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DISCHARGE INVESTIGATION AND CORRECTIVE ACTION REPORT

BUILDING S-106

NWS EARLE, COLTS NECK, NEW JERSEY

FOR

NORTHERN DIVISION, NAVFAC

NAVAL BASE, PHILADELPHIA

JUNE 10, 1992

K&D PROJECT #E1-1629-024

PREPARED BY

KASELAAN & D'ANGELO ASSOCIATES, INC.

A HILL GROUP COMPANY

ENVIRONMENTAL SCIENCE AND ENGINEERING

HADDON HEIGHTS, NEW JERSEY

BOSTON O LOS ANGELES O NEW ORLEANS O NEW YORK O WASHINGTON

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1.0 *INTRODUCTION*

The activities under this Scope of Work consisted of the implementation and execution of the approved Plan of Action for underground storage tank (UST) discharge at the Naval Weapons Station Earle (NWSE). The investigation was used to determine any impact to the subsurface environment in proximity to the release from a 1,000 heating oil underground storage tank (UST) at Building S-106 (Registration Number UST 0151003).

The implementation of the field investigation included the installation of piezometers, generation of water level measurements and preparation of groundwater contours depicting groundwater flow direction. Field activities also included oversight of the storage tank cleaning, removal and subsequent excavation of contaminated soils. The tank removal activities along with post excavation sampling were performed by J&J Environmental, Chatham, New Jersey under a contract by NWSE. Upon interpretation of this data one (1) groundwater monitoring well was installed within ten (10) feet downgradient of the historical location of the tank system. The well was sampled and analyzed for the appropriate analytical parameters.

A detailed summary of field activities as well as an overview and interpretation of the laboratory findings are presented herein. Recommendations associated with future investigation are also provided.

In May of 1990, the UST was integrity tested using the Heath Petro-tite tank testing system. This was prompted due to the presence of petroleum vapors in the adjacent residence building. The tank system was subsequently tested. With the presence of an elevated leak rate, excavation down to the tank top ensued in order to test the tank separately from the piping system. The tank failed the test with leak rates in excess of National Fire Protection Association (NFPA) allowable limits. Subsequent to the identification of the potential release, the Navy reported the suspected discharge to New Jersey Department of Environmental Protection and Energy (NJDEP&E) Spill Hotline (NJDEP&E Case No. 90-05-09-1324.) It should be noted that the residences were evacuated due to the presence of vapors within the structure. In response to this testing program, a Plan of Action was designed to identify the presence of subsurface contamination in proximity to the tank system.

This initially involved a site visit on October 16, 1990, along with the collection and review of available utility and historical drawings for this area. The site visit was used to gather pertinent data useful for the characterization of the area.

2.0 *PROCEDURE AND METHODOLOGY*

Mr. Frank Hunsberger, Hydrogeologist and Mr. Andrew Rola, P.E. of K&D visited the site (See Figure 1) on October 16, 1990 to perform a site inspection and investigation. The field investigation was conducted utilizing a HNu PI 101 photoionization detector (PID) equipped with a 10.2 ev lamp, a metal detector and visual observation. Subsequent to the field investigation, a record search of available historical drawings and geological data was obtained from the Public Works Office with the assistance of Mr. John Pawlus of NWS Earle.

Geological and hydrogeological background information was obtained from a Site Investigation Work Plan of November 1989 prepared by Roy F. Weston, Inc. for the Navy Installation Restoration program.

Old drawings of renovations to Building S-106 revealed some historical evidence of the single UST's use and management, however the actual date of the installation was not found.

In May, 1990, the tank was precision tested by the Petro-tite method because the Navy suspected possible leakage. The tank was exposed to the tank top, isolated from the lines and individually tested. The individual lines and tank were tested separately to determine the specific source of the leak. As stated in Section 1.0, the tank failed the precision test therefore additional investigation and remedial action were required.

It was noted that the 1,000 gallon tank at S-106 appeared to leak so fast that a leak rate could not be measured. The product level in the standpipe continued to drain into the tank several times after all vapor pockets were removed and bung holes sealed. The entire tank top had been exposed and no visible leak at the tank top was observed.

Tank S-106 is located in a housing complex with over 20 other similar 1,000 gallon USTs, S-106 is topographically the most downgradient tank in the housing complex. It appears that leaks from any of the other fuel oil tanks in the complex would migrate towards S-106 until encountering groundwater.

2.1 *Investigation Activities*

The investigation activities performed by K&D included the following:

Well Search

A computer radius program search, for major withdrawal wells, and a microfilm well record file search, for other wells was performed by the NJDEP&E Bureau of Water Allocations, Well Permits Section at the request of K&D. The well search included non-public water supply wells within one half mile of the subject site and public water supply/industrial supply/other wells with water allocation permits within one mile of the site. In addition a listing of water withdrawal points and New Jersey Geological Survey (NJGS) Case Index Sites within a five mile radius was provided. A copy of the well search is presented as Appendix A.

Piezometer Installation

The installation and survey of three (3) piezometer was conducted to determine groundwater flow direction. The piezometers were installed in accordance with the NJDEP&E specification by Uni-Tech Drilling, Clayton, New Jersey under the supervision of K&D. The piezometers were designated as PZ-1, PZ-2 and PZ-3 (See Figure 1).

Groundwater Monitoring Well Installation

The installation of the groundwater monitoring well was conducted hydrologically downgradient of the UST. The well was installed on January 22, 1992 in accordance with NJDEP&E specifications by J.E. Fritts and Associates, Inc., Voorhees, New Jersey under the supervision of K&D. The well was designated as MW-1 (See Figure 1). The piezometers and monitoring well were surveyed to the nearest 0.01 of an inch by a New Jersey registered surveyor. The pertinent information (i.e. specifications, permits, forms) regarding the installation and surveying of the piezometers and monitoring well is presented in Appendix B and Appendix C.

A total of nine (9) subsurface soil samples were collected by K&D during the installation of the three (3) piezometers. In addition, six (6) subsurface soil samples were collected by K&D during the installation of MW-1. A truck mounted drilling rig was used at all boring locations. Borings were advanced using standard hollow stem auger drilling equipment. Continuous soil samples were collected at two foot intervals using clean, two or three inch diameter (two foot in length) carbon steel split spoon samplers driven in advance of the augered borehole with a 140 lb. hammer. The soil samples were logged for physical composition and screened for total organic vapors using a Thermo Environmental Instruments, Inc. Model 580B Organic Vapor Meter (OVM) immediately upon their retrieval from each boring. The OVM is equipped with a PID using a 10.6 eV lamp. The boring logs are submitted as Appendix D. The samples selected for chemical analysis were collected with fully decontaminated equipment. The decontamination procedures utilized are submitted as Appendix E. The soil samples were analyzed for Total Petroleum Hydrocarbons (EPA Method 418.1) by GTEL Environmental Laboratories, Inc., Milford, New Hampshire. GTEL Environmental Laboratories, Inc. is a NJDEP&E certified laboratory (Certification No. 70609).

Dedicated, field decontaminated, stainless steel spatulas were used to transfer the sample from the split spoon sampler directly into the appropriate sample container. The samples were collected in accordance with the NJDEP&E Field Sampling Procedures Manual.

All drilling and well material used in the installation of the piezometers and monitoring well were steam cleaned prior to use and between each boring location. The four inch flush mounted, flush joint, threaded, polyvinyl chloride (PVC) monitoring well was installed using the hollow stem auger method in accordance with the specifications as shown in Appendix B.

Upon completion the monitoring well was developed using a centrifugal pump. The well was developed until a turbidity-free discharge was present. All drilling and development material (mud, soil and water) were containerized in 55-gallon DOT 17H drums and stored on site.

Groundwater and Surface Water Sampling

A product sheen on the groundwater was recorded during the installation of the MW-1. The monitoring well was allowed to stabilize or equilibrate for a minimum of fourteen (14) days prior to sampling. A measurement was made on February 27, 1992 of the free floating product in MW-1 using a ORS Model 1068 oil-water Interface Probe. A total of thirty six (36) inches of product was recorded. A sample of the product was collected on February 26, 1992 for a hydrocarbon fingerprint analysis by GTEL Environmental, Inc. The analysis provides a comparison of the composition versus boiling point range for samples and fuel standards.

A groundwater sample was not collected from MW-1 since measurable product was found.

One (1) surface water sample (WS-1) was collected from the concrete swale located north-northeast of the UST (See Figure 1). The sample was collected to assess the water quality of the runoff from the area. The sample was collected directly into the sample containers thereby eliminating the need for a field blank.

The surface water was shipped to GTEL Environmental Laboratories, Inc. The sample was analyzed for EPA Priority Pollutants List Volatile Organic Compounds (VOC) using EPA Method 624+15 and the EPA Priority Pollutants List Base/Neutral Organic Compounds (B/N) using EPA Method 625+15.

It should be noted that a trip blank and a field blank were collected for the groundwater sample (MW02) collected from the monitoring well installed at Quarters G. The monitoring well was installed as part of a Discharge Investigation and Corrective Action Report being prepared for that NWS Earle building. The surface water sample (WS-01) was shipped along with that groundwater sample so in fact the trip blank served as a check for all samples collected that day. The purpose of the trip and field blanks was to provide an analytical check on sample handling, transport, collection process, sampling equipment decontamination, container cleaning procedure and any contamination that may have occurred in transit or in the laboratory. All samples were submitted for analysis under Chain of Custody. GTEL Environmental Laboratories, Inc. is a NJDEP&E certified laboratory.

2.2 Remediation Activities

The remediation activities including the removal of the UST, soil sampling, excavation and disposal of contaminated soil and backfilling were performed by and under the supervision of J&J Environmental. K&D received the soil sampling data for review and interpretation.

Subsurface Soil Sampling

A total of twelve (12) subsurface soil and stockpiled soil samples were collected by J&J Environmental on November 25, 1991. A total of four (4) sidewall samples and five (5) invert samples were collected from the excavation upon the removal of the UST. One of the invert samples (Sample Number 16) was also analyzed for the EPA Priority Pollutant List (PP+40). The GC/MS analysis for volatile, base/neutral and acid extractable compounds allows for the tentative identification of non-priority pollutant organic compounds through use of GC/MS library spectral matching procedures. This procedure does not provide definitive information, because no standardization or calibration is performed. The results for this "Tentatively Identified Compounds" or TICs are therefore reviewed with caution.

Three (3) composite soil samples were collected from two (2) separate stockpiles. All samples were analyzed for TPHC using Method 418.1 by W.A.T.E.R. Works Laboratory Inc., East Orange, New Jersey (with the exception of the PP+40 analysis). W.A.T.E.R. Works Laboratory, Inc. is a certified NJDEP&E laboratory (No. 07673).

3.0 *SITE CHARACTERIZATION*

3.1 *Physical Geography*

NWS Earle is located in the Coastal Lowlands of Monmouth County in eastern New Jersey. This area falls within the Atlantic Coastal Plains Physiographic Province, approximately 6 miles inland from the Atlantic Ocean.

The station is divided into three physically separate areas, the largest being the Main Base (10,428 acres), the smaller being the waterfront and Chapel Hill areas (706 acres, combined).

The Main Base lies within the Outer Coastal Plain, a relatively flat area with little topographic relief, except for the Hominy Hills. The Hominy Hills are a northeast-trending set of low hills near the center of the Main Base. Elevations range from approximately 100 to 300 feet above mean sea level (MSL).

3.2 *Climate*

The Main Base area is characterized by a predominantly continental climate with significant seasonal and daily temperature fluctuations. High humidity occurs frequently along the coast and less frequently inland. Freezing temperatures occur intermittently from October to April. The average first frost occurs on October 17, and the average last frost occurs on April 24, allowing for an average growing season of 198 days. The average annual precipitation is 44.67 inches at Long Branch and 41.82 inches at Newark. The annual peak daily rainfall (1-year, 24-hour) is greater than 2.5 inches. The mean annual temperatures at the Long Branch and Newark meteorological stations are 56.2°F and 45.2°F, respectively.

Winds are highly variable in the area of NWS Earle. The dominant winds are from the northwest during the winter and early spring. Onshore winds predominate during the spring and summer.

3.3 *Surface Drainage*

All rivers and streams draining NWS Earle, which are just a few miles inland, ultimately discharge to the Atlantic Ocean.

The headwaters and drainage basins of three major Coastal Plain Rivers (i.e., Swimming, Manasquan, and Shark) originate on the main base. The northern half of the Main Base is in the drainage basin of the Swimming River, and tributaries include Main Brook, Hockhockson Brook, and Pine Brook. The southwestern portion of the Main Base drains to the Manasquan River via either Marsh Bog Brook or Mingamahone Brook. The southeastern corner of Main Base drains to the Shark River. Both the Swimming River and the Shark River supply water to reservoirs used for public water supplies.

Building S-106 lies within the drainage basin which feeds the Hockhockson Creek which flows north to the Swimming River. Figure 2 shows the location of Building S-106 in relation to surface hydrogeology.

3.4 *Soils*

The soils at NWS Earle are generally distributed in northeast/southwest-trending belts that parallel the outcrop patterns of the underlying geologic units. More than half of the identified soil types in Monmouth County are found on the NWS Earle facility.

The dominant soil in this area is sandy and well drained. The soils typically have high iron and sulfur contents and many are acidic.

Acidic soils are formed from the weathering of pyrite (iron sulfide) or lignite (low-grade coal) contained in the sedimentary deposits. When exposed to air and water these materials form corrosive sulfuric acid. Severely acids soils with pH values as low as 3.5 can be developed naturally in some of the soils found at NWS Earle.

Poorly drained soils are typically organic-rich and occur in low-lying areas such as swamps, marshes, and flood plains. The soils poorly drained unconsolidated sediments are prone to settlement and subject to flooding and tides.

At the Main Base, the most prevalent soils include the Lakewood, Lakehurst, Leon, and St. Johns Series. The soils range from well drained sandy soils to very poorly drained flood plain soils adjacent to streams and swamps. Highly acidic black soils have been exposed at various depths on the Main Base by construction activities. The black soils are apparently related to lignite-rich clays of the Kirkwood Formation, which crop out across the southern end of the station.

Building S-106 lies on the well drained sandy soils of the dry upland areas of the base.

3.5 *Surficial Geology*

The geological setting at NWS Earle consists of a thick wedge of layered unconsolidated sediments that dip seaward (southeast). The sedimentary formations of the Coastal Plain are exposed at the surface in a banded outcrop pattern roughly parallel to the shore.

The Kirkwood Formation of the Miocene age is an important aquifer both regionally and locally. It crops out at the surface over two-thirds of the Main Base (the central and southern portions) as well as across the southern tier of Monmouth County.

In fact, most of the southern part of New Jersey consists of surface exposure of the Kirkwood Formation (grouped with the Cohansey Sand). Texturally, the Kirkwood consists of fine to medium grained quartz sand with some mica, some lignite, and some diatomaceous clay. A lower member is finer-grained, darker, and pebbly and contains some glauconite. The total thickness ranges from approximately 30 feet at the outcrop area on the station to 800 feet near the coast. The texture grades from fine-grained sand and silt inland (updip) to clay beds with finer sands along the coast.

The Kirkwood is used locally for domestic wells and in other areas of the Coastal Plain for municipal supplies. Yields range from 15 to over 1,000 gpm, but the water is generally acidic and contains iron and sulfide.

The overlying Cohansey Sand is a light-colored medium to coarse-grained sand, occasionally pebbly, with local clay beds. In combination with the Kirkwood, it forms a major unconfined aquifer throughout the New Jersey Coastal Plain. It produces brackish or salty water in some coastal areas. The Cohansey Sand crops out at the Main Base, forming topographically prominent Hominy Hills area. No wells are known to tap the Cohansey on the station. Due to its position at the top of the sedimentary sequence, the Cohansey provides recharge of the underlying aquifers, particularly the Kirkwood.

The Hornerstown Sand is the basal Tertiary formation in Monmouth County, and other oldest unit in the Rancocas Group. It is a massive, green, glauconitic sand with interbedded shale. The lithology is homogeneous, and the thickness is fairly constant downdip, with an average thickness of 30 to 50 feet. The Hornerstown crops out along the northwestern boundary of the Main Base.

The Vincentown Formation is a fossiliferous quartz sand, up to 130 feet thick, that contains some coarse-grained glauconite and some clay. An upper member is a lime sand with abundant fossil fragments. The Vincentown Formation is an important source of water for low-yield home wells, with an average range of 10 to 50 gpm. The Vincentown Formation crops out at the surface at the Main Base, covering approximately 25 percent of the station in a bank along the northern border of the facility.

As shown in Figure 3, Building S-106 lies on Cohensey Sands which recharge directly into the Kirkwood Formation.

3.6 *Hydrogeology*

3.6.1 *Regional Hydrogeology*

The Atlantic Coastal Plan sediments are the most important source of potable water in the region. More than 75 percent of the fresh water supply in the New Jersey Coastal Plain is from groundwater.

The Coastal Plain province is composed of a wedge-shaped deposit of alternating layers of sand and clay that thickens to the southeast and overlies a crystalline basement. These deposits store and transmit water through interconnected pore spaces.

Recharge to the groundwater system is derived from precipitation, which averages 44 inches per year. Approximately 15 to 39 inches of this precipitation recharges the groundwater reservoir annually. In addition to precipitation in the outcrop areas, recharge is also provided by vertical leakage through confining beds and by seepage from surface water bodies.

The five principal Coastal Plain aquifers are the:

- o Kirkwood-Cohansey aquifer system
- o Atlantic City "800-foot sand"
- o Wenonah-Mount Laurel aquifer
- o Englishtown aquifer
- o Potomac-Raritan-Magothy aquifer system

All but the Kirkwood-Cohansey are confined, except where they crop out or are overlain by permeable surficial deposits. NWS Earle is situated over the recharge area of many of these formations.

Water quality is generally satisfactory for drinking. Minor problems due to locally high iron concentrations occur in several aquifers, including the Potomac-Raritan-Magothy. Saline water is a problem in some coastal areas with unconfined aquifers and in deep portions of some confined aquifers.

In general, in the New Jersey Coastal Plain, the deeper aquifers are used for public water supplies, while near-surface aquifers are used for shallow domestic wells.

3.6.2 *Local Hydrogeology at NWS Earle*

Four sedimentary formations of the Coastal Plain crop out at the Main Base:

- o The Hornerstown Sand
- o The Vincentown Formation
- o The Kirkwood Formation
- o The Cohansey Sand

These units and their hydrologic significance are described in detail in Subsection 3.5 and are shown on Figure 3. All these units are recharged by direct precipitation at the surface. Of particular importance are the Vincentown, and Kirkwood Formations because they are used extensively for residential wells in the nearby area. None of the aquifers are used for municipal wells in the area. High iron content is a problem in these aquifers.

The most important groundwater aquifers in the area of NWS Earle occur in the Englishtown, Vincentown, and Kirkwood-Cohansey Formations. Natural groundwater quality in these formations is good and is generally suitable for drinking water purposes. Local high concentrations of nitrate/nitrite occur and are generally associated with higher population densities.

Regional groundwater flow from the Main Base is generally to the east/southeast. Two deep water supply wells located on the Main Base tap the Raritan-Magothy aquifer system at depths of approximately 800 feet below ground. It should be noted, that according to the Navy, the two deep water supply wells are permanently out of service. The outcrop and recharge areas of this aquifer system are located several miles north and west of the Main Base; therefore, water quality in these aquifers would not be affected by activities at NWS Earle.

The surface water flow directions follow the local topography.

4.0 *FINDINGS*

The following information was determined during the site investigation performed by K&D and review of the analytical data submitted by J&J Environmental.

1) The 1000 gallon bare steel UST previously at Building S-106 was greater than 25 years old). The tank had stored #2 fuel oil used for heating purposes. The tank failed a precision test in May of 1990. A site inspection conducted by K&D on October 16, 1990 did not reveal elevated HNu readings in the adjacent drainage swales and sanitary manhole or beneath the crawl spaces of adjacent buildings. Building S-106 was evacuated of inhabitants and the UST scheduled for removal.

2) The site characterization reported that migration of potential leakage from the UST was a concern since the site lies within the well drained sands of the Kirkwood-Cohansey Aquifer System. A review of the well search provided by the NJDEP&E revealed one (1) NJGS Case Index Site within a one-mile radius to the site. The site (designated as #668) is located on the Earle Naval Weapons Station and is approximately 0.9 mile south of Building S-106. A undefined nonvolatile organic compound has been reported. It should be noted that the NJGS Case Index Sites listing contains only some of the identified potential pollution sites, but does not include those identified after December 22, 1987. The listing does not generally include spill sites and may contain significant errors and omissions therefore this resource is to be used as a guide only.

3) The groundwater flow direction at the subject site was determined to be in a east-northeasterly direction. This flow direction was determined based on groundwater elevations from three (3) piezometers installed under the supervision of K&D (See Figure 1). The depth to groundwater measured during this investigation ranged from approximately 25-28 feet below grade.

4) A summary of the subsurface soil samples collected during the installation of the three (3) piezometers (PZ-1, PZ-2, PZ-3) and the monitoring well (MW-1 is presented below:

Sample No.	*Boring Location*	*Depth (Ft.)*	*Parameter*	Result(ppm)
PZ-01 S106 (4'-6')	PZ-01S106	4-6	TPHC*	ND
PZ-01 S106 (10'12')	PZ-01S106	10-12	TPHC*	ND
PZ-01 S106 (24'-26')	PZ-01S106	24-26	TPHC*	ND
PZ-02 S106 (4'-6')	PZ-02S106	4-6	TPHC*	ND
PZ-02 S106 (14'-16')	PZ-02S106	14-16	TPHC*	ND
PZ-02 S106 (24'-26')	PZ-02S106	24-26	TPHC*	ND
PZ-03 S106 (4'-6')	PZ-03S106	4-6	TPHC*	ND
PZ-03 S106 (14'-16')	PZ-03S106	14-16	TPHC*	ND
PZ-03 S106 (22'-24')	PZ-03S106	22-24	TPHC*	ND

Sample No.	Boring Location	Depth (Ft.)	Parameter	Result(ppm)
MW-01 (4'-6')	MW-1	4-6	TPHC*	ND
MW-01 (8'-10')	MW-1	8-10	TPHC*	ND
MW-01 (14'-16')	MW-1	14-16	TPHC*	ND
MW-01 (18'-20')	MW-1	18-20	TPHC*	8000
MW-01 (24'-26')	MW-1	24-26	TPHC*	ND
MW-01 (28'-30')	MW-1	28-30	TPHC*	ND

ND= Not Detected
* Method 418.1

Overall the results do not indicate the presence of TPHC contamination in the subsurface soils at the piezometer locations. A concentration of 8000 ppm TPHC was detected at the 18-20 foot interval of MW-1.

5) Three (3) feet of floating product was measured in monitoring well MW-1. The result of subsurface soil sample MW-01 (18-20') correlates with the floating product found in the well. A groundwater sample was not collected for chemical analysis due to the presence of the floating product.

6) A sample of the floating product was collected for a hydrocarbon fingerprint analysis. The analysis confirmed the product to be in the boiling range of diesel or #2 fuel oil.

   Overall, the results indicate serious contaminant migration into the subsurface soils and groundwater from leakage of the former UST.

7) The results of the soil samples collected by J&J Environmental during the removal of the UST and analyzed for TPHC are listed below.

Sample No.	Sample Date	Sample Location	Parameter	Result (ppm)
8	11/25/91	Sidewall	TPHC (418.1)	11659
9	11/25/91	Sidewall	TPHC (418.1)	10750
10	11/25/91	Sidewall	TPHC (418.1)	74
11	11/25/91	Sidewall	TPHC (418.1)	41
12	11/25/91	Invert	TPHC (418.1)	2474
13	11/25/91	Invert	TPHC (418.1)	8002
14	11/25/91	Invert	TPHC (418.1)	3058
15	11/25/91	Invert	TPHC (418.1)	11982
16	11/25/91	Invert	TPHC (418.1)	10596
17	11/25/91	Soil Stockpile #1*	TPHC (418.1)	12062
19	11/25/91	Soil Stockpile #2*	TPHC (418.1)	4001
21	11/25/91	Soil Stockpile #2*	TPHC (418.1)	50

*Composite Sample

A summary of the PP+40 analysis of Sample Number 16 is presented:

Volatile Organic Compounds (VOC)

Pollutant Detected	*Concentration (ppb)*
Chloroform	340J
1,1,1-Trichloroethane (TCA)	380J
Trichloroethane (TCE)	480J
Tetrachloroethane (PCE)	460J
Ethylbenzene	840
o-xylene	3000
m,p-xylene	6100

J- indicates an estimated value detected below the method detection limit (MDL).

The presence of the petroleum based volatile hydrocarbons (i.e. ethylbenzene, xylenes) are attributed to the leakage and discharge of the subject UST. Ethylbenzene and xylenes are constituents of petroleum products such as gasoline, diesel and #2 heating oil.

The presence of the chlorinated VOC (chloroform, TCA, TCE, PCE) is not attributed to the UST but may indicate another source. The detected chlorinated hydrocarbons are common industrial solvents. It was reported in the well search that a undefined non-volatile organic compound not a volatile organic compound had been detected in a nearby potable well. NO

A source of the chlorinated volatile hydrocarbon was not identified during this limited investigation. It should be noted the dilution factor was 1:125 due to the high concentrations of ethylbenzene and xylenes. This dilution factor therefore caused an increase in the MDL which in turn caused the concentrations of the chlorinated volatile hydrocarbons to be flagged with a "J" qualifier. The concentrations are significant and warrant further investigation since this soil sample was collected approximately five (5) feet above the water table.

VOC TICs

The total concentration of the thirteen (13) TICs detected in the library search was 61.08 ppm. The majority of the total concentration were attributed to unknowns. The high concentration are presumably attributed to the leakage of the UST.

Semi-Volatile Organic Compounds (SVO)

The SVO are subdivided into two (2) subgroups, the base/neutral (B/N) and acid extractable organic compounds. A total of five (5) B/N were detected.

Pollutant Detected	*Concentration (ppb)*
2-Methylnaphthalene	22000
Fluorene	7100
Phenanthrene	13000
Anthracene	1100J
Pyrene	1700J

These compounds are constituents of #2 fuel oil and thus their presence is attributed to the leakage of the UST.

SVO TICs

Twenty five (25) unknown hydrocarbons and unknown polycyclic aromatic hydrocarbons (PAH) were detected in the library search. The accumulative total concentration was 1,516 ppm. The high concentrations are attributed to the leaking UST.

Pesticides and Polychlorinated Biphenyl (PCBs)

Pesticides and PCBs were not detected in Sample Number 16.

Inorganics and Total Phenols

Cyanide was not detected in the soil sample. Total phenols were detected at a concentration of 18.3 ppm.

The following six (6) metals were present.

Metal	*Concentration (ppm)*
Arsenic	19.15
Beryllium	1.2
Chromium	198.7
Lead	6.17
Selenium	1.99
Zinc	9.74

Subsurface soil cleanup levels are addressed on a case by case basis by the NJDEP&E. The concentrations of arsenic and chromium detected may warrant further investigation due to the proximity of groundwater to this sample collection point.

8) The results of the surface water sample collected from the concrete swale located north- northwest of the UST are presented below:

VOC

No VOC or VOC TICs were detected in Sample Number WS-1.

SVO

Two (2) base neutral extractable organic compounds were detected. Di-n-octylphthalate and bis (2-ethylhexyl) phthalate were detected at 3.2J and 5.1JB, respectively. These estimated results are not considered significant due to the very low concentrations and the type of contaminants present. The phthalates detected are common environmental contaminants through their widespread use as plasticizers and carriers in commercial products, including food packaging and are also found as laboratory artifacts. The qualifier "B" denotes that bis (2-Ethylhexyl) phthalate was indeed present in the laboratory method blank.

5.0 *CONCLUSIONS AND RECOMMENDATIONS*

Based on the investigation conducted by K&D and a review of the UST removal performed by J&J Environmental it is concluded that the subsurface soils and groundwater at Building S-106 have been severely contaminated. This conclusion is based on the high concentrations of TPHC present in the post excavation samples collected by J&J Environmental and the three feet of floating product present in monitoring well MW-1.

The source of the petroleum based VOC and SVO contamination discussed in Section 4.0 is attributed to the documented high leakage rate of the 1000 gallon base steel No. 2 heating fuel oil UST. The presence of the chlorinated VOC is not attributed to this UST and may indicate another contaminant source.

The presence of significant concentrations of VOC and SVO was not detected in the surface water sample collected from a nearby concrete swale. The sample was collected as an evaluation of surface water impact from this leakage or an possible off-site source. The other surface water proposed in the initial scope of work were not collected due to lack of water in the drainage systems.

It is concluded that the source of the petroleum based contamination has been eliminated through the removal of the UST and excavation of the surrounding soil. Serious contamination in the subsurface soils and groundwater in the immediate area of the former tank location do remain even though this source has been eliminated. The soil samples collected during the installation of the three (3) piezometers did not indicate contamination in those areas.

The immediate and imminent health hazard associated with this contamination was minimized by the evacuation of Building S-106. A site inspection conducted by K&D on October 16, 1990 did not reveal elevated HNu readings in the adjacent drainage swales, a nearby sanitary manhole or beneath the crawl spaces of adjacent building.

The UST, associated product and 320.61 tons of I.D. 27 soils were removed by J&J Environmental during November and December of 1991. The soils were scheduled for receipt by Gerald Moore & Sons, Inc., Exmore, Virginia for treatment. Treatment of this material was reported to be through asphalt and/or road bedding recycling. Copies of the non-hazardous material manifests and site entry tickets are submitted as Appendix H. The soil excavation conducted around the UST was conducted to remove the most grossly contaminated soils containing free product or highest degree of residual saturation.

Based on the conclusions of the limited investigation by K&D and the review of the UST removal, the following recommendations are offered. The scope of the limited investigation by K&D was to determine the presence of any subsurface and groundwater contamination associated with the subject UST.

1) It is imperative that a immediate free product recovery system be installed in the former UST location. It is recommended that the recovery of the free floating hydrocarbons be initiated utilizing a "skimmer/pneumatic" or mechanical recovery pump and float system. This type of system adjusts to changing water levels in the recovery well automatically thereby recovering only the free floating product. The existing monitoring well (MW-1) can be easily converted to accommodate this system. The recovered product should be transferred to a tanker truck stored on site for pending disposal/reuse.

2) Estimate free hydrocarbon volume and recoverability. This involves a number of factors and assumptions including time versus apparent hydrocarbon thickness, validity of bail down tests, extrapolation of free product thickness between monitoring points, porosity, and estimations of specific yield and retention. In many cases only 20 to 50 percent of the total pore volume of free hydrocarbons product is recoverable by conventional means. In general, recovery limitations depend on relative permeability of the fluids, areal distribution and geometry of the hydrocarbon pool, and other site specific factors.

3) Delineation of the contaminant plume may include additional monitoring wells, piezometers, soil gas investigation, geophysics, etc. In turn isopleth maps of dissolved product concentrations and product thickness as well as additional groundwater contour maps should be prepared.

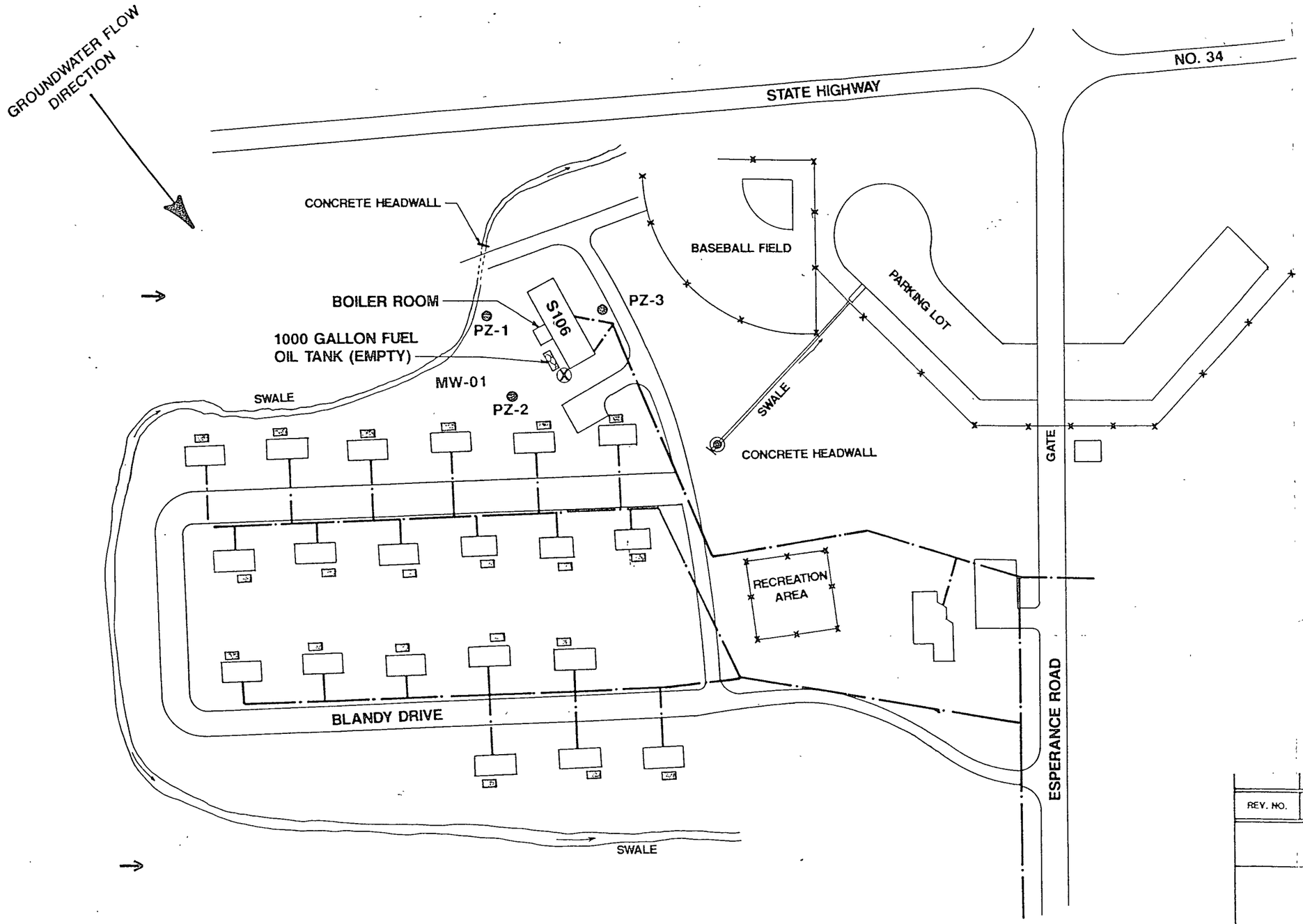
4) Further detailed investigation of the hydrogeological condition at the site is necessary. This may entail the installation of addition piezometers and monitoring wells and initiation of pump/draw down bail test(s). This information will be used to determining site specific aquifer characteristics such as transmissibility, storage coefficient, velocity, permeability etc. This data would be used to determine groundwater flow velocity, site specific variations in flow directions and ultimately the nature and extent, as well as the fate and transport of the contaminants.

5) From preliminary data gathered during tank decommissioning procedures, the initial method of remediation, after skimming operations are completed, would appear to be a "pump and treat" scenario. This type of system creates a cone of depression to capture or draw in recoverable petroleum based hydrocarbons. This would entail a two pump groundwater depressant system with an oil/water separator. The recovered product can be stored in the above referenced tanker for ultimate disposal/reuse. The contaminated groundwater could possibly be discharged into the Earle sewage treatment facility pending approval of proper permits. The method chosen must demonstrate hydraulic control over the free and dissolved product based on the hydrogeological conditions at the site.

6) The remediation of the dissolved petroleum based hydrocarbons as well as the chlorinated VOC would require further treatment. This may entail the use of air stripping tower(s), soil vapor extraction, carbon adsorption and/or bioremediation.

