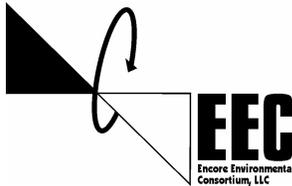


# MEMORANDUM



**To:** Bob Hare/ENCORE

**Date:** 05/25/2006

**From:** Tony Perfetto/CRA

**cc:** Gavin O'Neill/CRA  
John McKenna/BBL

**Re:** AIR Methane Investigation Work Plan  
Expanded Methane Investigation  
Pontiac North Campus  
Pontiac, Michigan

## BACKGROUND

This memorandum presents the approach to further evaluate methane generation in the Area of Industrial Redevelopment (AIR), as previously proposed. The previously proposed work was not completed due to Site conditions at the time (e.g., saturated soils resulting in flooded probes). As a result, previously installed probes were subsequently abandoned to avoid impacting the construction activities within the AIR.

The soils in the AIR are expected to act as a natural barrier in the subsurface, thereby slowing or preventing gas migration to the surface. The objective of this work is to determine if methane previously observed in probes screened at depth is present near the surface and also to determine whether the methane has migrated in the sandy soils observed along the western portion of the proposed United States Postal Service (USPS) Building.

The AIR is situated in an area of the Site formerly occupied by the Demolition Area (DA), which consisted of approximately 48 acres in the south-central portion of the Site. An area of fill material, referred to as the A1 Fill Area, is situated in a portion of the AIR. In addition, Resource Conservation and Recovery Act (RCRA) Facility Investigations have identified several areas where light non-aqueous phase liquids (LNAPL) was detected in monitoring wells in the AIR. The AIR is currently leased to the USPS, which is currently in the design/build phase of constructing an approximately 800,000 square foot regional distribution facility.

On March 17, 2005, EEC submitted a memorandum entitled *AIR Methane Investigation Work Plan* presenting the proposed approach to determine if methane was present in the AIR due to the decomposition of wood and demolition debris in the A1 Fill Area. The concerns of the USPS were specifically related to those areas where the fill area was present beneath the footprint of the proposed USPS building.

Based on initial results from the methane investigation, it was observed that methane readings recorded in the former DA coincided with the location of LNAPL present in LNAPL Area Nos. 1, 2, and 7. On June 24, 2005, EEC prepared the *Draft AIR Methane Investigation Work Plan, Addendum No. 1* to expand the investigation to assess the presence of methane in existing wells installed within the LNAPL Area Nos. 1, 2, 3, 7, 9, and 10. As a result, methane was also observed during the expanded investigation in LNAPL Area Nos. 3, 9, and 10.

As part of the methane evaluations, soil gas sampling was completed at several gas probes and existing monitoring wells at or near the water table throughout the AIR. The initial monitoring took place between

March 23 and July 8, 2005 during periods when an active LNAPL remediation system was in operation for portions of LNAPL Area No. 3. The results of the methane evaluations were presented to U.S. EPA and USPS in a memorandum dated July 15, 2005, entitled *AIR Methane Investigation Summary*. At the request of USPS and on behalf of GM, EEC installed additional gas probes on November 28 to 30, 2005 in the vicinity and beneath the footprint of the building footprint. Generally, as requested by USPS, one gas probe was installed for each 200-foot square grid beneath the building (i.e. on 200-foot centers). The USPS then performed soil gas monitoring including methane, carbon dioxide, oxygen and PID on existing probes in the AIR, on December 1, 2005. The monitoring confirmed that methane levels of concern are isolated to the LNAPL areas.

It was concluded by EEC and USPS that the primary source of methane is likely a result of the anaerobic degradation of LNAPL.

## **SCOPE OF WORK**

The following section presents the Scope of Work (SOW) to further investigate methane in the AIR. The installation of additional gas probes is proposed to further determine the presence, magnitude, and potential for the migration (e.g., pressure) of methane gas to the area in the southwest corner of the proposed building and to the shallow soils.

