



January 10, 2014

Mr. John E. Okesson  
Environmental Engineering Technician 3  
New York State Department of Environmental Conservation – Region 7  
1679 NY Route 11  
Kirkwood, NY 13795

Re: Spill Closure Report  
Former Dover Electronics Site, Kirkwood, Broome County, New York  
NYSDEC Site No. 7-04-026  
Spill 1309286 – Pin # H1522 – Sodium Permanganate

Dear Mr. Okesson,

On behalf of Dover Corporation (Dover), Verina Engineering, P.C. (VERINA) has prepared this Spill Closure Report to summarize the site inspections, investigations and actions taken to respond to permanganate solution release into the storm water collection system near the Pilot Truck Stop area. The Pilot Truck Stop area is located south of the former Dover Electronics site in Kirkwood, Broome County, New York.

## **Background**

The former Dover Electronics site (the Site) is located at 29 Industrial Park Drive, Kirkwood, Broome County, New York. The Site is located on approximately 9.58 acres in an industrial setting and consists of an industrial building with associated parking areas. The Site is presently occupied by Modern Marketing Concepts, Inc. (MMC). A regional site location map and a site plan are shown respectively in Figures 1 and 2.

The Site is a New York State Department of Environmental Conservation (NYSDEC) class 2 inactive hazardous waste disposal site (Site No. 7-04-026). The Site is currently under active groundwater remediation using in situ chemical oxidation (ISCO) to remediate the residual chlorinated VOCs in the groundwater plume. The full-scale ISCO groundwater remedy was initiated in November 2011 and consists of the injection of a diluted solution of sodium permanganate (5% to 10% by weight) via a gravity-injection system in the source area along with manual injection down-gradient of the source area. A groundwater monitoring program is also implemented to monitor the performance of the ISCO system and the progress of groundwater remediation.

## **Spill Investigation and Surface Water Monitoring**

At approximately 8:00 A.M. on Friday, December 20, 2013, VERINA was notified by the MMC facility manager of the presence of the permanganate solution in the storm water drainage near the Pilot Truck Stop site (currently occupied by Love's Travel Stops and Wendy's). NYSDEC was on site later of the day on December 20, 2013. At this time, the main distribution gate valve



from the ISCO aboveground storage tank (AST) was shut-off to discontinue the injection of permanganate solution into the injection pipes and wells.

VERINA personnel were on site between Saturday, December 21, 2013 through Monday, December 23, 2013 to investigate to this incident and implement corrective actions. Based on the AST/piping/well system configuration and observations during site visits, there was neither overflow from the AST secondary containment, nor any leak occurring from the AST once the discharge line of the AST was shut off on December 20, 2013. Based on all other observations it is concluded that the release of the permanganate solution is related to either an overflow of the injection wells under the gravity flow condition or a break in the injection distribution pipes.

VERINA also inspected two drainage culverts (Pilot Truck Stop Area Discharge #1 – 4, shown on Figure 3) located on the western side of the Pilot Truck Stop property and observed purple coloring presented at the locations close to Pilot Truck Stop Area discharge #1 through #3. This purple coloring was indicative of the presence of the permanganate solution within each culvert.

On December 23 and 27, 2013, VERINA inspected all storm water catch basins located at the Site to confirm if other storm water collection locations were impacted by the permanganate release. It has been concluded that catch basin CB-1537 and the down-gradient storm water collection network is the only portion of the system impacted.

On December 26 and 27, 2013, nine surface water monitoring locations were established along the storm water drainage route down-gradient to the CB-1537 outfall. Each monitoring location was visually inspected and surface water samples were collected for analyses of pH and oxidation-reduction potential (ORP) using a calibrated YSI Model 600XL portable water quality field meter and for field measurement of permanganate concentrations using a Hach DR 890 colorimeter. The field parameter readings at each location were presented on Figure 3.

Detected permanganate concentrations from the nine monitoring points ranged from 0% to 0.03% or 300 milligram per liter (mg/L), with the 0.03% permanganate concentration being detected from the CB-1537 outfall location. The permanganate concentrations were detected at much lower levels (<0.0024% or 24 mg/L) down-gradient from CB-1537 outfall location to the background condition, e.g. 0.4 mg/L at CB-1456 Outfall or 0.3 mg/L at Conklin Kirkwood Road Outfall.

Elevated ORP readings were found correlated with permanganate concentrations, where those locations with elevated ORP readings also exhibited elevated permanganate concentrations. pH was found to be neutral and in the range of background conditions at all locations.

The field parameter data demonstrated impacts to the storm water drainage down-gradient of the storm water catch basin CB-1537 outfall. However, this change dissipated at Conklin Kirkwood Road outfall and Route 11 outfall suggesting the natural conditions have not been affected beyond these locations.

### **Interim Spill Control Actions**

Interim spill control actions were implemented at the site beginning on December 21, 2013. VERINA initiated the clean-up of the secondary containment basin of the AST as well as storm



water catch basin CB-1537. All fluids were in the second containment of the AST were pumped from the containment basin back to the AST. The secondary containment basin was then flushed with tap water and sprayed with neutralizing solution (30 parts water: 40 parts white vinegar: 30 parts 3% hydrogen peroxide). The secondary containment basin was cleaned up on December 21 through December 23, 2013 and was continuously monitored. On December 23, between 2 to 3 p.m., portable water was introduced to the impacted catch basin CB-1537. The hydrant flow was approximately 75 to 100 gallon per minute, and was used for one hour. Although the discoloration lessened at the CB-1537 outfall, it was not able to be completely flushed clear.

In the afternoon on December 23, 2013, protective safety fences were installed by Op-Tec Environmental Services of East Syracuse, New York, along the perimeters of the two drainage culvert areas to limit potential exposure of permanganate solution to public.

Permanganate solution at all five injection wells on site (IJ-7, IJ-2, IJ-8, IJ-3, and IJ-9) were measured on December 26, 2013. Permanganate solution was then pumped out from injection wells IJ-8 and IJ-9, where the depth to the solution from the top of well inner casing was less than 0.5 feet below top of well casing (ft, btwc). These levels were reduced until the solution level in each well was below 30 ft, btwc. The permanganate solution was also found to have accumulated in the well vaults of these two injection wells and was also pumped out using a peristaltic pump. A total of approximately 100 gallons of permanganate solution was recovered during these processes on December 26, 2013 and was temporarily stored on-site in a 150-gallon polyethylene tank.

A 3,000-gallon vacuum truck from Sun Environmental Corp. (SEC) of Liverpool, New York arrived on site on December 27, 2013. Dark purple solutions at CB-1537 outfall and accumulated solutions in injection vaults (IJ-7, IJ-2, IJ-8, IJ-3, and IJ-9) have been recovered on December 27 with a vacuum truck for off-site disposal or potential future reuse in the groundwater remediation. Upon completion, the vacuum truck was moved to the Pilot Stop Area to vacuum the water from the area near Pilot Trucking Area Discharge #1 until the truck tank was full. About 3,000 gallons of liquids were recovered on December 27, 2013.

### **Final Spill Response Actions**

From December 28 to 30, 2013, with the concurrence of NYSDEC, the piping trench area was excavated to contain residual permanganate solution before seeping into the catch basin CB-1537. The excavated piping trench is located between catch basin CB-1537 and injection well IJ-9 (Figure 4).

The majority of the permanganate impacted soils were bedding materials used in the original backfilling of the injection piping trench. During the excavation, permanganate solution was observed to be seeping into the trench from the sidewalls of the excavation. The discoloration was evident in the sand bedding of the ISCO distribution piping and the asphalt sub-base of the parking lot.

The excavation work was completed on Monday, December 30, 2013. The final dimensions of the excavated area were 2.5 feet wide in the middle and 4 feet wide at the two ends by 72 feet long, with an approximate depth of 3 to 4 feet below grade (ft, bg). Approximately 30 cubic yards of soils were excavated. The excavated soils were stored on site in three 20-cubic yard



roll off boxes. The open trench was protected from vehicular and pedestrian traffic by temporary chain link fencing erected at the end of each day.

