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Remedial Action Plan for Free Product

Former Hyatt Clark Industries, Inc. Site
Clark and Cranford, New Jersey

ARCADIS
GERAGHTY & MILLER

7 February 2000

PREPARED FOR

General Motors Corporation

Tables

Figures

Appendices

1.0 Introduction

ARCADIS Geraghty & Miller, Inc. was retained by General Motors Corporation (GM) to prepare this Remedial Action Plan for Free Product (RAP) for the former Hyatt Clark Industries, Inc. Site (Site) located in Clark and Cranford, New Jersey. GM is conducting investigation and remediation activities at the Site pursuant to an Administrative Consent Order (ACO) (ECRA/ISRA Case No. 87769) entered into in 1989 by GM with the New Jersey Department of Environmental Protection (NJDEP). The final Remedial Action Work Plan (RAW) for soil was submitted in October 1998 and approved by NJDEP in February 1999. A separate RAW for groundwater will be submitted to the NJDEP following the completion of the investigative work. This RAP will be included in the RAW for groundwater.

The purpose of this RAP is to present and discuss the results of the product investigation and recovery work conducted in 1999 and propose a product recovery system that will be incorporated into the soil cap system for the Site. The results of the investigation were discussed during the 3 November 1999 meeting with the NJDEP. This RAP also provides responses to the NJDEP letter dated 7 June 1999 on the Free Product Summary and Work Plan.

A summary of prior investigations and recovery efforts and the work plan for the work conducted in 1999 is presented in the Free Product Summary and Work Plan, submitted to NJDEP in November 1998. The work plan also includes a description of the Interim Product Recovery System.

Unless specifically noted, all directional references refer to true north. Project north references are noted by the word "project" in parentheses. Project north is approximately 47 degrees west of true north.

2.0 Recent Free Product Delineation

The work described in this section was conducted in accordance with the Free Product Summary and Work Plan. The work consisted of installation of test wells for free product delineation and free product recovery testing. This work was conducted in April through August 1999. The NJDEP requested the collection of soil samples during installation of the proposed test wells if the locations represented by these wells had not been previously characterized (Response 1: letter dated 7 June 1999). The locations of the 1999 test wells were within the impacted areas that were characterized by previous soil investigations. The results of the previous investigations were presented in the Remedial Action Work Plan for Soil, submitted to the NJDEP in October 1998. Therefore, further characterization was not needed. These areas will be contained under the site cap system.

2.1 Overburden Well Installation

Six overburden test wells (OW-46, OW-47, OW-48, OW-49, OW-50, and OW-51) were proposed in the Free Product Summary and Work Plan. These wells were installed near the former quench oil pits and Butler Building. The well locations are shown on Figure 2-1. The purpose of these wells was to further delineate and recover free product in overburden. Each well was pilot tested using total fluids pumping to determine if the well produced recoverable amounts of free product. Recoverable amounts of free product is defined to be greater than 0.5 gpd as per the Free Product Summary and Work Plan, which was reviewed and commented on by the NJDEP. If a well produced recoverable amounts of product, additional wells were installed to further delineate and/or recover product in the area. The pilot test procedures and results are discussed in Section 2.4.

Based on the results of the pilot testing, five additional test wells (OW-64, OW-65, OW-66, OW-76, and OW-81) were installed near the Butler Building to further delineate areas where recoverable free product was encountered. Two additional wells (OW-58 and OW-73) were installed in the west central portion of the Site near OW-28S. These wells were installed in response to the free product observed in overburden during the drilling of bedrock well OW-58D. The seven additional wells were installed and pilot tested using the same procedures as the initial six wells. A summary and rationale of the well installation and pilot testing program is presented on Figure 2-2. The program has delineated recoverable free product in overburden.

The overburden wells were drilled using the ODEX drilling method that advances steel casing as the borehole is drilled. The wells were constructed of 4-inch diameter PVC well materials. The NJDEP requested that the well screens be installed across the water table (Response 4: letter dated 7 June 1999). The well screens were installed across the water table, extending from the top of the till/weathered bedrock to above the shallowest saturated zone. The well construction and sample core logs are presented in Appendix A.

2.2 Bedrock Well Installation

Six bedrock test wells (OW-52D, OW-53D, OW-54D, OW-55D, OW-56D, and OW-57D) were proposed in the Free Product Summary and Work Plan. These wells were located near existing wells OW-28D and OW-32D. The well locations are shown on Figure 2-1. The purpose of these wells was to further delineate and recover free product in bedrock. Each well was pilot tested using total fluids pumping to determine if the well produces recoverable amounts of free product. If a well produced recoverable amounts of product, additional wells were installed to further delineate and/or recover product in the area. The pilot test procedures and results are discussed in Section 2.4.

Based on the results of the pilot testing, 11 additional wells (OW-58D, OW-59D, OW-69D through OW-72D, OW-75D, OW-77D, OW-79D, OW-82D, and OW-83D) were installed to further delineate free product in the bedrock. These wells were installed and pilot tested using the same procedures as the initial six wells. A summary and rationale of the well installation and pilot testing program is presented on Figure 2-3. The program has delineated the recoverable free product in bedrock.

The bedrock wells were drilled using the ODEX drilling method. The wells were constructed of 4-inch diameter PVC well materials. Because product occurs in the upper portions of the bedrock, the well screens (ten feet in length) were installed with the top of the screen approximately 2 to 3 feet below the top of bedrock. The well construction and sample core logs are presented in Appendix A.

2.3 Well Permitting

Nine test wells produced product and will be repermitted as recovery wells. Nine wells that did not produce product were abandoned. The NJDEP had recommended that bedrock wells remain open so they could be used as monitoring points (Response 3: letter dated 7 June 1999). Twelve wells (6 overburden and 6 bedrock) that did not produce product and were not abandoned will be repermitted as observation wells. These wells were used as observation wells during the pumping tests (Section 2.5) and they will be used as piezometers to evaluate capture and monitor free product during the operation of the product recovery system.

2.4 Pilot Testing

Total fluids pumping pilot tests were conducted on each well to determine if the well produced recoverable amounts of free product. Most of the wells were continuously pumped for 3 to 4 days. The tests were conducted using top-loading pneumatic total

fluids pumps. The pumps were placed at the bottom of the wells to maximize yield and product recovery. These pumps conveyed both product and groundwater to a LNAPL separator. After completing the pilot test, the LNAPL separator was drained and the volume of product was measured in a graduated container. If a well produced recoverable amounts of product (greater than 0.5 gallons per day [gpd] per the Free Product Summary and Work Plan), it was incorporated into the Interim Product Recovery (IPR) system. Wells that did not produce recoverable amounts of product (i.e., less than 0.5 gpd per the Free Product Summary and Work Plan) were either abandoned or kept as piezometers to evaluate capture.

The NJDEP noted that drawing the water level down during the pilot tests, causing smearing across a clean zone, should be avoided if a clean zone exists (Response 6: letter dated 7 June 1999). As discussed during the 3 November 1999 meeting, most of the product is confined at depth in the deeper portion of the overburden and the shallow bedrock. Drawing the water levels down to these intervals would not impact a clean zone.

Overburden wells OW-47, OW-49, OW-58, and OW-66 and bedrock wells OW-52D, OW-53D, OW-58D, OW-59D, and OW-77D produced product at rates greater than 0.5 gpd. Nineteen wells did not produce product. Two wells produced product, but at rates less than 0.5 gpd. Nine wells were abandoned and twelve were kept as piezometers and product monitoring points. The results of the pilot tests are summarized in Table 2-1.

The NJDEP requested a product monitoring system (Response 8: letter dated 7 June 1999). The eleven wells kept as piezometers and product monitoring points along with the existing monitoring wells will serve as the product monitoring system. The NJDEP also requested product distribution maps (Response 7: letter dated 7 June

1999). Free product distribution and areas of free product in overburden and bedrock are shown on Figures 2-4 and 2-5, respectively.

2.5 Capture Zone Analysis

The NJDEP requested a capture zone analysis for the product recovery wells (Response 5: letter dated 7 June 1999). The capture zones for the product recovery wells were evaluated using two approaches. One approach used calculations based on transmissivity. The other approach used flow net analysis based on water-level data (water level data for wells containing product was corrected). Drawdown pumping tests were conducted on overburden wells OW-49 and OW-66 and bedrock wells OW-58D and OW-59D. The duration of the tests ranged from approximately 24 to 48 hours. The wells used for each test are identified below.

Test A
- Pumping Well: OW-66
- Observation Wells: OW-50, OW-47, OW-81, OW-46, OW-76, and OW-65

Test B
- Pumping Well: OW-59D
- Observation Wells: OW-52D, OW-77, OW-75, OW-53, and OW-58D

Test C
- Pumping Well: OW-49
- Observation Wells: OW-65, OW-50, OW-47, OW-64, and OW-81

Test D
- Pumping Well: OW-58D
- Observation Wells: OW-53D, OW-70D, OW-69D, OW-52D, OW-75D, OW-8S, OW-59D, OW-73, and OW-79D

The pumping test data were used to determine transmissivity for the overburden and shallow bedrock. The transmissivity values were used to calculate the theoretical width of capture for each of the pumping wells. The transmissivity values and the capture widths for the pumping wells are summarized in Table 2-2. The calculated

capture widths for overburden well OW-49 and bedrock well OW-58D are 62 feet and 90 feet, respectively. These values agree with the values measured for the flow net analysis (see below). The capture widths for overburden well OW-66 (500 feet) and bedrock well OW-59D (800 feet) appear to be high. The relatively large capture widths calculated for bedrock results from the relatively low transmissivity and the gentle gradients.

A flow net analysis to evaluate capture was conducted based on measured drawdown during the pumping tests. The total drawdown values from the pumping tests were subtracted from site-wide overburden and shallow bedrock water elevations. Water elevation contour figures were then produced for OW-49, OW-66 and OW-58D (Figures 2-6 through 2-8). A contour map was not produced for Well OW-59D because of insufficient hydraulic control. The estimated width of capture based on the flow net analysis for overburden wells OW-49 and OW-66 is 60 feet and 100 feet, respectively. The estimated capture width for bedrock well OW-58D is 80 feet.

Capture will also be evaluated when all Interim Product Recovery (IPR) wells are pumping simultaneously. At that time, site-wide groundwater levels will be measured. A groundwater elevation contour map will be produced and a flow net analysis will be conducted. An addendum to this RAP for Free Product will be prepared to summarize the flow net analysis and submitted to the NJDEP.

3.0 Product Recovery

This section describes the IPR System currently operating at the Site. The IPR System includes 16 wells: seven original wells (OW-22, OW-25M, OW-27, OW-28S, OW-28D, OW-29, and OW-32D) and nine wells installed during 1999 (OW-47, OW-49, OW-52D, OW-53D, OW-58, OW-58D, OW-59D, OW-66, and OW-77D). The well locations are shown on Figure 2-1.

The basic operation principle of the IPR System is total fluids pumping from wells followed by phase separation and water treatment. Top-loading pneumatic pumps convey both product and groundwater to a LNAPL separator (24-gpm capacity). The pumps are installed at the bottom of the wells to maximize drawdown and recovery. Following separation, product drains to a 275-gallon product storage tank. The groundwater then gravity drains to a holding tank from which it is pumped through two 400-pound granular activated carbon vessels. Following carbon treatment, the groundwater is stored in a 750,000 gallon storage tank at the facility (formerly used for waste water management) and is ultimately characterized and transported off-site for disposal by GM. The product in the storage tank is pumped into 55-gallon drums for characterization and disposal by GM.

The air compressor, LNAPL separator, wet-well, carbon vessels, product storage tank, and control panel are enclosed in a 20-foot trailer within a secondary containment area.

3.1 System Control and Automation

An electrically operated solenoid valve installed in the compressed air line controls the flow of air to the pneumatic total fluids pumps. During normal operating conditions, the solenoid valve is energized (open), supplying compressed air to the well pumps and permitting them to function. Three liquid level switches and one pressure switch are used for system alarms. The liquid level switches are used as high-level indicators in the LNAPL separator, holding tank, and product storage tank. The pressure switch is located in the compressed air line. If any of these switches are engaged, an alarm condition occurs. During an alarm condition, the solenoid valve is de-energized (closed) and the line pressure is exhausted to the atmosphere, shutting-down the system.

3.2 System Performance

From April 1997 through December 1999, approximately 7,300 gallons of product were recovered with the IPR system. Approximately 2,360 gallons of product were recovered from historic product recovery efforts (product skimming). Total product recovered is approximately 9,660 gallons.

4.0 Final Product Recovery System

This section describes the Final Product Recovery (FPR) System proposed for the Site. The FPR System will include total fluids pumping from 16 wells: nine overburden wells (OW-22, OW-25M, OW-27, OW-28S, OW-29, OW-47, OW-49, OW-58, and OW-66) and seven shallow bedrock wells (OW-28D, OW-32D, OW-52D, OW-53D, OW-58D, OW-59D, and OW-77D). Additionally, product and groundwater will be extracted periodically (using total fluids pumping) from five wells (OW-24, OW-25S, OW-26S, OW-26M, and OW-65) that currently have a measurable product thickness, but do not produce recoverable amounts of product when pumped.

Three other wells that are located in remote areas and have measurable product thicknesses, but do not produce recoverable amounts of product when pumped (MW-15, MW-20, and MW-34), will be equipped with sorbant material to collect product. A schedule for replacing the sorbant material will be established for each well based on the product recovery rates. The FPR System well locations are shown in Appendix B.

The piping for the FPR System (fluids and compressed air) will be installed below grade. The total fluids piping will be secondarily contained. Piping from the wells will be routed to distribution boxes that will house all valves and connections. Two

distribution boxes will service the 16 continuously pumped wells. A third distribution box will service the five wells to be pumped periodically. Secondarily contained piping from each of the distribution boxes will carry total fluids to the treatment building. The layout for the FPR System is shown in Appendix B.

The operation principle of the FPR System is similar to that previously discussed for the IPR System in Section 3. The FPR system will also employ total fluids pumping from the subsurface followed by phase separation.

Pneumatic pumps will convey both product and groundwater from the wells to the treatment building. At the head of the system will be a LNAPL separator in which physical separation occurs. Following separation, product will accumulate in the skimmer and drain to a 500-gallon storage tank. The product in the storage tank will be pumped into 55-gallon drums for characterization and disposal by GM. The groundwater will gravity drain to a holding tank from which it will be pumped through two granular activated carbon vessels operated in series. Following carbon treatment, the groundwater will be discharged to the bedrock or to the on-site irrigation pond. The discharge options are currently being evaluated.

4.1 System Control and Automation

An electrically operated solenoid valve installed in the compressed air line controls the flow of air to the pneumatic total fluids pumps. During normal operating conditions, the solenoid valve is energized (open), supplying compressed air to the well pumps and permitting them to function. Three liquid level switches and one pressure switch are used for system alarms. The liquid level switches are used as high-level indicators in the LNAPL separator, holding tank, and product storage tank. The pressure switch is located in the compressed air line. If any of these switches are engaged, an alarm condition occurs. During an alarm condition, the solenoid valve is de-energized

(closed) and the line pressure is exhausted to the atmosphere, shutting-down the system. Once the alarm condition is cleared, the system can be restarted. The process flow diagram for the FPR System is presented in Appendix B.

5.0 Permit Identification

An application for a New Jersey Pollutant Discharge Elimination System (NJPDES) DGW permit will be submitted. This permit will be required if the effluent (groundwater) from the FPR system will be discharged to the bedrock. If the effluent is discharged to the irrigation pond, the discharge will be in accordance with NJDEP rules and regulations for Reclaimed Water for Beneficial Reuse.

6.0 Performance Monitoring

The parameters that will be monitored to evaluate the FPR System performance during the first year are presented below. The results of the monitoring will be presented in a report to be submitted after the first full year of system operation (discussed in Section 7.0).

- Hydraulic Capture. The flow net analysis will be used to demonstrate that effective hydraulic capture continues during the operational life of the FPR System. During the first year of operation, quarterly rounds of water-level measurements will be collected and a flow net will be prepared for each round. If the flow nets demonstrate consistent capture, the capture zone analysis will be performed annually.

- LNAPL Recovery. The volume of product in the product storage tank will be monitored with an electronic sensor. The LNAPL recovery rate will be monitored and plotted versus time to evaluate the anticipated decreasing trends. When three consecutive months of operation indicate

approximately equivalent (asymptotic) recovery rates, cycling operation of the recovery system may be proposed. Cyclic operation would be initiated after approval by NJDEP.

- LNAPL Recovery for Individual Wells. The LNAPL recovery rates for individual wells will be monitored periodically. If a well is producing product at a rate greater than 0.5 gpd it will be pumped continuously. If a well produces product at a rate between 0.5 gpd and 0.25 gpd it may be pumped intermittently. If a well produces product at a rate less than 0.25 gpd it may be taken off line. Wells may be brought back on line in response to the system monitoring data. Modifications to system operation will be proposed to the NJDEP in the report described in Section 7.0.

- Effluent Monitoring. The effluent (groundwater) from the FPR system will be sampled to ensure the system is in compliance with the applicable effluent standards. Currently, two effluent discharge scenarios are being evaluated, injection into the bedrock and discharge to the on-site irrigation pond.

7.0 Reporting Schedule

A report will be prepared after the first full year of system operation. The report will summarize the performance monitoring data and results. The report may also propose modifications to the system, its operation, and system monitoring. The report will also propose the deliverable date for the second report. The report will be submitted to the NJDEP for review and comment.

TABLES

Table 2-1. Product Recovery Pilot Testing Results, Former Hyatt Clark Industries Site, Clark, New Jersey

Well	Product Recovery Rate (gallons/day)	Product Recovered (gallons)	Number of Days Tested	Test Start Date	Product Thickness* (feet)	Status
Bedrock Wells						
OW-52D	1.5	6	3.5	5/17/99	0	On IPR system
OW-53D	10	31	3	5/21/99	0.18	On IPR system
OW-54D	0	0	3	5/21/99	---	Abandoned
OW-55D	0	0	3.5	5/13/99	---	Abandoned
OW-56D	0	0	3.5	5/13/99	---	Abandoned
OW-57D	0	0	3.5	5/17/99	---	Abandoned
OW-58D	11	32	3	6/14/99	2.37	On IPR system
OW-59D	10	38	4	6/21/99	0.32	On IPR system
OW-69D	0	0	3	6/29/99	0	Not abandoned
OW-70D	0.4	1.25	3	6/29/99	0	Not abandoned
OW-71D	0	0	3.5	7/2/99	---	Abandoned
OW-72D	0	---	---	---	---	Abandoned
OW-75D	0	0	3	8/5/99	1.05	Not abandoned
OW-77D	1	3	3	8/5/99	0.05	On IPR system
OW-79D	0	0	3	8/5/99	0	Not abandoned
OW-82D	0	---	---	---	0	Not abandoned
OW-83D	0	0	2	8/18/99	0	Not abandoned
Overburden Wells						
OW-46	0	0	4	6/21/99	0.15	Not abandoned
OW-47	>100	110	< 8 hours	6/21/99	0.41	On IPR system
OW-48	0	trace	5	6/14/99	---	Abandoned
OW-49	4	24	6	5/25/99	6.56	On IPR system
OW-50	0.3	1	3.5	6/25/99	---	Abandoned
OW-51	0	trace	6	5/25/99	---	Abandoned
OW-58	17	43	2.5	6/25/99	1.94	On IPR system
OW-64	0	trace	3.5	6/25/99	0	Not abandoned
OW-65	0	0	3	6/29/99	0.06	Not abandoned
OW-66	>100	140	< 8 hours	7/6/99	7.35	On IPR system
OW-73	0	0	3	7/6/99	0	Not abandoned
OW-76	0	0	3	7/6/99	0	Not abandoned
OW-81	0	0	3	7/30/99	0	Not abandoned

* Measurements were collected on 9/7/99.

Table 2-2 Summary of Pumping Test and Capture Zone Analysis, Former Hyatt Clark Industries Site, Clark New Jersey

Well/Test	Average Transmissivity (ft^2/day)	Theoretical Width of Capture (ft)	Capture Based on Flow Net Analysis (ft)
Overburden			
OW-66 (Test A)	53	500	100
OW-49 (Test C)	37	62	60
Bedrock			
OW-59D (Test B)	29	800	---
OW-58D (Test D)	High 190 Low 23	90 800	80

FIGURES

PROJECT NORTH

N.J. GEODETIC NORTH

47°-03'-50"

LEGEND

- APPROXIMATE PROPERTY BOUNDARY
- TOWNSHIP BOUNDARY
- FENCE
- RAILROAD TRACKS
- EXTENT OF CONCRETE SLAB

COLOR DESIGNATION

- ⊕15g(27') GREEN = NO PRODUCT OR PRODUCT THICKNESS < 0.01 FEET
- ⊕ 29n(30')(.01) BLUE = PRODUCT THICKNESS > 0.01 AND < 0.05 FEET
- ⊕ 29m(30')(.10) BROWN = PRODUCT THICKNESS > 0.05 FEET
- ● NO PRODUCT IN MONITORING WELL
- ● MONITORING WELL CONTAINS PRODUCT BUT DOES NOT PRODUCE PRODUCT
- ⊕ OBSERVATION WELL CONTAINS PRODUCT BUT DOES NOT PRODUCE PRODUCT
- OVERBURDEN ⊕ / BEDROCK ⊕ WELL PRODUCES PRODUCT [IPR SYSTEM]
- OVERBURDEN ▲ / BEDROCK ■ WELL PRODUCED >0.5 GALLONS OF LNAPL PER DAY [IPR SYSTEM] (INSTALLED IN 1999)
- OVERBURDEN ▲ / BEDROCK ■ WELL PRODUCED <0.5 GALLONS OF LNAPL PER DAY (INSTALLED IN 1999)
- △ ABANDONED OVERBURDEN WELL
- □ ABANDONED BEDROCK WELL
- [IPR SYSTEM] INTERIM PRODUCT RECOVERY SYSTEM

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GRAPHIC SCALE

100 0 100

(IN FEET)

1 inch = 100 ft.

NO.	DATE	REVISION DESCRIPTION	BY CKD

SCALE VERIFICATION

THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING:

USE TO VERIFY FIGURE REPRODUCTION SCALE

ARCADIS GERAGHTY & MILLER

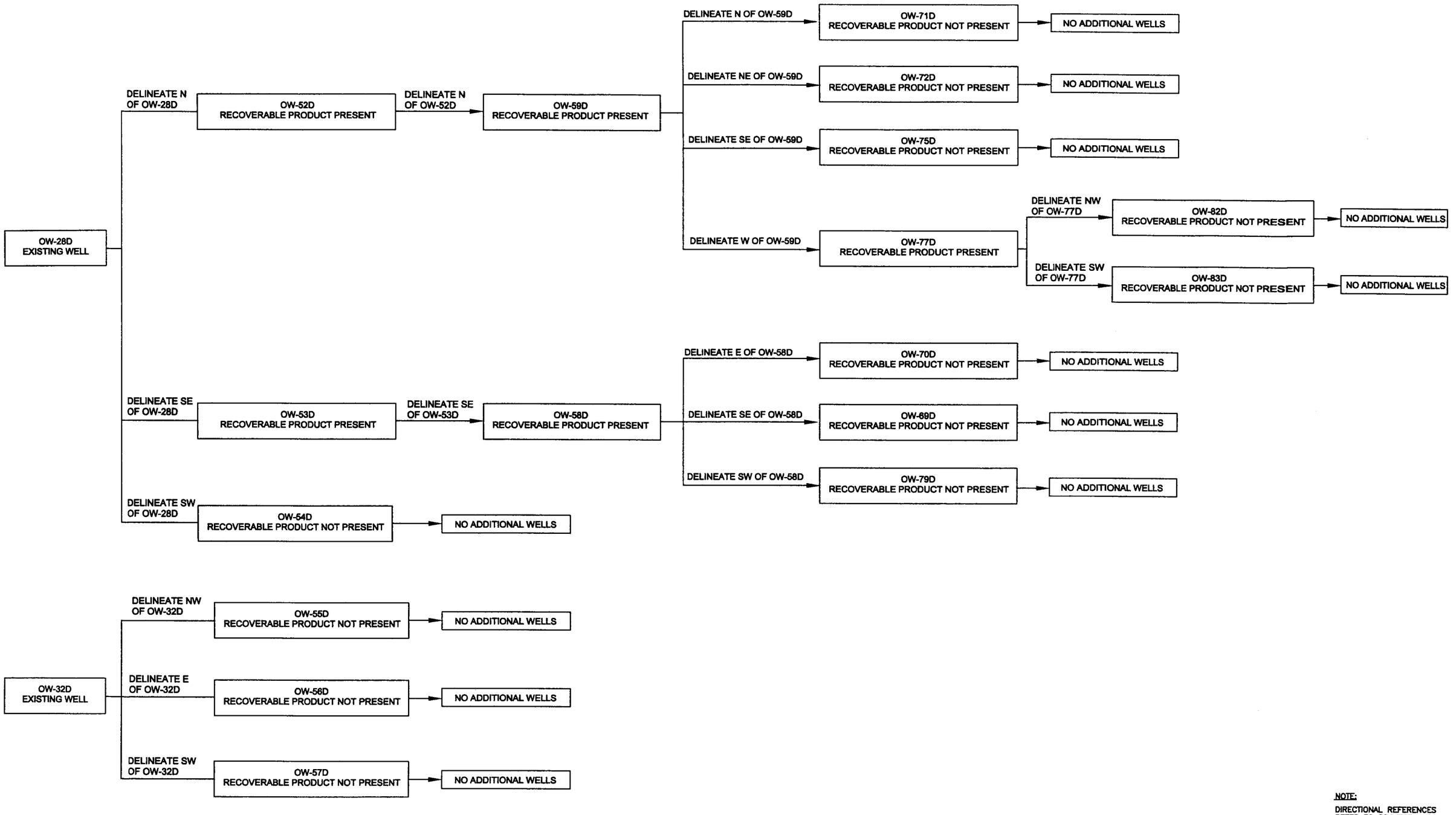
1200 MacArthur Boulevard
Mahwah, New Jersey 07430
Tel: 201/236-2233 Fax: 201/236-5110/5112

FORMER HYATT CLARK INDUSTRIES, INC. SITE CLARK, NEW JERSEY

PREPARED FOR: GENERAL MOTORS CORPORATION

SITE PLAN WITH PRODUCT RECOVERY WELLS

DRAWN	DATE	PROJECT MANAGER	DEPARTMENT MANAGER
M. WASILEWSKI	10/22/99	J. MESSINGER	
		LEAD DESIGN PROF.	CHECKED J. MESSINGER
		PROJECT NUMBER NJ0298.001	DRAWING NUMBER 2-1



NOTE:
DIRECTIONAL REFERENCES
REFER TO PROJECT NORTH

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NO.	DATE	REVISION DESCRIPTION	BY	CKD

