APPENDIX B

THE TORRINGTON COMPANY, "ENVIRONMENTAL ASSESSMENT," MARCH 11, 1985

ENVIRONMENTAL ASSESSMENT

TORRINGTON COMPANY
HEAVY BEARINGS FACILITY
SOUTH BEND, INDIANA

Submitted By:

The Torrington Company

March 11, 1985

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INTRODUCTION

The Torrington Company operated a bearing manufacturing facility in South Bend, Indiana, until 1984. At that time, the company made a decision to close the South Bend manufacuturing plant. Since the facility was a hazardous waste generator, the Torrington Company initiated a series of environmental investigations to determine if hazardous materials remained at the site. The purpose of this report is to summarize the background and history of the facility through the closure date, and also to summarize the environmental evaluations performed at the site.

Report Organization

In addition to this Introduction, this report is organized in four major sections as follows:

- The Background Section presents:

  1. A discussion of the plant history through the time of closure.
  2. The sequence of environmental investigations performed at the site.
  3. The general approach followed in completing the investigations.

- The Site-Specific Evaluation Procedures Section includes the following:

  1. Site-Specific Field Methods
  2. Site-Specific Laboratory Methods

- The Presentation of Data/Results Section includes the following:

  1. General Geologic and Hydrogeologic Conditions
  2. EIS Environmental Engineers Study
  3. Investigations by Canonie Engineers
  4. Data Interpretation
  5. Conclusions

- The Remedial Action Recommendations Section presents recommendations based on data interpretation.

BACKGROUND

This section of the report presents the history of manufacturing at the South Bend facility, the events leading to the environmental investigations, and the general approach to those investigations. Figure 1 shows the location of the Torrington facility within the City of South Bend. Figure 2 and Plate 1 (located in the pocket at the back of the report) are detailed site plans of the facility.

Plant History

The history of manufacturing at the present 3702 West Sample Street location of South Bend, Indiana, prior to 1928 is unknown. On or about 1928, the Bantam Ball Bearings Company, from Bantam, Connecticut, built or bought at the above address. At that time, the name was changed to the Bantam Bearings Corporation. In December, 1935, the Torrington Company purchased that company which manufactured ball, thrust, radial, tapered, and cylindrical roller bearings. The location retained the identity of the Bantam Ball Bearings Corporation until May/June, 1943, when it became the Torrington Company, Bantam Bearings Division. At some later date, it became the Torrington Company, Heavy Bearings Division.

The physical facility grew in size as various additions were constructed following the original building in 1928. By 1967, the plant had reached its present-day size which included the main buildings, a foundry, and three out buildings (Sheds A, B, and C, see Figure 2). In the mid-1970's, property identified as 3602 West Sample Street was purchased. The front half of this building was converted to an office complex and the southern portion housed

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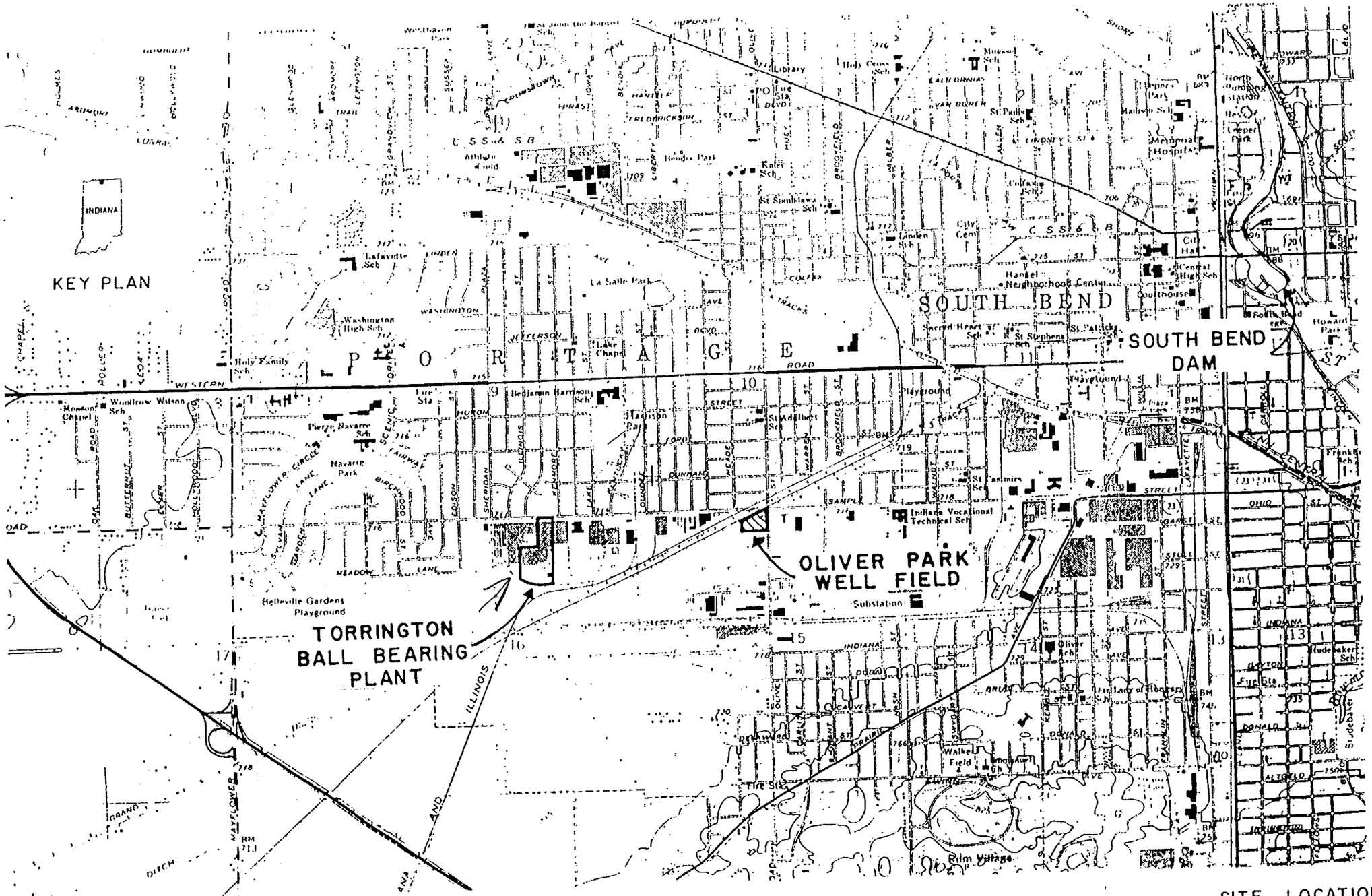

REFERENCES:

Mapped, edited, and published by the Geological Survey
Revised in cooperation with Indiana Department of Natural Resources
Control by USGS, NOS/NOAA, and Indiana Flood Control and Water Resources Commission
Planimetry by photogrammetric methods from aerial photographs taken 1952. Topography by planetable surveys 1957–1958
Revised from aerial photographs taken 1967. Field checked 1969

SOUTH BEND EAST, IND.
N4137.5—W8607.5/7.5

SOUTH BEND WEST, IND.
N4137.5—W8615/7.5

N

SCALE
24,000 0 24,000

SITE LOCATION
TORRINGTON COMPANY
BANTAM BEARING DIVISION
SOUTH BEND, INDIANA

BARNES AND THORNBURG

FIGURE 1

CanonieEngineers

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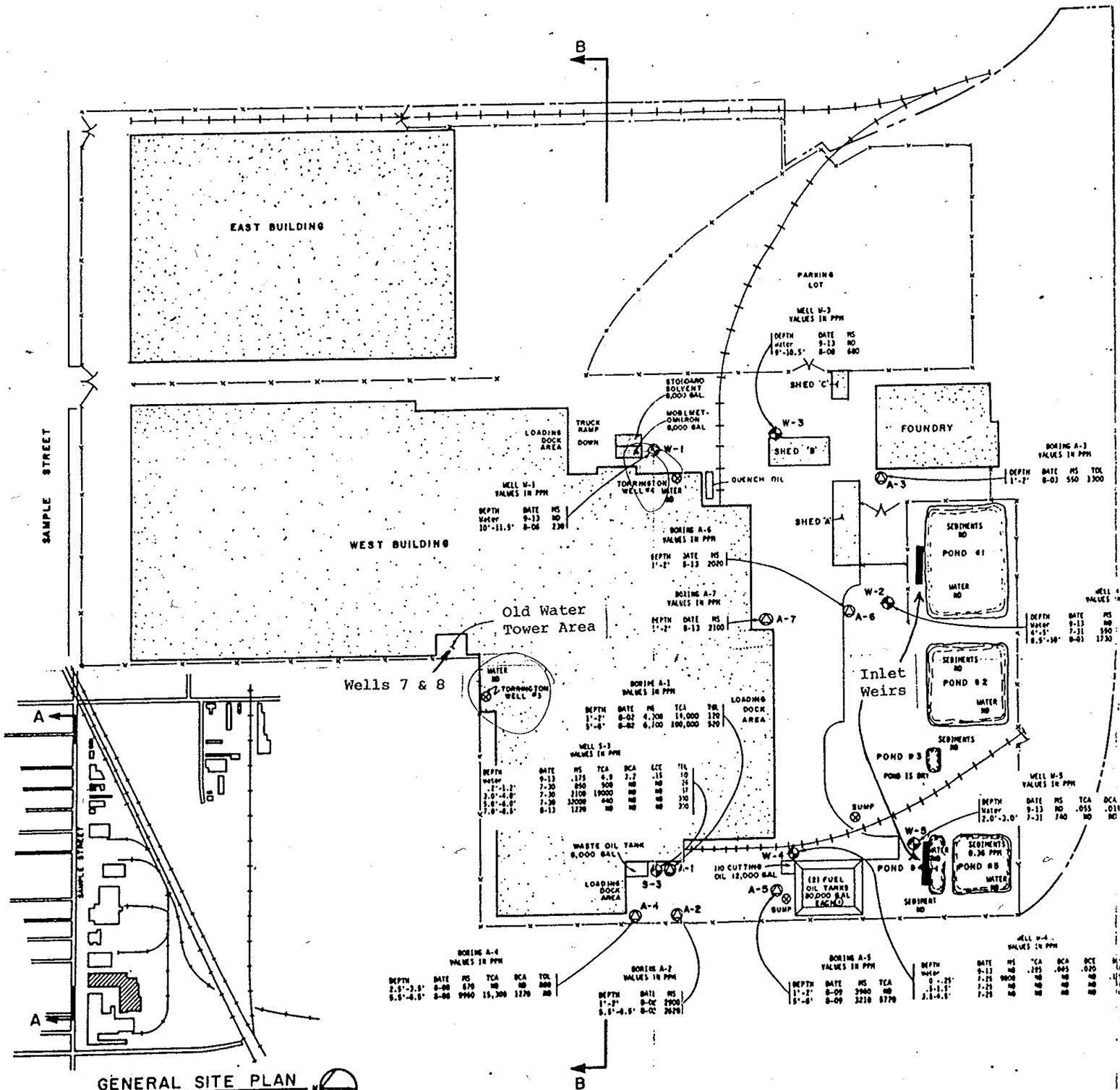

LEGEND

- UNDERGROUND TANKS
- ABOVEGROUND TANKS
- RAILROAD
- PROPERTY LINE
- FENCE LINE
- A-2 SOIL BORING LOCATION
- W-6 MONITORING WELL

CONTAMINANT ABBREVIATIONS

MS = MINERAL SPIRITS
TCA = 1,1,1 TRICHLOROETHANE
DCA = 1,1, DICHLOROETHANE
DCE = 1,1, DICHLOROETHYLENE
TOL = TOLUENE
BEN = BENZENE
ND = NOT DETECTED

BORING	GROUND SURFACE ELEVATION
W-1	713.46
W-2	712.42
W-3	712.90
W-4	710.38
W-5	710.31
W-6	712.33
A-1	710.10
A-2	710.40
A-3	712.47
A-4	710.41
A-5	710.05
A-6	710.96
A-7	713.27

NOTES

1. 110 CUTTING OIL TANK AND FUEL OIL TANKS COVERED BY SOIL MOUND.
2. TABLES LIST VOLATILE COMPOUNDS DETECTED AT EACH WELL. PCB WAS NOT DETECTED ANYWHERE ON THE TORRINGTON SITE.
3. ALL SAMPLES WERE TAKEN IN 1984.

SITE PLAN AND TEST RESULTS
TORRINGTON COMPANY
BANTAM BEARING DIVISION
SOUTH BEND, INDIANA
PREPARED FOR
BARNES AND THORNBURG

Canonie Engineers

DATE: 9-14-84	FIGURE 2	DRAWING NUMBER 83-182-E4
SCALE:		

functions which included the shipping and receiving area, a storage area, and machine repair. There were no manufacturing operations performed in this building. For these reasons, the 3602 West Sample Street facility is not included in these environmental evaluations.

In June, 1984, the ownership of the 3602 address was transferred to the City of South Bend and eventually to the American Royal Company, a furniture manufacturer. In addition, subsequent to June, 1984, the American Royal Company purchased from the Torrington Company, and moved to its property, the out buildings previously known as Sheds A and B.

Approach to the Environmental Investigations

As shown on Figure 2, there are five surface water ponds located on the Torrington site. The surface drainage from roof and pavement areas on this site is discharged to Ponds 1 and 4 via catchbasins located on the site. There are box inlet weirs prior to discharge to Ponds 1 and 4. Pond 4 receives discharge from a sump located near the fuel oil tanks at the southwest corner of the west building (see Figure 2). Surface drainage collected from this area of the site was drained to the sump and ultimately to the ponds.

Initial concern regarding the possible presence of hazardous materials on the site centered on the ponds because of the long-term discharge of surface water and the possibility of small spills which may have occurred throughout the years of operation at the facility. Therefore, the Torrington Company contracted with EIS Environmental Engineers to perform pond water and sediment sampling in each of the five ponds.

These samples were obtained in the winter of 1983/84. The results of these preliminary analyses showed low concentrations of trace organic compounds and non-detectable concentrations of PCBs. At approximately the same time, an anonymous complaint was made to the State Board of Health, and a representative (Mr. Dave Berry) visited the site to look at the ponds and the general site conditions.

As a result of the initial work, Canonie Engineers was contracted by the local attorneys for Torrington (Barnes and Thornburg) to conduct additional testing and environmental investigations. An initial Work Plan was prepared and a meeting was held with the State Board of Health. In a letter dated August 21, 1984, the Work Plan to perform a site-specific soil and groundwater investigation was approved. The scope of work as described in the Work Plan was completed by Canonie Engineers and, based on those results, a more detailed evaluation was performed in the area of the waste oil tank. Also, two (2) additional monitoring wells, Wells 7 and 8, were constructed in addition to those proposed in the original Work Plan. The results of the completed investigation were reviewed both by the Torrington Company and Capsule Environmental Engineering. This report has been prepared based on the results of all of the investigations completed to date and data presented.

SITE-SPECIFIC EVALUATION PROCEDURES

This section describes the field and laboratory procedures used during the environmental investigations. It includes both the site-specific field methods and the site-specific laboratory methods. This section primarily describes the methods used in the detailed investigations conducted by Canonie Engineers. More information regarding the EIS portion of the project is discussed in the Presentation of Data/Results Section.

Site-Specific Field Methods

This section provides a general description of the field and sampling procedures used in completing the site-specific investigations. These include the following:

1. Soil Sampling Procedures
2. Monitoring Well Construction Procedures
3. Well Development Procedures
4. Groundwater Sampling Procedures
5. Pond Sampling Procedures

These topics are briefly discussed in the paragraphs that follow:

1. Soil Sampling Procedures:

The investigations began with a generalized approach and, as the results of each investigation were reviewed, the sampling program became more detailed and specific. EIS Environmental Engineers initially performed analyses on grab samples of the sediment and pond water obtained during the winter. Using more exacting methodologies, the subsequent investigation conducted by Canonie Engineers used split barrel sampling

procedures with cleanup of the sampling equipment between samples in order to provide more detailed information regarding the vertical distribution of contaminants which may be present in the soil samples. Canonie's sampling procedure utilized either unlined or brass-lined, two-inch split spoons to sample the soil column at each of the selected locations (identified as A-1 through A-7). These sampling locations are shown on Figure 2. The boring logs for all shallow soil borings and all monitoring wells are shown in Appendix A.

As the specific areas of concern were more precisely identified, the soil sampling program focused on the area between the waste oil tank and the three oil tanks to the south (see Figure 3). The sampling was performed on a grid pattern using the same split barrel sampling procedures (locations identified as A-8 through A-21, and Wells 7 and 8). These are additional soil borings and were not included in the original Work Plan submitted to the State in the summer of 1984.

2. Monitoring Well Construction Procedures:

As part of the scope of the original Work Plan, six monitoring wells were constructed at the Torrington site. The well locations are shown on Figure 2 and are numbered W-1 through W-5 and S-3. The bore holes were drilled with a hand auger from the ground surface to the groundwater table. Soil samples were recovered at each bore hole during hand augering using a 1-inch diameter, hand-sample tube with an acetate liner. The samples obtained below the groundwater table were recovered using a standard 2-inch O.D. split spoon sampler with brass liners. The boring logs for all monitoring wells and Torrington Production Wells 3 and 4 are presented in Appendix A.

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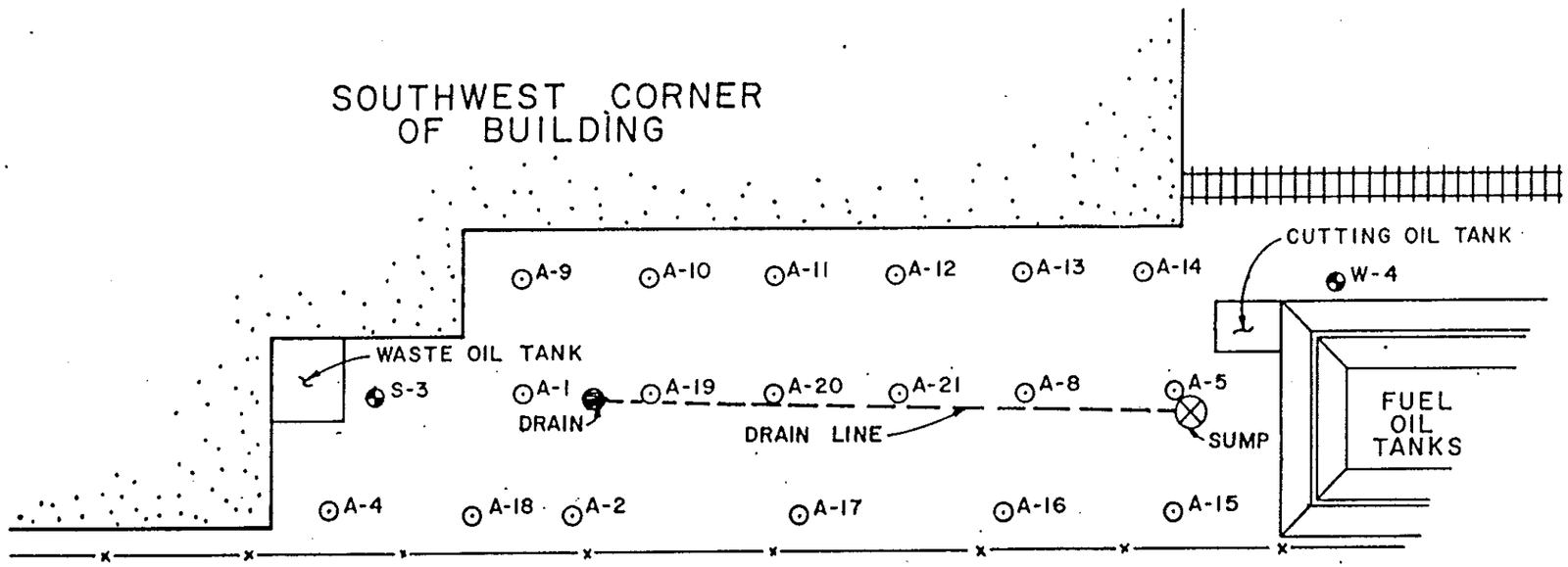

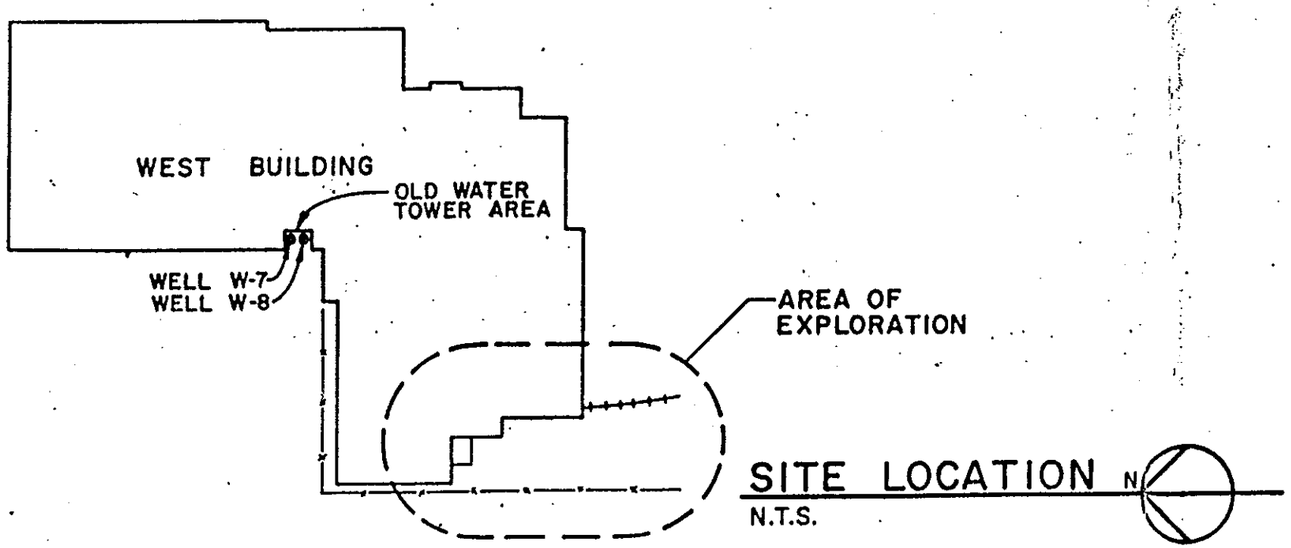

LEGEND:

- ⊙ SOIL BORING
- ◐ MONITORING WELL
- ● DRAIN
- ⊗ SUMP
- —— UNDERGROUND PIPE

SOIL BORING LOCATIONS
TORRINGTON COMPANY
BANTAM BEARING DIVISION
SOUTH BEND, INDIANA

BARNES AND THORNBURG
FIGURE 3

CanonieEngineers

All six monitoring wells were installed using a cable tool drill rig and 8-inch diameter casing. Wells W-1 and W-3 extend to the clay layer (65 feet and 61 feet, respectively). Three of the wells, W-2, W-4, and W-5 extend to a depth of approximately 35 feet. The sixth well, S-3, is completed at a depth of 24 feet. Wells W-1 through W-5 are constructed with 5-inch, Schedule 40 PVC pipe with threaded joints. Well S-3 is constructed with 4-inch, Schedule 40 PVC pipe with threaded joints. A 5-foot section of machine-slotted No. 10 PVC screen is attached to the base of each of the PVC well casings. The wells are sealed with a mixture of Type 1 Portland cement and bentonite. Wells W-1 and W-3 are sealed to a depth of 45 feet and 39 feet, respectively. Wells W-2, W-4, W-5, and S-3 are sealed from the ground surface to the water table. A protective steel casing with locking cap is grouted in place around each well casing and a bentonite/concrete surface seal was placed at each well. Wells W-1 and W-3 were drilled in the paved, dry area and are installed flush with the ground surface. Manhole covers are installed over the protective casing to prevent damage to these wells.

After completing the original scope of work, two additional monitoring wells were constructed (Wells 7 and 8). Well 7 was completed to a depth of 32 feet with a 5-foot, 10-slot, 4-inch diameter PVC screen. Well 8 was constructed to a depth of 59 feet with a 5-foot, 10-slot, 4-inch diameter PVC screen using revert drilling fluid and a rotary drilling procedure.

In addition to the monitoring wells constructed on the site, the existing production wells (Torrington Well Nos. 3 and 4) were also sampled. Detailed drawings of each of the

monitoring wells and the available construction diagrams for Torrington Production Wells 3 and 4 are shown in Appendix B.

3. Well Development Procedures:

After completion of the monitoring wells, it was necessary to develop the wells, both to maximize production and to obtain representative formation samples to minimize the possibility of measuring contaminants introduced through the drilling process. Each of the six new monitoring wells and the two on-site production wells (Torrington Well Nos. 3 and 4) were developed by overpumping prior to obtaining the groundwater samples. A volume of water in excess of 300 gallons was purged from each of the wells during development. Once the well development was completed, the wells were ready for groundwater sampling.

4. Groundwater Sampling Procedures:

After completing well development, each of the monitoring wells and the two on-site production wells were sampled. Prior to sampling, the wells were evacuated using a stainless steel bailer to remove approximately two casing volumes of water. After evacuation was completed, the wells were sampled using a stainless steel bailer. A 40-milliliter vial (for volatile organic analysis) and a 1-liter bottle (for PCB analysis) were obtained from each of the wells and returned to Gulf Coast Laboratories for chemical analysis. The analytical parameters and procedures are discussed in the next subsection (Site-Specific Laboratory Methods).

5. Pond Sampling Procedures:

Both water samples and sediment samples were obtained from the five ponds located behind the Torrington Plant. A water sample was not recovered from Pond No. 3 since the pond was dry at the time of sampling. Water samples were obtained in both 40-milliliter vials and 1-liter bottles, for volatile organic and PCB analysis, respectively. Undisturbed sediment samples were obtained in brass tubes and composite sediment samples were obtained in mason jars. The undisturbed brass tube samples were recovered at the inlet to each pond and were submitted to Gulf Coast Laboratories for volatile organic analysis. The composite sediment samples obtained in mason jars were submitted to the laboratory for PCB analysis. The specific laboratory procedures and parameters analyzed for are discussed in the next subsection (Site-Specific Laboratory Methods).

Site-Specific Laboratory Methods

Soil samples submitted for analysis were obtained from two sources as follows:

1. Soil sediment samples obtained from Pond Nos. 1 through 5.
2. Granular soil samples obtained from the unsaturated zone above the upper aquifer at Monitoring Well Nos. W-1 through W-5 and S-3, and from Soil Boring Nos. A-1 through A-7.

At least one soil sample was selected from each location for analysis for both volatile organic compounds and PCBs.

The water samples were obtained from four sources as follows:

1. Surface water samples were obtained from Pond Nos. 1, 2, 4, and 5 (No. 3 was dry at the time of sampling).
2. Groundwater samples from the upper aquifer were obtained from Well Nos. W-1 through W-5, and S-3 and W-7.
3. Groundwater samples from the lower aquifer were obtained from Torrington Production Wells 3 and 4, and W-8.
4. Samples of municipal water available at the site and used in drilling were taken from the drinking water fountain in the Guard House for background analysis and to determine that no contaminants were added in the drilling process.

Two samples were (generally) obtained at each sampling location, one in 40-milliliter vials for volatile organic analysis, and a second collected in a 1-liter bottle for PCB analysis.

1. **Soil Analysis:**

Gulf Coast Laboratories used a hexane/acetone extraction procedure for all of the soil samples. The PCB analyses were performed using a gas chromatograph with an electron capture detector. Gulf Coast Laboratories states a 5 ppm detection limit using this procedure for soil samples.

The soil samples for volatile organics were analyzed using EPA Methods 601 and 602 after the extraction procedure was completed. Gulf Coast stated a detection limit of 0.1 ppm for all soil samples. The results of these analyses are presented in Tables 3 and 4 in the next section (Presentation of Data/Results).

2. **Water Analysis:**

The PCB analyses for the water samples were performed using a hexane/methylene chloride extraction for the samples. The analysis was performed using a gas chromatograph with an electron capture detector. Gulf Coast Laboratories stated the detection limit for the water samples as 0.0001 ppm.

The water samples obtained for volatile organic analysis were analyzed using EPA Methods 601 and 602 (Method 624 without a mass spectrometer). Gulf Coast stated the detection limit for this method was 0.010 ppm. The results of these analyses are summarized in Tables 5 through 7 in the following section (Presentation of Data/Results).

PRESENTATION OF DATA/RESULTS

This section of the report begins by describing the general geologic and hydrogeologic conditions in the South Bend vicinity to provide a general frame of reference for the site-specific information. It further presents the data gathered from the environmental investigations conducted at the Torrington, South Bend, site. The presentation of the data reflects the sequence of increasing detail from the initial pond sediment and water analysis performed by EIS Environmental Engineers, the Work Plan and subsequent study by Canonie Engineers, follow-up soil sampling and monitoring well construction by Canonie Engineers, and verification analyses performed by Pollution Control Systems/Encotech, Mead Compuchem, and Canonie Engineers. This section is divided into the following topics:

1. General Geologic and Hydrogeologic Conditions
2. EIS Environmental Engineers Study
3. Investigations by Canonie Engineers
4. Data Interpretation
5. Conclusions

The data is presented in the same sequence in which the investigations were performed with the soil data first and the water data second. The analytical data incorporated into this section includes chemical analysis for the following:

1. Soil samples collected on-site.
2. Sediment samples collected from the five surface water ponds.
3. Groundwater samples collected from monitoring wells constructed at the site.
4. Surface water samples collected from the surface water ponds.

For the analytical data reported in the tables, results are shown only when a compound was present in at least one sample. However, all the parameters shown in Table 2 were analyzed for, as well as PCBs.

General Geologic and Hydrogeologic Conditions

Sand and gravel deposits in the glacial drift are the major source of water supply for the South Bend area. In addition to the private and municipal wells located in these deposits, the Torrington Company has two production wells which are also in the sand and gravel aquifer. The generalized cross sections in Figures 4 and 5 show the presence of a clay layer at approximately 60 feet which is generally continuous in the South Bend area; however, some windows are present where this clay layer grades laterally into sand and gravel or was eroded out as a result of post-glacial stream action. The specific lines of cross section are shown on Figure 2 and Plate 1.

The St. Joseph River to the northeast of the Torrington site (see Figure 1) is the primary regional control for groundwater flow in the South Bend area. This is based on information presented in U.S. Geological Survey (USGS) studies which have previously been completed (Appendix D). Because of the presence of the clay-confining layer, groundwater conditions in the sand and gravel aquifer are occasionally artesian rather than water table. The USGS has measured transmissivities in this aquifer to be on the order of 500,000 gallons per day per foot. Based on these conditions, a relatively flat hydraulic gradient would be expected in the area. This is confirmed by the USGS studies which show gradients in the range of 16 to 35 feet per mile.