On December 31, 2013, SEC excavated additional soils for the installation of a dry well north to the catch basin CB-1537 in order to recover any remaining permanganate solution in the subsurface and to prevent it from entering into the storm water catch basin CB-1537. The excavation was completed to 8 ft, bg. Approximately 10 cubic yards of soils were excavated and stored in the on-site roll off boxes. A perforated corrugated 12" pipe was installed vertically to allow a submersible pump or other extraction devices to be lowered to depth and remove any accumulated permanganate solution. The 12" well was backfilled with clean #2 stone up to 4.5 ft below grade.

Upon completion of the dry well installation, SEC vacuumed any pooling permanganate solution from the trench bottom as well as from the four injection well vaults (IJ-2, IJ-8, IJ-3 and IJ-9), catch basin CB1537 and excavated sump area adjacent to CB1537 and stored the recovered solution in an onsite 6,000-gallon frac tank supplied by Adler Tank Rentals. Until the accumulated permanganate solutions to be vacuumed, the trench was treated with neutralizing solution on December 31, 2013 and subsequently backfilled. Prior to backfilling, all 1inch HDPE permanganate supply lines were cut and removed from the trench. The cut ends were plugged/capped with 1inch PVC fittings. After a steel collar with steel lid was placed over top of the 12" dry well, the trench and area around the dry well were backfilled completely to grade.

The trench was refilled with the previously excavated top soil, which did not exhibit any signs of a presence of permanganate impact and  $\frac{3}{4}$ " clean crushed stone provided by Gorick Construction of Binghamton, New York. Approximately 70% of the backfilling was completed on December 31, 2013. Material was backfilled and compacted using a jumping jack compactor starting from the farthest well (IJ-9) and working towards the catch basin CB-1537. All backfilling was completed on January 2, 2014.

VERINA personnel checked the level of the permanganate liquid in the dry well on January 1, 2014. Approximate 2.5 ft of the permanganate solution was accumulated in the dry well between 5:00 pm Dec. 31, 2013 and 1:30 pm Jan. 1, 2014. On January 2, 2014, additional 0.5 ft of permanganate impacted water accumulated in the sump. The purple permanganate liquid was pumped to the nearest two injection wells IJ-2 and IJ-8. The water level in the closest well was 29' 4" bg, before filling with the collected sump water. After two wells were filled to approximately 4 ft, bg, the remaining impacted sump water was pumped to the onsite frac tank. Approximately 115 gallons were pumped from the sump to the frac tank.

On January 2 and 3, 2014, any accumulated permanganate liquid was continuously recovered until dry. At the end of January 3, less than half a foot of clear water was observed at the bottom of the dry well. The solution accumulated in the dry well will be monitored and pumped on a periodic basis until the permanganate concentration is less than 0.01% to eliminate any downstream impact.

### **Post-Action Surface Water Monitoring**

To monitor the effectiveness of the spill response actions undertaken, VERINA performed surface water monitoring at the established nine monitoring locations on January 9, 2014. VERINA personnel noticed that the CB-1537 Outfall monitoring location is the only location



exhibiting a light purple color, which was much lighter than the dark purple color observed in December 2013. Additionally, ORP readings and permanganate concentrations dropped at all surface water monitoring areas down-gradient of the catch basin CB-1537 outfall. Based on the data collected from this surface water monitoring event, it is concluded that the spill response actions undertaken have been effectively eliminating further release of the permanganate solution to the storm water drainage.

Through the activities to date, a total of 6,820 gallons of permanganate solution were recovered, including 2,500 gallons stored into the ISCO AST tank and disposed of 4,320 gallons off-site. A total of approximately 40 cubic yards of permanganate stained soils were excavated and will be properly disposed of off-site.

VERINA will continue the surface water monitoring on monthly basis and pump-out, if necessary, until the permanganate concentrations in the dry well and catch basin CB-1537 outfall are less than 0.01% or the color changes to light pink or clear. The results of the surface water monitoring will be communicated with NYSDEC in a timely manner.

Based upon the response actions undertaken and the subsequent surface water monitoring results, VERINA requests NYSDEC consideration to close out this spill case.

Please let me know if you have any questions or need additional information.

Very truly yours,

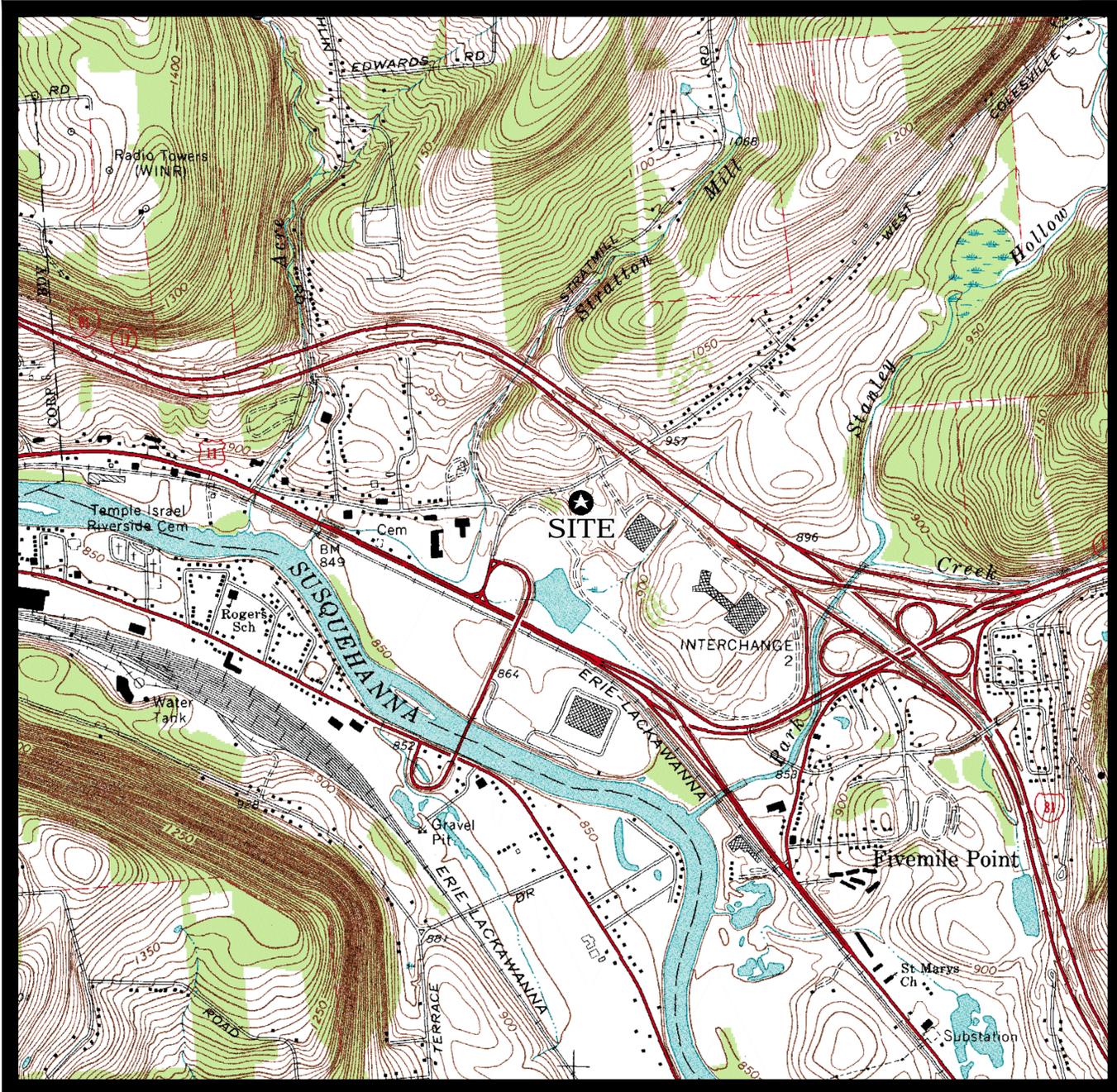
**VERINA ENGINEERING, P.C.**

A handwritten signature in blue ink, appearing to read "D. Robert Gan", written over a light blue circular stamp.

