

**SUB-SLAB SOIL VAPOR EXTRACTION SYSTEM
INSTALLATION WORK PLAN**

GLARO, INCORPORATED
735 CALEBS PATH
HAUPPAUGE, NY 11788
NYSDEC SITE # 1-52-124

Prepared for:

Glaro, Incorporated
735 Calebs Path
Hauppauge, NY 11788

Prepared by:

Environmental Assessment & Remediations
225 Atlantic Avenue
Patchogue, NY 11772

TABLE OF CONTENTS

1.0 INTRODUCTION	2
2.0 SITE PREPARATION/MOBILIZATION.....	2
3.0 WELL INSTALLATIONS	2
4.0 SUB-SLAB SOIL VAPOR EXTRACTION SYSTEM.....	3
5.0 TRENCHING & PIPING	4
6.0 SURFACE RESTORATION	5
FIGURES	6
FIGURE 1: SITE MAP	6
FIGURE 2: PROPOSED VAPOR EXTRACTION PIPING TO EQUIPMENT COMPOUNDS	6
FIGURE 3: PROPOSED VAPOR EXTRACTION RADIUS OF INFLUENCE	6
FIGURE 4: PROPOSED VAPOR EXTRACTION WELL CONSTRUCTION	6

1.0 INTRODUCTION

Glaro Inc. was directed by the New York State Department of Environmental Conservation (NYSDEC) to develop and implement a sub-slab soil vapor extraction (SSSVE) system to mitigate potential sub-slab vapor intrusion concerns associated with normal operations conducted at the site. The goal is to achieve sub-slab depressurization (SSD) requirements to effectively improve indoor air quality at the Glaro facility.

The site is located at 735 Calebs Path, Hauppauge, Suffolk County, New York and is situated within a predominantly commercial/industrial area, with residential areas located to the northeast and to the southwest. On the property, there is 1 single-story building, measuring approximately 50,000 square feet, which currently operates as an active manufacturing facility, with commercial offices located within the footprint of the building. A site map has been included as Figure 1.

The site is located atop the Ronkonkoma Moraine, approximately 1 mile southwest of the headwaters of the Nissequogue River. Based on drilling logs generated during well installations throughout the project area, the lithology consists of unconsolidated silt and sand, with occasional gravel. The approximate depth to water at the site is 70 feet below grade surface (bgs), and groundwater flow direction appears to have a northeastern component; based on groundwater elevation data provided by the United States Geological Survey.

This work plan has been prepared in accordance with the results from the communication testing, as well as subsequent site information gathered during site visits. The scope of work at this site will include the construction and installation of a sub-slab soil vapor extraction system along with associated piping and wells.

2.0 SITE PREPARATION/MOBILIZATION

In preparation for the work activities detailed here, EAR personnel have visited the site to determine a practical site plan including sub-slab soil vapor extraction system location and piping layout. These proposed layouts are identified in the site plan provided as Figure 2.

Following NYSDEC approval of the proposed work plan, a private utility locator will be retained to locate and mark any subsurface utilities or structures using both conductive and non-conductive methodologies. A request for public utility mark outs along the right of way (ROW) will be made as well. Once utilities have been located, marked, and reviewed, EAR will conduct an evaluation of the proposed site plan against existing utilities and other below grade features. Based on this evaluation, the locations of the vapor extraction (VE) wells and pipe trenches may be adjusted as necessary to avoid utilities and/or maximize distance from drywells/infiltration drains.

3.0 WELL INSTALLATIONS

After all subsurface utilities/features have been marked, and following approval, EAR will begin installation of the VE wells. Well installations will include an estimated fourteen (14) VE wells around the perimeter of the facility will be required for appropriate coverage. Please refer to Figure 3, VE well locations, including estimated radii of influence. In addition, to reduce the vacuum readings observed during the communication test the well diameters were increased from 2" to 4" wells.

All drilling activities will be overseen by a qualified EAR geologist. The geologist will be responsible for adherence to specifications, measurement and recording of quantities/depths of well construction materials used, logging of lithology, and generation of drill logs. Drilling personnel will accurately measure and mix all bentonite products to minimize air entrainment.

Auger cuttings which do not have evidence contamination (via visual, olfactory, or PID headspace analysis), will be re-used as backfill. Contaminated and surplus auger cuttings will be containerized in USDOT approved 55-gallon drums, properly labeled, and staged onsite for waste characterization testing, transport, and disposal.

