

**U.S. Army Corps
of Engineers
Louisville District**

Defense Environmental Restoration Program
For
Formerly Used Defense Sites

Limited Site Investigation

Final Report

for
the former

Plum Brook Ordnance Works

Lower Toluene Tank Area

Sandusky, Ohio
Project Number G05OH001824

July 2000

Table of Contents

1.0 INTRODUCTION	1
1.1 SITE DESCRIPTION/HISTORY	1
1.1.1 Installation.....	1
1.1.2 Site Specific.....	2
1.2 CLIMATE.....	4
1.3 TOPOGRAPHY	4
1.4 GEOLOGY	4
1.5 HYDROGEOLOGY	5
2.0 PREVIOUS INVESTIGATIONS.....	5
3.0 SITE INVESTIGATION ACTIVITIES	6
3.1 VISUAL SURVEY	6
3.2 SOIL BORING AND SOIL SAMPLING.....	7
3.3 FIELD SCREENING.....	8
3.4 SURVEYING	9
4.0 ANALYTICAL RESULTS	9
4.1 BTEX ANALYSIS.....	9
5.0 GEOTECHNICAL CHARACTERISTIC ANALYSIS	10
6.0 VARIANCES/NONCONFORMANCES.....	10
7.0 SUMMARY AND CONCLUSIONS	10
8.0 RECOMMENDATIONS	11

REFERENCES

TABLES

Table 3-1: Samples Collected for SI investigation

Table 3-2: Coordinates and Surface Elevations of Boring Locations

Table 4-1: BTEX Analyses (PRGs)

FIGURES

Figure 1-1: Vicinity Location Plan

Figure 1-2: Plum Brook Ordnance Works - Sandusky, OH

Figure 1-3: Site Location Plan - Toluene Tanks

Figure 1-4: Lower Toluene Tanks from c. 1997 Aerial Photograph (PBOW)

Figure 1-5: Lower Toluene Tanks from c. 1950 Aerial Photograph (PBOW)

Figure 3-1: Visual Survey Features Lower Toluene Tanks

Figure 3-2: Sample Location Plan Lower Toluene Tanks

Figure 3-2a: 2 foot Topographic Contours Overlay

APPENDICES

- A. Land Use Map / Historic Ownership Map
- B. Historic Topographical Maps 1959 and 1969
- C. Groundwater Resources, Erie County, 1986
- D. Visual Survey Photographs
- E. Boring Logs
- F. BTEX Laboratory Analysis
- G. Geotechnical Data
- H. Variance Report
- I. Environmental Information And Imaging Services (ERIIS) Data
- J. Data Review / Data Validation
- K. Review Comments

1.0 INTRODUCTION

Located near Sandusky Ohio, the former Plum Brook Ordnance Works (PBOW) was operated from 1941 to 1945 by the Department of Defense (DOD) as a manufacturing plant for trinitrotoluene (TNT), dinitrotoluene (DNT), and pentolite. Contamination detected at the installation by several studies has been related to past activities and is being addressed by the DOD under the Defense Environmental Restoration Program (DERP), Formerly Used Defense Sites (FUDS).

A limited Site Investigation (SI) of the lower toluene storage tanks was conducted and is reported herein. The potential for contamination of the tank area was identified in an Inventory Project Request (INPR) (Huntington District U.S. Army Corps of Engineers USACE, 1998). The purpose of this limited Site Investigation (SI) was to evaluate the potential for contamination of the former tank area that may have resulted from past Department of Defense (DOD) activities. The Reference sections of this report identifies the guidance documents and information used to complete this investigation. Historical information was reviewed to identify the environmental media and locations most likely affected. Field sampling, a visual survey, and chemical analyses were performed to evaluate the environmental media and site conditions. Results of the laboratory analyses were then compared to risk-based, media specific screening criteria. United States Environmental Protection Agency (USEPA) Region 9 Preliminary Remediation Goals (PRGs) were used for the screening criteria.

This project is one of several limited SI projects simultaneously undertaken by the US Army Corps of Engineers to be executed by the Louisville District (CELRL) under the direction of the Huntington District (CELRH).

The sampling and chemical laboratory analyses were performed in accordance with the Quality Assurance Project Plan (QAPP) prepared by the U. S. Army Corps of Engineers, Louisville District, dated June 1999.

1.1 Site Description/History

1.1.1 Installation

Land for the original site was acquired by the Department of War in 1938 and consisted of approximately 9,010 acres of land. In the early 1940s, the U.S. Army contracted with Trojan Powder Company to manufacture 2,4,6-TNT, dinitrotoluene and pentolite at PBOW. Production began on December 16, 1941 and continued through late 1945, ceasing two weeks after V-J Day (September 2, 1945). After operations ceased, the area was turned over to the Army Ordnance Department and renamed Plum Brook Depot and used for ammunition storage.

PBOW was placed in standby status from 1945 to 1946. During this time, decontamination and decommissioning (D&D) procedures were performed on many structures associated with the manufacturing process. D&D included the removal and relocation of all explosives to burning grounds for destruction by open burning. Where possible, remaining structures and buildings were burned in place. Drain lines and steam lines were flushed and dismantled.

In December 1945, custody of PBOW was transferred from Trojan Powder Company to U.S. Army Ordnance Department, with the U.S. Army Corps of Engineers assuming custodial responsibilities from January 1 through June 30 1946. In August 1946, PBOW was transferred to the War Assets Administration.

In 1956 the National Advisory Committee for Aeronautics (NACA) began leasing sections of PBOW from the War Assets Administration. An agreement was made in 1956 to lease 500 acres in the northern portion of PBOW to construct and operate the Plum Brook Reactor Facility (PBRF). In 1958 NACA changed its name to National Aeronautics and Space Administration (NASA). By 1963, approximately 6,400 acres of PBOW had been acquired by NASA for various aerospace research activities. An additional 2,000 acres were acquired to serve as a buffer zone between the facility and the adjacent community. Research and test activities were conducted by NASA throughout the 1960s and have continued until today.

NASA declared approximately 2,150 acres as excess in 1978. Forty-six acres of the excessed property is used by the Perkins Township Board of Education as a bus transportation center. Much of the remaining excess property was reclaimed as farmland. NASA also excessed Parcel #59 to the General Services Administration (GSA) for subsequent disposal.

The PBS site currently lies in an area that is primarily rural and agricultural with a low population density. The NASA Lewis Research Center occupies a majority of the former ordnance works. The Department of the Army maintains a reserve center on the westernmost portion of the facility. The remainder of the former installation is in private ownership with the vast majority being cultivated. A tract on the northern boundary is owned by the Perkins Board of Education and is utilized as a bus maintenance facility. A land use map (dated 1980/1983) and an historic land ownership map (dated 1865) of the PBOW vicinity is included in Appendix A.

1.1.2 Site Specific

During the period that PBOW was operational, DOD constructed and utilized six storage tanks that served as bulk storage for toluene used in the production of TNT. PBOW had three TNT production areas A, B, and C. Each production area was supported by two aboveground storage tanks (AST) used for bulk toluene storage. Each tank was

approximately 30 feet in diameter, 41 feet high, constructed of steel, and had a capacity of 200,000 gallons. Each tank rested on a concrete foundation surrounded by a 1-foot wide by 1-foot high concrete containment berm. The berm emptied into a 3-foot square drain valve pit. The pump for each tank is located at ground level near the drain valve pit. Historical photographs show large earthen berms around each tank, which were approximately 55 feet from the center of the tank. More recent historical photographs do not show an earthen berm around the tanks. It has not been ascertained if these berms were removed by DOD, NASA, or naturally eroded away. The lower toluene tanks supported "TNT Area C" during PBOW operations. The tanks were numbered 645 (northern tank) and 655 (southern tank). The tanks were installed in 1941, and were in service until 1945. According to the Records Review Report (Dames & Moore, 1995), no mention of any releases from the toluene tanks, while DOD used them was found. Toluene was transported to and from the tank area by railroad. The tanks were decommissioned in 1945 by pumping out their contents, draining transfer lines, and opening top and bottom flanges for ventilation.

Based on topographical quadrangles (dated 1959 & 1969), aerial photographs, and the visual site survey (section 3.1, herein), the site has essentially remained unchanged since the tanks were decommissioned in 1945. Exceptions to this are that the site has become overgrown and Tank 655 has been removed. Tank 655 was moved and installed near the Plum Brook Reactor Facility by NASA. Figures 1-4 & 1-5 are aerial photographs taken of the area in 1997 & 1950, respectively. Appendix B provides historical topographic quadrangles dated 1959 and 1969.

Environmental Information and Imaging Services (ERIIS) performed a database search of the PBOW vicinity. The data base search included those sites within close proximity to the PBOW that are currently listed under the following database records:

- National Priorities List (NPL)
- Resource Conservation and Recovery Information System- TSD's: Subject to Corrective Action (RCRIS_CA)
- Resource Conservation and Recovery Information System- Non-Corrective Action TSD Facilities (RCRIS_TS)
- Comprehensive Environmental Response, Compensation and liability Information System (CERCLIS)
- No Further Remedial Action Planned Sites (NFRAP)
- Resource conservation and Recovery Information System-Large Quantity Generators (RCRIS_LG)
- Resource conservation and Recovery Information System-Small Quantity Generators (RCRIS_SG)
- Emergency Response Notification System (ERNS)
- Ohio Master Sites List (HWS)
- Ohio Leaking Underground Storage Tank Report (LRST)
- Ohio Solid Waste Facility List (SWF)
- Ohio Underground Storage Tank Report (RST)

A description of each of these records is presented in Appendix I. Within the radii on the ERIIS figure in Appendix I, the search revealed 25 LRST sites, 18 RST sites, 3 SWF sites, 5 RCRIS_SG sites, 1 RCRIS_TS site, 1 NFRAP site, and 3 HWS sites. Of these sites, 6 LRST sites, 9 RST sites, 1 RCRIS_SG site, 1 RCRIS_TS site, 1 NFRAP site and 1 HWS site are located on the PBOW installation and the remainder are located outside the installation boundary. Information concerning each of these listed facilities and their location is included in Appendix I. Based on the proximity of these sites and/or their status, the potential for any of these listed facilities to negatively impact the lower toluene tank site is minimal.

1.2 Climate

The climate for Erie County is continental with cold and cloudy winters and warm humid summers. The county's first freezing temperature is typically in October, and its last freezing temperature is typically in April. Average annual precipitation for Sandusky from 1961 to 1990 was 34.05 inches. Within that time period, February had the lowest monthly rainfall average with 1.65 inches, whereas July had the highest monthly rainfall average of 3.70 inches. The weather changes every few days as cold fronts move through the region. Wind is from the southwest 55 percent of the time (MK1994: DM, 1997).

1.3 Topography

The lower toluene storage tank area is located primarily on a flat grassland area at an elevation of approximately 680 feet mean sea level (msl). Based on review of historical topographic quadrangles (USGS, 1959, 1969), and current survey data, the surface elevation of the tank area has not changed significantly over the years. A copy of these topographic quadrangles can be found in Appendix B. The tank area is located north of the Taylor Road and Patrol Road intersection, and is southeast of "TNT Area C". Mature trees and vegetation surround the remaining tank. There are no buildings within the area. Some abandoned single-track railroad lines are located to the east of the tank area. Precipitation runoff from the tank area accumulates in a nearby surface depression or pond west of the site, or flows northward to a tributary of Pipe Creek by means of a drainage ditch. The surface depression was identified in an Inventory Project Request (INPR) prepared by CELRH (USACE, 1998) for the lower toluene tank area. Recent aerial photographs show a darkened area west of the tank area that is located in approximately the same location depicted in historical topographical quadrangles but doesn't appear to be surface water. It is assumed that this feature could be a seasonal drainage effect and not a body of water.

1.4 Geology

Two formations of the Devonian Age underlay the lower toluene tank area. The lower and oldest formation is the Delaware Limestone. It is characterized as a hard, dense, finely crystalline limestone and dolomite. Dissolution of this unit has produced solution

channels along bedding planes and joints, and even produced caverns in some areas. The unit is typically buff colored and usually is described as fossiliferous. Overlaying the Delaware Limestone is the Olentangy Formation. This formation is made up of two members, the Plum Brook Shale and the overlying Prout Limestone. The Plum Brook Shale member should be encountered at the tank area. The Plum Brook Shale is interpreted to consist of approximately 35 feet of bluish gray, soft, fossiliferous shale containing thin layers of dark, hard, fossiliferous limestone. The Olentangy formation is the first natural boundary beneath the tank area at an approximate depth of 10 feet below ground surface (IT, 1999).

The overburden at the tank area is predominately composed of glacial till, outwash, or lacustrine (lake) deposits. The overburden at the lower tank area is approximately 10 feet thick (IT, 1999). Morrison Knudsen installed two monitoring wells, MK-MW-14 (installed north of removed Tank 655) and MK-MW-15 (installed north of Tank 645). The boring logs of these two wells described the lithology of the overburden unit as brown silty sand with traces of clay and some organics, until bedrock is encountered at depths of 11.5 feet (MK-MW-14) and 9 feet (MK-MW-15).

1.5 Hydrogeology

No groundwater was encountered at the time of the field investigation to the boring termination depth of 4 feet. Based on a review of the site-wide groundwater study (IT, 1999), groundwater is encountered in the overburden soils underlying the tank area. This study reported four water level readings in the Morrison Knudsen wells from August 1997 to May 1998. The depths measured ranged between 4.62 feet bags to 8.8 feet bags.

Based on a review of the 1986 Groundwater Resources of Erie County found in Appendix C, the tank area is in a hydrogeologic region that seldom exceeds 3 gallons per minute from deeper bedrock groundwater sources. Limited quantities of groundwater are obtained from thin, discontinuous sand and gravel deposits interbedded in fine, sandy clay or from the underlying shale. Drilling deeper than 30 feet into the shale is not recommended. Occasional gas or salt noted in the eastern half of the county. Larger yields may be obtained in western Huron and Oxford townships and southeastern Perkins township. Wells may encounter water-bearing limestone beneath as much as 60 feet of impervious shale.

2.0 PREVIOUS INVESTIGATIONS

In 1993 Morrison Knudsen performed an installation wide site investigation. Two monitoring wells were installed at the lower toluene tank area. Soil samples were obtained from the borings at depths of 2 feet. After the wells were developed ground water samples were obtained. Both matrices, water and soil, were analyzed for volatiles, semivolatiles, explosives, and metals. The results of these analyses revealed no contamination in the soil or the groundwater. These wells were then included in the site

wide groundwater study performed by IT Corporation. They were analyzed again in 1997 and 1998 for the same parameters and revealed no contamination.

Dames & Moore reported a "Records Review" of the PBOW in 1997, which included the lower toluene tanks site. According to this report there was no documentation of any releases from the lower toluene tanks.

3.0 SITE INVESTIGATION ACTIVITIES

The U.S. Army Corps of Engineers, Louisville District, prepared a detailed Quality Assurance Project Plan (QAPP) for this limited Site Investigation (SI) of the lower toluene tank area (USACE, 1999). This document was used in completing the associated field activities. Field activities were conducted from 7 June 1999 through 11 June 1999.

3.1 Visual Survey

On 8 June 1999 a visual survey was performed on the lower toluene tank area. Photographs taken during the visual survey can be found in Appendix D. The following observations of current site conditions were documented. Figure 3-1 displays the tank area with the physical features documented below.

- The remaining tank (# 645) was identified. The tank appeared to be in good condition. No significant structural damage of the tank was observed. Small amounts of rust were observed at various locations on the tank. The square drain valve pit located on the northern side of the tank was located. A tree has grown through the center of the drain valve pit. No external or above ground piping was located within close proximity of the tank. A valve was located on the eastern side of the tank approximately 2 feet above the base. It is assumed that this valve was used to fill the tank.
- The concrete berm for tank # 655 was located by conducting limited brush removal and light excavation. The entire circumference of the concrete berm was still intact. The concrete square drain valve pit was located on the southern side of the concrete berm.
- Both monitoring wells MK-MW-14 and MK-MW-15 were located.
- Thick vegetation and mature trees surround the tank area. On the eastern boundary of the tank area numerous mature trees have been downed and their debris is still present. It was later revealed, that NASA, in protecting the power lines running along the eastern side of the tank area, cut down these trees and left the debris in place.

- Abandoned railroad tracks running north and south were located east of the tank area.
- One drainage ditch running north and south was located east of the tank area and west of the railroad tracks. This drainage ditch contained water and was flowing in a northerly direction. Two additional drainage ditches and associated culverts were located to the south and south west of the tank area. Neither ditch contained water. These two ditches eventually converged south of the tank area. The ditch formed from the adjoining ditches ends or could not be traced south east of the tanks.
- Two large concrete chunks/debris were located approximately 85 feet to the east of the former tank #655 location.
- In a heavy forested area approximately 65 feet to the west of the former tank #655 location the possible location of the surface depression was observed and documented. There was no water present in the depression; however, the trunks of trees in this area revealed watermarks about 2 feet above the ground surface.
- The pump and associated piping (east of the tanks) leading to the tanks could not be located. Trees and debris hindered access to the approximate pump location.

3.2 Soil Boring and Soil Sampling

A total of 10 borings were advanced during the field investigation. The locations of the borings are displayed in Figure 3-2. Four borings were placed around each tank approximately 40 feet to the north, south, east, and west. One additional boring was placed on the eastern side of tank #645, near what is believed to be the fill valve location. Another boring was placed within the center of the concrete berm of the former tank #655 location.

All borings were advanced using a stainless-steel hand auger. Soil samplings from each boring were screened at one-foot intervals with a photoionization detector. Continuous disturbed soil samples were collected at two different depths (0-2 feet and 3-4 feet) following decontamination and sampling procedures documented in the QAPP dated May 1999. Samples were placed in the appropriate containers, labeled, and preserved on ice. At the field base station the samples were processed and packaged for shipment. A chain of custody record was generated and custody seals were placed on the sample coolers. The samples were shipped overnight to Quanterra Laboratory located in North Canton, Ohio for chemical analyses. All soil samples were analyzed for Benzene, Toluene, Ethylbenzene, and Xylene (BTEX). Two soil samples were additionally analyzed for pH, Total Organic Carbon (TOC), and Sieve analysis. These two samples were chosen to aid in assessing the geotechnical characteristics of the soils encountered at the site.

Logs were completed for all borings during the field investigation. The field team leader completed the boring logs. The logs were used to document lithology description, depth of boring, date of boring, equipment used, sample collection, and field screening results.

A sketch showing the approximate location of the boring in relation to known site features is also presented in each boring log.

Soil was classified in accordance with the Unified Soil Classification System (USCS). Soil boring logs are presented in Appendix E. The soil samples collected for this investigation are summarized in Table 3-1 below.

3.3 Field Screening

Soil samples from each boring were screened using headspace analysis as stated in the QAPP (USACE,1999), at one-foot intervals with a photoionization detector (PID). The PID was used to help determine which samples would be collected for laboratory analyses. PID screening results are recorded on the boring logs given in Appendix E. All of the headspace screening results were low.

TABLE 3-1 Samples Collected for SI investigation

Sample Identification	Date Collected	Analyses
PBOW99SB01-1'	9 June 1999	BTEX
PBOW99SB02-1'	9 June 1999	BTEX
PBOW99SB02-3'9"	9 June 1999	BTEX
PBOW99SB03-1'	9 June 1999	BTEX, pH, TOC, Sieve
PBOW99SB03-3'5"	9 June 1999	BTEX
PBOW99SB04-1'4"	9 June 1999	BTEX
PBOW99SB04-4'2"	9 June 1999	BTEX
PBOW99SB05-1'	9 June 1999	BTEX
PBOW99SB05-4'	9 June 1999	BTEX
PBOW99SB06-1'	9 June 1999	BTEX
PBOW99SB06-2'9"	9 June 1999	BTEX, pH, TOC, Sieve
PBOW99SB06-4'	9 June 1999	BTEX
PBOW99SB07-1'	9 June 1999	BTEX
PBOW99SB07-1' DUP	9 June 1999	BTEX
PBOW99SB07-4'	9 June 1999	BTEX
PBOW99SB08-1'	9 June 1999	BTEX
PBOW99SB08-3'10"	9 June 1999	BTEX
PBOW99SB09-1'	9 June 1999	BTEX
PBOW99SB10-1'	9 June 1999	BTEX
PBOW99SB10-2'6"	9 June 1999	BTEX
TRIP BLANK	9 June 1999	BTEX

3.4 Surveying

Eight of the ten boring locations were surveyed to the nearest 0.01 foot and referenced to the Ohio State Plane Coordinate System. These eight borings were located approximately 40 feet north, south, east, and west around each tank. Table 3-2 displays the Ohio State Plane Coordinates (Northing, Easting) and surface elevations of the boring locations. Soil borings PBOW99SB09 and PBOW99SB10 were not surveyed.

Table 3-2 Coordinates and Surface Elevations of Boring Locations

Boring Number	Northing	Easting	Ground Surface Elevation (msl)*
PBOW99SB-01	618493.63	1913295.92	679.0 ft
PBOW99SB-02	618433.58	1913360.41	680.0 ft
PBOW99SB-03	618381.29	1913309.91	679.4 ft
PBOW99SB-04	618444.35	1913248.63	679.3 ft
PBOW99SB-05	618263.62	1913294.42	679.3 ft
PBOW99SB-06	618201.67	1913354.77	679.6 ft
PBOW99SB-07	618151.69	1913305.24	679.2 ft
PBOW99SB-08	618202.22	1913244.19	679.0 ft

* = (msl) mean sea level

4.0 ANALYTICAL RESULTS

Twenty soil samples and one matrix spike/matrix spike duplicate sample were collected from the lower toluene tank area and submitted for laboratory analyses. These samples were analyzed for BTEX. The analytical report from the laboratory is located in Appendix F. The analytical results are summarized below.

4.1 BTEX Analysis

BTEX analyses were performed in accordance with guidelines in the United States Environmental Protection Agency (USEPA) document entitled *Test Methods for Evaluating Solid Waste, Physical and Chemical Methods (SW-846)* method 8021B (USEPA, 1996). Toluene was not detected in any of the samples collected, as shown in tables 4-1. Xylene (total) was detected in 5 of the 20 samples. However, none of the xylene concentrations exceeded the media specific-screening criteria (USEPA Region 9 preliminary remediation goals (PRGs)). A comparison of the BTEX analysis and USEPA Region 9 PRGs is presented in table 4-1.

5.0 GEOTECHNICAL CHARACTERISTIC ANALYSIS

Of the 20 samples collected at the lower toluene tank area, two samples were selected for geotechnical characteristic analysis. Selections of these samples were based on field observations of encountering differences in strata within the borings placed in the tank area. The analyses included grain size, hydrometer, pH and total organic carbon (TOC). Grain size and hydrometer were performed per American Society for Testing and Materials (ASTM) method D-422. USEPA SW-846 test method 9045C was used to analyze pH. *Standard Methods of Chemical Analysis, 6th Edition, D. Van Nostrand Co.* (SMCA) Walkley- Black test method was used to analyze for total organic carbon. Although pH and TOC are chemical analyses, they have been included in this section to aid in assessing the physical and geotechnical characteristics of the soils encountered at the tank area. The results of these analyses can be found in Appendix G.

The lithology encountered at the tank area was visually classified by the field team leader using the Unified Soil Classification System. All of the soils encountered in the borings were classified in the field as (SM) Silty Sand. There were some differences in color and moisture contents. This classification was confirmed with the laboratory sieve and hydrometer analyses and was consistent with the anticipated lithology from the information reviewed prior to field activities. The pH of these samples ranged between 5.2 and 6.3. The Total Organic Carbon (TOC) results for these samples ranged from 8330 to 14000 mg/kg.

6.0 VARIANCES/NONCONFORMANCES

For the purpose of this investigation, variances are defined as necessary changes or modifications to the planned activities as specified by the Quality Assurance Project Plan (QAPP), or Field Sampling Plan (FSP). Variances do not significantly affect the quality of the data or process being modified. However, nonconformances are defined as malfunctions, deficiencies, or deviations that may render the quality of information or data unacceptable or indeterminate. There were no nonconformances during this site investigation. The variances during this site investigation (SI) are listed in Appendix H.

7.0 SUMMARY AND CONCLUSIONS

The purpose of this site investigation of the lower toluene tank area was to gather data necessary to evaluate the site for contamination due to past DOD activities. The referenced information was reviewed and soil samples were analyzed to assess the environmental media at the site. Activities included document research, a visual site survey, soil sample collection, PID screening and chemical laboratory analysis.

- The lower toluene tank site is located within the PBS. PBS is a large NASA testing facility surrounded by residential and commercial development. The lower toluene tank site is currently not used and overgrown. Access to the site is limited.
- At the time of DOD occupancy, the lower toluene tanks site housed two large ASTs that were decommissioned in 1945. Since DOD occupancy, it appears the site has essentially remained unchanged with the exception that one of the tanks has been moved and the site has become overgrown.
- Ten soil borings to depths ranging from about one foot to four feet were advanced in the area. Soil samples were field screened at one-foot intervals using a PID. The field screening revealed no indications of contamination.
- Twenty soil samples were collected for laboratory BTEX analysis. Toluene was not detected in any of the soil samples. Xylene (total) was found in five of the samples; however, the levels detected were well below the screening criteria (USEPA Region 9 PRGs).
- Previous studies included the installation and testing of the two groundwater monitoring wells in the lower toluene tank area. Multiple samples previously tested from these wells revealed no contamination.
- This SI has revealed no evidence of releases to the site during or after DOD use.

8.0 RECOMMENDATIONS

Based on the results of this SI, operation & decommissioning of the lower toluene tank area has not negatively impacted the environment in regards to toluene. Therefore, the U.S. Army Corps of Engineers, Louisville District recommends coordination with federal and state regulatory authorities to proceed toward a No Further Action (NFA) decision document for the lower toluene tank area. It should be noted that the intent of this recommendation is to proactively obtain input from regulatory authorities so that the proper steps can be taken to proceed toward a NFA decision document. Should it be determined, based on input from regulatory authorities, additional information and data is required the U.S. Army Corps of Engineers will provide the required information and/or data so that the NFA decision document can be implemented.

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TABLES

Table 4-1 LOWER TOLUENE TANKS BTEX ANALYSIS

Sample ID		PBOW99SB01-1'	PBOW99SB02-1'	PBOW99SB02-3' 9"	PBOW99SBO3-1'
Matrix		SOIL	SOIL	SOIL	SOIL
Collection Date		9-Jun-99	9-Jun-99	9-Jun-99	9-Jun-99

BTEX

Parameter	Units	*PRG				
Benzene	ug/kg	3.0E+01	ND(1.1)	ND(1.1)	ND(1.2)	ND(1.2)
Ethylbenzene	ug/kg	1.3E+04	ND(1.1)	ND(1.1)	ND(1.2)	ND(1.2)
Toluene	ug/kg	1.2E+04	ND(1.1)	ND(1.1)	ND(1.2)	ND(1.2)
Xylenes (total)	ug/kg	1.9E+05	2.9	ND(1.1)	ND(1.2)	ND(1.2)

Sample ID		PBOW99SB03-3' 5"	PBOW99SB04-1' 4"	PBOW99SB04-4' 2"	PBOW99SBO5-1'
Matrix		SOIL	SOIL	SOIL	SOIL
Collection Date		9-Jun-99	9-Jun-99	9-Jun-99	9-Jun-99

BTEX

Parameter	Units	*PRG				
Benzene	ug/kg	3.0E+01	ND(1.2)	ND(1.1)	ND(1.2)	ND(1.1)
Ethylbenzene	ug/kg	1.3E+04	ND(1.2)	ND(1.1)	ND(1.2)	ND(1.1)
Toluene	ug/kg	1.2E+04	ND(1.2)	ND(1.1)	ND(1.2)	ND(1.1)
Xylenes (total)	ug/kg	1.9E+05	ND(1.2)	ND(1.1)	ND(1.2)	4.7

Sample ID		PBOW99SB05-4'	PBOW99SB06-1'	PBOW99SB06-2' 9"	PBOW99SBO6-4'
Matrix		SOIL	SOIL	SOIL	SOIL
Collection Date		9-Jun-99	9-Jun-99	9-Jun-99	9-Jun-99

BTEX

Parameter	Units	*PRG				
Benzene	ug/kg	3.0E+01	ND(1.2)	ND(1.1)	ND(1.2)	ND(1.2)
Ethylbenzene	ug/kg	1.3E+04	ND(1.2)	ND(1.1)	ND(1.2)	ND(1.2)
Toluene	ug/kg	1.2E+04	ND(1.2)	ND(1.1)	ND(1.2)	ND(1.2)
Xylenes (total)	ug/kg	1.9E+05	ND(1.2)	ND(1.1)	ND(1.2)	ND(1.2)

*PRG = USEPA Region 9 Preliminary Remediation Goals Migration to Groundwater DAF20 (Dilution Attenuation Factor 20)
 ND = Non-Detect
 () = Reporting Limit

Table 4-1 LOWER TOLUENE TANKS BTEX ANALYSIS

Sample ID		PBOW99SB07-1'	PBOW99SB07-1'(DUP)	PBOW99SB07-4'	PBOW99SBO8-1'
Matrix		SOIL	SOIL	SOIL	SOIL
Collection Date		9-Jun-99	9-Jun-99	9-Jun-99	9-Jun-99
BTEX					
Parameter	Units *PRG				
Benzene	ug/kg 3.0E+01	ND(1.1)	ND(1.1)	ND(1.2)	ND(1.1)
Ethylbenzene	ug/kg 1.3E+04	ND(1.1)	ND(1.1)	ND(1.2)	ND(1.1)
Toluene	ug/kg 1.2E+04	ND(1.1)	ND(1.1)	ND(1.2)	ND(1.1)
Xylenes (total)	ug/kg 1.9E+05	1.2	ND(1.1)	ND(1.2)	ND(1.1)

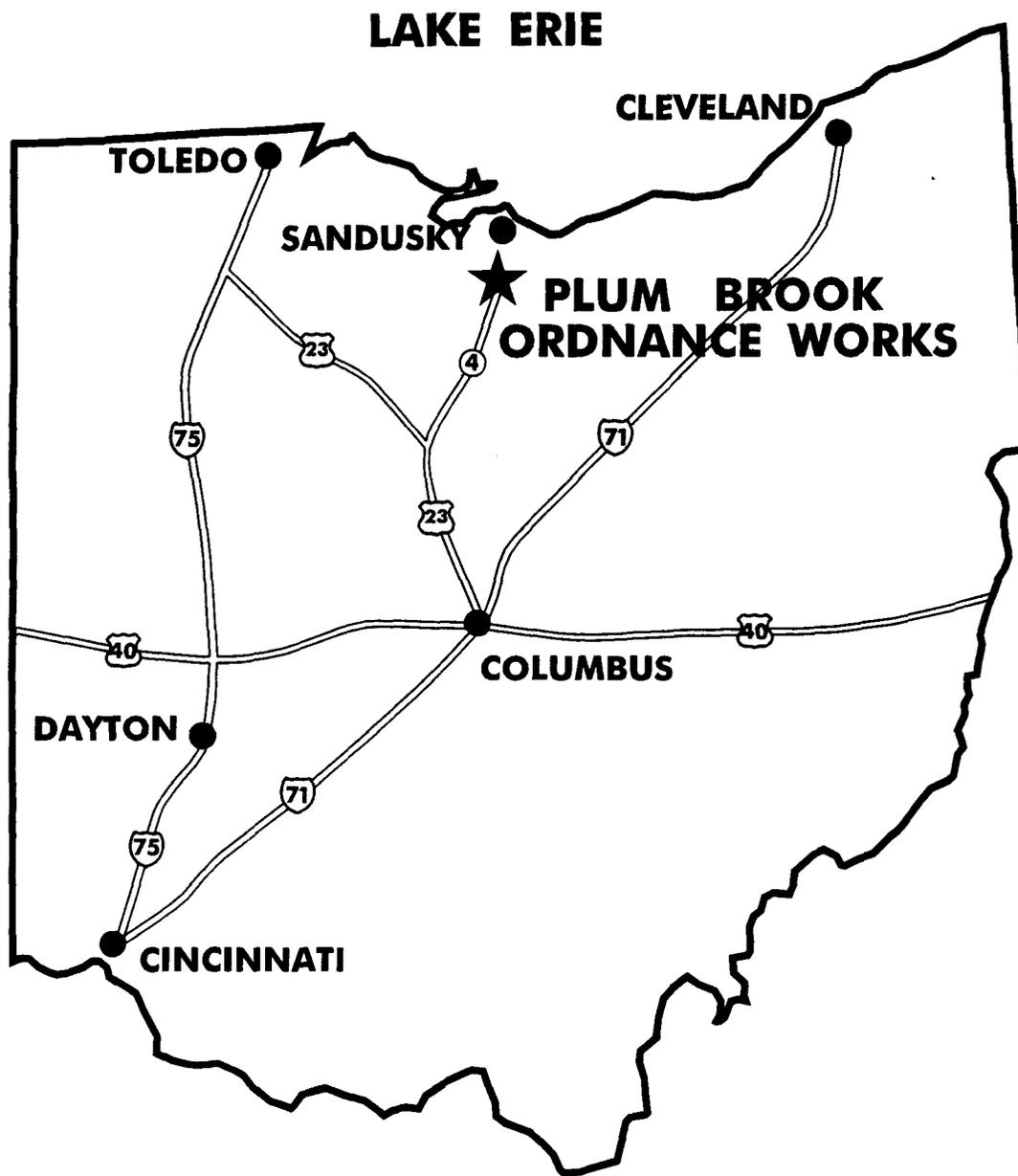
Sample ID		PBOW99SB08-3' 10"	PBOW99SB09-1'	PBOW99SB10-1'	PBOW99SB10-2' 6"
Matrix		SOIL	SOIL	SOIL	SOIL
Collection Date		9-Jun-99	9-Jun-99	9-Jun-99	9-Jun-99
BTEX					
Parameter	Units PRG				
Benzene	ug/kg 3.0E+01	ND(1.2)	ND(1.0)	ND(1.0)	ND(1.1)
Ethylbenzene	ug/kg 1.3E+04	ND(1.2)	ND(1.0)	ND(1.0)	ND(1.1)
Toluene	ug/kg 1.2E+04	ND(1.2)	ND(1.0)	ND(1.0)	ND(1.1)
Xylenes (total)	ug/kg 1.9E+05	ND(1.2)	5.0	1.3	ND(1.1)

*PRG = USEPA Region 9 Preliminary Remediation Goals Migration to Groundwater DAF20 (Dilution Attenuation Factor 20)

ND = Non-Detect

() = Reporting Limit

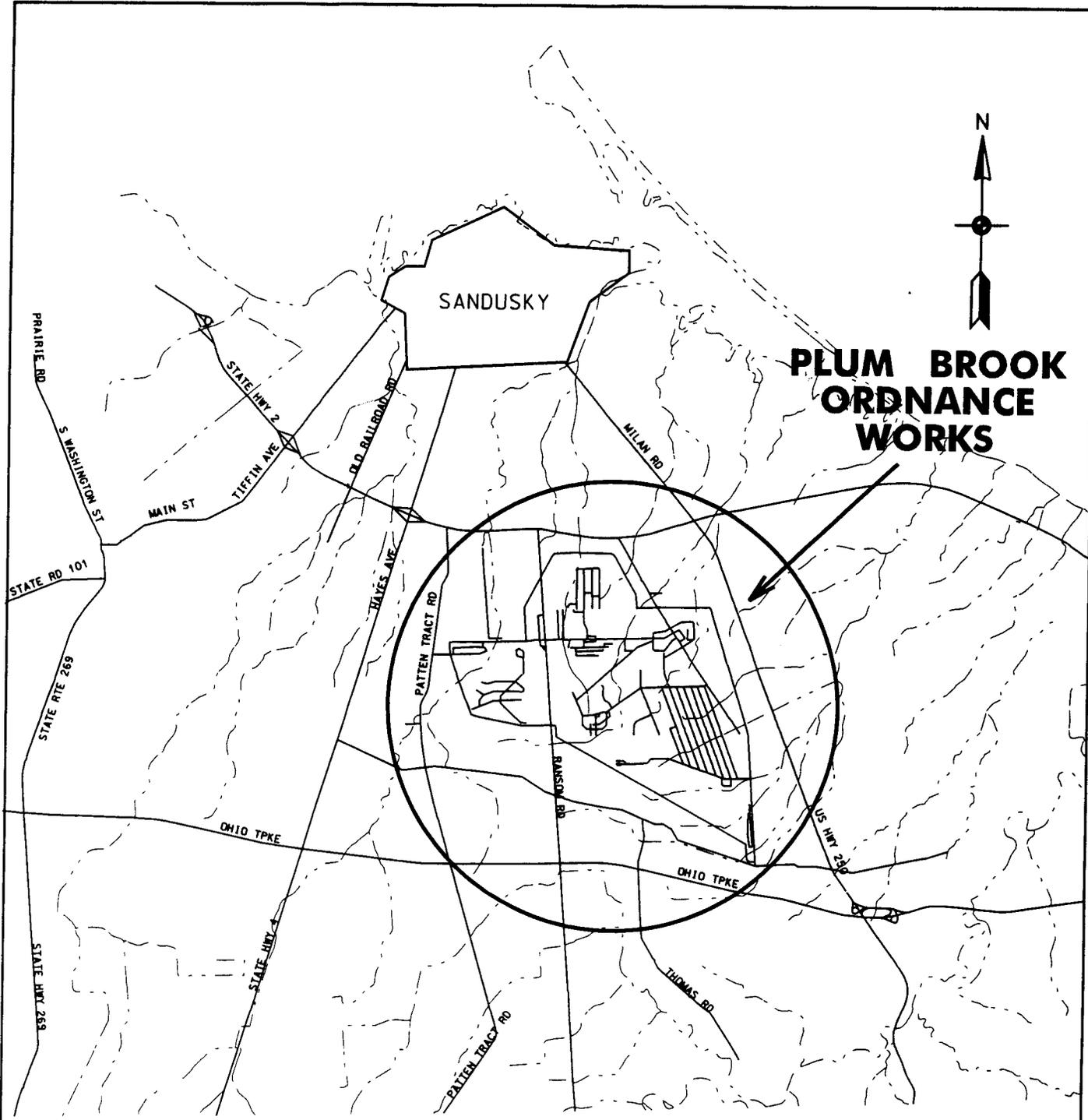
Figures



Design By:	Drawn By: WDB	Checked By:	 US Army Corps of Engineers	VICINITY LOCATION PLAN PLUM BROOK ORDNANCE WORKS SANDUSKY, OHIO	
Reviewed By:	Approved By:				
Date: AUG 1999	Scale: NONE	Drawing Code:	Sheet Ref. No.	FIGURE 1-1	



PLUM BROOK ORDNANCE WORKS



Design By: Drawn By: Checked By:
WDB



US Army Corps
of Engineers

PLUM BROOK ORDNANCE WORKS
SANDUSKY, OHIO

Reviewed By: Approved By:

Date:
AUG 1999

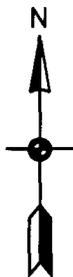
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Sheet Ref. No.

FIGURE 1-2

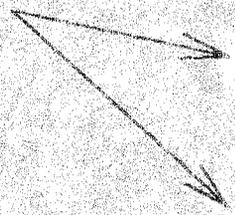

TOLUENE TANKS



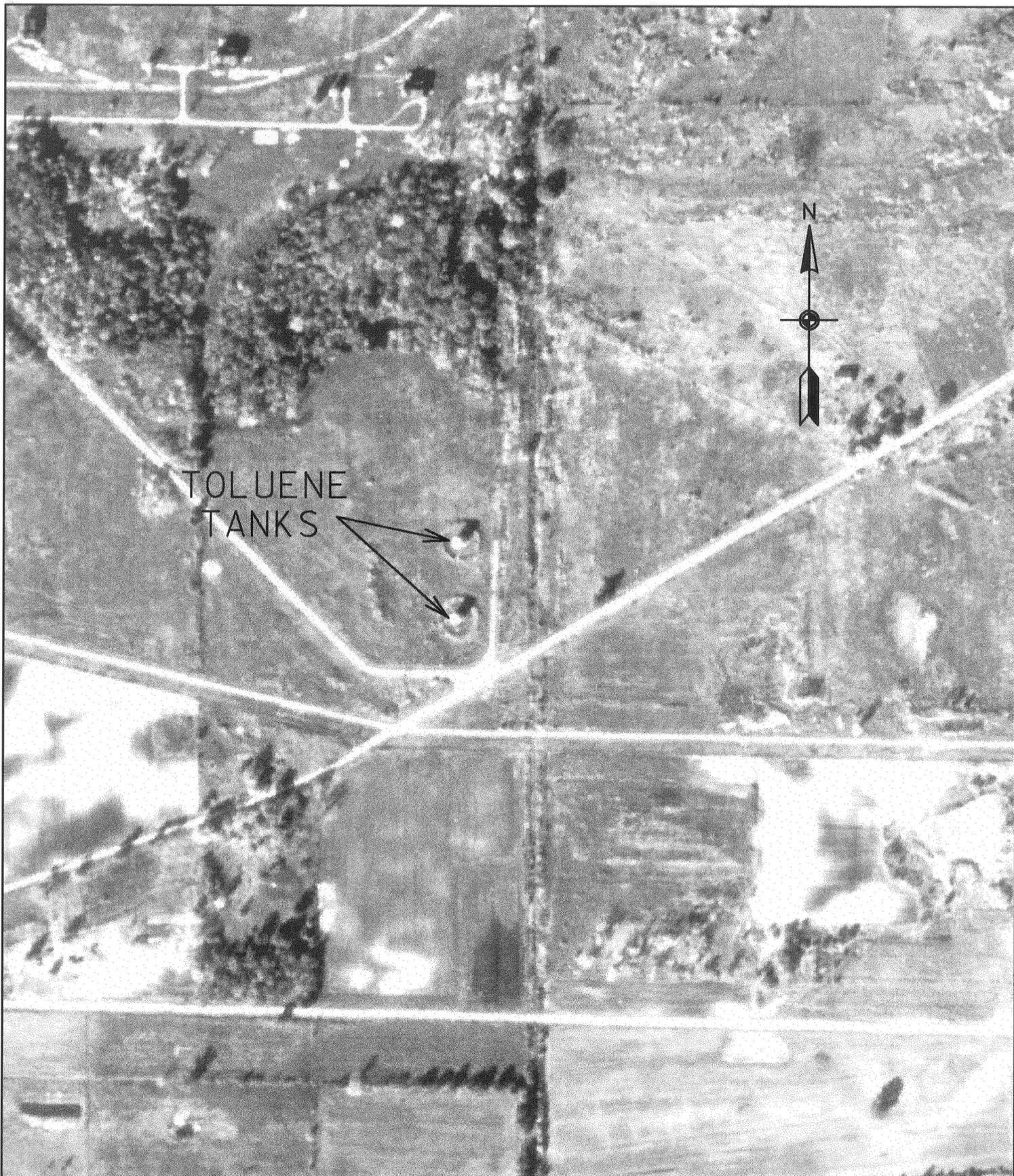
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Reviewed By:	Approved By:				
Date: AUG 1999	Scale: NONE	Drawing Code:	Sheet Ref. No.	FIGURE 1-3	



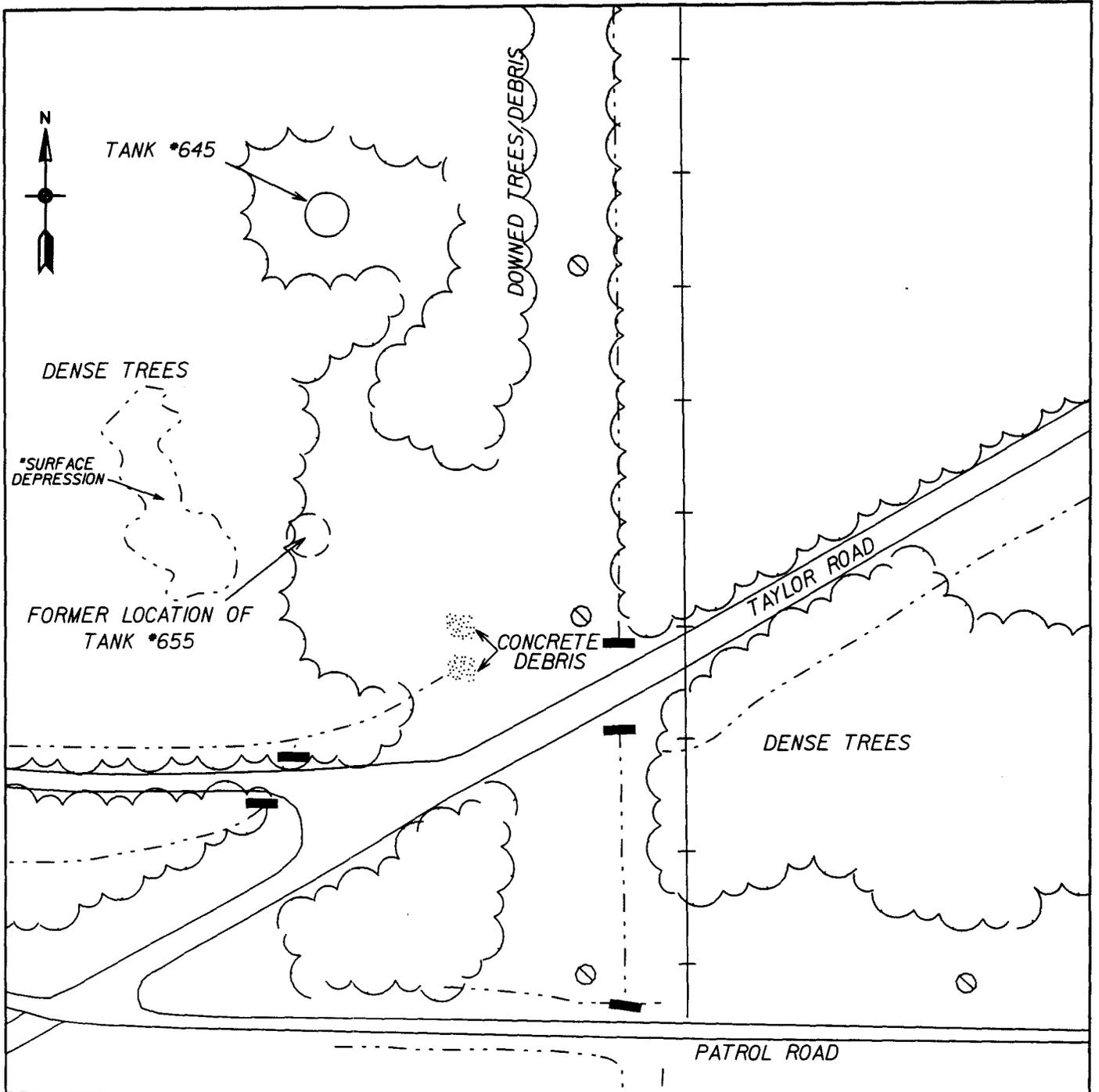
TOLUENE
TANKS



Design By:	Drawn By: WDB	Checked By:	 US Army Corps of Engineers	LOWER TOLUENE TANKS FROM c. 1997 AERIAL PHOTOGRAPH PLUM BROOK ORDNANCE WORKS SANDUSKY, OHIO	
Reviewed By:	Approved By:				
Date: AUG 1999	Scale: 1" = 300'	Drawing Code:	Sheet Ref. No.:	FIGURE 1-4	



Design By:	Drawn By: WDB	Checked By:	 US Army Corps of Engineers	LOWER TOLUENE TANKS FROM c. 1950 AERIAL PHOTOGRAPH PLUM BROOK ORDNANCE WORKS SANDUSKY, OHIO	
Reviewed By:	Approved By:				
Date: AUG 1999	Scale: 1" = 400'	Drawing Code:	Sheet Ref. No.	FIGURE 1-5	



- ⊕ SAMPLE LOCATION
- ⊙ UTILITY POLE
- WATER SURFACE DEPICTED FROM 97 AERIAL PHOTOGRAPHY
- ▬ HEADWALL

100 50 0 100 200FT

SCALE: 1" = 100'

Design By: Drawn By: Checked By:

WDB



US Army Corps of Engineers

VISUAL SURVEY FEATURES
LOWER TOLUENE TANKS
PLUM BROOK ORDNANCE WORKS
SANDUSKY, OHIO

Reviewed By:

Approved By:

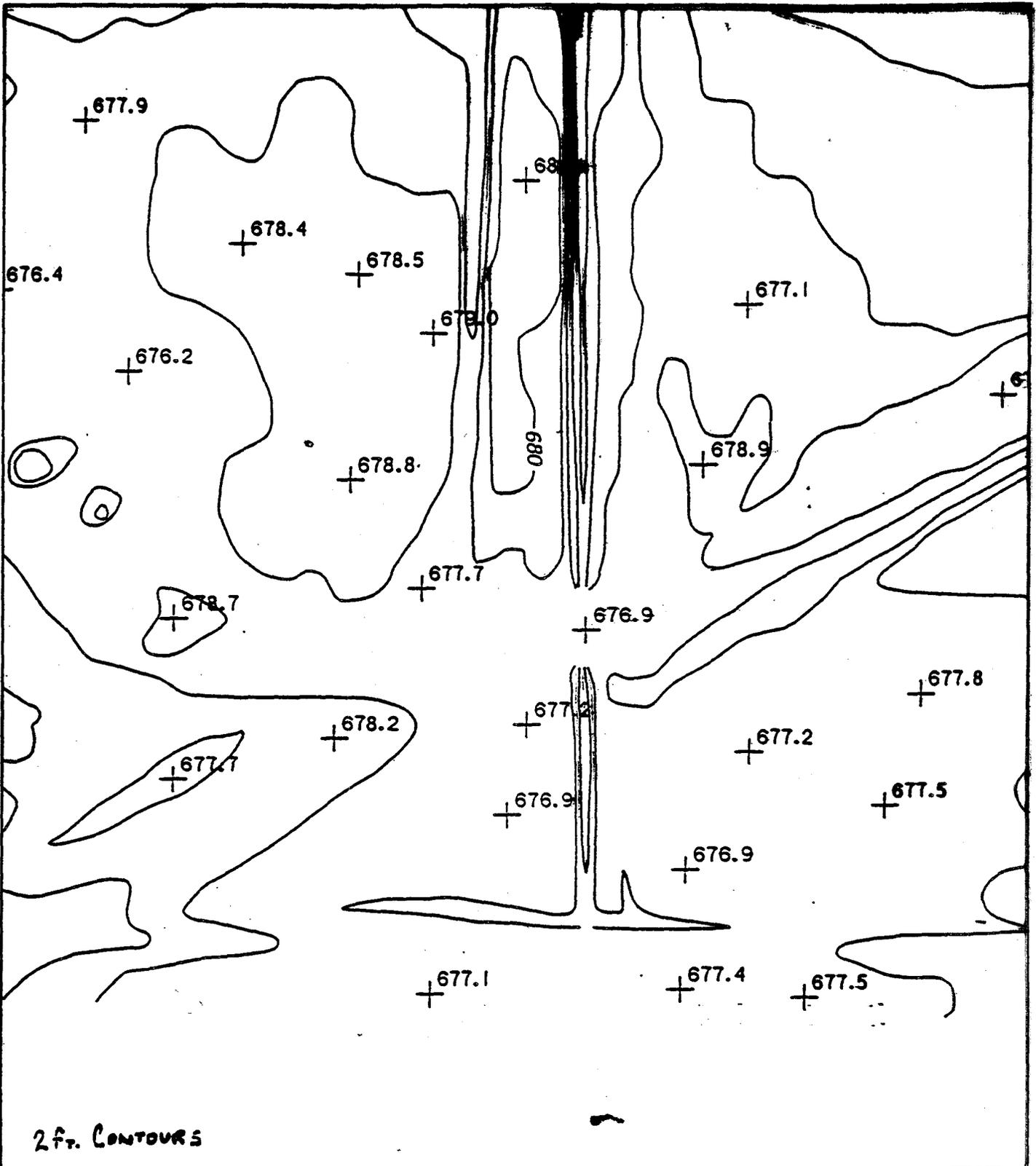
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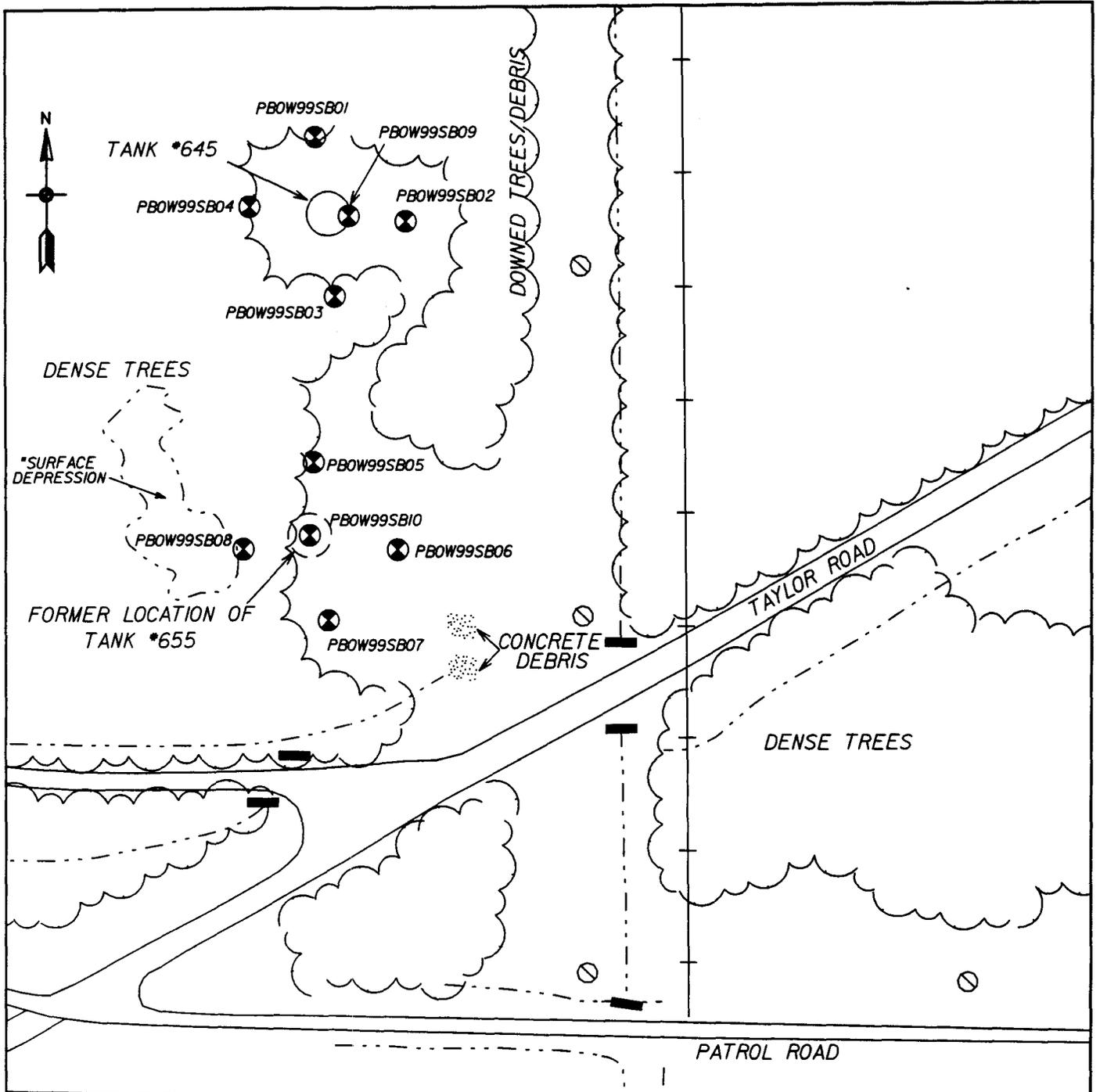
Sheet Ref. No.

FIGURE 3-1



2 ft. CONTOURS

Design By:	Drawn By:	Checked By:	 US Army Corps of Engineers		
Reviewed By:	Approved By:				
Date:	Scale:	Drawing Code:	Sheet Ref. No.	FIGURE 3-2a	



- ⊗ SAMPLE LOCATION
- ⊘ UTILITY POLE
- WATER SURFACE DEPICTED FROM 97 AERIAL PHOTOGRAPHY
- ▬ HEADWALL



Design By: Drawn By: WDB Checked By:



SAMPLE LOCATON PLAN
LOWER TOLUENE TANKS
PLUM BROOK ORDNANCE WORKS
SANDUSKY, OHIO

Reviewed By: Approved By:

Date: AUG 1999

Scale: 1" = 100'

Drawing Code:

Sheet Ref. No.

FIGURE 3-2

Appendix A - Land Use Map / Historic
Ownership Map

LAND USE AND LAND COVER

1 URBAN OR BUILT-UP LAND

- 11 Residential
- 12 Commercial and Services
- 13 Industrial
- 14 Transportation, Communications and Utilities
- 15 Industrial and Commercial Complexes
- 16 Mixed Urban or Built-up Land
- 17 Other Urban or Built-up Land

2 AGRICULTURAL LAND

- 21 Cropland and Pasture
- 22 Orchards, Groves, Vineyards, Nurseries, and Ornamental Horticultural Areas
- 23 Confined Feeding Operations
- 24 Other Agricultural Land

3 RANGELAND

- 31 Herbaceous Rangeland
- 32 Shrub and Brush Rangeland
- 33 Mixed Rangeland

4 FOREST LAND

- 41 Deciduous Forest Land
- 42 Evergreen Forest Land
- 43 Mixed Forest Land

5 WATER

- 51 Streams and Canals
- 52 Lakes
- 53 Reservoirs
- 54 Bays and Estuaries

6 WETLAND

- 61 Forested Wetland
- 62 Nonforested Wetland

7 BARREN LAND

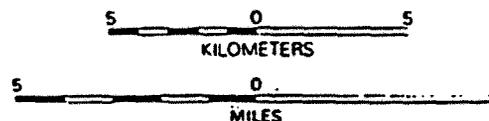
- 71 Dry Salt Flats
- 72 Beaches
- 73 Sandy Areas Other than Beaches
- 74 Bare Exposed Rock
- 75 Strip Mines, Quarries, and Gravel Pits
- 76 Transitional Areas
- 77 Mixed Barren Land

8 TUNDRA

- 81 Shrub and Brush Tundra
- 82 Herbaceous Tundra
- 83 Bare Ground Tundra
- 84 Wet Tundra
- 85 Mixed Tundra

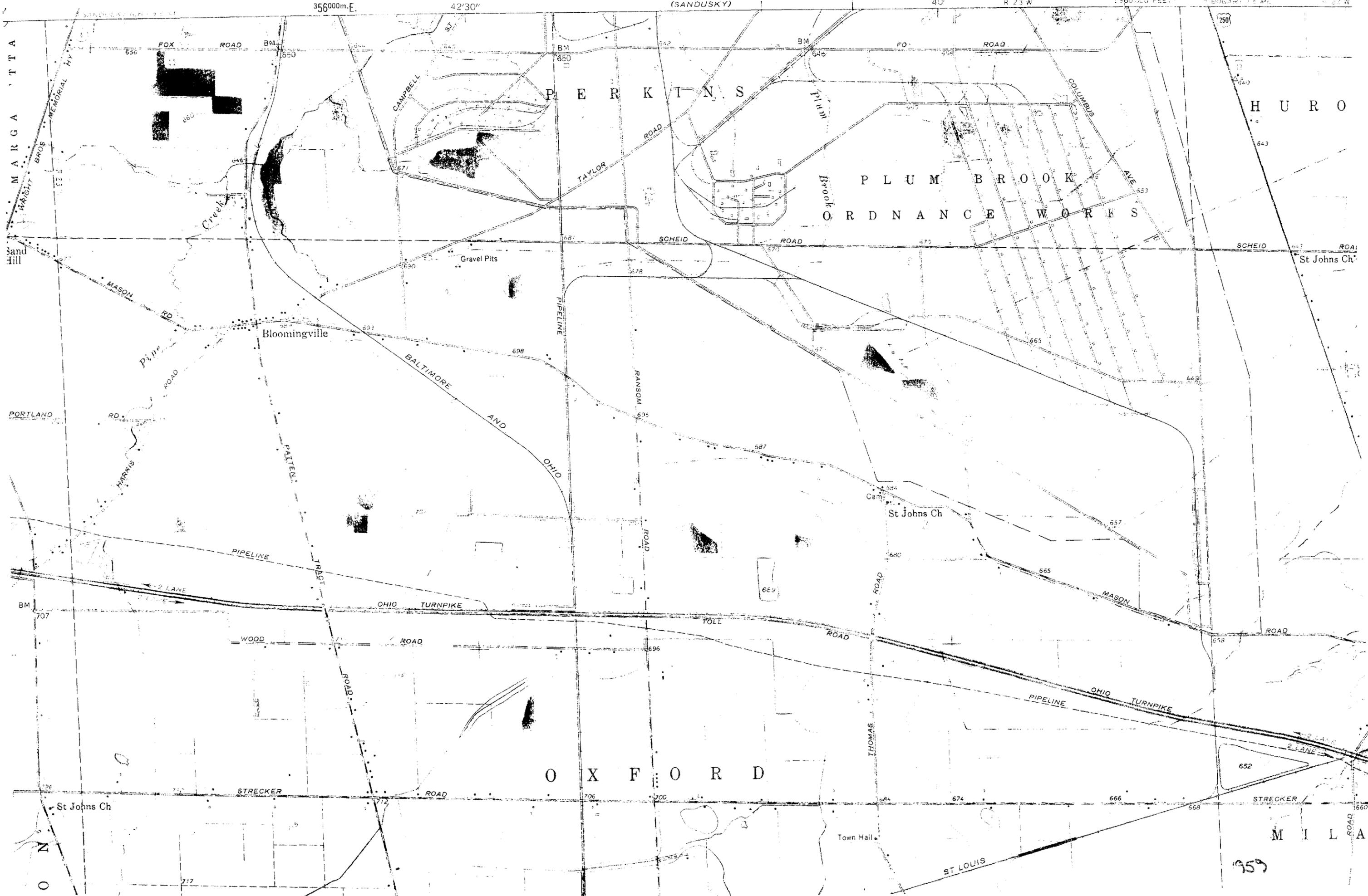
For definitions of Level I and Level II categories see U.S. Geological Survey Professional Paper 964, *A Land Use and Land Cover Classification System for Use With Remote Sensor Data*, 1976, by Anerson, J. R., E. E. Hardy, J. T. Roach, and R. E. Witmer. Minimum mapping units are: 4 hectares (10 acres) for Level II categories 11-17, 23-24, 51-54, 75, and urban occurrences of 76; and 16 hectares (40 acres) for all other Level II categories.

SCALE 1:250 000



Land use and land cover information compiled from source materials dated 1980 and 1983

Appendix B - Historic Topographical Maps
1959/1969



356000m.E.

42'30"

(SANDUSKY)

40'

