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May 19, 2010

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DER/HAZ. WASTE REMED
REGION 8

Mr. Gary Bonarski
Division of Environmental Remediation
New York State Department of Environmental Conservation Region 8
6274 East Avon - Lima Road
Avon, NY 14414

Re: 124 Victory Highway, Painted Post, NY
IRM Report Addendum

Dear Mr. Bonarski:

This letter is to serve as an addendum to the March 11, 2010 Interim Remedial Measure (IRM) Report prepared by The Palmerton Group, LLC (Palmerton Group) for the site at 124 Victory Highway, Painted Post, NY ("site"). In the New York State Department of Environmental Conservation (NYSDEC)-approved Site Characterization Report (SCR) for the site, dated August 2009, Palmerton Group recommended that groundwater sampling be performed six months following the IRM to "verify that volatile organic compounds (VOCs) are reduced to acceptable levels".

In completing the IRM for the site between September 21 and September 24, 2009, monitoring wells MW-1 and MW-5 were removed along with the excavation of approximately 60 cubic yards of soil. MW-5 was the only monitoring well with detected concentrations of VOCs exceeding NYSDEC Groundwater Standards during the Site Characterization Investigation (specifically benzene and 1,2-dichlorobenzene), as noted in Figure 11 of the Site Characterization Report. Also, the former UST excavation confirmatory analytical results from the floor and wall samples gathered away from the building structure during the IRM, met NYSDEC 6 NYCRR Part 375 Soil Cleanup Objectives - Unrestricted Use (see figure 7 of the IRM Report). Analytical results of soil samples collected from borings SB-2, SB-3, and SB-4, physically located between the three monitoring wells on the site and the UST excavation, were also determined to be in compliance with NYSDEC 6 NYCRR Part 375 Soil Cleanup Objectives – Unrestricted Use (Figure 8 of the Site Characterization Report). Copies of the above-referenced figures are attached to this letter. Based on this information, the Palmerton Group is requesting that requirements for any further groundwater sampling and analyses be waived.

Additionally, Palmerton Group proposes to decommission the three remaining groundwater monitoring wells, MW-2, MW-3 and MW-4, which did not have detected concentrations of VOCs above NYSDEC Groundwater Standards. The monitoring wells will be decommissioned in accordance with attached sections 2.3, 6.1, 6.4 and 7.0 of the CP-43 NYSDEC Groundwater Monitoring Well Decommissioning Policy ("policy'). A backhoe or mini-excavator will be used to pull the two-inch diameter polyvinyl chloride (PVC) well casing and curb box out of the ground.

Once the well has been pulled off the bottom, a tremie pipe will be inserted in the well to puncture the bottom of the well. The tremie pipe will then be used to deliver grout (as described in section 6.1 of the policy) into the well, filling the well from the bottom as the well casing is removed, to within one to two feet of the surface. The upper one to two feet of the void left by the removed monitoring well will be backfilled with site soil.

The groundwater monitoring well decommissioning will be observed by Palmerton Group. Monitoring well decommissioning observations will be recorded on Figure 1 and 3 from the policy. In the event that a well casing cannot be removed, it will be grouted in place per section 2.1 of the policy.

The soil borings, monitoring wells and former UST excavation soil sample analyses, found in the various documents prepared for the site, indicate that VOCs are not anticipated to be present in the sub-grade soils. In addition, Community Air Monitoring Programs (CAMP) conducted at the site during past subsurface excavation activities have not recorded continuously elevated VOC concentrations. Results of the CAMP are included in Table 1. As such, we are requesting that monitoring well head space screening with a photoionization detector (PID) and performance of a CAMP also be waived.

**Table 1**
CAMP Observations
September 8, 2008

| Time of Reading | Observed PID Concentration (parts per million) |
|---|---|
| 11:00 | 0.0 |
| 12:35 | 0.0 |
| 14:30 | 0.0 |

With approval from NYSDEC, Palmerton Group proposes to perform the monitoring well decommissioning within seven to 10 days of acceptance of this addendum followed by a summary letter of the decommissioning work.

