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Hydrogeologic Investigation Report
Metro-North Commuter Railroad
Harmon Yard Outdoor Storage Area
Croton-on-Hudson, New York

Prepared For: American Environmental Technologies
13 Francis J. Clarke Circle
Bethel, CT 06801

Prepared By: Land Tech Remedial, Inc.
567-2 Main Street
Monroe, CT

Jeffrey A. Brown
Senior Hydrogeologist

November 1990
Project #10247

TABLE OF CONTENTS

Page

1.0 INTRODUCTION AND OBJECTIVES..... 1

1.1 Site History/Background Information..... 1

1.2 Preliminary Reconnaissance..... 2

2.0 HYDROGEOLOGIC INVESTIGATION..... 4

2.1 Subsurface Drilling/Monitoring Well Installation..... 4

2.2 Survey and Monitoring Program..... 5

3.0 HYDROGEOLOGIC INVESTIGATION: FINDINGS AND INTERPRETATIONS..... 6

3.1 Local Geology..... 6
3.2 Site Hydrogeology..... 6
3.3 Immiscible Hydrocarbon Extent..... 7

4.0 CONCLUSIONS/RECOMMENDATIONS..... 8

APPENDIX 1: Soil boring/Monitoring Well Logs

APPENDIX 2: Observation Well Reports

APPENDIX 3: Figures

FIGURE 1A: Site Locus Map

FIGURE 1: Site Plan

FIGURE 2: Ground Water Contour Map August 24, 1990

FIGURE 3: Ground Water Contour Map August 27, 1990

FIGURE 4: Product Isopach Map August 27, 1990

1.0 INTRODUCTION AND OBJECTIVES

In August 1990, American Environmental Technologies, Inc. (AET) retained Land Tech Remedial, Inc. (LTR) to provide technical support expertise in conducting a subsurface investigation at the Metro-North Commuter Railroad Harmon Yard. The purpose of the investigation was to specifically address the occurrence of subsurface free phase hydrocarbons in the vicinity of the outdoor storage area adjacent to the south side of the Harmon Distribution Center Building.

1.1 Site History/Background Information

The Metro-North Harmon Yard is located in Croton-on-Hudson, New York, along the east side of the Hudson River. Reportedly, the facility is the largest of the company's five train maintenance and repair yards encompassing a total of roughly 50 acres.

The specific area addressed in the AET investigation, known as the outdoor storage area, is situated immediately south of the Distribution Center building (see Figure 1A). Additionally, the area is directly adjacent to the track yard to the east, the new T&E building (under construction) to the south, and parking areas to the west. A single-lane, elevated access road to the facility passes directly over the north quarter of the area under investigation.

The subject area contains steel rack structures upon which are stored various rail-car parts including springs, brake shoes, and electric motors. Two or three roll-off containers are situated in the southwest quadrant of the area and contain trash/refuse, steel scrap, and aluminum scrap, respectively. A small concrete ramp along the north boundary of the area permits fork truck access to a loading dock and concrete platform at the south-southeast corner of the Distribution Center building.

Prior to initiating the subsurface investigation, Metro North removed a underground storage tank (UST) adjacent to a concrete platform along the east side of the study area. This task was completed to meet scheduled tank removal objectives. The tank was formerly used to store fuel oil and had a capacity of 1,000 gallons.

Upon removing the UST, the contractor observed that annular soils exhibited odor and discoloration typical of fuel oil. While it was suggested that the tank itself had leaked, further inspection by the contractor, Metro North, and the New York State Department of Environmental Conservation (NYSDEC) indicated that the tank and lines exhibited no signs of corrosion or leakage. Subsequently, Metro North officials speculated that a former line leak in a 4 - 6 inch fuel oil supply line under the subject area may have resulted in the evidenced hydrocarbon contamination.

Reportedly, the referenced leak occurred in approximately the center of the subject area in November 1989. In response to the leak event, AET uncovered the fuel oil line at the leak area, removed any free-phase fuel oil by vacuum tanker, and excavated adjacent saturated soils. Metro North later backfilled the excavation with clean fill after inspection by the NYSDEC. Following the primary leak response, Metro North evacuated the supply line of standing fuel oil and capped the ends.

1.2 Preliminary Reconnaissance

In order to assess the suspected free product occurrence near the former UST, two (2), two-inch diameter polyvinyl chloride (PVC) monitoring wells were installed west of the tank grave. These wells, labelled MW-A and MW-B on the attached site plan, are located approximately 10 feet west and 15 feet south-southwest of the former tank area.

On August 10, 1990, AET and LTR met with Metro North to discuss the aforementioned background information and review objectives and methods of the anticipated investigation. It was decided that AET would furnish all drilling equipment and materials to complete an additional three or four additional soil borings/monitoring wells in the subject area. LTR would initially provide technical project management during the drilling and well installation phase.

With input from all parties, potential well locations were chosen to provide subsurface information as follows:

- Further define the occurrence of free phase product in the study area (product plume boundaries) as site restrictions permit.

- Install sufficiently spaced wells to facilitate surveys and measurements of ground water and product levels and ultimately provide an evaluation of ground water flow direction.

- Assess subsurface conditions on both east and west sides of fuel supply line.

During this preliminary site review fluid levels in MW-A and MW-B were measured and indicated that both wells were approximately 17 feet deep. Depth to water in each was roughly 12.2 feet below grade and depth to product (fuel oil) was approximately 8.2 feet below grade, indicating a total product thickness of four feet.

2.0 HYDROGEOLOGIC INVESTIGATION

2.1 Subsurface Drilling/Monitoring Well Installation

On August 14, 1990, AET began the installation of additional soil borings and monitoring wells in the study area. Soil borings were completed using a hydraulic rotary drill rig advancing 8 3/4 inch O.D. hollow stem augers to approximately 20 feet below grade.

Wells were constructed using 15 feet of four-inch diameter .020 factory-slotted PVC well screen threaded to five feet of solid PVC riser. Upon withdrawing the auger flights, approximately two - three feet of open borehole length was lost due to the infusion of fine wet sands into the hollow augers. Consequently, the wells were reduced to 17+ feet total length by removing roughly three feet of solid riser length.