D. Robert Gan, Ph.D., P.E.  
President

#### Attachments

- Figure 1 – Regional Location Map
- Figure 2 – Site Map with Monitoring Well Locations
- Figure 3 – Surface Water Monitoring Locations
- Figure 4 – Approximate Location and Extent of Excavation



BINGHAMTON EAST QUADRANGLE  
7.5-MINUTE SERIES



REGIONAL LOCATION MAP

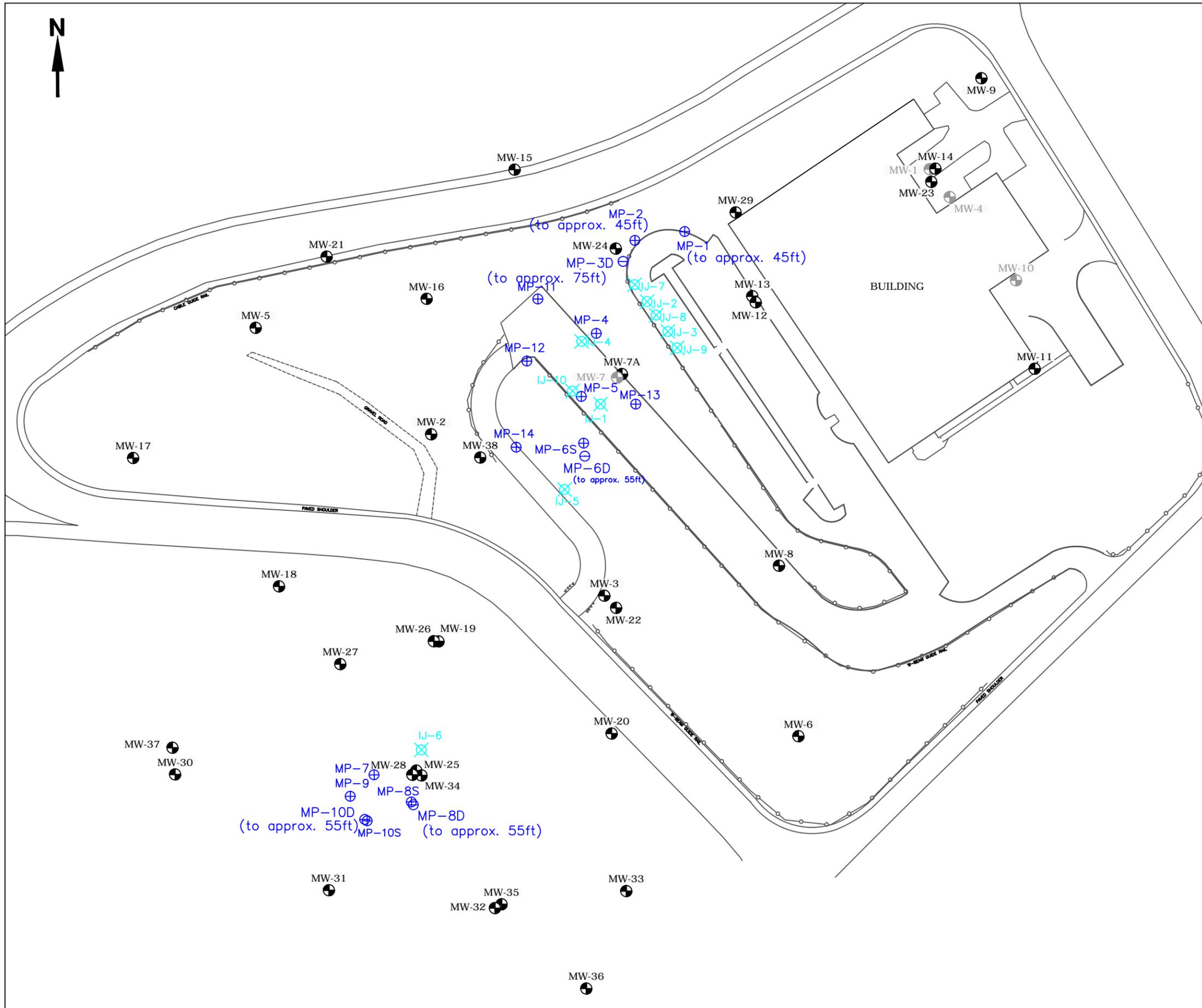
FORMER DOVER ELECTRONICS FACILITY – KIRKWOOD, NEW YORK