This work will be completed in anticipation of a subsequent decision of No Further Action, effectively closing the site per the Order on Consent, Index # B8-0736-07-01.

Please contact me with any questions.

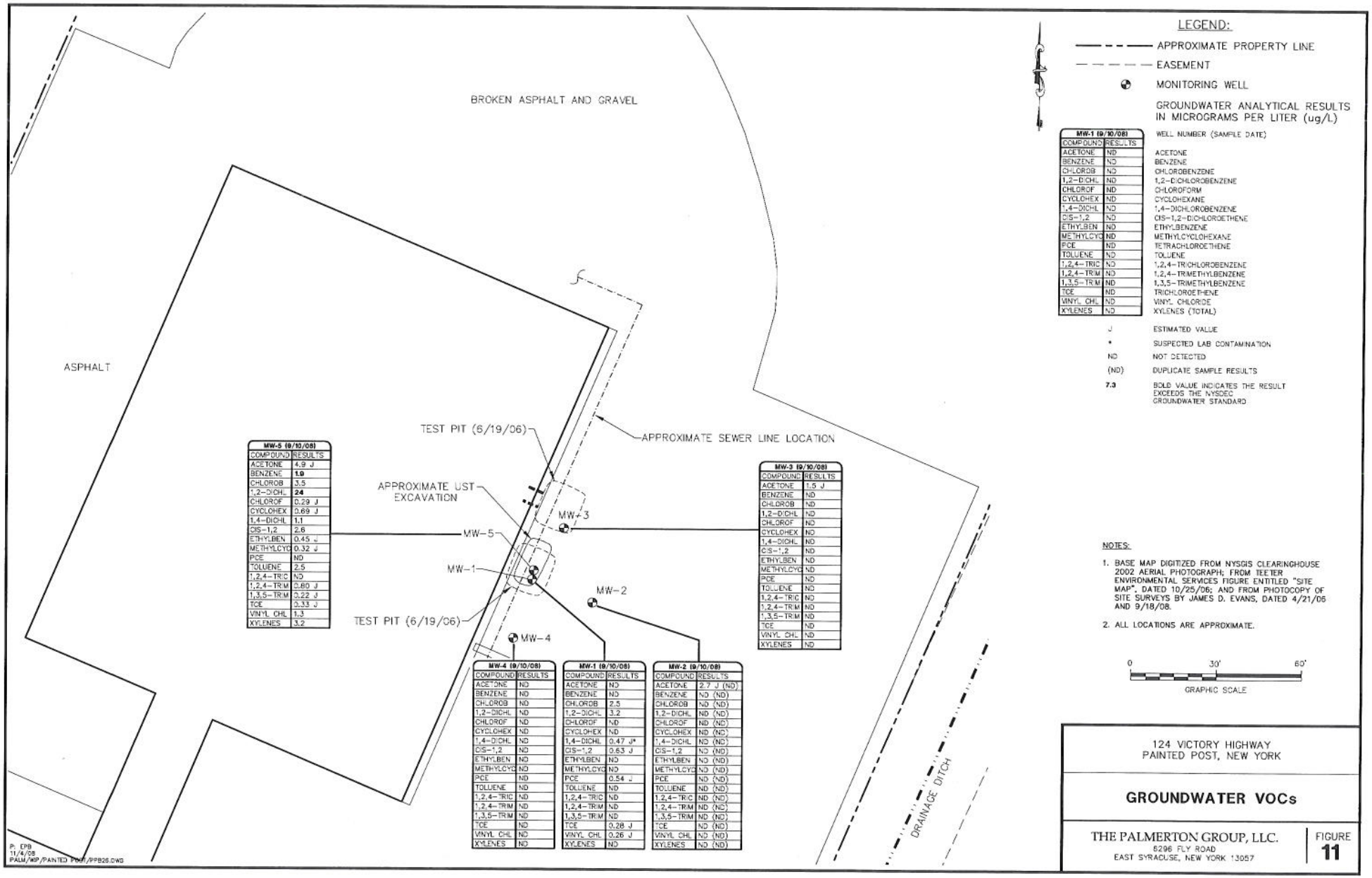
Sincerely,

Matthew Hoskins
Geologist

Enclosures

cc: Katherine Comerford, NYSDOH
Tim Birnie, T&K Realty
Richard Capozza, Esq., Hiscock & Barclay
John Jadhon, Esq., Hiscock & Barclay

# FIGURES




| MW-5 (9/10/08) | |
|---|---|
| COMPOUND | RESULTS |
| ACETONE | 4.9 J |
| BENZENE | **1.9** |
| CHLOROB | 3.5 |
| 1,2-DICHL | **24** |
| CHLOROF | 0.29 J |
| CYCLOHEX | 0.69 J |
| 1,4-DICHL | 1.1 |
| CIS-1,2 | 2.8 |
| ETHYLBEN | 0.45 J |
| METHYLCYC | 0.32 J |
| PCE | ND |
| TOLUENE | 2.5 |
| 1,2,4-TRIC | ND |
| 1,2,4-TRIM | 0.80 J |
| 1,3,5-TRIM | 0.22 J |
| TCE | 0.33 J |
| VINYL CHL | 1.3 |
| XYLENES | 3.2 |

| MW-3 (9/10/08) | |
|---|---|
| COMPOUND | RESULTS |
| ACETONE | 1.5 J |
| BENZENE | ND |
| CHLOROB | ND |
| 1,2-DICHL | ND |
| CHLOROF | ND |
| CYCLOHEX | ND |
| 1,4-DICHL | ND |
| CIS-1,2 | ND |
| ETHYLBEN | ND |
| METHYLCYC | ND |
| PCE | ND |
| TOLUENE | ND |
| 1,2,4-TRIC | ND |
| 1,2,4-TRIM | ND |
| 1,3,5-TRIM | ND |
| TCE | ND |
| VINYL CHL | ND |
| XYLENES | ND |