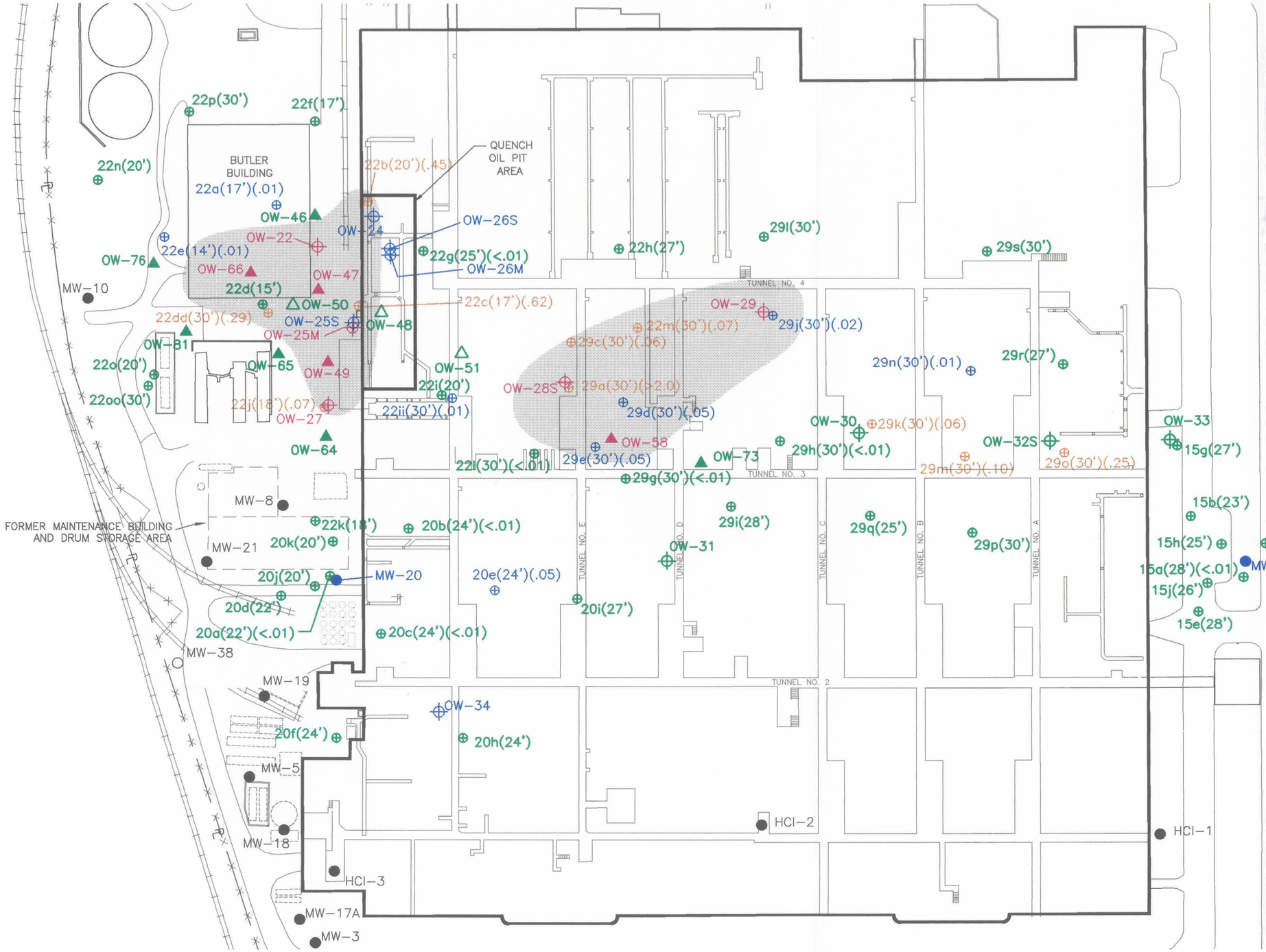
ARCADIS GERAGHTY & MILLER

FORMER HYATT CLARK INDUSTRIES,
INC. SITE CLARK, NEW JERSEY

PREPARED FOR:
GENERAL MOTORS CORPORATION

DRAWN	DATE	PROJECT MANAGER	DEPARTMENT MANAGER
A.G.	12/1/99	J. MESSINGER	
		LEAD DESIGN PROF.	CHECKED J.M.
		PROJECT NUMBER	DRAWING NUMBER
		NJ0298.001	2-3

FLOW DIAGRAM FOR
PRODUCT DELINEATION IN
BEDROCK



LEGEND

COLOR DESIGNATION

- ⊕15g(27') — GREEN = NO PRODUCT OR PRODUCT THICKNESS < 0.01 FEET
- ⊕29n(30')(.01) — BLUE = PRODUCT THICKNESS > 0.01 AND < 0.05 FEET
- ⊕29m(30')(.10) — BROWN = PRODUCT THICKNESS > 0.05 FEET
- ● NO PRODUCT IN MONITORING WELL
- ● MONITORING WELL CONTAINS PRODUCT BUT DOES NOT PRODUCE PRODUCT
- ⊕ OBSERVATION WELL CONTAINS PRODUCT BUT DOES NOT PRODUCE PRODUCT
- ⊕ NO PRODUCT IN OBSERVATION WELL
- ⊕ WELL PRODUCES PRODUCT [IPR SYSTEM]
- ▲ WELL PRODUCED >0.5 GALLONS OF LNAPL PER DAY [IPR SYSTEM] (INSTALLED IN 1999)
- ▲ WELL PRODUCED <0.5 GALLONS OF LNAPL PER DAY (INSTALLED IN 1999)
- △ ABANDONED OVERBURDEN WELL
- [IPR SYSTEM] INTERIM PRODUCT RECOVERY SYSTEM
- FREE PRODUCT AREA BASED PRIMARILY ON PRODUCT RECOVERY PILOT TESTING

GRAPHIC SCALE

120 0 120

(IN FEET)

1 inch = 120 ft.

NO.	DATE	REVISION DESCRIPTION	BY CKD

ARCADIS GERAGHTY & MILLER

FORMER HYATT CLARK INDUSTRIES, INC. SITE
CLARK, NEW JERSEY

PREPARED FOR:
GENERAL MOTORS CORPORATION

DRAWN	DATE	PROJECT MANAGER	DEPARTMENT MANAGER
A.G.	12/29/99	J. MESSINGER	
		LEAD DESIGN PROF.	CHECKED J. MESSINGER
		PROJECT NUMBER	DRAWING NUMBER
		NJ0298.001	2-4

AREAS OF FREE PRODUCT IN OVERBURDEN

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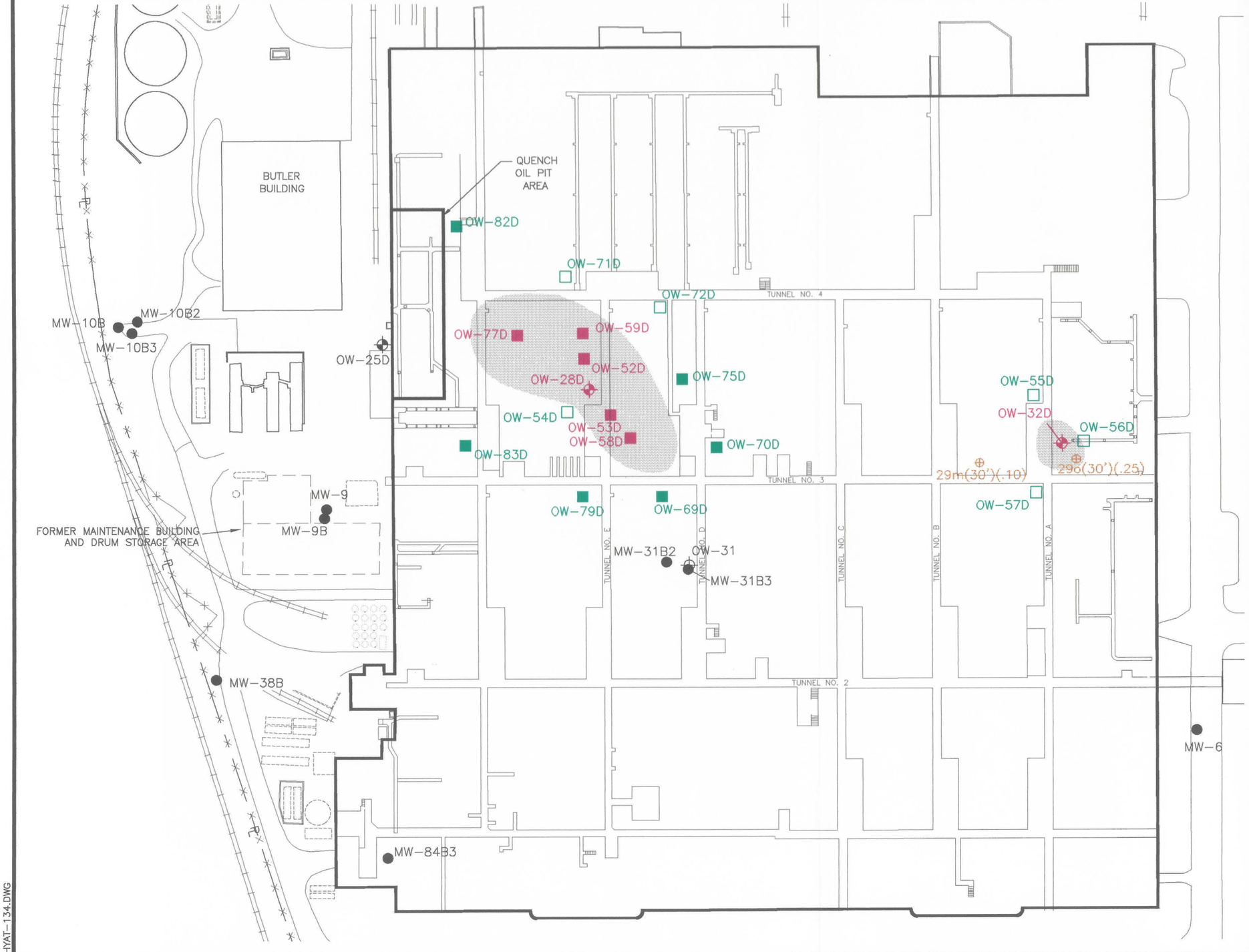

LEGEND

COLOR DESIGNATION

29o(30')(.25)	BROWN = PRODUCT THICKNESS > 0.05 FEET
●	NO PRODUCT IN MONITORING WELL
⌖	WELL PRODUCES PRODUCT [IPR SYSTEM]
■	WELL PRODUCED >0.5 GALLONS OF LNAPL PER DAY [IPR SYSTEM] (INSTALLED IN 1999)
■	WELL PRODUCED <0.5 GALLONS OF LNAPL PER DAY (INSTALLED IN 1999)
□	ABANDONED BEDROCK WELL
[IPR SYSTEM]	INTERIM PRODUCT RECOVERY SYSTEM
	FREE PRODUCT AREA BASED PRIMARILY ON PRODUCT RECOVERY PILOT TESTING

GRAPHIC SCALE

120 0 120

(IN FEET)
1 inch = 120 ft.

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NO.	DATE	REVISION DESCRIPTION	BY CKD

ARCADIS GERAGHTY & MILLER

FORMER HYATT CLARK INDUSTRIES, INC. SITE
CLARK, NEW JERSEY

PREPARED FOR:
GENERAL MOTORS CORPORATION

AREAS OF FREE PRODUCT IN BEDROCK

DRAWN	DATE	PROJECT MANAGER	DEPARTMENT MANAGER
A.G.	12/29/99	J. MESSINGER	
LEAD DESIGN PROF.		CHECKED	
		J. MESSINGER	
PROJECT NUMBER		DRAWING NUMBER	
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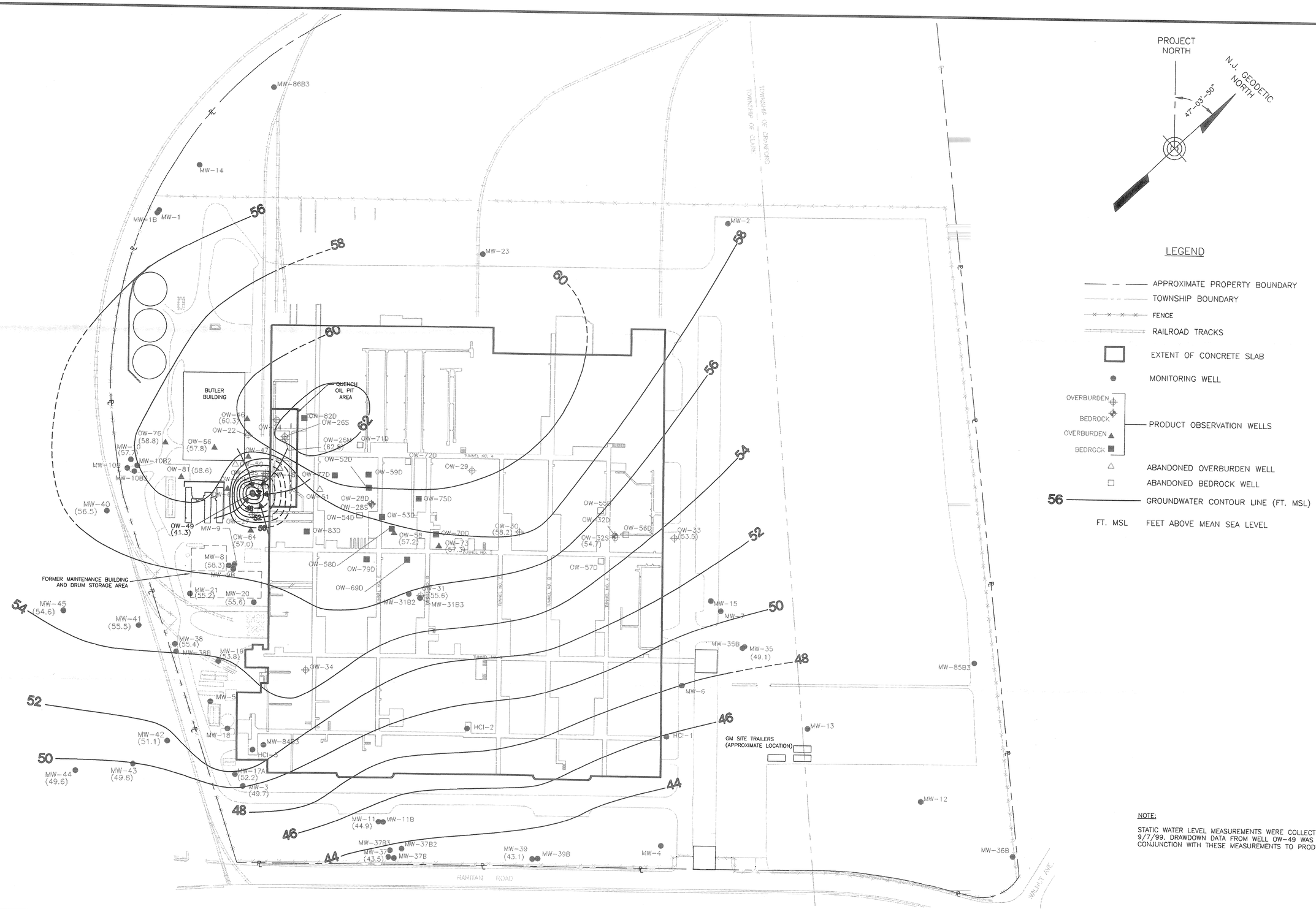

LEGEND

- APPROXIMATE PROPERTY BOUNDARY
- TOWNSHIP BOUNDARY
- FENCE
- RAILROAD TRACKS
- EXTENT OF CONCRETE SLAB
- MONITORING WELL
- PRODUCT OBSERVATION WELLS (OVERBURDEN / BEDROCK / OVERBURDEN ▲ / BEDROCK ■)
- ABANDONED OVERBURDEN WELL
- ABANDONED BEDROCK WELL
- 56 GROUNDWATER CONTOUR LINE (FT. MSL)
- FT. MSL FEET ABOVE MEAN SEA LEVEL

NOTE:

STATIC WATER LEVEL MEASUREMENTS WERE COLLECTED ON 9/7/99. DRAWDOWN DATA FROM WELL OW-49 WAS USED IN CONJUNCTION WITH THESE MEASUREMENTS TO PRODUCE FIGURE.

G:\DRAFTING\GM\GMHYAT\HYATT-132B.DWG 1-100

GRAPHIC SCALE
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(IN FEET)
1 inch = 100 ft.

NO.	DATE	REVISION DESCRIPTION	BY
			CKD

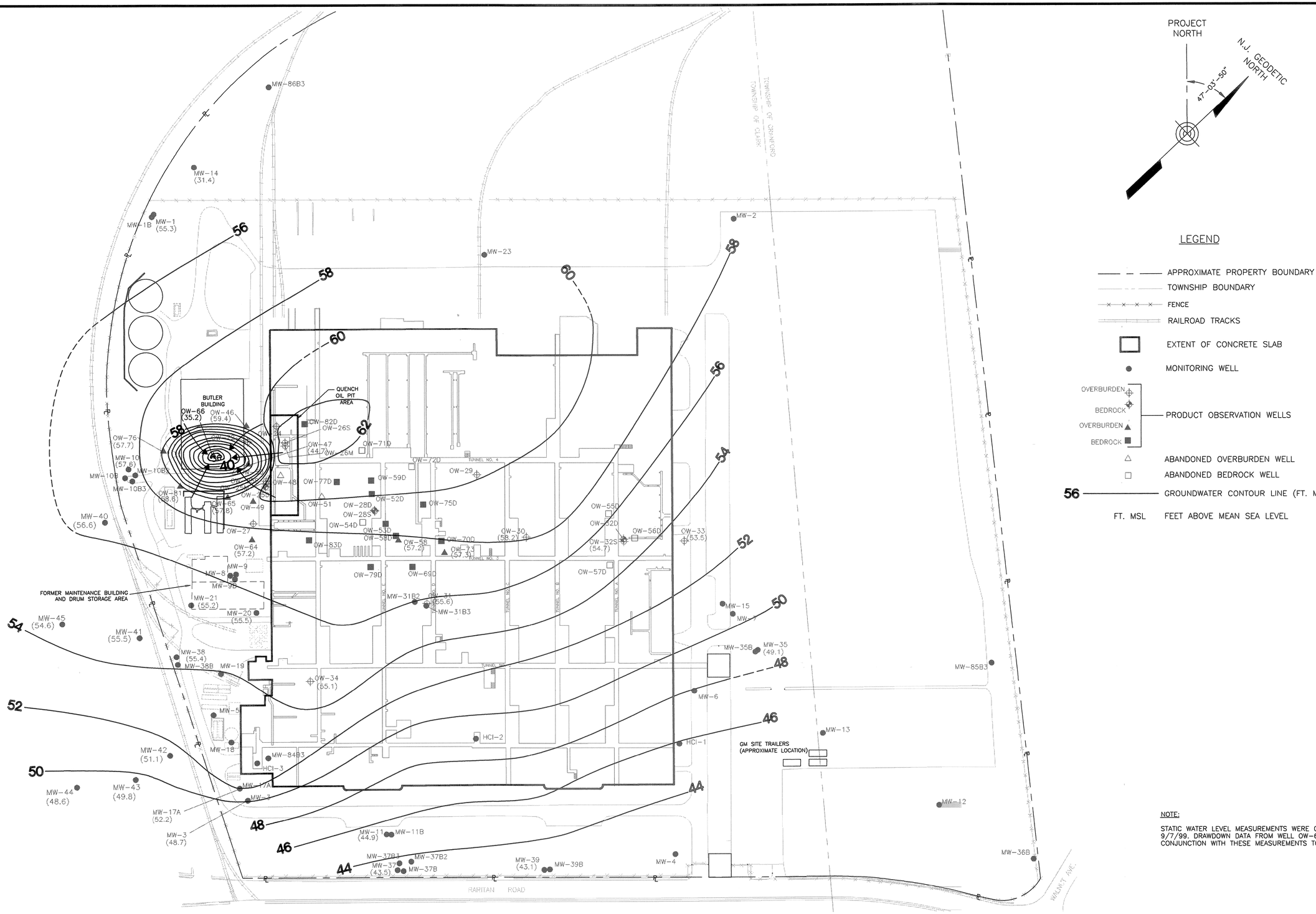
SCALE VERIFICATION
THIS BAR REPRESENTS ONE INCH ON THE ORIGINAL DRAWING:
USE TO VERIFY FIGURE REPRODUCTION SCALE

ARCADIS GERAGHTY & MILLER
1200 MacArthur Boulevard
Mahwah, New Jersey 07430
Tel: 201/236-2233 Fax: 201/236-5110/5112

FORMER HYATT CLARK INDUSTRIES, INC. SITE CLARK, NEW JERSEY
PREPARED FOR: GENERAL MOTORS CORPORATION

FLOW NET FOR PUMPING TEST ON WELL OLW-49

DRAWN	DATE	PROJECT MANAGER	DEPARTMENT MANAGER
M. WASILEWSKI	11/16/99	J. MESSINGER	
		LEAD DESIGN PROF.	CHECKED
			J. MESSINGER
		PROJECT NUMBER	DRAWING NUMBER
		NJ0298.001	2-6



NOTE:

STATIC WATER LEVEL MEASUREMENTS WERE COLLECTED ON 9/7/99. DRAWDOWN DATA FROM WELL OW-66 WAS USED IN CONJUNCTION WITH THESE MEASUREMENTS TO PRODUCE FIGURE.

G:\DRAFTING\GM\GMHYAT\HYATT-130B.DWG 1-100

GRAPHIC SCALE

100 0 100

(IN FEET)

1 inch = 100 ft.

NO.	DATE	REVISION DESCRIPTION	BY CKD

SCALE VERIFICATION

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USE TO VERIFY FIGURE REPRODUCTION SCALE

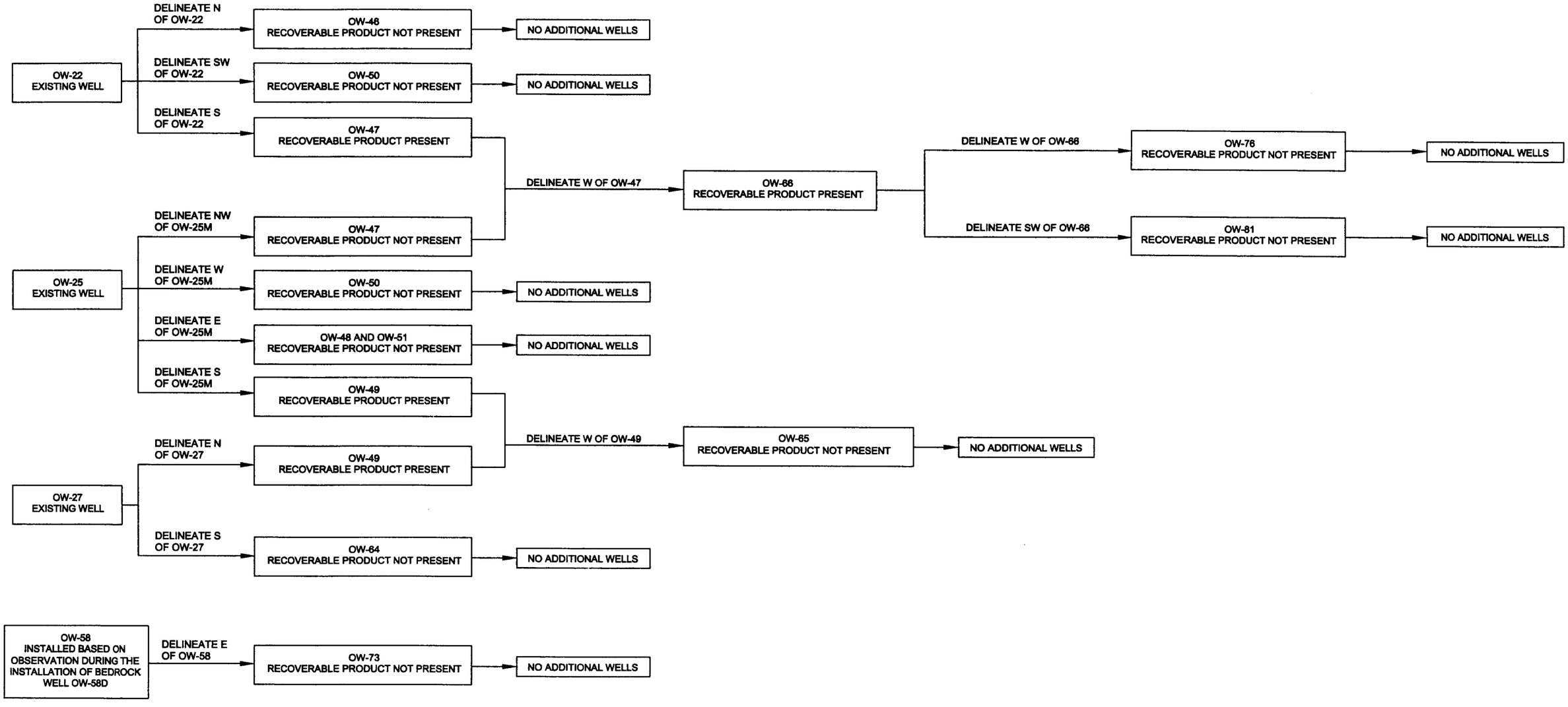
ARCADIS GERAGHTY & MILLER

FORMER HYATT CLARK INDUSTRIES, INC. SITE CLARK, NEW JERSEY

PREPARED FOR: GENERAL MOTORS CORPORATION

FLOW NET FOR PUMPING TEST ON WELL OW-66

DRAWN	DATE	PROJECT MANAGER	DEPARTMENT MANAGER
M. WASILEWSKI	11/16/99	J. MESSINGER	
		LEAD DESIGN PROF.	CHECKED: J. MESSINGER
		PROJECT NUMBER: NJ0298.001	DRAWING NUMBER: 2-7



NOTE:
DIRECTIONAL REFERENCES REFER TO PROJECT NORTH

G:\DRAFTING\CLIENT\GM\HYATT\FLOWCHARTS.DWG

NO.	DATE	REVISION DESCRIPTION	BY / CKD

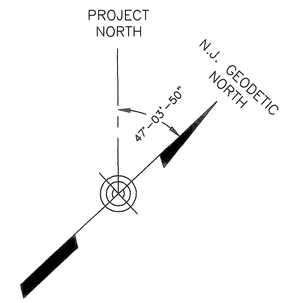
ARCADIS GERAGHTY & MILLER

FORMER HYATT CLARK INDUSTRIES, INC. SITE CLARK, NEW JERSEY

PREPARED FOR:
GENERAL MOTORS CORPORATION

FLOW DIAGRAM FOR PRODUCT DELINEATION IN OVERBURDEN

DRAWN	DATE	PROJECT MANAGER	DEPARTMENT MANAGER
A.G.	12/1/99	J. MESSINGER	
		LEAD DESIGN PROF.	CHECKED J.M.
		PROJECT NUMBER	DRAWING NUMBER
		NJ0298.001	2-2



LEGEND

- APPROXIMATE PROPERTY BOUNDARY
- TOWNSHIP BOUNDARY
- FENCE
- RAILROAD TRACKS
- EXTENT OF CONCRETE SLAB
- MONITORING WELL
- PRODUCT OBSERVATION WELLS (OVERBURDEN, BEDROCK, OVERBURDEN, BEDROCK)
- ABANDONED OVERBURDEN WELL
- ABANDONED BEDROCK WELL
- 42 GROUNDWATER CONTOUR LINE (FT. MSL)
- FT. MSL FEET ABOVE MEAN SEA LEVEL

NOTE:

STATIC WATER LEVEL MEASUREMENTS WERE COLLECTED ON 9/7/99. DRAWDOWN DATA FROM WELL OW-58D WAS USED IN CONJUNCTION WITH THESE MEASUREMENTS TO PRODUCE FIGURE.

G:\DRAFTING\GM\GMHYATT\HYATT-131B.DWG 1-100

GRAPHIC SCALE
100 0 100
(IN FEET)
1 inch = 100 ft.

