



64556

**PHASE II REMEDIAL INVESTIGATION
TUTU WELLS SITE
ST. THOMAS, U.S. VIRGIN ISLANDS**

VOLUME II OF III

April 1995

Prepared for

Tutu Environmental Investigation Committee

Prepared by

Geraghty & Miller, Inc.
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(201) 909-0700



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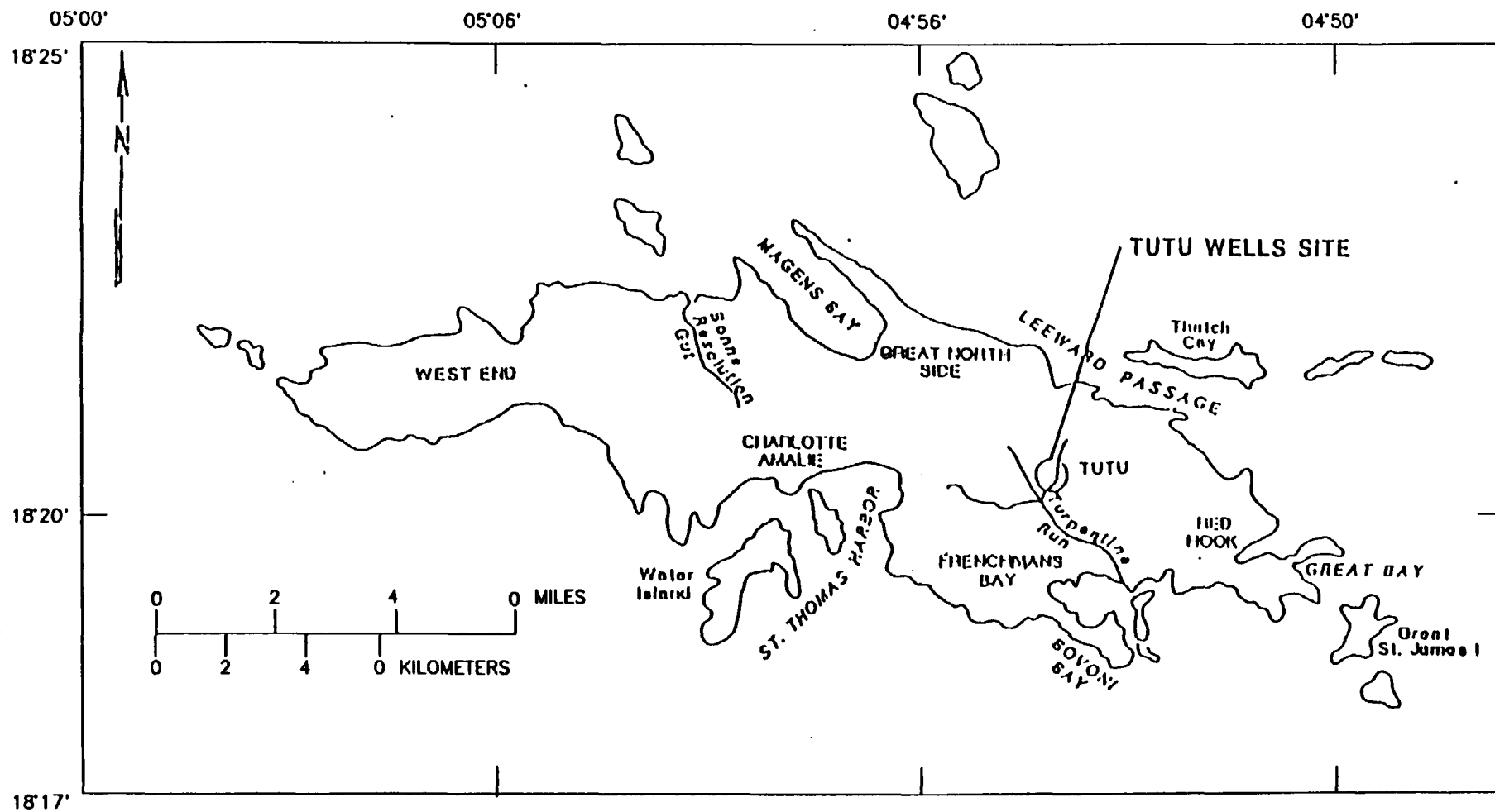


FIGURES (continued)

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SITE LOCATION

TUTU WELLS SITE
ST. THOMAS, U.S. VIRGIN ISLANDS

FIGURE

1-1

DRAWN: R.P.A.

APPROVED: J.POTENZA

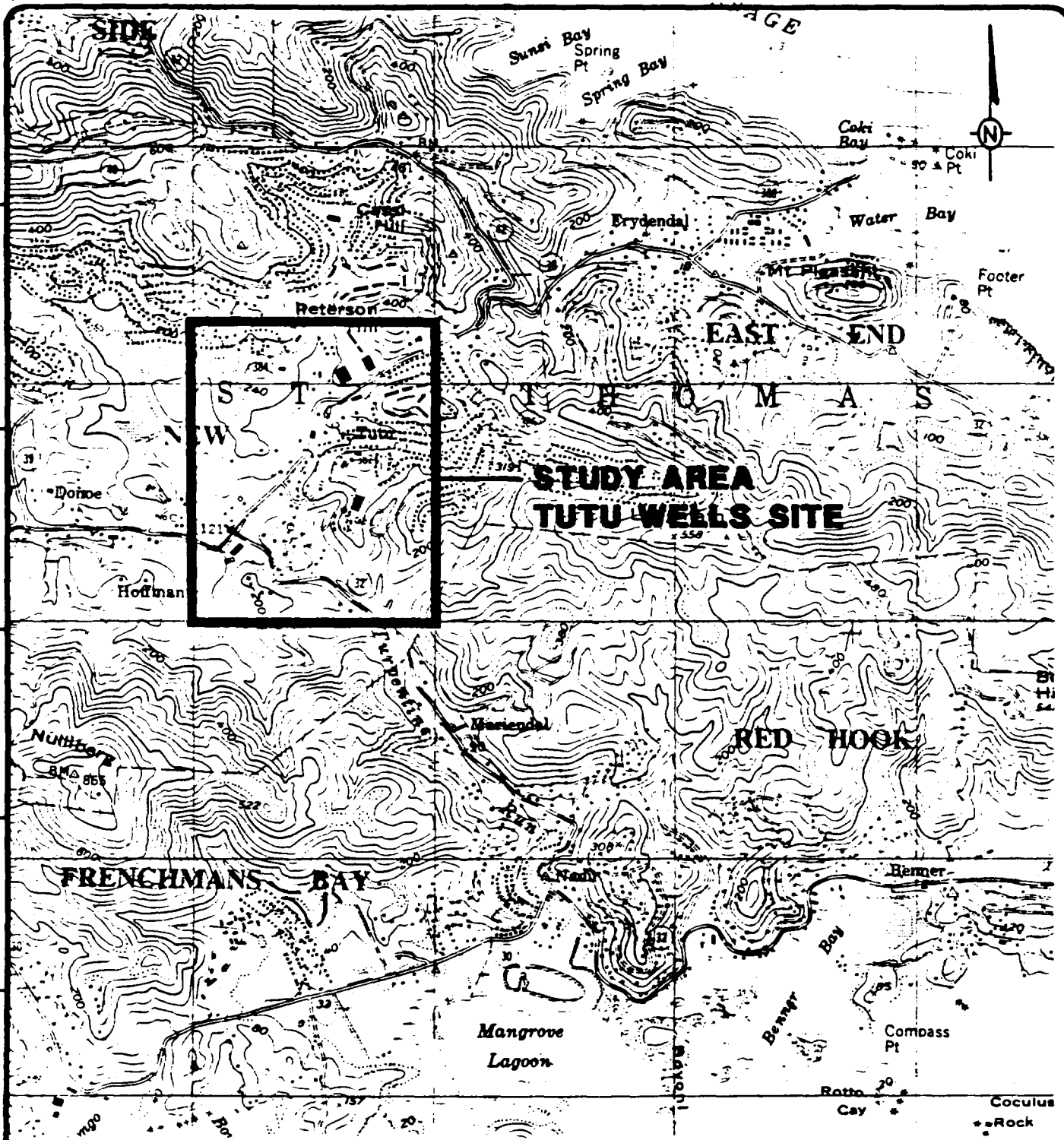
CHECKED: D. STERN

DRAWING: TU-322

FILE: TU-322

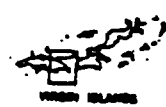
PROJECT NO.: PRO013033

DWG DATE: 27 JULY 84



SCALE
0 2000 FEET

QUADRANGLE LOCATION



SOURCE: USGS—EASTERN ST. THOMAS, V.I., 1854 (PHOTOREVISED - 1982)

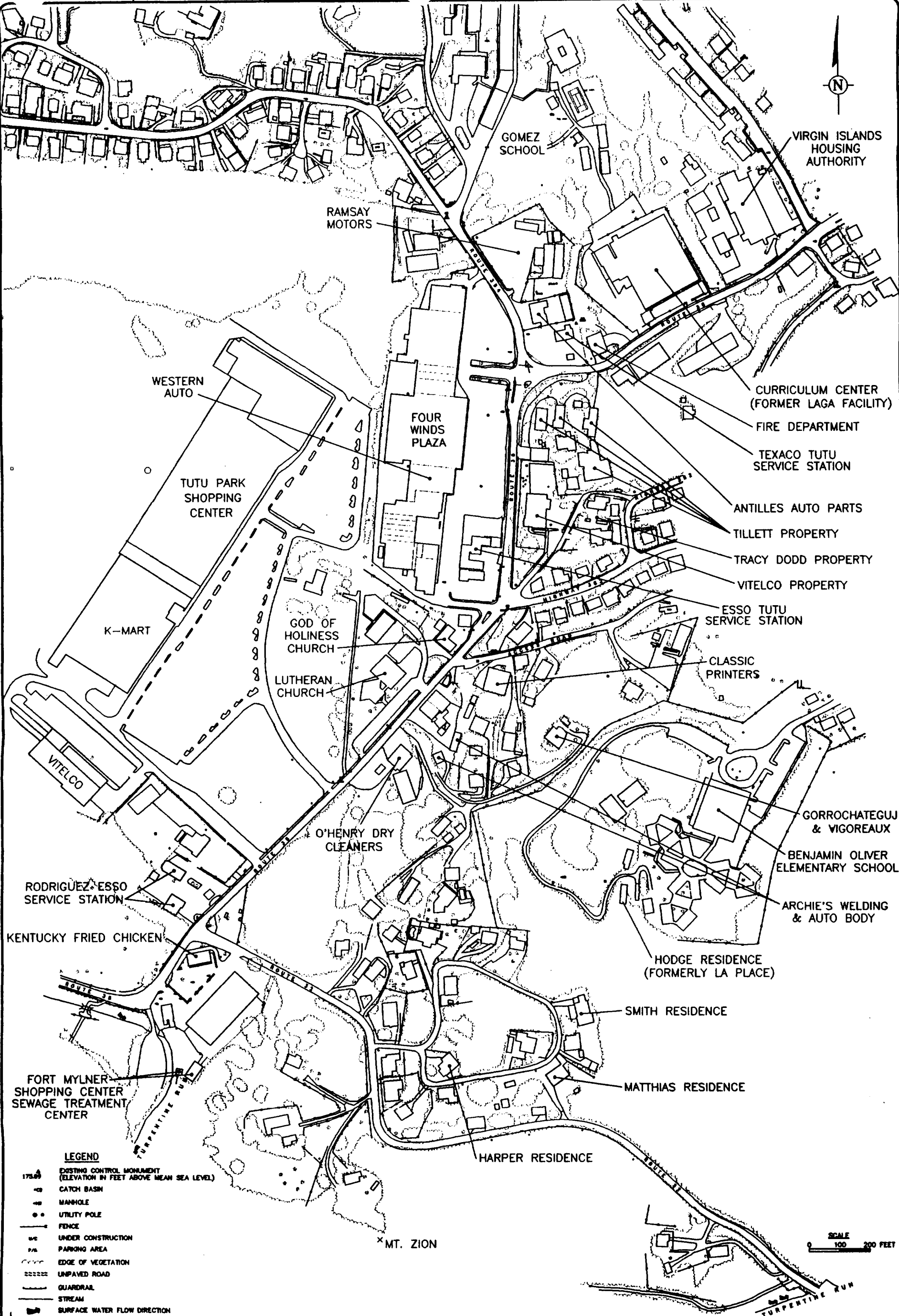


STUDY AREA

TUTU WELLS SITE
ST. THOMAS, U.S. VIRGIN ISLANDS

FIGURE

1-2



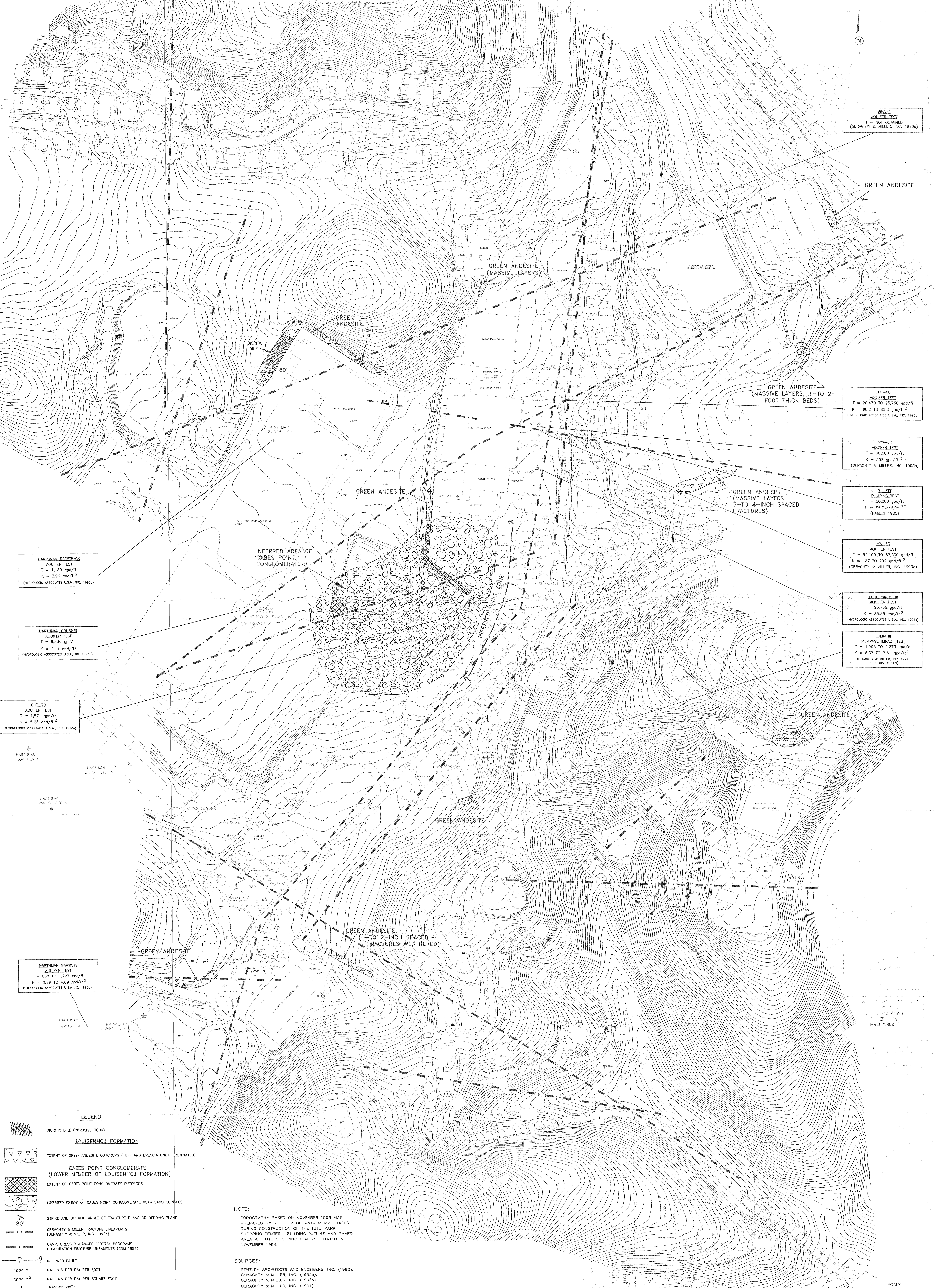
GERAGHTY & MILLER, INC.
Environmental Services

PROPERTY LOCATIONS

TUTU WELLS SITE
ST. THOMAS, U.S. VIRGIN ISLANDS

FIGURE

1-4



WELL-1
AQUIFER TEST
T = NOT OBTAINED
(GERAGHTY & MILLER, INC. 1993a)

GREEN ANDESITE

GREEN ANDESITE
(MASSIVE LAYERS)

GREEN ANDESITE

GREEN ANDESITE
(MASSIVE LAYERS, 1-TO 2-
FOOT THICK BEDS)

WELL-60
AQUIFER TEST
T = 20,470 TO 25,750 gpd/ft
K = 66.2 TO 85.8 gpd/ft²
(HYDROLOGIC ASSOCIATES U.S.A., INC. 1993a)

WELL-68
AQUIFER TEST
T = 90,500 gpd/ft
K = 302 gpd/ft²
(GERAGHTY & MILLER, INC. 1993a)

TILLET
PUMPAGE TEST
T = 20,000 gpd/ft
K = 66.7 gpd/ft²
(HAMLEN 1985)

WELL-60
AQUIFER TEST
T = 56,100 TO 67,500 gpd/ft
K = 187 TO 292 gpd/ft²
(GERAGHTY & MILLER, INC. 1993a)

FOUR WINDS III
AQUIFER TEST
T = 25,755 gpd/ft
K = 85.95 gpd/ft²
(HYDROLOGIC ASSOCIATES U.S.A., INC. 1993a)

ECUM III
PUMPAGE IMPACT TEST
T = 1,906 TO 2,275 gpd/ft
K = 6.37 TO 7.61 gpd/ft²
(GERAGHTY & MILLER, INC. 1994
AND THIS REPORT)

GREEN ANDESITE

GREEN ANDESITE

GREEN ANDESITE
(1-TO 2-INCH SPACED
FRACTURES, WEATHERED)

GREEN ANDESITE

HARTMAN RACETRACK
AQUIFER TEST
T = 1,189 gpd/ft
K = 3.96 gpd/ft²
(HYDROLOGIC ASSOCIATES U.S.A., INC. 1993a)

HARTMAN CRUISER
AQUIFER TEST
T = 6,336 gpd/ft
K = 21.1 gpd/ft²
(HYDROLOGIC ASSOCIATES U.S.A., INC. 1993a)

WELL-70
AQUIFER TEST
T = 1,571 gpd/ft
K = 5.23 gpd/ft²
(HYDROLOGIC ASSOCIATES U.S.A., INC. 1993a)

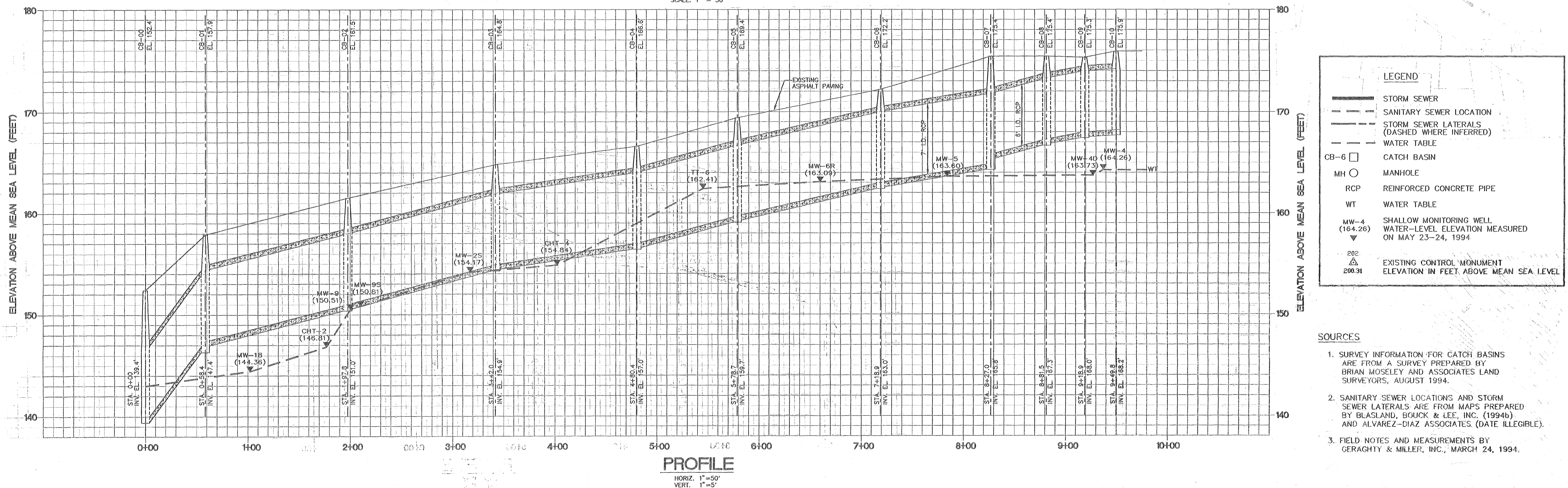
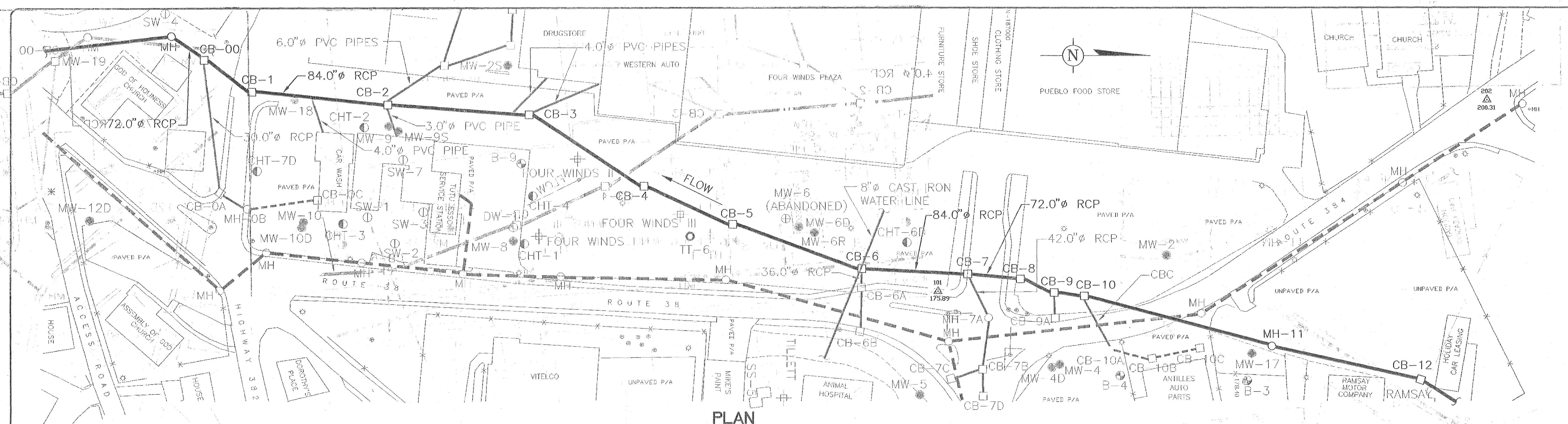
HARTMAN BAPTISTE
AQUIFER TEST
T = 868 TO 1,227 gpd/ft
K = 2.89 TO 4.09 gpd/ft²
(HYDROLOGIC ASSOCIATES U.S.A. INC. 1993a)

- LEGEND**
- DIORITE DIKE (INTRUSIVE ROCK)
 - EXTENT OF GREEN ANDESITE OUTCROPS (TUFF AND BRECCIA UNDIFFERENTIATED)
 - CABES POINT CONGLOMERATE
(LOWER MEMBER OF LOUISEHOJ FORMATION)
 - EXTENT OF CABES POINT CONGLOMERATE OUTCROPS
 - INFERRED EXTENT OF CABES POINT CONGLOMERATE NEAR LAND SURFACE
 - STRIKE AND DIP WITH ANGLE OF FRACTURE PLANE OR BEDDING PLANE
 - GERAGHTY & MILLER FRACTURE LINEAMENTS
(GERAGHTY & MILLER, INC. 1992b)
 - CAMP, DRESSER & MCKEE FEDERAL PROGRAMS
CORPORATION FRACTURE LINEAMENTS (CDM 1992)
 - INFERRED FAULT
 - gpd/ft
gpd/ft²
T
K
 - HYDRAULIC CONDUCTIVITY (BASED ON ASSUMED AQUIFER THICKNESS OF 300 FEET)

NOTE:
TOPOGRAPHY BASED ON NOVEMBER 1993 MAP
PREPARED BY R. LOPEZ DE AZUA & ASSOCIATES
DURING CONSTRUCTION OF THE TUTU PARK
SHOPPING CENTER. BUILDING OUTLINE AND PAVED
AREA AT TUTU SHOPPING CENTER UPDATED IN
NOVEMBER 1994.

SOURCES:
BENTLEY ARCHITECTS AND ENGINEERS, INC. (1992).
GERAGHTY & MILLER, INC. (1993a).
GERAGHTY & MILLER, INC. (1993b).
GERAGHTY & MILLER, INC. (1994).
R. LOPEZ DE AZUA & ASSOCIATES (1993).

SCALE
0 100 200



LEGEND	
	STORM SEWER
	SANITARY SEWER LOCATION
	STORM SEWER LATERALS (DASHED WHERE INFERRED)
	WATER TABLE
	CATCH BASIN
	MANHOLE
	REINFORCED CONCRETE PIPE
	WATER TABLE
	SHALLOW MONITORING WELL
	WATER-LEVEL ELEVATION MEASURED ON MAY 23-24, 1994
	EXISTING CONTROL MONUMENT
	ELEVATION IN FEET ABOVE MEAN SEA LEVEL

- SOURCES**
1. SURVEY INFORMATION FOR CATCH BASINS ARE FROM A SURVEY PREPARED BY BRIAN MOSELEY AND ASSOCIATES LAND SURVEYORS, AUGUST 1994.
 2. SANITARY SEWER LOCATIONS AND STORM SEWER LATERALS ARE FROM MAPS PREPARED BY BLASLAND, BOUCK & LEE, INC. (1994b) AND ALVAREZ-DIAZ ASSOCIATES. (DATE ILLEGIBLE).
 3. FIELD NOTES AND MEASUREMENTS BY GERAGHTY & MILLER, INC., MARCH 24, 1994.