The VE wells will be installed using hollow-stem auger drilling techniques. Soil samples shall be collected from the auger flights at a rate of 1 composite sample per 5-feet of advancement. Upon collection, each sample will be logged for lithology and screened for volatile organic compounds with a PID by an on-site geologist. Prior to each use, the PID will be calibrated using a 100 ppm isobutylene standard and ambient air.

Augers capable of providing a minimum 7-inch diameter borehole will be advanced to 17 feet BGS. The VE wells will be constructed of 12 ft of 4-inch diameter SCH 40 0.02" slotted PVC screen and 5 ft of 4-inch diameter SCH40 PVC riser (total well depth = 17 ft). Once installed, #2 well gravel will be added surrounding the PVC screen to a height of 4 ft below grade. A bentonite/grout mixture will be added from 4 ft to 2 ft below grade and native backfill material will fill the rest of the hole from 2 ft to approximately 0.5 ft below grade (see Figure 4). An onsite geologist will confirm the depths using a weighted tape measure. Prior to hydrating the seal, the onsite geologist will measure depth to the bentonite pellets to ensure adherence to specification and confirm that the pellets did not bridge. The bentonite will be hydrated according to the manufacturer's specifications using potable water. Once all VE wells are installed they will be piped back to two system shed locations via 4-inch diameter lateral lines.

4.0 SUB-SLAB SOIL VAPOR EXTRACTION SYSTEM

To effectively improve indoor air quality at the Glaro facility, EAR proposes a sub-slab soil vapor extraction system to prevent migration of fugitive vapors and to remove volatiles from within the vadose zone beneath the Glaro facility. The system shall be housed in two steel sheds, 1 located on North side and 1 on the East side of the facility (see Figure 2). The North system will operate seven (7) VE wells and the East system will operate seven (7) wells. All hardware, equipment, and controls (unless noted otherwise) shall be mounted and plumbed.

The VE system shall operate by inducing a vacuum at extraction wells (utilizing a 10 horsepower (HP), inverter duty rated, regenerative blower (Ametek Rotron DR 858 or approved equal). The vacuum blower will be equipped with a vacuum gauge, vacuum relief valve and a thermal overload relay which will prevent the motor from overheating due to line restrictions. Vacuum will be applied to the VE wells using a regenerative type blower. Each blower will be able to supply a minimum of 448 CFM (approximately 32 CFM per point with an anticipated 42 ft radius of influence). Captured soil vapors shall be transported to the system compound via SCH40 PVC piping. Moisture in the airstream shall be removed at a 55-gallon moisture separator tank prior to reaching the blower.

A 3-inch diameter, SCH40 PVC header pipe will be used to manifold the VE lines. The VE manifold shall be constructed inside the equipment shed. Each well header pipe shall include the following:

- Gate valve to allow for independent adjustments
- Sample port (1/4-inch nipple & ball valve, with 1/8-inch hose barb)

- Vacuum gauge (low pressure diaphragm, -15 – 0 “WC)

Pitot tube/differential pressure gauge (Magnehelic 2000 series or similar) combinations shall provide instant read data for velocity/flow calculations for the combined VE influent and VE exhaust locations. The exhaust stack shall extend through the roof of the shed and terminate above grade the roofline of the Glaro building. The exhaust stack shall be finished with a “tee.” The exhaust “tee” shall be equipped with screen or appropriately sized flapper valves to help reduce rainwater and/or animal intrusion. All VE distribution piping and fittings shall be Schedule 40 PVC. Should nuisance odor issues arise, treatment of the VE exhaust can be accomplished by the use of a granular activated carbon (GAC) vessels prior to discharge to the atmosphere. If treatment is needed, cost, and available space will be evaluated.

Controls/motor starters will be housed in an appropriately sized NEMA 4 panel mounted inside the system shed. Each blower/pump will be equipped with an hour meter, off/hand/auto switch, and status and alarm indicator lights mounted on the exterior door of the control panel. Switches will be spring loaded to ensure system/components are not in “hand” continuously.

Pressure/vacuum switches, flow switches, temperature switches, and float switches, shall initiate alarm conditions as summarized below:

Condition	System Response	Panel Indicator Light	Alarm Notification	Alarm Set Point
Moisture Separator High Liquid Level	sub-slab soil vapor extraction system Shutdown	Yes	Yes	25 gallons
VE Blower Influent Low Air Flow	sub-slab soil vapor extraction system Shutdown	Yes	Yes	20 SCFM (approx.)
VE Blower Effluent High Temperature	sub-slab soil vapor extraction system Shutdown	Yes	Yes	125°F

The system shall be equipped with a Sensaphone® Cell682 cellular auto dialer. This unit provides alarm notifications via phone/voice, email, and text, and can be accessed via web portal for remote monitoring and programming changes. The auto dialer shall be programmed to notify EAR in case of any of the above listed alarm conditions.

