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NWS EARLE
5090.3a

TRANSMITTAL LETTER FOR THE REGULATORY COMMITTEE REPLY TO STATE OF NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION COMMENT ON UNDERGROUND STORAGE TANK REMEDIAL INVESTIGATION FOR GROUP II SITES NWS EARLE NJ

6/21/1996

BROWN AND ROOT ENVIRONMENTAL

Brown & Root Environmental

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Wayne, PA 19087-1710

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BRPH/51-6-6-67

June 21, 1996

Mr. Brian Helland
Naval Facilities Engineering Command
Northern Division Code 1812
10 Industrial Highway, Mail Stop No. 82
Lester, Pennsylvania 19113

Subject: Underground Storage Tank Remedial Investigation Report for Various Sites (Group II)
Naval Weapons Station Earle
Colts Neck, Monmouth County

Dear Mr. Helland:

Brown & Root (B&R) Environmental is pleased to provide the following information in response to the New Jersey Department of Environmental Protection's (NJDEP) May 14, 1996 comments on the subject Remedial Investigation Report. Note that we have also provided a copy of this letter to Greg Goepfert at the Naval Weapons Station Earle.

Response to Comments:

1. B&R Environmental re-evaluated field decontamination methods. Field teams will be provided with reinforced guidance directed at controlling acetone use during rinses and increasing equipment air dry time.

2. The following historical information was obtained from the UST Closure Reports at each site. Please note that this information was included in the UST RI Work Plan.

Building 617

UST 617/1 was installed in 1959. Historical site plans, as-built diagrams, and operating and maintenance records are not available for UST 617/1. The UST failed a tightness test on November 10, 1992 and was removed. Samples collected during the 1992 removal activities detected TPH in the soil, indicating that a leak had occurred from the tank and associated piping system and/or from the fill ports. The incident discharge number for UST 617/1 is 92-11-10-1426-16.

Previous Investigations

Contaminated soil was excavated to a depth of 10 feet, and approximately eight cubic yards of soil were removed during the 1992 removal activities. An oily sheen was observed on the groundwater in the excavation. Three soil samples were collected from the bottom of the excavation (Samples 617 N, 617 C, and 617 S), and one was collected from stockpiled soil (Sample 617 Pile) during the removal of UST 617/1A groundwater sample (Sample 617 LIQID) was also collected from the excavation. The samples were submitted to Laboratory Resources, Incorporated, for TPH analysis on November 10, 1992.

The samples were received by the laboratory on November 12, 1992; the soil samples were analyzed on November 18, 1992 and the groundwater sample was analyzed on November 13, 1992. TPH was not detected in any of the soil samples at a concentration greater than the TPH soil clean-up criterion of 10,000 mg/kg.

Historical TPH Analytical Results - Building 617

	Sample 617 N	**Sample 617 C**	**Sample 617 S**	**Sample 617 Pile**
TPH (mg/kg)	20	19	37	8,800

A concentration of 530 mg/l of TPH was detected in the groundwater sample.

Building C-8

UST C8/1 was installed in 1958. Historical site plans and operating and maintenance records are not available for UST C8/1. UST C8/1 failed a tightness test on June 11, 1993 and was removed in 1993. Samples collected during the removal activities for C8/1 detected TPH in the soil, indicating that a leak had occurred from the tank and its associated piping systems and/or from the fill ports. The incident discharge number for USTC8/1 is 93-6-11-0756-05.

Previous Investigations

Contaminated soil was excavated to a depth of approximately 10 feet, and between 80 to 90 cubic yards of soil were removed during 1993 UST C8/1 removal activities. Visual contamination of the soil was observed during the tank excavation. Groundwater was observed entering the excavation from the sidewall at a depth of approximately 10 feet. Seven soil samples (NEC8-610-SS1 through SS7) were collected at depths ranging from six to 12 feet below grade from the excavation on June 10, 1993 following removal activities. The samples were submitted to American Environmental Network, Incorporated, for TPH analysis; 25

percent were to be analyzed for VOC + 10 if any sample exceeded 1,000 mg/kg for TPH. TPH was not detected in any of the samples at a concentration greater than the TPH soil clean-up criterion of 10,000 mg/kg.

Historical TPH Analytical Results Building C-8

NEC8-610-	Sample SS1	Sample SS2	Sample SS3	Sample SS4
TPH (mg/kg)	1,910	210	Not Detected	Not Detected

NEC8-610-	Sample SS5	Sample SS6	Sample SS7
TPH (mg/kg)	9,190	80	Not Detected

Because TPH was detected in Samples NEC-610-SS1 and NEC-610-SS5 at concentrations greater than 1,000 mg/kg, the samples was analyzed for VOC + 10.

Acetone (2,100 ug/kg B), benzene (400 ug/kg estimated), 4-methyl-2-pentanone (240,000 ug/kg), 2-hexanone (47,000 ug/kg), 1,1,2,2-tetrachloroethane (4,400 ug/kg), toluene (18,000 ug/kg), ethylbenzene (69,000 ug/kg), meta- + para-xylenes (310,000 ug/kg), ortho-xylene (28,000 ug/kg), and 10 tentatively identified compounds were detected in sample NEC8-610-SS1. Only 4-methyl-2-pentanone and 1,1,2,2-tetrachloroethane were detected at concentrations above their respective impact to groundwater soil clean-up criteria listed in New Jersey Soil Clean-Up Criteria (revised February 3, 1994). Acetone was identified as a probable laboratory contaminant. Oxygenated solvents (4-methyl-2-pentanone and 2-hexanone) and chlorinated solvents (1,1,2,2-tetrachloroethane) are not typically associated with the formulation, by-products, or storage of petroleum products in UST systems. Therefore, the presence of 4-methyl-2-pentanone, 2-hexanone, and 1,1,2,2-tetrachloroethane is probably not related to the UST system.

Methylene chloride (1,600 ug/kg B), acetone (2,000 ug/kg B), carbon disulfide (1,000 ug/kg B), 1,2-dichloroethane (520 ug/kg estimated), trichloroethene (350 ug/kg estimated), 4-methyl-2-pentanone (2,500 ug/kg estimated), 2-hexanone (930 ug/kg estimated), 1,1,2,2-tetrachloroethane (180 ug/kg estimated), ethylbenzene (780 ug/kg), styrene (490 ug/kg estimated), meta- + para-xylenes (1,100 ug/kg), ortho-xylenes (560 ug/kg estimated), and one tentatively identified compound were detected in Sample NEC8-610-SS5. None of the contaminants were detected at concentrations above their respective residential or non-residential direct contact soil clean-up criteria or impact to groundwater soil clean-up criteria listed in the New Jersey Soil Clean-Up Criteria (revised February 3, 1994). Methylene chloride, acetone, and carbon disulfide were identified as probable laboratory contaminants. As previously mentioned, oxygenated solvents (4-methyl-2-pentanone and 2-hexanone), chlorinated solvents (1,2-dichloroethane, trichloroethene, 1,1,2,2-tetrachloroethane), and unsaturated hydrocarbons (styrene) are not typically associated with the formulation, by-products, or storage of petroleum products in UST systems. The presence of 4-methyl-2-pentanone, 2-hexanone, 1,2-dichloroethane, trichloroethene, 1,1,2,2-tetrachloroethane, and styrene is probably not related to the UST system.

Building C-28

UST C28/1 was installed in 1953. Historical site plans, as-built diagrams, and operating and maintenance records are not available for UST C28/1. The UST failed a tightness test on April 23, 1993 and was removed. Samples collected during the 1993 removal activities detected TPHs in the soil, indicating that a leak had occurred from the tank and associated piping system and/or from the fill ports. The incident discharge number for UST C28/1 is 93-4-23-1120-34.

Previous Investigations

Contaminated soil was excavated to a depth of 12 feet, and approximately 19 cubic yards of soil were removed during the 1993 removal activities. Four soil samples were collected from the excavation (Samples 1, 2, 3, and 4) on April 28, 1993 and were submitted to Laboratory Resources, Incorporated, for TPH analysis. The locations of the excavation samples are unknown. The samples were received by the laboratory on April 26, 1993 and were analyzed on April 28, 1993. TPH was detected in one of the samples at a concentration greater than the TPH soil clean-up criterion of 10,000 mg/kg.

Historical TPH Analytical Results Building C-28

	Sample 1	Sample 2	Sample 3	Sample 4
TPH (mg/kg)	3,900	9,400	210	16,000

Building R-4B

UST R4B/1 was installed in 1972. Historical site plans and operating and maintenance records are not available for UST R4B/1. The UST failed a tightness test on October 12, 1993 and was removed. Samples collected during 1994 removal activities for R4B/1 detected TPH in the soil, indicating that a leak had occurred from the tank, its associated piping, or the fill port. The incident discharge number for UST R4B/1 is 94-9-22-1032-56.

Previous Investigations

Contaminated soil was excavated to a depth of approximately 11 feet during 1994 UST R4B/1 removal activities. Visual contamination of the soil was observed during the tank excavation. Groundwater was observed entering the excavation at a depth of about 10 feet. A brown sheen was noted on the groundwater in the excavation. Five soil samples (R4B-1 through R4B-5) were collected from the excavation and two samples (R4B-Pile 1 and R4B-Pile 2) were collected from excavated soil piles on August 11, 1994 following removal activities. The samples were submitted to Laboratory Resources for TPH analysis; 25 percent were to be analyzed for VOC + 10 if any sample exceeded 1,000 mg/kg for TPH. TPH was detected in one of the samples at a concentration greater than the TPH soil clean-up criterion of 10,000 mg/kg.

Historical TPH Analytical Results Building R-4B

	Sample R4B-1	**Sample R4B-2**	**Sample R4B-3**
TPH (mg/kg)	350	470	3,300

	Sample R4B-4	**Sample R4B-5**	**Sample R4B-Pile 1**	**Sample R4B- Pile 2**
TPH (mg/kg)	600	130	27,000	Not Detected

Because TPH was detected in Sample R4B-3 at a concentration greater than 1,000 mg/kg, the sample was analyzed for VOC + 10. Methylene chloride (14 ug/kg), acetone (20 ug/kg), toluene (estimated 2 ug/kg), xylenes (estimated 2 ug/kg), and three tentatively identified compounds were detected in Sample R4B-3. None of the contaminants were detected at concentrations above their respective residential or non-residential direct-contact soil clean-up criteria or impact to groundwater soil clean-up criteria listed in New Jersey Soil Clean-Up Criteria (revised February 3, 1994).

Building R-11

UST R11/1 was installed in 1959. Historical site plans and operating and maintenance records are not available for UST R11/1. The UST failed a tightness test on September 28, 1993 and was removed. Samples collected during the 1993 removal activities for R11/1 detected TPH in the soil, indicating that a leak had occurred from one or both of the tanks and their associated piping systems and/or from the fill ports. The incident discharge number for UST R11/1 is 93-9-28-1519-27.