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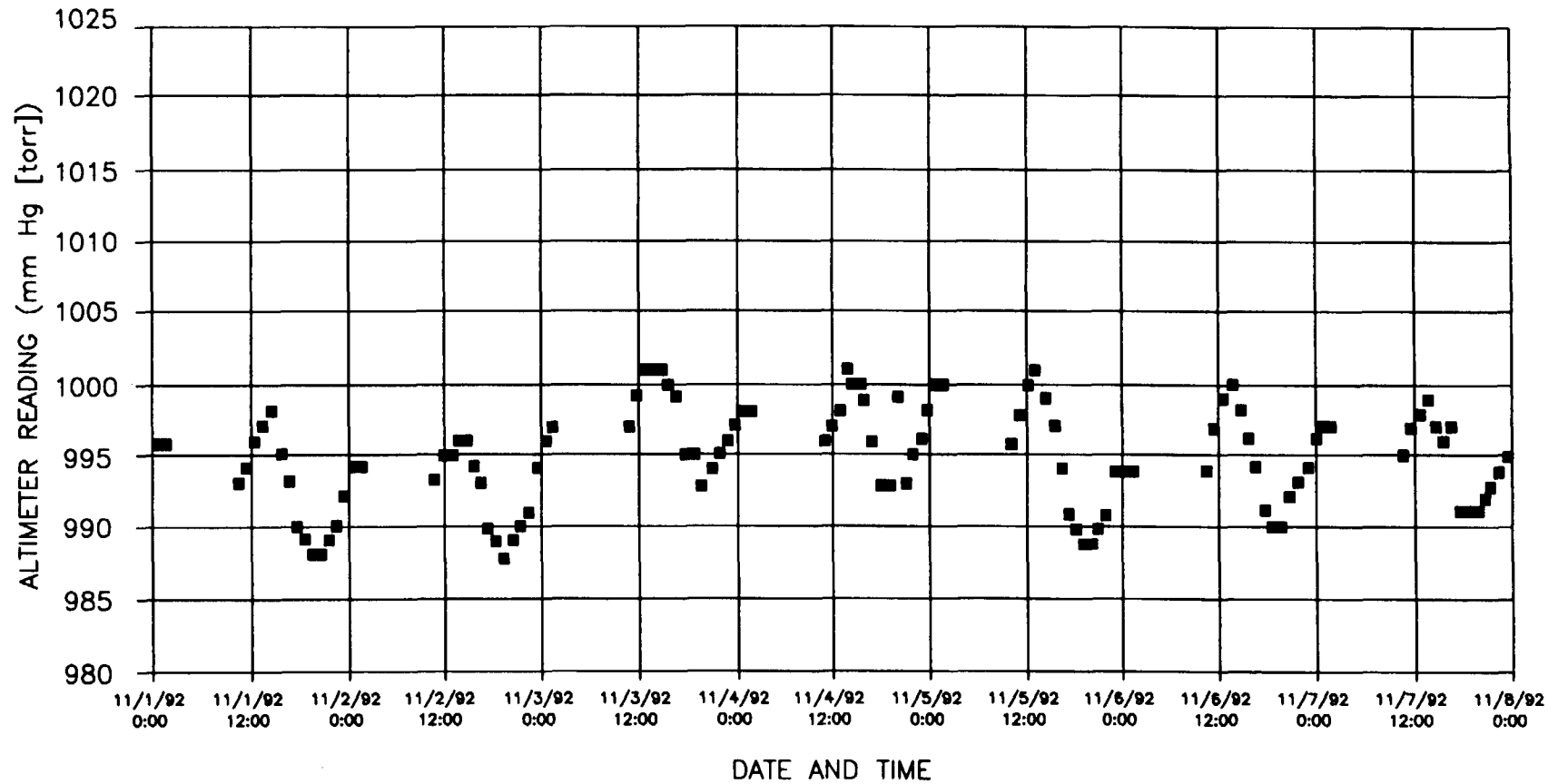
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CHECKED BY: D. JACKSON	DATE: 1-25-95
APPROVED BY: T. DANAHY	DATE: 1-25-95

**STORM SEWER
PLAN AND PROFILE**
TUTU WELLS SITE
ST. THOMAS, U.S. VIRGIN ISLANDS

FIGURE
4-2



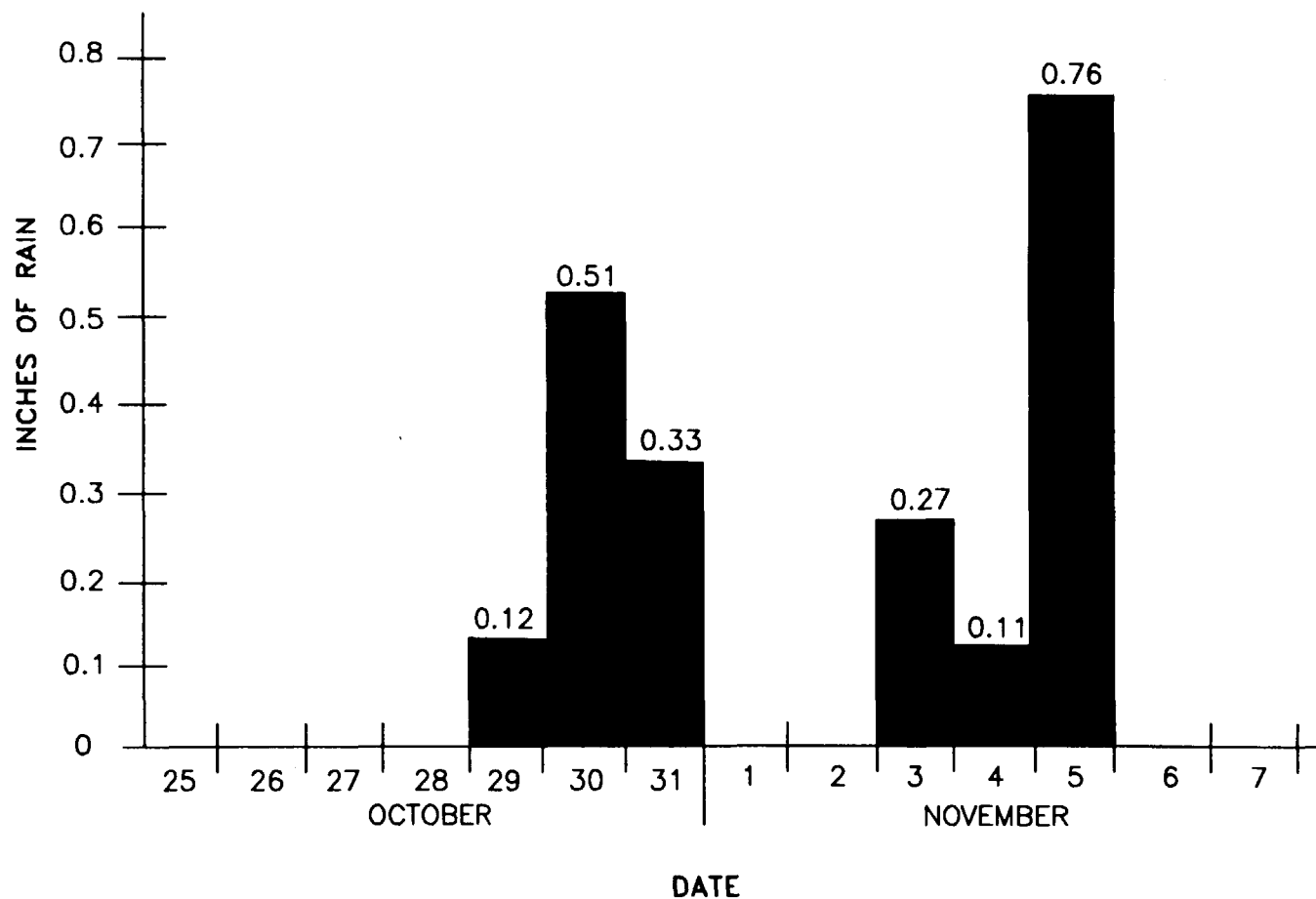
mm Hg - MILLIMETERS OF MERCURY

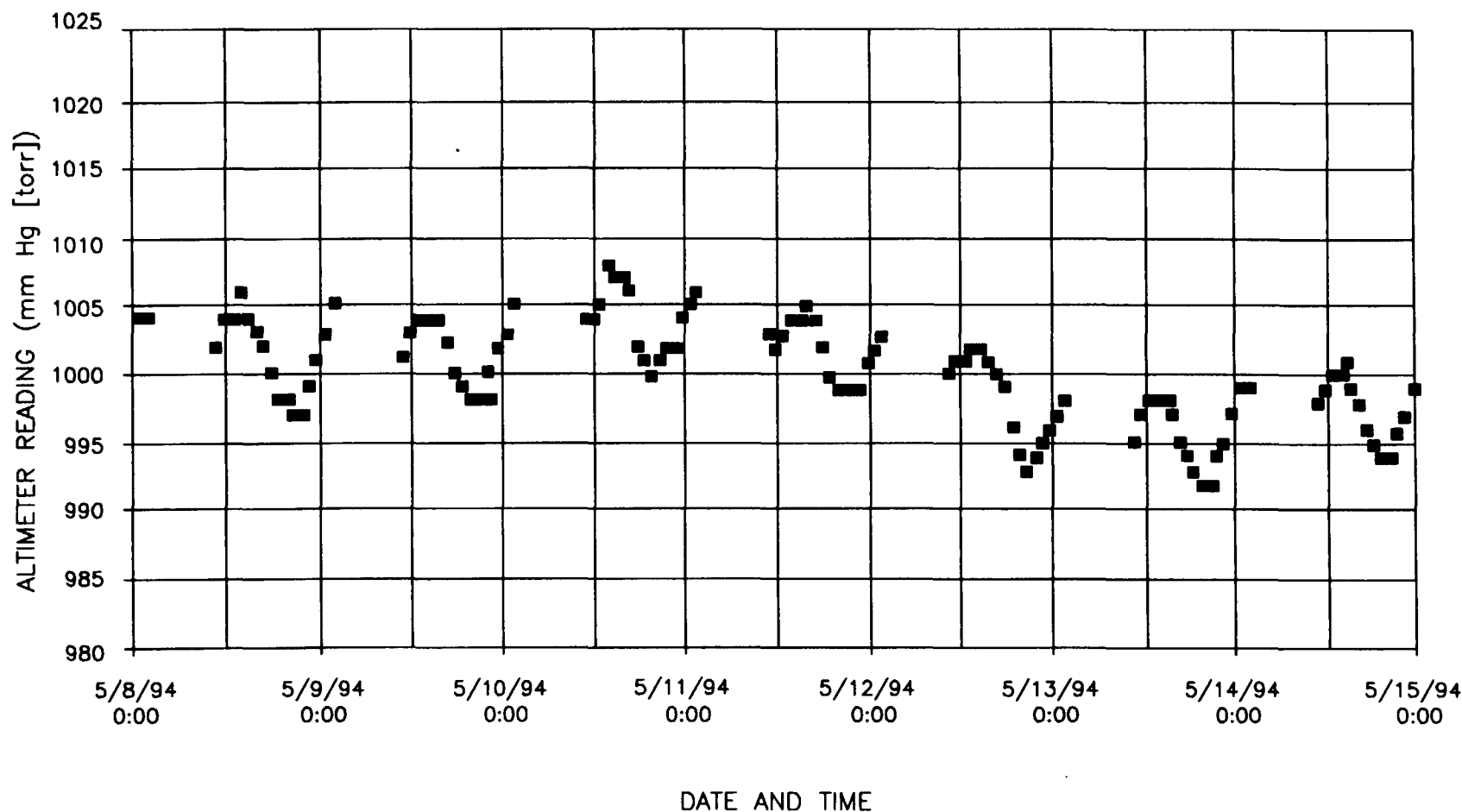


**BAROMETRIC PRESSURE READINGS
NOVEMBER 1 THROUGH 7, 1992
CYRIL E. KING AIRPORT
TUTU WELLS SITE
ST. THOMAS, U.S. VIRGIN ISLANDS**

FIGURE

4-3





mm Hg - MILLIMETERS OF MERCURY

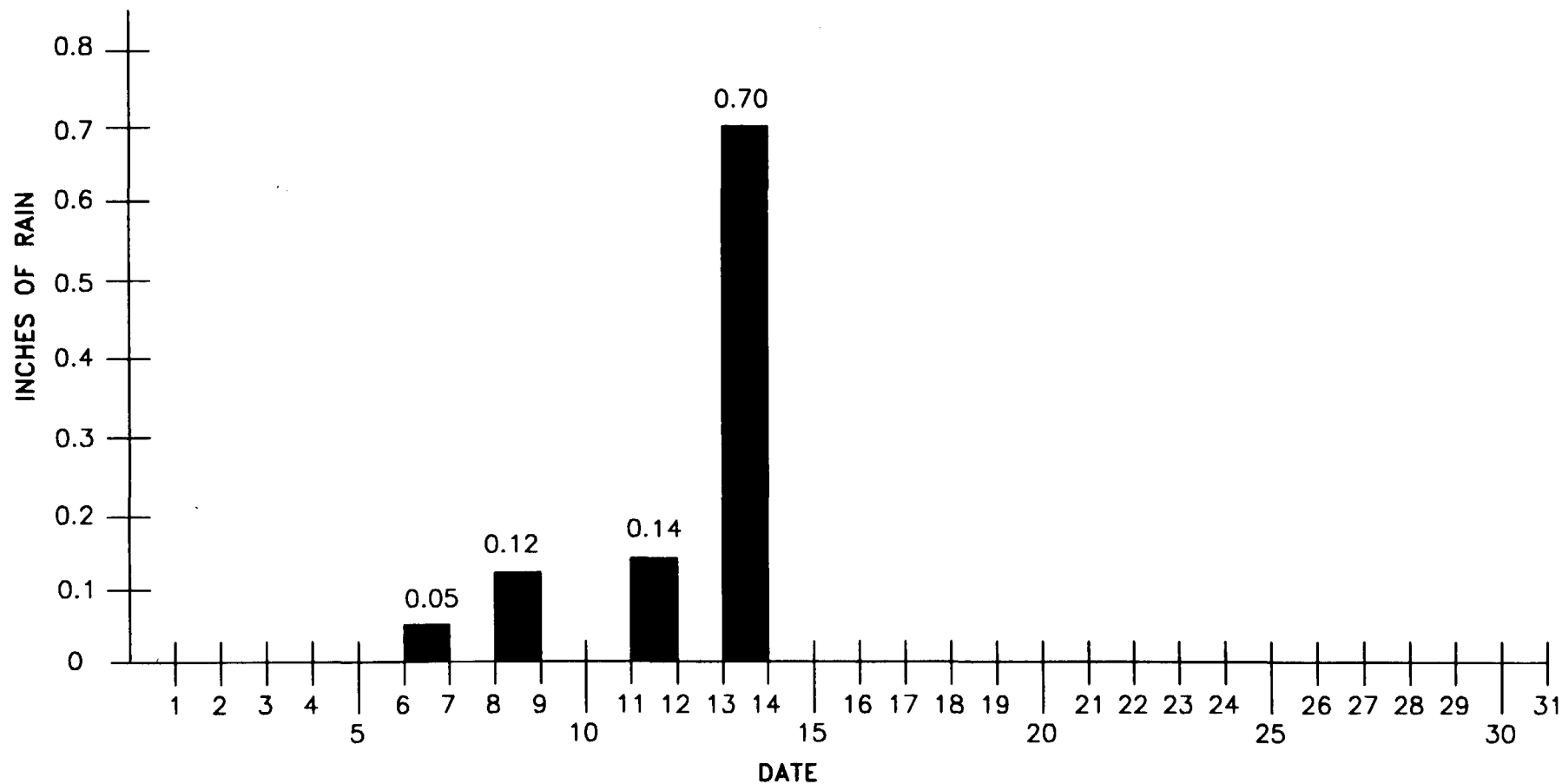


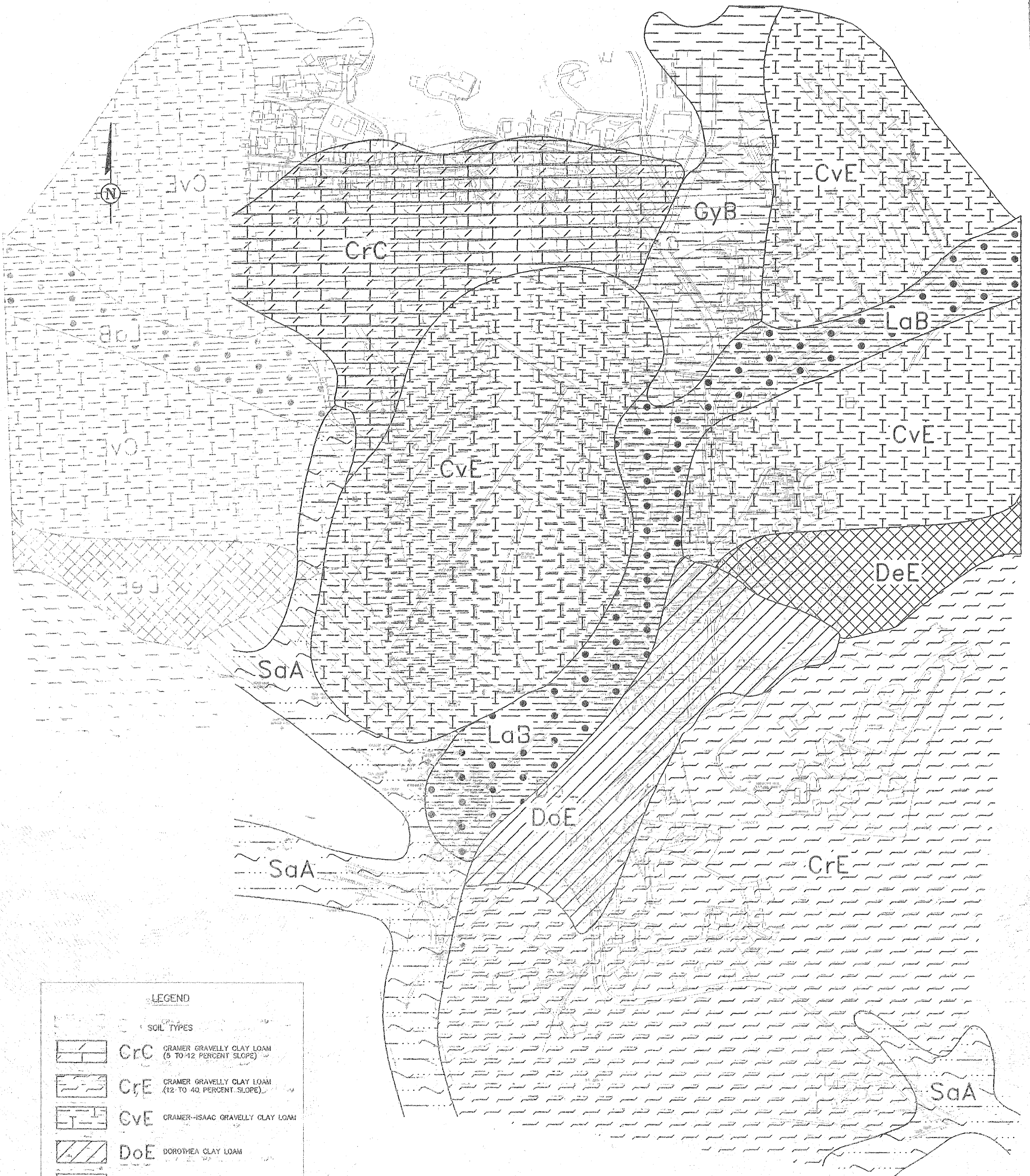
BAROMETRIC PRESSURE READINGS
MAY 8 THROUGH 14, 1994
CYRIL E. KING AIRPORT
 TUTU WELLS SITE
 ST. THOMAS, U.S. VIRGIN ISLANDS

FIGURE

4-5

TUT 005 0722





LEGEND

SOIL TYPES

	CrC	CRAMER GRAVELLY CLAY LOAM (5 TO 12 PERCENT SLOPE)
	CrE	CRAMER GRAVELLY CLAY LOAM (12 TO 40 PERCENT SLOPE)
	CvE	CRAMER-ISAAC GRAVELLY CLAY LOAM
	DoE	DOROTHEA CLAY LOAM
	LaB	LAVALLEE GRAVELLY CLAY LOAM
	SaA	SAN ANTON CLAY LOAM
	GyB	GLYNN CLAY LOAM
	DeE	DESCALABRADO CLAY LOAM

SCALE
0 300 FEET

SOURCE: U.S. DEPARTMENT OF AGRICULTURE 1970

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CHECKED BY: S. CARNICELLI	DATE: 1/5/95
APPROVED BY: T. DANAHY	DATE: 1/5/95

SOIL TYPE DISTRIBUTION

TUTU WELLS SITE
ST. THOMAS, U.S. VIRGIN ISLANDS

FIGURE

4-7



LEGEND

- 17559 EXISTING CONTROL MONUMENT (ELEVATION IN FEET ABOVE MEAN SEA LEVEL)
- CB CATCH BASIN
- WM WAREHOUSE
- UP UNPAVED ROAD
- PC PAVED ROAD
- PC UNDER CONSTRUCTION
- PA PARKING AREA
- EV EDGE OF VEGETATION
- ST STREAM
- SW-4 SHALLOW MONITORING WELL INSTALLED BY BLASLAND, BUCK & LEE, INC.
- DW-1 DEEP MONITORING WELL INSTALLED BY BLASLAND, BUCK & LEE, INC.
- TI-5 MONITORING WELL INSTALLED BY GCL
- SS-5 SURFACE SOIL SAMPLE APPROXIMATE LOCATION
- CHM-4 SHALLOW MONITORING WELL INSTALLED BY GEO CARBIDE, INC.
- MTW-2 MONITORING WELL INSTALLED BY TERRA-VAC
- WPC-1 MONITORING WELL IDENTIFICATION IN PARENTHESES APPLIED BY GERAGHTY & MILLER, INC.
- THICKNESS OF OVERBURDEN, DETERMINED FROM MONITORING WELL AND SOIL BORING
- SEDIMENT EXPOSED AT SURFACE
- 20
- 0

NOTE:

TOPOGRAPHY BASED ON NOVEMBER 1993 MAP PREPARED BY R. LOPEZ DE AZUA & ASSOCIATES DURING CONSTRUCTION OF THE TUTU PARK SHOPPING CENTER. BUILDING OUTLINE AND PAVED AREA AT TUTU SHOPPING CENTER UPDATED IN NOVEMBER 1994.

SOURCES:

GERAGHTY & MILLER, INC. (1993)
R. LOPEZ DE AZUA & ASSOCIATES (1993)
BENTLEY ARCHITECTS AND ENGINEERS, INC. (1992)
IT CORPORATION (1990)

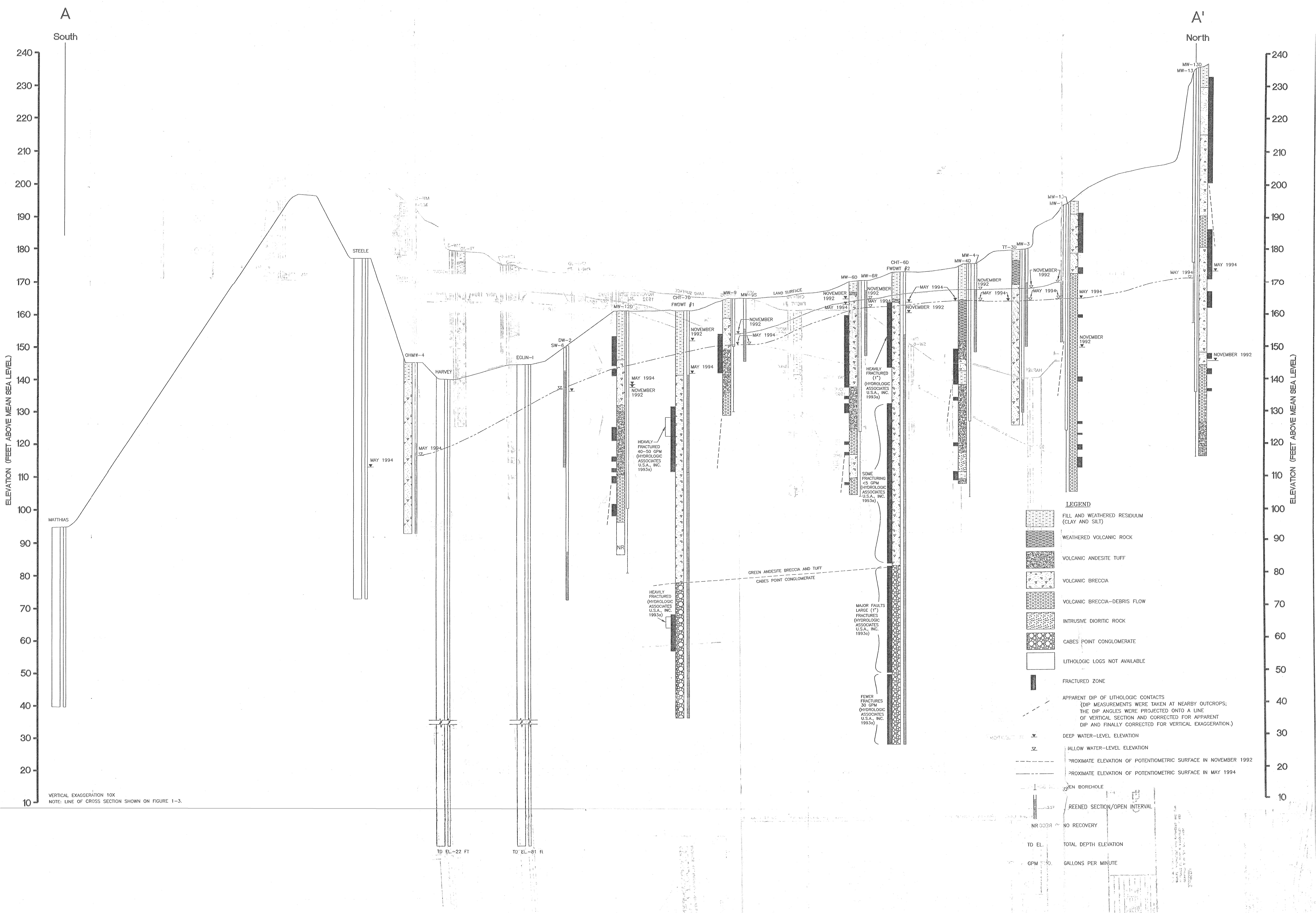


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CHECKED BY: L. MUSKER	DATE: 1-28-95
APPROVED BY: T. DANAHY	DATE: 1-28-95

OVERBURDEN THICKNESS
TUTU WELLS SITE
ST. THOMAS, U.S. VIRGIN ISLANDS



VERTICAL EXAGGERATION 10X
NOTE: LINE OF CROSS SECTION SHOWN ON FIGURE 1-3.

