

SCS ENGINEERS

March 14, 2017
File No. 25214107.00

Mr. Jeffery D. Jeep
Jeep & Blazer, LLC
24 N. Hillside Avenue Suite A
Hillside, IL 60162

Subject: Work Plan for Investigation of 24-inch Diameter Pipelines along Dodge Avenue and Oakton Street, Evanston, Illinois

Dear Mr. Jeep:

SCS Engineers (SCS) prepared the following work plan for the investigation of the 24-inch diameter, cast-iron pipeline running north-south along Dodge Avenue and the 24-inch diameter, cast-iron pipeline running east-west along Oakton Street in Evanston, IL.

Background

Results of Previous Investigations

This work plan outlines additional investigation of the 24-inch diameter pipelines located along both Dodge Avenue and Oakton Street in Evanston, Illinois. This work plan is intended to supplement previous investigations and expert reports, including the following:

- Opinion on the Source of the Occurrence of Petroleum and Gas in Monitor Wells and Borings in the James Park Area, by David Hendron, PE, SCS Engineers, dated January 30, 2015.
- Sampling and Analytical Report for Dodge County Water Main Replacement Project, by David Hendron, PE, SCS Engineers, dated February 10, 2016.

These reports are hereinafter referred to as the 2015 and 2016 Hendron Reports. Refer to these reports for additional background and investigation results. The investigations performed to date have found petroleum and gas in gas monitoring probes and borings in and around the perimeter of James Park. In addition, fluoranthene and phenanthrene have been detected in the City's drinking water. Conclusions of the 2015 and 2016 Hendron Reports associate the presence of this petroleum, gas, fluoranthene and phenanthrene with releases from Skokie MGP distribution infrastructure in the vicinity of James Park.

Evidence of infrastructure has been found in documents discussed in the Hendron Reports cited previously, in construction activities by the City of Evanston Water Department and in recent documents provided by Nicor as discussed in the following paragraphs.



Description of the North-South 24-inch Pipeline

The City of Evanston's Water Department has encountered 24-inch-diameter, cast-iron pipes of unknown origin at a number of locations along Dodge Avenue in about 2004 (SCS Memo by Dave Hendron, September 12, 2014). The existence of these pipes was confirmed and documented in the summer of 2015 during water main replacement work on Dodge Avenue (refer to the Sampling and Analytical Report for Dodge Avenue Water Main Replacement Project prepared by SCS, dated February 10, 2016). A north-south 24-inch pipe was encountered at a depth of approximately 4 feet at three locations on Dodge Avenue between Oakton and Mulford Streets, roughly 2 to 5 feet east of the west curb (see **Figure 1**). At the middle location, located at Evanston grid number 78+95, the pipeline was covered with a black crust with high concentrations (335,800 parts per billion [ppb]) of polyaromatic hydrocarbons (PAHs).

Description of the East-West 24-Inch Pipeline

In addition to the Dodge Avenue 24-inch pipeline, an east-west 24-inch pipeline was encountered on Oakton Street at the intersection with Dodge Avenue during the 2015 water-main-replacement project. This pipeline was encountered 4 to 11 feet north of the south curb on Oakton Street at a depth of approximately 7 feet. This 24-inch pipeline, according to Nicor Gas, connects with two reported occurrences of east-west, 24-inch gas pipelines located west of the Oakton Street and Dodge Avenue.

Goal of the Work

There is no information available to understand anything related to the abandonment and closure of either of the 24-inch diameter pipes, and the pressures and gas constituents inside these pipes is unknown. The objective of this investigation is to obtain this information and to evaluate past releases from these pipelines and the effect of any releases from these infrastructure elements on the soils, bedrock, groundwater and existing Evanston water and sewer facilities in the area. Throughout the investigation activities, the following will be noted:

1. Physical layout, connections, and construction characteristics of the pipes (sumps, service lines, cracks, corrosion, joints, slopes, pressure regulators, etc.).
2. Current conditions inside and outside the pipes (residual gases, residual pressures, and any liquid or solid contaminants deposited inside or outside of the pipes).
3. Signs of contamination in soil, water and/or bedrock in the vicinity of the pipelines at select locations along the pipelines.