5.0 TRENCHING & PIPING

Following well installations EAR will proceed with trenching and piping activities. The proposed trench runs are illustrated in Figure 2. Please note that the proposed pipe layout may be altered based on the locations of utilities or other sub-grade features.

Prior to excavation, EAR will sawcut as necessary along the trench lines. Saw cuts will be made to a depth of approximately 6-inches below grade surface (BGS) using a saw cutter with an appropriately sized, circular blade. Excavated soils will be staged onsite in a designated area(s) and used for backfilling where applicable. To minimize dust and prevent erosion/runoff, any stockpiled soil left onsite overnight will be covered and secured with plastic sheeting. High visibility temporary fencing will be utilized as necessary to delineate the work zone and provide an additional measure of protection for pedestrian and vehicular traffic.

Each sub-slab soil vapor extraction system well will be constructed with a dedicated lateral pipe for air conveyance. All VE line piping will be 4-inch diameter, schedule 40 PVC. Where feasible (as per length of straight piping runs), EAR may use “bell-ended” piping rather than straight pipe & couplings. In all cases, piping will be connected using PVC primer and glue.

The excavation will then be backfilled with the native excavated soils to approximately 6-inches BGS. Trenches through asphalted areas will be finished to grade using Type 4 aggregate. This will be applied in single 6-inch lifts and compacted using a vibratory-plate type compactor. This layer will be dug out (to required depth) by the asphalt subcontractor during installation of bituminous paving. Trenches through grass areas will be finished to grade using a clean top soil. This layer will be adjusted as necessary prior to seeding.

To reduce trenching and restoration the VE piping from the west side and south side of the Glaro building will be advanced above grade or across the rooftop as illustrated in Figure 2. Above grade piping shall be secured to walls and along the rooftop using stainless-steel Kindorf support systems. Bollards will be installed near the subsurface-to-above grade transition point to prevent potential damage to system piping.

6.0 SURFACE RESTORATION

Following trenching & piping activities, an EAR subcontractor will furnish and install bituminous paving within all excavation limits. The paving shall consist of at least 4-inches of base coarse followed by a tack coat and 2-inches of surface coarse. Any traffic and parking marks disturbed by the trenching & piping activities will be repainted as necessary by the subcontractor. An EAR foreman will be onsite to oversee the surface restoration and ensure adherence to the specifications.

Grass areas disturbed by trenching/conduit installation in the front of the property will be restored by EAR to match surrounding conditions using top soil and sod.

