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Preliminary Site ~~Assess~~ Evaluation

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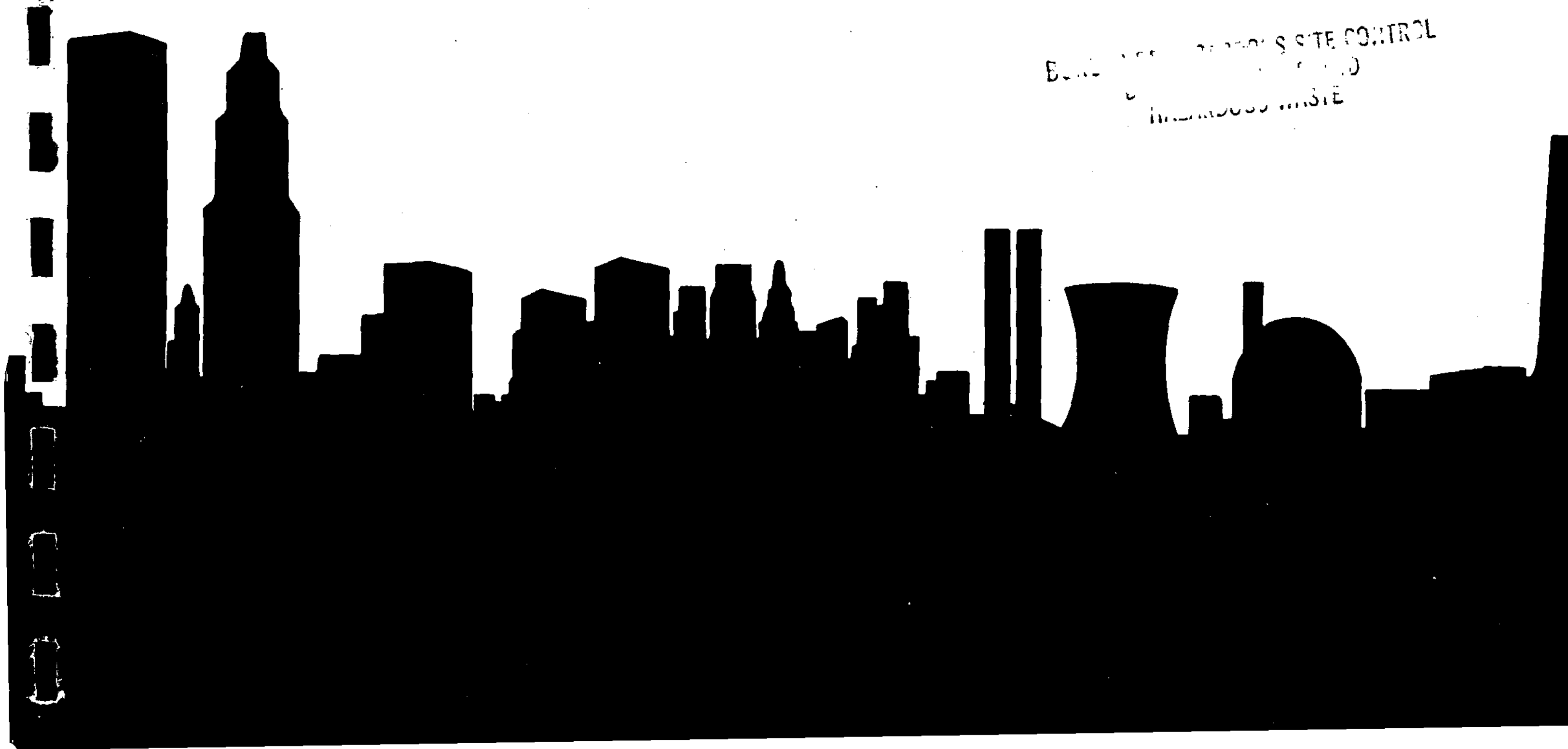

NEW YORK STATE ELECTRIC & GAS CORPORATION
INVESTIGATION OF THE FORMER
COAL GASIFICATION SITE IN
DANSVILLE, NEW YORK

TASK 1 REPORT
PRELIMINARY SITE EVALUATION

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TRC Project No. 3438-N61

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TABLE OF CONTENTS

LIST OF FIGURES

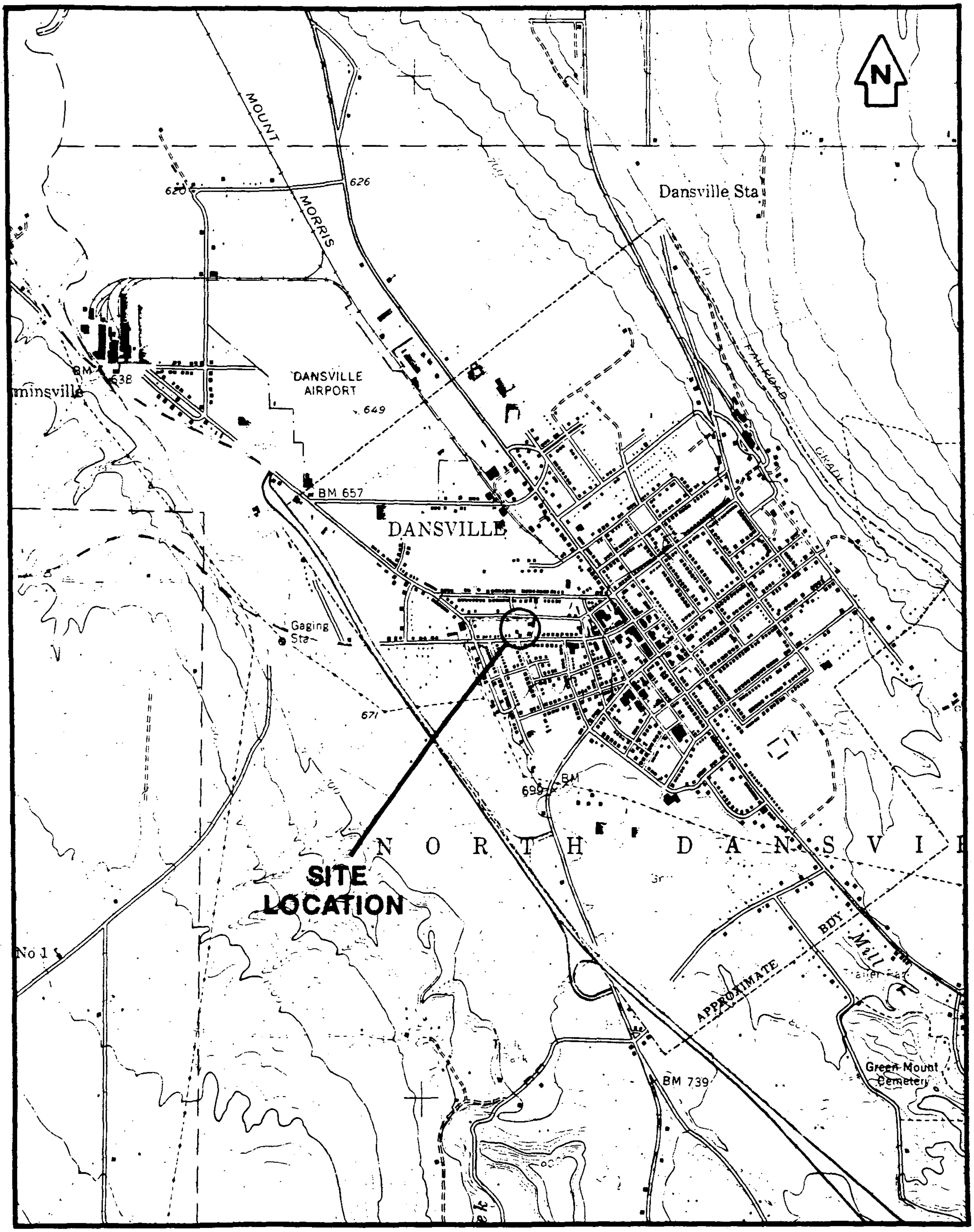
LIST OF TABLES

1.0 INTRODUCTION

On April 20, 1986, TRC Environmental Consultants, Inc., (TRC) under contract to the New York State Electric and Gas Corporation (NYSEG), initiated the investigation of the former gas manufacture site on Ossian Street, Dansville, New York (Figure 1-1). Under the terms of the contract, TRC is to provide NYSEG with an investigation made up of five separate tasks. This report documents the results of Task 1, the Preliminary Site Evaluation.

The purpose of Task 1 is to prepare a concise history of the site activities during the gas manufacturing plant's approximately 70 years of operation and to identify those areas of the property which may be contaminated by waste products from the plant. This information will be used to develop an investigation strategy that is documented in a Sampling Plan, which on approval from NYSEG will be implemented in Task 2.

The information collected for the Dansville site history was gathered during three visits to the area by TRC staff. On January 15, 1986, TRC made a preliminary site visit with the NYSEG project manager and collected preliminary information on the Dansville site. During the week of April 20, TRC conducted an electromagnetic survey (EM31) of the site, as well as a soil gas survey of the south lawn area. A literature search was also conducted for local history and old maps at the Dansville Public Library and local geology at the Geneseo College Library. The Dansville Water and Sewer Department was contacted, as well as the Dansville Historical Society. On May 14 through 16, a third visit was conducted to interview retired NYSEG employees and complete the geology literature search at the University of Rochester Geology Library. This information is discussed in the following sections: Section 2.0 Site History, Section 3.0 Site Setting, Section 4.0 Preliminary Site Data, Section 5.0 Discussion of Findings, and Section 6.0, Recommendations. The Sampling Plan for Task 2 is presented in Appendix A.



from Dansville, NY 7.5' USGS Topographic Map

0 3000 FT
SCALE

Figure 1-1. Dansville Site Location Map

2.0 SITE HISTORY

As part of Task 1, information on the history of the plant was obtained. The gas plant is discussed in both the 1881 History of Livingston County and the 1902 History of Dansville available in the Dansville Public Library. The library also contains 1872 and 1902 maps and an 1882 photograph of the town and site. NYSEG files contain a 1941 letter reviewing organizational changes at the gas plant as well as a late 1920's photograph of the site.

Because the gas manufacturing plant closed January 1, 1930, it was difficult to get information on how the plant was operated. The three retired NYSEG employees interviewed by TRC began working at the site shortly after the Second World War, more than 15 years after plant closure. Only one previous employee was identified who is still living and who worked at the site while it was manufacturing gas. However, he worked in the meter department and customer service, and therefore, his knowledge of the gas plant operations is limited.

The information from these sources was reviewed and is summarized as follows:

- Site chronology
- Plant operations
- Plant closure and present conditions

Table 2-1 lists the more significant events in the gas plant's history.

2.1 Site Chronology

Industrial activity at the Dansville site began with the Gilman Foundry, which was located on the southwest third of the present NYSEG property. The foundry, which existed from 1842 to 1926, may have contributed to any potential contamination at the site.

TABLE 2-1

CHRONOLOGICAL SEQUENCE OF EVENTS AT THE DANSVILLE SITE

1842 - 1926	Gilman Foundry operated on southwest third of present NYSEG property.
1861	Dansville Gas Light Plant started operating on the southern end of the property. The operation consisted of one building and one gas holder (10,000 ft^3).
1894	Dansville Gas Light began domestic service (Dansville Historian Notes)
1895	Dansville Gas Light merged with the local electric company forming Dansville Gas and Electric Company.
1896	Land purchases on the east side of the property allowed extension of a railroad spur to the plant and erection of additional storage facilities.
1902	A larger gas holder (40,000 ft^3) was built to increase storage capacity from 10,000 ft^3 to 50,000 ft^3.
1906	Additional land on east side purchased. This area includes the present pole yard and discovered tar well.
1921	Newfield Gas Company was contracted to supply natural gas to Dansville Gas and Electric Company from local wells. The natural gas supply was insufficient, resulting in intermittent service to customers.
1924	Dansville Gas and Electric was purchased by New York Central Electric Company.
1925	An electric line from Elmira to Dansville was completed and the electric plant at Dansville ceased production.
1926	New York Central Electric Company refurbished the gas plant and manufacture of gas started again.
1930	The gas manufacturing plant was closed and the Iroquois Gas Company contracted to supply natural gas to the village. Plant closure and removal of structures occurred some time between 1930 and June 1938.
1937	New York Central Electric Company merged with NYSEG.
1958	Remainder of the gas house removed from the site. The former electricity plant building still remains on the property.

Gas manufacture in Dansville was discussed as early as 1856. The Dansville Gas Light Plant was built on the southern end of the site and started operating in 1861. Initially, gas was distributed through wooden mains for street lighting and public buildings. An 1872 map shows the plant consisting of one building with one gas holder north of it (Figure 2-1).

Electricity replaced manufactured gas for street lighting with the construction of the first electric plant in 1888. By 1894, the gas plant was supplying domestic heating needs. In 1895, the gas company and electric company merged to form the Dansville Gas and Electric Company. During this time, what is now the oldest part of the present NYSEG Service Center was built to house the electric plant. Several land purchases east of the site were made, in order to extend a railroad spur to the plant and to erect additional work and storage facilities.

The 1902 History of Dansville contains photographs of the gas house and electric plant. The electric plant picture shows a ditch on the east side of the plant running north to the old canal. Because the ditch appears to be positioned so as to provide drainage from the gas plant to the canal, it may have received waste water. The gas house picture shows a 27 ft by 55 ft one story brick building with a gas holder behind it and the foundry to the west of it. That year, a new larger gas holder (40,000 ft^3) was being built to receive gas passing through the older holder (10,000 ft^3) (Figure 2-2). At that point, the plant produced 15,000 MCE (MCF = 1000 ft^3) per day of gas by the carburetted water gas method. The plant served 300 customers. About 4 kW-hr. of electricity were produced by coal-fired boilers. In 1906, additional land to the east was purchased. In August 1921, the Dansville Gas and Electric Company contracted with Newfield Gas Company to supply natural gas from local wells and manufacturing of gas was discontinued. However,

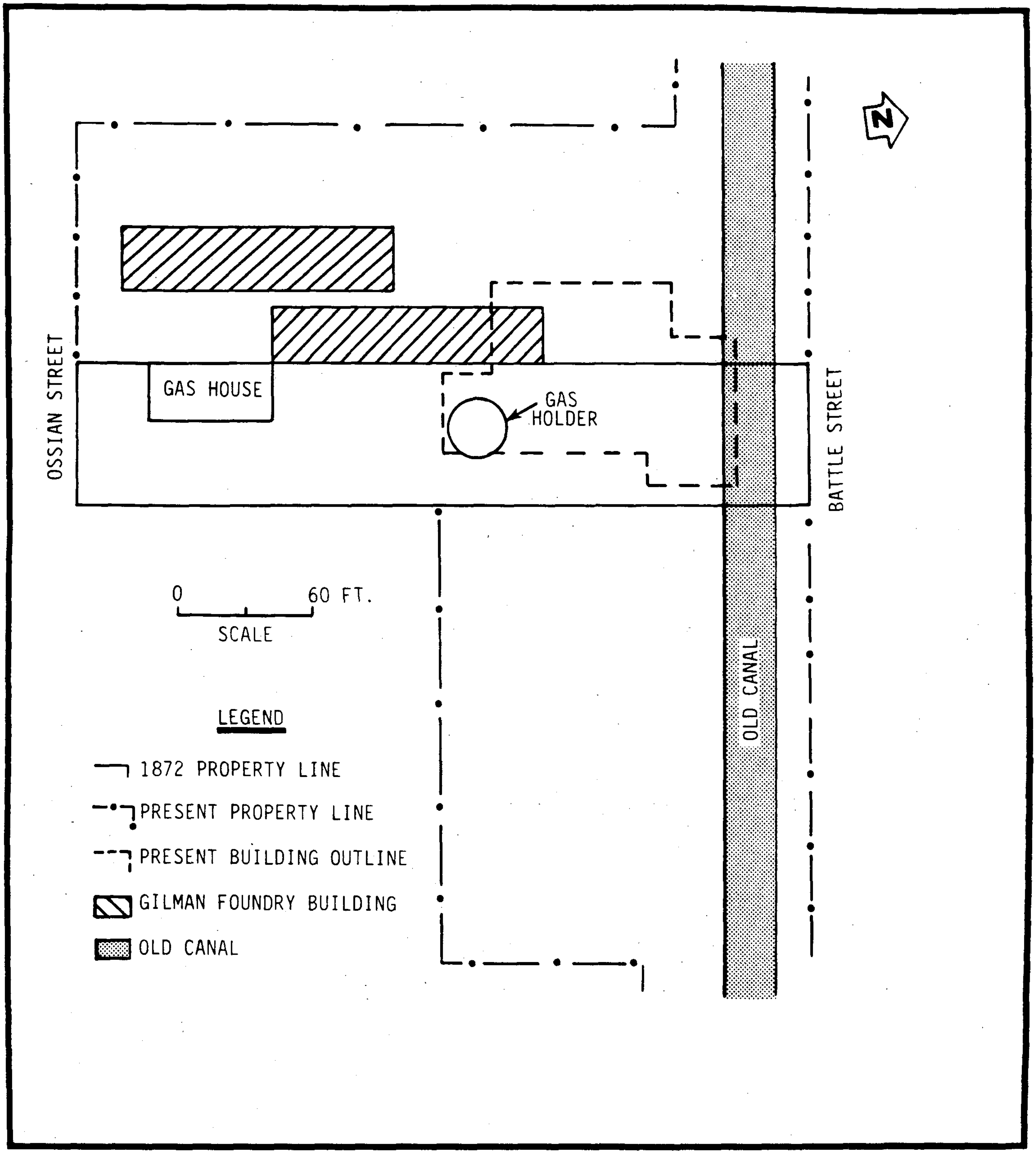


Figure 2-1. Dansville Gas Light Company, 1872

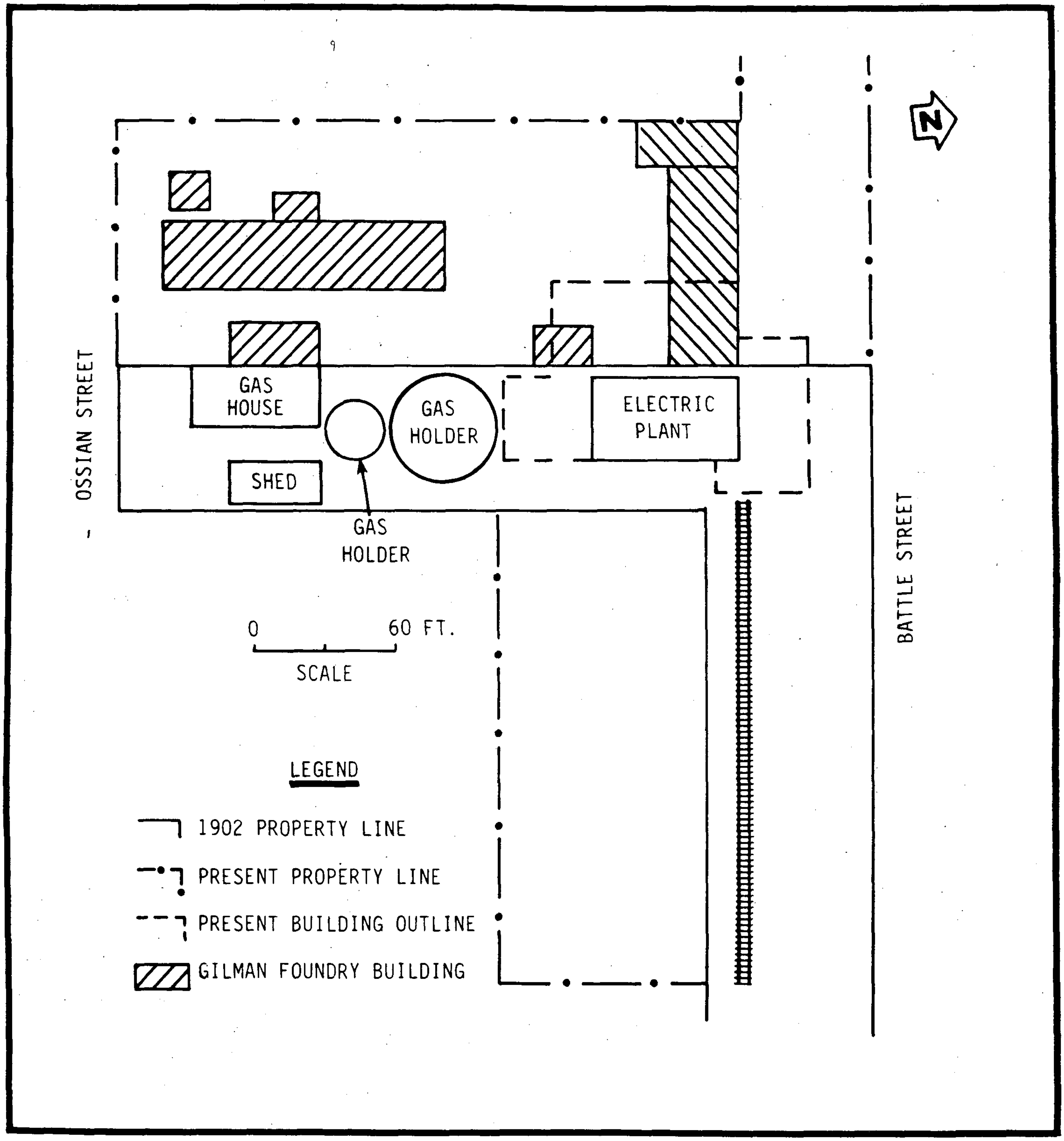


Figure 2-2. Dansville Gas and Electric Company, 1902.

after a year, the supply of natural gas proved to be insufficient. Nevertheless, gas was not manufactured again until 1926.