The annular space between the formation and screen was backfilled with #2 coefficient silica sand to approximately one foot above the well screen. A one foot thickness of bentonite (clay) pellets was hydrated directly above the sand to prevent surface water inseepage and wells were completed with loading bearing curb boxes set flush to grade with concrete.

The wells are identified MW-1 through MW-4 as labelled in order of installation. Appendix 1 contains subsurface drilling logs and completed well specifications.

Note that wells MW-1 through MW-3 were completed on August 14, 1990 while MW-4 was installed on August 15th.

2.2 Survey and Monitoring Program

A site area survey was completed on August 15, 1990 to determine the location and elevation of all six monitoring wells and positions of pertinent area features. A benchmark elevation datum of 100.00 feet was assigned to the northwest corner of a concrete block storage shed just east of MW-B in order to determine relative elevations of the monitoring wells.

Later survey data coupled with an area map provided by Metro North was used to plot well locations and prepare the attached site plan (Figure 1).

Monitoring wells were developed by AET on August 24, 1990 by alternately surging the well with a four foot PVC bailer and evacuating the well with a vacuum tanker. Well development procedures were recommended to enhance communication between each well and the adjacent formation. Well evacuation and subsequent monitoring also allowed an evaluation as to whether product thicknesses would recharge and hence more accurately determinate plume thickness. Finally, well evacuation resulted in the removal of some free product, albeit less than 100 gallons, from the subsurface.

3.0 HYDROGEOLOGIC INVESTIGATION: FINDINGS AND INTERPRETATIONS

3.1 Local Geology

As shown in the soil boring logs, unconsolidated sediments underlying the site are relatively homogeneous fine- to medium-grained sand, trace amounts of fine gravel, and some to little intermingled silt.

These sediments typically result from river overbank or flood plain deposits and were expected given the proximity of the Hudson River to the west and the low lying topography of the Harmon Yard.

Hydrocarbons released in this type of formation generally migrate vertically until they contact the water table. There they generally migrate horizontally on the water table extending more prominently in the direction of local ground water flow. Fine- to medium-grained sand formations typically produce modest quantities of water because while porosity is moderate to high, permeability is relatively poor to fair.

3.2 Site Hydrogeology

Well monitoring data from August 24 and August 27, 1990 is compiled in Tables 1 and 2. Relative water elevations in each well were used to develop shallow ground water contours over the study area. As shown in Figures 2 and 3, these contours indicate that ground water flow underlying the storage area is predominantly toward the southeast. Contours developed from monitoring data collected August 27th more clearly suggest a southeast flow direction and show a gradient of approximately 0.006 ft/ft (slightly more than .5 foot per 100 feet horizontal distance).

TABLE 1

WELL MONITORING DATA
AUGUST 24, 1990
(Before Development)

Metro North Harmon Yard
Outdoor Storage Area
Croton-on-Hudson, NY

Well #	Well Elevation	Depth to Water	Depth to Product	Product Thickness	Corrected Water Table Elevation
MW-A	99.91	12.04	7.79	4.25	91.53
MW-B	99.72	12.08	8.12	3.96	91.05
MW-1	99.03	8.25	8.17	0.08	90.85
MW-2	99.66	9.04	7.50	1.54	91.94
MW-3	99.34	8.21	8.12	0.09	91.21
MW-4	100.00	9.17	8.50	0.67	91.41

TABLE 2

WELL MONITORING DATA
AUGUST 27, 1990
(After Development)

Metro North Harmon Yard
Outdoor Storage Area
Croton-on-Hudson, NY

Well #	Well Elevation	Depth to Water	Depth to Product	Product Thickness	Correct Water Table Elevation
MW-A	99.91	11.79	7.79	4.00	91.56
MW-B	99.72	11.75	8.08	3.67	91.13
MW-1	99.03	9.12	7.42	1.70	91.37
MW-2	99.66	8.71	8.21	0.50	91.38
MW-3	99.34	9.29	8.45	0.84	90.77
MW-4	100.00	9.75	7.61	2.14	92.01

3.3 Immiscible Hydrocarbon Extent

As discussed, all monitoring wells were developed in part to evaluate recharge of immiscible hydrocarbons and thereby better define floating phase thicknesses across the study area. As shown in Tables 1 and 2 and on "Observation Well Reports" in Appendix 1, recharge of the entire free phase hydrocarbon thickness in wells MW-A and MW-B was nearly complete one hour after well evacuation. Recharge of product in wells MW-1 through MW-4 was slightly less than initial thicknesses, however, recharge after the second well evacuation round was more than 100% in wells MW-2 and MW-3.

Monitoring results from August 27, 1990, reveal marked increases in product thickness in wells MW-1 through MW-4. Product thickness in MW-1 increased from a film (August 24) to 1.70 feet while in MW-4 it increased from 0.05 feet to 2.14 feet. The data strongly supports the conclusion that the well development program was highly effective in flushing the well pack and enhancing communication with the formation.

Free phase hydrocarbon thicknesses observed on August 27, 1990 were used to develop a product isopach map (Figure 4). This map shows extrapolated and inferred plume dimensions based on the thicknesses in each well, ground water flow direction, and assumed location of subsurface structures/conduits (i.e. fuel supply line).

As shown in Figure 4, a pool of free product underlies much of the study area. The extent or boundaries of the floating layer are not definable with the existing well grid due to the presence of free product in all wells. The data indicate that the heaviest accumulation of immiscible hydrocarbons is in the area of MW-A and MW-B. It also suggests that the approximate four foot thickness may extend to the east-southeast, toward areas underlying the concrete platform and tracks.

Because the fuel supply line backfill materials are similar in grain size (fine sand) to the native formation, permeability of the backfill has probably not played a substantial role in plume migration as is often the case.

4.0 CONCLUSIONS/RECOMMENDATIONS

The hydrogeologic investigation completed shows clearly that the Metro North Outdoor Storage Area is underlain by a pool of free phase hydrocarbons. This product is likely diesel fuel/#2 oil which leaked from a former (now abandoned) underground fuel oil supply line which runs approximately north-south through the center of the study area.

Product thicknesses in six monitoring wells in the study area ranged from 0.50 feet to 4.0 feet. Shallow, unconfined ground water flow is toward the southeast at a gradient of 0.006. Subsurface sediments were observed to be predominantly fine sand with some medium sand, little silt, and trace fine gravel.

The lateral dimensions of the product plume was not defined during this phase of investigation due to the limited number of wells installed during the study. However, the absence of a pronounced ground water gradient coupled with the permeability of the subsurface sediments indicate that the product plume, if from a relatively low volume, one-time line loss, may not have extensively migrated from the study area.

Should current NYSDEC concerns from supply line losses and the general occurrence of free product in the subsurface be focused primarily on remediation of free product, we feel that a effective product recovery system can be designed. Briefly, the proposed design would entail the pumping of groundwater underlying the plume to create a "cone of depression" in the local water table. Ground water withdrawn by pumping could be directed to the Metro North water treatment plant for treatment. Free-floating product would migrate toward the ground water withdrawal well where it would be pumped to an above ground holding tank. Radial capture area of this system could be evaluated prior to installation by conducting a half- to full-day pump test of one of the current four inch monitoring wells.

Known product levels and formation characteristics suggest a recovery system as follows:

- Installation of a large diameter (24") recovery well installed by bucket auger drilling. Total required well depth would be approximately 25 feet.

- Suggested recovery equipment is a submersible water pump required to remove ground water underlying the product plume thus creating a "cone of depression" in the local water table.

- Floating hydrocarbon product will migrate toward the recovery well along the depressed water table where it will be pumped by a floating filter scavenger unit (19" dia.) to an above ground holding tank.

- We anticipate that all ground water withdrawn by pumping could be directed to the Metro-North water treatment plant for treatment.

Finely, we recommend the completion of another four - six monitoring wells in and around the study area to better define product plume dimensions and further evaluate ground water flow patterns. Wells should be similar in construction to MW-1 through MW-4.

APPENDIX 1

Soil Boring/Monitoring Well Logs

LAND TECH REMEDIAL, INC.

SOIL BORING/WELL LOG NO. MW-1

PROJECT NAME: AET/Metro North Harmon Yard | PROJECT NO: 10247 | PAGE 1

PROJECT LOCATION: Outdoor Storage Area | PERMIT NO: N/A

BORING LOCATION: Just N. of west side storage racks | DATE COMPLETED: 8/14/90

DRILLING EQUIPMENT: Mobil B-51 | DRILLMASTER: K. McSherry | COMPLETED DEPTH: 21 ft. (boring) 17 ft. (well)

DRILLING METHOD: Rotary Auger | STAFF GEOLOGIST: Jeff Brown

SAMPLE # & TYPE	DEPTH/FT	SOIL DESCRIPTION	BLOWS PER 6"	PID	MONITORING WELL CONSTRUCTION
	0 - 1	asphalt overlying grey medium grey angular gravel			**TYPE:** Flush to grade overburden well
	1 - 2	d. brown medium-coarse SAND, little f. gravel			**WELL ELEVATION:**
	2 - 3.5	brown fine-medium, SAND, trace fine gravel, trace silt			
	3.5 - 5	grey fine SAND, little silt			**REFERENCE POINT:** North side top of PVC casing
	5 - 13	lt. brown fine SAND, trace (-) silt			**DIAMETER:**
split spoon MW-1-5'	5' - 7'	fine micaceous SAND			4-inch
split spoon MW-1-10'	10' - 12'	grey fine-medium SAND	2/2/3/3		**SCREEN:**
	13 - 21	grey fine-medium SAND			15' of .020 slot threaded PVC
					CASING: 2' solid PVC riser
					WELL PACK: #2 coefficient washed filter gravel

Type of Sample:

REMARKS:

1) Hydrocarbon (fuel) odor first noted in samples from 2'
2) Odor noted at 7' internal in split spoon sample
3) Moist with fuel at 9'
4) Lost approx. 3.5 feet of boring to collapse of fine sands

GROUNDWATER OBSERVATIONS

Ground water observed at 10 -11' below grade

LAND TECH REMEDIAL, INC.

SOIL BORING/WELL LOG NO. MW-2

PROJECT NAME: AET/Metro North Harmon Yard | PROJECT NO: 10247 | PAGE 1

PROJECT LOCATION: outdoor storage area | PERMIT NO: N/A

BORING LOCATION: west of fuel line just south of elevated road | DATE COMPLETED: 8/14/90

DRILLING EQUIPMENT: Mobil B-51 | DRILLMASTER: K. McSherry | COMPLETED DEPTH: 20 ft. (boring) 17 ft. (well)

DRILLING METHOD: Rotary Auger | STAFF GEOLOGIST: J. Brown

SAMPLE & TYPE	DEPTH/FT	SOIL DESCRIPTION	BLOWS PER 6"	PID	MONITORING WELL CONSTRUCTION
	0 - 4"	asphalt			**TYPE:** Flush to grade overburden well
	4" - 1'	angular medium GRAVEL			**WELL ELEVATION:**
	1' - 2.5	dark brown, fine-coar. SAND, some f-m sbrnd gravel			**REFERENCE POINT:** North side top of PVC casing
	2.5 - 4	light brown, fine-medium SAND, trace fine gravel			**DIAMETER:** 4-inch
	4 - 5.5	fine-coarse light brown SAND, little f-m gravel			
	5.5 - 20	fine (some medium) grey/brown SAND, trace (-) fine gravel			**SCREEN:** 15' of .020 slot threaded PVC
					CASING: 2' of solid PVC riser
					WELL PACK: #2 coefficient washed filter gravel

Type of Sample:

REMARKS:

1) slight product odor at 2 feet

2) continuous fuel odor from 5'

3) moist with fuel at 9'

GROUNDWATER OBSERVATIONS

Ground water observed at approx. 9.5 - 1- feet below grade.

LAND TECH REMEDIAL, INC.

SOIL BORING/WELL LOG NO. MW-3

PROJECT NAME: AET/Metro North Harmon Yard | PROJECT NO: 10247 | PAGE 1

PROJECT LOCATION: outdoor storage area | PERMIT NO: N/A

BORING LOCATION: just N. of past side storage racks | DATE COMPLETED: 8/14/90

DRILLING EQUIPMENT: Mobil B-51 | DRILLMASTER: K. McSherry | COMPLETED DEPTH: 20 ft. (boring) 20 ft. (well)

DRILLING METHOD: Rotary Auger | STAFF GEOLOGIST: J. Brown

SAMPLE # & TYPE	DEPTH/FT	SOIL DESCRIPTION	BLOWS PER 6"	PID	MONITORING WELL CONSTRUCTION
	0 - 1'	asphalt overlying angular medium gravel			**TYPE:** Flush to grade overburden well
	1' - 2'	d. brown/black f-c SAND, some (-) f gravel			**WELL ELEVATION:**
	2 - 7'	brown/lt brown f-c SAND, trace f gravel			**REFERENCE POINT:** North side top of PVC casing
	7 - 12'	grey f-med SAND, trace f. gravel			**DIAMETER:** 4- inch
	12 - 20'	grey f-med SAND, little coarse SAND			**SCREEN:** 15' of .020 slot threaded PVC
					CASING: 5' of solid PVC riser
					WELL PACK: #2 coefficient washed filter gravel

Type of Sample:

REMARKS:

1) product odor from 4 feet
2) moist with fuel at 9'

GROUNDWATER OBSERVATIONS

Approx. 9 - 10 feet below grade

LAND TECH REMEDIAL, INC.

SOIL BORING/WELL LOG NO. MW-4

PROJECT NAME: AET/Metro North Harmon Yard PROJECT NO: 10247 PAGE 1

PROJECT LOCATION: outdoor storage area PERMIT NO:

BORING LOCATION: E. of supply line, just W. of ramp DATE COMPLETED: 8/15/90

DRILLING EQUIPMENT: Mobile B-51 DRILLMASTER: K. McSherry COMPLETED DEPTH: 20 ft. (boring) 20 ft. (well)

DRILLING METHOD: Rotary Auger STAFF GEOLOGIST: J. Brown

SAMPLE & TYPE	DEPTH/FT	SOIL DESCRIPTION	BLOWS PER 6"	PID	MONITORING WELL CONSTRUCTION
	0 - 1'	asphalt and grey angular medium gravel			**TYPE:** Flush to grade overburden well
	1 - 2'	d. brown/black f-c SAND, little f. gravel			**WELL ELEVATION:**
	2 - 14'	light brown f-m SAND, trace (+) f. gravel			**REFERENCE POINT:** North side top of PVC casing
	8'	color change to grey			**DIAMETER:** 4-inch
	14 - 20'	(slight coarsening) grey f-m SAND, some (-) coar. SAND			**SCREEN:** 15' of .020 slot threaded PVC
					CASING: 5' of solid PVC riser
					WELL PACK: #2 coefficient washed filter gravel

Type of Sample:

REMARKS:

1) Fuel odor noted at 6'
2) Moist with fuel at 9'

GROUNDWATER OBSERVATIONS

Approx. 10 feet below grade

APPENDIX 2

Observation Well Reports

AET

American Environmental Technologies, Inc.
13 Francis J. Clarke Circle, Bethel, CT 06801
(203) 744-3477

Metro North
Harmon Yard
Croton-on-Hudson, N.Y.

OBSERVATION WELL REPORT

PROJECT # 3272

Croton-on-Hudson N.Y. | Rain 70 | Friday Aug 24 1990
JOB LOCATION | WEATHER CONDITIONS | DATE

WELL #	DEPTH TO FLUID	DEPTH TO WATER	PRODUCT THICKNESS	COMMENTS
				9 AM
A	7.79	12.04	4.25	monitoring before vac out
B	8.12	12.08	3.96	
				measurements to pvc
1	8.17	8.85	0.08	
2	7.50	9.04	1.54	
3	8.12	8.21	0.09	
4	8.50	9.17	0.67	
				1ST
A	8'	11.79	3.79	monitoring 1hr after vac out
B	8.17	12'	3.83	
				10 AM
1	-	8.33	Film	
2	7.75	8'	0.25	
3	8.12	8.17	0.05	
4	8.58	8.71	0.13	
				2ND
A	8'	12.08	4.08	Monitoring 1hr after vac out
B	8.17	11.75	3.58	
				11 AM
1	[illegible]	8.33	Film	
2	7.67	8'	0.33	
3	8.58	8.71	0.13	
4	8.17	8.17	0.05	

Chris McGrath
SYSTEMS TECHNICIAN

AET

American Environmental Technologies, Inc.
13 Francis J. Clarke Circle, Bethel, CT 06801
(203) 744-3477

Metro North
Harmon Yard
Croton-on-Hudson, N.Y

OBSERVATION WELL REPORT

PROJECT # 9072

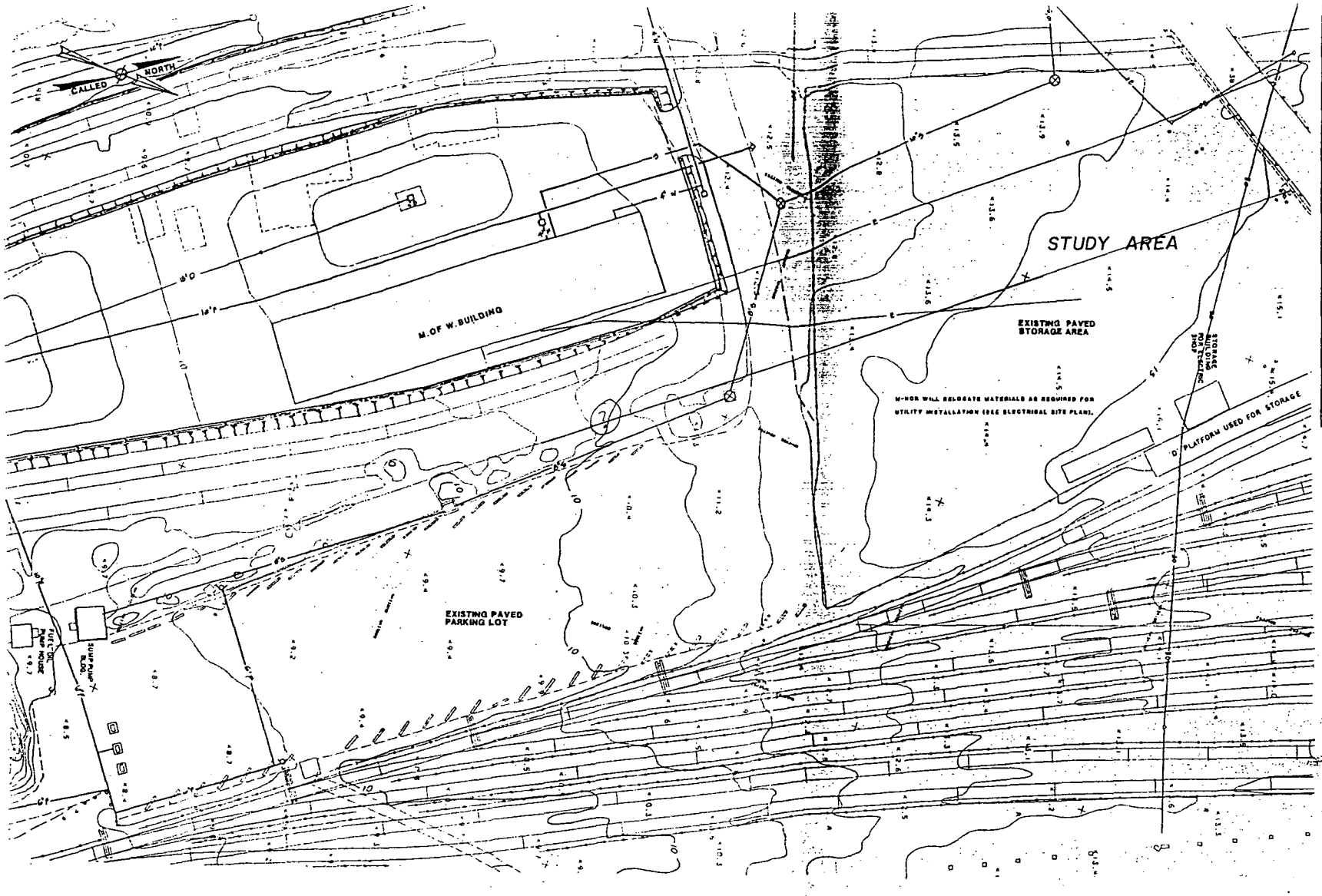
Croton-on-Hudson N.Y — JOB LOCATION
Sunny 90° — WEATHER CONDITIONS
Mon Aug 27 1990 — DATE

WELL #	DEPTH TO FLUID	DEPTH TO WATER	PRODUCT THICKNESS	COMMENTS
A	7.79	11.79	4'	Monitored on North side
B	8.08	11.75	3.67	
1	7.48	9.12	1.70	
2	8.21	8.71	0.~~05~~	.50
3	8.45	9.29	0.84	
4	7.61	9.75	2.14	

SYSTEMS TECHNICIAN

APPENDIX 3

Figures



LEGEND

DESCRIPTION	EXISTING	PROPOSED	TO BE REMOVED OR ABANDONED
BORING LOCATION	⊗		
CONTOUR LINE	10		
SPOT ELEVATION	x 14.5	+ 10.5	
STRUCTURE			
FIRE HYDRANT			
WATER VALVE			
WATER LINE	W	W	
SANITARY SEWER LINE	S	S	
STORM DRAIN LINE	D	D	
MANHOLE	⊗ OR		
CATCH BASIN			
BERM			
FENCE			
UTILITY POLE			
OVERHEAD ELECTRIC	OE	OE	
UNDERGROUND ELECT.	E	E	
ELECTRIFIED 3RD RAIL			
WHEEL STOP			

GENERAL NOTES

1. REFER TO SPECIFICATIONS FOR STAGING AND PHASING REQUIREMENTS.
2. THE CONTRACTOR SHALL MAINTAIN ACCESS FOR RAILROAD EMPLOYEES INTO THE YARD AND PARKING AREA THROUGHOUT THE PROJECT.
3. THE CONTRACTOR SHALL PROVIDE A SAFE AND OPERATIONAL WORK SITE FOR PERSONNEL AND RAILROAD OPERATIONS AT ALL TIMES.
4. THE CONTRACTOR SHALL GUARD AGAINST MUD AND DEBRIS BEING TRACKED ONTO PUBLIC ROADS.
5. THE CONTRACTOR SHALL COORDINATE HIS CONSTRUCTION WORK WITH THE RAILROAD TO SCHEDULE TRACK OUTAGES OR FLAGMEN AT LEAST 48 HOURS PRIOR TO WORK ADJACENT TO ACTIVE TRACKS.
6. THE CONTRACTOR SHALL PROTECT ALL EXISTING WORK THAT IS TO REMAIN IN PLACE.
7. ALL EXISTING UNDERGROUND UTILITIES SHOWN ARE AT THEIR APPROXIMATE LOCATIONS. THE CONTRACTOR SHALL LOCATE AND VERIFY THE LOCATION, GRADES AND CONSTRUCTION OF ALL EXISTING UTILITY LINES PRIOR TO ANY NEW CONSTRUCTION.
8. THE CONTRACTOR SHALL REMOVE ALL ABANDONED UTILITIES THAT INTERFERE WITH PROPOSED CONSTRUCTION. ALL STRUCTURES AND FOUNDATIONS NOTED TO BE REMOVED, SHALL BE REMOVED COMPLETELY, UNLESS OTHERWISE NOTED.
9. THE ENDS OF PIPES LEFT IN PLACE SHALL BE CAPPED OR PLUGGED AS APPROVED BY THE ENGINEER.
10. ALL WATER LINES SHALL HAVE A MINIMUM OF 4'-8" COVER.
11. SURVEY AND BOILS INFORMATION IS SUPPLIED BY M-NCR.

FIGURE 1A.
STUDY AREA LOCUS MAP

A. EPSTEIN AND SONS (NEW YORK)
ENGINEERS 1616 BROADWAY
ARCHITECTS NEW YORK, N.Y. 10036

METRO-NORTH COMMUTER RAILROAD
T & E WELFARE FACILITIES
HARMON, N.Y.

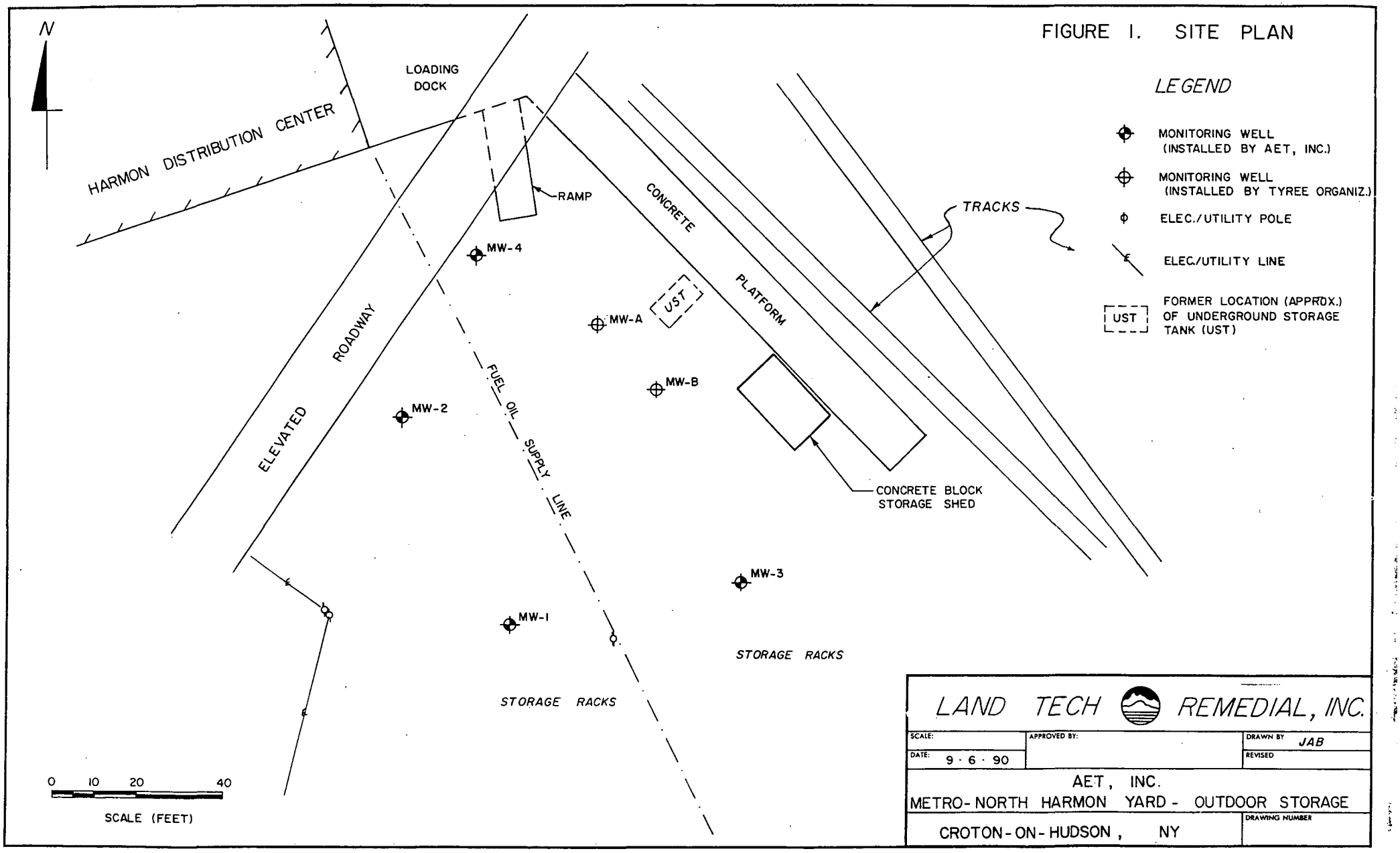


FIGURE I. SITE PLAN

LEGEND

- MONITORING WELL (INSTALLED BY AET, INC.)
- MONITORING WELL (INSTALLED BY TYREE ORGANIZ.)
- ELEC./UTILITY POLE
- ELEC./UTILITY LINE
- UST — FORMER LOCATION (APPROX.) OF UNDERGROUND STORAGE TANK (UST)

LAND TECH REMEDIAL, INC.

SCALE:	APPROVED BY:	DRAWN BY JAB
DATE: 9 · 6 · 90		REVISED

AET, INC.
METRO-NORTH HARMON YARD - OUTDOOR STORAGE
CROTON-ON-HUDSON, NY

DRAWING NUMBER

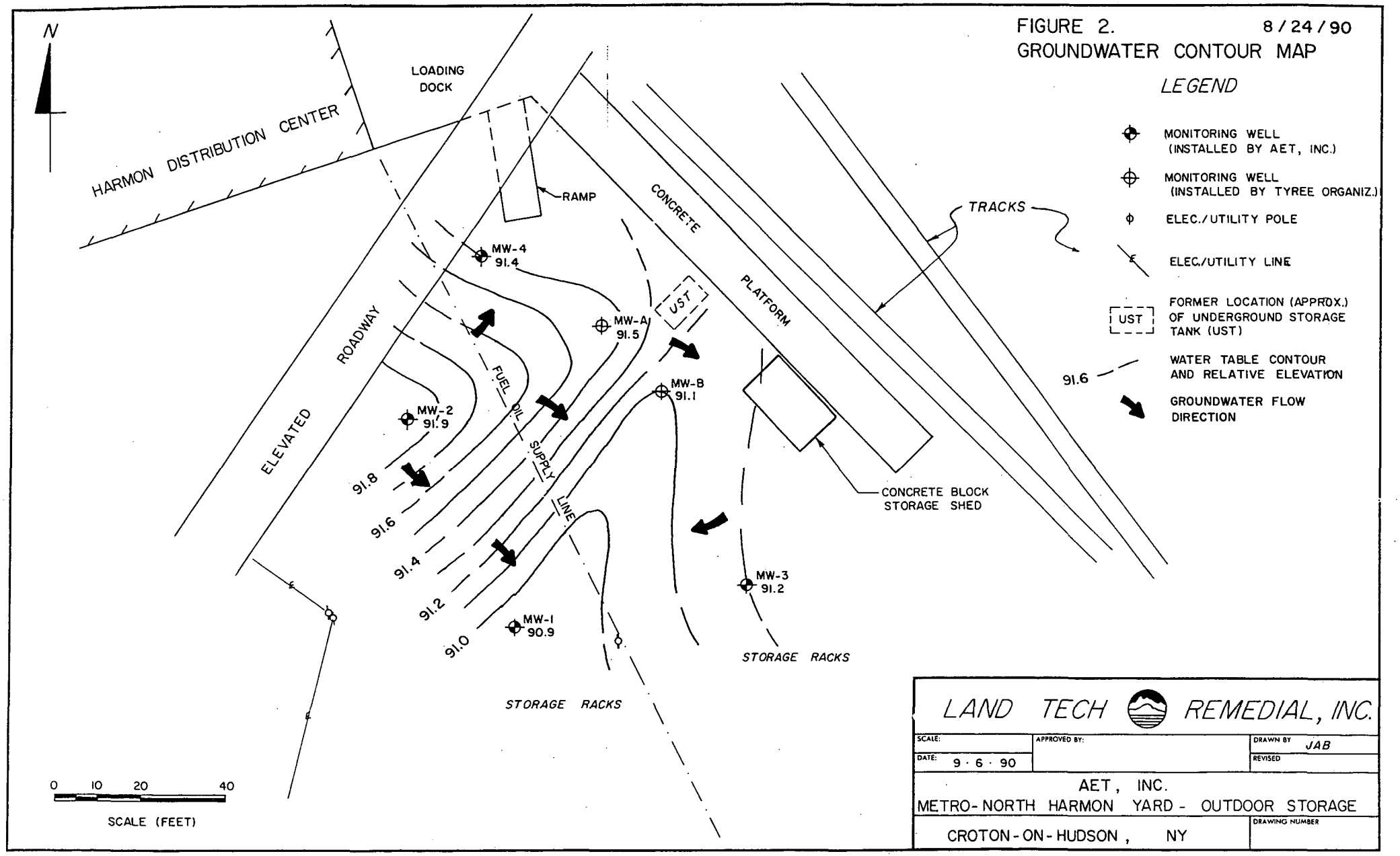


FIGURE 2. 8/24/90
GROUNDWATER CONTOUR MAP

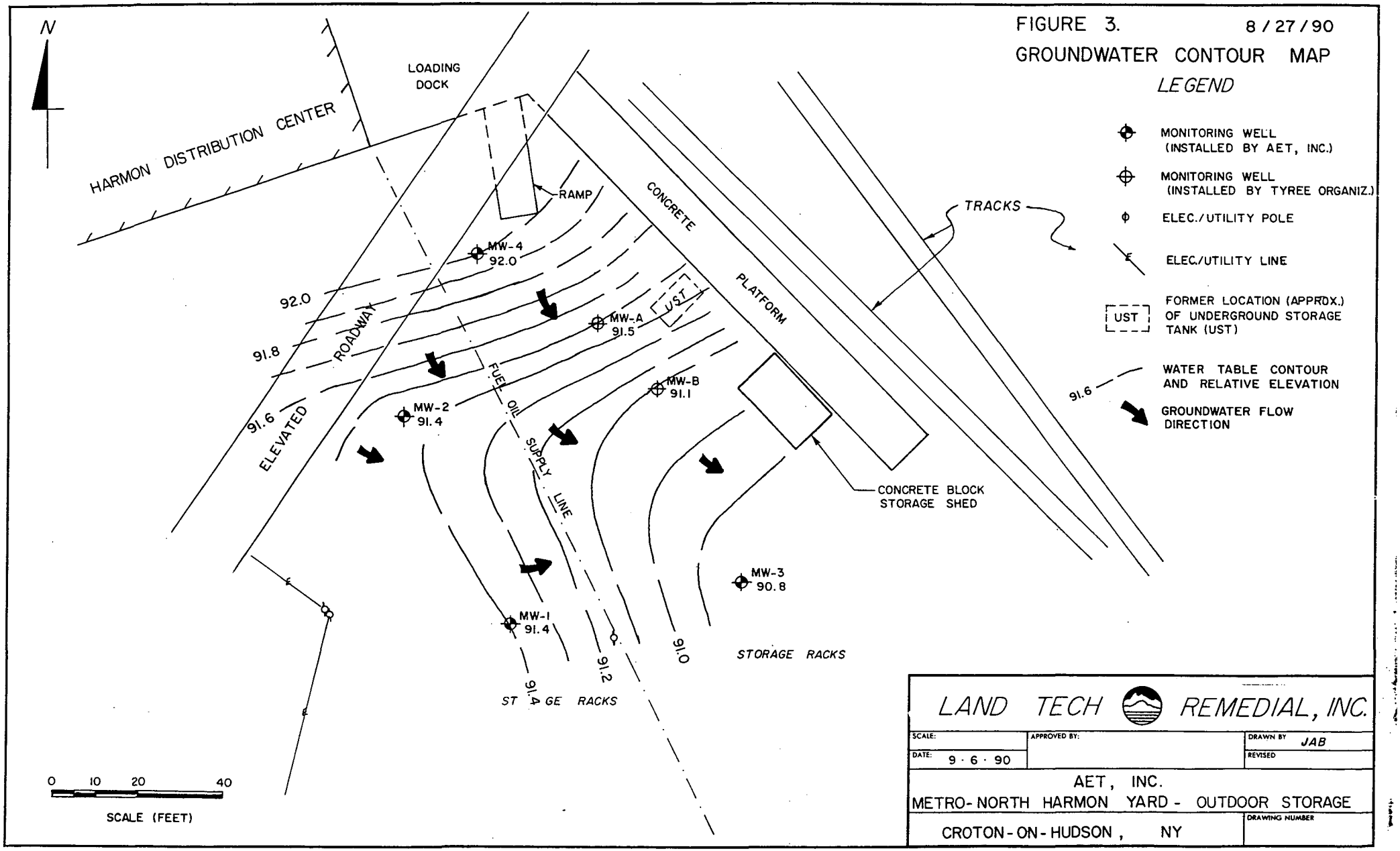
LEGEND

- MONITORING WELL (INSTALLED BY AET, INC.)
- MONITORING WELL (INSTALLED BY TYREE ORGANIZ.)
- ELEC./UTILITY POLE
- ELEC./UTILITY LINE
- UST — FORMER LOCATION (APPROX.) OF UNDERGROUND STORAGE TANK (UST)
- 91.6 — WATER TABLE CONTOUR AND RELATIVE ELEVATION
- GROUNDWATER FLOW DIRECTION

LAND TECH REMEDIAL, INC.

SCALE:	APPROVED BY:	DRAWN BY JAB
DATE: 9 · 6 · 90		REVISED

AET, INC.
METRO-NORTH HARMON YARD - OUTDOOR STORAGE
CROTON-ON-HUDSON, NY
DRAWING NUMBER


N
LOADING DOCK
HARMON DISTRIBUTION CENTER
RAMP
CONCRETE
PLATFORM
TRACKS
MW-4
92.0
92.0
91.8
ROADWAY
91.6
ELEVATED
MW-A
91.5
UST
MW-B
91.1
MW-2
91.4
FUEL OIL
SUPPLY LINE
CONCRETE BLOCK
STORAGE SHED
MW-3
90.8
MW-1
91.4
91.2
91.0
STORAGE RACKS
91.4
STORAGE RACKS
0 10 20 40
SCALE (FEET)
FIGURE 3. 8/27/90
GROUNDWATER CONTOUR MAP
LEGEND
MONITORING WELL (INSTALLED BY AET, INC.)
MONITORING WELL (INSTALLED BY TYREE ORGANIZ.)
ELEC./UTILITY POLE
ELEC./UTILITY LINE
UST
FORMER LOCATION (APPROX.) OF UNDERGROUND STORAGE TANK (UST)
91.6
WATER TABLE CONTOUR AND RELATIVE ELEVATION
GROUNDWATER FLOW DIRECTION
LAND TECH REMEDIAL, INC.
SCALE:
APPROVED BY:
DRAWN BY JAB
DATE: 9 · 6 · 90
REVISED
AET, INC.
METRO-NORTH HARMON YARD - OUTDOOR STORAGE
CROTON-ON-HUDSON, NY
DRAWING NUMBER

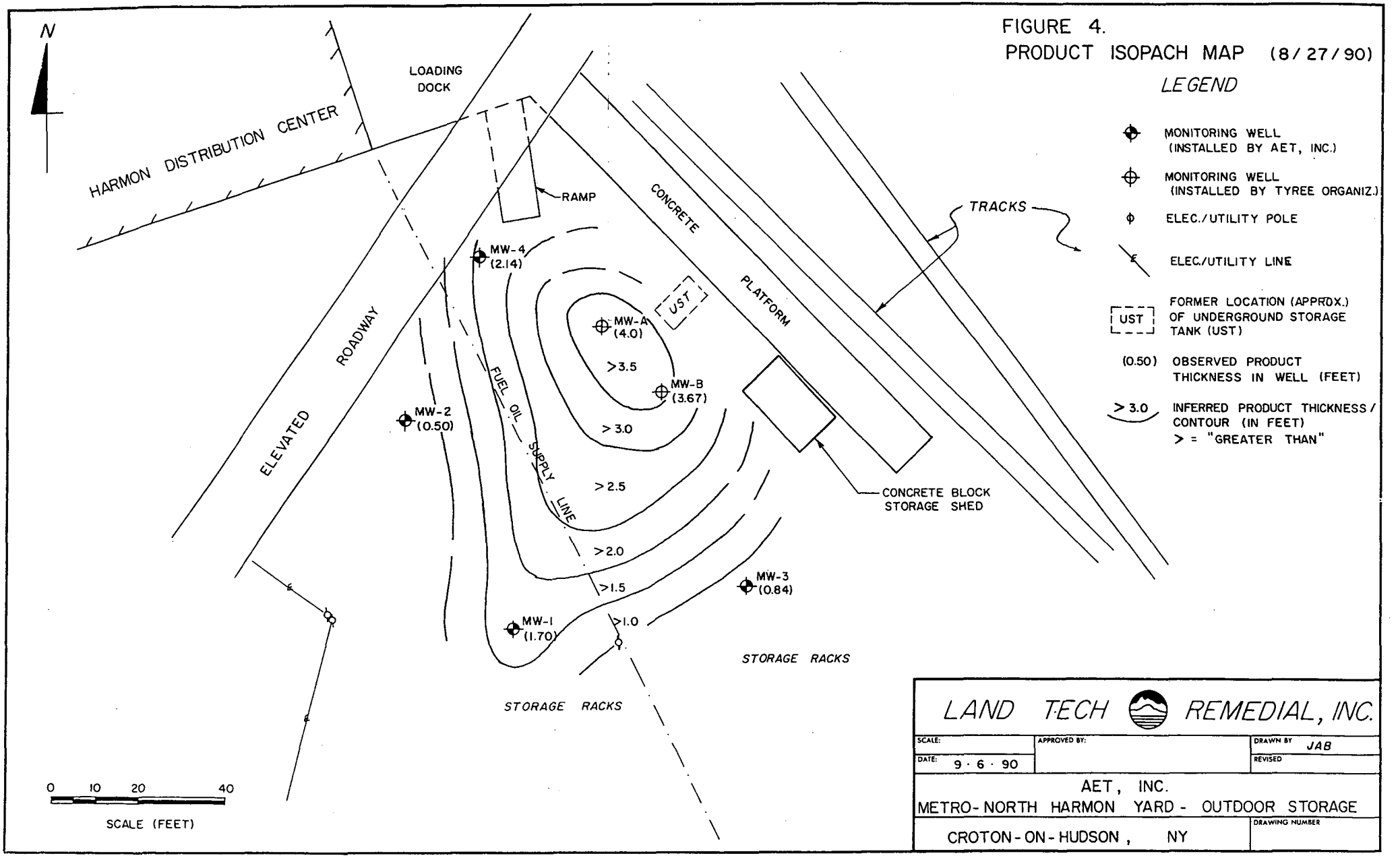


FIGURE 4.
PRODUCT ISOPACH MAP (8/27/90)

LEGEND

- MONITORING WELL (INSTALLED BY AET, INC.)
- MONITORING WELL (INSTALLED BY TYREE ORGANIZ.)
- ELEC./UTILITY POLE
- ELEC./UTILITY LINE
- UST — FORMER LOCATION (APPROX.) OF UNDERGROUND STORAGE TANK (UST)
- (0.50) OBSERVED PRODUCT THICKNESS IN WELL (FEET)
- >3.0 INFERRED PRODUCT THICKNESS / CONTOUR (IN FEET) > = "GREATER THAN"

LAND TECH REMEDIAL, INC.

SCALE:	APPROVED BY:	DRAWN BY JAB
DATE: 9 · 6 · 90		REVISED

AET, INC.
METRO-NORTH HARMON YARD - OUTDOOR STORAGE
CROTON-ON-HUDSON, NY
DRAWING NUMBER