NO.	DATE	REVISION DESCRIPTION	BY CKD

SCALE VERIFICATION
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USE TO VERIFY FIGURE REPRODUCTION SCALE

ARCADIS GERAGHTY & MILLER

FORMER HYATT CLARK INDUSTRIES, INC. SITE CLARK, NEW JERSEY

PREPARED FOR:
GENERAL MOTORS CORPORATION

FLOW NET FOR PUMPING TEST ON WELL OW-58D

DRAWN	DATE	PROJECT MANAGER	DEPARTMENT MANAGER
M. WASILEWSKI	11/16/99	J. MESSINGER	
LEAD DESIGN PROF.		CHECKED	
		J. MESSINGER	
PROJECT NUMBER		DRAWING NUMBER	
NJ0298.001		2-8	

APPENDIX A

SAMPLE CORE AND WELL CONSTRUCTION LOGS FOR NEW WELLS

SAMPLE/CORE LOGS

ARCADIS GERAGHTY & MILLER

Sample/Core Log

Boring/Well OW-46 Project/No. NJ000298.0021.00004 Page 1 of 1

Site Location Clark, New Jersey Drilling Started 5/17/99 Drilling Completed 5/17/99

Total Depth Drilled 35 Feet Hole Diameter 8 inches Type of Sample/ Coring Device ODEX

Length and Diameter of Coring Device 7-7/8" dia. ODEX Sampling Interval N/A feet

Land-Surface Elev. _____ feet ☐ Surveyed ☐ Estimated Datum _____

Drilling Fluid Used Air Drilling Method ODEX

Drilling Contractor CT&E, B-80 Mobile Drill Driller T. Lynch Helper T. Lynch Jr.

Prepared By Eric Rodriguez Hammer Weight N/A Hammer Drop N/A ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description*
0	23			Sand, fine to medium; Silt; and Gravel, fine to medium; red brown.
				Slight product odor, no visual impact observed.
23	35			Till and weathered rock zone consisting of rounded Gravels, med; and
				weathered Siltstone; red brown.
				No visual impact observed.

* Lithologic descriptions are based on soil cuttings.

ARCADIS GERAGHTY & MILLER

Sample/Core Log

Boring/Well OW-47 Project/No. NJ000298.0021.00004 Page 1 of 1

Site Location Clark, New Jersey Drilling Started 5/14/99 Drilling Completed 5/14/99

Total Depth Drilled 36 Feet Hole Diameter 8 inches Type of Sample/ Coring Device ODEX

Length and Diameter of Coring Device 7-7/8" dia. ODEX Sampling Interval N/A feet

Land-Surface Elev. _____ feet ☐ Surveyed ☐ Estimated Datum _____

Drilling Fluid Used Air Drilling Method ODEX

Drilling Contractor CT&E, B-80 Mobile Drill Driller T. Lynch Helper T. Lynch Jr.

Prepared By Eric Rodriguez Hammer Weight N/A Hammer Drop N/A ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description*
0	25			Sand, fine to medium; Silt; and Gravel, fine to medium; red brown.
				No visual impact.
25	36			Till and weathered rock zone consisting of rounded Gravels, med; and
				weathered Siltstone; red brown.
				Sheen visable in till unit.

* Lithologic descriptions are based on soil cuttings.

ARCADIS GERAGHTY & MILLER

Sample/Core Log

Boring/Well OW-47R Project/No. NJ000298.0021.00004 Page 1 of 1

Site Location Clark, New Jersey Drilling Started 8/30/99 Drilling Completed 8/30/99

Total Depth Drilled 36 Feet Hole Diameter 8 inches Type of Sample/ Coring Device ODEX

Length and Diameter of Coring Device 7-7/8" dia. ODEX Sampling Interval N/A feet

Land-Surface Elev. ____ feet ☐ Surveyed ☐ Estimated Datum ____

Drilling Fluid Used Air Drilling Method ODEX

Drilling Contractor CT&E, B-80 Mobile Drill Driller Jim Lewis Helper Larry Lynch

Prepared By Eric Rodriguez Hammer Weight N/A Hammer Drop N/A ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description*
0	25			Sand, fine to medium; Silt; and Gravel, fine to medium; red brown.
				No visual impact.
25	36			Till and weathered rock zone consisting of rounded Gravels, med; and
				weathered Siltstone; red brown.
				Sheen visable in till unit.
				Drilling observations are based on the drilling of OW-47.

* Lithologic descriptions are based on soil cuttings.

ARCADIS GERAGHTY & MILLER

Sample/Core Log

Boring/Well OW-48 Project/No. NJ000298.0021.00004 Page 1 of 1

Site Location Clark, New Jersey Drilling Started 5/13/99 Drilling Completed 5/13/99

Total Depth Drilled 25 Feet Hole Diameter 8 inches Type of Sample/ Coring Device ODEX

Length and Diameter of Coring Device 7-7/8" dia. ODEX and Air Hammer Sampling Interval N/A feet

Land-Surface Elev. ____ feet ☐ Surveyed ☐ Estimated Datum ____

Drilling Fluid Used Air Drilling Method ODEX

Drilling Contractor CT&E, B-80 Mobile Drill Driller T. Lynch Helper T. Lynch Jr.

Prepared By Eric Rodriguez Hammer Weight N/A Hammer Drop N/A ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description*
0	21			Sand, fine to medium; Silt; and Gravel, fine to medium; red brown.
				Cuttings appear to be stained black, no free product observed.
21	25			Till and weathered rock zone consisting of rounded Gravels, med; and
				weathered Siltstone; red brown.
				No impact observed.

* Lithologic descriptions are based on soil cuttings.

ARCADIS GERAGHTY & MILLER

Sample/Core Log

Boring/Well OW-49 Project/No. NJ000298.0021.00004 Page 1 of 1

Site Location Clark, New Jersey Drilling Started 5/13/99 Drilling Completed 5/13/99

Total Depth Drilled 30 Feet Hole Diameter 8 inches Type of Sample/ Coring Device ODEX

Length and Diameter of Coring Device 7-7/8" dia. ODEX and Air Hammer Sampling Interval N/A feet

Land-Surface Elev. ____ feet ☐ Surveyed ☐ Estimated Datum ____

Drilling Fluid Used Air Drilling Method ODEX

Drilling Contractor CT&E, B-80 Mobile Drill Driller T. Lynch Helper T. Lynch Jr.

Prepared By Eric Rodriguez Hammer Weight N/A Hammer Drop N/A ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description*
0	21			Sand, fine to medium; Silt; and Gravel, fine to medium; red brown.
				Sheen observed in soil cuttings.
21	30			Till and weathered rock zone consisting of rounded Gravels, med; and
				weathered Siltstone; red brown.
				No impact observed

* Lithologic descriptions are based on soil cuttings.

ARCADIS GERAGHTY & MILLER

Sample/Core Log

Boring/Well OW-50 Project/No. NJ000298.0021.00004 Page 1 of 1

Site Location Clark, New Jersey

Drilling Started 5/14/99 Drilling Completed 5/14/99

Total Depth Drilled 31 Feet Hole Diameter 8 inches Type of Sample/ Coring Device ODEX

Length and Diameter of Coring Device 7-7/8" dia. ODEX and Air Hammer Sampling Interval N/A feet

Land-Surface Elev. ____ feet ☐ Surveyed ☐ Estimated Datum ____

Drilling Fluid Used Air Drilling Method ODEX

Drilling Contractor CT&E, B-80 Mobile Drill Driller T. Lynch Helper T. Lynch Jr.

Prepared By Eric Rodriguez Hammer Weight N/A Hammer Drop N/A ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description*
0	20			Sand, fine to medium; Silt; and Gravel, fine to medium; red brown.
				Sheen observed in soil cuttings
20	31			Till and weathered rock zone consisting of rounded Gravels, med; and
				weathered Siltstone; red brown.
				No impact observed

* Lithologic descriptions are based on soil cuttings.

ARCADIS GERAGHTY & MILLER

Sample/Core Log

Boring/Well OW-51 Project/No. NJ000298.0021.00004 Page 1 of 1

Site Location Clark, New Jersey Drilling Started 5/13/99 Drilling Completed 5/13/99

Total Depth Drilled 25 Feet Hole Diameter 8 inches Type of Sample/ Coring Device ODEX

Length and Diameter of Coring Device 7-7/8" dia. ODEX and Air Hammer Sampling Interval N/A feet

Land-Surface Elev. _____ feet ☐ Surveyed ☐ Estimated Datum _____

Drilling Fluid Used Air Drilling Method ODEX

Drilling Contractor CT&E, B-80 Mobile Drill Driller T. Lynch Helper T. Lynch Jr.

Prepared By Eric Rodriguez Hammer Weight N/A Hammer Drop N/A ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description*
0	20			Sand, fine to medium; Silt; and Gravel, fine to medium; red brown.
				No impact observed.
20	25			Till and weathered rock zone consisting of rounded Gravels, med; and
				weathered Siltstone; red brown.
				No impact observed.

* Lithologic descriptions are based on soil cuttings.

ARCADIS GERAGHTY & MILLER

Sample/Core Log

Boring/Well OW-81 Project/No. NJ000298.0021.00004 Page 1 of 1

Site Location Clark, New Jersey Drilling Started 7/14/99 Drilling Completed 7/14/99

Total Depth Drilled 32 Feet Hole Diameter 8 inches Type of Sample/ Coring Device ODEX

Length and Diameter of Coring Device 7-7/8" dia. ODEX Sampling Interval N/A feet

Land-Surface Elev. _____ feet ☐ Surveyed ☐ Estimated Datum _____

Drilling Fluid Used Air Drilling Method ODEX

Drilling Contractor CT&E, B-80 Mobile Drill Driller T. Lynch Helper T. Lynch Jr.

Prepared By Eric Rodriguez Hammer Weight N/A Hammer Drop N/A ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description*
0	25			Sand, fine to medium; Silt; and Gravel, fine to medium; red brown.
				No visual impact observed.
25	32			Till and weathered rock zone consisting of rounded Gravels, med; and
				weathered Siltstone; red brown.
				No visual impact observed.

* Lithologic descriptions are based on soil cuttings.

ARCADIS GERAGHTY & MILLER

Sample/Core Log

Boring/Well OW-52D Project/No. NJ000298.0021.00004 Page 1 of 1

Site Location: Clark, New Jersey

Drilling Started: 5/11/99 Drilling Completed: 5/11/99

Total Depth Drilled: 43 Feet Hole Diameter: 8 inches Type of Sample/ Coring Device: ODEX/Air Hammer

Length and Diameter of Coring Device: 7-7/8" dia. ODEX and Air Hammer Sampling Interval: N/A feet

Land-Surface Elev. _____ feet ☐ Surveyed ☐ Estimated Datum _____

Drilling Fluid Used: Air Drilling Method: ODEX/Air

Drilling Contractor: CT&E, B-80 Mobile Drill Driller: T. Lynch Helper: T. Lynch Jr.

Prepared By: Eric Rodriguez Hammer Weight: N/A Hammer Drop: N/A ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description*
0	25			Sand, fine to medium; Silt; and Gravel, fine to medium; red brown.
				No visual impact observed.
25	29			Till and weathered rock zone consisting of rounded Gravels, med; and
				weathered Siltstone; red brown.
				No visual impact observed.
29	43			Siltstone bedrock, red brown.
				No visual impact observed.

* Lithologic descriptions are based on soil cuttings.

ARCADIS GERAGHTY & MILLER

Sample/Core Log

Boring/Well OW-53D Project/No. NJ000298.0021.00004 Page 1 of 1

Site Location Clark, New Jersey Drilling Started 5/12/99 Drilling Completed 5/12/99

Total Depth Drilled 44 Feet Hole Diameter 8 inches Type of Sample/ Coring Device ODEX/Air Hammer

Length and Diameter of Coring Device 7 7/8" dia. ODEX Sampling Interval N/A feet

Land-Surface Elev. ____ feet ☐ Surveyed ☐ Estimated Datum ____

Drilling Fluid Used Air Drilling Method ODEX/Air

Drilling Contractor CT&E, B-80 Mobile Drill Driller T. Lynch Helper T. Lynch Jr.

Prepared By Eric Rodriguez Hammer Weight N/A Hammer Drop N/A ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description*
0	25			Sand, fine to medium; Silt; and Gravel, fine to medium; red brown.
				No visual impact observed.
25	29.5			Till and weathered rock zone consisting of rounded Gravels, med; and
				weathered Siltstone; red brown.
				No visual impact observed.
29.5	44			Siltstone bedrock, red brown.
				Sheen observed in rock cuttings.

* Lithologic descriptions are based on soil cuttings.

ARCADIS GERAGHTY & MILLER

Sample/Core Log

Boring/Well OW-54D Project/No. NJ000298.0021.00004 Page 1 of 1

Site Location Clark, New Jersey Drilling Started 5/12/99 Drilling Completed 5/12/99

Total Depth Drilled 44 Feet Hole Diameter 8 inches Type of Sample/ Coring Device ODEX/Air Hammer

Length and Diameter of Coring Device 7 7/8" dia. ODEX Sampling Interval N/A feet

Land-Surface Elev. ____ feet ☐ Surveyed ☐ Estimated Datum ____

Drilling Fluid Used Air Drilling Method ODEX/Air

Drilling Contractor CT&E, B-80 Mobile Drill Driller T. Lynch Helper T. Lynch Jr.

Prepared By Eric Rodriguez Hammer Weight N/A Hammer Drop N/A ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description*
0	28			Sand, fine to medium; Silt; and Gravel, fine to medium; red brown.
				No visual impact observed.
28	30			Till and weathered rock zone consisting of rounded Gravels, med; and
				weathered Siltstone; red brown.
				No visual impact observed.
30	44			Siltstone bedrock, red brown.
				Slight sheen visable in rock cuttings.

* Lithologic descriptions are based on soil cuttings.

ARCADIS GERAGHTY & MILLER

Sample/Core Log

Boring/Well OW-55D Project/No. NJ000298.0021.00004 Page 1 of 1

Site Location Clark, New Jersey Drilling Started 5/11/99 Drilling Completed 5/11/99

Total Depth Drilled 34 Feet Hole Diameter 8 inches Type of Sample/ Coring Device ODEX/Air Hammer

Length and Diameter of Coring Device 7 7/8" dia. ODEX Sampling Interval N/A feet

Land-Surface Elev. ____ feet ☐ Surveyed ☐ Estimated Datum ____

Drilling Fluid Used Air Drilling Method ODEX/Air

Drilling Contractor CT&E, B-80 Mobile Drill Driller T. Lynch Helper T. Lynch Jr.

Prepared By Eric Rodriguez Hammer Weight N/A Hammer Drop N/A ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description*
0	18.5			Sand, fine to medium; Silt; and Gravel, fine to medium; red brown.
				No visual impact observed.
18.5	19.5			Till and weathered rock zone consisting of rounded Gravels, med; and
				weathered Siltstone; red brown.
				No visual impact observed.
19.5	34			Siltstone bedrock, red brown.
				No visual impact observed.

* Lithologic descriptions are based on soil cuttings.

ARCADIS GERAGHTY & MILLER

Sample/Core Log

Boring/Well OW-56D Project/No. NJ000298.0021.00004 Page 1 of 1

Site Location Clark, New Jersey Drilling Started 5/10/99 Drilling Completed 5/10/99

Total Depth Drilled 33.5 Feet Hole Diameter 8 inches Type of Sample/ Coring Device ODEX/Air Hammer

Length and Diameter of Coring Device 7 7/8" dia. ODEX Sampling Interval N/A feet

Land-Surface Elev. ____ feet ☐ Surveyed ☐ Estimated Datum ____

Drilling Fluid Used Air Drilling Method ODEX/Air

Drilling Contractor CT&E, B-80 Mobile Drill Driller T. Lynch Helper T. Lynch Jr.

Prepared By Eric Rodriguez Hammer Weight N/A Hammer Drop N/A ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description*
0	17			Sand, fine to medium; Silt; and Gravel, fine to medium; red brown.
				No visual impact observed.
17	20			Till and weathered rock zone consisting of rounded Gravels, med; and
				weathered Siltstone; red brown.
				No visual impact observed.
20	33.5			Siltstone bedrock, red brown.
				No visual impact observed.

* Lithologic descriptions are based on soil cuttings.

ARCADIS GERAGHTY & MILLER

Sample/Core Log

Boring/Well OW-57D Project/No. NJ000298.0021.00004 Page 1 of 1

Site Location Clark, New Jersey Drilling Started 5/11/99 Drilling Completed 5/11/99

Total Depth Drilled 34 Feet Hole Diameter 8 inches Type of Sample/ Coring Device ODEX/Air Hammer

Length and Diameter of Coring Device 7 7/8" dia. ODEX Sampling Interval N/A feet

Land-Surface Elev. ____ feet ☐ Surveyed ☐ Estimated Datum ____

Drilling Fluid Used Air Drilling Method ODEX/Air

Drilling Contractor CT&E, B-80 Mobile Drill Driller T. Lynch Helper T. Lynch Jr.

Prepared By Eric Rodriguez Hammer Weight N/A Hammer Drop N/A ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description*
0	19			Sand, fine to medium; Silt; and Gravel, fine to medium; red brown.
				No visual impact observed.
19	20			Till and weathered rock zone consisting of rounded Gravels, med; and
				weathered Siltstone; red brown.
				No visual impact observed.
20	34			Siltstone bedrock, red brown.
				No visual impact observed.

* Lithologic descriptions are based on soil cuttings.

ARCADIS GERAGHTY & MILLER

Sample/Core Log

Boring/Well OW-58 Project/No. NJ000298.0021.00004 Page 1 of 1

Site Location Clark, New Jersey Drilling Started 6/21/99 Drilling Completed 6/21/99

Total Depth Drilled 30.5 Feet Hole Diameter 8 inches Type of Sample/ Coring Device ODEX

Length and Diameter of Coring Device 7 7/8" dia. ODEX Sampling Interval N/A feet

Land-Surface Elev. _____ feet ☐ Surveyed ☐ Estimated Datum _____

Drilling Fluid Used Air Drilling Method ODEX

Drilling Contractor CT&E, B-80 Mobile Drill Driller T. Lynch Helper T. Lynch Jr.

Prepared By Eric Rodriguez Hammer Weight N/A Hammer Drop N/A ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description*
0	26			Sand, fine to medium; Silt; and Gravel, fine to medium; red brown.
				Sheen visable in soil cuttings
26	30.5			Till and weathered rock zone consisting of rounded Gravels, med; and
				weathered Siltstone; red brown.
				Till is stained, no free product observed.

* Lithologic descriptions are based on soil cuttings.

ARCADIS GERAGHTY & MILLER

Sample/Core Log

Boring/Well OW-58D Project/No. NJ000298.0021.00004 Page 1 of 1

Site Location Clark, New Jersey Drilling Started 6/10/99 Drilling Completed 6/10/99

Total Depth Drilled 44 Feet Hole Diameter 8 inches Type of Sample/ Coring Device ODEX/Air Hammer

Length and Diameter of Coring Device 7-7/8" dia. ODEX and Air Hammer Sampling Interval N/A feet

Land-Surface Elev. _____ feet ☐ Surveyed ☐ Estimated Datum _____

Drilling Fluid Used Air Drilling Method ODEX/Air

Drilling Contractor CT&E, B-80 Mobile Drill Driller T. Lynch Helper T. Lynch Jr.

Prepared By Eric Rodriguez Hammer Weight N/A Hammer Drop N/A ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description*
0	26			Sand, fine to medium; Silt; and Gravel, fine to medium; red brown.
				Slight sheen observed in soil cuttings. Product observed in lower 2 feet of unit.
26	31			Till and weathered rock zone consisting of rounded Gravels, med; and
				weathered Siltstone; red brown.
				Product observed in upper 1 foot of Till.
31	44			Siltstone bedrock, red brown.
				Slight sheen observed in rock cuttings.

* Lithologic descriptions are based on soil cuttings.

ARCADIS GERAGHTY & MILLER

Sample/Core Log

Boring/Well OW-59D Project/No. NJ000298.0021.00004 Page 1 of 1

Site Location Clark, New Jersey Drilling Started 6/10/99 Drilling Completed 6/10/99

Total Depth Drilled 42 Feet Hole Diameter 8 inches Type of Sample/ Coring Device ODEX/Air Hammer

Length and Diameter of Coring Device 7-7/8" dia. ODEX and Air Hammer Sampling Interval N/A feet

Land-Surface Elev. ____ feet ☐ Surveyed ☐ Estimated Datum ____

Drilling Fluid Used Air Drilling Method ODEX/Air

Drilling Contractor CT&E, B-80 Mobile Drill Driller T. Lynch Helper T. Lynch Jr.

Prepared By Eric Rodriguez Hammer Weight N/A Hammer Drop N/A ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description*
0	24			Sand, fine to medium; Silt; and Gravel, fine to medium; red brown.
				No visual impact observed.
24	29			Till and weathered rock zone consisting of rounded Gravels, med; and
				weathered Siltstone; red brown.
				No visual impact observed.
29	42			Siltstone bedrock, red brown.
				No visual impact observed.

* Lithologic descriptions are based on soil cuttings.

ARCADIS GERAGHTY & MILLER

Sample/Core Log

Boring/Well OW-64 Project/No. NJ000298.0021.00004 Page 1 of 1

Site Location Clark, New Jersey

Drilling Started 6/21/99 Drilling Completed 6/21/99

Total Depth Drilled 27 Feet Hole Diameter 8 inches Type of Sample/ Coring Device ODEX

Length and Diameter of Coring Device 7-7/8" dia. ODEX and Air Hammer Sampling Interval N/A feet

Land-Surface Elev. _____ feet ☐ Surveyed ☐ Estimated Datum _____

Drilling Fluid Used Air Drilling Method ODEX

Drilling Contractor CT&E, B-80 Mobile Drill Driller T. Lynch Helper T. Lynch Jr.

Prepared By Eric Rodriguez Hammer Weight N/A Hammer Drop N/A ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description*
0	24			Sand, fine to medium; Silt; and Gravel, fine to medium; red brown.
				Sheen observed in soil cuttings.
24	27			Till and weathered rock zone consisting of rounded Gravels, med; and
				weathered Siltstone; red brown.
				No impact observed.

* Lithologic descriptions are based on soil cuttings.

ARCADIS GERAGHTY & MILLER

Sample/Core Log

Boring/Well OW-65 Project/No. NJ000298.0021.00004 Page 1 of 1

Site Location Clark, New Jersey Drilling Started 6/25/99 Drilling Completed 6/25/99

Total Depth Drilled 32 Feet Hole Diameter 8 inches Type of Sample/ Coring Device ODEX

Length and Diameter of Coring Device 7-7/8" dia. ODEX and Air Hammer Sampling Interval N/A feet

Land-Surface Elev. ____ feet ☐ Surveyed ☐ Estimated Datum ____

Drilling Fluid Used Air Drilling Method ODEX

Drilling Contractor CT&E, B-80 Mobile Drill Driller T. Lynch Helper T. Lynch Jr.

Prepared By Eric Rodriguez Hammer Weight N/A Hammer Drop N/A ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description*
0	27			Sand, fine to medium; Silt; and Gravel, fine to medium; red brown.
				No visual impact observed.
27	32			Till and weathered rock zone consisting of rounded Gravels, med; and
				weathered Siltstone; red brown.
				Slight sheen observed in soil cuttings.

* Lithologic descriptions are based on soil cuttings.

ARCADIS GERAGHTY & MILLER

Sample/Core Log

Boring/Well OW-66 Project/No. NJ000298.0021.00004 Page 1 of 1

Site Location Clark, New Jersey

Drilling Started 6/28/99 Drilling Completed 6/28/99

Total Depth Drilled 35 Feet Hole Diameter 8 inches Type of Sample/ Coring Device ODEX

Length and Diameter of Coring Device 7-7/8" dia. ODEX and Air Hammer Sampling Interval N/A feet

Land-Surface Elev. ____ feet ☐ Surveyed ☐ Estimated Datum ____

Drilling Fluid Used Air Drilling Method ODEX

Drilling Contractor CT&E, B-80 Mobile Drill Driller T. Lynch Helper T. Lynch Jr.

Prepared By Jennifer Guido/Eric Rodriguez Hammer Weight N/A Hammer Drop N/A ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description*
0	25			Sand, fine to medium; Silt; and Gravel, fine to medium; red brown.
				No visual impact observed.
25	35			Till and weathered rock zone consisting of rounded Gravels, med; and
				weathered Siltstone; red brown.
				Product observed in Till.

* Lithologic descriptions are based on soil cuttings.

ARCADIS GERAGHTY & MILLER

Sample/Core Log

Boring/Well OW-69D Project/No. NJ000298.0021.00004 Page 1 of 1

Site Location Clark, New Jersey Drilling Started 6/23/99 Drilling Completed 6/23/99

Total Depth Drilled 41 Feet Hole Diameter 8 inches Type of Sample/ Coring Device ODEX/Air Hammer

Length and Diameter of Coring Device 7-7/8" dia. ODEX and Air Hammer Sampling Interval N/A feet

Land-Surface Elev. _____ feet ☐ ☐ Estimated Datum _____

Drilling Fluid Used Air Drilling Method ODEX/Air

Drilling Contractor CT&E, B-80 Mobile Drill Driller T. Lynch Helper T. Lynch Jr.

Prepared By Eric Rodriguez Hammer Weight N/A Hammer Drop N/A ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description*
0	26			Sand, fine to medium; Silt; and Gravel, fine to medium; red brown.
				No visual impact observed.
26	28			Till and weathered rock zone consisting of rounded Gravels, med; and
				weathered Siltstone; red brown.
				No visual impact observed.
28	41			Siltstone bedrock, red brown.
				No visual impact observed.

* Lithologic descriptions are based on soil cuttings.

ARCADIS GERAGHTY & MILLER

Sample/Core Log

Boring/Well OW-70D Project/No. NJ000298.0021.00004 Page 1 of 1

Site Location Clark, New Jersey Drilling Started 6/23/99 Drilling Completed 6/23/99

Total Depth Drilled 45 Feet Hole Diameter 8 inches Type of Sample/ Coring Device ODEX/Air Hammer

Length and Diameter of Coring Device 7-7/8" dia. ODEX and Air Hammer Sampling Interval N/A feet

Land-Surface Elev. _____ feet ☐ Surveyed ☐ Estimated Datum _____

Drilling Fluid Used Air Drilling Method ODEX/Air

Drilling Contractor CT&E, B-80 Mobile Drill Driller T. Lynch Helper T. Lynch Jr.

Prepared By Eric Rodriguez Hammer Weight N/A Hammer Drop N/A ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description*
0	27			Sand, fine to medium; Silt; and Gravel, fine to medium; red brown.
				No visual impact observed.
27	32			Till and weathered rock zone consisting of rounded Gravels, med; and
				weathered Siltstone; red brown.
				No visual impact observed.
32	45			Siltstone bedrock, red brown.
				Slight sheen observed in rock cuttings.

* Lithologic descriptions are based on soil cuttings.

ARCADIS GERAGHTY & MILLER

Sample/Core Log

Boring/Well: OW-71D Project/No.: NJ000298.0021.00004 Page: 1 of 1

Site Location: Clark, New Jersey Drilling Started: 6/29/99 Drilling Completed: 6/29/99

Total Depth Drilled: 47.5 Feet Hole Diameter: 8 inches Type of Sample/ Coring Device: ODEX/Air Hammer

Length and Diameter of Coring Device: 7-7/8" dia. ODEX and Air Hammer Sampling Interval: N/A feet

Land-Surface Elev.: ____ feet ☐ Surveyed ☐ Estimated Datum: ____

Drilling Fluid Used: Air Drilling Method: ODEX/Air

Drilling Contractor: CT&E, B-80 Mobile Drill Driller: T. Lynch Helper: T. Lynch Jr.