SCALE
0 200 FEET



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CHECKED BY: D. STERN	DATE: 1-25-95
APPROVED BY: L. MUSKIE	DATE: 1-25-95

REV. NO.	DATE	DESCRIPTION	BY	APPR.	REV. NO.	DATE	DESCRIPTION	BY	APPR.

HYDROGEOLOGIC CROSS SECTION A-A'
TUTU WELLS SITE
ST. THOMAS, U.S. VIRGIN ISLANDS

DRAFTER: K. McCANN

APPROVED: T. DANAHY

CHECKED: M. BREAUULT

DRAWING: TU-368

FILE: TU-368

PRJCT NO.: PR0013.033

DWG DATE: 1/5/95

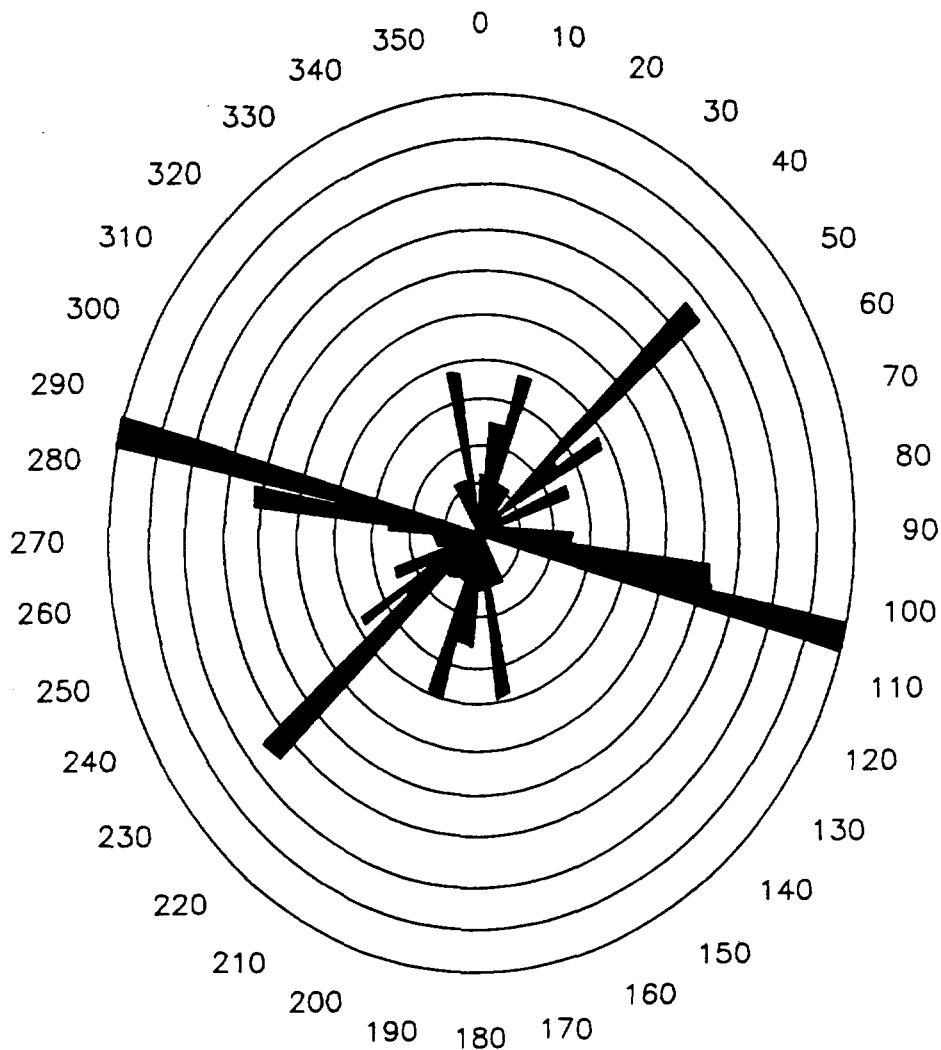


FRACTURE TRACE ROSE DIAGRAM

TUTU WELLS SITE
ST. THOMAS, U.S. VIRGIN ISLANDS

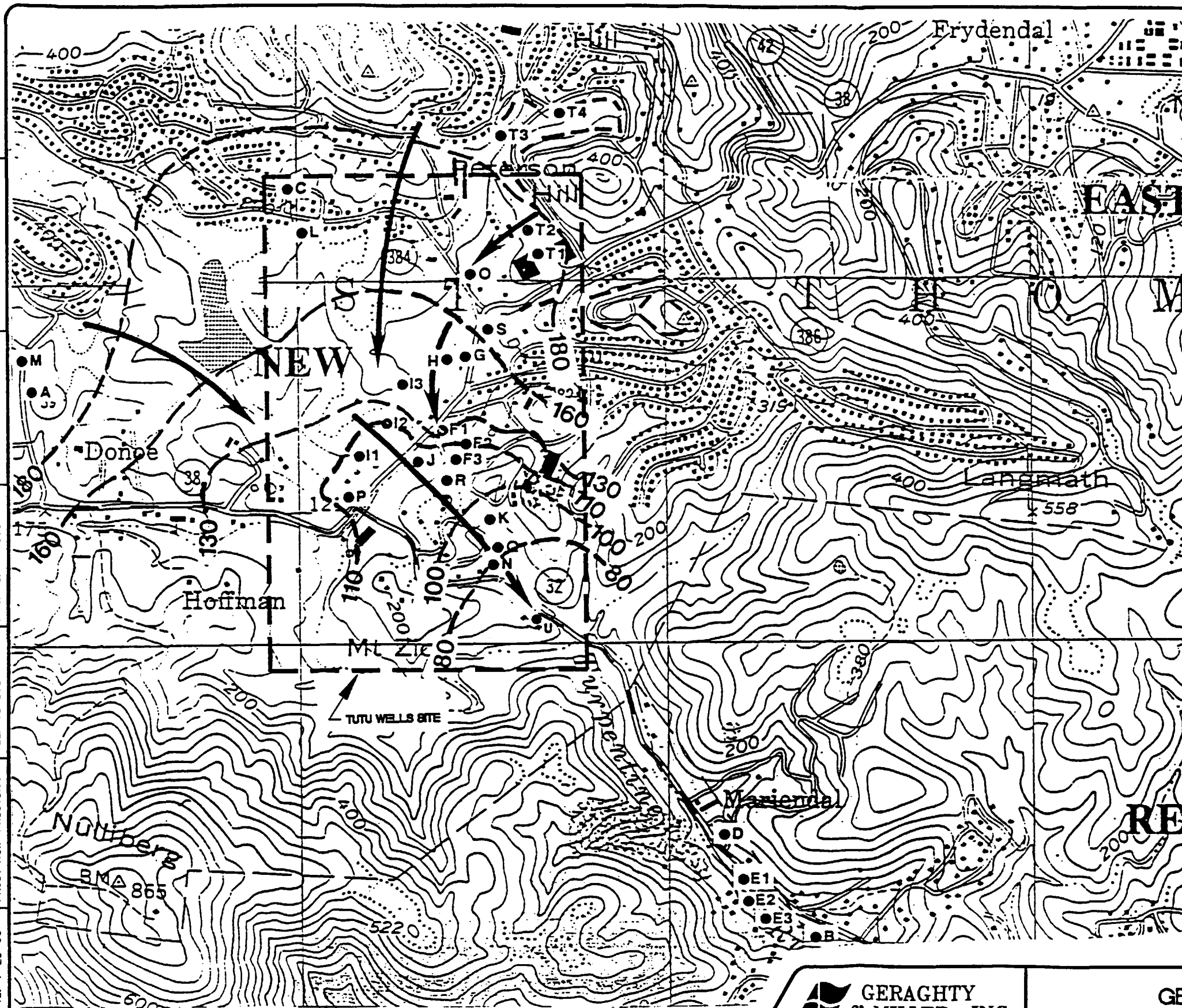
FIGURE

4-10



TUT 005 0727

DRAFTER: A. THOMAS
APPROVED: T. DANAHY
CHECKED: L. MUSIKER
DRAWING: 95
PRCT NO.: PR0013.034 FILE: TU-395
1-25-95



- LEGEND**
- RESIDENTIAL WELL
 - A BRYAN
 - B DEDE
 - C DEMITRI
 - D DENCH
 - E1 DEVCON I
 - E2 DEVCON II (ALTERNATE)
 - E3 DEVCON III
 - F1 EGLIN I
 - F2 EGLIN II
 - F3 EGLIN III
 - G FOUR WINDS I
 - H FOUR WINDS II
 - I GASSETT
 - I2 HARTHMAN II (CRUSHER)
 - I3 HARTHMAN III (ESTATE)
 - J HARVEY
 - K LdPLACE
 - L LEONARD
 - M LOCKHART (ALTERNATE)
 - N MATTHIAS
 - O RAMSAY
 - P RODRIGUEZ
 - Q SMITH
 - R STEELE
 - S TILLET
 - T1 VIHA I
 - T2 VIHA II (ALTERNATE)
 - T3 VIHA III
 - T4 VIHA IV (ALTERNATE)
 - U DELEGARDE
 - 160 --- LINE OF EQUAL GROUNDWATER LEVEL ELEVATION (FEET ABOVE MEAN SEA LEVEL)
 - ➔ DIRECTION OF GROUNDWATER FLOW
- (MODIFIED FROM GRAVES AND GONZALEZ 1988)

 **GERAGHTY
& MILLER, INC.**
Environmental Services

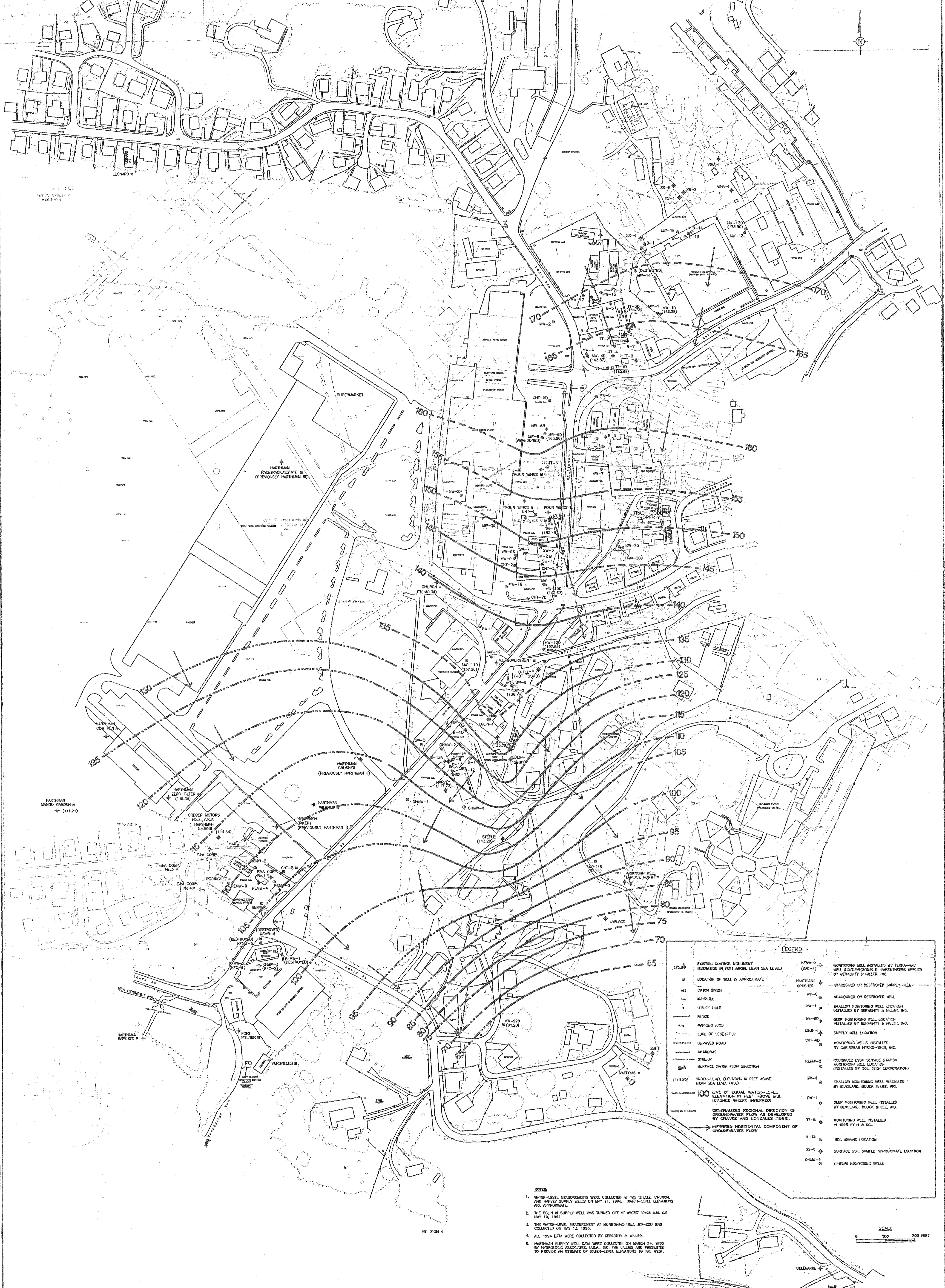
**GENERALIZED POTENTIOMETRIC
SURFACE, SEPTEMBER 11, 1987**

TUTU WELLS SITE
ST. THOMAS, U.S. VIRGIN ISLANDS

FIGURE
4-11

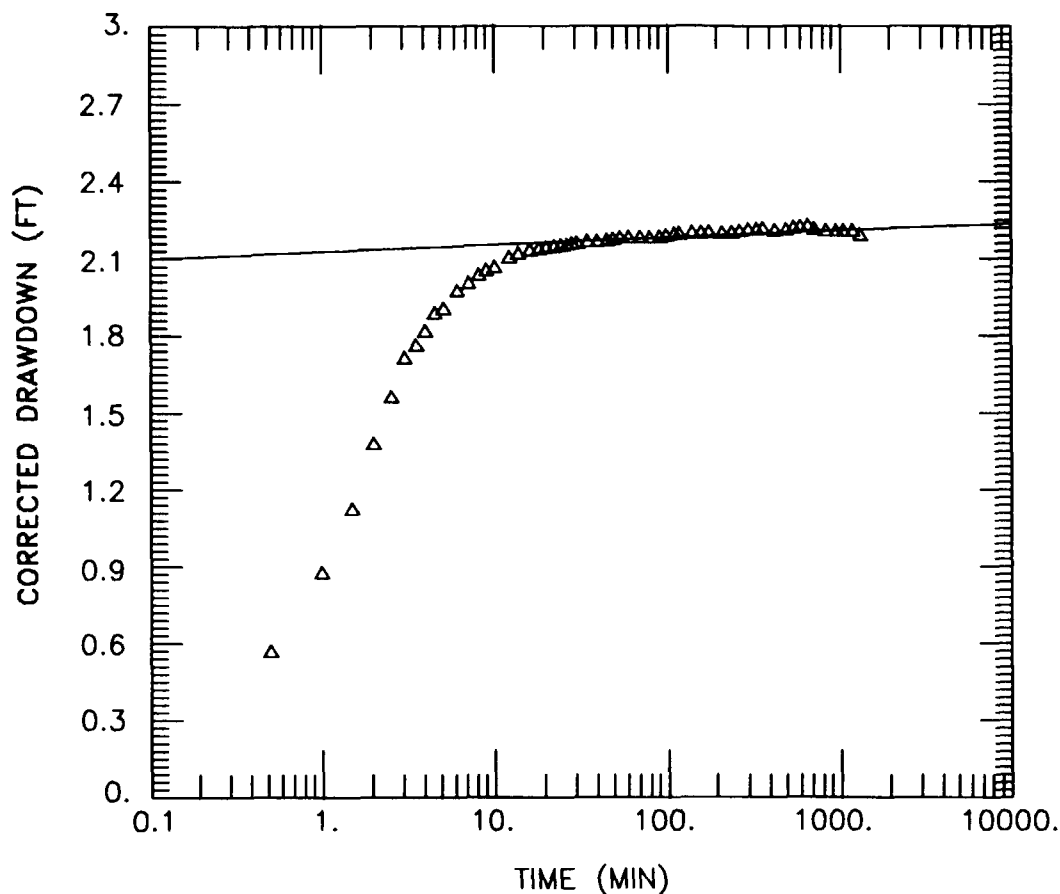
SOURCE: USGS QUADRANGLE EASTERN ST. THOMAS, VI (1954)

TUT 005 072B



NOTES:

1. WATER-LEVEL MEASUREMENTS WERE COLLECTED AT THE CHURCH AND HURRY SUPPLY WELLS ON MAY 11, 1994. WATER-LEVEL ELEVATIONS ARE APPROXIMATE.
2. THE EOLIN III SUPPLY WELL WAS TURNED OFF AT ABOUT 17:45 A.M. ON MAY 10, 1994.
3. THE WATER-LEVEL MEASUREMENT AT MONITORING WELL MW-220 WAS COLLECTED ON MAY 13, 1994.
4. ALL 1994 DATA WERE COLLECTED BY GERAGHTY & MILLER.
5. HARTMAN SUPPLY WELL DATA WERE COLLECTED ON MARCH 24, 1992 BY HYDROLOGIC ASSOCIATES, U.S.A., INC. THE VALUES ARE PRESENTED TO PROVIDE AN ESTIMATE OF WATER-LEVEL ELEVATIONS TO THE WEST.