In 1924, Dansville Gas and Electric was purchased by New York Central Electric Company. Construction of an electric power line from Elmira began immediately. When it was completed in 1925, electricity production in Dansville ceased. Extensive repairs and improvements to the gas plant were completed in 1926, so that gas manufacture could resume. A photograph from this latter period shows that the gas house had a second story added to the north end. The gas holder visible in the 1902 photograph had been replaced by the late 1920's. Also, the foundry which had been purchased in 1926 was removed by the time of this photograph. By the 1920's, a long north-south oriented building stood on the east side of the gas house and was used for offices, workshops and storage (Figure 2-3).

The gas manufacturing plant was closed sometime in 1930, and Iroquois Gas Company was contracted to supply natural gas to the town. In 1937, New York Central Electric Company was merged with New York State Electric and Gas (NYSEG). A 1938 aerial photograph shows that most of the gas plant had been removed. All that remained standing was the long north-south building and the southern half of the gas house. After the Second World War, the long building was removed and the remainder of the gas house was converted for use by the meter department. This structure was removed in 1958.

2.2 Plant Operations

Due to the closure date (January 1, 1930) of the Dansville Gas Plant, no living person who worked at the plant was found. Mr. Allen Dixon of Manlius, N.Y. did work at the site from 1923 until closure, but his responsibilities were with meters and customer service, and therefore, his knowledge of plant operations is limited.

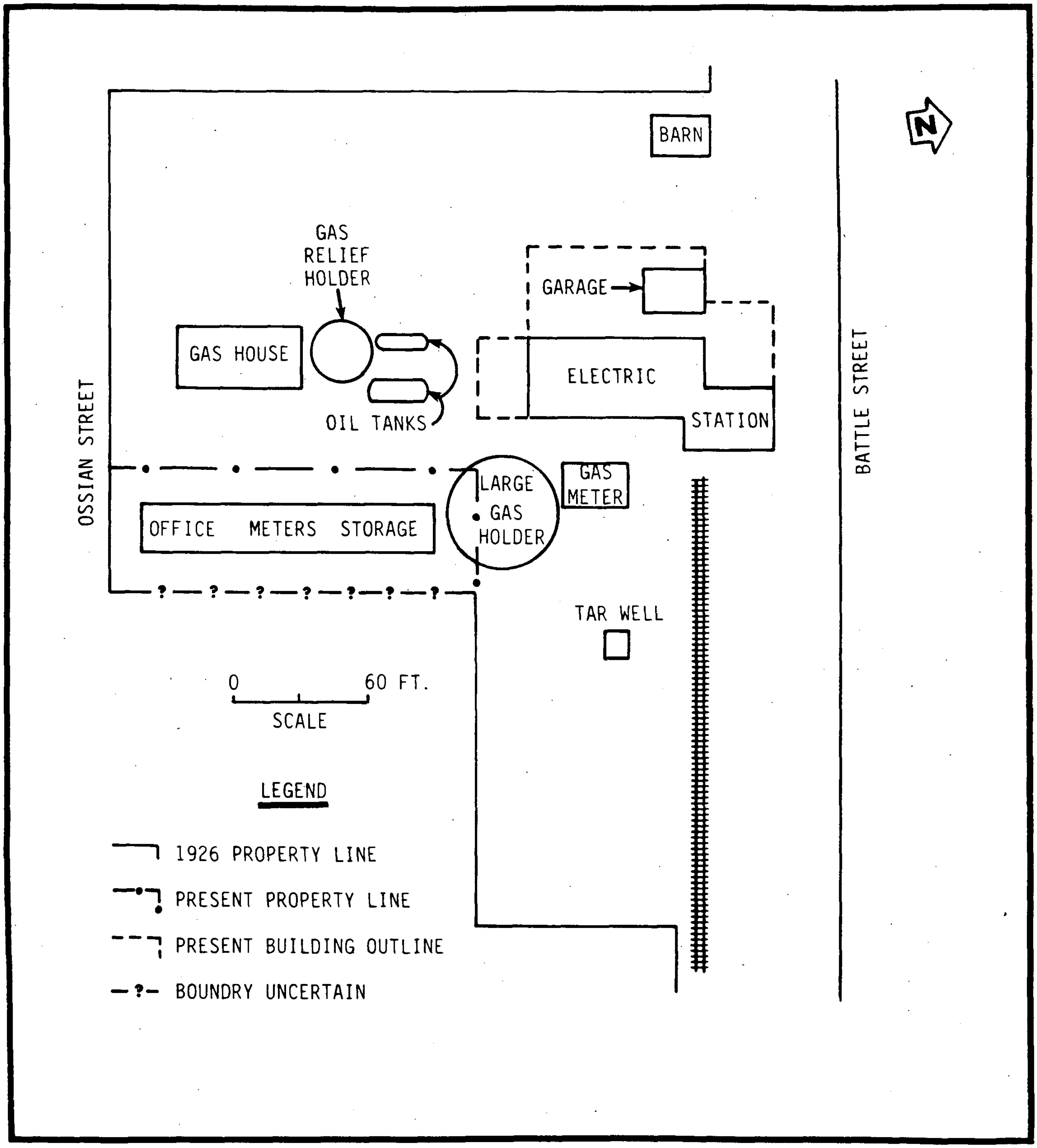


Figure 2-3. New York Central Electric Dansville Plant (circa 1926)

The 1881 History of Livingston County states that, "Gas was first made from coal, next from naptha [sic] vapor, then from gasoline, subsequently from oil, and at present from naptha." Thus, the feed fuel changed four times in the first 20 years of plant operation. The initial product was probably "blue gas" produced by passing steam over incandescent coal. Subsequently, various grades of hydrocarbon liquids were employed to produce an "oil gas" of much greater heating value.

The 1902 History of Dansville includes a similar list: "Gas was first made from coal, next from naptha vapor, then from gasoline, subsequently from oil, thereafter from coal and now by the water process." This list omits the second reference to naphtha and substitutes coal instead. The "water process" most likely refers to carburetted water gas or more simply "water gas." Water gas is intermediate in heating value between blue and oil gas. Manufacture of water gas involved enriching the blue gas with oil. The process is described in more detail below.

The Dansville History mentions underground oil tanks with a capacity of 5,000 gallons. The article described the gas generator as "new" suggesting the conversion to water gas may have been fairly recent to 1902. It said that gas consumption at this time was 15 MCF per day (1000 ft^3 = 1 MCF) for 300 customers. Assuming gas production equaled gas consumption, the annual gas production for 1902 was about 5500 MCF. Gas production records for 1912 through 1918 (Table 2-2) indicate that average annual production was slightly less than 10,000 MCF. The number of customers served had expanded during this period to about 600.

A single photograph of the plant from the late 1920's, along with Mr. Allen Dixon's recollections, provided a sketchy outline of the plant's operation during its final decade. Figure 2-3 shows the plant lay-out as it was in the late 1920's. However, the position and size of the various tanks

TABLE 2-2

OPERATING STATISTICS FOR THE DANSVILLE GAS PLANT

Year	Total Gas Manufactured (MCF)	No. of Customers	Length of Main (miles)
1907	[1]	225	5.5
1908	[1]	[1]	[1]
1909	[1]	[1]	[1]
1910	[1]	388	8.00
1911	[1]	462	8.09
1912	10,680	516	9.00
1913	9,413	492	9.33
1914	8,546	503	9.32
1915	8,236	[2]	[2]
1916	8,735	531	9.75
1917	10,455	550	9.60
1918	12,261	602	9.60
1919	[2]	[2]	[2]
1920	[2]	[2]	[2]
1921	9,579	[2]	[2]
1922	[3]	[2]	[2]
1923	[3]	1,014	10.00
1924	[1]	[2]	[2]
1925	[1]	[2]	[2]
1926	7,238	[2]	[2]
1927	20,875	[2]	[2]
1928	24,718	[2]	[2]
1929	22,945	[2]	[2]
1930	11,268	[2]	[2]

NOTE: Data is from Annual Report of the N.Y. Public Service Commission Report
[1]Data not reported
[2]Report not available
[3]Natural gas purchased

is an approximation from one photograph. Standard practices for producing water gas are also assumed for the Dansville plant.

Gas was produced by passing steam over incandescent coke in reducing conditions (no oxygen). The water reacted with the carbon in an endothermic reaction to produce carbon monoxide, carbon dioxide and hydrogen gas with a heating value of approximately 300 Btu/ft^3. The gas was then injected into a carburetor where hot atomized oil was added. As the gas passed into the "superheater", the oil was vaporized and the molecules broken into smaller gas molecules. The resulting heating value of the gas depended on the type of oil and the oil to blue gas ratio. A value of 530 Btu/ft^3 was standard.

Because the basic reactions were endothermic, the coke bed had to be reheated by blowing air over it. The resulting "blast gas" could not be mixed with the water gas because of excessive nitrogen and carbon dioxide. Instead, it was burned in the carburetor and superheater to store heat for the next cycle. Mr. Dixon said 2 MCF of water gas was produced per cycle.

The raw gas contained steam, tar, oil, and sulfur which needed to be removed before the gas was stored or distributed. Much of the tar and oil was removed with the steam as it cooled in the condenser. The gas could be purified further in scrubbers with oil or water as the scrubbing liquid. The water-tar-oil liquor produced from the cleaning processes went to the tar separator where the three phases would separate. In the 20th century, it was likely that the tar was boiled to drive off the remaining water and then shipped out for sale to a tar refinery. The tar was temporarily stored in a "tar well" near the railroad tracks. Although some of the oil could be skimmed off for reuse, the oily water from the tar separator would be released as waste. Mr. Dixon had no knowledge of these cleaning processes.

After the first round of cleaning, the gas entered the gas relief holder which was a telescoping adjustable-volume tank. From the relief holder, the gas was pushed through the sulfur purifier. The sulfur purifier consisted of iron oxide covered wood chips which reacted with the H_2S in the gas. Periodically, the adsorbed sulfur was released by blowing air over the purifier beds, producing sulfur dioxide (SO_2). Eventually, the iron oxide could not be regenerated and had to be disposed of. These wastes contained sulfur and cyanide. The gas was held in the 40,000 ft^3 gas holder for distribution.

Mr. Dixon recalls that the generator was 20 ft tall and coke was charged manually from the top. The tanks shown in Figure 2-3 lying on their side probably contained oil. The location of the condensers, scrubbers, and tar separator is not known. The sulfur purifiers were located in the south end of the gas house.

The spent iron oxide chips, which were stored in burlap bags, were piled on the west side of the gas house and disposed of periodically at a dump on Ossian Street, across Canaseraga Creek. The method of disposal of ash and clinkers from the generators is not known. Waste water from the tar separator may have flowed into the ditch which ran north to the old canal. A wood-sided tar pit was discovered in the 1970's under the pole yard near the railroad track. Also, tars were discovered in the sediments 4 feet below the pole yard when NYSEG employees did some shallow borings (NYSEG files).

Waste tar and tar sludges are the primary environmental concern at former manufactured gas sites. In the early part of the manufactured gas era, tar was treated as a waste and was usually disposed in the most expeditious manner. It is not known if wastes were placed in the inactive Dansville canal. The tar may have been burned as fuel in the plant.

Although the first tar refinery in the United States was established in Philadelphia in 1887 (Rhodes, 1966, pg. 14), a remote plant like Dansville Gas and Electric would not have exported tar until 1895 or 1896, when the railroad spur was built. Thus, all tar produced prior to this date would require another form of handling. Assuming an average daily gas production of 5 MCF for the pre-1896 period and a tar production rate of 2 gal/MCF of oil gas (Gas Engineer's Handbook, 1969), 128,000 gallons of tar would have been produced during this period.

After 1896, the plant still needed to dispose of tar sludge from the tar separator. The sludge could not be refined because of its high concentration of particulate matter (mostly coke fines). In fact, although Mr. Dixon does not recall anything about tar generation, export or disposal, he remembered that the coke was washed before being charged into the generator. This suggests that New York Central Electric was trying to keep its tar sludges to a minimum and to maximize tar exports. The tar well discovered near the railroad tracks is on a piece of property that was not acquired by Dansville Gas and Electric until 1906. It is not known where the tar produced between 1896 and 1906 was stored.

The Gas Engineers Handbook contains data which show that approximately 1 gallon of tar is produced per 1000 ft^3 (1 MCF) of water gas produced. Table 2-2 shows the operating statistics of the Dansville gas plant for the years 1907 to 1930. The average annual volume of gas manufactured for 1912 to 1918 is 9761 MCF. Assuming this value for all the years between 1911 and 1921, and the 1902 value (5,500 MCF) for all the years between 1896 and 1911, when the plant ownership changed hands, 195,370 gallons of tar would have been produced during this period. When gas manufacture resumed again in the late 1920's, another 87,000 gallons would have been produced.

Estimates of tar sludge generation rates for water gas plants are not available. However, a study of coke oven tar sludge suggests that generation rates are on the order of 0.1% to 1% of total tar production (Environmental Research & Technology, 1984). It is reasonable to assume that generation rates of water gas tar sludge are on the lower end of the range for coke ovens (0.1%), because the feed is cleaner (coke vs. coal). Based on these assumptions, 260 gallons of sludge would have been produced in the 1896 to 1930 period. The amount of spillage which may have occurred around the gas relief holder, tar separator and tar well is not known.

2.3 Plant Closure and Present Conditions

Few details are known about the plant closure. The gas holders were cut off at their foundations. Metal from the wall of the gas holder continues to protrude through the asphalt and needs to be periodically cut off. The foundation of the gas relief holder was still visible in the 1940's and a cavity existed below it.

The tar well was left intact. During the 1970's, the tar well caved in under the weight of a truck and needed to be repaved.

At some point after closure, soil was spread over the south end of the property for a lawn. Much of the remaining property is paved with asphalt. However, the east side is only paved with crushed stone and oil except for the 60 feet next to the building which has asphalt. Because all of the site has been covered with clean fill or paved, there is no evidence of surface contamination.

3.0 SITE SETTING

The objective of the following sections is to describe both the regional and site specific geological and hydrological settings for the Dansville site. The regional and site specific characteristics, as currently understood, are presented in separate sections dealing with geology and hydrology, followed by a discussion of current land use adjaceant to the site.

3.1 Geology

Geology of the Dansville site is presented in discussions of surface soils, unconsolidated materials, and bedrock. There is very limited site specific information available for the site, and therefore, information presented in the following sections is brief and tends to be regional in nature.

3.1.1 Bedrock

The Village of Dansville lies within the Allegheny Plateau Physiographic Province. The bedrock in the area is nearly horizontal and consists of the Gardeau Shale unit of the Portage Formation. The Upper Devonian shale unit was deposited in a marine environment and is immediately overlain by unconsolidated deposits. The bedrock dips gently (70 ft/mile) southward and strike trends nearly east and west (Fairchild, 1926).

3.1.2 Unconsolidated Material

Dansville lies in an abandoned bedrock river valley partially filled with unconsolidated Quaternary glacial deposits. The unconsolidated material in the valley was deposited as the last glacier retreated northward. When the retreating glacier blocked the northward stream drainage out of the Dansville Valley, a large proglacial lake formed in the valley. As a result, clays were deposited over the bedrock (Fairchild, 1926). The logs of wells drilled for the Village of Dansville are presented in Appendix B and were used to construct a geologic cross-section of the valley perpendicular to its axis (Figure 3-1). Clay and clay mixed with sand and gravel extend from bedrock to within 15 to 40 feet of the ground surface. The well logs also indicate that most of the various stratigraphic layers within the unconsolidated sediments are continuous over the valley floor. The top 15 to 40 feet of sediment is permeable alluvium, which is thickest along the valley margins and thinnest in the middle. The depth to bedrock in the site area is approximately 215 feet.

3.1.3 Soils

The site is in an area mapped as the Howard Gravelly Loam (Soil Survey, Livingston County, 1956). Its description is as follows:

0-10" soil surface: grayish-brown friable gravelly loam, fairly well supplied with organic matter.

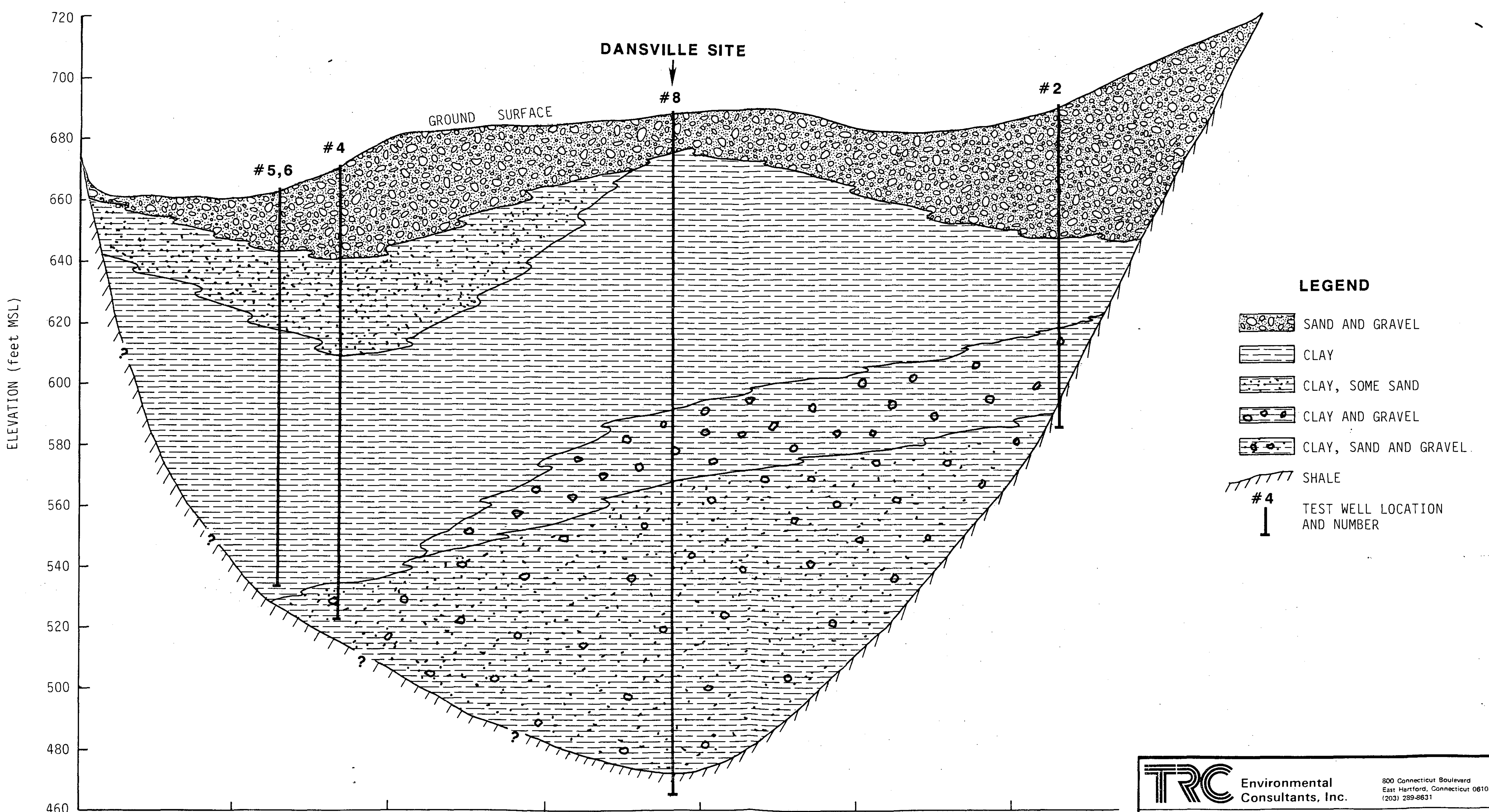
10-22" yellowish-brown, very strongly acid, friable gravelly loam.