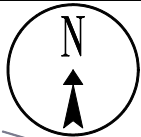
FIGURES

Figure 1: Site Map

Figure 2: Proposed Vapor Extraction Piping to Equipment Compounds

Figure 3: Proposed Vapor Extraction Radius of Influence

Figure 4: Proposed Vapor Extraction Well Construction



Rabro Drive

Power Drive

Office Building

Old Willets Path

Calebs Path

GLARO

0 50 100
SCALE IN FEET



ENVIRONMENTAL
ASSESSMENT &
REMEDIATIONS

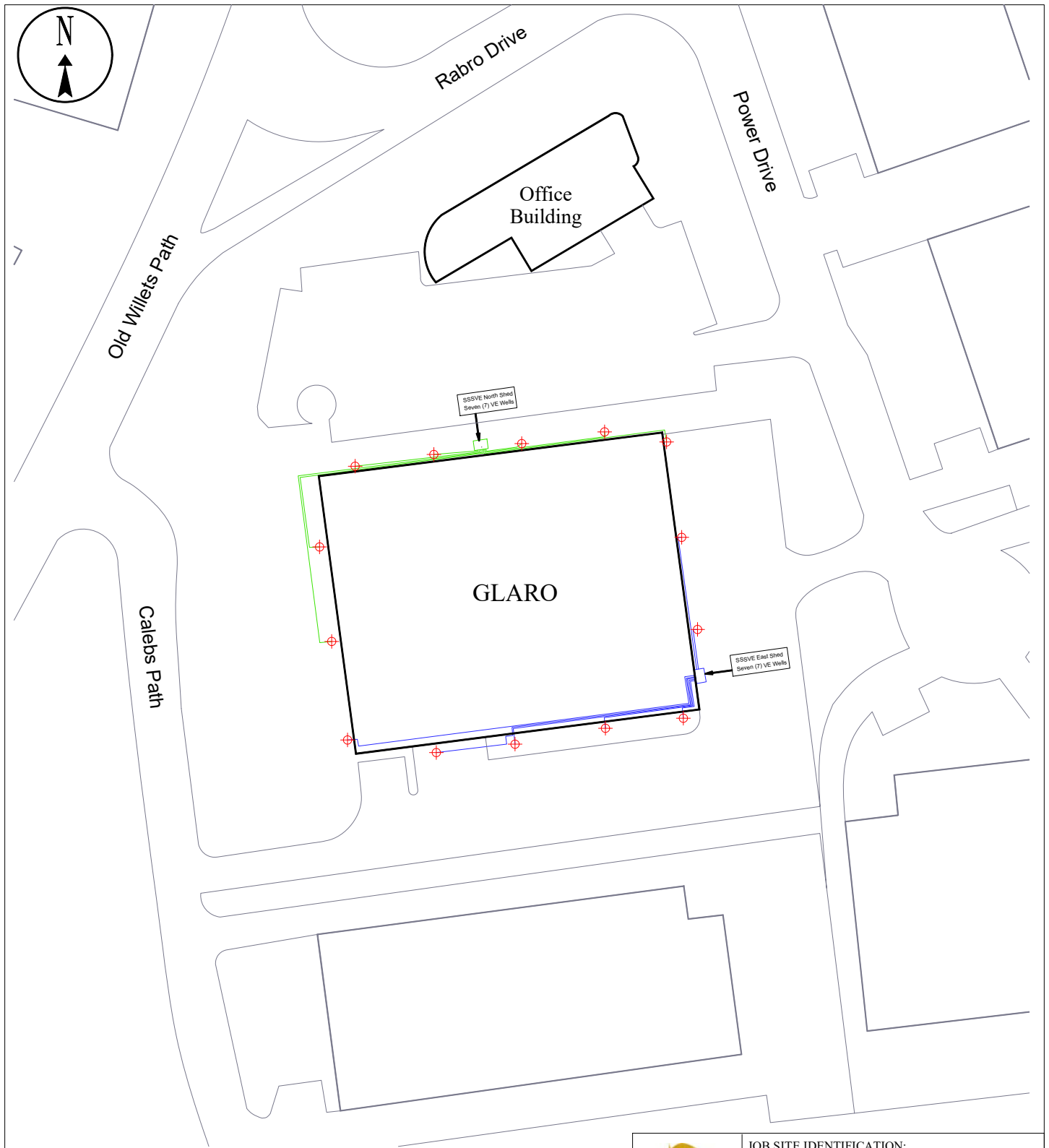
JOB SITE IDENTIFICATION:

Glaro, Inc.
735 Old Willets Path
Hauppauge, New York, 11788
Site ID: 1-52-124

DRAWING IDENTIFICATION:

Site Map

				DESIGNED BY:	D. Cornacchiulo	DATE: 2/9/18
				DRAWN BY:	D. Cornacchiulo	DRAWING NO:
				CHECKED BY:		Figure 1
REVISION:	DESCRIPTION:	DATE:	APPROVED:	APPROVED BY:		REVISION:



0 50 100
SCALE IN FEET

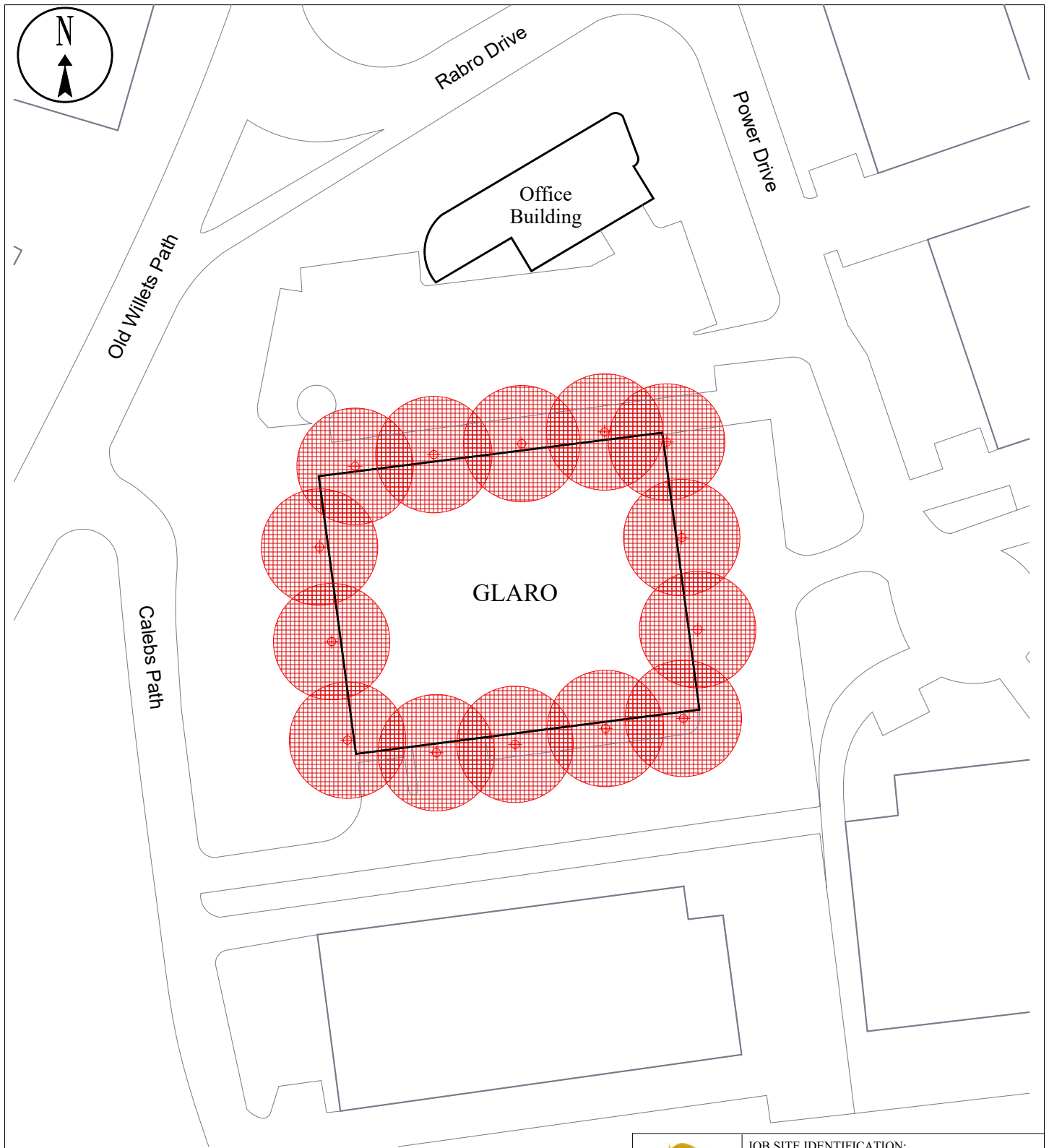
⊕ Vapor Monitoring Point



JOB SITE IDENTIFICATION:
Glaro, Inc.
735 Old Willets Path
Hauppauge, New York, 11788
Site ID: 1-52-124

DRAWING IDENTIFICATION:
Proposed
Vapor Extraction
Piping to Equipment Compounds

				DESIGNED BY:	D. Cornacchiulo	DATE: 2/9/18
				DRAWN BY:	D. Cornacchiulo	DRAWING NO:
				CHECKED BY:		Figure 2
REVISION:	DESCRIPTION:	DATE:	APPROVED:	APPROVED BY:		REVISION:



0 50 100
SCALE IN FEET

⊕ Vapor Monitoring Point



JOB SITE IDENTIFICATION:
Glaro, Inc.
735 Old Willets Path
Hauppauge, New York, 11788
Site ID: 1-52-124

DRAWING IDENTIFICATION:
Proposed
Vapor Extraction
Radius of Influence

				DESIGNED BY:	D. Cornacchiulo	DATE: 2/9/18
				DRAWN BY:	D. Cornacchiulo	DRAWING NO:
				CHECKED BY:		Figure 3
REVISION:	DESCRIPTION:	DATE:	APPROVED:	APPROVED BY:		REVISION:

Grade

5' x 4" PVC Riser

12' x 4", 0.02" Slot
PVC Well Screen

Native Soil (0.5'-2' BGS)

Bentonite/Grout Mix (2'-4' BGS)

#2 Gravel Pack (4'-17' BGS)

Bentonite/Grout Mix

Native/Fill Material

Gravel/Sand

EOB 17' BGS

NOT TO SCALE



JOB SITE IDENTIFICATION:
Glaro, Inc.
735 Old Willets Path
Hauppauge, New York, 11788
Site ID: 1-52-124

DRAWING IDENTIFICATION:
Proposed
Vapor Extraction
Well Construction

DESIGNED BY:	D. Cornacchiulo	DATE: 2/9/18
DRAWN BY:	D. Cornacchiulo	DRAWING NO:
CHECKED BY:		Figure 4
APPROVED BY:		REVISION: