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NITTANY GEOSCIENCE INC. MEMORANDUM

TO: EPA Region III
FROM: Merck & Co., Inc.
DATE: March 19, 1991
SUBJECT: Presentation Outline
RCRA 7003 Environmental Site Investigation
West Point Site, Pennsylvania

This presentation has **two main points:**

- Merck's groundwater problem is separate from the NPWA Zone 7 Superfund problem.
- Merck is addressing its groundwater problem aggressively.

The **basis for separating Merck** from the NPWA Zone 7 Superfund problem is twofold:

- A groundwater divide separates Merck from NPWA wells L-22 and L-17.
- Contaminated groundwater from beneath the Merck site does not extend to the vicinity of NPWA wells L-22 and L-17.

Merck's aggressive approach to its groundwater problem is reflected in the following summary of facts:

1. **Staff**
   - Environmental management of Consent Order activities - 13
   - In-house environmental laboratory - 12
2. **Monitoring Wells**

Well Type	On-Site	Off-Site	Total
Pumping wells	7	0	7
100-ft monitoring wells	25 + 1	9 ~~19~~ + 2	34 + 3
300-ft monitoring wells	7	1	8
Domestic wells	0	17	17
Municipal wells	0	4	4
	39 ~~30~~ + 1	31 + 2	70 + 3

all monitored qtrly - some monitored monthly.

Note that 3 in the above list are additional wells are planned for 1991.

NWWA #5 + 7 &

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3. **Financial Investment**

1991 Budget	1990	1989	1988	Total
$5.1M Env. Mgmt. $1.0M Lab $6.1M	$5.6M	$4.9M	$4.8M	$21.4M

4. **Public Water Connections** - 54 total at $1.0M cost

5. **Interim Remediation** - Chloroform capture (pounds) - Jan. 1988 through Feb. 1991

In-Situ Volatilization	17,203
Groundwater Pumping and Treatment	7,066 (carbon filtration)
Total	24,269 pounds

6. **Shallow Piezometer Installations** - 46 shallow nests and 2 deep nests, with 1 additional planned for 1991

7. **Soil Gas Sample Locations** - 660 in 19 of 20 PSAs

8. **Soil Boring Sample Locations** - 95 in 19 of 20 PSAs

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TITLES OF PRESENTATION ILLUSTRATIONS

1. Site Location on Topographic Map
2. Site Location on Drainage Map
3 Site Drainage Map
4. Regional Geologic Map
5. Site Geologic Map
6. Site Geologic Cross Sections
7. Schematic of Typical Monitoring Well Construction
8. Schematic of Typical Monitoring Well Conversion
9. Schematic of Nested Piezometers
10. Quarterly Groundwater Monitoring Locations
11. Groundwater Level Contour Map, December 1990
12. Fracture Trace Map
13. TCE Isoconcentration Map, December 1990
14. Chloroform Isoconcentration Map, December 1990
15. Potential Source Area Location Map
16. Soil Sampling Locations Per Soil Gas Isoconcentration Map
17. Perched Water Zones as Sampling Locations

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WEST POINT SITE INVESTIGATE PER RFI GUIDANCE

1.0 ENVIRONMENTAL SETTING CHARACTERIZATION

- 1.1 Hydrology
- 1.2 Geology
  - 1.2.1 Lithology
  - 1.2.2 Structure
- 1.3 Fracture traces
- 1.4 Aquifer characteristics
  - Slug tests
  - Pumping tests

2.0 SOURCE CHARACTERIZATION

- 2.1 Site History
- 2.2 Regional Groundwater Quality
- 2.3 Source Verification
  - 2.3.1 Soil-gas Survey
  - 2.3.2 Soil Sampling
  - 2.3.3 Shallow Groundwater Sampling

3.0 CONTAMINATION CHARACTERIZATION

- 3.1 Nature
  - 3.1.1 Chloroform and TCE
  - 3.1.2 Other Constituents
- 3.2 Extent
  - 3.2.1 Lateral -- Isoconcentration Maps
  - 3.2.2 Vertical -- Well Clusters at 100 ft and 300 ft

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4.0 POTENTIAL RECEPTOR IDENTIFICATION