The scope of work includes the installation of shallow gas probes in areas where previous investigations have confirmed the presence of methane in deeper soils near the water table, to screen for methane near surface soils. Additional deeper gas probes screened directly above the water table (approximately 10 to 15 feet below ground surface) will also be installed to further assess methane. The proposed locations of the deep and shallow gas probes are presented on Figure 1.

The deep probes will be completed with a 10-foot screen placed in the vadose zone, with the bottom one foot of the screen located in the water table. The shallow probes will be completed with a three-foot screen, placed in the vadose zone, with the screened interval commencing approximately two-feet below ground surface. The gas probes will be constructed of 1-inch diameter Schedule 40 polyvinyl chloride (PVC) casing and screens, and will be completed with a slip cap containing a hose barb assembly and a stopcock. Typical construction details of deep and shallow gas probes are presented on Figure 2.

### **Deep and Shallow Methane Gas Probe Locations**

The proposed locations of the gas probes are further discussed below (refer to Figure 1):

#### **LNAPL Area No. 3**

Three shallow gas probes are proposed for LNAPL Area No. 3, partially situated beneath the northern portion of the proposed USPS building. One shallow gas probe is proposed for the northern extent of LNAPL Area No. 3, where previous methane gas measurements from monitoring well MWW8-55 indicated that methane was present in the soils in concentrations ranging from 28.1% to 35.6%. Two shallow gas probes are proposed for the southern extent of LNAPL Area No. 3, situated beneath the northern portion of the USPS building, where previous methane gas measurements from monitoring well MWW8-16 indicated that methane was present in the soils in concentrations ranging from 0.3% to 5.8%. Shallow gas probes will be installed to assess the potential for methane migration to shallow soils beneath the proposed building footprint and paved surfaces at the north end of the USPS site.

### LNAPL Area No. 9

Two shallow gas probes are proposed for LNAPL Area No. 9, situated immediately west of the USPS building. Previous methane gas measurements from monitoring wells MWW8-29 and MWW8-30, located within LNAPL Area No. 9, indicate that methane was present in the soils in concentrations ranging from 1.2% to 71%. Shallow gas probes will be installed to assess the potential for methane migration to shallow soils that will be beneath paved surfaces.

### LNAPL Area No. 10

Two shallow gas probes are proposed for LNAPL Area No. 10, situated to the west of the LNAPL Area No. 9 and the USPS building. Previous methane gas measurements from monitoring wells MWW8-33 and MWW8-34, located within LNAPL Area No. 10, indicate that methane was present in the soils in concentrations ranging from 0.9% to 72%. Shallow gas probes will be installed to assess the potential for methane migration to the shallow soils.

### LNAPL Area No. 11

Two shallow gas probes and two deep/shallow gas probe pairs are proposed for LNAPL Area No. 11, situated to the north of the USPS building. The deep/shallow gas probe pairs will be installed in the northeastern and southwestern extents of LNAPL Area No. 11, in areas not previously evaluated for methane.

In addition, two shallow gas probes are proposed for the northwestern and southeastern extents of LNAPL Area No. 11 to assess the potential for methane migration to the shallow soils that will be beneath paved surfaces (i.e., parking lots).

### USPS North Parking Area

One nested gas probe pair (i.e., one deep and one shallow) is proposed for the parking area situated to the north of the proposed USPS building. The deep/shallow gas probe pair will be installed in an area not previously delineated for methane.

### USPS Building Footprint

A total of five nested gas probe pairs and one deep gas probe are proposed for the western extent and central areas within the proposed USPS building footprint. At the western extent of the proposed building, previous methane gas measurements from gas probes GPW9-25, GPW9-28, BW9-100, BW9-101, and GPW9-06 indicated that methane was present in the soils in concentrations of 0.1% to 0.7%. The five nested gas probe pairs will be installed to further delineate methane gas and migration in this area.

### **Methane Gas Monitoring Procedure**

The presence and concentration of methane at the gas probes will be monitored using a Landtec GA-90. Monitoring will include pressure readings measured using a digital manometer. The carbon dioxide (CO<sub>2</sub>), oxygen (O<sub>2</sub>) and methane gas measurement will be obtained with a Landtec GA-90.