Prepared By: Eric Rodriguez Hammer Weight: N/A Hammer Drop: N/A ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description*
0	26			Sand, fine to medium; Silt; and Gravel, fine to medium; red brown.
				No visual impact observed.
26	34.5			Till and weathered rock zone consisting of rounded Gravels, med; and
				weathered Siltstone; red brown.
				No visual impact observed.
34.5	47.5			Siltstone bedrock, red brown.
				No visual impact observed.

* Lithologic descriptions are based on soil cuttings.

ARCADIS GERAGHTY & MILLER

Sample/Core Log

Boring/Well OW-72D Project/No. NJ000298.0021.00004 Page 1 of 1

Site Location Clark, New Jersey Drilling Started 6/30/99 Drilling Completed 6/30/99

Total Depth Drilled 49 Feet Hole Diameter 8 inches Type of Sample/ Coring Device ODEX/Air Hammer

Length and Diameter of Coring Device 7-7/8" dia. ODEX and Air Hammer Sampling Interval N/A feet

Land-Surface Elev. _____ feet ☐ Surveyed ☐ Estimated Datum _____

Drilling Fluid Used Air Drilling Method ODEX/Air

Drilling Contractor CT&E, B-80 Mobile Drill Driller T. Lynch Helper T. Lynch Jr.

Prepared By Eric Rodriguez Hammer Weight N/A Hammer Drop N/A ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description*
0	24			Sand, fine to medium; Silt; and Gravel, fine to medium; red brown.
				No visual impact observed.
24	36			Till and weathered rock zone consisting of rounded Gravels, med; and
				weathered Siltstone; red brown.
				No visual impact observed.
36	49			Siltstone bedrock, red brown.
				Sheen observed in rock cuttings.

* Lithologic descriptions are based on soil cuttings.

ARCADIS GERAGHTY & MILLER

Sample/Core Log

Boring/Well OW-73 Project/No. NJ000298.0021.00004 Page 1 of 1

Site Location: Clark, New Jersey

Drilling Started: 6/30/99 Drilling Completed: 6/30/99

Total Depth Drilled: 32 Feet Hole Diameter: 8 inches Type of Sample/ Coring Device: ODEX

Length and Diameter of Coring Device: 7-7/8" dia. ODEX and Air Hammer Sampling Interval: N/A feet

Land-Surface Elev. ____ feet ☐ Surveyed ☐ Estimated Datum ____

Drilling Fluid Used: Air Drilling Method: ODEX

Drilling Contractor: CT&E, B-80 Mobile Drill Driller: T. Lynch Helper: T. Lynch Jr.

Prepared By: Eric Rodriguez Hammer Weight: N/A Hammer Drop: N/A ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description*
0	25			Sand, fine to medium; Silt; and Gravel, fine to medium; red brown.
				No visual impact observed.
25	32			Till and weathered rock zone consisting of rounded Gravels, med; and
				weathered Siltstone; red brown.
				No visual impact observed.

* Lithologic descriptions are based on soil cuttings.

ARCADIS GERAGHTY & MILLER

Sample/Core Log

Boring/Well OW-75D Project/No. NJ000298.0021.00004 Page 1 of 1

Site Location Clark, New Jersey Drilling Started 7/9/99 Drilling Completed 7/9/99

Total Depth Drilled 48 Feet Hole Diameter 8 inches Type of Sample/ Coring Device ODEX/Air Hammer

Length and Diameter of Coring Device 7-7/8" dia. ODEX and Air Hammer Sampling Interval N/A feet

Land-Surface Elev. _____ feet ☐ Surveyed ☐ Estimated Datum _____

Drilling Fluid Used Air Drilling Method ODEX/Air

Drilling Contractor CT&E, B-80 Mobile Drill Driller T. Lynch Helper T. Lynch Jr.

Prepared By Eric Rodriguez Hammer Weight N/A Hammer Drop N/A ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description*
0	26			Sand, fine to medium; Silt; and Gravel, fine to medium; red brown.
				No visual impact observed.
26	35			Till and weathered rock zone consisting of rounded Gravels, med; and
				weathered Siltstone; red brown.
				No visual impact observed.
35	48			Siltstone bedrock, red brown.
				Some sheen observed in rock cuttings.

* Lithologic descriptions are based on soil cuttings.

ARCADIS GERAGHTY & MILLER

Sample/Core Log

Boring/Well OW-76 Project/No. NJ000298.0021.00004 Page 1 of 1

Site Location Clark, New Jersey Drilling Started 7/2/99 Drilling Completed 7/2/99

Total Depth Drilled 30 Feet Hole Diameter 8 inches Type of Sample/ Coring Device ODEX

Length and Diameter of Coring Device 7-7/8" dia. ODEX Sampling Interval N/A feet

Land-Surface Elev. _____ feet ☐ Surveyed ☐ Estimated Datum _____

Drilling Fluid Used Air Drilling Method ODEX

Drilling Contractor CT&E, B-80 Mobile Drill Driller T. Lynch Helper T. Lynch Jr.

Prepared By Eric Rodriguez Hammer Weight N/A Hammer Drop N/A ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description*
0	25			Sand, fine to medium; Silt; and Gravel, fine to medium; red brown.
				Some staining in upper portion of unit.
25	30			Till and weathered rock zone consisting of rounded Gravels, med; and
				weathered Siltstone; red brown.
				No visual impact observed.

* Lithologic descriptions are based on soil cuttings.

ARCADIS GERAGHTY & MILLER

Sample/Core Log

Boring/Well: OW-79D Project/No.: NJ000298.0021.00004 Page: 1 of 1

Site Location: Clark, New Jersey Drilling Started: 7/13/99 Drilling Completed: 7/13/99

Total Depth Drilled: 40 Feet Hole Diameter: 8 inches Type of Sample/ Coring Device: ODEX/Air Hammer

Length and Diameter of Coring Device: 7-7/8" dia. ODEX and Air Hammer Sampling Interval: N/A feet

Land-Surface Elev.: _____ feet ☐ Surveyed ☐ Estimated Datum: _____

Drilling Fluid Used: Air Drilling Method: ODEX/Air

Drilling Contractor: CT&E, B-80 Mobile Drill Driller: T. Lynch Helper: T. Lynch Jr.

Prepared By: Jennifer Guido/Eric Rodriguez Hammer Weight: N/A Hammer Drop: N/A ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description*
0	24			Sand, fine to medium; Silt; and Gravel, fine to medium; red brown.
				No visual impact observed.
24	27			Till and weathered rock zone consisting of rounded Gravels, med; and
				weathered Siltstone; red brown.
				No visual impact observed.
27	40			Siltstone bedrock, red brown.
				No visual impact observed.

* Lithologic descriptions are based on soil cuttings.

ARCADIS GERAGHTY & MILLER

Sample/Core Log

Boring/Well OW-77D Project/No. NJ000298.0021.00004 Page 1 of 1

Site Location Clark, New Jersey Drilling Started 7/13/99 Drilling Completed 7/13/99

Total Depth Drilled 50 Feet Hole Diameter 8 inches Type of Sample/ Coring Device ODEX/Air Hammer

Length and Diameter of Coring Device 7-7/8" dia. ODEX and Air Hammer Sampling Interval N/A feet

Land-Surface Elev. ____ feet ☐ Surveyed ☐ Estimated Datum ____

Drilling Fluid Used Air Drilling Method ODEX/Air

Drilling Contractor CT&E, B-80 Mobile Drill Driller T. Lynch Helper T. Lynch Jr.

Prepared By Jennifer Guido/Eric Rodriguez Hammer Weight N/A Hammer Drop N/A ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description*
0	27			Sand, fine to medium; Silt; and Gravel, fine to medium; red brown.
				No visual impact observed.
27	37			Till and weathered rock zone consisting of rounded Gravels, med; and
				weathered Siltstone; red brown.
				No visual impact observed.
37	50			Siltstone bedrock, red brown.
				Product observed in rock cuttings.

* Lithologic descriptions are based on soil cuttings.

ARCADIS GERAGHTY & MILLER

Sample/Core Log

Boring/Well OW-83D Project/No. NJ000298.0021.00004 Page 1 of 1

Site Location Clark, New Jersey Drilling Started 8/11/99 Drilling Completed 8/11/99

Total Depth Drilled 43 Feet Hole Diameter 8 inches Type of Sample/ Coring Device ODEX

Length and Diameter of Coring Device 7-7/8" dia. ODEX and Air Hammer Sampling Interval N/A feet

Land-Surface Elev. ____ feet ☐ Surveyed ☐ Estimated Datum ____

Drilling Fluid Used Air Drilling Method ODEX

Drilling Contractor CT&E, B-80 Mobile Drill Driller T. Lynch Helper Matt & Ken

Prepared By Jennifer Guido Hammer Weight N/A Hammer Drop N/A ins.

Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description*
0	20			Sand, fine to medium; Silt; and Gravel, fine to medium; red brown.
				No visual impact observed.
20	29			Till and weathered rock zone consisting of rounded Gravels, med; and
				weathered Siltstone; red brown.
				No visual impact observed.
29	43			Siltstone bedrock, red brown.
				No visual impact observed.

* Lithologic descriptions are based on soil cuttings.

ARCADIS GERAGHTY & MILLER

Sample/Core Log

Boring/Well OW-82D Project/No. NJ000298.0021.00004 Page 1 of 1

Site Location Clark, New Jersey Drilling Started 8/11/99 Drilling Completed 8/11/99

Total Depth Drilled 51 Feet Hole Diameter 8 inches Type of Sample/ Coring Device ODEX

Length and Diameter of Coring Device 7-7/8" dia. ODEX and Air Hammer Sampling Interval N/A feet

Land-Surface Elev. _____ feet ☐ Surveyed ☐ Estimated Datum _____

Drilling Fluid Used Air Drilling Method ODEX

Drilling Contractor CT&E, B-80 Mobile Drill Driller T. Lynch Helper Matt & Ken

Prepared By Jennifer Guido Hammer Weight N/A Hammer Drop N/A ins.

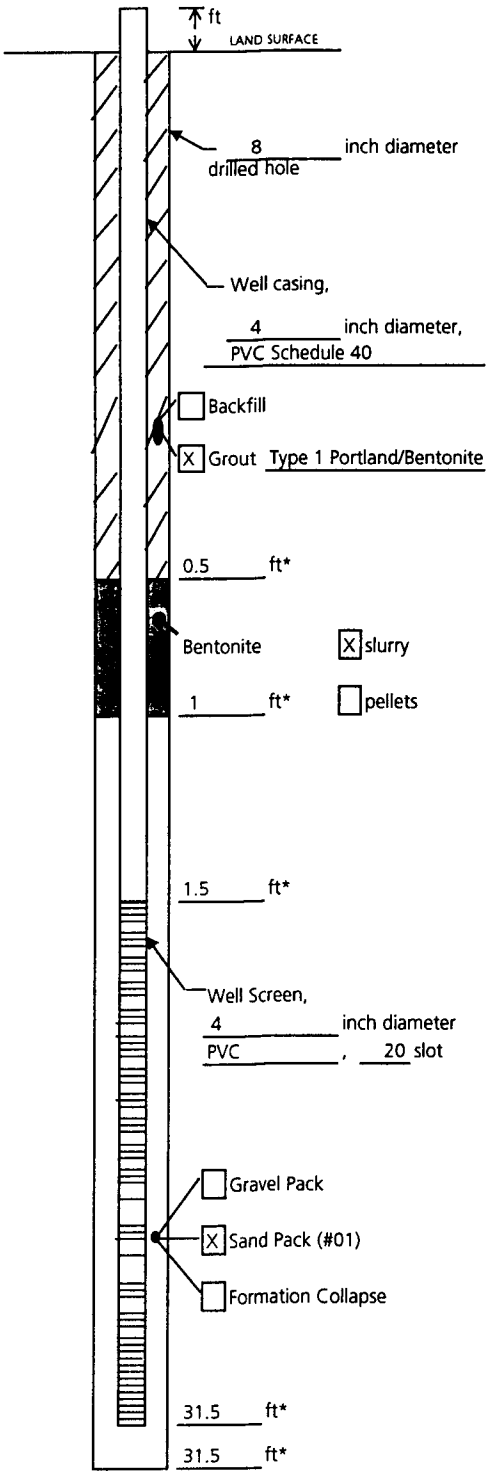
Sample/Core Depth (feet below land surface) From	To	Core Recovery (feet)	Time/Hydraulic Pressure or Blows per 6 Inches	Sample/Core Description*
0	25			Sand, fine to medium; Silt; and Gravel, fine to medium; red brown.
				No visual impact observed.
25	38			Till and weathered rock zone consisting of rounded Gravels, med; and
				weathered Siltstone; red brown.
				No visual impact observed.
38	51			Siltstone bedrock, red brown.
				No visual impact observed.

* Lithologic descriptions are based on soil cuttings.

WELL CONSTRUCTION LOGS

ARCADIS GERAGHTY & MILLER

Well Construction Log
(Unconsolidated)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

* Depth Below Land Surface

Project NJ000298.0021.00004 Well 0W-46

Town/City Clark

County Union State NJ

Permit No. 26-53736

Land-Surface Elevation and Datum:

_____ feet ☐ Surveyed ☐ Estimated

Installation Date(s) 5/17/99

Drilling Method ODEX

Drilling Contractor CT&E, B-80 Mobile Drill

Drilling Fluid Air

Development Technique(s) and Date(s)

5/18/99

Pump and surge.

Fluid Loss During Drilling N/A gallons

Water Removed During Development 55 gallons

Static Depth to Water 7.2 feet below M.P.

Pumping Depth to Water 30.81 feet below M.P.

Pumping Duration 3 hours

Yield ~1/8 gpm Date 5/18/99

Well Purpose Test Recovery Well

Remarks

Prepared by Eric Rodriguez

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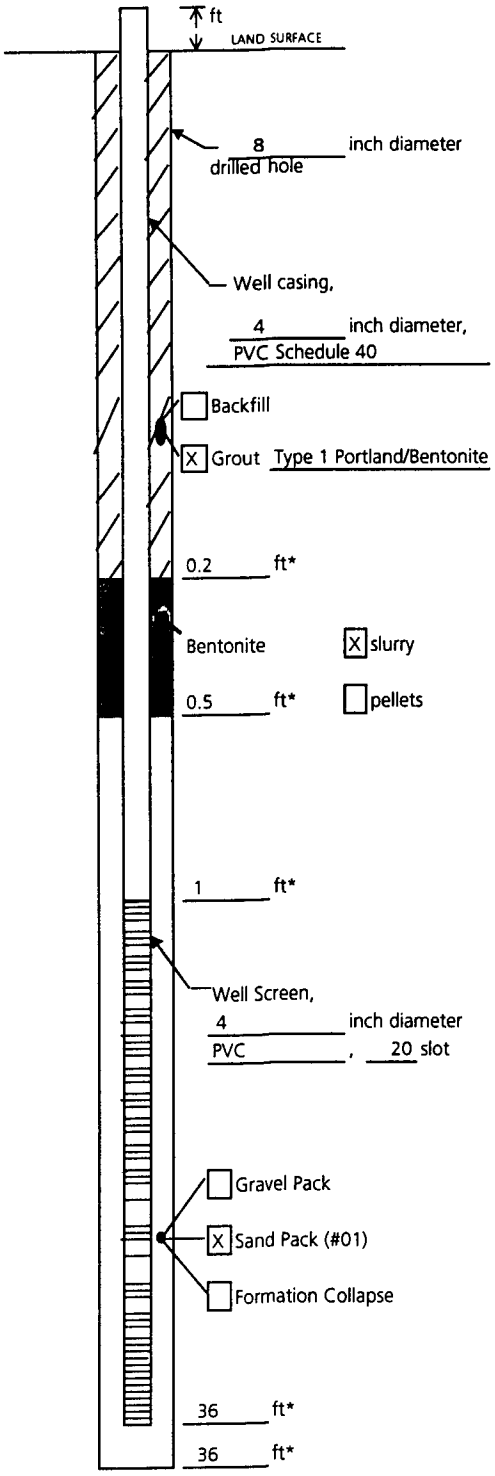
ARCADIS GERAGHTY & MILLER

Well Construction Log
(Unconsolidated)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

* Depth Below Land Surface

Project NJ000298.0021.00004 Well OW-47

Town/City Clark

County Union State NJ

Permit No. 26-53738

Land-Surface Elevation and Datum:

_____ feet ☐ Surveyed ☐ Estimated

Installation Date(s) 5/14/99

Drilling Method ODEX

Drilling Contractor CT&E, B-80 Mobile Drill

Drilling Fluid Air

Development Technique(s) and Date(s)

5/18/99

Pump and surge.

Fluid Loss During Drilling N/A gallons

Water Removed During Development 100 gallons

Static Depth to Water ~30 feet below M.P.

Pumping Depth to Water 16.5 feet below M.P.

Pumping Duration 1.5 hours

Yield ~1 gpm Date 5/18/99

Well Purpose Test Recovery Well

Remarks

Prepared by Eric Rodriguez

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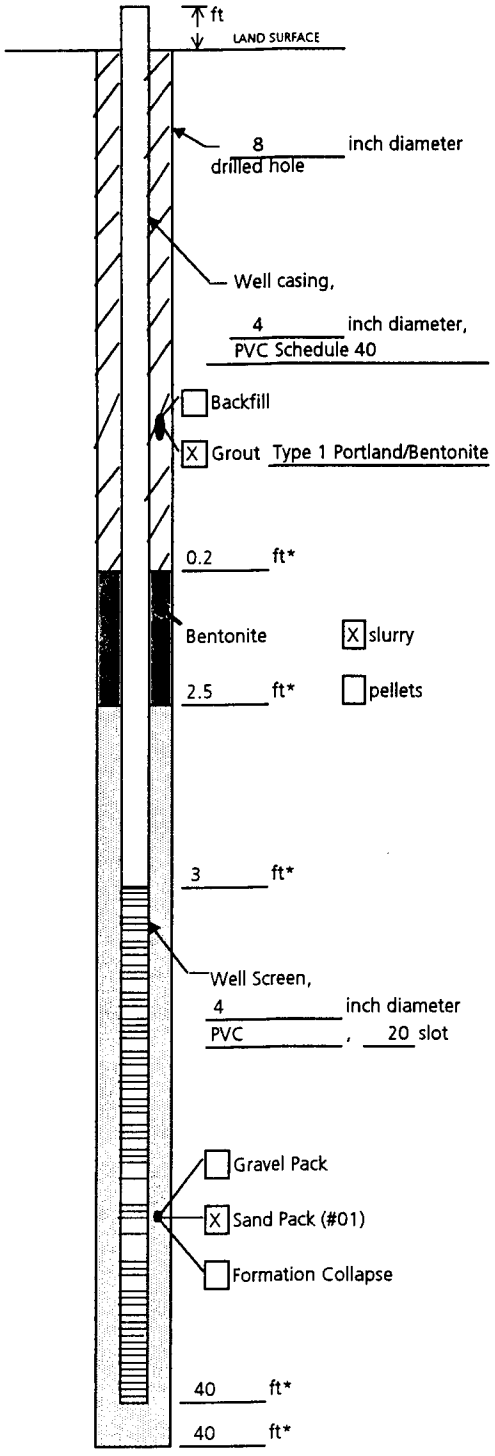
ARCADIS GERAGHTY & MILLER

Well Construction Log
(Unconsolidated)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

* Depth Below Land Surface

Project NJ000298.0021.00004 Well OW-47R

Town/City Clark

County Union State NJ

Permit No. 26-53738

Land-Surface Elevation and Datum:

_____ feet ☐ Surveyed ☐ Estimated

Installation Date(s) 8/30/99

Drilling Method ODEX

Drilling Contractor CT&E, B-80 Mobile Drill

Drilling Fluid Air

Development Technique(s) and Date(s)

8/31/99

Pump and surge.

Fluid Loss During Drilling N/A gallons

Water Removed During Development 75 gallons

Static Depth to Water 12.6 feet below M.P.

Pumping Depth to Water 21.7 feet below M.P.

Pumping Duration 1.5 hours

Yield ~0.8 gpm Date 8/31/99

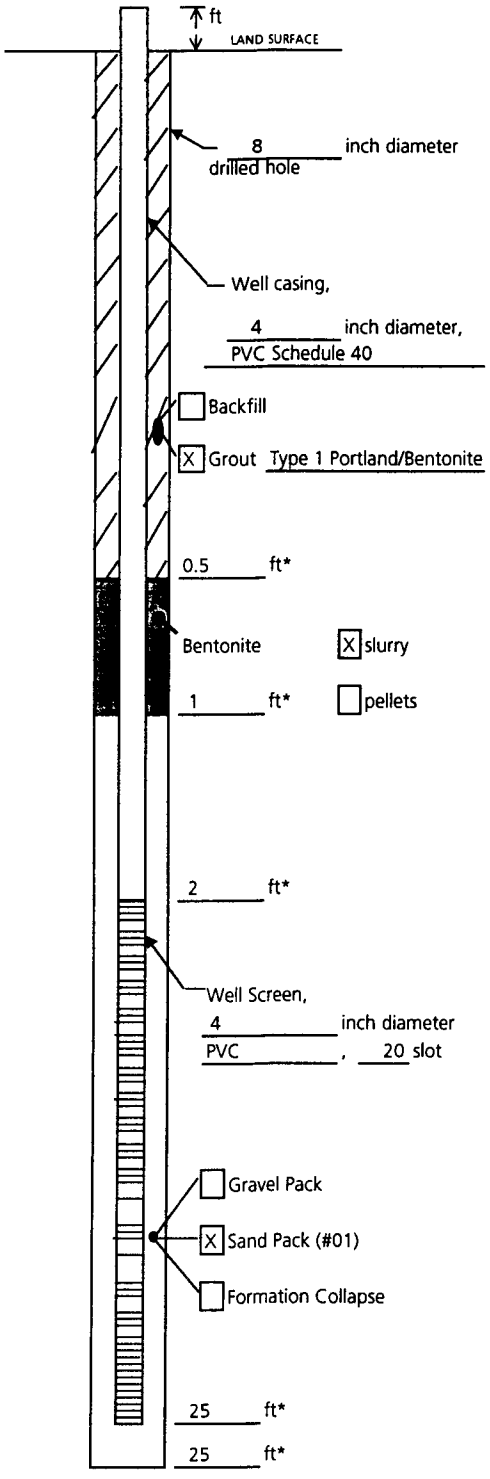
Well Purpose Test Recovery Well

Remarks OW-47R is a replacement well for OW-47 which was damaged during construction and grading activities. Please note that OW-47R was advanced an additional 4 feet to compensate for the increase in grade elevation (4 feet) during grading activities.

Prepared by Eric Rodriguez

ARCADIS GERAGHTY & MILLER

Well Construction Log
(Unconsolidated)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

* Depth Below Land Surface

Project NJ000298.0021.00004 Well OW-48

Town/City Clark

County Union State NJ

Permit No. 26-53737

Land-Surface Elevation and Datum:

_____ feet ☐ Surveyed ☐ Estimated

Installation Date(s) 5/13/99

Drilling Method ODEX

Drilling Contractor CT&E, B-80 Mobile Drill

Drilling Fluid Air

Development Technique(s) and Date(s)

5/14/99

Pump and Surge.

Fluid Loss During Drilling N/A gallons

Water Removed During Development 90 gallons

Static Depth to Water ~6.65 feet below M.P.

Pumping Depth to Water 7 feet below M.P.

Pumping Duration 2 hours

Yield ~1/2 gpm Date 5/14/99

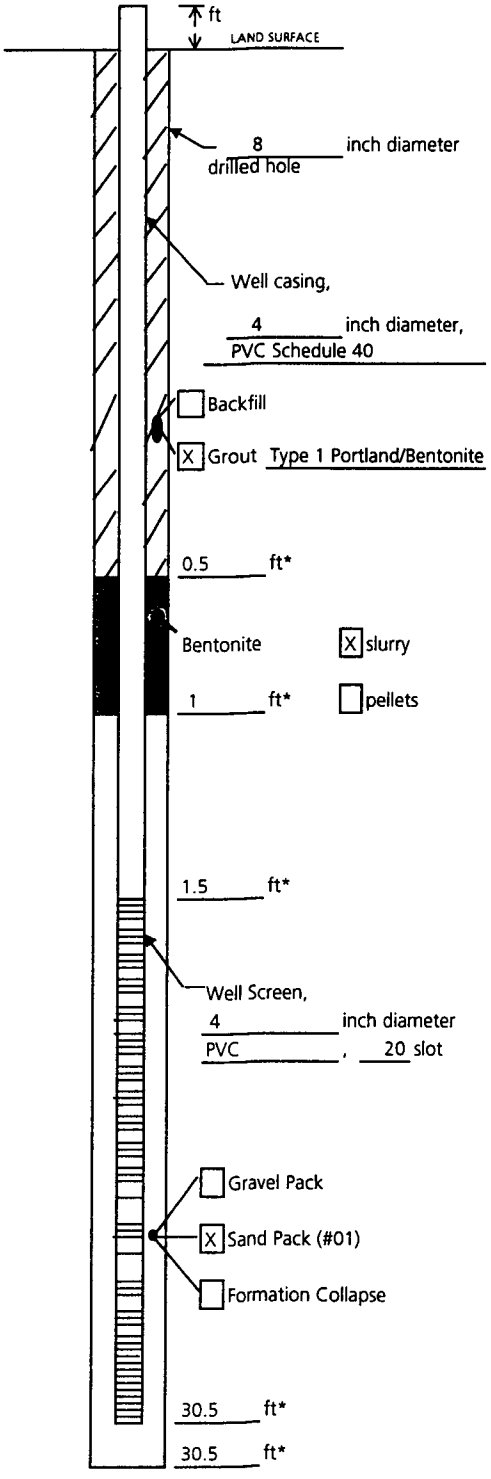
Well Purpose Test Recovery Well

Remarks Well was abandoned on 7/9/99.

Prepared by Eric Rodriguez

ARCADIS GERAGHTY & MILLER

Well Construction Log
(Unconsolidated)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

* Depth Below Land Surface

Project NJ000298.0021.00004 Well OW-49

Town/City Clark

County Union State NJ

Permit No. 26-53739

Land-Surface Elevation and Datum:

_____ feet ☐ Surveyed ☐ Estimated

Installation Date(s) 5/13/99

Drilling Method ODEX

Drilling Contractor CT&E, B-80 Mobile Drill

Drilling Fluid Air

Development Technique(s) and Date(s)

5/18/99

Pump and surge.

Fluid Loss During Drilling N/A gallons

Water Removed During Development 55 gallons

Static Depth to Water 8.5 feet below M.P.

Pumping Depth to Water 11.5 feet below M.P.