| MW-4 (9/10/08) | |
|---|---|
| COMPOUND | RESULTS |
| ACETONE | ND |
| BENZENE | ND |
| CHLOROB | ND |
| 1,2-DICHL | ND |
| CHLOROF | ND |
| CYCLOHEX | ND |
| 1,4-DICHL | ND |
| CIS-1,2 | ND |
| ETHYLBEN | ND |
| METHYLCYC | ND |
| PCE | ND |
| TOLUENE | ND |
| 1,2,4-TRIC | ND |
| 1,2,4-TRIM | ND |
| 1,3,5-TRIM | ND |
| TCE | ND |
| VINYL CHL | ND |
| XYLENES | ND |

| MW-1 (9/10/08) | |
|---|---|
| COMPOUND | RESULTS |
| ACETONE | ND |
| BENZENE | ND |
| CHLOROB | 2.5 |
| 1,2-DICHL | 3.2 |
| CHLOROF | ND |
| CYCLOHEX | ND |
| 1,4-DICHL | 0.47 J* |
| CIS-1,2 | 0.63 J |
| ETHYLBEN | ND |
| METHYLCYC | ND |
| PCE | 0.54 J |
| TOLUENE | ND |
| 1,2,4-TRIC | ND |
| 1,2,4-TRIM | ND |
| 1,3,5-TRIM | ND |
| TCE | 0.28 J |
| VINYL CHL | 0.26 J |
| XYLENES | ND |

| MW-2 (9/10/08) | |
|---|---|
| COMPOUND | RESULTS |
| ACETONE | 2.7 J (ND) |
| BENZENE | ND (ND) |
| CHLOROB | ND (ND) |
| 1,2-DICHL | ND (ND) |
| CHLOROF | ND (ND) |
| CYCLOHEX | ND (ND) |
| 1,4-DICHL | ND (ND) |
| CIS-1,2 | ND (ND) |
| ETHYLBEN | ND (ND) |
| METHYLCYC | ND (ND) |
| PCE | ND (ND) |
| TOLUENE | ND (ND) |
| 1,2,4-TRIC | ND (ND) |
| 1,2,4-TRIM | ND (ND) |
| 1,3,5-TRIM | ND (ND) |
| TCE | ND (ND) |
| VINYL CHL | ND (ND) |
| XYLENES | ND (ND) |