Previous Investigations

Contaminated soil was excavated, and approximately 75 cubic yards of soil were removed during 1993 tank removal activities. Visual contamination of the soil was observed during the tank excavation. Groundwater was observed entering the excavation from the sidewall at a depth of between five and six feet. Six soil samples (SS01 through SS06) were collected from the sidewalls just above the depth of groundwater incursion on August 19, 1993 following removal activities. The samples were submitted to American Environmental Network, Incorporated, for TPH analysis; 25 percent were to be analyzed for VOCs if any sample exceeded 1,000 mg/kg for TPH. The samples were received by the laboratory on August 20, 1993 and were analyzed on August 23, 1993. TPH was not detected in any of the samples at a concentration greater than the TPH soil clean-up criterion of 10,000 mg/kg.

Historical TPH Analytical Results Building R-11

	SS01	SS02	SS03
TPH (mg/kg)	6, 010	not detected	not detected

	SS04	SS05	SS06
TPH (mg/kg)	not detected	9,100	7,870

Because TPH was detected in Samples SS01, SS05, and SS06 at concentrations greater than 1,000 mg/kg, the samples were analyzed for VOC + 10. Methylene chloride (78 ug/kg B), acetone (35 ug/kg JB), carbon disulfide (64 ug/kg B), meta- + para-xylenes (3 ug/kg estimated), and three tentatively identified compounds were detected in Sample SS01. None of the contaminants were detected at concentrations above their respective residential or non-residential direct contact soil clean-up criteria or impact to groundwater soil clean-up criteria listed in New Jersey Soil Clean-Up Criteria (revised February 3, 1994). Methylene chloride, acetone, and carbon disulfide were identified as probable laboratory contaminants.

Methylene chloride (6,200 ug/kg B), 1,1,1-trichloroethane (1,000 ug/kg), benzene (730 ug/kg estimated), toluene (3,100 ug/kg), chlorobenzene (2,800 ug/kg), ethylbenzene (11,000 ug/kg), and 13 tentatively identified compounds were detected in Sample SS05. Methylene chloride and chlorobenzene were detected at concentrations above their respective impact to groundwater soil clean-up criteria listed in New Jersey Soil Clean-Up Criteria (revised February 3, 1994). Methylene chloride was identified as a probable laboratory contaminant. Chlorinated solvents (chlorobenzene and 1,1,1-trichloroethane) are not typically associated with the formulation, by-products, or storage of petroleum product in UST system. The presence of chlorobenzene and 1,1,1-trichloroethane is probably not related to the UST system.

Methylene chloride (2,400 ug/kg B), 1,1,1-trichloroethane (540 ug/kg estimated), toluene (200 ug/kg estimated), chlorobenzene (380 ug/kg estimated), ethylbenzene (2,300 ug/kg), total xylenes (5,500 ug/kg), and six tentatively identified compounds were detected in Sample SS06. Methylene chloride and chlorobenzene were detected at concentrations above their respective impact to groundwater soil clean-up criteria listed in New Jersey Soil Clean-Up Criteria (revised February 3, 1994). Methylene chloride was identified as a laboratory contaminant. As previously mentioned, chlorinated solvents (chlorobenzene and 1,1,1-trichloroethane) are not typically associated with the formulation, by-products, or storage of petroleum product in UST system. The presence of chlorobenzene and 1,1,1-trichloroethane is probably not related to the UST system.

3. The location of the UST excavations as indicated in the RI Report represents B&R Environmental's best estimate of the location of the former USTs, based on site conditions and the information in the Closure Reports. The Closure Reports were prepared previously by another Navy subcontractor. Refer to Attachment A for a copy of UST location documentation as indicated in the Closure Reports for Buildings C-8, R-4B, and R-11. Note that drawings or maps that indicate the locations of the USTs and the post-excavation samples at Buildings C-28 and 617 were not included with the closure documents.

4. Sample locations during the RI were measured in the field based on fixed references (such as building corners) and plotted on scaled site maps that were included in the RI Report. Copies of the field log book indicating field measurements are included in Attachment B.

Page Specific Comment

The interim action planned for Building 566 is detailed in a letter report dated October 11, 1995, from B&R Environmental to Mr. Brian Helland, Naval Facilities Engineering Command. This letter is included for review in Attachment C.

As always, B&R Environmental appreciates the opportunity to provide technical services to the Navy. Do not hesitate to contact me if you have additional questions or comments.

Sincerely,

Richard J. Gorrell
Project Manager

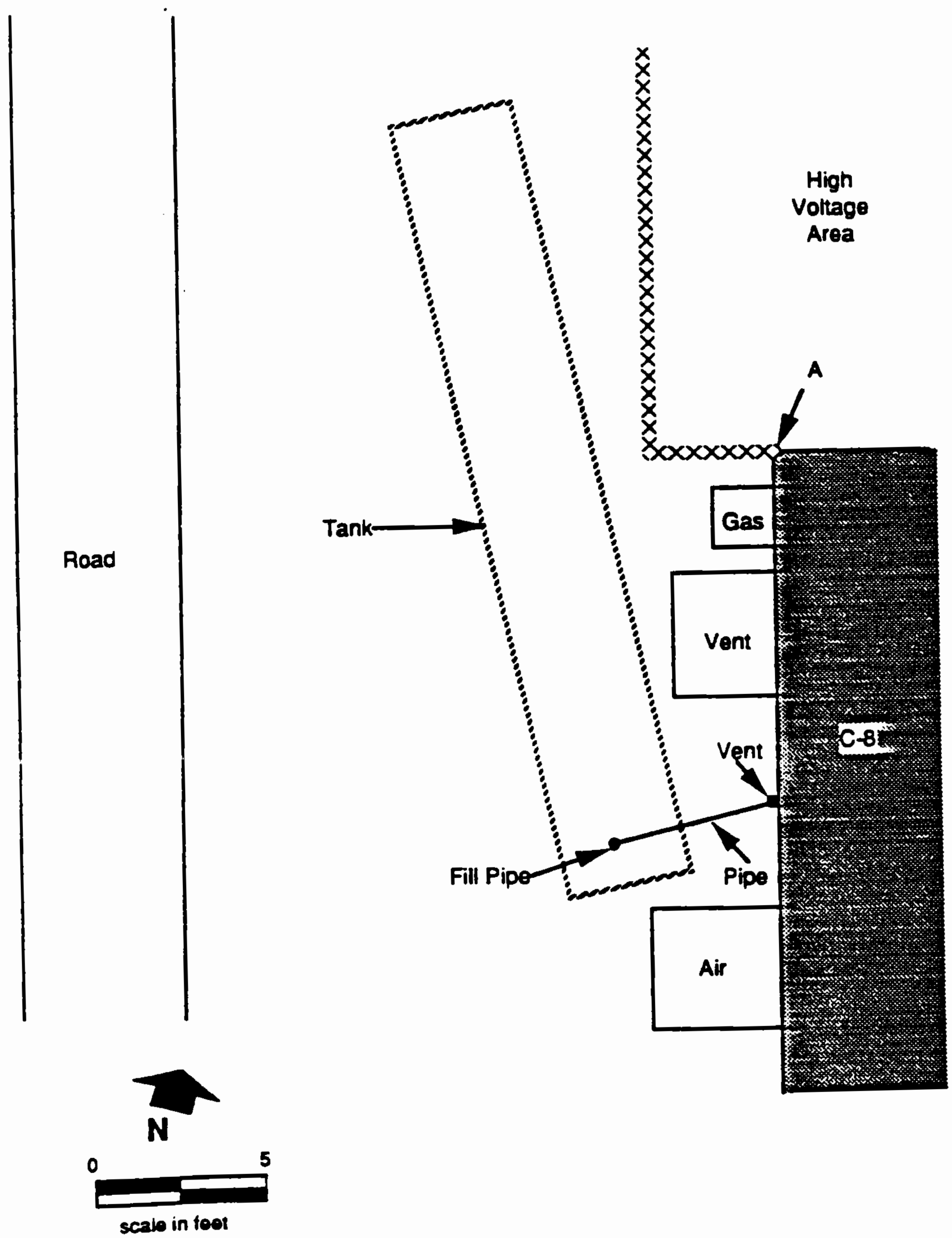
RJG/dhn

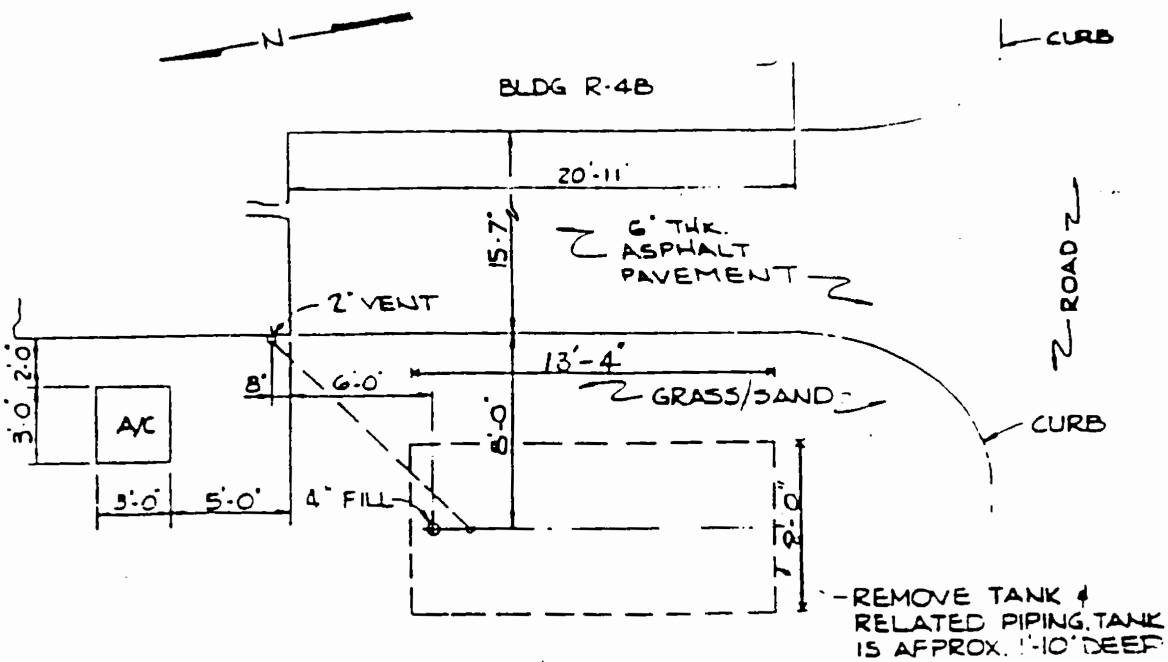
c: Greg Goepfert (NWS Earle)
John Trepanowski, P.E. (B&R Environmental)
Michael Turco, P.E., DEE (B&R Environmental)