7) In accordance with NYDEP&E regulations, accurate records of product recovery and groundwater pumpage must be maintained. Static water levels and product thickness must be recorded on a monthly basis. All electrical equipment and storage containers used during the investigation and the corrective action must conform with all federal, state and local fire codes. It is recommended that the local health department be keep abreast of all activities. It may be required that the nearest potable well(s) within the anticipated path of the contaminant plume be sampled.

8) K&D can not determine the most feasible available remedial methodologies or provide an estimate relative to the overall costs and duration of the pending remedial activities. These costs, remediation designs and the project duration would be dependent upon the generation of the data and information beyond the initial plan of action.



LEGEND

- DRAINAGE
- SWALE
- SANITARY SEWER
- GRADE
- APPROXIMATE PIEZOMETER LOCATION
- APPROXIMATE MONITORING WELL LOCATION
- 1000 GALLON FUEL OIL TANKS
- SURFACE WATER SAMPLE
- 1000 GALLON FUEL OIL TANK REMOVED

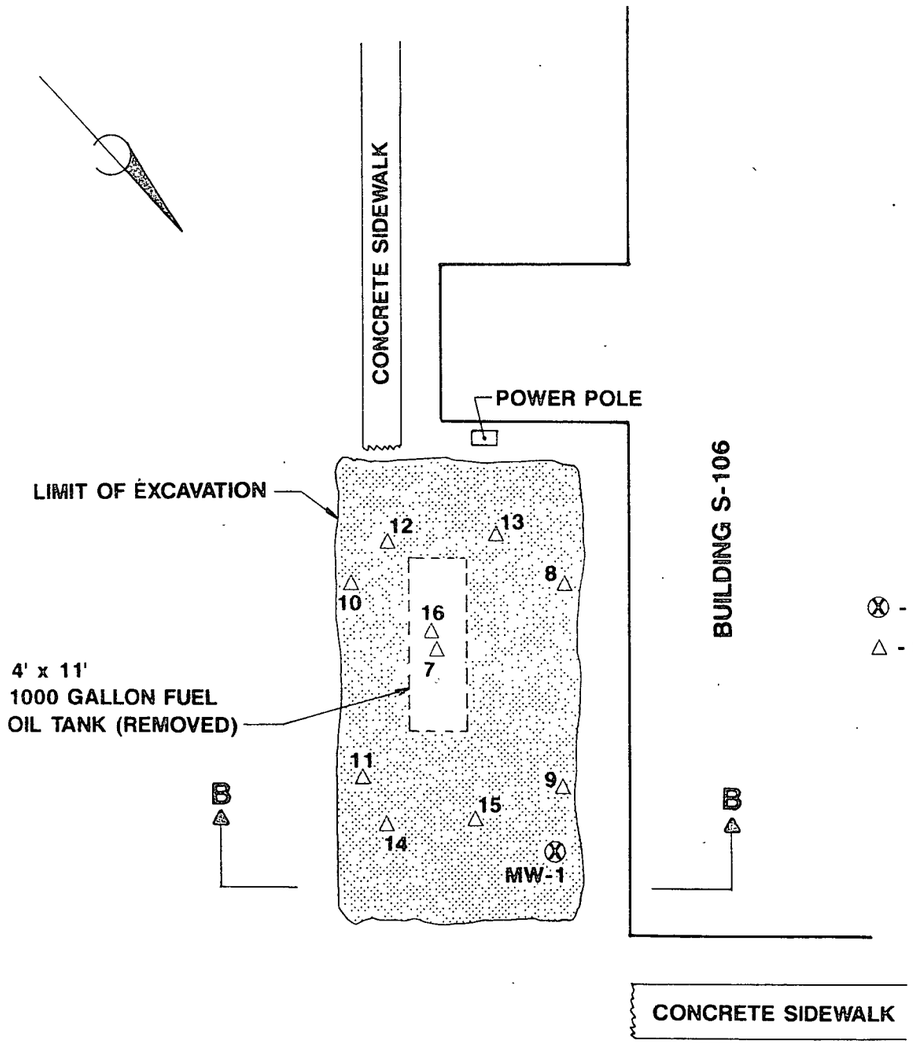
N

REV. NO.	DATE	REVISION DESCRIPTION

SITE PLAN

U.S. NAVAL WEAPONS STATION
BUILDING S-106
EARLE, NEW JERSEY

Drawn By: M.S.	Kaselaan & D'Angelo Associates, Inc.	Scale: N.T.S.
Approved By:	Engineering & Land Surveying Environmental Consultants 515 Grove Street, Haddon Heights, N.J. 08035 (609) 547-6500	Sheet: Figure 1
Date: 6/10/92		Drawing No.: 21-1629-24

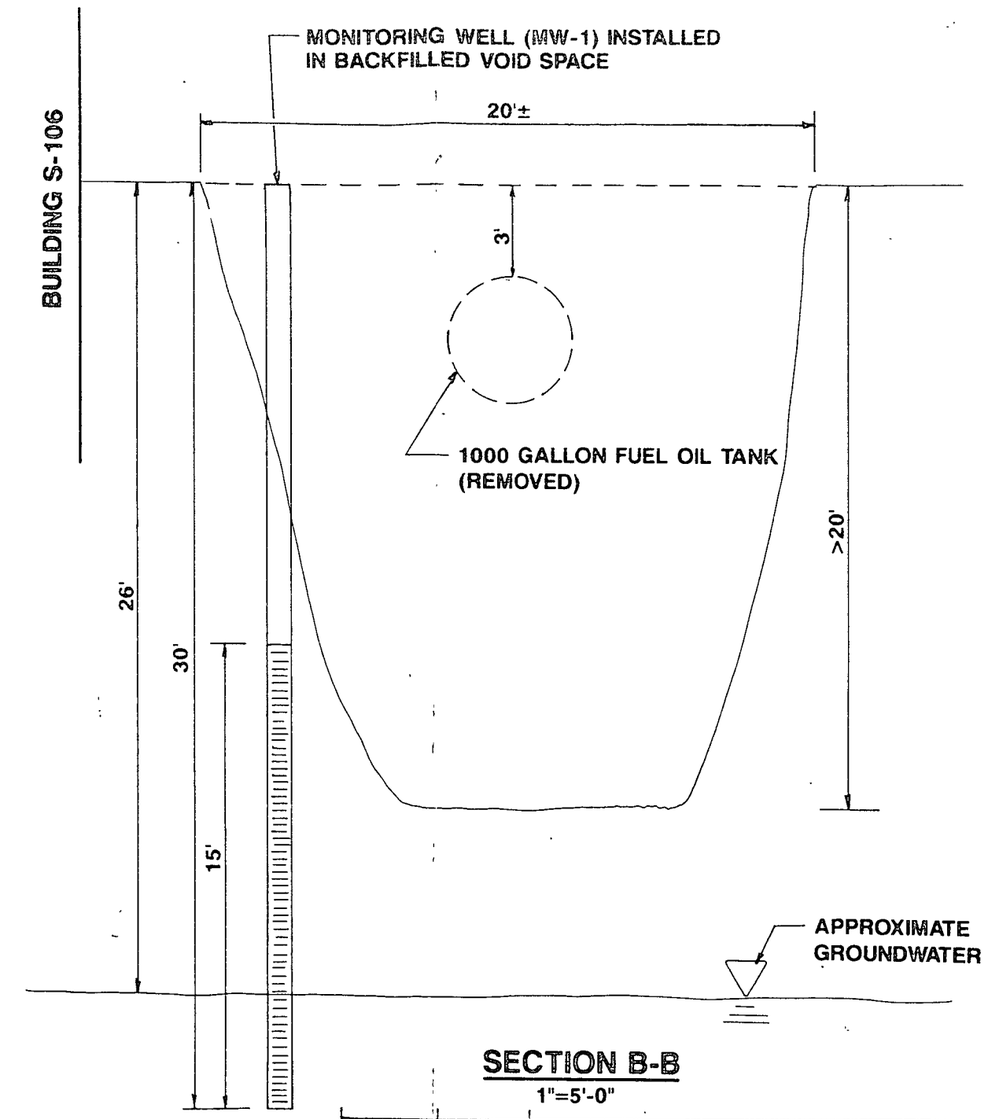


⊗ - MONITORING WELL LOCATION

△ - SOIL SAMPLE LOCATION

DETAIL A

N.T.S.



SECTION B-B

1"=5'-0"

REV. NO.	DATE	REVISION DESCRIPTION

SITE PLAN DETAILS

U.S. NAVAL WEAPONS STATION
BUILDING S-106
EARLE, NEW JERSEY

Drawn By: M.S.	Kaselaan & D'Angelo Associates, Inc.	Scale: AS NOTED
Approved By:	Engineering & Land Surveying Environmental Consultants	Sheet: Figur 2
Date: 6/10/92	515 Grove Street, Haddon Heights, N.J. 08035 (609) 547-6500	Drawing No.: 1629-024

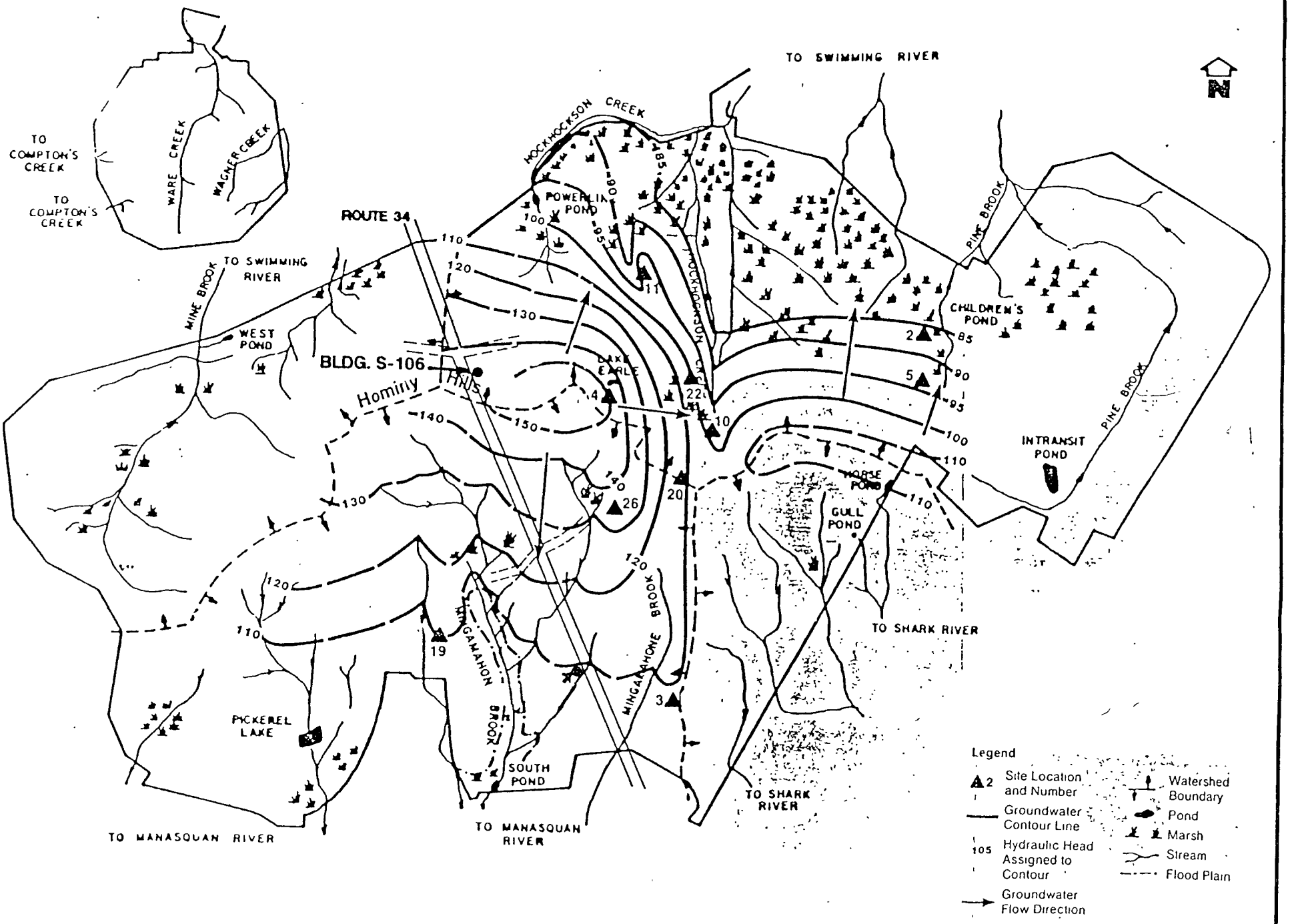

TO COMPTON'S CREEK
TO COMPTON'S CREEK
WARE CREEK
WAGNER CREEK
TO SWIMMING RIVER
MOCKHOCKSON CREEK
ROUTE 34
POWERLIN POND
MINE BROOK
TO SWIMMING RIVER
WEST POND
BLDG. S-106
Hominy Hills
LAKE EARLE
MOCKHOCKSON CREEK
PINE BROOK
CHILDREN'S POND
INTRANSIT POND
PINE BROOK
HORSE POND
GULL POND
TO SHARK RIVER
MINGAMAHONE BROOK
MINGAMAHONE BROOK
PICKEREL LAKE
SOUTH POND
TO SHARK RIVER
TO MANASQUAN RIVER
TO MANASQUAN RIVER
N
Legend
Site Location and Number
Groundwater Contour Line
Hydraulic Head Assigned to Contour
Groundwater Flow Direction
Watershed Boundary
Pond
Marsh
Stream
Flood Plain

FIGURE 3

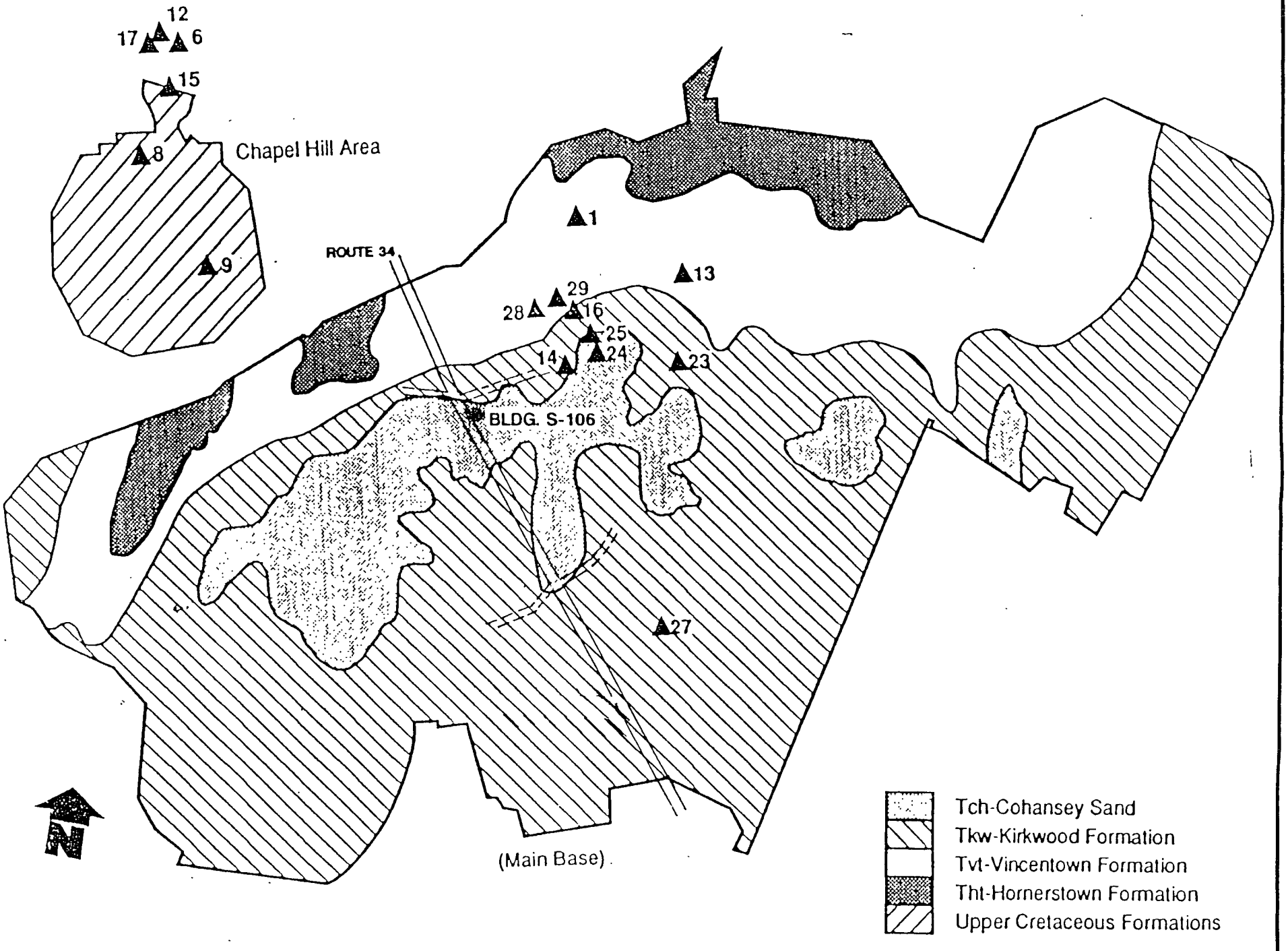

12
17
6
15
8
Chapel Hill Area
9
ROUTE 34
1
13
29
28
16
25
24
14
23
BLDG. S-106
27
(Main Base)
N
Tch-Cohansey Sand
Tkw-Kirkwood Formation
Tvt-Vincentown Formation
Tht-Hornerstown Formation
Upper Cretaceous Formations

FIGURE 4

APPENDICES

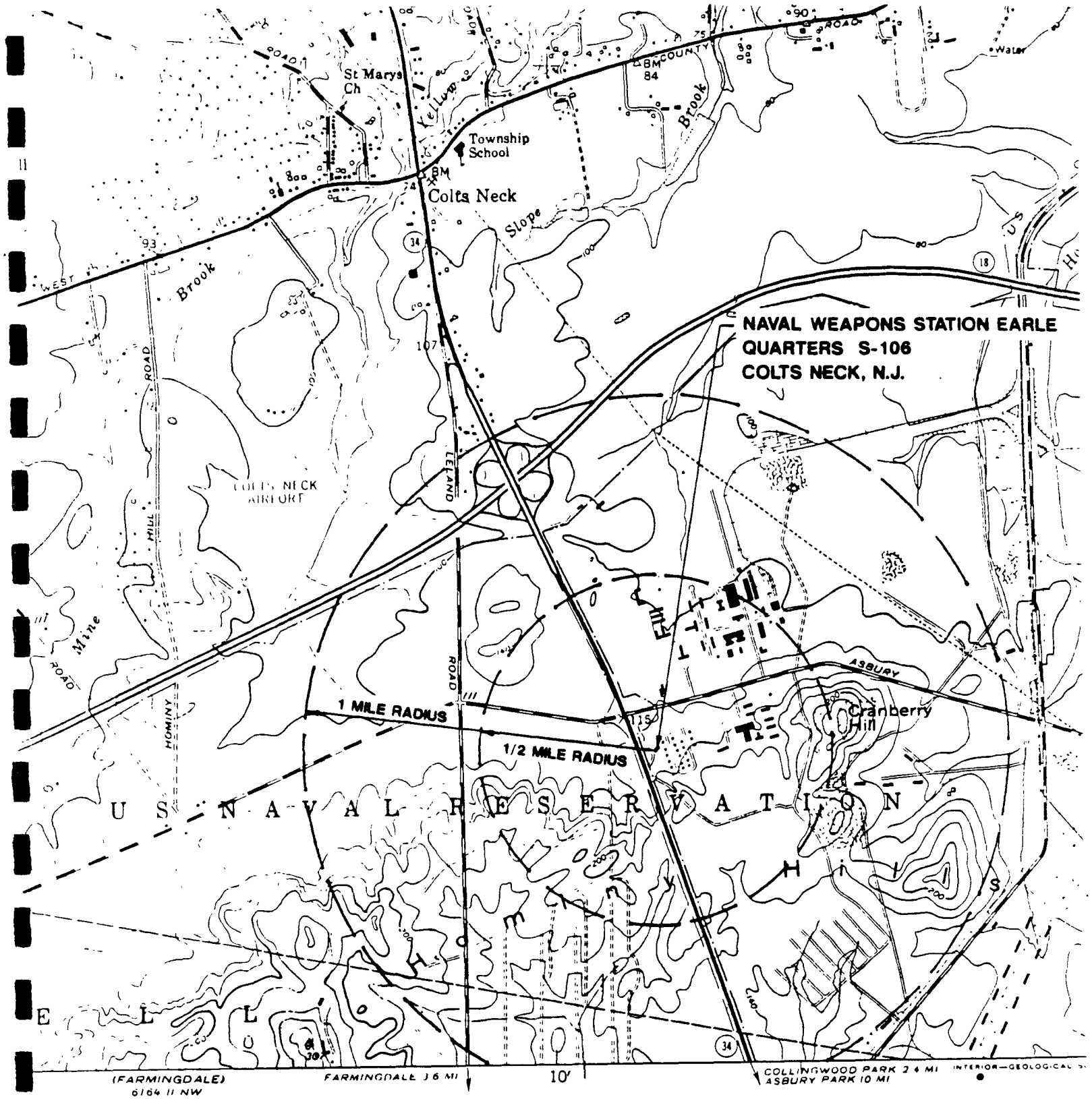
APPENDIX A

Well Search

Sheet 29

40
14

7408



SCALE 1 24000

1 MILE

5000 0000 FEET

1 KILOMETER

CONTOUR INTERVAL 20 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

MARLBORO QUAD

Heavy-duty
Medium-duty
U S Route

NEW JERSEY

QUADRANGLE LOCATION

U S GEOLOGICAL SURVEY, RESTON, VIRGINIA 22092
TOPOGRAPHIC MAPS AND SYMBOLS IS AVAILABLE ON REQUEST

Revisions shown in purple compiled by the Geological Survey from aerial photographs taken 1976 and other sources This information not field checked. Map edited 1981

Purple tint indicates extension of urban areas

NEW JERSEY RECTANGULAR COORDINATE GRID SYSTEM

for

THE LOCATION OF WELLS

The rectangular coordinate system is a seven digit number based upon the State Atlas Sheets, note the diagram on the following page. The first two digits of the number refers to the number of the State Atlas Sheet. The second two digits represent one of twenty-five blocks, each made up of six minutes of latitude and longitude. The fifth digit represents one of nine rectangles (contained within each block) which each consist of two minutes of latitude and longitude. The sixth digit represents one of nine smaller rectangles (contained within each rectangle) called a square. The seventh digit represents one of nine even smaller rectangular units (contained within each square) called a unit.

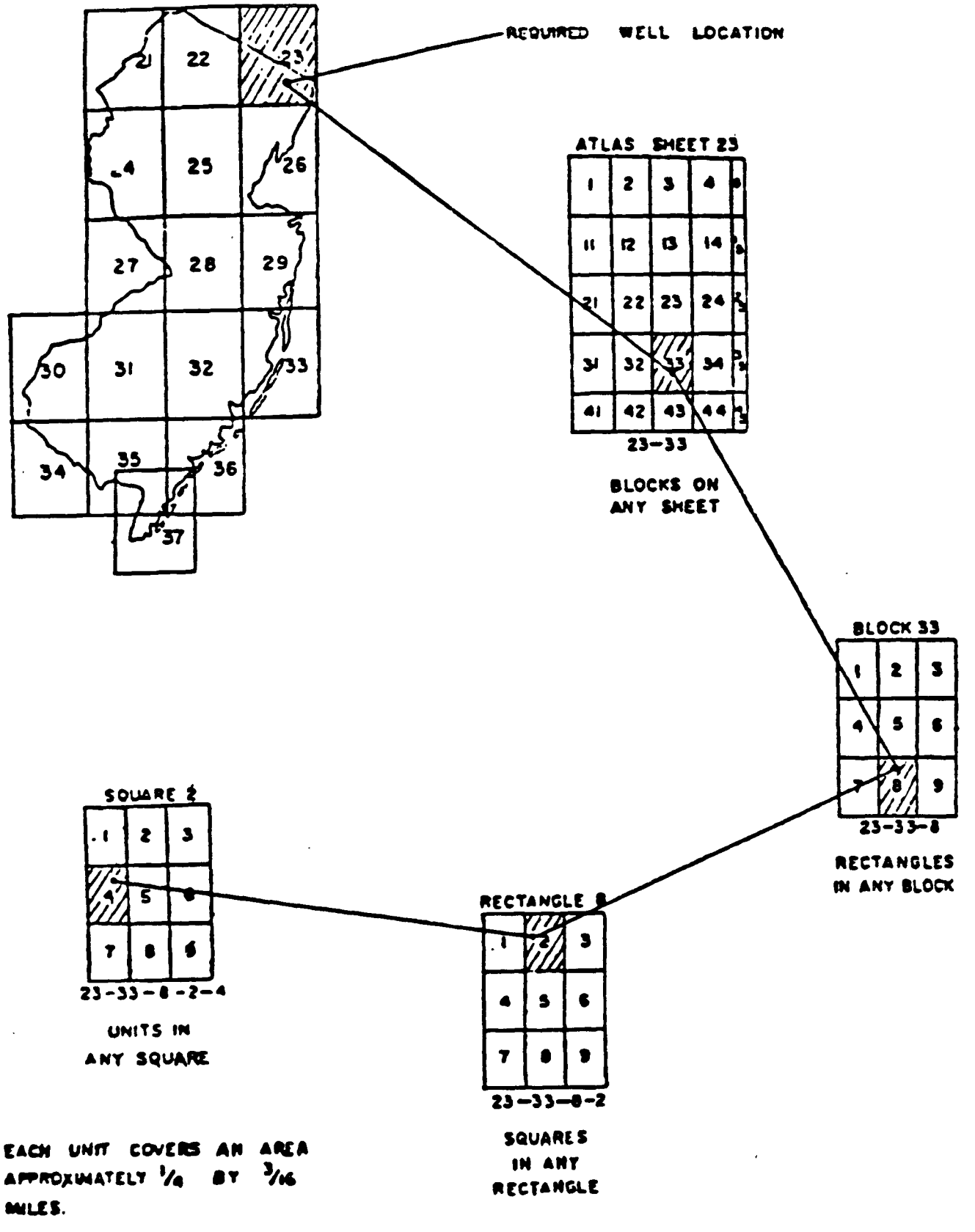
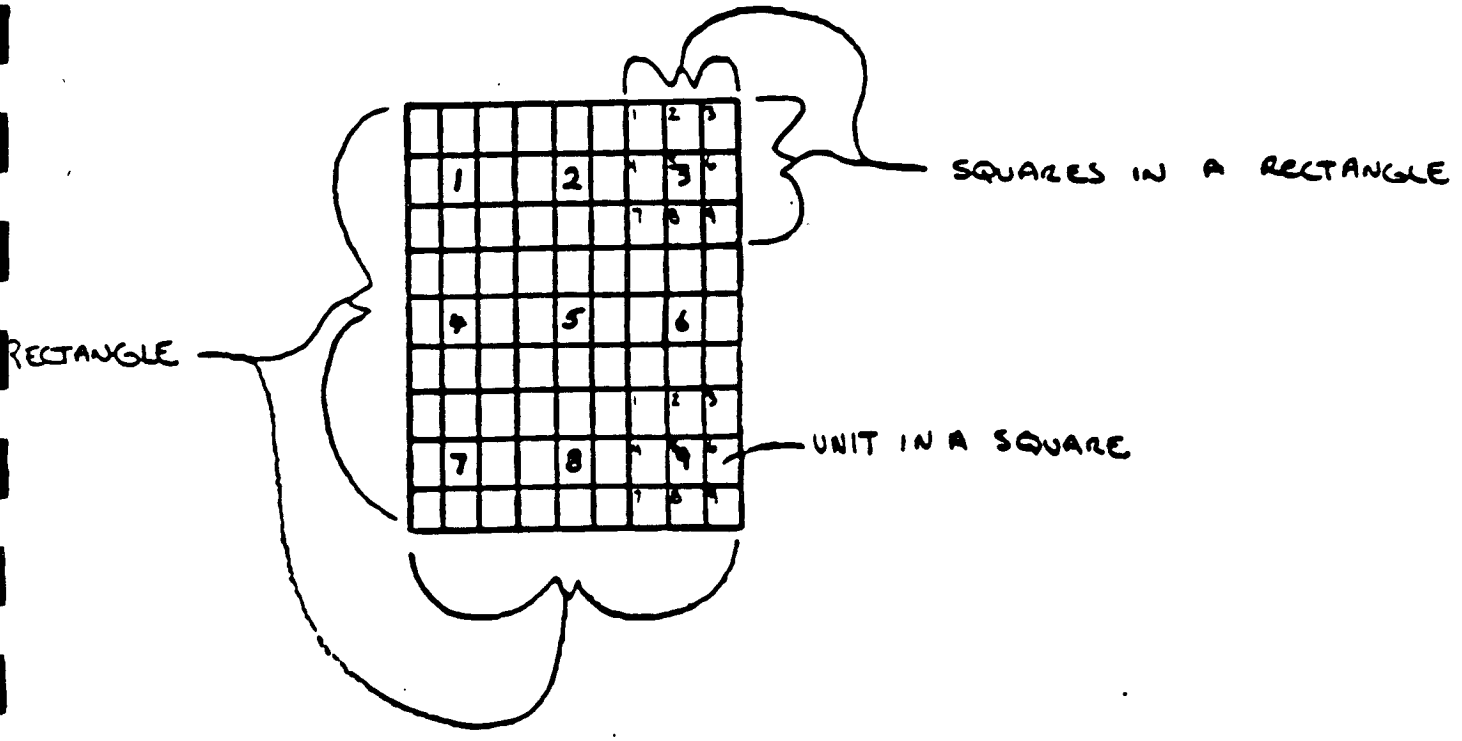
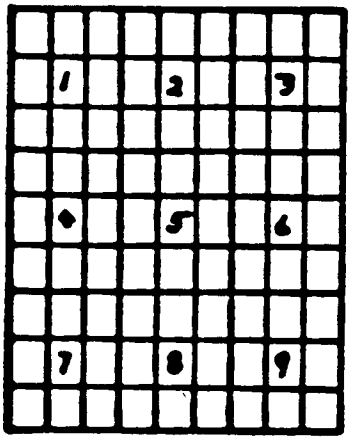
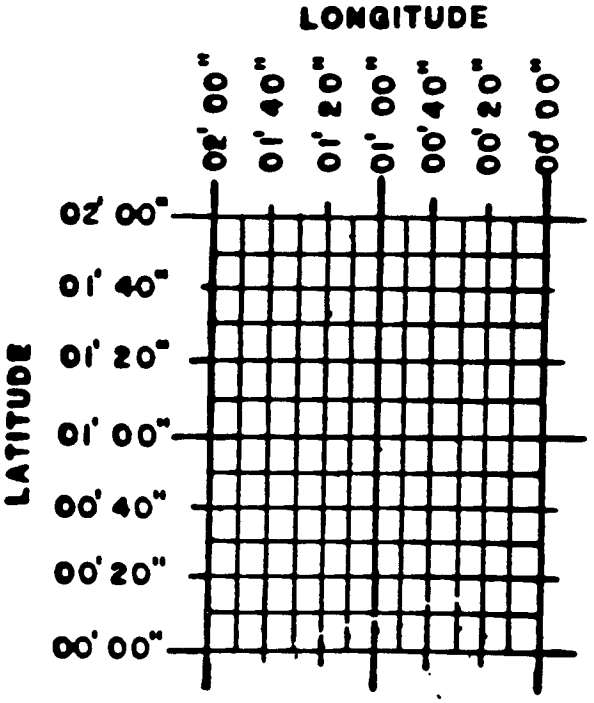


DIAGRAM SHOWING USE OF NEW JERSEY RECTANGULAR COORDINATE SYSTEM SAMPLE WELL LOCATED AT 23-33-8-2-4


SQUARES IN A RECTANGLE
RECTANGLE
UNIT IN A SQUARE





77 feet/sec long
101 feet/sec lat

State f New Jersey
Department of Environmental Protection and Energy
Water Technical Programs
CN 029
Trenton, NJ 08625-0029
Tel. # 609-292-1623
Fax. # 609-292-1654

Scott A. Weiner
Commissioner

James E. Mumman
Administrator

The well survey that you have requested includes the wells that are currently contained in the Water Allocation Files which relate to the area in question. Recognizing the fact that not all well records have been submitted, wells installed before 1947 are not included and that there can be errors in location, it is advisable to use this resource as a guide. The Bureau recommends that a field survey of the area in question be performed in order to verify all data. We try to maintain accurate well records; however, well locations are only as accurate as the information suppli d by the drilling company. Therefore, we cannot guarantee their reliability. Local Health Departments should also be contacted concerning the locations of wells within their jurisdiction. Please call or write to us in reference to "Well Surveys" at :

New Jersey Department of Environmental Proection & Energy
Water Technical Programs
Bureau of Water Allocation
CN - 029
Trenton, New Jersey 08625

(609) 292-2957

Thank You.

bc/la.survey

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Recycled Paper

Form DWR-138
11/80

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES

Coord: 1912699

PERMIT NO. 291 1334

APPLICATION NO. _____

COUNTY Monmouth

WELL RECORD

1. OWNER MAR-JEN BUILDERS ADDRESS 2490 KIPLING AVE.

Owner's Well No. _____ SURFACE ELEVATION _____ Feet (Above mean sea level)

2. LOCATION Lot: 12 Block: 47 Municipality: Colts Neck Twp.

3. DATE COMPLETED 3/20/85 DRILLER Tiger Construction Corp.

4. DIAMETER: Top 4 inches Bottom 4 inches TOTAL DEPTH 300 Feet

5. CASING: Type PVC Diameter 4 Inches Length 288 Feet

6. SCREEN: Type PVC Size of Opening .036/.008 Diameter 3/3 Inches (284/16/276) Length 12 Feet

Range in Depth { Top _____ Feet / Bottom _____ Feet } Geologic Formation Englishtown

Tail Piece: Diameter _____ Inches Length _____ Feet

7. WELL FLOWS NATURALLY _____ Gallons per minute at _____ Feet above surface

Water rises to _____ Feet above surface

8. RECORD OF TEST: Date 3/20/85 Yield 90 Gallons per minute

Static water level before pumping 60 Feet below surface

Pumping level 120 feet below surface after 1 hours pumping

Drawdown ~~[illegible]~~ 60 Feet Specific Capacity 1 Gals. per min. per ft. of drawdown

How pumped air How measured surface

Observed effect on nearby wells none

9. PERMANENT PUMPING EQUIPMENT:

Type submersible Mfrs. Name Goulds

Capacity 25 G.P.M. How Driven electric H.P. 2 R.P.M. 3450

Depth of Pump in well _____ Feet Depth of Footpiece in well _____ Feet

Depth of Air Line in well _____ Feet Type of Meter on Pump _____ Size _____ Inches

10. USED FOR public-noncommunity AMOUNT { Average 1000 Gallons Daily / Maximum 2000 Gallons Daily }

11. QUALITY OF WATER Good Sample: Yes ✓ No _____

Taste _____ Odor _____ Color _____ Temp. _____ °F.

12. LOG See back Are samples available? Yes

(Give details on back of sheet or on separate sheet. If electric log was made, please furnish copy.)

13. SOURCE OF DATA Driller

14. DATA OBTAINED BY Kenneth B. Lauer Date 6/21/85

(NOTE: Use other side of this sheet for additional information such as log of materials penetrated, analysis of the water, sketch map, sketch of special casing arrangements, etc.)