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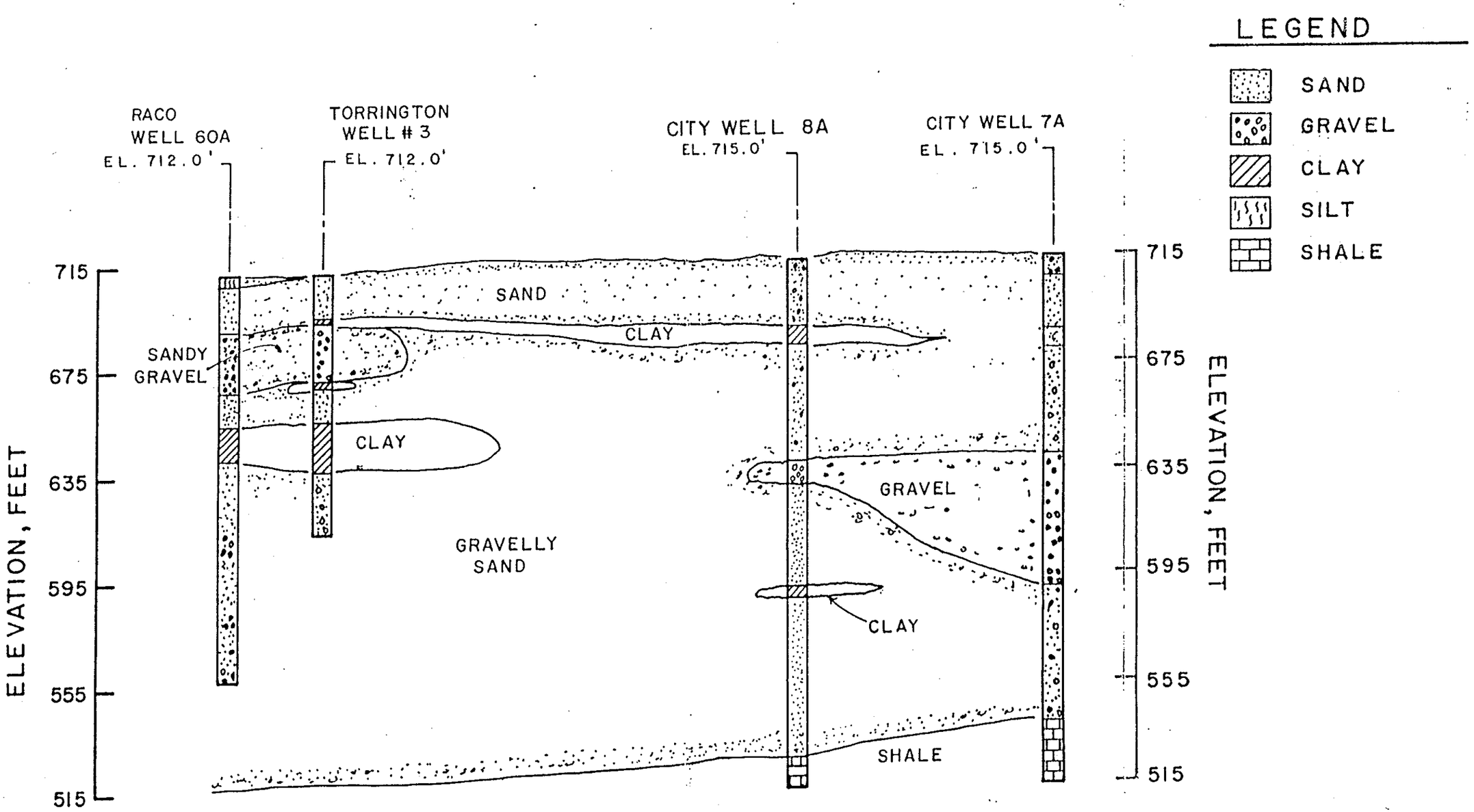

LEGEND

- SAND
- GRAVEL
- CLAY
- SILT
- SHALE

HORIZONTAL SCALE
600' 0 600'

VERTICAL SCALE
40' 0 40'

SOIL PROFILE A-A
TORRINGTON COMPANY
BANTAM BEARING DIVISION
SOUTH BEND, INDIANA

BARNES AND THORNBURG

FIGURE 4

CanonieEngineers

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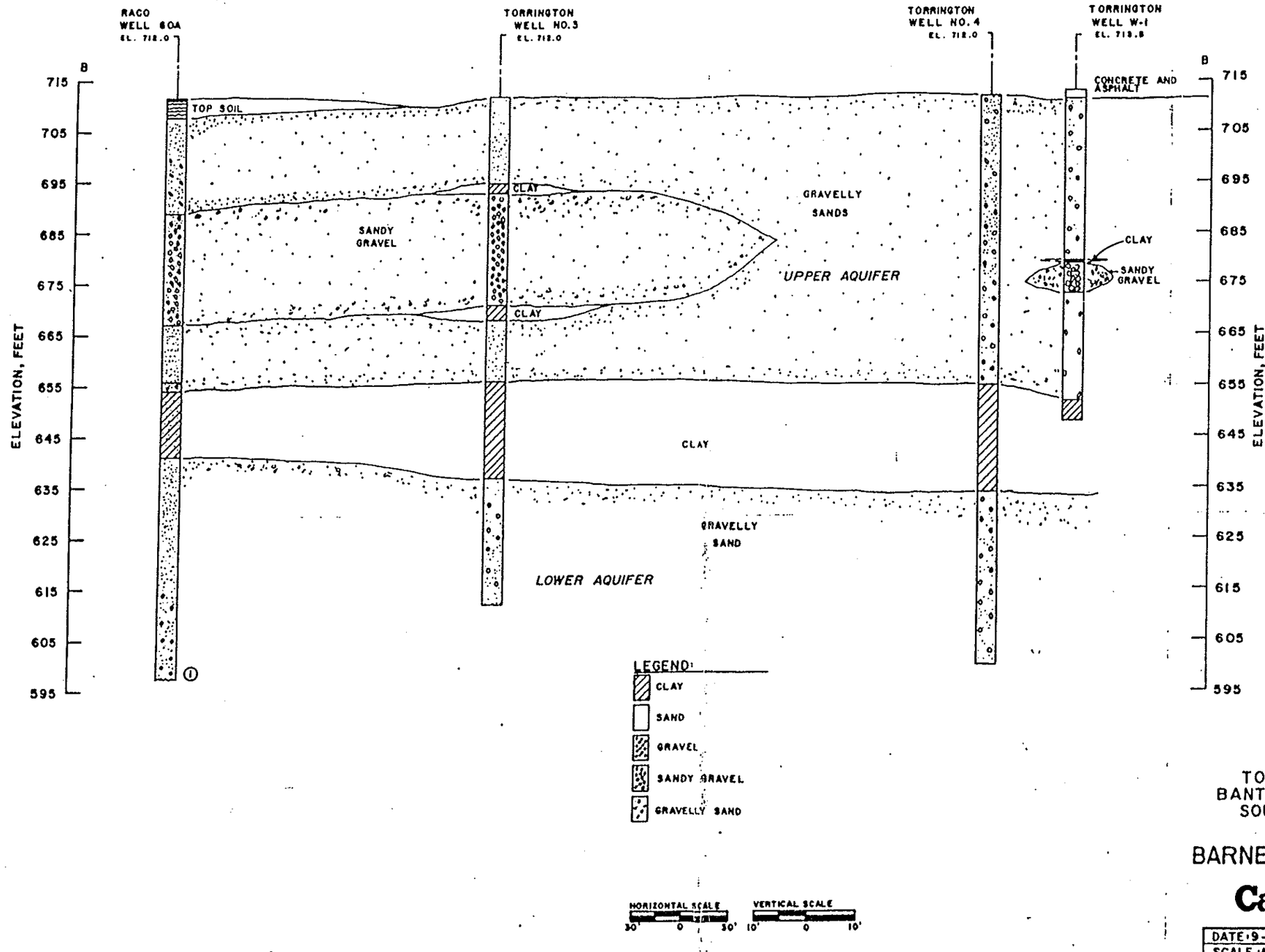


NOTES

1. BORING CONTINUES AS GRAVELLY SAND TO ELEVATION OF 556.

SOIL PROFILE B-B
TORRINGTON COMPANY
BANTAM BEARING DIVISION
SOUTH BEND, INDIANA
PREPARED FOR
BARNES AND THORNBURG

Canonie Engineers

DATE 9-13-84	FIGURE 5	DRAWING NUMBER 83-182-E3
SCALE AS SHOWN		

The Oliver Park Well Field (see Figure 1) is located approximately 4,000 feet east of the Torrington Company facility. The Oliver Park Well Field was contaminated as a result of spills by a local chemical manufacturer in the area. The well field is currently inactive and is not being pumped. The studies completed by the USGS show that the Torrington Company site is outside the radius of influence of the Oliver Park Well Field even if it were in operation.

Surface water drainage in the South Bend area is controlled by storm sewers which ultimately discharge to the St. Joseph River.

EIS Environmental Engineers Study

EIS Enviornmental Engineers was engaged by Torrington Company, South Bend, to perform initial water and sediment sampling from the surface water ponds on-site. The results of the analyses are shown in Table 1. The water and sediment data showed trace concentrations of volatile organic compounds. In addition, EIS sampled the two Torrington production wells on-site (Well Nos. 3 and 4). These wells also showed very low concentrations of tetrachloroethylene and methylene chloride.

Investigation by Canonie Engineers

As a result of the EIS investigation, Canonie Engineers was engaged to perform additional environmental investigations at the South Bend site. A Work Plan was submitted to the Indiana Board of Health, reviewed, and approved. The scope of work outlined in the Work Plan was completed by Canonie Engineers. The scope of work included the following:

TABLE 1

EIS Lab Results
EIS Environmental Engineers
Concentrations in Parts Per Million (ppm)

Pond	#1	#2	#3	#4	#5	#1
Type of Sample	Water	Water	Water	Water	Water	Sediments
1,1,1 Trichloroethylene	ND	ND	ND	ND	ND	ND
1,1,1 Trichloroethane	ND	ND	.0015	.0044	.0057	ND
1,1 Dichloroethylene	ND	ND	ND	ND	ND	ND
1,1 Dichloroethane	ND	ND	ND	ND	.00053	ND
1,1,2,2 Tetrachloroethane	ND	ND	ND	ND	ND	ND
Tetrachloroethylene	.0008	.0012	.0063	ND	.0041	ND
Benzene	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND	ND
Methylene Chloride	.032	.024	.023	.016	.0097	2.8
Chloroform	ND	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND	ND	ND
PCBs	-	-	-	-	-	<2

Pond	#2	#3	#4	#5	Torrington Well #3	Torrington Well #4
Type of Sample	Sediments	Sediments	Sediments	Sediments	Water	Water
1,1,1 Trichloroethylene	ND	ND	ND	ND	ND	ND
1,1,1 Trichloroethane	ND	ND	70.0	ND	ND	ND
1,1 Dichloroethylene	ND	ND	ND	ND	ND	ND
1,1 Dichloroethane	ND	ND	1.9	ND	ND	ND
1,1,2,2 Tetrachloroethane	ND	ND	ND	ND	ND	ND
Teterchloroethylene	ND	ND	ND	ND	.0026	.0031
Benzene	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND	ND
Methylene Chloride	1.1	0.97	0.84	0.56	ND	.0018
Chloroform	ND	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND	ND	ND
PCB's	<2	<2	<2	<2	-	-

ND = Not Detectable
- = Not Performed

1. Soil sampling near underground storage tanks.
2. Sediment samples from the five surface water ponds.
3. Near-surface (ground surface to three or four feet) soil sampling at four or five locations. The locations were chosen in the field to correspond to areas where surface oil staining existed.
4. The construction of five monitoring wells at the site, including two wells which extend to the dividing clay layer (approximately 60 feet) and three shallower monitoring wells.
5. Chemical analyses of both soil and water samples.

After completing the scope of work originally outlined in the Work Plan, it was decided to conduct more detailed soil sampling in the area of the waste oil tank (see Figure 3), and that two additional down-gradient monitoring wells be constructed (Wells 7 and 8). This work was completed in November and December, 1984.

Tables 2 through 7 in this section present the chemical analytical data for the soil borings, soil samples, pond sediment, groundwater, and pond water. The list of volatile organic parameters shown in Table 2 were analyzed for in all samples. In addition, PCB analyses were performed on all groups of samples.

Results from the bore hole and surface soil sampling performed in accordance with the original Work Plan (Table 3) identified volatile organic compounds at a number of soil sampling locations in the area of the waste oil tank. Samples at other locations on the site did not reveal anything of significance. In addition, undifferentiable hydrocarbons are present at several locations. These undifferentiable hydrocarbons probably indicate the presence

TABLE 2

VOLATILE ORGANIC COMPOUNDS
INCLUDED IN METHOD 624

Acrolein

Acrylonitrile

Benzene

Bis (Chloromethyl) Ether

Bromoform

Carbon Tetrachloride

Chlorobenzene

Chlorodibromomethane

Chloroethane

2-Chloroethylvinyl Ether

Chloroform

Dichlorobromomethane

Dichlorodifluoromethane

1,1-Dichloroethane

1,2-Dichloroethane

1,1-Dichloroethylene

1,2-Dichloropropane

1,3-Dichloropropylene

Ethylbenzene

Methyl Bromide

Methyl Chloride

Methylene Chloride

1,1,2,2-Tetrachloroethane

Tetrachloroethylene

Toluene

1,2-Trans-Dichloroethylene

1,1,1-Trichloroethane

1,1,2-Trichloroethane

Trichloroethylene

Trichlorofluoromethane

Vinyl Chloride

TABLE 3

(According to Original Work Plan)
Soil Results - Soil Borings
Gulf Coast Laboratories
Concentrations in Parts Per Million (ppm)

Boring	W-1	W-2	W-2	W-3	W-4	W-4
Depth (ft)	10.0-11.5	4.0-5.0	8.5-10.5	9.0-10.5	0.0-.25	0.5-1.5
Undifferentiable Hydrocarbons	230	550	1730	680	9000	ND
1,1,1 Trichloroethylene	ND	ND	ND	ND	ND	ND
1,1,1 Trichloroethane	ND	ND	ND	ND	ND	ND
1,1 Dichloroethylene	ND	ND	ND	ND	ND	ND
1,1 Dichloroethane	ND	ND	ND	ND	ND	ND
1,1,2,2 Tetrachloroethane	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	0.17	ND
Toluene	ND	ND	ND	ND	ND	ND
PCBs	<5	<5	<5	<5	<5	<5

Boring	W-4	W-5	S-3	S-3	S-3	S-3
Depth (ft)	3.5-4.5	2.0-3.0	0.2-1.2	3.0-4.0	5.0-6.0	7.0-8.5
Undifferentiable Hydrocarbons	ND	740	850	2100	32000	1220
1,1,1 Trichloroethylene	ND	ND	ND	ND	ND	ND
1,1,1 Trichloroethane	ND	ND	500	19000	440	ND
1,1 Dichloroethylene	ND	ND	ND	ND	ND	ND
1,1 Dichloroethane	ND	ND	ND	ND	ND	ND
1,1,2,2 Tetrachloroethane	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	24	57	340	360
PCBs	<5	<5	<5	<5	<5	<5

ND = Not Detectable

TABLE 3
(Continued)

(According to Original Work Plan)
Soil Results - Soil Borings
Gulf Coast Laboratories
Concentrations in Parts Per Million (ppm)

Boring	A-1	A-1	A-2	A-2	A-3	A-4
Depth (ft)	1.0-2.0	5.0-6.0	1.0-2.0	5.5-6.5	1.0-2.0	2.5-3.5
Undifferentiable Hydrocarbons	4300	6700	2900	2620	550	670
1,1,1 Trichloroethylene	ND	ND	ND	ND	ND	ND
1,1,1 Trichloroethane	14000	100000	ND	ND	ND	ND
1,1 Dichloroethylene	ND	ND	ND	ND	ND	ND
1,1 Dichloroethane	ND	ND	ND	ND	ND	ND
1,1,2,2 Tetrachloroethane	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND
Toluene	120	520	ND	ND	1300	880
PCB's	<5	<5	<5	<5	<5	<5

Boring	A-4	A-5	A-5	A-6	A-7
Depth (ft)	5.5-6.5	1.0-2.0	5.0-6.0	1.0-2.0	1.0-2.0
Undifferentiable Hydrocarbons	9950	3960	3210	2020	2100
1,1,1 Trichloroethylene	ND	ND	ND	ND	ND
1,1,1 Trichloroethane	15300	ND	5770	ND	ND
1,1 Dichloroethylene	ND	ND	ND	ND	ND
1,1 Dichloroethane	1270	ND	ND	ND	ND
1,1,2,2 Tetrachloroethane	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	ND
PCB's	<5	<5	<5	<5	<5

ND = Not Detectable

TABLE 3
(Continued)

(According to Original Work Plan)
Soil Results - Pond Sediments
Gulf Coast Laboratories
Concentrations in Parts Per Million (ppm)

Pond	#1	#2	#3	#4	#5
Depth (ft)	0-1	0-1	0-1	0-1	0-1
Undifferentiable Hydrocarbons	ND	ND	ND	ND	.36
1,1,1 Trichloroethylene	ND	ND	ND	ND	ND
1,1,1 Trichloroethane	ND	ND	ND	ND	ND
1,1 Dichloroethylene	ND	ND	ND	ND	ND
1,1 Dichloroethane	ND	ND	ND	ND	ND
1,1,2,2 Tetrachloroethane	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	ND
PCBs	<5	<5	<5	<5	<5

ND = Not Detectable

of oil as a result of occasional spills on the site. It was not possible for Gulf Coast Laboratories to separate these hydrocarbons and positively identify them through their analytical procedures. The volatile organic compounds are generally present to a maximum depth of five to six feet. In the case of S-3, which is located immediately adjacent to the waste oil tank, trace organics are present to a depth of 8-1/2 feet. However, since the soil boring was unknowingly drilled through an area of high volatile organic compound concentration, it is possible that some contamination may have been carried down during the drilling process in this area.

Table 3 also shows the data for the pond sediment samples. No significant concentrations of volatile organics were present in the pond sediment samples. In addition, no detectable levels of PCBs were found in these samples.

As a result of the volatile organic compounds found in the test borings and the soil samples, additional soil sampling in the vicinity of the waste oil tank was desirable. The additional soil sampling in this area showed the presence of volatile organic compounds (Table 4), primarily in the upper three feet. However, in the area of Samples A-17, A-18, A-19, and A-20, low levels of volatile organics are present to a depth of 8-1/2 feet.

Table 5 presents the groundwater analyses for Wells 1 through 5, S-3, Wells 7 and 8, and the two Torrington productions wells, 3 and 4. Low concentrations of some volatile organic compounds were found in some of the wells (see the tables). However, PCBs were not found in any of the groundwater samples. Since Well S-3 was located in the area of greatest soil contamination, the highest concentrations of volatile organic compounds were found in water samples from that well.

TABLE 4

(Additional Sampling)
Soil Results - Soil Borings
Gulf Coast Laboratories
Concentrations in Parts Per Million (ppm)

Boring	A-8	A-8	A-8	A-9	A-9	A-9	A-10	A-10	A-1
Depth (ft)	2.5	5.5	8.5	2.5	5.5	8.5	2.5	5.5	8.5
Undifferentiable Hydrocarbons	ND	3.2	1.8	11	15	350	4.1	8.1	13
1,1,1 Trichloroethylene	ND	ND	ND	ND	ND	115	ND	ND	ND
1,1,1 Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1 Dichloroethylene	ND	ND	ND	ND	ND	2.5	ND	ND	ND
1,1 Dichloroethane	ND	ND	ND	ND	ND	2.3	ND	ND	ND
1,1,2,2 Tetrachloroethane	ND	ND	ND	ND	ND	7.9	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	1.9	ND	ND	ND
Toluene	ND	ND	ND	ND	ND	3.0	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND	6.6	ND	ND	ND
Methylene Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCBs	<5	<5	<5	<5	<5	<5	<5	<5	<5

Boring	A-11	A-11	A-11	A-12	A-12	A-12	A-13	A-13	A-1
Depth (ft)	2.5	5.5	8.5	2.5	5.5	8.5	2.5	5.5	8.5
Undifferentiable Hydrocarbons	12	ND	ND	1000	ND	ND	85	ND	4.6
1,1,1 Trichloroethylene	14	ND	ND	580	ND	ND	ND	ND	ND
1,1,1 Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1 Dichloroethylene	ND	ND	ND	6.4	2.1	ND	ND	ND	ND
1,1 Dichloroethane	ND	ND	ND	8.8	ND	ND	4.2	ND	ND
1,1,2,2 Tetrachloroethane	ND	ND	ND	23	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	6.9	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	ND	ND	ND	ND	13	ND	35	ND	ND
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCBs	<5	<5	<5	<5	<5	<5	<5	<5	<5

ND = Not Detectable

TABLE 4
(Continued)

(Additional Sampling)
Soil Results - Soil Borings
Gulf Coast Laboratories
Concentrations in Parts Per Million (ppm)

Boring	A-14	A-14	A-14	A-15	A-15	A-15	A-16	A-16	A-16
Depth (ft)	2.5	5.5	8.5	2.5	5.5	8.5	2.5	5.5	8.5
Undifferentiable Hydrocarbons	320	295	8.7	ND	ND	1.1	ND	1.9	4
1,1,1 Trichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1 Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1 Dichloroethylene	12	ND	ND	ND	ND	ND	ND	ND	ND
1,1 Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2 Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	ND	ND	ND	ND	ND
PCBs	<5	<5	<5	<5	<5	<5	<5	<5	<5

Boring	A-17	A-17	A-17	A-18	A-18	A-18	A-19	A-19	A-19
Depth (ft)	2.5	5.5	8.5	2.5	5.5	8.5	2.5	5.5	8.5
Undifferentiable Hydrocarbons	ND	120	80	61	21	175	330	235	220
1,1,1 Trichloroethylene	ND	ND	9.9	ND	ND	79	ND	ND	18
1,1,1 Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1 Dichloroethylene	ND	11	ND	7.1	ND	ND	ND	30	ND
1,1 Dichloroethane	ND	ND	6.6	ND	ND	18	ND	19	ND
1,1,2,2 Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	93	24	ND	27	92	ND	ND	ND
Toluene	ND	9.3	1.9	ND	ND	4.1	ND	ND	1.0
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ND	15	ND	ND	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	ND	ND	ND	39	ND
PCBs	<5	<5	<5	<5	<5	<5	<5	<5	<5

ND = Not Detectable

TABLE 4
(Continued)

(Additional Sampling)
Soil Results - Soil Borings
Gulf Coast Laboratories
Concentrations in parts per million (ppm)

Boring	A-20	A-20	A-20	A-21	W-7	W-7
Depth (ft)	2.5	5.5	8.5	2.5	5.0	8.5
Undifferentiable Hydrocarbons	540	5.3	45	66	5	ND
1,1,1 Trichloroethylene	27	ND	ND	ND	ND	ND
1,1,1 Trichloroethane	ND	ND	ND	ND	ND	ND
1,1 Dichloroethylene	39	15	14	ND	ND	ND
1,1 Dichloroethane	ND	ND	8.4	6.7	ND	ND
1,1,2,2 Tetrachloroethane	ND	ND	ND	ND	ND	ND
Benzene	8.6	ND	ND	ND	ND	ND
Toluene	6.2	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND	ND
Methylene Chloride	ND	ND	ND	ND	ND	ND
Chloroform	73	ND	ND	ND	ND	ND
Bromoform	44	15	12	ND	ND	ND
PCBs	<5	<5	<5	<5	<5	<5

ND = Not Detectable

TABLE 5

Groundwater Analysis
Units all ppm Unless Otherwise Specified

VOLATILE ORGANIC COMPOUNDS	W-1	W-2	W-3	W-4	W-5
1,1 Dichloroethane	-	.030	-	.065	.014
1,1 Dichloroethylene	-	-	-	.020	-
1,1,1 Trichloroethane	-	.030	-	.285	.055
OTHER PARAMETERS					
PCBs	ND	ND	ND	ND	ND
Undifferentiable Hydrocarbons, mg/l	<0.100	<0.100	<0.100	<0.100	<0.100

TABLE 5

Groundwater Analysis
Units all ppm Unless Otherwise Specified

	S-3	W-7	W-8	T-3	T-4
VOLATILE ORGANICS					
Chloroethane	.075	-	-	-	-
1,1 Dichloroethane	.940	.016	-	ND	.065
1,1 Dichloroethylene	.025	.001	-	ND	.020
1,1,1 Trichloroethane	1.30	ND	ND	ND	.285
1,1,2 Trichloroethane	-	ND	ND	-	-
Trichloroethylene	.002	ND	ND	ND	-
Vinyl Chloride	<.010	-	ND	ND	-
OTHER PARAMETERS					
Total PCBs, µg/l	ND	-	ND	<0.1	<0.1
Unidfferentiable Hydrocarbons	ND	ND	ND	-	<.100

Table 6 shows the results of the pond water analysis. No significant levels of volatile organic compounds or PCBs were found. Table 7 shows comparative analyses for Wells S-3 and W-7. These comparative analyses were performed as a follow-up to the initial sampling of each of these wells in order to verify the presence or absence of specific volatile organic compounds. The analyses that are shown in Table 5 present the most recent verified results for each of these wells. For Well S-3, the Pollution Control Systems (PCS) data (11/20/84) is data reported for S-3. The Canonie Engineers data (12/7/84) is the data reported for W-7.

Data Interpretation

This subsection presents the interpretation of the geologic, hydrogeologic, and chemical data. Site-specific geologic cross sections are presented to show the site-specific geologic conditions and to provide general information regarding depths of volatile organic contamination at the specific soil boring locations. There are six cross sections shown for the area of the waste oil tank; three of these cross sections are drawn in an east/west direction (Figure 6) and three in a north/south direction (Figure 7). The specific lines of cross section are shown on Figure 8. In addition to the cross sections in the area of the waste oil tank, a more general cross section was drawn from Well 1 through Well 5 (Figure 9), and all wells were projected perpendicularly into the line of cross section. The line of cross section is shown on Plate 1.

Based on the above-referenced cross sections, the site-specific conditions consist primarily of a sand and gravel zone above the deeper clay layer (at approximately 60 feet). This upper zone is relatively permeable. Therefore,

TABLE 6

Pond Water Analysis

	PW-1	PW-2	PW-3	PW-4	PW-5
OTHER PARAMETERS					
Total PCBs, µg/l	<0.1	<0.1	*	<3	<0.1
Undifferentiable Hydrocarbons	ND	ND	ND	<.1	.36

*Pond was dry at time of sampling; no samples obtained

TABLE 7

Comparison
Laboratory Analysis
Wells W-7 and S-3

WELL S-3 (ppm)

Compound	(date)/laboratory			
	(9/13/84)/Gulf	(10/29/84)/Gulf	(10/29/84)/Mead	(11/20/84)/PCS
Mineral Spirits[1]	0.175	0.012	-[2]	-
Vinyl Chloride	ND	ND	ND	0.003
Trichloroethylene	ND	ND	ND	0.002
1.1 Dichloroethylene	0.15	0.170	0.029	0.025
Chloroethane	ND	ND	.180	0.075
1,1,1-Trichloroethane	4.9	6.0	1.3	1.3
1,1-Dichloroethane	3.2	3.1	0.740	0.940
Dichlorobromomethane	ND	0.22	ND	ND
PCBs (ug/l)	<.1	<.1	-[3]	-[3]

WELL W-7 (ppm)

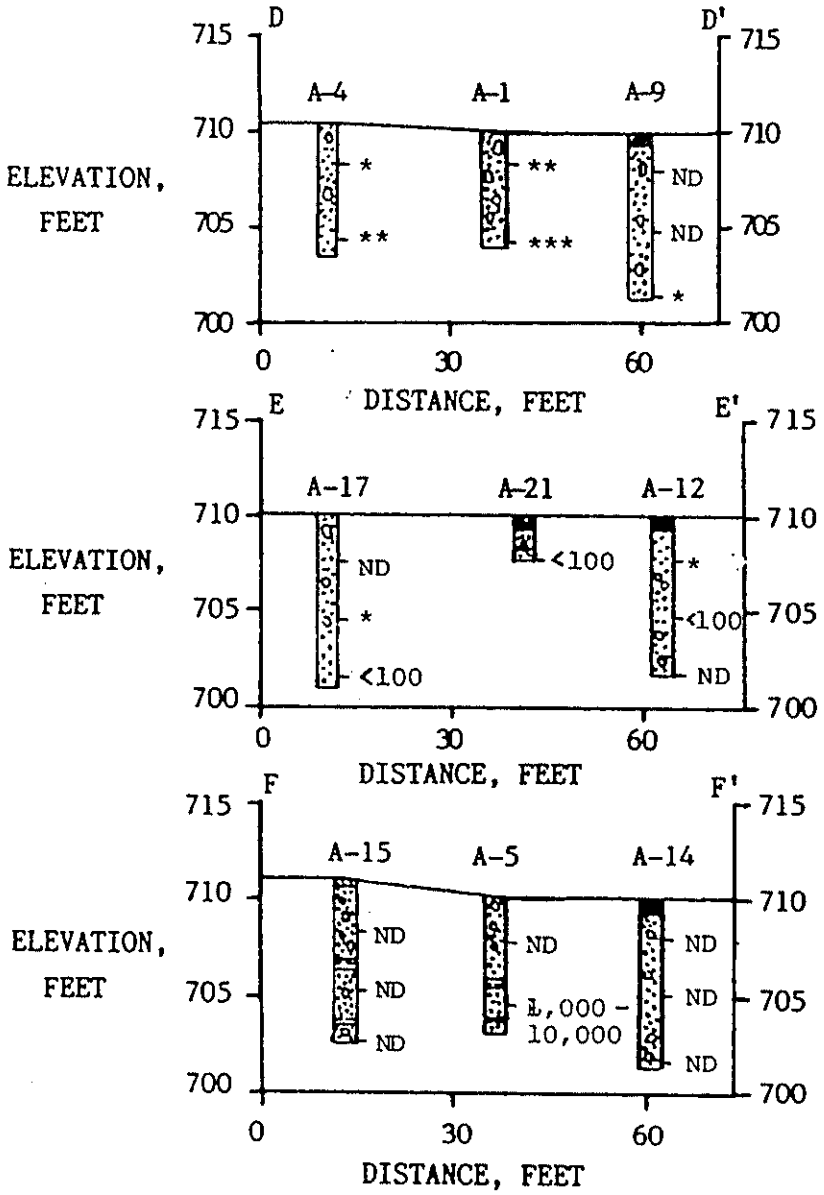
Compound	(date)/laboratory			
	(10/29/84)/Gulf	(11/20/84)/PCS	(12/7/84)/Gulf	(12/7/84)/Canonie
Mineral Spirits[1]	0.510	-	0.265	-
Trichloroethylene	ND	0.001	ND	ND
1,1-Dichloroethylene	0.028	0.002	0.055	0.0013
Trans 1,2-Dichloroethylene	ND	0.003	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	0.020	ND
1,1,1-Trichloroethane	0.072	0.012	0.083	ND
1,1-Dichloroethane	0.097	0.012	0.065	0.016
Toluene	ND	0.010	ND	ND
PCBs	<.1	-[3]	<.1	-[3]

Gulf - Gulf Coast Laboratories (detection limit 0.010 ppm)
PCS - Pollution Control Systems (detection limit 0.001 ppm)
Mead - Mead Compuchem (detection limit 0.010 ppm)
Canonie- Canonie Engineers, Inc. (detection limit 0.0005 ppm)

[1]Mineral spirits reported by Gulf Coast only not standard parameter under EPA 601-602.

[2]Three peaks on MS identified as 1,3-Dioxolane (0.004 ppm), Ethane,1,1'-Oxybis (0.003 ppm), and 2-Butanol, 2-Methyl (0.015 ppm).

Not tested.



SCALE

VERTICAL: 1"= 10'

HORIZONTAL: 1"= 30'

VERTICAL EXAGERATION: 3X

KEY

- GRAVEL
- SAND
- CLAY
- CONCRETE
- FILL-SAND AND GRAVEL

*	100 - 1,000
**	10,000 - 100,000
***	>100,000

FIGURE 6

SITE-SPECIFIC CROSS SECTIONS
WASTE OIL TANK AREA
SHOWING TOTAL VOLATILE ORGANIC
CONCENTRATION RANGES (PPM)

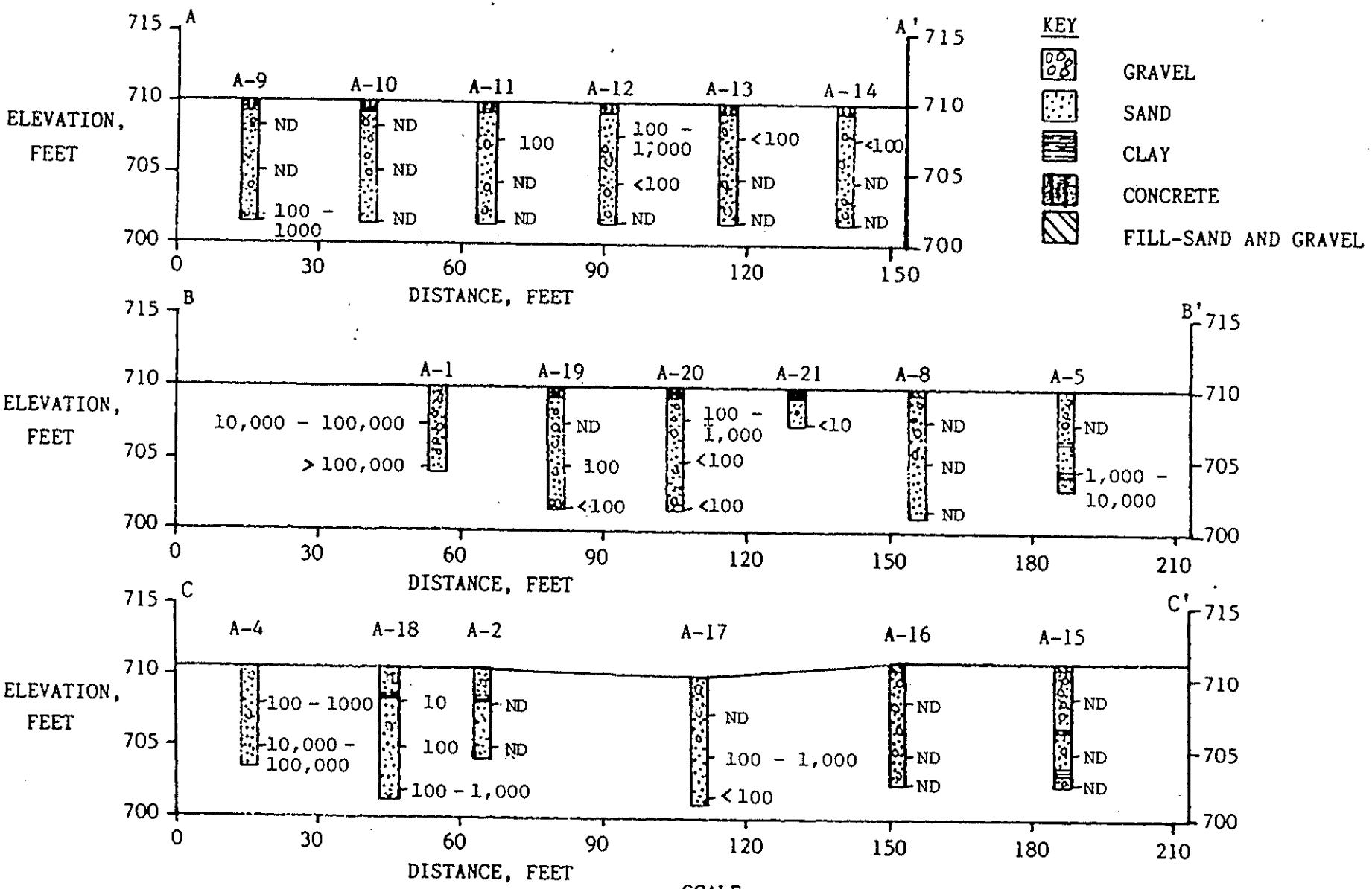


FIGURE 7

SITE-SPECIFIC CROSS SECTIONS
WASTE TANK OIL AREA
SHOWING TOTAL VOLATILE ORGANIC
CONCENTRATION RANGES (PPM)