Below are three possible scenarios that may be encountered during the proposed additional investigation activities:

1. The most conservative assumption, from a risk standpoint, is to assume that the 24-inch pipelines are active (pressurized) with unknown origin and unknown contents.
2. The 24-inch pipelines are abandoned but still contain residual pressures, combustible gases and contaminants from their former use as MGP distribution mains.
3. The 24-inch pipelines do not contain residual pressures, or residual gases, but may contain residual liquid and solid contaminants from their former use as MGP.

Although Scenario 3 is most likely based on current information, these pipelines will be assumed to be active, pressurized pipes of unknown origin and contents until proven otherwise (Scenario 1).

Work Plan to Investigate the North-South 24-Inch Pipe on Dodge Avenue and the East-West 24-Inch Pipe on Oakton Street

The initial 10 tasks in this work plan will be conducted at locations 1 and 2 on **Figure 2** and will focus on tapping into and investigating the structure and contents of the 24-inch pipes. Tasks 11 to 18 will focus on determining the nature and extent of MGP wastes released from the pipes. Tasks 11 to 18 will occur at the yet-to-be-determined locations 3 and 4.

The work plan tasks are as follows:

- **Task 1 – Develop Health and Safety Plan (HASP):** A site-specific HASP will be prepared by SCS and by contractors performing work. The HASP provisions will be followed throughout each task below to provide a safe work environment throughout. Both SCS and contractors will have site-specific HASPs in place prior to the start of any work. Contractors will be responsible for assisting SCS in obtaining samples or performing field measurements without SCS entering excavations.
- **Task 2 – Excavate at Locations 1 and 2 to Expose the Pipes:** Contractor will excavate to expose the 24-inch pipes at approximate locations 1 and 2, and shore the excavations, as necessary. Contractor will temporarily stockpile excavated soil on tarps along the west side of James Park. SCS will sample the excavated material and send to Test America for analytical testing. Contractor will be responsible for covering and maintaining the stockpile throughout its duration. Based on the results of the analytical testing, the contractor will either load and haul the material for off-site clean disposal, or send to a landfill. SCS will secure the appropriate disposal location. Contractor will also be responsible for obtaining permits, arranging utility clearances, opening the street and traffic control. These excavations need to be sufficiently large to:

- Install a tapping machine (Task 4)
- Cut and remove a sufficiently large section of pipe so a camera-equipped crawler can be inserted (Task 7)
- Allow the crawler cable to freely spool into the 24-inch pipes (Task 9)
- **Task 3 – Log Soils and Collect Samples (SCS task):** Log and collect representative samples from soils and pipe-crusts (if present) around and under the pipes at test pit locations 1 and 2. Send these samples to Test America for volatile organic compound (VOCs) analysis and semi-volatile organic compound (SVOCs) analysis. Excavated soil will be managed as noted in Task 2 above.
- **Task 4 – Tap into Pipes:** Contractor will develop a work plan to tap into the 24-inch pipes using a tapping machine designed for cast-iron pipe and pressures as high as 30 psi. It will be assumed that the pipe could contain combustible gases such as hydrogen and methane under pressure, so extreme care will be taken when drilling (tapping) into the pipe. If pipe is obviously broken and does not contain gas under pressure, tapping of the pipe is not required. Contractor is not to proceed with pipe cutting until approved by SCS.

The person in charge of the tapping operation will be required to provide proper tapping-certification paperwork as part of the bidding process. The contractor will be required to submit a work plan stipulating equipment, procedures and safety precautions consistent with gas-industry best-practices for this type of work.