Form DWR-138
11/80

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES

Code: 291.69%

PERMIT NO. 291815

APPLICATION NO. _____

COUNTY Ocean

WELL RECORD

1. OWNER MR-JEN BUILDERS ADDRESS 2250 KIPLING AVE.

Owner's Well No. _____ SURFACE ELEVATION _____ Feet (Above mean sea level)

2. LOCATION Lot: 14 Block: 47 Municipality: Co. Neck Twp.

3. DATE COMPLETED 3/20/85 DRILLER Tiger Construction Corp.

4. DIAMETER: Top 4 inches Bottom 4 inches TOTAL DEPTH 300 Feet

5. CASING: Type PVC Diameter 3/4 Inches Length 288 Feet

6. SCREEN: Type PVC Size of Opening .006" Diameter 3 Inches Length 12 Feet

Range in Depth { Top 288 Feet / Bottom 300 Feet } Geologic Formation Englishtown

Tail Piece: Diameter _____ Inches Length _____ Feet

7. WELL FLOWS NATURALLY _____ Gallons per minute at _____ Feet above surface

Water rises to _____ Feet above surface

8. RECORD OF TEST: Date 3/20/85 Yield 60 Gallons per minute

Static water level before pumping 60' Feet below surface

Pumping level 120' feet below surface after 1 hours pumping

Drawdown 60 Feet Specific Capacity 1 Gals. per min. per ft. of drawdown

How pumped all How measured surface

Observed effect on nearby wells none

9. PERMANENT PUMPING EQUIPMENT:

Type submersible Mfrs. Name Goulds

Capacity 25 G.P.M. How Driven electric H.P. 2 R.P.M. 3450

Depth of Pump in well _____ Feet Depth of Footpiece in well _____ Feet

Depth of Air Line in well _____ Feet Type of Meter on Pump _____ Size _____ Inches

10. USED FOR public - noncommunity AMOUNT { Average 1000 Gallons Daily / Maximum 2000 Gallons Daily }

11. QUALITY OF WATER good Sample: Yes ✓ No ____

Taste _____ Odor _____ Color _____ Temp. _____ °F.

12. LOG see back Are samples available? no

(Give details on back of sheet or on separate sheet. If electric log was made, please furnish copy.)

13. SOURCE OF DATA driller

14. DATA OBTAINED BY Dennis B. Baker Date 6/21/85

(NOTE: Use other side of this sheet for additional information such as log of materials penetrated, analysis of the water, sketch map, sketch of special casing arrangements, etc.)

27-12-892

DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES

Permit No. 27-7120
Application No. _____

WELL RECORD

OWNER _____ ADDRESS _____

Owner's Well No. _____ SURFACE ELEVATION 110 Feet (above mean sea l vel)

LOCATION Leland Road

DATE COMPLETED _____ DRILLER _____

DIAMETER: top 7 7/8 inches Bottom _____ inches TOTAL DEPTH 325 Feet

CASING: Type _____ Diameter _____ inches Length 325 Feet

SCREEN: Type _____ Size of Opening _____ Diameter _____ inches Length 325 Feet

Range in Depth Top _____ Feet Bottom _____ Feet Geologic Formation _____

Tail piece: Diameter _____ inches Length _____ Feet

WELL FLOWS NATURALLY 10 Gallons per Minute at _____ Feet above surfac

Water rises to _____ Feet above surface

RECORD OF TEST: Date _____ Yield _____ Gallons per minute

Static water level before pumping _____ Feet below surface

Pumping level _____ feet below surface after _____ hours pumping

Drawdown _____ Feet Specific Capacity _____ Gals. per min. per ft. of drawdown

How Pumped _____ How measured _____

Observed effect on nearby wells _____

PERMANENT PUMPING EQUIPMENT:

Type _____ Mfrs. Name _____

Capacity _____ G.P.M. How Driven _____ H.P. _____ R.P.M. _____

Depth of Pump in well _____ Feet Depth of Footpiece in well _____ Feet

Depth of Air Line in well _____ Feet Type of Meter on Pump _____ Size _____ inches

USED FOR domestic AMOUNT Average _____ Gallons Daily Maximum _____ Gallons Daily

QUALITY OF WATER _____ Sample: Yes _____ No. _____

Taste _____ Odor _____ Color _____ Temp. _____ °F

LOG _____ Are samples available? _____

(Give details on back of sheet or separate feet. If electric log as made, please furnish copy.)

SOURCE OF DATA _____

DATA OBTAINED BY _____ Date _____

(Note: Use either side of this sheet for additions. Information such as log of materials penetrated analysis of the water, sketch map, sketch of specific casing arrangements, etc.)

29-12 84.2

FORM 87

DEPARTMENT OF CONSERVATION
AND ECONOMIC DEVELOPMENT
DIVISION OF WATER POLICY & SUPPLY

Permit No. _____
Application No. _____
County _____

WELL RECORD

1. OWNER Mr. Anthony Rozycki ADDRESS R.D.1., Box 9, Colts Neck, N
   Owner's Well No. _____ SURFACE ELEVATION 140 Feet (Above mean sea level)
2. LOCATION Colts Neck, N. J.
3. DATE COMPLETED Jan. 12, 1966 DRILLER Kaye Well Drilling, Inc.
4. DIAMETER: top _____ Inches Bottom _____ Inches TOTAL DEPTH 226 Feet
5. CASING: Type Black Steel Diameter 4 Inches Length _____ Feet
6. SCREEN: Type Cook Size of Opening 16 Diameter 4 Inches Length 12 Feet
   Range in Depth { Top _____ Feet / Bottom _____ Feet } Geologic Formation _____
   Tail piece: Diameter _____ Inches Length _____ Feet
7. WELL FLOWS NATURALLY _____ Gallons per Minute at _____ Feet above surface
   Water rises to _____ Feet above surface
8. RECORD OF TEST: Date Jan. 12, 1966 Yield 10 Gallons per minute
   Static water level before pumping 43 Feet below surface
   Pumping level 120 feet below surface after _____ hours pumping
   Drawdown _____ Feet Specific Capacity _____ Gals. per min. per ft. of drawdown
   How Pumped Cylinder How measured 50 Gal. Drum
   Observed effect on nearby wells _____
9. PERMANENT PUMPING EQUIPMENT:
   Type _____ Mfrs. Name _____
   Capacity _____ G.P.M. How Driven _____ H.P. _____ R.P.M. _____
   Depth of Pump in well _____ Feet Depth of Footpiece in well _____ Feet
   Depth of Air Line in well _____ Feet Type of Meter on Pump _____ Size _____ Inches
10. USED FOR Domestic AMOUNT { Average _____ Gallons Daily / Maximum _____ Gallons Daily }
11. QUALITY OF WATER Good Sample: Yes _____ No. _____
    Taste Good Odor None Color Clear Temp. _____ °F
12. LOG _____ Are samples available? _____
    (Give details on back of sheet or on separate sheet. If electric log was made, please furnish copy)
13. SOURCE OF DATA Drillers
14. DATA OBTAINED BY W. McClellan Date Jan. 14, 1966
    Kaye Well Drilling, Inc.

(NOTE: Use other side of this sheet for additional information such as log of materials penetrated, analysis of the water, sketch map, sketch of special casing arrangements etc.)

Form DWR-138
11/85

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES

WELL RECORD

Well Permit No. 29 17551
Atlas Sheet Coordinates 29 12 892

OWNER IDENTIFICATION - Owner GAETANO, JOSEPH
Address BOX 371
City EATONTOWN State NJ Zip Code
(WR.4D)

WELL LOCATION - If not the same owner please give address. Owner's Well No.
Address Property: Leland Road, Colts Neck, NJ
County Cty: Monmouth Municipality COLTS NECK TWP Lot No. 3/10 Block No. 47

WELL USE WITHDRAWAL Status IN USE

WATER USE DOMESTIC Average 1,000 gals. daily Maximum 2,000 gals. daily

WELL CONSTRUCTION Date well completed COMPLETED: 87/01/02
BOREHOLE DIMENSIONS Depths: Total TD: 310 ft. Finished ft.
Diameter: Top 8.5" in. Bottom --- in.
Land Surface Elevation at well E: 100 ft. Elevation was determined using Topographic map
Casing Height (stick-up) above land surface 1.5' ft.

	DEPTH TO TOP (FT.)	LENGTH (FT.)	DIAMETER (IN.)	TYPE AND MATERIAL Screens Note Slot Size(s)
Casing 1		L: 295	4.0"	Sched 40 PVC
Casing 2				
Casing 3				
Screen 1	Top: 295	10'	4.0"	Sched 40 PVC7.020
Screen 2				
Tail Piece		5'	4.0"	Sched 40 PVC
Gravel Pack	Top: 285	25'	8.5"	.025 Blended
Grout	Surface	L: 285		200 Mesh Bentonite
Grouting Method	Pressure thru tremie pipe			

WELL FLOWS NATURALLY gals. per min. at ft. above the land surface.
Water rises to ft. above the land surface.

Test Date: 87/01/02

RECORD OF TEST Test Date / / Level: 225
Static water-level before pumping S: 84 ft. below land surface. Water level ft. below land surface after 1 hrs. of pumping.
Water level was measured using estimated Drawdown DD: 141 ft.
Discharge rate measured using measured container Discharge Rate Yield: 20 gals. per min.
Well was pumped using Air Lift Specific Capacity Sp. C: 0.1 gals. per min. per ft. of drawdown
Observed effects on nearby wells none
Water Quality (taste, odor, color, etc.) good

PERMANENT PUMPING EQUIPMENT Installed by PICKWICK WELL DRLG Pump Type Submersible
Mfrs. Name Gould/ Model Model: Gould 10EJ10422
CAPACITY: Pump delivers : 12 gpm at 40 PSI pressure.
POWER: : 1 HP at 3450 RPM Power Source Electric
DEPTHS: Pump Set: 160 ft. Footpiece ft. Airline ft.
FLOW METER: Model installed on in. diameter pipe.

CONTRACTOR - Name of Drilling Contractor PICKWICK WELL DRILLING
Address P.O. Box 6, Farmingdale, NJ 07727 (201 938 5300)
City State Zip Code
Name of Driller Norman Primost J 1040 License No.
N

Signature of Contractor Date 3 / 14 / 87

COPIES: White - DEP Canary - Driller Pink - Owner Goldenrod - Health Dept.

Form DWH-138
11/85

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES

WELL RECORD

Well Permit No. 29-17551
29 12.892

Driller: Please use the space below for the log description. Note water bearing zones or geological formation.

Are samples available? ☐ Yes ☒ No

Drilling Method: Mud Rotary

Type of Rig: T.H. Drive

Aquifer/Geo. Fm.: KET

DEP USE ONLY

Storet Hydrogeo Code ____
USGS Hydrogeo Code ____
Depth to Bedrock ____ ft
Bedrock Lith Code ____
Bedrock Fm Code ____

Completed by ____
Date ____ / ____ / ____

LOG

		Thick.	Lith.	Fm
0-25	Coarse brown sand with some pebbles and gravel			
25-55	Dark green sandy clay			
55-65	Dark green sandy clay with some med. and course green sand and a trace of shells			
65-130	Med and coarse green sand with some green clay			
130-135	Med and coarse green sand with some gray silty clay			
135-165	Sandy and silty gray clay			
165-225	Sandy and silty gray clay with a trace of shells			
225-295	Very fine gray sand with gray silty clay			
295-310	Very fine gray sand with bulk			

GWPI No. ____ - ____ NJPDES No. ____ - ____

Latitude ____ ° ____ ' ____ " Longitude ____ ° ____ ' ____ "

Lat-Long Accuracy ☐ 1" ☐ 5" ☐ 10' ☐ 20"

USGS Quadrangle ____

Drainage Basin Code ____ County/Municipality Code ____

OTHER FILES: ☐ Lithologic Log ☐ Samples Available ☐ Aquifer Test ☐ Water Level Data ☐ Geophysical Logs ☐ Water Chemistry ☐ Pollution Case

Checked by ____ Date ____ / ____ / ____

COPIES: White - DEP Canary - Driller Pink - Owner Goldenrod - Health Dept.

1-12-893

FORM 87

DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES

Permit No. 29-8318
Application No. _____
County Monmouth

WELL RECORD

1. OWNER Colts Neck Municipal Garage Route 34, Colts Neck, N.J.
Paul J. Gross, Contractor
Owner's Well No. _____ Surface Elevation 90 Feet (above mean sea level)

2. LOCATION Route 34, Colts Neck, N.J.

3. DATE COMPLETED August 25, 1976 DRILLER Kaye Well Drilling, Inc.

4. DIAMETER: top 4 Inches Bottom 4 Inches TOTAL DEPTH 345 Feet

5. CASING: Type Black Steel Diameter 4 Inches Length 334 Feet

6. SCREEN: Type Stainless Steel Size of Opening 16 Diameter 4 Inches Length 6 Feet

Range in Depth { Top _____ Feet / Bottom _____ Feet } Geologic Formation _____

Tail piece: Diameter _____ Inches Length _____ Feet

7. WELL FLOWS NATURALLY _____ Gallons per Minute at _____ Feet above surface

Water rises to _____ Feet above surface

8. RECORD OF TEST: Date August 25, 1976 Yield 40 Gallons per minute

Static water level before pumping 48 Feet below surface

Pumping level 180' Air Line below surface after _____ hours pumping

Drawdown _____ Feet Specific Capacity _____ Gals. per min. per ft. of drawdown

How Pumped Air Compressor How measured 5 Gal. Pail

Observed effect on nearby wells _____

9. PERMANENT PUMPING EQUIPMENT:

Type _____ Mfrs. Name _____

Capacity _____ G.P.M. How Driven _____ H.P. _____ R.P.M. _____

Depth of Pump in well _____ Feet Depth of Footpiece in well _____ Feet

Depth of Air Line in well _____ Feet Type of Meter on Pump _____ Size _____ Inches

10. USED FOR Domestic AMOUNT { Average _____ Gallons Daily / Maximum _____ Gallons Daily }

11. QUALITY OF WATER Good Sample: Yes _____ No. _____

Taste Good Odor None Color Clear Temp. _____ °F

12. LOG _____ Are samples available? _____
(Give details on back of sheet or on separate sheet. If electric log was made, please furnish copy)

13. SOURCE OF DATA Drillers

14. DATA OBTAINED BY Kaye Well Drilling, Inc. Date Oct. 13, 1976

(NOTE: Use other side of this sheet for additional information such as log of materials penetrated, analysis of the water, sketch map, sketch of special casing arrangements etc.)

29-12-893

Form 87

DEPARTMENT OF ENVIRONMENTAL PROTECTION

Permit No. 29-8412

Application No. _____

County _____

WELL RECORD

1. OWNER Katherine Garrett ADDRESS Rt #3 Colts Neck

Owner's Well No. 29-8412 SURFACE ELEVATION _____ Feet (Above mean sea level)

2. LOCATION Hwy #34 Colts Neck

3. DATE COMPLETED 7/26/76 DRILLER Allen McCurdy

4. DIAMETER: top 4 inches Bottom 4 inches TOTAL DEPTH 153 Feet

5. CASING: Type Steel ~~Brass~~ Diameter 4 inches Length 150 Feet

6. SCREEN: Type None Size of Opening ___ Diameter _____ inches Length _____ Feet

Range in Depth { Top 119 Feet, Bottom 153 Feet } Geologic Formation Lignite

Tail piece: Diameter 3 inches Length 2 Feet

7. WELL FLOWS NATURALLY _____ Gallons per Minute at _____ Feet above surface

Water rises to _____ Feet above surface

8. RECORD OF TEST: Date 7/26/76 Yield 10 Gallons per minute

Static water level before pumping 48 Feet below surface

Pumping level 100 feet below surface after 3 hours pumping

Drawdown 52 Feet Specific Capacity 10 Gals. per min. per ft. of drawdown

How Pumped rod & cylinder How measured Sight Gauge & Stop Watch

Observed effect on nearby wells _____

9. PERMANENT PUMPING EQUIPMENT:

Type Submersible Mfrs. Name Myers

Capacity 10 G.P.M. How Driven elec H.P. 1/2 R.P.M. _____

Depth of Pump in well _____ Feet Depth of Footpiece in well _____ Feet

Depth of Air Line in well ___ Feet Type of Meter on Pump _____ Size ___ inches

10. USED FOR Domestic AMOUNT { Average _____ Gallons Daily, Maximum _____ Gallons Daily }

11. QUALITY OF WATER Good Sample: Yes ___ No. ___

Taste OK Odor OK Color OK Temp. _____ °F

12. LOG _____ Are samples available? _____

(Give details on back of sheet or on separate sheet. If electric log was made, please furnish copy)

13. SOURCE OF DATA J. McCurdy

14. DATA OBTAINED BY Jay Curd Date 4/16/79

(NOTE: Use other side of this sheet for additional information such as log of materials penetrated, analysis of the water, sketch map, sketch of special sealing arrangements etc.)

DWR-138 M
6/89

New Jersey Department of Environmental Protection
Division of Water Resources

MONITORING WELL RECORD

Well Permit No. 39 24900
Atlas Sheet Coordinates ~~29~~ : ~~12~~ : ~~393~~

OWNER IDENTIFICATION - Owner STANHLIN INC
Address ~~77 HWY 34 SOUTH~~
City ~~COLTS NECK~~ State ~~NJ~~ Zip Code

WELL LOCATION - If not the same as owner please give address. Owner's Well No. 1
County Municipality COLTS NECK TWP Lot No. 10 Block No. 48
Address

TYPE OF WELL (as per Well Permit Categories) MONITORING Date well completed 6/20/90
Regulatory Program Requiring Well UST Case I.D. # 8910031443
CONSULTING FIRM/FIELD SUPERVISOR (if applicable) Groundwater & Environmental Services Tele. # 389-6500

WELL CONSTRUCTION

Total depth drilled 18 ft.
Well finished to 18 ft.
Borehole diameter:
Top 10 in.
Bottom 10 in.
Well was finished: ☐ above grade ☒ flush mounted
If finished above grade, casing height (stick up) above land surface ____ ft.
Was steel protective casing installed? ☐ Yes ☒ No

	Depth to Top (ft.) [From land surface]	Depth to Bottom (ft.)	Diameter (inches)	Type and Material
Inner Casing	0	3	4	Sch 40 PVC FJT solid
Outer Casing (Not Protective Casing)	—	—	—	—
Screen (Note slot size)	3	18	4	Sch 40 PVC FJT .02
Tail Piece	—	—	—	—
Gravel Pack	2	18		#2 Morie Gravel
Annular Seal/Grout	1	2		Bentonite Pellets
Method of Grouting	0-1			Slurry

Static water level after drilling ____ ft.
Water level was measured using
Well was developed for 1 hours at 2-3 gpm
Method of development purged with pump
Was permanent pumping equipment installed? ☐ Yes ☐ No
Pump capacity ____ gpm
Pump type:
Drilling Method Auger
Drilling Fluid Type of Rig TH-10
Name of Driller Gregg Myers
Health and Safety Plan submitted? ☐ Yes ☒ No
Level of Protection used on site (circle one) None (D) C B A
N.J. License No. J1472 ~~GROUNDWATER & ENVIRONMENTAL SE~~
Name of Drilling Company B.L. MYERS

GEOLOGIC LOG (Copies of other geologic logs and/or geophysical logs should be attached.)

see attached

I certify that I have drilled the above-referenced well in accordance with all well permit requirements and all applicable State rules and regulations.

Driller's Signature Gregg Myers Susan M. Laughlin for Gregg Myers Date 21/Nov/90

COPIES: White & Green - DEP Canary - Driller Pink - Owner Goldenrod - Health Dept.

Sketch Map

Project Gulf Colts Neck Owner Stan-Lin Inc.

Location Route 34 North Permit No 2924900-7 Coor: 29.12.8.93

Well Number 1 Total Depth 18' Diameter 10"

Casing Elevation Water Level: Initial 7.95' Static

Screen Diameter 4" Length 15' Slot Size .020"

Casing Diameter 4" Length 3' Type Sch .40 PVC

Drilling Method Auger Sample Method Continuous Split Spoon

Completion Details Flush w/grade manhole, locking inner cap

Driller B. L. Myers Log By L. Gooding Date Drilled 6/20/90

Depth Ft	Well Constr	HNu ppm	Lithological Description	Comments
1		0	Asphalt and Fill	Continuous split spoon
2				
3			Light brown to reddish brown, medium Sand with some silt interbedded with well rounded quartz pebbles.	
4				
5		0		
6			Mottled light brown to gray, medium to coarse Sand with some silt and clay. Micaceous slight plasticity.	
7				
8				Moist
9		0		
10				Wet
11				
12			Mottled olive green, medium Sand and Silt with some clay. Slight plasticity.	Dry
13				
14		0		
15				
16				
17				
18			END HOLE @ 18'	
19				
20				
21				
22				
23				
24				
25				

DWR-138 M
6/89

New Jersey Department of Environmental Protection
Division of Water Resources

MONITORING WELL RECORD

Well Permit No. 29 - 24701
Atlas Sheet Coordinates 29 : 12 . 393

OWNER IDENTIFICATION - Owner STAN-LIN INC
Address 77 HWY 34 SOUTH
City COLTS NECK State NJ Zip Code

WELL LOCATION - If not the same as owner please give address. Owner's Well No. 2
County Municipality ~~COLTS NECK TWP~~ Lot No. ~~10~~ Block No. ~~48~~
Address

TYPE OF WELL (as per Well Permit Categories) ~~MONITORING~~ Date well completed 6/20/90
Regulatory Program Requiring Well UST Case I.D. # 8910071447
CONSULTING FIRM/FIELD SUPERVISOR (if applicable) Groundwater & Environmental Services Tele. # 389-6500

WELL CONSTRUCTION

Total depth drilled 18 ft.
Well finished to 18 ft.
Borehole diameter:
Top 10 in.
Bottom 10 in.
Well was finished: ☐ above grade ☒ flush mounted
If finished above grade, casing height (stick up) above land surface _____ ft.
Was steel protective casing installed? ☐ Yes ☒ No

	Depth to Top (ft.) [From land surface]	Depth to Bottom (ft.)	Diameter (inches)	Type and Material
Inner Casing	0	3	4	Sch 40 PVC FJT Solid
Outer Casing (Not Protective Casing)	—	—	—	—
Screen (Note slot size)	3	18	4	Sch 40 PVC FJT .02
Tail Piece	—	—	—	—
Gravel Pack	2	18		#2 Mone Gravel
Annular Seal/Grout	1	2		Bentonite Pellets
Method of Grouting	0 - 1		Slurry	

Static water level after drilling _____ ft.
Water level was measured using _____
Well was developed for 1 hours at 2-3 gpm
Method of development purged with pump
Was permanent pumping equipment installed? ☐ Yes ☐ No
Pump capacity _____ gpm
Pump type: _____
Drilling Method Auger
Drilling Fluid _____ Type of Rig TH-10
Name of Driller Gregg Myers
Health and Safety Plan submitted? ☐ Yes ☒ No
Level of Protection used on site (circle one) None (D) C B A
N J. License No. J1472
Name of Drilling Company ~~GROUNDWATER & ENVIRONMENTAL SE~~ B.L. MYERS

GEOLOGIC LOG (Copies of other geologic logs and/or geophysical logs should be attached.)

See attached

I certify that I have drilled the above-referenced well in accordance with all well permit requirements and all applicable State rules and regulations.

Driller's Signature Susan M. Laughlin for Gregg Myers Date 21/NOV/90

COPIES. White & Green - DEP Canary - Driller Pink - Owner Goldenrod - Health Dept.

Sk tch Map

Project Gulf Colts Neck Owner Stan-Lin Inc.

Location Route 34 North Permit No 2924901-5 Coor: 29.12.8.93

Well Number 2 Total Depth 18' Diameter 10"

Casing Elevation Water Level: Initial 6.50' Static

Screen Diameter 4" Length 15' Slot Size .020"

Casing Diameter 4" Length 3' Type PVC Sch. 40

Drilling Method Auger Sample Method Cuttings

Completion Details Steel riser above grade, locking inner cap

Driller B. L. Myers Log By L. Gooding Date Drilled 6/20/90

Depth Ft	Well Constr	HNu ppm	Lithological Description	Comments
1			Asphalt and Fill material	
2		0		
3			Light reddish brown, medium to coarse Sand and some silt mixed with well rounded quartz pebbles; trace clay	
4				
5				
6		0		
7				
8				
9				
10			Mottled reddish brown and gray medium Sand and Silt with a little clay. Micaceous. Slight plasticity	Moist
11				
12		0		
13				
14			Mottled green and gray medium Sand and Silt with a little clay. Micaceous. Slight plasticity.	Wet
15				
16		0		
17				
18			END HOLE @ 18FT	
19				
20				
21				
22				
23				
24				
25				

DWR-138 M
6/89

New Jersey Department of Environmental Protection
Division of Water Resources

MONITORING WELL RECORD

Well Permit No. 29 - 24702
Atlas Sheet Coordinates 29 : 12 : 893

OWNER IDENTIFICATION - Owner STAN-LIN INC
Address 77 HWY 34 SOUTH
City COLTS NECK State NJ Zip Code

WELL LOCATION - If not the same as owner please give address. Owner's Well No. 3
County Municipality Lot No. Block No.
Address COLTS NECK TWP 10 48

TYPE OF WELL (as per Well Permit Categories) Date well completed 6/20/90
Regulatory Program Requiring Well MONITORING Case I.D. # 8910221443
CONSULTING FIRM/FIELD SUPERVISOR (if applicable) LST Groundwater & Environmental Services Tele. # 389-6500

WELL CONSTRUCTION

Total depth drilled 18 ft.
Well finished to 18 ft.
Borehole diameter:
Top 10 in.
Bottom 10 in.
Well was finished: ☐ above grade ☒ flush mounted
If finished above grade, casing height (stick up) above land surface ____ ft.
Was steel protective casing installed? ☐ Yes ☒ No

	Depth to Top (ft.) [From land surface]	Depth to Bottom (ft.)	Diameter (inches)	Type and Material
Inner Casing	0	3	4	Sch 40 PVC FJT solid
Outer Casing (Not Protective Casing)				
Screen (Note slot size)	3	18	4	Sch 40 PVC FJT .02
Tail Piece	—	—	—	—
Gravel Pack	2	18		#2 Morie Gravel
Annular Seal/Grout	1	2		Bentonite Pellets
Method of Grouting	0 - 1 Slurry			

Static water level after drilling ____ ft.
Water level was measured using
Well was developed for 1 hours at 2-3 gpm
Method of development purged with pump
Was permanent pumping equipment installed? ☐ Yes ☐ No
Pump capacity ____ gpm
Pump type:
Drilling Method Auger
Drilling Fluid Type of Rig TH-10
Name of Driller Gregg Myers
Health and Safety Plan submitted? ☐ Yes ☒ No
Level of Protection used on site (circle one) None (D) C B A
N.J. License No. J1472
Name of Drilling Company B.L. MYERS

GEOLOGIC LOG (Copies of other geologic logs and/or geophysical logs should be attached.)

see attached

I certify that I have drilled the above-referenced well in accordance with all well permit requirements and all applicable State rules and regulations.

Driller's Signature Susan M. Slaughter for Gregg Myers Date 21/Nov/90

COPIES White & Green - DEP Canary - Driller Pink - Owner

Sketch Map

Project Gulf Colts Neck Owner Stan-Lin Inc.

Location Route 34 North Permit No 2924902-3 Coor: 29.12.8.93

Well Number 3 Total Depth 18' Diameter 10"

Casing Elevation Water Level: Initial 7.8' Static

Screen Diameter 4" Length 15' Slot Size .020"

Casing Diameter 4" Length 3' Type PVC Sch. 40

Drilling Method Auger Sample Method Cuttings

Completion Details Steel riser above grade, locking inner cap

Driller B.L. Myers Log By L. Gooding Date Drilled 6/20/90

Depth Ft	Well Constr	HNu ppm	Lithological Description	Comments
1			Asphalt and Fill material	Concrete block
2				
3			Mottled, light reddish brown and gray medium Sand with some silt. Slight plasticity. Micaceous.	PHC odor
4				
5		50		
6				
7				PHC odor
8		40	Dark, reddish brown medium Sand and Silt with a little clay. Low plasticity. Micaceous.	Moist
9				
10		100		
11				PHC odor
12				
13		300		
14			Grayish green Sand and Silt with some clay. Medium plasticity.	Wet
15		100		PHC odor
16				
17				
18		200	END HOLE @ 18 FT.	
19				
20				
21				
22				
23				
24				
25				

FORM 87

29-12-898
29-6643

DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES

Permit No. _____
Application No. _____
County _____

WELL RECORD

1. OWNER Piedmont Farms ADDRESS Laurel Avenue Drive LOT 21 BLK 7-21
Owner's Well No. 29-6643 SURFACE ELEVATION 145 Feet (Above mean sea level)

2. LOCATION Colts Neck Twp Monmouth County

3. DATE COMPLETED 10-16-72 DRILLER McCurdy Well Drilling

4. DIAMETER: top 4 Inches Bottom 4 Inches TOTAL DEPTH 132 Feet

5. CASING: Type Drive Stee Diameter 4 Inches Length 126 Feet

6. SCREEN: Type S.S Size of Opening 12 Slot Diameter 4 Inches Length 4 Feet

Range in Depth { Top 117 Feet, Bottom 132 Feet } Geologic Formation English Town sand

Tail piece: Diameter 3 Inches Length 10 Feet

7. WELL FLOWS NATURALLY _____ Gallons per Minute at _____ Feet above surface

Water rises to _____ Feet above surface

8. RECORD OF TEST: Date 10-16-72 Yield 10 Gallons per minute

Static water level before pumping 30 Feet below surface

Pumping level 84 feet below surface after 3 hours pumping

Drawdown 54 Feet Specific Capacity 15 Gals. per min. per ft. of drawdown

How Pumped Rod + cylinder How measured Stop watch + 5 gal pail

Observed effect on nearby wells —

9. PERMANENT PUMPING EQUIPMENT: DID NOT INSTALL

Type _____ Mfrs. Name _____

Capacity _____ G.P.M. How Driven _____ H.P. _____ R.P.M. _____

Depth of Pump in well _____ Feet Depth of Footpiece in well _____ Feet

Depth of Air Line in well _____ Feet Type of Meter on Pump _____ Size _____ Inches

10. USED FOR domestic AMOUNT { Average 75 Gallons Daily, Maximum 300 Gallons Daily }

11. QUALITY OF WATER Good Sample: Yes ✓ No. _____

Taste _____ Odor _____ Color _____ Temp. _____ °F

12. LOG _____ Are samples available? No
(Give details on back of sheet or on separate sheet. If electric log was made, please furnish copy)

13. SOURCE OF DATA _____

14. DATA OBTAINED BY J. Allyn Conover Date 11-1-72

(NOTE: Use other side of this sheet for additional information such as log of materials penetrated, analysis of the water, sketch map, sketch of special casing arrangements etc.)

29-12-977 [3]

FORM 87

RECEIVED
MAR 2 '82
DEPT. CONS. & ECON. DEV.
DIVISION OF
WATER POLICY AND SUPPLY

DEPARTMENT OF CONSERVATION
AND ECONOMIC DEVELOPMENT
DIVISION OF WATER POLICY & SUPPLY

Permit No. 29-3377
Application No. _____
County _____

WELL RECORD

Foster-Neumann Contracting Co.

1. OWNER U.S. Naval Ammunition Depot for . ADDRESS Earle, N.J.

Owner's Well No. _____ SURFACE ELEVATION _____ Feet (Above mean sea level)

2. LOCATION _____

3. DATE COMPLETED _____ DRILLER John Gunther

4. DIAMETER: top 8 Inches Botton 8 Inches TOTAL DEPTH 351 Feet

5. CASING: Type Black-steel Diameter 8 Inches Length 331 Feet

6. SCREEN: Type Stainless steel Johnson Size of opening 25/30 Diameter 8 Inches Length 20 Feet

Range { Top _____ Feet Geologic Formation Gray sand
Bottom _____ Feet

Tail piece. Diameter _____ Inches Length _____ Feet

7. WELL FLOWS NATURALLY _____ Gallons per Minute at _____ Feet above surface

Water rises to _____ Feet above surface

8. RECORD OF TEST: Date Jan.5-61 Yield 130 Gallons per minute

Static water level before pumping 190 Feet below surface

Pumping level 255 feet below surface after 24 hours pumping

Drawdown 125 Feet Specific Capacity _____ Gals. per min. per ft. of drawdown

How Pumped 15 H.P. Submersible How measured Meter

Observed effect on nearby wells Well when pumped at 85 gpm -pumping level 215'

9. PERMANENT PUMPING EQUIPMENT: To be done by Navy

Type _____ Mfrs. Name _____

Capacity _____ G.P.M. How Driven _____ H.P. _____ R.P.M. _____

Depth of Pump in well _____ Feet _____ Depth of Footpiece in well _____ Feet

Depth of Air Line in well _____ Feet _____ Depth of Meter on Pump _____

10. USED FOR Navy AMOUNT Average _____ Gallons Daily

Maximum _____ Gallons Daily

11. QUALITY OF WATER Good Sample: Yes X No. _____

Taste none Odor none Color clear Temp. _____ °F

12. LOG _____ Are samples available _____

(Give details on back of sheet or on separate sheet. If electric log was made, please furnish copy)

13. SOURCE OF DATA John Gunther

14. DATA OBTAINED BY _____ Date Jan.10-61

(NOTE: Use other side of this sheet for additional information such as log of materials penetrated, analysis of the water, sketch map, sketch of special casing arrangements etc.)

29-12-977 [illegible]

FORM 8-2-70

RECEIVED
MAR 2 '62
DEPT. CONS. & ECON. DEV.
DIVISION OF
WATER POLICY AND SUPPLY

DEPARTMENT OF CONSERVATION
AND ECONOMIC DEVELOPMENT
DIVISION OF WATER POLICY & SUPPLY

Permit No. 22-3376
Application No. _____
County _____

WELL RECORD

Foster-Newmann Contracting Co.,Inc.
for

1. OWNER ~~U.S. Naval Ammunition Depot~~ ADDRESS ~~Earle, N.J.~~
   Owner's Well No. _____ SURFACE ELEVATION _____ Feet (Above mean sea level)

2. LOCATION _____

3. DATE COMPLETED _____ DRILLER _____

4. DIAMETER: top _____ Inches Botton _____ Inches TOTAL DEPTH 292 Feet

5. CASING: Type ~~Black steel~~ Diameter 6 Inches Length 282 Feet

6. SCREEN: Type ~~Johnson~~ Size of Opening ~~30 slot~~ Diameter 6 Inches Length 10 Feet
   Range { Top _____ Feet / Bottom _____ Feet } Geologic Formation light gray sand
   Tail piece. Diameter _____ Inches Length _____ Feet

7. WELL FLOWS NATURALLY _____ Gallons per Minute at _____ Feet above surface
   Water rises to _____ Feet above surface

8. RECORD OF TEST: Date Oct.21-60 Yield 20 Gallons per minute
   Static water level before pumping 70 Feet below surface
   Pumping level 91 feet below surface after 8 hours pumping
   Drawdown 21 Feet Specific Capacity _____ Gals. per min. per ft. of drawdown
   How Pumped ~~4" column & sucker rod~~ How measured _____
   Observed effect on nearby wells _____

9. PERMANENT PUMPING EQUIPMENT: To be installed by Navy
   Type _____ Mfrs. Name _____
   Capacity _____ G.P.M. How Driven _____ H.P. _____ R.P.M. _____
   Depth of Pump in well _____ Feet _____ Depth of Footpiece in well _____ Feet
   Depth of Air Line in well _____ Feet _____ Depth of Meter on Pump _____

10. USED FOR Navy AMOUNT Average _____ Gallons Daily
    Maximum _____ Gallons Daily

11. QUALITY OF WATER good Sample: Yes X No. _____
    Taste none Odor none Color clear Temp. _____ °F

12. LOG _____ Are samples available Yes
    (Give details on back of sheet or on separate sheet. If electric log was made, please furnish copy)

13. SOURCE OF DATA John Gunther

14. DATA OBTAINED BY John Gunther Date Oct.24,1960

(NOTE: Use other side of this sheet for additional information such as log of materials penetrated, analysis of the water, sketch map, sketch of special casing arrangements etc.)