LEGEND:

APPROXIMATE PROPERTY LINE

EASEMENT

MONITORING WELL

GROUNDWATER ANALYTICAL RESULTS IN MICROGRAMS PER LITER (ug/L)

| MW-1 (9/10/08) | | WELL NUMBER (SAMPLE DATE) |
|---|---|---|
| COMPOUND | RESULTS | |
| ACETONE | ND | ACETONE |
| BENZENE | ND | BENZENE |
| CHLOROB | ND | CHLOROBENZENE |
| 1,2-DICHL | ND | 1,2-DICHLOROBENZENE |
| CHLOROF | ND | CHLOROFORM |
| CYCLOHEX | ND | CYCLOHEXANE |
| 1,4-DICHL | ND | 1,4-DICHLOROBENZENE |
| CIS-1,2 | ND | CIS-1,2-DICHLOROETHENE |
| ETHYLBEN | ND | ETHYLBENZENE |
| METHYLCYC | ND | METHYLCYCLOHEXANE |
| PCE | ND | TETRACHLOROETHENE |
| TOLUENE | ND | TOLUENE |
| 1,2,4-TRIC | ND | 1,2,4-TRICHLOROBENZENE |
| 1,2,4-TRIM | ND | 1,2,4-TRIMETHYLBENZENE |
| 1,3,5-TRIM | ND | 1,3,5-TRIMETHYLBENZENE |
| TCE | ND | TRICHLOROETHENE |
| VINYL CHL | ND | VINYL CHLORIDE |
| XYLENES | ND | XYLENES (TOTAL) |

| | |
|---|---|
| J | ESTIMATED VALUE |
| * | SUSPECTED LAB CONTAMINATION |
| ND | NOT DETECTED |
| (ND) | DUPLICATE SAMPLE RESULTS |
| **7.3** | BOLD VALUE INDICATES THE RESULT EXCEEDS THE NYSDEC GROUNDWATER STANDARD |

NOTES:

1. BASE MAP DIGITIZED FROM NYSGIS CLEARINGHOUSE 2002 AERIAL PHOTOGRAPH; FROM TEETER ENVIRONMENTAL SERVICES FIGURE ENTITLED "SITE MAP", DATED 10/25/06; AND FROM PHOTOCOPY OF SITE SURVEYS BY JAMES D. EVANS, DATED 4/21/06 AND 9/18/08.
2. ALL LOCATIONS ARE APPROXIMATE.

0 30' 60'