ATTACHMENT A

UST LOCATION DOCUMENTATION

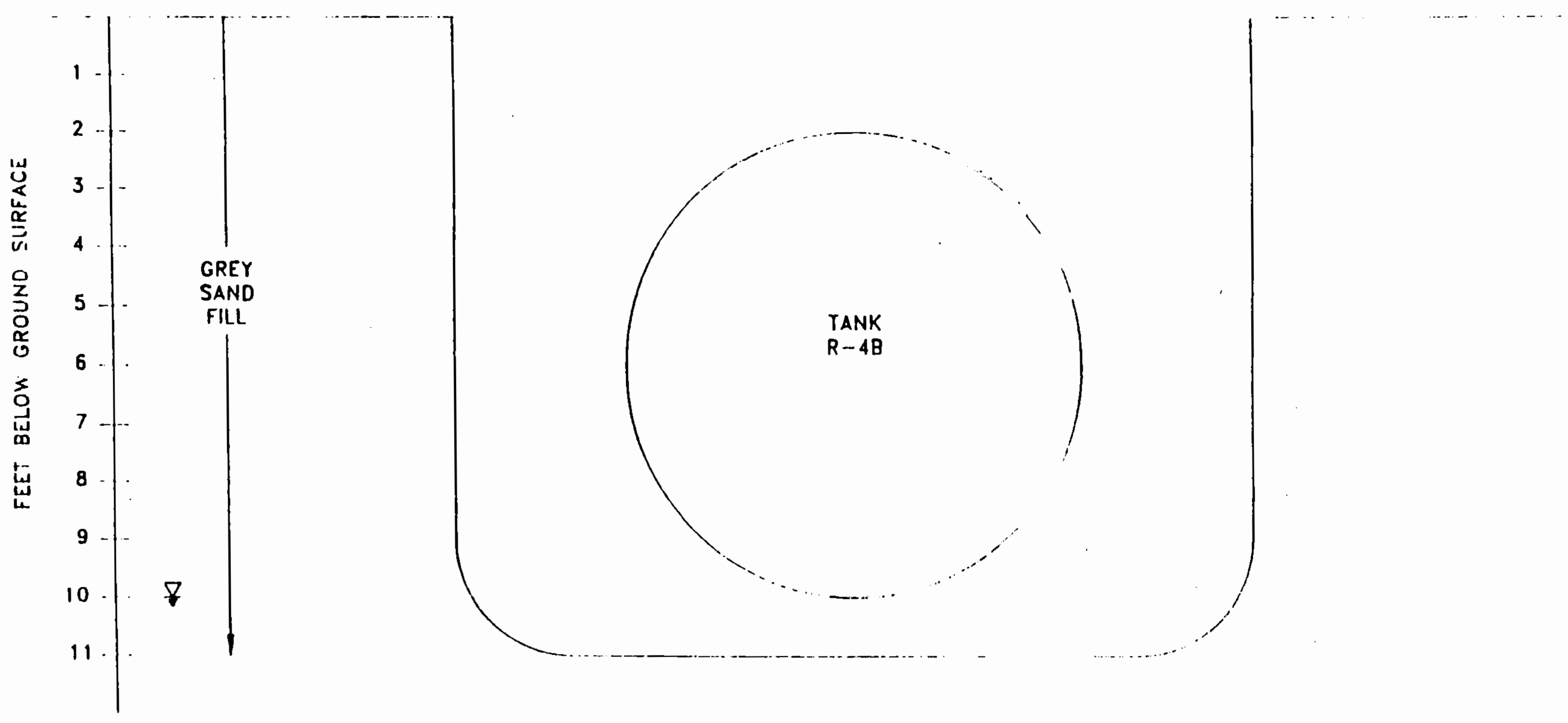
FIGURE 2-2
Building C8/02 UST Location Map
Naval Weapons Station Earle





WESTON MANAGERS DESIGNERS/CONSULTANTS	PROJECT NAME: UNDERGROUND STORAGE TANK CLOSURES NAVAL WEAPON STATION EARLE COLTS NECK, NEW JERSEY	SITE LOCATION MAP TANK R-4B
	CLIENT NAME: DEPARTMENT OF THE NAVY NAVFAC CONTRACTS	DATE: 16 SEPTEMBER 1994 FIGURE #: 2-8

REVISION #: 0000 DATE: 9/1/94 PLOT NAME:
FILE NAME: EARLE-2X.DWG DRAWN BY: B. MAC



HORIZONTAL SCALE

1.5 0 1.5 3

(IN FEET)