Form DWR- 138
11/80

Coord: 2912989

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES

PERMIT NO. 2915769

APPLICATION NO. _____

COUNTY Monmouth

WELL RECORD

1. OWNER DEPT. OF NAVY-NORTHERN DIV. ADDRESS U.S. NAVY BASE BLDG. 77 LOW

   Owner's Well No. MW 11-1 SURFACE ELEVATION _____ Feet (Above mean sea level)

2. LOCATION Lot: Block: Municipality: Colts Neck Twp.

3. DATE COMPLETED 12/18/85 DRILLER J. E. Fritts

4. DIAMETER: Top 4 inches Bottom 4 inches TOTAL DEPTH 19 Feet

5. CASING: Type PVC Diameter 4 Inches Length 4 Feet

6. SCREEN: Type PVC Size of Opening .010 Diameter 4 Inches Length 15 Feet

   Range in Depth { Top 4 Feet / Bottom 19 Feet } Geologic Formation _____

   Tail Piece: Diameter _____ Inches Length _____ Feet

7. WELL FLOWS NATURALLY _____ Gallons per minute at _____ Feet above surface

   Water rises to _____ Feet above surface

8. RECORD OF TEST: Date _____ Yield _____ Gallons per minute

   Static water level before pumping _____ Feet below surface

   Pumping level _____ feet below surface after _____ hours pumping

   Drawdown _____ Feet Specific Capacity _____ Gals. per min. per ft. of drawdown

   How pumped _____ How measured _____

   Observed effect on nearby wells _____

9. PERMANENT PUMPING EQUIPMENT:

   Type None Mfrs. Name _____

   Capacity _____ G.P.M. How Driven _____ H.P. _____ R.P.M. _____

   Depth of Pump in well _____ Feet Depth of Footpiece in well _____ Feet

   Depth of Air Line in well _____ Feet Type of Meter on Pump _____ Size _____ Inches

10. USED FOR Monitoring AMOUNT { Average _____ Gallons Daily / Maximum _____ Gallons Daily }

11. QUALITY OF WATER _____ Sample: Yes ____ No ____

    Taste _____ Odor _____ Color _____ Temp. _____ F.

12. LOG _____ Are samples available? _____

    (Give details on back of sheet or on separate sheet. If electric log was made, please furnish copy.)

13. SOURCE OF DATA Drillers Log

14. DATA OBTAINED BY J.E. Fritts & Assoc., Inc. Date 12/30/85

(NOTE: Use other side of this sheet for additional information such as log of materials penetrated, analysis of the water, sketch map, sketch of special casing arrangements, etc.)

Form DWR-138
11/80

Coord: 2912989

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES

PERMIT NO. 2915770

APPLICATION NO. _____

COUNTY Monmouth

ONLY

WELL RECORD

1. OWNER DEPT. OF NAVY-NORTHERN DIV. ADDRESS U.S. NAVY BASE BLDG. 77 LOW

   Owner's Well No. MW 11-2 SURFACE ELEVATION _____ Feet (Above mean sea level)

2. LOCATION Lot: Block: Municipality: Colts Neck Twp.

3. DATE COMPLETED 12/19/85 DRILLER J. E. Fritts

4. DIAMETER: Top 4 inches Bottom 4 inches TOTAL DEPTH 18 Feet

5. CASING: Type PVC Diameter 4 Inches Length 3 Feet

6. SCREEN: Type PVC Size of Opening .010 Diameter 4 Inches Length 15 Feet

   Range in Depth { Top 3 Feet / Bottom 18 Feet } Geologic Formation _____

   Tail Piece: Diameter ——— Inches Length _____ Feet

7. WELL FLOWS NATURALLY _____ Gallons per minute at _____ Feet above surface

   Water rises to _____ Feet above surface

8. RECORD OF TEST: Date _____ Yield _____ Gallons per minute

   Static water level before pumping _____ Feet below surface

   Pumping level _____ feet below surface after _____ hours pumping

   Drawdown _____ Feet Specific Capacity _____ Gals. per min. per ft. of drawdown

   How pumped _____ How measured _____

   Observed effect on nearby wells _____

9. PERMANENT PUMPING EQUIPMENT:

   Type None Mfrs. Name _____

   Capacity _____ G.P.M. How Driven _____ H.P. _____ R.P.M. _____

   Depth of Pump in well _____ Feet Depth of Footpiece in well _____ Feet

   Depth of Air Line in well _____ Feet Type of Meter on Pump _____ Size _____ Inches

10. USED FOR Monitoring AMOUNT { Average _____ Gallons Daily / Maximum _____ Gallons Daily }

11. QUALITY OF WATER _____ Sample: Yes ____ No ____

    Taste _____ Odor _____ Color _____ Temp. _____ °F.

12. LOG _____ Are samples available? _____
    (Give details on back of sheet or on separate sheet. If electric log was made, please furnish copy.)

13. SOURCE OF DATA Drillers Log

14. DATA OBTAINED BY J.E. Fritts & Assoc., Inc. Date 12/30/85

(NOTE: Use other side of this sheet for additional information such as log of materials penetrated, analysis of the water, sketch map, sketch of special casing arrangements, etc.)

Form OWR-138
11/80

FOR MONITORING PURPOSES ONLY

Coord: 2912989

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES

PERMIT NO. 2915771

APPLICATION NO. _____

COUNTY Monmouth

WELL RECORD

1. OWNER DEPT. OF NAVY-NORTHERN DIV. ADDRESS U.S. NAVY BASE BLDG. 77 LOW

   Owner's Well No. mw 11-3 SURFACE ELEVATION _____ Feet (Above mean sea level)

2. LOCATION Lot: Block: Municipality: Colts Neck Twp.

3. DATE COMPLETED 12/18/85 DRILLER J. E. Fritts

4. DIAMETER: Top 4 inches Bottom 4 inches TOTAL DEPTH 20 Feet

5. CASING: Type PVC Diameter 4 Inches Length 5 Feet

3. SCREEN: Type PVC Size of Opening .010 Diameter 4 Inches Length 15 Feet

   Range in Depth { Top 5 Feet / Bottom 20 Feet } Geologic Formation _____

   Tail Piece: Diameter _____ Inches Length _____ Feet

7. WELL FLOWS NATURALLY _____ Gallons per minute at _____ Feet above surface

   Water rises to _____ Feet above surface

8. RECORD OF TEST: Date _____ Yield _____ Gallons per minute

   Static water level before pumping _____ Feet below surface

   Pumping level _____ feet below surface after _____ hours pumping

   Drawdown _____ Feet Specific Capacity _____ Gals. per min. per ft. of drawdown

   How pumped _____ How measured _____

   Observed effect on nearby wells _____

9. PERMANENT PUMPING EQUIPMENT:

   Type None Mfrs. Name _____

   Capacity _____ G.P.M. How Driven _____ H.P. _____ R.P.M. _____

   Depth of Pump in well _____ Feet Depth of Footpiece in well _____ Feet

   Depth of Air Line in well _____ Feet Type of Meter on Pump _____ Size _____ Inches

10. USED FOR Monitoring AMOUNT { Average _____ Gallons Daily / Maximum _____ Gallons Daily }

11. QUALITY OF WATER _____ Sample: Yes ____ No ____

    Taste _____ Odor _____ Color _____ Temp. _____ °F.

12. LOG _____ Are samples available? _____

    (Give details on back of sheet or on separate sheet. If electric log was made, please furnish copy.)

13. SOURCE OF DATA Drillers Log

14. DATA OBTAINED BY J.E. Fritts & Assoc., Inc. Date 12/30/85

(NOTE: Use other side of this sheet for additional information such as log of materials penetrated, analysis of the water, sketch map, sketch of special casing arrangements, etc.)

Form DWR- 138
11/80

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES

2722.2.36

PERMIT NO. 29-1554

APPLICATION NO. _____

COUNTY Monmouth

WELL RECORD

1. OWNER Bethany Baptist Church ADDRESS R.D #1 Box 116A Farmingdale
   Owner's Well No. _____ SURFACE ELEVATION 80 Feet (Above mean sea level)
2. LOCATION Lot # 18 Block # 153 Township: Howell
3. DATE COMPLETED 11/5/85 DRILLER (~~David~~)(Norman) Primost
4. DIAMETER: Top 8½ inches Bottom _____ inches TOTAL DEPTH 99 Feet
5. CASING: Type PVC Sched 40 Diameter 4" Inches Length 84 Feet
6. SCREEN: Type PVC Size of Opening .020 Diameter 4" Inches Length 10 Feet
   Range in Depth { Top _____ Feet / Bottom _____ Feet } Geologic Formation TVT (Gravel Pack d Well)
   Tail Piece: Diameter 4" Inches Length 5 Feet
7. WELL FLOWS NATURALLY _____ Gallons per minute at _____ Feet above surface
   Water rises to _____ Feet above surface
8. RECORD OF TEST: Date 11/5/85 Yield 75 Gallons per minute (Air Lift w/100 cfm)
   Static water level before pumping 21 Feet below surface
   Pumping 18 gpm/29 feet below surface after 2 hours pumping
   Drawdown 8 Feet Specific Capacity 2.25 Gals. per min. per ft. of drawdown
   How pumped Temporary Sub How measured Container
   Observed effect on nearby wells None
9. PERMANENT PUMPING EQUIPMENT:
   Type Submersible Mfrs. Name GOULDS
   Capacity 12 G.P.M. How Driven Electric H.P. 1½ R.P.M. 3450
   Depth of Pump in well 45 Feet Depth of Footpiece in well _____ Feet
   Type of Meter on Pump _____ Size _____ Inches
10. USED FOR Public-non community (Replacement) ~~IRRIGATION USE ONLY~~ ~~DOMESTIC (New) (Replace)~~ ~~HEATING/COOLING (Supply)(Recharge)~~ { Average _____ Gallons Daily / Maximum _____ Gallons Daily }
11. QUALITY OF WATER _____ Sample: Yes X No _____
    Taste _____ Odor _____ Color _____ Temp. _____ °F.
12. LOG _____ Are samples available? _____
    (Give details on back of sheet or on separate sheet. If electric log was made, please furnish copy.)
13. SOURCE OF DATA **Pickwick Well Drilling**, P.O. Box 6, Farmingdale, N.J. 07727 DRILLER [signature]
    Date 11/24/85

(NOTE: Use other side of this sheet for additional information such as log of materials penetrated, analysis of the water, sketch map, sketch of special casing arrangements, etc.)

DWR-138 M
6/89

New Jersey Department of Environmental Protection
Division of Water Resources

MONITORING WELL RECORD

Well Permit No. 29 . 27378
Atlas Sheet Coordinates ~~29~~ . ~~22~~ : 312

OWNER IDENTIFICATION - Owner US GOV NAVAL WEAPON STATI
Address ROUTE 34
City COLTS NECK State NJ Zip Code

WELL LOCATION - If not the same as owner please give address. Owner's Well No.
County Monmouth Municipality ~~COLTS NECK TWP~~ Lot No. 1 Block No. 55
Address

TYPE OF WELL (as per Well Permit Categories) ~~CATHODIC PROTECTION~~ Date well completed 2 / 11 / 92
Regulatory Program Requiring Well Case I.D. #
CONSULTING FIRM/FIELD SUPERVISOR (if applicable) Tele. #

WELL CONSTRUCTION

Total depth drilled 254 ft.
Well finished to 254 ft.
Borehole diameter:
Top 12½ in.
Bottom 8 in.
Well was finished: ☐ above grade ☒ flush mounted
If finished above grade, casing height (stick up) above land surface ____ ft.
Was steel protective casing installed? ☐ Yes ☒ No

	Depth to Top (ft.) [From land surface]	Depth to Bottom (ft.)	Diameter (inches)	Type and Material
Inner Casing	--	--	--	--
Outer Casing (Not Protective Casing)	0	42	8	Sch. 40 PVC
Screen (Note slot size)	--	--	--	--
Tail Piece	--	--	--	--
Gravel Pack	0	252	8	3500# of granular petroleum backfill
Annular Seal/Grout	0	42	12½	Bentonite slurry
Method of Grouting	Pressure Tremied			

Static water level after drilling N/A ft.
Water level was measured using N/A
Well was developed for N/A hours at ____ gpm
Method of development N/A
Was permanent pumping equipment installed? ☐ Yes ☒ No
Pump capacity N/A gpm
Pump type: N/A
Drilling Method Rotary
Drilling Fluid Mud Type of Rig Failing CF-1500
Name of Driller Dennis B. Davis
Health and Safety Plan submitted? ☐ Yes ☒ No
Level of Protection used on site (circle one) None D C B A
N J License No. M987
Name of Drilling Company TIGER CONSTRUCTION CORP.

GEOLOGIC LOG (Copies of other geologic logs and/or geophysical logs should be attached.)

0-15 SILTY YELLOW SAND
15-95 Pea Green silty glauconitic sand
95-132 Silty obdudated fine to mediom Green glauconitic sand with trace o t clay lens
132-192 Green glauconitic clay
192-252 Green glauconitic clay with interbedded lenses of weathered gree sand and shell

I certify that I have drilled the above-referenced well in accordance with all well permit requirements and all applicable State rules and regulations.

Driller's Signature M987 Date 2-12-92

COPIES White & Green - DEP Canary - Driller Pink - Owner Goldenrod - Health Dept

Form DWR-138
11/80

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES

Coord: 2922322

PERMIT NO. 2915759

APPLICATION NO. _____

COUNTY Monmouth

WELL RECORD

1. OWNER DEPT. OF NAVY-NORTHERN DIV ADDRESS U.S. NAVY BASE BLDG. 77 LOW
   Owner's Well No. MW 4-1 SURFACE ELEVATION _____ Feet (Above mean sea level)
2. LOCATION Lot: Block: Municipality: Colts Neck Twp.
3. DATE COMPLETED 1/8/86 DRILLER J. E. Fritts
4. DIAMETER: Top 4 inches Bottom 4 inches TOTAL DEPTH 30 Feet
5. CASING: Type PVC Diameter 4 Inches Length 15 Feet
6. SCREEN: Type PVC Size of Opening .010 Diameter 4 Inches Length 15 Feet
   Range in Depth { Top 15 Feet / Bottom 30 Feet } Geologic Formation _____
   Tail Piece: Diameter --- Inches Length _____ Feet
7. WELL FLOWS NATURALLY _____ Gallons per minute at _____ Feet above surface
   Water rises to _____ Feet above surface
8. RECORD OF TEST: Date _____ Yield _____ Gallons per minute
   Static water level before pumping _____ Feet below surface
   Pumping level _____ feet below surface after _____ hours pumping
   Drawdown _____ Feet Specific Capacity _____ Gals. per min. per ft. of drawdown
   How pumped _____ How measured _____
   Observed effect on nearby wells _____
9. PERMANENT PUMPING EQUIPMENT:
   Type None Mfrs. Name _____
   Capacity _____ G.P.M. How Driven _____ H.P. _____ R.P.M. _____
   Depth of Pump in well _____ Feet Depth of Footpiece in well _____ Feet
   Depth of Air Line in well _____ Feet Type of Meter on Pump _____ Size _____ Inches
10. USED FOR Monitoring AMOUNT { Average _____ Gallons Daily / Maximum _____ Gallons Daily }
11. QUALITY OF WATER _____ Sample: Yes ____ No ____
    Taste _____ Odor _____ Color _____ Temp. _____ °F.
12. LOG _____ Are samples available? _____
    (Give details on back of sheet or on separate sheet. If electric log was made, please furnish copy.)

SOURCE OF DATA Drillers Log

DATA OBTAINED BY J. E. Fritts & Associates, Inc. Date 1/10/86

(NOTE: Use other side of this sheet for additional information such as log of materials penetrated, analysis of the water, sketch map, sketch of special casing arrangements, etc.)

Form DWR-138
11/80

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES

Coord: 2922322

PERMIT NO. 2915760

APPLICATION NO. _____

COUNTY Monmouth

WELL RECORD

1. OWNER DEPT. OF NAVY-NORTHERN DIV ADDRESS U.S. NAVY BASE BLDG. 77 LOW
   Owner's Well No. MW 4-2 SURFACE ELEVATION _____ Feet (Above mean sea level)
2. LOCATION Lot: Block: Municipality: Colts Neck Twp.
3. DATE COMPLETED 1/9/86 DRILLER J. E. Fritts
4. DIAMETER: Top 4 inches Bottom 4 inches TOTAL DEPTH 18 Feet
5. CASING: Type PVC Diameter 4 Inches Length 3 Feet
6. SCREEN: Type PVC Size of Opening .010 Diameter 4 Inches Length 15 Feet
   Range in Depth { Top 3 Feet / Bottom 18 Feet } Geologic Formation _____
   Tail Piece: Diameter --- Inches Length _____ Feet
7. WELL FLOWS NATURALLY _____ Gallons per minute at _____ Feet above surface
   Water rises to _____ Feet above surface
8. RECORD OF TEST: Date _____ Yield _____ Gallons per minute
   Static water level before pumping _____ Feet below surface
   Pumping level _____ feet below surface after _____ hours pumping
   Drawdown _____ Feet Specific Capacity _____ Gals. per min. per ft. of drawdown
   How pumped _____ How measured _____
   Observed effect on nearby wells _____
9. PERMANENT PUMPING EQUIPMENT:
   Type None Mfrs. Name _____
   Capacity _____ G.P.M. How Driven _____ H.P. _____ R.P.M. _____
   Depth of Pump in well _____ Feet Depth of Footpiece in well _____ Feet
   Depth of Air Line in well _____ Feet Type of Meter on Pump _____ Size _____ Inches
10. USED FOR Monitoring AMOUNT { Average _____ Gallons Daily / Maximum _____ Gallons Daily }
11. QUALITY OF WATER _____ Sample: Yes ____ No ____
    Taste _____ Odor _____ Color _____ Temp. _____ °F.
12. LOG _____ Are samples available? _____
    (Give details on back of sheet or on separate sheet. If electric log was made, please furnish copy.)
13. SOURCE OF DATA Drillers Log
14. DATA OBTAINED BY J. E. Fritts & Associates, Inc. Date 1/10/86

(NOTE: Use other side of this sheet for additional information such as log of materials penetrated, analysis of the water, sketch map, sketch of special casing arrangements, etc.)

Form DWR- 138
11/80

FOR MONITORING PURPOSES ONLY

Coord: 2922322

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES

PERMIT NO. 2915761

APPLICATION NO. _____

COUNTY Monmouth

WELL RECORD

1. OWNER DEPT. OF NAVY-NORTHERN DIV. ADDRESS U.S. NAVY BASE BLDG. 77 LOW

   Owner's Well No. MW 4-3 SURFACE ELEVATION _____ Feet (Above mean sea level)

2. LOCATION Lot: Block: Municipality: Colts Neck Twp.

3. DATE COMPLETED 1/10/86 DRILLER J. E. Fritts

4. DIAMETER: Top 4 inches Bottom 4 inches TOTAL DEPTH 25 Feet

5. CASING: Type PVC Diameter 4 Inches Length 10 Feet

6. SCREEN: Type PVC Size of Opening .010 Diameter 4 Inches Length 15 Feet

   Range in Depth { Top 10 Feet / Bottom 25 Feet } Geologic Formation _____

   Tail Piece: Diameter - Inches Length _____ Feet

7. WELL FLOWS NATURALLY _____ Gallons per minute at _____ Feet above surface

   Water rises to _____ Feet above surface

8. RECORD OF TEST: Date _____ Yield _____ Gallons per minute

   Static water level before pumping _____ Feet below surface

   Pumping level _____ feet below surface after _____ hours pumping

   Drawdown _____ Feet Specific Capacity _____ Gals. per min. per ft. of drawdown

   How pumped _____ How measured _____

   Observed effect on nearby wells _____

9. PERMANENT PUMPING EQUIPMENT:

   Type None Mfrs. Name _____

   Capacity _____ G.P.M. How Driven _____ H.P. _____ R.P.M. _____

   Depth of Pump in well _____ Feet Depth of Footpiece in well _____ Feet

   Depth of Air Line in well _____ Feet Type of Meter on Pump _____ Size _____ Inches

10. USED FOR Monitoring AMOUNT { Average _____ Gallons Daily / Maximum _____ Gallons Daily }

11. QUALITY OF WATER _____ Sample: Yes ____ No ____

    Taste _____ Odor _____ Color _____ Temp. _____ °F.

12. LOG _____ Are samples available? _____

    (Give details on back of sheet or on separate sheet. If electric log was made, please furnish copy.)

13. SOURCE OF DATA Drillers Log

14. DATA OBTAINED BY J. E. Fritts & Associates, Inc. Date 1/17/86

(NOTE: Use other side of this sheet for additional information such as log of materials penetrated, analysis of the water, sketch map, sketch of special casing arrangements, etc.)

DWR-138A
1/88

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES

PERMIT NO. 29206 66-9
APPLICATION NO. _____
COUNTY Monmouth
COORD. 29.22.3.25

WELL RECORD

1. OWNER U.S. NAVY NAVAL WEAPONS STATION ADDRESS Colts Neck, New Jersey 07722
   Owner's Well No. MW- C14.1 SURFACE ELEVATION _____ Feet (Above mean sea level)
2. LOCATION LOT: NA BLOCK: NA
3. DATE COMPLETED 6/06/88 DRILLER EMPIRE SOILS INVESTIGATIONS, INC.
4. DIAMETER: Top 4 inches Bottom 4 inches TOTAL DEPTH 25.5 Feet
5. CASING: Type PVC Diameter 4 Inches Length 10.0 Feet
6. SCREEN: Type PVC Size of Opening .020 Diameter 4 Inches Length 15.0' Feet
   Range in Depth { Top _____ Feet / Bottom _____ Feet } Geologic Formation _____
   Tail Piece: Diameter _____ Inches Length _____ Feet
7. WELL FLOWS NATURALLY _____ Gallons per minute at _____ Feet above surface
   Water rises to _____ Feet above surface
8. RECORD OF TEST: Date NONE Yield _____ Gallons per minute
   Static water level before pumping _____ Feet below surface
   Pumping level _____ feet below surface after _____ hours pumping
   Drawdown _____ Feet Specific Capacity _____ Gals. per min. per ft. of drawdown
   How pumped _____ How measured _____
   Observed effect on nearby wells _____
9. PERMANENT PUMPING EQUIPMENT:
   Type NONE Mfrs. Name _____
   Capacity _____ G.P.M. How Driven _____ H.P. _____ R.P.M. _____
   Depth of Pump in well _____ Feet Depth of Footpiece in well _____ Feet
   Depth of Air Line in well _____ Feet Type of Meter on Pump _____ Size _____ Inches
10. USED FOR Monitoring AMOUNT { Average _____ Gallons Daily / Maximum _____ Gallons Daily }
11. QUALITY OF WATER _____ Sample: Yes ____ No ____
    Taste _____ Odor _____ Color _____ Temp. _____ °F.
12. LOG _____ Are samples available? _____
    (Give details on back of sheet or on separate sheet. If electric log was made, please furnish copy.)
13. SOURCE OF DATA _____
14. DATA OBTAINED BY Walter Ketter #1316 Date July 28, 1988

(NOTE: Use other side of this sheet for additional information such as log of materials penetrated, analysis of the water, sketch map, sketch of special casing arrangements, etc.)

29-22-325

DATE	TIME	DRILLED FROM	DRILLED TO	WEATHER	TEMP
6-6-88		0	25.5	SUNNY	73°

EMPIRE

FIELD LOG

HOLE NO. C14-1

GRD. ELEV.

29-20666-9

PROJECT NAVAL WEAPONS STATION (EARLE)

LOCATION COLTS NECK. Sheet 1 of

DEPTH OF SAMPLE	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOWS ON CASING C	MOISTURE	COLOR	SAMPLE RECOVERY	CLASSIFICATION OF MATERIALS DRILLED	OTHER DATA	WELL DETAILS
0-2	1	4	5				MOI	BR	18"	FINE SAND w/ LITTLE MED SAND TR. SILT.		
			7	5								
5-7	2	7	13				MOI	BR	20"	(SAME) TRACE FINE GRAVEL		
			14	17								
10-12	3	8	7				MOI	BR	20"	(SAME) NO GRAVEL		
			6	5								
											WATER LEVEL 13.5' AT 11:30 AM	
15-17	4	3	4				WET	BR	13"	FINE SAND LITTLE MED SAND & SILT		
			6	5								
20-22	5	4	4				WET	BR	20"	FINE SAND TRACE SILT		
			4	4								
23.25												
	6	9	3				WET	BR	22"	SAME		
			7	9								

DRILLERS CLASSIFICATION

NANCY & EILEEN

NOTATION: SIZE AUGERS/CASING 6"/4 SIZE SPOON 2"

SIZE THIN-WALLED TUBE SIZE CORE

N = NO. OF BLOWS TO DRIVE 2" SPOON 24" WITH 140 LB. WEIGHT FALLING 30 PER BLOW

C = NO. OF BLOWS TO DRIVE " CASING " WITH LB. WEIGHT FALLING PER BLOW

FILL OUT BACK OF LOG AND SIGN YOUR NAME

29-22325
39-30666-9

DATE
STARTED 6/06/88
FINISHED 6/06/88
SHEET 1 OF 1

EMPIRE SOILS INVESTIGATIONS INC.

SUBSURFACE LOG

HOLE NO C14-1
SURF ELEV
G. W. DEPTH 13.7'

PROJECT U.S. Naval Weapons Station
LOCATION Colts Neck, New Jersey

DEPTH FT	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
0		1	4	5				Moist brown fine SAND with little medium sand, trace silt	
				7	5	12			
5		2	7	13				Same, trace fine gravel	
				14	17	27			
10		3	8	7				Same, no gravel	
				6	5	13			
15		4	3	4				Wet brown fine SAND, little medium sand and silt	
				6	5	10			
20		5	4	4				Wet brown fine SAND, trace silt	
				4	4	8			
		6	3	3				Same	
25				7	9	10			
								Boring terminated @ 25.0'.	
30									
35									
40									

N = No blows to drive 2" spoon 24" with 140 lb. pin wt. falling 30" per blow.
C = No blows to drive ____" casing ____" with ____ lb. weight falling ____" per blow.
METHOD OF INVESTIGATION 6¼ Hollow Stem Augers

CLASSIFICATION driller's

ENCL (1)

29 22 325

29-20666-9

Well C-14-1
Permit No. 2920666-9

Depth	Lithologic Description
0-2'	90% sand, 9% clay, 1% gravel. USDA SCS classification: sand. Color: 10 YR 5/6 yellowish brown. Less than 1% gravel consisting of quartz fragments up to .25" diameter. Sample is dry.
5-7'	5-5.3 99% fine sand, 1% gravel size. USDA SCS classification: sand. Quartz fragments Color: 10 YR 3/4 dark yellowish brown. 5.3-5.5 same lithology Color: 10 YR 5/6 yellowish brown. 5.5-5.9 same lithology Color: 10 YR 6/6 browinsh yellow. 5.9-6.3 90% sand, 10% quartz gravel USDA SCS classification: sand. 6.3-6.4 95% sand, 5% quartz gravel. 6.5-7.0 same lithology Color: 10 YR 3/3 dark brown. Sample is dry.
10-12'	Sample is homogeneous. Color: 10 YR 6/8 brownish yellow. 85% quartz sand, 15% silt. USDA PSCS classification: loamy sand. Sample end is moist.
13.5	Water level
15-17'	98% sand, 2% silt. USDA SCS classification: loamy sand. Color: 2.5 Y 5/6 light olive brown to 2.5 Y 6/8 olive yellow. Sample is wet.
20-22'	98% sand, 2% silt. USDA SCS classification: sand. Color: 2.5 Y 5/4 light olive brown. Sample is wet.
25-27'	98% sand, 2% silt. Dark brown roots are present. Color: 10 YR 3/2 very dark grayish brown. Sample is wet.

Well Depth 26 feet

DWR-138A
1/88

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES

PERMIT NO. 29 20667-7
APPLICATION NO. _____
COUNTY Monmouth
COORD. 29.22.3.25

WELL RECORD

1. OWNER U.S. NAVY NAVAL WEAPONS STATION ADDRESS Colts Neck, New Jersey 07722
   Owner's Well No. MW-C14-3 SURFACE ELEVATION _____ Feet (Above mean sea level)
2. LOCATION LOT: NA BLOCK: NA
3. DATE COMPLETED 6/07/88 DRILLER EMPIRE SOILS INVESTIGATIONS, INC.
4. DIAMETER: Top 4 inches Bottom 4 inches TOTAL DEPTH 22.0' Feet
5. CASING: Type PVC Diameter 4 Inches Length 7.0' Feet
6. SCREEN: Type PVC Size of Opening .020 Diameter 4 Inches Length 15.0' Feet
   Range in Depth { Top _____ Feet / Bottom _____ Feet } Geologic Formation _____
   Tail Piece: Diameter _____ Inches Length _____ Feet
7. WELL FLOWS NATURALLY _____ Gallons per minute at _____ Feet above surface
   Water rises to _____ Feet above surface
8. RECORD OF TEST: Date NONE Yield _____ Gallons per minute
   Static water level before pumping _____ Feet below surface
   Pumping level _____ feet below surface after _____ hours pumping
   Drawdown _____ Feet Specific Capacity _____ Gals. per min. per ft. of drawdown
   How pumped _____ How measured _____
   Observed effect on nearby wells _____
9. PERMANENT PUMPING EQUIPMENT:
   Type NONE Mfrs. Name _____
   Capacity _____ G.P.M. How Driven _____ H.P. _____ R.P.M. _____
   Depth of Pump in well _____ Feet Depth of Footpiece in well _____ Feet
   Depth of Air Line in well _____ Feet Type of Meter on Pump _____ Size _____ Inches
10. USED FOR Monitoring AMOUNT { Average _____ Gallons Daily / Maximum _____ Gallons Daily }
11. QUALITY OF WATER _____ Sample: Yes _____ No _____
    Taste _____ Odor _____ Color _____ Temp. _____ °F.
12. LOG _____ Are samples available? _____
    (Give details on back of sheet or on separate sheet. If electric log was made, please furnish copy.)
13. SOURCE OF DATA _____
14. DATA OBTAINED BY Walter Ketter #1316 Date July 28, 1988

(NOTE: Use other side of this sheet for additional information such as log of materials penetrated, analysis of the water, sketch map, sketch of special casing arrangements, etc.)

29·22·325

DATE	TIME	DRILLED FROM	DRILLED TO	WEATHER	TEMP
6-7-88		0	23		

EMPIRE

FIELD LOG

HOLE NO. C-14-3

GRD. ELEV. _____

29-20667-7

PROJECT _____

LOCATION _____ Sheet 1 of 1

DEPTH OF SAMPLE	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOWS ON CASING C	MOISTURE	COLOR	SAMPLE RECOVERY	CLASSIFICATION OF MATERIALS DRILLED	OTHER DATA	WELL DETAILS
0-2	1	2	3	7	8		D		24	Br Sandy Silt		
5-7	2	9	7	9	11		D		24	Br. to Dark gray Sandy Silt		
10-12	3	3	2	2	6		M		24	Dark-Br to yellow F. Sand		
15-17	4	WR	2	3	3		W		18in	yellow F. Sa.		
20-22	5	1	2	3	8		W		18	yellow F. Sa.		

DRILLERS CLASSIFICATION

NOTATION: SIZE AUGERS / CASING 6¼ SIZE SPOON 2in

SIZE THIN-WALLED TUBE _____ SIZE CORE _____

N = NO. OF BLOWS TO DRIVE "SPOON "WITH lb. WEIGHT FALLING PER BLOW

C = NO. OF BLOWS TO DRIVE "CASING "WITH lb. WEIGHT FALLING PER BLOW

FILL OUT BACK OF LOG AND SIGN YOUR NAME

24 22 325
29-26661-

DATE
STARTED 6/07/88
FINISHED 6/07/88
SHEET 1 OF 1

EMPIRE SOILS INVESTIGATIONS INC.

SUBSURFACE LOG

HOLE NO. C14-2
SURF ELEV.
G. W DEPTH 12.5'

PROJECT U.S. Naval Weapons Station
LOCATION Colts Neck, New Jersey

DEPTH FT	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
0		1	2	2				Dry orange-brown Silty SAND	
				7	7	9			
5		2	10	21				Same (Moist)	
				25	25	46			
10		3	4	4				Same (Wet)	
				7	6	11			
15		4	2	4				Same	
				3	4	7			
20		5	2	2					
				6	7	8			
								Boring terminated @ 22.0'.	
25									
30									
35									
40									

N = No blows to drive 2 " spoon 24 " with 140 lb. pin wt. falling 30 "per blow. CLASSIFICATION driller's

C = No blows to drive ____ " casing ____ " with ____ lb. weight falling ____ "per blow.

METHOD OF INVESTIGATION 6¼ Hollow Stem Auger

29 22 325
34-20669

Well C-14-2
Permit No. 2920669-3

Depth	Blow Count	Lithologic Description
0-2'	2-2-7-7	0-1 ft. 50% sand, 50% silt. Sandy loam/silt loam. Roots present. Color: 5 YR 4/1 dark gray. 1-1.5 ft. 70% clay, 25% silt, 5% sand. USDA SCS classification: clay. Color: 7.5 YR 6/8 reddish yellow and 10 YR 6/2 light brownish gray. 1.5-2 ft. 90% fine sand, 10% silt. USDA SCS classification: sand. Color: 1.5-1.75 ft: 10 YR 7/6 yellow. 1.75-2 ft.: 10 YR 7/8 yellow.
5-7'	10-21-25-25	5-5.25 ft. 70% silt, 30% sand. Silt loam <1% coarse quartz fragments up to .25" diameter. Color: 10 YR 4/2 dark grayish brown. 5.25-5.5 ft. 50% sand, 50% silt Sandy loam/silt loam. Color: 10 YR 4/2 dark grayish brown. 5.5-6.0 ft. 30% of total is quartz fragments greater than 1/4" diameter. 50% sand, 50% silt (silt loam, sandy loam). 6.0-6.5 ft. sample is moist. 60% silt, 40% quartz sand, 10% of total contains quartz fragments > 1/4" diameter. 6.5-6.75 ft. gravel layer. Rounded quartz fragments 1/4" to 1/2" diameter. 6.75-7.0 ft. 75% silt, 25% quartz sand. USDA SCS classification: silt loam. Color: 10 YR 3/2 very dark grayish brown.
10-12'	4-4-7-6	10-10.5 ft. 50% quartz sand, 50% silt. Sandy loam/silt loam. Color 2.5 Y 5/4 light olive brown. 10.5-12 ft. 80% sand, 20% silt. Loamy sand. Color: 2.5 YR 5/4 light olive brown.
Groundwater at 12 feet		
15-17'	2-4-3-4	70% fine quartz sand, 30% micaceous silt. Sandy loam. Sample is very homogeneous. Color: 2.5 YR 5/6 red.
20-22'	2-2-6-7	80% sandy (70% quartz, 30% ferromagnesian minerals) 20% micaceous silt. Color: 2.5 YR 5/6 light olive brown. Sample is homogeneous.

DWR-138A
1/88

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES

PERMIT NO. 29 20668-5
APPLICATION NO. _____
COUNTY Monmouth
COORD. 29.22.3.25

WELL RECORD

1. OWNER U.S. NAVY NAVAL WEAPONS STATION ADDRESS Colts Neck, New Jersey 07722
   Owner's Well No. MW- C14-4 SURFACE ELEVATION _____ Feet (Above mean sea level)
2. LOCATION LOT: NA BLOCK: NA
3. DATE COMPLETED 6/08/88 DRILLER EMPIRE SOILS INVESTIGATIONS, INC.
4. DIAMETER: Top 4 inches Bottom 4 inches TOTAL DEPTH 20.0' Feet
5. CASING: Type PVC Diameter 4 Inches Length 5.0' Feet
6. SCREEN: Type PVC Size of Opening .020 Diameter 4 Inches Length 15.0' Feet
   Range in Depth { Top _____ Feet / Bottom _____ Feet } Geologic Formation _____
   Tail Piece: Diameter _____ Inches Length _____ Feet
7. WELL FLOWS NATURALLY _____ Gallons per minute at _____ Feet above surface
   Water rises to _____ Feet above surface
8. RECORD OF TEST: Date NONE Yield _____ Gallons per minute
   Static water level before pumping _____ Feet below surface
   Pumping level _____ feet below surface after _____ hours pumping
   Drawdown _____ Feet Specific Capacity _____ Gals. per min. per ft. of drawdown
   How pumped _____ How measured _____
   Observed effect on nearby wells _____
9. PERMANENT PUMPING EQUIPMENT:
   Type NONE Mfrs. Name _____
   Capacity _____ G.P.M. How Driven _____ H.P. _____ R.P.M. _____
   Depth of Pump in well _____ Feet Depth of Footpiece in well _____ Feet
   Depth of Air Line in well _____ Feet Type of Meter on Pump _____ Size _____ Inches
10. USED FOR Monitoring AMOUNT { Average _____ Gallons Daily / Maximum _____ Gallons Daily }
11. QUALITY OF WATER _____ Sample: Yes ____ No ____
    Taste _____ Odor _____ Color _____ Temp. _____ °F.
12. LOG _____ Are samples available? _____
    (Give details on back of sheet or on separate sheet. If electric log was made, please furnish copy.)
13. SOURCE OF DATA _____
14. DATA OBTAINED BY Walter Ketter #1316 Date July 28, 1988

(NOTE: Use other side of this sheet for additional information such as log of materials penetrated, analysis of the water, sketch map, sketch of special casing arrangements, etc.)

29-22-325

DATE	TIME	DRILLED FROM	DRILLED TO	WEATHER	TEMP
6-8-88		0	20		

EMPIRE

FIELD LOG

HOLE NO. C-14-4

GRD. ELEV.

26-20664-5

PROJECT

LOCATION

Sheet 1 of 1

DEPTH OF SAMPLE	SAMPLE NO.	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOWS ON CASING C	MOISTURE	COLOR	SAMPLE RECOVERY	CLASSIFICATION OF MATERIALS DRILLED	OTHER DATA	WELL DETAILS
0-2	1									Bl. Silty Sa. Strong odor	Oil	
5-7	2	2	3				mo		1.3	mud gray-Br Sandy	Silt	
				6	10							
10-12	3	WR	2	4			W		1.5	Br. Silty F. Sand		
					5							
15-17	4	5	6				W		1.6	Silty Sand Br		
				11	16							

DRILLERS CLASSIFICATION

NOTATION: SIZE AUGERS / CASING 6 1/4 SIZE SPOON 2 in

SIZE THIN-WALLED TUBE _____ SIZE CORE _____

N = NO. OF BLOWS TO DRIVE "SPOON "WITH lb. WEIGHT FALLING PER BLOW

C = NO. OF BLOWS TO DRIVE "CASING "WITH lb. WEIGHT FALLING PER BLOW

FILL OUT BACK OF LOG AND SIGN YOUR NAME

27 22 323
27-20668

DATE			
STARTED 6/07/88	**EMPIRE** SOILS INVESTIGATIONS INC	SUBSURFACE LOG	HOLE NO. C14-3
FINISHED 6/07/88			SURF. ELEV.
SHEET 1 OF 1			G. W DEPTH 11'

PROJECT U.S. Naval Weapons Station LOCATION Colts Neck, New Jersey

DEPTH FT	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
0		1	2	3				Dry brown Sandy SILT	
				7	8	10			
5		2	9	7				Dry brown to dark grey Sandy SILT	
				9	11	16			
10		3	3	2				Moist dark brown to yellow fine SAND	
				2	6	4			
15		4	WR	2				Wet yellow fine SAND	
				3	3	5			
20		5	1	2				Same	
				3	8	5			
								Boring terminated @ 22.0'.	
25									
30									
35									
40									

N = No blows to drive 2 " spoon 24 " with 140 lb. pin wt. falling 30 "per blow CLASSIFICATION driller's

C = No blows to drive _____ " casing _____ " with _____ lb. weight falling _____ "per blow.

METHOD OF INVESTIGATION 6¼ Hollow Stem Auger

29 22 325

29-20663

Well C-14-3
Permit No. 2920667-7

Depth	Blow Count	Lithologic Description
0-2'	2-3-7-8	0-.5 ft. 90% silt, 10% sand. USDA SCS classification: silt. Roots present. 4% quartz fragments to 1/4" diameter. Color: 5 YR 2.5/1 black. .5-.9 ft. 80% sand, 20% silt. Loamy sand. Color: 10 YR 4/6 dark yellowish brown. .9-2.0 ft. 95% sand, 10% silt. Color: 10 YR 5/2 grayish brown.
5-7'	9-7-9-11	5-5.5 50% silt, 50% clay. Silty clay. Color: 2.5 YR 2.5/2 very dusky red. 5.6-7.0 80% silt, 20% sand. Silt loam. Color: 10 YR 3/2 very dark grayish brown.
10-12'	3-2-2-26	10-10.15 ft. 15% sand, 85% silt. Silt. Color: 2.5 Y 3/2 very dark grayish brown. 10.15-10.5 ft. 50% sand, 50% silt. Sandy loam/silt loam. Color: 2.5 Y 6/4 light yellowish brown. 11 ft - water table. 10.5-12 ft. 65% sand, 35% silt. Sandy loam. Color: 10.5 Y 6/8 olive yellow.
15-17'	WR-2-3-3	15% silt, 85% sand. Sample is homogeneous. Loamy sand, sand consists of 50% quartz, 30% ferromagnesia minerals, 20% plagoclase and meca.
20-23'	WR-2-3-8	Same as above (loamy sand). All sand is fine grained.

DWR-138A
1/88

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES

PERMIT NO. 2920669-3
APPLICATION NO. _____
COUNTY Monmouth
COORD. 29.22.3.25

WELL RECORD

1. OWNER U.S. NAVY NAVAL WEAPONS STATION ADDRESS Colts Neck, New Jersey 07722
   Owner's Well No. MW-C14-2 SURFACE ELEVATION _____ Feet (Above mean sea level)
2. LOCATION LOT: NA BLOCK: NA
3. DATE COMPLETED 6/07/88 DRILLER EMPIRE SOILS INVESTIGATIONS, INC.
4. DIAMETER: Top 4 inches Bottom 4 inches TOTAL DEPTH 24.0' Feet
5. CASING: Type PVC Diameter 4 Inches Length 9.0' Feet
6. SCREEN: Type PVC Size of Opening .020 Diameter 4 Inches Length 15.0' Feet
   Range in Depth { Top _____ Feet / Bottom _____ Feet } Geologic Formation _____
   Tail Piece: Diameter _____ Inches Length _____ Feet
7. WELL FLOWS NATURALLY _____ Gallons per minute at _____ Feet above surface
   Water rises to _____ Feet above surface
8. RECORD OF TEST: Date NONE Yield _____ Gallons per minute
   Static water level before pumping _____ Feet below surface
   Pumping level _____ feet below surface after _____ hours pumping
   Drawdown _____ Feet Specific Capacity _____ Gals. per min. per ft. of drawdown
   How pumped _____ How measured _____
   Observed effect on nearby wells _____
9. PERMANENT PUMPING EQUIPMENT:
   Type NONE Mfrs. Name _____
   Capacity _____ G.P.M. How Driven _____ H.P. _____ R.P.M. _____
   Depth of Pump in well _____ Feet Depth of Footpiece in well _____ Feet
   Depth of Air Line in well _____ Feet Type of Meter on Pump _____ Size _____ Inches
10. USED FOR Monitoring AMOUNT { Average _____ Gallons Daily / Maximum _____ Gallons Daily }
11. QUALITY OF WATER _____ Sample: Yes ____ No ____
    Taste _____ Odor _____ Color _____ Temp. _____ °F.
12. LOG _____ Are samples available? _____
    (Give details on back of sheet or on separate sheet. If electric log was made, please furnish copy.)
13. SOURCE OF DATA _____
14. DATA OBTAINED BY Walter Ketter #1316 Date July 28, 1988

(NOTE: Use other side of this sheet for additional information such as log of materials penetrated, analysis of the water, sketch map, sketch of special casing arrangements, etc.)

29-22-328

DATE	TIME	DRILLED FROM	DRILLED TO	WEATHER	TEMP
6-7-88		0	24		

EMPIRE

FIELD LOG

HOLE NO. 614-

GRD. ELEV.

29-20669-3

PROJECT

LOCATION

Sheet 1 of 1

DEPTH OF SAMPLE	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOWS ON CASING C	MOISTURE	COLOR	SAMPLE RECOVERY	CLASSIFICATION OF MATERIALS DRILLED	OTHER DATA	WELL DETAILS
0-2	1	62	2				0			Or. Br Silt Sa.		
				7	7							
5-7	2	10	21				m					
				25	25							
10-12	3	4	4				w					
				7	6							
15-17	4	2	4	3			w					
					4							
20-22	5	2	2				w					
				6	7							

DRILLERS CLASSIFICATION

NOTATION: SIZE AUGERS/CASING 6"14 SIZE SPOON 2in

SIZE THIN-WALLED TUBE _____ SIZE CORE _____

N = NO. OF BLOWS TO DRIVE "SPOON "WITH lb. WEIGHT FALLING PER BLOW

C = NO. OF BLOWS TO DRIVE "CASING "WITH lb. WEIGHT FALLING PER BLOW

FILL OUT BACK OF LOG AND SIGN YOUR NAME

29 22 327
29-20669

DATE
STARTED 6/08/88
FINISHED 6/08/88
SHEET 1 OF 1

EMPIRE SOILS INVESTIGATIONS INC.

SUBSURFACE LOG

HOLE NO. C14-4
SURF. ELEV.
G. W. DEPTH 8.0'

PROJECT U.S. Naval Weapons Station
LOCATION Colts Neck, New Jersey

DEPTH FT	SAMPLES	SAMPLE NO	BLOWS ON SAMPLER 0/6	6/12	12/18	N	BLOW ON CASING C	SOIL OR ROCK CLASSIFICATION	NOTES
0		1						Black Silty SAND (strong oil odor)	
5		2	2	3				Moist medium grey-brown Sandy SILT	
				6	10	9			
10		3	WR	2				Wet brown Silty fine SAND	
				4	5	6			
15		4	5	6				Same	
				11	16	17			
								Boring terminated @ 17.0'.	
20									
25									
30									
35									
40									

N = No blows to drive 2 " spoon 24 " with 140 lb. pin wt. falling 30 "per blow.
C = No blows to drive ____ " casing ____ " with ____ lb. weight falling ____ "per blow.

CLASSIFICATION driller's

METHOD OF INVESTIGATION 6¼ Hollow Stem Augers

24 22.325

24-20669

Well C-14-4
Permit No. 2920668-5

Depth	Blow Count	Lithologic Description
0-2'	Driven with sledge hammer Recovery: 1.35 ft.	0-1.2 ft. 65% sand, 35% silt. Sandy loam. 1.2-1.5 ft. 50% silt, 50% sand. Silty loam, sandy loam.
5-7'	2-3-6-10 1.35 ft. recovery	Sample moist. .8 ft. of medium gray brown loam (35% sand, 40% silt, 25% clay). .35 ft. of clay. Light gray and orange in color. .5 ft. - 70% sand, 30% silt. Sandy loam, dark olive brown.
Drill rod wet at 9'		
10-12'	WR-2-4-5 1.5 ft. recovery	60% sand, 40% silt. Sandy loam, olive brown color. Sand content: 50% quartz, 40% ferromagnesian minerals, 10% mica.
15-17'	5-6-11-16 1.6' ft. recovery	15-16 ft. 70% sand, 30% silt. Sandy loam, olive brown. Sand composed of quartz, ferromagnesian minerals and mica. 16-17 ft. 50% sand, 50% silt. Sandy loam/silt loam. <5% white mottling. Color: orange brown.

Depth of well - 19.7 ft.

Form. DWR- 138
11/80

Coord: 2922352

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES

PERMIT NO. 2915766

APPLICATION NO. _____

COUNTY Monmouth

WELL RECORD

1. OWNER DEPT. OF NAVY-NORTHERN DIV. ADDRESS U.S. NAVY BASE BLDG. 77 LOW

   Owner's Well No. MW 10-1 SURFACE ELEVATION _____ Feet (Above mean sea level)

2. LOCATION Lot: Block: Municipality: Colts Neck Twp.

3. DATE COMPLETED 1/14/86 DRILLER J. E. Fritts

4. DIAMETER: Top 4 inches Bottom 4 inches TOTAL DEPTH 27'6" Feet

5. CASING: Type PVC Diameter 4 Inches Length 12'6" Feet

6. SCREEN: Type PVC Size of Opening .010 Diameter 4 Inches Length 15" Feet

   Range in Depth { Top 12'6" Feet / Bottom 27'6" Feet } Geologic Formation _____

   Tail Piece: Diameter _____ Inches Length _____ Feet

7. WELL FLOWS NATURALLY _____ Gallons per minute at _____ Feet above surface

   Water rises to _____ Feet above surface

8. RECORD OF TEST: Date _____ Yield _____ Gallons per minute

   Static water level before pumping _____ Feet below surface

   Pumping level _____ feet below surface after _____ hours pumping

   Drawdown _____ Feet Specific Capacity _____ Gals. per min. per ft. of drawdown

   How pumped _____ How measured _____

   Observed effect on nearby wells _____

9. PERMANENT PUMPING EQUIPMENT:

   Type None Mfrs. Name _____

   Capacity _____ G.P.M. How Driven _____ H.P. _____ R.P.M. _____

   Depth of Pump in well _____ Feet Depth of Footpiece in well _____ Feet

   Depth of Air Line in well _____ Feet Type of Meter on Pump _____ Size _____ Inches

10. USED FOR Monitoring AMOUNT { Average _____ Gallons Daily / Maximum _____ Gallons Daily }

11. QUALITY OF WATER _____ Sample: Yes _____ No _____

    Taste _____ Odor _____ Color _____ Temp. _____ °F.

12. LOG _____ Are samples available? _____
    (Give details on back of sheet or on separate sheet. If electric log was made, please furnish copy.)

13. SOURCE OF DATA Drillers Log

14. DATA OBTAINED BY J. E. Fritts & Associates, Inc. Date 1/17/86

(NOTE: Use other side of this sheet for additional information such as log of materials penetrated, analysis of the water, sketch map, sketch of special casing arrangements, etc.)

Form DWR- 138
11/80

Coord: 2922352

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES

PERMIT NO. 2915767

APPLICATION NO. _____

COUNTY Monmouth

WELL RECORD

1. OWNER DEPT. OF NAVY-NORTHERN DIV. ADDRESS U.S. NAVY BASE BLDG. 77 LOW

Owner's Well No. MW-10-2 SURFACE ELEVATION _____ Feet (Above mean sea level)

2. LOCATION Lot: Block: Municipality: Colts Neck Twp.

3. DATE COMPLETED 1/15/86 DRILLER J. E. Fritts

4. DIAMETER: Top 4 inches Bottom 4 inches TOTAL DEPTH 22 Feet

5. CASING: Type PVC Diameter 4 Inches Length 7 Feet

6. SCREEN: Type PVC Size of Opening .010 Diameter 4 Inches Length 15 Feet

Range in Depth { Top 7 Feet / Bottom 22 Feet } Geologic Formation _____

Tail Piece: Diameter - Inches Length _____ Feet

7. WELL FLOWS NATURALLY _____ Gallons per minute at _____ Feet above surface

Water rises to _____ Feet above surface

8. RECORD OF TEST: Date _____ Yield _____ Gallons per minute

Static water level before pumping _____ Feet below surface

Pumping level _____ feet below surface after _____ hours pumping

Drawdown _____ Feet Specific Capacity _____ Gals. per min. per ft. of drawdown

How pumped _____ How measured _____

Observed effect on nearby wells _____

9. PERMANENT PUMPING EQUIPMENT:

Type None Mfrs. Name _____

Capacity _____ G.P.M. How Driven _____ H.P. _____ R.P.M. _____

Depth of Pump in well _____ Feet Depth of Footpiece in well _____ Feet

Depth of Air Line in well _____ Feet Type of Meter on Pump _____ Size _____ Inches

10. USED FOR Monitoring AMOUNT { Average _____ Gallons Daily / Maximum _____ Gallons Daily }

11. QUALITY OF WATER _____ Sample: Yes ____ No ____

Taste _____ Odor _____ Color _____ Temp. _____ °F.

12. LOG _____ Are samples available? _____

(Give details on back of sheet or on separate sheet. If electric log was made, please furnish copy.)

13. SOURCE OF DATA Drillers Log

14. DATA OBTAINED BY J. E. Fritts & Asociates, Inc. Date 1/20/86

(NOTE: Use other side of this sheet for additional information such as log of materials penetrated, analysis of the water, sketch map, sketch of special casing arrangements, etc.)

Form DWR-138
11/80

MONITORING PURPOSES ONLY

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES

Coord: 2922352

PERMIT NO. 2915768

APPLICATION NO. _____

COUNTY Monmouth

WELL RECORD

1. OWNER DEPT. OF NAVY-NORTHERN DIV ADDRESS U.S. NAVY BASE BLDG. 77 LOW
   Owner's Well No. MW 10-3 SURFACE ELEVATION _____ Feet (Above mean sea level)
2. LOCATION Lot: Block: Municipality: Colts Neck Twp.
3. DATE COMPLETED 1/14/86 DRILLER J. E. Fritts
4. DIAMETER: Top 4 inches Bottom 4 inches TOTAL DEPTH 25 Feet
5. CASING: Type PVC Diameter 4 Inches Length 10 Feet
6. SCREEN: Type PVC Size of Opening .010 Diameter 4 Inches Length 15 Feet
   Range in Depth { Top 10 Feet / Bottom 25 Feet } Geologic Formation _____
   Tail Piece: Diameter - Inches Length _____ Feet
7. WELL FLOWS NATURALLY _____ Gallons per minute at _____ Feet above surface
   Water rises to _____ Feet above surface
8. RECORD OF TEST: Date _____ Yield _____ Gallons per minute
   Static water level before pumping _____ Feet below surface
   Pumping level _____ feet below surface after _____ hours pumping
   Drawdown _____ Feet Specific Capacity _____ Gals. per min. per ft. of drawdown
   How pumped _____ How measured _____
   Observed effect on nearby wells _____
9. PERMANENT PUMPING EQUIPMENT:
   Type None Mfrs. Name _____
   Capacity _____ G.P.M. How Driven _____ H.P. _____ R.P.M. _____
   Depth of Pump in well _____ Feet Depth of Footpiece in well _____ Feet
   Depth of Air Line in well _____ Feet Type of Meter on Pump _____ Size _____ Inches
10. USED FOR Monitoring AMOUNT { Average _____ Gallons Daily / Maximum _____ Gallons Daily }
11. QUALITY OF WATER _____ Sample: Yes ____ No ____
    Taste _____ Odor _____ Color _____ Temp. _____ °F.
12. LOG _____ Are samples available? _____
    (Give details on back of sheet or on separate sheet. If electric log was made, please furnish copy.)
13. SOURCE OF DATA Drillers Log
14. DATA OBTAINED BY J. E. Fritts & Associates, Inc. Date 1/17/86

(NOTE: Use other side of this sheet for additional information such as log of materials penetrated, analysis of the water, sketch map, sketch of special casing arrangements, etc.)

Form DWR-138
11/80

FOR MONITORING PURPOSES ONLY

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES

Coord: 292300

PERMIT NO. [illegible]

APPLICATION NO. _____

COUNTY [illegible]

WELL RECORD

1. OWNER NEW JERSEY WATER SUPPLY AUTH. ADDRESS P.O. BOX 5196

   Owner's Well No. MW-17A SURFACE ELEVATION _____ Feet (Above mean sea level)

2. LOCATION Lot: Block: Municipality: Wall Twp.

3. DATE COMPLETED 1-23-85 DRILLER Engineering Drilling Co.

4. DIAMETER: Top 4 inches Bottom 4 inches TOTAL DEPTH 55 Feet

5. CASING: Type PVC Diameter 4 Inches Length 35 Feet

6. SCREEN: Type PVC Size of Opening .020 Diameter 4 Inches Length 20 Feet

   Range in Depth { Top 35 Feet / Bottom 55 Feet } Geologic Formation Coastal

   Tail Piece: Diameter _____ Inches Length _____ Feet

7. WELL FLOWS NATURALLY _____ Gallons per minute at _____ Feet above surface

   Water rises to _____ Feet above surface

8. RECORD OF TEST: Date 1-23-85 Yield 1 Gallons per minute

   Static water level before pumping 47.5' Feet below surface

   Pumping level 54' feet below surface after 1 hours pumping

   Drawdown _____ Feet Specific Capacity 1 Gals. per min. per ft. of drawdown

   How pumped Air How measured _____

   Observed effect on nearby wells _____

9. PERMANENT PUMPING EQUIPMENT:

   Type _____ Mfrs. Name _____

   Capacity _____ G.P.M. How Driven _____ H.P. _____ R.P.M. _____

   Depth of Pump in well _____ Feet Depth of Footpiece in well _____ Feet

   Depth of Air Line in well _____ Feet Type of Meter on Pump _____ Size _____ Inches

10. USED FOR Monitoring AMOUNT { Average _____ Gallons Daily / Maximum _____ Gallons Daily }

11. QUALITY OF WATER _____ Sample: Yes ____ No ____

    Taste _____ Odor _____ Color _____ Temp. _____ °F.

12. LOG Yes Are samples available? _____

    (Give details on back of sheet or on separate sheet. If electric log was made, please furnish copy.)

13. SOURCE OF DATA Spoon Samples

14. DATA OBTAINED BY R. Kitsima Date 11-26-85

(NOTE: Use other side of this sheet for additional information such as log of materials penetrated, analysis of the water, sketch map, sketch of special casing arrangements, etc.)

DESCRIPTION OF WATER WITHDRAWAL POINTS

The Water Withdrawal Points listing contains the following fields:

CAPACITY:	The pump capacity in gallons per minute
COUNTY:	County the withdrawal point is in
DEPTH:	Depth of the well or pond
DISTANCE:	Distance in miles from center of circle
GEO1:	The ground or surface water source
GEO2:	A secondary source of the water
LAT:	Latitude of the withdrawal point
LLACC:	Accuracy of the latitude and longitude estimates
LOCID:	The local identification of the withdrawal point, or a continuation of the SOURCEID field for surface water
LON:	Longitude of the withdrawal point
MUN:	The municipality the withdrawal point is in
NAME:	Name of the permit, certificate, or registration holder
NUMBER:	Water Allocation Permit, Agricultural Certification, or Registration number
SOURCEID:	The well permit number or other identifier for the water withdrawal

The listing that you have requested includes most wells and surface intakes that are in the Water Allocation Permits, Water Use Registrations, and representative sources from most of the Agricultural Certificates. Recognizing the fact that the list will contain errors and omissions, it is advisable to use this r source as a guide and to verify all data. We try to maintain an accurate database; however, we can not yet guarantee reliability. If you spot any errors we would be very grateful to hear about them. Please call or write to us in reference to the "Radius Program" at:

NJDEPE
Water Technical Programs
Bureau of Water Allocation
CN-029
Trenton, New Jersey 08625

(609) 292-2957

Thank you.

Please see the attached sheets for definitions of the codes used in the Water Withdrawal Points listing.

CODES USED IN THE WATER WITHDRAWAL POINTS LISTING

This packet contains information on the database codes that the Bureau of Water Allocation uses in the Water Withdrawal Points Listing.

COUNTY:

01 - Atlantic	15 - Gloucester	29 - Ocean
03 - Bergen	17 - Hudson	31 - Passaic
05 - Burlington	19 - Hunterdon	33 - Salem
07 - Camden	21 - Mercer	35 - Somerset
09 - Cape May	23 - Middlesex	37 - Sussex
11 - Cumberland	25 - Monmouth	39 - Union
13 - Essex	27 - Morris	41 - Warren

GEO:

RECENT	
Surficial Deposits	GRS
PLEISTOCENE	
Glacial Undifferentiated	GQGU
Stratified Drift	GQSD
Terminal Moraine	GQTM
Bridgeton	GQBS
Cape May	GQCM
Holly Beach Mbr.	GQCHB
Estuarine Sand	GQES
Pennsauken	GQPS
TERTIARY	
Beacon Hill	GTBH
Cohansey	GTCH
Cohansey & Kirkwood	GTCK
Kirkwood	GTKW
Upper	GTKWU
Rio Grande	GTKRG
Lower	GTKWL
Piney Point Mbr.	GTKPP
Shark River Marl	GTSR
Manasquan Marl	GTMQ
Vincentown Sand	GTVT
Hornerstown Marl	GTHT
CRETACEOUS	
Red Bank	GKRB
Navesink	GKNS
Mount Laurel	GKML
Wenonah	GKWE
Mount Laurel & Wenonah	GKMW
Marshalltown	GKMT
Englishtown	GKET
Woodbury	GKWB
Merchantville	GKMV
Magothy	GKM

Old Bridge	GKROB
Raritan	GKR
Sayreville Sand	GKRSS
Farrington	GKRF
Raritan/Magothy	GKMR
Potomac	GKP
TRIASSIC	
Brunswick Formation	GTRB
Lockatong Formation	GTRL
Stockton Formation	GTRS
Basalt	GTRBS
Diabase	GTRDB
Conglomerate	GTRCG
DEVONIAN	
Undifferentiated	GD
SILURIAN	
Bossardville Limestone	GSBD
Decker Formation	GSDK
Longwood Shale	GSLS
Poxono Island Fm	GSPI
Greenpond Conglomerate	GSGP
High Falls	GSHF
Shawangunk Fm	GSSG
ORDOVICIAN	
Martinsburg Fm	GOMB
Jacksonburg Fm	GOJB
Kittatinny Group	GOK
Outleaunee Fm	GOKO
Harmonyvale Mbr	GOKOH
Beaver Run Mbr	GOKOB
Epler	GOKE
Rickenbach	GOKR
CAMBRO ORDOVICIAN	
Kittatinny Fm	GCOK
CAMBRIAN	
Hardyston Quartzite	GCH
Allentown Fm	GCKA
Upper Mbr	GCKU
Limeport Mbr	GCKLP
Leithsville Fm	GCKL
Walkill Mbr	GCKLW
Hamburg Mbr	GCKLH
Califon Mbr	GCKLC
PRECAMBRIAN	
Granite	GPCGR
Gneiss	GPCGN
Undifferentiated	GPC

Franklin Lms	GPCFL
DELAWARE RIVER BASIN	
Unknown or Non-Specific	SD
Alloways Creek	SDALL
Alexsocken Creek	SDALE
Assiscunk Creek	SDASC
Assunpink Creek	SDASP
Big Timber Creek	SDBIG
Blacks Creek	SDBLA
Cooper's Creek	SDCOO
Crafts Creek	SDCRA
Crosswicks Creek	SDCRO
Delaware River	SDDEL
Flat Brook	SDFLA
Hakihokake Creek	SDHAK
Harihokake Creek	SDHAR
Jacob's Creek	SDJAC
Lockatong Creek	SDLOC
Lopatcong Creek	SDLOP
Mantua Creek	SDMNT
Musconetcong River	SDMUS
Nichisakawick Creek	SDNIC
Old Man's Creek	SDOLD
Paulins Kill	SDPAU
Pennsauken Creek	SDPEN
Pequest River	SDPST
Pohatcong Creek	SDPOH
Raccoon Creek	SDRAC
Rancocas Creek	SDRAN
Salem River	SDSAL
Wickecheoke Creek	SDWIC
RARITAN RIVER BASIN	
Unknown or Non-Specific	SR
Lawrence Brook	SRLAW
Lower Raritan	SRLOW
Millstone River	SRMIL
North Branch Raritan	SRNBR
South Branch Raritan	SRSBR
South River	SRSRV
PASSAIC RIVER BASIN	
Unknown or Non-Specific	SP
Canoe Brook	SPCAN
Lower Mid-Passaic River	SPLMP
Lower Passaic	SPLOW
Passaic River	SPPAS
Peckman River	SPPEC
Pequannock River	SPPNK
Pompton River	SPPOM
Ramapo River	SPRAM
Rockaway River	SPROC
Saddle River	SPSAD

Upper Mid-Passaic River	SPUMP
Upper Passaic River	SPUPP
Wanaque River	SPWAN
Whippany River	SPWHI
ATLANTIC COASTAL BASIN	
Unknown or Non-Specific	SC
Atlantic County Coastal	SCATL
Cape May County Coastal	SCCAP
Cedar Creek	SCCED
Great Egg Harbor River	SCGRE
Manasquan River	SCMSQ
Metedeconk River	SCMET
Monmouth County Coastal	SCMON
Mullica River	SCMUL
Navesink River	SCNAV
Ocean County Coastal	SCOCE
Raritan Bay	SCRAR
Shark River	SCSHA
Shrewsbury River	SCSHR
Toms River	SCTOM
Tuckahoe River	SCTUC
HUDSON RIVER BASIN	
Unknown or Non-Specific	SH
Hudson River	SHHUD
Papakating Creek	SHPAP
Pochuck Creek	SHPOC
Wallkill River	SHWAL
HACKENSACK RIVER BASIN	
Unknown or Non-Specific	SK
Hackensack River	SKHAC
RAHWAY RIVER BASIN	
Unknown or Non-Specific	SY
Rahway River	SYRAH
ELIZABETH RIVER BASIN	
Unknown or Non-Specific	SE
Elizabeth River	SEELI
DELAWARE BAY BASIN	
Unknown or Non-Specific	SB
Cohansey River	SBCOH
Maurice River	SBMAU
Stow Creek	SBSTO

LLACC:

S - accurate to +- 1 second
F - accurate to +- 5 seconds
T - accurate to +- 10 seconds
M - accurate to +- 1 minute
U - accuracy unknown

MUN:

ATLANTIC COUNTY (01)

01 - Absecon City
02 - Atlantic City
03 - Brigantine City
04 - Buena Boro
05 - Buena Vista Twp
06 - Corbin City
07 - Egg Harbor City
08 - Egg Harbor Twp
09 - Estell Manor City
10 - Folsom Boro
11 - Galloway Twp
12 - Hamilton Twp
13 - Hammonton Town
14 - Linwood City
15 - Longport Boro
16 - Margate City
17 - Mullica Twp
18 - Northfield City
19 - Pleasantville City
20 - Port Republic City
21 - Somers Point City
22 - Ventnor City
23 - Weymouth Twp

BERGEN COUNTY (03)

01 - Allendale Boro
02 - Alpine Boro
03 - Bergenfield Boro
04 - Bogota Boro
05 - Carlstadt Boro
06 - Cliffside Park Boro
07 - Closter Boro
08 - Cresskill Boro
09 - Demarest Boro
10 - Dumont Boro
12 - East Rutherford Boro
13 - Edgewater Boro
11 - Elmwood Park Boro
14 - Emerson Boro
15 - Englewood City
16 - Englewood Cliffs Boro
17 - Fair Lawn Boro
18 - Fairview Boro
19 - Fort Lee Boro
20 - Franklin Lakes Boro
21 - Garfield Boro
22 - Glen Rock Boro
23 - Hackensack City
24 - Harrington Park Boro
25 - Hasbrouck Heights Boro
26 - Haworth Boro
27 - Hillsdale Boro
28 - Hohokus Boro
29 - Leonia Boro
30 - Little Ferry Boro
31 - Lodi Boro
32 - Lyndhurst Twp
33 - Mahwah Twp
34 - Maywood Boro
35 - Midland Park Boro
36 - Montvale Boro
37 - Moonachie Boro
38 - New Milford Boro
39 - North Arlington Boro
40 - Northvale Boro
41 - Norwood Boro
42 - Oakland Boro
43 - Old Tappan Boro
44 - Oradell Boro
45 - Palisades Park Boro
46 - Paramus Boro
47 - Park Ridge Boro
48 - Ramsey Boro
49 - Ridgefield Boro
50 - Ridgefield Park Village
51 - Ridgewood Village
52 - River Edge Boro
53 - River Vale Twp
54 - Rochelle Park Twp
55 - Rockleigh Boro
56 - Rutherford Boro
57 - Saddle Brook Twp
58 - Saddle River Boro
59 - South Hackensack Twp
60 - Teaneck Twp
61 - Tenafly Boro
62 - Teterboro Boro
63 - Upper Saddle River Boro
64 - Waldwick Boro
65 - Wallington Boro
66 - Washington Twp
67 - Westwood Boro
68 - Wood-Ridge Boro
69 - Woodcliff Lake Boro
70 - Wyckoff Twp

BURLINGTON COUNTY (05)

01 - Bass River Twp
02 - Bev rly City
03 - Bordentown City
04 - Bordentown Twp

05 - Burlington City
06 - Burlington Twp
07 - Chesterfield Twp
08 - Cinnaminson Twp
09 - Delanco Twp
10 - D lran Twp
11 - Eastampton Twp
12 - Edgewater Park Twp
13 - Evesham Twp
14 - Fieldsboro Boro
15 - Florence Twp
16 - Hainesport Twp
17 - Lumberton Twp
18 - Mansfield Twp
19 - Maple Shade Twp
20 - Medford Lakes Boro
21 - Medford Twp
22 - Moorestown Twp
23 - Mount Holly Twp
24 - Mount Laurel Twp
25 - New Hanover Twp
26 - North Hanover Twp
27 - Palmyra Boro
28 - Pemberton Boro
29 - Pemberton Twp
30 - Riverside Twp
31 - Riverton Boro
32 - Shamong Twp
33 - Southampton Twp
34 - Springfield Twp
35 - Tabernacle Twp
36 - Washington Twp
37 - Westampton Twp
38 - Willingboro Twp
39 - Woodland Twp
40 - Wrightstown

CAMDEN COUNTY (07)

01 - Audubon Boro
02 - Audubon Park Boro
03 - Barrington Boro
04 - Bellmawr Boro
05 - Berlin Boro
06 - Berlin Twp
07 - Brooklawn Boro
08 - Camden City
09 - Cherry Hill Twp
10 - Chesilhurst Boro
11 - Clementon Boro
12 - Collingswood Boro
13 - Gibbsboro Boro
14 - Gloucester City
15 - Gloucester Twp
18 - Haddon Heights Boro
16 - Haddon Twp
17 - Haddonfield Boro
19 - Hi-Nella Boro
20 - Laurel Springs Boro
21 - Lawnside Boro
22 - Lindenwold Boro
23 - Magnolia Boro
24 - Merchantville Boro
25 - Mount Ephraim Boro
26 - Oaklyn Boro
27 - Pennsauken Twp
28 - Pine Hill Boro
29 - Pine Valley Boro
30 - Runnemede Boro
31 - Somerdale Boro
32 - Stratford Boro
33 - Tavistock Boro
34 - Voorhees Twp
35 - Waterford Twp
36 - Winslow Twp
37 - Woodlynne Boro

CAPE MAY COUNTY (09)

01 - Avalon Boro
02 - Cape May City
03 - Cape May Point Boro
04 - Dennis Twp
05 - Lower Twp
06 - Middle Twp
07 - North Wildwood City
08 - Ocean City
09 - Sea Isle City
10 - Stone Harbor Boro
11 - Upper Twp
12 - West Cape May Boro
13 - West Wildwood Boro
14 - Wildwood City
15 - Wildwood Crest Boro
16 - Woodbine Boro

CUMBERLAND COUNTY (11)

01 - Bridgeton City
02 - Commercial Twp
03 - Deerfield Twp
04 - Downe Twp
05 - Fairfield Twp
06 - Greenwich Twp

07 - Hopewell Twp
08 - Lawrence Twp
09 - Maurice River Twp
10 - Millville City
11 - Shiloh Boro
12 - Stow Creek Twp
13 - Upper Deerfield Twp
14 - Vineland City

ESSEX COUNTY (13)

01 - Belleville Town
02 - Bloomfield Town
03 - Caldwell Boro
04 - Cedar Grove Twp
05 - East Orange City
06 - Essex Fells Boro
07 - Fairfield Boro
08 - Glen Ridge Boro
09 - Irvington Town
10 - Livingston Twp
11 - Maplewood Twp
12 - Millburn Twp
13 - Montclair Town
14 - Newark City
15 - North Caldwell Boro
16 - Nutley Town
17 - Orange City
18 - Roseland Boro
19 - South Orange Village
20 - Verona Boro
21 - West Caldwell Boro
22 - West Orange Town

GLOUCESTER COUNTY (15)

01 - Clayton Boro
02 - Deptford Twp
03 - East Greenwich Twp
04 - Elk Twp
05 - Franklin Twp
06 - Glassboro Boro
07 - Greenwich Twp
08 - Harrison Twp
09 - Logan Twp
10 - Mantua Twp
11 - Monroe Twp
12 - National Park Boro
13 - Newfield Boro
14 - Paulsboro Boro
15 - Pitman Boro
16 - South Harrison Twp
17 - Swedesboro Boro
18 - Washington Twp
19 - Wenonah Boro
20 - West Deptford Twp
21 - Westville Boro
22 - Woodbury City
23 - Woodbury Heights Boro
24 - Woolwich Twp

HUDSON COUNTY (17)

01 - Bayonne City
02 - East Newark Boro
03 - Guttenberg Town
04 - Harrison Town
05 - Hoboken City
06 - Jersey City
07 - Kearny Town
08 - North Bergen Twp
09 - Secaucus Twp
10 - Union City
11 - Weehawken Twp
12 - West New York Town

HUNTERDON COUNTY (19)

01 - Alexandria Twp
02 - Bethlehem Twp
03 - Bloomsbury Boro
04 - Califon Boro
05 - Clinton Town
06 - Clinton Twp
07 - Delaware Twp
08 - East Amwell Twp
09 - Flemington Boro
10 - Franklin Twp
11 - Frenchtown Boro
12 - Glen Gardner Boro
13 - Hampton Boro
14 - High Bridge Boro
15 - Holland Twp
16 - Kingwood Twp
17 - Lambertville City
18 - L banon Boro
19 - Lebanon Twp
20 - Milford Boro
21 - Raritan Twp
22 - Readington Twp
23 - Stockton Boro
24 - Tewksbury Twp
25 - Union Twp
26 - West Amwell Twp

MERCER COUNTY (21)

01 - East Windsor Twp
02 - Ewing Twp
03 - Hamilton Twp
04 - Hightstown Boro
05 - Hopewell Boro
06 - Hopewell Twp
07 - Lawrence Twp
08 - Pennington Boro
09 - Princeton Boro
10 - Princeton Twp
11 - Trenton City
12 - Washington Twp
13 - West Windsor Twp

MIDDLESEX COUNTY (23)

01 - Carteret Boro
02 - Cranbury Twp
03 - Dunellen Boro
04 - East Brunswick Twp
05 - Edison Twp
06 - Helmetta Boro
07 - Highland Park Boro
08 - Jamesburg Boro
10 - Metuchen Boro
11 - Middlesex Boro
12 - Milltown Boro
13 - Monroe Twp
14 - New Brunswick City
15 - North Brunswick Twp
09 - Old Bridge Twp
16 - Perth Amboy City
17 - Piscataway Twp
18 - Plainsboro Twp
19 - Sayreville Boro
20 - South Amboy City
21 - South Brunswick Twp
22 - South Plainfield Boro
23 - South River Boro
24 - Spotswood Boro
25 - Woodbridge Twp

MONMOUTH COUNTY (25)

30 - Aberdeen Twp
01 - Allenhurst Boro
02 - Allentown Boro
03 - Asbury Park City
04 - Atlantic Highlands Boro
05 - Avon-By-The-Sea Boro
06 - Belmar Boro
07 - Bradley Beach Boro
08 - Brielle Boro
09 - Colts Neck Twp
10 - Deal Boro
11 - Eatontown Boro
12 - Englishtown Boro
13 - Fair Haven Boro
14 - Farmingdale Boro
15 - Freehold Boro
16 - Freehold Twp
39 - Hazlet Twp
17 - Highland Boro
18 - Holmdel Boro
19 - Howell Twp
20 - Interlaken Boro
21 - Keansburg Boro
22 - Keyport Boro
23 - Little Silver Boro
24 - Loch Arbour Village
25 - Long Branch City
26 - Manalapan Twp
27 - Manasquan Boro
28 - Marlboro Twp
29 - Matawan Boro
31 - Middletown Twp
32 - Millstone Twp
33 - Monmouth Beach Boro
35 - Neptune City Boro
34 - Neptune Twp
37 - Ocean Twp
38 - Oceanport Boro
40 - Red Bank Boro
41 - Roosevelt Boro
42 - Rumson Boro
43 - Sea Bright Boro
44 - Sea Girt Boro
45 - Shrewsbury Boro
46 - Shrewsbury Twp
47 - South Belmar Boro
48 - Spring Lake Boro
49 - Spring Lake Heights Boro
36 - Tinton Falls Boro
50 - Union Beach Boro
51 - Upper Freehold Twp
52 - Wall Twp
53 - West Long Branch Twp

MORRIS COUNTY (27)

01 - Boonton Town
02 - Boonton Twp
03 - Butler Boro
04 - Chatham Boro
05 - Chatham Twp
06 - Chester Boro
07 - Chester Twp
08 - Denville Twp
09 - Dover Town
10 - East Hanover Twp
11 - Florham Park Boro
12 - Hanover Twp
13 - Harding Twp
14 - Jefferson Twp
15 - Kinnelon Boro
16 - Lincoln Park Boro
17 - Madison Boro
18 - Mendham Boro
19 - Mendham Twp
20 - Mine Hill Twp
21 - Montville Twp
23 - Morris Plains Boro
22 - Morris Twp
24 - Morristown Town
26 - Mount Arlington Boro
27 - Mount Olive Twp
25 - Mountain Lakes Boro
28 - Netcong Boro
29 - Parsippany Troy-Hills Twp
30 - Passaic Twp
31 - Pequannock Twp
32 - Randolph Twp
33 - Riverdale Boro
34 - Rockaway Boro
35 - Rockaway Twp
36 - Roxbury Twp
37 - Victory Gardens Boro
38 - Washington Twp
39 - Wharton Boro

OCEAN COUNTY (29)

01 - Barnegat Light Boro
33 - Barnegat Twp
02 - Bay Head Boro
03 - Beach Haven Boro
04 - Beachwood Boro
05 - Berkeley Twp
06 - Brick Twp
07 - Dover Twp
08 - Eagleswood Twp
09 - Harvey Cedars Boro
10 - Island Heights Boro
11 - Jackson Twp
12 - Lacey Twp
13 - Lakehurst Boro
14 - Lakewood Twp
15 - Lavalette Boro
16 - Little Egg Harbor Twp
17 - Long Beach Twp
18 - Manchester Twp
19 - Mantaloking Boro
21 - Ocean Gate Boro
20 - Ocean Twp
22 - Pine Beach Boro
23 - Plumsted Twp
25 - Point Pleasant Beach Boro
24 - Point Pleasant Boro
26 - Seaside Heights Boro
27 - Seaside Park Boro
28 - Ship Bottom Boro
29 - South Toms River Boro
30 - Stafford Twp
31 - Surf City Boro
32 - Tuckerton Boro

PASSAIC COUNTY (31)

01 - Bloomingdale Boro
02 - Clifton City
03 - Haledon Boro
04 - Hawthorne Boro
05 - Little Falls Twp
06 - North Haledon Boro
07 - Passaic City
08 - Paterson City
09 - Pompton Lakes Boro
10 - Prospect Park Boro
11 - Ringwood Boro
12 - Totowa Boro
13 - Wanaque Boro
14 - Wayne Twp
15 - West Milford Twp
16 - West Pat rson Boro

SALEM COUNTY (33)

01 - Alloway Twp
13 - Carney's Point Twp
02 - Elmer Boro
03 - Elsinboro Twp

04 - L wer Alloways Creek Twp
05 - Mannington Twp
06 - Oldmans Twp
07 - Penns Grove Boro
08 - Pennsville Twp
09 - Pilesgrove Twp
10 - Pittsgrove Twp
11 - Quinton Twp
12 - Salem City
14 - Upper Pittsgrove Twp
15 - Woodstown Boro

SOMERSET COUNTY (35)

01 - Bedminster Twp
02 - Bernards Twp
03 - Bernardsville Boro
04 - Bound Brook Boro
05 - Branchburg Twp
06 - Bridgewater Twp
07 - Far Hills Boro
08 - Franklin Twp
09 - Green Brook Twp
10 - Hillsborough Twp
11 - Manville Boro
12 - Millstone Boro
13 - Montgomery Twp
14 - North Plainfield Boro
15 - Peapack-Gladstone Boro
16 - Raritan Boro
17 - Rocky Hill Boro
18 - Somerville Boro
19 - South Bound Brook Boro
20 - Warren Twp
21 - Watchung Boro

SUSSEX COUNTY (37)

01 - Andover Boro
02 - Andover Twp
03 - Branchville Boro
04 - Byram Twp
05 - Frankford Twp
06 - Franklin Boro
07 - Fredon Twp
08 - Green Twp
09 - Hamburg Boro
10 - Hampton Twp
11 - Hardyston Twp
12 - Hopatcong Boro
13 - Lafayette Twp
14 - Montague Twp
15 - Newton Town
16 - Ogdensburg Boro
17 - Sandyston Twp
18 - Sparta Twp
19 - Stanhope Boro
20 - Stillwater Twp
21 - Sussex Boro
22 - Vernon Twp
23 - Walpack Twp
24 - Wantage Twp

UNION COUNTY (39)

01 - Berkeley Heights Twp
02 - Clark Twp
03 - Cranford Twp
04 - Elizabeth City
05 - Fanwood Boro
06 - Garwood Boro
07 - Hillside Twp
08 - Kenilworth Boro
09 - Linden City
10 - Mountainside Boro
11 - New Providence Boro
12 - Plainfield City
13 - Rahway City
14 - Roselle Boro
15 - Roselle Park Boro
16 - Scotch Plains Twp
17 - Springfield Twp
18 - Summit City
19 - Union Twp
20 - Westfield Town
21 - Winfield Twp

WARREN COUNTY (41)

01 - Allamuchy Twp
02 - Alpha Boro
03 - Belvidere Town
04 - Blairstown Twp
05 - Franklin Twp
06 - Frelinghuysen Twp
07 - Greenwich Twp
08 - Hackettstown Town
09 - Hardwick Twp
10 - Harmony Twp
11 - Hope Twp
12 - Independence Twp

13 - Knowlton Twp
14 - Liberty Twp
15 - Lopatcong Twp
16 - Mansfield Twp.
17 - Oxford Twp
18 - Pahaquarry Twp
19 - Phillipsburg Town
20 - Pohatcong Twp
21 - Washington Boro
22 - Washington Twp
23 - White Twp

DESCRIPTION OF NJGS CASE INDEX SITES

The NJGS Index Sites listing contains the following fields:

CONTAM: Contaminate code
DISTANCE: Distance in miles from center of circle
FMCODE1: NJGS primary formation code
FMCODE2: NJGS secondary formation code
LAT: Latitude of site
LON: Longitude of site
NAME: Name and location of site
SITENUM: Site identifier
STATUS1: Current status of site
STATUS2: Further description of site status

The data in this listing is from the 1987 New Jersey Geological Survey's Case Index File. The actual transfer date is printed on the left side of the enclosed map. This file contains some of the identified potential pollution sites in the State, but does not include those identified after December 22, 1987. For xample the file does not generally include spill sites. Recognizing the fact that this list may contain significant rrors and omissions, it is advisable to use this resource as a guide and to verify all information.

If you have any questions, please call or write to us in r ference to the "Radius Program" at:

NJDEPE
Water Technical Programs
Bureau of Water Allocation
CN-029
Trenton, New Jersey 08625

(609) 292-2957

Please see the attached sheets for definitions of the codes used in the NJGS Case Index Sites listing.

CODES USED IN THE NJGS CASE INDEX SITES LISTING

This packet contains definitions of the database codes used in the NJGS Case Index Sites listing.

CONTAM

00 = ORGANIC CHEM (VOLATILE)
01 = ORGANIC CHEM (NONVOLATILE)
02 = CHLOROFORM
03 = '1,2 - DICHLOROETHANE'
04 = '1,1,1 - TRICHLOROETHANE'
05 = TETRACHLOROETHYLENE
06 = DICHLOROETHYLENE
07 = TRICHLOROETHYLENE
08 = CARBON TETRACHLORIDE
09 = METHYLENE CHLORIDE
10 = ACETONE
11 = BENZENE
12 = TOLUNE
13 = XYLENE
14 = METHYL ISOBUTYL KETONE
15 = ETHYLENE DICHLORIDE
16 = METHYL ETHYL KETONE
17 = TETRAHYDROFURAN
18 = '1,2 - DICHLOROETHENE'
19 = '1,1 - DICHLOROETHENE'
20 = '1,1 - DICHLOROETHANE'
21 = '1,1,2,2 - TETRACHLOROETHYLENE'
22 = '1,1,2,2 - TETRACHLOROETHANE'
23 = TRICHLOROFLUOROMETHANE
24 = CHLOROBENZENE
25 = ETHYLBENZENE
26 = '1,2 - DICHLOROBENZENE'
27 = DICHLOROFLUOROMETHANE
28 = STYRENE
29 = ISOPROPYL ALCOHOL
30 = VINYL CHLORIDE
31 = HEXANE
32 = HEPTANE
33 = PHENTANE
34 = PHENOLS
35 = METALS
36 = LEAD
37 = IRON
38 = MERCURY
39 = CHROMIUM
41 = ARSENIC
42 = CADMIUM
43 = CHLORIDE
44 = SODIUM
45 = NITRATE

46 = SULFATE
47 = PESTICIDES
48 = HERBICIDES
49 = NATURAL RADIOACTIVITY
50 = 'PCB''S'
51 = GASOLINE
52 = DIESEL FUEL
53 = FUEL OIL
54 = INORGANIC CHEMICALS
55 = GREASES AND FATS
56 = SLUDGE
57 = ACID
58 = LEACHATE
59 = METHANE GAS
60 = DYE
61 = IODINE
62 = EXPLOSIVES
63 = PETROLEUM HYDROCARBONS
64 = PHARMACEUTICALS
65 = SURFACTANTS
66 = SEPTIC DISCHARGES
67 = RADIOACTIVE WASTE
68 = UNKNOWN
69 = TRICHLORETHYLENE
70 = COAL TAR
71 = ASBESTOS
72 = DIOXIN

FMCODE

0000 = 'N/A'
0100 = QUATERNARY
0101 = MEADOW MAT
0102 = ALLUVIUM
0103 = FILL
0104 = BEACH SANS
0110 = GLACIAL,UNDIFFERENTIATED
0120 = GLACIAL,UNSTRATIFIED TILL
0130 = STRATIFIED DRIFT
0140 = MORAINE
0144 = TERMINAL MORAINE
0148 = RECESSIONAL MORAINE
0150 = BRIDGETON
0160 = CAPE MAY
0161 = HOLLY BEACH MBR
0170 = PENNSAUKEN
1000 = TERTIARY
1010 = BEACON HILL
1020 = COHANSEY SAND
1025 = COHANSEY KIRKWOOD
1030 = KIRKWOOD SAND
1031 = UPPER MEMBER
1032 = LOWER MEMBER

1033 = PINEY POINT MBR
1040 = SHARK RIVER MARL
1050 = MANASQUAN MARL
1060 = VINCENTOWN SAND
1070 = HORNERSTOWN MARL
2000 = CRETACEOUS
2010 = RED BANK AND TINTON SANDS
2020 = NAVESANK MARL
2030 = MOUNT LAUREL WENONAH SANDS
2034 = MOUNT LAUREL SAND
2038 = WENONAH SAND
2040 = MARSHALLTOWN FM
2050 = ENGLISHTOWN SAND
2060 = WOODBURY CLAY
2070 = MERCHANTVILLE CLAY
2080 = MAGOTHY RARITAN FM
2081 = MAGOTHY RARITAN UPPER MBR
2084 = MAGOTHY RARITAN MIDDLE MBR
2088 = MAGOTHY RARITAN LOWER MBR
2090 = MAGOTHY FM
2091 = AMBOY STONEWARE CLAY MBR
2092 = OLD BRIDGE SAND MBR
2093 = SOUTH AMBOY FIRE CLAY MBR
2094 = SAYREVILLE SAND MBR
2095 = WOODBRIDGE CLAY MBR
2096 = FARRINGTON SAND MBR
2097 = RARITAN FIRE CLAY MBR
3000 = TRIASIC JURASSIC
3010 = BOONTON FM
3020 = BASALT UNDIFFERENTIATED
3021 = HOOK MT BASALT
3030 = TOWACO FM
3022 = PREAKNESS BASALT
3040 = FELTVILLE FM
3023 = ORANGE MT BASALT
3050 = DIABASE
3060 = CONGLOMERATE (HAMMER CREEK)
3070 = BRUNSWICK FM
3080 = LOCKATONG FM
3090 = STOCKTON FM
4000 = DEVONIAN
4010 = SKUNNEMUNK CNGLM
4020 = BELLVALE SS PEQUANAC SH
4030 = KANOUSE SANDSTONE
4040 = MARCELLUS SHALE
4050 = ONONDAGE LS
4060 = ESOPUS GRIT
4070 = ORISKANY BECRAFT LS
4080 = NEW SCOTLAND COEYMANS
5000 = SILURIAN
5010 = BOSSARDVILLE LS
5020 = DECKER FM
5030 = LONGWOOD SHALE
5040 = POXONO ISLAND

5050 = GREENPOND CONGLOMERATE
5060 = HIGH FALLS
5070 = SHAWANGUNK CONGLOMERATE
6000 = ORDOVICIAN
6010 = MARTINSBURG SHALE
6011 = PEN ARGYL MBR
6012 = RAMSEYBURG MBR
6013 = BUSHKILL MBR
6020 = JACKONSBURG LS
6030 = ONTLEAUNEE FM
6031 = HARMONYVALE MBR
6032 = BEAVER RUN MBR
6040 = EPLER FM
6041 = LAFAYETTE MBR
6042 = BIG SPRINGS MBR
6043 = BRANCHVILLE MBR
6050 = RICKENBACK DOLOMITE
6060 = MANHATTAN SCHIST
7000 = CAMBRO ORDOVICIAN
7010 = KITTATINNY SUPERGROUP
8000 = CAMBRIAN
8010 = ALLENTOWN FM
8011 = UPPER MBR
8012 = LIMEPORT MBR
8020 = LEITHSVILLE FM
8021 = WALLKILL MBR
8022 = HAMBURG MBR
8023 = CALIFON MBR
8030 = HARDYSTONE SAND
9000 = PRE CAMBRIAN
9010 = GRANITE
9011 = HORNBLEND GRANITE
9020 = GNEISS
9021 = GRANITE GNEISS
9022 = HORNBLEND GNEISS
9023 = QUARTZ OLIGOCLAISE GNEISS
9030 = ALASKITE
9040 = SYENITE
9041 = SYENITE GNESS
9050 = PYROXENE GRANITE
9060 = MICROCLINE GNEISS
9070 = FRANKLIN LIMESTONE
9080 = AMPHIBOLITE
9090 = BIOTITE GNEISS
9091 = MIXED GNEISS;

STATUS1

1 = INVESTIGATION 2 = AQUIFER RESTOR CONT
3 = REQUEST FOR GEOLOG
4 = MONITORING
5 = LITIGATION
6 = CLOSED

7 = OTHER
8 = BACKLOGGED
9 = TRANS PERMITS
0 = UNKNOWN
F = FIELD REC PROVIDED

STATUS2

O = INVEST CONT
A = CLEAN UP PLAN
B = SAMPLING PLAN
C = INITIAL INVEST
D = RQST PRPSL (RFP)
E = REMEDIAL INVEST
F = FSBLTY STUDY (FS)
G = PLAN, CONST REMEDIAL
H = FREE PRODUCT RECOVERY
I = DSLVD FRACTION RECOV
J = FREE, DSSLVD RECOV
K = CASE ABSORBED

SUBJECT TO REVISION

WATER WITHDRAWAL POINTS AND NJGS CASE INDEX SITES WITHIN 5.0 MILES OF:

LATITUDE 401547
LONGITUDE 740942

DRAFT

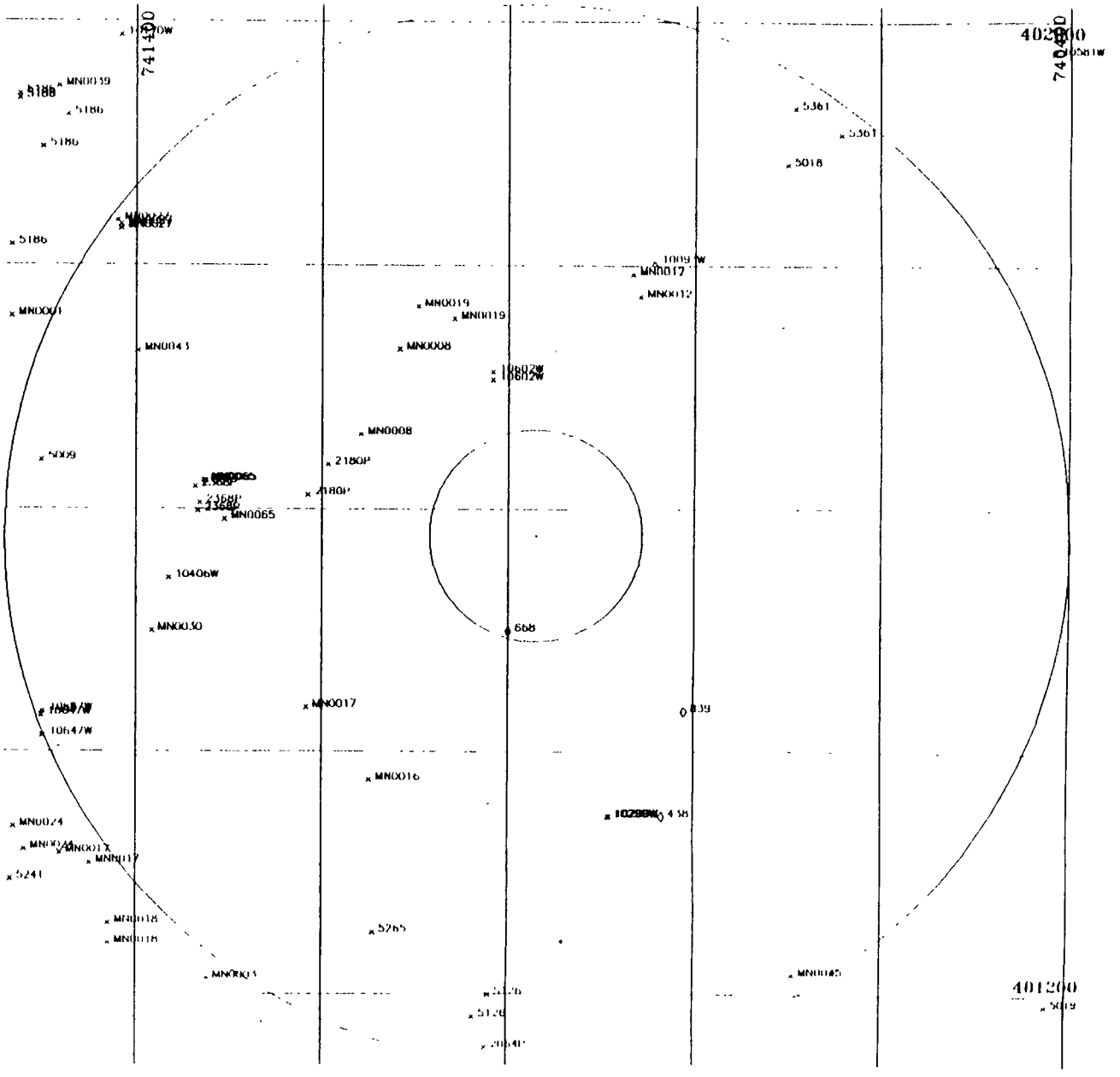
SCALE 1:63,360
(1 Inch = 1 Mile)

× WATER WITHDRAWAL POINTS
◊ NJGS CASE INDEX SITES
1 MILE AND 5 MILE RADII INDICATED

NJGS CASE INDEX DATA RETRIEVED FROM
NEW JERSEY GEOLOGICAL SURVEY
ON 12/22/87

PLOT PRODUCED BY
NJDEP
WATER TECHNICAL PROGRAMS
BUREAU OF WATER ALLOCATION
CN 029
TRENTON, NJ 08625

DATE 03/08/92



SUBJECT TO REVISION

[illegible] LISTING OF WATER WITHDRAWAL POINTS WITHIN [illegible] MILE OF 401[illegible] LAT, 74[illegible] LON (ORDERED BY PERMIT NUMBER) [illegible]

[illegible]	NAME	[illegible] ID	LOCAL ID	LAT	LON	[illegible]	DISTANCE	COUNTY	MUN	DEPTH	GEOL	GEOL	CAPACITY
[illegible]	[illegible]	[illegible]	[illegible]	401[illegible]	740[illegible]	T	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		100
[illegible]	[illegible]	[illegible]	#	401[illegible]	741410	T	6.1	25	31	210	[illegible]		100
[illegible]	[illegible]	[illegible]	1	401[illegible]	740[illegible]4		2.7	25	19	170	GEMW		100
	[illegible]	[illegible]	2	401[illegible]	740[illegible]	T	2.7	25	19	[illegible]	GEMW		100
	[illegible]	2917603	[illegible]	401[illegible]	740[illegible]5	T	2.7	25	19	[illegible]	GEMW		100
[illegible]	[illegible] FILE	2914351		401[illegible]6	741[illegible]		7.5	25	09	250	GEET		200
	[illegible] FILE	2914352		401526	741[illegible]		7.5	25	09	250	GEET		200
[illegible]	[illegible] (CANCELLED)	2921219		401945	740410		6.6	25	36		GEET		50
[illegible]	BRANDYWINE ASSOCIATES	2920681		401704	741010	T	1.5	25	09				
	BRANDYWINE ASSOCIATES	2920682		401708	741010	T	1.6	25	09				
	BRANDYWINE ASSOCIATES	2920683		401708	741010	T	1.6	25	09				
	BRANDYWINE ASSOCIATES	2920684		401704	741010	T	1.5	25	09				
	BRANDYWINE ASSOCIATES	2920685		401708	741010	T	1.6	25	09				
	BRANDYWINE ASSOCIATES	2920686		401708	741010	T	1.6	25	09				
	BRANDYWINE ASSOCIATES	2920687		401708	741010	T	1.6	25	09				
106[illegible]	COOPER DEVELOPMENT CO.	2919875	1	401408	741500	T	5.0	25	16	15	GTHT		60
	COOPER DEVELOPMENT CO.	2919888	2	401408	741500	T	5.0	25	16	15	GTHT		60
	COOPER DEVELOPMENT CO.	2919889	3	401408	741500	T	5.0	25	16	15	GTHT		60
	COOPER DEVELOPMENT CO.	2919890	4	401408	741500	T	5.0	25	16	15	GTHT		60
	COOPER DEVELOPMENT CO.	2919891	5	401408	741500	T	5.0	25	16	15	GTHT		60
	COOPER DEVELOPMENT CO.	2919740	6	401408	741500	T	5.0	25	16	15	GTHT		60
	COOPER DEVELOPMENT CO.	2919879	7	401408	741500	T	5.0	25	16	15	GTHT		60
	COOPER DEVELOPMENT CO.	2919878	8	401408	741500	T	5.0	25	16	15	GTHT		60
	COOPER DEVELOPMENT CO.	2919887	9	401408	741500	T	5.0	25	16	15	GTHT		60
	COOPER DEVELOPMENT CO.	2919873	10	401408	741500	T	5.0	25	16	15	GTHT		60
	COOPER DEVELOPMENT CO.	2919872	11	401408	741500	T	5.0	25	16	15		GTHT	60
	COOPER DEVELOPMENT CO.	2919874	12	401408	741500	T	5.0	25	16	15	GTHT		60
	COOPER DEVELOPMENT CO.	2919876	13	401408	741500	T	5.0	25	16	15	GTHT		60
	COOPER DEVELOPMENT CO.	2919877	14	401408	741500	T	5.0	25	16	15	GTHT		60
	COOPER DEVELOPMENT CO.	2919884	15	401408	741500	T	5.0	25	16	15	GTHT		60
	COOPER DEVELOPMENT CO.	2919885	16	401408	741500	T	5.0	25	16	15	GTHT		60
	COOPER DEVELOPMENT CO.	2919886	17	401408	741500	T	5.0	25	16	15	GTHT		60
	COOPER DEVELOPMENT CO.	2919880	18	401408	741500	T	5.0	25	16	15	GTHT		60
	COOPER DEVELOPMENT CO.	2919881	19	401408	741500	T	5.0	25	16	15	GTHT		60
	COOPER DEVELOPMENT CO.	2919882	20	401408	741500	T	5.0	25	16	15	GTHT		60
	COOPER DEVELOPMENT CO.	2919883	21	401408	741500	T	5.0	25	16	15	GTHT		60
	COOPER DEVELOPMENT CO.	2917999	MW-3	401418	741501	T	5.0	25	16	12.5	GTHT		20
	COOPER DEVELOPMENT CO.	29[illegible]007	MW-15	401418	741501	T	5.0	25	16	17	GTHT		20
	COOPER DEVELOPMENT CO.	2926606	RW6	401430	741500		4.9	25	16	25	GTHT		60
	COOPER DEVELOPMENT CO.	2926607	RW7	401430	741500		4.9	25	16	25	GTHT		60
	COOPER DEVELOPMENT CO.	2926608	RW8	401430	741500		4.9	25	16	25	GTHT		60
	COOPER DEVELOPMENT CO.	2926609	RW9	401430	741500		4.9	25	16	25	GTHT		60
	COOPER DEVELOPMENT CO.	2926610	RW10	401430	741500		4.9	25	16	25	GTHT		60
	COOPER DEVELOPMENT CO.	2926611	RW11	401430	741500		4.9	25	16	25	GTHT		60
	COOPER DEVELOPMENT CO.	2926612	2921385	401430	741500		4.9	25	16	25	GTHT		60
	COOPER DEVELOPMENT CO.	2926615	RW3	401430	741500		4.9	25	16	25	GTHT		60
	COOPER DEVELOPMENT CO.	2926616	RW8	401430	741500		4.9	25	16	25	GTHT		60
	COOPER DEVELOPMENT CO.	2921385	RW6	401430	741500		4.9	25	16	25	GTHT		60
106[illegible]	[illegible] PACKAGING CO., INC.	2926617	RW1	401430	741500		4.9	25	16	25	GTHT		60
20[illegible]	[illegible] - STERN - [illegible]	2902492	4	401[illegible]4	741014		4.9	25	14	805	GERDR		600
[illegible]	MONMOUTH COUNTY PARKS SYSTEM	2904068	2	401607	741[illegible]		[illegible]	25	09	712	GERDR		1000
	MONMOUTH COUNTY PARKS SYSTEM	4900012	1	4016[illegible]	741[illegible]6		[illegible]	25	09	[illegible]	GEET		45
50[illegible]	FREEHOLD TOWNSHIP	2904425	ABANDONED	401624	741[illegible]1	F	4.7	25	15		GERDR		
5018	NEW JERSEY AMERICAN WATER CO.	SWIMMING RIVER		401[illegible]	740[illegible]		4.2	25	31		SWNAV		
5019	NEW JERSEY AMERICAN WATER CO.	SHARK RIVER		401[illegible]5	740[illegible]	F	6.5	25	34		SW[illegible]		

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5010	NEW JERSEY-AMERICAN WATER CO.	[illegible]	[illegible]	[illegible]	[illegible]		4.[illegible]	25	4		[illegible]	SUNNY		
5019	NEW JERSEY-AMERICAN WATER CO.	MAIN RIVER		401[illegible]	[illegible]	F	6.5	25	4		[illegible]	[illegible]		

Page 2 of PRELIMINARY SURVEY OF WATER WITHDRAWAL POINTS WITHIN 5.0 MILES OF 401517 LAT. 74694. LON. (IN ORDER BY PERMIT NUMBER) - 03/08/92

NUMBER	NAME	SOURCE ID	FIELD ID	LAT	LON	FLOW	DISTANCE	COUNTY	MIN	DEPTH	GEOL	GEO2	CAPACITY
5126	FARMINGDALE BOROUGH	[illegible]	-	401149	741[illegible]	F	4.6	25	14	467	[illegible]		[illegible]
	FARMINGDALE BOROUGH	[illegible]	4	401[illegible]	741[illegible]	F	4.4	25	14	470	[illegible]		[illegible]
5186	GORDON'S CORNER WATER COMPANY	[illegible]	7 NEW PONDS	401[illegible]	741[illegible]	F	5.9	25	38	667	[illegible]		[illegible]
	GORDON'S CORNER WATER COMPANY	[illegible]	8 (SPENCER)	401914	741444		5.9	25	38	[illegible]	[illegible]		[illegible]
	GORDON'S CORNER WATER COMPANY	[illegible]	9 STANDBY	401[illegible]	741515	F	6.4	25	38	[illegible]	[illegible]		[illegible]
	GORDON'S CORNER WATER COMPANY	[illegible]	11	401924	741515	F	6.4	25	38	581	[illegible]		[illegible]
	GORDON'S CORNER WATER COMPANY	PROPOSED	14	401810	741520	F	5.6	25	38		[illegible]		[illegible]
5241	ADELPHIA WATER COMPANY	[illegible]	1	401[illegible]	741521		5.9	25	19	767	[illegible]		[illegible]
5265	HOWELL TWP. DEPT. SEWER & WTR	[illegible]	HI 1975	401231	741127		4.0	25	17	862	[illegible]		[illegible]
5361	NEW JERSEY-AMERICAN WATER CO.	[illegible]	2	401905	740625	F	4.8	25	09	677	[illegible]		[illegible]
	NEW JERSEY-AMERICAN WATER CO.	[illegible]	3	401918	740655	F	4.7	25	09	781	[illegible]		[illegible]
MN0001	OUT OF BUSINESS	POND	6	401735	741520	F	5.2	25	16	8	SUNNY	OPEN	[illegible]
MN0002	TURF GRASS SOD FARMS, INC.	MANASQUAN RIV	STREAM 1	401308	741314	F	5.2	25	19		SUNNY		[illegible]
MN0003	DE FEDELE BROS.	YELLOW BROOK	POND 1	401719	741110	F	2.2	25	09	10	SUNNY	OPEN	[illegible]
	DE FEDELE BROS.	MINE BROOK	POND 2	401637	741115	F	1.9	25	09	10	SUNNY	OPEN	[illegible]
MN0012	EASTMONT ORCHARDS	POND	1	401756	740640	F	2.6	25	09	10	SUNNY	OPEN	[illegible]
	EASTMONT ORCHARDS	STREAM	1	401745	740635	F	2.5	25	09		SUNNY		
MN0016	FAIR SOD FARM	MANASQUAN	PUMP 1	401346	741127	F	2.8	25	17		SUNNY	OPEN	[illegible]
MN0017	HEITER FARMS, INC.	POND	1	401310	741449	F	5.4	25	19	18	SUNNY	OPEN	[illegible]
	HEITER FARMS, INC.	POND	2	401306	741430	F	5.2	25	19	18	SUNNY	OPEN	[illegible]
	HEITER FARMS, INC.	POND	3	401422	741210	F	2.7	25	17	18	SUNNY	OPEN	[illegible]
MN0018	DI GIACOMO, ANGELO	POND	1	401225	741418	F	5.6	25	19	15	SUNNY	OPEN	[illegible]
	DI GIACOMO, ANGELO	POND	2	401235	741418	F	5.4	25	19	15	SUNNY	OPEN	[illegible]
MN0019	CHARLES D ELLIOT & SONS	STREAM	1	401734	741035	F	2.2	25	09		SUNNY		[illegible]
	CHARLES D ELLIOT & SONS	POND	1	401740	741058	F	2.4	25	09	10	SUNNY	OPEN	[illegible]
MN0024	ROTGERS U DEPT OF ORNA SCIENCE	WELL 2	WELL 2	401312	741512	F	5.7	25	19	20	[illegible]		[illegible]
	ROTGERS U DEPT OF ORNA SCIENCE	PROPOSED	WELL 1	401322	741519	F	5.6	25	19	180	[illegible]		[illegible]
MN0027	HOLLAND, HARVEY V.	POND	1	401820	741410	F	4.9	25	28	20	SUNNY	OPEN	[illegible]
	HOLLAND, HARVEY V.	POND	2	401822	741411	F	4.9	25	28	20	SUNNY	OPEN	[illegible]
	HOLLAND, HARVEY V.	POND	3	401818	741410	F	4.9	25	28	20	SUNNY	OPEN	[illegible]
MN0030	FARM SOLD	POND	1	401500	741350	F	3.7	25	19	10	OPEN	SUNNY	[illegible]
MN0039	STROTEL, KENNETH & BOB	STREAM 1	STREAM 1	401938	741450	F	6.2	25	28		SUNNY		[illegible]
MN0042	FARM SOLD	POND	1	401718	741337	F	4.1	25	28	15	OPEN	SUNNY	[illegible]
MN0045	MC DOWELL, FRED	MAIN RIVER	STREAM 1	401210	740656	F	4.8	25	52		SUNNY		[illegible]
	MC DOWELL, FRED	POND	1	401210	740656	F	4.8	25	52	6	OPEN		[illegible]
	MC DOWELL, FRED	PROPOSED	WELL 1	401210	740656	F	4.8	25	52	90	OPEN		[illegible]
	MC DOWELL, FRED	PROPOSED	WELL 2	401210	740656	F	4.8	25	52	90	OPEN		[illegible]
	MC DOWELL, FRED	PROPOSED	WELL 3	401210	740656	F	4.8	25	52	90	OPEN		[illegible]
	MC DOWELL, FRED	PROPOSED	WELL 4	401210	740656	F	4.8	25	52	90	OPEN		[illegible]
	MC DOWELL, FRED	PROPOSED	WELL 5	401210	740656	F	4.8	25	52	90	OPEN		[illegible]
	MC DOWELL, FRED	PROPOSED	WELL 6	401210	740656	F	4.8	25	52	90	OPEN		[illegible]
MN0063	[illegible], ANTHONY	MINE BROOK	STREAM 1	401614	741315	F	[illegible]	25	09		SUNNY		[illegible]
	[illegible], ANTHONY	POND	1	401625	741327	F	[illegible]	25	09	7	OPEN	[illegible]	[illegible]
	[illegible], ANTHONY	POND	2	401614	741316	F	[illegible]	25	09	1[illegible]	SUNNY	OPEN	[illegible]

Number of Observations: [illegible]

NUMBER	NAME	SOURCE ID	LOCID	LAT	LON	FLAG	DISTANCE	COUNTY	MUN	DEPTH	USE	GEOL	CAPACITY
5241	ADELPHIA WATER COMPANY	2906651	1	401557	741511		5.9	25	19	760	GIHOU		900
5186	GORDON'S CORNER WATER COMPANY	EXUMPOLD	14	401010	741530	F	5.6	25	38		GIHOU		700
MN0001	OUT OF BUSINESS	FUND	6	401235	741530	F	5.2	25	16	18	SECAY	GIPM	1000
MN0024	RUTGERS U DEPT OF GROUP SCIENCE	4900026	WELL 1	401223	741519	F	5.6	25	19	185	GIPM		60
5186	GORDON'S CORNER WATER COMPANY	2906[illegible]	9-STANDBY	401912	741515	F	6.4	25	38	[illegible]	GIHOU		200
5186	GORDON'S CORNER WATER COMPANY	2913877	11	401924	741515	F	6.4	25	38	581	GIHOU		1000
MN0024	RUTGERS U DEPT OF GROUP SCIENCE	WELL [illegible]	WELL 2	401312	741512	F	5.7	25	19	40	GIET		20
10647W	COOPER DEVELOPMENT CO.	2917999	MW-3	401418	741501	I	5.0	25	16	1.25	GIHI		30
10647W	COOPER DEVELOPMENT CO.	2922307	MW 15	401418	741501	I	5.0	25	16	17	GIHI		10
5009	FREEHOLD TOWNSHIP	2904435	ABANDONED	401624	741501	F	4.7	25	16		GIHOU		
10647W	COOPER DEVELOPMENT CO.	2919875	1	401408	741500	I	5.0	25	16	15	GIHI		60
10647W	COOPER DEVELOPMENT CO.	2919888	2	401408	741500	I	5.0	25	16	15	GIHI		60
10647W	COOPER DEVELOPMENT CO.	2919889	3	401408	741500	I	5.0	25	16	15	GIHI		60
10647W	COOPER DEVELOPMENT CO.	2919890	4	401408	741500	I	5.0	25	16	15	GIHI		60
10647W	COOPER DEVELOPMENT CO.	2919891	5	401408	741500	I	5.0	25	16	15	GIHI		60
10647W	COOPER DEVELOPMENT CO.	2919740	6	401408	741500	I	5.0	25	16	15	GIHI		60
10647W	COOPER DEVELOPMENT CO.	2919879	7	401408	741500	I	5.0	25	16	15	GIHI		60
10647W	COOPER DEVELOPMENT CO.	2919878	8	401408	741500	I	5.0	25	16	15	GIHI		
10647W	COOPER DEVELOPMENT CO.	2919887	9	401408	741500	I	5.0	25	16	15	GIHI		[illegible]
10647W	COOPER DEVELOPMENT CO.	2919873	10	401408	741500	I	5.0	25	16	15	GIHI		60
10647W	COOPER DEVELOPMENT CO.	2919872	11	401408	741500	I	5.0	25	16	15		GIHI	60
10647W	COOPER DEVELOPMENT CO.	2919874	12	401408	741500	I	5.0	25	16	15	GIHI		60
10647W	COOPER DEVELOPMENT CO.	2919876	13	401408	741500	I	5.0	25	16	15	GIHI		60
10647W	COOPER DEVELOPMENT CO.	2919877	14	401408	741500	I	5.0	25	16	15	GIHI		60
10647W	COOPER DEVELOPMENT CO.	2919884	15	401408	741500	I	5.0	25	16	15	GIHI		60
10647W	COOPER DEVELOPMENT CO.	2919885	16	401408	741500	I	5.0	25	16	15	GIHI		60
10647W	COOPER DEVELOPMENT CO.	2919886	17	401408	741500	I	5.0	25	16	15	GIHI		60
10647W	COOPER DEVELOPMENT CO.	2919880	18	401408	741500	I	5.0	25	16	15	GIHI		60
10647W	COOPER DEVELOPMENT CO.	2919881	19	401408	741500	I	5.0	25	16	15	GIHI		60
10647W	COOPER DEVELOPMENT CO.	2919882	20	401408	741500	I	5.0	25	16	15	GIHI		60
10647W	COOPER DEVELOPMENT CO.	2919883	21	401408	741500	I	5.0	25	16	15	GIHI		60
10647W	COOPER DEVELOPMENT CO.	2926606	RW6	401420	741500		4.9	25	16	5	GIHI		60
10647W	COOPER DEVELOPMENT CO.	2926607	RW7	401420	741500		4.9	25	16	25	GIHI		60
10647W	COOPER DEVELOPMENT CO.	2926608	RW8	401420	741500		4.9	25	16	25	GIHI		60
10647W	COOPER DEVELOPMENT CO.	2926609	RW9	401420	741500		4.9	25	16	25	GIHI		60
10647W	COOPER DEVELOPMENT CO.	2926610	RW10	401420	741500		4.9	25	16	25	GIHI		60
10647W	COOPER DEVELOPMENT CO.	2926611	RW11	401420	741500		4.9	25	16	25	GIHI		60
10647W	COOPER DEVELOPMENT CO.	2926612	2921365	401420	741500		4.9	25	16	5	GIHI		60
10647W	COOPER DEVELOPMENT CO.	2926613	RW3	401420	741500		4.9	25	16	5	GIHI		60
10647W	COOPER DEVELOPMENT CO.	2926615	RW4	401420	741500		4.9	25	16	5	GIHI		60
10647W	COOPER DEVELOPMENT CO.	2921365	RW5	401420	741500		4.9	25	16	25	GIHI		60
10647W	FLORIO PROPERTIES CO., INC.	2926614	RW1	401420	741500		4.9	25	16	25	GIHI		60
5186	GORDON'S CORNER WATER COMPANY	2905700	7-TO CHANGE	401658	741500	F	5.9	25	38	600	GIHOU		1000
MN0039	SHUTTLE, KENNEDY & RUD	SHUTTLE 1	SHUTTLE 1	401928	741450	F	6.1	25	38		GIHU		700
MN0017	HOFFER FARMS, INC.	FUND	1	401710	741449	F	5.4	25	19	18	SIIRO	GIPM	1000
5186	GORDON'S CORNER WATER COMPANY	2906[illegible]	10 (CLOSED)	401914	741440		5.7	25	38	500	GIHOU		1000
MN0017	HOFFER FARMS, INC.	FUND	2	401706	741436	F	5.2	25	19	18	SIIRO	GIPM	1000
MN0018	DI COTOCCIO, ANGELO	FUND	1	401225	741410	F	5.5	25	19	15	SIIRO	GIPM	100
MN0018	DI COTOCCIO, ANGELO	FUND	2	401[illegible]	741410	F	5.4	25	19	[illegible]	SIIRO	GIPM	100
MN0017	HOFFER, [illegible]	FUND		401[illegible]	741410	F	4.9	25	19	19	SIIRO	GIPM	100
[illegible]	[illegible]	[illegible]	8	401[illegible]	741410	F	6.1	25	38	10	GIET		100
[illegible]	[illegible]	FUND	1	401[illegible]	741410	F	[illegible]	25	38	[illegible]	SIIRO	GIPM	100
[illegible]	[illegible]	FUND		401[illegible]	741410	F	[illegible]	25	38	[illegible]	SIIRO	GIPM	100
[illegible]	[illegible]	FUND	1	401[illegible]	741	F	4.1	25	38	15	GIHU	[illegible]	50
[illegible]	[illegible]	FUND	1	401[illegible]	[illegible]	F		25	19	19	GIHU	[illegible]	50
		[illegible]		401[illegible]	[illegible]			25	[illegible]	[illegible]	GIET		50

[illegible]

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	2914[illegible]		401576	741[illegible]9		[illegible]	[illegible]	09	[illegible]	GEET		200
[illegible]	[illegible]	POND	.	401614	741[illegible]	[illegible]	[illegible]	[illegible]	09	1	SUNAV	GEMW	800
[illegible]	[illegible]	MINE BROOK	STREAM 1	401614	741[illegible]	F	5.1	[illegible]	09		SUNAV		800
[illegible]	[illegible]	MANASQUAN RIV	STREAM 1	401[illegible]	741 14	F	5.[illegible]	[illegible]	19		[illegible]		1500
[illegible]	[illegible]	POND	1	401[illegible]	741[illegible]	T	[illegible]	[illegible]	09	9	GEMW	SUNAV	800
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[illegible]	[illegible]	MANASQUAN	POND 1	401346	741[illegible]	T	[illegible]	[illegible]	19		SUNAV	GIVI	2000
[illegible]	[illegible]	2907784	HI 1975	401[illegible]	741[illegible]		[illegible]	[illegible]	19	882	GEMW		1000
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[illegible]	[illegible]	2904[illegible]6	3	401149	741022	F	4.6	[illegible]	14	465	GEET		250
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[illegible]	[illegible]	2920682		401708	741010	T	1.6	[illegible]	09				
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MN1012	[illegible]	POND	1	401756	740[illegible]	F	[illegible]	[illegible]	09	10	[illegible]	[illegible]	50
MN001	[illegible]	STREAM	1	401745	740835	F	[illegible]	[illegible]	09		SUNAV		
[illegible]	[illegible]	2908219	#1	401802	740826	T	[illegible]	[illegible]	09	331	GEET		100
5018	NEW JERSEY-AMERICAN WATER CO.	SWIMMING RIVER		401850	740700		4.2	[illegible]	31		SUNAV		
[illegible]	[illegible]	SWIM RIVER	STREAM 1	401210	740656	F	4.8	[illegible]	52		[illegible]		750
[illegible]	[illegible]	POND	1	401210	740656	F	4.8	[illegible]	52	6	GIO		750
[illegible]	[illegible]	4900081	WELL 1	401210	740656	F	4.8	[illegible]	52	90	GIO		750
[illegible]	[illegible]	4900082	WELL 2	401210	740656	F	4.8	[illegible]	52	90	GIO		750
[illegible]	[illegible]	4900083	WELL 3	401210	740656	F	4.8	[illegible]	52	90	GIO		750
[illegible]	[illegible]	4900084	WELL 4	401210	740656	F	4.8	[illegible]	52	90	GIO		750
[illegible]	[illegible]	4900085	WELL 5	401210	740656	F	4.8	[illegible]	52	90	GIO		750
[illegible]	[illegible]	4900086	WELL 6	401210	740656	F	4.8	[illegible]	52	90	GIO		750
[illegible]	NEW JERSEY-AMERICAN WATER CO.	2921612	3	401918	740655	F	4.7	[illegible]	09	682	GEBOR		700
[illegible]	NEW JERSEY-AMERICAN WATER CO.	2921611	2	401915	740655	F	4.8	[illegible]	09	677	GEBOR		700
5017	NEW JERSEY-AMERICAN WATER CO.	SWIM RIVER		401155	740413	F	6.5	[illegible]	34		SUNAV		
[illegible]	[illegible]	2921219		401945	740410		6.6	[illegible]	76		GEET		50

Number of Records Shown: 99

Page [illegible] [illegible] WITHIN [illegible] MILES OF [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] CHECKED BY SEIR NUMBER [illegible]

SEIRNUM	TYPE	LAT	LONG	DISTANCE	CONDUCT	EFFORT	EFFTIME	SIGHTED	STATUS
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	

Number of Observations [illegible]

[illegible]

[illegible]	NAME	LAT	LON	DISTANCE	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible] STATION, [illegible] NJ., MONMOUTH CO.	401500	741000	0.9	1	1050	1050	1	1
[illegible]	[illegible] CO., [illegible] INC., MONMOUTH CO.	401330	740800	2.9	50	1050	0	2	
[illegible]	[illegible], [illegible], ESSEX CO.	401400	740800	3.2	25	0110	9070	1	

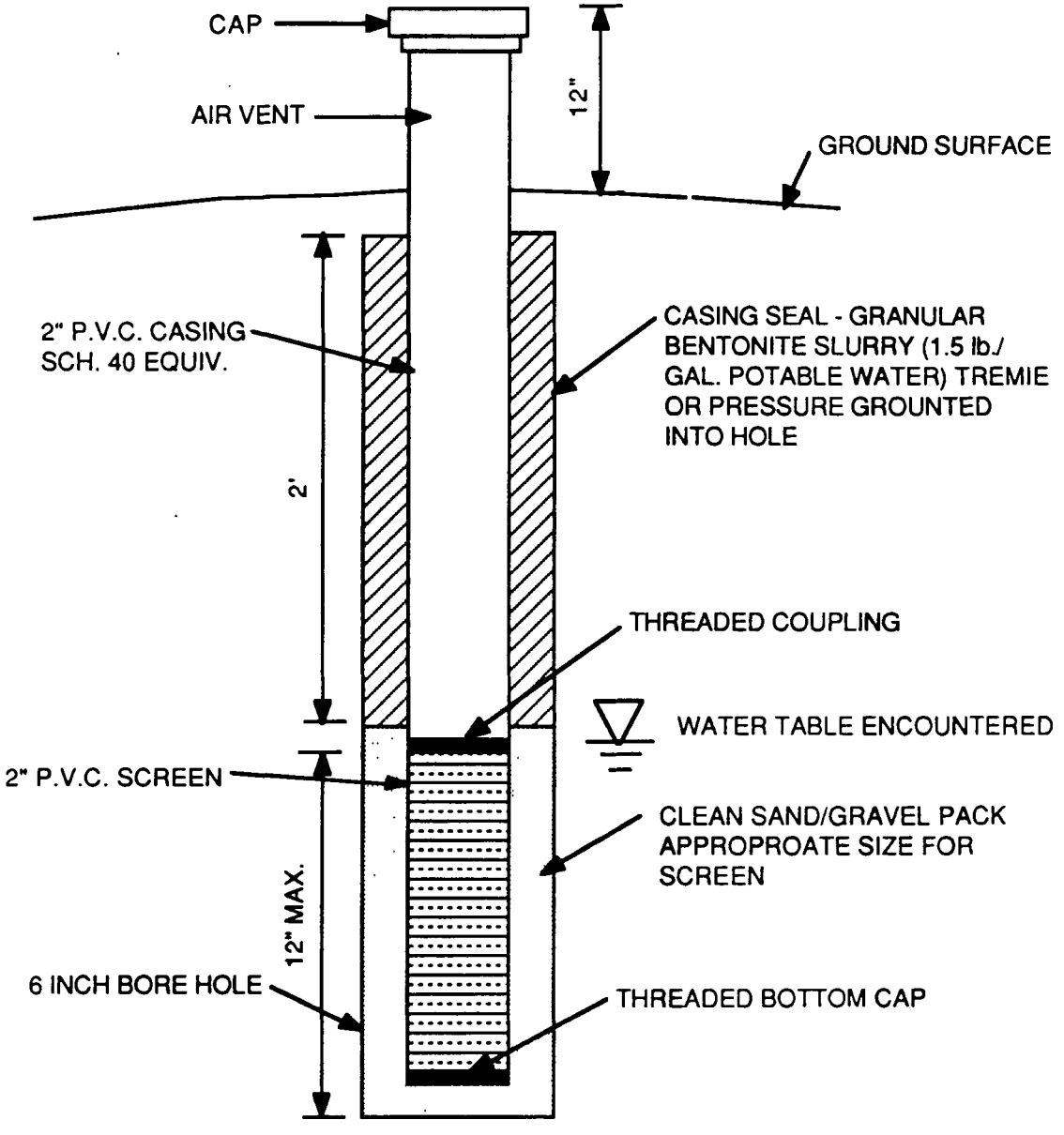
Number of observations: 3

APPENDIX B

Piezometer and Monitoring Well Installation Specifications and Permits

UNCONSOLIDATED TEMPORARY PIEZOMETER INSTALLATION SPECIFICATIONS

N.T.S.



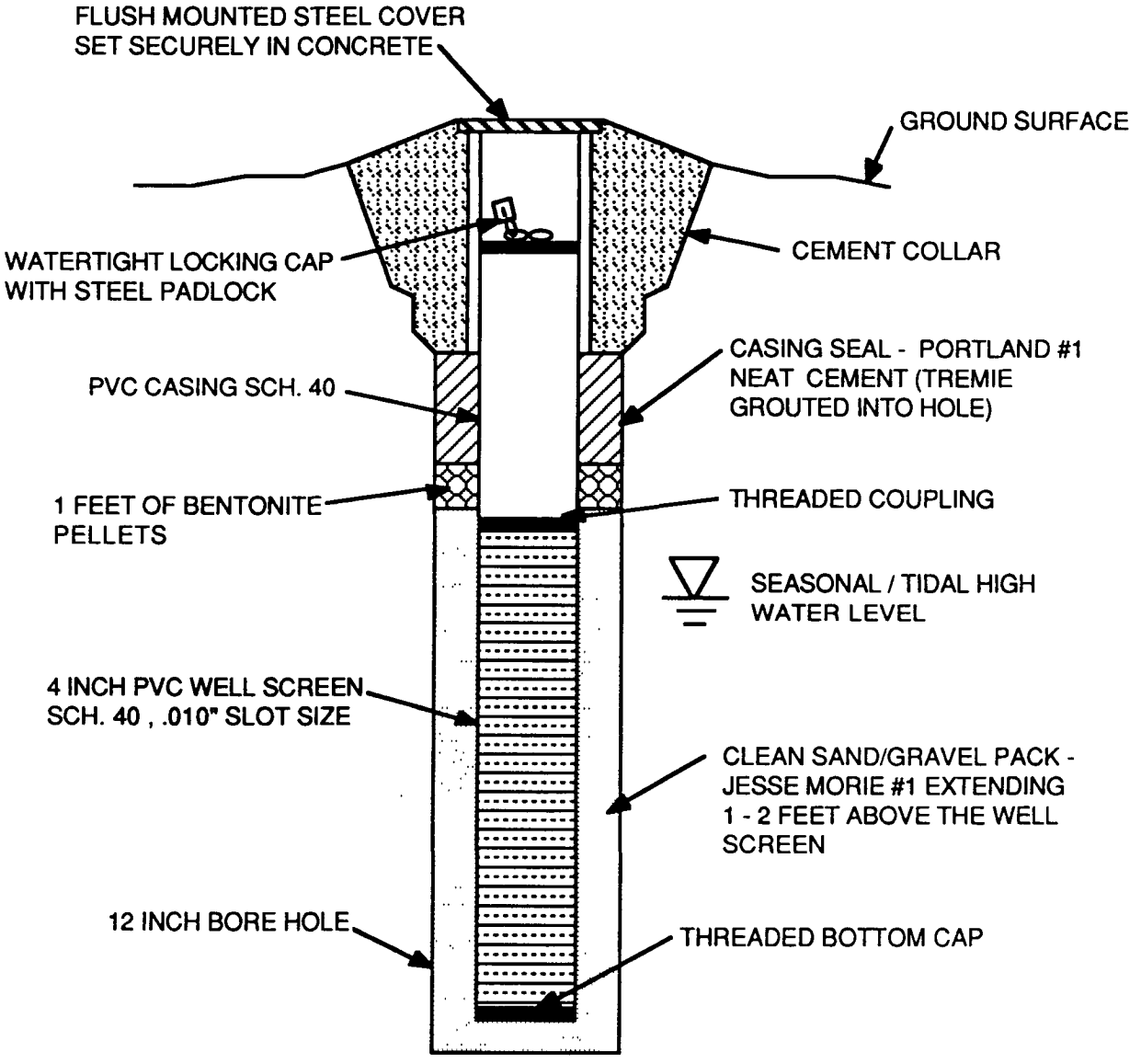
UNCONSOLIDATED FLUSH MOUNT MONITOR WELL SPECIFICATIONS

N.T.S.

SITE NAME: EARLE WEAPONS STATION

MONITORING WELL NO.: MW-01

LOCATION: BUILDING S-106



DWR-133M (4/90)

SERIAL # 22968

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF WATER RESOURCES
TRENTON, N.J.

Permit No. 29 3n081

Mail to

Water Allocation
CN 029
Trenton, N.J. 08625

MONITORING WELL PERMIT

VALID ONLY AFTER APPROVAL BY THE D.E.P. COORD #: 29.223 5

Owner Earle Naval Amm Depot
Address Highway 34
Earle, NJ. 07722

Driller Unitech Drilling
Address PO Box 467
Clayton, NJ 08312

Name of Facility SAME
Address

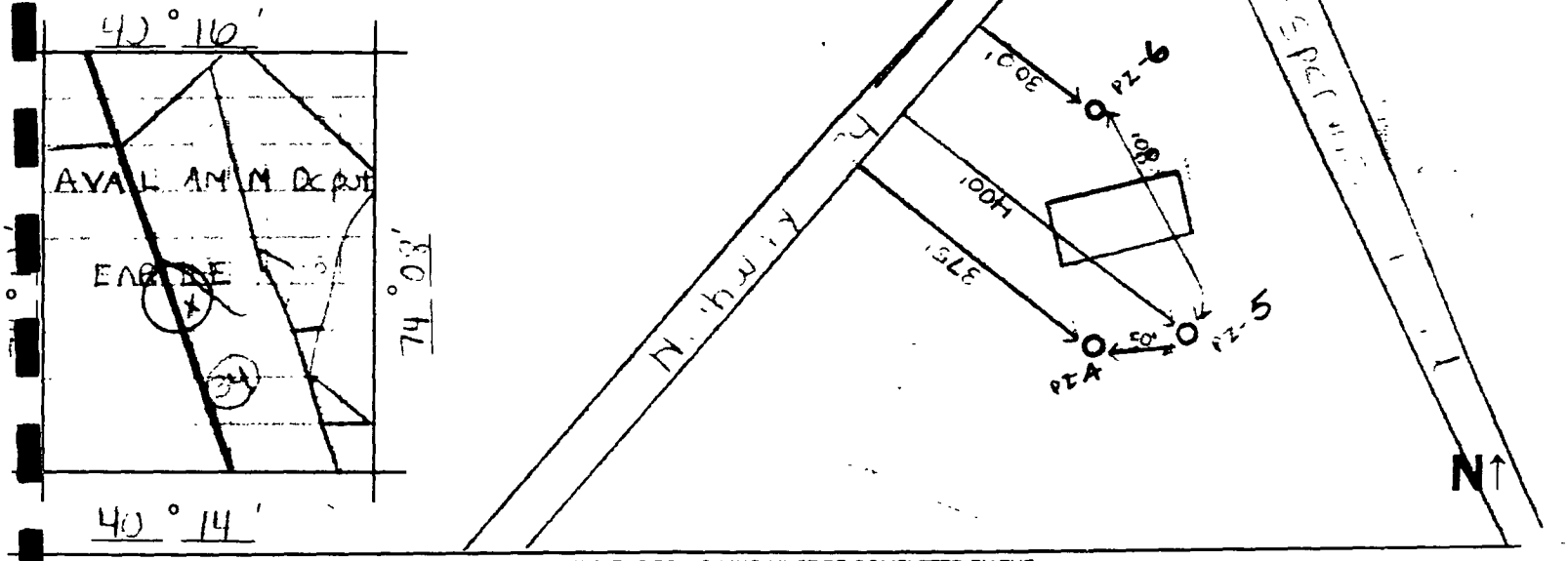
Diameter of Well(s)	2 Inches	Proposed Depth of Well(s)	30 Feet
# of Wells Applied for (max. 10)	3	Will pumping equipment be installed? YES ☐ NO ☒	
Type of Well (see reverse)	Piezometer	If Yes, give pump capacity	N/A GPM

LOCATION OF WELL(S)

Lot	Block #	Municipality	County
N/A	N/A	Earle	Monmouth

State Atlas Map No. 29

Draw sketch of well(s) nearest roads, buildings, etc. with marked distances in feet. Each well MUST be labeled with a name and/or number on the sketch.



FOR MONITORING WELLS, RECOVERY WELLS, OR PIEZOMETERS, THE FOLLOWING MUST BE COMPLETED BY THE APPLICANT. PLEASE INDICATE WHY THE WELLS ARE BEING INSTALLED:

- ☐ Spill Fund Case
- ☐ ECRA Case
- ☐ CERCLA (Superfund) Site
- ☐ RCRA Site
- ☐ Underground Storage Tank
- ☐ NJPDES Municipal Discharge Permit
- ☐ NJPDES Industrial Discharge Permit
- ☐ Div. Hazardous Waste Mgmt. Enforcement Case
- ☐ Div. Water Resources Enforcement Case
- ☐ Water Supply Aquifer Test Observation Well
- ☐ Other (explain)

Case I.D. Number: Unknown

This Space for Approval Stamp

WELL PERMIT APPROVED
Dept. of Environmental Protection
Water Resources/Water Allocation
OCT 24 1991

FOR D.E.P. USE
- ☐ Issuance of this permit is subject to the conditions attached. (see next page)
- ☐ For monitoring purposes only
- ☒ The well(s) may not be completed with more than 25 feet of total screen or uncased borehole.
- ☐

SEE REVERSE SIDE FOR IMPORTANT PROVISIONS AND REGULATIONS PERTAINING TO THIS PERMIT

In compliance with N.J.S.A. 58:4A-14, application is made for a permit to drill a well as described above.

Date 10-24-91

Signature of Driller [illegible] License # [illegible]

Signature of Owner [illegible] John Paulis

COPIES: Water Allocation — White and Pink Health Dept. — Yellow Owner — Blue Driller — White

New Jersey Department of Environmental Protection and Energy
Bureau of Water Allocation

MONITORING WELL RECORD

Well Permit No. 29 - 37436
Atlas Sheet Coordinates 29 22 358

OWNER IDENTIFICATION - Owner U.S. NAVAL WEAPONS STATIO
Address U.S. RT. 34
City COLTS NECK State NJ Zip Code 07722

WELL LOCATION - If not the same as owner please give address. Owner's Well No. MW-1
County Monmouth Municipality COLTS NECK TWP Lot No. N/A Block No. N/A
Address Same as Above

TYPE OF WELL (as per Well Permit Categories) Date well completed 1/22/92
Regulatory Program Requiring Well MONITORING UST Case I.D. #
CONSULTING FIRM/FIELD SUPERVISOR (if applicable) Mulcayey Engineering Tele. # 747-4593
Chuck Heffner

WELL CONSTRUCTION

Total depth drilled 30 ft.
Well finished to 30 ft.
Borehole diameter:
Top 12 in.
Bottom 12 in.
Well was finished: ☐ above grade ☒ flush mounted
If finished above grade, casing height (stick up) above land surfac ____ ft.
Was steel protective casing installed? ☐ Yes ☒ No

	Depth to Top (ft.) [From land surface]	Depth to Bottom (ft.)	Diameter (inches)	Type and Material
Inner Casing	0	15'	4	PVC
Outer Casing (Not Protective Casing)	—	—	—	—
Screen (Note slot size)	15'	30'	4	PVC (.010)
Tail Piece	—	—	—	—
Gravel Pack	12'8"	30'	—	#2 Sand
Annular Seal/Grout	0	12'8"	—	Cement/Bent.
Method of Grouting	Pressure grouted Tremie pipe			

Static water level after drilling 22 ft.
Water level was measured using Tape
Well was developed for 1 hours at 1 gpm
Method of development pumped
Was permanent pumping equipment installed? ☐ Yes ☒ No
Pump capacity — gpm
Pump type: —
Drilling Method HSA
Drilling Fluid — Type of Rig B-80
Name of Driller
Health and Safety Plan submitted? ☐ Yes ☒ No
Level of Protection used on site (circle one) None D C B A
N.J. License No. 1226
Name of Drilling Company J. E. FRITTS

GEOLOGIC LOG (Copies of other geologic logs and/or geophysical logs should be attached.)

0-6" Topsoil
6"-5' F-M Br. Sand-Silt
5'-30' F-M Green Sand Trace gravel.

I certify that I have drilled the above-referenced well in accordance with all well permit requirements and all applicable State rules and regulations.

Driller's Signature Bruce A. Higbee Date Jan 28, 1992

COPIES: White & Green - DEPE Canary - Driller Pink - Owner Goldenrod - Health Dept.

MONITOR WELL REQUIREMENTS FOR CONFINED UNCONSOLIDATED AQUIFERS

Revised 3/92

1. State well permits are required for each monitoring well installed and the well must be constructed by a New Jersey-licensed well driller of the proper class.

2. The State well permit number must be prominently displayed and permanently affixed to each monitoring well. Each well must have a site-specific well identification number permanently affixed (e.g., MW-1).

3. Copies of the site-specific well specifications and State approved well permit must be maintained at the drilling site by the driller.

4. Minimum screen and riser pipe inner diameter is 2 inches.

5. The use of glue or solvents is prohibited in the installation of well screens, riser pipes and well casing.

6. Any borehole that is to have a casing installed and grouted, must be a minimum of 4 inches greater than the immediate casing it surrounds.

7. In order to prevent any induced interconnection between the overburden/weathered bedrock and competent bedrock, the well screen shall not extend across the aforementioned interface.

8. Wells must have a filter pack installed.

9. No more than 25 feet of well screen shall be installed and no more than 5 feet of filter pack shall be placed above the top of the well screen.

10. Under no circumstances shall the filter pack extend into a confining layer.

11. Acceptable well grouting procedures:

    a. The following materials shall be acceptable for the grouting of the annular space between the casing and the oversize borehole.

        i. Portland Neat Cement - In accordance with Table 1

        ii. Portland Cement/High Grade Bentonite - In accordance with Table 2

        iii. High Grade Bentonite - In accordance with Table 3

Table 1 - Portland Cement

Type of Cement	Pounds of Cement	Gallons of Water	Target Density lbs/gal	Acceptable Density Range lbs/gal	Water to Cement Ratio
I & II	94	5.2	15.6	15.9 to 16.3	0.46
III	94	6.3	14.8	14.2 to 15.5	0.56

Table 2 - Portland Cement/High Grade Bentonite
* - Only Portland Cement Types I or II

Pounds of Bentonite	Pounds of Cement	Gallons of Water	Target Density lbs/gal	Acceptable Density Range lbs/gal	Water to Cement Ratio
5.0	94	8.3	13.9	13.4 to 14.5	0.74

Table 3 - High Grade Bentonite
* - Numbers Based on 15 to 30% Solids by Weight

Pounds of Bentonite	Target Gallons of Water**	Acceptable Range of Water (gallons)**	Target Density lbs/gal*	Acceptable Density Range lbs/gal*
50	18	14-34	9.8	9.2 to 10.2

* Accurate Measurement of materials prior to mixing is imperative as air entrainment during the physical mixing of the slurry tends to decrease the density of the mixture.

** Bentonite Products and additives should be mixed in accordance with manufacturers specifications.

b. When using straight bentonite - Bentonite shall not be used for grouting in those instances where it will come in contact with ground water having a pH less than 5.0 and/or a Total Dissolved Solids content in excess of 1,000 ppm.

c. Where the grouting material extends through zones of salt water, a salt/water resistant grout material shall be used.

12. Grout Placement

a. Pressure Grouting - The grout shall be pumped, through a tremie pipe, in one continuous operation, from the bottom to the top of the annular space. The tremie /grout pipe may be slowly raised as the grout is being placed but the discharge end of the pipe shall remain submerged in the grout at all times until grouting is complete.

b. When grouting the annular space around a well casing or riser pipe the grout must extend up to the ground surface.

c. When grouting the annular space directly above a filter pack, the grout should be discharged horizontally from the tremie pipe.

13. Potable water must be used for mixing grouting materials and drilling fluids.

14. The driller must maintain an accurate written log of all materials encountered, record construction details for each well, and record the depth of each water bearing zone. This information must be submitted to the Bureau of Water Allocation as required by N.J.S.A. 58:4A-14.

15. The protective steel casing shall be installed to a minimum depth of 3 feet below grade, equipped with a locking cap and securely set in concrete, as shown in the diagram. The locking cap must be made of steel. Flush-mount monitoring wells are acceptable provided they have manholes, locking caps, and seals to prevent leakage of surface water into the well.

16. Top of the innermost casing (excluding cap) must be surveyed to the nearest 0.01 foot by a New Jersey licensed surveyor. The survey point shall be the highest point of the casing. The survey point must be marked on each well.

17. Wells should be developed to a turbid-free discharge.

Notice is Hereby Given of the Following:

The Department does not review well locations or depths to ascertain the presence of, nor the potential for, damage to any pipeline, cabl , or other structures.

Th permittee (applicant) is solely responsible for the safety and adequacy of the design and construction of monitoring well(s) required by the Department.

The permittee (applicant) is solely responsible for any harm or damage to person or property which results from the construction or maintenance of any well; this provision is not intended to r liev third parties of any liabilities or responsibilities which are legally theirs.