22-36" brown-slightly red-brown, very gravelly clay loam in tongues a few inches to 1 ft wide to a depth of 4 or 5 ft.

Most of the soil at the site has probably been removed and replaced with fill materials during the life of the plant.

3.2 Hydrology

Site specific hydrological information for the Dansville site is limited. Regional data are presented in the following sections on surface water hydrology and ground water hydrology.



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NYSEG DANSVILLE, NY

FIGURE 3-1
GEOLOGIC CROSS-SECTION

3.2.1 Surface Water Hydrology

Average annual precipitation in the Dansville area is 30 inches. The heaviest average precipitation (17 inches) occurs during the growing season, May through October. Most of the non-growing season, November through April, precipitation (13 inches) occurs as snow and ice. The average mid-winter temperature is 25°F, while the average mid-summer temperature is 70°F.

The Village of Dansville lies on the extreme southern end of a flat linear valley, which trends northwest to the Genesee River Valley. In the Dansville area, the valley is bounded on three sides by steep mountains, which rise 700 to 1000 feet above the valley floor. The Canaseraga and Mill Creeks emerge from steep-walled canyons to join on the west side of town (Figure 1-1). The USGS gaging station, immediately downstream of the confluence of these two creeks, recorded steamflows from 1931 to 1960 (Gilbert and Kammerer, 1971). Average annual runoff during this period was 13.27 inches. Forty to fifty percent of the annual runoff occurred during March and April, when the spring thaw occurs. September is the low-flow month, contributing only 2% of the annual runoff. The relative contribution of ground water to streamflow is greatest during low-flow periods.

3.2.2 Ground Water Hydrology

The ability of the Quaternary deposits to transmit water is closely related to their mode of deposition. The fine grained clay deposits are impermeable layers and will yield only small quantities of ground water. The alluvium is permeable, but its saturated thickness is not large enough to make municipal water supply feasible. Nevertheless, this permeable layer could transmit any potential contaminants from the site to Canaseraga Creek.

The only depth to water information available for Dansville is from a local resident who drove a shallow well in order to irrigate his garden. He reported that the depth to water was 16 feet. Ground-water flow is probably westward toward Canaseraga Creek.

Dansville's water supply is provided by two surface reservoirs approximately 2 miles southeast of the site. The reservoirs are fed by the headwaters of Mud Creek. Two wells located northeast of Perkinsville (approximately 3 miles from the site) supplement the village water supply during periods of low rainfall. If necessary, these wells are capable of supplying up to 1.3 mgd, which is the average amount supplied by the surface reservoirs. There are no known wells being used for water supply within a one mile radius of the site.

3.3 Site Area Land Use

Site area land use analysis was conducted by driving by all the properties within a one mile radius of the site and mapping their present use. The map, Figure 3-2, was prepared using the 1978 revised Dansville, New York 7-1/2 minute USGS quadrangle map.

Within a one mile radius of the site, land use is roughly divided into 75% residential, 15% commercial-industrial, and 10% agricultural. Immediately surrounding the site, land use is primarily residential. One commercial operation is located north of the site on the north side of Battle Street. The property is operated by a meat wholesaler. A dry cleaning operation is located to the immediate southeast of the site area on Ossian Street. East of the site, past a small residential area, is a commercial lot occupied by a home-heating-oil-distributing company, and a farm equipment dealership. There did not appear to be any storage tanks or underground pipe lines for heating oil at the distribution center.

Five schools are located within a one-mile radius of the site area. The closest is the Dansville Junior High School, at 1750 feet to the southeast

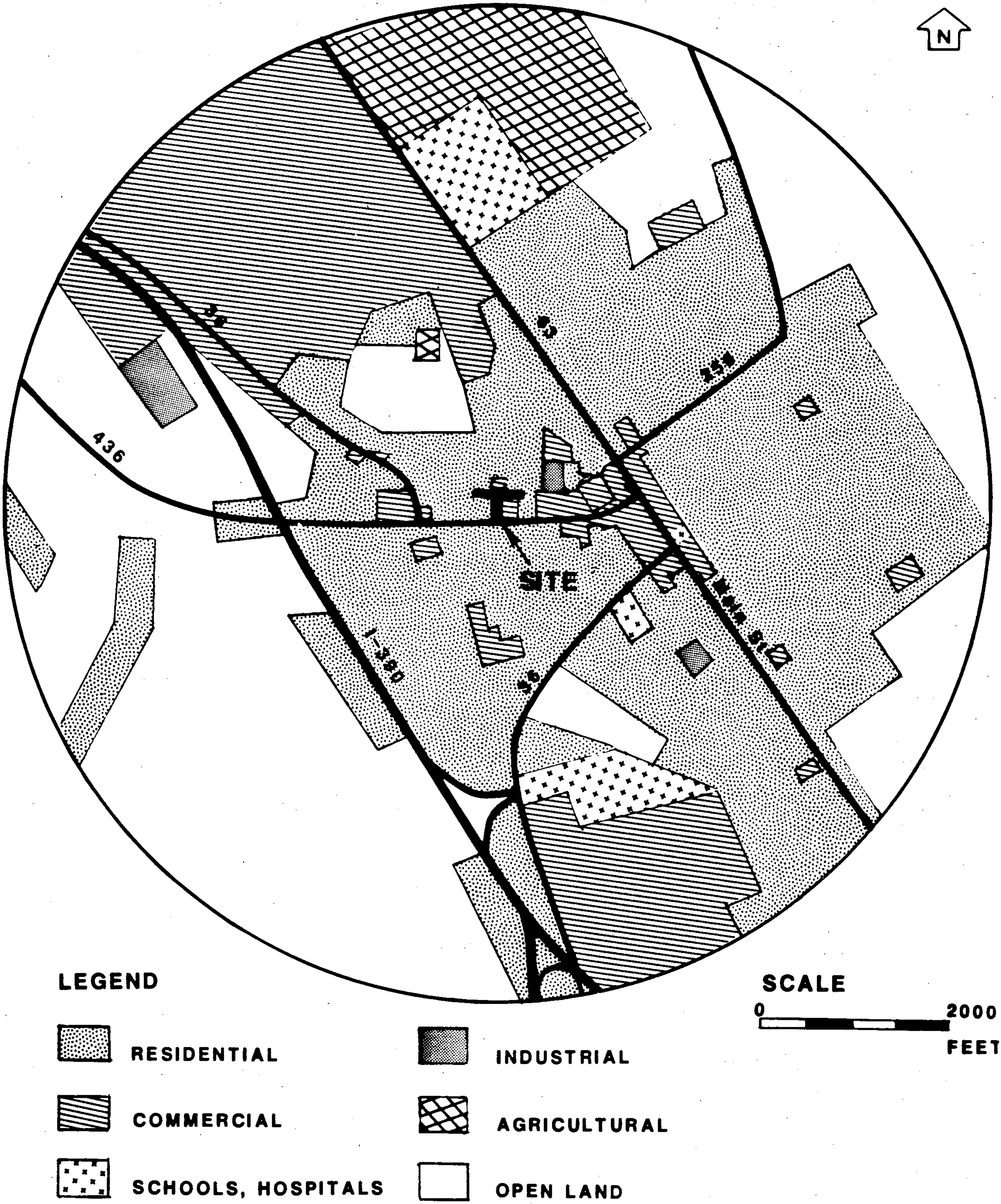


Figure 3-2. Existing Land Use Map - Dansville, New York

(Table 3-1). One hospital, Nicholas H. Noyes Memorial Hospital, is located 2900 feet south of the site area.

The Village Water and Sewer Department provided information on the location of sewers in the site vicinity. The two streets bordering the site, Battle and Ossian Streets, are included in the village sewer system. All other streets surrounding the site area are also connected to the central sewer system.

TABLE 3-1

DISTANCE OF SCHOOLS WITHIN ONE-MILE RADIUS FROM SITE AREA

School	Distance
Dansville Junior High School	1750 feet
St. Mary's School	2000 feet
Ellis B. Hyde Elementary School	3000 feet
Dansville High School	3350 feet
Dansville Primary School	3700 feet

4.0 PRELIMINARY SITE DATA

Preliminary site information will be used to help develop the investigation strategy documented in a Sampling Plan (Appendix A) which will, on approval from NYSEG, be implemented in Task 2. The preliminary site data consists of geophysical information (EM-31), soil gas and site air quality surveys completed with an Organic Vapor Analyzer, and a review of soil quality data collected previously by NYSEG.

4.1 Geophysical Survey

During the week of April 20, 1986, TRC conducted an electromagnetic terrain conductivity survey with the Geonics Limited EM31 at the Dansville site. A grid system was laid out with 30 feet between grid points, except for the south lawn area where grid points were 25 feet apart in a north-south direction and 40 feet in the east-west direction (Figure 4-1). At each grid point the conductivity was measured with the boom oriented in an east-west direction and then in a north-south direction. A large difference between these two values indicates interference from a nearby object. Some of the grid points were moved to avoid interference. Appendix C lists the conductivity values measured at each grid point.

Several areas of high conductivity were observed. The high conductivity under the eastern driveway is probably related to the former gas plant structures and operations. Another area of moderately high conductivities was found in the northeast corner of the fenced area. Slightly high conductivities were observed in an area adjacent to the northeast corner of the NYSEG building and trending west along the northern boundary of the property.

Several linear high conductivity anomalies were also detected. Several anomalies were found in the southwest corner of the eastern fenced yard.

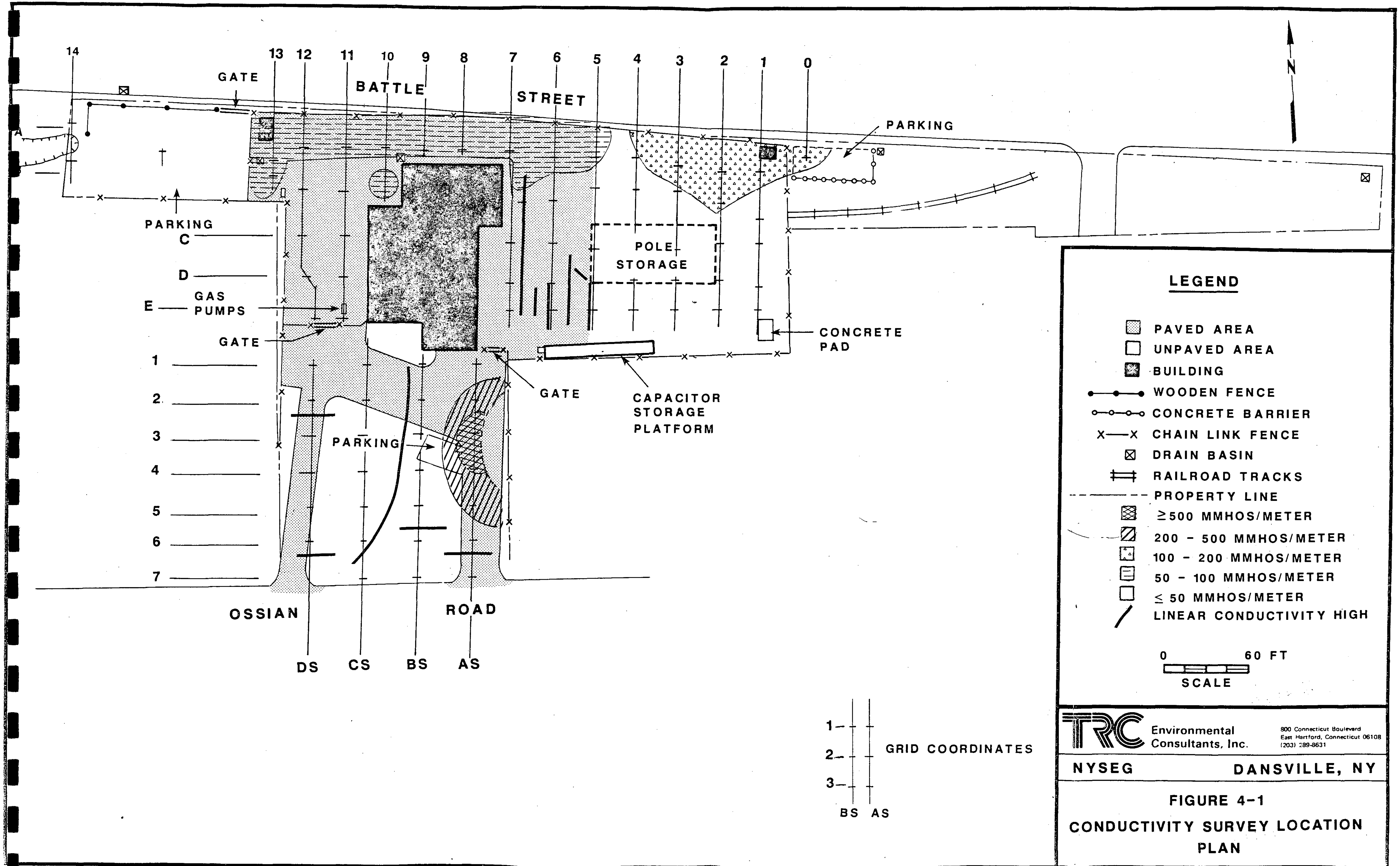


FIGURE 4-1
CONDUCTIVITY SURVEY LOCATION PLAN

These probably represent abandoned gas distribution pipes as well as the remains of the large gas holder. The long north-south trending anomaly in the south lawn corresponds to a water pipe laid in the 1960's. While excavating the trench for the pipe, a circular foundation with a brown liquid within was encountered in the middle of the lawn.

4.2 Soil Gas

During the week of April 20, 1986, a soil gas survey was conducted in the south lawn (Figure 4-2). At each grid point, a hole 14 to 18 inches deep and 1-1/4 inches in diameter was augered. Immediately upon completion of the hole, a 1-1/2 inch OD PVC pipe was inserted approximately 12 inches. The pipe is outfitted with a rubber stopper with a teflon tube through it which leads to a stainless steel valve. The valve opens to an outlet in which the Century Organic Vapor Analyzer (OVA) probe tip is inserted. The OVA pumped the air out of the hole and measured the concentration of organic vapors in the soil atmosphere. Studies have shown that this method can detect volatile organic contamination in the ground water or soil (Lappala and Thompson, 1984). An area of elevated organic vapor concentrations was found in the middle of the lawn overlapping the area where the circular foundation was found (Figure 4-2). The augered holes typically went through 12 inches of top soil and then encountered rubble consisting of bricks and cinders.

4.3 Site Air Quality

On April 21, 1986, TRC conducted an air quality survey of the Dansville site. Using a Century Organic Vapor Analyzer, ambient airborne concentrations of total organic vapors were measured. Readings were taken at each of the grid points for the EM31 survey (Figure 4-1). The temperature was 32 to 35°F,

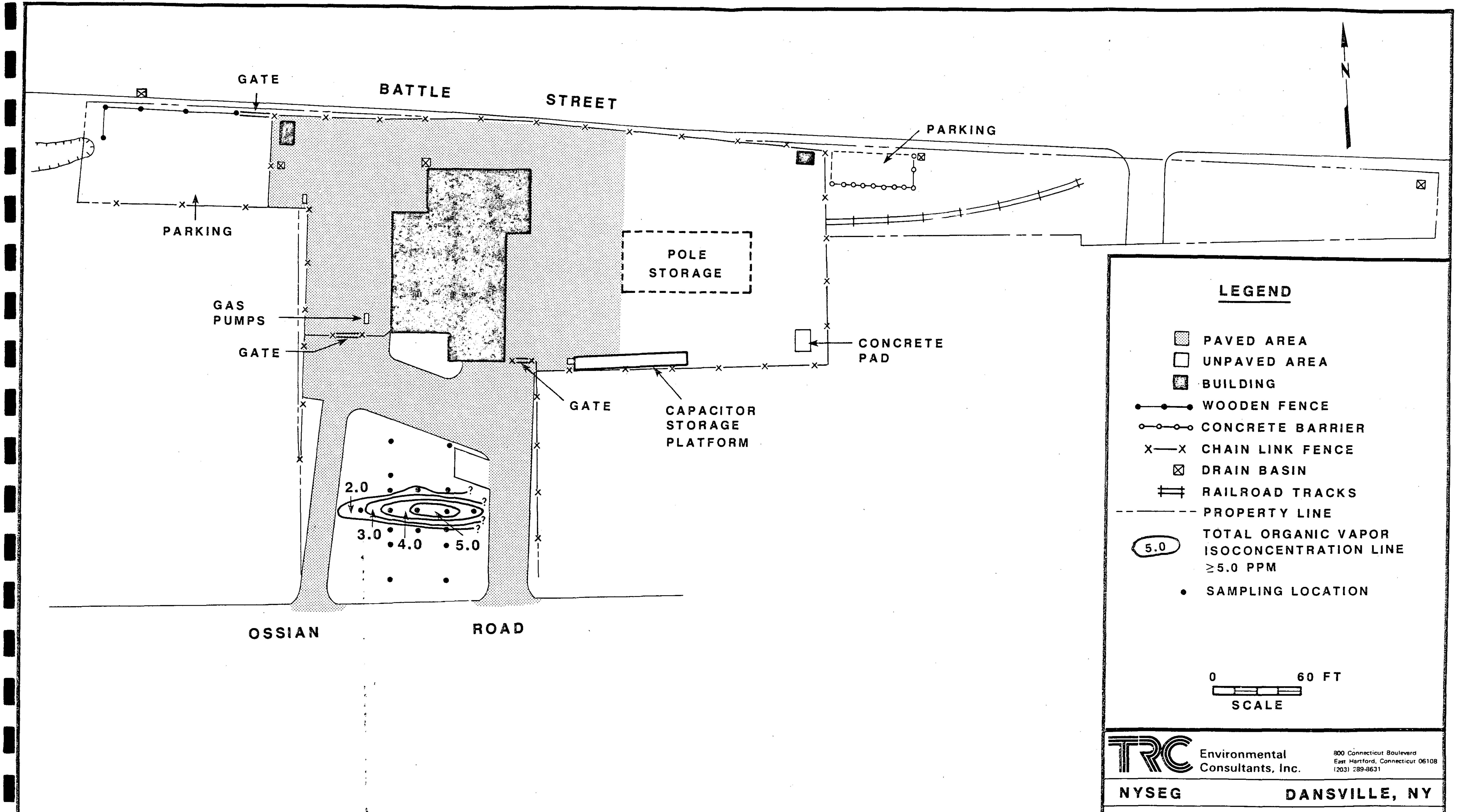


FIGURE 4-2

SOIL GAS SAMPLING LOCATION PLAN

with a slight breeze and overcast skies. The low temperatures and breeze decreased the probability of detecting organic vapors.