WESTON MANAGERS DESIGNERS/CONSULTANTS

PROJECT NAME: UNDERGROUND STORAGE TANK CLOSURES NAVAL WEAPON STATION EARLE

COLTS NECK, NEW JERSEY

CLIENT NAME: DEPARTMENT OF THE NAVY NAVFAC CONTRACTS

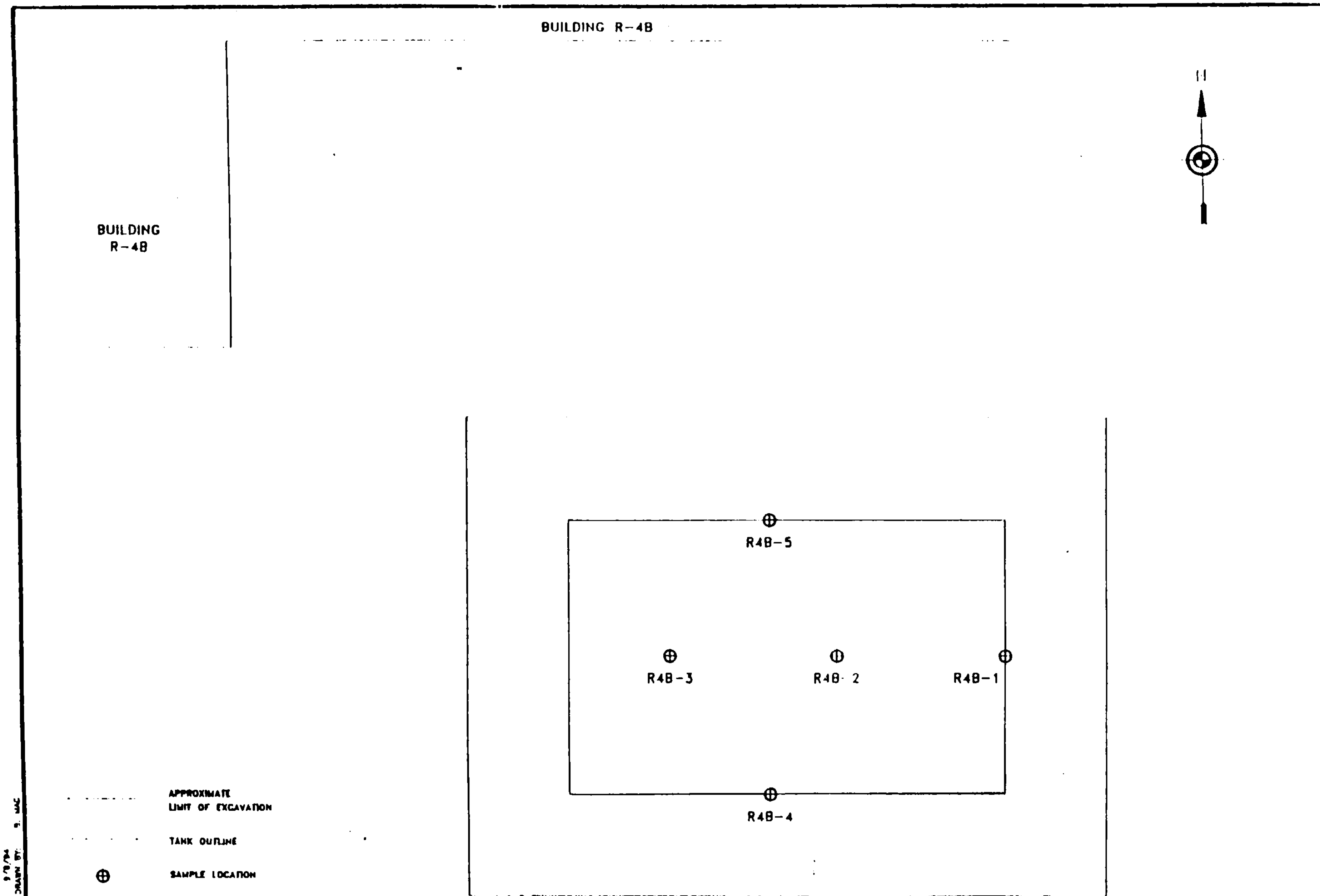
SUBSURFACE PROFILE TANK R-4B

DATE: 16 SEPTEMBER 1994

FIGURE #: 2-17

REVISION #: 0000 DATE: 9/19/94

FILE NAME: EARLE-23.DWG DRAWN BY: R. MAC



WESTON
MANAGERS DESIGNERS/CONSULTANTS

PROJECT NAME:
UNDERGROUND STORAGE TANK CLOSURES
NAVAL WEAPON STATION EARLE

COLTS NECK, NEW JERSEY

CLIENT NAME: DEPARTMENT OF THE NAVY
NAVFAC CONTRACTS

SAMPLE LOCATION MAP
TANK R-4B

DATE: 16 SEPTEMBER 1994

FIGURE: 2-26

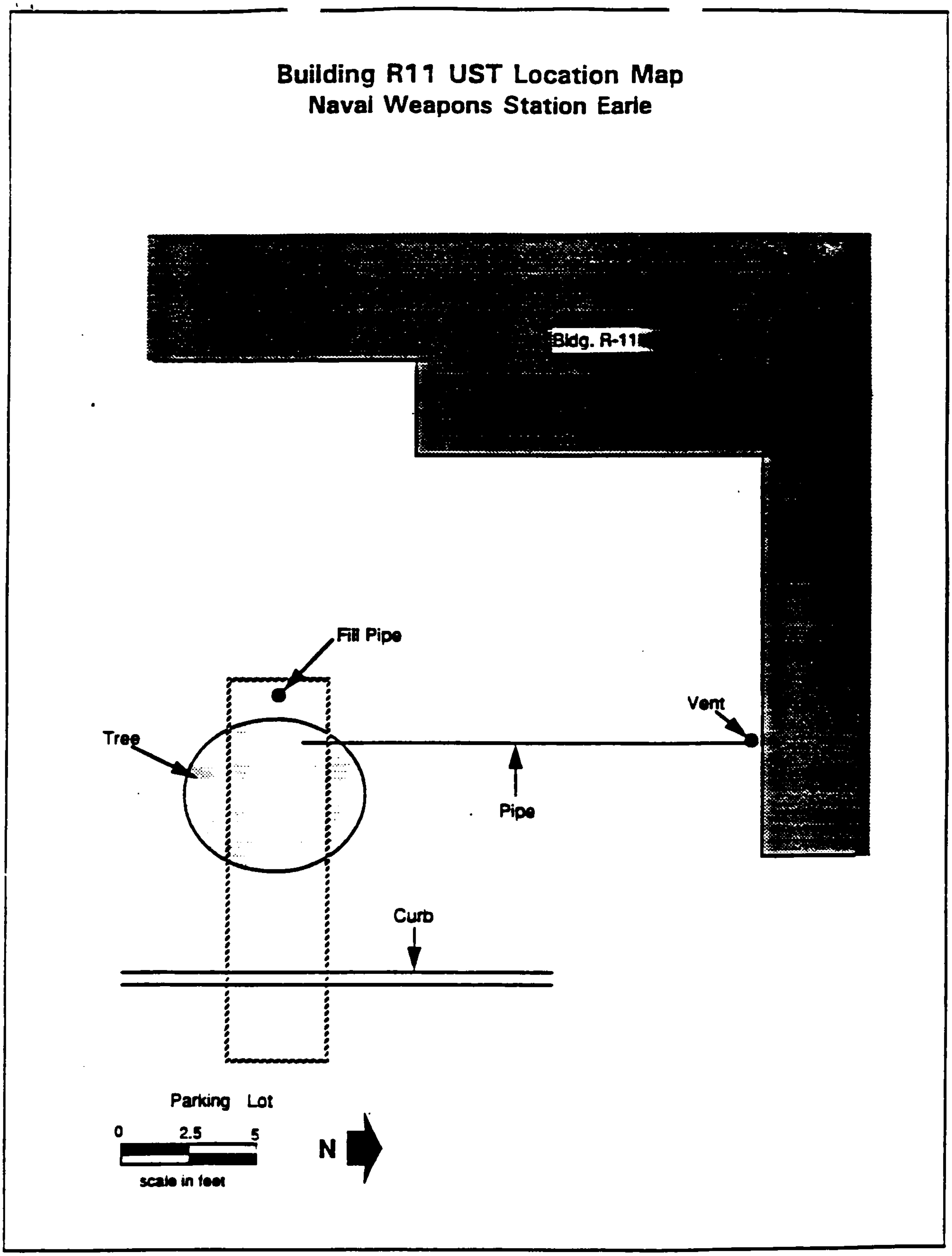
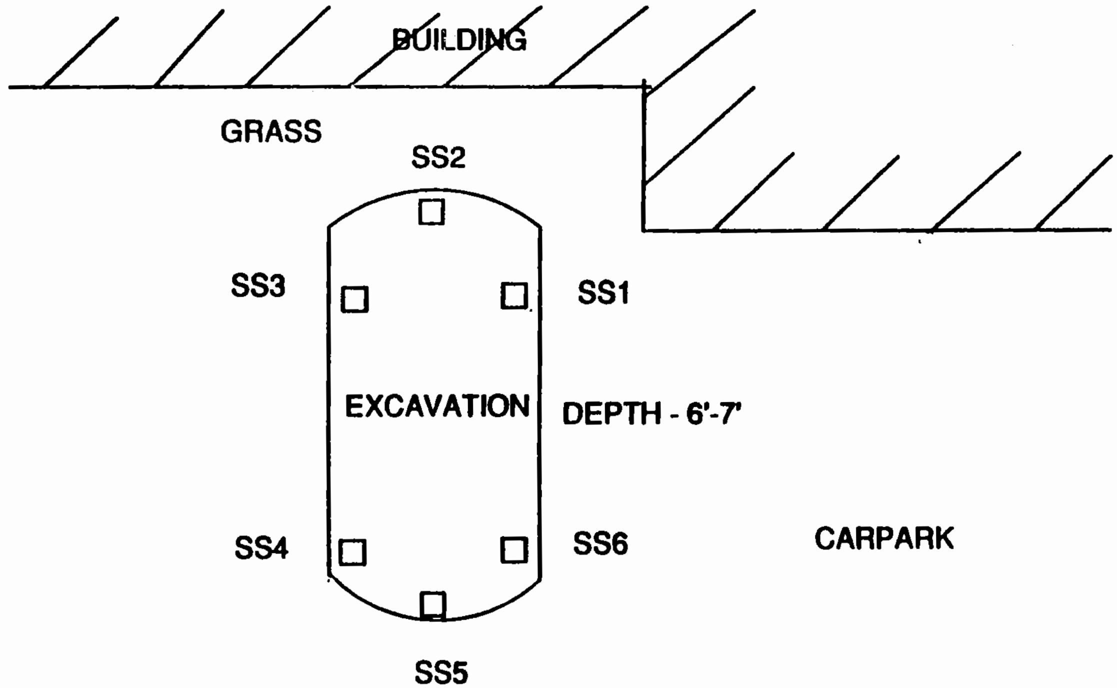

Building R11 UST Location Map
Naval Weapons Station Earle
Bldg. R-11
Fill Pipe
Vent
Tree
Pipe
Curb
Parking Lot
0
2.5
5
scale in feet
N

Figure 2-2



NOT TO SCALE

FIGURE 2-4

WESTON MANAGERS DESIGNERS/CONSULTANTS

R11 UNDERGROUND STORAGE TANK
EARL NAVAL WEAPON STATION

SOIL SAMPLE LOCATIONS

ATTACHMENT B

SAMPLE LOCATION DOCUMENTATION

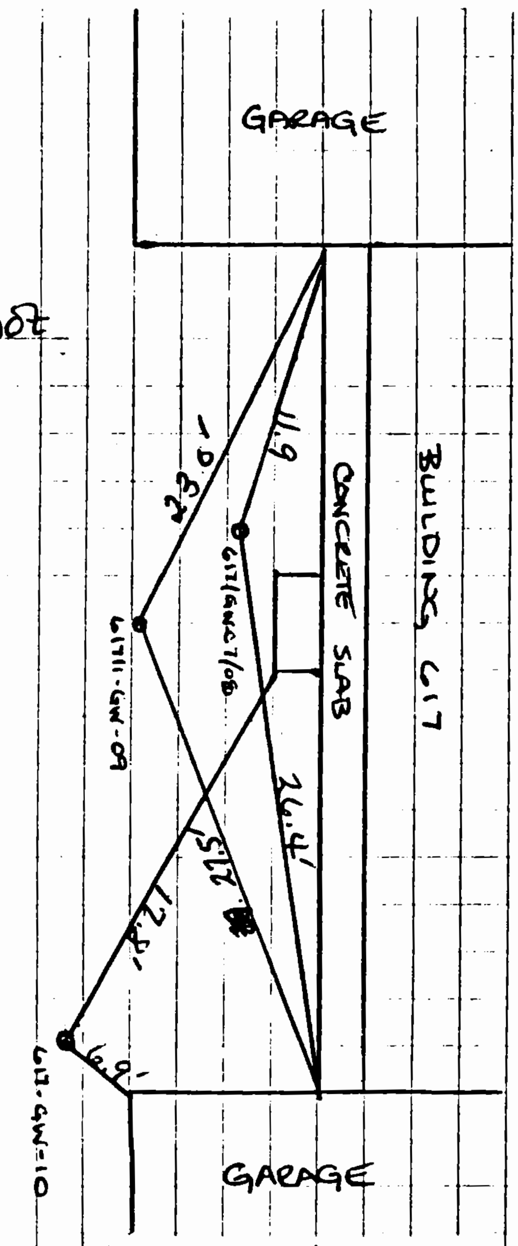
BLDG 617 GROUNDWATER SAMPLE LOCATIONS

5333

8/15/95 (cont)

NOT TO SCALE

* Measurements are not accurate
Add 1' to each



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DATE 8/15/95

BLDG 617 SOIL SAMPLE LOCATIONS

PROJECT 5333

BOOK 2283

6/8/95 (cont)

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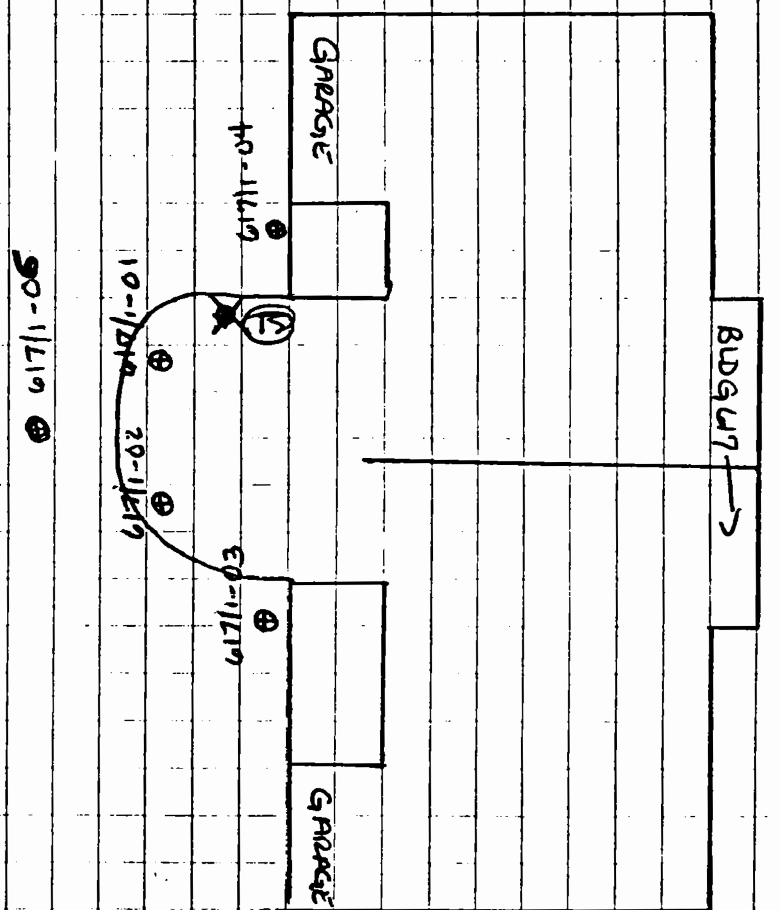

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DATE 6/8/95

WITNESS

DATE

BLDG C-8 1ST ROUND SAMPLE LOCATIONS (DIRECT-PUSH)