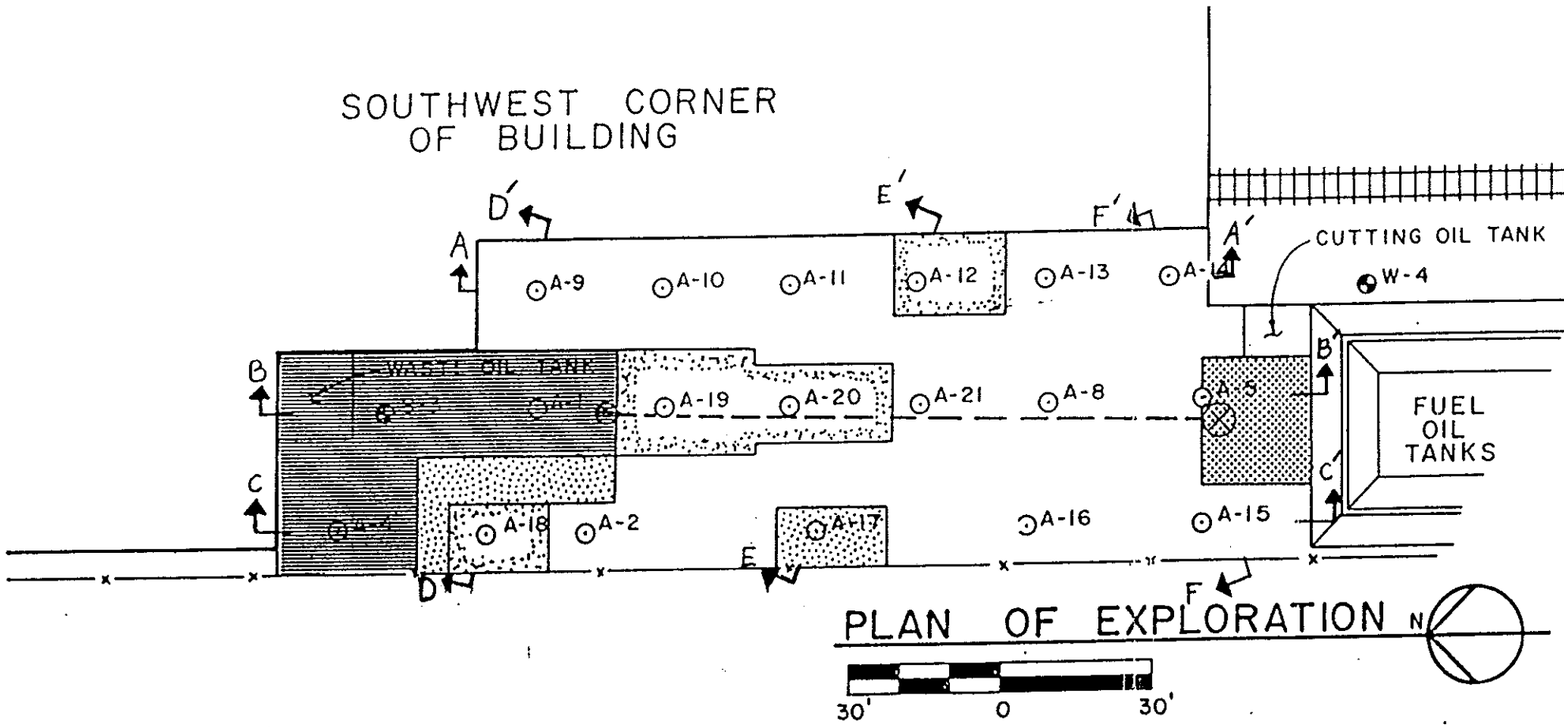
SCALE

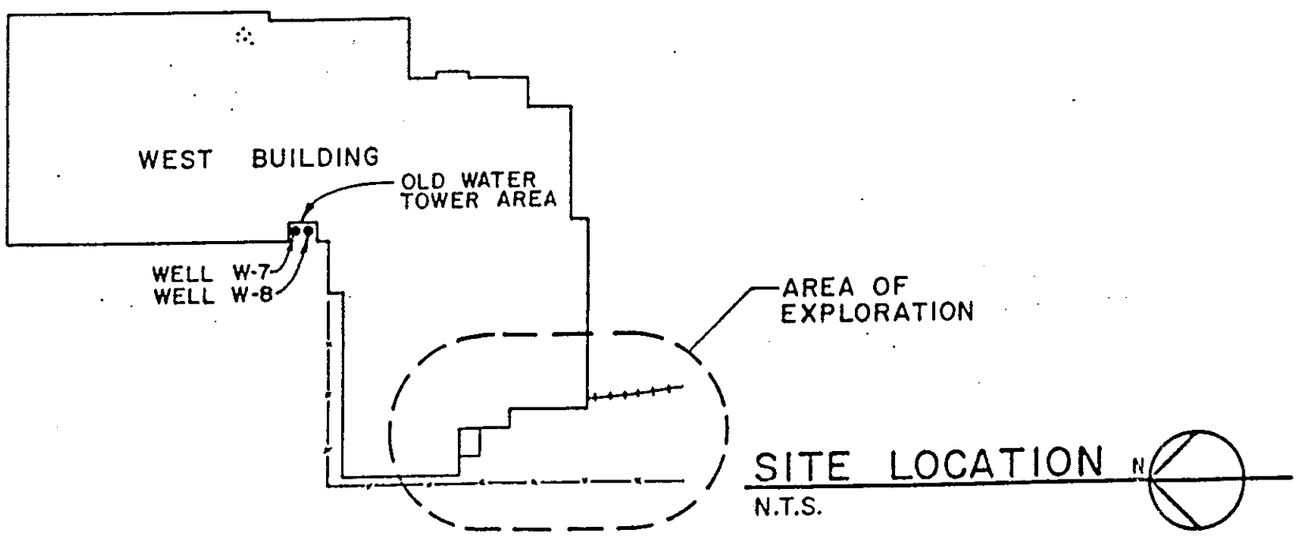
VERTICAL: 1"= 10'

HORIZONTAL: 1" = 30'

VERTICAL EXAGERATION: 3X

DRAWN BY	BJH	10-26-84
CHECKED BY	SMS	11/13/84
APPROVED BY	TJH	11/26/84
DRAWING NUMBER	83-182-85	





LEGEND:

- ⊙ SOIL BORING
- ◐ MONITORING WELL
- ◍ DRAIN
- ⊗ SUMP
- — — UNDERGROUND PIPE
- □ 0-10 PPM
- ▨ 10-100 PPM
- ▨ 100-1,000 PPM
- ▨ 1,000-10,000 PPM
- ▨ >10,000 PPM

TOTAL VOLATILE ORGANIC CONCENTRATIONS
3.0'-6.0' INTERVAL
SOIL BORING LOCATIONS
TORRINGTON COMPANY
BANTAM BEARING DIVISION
SOUTH BEND, INDIANA

BARNES AND THORNBURG

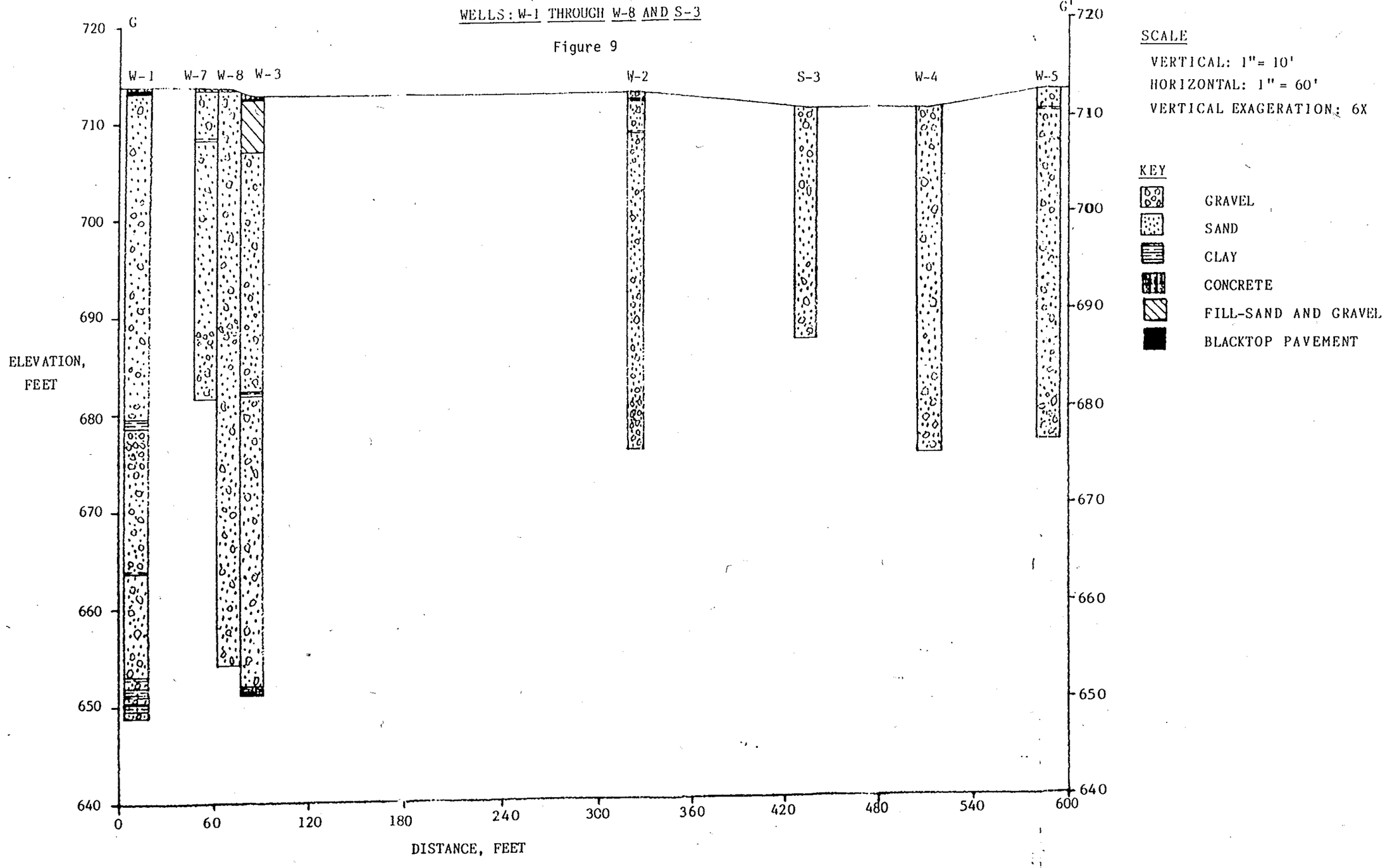
FIGURE 8

CanonieEngineers

SITE SPECIFIC CROSS SECTIONS

WELLS: W-1 THROUGH W-8 AND S-3

Figure 9



surface water runoff and precipitation can infiltrate the ground surface, potentially carrying surface contaminants deeper into the soil column. The analytical data shows that the major contamination with volatile organic compounds in this area has penetrated to depths of less than 7 feet in most cases, and in some cases as deep as 8-1/2 feet. Test borings A-19 and A-20 are located adjacent to the pipe which connects a surface catchbasin with the sump near the buried fuel oil tanks. There is some contamination in this area to depths as great as 8-1/2 feet. However, the degree of contamination in this area is not as severe as in the area north of the catchbasin as represented by soil samples A-1 and A-4 and Well S-3. Specific areas and relative degree of contamination with volatile organic compounds are shown on Figure 8.

No significant quantities of either oils or volatile organic compounds were found in the test borings and soil samples obtained at other selected locations around the site.

The groundwater levels at the site varied so little that it was not possible to construct a water level contour map.

The groundwater sampling data shows that there are no wells which contain significant concentrations of volatile organic compounds other than in the area of Well S-3. Since Well S-3 is located in the area of greatest soil contamination , the groundwater quality results from this area may not be representative of actual groundwater quality. Volatile organic compounds were at or below detection limits for all other wells on the site. In addition, the pond water and sediment samples obtained in the Canonie investigation show no significant concentrations of volatile organic compounds or PCBs.

Conclusions

Based on the soil, sediment, groundwater, and surface water data, the only identified area of localized contamination exists in the vicinity of the waste oil tank (see Figure 8) at the South Bend site. The soil in this area is contaminated with significant concentrations of volatile organic compounds and oil.

A review of the groundwater data shows that significant groundwater contamination has not occurred at the South Bend site. However, since a localized area has soil contaminated with concentrations of oils and volatile organic compounds, it is necessary to eliminate this area as a potential source of groundwater contamination prior to final closure of the Torrington facility.

REMEDIAL ACTION RECOMMENDATIONS

This section of the report provides recommendations for remedial action at the Torrington, South Bend, site. Based on the test results and conclusions, the Torrington plant site is generally free of potential environmental problems. The presence of volatile organics in the area of the waste oil tank, however, warrants preventative action and further monitoring. To meet this objective, the following steps are recommended:

1. Soil removal in the area of the waste oil tank.
2. Additional on-site testing as work proceeds to monitor and evaluate the extent of contamination.
3. Assess the groundwater immediately under the potential source for two years to assure all parties that groundwater under the site is not a potential source of adverse impact.
4. Assess the groundwater down-gradient of the potential source to assure all parties that no adverse or side affects are occurring.

Based on Figure 8, the area of greatest contamination is in the immediate vicinity of the waste oil tank (S-3, A-1 and A-4), and in the area of the sump just north of the three buried oil tanks. We propose to excavate these two areas in order to remove the total volatile organic concentrations to a level of less than 1,000 ppm. It is anticipated that the soil excavation will remove 95% of the organics potentially present in the area. This will require the removal of contaminated soil to a depth of three feet except for isolated pockets. As the excavation in these two areas proceeds, it is proposed to take additional soil samples as necessary for gross chemical analysis to determine relative levels of contamination. In addition, we will have a field meter on-site to monitor the approximate levels of total volatile organic compounds.

Prior to excavation in these areas, we intend to further evaluate the most effective means of disposal for the contaminated soil. We will evaluate alternatives to hauling this material to a secure landfill for disposal.

Since Well S-3 will be eliminated during soil removal, we recommend replacing it after the site has been backfilled. We propose to sample monitoring wells W-4, W-7, W-8 and the replacement well for S-3 for two years to determine if groundwater contamination is occurring at the site. This will also serve to evaluate the source elimination carried out during the remedial action.

APPENDIX A

ON-SITE BORING LOGS

Canonie

Boring Log

PROJECT No. CE 83-182
BORING No. W-1
PAGE 1 OF 2

PROJECT NAME TORRINGTON BANTAM BEARING DIVISION
BORING LOCATION N 4299.03, E 6082.64 * SURFACE ELEV. 713.46
DRILLER J. BLATZ, PEERLESS-MIDWEST DATE: START 8/3/84 FINISH 8/8/84

DEPTH	SAMPLE No.	SAMPLE TYPE	SAMPLE INTERVAL FROM	SAMPLE INTERVAL TO	BLOW COUNT 0-6	BLOW COUNT 6-12	BLOW COUNT 12-18	RECOVERY IN INCHES	U.S.C.S. SOIL TYPE	PERCENT MOISTURE	qu TSF	CONTACT DEPTH	SOIL DESCRIPTION AND REMARKS	PIEZO
												.4	REINFORCED CONCRETE.	
	1	HS	2.0					3				.8	BLACKTOP PAVEMENT.	
									SP				DARK BROWN MEDIUM TO COARSE SAND, TRACE OF GRAVEL. OVA = 0.0 PPM.	
5	2	HS	5.0	6.0				12					LIGHT BROWN MEDIUM TO COARSE SAND, TRACE OF GRAVEL. OVA = 0.0 PPM.	
10	1	SS	10.0	11.5	10	12	14	14					WATER ENCOUNTERED AT APPROXIMATELY 8.5 FT.	
15													LIGHT BROWN MEDIUM TO COARSE SAND, SOME GRAVEL.	
20														
25														
30													LIGHT GRAY MEDIUM TO COARSE SAND, TRACE OF GRAVEL.	
												34.0	VERY STIFF GRAY SANDY GRAVELLY	
35									CL			34.5	CLAY,	
									GP				GRAVEL, SOME MEDIUM SAND.	
40												40.0		

*PLANT COORDINATES

Canonie

Boring Log

PROJECT No. CE 83-182
BORING No. H-1
PAGE 2 OF 2

PROJECT NAME TORRINGTON BANTAM BEARING DIVISION
BORING LOCATION N 4299.03, E 6082.64 * SURFACE ELEV. 713.46
DRILLER J. BLATZ, PEERLESS-MIDWEST DATE: START 8/3/84 FINISH 8/8/84

DEPTH	SAMPLE No.	SAMPLE TYPE	SAMPLE INTERVAL FROM	SAMPLE INTERVAL TO	BLOW COUNT 0 TO 6	BLOW COUNT 6 TO 12	BLOW COUNT 12 TO 18	RECOVERY IN INCHES	U.S.C.S. SOIL TYPE	PERCENT MOISTURE	qu TSF	CONTACT DEPTH	SOIL DESCRIPTION AND REMARKS	PIEZO
									SP				BROWNISH-GRAY COARSE TO MEDIUM SAND. SOME GRAVEL.	
45														
50													TRACE OF CLAY.	
55														
60												61.0		
									CL				VERY STIFF GRAY SANDY GRAVELLY CLAY.	
65												65.0		
													BORING TERMINATED AT 65.0 FT.	
													NOTE: OVA VALUE IS ORGANIC VAPOR LEVEL FROM BOREHOLE MONITORED WITH A CENTURY FLAME IONIZING OVA METER.	

*PLANT COORDINATES

Canonie

Boring Log

PROJECT No. CF 83-182
BORING No. W-2
PAGE 1 OF 1

PROJECT NAME TORRINGTON BANTAM BEARING DIVISION
BORING LOCATION N 3998.41, E 5867.16 * SURFACE ELEV. 712.42
DRILLER J. BLATZ, PEERLESS-MIDWEST DATE: START 8/1/84 FINISH 8/2/84

DEPTH	SAMPLE No.	SAMPLE TYPE	INTERVAL FROM	INTERVAL TO	BLOW COUNT 0-6	BLOW COUNT 6-12	BLOW COUNT 12-18	RECOVERY IN INCHES	U.S.C.S. SOIL TYPE	PERCENT MOISTURE	qu TSF	CONTACT DEPTH	SOIL DESCRIPTION AND REMARKS	PIEZO
									SP			1.0	BROWN MEDIUM SAND, SOME GRAVEL.	
												1.2	BLACKTOP PAVEMENT.	
	1	HS	3.0	4.0				12					BROWN MEDIUM SAND, TRACE OF GRAVEL AND CLAY. OVA = 0 PPM.	
	2	HS	4.0	5.0				12	SP					
5	3	HS	5.0	6.0				12					GRAY MEDIUM SAND, TRACE OF GRAVEL. OVA = 0 PPM.	
	1	SS	8.5	10.0	16	20	20	16					WATER ENCOUNTERED AT APPROXIMATELY 8.5 FT.	
10														
15														
20													GRAY MEDIUM TO COARSE SAND, SOME GRAVEL. OVA = 0.0 PPM.	
25														
30												31.0		
									GP				BROWN SANDY GRAVEL, DENSE FORMATION AT 31.0 FT. LARGER PIECES APPEAR TO BE BROKEN COBBLES.	
35												37.0		
													BORING TERMINATED AT 37.0 FT. NOTE: OVA VALUE IS ORGANIC VAPOR LEVEL FROM BOREHOLE MONITORED WITH A CENTURY FLAME IONIZING OVA METER	
40														

*PLANT COORDINATES

Canonie

Boring Log

PROJECT No. CE 83-182
BORING No. W-3
PAGE 1 OF 2

PROJECT NAME TORRINGTON BEARING BANTAM DIVISION
BORING LOCATION N 4173.35, E 6103.37 * SURFACE ELEV. 712.90
DRILLER J. BLATZ, PEERLESS-MIDWEST DATE: START 8/8/84 FINISH 8/10/84

DEPTH	SAMPLE No.	SAMPLE TYPE	SAMPLE INTERVAL FROM	SAMPLE INTERVAL TO	BLOW COUNT 0 6	BLOW COUNT 6 12	BLOW COUNT 12 18	RECOVERY IN INCHES	U.S.C.S. SOIL TYPE	PERCENT MOISTURE	qu TSF	CONTACT DEPTH	SOIL DESCRIPTION AND REMARKS	PIEZO
												.4	REINFORCED CONCRETE.	
	1	HS	2.0	2.0				3				.8	BLACKTOP PAVEMENT.	
									SP				BROWN GRAVELLY SAND FILL. OVA = 0 PPM.	
5	2	HS	5.0	6.0				12	SM-SP				DARK BROWN MEDIUM SAND, TRACE OF GRAVEL, SILT, AND CLAY.	
	1	SS	9.0	10.5	15	22	26	16	SP				LIGHT BROWN MEDIUM TO COARSE SAND, TRACE OF GRAVEL.	
10													WATER ENCOUNTERED AT APPROXIMATELY 8.5 FT.	
15														
20														
25													LIGHT GRAY MEDIUM TO COARSE SAND, SOME GRAVEL.	
30													TRACE OF CLAY.	
35														
40													NOTE: OVA VALUE IS ORGANIC VAPOR LEVEL FROM BOREHOLE MONITORED WITH A CENTURY FLAME IONIZING OVA METER.	

*PLANT COORDINATES

Canonie

Boring Log

PROJECT No. CE 83-182
BORING No. W-3
PAGE 2 OF 2

PROJECT NAME TORRINGTON BANTAM BEARING DIVISION
BORING LOCATION N 4173.35, E 6103.37 * SURFACE ELEV. 712.90
DRILLER J. BLATZ, PEERLESS-MIDWEST DATE: START 8/8/84 FINISH 8/10/84

DEPTH	SAMPLE No.	SAMPLE TYPE	SAMPLE INTERVAL FROM	SAMPLE INTERVAL TO	BLOW COUNT 0 to 6	BLOW COUNT 6 to 12	BLOW COUNT 12 to 18	RECOVERY IN INCHES	U.S.C.S. SOIL TYPE	PERCENT MOISTURE	qu TSF	CONTACT DEPTH	SOIL DESCRIPTION AND REMARKS	PIEZO
45									SP				LIGHT GRAY MEDIUM TO COARSE SAND WITH SOME GRAVEL.	
50														
55														
60												61.0		
									CL				VERY STIFF GRAVELLY SANDY CLAY.	
													TERMINATED BORING AT 62.0 FT.	
													NOTE: OVA VALUE IS ORGANIC VAPOR LEVEL FROM BOREHOLE MONITORED WITH A CENTURY FLAME IONIZING OVA METER.	

*PLANT COORDINATES

Canonie

Boring Log

PROJECT No. CE 83-182
BORING No. W-4
PAGE 1 OF 1

PROJECT NAME TORRINGTON BANTAM BEARING DIVISION
BORING LOCATION N 4112.18, E 5579.40 * SURFACE ELEV. 710.31
DRILLER J. BLATZ, PEERLESS-MIDWEST DATE: START 7/27/84 FINISH 7/30/84

DEPTH	SAMPLE No.	SAMPLE TYPE	SAMPLE INTERVAL FROM	SAMPLE INTERVAL TO	BLOW COUNT 0 6 / 6 12	BLOW COUNT 6 12 / 12 18	RECOVERY IN INCHES	U.S.C.S. SOIL TYPE	PERCENT MOISTURE	qu TSF	CONTACT DEPTH	SOIL DESCRIPTION AND REMARKS	PIEZO.
	3	HS	0	.25			3	SP				OILY BLACK SAND WITH GRAVEL. OVA = 80 PPM.	
	4	HS	.5	1.5			12					BROWN MEDIUM TO COARSE SAND, TRACE OF GRAVEL.	
	1	HS	3.5	4.5			12					GRAY MEDIUM TO COARSE SAND,	
5	2	HS	4.5	5.5			12					TRACE OF GRAVEL. OVA = 0.0 PPM.	
10	1	SS	10.0	11.5			9						
	2	SS	11.5	13.0	4	4 5	9				24.0		
15													
20													
25								GP				BROWNISH-GRAY GRAVEL AND MEDIUM TO COARSE SAND.	
30											34.0		
35												BORING TERMINATED AT 34.0 FT.	

NOTE: OVA VALUE IS ORGANIC VAPOR LEVEL FROM BOREHOLE MONITORED WITH A CENTURY FLAME IONIZING OVA METER.

*PLANT COORDINATES

NOTE: NO FREE OIL LAYER WAS VISIBLE ON THE WATER TABLE.

Canonie

Boring Log

PROJECT No. CE 83-182
BORING No. W-5
PAGE 1 OF 1

PROJECT NAME TORRINGTON BANTAM BEARING DIVISION
BORING LOCATION N 3994.81, E 5613.03 * SURFACE ELEV. 712.33
DRILLER J. BLATZ, PEERLESS-MIDWEST DATE: START 7/30/84 FINISH 7/31/84

DEPTH	SAMPLE No.	SAMPLE TYPE	SAMPLE INTERVAL FROM	SAMPLE INTERVAL TO	BLOW COUNT 0 6 / 6 12	BLOW COUNT 6 12 / 12 18	RECOVERY IN INCHES	U.S.C.S. SOIL TYPE	PERCENT MOISTURE	qu TSF	CONTACT DEPTH	SOIL DESCRIPTION AND REMARKS	PIEZO.
	2	HS	.5	.5			3	SP				BLACK MEDIUM TO COARSE SAND, TRACE OF CLAY AND SOME GRAVEL.	
	1	HS	2.0	3.0			12					OVA = 0.0 PPM.	
												BROWN MEDIUM TO COARSE SAND, SOME	
5	3	HS	5.0	6.0			12					GRAVEL.	
												ENCOUNTERED WATER AT 8.5 FT.	
	1	SS	8.5	10.0			9					CASING WENT DOWN 1 FT. WHILE	
10												BAILING 3 IN.	
15													
20													
25													
											29.0		
30								GP				BROWN SANDY GRAVEL.	
35											35.0		
												TERMINATED BORING AT 35.0 FT.	
												NOTE: OVA VALUE IS ORGANIC VAPOR LEVEL FROM BOREHOLE MONITORED WITH A CENTURY FLAME IONIZING OVA METER.	

*PLANT COORDINATES

NOTE: NO FREE OIL LAYER WAS VISIBLE ON THE WATER TABLE.

Canonie

Boring Log

PROJECT No. CE 83-182
BORING No. S-3
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PROJECT NAME TORRINGTON BANTAM BEARING DIVISION
BORING LOCATION N 4307.30, E 5552.18 * SURFACE ELEV. 710.38
DRILLER J. BLATZ, PEERLESS-MIDWEST DATE: START 8/13/84 FINISH 8/13/84

DEPTH	SAMPLE No.	SAMPLE TYPE	SAMPLE INTERVAL FROM	SAMPLE INTERVAL TO	BLOW COUNT 0 to 6	BLOW COUNT 6 to 12	BLOW COUNT 12 to 18	RECOVERY IN INCHES	U.S.C.S. SOIL TYPE	PERCENT MOISTURE	qu TSF	CONTACT DEPTH	SOIL DESCRIPTION AND REMARKS	PIEZO
	1	HS	.2	1.2				12				.2	BLACK SANDY GRAVEL, FILL (OIL STAINED).	
	2	HS	1.4	2.4				12						
	3	HS	1.5	1.5				3	SP				BROWN MEDIUM SAND, SOME GRAVEL.	
	4	HS	3.0	4.0				12					SEWAGE ODOR.	
5	5	HS	4.0	5.0				12					BLACK MEDIUM SAND, SOME GRAVEL.	
	6	HS	5.0	6.0				12					OVA = 200 PPM.	
													OVA = 500 PPM.	
	1	SS	7.0	8.5				14					OVA = 700 PPM.	
10													DARK BROWN MEDIUM SAND. STRONG ODOR. OVA > 1,000 PPM.	
													GRAY MEDIUM TO COARSE SAND, SOME GRAVEL. OVA = 200 PPM.	
15													BROWN MEDIUM TO COARSE SAND, SOME GRAVEL. OVA = 100 PPM.	
20												24.0		
25													BORING TERMINATED AT 24.0 FT. WATER ENCOUNTERED AT APPROXIMATELY 6.5 FT. NOTE: OVA VALUE IS ORGANIC VAPOR LEVEL FROM BOREHOLE MONITORED WITH A CENTURY FLAME IONIZING OVA METER.	

*PLANT COORDINATES

Canonie

Boring Log

PROJECT No. CE 83-182
BORING No. W-7
PAGE 1 OF 1

PROJECT NAME TORRINGTON BANTAM BEARING DIVISION
BORING LOCATION N 4550.88, E 5855.74 SURFACE ELEV. 713.30
DRILLER NORM EGER DATE: START 10/18/84 FINISH 10/18/84

DEPTH	SAMPLE No.	SAMPLE TYPE	SAMPLE INTERVAL FROM	SAMPLE INTERVAL TO	BLOW COUNT 0 to 6	BLOW COUNT 6 to 12	BLOW COUNT 12 to 18	RECOVERY IN INCHES	U.S.C.S. SOIL TYPE	PERCENT MOISTURE	qu TSF	CONTACT DEPTH	SOIL DESCRIPTION AND REMARKS	PIEZO.
									GP			.2	GRAVEL FILL.	
									SP				BROWN MEDIUM TO COARSE SAND, TRACE OF GRAVEL. OVA = 0 PPM.	
	1	SS	3.5	5.0	1	1	2	9						
5													TRACE OF CLAY.	
	2	SS	8.0	9.5	7	9	11	12						
10														
15													GRAY MEDIUM TO COARSE SAND. OVA = 0 PPM.	
20														
25												25.0		
									GP			26.0	LAYER OF FINE GRAVEL.	
									SP				GRAY MEDIUM TO COARSE SAND, SOME GRAVEL.	
30												31.8		
													BORING TERMINATED AT 31.8 FEET.	
													NOTE: OVA VALUE IS ORGANIC VAPOR LEVEL FROM BOREHOLE MONITORED WITH A CENTURY FLAME IONIZING OVA METER.	

* ESTIMATED

NOTE: NO FREE OIL LAYER WAS VISIBLE

Canonie

Boring Log

PROJECT No. CE 83-182
BORING No. W-8
PAGE 1 OF 2

PROJECT NAME TORRINGTON BANTAM BEARING DIVISION
BORING LOCATION N 4542.42, E 5855.80 SURFACE ELEV. 713.30
DRILLER NORM EGER DATE: START 10/23/84 FINISH 10/23/84

DEPTH	SAMPLE No.	SAMPLE TYPE	SAMPLE INTERVAL FROM	SAMPLE INTERVAL TO	BLOW COUNT 0 TO 6	BLOW COUNT 6 TO 12	BLOW COUNT 12 TO 18	RECOVERY IN INCHES	U.S.C.S. SOIL TYPE	PERCENT MOISTURE	qu TSF	CONTACT DEPTH	SOIL DESCRIPTION AND REMARKS	PIEZO.
									GP			.2	GRAVEL FILL.	
									SP				BROWN MEDIUM TO COARSE SAND, SOME GRAVEL.	
5														
10														
15														
20													GRAY MEDIUM TO COARSE SAND, TRACES OF GRAVEL.	
												24.5		
25									GP			25.5	LAYER OF FINE GRAVEL.	
									SP					
30														
35													GRAY MEDIUM TO COARSE SAND, SOME GRAVEL.	
40												40.0		

* ESTIMATED

Canonie

Boring Log

PROJECT No. CE 83-182
BORING No. W-8
PAGE 2 OF 2

PROJECT NAME TORRINGTON BANTAM BEARING DIVISION
BORING LOCATION N 4542.42, E 5855.80 SURFACE ELEV. 713.30
DRILLER NORM EGER DATE: START 10/23/84 FINISH 10/23/84

DEPTH	SAMPLE No.	SAMPLE TYPE	SAMPLE INTERVAL FROM	SAMPLE INTERVAL TO	BLOW COUNT 0-6	BLOW COUNT 6-12	BLOW COUNT 12-18	RECOVERY IN INCHES	U.S.C.S. SOIL TYPE	PERCENT MOISTURE	qu TSF	CONTACT DEPTH	SOIL DESCRIPTION AND REMARKS	PIEZO.
									SP				GRAY MEDIUM TO COARSE SAND, SOME GRAVEL.	
45														
50														
55														
												59.3		
60													BORING TERMINATED AT 59.3 FEET.	

* ESTIMATED

Canonie

Boring Log

PROJECT No. CE 83-182
BORING No. A-1
PAGE 1 OF 1

PROJECT NAME TORRINGTON BANTAM BEARING DIVISION
BORING LOCATION N 4277.21, E 5550.00 * SURFACE ELEV. 710.10
DRILLER K. BRISSETTE DATE: START 8/2/84 FINISH 8/2/84

DEPTH	SAMPLE No.	SAMPLE TYPE	SAMPLE INTERVAL FROM	SAMPLE INTERVAL TO	BLOW COUNT 0 6 / 6 12	BLOW COUNT 6 12 / 12 18	RECOVERY IN INCHES	U.S.C.S. SOIL TYPE	PERCENT MOISTURE	qu TSF	CONTACT DEPTH	SOIL DESCRIPTION AND REMARKS	PIEZO
								GP				OILY BLACK SANDY GRAVEL, FILL,	
	1	HS	1.0	2.0			12	SP			1.0	OVA = 0 PPM	
												OIL AND WATER AT 0.9 FT.	
	2	HS	2.0	3.0			12					OILY BLACK MEDIUM TO COARSE GRAVELLY SAND WITH POCKETS OF BROWN SAND. OVA > 1,000 PPM.	
	3	HS	3.0	4.0			12						
	4	HS	4.0	5.0			12						
5	5	HS	5.0	6.0			12					OILY BLACK MEDIUM SAND WITH BROWN SAND INCLUSIONS INCREASING FROM 25% TO 75% FROM 3.0 TO 6.0 FT.	
											6.0		
												BORING TERMINATED AT 6.0 FT.	
												WATER ENCOUNTERED AT APPROXIMATELY 6.0 FT.	
10													
												NOTE: OVA VALUE IS ORGANIC VAPOR LEVEL FROM BOREHOLE MONITORED WITH A CENTURY FLAME IONIZING OVA METER.	

*PLANT COORDINATES

Canonie

Boring Log

PROJECT No. CE 83-182
BORING No. A-2
PAGE 1 OF 1

PROJECT NAME TORRINGTON BANTAM BEARING DIVISION
BORING LOCATION N 4262.42, E 5524.42 * SURFACE ELEV. 710.40
DRILLER K. BRISSETTE DATE: START 8/2/84 FINISH 8/2/84

DEPTH	SAMPLE No.	SAMPLE TYPE	SAMPLE INTERVAL FROM	SAMPLE INTERVAL TO	BLOW COUNT 0 to 6	BLOW COUNT 6 to 12	BLOW COUNT 12 to 18	RECOVERY IN INCHES	U.S.C.S. SOIL TYPE	PERCENT MOISTURE	qu TSF	CONTACT DEPTH	SOIL DESCRIPTION AND REMARKS	PIEZO
	1	HS	.7					3	SM-SP				BLACK MEDIUM SAND, TRACE OF GRAVEL	
	2	HS	1.0	2.0				12	CL			1.2	AND CLAY. OVA = 0 PPM.	
												1.7	ORANGISH-RED SOFT CLAY, SOME SAND.	
	3	HS	2.0	3.0				12	SP				BROWN MEDIUM TO COARSE SAND. OVA = 80 PPM.	
	4	HS	3.0	4.0				12						
5													LIGHT BROWN MEDIUM TO COARSE SAND. OVA = 100 PPM.	
	5	HS	5.5	6.5				12					GRAY MEDIUM TO COARSE SAND OVA = 100 PPM.	
												6.5		
													BORING TERMINATED AT 6.5 FT.	
													WATER ENCOUNTERED AT APPROXIMATELY 6.5 FT.	
10													NOTE: OVA VALUE IS ORGANIC VAPOR LEVEL FROM BOREHOLE MONITORED WITH A CENTURY FLAME IONIZING OVA METER.	