R 23 W

1:80,000 FEET

22 W

MARGA TTA

Sand Hill

PORTLAND

NO



Creek

Bloomington

Gravel Pits

OXFORD

St Johns Ch

Town Hall

HURO

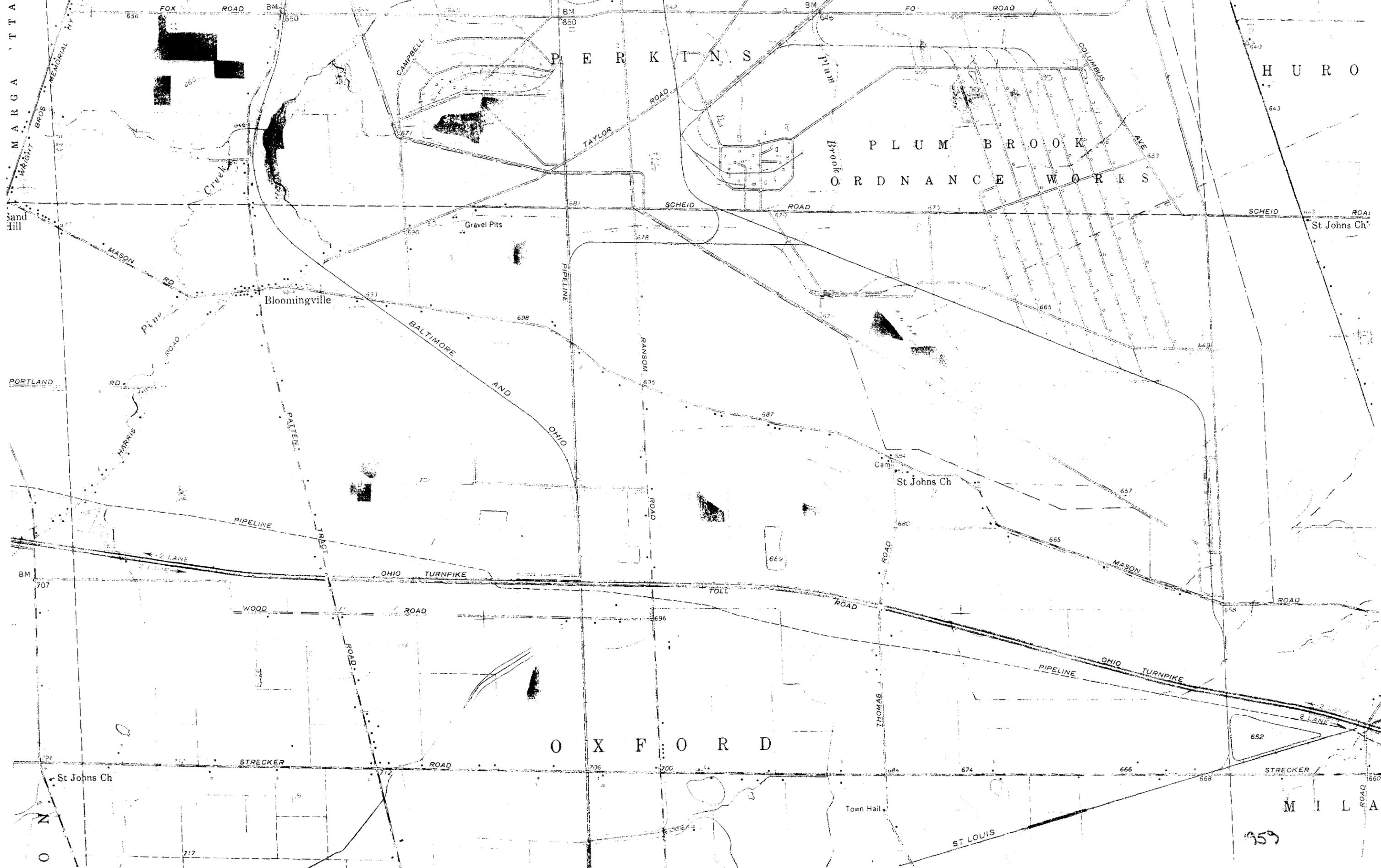
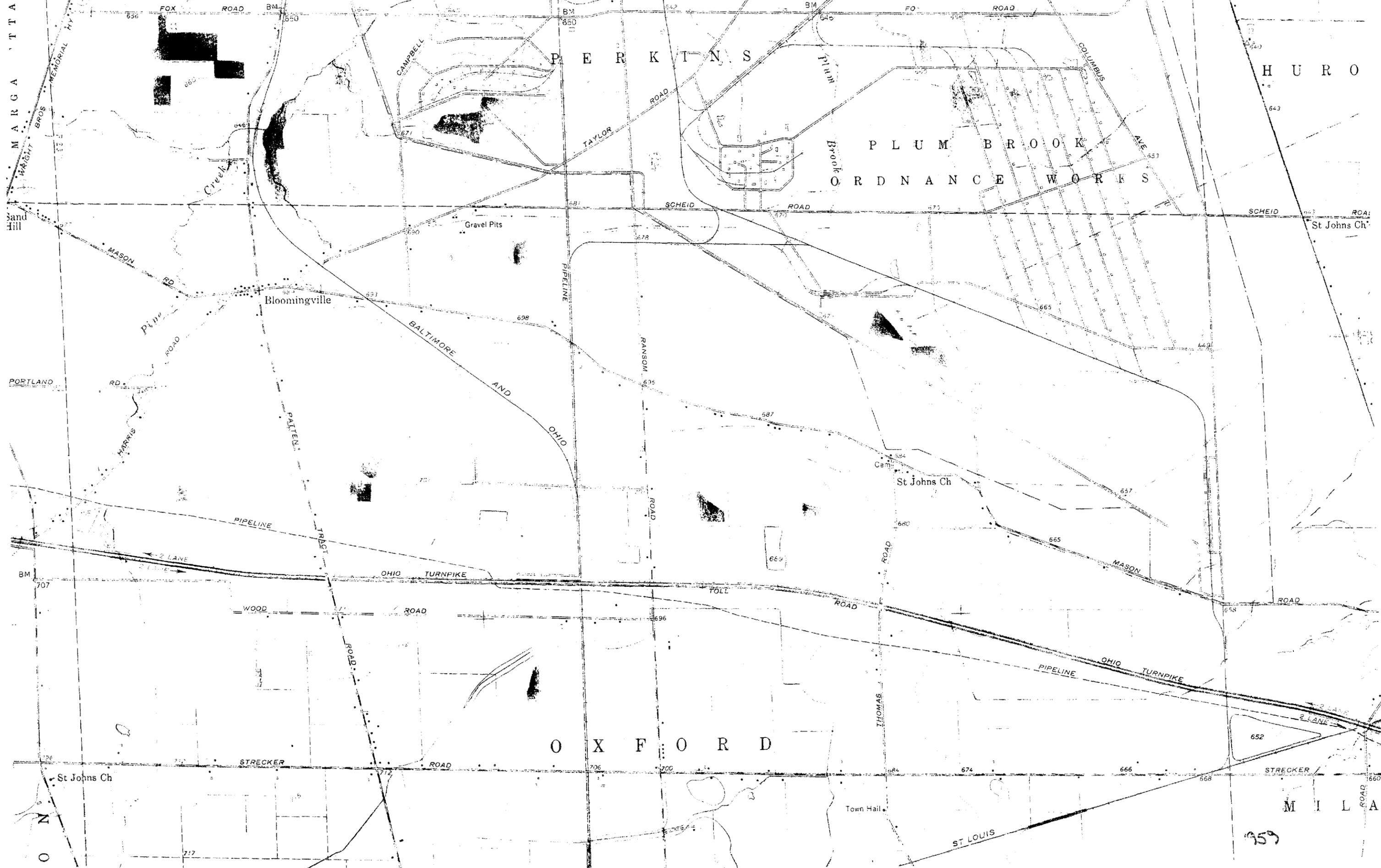
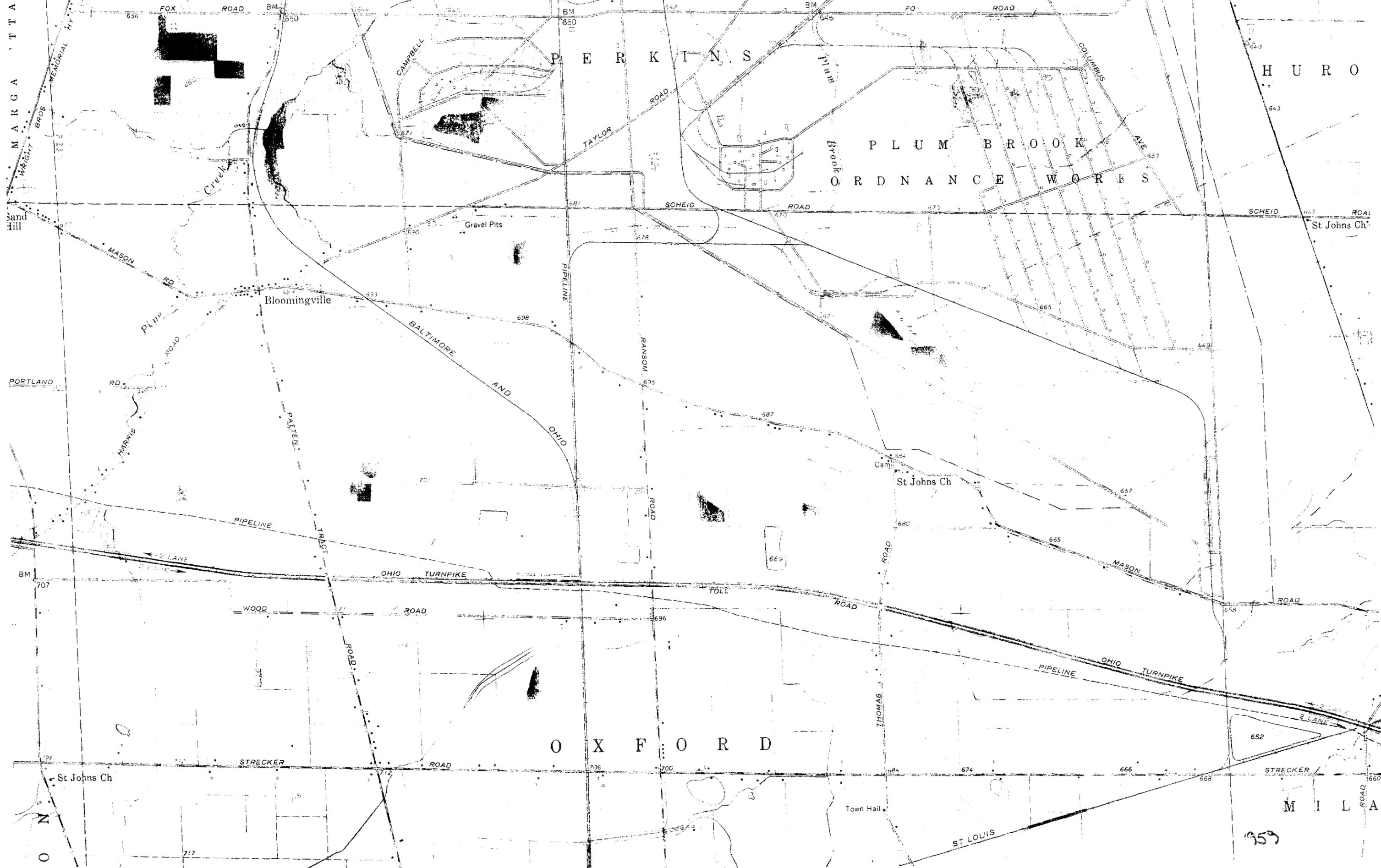
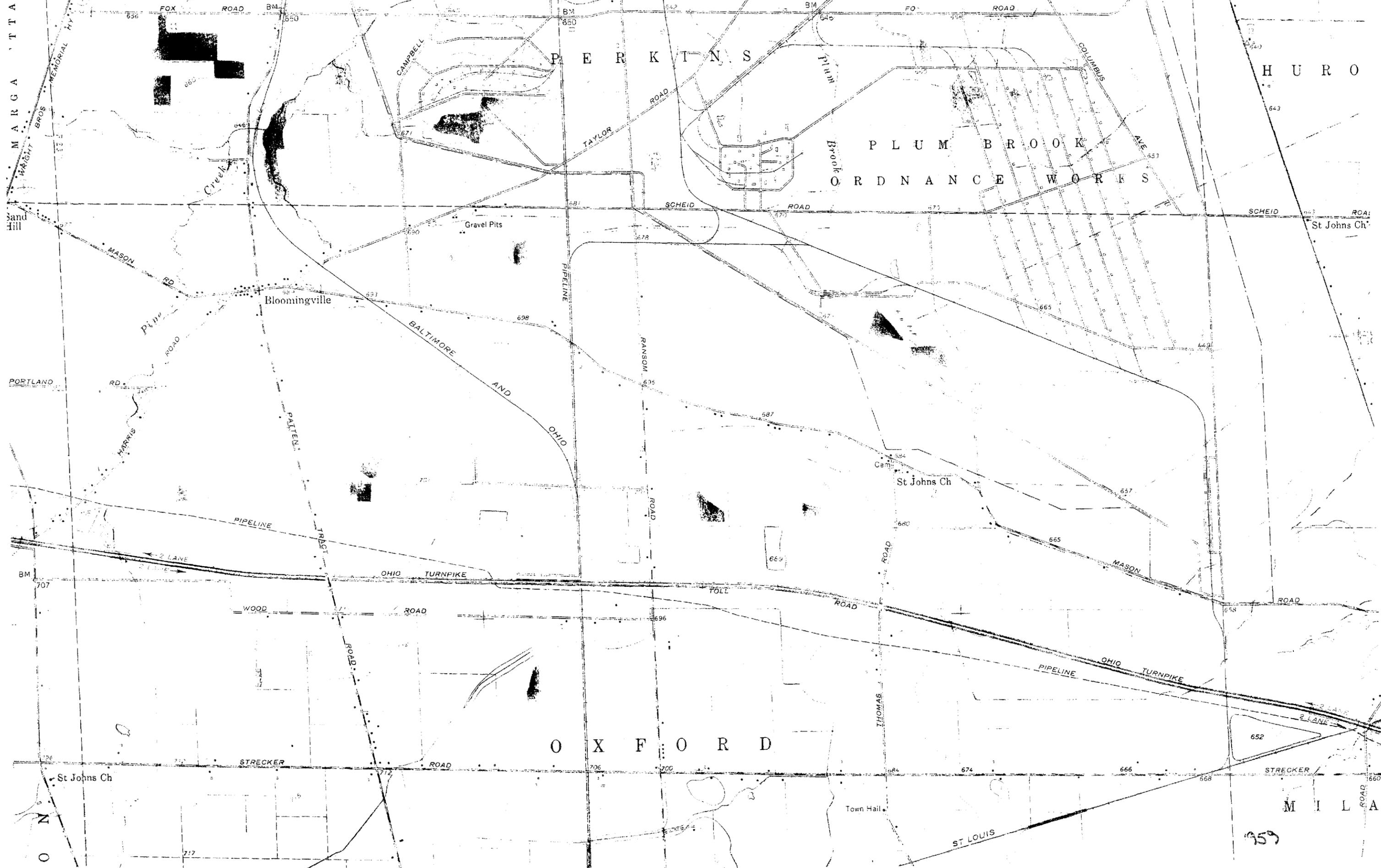
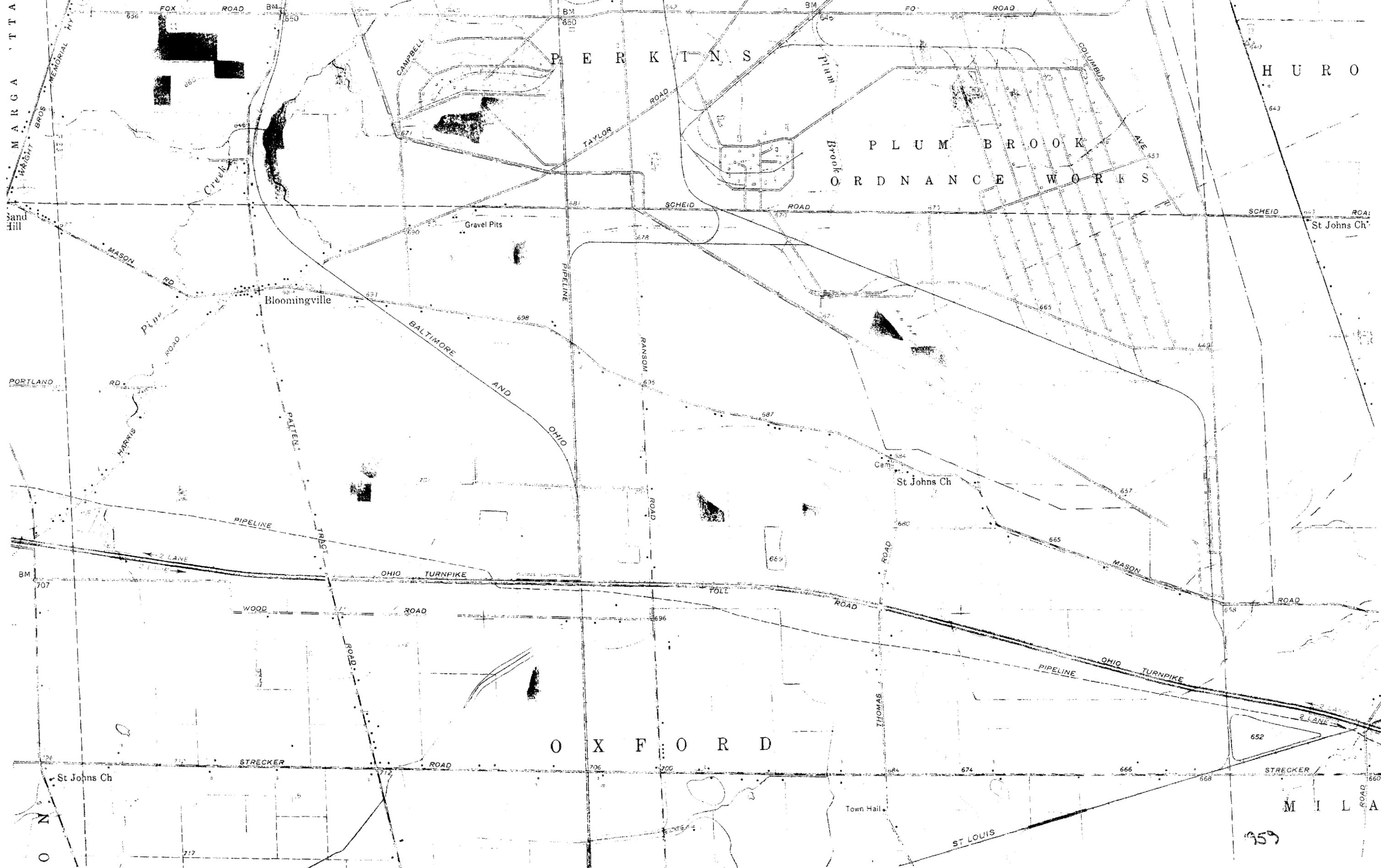
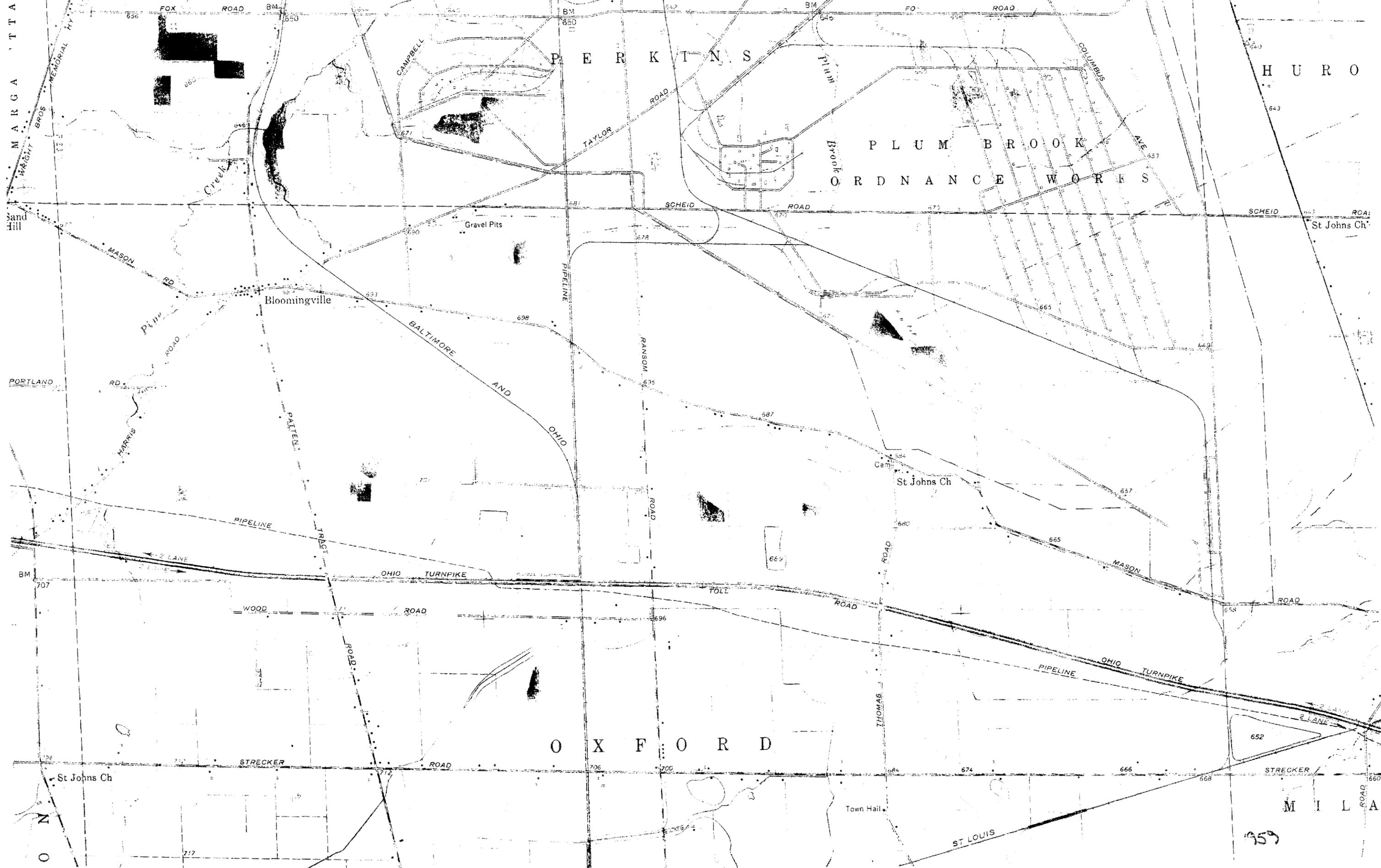
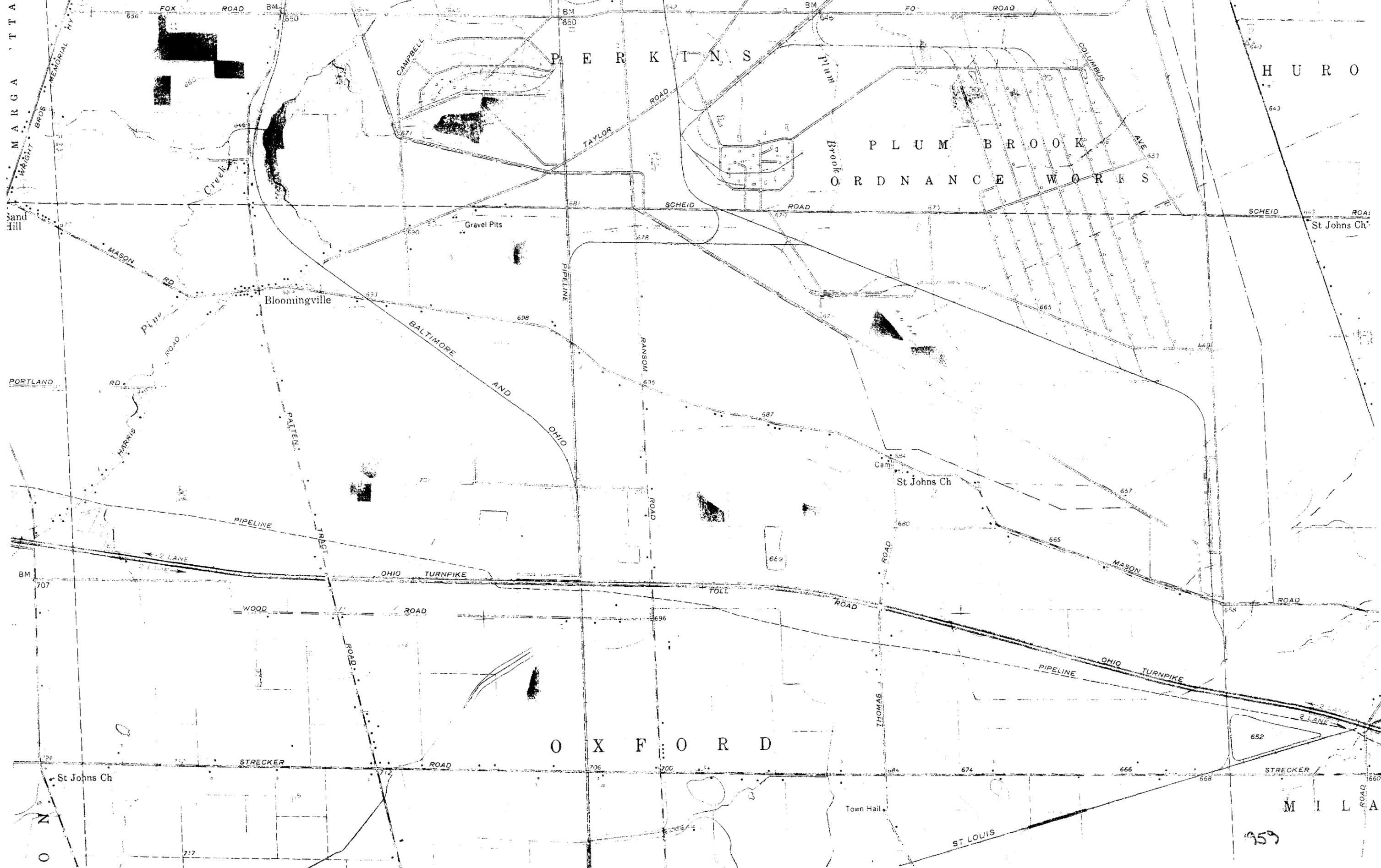
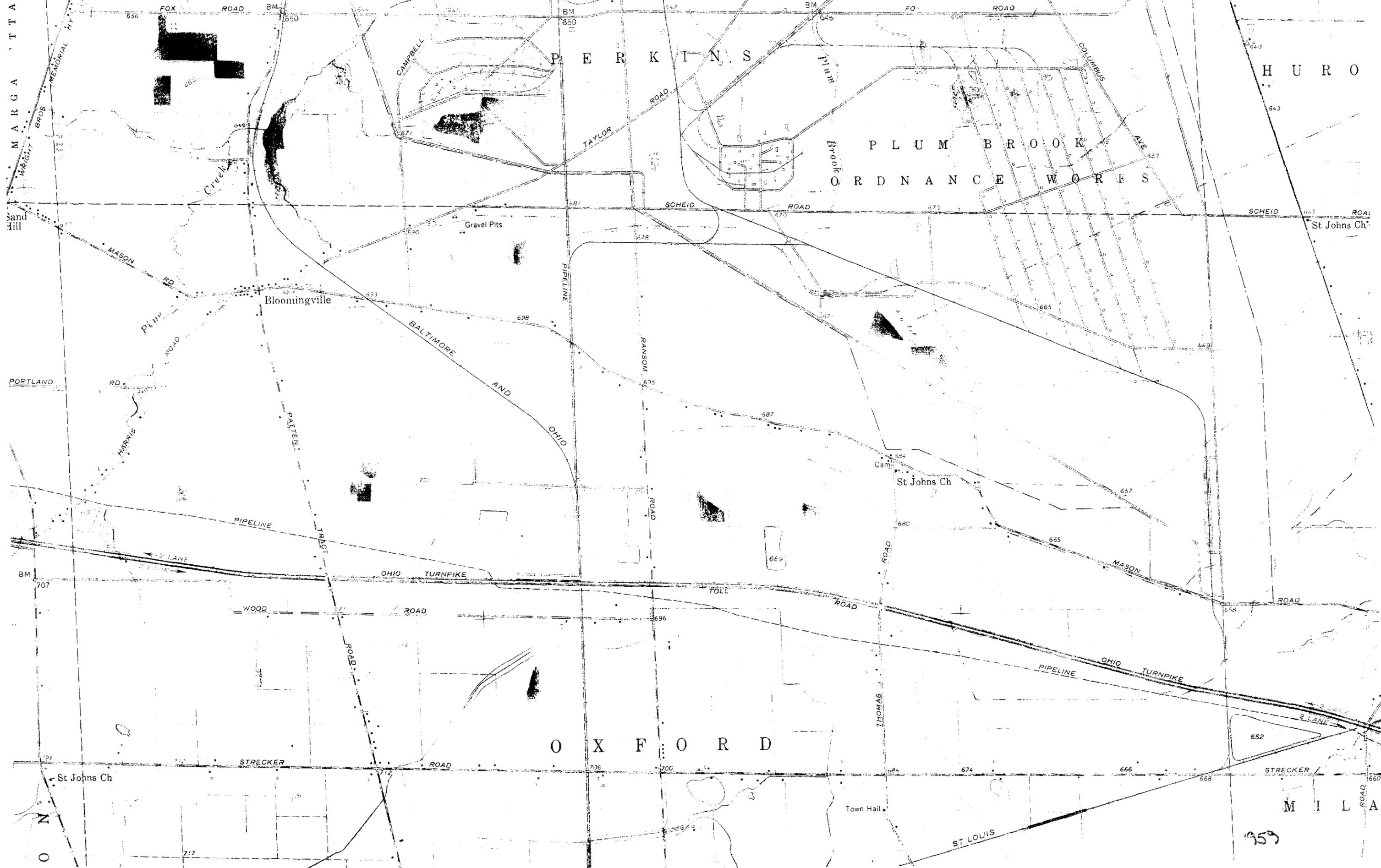
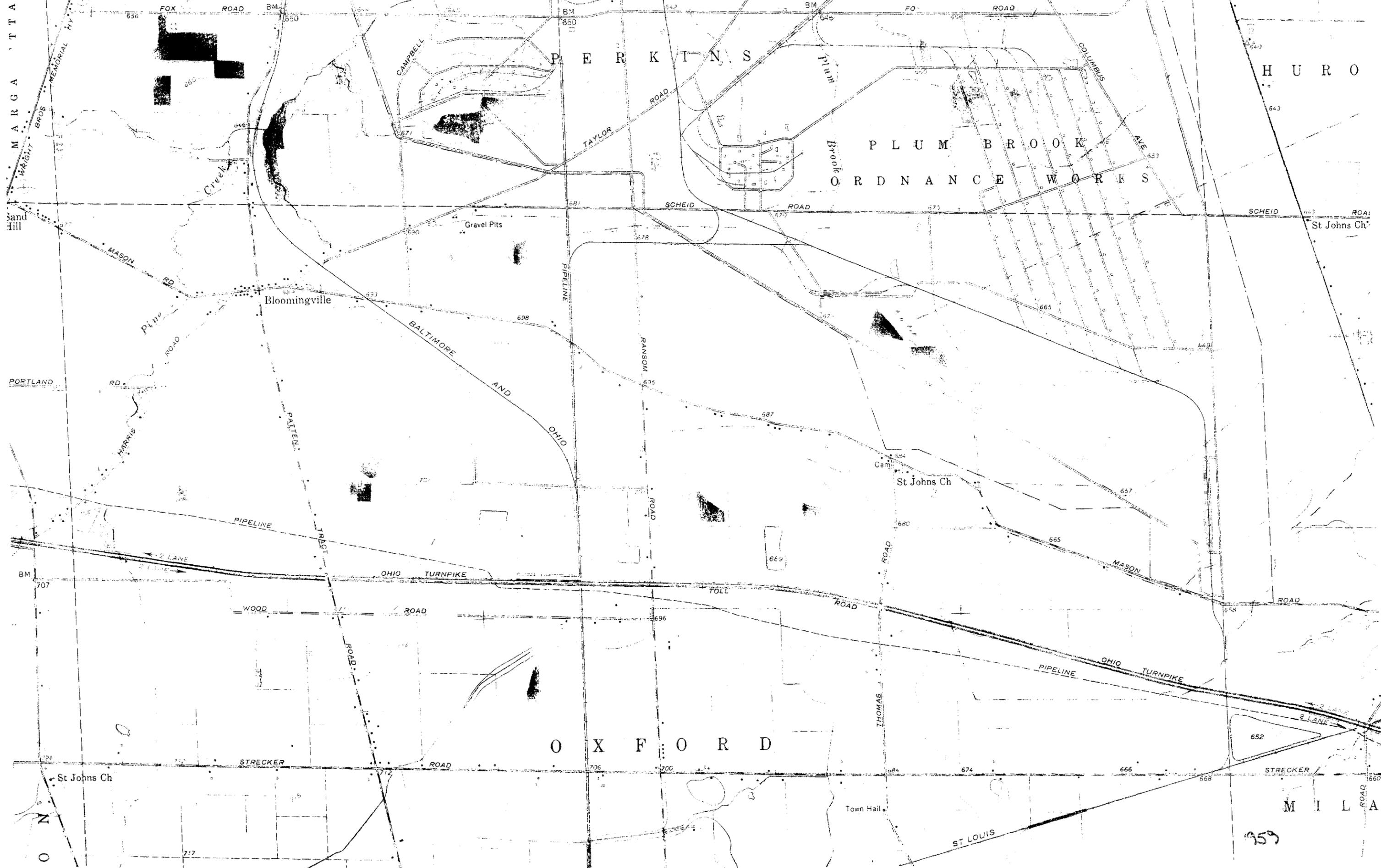
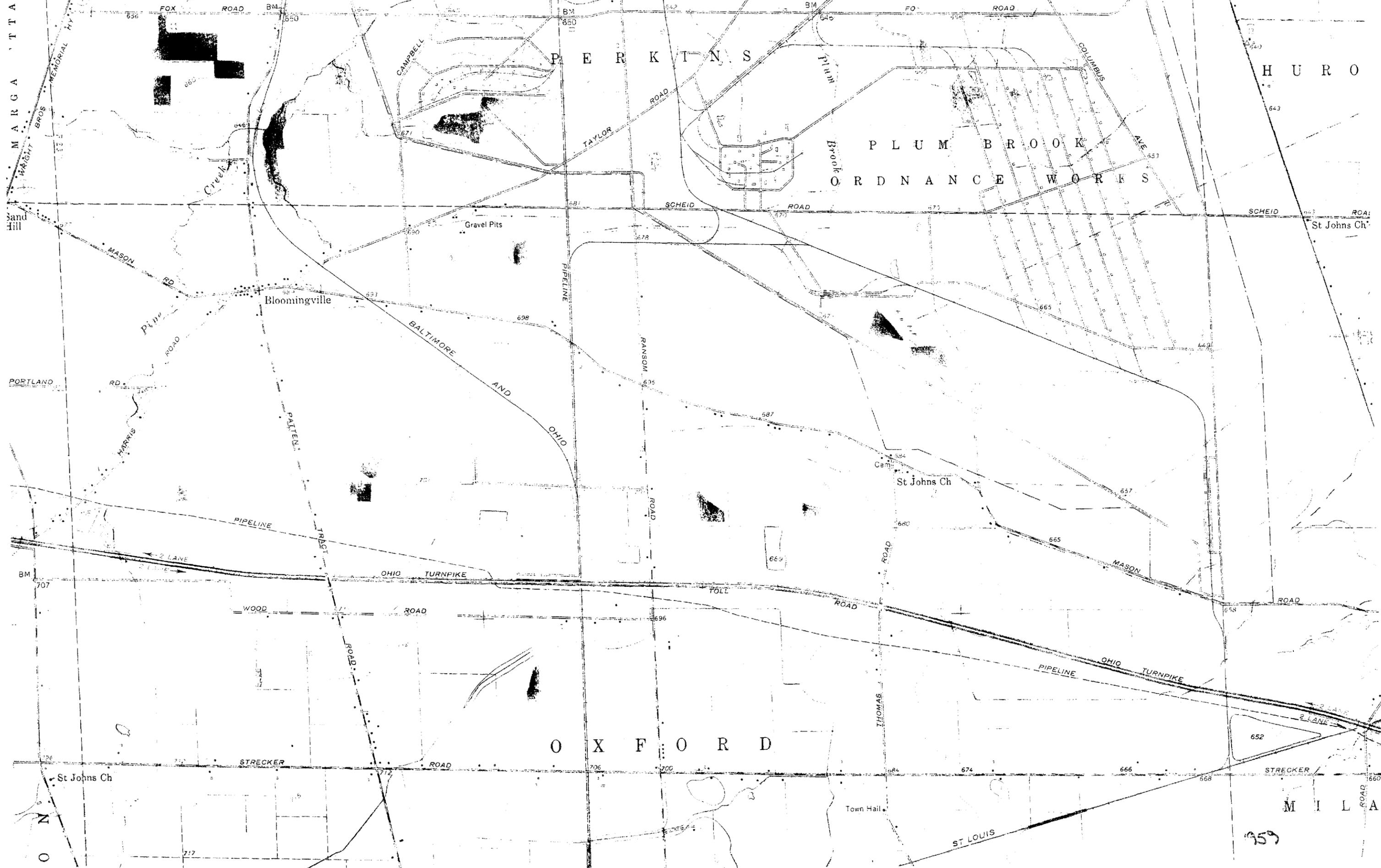
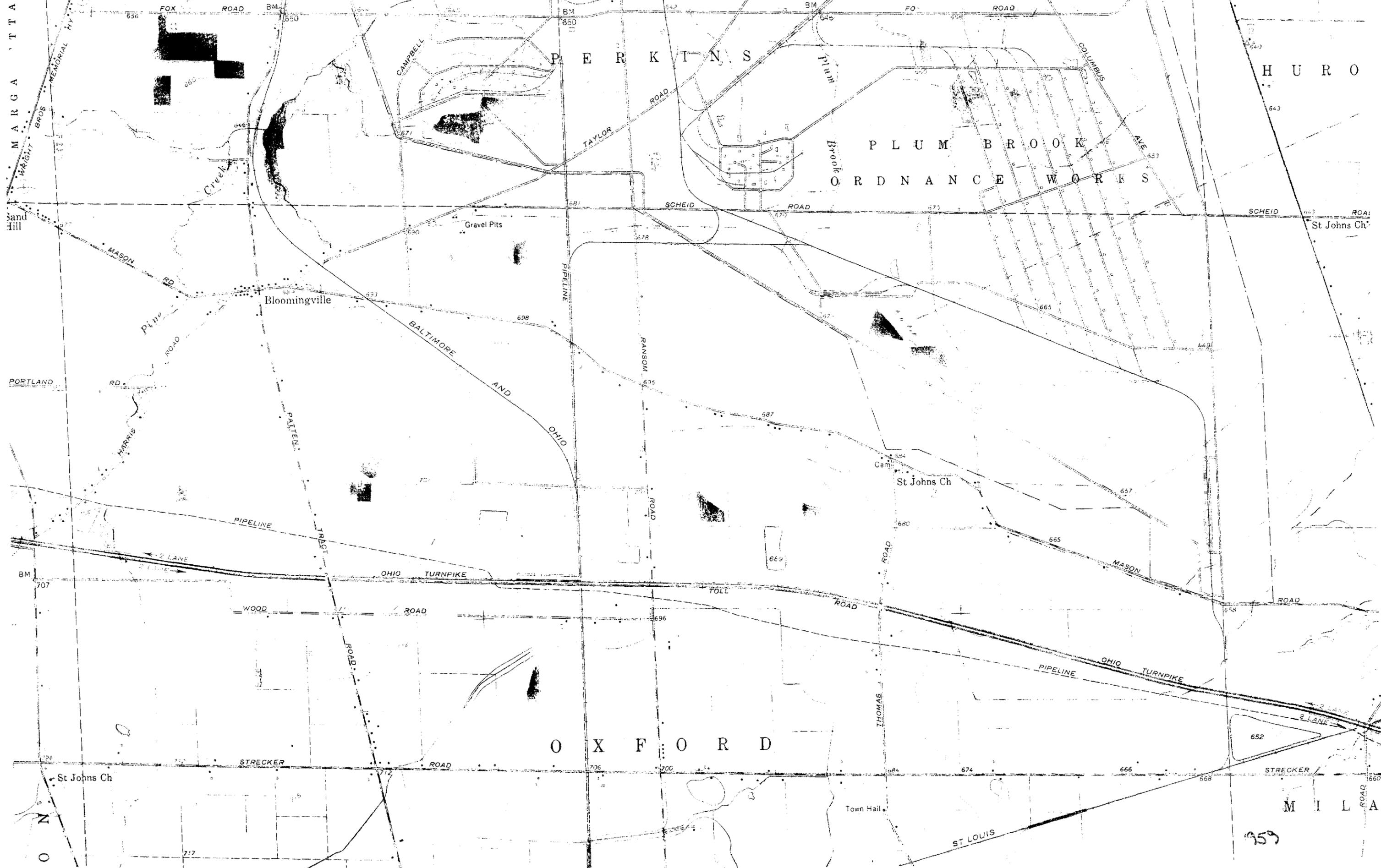
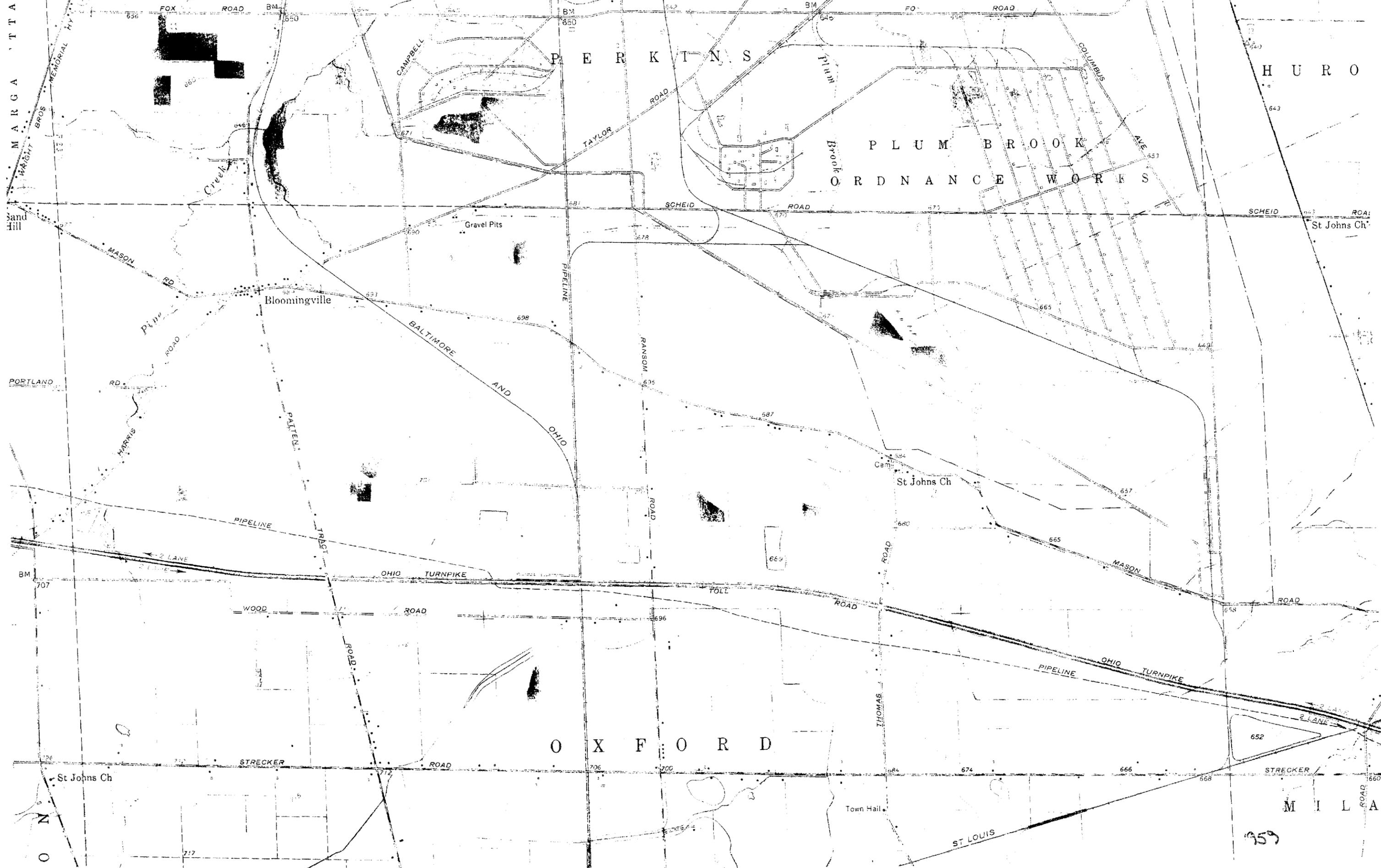
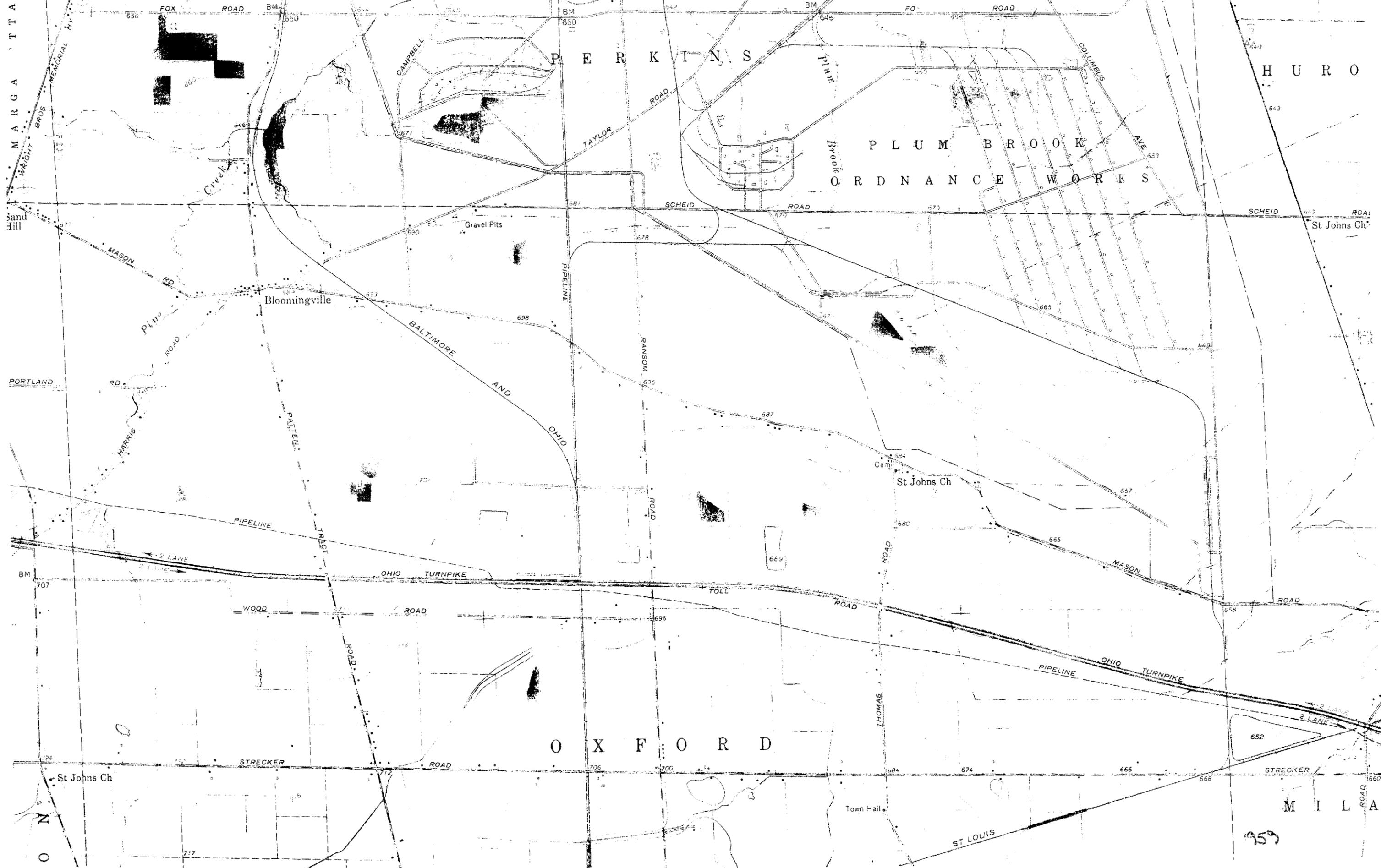
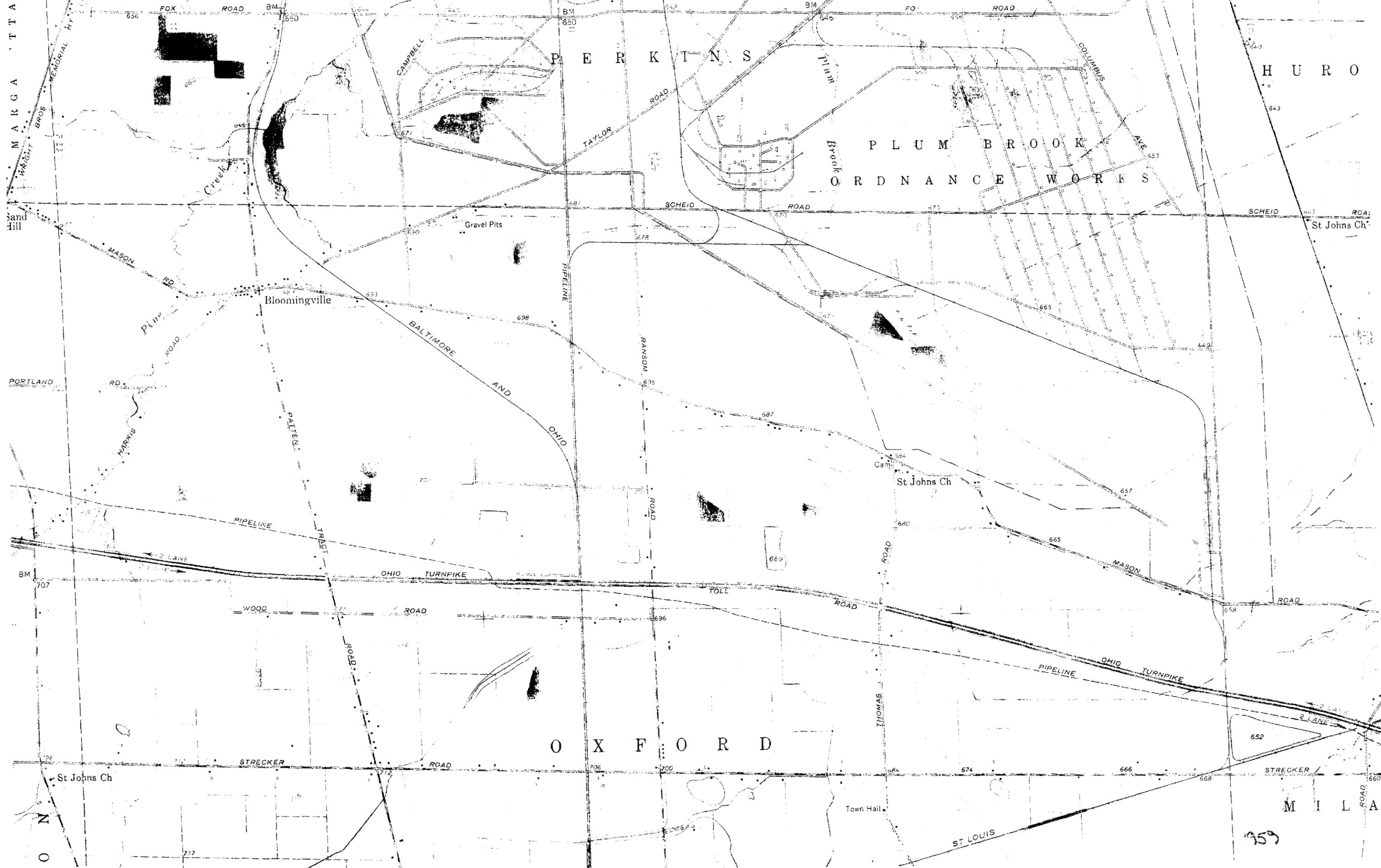
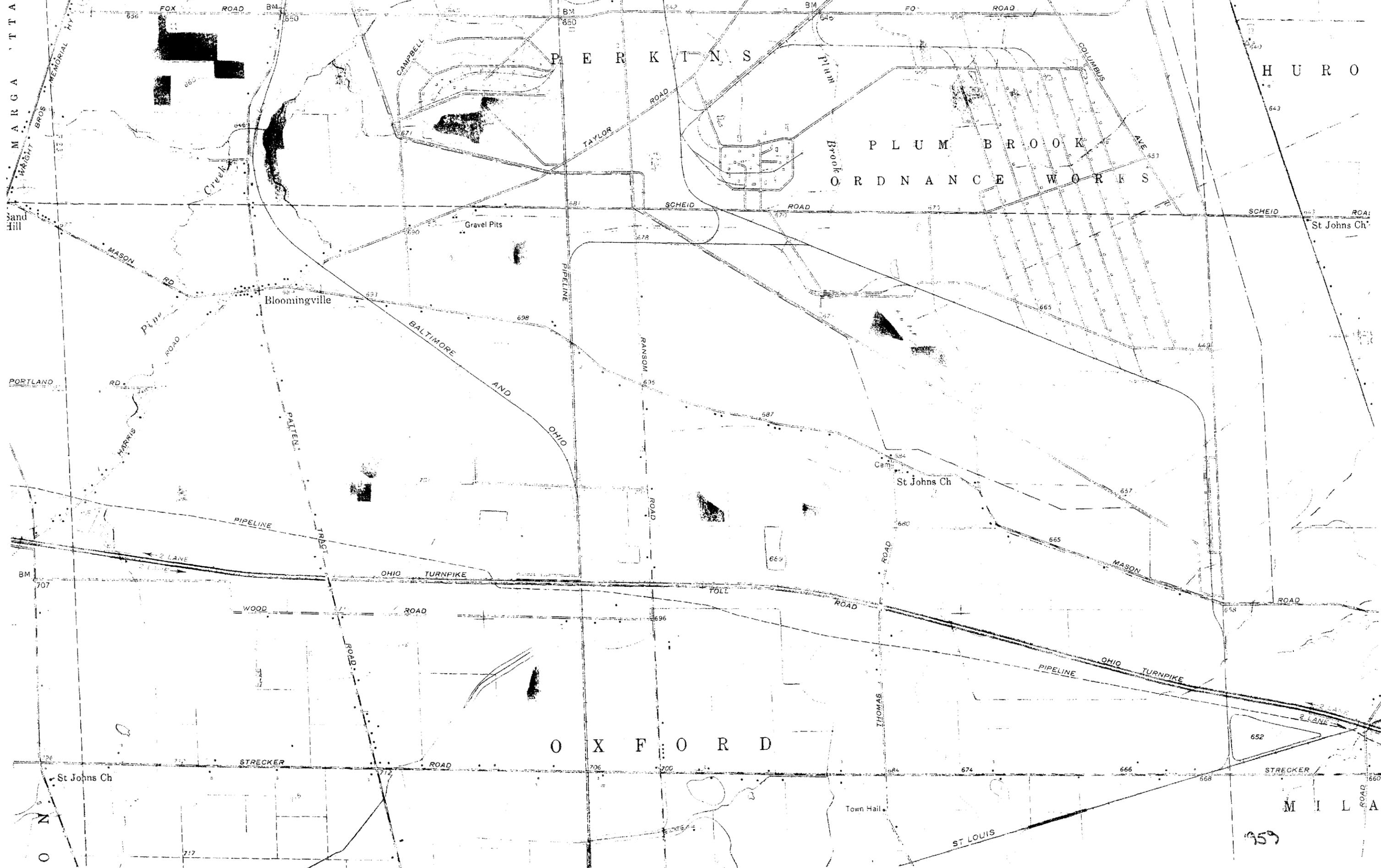
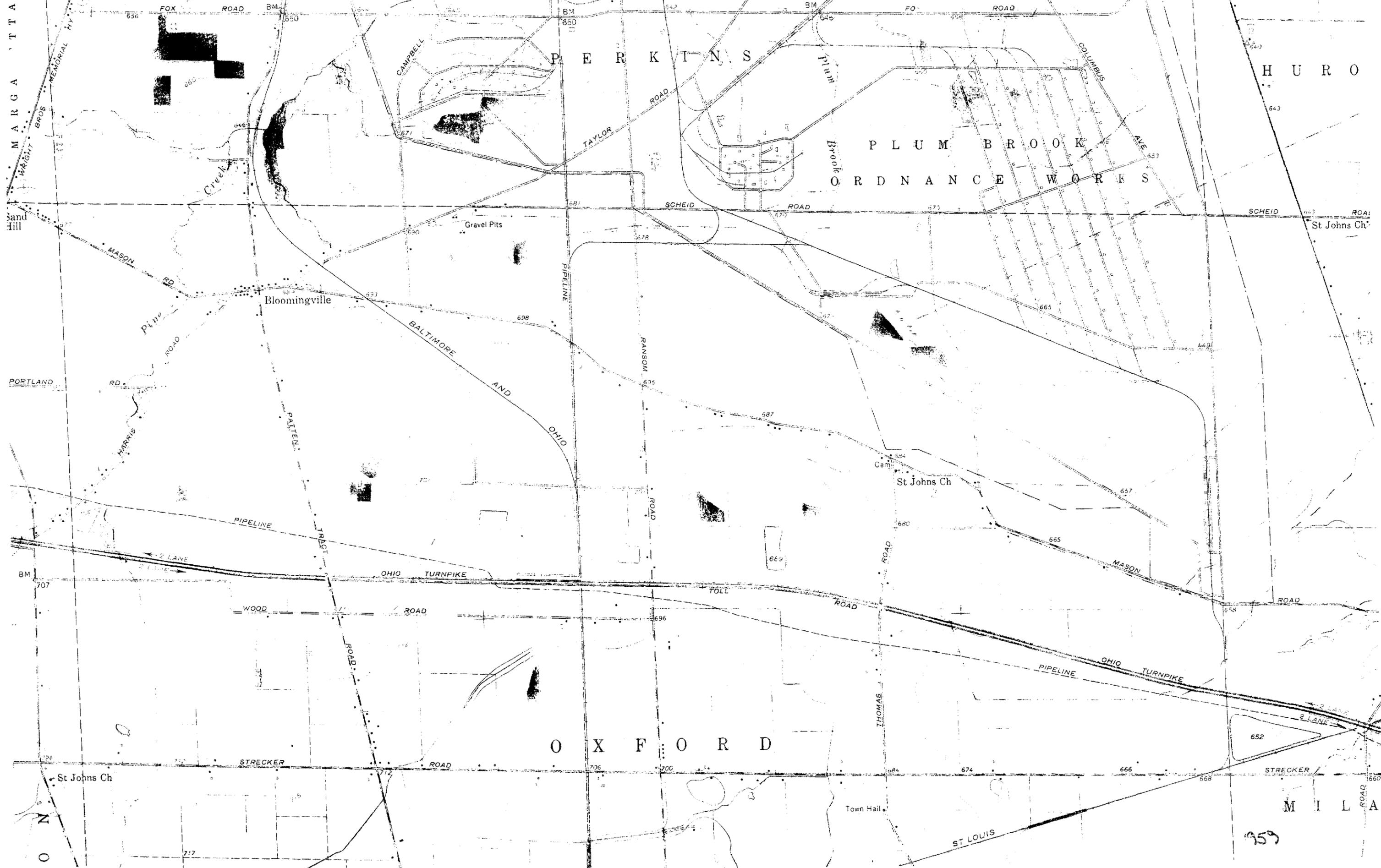
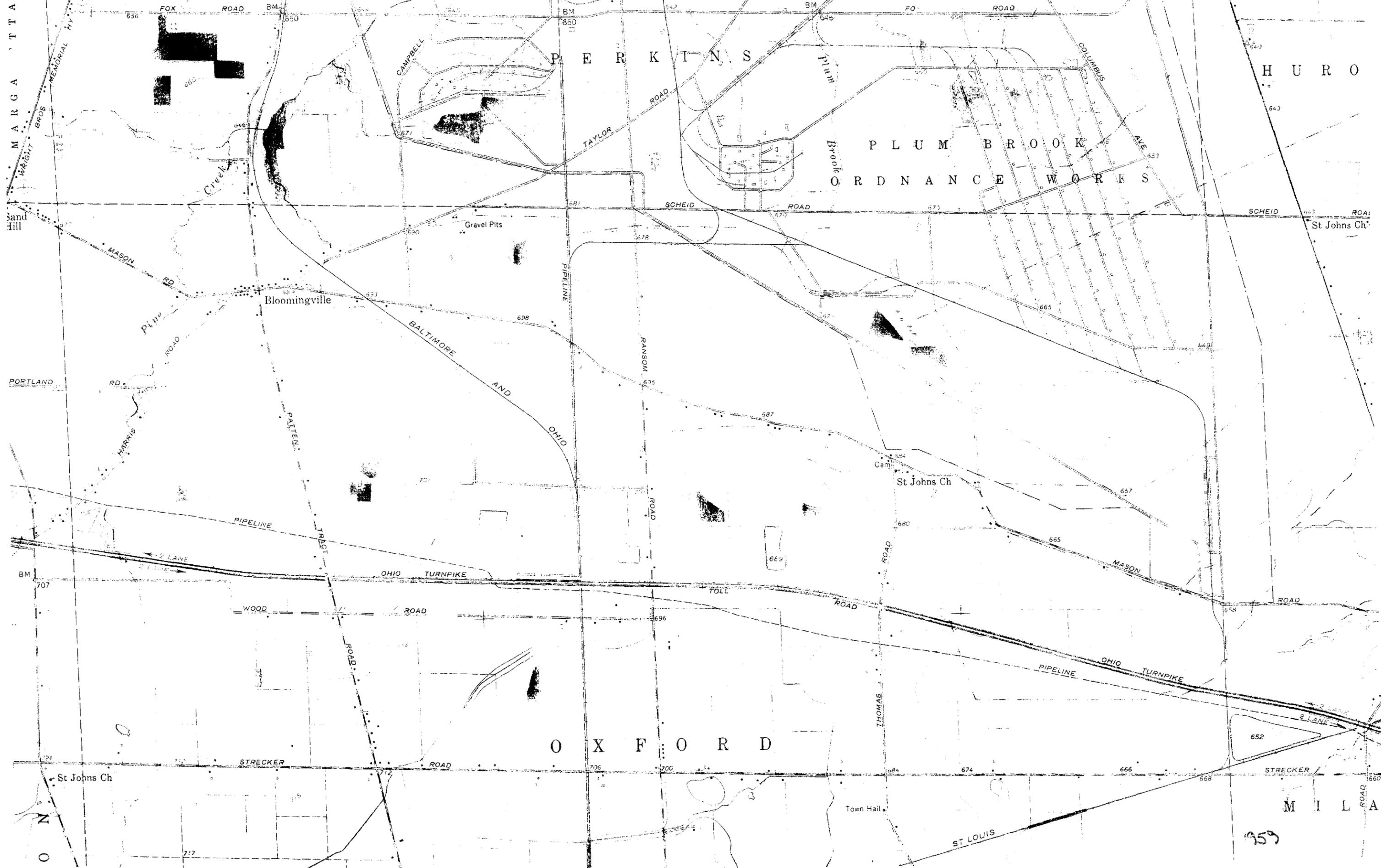
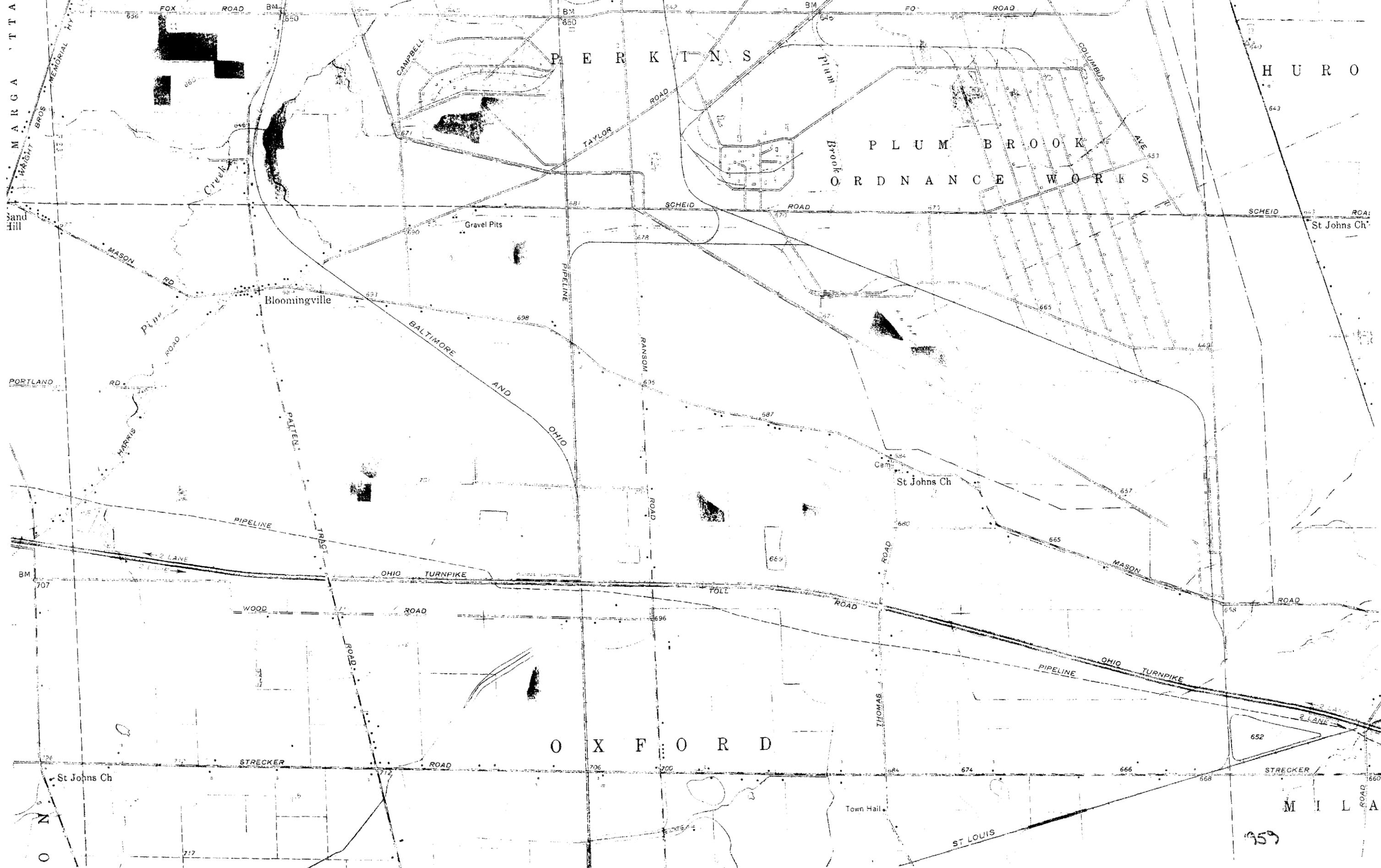
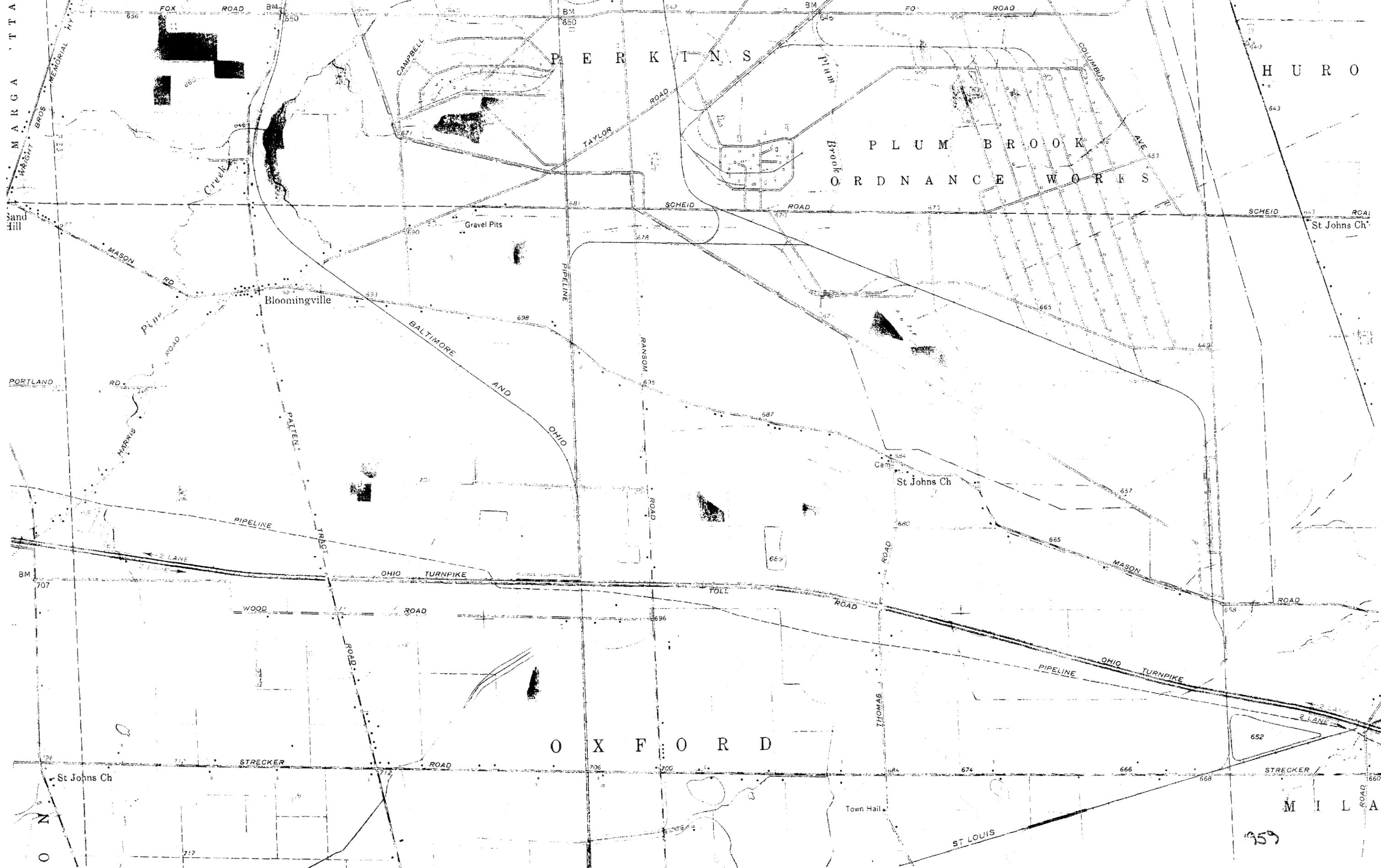
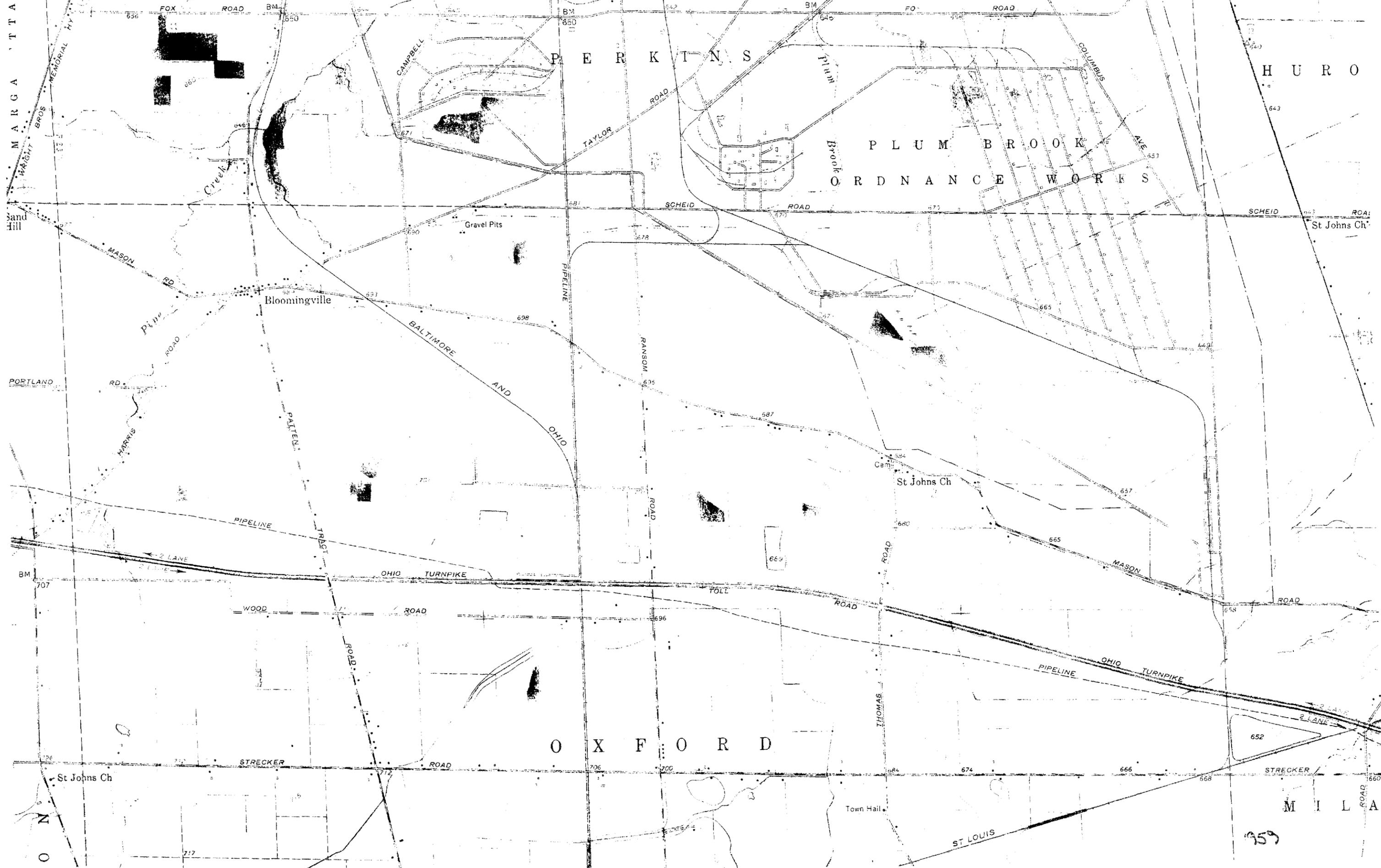
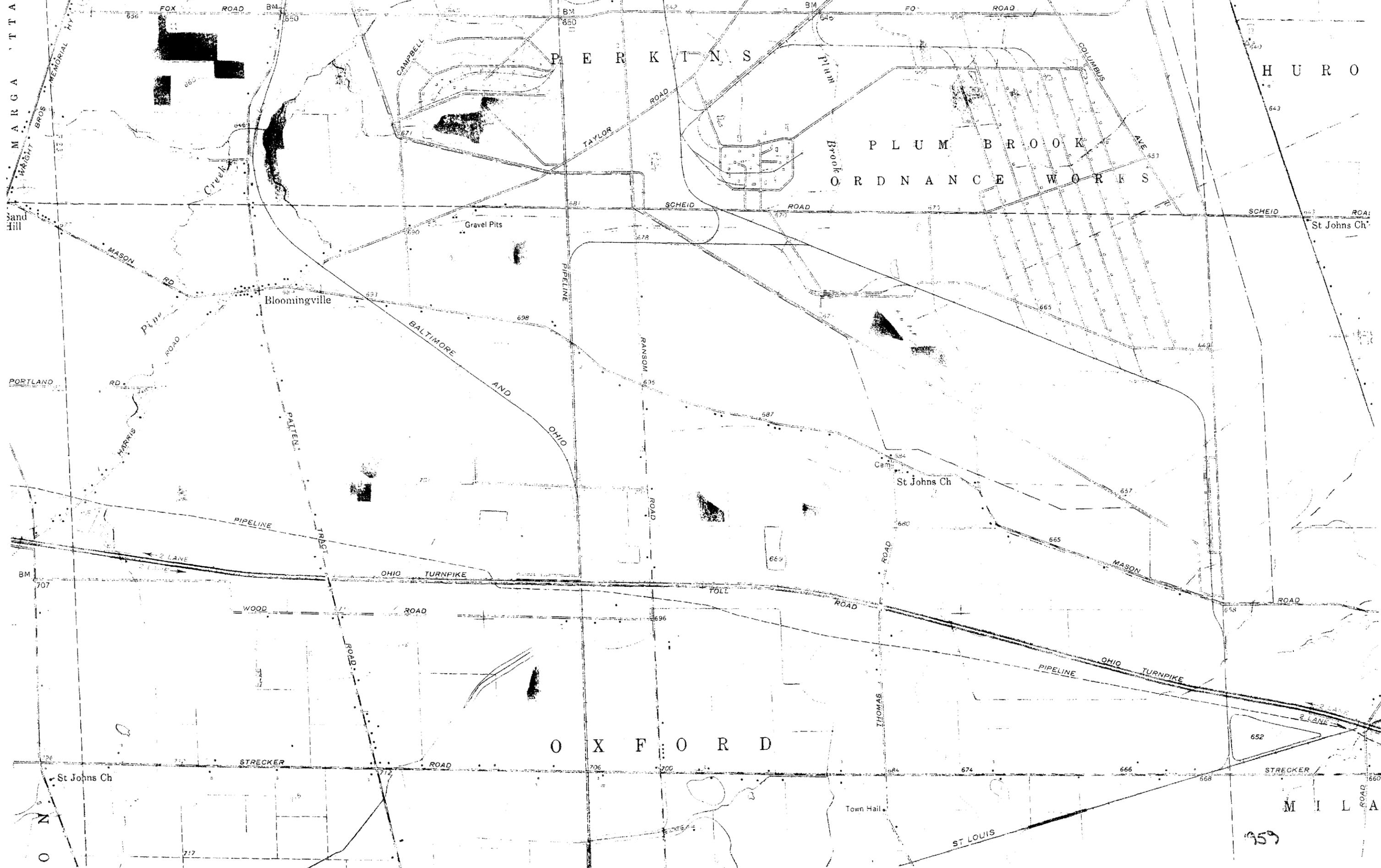