TITLE PROJECT NO 5333

6/8/95 (cont) BOOK 2283

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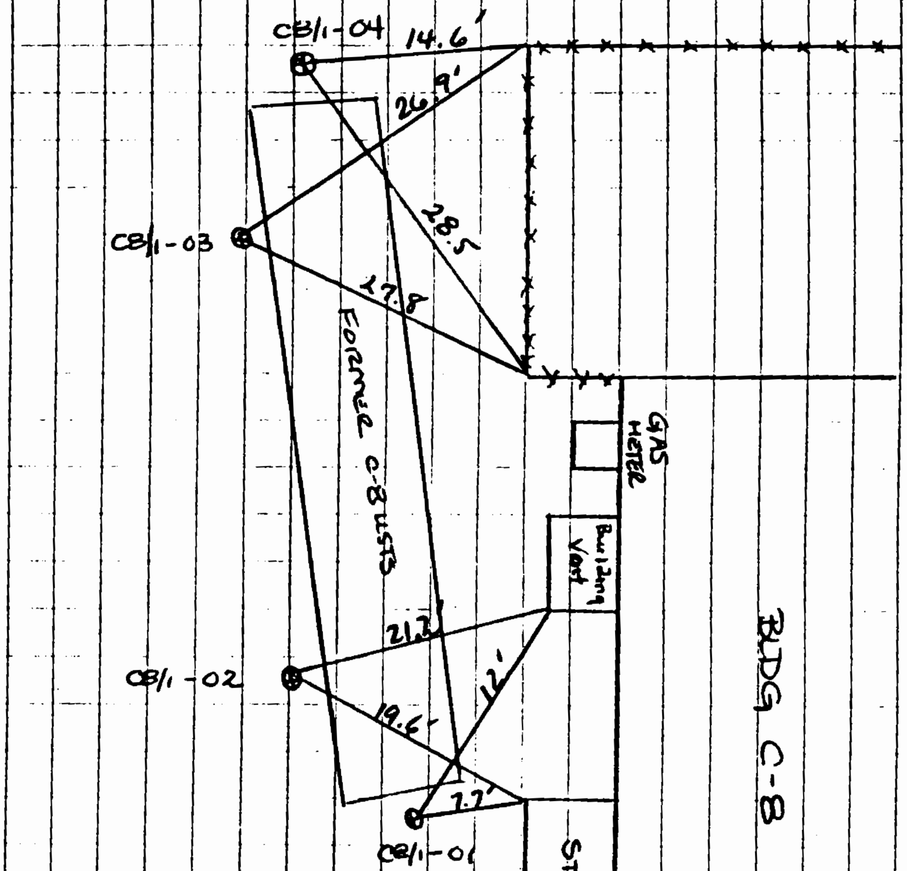

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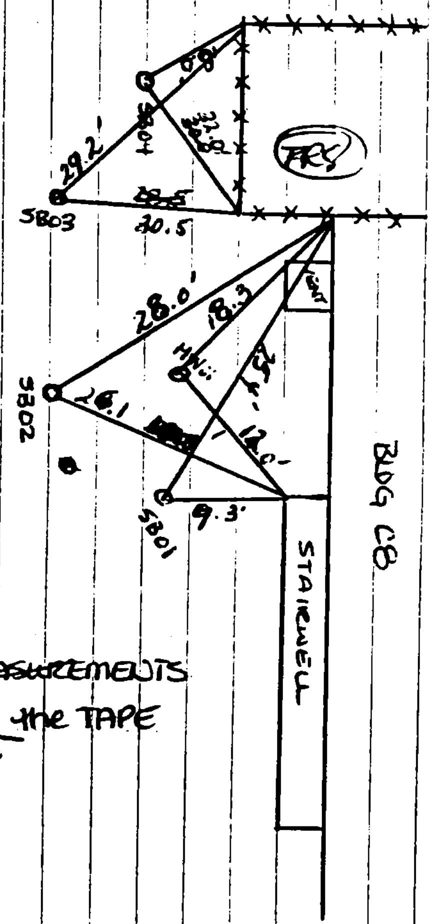
WITNESS DATE

BLDG C-8 SOIL BORING LOCATIONS

5333

8/14/95 (cont)

1330 R. GORRELL AND I GO AND MEASURE SOIL BORING LOCATIONS @ C8 DONE ON 06/23/95



* ~~THESE ARE ACCURATE MEASUREMENTS DO NOT SUBTRACT 1' For the TAPE~~

STET

SIGN Teresa Amoye 8/14/95

BLDG C-8 GROUNDWATER SAMPLE LOCATIONS

TITLE ... 5333

8/16/95 (cont)

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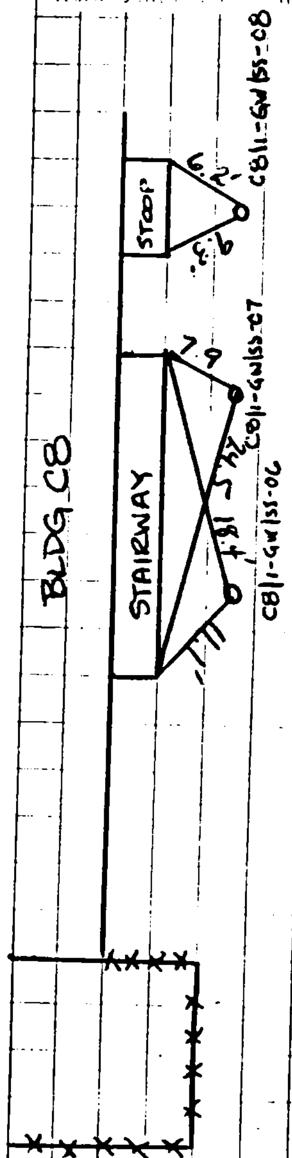

Measurements are accurate

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SIGNATURE Teresa Aauzer 8/16/95

WITNESS

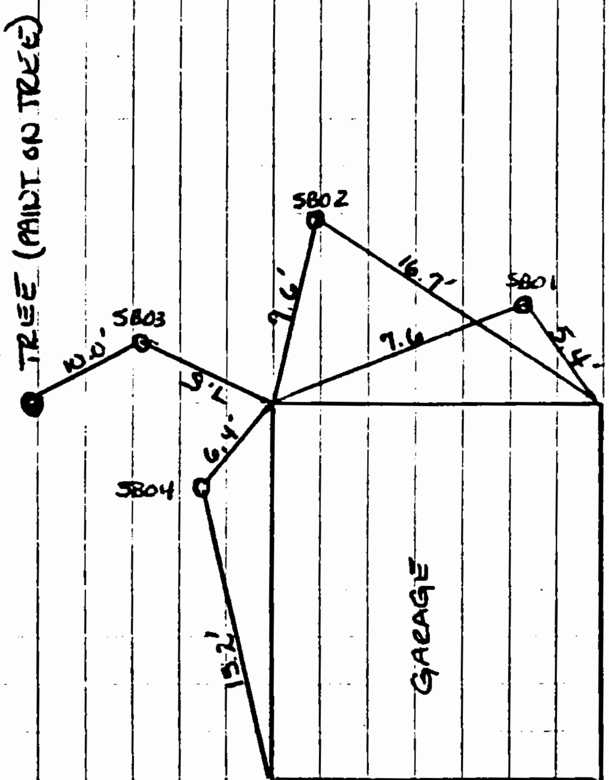
BLDG C-28 SOIL BORING LOCATIONS

5333

08/14/95 (cont)

SOIL BORING LOCATIONS FOR UST C28, COLLECTED ON 06/23/95. SEE PAGE 89

* MEASUREMENTS ARE NOT ACCURATE ADD 1' to each



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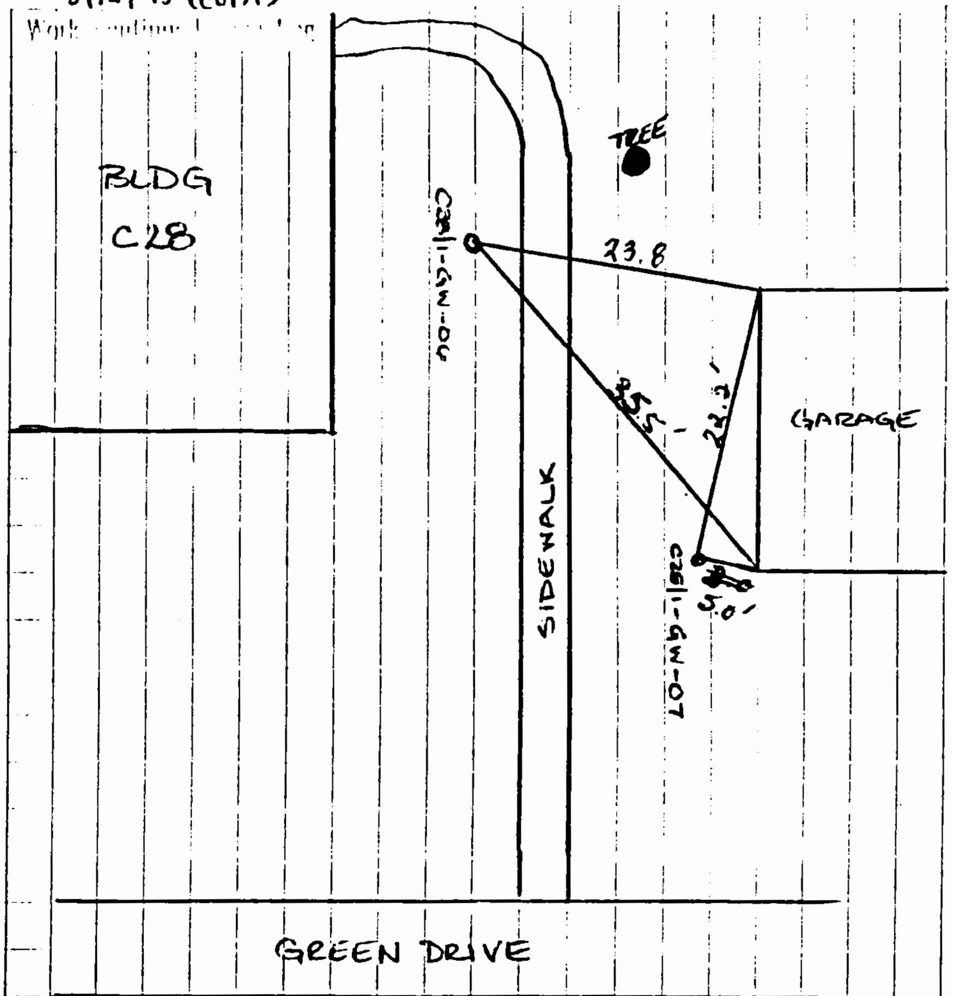
WITNESS DATE

BLDG C-28 SECOND ROUND DIRECT PUSH SAMPLES

5333

8/16/95 (cont)