- **Task 5 – Collect Field Measurement of Pipeline Contents:** After the pipes are tapped, the contractor will assist SCS in performing a variety of field measurements to determine the conditions inside the 24-inch pipes, including:
 - Pressures, temperatures and flow rates. Flow rates will be measured while venting the pipeline gases into a portable tank.
 - Lower explosive limits (LEL) for both methane (5 percent LEL) and hydrogen (4 percent LEL) will be measured with the appropriate portable meters from a sampling valve on the tapping machine.
 - Gas compositions will be determined using portable gas meters capable of measuring hydrogen (H₂), carbon monoxide (CO), carbon dioxide (CO₂), methane (CH₄), hydrogen sulfide (H₂S), and oxygen (O₂). The meters will be attached to the sampling valve on the tapping machine. In addition, a Dräger Tube for detecting cyanide gas will be used before opening the 24-inch pipes.
- **Task 6 – Collect Air Samples for Laboratory Analysis:** Under the direction of SCS, contractor shall collect Summa-canister air samples from inside the pipes using

the sampling valve on the tapping machine. The air samples will be analyzed by Test America for VOCs using method TO-15.

- **Task 6.1 – Liquid Sampling Through the Tapping Machine (SCS Task):** If the pipes are determined to be unpressurized, liquid sampling will be attempted. The contractor will assist SCS in obtaining samples. Liquid samples will be analyzed for VOC and SVOC compounds by Test America.
- **Task 7 – Cut Opening in 24-inch pipe for the Video Camera Inspection:** This task will consist of one of the following, depending on the results of the previous tasks.

If the 24-inch pipes are found to be unpressurized, and free of explosive gases, the contractor will cut an opening into each of the 24-inch pipes, at approximate locations 1 and 2, that is sufficiently large to insert a camera and crawler. Removed sections of piping will be provided to SCS and stored by the City. The contractor will cut and remove a section of pipe sufficiently large to insert a video camera. The contractor will be responsible for preparing the pipe cut in a manner that prevents the crawler cables from getting cut or caught on the pipe. The contractor will ventilate the excavation as needed during the cutting and videotaping operations to dissipate residual gases in or around the pipes. The contractor will also be responsible for containing and properly disposing liquids that may be present in the pipe.

If the 24-inch pipes are found to be pressurized or contain explosive levels of gas, the tap hole in the pipeline will be plugged using the tapping machine, and the investigative activities will be discontinued. In this case, the excavations will be filled and the roads patched. All of the remaining investigatory tasks will then be put on hold for review and possible modification.

- **Task 8 – Obtain Samples of Liquids and Solids from Inside the Pipes:** If liquids are present in the piping, the contractor will obtain a sample of the liquids using sampling containers and sampling methods provided by SCS. Samples recovered will be sent to Test America for VOC and SVOC analysis.
- **Task 9 – Video Inspection of Interior of the 24-inch pipes:** The video inspection contractor will provide a high-definition video camera of 1080 pixel or better resolution, and a high-intensity lighting system to inspect the interior of the 24-inch pipes in both directions from the points of entry. The condition of the interior of the pipe is unknown, but could contain liquids, tarry substances, solids and/or debris. The camera equipment must be able to accommodate these potential conditions to the extent practicable. The camera equipment must also be spark-proof.

The video device shall accurately measure and record its distance from the entry point. Time and distance stamps will be added to the video image for reference during replay. The video camera will be capable of viewing forward, 90-degrees

side-to-side, and up-and-down. If possible, the crawler will be equipped with a sensor capable of measuring and recording the slope of the pipe in degrees from horizontal.