Pumping Duration 3 hours

Yield ~1/8 gpm Date 5/18/99

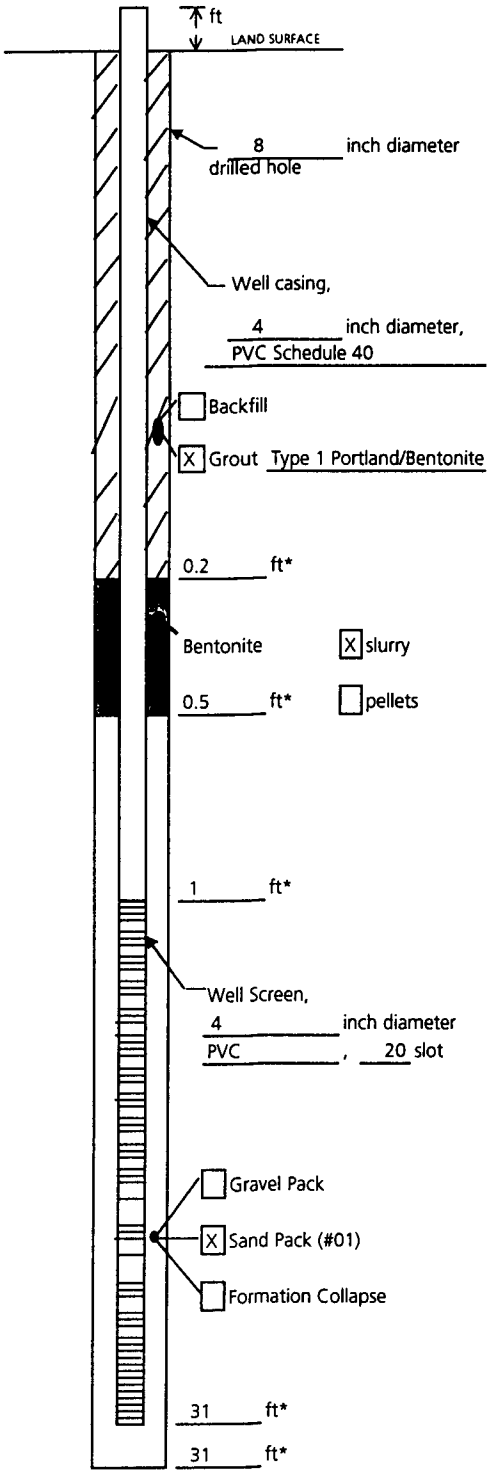
Well Purpose Test Recovery Well

Remarks

Prepared by Eric Rodriguez

ARCADIS GERAGHTY & MILLER

Well Construction Log
(Unconsolidated)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

* Depth Below Land Surface

Project NJ000298.0021.00004 Well OW-50

Town/City Clark

County Union State NJ

Permit No. 26-53740

Land-Surface Elevation and Datum:

_____ feet ☐ Surveyed ☐ Estimated

Installation Date(s) 5/14/99

Drilling Method ODEX

Drilling Contractor CT&E, B-80 Mobile Drill

Drilling Fluid Air

Development Technique(s) and Date(s)

5/17/99, Pump and surge.

Fluid Loss During Drilling N/A gallons

Water Removed During Development 50 gallons

Static Depth to Water 8.14 feet below M.P.

Pumping Depth to Water -- feet below M.P.

Pumping Duration 2 hours

Yield <0.5 gpm Date 5/17/99

Well Purpose Test Recovery Well

Remarks Well was abandoned on 7/9/99.

Prepared by Eric Rodriguez

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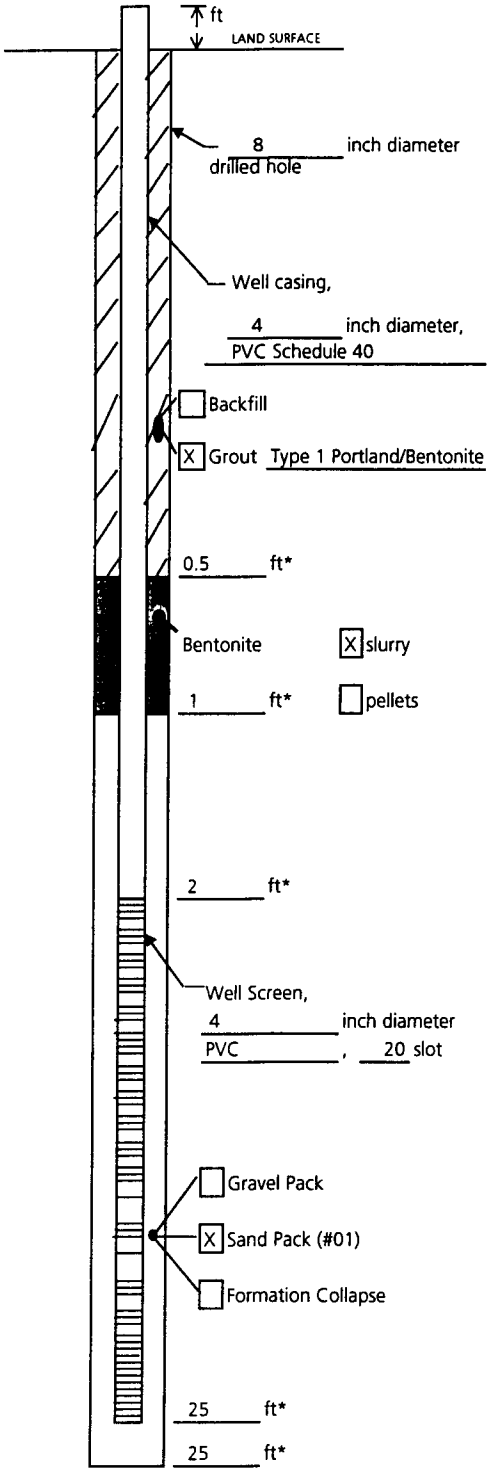
ARCADIS GERAGHTY & MILLER

Well Construction Log
(Unconsolidated)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

* Depth Below Land Surface

Project NJ000298.0021.00004 Well OW-51

Town/City Clark

County Union State NJ

Permit No. 26-53741

Land-Surface Elevation and Datum:

_____ feet ☐ Surveyed ☐ Estimated

Installation Date(s) 5/13/99

Drilling Method ODEX

Drilling Contractor CT&E, B-80 Mobile Drill

Drilling Fluid Air

Development Technique(s) and Date(s)

5/17/99

Pump and surge.

Fluid Loss During Drilling N/A gallons

Water Removed During Development 55 gallons

Static Depth to Water 7.3 feet below M.P.

Pumping Depth to Water 18 feet below M.P.

Pumping Duration 3.5 hours

Yield ~0.4 gpm Date 5/17/99

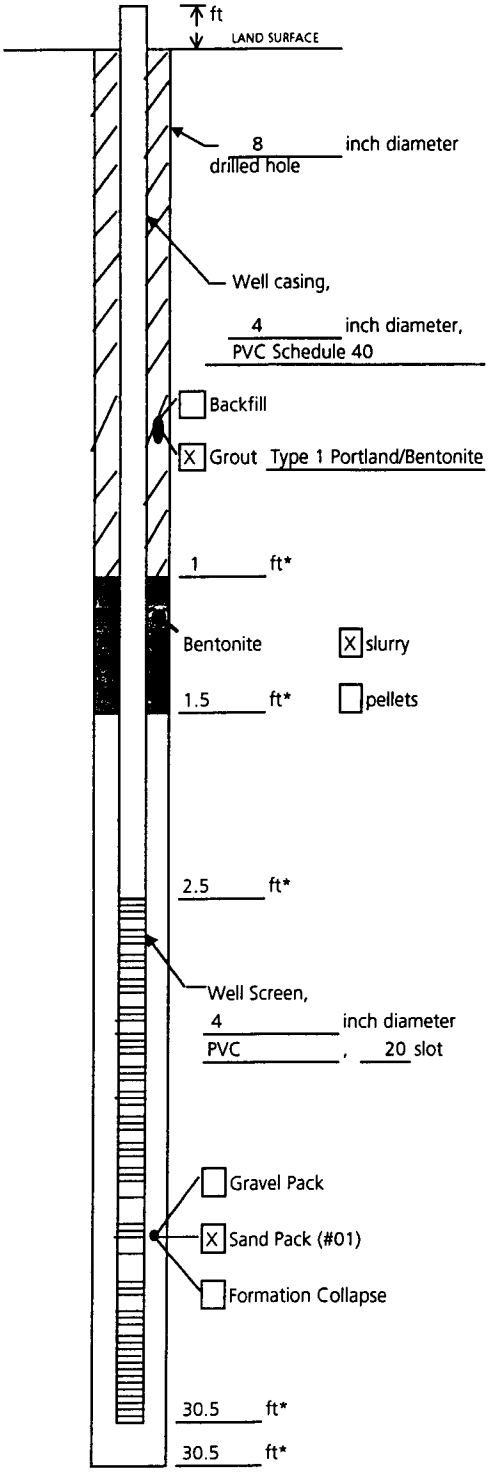
Well Purpose Test Recovery Well

Remarks Well was abandoned on 7/9/99.

Prepared by Eric Rodriguez

ARCADIS GERAGHTY & MILLER

Well Construction Log
(Unconsolidated)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

* Depth Below Land Surface

Project NJ000298.0021.00004 Well OW-58

Town/City Clark

County Union State NJ

Permit No. 26-54138

Land-Surface Elevation and Datum:

_____ feet ☐ Surveyed ☐ Estimated

Installation Date(s) 6/21/99

Drilling Method ODEX

Drilling Contractor CT&E, B-80 Mobile Drill

Drilling Fluid Air

Development Technique(s) and Date(s)

6/22/99, Pump and surge.

Fluid Loss During Drilling N/A gallons

Water Removed During Development 60 gallons

Static Depth to Water 16 feet below M.P.

Pumping Depth to Water -- feet below M.P.

Pumping Duration 3 hours

Yield ~0.5 gpm Date 6/22/99

Well Purpose Test Recovery Well

Remarks

Prepared by Eric Rodriguez

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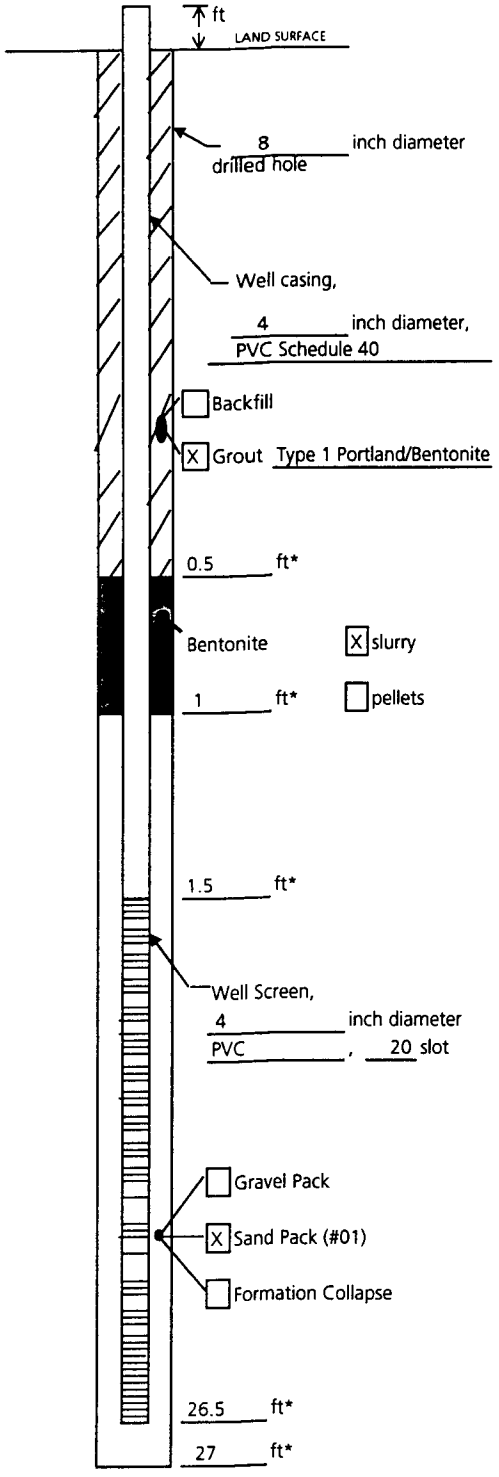
ARCADIS GERAGHTY & MILLER

Well Construction Log
(Unconsolidated)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

* Depth Below Land Surface

Project NJ000298.0021.00004 Well OW-64

Town/City Clark

County Union State NJ

Permit No. 26-54141

Land-Surface Elevation and Datum:

_____ feet ☐ Surveyed ☐ Estimated

Installation Date(s) 6/21/99

Drilling Method ODEX

Drilling Contractor CT&E, B-80 Mobile Drill

Drilling Fluid Air

Development Technique(s) and Date(s)

6/22/99

Pump and surge.

Fluid Loss During Drilling N/A gallons

Water Removed During Development 65 gallons

Static Depth to Water 13.82 feet below M.P.

Pumping Depth to Water 26.5 feet below M.P.

Pumping Duration 3 hours

Yield ~0.5 gpm Date 6/22/99

Well Purpose Test Recovery Well

Remarks

Prepared by Eric Rodriguez

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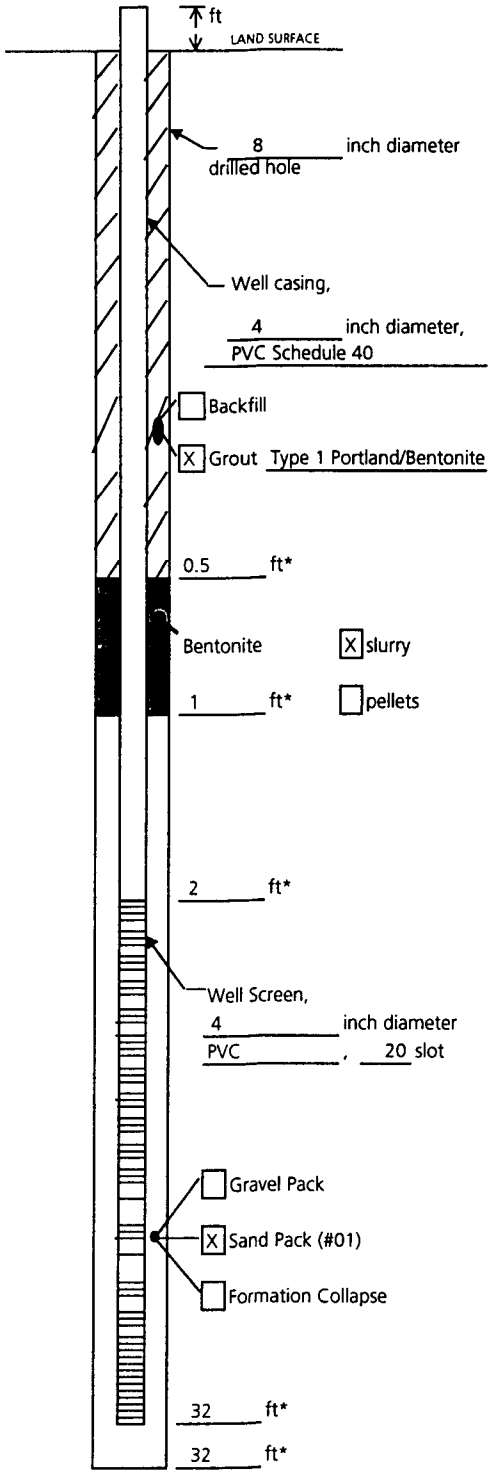
ARCADIS GERAGHTY & MILLER

Well Construction Log
(Unconsolidated)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

* Depth Below Land Surface

Project NJ000298.0021.00004 Well OW-65

Town/City Clark

County Union State NJ

Permit No. 26-54142

Land-Surface Elevation and Datum:

_____ feet ☐ Surveyed ☐ Estimated

Installation Date(s) 6/25/99

Drilling Method ODEX

Drilling Contractor CT&E, B-80 Mobile Drill

Drilling Fluid Air

Development Technique(s) and Date(s)

6/28/99, Pump and surge.

Fluid Loss During Drilling N/A gallons

Water Removed During Development 50 gallons

Static Depth to Water 12.3 feet below M.P.

Pumping Depth to Water 22.15 feet below M.P.

Pumping Duration 2 hours

Yield ~0.75 gpm Date 6/28/99

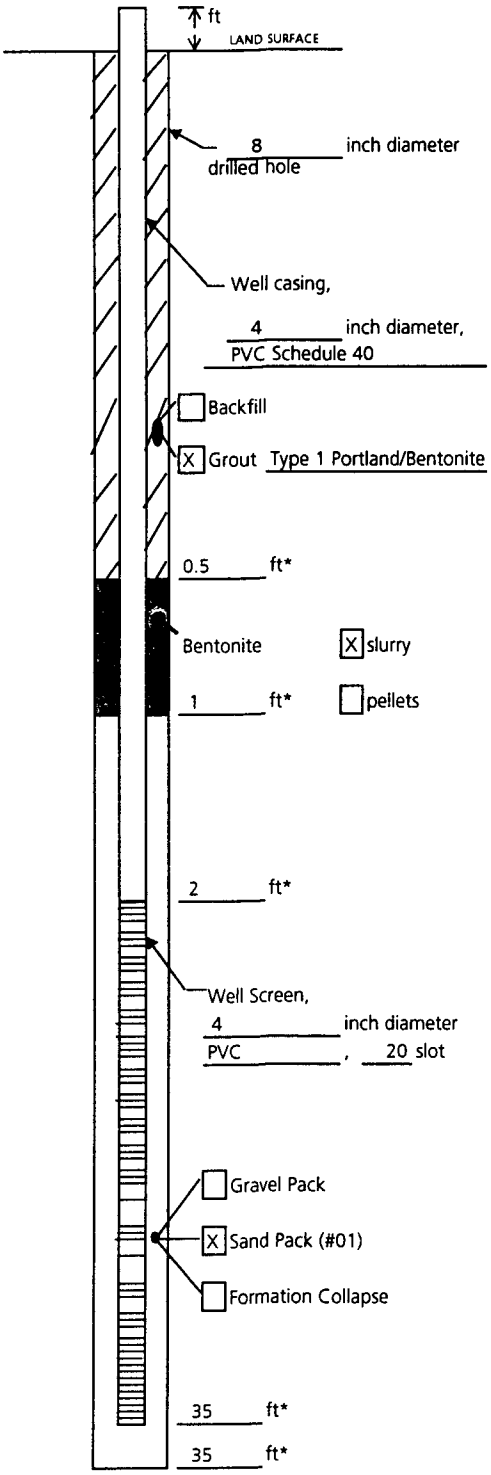
Well Purpose Test Recovery Well

Remarks

Prepared by Eric Rodriguez

ARCADIS GERAGHTY & MILLER

Well Construction Log
(Unconsolidated)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

* Depth Below Land Surface

Project NJ000298.0021.00004 Well OW-66

Town/City Clark

County Union State NJ

Permit No. 26-54143

Land-Surface Elevation and Datum:

_____ feet ☐ Surveyed ☐ Estimated

Installation Date(s) 6/28/99

Drilling Method ODEX

Drilling Contractor CT&E, B-80 Mobile Drill

Drilling Fluid Air

Development Technique(s) and Date(s)

7/1/99, Pump and surge.

Fluid Loss During Drilling N/A gallons

Water Removed During Development 50 gallons

Static Depth to Water 25 feet below M.P.

Pumping Depth to Water -- feet below M.P.

Pumping Duration 1.5 hours

Yield ~0.75 gpm Date 7/1/99

Well Purpose Test Recovery Well

Remarks

Prepared by Jennifer Guido/Eric Rodriguez

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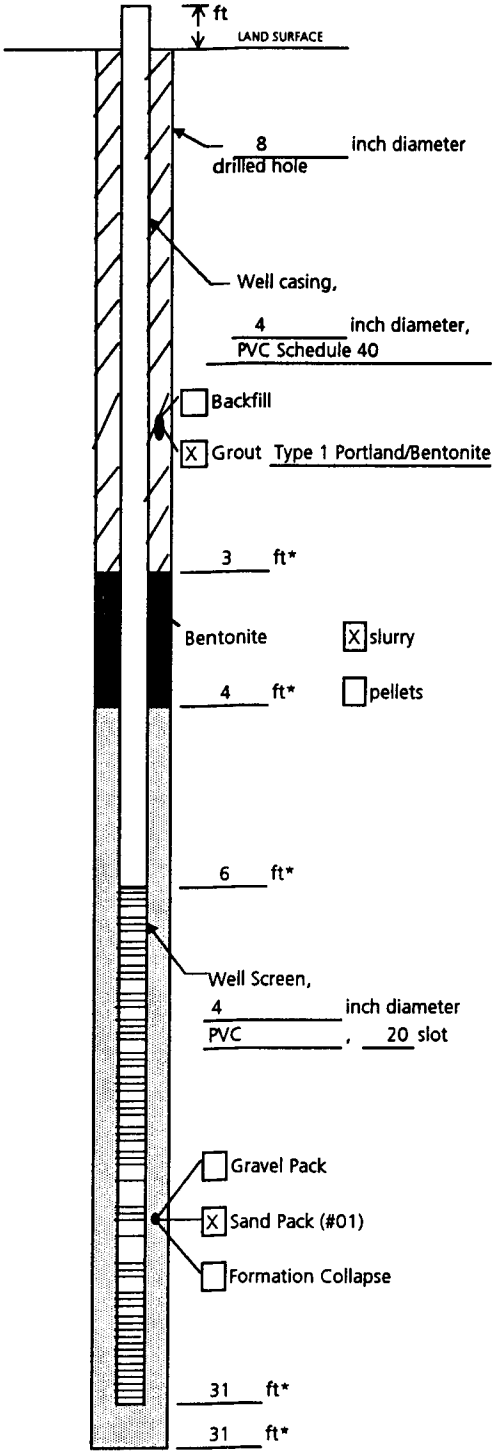
ARCADIS GERAGHTY & MILLER

Well Construction Log
(Unconsolidated)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

* Depth Below Land Surface

Project NJ000298.0021.00004 Well OW-73

Town/City Clark

County Union State NJ

Permit No. 26-54545

Land-Surface Elevation and Datum:

_____ feet ☐ Surveyed ☐ Estimated

Installation Date(s) 7/1/99

Drilling Method ODEX

Drilling Contractor CT&E, B-80 Mobile Drill

Drilling Fluid Air

Development Technique(s) and Date(s)

7/1/99, Pump and surge.

Fluid Loss During Drilling N/A gallons

Water Removed During Development 15 gallons

Static Depth to Water 40.6 feet below M.P.

Pumping Depth to Water -- feet below M.P.

Pumping Duration 1 hours

Yield <0.125 gpm Date 7/1/99

Well Purpose Test Recovery Well

Remarks

Prepared by Eric Rodriguez

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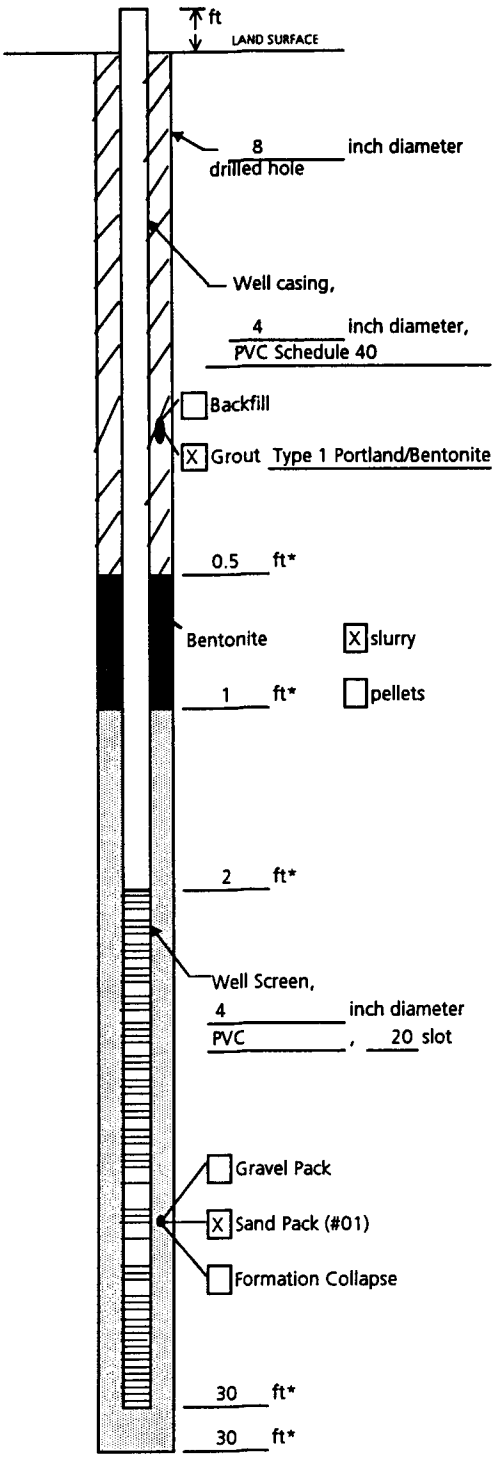
ARCADIS GERAGHTY & MILLER

Well Construction Log
(Unconsolidated)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

* Depth Below Land Surface

Project NJ000298.0021.00004 Well OW-76

Town/City Clark

County Union State NJ

Permit No. 26-54542

Land-Surface Elevation and Datum:

_____ feet ☐ Surveyed ☐ Estimated

Installation Date(s) 7/2/99

Drilling Method ODEX

Drilling Contractor CT&E, B-80 Mobile Drill

Drilling Fluid Air

Development Technique(s) and Date(s)

7/6/99, Pump and surge.

Fluid Loss During Drilling N/A gallons

Water Removed During Development 30 gallons

Static Depth to Water 13.35 feet below M.P.

Pumping Depth to Water 24 feet below M.P.

Pumping Duration 3.5 hours

Yield ~0.125 gpm Date 7/6/99

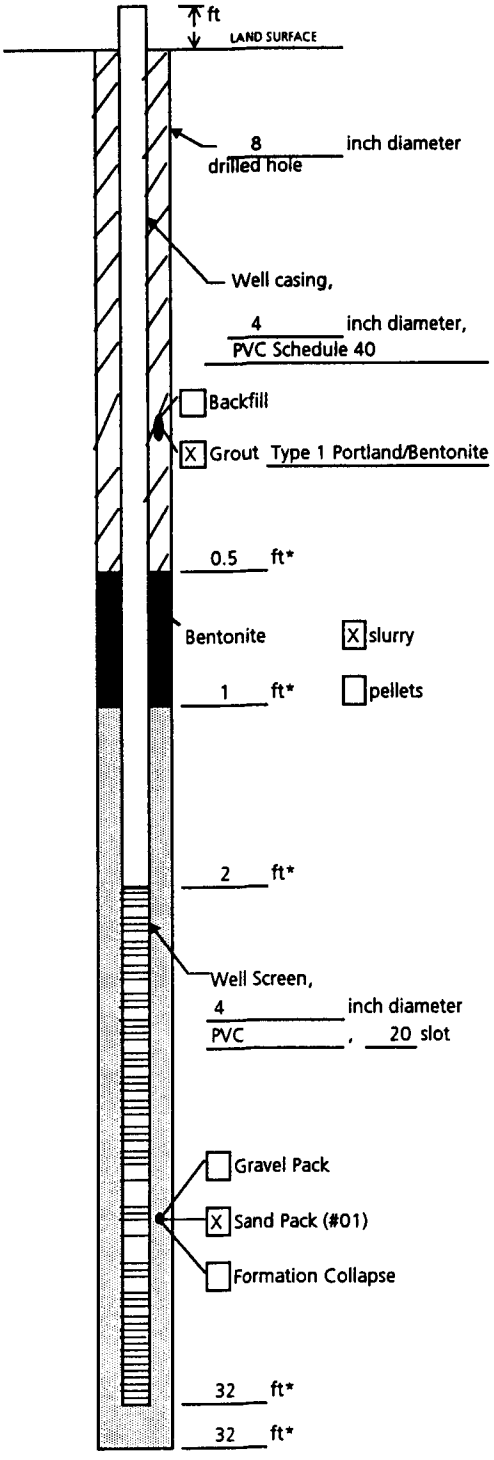
Well Purpose Test Recovery Well

Remarks

Prepared by Eric Rodriguez

ARCADIS GERAGHTY & MILLER

Well Construction Log
(Unconsolidated)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

* Depth Below Land Surface

Project NJ000298.0021.00004 Well OW-81

Town/City Clark

County Union State NJ

Permit No. 26-54597

Land-Surface Elevation and Datum:

_____ feet ☐ Surveyed ☐ Estimated

Installation Date(s) 7/14/99

Drilling Method ODEX

Drilling Contractor CT&E, B-80 Mobile Drill

Drilling Fluid Air

Development Technique(s) and Date(s)

7/16/99, Pump and surge.

Fluid Loss During Drilling N/A gallons

Water Removed During Development 40 gallons

Static Depth to Water 10.77 feet below M.P.

Pumping Depth to Water -- feet below M.P.

Pumping Duration 2 hours

Yield ~0.3 gpm Date 7/16/99

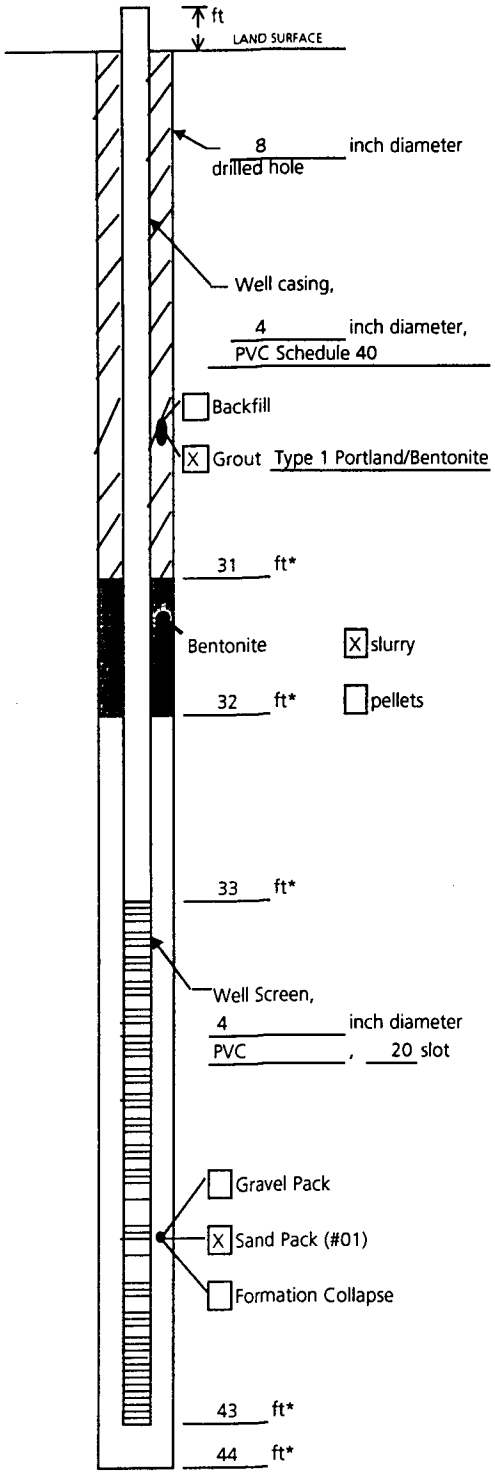
Well Purpose Test Recovery Well

Remarks

Prepared by Eric Rodriguez

ARCADIS GERAGHTY & MILLER

Well Construction Log
(Bedrock)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

* Depth Below Land Surface

Project NJ000298.0021.00004 Well OW-52D

Town/City Clark

County Union State NJ

Permit No. 26-53731

Land-Surface Elevation and Datum:

_____ feet ☐ Surveyed ☐ Estimated

Installation Date(s) 5/12/99

Drilling Method ODEX/Air Hammer

Drilling Contractor CT&E, B-80 Mobile Drill

Drilling Fluid Air

Development Technique(s) and Date(s)

5/17/99

Pump and surge.

Fluid Loss During Drilling N/A gallons

Water Removed During Development 60 gallons

Static Depth to Water 13.6 feet below M.P.

Pumping Depth to Water -- feet below M.P.

Pumping Duration 3.5 hours

Yield ~1/8 gpm Date 5/13/99

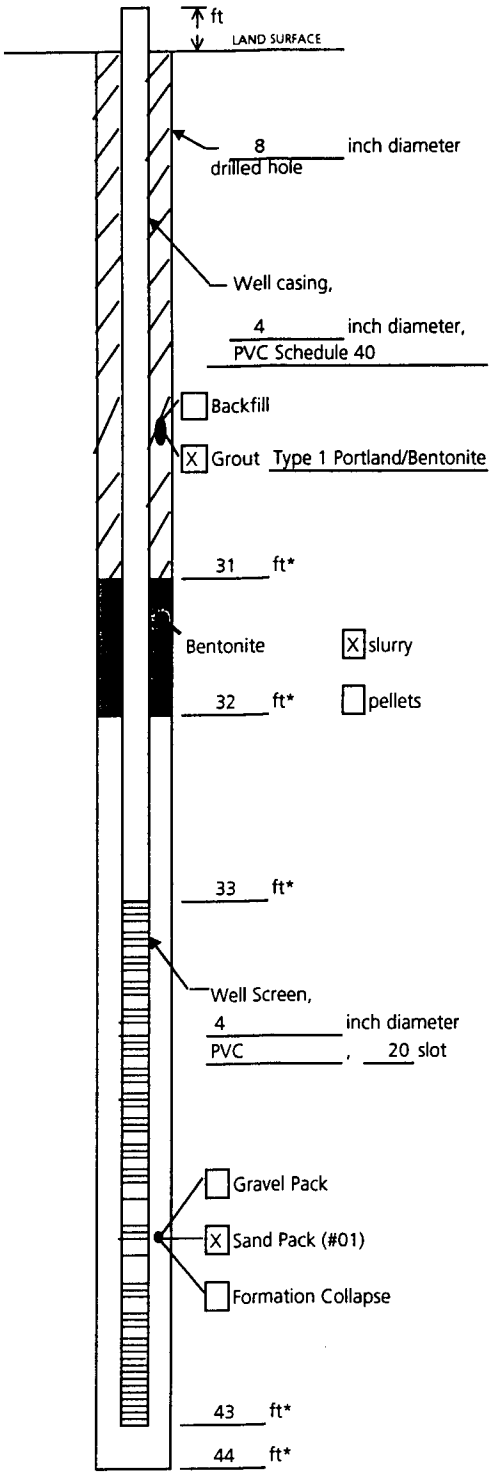
Well Purpose Test Recovery Well

Remarks

Prepared by Eric Rodriguez

ARCADIS GERAGHTY & MILLER

Well Construction Log
(Bedrock)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

* Depth Below Land Surface

Project NJ000298.0021.00004 Well OW-53D

Town/City Clark

County Union State NJ

Permit No. 26-53730

Land-Surface Elevation and Datum:

_____ feet ☐ Surveyed ☐ Estimated

Installation Date(s) 5/12/99-5/13/99

Drilling Method ODEX/Air Hammer

Drilling Contractor CT&E, B-80 Mobile Drill

Drilling Fluid Air

Development Technique(s) and Date(s)

5/17/99

Pump and surge.

Fluid Loss During Drilling N/A gallons

Water Removed During Development 90 gallons

Static Depth to Water 13.8 feet below M.P.

Pumping Depth to Water 17 feet below M.P.

Pumping Duration 1.5 hours

Yield ~1 gpm Date 5/17/99

Well Purpose Test Recovery Well

Remarks

Prepared by Eric Rodriguez

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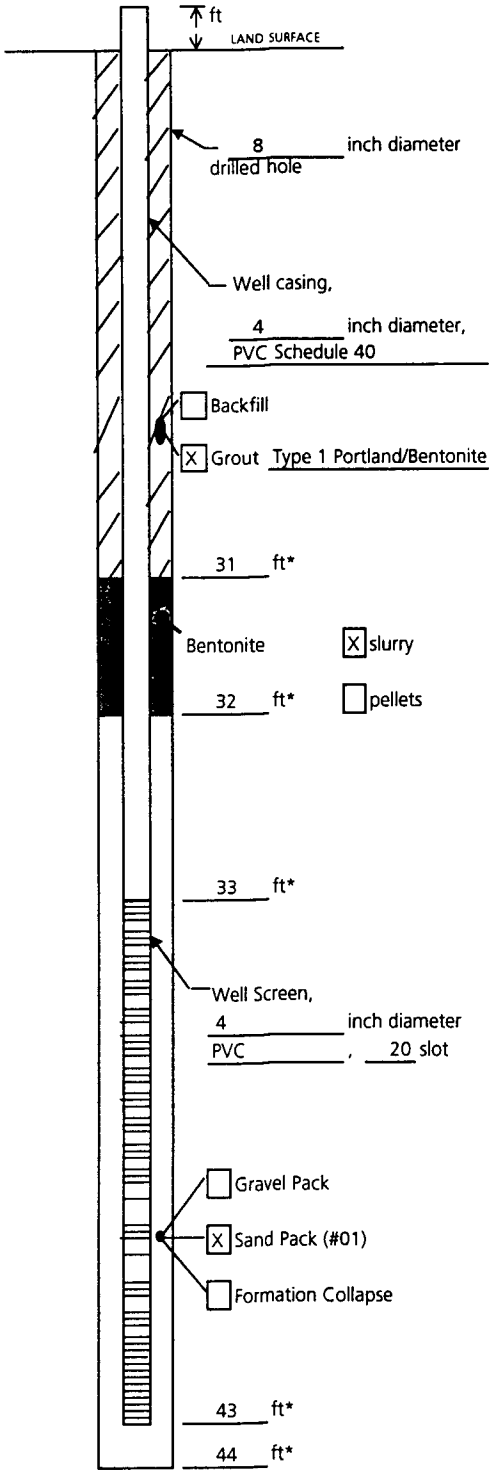
ARCADIS GERAGHTY & MILLER

Well Construction Log
(Bedrock)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

* Depth Below Land Surface

Project NJ000298.0021.00004 Well OW-54D

Town/City Clark

County Union State NJ

Permit No. 26-53732

Land-Surface Elevation and Datum:

_____ feet ☐ Surveyed ☐ Estimated

Installation Date(s) 5/12/99

Drilling Method ODEX/Air Hammer

Drilling Contractor CT&E, B-80 Mobile Drill

Drilling Fluid Air

Development Technique(s) and Date(s)

5/17/99

Pump and surge.

Fluid Loss During Drilling N/A gallons

Water Removed During Development 60 gallons

Static Depth to Water 13.1 feet below M.P.

Pumping Depth to Water 28.96 feet below M.P.

Pumping Duration 6 hours

Yield <1/8 gpm Date 5/17/99

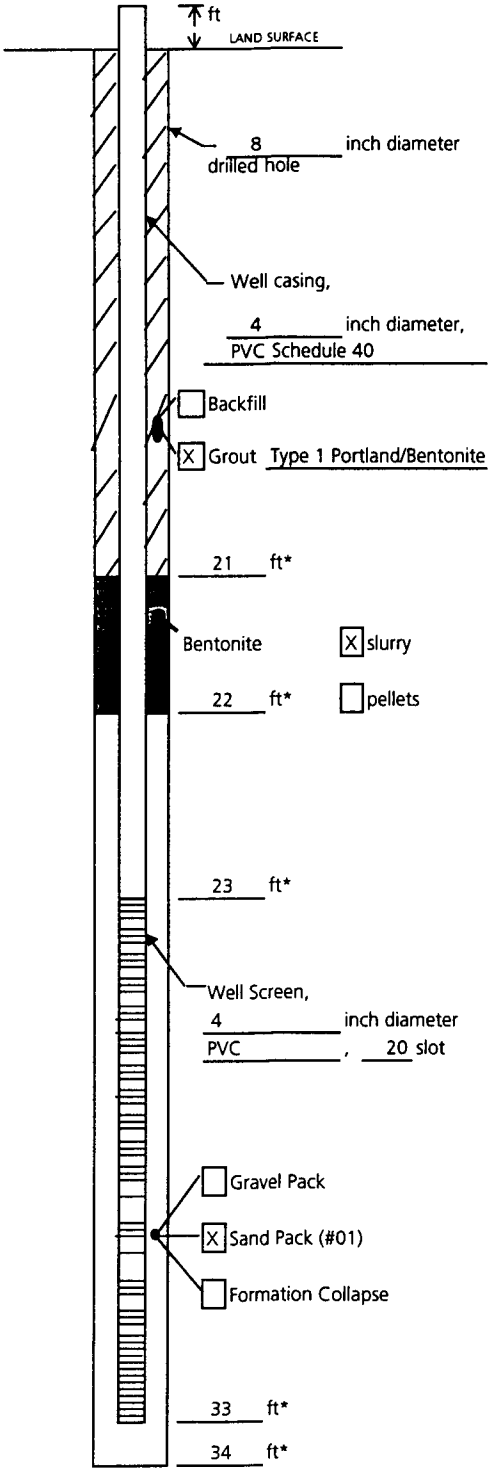
Well Purpose Test Recovery Well

Remarks Well was abandoned on 7/9/99.

Prepared by Eric Rodriguez

ARCADIS GERAGHTY & MILLER

Well Construction Log
(Bedrock)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

* Depth Below Land Surface

Project NJ000298.0021.00004 Well OW-55D

Town/City Clark

County Union State NJ

Permit No. 26-53733

Land-Surface Elevation and Datum:

_____ feet ☐ Surveyed ☐ Estimated

Installation Date(s) 5/11/99

Drilling Method ODEX/Air Hammer

Drilling Contractor CT&E, B-80 Mobile Drill

Drilling Fluid Air

Development Technique(s) and Date(s)

5/12/99

Pump and surge.

Fluid Loss During Drilling N/A gallons

Water Removed During Development 45 gallons

Static Depth to Water 20.1 feet below M.P.

Pumping Depth to Water -- feet below M.P.

Pumping Duration 3 hours

Yield ~0.25 gpm Date 5/12/99

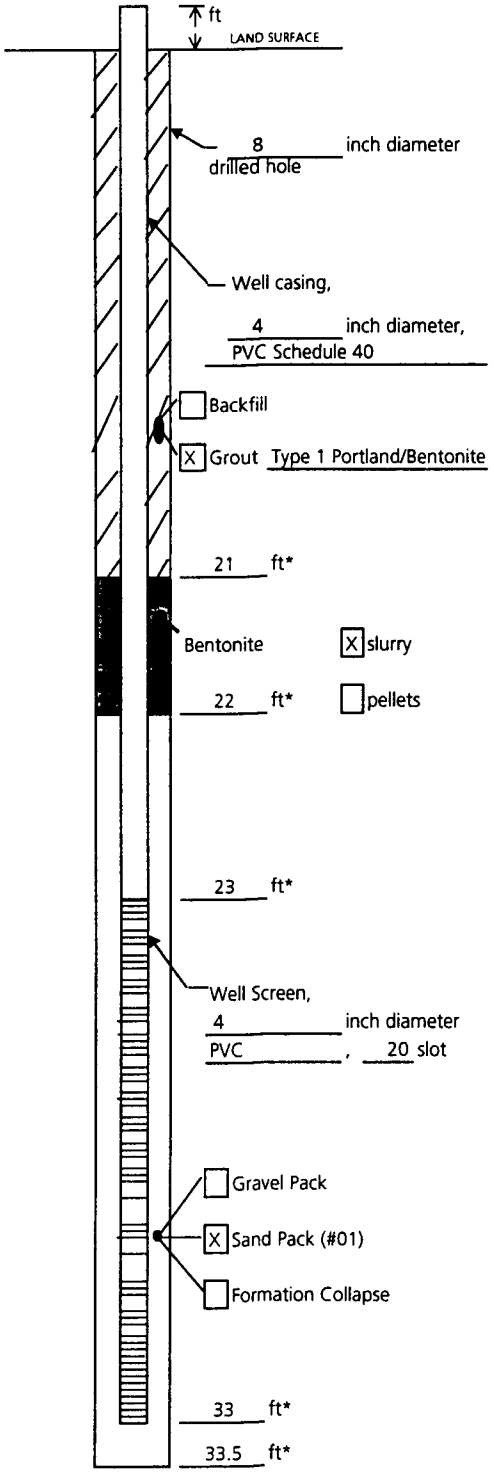
Well Purpose Test Recovery Well

Remarks Well was abandoned on 7/9/99.

Prepared by Eric Rodriguez

ARCADIS GERAGHTY & MILLER

Well Construction Log
(Bedrock)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

* Depth Below Land Surface

Project NJ000298.0021.00004 Well OW-56D

Town/City Clark

County Union State NJ

Permit No. 26-53734

Land-Surface Elevation and Datum:

_____ feet ☐ Surveyed ☐ Estimated

Installation Date(s) 5/10/99

Drilling Method ODEX/Air Hammer

Drilling Contractor CT&E, B-80 Mobile Drill

Drilling Fluid Air

Development Technique(s) and Date(s)

5/11/99

Pump and surge.

Fluid Loss During Drilling N/A gallons

Water Removed During Development 45 gallons

Static Depth to Water 19.6 feet below M.P.

Pumping Depth to Water 27.2 feet below M.P.

Pumping Duration 3 hours

Yield ~0.3 gpm Date 5/11/99

Well Purpose Test Recovery Well

Remarks Well was abandoned on 7/9/99.

Prepared by Eric Rodriguez

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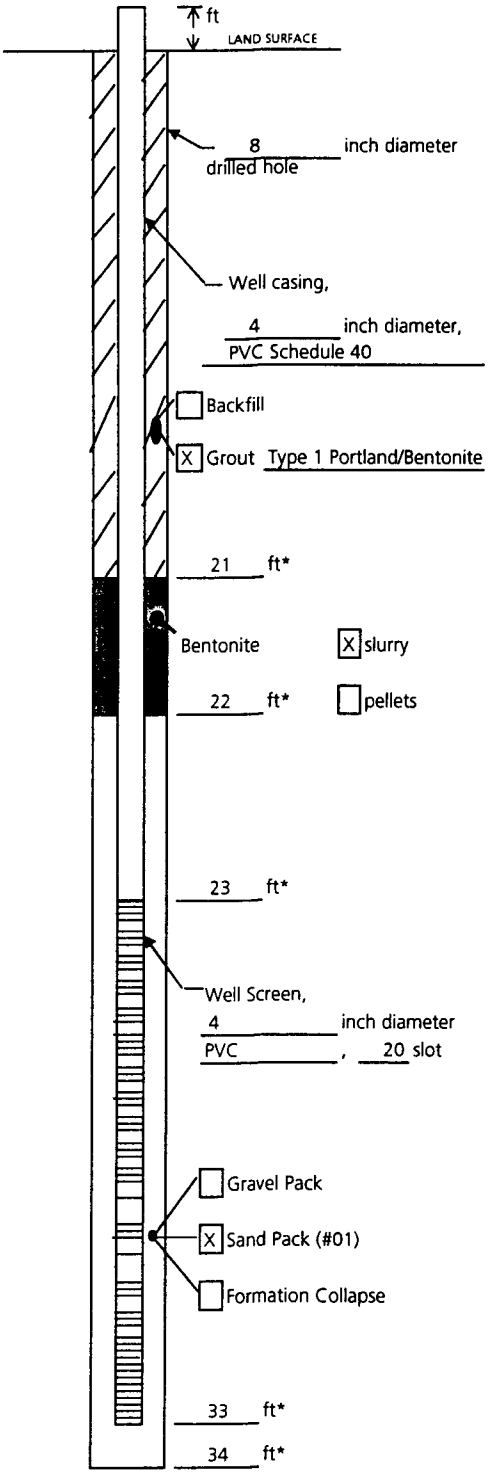
ARCADIS GERAGHTY & MILLER

Well Construction Log
(Bedrock)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

* Depth Below Land Surface

Project NJ000298.0021.00004 Well OW-57D

Town/City Clark

County Union State NJ

Permit No. 26-53735

Land-Surface Elevation and Datum:

_____ feet ☐ Surveyed ☐ Estimated

Installation Date(s) 5/11/99

Drilling Method ODEX/Air Hammer

Drilling Contractor CT&E, B-80 Mobile Drill

Drilling Fluid Air

Development Technique(s) and Date(s)

5/14/99

Pump and surge.

Fluid Loss During Drilling N/A gallons

Water Removed During Development 40 gallons

Static Depth to Water 17.8 feet below M.P.

Pumping Depth to Water 26 feet below M.P.

Pumping Duration 4 hours

Yield <1.8 gpm Date 5/14/99

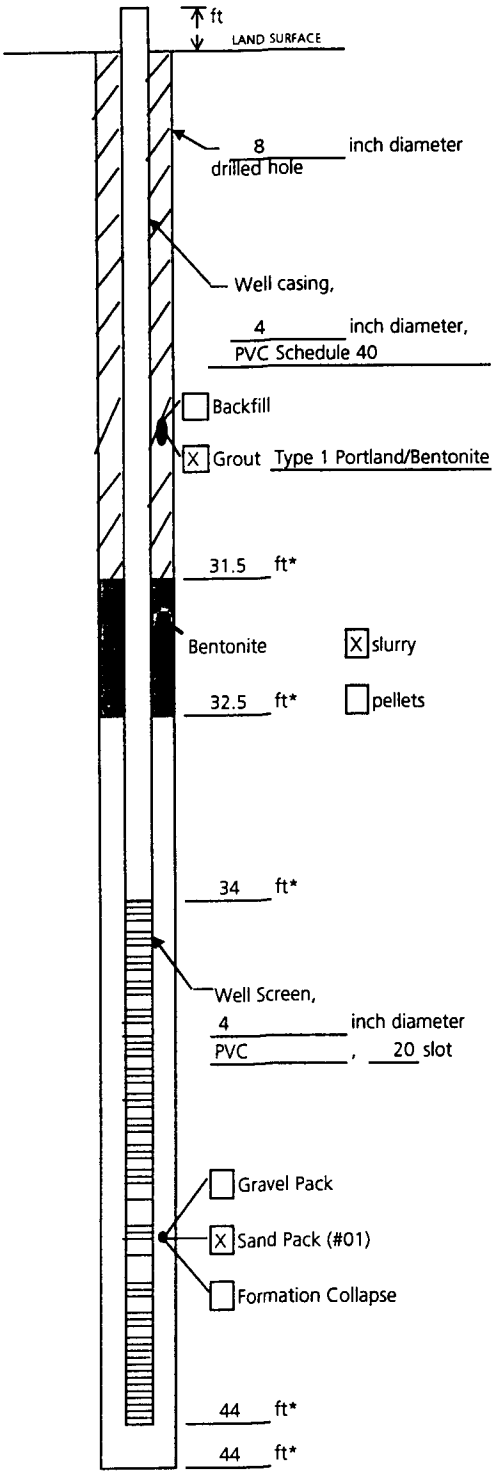
Well Purpose Test Recovery Well

Remarks Well was abandoned on 7/9/99.

Prepared by Eric Rodriguez

ARCADIS GERAGHTY & MILLER

Well Construction Log
(Bedrock)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

* Depth Below Land Surface

Project NJ000298.0021.00004 Well OW-58D

Town/City Clark

County Union State NJ

Permit No. 26-54135

Land-Surface Elevation and Datum:

_____ feet ☐ Surveyed ☐ Estimated

Installation Date(s) 6/10/99

Drilling Method ODEX/Air Hammer

Drilling Contractor CT&E, B-80 Mobile Drill

Drilling Fluid Air

Development Technique(s) and Date(s)

6/11/99 Pump and surge.

Fluid Loss During Drilling N/A gallons

Water Removed During Development 75 gallons

Static Depth to Water 12.2 feet below M.P.

Pumping Depth to Water 32.5 feet below M.P.

Pumping Duration 2.5 hours

Yield ~0.5 gpm Date 6/11/99

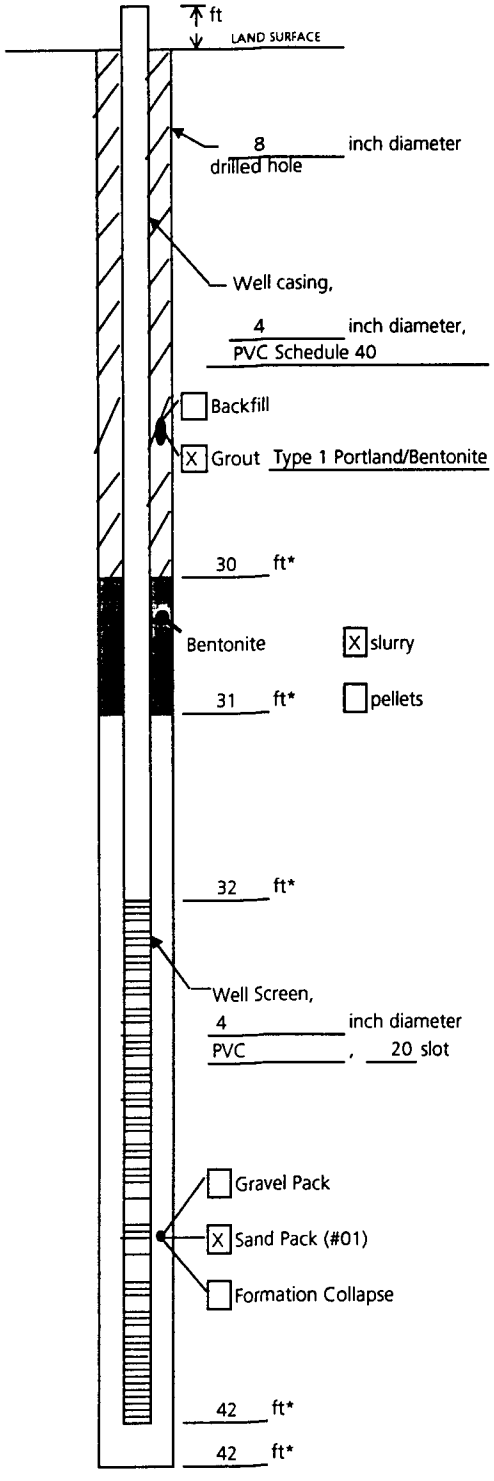
Well Purpose Test Recovery Well

Remarks

Prepared by Eric Rodriguez

ARCADIS GERAGHTY & MILLER

Well Construction Log
(Bedrock)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

* Depth Below Land Surface

Project NJ000298.0021.00004 Well OW-59D

Town/City Clark

County Union State NJ

Permit No. 26-54136

Land-Surface Elevation and Datum:

_____ feet ☐ Surveyed ☐ Estimated

Installation Date(s) 6/10/99

Drilling Method ODEX/Air Hammer

Drilling Contractor CT&E, B-80 Mobile Drill

Drilling Fluid Air

Development Technique(s) and Date(s)

6/11/99 Pump and surge.

Fluid Loss During Drilling N/A gallons

Water Removed During Development 75 gallons

Static Depth to Water 14.8 feet below M.P.

Pumping Depth to Water -- feet below M.P.