Measurements are accurate

Not to scale

SIGNATURE

WITNESS

8/16/95

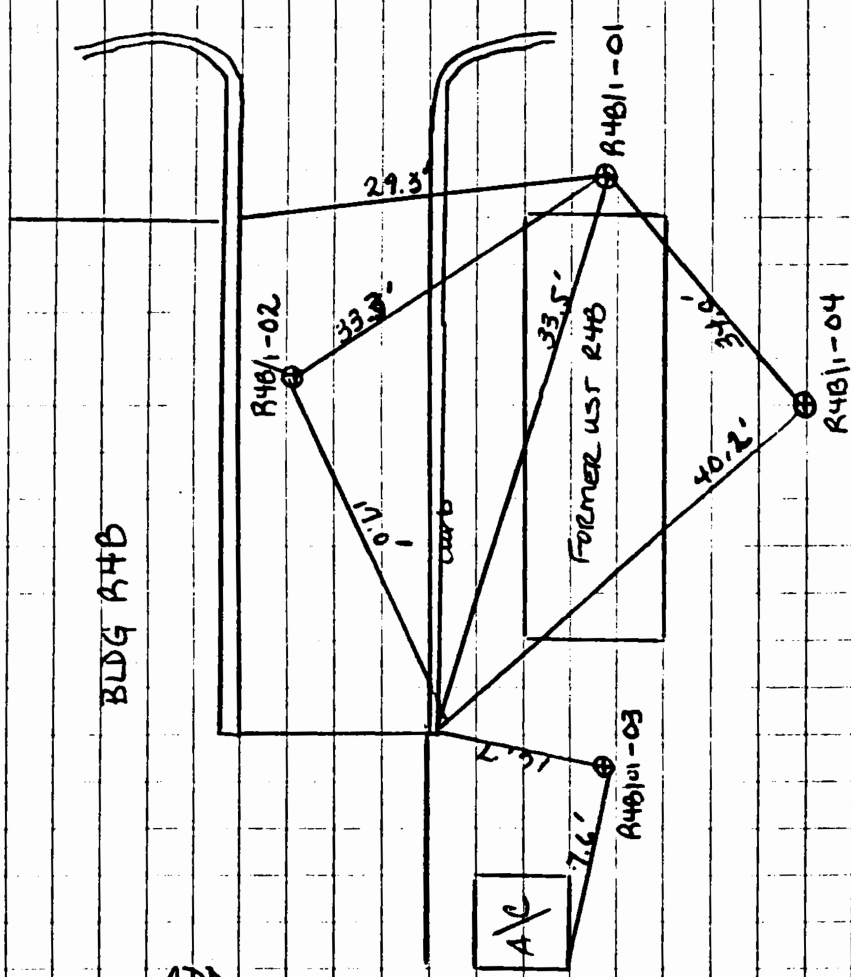
BLDG R4B FIRST ROUND DIRECT PUSH SAMPLE LOCATIONS

5333

2283

6/7/95 (cont)

N↓ MAP OF R4B - with triangulation measurements



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SCIENTIFIC BINDERY PROD ... CHICAGO 60605

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WITNESS DATE

BLDG R4B SOIL BORING LOCATIONS

5333

8/14/95 (cont)

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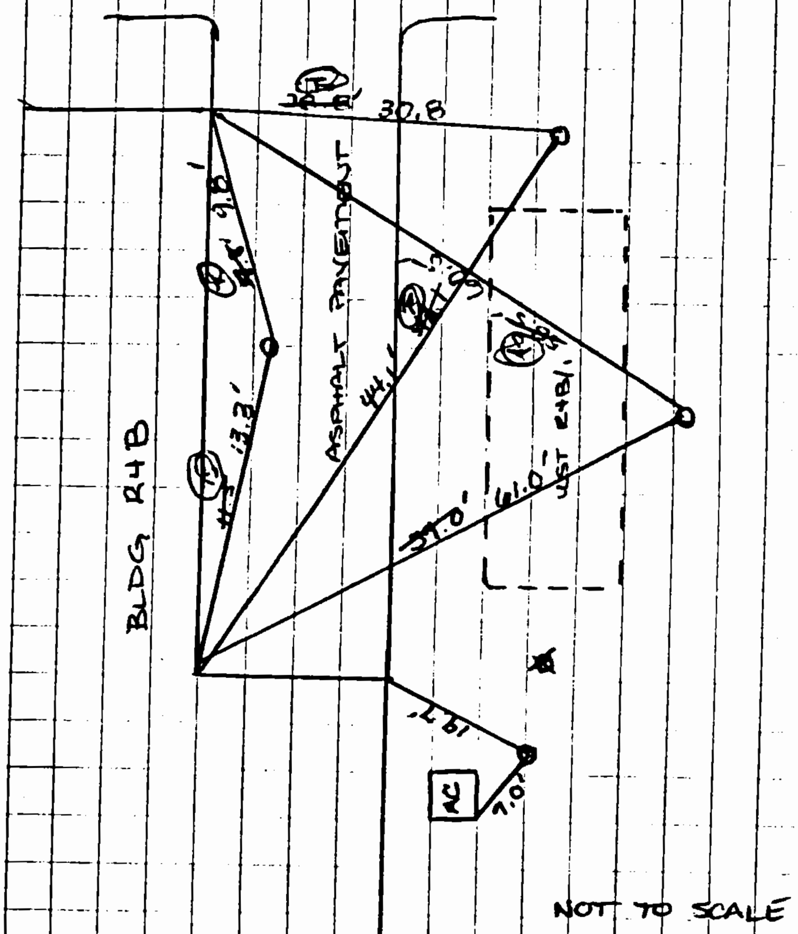
SOIL BORING LOCATIONS FOR UST R4B COLLECTED ON 06/21/95. SEE PAGE 67.

* THESE ARE ACCURATE MEASUREMENTS
DO NOT SUBTRACT 1' FOR TAPE



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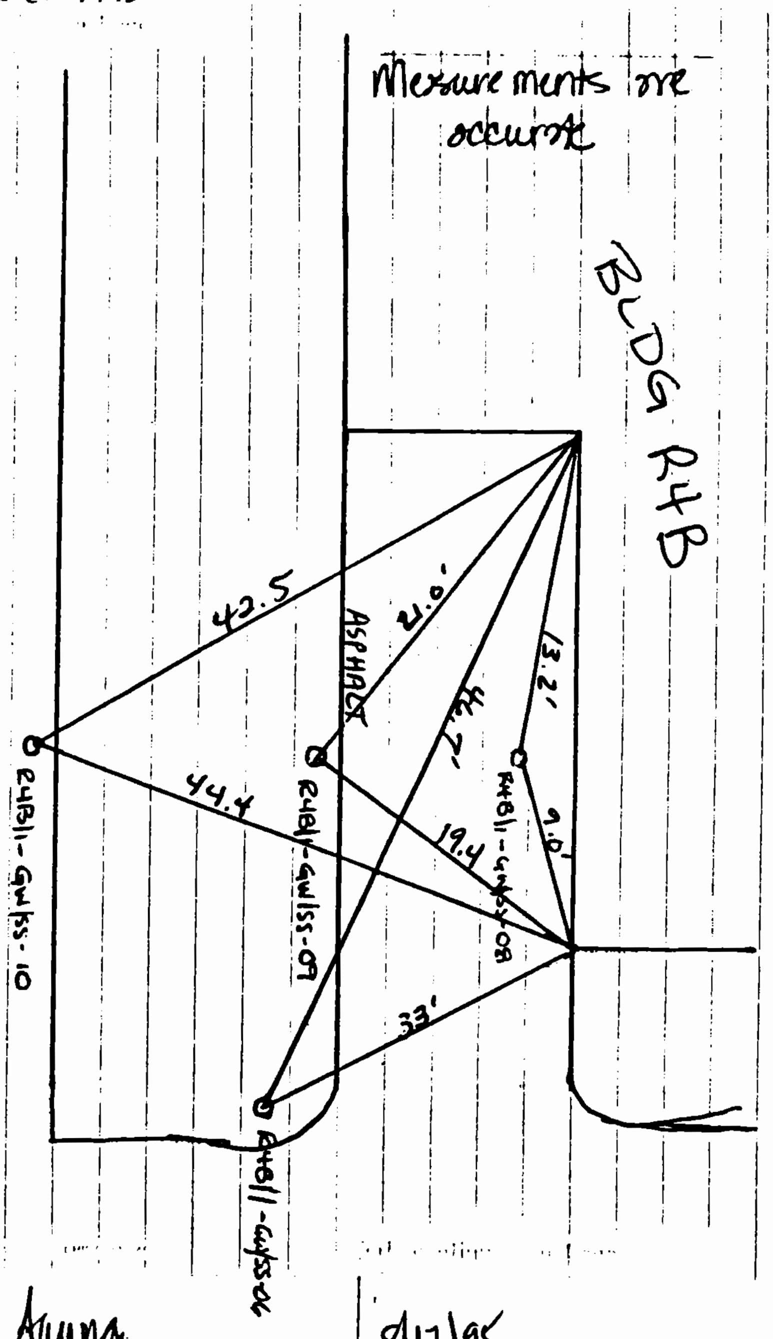
SIGNATURE Teresa Araujo 8/14/95

WITNESS

BLDG R4B SECOND ROUND DIRECT PUSH SAMPLE LOCATIONS

5333

8/17/95 (cont)



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Tereta Amya

WITNESS

8/17/95

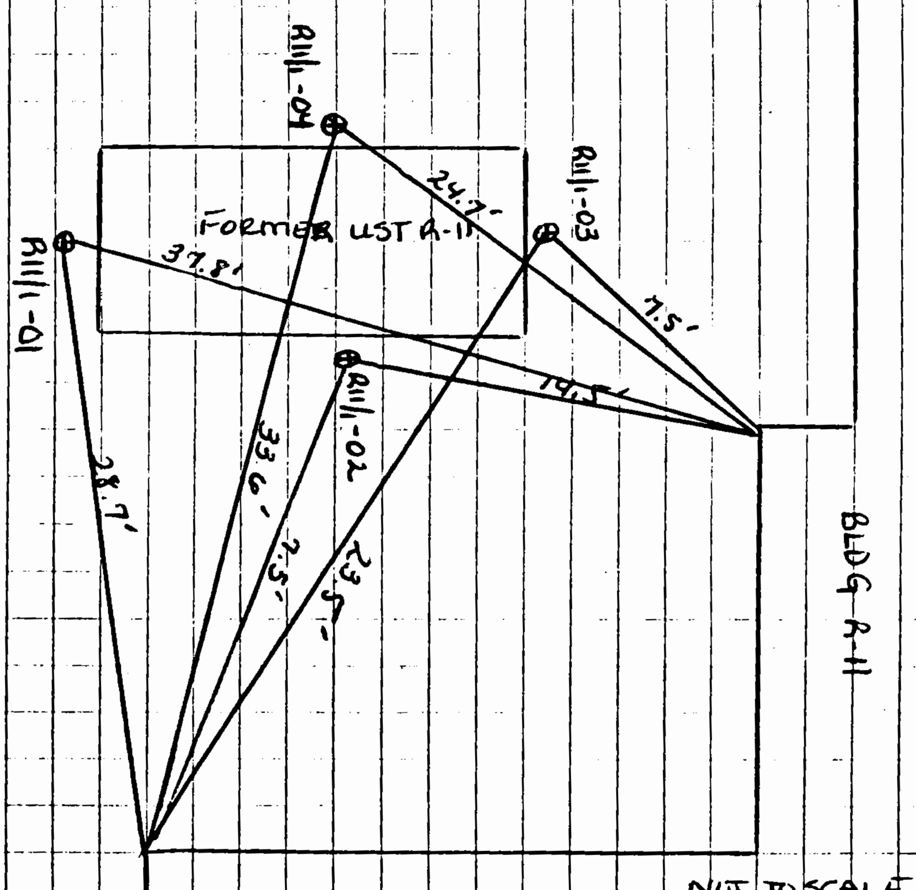
BLDG R-11 FIRST ROUND DIRECT-PUSH SAMPLE LOCATIONS