- **Task 9.1 Log Video:** With the video inspection contractor, SCS will log the video and identify significant internal features of the 24-inch pipe, including, but not limited to: the characteristics and extent of solids and liquids, locations of joints, signs of corrosion, pipe breaches, roots, drip tanks, pressure regulators, valves, gas service lines, jogs in pipe direction (including the approximate angles), and changes in slope. The logs will be used to select two locations (Location 3 on Oakton Street pipe and Location 4 on Dodge Avenue pipe) for exposing the pipe, performing borings and installing wells to investigate the potential for pipeline-related soil, bedrock and groundwater contamination.
- **Task 10 – Repair Pipes, Close Excavations 1 and 2, and Repair Street:** Contractor will repair pipe either by capping or with a new section of piping installed with watertight connections. Contractor will backfill the excavations and will repair the street as required by the City of Evanston requirements.
- **Task 11 – Excavate at Suspect Locations:** Based on the observations from the pipeline video, two locations (referred to as locations 3 and 4) will be selected for further investigation. Locations will be selected to expose potential features that could be points of leakage in the pipelines, such as joints, pipe connections, corroded areas, pipe breaks or sumps. The excavation will be of sufficient width and depth to expose the entire perimeter of the 24-inch pipeline. Contractor will be responsible for obtaining permits, clearing utilities, opening the street, shoring the excavation and traffic control. Contractor will temporarily stockpile excavated soil on tarps along the west side of James Park. SCS will sample the excavated material and send to Test America for analytical testing. Contractor will be responsible for covering and maintaining the stockpile throughout its duration. Based on the results of the analytical testing, the contractor will either load and haul the material for off-site clean disposal, or send to a landfill. SCS will secure the appropriate disposal location.
- **Task 12 – Log Soils and Collect Samples (SCS task):** An SCS representative will log and describe the natural soils and the characteristics and extent of released materials noted in the excavations at locations 3 and 4. SCS will collect representative samples from natural soils for geotechnical analysis and released materials for chemical analysis. Samples containing released materials will be sent to Test America for VOC and SVOC analysis.
 - **Task 12.1 – Geotechnical Testing (SCS Task):** Samples of natural soils collected for geotechnical testing will be field classified, jarred, and sent to a geotechnical laboratory for index-property testing. Tests will include grain size, moisture content, specific gravity, liquid limit, plastic limit, and plasticity index.

- **Task 13 – Cut Openings into the 24-Inch Pipes:** At each location, contractor will cut an opening in the pipe large enough to obtain representative interior samples of solids and liquids. Removed sections of piping will be provided to SCS and stored by the City.
- **Task 14 – Collect Samples for Chemical and Physical Testing from Interior of Pipes:** The contractor will obtain representative samples of liquids and solids from inside the 24-inch pipes using sampling containers and sampling methods provided by SCS. Samples for will be sent to Test America for VOC and SVOC analysis and for physical-property testing (e.g., boiling point, density).
- **Task 15 – Repair Pipes, Fill Excavations 3 and 4, and Repair Street:** Contractor will repair pipe by capping or with a new section of piping installed with watertight connections. Contractor will backfill the excavations and will repair the street as required by the City of Evanston requirements.
- **Task 16 – Geotechnical Borings at Locations 3 and 4:** After the street has been repaired, a drilling contractor will auger-drill two geotechnical borings at location 3 and two at location 4. One deep boring in each pair will be auger-drilled to the base of the glacial soils and then cored 20 feet into bedrock, for a total depth of roughly 90 feet. The second shallow boring in each pair will be auger drilled to a depth of roughly 56 feet, or so, with the intention of reaching a sand seam known to occur in the James Park area at a depth of 50 to 55 feet. Bedrock will not be reached in the shallow boring so no bedrock coring will occur.

These geotechnical borings will be positioned near the 24-inch pipes. Each boring will be continuously sampled in the glacial soils using a split spoon sampler and Standard Penetration Test (SPT) methods. The bedrock boring in each pair will be cored 20 feet into the bedrock using an NX sized core barrel, as appropriate. Spoils will be managed as noted in Task 2.

- **Task 17 – Log Borings and Select Soil and Rock Samples for Chemical and Geotechnical Testing (SCS Task):** Each SPT soil sample and bedrock core will be visually logged by an experienced SCS engineer or geologist to establish the nature and extent of inorganic and organic materials encountered.

A portion of each SPT sample and bedrock core will be bagged and field tested with both a flameionization detector (FID) and/or a photoionization detector (PID), as was done during the 2014 James Park investigation. These measurements will be recorded on the boring logs.

Representative soil and bedrock samples will be collected for chemical analysis. Chemical samples will be selected based on appearance (discoloration and presence of tarry or oily materials), odors, and PID/FID readings and sent to Test America

for VOC and SVOC analysis. A minimum of 10 samples will be collected from the borings for chemical analysis.

- **Task 17.1 – Geotechnical Testing (SCS Task):** Soil geotechnical samples will be collected every 5 feet from just the deep boring in each pair. These samples will be field classified, jarred, and sent to a geotechnical laboratory for index-property testing. Tests will include grain size, moisture content, liquid limit, plastic limit and plasticity index.
- **Task 18 – Install Gas/Fluid Monitoring Wells:** The drilling contractor will install gas/fluid monitoring wells in the bedrock portion of the deep borings and in the sand-seam portion of the shallow borings.

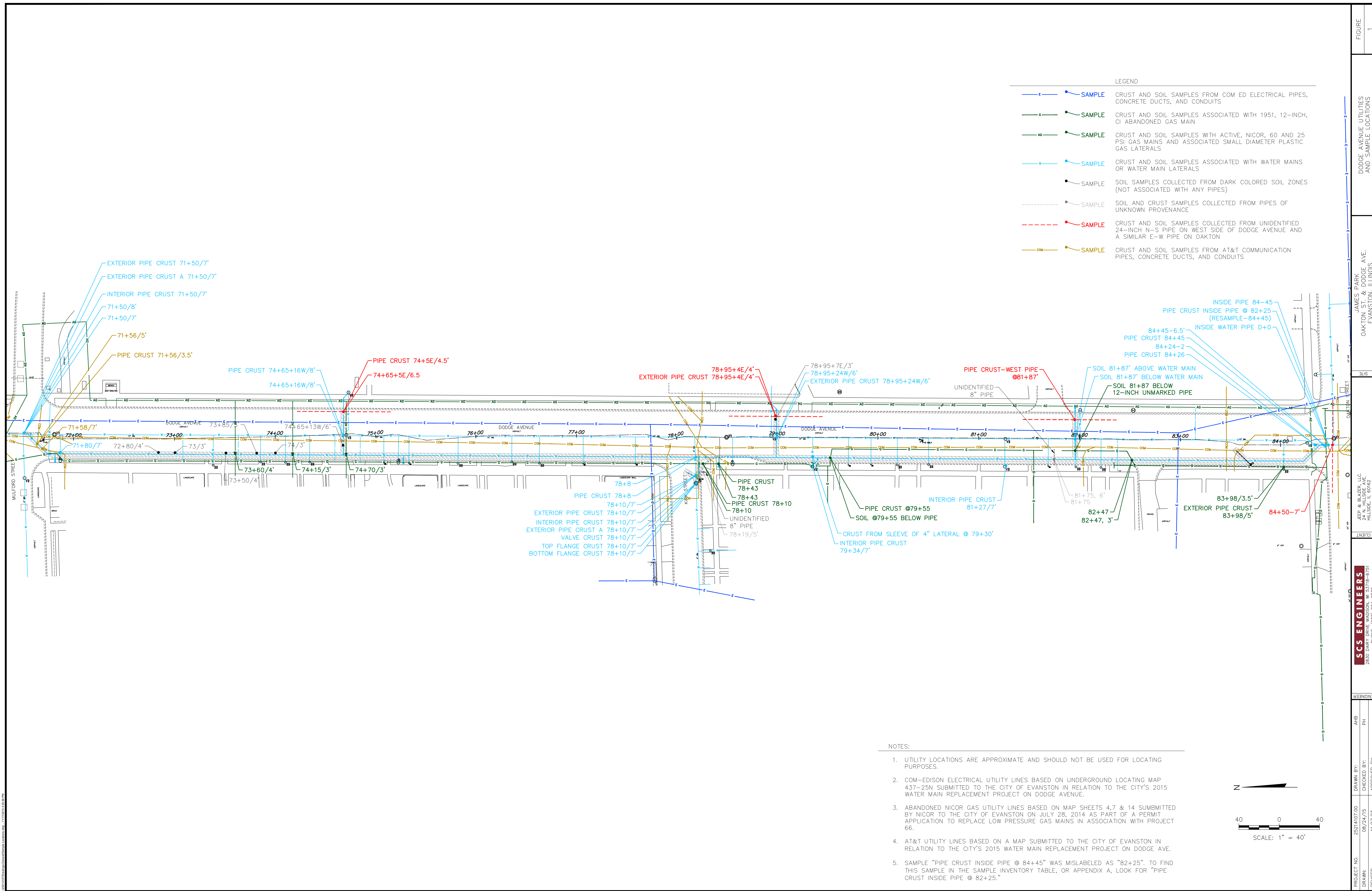
The wells will be 2-inch-diameter, dual-purpose wells that can be sampled for either gases or liquids. The wells will have a sand filter pack around the well screen and a bentonite annular-space seal.