The OVA was calibrated on the 1X scale with zero air and 19 ppm benzene standards from Kevlar bags. All of the outside ambient airborne concentrations were between 0.4 and 1.2 ppm, with 0.9 being the median value. In addition, the air inside the storm sewer system was tested by inserting the OVA probe into the manholes and drains. The results indicate slightly elevated concentrations of organic vapors in the storm sewer system (Figure 4-3).

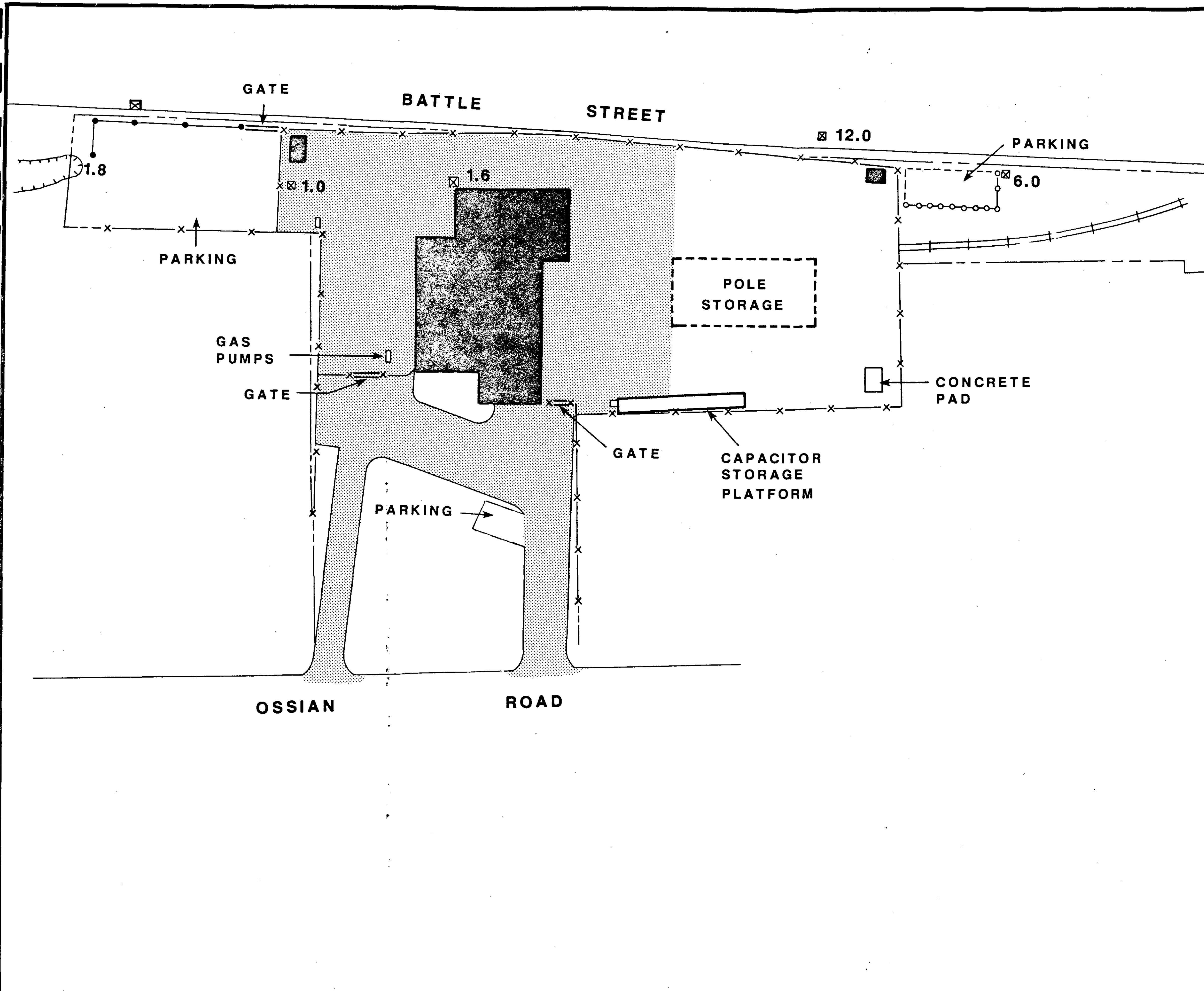
An air quality survey of the inside of the NYSEG building was also conducted on April 21 (Figure 4-4). The values ranged from 1.2 ppm to 10 ppm and were highest in the storage room.

4.4 Soil Quality

In November of 1981, NYSEG collected two soil samples at the Dansville site. Both samples were taken along the south side of the pole storage yard from excavation #2 at depths of 8 and 12.5 feet (Figure 4-5). The soils were leached following the Extraction Procedure Toxicity* (EP Toxicity) method and analyzed for the eight EP Toxicity metals as well as copper, zinc, total phenols, ortho- and para-cresol, naphthalene and quinoline. In addition, the samples were analyzed for cyanide, sulfide, pH and flash point. The analytical results are summarized in Table 4-1.

The appearance of cresols, naphthalene and quinoline in the leachate indicates the presence of coal tar or coal gasification products in the soil.

*In accordance with 40 CFR 261 (Federal Register, Vol. 45, No. 98, May 19, 1980.)



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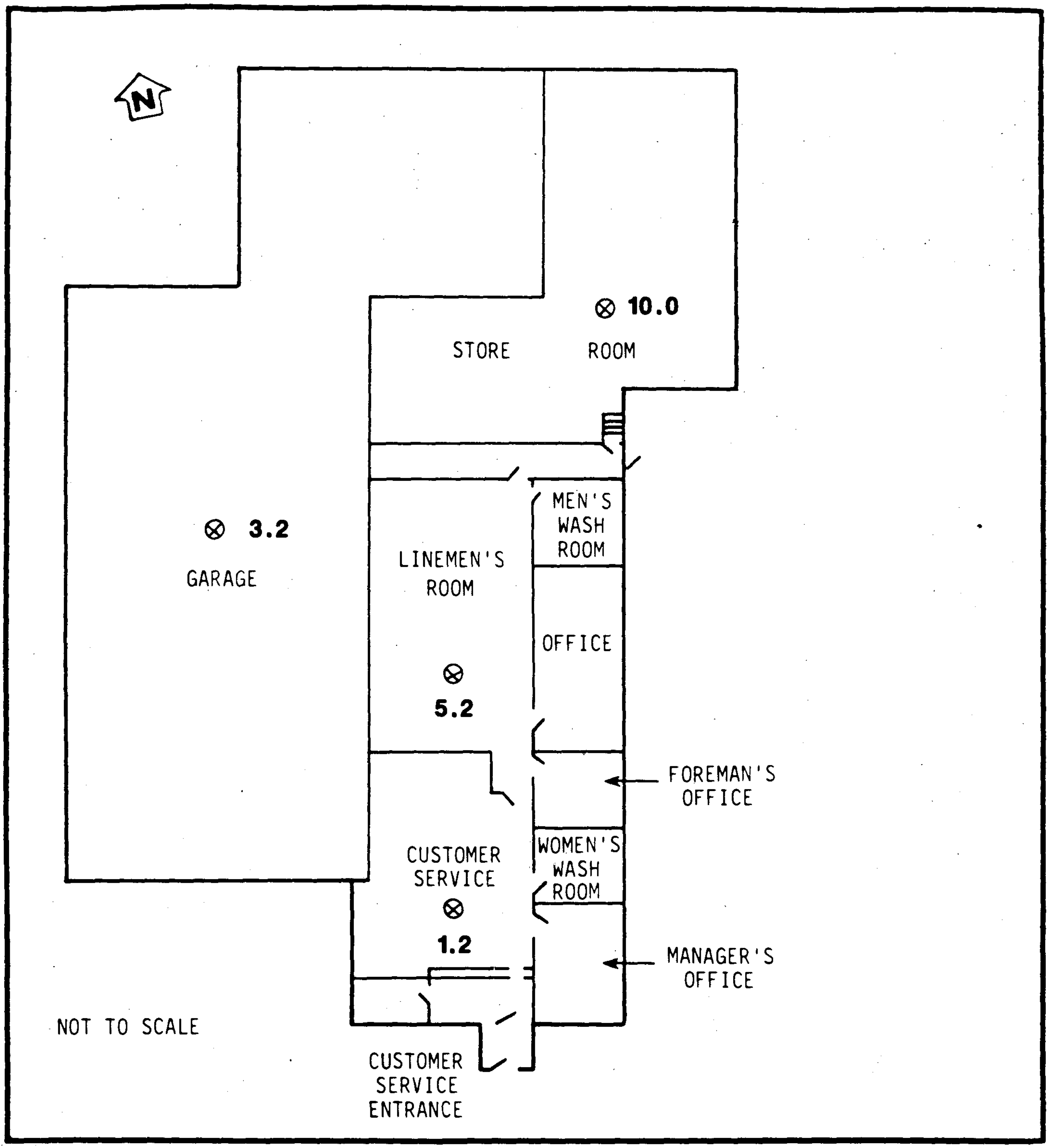
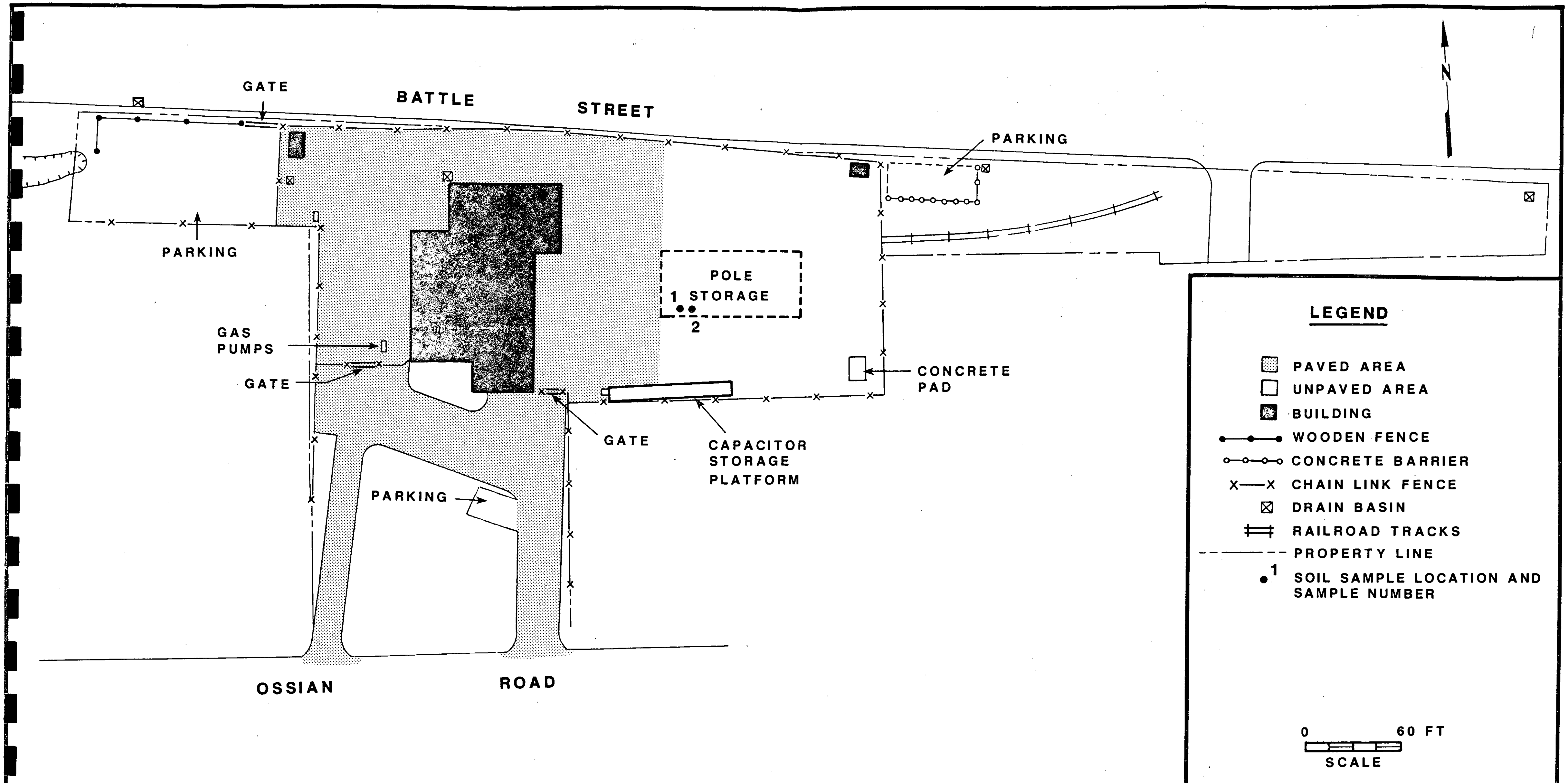
NYSEG DANSVILLE, NY

FIGURE 4-3
SEWER AIR QUALITY SAMPLING LOCATION PLAN



⊗ 5.2 GENERAL SAMPLING LOCATION AND TOTAL ORGANIC VAPOR CONCENTRATION (ppm)

Figure 4-4. Indoor Air Quality Sampling Location Plan



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NYSEG DANSVILLE, NY

FIGURE 4-5

1981 SOIL SAMPLING LOCATION PLAN

TABLE 4-1

SUMMARY TABLE OF CHEMICAL DATA FOR THE DANSVILLE
COAL GASIFICATION SITE - DANSVILLE, NEW YORK

	Sample ID	DAN-01	DAN-02
	Date	11/2/81	11/2/81
	Depth	8'	12-1/2'
	Lab No.	81-1770	81-1771
Compound	Units		
Arsenic	mg/L	0.044	ND<0.025
Barium	mg/L	0.352	0.207
Cadmium	mg/L	0.002	0.014
Chromium	mg/L	ND<0.010	ND<0.010
Copper	mg/L	ND<0.05	ND<0.05
Lead	mg/L	0.031	ND<0.010
Mercury	mg/L	ND<0.0004	ND<0.0004
Selenium	mg/L	ND<0.002	ND<0.002
Silver	mg/L	ND<0.05	ND<0.05
Zinc	mg/L	0.371	0.345
Phenols, total	mg/L	0.15	ND<0.008
o-Cresol	mg/L	0.110	0.022
p-Cresol	mg/L	0.056	0.015
Naphthalene	mg/L	0.930	0.103
Quinoline	mg/L	0.350	0.0035
pH	-	7.4	7.1
Flashpoint	°F	>170	>170
Cyanide	mg/kg	ND<1	ND<1
Sulfide	mg/Kg	320	530

5.0 DISCUSSION OF FINDINGS

5.1 Summary of Findings

Based on the preliminary data gathered in Task 1, several observations were made regarding the former Dansville Gas Plant. Several questions were also raised which will be addressed in the remaining program tasks. The conclusions and questions include:

- Gas manufacture wastes have been identified in the subsurface on the NYSEG property. The extent of contamination has not been determined.
- Potential sources of the contaminants have been identified as:
  - tar well
  - materials disposed of in the canal
  - spills during operations
  - ash disposal
  - trench from the plant to the canal
- Inadequate data exist on the types and locations of holders used throughout the plant history. The holders are a potential source of contamination. This will require confirmation during subsequent investigations.
- No surface contamination was observed.
- Absence of coal tar odors and low Organic Vapor Analyzer readings, as compared to background, indicate no immediate respiratory hazard on-site. Further studies will be required, however, to assess potential risks during excavation because of the number of sensitive receptors in the area.
- The depth to ground water and direction and velocity of ground water flow needs to be measured in order to assess the potential for contaminant migration off-site.
- Several areas of high terrain conductivity exist and may indicate the presence of gas manufacture wastes. This will require confirmation during subsequent investigations.

5.2 Preinvestigative Evaluation

The objectives of the Task 2 and Task 3 investigations for the Dansville site are to obtain sufficient site specific field data to determine if there is an environmental problem at the site and to allow site characterization, risk assessment, and identification of appropriate remedial alternatives. To assure that the investigation will result in development of the necessary data, the preinvestigative evaluation is undertaken to summarize the potential environmental problems existing at the Dansville site and to identify remedial technologies which may be applicable to those environmental problems. With potential remedial technologies identified, it is possible to review the work program to verify that the field program will develop sufficient data to enable the specific remedial technologies to be evaluated. As the project progresses and understanding of the site improves, these technologies will be reviewed and refined as necessary. Additional data needs which may be identified as a result of Task 2 will be satisfied in Task 3.

Table 5-1 summarizes the potential environmental problems which may exist at the Dansville site. The media addressed in Table 5-1 are soils, ground water, sewers, and air. Surface water is not addressed because the nearest surface water bodies, Canaseraga Creek and Mill Creek, are 0.7 miles and 0.5 miles, respectively, from the site. Data developed in Task 2 will be used to assess whether or not former coal gasification activities at the site could potentially impact these water bodies. The potential environmental problems have been summarized for soils, ground water, sewers, and air based on a number of technical factors including the chemicals present at the site, the chemical transport mechanisms, the expected persistence of chemicals in the environment, and existing or potential receptors of those chemicals.

Based on the environmental problems which may be identified at the site, several remedial technologies have been considered for each media. These technologies are identified in Table 5-2. Comments are provided for each of the remedial technologies presented.

TABLE 5-1

SUMMARY OF POTENTIAL ENVIRONMENTAL PROBLEMS AT THE DANSVILLE SITE

Technical Factors	On-Site Soils	Ground Water	Sewers	Air
Chemicals Present	Two soil samples have been collected at the site and contain the following: • arsenic • barium • cadmium • lead • zinc • phenols • o-cresol • p-cresol • naphthalene • quinoline • sulfide The following chemicals may also be present in the soils: • benzene • toluene • ethylbenzene • xylenes • polynuclear aromatic hydrocarbons • heavy metals • cyanides	There are no ground water wells at the site and no ground water samples have been collected. Chemicals that may be expected in ground water if coal gasification wastes were deposited on site are: • benzene • toluene • ethylbenzene • xylenes • naphthalene • phenols • cyanide Low concentrations of polynuclear aromatic hydrocarbons may also be found in the ground water.	No sewer samples have been collected at the site, but the chemicals that may be expected in the ground water may also be expected in the sewers.	No air samples have been collected at the site but the more volatile chemicals present in the soil may also be present in the air.
Chemical Transport Mechanism	Volatilization to air and/or seepage and leaching of soluble or free liquid wastes to ground water.	The ground water surface is expected to be within 20 feet of the ground surface. The silt and clay soils expected at the site may contain occasional layers of more permeable sands and gravels. Shallow ground water movement is anticipated to be to the west with discharge to Canaseraga Creek.	The storm sewer along Battle Street flows into a drainage ditch just west of the Dansville site. The drainage ditch is in the location of the former canal which was used in the mid-1800s. Based on field observations, the discharge would eventually flow to Canaseraga Creek, but the ditch is overgrown with vegetation and, under most circumstances, most discharge would infiltrate down into the soil and eventually to the ground water.	Volatilization and particulate migration occur via wind scour; however, most of the site is paved or covered with gravel. Volatilization is the primary route when materials are exposed. Winds in the area are generally from the northwest.