Pumping Duration 5 hours

Yield <0.25 gpm Date 6/11/99

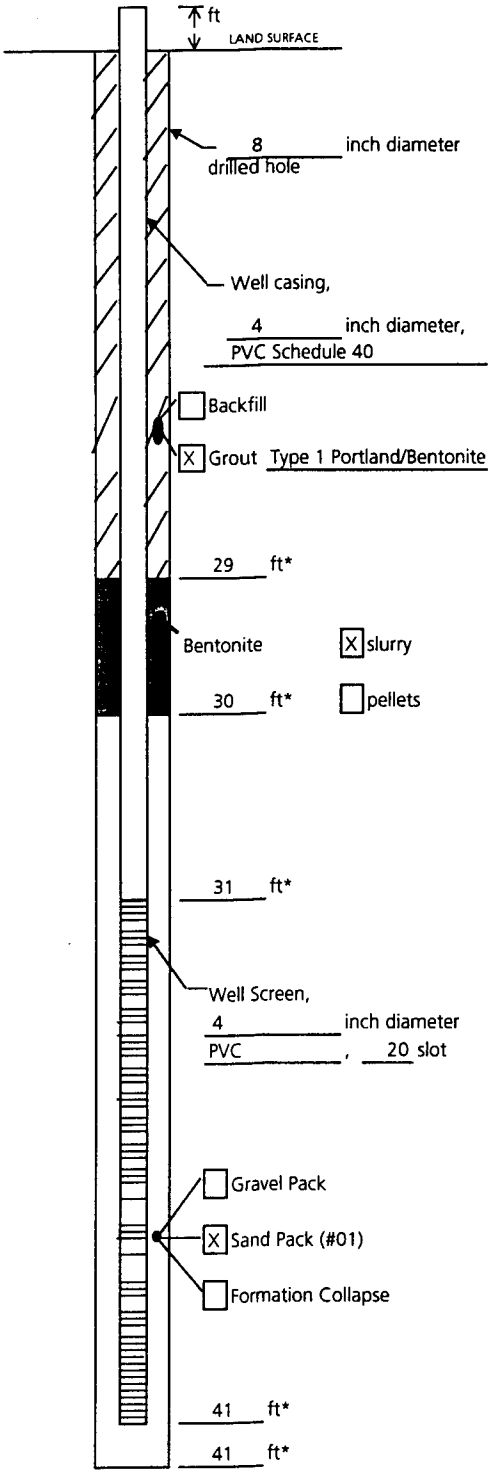
Well Purpose Test Recovery Well

Remarks

Prepared by Eric Rodriguez

ARCADIS GERAGHTY & MILLER

Well Construction Log
(Bedrock)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

* Depth Below Land Surface

Project NJ000298.0021.00004 Well OW-69D

Town/City Clark

County Union State NJ

Permit No. 26-54297

Land-Surface Elevation and Datum:

_____ feet ☐ Surveyed

☐ Estimated

Installation Date(s) 6/23/99

Drilling Method ODEX/Air Hammer

Drilling Contractor CT&E, B-80 Mobile Drill

Drilling Fluid Air

Development Technique(s) and Date(s)

6/24/99 Pump and surge.

Fluid Loss During Drilling N/A gallons

Water Removed During Development 60 gallons

Static Depth to Water 19.2 feet below M.P.

Pumping Depth to Water DRY feet below M.P.

Pumping Duration 6 hours

Yield N/A gpm Date 6/24/99

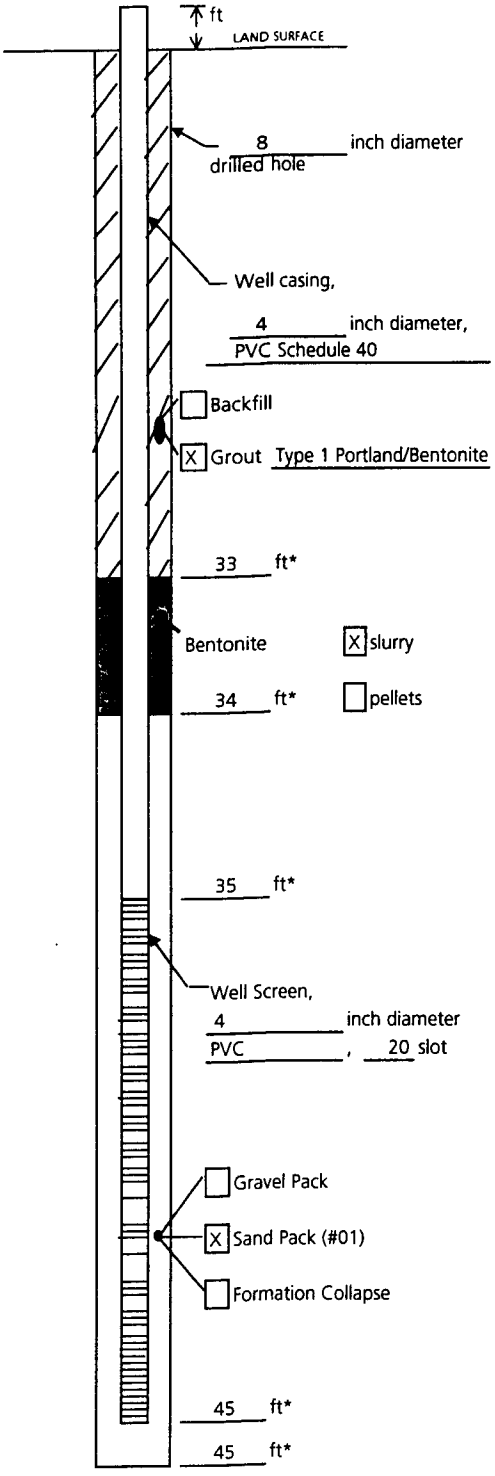
Well Purpose Test Recovery Well

Remarks

Prepared by Eric Rodriguez

ARCADIS GERAGHTY & MILLER

Well Construction Log
(Bedrock)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

* Depth Below Land Surface

Project NJ000298.0021.00004 Well OW-70D

Town/City Clark

County Union State NJ

Permit No. 26-54295

Land-Surface Elevation and Datum:

_____ feet ☐ Surveyed ☐ Estimated

Installation Date(s) 6/23/99

Drilling Method ODEX/Air Hammer

Drilling Contractor CT&E, B-80 Mobile Drill

Drilling Fluid Air

Development Technique(s) and Date(s)

6/24/99 Pump and surge.

Fluid Loss During Drilling N/A gallons

Water Removed During Development 75 gallons

Static Depth to Water 11.2 feet below M.P.

Pumping Depth to Water -- feet below M.P.

Pumping Duration 2.5 hours

Yield ~0.5 gpm Date 6/24/99

Well Purpose Test Recovery Well

Remarks

Prepared by Eric Rodriguez

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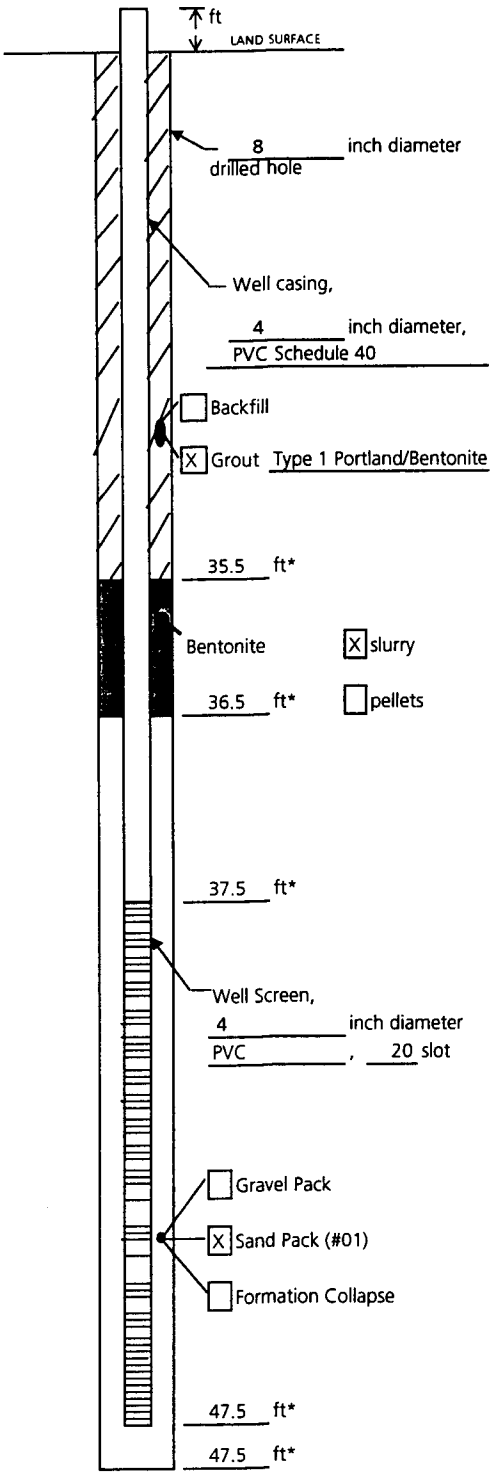
ARCADIS GERAGHTY & MILLER

Well Construction Log
(Bedrock)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

* Depth Below Land Surface

Project NJ000298.0021.00004 Well OW-71D

Town/City Clark

County Union State NJ

Permit No. 26-54546

Land-Surface Elevation and Datum:

_____ feet ☐ Surveyed ☐ Estimated

Installation Date(s) 6/29/99

Drilling Method ODEX/Air Hammer

Drilling Contractor CT&E, B-80 Mobile Drill

Drilling Fluid Air

Development Technique(s) and Date(s)

7/1/99 Pump and surge

Fluid Loss During Drilling N/A gallons

Water Removed During Development 20 gallons

Static Depth to Water 40.55 feet below M.P.

Pumping Depth to Water DRY feet below M.P.

Pumping Duration 4 hours

Yield N/A gpm Date 7/1/99

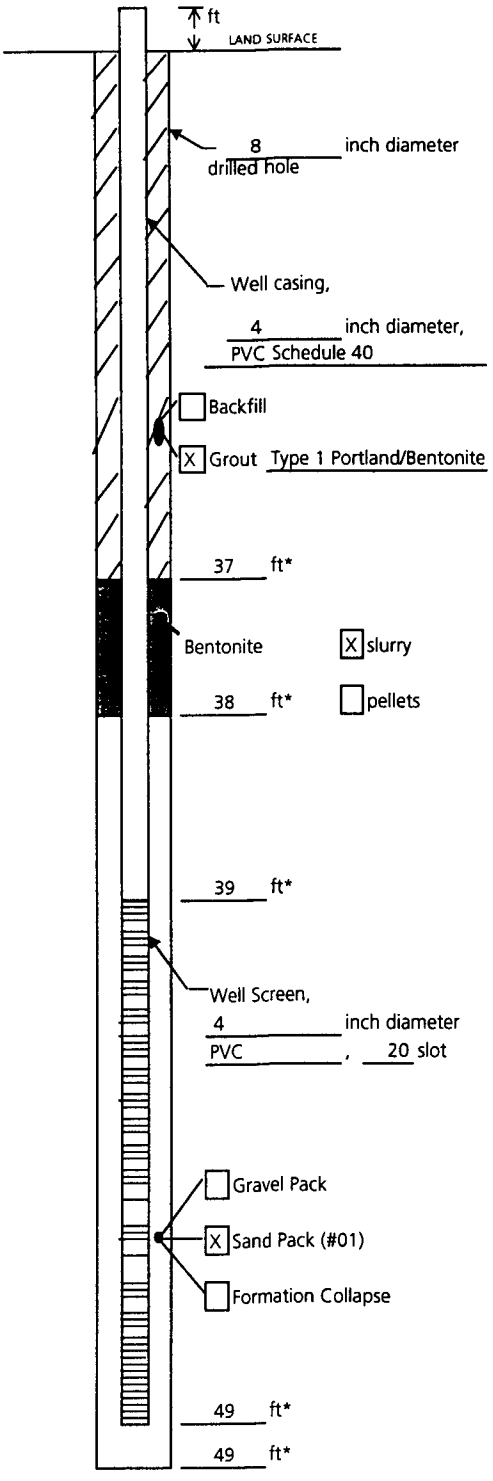
Well Purpose Test Recovery Well

Remarks Well was abandoned on 7/19/99.

Prepared by Eric Rodriguez

ARCADIS GERAGHTY & MILLER

Well Construction Log
(Bedrock)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

* Depth Below Land Surface

Project NJ000298.0021.00004 Well OW-72D

Town/City Clark

County Union State NJ

Permit No. 26-54547

Land-Surface Elevation and Datum:

_____ feet ☐ Surveyed ☐ Estimated

Installation Date(s) 6/30/99

Drilling Method ODEX/Air Hammer

Drilling Contractor CT&E, B-80 Mobile Drill

Drilling Fluid Air

Development Technique(s) and Date(s)

7/1-7/2/99 Pump and surge

Fluid Loss During Drilling N/A gallons

Water Removed During Development 20 gallons

Static Depth to Water 49 feet below M.P.

Pumping Depth to Water DRY feet below M.P.

Pumping Duration 4 hours

Yield ~0.125 gpm Date 7/1-2/99

Well Purpose Test Recovery Well

Remarks Well was abandoned on 7/19/99.

Prepared by Eric Rodriguez

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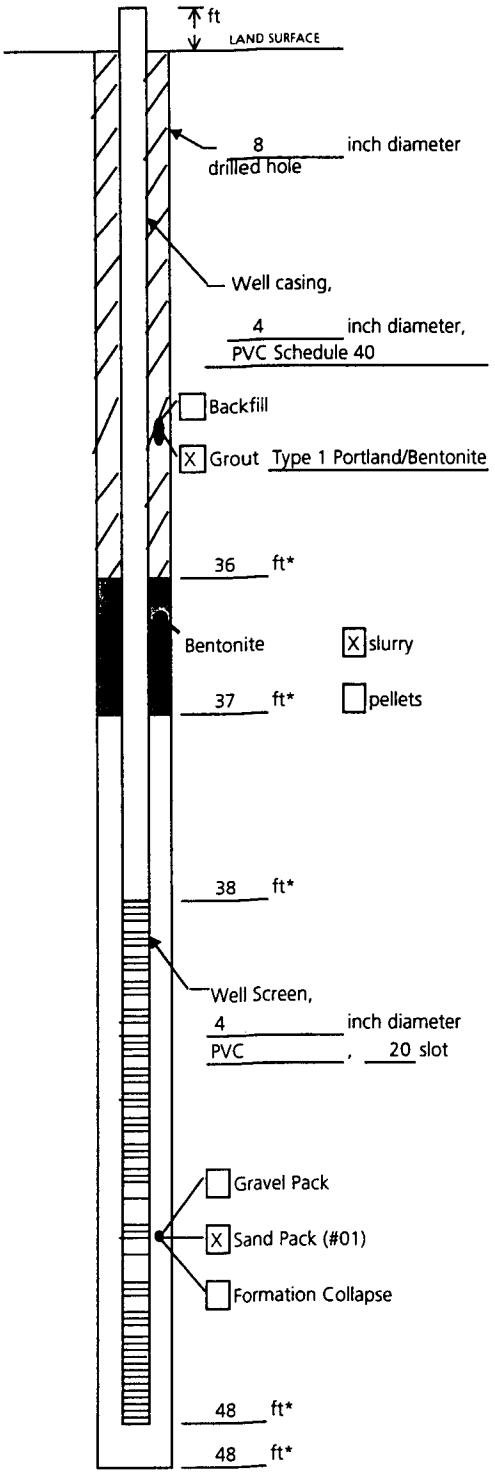
ARCADIS GERAGHTY & MILLER

Well Construction Log
(Bedrock)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

* Depth Below Land Surface

Project NJ000298.0021.00004 Well OW-75D

Town/City Clark

County Union State NJ

Permit No. 26-54543

Land-Surface Elevation and Datum:

_____ feet ☐ Surveyed ☐ Estimated

Installation Date(s) 7/9/99

Drilling Method ODEX/Air Hammer

Drilling Contractor CT&E, B-80 Mobile Drill

Drilling Fluid Air

Development Technique(s) and Date(s)

7/13-14/99, Pump and surge

Fluid Loss During Drilling N/A gallons

Water Removed During Development 70 gallons

Static Depth to Water 26.8 feet below M.P.

Pumping Depth to Water DRY feet below M.P.

Pumping Duration 6 hours

Yield N/A gpm Date 7/13-7/14/99

Well Purpose Test Recovery Well

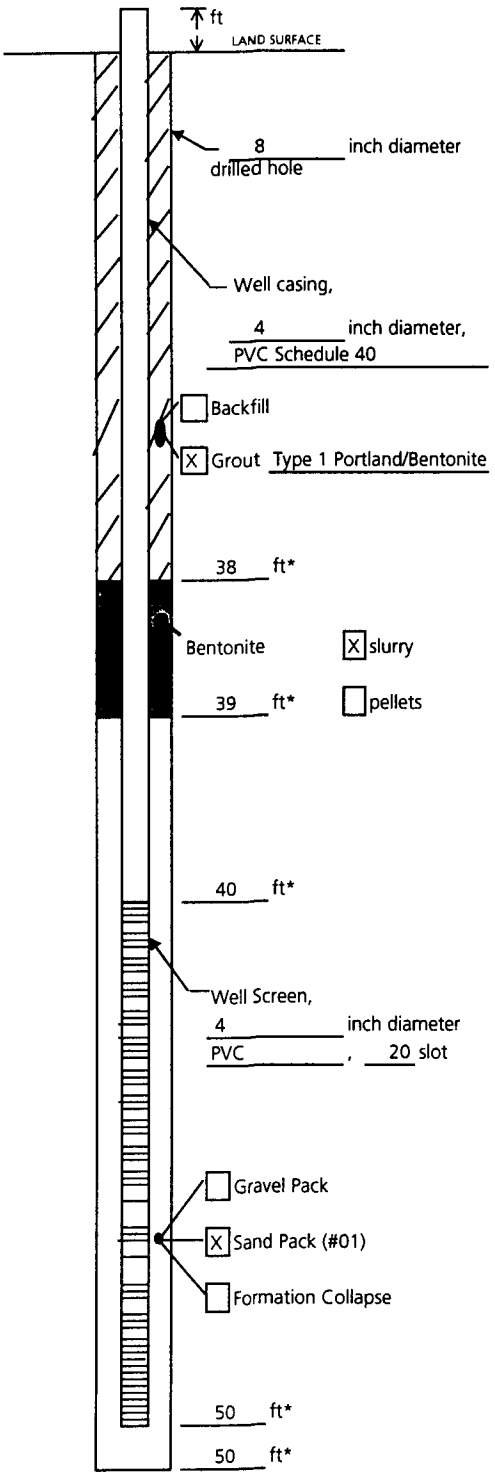
Remarks

Prepared by Eric Rodriguez

g:\Aproject\Gmhyatt\NJ0298.021\data\prodwlconst

ARCADIS GERAGHTY & MILLER

Well Construction Log
(Bedrock)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

* Depth Below Land Surface

Project NJ000298.0021.00004 Well OW-77D

Town/City Clark

County Union State NJ

Permit No. 26-54601

Land-Surface Elevation and Datum:

_____ feet ☐ Surveyed ☐ Estimated

Installation Date(s) 7/13/99

Drilling Method ODEX/Air Hammer

Drilling Contractor CT&E, B-80 Mobile Drill

Drilling Fluid Air

Development Technique(s) and Date(s)

7/16/99, Pump and surge.

Fluid Loss During Drilling N/A gallons

Water Removed During Development 100 gallons

Static Depth to Water 14 feet below M.P.

Pumping Depth to Water 31 feet below M.P.

Pumping Duration 2.5 hours

Yield ~0.75 gpm Date 7/16/99

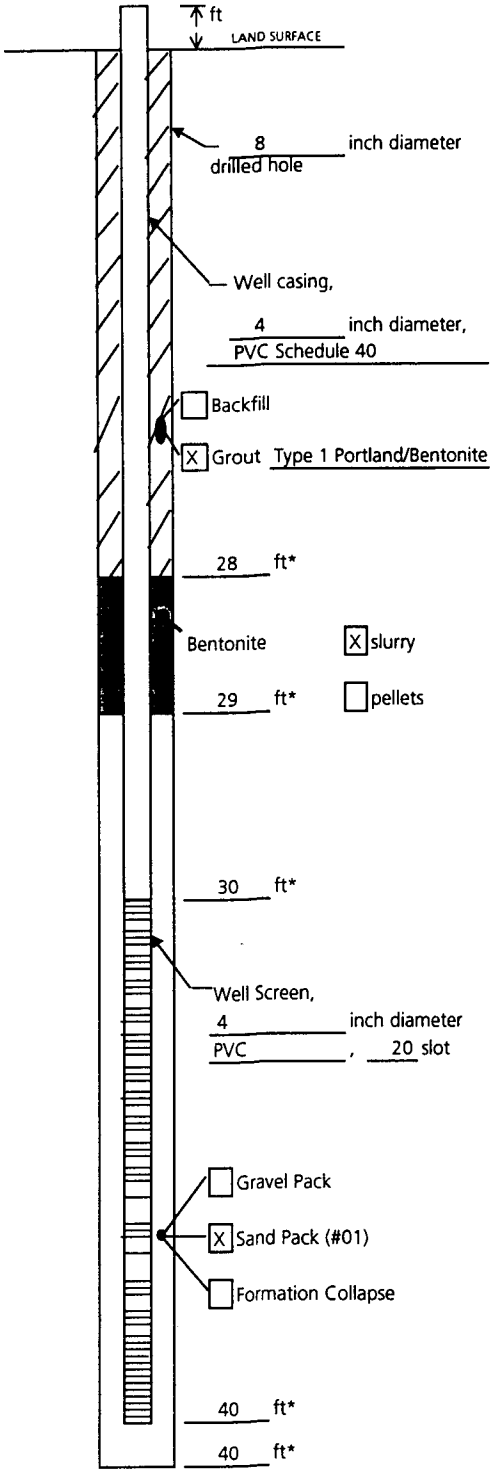
Well Purpose Test Recovery Well

Remarks

Prepared by Jennifer Guido/ Eric Rodriguez

ARCADIS GERAGHTY & MILLER

Well Construction Log
(Bedrock)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

* Depth Below Land Surface

Project NJ000298.0021.00004 Well OW-79D

Town/City Clark

County Union State NJ

Permit No. 26-54599

Land-Surface Elevation and Datum:

_____ feet ☐ Surveyed ☐ Estimated

Installation Date(s) 7/13/99

Drilling Method ODEX/Air Hammer

Drilling Contractor CT&E, B-80 Mobile Drill

Drilling Fluid Air

Development Technique(s) and Date(s)

7/16/99 Pump and surge.

Fluid Loss During Drilling N/A gallons

Water Removed During Development 15 gallons

Static Depth to Water 35.4 feet below M.P.

Pumping Depth to Water DRY feet below M.P.

Pumping Duration 2 hours

Yield N/A gpm Date 7/16/99

Well Purpose Test Recovery Well

Remarks

Prepared by Jennifer Guido/ Eric Rodriguez

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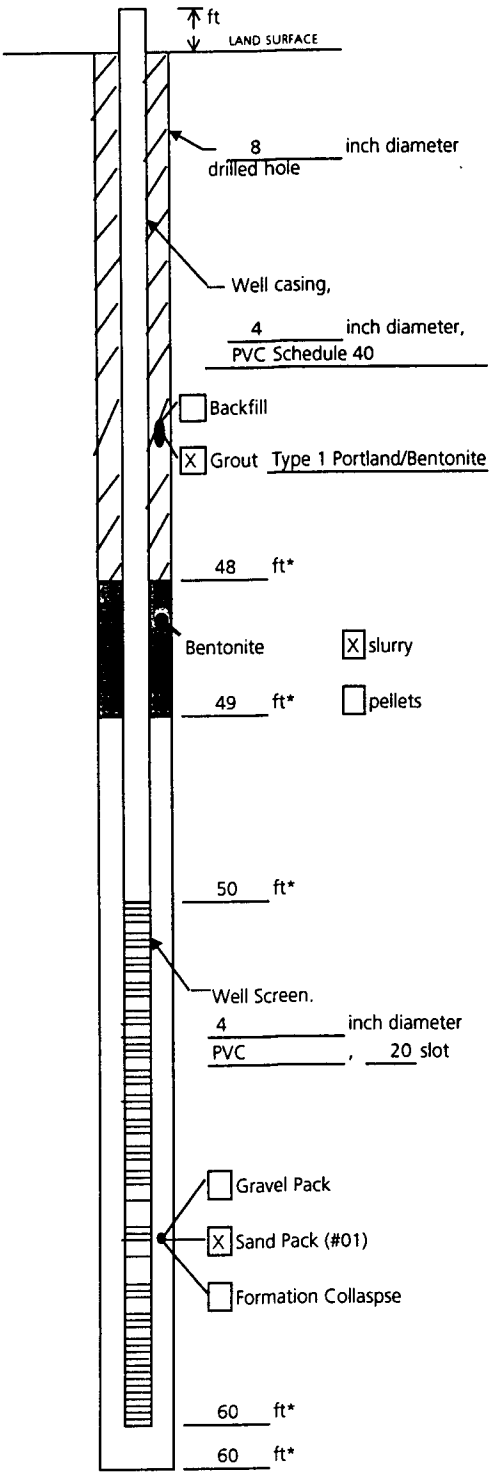
ARCADIS GERAGHTY & MILLER

Well Construction Log
(Bedrock)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

* Depth Below Land Surface

Project NJ000298.0021.00004 Well OW-82D

Town/City Clark

County Union State NJ

Permit No. 26-54885

Land-Surface Elevation and Datum:

_____ feet ☐ Surveyed ☐ Estimated

Installation Date(s) 8/11/99

Drilling Method ODEX/Air Hammer

Drilling Contractor CT&E, B-80 Mobile Drill

Drilling Fluid Air

Development Technique(s) and Date(s)

8/12/99 Pump and surge.

Fluid Loss During Drilling N/A gallons

Water Removed During Development 0 gallons

Static Depth to Water 54.4 feet below M.P.

Pumping Depth to Water DRY feet below M.P.

Pumping Duration 1 hours

Yield N/A gpm Date 8/12/99

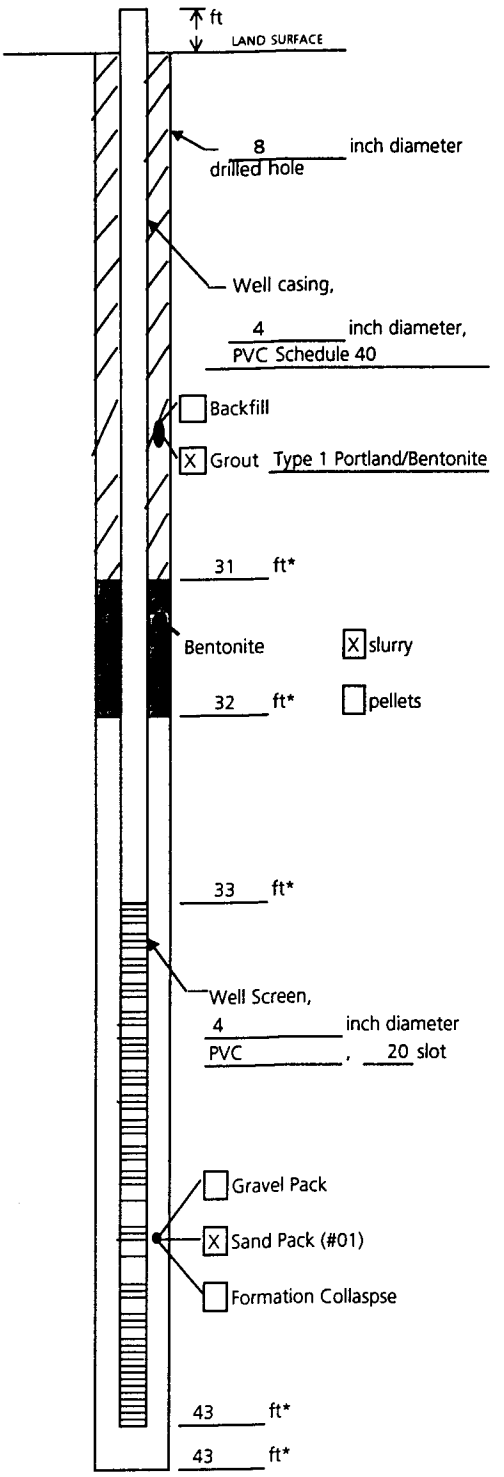
Well Purpose Test Recovery Well

Remarks For development, 10 gallons of water was added to the well . The well was then pumped and surged.