Since ambient air may have been introduced into the soil boring during drilling, the gas probes will be monitored for the presence of methane after a minimum of two days following the completion of the probes. The methane gas will be monitored using the following series of events:

#### Atmospheric Pressure Measurement

Atmosphere pressure will be obtained either from a local weather station or from a nearby airport.

#### Pressure Measurement Procedure

Monitoring of the gage pressure (or vacuum) from gas probes will provide data for assessing the migration of methane gas at the Site. Pressure measurements are referenced relative to atmospheric pressure (i.e., gage readings). Generally, calibration consists of zeroing the instrument before each measurement. To collect undisturbed pressure readings (i.e. prior to methane gas measurement and water level measurements), the following procedures will be implemented in the following order:

- Connect the pressure gage to the hose barb on the probe.
- Open the stopcock.
- Obtain the probe pressure reading and record the time of the reading. If the pressure reading fluctuates, record both the maximum and minimum readings.
- Close the stopcock.

#### Methane Gas Measurement Procedure

The gas content measured will be expressed as the equivalent percent methane by volume in air. Monitoring results will clearly state which units the levels are being reported. To monitor methane gas concentration in the probe, the following procedures will be implemented in the following order:

- Turn on the Landtec GA-90 and allow the unit to acclimatize. The unit is purged with fresh air and the zero is checked and adjusted (recalibrated), if necessary.
- Connect the Landtec GA-90 hose to the probe and open the stopcock valve.
- A minimum of 200 percent of the probe and filter pack pore volume should be purged prior to obtaining a reading.
- Monitor the methane gas concentration during and after purging and record the stabilized reading (any fluctuations in the reading are to be noted, and the range of readings should be recorded).
- Measure and record levels of CO<sub>2</sub> and O<sub>2</sub> from the Landtec GA-90.

#### Water Level Measurements

The measurement of water levels in the gas probes is used to determine if the probe is operational (i.e., not flooded) and to assist in the evaluation of methane gas migration potential at the Site.

The water level is measured with standard electronic water level indicators (Solinst meter with narrow gage probe). To measure the water level within the gas probe, the entire stopcock and hose barb assembly must be unthreaded from the male adaptor on the top of the riser pipe. The depth recorded is taken from the top of the riser pipe. Upon completion of the water level measurement, the stopcock and hose barb assembly must be threaded back onto the riser pipe.

The stopcock and hose barb assembly will be replaced and the same procedure will be repeated for the remaining probes.