- a. The bedrock gas/fluid wells will be installed with a 2-inch diameter PVC riser and 15-foot screen. The shallow, sand-seam wells will be installed with a 2-inch diameter PVC riser and 10-foot screen. All wells will be fitted with a threaded PVC cap with a quick-connect fitting for periodic gas sampling.
- b. If pressurized gas is present in any of the wells, field measurements will be taken to measure methane (using a four-gas meter), pressure, and gas flow rates in each well.
- c. In wells where pressurized gas is present, a Summa canister sample will be collected for VOC testing.
- d. In fluid monitoring wells, each well will be developed using generally-accepted industry methods (baler or pump).
- e. After development is completed, SCS will use generally-accepted industry methods to take fluid samples from each monitoring well. SCS will also perform physical testing (pH, redox potential, and temperature) and chemical testing (VOCs and SVOCs) on each of the fluid samples consistent with the objectives of the source evaluation study, as described herein and in the 2015 and 2016 Hendron Reports. Water samples will be analyzed by Test America for VOCs and SVOCs using methods 8260B and 8270D, respectively.

- **Task 19 – Data Analysis and Report:** SCS will analyze the field and laboratory data obtained from excavations, borings, pipes, and wells to prepare a report presenting results from the excavations, pipes, borings, and wells. The report will supplement the earlier investigation reports (2015 and 2016 Hendron reports). The report will provide conclusions and opinions regarding the 24-inch pipelines and associated elements as a source of the MG waste oil constituents found: 1) on the crust on and in the drinking water pipeline for the City of Evanston, and 2) causing the occurrence of methane gas in subsoils and bedrock in the James Park area, as described in the 2015 and 2016 Hendron Reports and the Round 1 through 4 Sampling of Drinking Water in South Evanston¹. The report will also document if additional investigation is recommended.

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¹ The Round 1 through 4 sample results are available at the City of Evanston's website at <http://www.cityofevanston.org/parks-recreation/parks/james-park-testing/>.



LEGEND

	SAMPLE	CRUST AND SOIL SAMPLES FROM COM ED ELECTRICAL PIPES, CONCRETE DUCTS, AND CONDUITS
	SAMPLE	CRUST AND SOIL SAMPLES ASSOCIATED WITH 1951, 12-INCH, CI ABANDONED GAS MAIN
	SAMPLE	CRUST AND SOIL SAMPLES WITH ACTIVE, NICOR, 60 AND 25 PSI GAS MAINS AND ASSOCIATED SMALL DIAMETER PLASTIC GAS LATERALS
	SAMPLE	CRUST AND SOIL SAMPLES ASSOCIATED WITH WATER MAINS OR WATER MAIN LATERALS
	SAMPLE	SOIL SAMPLES COLLECTED FROM DARK COLORED SOIL ZONES (NOT ASSOCIATED WITH ANY PIPES)
	SAMPLE	SOIL AND CRUST SAMPLES COLLECTED FROM PIPES OF UNKNOWN PROVENANCE
	SAMPLE	CRUST AND SOIL SAMPLES COLLECTED FROM UNIDENTIFIED 24-INCH N-S PIPE ON WEST SIDE OF DODGE AVENUE AND A SIMILAR E-W PIPE ON OAKTON
	SAMPLE	CRUST AND SOIL SAMPLES FROM AT&T COMMUNICATION PIPES, CONCRETE DUCTS, AND CONDUITS

