DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

RCRA Corrective Action
Environmental Indicator (EI) RCRIS Code (CA750)
Migration of Contaminated Groundwater Under Control

Facility Name: Arsynco, Inc.
Facility Address: P.O. Box 8, Foot of 13th Street, Carlstadt, New Jersey 07072
Facility EPA ID#: NJD044688935

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental indicators (EIs) are measures being used by the Resource Conservation and Recovery Act (RCRA) Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved) to track changes in the quality of the environment. The two EIs developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of "Migration of Contaminated Groundwater Under Control" EI

A positive "Migration of Contaminated Groundwater Under Control" EI determination ("YE" status code) indicates that the migration of "contaminated" groundwater has stabilized, and that monitoring will be conducted to confirm that contaminated groundwater remains within the original "area of contaminated groundwater" (for all groundwater "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

Relationship of EI to Final Remedies

While final remedies remain the long-term objectives of the RCRA Corrective Action program, the EIs are near-term objectives, which are currently being used as program measures for the Government Performance and Results Act of 1993 (GPRA). The "Migration of Contaminated Groundwater Under Control" EI pertains ONLY to the physical migration (i.e., further spread) of contaminated groundwater and contaminants within groundwater (e.g., non-aqueous phase liquids or NAPLs). Achieving this EI does not substitute for achieving other stabilization or final remedy requirements and expectations associated with sources of contamination and the need to restore, wherever practicable, contaminated groundwater to be suitable for its designated current and future uses.

Duration / Applicability of EI Determinations

EI determination status codes should remain in the Resource Conservation Recovery Information System (RCRIS) national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

Facility Information

The Arsynco facility is located in a heavy industrial and commercial area at the western boundary of the Hackensack Meadowlands tidal marsh area in Carlstadt, Bergen County, New Jersey. The facility consisted of several manufacturing/storage buildings and two ponds situated on approximately 12.3 acres of industrial zoned land. From the early 1900's to 1969, the site was used for a variety of chemical and

pharmaceutical manufacturing operations. Arsynco manufactured specialty organic chemicals and pharmaceutical intermediates, propylene imine and derivatives, hair dyes, silicone intermediates, a quaternary ammonium salt, propiophenone, and isobutyrophenone at this property from 1969 to September 1993, when all operations at the site ceased. This site is currently undergoing remediation.

The Arsynco facility consists of two tracts of land, collectively known as Block 91, Lot 1. The eastern portion of the property (Tract 2), is approximately 2.8 acres of saline marsh and contains manmade ditches, which are part of the Berry's Creek system. This portion of the site has never been developed and remains vacant. The main portion of the property (Tract 1) is comprised of 9.46 acres of land and has historically been the location of all manufacturing operations. Fill materials placed at Tract 1 for site development included process wastes and other fill materials that contained hazardous constituents. At the time Arsynco ceased operations, a total of 17 buildings were located on Tract 1. All buildings (except Building 16) and units at the facility were removed during site decommissioning activities in 1993 and 1994. The ponds used to store process wastewater and non-contact cooling water were also removed from the site. Building 16 is the only structure still in place at the site.

The property is bounded to the north by a newly constructed Anheuser Busch warehouse/distribution facility (Northern Eagle Beverage [NEB]) and the Cognis Corporation property (formerly Henkel Chemical and Diamond Shamrock plant). Cosan Chemical Company and Aluminum Anodizing Corporation are located adjacent to the southern property boundary. The west side of the property is bounded by New Jersey Transit railroad tracks and commercial and industrial facilities. Route 17 is located immediately beyond the properties that border the west side of the site. The nearest residential area is located approximately one-fourth of a mile to the west of the Arsynco site, on the opposite site of Route 17. Industrial and commercial facilities are also located immediately east of the site, on the opposite side of 16th Street.

Arsynco submitted Industrial Site Recovery Act (ISRA) Initial Notice applications for the site in early 1993 and subsequently began a comprehensive Site Investigation/Remedial Investigation (SI/RI) sampling program. A Remedial Investigation Report (RIR) was submitted to the New Jersey Department of Environmental Protection (NJDEP) in June 1997, and a Remedial Action Selection Report (RASR) and proposed Remedial Action Work Plan (RAW) were submitted in February 1999. NJDEP responded to the RIR and RAW in a comment letter dated March 28, 2000. Arsynco addressed these comments in a May 11, 2000, submittal, which included additional proposals. In turn, NJDEP issued additional comments on the RIR and RAW in a May 1, 2001, comment letter, and Arsynco submitted a RIR Addendum in June 2002 to address these comments. The RIR Addendum included additional soil and groundwater sampling data. NJDEP issued two separate responses to the RIR Addendum: a November 7, 2002, comment letter addressing soil issues; and a February 4, 2003, comment letter addressing groundwater issues. Arsynco submitted a required Baseline Ecological Evaluation (BEE) in July 2003. Finally, Arsynco submitted a RIR Addendum and Revised RAW (RIR Addendum & RAW) in December 2003, which describes the results of all additional soil and groundwater investigation activities that have been completed at the site since the June 2002 RIR Addendum. Arsynco has also been working with EPA to gain approval of a proposed capping program for certain polychlorinated biphenyl (PCB)-contaminated soils, and will submit the required cap and berm specification plans to EPA and NJDEP in the near future.

1. Has **all** available relevant/significant information on known and reasonably suspected releases to the groundwater media, subject to RCRA Corrective Action (e.g., from solid waste management units (SWMUs), regulated units (RUs), and areas of concern (AOCs)), been **considered** in this EI determination?

   X If yes - check here and continue with #2 below.

   If no - re-evaluate existing data, or

   If data are not available, skip to #8 and enter "IN" (more information needed) status code.

Areas of Environmental Concern (AOCs)

The June 1997 RIR and February 1999 RAW outlined each area of environmental concern (AOC) investigated at the site. A description of these AOCs and the contaminants detected above the NJDEP relevant standards[1] is outlined below.

AOC I, Parking Lot, Office Buildings and Pond: AOC I encompasses the majority of the gravel parking lot located adjacent to 13th Street, the 13th Street entrance to the site, Building 16, former Building 20, and the production pond that was used to store non-contact cooling water, as shown in Figure 1 of the RIR Addendum & RAW (Ref. 8). AOC I was not directly involved in any production activities during Arsynco's operation of the site. Metals and benzo(a)pyrene (BaP) are present above the NJ Non-Residential Direct Contact Soil Cleanup Criteria (NRDCSCC) in surface soil, and lead is present above the NJ NRDCSCC in subsurface soil. According to the RAW, the contaminants are related to the presence of historic fill on the site. It should be noted that the extent of historic fill materials in AOC I does not include the former production pond in this area. The production pond was closed and backfilled with clean fill material during the SI/RI activities conducted in 1994 (Ref. 2). Proposed remedial actions for this AOC include institutional (i.e., Deed Notice) and engineering (i.e., capping) controls (Ref. 8).

AOC II, Northwest Portion of Site: AOC II extends along the west side of the property, north of AOC I and former Building 20, as shown in Figure 1 of the RIR Addendum & RAW (Ref. 8). New Jersey Transit railroad tracks are located immediately adjacent to the western property line. A shallow, narrow, concrete-lined drainage ditch is located between a portion of the property boundary and the railroad tracks, and is usually dry. This ditch flows from north to south and accepts surficial runoff from the Arsynco property, the adjacent rail area, and sites further north. A larger, unlined drainage ditch that consistently contains water is located directly west of the train tracks. This larger ditch flows from north to south and accepts discharges and drainage from the rail lines, Route 17 to the west, and properties located along the train tracks more than 2,000 feet to the north. AOC II encompasses the following points of concern:

- Former Container Storage Area

[1] Because Arsynco has agreed to restrict the future use of the site to non-residential through the implementation of a Deed Notice, all soil contaminants were delineated to the New Jersey Non-Residential Direct Contact Soil Cleanup Criteria (NJ NRDCSCC).

- Former Septic System
- Former Drum Storage Area
- Former Aboveground Tank Farm Location
- RCRA Storage Area
- PP-12 Sample Location.

The RCRA storage area was closed under NJDEP supervision in June 1992, and final NJDEP closure approval was received in February 1994. Semi-volatile organic compounds (SVOCs) (i.e., base-neutral (BN) compounds) and volatile organic compounds (VOCs) are present above NJ NRDCSCC in surface soil in AOC II. According to the RAW, elevated concentrations of BN compounds are due to the presence of historic fill material. VOC contamination is present in the PP-12 sample location and was believed to be related to the presence of a gasoline fueling pump associated with underground storage tank (UST) 00P2. UST 00P2 was a 17,000-gallon gasoline tank located below the loading platform of Building 1, and was addressed as part of the remediation of AOC IV. Proposed remedial actions for this AOC include institutional (i.e., Deed Notice) and engineering (i.e., capping) controls (Ref. 8). The VOC exceedences in this AOC will be addressed by the proposed VOC air sparging treatment system (Ref. 8).

AOC III, Northeast Portion of Site: AOC III extends from the former Building 1 and Building 5 locations to the northern property line, as shown on Figure 1 of the RIR Addendum & RAW (Ref. 8). The following individual points of concern were addressed within AOC III:

- Former Trash Compacter
- Former Material Staging Area
- Former Acidic Wastewater Treatment Basin
- Former Drum Cleaning Station
- Former Aboveground Tanker Trailer, and
- Former Building 5 Septic Tank.

The Acidic Wastewater Treatment Basin was backfilled with clean fill in 1993. SVOCs, benzene, arsenic, and total petroleum hydrocarbon (TPH) are present in surface soil above NJ NRDCSCC in AOC III. Additionally, benzene is present in subsurface soil above NJ NRDCSCC. According to the RAW, the elevated concentrations of BN compounds are related to the presence of historic fill material. Proposed remedial actions for this AOC include institutional (i.e., Deed Notice) and engineering (i.e., capping) controls (Ref. 8). The VOC exceedences in this AOC will be addressed by the proposed VOC air sparging treatment system (Ref. 8).

AOC IV, Plant Production Area: AOC IV is the central portion of the site and included all of the facility manufacturing buildings (excluding the location of former Building 19). Buildings 1, 3 through 9, 12, and 14, as well as the effluent treatment basin (ETB) and nearly all of the facility's subsurface process draining lines, storage areas, and a transformer bank were all located within AOC IV. Previous SI/RI activities conducted in AOC IV included the cleaning and removal of the entire subsurface drainage system (lines and catch basins), cleaning and removal of the ETB, and the removal of two USTs (tanks 00P1 and 00P2). In addition, with the exception of former

Buildings 3 and 9, all of the building floor slabs were crushed in place to allow sampling of soil beneath the slabs, as well as sampling of the concrete slab material. UST closure approval for tanks 00P1 and 00P2 was provided by NJDEP via a letter dated February 28, 1994 (Ref. 1). Polycyclic aromatic hydrocarbons (PAHs) and metals are present above NJ NRDCSCC in surface soil; however, the RAW indicates that these contaminants are related to the presence of historic fill material. VOCs were also present in this AOC above NJ NRDCSCC and are part of a VOC soil plume that extends through AOCs IV, V, VI, and VII. Proposed remedial actions for this AOC include institutional (i.e., Deed Notice) and engineering (i.e., capping) controls (Ref. 8). The VOC exceedences in this AOC will be addressed by the proposed VOC air sparging treatment system (Ref. 8).

AOC V, Building 19 and Northeast Tank Farm: AOC V is located in the northeast portion of Tract 1, as shown in Figure 1 of the RIR Addendum & RAW (Ref. 8). This AOC contained Building 19, a diked aboveground tank farm, and a cleared area to the east of the tank farm, which had historically been used for material and drum staging. Soil sampling activities conducted in this area of the site date back to the early 1990's (Ref. 2). The contaminants present in AOC V consist primarily of aromatic VOCs, including benzene, toluene, ethylbenzene, and xylene (BTEX), which are present above NJ NRDCSCC in surface soil. Benzene is present above NJ NRDCSCC in subsurface soil. VOCs were also present in surface soil in two off-site sampling locations to the north of AOC V, ARSD-33 and DJS-009; see Figure 1 of RIR Addendum & RAW (Ref. 8). Proposed remedial actions for this AOC include institutional (i.e., Deed Notice) and engineering (i.e., capping) controls (Ref. 8). The VOC exceedences in this AOC, including the off-site area, will be addressed by the proposed VOC air sparging treatment system (Ref. 8).

AOC VI, Former Pond Area: A pond that measured approximately 150 feet long and 75 feet wide was formerly present on the eastern side of Tract 1 (see Figure 1 of the RIR Addendum & RAW) (Ref. 8). The pond had two concrete drainage channels that extended from the plant production area and a concrete headwall that controlled pond overflow onto Tract 2 of the property. The entire pond area was filled in around 1971, and the top four to five feet of material located within the majority of the pond limits consists of historic fill (Ref. 8). A distinguishable layer of contaminated material, approximately three feet thick, lies below this fill material. The entire pond was lined with a dense, thick layer of bentonite clay that has largely prevented the migration of contaminants outside the boundaries of the pond structure (the only exception is in the pond outflow location at the southeast corner of the pond). Contaminants present above NJ NRDCSCC include: VOCs, BaP, and metals in surface soil; VOCs, BaP, metals, and TPH in subsurface soil; and VOCs and metals in sediment. Proposed remedial actions for this AOC include leaving the contaminated material layer in place and sealing the area of the pond outflow and both pond inflow locations with a cement/bentonite slurry. The entire surficial area of the pond would then be capped with the bituminous asphalt cap system and a Deed Notice implemented (Ref. 8).

AOC VII, Primary Tank Farm Area: The former primary tank farm area is located in the approximate center of the site, south of the former plant production area. AOC VII extends from the former southern sides of Buildings 6 and 14 to the rail spur that had intersected the site. This AOC encompassed the main tank farm area, the old tank farm

area, the #6 fuel oil tank (tank 58) and six aboveground storage tanks (ASTs) that were located along the south wall of Building 6. The primary contaminants present above NJ NRDCSCC in surface soil include VOCs, BaP, metals, and petroleum hydrocarbons (PHC). PHC is also present in subsurface soil above NJ NRDCSCC. Separate phase product floating on the water table was identified in the area beneath tank 58 during the RI and was removed with absorbent materials during the SI/RI. Proposed remedial actions for this AOC include institutional (i.e., Deed Notice) and engineering (i.e., capping) controls (Ref. 8). The VOC exceedences will be addressed by the proposed VOC air sparging treatment system (Ref. 8).

AOC VIII, Southern Portion of the Site: The southern portion of the Arsynco property has remained essentially undeveloped, as shown in Figure 1 of the RIR Addendum & RAW (Ref. 8). A drainage ditch extends across the southern boundary of AOC VIII and marks the southern extent of the Arsynco property, although portions of the drainage ditch are off site. The only buildings that were located in this AOC were Buildings 17 and 18, and a small shed located in the northeast part of AOC VIII, just south of the former pond (AOC VI). In addition, a diked 12,000-gallon toluene AST (Tank 73) was located in the west portion of this AOC, adjacent to Building 2. The former RCRA storage area was also located in this AOC, to the south of Building 18 and adjacent to the gravel parking lot (AOC I). AOC VIII was originally undeveloped, marshy land that was significantly altered and completely filled in the 1950's and 1960's. The fill material consisted not only of historic fill material, but also contained industrial and process-type waste materials (e.g., still bottoms). VOCs, benzo(a)anthracene, and metals are present above NJ NRDCSCC in surface soil, while VOCs, SVOCs, and TPH are present above NJ NRDCSCC in subsurface soil. Proposed remedial actions for this AOC include excavation and off-site disposal of soil containing elevated levels of BNs, metals, VOCs, phenols, and TPH (Ref. 8). Proposed remedial actions also include institutional (i.e., Deed Notice) and engineering (i.e., capping) controls for this AOC in association with the historic fill remediation on Tract 1 (Ref. 8).

AOC IX, PCB and Site Fill Material Investigation: The development of the site included the placement of fill material over the native meadow mat layer, which is a common swamp bed material high in organic content in the Hackensack Meadowlands. The thickness of the fill material is generally five to six feet across the site, with as much as eight feet of fill present in the southeast part of the property. In addition to the typical fill material, the southeast part of Tract 1 (AOC VIII) was also found to contain process and industrial waste materials characterized by high PCB levels in surface and subsurface soil. PCBs are present above NJ NRDCSCC in surface soil over the majority of the site, including Tract 2. PCBs are also present above NJ NRDCSCC in subsurface soil, although the extent of these exceedences is limited by comparison. Based on the documented use of historic fill at the site and in the vicinity of the site, active treatment and removal of BN and metals contamination across the site is not proposed (Ref. 6); rather, contamination will be addressed with the implementation of institutional (i.e., Deed Notice) and engineering (i.e., capping) controls. Arsynco has proposed a three-tiered approach to address PCB-contaminated soils at the site using different remedial actions for soils contaminated with PCBs between 0.49 mg/kg and 50 mg/kg, 50 mg/kg and 500 mg/kg, and above 500 mg/kg. For PCB soils within the range of 0.49 to 50 mg/kg, proposed remedial actions include institutional (i.e., Deed Notice) and engineering (i.e., capping) controls. For PCB soils within the range of 50 to 500 mg/kg,

Arsynco has proposed to excavate and consolidate these soils into a designated area at the site (AOC VIII), install a cap and berm over the area, and secure with fencing and signs as appropriate. Per 40 CFR 761.61, Arsynco was required to perform a baseline risk assessment to determine the risks associated with leaving PCB-contaminated soils within the range of 50 to 500 mg/kg in place at the site. The risk assessment concluded that there is no unacceptable risk associated with leaving PCB-contaminated soils between 50 to 500 mg/kg in place (i.e., either in their existing location with no engineering controls or in a consolidated location with no engineering controls). Arsynco has proposed excavation and off-site disposal for all soil impacted with PCBs above 500 mg/kg (Refs. 3, 5). NJDEP has tentatively approved the proposed remedial alternatives (Ref. 6). Arsynco is currently working with EPA to gain approval of the proposed PCB remedial program (Ref. 8).

AOC X, Tract 2 (Eastern Side of Site): Tract 2 is a 2.8-acre, undeveloped portion of land located at the far eastern part of the Arsynco property. Tract 2 is a saline marsh and contains a series of tidal ditches that are tidally influenced by Never Touch Creek and Berry's Creek, as well as drainage from off-site sources on all sides of the Arsynco site. A large drainage ditch passes by the west side of the Arsynco site, along the west side of the adjacent rail lines, and then turns east and becomes the open ditch that flows along the southern boundary of the Arsynco property and up into Tract 2 (see Figure 1 of the RIR Addendum & RAW) (Ref. 8). This ditch consistently carries water and accepts discharges and drainage from the rail lines, Route 17, and properties located along the train tracks more than 2,000 feet to the north (Ref. 8). Tract 2 also received outflow drainage from the former pond (AOC VI) prior to the early 1970's. All samples from Tract 2 were classified as sediment because this area is primarily wetlands. Benzene, metals, and PCBs are present in sediment above NJ NRDCSCC. Surface water was sampled from the drainage ditch in this AOC and at two off-site locations, and metals are present above New Jersey Surface Water Quality Criteria (NJ SWQC) in each sample. A BEE was prepared for this AOC in July 2003. The BEE identified the potential for impacts to ecological receptors from exposure to soil, sediment, and surface water in Tract 2, and concluded that further evaluation of Tract 2 soil is required (Ref. 7). Proposed remedial actions include excavation and off-site disposal of approximately 100 cubic yards of sediments containing over 1,000 mg/kg total VOCs and restoration/mitigation of disturbed wetlands (Ref. 8). The area to be remediated surrounds sample VI-16 and can be excavated from the Tract 1 border. No active remediation is proposed for the widespread area of metals and low-level PCB-impacted sediments on Tract 2, due to the nature of the contaminants and the nature of the regional drainage and depositions that occur throughout the AOC. Instead, a Deed Notice is proposed for the majority of sediments on Tract 2, and a fence will be completed along the entire property perimeter (Refs. 8).

AOC XI, Groundwater: The groundwater monitoring network at the Arsynco facility is comprised of 47 wells that monitor groundwater levels and quality in both the shallow and deep groundwater units at on- and off-site locations. The results of six rounds of groundwater sampling (1995, 1996, 1997, 1998, 2001, and 2002) indicate that groundwater has been impacted by former facility operations, the disposal of process waste, the placement of historic fill, and off-site sources. Groundwater contamination consists primarily of VOCs in both shallow and deep wells, and metals, primarily in shallow wells. Recent groundwater data collected in May 2003 along the western

facility boundary indicate an off-site, upgradient, chlorinated VOC source (Ref. 8). According to the December 2003 RIR Addendum & RAW, no off-site migration of groundwater contamination has occurred, nor is any off-site migration projected. The proposed remedial alternative for VOC-impacted shallow groundwater includes the installation of a phased air sparging system to promote bioremediation in the area where total soil VOC concentrations are greater than 1,000 mg/kg (primarily in AOCs IV, V, and VII), followed by monitored natural attenuation (MNA) until appropriate groundwater standards are reached. Arsynco has proposed natural attenuation to remediate VOCs in deep groundwater (Ref. 8).

In summary, 11 AOCs have been identified at the site and contamination has been delineated at all AOCs. Soil/sediment contamination remains at AOCs I through X, while groundwater contamination is also present beneath the site (AOC XI). Remedial actions have been proposed for all AOCs and are still pending. As presented in the December 2003 RAW, the remedial approach addresses the broader contamination issues that were identified in the SI/RI, rather than providing remedial proposals on an AOC-by-AOC basis (Ref. 8).

References:

1. Letter from Douglas Stuart, NJDEP, to Peter Herzber, Pitney, Hardin, Kipp & Szuh, re: SI/RI and UST Closure Approval. Dated February 28, 1994.
2. Remedial Investigation Report, Arsynco, Inc. Prepared by J M Sorge, Inc. Dated June 1997.
3. Letter from James Clabby, Atlantic Environmental Solutions, Inc., to Jeanne Fox, NJDEP, re: Application for Risk-Based Cleanup Approval. Dated October 10, 1998.
4. Remedial Action Workplan and Remedial Action Selection Report, Arsynco, Inc. Prepared by Atlantic Environmental Solutions, Inc. Dated February 25, 1999.
5. Letter from James Clabby, JMC Environmental Consultants, Inc., to Dorothy Zoledziowska, NJDEP, re: TSCA PCB Coordinated Approval. Dated October 10, 2000.
6. Letter from Bryan Moore, NJDEP to David B. Hird, Weil, Gotshal & Manges, re: Response Letter Dated May 11, 2000. Dated May 1, 2001.
7. Baseline Ecological Evaluation, Former Arsynco Facility Site. Prepared by AMEC Earth & Environmental, Inc. Dated July 2003.
8. Remedial Investigation Report Addendum & Remedial Action Workplan, Arsynco, Inc. Prepared by JMC Environmental Consultants, Inc. Dated December 2003.
9. Letter from James Clabby, JMC Environmental Consultants, Inc., to Alan Straus, USEPA, re: Arsynco, Inc. Dated April 26, 2004.

2. Is **groundwater** known or reasonably suspected to be "**contaminated**"[2] above appropriately protective "levels" (i.e., applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action, anywhere at, or from, the facility?

   X If yes - continue after identifying key contaminants, citing appropriate "levels," and referencing supporting documentation.

   If no - skip to #8 and enter "YE" status code, after citing appropriate "levels," and referencing supporting documentation to demonstrate that groundwater is not "contaminated."

   If unknown - skip to #8 and enter "IN" status code.

Rationale:

Groundwater Conditions
The site geology is characterized by artificial fill material (up to approximately eight feet thick), underlain by meadow mat, salt marsh deposits, and glacial lake bottom and deltaic deposits. Groundwater occurs under unconfined conditions in the fill material and confined conditions in the underlying sediments. Drilling results indicate that depth to the top of the confined unit ranges from 12 to 21 feet below ground surface (bgs). According to the RIR Addendum & RAW, the meadow mat is continuous across the site and acts as a confining layer that separates the water-bearing fill above the meadow mat and the underlying water-bearing sediments (Ref. 1).

According to data collected in May 2003, depth to shallow unconfined groundwater in monitoring wells completed within the fill overburden (above the meadow mat) varied between 0.5 and 5.7 feet bgs (Ref. 3). Depth to groundwater in monitoring wells completed in the underlying confined unit varied from 0.62 feet to 6.7 feet bgs in May 2003. A review of May 2003 groundwater elevations indicates that both upward and downward hydraulic gradients are recorded across the site (Ref. 1). Groundwater flow direction is generally to the east and/or south. The May 2003 water level data indicate a northeastern component of flow in a very localized area at the northern portion of the site; however, this small component of flow appears to be impacted by tidal fluctuations and likely resumes a southeasterly flow direction over a relatively short distance (Ref. 2). Groundwater flow directions in the unconfined and confined saturated units, determined from May 2003 water level data, are depicted in the RIR Addendum & RAW in Figure 20, titled Water Table Map for Shallow GW Zone, May 19, 2003, and Figure 21, titled Water Table Map for Deep GW Zone, May 19, 2003 (Ref. 1).

Groundwater Quality
The 47 groundwater monitoring wells that comprise the monitoring network include 20 on-site shallow wells (MW-4, MW-5S, MW-7S through MW-15S, MW-17S, and MW-19S through MW-26S), 5 off-site shallow wells (MW-27S and MW-29S through MW-32S), 17 on-site deep wells (MW-5D, MW-5DD, MW-6D, MW-8D through MW-18D, MW-11DD, MW-22D, and MW-25D), and 5 off-site deep wells (MW-27D through MW-30D, and MW-32D). The shallow wells ("S" series) were completed to maximum depths of 9.5 feet bgs and screened within the fill material. The deep wells, "D" and "DD"

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[2] "Contamination" and "contaminated" describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriate "levels" (appropriate for the protection of the groundwater resource and its beneficial uses).

series, were completed to depths of 38 feet and 60 feet, respectively, and were screened in the sediments below the meadow mat (Ref. 1).

As identified in Table 1, various contaminants are reported in on-site groundwater monitoring wells at concentrations above the NJ Groundwater Quality Criteria (GWQC) in May 2003. Metals are primarily present in shallow wells, with arsenic detected in a few deeper wells. In most areas of the site, the presence of metals in groundwater is believed to be related to the historic fill material at the site, as well as regional groundwater quality. VOCs (primarily BTEX and chlorinated VOCs) are present in several areas throughout the site in both shallow and deep groundwater. The highest levels of VOC contamination are present in AOC IV, the Former Plant Production Area. Deep wells MW-5DD and MW-11DD report methylene chloride and vinyl chloride concentrations at or slightly above the NJ GWQC, which indicates that the vertical extent of contaminant migration has been delineated at the site. Refer to the RIR Addendum & RAW for graphical depictions of BTEX concentrations in the shallow (Figure 22) and deep units (Figure 23) and chlorinated VOC concentrations in the shallow (Figure 24) and deep (Figure 25) units.

Water quality data provided by a network of off-site monitoring wells indicate that off-site sources exist for metals and both chlorinated and non-chlorinated VOCs reported in shallow and deep wells in northern, western, and southern portions of the site (AOCs I, II, III, and VIII). The off-site network consists of a series of nested shallow/deep well pairs positioned at upgradient, crossgradient and downgradient (MW-27S/D through MW-30S/D, and MW-32S/D) locations. On-site monitoring wells impacted by off-site sources include MW-7S, MW-29S, MW-5D, MW-6D, MW-8D, MW-12D, MW-15D, MW-16D, MW-17D, and MW-18D.

The only site-related impact observed in off-site areas is a slightly elevated concentration of benzene (10.1 μg/L) in well MW-31S, which is located along the northern property boundary adjacent to former building 19 (AOC V) (Ref. 1). However, the most recent groundwater data indicate that the groundwater flowpath from MW-31S moves back onto site where benzene concentrations decline below the NJ GWQC as indicated by on-site downgradient wells MW-4 (0.46 μg/L) and MW-26S (non-detect) (Ref. 1).

Table 1 - Maximum Contaminant Concentrations Detected Above NJ GWQC in On-Site Groundwater Monitoring Wells (µg/L)

Aquifer	Constituent	Well I.D.[1]	Concentration[2]	NJ GWQC
Shallow	**VOCs**			
	Benzene	MW-13S(R)	312	1
	Chloroethane	MW-11S	553	100
	Cis-1,2-dichloroethylene	MW-7S	374	70
	Ethylbenzene	MW-24S	17,800	700
	Methylene Chloride	MW-12S	93.3	3
	Toluene	MW-11S	36,200	1,000
	Trichloroethylene	MW-7S	1.6J	1
	Xylenes	MW-24S	107,000	1,000
	Metals			
	Antimony	MW-13S(R)	178	20
	Arsenic	MW-7S	1,850	8
	Cadmium	MW-4S	34.3	4
	Lead	MW-17S	186	10
	Mercury	MW-17S	2.6	2
	Nickel	MW-12S	2,760	100
Deep	**VOCs**			
	Benzene	MW-8D	1,380	1
	Chlorobenzene	MW-8D	643	50
	Chloroform	MW-8D	39.7J	6
	Cis-1,2-dichloroethylene	MW-22D	47,000	70
	1,1-Dichloroethane	MW-11D	1,480	70
	Methylene Chloride	MW-11D	404	3
	Toluene	MW-11D	12,400	1,000
	Tetrachloroethylene	MW-12D	171B	1
	1,1,1-Trichloroethane	MW-11D	1,300	30
	Trichloroethylene	MW-22D	736	1
	Vinyl Chloride	MW-11D	8,930	5
	Xylenes	MW-11D	1,190	1,000
	SVOCs			
	bis(2-chloroethyl)ether	MW-6D	36.8	10
	Metals			
	Arsenic	MW-14D	178	8
Deep (total depth = 56 to 60 feet)	**VOCs**			
	Methylene Chloride	MW-11DD	3	3
	Vinyl Chloride	MW-5DD	6.3	5

1. Elevated contaminant (VOC/SVOC) concentrations in shallow monitoring well MW-7S and deep monitoring wells MW-8D and MW-12D have been attributed to off-site sources.
2. Samples collected in May 2003 (Ref. 1). "J" indicates the concentration is an estimated value. "B" indicates the constituent was detected in the method blank.

References:

1. Remedial Investigation Report Addendum & Remedial Action Workplan, Arsynco, Inc. Prepared by JMC Environmental Consultants, Inc. Dated December 2003.
2. Letter from James Clabby, JMC Environmental Consultants, Inc., to Alan Straus, USEPA, re: Arsynco, Inc, Foot of 13th Street, Carlstadt, Bergen County, NJ. Dated June 16, 2004.

3. Has the **migration** of contaminated groundwater **stabilized** (such that contaminated groundwater is expected to remain within "existing area of contaminated groundwater"[3] as defined by the monitoring locations designated at the time of this determination)?

X If yes - continue, after presenting or referencing the physical evidence (e.g., groundwater sampling/measurement/migration barrier data) and rationale why contaminated groundwater is expected to remain within the (horizontal or vertical) dimensions of the "existing area of groundwater contamination"[2].

If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the "existing area of groundwater contamination"[2]) - skip to #8 and enter "NO" status code, after providing an explanation.

If unknown - skip to #8 and enter "IN" status code.

Rationale:

The existing area of groundwater contamination has been delineated at the site. As discussed in the response to Question 2, groundwater contamination occurs in the shallow unconfined unit (above the meadow mat) and the underlying confined unit (below the meadow mat). The lateral extent of groundwater contamination has been delineated by downgradient monitoring wells MW-9S/D, MW-10S/D, MW-12S, MW-13S/D, MW-25S/D, and MW-26S and the vertical extent has been delineated by monitoring wells MW-5DD and MW-11DD.

The lateral extent of groundwater contamination in the shallow unconfined unit is limited due to the downgradient manmade tidal ditches located along the southern and eastern property boundaries. The discharge of contaminated groundwater in the shallow unconfined unit to the tidal ditches is discussed further in the responses to Questions 4, 5 and 6.

The tidal ditches do not limit the lateral extent of groundwater contamination in the underlying confined unit. The groundwater contamination in the confined unit has not extended to the ditch boundary and, although the confined unit may contribute some flow to the tidal ditches, the ditches do not act as complete discharge areas. However, contaminant migration in the confined unit can be considered stabilized as indicated by the limited migration of contaminants from source areas. The highest contaminant concentrations in the confined unit that have been attributed to on-site activities are reported in groundwater monitoring wells MW-11D and MW-22D (located in AOC IV - the Former Plant Production Area), as illustrated in Table 1 (elevated VOC concentrations listed for monitoring wells MW-8D and MW-12D have been attributed to off-site sources). Monitoring well MW-11D is located downgradient of monitoring well MW-22D. Monitoring well MW-5D, located 130 feet south of MW-11D, also defines the leading edge of the groundwater VOC plume in this area. Recent water quality data (May 2003) from monitoring wells MW-9D, MW-10D, and MW-13D, located approximately 200 feet downgradient and east of monitoring wells MW-5D and MW-11D, indicate that contaminant migration in

---

[3] "Existing area of contaminated groundwater" is an area (with horizontal and vertical dimensions) that has been verifiably demonstrated to contain all relevant groundwater contamination for this determination, and is defined by designated (monitoring) locations proximate to the outer perimeter of "contamination" that can and will be sampled/tested in the future to physically verify that all "contaminated" groundwater remains within this area, and that the further migration of "contaminated" groundwater is not occurring. Reasonable allowances in the proximity of the monitoring locations are permissible to incorporate formal remedy decisions (i.e., including public participation) allowing a limited area for natural attenuation.

the confined unit is very limited in lateral extent. No VOCs were detected in downgradient monitoring wells MW-9D, MW-10D, and MW-13D. Arsenic, attributed to regional water quality, was the only constituent detected in these wells at concentrations above the NJ GWQC.

References:

1. Remedial Investigation Report Addendum & Remedial Action Workplan, Arsynco, Inc. Prepared by JMC Environmental Consultants, Inc. Dated December 2003.

4. Does "contaminated" groundwater **discharge** into **surface water** bodies?

X If yes - continue after identifying potentially affected surface water bodies.

__ If no - skip to #7 (and enter a "YE" status code in #8, if #7 = yes) after providing an explanation and/or referencing documentation supporting that groundwater "contamination"does not enter surface water bodies.

If unknown - skip to #8 and enter "IN" status code.

Rationale:

The site is located west of Berry's Creek in the reclaimed portion of the grass marsh area of the Hackensack River flood plain. Tidal flood water is received by and drained from the site via a series of interconnecting, manmade tidal ditches that run along the southern property boundary and in Tract 2. These ditches are located both on and off the Arsynco property and drain the entire surrounding area, including adjacent industrial properties (including open pipe discharges). These ditches drain to and receive drainage from the Never Touch Creek and Berry's Creek.

Water level data indicate that shallow and deep groundwater flow direction is to the south and east towards the manmade tidal ditches located along the southern and eastern (Tract 2) property boundaries (Ref. 1). The tidal ditches intercept the water table and therefore act as discharge areas for the shallow groundwater. Review of historic water quality data collected from monitoring wells located hydraulically downgradient of facility AOCs and adjacent to the tidal ditches (wells MW-9S, MW-10S, MW-12S, and MW-13S) indicate metal and VOC concentrations that exceed NJ GWQC. Based on these NJ GWQC exceedences in groundwater, contaminated groundwater in the shallow unconfined unit could potentially discharge to the tidal ditches.

The groundwater plume in the confined unit does not extend to the tidal ditches and although the confined unit may contribute some flow to the tidal ditches, the ditches do not act as complete discharge areas. Therefore, the confined unit is not addressed in the responses to Questions 5 and 6.

References:

1. Remedial Investigation Report Addendum & Remedial Action Workplan, Arsynco, Inc. Prepared by JMC Environmental Consultants, Inc. Dated December 2003.

5. Is the **discharge** of "contaminated" groundwater into surface water likely to be **"insignificant"** (i.e., the maximum concentration[4] of each contaminant discharging into surface water is less than 10 times their appropriate groundwater "level," and there are no other conditions (e.g., the nature, and number, of discharging contaminants, or environmental setting), which significantly increase the potential for unacceptable impacts to surface water, sediments, or ecosystems at these concentrations)?

If yes - skip to #7 (and enter "YE" status code in #8 if #7 = yes), after documenting: 1) the maximum known or reasonably suspected concentration[3] of key contaminants discharged above their groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) provide a statement of professional judgement/explanation (or reference documentation) supporting that the discharge of groundwater contaminants into the surface water is not anticipated to have unacceptable impacts to the receiving surface water, sediments, or ecosystem.

X If no - (the discharge of "contaminated" groundwater into surface water is potentially significant) - continue after documenting: 1) the maximum known or reasonably suspected concentration[3] of each contaminant discharged above its groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) for any contaminants discharging into surface water in concentrations[3] greater than 100 times their appropriate groundwater "levels," the estimated total amount (mass in kg/yr) of each of these contaminants that are being discharged (loaded) into the surface water body (at the time of the determination), and identify if there is evidence that the amount of discharging contaminants is increasing.

If unknown - enter "IN" status code in #8.

Rationale:

The potential for groundwater discharge of contaminants from the shallow unconfined unit to the tidal ditches along the eastern and southern boundaries can be evaluated by reviewing water quality data collected from adjacent monitoring wells. Table 2 presents the contaminants detected at concentrations above the NJ GWQC during the most recent groundwater monitoring event (May 2003) in wells located adjacent to the tidal ditches (Ref. 1). The data indicate that contaminant concentrations exceed 10 times the NJ GWQC for methylene chloride and nickel in well MW-12S and benzene in well MW-13S(R). According to the RIR Addendum & RAW, these elevated methylene chloride, nickel, and benzene concentrations are likely related to process-type wastes that were managed in adjacent areas (Ref. 1). Because these concentrations exceed 10 times NJ GWQC, the discharge of contaminated groundwater from the unconfined unit to the tidal ditches cannot be considered "insignificant," and therefore will be furthered assessed in the response to Question 6.

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[4] As measured in groundwater prior to entry to the groundwater-surface water/sediment interaction (e.g., hyporheic) zone.

Table 2 - Contaminant Concentrations Detected Adjacent to the Tidal Ditches (May 2003) (µg/L)

Constituent	Well ID	Concentration[1,2]	NJ GWQC	10x NJ GWQC
VOCs				
Methylene Chloride	MW-12S	**93.3**	3	30
Benzene	MW-12S MW-13S(R)	**25.7** **312**	1	10
Metals				
Antimony	MW-13S(R)	178	20	200
Arsenic	MW-10S	14.5	8	80
Cadmium	MW-10S MW-13S(R)	4 28.3	4	40
Lead	MW-9S MW-10S MW-13S(R)	20 21.4 84.9	10	100
Nickel	MW-12S	**2,760**	100	1,000
Mercury	MW-10S	2.2	2	20

1 Data Source is Ref. 1.
2 **Bold** formatting indicates concentration > 10 x NJ GWQC.

References:

1. Remedial Investigation Report Addendum & Remedial Action Workplan, Arsynco, Inc. Prepared by JMC Environmental Consultants, Inc. Dated December 2003.

6. Can the **discharge** of "contaminated" groundwater into surface water be shown to be **"currently acceptable"** (i.e., not cause impacts to surface water, sediments or ecosystems that should not be allowed to continue until a final remedy decision can be made and implemented[5])?

X If yes - continue after either: 1) identifying the Final Remedy decision incorporating these conditions, or other site-specific criteria (developed for the protection of the site's surface water, sediments, and ecosystems), and referencing supporting documentation demonstrating that these criteria are not exceeded by the discharging groundwater; OR 2) providing or referencing an interim-assessment[6], appropriate to the potential for impact, that shows the discharge of groundwater contaminants into the surface water is (in the opinion of a trained specialist, including an ecologist) adequately protective of receiving surface water, sediments, and ecosystems, until such time when a full assessment and final remedy decision can be made. Factors which should be considered in the interim-assessment (where appropriate to help identify the impact associated with discharging groundwater) include: surface water body size, flow, use/classification/habitats and contaminant loading limits, other sources of surface water/sediment contamination, surface water and sediment sample results and comparisons to available and appropriate surface water and sediment "levels," as well as any other factors, such as effects on ecological receptors (e.g., via bio-assays/benthic surveys or site-specific ecological Risk Assessments), that the overseeing regulatory agency would deem appropriate for making the EI determination.

If no - (the discharge of "contaminated" groundwater can not be shown to be "currently acceptable") - skip to #8 and enter "NO" status code, after documenting the currently unacceptable impacts to the surface water body, sediments, and/or ecosystem.

If unknown - skip to 8 and enter "IN" status code.

Rationale:

Arsynco performed a BEE to determine the potential impacts of facility activities on adjacent tidal ditches (Ref. 1). The BEE explained that surface waters of this area, including the drainage ditches, are known to be contaminated from a variety of sources. Four surface water samples obtained in September 2002 from the tidal ditches along the eastern and southern property boundaries were used in support of the BEE. Samples DW-1 and DW-3 were taken from the ditch in Tract 2. Off-site sample DW-4 was taken from the ditch to the south of AOC I, and off-site sample DW-2 was taken from the ditch to the north of Tract 2 (Ref. 3). See Figure 1 of the RIR Addendum & RAW for sample locations.

The surface water data indicate that the constituents that exceeded 10 times the NJ GWQC in adjacent

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[5] Note, because areas of inflowing groundwater can be critical habitats (e.g., nurseries or thermal refugia) for many species, an appropriate specialist (e.g., ecologist) should be included in management decisions that could eliminate these areas by significantly altering or reversing groundwater flow pathways near surface water bodies.

[6] The understanding of the impacts of contaminated groundwater discharges into surface water bodies is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration to be reasonably certain that discharges are not causing currently unacceptable impacts to the surface waters, sediments or eco-systems.

groundwater (methylene chloride, nickel, and benzene, as discussed in the response to Question 5) were not reported in surface water at concentrations above laboratory reporting limits. No other VOCs were detected, but other metals were detected above NJ SWQC in all four samples. The highest concentrations included: arsenic at 8.5 μg/L (FW2-NT = 0.017 μg/L, SE2 = 0.136 μg/L), lead at 8.4 μg/L (FW2-NT/SE2 = 5 μg/L), and mercury at 1.3 μg/L (FW2-NT = 0.144 μg/L, SE2 = 0.146 μg/L). However, these metals are not known to have been used on the site and therefore appear to be attributable to off-site sources, transported by tidal inflows into the ditches.

The BEE concluded that facility activities do not impact ecological receptors because of the off-site sources of contaminant concentrations in surface water and exceptionally low calculated values for the Hazard Quotient (HQ) (Ref. 1). NJDEP accepted the BEE in a letter dated August 21, 2003 (Ref. 2) on the condition that the report be revised to provide additional clarification on a number of issues relating to soil, sediment, and surface water results. None of these issues put into question the validity of the surface water data. Based on these surface water results and BEE findings, it is concluded that groundwater discharge to the tidal ditches can be considered "currently acceptable."

References:

1. Baseline Ecological Evaluation, Former Arsynco Facility Site. Prepared by AMEC Earth & Environmental, Inc. Dated July 2003.
2. Letter from Ralph Rodriguez, NJDEP, to James Clabby, JMC Environmental Consultants, Inc., re: Arsynco, Inc. (Arsynco), 13th Street, Carlstadt Borough, Bergen County, Block 91, Lot 1, ISRA Case #E93024, Baseline Ecological Evaluation (BEE), dated July 17, 2003. Dated August 21, 2003.
3. Remedial Investigation Report Addendum & Remedial Action Workplan, Arsynco, Inc. Prepared by JMC Environmental Consultants, Inc. Dated December 2003.

7. Will groundwater **monitoring** / measurement data (and surface water/sediment/ecological data, as necessary) be collected in the future to verify that contaminated groundwater has remained within the horizontal (or vertical, as necessary) dimensions of the "existing area of contaminated groundwater?"

   X If yes - continue after providing or citing documentation for planned activities or future sampling/measurement events. Specifically identify the well/measurement locations which will be tested in the future to verify the expectation (identified in #3) that groundwater contamination will not be migrating horizontally (or vertically, as necessary) beyond the "existing area of groundwater contamination."

   If no - enter "NO" status code in #8.

   If unknown - enter "IN" status code in #8.

Rationale:

The RIR Addendum & RAW propose an air sparging system to remove the bulk of the VOC contaminated groundwater in the unconfined unit, followed by MNA (Ref. 1). Groundwater monitoring to evaluate system effectiveness is proposed in existing shallow wells MW-4S, MW-5S, MW-11S, MW-19S, MW-23S, MW-24S, and MW-31S, and additional shallow wells proposed near former buildings 1 and 19.

MNA is being considered to address VOC contaminated groundwater in the confined unit (Ref. 1). Because some deep wells (e.g. MW-22D) do not contain sufficient data to evaluate actual natural attenuation rates, the RIR Addendum & RAW propose to collect four to six quarters of monitoring data to confirm that conditions are favorable for MNA. Sampling will be conducted at source wells (MW-11D and MW-22D), a plume fringe well (to be installed 100 feet downgradient of MW-11D), and downgradient sentinel wells (MW-9D, MW-10D, and MW-13D).

References:

1. Remedial Investigation Report Addendum & Remedial Action Workplan, Arsynco, Inc. Prepared by JMC Environmental Consultants, Inc. Dated December 2003.

8. Check the appropriate RCRIS status codes for the Migration of Contaminated Groundwater Under Control EI (event code CA750), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (attach appropriate supporting documentation as well as a map of the facility).

_X_ YE - Yes, "Migration of Contaminated Groundwater Under Control" has been verified. Based on a review of the information contained in this EI determination, it has been determined that the "Migration of Contaminated Groundwater" is "Under Control" at the Arsynco, Inc., EPA ID #NJD044688935, located at P.O. Box 8, Foot of 13th Street, Carlstadt, New Jersey 07072. Specifically, this determination indicates that the migration of "contaminated" groundwater is under control, and that monitoring will be conducted to confirm that contaminated groundwater remains within the "existing area of contaminated groundwater" This determination will be re-evaluated when the Agency becomes aware of significant changes at the facility.

NO - Unacceptable migration of contaminated groundwater is observed or expected.

IN - More information is needed to make a determination.

Completed by: Lucas Kingston — Date: 7/19/04
Lucas Kingston
Hydrogeologist
Booz Allen Hamilton

Reviewed by: M Benchouk — Date: 7/20/04
Michele Benchouk
Environmental Engineer
Booz Allen Hamilton

Also reviewed by: Date: 7/21/04
Alan Straus, RPM
RCRA Programs Branch
EPA Region 2

Date: 7/21/04
Barry Tornick, Section Chief
RCRA Programs Branch
EPA Region 2

Approved by: Date: 7/23/04
Adolph Everett, Chief
RCRA Programs Branch
EPA Region 2

Locations where references may be found:

References reviewed to prepare this EI determination are identified after each response. Reference materials are available at the USEPA Region 2, RCRA Records Center, located at 290 Broadway, 15th Floor, New York, New York, and the New Jersey Department of Environmental Protection Office located at 401 East State Street, Records Center, 6th Floor, Trenton, New Jersey.

Contact telephone and e-mail numbers: Alan Straus, EPA RPM
(212) 637-4160
Straus.alan@epa.gov

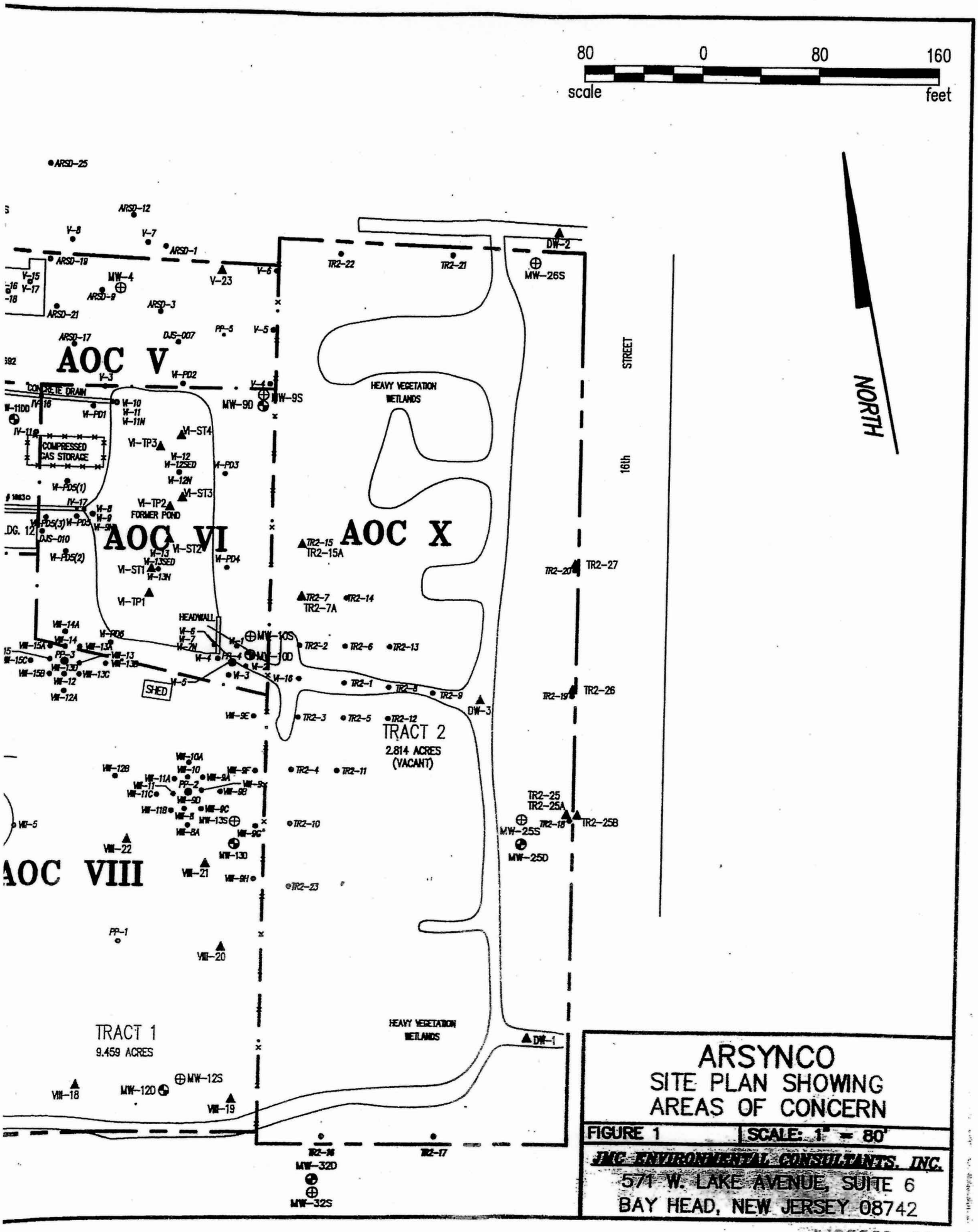
Attachments

The following attachments have been provided to support this EI determination.

- Attachment 1 - Summary of Media Impacts Table

Attachment 1 - Summary of Media Impacts Table
Arsynco, Inc.

Description of Area	Affected AOCs	Affected Media	Key Contaminants	Proposed Remedial Action
Historic Fill Material and Tract 1 Fill/ Soils with PCB Levels < 50 mg/kg	Tract 1 (except proposed PCB containment area and Building 16), narrow section of Tract 2 along 16th Street.	Surface/ Subsurface Soil	Metals, SVOCs, PCBs	(1) Place a bituminous asphalt cap over the approximately 7.4 acres covered by the affected AOCs; (2) place/maintain 6-foot chain-link fencing around the perimeter of Tract 1; (3) implement a Deed Notice restricting future use of these areas to non-residential use only.
Tract 1 Fill/ Soils with PCB Levels > 50 mg/kg	IX	Surface/ Subsurface Soil	PCBs	Excavation and proper disposal of materials containing PCBs at concentrations ≥500 mg/kg and post-excavation sampling. Consolidation of approximately 15,650 cubic yards of material with PCB concentrations > 50 mg/kg and < 500 mg/kg into the eastern part of Tract 1. Installation of a uniform cap, berms, and appropriate fencing and signs. Performance of necessary inspection, maintenance, and monitoring. Installation of groundwater monitoring wells around the perimeter of the contained area, and groundwater monitoring as required.
Contamination in Area of Process-Type Fill Materials in Southeast Part of Tract 1	VIII	Surface/ Subsurface Soil	VOCs, SVOCs, Metals, TPH	Excavation and off-site disposal of soil containing elevated levels of BNs, metals, VOCs, phenols, and TPH, in conjunction with proposed PCB remedial program. Confirmatory sampling.
VOC Contamination in Shallow Soil/ Fill Material and Shallow Groundwater	I, II, and III (limited); IV, V, and VII (extensive)	Surface/ Subsurface Soil, Groundwater	VOCs	Installation and operation of an air sparging system in an expanding fashion to remediate approximately 78,000 pounds of VOCs in this area. Monitored natural attenuation to address residual VOC contaminants.
Contaminated Material Within Former Pond	VI	Surface/ Subsurface Soil, Sediment	VOCs, SVOCs, Metals, TPH	Leave the contaminated material layer in place, and seal the area of the pond outflow and inflow locations with a cement/bentonite slurry. Potential long-term groundwater monitoring.
VOCs in Deep Groundwater	XI	Groundwater	VOCs	Institute a monitoring program that will specifically evaluate actual natural attenuation rates of chlorinated VOCs in deep groundwater, and continue to pursue reclassification of groundwater from II-A.
Sediments on Tract 2	X	Sediment	VOCs, Metals, PCBs	Excavation and off-site disposal of approximately 100 cubic yards of sediments containing > 1,000 mg/kg total VOCs; confirmatory sampling; and restoration/mitigation of disturbed wetlands. The proposed Deed Notice will include the sediments contaminated with PCB and metals above NJ Residential Direct Contact Soil Cleanup Criteria (RDCSCC).

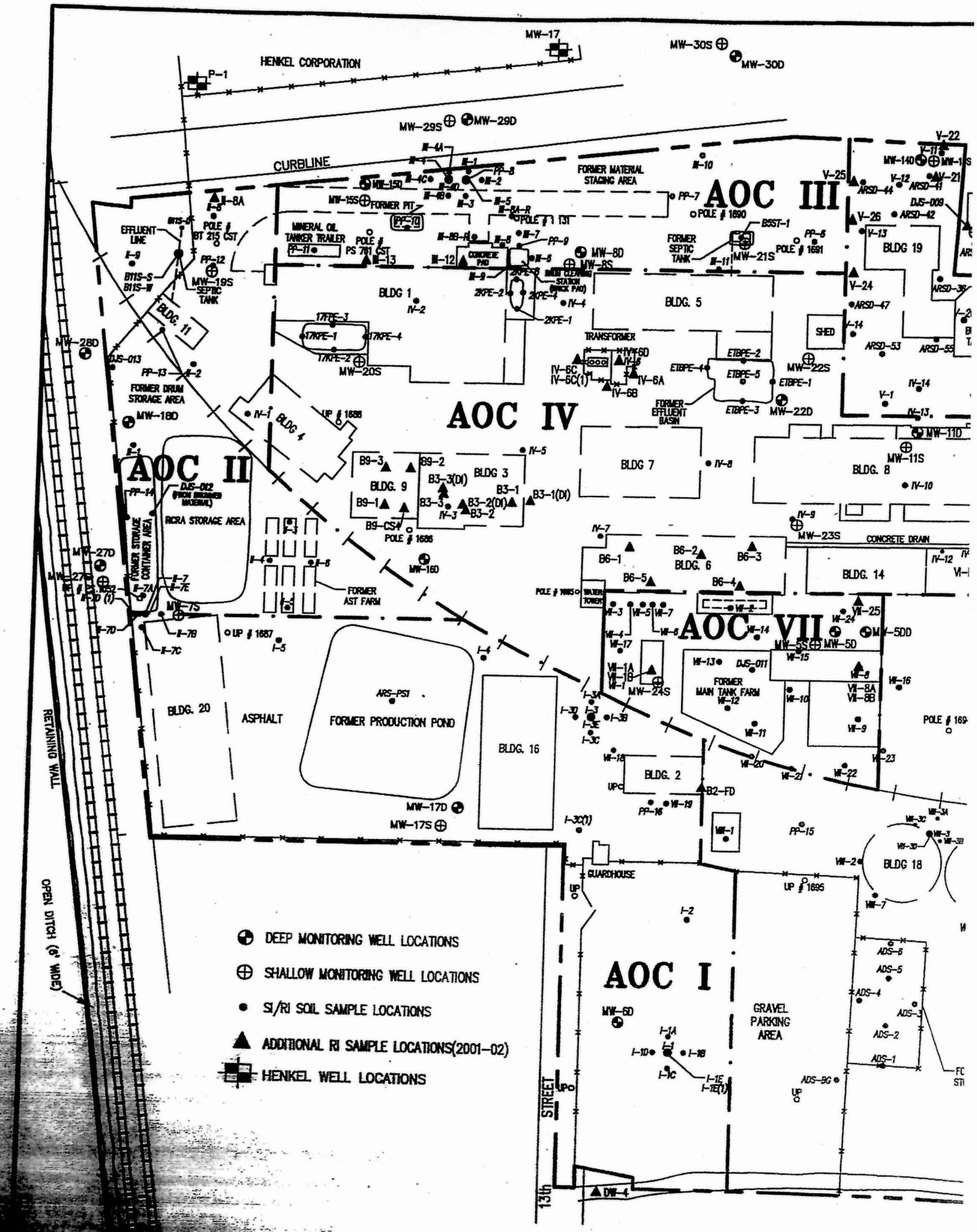


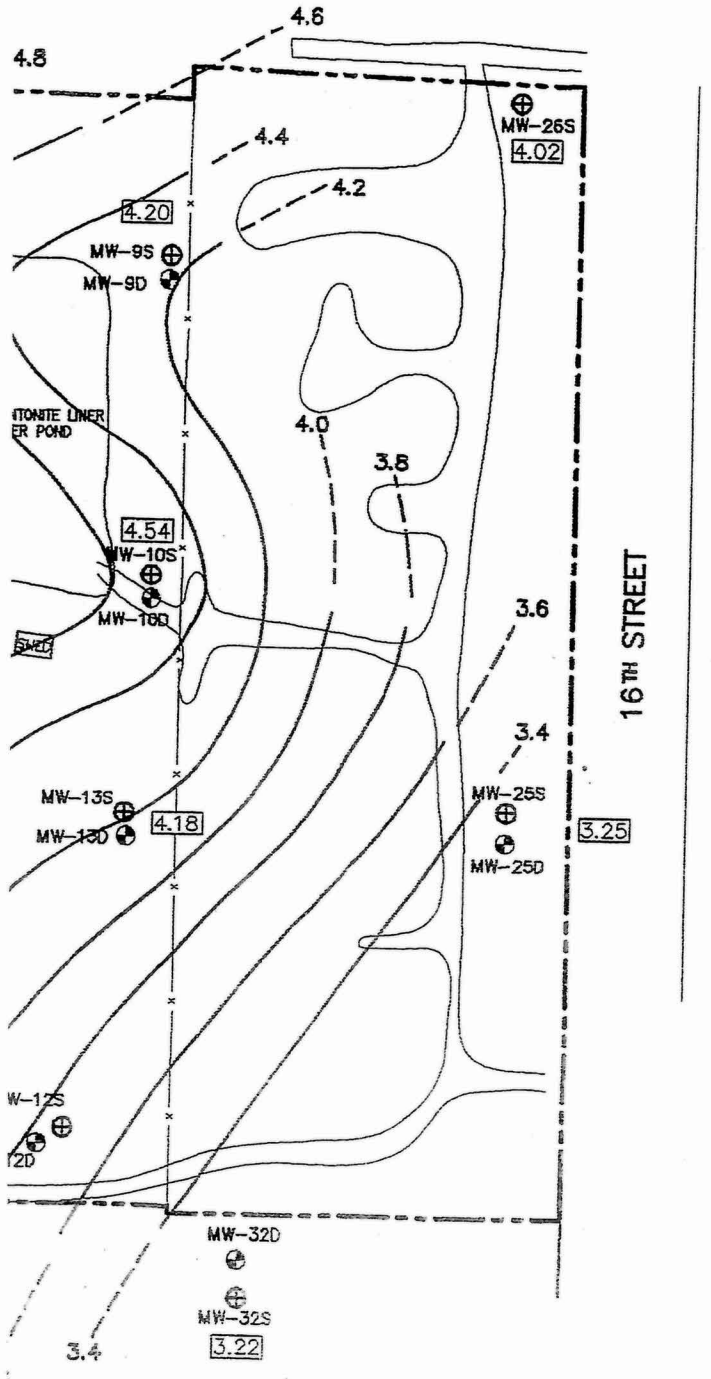
ARSYNCO
SITE PLAN SHOWING
AREAS OF CONCERN

FIGURE 1 | SCALE: 1" = 80'

JMC ENVIRONMENTAL CONSULTANTS, INC.
571 W. LAKE AVENUE, SUITE 6
BAY HEAD, NEW JERSEY 08742

JMC2003-85


HENKEL CORPORATION
CURBLINE
AOC I
AOC II
AOC III
AOC IV
AOC VII
BLDG. 1
BLDG. 2
BLDG. 3
BLDG. 5
BLDG. 6
BLDG. 7
BLDG. 8
BLDG. 9
BLDG. 11
BLDG. 14
BLDG. 16
BLDG. 18
BLDG. 19
BLDG. 20
FORMER PRODUCTION POND
ASPHALT
GRAVEL PARKING AREA
GUARDHOUSE
RCRA STORAGE AREA
FORMER DRUM STORAGE AREA
FORMER MATERIAL STAGING AREA
FORMER MAIN TANK FARM
FORMER AST FARM
FORMER EFFLUENT BASIN
FORMER SEPTIC TANK
MINERAL OIL TANKER TRAILER
TRANSFORMER
SHED
CONCRETE DRAIN
RETAINING WALL
OPEN DITCH (6' WIDE)
13th STREET
DEEP MONITORING WELL LOCATIONS
SHALLOW MONITORING WELL LOCATIONS
SI/RI SOIL SAMPLE LOCATIONS
ADDITIONAL RI SAMPLE LOCATIONS(2001-02)
HENKEL WELL LOCATIONS



NORTH

LEGEND:

- ⊕ – SHALLOW MONITORING WELLS
- – DEEP MONITORING WELLS
- – HENKEL WELL LOCATIONS
- —5.0— – PIEZOMETRIC SURFACE CONTOUR
- 4.96 – WATER SURFACE ELEVATION IN WELL

GRAPHIC SCALE

50 100 200 400

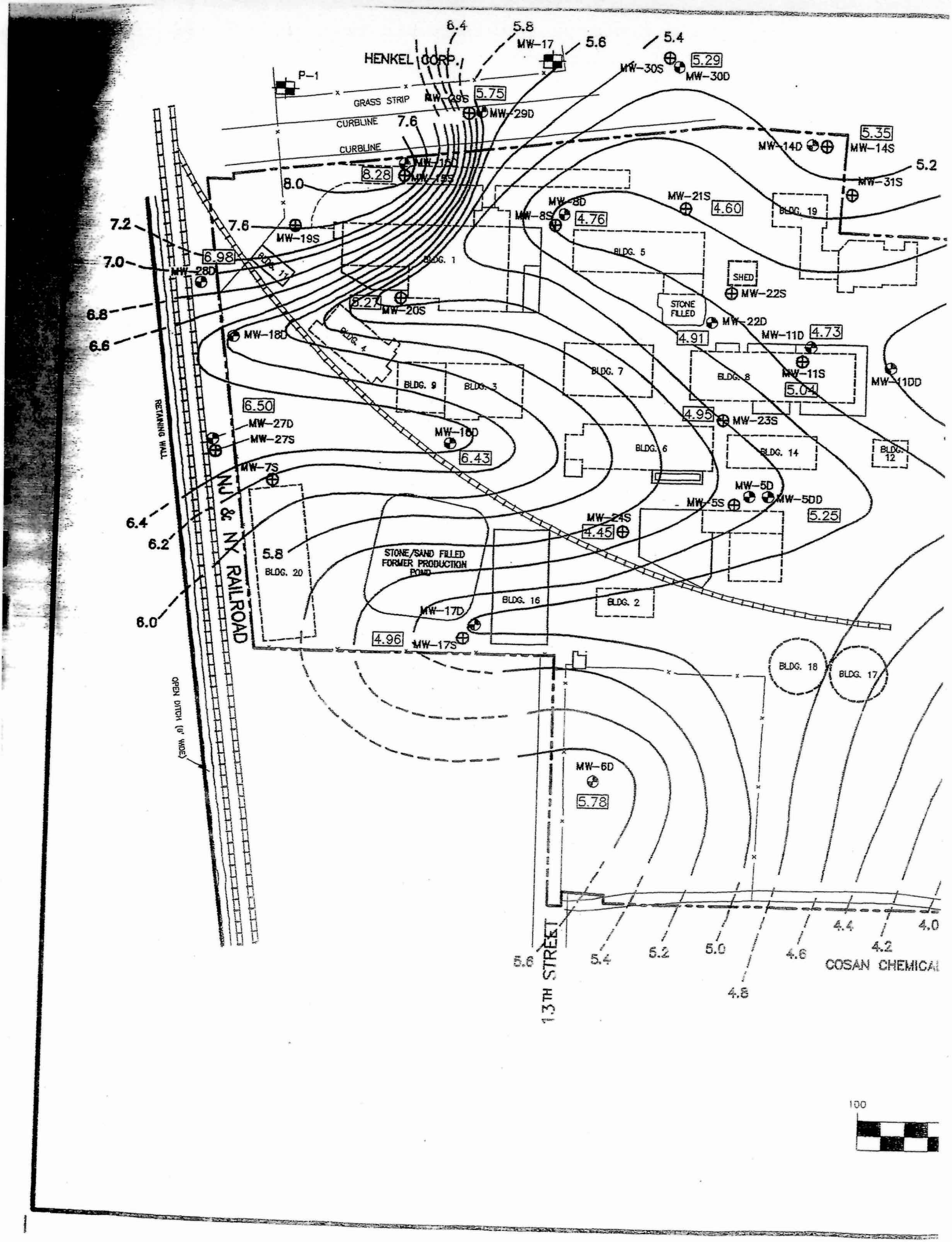
(IN FEET)
1 inch = 100 ft.

ARSYNCO, INC.

WATER TABLE MAP FOR THE DEEP GROUND WATER ZONE
MAY 19, 2003
WATER LEVELS COLLECTED BETWEEN 8:14 & 9:26 AM
ISRA CASE # 93024

FIGURE: 21 | SCALE: 1" = 100'

JMC ENVIRONMENTAL CONSULTANTS, INC.
571 W. LAKE AVENUE, SUITE 6
BAY HEAD, NEW JERSEY 08742


HENKEL CORP.
P-1
GRASS STRIP
CURBLINE
CURBLINE
MW-17
MW-30S
MW-30D
MW-29S
MW-29D
MW-16D
MW-16S
MW-14D
MW-14S
MW-31S
MW-21S
MW-8D
MW-8S
MW-19S
MW-28D
MW-20S
MW-18D
MW-22S
MW-22D
MW-11D
MW-11S
MW-11DD
MW-23S
MW-27D
MW-27S
MW-16D
MW-7S
MW-5D
MW-5DD
MW-5S
MW-24S
MW-17D
MW-17S
MW-6D
BLDG. 1
BLDG. 2
BLDG. 3
BLDG. 4
BLDG. 5
BLDG. 6
BLDG. 7
BLDG. 8
BLDG. 9
BLDG. 12
BLDG. 14
BLDG. 16
BLDG. 17
BLDG. 18
BLDG. 19
BLDG. 20
SHED
STONE FILLED
STONE/SAND FILLED FORMER PRODUCTION POND
RETAINING WALL
NJ & NY RAILROAD
OPEN DITCH (8' WIDE)
13TH STREET
COSAN CHEMICAL
5.8
6.4
5.6
5.4
5.29
5.75
7.6
5.35
5.2
8.0
8.28
4.60
4.76
7.2
7.6
6.98
7.0
6.8
6.6
8.27
4.91
4.73
5.04
6.50
4.95
6.43
6.4
6.2
5.8
4.45
5.25
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4.4
4.2
4.0
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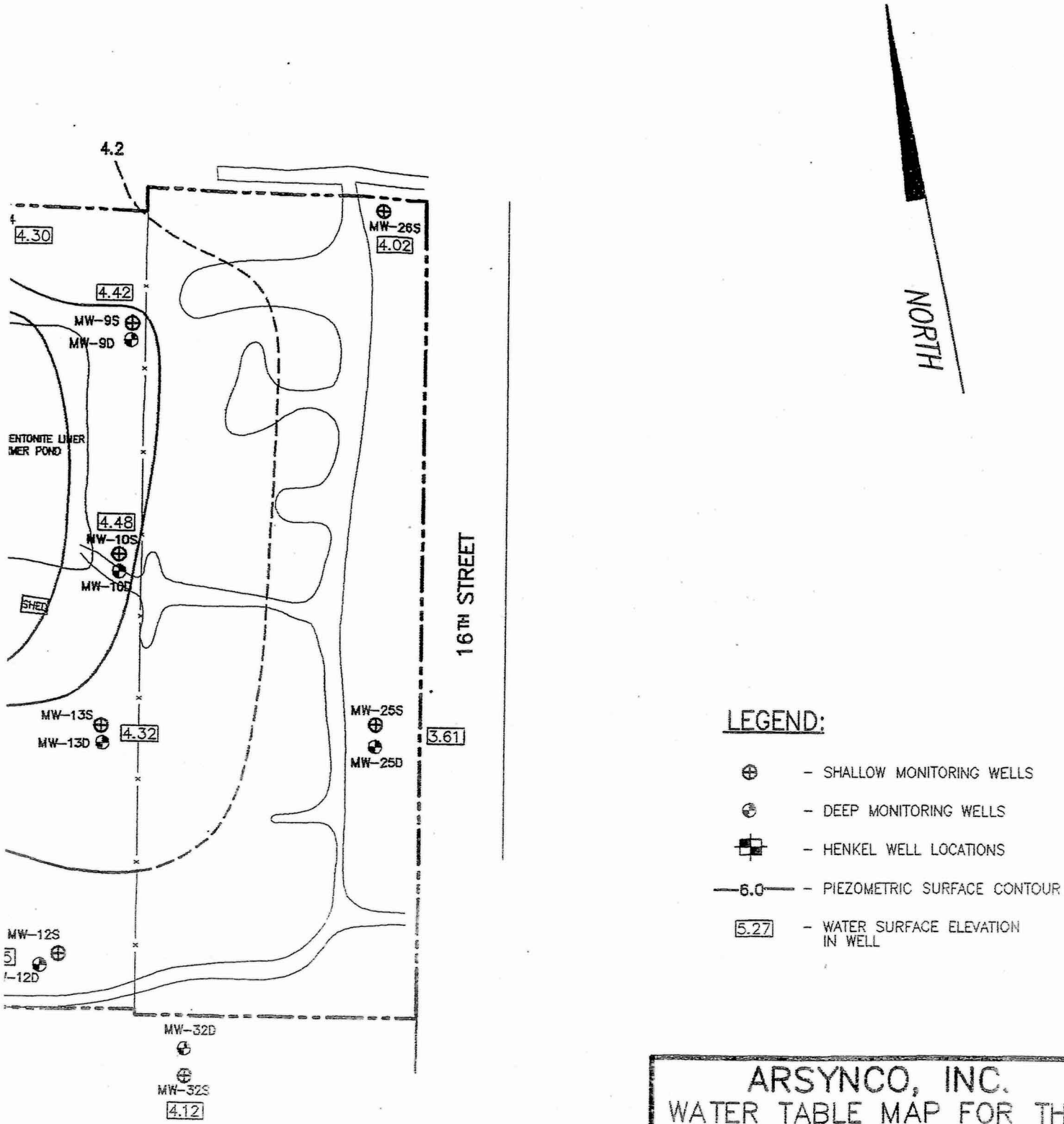


GRAPHIC SCALE

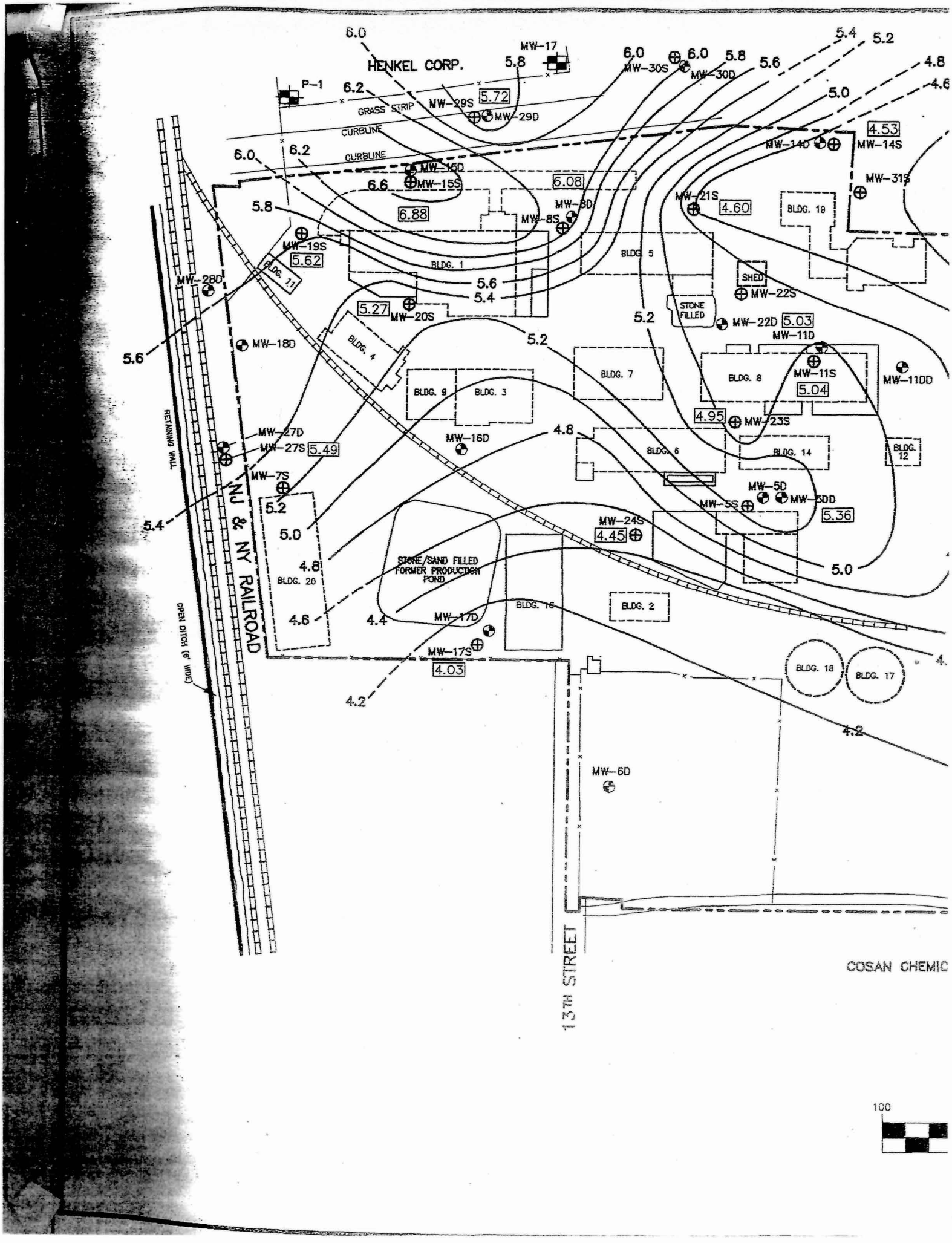
0 50 100 200 400

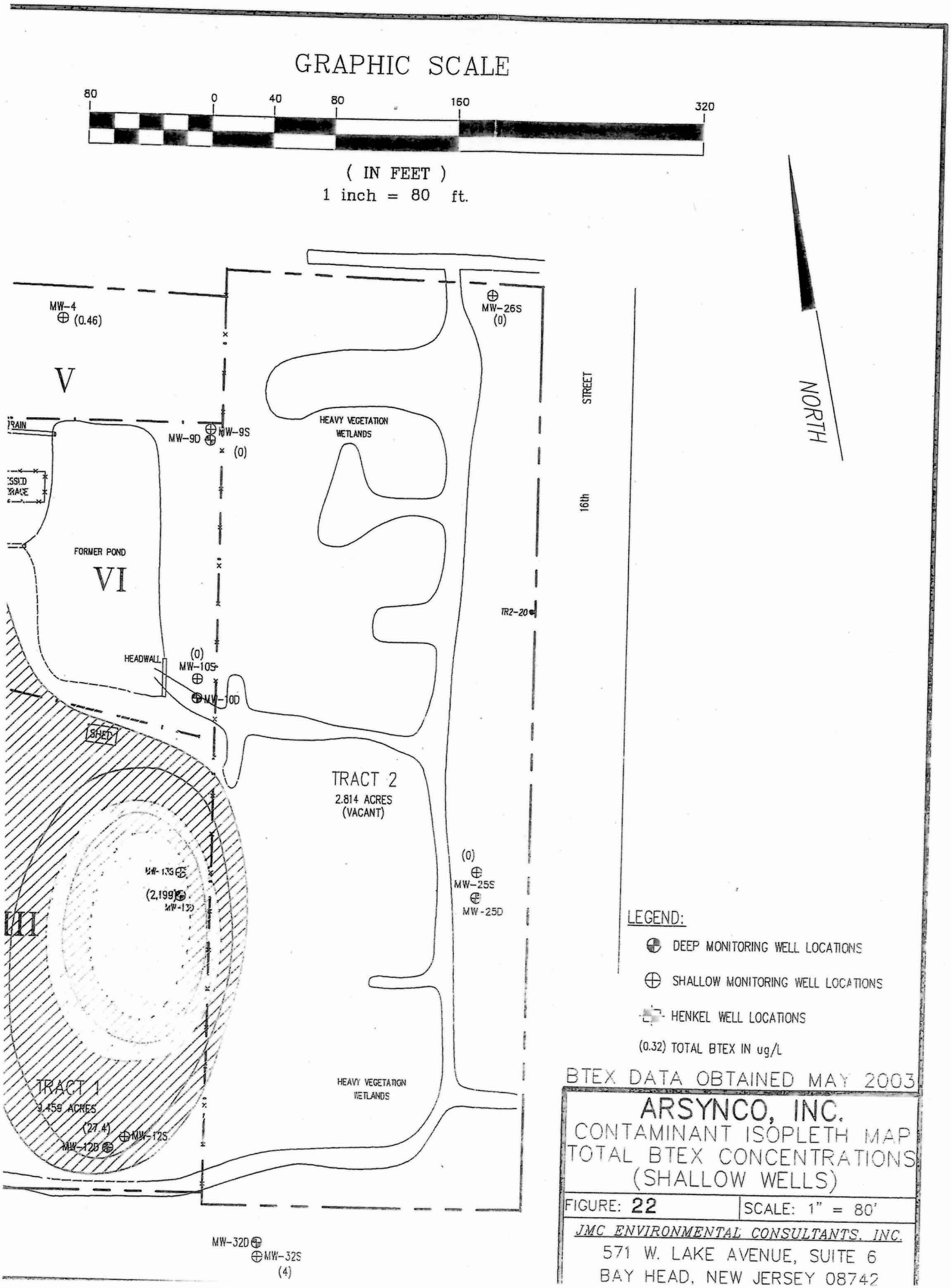
(IN FEET)
1 inch = 100 ft.

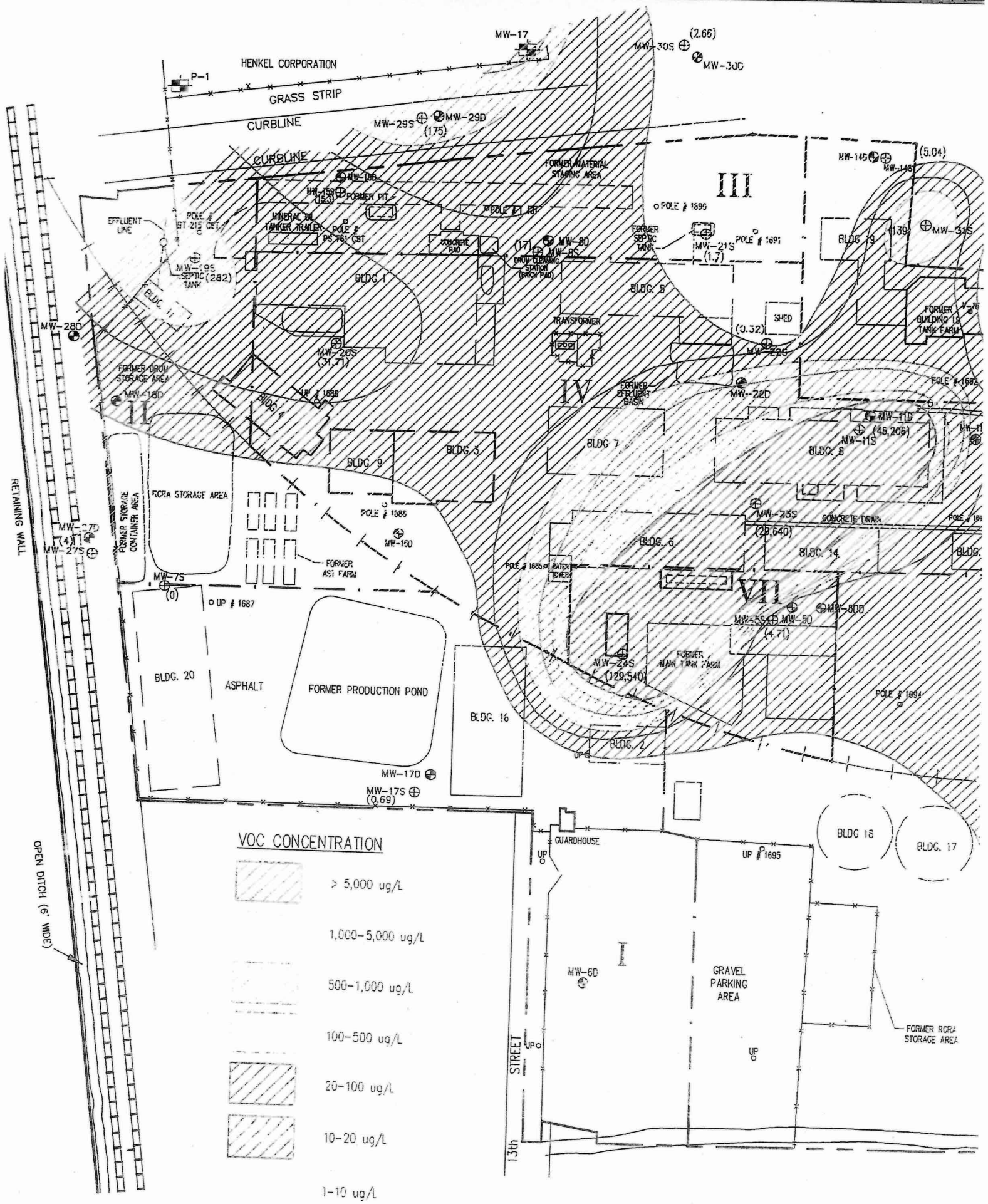
ARSYNCO, INC.
WATER TABLE MAP FOR THE SHALLOW ZONE
MAY 19, 2003
WATER LEVELS COLLECTED BETWEEN 8:14 & 9:26 AM
ISRA CASE # 93024

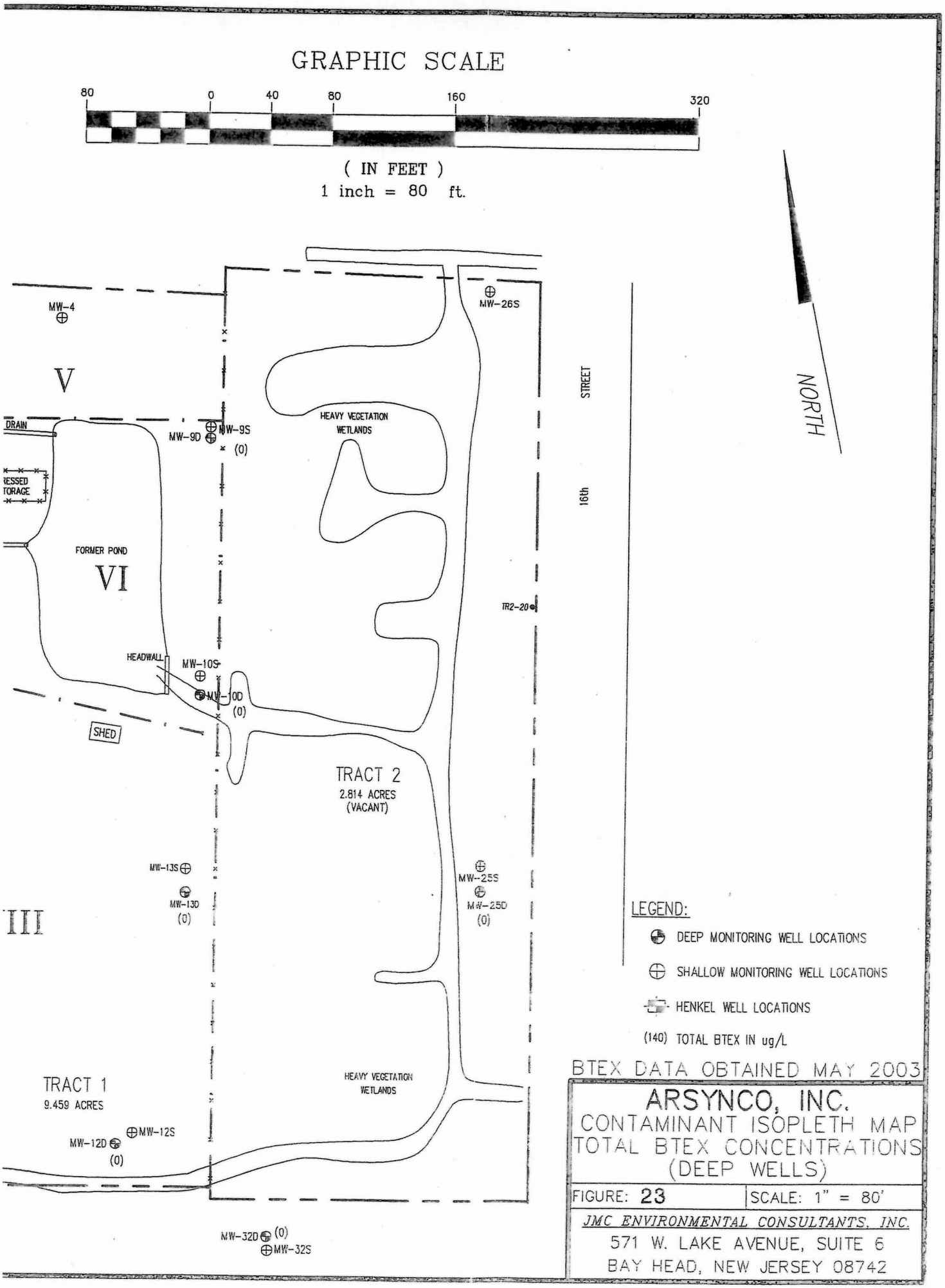
FIGURE: 20 | SCALE: 1" = 100'

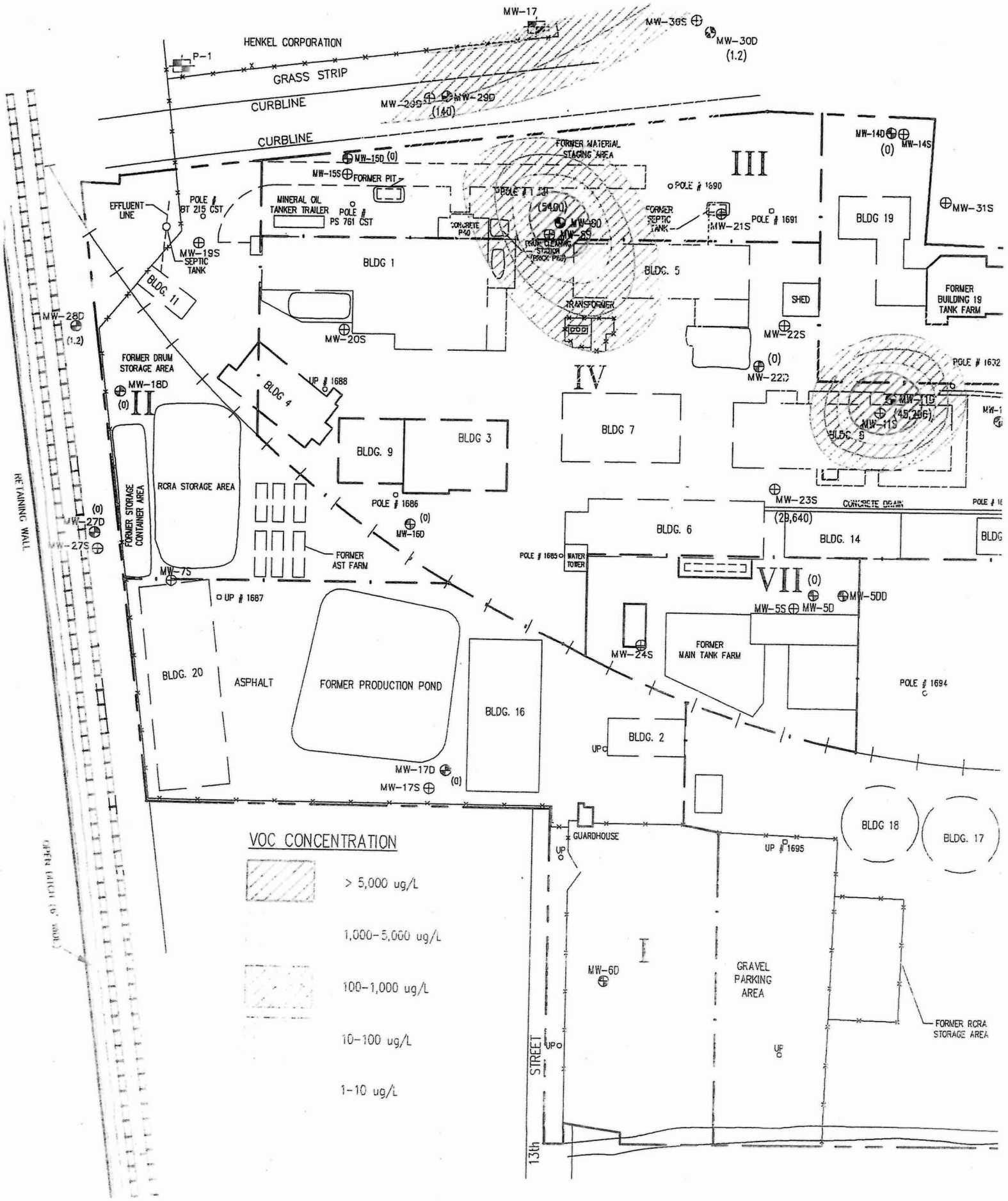
JMC ENVIRONMENTAL CONSULTANTS, INC.
571 W. LAKE AVENUE, SUITE 6
BAY HEAD, NEW JERSEY 08742


HENKEL CORP.
P-1
MW-17
GRASS STRIP
CURBLINE
CURBLINE
MW-29S
5.72
MW-29D
MW-30S
MW-30D
MW-14D
MW-14S
4.53
MW-31S
MW-15D
MW-15S
6.08
6.88
MW-8D
MW-8S
MW-21S
4.60
BLDG. 19
MW-19S
5.62
BLDG. 11
BLDG. 1
BLDG. 5
SHED
MW-22S
MW-28D
5.27
MW-20S
STONE FILLED
MW-22D
5.03
MW-11D
MW-18D
BLDG. 4
BLDG. 7
BLDG. 8
MW-11S
5.04
MW-11DD
BLDG. 9
BLDG. 3
4.95
MW-23S
MW-27D
MW-27S
5.49
MW-16D
BLDG. 6
BLDG. 14
BLDG. 12
MW-7S
MW-5D
MW-5DD
MW-5S
5.36
MW-24S
4.45
STONE/SAND FILLED FORMER PRODUCTION POND
BLDG. 20
BLDG. 16
BLDG. 2
MW-17D
MW-17S
4.03
BLDG. 18
BLDG. 17
MW-6D
RETAINING WALL
NJ & NY RAILROAD
OPEN DITCH (6' WIDE)
13TH STREET
COSAN CHEMIC
100

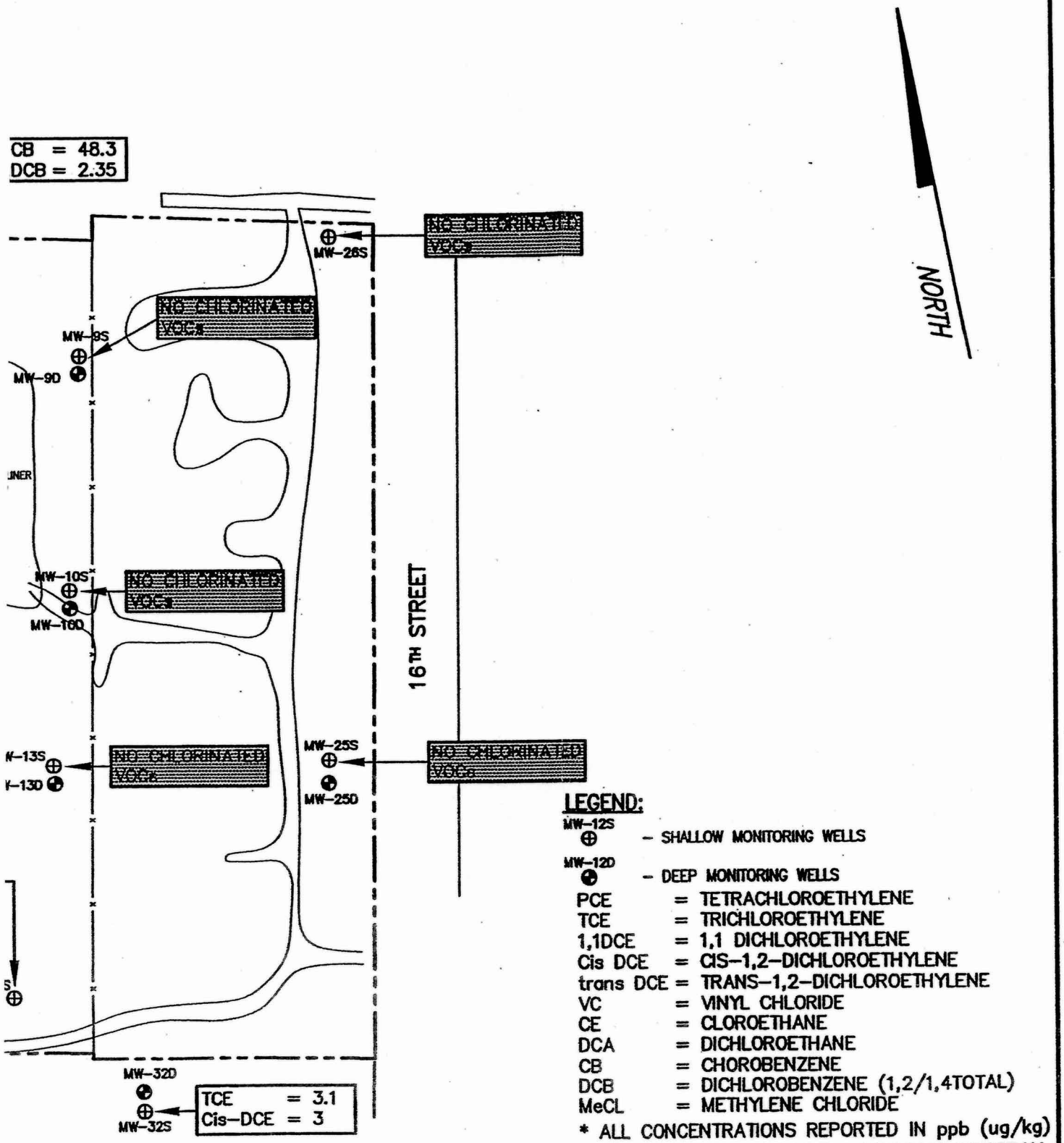

GRAPHIC SCALE
80
0
40
80
160
320
(IN FEET)
1 inch = 80 ft.
NORTH
MW-4
(0.46)
V
MW-26S
(0)
STREET
16th
HEAVY VEGETATION
WETLANDS
MW-9D
MW-9S
(0)
FORMER POND
VI
TR2-20
HEADWALL
(0)
MW-10S
MW-10D
SHED
TRACT 2
2.814 ACRES
(VACANT)
(0)
MW-25S
MW-25D
(2,199)
III
HEAVY VEGETATION
WETLANDS
TRACT 1
3.459 ACRES
(27.4)
MW-12S
MW-12D
MW-32D
MW-32S
(4)
LEGEND:
DEEP MONITORING WELL LOCATIONS
SHALLOW MONITORING WELL LOCATIONS
HENKEL WELL LOCATIONS
(0.32) TOTAL BTEX IN ug/L
BTEX DATA OBTAINED MAY 2003
ARSYNCO, INC.
CONTAMINANT ISOPLETH MAP
TOTAL BTEX CONCENTRATIONS
(SHALLOW WELLS)
FIGURE: 22
SCALE: 1" = 80'
JMC ENVIRONMENTAL CONSULTANTS, INC.
571 W. LAKE AVENUE, SUITE 6
BAY HEAD, NEW JERSEY 08742


HENKEL CORPORATION
GRASS STRIP
CURBLINE
CURBLINE
P-1
MW-17
MW-30S
(2.66)
MW-30D
MW-29S
MW-29D
(175)
FORMER MATERIAL STAGING AREA
III
MW-14D
(5.04)
MW-15D
MW-15S
(15.3)
FORMER PIT
POLE # 1690
EFFLUENT LINE
POLE # GT 215 CST
MINERAL OIL TANKER TRAILER
POLE # PS 761 CST
CONCRETE PAD
(17)
MW-8D
MW-8S
DRUM CLEANING STATION (BRICK PAD)
FORMER SEPTIC TANK
MW-21S
(1.7)
POLE # 1691
BLDG 19
(139)
MW-31S
MW-19S
SEPTIC TANK
(282)
BLDG 1
BLDG. 5
BLDG. 11
MW-28D
TRANSFORMER
SHED
(0.32)
MW-22S
FORMER BUILDING 19 TANK FARM
MW-20S
(31.71)
FORMER DRUM STORAGE AREA
MW-18D
II
BLDG 4
UP # 1688
IV
FORMER EFFLUENT BASIN
MW-22D
POLE # 1692
MW-11D
(45,206)
MW-11S
BLDG. 8
BLDG 9
BLDG 3
BLDG 7
RETAINING WALL
FORMER STORAGE CONTAINER AREA
RCRA STORAGE AREA
POLE # 1686
MW-15D
MW-23S
(29,640)
CONCRETE DRAIN
MW-27D
(4)
MW-27S
FORMER AST FARM
BLDG. 6
BLDG. 14
POLE # 1685
WATER TOWER
MW-7S
(0)
UP # 1687
VII
MW-5D
MW-5D
(4.71)
MW-5DD
MW-24S
(129,540)
FORMER MAIN TANK FARM
BLDG. 20
ASPHALT
FORMER PRODUCTION POND
BLDG. 16
POLE # 1694
BLDG. 2
MW-17D
MW-17S
(0.69)
GUARDHOUSE
UP
UP # 1695
BLDG 18
BLDG. 17
VOC CONCENTRATION
> 5,000 ug/L
1,000-5,000 ug/L
500-1,000 ug/L
100-500 ug/L
20-100 ug/L
10-20 ug/L
1-10 ug/L
OPEN DITCH (6' WIDE)
I
MW-6D
GRAVEL PARKING AREA
FORMER RCRA STORAGE AREA
UP
UP
STREET
13th


GRAPHIC SCALE
80
0
40
80
160
320
(IN FEET)
1 inch = 80 ft.
NORTH
MW-4
V
DRAIN
MW-9D
MW-9S
(0)
HEAVY VEGETATION WETLANDS
MW-26S
STREET
16th
FORMER POND
VI
TR2-20
HEADWALL
MW-10S
MW-10D
(0)
SHED
TRACT 2
2.814 ACRES
(VACANT)
MW-13S
MW-13D
(0)
MW-25S
MW-25D
(0)
III
TRACT 1
9.459 ACRES
HEAVY VEGETATION WETLANDS
MW-12S
MW-12D
(0)
MW-32D
(0)
MW-32S
LEGEND:
DEEP MONITORING WELL LOCATIONS
SHALLOW MONITORING WELL LOCATIONS
HENKEL WELL LOCATIONS
(140) TOTAL BTEX IN ug/L
BTEX DATA OBTAINED MAY 2003
ARSYNCO, INC.
CONTAMINANT ISOPLETH MAP
TOTAL BTEX CONCENTRATIONS
(DEEP WELLS)
FIGURE: 23
SCALE: 1" = 80'
JMC ENVIRONMENTAL CONSULTANTS, INC.
571 W. LAKE AVENUE, SUITE 6
BAY HEAD, NEW JERSEY 08742



HENKEL CORPORATION
GRASS STRIP
CURBLINE
CURBLINE
P-1
MW-17
MW-30S
MW-30D
(1.2)
MW-29S
MW-29D
(140)
MW-15D (0)
MW-15S
FORMER PIT
FORMER MATERIAL STAGING AREA
III
MW-14D
(0)
MW-14S
POLE # 1690
EFFLUENT LINE
POLE # BT 215 CST
MINERAL OIL TANKER TRAILER
POLE # PS 761 CST
CONCRETE P40
(5400)
MW-8D
MW-8S
FORMER SEPTIC TANK
MW-21S
POLE # 1691
BLDG 19
MW-31S
MW-19S
SEPTIC TANK
BLDG 1
BLDG. 5
BLDG. 11
TRANSFORMER
SHED
FORMER BUILDING 19 TANK FARM
MW-28D
(1.2)
MW-20S
MW-22S
(0)
MW-22D
POLE # 1632
FORMER DRUM STORAGE AREA
MW-18D
(0)
II
BLDG 4
UP # 1688
IV
MW-11D
(45,206)
MW-11S
BLDG. 9
BLDG 3
BLDG 7
BLDG. 9
RCRA STORAGE AREA
FORMER STORAGE CONTAINER AREA
RETAINING WALL
POLE # 1686
(0)
MW-16D
MW-23S
(29,640)
CONCRETE DRAIN
BLDG. 6
BLDG. 14
(0)
MW-27D
MW-27S
FORMER AST FARM
POLE # 1685
WATER TOWER
MW-7S
VII
(0)
MW-5DD
MW-5S
MW-5D
UP # 1687
MW-24S
FORMER MAIN TANK FARM
BLDG. 20
ASPHALT
FORMER PRODUCTION POND
BLDG. 16
POLE # 1694
BLDG. 2
UP
MW-17D
(0)
MW-17S
GUARDHOUSE
UP
UP # 1695
BLDG 18
BLDG. 17
VOC CONCENTRATION
> 5,000 ug/L
1,000-5,000 ug/L
100-1,000 ug/L
10-100 ug/L
1-10 ug/L
I
MW-6D
GRAVEL PARKING AREA
FORMER RCRA STORAGE AREA
UP
UP
STREET
13th