Prepared By: CMS/TY

Date: JANUARY 2014

Project No: 5101.0002

Figure: 1



**EXPLANATION**

- MW-2 DESIGNATION AND APPROXIMATE LOCATION OF MONITORING WELL
- MW-1 DESIGNATION AND APPROXIMATE LOCATION OF ABANDONED MONITORING WELL
- MP-1 DESIGNATION AND APPROXIMATE LOCATION OF 1" DIAMETER SHALLOW MONITORING POINT TO 25' UNLESS OTHERWISE INDICATED
- MP-6D DESIGNATION AND APPROXIMATE LOCATION OF 1" DIAMETER DEEP MONITORING POINT TO INDICATED DEPTH
- IJ-1 INJECTION WELL

SOURCE:  
 SITE MAP AND FEATURES OBTAINED FROM  
 BOUNDARY AND TOPOGRAPHIC SURVEY UNIVERSAL  
 INSTRUMENTS CORPORATION 29 INDUSTRIAL PARK  
 DRIVE TOWN OF KIRKWOOD BROOME COUNTY  
 NEW YORK STATE PREPARED BY HAWK ENGINEERING  
 OF BINGHAMTON, NEW YORK  
 OCTOBER 7, 1996



**SITE MAP WITH  
MONITORING WELL LOCATIONS**

FORMER DOVER ELECTRONICS FACILITY – KIRKWOOD, NEW YORK

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Figure: 2

**WEST PROPERTY LINE OUTFALL**

| Date               | 12/26/2013   | 1/9/2014 |
|--------------------|--------------|----------|
| Visual Observation | Light Purple | Clear    |
| pH                 | 7.47         | 7.49     |
| Orp                | 645.0        | 220.1    |
| MnO4- (mg/L)       | 24           | 0.1      |

**CB-1537 OUTFALL**

| Date               | 12/27/2013 | 1/9/2014          |
|--------------------|------------|-------------------|
| Visual Observation | Purple     | Pink/Light Purple |
| pH                 | 7.03       | 7.95              |
| Orp                | 682.9      | 512.4             |
| MnO4- (mg/L)       | 300        | 7.3               |

**CB-1547 OUTFALL**

| Date               | 12/27/2013 | 1/9/2014 |
|--------------------|------------|----------|
| Visual Observation | Clear      | Clear    |
| pH                 | 7.35       | 7.34     |
| Orp                | 234.4      | 244.2    |
| MnO4- (mg/L)       | 0.7        | 0.3      |

**PILOT TRUCKING AREA DISCHARGE #1**

| Date               | 12/26/2013   | 12/30/2013  | 1/9/2014 |
|--------------------|--------------|-------------|----------|
| Visual Observation | Light Purple | Medium Pink | Clear    |
| pH                 | 7.30         | 6.88        | 7.28     |
| Orp                | 596.0        | 575.5       | 217.9    |
| MnO4- (mg/L)       | 2.7          | 0.3         | 0.0      |

**PILOT TRUCKING AREA DISCHARGE #2**

| Date               | 12/26/2013   | 12/30/2013  | 1/9/2014 |
|--------------------|--------------|-------------|----------|
| Visual Observation | Light Purple | Medium Pink | Clear    |
| pH                 | 7.69         | 7.28        | 7.39     |
| Orp                | 548.7        | 560.9       | 204.8    |
| MnO4- (mg/L)       | 3.2          | 0.3         | 0.0      |