GRAPHIC SCALE

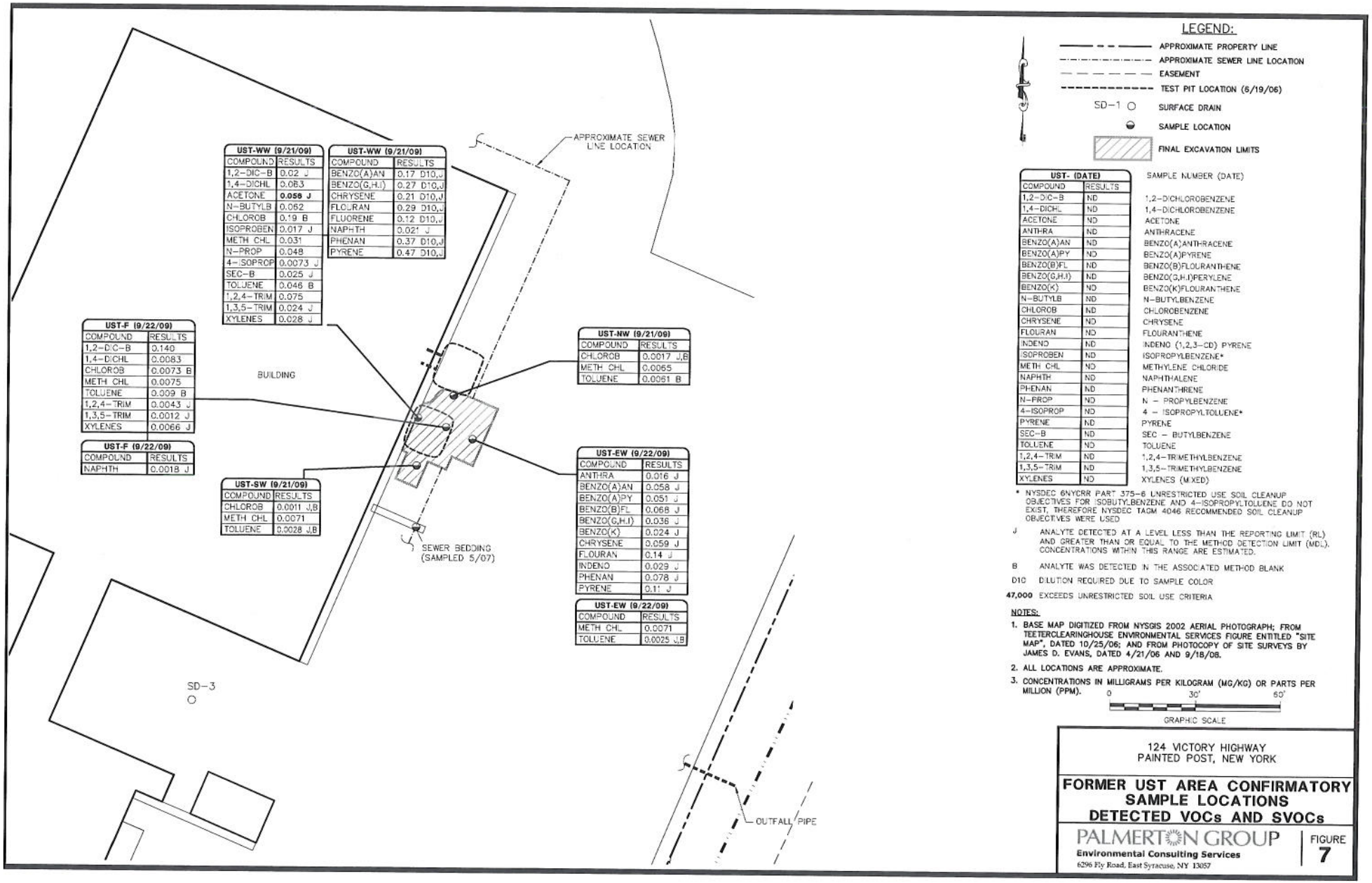
124 VICTORY HIGHWAY
PAINTED POST, NEW YORK

# GROUNDWATER VOCs

THE PALMERTON GROUP, LLC.
6296 FLY ROAD
EAST SYRACUSE, NEW YORK 13057

FIGURE 11

P: EPB
11/4/08
PALM/WP/PAINTED POST/PPB26.DWG




| UST-WW (9/21/09) | |
|---|---|
| COMPOUND | RESULTS |
| 1,2-DIC-B | 0.02 J |
| 1,4-DICHL | 0.083 |
| ACETONE | **0.058 J** |
| N-BUTYLB | 0.052 |
| CHLOROB | 0.19 B |
| ISOPROBEN | 0.017 J |
| METH CHL | 0.031 |
| N-PROP | 0.048 |
| 4-ISOPROP | 0.0073 J |
| SEC-B | 0.025 J |
| TOLUENE | 0.046 B |
| 1,2,4-TRIM | 0.075 |
| 1,3,5-TRIM | 0.024 J |
| XYLENES | 0.028 J |