4.1 Domestic Well Users -- Hookups to public supply

4.2 Municipal Wells -- NWWA 21, 23, 7

5.0 INTERIM MEASURES

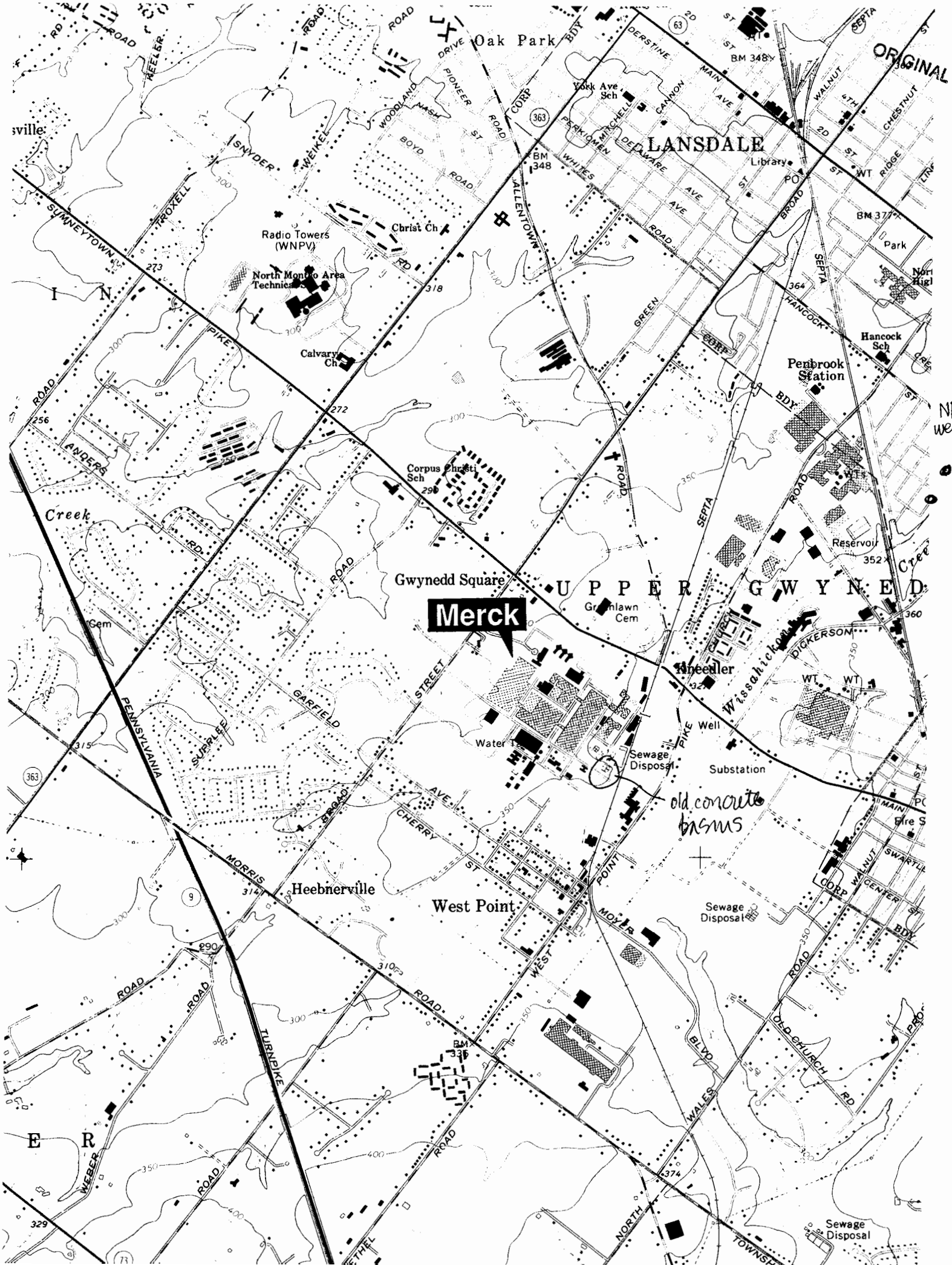
5.1 Domestic Well Hookups

5.2 Carbon Treatment

5.3 Hydraulic Barrier

5.4 In-Situ Volatilization

- removal of sludge lagoons



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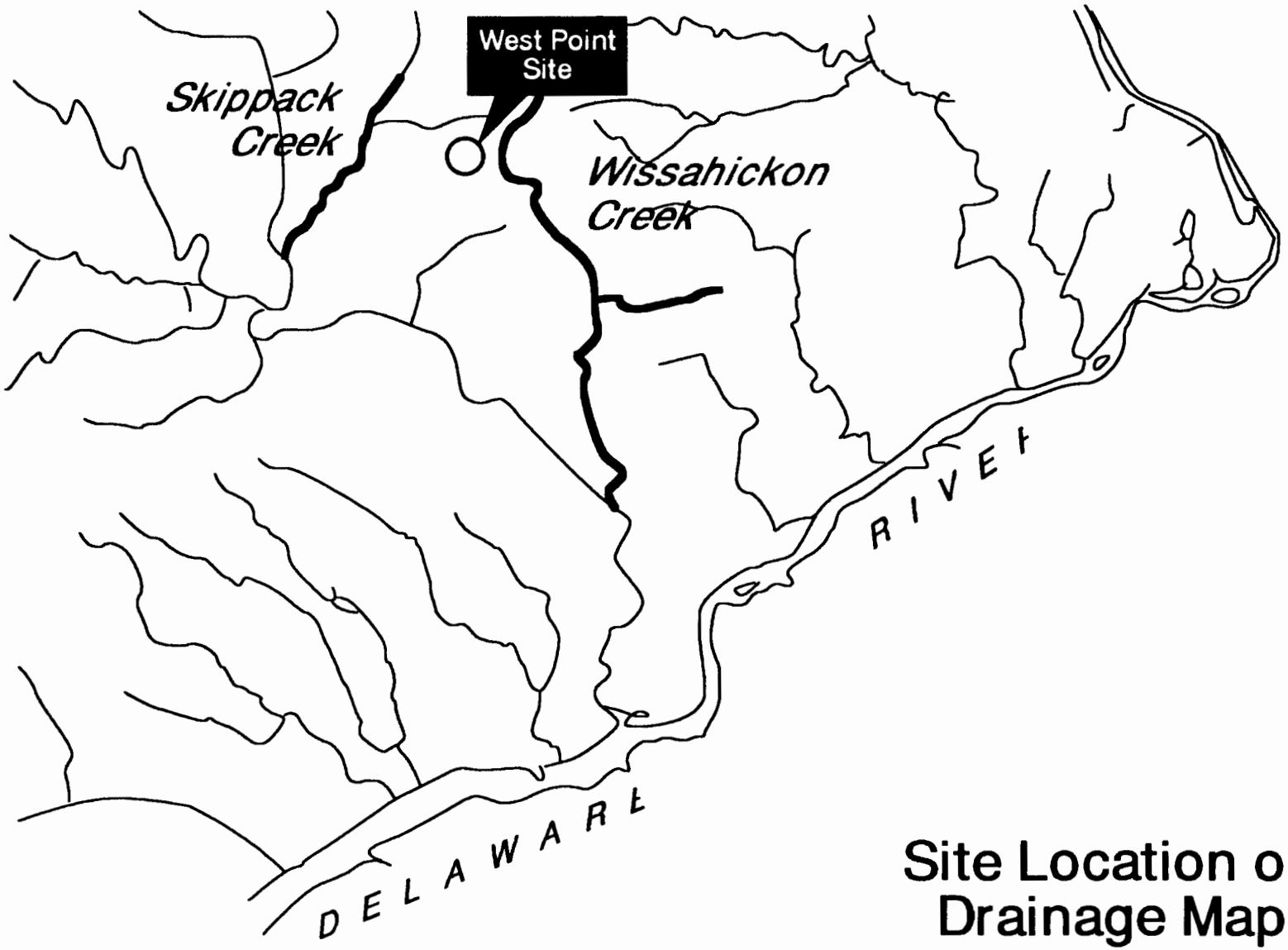
Oak Park
LANSDALE
Library
Radio Towers (WNPV)
North Montgo Area Technical
Christ Ch
Calvary Ch
Corpus Christi Sch
Penbrook Station
Hancock Sch
Reservoir
Gwynedd Square
UPPER GWYNED
Merck
Greenlawn Cem
Kneedler
Wissahickon
Well
Substation
Sewage Disposal
Water
old concrete basins
Heebnerville
West Point
Sewage Disposal
Sewage Disposal
NPWA wells



Site Location on Drainage Map

"site drainage southerly"

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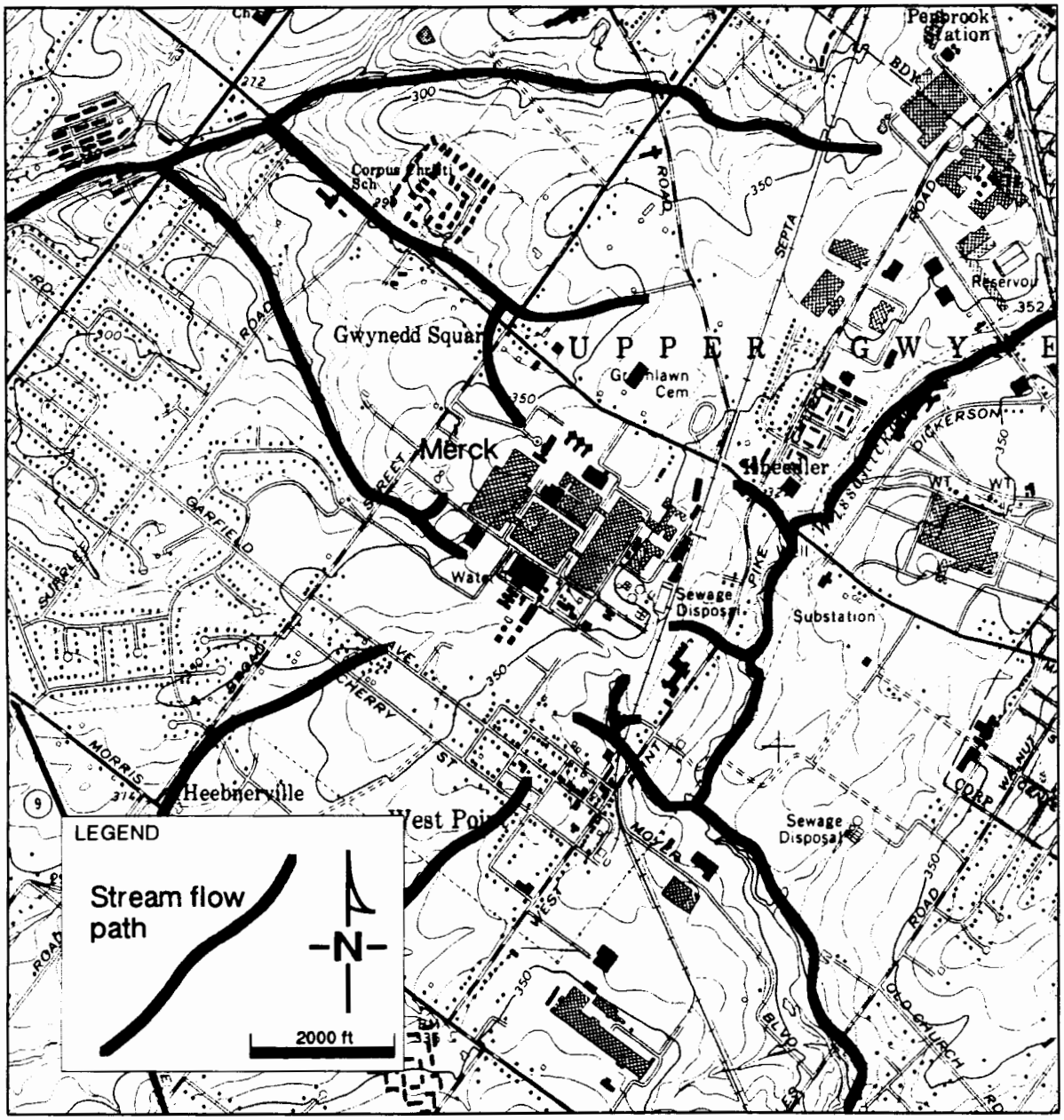

Site drainage map.