5333

6/7/95 (cont) 2283

MAP OF R11 - with triangulation measurements

* ~~SUBTRACT~~ ADD 1' FROM THESE MEASUREMENTS (TR)



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SIGNATURE Teresa Aguinaga DATE 6/7/95

WITNESS DATE

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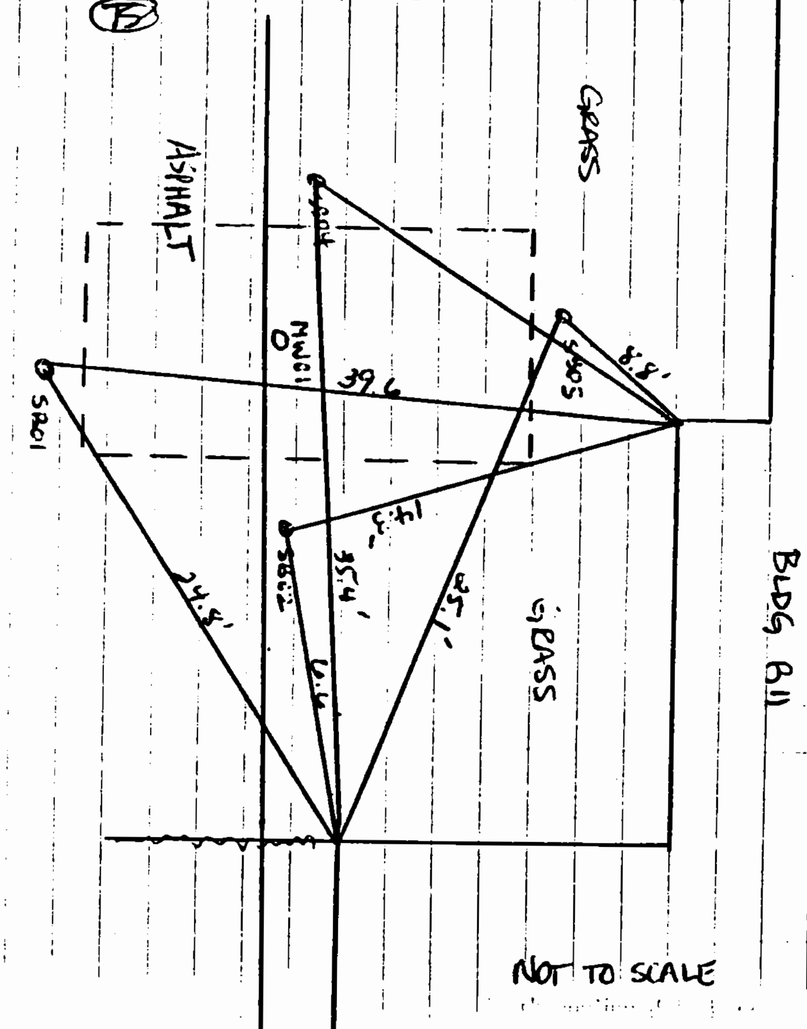
BLDG R-11 SOIL BORING LOCATIONS

8/14/95 (cont)

SOIL BORING LOCATIONS FOR R11 COLLECTED ON 6/22/95 - SEE PAGE 79

* ~~Subtract~~ ADD 1' from these measurements (TB)



Teresa Aaronze 8/14/95

ATTACHMENT C

BUILDING 566 INTERIM ACTION PLAN

Brown & Root Environmental

993 Old Eagle School Road, Suite 415
Wayne, PA 19087-1710

(610) 971-0900
FAX: (610) 971-9715

BRPH\51-10-5-41

October 11, 1995

Project Number 5085

Mr. Brian Helland
Northern Division, Code 1812
Naval Facilities Engineering Command
10 Industrial Highway, Mailstop No. 82
Lester, Pennsylvania 19113

Reference: CLEAN Contract No. N62472-90-D-1298
Contract Task Order (CTO) No. 206

Subject: Building 566 Septic Field - Interim Remedial Action
Naval Weapons Station Earle
Colts Neck, New Jersey

Dear Mr. Helland:

Based on the conclusions resulting from the teleconference conducted on October 4,1995 between Northern Division Naval Facilities Engineering Command and Brown & Root Environmental (B&R Environmental), B&R Environmental offers the following recommendations for interim remedial actions for the septic system and underground storage tank (UST) area located at Building 566, NWS Earle in Colts Neck, New Jersey. The interim remedial action discussion memorandum is presented in two sections, project summary and recommended interim remedial actions. The attached Figure 1 provides a plan view of current site conditions and proposed interim action site modifications.

1.0 PROJECT SUMMARY

1.1 SITE HISTORY AND HISTORICAL DATA

Historical data relating to Building 566 operations indicate that the USTs and associated piping have resulted in releases of product to the surrounding soil and groundwater. These releases were partially remediated during the replacement of tanks. The data also indicate that release of petroleum has occurred through the piping of the septic system leach field. Data from sampling conducted during later removal of the USTs (designated as 556/1 and 556/2) indicate that petroleum and chlorinated organic solvents were present in the soil surrounding the USTs.

1.2 RECENT SITE INVESTIGATION ACTIVITIES

Field investigations were conducted by B&R Environmental during the period August 1994 through August 1995. Samples were collected and analyzed during May 1995 to confirm the presence of petroleum in soil and groundwater immediately downgradient of the septic leach field. Petroleum products were found to be present in the samples analyzed during this event. The presence of "free product" was observed approximately 50 feet downslope of the septic leach field in test borings and at seeps at the soil surface. It is believed that a high groundwater table contributed to movement of free product to the surface of the site. Additionally, a leaking water main was discovered upgradient of the site. The presence of chlorinated solvents in soil or groundwater at the site under current conditions has not been confirmed.

Three site visits conducted by B&R Environmental in January, May, and July and August 1995 suggested that groundwater was artificially raised as a result of a leaking underground water main and precipitation events occurring prior to the time of sampling. It is likely that the shallow groundwater found at the site was the result of the defective water line combined with precipitation runoff from Building 566 and the adjoining parking lot. Soil borings installed during January 1995 indicate that shallow groundwater is likely to be confined to a surficial layer of gravelly sandy soil due to the presence of an underlying confining clay layer. The thickness of the surface sand decreases from a maximum of approximately 10 feet in the UST area to a minimum thickness of a few inches just above the wetland area. The clay appears to be flat or to slope slightly upgradient toward the southwest and south. The clay layer is apparently greater than 1 foot thick. Dark stains from apparent seeps have been observed immediately upslope of the area where the clay layer reaches the surface.

2.0 DISCUSSION OF REMEDIAL ALTERNATIVES

2.1 REMEDIAL ALTERNATIVES

B&R Environmental considered seven remedial alternatives after compiling a site history and the data generated during field investigations. Alternatives such as air sparging and groundwater pump and treat systems were eliminated from consideration due to a highly variable groundwater elevation and the assumption that containment of the product plume can be achieved by controlling the flow of groundwater. (Groundwater flow is assumed to be controllable with surface runoff management mechanisms and repair of leaking pipes.) The five remaining alternatives are soil vapor extraction, bioventing, biosparging, excavation (in combination with biopiles and/or off-site disposal), and natural attenuation. Table 1 provides a summary of the results of the preliminary screening of these alternatives.

2.2 EVALUATION CRITERIA

The five remaining alternatives require the generation of additional site-specific data to determine their applicability. This information will be obtained as part of the RI proposed under CTO 226, incorporating the Building 566 area as one or the sites investigated under this CTO scope of work. The following information must be generated in order to complete the evaluation:

- Development of a current and complete fingerprint of the contaminants and concentrations.
- Determination of groundwater elevation, gradient, and flow rate throughout the site.
- Evaluation of groundwater quality upgradient of the UST area.
- Delineation (vertical and horizontal) of the clay layer that underlies the site.
- Evaluation of the impact of man-made influences that contribute to contaminant generation, release, or migration [such as leaking water pipes, leaking fuel lines (within the building or connecting the building to the USTs), building foundations, internal floor drains, and utilities].
- Determination of site soil properties including but not limited to permeability, density, pH, gradation, soil chemistry, void space, and compaction (density) parameters.
- Determination of soil microbial characteristics such as total microbial count and petroleum-consuming microbial count.
- Determination of site-specific costs for each alternative (developed after evaluation of site technical data).

3.0 RECOMMENDED INTERIM REMEDIAL ACTIONS

3.1 SUMMARY OF RECOMMENDED ACTION

B&R Environmental proposes a two-phase approach to implementing remediation activities at the subject site. The two phases are design and implementation of surface water and groundwater management interim remedial action mechanisms for control of contaminant migration and implementation of a remedial investigation (RI) provided for in CTO 226. Final remedial response action, if any, will be based on the results of the RI.

3.2 PHASE I - CONTROL OF CONTAMINATION MIGRATION

Mechanisms to control contaminant migration will be designed and implemented to minimize or prevent off-site migration of contaminated groundwater and soil until the final remedial action. Surface water runoff will be diverted away from the septic field and UST area by installing temporary curbs and redirecting flow from roof drains. Elimination of surface water run-on to the septic field area from the parking lot and roof drains will minimize erosion of soil from the UST and septic leach field areas of the site and minimize infiltration of surface water. Leaking water utilities contributing to local groundwater flow will be isolated or repaired. By controlling the flow of groundwater, it is anticipated that both the horizontal and vertical flow rate of subsurface contamination will be reduced, stabilized, and largely contained.

Reducing surface water and groundwater flow through the site may impact the downgradient wetland area. Man-made flow from leaking pipes will be eliminated. Flow diverted around the leach field will be directed to the downgradient wetland areas. Naturally occurring flow volume to the wetlands should remain relatively unchanged.

3.3 RECOMMENDED PHASE I INTERIM REMEDIAL ACTION ACTIVITIES

B&R Environmental recommends the following interim remedial actions:

1. Isolate all leaking pipes that contribute to localized groundwater flow by closing valves or repairing the leaks. If it is determined that repairs to the pipes cannot occur, the leaking pipes should be isolated until final remediation is completed.