TABLE 5-1
(CONTINUED)

SUMMARY OF POTENTIAL ENVIRONMENTAL PROBLEMS AT THE DANSVILLE SITE

Technical Factors	On-Site Soils	Ground Water	Sewers	Air
Expected Persistence of Chemicals in the Environment	Biodegradation of coal tar present in the soils is very slow or nonexistent. The volatile fraction of the coal tar (benzene, toluene, ethylbenzene, and xylenes) is expected to leach slowly into ground water or vaporize slowly into the air. Naphthalene, phenols, and cyanides are also expected to leach into the ground water slowly. The polynuclear aromatic hydrocarbons and the heavy metals are not expected to vaporize or leach into the ground water at any significant rate.	Any constituent of coal tar present in the ground water is not expected to biodegrade very rapidly except perhaps the phenols. These constituents are expected to remain in ground water until it discharges to a surface water body where vaporization will eventually occur.	Any constituent in the sewers is discharged into the ditch where the constituent would enter the soil or eventually the ground water. The persistence of the constituent would then be as described for on-site soils or ground water.	Contaminants are rapidly dispersed and susceptible to photo-oxidation.
Existing or Potential Receptors of Chemicals	The probability of direct contact to humans or animals is low since the site is paved and the coal tar constituents are buried. However, leaching and volatilization may transport these chemicals to other media such as ground water and expose humans and animals off-site.	Ground water may discharge to nearby surface water body (Canaseraga Creek). There are no known domestic water or industrial wells in a one-mile radius of the site.	The probability of direct contact to humans or animals is low since there is no access to the sewers other than through manholes. However, discharge into the ditch, which is accessible, may expose humans or animals off-site.	Humans or animals in the vicinity of the site are potential receptors of any chemicals present in the air.

TABLE 5-2

PRELIMINARY IDENTIFICATION OF REMEDIAL ALTERNATIVES
FOR THE DANSVILLE SITE

Medium	Conceptual Action	Remedial Measure	Remarks
Soils	Removal	Excavation and Disposal • contaminated soils • waste deposits	Off-site disposal will involve excavation and removal of contaminated soils and waste deposits with subsequent transportation to another location. Potential impact on air quality during excavation.
	Containment	Capping, Grading, Revegetation • wastes • contaminated soils	Commonly implemented together, they will prevent the movement of wastes, contaminated soils into the environment from erosion. The cap will also reduce infiltration and, therefore, the rate of leaching of chemicals from the soils into the ground water.
		Slurry Wall	Generally used in conjunction with extraction and treatment of ground water.
	Treatment	Solidification	Large quantity of soils would be involved. Potential impact on air quality during excavation.
		Extraction (soil flushing)	Not applicable for large quantities of material with diverse compositions. A variety of treatment technologies are potentially applicable to extracted wastes. Extracted soils may still contain much contamination.
		Land Treatment	Generally not effective for high molecular weight organic or metallic contaminated materials. Requires suitable land be available. Surface application will require revegetation to control erosion and periodic cultivation to stimulate biological activity.
	No Action	Posting	May not be applicable for a complete remedial action plan, but may be used as an element of a comprehensive plan. Will be considered in conjunction with other technologies.
Ground water	Removal/Treatment	Extraction of ground water via pumping	If large volumes of water are to be extracted, on-site treatment may be appropriate. May include recharge or discharge to surface drainage. Extent of contamination and required operating period is not known. May require years of operation.
		Stripping or carbon adsorption	Stripping may cause air contamination without proper and expensive controls applicable to organic constituents; contaminated carbon filters require appropriate disposal.
	In-situ Treatment	Biostimulation	Analysis/culture of the contaminated water to determine the present activity and nutrient levels needed to stimulate hydrocarbon-utilizing bacteria.
		Aquifer flushing	May include the use of chemical additives. Often used in conjunction with ground water removal.
		Other technologies	Cost-effectiveness is dependent on concentration and types of contamination. Physical or physical/chemical technologies such as oxidation, precipitation, etc. may be applicable to highly contaminated waters.

TABLE 5-2
(Continued)

PRELIMINARY IDENTIFICATION OF REMEDIAL ALTERNATIVES
FOR THE DANSVILLE SITE

Medium	Conceptual Action	Remedial Measure	Remarks
Ground water (Continued)	Containment	Slurry Wall	Generally used in conjunction with extraction and treatment of ground water.
		Capping	See Soils.
	Diversion	Low permeable barriers	Prevent chemical migration within shallow aquifer.
		Injection wells/interceptor trenches	Control ground water flow direction. Generally used in conjunction with ground water extraction. To be considered in conjunction with other technologies.
	No Action		
Air	Removal of Source	Excavation	Major excavation to remove source of volatilizing chemicals may result in short-term degradation of air quality when soils are exposed to the atmosphere.
	Control	Capping • clay liner • synthetic liner	The addition of a cover will considerably reduce the release of volatilized chemicals and may require collection and removal of contaminant vapors.
	No Action		To be considered in conjunction with other technologies.
Sewer	Removal	Excavation and Relocation of Sewers	Removal of sewers will involve excavation and removal of contaminated soils and pipes and may require subsequent transportation to an approved disposal site. Potential impact on air quality during excavation.
		Lowering Water Table via Pumping	If large volumes of water are to be extracted, on-site treatment may be appropriate. Extent of contamination and required operating period is not known.
		Plugging and Relocation of Sewers	Avoids the air quality concerns of excavation. However, the sewer line bedding may still act as a permeable conduit for contaminated ground water.
		Sealing Sewer Line	Coating the interior of the sewer line has the same advantages and disadvantages as plugging.
	Treatment	Stripping or Carbon Adsorbtion	Stripping may cause air contamination without proper and expensive controls applicable to organic constituents; contaminated carbon filters require appropriate disposal.
	No Action	Posting, Fencing Land Restrictions	To be considered in conjunction with other technologies.

5.2.1 Data Needs

The data requirements for risk assessment and remediation fall into four general categories:

1. Establishment of background conditions.
2. Characterization of contamination sources.
3. Determination of transport routes.
4. Identification of potential receptors.

Table 5-3 lists specific data requirements in each of these categories for the Dansville site. Activities referred to in Table 5-3 are described in detail in the Task 2 Sampling Plan which is included as Appendix A.

5.2.2 Data Quality Requirements

In order to investigate the presence or absence of coal gasification wastes at the Dansville site, the following parameters will be included in the soil and water analytical program: volatile organics, polynuclear aromatic hydrocarbons, total cyanide, ferroferric cyanide, total organic carbon (water samples only), non chlorinated phenolics, iron, zinc, ammonia and sulfate. In addition, a total of two soil and four ground water samples should be analyzed for the USEPA priority pollutants, minus the PCB/pesticide fraction, which will indicate the presence of several other types of compounds including acid extractable organics and 12 other inorganic parameters. RCRA disposal parameters are not included in the Task 2 analytical program, but will be added later if the need for an evaluation of off-site disposal alternatives for wastes arises. Air samples will be analyzed for polynuclear aromatic hydrocarbons and volatile organic compounds with low volume pumps since the site is paved and a fugitive dust problem is not expected.

TABLE 5-3

TASK 2 DATA REQUIREMENTS
DANSVILLE SITE

General Data Requirement	Specific Data Requirement	Related Task 2 Activity
A. Establishment of Background Conditions	Analytical data from soil, ground water, sewer, and air samples collected from areas not expected to be influenced by former coal gasification plant activities.	Samples collected and analyzed from test pit 15, boring B-1, monitoring wells 1S and 1D, sewer sampling point SR-1, and an upwind air sample (to be determined in the field). Specific locations are shown on the figures in Appendix A, Task 2 Sampling Plan.
B. Characterization of Contaminant Sources		
1. Location	Confirmation of location of gas holder foundations.	Test pits 2, 3, 8, 9, and 10.
	Soil conditions adjacent to former coal gasification structures.	Test pits 1, 4, 5, 6, 11, 12, 13, and 14.
2. Chemical nature	Analytical data from soil, ground water, sewer, and air samples collected from areas adjacent to former coal gasification structures.	Analyses of samples from test pits 1 through 20, sewer sampling locations SR-1 through SR-3, monitoring wells 1S, 1D, 2S, 2D, 3S, and 3D, and up to 10 dosimeters and 12 tenax tubes.
	Chemical data which will allow differentiation between coal gasification related constituents and other contaminant sources such as the former gasoline storage tank.	Analysis of four ground water samples by GC/MS at locations selected based on conditions encountered during the field program.
C. Determination of Potential Transport Routes		
1. Airborne transport	Meteorological data (wind speed, wind direction, ambient temperature, humidity).	Meteorological monitoring during air sampling.

TABLE 5-3
(CONTINUED)

TASK 2 DATA REQUIREMENTS
DANSVILLE SITE

General Data Requirement	Specific Data Requirement	Related Task 2 Activity
C. (Continued)		
	Air quality data downwind of site.	Sampling and analysis at locations determined by field conditions.
2. Ground water transport	Site stratigraphy; identification of changes in soil permeability.	All borings and test pits.
	Ground water gradient.	Water level measurements in monitoring wells.
	Quality of ground water downgradient of potential sources of contamination.	Sampling and analysis at 2S, 2D, 3S, and 3D.
D. Identification of Potential Receptors	Evaluation of ground water discharge points and potentially impacted surface water bodies (Canaseraga and Mill Creeks).	Water level measurements in wells and plotting of ground water contours.
	Evaluation of potential for direct human contact with waste.	Identifying surface/near surface sources of contamination.

The primary use of the Task 2 data is for problem identification, preliminary assessment of risk, and preliminary (conceptual) engineering. The methods used to analyze for the above parameters must be appropriate for this use. In addition, analytical methods for air, soil, and water samples must generate data that are comparable so that relationships between contaminants in different media can be examined. The data must also be of a quality which will allow comparison between site conditions and regulatory criteria. Where sources of contamination not related to past use of the site for coal gasification are present, the analytical methods must provide sufficient information to allow contaminant source identification.

6.0 RECOMMENDATIONS

The following activities are recommended for Task 2, and are designed to meet the data requirements described in Table 5-3. Recommended activities involve subsurface investigations, and sampling of site soils, ground water, sewers, and air. Detailed discussion of these proposed Task 2 activities is presented in Appendix A, Task 2 Sampling Plan.

Subsurface investigations will involve test pits, borings, and monitoring wells. Test pits will allow for discovery and investigation of buried structures and past disposal practices. Six soil borings will allow for determination of the stratigraphy of the unconsolidated sediments at the site, as well as delineation of potential aquifers; each boring will be converted into a monitoring well. The six wells will be grouped into three well nests, which will have a deep and shallow well. One well nest will be upgradient and two well nests will be downgradient. The wells will provide hydrologic information, such as vertical and horizontal hydraulic gradients, aquifer hydraulic conductivities, and seasonal fluctuations of water levels.

Various media at the site will be sampled for potential contaminants. An average of one soil sample will be collected from each test pit. At test pits which appear to be uncontaminated, a composite sample over the entire depth will be taken. At contaminated test pits, the most apparently contaminated zone will be sampled. Where several test pits are clustered in a contaminated area, samples will be collected from different levels in the various pits, in order to delineate the vertical extent of contamination.

During the excavation of test pits, air samples will be collected upwind, downwind, and at the test pit, in order to develop data for risk assessment of remedial activities involving excavation. Two sampling media will be used. One media will collect volatile organic compounds for GC/MS analysis while the other will be focused on polynuclear aromatic hydrocarbons.

Four weeks after installation, the ground water monitoring wells will be sampled. In addition, the storm sewer will also be sampled for analysis. The storm sewer which passes along the northern side of the site will be sampled at three locations: upstream, downstream, and in the middle of the site. The proposed test pit, boring/monitoring well, sewer, and air sampling locations are discussed in detail in the Task 2 Sampling Plan (Appendix A).

The analytical program is designed to fulfill the data quality requirements discussed in Section 5. The organic analyses for soil, ground water, and air will be done by GC/PID, with GC/MS confirmation on two soil samples collected from the test pits and two samples each from the first two ground water sampling rounds. This program will allow comparison of data from different media and will yield concentrations at the trace level which are sufficient for comparison with regulatory and health criteria.

A report will be prepared to assess the data obtained in Task 2 in conjunction with the site information developed in Task 1. On the basis of the Task 2 findings, a preliminary assessment of risk will be completed and recommendations for continued investigation (Task 3), monitoring the existing situation, or discontinuing the program will be provided where appropriate.

7.0 REFERENCES

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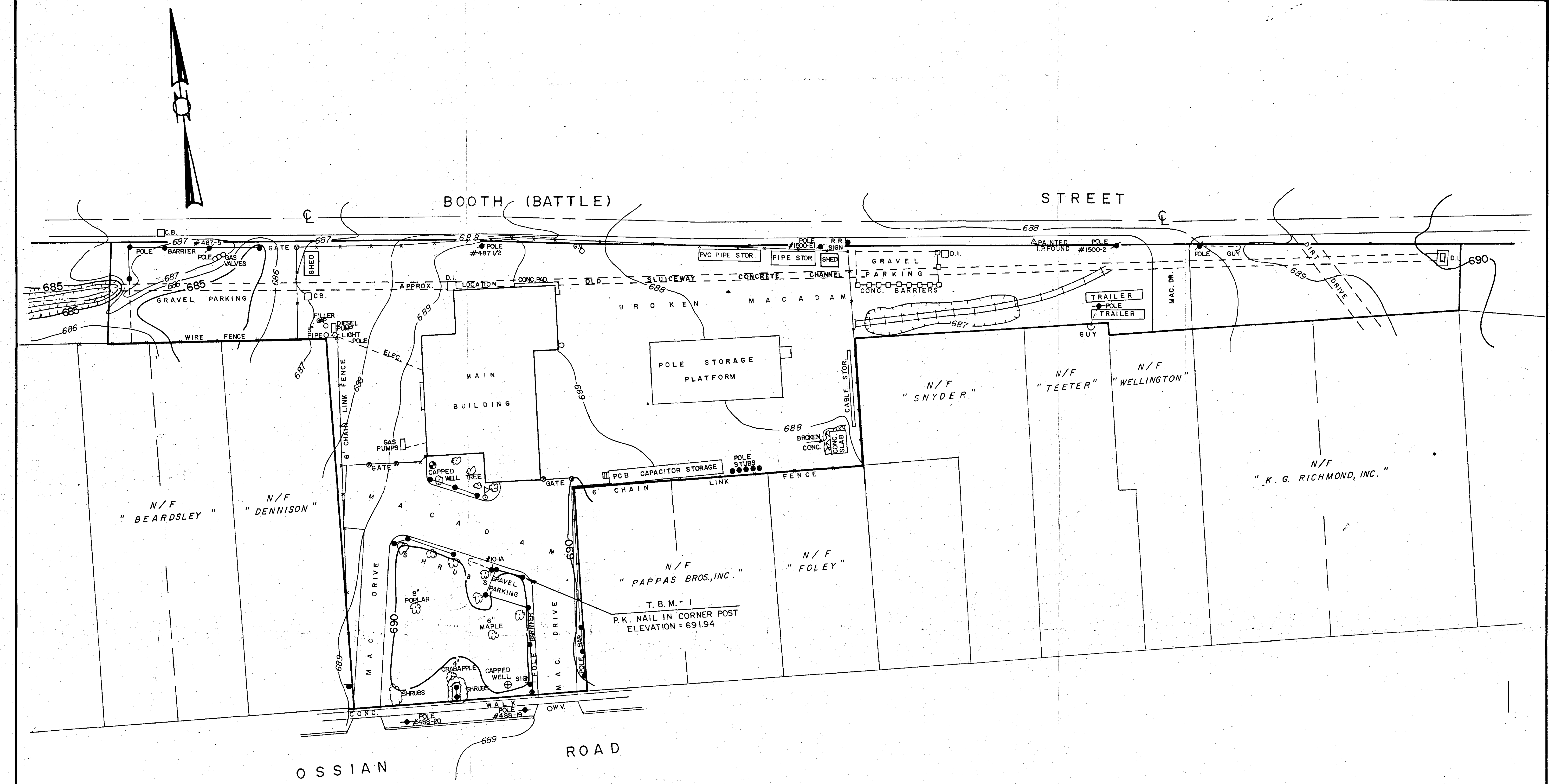
EXHIBIT 1

TOPOGRAPHIC SURVEY
DANSVILLE SITE



NOTES: 1) ELEVATIONS ARE ON N.G.S. SEA LEVEL DATUM

2) HORIZONTAL IS N.Y.S. PLANE COORDINATES

SUBDIVISION PLANNING	**WEILER ASSOCIATES** LICENSED LAND SURVEYORS HORSEHEADS, N.Y. BALTIC, CONN.	SURVEYING & MAPPING

TOPOGRAPHIC SURVEY
FOR

T.R.C. ENVIRONMENTAL CONSULTANTS, INC.

VILLAGE OF DANSVILLE — LIVINGSTON COUNTY
NEW YORK

DRAWN BY M.G.S.	SCALE 1" = 50'	REVISED:	JOB NO. X-553
CHECKED BY E.L.G.	DATE MAY 13, 1986	REVISED:	

75037
HHS-191153

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APPENDIX A

TASK 2 SAMPLING PLAN
DANSVILLE SITE

TASK 2 SAMPLING PLAN FOR THE SITE INVESTIGATION AT THE FORMER DANSVILLE COAL GASIFICATION PLANT

FOR
NEW YORK STATE ELECTRIC & GAS CORPORATION

Prepared By:

Carl J. Mohrbacher
Curtis A. Kraemer, P.G.

Reviewed By:

James Gould, P.E.

TRC Project No. 3438-N61

August 20, 1986

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF EXHIBITS

1.0 INTRODUCTION

This field sampling plan describes in detail the plan to conduct the various field tasks necessary during the Task 2 investigation at Dansville. Included in this plan are the schedules, locations of samples, and procedures to be employed in sampling site soils, test pits, ambient air, sewers and ground water monitoring wells. Where a specific TRC quality assurance procedure is incorporated, the procedure is referenced.

A number of maps are included to illustrate the various sampling locations; the maps are based on a site map, included as Exhibit A, developed by Weiler Mapping, Inc. of Horseheads, N.Y. The site map developed by Weiler has a scale of 1" equals 50', all other maps used in this report have been reduced to 1" equals 60' for presentation purposes. The plan is organized according to the chronological order of events starting with field mobilization and ending with sample shipping and documentation. The program schedules and costs are presented at the end of this plan.

2.0 FIELD MOBILIZATION

Based upon approval of this plan by NYSEG, TRC will mobilize to the Dansville site. One day is estimated to establish the project site so that subsurface explorations can commence.

The field mobilization will include the following work elements:

2.1 Establish the Field Office

A field office with room for a field laboratory will be established; TRC has received approval from the Dansville NYSEG Service Center to establish a field office in the existing building. The office will be in an open area on the east side of the storage room. This room is equipped with power and a phone as well as an empty desk. The area will be out of the main pathways of the storage area so as to minimize interference with NYSEG work activities. Sanitary facilities are available in the NYSEG building. The entire NYSEG building will be designated a "clean" area. Therefore, TRC personnel and subcontractors will be required to go through decontamination before entering the building. Figure SP-1 shows the lay-out of the building and location of TRC temporary facilities.