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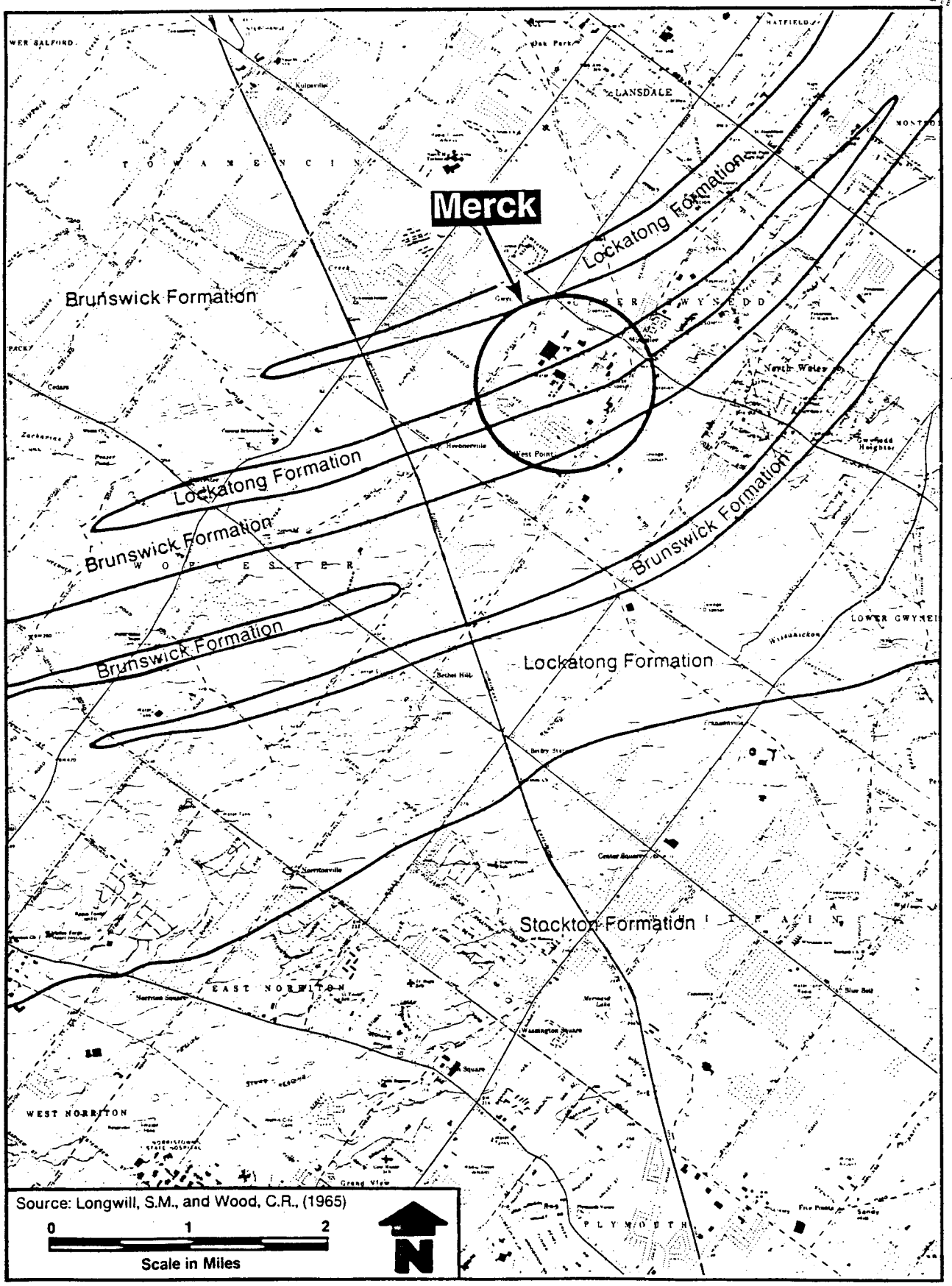
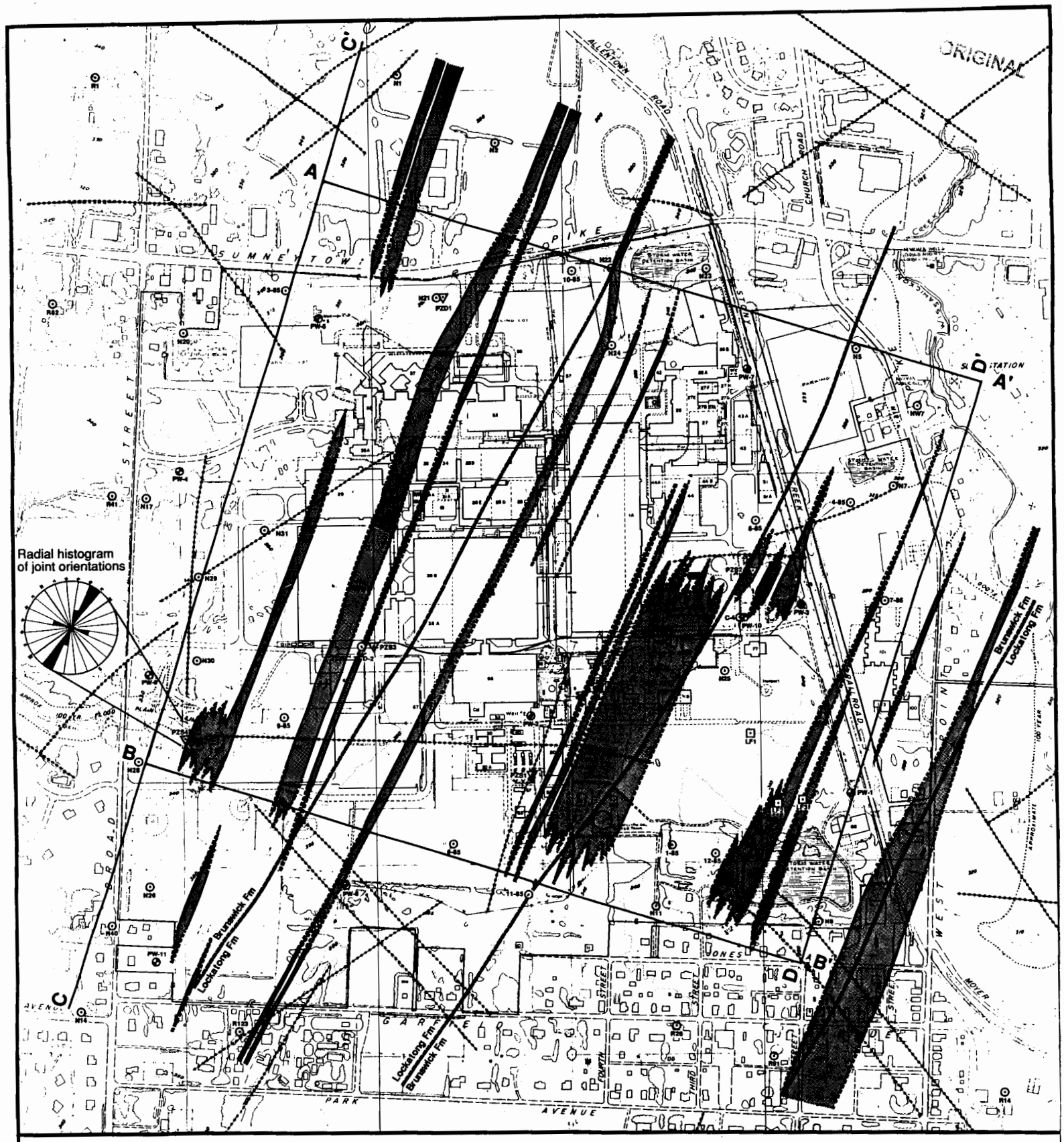

Merck
Lockatong Formation
Brunswick Formation
Lockatong Formation
Brunswick Formation
Brunswick Formation
Brunswick Formation
Lockatong Formation
Stockton Formation
LANSDALE
WORCESTER
EAST NORRITON
WEST NORRITON
PLYMOUTH
Source: Longwill, S.M., and Wood, C.R., (1965)
0
1
2
Scale in Miles
N



A — A' Line of Cross Section

Gray Marker Beds
Solid lines indicate known contacts
Dashed lines indicate unknown contacts

Fracture Trace

Formation Contacts Mapped by Longwill and Wood (1965)
Note: Average bedrock strike is N57°
Average dip is 10°N

N18 Monitoring Well

PZS4 Piezometer

LF3 4" Diameter Monitoring Well

PW-9 Plant Production/Recovery Well

0 600'