| UST-WW (9/21/09) | |
|---|---|
| COMPOUND | RESULTS |
| BENZO(A)AN | 0.17 D10,J |
| BENZO(G,H,I) | 0.27 D10,J |
| CHRYSENE | 0.21 D10,J |
| FLOURAN | 0.29 D10,J |
| FLUORENE | 0.12 D10,J |
| NAPHTH | 0.021 J |
| PHENAN | 0.37 D10,J |
| PYRENE | 0.47 D10,J |

| UST-F (9/22/09) | |
|---|---|
| COMPOUND | RESULTS |
| 1,2-DIC-B | 0.140 |
| 1,4-DICHL | 0.0083 |
| CHLOROB | 0.0073 B |
| METH CHL | 0.0075 |
| TOLUENE | 0.009 B |
| 1,2,4-TRIM | 0.0043 J |
| 1,3,5-TRIM | 0.0012 J |
| XYLENES | 0.0066 J |

| UST-F (9/22/09) | |
|---|---|
| COMPOUND | RESULTS |
| NAPHTH | 0.0018 J |

| UST-NW (9/21/09) | |
|---|---|
| COMPOUND | RESULTS |
| CHLOROB | 0.0017 J,B |
| METH CHL | 0.0065 |
| TOLUENE | 0.0061 B |

| UST-SW (9/21/09) | |
|---|---|
| COMPOUND | RESULTS |
| CHLOROB | 0.0011 J,B |
| METH CHL | 0.0071 |
| TOLUENE | 0.0028 J,B |

| UST-EW (9/22/09) | |
|---|---|
| COMPOUND | RESULTS |
| ANTHRA | 0.016 J |
| BENZO(A)AN | 0.058 J |
| BENZO(A)PY | 0.051 J |
| BENZO(B)FL | 0.068 J |
| BENZO(G,H,I) | 0.036 J |
| BENZO(K) | 0.024 J |
| CHRYSENE | 0.059 J |
| FLOURAN | 0.14 J |
| INDENO | 0.029 J |
| PHENAN | 0.078 J |
| PYRENE | 0.11 J |

| UST-EW (9/22/09) | |
|---|---|
| COMPOUND | RESULTS |
| METH CHL | 0.0071 |
| TOLUENE | 0.0025 J,B |

## LEGEND:

- APPROXIMATE PROPERTY LINE
- APPROXIMATE SEWER LINE LOCATION
- EASEMENT
- TEST PIT LOCATION (6/19/06)
- SD-1 ○ SURFACE DRAIN
- SAMPLE LOCATION
- FINAL EXCAVATION LIMITS

| UST- (DATE) | | SAMPLE NUMBER (DATE) |
|---|---|---|
| COMPOUND | RESULTS | |
| 1,2-DIC-B | ND | 1,2-DICHLOROBENZENE |
| 1,4-DICHL | ND | 1,4-DICHLOROBENZENE |
| ACETONE | ND | ACETONE |
| ANTHRA | ND | ANTHRACENE |
| BENZO(A)AN | ND | BENZO(A)ANTHRACENE |
| BENZO(A)PY | ND | BENZO(A)PYRENE |
| BENZO(B)FL | ND | BENZO(B)FLOURANTHENE |
| BENZO(G,H,I) | ND | BENZO(G,H,I)PERYLENE |
| BENZO(K) | ND | BENZO(K)FLOURANTHENE |
| N-BUTYLB | ND | N-BUTYLBENZENE |
| CHLOROB | ND | CHLOROBENZENE |
| CHRYSENE | ND | CHRYSENE |
| FLOURAN | ND | FLOURANTHENE |
| INDENO | ND | INDENO (1,2,3-CD) PYRENE |
| ISOPROBEN | ND | ISOPROPYLBENZENE* |
| METH CHL | ND | METHYLENE CHLORIDE |
| NAPHTH | ND | NAPHTHALENE |
| PHENAN | ND | PHENANTHRENE |
| N-PROP | ND | N - PROPYLBENZENE |
| 4-ISOPROP | ND | 4 - ISOPROPYLTOLUENE* |
| PYRENE | ND | PYRENE |
| SEC-B | ND | SEC - BUTYLBENZENE |
| TOLUENE | ND | TOLUENE |
| 1,2,4-TRIM | ND | 1,2,4-TRIMETHYLBENZENE |
| 1,3,5-TRIM | ND | 1,3,5-TRIMETHYLBENZENE |
| XYLENES | ND | XYLENES (MIXED) |