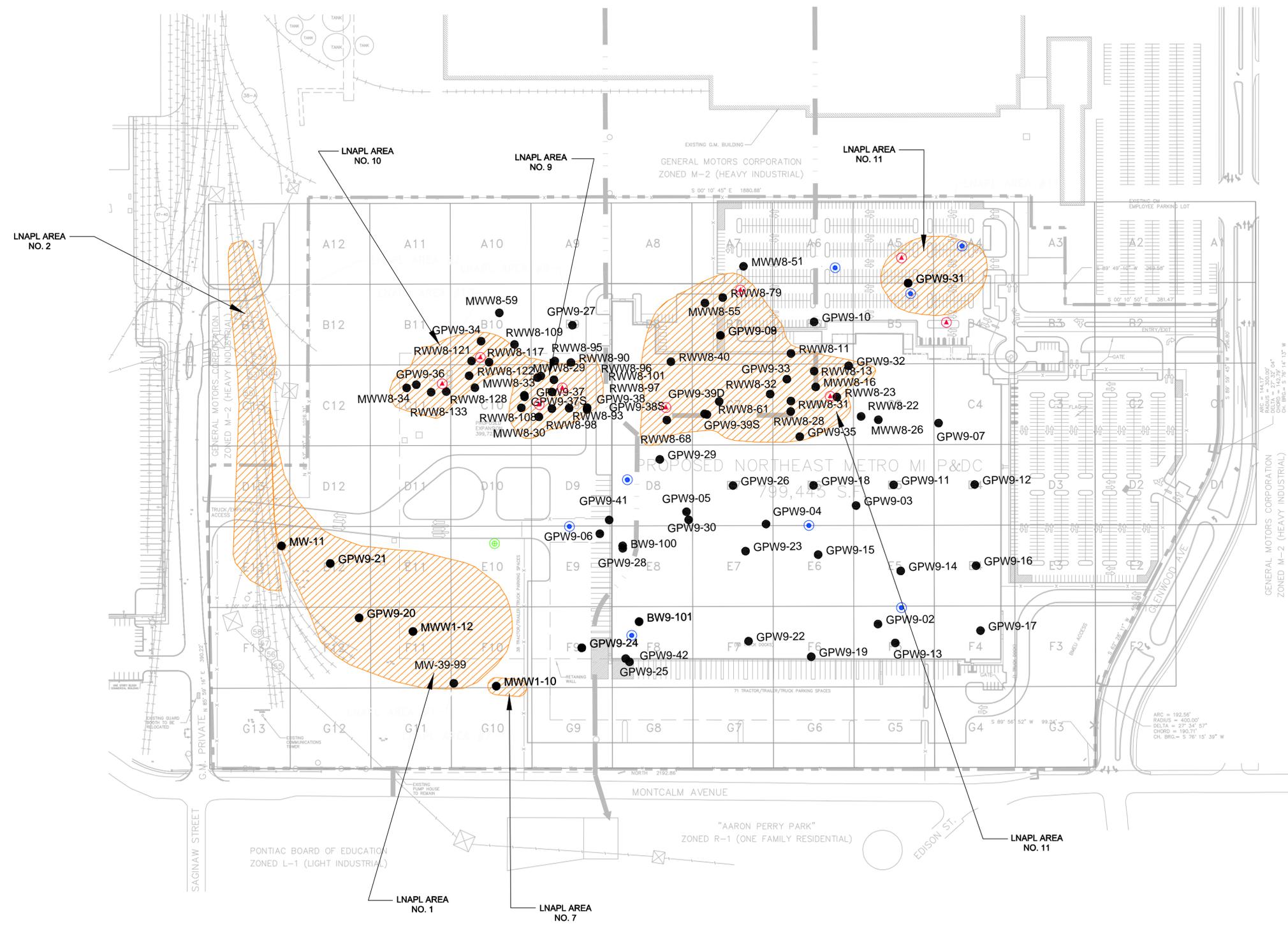
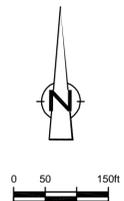
### **EVALUATION**

The results of the investigation will be evaluated and compared to Michigan Department of Environmental Quality (MDEQ) guidelines.

### **SCHEDULE**

The work is proposed to be completed over the Memorial Day weekend, when active construction within the AIR will not be occurring. This work will be initiated with gas probe installations on May 25 and 26, 2006. Methane and pressure will be allowed to accumulate in the wells, and the probes will be monitored on Monday, May 29, 2006, followed by abandonment of the wells.

If you have any questions, please do not hesitate to contact us.



- LEGEND**
- AREA OF INDUSTRIAL REDEVELOPMENT
  - EXISTING BUILDING
  - EXISTING STORM SEWER
  - APPROXIMATE EXTENT OF LNAPL BASED ON DELINEATION COMPLETED TO DATE
  - PROPOSED SHALLOW GAS PROBE
  - PROPOSED DEEP GAS PROBE
  - PROPOSED DEEP/SHALLOW GAS PROBE PAIR
  - PREVIOUSLY INSTALLED GAS PROBE OR GAS MONITORING WELL LOCATION

**SCALE VERIFICATION**  
 THIS BAR MEASURES 1" ON ORIGINAL. ADJUST SCALE ACCORDINGLY.

**GENERAL MOTORS  
 PONTIAC, MICHIGAN  
 PONTIAC NORTH CAMPUS  
 AIR EXPANDED METHANE  
 INVESTIGATION WORK PLAN**



Source Reference:

Project Manager:	Reviewed By:	Date:
		MAY 2006
Scale:	Project N#:	Report N#:
1"=150'	17487-22	MEMO018
		Drawing N#:
		figure 1