DATA SET

mw6r-6r.dra

02/11/93

AQUIFER TYPE

UNCONFINED

SOLUTION METHOD

Cooper - Jacob

ESTIMATED PARAMETERS

 $T = 8.39 \text{ ft}^2 / \text{min}$

TEST DATA

 $Q = 1.24 \text{ ft}^3 / \text{min}$ $r = 0.17 \text{ ft}$ $b = 14.0 \text{ ft}$

T = TRANSMISSIVITY

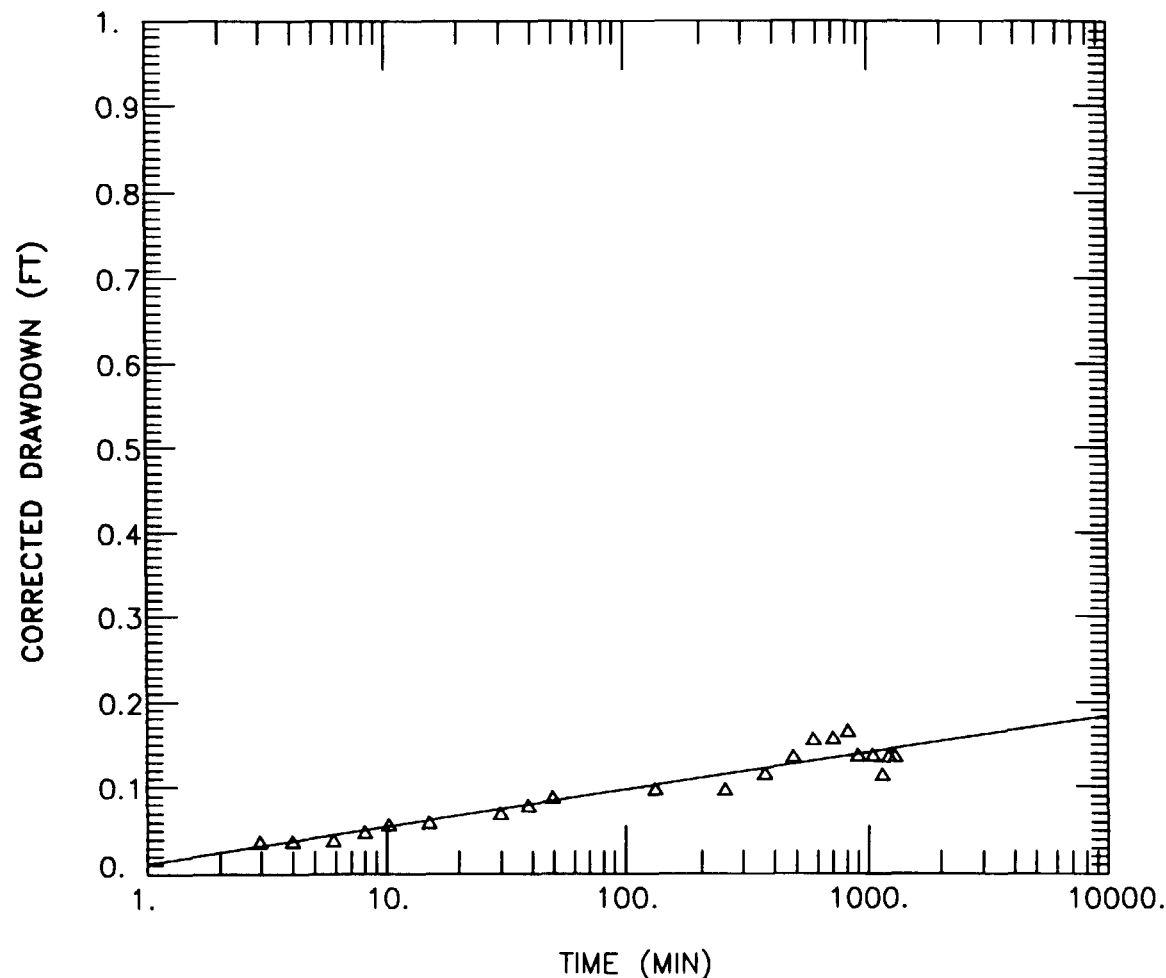
Q = DISCHARGE

r = RADIUS OF INFLUENCE

b = HYDRAULIC CONDUCTIVITY

ft = FEET

min = MINUTE



DATA SET

cht6-6d . n

02/11/93

AQUIFER TYPE

UNCONFINED

SOLUTION METHOD

Cooper - Jacob

ESTIMATED PARAMETERS

 $T = 8.14 \text{ ft}^2 / \text{min}$ $S = 0.0007054$

TEST DATA

 $Q = 1.9 \text{ ft}^3 / \text{min}$ $r = 110 \text{ ft}$ $b = 57.0 \text{ ft}$

T = TRANSMISSMITY

S = STORAGE VALUE

Q = DISCHARGE

r = RADIUS OF INFLUENCE

b = HYDRAULIC CONDUCTIVITY

ft = FEET

min = MINUTE

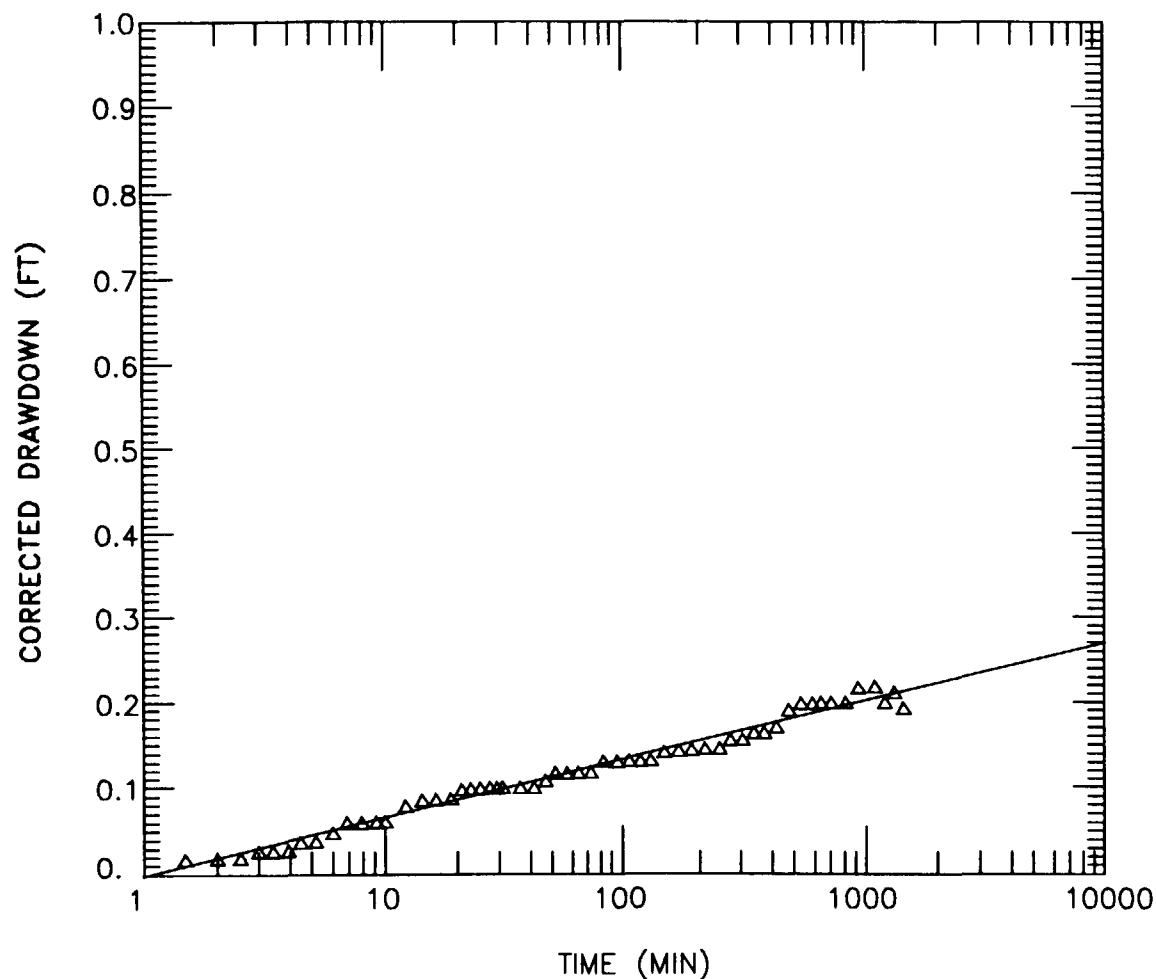


MONITORING WELL CHT-6D DRAWDOWN DATA PUMPING TEST OF MONITORING WELL MW-6D

TUTU WELLS SITE
ST. THOMAS, U.S. VIRGIN ISLANDS

FIGURE

4-17



DATA SET

mw6d-6d. dra

02/11/93

AQUIFER TYPE

UNCONFINED

SOLUTION METHOD

Cooper - Jacob

ESTIMATED PARAMETERS

 $T = 5.225 \text{ ft}^2 / \text{min}$

TEST DATA

 $Q = 1.9 \text{ ft}^3 / \text{min}$ $r = 0.23 \text{ ft}$ $b = 65.0 \text{ ft}$

T = TRANSMISSIVITY

Q = DISCHARGE

r = RADIUS OF INFLUENCE

b = HYDRAULIC CONDUCTIVITY

ft = FEET

min = MINUTE



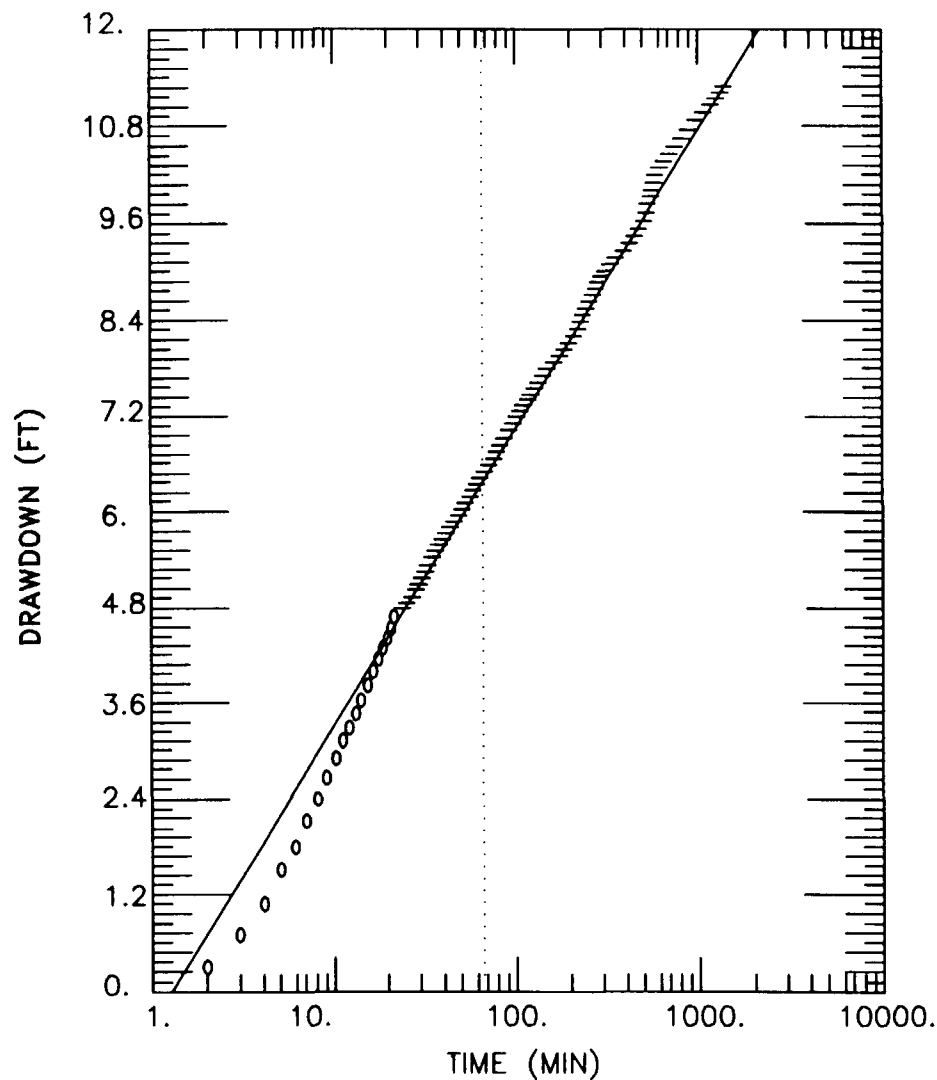
MONITORING WELL MW-6D DRAWDOWN DATA

PUMPING TEST OF MONITORING WELL MW-6D

TUTU WELLS SITE
ST. THOMAS, U.S. VIRGIN ISLANDS

FIGURE

4-18



AQUIFER TYPE
UNCONFINED

SOLUTION METHOD
Cooper - Jacob

ESTIMATED PARAMETERS

$T = 0.2052 \text{ ft}^2 / \text{min.}$
 $S = 0.00007$

TEST DATA

$Q = 4.14 \text{ ft}^3 / \text{min} \text{ (31 gpm)}$
 $r = 88 \text{ ft}$
 $b = 350 \text{ ft}$

T = TRANSMISSIVITY

S = STORAGE VALUE

Q = DISCHARGE

r = RADIUS OF INFLUENCE

b = HYDRAULIC CONDUCTIVITY

ft = FEET

min = MINUTE

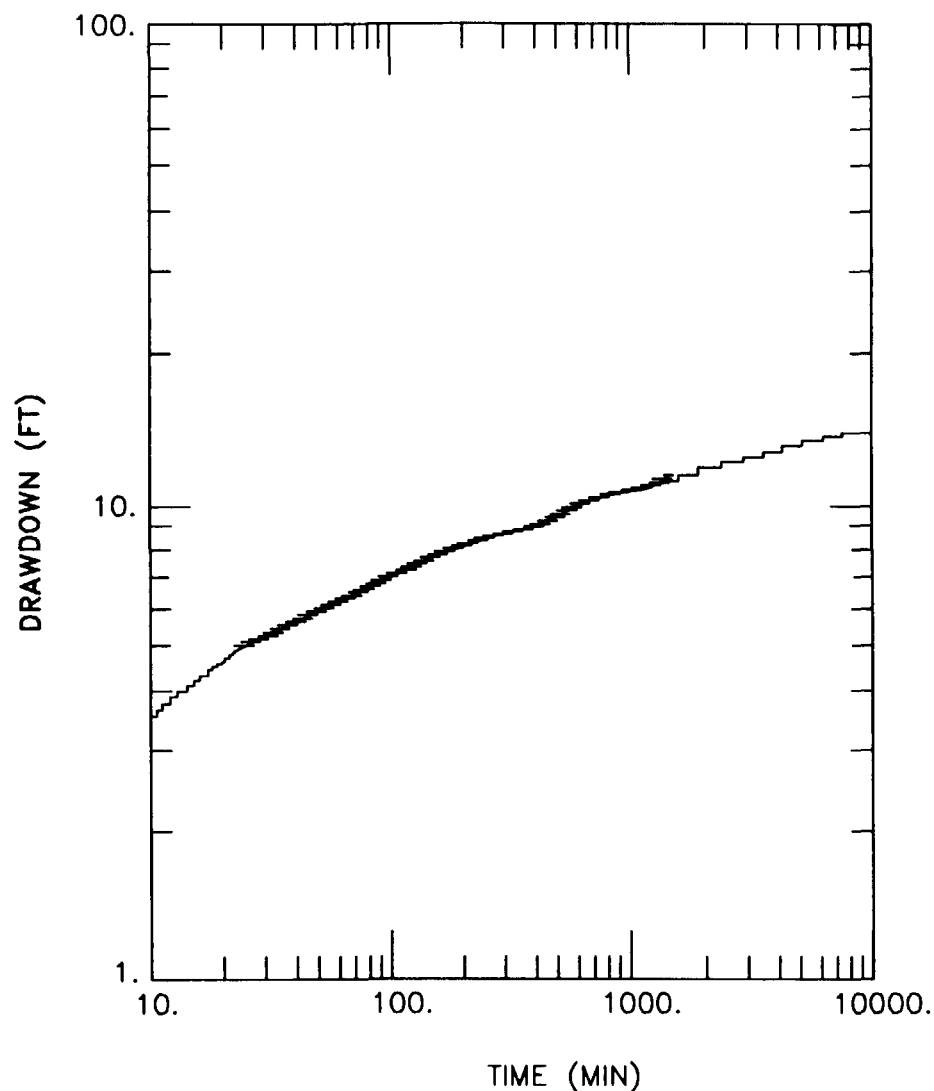


EGLIN II SUPPLY WELL DRAWDOWN DATA EGLIN III SUPPLY WELL PUMPAGE IMPACT TEST

TUTU WELLS SITE
ST. THOMAS, U.S. VIRGIN ISLANDS

FIGURE

4-19



AQUIFER TYPE
UNCONFINED

SOLUTION METHOD
Theis Recovery

ESTIMATED PARAMETERS

$T = 0.2112 \text{ ft}^2/\text{min}$
 $S = 0.00007$

TEST DATA

$Q = 4.14 \text{ ft}^3/\text{min}$ (31 gpm)
 $r = 88 \text{ ft}$
 $b = 350 \text{ ft}$

T = TRANSMISSIVITY

S = STORAGE VALUE

Q = DISCHARGE

r = RADIUS OF INFLUENCE

b = HYDRAULIC CONDUCTIVITY

ft = FEET

min = MINUTE

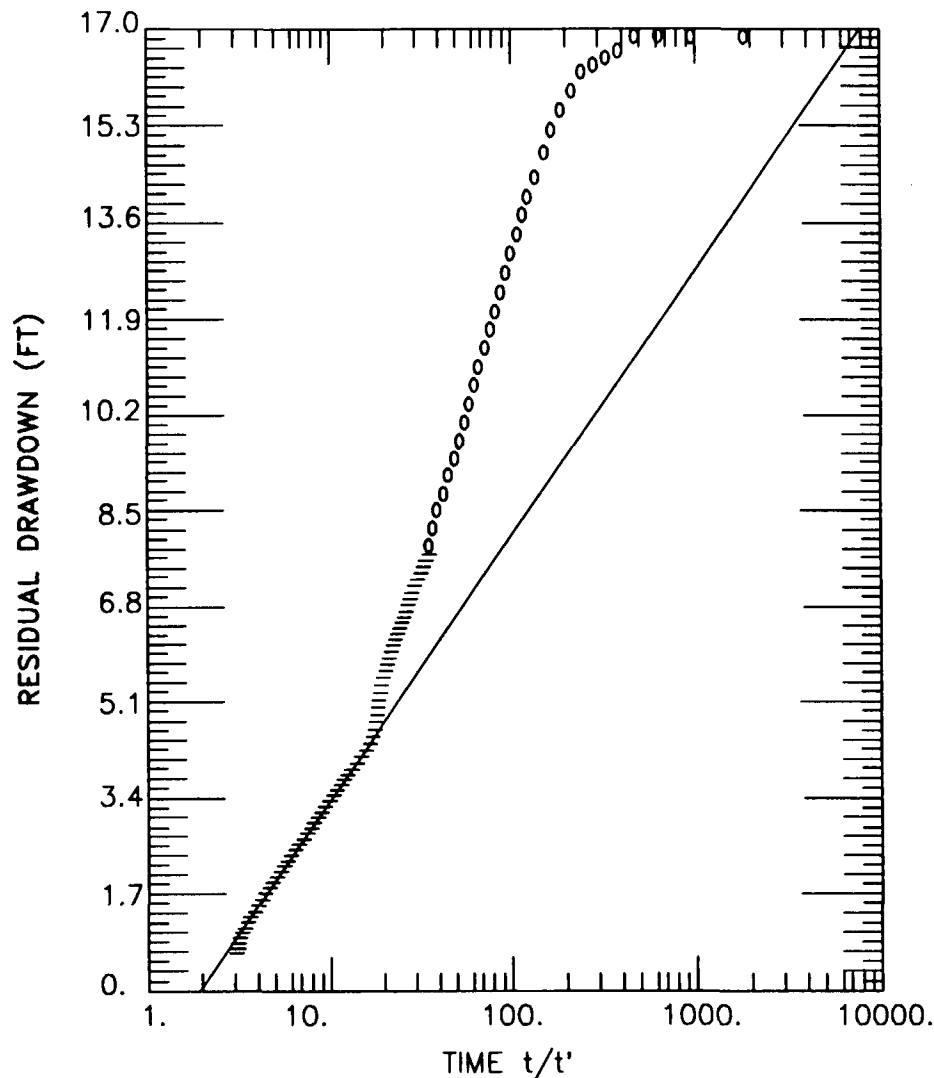


EGLIN II SUPPLY WELL DRAWDOWN DATA EGLIN III SUPPLY WELL PUMPAGE IMPACT TEST

TUTU WELLS SITE
ST. THOMAS, U.S. VIRGIN ISLANDS

FIGURE

4-20



AQUIFER TYPE
UNCONFINED

SOLUTION METHOD
Theis Recovery

ESTIMATED PARAMETER
 $T = 0.177 \text{ ft}^2 / \text{min}$

TEST DATA
Average Pumping Rate = $4.55 \text{ ft}^3 / \text{min}$
Total pumping time = 1,868 min

T = TRANSMISSIVITY
 ft = FEET
 min = MINUTE

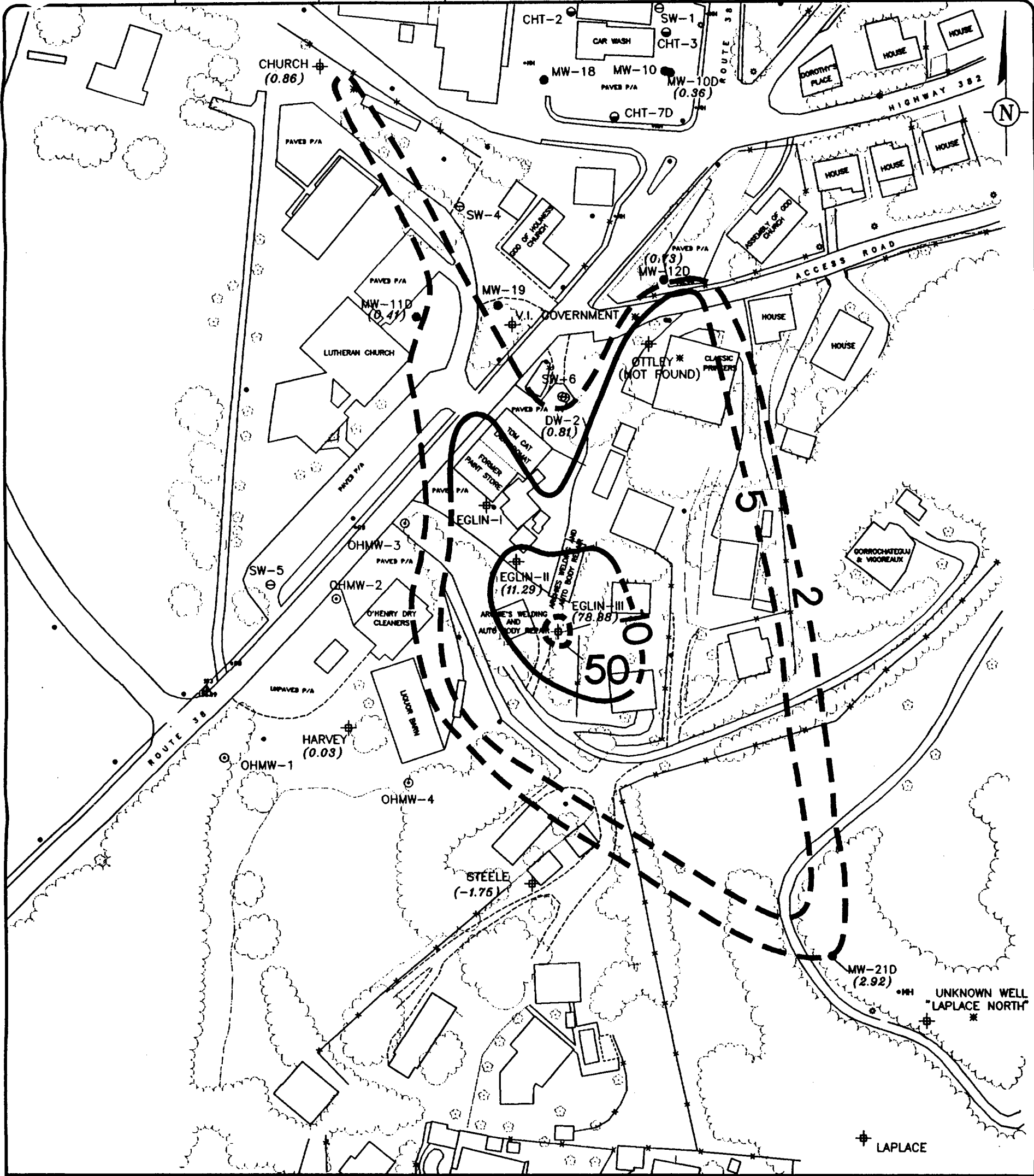


EGLIN II SUPPLY WELL RECOVERY DATA EGLIN III SUPPLY WELL PUMPAGE IMPACT TEST

TUTU WELLS SITE
ST. THOMAS, U.S. VIRGIN ISLANDS

FIGURE

4-21



LEGEND

- | | | | |
|----------|---|-----------|--|
| ▲ 175.89 | EXISTING CONTROL MONUMENT
(ELEVATION IN FEET ABOVE MEAN SEA LEVEL) | (2.92) | WATER-LEVEL DRAWDOWN IN FEET |
| ✱ | LOCATION OF WELL IS APPROXIMATE | MW-12D ● | DEEP MONITORING WELL INSTALLED
INSTALLED BY GERAGHTY & MILLER, INC. |
| ● CB | CATCH BASIN | MW-10 ● | SHALLOW MONITORING WELL
INSTALLED BY GERAGHTY & MILLER, INC. |
| ● MH | MANHOLE | MW-10D ● | DEEP MONITORING WELL INSTALLED
BY GERAGHTY & MILLER, INC. |
| ● U | UTILITY POLE | EGLIN-I ✱ | SUPPLY WELL LOCATION |
| ● L | LIGHT POLE | CHT-7D ● | MONITORING WELLS INSTALLED BY CARRIBEAN HYDRO-TECH, INC. |
| — F — | FENCE | SW-4 ● | SHALLOW MONITORING WELL INSTALLED
BY BLASLAND, BOUCK & LEE, INC. |
| P/A | PARKING AREA | DW-2 ● | DEEP MONITORING WELL INSTALLED
BY BLASLAND, BOUCK & LEE, INC. |
| — V — | EDGE OF VEGETATION | OHMW-4 ● | SHALLOW MONITORING WELLS INSTALLED BY
GEO CARIBE, INC. |
| — UR — | UNPAVED ROAD | | |
| — GR — | GUARDRAIL | | |
| -10- | LINE OF EQUAL WATER-LEVEL DRAWDOWN
(FEET) DASHED WHERE INFERRED | | |

NOTE: DRAWDOWN MEASUREMENTS TAKEN AFTER APPROXIMATELY 23 HOURS OF PUMPING AT A CONTINUOUS RATE OF 31 GALLONS PER MINUTE.

SCALE
0 110 220 FEET

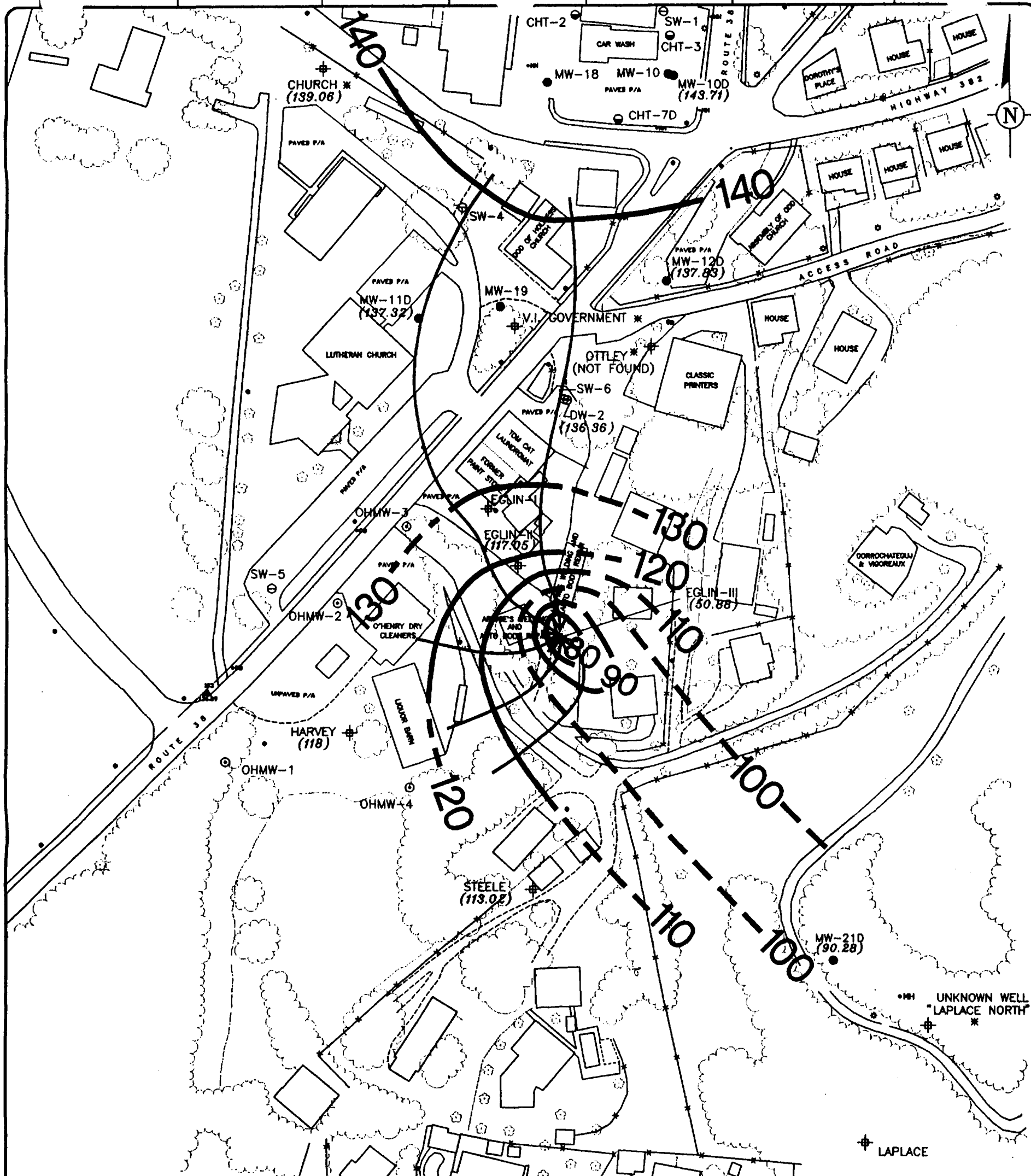


MAXIMUM DRAWDOWN IN DEEP WELLS DURING EGLIN III PUMPAGE IMPACT TEST MAY 12, 1994

TUTU WELLS SITE
ST. THOMAS, U.S. VIRGIN ISLANDS

FIGURE

4-22



LEGEND

175.89

EXISTING CONTROL MONUMENT
(ELEVATION IN FEET ABOVE MEAN SEA LEVEL)

LOCATION OF WELL IS APPROXIMATE

•C) CATCH BASIN

•MH MANHOLE

- **UTILITY POLE**

* LIGHT POLE
* FENCE

 FENCE

P/A PARKING ARE

EDGE OF VEG

===== UNPAVED ROAD

CLARIBAIL

GUARDRAIL

SCALE 100 200

220 555T

—120—
(90.28)

LINE OF EQUAL WATER-LEVEL ELEVATION IN FEET
ABOVE SEA LEVEL (DASHED WHERE INFERRED)

WATER-LEVEL ELEVATION IN FEET ABOVE MEAN SEA LEVEL

INFERRED DIRECTION OF GROUNDWATER FLOW

MW-10 ● SHALLOW MONITORING WELL INSTALLED

AW-10D ● DEER MONITORING WELL INSTALLED

DEPT MONITORING WILL
BY GERAGHTY & MILLER

EGLIN-1 ~~SECRET~~ SUPPLY WELL LOCATION

CHT-7D ● MONITORING WELLS INSTALLED BY CARBON
SW-4 ● SHALLOW MONITORING WELL INSTALLED

BY BLASLAND, BOUCK & LEE INC.

DW-2 @ DEEP MONITORING WELL INSTALLED

BY BLASLAND, BOUCK & LEE INC.

NOTES: WATER-LEVEL DATA WERE COLLECTED AFTER APPROXIMATELY 23 HOURS OF PUMPING AT A CONTINUOUS RATE OF 31 GALLONS PER MINUTE.
THE ELEVATION AT THE HARVEY SUPPLY WELL IS APPROXIMATE.