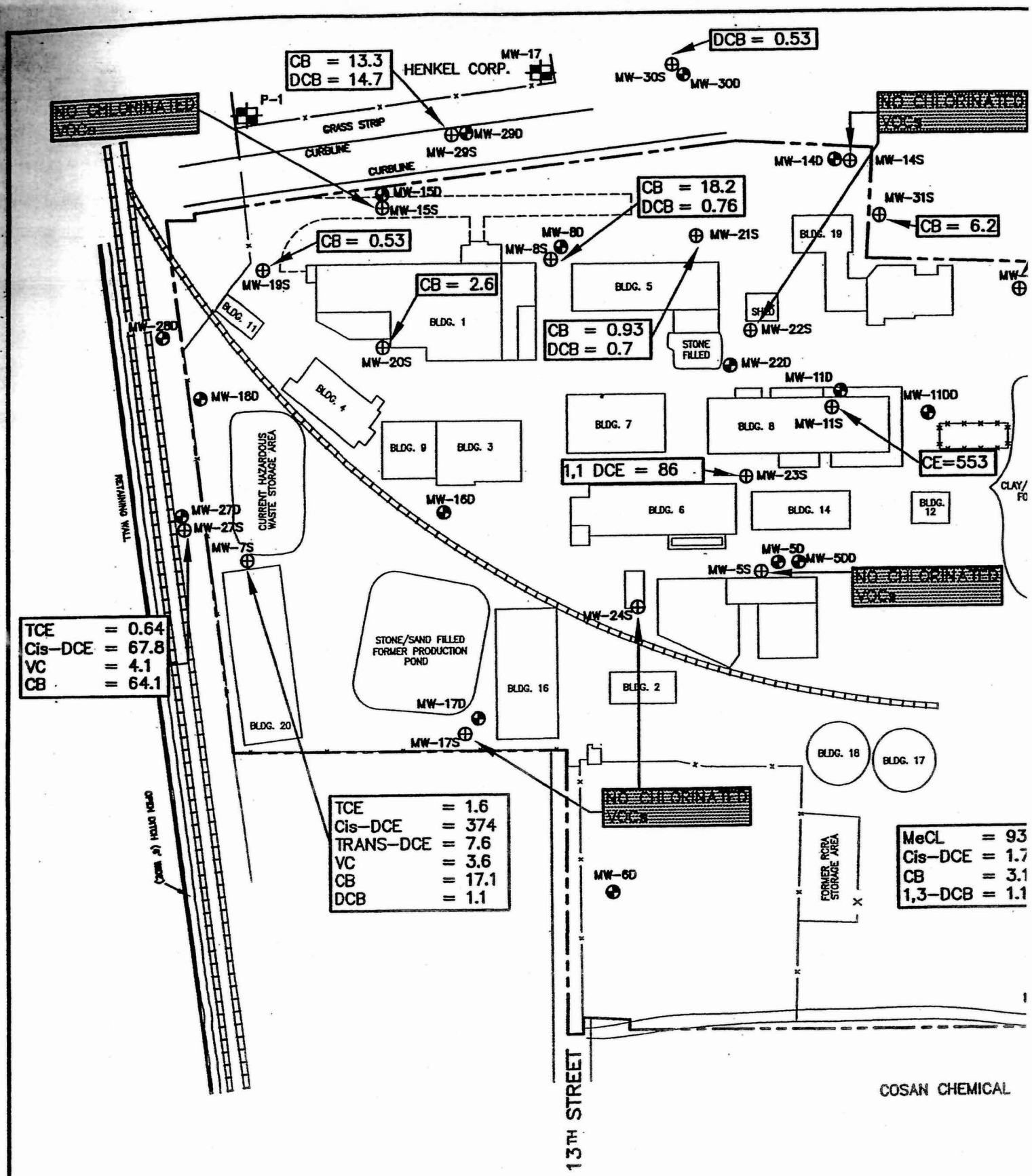


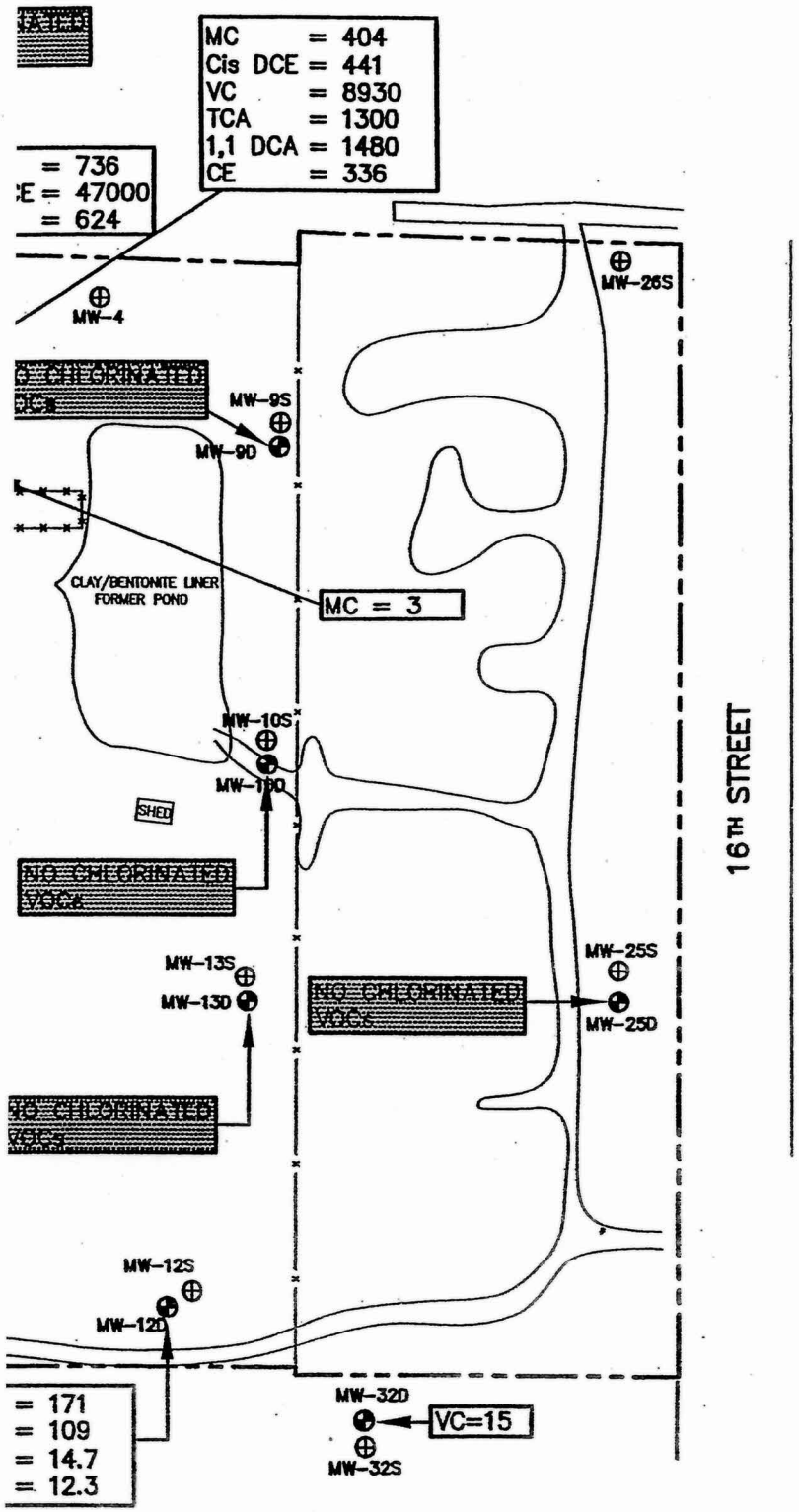
ARSYNCO
LEVELS OF CHLORINATED VOCs IN GROUNDWATER (SHALLOW WELLS)

FIGURE 24 | SCALE: 1" = 100'

JMC ENVIRONMENTAL CONSULTANTS, INC.
571 W. LAKE AVENUE, SUITE 6
BAY HEAD, NEW JERSEY 08742

JMC2003-BD


DCB = 0.53
CB = 13.3
DCB = 14.7
HENKEL CORP.
MW-17
MW-30S
MW-30D
NO CHLORINATED VOCs
P-1
GRASS STRIP
CURBLINE
MW-29D
MW-29S
MW-14D
MW-14S
MW-15D
MW-15S
CB = 18.2
DCB = 0.76
MW-31S
CB = 6.2
CB = 0.53
MW-8D
MW-8S
MW-21S
BLDG. 19
MW-19S
CB = 2.6
BLDG. 5
BLDG. 1
BLDG. 11
MW-28D
CB = 0.93
DCB = 0.7
SHED
MW-22S
STONE FILLED
MW-22D
MW-20S
MW-11D
MW-11DD
MW-18D
BLDG. 4
BLDG. 7
BLDG. 8
MW-11S
CE=553
BLDG. 9
BLDG. 3
1,1 DCE = 86
MW-23S
CURRENT HAZARDOUS WASTE STORAGE AREA
MW-16D
BLDG. 6
BLDG. 14
BLDG. 12
MW-27D
MW-27S
MW-7S
MW-5D
MW-5DD
MW-5S
NO CHLORINATED VOCs
MW-24S
TCE = 0.64
Cis-DCE = 67.8
VC = 4.1
CB = 64.1
STONE/SAND FILLED FORMER PRODUCTION POND
BLDG. 16
BLDG. 2
MW-17D
BLDG. 20
MW-17S
BLDG. 18
BLDG. 17
NO CHLORINATED VOCs
TCE = 1.6
Cis-DCE = 374
TRANS-DCE = 7.6
VC = 3.6
CB = 17.1
DCB = 1.1
FORMER RCRA STORAGE AREA
MeCL = 93
Cis-DCE = 1.7
CB = 3.1
1,3-DCB = 1.1
MW-6D
13TH STREET
COSAN CHEMICAL
100



LEGEND:

MW-12S ⊕ – SHALLOW MONITORING WELLS

MW-12D ◉ – DEEP MONITORING WELLS

CF	=	CHLOROFORM
MC	=	METHYLENE CHLORIDE
TCE	=	TRICHLOROETHYLENE
1,1DCE	=	1,1 DICHLOROETHYLENE
Cis DCE	=	CIS–1,2–DICHLOROETHYLENE
trans DCE	=	TRANS–1,2–DICHLOROETHYLENE
VC	=	VINYL CHLORIDE
CE	=	CLOROETHANE
TCA	=	1,1,1 TRICHLOROETHANE
DCA	=	DICHLOROETHANE
CB	=	CHOROBENZENE

* ALL CONCENTRATIONS REPORTED IN ppb (ug/kg)
ALL DATA FROM MAY 2003 SAMPLING PROGRAM

GRAPHIC SCALE

0 50 100 200 400

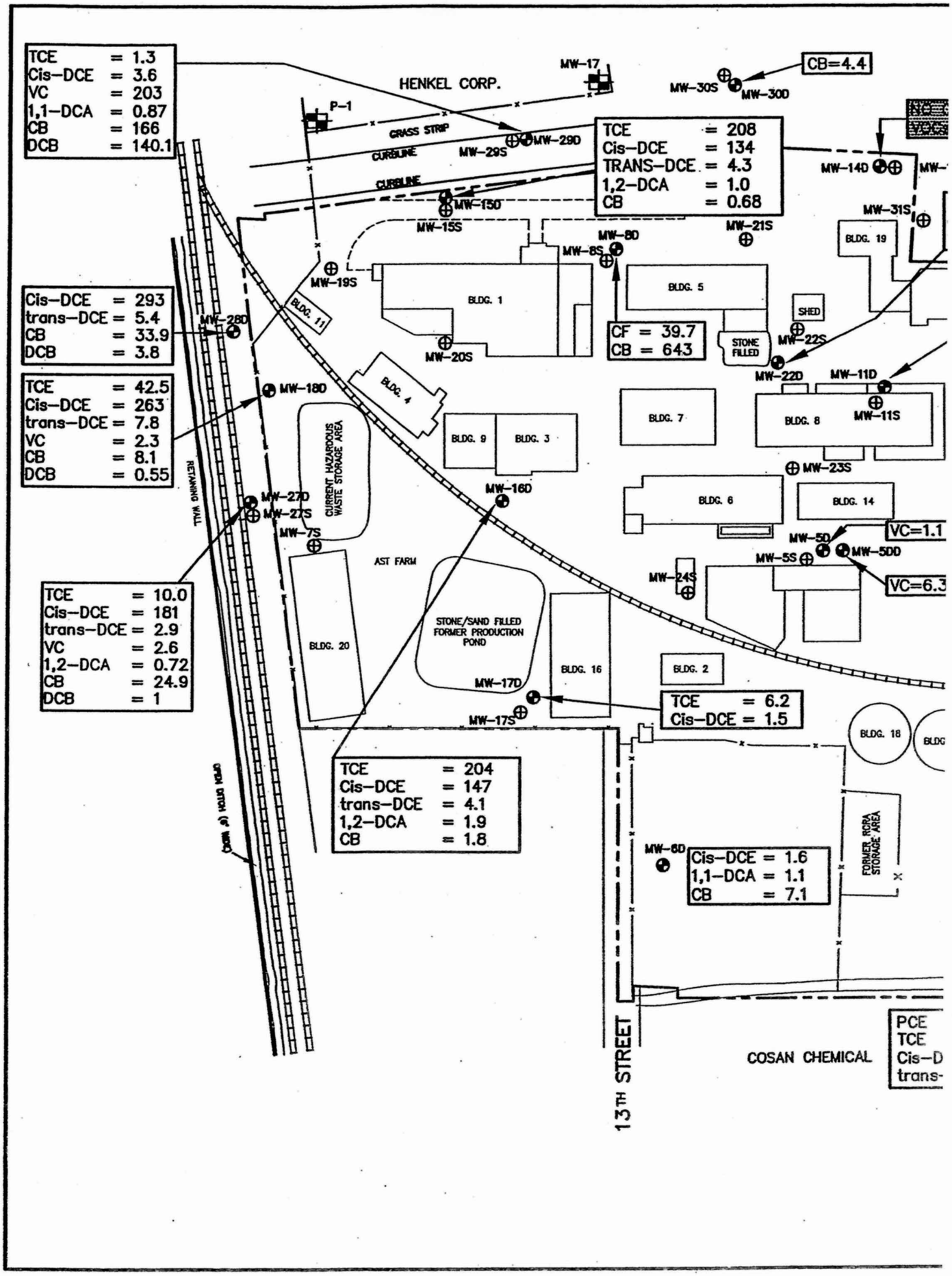
(IN FEET)
1 inch = 100 ft.

ARSYNCO
LEVELS OF CHLORINATED VOCs IN GROUNDWATER (DEEP WELLS)

FIGURE 25 | SCALE: 1" = 100'

JMC ENVIRONMENTAL CONSULTANTS, INC.
571 W. LAKE AVENUE, SUITE 6
BAY HEAD, NEW JERSEY 08742

JMC2003-8F


TCE = 1.3
Cis-DCE = 3.6
VC = 203
1,1-DCA = 0.87
CB = 166
DCB = 140.1
HENKEL CORP.
MW-17
P-1
GRASS STRIP
CURBLINE
MW-29S
MW-29D
MW-30S
MW-30D
CB=4.4
TCE = 208
Cis-DCE = 134
TRANS-DCE = 4.3
1,2-DCA = 1.0
CB = 0.68
MW-14D
MW-15D
MW-15S
MW-21S
MW-31S
MW-8D
MW-8S
BLDG. 19
MW-19S
BLDG. 1
BLDG. 5
SHED
Cis-DCE = 293
trans-DCE = 5.4
CB = 33.9
DCB = 3.8
MW-28D
BLDG. 11
CF = 39.7
CB = 643
STONE FILLED
MW-22S
MW-20S
MW-22D
MW-11D
TCE = 42.5
Cis-DCE = 263
trans-DCE = 7.8
VC = 2.3
CB = 8.1
DCB = 0.55
MW-18D
BLDG. 4
BLDG. 7
BLDG. 8
MW-11S
BLDG. 9
BLDG. 3
MW-23S
RETAINING WALL
CURRENT HAZARDOUS WASTE STORAGE AREA
MW-16D
BLDG. 6
BLDG. 14
MW-27D
MW-27S
MW-7S
VC=1.1
MW-5D
MW-5S
MW-5DD
AST FARM
MW-24S
VC=6.3
TCE = 10.0
Cis-DCE = 181
trans-DCE = 2.9
VC = 2.6
1,2-DCA = 0.72
CB = 24.9
DCB = 1
STONE/SAND FILLED FORMER PRODUCTION POND
BLDG. 20
BLDG. 16
BLDG. 2
MW-17D
TCE = 6.2
Cis-DCE = 1.5
MW-17S
BLDG. 18
TCE = 204
Cis-DCE = 147
trans-DCE = 4.1
1,2-DCA = 1.9
CB = 1.8
MW-6D
Cis-DCE = 1.6
1,1-DCA = 1.1
CB = 7.1
FORMER RCRA STORAGE AREA
13TH STREET
COSAN CHEMICAL
PCE
TCE
Cis-D
trans-