2.2 Establish the Decon Area and Tool Storage Room

TRC will make arrangements with the Dansville NYSEG Service Center to provide space in the garage for secure storage of field tools, equipment, steam generators, and sample shipping containers. Some smaller equipment may also be stored in the field office (Figure SP-1). A heavy equipment decon area used primarily for steam cleaning backhoes and drilling rigs (no material will be collected) will be located inside the fence on the east end of the property. This location was chosen because it will not be in the area of drilling or excavation. Outside of the east wall of the NYSEG building,

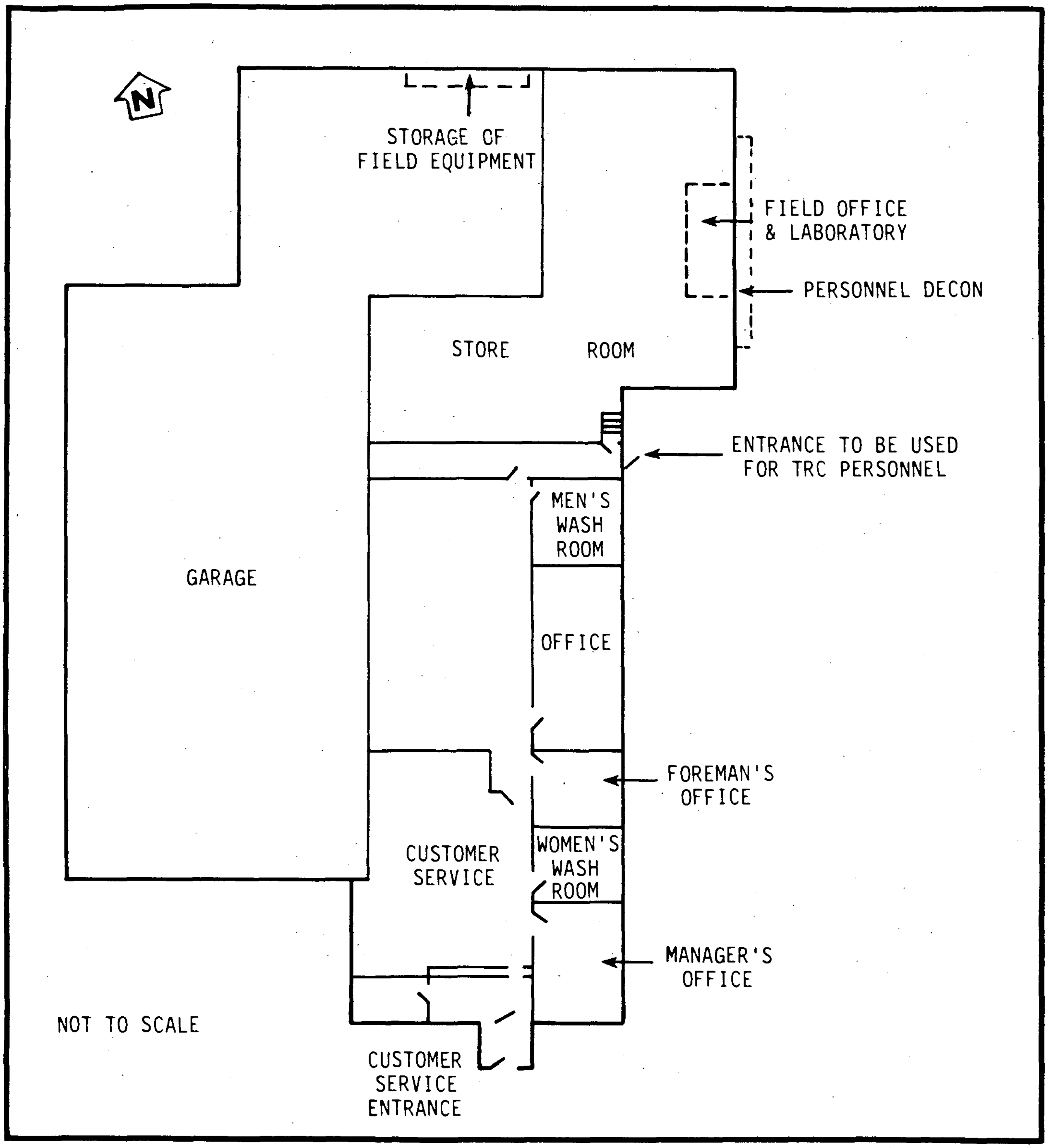

FIGURE SP-1. FIELD OFFICE, FIELD LABORATORY AND STORAGE

there will be facilities for boot and glove washing, disposable coverall removal and hand washing. This personnel decon area is conveniently located for TRC personnel passing in and out of the building yet will not interfere with NYSEG work activities. The locations of the decon areas are shown on Figure SP-2.

2.3 Establish Field Communications

The field communications, as outlined in the Health and Safety Plan (HASP) dated June 2, 1986, will consist of two-way radios and a telephone. The field office will be equipped with an FM two-way radio base station from which communication to field work teams can be made. The system will include an AC to DC converter, the base station, and an antenna. Field personnel will be equipped with hand-held radios. A telephone will also be near the field office. While the site is not large, the FM two-way radio will provide frequent and easy communication between members of the field party and minimize the need for them to pass from the contaminated areas into the NYSEG building. The phone is to provide communication off-site, including the remote possibility of emergency services such as the police or fire departments (telephone numbers are in the HASP).

2.4 Backhoe and Drilling Equipment Mobilization

A backhoe and drill rig will be delivered to the site by Northstar Drilling, Inc. and parked in the designated parking zone (Figure SP-2). All small tools, safety equipment, etc. will be locked in the NYSEG building.

2.5 Set Up the Site Laboratory

A field laboratory will be in the same area as the field office. A Century Organic Vapor Analyzer (OVA) Model 128 or an HNu Photoionizer PI-101

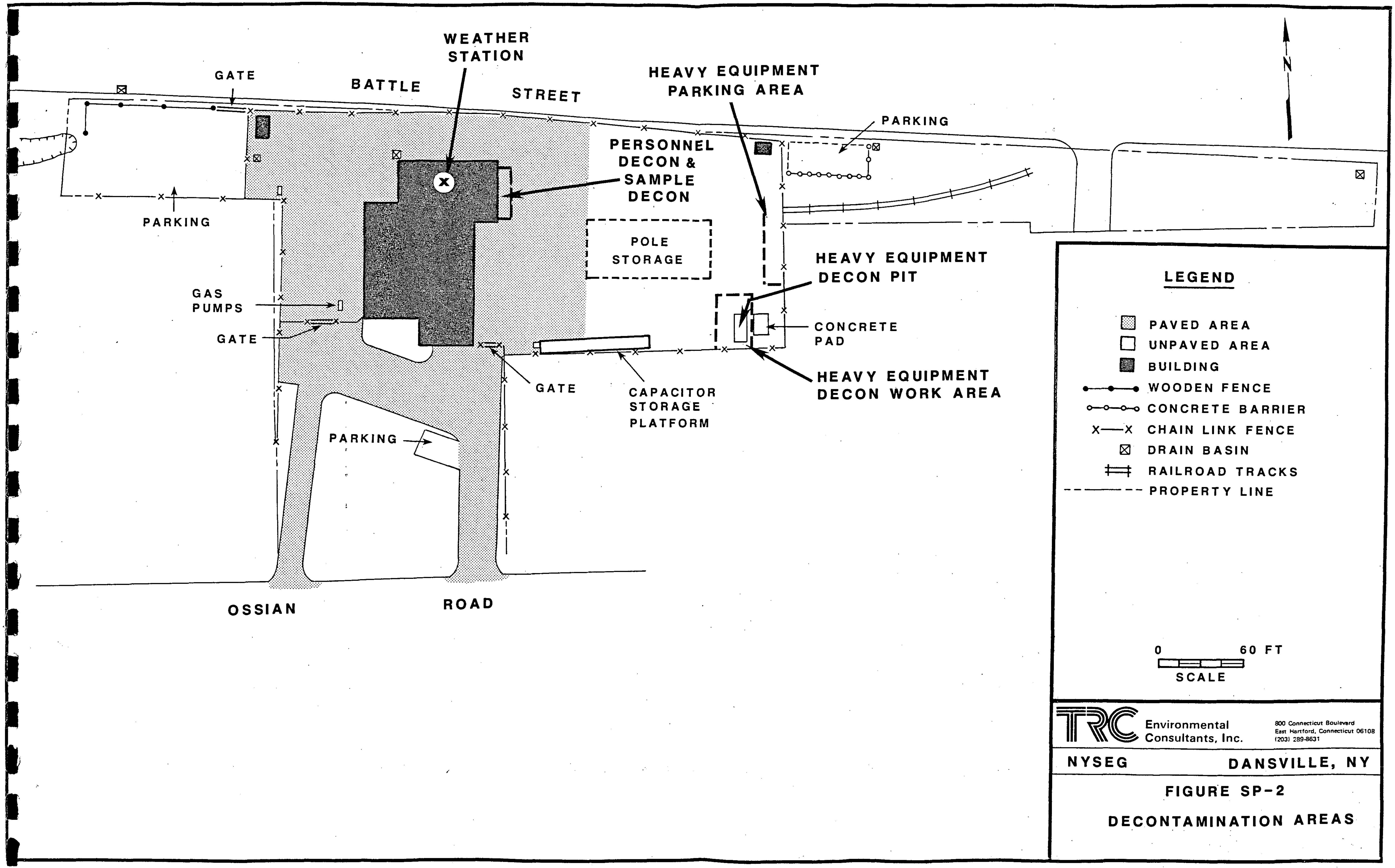

FIGURE SP-2

DECONTAMINATION AREAS

will be the survey tools used to detect levels of organics in site soils. The primary procedures for operation and calibration of the OVA and HNu will follow TRC Technical Standard T/S-990, Operation and Calibration of the Century Organic Vapor Analyzer Model OVA-128, and Technical Standard T/S-993, Operation and Calibration of the HNu PI-101 Photoionizer Analyzer. The OVA or HNu will be maintained in the clean, protected area of the field office where they will be prepared for monitoring site soils and test pits. All samples from field activities will be carried to the personnel decon station by the field technician. There the field chemist will decontaminate the outside of the sample container and take them into the field laboratory for head space analysis or shipping.

2.6 Meteorological Monitoring Station Setup

As part of the ambient air monitoring program TRC will, during the site mobilization, establish a station which will monitor and record wind speed and direction. Located on the highest point of the NYSEG building, (Figure SP-2), this instrument will include a 7 foot tower with vane and anemometer powered by a battery located in a weathertight recorder box. The device is a Climatronics EWS-1 Electronic Weather Station and it will be checked as necessary to determine upwind and downwind directions just prior to and during drilling operations.

2.7 Identification of Sampling Locations

During the mobilization phase, wooden stakes with orange flagging will be placed around the site to identify test pit and monitoring well locations. Where these locations are over asphalt, orange spray paint will be used to mark the spot.

After the drillers and backhoe operator have set up their equipment, they will be shown the sequence of sampling locations so that they can prepare for any contingencies.

3.0 SUBSURFACE INVESTIGATIONS

The purpose of the subsurface investigations (test pits and borings) is to define the nature of possible contaminants, and to establish a ground water monitoring system that will define the effects that potential site contamination has had on area ground water, specifically possible contaminant migration rates and directions.

3.1 Test Pits

In TRC's Work Plan for the Dansville Site (April 1, 1986), one of the program options discussed was the use of the test pits to locate areas of contamination. Based on the geophysics work completed in Task 1 and the likelihood that the depth to ground water on the site is about 10 feet, test pits are feasible and will allow for quick delineation of shallow subsurface conditions which in turn can provide information to better locate monitoring wells.

Therefore, about 20 test pits will be excavated at the site in the approximate locations shown on Figure SP-3. TRC has allocated five days for backhoe work, and based on our experience, the number of test pits could likely increase to greater than 25. The majority of the test pits will be in the vicinity of former plant operations, with particular emphasis placed on areas around the the separators, purifier boxes, and gas holders. The pits have been located to determine the extent of soil contamination around the plant site, characterize the waste products, and determine the pathways of contaminant migration.

Referring to Figure SP-3, the following is a summary of the location and purpose for each test pit:

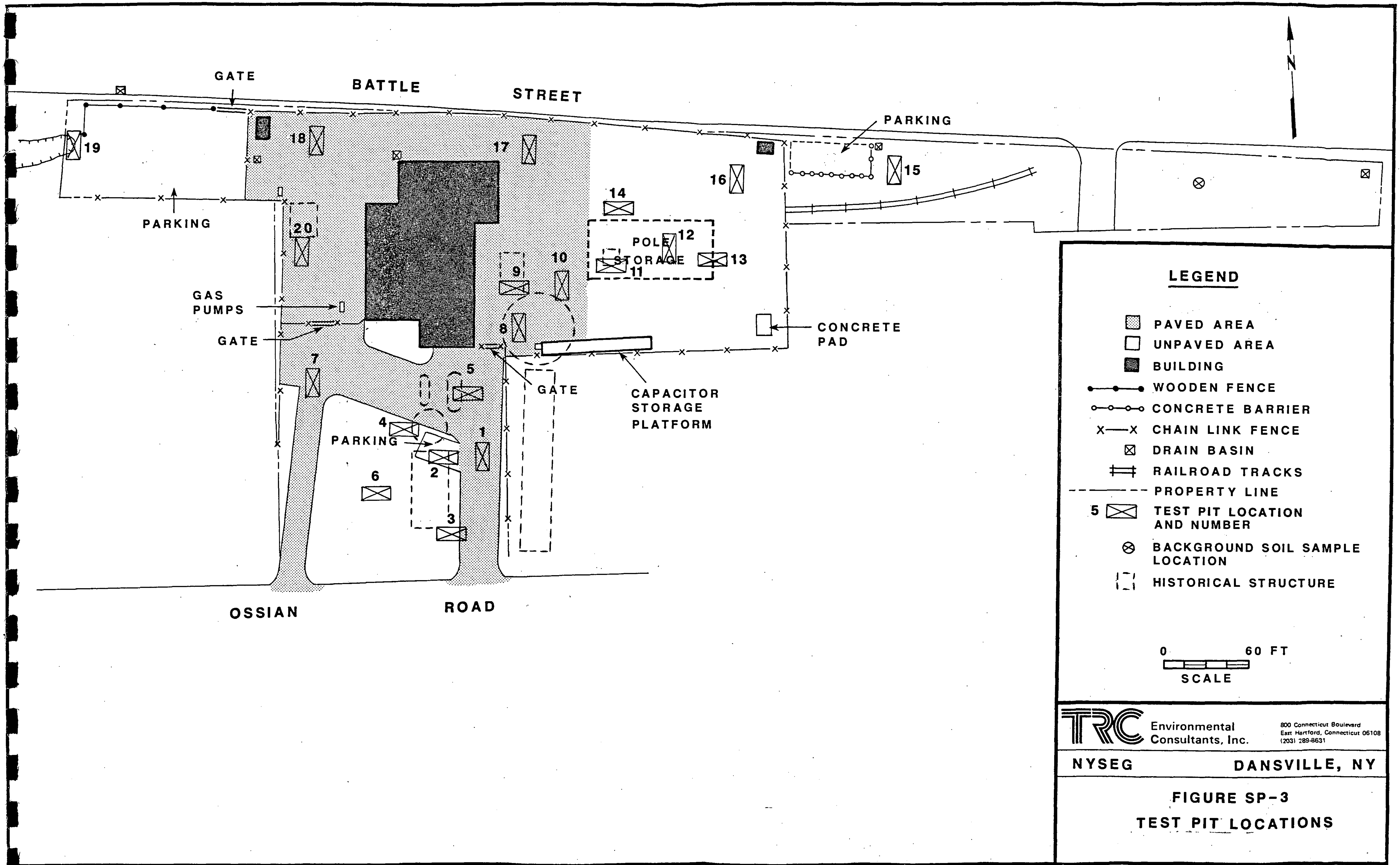

FIGURE SP-3
TEST PIT LOCATIONS

Test Pit Number	Description
Background	To delineate background soil quality. Will be collected with a hand auger.
1	To investigate a high conductivity anomaly.
2, 3, 4 and 5	To verify location of gas house, gas relief holder and various tanks and determine if coal tar and oil was disposed in them.
8	Along the present NYSEG property boundary to determine if contaminants may be on the adjoining property.
6	To investigate a circular foundation discovered during laying of a water line.
7	At a high conductivity anomaly.
9, and 10	To investigate gas holder and high conductivity anomaly.
11	To investigatge former tar well.
12, 13 and 14	To investigate extent of contamination in area known to have coal tar.
16, 17 and 18	To determine if wastes were disposed of in the old canal.
15 and 19	To determine if there are any contaminants upgradient or downgradient of the site.
20	To determine if contaminants have moved west of the site.

The test pits will be excavated in a sequence starting from the areas suspected to have the heaviest contamination to areas expected to have little or no contamination. Thus, in the most efficient manner possible, TRC should be able to identify the limits of contamination on site. After excavation of a contaminated pit the backhoe bucket will be decontaminated at the heavy equipment decon zone before moving on to the next test pit. A background soil sample will be collected with a hand auger at the location shown in Figure SP-3.

The test pit exploration is scheduled for five days and will begin immediately after the field mobilization tasks are complete. Prior to any test pit work, the backhoe will be utilized to scrape about one foot of material from the top of a 10 foot by 20 foot area into which about four to six inches of coarse gravel will be laid. This area will be the decontamination zone, however, no material will be taken off the site. The gravel will allow the decon fluids to drain below the heavy equipment. All heavy equipment will be decontaminated using steam, and detergent.

Test pits will be excavated by backhoe with a maximum reach of approximately 12 feet. The top 2 feet of soil will be stockpiled on the right side of the test pit, while the remaining soil will be piled on the left side on top of a tarp. The soils, waste products, and ground water encountered in the pit will be logged and photographed according to TRC Technical Standard T/S-973, Procedures for Logging and Collecting Subsurface Soils in Test Pit Excavations. No one will be allowed to enter the test pits; TRC personnel will use a long-reach sampling tool to collect samples for detailed descriptions and screening. The samples will be placed in air-tight jars and taken to the field laboratory for head space analysis with the OVA at the end of each day. Test pits will not be left unattended or left open overnight. The TRC field supervisor will direct the backhoe operator and have control over the depth of excavation. Excavation will be terminated if any of the following occurs:

- A gross show of contaminant that may endanger the health and safety of the field team, NYSEG employees, or nearby public.
- A confining layer (lense) is encountered at an elevation lower than contaminated soil.

- A heavy flow of contaminated ground water or contaminants enters the pit, where a continued excavation would cause heavier flow and subseguent problems in backfilling when the contaminant is displaced and brought to the ground surface.

Assisting the backhoe supervisor will be a field technician whose principal responsibility will be to collect and label soil and waste samples according to TRC Technical Standard T/S-973. After the test pit has been excavated to its maximum depth, the soil on the left side of the pit will be returned to the pit in 1 foot layers with compacting of each layer. In non-paved areas, the clean soil on the right side will be used to fill the pit to grade, and the area will be reseeded. For test pits in areas paved with asphalt or crushed stone, the top 1 foot will be filled with crushed stone and compacted to grade. In addition, pits in asphalt areas will be covered with a tarp until they are repaved at the conclusion of test pitting. The only material remaining after the conclusion of test pitting will be clean soil, crushed stone, and broken asphalt. The latter two materials will be stored on site, and the clean soil will be spread in a depression on the east end of the site. After backfilling, the test pit locations will be marked with a stake and flagging or spray paint.

During the test pit excavations, all personnel observing (including the backhoe operator) the operation will wear, at a minimum, Level 'D' protective clothing (work boots, work gloves, coveralls) as specified in TRC's HASP. Level 'C' protection will be available at the personnel decon station at all times and will be used as required by the site safety director or his designee. The test pit operation will be monitored with either an HNu or OVA for increased levels of organic vapors. It is TRC's policy that Level 'C' gear must be used when the level of total organics (based on OVA or HNu) in the air exceeds 10 ppm above background.

Upon completion of the test pit excavations the backhoe will be completely decontaminated prior to leaving the site. Decontamination of the backhoe wheels, undercarriage and arm may be warranted between test pits and will be done, based on field conditions, at the discretion of the TRC supervisor.

3.2 Drilling, Installation and Development of Monitoring Wells

A total of 6 borings will be drilled and completed as monitoring wells at the locations shown on Figure SP-4. The 6 wells will consist of 3 sets of "nested" wells (one shallow, one deep). The following is a summary of the purpose for each boring/monitoring well:

Well Number	Description
1S and 1D	Upgradient wells based on ground surface topography. They will supply background data for shallow and deep ground-water conditions.
2S and 2D	Downgradient of former gas plant. This pair is most likely to show if there is any ground water contamination.
3S and 3D	Downgradient of area of known coal tar contamination as well as being in the old canal, a potential disposal area. The large spread between well pairs 1, 2 and 3 will facilitate measurement of shallow and deep ground water gradients.

The first (upgradient) deep boring will be drilled to 100 feet, approximately half the distance to bedrock beneath the site. The depth of this boring will provide geologic information beneath the site and indicate any downward movement of possible contamination. If contamination is detected at 100 feet below the ground surface, deeper borings may be considered in Task 3. The depth of the other deep borings may be adjusted if, based on the first boring, the statigraphy appears to be uniform (lucustrine vs. alluvial). The depth of the corresponding deep monitoring wells will depend on field conditions. The

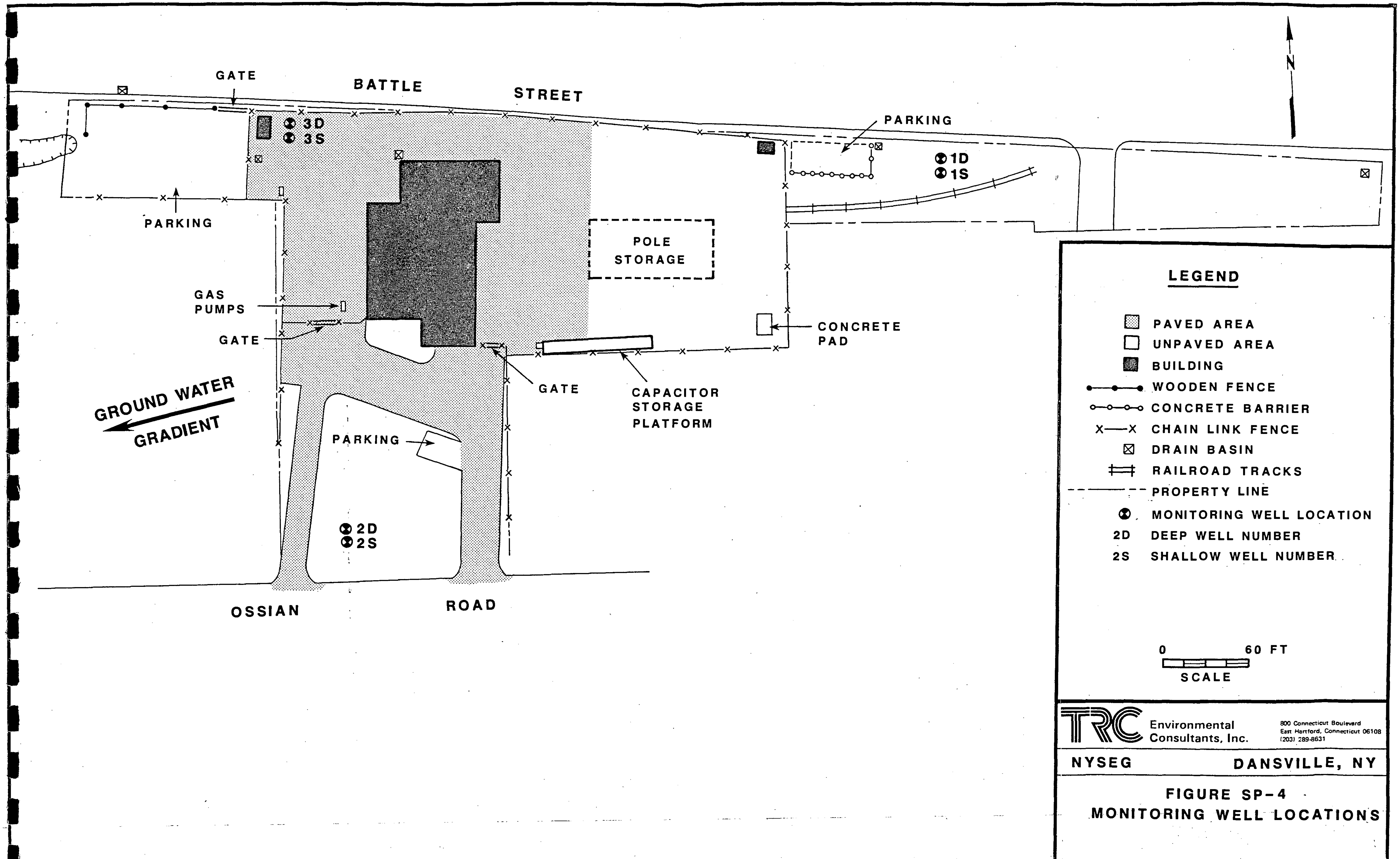

FIGURE SP-4
MONITORING WELL LOCATIONS

deep wells will be screened in a permeable zone which is at least 10 feet thick, and is overlain and underlain by at least 20 feet of low permeability sediments. The three shallow borings (no greater than 40 feet) will be placed above any intermediate confining layer. Final depths for all the wells will be decided in the field after the first deep boring is completed.

The method of drilling the borings will be an 8 inch o.d. (4-inch i.d.) hollow stem auger. If coarse sediments (coarse sand and gravel) are encountered below 30 feet, artesian conditions may exist, resulting in running sands. If such conditions are encountered, it may be necessary to continue the boring by either driving or spinning casing.

All the borings and well installations will be supervised by the TRC site geologist, who will log and classify samples according to TRC Technical Standard T/S-974, Procedures for Logging and Collecting Subsurface Soils During Test Borings and Well Drilling. The site geologist will be assisted by a field technician who will collect, label, and deliver the soil samples to the site chemist for screening.

Each split spoon sample will be screened with a HNu or OVA while it is still in the split spoon. Part of the split spoon sample will be retained in an air-tight jar for later headspace analysis with a HNu or OVA. All headspace samples will be analyzed a uniform period of time after collection when equilibrium conditions have been achieved.

During the drilling of the monitoring wells, Level 'D' protection will be worn by all personnel at the drill rig. Level 'C' protection will be readily available if required (based on organic vapor levels exceeding background by 10 ppm).

The wells will consist of 2-inch stainless steel casing with a maximum of 30 feet of stainless steel screen (0.020-inch slot size). For the shallow wells, the top of the screen will be set approximately 2 feet above the water table. The actual screen length will be determined in the field, depending on the depth to the confining layer, depth to the water table, and any noted zones of contamination. The well screen will be packed in a clean uniform, medium sand pack. A three-foot thick bentonite clay seal will be placed above this sand pack. The annular space will then be backfilled to the ground surface with a cement/bentonite slurry. A protective steel casing with a vented locking cap will be set in this slurry at a minimum of three feet below the ground surface. A vented stainless steel cap will be placed on the finished well. Finally, a concrete apron, pitched to drain, will be placed around the well. Deep wells will be completed in a similar manner with a 10 foot screened interval. Wells which have to be drilled in the driveway or parking areas will be completed flush with the asphalt surface with a steel road box protecting them.

To prevent cross-contamination during drilling, the split spoon sampler will be cleaned between samples with detergent, tap water, acetone (if there is gross contamination on the spoon), and distilled water. Any acetone used will be collected and allowed to evaporate from the collection container. Drill rods and casing will be steam cleaned after each boring is completed. The drill rig will be steam cleaned when the project is completed.

Completed wells will be surveyed, by a licensed surveyor, for location and elevation to the nearest hundredth foot (MSL) of the top of the stainless steel well pipe, the locking protective casing and the ground surface. These locations and elevations will be plotted on the site map.

All wells will be developed after installation by pumping and surging to remove cuttings and silt. The wells will be evacuated with a pump or bailer until the water attains visual clarity. In order to prevent cross-contamination, the pump will be thoroughly cleaned with detergent, tap water, and acetone before each well is pumped.

After each well is completed, a permeability test will be performed using the procedures found in Table SP-1. The particular procedure used will depend on the expected permeability and whether the well is screened above the water table. Using the permeability data in conjunction with hydraulic gradients and other aguifer properties, TRC will conduct a hydraulic analysis on the site to determine the rate and direction of ground water flow.

TABLE SP-1

PERMEABILITY TEST METHODS

Aquifer Condition	Type of Test	Reference
Medium to high permeability (clean sand and gravel), screen below or partially above the water table	Pump/recovery test with gasoline powered pump	Determining the Permeability of Water Table Aquifers. The Recovery Method for Determining the Coefficient of Transmissibility (USGS Water-Supply Paper 1536-I).
Low permeability (silt and silty sand), entire screen below water table	Slug injection/ extraction test	The Slug-Injection Test for Estimating the Coefficient of Transmissibility of an Aquifer (USGS Water-Supply Paper 1536-I).
Low permeability (silt and silty sand), screen partially above water table	Pump with low-discharge battery-powered pump	Determining the Permeability of Water Table Aquifers. The Recovery Method for Determining the Coefficient of Transmissibility (USGS Water-Supply Paper 1536-I).
Extremely low permeability (clay), screen below or partially above the water table	Slug injection and extraction test	The Slug-Injection Test for Estimating the Coefficient of Transmissibility of an Aquifer (USGS Water-Supply Paper 1536-I).

4.0 SUBSURFACE SOIL SAMPLING

Soil samples will be collected from the test pits for laboratory analysis to help identify all potential site contaminants. Generally, the source of contamination is expected to be associated with the former coal gasification structures which are usually no more than five feet below the ground surface and easily uncovered with a backhoe. At each test pit a soil sample will be collected for laboratory analysis for the parameters listed in Table SP-2. Approximately one soil sample collected per test pit will be chemically analyzed. The methodology discussed below will be used for selecting the sample for analysis.

During the test pit excavation, exposed soils will be continuously monitored for organic vapor emissions. Excavated soil exhibiting elevated volatile organic emissions will be collected in a laboratory sample jar for possible analysis. Where test pits are "clustered" near potential contamination areas the selected sample location will alternate from a shallow sample (0-1 foot depth) with an elevated OVA reading to a deeper sample just above the water table (10± foot depth). This process will provide information relative to the variation of contaminant concentrations with depth to assess vertical contaminant migration and migration potential, and to provide risk data relative to direct contact with surface soils. At test pit locations which are not "clustered", the sample collected for analysis will be the deepest sample exhibiting an organic emissions. This will allow the assessment of the contaminant concentration at that depth. At test pit locations where no significant variation in organic emissions is noted, a composite soil sample will be analyzed. A maximum of one sample per test pit will be collected. A total of 20 samples have been assumed for analysis, but field conditions may permit a smaller number of samples to be collected. At two different test pit locations on the site, significantly contaminated soil

TABLE SP-2

SOIL SAMPLE ANALYSIS PARAMETERS

Parameter

- Iron
- Zinc
- Ammonia (organic nitrogen)
- Sulfate
- Total Cyanide
- Ferroferric cyanide

Method 602 (Aromatics)

- Benzene
- Toluene
- Ethylbenzene
- p-xylene
- o-xylene
- Styrene
- n-propylbenzene

Method 604

- Phenols (non-chlorinated)

Method 610 (Polynuclear Aromatic Hydrocarbons)

- Acenaphthene
- Acenaphthylene
- Anthracene
- Benzo (a) Anthracene
- Benzo (a) Pyrene
- Benzo (b) Fluoranthene
- Benzoperylene
- Benzo (k) Fluoranthene
- Chrysene
- Fluoranthene
- Fluorene
- Indeno (1,2,3-CD) Pyrene
- Naphthalene
- Pyrene

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will be tested for priority pollutants, excluding the PCB/pesticide fraction, to identify all potential site contaminants. A background soil sample will be taken at approximately 1 foot depth as noted on Figure SP-2.

The samples will be collected from the test pits with a stainless steel sampling spoon which can collect soil from a test pit wall without personnel entering the test pit in. Samples collected for laboratory analysis will not be used for head space analysis; duplicate samples will be collected for that purpose. The samples will be shipped to the analytical laboratory within 24 hours of sampling following TRC Technical Standard T/S 980, Shipping Procedures for Water and Soil Samples. Soil sampling will be completed concurrent with the test pit excavations and all personnel will wear Level 'D' protective clothing with level 'C' protective gear available at the personnel decon area.

The stainless steel spoon will be decontaminated between samples with the following:

- Scrub with non-foaming detergent (alconox)
- Rinse (scrub) with tap water
- Rinse with acetone (only if gross contamination was noted on the spoon, scrubbed with acetone if necessary)
- Rinse with distilled water
- Allow to air dry

The acetone used for decontamination will be collected and allowed to evaporate from the collection container. Less than one gallon of waste acetone will be generated per day.

Stainless steel bowls will be used to composite samples where necessary and will be decontaminated between samples with the above procedure.

Each sample will be logged and numbered according to the following (based on the NYSEG protocol):

Example: DNEITP8606 06/20/86

Where:

DN = Dansville Site
E = Soil Sample
I = In source
TP = Test Pit
86 = Year
06 = Test pit #6
06/20/86 = Date of Collection

The sample number may be further defined with the following:

- Location (LOC, gas holder vs. oil storage area)
- Replicate (REP, denote whether sample sent to either TRC or NYSEG laboratory).

One blind duplicate per 10 samples will be collected as part of the field QA/QC program. Additionally, one field blank (organic free water poured over the sampling instrument after decontamination) per day will be collected as part of the program.

5.0 GROUND WATER SAMPLING

A one-year long quarterly sampling program for the monitoring wells will be initiated approximately four weeks after the last monitoring well has been installed. One sample from the shallow upgradient and one sample from the shallow downgradient well will be analyzed for the U.S.E.P.A. priority pollutants, excluding the PCB/pesticide fraction. The samples from the other wells will be analyzed for the parameters listed in Table SP-3. Two of the samples from the next quarterly event will be analyzed for U.S.E.P.A. priority pollutants excluding the PCB/pesticide fraction (not necessarily the same two wells as the first round). All other samples will be analyzed for the parameters listed in Table SP-3, however, the list of parameters may change based on the laboratory results of the first event and discussions with NYSEG. All ground water sampling will be completed in accordance with TRC Technical Standard T/S-975, Field Procedures for Collection of Ground Water Samples.

Prior to sampling the monitoring wells, the water levels will be measured to within 0.01 feet and recorded. Each well will then be evacuated a minimum of three well volumes by using either a hand operated bailer or a peristaltic pump. The bailers or suction lines for the pump will be dedicated to each well. Typically, the automatic pumps are set up and left to evacuate wells while sampling personnel bail other wells by hand.

During all ground water sampling, personnel will be equipped with Level 'D' protection according to the site health and safety plan. Higher levels of protection will be available and used as required.

The following QA/QC samples will be collected during all ground water sampling episodes at the frequency specified:

TABLE SP-3

GROUND WATER AND SEWER SAMPLE ANALYSIS PARAMETERS

Parameter

- Ferro-Ferric Cyanide
- Total Cyanide
- Iron
- Zinc
- Sulfate
- Ammonia (organic nitrogen)
- TOC

Method 602 (Aromatics)

- Benzene
- Toluene
- Ethyl Benzene
- p-xylene
- o-xylene
- Styrene
- n-Propylbenzene

Method 604

- Phenols (non-chlorinated)

Method 610 (Polyaromatic Hydrocarbons)

- Acenaphthene
- Acenaphthylene
- Anthracene
- Benzo (a) Anthracene
- Benzo (a) Pyrene
- Benzo (b) Fluoranthene
- Benzoperylene
- Benzo (k) Fluoranthene
- Chrysene
- Fluoranthene
- Fluorene
- Indeno (1,2,3-CD) Pyrene
- Naphthalene
- Pyrene

- Per each day of sampling:

  - one field blank
  - one blind duplicate per every 10 samples (one blind duplicate per sampling round as a minimum)

Determination of temperature, pH, and specific conductance will be performed in the field immediately after sample collection. The pH will be measured to the nearest tenth of a standard unit using an "Orion" 407A specific ion meter, following TRC Technical Standard T/S-961, Calibration and Operating Procedures for the Orion Research Specific Ion/pH Meter Model 407A. Specific conductance will be measured with a "YSI" conductivity meter. The samples will be refrigerated and shipped to the analytical laboratory within 24 hours of collection in accordance with TRC Technical Standard T/S 980.

Each well sample will be labeled and numbered according to the following (based on NYSEG protocol):

Example: DNGUMW8606 07/20/86
Where:
DN - Dansville Site
G - Ground water sample
U - Upgradient
MW - monitoring well
86 - year
06 - Monitoring well #6
07/20/86 - Date of collection

The sample number may be further defined with the following:

- Reason no sample (RNS, equipment failure vs. not enough water, etc.);
- Replicate (REP, denote whether sample sent to either TRC or NYSEG laboratory).

6.0 SEWER SAMPLING

A storm sewer runs along the old canal on the north side of the NYSEG property. The sewer may intercept and transport contaminated ground water from the site. TRC plans to collect a maximum of three sewer samples, one "upgradient", possibly one "downgradient", and one in the middle of the site. Figure SP-5 shows the location of the sewer sampling points. The storm sewer discharges into a drainage ditch at sampling point SR-3. The presence of flow from the storm sewer into the drainage ditch will determine if a sample is taken at SR-3.

The sewer samples will be collected on the same dates that the ground water samples are collected and in accordance with TRC Technical Standard T/S 972, Field Procedures for Collection of Surface Water and Sediment Samples. The samples will be analyzed for the parameters listed in Table SP-3. The samples will be shipped to the analytical laboratory within 24 hours of sampling following TRC Technical Standard T/S 980.

Each sewer sample will be labeled and numbered according to the following (based on NYSEG protocol):

Example: DNSDSR8604 07/20/86
Where:
DN - Dansville Site
S - Surface water
D - Downgradient
SR - Sewer
86 - year
04 - Sewer sample location #4
07/20/86 - Date of collection

The sample number may be further defined with the following:

- Reason no sample (RNS, equipment failure vs. not enough water, etc.);
- Composite hours (COMP HRS, number of hours over which a sample was composited);

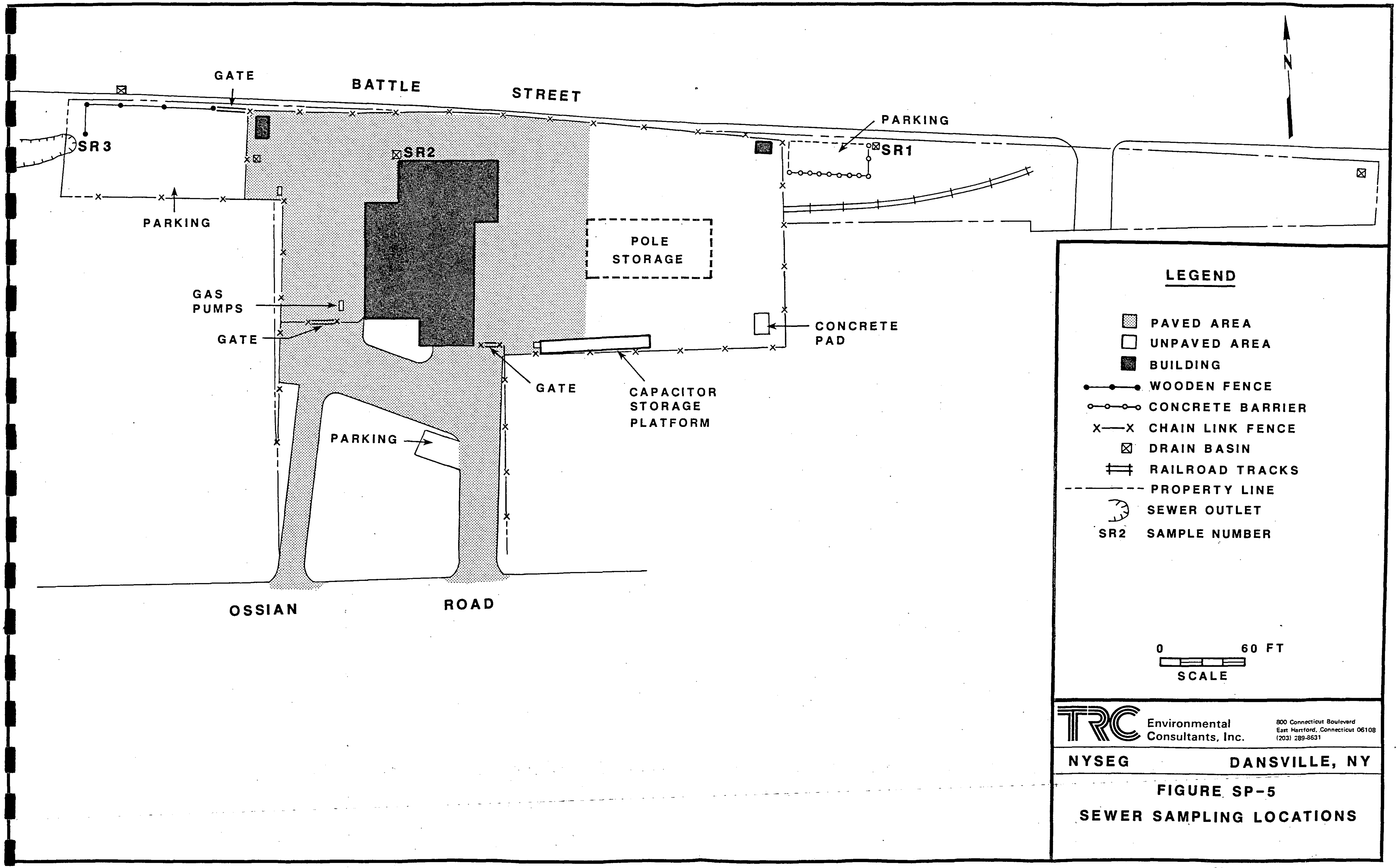

FIGURE SP-5
SEWER SAMPLING LOCATIONS

- Replicate (REP, denote whether sample sent to either TRC or NYSEG laboratory).