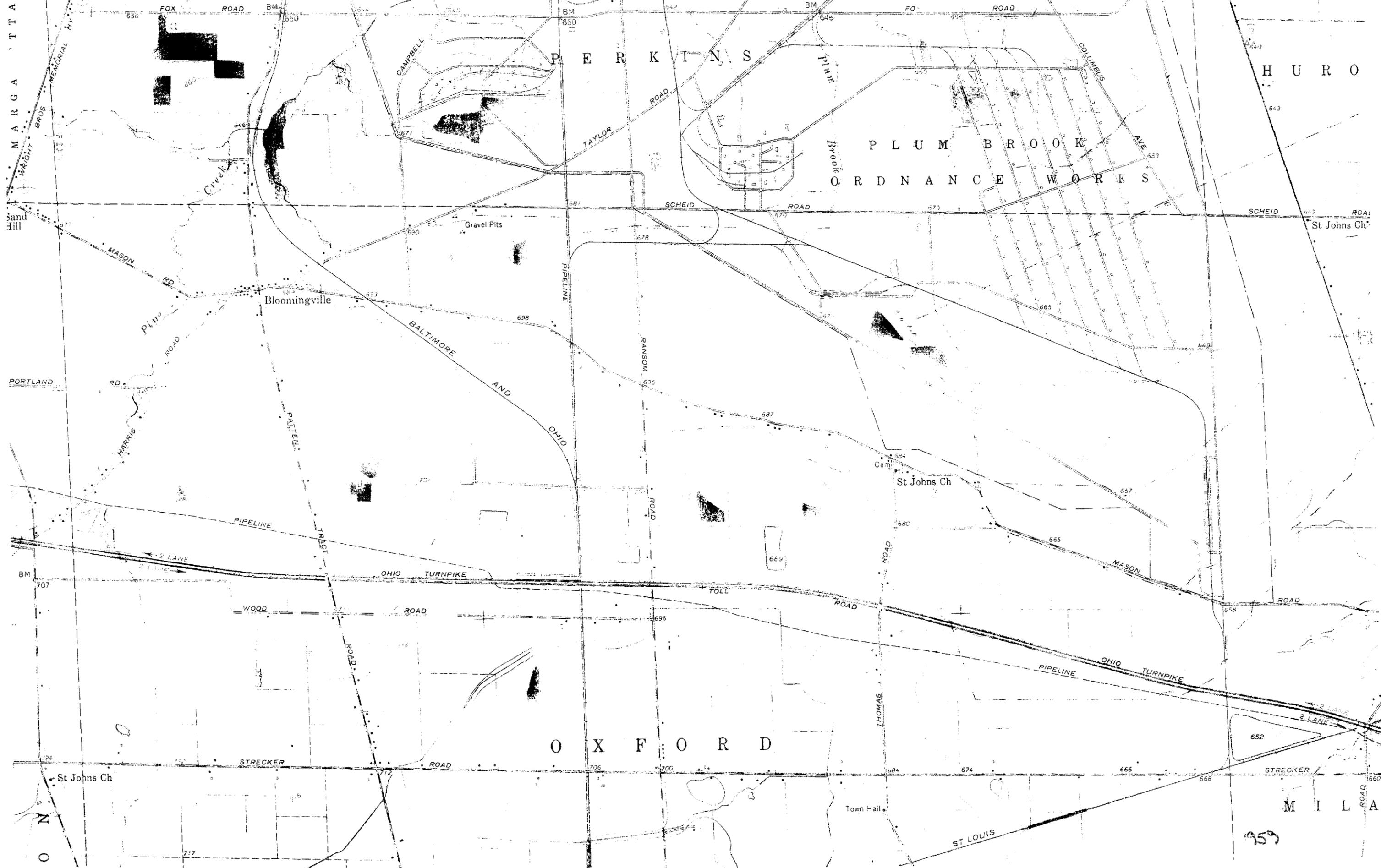
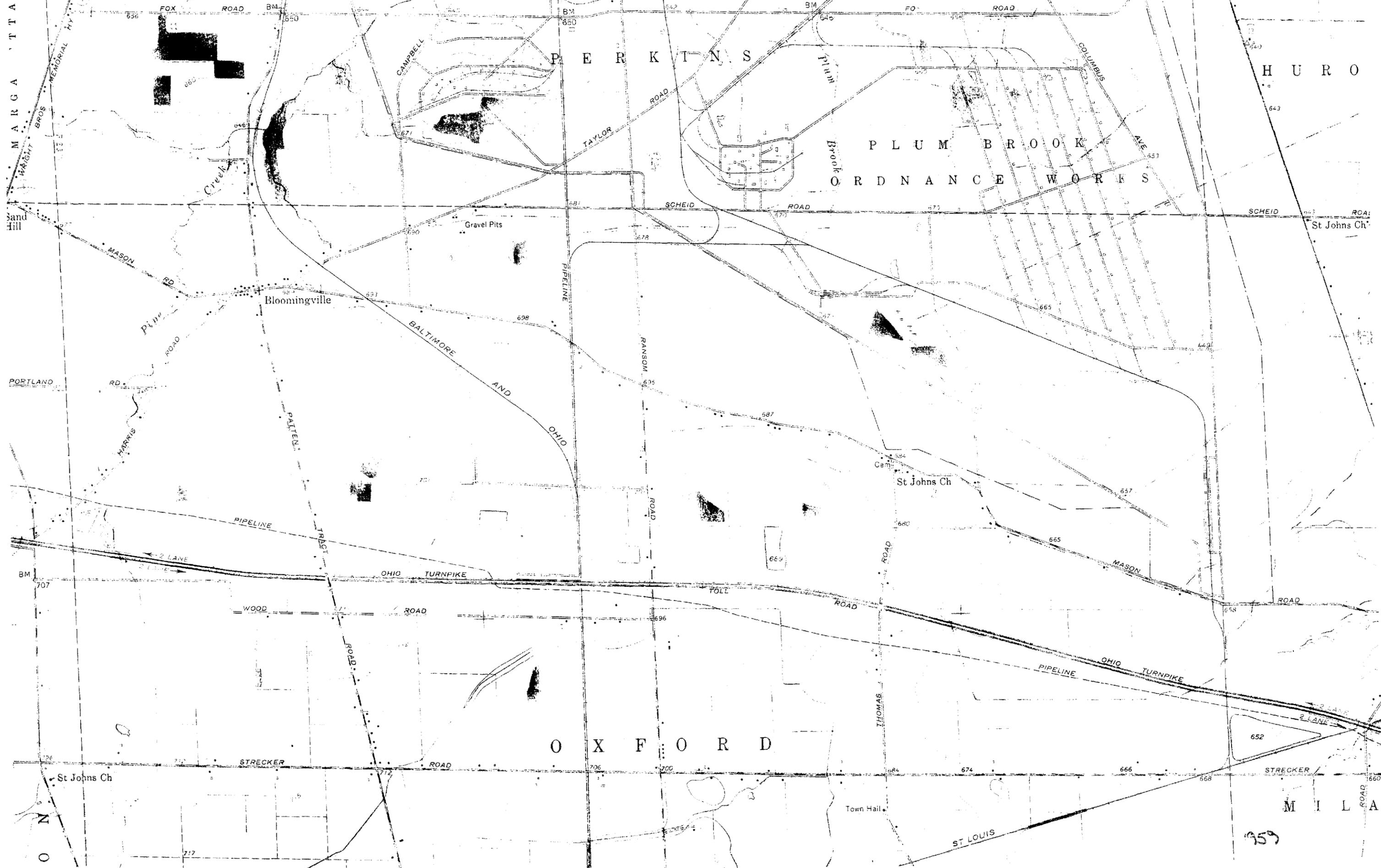
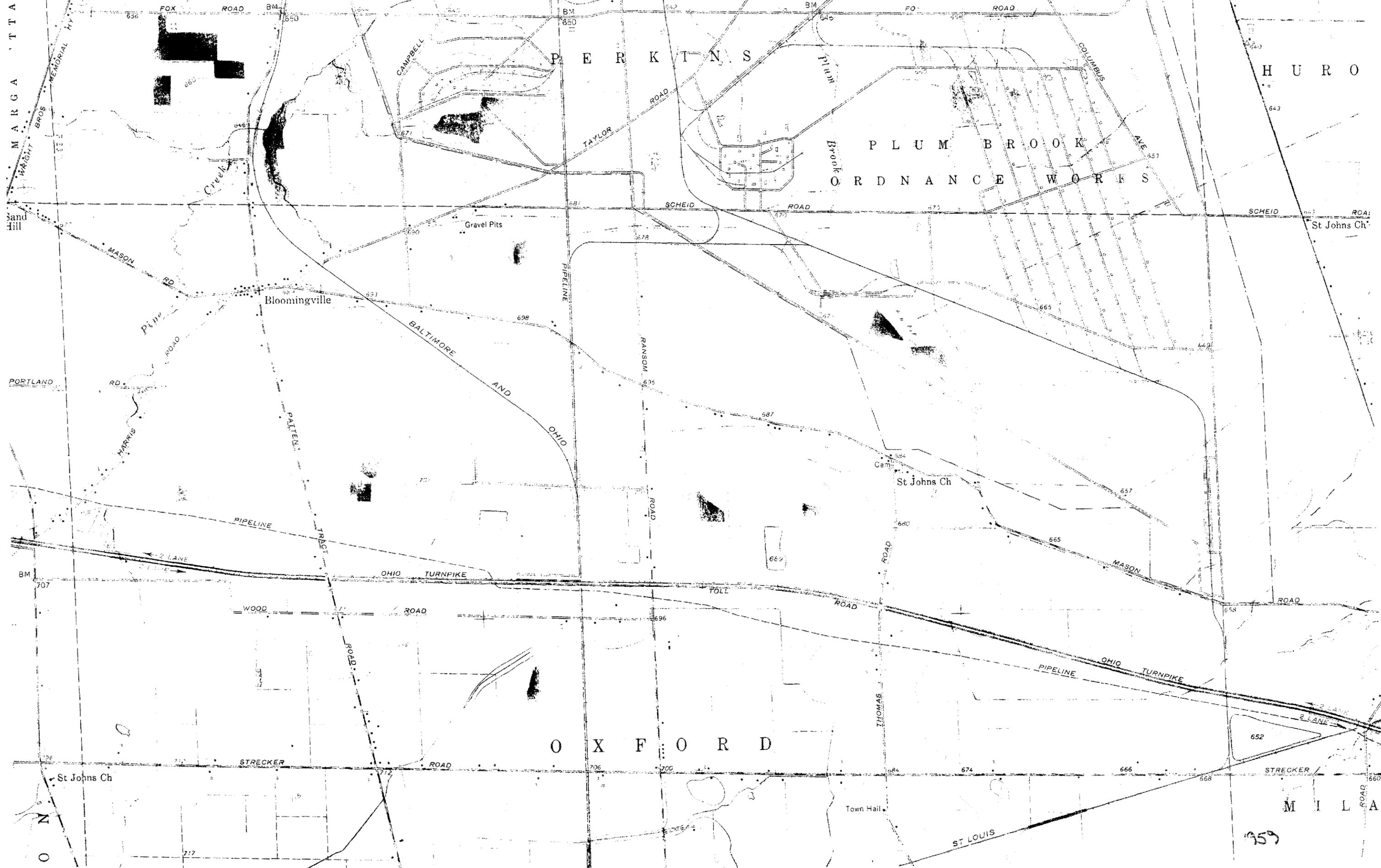
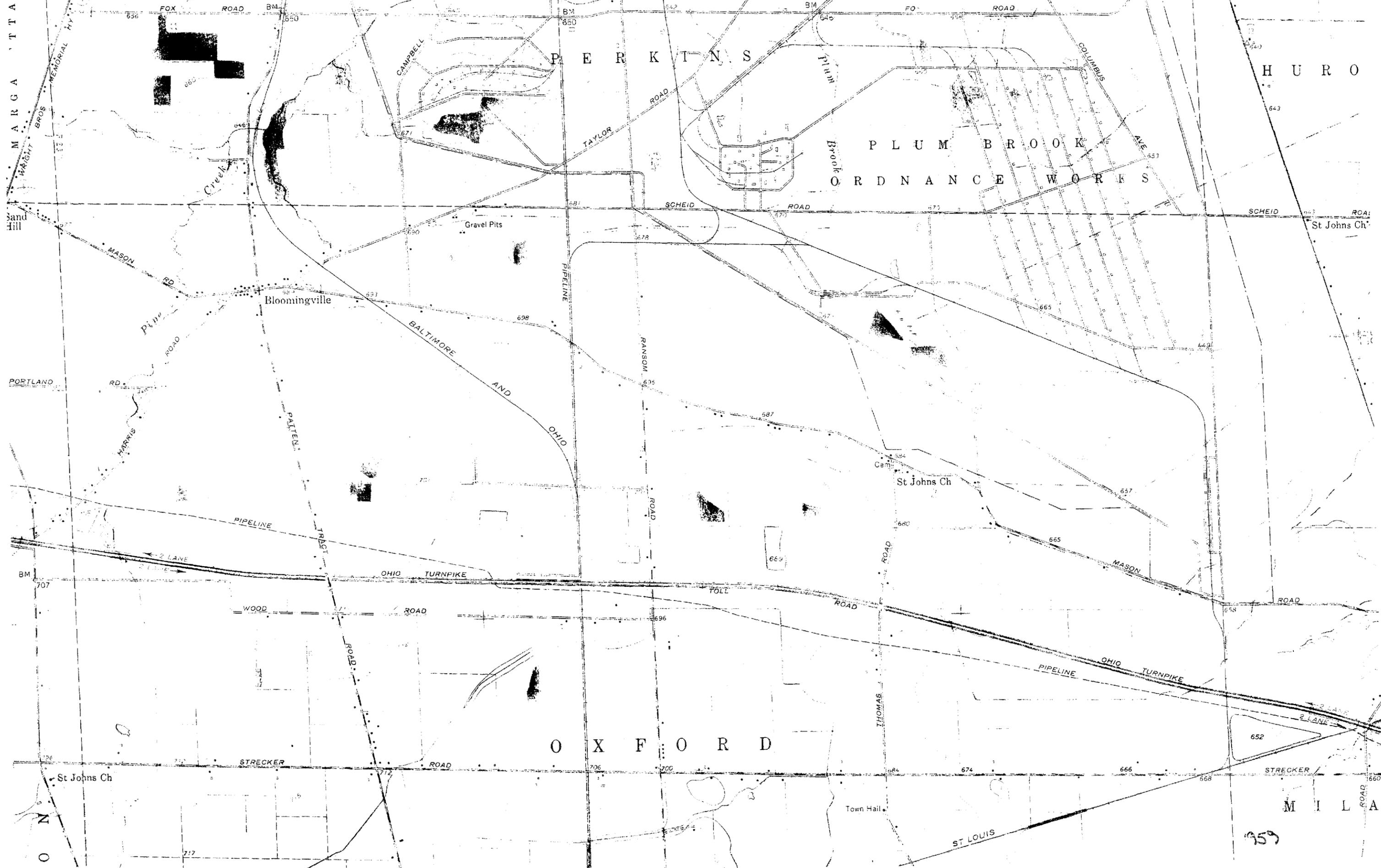
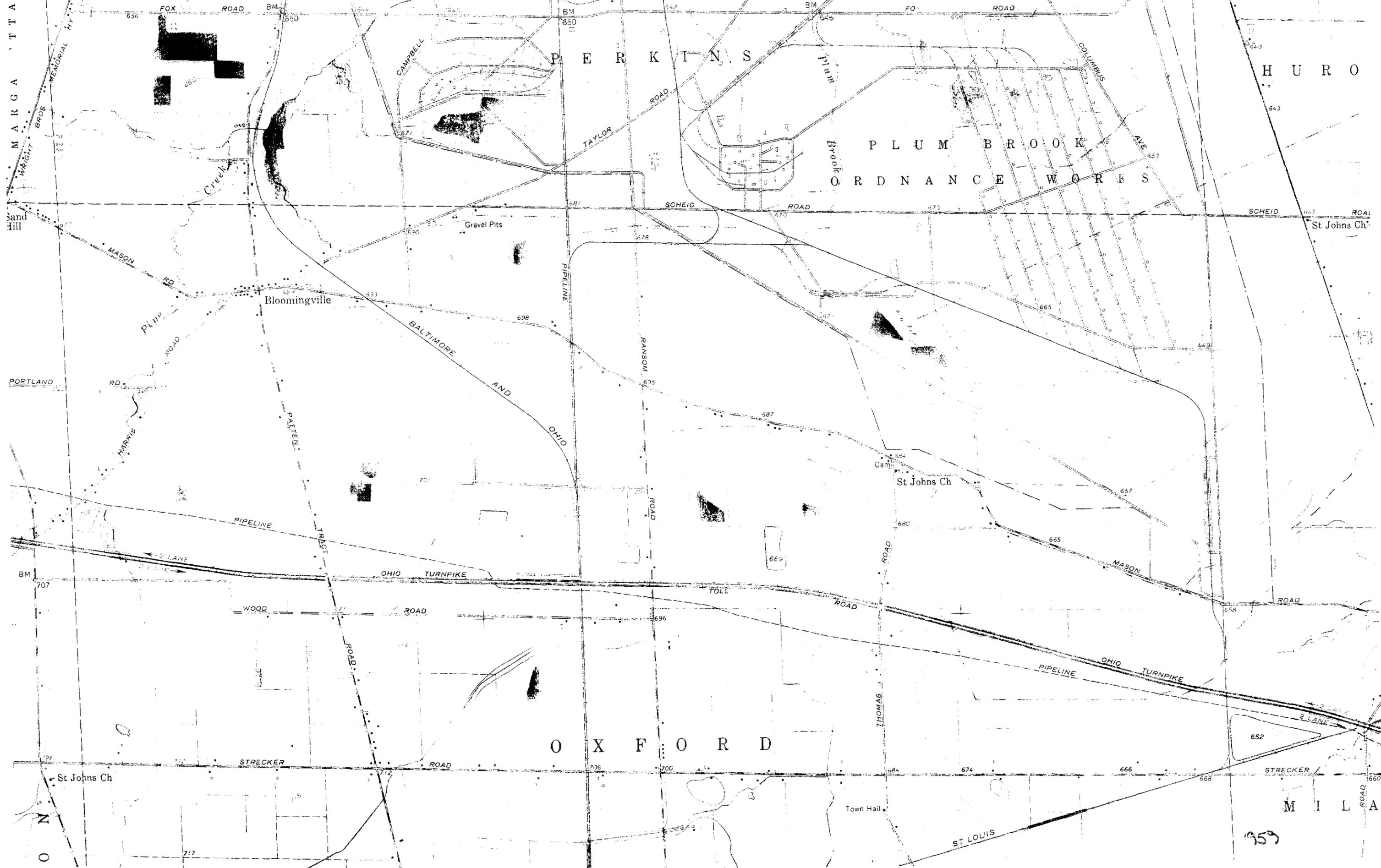
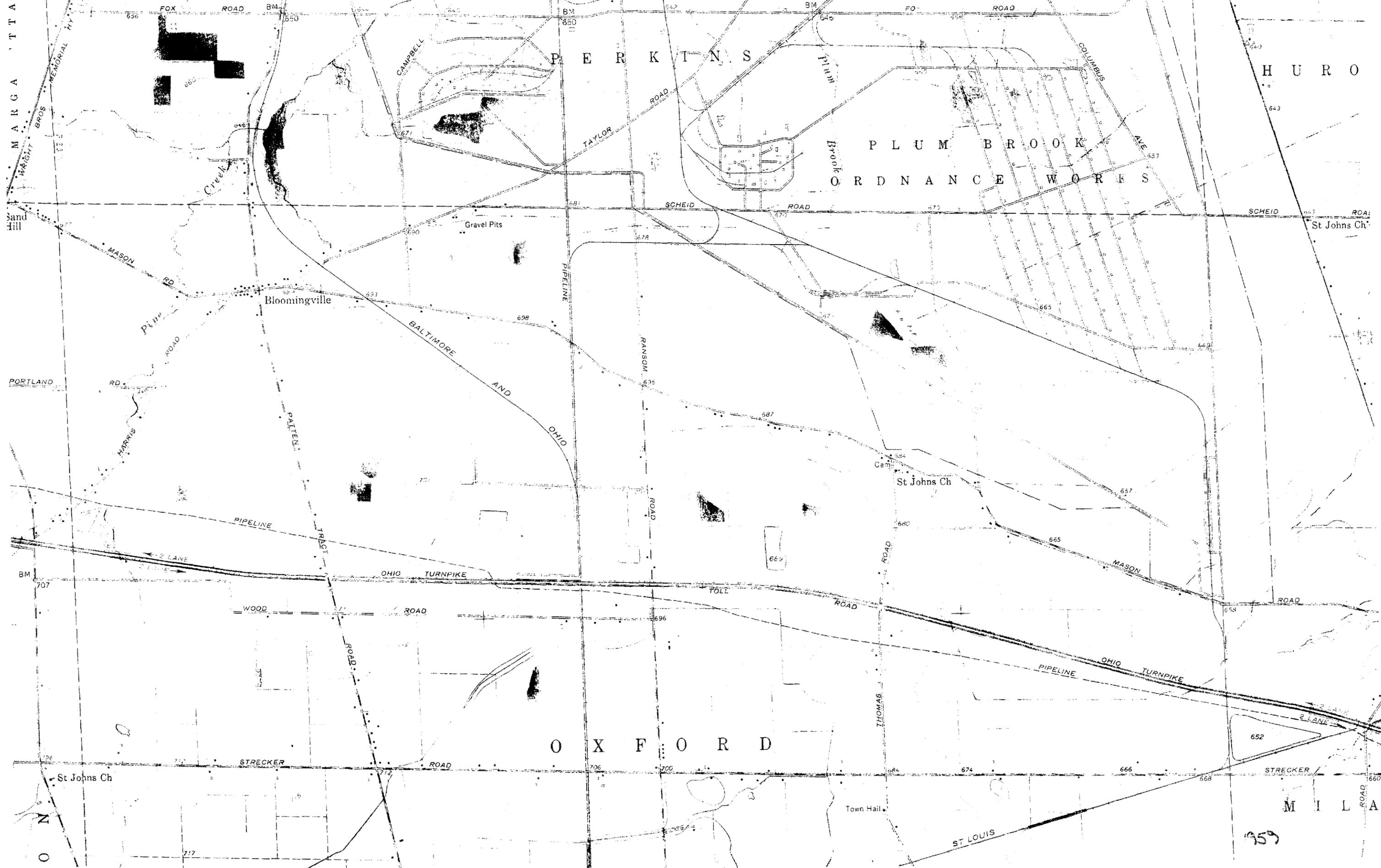
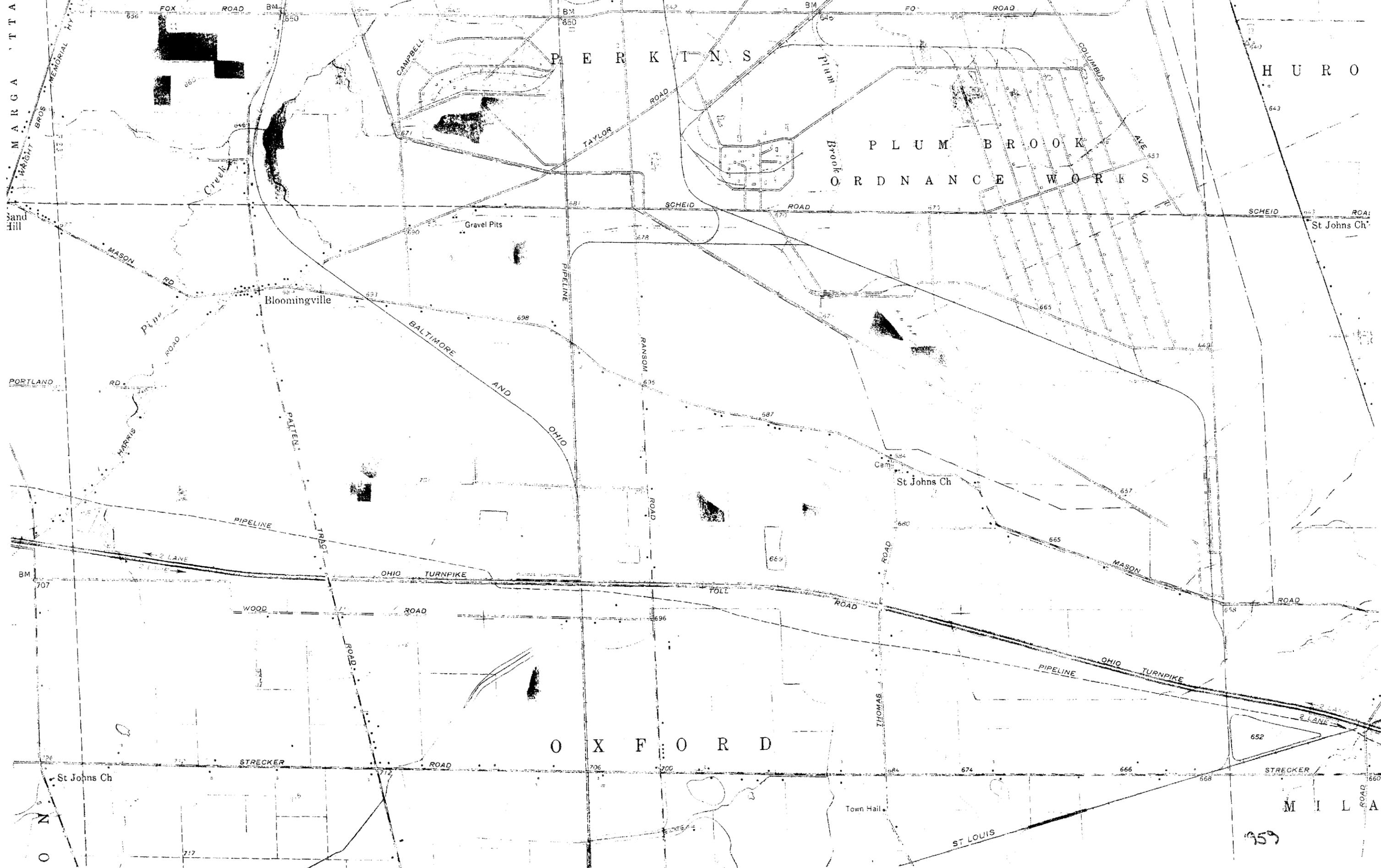
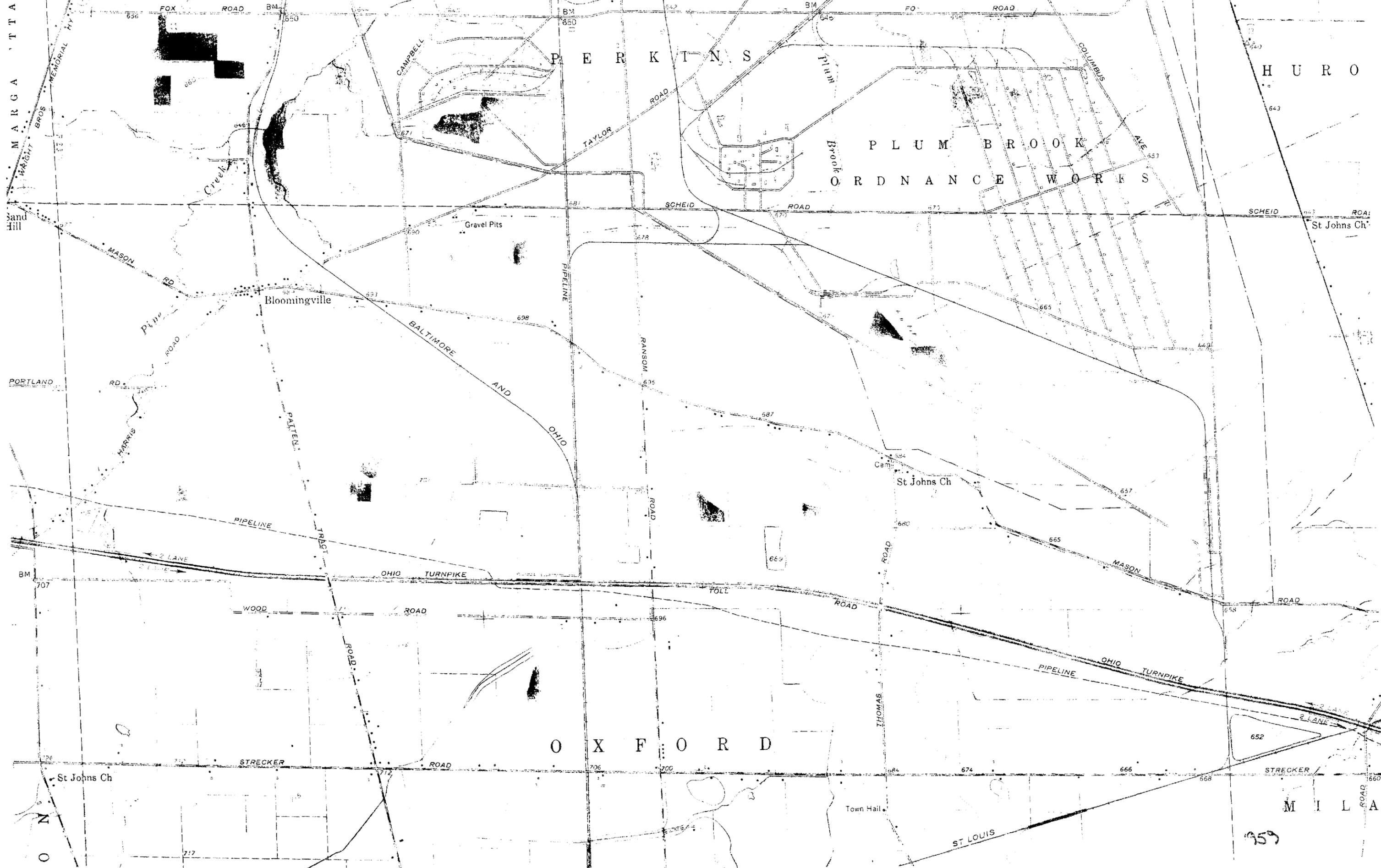
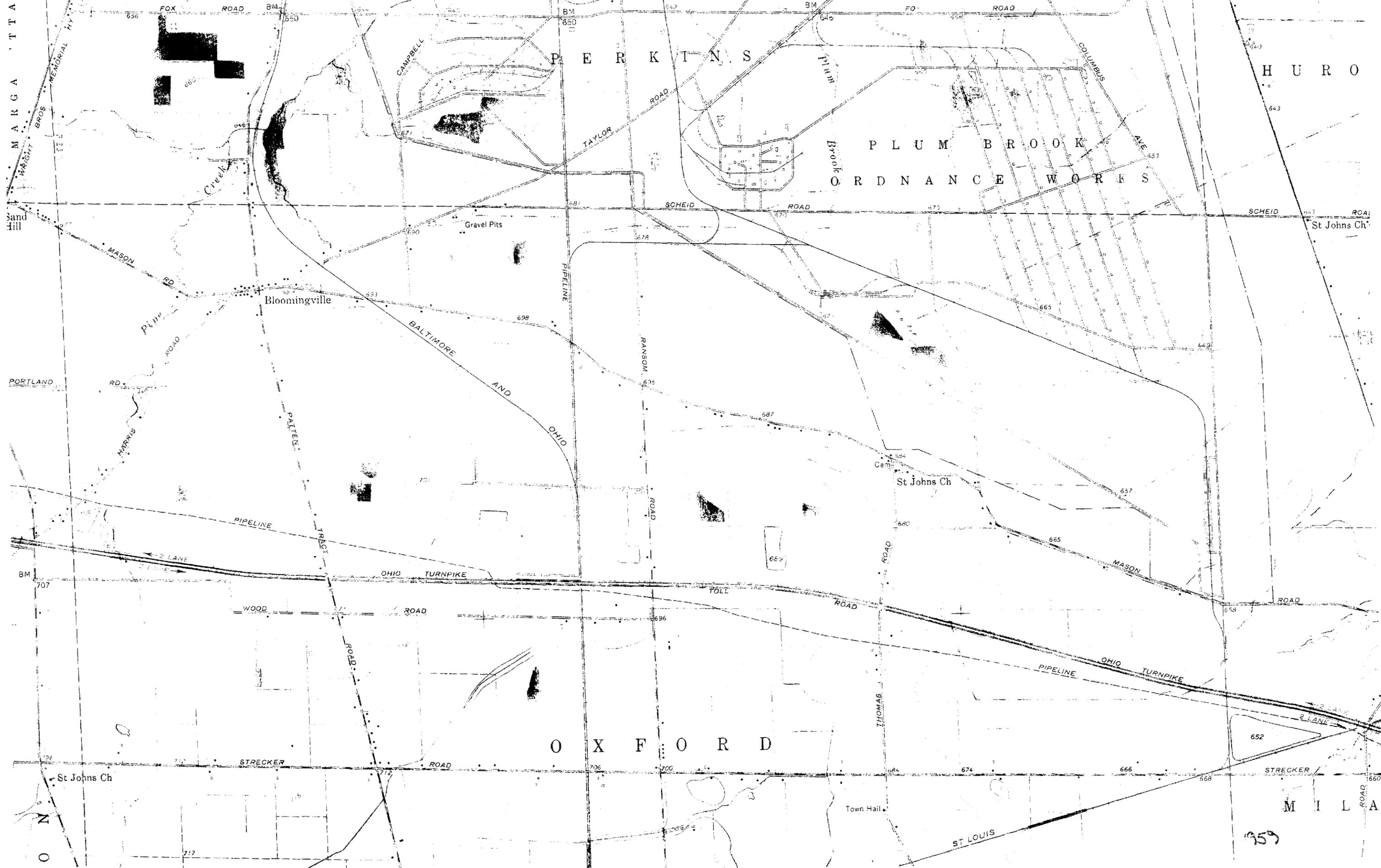
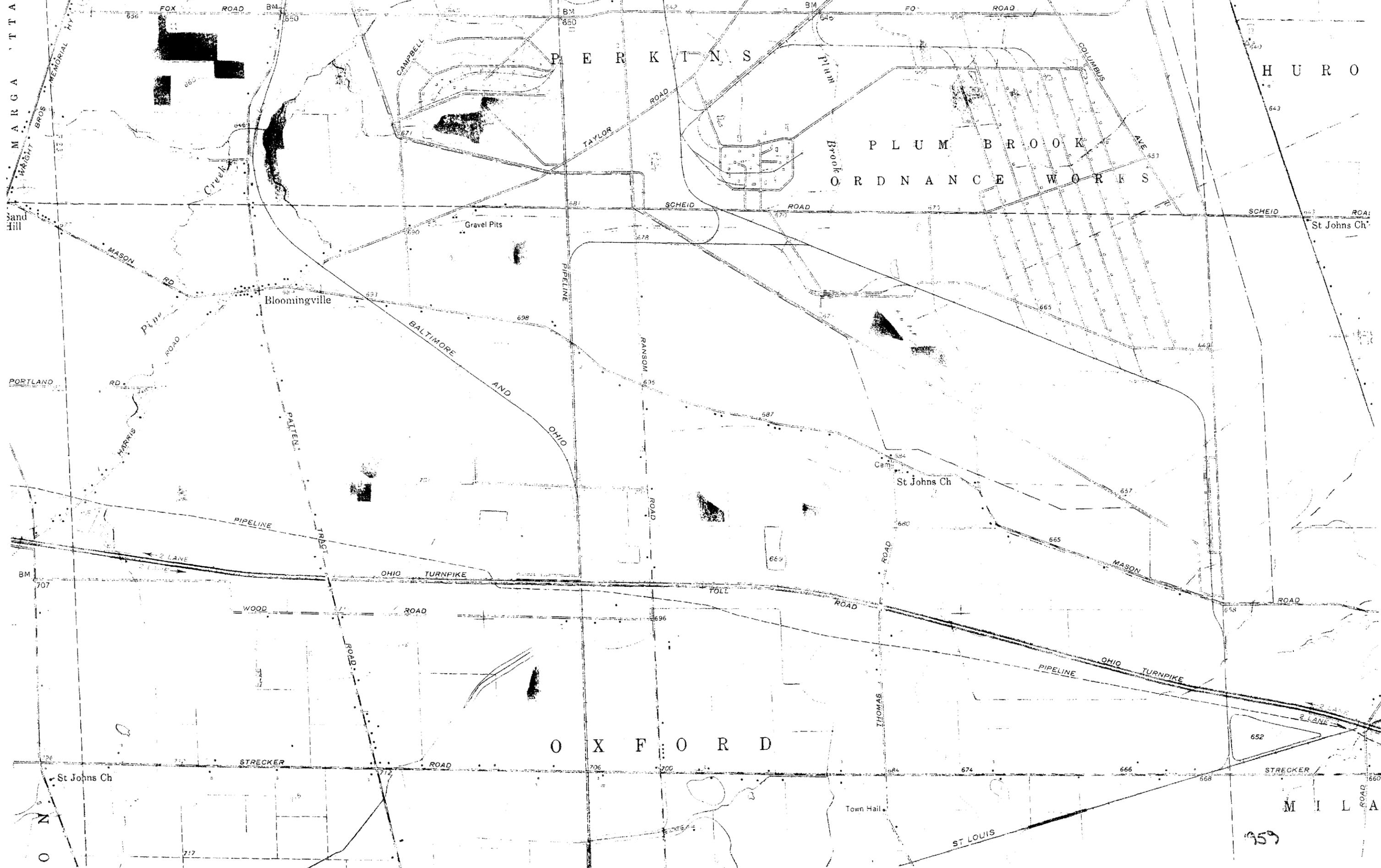
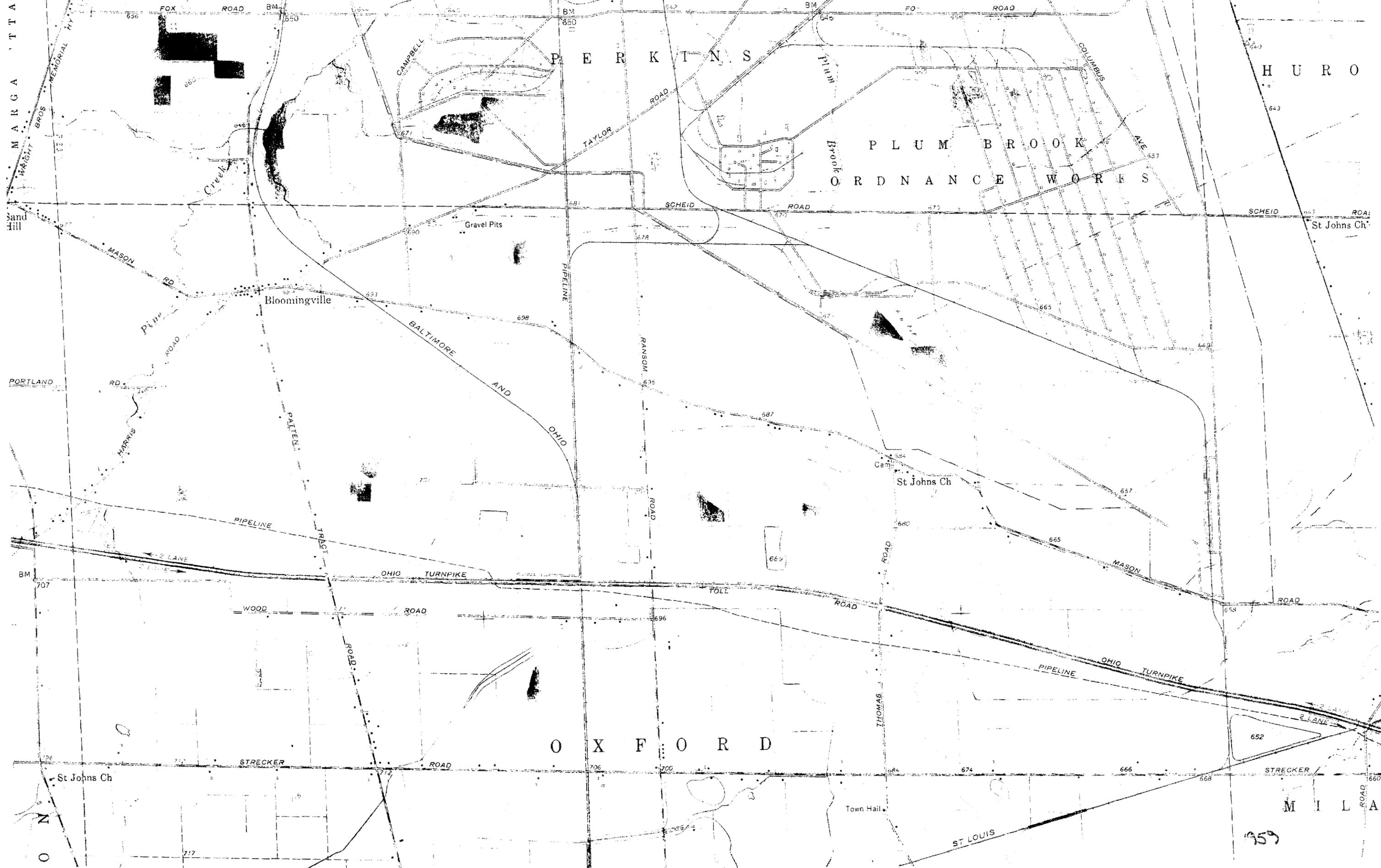
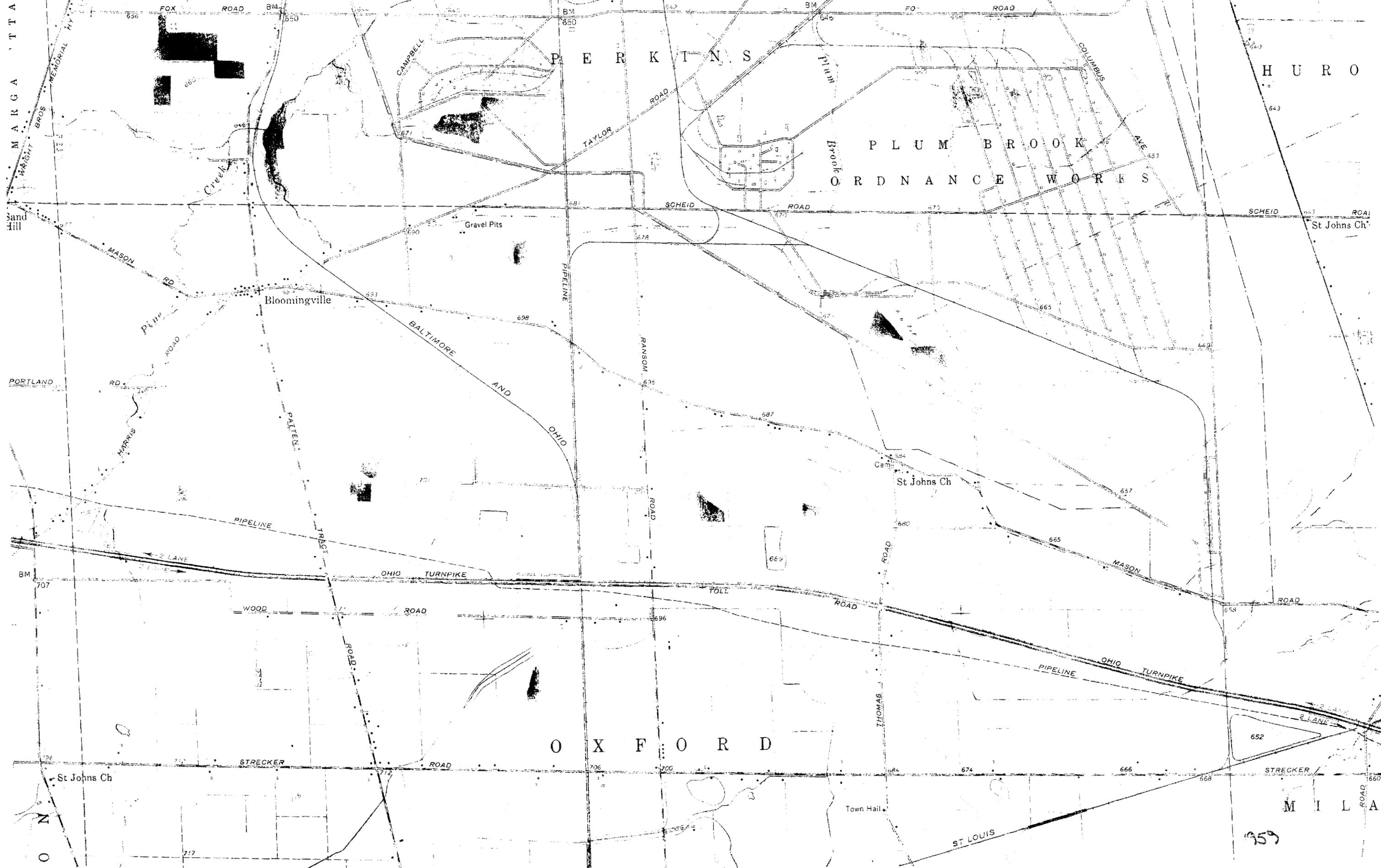
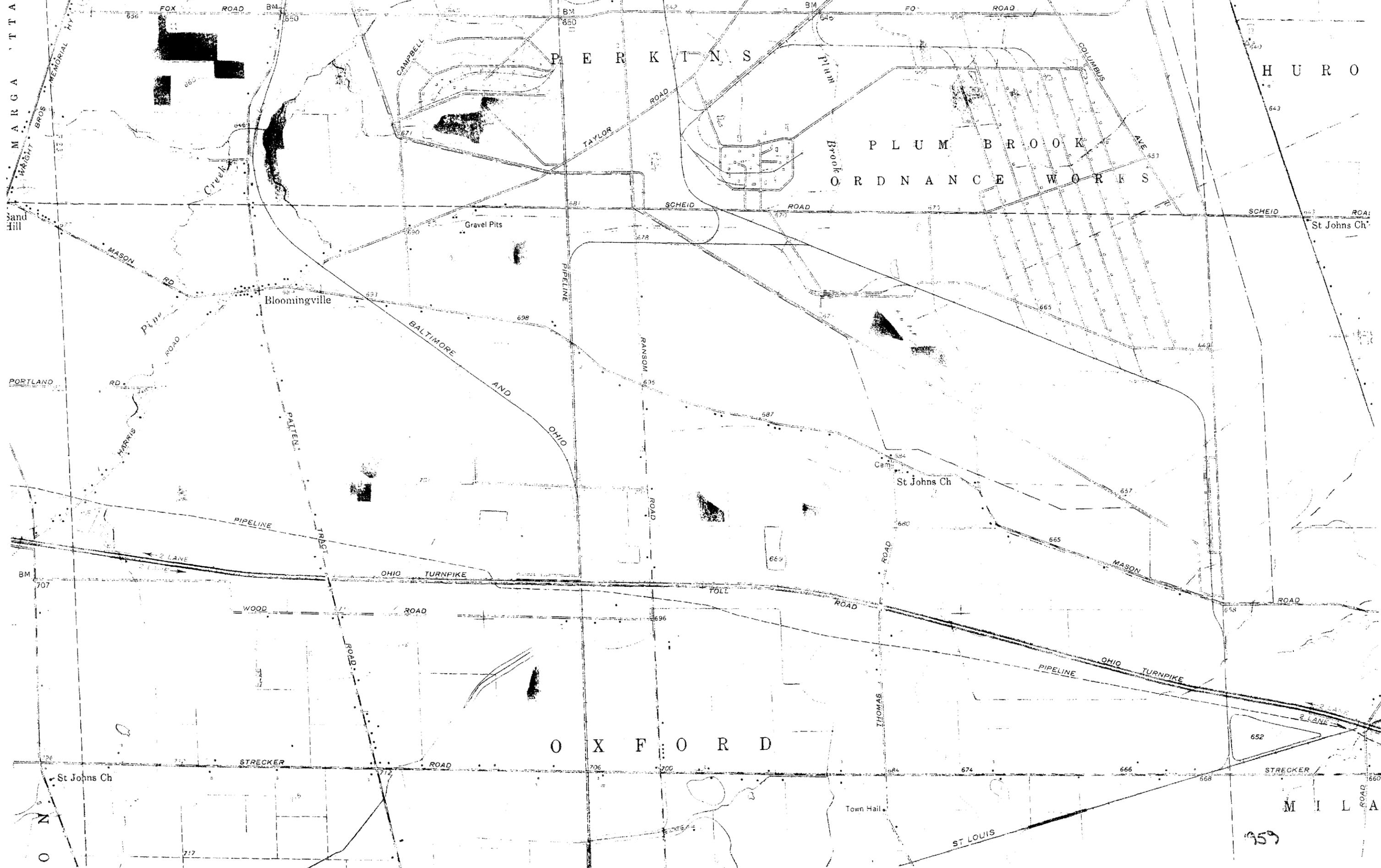
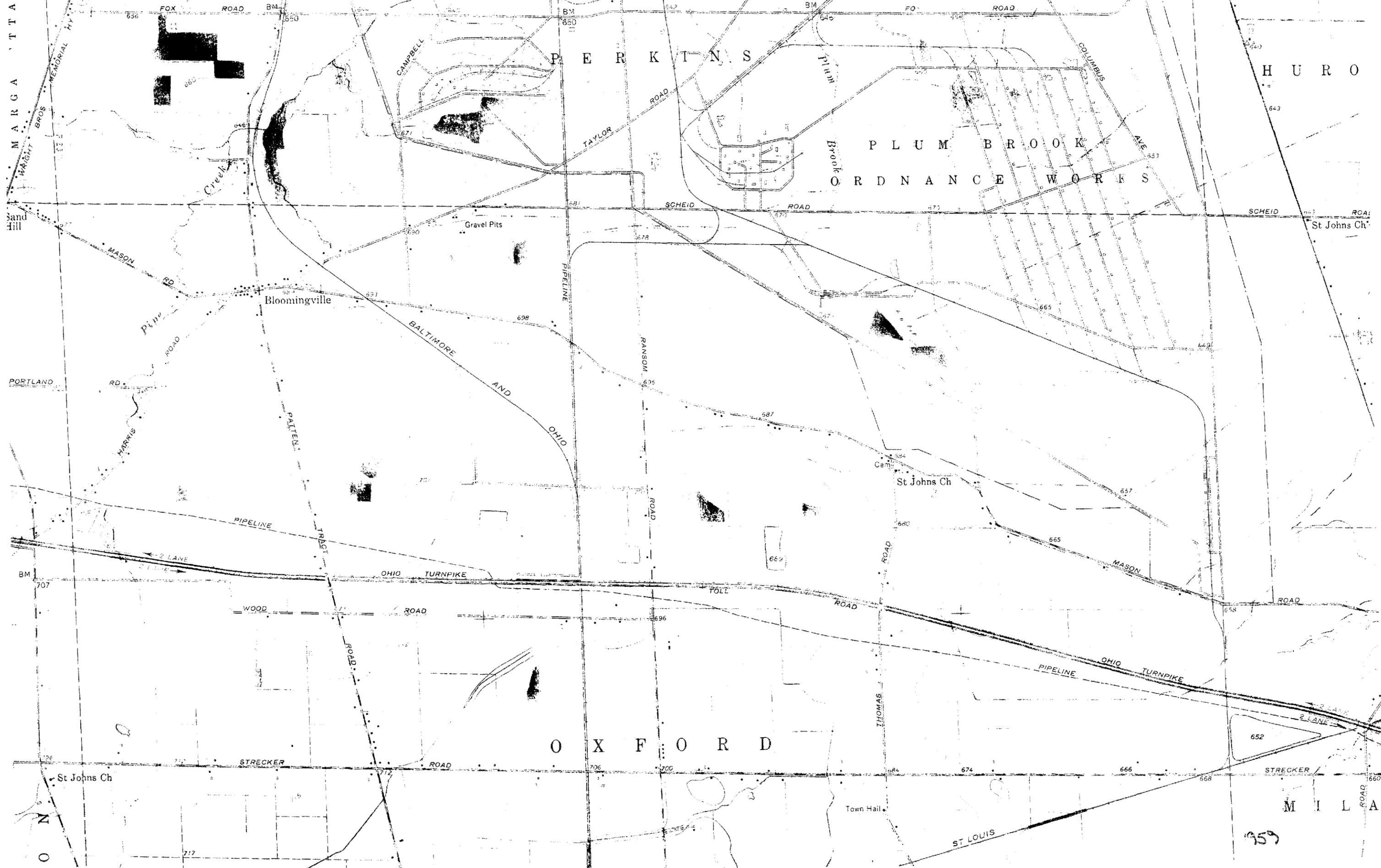
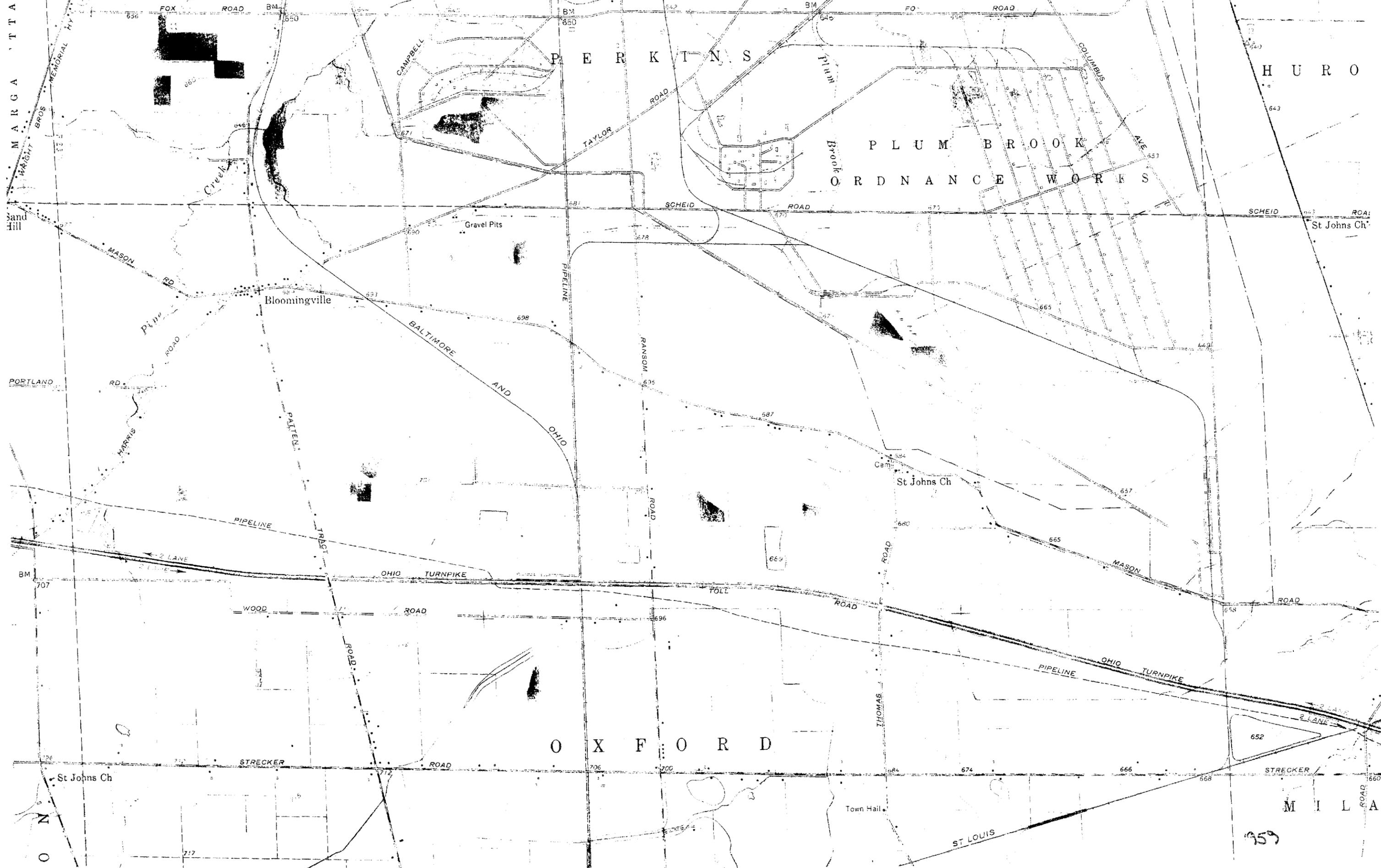
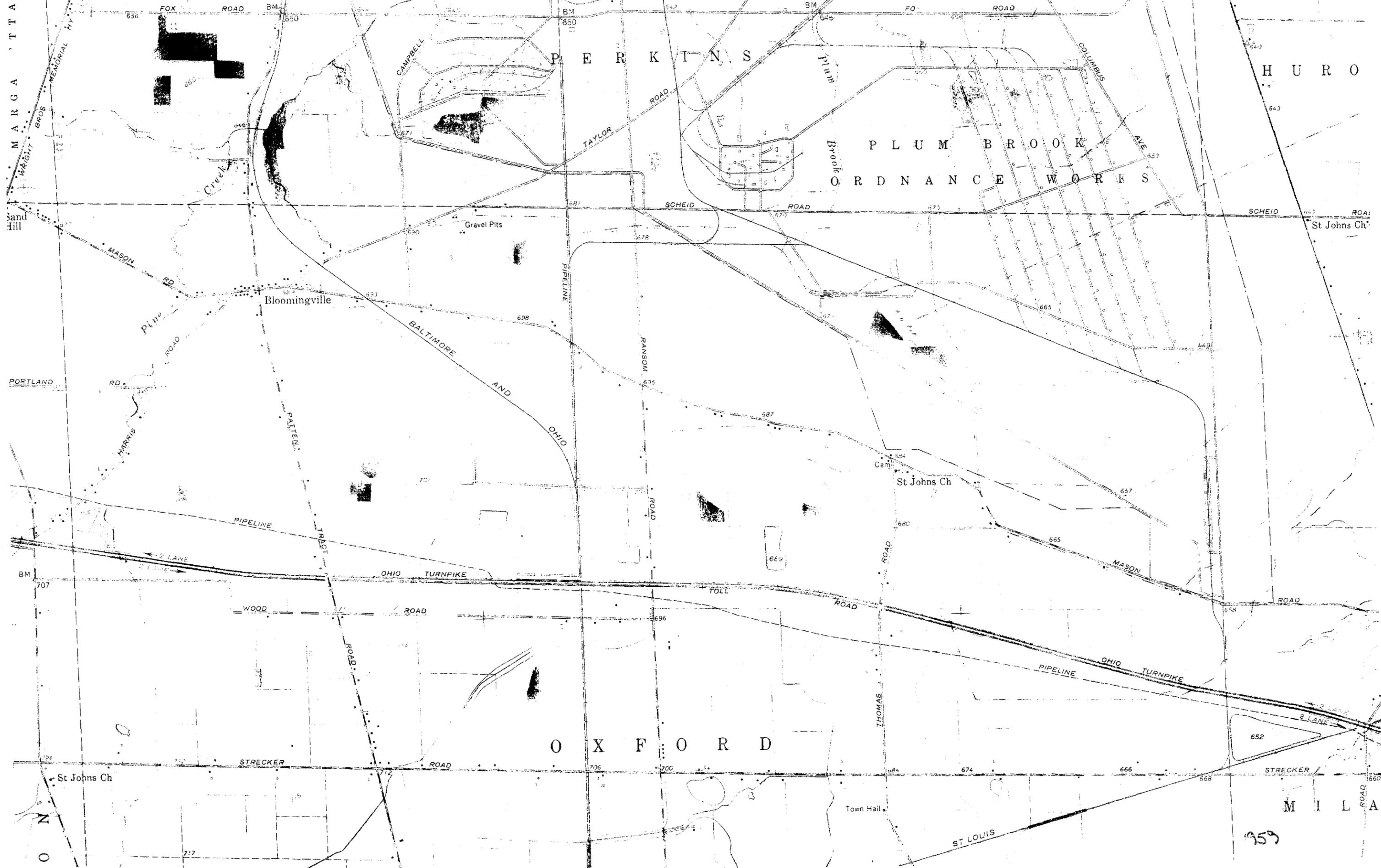
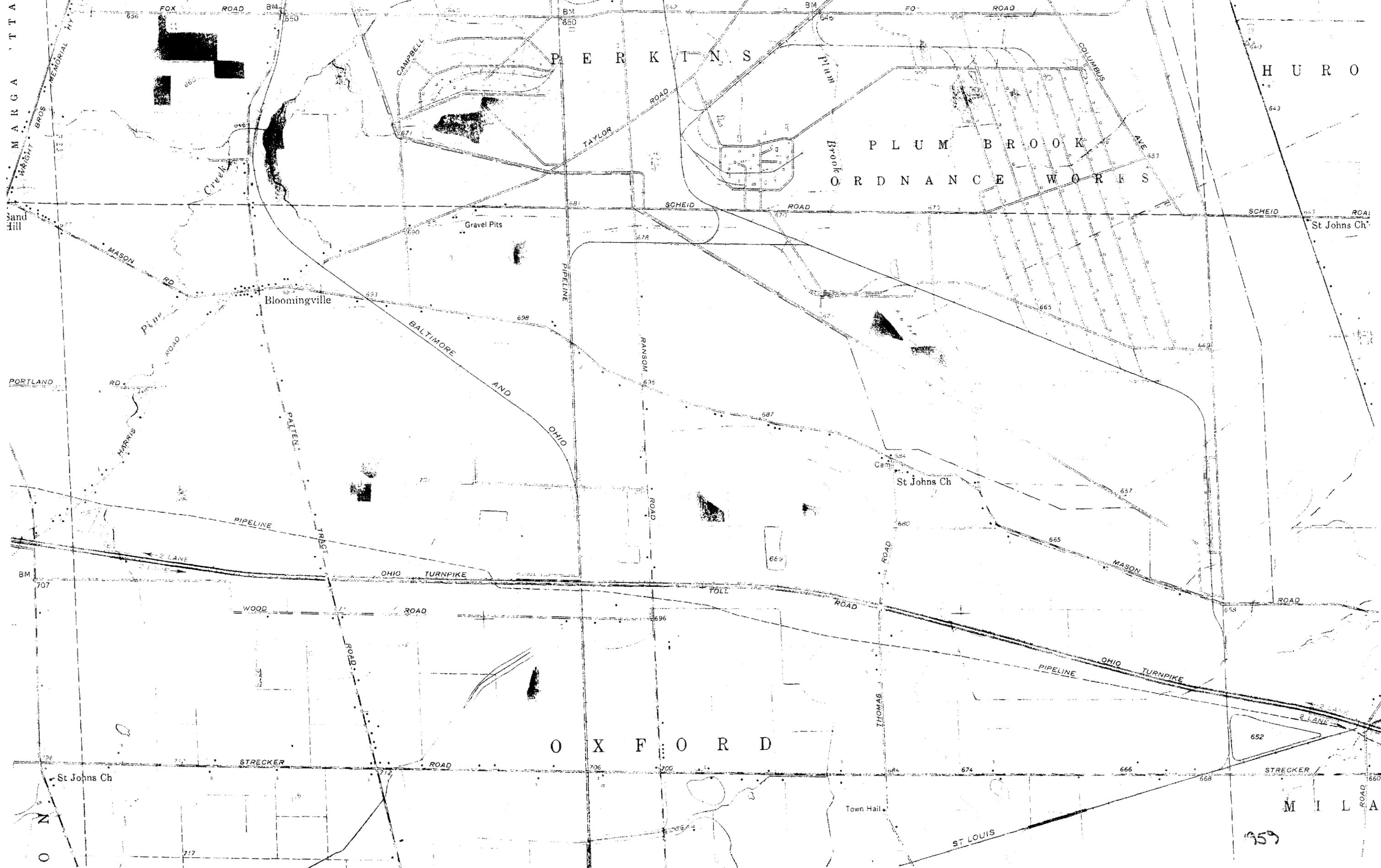
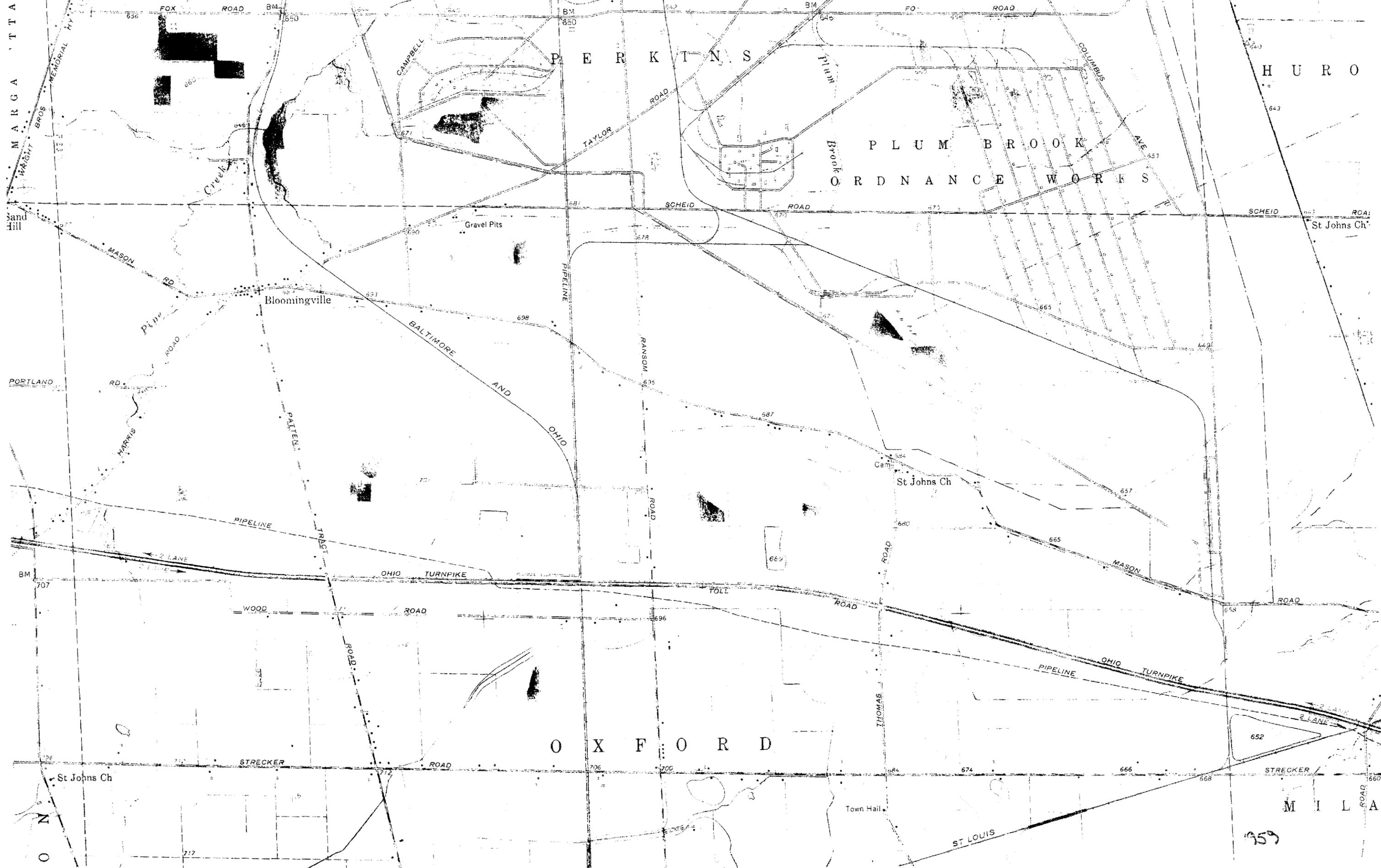
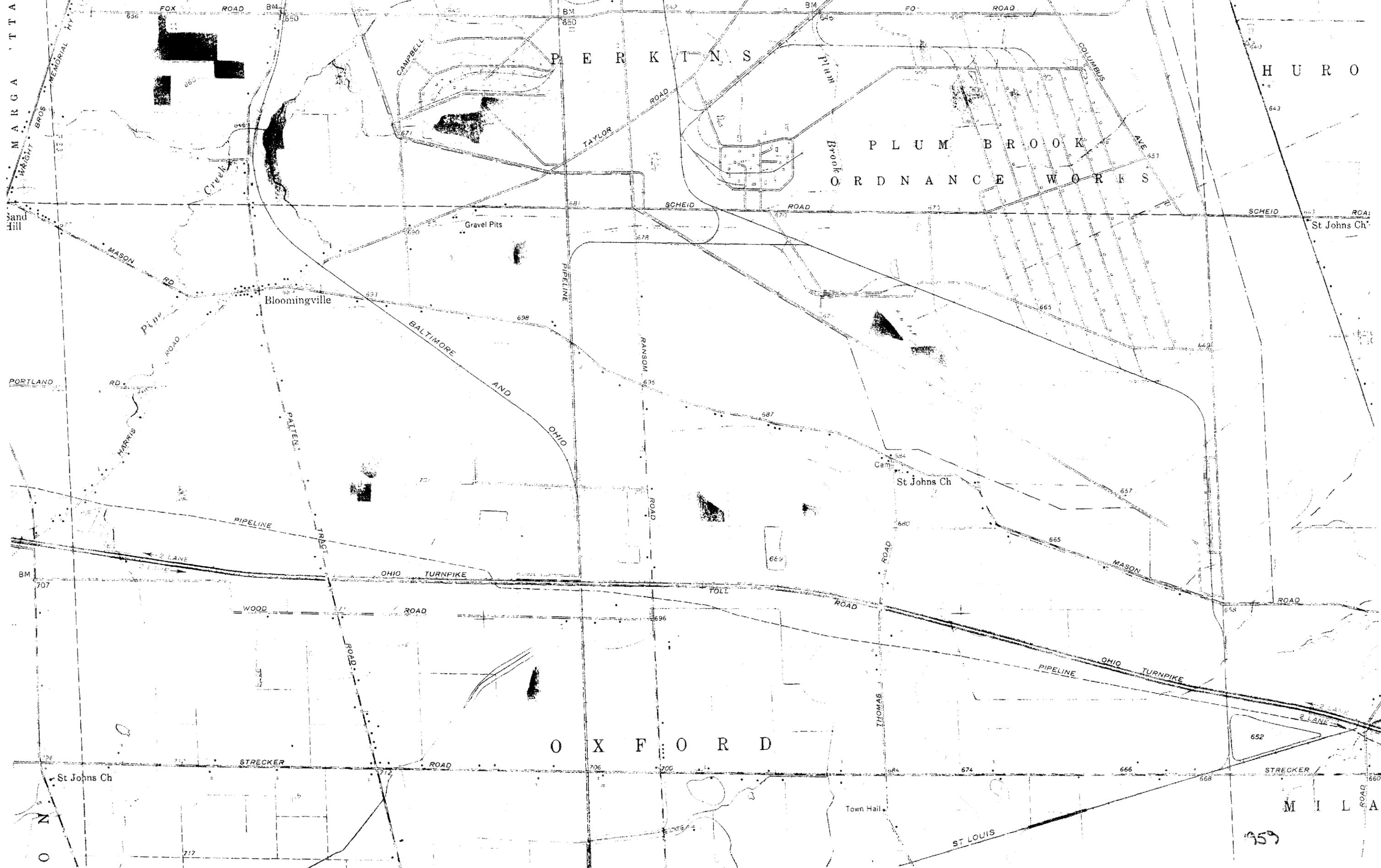
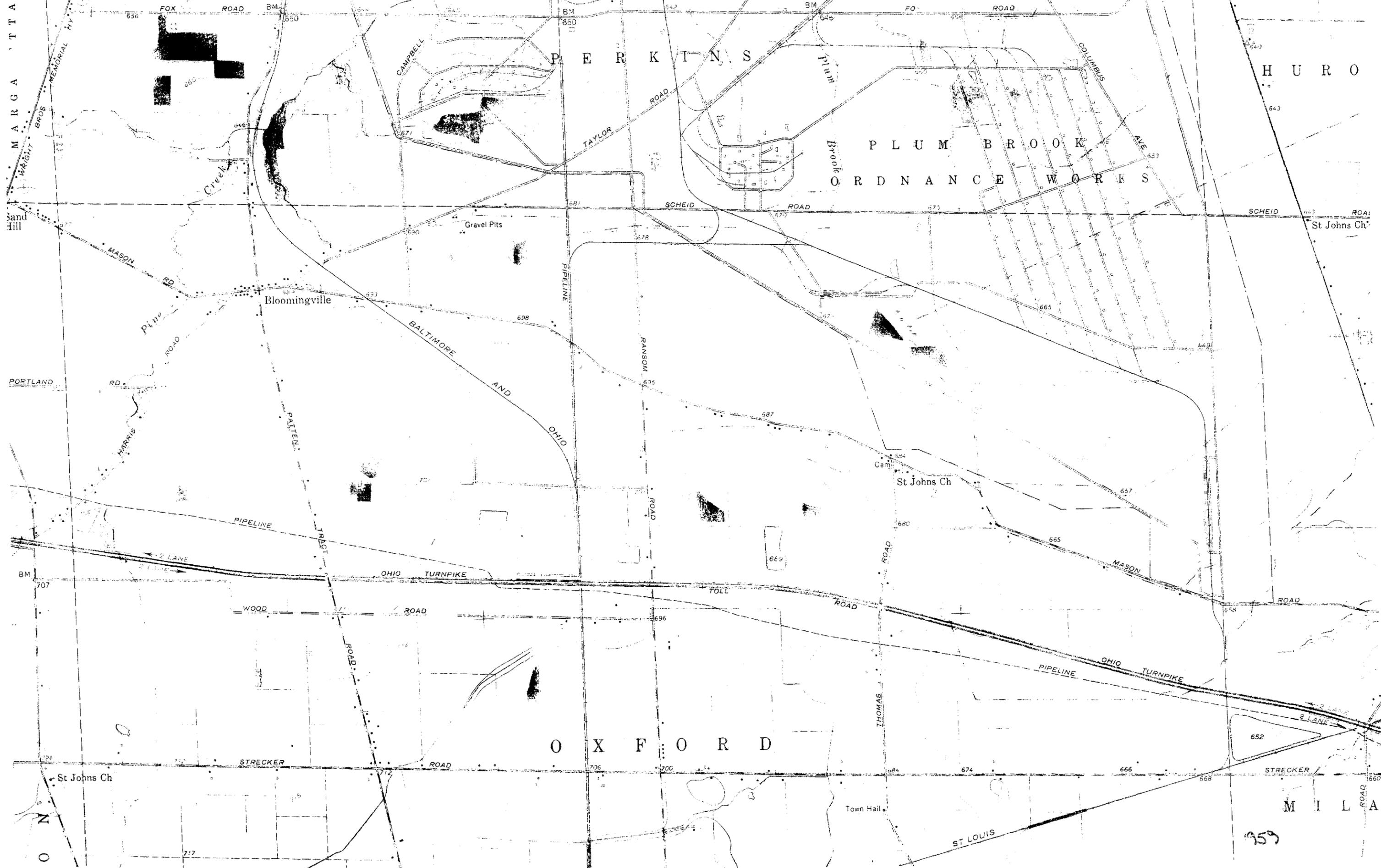
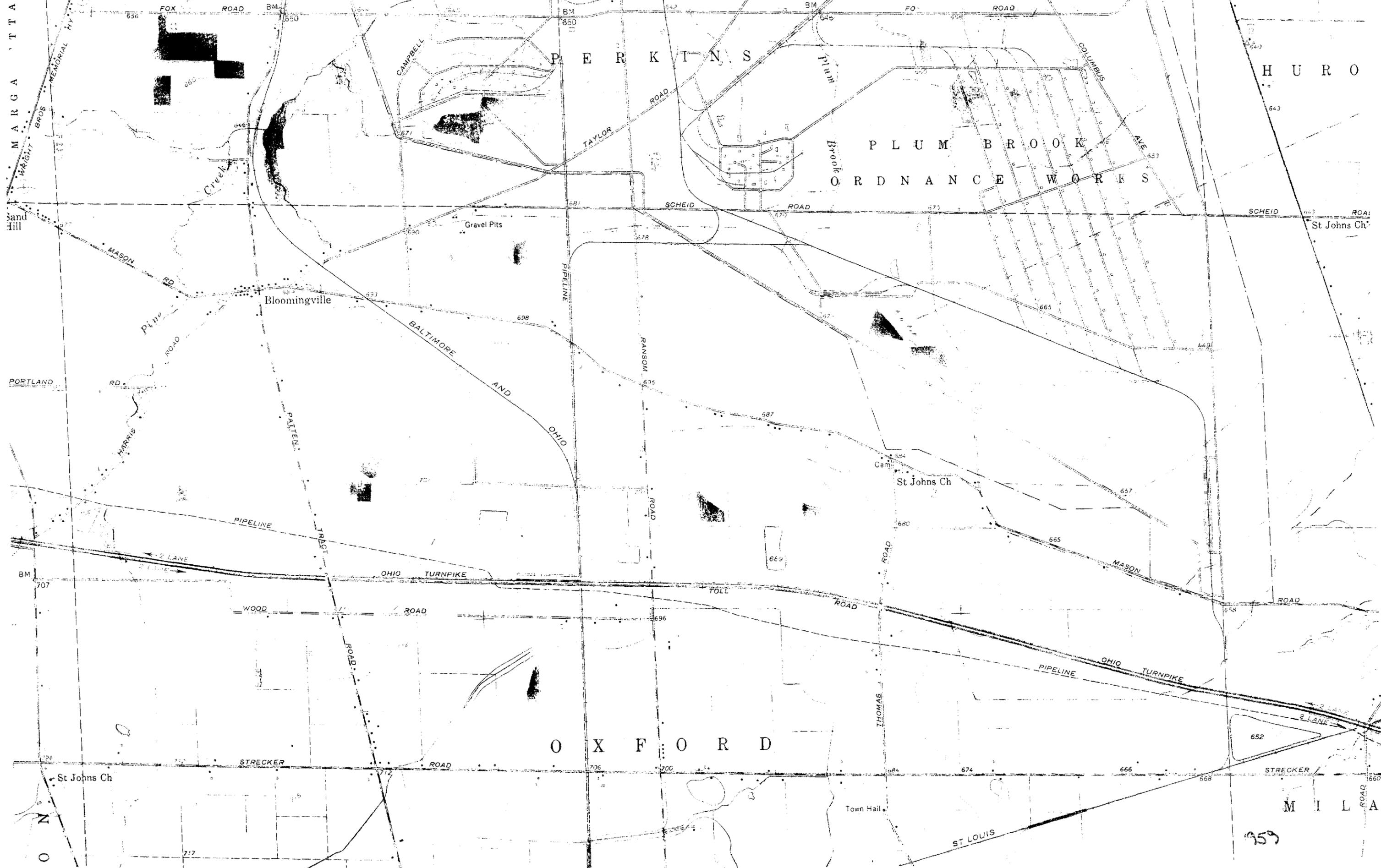
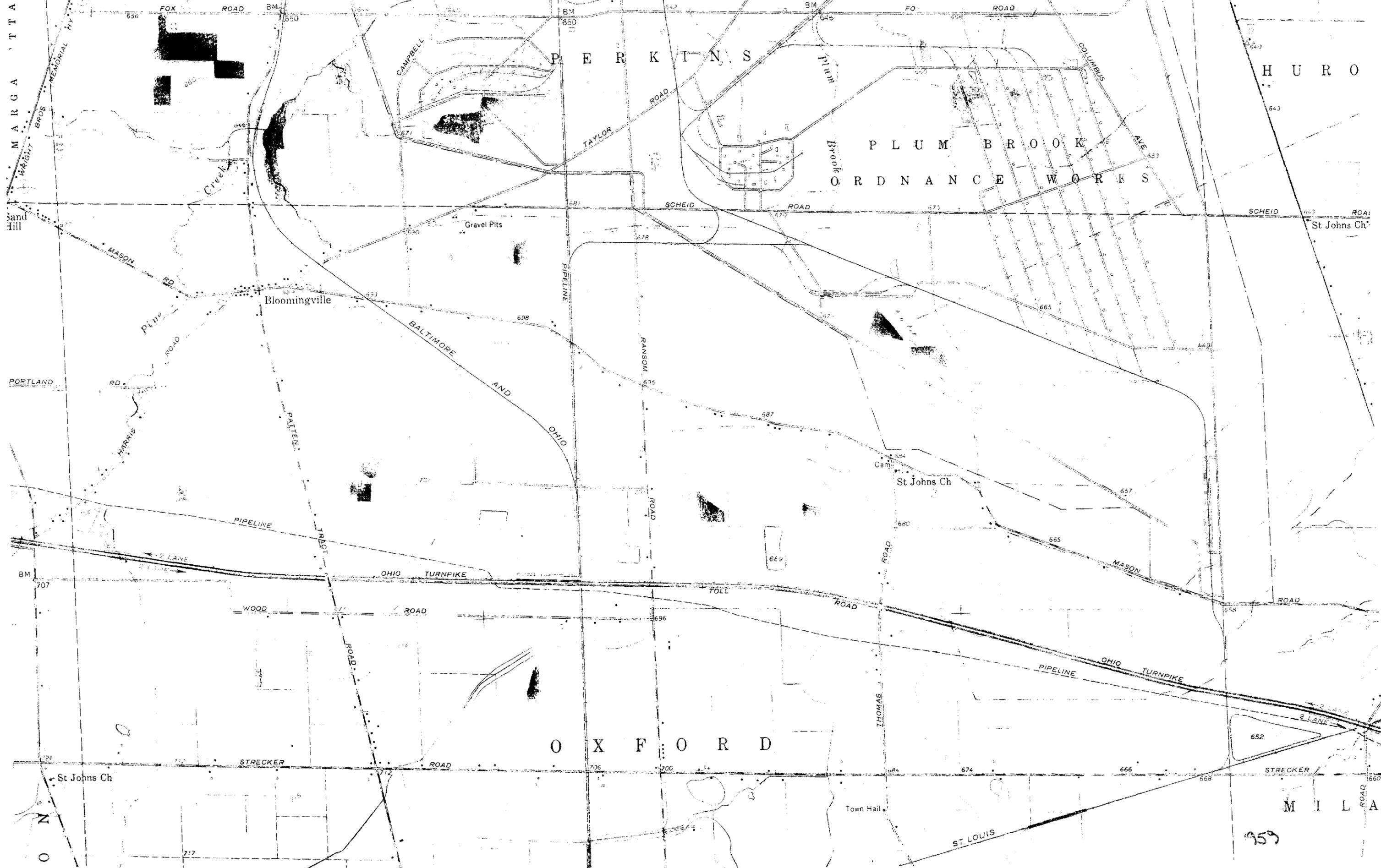
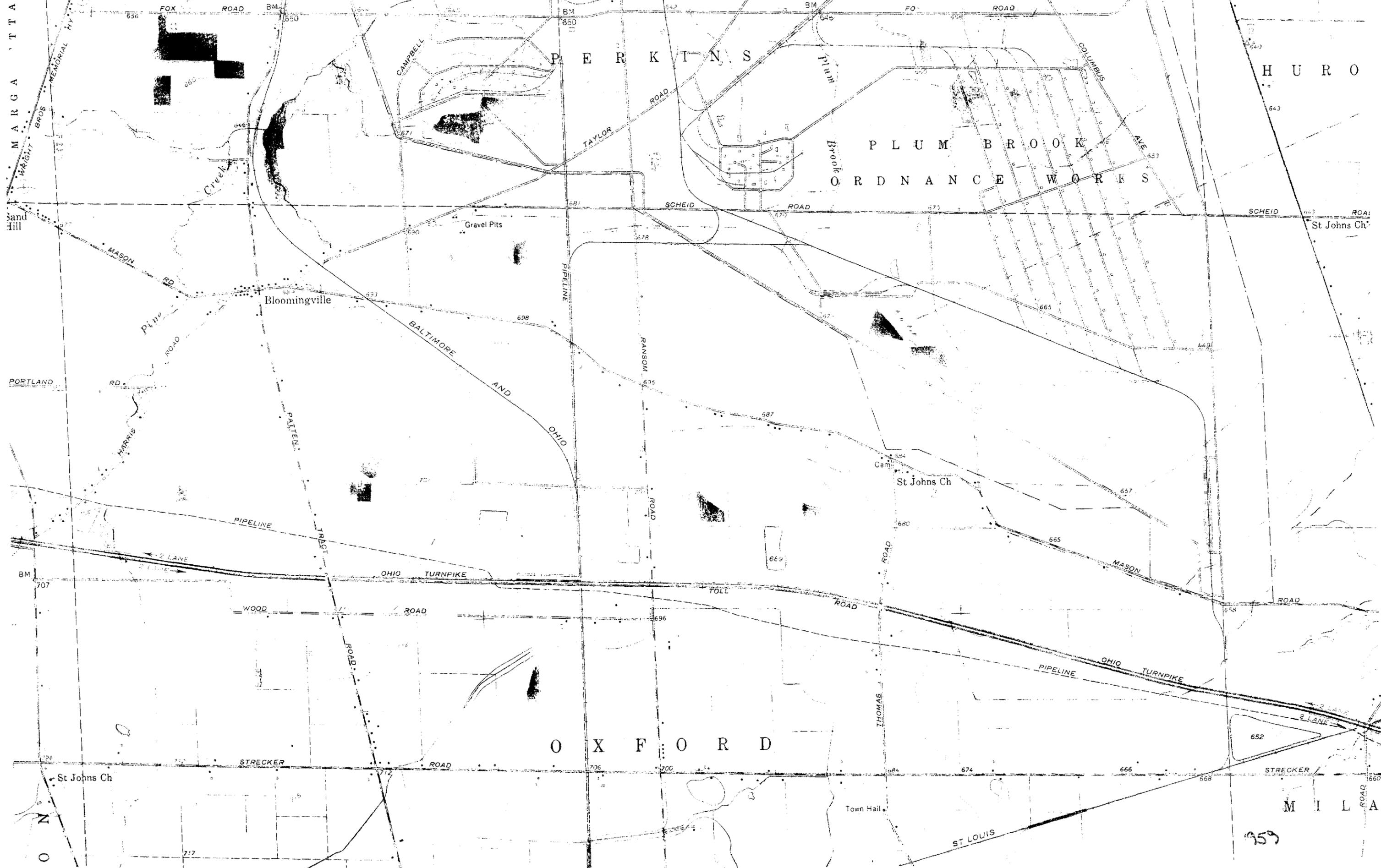