*PLANT COORDINATES

Canonie

Boring Log

PROJECT No. CE 83-182
BORING No. A-3
PAGE 1 OF 1

PROJECT NAME TORRINGTON BANTAM BEARING DIVISION
BORING LOCATION N 4089.68, E 5338.41 * SURFACE ELEV. 712.47
DRILLER K. BRISSETTE DATE: START 8/3/84 FINISH 8/3/84

DEPTH	SAMPLE No.	SAMPLE TYPE	SAMPLE INTERVAL FROM	SAMPLE INTERVAL TO	BLOW COUNT 0 TO 6	BLOW COUNT 6 TO 12	BLOW COUNT 12 TO 18	RECOVERY IN INCHES	U.S.C.S. SOIL TYPE	PERCENT MOISTURE	qu TSF	CONTACT DEPTH	SOIL DESCRIPTION AND REMARKS	PIEZO
	1	HS	1.0	2.0				12	SP				BROWN MEDIUM SAND, SOME GRAVEL. OVA = 0 PPM.	
												4.0		
5													LARGE PIECES OF CONCRETE AT APPROXIMATELY 4.0 FT. BORING TERMINATED AT 4.0 FT.	
10													NOTE: OVA VALUE IS ORGANIC VAPOR LEVEL FROM BOREHOLE MONITORED WITH A CENTURY FLAME IONIZING OVA METER.	

*PLANT COORDINATES

Canonie

Boring Log

PROJECT No. CE 83-182
BORING No. A-4
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PROJECT NAME TORRINGTON BANTAM BEARING DIVISION
BORING LOCATION N 4315.37, E5526.21 * SURFACE ELEV. 710.41
DRILLER K. BRISSETTE DATE: START 8/8/84 FINISH 8/8/84

DEPTH	SAMPLE No.	SAMPLE TYPE	SAMPLE INTERVAL FROM	SAMPLE INTERVAL TO	BLOW COUNT 0 to 6	BLOW COUNT 6 to 12	BLOW COUNT 12 to 18	RECOVERY IN INCHES	U.S.C.S. SOIL TYPE	PERCENT MOISTURE	qu TSF	CONTACT DEPTH	SOIL DESCRIPTION AND REMARKS	PIEZO
	1	HS	1.5	2.5				12	SP				BROWN MEDIUM SAND, SOME BLACK OIL-STAINED AREAS, TRACE OF GRAVEL. OVA = 0 PPM.	
	2	HS	2.5	3.5				12					LIGHT BROWN MEDIUM TO COARSE SAND, STRONG OILY ODOR. OVA = 30 PPM.	
	3	HS	3.5	4.5				12					OILY ODOR STRONGER AT APPROXIMATELY 5.0 FT. OVA = 150 PPM.	
5	4	HS	4.5	5.5				12					WET BLACK MEDIUM SAND.	
	5	HS	5.5	6.5				12				7.0		
													BORING TERMINATED AT 7.0 FT.	
													WATER ENCOUNTERED AT APPROXIMATELY 7.0 FT.	
10													NOTE: OVA VALUE IS ORGANIC VAPOR LEVEL FROM BOREHOLE MONITORED WITH A CENTURY FLAME IONIZING OVA METER.	

*PLANT COORDINATES

Canonie

Boring Log

PROJECT No. CE 83-182
BORING No. A-5
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PROJECT NAME TORRINGTON BANTAM BEARING DIVISION
BORING LOCATION N 4143.64, E 5548.10 * SURFACE ELEV. 710.05
DRILLER K. BRISSETTE DATE: START 8/9/84 FINISH 8/9/84

DEPTH	SAMPLE No.	SAMPLE TYPE	INTERVAL FROM	INTERVAL TO	BLOW COUNT 0-6	BLOW COUNT 6-12	BLOW COUNT 12-18	RECOVERY IN INCHES	U.S.C.S. SOIL TYPE	PERCENT MOISTURE	qu TSF	CONTACT DEPTH	SOIL DESCRIPTION AND REMARKS	PIEZO
	1	HS	1.0	2.0				12	SP				BROWN MEDIUM SAND, SOME GRAVEL. OVA = 0 PPM.	
	2	HS	2.0	3.0				12					BLACK MEDIUM SAND, TRACES OF CLAY AND GRAVEL, PIECES OF STEEL REINFORCING BAR. OVA = 0 PPM	
	3	HS	3.0	4.0				12						
	4	HS	4.0	5.0				12						
5	5	HS	5.0	6.0				12				7.0		
													BORING TERMINATED AT 7.0 FT.	
													WATER ENCOUNTERED AT APPROXIMATELY 7.0 FT.	
10													NOTE: OVA VALUE IS ORGANIC VAPOR LEVEL FROM BOREHOLE MONITORED WITH A CENTURY FLAME IONIZING OVA METER.	

*PLANT COORDINATES

Canonie

Boring Log

PROJECT No. CF 83-182
BORING No. A-6
PAGE 1 OF 1

PROJECT NAME TORRINGTON BANTAM BEARING DIVISION
BORING LOCATION N 4053.50, E 5858.03 * SURFACE ELEV. 710.55
DRILLER K. BRISSETTE DATE: START 8/13/84 FINISH 8/13/84

DEPTH	SAMPLE No.	SAMPLE TYPE	SAMPLE INTERVAL FROM	SAMPLE INTERVAL TO	BLOW COUNT 0 6	BLOW COUNT 6 12	BLOW COUNT 12 18	RECOVERY IN INCHES	U.S.C.S. SOIL TYPE	PERCENT MOISTURE	qu TSF	CONTACT DEPTH	SOIL DESCRIPTION AND REMARKS	PIEZO
												.5	BLACK SANDY GRAVEL, FILL.	
	1	HS	1.0	2.0				12	SP				OVA = 5 PPM.	
													BROWN MEDIUM TO COARSE SAND.	
	2	HS	2.0	3.0				12					OVA = 5 PPM.	
5												5.0	OVA = 0 PPM.	
													BORING TERMINATED AT 5.0 FT.	
10													NOTE: OVA VALUE IS ORGANIC VAPOR LEVEL FROM BOREHOLE MONITORED WITH A CENTURY FLAME IONIZING OVA METER.	

*PLANT COORDINATES

Canonie

Boring Log

PROJECT No. CE 83-182
BORING No. A-7
PAGE 1 OF 1

PROJECT NAME TORRINGTON BANTAM BEARING DIVISION
BORING LOCATION N. 4133.93, E 5878.63 * SURFACE ELEV. 713.27
DRILLER K. BRISSETTE DATE: START 8/13/84 FINISH 8/13/84

DEPTH	SAMPLE No.	SAMPLE TYPE	INTERVAL FROM	INTERVAL TO	BLOW COUNT 0-6	BLOW COUNT 6-12	BLOW COUNT 12-18	RECOVERY IN INCHES	U.S.C.S. SOIL TYPE	PERCENT MOISTURE	qu TSF	CONTACT DEPTH	SOIL DESCRIPTION AND REMARKS	PIEZO
	1	HS	1.0	2.0				12	SP				OILY BLACK GRAVELLY MEDIUM SAND. OVA = 0 PPM.	
													BROWN MEDIUM TO COARSE SAND. OVA = 5 PPM.	
												3.0	OVA = 0 PPM.	
													BORING TERMINATED AT 3.0 FT.	
5														
10													NOTE: OVA VALUE IS ORGANIC VAPOR LEVEL FROM BOREHOLE MONITORED WITH A CENTURY FLAME IONIZING OVA METER.	

PLANT COORDINATES

Canonie

Boring Log

PROJECT No. CE 83-182
BORING No. A-8
PAGE 1 OF 1

PROJECT NAME TORRINGTON BANTAM BEARING DIVISION
BORING LOCATION SEE FIGURE 1 SURFACE ELEV. 710.0*
DRILLER NORM EGER DATE: START 10/19/84 FINISH 10/19/84

DEPTH	SAMPLE No.	SAMPLE TYPE	SAMPLE INTERVAL FROM	SAMPLE INTERVAL TO	BLOW COUNT 0 6 / 6 12 / 12 18	RECOVERY IN INCHES	U.S.C.S. SOIL TYPE	PERCENT MOISTURE	qu TSF	CONTACT DEPTH	SOIL DESCRIPTION AND REMARKS	PIEZO.
	1	SS	0.0	1.5	3 5 8	4	GP			0.5	GRAY SANDY GRAVEL FILL.	
	2	SS	1.5	3.0	4 8 7	9	SP				BROWN MEDIUM TO COARSE SAND, SOME GRAVEL. OVA=0 PPM	
	3	SS	3.0	4.5	5 4 4	12					TRACES OF GRAVEL. OVA=0 PPM	
5	4	SS	4.5	6.0	4 2 2	10						
	5	SS	6.0	7.5	1 1 2	9					GRAY MEDIUM TO COARSE SAND.	
	6	SS	7.5	9.0	1 1 1	9				9.0		
10											BORING TERMINATED AT 9.0 FT.	
											WATER ENTERED HOLE AT 4.0 FEET. PROBABLY SEEPAGE FROM PONDED WATER IN THE AREA.	
											NOTE: OVA VALUE IS ORGANIC VAPOR LEVEL FROM BOREHOLE MONITORED WITH A CENTURY FLAME IONIZING OVA METER.	

* ESTIMATED

Canonie

Boring Log

PROJECT No. CE 83-182
BORING No. A-9
PAGE 1 OF 1

PROJECT NAME TORRINGTON BANTAM BEARING DIVISION
BORING LOCATION See Figure 1 SURFACE ELEV. 710.0*
DRILLER Norm Eger DATE: START 10/19/84 FINISH 10/19/84

DEPTH	SAMPLE No.	SAMPLE TYPE	SAMPLE INTERVAL FROM	SAMPLE INTERVAL TO	BLOW COUNT 0 to 6	BLOW COUNT 6 to 12	BLOW COUNT 12 to 18	RECOVERY IN INCHES	U.S.C.S. SOIL TYPE	PERCENT MOISTURE	qu TSF	CONTACT DEPTH	SOIL DESCRIPTION AND REMARKS	PIEZO
												.75	Reinforced concrete.	
	1	SS	1.0	2.5	4	7	12	10	SP				Brownish gray medium to coarse sand, traces of gravel. OVA=100 ppm	
	2	SS	2.5	4.0	10	12	17	10					Gray medium to coarse sand, traces of gravel. OVA>1000 ppm.	
	3	SS	4.0	5.5	9	8	6	10					OVA=900 ppm.	
5	4	SS	5.5	7.0	2	2	2	10					OVA=900 ppm.	
	5	SS	7.0	8.5	1	2	3	10					OVA=900 ppm.	
												8.5	Boring Terminated at 8.5 Feet.	
10													Water Encountered at Approximately 7.0 Feet.	
													Note: OVA Value is Organic Vapor Level from Borehole Monitored with a Century Flame Ionizing OVA Meter.	

* ESTIMATED

Canonie

Boring Log

PROJECT No. CF 83-182
BORING No. A-10
PAGE 1 OF 1

PROJECT NAME TORRINGTON BANTAM BEARING DIVISION
BORING LOCATION SEE FIGURE 1 SURFACE ELEV. 710.0*
DRILLER NORM EGER DATE: START 10/19/84 FINISH 10/19/84

DEPTH	SAMPLE No.	SAMPLE TYPE	SAMPLE INTERVAL FROM	SAMPLE INTERVAL TO	BLOW COUNT 0 to 6	BLOW COUNT 6 to 12	BLOW COUNT 12 to 18	RECOVERY IN INCHES	U.S.C.S. SOIL TYPE	PERCENT MOISTURE	qu TSF	CONTACT DEPTH	SOIL DESCRIPTION AND REMARKS	PIEZO
												.75	REINFORCED CONCRETE.	
	1	SS	1.0	2.5	4	5	12	10	SP				BROWN MEDIUM SAND, SOME GRAVEL. OVA=70 PPM.	
	2	SS	2.5	4.0	9	16	20	10					OVA>1000 PPM.	
	3	SS	4.0	5.5	4	6	7	10					DARK GRAY MEDIUM TO COARSE SAND, TRACES OF GRAVEL. OVA>1000 PPM.	
5	4	SS	5.5	7.0	2	3	4	10					GRAY MEDIUM TO COARSE SAND. OVA>1000 PPM.	
	5	SS	7.0	8.5	2	2	10	10				8.5		
10													BORING TERMINATED AT 8.5 FEET. WATER ENCOUNERED AT APPROXIMATELY 6.5 FEET. NOTE: OVA VALUE IS ORGANIC VAPOR LEVEL FROM BOREHOLE MONITORED WITH A CENTURY FLAME IONIZING OVA METER.	

* ESTIMATED

Canonie

Boring Log

PROJECT No. CE 83-182
BORING No. A-11
PAGE 1 OF 1

PROJECT NAME TORRINGTON BANTAM BEARING DIVISION
BORING LOCATION SEE FIGURE 1 SURFACE ELEV. 710.0*
DRILLER NORM EGER DATE: START 10/23/84 FINISH 10/23/84

DEPTH	SAMPLE No.	SAMPLE TYPE	SAMPLE INTERVAL FROM	SAMPLE INTERVAL TO	BLOW COUNT 0 TO 6	BLOW COUNT 6 TO 12	BLOW COUNT 12 TO 18	RECOVERY IN INCHES	U.S.C.S. SOIL TYPE	PERCENT MOISTURE	qu TSF	CONTACT DEPTH	SOIL DESCRIPTION AND REMARKS	PIEZO.
												.75	REINFORCED CONCRETE.	
	1	SS	1.0	2.5	7	8	11	10	SP				BLACK MEDIUM TO COARSE SAND, OVA=600 PPM.	
	2	SS	2.5	4.0	8	15	16	10					BROWN MEDIUM TO COARSE SAND, TRACES OF GRAVEL.	
	3	SS	4.0	5.5	6	6	6	10					GRAY MEDIUM TO COARSE SAND, TRACE OF GRAVEL. OVA>1000 PPM.	
5	4	SS	5.0	7.0	3	2	2	9					OVA>1000 PPM.	
	5	SS	7.0	8.5	2	2	3	9					OVA>1000 PPM.	
												8.5		
10													BORING TERMINATED AT 8.5 FEET. WATER ENCOUNTERED AT APPROXIMATELY 6.5 FEET. NOTE: OVA VALUE IS ORGANIC VAPOR LEVEL FROM BOREHOLE MONITORED WITH A CENTURY FLAME IONIZING OVA METER.	

* ESTIMATED

Canonie

Boring Log

PROJECT No. CE 83-182
BORING No. A-12
PAGE 1 OF 1

PROJECT NAME TORRINGTON BANTAM BEARING DIVISION
BORING LOCATION See Figure 1 SURFACE ELEV. 710.0*
DRILLER Norm Eger DATE: START 10/23/84 FINISH 10/23/84

DEPTH	SAMPLE No.	SAMPLE TYPE	INTERVAL FROM	INTERVAL TO	BLOW COUNT 0-6	BLOW COUNT 6-12	BLOW COUNT 12-18	RECOVERY IN INCHES	U.S.C.S. SOIL TYPE	PERCENT MOISTURE	qu TSF	CONTACT DEPTH	SOIL DESCRIPTION AND REMARKS	PIEZO
												.75	REINFORCED CONCRETE.	
	1	SS	1.0	2.5	7	15	27	8	SP				BLACK MEDIUM TO COARSE SAND.	
	2	SS	2.5	4.0	17	23	29	10					BROWN MEDIUM TO COARSE SAND, SOME GRAVEL.	
	3	SS	4.0	5.5	6	6	6	9					GRAY MEDIUM TO COARSE SAND, TRACE OF GRAVEL.	
5	4	SS	5.0	7.0	3	3	4	9					PIECES OF FINE WIRE. (APPROXIMATELY 20 GAGE)	
	5	SS	7.0	8.5	2	2	2	10				8.5		
10													BORING TERMINATED AT 8.5 FEET. WATER ENCOUNTERED AT APPROXIMATELY 6.5 FEET. NOTE: OVA METER WAS BROKEN.	

* ESTIMATED

Canonie

Boring Log

PROJECT No. CF 83-182
BORING No. A-13
PAGE 1 OF 1

PROJECT NAME TORRINGTON BANTAM BEARING DIVISION
BORING LOCATION SEE FIGURE 1 SURFACE ELEV. 710.0*
DRILLER NORM EGER DATE: START 10/24/84 FINISH 10/24/84

DEPTH	SAMPLE No.	SAMPLE TYPE	SAMPLE INTERVAL FROM	SAMPLE INTERVAL TO	BLOW COUNT 0 TO 6	BLOW COUNT 6 TO 12	BLOW COUNT 12 TO 18	RECOVERY IN INCHES	U.S.C.S. SOIL TYPE	PERCENT MOISTURE	qu TSF	CONTACT DEPTH	SOIL DESCRIPTION AND REMARKS	PIEZO.
												.75	REINFORCED CONCRETE.	
	1	SS	1.0	2.5	11	18	29	9	SP				BLACK MEDIUM TO COARSE SAND, TRACES OF GRAVEL. OVA=200 PPM.	
	2	SS	2.5	4.0	15	23	17	9					GRAY MEDIUM TO COARSE SAND, TRACES OF GRAVEL. OVA=200 PPM.	
	3	SS	4.0	5.5	4	6	6	10						
5													OVA=200 PPM.	
	4	SS	5.5	7.0	4	3	4	12					OVA=200 PPM.	
	5	SS	7.0	8.5	2	4	9	10				8.5		
10													BORING TERMINATED AT 8.5 FEET. WATER ENCOUNTERED AT APPROXIMATELY 6.5 FEET. NOTE: OVA VALUE IS ORGANIC VAPOR LEVEL FROM BOREHOLE MONITORED WITH AN AID MODEL 580 PHOTOIONIZING OVA METER.	

* ESTIMATED

Canonie

Boring Log

PROJECT No. CE 83-182
BORING No. A-14
PAGE 1 OF 1

PROJECT NAME TORRINGTON BANTAM BEARING DIVISION
BORING LOCATION SEE FIGURE 1 SURFACE ELEV. 710.0*
DRILLER NORM EGER DATE: START 10/24/84 FINISH 10/24/84

DEPTH	SAMPLE No.	SAMPLE TYPE	SAMPLE INTERVAL FROM	SAMPLE INTERVAL TO	BLOW COUNT 0 6	BLOW COUNT 6 12	BLOW COUNT 12 18	RECOVERY IN INCHES	U.S.C.S. SOIL TYPE	PERCENT MOISTURE	qu TSF	CONTACT DEPTH	SOIL DESCRIPTION AND REMARKS	PIEZO.
												.75	REINFORCED CONCRETE.	
	1	SS	1.0	2.5	2	2	2	12	SP				GRAY MEDIUM TO COARSE SAND, TRACES OF GRAVEL. OVA=200 PPM	
	2	SS	2.5	4.0	1	3	6	9					OVA=300 PPM.	
	3	SS	4.0	5.5	6	9	12	9					OVA=300 PPM.	
5	4	SS	5.5	7.0	4	8	16	10					OVA=300 PPM.	
	5	SS	7.0	8.5	7	14	19	10				8.5		
													BORING TERMINATED AT 8.5 FEET.	
10													WATER ENCOUNTERED AT APPROXIMATELY 6.5 FEET.	
													NOTE: OVA VALUE IS ORGANIC VAPOR LEVEL FROM BOREHOLE MONITORED WITH AN AID MODEL 580 PHOTOIONIZING OVA METER.	

* ESTIMATED

Canonie

Boring Log

PROJECT No. CE 83-182
BORING No. A-15
PAGE 1 OF 1

PROJECT NAME TORRINGTON BANTAM BEARING DIVISION
BORING LOCATION See Figure 1 SURFACE ELEV. 711.0*
DRILLER Norm Eger DATE: START 10/24/84 FINISH 10/24/84

DEPTH	SAMPLE No.	SAMPLE TYPE	SAMPLE INTERVAL FROM	SAMPLE INTERVAL TO	BLOW COUNT 0 6	BLOW COUNT 6 12	BLOW COUNT 12 18	RECOVERY IN INCHES	U.S.C.S. SOIL TYPE	PERCENT MOISTURE	qu TSF	CONTACT DEPTH	SOIL DESCRIPTION AND REMARKS	PIEZO.
									GP			.3	SANDY GRAVEL FILL.	
	1	SS	1.0	2.5				0	SP				BROWN MEDIUM TO COARSE SAND, SOME GRAVEL, TRACES OF CLAY. OVA=0 PPM	
	2	SS	2.5	4.0				4						
	3	SS	4.0	5.5				6						
5	4	SS	5.5	7.0				4					TRACES OF GRAVEL, OVA=0 PPM.	
	5	SS	7.0	8.5				4				8.5		
													BORING TERMINATED AT 8.5 FEET.	
10													WATER ENCOUNTERED AT APPROXIMATELY 7.5 FEET.	
													NOTE: OVA VALUE IS ORGANIC VAPOR LEVEL FROM BOREHOLE MONITORED WITH AN AID MODEL 580 PHOTOIONIZING OVA METER.	

* ESTIMATED

Canonie

Boring Log

PROJECT No. CE 83-182
BORING No. A-16
PAGE 1 OF 1

PROJECT NAME TORRINGTON BANTAM BEARING DIVISION
BORING LOCATION See Figure 1 SURFACE ELEV. 711.0*
DRILLER Norm Eger DATE: START 10/24/84 FINISH 10/24/84

DEPTH	SAMPLE No.	SAMPLE TYPE	INTERVAL FROM	INTERVAL TO	BLOW COUNT 0-6	BLOW COUNT 6-12	BLOW COUNT 12-18	RECOVERY IN INCHES	U.S.C.S. SOIL TYPE	PERCENT MOISTURE	qu TSF	CONTACT DEPTH	SOIL DESCRIPTION AND REMARKS	PIEZO
									GP			.3	SANDY GRAVEL FILL.	
	1	SS	1.0	2.5				0	SP				BROWN MEDIUM TO COARSE SAND, SOME GRAVEL. OVA=0 PPM.	
	2	SS	2.5	4.0				4					OVA=50 PPM.	
	3	SS	4.0	5.5				0					LARGE PIECE OF GRAVEL PREVENTED RECOVERY.	
5	4	SS	5.5	7.0				4					OVA=0 PPM.	
	5	SS	7.0	8.5				4				8.5		
													BORING TERMINATED AT 8.5 FEET.	
10													WATER ENCOUNTERED AT APPROXIMATELY 7.5 FEET.	
													NOTE: OVA VALUE IS ORGANIC VAPOR LEVEL FROM BOREHOLE MONITORED WITH AN AID MODEL 580 PHOTOIONIZING OVA METER.	

* ESTIMATED

Canonie

Boring Log

PROJECT No. CE 83-182
BORING No. A-17
PAGE 1 OF 1

PROJECT NAME TORRINGTON BANTAM BEARING DIVISION
BORING LOCATION SEE FIGURE 1 SURFACE ELEV. 710.0*
DRILLER NORM EGER DATE: START 10/24/84 FINISH 10/24/84

DEPTH	SAMPLE No.	SAMPLE TYPE	INTERVAL FROM	INTERVAL TO	BLOW COUNT 0 6 / 6 12	BLOW COUNT 6 12 / 12 18	RECOVERY IN INCHES	U.S.C.S. SOIL TYPE	PERCENT MOISTURE	qu TSF	CONTACT DEPTH	SOIL DESCRIPTION AND REMARKS	PIEZO
	1	SS	0.0	1.5			4	SP				BROWN COARSE TO MEDIUM SAND, SOME GRAVEL.	
	2	SS	1.5	3.0			9					OVA=400 PPM.	
	3	SS	3.0	4.5			6					OVA=1200 PPM.	
5	4	SS	4.5	6.0			12					GRAY MEDIUM TO COARSE SAND. OVA=1700 PPM.	
	5	SS	6.0	7.5			6					OVA=1500 PPM.	
	6	SS	7.5	9.0			6				9.0		
10												BORING TERMINATED AT 9.0 FEET. WATER ENCOUNTERED AT APPROXIMATELY 7.0 FEET. NOTE: OVA VALUE IS ORGANIC VAPOR LEVEL FROM BOREHOLE MONITORED WITH AN AID MODEL 580 PHOTOIONIZING OVA METER.	

* ESTIMATED

Canonie

Boring Log

PROJECT No. CE 83-182
BORING No. A-18
PAGE 1 OF 1

PROJECT NAME TORRINGTON BANTAM BEARING DIVISION
BORING LOCATION SEE FIGURE 1 SURFACE ELEV. 710.5*
DRILLER NORM EGER DATE: START 10/24/84 FINISH 10/24/84

DEPTH	SAMPLE No.	SAMPLE TYPE	SAMPLE INTERVAL FROM	SAMPLE INTERVAL TO	BLOW COUNT 0 6 / 6 12 / 12 18	RECOVERY IN INCHES	U.S.C.S. SOIL TYPE	PERCENT MOISTURE	qu TSF	CONTACT DEPTH	SOIL DESCRIPTION AND REMARKS	PIEZO.
	1	SS	0.0	1.5		6	SP				BLACK OILY COARSE TO MEDIUM SAND, TRACES OF CLAY AND GRAVEL. OVA = 1,100 PPM.	
	2	SS	1.5	3.0		6					BROWN MEDIUM TO COARSE SAND, TRACES OF GRAVEL. OVA >2,000 PPM.	
	3	SS	3.0	4.5		9					GRAY MEDIUM TO COARSE SAND, TRACE OF GRAVEL. OVA >2,000 PPM.	
5	4	SS	4.5	6.0		10						
	5	SS	6.0	7.5		8					OVA >2,000 PPM.	
	6	SS	7.5	9.0		8				9.0		
10											BORING TERMINATED AT 9.0 FEET. WATER ENCOUNTERED AT APPROXIMATELY 7.0 FEET. NOTE: OVA VALUE IS ORGANIC VAPOR LEVEL FROM BOREHOLE MONITORED WITH AN AID MODEL 580 PHOTOIONIZING OVA METER.	

* ESTIMATED

Canonie

Boring Log

PROJECT No. CE 83-182
BORING No. A-19
PAGE 1 OF 1

PROJECT NAME TORRINGTON BANTAM BEARING DIVISION
BORING LOCATION SEE FIGURE 1 SURFACE ELEV. 710.0*
DRILLER NORM EGER DATE: START 10/24/84 FINISH 10/24/84

DEPTH	SAMPLE No.	SAMPLE TYPE	SAMPLE INTERVAL FROM	SAMPLE INTERVAL TO	BLOW COUNT 0 TO 6	BLOW COUNT 6 TO 12	BLOW COUNT 12 TO 18	RECOVERY IN INCHES	U.S.C.S. SOIL TYPE	PERCENT MOISTURE	qu TSF	CONTACT DEPTH	SOIL DESCRIPTION AND REMARKS	PIEZO
												.75	REINFORCED CONCRETE.	
	1	SS	1.0	2.5	10	10	10	12	SP				GRAY MEDIUM TO COARSE SAND, SOME GRAVEL. OVA = 30 PPM.	
	2	SS	2.5	4.0	5	14	14	12					OVA = 100 PPM.	
	3	SS	4.0	5.5	4	4	4	12					TRACES OF GRAVEL. OVA = 100 PPM.	
5	4	SS	5.5	7.0	2	1	2	10					OVA = 100 PPM.	
	5	SS	7.0	8.5	2	2	2	10				8.5		
													BORING TERMINATED AT 8.5 FEET.	
10													WATER ENCOUNTERED AT APPROXIMATELY 6.5 FEET.	
													NOTE: OVA VALUE IS ORGANIC VAPOR LEVEL FROM BOREHOLE MONITORED WITH AN AID MODEL 580 PHOTOIONIZING OVA METER.	

* ESTIMATED

Canonie

Boring Log

PROJECT No. CE 83-182
BORING No. A-20
PAGE 1 OF 1

PROJECT NAME TORRINGTON BANTAM BEARING DIVISION
BORING LOCATION SEE FIGURE 1 SURFACE ELEV. 710.0*
DRILLER NORM EGER DATE: START 10/24/84 FINISH 10/24/84

DEPTH	SAMPLE No.	SAMPLE TYPE	SAMPLE INTERVAL FROM	SAMPLE INTERVAL TO	BLOW COUNT 0 TO 6	BLOW COUNT 6 TO 12	BLOW COUNT 12 TO 18	RECOVERY IN INCHES	U.S.C.S. SOIL TYPE	PERCENT MOISTURE	qu TSF	CONTACT DEPTH	SOIL DESCRIPTION AND REMARKS	PIEZO.
												.75	REINFORCED CONCRETE.	
	1	SS	1.0	2.5	7	18	-	6	SP				BLACK MEDIUM TO COARSE SAND, SOME GRAVEL.	
	2	SS	2.5	4.0	16	17	17	12					HIT OBSTRUCTION AT 2.0 FEET. GRAY MEDIUM TO COARSE SAND, TRACES OF GRAVEL.	
	3	SS	4.0	5.5	5	7	6	9					OVA = 75 PPM.	
5													OVA = 25 PPM.	
	4	SS	5.5	7.0	4	3	2	12					OVA = 50 PPM.	
	5	SS	7.0	8.5	1	7	1	10				8.5		
10													BORING TERMINATED AT 8.5 FEET. WATER ENCOUNTERED AT APPROXIMATELY 6.5 FEET. NOTE: OVA VALUE IS ORGANIC VAPOR LEVEL FROM BOREHOLE MONITORED WITH AN AID MODEL 580 PHOTOIONIZING OVA METER.	

* ESTIMATED

Canonie

Boring Log

PROJECT No. CE 83-182
BORING No. A-21
PAGE 1 OF 1

PROJECT NAME TORRINGTON BANTAM BEARING DIVISION
BORING LOCATION SEE FIGURE 1 SURFACE ELEV. 710.0*
DRILLER NORM EGER DATE: START 10/24/84 FINISH 10/24/84

DEPTH	SAMPLE No.	SAMPLE TYPE	SAMPLE INTERVAL FROM	SAMPLE INTERVAL TO	BLOW COUNT 0 to 6	BLOW COUNT 6 to 12	BLOW COUNT 12 to 18	RECOVERY IN INCHES	U.S.C.S. SOIL TYPE	PERCENT MOISTURE	qu TSF	CONTACT DEPTH	SOIL DESCRIPTION AND REMARKS	PIEZO.
												.75	REINFORCED CONCRETE.	
	1	SS	1.0	2.5	5	8	20	10	SP				BLACK MEDIUM TO COARSE SAND, TRACES OF GRAVEL. OVA = 50 PPM.	
												2.5	BORING TERMINATED AT 2.5 FEET.	
5													AN OBSTRUCTION WAS ENCOUNTERED AT 2.5 FEET. IT COULD NOT BE PENETRATED.	
													NOTE: OVA VALUE IS ORGANIC VAPOR LEVEL FROM BOREHOLE MONITORED WITH AN AID MODEL 580 PHOTOIONIZING OVA METER.	

* ESTIMATED

INDIANA-MICHIGAN WATER DEVELOPMENT CO.

1912 So. Main St.
SOUTH BEND 23, INDIANA
Phone 3-8231

Log. 943

Well #3

Well log for Torrington Company, South Bend, Indiana
Sold thru Sollitt Constr. Co.

Location of well North East Corner of New Building
2W. " . Old "

Date completed 4-17-53

Size or diameter 12"

Finished depth. Surface to bottom of screen 100'

SCREEN

Diameter 12

Length (Exclusive of fittings) 18'

Make and type Johnson Everdur

Opening or slot size 30 Slot

Fittings Standard

Formations encountered

0-17 Dry Sand	[illegible] Analysis
17-19 Hard Pan	80/97
19-33 Coarse gravel	70/55
33-37 Coarse gravel	66/46
37-41 Gravel with Clay balls	64/39
41-44 Clay	60/33
44-56 Fine Sand	58/28
56-75 Clay & Hard Pan	50/23
75-80 Sand & Gravel- Some Clay balls	36/40
80-97 Sand & Gravel	26/16
97-100 Fine Sand (Still in it)	12/14

75'-80' Same as 80'-97' but very dirty.

Total depth penetrated

Static or normal water level ~~from base of machine~~ 13' 15'

PUMPING TEST No test made — Tested 8/30 by Roy with Permanent Pump - W.O. 329

Drawdown 35 ft. at 325 GPM.

Permanent well information, as installed

LAYNE-NORTHERN COMPANY
Incorporated

MISHAWAKA, INDIANA

☐ TEST

☒ PERMANENT

Job No. M11,388

WELL LOG No. 4 CITY South Bend County St. Joseph

Owner Torrington Company Township Portage

Section

Location State Indiana

From Land Description ft. East and ft. North of SW Corner of Section.