NOTES:

- UTILITY LOCATIONS ARE APPROXIMATE AND SHOULD NOT BE USED FOR LOCATING PURPOSES.
- COM-EDISON ELECTRICAL UTILITY LINES BASED ON UNDERGROUND LOCATING MAP 437-25N SUBMITTED TO THE CITY OF EVANSTON IN RELATION TO THE CITY'S 2015 WATER MAIN REPLACEMENT PROJECT ON DODGE AVENUE.
- ABANDONED NICOR GAS UTILITY LINES BASED ON MAP SHEETS 4,7 & 14 SUBMITTED BY NICOR TO THE CITY OF EVANSTON ON JULY 28, 2014 AS PART OF A PERMIT APPLICATION TO REPLACE LOW PRESSURE GAS MAINS IN ASSOCIATION WITH PROJECT 66.
- AT&T UTILITY LINES BASED ON A MAP SUBMITTED TO THE CITY OF EVANSTON IN RELATION TO THE CITY'S 2015 WATER MAIN REPLACEMENT PROJECT ON DODGE AVE.
- SAMPLE "PIPE CRUST INSIDE PIPE @ 84+45" WAS MISLABELED AS "82+25". TO FIND THIS SAMPLE IN THE SAMPLE INVENTORY TABLE, OR APPENDIX A, LOOK FOR "PIPE CRUST INSIDE PIPE @ 82+25."