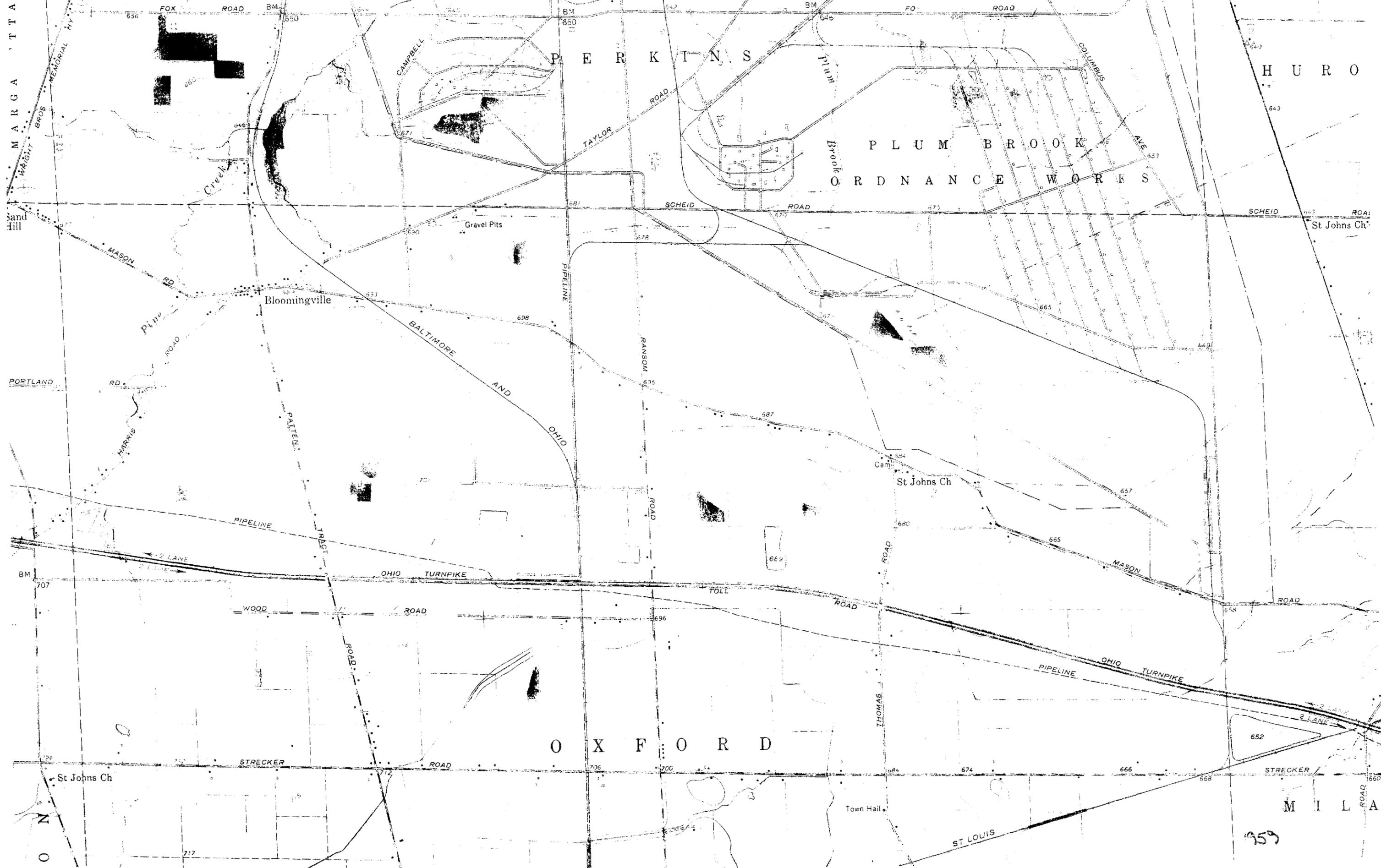
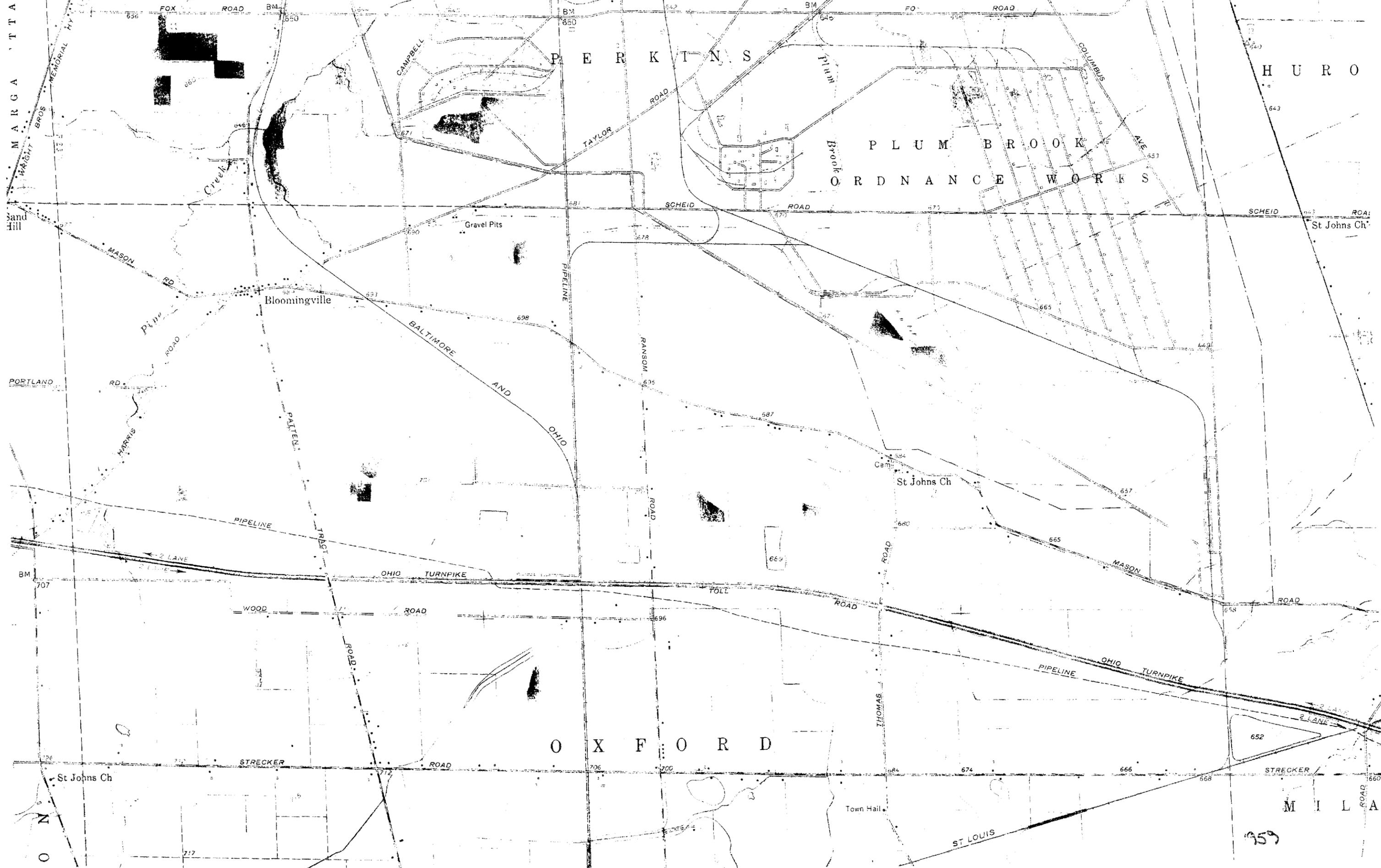
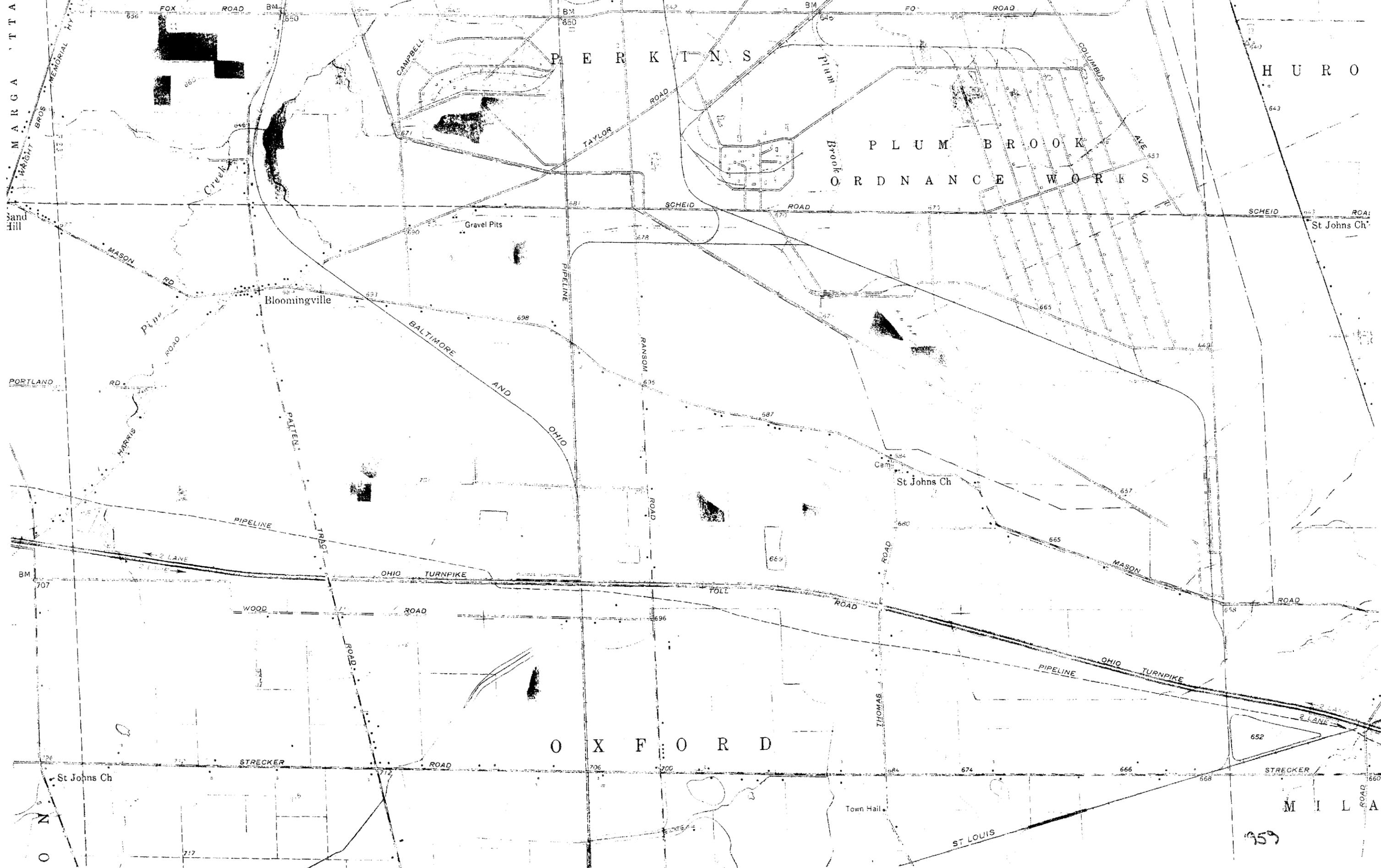
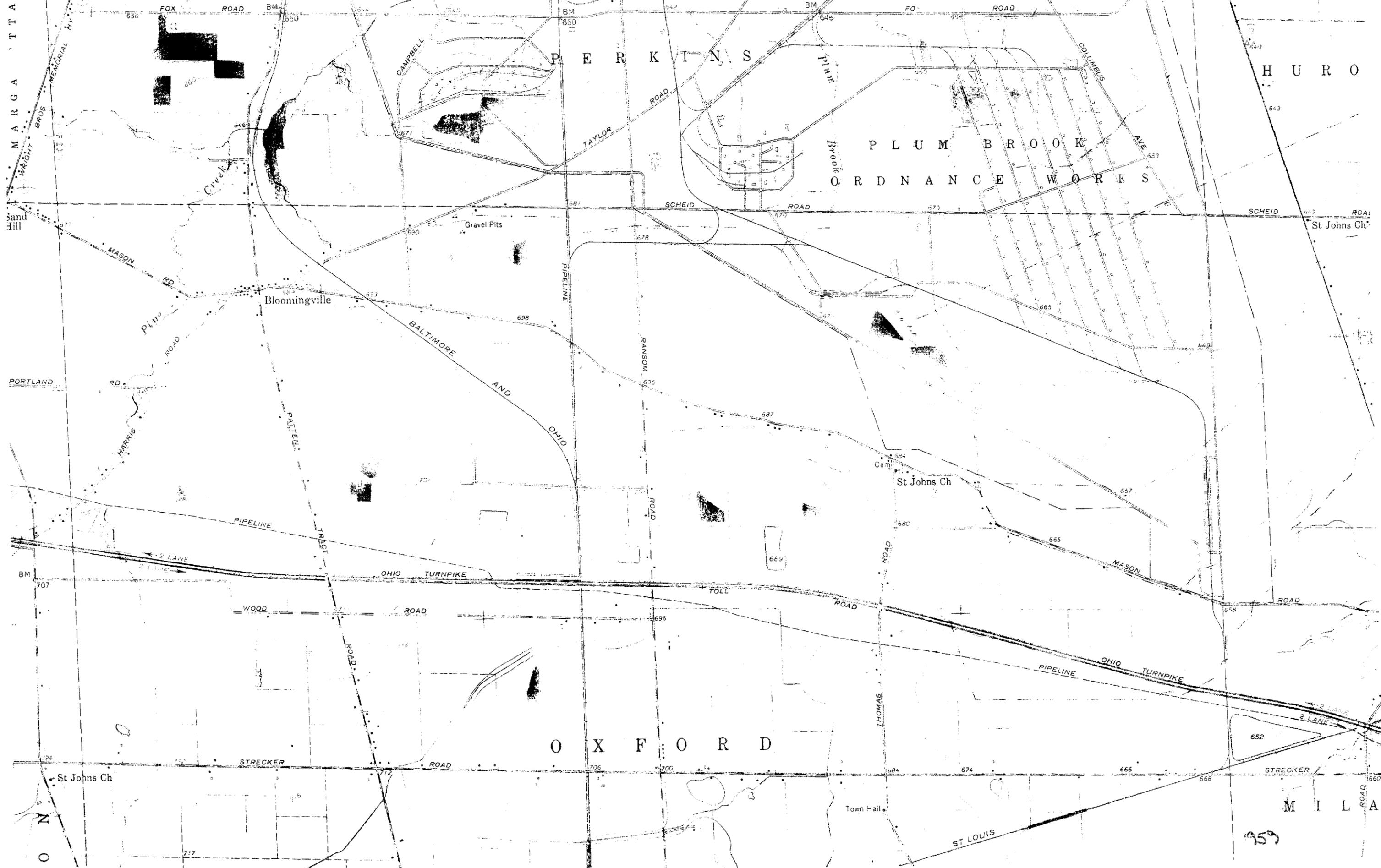
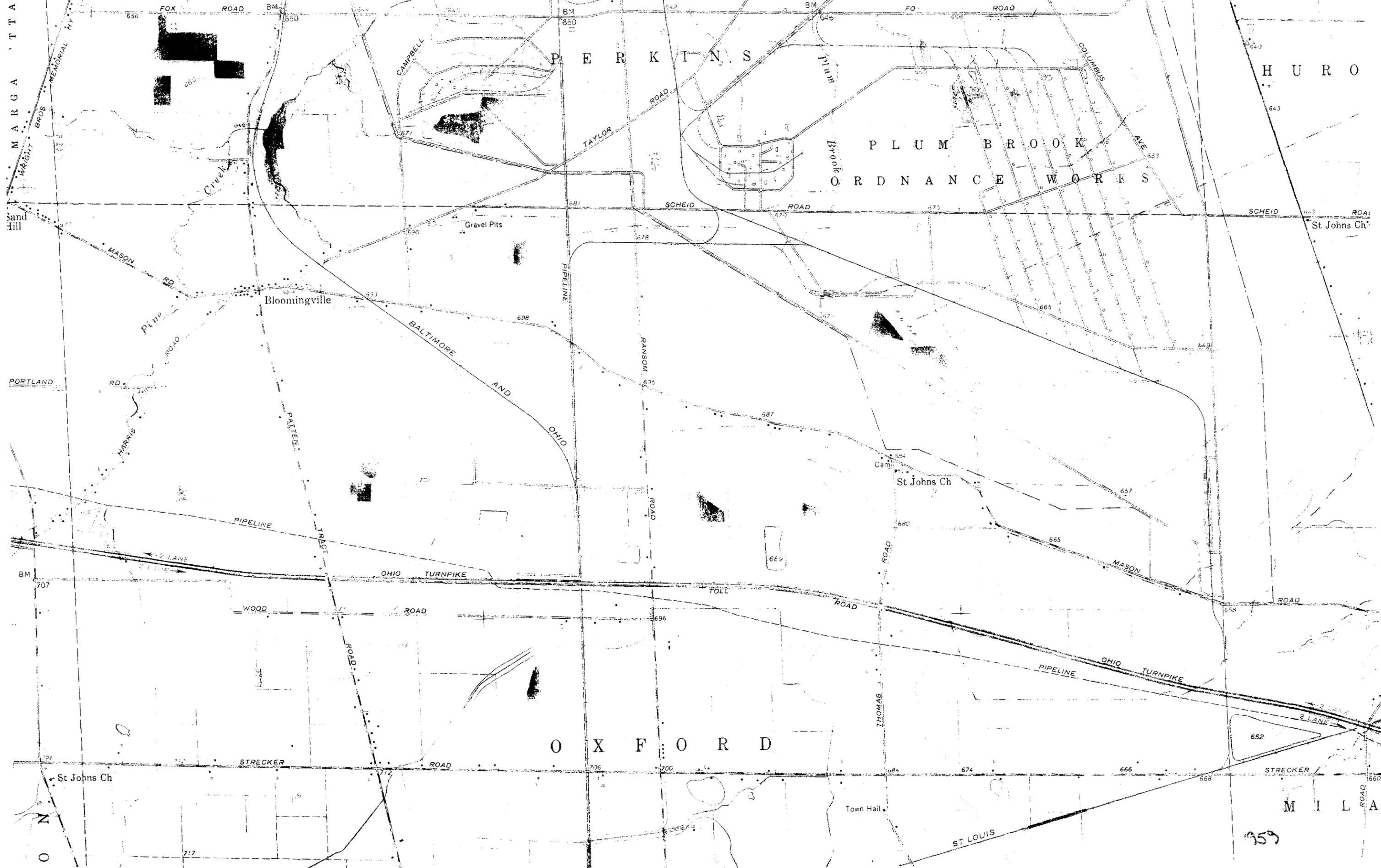
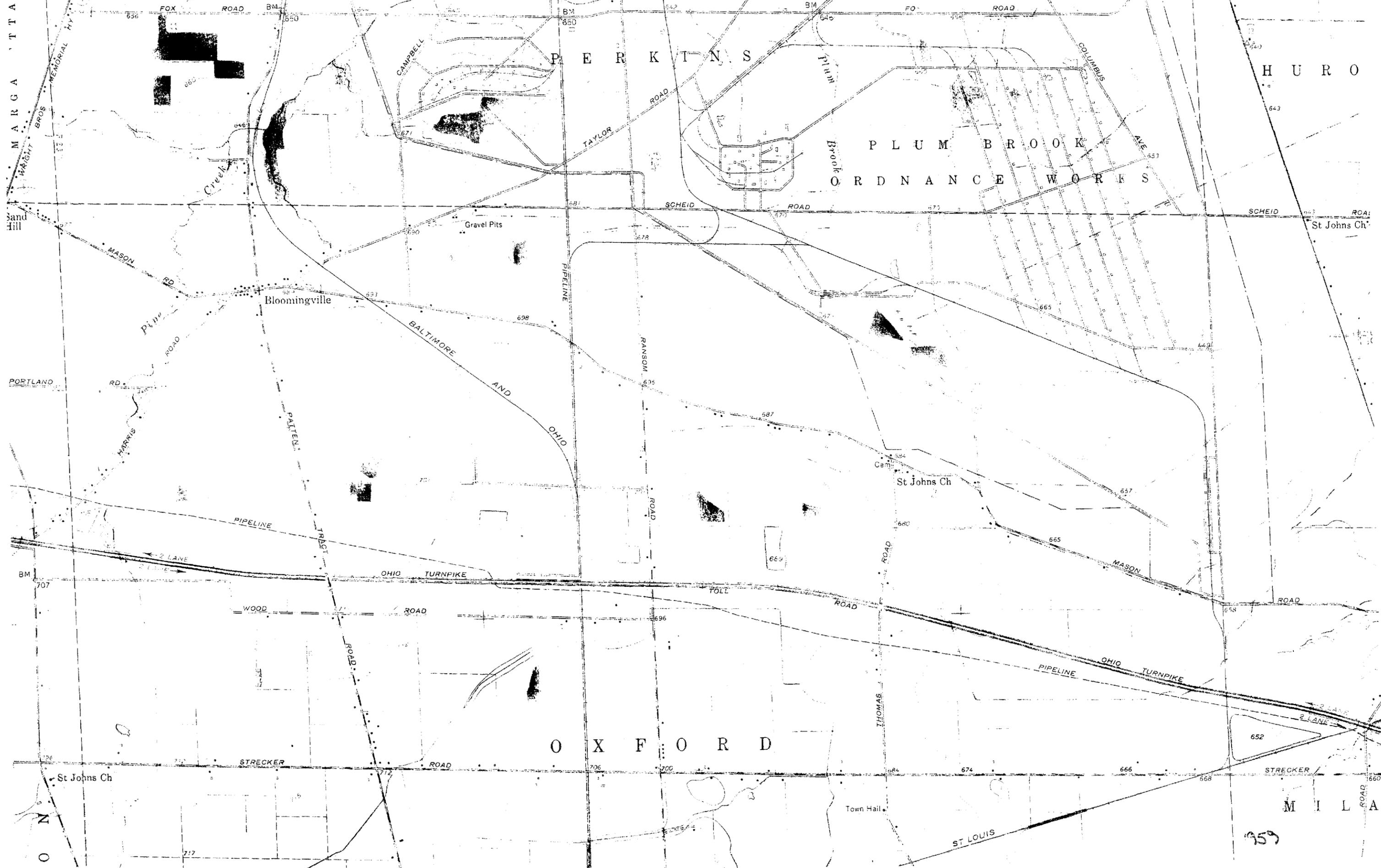
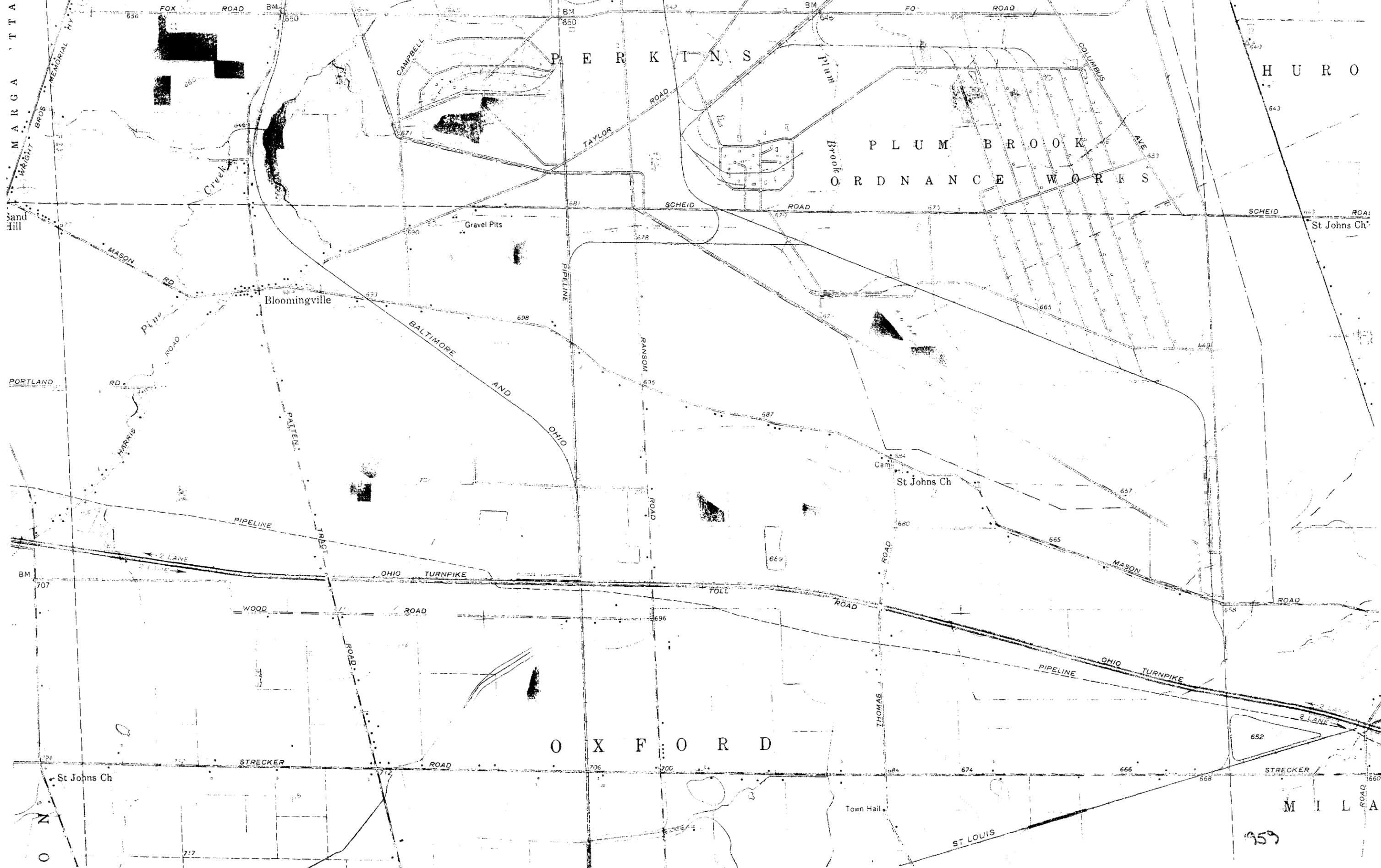
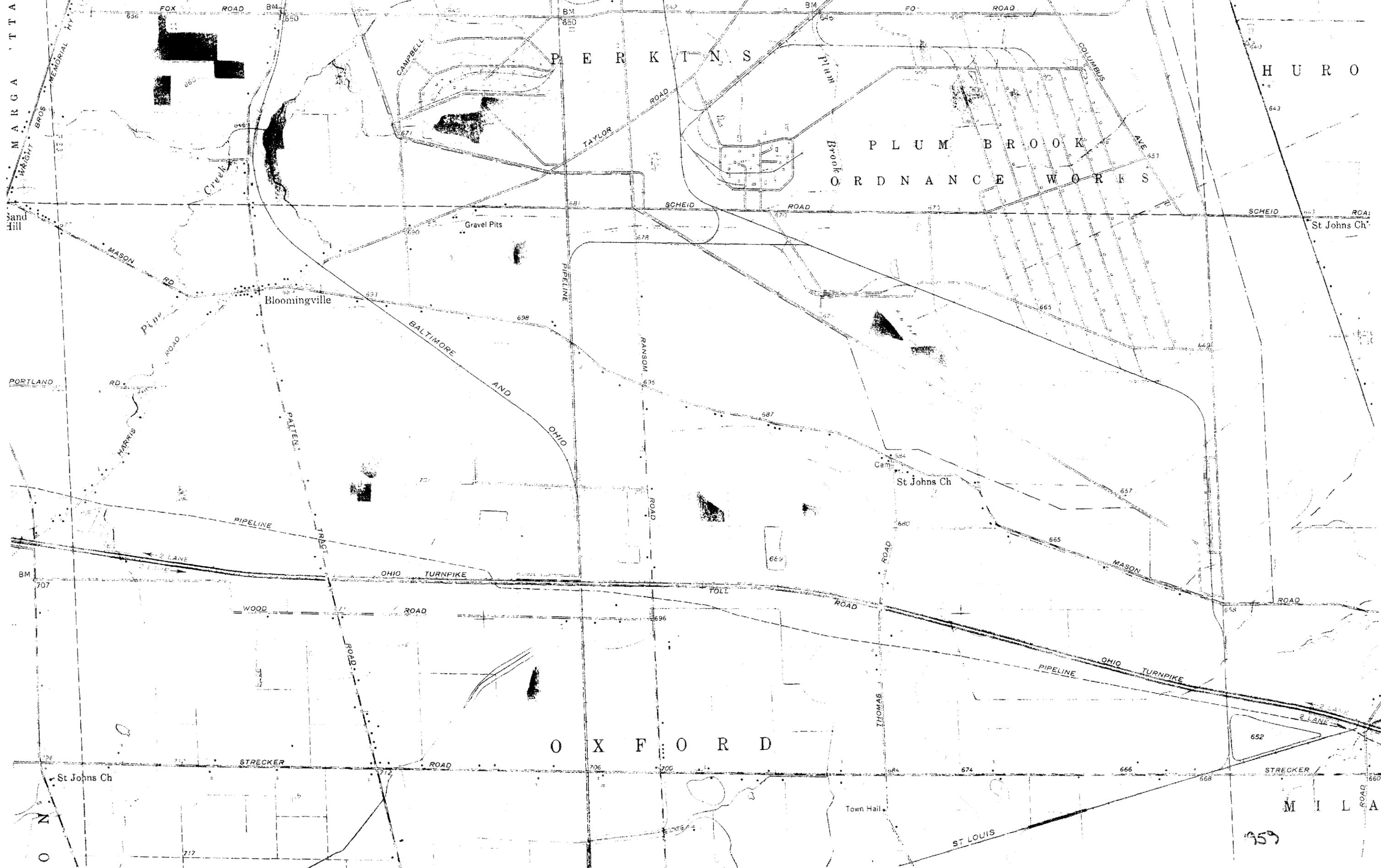
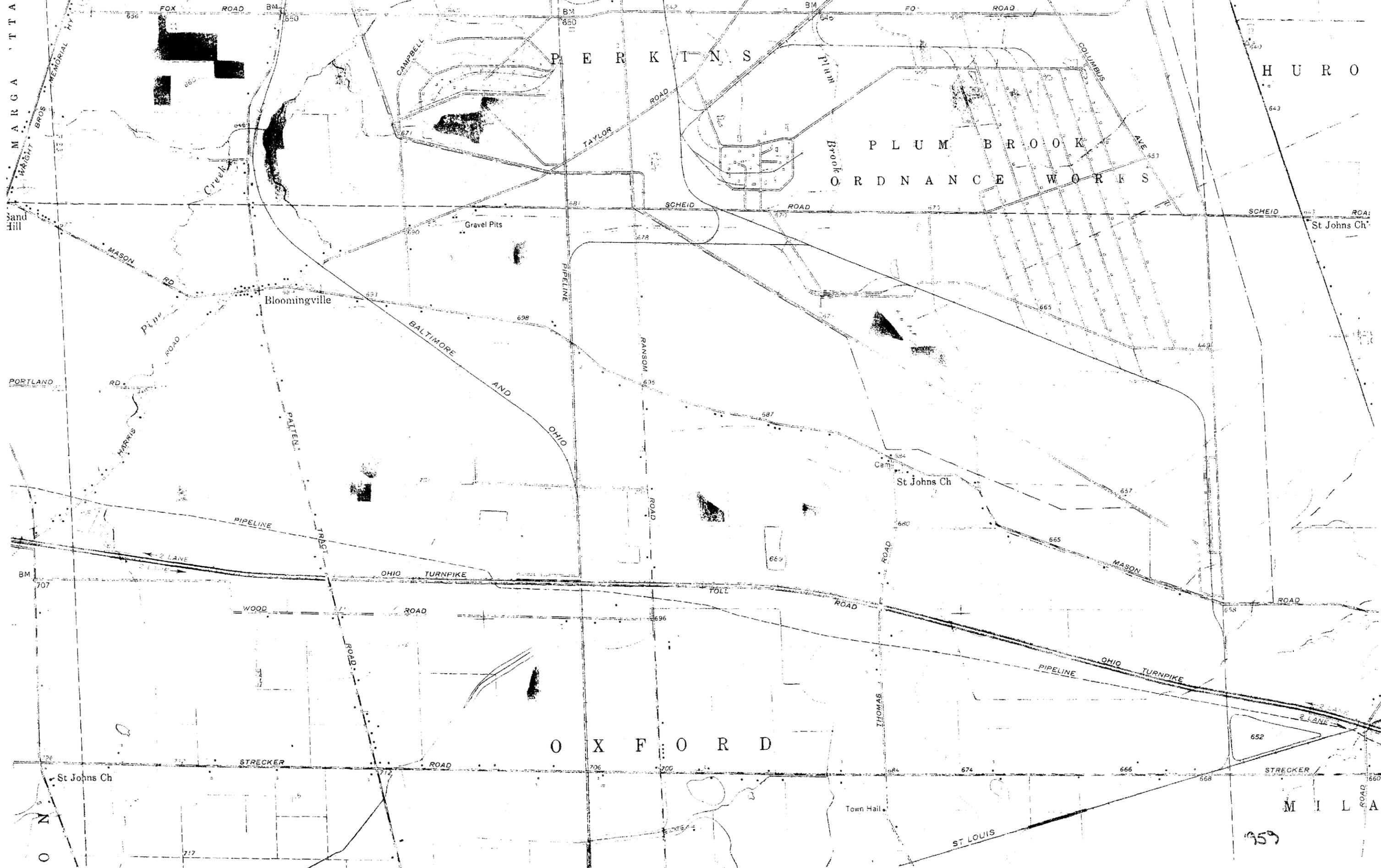
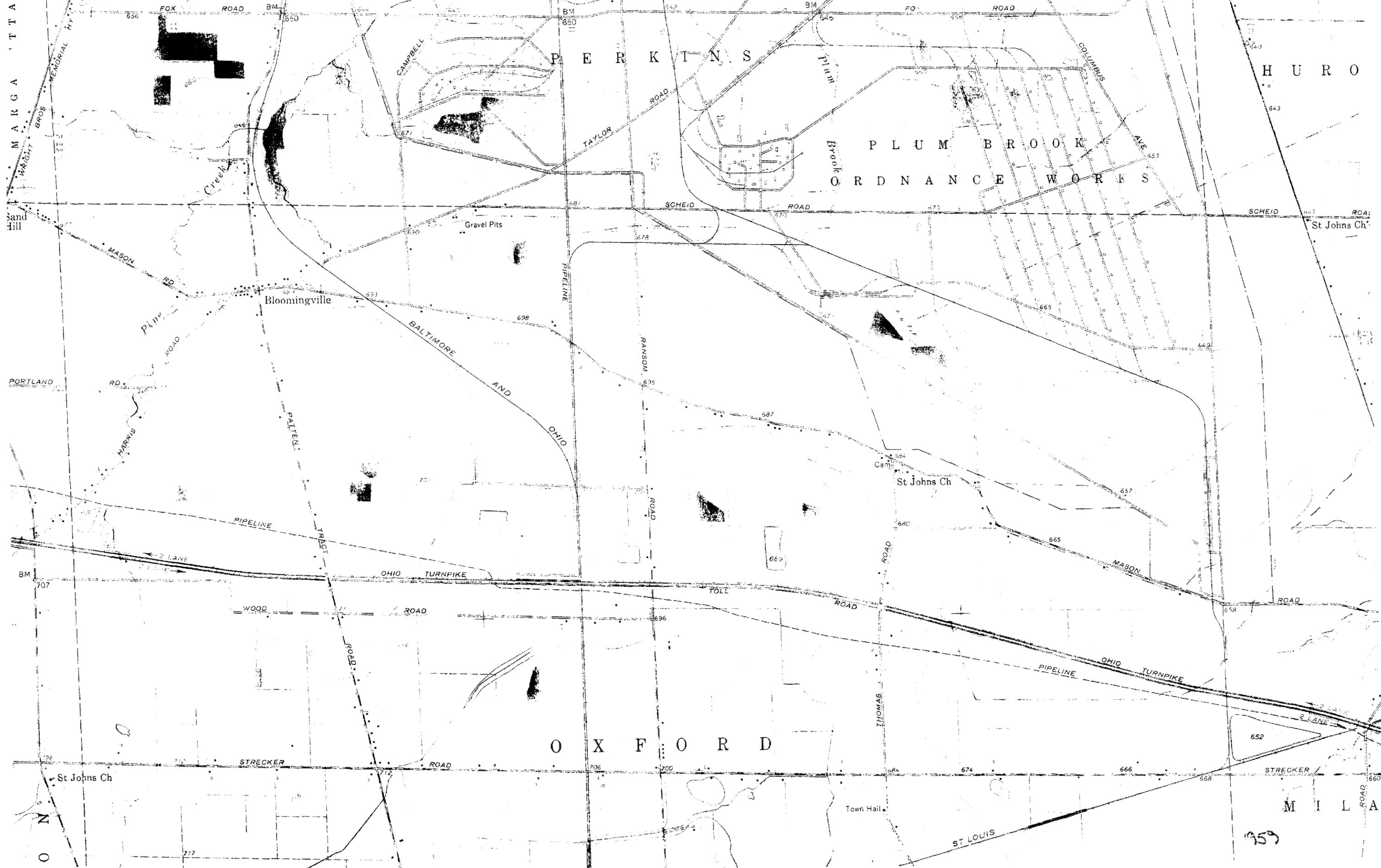
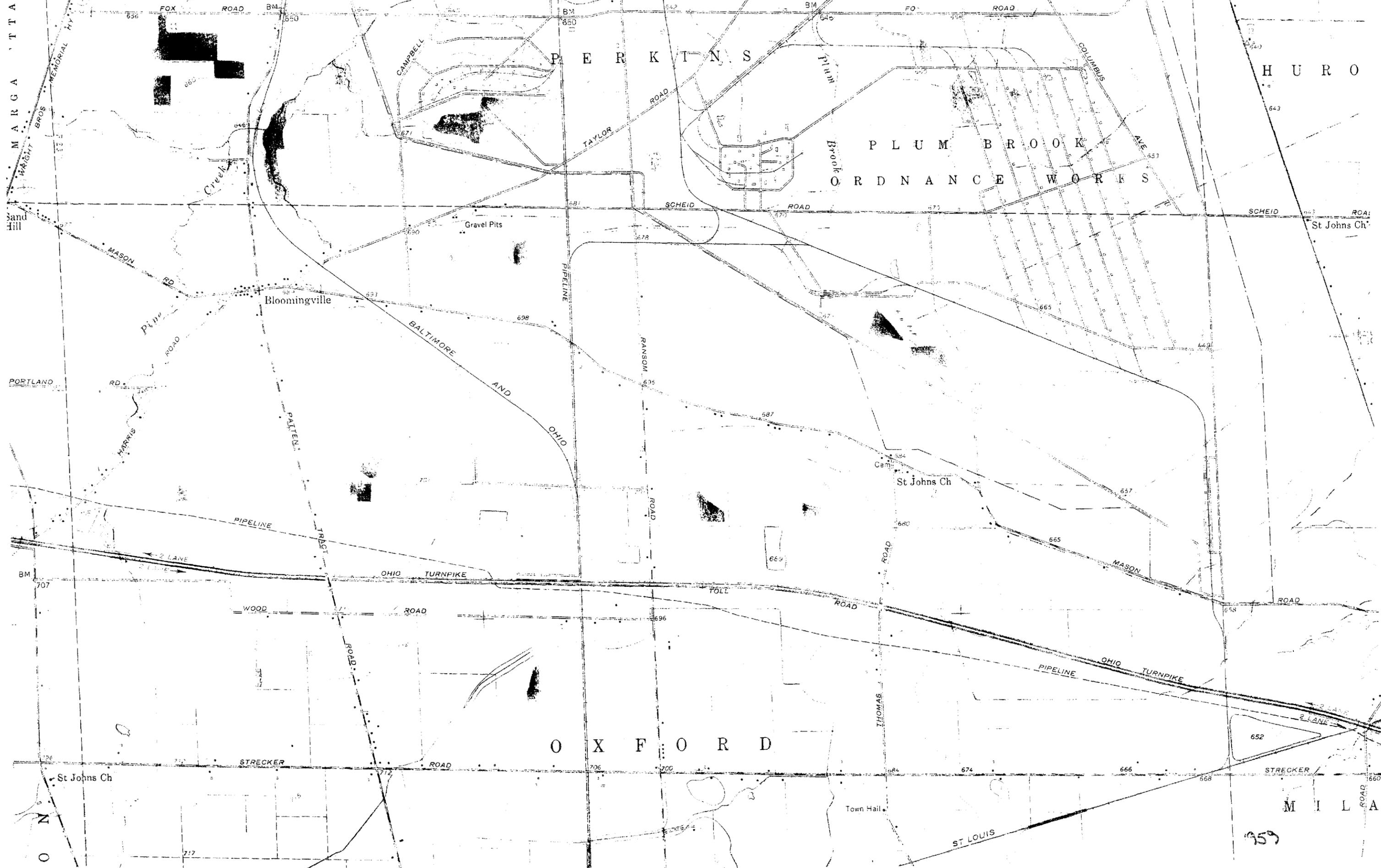
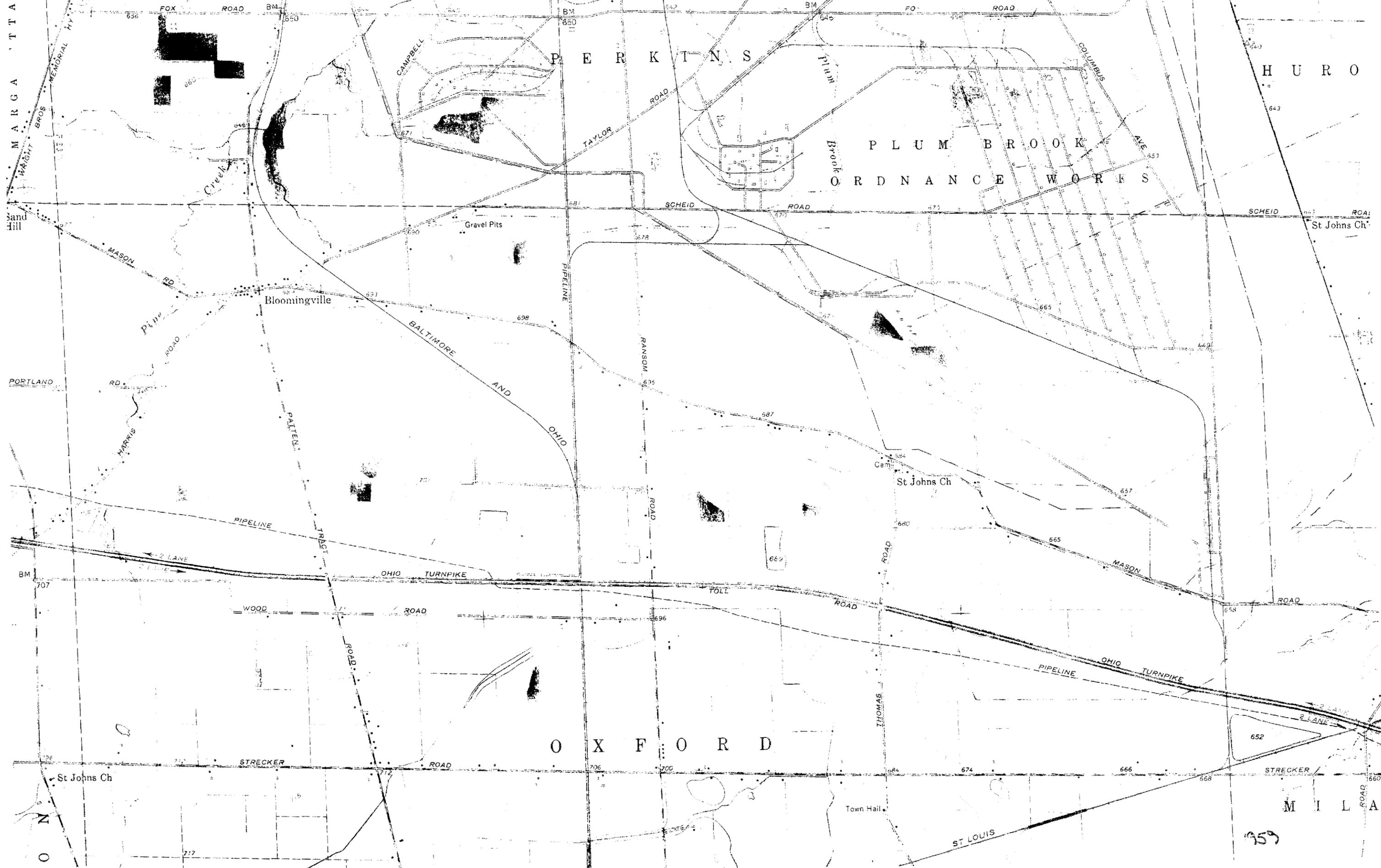
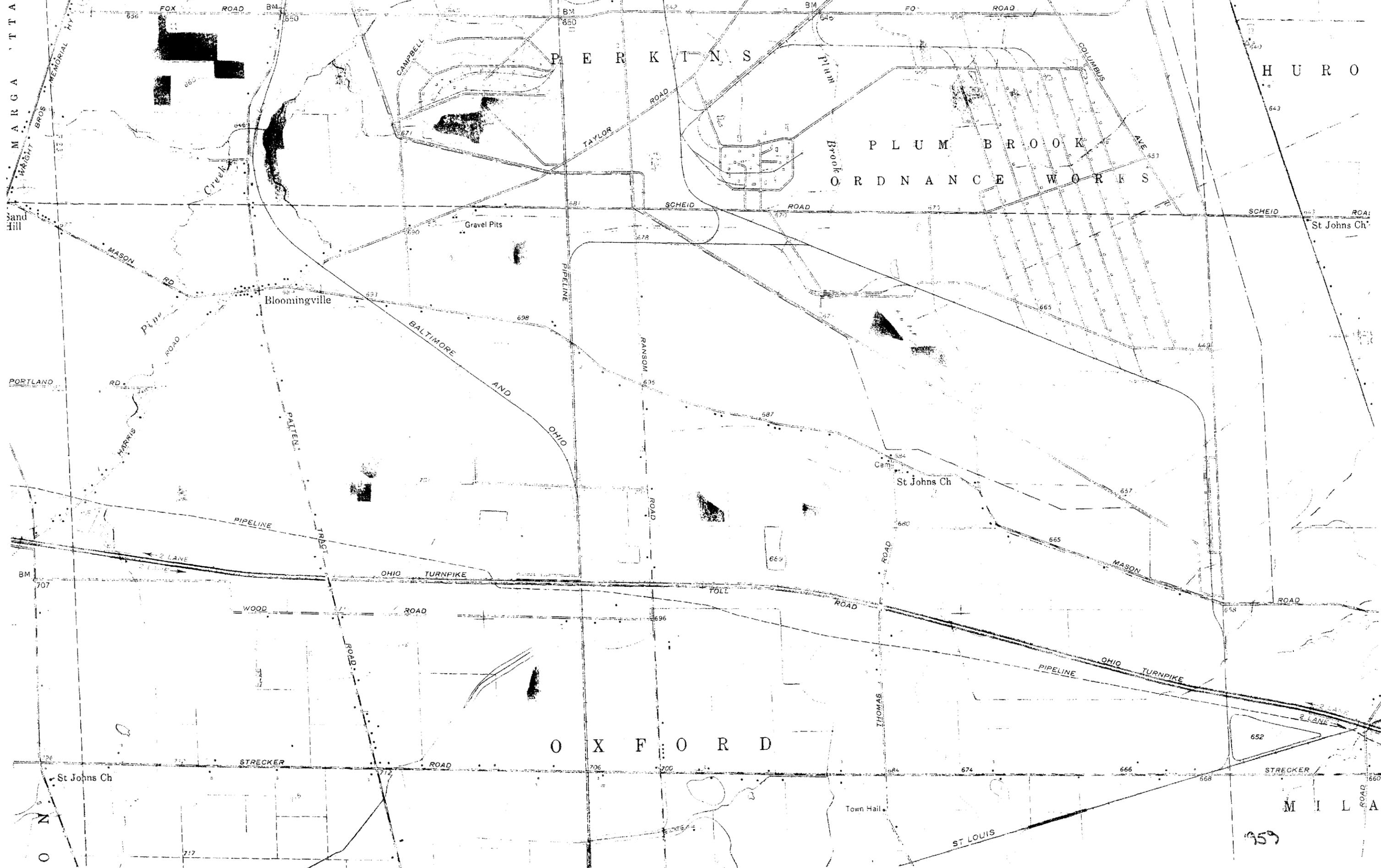
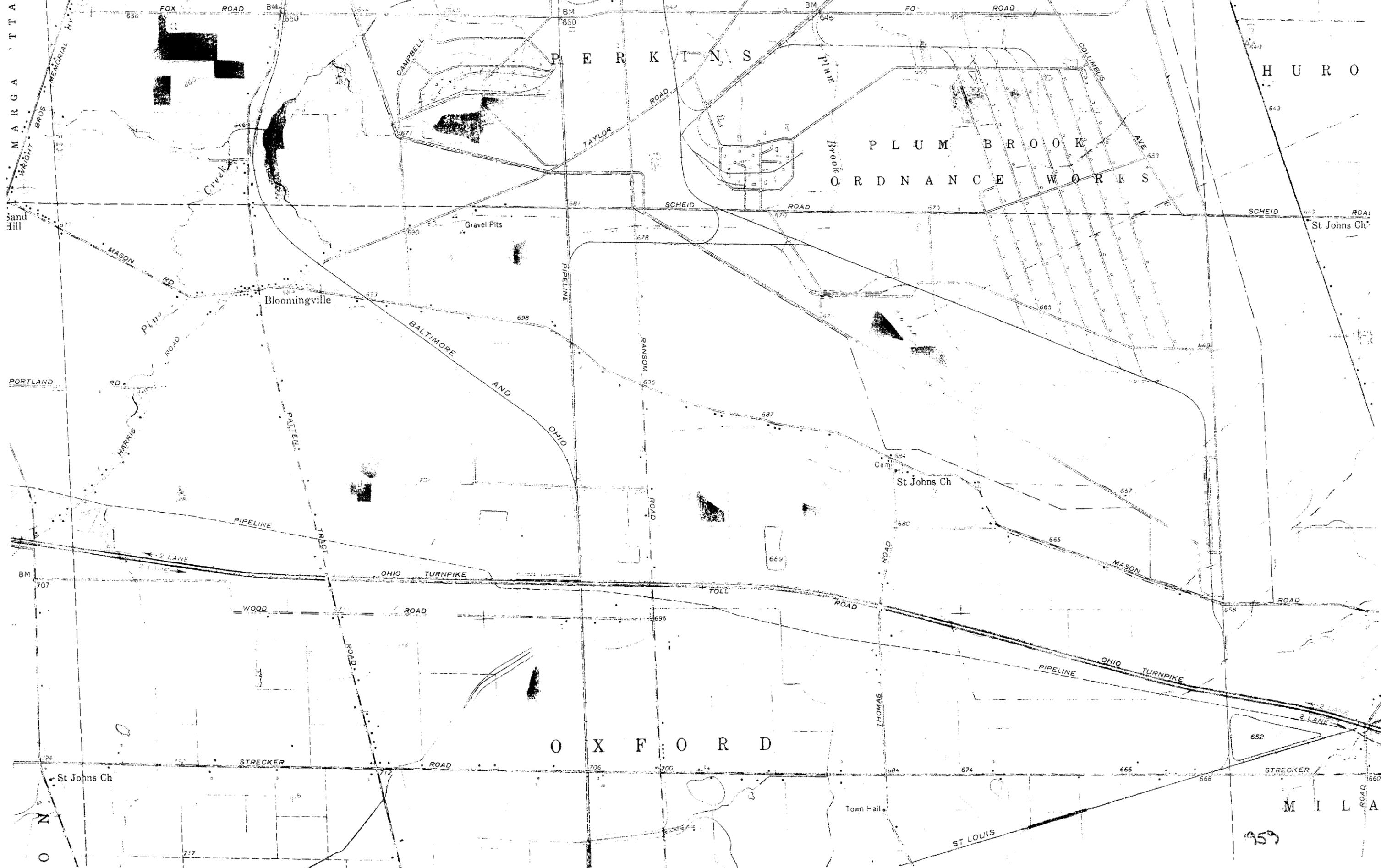
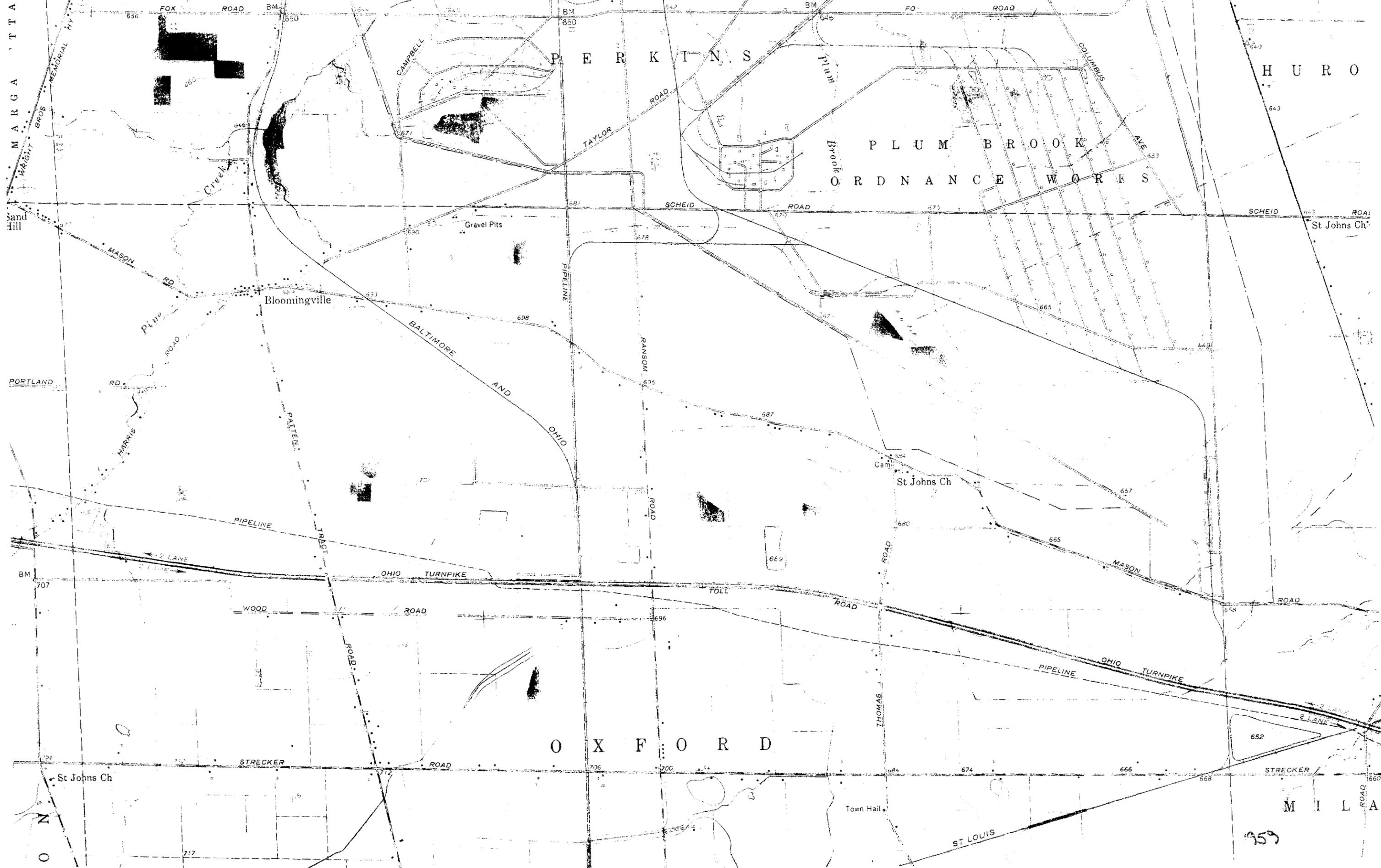
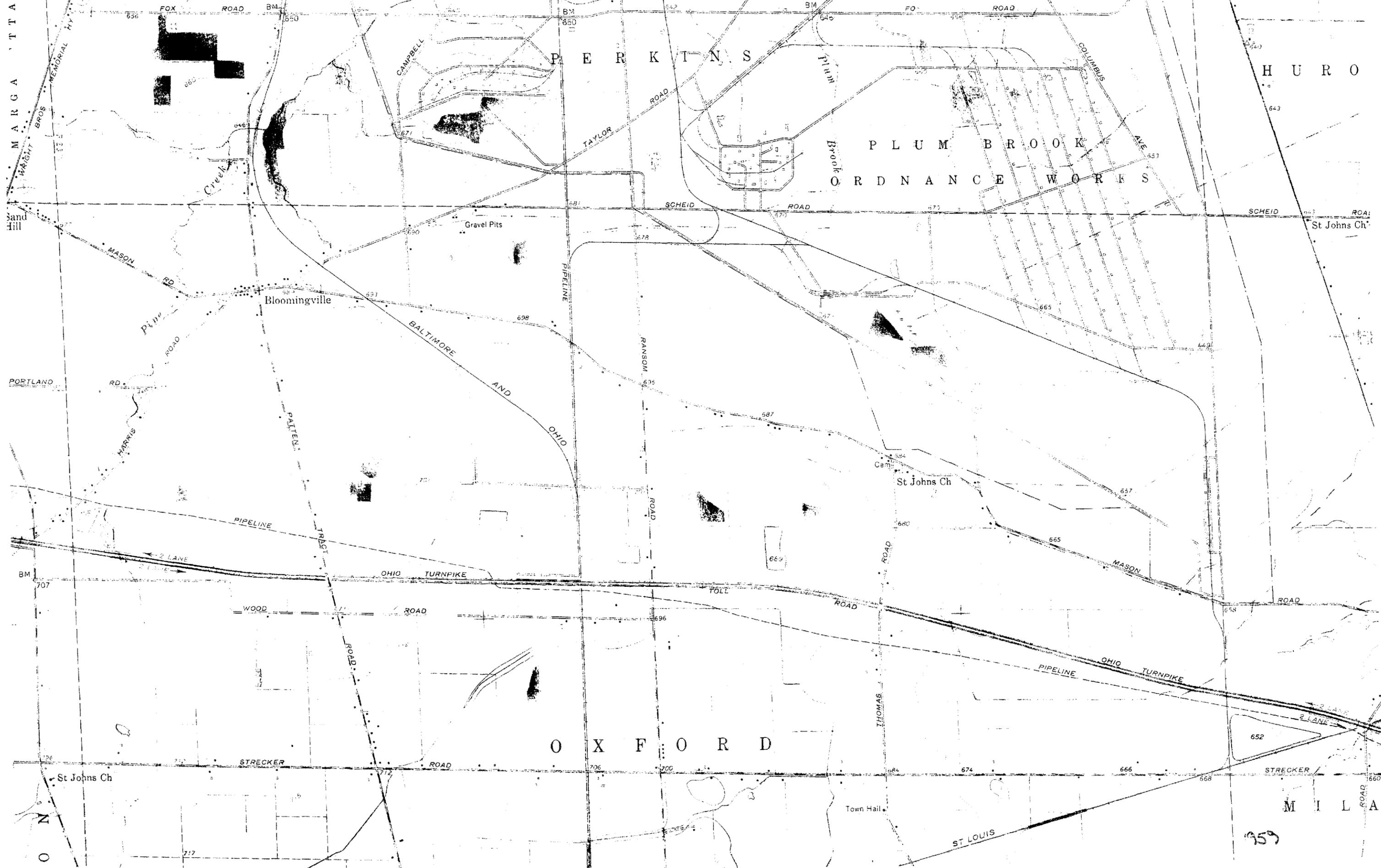
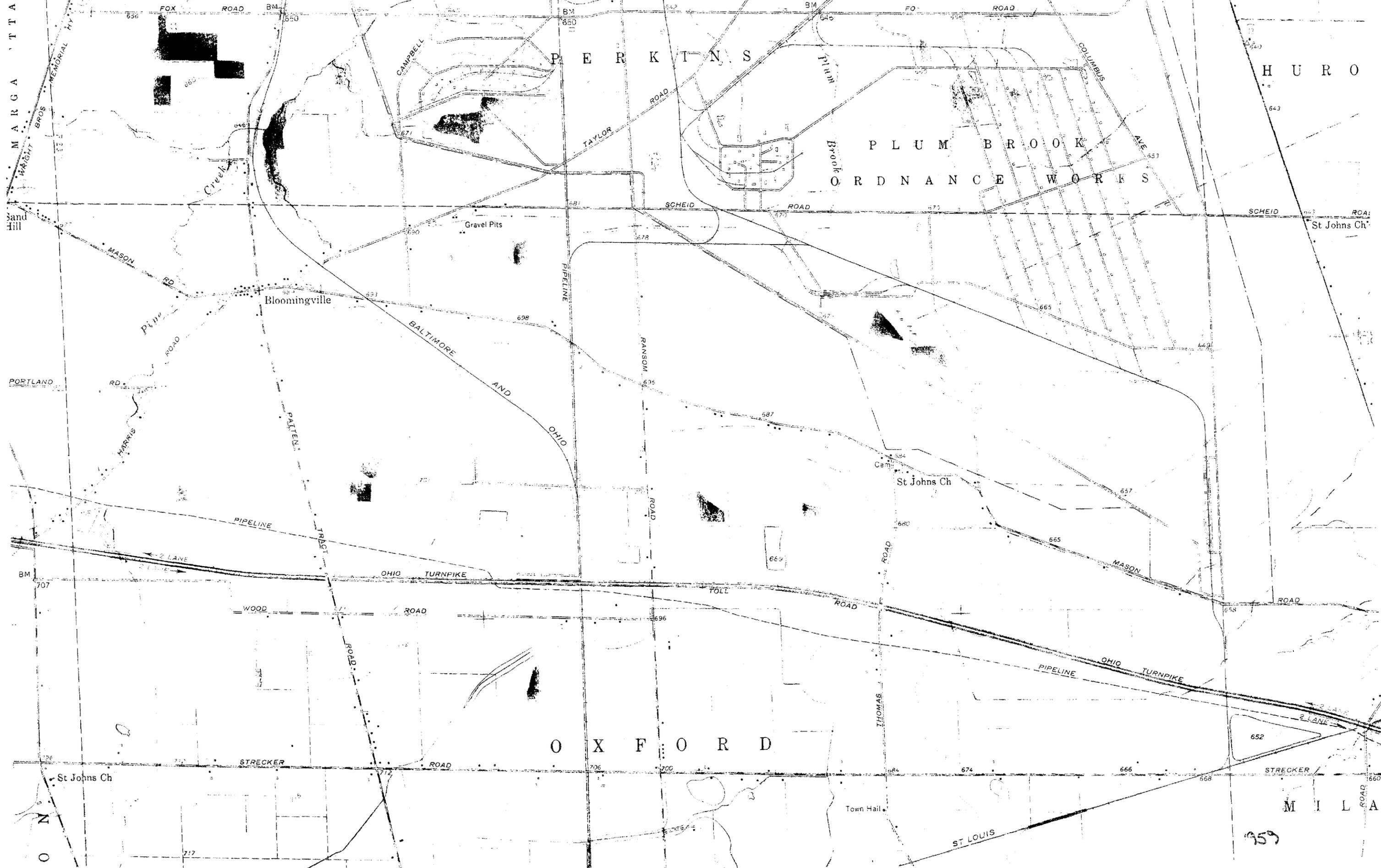
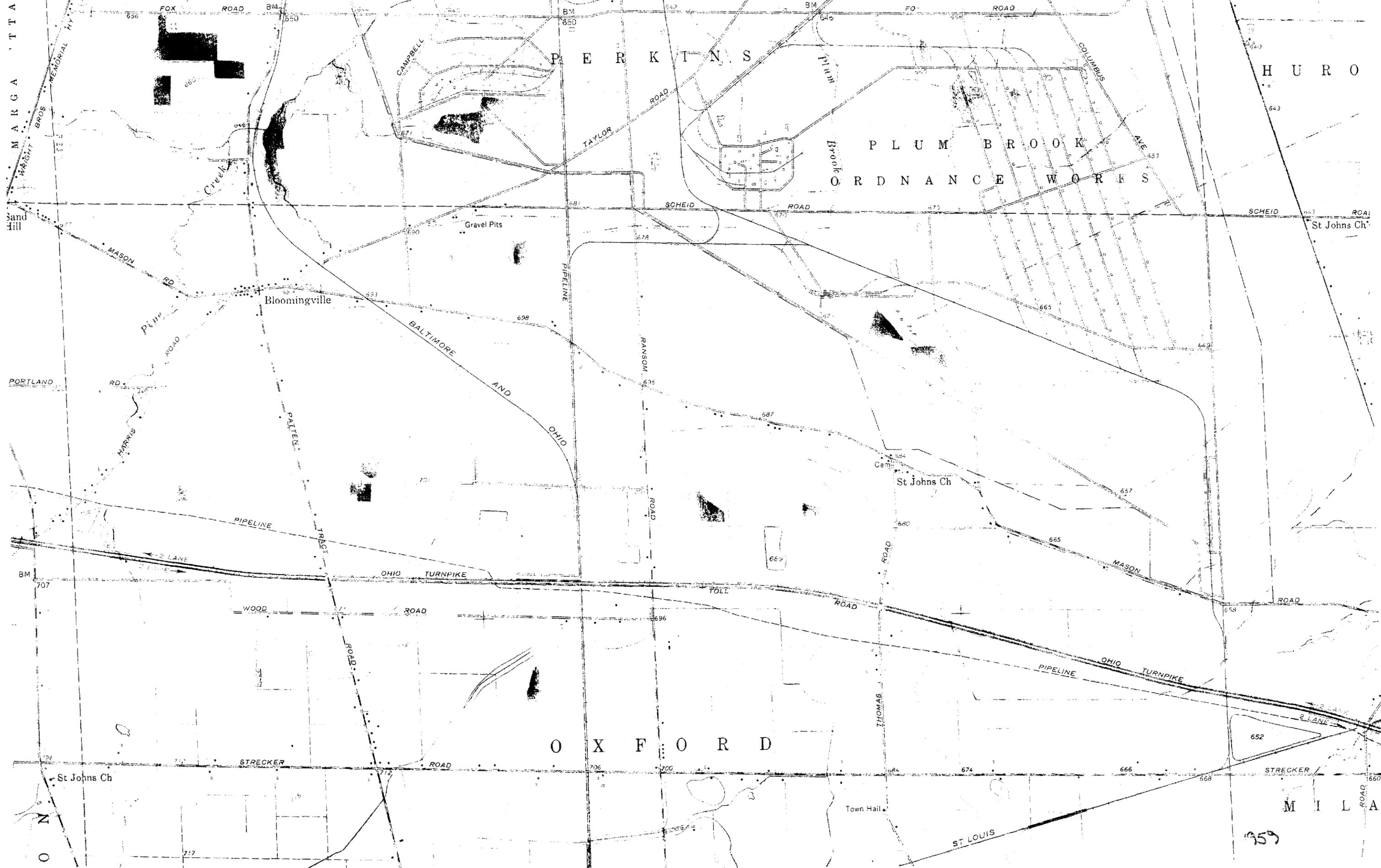
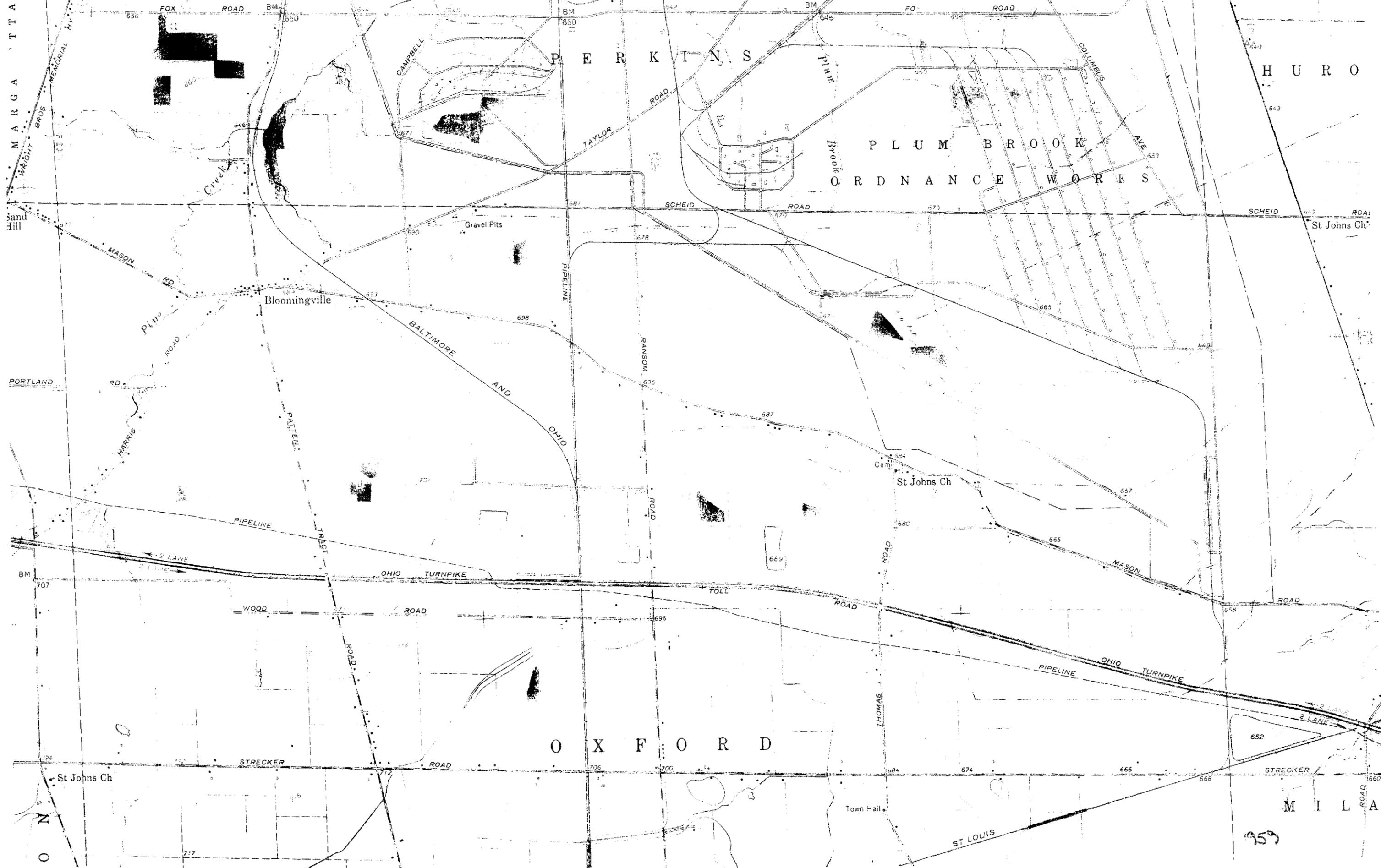
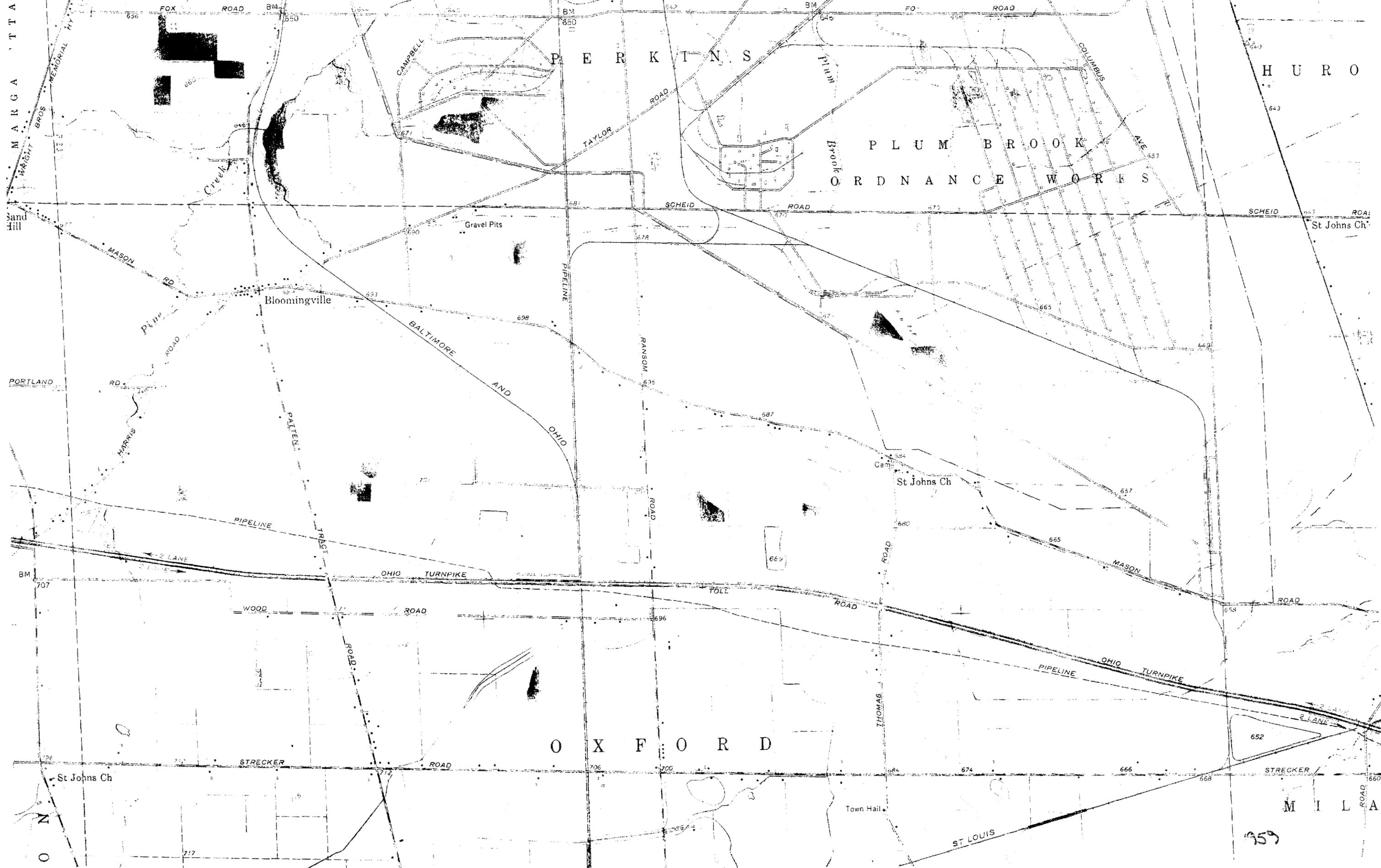
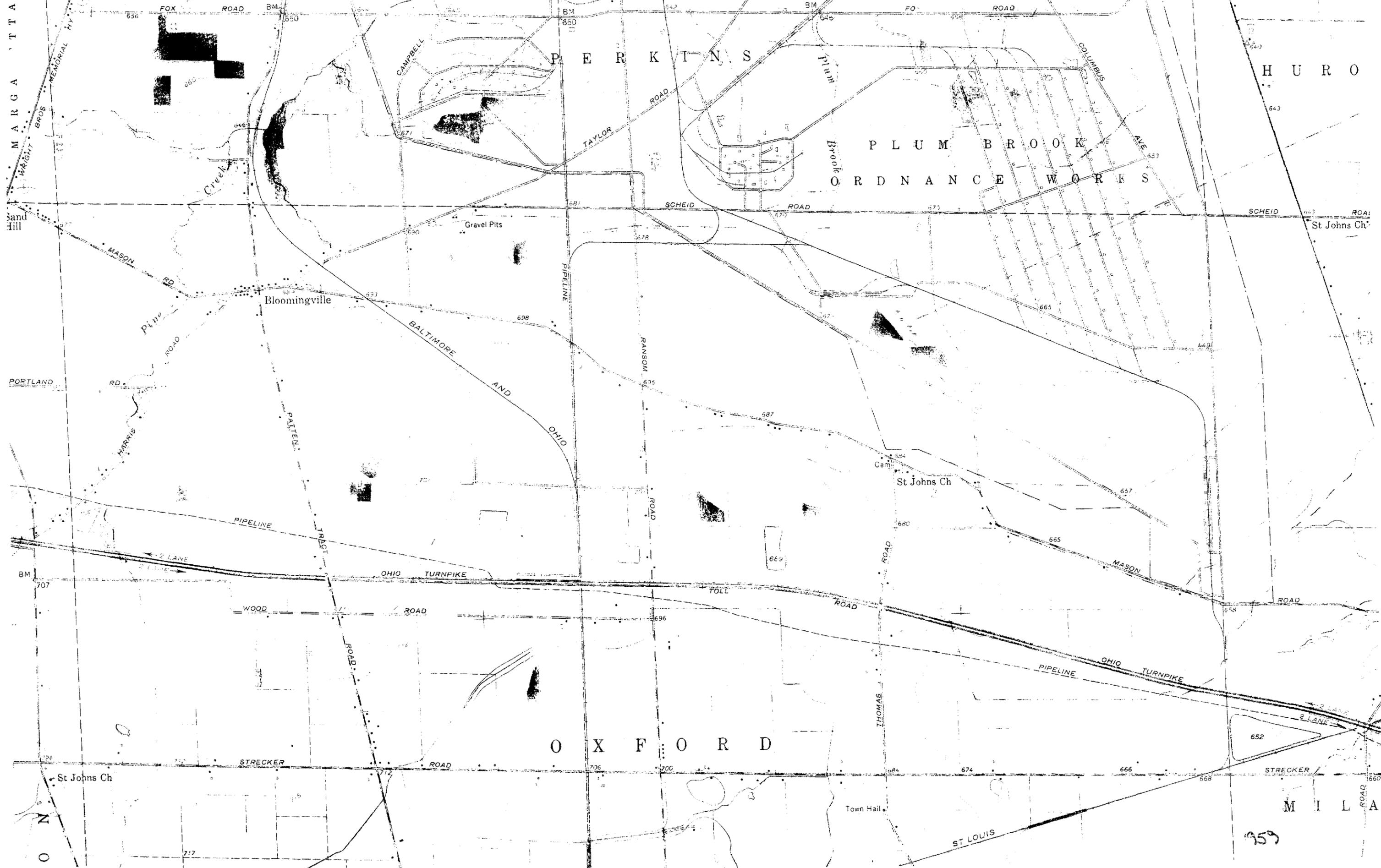
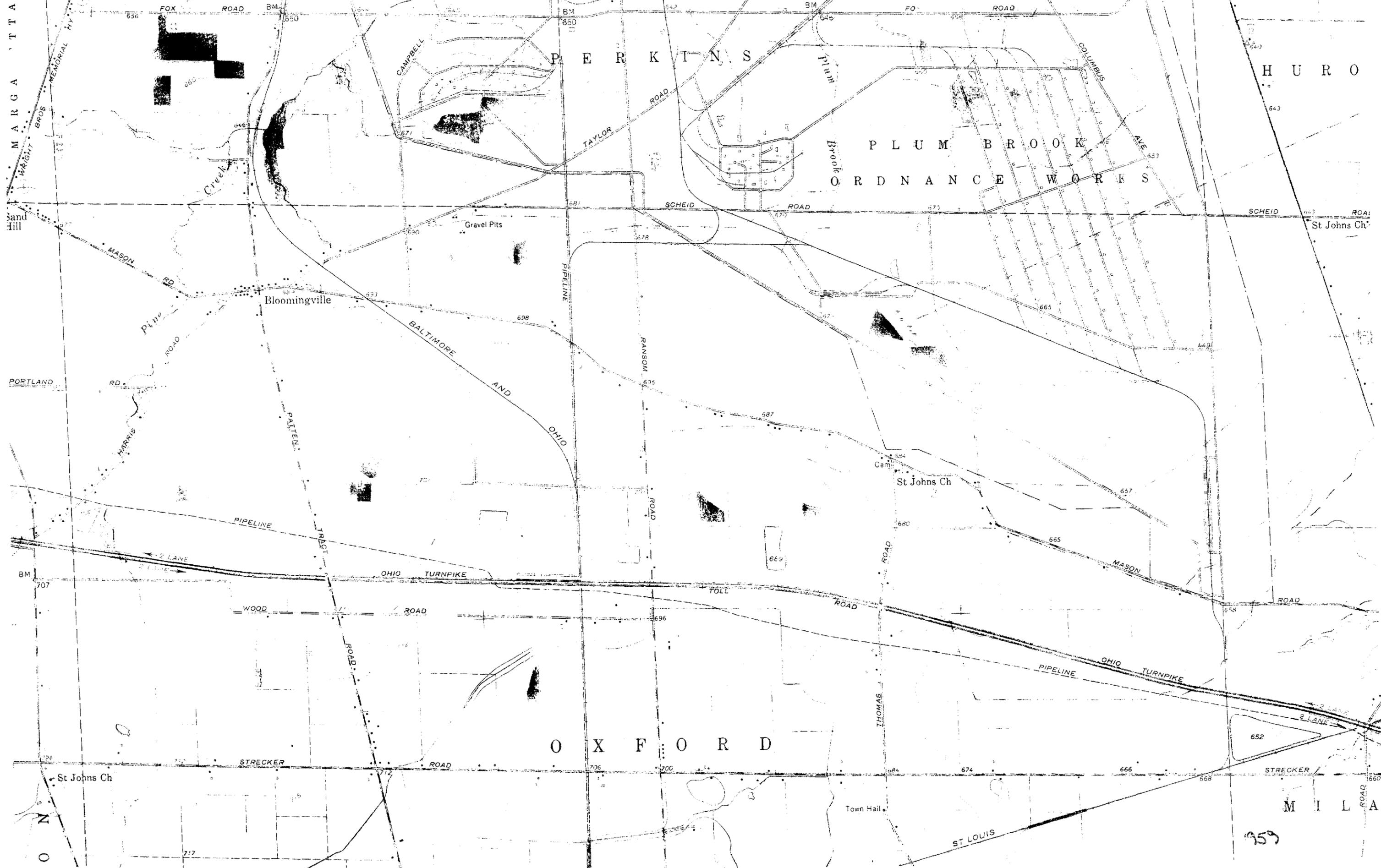
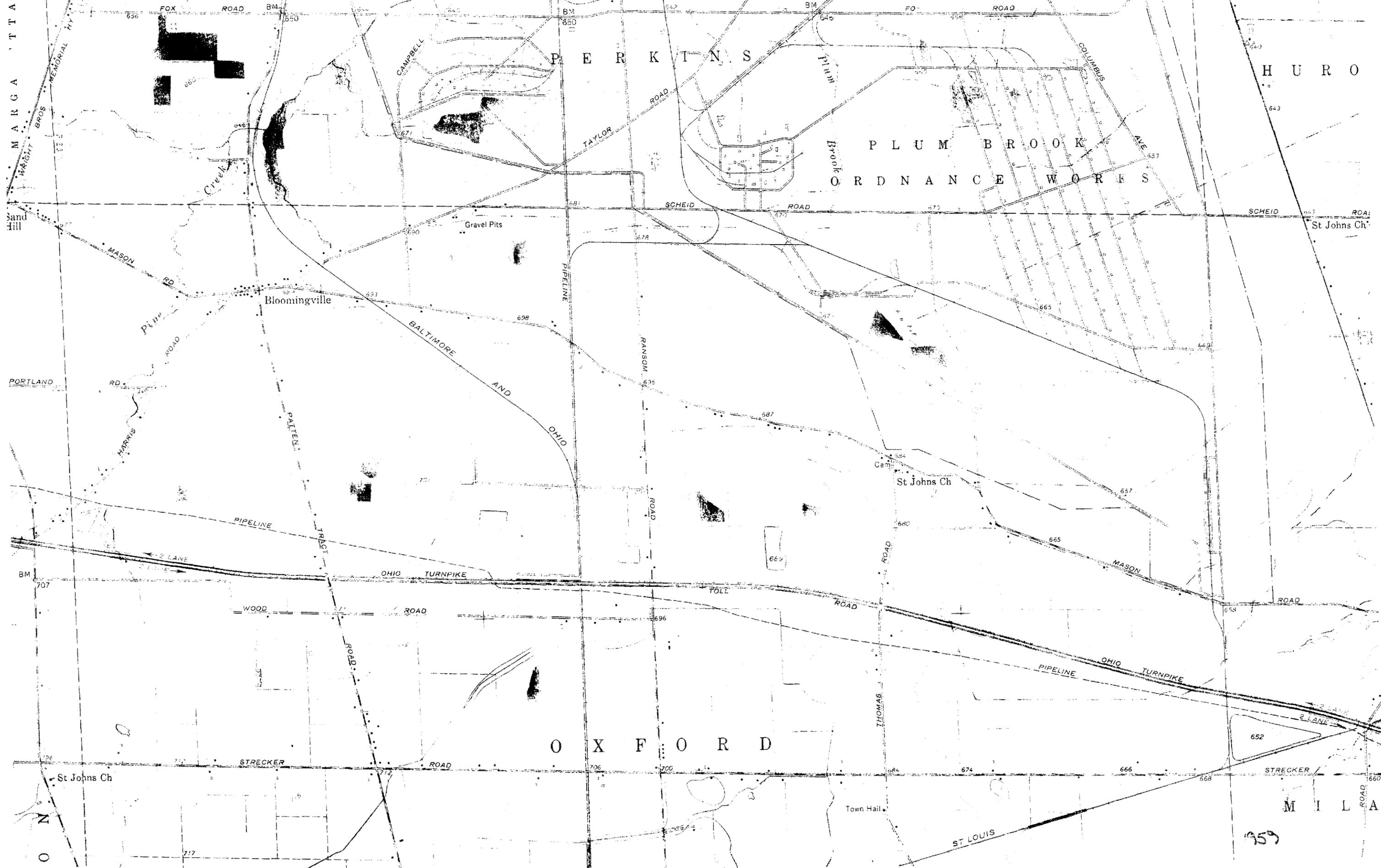
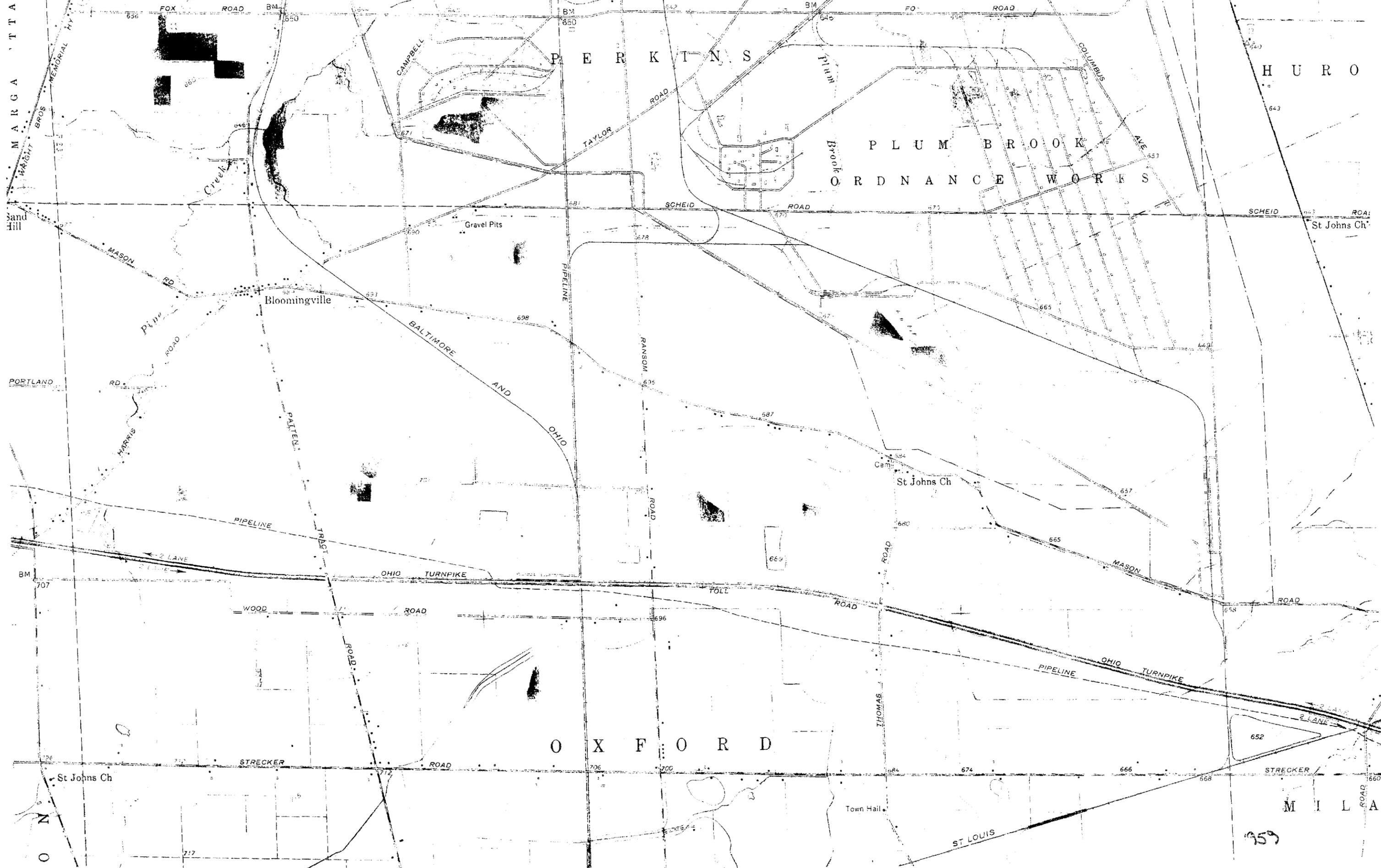