From Street or Road On east side of bldg. approx. 15' SE of abandoned #3 well

FORMATION FOUND — DESCRIBE FULLY	FROM NATURAL GROUND LEVEL			
	Depth to Top of Stratum	Depth to Bottom of Stratum	Thickness of Stratum	Static Water Level
Sandy & gravely fill	0	7	7	
Sand	7	11	24	
Sand & gravel with boulders	11	57	46	
Sandy gravely clay	57	62	5	
Clay	62	78	16	
Dirty Sand & gravel & black silt	78	92	14	
Sand & gravel clean	92	112	20	13'
Stopped in clean sand and gravel				

30 inch diameter hole drilled by ☐ Cable Tool ☒ Rotary ☐ Jetting

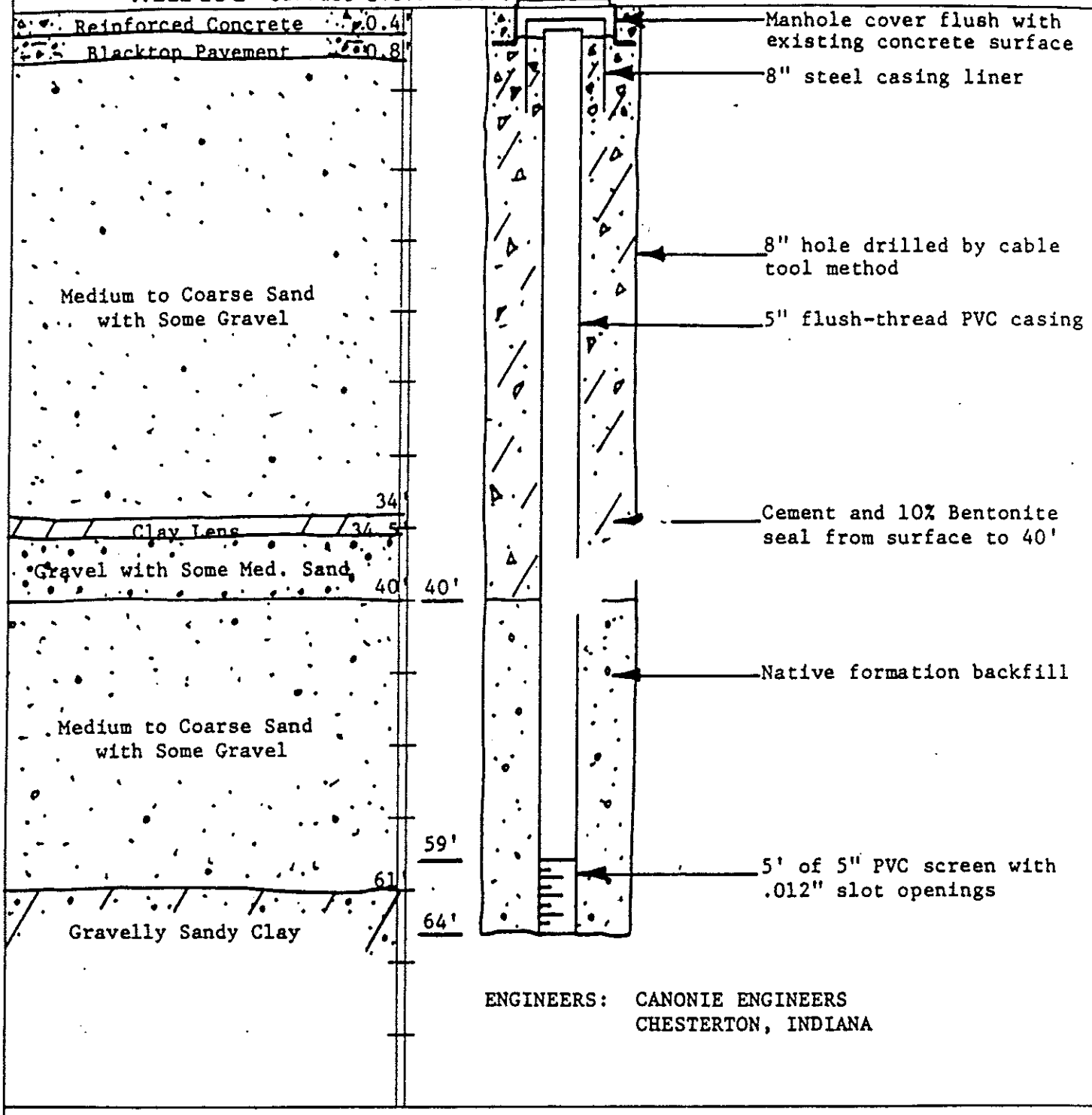
Pipe left in hole 93' of 16" pipe

Date Started 3/18/65 Finished 4/5/65 George Petz

APPENDIX B

ON-SITE
WELL CONSTRUCTION DIAGRAMS

WELL LOG Surface Elev. 713.46



ENGINEERS: CANONIE ENGINEERS
CHESTERTON, INDIANA

City South Bend State Indiana

Location Approximately 50' East of Water Supply Well #4

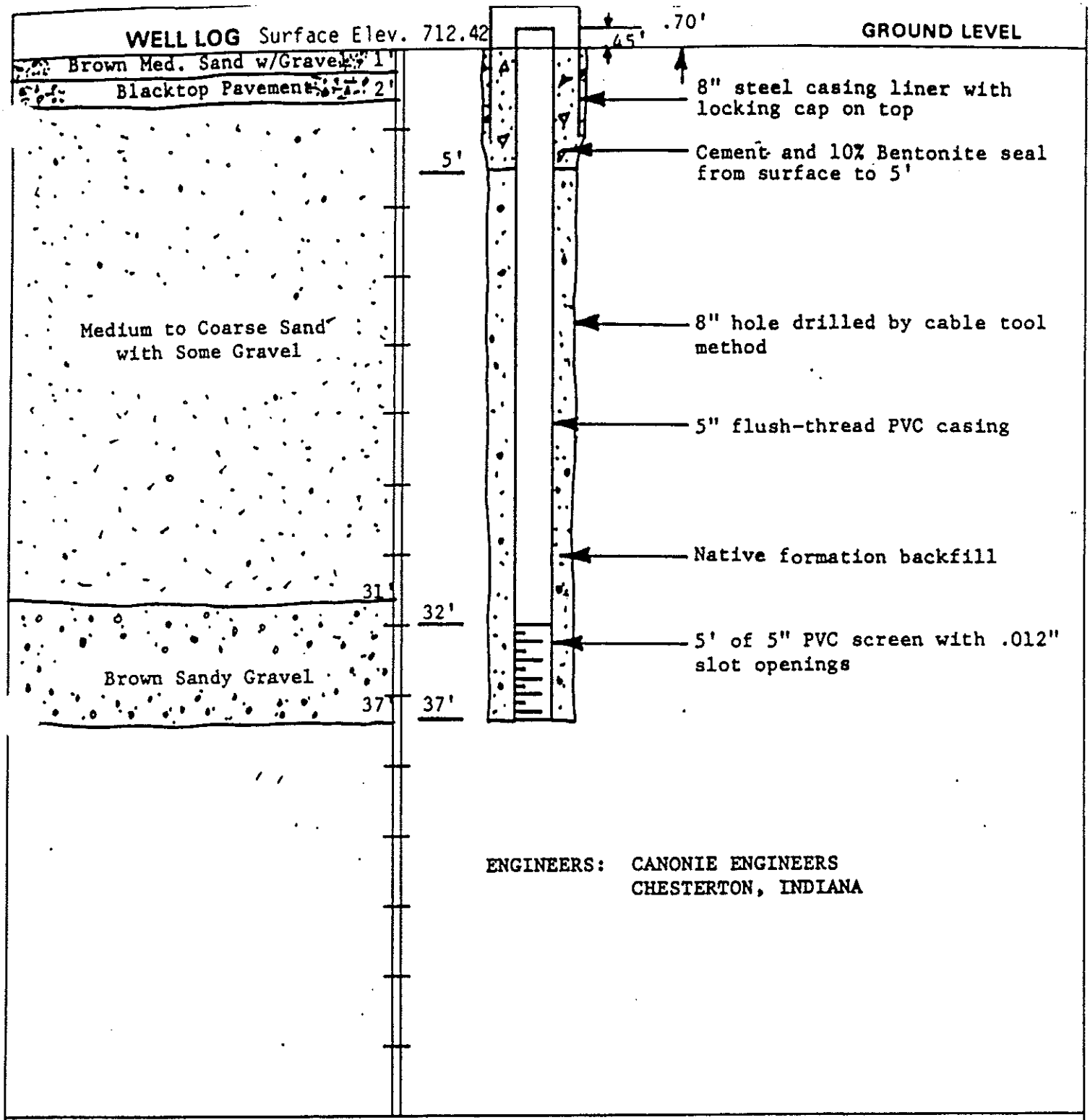
County St. Joseph Twp. Portage Section SE¼NW¼NE¼ of 16

Test Capacity _____ GPM. Static Water Level _____ ft. Pumping Level _____ ft.
Specific Capacity _____ GPM/Ft. D.D.
Date Drilled August 7, 1984
Driller John Blatz
Job No. 4704

Well No. W-1
TORRINGTON COMPANY
SOUTH BEND, INDIANA

PEERLESS-MIDWEST, INC.

WELL LOG Surface Elev. 712.42



ENGINEERS: CANONIE ENGINEERS
CHESTERTON, INDIANA

City South Bend State Indiana

Location Off NW Corner of Pond #1

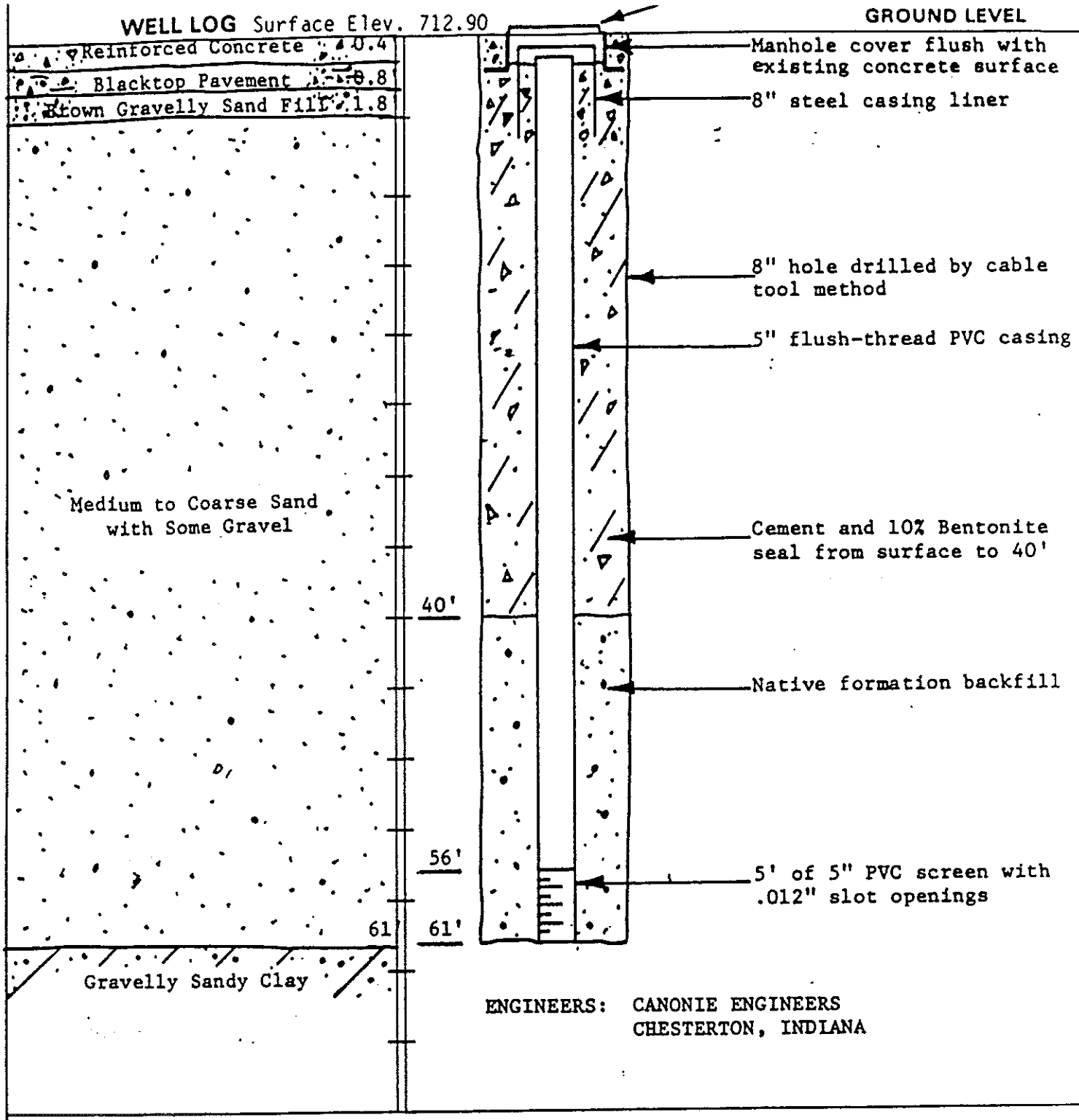
County St. Joseph Twp. Portage Section SE¼NW¼NE¼ of 16

Test Capacity _____ GPM. Static Water Level _____ ft. Pumping Level _____ ft.
Specific Capacity _____ GPM/Ft. D.D.
Date Drilled August 1, 1984
Driller John Blatz
Job No. 4704

Well No W-2
TORRINGTON COMPANY
SOUTH BEND, INDIANA

PEERLESS-MIDWEST, INC.
Groveer, Indiana

WELL LOG Surface Elev. 712.90



ENGINEERS: CANONIE ENGINEERS
CHESTERTON, INDIANA

City South Bend State Indiana

Location Approximately 15' East of NE Corner of Maintenance Shed "B"

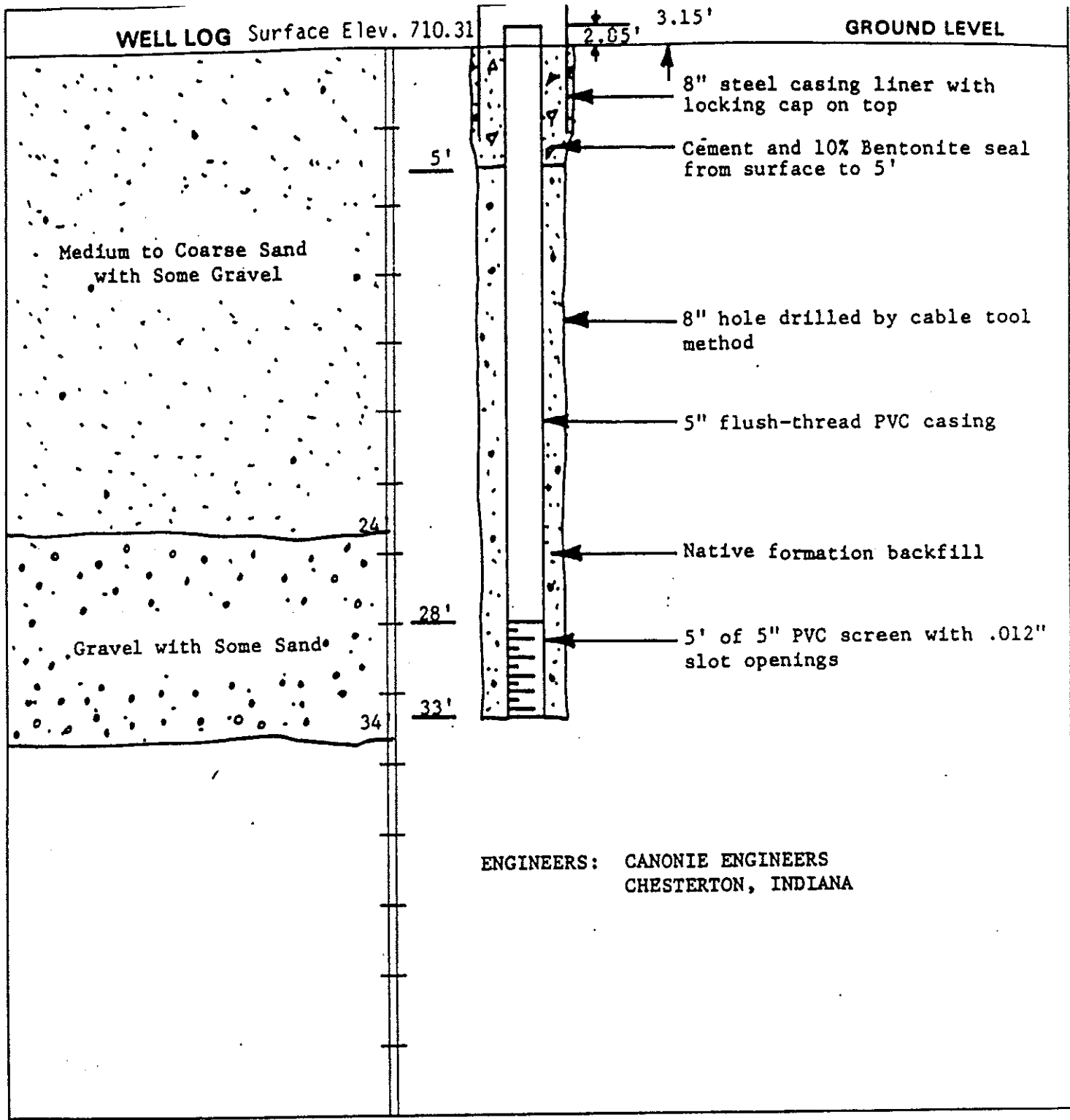
County St. Joseph Twp. Portage Section SE¼NW¼NE¼ of 16

Test Capacity _____ GPM. Static Water Level _____ ft. Pumping Level _____ ft.
Specific Capacity _____ GPM/Ft. D.D.
Date Drilled August 10, 1984
Driller John Blatz
Job No. 4704

Well No. W-3
TORRINGTON COMPANY
SOUTH BEND, INDIANA

PEERLESS-MIDWEST, INC.
Granger, Indiana

WELL LOG Surface Elev. 710.31



ENGINEERS: CANONIE ENGINEERS
CHESTERTON, INDIANA

City South Bend State Indiana

Location Along East Edge of Mound Containing Buried Oil Tanks Just North of Pond #4

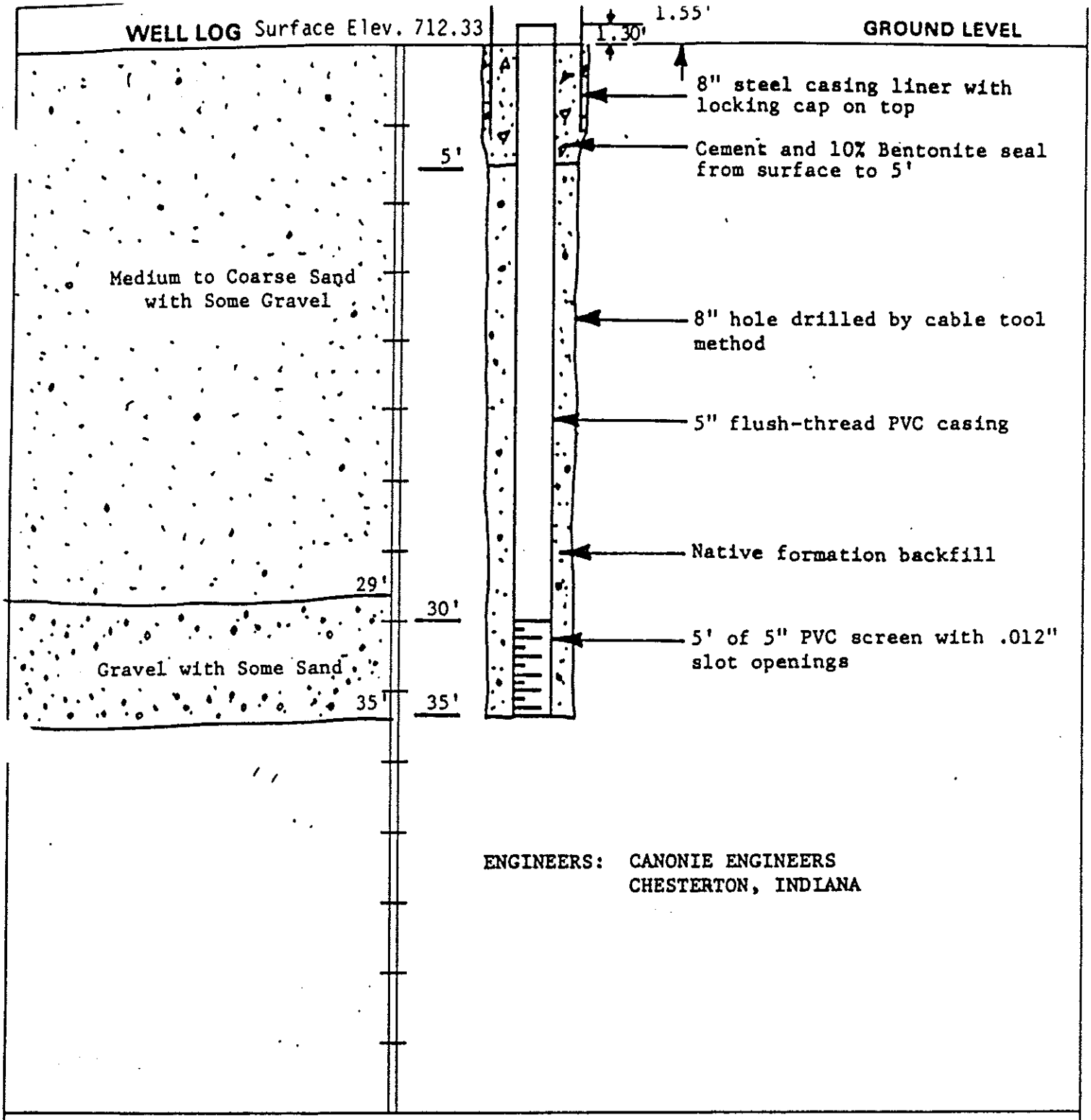
County St. Joseph Twp. Portage Section SE¼NW¼NE¼ of 16

Test Capacity _____ GPM. Static Water Level _____ ft. Pumping Level _____ ft.
Specific Capacity _____ GPM/Ft. D.D.
Date Drilled July 30, 1984
Driller John Blatz
Job No. 4704

Well No W-4
TORRINGTON COMPANY
SOUTH BEND, INDIANA

PEERLESS-MIDWEST, INC.
Granger, Indiana

WELL LOG Surface Elev. 712.33



ENGINEERS: CANONIE ENGINEERS
CHESTERTON, INDIANA

City South Bend State Indiana

Location On North Side of Line Between Pond #4 and Pond #3

County St. Joseph Twp. Portage Section SE¼NW¼NE¼ of 16

Test Capacity _____ GPM. Static Water Level _____ ft. Pumping Level _____ ft.

Specific Capacity _____ GPM/Ft. D.D.

Date Drilled July 31, 1984

Driller John Blatz

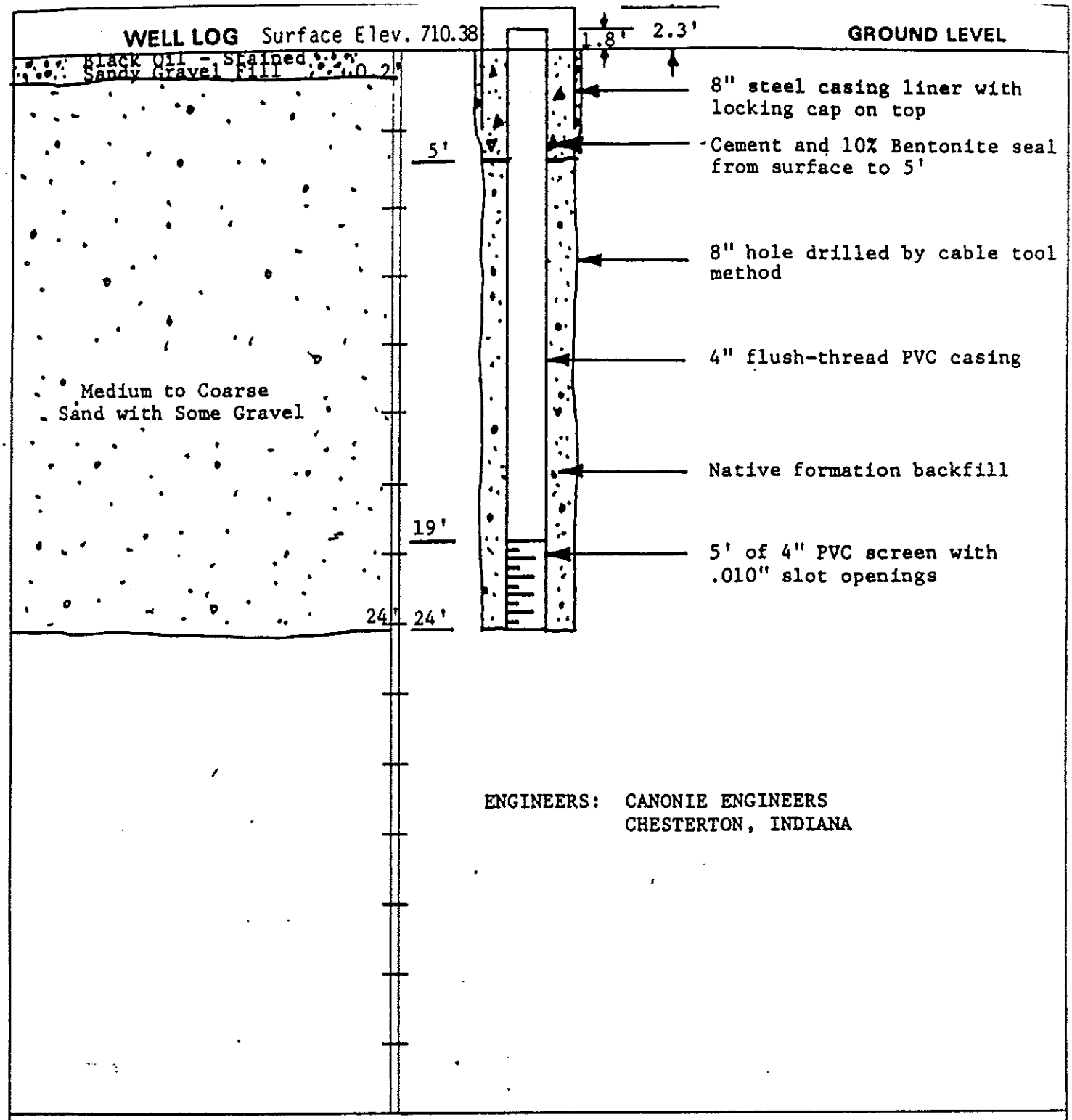
Job No. 4704

Well No W-5

TORRINGTON COMPANY
SOUTH BEND, INDIANA

PEERLESS-MIDWEST, INC.
Granger, Indiana

WELL LOG Surface Elev. 710.38



ENGINEERS: CANONIE ENGINEERS
CHESTERTON, INDIANA

City South Bend State Indiana

Location Next to above ground quench oil tanks on west side of plant

County St. Joseph Twp. Portage Section SE¼NW¼NE¼ of 16

Test Capacity _____ GPM. Static Water Level _____ ft. Pumping Level _____ ft.
Specific Capacity _____ GPM/Ft. D.D.
Date Drilled August 13, 1984
Driller John Blatz
Job No. 4704

Well No S-3

TORRINGTON COMPANY
SOUTH BEND, INDIANA

PEERLESS-MIDWEST, INC.
Granger, Indiana

Canonie

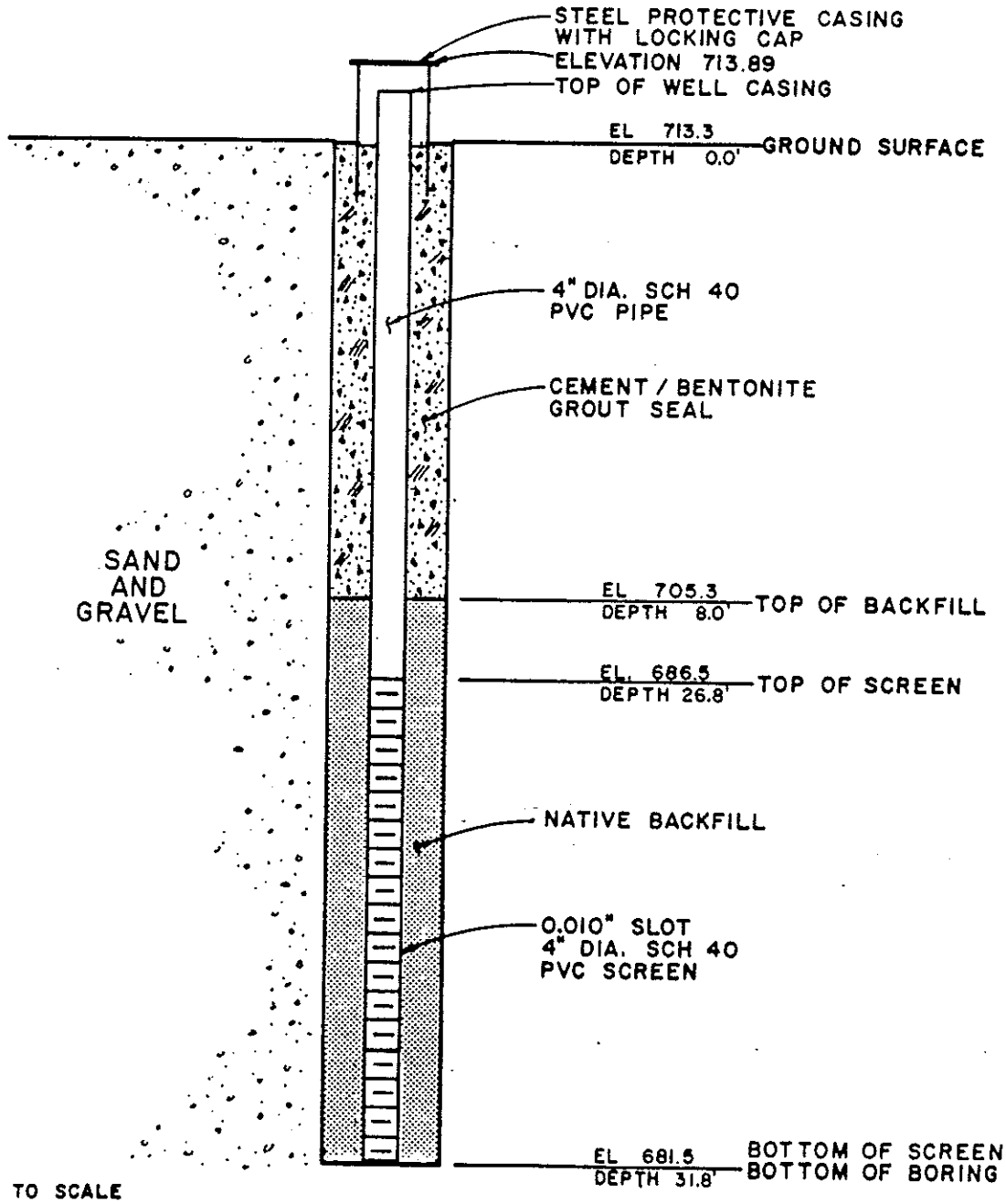
Observation Well Details

PROJECT No. 83-182

WELL No. W-7

PROJECT NAME BARNES AND THORNBURG

BORING LOCATION N 4550.88 E 5855.74* DATE 10-18-84 BY KMB



NOTE:
NOT DRAWN TO SCALE
* PLANT COORDINATES

Canonie

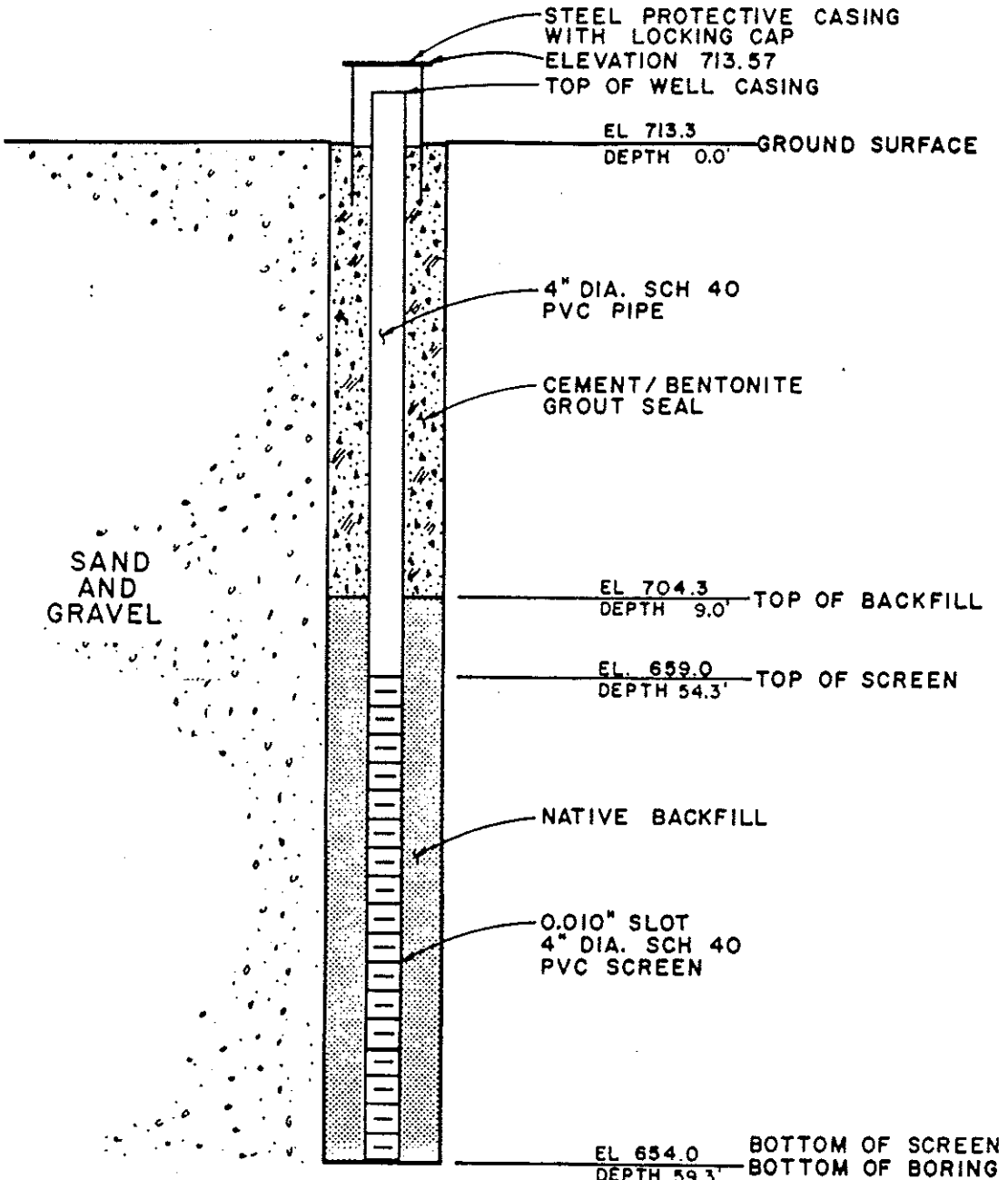
Observation Well Details

PROJECT No. 83-182

WELL No. W-8

PROJECT NAME BARNES AND THORNBURG

BORING LOCATION N 4542.42 E 5855.85* DATE 10-23-84 BY KMB



NOTE:
NOT DRAWN TO SCALE
* PLANT COORDINATES

Pipe extends ___ feet above ground level.