* NYSDEC 6NYCRR PART 375-6 UNRESTRICTED USE SOIL CLEANUP OBJECTIVES FOR ISOBUTYLBENZENE AND 4-ISOPROPYLTOLUENE DO NOT EXIST, THEREFORE NYSDEC TAGM 4046 RECOMMENDED SOIL CLEANUP OBJECTIVES WERE USED

J ANALYTE DETECTED AT A LEVEL LESS THAN THE REPORTING LIMIT (RL) AND GREATER THAN OR EQUAL TO THE METHOD DETECTION LIMIT (MDL). CONCENTRATIONS WITHIN THIS RANGE ARE ESTIMATED.

B ANALYTE WAS DETECTED IN THE ASSOCIATED METHOD BLANK

D1C DILUTION REQUIRED DUE TO SAMPLE COLOR

**47,000** EXCEEDS UNRESTRICTED SOIL USE CRITERIA

NOTES:

1. BASE MAP DIGITIZED FROM NYSGIS 2002 AERIAL PHOTOGRAPH; FROM TEETERCLEARINGHOUSE ENVIRONMENTAL SERVICES FIGURE ENTITLED "SITE MAP", DATED 10/25/06; AND FROM PHOTOCOPY OF SITE SURVEYS BY JAMES D. EVANS, DATED 4/21/06 AND 9/18/08.
2. ALL LOCATIONS ARE APPROXIMATE.
3. CONCENTRATIONS IN MILLIGRAMS PER KILOGRAM (MG/KG) OR PARTS PER MILLION (PPM).

0 30' 60'