Adapted from Merck & Co., Inc. Drawing E-22779-2

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GEOLOGIC MAP

MERCK & CO., INC.
WEST POINT, PA

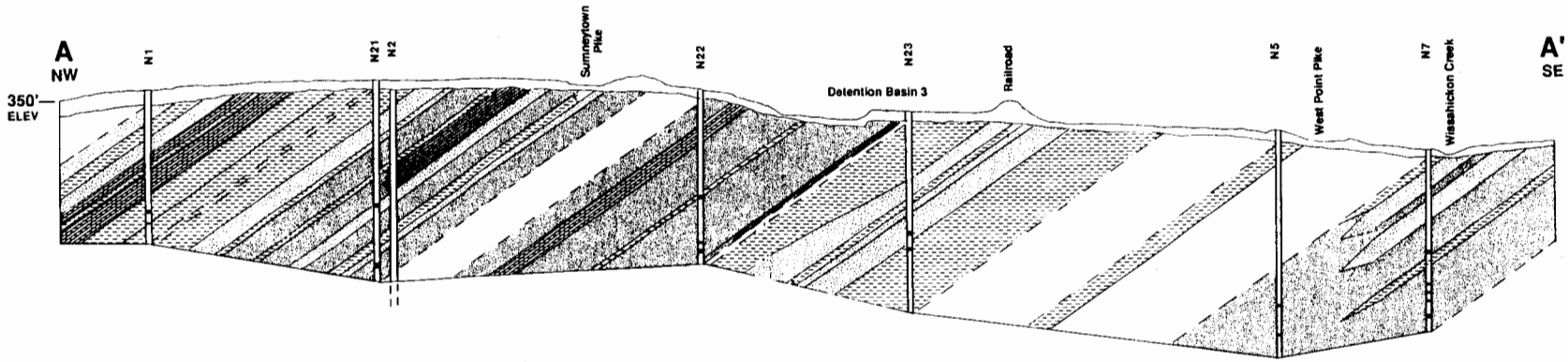
PREPARED BY: P.G.C.	DATE: 2/6/89	PLATE 1
CHECKED BY: W.F.E.	REVISED: 5/30/89	
DRAWN BY: D.G.L.	FIGURE NO: 666-14/00/1	

radial histogram: direction & frequency of cracks
" preferred direction of joints

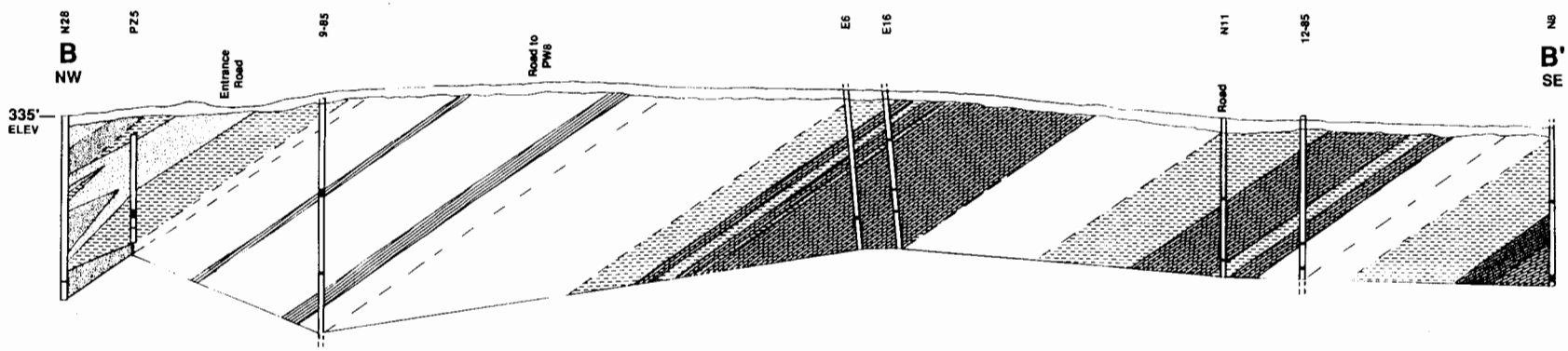
SW

10° slope

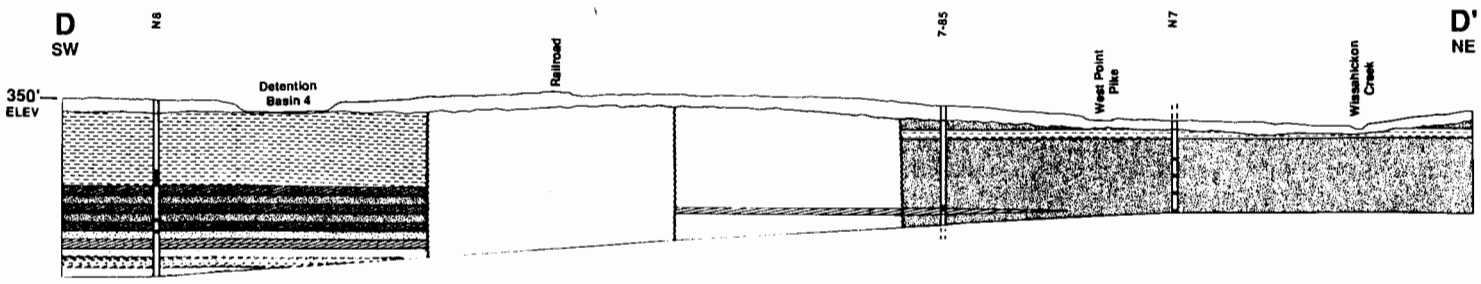
CROSS SECTION A-A'



CROSS SECTION B-B'



CROSS SECTION D-D'



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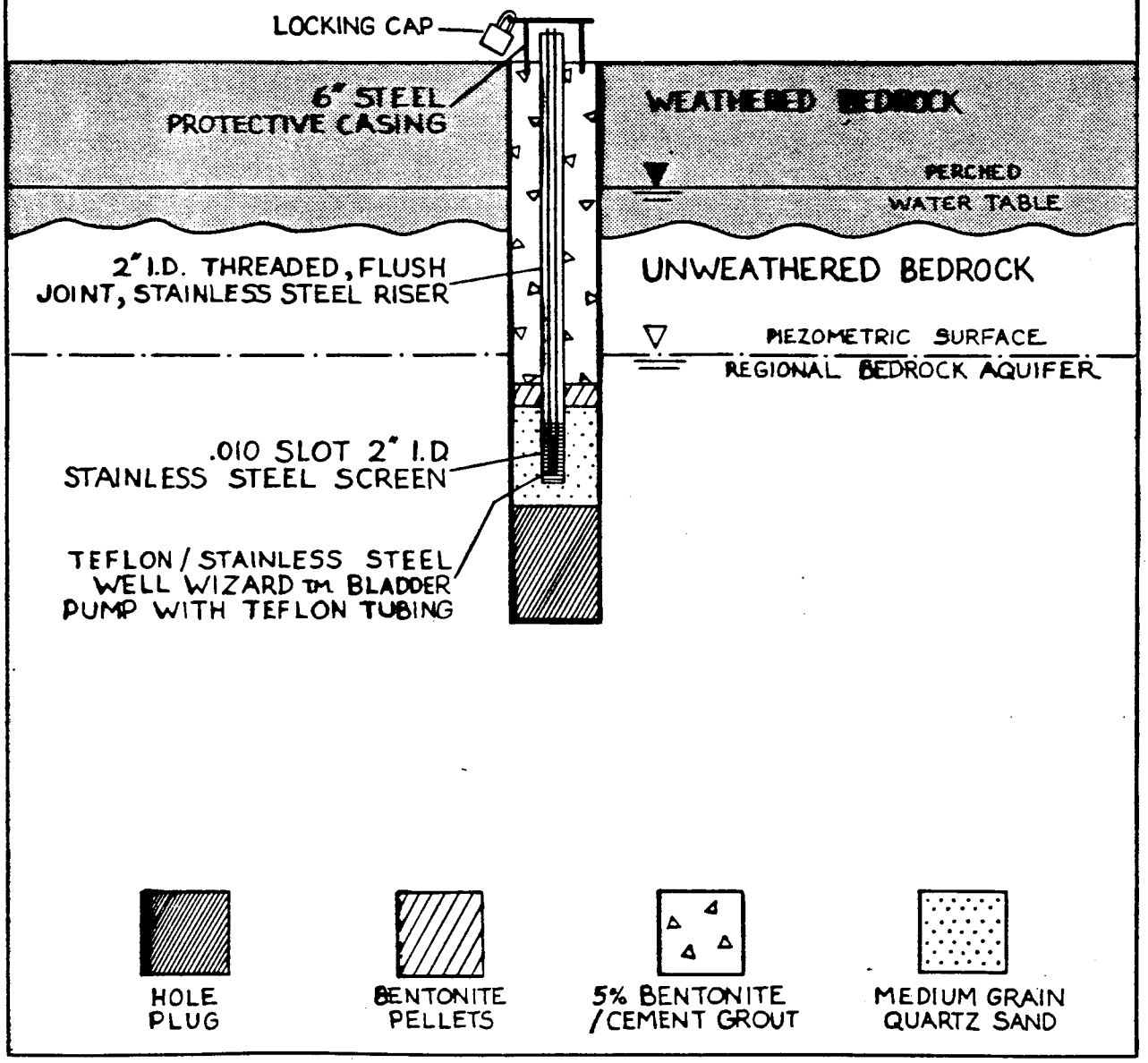
Schematic of Typical Monitoring Well Construction.