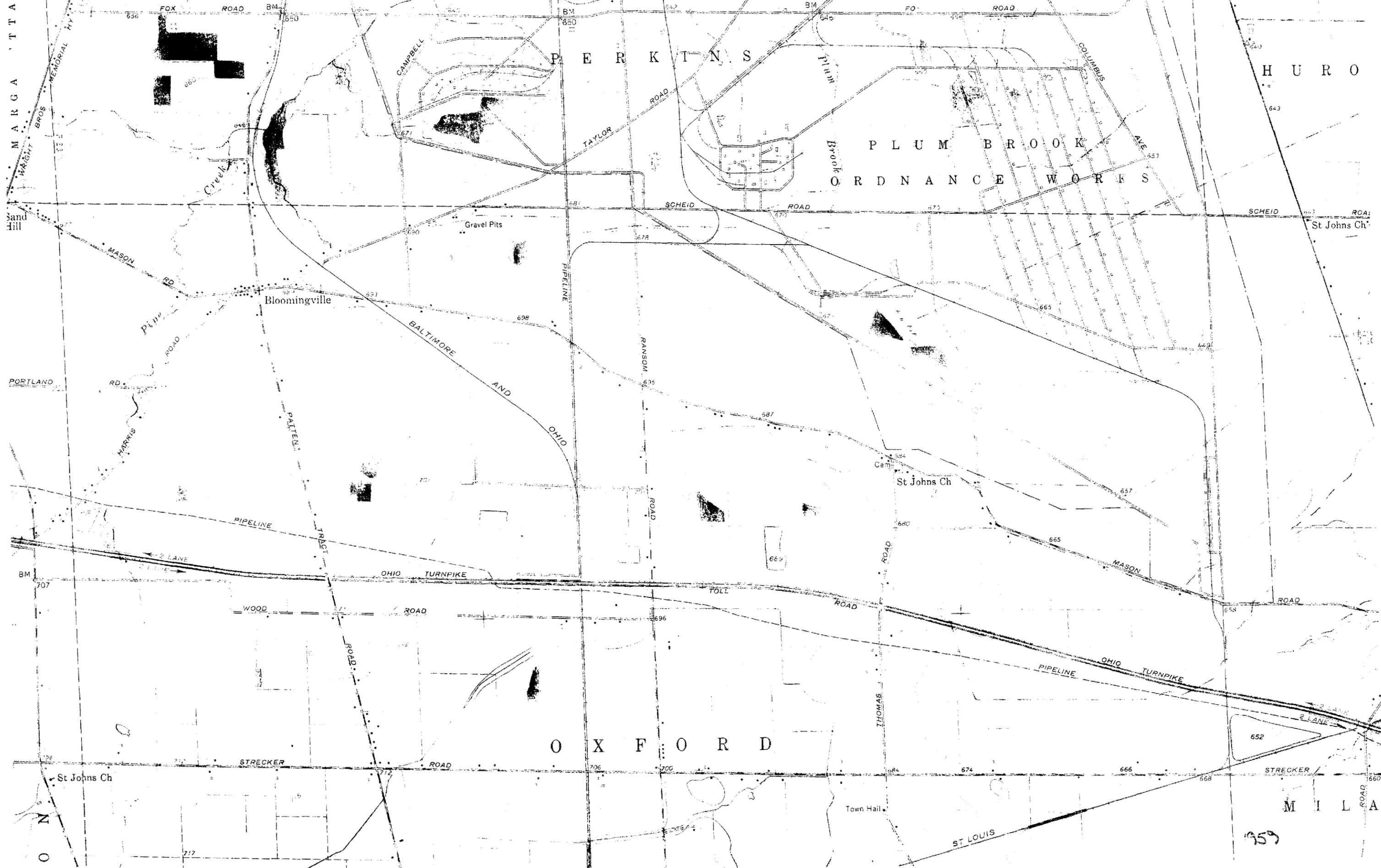
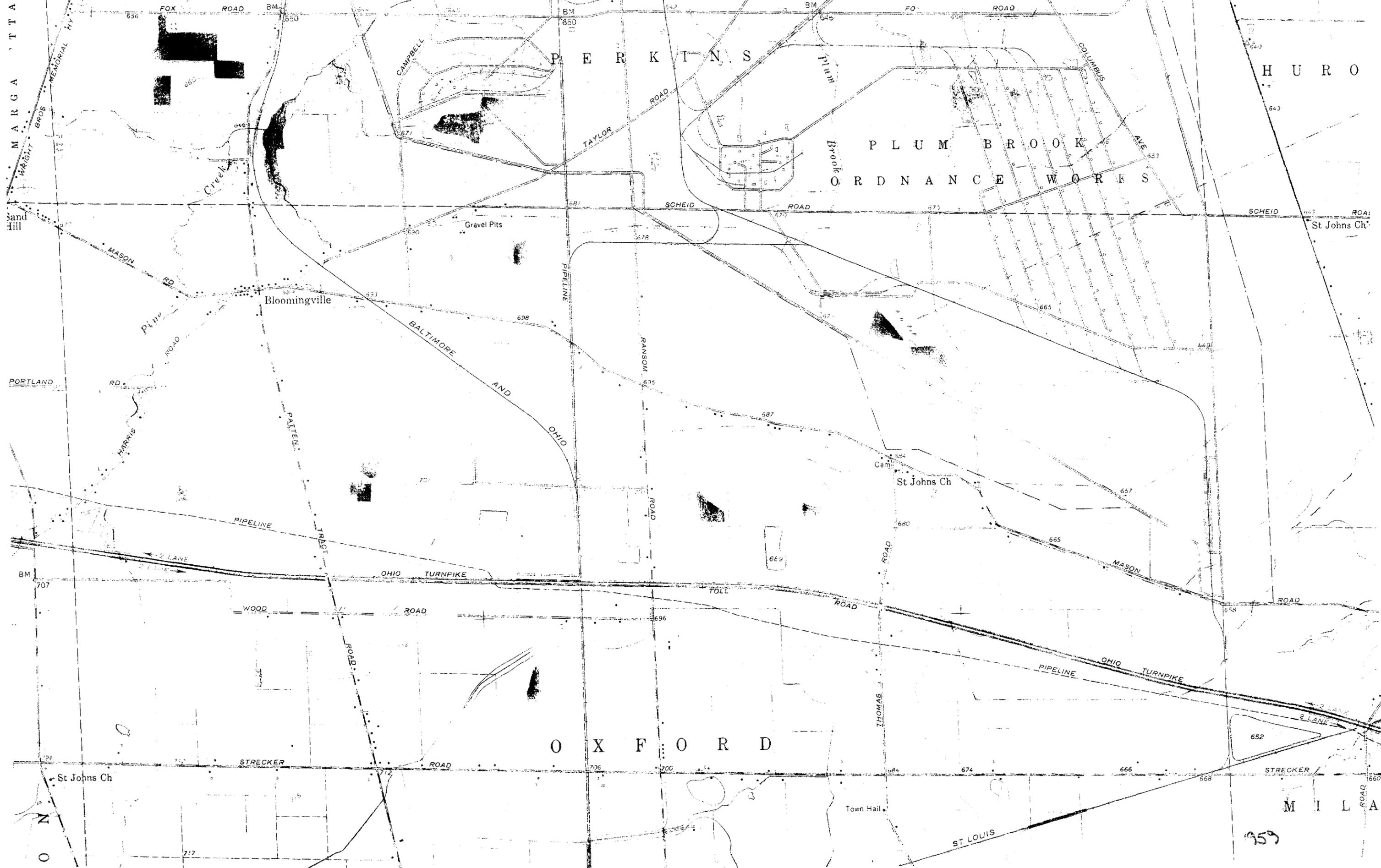
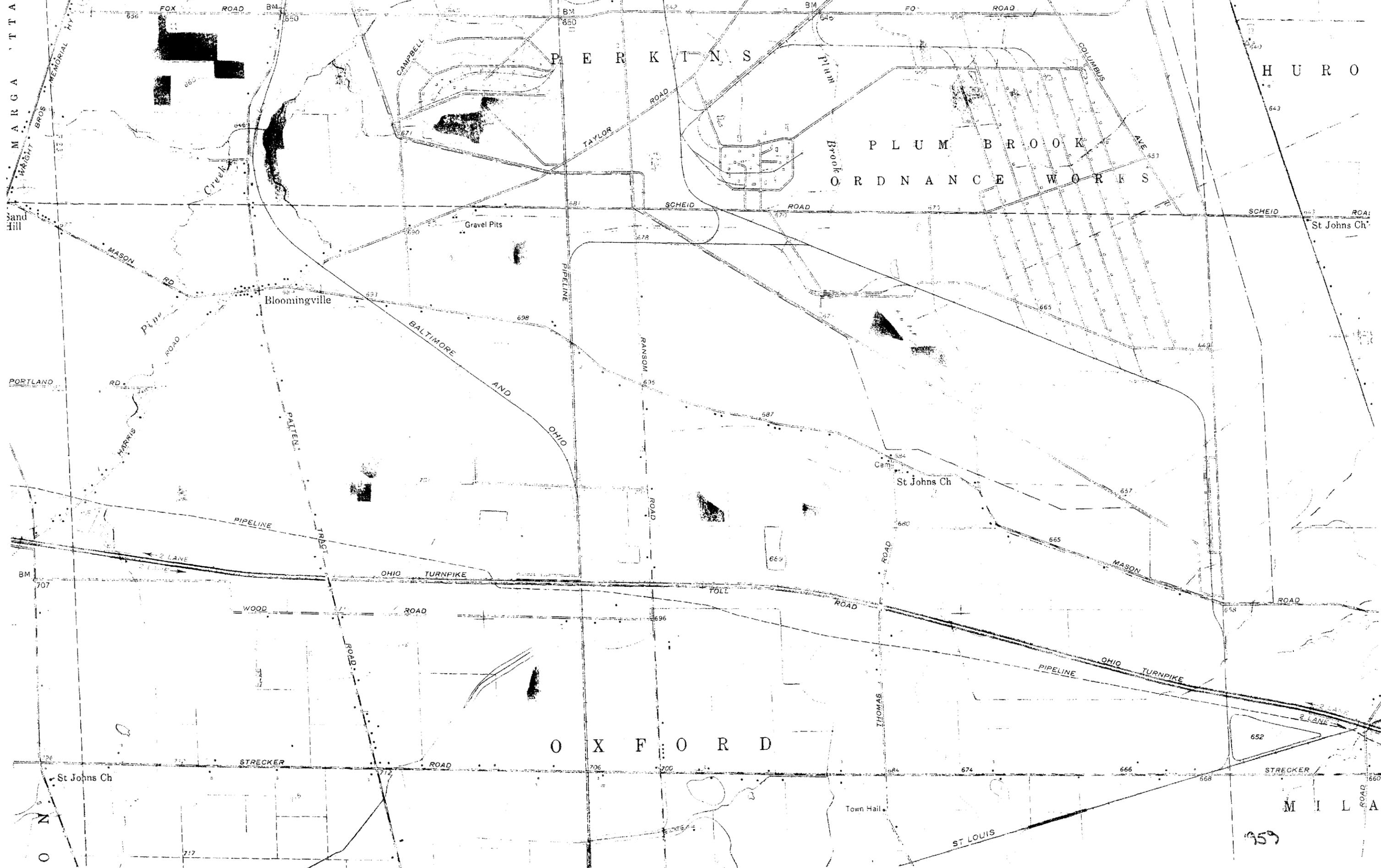
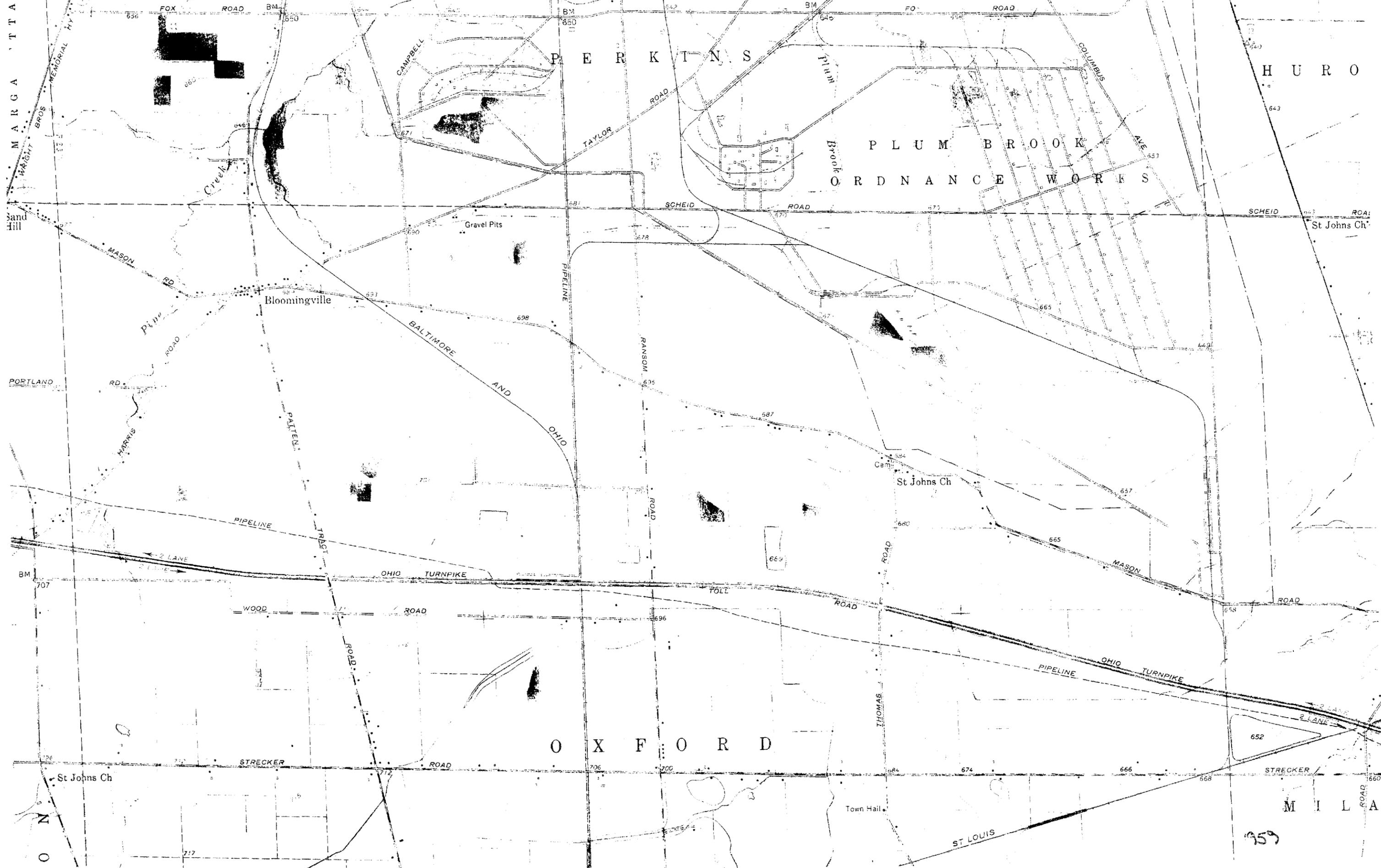
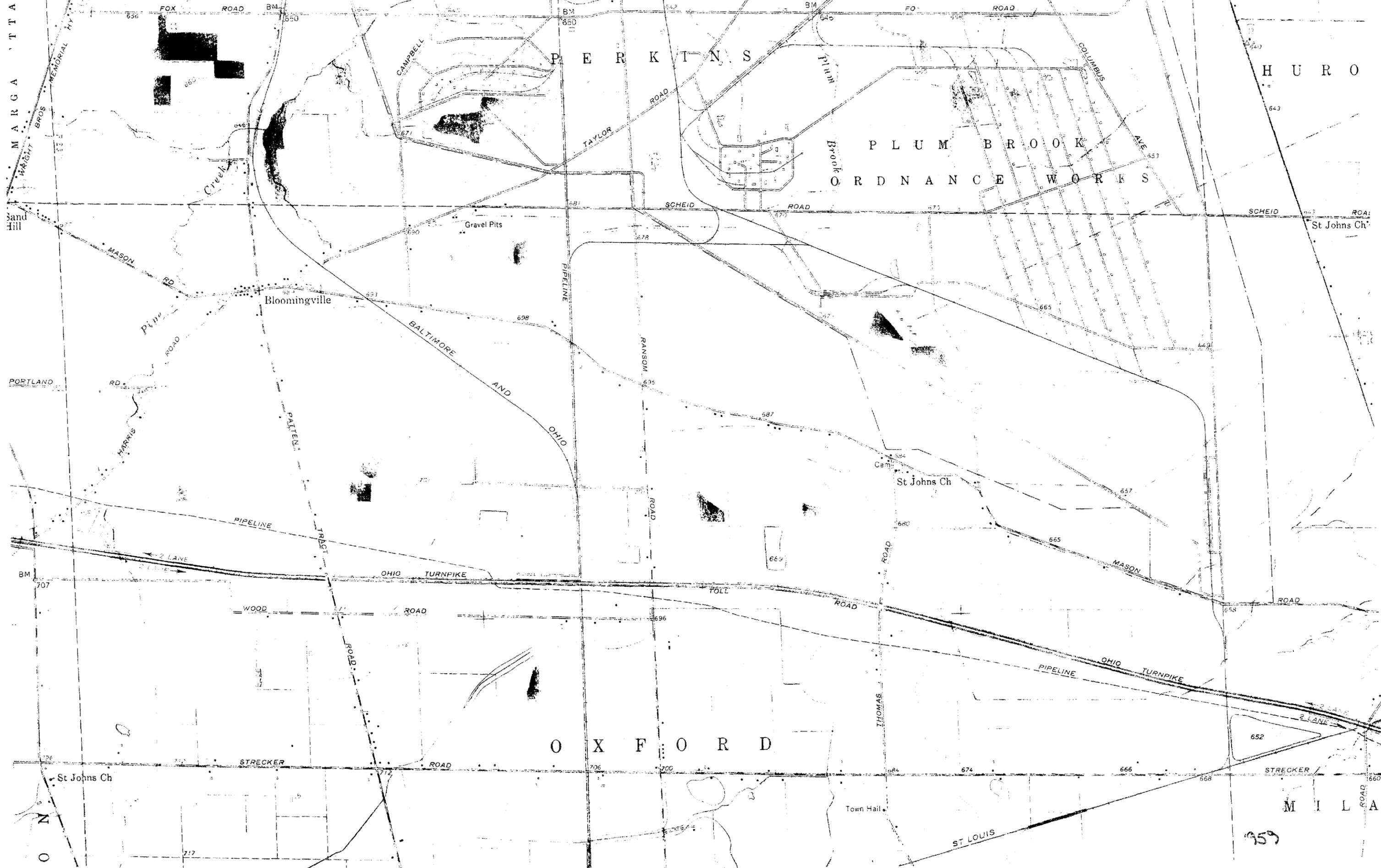
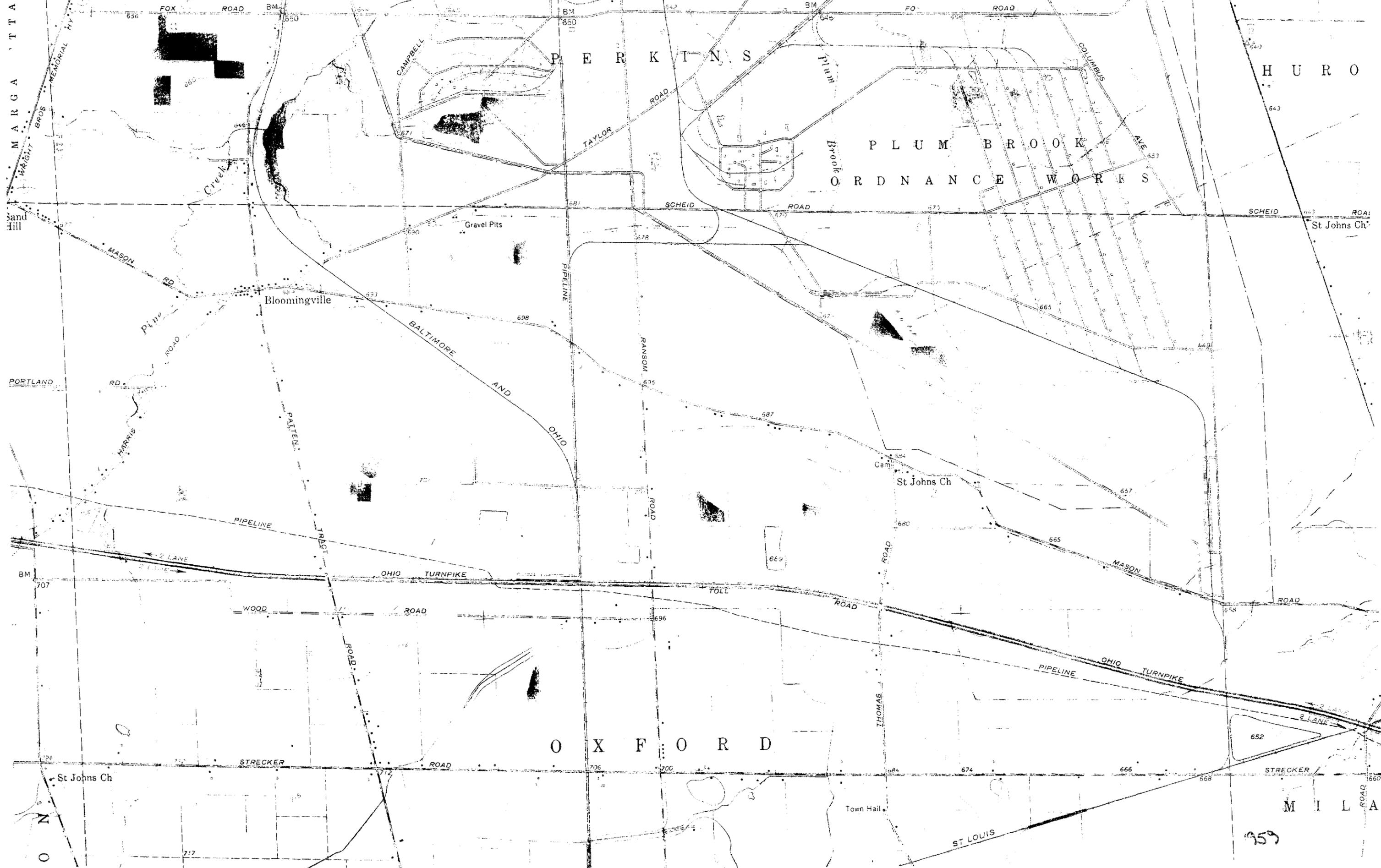
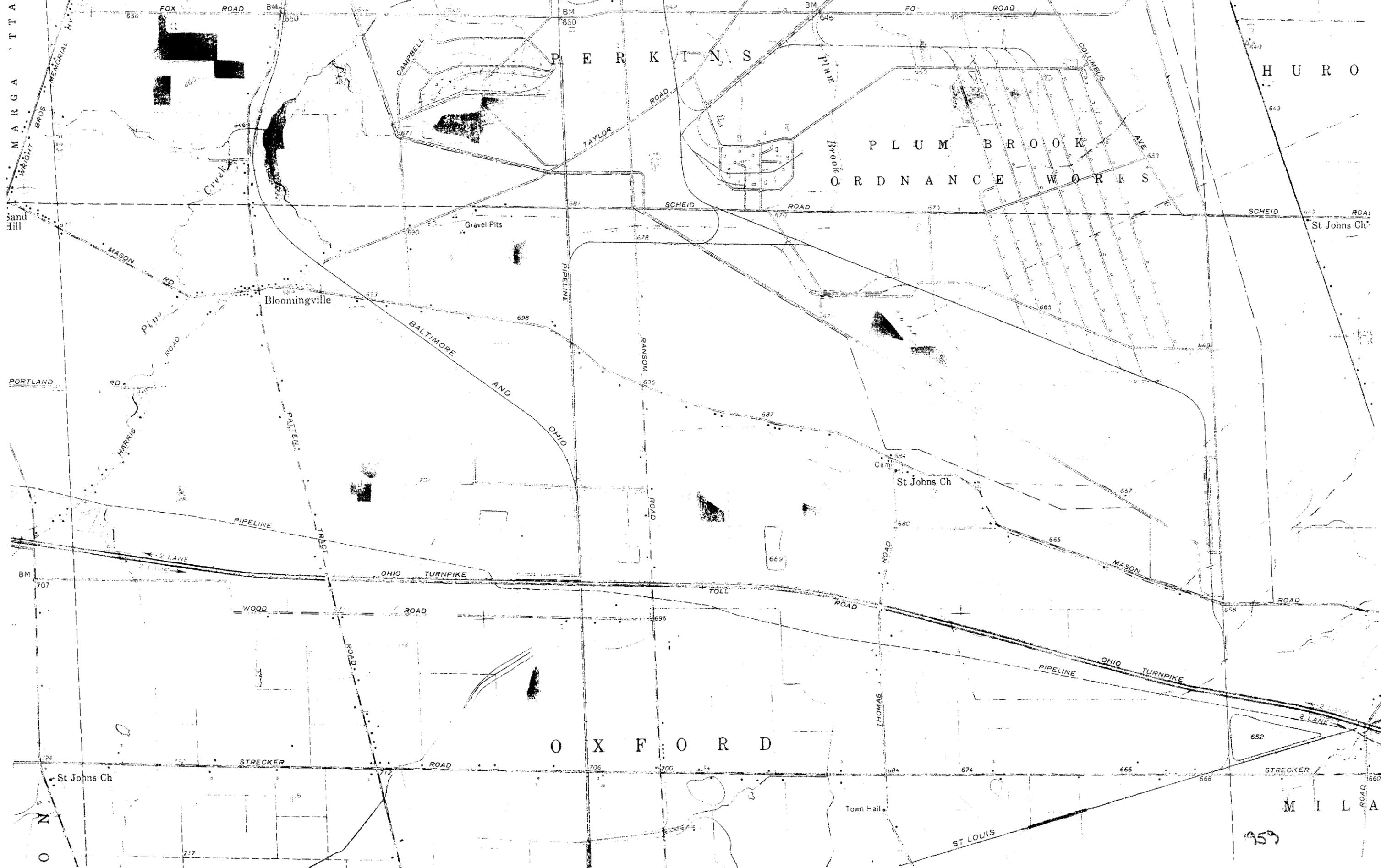
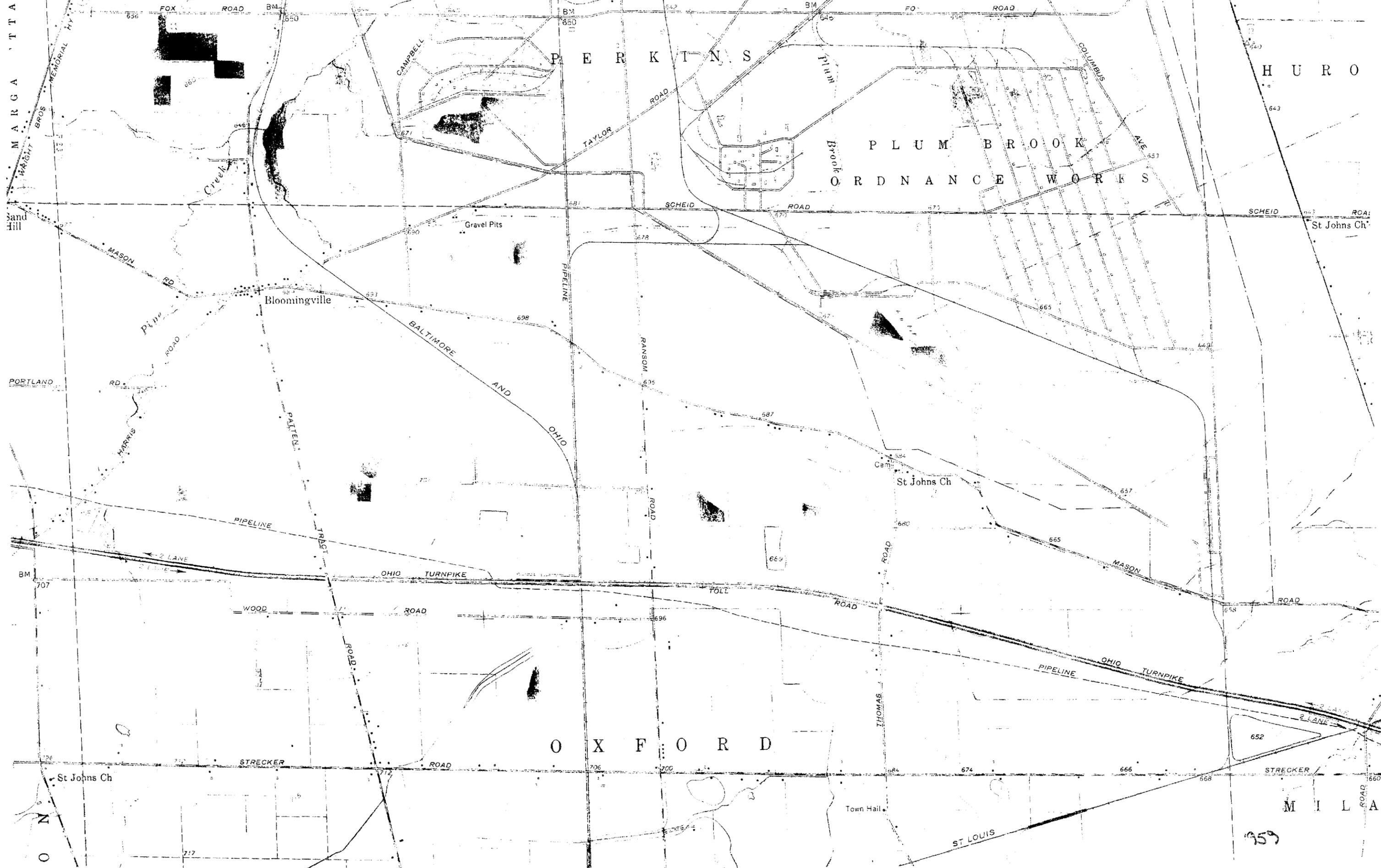
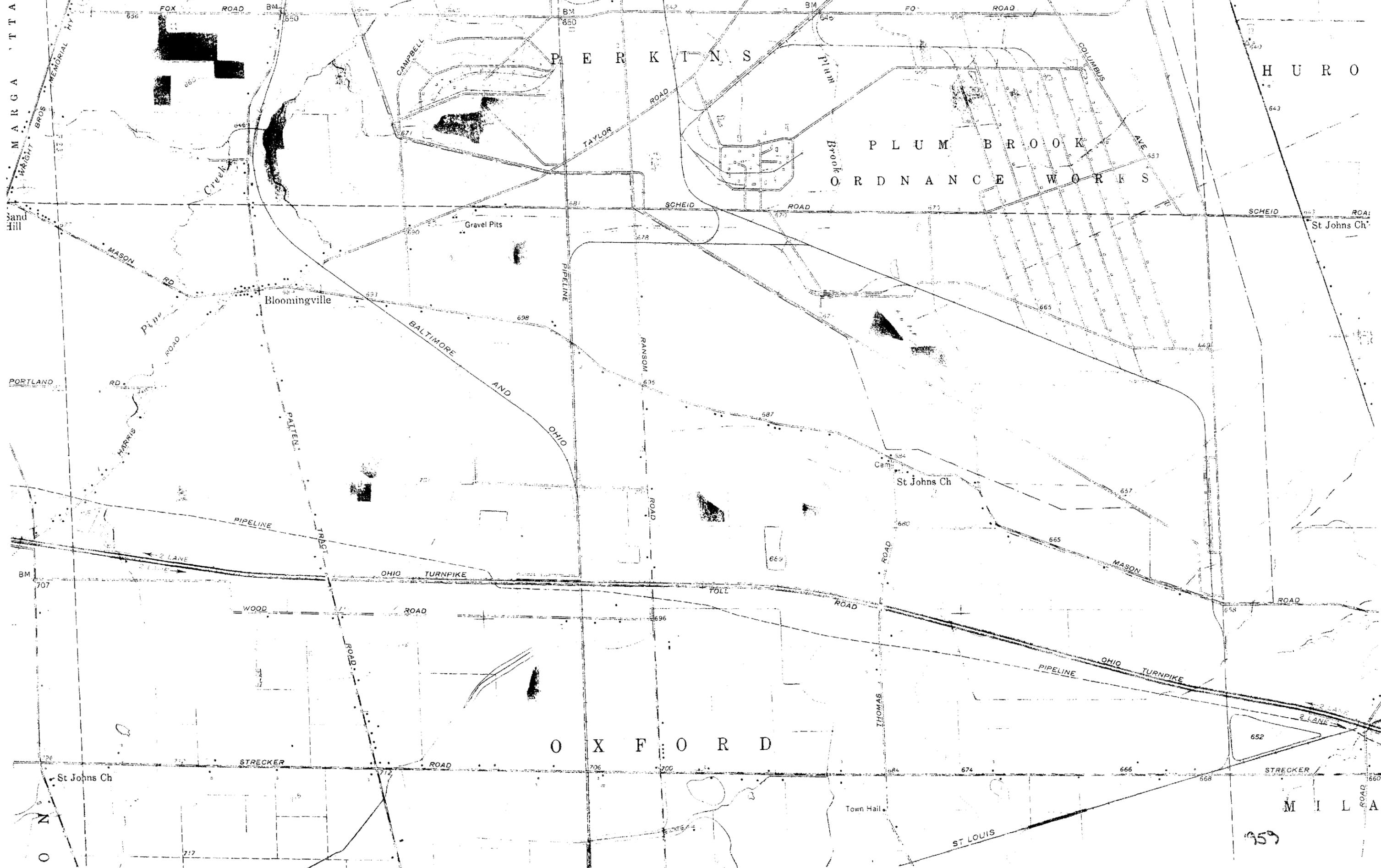
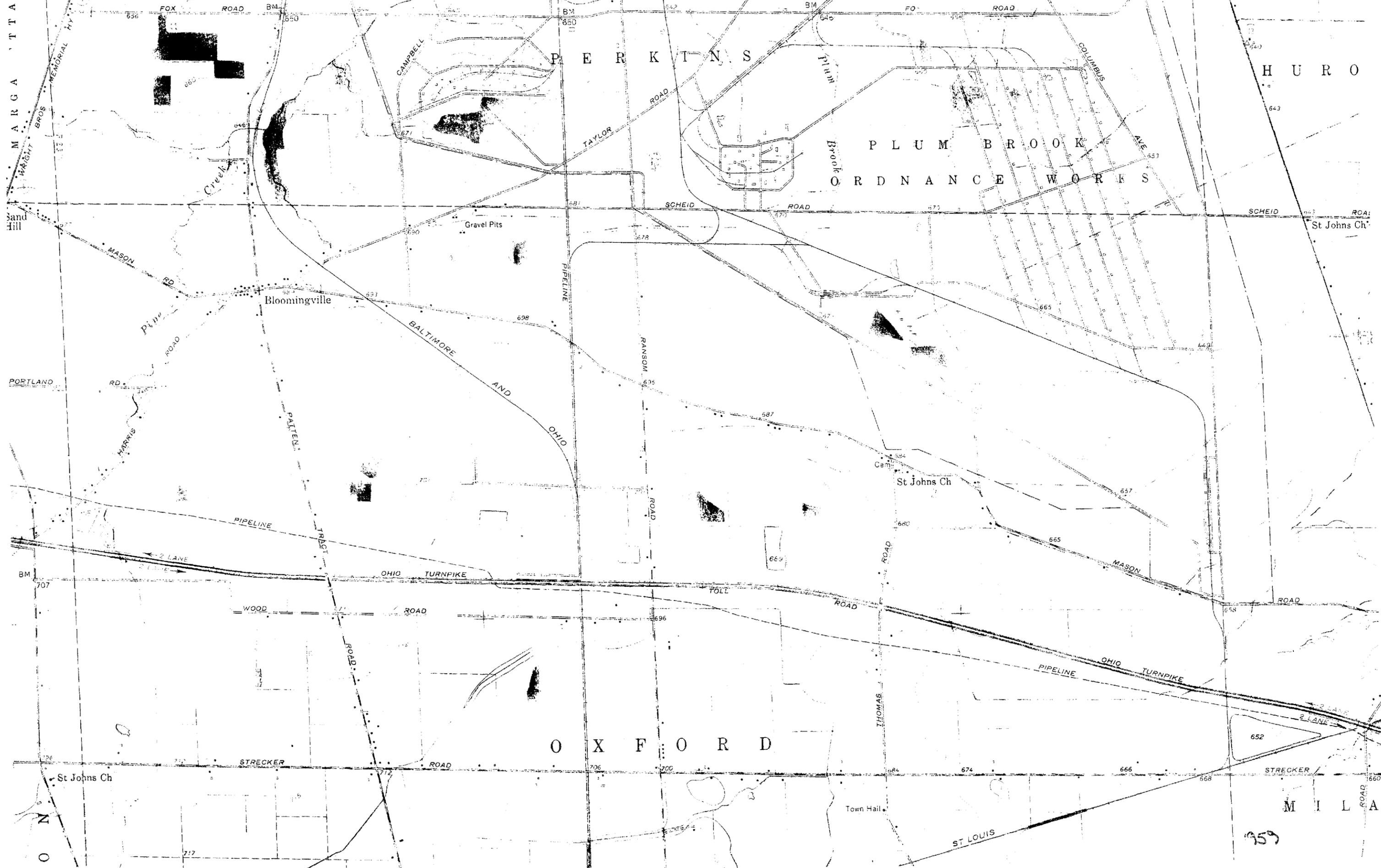
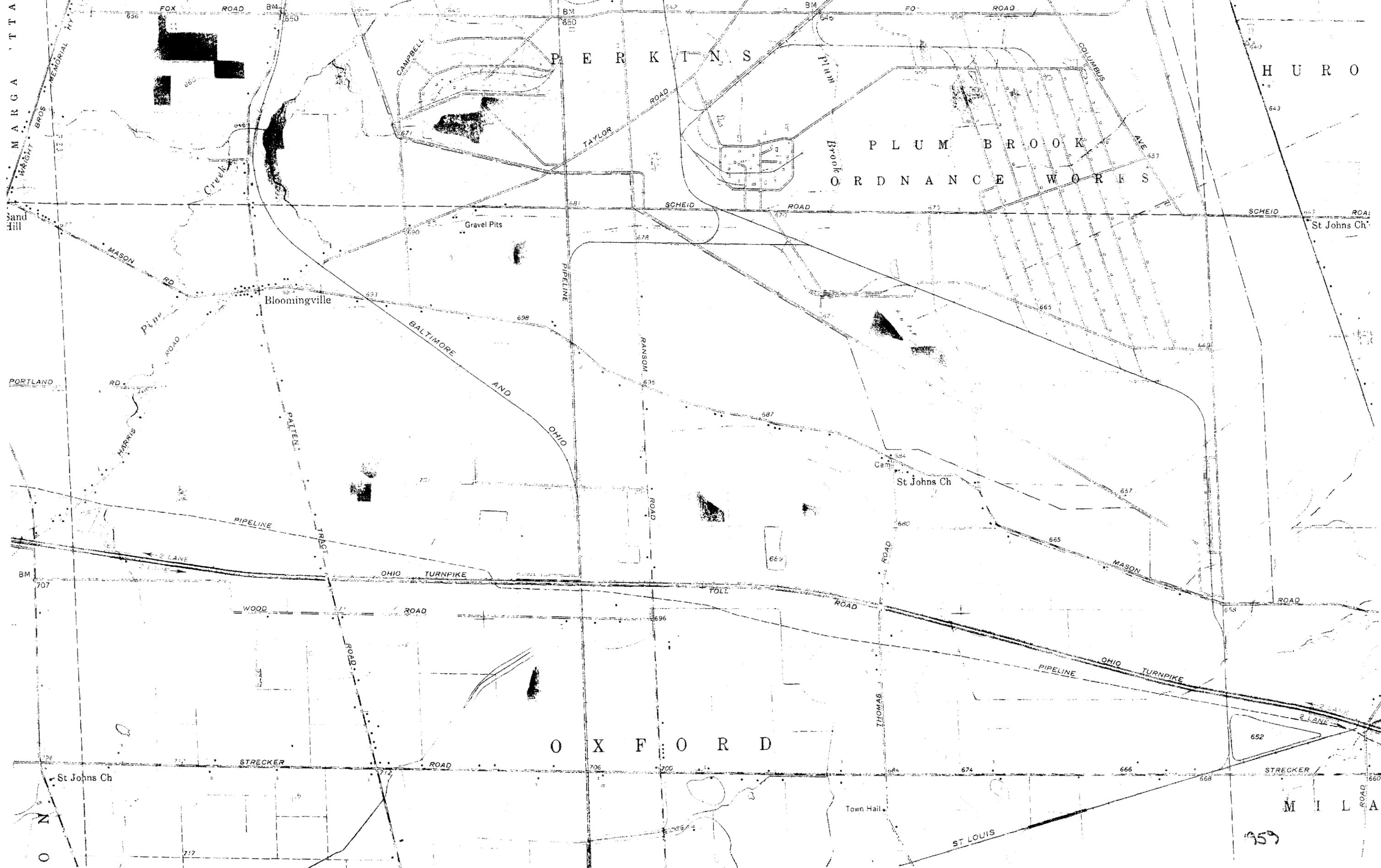
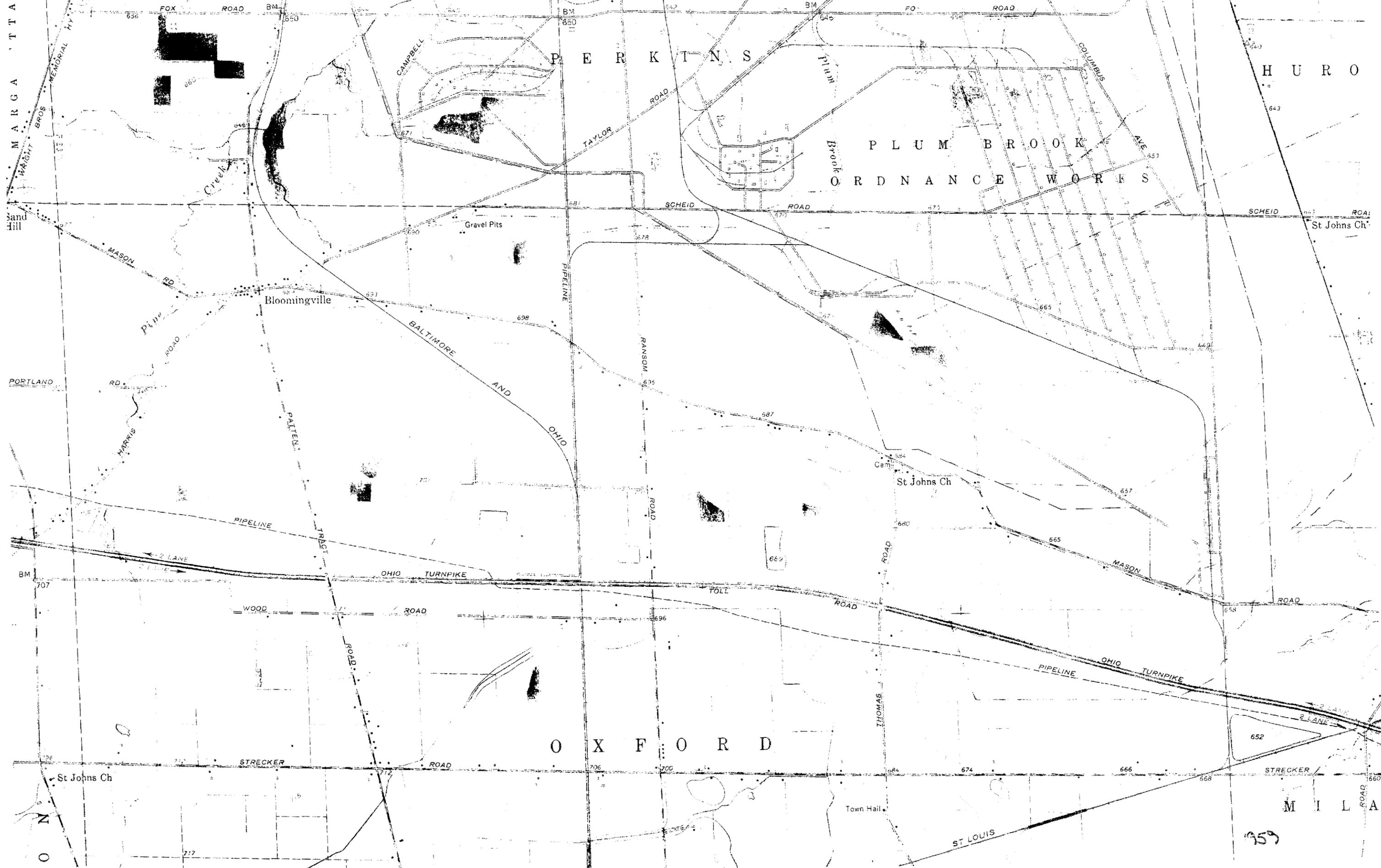
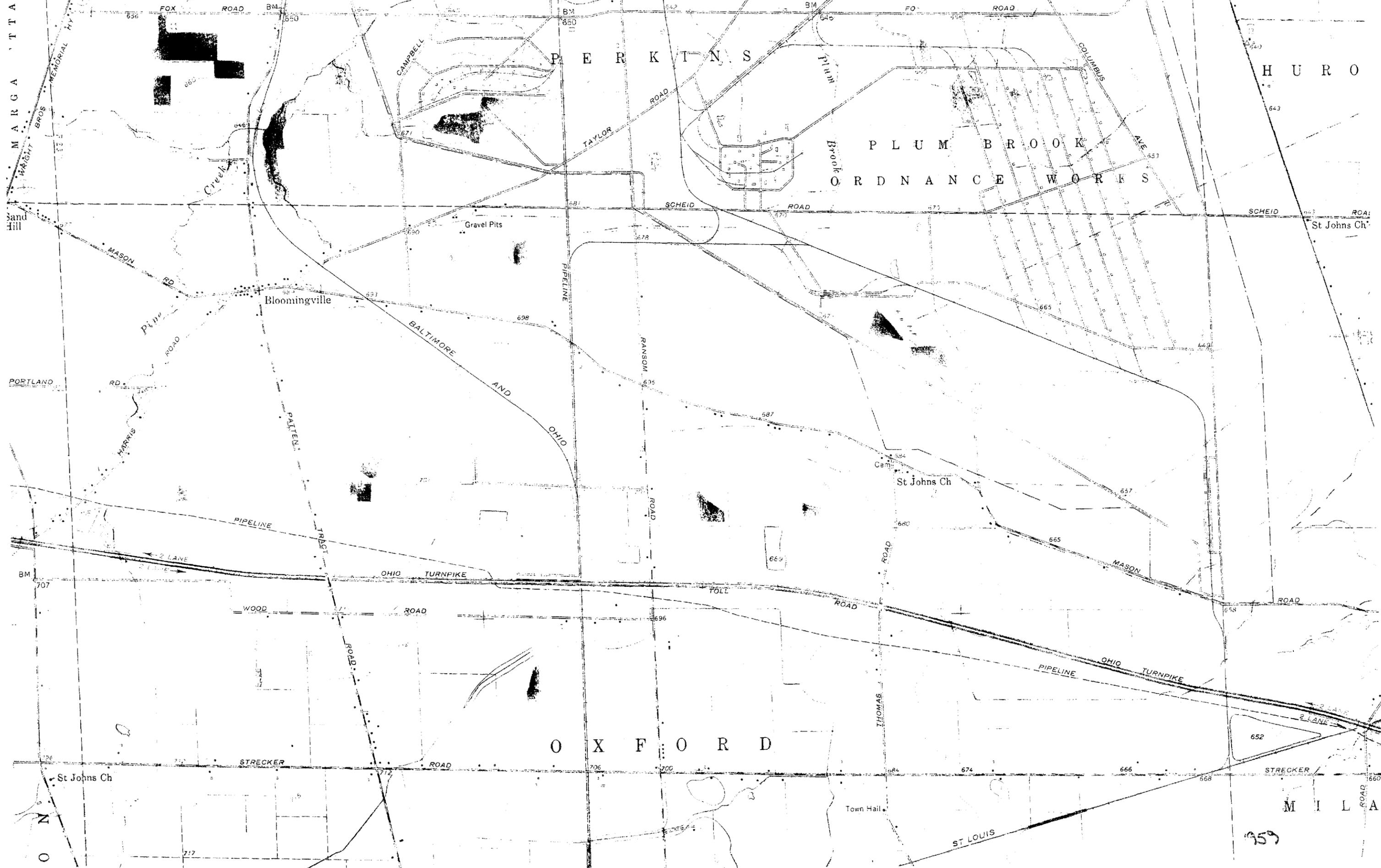
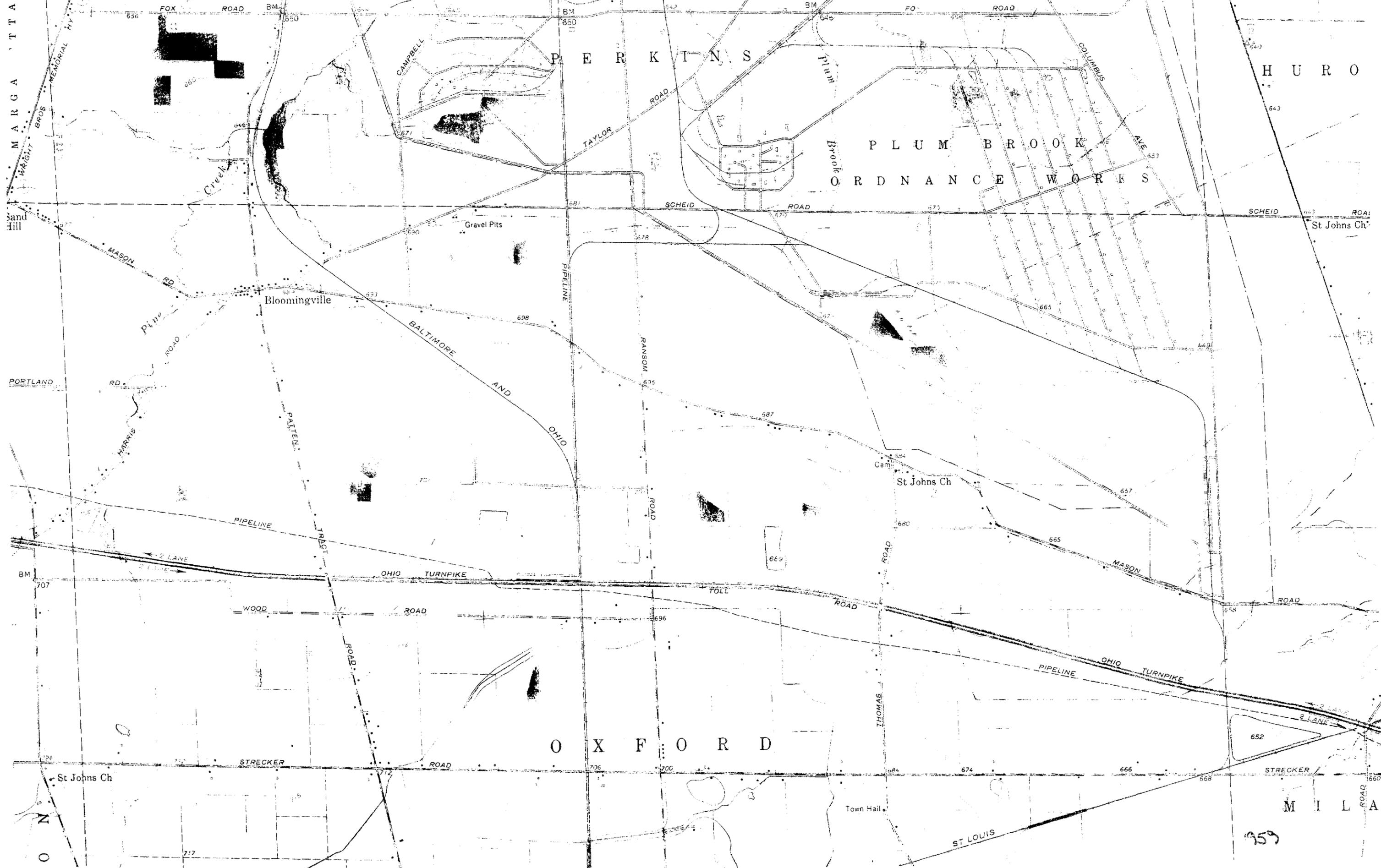
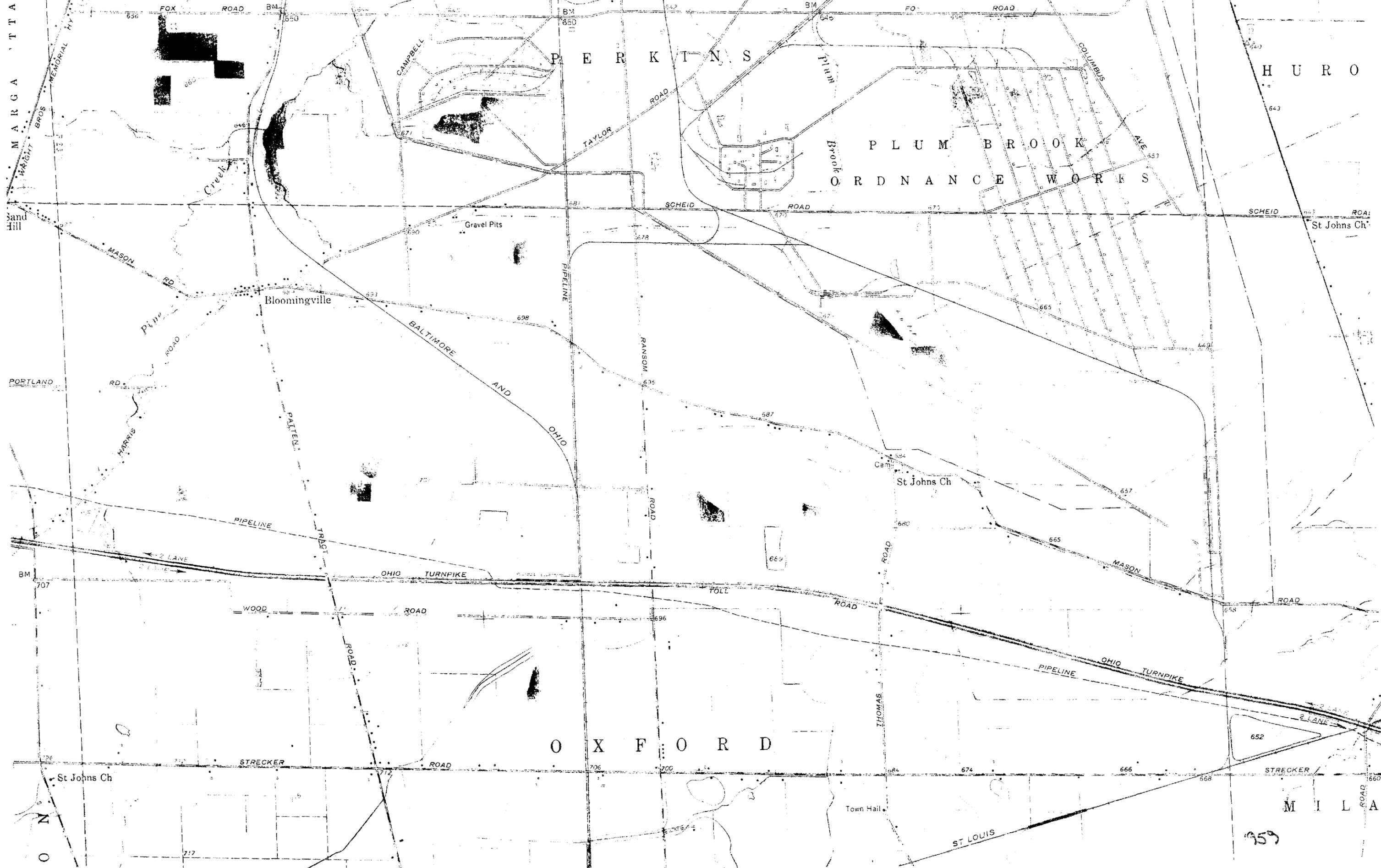
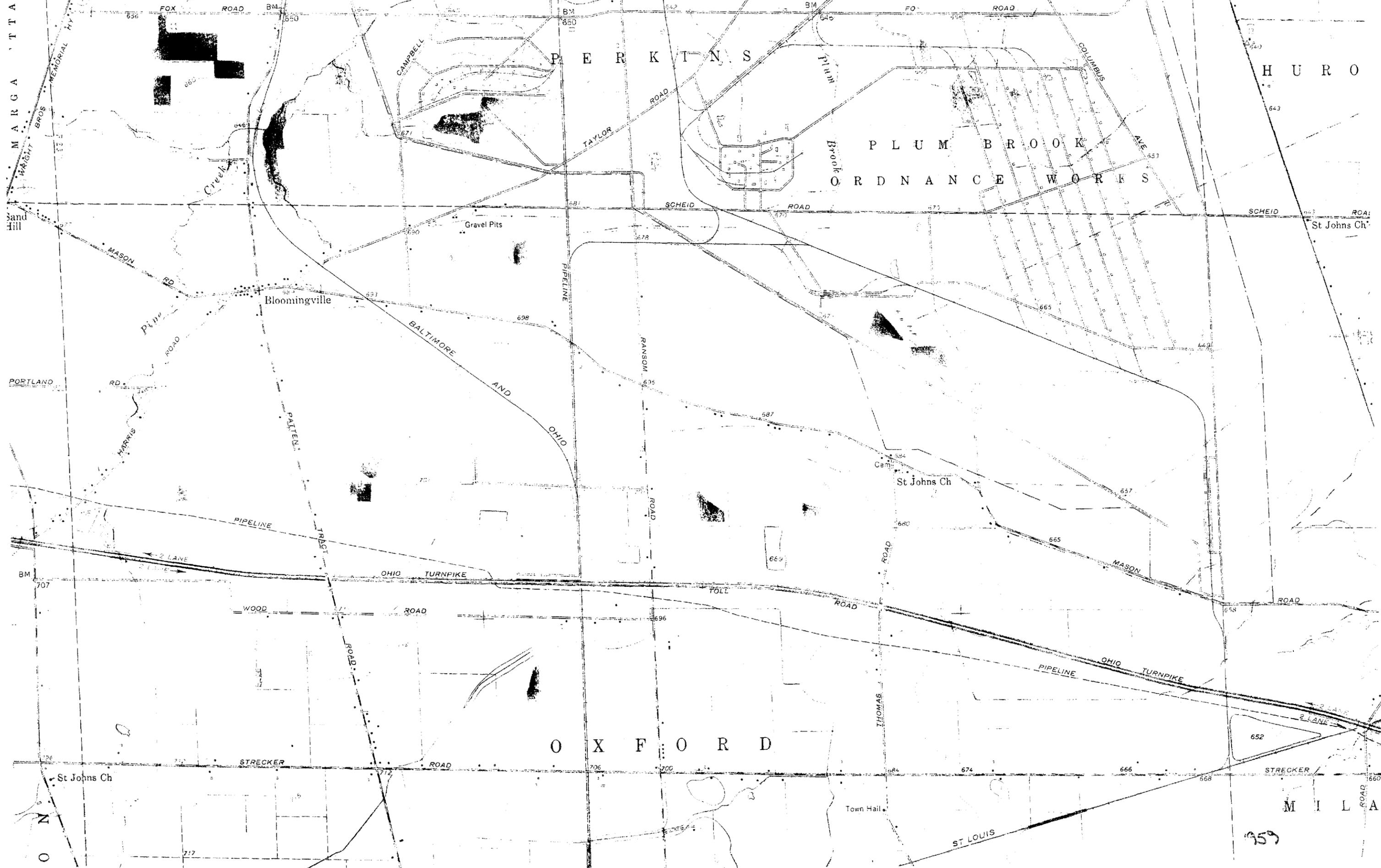
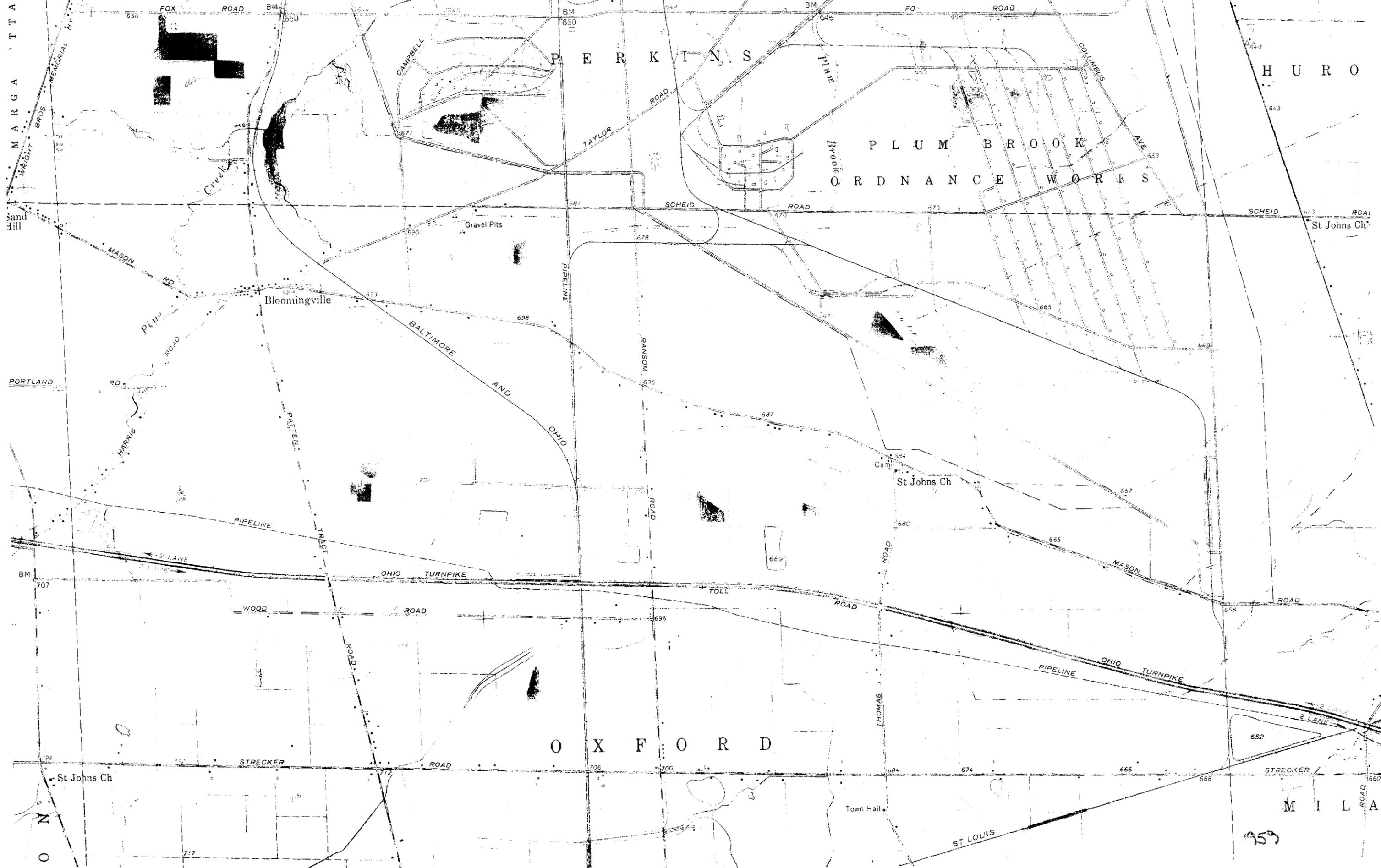
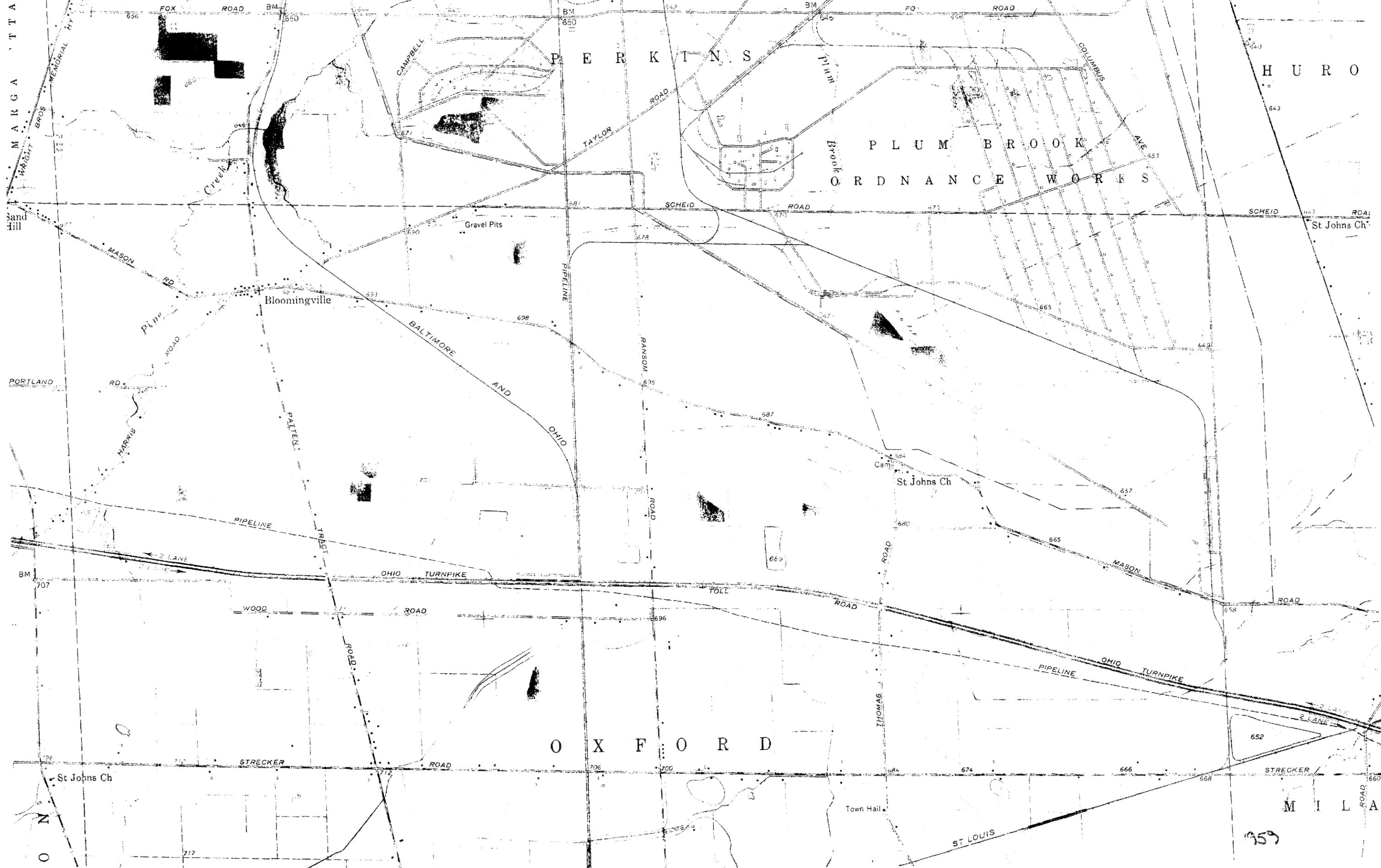
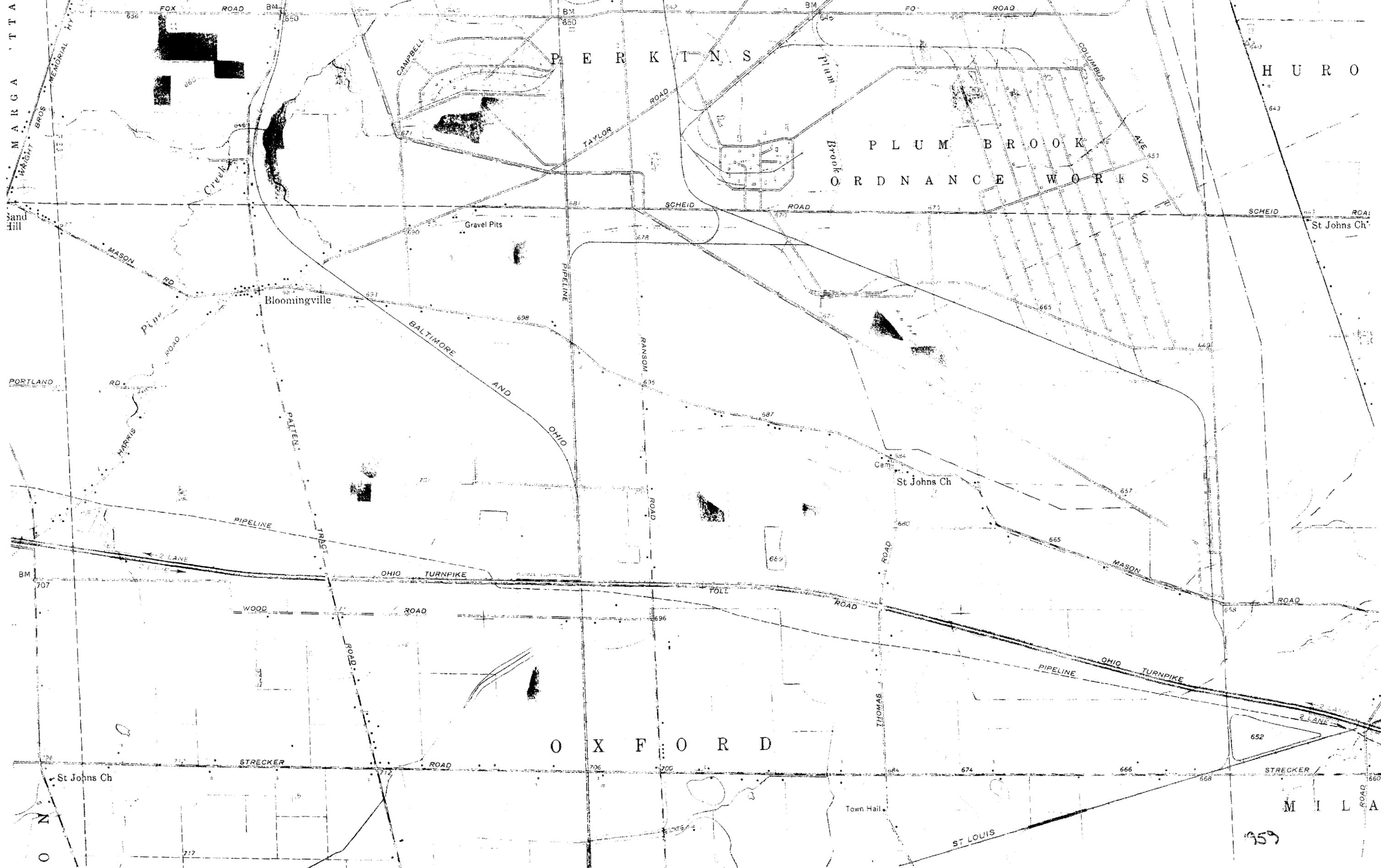
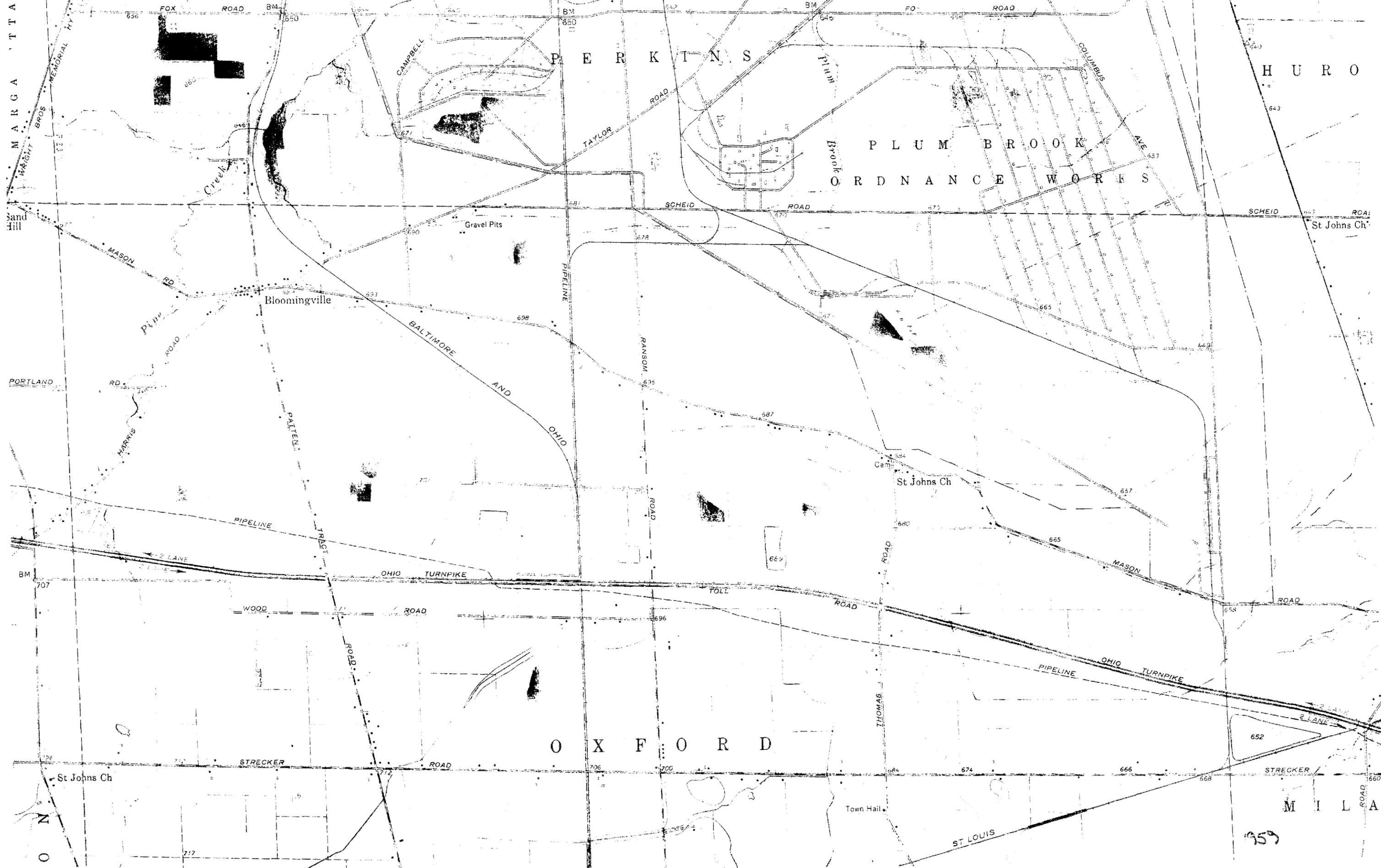
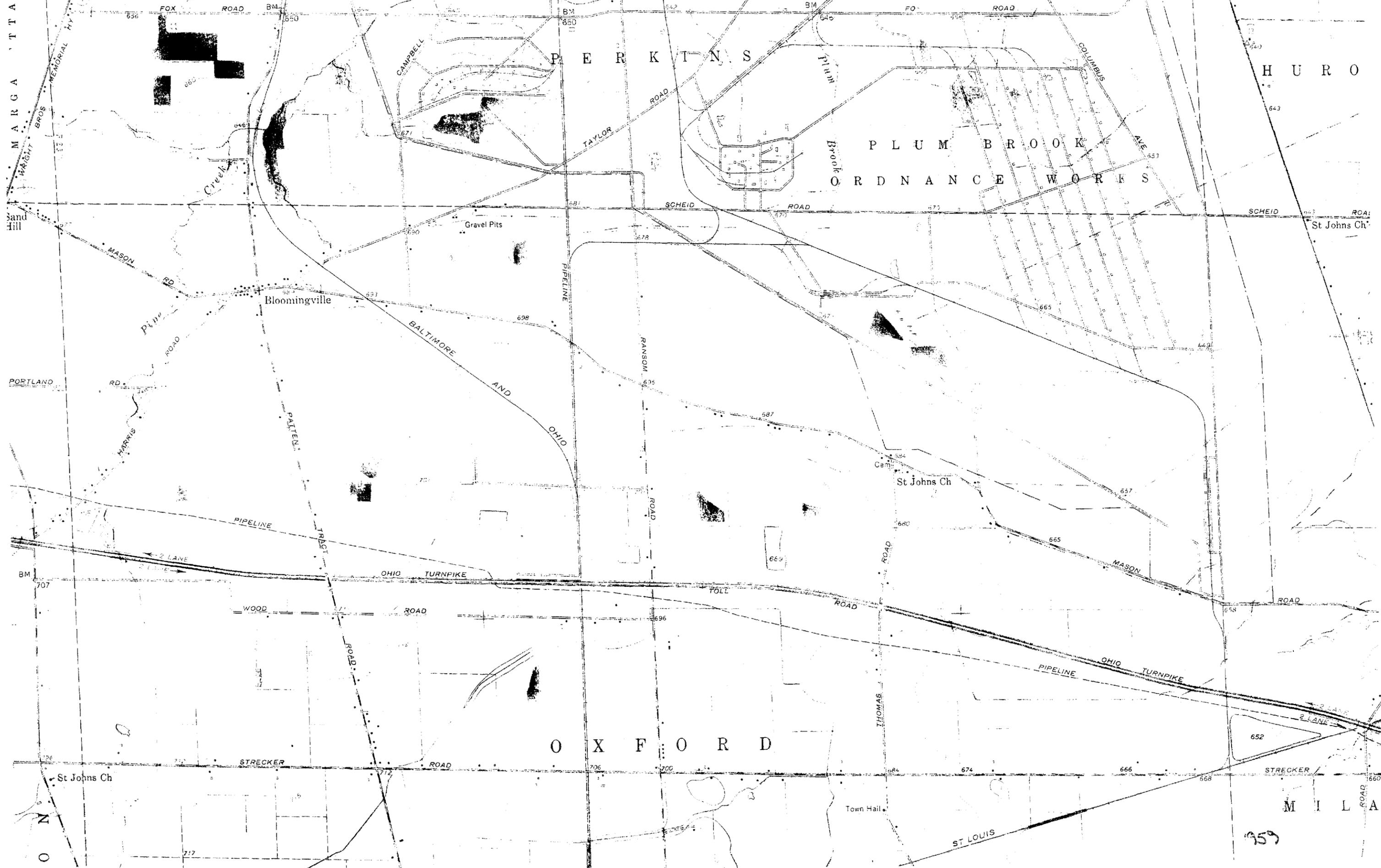
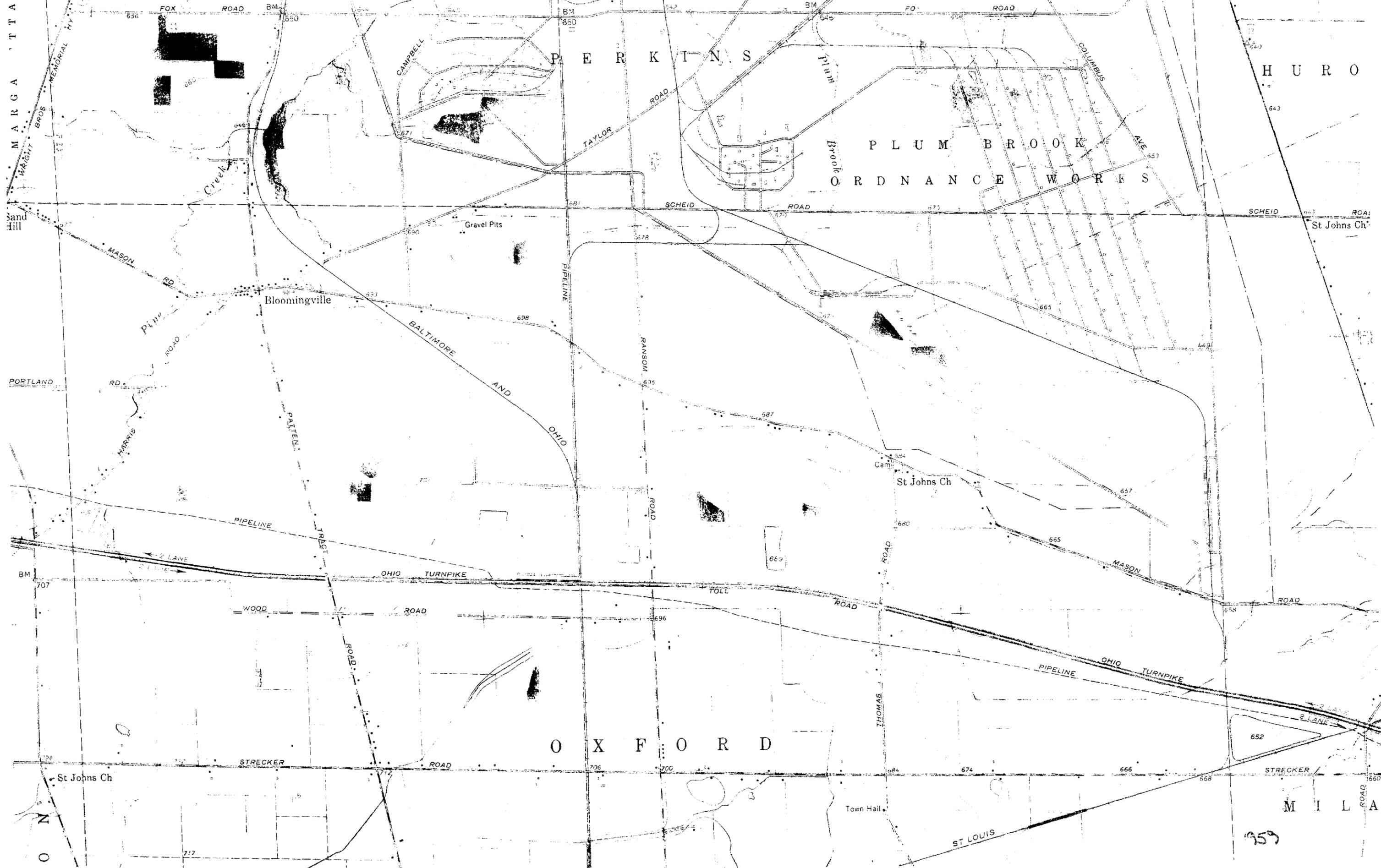
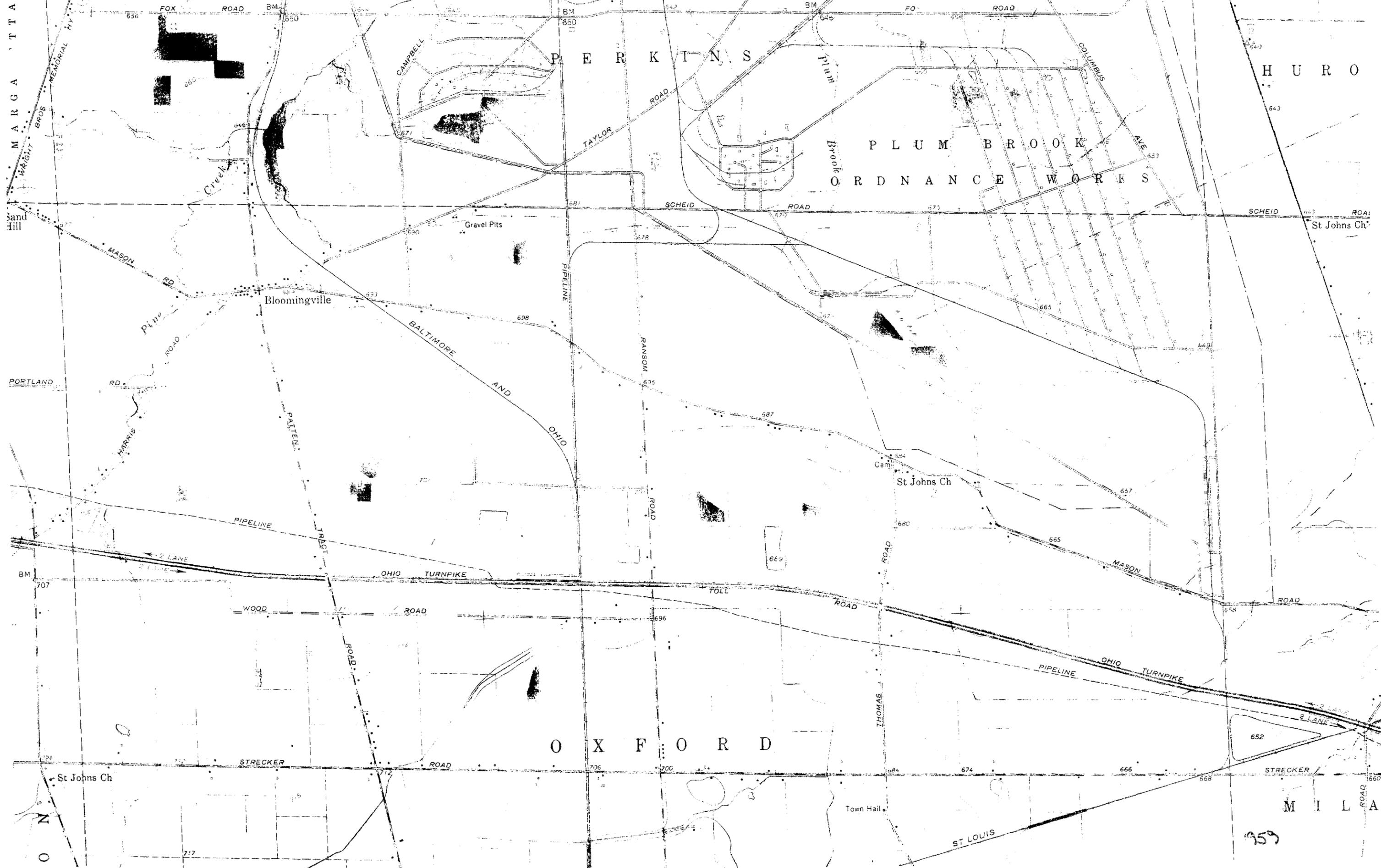
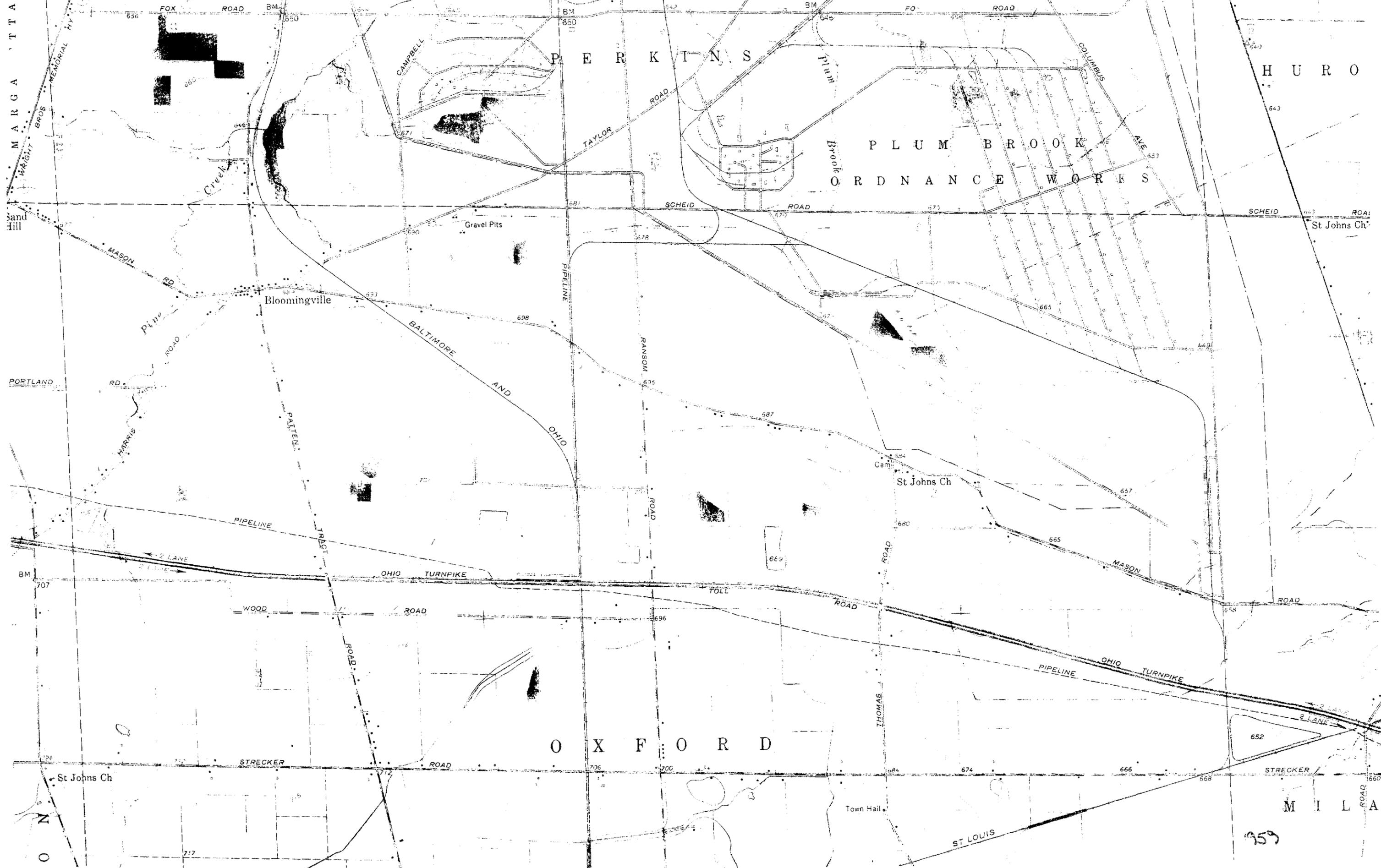
St Johns Ch