2. Install piezometers upgradient of the USTs and downgradient of the septic leach field. The piezometers or monitoring wells should be installed using "push-point" methods. A minimum of seven piezometers will be required. Figure 1 shows the proposed location of the piezometers.

3. Survey the entire site for topography and significant features and for the development of site drawings. The development of two drawings is recommended, one showing the building and surrounding area and one showing the building area and adjoining areas. These drawings could be developed using previously proposed Geographic Inventory System (GIS) technology described under CTO 231. A soil erosion and sediment control plan used to manage storm water runoff (discharge to wetlands) would be developed using these drawings.

4. Conduct sampling from the piezometers (conducted as part of the RI). A minimum of three rounds of sampling are recommended. The first round of sampling would occur as soon as possible after the new piezometers were installed and prior to repair of leaking water utilities. Sampling parameters would include groundwater elevation, groundwater quality parameters, and soil quality parameters. Groundwater and soil would be sampled and analyzed for the presence of volatile and semivolatile organic compounds including chlorinated solvents and petroleum hydrocarbons. Two subsequent rounds of sampling for groundwater elevation only would also be required. The first round of sampling would be conducted during or immediately after the isolation or repair of the leaking pipe. The subsequent round of sampling would be conducted a sufficient time after isolation or repair of the leaking pipe is completed or nearing completion.

5. Install surface water management mechanisms. The mechanisms would include a temporary curb located immediately upgradient of the USTs at the edge of the asphalt paving. The curb would divert surface water from the paved parking lot around the USTs and septic leach field. The curb could be constructed from sand bags or installed as a permanent feature using asphalt or concrete. The surface water management mechanisms would also include diverting flow from the roof drain downspouts away from the UST and septic leach field area. The downspout flow can be redirected using polyvinyl chloride (PVC) or corrugated polyethylene drainage pipe. Minor removal and replacement of asphalt paving may be necessary if disruption of traffic flow around the building is a concern. This removal and replacement would be associated with installation of pipe under the driveway to minimize impact to traffic over the long term. Rip-rap would be installed at the discharge location of the curb and redirected roof downspout outfalls. Since rip-rap currently exists on the southwest slopes leading away from the building, it is likely that only one outfall to the east would require design and installation.

6. Empty the septic settling tank by pumping if it is not already empty and isolate flow from the building into the tank. This should be done after isolation or repair of the leaking water supply pipe.

In summary, B&R Environmental recommends immediate implementation of interim remedial actions described above and the initiation of RI work under CTO 226.

B&R Environmental appreciates the opportunity to submit the recommendations detailed above. If you agree with the approach, please contact us immediately. We will then revise and re-issue applicable CLEAN contract scope of work, schedule, and budget documents. If you have questions or comments, please contact me at your earliest convenience.

Sincerely,

Richard J. Gorrell

Richard Gorrell
Project Manager

RM/vb

c: Richard McGuire (B&R Environmental)
John Trepanowski, P.E. (B&R Environmental)
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Russell Turner (B&R Environmental)

TABLE 1
COMPARISON OF ADVANTAGES AND DISADVANTAGES FOR INITIAL SCREENING OF REMEDIAL ALTERNATIVES

Alternative No. 1 - Soil Vapor Extraction

Advantages

- Proven performance; readily available equipment; easy installation
- Minimal disturbance to site operations
- Treatment time usually 6 to 24 months
- Can be combined with other technologies
- Can be used under and around structures where excavation cannot be conducted

Disadvantages

- Concentration reduction greater than 90 percent difficult to achieve
- Likely to require treatment for discharge of extracted gases
- Air emissions permit required
- Appropriate for unsaturated (vadose) zone soils only

Alternative No. 2 - Bioventing

Advantages

- Proven performance; readily available equipment; easy installation
- Minimal disturbance to site operations
- Treatment time usually 6 to 24 months
- Can be combined with other technologies
- Can be used under and around structures where excavation cannot be conducted
- Off gases may not require pre-discharge treatment

Disadvantages

- High constituent concentrations may initially be toxic to microorganisms.
- Cannot always achieve clean-up standard requirements.
- Permits may be required for nutrient injection.
- May require installation of downgradient containment mechanisms such as a cut-off trench for control of injected nutrients and other runoff.

Alternative No. 3. - Biosparging

Advantages

- Proven performance; readily available equipment; easy installation
- Minimal disturbance to site operations
- Treatment time usually 6 to 24 months
- Can be combined with other technologies
- Can be used under and around structures where excavation cannot be conducted
- Can accommodate a wider range of contaminants than air sparging

Disadvantages

- Should be used where free phase product is not present
- Potential for inducing migration of constituents, possibly below existing structures

Alternative No. 4a - Excavation and On-Site Treatment Using Biopiles

Advantages

- Proven performance; readily available equipment; easy installation.
- Treatment time usually 6 months or less for on-site concerns.
- Can be combined with other technologies.
- Off-site discharges are controlled or eliminated during remediation.
- Contamination liability is generally limited to the site property.
- Biopile treatment can be engineered to accommodate a range of constituents and concentrations.
- Effective on organic constituents with slow biodegradation rates.
- Can be designed to be a closed system with vapor emission collection.

Disadvantages

- Extensive disruption to site activities and site in general.
- Requires use of significant area near site for biopile.
- Incorporates all disadvantages and only some advantages of soil treatment technology.
- Potential for worker contact with contaminated materials.
- Can generate contaminated liquids requiring management and treatment if dewatering is necessary.
- May require air emissions permit.
- May not be effective for high constituent concentrations (>50,000 ppm TPH).
- May require bottom liner in biopile area if leaching is a concern.

Alternative No. 4b - Excavation and Off-Site Treatment

Advantages

- Proven performance; readily available equipment.
- Treatment time usually 6 months or less for on-site concerns.
- Off-site discharges are controlled or eliminated during and after remediation.
- Can be combined with other technologies.
- Can achieve remediation to very low concentrations of contaminants.
- High concentrations of contaminants are easily treated through other off-site technologies such as incineration.

Disadvantages

- Extensive disruption of site activities and site in general.
- Potential for worker contact with contaminated materials.
- Increased liability for transportation and internment of constituents in landfills.
- Can generate contaminated liquids requiring management and treatment if dewatering is necessary.
- May required traffic management plan for high volume of truck traffic.
- May require use in combination with other technologies if contamination is located in areas that cannot be excavated.

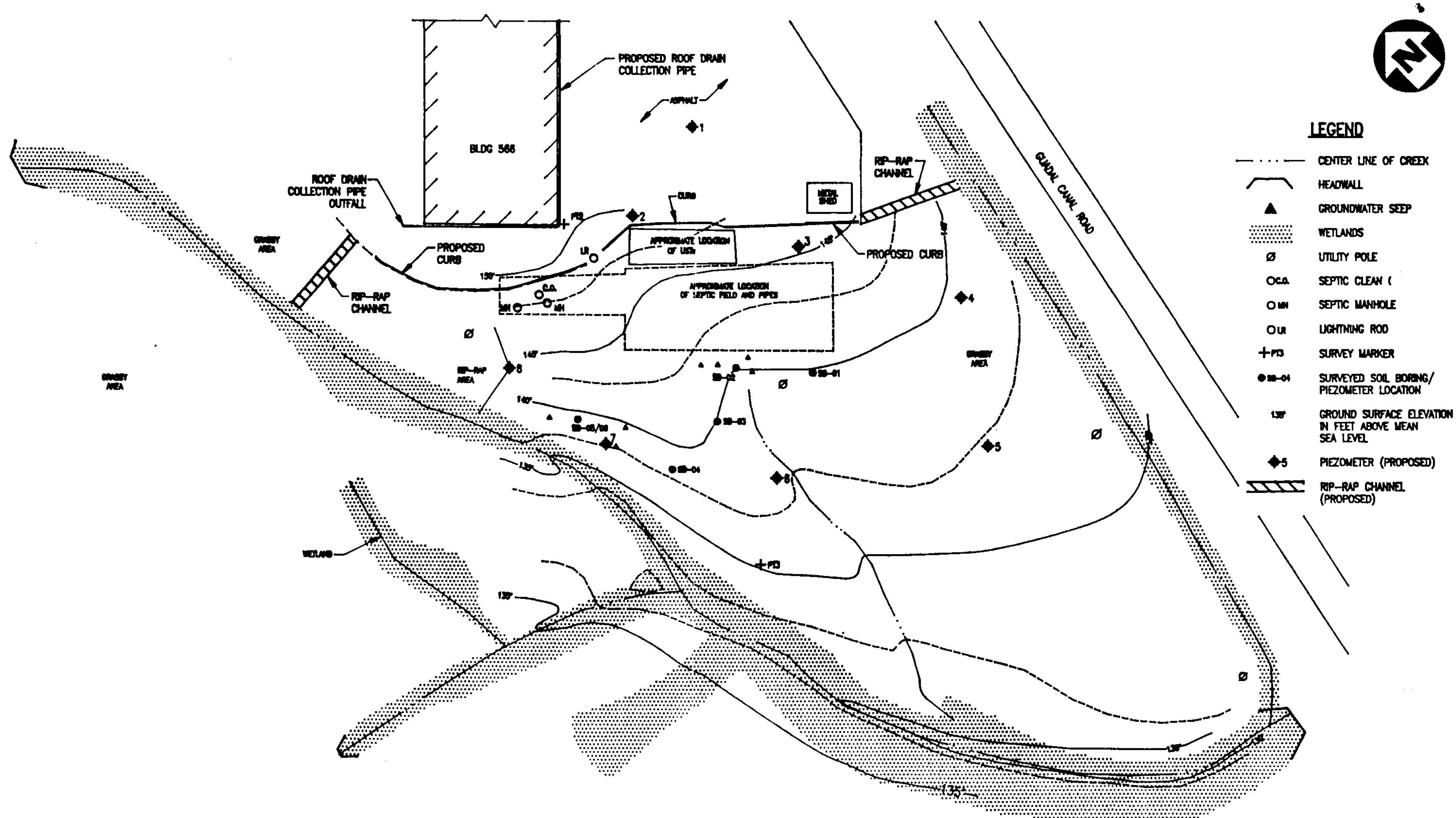
Alternative No. 5 - Natural Attenuation

Advantages

- Minimal impact to site operations
- Potential use below buildings and other areas that cannot be excavated
- Low cost

Disadvantages

- Not usually effective where constituent concentrations are high (>20,000 ppm TPH)
- Not usually suitable when free product is present
- Significant potential for off-site migration of contamination during treatment
- Longer treatment time required than for more active treatment measures
- May not always achieve desired clean-up levels within a reasonable length of time
- Requires long-term monitoring



BUILDING 566

UST AND LEACHFIELD PROPOSED INTERIM REMEDIAL ACTION

NWS EARLE, NEW JERSEY

Brown & Root Environmental

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