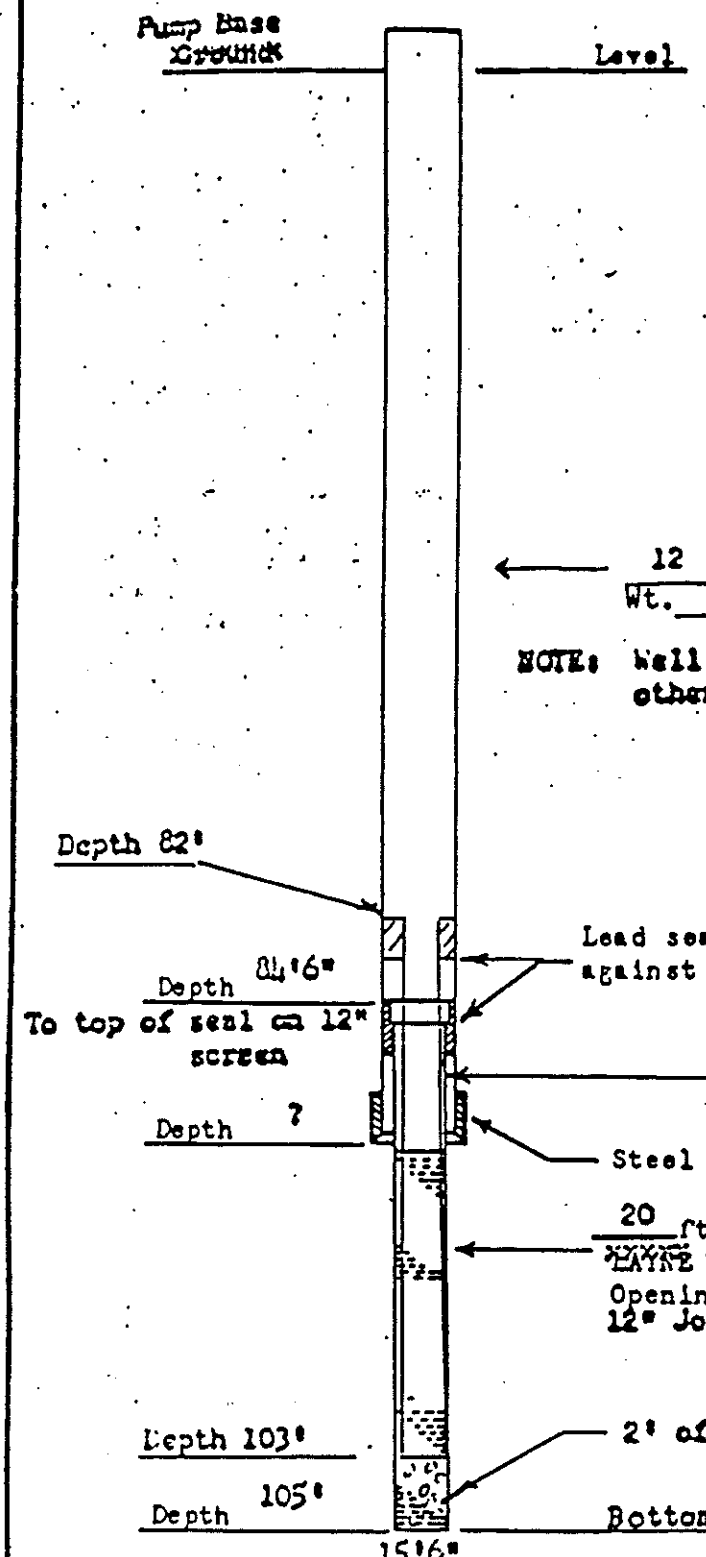
Job No. K11C27

Location from Street or Road
Inside new bldg.

County St. Joseph

Township Portage

Section



Pipe Tally	Welded Threaded
Bottom	
Top	
Total	

Static Level ___

Pumped 328 GPM

at 45' pumping level

after 1 hours

Driller Schoon

Date Finished June 10, 1964

Not drawn to scale
All depths measured from Ground Level

LAYNE TUBULAR WELL No. 3
For
TORRINGTON COMPANY
SOUTH BEND, IND.

LAYNE NORTHERN CO. INC.
MISHAWAKA, INDIANA

DRAWN BY	DRAWING No.
APPROVED BY	
DATE	

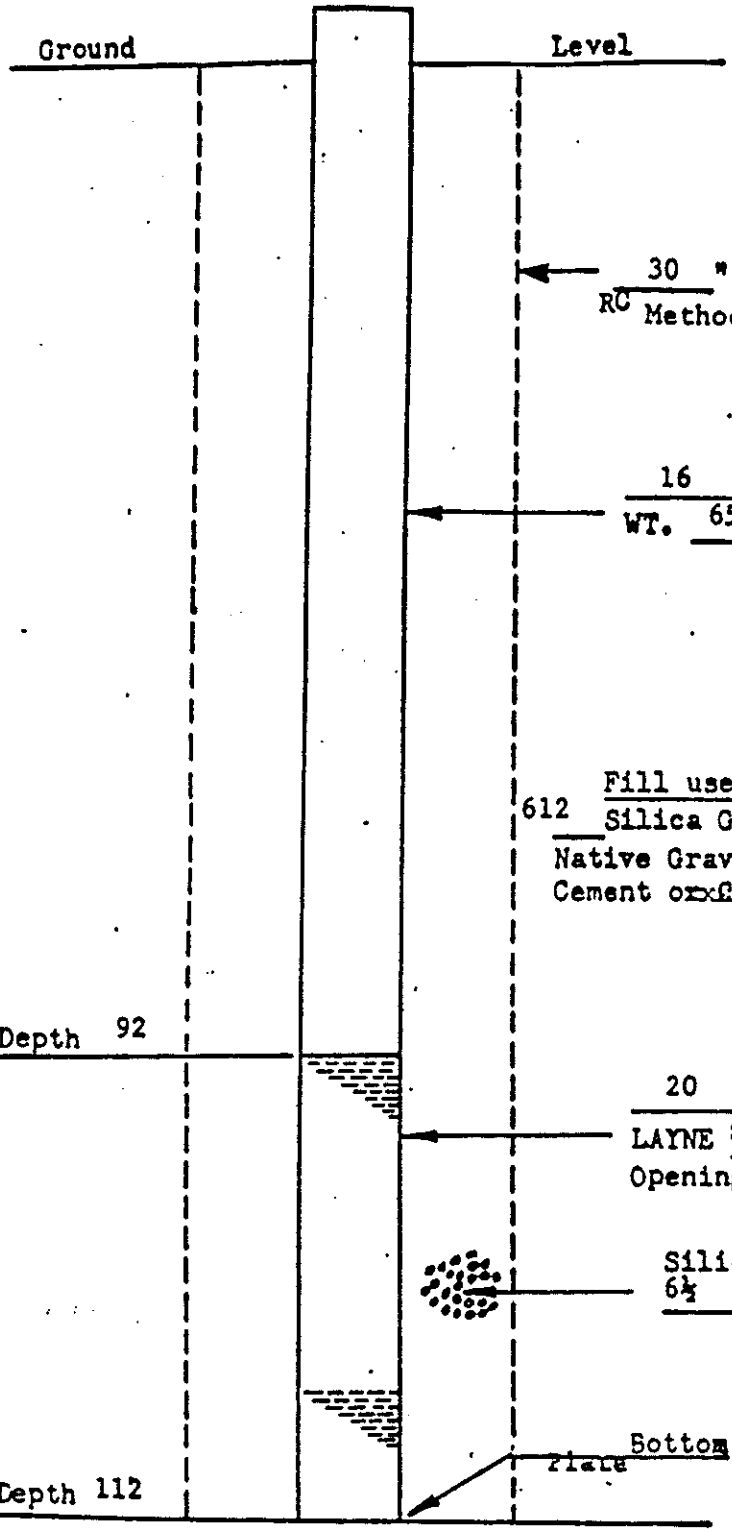
Pipe extends 1 feet above ground level

Job No. 11,300

Location:

7 ft. East of Foundry

7 Ft. South of old pump house



Pipe Tally	Welded ~~Threaded~~
Bottom	18'7"
	22' 8"
	21'3"
	19' 3"
	11' 3"
	93'

Fill used from Bottom Up:

612 Silica Gravel 112 to 72 ft.

Native Gravel 72 to 5 ft.

Cement ~~or fill~~ 5 to 0 ft.

St. Joseph Co.
Portage Twp.

Static Level 13'

Pumped 1034 GPM

at 50 pumping level

Driller George Petz

Date Finished 4/5/65

Not drawn to scale

All depths measured from Ground Level

LAYNE GRAVEL WALL WELL NO. 4

for

TORRINGTON COMPANY

SOUTH BEND, Indiana

LAYNE NORTHERN CO. INC.

MISHAWAKA, INDIANA

DRAWN BY	DRAWING NO.
APPROVED BY	
DATE	

APPENDIX C

REGIONAL GEOLOGIC LOGS

LAYNE-NORTHERN COMPANY
Incorporated
MISHAWAKA, INDIANA

☒ TEST
☐ PERMANENT

Job No. M10270

WELL LOG No. 60A CITY South Bend County St. Joseph

Owner Roach Appleton Company Township Portage

Section 19

Location State Indiana

From Land Description _____ ft. East and _____ ft. North of SW Corner of Sectio

From Street or Road 36' W. of CL of S. Wellington St. - 96' S. of CL of W. Sample S

FORMATION FOUND — DESCRIBE FULLY	FROM NATURAL GROUND LEVEL			
	Depth to Top of Stratum	Depth to Bottom of Stratum	Thickness of Stratum	Static Water Level
Top Soil	0	4	4	16
Sand	4	12	8	
Dirty Sand & Gravel	12	23	11	
Sand and Gravel (more gravel)	23	45	22	
Sand	45	56	11	
Sand and Gravel	56	58	2	
Sandy Clay	58	71	13	
Muddy Sand	71	97	26	
Muddy Sand & Gravel	97	104	7	
Muddy Sand	104	123	19	
Sand and gravel (clean)	123	154	31	16
Stopped in Sand & Gravel				

6 inch diameter hole drilled by ☒ Cable Tool ☐ Rotary ☐ Jetting

Pipe left in hole None

Date Started July 27, 1960 Finished Aug. 3, 1960 A. Folger

LAYNE-NORTHERN COMPANY
Incorporated

MISHAWAKA, INDIANA

☒ TEST
☐ PERMANENT

Job No. ____

WELL LOG No. 7A CITY South Bend County ~~Ind.~~ St. Joseph

Owner City Water Dept. Township Portage

Section ____

Location Sample St. just west of Olive St. State Ind.

From Land Description ____ ft. East and ____ ft. North of SW Corner of Section.

From Street or Road ____

FORMATION FOUND — DESCRIBE FULLY	FROM NATURAL GROUND LEVEL			
	Depth to Top of Stratum	Depth to Bottom of Stratum	Thickness of Stratum	Static Water Level
Muck	0	8		8.05
Light Sand and Gravel	8	20		
Light colored sand	30	28		
Cemented sand	28	35		
Sand and Gravel	35	47		
Sand and Gravel (somewhat coarser)	47-	75		
Good Water bearing gravel	75	115		
Not quite as good as above	115	125		
Sand and some gravel	125	137		
Good water, sand and gravel	137	150		
Somewhat coarser S&G and better	150	176		
Blue Shale	176	184		

____ inch diameter hole drilled by ☐ Cable Tool ☐ Rotary ☐ Jetting

Pipe left in hole

Date Started ____ Finished 1921

PRINTED

LAYNE-NORTHERN COMPANY
Incorporated
MISHAWAKA, INDIANA

☒ TEST
☐ PERMANENT

Job No. _____

WELL LOG No. 8A CITY South Bend County St. Joseph

Township Portage

Owner _____

Section _____

State Indiana

Location Sample St. and Camden

From Land Description _____ ft. East and _____ ft. North of SW Corner of Section.

From Street or Road _____

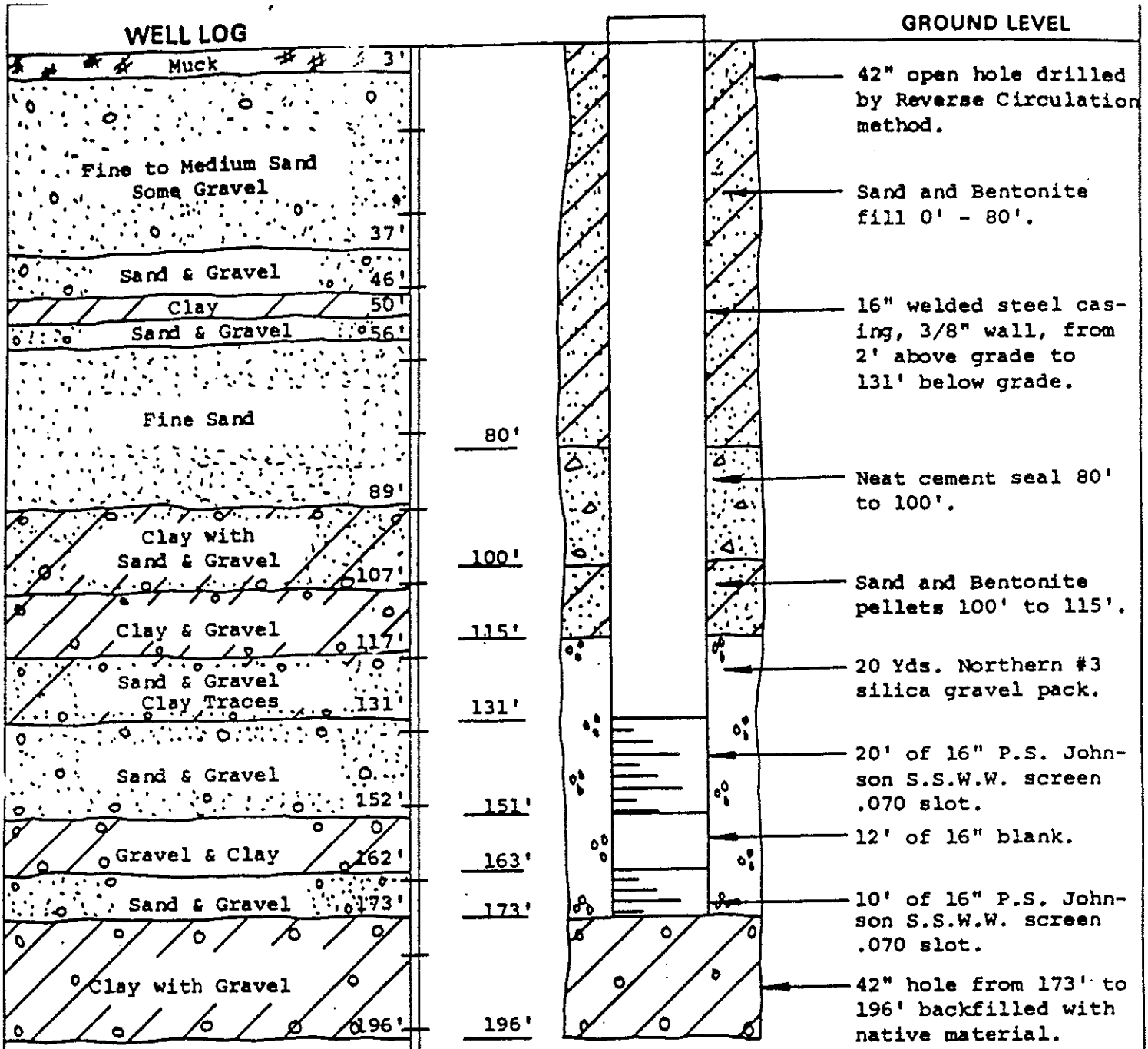
FORMATION FOUND — DESCRIBE FULLY	FROM NATURAL GROUND LEVEL			
	Depth to Top of Stratum	Depth to Bottom of Stratum	Thickness of Stratum	Static Water Level
Top Soil	0	8		5.94
Sand and Gravel	8-	25		
Hard Pan	25	32		
Sand and Gravel	32	44		
Sand and Gravel and Boulders	44	66		
Sand and Gravel small boulders	66	77		
Gravel	77	85		
Fine Sand with some gravel	85	105		
Fine Sand	105	115		
Fine Sand	115	124		
Hard Pan	124	127		
Coarse Sand	127	141		
Coarse Water Sand	141	155		
Fine reducing to sand	155	165		
Fine Sand	165	170		
Finer Sand	170	180		
Fine Sand with some Clay	180	188		
Shale	188	194		

_____ inch diameter hole drilled by ☐ Cable Tool ☐ Rotary ☐ Jetting

Pipe left in hole

Date Started _____ Finished 1921

WELL LOG



ENGINEERS:
Shilts, Graves & Associates
South Bend, Indiana

City South Bend State Indiana

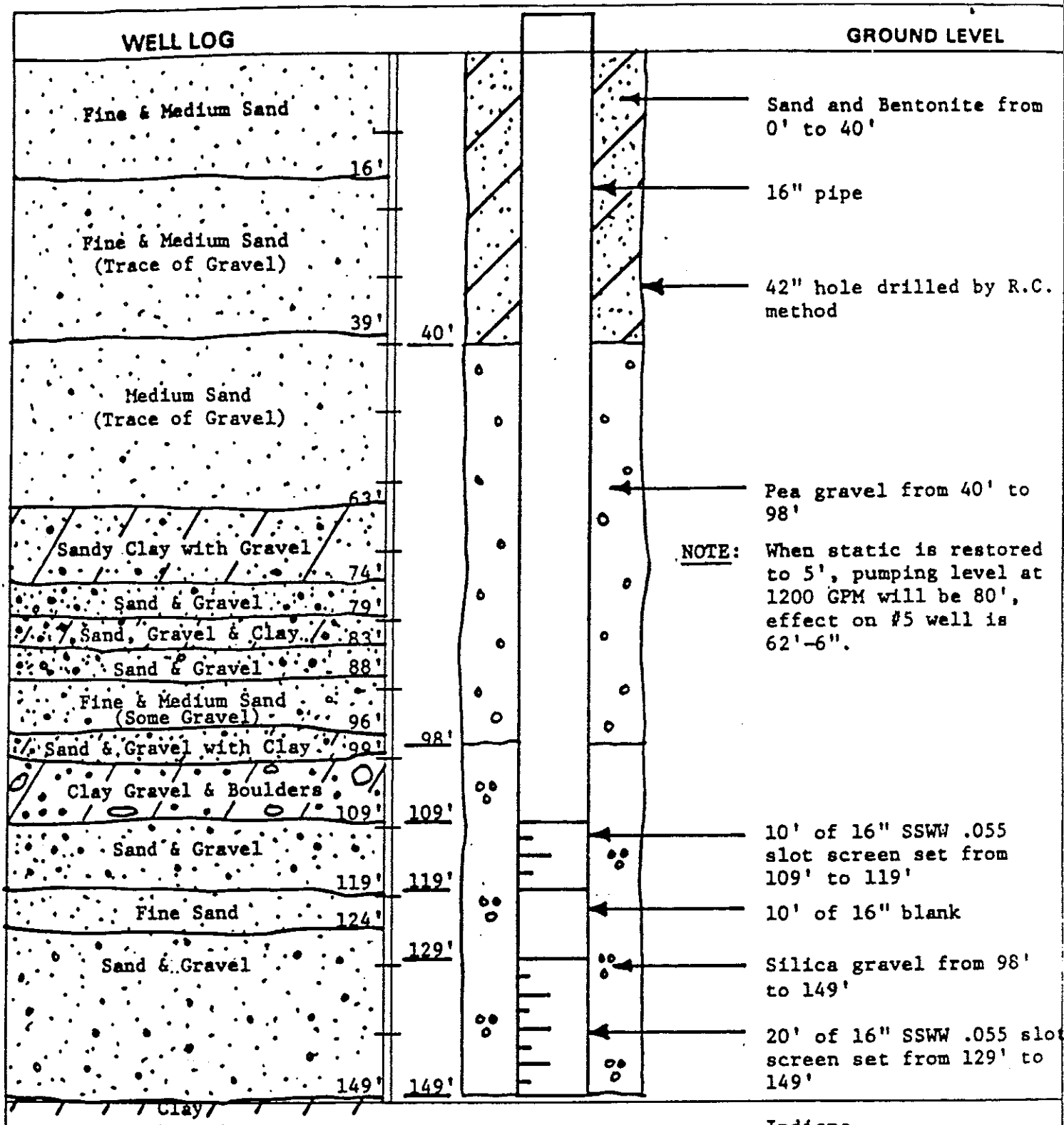
Location Davy-McKee Corp. Co-ordinates N785, E3860
785' N. of Calvert St. (extended) & 1130' W. of E. Line Section 16

County St. Joseph Twp. Portage Section N½ of SW¼ of 16

Test Capacity 2000 GPM. Static Water Level 5 ft. Pumping Level 114 ft.
Specific Capacity 18.35 GPM/Ft. D.D.
Date Drilled 2-18-81
Driller Mike Garrage
Job No. 2961

Well No. 1
New Energy Company of Indiana
South Bend, Indiana

PEERLESS-MIDWEST, INC.
Granger, Indiana



City South Bend State Indiana

Location N360 E3885

County St. Joseph Twp. Portage Section NW¼ of SW¼ of 16

Test Capacity 1200 GPM. Static Water Level 24' ft. Pumping Level 99 ft.
Specific Capacity 16.0 GPM/Ft. D.D.
Date Drilled 6-16-83
Driller Mike Garrage
Job No. 4027

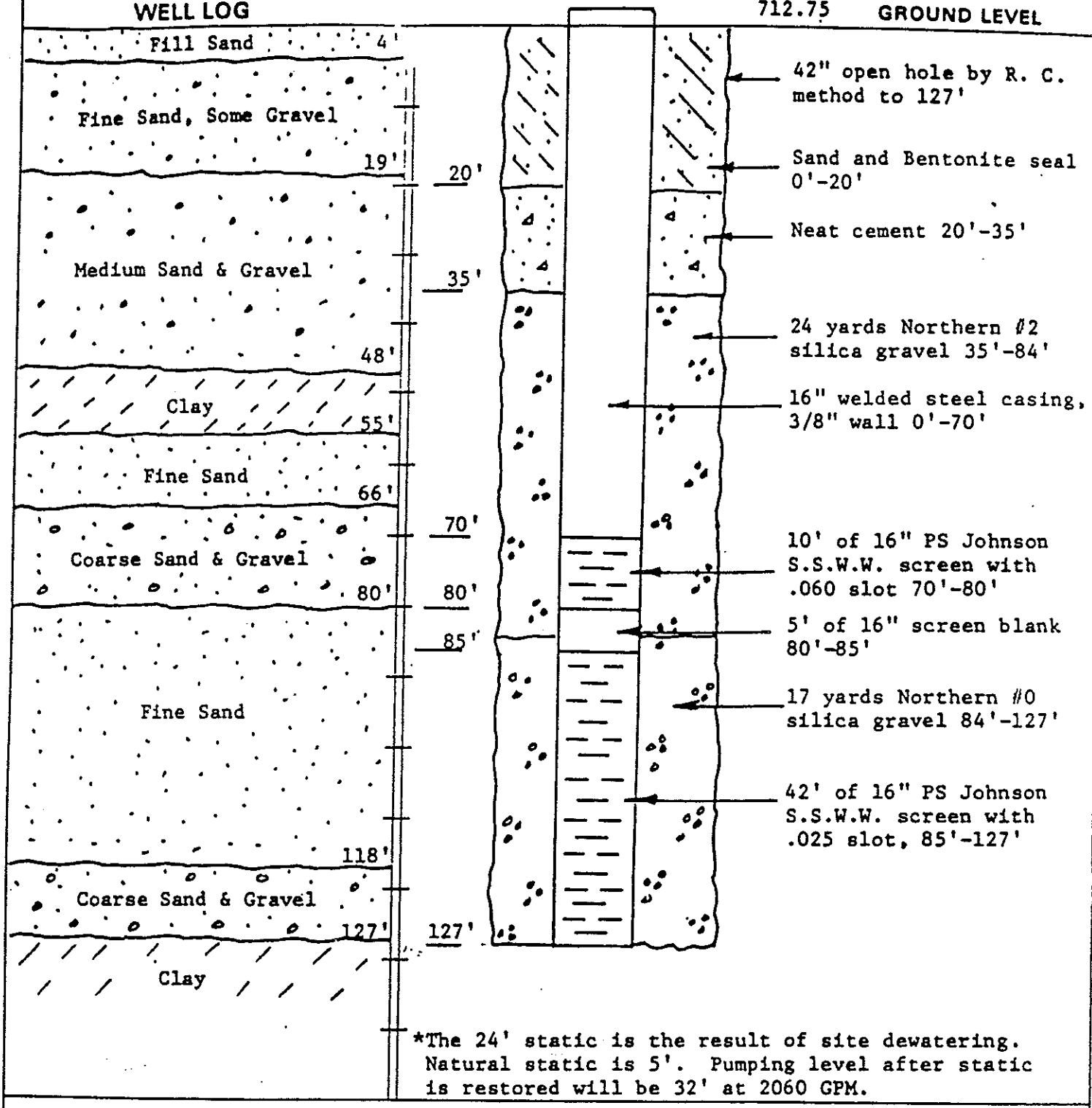
Well No 2

NEW ENERGY COMPANY OF INDIANA
SOUTH BEND, INDIANA

PEERLESS-MIDWEST, INC.
Granger, Indiana

WELL LOG

712.75 GROUND LEVEL



*The 24' static is the result of site dewatering. Natural static is 5'. Pumping level after static is restored will be 32' at 2060 GPM.

City South Bend State Indiana

Location N520 - E4260, 520' North of Calvert Street

County St. Joseph Twp. Portage Section NW¼ of SW¼ of 16

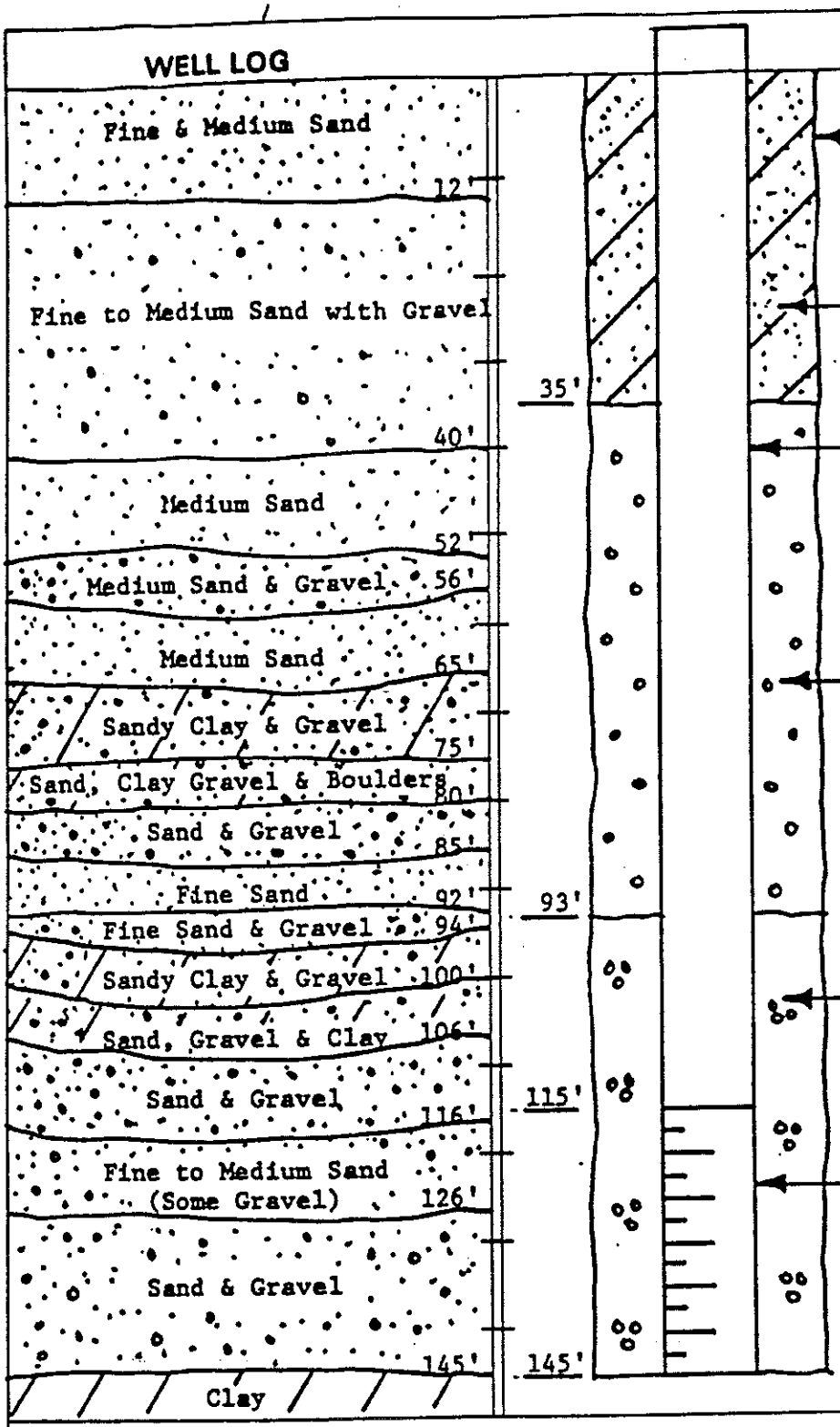
Test Capacity 2210 GPM. Static Water Level * 24 ft. Pumping Level * 53 ft.
Specific Capacity 76.2 GPM/Ft. D.D.
Date Drilled 5-13-83
Driller Mike Garrage
Job No. 4027

Well No 4
NEW ENERGY COMPANY OF INDIANA
SOUTH BEND, INDIANA

PEERLESS-MIDWEST, INC.
Granger, Indiana

WELL LOG

GROUND LEVEL



42" hole drilled by R. C. method

Sand and Bentonite from 0' to 35'

16" pipe

Pea gravel from 35' to 93'

NOTE: When static is restored to 5', pumping level at 1200 GPM will be 89', effect on #2 well is 62'.

Silica gravel from 93' to 145'

30' of 16" SSWW .055 slot screen

City South Bend State Indiana

Location N345 E3885

County St. Joseph Twp. Portage Section NW¼ of SW¼ of 16

Test Capacity 1200 GPM. Static Water Level 24 ft. Pumping Level 108 ft.

Specific Capacity 14.3 GPM/Ft. D.D.

Date Drilled 6-9-83

Driller Mike Garrage

Job No. 4027

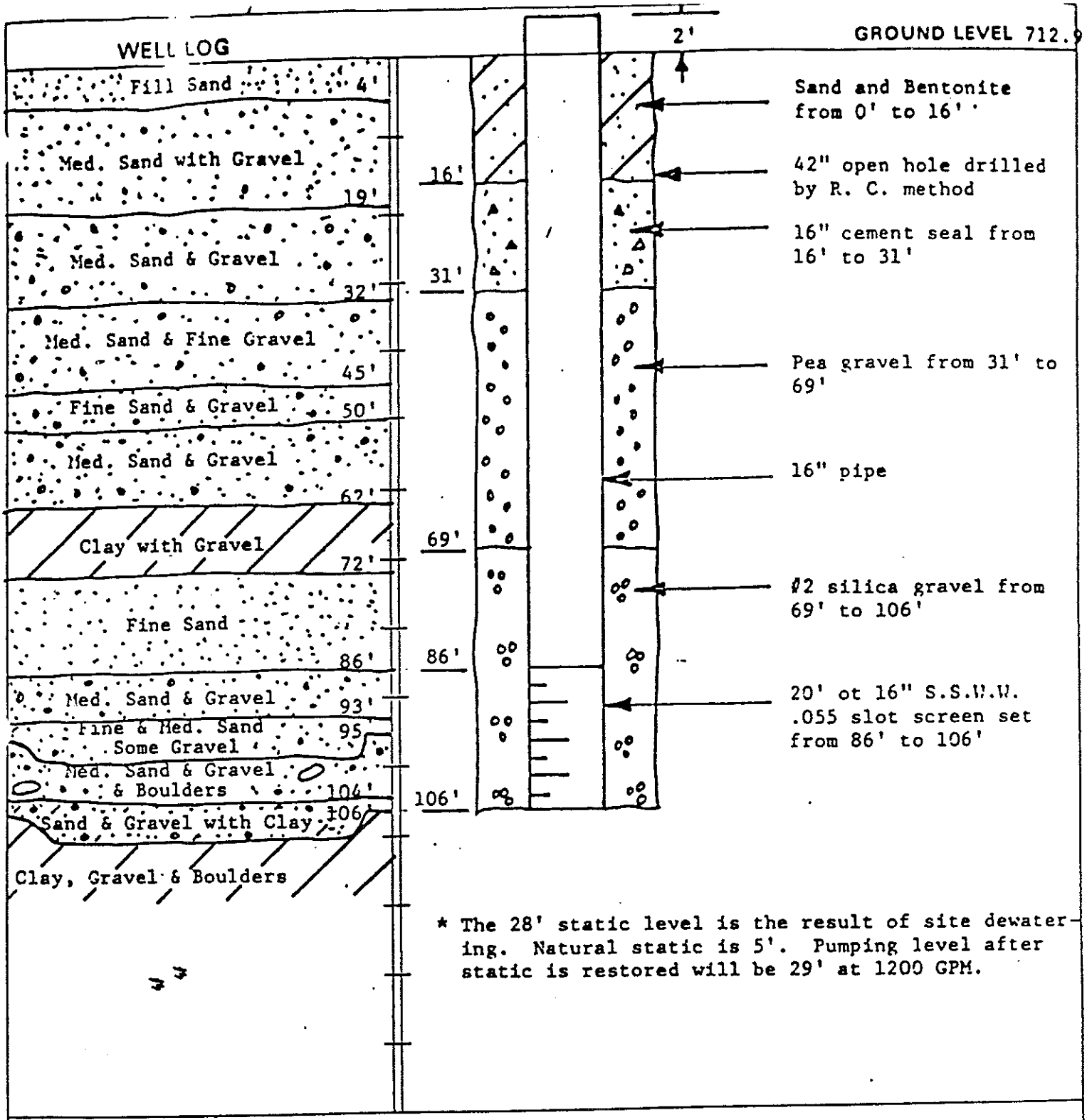
Well No 5

NEW ENERGY COMPANY OF INDIANA
SOUTH BEND, INDIANA

PEERLESS-MIDWEST, INC.
Granger, Indiana

WELL LOG

GROUND LEVEL 712.9'



* The 28' static level is the result of site dewatering. Natural static is 5'. Pumping level after static is restored will be 29' at 1200 GPM.