MILA

959

P E R K I N S

P L U M B R O O K
O R D N A N C E W O R K S





MARGARETTA

Sand Hill

PORTLAND RD

BM 707

St Johns Ch

N

O

FOX ROAD

Creek

Bloomingville

WOOD ROAD

STRECKER ROAD

717

WATER TANK

P E R K I N

BALTIMORE AND OHIO

OHIO TURNPIKE

ROAD

712

WATER TANK

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

LEWIS RESEARCH CENTER

ROAD

TOLL

ROAD

706

WATER TANK

MAGAZINE ROAD

ROAD

ROAD

ROAD

ROAD

689

WATER TANK

H U R O

ROAD

ROAD

ROAD

ROAD

668

DITCH

DITCH

ROAD

ROAD

ROAD

ROAD

660

M I L A

1969

Appendix C - Groundwater Resources, Erie
County, 1986

LEGEND

AREAS IN WHICH YIELDS OF 100 TO 500 GALLONS PER MINUTE MAY BE DEVELOPED.

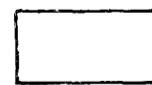
 Yields of more than 500 gallons per minute have been developed at depths of less than 200 feet in cavernous limestone and dolomite. Domestic supplies are generally obtained at depths of around 100 feet.

Hydrogen sulfide, in varying amounts, may be encountered in the bedrock.

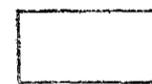
 Areas in which there is a potential concentration of contamination due to the underground disposal of storm wastes from Bellevue.

 Municipal and industrial water supplies are available from wells drilled into permeable sand and gravel deposits in ancient buried valley.

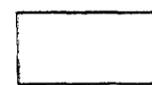
AREAS IN WHICH YIELDS OF 25 TO 100 GALLONS PER MINUTE MAY BE DEVELOPED.

 Buried valley containing more than 150 feet of unconsolidated deposits. Much of the valley fill consists of clay and fine sand. Extensive test drilling may be needed to locate coarse materials capable of supplying larger yields to drilled wells.

AREAS IN WHICH YIELDS OF 5 TO 25 GALLONS PER MINUTE MAY BE DEVELOPED.

 Yields of 15, or less, gallons per minute are developed from wells drilled into the limestone. Hydrogen sulfide may be present in varying amounts.

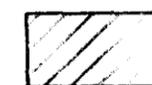
AREAS IN WHICH YIELDS OF 3 TO 10 GALLONS PER MINUTE MAY BE DEVELOPED.

 Ground water obtained from the Berea sandstone. Although this formation covers a larger area than shown, its thickness and recharge potential limit productivity to isolated zones.

AREAS IN WHICH YIELDS SELDOM EXCEED 3 GALLONS PER MINUTE

 Limited quantities of ground water are obtained from thin, discontinuous sand and gravel deposits interbedded in fine, sandy clay or from the underlying shale. Drilling deeper than 30 feet into the shale is not recommended. Occasional gas or salt noted in the eastern half of the county.

Larger yields may be obtained in western Huron and Oxford townships and southeastern Perkins Township. Wells may encounter water-bearing limestone beneath as much as 60 feet of impervious shale.

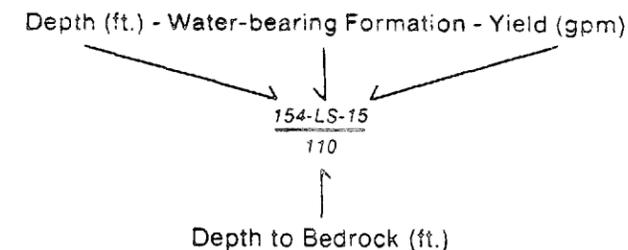
 Thick deposits (as much as 90 feet) of clay, sand and gravel cover the shale bedrock. Where permeable sands and gravels are present, adequate domestic supplies are obtained.

The ground-water characteristics of Erie County have been mapped regionally, based upon interpretations of 2100 water well records and the area's geology and hydrology. Well log data on the map were selected as typical for the areas shown. Information regarding specific sites may be obtained from the Division of Water.

Chemical Analysis Table

Well site	A	B	C	D	E	F
Depth (ft.)	168	60	146	100	69	30
Aquifer	LS	LS	SG	SS	Sh	Sh
Iron (Fe)	0.33	0.02	1.3	0.92	1.1	0.39
Calcium (Ca)	536.	130.	82.	86.	8.2	4.0
Sodium (Na)	6.5	29.	30.	21.	479.	100.
Chloride (Cl)	12.0	49.	0.6	10.	134.	10.
Fluoride (F)	1.0	0.3	0.43	0.2	0.8	0.2
Sulfate (SO ₄)	1224.	232.	68.	72.	188.	16.0
Hydrogen Sulfide (H ₂ S)	0.5	—	—	—	Trace	Trace
Hardness as CaCO ₃	1537.	472.	282.	301.	32.0	14.0
Dissolved Solids	2150.	630.	—	328.	1230.	267.
pH	7.3	6.9	7.5	6.8	8.0	6.7

Chemical Constituents as Mg/1

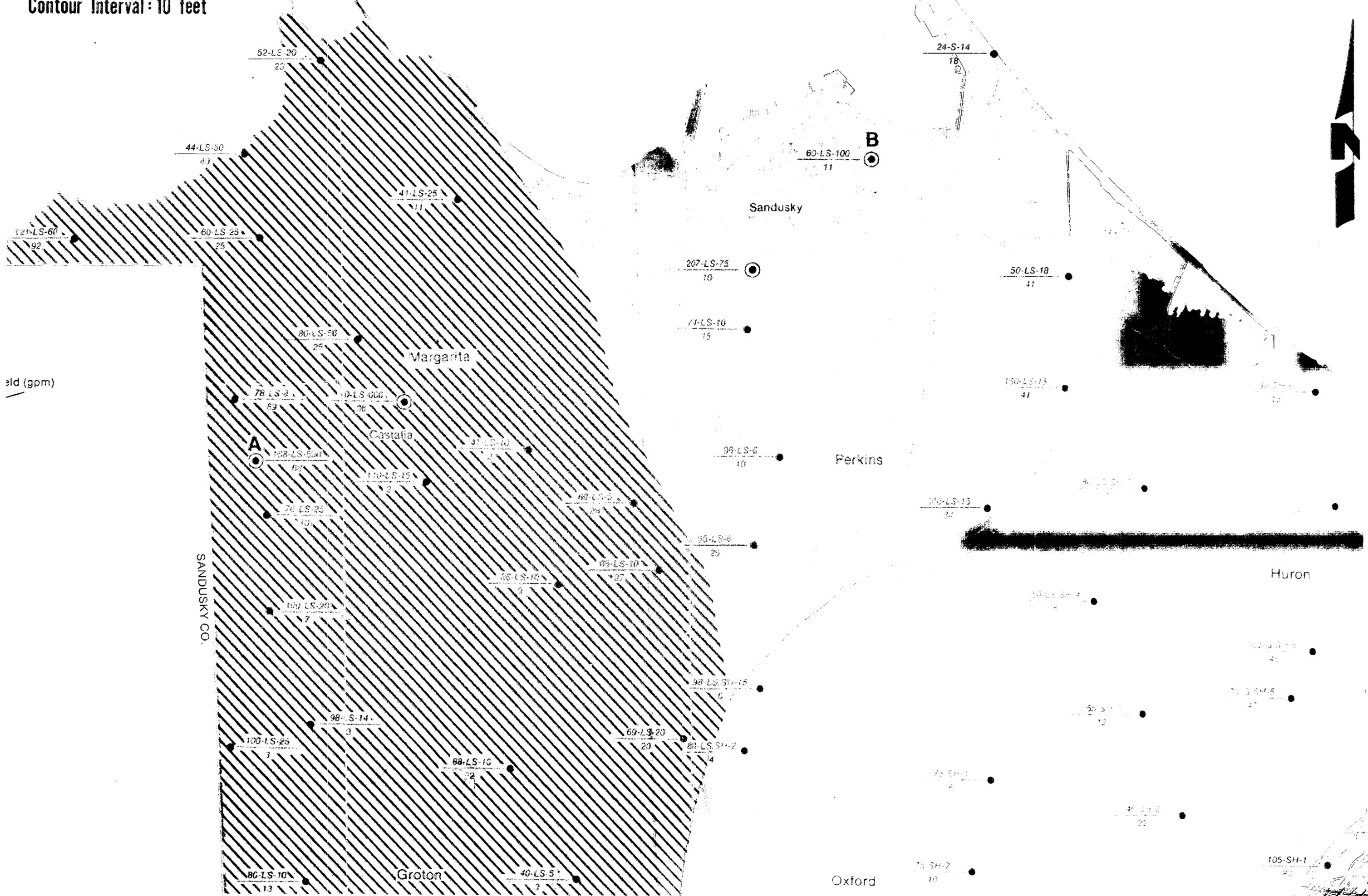


- Domestic Well
- ⊙ Municipal—Industrial Well
- A** Chemical Analyses

Formations

- SS - Sandstone
- SH - Shale
- LS - Limestone
- SG - Sand and Gravel

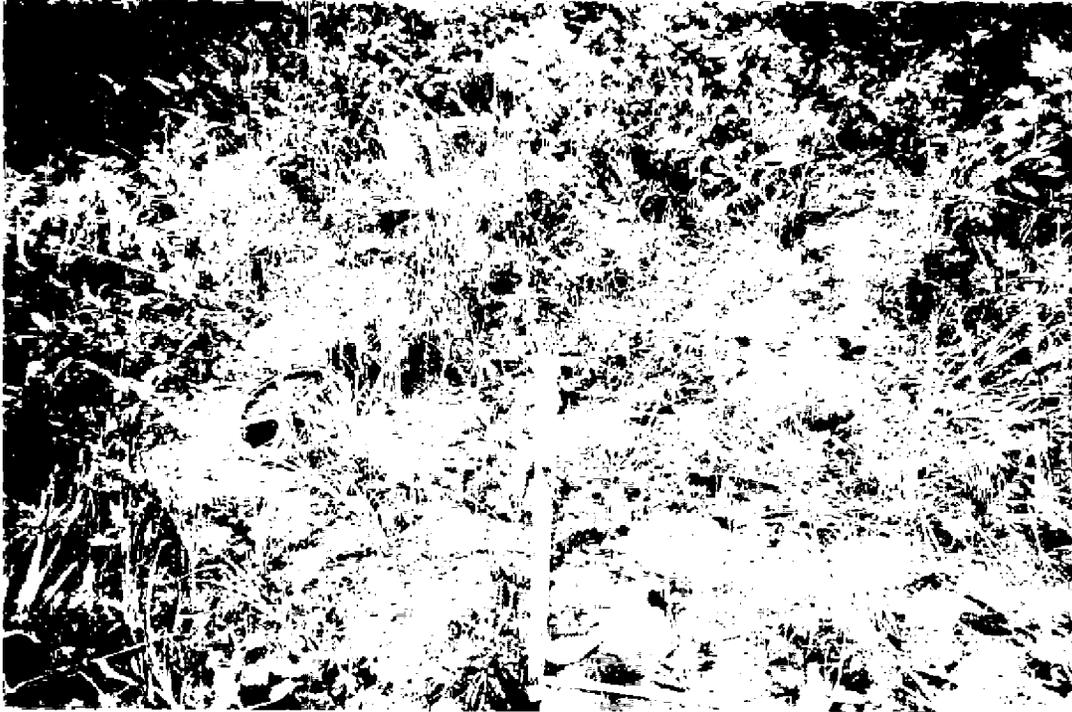
Contour Interval: 10 feet



Appendix D - Visual Survey Photographs



Looking east at existing Tank #645



Concrete square drain valve pit former Tank #655 location.



Concrete berm former Tank #655 location.



Tank #645 - Looking east at concrete square drain valve pit.
(Tree growing through center)



Tank #645 - Looking west at fill valve.
(Location of soil boring SB-09)



Looking south at Tank #645
Downed trees left side of picture
Monitoring well MK-MW-15 in foreground



Looking north from Taylor Road
Abandoned railroad Tracks bottom right
Tank # 645 and downed trees top left



Looking north from Taylor Road
Concrete chunks and downed tree debris



Looking east from Tank #045. Downed trees and debris.



Additional drainage ditch and culvert south of tank area.



Additional drainage ditch and culvert south of tank area.



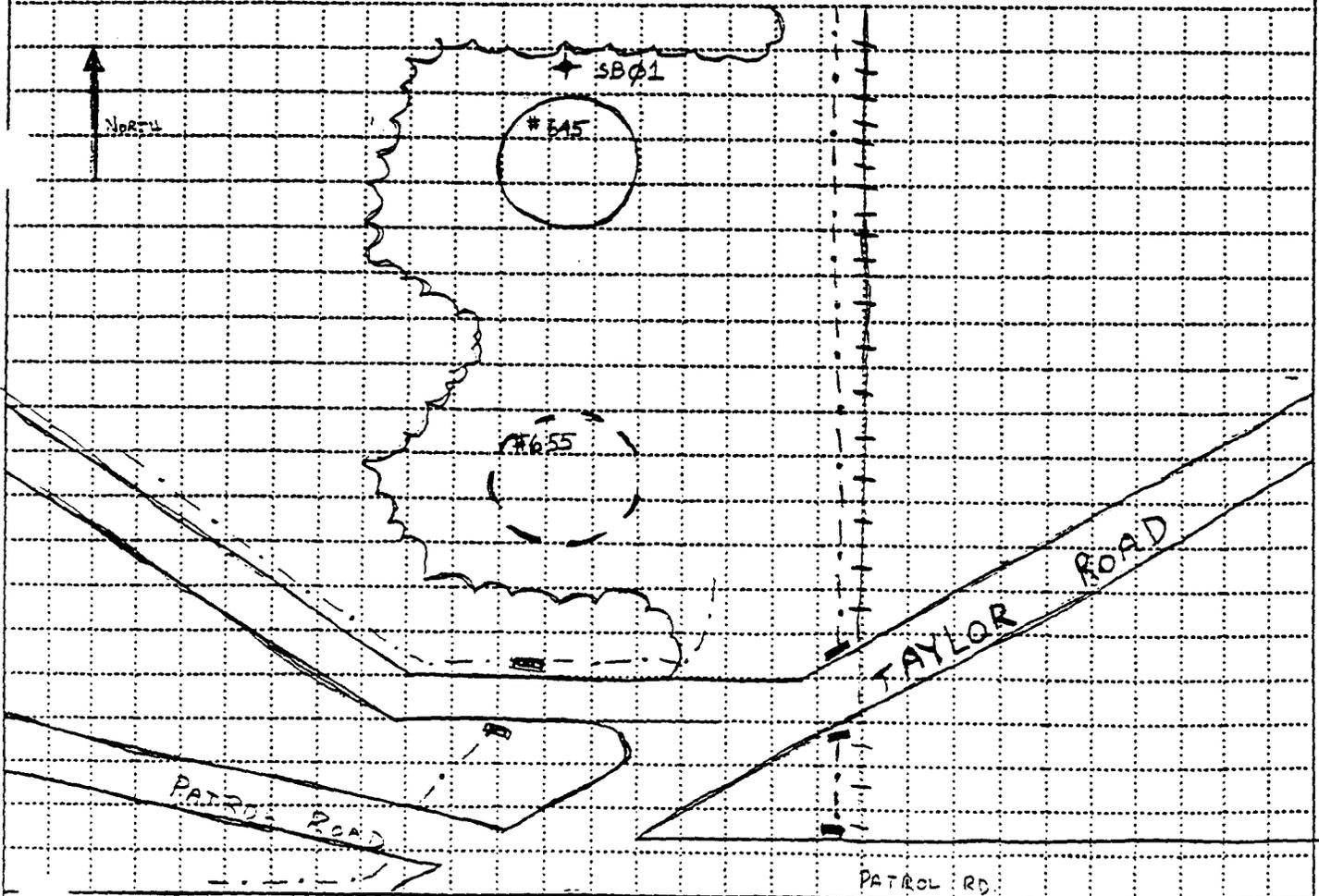
Looking north at drainage ditch running north/south in parallel with railroad tracks. Ditch runs under Taylor Road.

Appendix E - Boring Logs

HTRW DRILLING LOG		DISTRICT CELRL (LOUISVILLE)		HOLE NUMBER SBØ1	
1. COMPANY NAME N/A		2. DRILL SUBCONTRACTOR N/A		SHEET SHEETS 1 OF 2	
3. PROJECT LOWER TOLUENE TANKS - PBOV			4. LOCATION SANDUSKY OH		
5. NAME OF DRILLER DARRELL R. DAVIS			6. MANUFACTURER'S DESIGNATION OF DRILL HAND AUGER		
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT 3/4" STAINLESS STEEL		8. HOLE LOCATION APPROX. 40' NORTH OF EXISTING TANK			
		9. SURFACE ELEVATION			
		10. DATE STARTED 6-9-99		11. DATE COMPLETED 6-9-99	
12. OVERBURDEN THICKNESS		13. DEPTH GROUNDWATER ENCOUNTERED N/A			
13. DEPTH DRILLED INTO ROCK		16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED N/A			
14. TOTAL DEPTH OF HOLE		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) N/A			
18. GEOTECHNICAL SAMPLES		DISTURBED X		UNDISTURBED	
19. TOTAL NUMBER OF CORE BOXES					
20. SAMPLES FOR CHEMICAL ANALYSIS		VOC -		METALS -	
		OTHER (SPECIFY) BTEX		OTHER (SPECIFY)	
21. TOTAL CORE RECOVERY					
22. DISPOSITION OF HOLE		BACKFILLED X		MONITORING WELL	
		OTHER (SPECIFY)		23. SIGNATURE OF INSPECTOR	

LOCATION SKETCH/COMMENTS

SCALE: NOT TO SCALE



ECT
LOWER TOLUENE TANKS

HOLE NO.
SBØ1

HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE NUMBER

SB01

PROJECT

LOWER TOLUENE TANKS

INSPECTOR

SHEET SHEETS

2 OF 2

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS (D)	GEOTECH SAMPLE OR CORE BOX NO. (E)	ANALYTICAL SAMPLE NO. (F)	BLOW COUNT (G)	REMARKS (H)
		TOP SOIL VEGETATION					
	1'	BROWN, MOIST, SILTY SAND, DENSE	PID=10.7		BTex		MOISTURE INCREASES WITH DEPTH
	2'	SM	PID=10.5				
	3'	LIGHT ORANGE/BROWN, SILTY SAND DENSE	PID=7.6				
	4'	SM	PID=10.9				
		TERMINATION @ 4'3"					

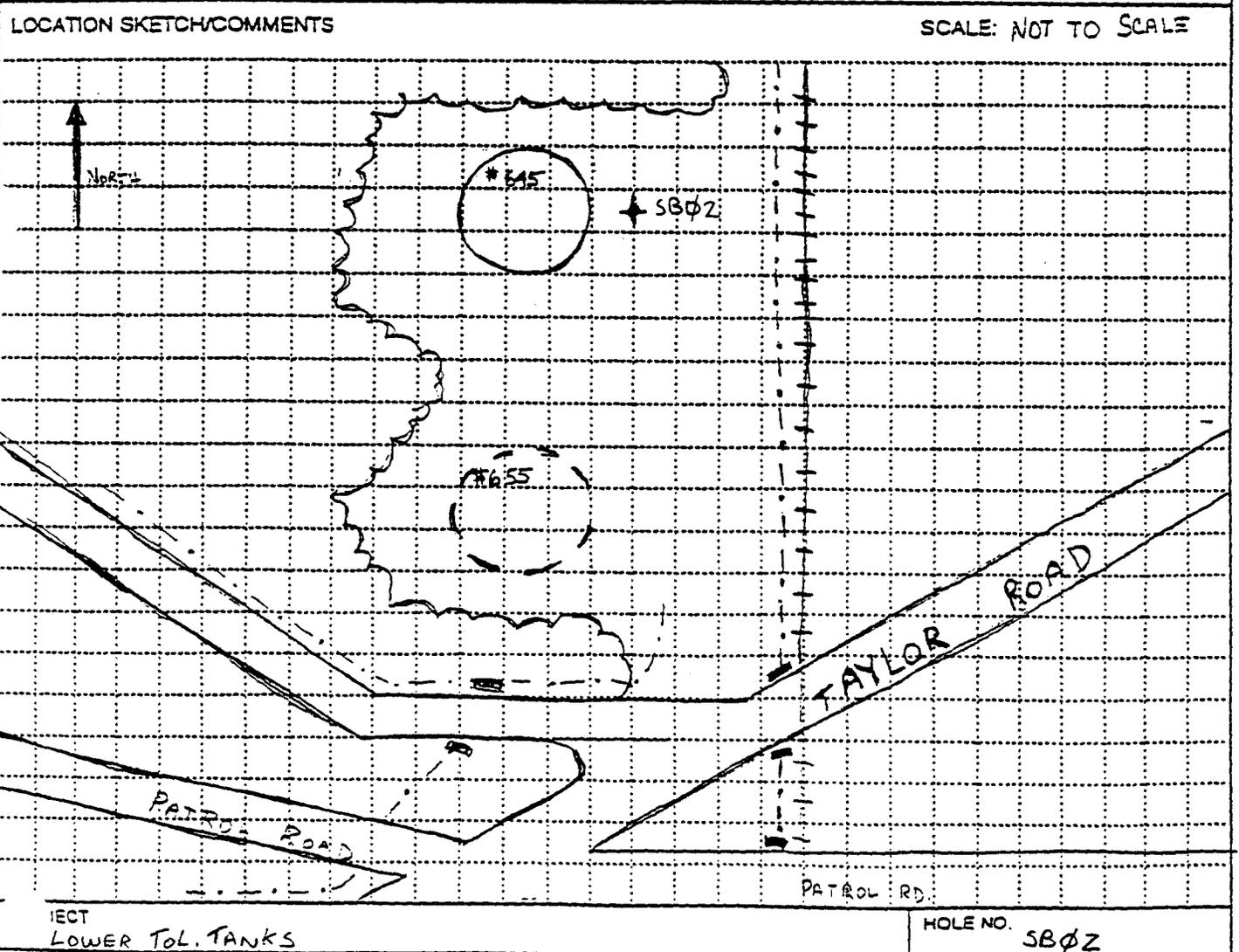
PROJECT

LOWER TOLUENE TANKS

HOLE NO.

SB01

HTRW DRILLING LOG		DISTRICT CELRL (LOUISVILLE)		HOLE NUMBER SB02	
1. COMPANY NAME N/A		2. DRILL SUBCONTRACTOR N/A		SHEET 1 OF 2 SHEETS	
3. PROJECT LOWER TOLUENE TANKS - PBOV			4. LOCATION SANDUSKY OH		
5. NAME OF DRILLER DARRELL R. DAVIS			6. MANUFACTURER'S DESIGNATION OF DRILL HAND AUGER		
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT 3/4" STAINLESS STEEL		8. HOLE LOCATION APPROXIM 40' EAST OF EXISTING TANK			
		9. SURFACE ELEVATION			
		10. DATE STARTED 6-9-99		11. DATE COMPLETED 6-9-99	
12. OVERBURDEN THICKNESS		15. DEPTH GROUNDWATER ENCOUNTERED N/A			
13. DEPTH DRILLED INTO ROCK		16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED N/A			
14. TOTAL DEPTH OF HOLE		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) N/A			
18. GEOTECHNICAL SAMPLES		DISTURBED <input checked="" type="checkbox"/>		UNDISTURBED	
19. TOTAL NUMBER OF CORE BOXES					
20. SAMPLES FOR CHEMICAL ANALYSIS		VOC <input type="checkbox"/>		METALS <input type="checkbox"/>	
		OTHER (SPECIFY) RTEX		OTHER (SPECIFY)	
21. TOTAL CORE RECOVERY					
22. DISPOSITION OF HOLE		BACKFILLED <input checked="" type="checkbox"/>		MONITORING WELL <input type="checkbox"/>	
		OTHER (SPECIFY)		23. SIGNATURE OF INSPECTOR	



HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE NUMBER

SB02

PROJECT

LOWER TOLUENE TANKS

INSPECTOR

SHEET SHEETS

2 OF 2

ELEV. (a)	DEPTH (b)	DESCRIPTION OF MATERIALS (c)	FIELD SCREENING RESULTS (d)	GEOTECH SAMPLE OR CORE BOX NO. (e)	ANALYTICAL SAMPLE NO. (f)	BLOW COUNT (g)	REMARKS (h)
		TOP SOIL - VEGETATION					
	1	BROWN, MOIST, SILTY SAND, DENSE	PID=20.5		BTEX		
	2	SM	PID=19.7				
	3		PID=18.5				
	4	TERMINATION @ 3'9"	PID=19.7		BTEX		

PROJECT

LOWER TOLUENE TANKS

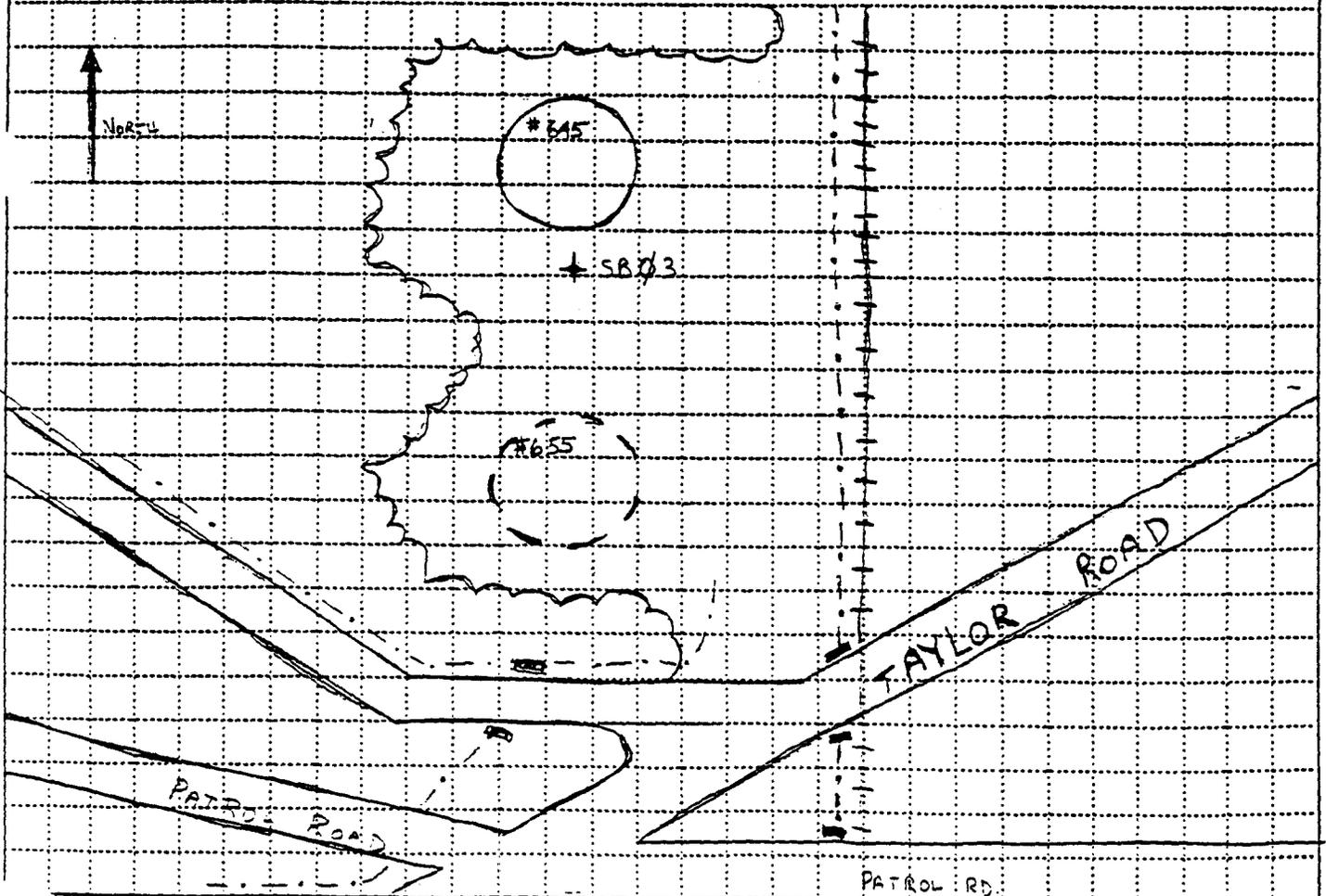
HOLE NO.

SB02

HTRW DRILLING LOG		DISTRICT CELRL (LOUISVILLE)		HOLE NUMBER SB03	
1. COMPANY NAME N/A		2. DRILL SUBCONTRACTOR N/A		SHEET SHEETS 1 OF 2	
3. PROJECT LOWER TOLUENE TANKS - PBOW			4. LOCATION SANDUSKY OH		
5. NAME OF DRILLER DARRELL R. DAVIS			6. MANUFACTURER'S DESIGNATION OF DRILL HAND AUGER		
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT 3/4" STAINLESS STEEL		8. HOLE LOCATION APPROXIM 40' SOUTH OF EXISTING TANK			
		9. SURFACE ELEVATION			
		10. DATE STARTED 6-9-99		11. DATE COMPLETED 6-9-99	
12. OVERBURDEN THICKNESS		15. DEPTH OF GROUNDWATER ENCOUNTERED N/A			
13. DEPTH DRILLED INTO ROCK		16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED N/A			
14. TOTAL DEPTH OF HOLE		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) N/A			
18. GEOTECHNICAL SAMPLES		DISTURBED X		UNDISTURBED	
19. TOTAL NUMBER OF CORE BOXES					
20. SAMPLES FOR CHEMICAL ANALYSIS		VOC -		METALS -	
		OTHER (SPECIFY) BTEX		OTHER (SPECIFY)	
21. TOTAL CORE RECOVERY					
22. DISPOSITION OF HOLE		BAG FILLED X		MONITORING WELL	
		OTHER (SPECIFY)		23. SIGNATURE OF INSPECTOR	

LOCATION SKETCH/COMMENTS

SCALE: NOT TO SCALE



JECT
LOWER Tol. TANKS

HOLE NO.
SB03

HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE NUMBER

SBØ3

PROJECT

LOWER TOLUENE TANKS

INSPECTOR

SHEET SHEETS

2 OF 2

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS (D)	GEOTECH SAMPLE OR CORE BOX NO. (E)	ANALYTICAL SAMPLE NO. (F)	BLOW COUNT (G)	REMARKS (H)
		TOP SOIL THICK VEGETATION					
	1	LIGHT BROWN, DRY, SILTY SAND, DENSE	PID=10.9	GEOTECH	3TEX		
	2	SM	PID=6.9				
	3	ORANGE STREAKS, LIGHT BROWN, DRY, SILTY SAND, DENSE	PID=2.6				
		SM	PID=3.7		3TEX		
	4	TERMINATION @ 3'5"					

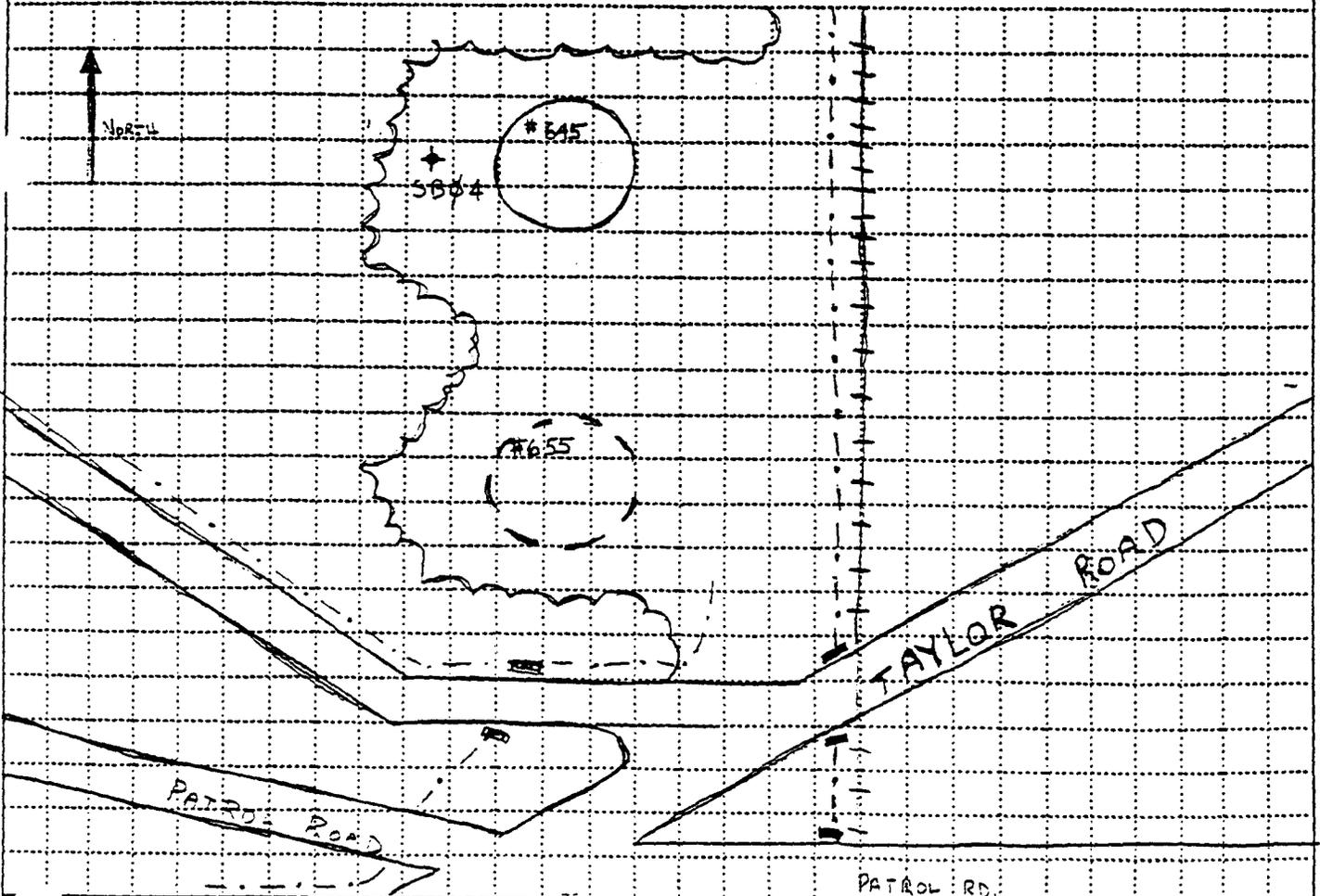
PROJECT

HOLE NO.

HTRW DRILLING LOG		DISTRICT CELRL (LOUISVILLE)		HOLE NUMBER SB04	
1. COMPANY NAME N/A		2. DRILL SUBCONTRACTOR N/A		SHEET SHEETS 1 OF 2	
3. PROJECT LOWER TOLUENE TANKS - PBOW			4. LOCATION SANDUSKY OH		
5. NAME OF DRILLER DARRELL R. DAVIS			6. MANUFACTURER'S DESIGNATION OF DRILL HAND AUGER		
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT 3/4" STAINLESS S-PEL		8. HOLE LOCATION APPROXIM 40' WEST OF EXISTING TANK			
		9. SURFACE ELEVATION			
		10. DATE STARTED 6-9-99		11. DATE COMPLETED 6-9-99	
12. OVERBURDEN THICKNESS		13. DEPTH GROUNDWATER ENCOUNTERED N/A			
13. DEPTH DRILLED INTO ROCK		14. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED N/A			
14. TOTAL DEPTH OF HOLE		15. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) N/A			
16. GEOTECHNICAL SAMPLES		DISTURBED X		UNDISTURBED	
19. TOTAL NUMBER OF CORE BOXES					
20. SAMPLES FOR CHEMICAL ANALYSIS		VOC -		METALS -	
		OTHER (SPECIFY) BTEX		OTHER (SPECIFY)	
21. TOTAL CORE RECOVERY					
22. DISPOSITION OF HOLE		BACKFILLED X		MONITORING WELL	
		OTHER (SPECIFY)		23. SIGNATURE OF INSPECTOR	

LOCATION SKETCH/COMMENTS

SCALE: NOT TO SCALE



ECT

LOWER TOLUENE TANKS

HOLE NO.
SB04

HTRW DRILLING LOG (CONTINUATION SHEET)

HOLE NUMBER

SBØ4

PROJECT

LOWER TOLUENE TANK

INSPECTOR

SHEET SHEETS

2 OF 2

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS (D)	GEO TECH SAMPLE OR CORE BOX NO. (E)	ANALYTICAL SAMPLE NO. (F)	BLOW COUNT (G)	REMARKS (H)
		TOP SOIL - VEGETATION					
	1	LIGHT BROWN, DRY, SILTY SAND	PID= 7.3		BTEX		
	2	SM ORANGE STREAKS/LIGHT BROWN, MOIST, SILTY SAND, DENSE	PID= 11.7				
	3	SM MORE ORANGE STREAKS/BROWN, WET, SILTY SAND, DENSE	RD= 2.3				
	4	SM	PID= 4.0		BTEX		
		TERMINATION @ 4'2"					

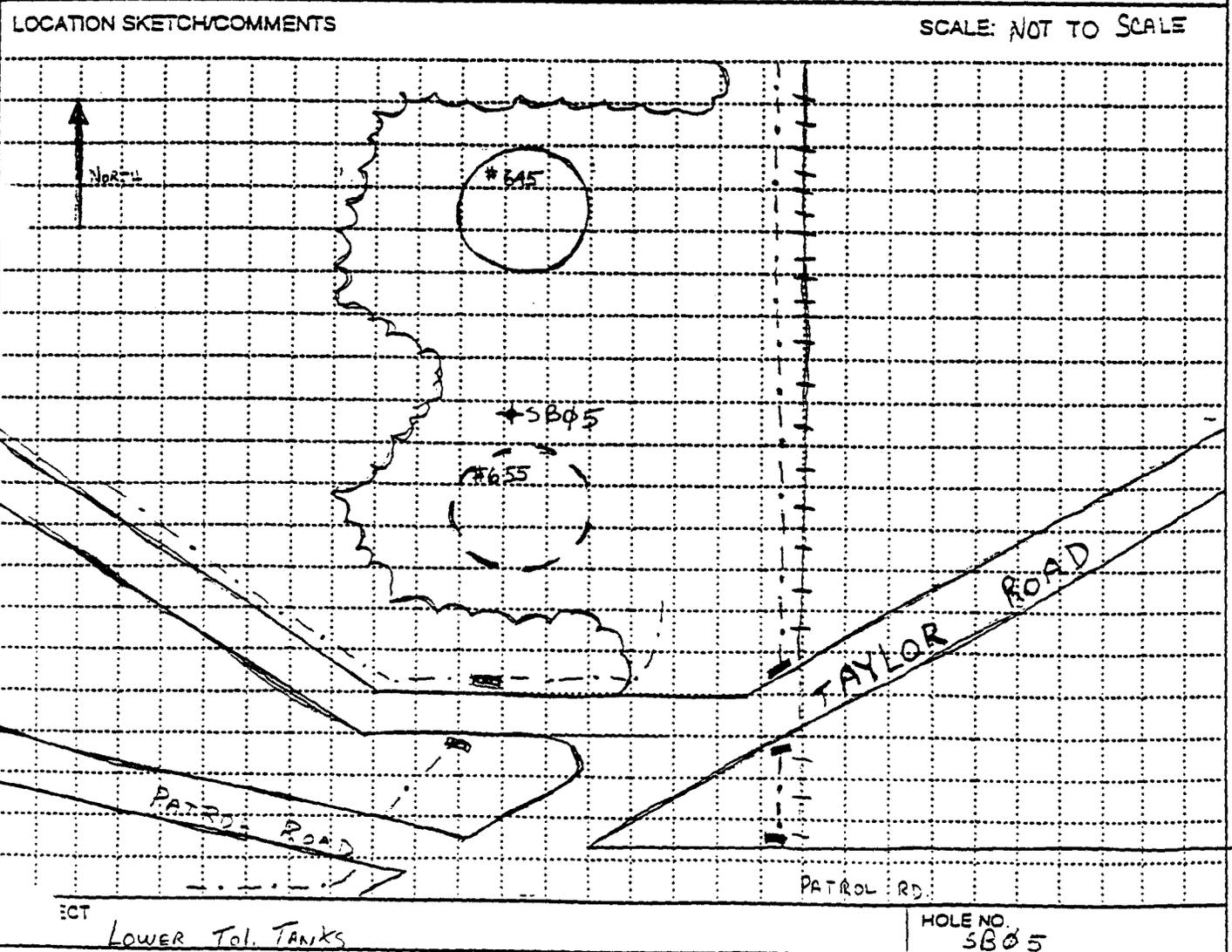
PROJECT

LOWER TOLUENE TANKS

HOLE NO.

SBØ4

HTRW DRILLING LOG		DISTRICT CELRL (LOUISVILLE)		HOLE NUMBER SB05	
1. COMPANY NAME N/A		2. DRILL SUBCONTRACTOR N/A		SHEET SHEETS 1 OF 2	
3. PROJECT LOWER TOLUENE TANKS - PBOW			4. LOCATION SANDUSKY OH		
5. NAME OF DRILLER DARRELL R. DAVIS			6. MANUFACTURER'S DESIGNATION OF DRILL HAND AUGER		
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT		8. HOLE LOCATION			
2 1/4" STAINLESS STEEL		APPROXIMAT. 40' NORTH OF REMOVED TANK			
12. OVERBURDEN THICKNESS		9. SURFACE ELEVATION			
13. DEPTH DRILLED INTO ROCK		10. DATE STARTED 6-9-99		11. DATE COMPLETED 6-9-99	
14. TOTAL DEPTH OF HOLE		15. DEPTH OF GROUNDWATER ENCOUNTERED N/A			
		16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED N/A			
		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) N/A			
18. GEOTECHNICAL SAMPLES		DISTURBED X		UNDISTURBED	
19. TOTAL NUMBER OF CORE BOXES					
20. SAMPLES FOR CHEMICAL ANALYSIS		VOC		METALS	
				OTHER (SPECIFY) BTEX	
21. TOTAL CORE RECOVERY					
22. DISPOSITION OF HOLE		BACKFILLED X		MONITORING WELL	
				OTHER (SPECIFY)	
		23. SIGNATURE OF INSPECTOR			



HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE NUMBER

SB 05

PROJECT

LOWER TOLUENE TANKS

INSPECTOR

SHEET

SHEETS

2 OF 2

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS (D)	GEOTECH SAMPLE OR CORE BOX NO. (E)	ANALYTICAL SAMPLE NO. (F)	BLOW COUNT (G)	REMARKS (H)
		TOP SOIL - VEGETATION					
	1	LIGHT BROWN, MOIST, SILTY SAND, DENSE SM	PID=1.9		BTEX		
	2	DARK BROWN/BLACK MOIST SAND, DENSE SM	PID=1.3				
	3	COLOR CHANGE TO GRAY/BROWN MOISTURE INCREASING	PID=1.1				
	4	SM	PID=1.9		BTEX		
		TERMINATION @ 4'					

PROJECT

HOLE NO.