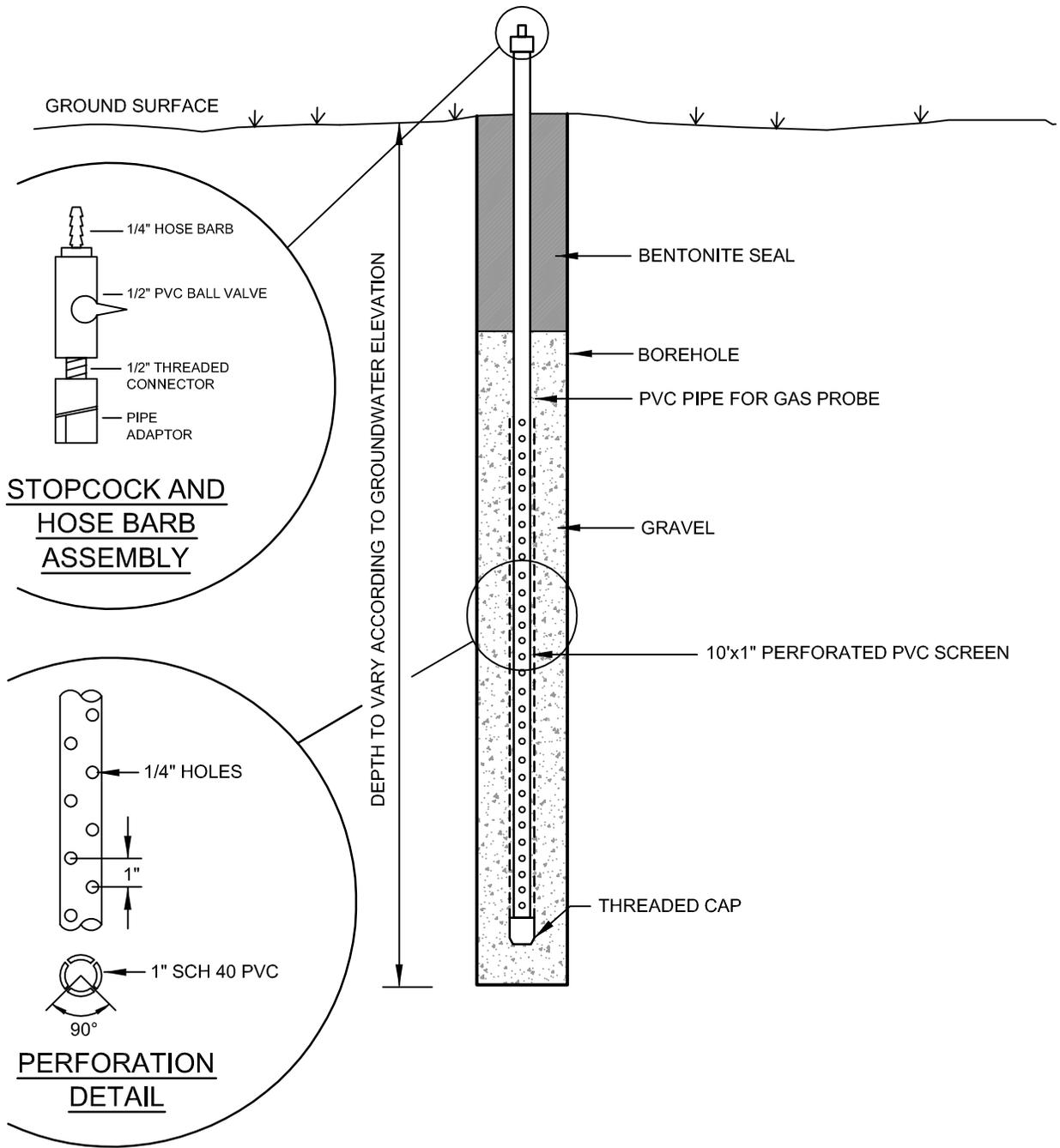


figure 2  
 TYPICAL GAS PROBE  
 AREA OF INDUSTRIAL REDEVELOPMENT  
 PONTIAC NORTH CAMPUS  
*Pontiac, Michigan*