City South Bend State Indiana

Location N 376.5 - E 4160. 376.5' North of Calvert Street

County St. Joseph Twp. Portage Section NW¼ of SW¼ of 16

Test Capacity 1200 GPM. Static Water Level * 28 ft. Pumping Level * 52 ft.

Specific Capacity 50.75 GPM/Ft. D.D.

Date Drilled 9-1-83

Driller Mike Garrage

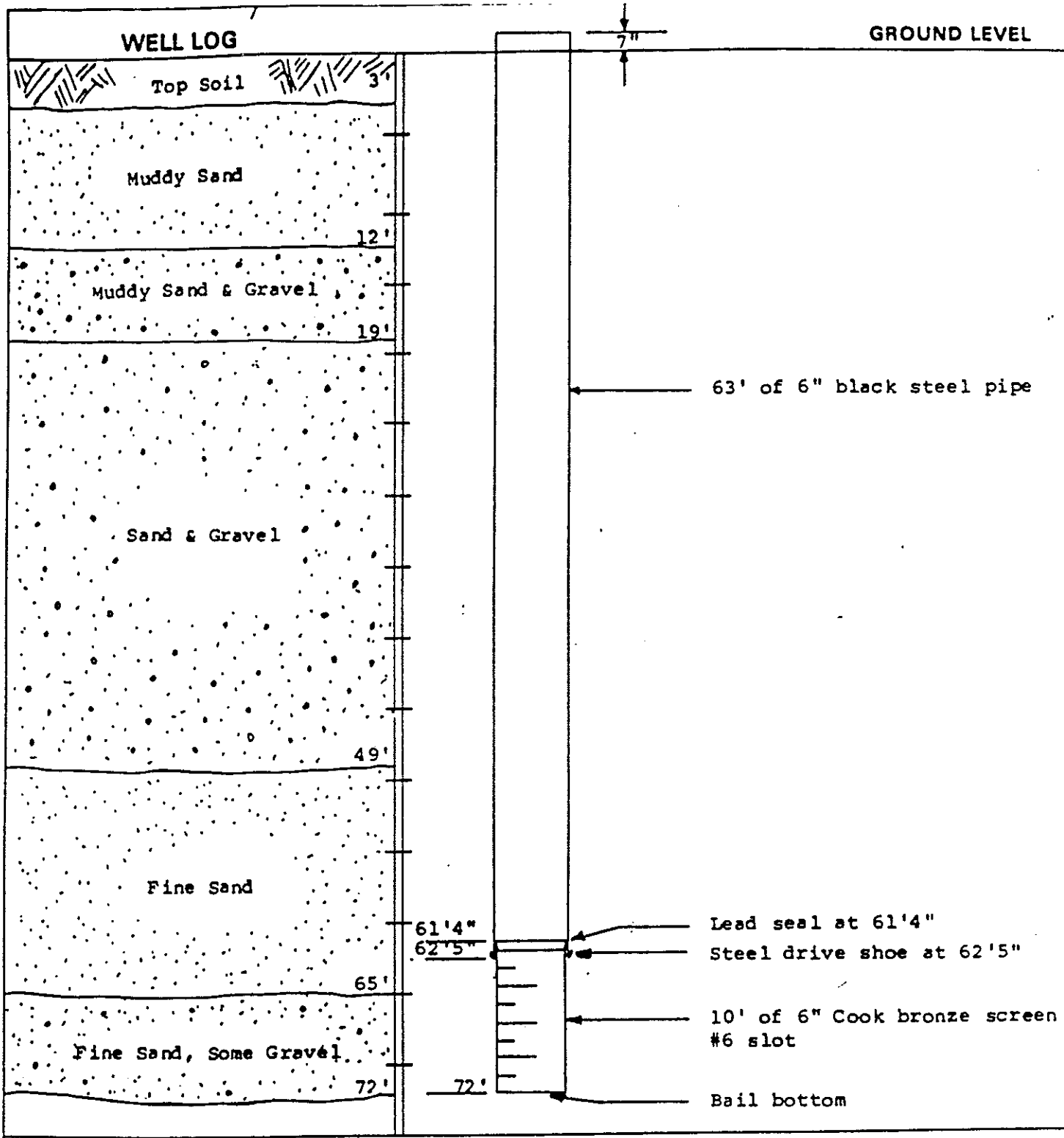
Job No. 4027

Well No 6

NEW ENERGY COMPANY OF INDIANA
SOUTH BEND, INDIANA

PEERLESS-MIDWEST, INC.
Granger, Indiana

WELL LOG



City South Bend State Indiana

Location 50' South of South Wall of Shop & 45' East of East Wall of Main Building

County St. Joseph Twp. Portage Section 8

Test Capacity 160 GPM. Static Water Level 16 ft. Pumping Level 34 ft.
Specific Capacity 8.8 GPM/Ft. D.D.
Date Drilled 1-14-60
Driller Others
Job No.

Well No 1

WASHINGTON HIGH SCHOOL
SOUTH BEND, INDIANA

PEERLESS-MIDWEST, INC.
Granger, Indiana

Layne-Northern Company

Division of Layne-Western Company, Inc.

INDIANAPOLIS • MISHAWAKA • LANSING

☑ TEST

☐ PERMANENT

Job No. MS1033

WELL LOG No. 79A CITY South Bend County St. Joseph

Owner Martin Blad Township Portage

Section 21

Location State Indiana

From Land Description SE¼, SE¼, NW¼

From Street or Road 5000' E. of Mayflower Rd. 2000' N. of U.S. 20 Bypass

FORMATION FOUND – DESCRIBE FULLY	FROM NATURAL GROUND LEVE			
	Depth to Top of Stratum	Depth to Bottom of Stratum	Thickness of Stratum	S W L
Black muck	0	4	4	
Brown medium sand to med. gravel	4	113	109	4
Grey clay	113	115	2	
Brown medium sand to medium gravel	115	130	15	
Grey clay	130	134	4	
Brown medium sand to medium gravel	134	140	6	
Brown medium to coarse sand	140	145	5	
Brown coarse sand, gravel and rocks	145	187	42	
Blue clay	187	192	5	
Blue shale	192	200		

Hole 6¼ "Dia Drilled by: { Cable Tool ____ Rotary X Jetting ____ / Reverse Circ. ____ Bucket ____ Auger ____ }

Rotary Hole Grouted: Neat Cement ____ Drilling Mud X Other ____

Casing 4 "OD From 24 "above ground to 165 feet below ground. Weight ____ Pounds per

Screen 4 " Set from 165 to 170 feet Make Layne Type Plastic Slot .025

Pumping test 80 plus or minus GPM drawdown to ____ feet after 1 hours pumping

Date Completed 9/25/79 Driller Don Snyder

Incorporated

MISHAWAKA, INDIANA

☐ TEST

☒ PERMANENT

Job No. M-6715

WELL LOG No. A CITY South Bend County St. Jos.

Owner ~~Martin Blad Farm~~ Township ~~Portage~~

Section 9

State Indiana

Location 155' W. of Mayflower Road-15' S. of #1 Well pump house

From Land Description ____ ft. East and ____ ft. North of SW Corner of Section.

From Street or Road ____

FORMATION FOUND — DESCRIBE FULLY	FROM NATURAL GROUND LEVEL			
	Depth to Top of Stratum	Depth to Bottom of Stratum	Thickness of Stratum	Static Water Level
~~Fill~~	0	2'	2'	5' 10"
~~Muck~~	2'	6'	4'	
~~Brown Sand Some gravel~~	6'	24'	18'	
~~Gravel Some Sand~~	24'	35'	11'	
~~Brown Sand (fine)~~	35'	40'	5'	
~~Sand and Gravel~~	40'	42'	2'	
~~Good Sand & Gravel~~	42'	68'	26'	

12 inch diameter hole drilled by ☐ Cable Tool ☐ Rotary ☐ Jetting

Pipe left in hole

Date Started ~~June 10, 1957~~ Finished June 13, 1957 A. Folger

DRILLER

LAYNE-NORTHERN COMPANY
Incorporated

MISHAWAKA INDIANA

☐ TEST

☑ PERMANENT

Job No. M10390

WELL LOG No. 1 CITY So. Bend County St. Joseph

Owner Martin Bird Farms Township Portage

Section 19

Location State Indiana

From Land Description ____ ft. East and ____ ft. North of SW Corner of Section.

From Street or Road 200' West of Cleveland Road-50' East of large drainage ditch

FORMATION FOUND — DESCRIBE FULLY	FROM NATURAL GROUND LEVEL			
	Depth to Top of Stratum	Depth to Bottom of Stratum	Thickness of Stratum	Static Water Level
Good Sand and gravel	49	70	21	6'
Light brown fine sand	70	75	5	
Light brown sand and gravel (muddy)	75	78	3	
Sandy Clay	78	90	12	
Sandy Clay some gravel	90	102	12	
Sand Gravel, some sand (clean)	102	105	3	
Brown Sand, some gravel	105	115	10	
Brown Sand and gravel	115	135	20	
Clean Coarse grey sand and gravel	135	160	25	
Old screen pulled and well drilled to 160 ft.				

12 inch diameter hole drilled by ☐ Cable Tool ☐ Rotary ☐ Jetting

Pipe left in hole

Date Started 3-7-61 Finished 3-27-61 ... Folger
Driller

LAINE-NORTHERN COMPANY
Incorporated
MISHAWAKA, INDIANA

PERMANENT
WELL LOG No. 2 CITY SOUTH BEND County ST. JOSEPH
Owner MARTIN BLAD FARMS Township PORTAGE
Section 21
Location State INDIANA
From Land Description ft. East and ft. North of SW Corner of Sectio
From Street or Road 1/4 mile north of Praire Avenue and one mile east of Mayflower road.

FORMATION FOUND — DESCRIBE FULLY	FROM NATURAL GROUND LEVEL			
	Depth to Top of Stratum	Depth to Bottom of Stratum	Thickness of Stratum	Static Water Level
Muck	0	3	3	
Sand and clay	3	12	9	
Fine sand	12	35	23	
Coarse sand	35	50	15	
Fine sand	50	53	3	
Clay	53			

____ inch diameter hole drilled by ☐ Cable Tool ☐ Rotary ☐ Jetting

Pipe left in hole

Date Started ____ Finished 1-28-48 Charles Kimble
DRILLER

LAYNE-NORTHERN COMPANY
Incorporated

MISHAWAKA, INDIANA

K-2585

PERM.
WELL LOG No. 3 CITY South Bend County St. Joseph

Owner Martin Blad Farms Township Portage

Section 20

Location State Indiana

From Land Description _____ ft. East and _____ ft. North of SW Corner of Section.

From Street or Road 75' West of Center Line of Mayflower Road and 3' South of foundation of Boiler House

FORMATION FOUND — DESCRIBE FULLY	FROM NATURAL GROUND LEVEL			
	Depth to Top of Stratum	Depth to Bottom of Stratum	Thickness of Stratum	Static Water Level
Muck	0	10	10	
Very fine brown sand	10	18	18	
Course sand and fine gravel	18	30	12	5' 11"
Fine Sand	30	38	8	
Brown gummy clay	38	42	4	
Very fine brown sand	42	45	3	
Med. brown sand, little gravel	45	54	9	
Fine & Med. gravel and sand and(not clean)	54	61	7	

8 inch diameter hole drilled by ☒ Cable Tool ☐ Rotary ☐ Jetting

Pipe left in hole

Date Started 12/22/48 Finished 1/7/49 L. Ness

DRILLER

LAYNE-NORTHERN COMPANY
Incorporated

MISHAWAKA, INDIANA

WELL LOG No. 1 CITY South Bend County St. Joe

Owner Martin Blod Farms Township Portage

Section 17

State Indiana

Location

From Land Description _____ ft. East and _____ ft. North of SW Corner of Section

From Street or Road Approximately .6 of mile East & North of Mayflower Pond & 100 ft. South of N. Y. C. Railroad

FORMATION FOUND — DESCRIBE FULLY	FROM NATURAL GROUND LEVEL			
	Depth to Top of Stratum	Depth to Bottom of Stratum	Thickness of Stratum	Static Water Level
Muck	0	4	4	11'
Fine & Medium Sand (Muddy)	4	12	8	
Medium Red Sand	12	36	24	
Sand & Gravel	36	52	16	
Fine sand	52	60	8	
Clay-gray and hard	60	76	16	
Medium & Fine Sand	76	95	19	
Clean Course Sand, little gravel	95	118	23	
Course sand (clean)	118	123	5	
Course sand & gravel	123	130	7	
Medium & Fine gravel still in Formation	130	142	12	

12 inch diameter hole drilled by ☒ Cable Tool ☐ Rotary ☐ Jetting

Pipe left in hole 10'6"

Date Started 2-9-49 Finished 3-10-49 L. Hess

DRILLER

LAYNE-NORTHERN COMPANY

Incorporated

MISHAWAKA, INDIANA

PERMANENT
WELL LOG No. 1 CITY SOUTH BEND County ST. JOSEPH

Owner MARTIN BLAD FARM Township PORTAGE

Section 19

Location 50' SOUTH OF SOUTHWEST CORNER OF WAREHOUSE State INDIANA

From Land Description _____ ft. East and _____ ft. North of SW Corner of Sectio

from Street or Road 200' WEST OF MAYFLOWER ROAD

FORMATION FOUND—DESCRIBE FULLY	FROM NATURAL GROUND LEVEL			
	Depth to Top of Stratum	Depth to Bottom of Stratum	Thickness of Stratum	Static Water Level
Top Soil	0'	6'	6'	
Fine Muddy Sand	6'	28'	22'	6'
Clay	28'	30'	2'	6'
Medium sand and some gravel	30'	39'	9'	6'
Coarse sand and some gravel	39'	60'	26'	6'

XX 12 inch diameter hole drilled by ☒ Cable Tool ☐ Rotary ☐ Jetting

Pipe left in hole 65' 1"

Date Started 4-17-46 Finished 4-23-46 CHARLES KIBLE
DRILLER

LAYNE-NORTHERN COMPANY
Incorporated
MISHAWAKA, INDIANA

TEST
WELL LOG No. 2 CITY SOUTH BEND County ST. JOSEPH

Owner MARTIN BLAD FARMS Township PORTAGE

Section INDIANA

State 17

Location

From Land Description _____ ft. East and _____ ft. North of SW Corner of Section

From Street or Road 8/10 mile N.E. of highway 123 & 20 feet South of Large Drain Ditch next to N.Y.C. Railroad

FORMATION FOUND — DESCRIBE FULLY	FROM NATURAL GROUND LEVEL			
	Depth to Top of Stratum	Depth to Bottom of Stratum	Thickness of Stratum	Static Water Level
Muck	0	8	8	
Sand	8	36	28	
Sand & Gravel	36	52	16	
Fine Sand	52	60	8	
Clay	60	76	16	
Muddy Sand	76	95	19	
Sand & Gravel Formation	95	117	22	3
Still in good formation				

6 inch diameter hole drilled by ☒ Cable Tool ☐ Rotary ☐ Jetting

Pipe left in hole

Date Started 1/17/49 Finished 1/27/49 Harry Hess
DRILLER

LAYNE-NORTHERN COMPANY

Incorporated

MISHAWAKA, INDIANA

☒ TEST

☐ PERMANENT

Job No. M-6133

WELL LOG No. 3 CITY SOUTH BEND County ST. JOSEPH

Owner MARTIN BLAD Township PORTAGE

Section XXX

Location 1862' WEST AND 55' FOOT SOUTH OF POTATOE State INDIANA

From Land Description _____ ft. East and _____ ft. North of SW Corner of Section

From Street or Road _____

FORMATION FOUND — DESCRIBE FULLY	FROM NATURAL GROUND LEVEL			
	Depth to Top of Stratum	Depth to Bottom of Stratum	Thickness of Stratum	Static Water Level
Muck	0'	3'	3'	
Marrow	3'	12'	8'	
Very fine sand	12'	40'	28'	
Clay	40'	51'	11'	
Gravel	51'	67'	16'	
Sandy clay with gravel strips	67'	71'	4'	
Clay, rocks	71'	91'	20'	
Clay, rocks	91'	100'	9'	
Clay, rocks	100'	111'	11'	
Clay, with strips of sand	111'	121'	10'	
Gravel	121'	160'	39'	15'
Clay	160'	171'	11'	

6 inch diameter hole drilled by ☐ Cable Tool ☒ Rotary ☐ Jetting

Pipe left in hole

Date Started 10-22-53 Finished 10-29-53 GEORGE PEET

Incorporated

MISHAWAKA, INDIANA

TEST WELL LOG No. 1 CITY SOUTH BEND County ST. JOSEPH

Owner MARTIN BLAD FARMS Township PORTAGE

Section 19

Location State INDIANA

From Land Description ____ ft. East and ____ ft. North of SW Corner of Sectio

From Street or Road 15' North of County Drain Ditch
5280' East of Mayflower Road

FORMATION FOUND — DESCRIBE FULLY	FROM NATURAL GROUND LEVEL			
	Depth to Top of Stratum	Depth to Bottom of Stratum	Thickness of Stratum	Static Water Level
Muck	0	4	4	
Red muck	4	10	6	4
Red sand (not clean)	10	25	15	
Medium sand and a little gravel (cleaner)	25	33	8	
Coarse sand (clean)	33	43	10	
Coarse sand and a little gravel	43	53	10	
Fine sand (not clean)	53	56	3	
Fine muddy sand	56	60	4	
Fine sand and muddy clay	60	86	26	

8 x 6 inch diameter hole drilled by ☑ Cable Tool ☐ Rotary ☐ Jetting

Pipe left in hole

Date Started 9-15-47 Finished 9-2-47 L. Ness
DRILLER

LAYNE-NORTHERN COMPANY
Incorporated
MISHAWAKA, INDIANA

☐ TEST
☒ PERMANENT

Job No. _____

WELL LOG No. 1 CITY South Bend County St. Jos.

Owner Roach Appleton Mfg. Co. Township Portage

RECORDED AS WELL 37/2-1685 in STATE BULL. #15 (1962) Section 19

Location State Indiana

From Land Description _____ ft. East and _____ ft. North of SW Corner of Section.

From Street or Road on East side of bldg. on inside bldg.

FORMATION FOUND — DESCRIBE FULLY	FROM NATURAL GROUND LEVEL			
	Depth to Top of Stratum	Depth to Bottom of Stratum	Thickness of Stratum	Static Water Level
Muck	0	9	9	
Sand & Gravel	9	40	31	
Clay & Gravel	40	60	20	
Hard Pan	60	90	30	
Clean Water Sand & Gravel	90	120	30	12'
Well was tested at 675 gpm with 29' of				
drawdown. Well is equipped with 20' of Johnson	Screen			
#30 slot.				
Peerless Pump #50760 rated 350 gpm at 169' TDH with				
20 HP motor and 40' of 5x1 col.				

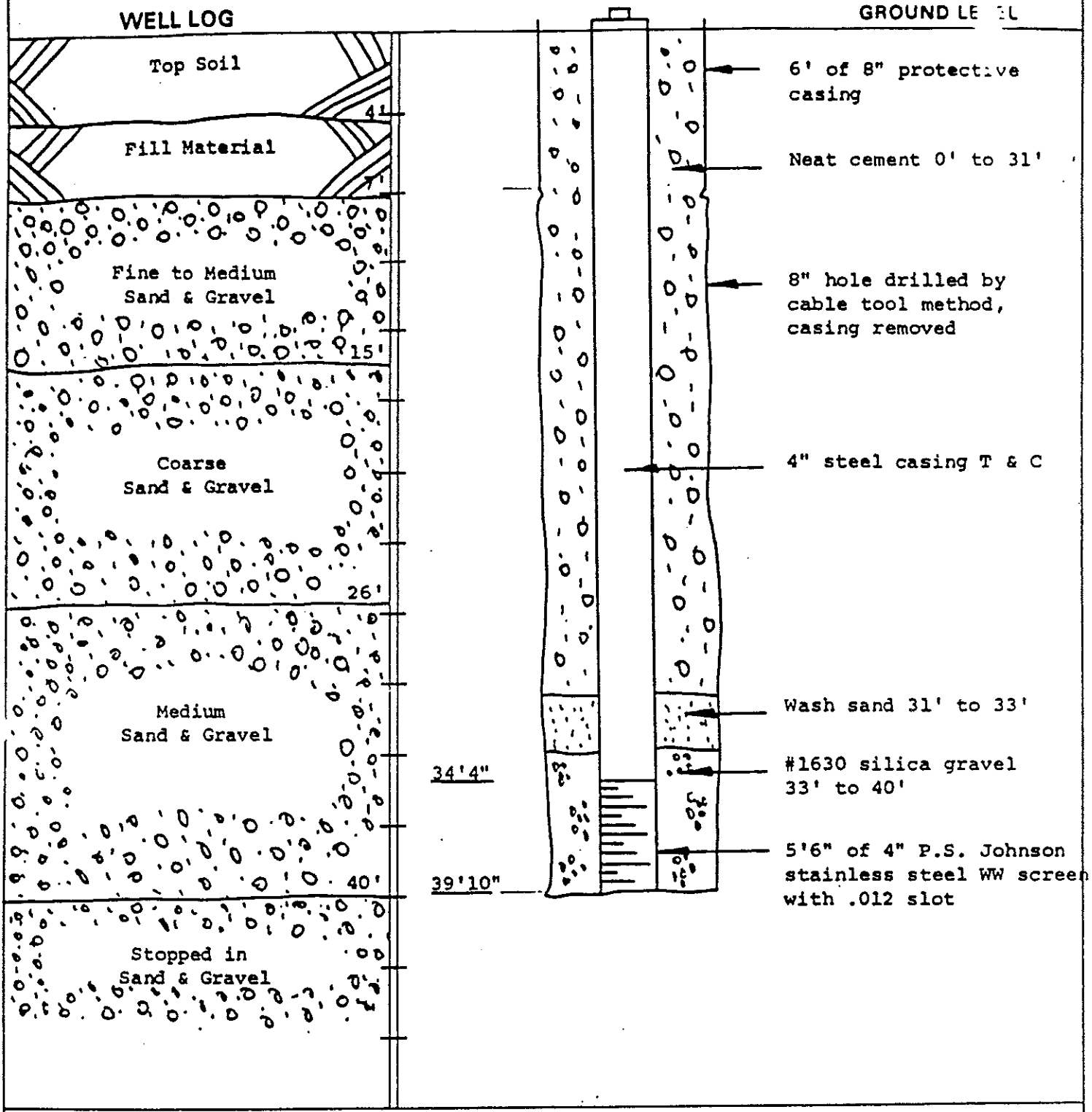
10 inch diameter hole drilled by ☒ Cable Tool ☐ Rotary ☐ Jetting

Pipe left in hole

Date Started _____ Finished 1948 Ind. & Mich. Water Dev. Co.

WELL LOG

GROUND LEVEL



City South Bend State Indiana

Location 20' N of Well #4, approximately 200' W of Olive Street

County St. Joseph Twp. Portage Section 15

Test Capacity _____ GPM. Static Water Level 14 ft. Pumping Level _____ ft.

Specific Capacity _____ GPM/Ft. D.D.

Date Drilled 8-5-80

Driller John Blatz

Job No. 2701

Well No MW 1 (Shallow)

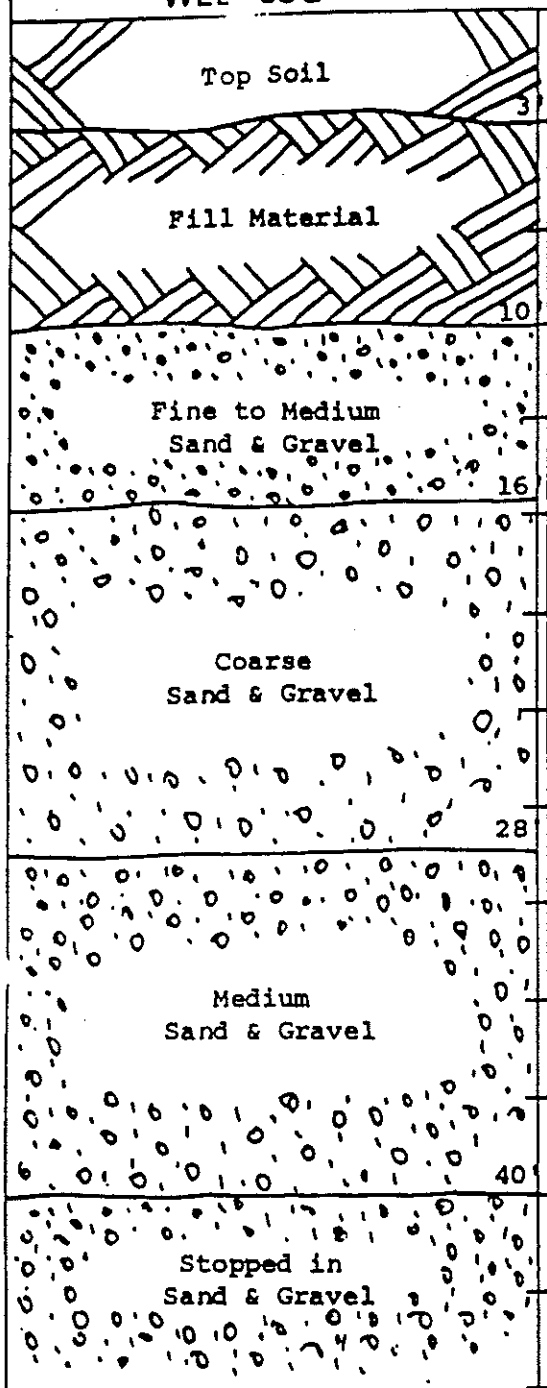
Olive-Sample Well Field

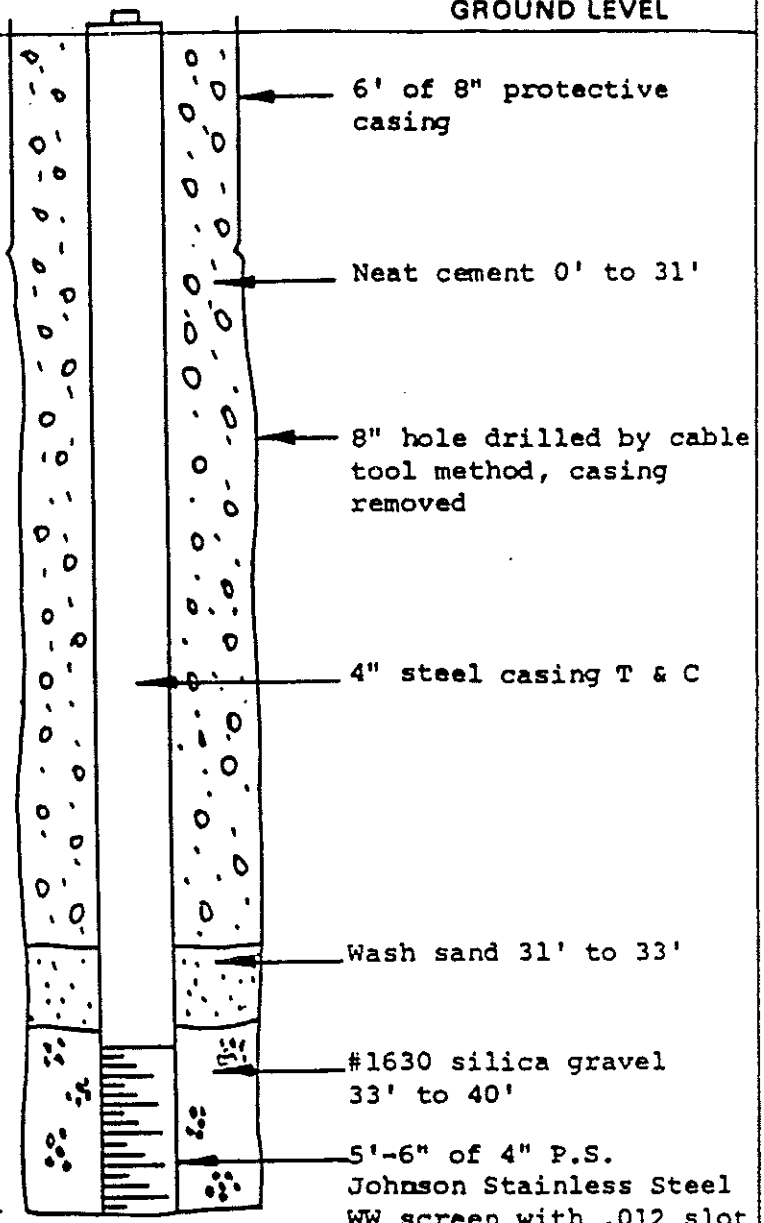
City of South Bend, Indiana

PEERLESS-MIDWEST, INC.

Granger, Indiana

WEL LOG





City South Bend State Indiana

Location Approx. 150' NE of Well #4, outside fence, approx. 140' W of Olive Street

County St. Joseph Twp. Portage Section 15

Test Capacity _____ GPM. Static Water Level 14 ft. Pumping Level _____ ft.

Specific Capacity _____ GPM/Ft. D.D.

Date Drilled 8-8-80

Driller John Blatz

Job No. 2701

Well No MW 2

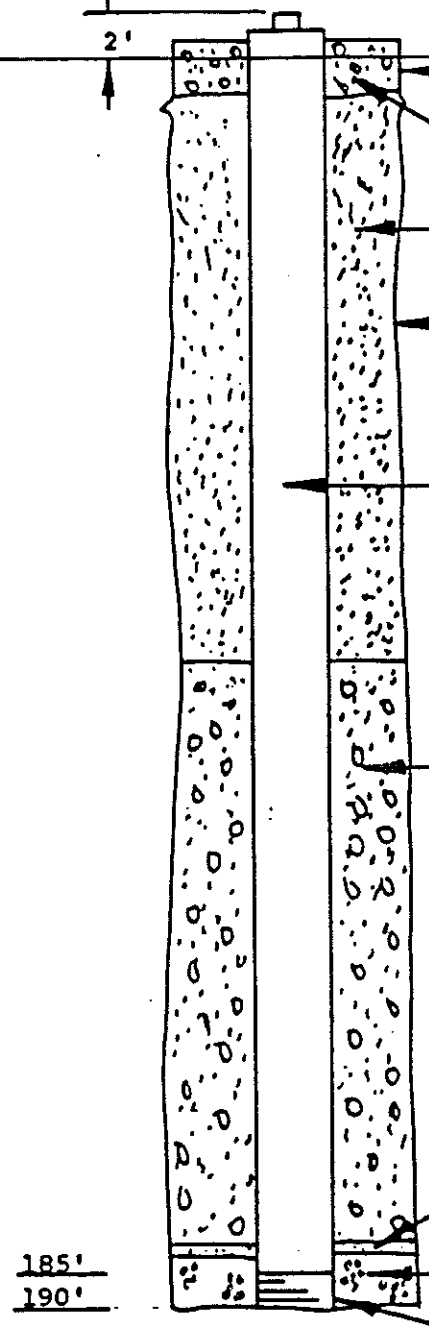
Olive-Sample Well Field
City of South Bend, Indiana

PEERLESS-MIDWEST, INC.
Granger, Indiana

WELL LOG

Fill	7
Fine Sand & Gravel	12
Medium Sand & Gravel	16
Coarse Sand & Gravel	27
Fine to Medium Sand & Gravel; Clay Traces At 27' & 40'	77
Medium Sand & Gravel	132
Fine Sand; Clay Trace at 139'	139
Fine to Medium Sand & Gravel	158
Fine Sand	162
Medium Sand & Gravel	190'

NOTE: Screen was set and samples taken at the following depths in this well: 70', 110', 150', 190'.



GROUND LEVEL

6' of 8" protective casing.

Neat cement 0' 0 5'

Wash sand 5' - 90'

8" hole drilled by cable tool method. Casing removed.

4" steel casing T & C

Neat cement 90' - 182'

Wash sand 182' - 183'

#1630 silica gravel 182' - 190'

5' of nom. 4" Johnson stainless steel WW screen with .012 slot set 185' - 190'

City South Bend State Indiana

Location 12' N of Well #4, approx. 200' W of Olive Street

County St. Joseph Twp. Portage Section 15

Test Capacity _____ GPM. Static Water Level 13 ft. Pumping Level _____ ft.

Specific Capacity _____ GPM/Ft. D.D.