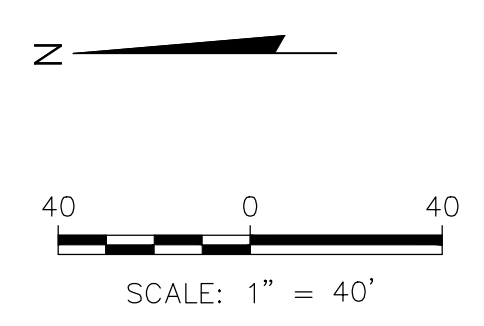
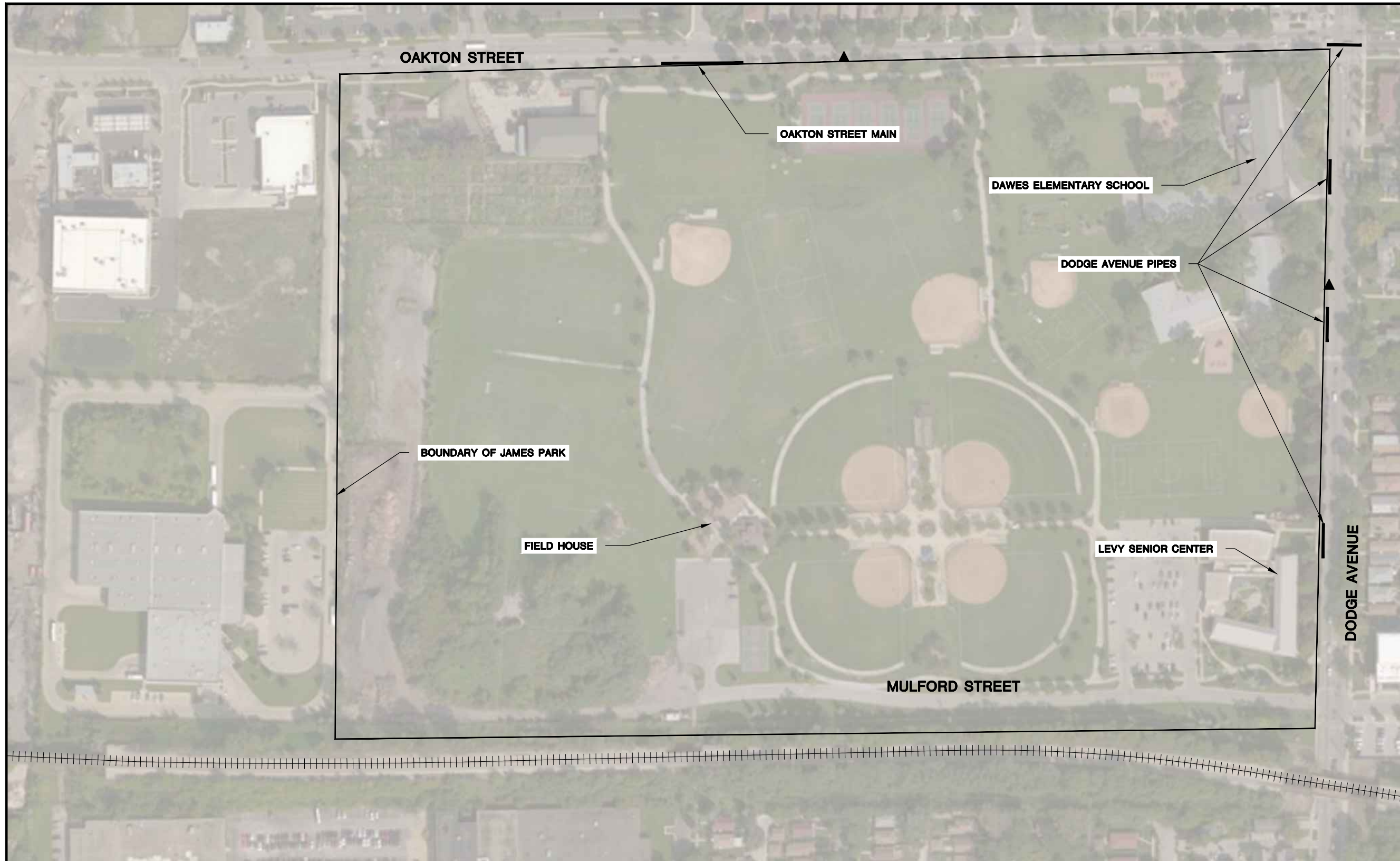
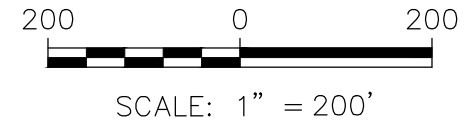


FIGURE 1



- LEGEND
- +++++ SKOKIE SWIFT TRAIN LINE
 - ▲ PROPOSED INITIAL EXPOSURE LOCATION (TO BE ADJUSTED IN THE FIELD AS APPROPRIATE)
 - MULFORD STREET SEWER
 - APPROXIMATE FACILITY BOUNDARIES BASED UPON CURRENTLY AVAILABLE INFORMATION



PROJECT NO. 25214107.00	DRAWN BY: KRG	SCS ENGINEERS 2830 DAIRY DRIVE MADISON, WI 53718-6751 PHONE: (608) 224-2830	CLIENT JEEP & BLAZER, LLC. 24 N. HILLSIDE AVE. HILLSIDE, IL 60162	SITE JAMES PARK PIPE INVESTIGATION OAKTON ST. & DODGE AVE. AREA EVANSTON, ILLINOIS	PROPOSED PIPE INVESTIGATION LOCATIONS	FIGURE
DRAWN: 03/03/17	CHECKED BY:					2
REVISD:	APPROVED BY:					

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