**PILOT TRUCKING AREA DISCHARGE #3**

| Date               | 12/26/2013 | 12/30/2013 | 1/9/2014 |
|--------------------|------------|------------|----------|
| Visual Observation | Pink       | Light Pink | Clear    |
| pH                 | 7.96       | 7.54       | 8.04     |
| Orp                | 545.3      | 548.3      | 194.6    |
| MnO4- (mg/L)       | 2.2        | 0.4        | 0.0      |

**PILOT TRUCKING AREA DISCHARGE #4**

| Date               | 12/26/2013          | 12/30/2013 | 1/9/2014             |
|--------------------|---------------------|------------|----------------------|
| Visual Observation | Turbid, Light Brown | Light Pink | Clear/Some Turbidity |
| pH                 | 7.46                | 7.44       | 7.87                 |
| Orp                | 542.7               | 561        | 200.2                |
| MnO4- (mg/L)       | 1.1                 | 0.3        | 0.0                  |

**CONKLIN KIRKWOOD RD OUTFALL**

| Date               | 12/27/2013 | 12/30/2013 | 1/9/2014     |
|--------------------|------------|------------|--------------|
| Visual Observation | Clear      | Clear      | Clear/Turbid |
| pH                 | 6.96       | 6.63       | 7.25         |
| Orp                | 224.6      | 232.9      | 220.3        |
| MnO4- (mg/L)       | 0.3        | 0.7        | 1.2*         |

**ROUTE 11 OUTFALL**

| Date               | 12/27/2013 | 12/30/2013 | 1/9/2014 |
|--------------------|------------|------------|----------|
| Visual Observation | Clear      | Clear      | Clear    |
| pH                 | 7.38       | 6.75       | 7.66     |
| Orp                | 216.7      | 222.7      | 185.9    |
| MnO4- (mg/L)       | 0.0        | 0.1        | 0.0      |

**NOTES:**

- 1) PERMANGANATE CONCENTRATIONS WERE FIELD MEASUREMENTS VIA HACH 890 COLORIMETER.
- 2) \* = SAMPLE WAS STILL TURBID AFTER FILTERING AND MAY BE A FALSE POSITIVE.



**SURFACE WATER MONITORING LOCATIONS**

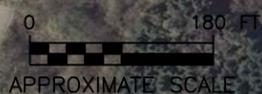
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Prepared By: CMS/TY