GROUNDWATER ELEVATIONS DURING THE EGLIN III PUMPAGE IMPACT TEST MAY 12, 1994

TUTU WELLS SITE

ST. THOMAS, U.S. VIRGIN ISLANDS

FIGURE

4-23

OIL 11	
NON-BTEX VOCs (ppb)	ND
2-Butanone	86500
Hexanone	8500
BTEX AND BNA COMPOUNDS* (ppb)	
Benzene	1375
BNAs	NA
TOTAL PETROLEUM HYDROCARBONS (ppm)	
NA	NA

OIL 18	
NON-BTEX VOCs (ppb)	ND
2-Butanone	1217 D
Methylene chloride	468 D
Acetone	7304 D
BTEX AND BNA COMPOUNDS* (ppb)	
Toluene	4930 D
Ethylbenzene	499 D
Xylenes	3307 D
BNAs	ND
TOTAL PETROLEUM HYDROCARBONS (ppm)	
NA	NA

OIL 19	
NON-BTEX VOCs (ppb)	ND
Methylene chloride	428
Acetone	6462
2-Butanone	607
1,1,1-Trichloroethane	393
BTEX AND BNA COMPOUNDS* (ppb)	
Benzene	1428
Toluene	35,093
Ethylbenzene	6819
Xylenes	22,634
BNAs	NA
TOTAL PETROLEUM HYDROCARBONS (ppm)	
NA	NA

OIL 20	
NON-BTEX VOCs (ppb)	ND
Methylene chloride	442
Acetone	6058
2-Butanone	1508
BTEX AND BNA COMPOUNDS* (ppb)	
Benzene	ND
BNAs	NA
TOTAL PETROLEUM HYDROCARBONS (ppm)	
NA	NA

OIL 12	
NON-BTEX VOCs (ppb)	ND
Acetone	8250
2-Butanone	32,000
BTEX AND BNA COMPOUNDS* (ppb)	
Benzene	1433
BNAs	ND
TOTAL PETROLEUM HYDROCARBONS (ppm)	
NA	NA

MW-13D (4.0'-6.0')	
NON-BTEX VOCs (ppb)	ND
BTEX AND BNA COMPOUNDS* (ppb)	
Benzene	ND
BNAs	ND
TOTAL PETROLEUM HYDROCARBONS (ppm)	
NA	NA

MW-13 (2.0'-3.5')	
NON-BTEX VOCs (ppb)	ND
BTEX AND BNA COMPOUNDS* (ppb)	
Benzene	ND
BNAs	ND
TOTAL PETROLEUM HYDROCARBONS (ppm)	
230	NA

OIL 02	
NON-BTEX VOCs (ppb)	ND
Methylene chloride	225,000
Acetone	587,500
1,1-Dichloroethane	525,000
1,1,1-Trichloroethane	16,112,500
BTEX AND BNA COMPOUNDS* (ppb)	
Ethylbenzene	137,500
Xylenes	775,000
BNAs	NA
TOTAL PETROLEUM HYDROCARBONS (ppm)	
NA	NA

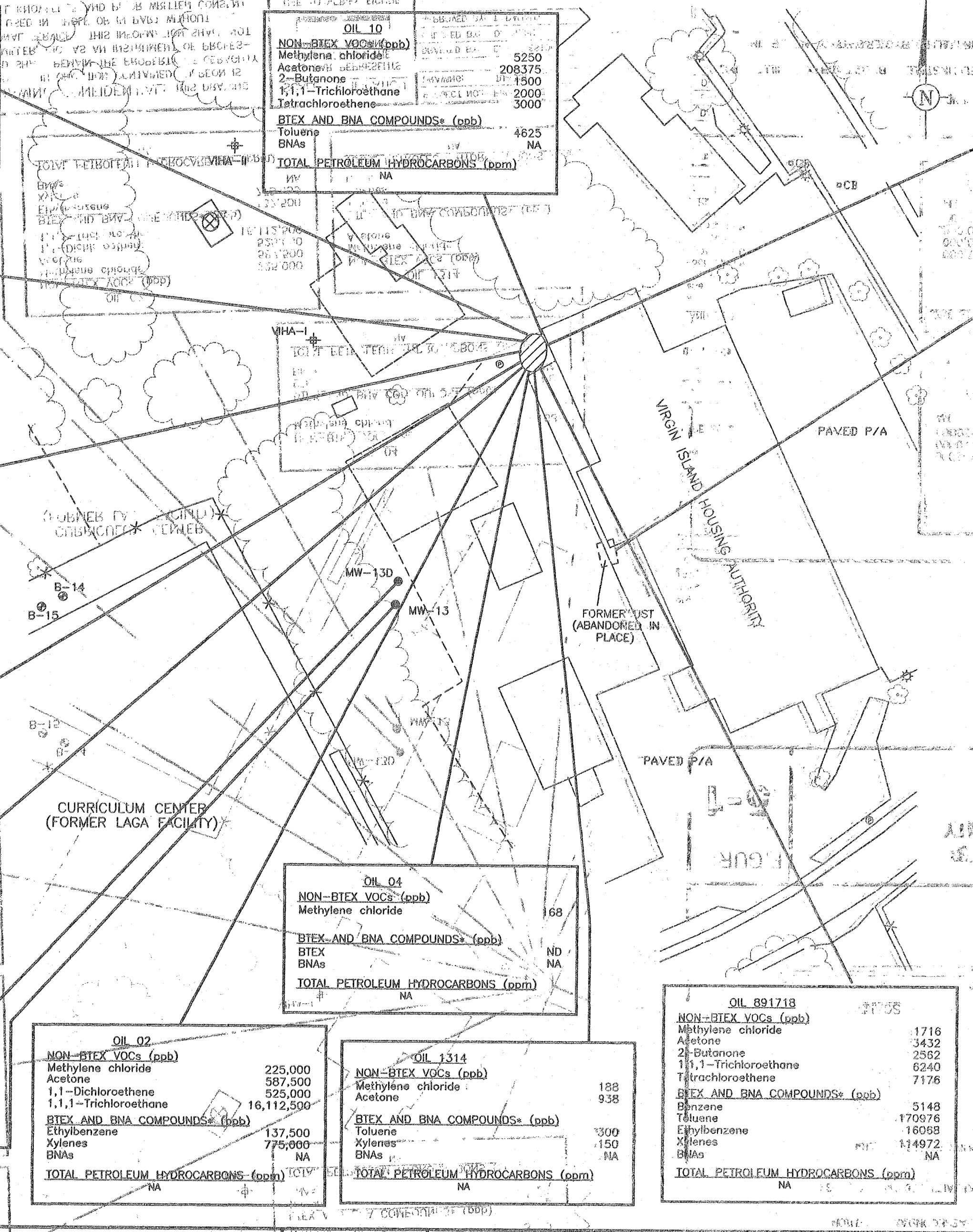
OIL 1314	
NON-BTEX VOCs (ppb)	ND
Methylene chloride	188
Acetone	938
BTEX AND BNA COMPOUNDS* (ppb)	
Toluene	300
Xylenes	150
BNAs	NA
TOTAL PETROLEUM HYDROCARBONS (ppm)	
NA	NA

OIL 891718	
NON-BTEX VOCs (ppb)	ND
Methylene chloride	1716
Acetone	3432
2-Butanone	2562
1,1,1-Trichloroethane	6240
Tetrachloroethane	7176
BTEX AND BNA COMPOUNDS* (ppb)	
Benzene	5148
Toluene	170976
Ethylbenzene	16068
Xylenes	114972
BNAs	NA
TOTAL PETROLEUM HYDROCARBONS (ppm)	
NA	NA

OIL 10	
NON-BTEX VOCs (ppb)	ND
Methylene chloride	5250
Acetone	208375
2-Butanone	1500
1,1,1-Trichloroethane	2000
Tetrachloroethane	3000
BTEX AND BNA COMPOUNDS* (ppb)	
Toluene	4625
BNAs	NA
TOTAL PETROLEUM HYDROCARBONS (ppm)	
NA	NA

OIL 3567	
NON-BTEX VOCs (ppb)	ND
BTEX AND BNA COMPOUNDS* (ppb)	
Toluene	437500
Ethylbenzene	170000
Xylenes	4770000
BNAs	NA
TOTAL PETROLEUM HYDROCARBONS (ppm)	
NA	NA

WASTE OIL COLLECTED BY ROY E. WESTON, INC.	
NON-BTEX VOCs (ppb)	ND
BTEX AND BNA COMPOUNDS* (ppb)	
Benzene	97,000
Toluene	998,000
Ethylbenzene	500,000
Xylenes	2,900,000
BNAs	NA
TOTAL PETROLEUM HYDROCARBONS (ppm)	
NA	NA



OIL 3567	
NON-BTEX VOCs (ppb)	ND
BTEX AND BNA COMPOUNDS* (ppb)	
Toluene	437500
Ethylbenzene	170000
Xylenes	4770000
BNAs	NA
TOTAL PETROLEUM HYDROCARBONS (ppm)	
NA	NA

WASTE OIL COLLECTED BY ROY E. WESTON, INC.	
NON-BTEX VOCs (ppb)	ND
BTEX AND BNA COMPOUNDS* (ppb)	
Benzene	97,000
Toluene	998,000
Ethylbenzene	500,000
Xylenes	2,900,000
BNAs	NA
TOTAL PETROLEUM HYDROCARBONS (ppm)	
NA	NA

LEGEND	
MW-13	SHALLOW MONITORING WELL INSTALLED BY GERAGHTY & MILLER, INC.
MW-13D	DEEP MONITORING WELL INSTALLED BY GERAGHTY & MILLER, INC.
VIHA-1	SUPPLY WELL LOCATION
B-14	SOIL BORING INSTALLED BY GERAGHTY & MILLER, INC.
(Symbol: Circle with diagonal lines)	DRUM STORAGE LOCATION (LOCATION IS APPROXIMATE), DRUM SAMPLES COLLECTED BY ARTHUR D. LITTLE, INC.
(Symbol: Circle with cross)	LOCATION OF DRUMS OBSERVED AND NOT SAMPLED BY ARTHUR D. LITTLE, INC.
(Symbol: Star)	INCLUDES MOSTLY PETROLEUM-RELATED COMPOUNDS; SOME BNA COMPOUNDS MAY BE LABORATORY ARTIFACTS
VOC	VOLATILE ORGANIC COMPOUND
BTEX	BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES
BNA	BASE NEUTRAL/ACID EXTRACTABLE
NA	NOT ANALYZED
ND	NOT DETECTED

SCALE	
0	50 100 FEET
SOURCES:	
GERAGHTY & MILLER, INC. (1993b)	
ARTHUR D. LITTLE, INC. (1994)	

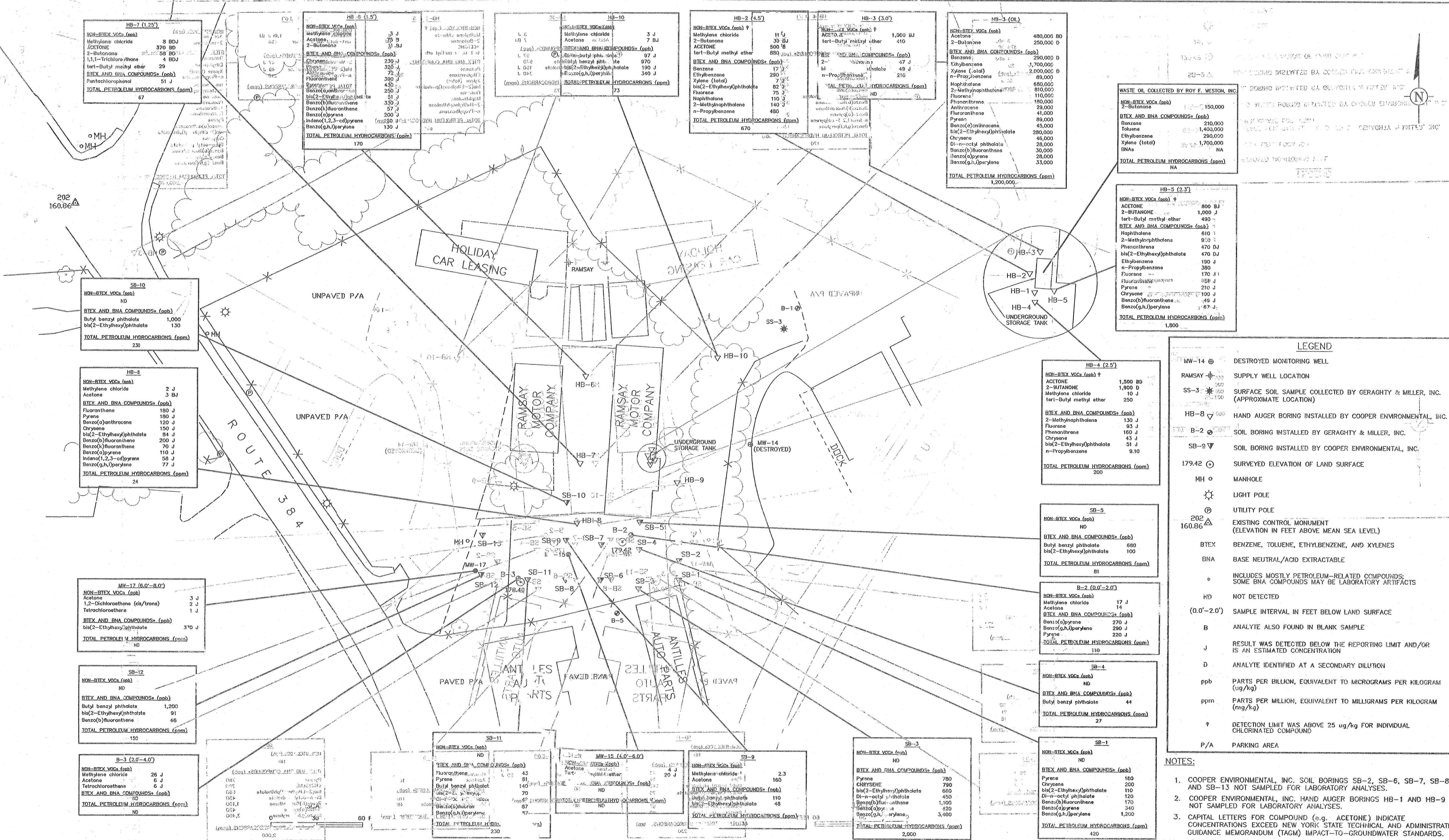
DRAWING CONFIDENTIAL: THIS DRAWING AND ALL INFORMATION CONTAINED THEREON IS AND SHALL REMAIN THE PROPERTY OF GERAGHTY & MILLER, INC. AS AN INSTRUMENT OF PROFESSIONAL SERVICE. THIS INFORMATION SHALL NOT BE USED IN WHOLE OR IN PART WITHOUT THE FULL KNOWLEDGE AND PRIOR WRITTEN CONSENT OF GERAGHTY & MILLER, INC.

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

PROJECT NO.: PRO013.033	FILE NO.: TU-351
DRAWING: TU-351	PLOT SIZE: 1=50
DRAFTED BY: E. EAGLESTON	DATE: 1-25-95
CHECKED BY: D. STERN	DATE: 1-25-95
APPROVED BY: T. DANAHY	DATE: 1-25-95

SOIL AND OIL SAMPLING RESULTS VIRGIN ISLAND HOUSING AUTHORITY

TUTU WELLS SITE
ST. THOMAS, U.S. VIRGIN ISLANDS



LEGEND

MW-14 (X) DESTROYED MONITORING WELL

RAMSAY (X) SUPPLY WELL LOCATION

SS-3 (X) SURFACE SOIL SAMPLE COLLECTED BY GERAGHTY & MILLER, INC. (APPROXIMATE LOCATION)

HB-8 (X) HAND AUGER BORING INSTALLED BY COOPER ENVIRONMENTAL, INC.

B-2 (X) SOIL BORING INSTALLED BY GERAGHTY & MILLER, INC.

SB-9 (X) SOIL BORING INSTALLED BY COOPER ENVIRONMENTAL, INC.

179.42 (X) SURVEYED ELEVATION OF LAND SURFACE

MH (X) MANHOLE

202 (X) LIGHT POLE

160.86 (X) UTILITY POLE

202 (X) EXISTING CONTROL MONUMENT (ELEVATION IN FEET ABOVE MEAN SEA LEVEL)

BTEX BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES

BNA BASE NEUTRAL/ACID EXTRACTABLE

* INCLUDES MOSTLY PETROLEUM-RELATED COMPOUNDS; SOME BNA COMPOUNDS MAY BE LABORATORY ARTIFACTS

ND NOT DETECTED

(0.0'-2.0') SAMPLE INTERVAL IN FEET BELOW LAND SURFACE

B ANALYTE ALSO FOUND IN BLANK SAMPLE

J RESULT WAS DETECTED BELOW THE REPORTING LIMIT AND/OR IS AN ESTIMATED CONCENTRATION

D ANALYTE IDENTIFIED AT A SECONDARY DILUTION

ppb PARTS PER BILLION, EQUIVALENT TO MICROGRAMS PER KILOGRAM (ug/kg)

ppm PARTS PER MILLION, EQUIVALENT TO MILLIGRAMS PER KILOGRAM (mg/kg)

† DETECTION LIMIT WAS ABOVE 25 ug/kg FOR INDIVIDUAL CHLORINATED COMPOUND

P/A PARKING AREA

- NOTES:**
- COOPER ENVIRONMENTAL, INC. SOIL BORINGS SB-2, SB-6, SB-7, SB-8, AND SB-13 NOT SAMPLED FOR LABORATORY ANALYSES.
 - COOPER ENVIRONMENTAL, INC. HAND AUGER BORINGS HB-1 AND HB-9 NOT SAMPLED FOR LABORATORY ANALYSES.
 - CAPITAL LETTERS FOR COMPOUND (E.G., ACETONE) INDICATE CONCENTRATIONS EXCEED NEW YORK STATE TECHNICAL AND ADMINISTRATIVE GUIDANCE MEMORANDUM (TAGM) IMPACT-TO-GROUNDWATER STANDARDS.

SOURCES: COOPER ENVIRONMENTAL, INC. (1993)
COOPER ENVIRONMENTAL, INC. (1994)
GERAGHTY & MILLER, INC. (1993a)
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (1994)

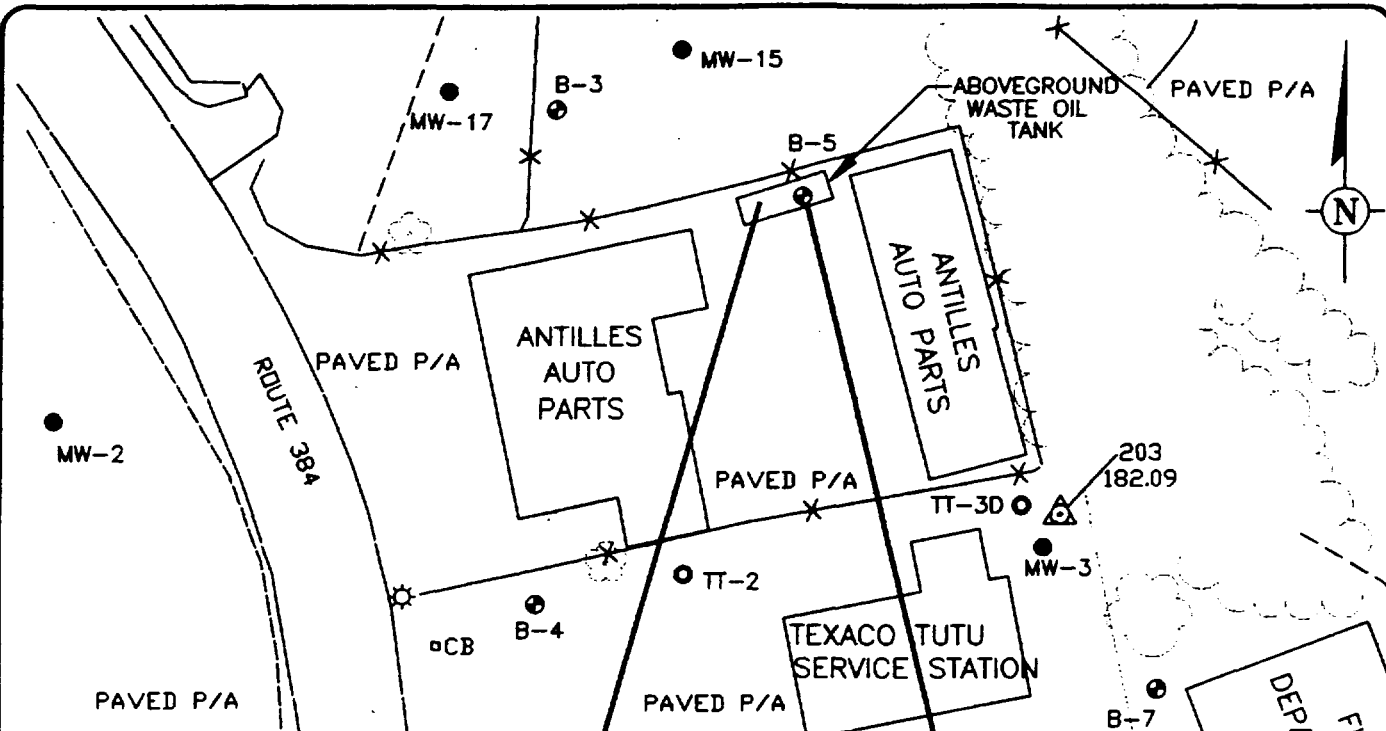


NO.	DESCRIPTION	BY	APPR.
1	PROJECT NO.: PR0013033		
2	FILE NO.: TU-355		
3	DRAWING: TU-355		
4	DRAFTED BY: E. EAGLESTON		
5	CHECKED BY: D. STERN		
6	APPROVED BY: J. DANAHY		
7	DATE: 1/25/95		
8	DATE: 1/25/95		
9	DATE: 1/25/95		

SOIL AND OIL SAMPLING RESULTS
RAMSAY MOTORS

TUTU WELLS SITE
ST. THOMAS, U.S. VIRGIN ISLANDS

DRAFTER: E. EAGLESTON
 APPROVED: J. POTENZA
 CHECKED: J. MESSINGER
 DRAWING: TU-352
 FILE: TU-352
 PROJECT NO.: PR0013.033
 DWG DATE: 1-25-95



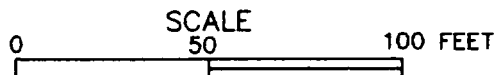
ANTILLES WOS	
<u>NON-BTEX VOCs (ppb)</u>	
1,1,1-Trichloroethane	7.0
<u>BTEX AND BNA COMPOUNDS* (ppb)</u>	
Benzene	1.8
Toluene	71 D
Ethylbenzene	18
Xylenes	130,000 D
BNAs	NA
<u>TOTAL PETROLEUM HYDROCARBONS (ppm)</u>	
NA	

B-5 (0.0'-2.0')	
<u>NON-BTEX VOCs (ppb)</u>	
Acetone	92 J
Methyl tertiary butyl ether	1.3 J
Methylene chloride	9 J
2-butanone	18
<u>BTEX AND BNA COMPOUNDS* (ppb)</u>	
Toluene	2 J
BNAs	ND
<u>TOTAL PETROLEUM HYDROCARBONS (ppm)</u>	
53	

LEGEND

- MW-1 ● SHALLOW MONITORING WELL INSTALLED BY GERAGHTY & MILLER, INC.
- MW-6D ● DEEP MONITORING WELL INSTALLED BY GERAGHTY & MILLER, INC.
- TT-5 ○ MONITORING WELL INSTALLED BY GCL
- B-5 ● SOIL BORING INSTALLED BY GERAGHTY & MILLER, INC.
- 203 182.09 ▲ EXISTING CONTROL MONUMENT (ELEVATION IN FEET ABOVE MEAN SEA LEVEL)
- UTILITY POLE
- ☆ LIGHT POLE
- P/A PARKING AREA

- VOC VOLATILE ORGANIC COMPOUND
- BTEX BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES
- BNA BASE NEUTRAL/ACID EXTRACTABLE
- (0.0'-2.0') SAMPLE INTERVAL IN FEET BELOW LAND SURFACE
- J RESULT WAS DETECTED BELOW THE REPORTING LIMIT AND/OR IS AN ESTIMATED CONCENTRATION
- ppb PARTS PER BILLION, EQUIVALENT TO MICROGRAMS PER KILOGRAM (ug/kg)
- ppm PARTS PER MILLION, EQUIVALENT TO MILLIGRAMS PER KILOGRAM (mg/kg)
- * INCLUDES MOSTLY PETROLEUM-RELATED COMPOUNDS. SOME BNA COMPOUNDS MAY BE LABORATORY ARTIFACTS



SOURCE: GERAGHTY & MILLER, INC. (1993a)

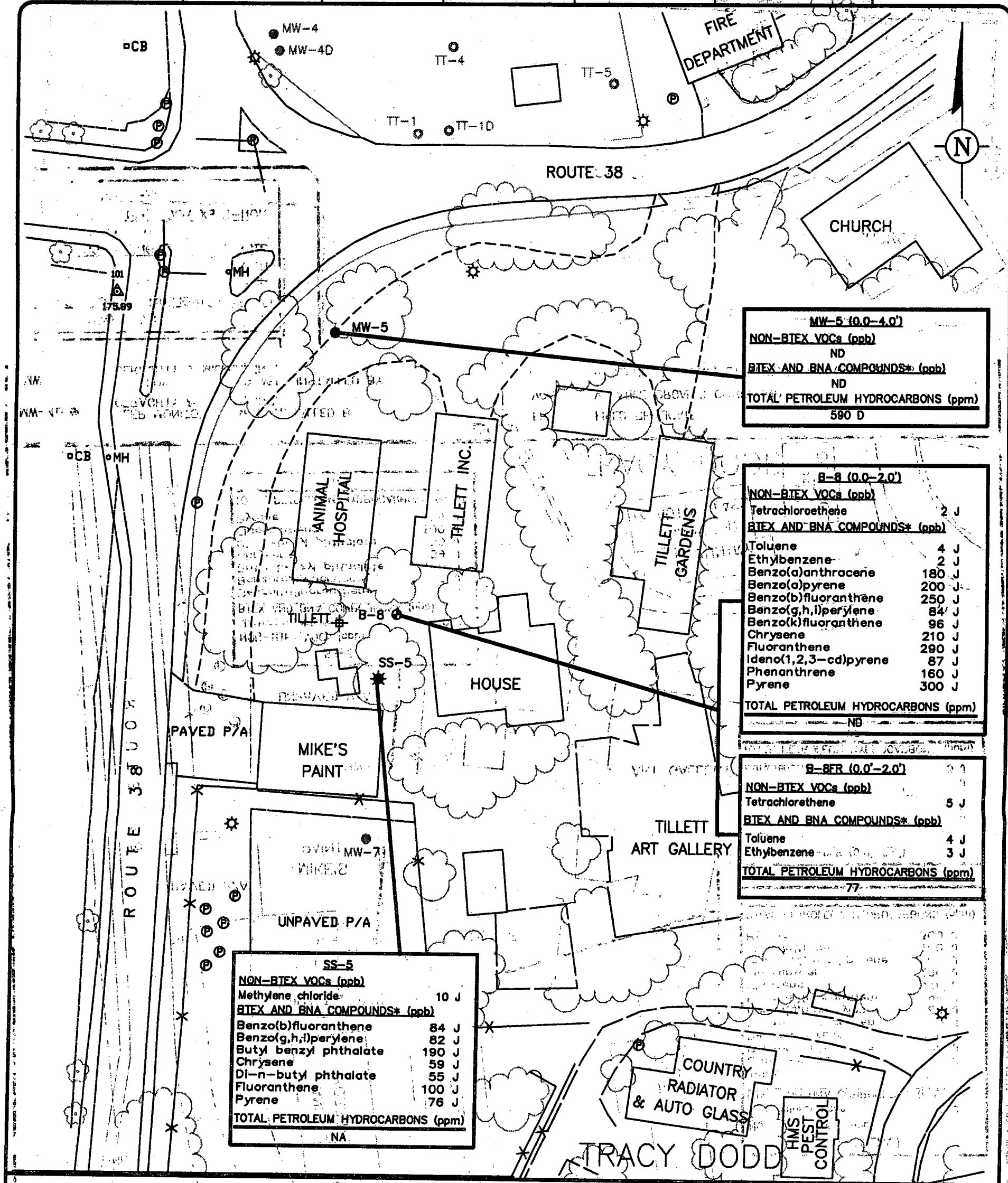
NOTE:
ANTILLES WASTE OIL SAMPLE (ANTILLES WOS) COLLECTED BY GERAGHTY & MILLER, INC.



SOIL SAMPLING RESULTS ANTILLES AUTO PARTS

TUTU WELLS SITE
ST. THOMAS, U.S. VIRGIN ISLANDS

FIGURE
5-4



- MW-4D ● DEEP MONITORING WELL INSTALLED BY GERAGHTY & MILLER, INC.
- MW-4 ● SHALLOW MONITORING WELL INSTALLED BY GERAGHTY & MILLER, INC.
- TT-1 ● MONITORING WELL INSTALLED BY GCL
- TILLET ● SUPPLY WELL LOCATION
- B-8 ● SOIL BORING INSTALLED BY GERAGHTY & MILLER, INC.
- SS-5 ★ SURFACE SOIL SAMPLE COLLECTED BY GERAGHTY & MILLER, INC. (APPROXIMATE LOCATION)
- 101 ● EXISTING CONTROL MONUMENT (ELEVATION IN FEET ABOVE MEAN SEA LEVEL)
- 175.89 ● UTILITY POLE
- LIGHT POLE
- P/A ● PARKING AREA

LEGEND

- FR FIELD REPLICATE
- VOC VOLATILE ORGANIC COMPOUND
- BTEX BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES (ppb)
- BNA BASE NEUTRAL/ACID-EXTRACTABLE
- NA NOT ANALYZED
- * INCLUDES MOSTLY PETROLEUM-RELATED COMPOUNDS; SOME BNA COMPOUNDS MAY BE LABORATORY ARTIFACTS
- (0.0'-2.0') SAMPLE INTERVAL IN FEET BELOW LAND SURFACE
- J RESULT WAS DETECTED BELOW THE REPORTING LIMIT AND/OR IS AN ESTIMATED CONCENTRATION
- D ANALYTE IDENTIFIED AT A SECONDARY DILUTION
- ppb PARTS PER BILLION, EQUIVALENT TO MICROGRAMS PER KILOGRAM (ug/kg)
- ppm PARTS PER MILLION, EQUIVALENT TO MILLIGRAMS PER KILOGRAM (mg/kg)

SOURCE: GERAGHTY & MILLER, INC. (1993a)



SOIL SAMPLING RESULTS TILLET GARDENS

TUTU WELLS SITE
ST. THOMAS, U.S. VIRGIN ISLANDS

FIGURE

5-6

TW-4 (2.5') (Soil)	
NON-BTEX VOCs (ppb)	
BTEX AND BNA COMPOUNDS* (ppb)	
2-Methylnaphthalene	570
TOTAL PETROLEUM HYDROCARBONS (ppm)	
Petroleum hydrocarbons	56
Oil & grease	240

TANK #2 (Liquid) Second Sample 3/93	
NON-BTEX VOCs (ppb)	
BTEX AND BNA COMPOUNDS* (ppb)	
1,1,1-Trichloroethane	2
BTEX AND BNA COMPOUNDS* (ppb)	
Benzene	15
Ethylbenzene	420
1-Xylene	420
2-Xylene	NA
TOTAL PETROLEUM HYDROCARBONS (ppm)	
Petroleum hydrocarbons	NA
Oil & grease	NA

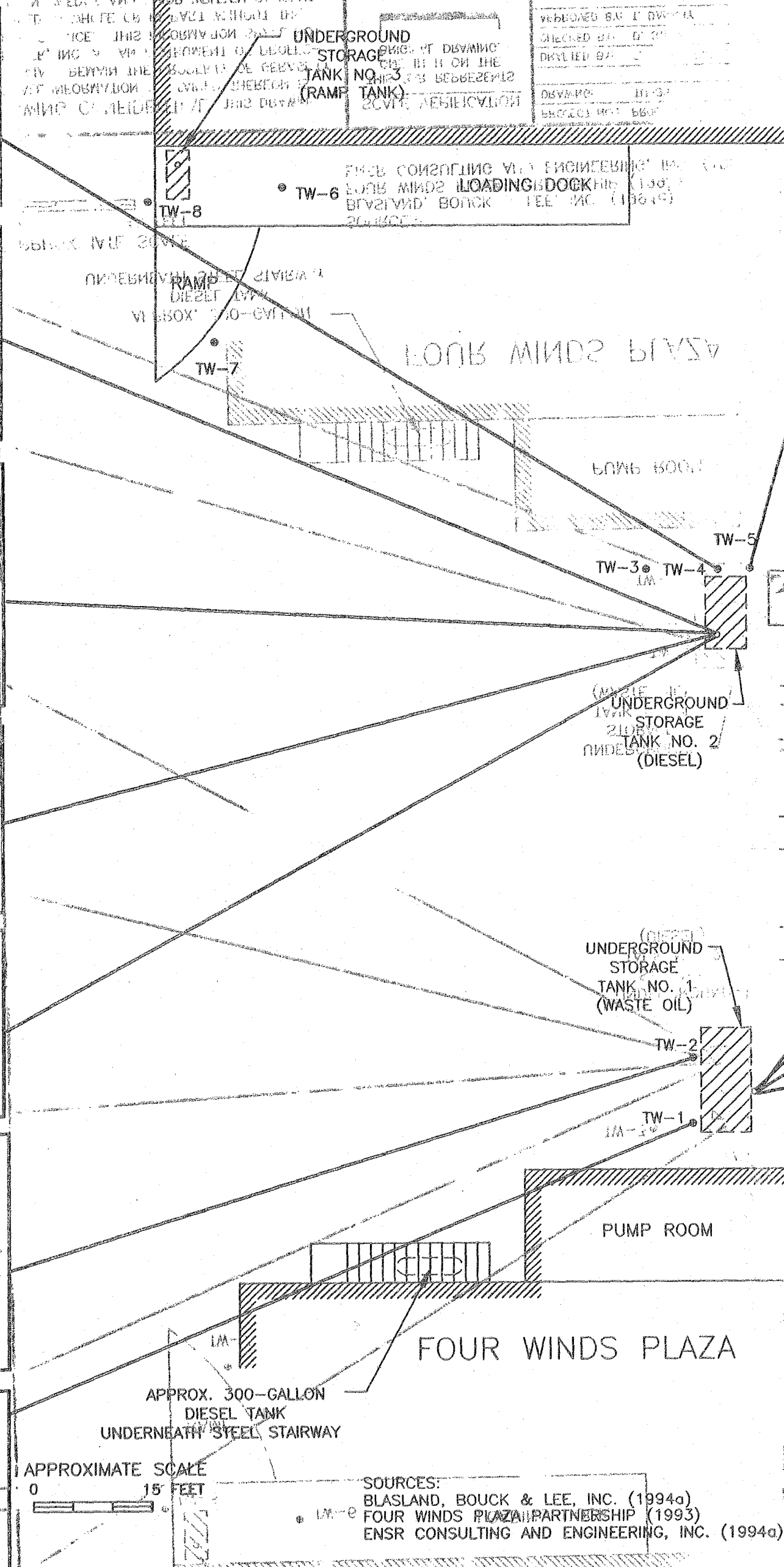
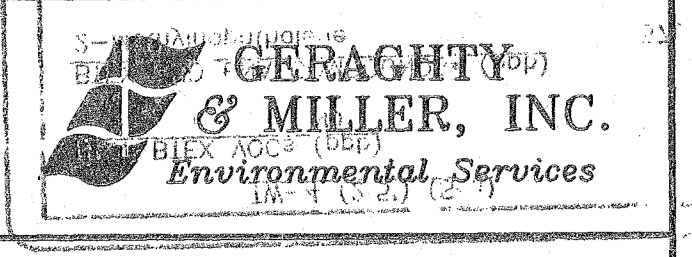
TANK #2 (Liquid) 12/92	
NON-BTEX VOCs (ppb)	
BTEX AND BNA COMPOUNDS* (ppb)	
1,1,1-Trichloroethane	700**
BTEX AND BNA COMPOUNDS* (ppb)	
Benzene	26
Ethylbenzene	13
Naphthalene	190
1-Methylnaphthalene	200
Pyrene	350
TOTAL PETROLEUM HYDROCARBONS (ppm)	
Petroleum hydrocarbons	690
Oil & grease	690

TANK #1 (4.5') (Liquid)	
NON-BTEX VOCs (ppb)	
BTEX AND BNA COMPOUNDS* (ppb)	
BTEX	[ND]
BNA	[NA]
TOTAL PETROLEUM HYDROCARBONS (ppm)	
Petroleum hydrocarbons	[NA]
Oil & grease	[NA]

TANK #1 (4.5') (Liquid)	
NON-BTEX VOCs (ppb)	
BTEX AND BNA COMPOUNDS* (ppb)	
BTEX	[ND]
BNA	[NA]
TOTAL PETROLEUM HYDROCARBONS (ppm)	
Petroleum hydrocarbons	[ND]
Oil & grease	[NA]

TANK #2 (3.0') (Liquid)	
NON-BTEX VOCs (ppb)	
BTEX AND BNA COMPOUNDS* (ppb)	
Benzene	2.8
Ethylbenzene	11
Toluene	3.6
Xylenes	17
TOTAL PETROLEUM HYDROCARBONS (ppm)	
Petroleum hydrocarbons	430
Oil & grease	450

TANK #1 (4.0') (Soil)	
NON-BTEX VOCs (ppb)	
BTEX AND BNA COMPOUNDS* (ppb)	
BTEX	[ND]
BNA	[NA]
TOTAL PETROLEUM HYDROCARBONS (ppm)	
Petroleum hydrocarbons	32
Oil & grease	40



TW-5 (3.0') (Liquid)	
NON-BTEX VOCs (ppb)	
BTEX AND BNA COMPOUNDS* (ppb)	
Ethylbenzene	7.8
Toluene	1.1
Xylenes	24
Naphthalene	730
Fluorene	760
2-Methylnaphthalene	1100
TOTAL PETROLEUM HYDROCARBONS (ppm)	
Petroleum hydrocarbons	90
Oil & grease	110

TW-1S-2 (Sludge)	
NON-BTEX VOCs (ppb)	
BTEX AND BNA COMPOUNDS* (ppb)	
Acetone	[13]
BTEX AND BNA COMPOUNDS* (ppb)	
BTEX	[ND]
BNA	[NA]
TOTAL PETROLEUM HYDROCARBONS (ppm)	
Petroleum hydrocarbons	[NA]
Oil & grease	[NA]

TW-4 (Liquid)	
NON-BTEX VOCs (ppb)	
BTEX AND BNA COMPOUNDS* (ppb)	
BTEX	[ND]/[ND]
BNA	[NA]/[NA]
TOTAL PETROLEUM HYDROCARBONS (ppm)	
Petroleum hydrocarbons	[NA]/[NA]
Oil & grease	[NA]/[NA]

TW-5 (Liquid)	
NON-BTEX VOCs (ppb)	
BTEX AND BNA COMPOUNDS* (ppb)	
BTEX	[ND]/[NA]
BNA	[NA]/[NA]
TOTAL PETROLEUM HYDROCARBONS (ppm)	
Petroleum hydrocarbons	[NA]/(110,000)
Oil & grease	[NA]/(452,000)

WASTE OIL TANK (Backfill sand from inside Tank)	
NON-BTEX VOCs (ppb)	
BTEX AND BNA COMPOUNDS* (ppb)	
BTEX	[ND]
BNA	[ND]/[NA]
TOTAL PETROLEUM HYDROCARBONS (ppm)	
Petroleum hydrocarbons	14
Oil & grease	15

LEGEND

- TW-1 SOIL BORING INSTALLED BY CARIBBEAN HYDRO-TECH, INC.
- APPROXIMATE LOCATION OF UNDERGROUND STORAGE TANK
- VOC VOLATILE ORGANIC COMPOUND
- BTEX BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES
- BNA BASE NEUTRAL/ACID EXTRACTABLE
- * INCLUDES MOSTLY PETROLEUM-RELATED COMPOUNDS; SOME BNA COMPOUNDS MAY BE LABORATORY ARTIFACTS
- ND NOT DETECTED
- NA NOT ANALYZED
- ppb PARTS PER BILLION, EQUIVALENT TO MICROGRAMS PER KILOGRAM (ug/kg)
- ppm PARTS PER MILLION, EQUIVALENT TO MILLIGRAMS PER KILOGRAM (mg/kg)
- (4.0') SAMPLE INTERVAL IN FEET BELOW LAND SURFACE
- ** RESULT WAS ATTRIBUTED TO LABORATORY CONTAMINATION.

NOTES:

- SAMPLES FOR TW-3, TW-7, AND TW-8 NOT ANALYZED. RESULTS FOR BORING TW-6 SHOWN ON FIGURE 5-7.
- TANK SAMPLES COLLECTED BY CARIBBEAN HYDRO-TECH, INC. AND ENSR CONSULTING AND ENGINEERING, INC.
- RESULTS IN PARENTHESES ARE FOR SAMPLES COLLECTED BY BLASLAND, BOUCK & LEE, INC.
- RESULTS IN BRACKETS ARE FOR SAMPLES COLLECTED BY ENSR CONSULTING AND ENGINEERING, INC.

SCALE VERIFICATION

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

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DRAWING: TU-358 PLOT SIZE: 11x15"

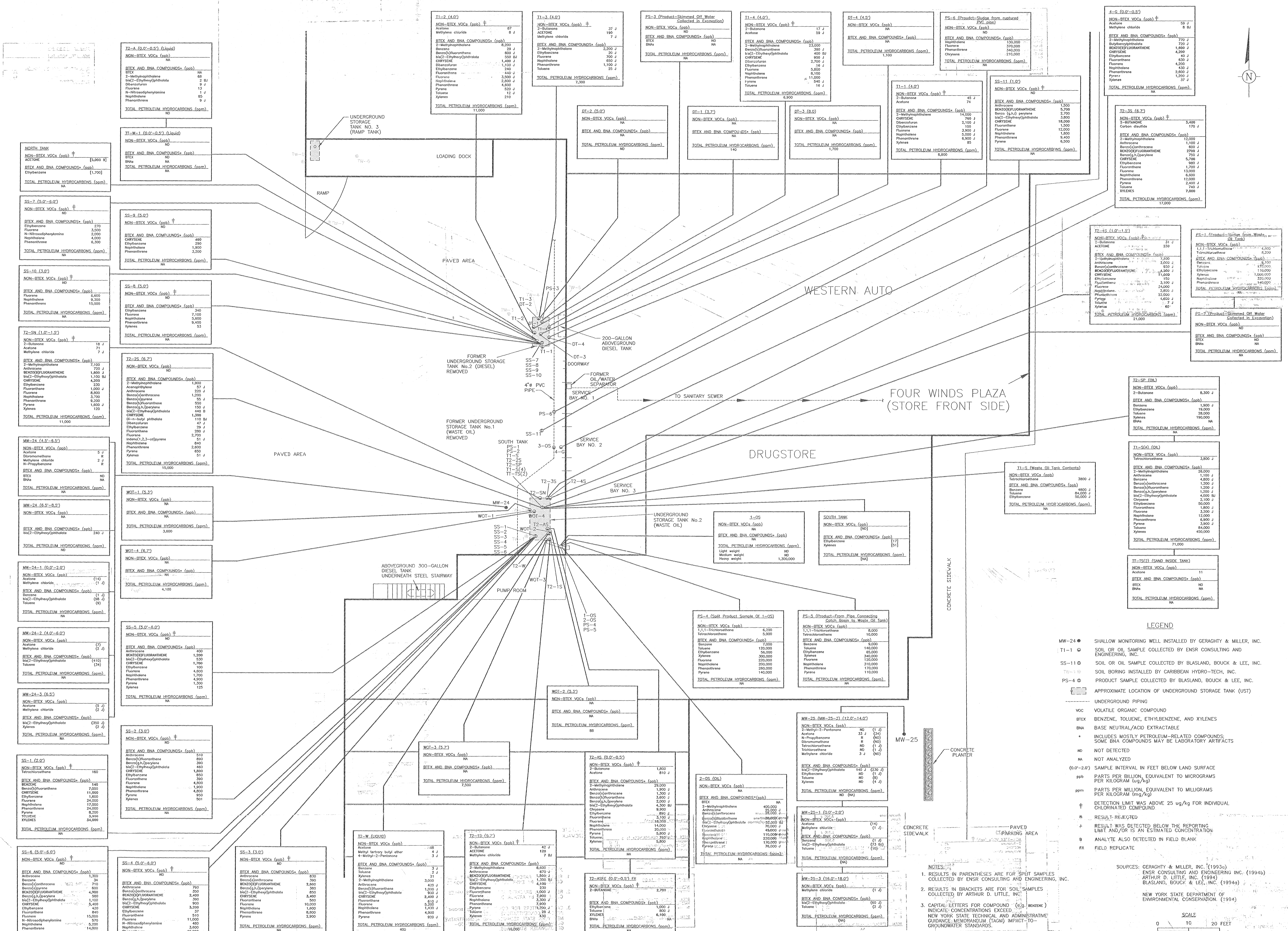
DRAFTED BY: E. EAGLESTON DATE: 1-25-95
CHECKED BY: D. STERN DATE: 1-25-95
APPROVED BY: T. DANAHY DATE: 1-25-95

AQUEOUS AND SOIL SAMPLING RESULTS PRIOR TO UST REMOVAL WESTERN AUTO FACILITY

TUTU WELLS SITE
ST. THOMAS, U.S. VIRGIN ISLANDS

FIGURE

5-8



LEGEND

- SHALLOW MONITORING WELL INSTALLED BY GERAGHTY & MILLER, INC.
- SOIL OR OIL SAMPLE COLLECTED BY ENSR CONSULTING AND ENGINEERING, INC.
- SOIL OR OIL SAMPLE COLLECTED BY BLASLAND, BOUCK & LEE, INC.
- SOIL BORING INSTALLED BY CARIBBEAN HYDRO-TECH, INC.
- PRODUCT SAMPLE COLLECTED BY BLASLAND, BOUCK & LEE, INC.
- APPROXIMATE LOCATION OF UNDERGROUND STORAGE TANK (UST)
- UNDERGROUND PIPING
- VOC VOLATILE ORGANIC COMPOUND
- BTEX BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES
- BNA BASE NEUTRAL/ACID EXTRACTABLE
- * INCLUDES MOSTLY PETROLEUM-RELATED COMPOUNDS. SOME BNA COMPOUNDS MAY BE LABORATORY ARTIFACTS
- ND NOT DETECTED
- NA NOT ANALYZED
- (0.0-2.0) SAMPLE INTERVAL IN FEET BELOW LAND SURFACE
- ppb PARTS PER BILLION, EQUIVALENT TO MICROGRAMS PER KILOGRAM (ug/kg)
- ppm PARTS PER MILLION, EQUIVALENT TO MILLIGRAMS PER KILOGRAM (mg/kg)
- † DETECTION LIMIT WAS ABOVE 25 ug/kg FOR INDIVIDUAL CHLORINATED COMPOUND
- R RESULT-REJECTED
- Δ RESULT WAS DETECTED BELOW THE REPORTING LIMIT AND/OR IS AN ESTIMATED CONCENTRATION
- B ANALYTE ALSO DETECTED IN FIELD BLANK
- FR FIELD REPLICATE

NOTES:
1. RESULTS IN PARENTHESES ARE FOR SPLIT SAMPLES COLLECTED BY ENSR CONSULTING AND ENGINEERING, INC.
2. RESULTS IN BRACKETS ARE FOR SPLIT SAMPLES COLLECTED BY ARTHUR D. LITTLE, INC.
3. CAPITAL LETTERS FOR COMPOUND (e.g. BENZENE) INDICATE CONCENTRATIONS EXCEED NEW YORK STATE TECHNICAL AND ADMINISTRATIVE GUIDANCE MEMORANDUM (TAGM) IMPACT-TO-GROUNDWATER STANDARDS.

SOURCES: GERAGHTY & MILLER, INC. (1993b)
ENSR CONSULTING AND ENGINEERING, INC. (1994b)
ARTHUR D. LITTLE, INC. (1994)
BLASLAND, BOUCK & LEE, INC. (1994a)
NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION. (1994)

SCALE
0 10 20 FEET

SOIL AND OIL SAMPLING RESULTS DURING AND AFTER UST REMOVAL
WESTERN AUTO FACILITY

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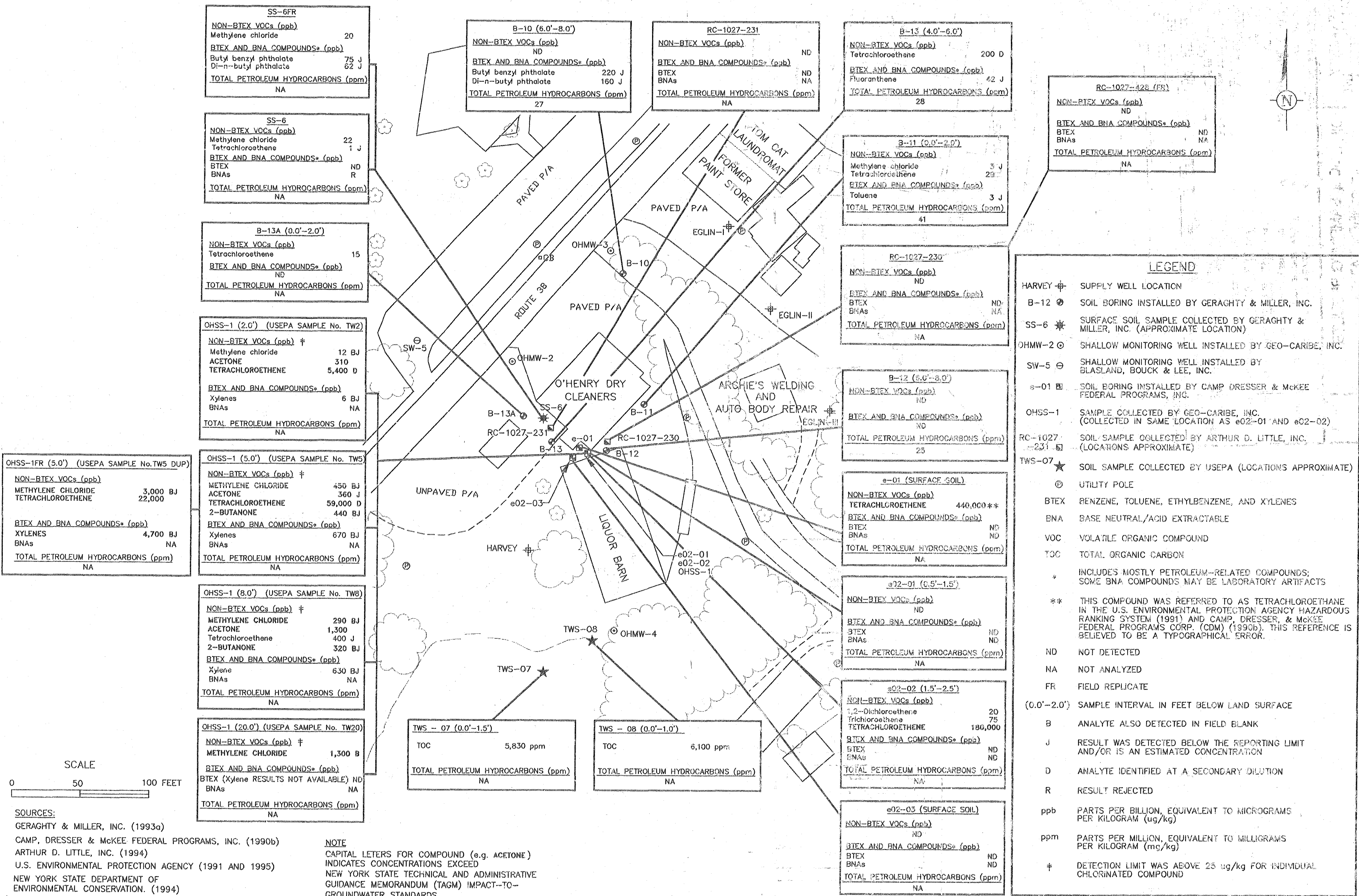
SCALE VERIFICATION
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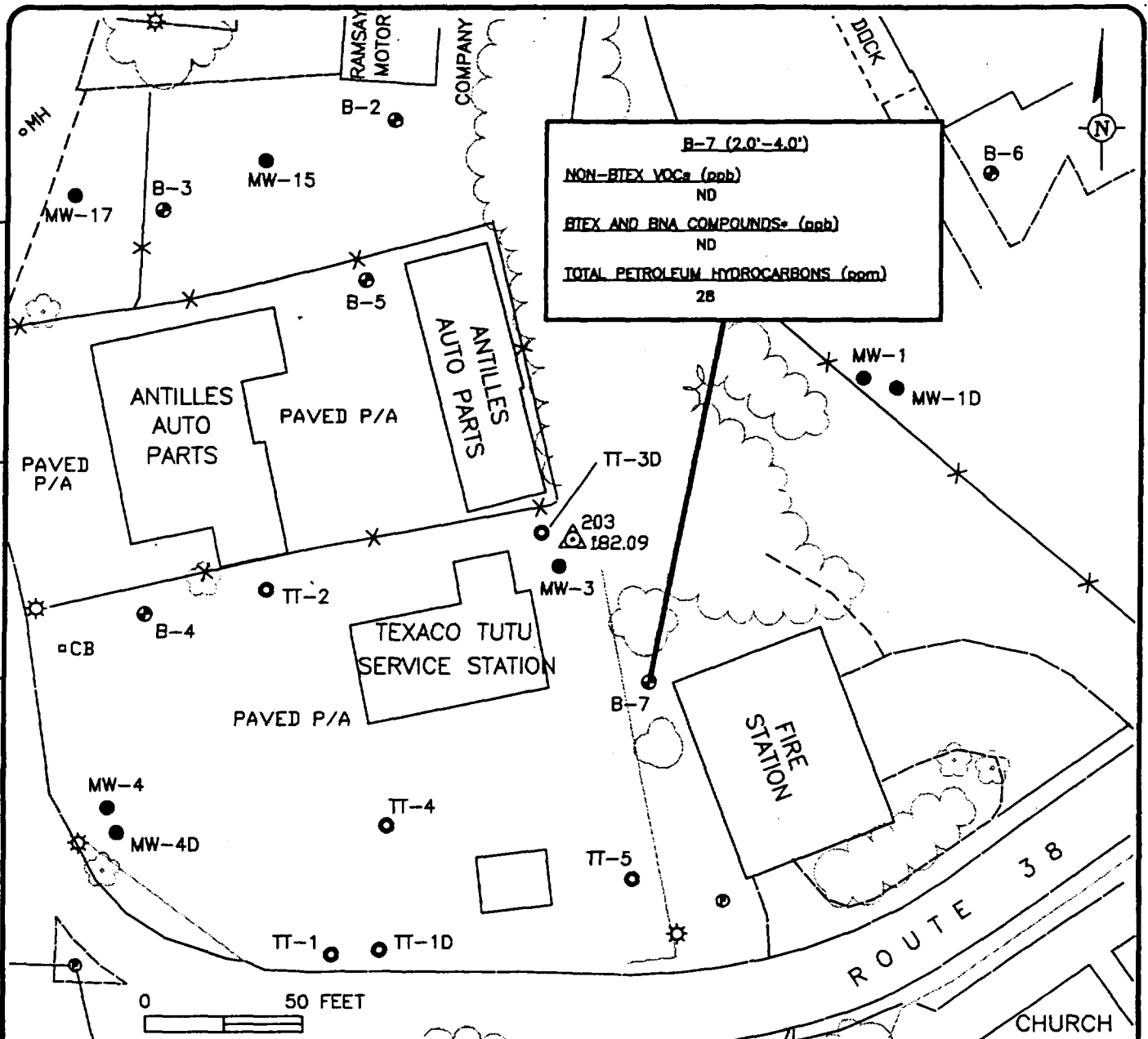
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1 1-25-95
2 1-25-95
3 1-25-95

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DWG DATE: 1-24-95 | PRJCT NO.: PRO013033 | FILE: TU-349 | DRAWING: TU-349 | CHECKED: J. MESSINGER | APPROVED: J. POTENZA | DRAFTER: E. EAGLESTON



B-7 (2.0'-4.0')	
<u>NON-BTEX VOCs (ppb)</u>	ND
<u>BTEX AND BNA COMPOUNDS* (ppb)</u>	ND
<u>TOTAL PETROLEUM HYDROCARBONS (ppm)</u>	28

- MW-4 ● SHALLOW MONITORING WELL INSTALLED BY GERAGHTY & MILLER, INC.
- MW-4D ● DEEP MONITORING WELL INSTALLED BY GERAGHTY & MILLER, INC.
- TT-5 ● MONITORING WELL INSTALLED BY GCL
- B-7 ● SOIL BORING INSTALLED BY GERAGHTY & MILLER, INC.
- ☆ LIGHT POLE
- ⊙ UTILITY POLE
- ▣ CB CATCH BASIN
- (2.0'-4.0') SAMPLE INTERVAL IN FEET BELOW LAND SURFACE
- P/A PARKING AREA

LEGEND

- 203 ▲ EXISTING CONTROL MONUMENT (ELEVATION IN FEET ABOVE MEAN SEA LEVEL)
- 182.09
- INCLUDES MOSTLY PETROLEUM-RELATED COMPOUNDS; SOME BNA COMPOUNDS MAY BE LABORATORY ARTIFACTS
- ND NOT DETECTED
- ppb PARTS PER BILLION, EQUIVALENT TO MICROGRAMS PER KILOGRAM (ug/kg)
- ppm PARTS PER MILLION, EQUIVALENT TO MILLIGRAMS PER KILOGRAM (mg/kg)
- BNA BASE NEUTRAL/ACID EXTRACTABLE
- BTEX BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES
- VOC VOLATILE ORGANIC COMPOUND

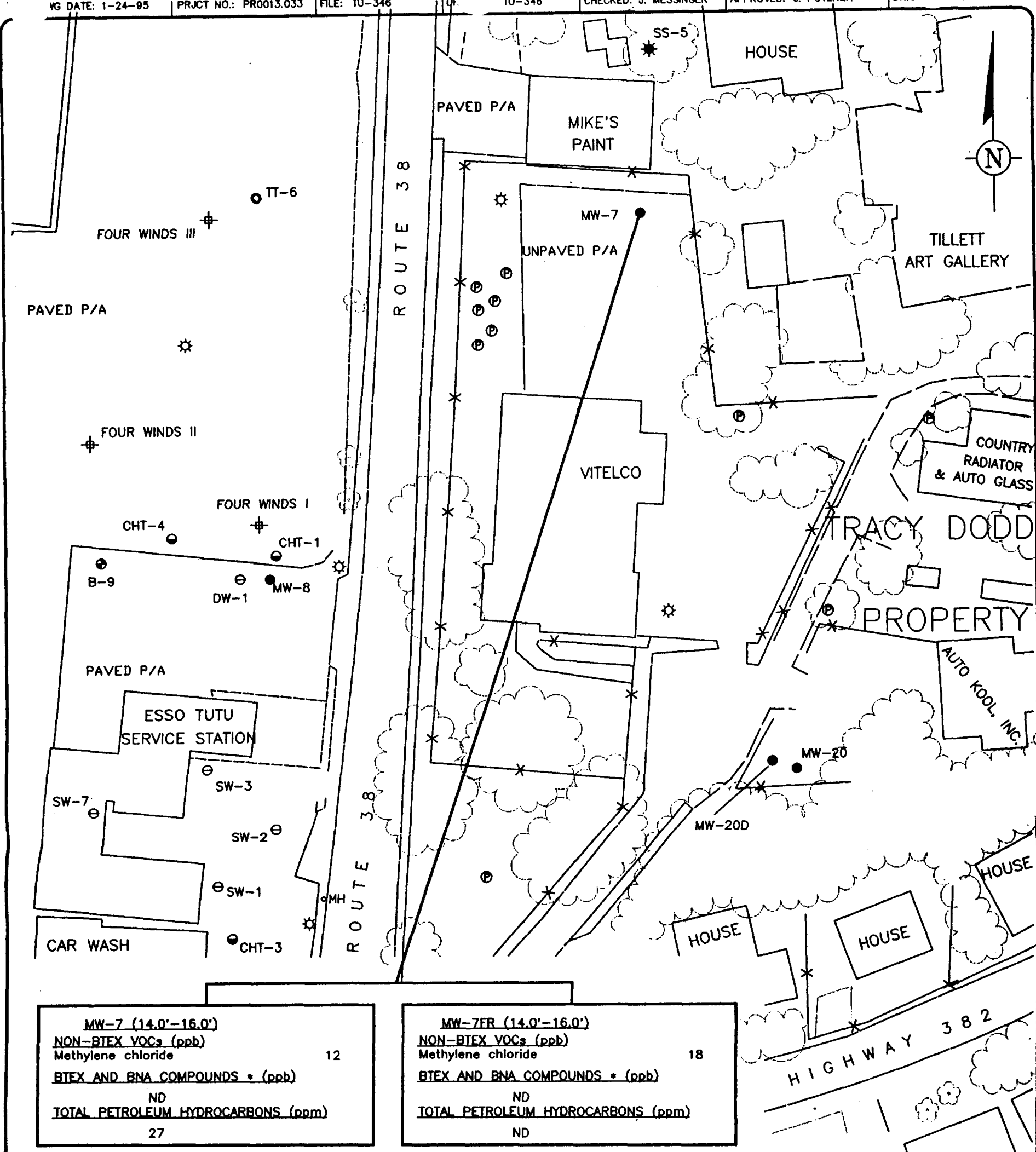
SOURCE: GERAGHTY & MILLER, INC. (1993a)



SOIL SAMPLING RESULTS

FIRE STATION
TUTU WELLS SITE
ST. THOMAS, U.S. VIRGIN ISLANDS

FIGURE
5-12

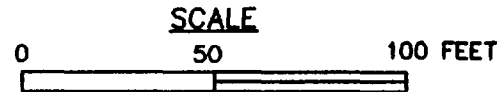


MW-7 (14.0'-16.0')	
NON-BTEX VOCs (ppb)	
Methylene chloride	12
BTEX AND BNA COMPOUNDS * (ppb)	
ND	
TOTAL PETROLEUM HYDROCARBONS (ppm)	
27	

MW-7FR (14.0'-16.0')	
NON-BTEX VOCs (ppb)	
Methylene chloride	18
BTEX AND BNA COMPOUNDS * (ppb)	
ND	
TOTAL PETROLEUM HYDROCARBONS (ppm)	
ND	

LEGEND			
MW-8 ●	SHALLOW MONITORING WELL	P/A	PARKING AREA
MW-20D ●	DEEP MONITORING WELL	☼	LIGHT POLE
FOUR WINDS III ⊕	SUPPLY WELL LOCATION	⊙	UTILITY POLE
CHT-3 ●	MONITORING WELLS INSTALLED	VOC	VOLATILE ORGANIC COMPOUND
SW-1 ⊕	SHALLOW MONITORING WELL INSTALLED	BTEX	BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES
DW-1 ⊕	DEEP MONITORING WELL INSTALLED	BNA	BASE NEUTRAL/ACID EXTRACTABLE
TT-6 ●	MONITORING WELL INSTALLED BY GCL	FR	FIELD REPLICATE
B-9 ●	SOIL BORING INSTALLED BY GERAGHTY & MILLER, INC.	ND	NOT DETECTED
SS-5 ★	SURFACE SOIL SAMPLE COLLECTED BY GERAGHTY & MILLER, INC. (APPROXIMATE LOCATION)	(14.0'-16.0')	SAMPLE INTERVAL IN FEET BELOW LAND SURFACE
		ppb	PARTS PER BILLION, EQUIVALENT TO MICROGRAMS PER KILOGRAM (ug/kg)
		ppm	PARTS PER MILLION, EQUIVALENT TO MILLIGRAMS PER KILOGRAM (mg/kg)

SOURCE:
GERAGHTY & MILLER, INC. (1993a)



SOIL SAMPLING RESULTS VITELCO PROPERTY

TUTU WELLS SITE
ST. THOMAS, U.S. VIRGIN ISLANDS

FIGURE

5-13

DRAFTER: E. EAGLESTON

APPROVED: T. DANAHY

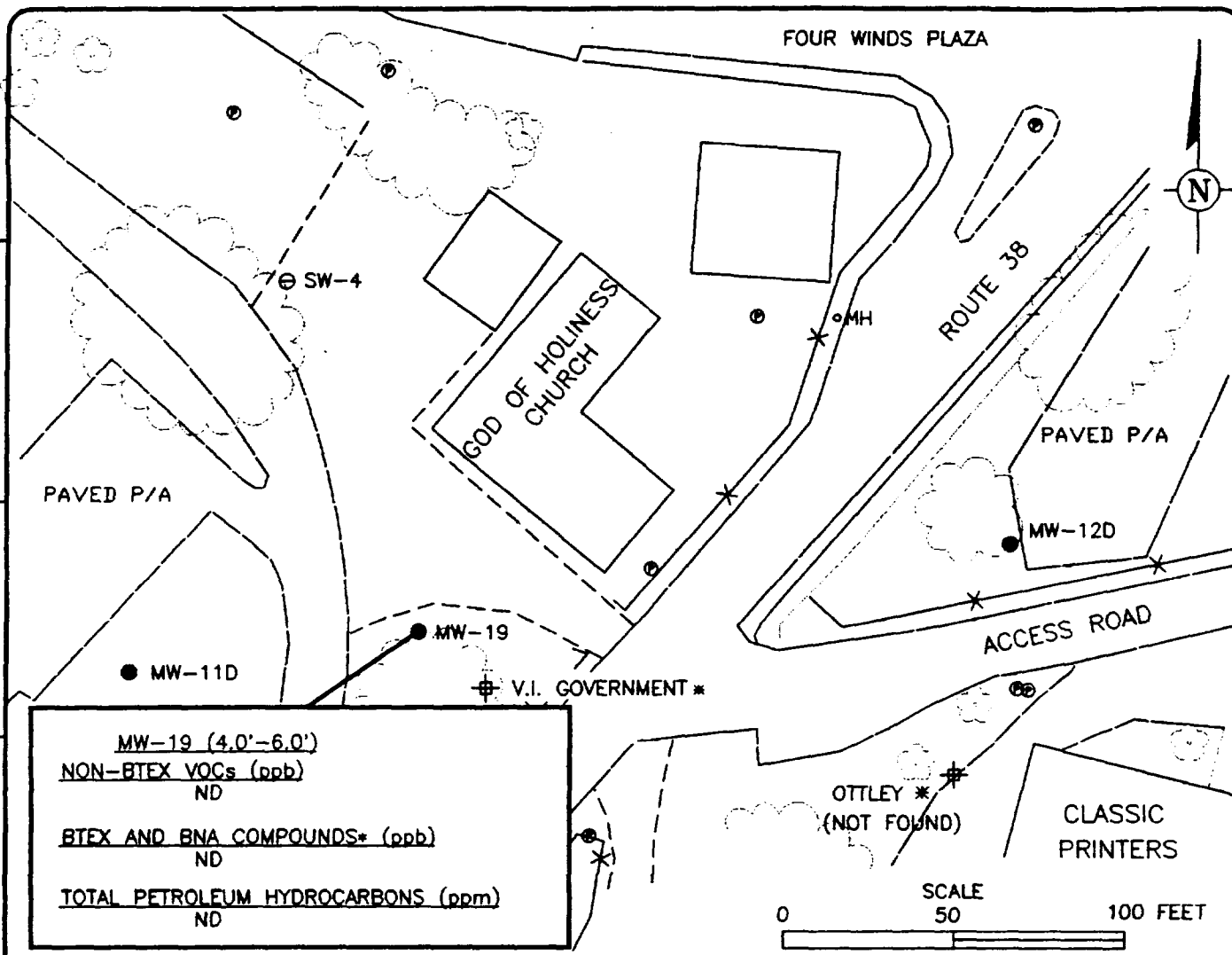
CHECKED: J. MESSINGER

DRAWING: TU-353

FILE: TU-353

PRJCT NO.: PR0013.033

DWG DATE: 1-24-95



MW-19 (4.0'-6.0')
 NON-BTEX VOCs (ppb)
 ND
 BTEX AND BNA COMPOUNDS* (ppb)
 ND
 TOTAL PETROLEUM HYDROCARBONS (ppm)
 ND

- MW-19 ● SHALLOW MONITORING WELL INSTALLED BY GERAGHTY & MILLER, INC.
- MW-12D ● DEEP MONITORING WELL INSTALLED BY GERAGHTY & MILLER, INC.
- OTTLEY ⊕ SUPPLY WELL LOCATION
- * LOCATION OF WELL IS APPROXIMATE
- SW-4 ⊖ SHALLOW MONITORING WELL INSTALLED BY BLASLAND, BOUCK & LEE, INC.
- * INCLUDES MOSTLY PETROLEUM-RELATED COMPOUNDS; SOME BNA COMPOUNDS MAY BE LABORATORY ARTIFACTS.

SOURCES:

GERAGHTY & MILLER, INC. (1993a)
 BLASLAND, BOUCK & LEE, INC. (1994a)

LEGEND

- UTILITY POLE
- VOC VOLATILE ORGANIC COMPOUND
- BTEX BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES
- BNA BASE NEUTRAL/ACID EXTRACTABLE
- ND NOT DETECTED
- (4.0'-6.0') SAMPLE INTERVAL IN FEET BELOW LAND SURFACE
- ppb PARTS PER BILLION, EQUIVALENT TO MICROGRAMS PER KILOGRAM (ug/kg)
- ppm PARTS PER MILLION, EQUIVALENT TO MILLIGRAMS PER KILOGRAM (mg/kg)
- MH MANHOLE

NOTE SOIL SAMPLES FROM MONITORING WELL SW-4 INSTALLED BY BLASLAND, BOUCK & LEE, INC. WERE NOT SAMPLED FOR LABORATORY ANALYSES.



SOIL SAMPLING RESULTS

GOD OF HOLINESS CHURCH

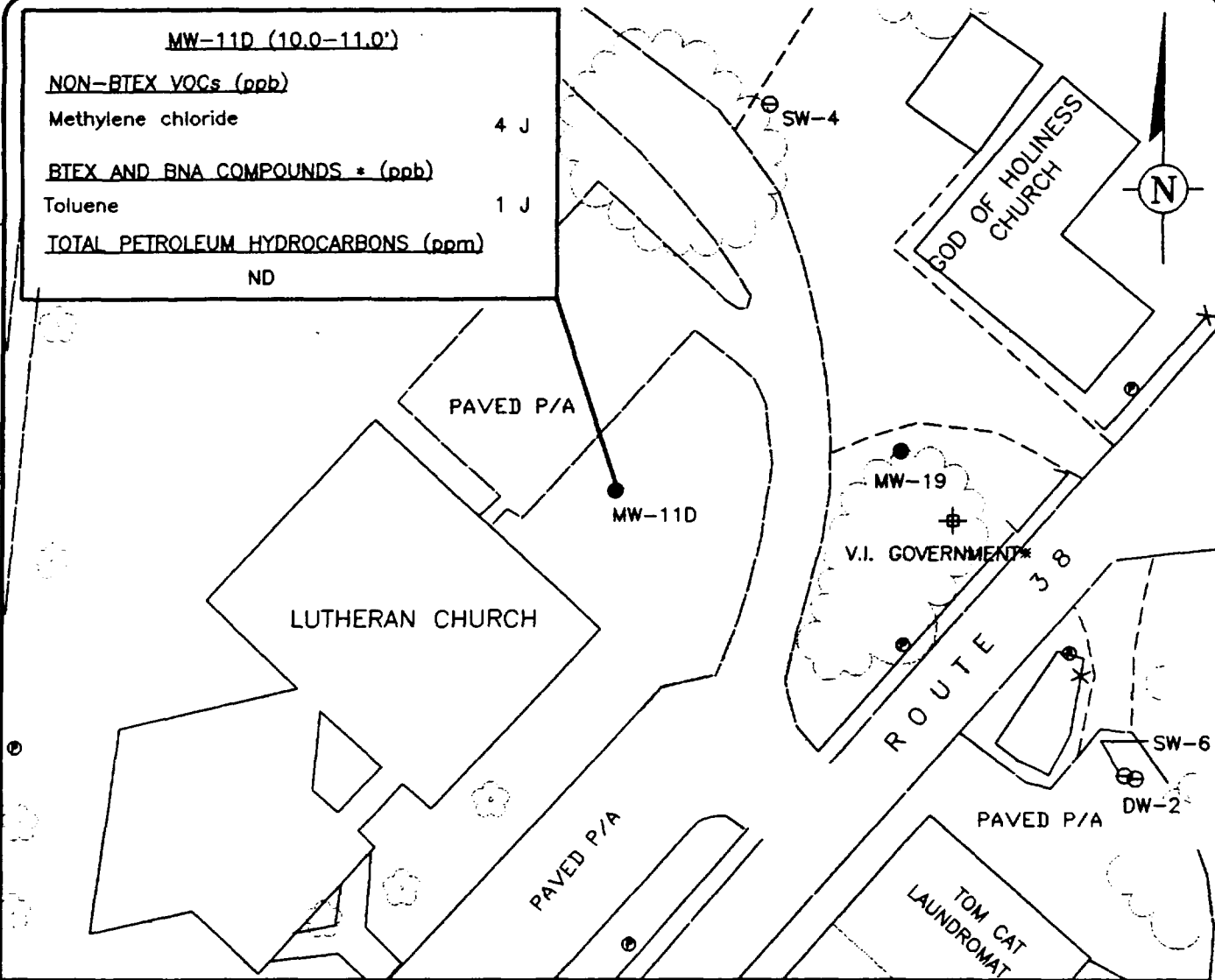
TUTU WELLS SITE
 ST. THOMAS, U.S. VIRGIN ISLANDS

FIGURE

5-14

DWG. DATE: 1-24-95 | PRJCT NO.: PR0013.033 | FILE: TU-354 | DRAWING: IU-354 | CHECKED: J. MESSINGER | APPROVED: T. DANAHY | DRAFTER: E. EAGLESTON

<u>MW-11D (10.0-11.0')</u>	
<u>NON-BTEX VOCs (ppb)</u>	
Methylene chloride	4 J
<u>BTEX AND BNA COMPOUNDS * (ppb)</u>	
Toluene	1 J
<u>TOTAL PETROLEUM HYDROCARBONS (ppm)</u>	
ND	



LEGEND

- MW-19 ● SHALLOW MONITORING WELL INSTALLED BY GERAGHTY & MILLER, INC.
- MW-11D ● DEEP MONITORING WELL INSTALLED BY GERAGHTY & MILLER, INC.
- V.I. GOVERNMENT ⊕ SUPPLY WELL LOCATION (DUG WELL)
- * LOCATION OF WELL IS APPROXIMATE
- DW-2 ⊖ DEEP MONITORING WELL INSTALLED BY BLASLAND, BOUCK & LEE, INC.
- SW-4 ⊖ SHALLOW MONITORING WELL INSTALLED BY BLASLAND, BOUCK & LEE, INC.
- ⊙ UTILITY POLE
- * INCLUDED MOSTLY PETROLEUM - RELATED COMPOUNDS; SOME BNA COMPOUNDS MAY BE LAB ARTIFACTS

- VOC VOLATILE ORGANIC COMPOUND
- BTEX BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES
- BNA BASE NEUTRAL/ACID EXTRACTABLE
- ND NOT DETECTED
- (10.0'-11.0') SAMPLE INTERVAL IN FEET BELOW LAND SURFACE
- J RESULT WAS DETECTED BELOW THE REPORTING LIMIT AND/OR IS AN ESTIMATED CONCENTRATION
- ppb PARTS PER BILLION, EQUIVALENT TO MICROGRAMS PER KILOGRAM (ug/kg)
- ppm PARTS PER MILLION, EQUIVALENT TO MILLIGRAMS PER KILOGRAM (mg/kg)

SOURCE: GERAGHTY & MILLER, INC. (1993a)

SCALE
0 50 100 FEET

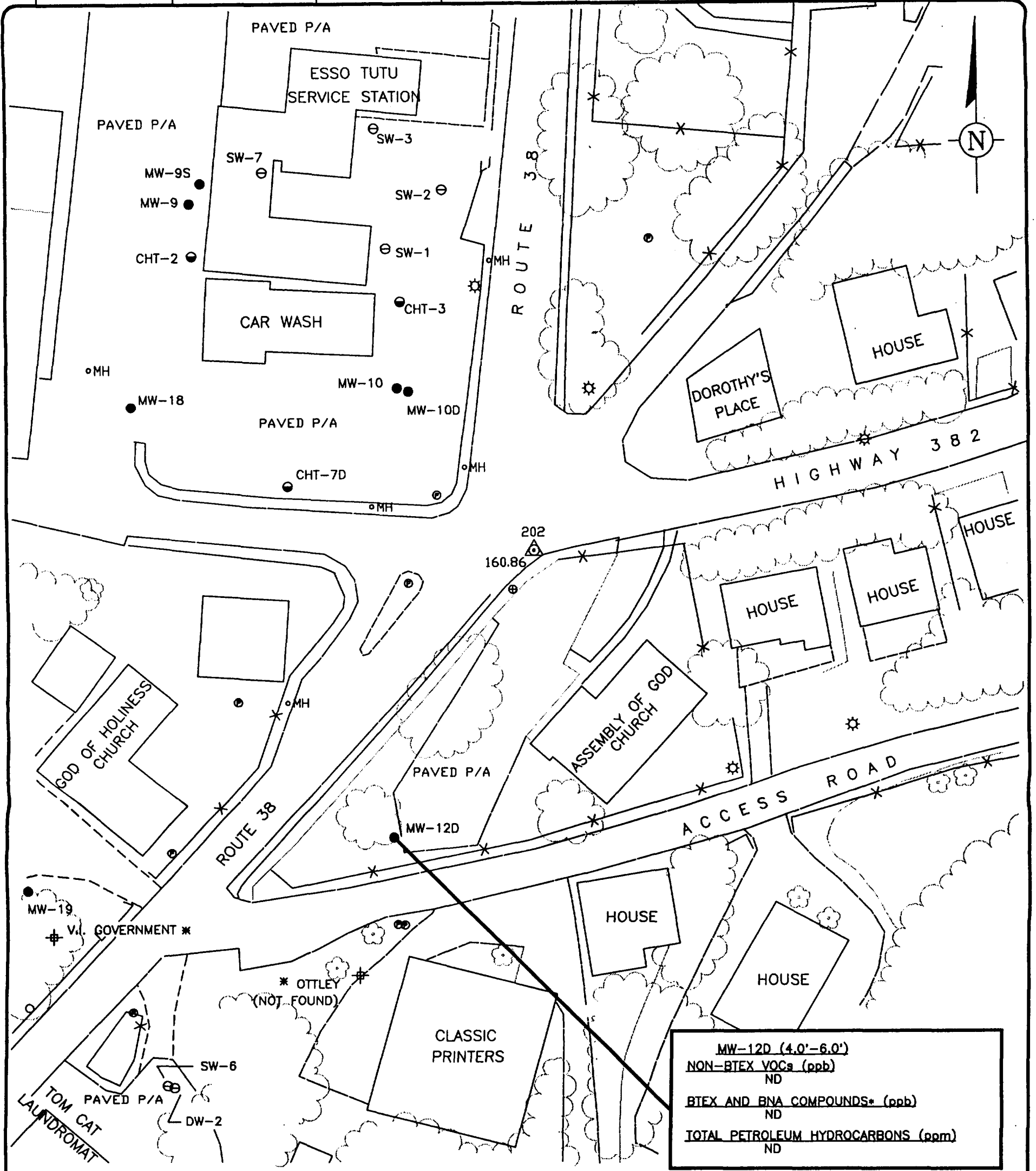


SOIL SAMPLING RESULTS LUTHERAN CHURCH

TUTU WELLS SITE
ST. THOMAS, U.S. VIRGIN ISLANDS

FIGURE

5-15



- LEGEND**
- DW-2 ⊖ DEEP MONITORING WELL INSTALLED BY BLASLAND, BOUCK & LEE, INC.
 - MW-10 ● SHALLOW MONITORING WELL INSTALLED BY GERAGHTY & MILLER, INC.
 - MW-10D ● DEEP MONITORING WELL INSTALLED BY GERAGHTY & MILLER, INC.
 - V.I. GOVERNMENT ⊕ SUPPLY WELL LOCATION
 - * LOCATION OF WELL IS APPROXIMATE
 - CHT-7D ● MONITORING WELLS INSTALLED BY CARIBBEAN HYDRO-TECH, INC.
 - SW-3 ⊖ SHALLOW MONITORING WELL INSTALLED BY BLASLAND, BOUCK & LEE, INC.
 - 202 ▲ EXISTING CONTROL MONUMENT (ELEVATION IN FEET ABOVE MEAN SEA LEVEL)