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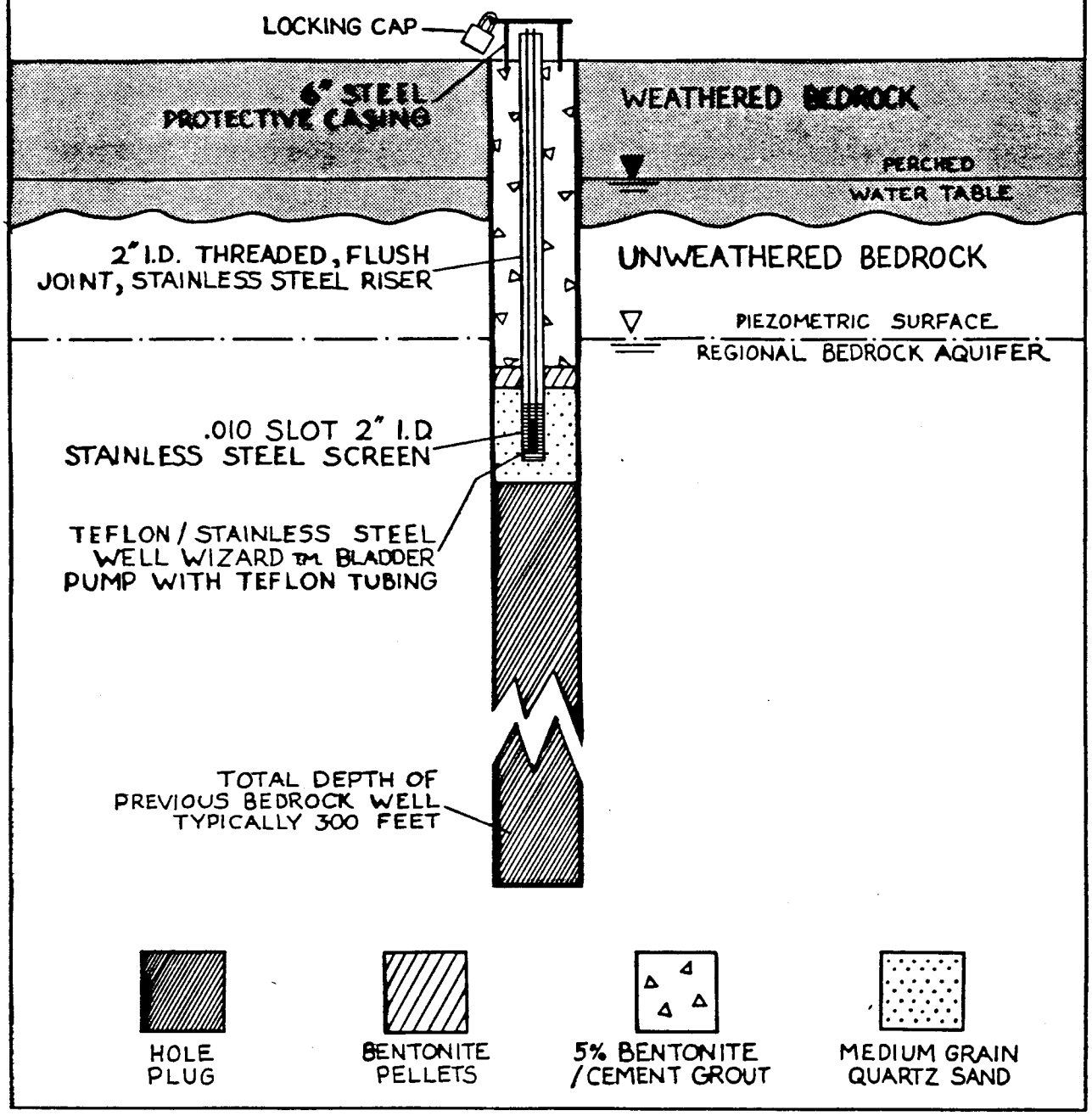
Schematic of Typical Monitoring Well Conversion.

Some wells were retrofit



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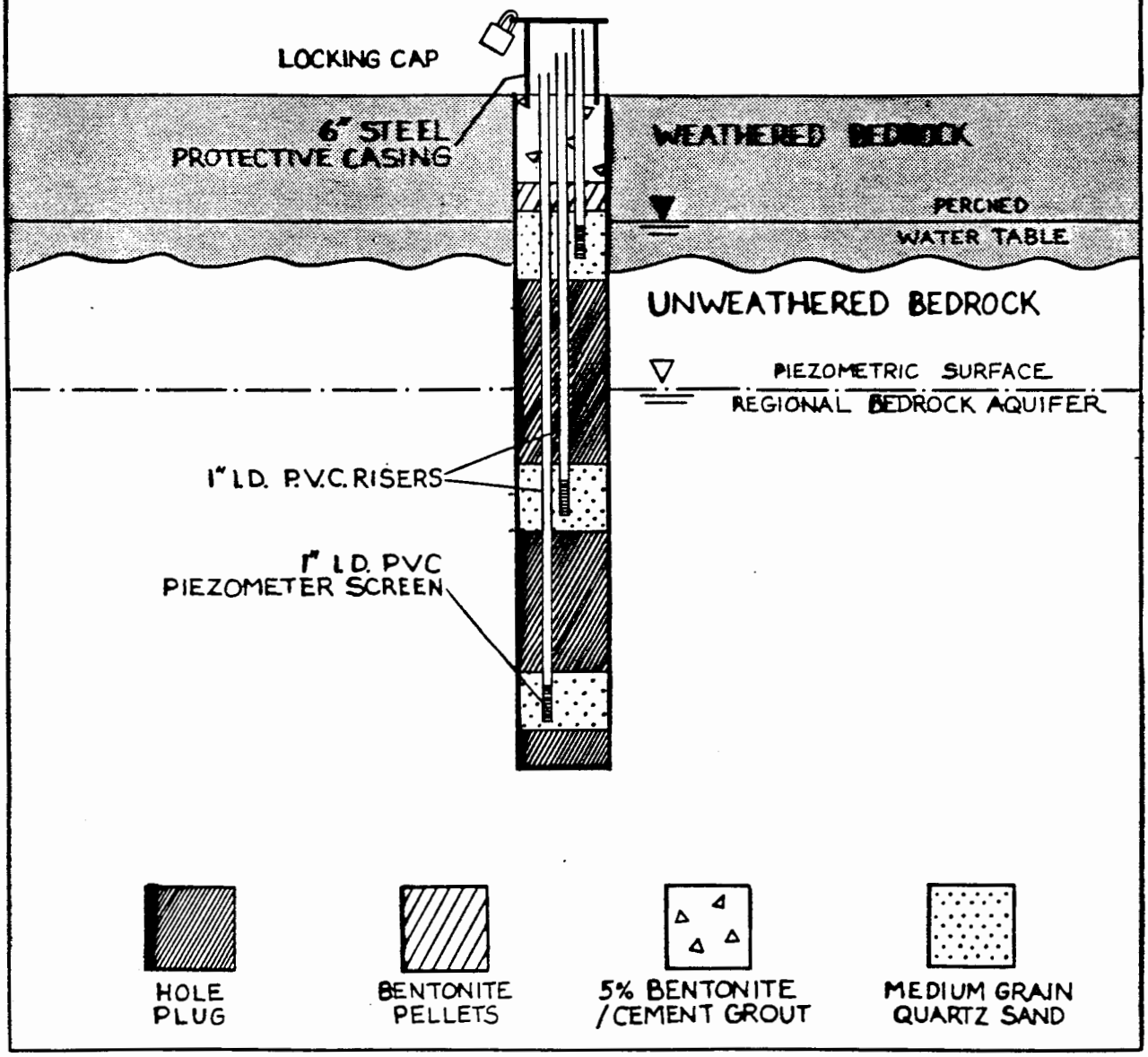
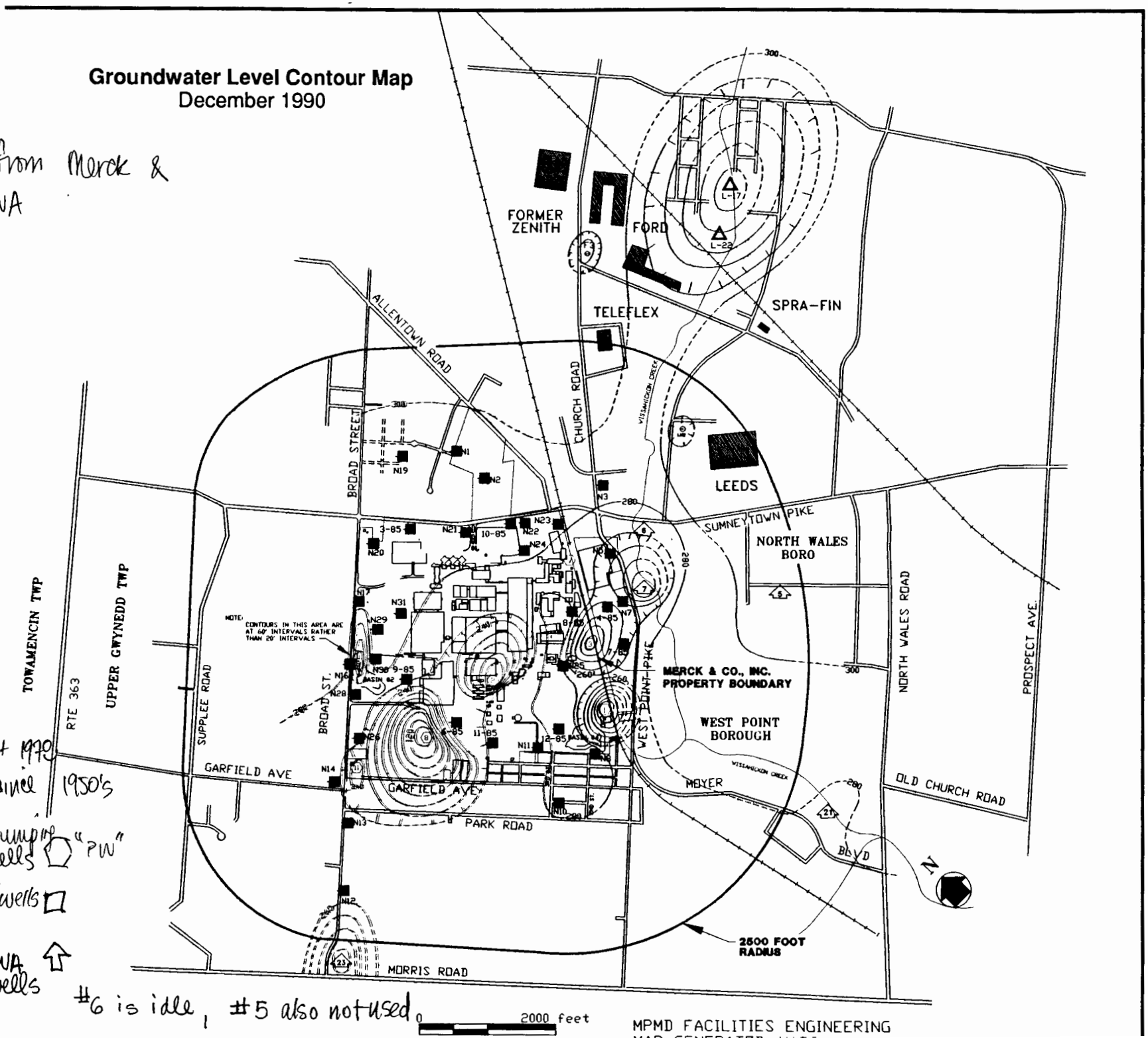
Schematic of Nested Piezometers.

Some 1" piez grouped as many as 5 together



Groundwater Level Contour Map
December 1990

data from Merck & NDWA



PW 8 inst 1979
all others since 1950's

merck pumping wells "PW"

34 100' wells

NWWA wells

#6 is idle, #5 also not used

MPMD FACILITIES ENGINEERING

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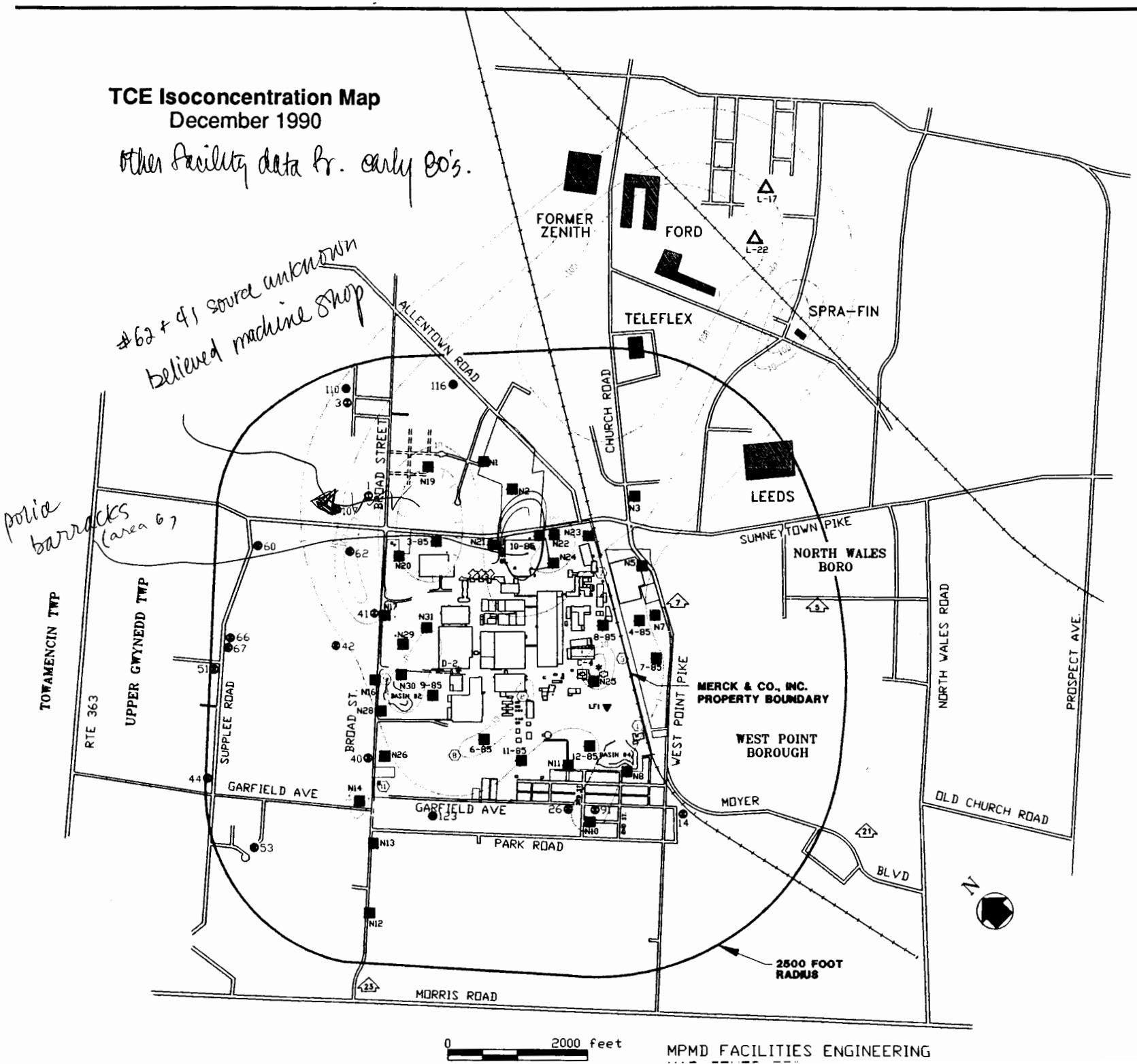
TCE Isoconcentration Map
December 1990

other facility data for. early 80's.



MPMD FACILITIES ENGINEERING

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clean (< 1ppb det. limit)

Chloroform Isoconcentration Map

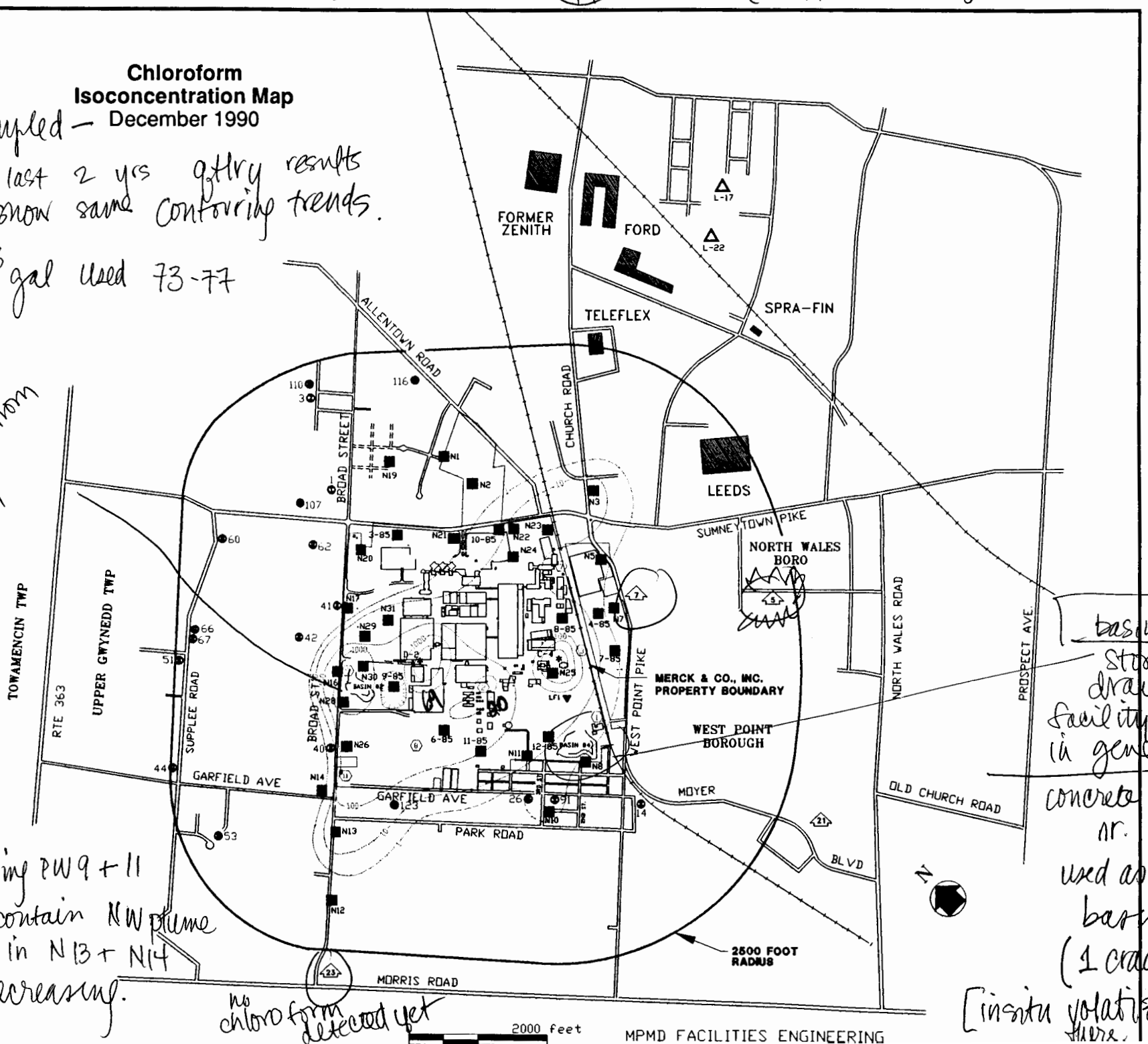
December 1990

all sampled —

For last 2 yrs qtlry results show same contouring trends.

10^6 gal used 73-77

Basin 2 overflow from bldg 69



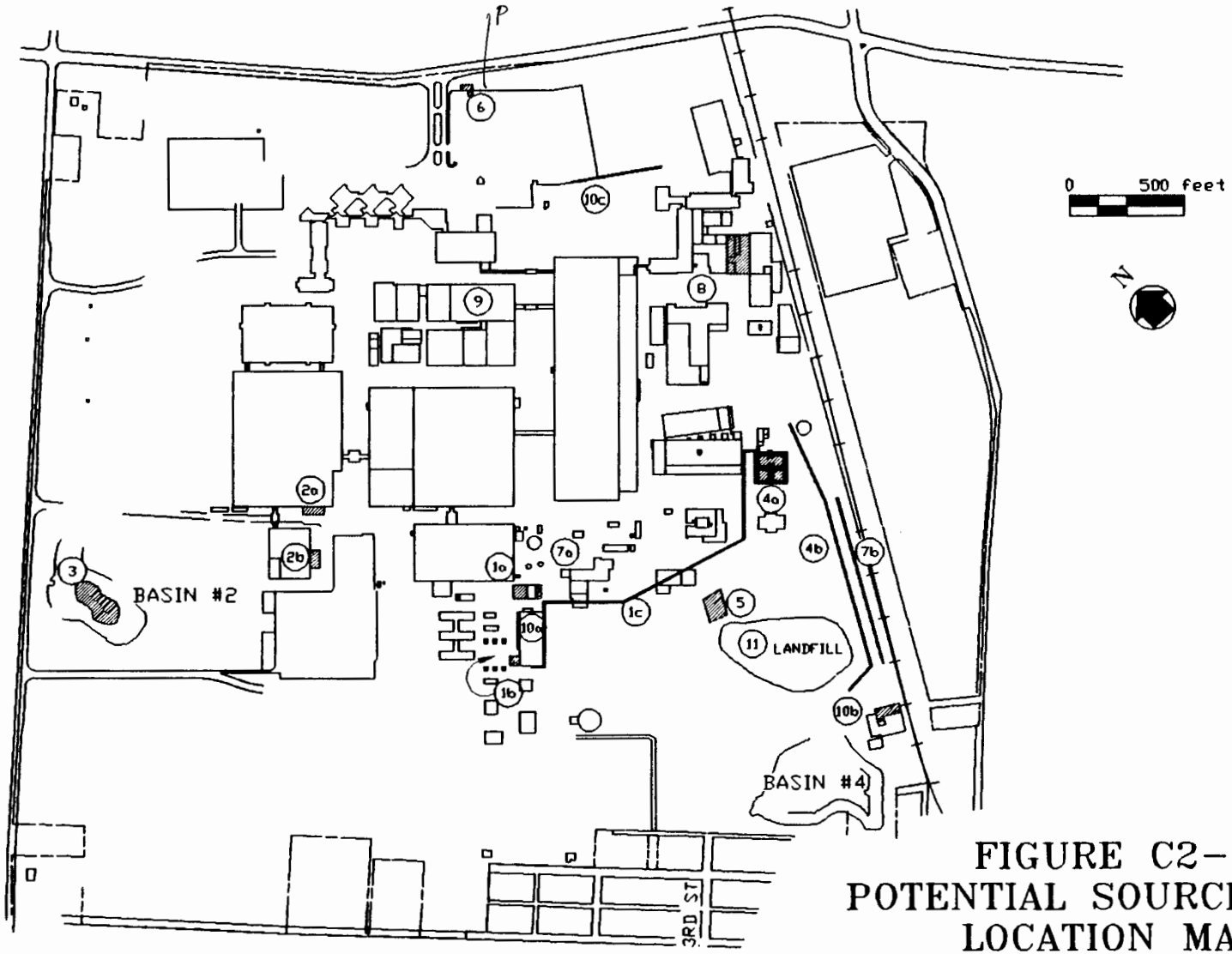
basin 4 stormwater drainage from facility & area in general

concrete basins nr. N25 used as evap basins (1 cracked) [insitu volatilization] there.

pumping PW 9 + 11 to contain NW plume levels in N13 + N14 decreasing.

no chloroform detected yet

septic system



6 police barracks

10a bldg 20

~~1~~b 69

2a chloroform

2b processes

FIGURE C2-1
POTENTIAL SOURCE AREA LOCATION MAP

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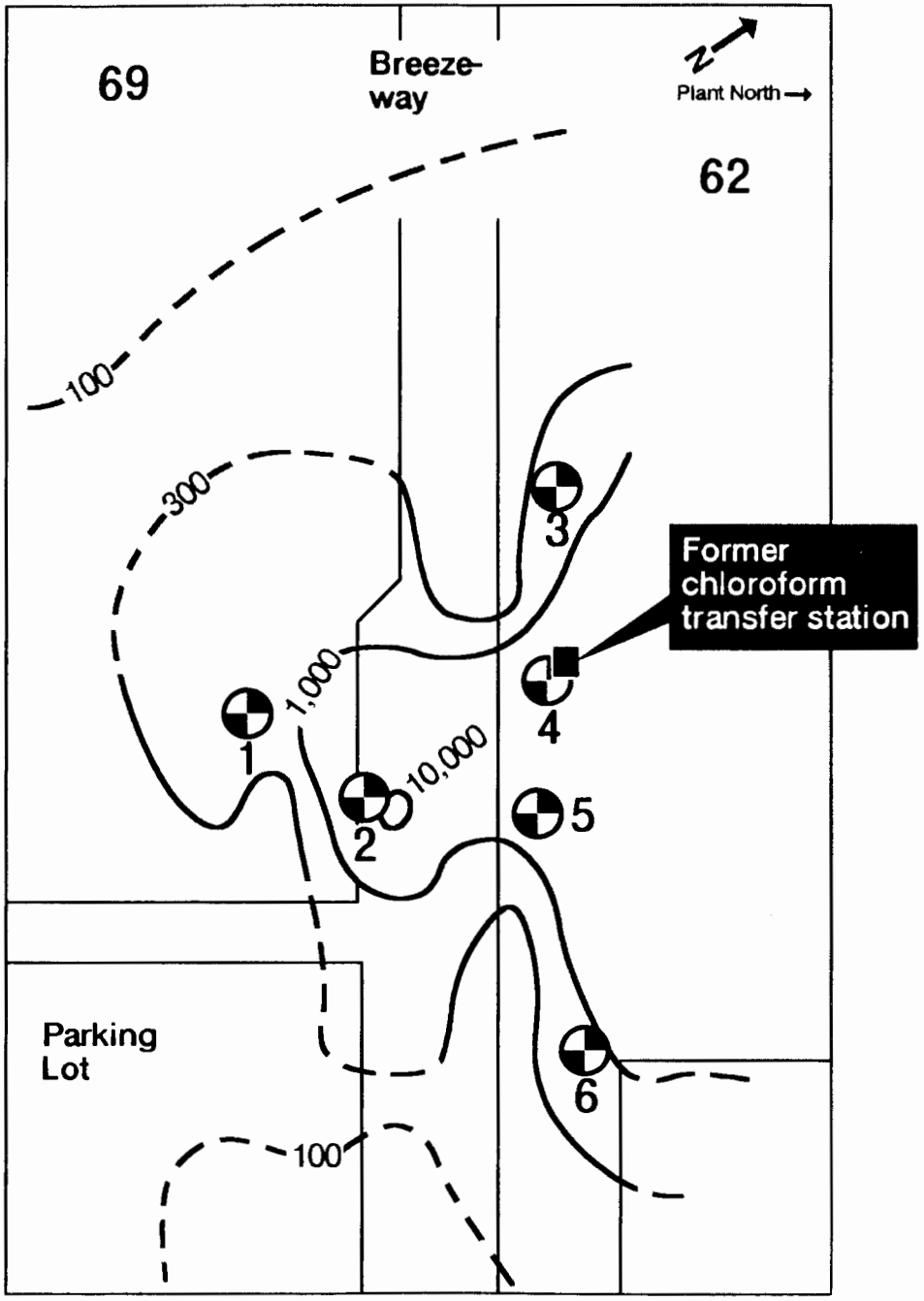
Soil Analysis



LEGEND

- Soil-~~gas~~ sampling point
- 100 — Chloroform concentration (ppb) logarithmic contours
- Estimated contour line

isoconcentration of soil gas data

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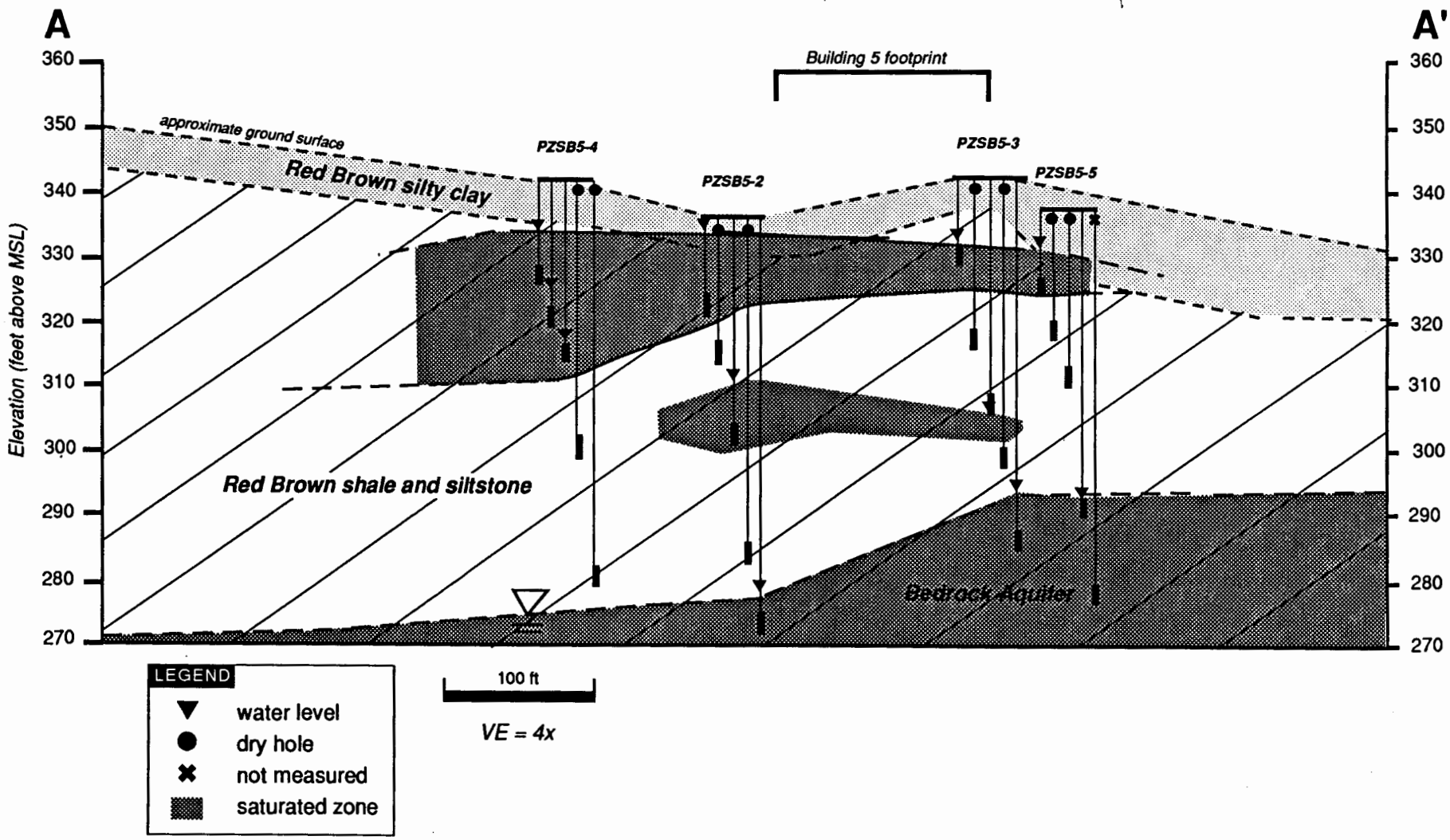
Occurrence of Perched Water Zones (1/10/91), Building 5 area.

47 piez. across facility; sampled today.