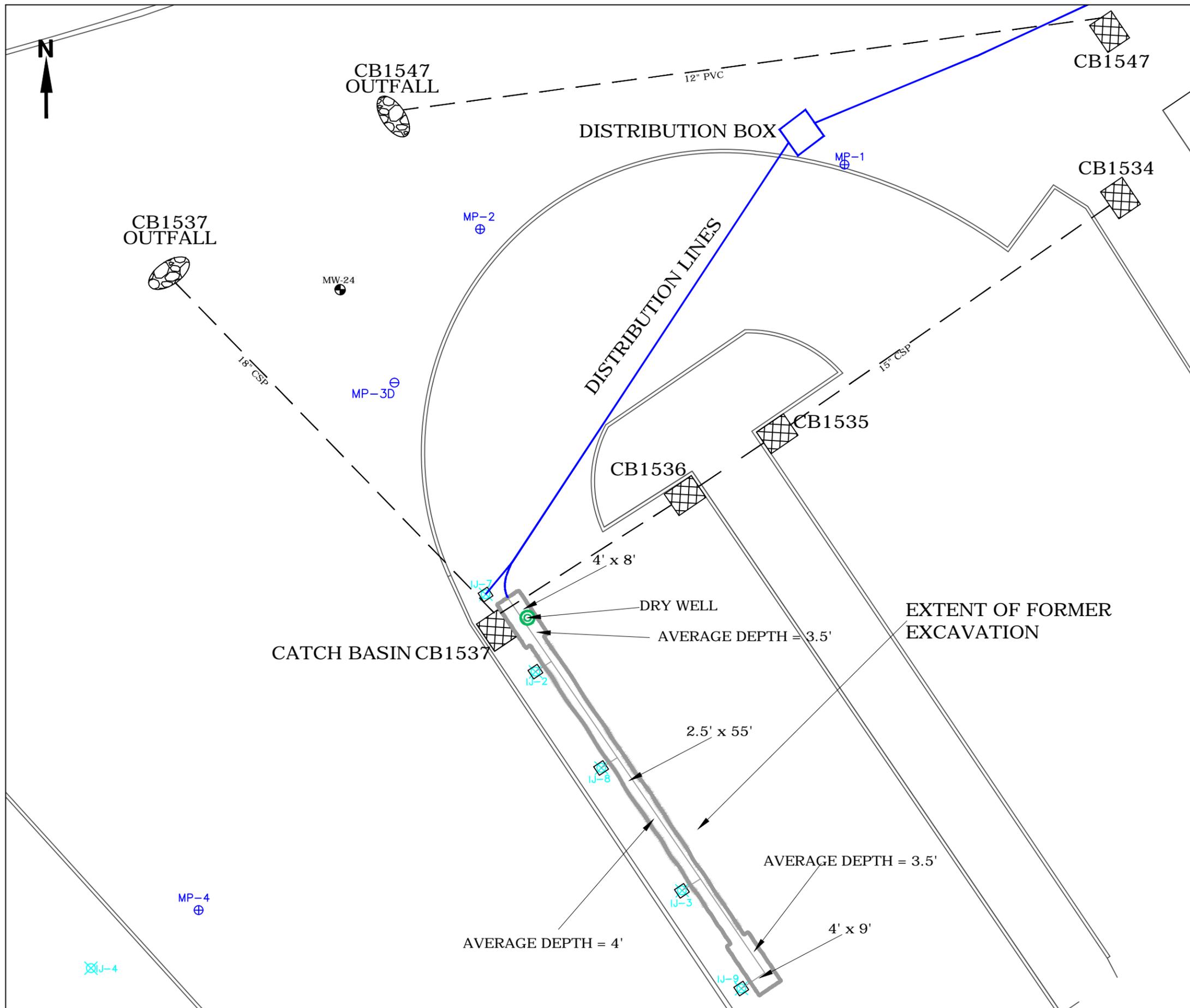
Date: JANUARY 2014

Project No: 5101.0002

Figure: 3

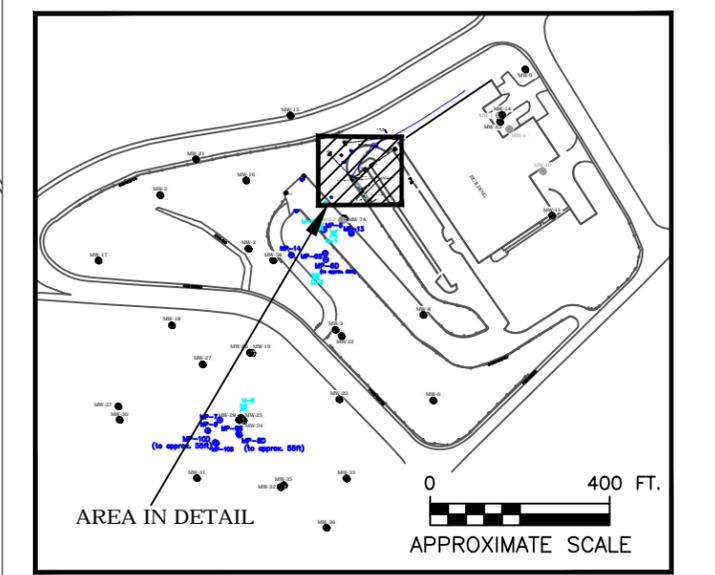


APPROXIMATE SCALE



**EXPLANATION**

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APPROXIMATE LOCATION AND EXTENT OF EXCAVATION

FORMER DOVER ELECTRONICS FACILITY – KIRKWOOD, NEW YORK

Prepared By: CMS/TY      Date: JANUARY 2014

Project No: 5101.0002      Figure: 4