One blind duplicate per 10 samples will be collected as part of the field QA/QC program. Additionally, one field blank (organic free water poured over the sampling instrument after decontamination) per day will be collected as part of the program.

TRC may collect surface water and sediment samples from Canaseraga and Mill Creek, upstream and downstream of the site if results from the sewer and ground water samples (first and/or second round) indicate possible contamination. Results from the surface water samples would be compared to the most recent NYSDEC standards.

7.0 AIR QUALITY SAMPLING

Air quality samples will be collected at the Dansville site utilizing methodologies which are appropriate for the pollutants associated with the production of coal gas.

The approach and methods for the air quality investigations will be the same and equivalent to those described in the following EPA compilations:

- "Standard Operating Procedure for Sampling Gaseous Organic Air Pollutants for Quantitative Analysis Using Solid Adsorbents" (EPA EMSL/RTP-SOR EMD-018)
- "Standard Operating Procedures for the GC/MS Determination of Volatile Organic Compounds Collected on Tenax" (EPA EMSL RTP-SOP-EMD-014)
- "Sampling and Analysis of Toxic Organics in the Atmosphere" (ASTM PCN 04-721000-19)

There are two types of ambient air monitoring that can be utilized at inactive coal tar or waste sites. The first type involves the use of portable instrumentation that gives real-time results while the second involves the use of stationary sampling equipment to obtain longer duration or time averaged samples at set locations; samples are subsequently analyzed by laboratory instrumentation. The portable air samplers are used for screening samples to develop a qualitative analysis or for a worker protection program. The stationary sampling equipment which collects time averaged samples are used to characterize and quantify the air quality impact from the site.

TRC will use either of two types of portable air samplers for performing the screening analysis, the HNu photoionization gas analyzer, or the Century OVA (Organic Vapor Analyzer).

The HNu is a sealed UV light source that emits photons which are energetic enough to ionize trace species, particularly organics, but not the major components of air. The ionized species are collected at an electrode, and the resulting current is proportional to the concentration. The detection limit may be as low as 0.1 ppm, with an operating range extending to 2,000 ppm. The photoionization detector responds to all ionizable gases present and does not distinguish between different compounds. The "total organics" measurement obtained will give useful screening results during site investigations but may be supplemented with chemical-specific analyses. TRC Technical Standard T/S 993 will be used to operate this device.

The Century OVA uses a flame ionization detector to give a real-time analysis of total hydrocarbons. The detection limit may be as low as 0.1 ppm, with an operating range extending to 1,000 ppm. TRC Technical Standard T/S 990 will be used to operate this device.

The stationary ambient air monitoring sampling equipment will be used near the point of anticipated maximum contaminant concentrations and for background (upwind) areas. Approximately 10 samples will be taken on 3M® dosimeters for analysis with a GC to determine points of high concentration. A grid system of approximately 10 points will be established prior to the field work. The dosimeters (diffusion samplers) used for on-site screening will be chemically desorbed with carbon disulfide and analyzed for benzene and naphthalene by using a gas chromatograph equipped with a flame ionization detector (FID). The dosimeter consists of a charcoal based badge-like device which absorbs the organic contaminants.

Twelve samples will be collected on solid sorbent or Tenax/silica gel/activated charcoal tubes for analysis by gas chromatography/mass spectrometry (GC/MS). This type of sampling tube collects both polar and non-polar compounds. The absorbent medium will collect polynuclear aromatic hydrocarbons and purgeable aromatic compounds. The level of particulates is not expected to be significant, therefore, a low flow portable pump will be used to draw ambient air through the solid absorbent. During each day of test pit excavation operations, 3 Tenax tubes will be used. One tube will be deployed upwind, one will be kept immediately downwind of each pit, and one will be at the downwind edge of the site. In addition, 2 tubes will be used as blind duplicates and 1 tube will be a field blank.

TRC will utilize standard sampling and sample preparation/preservation procedures in performing the sampling. These procedures will include but not be limited to: 1) pre-cleaning sampling sorbent, 2) pre- and post-test calibration of sampling pumps, 3) collecting field blank samples, and 4) sealing, labeling, and storing the sample. At the analytical laboratory the sampling tubes will be thermally desorbed and qualitatively screened by using GC/MS. Qualitative identification will be made by a computerized library search that compares the sample compound mass spectrum to the 31,000 member National Bureau of Standards (NBS) special library. This qualitative analysis includes a semi-quantitative determination of the concentrations of up to 10 compounds that may be present on the sample collection media. The quantitative determination can only identify the relative concentration of a compound because the equipment is not comparing the results to a newly run standard, but to a library standard.

Each air sample will be labeled and numbered according to the following (based on NYSEG protocol):

Example: DNAUXX8602 06/20/86
Where:
DN - Dansville Site
A - Air sample
U - Upgradient
XX - N/A
86 - year
02 - Air monitoring station #2
06/20/86 - Date of collection

The sample number may be further defined with the following:

- Reason no sample (RNS, equipment failure vs. operator error, etc.);
- Composite hours (COMP HRS, number of hours over which a sample was composited);
- Replicate (REP, denote whether sample sent to either TRC or NYSEG laboratory).

8.0 RECORD KEEPING AND DOCUMENTATION

Due to the number of soil and water samples that will be collected at the site, the number of field staff that will be involved in sampling, and the inclusion of TRC QA/QC procedures for document control, a specific record keeping and site documentation is required. TRC will use the following to accomplish this:

Document	
1. Site Field Logs	Issued to each field team member with a control number on it. These logs are waterproof and will be the prime source of field data.
2. Master Sample Log	A page-numbered bound laboratory notebook that will remain in the site field office to document every sample taken. At the end of each field sampling day, the field operations manager will log in all samples and list those sent to the laboratories with the waybill number.
3. Chain-of-Custody Record	To track the possession of all samples from field to lab.
4. Site Laboratory Notebook	A page-numbered bound laboratory notebook that will be the responsibility of the field chemist. This notebook will document all analysis, e.g., OVA, HNU, temperature, etc., performed during field screening.
5. TRC Accident Report, Daily First Aid Report, Employer's First Report of Injury, and OSHA 100 Forms	Data sheets attached to the Health and Safety Plan, located in the site field office that will document any accident occurring at the site during the field investigations.
6. Waybills	Once a shipment of samples is accepted by the courier, all waybill receipts will be maintained in a sealed envelope attached to the Master Sample Log (MSL). Also the MSL will list which samples were shipped under specific waybill numbers.

At the conclusion of each round of field sampling, the site field logs, master sample log and site laboratory notebook will be copied and filed in the project file at TRC in East Hartford, CT.

9.0 SCHEDULE

9.1 Operations Schedule

Site operations are planned to commence within two weeks from receipt of a written authorization to proceed from NYSEG. The project schedule is as follows:

Week	Task
0	Written authorization to proceed
2	Site Setup
3,4	Drilling, test pit and well installation. Air quality sampling.
5	Surveyors locate all new excavations and wells.
9	First quarterly sampling of monitoring wells, and sewers.
10-13	Analyze priority pollutant and indicator parameters on wells and sewer samples.
22,35,48	Quarterly well and sewer sampling.
23,36,49	Begin analysis of quarterly samples.
52	Draft Task 2 Report
57	Final Task 2 Report

9.2 Sample Schedule

Table SP-4 presents the sample schedule which shows the weeks in which samples will be taken in 1986 and 1987. Shown on this schedule are all prime samples plus QA/QC samples that will be used by the site investigation team to plan for sample shipping activities.

TABLE SP-4

SAMPLE SCHEDULE

Week from Authorization	Location or Media	No.	QA Field Blanks	QA Duplicate	Total
3	Soil	20	5	2	27
3,4	Tenax	6			6
9	6 Monitoring Wells	6	2	1	9
9	3 Sewer Samples	3	1	1	5
22	Quarterly G.W. and Sewer Samples	9	3	2	14
35	Quarterly G.W. and Sewer Samples	9	3	2	14
48	Quarterly G.W. and Sewer Samples	9	3	2	14
Total of Task 2 Samples					89

APPENDIX B

VILLAGE OF DANSVILLE
WELL LOGS

Location of Wells

The precise locations of the test wells drilled for the Village of Dansville are not printed on the well logs. A report on the Genesee River Basin (Kammerer and Hobba, 1967) listed these wells including the 1-minute quadrangle in which they were drilled and the ground surface elevation at the site. The elevation data were used to circumscribe an area within the 1-minute quadrangle in which the well could be located.

LAYNE-NEW YORK CO., INC.

1250 WEST ELIZABETH AVE., LINDEN, N. J.

LOG OF WELL

Log of Well for VILLAGE OF DANSVILLE ~~Well No.~~ Test No. 4

Address DANSVILLE

Well Located at .... in .... County, State of NEW YORK

Date Drilling started 4-3-46 Date Test Hole Completed 5-2-46

Total depth to bottom of Well 148' Diameter Test Hole 6-1/2"

Water stands when not pumping .... feet .... inches from the surface of the ground

THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATA	FORMATION FOUND EACH STRATUM	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATA	FORMATION FOUND EACH STRATUM
9"	9"	TOPSOIL			
30' 3"	31'	COARSE GRAVEL & COARSE SAND (6 BAGS CLAY)			
6' 6"	37' 6"	SANDY CLAY			
2'	39' 6"	COARSE GRAVEL & SOME FINE SAND			
22' 6"	62'	SANDY CLAY			
34'	96'	TOUGH BLUE CLAY & GRAVEL			
9' 6"	105' 6"	TOUGH BLUE CLAY			
1' 6"	107'	TOUGH BLUE CLAY & GRAVEL			
29' 6"	136' 6"	TOUGH BLUE CLAY & SOME FINE SAND			
11' 6"	148'	SOFT SAND, ROCK & CLAY			

Remarks and opinion of Test

CHECK TYPE OF RIG USED: Reverse Rotary / Cable Tool / Wash / Other?

B. DIVINS
Driller

5M-1-63WP

LAYNE-NEW YORK CO., INC.

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LOG OF WELL

Log of Well for VILLAGE OF DANSVILLE ~~Well No.~~ Test No. 5

Address DANSVILLE

Well Located at .... in .... County, State of NEW YORK

Date Drilling started 4-17-46 Date Test Hole Completed 4-18-46

Total depth to bottom of Well .... Diameter Test Hole 6-1/2"

Water stands when not pumping 154' feet .... inches from the surface of the ground

THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATA	FORMATION FOUND EACH STRATUM	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATA	FORMATION FOUND EACH STRATUM
1'	1'	TOPSOIL			
1'	2'	SAND & CLAY			
17' 6"	19' 6"	COARSE GRAVEL, BOULDERS & COARSE SAND			
5'	24' 6"	COARSE GRAVEL & SOME FINE SAND (4 BAGS CLAY)			
28' 6"	53'	SANDY CLAY & STREAKS OF GRAVEL			
12'	65'	SANDY CLAY			
64'	129'	TOUGH BLUE CLAY			
1'	130'	CLAY & GRAVEL			
10'	140'	TOUGH BLUE CLAY			
1'	141'	CLAY & GRAVEL			
13'	154'	TOUGH BLUE CLAY			

Remarks and opinion of Test

CHECK TYPE OF RIG USED { Reverse Rotary / Cable Tool / Wash / Other?

B. DIVINS
Driller

SM-1-63WP

LAYNE-NEW YORK CO., INC.

1250 WEST ELIZABETH AVE., LINDEN, N. J.

LOG OF WELL

Log of Well for VILLAGE OF DANSVILLE ~~Well No.~~ Test No. 2

Address DANSVILLE, NEW YORK

Well Located at ROTARY FIELD in County, State of NEW YORK

Date Drilling started MAY 6, 1946 Date Test Hole Completed MAY 10, 1946

Total depth to bottom of Well 100' 6" Diameter Test Hole 6-1/2"

Water stands when not pumping ______ feet ______ inches from the surface of the ground

THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATA	FORMATION FOUND EACH STRATUM	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATA	FORMATION FOUND EACH STRATUM
1'	1'	TOPSOIL			
21'	22'	COARSE GRAVEL & SOME FINE SAND (3 BAGS CLAY)			
5'	27'	COARSE SAND & FINE SAND (1/4 BAG CLAY)			
15' 6"	42' 6"	MED. GRAVEL & FINE SAND (2-1/2 BAGS CLAY)			
28' 6"	71'	TOUGH BLUE CLAY			
2'	73'	SHALE ROCK			
19'	92'	COARSE GRAVEL & CLAY			
8' 6"	100' 6"	HARD SHALE ROCK			

Remarks and opinion of Test

CHECK TYPE OF RIG USED { Reverse / Rotary / Cable Tool / Wash / Other?

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Driller

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LOG OF WELL

Log of Well for VILLAGE OF DANSVILLE ~~Well No.~~ Test No. 6

Address DANSVILLE

Well Located at ____ in STEUBEN County, State of N. Y.

Date Drilling started 5-28-46 Date Test Hole Completed 5-29-46

Total depth to bottom of Well 83' 6" Diameter Test Hole 6-1/2"

Water stands when not pumping ____ feet ____ inches from the surface of the ground

THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATA	FORMATION FOUND EACH STRATUM	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATA	FORMATION FOUND EACH STRATUM
1'	1'	FINE SAND			
8' 6"	9' 6"	COARSE GRAVEL & SOME FINE SAND			
22' 6"	32'	TOUGH BLUE CLAY			
7' 6"	39' 6"	MED. GRAVEL & CLAY			
38' 6"	78'	BLUE CLAY			
5' 6"	83' 6"	HAR D SHALE ROCK			

Remarks and opinion of Test

CHECK TYPE OF RIG USED
- Reverse
- Rotary
- Cable Tool
- Wash
- Other?

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LOG OF WELL

Log of Well for VILLAGE OF DANSVILLE ~~XXXXXXX~~ Test No. 8

Address DANSVILLE

Well Located at DANSVILLE in .... County, State of NEW YORK

Date Drilling started 5-14-46 Date Test Hole Completed 5-15-46

Total depth to bottom of Well 222' 6" Diameter Test Hole ....

Water stands when not pumping .... feet .... inches from the surface of the ground

THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATA	FORMATION FOUND EACH STRATUM	THICKNESS OF STRATUM	DEPTH TO BOTTOM OF STRATA	FORMATION FOUND EACH STRATUM
1'	1'	TOP SOIL			
3' 9"	4' 9"	CLAY			
4' 9"	9' 6"	COARSE GRAVEL & COARSE SAND			
86' 6"	96'	TOUGH BLUE CLAY			
17'	113'	CLAY & GRAVEL			
8'	121'	COARSE GRAVEL & CLAY			
72'	193'	MED. GRAVEL SAND & CLAY			
23'	216'	COARSE GRAVEL, SAND & CLAY			
6' 6"	222' 6"	HARD SHALE ROCK			

Remarks and opinion of Test

CHECK TYPE OF RIG USED: Reverse / Rotary / Cable Tool / Wash / Other?

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APPENDIX C

EM-31 FIELD CONDUCTIVITY VALUES
DANSVILLE SITE

Location	East/West Conductivity mm hos/meter	North/South Conductivity mm hos/meter	Remarks
A-0	66	52	
A-1	120	128	
A-2	112	85	
A-3	110	120	
A-4	90	84	
A-5	50	40	
A-6	72	60	
A-7	60	125	
A-8	65	70	
A-9	62	80	
A-10	53	44	
A-11	74	57	
A-12	79	76	
A-13	62	32	
A-14	43	35	
B-1	36	12	
B-2	100	70	
B-3	90	40	
B-4	90	30	Truck parked to south
B-5	36	36	
B-6	60	5	
B-7	-	-	North/south conductor 5 ft. to the east
B-10	100	70	
B-11	-	-	East/west conductor
B-12	34	30	

Location	East/West Conductivity mm hos/meter	North/South Conductivity mm hos/meter	Remarks
B-13	72	52	
B-14	15	15	
C-1	19	20	
C-2	12	15	
C-3	14	14	
C-4	13	13	
C-5	22	23	
C-6	50	24	Conductivity sounding suggests increased conductivity with depth.
C-7	115	180	Strong north/south conductor 5 ft east
C-11	27	27	
C-12	-	-	Truck parked at C12
D-1	19	18	
D-2	11	14	
D-3	13	13	
D-4	15	16	
D-5	21	20	Northwest conductor 10 ft west North/south conductor 17 ft.
D-6	-	-	East/west conductor
D-7	-	-	North/south conductor 5 ft east
D-11	29	20	
D-12	33	32	
E-1	19	19	
E-2	19	19	

Location	East/West Conductivity mm hos/meter	North/South Conductivity mm hos/meter	Remarks
E-3	20	22	
E-4	20	20	
E-5	-	-	North/south conductors 6 ft and 17 ft west
E-6	-	-	North/south conductor
E-7	-	-	North/south conductors 5 ft and 17 ft east
E-11	25	21	
E-12	30	36	
AS-1	150	120	
AS-2	200	155	
AS-3	290	135	
AS-4	290	150	Conductivity high of 800/750 mmhos/meter 15 ft south
AS-5	140	42	
AS-6	50	12	
AS-7	-	-	East/west conductor
BS-1	52	49	
BS-2	36	34	
BS-3	28	22	
BS-4	30	30	
BS-5	33	36	
BS-6	7	20	East/west conductor
BS-7	37	50	
CS-1	25	25	
CS-2	27	28	
CS-3	20	30	

Location	East/West Conductivity mm hos/meter	North/South Conductivity mm hos/meter	Remarks
CS-4	28	27	
CS-5	30	13	
CS-6	29	6.5	Curving north/south conductor from here to building between 'B' and 'C' transects
CS-7	15	2.6	
DS-1	21	26	
DS-2	27	26	East/west conductor 10 ft north
DS-3	-	-	
DS-4	19	19	
DS-5	17	17	
DS-6	13	16.5	
DS-7	-	-	East/west conductor 10 ft north

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