- VOC VOLATILE ORGANIC COMPOUND
- BTEX BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES
- BNA BASE NEUTRAL/ACID EXTRACTABLE
- ND NOT DETECTED
- (4.0'-6.0') SAMPLE INTERVAL IN FEET BELOW LAND SURFACE
- ppb PARTS PER BILLION, EQUIVALENT TO MICROGRAMS PER KILOGRAM (ug/kg)
- ppm PARTS PER MILLION, EQUIVALENT TO MILLIGRAMS PER KILOGRAM (mg/kg)
- * INCLUDES MOSTLY PETROLEUM-RELATED COMPOUNDS; SAME BNA COMPOUNDS MAY BE LABORATORY ARTIFACTS
- ⊖ MH MANHOLE
- ⊙ LIGHT POLE
- ⊙ UTILITY POLE

SOURCE:
GERAGHTY & MILLER, INC. (1993a)

SCALE
0 50 100 FEET

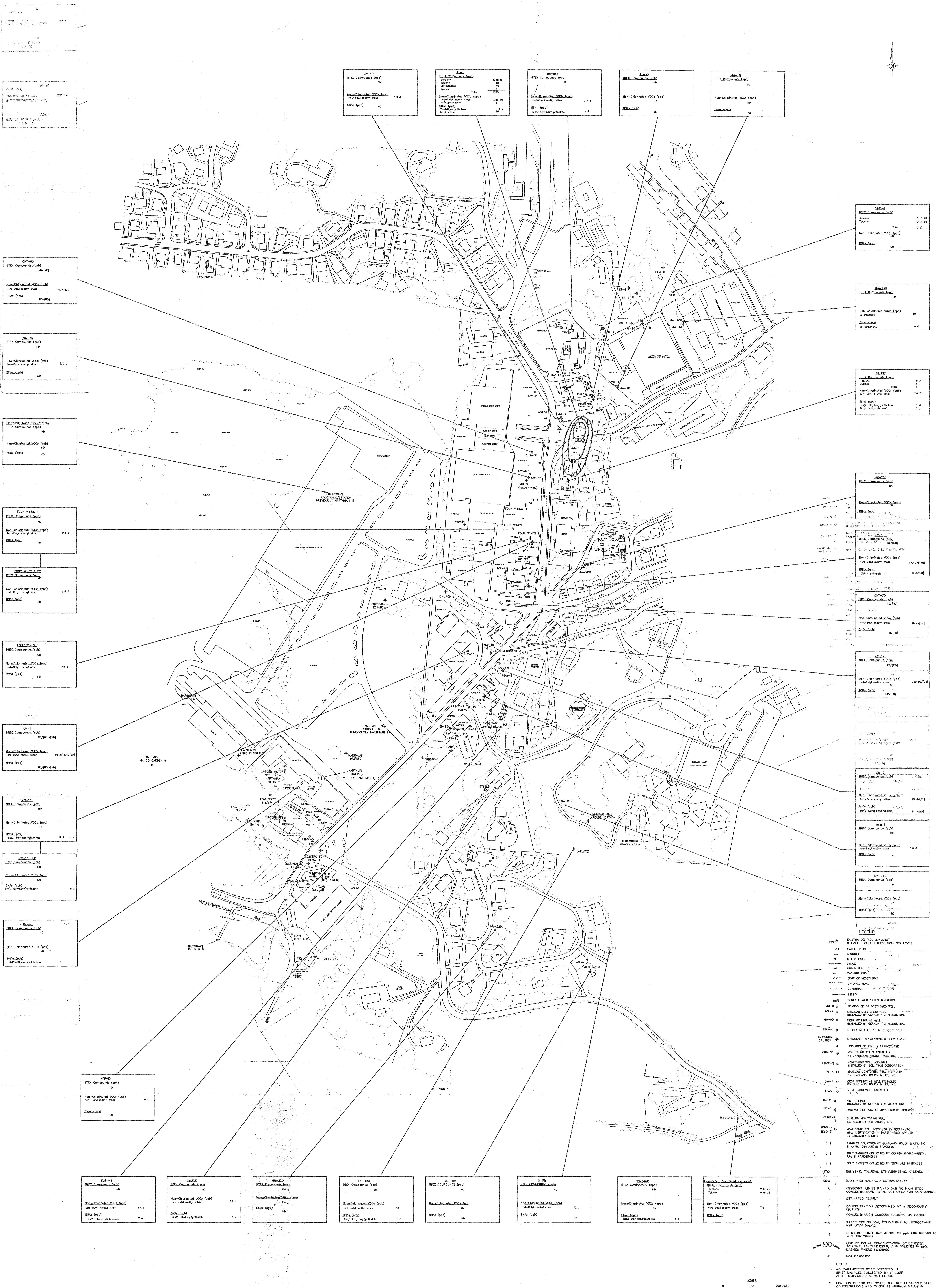


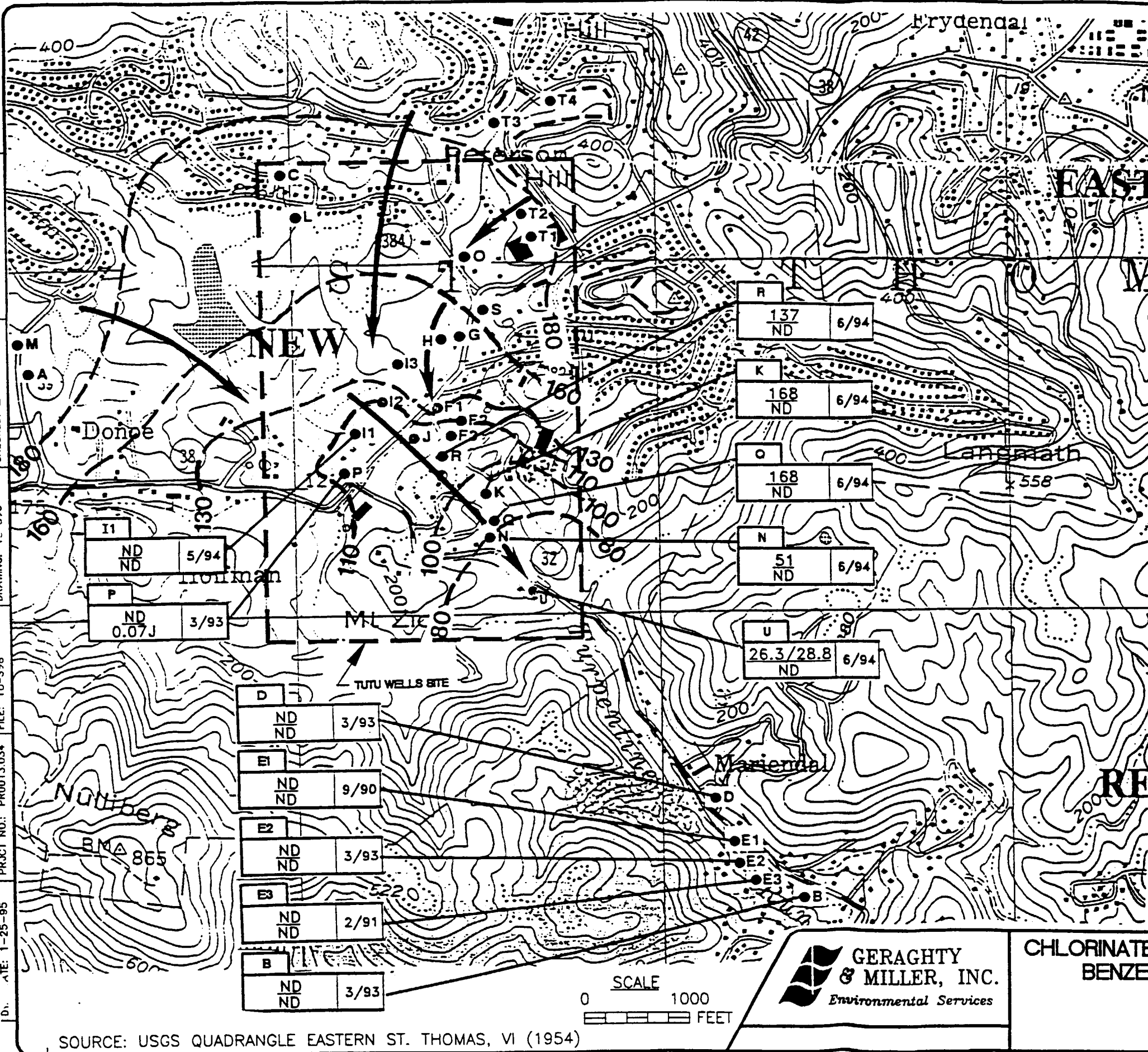
SOIL SAMPLING RESULTS ASSEMBLY OF GOD CHURCH

TUTU WELLS SITE
ST. THOMAS, U.S. VIRGIN ISLANDS

FIGURE

5-16





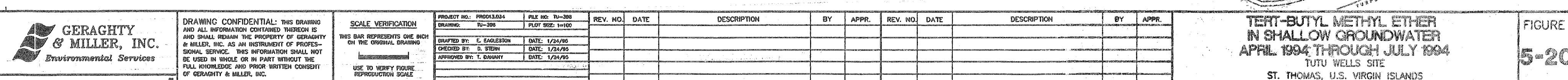
SOURCE: USGS QUADRANGLE EASTERN ST. THOMAS, VI (1954)

GERAGHTY
 & MILLER, INC.
 Environmental Services

CHLORINATED VOLATILE ORGANIC COMPOUNDS AND BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES IN SUPPLY WELLS

TUTU WELLS SITE
 ST. THOMAS, U.S. VIRGIN ISLANDS

FIGURE
 5-19

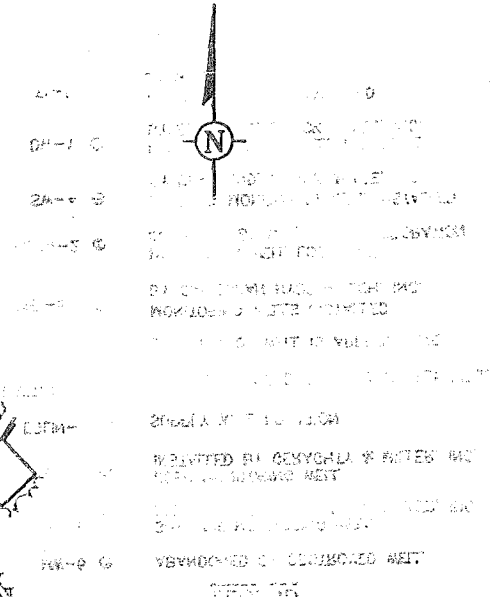




LEGEND

- ABANDONED OR DESTROYED WELL
- SHALLOW MONITORING WELL
- DEEP MONITORING WELL
- SUPPLY WELL LOCATION
- ABANDONED OR DESTROYED SUPPLY WELL
- LOCATION OF WELL IS APPROXIMATE
- MONITORING WELLS INSTALLED BY CARIBBEAN HYDRO-TECH, INC.
- MONITORING WELL LOCATION
- SHALLOW MONITORING WELL INSTALLED BY BLASLAND, BOUCK & LEE, INC.
- DEEP MONITORING WELL INSTALLED BY BLASLAND, BOUCK & LEE, INC.
- MONITORING WELL INSTALLED BY GCL
- SOIL BORING
- SURFACE SOIL SAMPLE APPROXIMATE LOCATION
- SHALLOW MONITORING WELL
- MONITORING WELL INSTALLED BY TERRA-VAC
- EXISTING CONTROL MONUMENT
- CATCH BASIN
- MANHOLE
- UTILITY POLE
- PEACE
- UNDER CONSTRUCTION
- PARKING AREA
- EDGE OF VEGETATION
- UNPAVED ROAD
- GUARDRAIL
- STREAM
- SURFACE WATER FLOW DIRECTION
- SAMPLES COLLECTED BY BLASLAND, BOUCK & LEE, INC. IN APRIL 1994 ARE IN BRACKETS
- SPLIT SAMPLES COLLECTED BY ENR ARE IN BRACES
- ESTIMATED RESULT
- CONCENTRATION DETERMINED AT A SECONDARY DILUTION
- PPB PARTS PER BILLION, EQUIVALENT TO MICROGRAMS PER LITER
- DETECTION LIMIT WAS ABOVE 25 PPB FOR INDIVIDUAL VOC COMPOUND
- LINE OF EQUAL CONCENTRATION OF TETRACHLOROETHENE IN GROUND DASHED WHERE INFERRED
- ND NOT DETECTED
- NA NOT AVAILABLE

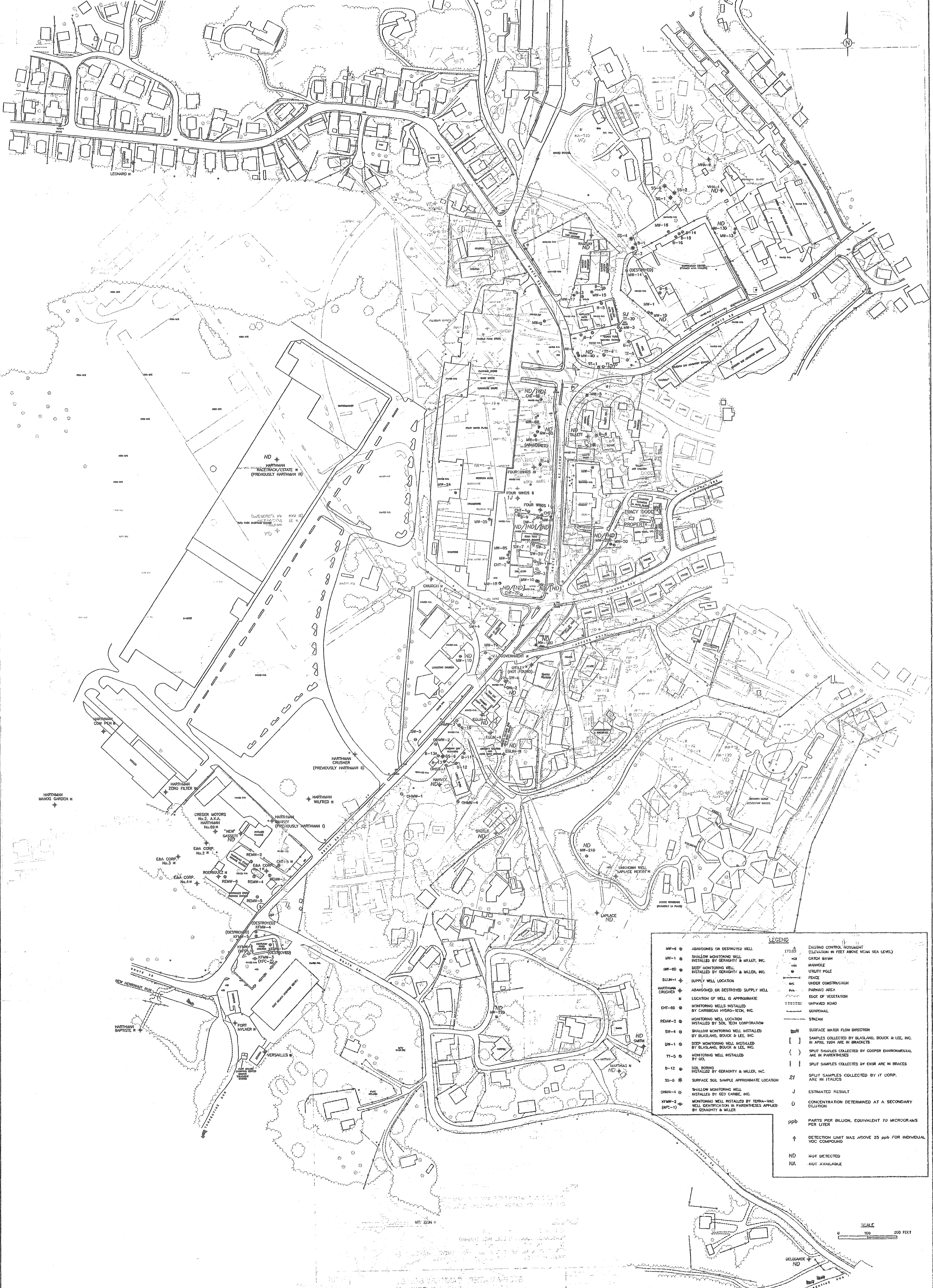
SCALE 0 100 200 FEET





LEGEND

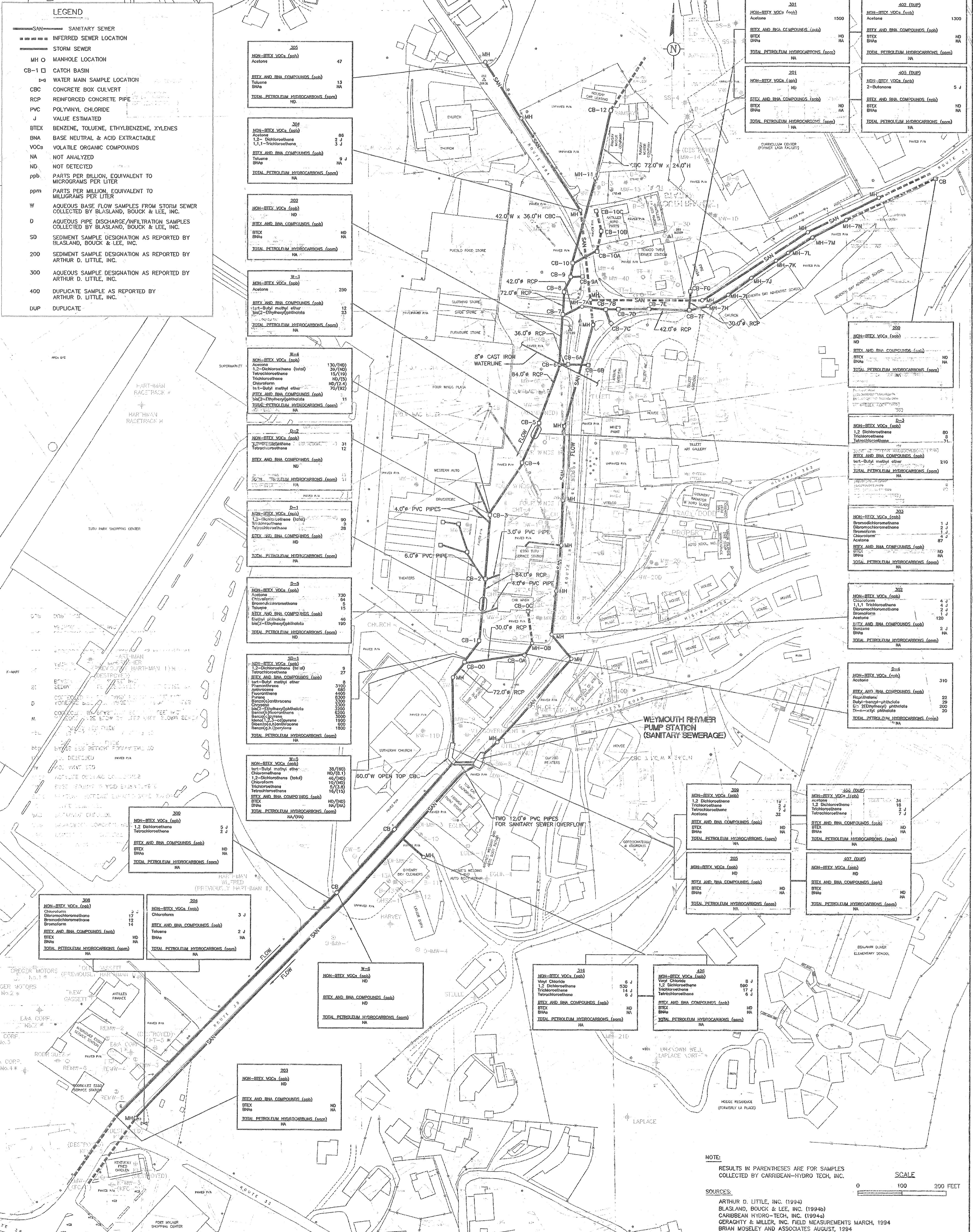
MW-1	ABANDONED OR DESTROYED WELL	175.99	EXISTING CONTROL MONUMENT (ELEVATION IN FEET ABOVE MEAN SEA LEVEL)
MW-1	SHALLOW MONITORING WELL INSTALLED BY GERAGHTY & MILLER, INC.	0.0	CATCH BASIN
MW-10	DEEP MONITORING WELL INSTALLED BY GERAGHTY & MILLER, INC.	0.0	MANHOLE
EGM-1	SUPPLY WELL LOCATION	0.0	UTILITY POLE
HARTHMAN CRUISER	ABANDONED OR DESTROYED SUPPLY WELL	0.0	FENCE
CHT-6D	LOCATION OF WELL IS APPROXIMATE	0.0	UNDER CONSTRUCTION
REHM-2	MONITORING WELLS INSTALLED BY CARIBBEAN HYDRO-TECH, INC.	0.0	PARKING AREA
SW-4	SHALLOW MONITORING WELL INSTALLED BY BLASLAND, BOUCK & LEE, INC.	0.0	EDGE OF VEGETATION
DN-1	DEEP MONITORING WELL INSTALLED BY BLASLAND, BOUCK & LEE, INC.	0.0	UNPAVED ROAD
TT-5	MONITORING WELL INSTALLED BY GEA	0.0	GUARDRAIL
B-12	SOIL BOREHOLE INSTALLED BY GERAGHTY & MILLER, INC.	0.0	STREAM
SS-5	SURFACE SOIL SAMPLE APPROXIMATE LOCATION	0.0	SURFACE WATER FLOW DIRECTION
OHMW-4	SHALLOW MONITORING WELL INSTALLED BY GEA CORP., INC.	[]	SAMPLES COLLECTED BY BLASLAND, BOUCK & LEE, INC. IN APRIL 1994 ARE IN BRACKETS
KTMW-2 (KTC-1)	MONITORING WELL INSTALLED BY TERRA-VAC WELL IDENTIFICATION IN PARENTHESES APPLIED BY GERAGHTY & MILLER	()	SPLIT SAMPLES COLLECTED BY JOSEPH ENVIRONMENTAL ARE IN PARENTHESES
		{ }	SPLIT SAMPLES COLLECTED BY EHR ARE IN BRACES
		21	SPLIT SAMPLES COLLECTED BY IT CORP. ARE IN ITALICS
		J	ESTIMATED RESULT
		D	CONCENTRATION DETERMINED AT A SECONDARY DILUTION
		ppb	PARTS PER BILLION, EQUIVALENT TO MICROGRAMS PER LITER
		+	DETECTION LIMIT WAS ABOVE 25 PPB FOR INDIVIDUAL VOC COMPOUND
		100	LINE OF EQUAL CONCENTRATION OF VINYL CHLORIDE IN PPB DASHED WHERE INFERRED
		ND	NOT DETECTED



LEGEND

SANITARY SEWER
INFERRED SEWER LOCATION
STORM SEWER

MH O MANHOLE LOCATION
CB-1 CATCH BASIN
WATER MAIN SAMPLE LOCATION
CBC CONCRETE BOX CULVERT
RCP REINFORCED CONCRETE PIPE
PVC POLYVINYL CHLORIDE
J VALVE ESTIMATED
BTEX BENZENE, TOLUENE, ETHYLBENZENE, XYLENES
BNA BASE NEUTRAL & ACID EXTRACTABLE
VOCs VOLATILE ORGANIC COMPOUNDS
NA NOT ANALYZED
ND NOT DETECTED
ppb PARTS PER BILLION, EQUIVALENT TO MICROGRAMS PER LITER
ppm PARTS PER MILLION, EQUIVALENT TO MILLIGRAMS PER LITER
W AQUEOUS BASE FLOW SAMPLES FROM STORM SEWER COLLECTED BY BLASLAND, BOUCK & LEE, INC.
D AQUEOUS PIPE DISCHARGE/INFILTRATION SAMPLES COLLECTED BY BLASLAND, BOUCK & LEE, INC.
SD SEDIMENT SAMPLE DESIGNATION AS REPORTED BY BLASLAND, BOUCK & LEE, INC.
200 SEDIMENT SAMPLE DESIGNATION AS REPORTED BY ARTHUR D. LITTLE, INC.
300 AQUEOUS SAMPLE DESIGNATION AS REPORTED BY ARTHUR D. LITTLE, INC.
400 DUPLICATE SAMPLE AS REPORTED BY ARTHUR D. LITTLE, INC.
DUP DUPLICATE



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TUTU WELLS SUPERFUND SITE

FIGURE 5-20

**TERT-BUTYL METHYL ETHER IN SHALLOW
GROUNDWATER APRIL 1994 THROUGH JULY
1994**

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FIGURE 5-21

**TERT-BUTYL METHYL ETHER IN DEEP
GROUNDWATER APRIL 1994 THROUGH JULY
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FIGURE 5-22
CHLORINATED VOLATILE ORGANIC
COMPOUNDS IN SHALLOW GROUNDWATER
APRIL 1994 THROUGH JULY 1994

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FIGURE 5-23
CHLORINATED VOLATILE ORGANIC
COMPOUNDS IN DEEP GROUNDWATER
APRIL 1994 THROUGH JULY 1994**

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FIGURE 5-24
CONCENTRATIONS OF CHLORINATED
VOLATILE ORGANIC COMPOUNDS ALONG
CROSS SECTION A-A'

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**TUTU WELLS SUPERFUND SITE
FIGURE 5-25
TETRACHLOROETHENE IN SHALLOW
GROUNDWATER APRIL 1994 THROUGH JULY
1994**

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TUTU WELLS SUPERFUND SITE
FIGURE 5-26
TETRACHLOROETHENE IN DEEP
GROUNDWATER APRIL 1994 THROUGH JULY
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FIGURE 5-27

TETRACHLOROETHENE IN SHALLOW

**GROUNDWATER APRIL 1994 THROUGH JULY
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TUTU WELLS SUPERFUND SITE
FIGURE 5-28
TETRACHLOROETHENE IN DEEP
GROUNDWATER APRIL 1994 THROUGH JULY
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FIGURE 5-29

1,2-DICHLOROETHENE IN SHALLOW

**GROUNDWATER APRIL 1994 THROUGH JULY
1994**

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FIGURE 5-30
1,2-DICHLOROETHENE IN DEEP
GROUNDWATER APRIL 1994 THROUGH JULY
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FIGURE 5-31
VINYL CHLORIDE IN SHALLOW
GROUNDWATER APRIL 1994 THROUGH JULY
1994

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FIGURE 5-32
VINYL CHLORIDE IN DEEP GROUNDWATER
APRIL 1994 THROUGH JULY 1994

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FIGURE 5-33
STORM WATER, SANITARY SEWER AND
SEDIMENT SAMPLING RESULTS

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