HTRW DRILLING LOG			DISTRICT CELRL (LOUISVILLE)			HOLE NUMBER SB06		
1. COMPANY NAME N/A			2. DRILL SUBCONTRACTOR N/A			SHEET SHEETS 1 OF 2		
3. PROJECT LOWER TOLUENE TANKS - PBOW				4. LOCATION SANDUSKY OH				
5. NAME OF DRILLER DARRELL R. DAVIS				6. MANUFACTURER'S DESIGNATION OF DRILL HAND AUGER				
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT 3/4" STAINLESS STEEL			8. HOLE LOCATION APPROXIMATE 40' EAST OF REMOVED TANK					
			9. SURFACE ELEVATION					
			10. DATE STARTED 6-9-99			11. DATE COMPLETED 6-9-99		
12. OVERBURDEN THICKNESS			13. DEPTH GROUNDWATER ENCOUNTERED N/A					
13. DEPTH DRILLED INTO ROCK			14. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED N/A					
14. TOTAL DEPTH OF HOLE			15. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) N/A					
16. GEOTECHNICAL SAMPLES		DISTURBED X		UNDISTURBED		18. TOTAL NUMBER OF CORE BOXES		
20. SAMPLES FOR CHEMICAL ANALYSIS		VOC		METALS		OTHER (SPECIFY) BTEX		OTHER (SPECIFY)
22. DISPOSITION OF HOLE		BACKFILLED X		MONITORING WELL		OTHER (SPECIFY)		21. SIGNATURE OF INSPECTOR
21. TOTAL CORE RECOVERY %								
LOCATION SKETCH/COMMENTS						SCALE: NOT TO SCALE		
1. DISTRICT LOWER Tol. TANKS						HOLE NO. SB06		

HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE NUMBER

SB06

PROJECT

LOWER TOLUENE TANKS

INSPECTOR

SHEET SHEETS

2 OF 2

ELEV. (2)	DEPTH (3)	DESCRIPTION OF MATERIALS (4)	FIELD SCREENING RESULTS (5)	GEOTECH SAMPLE OR CORE BOX NO. (6)	ANALYTICAL SAMPLE NO. (7)	BLOW COUNT (8)	REMARKS (9)
		TOP SOIL - VEGETATION					
	1	LIGHT BROWN, MOIST, SILTY SAND, DENSE SM	PD=2.3		BTEX		
	2	DARK BROWN/GRAY, MOIST SILTY/CLAYEY/SAND	NO DATA	GEOTECH SAMPLE	BTEX		
	3	GRAYISH BROWN, MOIST SILTY SAND, DENSE SC-SM	NO DATA				
	4	SM	PD=1.1		BTEX		
		TERMINATION @ 4.1'					

PROJECT

LOWER TOLUENE TANKS

HOLE NO.

SB06

HTRW DRILLING LOG		DISTRICT CELRL (LOUISVILLE)			HOLE NUMBER SB07	
1. COMPANY NAME N/A		2. DRILL SUBCONTRACTOR N/A			SHEET 1 OF 2 SHEETS	
3. PROJECT LOWER TOLUENE TANKS - PBDW				4. LOCATION SANDUSKY OH		
5. NAME OF DRILLER DARRELL R. DAVIS				6. MANUFACTURER'S DESIGNATION OF DRILL HAND AUGER		
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT 3/4" STAINLESS STEEL		8. HOLE LOCATION			9. SURFACE ELEVATION	
12. OVERBURDEN THICKNESS		13. DEPTH DRILLED INTO ROCK			14. TOTAL DEPTH OF HOLE	
10. DATE STARTED 6-9-99		11. DATE COMPLETED 6-9-99			15. DEPTH GROUNDWATER ENCOUNTERED N/A	
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED N/A		17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) N/A				
18. GEOTECHNICAL SAMPLES		DISTURBED X	UNDISTURBED		19. TOTAL NUMBER OF CORE BOXES	
20. SAMPLES FOR CHEMICAL ANALYSIS		VOC	METALS	OTHER (SPECIFY) RTEX	OTHER (SPECIFY)	OTHER (SPECIFY)
21. TOTAL CORE RECOVERY		22. DISPOSITION OF HOLE BACKFILLED X		MONITORING WELL	23. SIGNATURE OF INSPECTOR	
LOCATION SKETCH/COMMENTS				SCALE: NOT TO SCALE		
ECT LOWER Tol TANKS				HOLE NO. SB07		

HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE NUMBER

SB07

PROJECT

LOWER TOLUENE TANKS

INSPECTOR

SHEET SHEETS

2 OF 2

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS (D)	GEOTECH SAMPLE OR CORE BOX NO. (E)	ANALYTICAL SAMPLE NO. (F)	BLOW COUNT (G)	REMARKS (H)
		TOP SOIL - VEGETATION					
	1	LIGHT BROWN MIXED w/ DARK BROWN BLACK SAND - DENSE SM	PID=00		BTEX		
	2	GRAYISH BROWN, SAND SANDY SAND, DENSE - moderate moisture	PID=00				HARD TO ADVANCE - 500
	3		PID=00				
	4	SM	PID=10		BTEX		
		TERMINATION @ 4'					

PROJECT

LOWER TOLUENE TANKS

HOLE NO.

SB07

HTRW DRILLING LOG		DISTRICT CELRL (LOUISVILLE)		HOLE NUMBER SB08	
1. COMPANY NAME N/A		2. DRILL SUBCONTRACTOR N/A		SHEET SHEETS 1 OF 2	
3. PROJECT LOWER TOLUENE TANKS - PBOW			4. LOCATION SANDUSKY OH		
5. NAME OF DRILLER DARRELL R. DAVIS			6. MANUFACTURER'S DESIGNATION OF DRILL HAND AUGER		
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT 3/4" STAINLESS STEEL		8. HOLE LOCATION APPROXIM. 40' WEST OF REMOVED TANK			
		9. SURFACE ELEVATION			
		10. DATE STARTED 6-9-99		11. DATE COMPLETED 6-9-99	
12. OVERBURDEN THICKNESS		13. DEPTH GROUNDWATER ENCOUNTERED N/A			
13. DEPTH DRILLED INTO ROCK		14. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED N/A			
14. TOTAL DEPTH OF HOLE		15. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) N/A			
16. GEOTECHNICAL SAMPLES		DISTURBED X		UNDISTURBED	
18. DATE STARTED		19. TOTAL NUMBER OF CORE BOXES			
20. SAMPLES FOR CHEMICAL ANALYSIS		VOC		METALS	
				OTHER (SPECIFY) RTEX	
21. DISPOSITION OF HOLE		BACKFILLED X		MONITORING WELL	
				OTHER (SPECIFY)	
				22. SIGNATURE OF INSPECTOR	
LOCATION SKETCH/COMMENTS		SCALE: NOT TO SCALE			
ECT LOWER TOL TANKS				HOLE NO. SB08	

HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE NUMBER
SB09

PROJECT
LOWER TOLUENE TANKS

INSPECTOR

SHEET SHEETS
2 OF 2

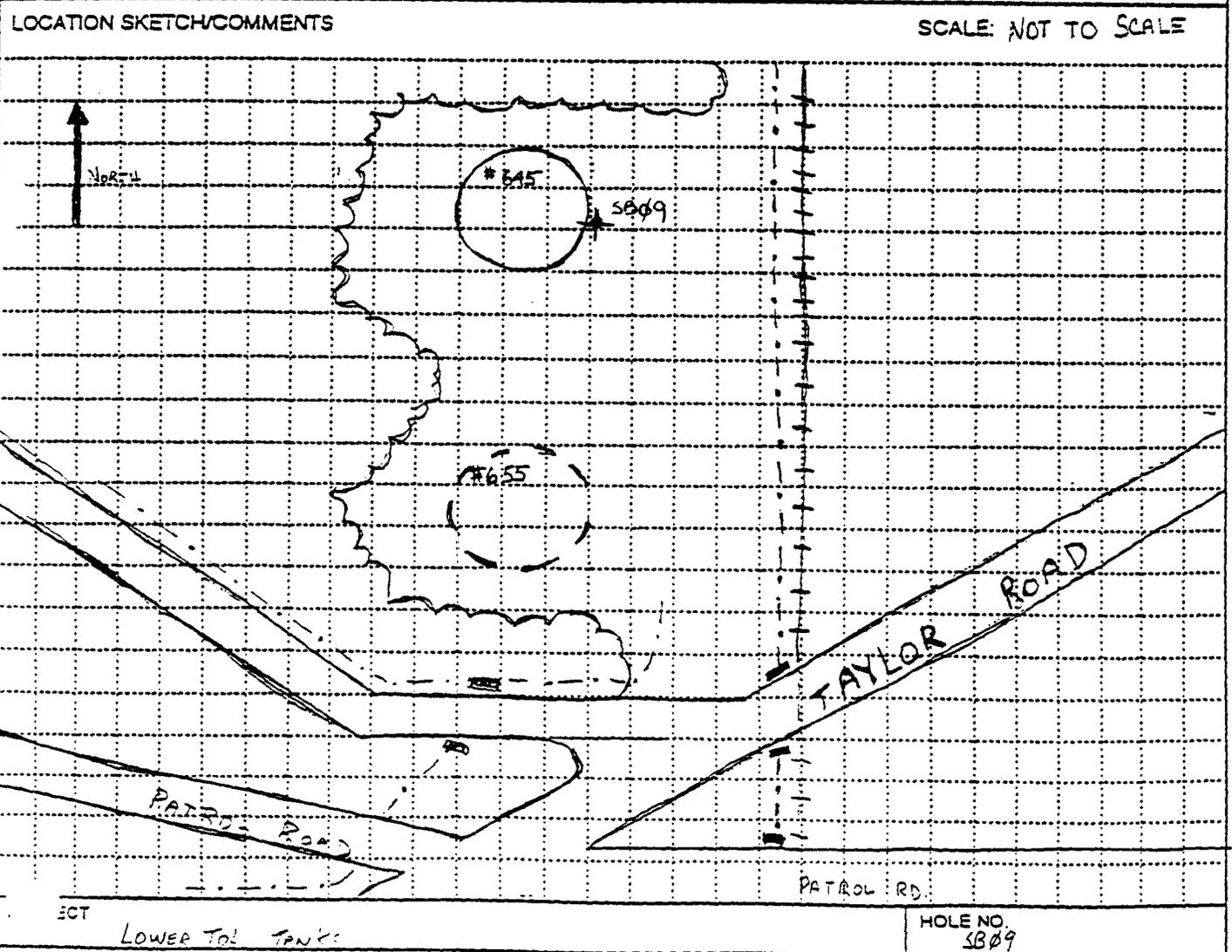
ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS (D)	GEOTECH SAMPLE OR CORE BOX NO. (E)	ANALYTICAL SAMPLE NO. (F)	BLOW COUNT (G)	REMARKS (H)
		TOP SOIL - VEGETATION					
	1	BROWN, MOIST, SILTY SAND DENSE SM	PID=2.2		BTEX		
	2	LIGHT BROWN, MOIST, SILTY SAND, DENSE SM	PID=1.6				
	3	DARK BROWN/BLACK, MOIST SILTY/CLAYEY SAND, DENSE SM-SC	PID=3.5				HARD TO ADVANCE AUGER
	4	GRAYISH BROWN, MOIST, SILTY SAND SM	PID=3.1		BTEX		
	4	TERMINATION @ 3'10"					

PROJECT
LOWER TOLUENE TANKS

HOLE NO. SB08

HTRW DRILLING LOG		DISTRICT CELRL (LOUISVILLE)	HOLE NUMBER SB09
1. COMPANY NAME N/A		2. DRILL SUBCONTRACTOR N/A	SHEET SHEETS 1 OF 2
3. PROJECT LOWER TOLUENE TANKS - P80W		4. LOCATION SANDUSKY OH	
5. NAME OF DRILLER DARRELL R. DAVIS		6. MANUFACTURER'S DESIGNATION OF DRILL HAND AUGER	
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT 2 1/4" STAINLESS S-FEEL		8. HOLE LOCATION APPROX. 2' EAST OF EXISTING TANK NEAR PIPE: VALVE	
		9. SURFACE ELEVATION	
		10. DATE STARTED 6-9-99	11. DATE COMPLETED 6-9-99
12. OVERBURDEN THICKNESS		13. DEPTH GROUNDWATER ENCOUNTERED N/A	
13. DEPTH DRILLED INTO ROCK		14. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED N/A	
14. TOTAL DEPTH OF HOLE		15. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) N/A	

18. GEOTECHNICAL SAMPLES	DISTURBED X	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES		
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY) BTEX	OTHER (SPECIFY)	OTHER (SPECIFY)
21. TOTAL CORE RECOVERY %					
22. DISPOSITION OF HOLE	BACKFILLED X	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR	



LOWER TOL TANKS	HOLE NO. SB09
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HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE NUMBER

SB09

PROJECT

Lower Toluene Tanks

INSPECTOR

SHEET SHEETS

2 OF 2

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS (D)	GEOTECH SAMPLE OR CORE BOX NO. (E)	ANALYTICAL SAMPLE NO. (F)	BLOW COUNT (G)	REMARKS (H)
		TOPSOIL - VEGETATION					
	1	Light BROWN, DRY. SILTY SAND, (LIKE S _u SP) SM	PID=13.0		BTEX		
	2	TERMINATION @ 1'					
	3						
	4						

PROJECT

Lower Toluene Tanks

HOLE NO.

SB09

HTRW DRILLING LOG			DISTRICT CELRL (LOUISVILLE)			HOLE NUMBER SB10		
1. COMPANY NAME N/A			2. DRILL SUBCONTRACTOR N/A			SHEET SHEETS 1 OF 2		
3. PROJECT LOWER TOLUENE TANKS - PBOW				4. LOCATION SANDUSKY OH				
5. NAME OF DRILLER DARRELL R. DAVIS				6. MANUFACTURER'S DESIGNATION OF DRILL HAND AUGER				
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT			8. HOLE LOCATION					
3/4" STAINLESS STEEL			APPROX. CENTER OF REMOVED TANK PLANT					
			9. SURFACE ELEVATION					
			10. DATE STARTED 6-9-99			11. DATE COMPLETED 6-9-99		
12. OVERBURDEN THICKNESS			13. DEPTH GROUNDWATER ENCOUNTERED N/A					
13. DEPTH DRILLED INTO ROCK			16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED N/A					
14. TOTAL DEPTH OF HOLE			17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) N/A					
18. GEOTECHNICAL SAMPLES		DISTURBED X		UNDISTURBED		19. TOTAL NUMBER OF CORE BOXES		
20. SAMPLES FOR CHEMICAL ANALYSIS		VOC		METALS		OTHER (SPECIFY)		21. TOTAL CORE RECOVERY %
						BTEX		
22. DISPOSITION OF HOLE		BACKFILLED X		MONITORING WELL		OTHER (SPECIFY)		23. SIGNATURE OF INSPECTOR
LOCATION SKETCH/COMMENTS						SCALE: NOT TO SCALE		
JECT LOWER TOL. TANKS						HOLE NO. SB10		

HTRW DRILLING LOG

(CONTINUATION SHEET)

HOLE NUMBER
SB10

PROJECT
Lower Toluene Tanks

INSPECTOR

SHEET SHEETS
2 OF 2

ELEV. (A)	DEPTH (B)	DESCRIPTION OF MATERIALS (C)	FIELD SCREENING RESULTS (D)	GEOTECH SAMPLE OR CORE BOX NO. (E)	ANALYTICAL SAMPLE NO. (F)	BLOW COUNT (G)	REMARKS (H)
	1	TOP SOIL - VEGETATION Light Brown moist clay SAND DENSE	NO REAM		BTEX		Residual @ 2'6" Due to nature of tank (concrete lining)
	2	SM					
	3	RESIDUAL @ 2'6"					

PROJECT
Lower Toluene Tanks

HOLE NO.
SB10

Appendix F - BTEX Laboratory Analysis



Quanterra Incorporated
4101 Shuffel Drive, NW
North Canton, Ohio 44720

330 497-9396 Telephone
330 497-0772 Fax

ANALYTICAL REPORT

PBOW-LOWER TOLUENE TANKS

Lot #: A9F160102

U.S. Army Corps of Engineers

QUANTERRA INCORPORATED

A handwritten signature in black ink, appearing to read "Deborah A. Hula".

Deborah A. Hula
Project Manager

July 23, 1999

CASE NARRATIVE

A9F160102

The following report contains the analytical results for twenty solid samples and one quality control sample submitted to Quanterra-North Canton by the U.S. Army Corps of Engineers from the PBOW-Lower Toluene Tanks Site. The samples were received June 11, 1999, according to documented sample acceptance procedures.

Quanterra-North Canton utilizes USEPA approved methods in all analytical work. The samples presented in this report were analyzed for the parameters listed on the Analytical Methods Summary page in accordance with the method indicated.

The results included in this report have been reviewed for compliance with the laboratory QA/QC plan. All data have been found to be compliant with laboratory protocol.

SUPPLEMENTAL QC INFORMATION

SAMPLE RECEIVING

The cooler was received at the laboratory at a temperature of 1.2° C.

ANALYTICAL METHODS SUMMARY

A9F160102

<u>PARAMETER</u>	<u>ANALYTICAL METHOD</u>
Soil and Waste pH	SW846 9045C
Total Organic Carbon	SMCA WALKLEY-BLACK
Total Residue as Percent Solids	MCAWW 160.3 MOD
Volatiles by GC	SW846 8021B

References:

- MCAWW "Methods for Chemical Analysis of Water and Wastes",
EPA-600/4-79-020, March 1983 and subsequent revisions.
- SMCA 90-3, Standard Methods of Chemical Analysis, 6th Edition,
D. Van Nostrand Co., Princeton, N.J., 1963.
- SW846 "Test Methods for Evaluating Solid Waste, Physical/Chemical
Methods", Third Edition, November 1986 and its updates.

SAMPLE SUMMARY

A9F160102

<u>WO #</u>	<u>SAMPLE#</u>	<u>CLIENT SAMPLE ID</u>	<u>DATE</u>	<u>TIME</u>
CWX40	001	PBOW99SB01-1'	06/09/99	10:22
CWX43	002	PBOW99SB02-1'	06/09/99	11:35
CWX44	003	PBOW99SB02-3'9"	06/09/99	11:30
CWX45	004	PBOW99SB03-1'	06/09/99	13:30
CWX47	005	PBOW99SB03-3'5"	06/09/99	13:47
CWX48	006	PBOW99SB04-1'4"	06/09/99	12:27
CWX49	007	PBOW99SB04-4'2"	06/09/99	12:39
CWX4A	008	PBOW99SB05-1'	06/09/99	18:55
CWX4C	009	PBOW99SB05-4'	06/09/99	19:07
CWX4D	010	PBOW99SB06-1'	06/09/99	16:30
CWX4E	011	PBOW99SB06-2'9"	06/09/99	16:38
CWX4H	012	PBOW99SB06-4'	06/09/99	16:50
CWX4K	013	PBOW99SB07-1'	06/09/99	17:37
CWX4M	014	PBOW99SB07-1'DUP	06/09/99	17:37
CWX4N	015	PBOW99SB07-4'	06/09/99	17:50
CWX4P	016	PBOW99SB08-1'	06/09/99	18:28
CWX4Q	017	PBOW99SB08-3'10"	06/09/99	18:39
CWX4V	018	PBOW99SB09-1'	06/09/99	14:41
CWX4X	019	PBOW99SB10-1'	06/10/99	08:57
CWX52	020	PBOW99SB10-2'6"	06/10/99	09:02
WX53	021	TRIP BLANK	06/10/99	.

NOTE (S) :

- The analytical results of the samples listed above are presented on the following pages.
- All calculations are performed before rounding to avoid round-off errors in calculated results.
- Results noted as "ND" were not detected at or above the stated limit.
- This report must not be reproduced, except in full, without the written approval of the laboratory.
- Results for the following parameters are never reported on a dry weight basis: color, corrosivity, density, flashpoint, ignitability, layers, odor, paint filter test, pH, porosity pressure, reactivity, redox potential, specific gravity, spot tests, solids, solubility, temperature, viscosity, and weight.

U.S. ARMY CORPS OF ENGINEERS

Client Sample ID: PBOW99SB01-1'

GC Volatiles

Lot-Sample #....: A9F160102-001 Work Order #....: CWX40102 Matrix.....: SOLID
Date Sampled...: 06/09/99 10:22 Date Received...: 06/11/99
Prep Date.....: 06/18/99 Analysis Date...: 06/18/99
Prep Batch #....: 9172359
Dilution Factor: 1
% Moisture.....: 7.0 Method.....: SW846 8021B

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>
Benzene	ND	1.1	ug/kg
Ethylbenzene	ND	1.1	ug/kg
Toluene	ND	1.1	ug/kg
Xylenes (total)	2.9	1.1	ug/kg

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
Trifluorotoluene	119	(50 - 150)

NOTE (S) :

Results and reporting limits have been adjusted for dry weight.

U.S. ARMY CORPS OF ENGINEERS

Client Sample ID: PBOW99SB02-1'

GC Volatiles

Lot-Sample #...: A9F160102-002 Work Order #...: CWX43102 Matrix.....: SOLID
Date Sampled...: 06/09/99 11:35 Date Received...: 06/11/99
Prep Date.....: 06/18/99 Analysis Date...: 06/18/99
Prep Batch #...: 9172359
Dilution Factor: 1
* Moisture.....: 9.8 Method.....: SW846 8021B

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>
Benzene	ND	1.1	ug/kg
Ethylbenzene	ND	1.1	ug/kg
Toluene	ND	1.1	ug/kg
Xylenes (total)	ND	1.1	ug/kg

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
Trifluorotoluene	117	(50 - 150)

NOTE (S) :

Results and reporting limits have been adjusted for dry weight.

U.S. ARMY CORPS OF ENGINEERS

Client Sample ID: PBOW99SB02-3'9"

GC Volatiles

Lot-Sample #....: A9F160102-003 Work Order #....: CWX44102 Matrix.....: SOLID
Date Sampled....: 06/09/99 11:30 Date Received...: 06/11/99
Prep Date.....: 06/18/99 Analysis Date...: 06/18/99
Prep Batch #....: 9172359
Dilution Factor: 1
* Moisture.....: 16 Method.....: SW846 8021B

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>	
		<u>LIMIT</u>	<u>UNITS</u>
Benzene	ND	1.2	ug/kg
Ethylbenzene	ND	1.2	ug/kg
Toluene	ND	1.2	ug/kg
Xylenes (total)	ND	1.2	ug/kg

<u>SURROGATE</u>	<u>PERCENT</u>	<u>RECOVERY</u>
	<u>RECOVERY</u>	<u>LIMITS</u>
Trifluorotoluene	120	(50 - 150)

NOTE (S) :

Results and reporting limits have been adjusted for dry weight.

U.S. ARMY CORPS OF ENGINEERS

Client Sample ID: PBOW99SB03-1'

GC Volatiles

Lot-Sample #....: A9F160102-004 Work Order #....: CWX45105 Matrix.....: SOLID
Date Sampled....: 06/09/99 13:30 Date Received...: 06/11/99
Prep Date.....: 06/18/99 Analysis Date...: 06/18/99
Prep Batch #....: 9172359
Dilution Factor: 1
% Moisture.....: 14 Method.....: SW846 8021B

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>	
		<u>LIMIT</u>	<u>UNITS</u>
Benzene	ND	1.2	ug/kg
Ethylbenzene	ND	1.2	ug/kg
Toluene	ND	1.2	ug/kg
Xylenes (total)	ND	1.2	ug/kg
	<u>PERCENT</u>	<u>RECOVERY</u>	
<u>SURROGATE</u>	<u>RECOVERY</u>	<u>LIMITS</u>	
Trifluorotoluene	118	(50 - 150)	

NOTE (S) :

Results and reporting limits have been adjusted for dry weight.

U.S. ARMY CORPS OF ENGINEERS

Client Sample ID: PBOW99SB03-3'5"

GC Volatiles

Lot-Sample #....: A9F160102-005 Work Order #....: CWX47102 Matrix.....: SOLID
Date Sampled....: 06/09/99 13:47 Date Received...: 06/11/99
Prep Date.....: 06/18/99 Analysis Date...: 06/18/99
Prep Batch #....: 9172359
Dilution Factor: 1
% Moisture.....: 17 Method.....: SW846 8021B

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u> <u>LIMIT</u>	<u>UNITS</u>
Benzene	ND	1.2	ug/kg
Ethylbenzene	ND	1.2	ug/kg
Toluene	ND	1.2	ug/kg
Xylenes (total)	ND	1.2	ug/kg

<u>SURROGATE</u>	<u>PERCENT</u> <u>RECOVERY</u>	<u>RECOVERY</u> <u>LIMITS</u>
Trifluorotoluene	121	(50 - 150)

NOTE (S) :

Results and reporting limits have been adjusted for dry weight.

U.S. ARMY CORPS OF ENGINEERS

Client Sample ID: PBOW99SB04-1'4"

GC Volatiles

Lot-Sample #....: A9F160102-006 Work Order #....: CWX48102 Matrix.....: SOLID
Date Sampled....: 06/09/99 12:27 Date Received...: 06/11/99
Prep Date.....: 06/18/99 Analysis Date...: 06/18/99
Prep Batch #....: 9172359
Dilution Factor: 1
% Moisture.....: 9.6 Method.....: SW846 8021B

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>	
		<u>LIMIT</u>	<u>UNITS</u>
Benzene	ND	1.1	ug/kg
Ethylbenzene	ND	1.1	ug/kg
Toluene	ND	1.1	ug/kg
Xylenes (total)	ND	1.1	ug/kg

<u>SURROGATE</u>	<u>PERCENT</u>	<u>RECOVERY</u>
	<u>RECOVERY</u>	<u>LIMITS</u>
Trifluorotoluene	120	(50 - 150)

NOTE (S) :

Results and reporting limits have been adjusted for dry weight.

U.S. ARMY CORPS OF ENGINEERS

Client Sample ID: PBOW99SB04-4'2"

GC Volatiles

Lot-Sample #....: A9F160102-007 Work Order #....: CWX49102 Matrix.....: SOLID
 Date Sampled...: 06/09/99 12:39 Date Received...: 06/11/99
 Prep Date.....: 06/19/99 Analysis Date...: 06/19/99
 Prep Batch #....: 9172359
 Dilution Factor: 1
 % Moisture.....: 18 Method.....: SW846 8021B

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>	
		<u>LIMIT</u>	<u>UNITS</u>
Benzene	ND	1.2	ug/kg
Ethylbenzene	ND	1.2	ug/kg
Toluene	ND	1.2	ug/kg
Xylenes (total)	ND	1.2	ug/kg

<u>SURROGATE</u>	<u>PERCENT</u>	<u>RECOVERY</u>
	<u>RECOVERY</u>	<u>LIMITS</u>
Trifluorotoluene	114	(50 - 150)

NOTE (S) :

Results and reporting limits have been adjusted for dry weight.

U.S. ARMY CORPS OF ENGINEERS

Client Sample ID: PBOW99SB05-1'

GC Volatiles

Lot-Sample #....: A9F160102-008 Work Order #....: CWX4A102 Matrix.....: SOLID
Date Sampled....: 06/09/99 18:55 Date Received...: 06/11/99
Prep Date.....: 06/18/99 Analysis Date...: 06/18/99
Prep Batch #....: 9172359
Dilution Factor: 1
% Moisture.....: 5.9 Method.....: SW846 8021B

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>	
		<u>LIMIT</u>	<u>UNITS</u>
Benzene	ND	1.1	ug/kg
Ethylbenzene	ND	1.1	ug/kg
Toluene	ND	1.1	ug/kg
Xylenes (total)	4.7	1.1	ug/kg
<u>SURROGATE</u>	<u>PERCENT</u>	<u>RECOVERY</u>	
	<u>RECOVERY</u>	<u>LIMITS</u>	
Trifluorotoluene	120	(50 - 150)	

NOTE (S) :

Results and reporting limits have been adjusted for dry weight.

U.S. ARMY CORPS OF ENGINEERS

Client Sample ID: PBOW99SB05-4'

GC Volatiles

Lot-Sample #....: A9F160102-009 Work Order #....: CWX4C102 Matrix.....: SOLID
Date Sampled...: 06/09/99 19:07 Date Received...: 06/11/99
Prep Date.....: 06/18/99 Analysis Date...: 06/18/99
Prep Batch #....: 9172359
Dilution Factor: 1
% Moisture.....: 16 Method.....: SW846 8021B

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>	
		<u>LIMIT</u>	<u>UNITS</u>
Benzene	ND	1.2	ug/kg
Ethylbenzene	ND	1.2	ug/kg
Toluene	ND	1.2	ug/kg
Xylenes (total)	ND	1.2	ug/kg

<u>SURROGATE</u>	<u>PERCENT</u>	<u>RECOVERY</u>
	<u>RECOVERY</u>	<u>LIMITS</u>
Trifluorotoluene	115	(50 - 150)

NOTE(S) :

Results and reporting limits have been adjusted for dry weight.

U.S. ARMY CORPS OF ENGINEERS

Client Sample ID: PBOW99SB06-1'

GC Volatiles

Lot-Sample #....: A9F160102-010 Work Order #....: CWX4D102 Matrix.....: SOLID
Date Sampled...: 06/09/99 16:30 Date Received...: 06/11/99
Prep Date.....: 06/19/99 Analysis Date...: 06/19/99
Prep Batch #....: 9172359
Dilution Factor: 1
% Moisture.....: 6.6 Method.....: SW846 8021B

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>	
		<u>LIMIT</u>	<u>UNITS</u>
Benzene	ND	1.1	ug/kg
Ethylbenzene	ND	1.1	ug/kg
Toluene	ND	1.1	ug/kg
Xylenes (total)	ND	1.1	ug/kg

<u>SURROGATE</u>	<u>PERCENT</u>	<u>RECOVERY</u>
	<u>RECOVERY</u>	<u>LIMITS</u>
Trifluorotoluene	119	(50 - 150)

NOTE (S) :

Results and reporting limits have been adjusted for dry weight.

U.S. ARMY CORPS OF ENGINEERS

Client Sample ID: PBOW99SB06-2'9"

GC Volatiles

Lot-Sample #....: A9F160102-011 Work Order #....: CWX4E105 Matrix.....: SOLID
Date Sampled....: 06/09/99 16:38 Date Received...: 06/11/99
Prep Date.....: 06/19/99 Analysis Date...: 06/19/99
Prep Batch #....: 9172359
Dilution Factor: 1
% Moisture.....: 18 Method.....: SW846 8021B

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>	
		<u>LIMIT</u>	<u>UNITS</u>
Benzene	ND	1.2	ug/kg
Ethylbenzene	ND	1.2	ug/kg
Toluene	ND	1.2	ug/kg
Xylenes (total)	ND	1.2	ug/kg

<u>SURROGATE</u>	<u>PERCENT</u>	<u>RECOVERY</u>
	<u>RECOVERY</u>	<u>LIMITS</u>
Trifluorotoluene	112	(50 - 150)

NOTE (S) :

Results and reporting limits have been adjusted for dry weight.

U.S. ARMY CORPS OF ENGINEERS

Client Sample ID: PBOW99SB06-4'

GC Volatiles

Lot-Sample #....: A9F160102-012 Work Order #....: CWX4H102 Matrix.....: SOLID
Date Sampled....: 06/09/99 16:50 Date Received...: 06/11/99
Prep Date.....: 06/19/99 Analysis Date...: 06/19/99
Prep Batch #....: 9172359
Dilution Factor: 1
% Moisture.....: 14 Method.....: SW846 8021B

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>	
		<u>LIMIT</u>	<u>UNITS</u>
Benzene	ND	1.2	ug/kg
Ethylbenzene	ND	1.2	ug/kg
Toluene	ND	1.2	ug/kg
Xylenes (total)	ND	1.2	ug/kg

<u>SURROGATE</u>	<u>PERCENT</u>	<u>RECOVERY</u>
	<u>RECOVERY</u>	<u>LIMITS</u>
Trifluorotoluene	129	(50 - 150)

NOTE (S) :

Results and reporting limits have been adjusted for dry weight.

U.S. ARMY CORPS OF ENGINEERS

Client Sample ID: PBOW99SB07-1'

GC Volatiles

Lot-Sample #....: A9F160102-013 Work Order #....: CWX4K102 Matrix.....: SOLID
Date Sampled....: 06/09/99 17:37 Date Received...: 06/11/99
Prep Date.....: 06/19/99 Analysis Date...: 06/19/99
Prep Batch #....: 9172359
Dilution Factor: 1
% Moisture.....: 7.7 Method.....: SW846 8021B

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>
Benzene	ND	1.1	ug/kg
Ethylbenzene	ND	1.1	ug/kg
Toluene	ND	1.1	ug/kg
Xylenes (total)	1.2	1.1	ug/kg

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
Trifluorotoluene	120	(50 - 150)

NOTE (S) :

Results and reporting limits have been adjusted for dry weight.

U.S. ARMY CORPS OF ENGINEERS

Client Sample ID: PBOW99SB07-1'DUP

GC Volatiles

Lot-Sample #....: A9F160102-014 Work Order #....: CWX4M102 Matrix.....: SOLID
Date Sampled....: 06/09/99 17:37 Date Received...: 06/11/99
Prep Date.....: 06/19/99 Analysis Date...: 06/19/99
Prep Batch #....: 9172359
Dilution Factor: 1
% Moisture.....: 7.7 Method.....: SW846 8021B

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>	
		<u>LIMIT</u>	<u>UNITS</u>
Benzene	ND	1.1	ug/kg
Ethylbenzene	ND	1.1	ug/kg
Toluene	ND	1.1	ug/kg
Xylenes (total)	ND	1.1	ug/kg
	<u>PERCENT</u>	<u>RECOVERY</u>	
<u>SURROGATE</u>	<u>RECOVERY</u>	<u>LIMITS</u>	
Trifluorotoluene	121	(50 - 150)	

NOTE (S) :

Results and reporting limits have been adjusted for dry weight.

U.S. ARMY CORPS OF ENGINEERS

Client Sample ID: PBOW99SB07-4'

GC Volatiles

Lot-Sample #....: A9F160102-015 Work Order #....: CWX4N102 Matrix.....: SOLID
Date Sampled....: 06/09/99 17:50 Date Received...: 06/11/99
Prep Date.....: 06/19/99 Analysis Date...: 06/19/99
Prep Batch #....: 9172359
Dilution Factor: 1
% Moisture.....: 17 Method.....: SW846 8021B

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>	
		<u>LIMIT</u>	<u>UNITS</u>
Benzene	ND	1.2	ug/kg
Ethylbenzene	ND	1.2	ug/kg
Toluene	ND	1.2	ug/kg
Xylenes (total)	ND	1.2	ug/kg

<u>SURROGATE</u>	<u>PERCENT</u>	<u>RECOVERY</u>
	<u>RECOVERY</u>	<u>LIMITS</u>
Trifluorotoluene	111	(50 - 150)

NOTE (S) :

Results and reporting limits have been adjusted for dry weight.

U.S. ARMY CORPS OF ENGINEERS

Client Sample ID: PBOW99SB08-1'

GC Volatiles

Lot-Sample #....: A9F160102-016 Work Order #....: CWX4P102 Matrix.....: SOLID
Date Sampled...: 06/09/99 18:28 Date Received...: 06/11/99
Prep Date.....: 06/19/99 Analysis Date...: 06/19/99
Prep Batch #....: 9172359
Dilution Factor: 1
% Moisture.....: 8.8 Method.....: SW846 8021B

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>
Benzene	ND	1.1	ug/kg
Ethylbenzene	ND	1.1	ug/kg
Toluene	ND	1.1	ug/kg
Xylenes (total)	ND	1.1	ug/kg

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
Trifluorotoluene	118	(50 - 150)

NOTE(S) :

Results and reporting limits have been adjusted for dry weight.

U.S. ARMY CORPS OF ENGINEERS

Client Sample ID: PBOW99SB08-3'10"

GC Volatiles

Lot-Sample #...: A9F160102-017 Work Order #...: CWX4Q102 Matrix.....: SOLID
Date Sampled...: 06/09/99 18:39 Date Received...: 06/11/99
Prep Date.....: 06/19/99 Analysis Date...: 06/19/99
Prep Batch #...: 9172359
Dilution Factor: 1
% Moisture.....: 18 Method.....: SW846 8021B

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>	
		<u>LIMIT</u>	<u>UNITS</u>
Benzene	ND	1.2	ug/kg
Ethylbenzene	ND	1.2	ug/kg
Toluene	ND	1.2	ug/kg
Xylenes (total)	ND	1.2	ug/kg

<u>SURROGATE</u>	<u>PERCENT</u>	<u>RECOVERY</u>
	<u>RECOVERY</u>	<u>LIMITS</u>
Trifluorotoluene	117	(50 - 150)

NOTE (S) :

Results and reporting limits have been adjusted for dry weight.

U.S. ARMY CORPS OF ENGINEERS

Client Sample ID: PBOW99SB09-1'

GC Volatiles

Lot-Sample #....: A9F160102-018 Work Order #....: CWX4V102 Matrix.....: SOLID
Date Sampled....: 06/09/99 14:41 Date Received...: 06/11/99
Prep Date.....: 06/19/99 Analysis Date...: 06/19/99
Prep Batch #....: 9172359
Dilution Factor: 1
% Moisture.....: 4.6 Method.....: SW846 8021B

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING LIMIT</u>	<u>UNITS</u>
Benzene	ND	1.0	ug/kg
Ethylbenzene	ND	1.0	ug/kg
Toluene	ND	1.0	ug/kg
Xylenes (total)	5.0	1.0	ug/kg

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
Trifluorotoluene	115	(50 - 150)

NOTE (S) :

Results and reporting limits have been adjusted for dry weight.

U.S. ARMY CORPS OF ENGINEERS

Client Sample ID: PBOW99SB10-1'

GC Volatiles

Lot-Sample #....: A9F160102-019 Work Order #....: CWX4X102 Matrix.....: SOLID
 Date Sampled....: 06/10/99 08:57 Date Received...: 06/11/99
 Prep Date.....: 06/19/99 Analysis Date...: 06/19/99
 Prep Batch #....: 9172359
 Dilution Factor: 1
 % Moisture.....: 4.3 Method.....: SW846 8021B

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>	
		<u>LIMIT</u>	<u>UNITS</u>
Benzene	ND	1.0	ug/kg
Ethylbenzene	ND	1.0	ug/kg
Toluene	ND	1.0	ug/kg
Xylenes (total)	1.3	1.0	ug/kg

<u>SURROGATE</u>	<u>PERCENT</u>	<u>RECOVERY</u>
	<u>RECOVERY</u>	<u>LIMITS</u>
Trifluorotoluene	121	(50 - 150)

NOTE (S) :

Results and reporting limits have been adjusted for dry weight.

U.S. ARMY CORPS OF ENGINEERS

Client Sample ID: PBOW99SB10-2'6"

GC Volatiles

Lot-Sample #....: A9F160102-020 Work Order #....: CWX52102 Matrix.....: SOLID
Date Sampled....: 06/10/99 09:02 Date Received...: 06/11/99
Prep Date.....: 06/19/99 Analysis Date...: 06/19/99
Prep Batch #....: 9172359
Dilution Factor: 1
% Moisture.....: 10 Method.....: SW846 8021B

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>	
		<u>LIMIT</u>	<u>UNITS</u>
Benzene	ND	1.1	ug/kg
Ethylbenzene	ND	1.1	ug/kg
Toluene	ND	1.1	ug/kg
Xylenes (total)	ND	1.1	ug/kg

<u>SURROGATE</u>	<u>PERCENT</u>	<u>RECOVERY</u>
	<u>RECOVERY</u>	<u>LIMITS</u>
Trifluorotoluene	121	(50 - 150)

NOTE (S) :

Results and reporting limits have been adjusted for dry weight.

U.S. ARMY CORPS OF ENGINEERS

Client Sample ID: TRIP BLANK

GC Volatiles

Lot-Sample #...: A9F160102-021 Work Order #...: CWX53101 Matrix.....: WATER
Date Sampled...: 06/10/99 Date Received...: 06/11/99
Prep Date.....: 06/18/99 Analysis Date...: 06/18/99
Prep Batch #...: 9172352
Dilution Factor: 1 Method.....: SW846 8021B

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>	
		<u>LIMIT</u>	<u>UNITS</u>
Benzene	ND	1.0	ug/L
Ethylbenzene	ND	1.0	ug/L
Toluene	ND	1.0	ug/L
Xylenes (total)	ND	1.0	ug/L

<u>SURROGATE</u>	<u>PERCENT</u> <u>RECOVERY</u>	<u>RECOVERY</u> <u>LIMITS</u>
Trifluorotoluene	106	(50 - 150)

QUALITY CONTROL SECTION

QUALITY CONTROL ELEMENTS OF SW-846 METHODS

Quanterra® Incorporated conducts a quality assurance/quality control (QA/QC) program designed to provide scientifically valid and legally defensible data. Toward this end, several types of quality control indicators are incorporated into the QA/QC program. These indicators are introduced into the sample testing process to provide a mechanism for the assessment of the analytical data.

QC BATCH

Environmental samples are taken through the testing process in groups called QUALITY CONTROL BATCHES (QC batches). A QC batch contains up to twenty environmental samples of a similar matrix (water, soil) that are processed using the same reagents and standards. Quanterra requires that each environmental sample be associated with a QC batch.

Several quality control samples are included in each QC batch and are processed identically to the twenty environmental samples. These QC samples include a METHOD BLANK (MB), a LABORATORY CONTROL SAMPLE (LCS) and, where appropriate, a MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD) pair or a MATRIX SPIKE/SAMPLE DUPLICATE (MS/DU) pair. If there is insufficient sample to perform an MS/MSD or an MS/DU, then a LABORATORY CONTROL SAMPLE DUPLICATE (LCSD) is included in the QC batch.

LABORATORY CONTROL SAMPLE

The Laboratory Control Sample is a QC sample that is created by adding known concentrations of a full or partial set of target analytes to a matrix similar to that of the environmental samples in the QC batch. The LCS analyte recovery results are used to monitor the analytical process and provide evidence that the laboratory is performing the method within acceptable guidelines. Failure to meet the established recovery guidelines requires the reparation and reanalysis of all samples in the QC batch. The only exception is that if the LCS recoveries are biased high and the associated sample is ND for the parameter(s) of interest, the batch is acceptable.

At times, a Laboratory Control Sample Duplicate (LCSD) is also included in the QC batch. An LCSD is a QC sample that is created and handled identically to the LCS. Analyte recovery data from the LCSD is assessed in the same way as that of the LCS. The LCSD recoveries, together with the LCS recoveries, are used to determine the reproducibility (precision) of the analytical system. Precision data are expressed as relative percent differences (RPDs). Failure of the RPDs to fall within the laboratory-generated acceptance windows requires the reparation and reanalysis of all samples in the QC batch. The only exception is that if the MS/MSD RPDs are within acceptance criteria, the batch is acceptable.

METHOD BLANK

The Method Blank is a QC sample consisting of all the reagents used in analyzing the environmental samples contained in the QC batch. Method Blank results are used to determine if interference or contamination in the analytical system could lead to the reporting of false positive data or elevated analyte concentrations. All target analytes must be below the reporting limits (RL) or the associated sample(s) must be ND except for the common laboratory contaminants indicated below.

<u>Volatile (GC or GC/MS)</u>	<u>Semivolatile (GC/MS)</u>	<u>Metals</u>
Methylene chloride	Phthalate Esters	Copper
Acetone		Iron
2-Butanone		Zinc
		Lead*

* for analyses run on TJA Trace ICP or GFAA only

QUALITY CONTROL ELEMENTS OF SW-846 METHODS (Continued)

The listed volatile and semivolatile compounds may be present in concentrations up to 5 times the reporting limits. The listed metals may be present in concentrations up to 2 times the reporting limit or must be twenty fold less than the results of the environmental samples. Failure to meet these Method Blank criteria requires the reparation and reanalysis of all samples in the QC batch.

MATRIX SPIKE/MATRIX SPIKE DUPLICATE

A Matrix Spike and a Matrix Spike Duplicate are a pair of environmental samples to which known concentrations of a full or partial set of target analytes are added. The MS/MSD results are determined in the same manner as the results of the environmental sample used to prepare the MS/MSD. The analyte recoveries and the relative percent differences (RPDs) of the recoveries are calculated and used to evaluate the effect of the sample matrix on the analytical results. When these values fail to meet acceptance criteria, the data is reviewed to determine the cause. If, in the analyst's judgment, sample matrix effects are indicated, no corrective action is performed. Otherwise, the MS/MSD and the environmental sample used to prepare them are reprepared and reanalyzed.

For certain methods, a Matrix Spike/Sample Duplicate (MS/DU) may be included in the QC batch in place of the MS/MSD. For the parameters (i.e. pH, ignitability) where it is not possible to prepare a spiked sample, a Sample Duplicate may be included in the QC batch.

SURROGATE COMPOUNDS

In addition to these batch-related QC indicators, each organic environmental and QC sample are spiked with surrogate compounds. Surrogates are organic chemicals that behave similarly to the analytes of interest and that are rarely present in the environment. Surrogate recoveries are used to monitor the individual performance of a sample in the analytical system.

The acceptance criteria do not apply to samples that are diluted. All other surrogate recoveries will be reported. If the LCS, LCSD, or the Method Blank surrogates fail to meet recovery criteria (exception for dilutions), the entire batch of samples is reprepared and reanalyzed.

If the surrogate recoveries are biased high in the LCS, LCSD, or the Method Blank and the associated sample(s) are ND, the batch is acceptable. If the surrogate recoveries are outside criteria for environmental or MS/MSD samples, the batch may be acceptable based on the analyst's judgment that sample matrix effects are indicated.

For the GC/MS BNA methods, the surrogate criteria is that two of the three surrogates for each fraction must meet acceptance criteria. The third surrogate must have a recovery of ten percent or greater.

For the Pesticide/PCB, PAH, TPH, and Herbicide methods, the surrogate criteria is that one of two surrogate compounds meet acceptance criteria.

Quanterra Incorporated – North Canton Facility, Certifications and Approvals:

Alabama (#41170), California (#2157), Connecticut (#PH-0590), Florida (#E87225) – Florida CompQAPP (#890651G), Kentucky (#90021), Massachusetts (#M-OH048), Maryland (#272), Minnesota (#39-999-348), Missouri (#6090), New Jersey (#74001), New York (#10975), North Dakota (#R-156), Ohio (#6090), OhioVAP (#CL0024), Pennsylvania (#68-340), South Carolina (#92007001, #92007002, #92007003), Tennessee (#02903), West Virginia (#210), Wisconsin (#999518190), NAVY, ARMY, USDA Soil Permit

LABORATORY CONTROL SAMPLE EVALUATION REPORT

GC Volatiles

Client Lot #....: A9F160102 Work Order #....: CX60A102-LCS Matrix.....: WATER
 LCS Lot-Sample#: A9F210000-352 CX60A103-LCSD
 Prep Date.....: 06/18/99 Analysis Date...: 06/18/99
 Prep Batch #....: 9172352
 Dilution Factor: 1

<u>PARAMETER</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>	<u>RPD</u>	<u>RPD LIMITS</u>	<u>METHOD</u>
Toluene	107	(71 - 132)			SW846 8021B
	111	(71 - 132)	3.3	(0-20)	SW846 8021B
Benzene	104	(73 - 134)			SW846 8021B
	107	(73 - 134)	3.1	(0-20)	SW846 8021B

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
Trifluorotoluene	104	(50 - 150)
	101	(50 - 150)

NOTE (S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.
 Bold print denotes control parameters

LABORATORY CONTROL SAMPLE EVALUATION REPORT

GC Volatiles

Client Lot #....: A9F160102 Work Order #....: CX600102-LCS Matrix.....: SOLID
 LCS Lot-Sample#: A9F210000-359 CX600103-LCSD
 Prep Date.....: 06/18/99 Analysis Date...: 06/18/99
 Prep Batch #....: 9172359
 Dilution Factor: 1

<u>PARAMETER</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>	<u>RPD</u>	<u>RPD LIMITS</u>	<u>METHOD</u>
Toluene	88	(66 - 129)			SW846 8021B
	88	(66 - 129)	0.84	(0-20)	SW846 8021B
Benzene	89	(69 - 132)			SW846 8021B
	89	(69 - 132)	0.61	(0-20)	SW846 8021B

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
Trifluorotoluene	95	(50 - 150)
	95	(50 - 150)

NOTE (S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

METHOD BLANK REPORT

GC Volatiles

Client Lot #...: A9F160102
MB Lot-Sample #: A9F210000-352

Work Order #...: CX60A101

Matrix.....: WATER

Analysis Date...: 06/18/99
Dilution Factor: 1

Prep Date.....: 06/18/99

Prep Batch #...: 9172352

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>
		<u>LIMIT</u>	<u>UNITS</u>	
Benzene	ND	1.0	ug/L	SW846 8021B
Ethylbenzene	ND	1.0	ug/L	SW846 8021B
Toluene	ND	1.0	ug/L	SW846 8021B
Xylenes (total)	ND	1.0	ug/L	SW846 8021B

<u>SURROGATE</u>	<u>PERCENT</u> <u>RECOVERY</u>	<u>RECOVERY</u> <u>LIMITS</u>
Trifluorotoluene	101	(50 - 150)

NOTE (S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK REPORT

GC Volatiles

Client Lot #....: A9F160102 Work Order #....: CX600101 Matrix.....: SOLID
 MB Lot-Sample #: A9F210000-359
 Analysis Date...: 06/18/99 Prep Date.....: 06/18/99
 Dilution Factor: 1 Prep Batch #....: 9172359

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u>		<u>METHOD</u>
		<u>LIMIT</u>	<u>UNITS</u>	
Benzene	ND	1.0	ug/kg	SW846 8021B
Ethylbenzene	ND	1.0	ug/kg	SW846 8021B
Toluene	ND	1.0	ug/kg	SW846 8021B
Xylenes (total)	ND	1.0	ug/kg	SW846 8021B

<u>SURROGATE</u>	<u>PERCENT</u> <u>RECOVERY</u>	<u>RECOVERY</u> <u>LIMITS</u>
Trifluorotoluene	121	(50 - 150)

NOTE (S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

MATRIX SPIKE SAMPLE EVALUATION REPORT

GC Volatiles

Client Lot #....: A9F160102 Work Order #....: CWX40103-MS Matrix.....: SOLID
 MS Lot-Sample #: A9F160102-001 CWX40104-MSD
 Date Sampled...: 06/09/99 10:22 Date Received...: 06/11/99
 Prep Date.....: 06/18/99 Analysis Date...: 06/18/99
 Prep Batch #....: 9172359
 Dilution Factor: 1 % Moisture.....: 7.0

<u>PARAMETER</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>	<u>RPD</u>	<u>RPD LIMITS</u>	<u>METHOD</u>
Toluene	86	(50 - 142)			SW846 8021B
	87	(50 - 142)	0.88	(0-40)	SW846 8021B
Benzene	88	(62 - 150)			SW846 8021B
	89	(62 - 150)	1.7	(0-33)	SW846 8021B

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
Trifluorotoluene	92	(50 - 150)
	92	(50 - 150)

NOTE (S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

Results and reporting limits have been adjusted for dry weight.

MATRIX SPIKE SAMPLE EVALUATION REPORT

GC Volatiles

Client Lot #....: A9F160102 Work Order #....: CX046104-MS Matrix.....: WATER
 MS Lot-Sample #: A9F160186-003 CX046105-MSD
 Date Sampled....: 06/15/99 09:00 Date Received...: 06/16/99
 Prep Date.....: 06/19/99 Analysis Date...: 06/19/99
 Prep Batch #....: 9172352
 Dilution Factor: 1

<u>PARAMETER</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>	<u>RPD</u>	<u>RPD LIMITS</u>	<u>METHOD</u>
Toluene	105	(55 - 159)			SW846 8021B
	110	(55 - 159)	4.3	(0-25)	SW846 8021B
Benzene	102	(55 - 161)			SW846 8021B
	106	(55 - 161)	3.9	(0-25)	SW846 8021B

<u>SURROGATE</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>
Trifluorotoluene	114	(50 - 150)
	121	(50 - 150)

NOTE (S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

Bold print denotes control parameters

Chain of Custody Record



QUA-4124

Client USACE		Project Manager DARRELL R. DAVIS		Date 6-10-99	Chain Of Custody Number 61624
Address		Telephone Number (Area Code)/Fax Number 502 582-5561		Lab Number	Page 1 of 1
City LOUISVILLE	State KY	Zip Code	Site Contact	Analysis	
Project Name PBOW - Lower Toluene TANKS			Carrier/Waybill Number		
Contract/Purchase Order/Quote No.					

Sample I.D. No. and Description	Date	Time	Sample Type	Total Volume	Containers		Preservative	Condition on Receipt	BTEX	TOC + PH	GEOTECHNICAL	Analysis							
					Type	No.													
PBOW99 SB 01 - 1'	6-9-99	10:22	GRASS _{SOIL}	202		1			✓										
PBOW99 SB 02 - 1'	6-9-99	11:35	GRASS _{SOIL}			1			✓										
PBOW99 SB 02 - 3'9"	6-9-99	11:30	GRASS _{SOIL}			1			✓										
PBOW99 SB 03 - 1'	6-9-99	13:30	GRASS _{SOIL}			3			✓	✓									
PBOW99 SB 03 - 3'5"	6-9-99	13:47	SOIL			1	N/A		✓										
PBOW99 SB 04 - 1' 4"	6-9-99	12:27	SOIL			1	N/A		✓										
PBOW99 SB 04 - 4' 2"	6-9-99	12:39	SOIL			1	N/A		✓										
PBOW99 SB 05 - 1'	6-9-99	18:55	SOIL			1	N/A		✓										
PBOW99 SB 05 - 4'	6-9-99	19:07	SOIL			1	N/A		✓										
PBOW99 SB 06 - 1'	6-9-99	16:30	SOIL			1	N/A		✓										
PBOW99 SB 06 - 2'9"	6-9-99	16:38	SOIL			3	N/A		✓	✓									
PBOW99 SB 06 - 4'	6-9-99	16:50	SOIL			1	N/A		✓										
PBOW99 SB 07 - 1'	6-9-99	17:37	SOIL			1	N/A		✓										
PBOW99 SB 07 - 1' DUP	6-9-99	17:37	SOIL			1	N/A		✓										
PBOW99 SB 07 - 4'	6-9-99	17:50	SOIL			1	N/A		✓										
PBOW99 SB 08 - 1'	6-9-99	18:28	SOIL			1	N/A		✓										

Special Instructions

Possible Hazard Identification <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input checked="" type="checkbox"/> Unknown			Sample Disposal <input type="checkbox"/> Return To Client <input checked="" type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months		
Turn Around Time Required <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Rush		QC Level <input type="checkbox"/> I. <input type="checkbox"/> II. <input type="checkbox"/> III.	Project Specific (Specify)		
1. Relinquished By <i>Darrell R. Davis</i>		Date 6-10-99	Time 14:10	1. Received By	
2. Relinquished By		Date	Time	2. Received By	
3. Relinquished By		Date	Time	3. Received By <i>William R. Coker</i>	
		Date 6/11/99	Time 1000A		

Comments: **PLEASE PERFORM MS/MSD FOR BTEX FROM THESE SAMPLES**

Chain of Custody Record



QUA 4124

Client USACE		Project Manager DARRELL R. DAVIS		Date 6-10-99	Chain Of Custody Number 61625
Address		Telephone Number (Area Code)/Fax Number 502 (582) - 5561		Lab Number	
City LOUISVILLE	State KY	Zip Code	Site Contact		
Project Name PBOW - Lower TOLUENE TANKS		Carrier/Waybill Number			
Contract/Purchase Order/Quote No.					

Page 2 of 2

Sample I.D. No. and Description	Date	Time	Sample Type	Total Volume	Containers		Preservative	Condition on Receipt	Analysis											
					Type	No.														
PBOW 995808 - 3' 10"	6-9-99	18:39	SOIL			1			✓✓✓✓✓ BTEX											
PBOW 995809 - 1'	6-9-99	14:47	SOIL			1														
PBOW 995810 - 1'	6-10-99	8:51	SOIL			1														
PBOW 995811 - 2' 6"	6-10-99	9:02	SOIL			2	N/A													
TRIP BLANK	-	-	-																	

Special Instructions

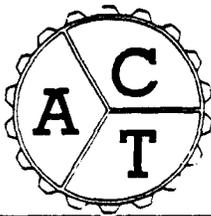
Possible Hazard Identification <input type="checkbox"/> Non-Hazard <input type="checkbox"/> Flammable <input type="checkbox"/> Skin Irritant <input type="checkbox"/> Poison B <input checked="" type="checkbox"/> Unknown		Sample Disposal <input type="checkbox"/> Return To Client <input checked="" type="checkbox"/> Disposal By Lab <input type="checkbox"/> Archive For _____ Months	
Turn Around Time Required <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Rush		QC Level <input type="checkbox"/> I. <input type="checkbox"/> II. <input type="checkbox"/> III.	
1. Relinquished By <i>Darrell R. Davis</i>		1. Received By Date: 6-10-99 Time: 14:10	
2. Relinquished By _____		2. Received By Date: _____ Time: _____	
3. Relinquished By _____		3. Received By <i>Darrell R. Davis</i> Date: 6-11-99 Time: 1000A	

Comments

Appendix G - Geotechnical Data



GRAIN SIZE DATA



ENGINEERING • TESTING • INSPECTION

APPLIED CONSTRUCTION TECHNOLOGIES, INC.

210 HAYES DRIVE • SUITE C • CLEVELAND, OHIO 44131 • (216) 459-TEST • FAX (216) 459-8954
478 E. EXCHANGE ST. • SUITE 202 • AKRON, OHIO 44304 • (330) 253-TEST • FAX (330) 253-3462

June 28, 1999

Quanterra, Inc.
4101 Shuffel Drive
North Canton, Ohio 44720

Attention: Ms. Debora A. Hula

SUBJECT: LAB TEST RESULTS
FOR TWO SUBMITTED SAMPLES
CLIENT CODE: 383620
LAB P.O. SR016700

ACT PROJECT NO. 9901.16
Report No. 17 - 28 June 1999

Enclosed are grain size analysis results for two jar samples of soil with organics submitted to ACT on June 12, 1999. Grain size analyses, which included a hydrometer for all of the samples, were performed per ASTM D-422, and samples were visually classified per ASTM D-2487. Materials submitted were non-plastic.

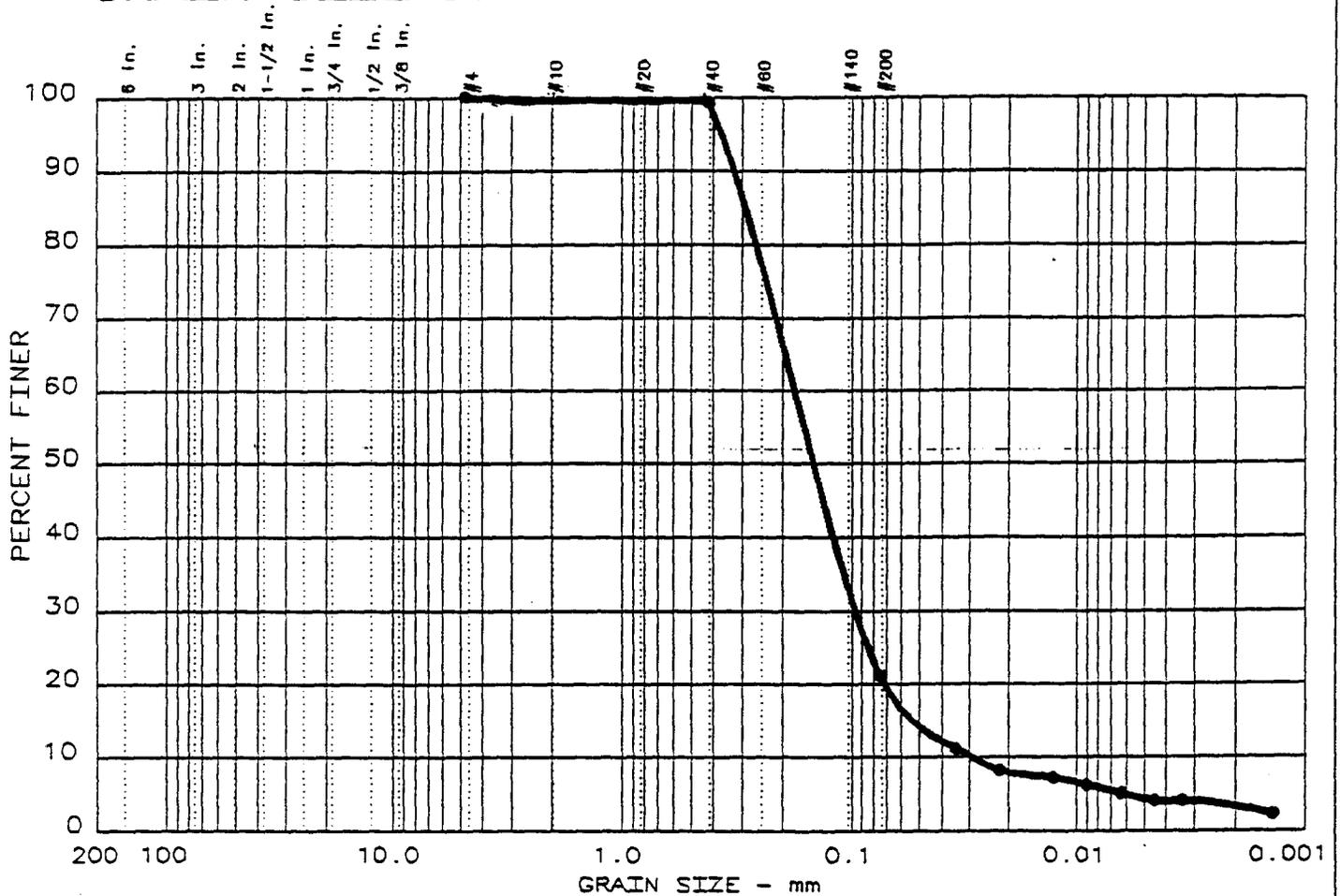
APPLIED CONSTRUCTION TECHNOLOGIES, INC.

by:

GEORGE WOZNIAK, C.E.T.
Manager - Materials Laboratory

GW:jh

GRAIN SIZE DISTRIBUTION TEST REPORT



% +3"	% GRAVEL	% SAND	% SILT	% CLAY
0.0	0.2	78.7	16.8	4.3

LL	PI	D ₈₅	D ₆₀	D ₅₀	D ₃₀	D ₁₅	D ₁₀	C _c	C _u
N.P.	N.P.	0.29	0.18	0.15	0.096	0.0538	0.0292	1.78	6.0

MATERIAL DESCRIPTION	USCS	AASHTO
● DARK GRAY SILTY SAND.	SM	

<p>Project No.: 9901.16 Project: P.O. SR016700 CLIENT CODE: 383620 ● Location: A9F160102-011 CWX4E-1-04 PBOW99SBφ6-2'9"</p> <p>Date: 6/22/99</p>	<p>Remarks: CLIENT: QUANTERRA, INC. JAR SAMPLES RECEIVED ON 6/17/99</p>
GRAIN SIZE DISTRIBUTION TEST REPORT APPLIED CONSTRUCTION TECH., INC.	
Figure No. <u>9-65</u>	

U.S. ARMY CORPS OF ENGINEERS

Client Sample ID: PBOW99SB03-1'

General Chemistry

Lot-Sample #....: A9F160102-004 Work Order #....: CWX45 Matrix.....: SOLID
Date Sampled....: 06/09/99 13:30 Date Received...: 06/11/99
% Moisture.....: 14

<u>PARAMETER</u>	<u>RESULT</u>	<u>RL</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>PREP BATCH #</u>
pH (solid)	5.2 Dilution Factor: 1		No Units	SW846 9045C	06/11/99	9169204
Percent Solids	86.2 Dilution Factor: 1	0.10	%	MCAWW 160.3 MOD	06/17-06/18/99	9168143
Total Organic Carbon	8300 Dilution Factor: 1	120	mg/kg	SMCA WALKLEY-BLAC	07/05/99	9186124

NOTE(S) :

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

U.S. ARMY CORPS OF ENGINEERS

Client Sample ID: PBOW99SB06-2'9"

General Chemistry

Lot-Sample #....: A9F160102-011 Work Order #....: CWX4E Matrix.....: SOLID
Date Sampled....: 06/09/99 16:38 Date Received...: 06/11/99
% Moisture.....: 18

<u>PARAMETER</u>	<u>RESULT</u>	<u>RL</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>PREP BATCH #</u>
pH (solid)	6.3 Dilution Factor: 1		No Units	SW846 9045C	06/11/99	9169204
Percent Solids	82.5 Dilution Factor: 1	0.10	%	MCAWW 160.3 MOD	06/17-06/18/99	9168143
Total Organic Carbon	14000 Dilution Factor: 1	120	mg/kg	SMCA WALKLEY-BLAC	07/05/99	9186124

NOTE(S) :

RL Reporting Limit

Results and reporting limits have been adjusted for dry weight.

LABORATORY CONTROL SAMPLE EVALUATION REPORT

General Chemistry

Client Lot #....: A9F160102

Matrix.....: SOLID

<u>PARAMETER</u>	<u>PERCENT RECOVERY</u>	<u>RECOVERY LIMITS</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>PREP BATCH #</u>
Total Organic Carbon	110	Work Order #: CXP61102 (69 - 130)	LCS Lot-Sample#: A9G050000-124 SMCA WALKLEY-BLAC	07/05/99	9186124

Dilution Factor: 1

NOTE (S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

METHOD BLANK REPORT

General Chemistry

Client Lot #...: A9F160102

Matrix.....: SOLID

<u>PARAMETER</u>	<u>RESULT</u>	<u>REPORTING</u> <u>LIMIT</u>	<u>UNITS</u>	<u>METHOD</u>	<u>PREPARATION-</u> <u>ANALYSIS DATE</u>	<u>PREP</u> <u>BATCH #</u>
Percent Solids	ND	Work Order #: CX0Q3101 0.10	%	MB Lot-Sample #: A9F170000-143 MCAWW 160.3 MOD	06/17-06/18/99	9168143
		Dilution Factor: 1				
Percent Solids	ND	Work Order #: CX6JR101 0.10	%	MB Lot-Sample #: A9F220000-141 MCAWW 160.3 MOD	06/22-06/23/99	9173141
		Dilution Factor: 1				
Total Organic Carbon	ND	Work Order #: CXP61101 100	mg/kg	MB Lot-Sample #: A9G050000-124 SMCA WALKLEY-BLAC	07/05/99	9186124
		Dilution Factor: 1				

NOTE(S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

SAMPLE DUPLICATE EVALUATION REPORT

General Chemistry

Client Lot #....: A9F160102

Work Order #....: CWTRH-SMP
CWTRH-DUP

Matrix.....: SOLID

Date Sampled....: 06/10/99 09:30 Date Received...: 06/11/99

% Moisture.....: 6.6

<u>PARAM</u>	<u>RESULT</u>	<u>DUPLICATE</u>	<u>UNITS</u>	<u>RPD</u>	<u>RPD</u>	<u>METHOD</u>	<u>PREPARATION-</u>	<u>PREP</u>
		<u>RESULT</u>		<u>RPD</u>	<u>LIMIT</u>		<u>ANALYSIS DATE</u>	<u>BATCH #</u>
Percent Solids	93.4	93.4	%	0.006	(0-20)	MCAWW 160.3 MOD	06/22-06/23/99	9173141

SD Lot-Sample #: A9F140104-017

Dilution Factor: 1

NOTE(S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.
Results and reporting limits have been adjusted for dry weight.

SAMPLE DUPLICATE EVALUATION REPORT

General Chemistry

Client Lot #...: A9F160102

Work Order #...: CWV8R-SMP
CWV8R-DUP

Matrix.....: SOLID

Date Sampled...: 06/11/99

Date Received...: 06/12/99

% Moisture.....: 9.8

<u>PARAM</u>	<u>RESULT</u>	<u>DUPLICATE</u> <u>RESULT</u>	<u>UNITS</u>	<u>RPD</u>	<u>RPD</u> <u>LIMIT</u>	<u>METHOD</u>	<u>PREPARATION-</u> <u>ANALYSIS DATE</u>	<u>PREP</u> <u>BATCH #</u>
Total Organic Carbon						SD Lot-Sample #: A9F140142-014		
	16000	16000	mg/kg	0.54	(0-20)	SMCA WALKLEY-BLAC	07/05/99	9186124

Dilution Factor: 1

NOTE (S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

Results and reporting limits have been adjusted for dry weight.

SAMPLE DUPLICATE EVALUATION REPORT

General Chemistry

Client Lot #....: A9F160102

Work Order #....: CWX4E-SMP
CWX4E-DUP

Matrix.....: SOLID

Date Sampled....: 06/09/99 16:38 Date Received...: 06/11/99

% Moisture.....: 18

<u>PARAM</u>	<u>RESULT</u>	<u>DUPLICATE</u>	<u>UNITS</u>	<u>RPD</u>	<u>RPD</u>	<u>METHOD</u>	<u>PREPARATION-</u>	<u>PREP</u>
		<u>RESULT</u>		<u>RPD</u>	<u>LIMIT</u>		<u>ANALYSIS DATE</u>	<u>BATCH #</u>
Percent Solids	82.5	82.1	%	0.53	(0-20)	SD Lot-Sample #: A9F160102-011 MCAWW 160.3 MOD	06/17-06/18/99	9168143

Dilution Factor: 1

NOTE (S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

Results and reporting limits have been adjusted for dry weight.

SAMPLE DUPLICATE EVALUATION REPORT

General Chemistry

Client Lot #...: A9F160102

Work Order #...: CWX45-SMP
CWX45-DUP

Matrix.....: SOLID

Date Sampled...: 06/09/99 13:30 Date Received...: 06/11/99

% Moisture.....: 14

<u>PARAM</u>	<u>RESULT</u>	<u>DUPLICATE</u>	<u>UNITS</u>	<u>RPD</u>	<u>RPD</u>	<u>METHOD</u>	<u>PREPARATION-</u>	<u>PREP</u>
		<u>RESULT</u>		<u>RPD</u>	<u>LIMIT</u>		<u>ANALYSIS DATE</u>	<u>BATCH #</u>
Percent Solids	86.2	87.2	%	1.1	(0-20)	MCAWW 160.3 MOD	06/17-06/18/99	9168143

SD Lot-Sample #: A9F160102-004

Dilution Factor: 1

NOTE (S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

Results and reporting limits have been adjusted for dry weight.

SAMPLE DUPLICATE EVALUATION REPORT

General Chemistry

Client Lot #...: A9F160102

Work Order #...: CWX5E-SMP
CWX5E-DUP

Matrix.....: SOLID

Date Sampled...: 06/11/99 18:19 Date Received...: 06/14/99

% Moisture.....: 12

<u>PARAM</u>	<u>RESULT</u>	<u>DUPLICATE RESULT</u>	<u>UNITS</u>	<u>RPD</u>	<u>RPD LIMIT</u>	<u>METHOD</u>	<u>PREPARATION- ANALYSIS DATE</u>	<u>PREP BATCH #</u>
Total Organic Carbon	8100	7800	mg/kg	3.4	(0-20)	SD Lot-Sample #: A9F160105-002 SMCA WALKLEY-BLAC	07/05/99	9186124

Dilution Factor: 1

NOTE (S) :

Calculations are performed before rounding to avoid round-off errors in calculated results.

Results and reporting limits have been adjusted for dry weight.

Appendix H - Variance Report

Variance Report

For the purpose of this investigation, variances are defined as necessary changes or modifications to the planned activities as specified by the Quality Assurance Project Plan (QAPP). Variances do not significantly affect the quality of the data or process being modified. The following are the variances that occurred during this investigation.

Variance#1: All subsurface soil samples at the four locations (40 feet North, South, East, and West) around each tank were collected for laboratory analyses regardless of screening data.

Justification: The field team leader made this decision based on the low readings of the headspace screening. The QAPP required that only additional 4-5 samples would be selected based on the highest field screening results of the subsurface soils.

Impact: This action had no adverse effects on the quality of the data. This action increased the number of samples obtained for chemical analyses within close proximity of the tank locations.

Variance#2: Surface water and sediment samples were not collected from drainage ditches and the surface water depression at the site.

Justification: The field team leader made this decision based on the low headspace screening results indicating that there was no contamination at the tank locations.

Impact: These potential migration pathways were not sampled. The laboratory analytical results indicated the field team leader assumption was confirmed. No contamination source was identified. Therefore, there was no need to sample the potential migration pathways. There was no impact on the quality of the data and information collected.

Variance #3: The sample identification procedures set forth in the QAPP (USACE, 1999) were not followed.

Justification: The sample identification numbers were assigned, however the field team leader included the sample depths within the identification number.

Impact: There will be no significant effects on the quality of data and information collected.

Appendix I - Environmental Information
and Imaging Services (ERIIS) Data

ERIIS REPORT OVERVIEW

The following features are available for an ERIIS report:

- * Database Report
 - * Statistical Profile
 - * Database Records
- * Related Maps
 - * Digital Custom Plotted Map
 - * Sanborn Fire Insurance Map(s)
 - * Topographical Map(s)

Statistical Profile

The statistical profile is an at-a-glance numeric summary of the databases searched for your ERIIS Report.

Database Records

The detailed federal and state database information indicates potential and actual environmental threats within the study radius. These records are sorted by their distance from the study site.

Digital Custom Map

The digital custom map is cross referenced with the database records. The cross-in-circle in the center of the map represents the study site. The red circles represent distances from the study site. The plottable sites in the report are distinguished on the map by symbols of different shape and color.

Historic Fire Insurance Maps

The ERIIS collection of historical Sanborn Fire Insurance Maps covers 14,000 cities and towns. These maps may indicate prior use of the study site. If no maps are available for the study site, a notice to that effect is included. This notice should serve as evidence of due diligence.

Topographical Map

USGS topographical maps show natural and man-made features as well as the shape and elevation of the terrain. The 7.5 minute quad maps are produced at a scale of 1:24,000, or one inch represents 2,000 feet.

If you have any questions about this report,
please contact ERIIS Customer Service at 1-800-989-0403

ERIIS CORRIDOR STATISTICAL PROFILE
State: OH

ERIIS Report #317596A

Mar 4, 1999

Site: SOUTH OF SANDUSKY
SANDUSKY, OH

<u>Database</u>	<u>Plotted Sites</u>
NPL	0
RCRIS_CA	0
RCRIS_TS	1
CERCLIS	0
NFRAP	1
RCRIS_LG	0
RCRIS_SG	1
ERNS	0
HWS	1
LRST	6
SWF	0
RST	9
	<hr/>
	19

NR in a radius count indicates that the database cannot be reported by this search criteria due to insufficient and/or inaccurate addresses reported by a federal/state agency.