APPENDIX C

Piezometer and Monitoring Well Survey Information

THIS FORM MUST BE COMPLETED BY THE PERMITTEE OR HIS/HER AGENT

GROUNDWATER MONITORING WELL CERTIFICATION - FORM B - LOCATION CERTIFICATION

Name of Permittee DEPARTMENT OF THE NAVY

Name of Facility NAVAL WEAPONS STATION - EARLE

Location BUILDING "S106B"

NJPDES Permit No. _____

LAND SURVEYOR'S CERTIFICATION

Well Permit Number (As assigned by NJDEP's Water Allocation Section (609) 984-6831): This number must be permanently affixed to the well casing. 29 - 27436

Longitude (one-tenth of a second) 74° 09' 39.98"
Latitude (one-tenth of a second) 40° 15' 47.67"
Elevation of Top of Casing (cap off) (one-hundredth of a foot) 124.92'
Owners Well Number MW-1

AUTHENTICATION:

I certify under penalty of law that I have personally examined and am familiar with the informaiton submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submtted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

Wayne W Burgett

PROFESSIONAL LAND SURVEYOR'S SIGNATURE

WAYNE W. BURGETT

PROFESSIONAL LAND SURVEYOR'S NAME (Type or Print)

SEAL

31654

PROFESSIONAL LAND SURVEYOR'S LICENSE #

The Department reserves the right in case of violation of permit specified groundwater limits or Ground Water Quality Standards (N. J. A. C. 7: 9-6. 1 et. seq.) to require that wells be resurveyed to an accuracy of one-hundredth of a second latitude and longitude. This shall not be considered to require a major modification of the NJPDES permit.

THIS FORM MUST BE COMPLETED BY THE PERMITTEE OR HIS/HER AGENT

GROUNDWATER MONITORING WELL CERTIFICATION - FORM E - LOCATION CERTIFICATION

Name of Permittee: DEPARTMENT OF THE NAVY

Name of Facility: NAVAL WEAPONS STATION-EARLE

Location: BUILDING "S106B"

NJPDES Permit No. _____

LAND SURVEYOR'S CERTIFICATION

Well Permit Number (As assigned by NJDEP's Water Allocation Section (609) 984-6831): This number must be permanently affixed to the well casing. 29-27436

Longitude (one-tenth of a second): 74° 09' 39.98"

Latitude (one-tenth of a second): 40° 15' 47.67"

Elevation of Top of Casing (cap off) (one-hundredth of a foot): 12.492'

Owners Well Number: MW-1

AUTHENTICATION:

I certify under penalty of law that I have personally examined and am familiar with the informaiton submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submtted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

Wayne W Burgett

PROFESSIONAL LAND SURVEYOR'S SIGNATURE

WAYNE W. BURGETT

PROFESSIONAL LAND SURVEYOR'S NAME (Type or Print)

SEAL

31654

PROFESSIONAL LAND SURVEYOR'S LICENSE #

The Department reserves the right in case of violation of permit specified groundwater limits or Ground Water Quality Standards (N. J. A. C. 7: 9-6. 1 et. seq.) to require that wells be resurveyed to an accuracy of one-hundredth of a second latitude and longitude. This shall not be considered to require a major modification of the NJPDES permit.

THIS FORM MUST BE COMPLETED BY THE PERMITTEE OR HIS/HER AGENT

GROUNDWATER MONITORING WELL CERTIFICATION - FORM E - LOCATION CERTIFICATION

Name of Permittee: DEPARTMENT OF THE NAVY

Name of Facility: NAVAL WEAPONS STATION-EARLE

Location: BUILDING "S106B"

NJPDES Permit No. _____

LAND SURVEYOR'S CERTIFICATION

Well Permit Number (As assigned by NJDEP's Water Allocation Section (609) 984-6831): This number must be permanently affixed to the well casing. 29-27436

Longitude (one-tenth of a second): 74° 09' 39.98"

Latitude (one-tenth of a second): 40° 15' 47.67"

Elevation of Top of Casing (cap off) (one-hundredth of a foot): 12.492'

Owners Well Number: MW-1

AUTHENTICATION:

I certify under penalty of law that I have personally examined and am familiar with the informaiton submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe the submtted information is true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fine and imprisonment.

Wayne W Burgett

PROFESSIONAL LAND SURVEYOR'S SIGNATURE

WAYNE W. BURGETT

PROFESSIONAL LAND SURVEYOR'S NAME (Type or Print)

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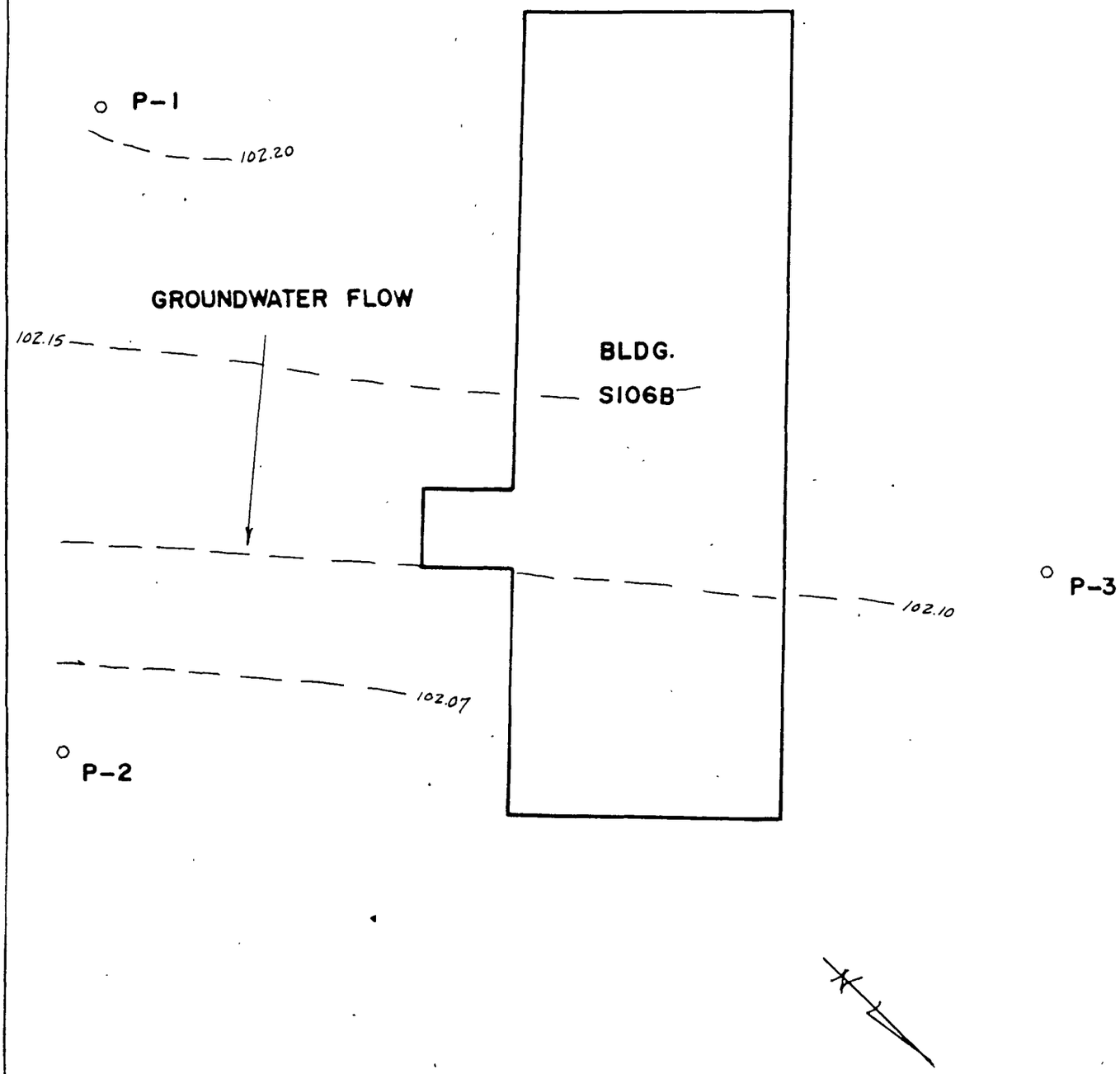


PIEZOMETER ELEVATION CHART
EARLE NAVAL WEAPONS, "S106B"

DESC.	TOP OF PIAZOMETER	GROUND WATER ELEV
P-1	129.48	102.21
P-2	128.51	102.05
P-3	127.28	102.11

TO ANY INSUROR OF TITLE RELYING HEREON AND ANY OTHER PARTY IN INTEREST "IN CONSIDEPATION OF THE FEE PAID FOR MAKING THIS SURVEY, I HEREBY CERTIFY TO ITS ACCURACY (EXCEPT SUCH EASEMENTS, IF ANY, THAT MAY BE LOCATED BELOW THE SURFACE OF THE LANDS AND NOT VISIBLE) AS AN INDUCEMENT FOR ANY INSUROR OF TITLE TO INSURE THE TITLE TO THE LANDS AND PREMISES SHOWN THEREON THIS RESPONSIBILITY LIMITED TO THE CURRENT MATTER AS OF THE DATE OF THIS SURVEY."

WAYNE W. BURGETT

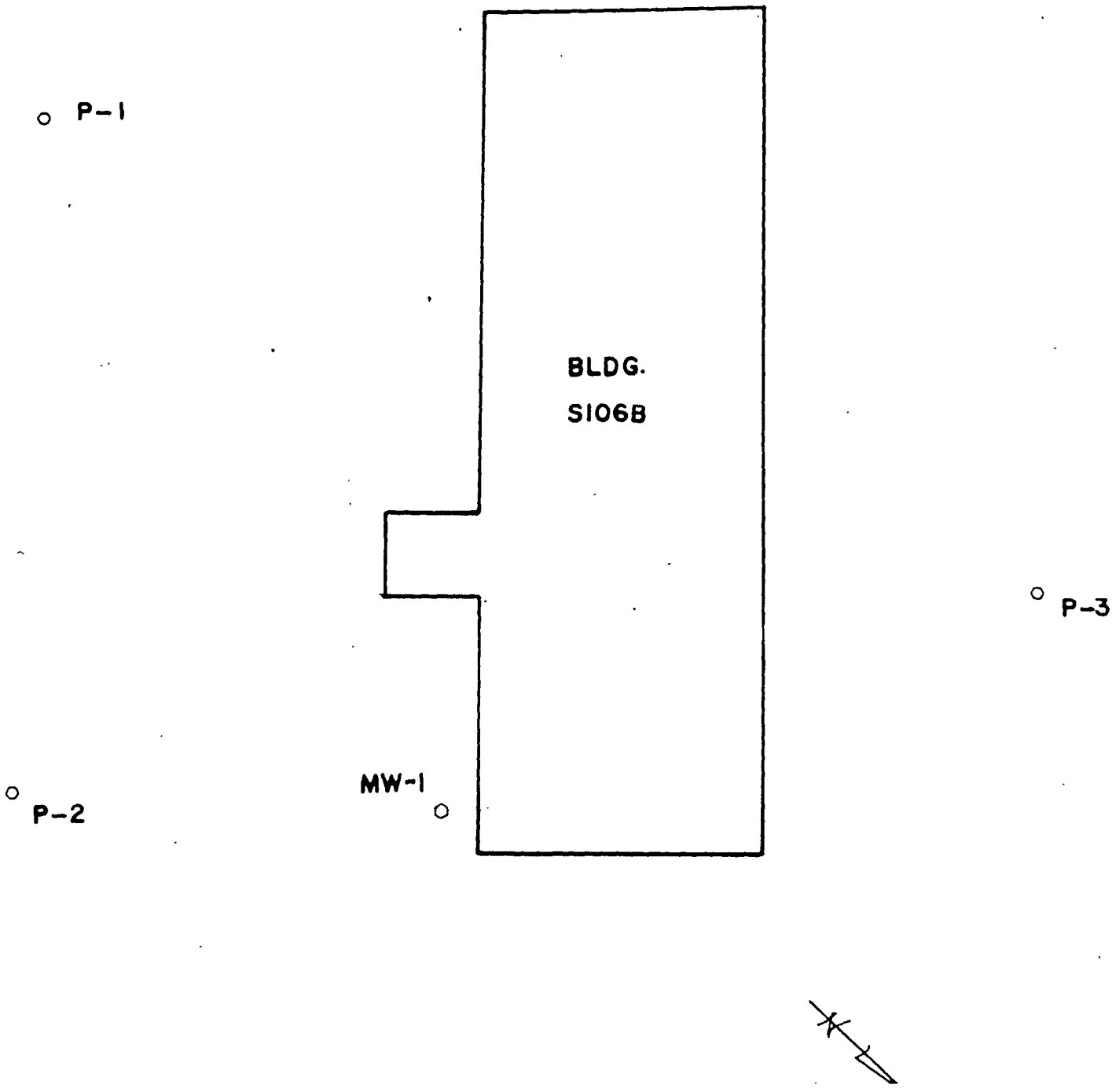
N.J. LICENSE NO. GS 31654

PLAN OF SURVEY

EARLE, N.W.S.

DATE: 12/18/91	DRAWN BY: WB	JOB NO
SCALE 1" = 20'	CHECKED BY WB	

WAYNE W. BURGETT PLS, PP
LAND SURVEYING, PLANNING, CONSULTING
246 S. WHITE HORSE PIKE
AUDUBON, NEW JERSEY 08106
(609) 547-7345



PIEZOMETER AND WELL ELEVATION CHART
EARLE NAVAL WEAPONS, "S106B"

DESC.	TOP OF CASING	GROUND WATER ELEV
P-1	129.48	101.90
P-2	128.51	101.73
P-3	127.28	101.79
MW-1	124.92	98.75

TO ANY INSUROR OF TITLE RELYING HEREON AND ANY OTHER PARTY IN INTEREST "IN CONSIDEPATION OF THE FEE PAID FOR MAKING THIS SURVEY, I HEREBY CERTIFY TO ITS ACCURACY (EXCEPT SUCH EASEMENTS, IF ANY, THAT MAY BE LOCATED BELOW THE SURFACE OF THE LANDS AND NOT VISIBLE) AS AN INDUCEMENT FOR ANY INSUROR OF TITLE TO INSURE THE TITLE TO THE LANDS AND PREMISES SHOWN THEREON THIS RESPONSIBILITY LIMITED TO THE CURRENT MATTER AS OF THE DATE OF THIS SURVEY."

WAYNE W. BURGETT

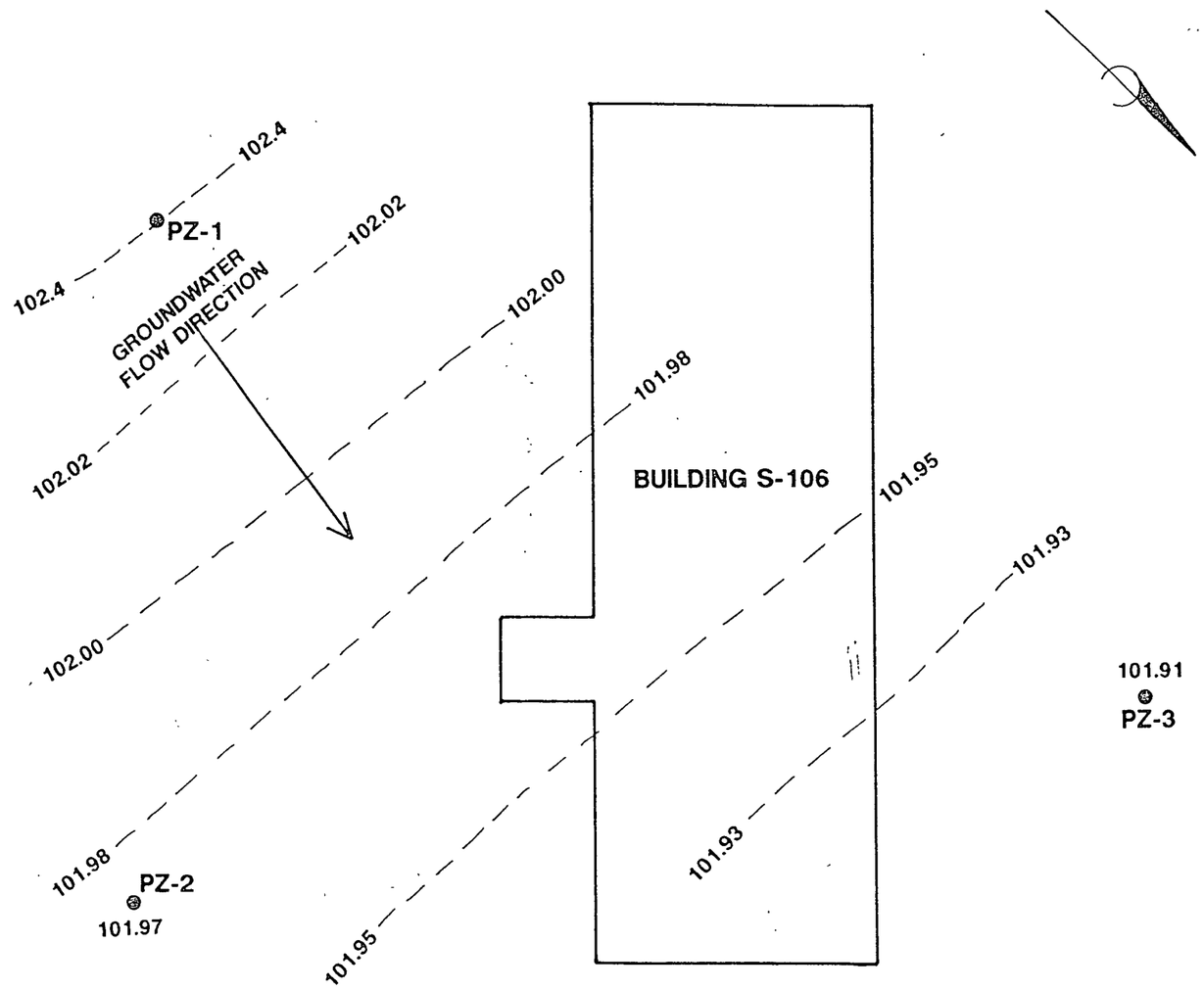
N.J. LICENSE NO. GS 31654

PLAN OF SURVEY

EARLE, N.W.S.

DATE: 2/25/92	DRAWN BY: WB	JOB NO:
SCALE: 1"=20'	CHECKED BY: WB	

WAYNE W. BURGETT PLS, PP
LAND SURVEYING, PLANNING, CONSULTING
246 S. WHITE HORSE PIKE
AUDUBON, NEW JERSEY 08106
(609) 547-7345



GROUNDWATER ELEVATION MEASUREMENTS - 1/22/92
EARLE NAVAL WEAPONS, BUILDING S-106

PIEZOMETER NO.	TOP OF PIEZOMETER	GROUNDWATER ELEVATION
PZ-1	129.48	102.04
PZ-2	128.51	101.97
PZ-3	127.28	101.91

REV. NO.	DATE	REVISION DESCRIPTION

GROUNDWATER ELEVATIONS

U.S. NAVAL WEAPONS STATION
BUILDING S-106
EARLE, NEW JERSEY

Drawn By: M.S.	Kaselaan & D'Angelo Associates, Inc.	Scale: N.T.S.
Approved By:	Engineering & Land Surveying Environmental Consultants	Sheet: Figure
Date: 6/10/92	515 Grove Street, Haddon Heights, N.J. 08035 (609) 547-6500	Drawing No.: 1629-024

APPENDIX D

Boring Logs

12/89

J.E. Fritts & Associates

ON-SITE 8.304
OFF-SITE
BLDG S-106

NO. _____ PROJECT: [illegible] MW-01 DATE, START [illegible]

ELEV. _____ DATE, FINISH [illegible]

DEPTH FROM	DEPTH TO	VISUAL CLASSIFICATION	SAMPLE NO.	SAMPLE DEPTHS		BLOWS ON SAMPLE SPOON 1ST 6"	2ND 6"	3RD 6"	4TH 6"	REC.
[illegible]	[illegible]	Topsoil		[illegible]	[illegible]	5	2	3	4	
[illegible]	5	Light yellow sand	2	2	4	5	6	7	7	
		Fine	3	4	6	5	9	10	[illegible]	
5	[illegible]	[illegible]	4	[illegible]	8	9	10	13	[illegible]	
		Sand & gravel	5	8	10	6	8	10	[illegible]	
		& [illegible]	6	10	12	9	9	10	9	
			7	12	14	9	10	11	10	
		at water 12'	8	14	16	9	12	13	14	
			9	16	18	12	17	16	14	
		red-to green silt	10	18	20	16	27	28	28	
		red & green silt	11	20	22	10	13	12	11	
		green	12	22	24	13	27	17	[illegible]	
		green	13	24	26	11	15	16	8	
		9% sand NO2	14	26	28	17	17	15	20	
		[illegible]	[illegible]	28	30	13	15	26	24	
		[illegible]								
		1- lock • lockwasher								
		5. Drums								
		screen to 30' - Sand		6	12	8	Auger			2'
		Bentonite 12 2 - 0'								

WATER LEVELS INDICATED ARE OBSERVED DURING DRILLING, OR AS NOTED. POROSITY OF SOIL STRATA, VARIATIONS OF RAINFALL, SITE TOPOGRAPHY, ETC., MAY CAUSE CHANGES IN THESE WATER LEVELS.

SAMPLE SPOON BLOWS ARE THOSE REQUIRED TO DRIVE A 2" O.D. SPOON 6 INCHES USING A 140 LB. WEIGHT FREE FALLING 30 INCHES.

JOB NO. _____

FOREMAN [illegible]

BORINGS [illegible]

Kaselaan & D'Angelo Associates, Inc.

BORING LOG

PROJECT:
Location: Bldg 106-S
Contractor: J.E. FRITTS
Field Scientist/Engineer: J. EDWARDS
Notes:

PROJECT NO.:
Coordinates:
Date: 1/22/91
Water Table Depth: 22'
Organic Vapor Instrument Used:

BORING NO.: MW-01
Drilling Method Used: Split Spoon 2"
Hammer Weight: 140 LB
OVM

Depth (feet)	Sample Interval	Blows per 6 inches	Adv. / Recov.	Org. vap. (ppm)	Sample Description	Strata Change	Comments	Sample No.
		5 / 2	12"	⊖	BROWN TOP SOIL	4"		
1		3 / 4			LIGHT BROWN SILTY M-C SAND	8"		
2		5 / 7	19"	⊖	LIGHT BROWN SILTY M-C SAND	19"		
3		7 / 9						
4		6 / 9	18"	⊖	LIGHT BROWN SILTY M-C SAND	6"		
5		10 / 10			LIGHT GREEN, LIGHT BROWN SILTY M-C SAND	12"	SAMPLE FOR TPHC	
6		9 / 10	20"	⊖	LIGHT GREEN, LIGHT BROWN RUSTY SILTY M-C SAND	20"		
7		13 / 11						
8		6 / 8	24"	⊖	LIGHT GREEN, LIGHT BROWN, RUSTY SILTY M-C SAND	9"		
9		10 / 10			DARK GREEN SILTY M-C SAND	15"	SAMPLE FOR TPHC	
10		9 / 9	23"	⊖	LIGHT GREEN, LIGHT BROWN SILTY M-C SAND	23"		
11		10 / 9						
12		9 / 10	24"	⊖	LIGHT GREEN, LIGHT BROWN SILTY M-C SAND	24"		
13		11 / 10						
14		9 / 12	24"	⊖	LIGHT GREEN, LIGHT BROWN, TAN, RUSTY SILTY M-C SAND	24"	SAMPLE FOR TPHC	
15		13 / 14						

Kaselaan & D'Angelo Associates, Inc.

BORING LOG

Project : _____

Project No.: _____

Boring No.: MW-01

Depth (feet)	Sample Interval	Blows per 6 inches	Adv. / Recov.	Org. vap. (ppm)	Sample Description	Strata Change	Comments	Sample No.
16		12 / 17	16"	Θ	LIGHT GREEN, LIGHT BROWN, TAN, RUSTY SILTY M-C SAND	16"		
17		16 / 14						
18		16 / 27	17"	Θ	LIGHT GREEN, BROWN, TAN RUSTY SILTY M-C SAND	17"	SAMPLE FOR TPHC	
19		28 / 28						
20		10 / 13	24"	30	LIGHT GREEN, BROWN TAN RUSTY SILTY M-C SAND	24"		
21		12 / 11						
22		13 / 27	22"	35	LIGHT GREEN, TAN, RUSTY M-C SAND SILTY	22"		
23		17 / 23						
24		11 / 15	24"	Θ	LIGHT GREEN, TAN, RUSTY SILTY M-C SAND	24"	SAMPLE FOR TPHC	
25		16 / 21						
26		17 / 17	24"	Θ	LIGHT GREEN, TAN, RUSTY SILTY M-C SAND	24"		
27		18 / 20						
28		13 / 15	24"	Θ	LIGHT GREEN, TAN, RUSTY SILTY M-C SAND	24"	SAMPLE FOR TPHC	
29		26 / 24						

Kaselaan & D'Angelo Associates, Inc.

BORING LOG

PROJECT:
PROJECT NO.:
BORING NO.: PZ-01
Location: BLDG 106-S
Coordinates:
Drilling Method Used: Split Spoon 2"
Contractor: UNI-TECH Drilling
Date: 10/28/91
Field Scientist/Engineer: J. EDWARDS
Water Table Depth: 24'
Hammer Weight: 140 LB
Notes:
Organic Vapor Instrument Used: OVM

Depth (feet)	Sample Interval	Blows per 6 inches	Adv. / Recov.	Org. vap. (ppm)	Sample Description	Strata Change	Comments	Sample No.
1		2 / 2	20"	0	DARK GRAY SILTY TOP SOIL	8"		
		2 / 2			WHITE F-M SAND W/SILT, STONE	6"		
2					LIGHT BROWN SILTY F-M SAND W/STONE	6"		
3		2 / 3	15"	0	LIGHT BROWN SILTY F-M SAND W/STONE	15"		
4		3 / 3						
5		3 / 4	18"	0	LIGHT BROWN SILTY F-M SAND W/STONE	12"	SAMPLE	
6		5 / 6			LIGHT BROWN, RUSTY, GREEN SILTY CLAY W/ F-M SAND, STONE	6"	FOR TPHC	
7		5 / 4	18"	0	LIGHT GREEN, RUSTY, BROWN SILTY F-M SAND	18"		
8		5 / 5						
9		3 / 4	15"	0	LIGHT GREEN, RUSTY, BROWN SILTY F-M SAND	15"		
10		5 / 5						
11		4 / 5	24"	0	LIGHT BROWN, RUSTY GREEN SILTY F-M SAND	24"	SAMPLE	
12		5 / 5					FOR TPHC	
13		6 / 8	20"	0	LIGHT BROWN, RUSTY, GREEN SILTY F-M SAND	20"		
14		8 / 9						
15		5 / 4	20"	0	LIGHT BROWN, RUSTY, GREEN SILTY F-M SAND	20"		
		6 / 6						

Kaselaan & D'Angelo Associates, Inc.

BORING LOG

Project : _____

Project No.: _____

Boring No.: P-2-01

Depth (feet)	Sample Interval	Blows per 6 inches	Adv. / Recov.	Org. vap. (ppm)	Sample Description	Strata Change	Comments	Sample No.
16		8	22"	0	LIGHT BROWN, RUSTY, GREEN SILTY F-M SAND	22"		
		8						
17		8						
		7						
18		6	21"	0	LIGHT BROWN, RUSTY, GREEN SILTY F-M SAND	21"		
		8						
19		8						
		11						
20		8	22"	0	LIGHT BROWN, RUSTY, GREEN SILTY F-M-SAND	22"		
		6						
21		7						
		8						
22		5	22"	0	LIGHT BROWN, RUSTY, GREEN SILTY F-M SAND	22"		
		7						
23		8						
		9						
24		5	22"	0	LIGHT BROWN, RUSTY, GREEN SILTY F-M SAND	22"	SAMPLE FOR TPH	
		6						
25		8						
		8						
26								
27								
28								
29								
30								
31								
32								

Kaselaan & D'Angelo Associates, Inc.

BORING LOG

PROJECT:
PROJECT NO.:
BORING NO.: PZ-02
Location: BLDG 106-5
Coordinates:
Drilling Method Used: Split Spoon 2"
Contractor: UNI-TECH DRILLING
Date: 10/28/92
Field Scientist/Engineer: J. EDWARDS
Water Table Depth: 24'
Hammer Weight: 140 LB
Notes:
Organic Vapor Instrument Used: OVM

Depth (feet)	Sample Interval	Blows per 6 inches	Adv. / Recov.	Org. vap. (ppm)	Sample Description	Strata Change	Comments	Sample No.
		1	20"	0	DARK GRAY SILTY F-M SAND	5"		
		2			DARK GRAY, WHITE SILTY F-M SAND	9"		
1		3			DARK BROWN, SILTY F-M SAND W/STONE	6"		
		4						
2		4	19"	0	DARK GRAY SILTY F-M SAND, STONE	5"		
		4			GRAY SILTY F-M SAND w/STONE	5"		
3		5			LIGHT BROWN SILTY F-M SAND w/STONE	9"		
		5						
4		4	18"	0	LIGHT GREEN, BROWN, RUSTY SILTY F-M SAND	18"	SAMPLE FOR TPHC	
		5						
5		4						
		5						
6		4	18"	0	LIGHT GREEN, BROWN, RUSTY SILTY F-M SAND	18"		
		3						
7		3						
		4						
8		3	16"	0	LIGHT GREEN, BROWN, RUSTY SILTY F-M-SAND	16"		
		4						
9		5						
		5						
10		4	16"	38	LIGHT GREEN, BROWN, RUSTY SILTY F-M SAND	16"		
		5						
11		7						
		7						
12		4	22"	0	LIGHT GREEN, BROWN, RUSTY SILTY F-M SAND	22"		
		7						
13		6						
		6						
		6	22"	0	LIGHT GREEN, BROWN, RUSTY SILTY F-M SAND	22"	SAMPLE FOR TPHC	
		6						
		7						
		7						

Kaselaan & D'Angelo Associates, Inc.
BORING LOG

Project : _____

Project No.: _____

Boring No.: PZ-02

Depth (feet)	Sample Interval	Blows per 6 inches	Adv. / Recov.	Org. vap. (ppm)	Sample Description	Strata Change	Comments	Sample No.
16		4	22"	2	LIGHT GREEN, BROWN, RUSTY SILTY F-M SAND	22"		
		6						
17		6						
		5						
18		5	18"	2	LIGHT GREEN, BROWN, RUSTY SILTY F-M SAND	18"		
		7						
19		7						
		6						
20		6	19"	Θ	LIGHT GREEN, BROWN, RUSTY SILTY F-M SAND	19"		
		7						
21		5						
		8						
22		5	22"	Θ	LIGHT GREEN, BROWN, RUSTY SILTY F-M SAND	22"		
		6						
23		7						
		7						
24		5	22"	Θ	LIGHT GREEN, BROWN, RUSTY SILTY F-M SAND	22"	SAMPLE FOR TPHC	
		7						
25		7						
		6						
26								
27								
28								
29								
30								
31								
32								
33								
34								

Kaselaan & D'Angelo, 1991

Kaselaan & D'Angelo Associates, Inc.

BORING LOG

PROJECT:
Location: BLDG 106-5
Contractor: NU-TECH DRILLING
Field Scientist/Engineer: J. EDWARDS
Notes:

PROJECT NO.:
Coordinates:
Date: 10/28/92
Water Table Depth: 22'
Organic Vapor Instrument Used: OVM

BORING NO.: PZ-03
Drilling Method Used: Split Spoon 2"
Hammer Weight: 140 LB

Depth (feet)	Sample Interval	Blows per 6 inches	Adv. / Recov.	Org. vap. (ppm)	Sample Description	Strata Change	Comments	Sample No.
1		2, 3	16"	0	DARK BROWN SILTY F-M SAND TOP SOIL W/STONE	8"		
2		4, 5			LIGHT BROWN SILTY F-C SAND W/STONE	8"		
3		2, 3	19"	0	LIGHT BROWN SILTY M-C SAND W/STONE	5"		
4		3, 4			LIGHT BROWN, GREEN SILTY F-C SAND W/STONE	14"		
5		2, 4	18"	0	LIGHT BROWN SILTY F-M SAND	18"	SAMPLE FOR TPHC	
6		4, 5						
7		5, 3	16"	0	LIGHT BROWN SILTY F-M SAND W/STONE	8"		
8		5, 6			BROWN SILTY F-M SAND W/STONE	8"		
9		3, 5	20"	0	LIGHT GREEN, RUSTY, BROWN SILTY F-M SAND	20"		
10		5, 6						
11		4, 6	20"	0	LIGHT GREEN, RUSTY BROWN SILTY F-M SAND	20"		
12		7, 7						
13		6, 6	22"	0	LIGHT GREEN, RUSTY, BROWN SILTY F-M SAND	22"		
14		6, 7						
15		6, 6	22"	0	LIGHT GREEN, RUSTY, BROWN SILTY F-M SAND	22"	SAMPLE FOR TPHC	
		6, 7						

Kaselaan & D'Angelo, 1991

Kaselaan & D'Angelo Associates, Inc.

BORING LOG

Project : _____

Project No.: _____

Boring No.: P2-03

Depth (feet)	Sample Interval	Blows per 6 inches	Adv. / Recov.	Org. vap. (ppm)	Sample Description	Strata Change	Comments	Sample No.
16		5	22"	⊖	LIGHT GREEN, RUSTY, BROWN SILTY F-M SAND	22"		
		5						
17		7						
		5						
18		5	24"	⊖	LIGHT GREEN, RUSTY, BROWN SILTY F-M SAND	24"		
		6						
19		7						
		9						
20		7	24"	⊖	LIGHT GREEN, RUSTY, BROWN SILTY F-M SAND	24"		
		7						
21		7						
		8						
22		5	24"	⊖	LIGHT GREEN, RUSTY, BROWN SILTY F-M SAND	24"	SAMPLE FOR TPHC	
		6						
23		8						
		9						
24								
25								
26								
27								
28								
3								
3								
3								

APPENDIX E

Decontamination Procedures

DECONTAMINATION PROCEDURES

(Laboratory and Field)

The field sampling equipment cleaning and decontamination procedures are as follows:

1. Non-phosphate detergent plus tap water wash
2. Tap water rinse
3. Distilled/deionized water rinse
4. 10% nitric acid rinse* (trace metal or higher grade HNO_3 diluted with distilled/deionized water rinse*
5. Distilled/deionized water rinse*
6. Acetone (pesticide grade) rinse**
7. Total air dry or pure nitrogen blow out**
8. Distilled/deionized water rinse**

* Only if sample is to be analyzed for metals.
** Only if sample is to be analyzed for organics.

APPENDIX F

Groundwater Sampling Procedures

Groundwater Sampling Equipment, Procedures and Methodologies

Sampling Procedures

All of the samples collected were analyzed by the referenced laboratory.

All sampling was in accordance with procedures and specifications set forth in the New Jersey Department of Environmental Protection's "Field Sampling Procedure Manual, February, 1988".

Monitoring Well Sampling

Groundwater samples were collected with a Teflon™ bailer. The following procedures/methodologies are listed under the section Groundwater Sampling Procedures found in the above referenced manual.

1. Prior to sampling, the elevation of groundwater within the well was determined using an electronic water level indicator. The measurement was recorded from the top of the casing (cap removed). The water level indicator was rinsed with distilled/deionized water and wiped with a clean paper towel prior to and after each use. This data was then used to calculate the volume of water within the casing (Casing Volume).

2. A field decontaminated PVC bailer was used to evacuate a minimum of three to five casing volumes of water. This was used to remove any stagnant or thermally stratified water within the well. Standard care was used not to overly agitate, aerate or disturb the water within the well. In addition to the physical measurements, physio-chemical parameters were collected. This included specific conductivity , pH and temperature.

3. Upon completion of bailing operations, the well was immediately sampled using a decontaminated, dedicated Teflon™ bottom filling bailer. The bailer was attached to a field decontaminated Teflon™ coated stainless steel leader six feet in length. The bailer was lowered into the well using dedicated clear polyethylene well rope. The bailer was removed from the well with minimal disturbance. The 40 ml volatile organic compounds vials were filled first. Each vial was checked to assure that all headspace was eliminated. The semi-volatile containers were then filled, followed by the remaining containers. All containers were preserved as per the appropriate procedures. The sample containers were then placed on ice in a clean cooler for shipment.

4. The glassware was labelled and sealed. Before collecting the next sample, all pertinent data was recorded in a log book and the sample analysis request form/chain of custody record was completed.

5. After decontaminating all equipment, the samples were immediately delivered to the laboratory for analysis.