Date Drilled 8-20-80

Driller Mike Garrage

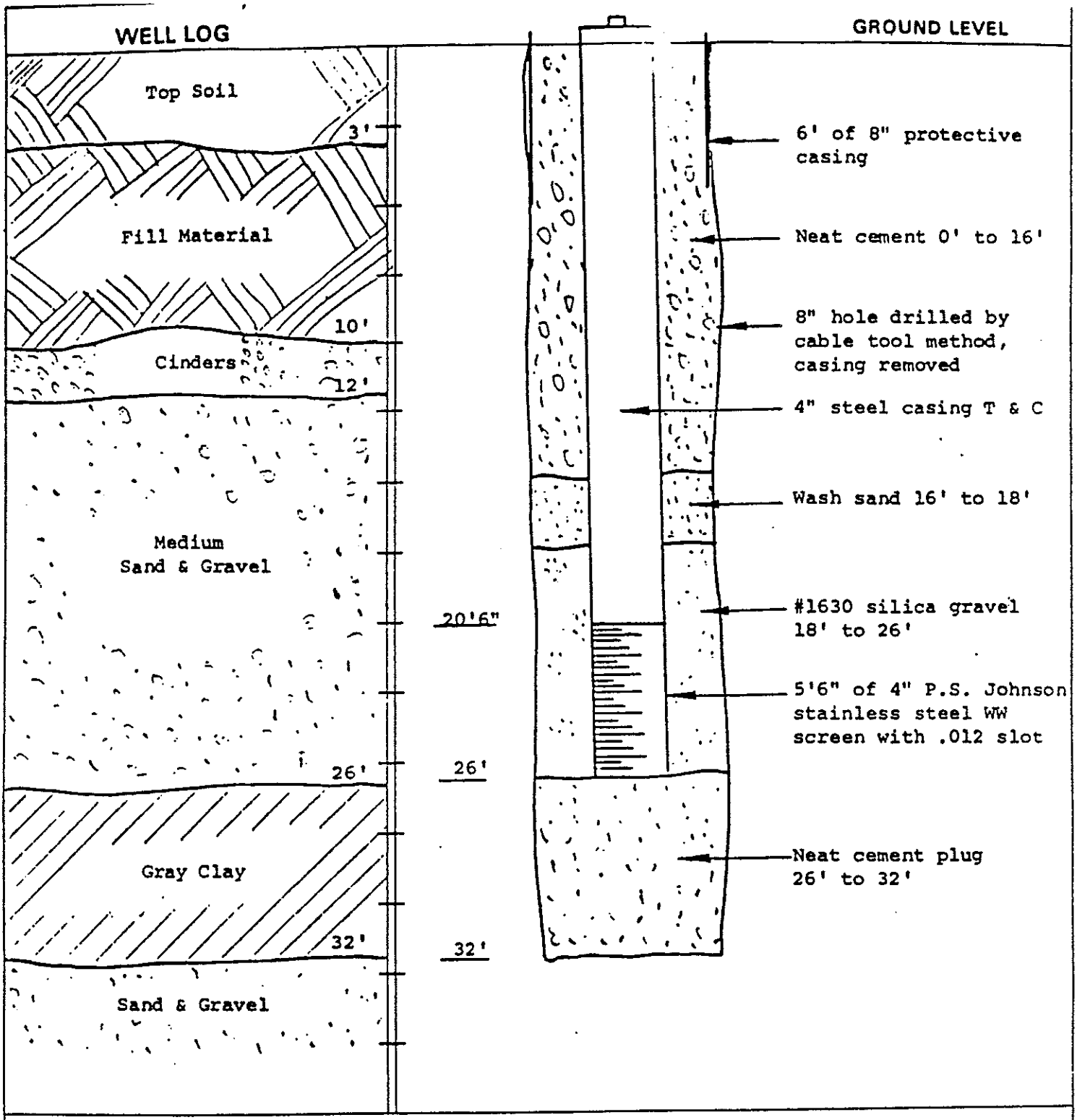
Job No. 2701

Well No. MW 1 (Deep)

Olive-Sample Well Field
City of South Bend, Indiana

PEERLESS-MIDWEST, INC.
Granger, Indiana

WELL LOG



City South Bend State Indiana

Location 40' N of Sample St. and 385' W of Olive St.

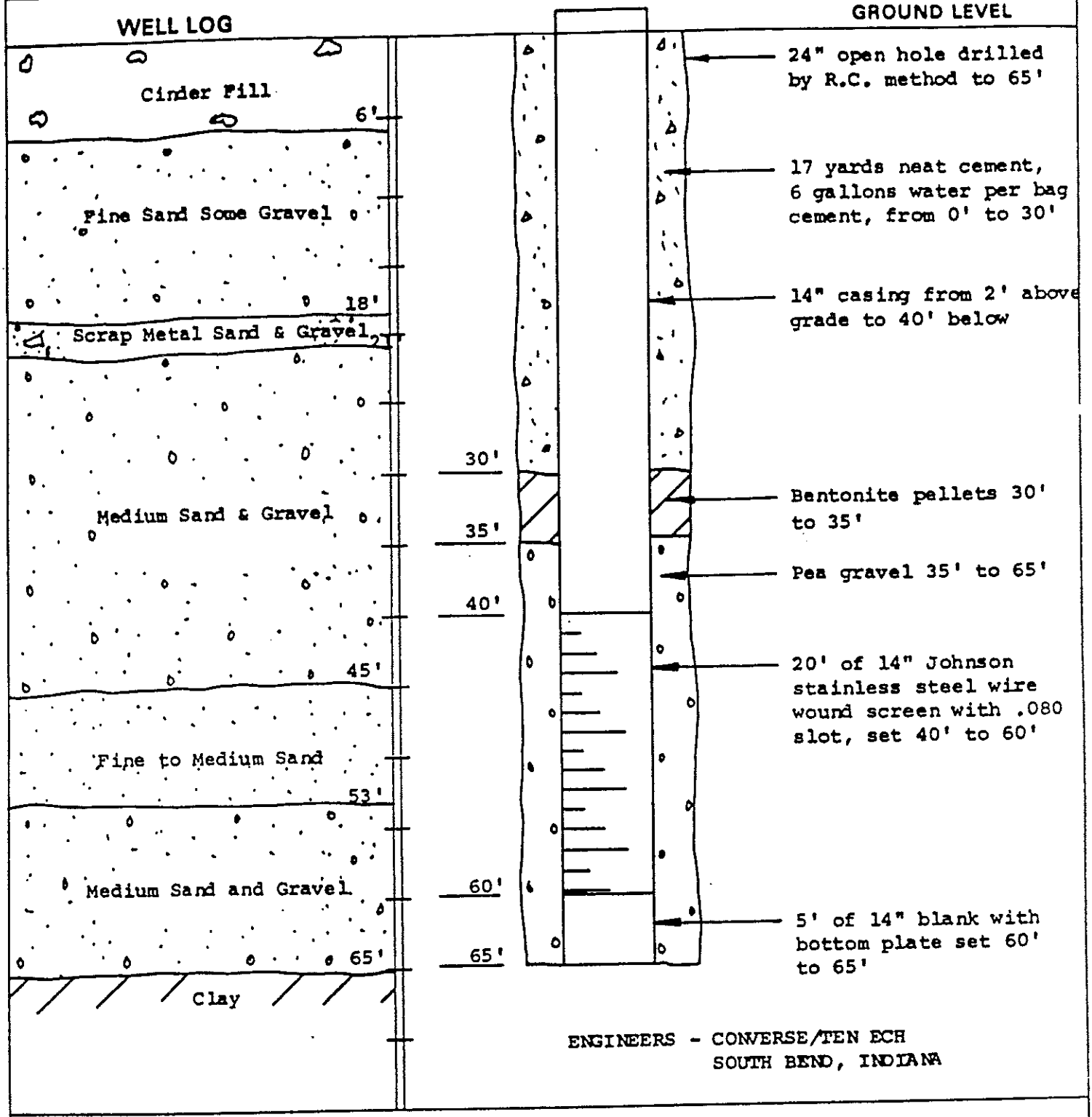
County St. Joseph Twp. Portage Section 15

Test Capacity _____ GPM. Static Water Level 13½ ft. Pumping Level _____ ft.
Specific Capacity _____ GPM/Ft. D.D.
Date Drilled 8-15-80
Driller John Blatz
Job No. 2701

Well No MW 4
Olive-Sample Well Field
City of South Bend, Indiana

PEERLESS-MIDWEST, INC.
Granger, Indiana

WELL LOG



ENGINEERS - CONVERSE/TEN ECH
SOUTH BEND, INDIANA

City South Bend State Indiana

Location S.E. Corner of Grant & Davis - Olive/Sample Well Field

County St. Joseph Twp. Portage Section 15

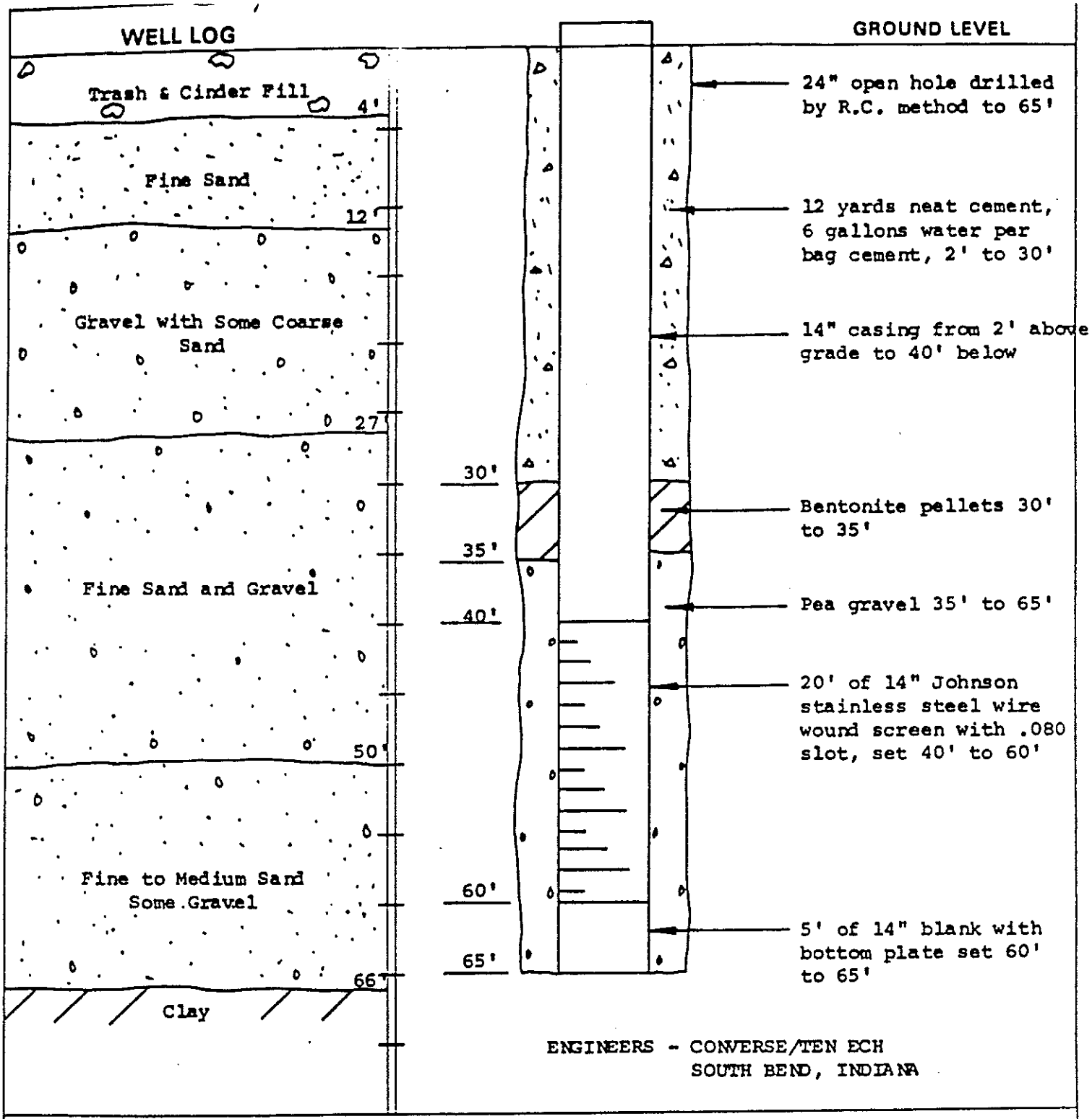
Test Capacity 1200 GPM. Static Water Level 10 ft. Pumping Level 23 ft.
Specific Capacity 92.3 GPM/Ft. D.D.
Date Drilled 6-26-81
Driller Mike Garrage
Job No. 3132

Well No 3 - Interceptor

City of South Bend
South Bend, Indiana

PEERLESS-MIDWEST, INC.
Granger, Indiana

WELL LOG



ENGINEERS - CONVERSE/TEN ECH
SOUTH BEND, INDIANA

City South Bend State Indiana

Location 320' E. of Olive St. & 700' N. of Davis Rd. - Olive/Sample Well Field

County St. Joseph Twp. Portage Section 15

Test Capacity 800 GPM. Static Water Level 10 ft. Pumping Level 36 ft.
Specific Capacity 30.8 GPM/Ft. D.D.
Date Drilled 7-2-81
Driller Mike Garrage
Job No. 3132

Well No 4 Interceptor

City of South Bend
South Bend, Indiana

PEERLESS-MIDWEST, INC.
Granger, Indiana

LAYNE-NORTHERN COMPANY
Incorporated
MISHAWAKA, INDIANA

Fire Well

☐ TEST
☒ PERMANENT

Job No. M10270

WELL LOG No. 1 CITY South Bend County St. Joseph

Owner Roach Appleton Mfg. Co. Township Portage

Section 19

Location FIRE WELL State Indiana

From Land Description _____ ft. East and _____ ft. North of SW Corner of Section.

From Street or Road 8' E. of New Loading Dock - 60' S. of Sample St.

FORMATION FOUND — DESCRIBE FULLY	FROM NATURAL GROUND LEVEL			
	Depth to Top of Stratum	Depth to Bottom of Stratum	Thickness of Stratum	Static Water Level
Muck			4	
Sand & gravel with boulders	4	42	38	14
Sand & Gravel	42	55	13	14
Sand and Gravel with Clay	55	58	3	
Clay	58	63	5	
Clay with Boulders	63	74	11	
Sand and Gravel with some clay	74	78	4	14
Sand & Gravel	78	152	74	14
Stopped in sand and gravel				

30 inch diameter hole drilled by ☐ Cable Tool ☒ Rotary ☐ Jetting

Pipe left in hole

Date Started 8/11/60 Finished 9-9-60 C. Kimble
DRILLER

old book 1921 borrowed from S.B.W.W.

LAYNE-NORTHERN COMPANY
Incorporated

MISHAWAKA, INDIANA

☒ TEST
☐ PERMANENT

Job No. _____

WELL LOG No. 24 A CITY South Bend County St. Joseph

Owner City of South Bend Township Portage

Section _____

State Indiana

Location

From Land Description _____ ft. East and _____ ft. North of SW Corner of Section.

From Street or Road Olive St. South of Sample

FORMATION FOUND — DESCRIBE FULLY	FROM NATURAL GROUND LEVEL			
	Depth to Top of Stratum	Depth to Bottom of Stratum	Thickness of Stratum	Static Water Level
Top Soil	0	15		12.20
Very Coarse Sand & Gravel	15	30		
Impervious Clayey Sand=	30	90		
Fine Sand	90	110		
Sand	110	120		
Sand Some Gravel	120	130		
Coarse Sand fine Gravel	130	135		
Coarse Sand and Gravel	135	170		

_____ inch diameter hole drilled by ☐ Cable Tool ☐ Rotary ☐ Jetting

Pipe left in hole

Date Started _____ Finished 1921

LAYNE-NORTHERN COMPANY
Incorporated

MISHAWAKA, INDIANA

☑ TEST
☐ PERMANENT

Job No. _____

WELL LOG No. 25-A CITY South Bend County St. Joseph

Owner _____ Township Portage

_____ Section _____

Location State Indiana

From Land Description _____ ft. East and _____ ft. North of SW Corner of Section.

From Street or Road 12" well 200 ft. South of Sample & Olive

FORMATION FOUND — DESCRIBE FULLY	FROM NATURAL GROUND LEVEL			
	Depth to Top of Stratum	Depth to Bottom of Stratum	Thickness of Stratum	Static Water Level
Top Soil	0	10		10.40
Fine Gravel and Some Sand	10	40		
Clay & Clay with Gravel (small amt)	40	50		
Very coarse sand & gravel. Some strata of very coarse gravel.	50	100		
Very coarse gravel (1/2" & over)	100	113		
Very coarse sand & gravel(some 2to 3" stones)	113	138		
Coarse sand with some pebbles	138	159		
~~This well was used for a pumping test~~				

_____ inch diameter hole drilled by ☐ Cable Tool ☐ Rotary ☐ Jetting

Pipe left in hole

Date Started _____ Finished 1921

_____

1921

LAING-NORTHERN COMPANY
Incorporated
MISHAWAKA, INDIANA

x TEST
☐ PERMANENT

Job No. _____

WELL LOG No. 4A CITY South Bend County St. Jos.

Owner City Water Dept. Township Portage

Section _____

Location State Ind.

From Land Description _____ ft. East and _____ ft. North of SW Corner of Section

From Street or Road Indiana and Olive Streets

FORMATION FOUND — DESCRIBE FULLY	FROM NATURAL GROUND LEVEL			
	Depth to Top of Stratum	Depth to Bottom of Stratum	Thickness of Stratum	Static Water Level
Top Soil	0	20	20	13'
Fine Sand	20	43	23	
Shale	43	--	--	
Boulder Clay & Gravel	43	(45)		
Clay	43	63	20	
Fine Sand	63	90	33	
Sand and Fine Gravel	90	100	10	
Coarse Sand (some small stones)	100	110	10	
Very Course Sand	110	120	10	
Coarse Sand and Fine Gravel	120	133	13	
Very coarse sand and 1/4" gravel	133	140	7	
Medium Sand	143	173	30	
Some Fine sand	(171)			

_____ inch diameter hole drilled by ☐ Cable Tool ☐ Rotary ☐ Jetting

Pipe left in hole

Date Started _____ Finished 1921

DRILLER

1921

LAYNE-NORTHERN COMPANY
Incorporated
MISHAWAKA, INDIANA

D-34

☑ TEST
☐ PERMANENT

Job No. _____

WELL LOG No. 5-A CITY South Bend County St. Joseph

Owner City Water Dept. Township Portage

Section _____

State Ind.

Location

From Land Description _____ ft. East and _____ ft. North of SW Corner of Section.

From Street or Road Olive St. (1/2 way between Indiana and Sample St.)

FORMATION FOUND — DESCRIBE FULLY	FROM NATURAL GROUND LEVEL			
	Depth to Top of Stratum	Depth to Bottom of Stratum	Thickness of Stratum	Static Water Level
Top Soil	0	20	20	12.23
Fine Sand	20	43	23	
Shale (about 2 ft. of heavy gravel and boulders at about 50')				
Clay	63			
Fine Sand	90			
Coarse Sand (some small stone)	100			
Sand and Fine Gravel	110			
Very coarse sand	120			
Coarse Sand & Fine Gravel	133			
Very coarse sand and 1/4" gravel	143			
Medium Sand	153	173		
Rock	177'9"			

_____ inch diameter hole drilled by ☐ Cable Tool ☐ Rotary ☐ Jetting

Pipe left in hole

Date Started _____ Finished 1921

LAYNE-NORTHERN COMPANY

INCORPORATED

MISHAWAKA INDIANA

WELL LOG No. 1 City SOUTH BEND County ST. JOSEPH

Township PENGAGE

Owner CITY OF SOUTH BEND, Main St. Station Section 15

State INDIANA

Location—From Land Description 200' SOUTH OF 1ST RAIL NE. NEW YORK CENTRAL RAILROAD, 160' SOUTH PROPERTY LINE.

Location—From Street or Road 1250' WEST OF OLIVE STREET

FORMATION FOUND	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM	STATIC WATER LEVEL	TEMP.	REMARKS
Soil	1½'	1½'			
Sandy Clay	1½'	3'			
Sand	12'	15'			
Coarse Sand	7'	22'			
Sand	3'	25'			
Gravel Sand	20'	45'			
Gravel Sand	41'	86'			Coarse
Gravelly Clay	5'	91'			
Gravelly Clay	27'	118'			
Sand & Gravel	47'	165'	20'6"		
Shale	6'	171'			
Set 6' screen at 151'6" with 10½'6" of 1½" Pipe. 5' of 2" pipe. 38' of 3"Pipe.					

Date Started 10-13-44 Finished 10-19-44 CALVIN REYNOLDS

DRILLER

(SKETCH OF LOCATION ON BACK OF THIS LOG SHEET)

LAYNE-NORTHERN COMPANY

INCORPORATED

MISHAWAKA, INDIANA

TEST WELL LOG No. 2 City SOUTH BEND County ST. JOSEPH

Township PORTAGE

Owner CITY OF SOUTH BEND, Allen M. Cline Section

State INDIANA

Location—From Land Description ON EAST CURB LINE OF LOMBARDY DRIVE PROPOSED.

Location—From Street or Road 60' SOUTH END OF SIDEWALK, 15' WEST EASTLINE LOMBARDY DRIVE ONE BLOCK SOUTH SAMPLE STREET

FORMATION FOUND	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATUM	STATIC WATER LEVEL	TEMP.	REMARKS
Soil	3'	3'			
Sand Gravel	12'	15'			
Gravel Sand	24'	39'	-		
Sandy Clay	17'	56'			Hard drilled very slow.
Gravelly Clay	29'	85'			Drilled faster.
Gravelly Clay	43'	128'			
Sand gravel	7'	135'	9'		
Sand gravel	26'	161'			
Shale	5'	166'			Very hard. Had trouble getting started into it.

Date Started 10-26-44 Finished 11-1-44 CALVIN REYNOLDS

DRILLER

(SKETCH OF LOCATION ON BACK OF THIS LOG SHEET)

[illegible]
Incorporated

MISHAWAKA, INDIANA

TEST
WELL LOG No. 3 CITY SOUTH BEND County ST. JOSEPH

Owner CITY OF SOUTH BEND Township PORTAGE

Section 15

Location 400' SOUTH OF OLIVE STREET STATION State INDIANA

From Land Description ft. East and ft. North of SW Corner of Section.

From Street or Road 200' W.E.T OF OLIVE STREET, 200' NORTH OF SOUTH PROPERTY LINE

FORMATION FOUND — DESCRIBE FULLY	FROM NATURAL GROUND LEVEL			
	Depth to Top of Stratum	Depth to Bottom of Stratum	Thickness of Stratum	Static Water Level
Fill	0'	7'	7'	
Clay	7'	16'	9'	
Coarse gravel and sand	16'	47'.	31'	18'10"
Muck	47'	80'.	33'	
Rusty Sand & Gravel	80'	129'	49'	18'10"
Clean gravel and sand	129'	143'.	14'	18'10"
Sand and gravel	143'	170'	27'	18'10"
Rusty sand and gravel	170	191'	21'	18'10"
Shale	191'	193'	2'	

6 inch diameter hole drilled by ☑ Cable Tool ☐ Rotary ☐ Jetting

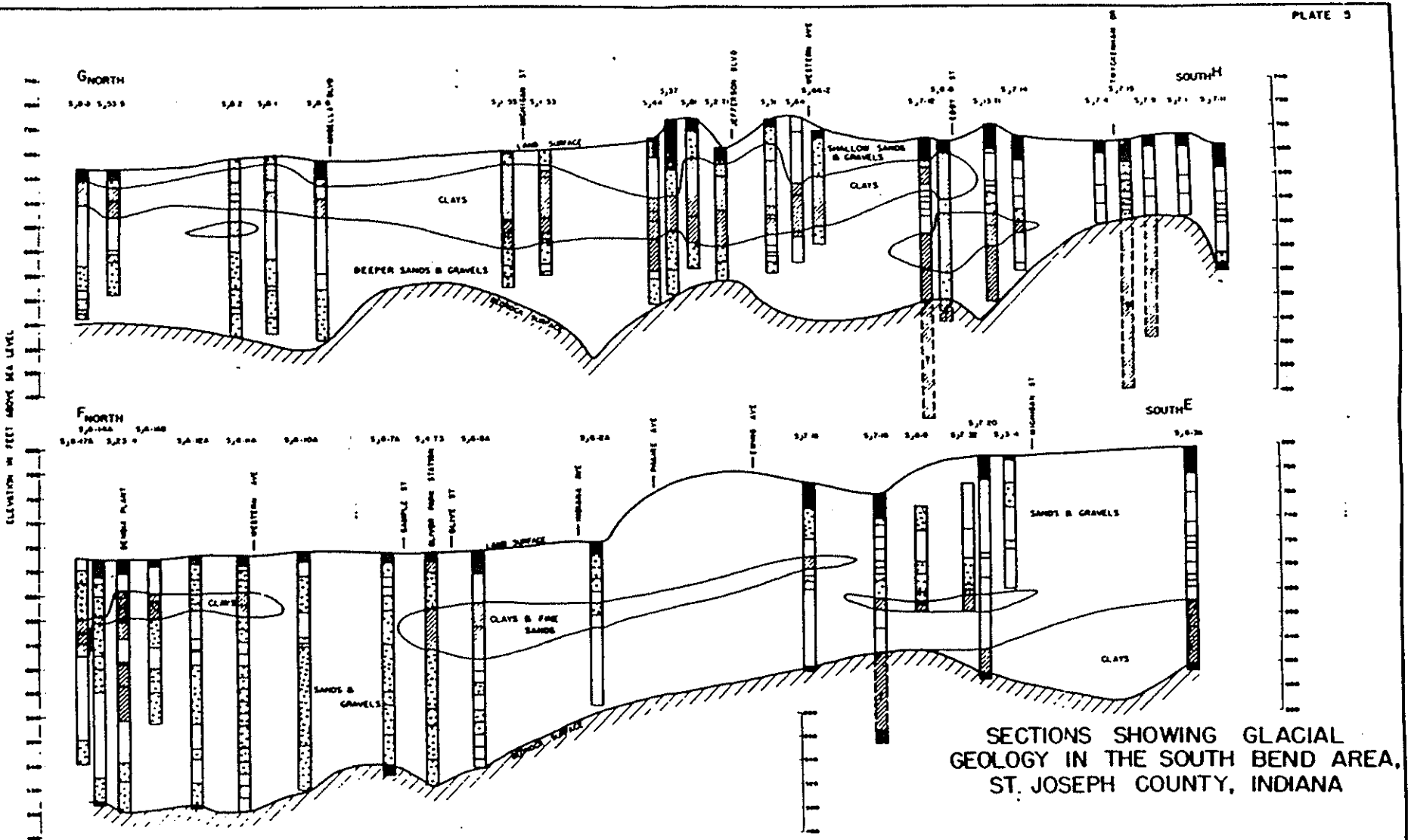
Pipe left in hole

Date Started 9-3-46 Finished 9-6-46 CHARLES KIMBLE
DRILLER

APPENDIX D

SECTIONS SHOWING GLACIAL GEOLOGY IN THE SOUTH BEND AREA CONTOURS OF PIEZOMETRIC SURFACE, 1945

PLATE 5



SECTIONS SHOWING GLACIAL GEOLOGY IN THE SOUTH BEND AREA, ST. JOSEPH COUNTY, INDIANA

HORIZONTAL SCALE

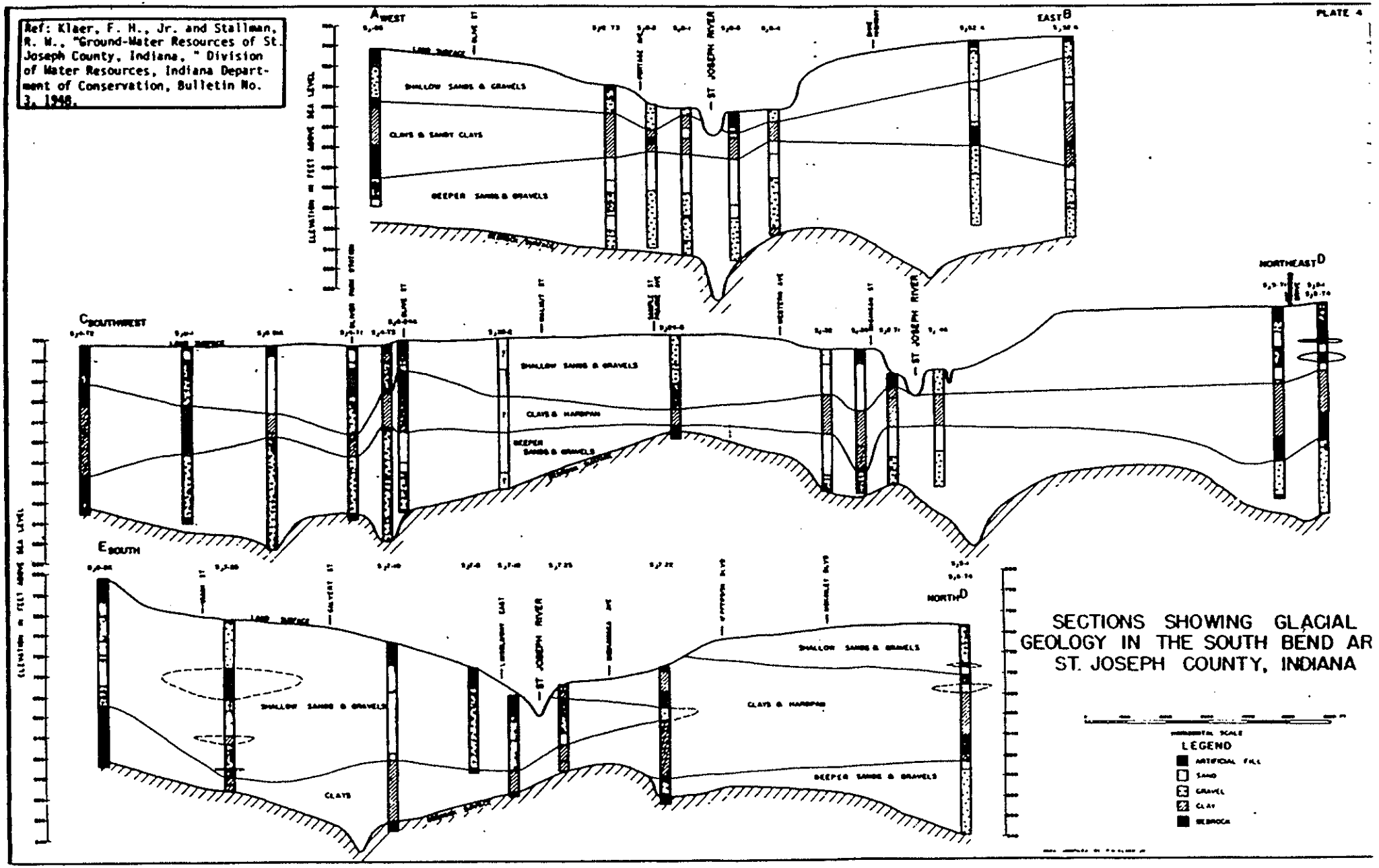
LEGEND

- ARTIFICIAL FILL
- SAND
- GRAVEL
- CLAY
- BEDROCK

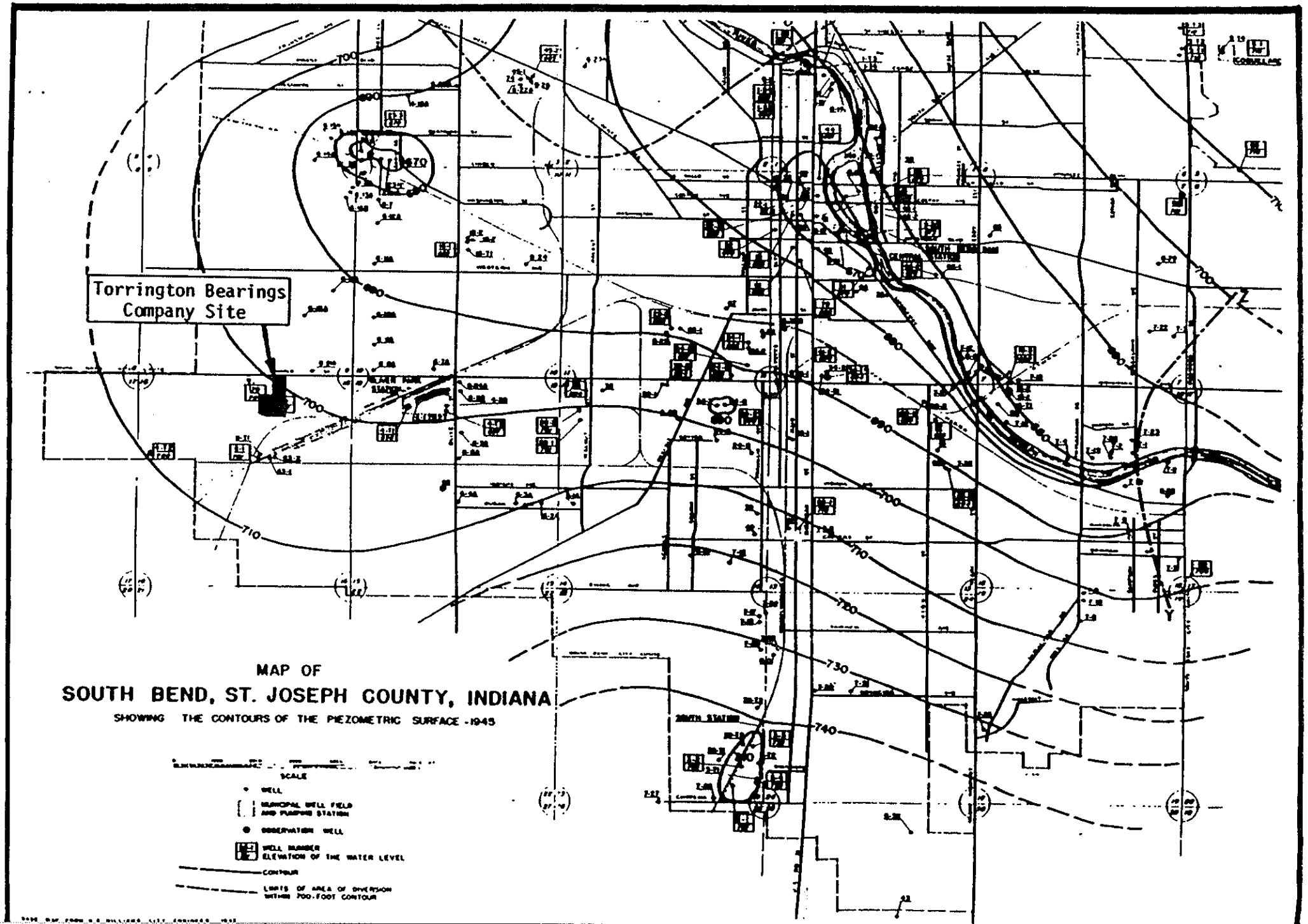
Ref: Klaer, F. H., Jr. and Stallman, R. W., "Ground-Water Resources of St. Joseph County, Indiana," Division of Water Resources, Indiana Department of Conservation, Bulletin No. 3, 1948.

Ref: Klaer, F. H., Jr. and Stallman, R. W., "Ground-Water Resources of St. Joseph County, Indiana," Division of Water Resources, Indiana Department of Conservation, Bulletin No. 3, 1948.

PLATE 4



SECTIONS SHOWING GLACIAL GEOLOGY IN THE SOUTH BEND AR ST. JOSEPH COUNTY, INDIANA


Torrington Bearings Company Site
700
710
720
730
740
MAP OF
SOUTH BEND, ST. JOSEPH COUNTY, INDIANA
SHOWING THE CONTOURS OF THE PIEZOMETRIC SURFACE -1945
SCALE
WELL
MUNICIPAL WELL FIELD AND PUMPING STATION
OBSERVATION WELL
WELL NUMBER
ELEVATION OF THE WATER LEVEL
CONTOUR
LIMITS OF AREA OF DIVERSION WITHIN 700-FOOT CONTOUR