**ENVIRONMENTAL RISK INFORMATION & IMAGING SERVICES
DATABASE REFERENCE GUIDE**

NPL

Date of Data: 10/14/1998
Release Date: 10/20/1998
Date on System: 11/20/1998
US Environmental Protection Agency
Office of Solid Waste and Emergency Response
703/603-8881
Date of Last Contact: 11/02/1998

National Priorities List

The NPL Report is an EPA listing of the nation's worst uncontrolled or abandoned hazardous waste sites. NPL sites are targeted for possible long-term remedial action under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) of 1980. In addition, the NPL Report includes information concerning cleanup agreements between EPA and Potentially Responsible Parties (commonly called Records of Decision, or RODS), any liens filed against contaminated properties, as well as the past and current EPA budget expenditures tracked within the Superfund Consolidated Accomplishments Plan (SCAP).

RCRIS CA

Date of Data: 07/01/1998
Release Date: 09/18/1998
Date on System: 12/04/1998
US Environmental Protection Agency
Office of Solid Waste and Emergency Response
800/424-9346
Date of Last Contact: 11/04/1998

Resource Conservation and Recovery Information System - TSD's Subject to Corrective Action

The RCRIS_CA Report contains information pertaining to hazardous waste treatment, storage, and disposal Facilities (RCRA TSD's) which have been conducted, or are currently conducting, a corrective action(s) as regulated under the Resource Conservation and Recovery Act. The following information is included within the RCRIS_CA Report:

- Information pertaining to the status of facilities tracked by the RCRA Administrative Action Tracking System (RAATS)
- Inspections & evaluations conducted by federal and state agencies
- All reported facility violations, the environmental statute(s) violated, and any proposed & actual penalties
- Information pertaining to corrective actions undertaken by the facility or EPA

RCRIS TS

Date of Data: 07/01/1998
Release Date: 09/18/1998
Date on System: 12/04/1998
US Environmental Protection Agency
Office of Solid Waste and Emergency Response
800/424-9346
Date of Last Contact: 11/04/1998

Resource Conservation and Recovery Information System - Non-Corrective Action TSD Facilities

The RCRIS_TS Report contains information pertaining to facilities which either treat, store, or dispose of EPA regulated hazardous waste. The following information is also included in the RCRIS_TS Report:

- Information pertaining to the status of facilities tracked by the RCRA Administrative Action Tracking System (RAATS)
- Inspections & evaluations conducted by federal and state agencies
- All reported facility violations, the environmental statute(s) violated, and any proposed & actual penalties

CERCLIS

Date of Data: 10/14/1998
Release Date: 10/20/1998
Date on System: 11/13/1998
US Environmental Protection Agency
Office of Solid Waste and Emergency Response
703/603-8881
Date of Last Contact: 11/02/1998

Comprehensive Environmental Response, Compensation, and Liability Information System

The CERCLIS Database is a comprehensive listing of known or suspected uncontrolled or abandoned hazardous waste sites. These sites have either been investigated, or are currently under investigation by the U.S. EPA for the release, or threatened release of hazardous substances. Once a site is placed in CERCLIS, it may be subjected to several levels of review and evaluation, and ultimately placed on the National Priorities List (NPL). In addition to site events and milestone dates, the CERCLIS Report also contains financial information from the Superfund Consolidated Accomplishments Plan (SCAP).

NFRAP

Date of Data: 10/14/1998
Release Date: 10/20/1998
Date on System: 11/13/1998
US Environmental Protection Agency
Office of Solid Waste and Emergency Response
703/603-8881
Date of Last Contact: 11/02/1998

No Further Remedial Action Planned Sites

The No Further Remedial Action Planned Report (NFRAP), also known as the CERCLIS Archive, contains information pertaining to sites which have been removed from the U.S. EPA's CERCLIS Database. NFRAP sites may be sites where, following an initial investigation, either no contamination was found, contamination was removed quickly without need for the site to be placed on the NPL, or the contamination was not serious enough to require federal Superfund action or NPL consideration.

RCRIS LG

Date of Data: 07/01/1998
Release Date: 09/18/1998
Date on System: 12/04/1998
US Environmental Protection Agency
Office of Solid Waste and Emergency Response
800/424-9346
Date of Last Contact: 11/04/1998

Resource Conservation and Recovery Information System - Large Quantity Generators

The RCRIS_LG Report contains information pertaining to facilities which either generate more than 1000kg of EPA regulated hazardous waste per month, or meet other applicable requirements of the Resource Conservation and Recovery Act. The following information is also included in the RCRIS_LG Report:

- Information pertaining to the status of facilities tracked by the RCRA Administrative Action Tracking System (RAATS)
- Inspections & evaluations conducted by federal and state agencies
- All reported facility violations, the environmental statute(s) violated, and any proposed & actual penalties
- Information pertaining to corrective actions undertaken by the facility or EPA

**ENVIRONMENTAL RISK INFORMATION & IMAGING SERVICES
DATABASE REFERENCE GUIDE**

RCRIS_SG

Date of Data: 07/01/1998
Release Date: 09/18/1998
Date on System: 12/04/1998
US Environmental Protection Agency
Office of Solid Waste and Emergency Response
800/424-9346
Date of Last Contact: 11/04/1998

Resource Conservation and Recovery Information System - Small Quantity Generators

The RCRIS SG Report contains information pertaining to facilities which either generate between 100kg and 1000kg of EPA regulated hazardous waste per month, or meet other applicable requirements of the Resource Conservation And Recovery Act. On advice of the U.S. EPA, ERIS does not report so-called "RCRA Protective Filers." Protective Filers, commonly called Conditionally Exempt Small Quantity Generators (CESQG's), are facilities that have completed RCRA notification paperwork, but are not, in fact, subject to RCRA regulation. The determination of CESQG status is made by the U.S. EPA. The following information is also included in the RCRIS SG Report:

- Information pertaining to the status of facilities tracked by the RCRA Administrative Action Tracking System (RAATS)
- Inspections & evaluations conducted by federal and state agencies
- All reported facility violations, the environmental statute(s) violated, and any proposed & actual penalties
- Information pertaining to corrective actions undertaken by the facility or EPA

ERNS

Date of Data: 10/08/1998
Release Date: 10/09/1998
Date on System: 11/13/1998
US Environmental Protection Agency
Office of Solid Waste and Emergency Response
202/260-2342
Date of Last Contact: 10/19/1998

Emergency Response Notification System

ERNS is a national computer database system that is used to store information concerning the sudden and/or accidental release of hazardous substances, including petroleum, into the environment. The ERNS Reporting System contains preliminary information on specific releases, including the spill location, the substance released, and the responsible party. Please note that the information in the ERNS Report pertains only to those releases that occurred between January 1, 1997 and October 8, 1998.

HWS

Date of Data: 01/02/1998
Release Date: 01/02/1998
Date on System: 02/27/1998
OH Environmental Protection Agency
Emergency and Remedial Response Division
614/644-2924
Date of Last Contact: 08/19/1998

Ohio Master Sites List

The Ohio Master Sites List tracks sites in Ohio where hazardous waste has been found or where there are any known, suspected, or likely release of such wastes from a facility.

LRST

Date of Data: 10/01/1998
Release Date: 11/20/1998
Date on System: 12/04/1998
OH Office of the State Fire Marshal
Bureau of Licensing and Certification
614/752-7924
Date of Last Contact: 12/01/1998

Ohio Leaking Underground Storage Tank Report

The Ohio Leaking Underground Storage Tank Report (formerly The Petroleum Underground Storage Tank Release Incident Report, or PUSTR) is a comprehensive listing of all reported active and inactive leaking underground storage tanks located within the State of Ohio.

SWF

Date of Data: 12/31/1997
Release Date: 02/01/1998
Date on System: 03/11/1998
OH Environmental Protection Agency
Division of Solid Waste Management
614/644-3135
Date of Last Contact: 10/16/1998

Ohio Solid Waste Facility List

The Ohio Solid Waste Facility List contains information pertaining to all active and closed permitted solid waste landfills and processing facilities within the State of Ohio.

RST

Date of Data: 10/01/1998
Release Date: 10/01/1998
Date on System: 10/01/1998
OH Office of the State Fire Marshal
Bureau of Licensing and Certification
614/752-7924
Date of Last Contact: 10/26/1998

Ohio Underground Storage Tank Report

The Ohio Underground Storage Tank Report is a comprehensive listing of all registered active and inactive underground storage tanks located within the State of Ohio.

ERIIS SUMMARY OF PLOTTABLE SITES

ERIIS Report #317596A

Mar 4, 1999

ERIIS ID.	FACILITY/ADDRESS	DATABASE	DISTANCE FROM SITE	MAP ID
1005009583	HEMMINGER FARMS 1118 FOX RD SANDUSKY, OH 44870-8367 COUNTY: ERIE	LRST	Corridor	9583
39005013250	NASA 6100 CLEVELAND AVE SANDUSKY, OH 44870 COUNTY: ERIE	LRST	Corridor	3250
39005013251	NASA 6100 COLUMBUS AVE SANDUSKY, OH 44870-8329 COUNTY: ERIE	LRST	Corridor	3251
39013000073	NASA LERC PLUM BROOK STATION 6100 COLUMBUS AVE SANDUSKY, OH 44870-8329 COUNTY: ERIE	RCRIS_TS	Corridor	73
39039000797	NASA PLUM BROOK 6100 COLUMBUS AVE SANDUSKY, OH 44870-8329 COUNTY: ERIE	NFRAP	Corridor	797
39005013257	NASA PLUM BROOK STATION 6100 COLUMBUS AVE SANDUSKY, OH 44870-8329 COUNTY: ERIE	LRST	Corridor	3257
39010005044	NASA PLUM BROOK STATION 6100 COLUMBUS AVE SANDUSKY, OH 44870-8329 COUNTY: ERIE	RST	Corridor	5044
39010005045	NASA PLUM BROOK STATION 6100 COLUMBUS AVE SANDUSKY, OH 44870-8329 COUNTY: ERIE	RST	Corridor	5045
39010005046	NASA PLUM BROOK STATION 6100 COLUMBUS AVE SANDUSKY, OH 44870-8329 COUNTY: ERIE	RST	Corridor	5046
010005047	NASA PLUM BROOK STATION 6100 COLUMBUS AVE SANDUSKY, OH 44870-8329 COUNTY: ERIE	RST	Corridor	5047
39010005048	NASA PLUM BROOK STATION 6100 COLUMBUS AVE SANDUSKY, OH 44870-8329 COUNTY: ERIE	RST	Corridor	5048
39010005049	NASA PLUM BROOK STATION 6100 COLUMBUS AVE SANDUSKY, OH 44870-8329 COUNTY: ERIE	RST	Corridor	5049
39010005050	NASA PLUM BROOK STATION 6100 COLUMBUS AVE SANDUSKY, OH 44870-8329 COUNTY: ERIE	RST	Corridor	5050
39010005051	NASA PLUM BROOK STATION 6100 COLUMBUS AVE SANDUSKY, OH 44870-8329 COUNTY: ERIE	RST	Corridor	5051
39010005052	NASA PLUM BROOK STATION 6100 COLUMBUS AVE SANDUSKY, OH 44870-8329 COUNTY: ERIE	RST	Corridor	5052
39005013258	NASA PLUMBROOK STATION 6100 COLUMBUS AVE SANDUSKY, OH 44870-8329 COUNTY: ERIE	LRST	Corridor	3258
39005014705	PERKINS TRANSP. BUS GARAGE TAYLOR RD AT COLUMBUS AVE SANDUSKY, OH 44870 COUNTY: ERIE	LRST	Corridor	4705
39050000278	US NASA PLUM BROOK TAYLOR & COLUMBUS RD SANDUSKY, OH 44870 COUNTY: ERIE	HWS	Corridor	278
08010305	USDOI SANDUSKY BIOLOGICAL STATION 6100 COLUMBUS AVE SANDUSKY, OH 44870-8329 COUNTY: ERIE	RCRIS_SG	Corridor	305

**ERIIS ENVIRONMENTAL DATA REPORT
 RESOURCE CONSERVATION AND RECOVERY INFORMATION SYSTEM
 RCRIS_TS - PLOTTABLE SITES - PAGE 1**

ERIIS Report #317596A

Mar 4, 1999

ERIIS ID EPA ID	FACILITY	ADDRESS	RAATS ISSUE DATE RAATS ACTION/STATUS RAATS PENALTIES	DISTANCE FROM SITE	DIRECTION FROM SITE	MAP ID
39013000073 OH3800015379	NASA LERC PLUM BROOK STATION COUNTY: ERIE	6100 COLUMBUS AVE SANDUSKY, OH 44870-8329	FACILITY NOT REPORTED IN RAATS	Corridor Site		73

FACILITY VIOLATIONS

	DATE DETERMINED: -----	DATE RESOLVED: -----	AREA OF VIOLATION: -----
1.	08/24/1989	12/05/1991	GENERATOR-ALL REQUIREMENTS
2.	08/24/1989	12/05/1991	GENERATOR-LAND BAN REQUIREMENTS
3.	02/18/1992	05/20/1992	GENERATOR-ALL REQUIREMENTS

FACILITY EVALUATIONS

	EVALUATION DATE: -----	EVALUATING AGENCY: -----	TYPE OF EVALUATION: -----	AREA(S) OF EVALUATION: -----
1.	08/24/1989	STATE	COMPLIANCE EVALUATION INSPECTION	GENERATOR-ALL REQUIREMENTS GENERATOR-LAND BAN REQUIREMENTS
2.	02/18/1992	STATE	COMPLIANCE EVALUATION INSPECTION	GENERATOR-ALL REQUIREMENTS GENERATOR-LAND BAN REQUIREMENTS

FACILITY ENFORCEMENTS

	ENFORCEMENT DATE: -----	ENFORCING AGENCY: -----	TYPE OF ACTION: -----	PENALTY(S): -----
1.	09/21/1990	EPA	WRITTEN, INFORMAL ADMINISTRATIVE ACTION	
2.	02/28/1992	STATE	WRITTEN, INFORMAL ADMINISTRATIVE ACTION	

ERIIS ENVIRONMENTAL DATA REPORT
CERCLIS NO FURTHER REMEDIAL ACTION PLANNED SITES
NFRAP - PLOTTABLE SITES - PAGE 1

ERIIS Report #317596A

Mar 4, 1999

ERIIS ID EPA ID	FACILITY	ADDRESS	DISTANCE FROM SITE	DIRECTION FROM SITE	MAP ID
39039000797 OH3800015379	NASA PLUM BROOK COUNTY: ERIE	6100 COLUMBUS AVE SANDUSKY, OH 44870-8329	Corridor		797
	<u>SITE EVENT(S)</u> DISCOVERY PRELIMINARY ASSESSMENT STATE, FUND FINANCED	<u>COMPLETE DATE</u> 08-01-1983 08-01-1984 09-30-1994			

ERIIS ENVIRONMENTAL DATA REPORT
RESOURCE CONSERVATION AND RECOVERY INFORMATION SYSTEM
RCRIS_SG - PLOTTABLE SITES - PAGE 1

ERIIS Report #317596A

Mar 4, 1999

ERIIS ID EPA ID	FACILITY	ADDRESS	RAATS ISSUE DATE RAATS ACTION/STATUS RAATS PENALTIES	DISTANCE FROM SITE	DIRECTION FROM SITE	MAP ID
39008010305 OH3143690250	USDOJ SANDUSKY BIOLOGICAL STATION COUNTY: ERIE	6100 COLUMBUS AVE SANDUSKY, OH 44870-8329	FACILITY NOT REPORTED IN RAATS	Corridor Site		305

ERIIS ENVIRONMENTAL DATA REPORT
OHIO MASTER SITES LIST
HWS - PLOTTABLE SITES - PAGE 1

ERIIS Report #317598A

Mar 4, 1999

ERIIS ID US EPA ID. OH EPA ID.	FACILITY	ADDRESS	PRIORITY	DELISTED(Y/N)	MAP ID
39050000278 OH3800015379 322-0552	US NASA PLUM BROOK DISTANCE FROM SITE: Corridor Site DIRECTION FROM SITE:	TAYLOR & COLUMBUS RD SANDUSKY, OH 44870 COUNTY: ERIE	NO PRIORITY	NOT REPORTED	278

ERIS ENVIRONMENTAL DATA REPORT
OHIO LEAKING UNDERGROUND STORAGE TANKS
LRST - PLOTTABLE SITES - PAGE 1

ERIS Report #317596A

Mar 4, 1999

ERIS ID	FACILITY	ADDRESS	COUNTY	DISTANCE FROM SITE	DIRECTION FROM SITE	MAP ID
39005009583	HEMMINGER FARMS	1118 FOX RD SANDUSKY, OH 44870-8367	ERIE	Corridor Site		9583
<u>INCIDENT NO.</u> 220219400	<u>STATUS</u> NO FURTHER ACTION	<u>LUST TRUST FUND (LTF) ELIGIBILITY</u> ELIGIBLE FOR LTF OVERSIGHT AND/OR SPENDING - SUSPECTED OR CONFIRMED FOR RELEASE OF PETROLEUM FROM A REGULATED UST.				
39005014705	PERKINS TRANSP. BUS GARAGE	TAYLOR RD AT COLUMBUS AVE SANDUSKY, OH 44870	ERIE	Corridor Site		4705
<u>INCIDENT NO.</u> 228167200	<u>STATUS</u> REPORTED	<u>LUST TRUST FUND (LTF) ELIGIBILITY</u> CLOSURE OF AN UNDERGROUND STORAGE TANK.				
39005013250	NASA	6100 CLEVELAND AVE SANDUSKY, OH 44870	ERIE	Corridor Site		3250
<u>INCIDENT NO.</u> 22936903 22936902	<u>STATUS</u> INITIAL CORRECTIVE ACTION NO FURTHER ACTION	<u>LUST TRUST FUND (LTF) ELIGIBILITY</u> SUSPECTED OR CONFIRMED FOR RELEASE OF PETROLEUM FROM AN UST NOT REGULATED BY RCRA SUBTITLE I. ELIGIBLE FOR LTF OVERSIGHT AND/OR SPENDING - SUSPECTED OR CONFIRMED FOR RELEASE OF PETROLEUM FROM A REGULATED UST.				
39005013251	NASA	6100 COLUMBUS AVE SANDUSKY, OH 44870-8329	ERIE	Corridor Site		3251
<u>INCIDENT NO.</u> 22936901 22936907 22936905 22936908 22936908 22936904	<u>STATUS</u> NO FURTHER ACTION NO FURTHER ACTION INITIAL CORRECTIVE ACTIONS INITIAL CORRECTIVE ACTIONS INITIAL CORRECTIVE ACTIONS INITIAL CORRECTIVE ACTIONS	<u>LUST TRUST FUND (LTF) ELIGIBILITY</u> ELIGIBLE FOR LTF OVERSIGHT AND/OR SPENDING - SUSPECTED OR CONFIRMED FOR RELEASE OF PETROLEUM FROM A REGULATED UST. ELIGIBLE FOR LTF OVERSIGHT AND/OR SPENDING - SUSPECTED OR CONFIRMED FOR RELEASE OF PETROLEUM FROM A REGULATED UST. SUSPECTED OR CONFIRMED FOR RELEASE OF A HAZARDOUS SUBSTANCE FROM A REGULATED UST. SUSPECTED OR CONFIRMED FOR RELEASE OF A HAZARDOUS SUBSTANCE FROM A REGULATED UST. SUSPECTED OR CONFIRMED FOR RELEASE OF A HAZARDOUS SUBSTANCE FROM A REGULATED UST. SUSPECTED OR CONFIRMED FOR RELEASE OF A HAZARDOUS SUBSTANCE FROM A REGULATED UST.				
39005013257	NASA PLUM BROOK STATION	6100 COLUMBUS AVE SANDUSKY, OH 44870-8329	ERIE	Corridor Site		3257
<u>INCIDENT NO.</u> 22936910	<u>STATUS</u> NO FURTHER ACTION	<u>LUST TRUST FUND (LTF) ELIGIBILITY</u> CLOSURE OF AN UNDERGROUND STORAGE TANK.				
39005013258	NASA PLUMBROOK STATION	6100 COLUMBUS AVE SANDUSKY, OH 44870-8329	ERIE	Corridor Site		3258
<u>INCIDENT NO.</u> 22936911	<u>STATUS</u> NO FURTHER ACTION	<u>LUST TRUST FUND (LTF) ELIGIBILITY</u> CLOSURE OF AN UNDERGROUND STORAGE TANK.				

ERIIS ENVIRONMENTAL DATA REPORT
OHIO UNDERGROUND STORAGE TANKS
RST - PLOTTABLE SITES - PAGE 1

ERIIS Report #317596A

Mar 4, 1999

ERIIS ID FACILITY ID	FACILITY	ADDRESS	OWNER ADDRESS	MANAGER	MAP ID	
39010005044 0-227802	NASA PLUM BROOK STATION DISTANCE FROM SITE: Corridor Site DIRECTION FROM SITE:	6100 COLUMBUS AVE SANDUSKY, OH 44870-8329 COUNTY: ERIE	NASA LEWIS RESEARCH CENTER 21000 BROOKPARK RD CLEVELAND, OH 44135	PETER W. MCCALLUM (216) 433-8852	5044	
	<u>TANK ID</u>	<u>STATUS</u>	<u>SUBSTANCE</u>	<u>CAPACITY</u>	<u>AGE</u>	<u>CONSTRUCTION</u>
	28	REMOVED	NOT REPORTED	3,000	55	BARE STEEL
	29	REMOVED	NOT REPORTED	770	33	BARE STEEL
	30	REMOVED	NOT REPORTED	770	33	BARE STEEL
	31	REMOVED	NOT REPORTED	770	33	BARE STEEL
39010005045 0-227803	NASA PLUM BROOK STATION DISTANCE FROM SITE: Corridor Site DIRECTION FROM SITE:	6100 COLUMBUS AVE SANDUSKY, OH 44870-8329 COUNTY: ERIE	NASA LEWIS RESEARCH CENTER 21000 BROOKPARK RD CLEVELAND, OH 44135		5045	
	<u>TANK ID</u>	<u>STATUS</u>	<u>SUBSTANCE</u>	<u>CAPACITY</u>	<u>AGE</u>	<u>CONSTRUCTION</u>
	32	REMOVED	USED OIL	1,500	55	BARE STEEL
39010005048 0-227804	NASA PLUM BROOK STATION DISTANCE FROM SITE: Corridor Site DIRECTION FROM SITE:	6100 COLUMBUS AVE SANDUSKY, OH 44870-8329 COUNTY: ERIE	NASA LEWIS RESEARCH CENTER 21000 BROOKPARK RD CLEVELAND, OH 44135		5046	
	<u>TANK ID</u>	<u>STATUS</u>	<u>SUBSTANCE</u>	<u>CAPACITY</u>	<u>AGE</u>	<u>CONSTRUCTION</u>
	201	CURRENTLY IN USE	GASOLINE	8,000	8	FIBERGLASS
	202	CURRENTLY IN USE	DIESEL	8,000	8	FIBERGLASS
39010005047 0-227805	NASA PLUM BROOK STATION DISTANCE FROM SITE: Corridor Site DIRECTION FROM SITE:	6100 COLUMBUS AVE SANDUSKY, OH 44870-8329 COUNTY: ERIE	NASA LEWIS RESEARCH CENTER 21000 BROOKPARK RD CLEVELAND, OH 44135		5047	
	<u>TANK ID</u>	<u>STATUS</u>	<u>SUBSTANCE</u>	<u>CAPACITY</u>	<u>AGE</u>	<u>CONSTRUCTION</u>
	37	REMOVED	NOT REPORTED	12,000	18	BARE STEEL
	38	REMOVED	NOT REPORTED	12,000	18	BARE STEEL
39010005048 0-227806	NASA PLUM BROOK STATION DISTANCE FROM SITE: Corridor Site DIRECTION FROM SITE:	6100 COLUMBUS AVE SANDUSKY, OH 44870-8329 COUNTY: ERIE	NASA LEWIS RESEARCH CENTER 21000 BROOKPARK RD CLEVELAND, OH 44135		5048	
	<u>TANK ID</u>	<u>STATUS</u>	<u>SUBSTANCE</u>	<u>CAPACITY</u>	<u>AGE</u>	<u>CONSTRUCTION</u>
	39	REMOVED	UNK	250	UNK	UNKNOWN
39010005049 0-227807	NASA PLUM BROOK STATION DISTANCE FROM SITE: Corridor Site DIRECTION FROM SITE:	6100 COLUMBUS AVE SANDUSKY, OH 44870-8329 COUNTY: ERIE	NASA LEWIS RESEARCH CENTER 21000 BROOKPARK RD CLEVELAND, OH 44135		5049	
	<u>TANK ID</u>	<u>STATUS</u>	<u>SUBSTANCE</u>	<u>CAPACITY</u>	<u>AGE</u>	<u>CONSTRUCTION</u>
	23	REMOVED	USED OIL	500	36	BARE STEEL
39010005050 0-227808	NASA PLUM BROOK STATION DISTANCE FROM SITE: Corridor Site DIRECTION FROM SITE:	6100 COLUMBUS AVE SANDUSKY, OH 44870-8329 COUNTY: ERIE	NASA LEWIS RESEARCH CENTER 21000 BROOKPARK RD CLEVELAND, OH 44135		5050	
	<u>TANK ID</u>	<u>STATUS</u>	<u>SUBSTANCE</u>	<u>CAPACITY</u>	<u>AGE</u>	<u>CONSTRUCTION</u>
	24	REMOVED	USED OIL	1,000	29	BARE STEEL

ERIIS ENVIRONMENTAL DATA REPORT
OHIO UNDERGROUND STORAGE TANKS
RST - PLOTTABLE SITES - PAGE 2

ERIIS Report #317598A

Mar 4, 1999

ERIIS ID FACILITY ID	FACILITY	ADDRESS	OWNER ADDRESS	MANAGER	MAP ID	
39010005051 0-227809	NASA PLUM BROOK STATION DISTANCE FROM SITE: Corridor Site DIRECTION FROM SITE:	6100 COLUMBUS AVE SANDUSKY, OH 44870-8329 COUNTY: ERIE	NASA LEWIS RESEARCH CENTER 21000 BROOKPARK RD CLEVELAND, OH 44135		5051	
	<u>TANK ID</u>	<u>STATUS</u>	<u>SUBSTANCE</u>	<u>CAPACITY</u>	<u>AGE</u>	<u>CONSTRUCTION</u>
	26	REMOVED	NOT REPORTED	11,000	29	BARE STEEL
	27	REMOVED	NOT REPORTED	11,000	29	BARE STEEL
39010005052 0-227810	NASA PLUM BROOK STATION DISTANCE FROM SITE: Corridor Site DIRECTION FROM SITE:	6100 COLUMBUS AVE SANDUSKY, OH 44870-8329 COUNTY: ERIE	NASA LEWIS RESEARCH CENTER 21000 BROOKPARK RD CLEVELAND, OH 44135		5052	
	<u>TANK ID</u>	<u>STATUS</u>	<u>SUBSTANCE</u>	<u>CAPACITY</u>	<u>AGE</u>	<u>CONSTRUCTION</u>
	35	REMOVED	GASOLINE	9,000	55	BARE STEEL

Unplottable Sites

The remaining report pages list additional environmental sites that have been selected based on geographic criteria unique to your study site. They are classified as "unplottable sites" and require further investigation to assess their potential impact on your site.

How to Evaluate Unplottable Sites

Step 1

Streets Within the Radius: the following page is an alphabetical index of all streets that intersect or are contained within the largest study radius (usually one mile).

Step 2

Cross-Reference: use the "Streets Within the Radius" index to cross-reference the unplottable sites. For example, if Maple Avenue and Oak Avenue are listed in the street index, then any unplottable sites with a Maple Avenue or Oak Avenue address should be checked for possible impact on study site.

Questions on ERIIS' Proprietary Geocoding?

We're happy to answer any questions you might have about our data processing and **point-geocoding** (assigning a latitude and longitude to each address). Just give us a call on our toll-free number at (800) 989-0402 and let us know what state you're calling from. Our customer service staff is available from 8 a.m. to 8 p.m. (EST).

The ASTM Standard Practice For Environmental Site Assessments

As stated in the recently published **Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process (E1527)** by the American Society for Testing and Materials (ASTM):

"For large databases with numerous facility records (such as RCRA hazardous waste generators and registered underground storage tanks), the records are not practically reviewable unless they can be obtained from the source agency in the smaller geographic area of ZIP code (3.3.24)."

Therefore, this Report contains information available by latitude/longitude or by ZIP code. If your research requires environmental records for which only city or county information is available (i.e., no valid street or ZIP code) ERIIS will include this data at no extra charge.

ERIS LIST OF STREETS IN THE RADIUS

ERIS Report #317596A

Mar 4, 1999

STREET NAME

BIRCHWOOD DR
E BOGART ROAD
W BOGART ROAD
BOSTON ROAD
BOTAY ROAD
BOUY ROAD
BOX FACTORY ROAD
CAMBRIDGE CIR
CAMPBELL ST
CLARK ROAD
COLUMBUS AVE
COUNTRY PLACE DR
DALLAS AVE
DEERFIELD LANE
DENVER AVE
FOX ROAD
HARTFORD AVE
INDIANA AVE
INDUSTRIAL PKY
KIRKWOOD TER
LAKE CT
S LAKE WILMER DR
LINDEN WAY
LINDEN WAY DR
LISBON CIR
LONDON ROAD
N MAGAZINE ROAD
MAINTENANCE ROAD
MASON ROAD
MEMPHIS AVE
MICHIGAN AVE
MILAN ROAD
NORMANDY CT
OHIO TER
PARKWAY S
PATROL ROAD
PATTEN TRACT ROAD
PENNSYLVANIA AVE
PENTOLITE ROAD
RANSOM ROAD
RICHMOND CIR
SCHEID ROAD
SCHENK ROAD
SHORT CUT ROAD
STATE HWY 2
SWANO DR
TAYLOR ROAD
US HWY 250
VIRGINIA AVE
WALT LAKE TRL

ERIS SUMMARY OF UNPLOTTABLE SITES
(Facilities sorted alphabetically within ZIP Code)

ERIS Report #317596A

Mar 4, 1999

ERIS ID.	FACILITY/STREET	CITY/STATE/ZIP/COUNTY	DATABASE
J005021849	BOB GARBA-FRANKLIN FLATS 90601 RIVER VIEW DR	HURON, OH 44839 COUNTY: ERIE	LRST
39005022207	CONSOLIDATED ELECTRIC 1901 SAWMILL INDUSTRIAL PKWY	HURON, OH 44839 COUNTY: ERIE	LRST
39010004952	DANIEL & CAROL LAPP 2112 CLEVELAND RD	HURON, OH 44839 COUNTY: ERIE	RST
39005022311	DANIEL LAPP 2112 CLEVELAND AVE	HURON, OH 44839 COUNTY: ERIE	LRST
39010019398	DENNIS MICHELSON 2416 CLEVELAND SANDUSY RD	HURON, OH 44839 COUNTY: ERIE	RST
39010005028	ERIE COUNTY LANDFILL HOOVER RD	HURON, OH 44839 COUNTY: ERIE	RST
39005022468	ERIE CTY LANDFILL HOOVER RD	HURON, OH 44839 COUNTY: ERIE	LRST
39005022729	GASTOWN 3674 2103 CLEVELAND	HURON, OH 44839 COUNTY: ERIE	LRST
39005022843	GTE NORTH, INC. MAIN ST	HURON, OH 44839 COUNTY: ERIE	LRST
39010005038	GTE NORTH, INC. MAIN & SHIRLEY	HURON, OH 44839 COUNTY: ERIE	RST
39018000056	HURON LIME COMPANY LANDFILL #1 RIVER RD	HURON, OH 44839 COUNTY: ERIE	SWF
118000052	HURON LIME COMPANY LANDFILL #2 PO BOX 451	HURON, OH 44839-0451 COUNTY: ERIE	SWF
39005023854	PRESTON TRUCKING CO 1711 SAWMILL INDUSTRIAL PKWY	HURON, OH 44839 COUNTY: ERIE	LRST
39010004878	RYE BEACH HY-MILER 2026 CLEVELAND RD	HURON, OH 44839 COUNTY: ERIE	RST
39005025012	YELLOW FREIGHT RYE BEACH RD	HURON, OH 44839 COUNTY: ERIE	LRST
39005021816	BFI SR 101	SANDUSKY, OH 44870 COUNTY: ERIE	LRST
39010004932	C.S.C. OIL CO. #484 607 PERKINS AVE	SANDUSKY, OH 44870 COUNTY: ERIE	RST
39005022026	CAUSEWAY DR LIFT STA 1300 CAUSEWAY DR	SANDUSKY, OH 44870 COUNTY: ERIE	LRST
39010004967	CEDAR POINT #1 CAUSEWAY DR	SANDUSKY, OH 44870 COUNTY: ERIE	RST
39005022195	COMMODORE PERRY SVC PLAZA MILE POST 100.0 SOUTH SIDE	SANDUSKY, OH 44870 COUNTY: ERIE	LRST
39008008756	ERIE COUNTY SCHOOLS 7142 TAYLOR-COLUMBUS AVE	SANDUSKY, OH 44870 COUNTY: ERIE	RCRIS_SG
39005022515	FARWELL ST LIFT STATION FARWELL ST	SANDUSKY, OH 44870 COUNTY: ERIE	LRST
39005022720	GAS AMERICA 7065 US RT 30	SANDUSKY, OH 44870 COUNTY: ERIE	LRST
39008009438	GORDON FOOD SERVICE INC 1415 HOLLAND RD	PERRYSBURG, OH 44870 COUNTY: ERIE	RCRIS_SG

ERIIS ENVIRONMENTAL DATA REPORT
RESOURCE CONSERVATION AND RECOVERY INFORMATION SYSTEM
RCRIS_SG - UNPLOTTABLE SITES

ERIIS Report #317596A

Mar 4, 1999

ERIIS ID EPA ID	FACILITY	ADDRESS	RAATS ISSUE DATE RAATS ACTION/STATUS RAATS PENALTIES
39008004325 OHD981786650	NORTHCOAST AUTO BODY COUNTY: ERIE	1944 ONE HALF MILAN RD SANDUSKY, OH 44870	FACILITY NOT REPORTED IN RAATS
39008004832 OHD982211450	SOHIO OIL CO NO 06672 COUNTY: ERIE	RTE 2 AND RTE 250 SANDUSKY, OH 44870	FACILITY NOT REPORTED IN RAATS
39008008756 OHR000003673	ERIE COUNTY SCHOOLS COUNTY: ERIE	7142 TAYLOR-COLUMBUS AVE SANDUSKY, OH 44870	FACILITY NOT REPORTED IN RAATS
39008009438 OHR000025809	GORDON FOOD SERVICE INC COUNTY: ERIE	1415 HOLLAND RD PERRYSBURG, OH 44870	FACILITY NOT REPORTED IN RAATS

**ERIS ENVIRONMENTAL DATA REPORT
EMERGENCY RESPONSE NOTIFICATION SYSTEM
ERNS - UNPLOTTABLE SITES**

ERIS Report #317596A

Mar 4, 1999

ERIS ID REPORT NUMBER SOURCE AGENCY	SPILL CITY, STATE, ZIP CODE SPILL COUNTY	DISCHARGER NAME ORGANIZATION ADDRESS	MEDIA AFFECTED					SPILL DATE WATER WAY AFFECTED	
			GRND	LAND	WATER	AIR	WATER		FACILITY
39002000030 420277 NATL. RESPONSE CTR	SANDUSKY, OH 44870 ERIE	JIMS AUTO SALVAGE 1707 GEORGE STREET SANDUSKY, OH 44870		N	N	N	N	N	01/17/1998 STORM DRAIN/SOIL

LOCATION: Superior Street / Dead End, North Side Of Venice Road

DESCRIPTION: Caller States: Company Towed Many Vehicles Over 2 Days, Some Of The Vehicles Being Towed Spilled Gasoline And Motor Oil Onto The Roadway

MATERIAL SPILLED: Oil, Misc: Motor QTY: 0 Unk LBS: 0 QTY IN WATER: 0 Unk

Oil: Diesel QTY: 0 Unk LBS: 0 QTY IN WATER: 0 Unk

Gasoline: Automotive (4.23g Pb/g) QTY: 0 Unk LBS: 0 QTY IN WATER: 0 Unk

ACTIONS TAKEN: None / Police Were Onscene, Were Going To Make Company Clean Up / Nothing Has Been Done To Date

MISCELLANEOUS: Sandusky Bay Is .5 Miles Away / Some Product Has Reached A Storm Drain And It Has Been Raining

ERIIS ENVIRONMENTAL DATA REPORT
OHIO MASTER SITES LIST
HWS - UNPLOTTABLE SITES

ERIIS Report #317598A

Mar 4, 1999

ERIIS ID US EPA ID. OH EPA ID.	FACILITY	ADDRESS	PRIORITY	DELISTED(Y/N)
39050000992 OHD980811487 362-0117		PORT CLINTON, OH 44870 COUNTY: ERIE	LOW	YES REASON: DSIWM SITE
39050000993 OHD980811487 362-0117		PORT CLINTON, OH 44870 COUNTY: ERIE	LOW	YES REASON: DSIWM REGULATION

ERIS ENVIRONMENTAL DATA REPORT
OHIO LEAKING UNDERGROUND STORAGE TANKS
LRST - UNPLOTTABLE SITES

ERIS Report #317596A

Mar 4, 1999

ERIS ID	FACILITY	ADDRESS	COUNTY
39005021849	BOB GARBA-FRANKLIN FLATS	90601 RIVER VIEW DR HURON, OH 44839	ERIE
<u>INCIDENT NO.</u> 228205100	<u>STATUS</u> REPORTED	<u>LUST TRUST FUND (LTF) ELIGIBILITY</u> CLOSURE OF AN UNDERGROUND STORAGE TANK.	
39005022207	CONSOLIDATED ELECTRIC	1901 SAWMILL INDUSTRIAL PKWY HURON, OH 44839	ERIE
<u>INCIDENT NO.</u> 224197300	<u>STATUS</u> NO FURTHER ACTION	<u>LUST TRUST FUND (LTF) ELIGIBILITY</u> CLOSURE OF AN UNDERGROUND STORAGE TANK.	
39005022311	DANIEL LAPP	2112 CLEVELAND AVE HURON, OH 44839	ERIE
<u>INCIDENT NO.</u> 222179300	<u>STATUS</u> NO FURTHER ACTION	<u>LUST TRUST FUND (LTF) ELIGIBILITY</u> CLOSURE OF AN UNDERGROUND STORAGE TANK.	
39005022468	ERIE CTY LANDFILL	HOOVER RD HURON, OH 44839	ERIE
<u>INCIDENT NO.</u> 397128300	<u>STATUS</u> REPORTED	<u>LUST TRUST FUND (LTF) ELIGIBILITY</u> CLOSURE OF AN UNDERGROUND STORAGE TANK.	
39005022729	GASTOWN 3674	2103 CLEVELAND HURON, OH 44839	ERIE
<u>INCIDENT NO.</u> 229105800	<u>STATUS</u> CORRECTIVE ACTIONS IN PROGRESS	<u>LUST TRUST FUND (LTF) ELIGIBILITY</u> ELIGIBLE FOR LTF OVERSIGHT AND/OR SPENDING - SUSPECTED OR CONFIRMED FOR RELEASE OF PETROLEUM FROM A REGULATED UST.	
39005022843	GTE NORTH, INC.	MAIN ST HURON, OH 44839	ERIE
<u>INCIDENT NO.</u> 228093300	<u>STATUS</u> NO FURTHER ACTION	<u>LUST TRUST FUND (LTF) ELIGIBILITY</u> CLOSURE OF AN UNDERGROUND STORAGE TANK.	
39005023854	PRESTON TRUCKING CO	1711 SAWMILL INDUSTRIAL PKWY HURON, OH 44839	ERIE
<u>INCIDENT NO.</u> 224197400	<u>STATUS</u> NO FURTHER ACTION	<u>LUST TRUST FUND (LTF) ELIGIBILITY</u> CLOSURE OF AN UNDERGROUND STORAGE TANK.	
39005025012	YELLOW FREIGHT	RYE BEACH RD HURON, OH 44839	ERIE
<u>INCIDENT NO.</u> 220106100	<u>STATUS</u> NO FURTHER ACTION	<u>LUST TRUST FUND (LTF) ELIGIBILITY</u> ELIGIBLE FOR LTF OVERSIGHT AND/OR SPENDING - SUSPECTED OR CONFIRMED FOR RELEASE OF PETROLEUM FROM A REGULATED UST.	
39005021816	BFI	SR 101 SANDUSKY, OH 44870	ERIE
<u>INCIDENT NO.</u> 221113001	<u>STATUS</u> DISPROVED	<u>LUST TRUST FUND (LTF) ELIGIBILITY</u> ELIGIBLE FOR LTF OVERSIGHT AND/OR SPENDING - SUSPECTED OR CONFIRMED FOR RELEASE OF PETROLEUM FROM A REGULATED UST.	

ERIS ENVIRONMENTAL DATA REPORT
OHIO LEAKING UNDERGROUND STORAGE TANKS
LRST - UNPLOTTABLE SITES

ERIS Report #317596A

Mar 4, 1999

ERIS ID	FACILITY	ADDRESS	COUNTY
39005022026	CAUSEWAY DR LIFT STA	1300 CAUSEWAY DR SANDUSKY, OH 44870	ERIE
<u>INCIDENT NO.</u> 220128300	<u>STATUS</u> NO FURTHER ACTION	<u>LUST TRUST FUND (LTF) ELIGIBILITY</u> CLOSURE OF AN UNDERGROUND STORAGE TANK.	
39005022195	COMMODORE PERRY SVC PLAZA	MILE POST 100.0 SOUTH SIDE SANDUSKY, OH 44870	ERIE
<u>INCIDENT NO.</u> 72948000	<u>STATUS</u> NO FURTHER ACTION	<u>LUST TRUST FUND (LTF) ELIGIBILITY</u> ELIGIBLE FOR LTF OVERSIGHT AND/OR SPENDING - SUSPECTED OR CONFIRMED FOR RELEASE OF PETROLEUM FROM A REGULATED UST.	
39005022515	FARWELL ST LIFT STATION	FARWELL ST SANDUSKY, OH 44870	ERIE
<u>INCIDENT NO.</u> 220078600	<u>STATUS</u> NO FURTHER ACTION	<u>LUST TRUST FUND (LTF) ELIGIBILITY</u> ELIGIBLE FOR LTF OVERSIGHT AND/OR SPENDING - SUSPECTED OR CONFIRMED FOR RELEASE OF PETROLEUM FROM A REGULATED UST.	
39005022720	GAS AMERICA	7065 US RT 30 SANDUSKY, OH 44870	ERIE
<u>INCIDENT NO.</u> 880063800	<u>STATUS</u> NO FURTHER ACTION	<u>LUST TRUST FUND (LTF) ELIGIBILITY</u> ELIGIBLE FOR LTF OVERSIGHT AND/OR SPENDING - SUSPECTED OR CONFIRMED FOR RELEASE OF PETROLEUM FROM A REGULATED UST.	
39005023788	PETERSON LIFT STATION	PETERSON LN SANDUSKY, OH 44870	ERIE
<u>INCIDENT NO.</u> 222274400	<u>STATUS</u> NO FURTHER ACTION	<u>LUST TRUST FUND (LTF) ELIGIBILITY</u> CLOSURE OF AN UNDERGROUND STORAGE TANK.	
39005024063	SANDUSKY BD OF EDUCATION	8118 CAMP ST SANDUSKY, OH 44870	ERIE
<u>INCIDENT NO.</u> 222173700	<u>STATUS</u> NO FURTHER ACTION	<u>LUST TRUST FUND (LTF) ELIGIBILITY</u> CLOSURE OF AN UNDERGROUND STORAGE TANK.	
39005024532	UNITED PARCEL SERV	PERKINS AVE SANDUSKY, OH 44870	ERIE
<u>INCIDENT NO.</u> 220165100	<u>STATUS</u> NO FURTHER ACTION	<u>LUST TRUST FUND (LTF) ELIGIBILITY</u> CLOSURE OF AN UNDERGROUND STORAGE TANK.	
39005024617	UNKNOWN	PERKINS TOWNSHIP SANDUSKY, OH 44870	ERIE
<u>INCIDENT NO.</u> 22704500	<u>STATUS</u> DISPROVED	<u>LUST TRUST FUND (LTF) ELIGIBILITY</u> ELIGIBLE FOR LTF OVERSIGHT AND/OR SPENDING - SUSPECTED OR CONFIRMED FOR RELEASE OF PETROLEUM FROM A REGULATED UST.	
39005024619	UNKNOWN	RAMADA & US RT 250 SANDUSKY, OH 44870	ERIE
<u>INCIDENT NO.</u> 221060900	<u>STATUS</u> REPORTED	<u>LUST TRUST FUND (LTF) ELIGIBILITY</u> ELIGIBLE FOR LTF OVERSIGHT AND/OR SPENDING - SUSPECTED OR CONFIRMED FOR RELEASE OF PETROLEUM FROM A REGULATED UST.	

ERIIS ENVIRONMENTAL DATA REPORT
OHIO LEAKING UNDERGROUND STORAGE TANKS
LRST - UNPLOTTABLE SITES

ERIIS Report #317596A

Mar 4, 1999

ERIIS ID	FACILITY	ADDRESS	COUNTY
39005024648	UNKNOWN (CITY WATER/SEWER LINE)	SR 101 SANDUSKY, OH 44870	ERIE
<u>INCIDENT NO.</u> 221113000	<u>STATUS</u> REPORTED	<u>LUST TRUST FUND (LTF) ELIGIBILITY</u> ELIGIBLE FOR LTF OVERSIGHT AND/OR SPENDING - SUSPECTED OR CONFIRMED FOR RELEASE OF PETROLEUM FROM A REGULATED UST.	

ERIIS ENVIRONMENTAL DATA REPORT
OHIO SOLID WASTE FACILITIES
SWF - UNPLOTTABLE SITES

ERIIS Report #317596A

Mar 4, 1999

ERIIS ID FACILITY ID	FACILITY ADDRESS	OPERATOR ADDRESS
39018000056 22-00-04	HURON LIME COMPANY LANDFILL #1 RIVER RD HURON, OH 44839 COUNTY: ERIE FACILITY TYPE: INDUSTRIAL SW LF CAPACITY: NOT REPORTED	H J MICHAELS HURON LIME COMPANY NOT REPORTED NOT REPORTED (419) 433-2141 FACILITY STATUS: CLOSED
39018000052 22-00-05	HURON LIME COMPANY LANDFILL #2 PO BOX 451 HURON, OH 44839-0451 COUNTY: ERIE FACILITY TYPE: INDUSTRIAL SW LF CAPACITY: NOT REPORTED	A.J. PARIS, HURON LIME COMPANY PO BOX 451 HURON, OH 44839 (419) 433-2141 FACILITY STATUS: ACTIVE
39018000388	HENSEN DUMP AKA HURON LIME CO. #2 WEST SIDE OF RIVER ROAD, 1/2 MILE HURON TOWNSHIP, OH COUNTY: ERIE FACILITY TYPE: PRIVATE, LIME SLUDGE CAPACITY: 12 ACRES	NOT REPORTED NOT REPORTED NOT REPORTED NOT REPORTED FACILITY STATUS: CLOSED 1982

**ERIIS ENVIRONMENTAL DATA REPORT
OHIO UNDERGROUND STORAGE TANKS
RST - UNPLOTTABLE SITES**

ERIIS Report #317596A

Mar 4, 1999

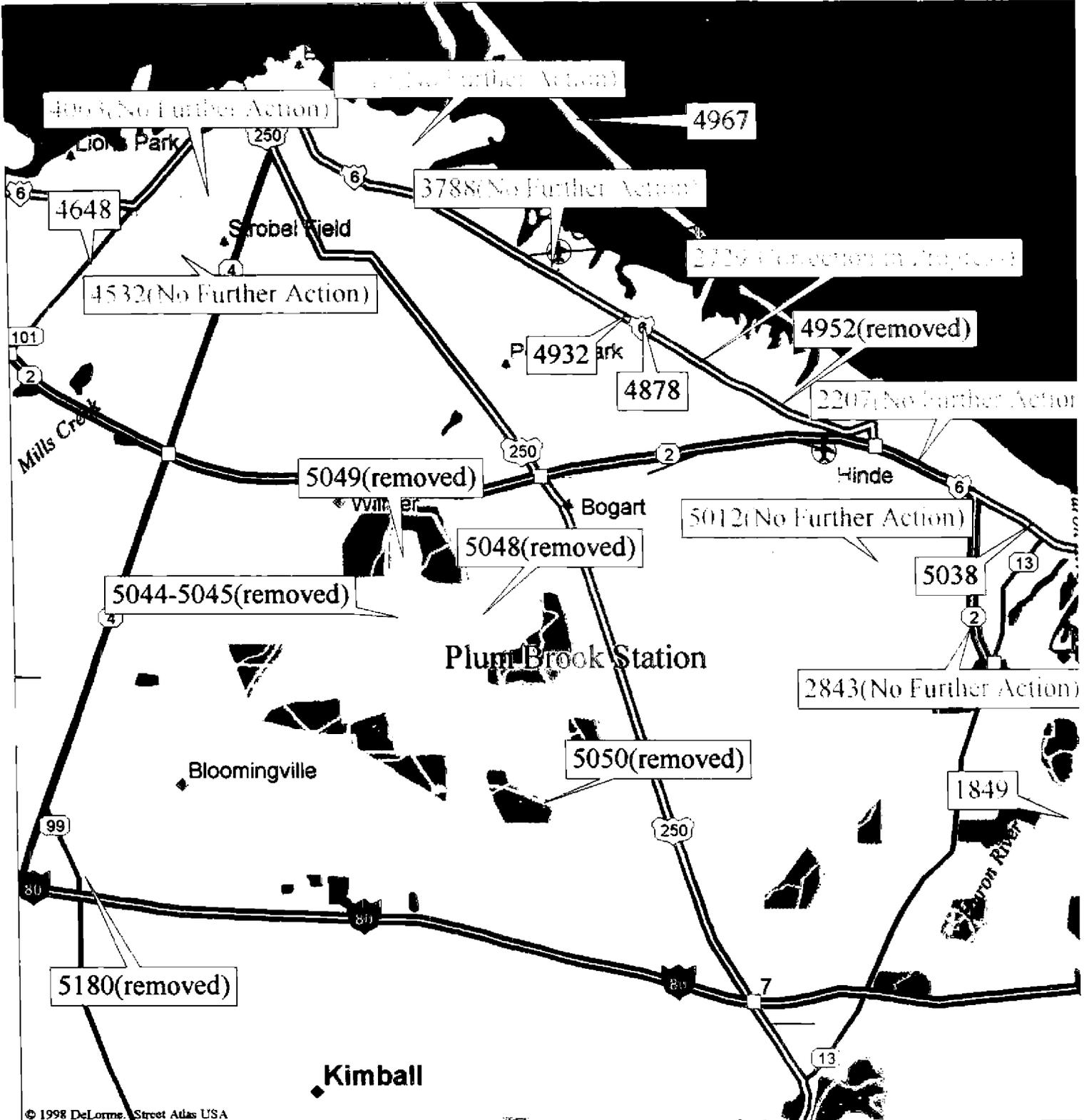
ERIIS ID FACILITY ID	FACILITY	ADDRESS	OWNER ADDRESS	MANAGER		
39010004878 0-220041	RYE BEACH HY-MILER	2026 CLEVELAND RD HURON, OH 44839 COUNTY: ERIE	DISTRICT PETROLEUM PRODUCTS, INC 1832 MILAN RD SANDUSKY, O 44870	MIKE STIPP		
<u>TANK ID</u>	<u>STATUS</u>	<u>SUBSTANCE</u>	<u>CAPACITY</u>	<u>AGE</u>	<u>CONSTRUCTION</u>	
1	CURRENTLY IN USE	GASOHOL	10,000	23	FIBERGLASS	
2	CURRENTLY IN USE	GASOHOL	4,000	23	BARE STEEL	
3	CURRENTLY IN USE	GASOHOL	6,000	23	BARE STEEL	
4	CURRENTLY IN USE	GASOHOL	6,000	23	BARE STEEL	
5	CURRENTLY IN USE	KEROSENE	2,000	23	BARE STEEL	
6	TEMPORARILY OUT OF USE	USED OIL	550	23	BARE STEEL	
39010004952 0-220235	DANIEL & CAROL LAPP	2112 CLEVELAND RD HURON, OH 44839 COUNTY: ERIE	DANIEL & CAROL LAPP 404 S HAMPTON CT HURON, OH 44839			
<u>TANK ID</u>	<u>STATUS</u>	<u>SUBSTANCE</u>	<u>CAPACITY</u>	<u>AGE</u>	<u>CONSTRUCTION</u>	
1	REMOVED	GASOLINE	6,000	24	FIBERGLASS	
2	REMOVED	GASOLINE	6,000	24	FIBERGLASS	
3	REMOVED	GASOLINE	6,000	24	FIBERGLASS	
39010005028 0-225986	ERIE COUNTY LANDFILL	HOOVER RD HURON, OH 44839 COUNTY: ERIE	ERIE COUNTY COMMISSIONERS PO BOX 370 HURON, OH 44839	JACK R. MYERS		
<u>TANK ID</u>	<u>STATUS</u>	<u>SUBSTANCE</u>	<u>CAPACITY</u>	<u>AGE</u>	<u>CONSTRUCTION</u>	
1	CURRENTLY IN USE	DIESEL	1,000	27	UNKNOWN	
39010005038 0-227135	GTE NORTH, INC.	MAIN & SHIRLEY HURON, OH 44839 COUNTY: ERIE	GTE NORTH, INC. 1300 COLUMBUS SANDUSKY RD N MARION, OH 43302	KEITH E. ZUSPAN		
<u>TANK ID</u>	<u>STATUS</u>	<u>SUBSTANCE</u>	<u>CAPACITY</u>	<u>AGE</u>	<u>CONSTRUCTION</u>	
2	CURRENTLY IN USE	DIESEL	8,000	1	FIBERGLASS	
39010019398 0-220307	DENNIS MICHELSON	2416 CLEVELAND SANDUSY RD HURON, OH 44839 COUNTY: ERIE	DENNIS MICHELSON 8322 146TH ST SW EDMONDS, WA 98026			
<u>TANK ID</u>	<u>STATUS</u>	<u>SUBSTANCE</u>	<u>CAPACITY</u>	<u>AGE</u>	<u>CONSTRUCTION</u>	
1	CURRENTLY IN USE	UNK	UNKNOWN	UNK	UNKNOWN	
2	CURRENTLY IN USE	UNK	UNKNOWN	UNK	UNKNOWN	
3	CURRENTLY IN USE	UNK	UNKNOWN	UNK	UNKNOWN	
4	CURRENTLY IN USE	UNK	UNKNOWN	UNK	UNKNOWN	
39010004932 0-220191	C.S.C. OIL CO. #484	607 PERKINS AVE SANDUSKY, OH 44870 COUNTY: ERIE	C.S.C. OIL CO. 2210 GOLDSMITH LN - STE 108 LOUISVILLE, KY 40218	WILLIAM SHEPARD		
<u>TANK ID</u>	<u>STATUS</u>	<u>SUBSTANCE</u>	<u>CAPACITY</u>	<u>AGE</u>	<u>CONSTRUCTION</u>	
1	CURRENTLY IN USE	GASOLINE	10,000	25	BARE STEEL	
2	CURRENTLY IN USE	GASOLINE	10,000	25	BARE STEEL	
3	CURRENTLY IN USE	GASOLINE	10,000	25	BARE STEEL	

**ERIIS ENVIRONMENTAL DATA REPORT
OHIO UNDERGROUND STORAGE TANKS
RST - UNPLOTTABLE SITES**

ERIIS Report #317596A

Mar 4, 1999

ERIIS ID FACILITY ID	FACILITY	ADDRESS	OWNER ADDRESS	MANAGER	
39010004967 0-220277	CEDAR POINT	#1 CAUSEWAY DR SANDUSKY, OH 44870 COUNTY: ERIE	CEDAR FAIR LIMITED PARTNERSHIP PO BOX 5008 SANDUSKY, OH 44870	RONALD K. FUSSNER	
<u>TANK ID</u>	<u>STATUS</u>	<u>SUBSTANCE</u>	<u>CAPACITY</u>	<u>AGE</u>	<u>CONSTRUCTION</u>
10	CURRENTLY IN USE	GASOLINE	10,000	13	FIBERGLASS
11	CURRENTLY IN USE	DIESEL	6,000	13	FIBERGLASS
4	CURRENTLY IN USE	GASOLINE	2,500	8	FIBERGLASS
6	CURRENTLY IN USE	USED OIL	2,500	7	FIBERGLASS
7	CURRENTLY IN USE	DIESEL	6,000	7	FIBERGLASS
8	CURRENTLY IN USE	GASOLINE	10,000	7	FIBERGLASS
9	CURRENTLY IN USE	GASOLINE	10,000	13	FIBERGLASS
39010009256 0-390093	SANDUSKY STEEL & SUPPLY CO.	4957 RT 250 N NORWALK, OH 44870 COUNTY: ERIE	SANDUSKY STEEL & SUPPLY CO. 4957 RT 250 N MILAN, OH 44846	STEVE LICHTESSIEN	
<u>TANK ID</u>	<u>STATUS</u>	<u>SUBSTANCE</u>	<u>CAPACITY</u>	<u>AGE</u>	<u>CONSTRUCTION</u>
1	REMOVED	GASOLINE	550	24	BARE STEEL
39010015180 0-720201	O.E. MEYER CO.	1520 E STATE ST SANDUSKY, OH 44870 COUNTY: ERIE	O.E. MEYER CO. PO BOX 479 SANDUSKY, OH 44870		
<u>TANK ID</u>	<u>STATUS</u>	<u>SUBSTANCE</u>	<u>CAPACITY</u>	<u>AGE</u>	<u>CONSTRUCTION</u>
1	REMOVED	UNK	2,000	34	COMPOSITE
2	REMOVED	UNK	2,000	34	UNKNOWN

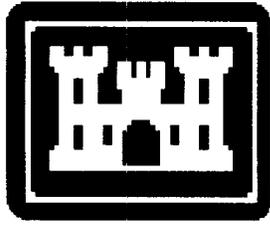


© 1998 DeLorme, Street Atlas USA

Mag 12.00
 Tue Aug 10 14:12 1999
 Scale 1:87,500 (at center)
 2 Miles
 2 KM

- | | |
|---------------------------|------------------|
| Local Road | Exit |
| Major Connector | Utility/Pipe |
| State Route | Railroad |
| Primary State Route | Small Town |
| Ferry | Airfield |
| Interstate/Limited Access | Park/Reservation |
| Toll Highway | Locale |
| US Highway | Public Airport |

Appendix J - Data Review / Data Validation



**U.S. Army Corps
of Engineers**
Louisville District

Data Review and Data Validation

for
the former
Plum Brook Ordnance Works
Lower Toluene Tank Area

Defense Environmental Restoration Program
For
Formerly Used Defense Sites
Hazardous, Toxic and Radiological Waste

Sandusky, Ohio
Project Number G05OH001824

July 2000

1 INTRODUCTION

The United States Army Corps of Engineers (USACE), Louisville District (CELRL) has performed a QC Data Review and Data Validation for chemical data generated by Quanterra Incorporated, from soil samples collected at the Former Plum Brook Ordnance Works (PBOW), Lower Toluene Tank Area (LTTA). One hundred percent of the data underwent a data review and 10 percent of the data underwent full data validation. The data review and validation followed the general guidance provided in the National Functional Guidelines for Organic Review (EPA, 1999). While these guidance documents were written for methods following the Contract Laboratory Program (CLP) Statement of Work (SOW), the guidelines were used where appropriate for the validated methods.

The data review included the review of the sample results and the quality control summary forms, while the data validation additionally included the review of raw data. The specific elements included in the data review and validation processes are identified in the subsequent sections. Where required, data were qualified as **U** (nondetect), **J** (estimated) or **R** (rejected) based on the data review and validation procedures.

The report is organized such that Section 1 summarizes the results of the data review, validation and the data usability for the subject site investigation. Section 2 provides the details of the data review. Section 3 provides the details of the data validation.

1.1 Data Review Summary

No samples were qualified based on the Data Review.

1.2 Validation Summary

No samples were qualified based on the Data Validation.

1.3 Data Usability

All data should be used for their intended purposes.

2 QC DATA REVIEW - Lower Toluene Tank Area (LTTA)

Samples Collected for (LTTA) SI investigation

Sample Identification	Date Collected	Analyses
PBOW99SB01-1'	9 June 1999	BTEX
PBOW99SB02-1'	9 June 1999	BTEX
PBOW99SB02-3'9"	9 June 1999	BTEX
PBOW99SB03-1'	9 June 1999	BTEX
PBOW99SB03-3'5"	9 June 1999	BTEX
PBOW99SB04-1'4"	9 June 1999	BTEX
PBOW99SB04-4'2"	9 June 1999	BTEX
PBOW99SB05-1'	9 June 1999	BTEX
PBOW99SB05-4'	9 June 1999	BTEX
PBOW99SB06-1'	9 June 1999	BTEX
PBOW99SB06-2'9"	9 June 1999	BTEX
PBOW99SB06-4'	9 June 1999	BTEX
PBOW99SB07-1'	9 June 1999	BTEX
PBOW99SB07-1' DUP	9 June 1999	BTEX
PBOW99SB07-4'	9 June 1999	BTEX
PBOW99SB08-1'	9 June 1999	BTEX
PBOW99SB08-3'10"	9 June 1999	BTEX
PBOW99SB09-1'	9 June 1999	BTEX
PBOW99SB10-1'	9 June 1999	BTEX
PBOW99SB10-2'6"	9 June 1999	BTEX
TRIP BLANK	9 June 1999	BTEX

2.1 Data Package Completeness

Were all items delivered as specified in the QAPP and COC?

Yes.

2.2 Laboratory Case Narrative

Were problems noted in the laboratory case narrative or cooler receipt form, which are not discussed in subsequent sections?

No.

2.3 Sample Preservation and Holding Times

Were samples properly preserved and extracted/analyzed within QAPP limits?

The cooler containing the subject samples was received at the laboratory at a temperature of 1.2° C. This temperature was outside the recommended 4± 2°C preservation temperature. The samples were intact and were not frozen. No qualifiers were assigned to the samples based on the cooler temperature exceeding the recommended preservation temperature. All samples were extracted and analyzed within the required holding times of 14 days as stated in the Quality Assurance Project Plan (QAPP) and Field Sampling Plan (FSP).

2.4 Blank Contamination

Were any target analytes detected in the Method Blanks or Trip Blanks?

No.

2.5 Laboratory Control Sample

Were LCS recoveries within evaluation criteria?

Yes.

2.6 Surrogate Recoveries

Were surrogate recoveries within evaluation criteria?

Yes.

2.7 Matrix Spike and Matrix Spike Duplicate Recoveries and RPDs

Were MS/MSD samples analyzed and reported at the required frequency?

Yes.

Were MS/MSD sample recoveries and RPDs within evaluation criteria?

Yes.

2.8 Lab Duplicate Results

Were lab duplicate samples analyzed at the required frequency?

The laboratory did not prepare and analyze a laboratory duplicate for one of the subject samples. The laboratory, however, did prepare a laboratory control sample and laboratory control sample duplicate (LCS/LCSD). These samples served as the lab duplicates and were analyzed within the required frequency.

Were the laboratory duplicate sample RPDs within the evaluation criteria?

The LCS/LCSD RPDs were within the evaluation criteria.

2.9 Field Duplicate Results

Were field duplicate samples collected and analyzed for the subject site investigation?

Yes.

Were field duplicates within the evaluation criteria?

Yes.

2.10 Sample Dilutions

Were samples diluted which exceed 10 X QAPP limits?

No.

2.11 Additional Qualifications

Were additional qualifications applied?

No.

3 FULL VALIDATION OF BTEX DATA - (LTTA)

This section describes the full validation for two soil samples that were analyzed for BTEX compounds by USEPA SW-846 Method 8021B. Samples were analyzed by Quanterra Incorporated of North Canton, Ohio and submitted as part of sample delivery group (SDG) A9F160102. Samples included as part of this validation are listed below:

Sample Identification #

PBOW99SB01-1'

PBOW99SB10-2'6"

Evaluation of the analytical data followed procedures outlined in the USEPA Contract Laboratory Program (CLP) National Functional Guidelines for Organic Review (USEPA, 1999) where applicable to SW-846 Method 8021B. The evaluation criteria used during validation were a combination of those criteria presented in Method 8021B and the laboratory criteria based on historical data (performance based criteria).

Criteria evaluated included the following method performance criteria:

- Completeness of data package
- Significant problems identified in the Laboratory Case narrative
- Sample preservation and holding times
- GC/PID/FID instrument performance
- Initial Calibration
- Calibration Verification
- Method Blank
- Surrogate recoveries
- Laboratory control samples
- MS/MSD samples
- Internal standard areas and retention times
- Target compound identification and quantitation
- Overall assessment of the data

3.1 Data Package Completeness

The data package was reviewed to make certain that it contained the data contractually required in the deliverable received from the laboratory. This included checking the data package for the results of each analyte requested, for each field sample submitted in the analytical batch, along with requested QC documentation and raw data for the respective methods. The data package was complete for this validation.

3.2 Problems Identified in the Laboratory Case Narrative

The case narrative indicated that the laboratory received the subject samples outside of temperature preservation criteria. This issue is discussed in the appropriate section below. No other significant problems were noted in the case narrative.

3.3 Sample Preservation and Holding Times

Review of the sample collection and analysis dates involved comparing the chain-of-custody, the summary forms, the raw data forms, and the chromatograms for accuracy, consistency, and holding time compliance. The laboratory case narrative and the cooler receipt form indicated the samples were received at 1.2° C, which is below the recommended 4 ± 2 °C cooler temperature. The samples were intact and not frozen. It was determined that the temperature did not adversely affect the BTEX analyses. All samples were analyzed within the required holding time. No qualifiers were assigned to the subject samples based sample preservation or holding times.

3.4 Initial Calibration

Calibration criteria were established to assess whether the instrument was capable of producing acceptable qualitative and quantitative data for BTEX analyses. Review of the raw data verified that an initial calibration was analyzed at the beginning of the run sequence. At least five standards were used to establish the initial calibration curve as required by Method 8021B. For the initial calibration, the response factors (RFs) were reviewed and were greater than 0.05 for all analytes. Review of the initial calibration summary forms also indicated % relative standard deviation (RSDs) were ≤ 20 percent for the BTEX target analytes. Recalculation of the RFs and %RSD for all standard compounds were performed, and no calculation or transcription errors were noted. No Qualifiers were assigned to the subject samples based on initial calibration criteria.

3.5 Calibration Verification

Review of the sample chromatograms indicated the calibration verifications (CVs) were performed approximately every 12 hours of operation. Based on the review of continuing calibration raw data and summary forms, all RFs met the evaluation criteria of greater than 0.05 for all target BTEX analytes. In addition, percent differences (%Ds) met the evaluation criteria of ≤ 15 percent for all target BTEX analytes. Recalculation of the RF and %D for the BTEX target analytes was completed, and no errors in calculation were noted. No samples were qualified based on continuing calibration criteria.

3.6 Blank Samples

The purpose of the method blank sample is to evaluate the existence and magnitude of contamination problems emanating from laboratory activities. Method blank samples were analyzed with each analytical batch as required by USEPA SW-846 Method 8021B. Review of the method blank chromatogram and associated raw data revealed that all target analytes were reported as non-detect, however low levels of ortho-xylene were detected in the method blank. The response for o-xylene was very low and below quantitation limits, and therefore was not reported in the method blank. The subject samples did have reported hits of ortho-xylene that were close to the reporting limit. Based on this information an expanded review of all sample chromatograms took place. This was done to evaluate ortho-xylene detections for all the samples in the SDG. Ortho-xylene was detected in all but 2 of the samples. Fourteen of the samples had ortho-xylene detected but were below quantitation limits. Five samples had detections of ortho-xylene above the quantitation limit and were reported. None of the samples in the SDG were qualified based on method blank contamination, primarily because there were no reported hits in the method blank.

The purpose of the trip blank is to evaluate the existence and magnitude of contamination problems while the samples are in transit from the field to the laboratory. Review of the trip blank chromatograms and associated raw data revealed that all target analytes were reported as non-detect. No samples were qualified based trip blank analysis.

3.7 Surrogate Spike Recoveries

Surrogate compounds were used to evaluate the overall laboratory sample preparation efficiency on a per-sample basis. All surrogate recoveries were within the method acceptance criteria for the subject samples. The surrogate recoveries were recalculated, and the summary forms versus the raw data were verified. No calculation or transcription errors were noted. No samples were qualified based on surrogate recoveries.

3.8 Matrix Spike/Matrix Spike Duplicate (MS/MSD) Samples

MS/MSD samples were analyzed to assess accuracy and precision for the analyses. The MS/MSD summary form indicated the sample used as the MS/MSD sample for the batch was PBO99SB01-1'. The recoveries and RPDs were recalculated for the subject sample MS/MSD. All evaluation criteria for recovery and RPDs were met, and no transcription or calculation errors were noted. No samples were qualified based on MS/MSD evaluations.

3.9 Internal Standard Areas and Retention Times

Internal standard areas and retention times were evaluated to ensure that the instrument sensitivity and response were stable during the analysis. The internal standard and retention time summary form for each sample was evaluated. All criteria were met. No samples were qualified based on internal standards and retention times.

3.10 Laboratory Control Samples (LCS)

LCS's were analyzed to assess the accuracy of the analytical process. All LCS data were within the evaluation criteria. Recoveries for LCSs were recalculated using the summary forms. No calculation or transcription errors were noted. No samples were qualified based on LCSs.

3.11 Target Compound Identification and Quantitation

For validation of the compound identification, raw data and chromatograms were reviewed to verify that major peaks were identified, and that the relative retention time was no greater than .06 relative retention time units of the associated continuing calibration standard retention times. The raw data and chromatograms were used to ensure that target analytes were correctly identified. The evaluation and identification of the internal standards, surrogates, MS/MSD, and LCS further support the validation. No qualification of any of the data is required.

3.12 Overall Data Assessment

Based on the criteria outlined, it is recommended that the results reported for these analyses be accepted for their intended use. Acceptable levels of accuracy and precision, based on MS/MSD, LCS, and surrogate data were achieved for this SDG. In addition, completeness defined to be the percentage of analytical results, which are judged to be valid, was 100 percent. The data quality objectives pertaining to the analytical data for this project were clearly met.

Appendix K - Review Comments

Comment Responses

Document: Draft Final Report for the Limited Site Inspection for "The Lower Toluene Tank Area"

Name: Susan P. Allemeier, CELRH-EC-CE

1. Page 2, first paragraph, third sentence, "burn grounds" should be "burning grounds".

Response: The text will be edited accordingly.

2. Page 5, first full sentence, " and even producing caverns" should be "and even produced caverns".

Response: The text will be edited accordingly.

3. Page 5, 1.5, second paragraph, first sentence, what is the purpose of the () in this sentence?

Response: The parentheses were inadvertently placed in the text. They will be removed from the text.

4. Page 5-6, the last sentence on page 5 does not connect to the sentence on the top of page 6.

Response: The last sentence on page 5 should read, " The results of these analyses revealed no contamination in the soil and groundwater". The first sentence on page 6 should read, " These wells were then included in the site-wide groundwater study performed by IT Corporation". The text will be edited accordingly.

5. Page 7, section 3.2, second sentence, put a "." Between "Figure 3-2" and "Four".

Response: The text will be edited accordingly.

6. Page 7, section 3.2, second paragraph, last sentence reads, These two sample samples were chosen...." Please revise.

Response: The word "sample" will be removed from the text.

7. Page 8, first full paragraph, last sentence, put a space between "Table 3-1" and "below".

Response: The text will be edited accordingly.

Comment Responses

8. Page 10, section 7.0, first sentence, revise to, "the purpose of this site investigation of the lower toluene tank area was to gather data necessary to evaluate the site for contamination due to past DOD activities."

Response: The text will be edited accordingly.

9. Page 11, second bullet, second sentence, "...it appears the site has (not hase) essentially...."

Response: The text will be edited accordingly.

10. Page 11, section 8.0, this is written in the 1st person, please revise.

Response: The words "we believe" will be removed from the text.

11. Figures: the figure between Figure 1-5 and Figure3-2 is copied as a mirror image and appears backwards. Please correct this and also please assign a figure number to this figure.

Response: This figure is an overlay for Figure 3-2 depicting ground elevations. The figure will be assigned a figure number (Figure 3-2a).

Comment Responses

Document: Draft Final Report for the Limited Site Inspection for "The Lower Toluene Tank Area"

Name: Janet K. Wolfe, CELRH-EC-CE

1. Section 1.1.2, Site Specific (site description). Does the remaining tank contain any sludges? Is there piping to other areas associated with the tanks?

Response: The tanks were decommissioned in 1945 by pumping out their contents, draining transfer lines, and opening top and bottom flanges for ventilation. During the visual survey field personnel were unable to gain access inside the tank for inspection. There were transfer lines present at the site during the time when the tanks were in operation, however during the visual survey these lines could not be located (Section 3.1 page 7).

2. Section 2.0, Previous Investigations. Refer to the last sentence on page 5 stating " the results of these analyses..." There is information missing. The sentence is incomplete.

Response: The last sentence on page 5 should read, " The results of these analyses revealed no contamination in the soil and groundwater". The first sentence on page 6 should read, " These wells were then included in the site-wide groundwater study performed by IT Corporation". The text will be edited accordingly.

3. Section 3.3, Field Screening, Table 3.1. The sample number for the fill valve location should be identified in this table for clarity.

Response: Sample number "PBOW99SB09-1" is the number for the fill valve and is in Table 3-1.

4. Section 8.0, Recommendations. Address what the plans are for the remaining tank. Will this tank be removed? Are sludges remaining in the tank?

Response: The Lower Toluene Tank Area is presently under the ownership of NASA. Future land use of the site is unknown at this time. The primary focus of this investigation was to determine if any contamination is present at the site due to past DOD activities.

5. Figures. Figure 1-3 is missing. There needs to be a site map that indicates the location of the Lower Toluene Area in relation to the remainder of the site.

Response: Figure 1-3 will be included in the report.

Comment Responses

Document: Final Report, Limited Site Inspection for "The Lower Toluene Tank Area"

Name: Ronald E. Nabors, Ohio EPA

1. Section 2.0, Previous Investigations, Page 5: The last sentence on page 5, When carried over to page 6, makes no sense. Please revise this section.

Response: The last sentence on page 5 should read, " The results of these analyses revealed no contamination in the soil and groundwater". The first sentence on page 6 should read, " These wells were then included in the site-wide groundwater study performed by IT Corporation". The text will be edited accordingly.

2. Section 3.3 Field Screening, Page 8: Photoionization is misspelled in the first sentence.

Response: The text will be edited accordingly.

3. Section 7.0 Summary and Conclusions, Page 11: The word "has" is misspelled in the second sentence of the second bullet.

Response: The text will be edited accordingly.

4. General comment: The Target Parameters for this investigation should have included analysis for Lead and Semivolatile Organic Compounds (SVOCs).

Response: The reviewer's point is valid and will be taken into consideration during the next phase of work performed at the site. The primary focus for this limited site investigation was to determine if the toluene stored within the tanks had adversely impacted the site through spills and leaks. The recommendation section of the final report will be edited to reflect that further investigation is required by OEPA DERR to address the Lower Toluene Tank Area.