Prepared by J. Guido

ARCADIS GERAGHTY & MILLER

Well Construction Log
(Bedrock)



Measuring Point is
Top of Well Casing
Unless Otherwise Noted.

* Depth Below Land Surface

Project NJ000298.0021.00004 Well OW-83D

Town/City Clark

County Union State NJ

Permit No. 26-54884

Land-Surface Elevation and Datum:

_____ feet ☐ Surveyed ☐ Estimated

Installation Date(s) 8/11/99

Drilling Method ODEX/Air Hammer

Drilling Contractor CT&E, B-80 Mobile Drill

Drilling Fluid Air

Development Technique(s) and Date(s)

8/12/99 Pump and surge.

Fluid Loss During Drilling N/A gallons

Water Removed During Development 30 gallons

Static Depth to Water 27.89 feet below M.P.

Pumping Depth to Water 41 feet below M.P.

Pumping Duration 1.5 hours

Yield N/A gpm Date 8/12/99

Well Purpose Test Recovery Well

Remarks For development, 12 gallons of water was added to the well and then it was pumped and surged.

Prepared by J. Guido

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APPENDIX B

REINJECTION WELL DETAIL

EQUIPMENT BUILDING LAYOUT

TREATMENT BUILDING

BUTLER BUILDING

SEE DISTRIBUTION BOX DETAIL THIS SHEET

QUENCH OIL PIT AREA

WELL-HEAD CONNECTION DETAIL

DB-400

DB-300

DB-200

DB-100

TUNNEL NO. 4

TUNNEL NO. 3

TUNNEL NO. 2

TUNNEL NO. E

TUNNEL NO. D

TUNNEL NO. C

TUNNEL NO. B

TUNNEL NO. A

MW-23

MW-10

MW-10B

MW-10B2

MW-10B3

MW-8

MW-9

MW-9B

MW-21

MW-20

MW-41

MW-38

MW-38B

MW-19

MW-31B2

MW-31B3

OW-22

OW-24

OW-25D

OW-25M

OW-25S

OW-26M

OW-26S

OW-27

OW-28D

OW-28S

OW-29

OW-30

OW-32D

OW-32S

OW-34

OW-46

OW-47

OW-48

OW-49

OW-50

OW-51

OW-52D

OW-53D

OW-54D

OW-55D

OW-56D

OW-57D

OW-58D

OW-59D

OW-64

OW-65

OW-66

OW-69D

OW-70D

OW-71D

OW-72D

OW-73

OW-75D

OW-76

OW-77D

OW-79D

OW-81

OW-82D

OW-83D

SCALE: 1"=50'-0"

LEGEND

1" MDPE AIR HEADER
2" IN 4" DUAL-WALL HDPE PIPING

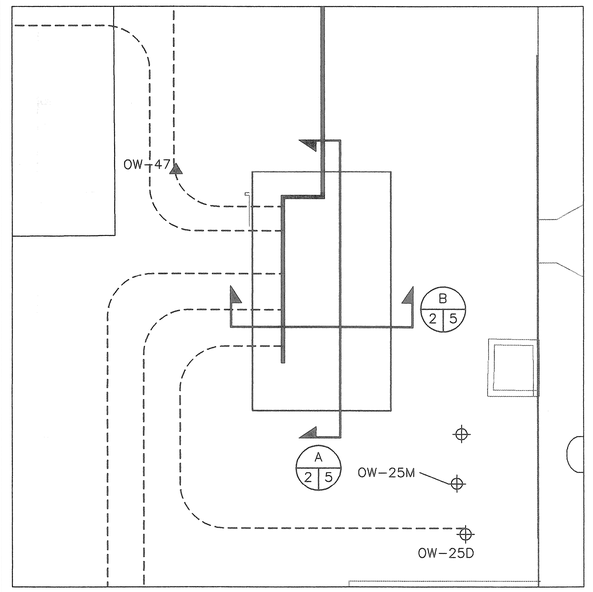
0.5" MDPE AIR LINE
1" IN 3" DUAL-WALL HDPE PIPING

DB-100
OW-29
OW-32D
OW-53D
OW-58
OW-58D

DB-200
OW-28S
OW-28D
OW-52D
OW-59D
OW-77D

DB-300
OW-22
OW-25M
OW-27
OW-47
OW-49
OW-66

DB-400
OW-24
OW-25S
OW-26S
OW-26M
OW-65



DISTRIBUTION BOX DETAIL

NO.	DATE	REVISION DESCRIPTION	BY
			CKD

ARCADIS GERAGHTY & MILLER
1200 MacArthur Boulevard
Mahwah, New Jersey 07430
Tel: 201/233-2233 Fax: 201/236-5110/5112

FORMER HYATT CLARK INDUSTRIES SITE
1300 RARITAN ROAD
CLARK, NEW JERSEY

SITE PLAN
50% DESIGN

DRAWN	DATE	PROJECT MANAGER	DEPARTMENT MANAGER
A.G.	10/4/99	J. MESSINGER	
		LEAD DESIGN PROF. M. KLECZKOWSKI, P.E.	CHECKED K. KEIVIT
		PROJECT NUMBER NJ0298.0021	DRAWING NUMBER B-1

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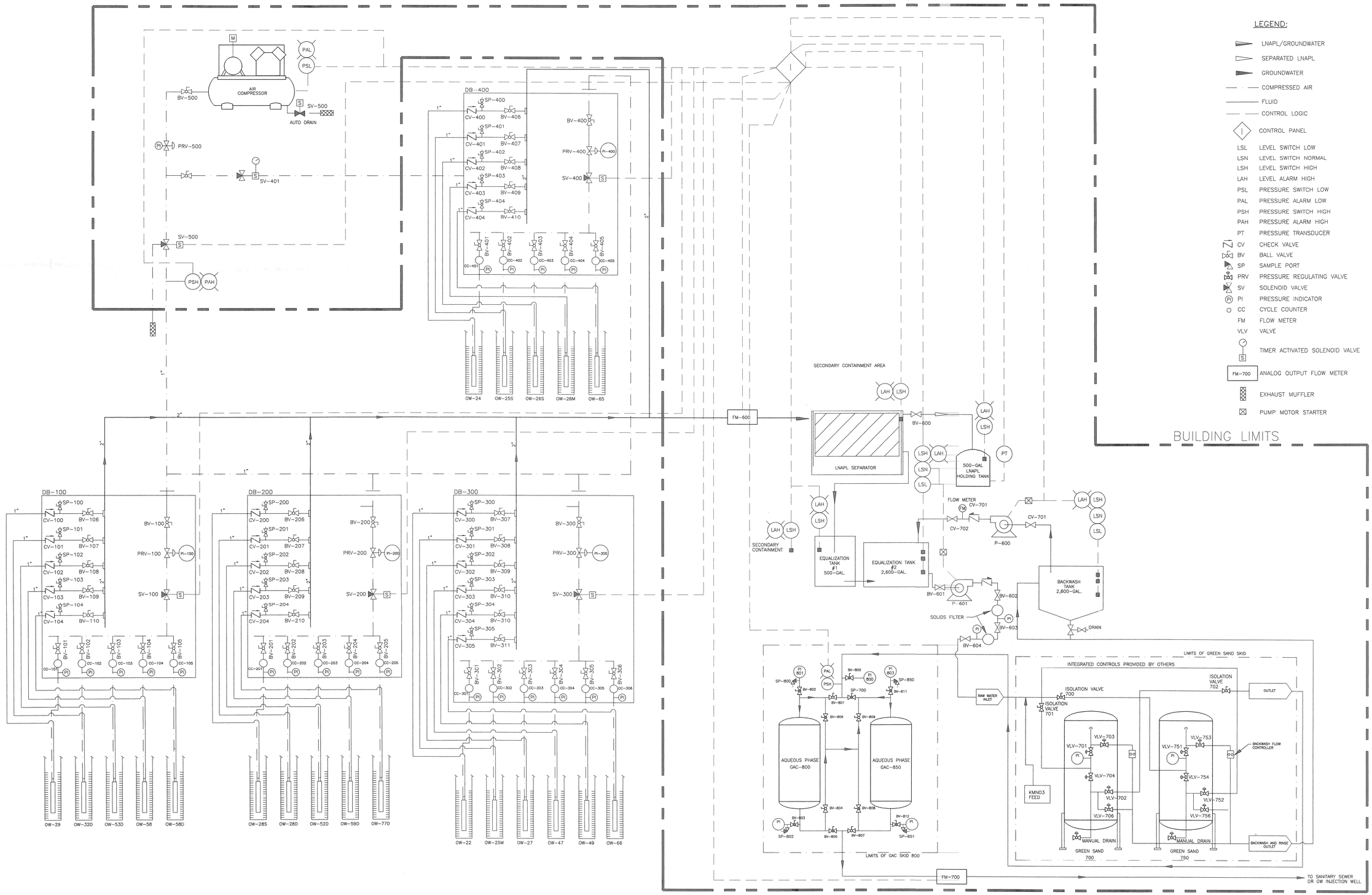

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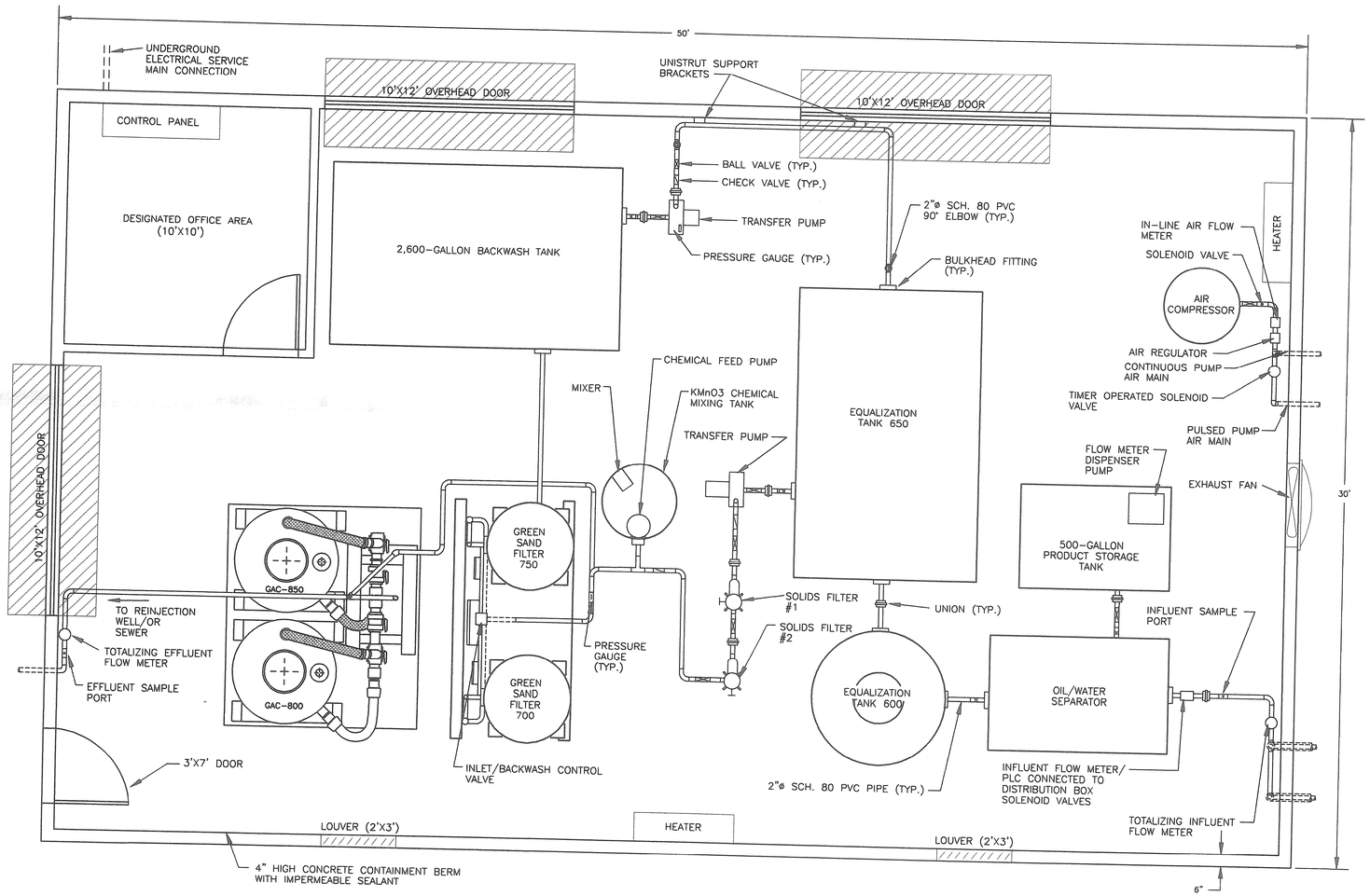
NO.	DATE	REVISION DESCRIPTION	BY CKD

ARCADIS GERAGHTY & MILLER
1200 MacArthur Boulevard
Mahwah, New Jersey 07430
Tel: 201/233-2233 Fax: 201/236-5110/5112

FORMER HYATT CLARK INDUSTRIES SITE
1300 RARITAN ROAD
CLARK, NEW JERSEY

PROCESS AND INSTRUMENTATION DIAGRAM
50% DESIGN

DRAWN	DATE	PROJECT MANAGER	DEPARTMENT MANAGER
A.G.	10/4/99	J. MESSINGER	
		LEAD DESIGN PROF. M. KLECZKOWSKI, P.E.	CHECKED K. KEIVIT
		PROJECT NUMBER NJ0298.0021	DRAWING NUMBER B-2



1/2/4 **EQUIPMENT BUILDING PLAN**

SCALE: 3/8" = 1'-0"

NO.	DATE	REVISION DESCRIPTION	BY / CKD

ARCADIS GERAGHTY & MILLER

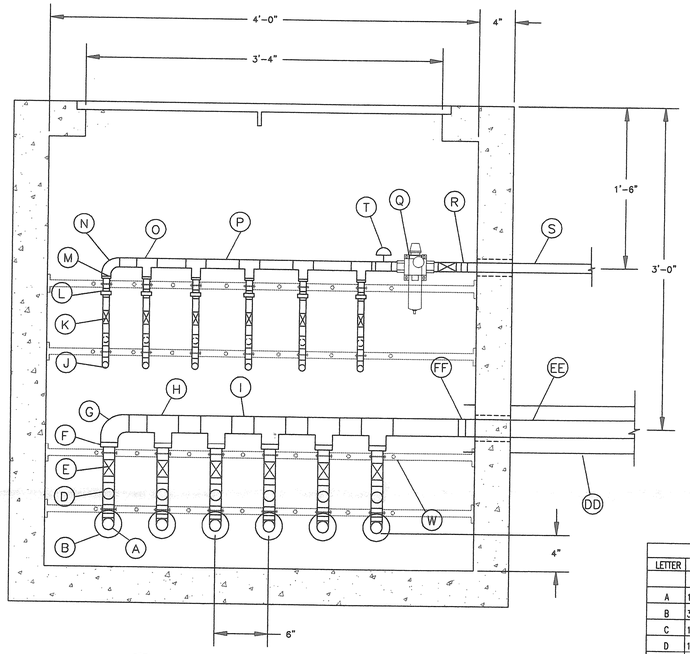
1200 MacArthur Boulevard
Mahwah, New Jersey 07430
Tel: 201/233-2233 Fax: 201/236-5110/5112

FORMER HYATT CLARK INDUSTRIES SITE

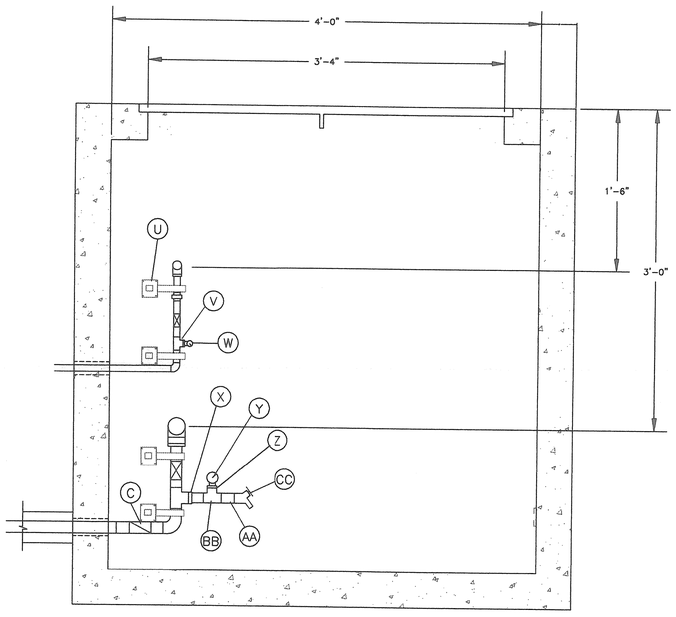
1300 RARITAN ROAD
CLARK, NEW JERSEY

EQUIPMENT LAYOUT
50% DESIGN

DRAWN	DATE	PROJECT MANAGER	DEPARTMENT MANAGER
A.G.	10/4/99	J. MESSINGER	
		LEAD DESIGN PROF. M. KLECSKOWSKI, P.E.	CHECKED K. KEIVIT
		PROJECT NUMBER NJ0298.0021	DRAWING NUMBER B-3

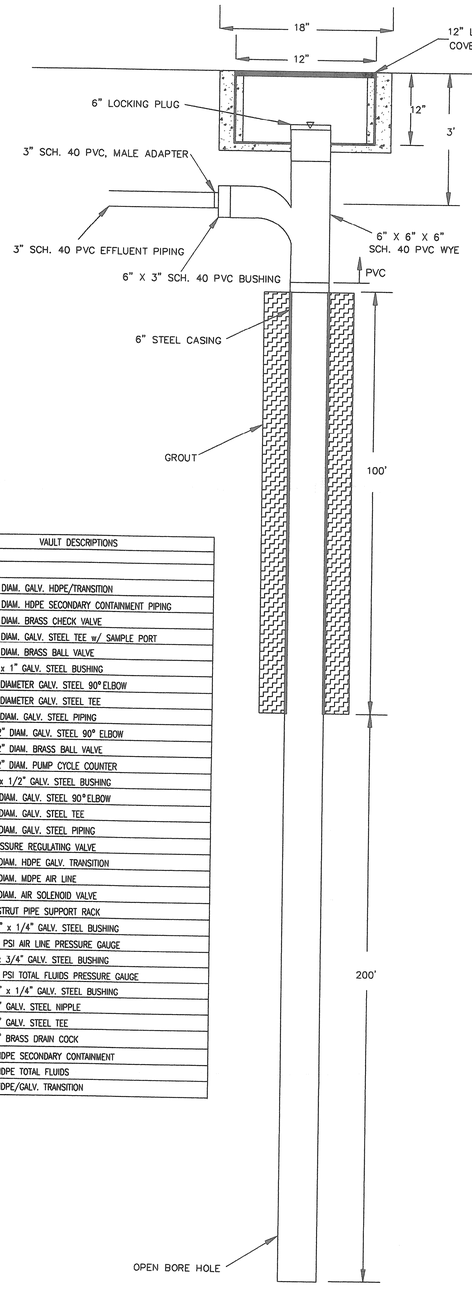


A/2|5 **SECTION**
SCALE: 1-1/2" = 1'-0"

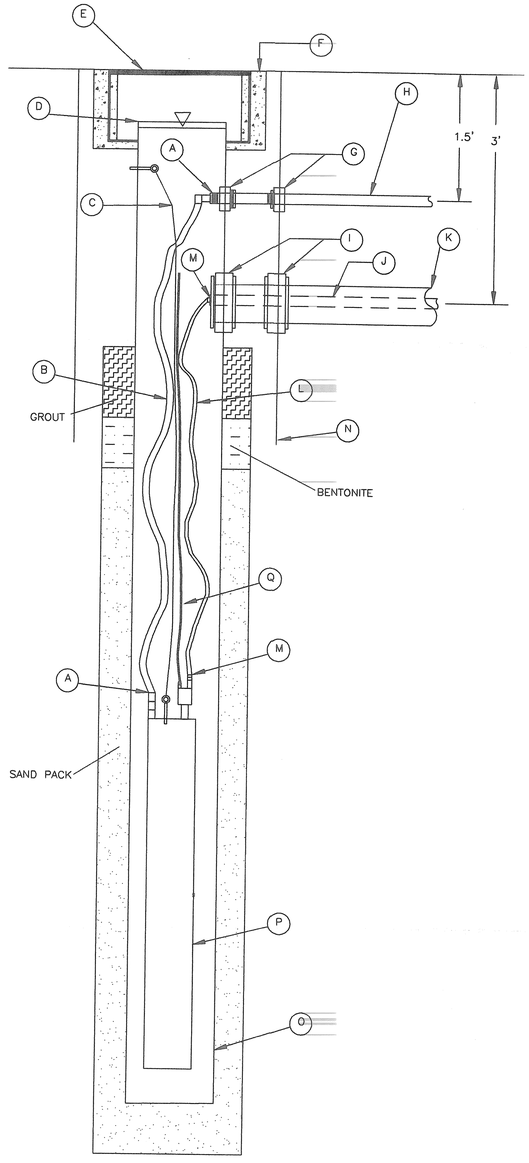


B/2|5 **SECTION**
SCALE: 1-1/2" = 1'-0"

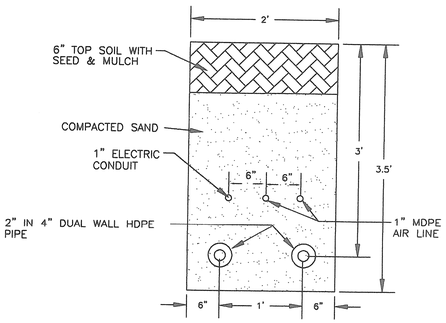
VAULT DESCRIPTIONS	
LETTER	
A	1" DIAM. GALV. HDPE/TRANSITION
B	3" DIAM. HDPE SECONDARY CONTAINMENT PIPING
C	1" DIAM. BRASS CHECK VALVE
D	1" DIAM. GALV. STEEL TEE w/ SAMPLE PORT
E	1" DIAM. BRASS BALL VALVE
F	2" x 1" GALV. STEEL BUSHING
G	2" DIAMETER GALV. STEEL 90° ELBOW
H	2" DIAMETER GALV. STEEL TEE
I	2" DIAM. GALV. STEEL PIPING
J	1/2" DIAM. GALV. STEEL 90° ELBOW
K	1/2" DIAM. BRASS BALL VALVE
L	1/2" DIAM. PUMP CYCLE COUNTER
M	1" x 1/2" GALV. STEEL BUSHING
N	1" DIAM. GALV. STEEL 90°ELBOW
O	1" DIAM. GALV. STEEL TEE
P	1" DIAM. GALV. STEEL PIPING
Q	PRESSURE REGULATING VALVE
R	1" DIAM. HDPE GALV. TRANSITION
S	1" DIAM. MDPE AIR LINE
T	1" DIAM. AIR SOLENOID VALVE
U	UNISTRUT PIPE SUPPORT RACK
V	1/2" x 1/4" GALV. STEEL BUSHING
W	100 PSI AIR LINE PRESSURE GAUGE
X	1" x 3/4" GALV. STEEL BUSHING
Y	100 PSI TOTAL FLUIDS PRESSURE GAUGE
Z	3/4" x 1/4" GALV. STEEL BUSHING
AA	3/4" GALV. STEEL NIPPLE
BB	3/4" GALV. STEEL TEE
CC	3/4" BRASS DRAIN COCK
DD	4" HDPE SECONDARY CONTAINMENT
EE	2" HDPE TOTAL FLUIDS
FF	2" HDPE/GALV. TRANSITION



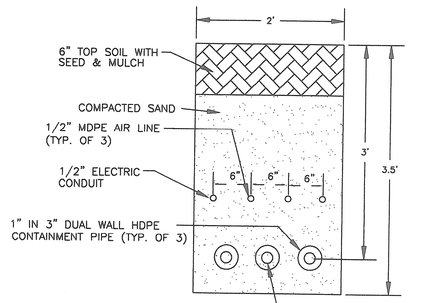
2/2|5 **REINJECTION WELL DETAIL**
NOT TO SCALE



3/2|5 **TYPICAL WELL-HEAD CONNECTION DETAIL**
NOT TO SCALE



C/2|5 **TYPICAL MAIN TRENCH DETAIL**
NOT TO SCALE



D/2|5 **TYPICAL DISTRIBUTION TRENCH DETAIL**
NOT TO SCALE

WELL DESCRIPTIONS	
LETTER	DESCRIPTION
A	1/2" DIAM. BRASS QUICK DISCONNECT COUPLING
B	1/2" DIAM. FLEXIBLE AIR HOSE - 150 psi
C	PUMP SUPPORT CABLE AND EYE HOOK
D	4" LOCKING WELL PLUG
E	12" STEEL MANHOLE FRAME & COVER (12" steel skirt)
F	18" x 18" 3,000 psi CONCRETE PAD
G	1/2" FLEXIBLE ENTRY BOOT WITH HOSE CLAMP
H	1/2" DAIM. MDPE AIR LINE
I	4" FLEXIBLE ENTRY BOOT WITH HOSE CLAMP
J	1" DIAM. HDPE TOTAL FLUIDS LINE
K	3" DIAM. HDPE SECONDARY CONTAINMENT PIPING
L	1" DIAM. FLEXIBLE TOTAL FLUIDS HOSE - 150 psi
M	1" DIAM. BRASS QUICK DISCONNECT COUPLING
N	24" DIAM. SCH. 40 PVC EXTENSION RISER, OR 36" CORRUGATED STEEL RISER
O	4" DIAM. RECOVERY WELL
P	CEE TOP LOADING AP-4/LONG BODY PNEUMATIC PUMP
Q	PUMP VENT LINE

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NO.	DATE	REVISION DESCRIPTION	BY CKD

ARCADIS GERAGHTY & MILLER
1200 MacArthur Boulevard
Mahwah, New Jersey 07430
Tel: 201/233-2233 Fax: 201/236-5110/5112

FORMER ~~HYATT~~ CLARK INDUSTRIES SITE
1300 RARITAN ROAD
CLARK, NEW JERSEY

RECOVERY WELL AND PIPING DETAILS
50% DESIGN

DRAWN	DATE	PROJECT MANAGER	DEPARTMENT MANAGER
A.G.	10/4/99	J. MESSINGER	
		LEAD DESIGN PROF. M. KLECZKOWSKI, P.E.	CHECKED K. KEIVIT
		PROJECT NUMBER NJ00298.021	DRAWING NUMBER B-4