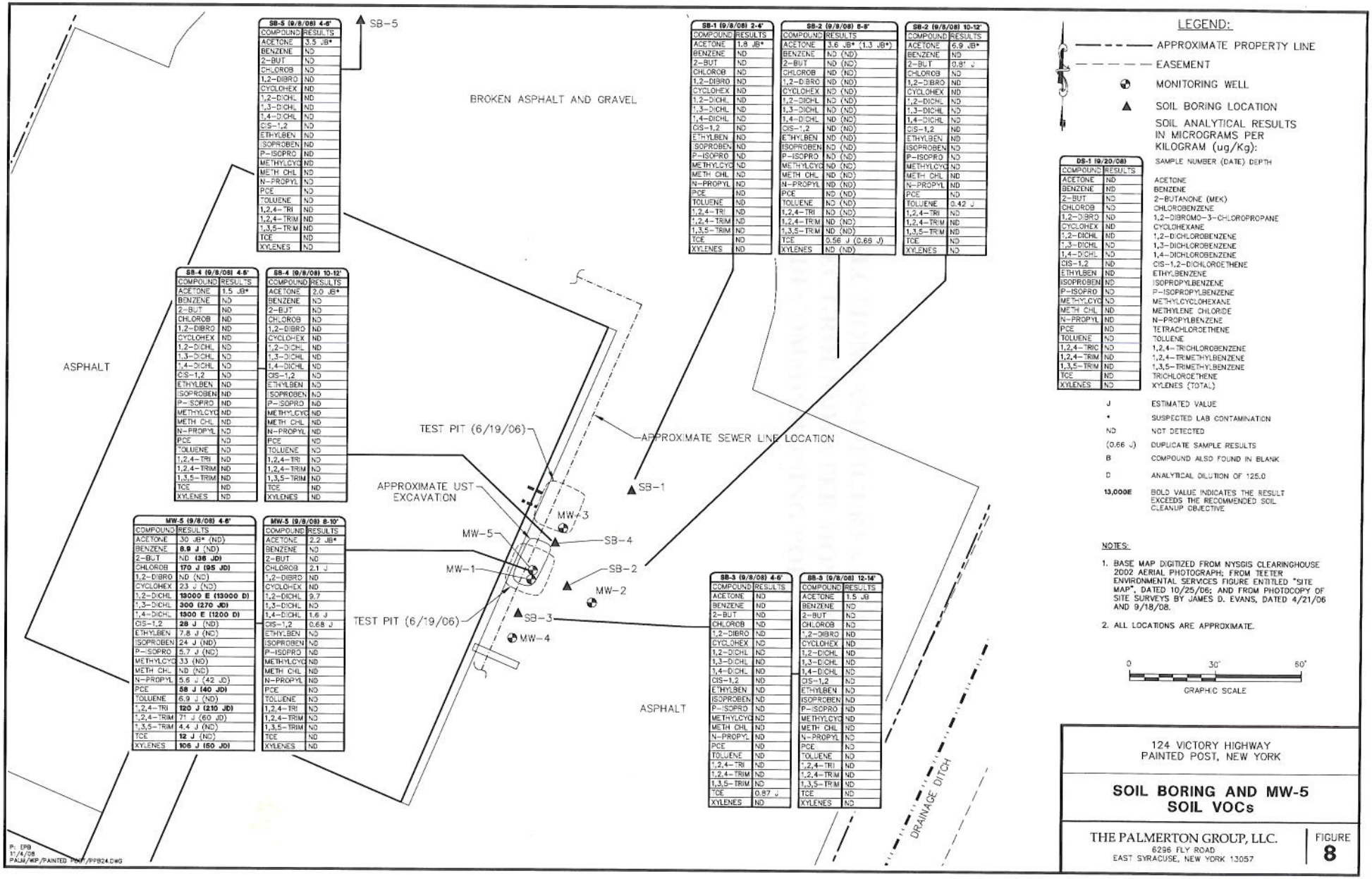
GRAPHIC SCALE

124 VICTORY HIGHWAY
PAINTED POST, NEW YORK

# FORMER UST AREA CONFIRMATORY SAMPLE LOCATIONS DETECTED VOCs AND SVOCs

PALMERTON GROUP
Environmental Consulting Services
6296 Fly Road, East Syracuse, NY 13057

FIGURE 7




124 VICTORY HIGHWAY
PAINTED POST, NEW YORK

# SOIL BORING AND MW-5 SOIL VOCs


THE PALMERTON GROUP, LLC.
6296 FLY ROAD
EAST SYRACUSE, NEW YORK 13057


FIGURE 8

# SECTIONS AND FIGURES FROM CP-43 NYSDEC GROUNDWATER MONITORING WELL DECOMMISSIONING POLICY

in the preceding section are the input for this flow chart. The four primary well decommissioning methods are:

1. Grouting in-place;
2. Perforating the casing followed by grouting in-place;
3. Grouting in-place followed by casing pulling;
4. Over-drilling and grouting with or without a temporary casing.

In a complex situation, one or more decommissioning procedures may be used for different intervals of the same well.

The remainder of Section 2 discusses the well decommissioning methods and the selection process. Refer to Figure 2 for a flow chart diagram of the complete procedure selection process. The DEC Project Manager has the discretion to deviate from the flow chart, (Figure 2), based on site conditions and professional judgment.

## 2.1 Grouting In-Place

Grouting in-place is the simplest and most frequently used well decommissioning method and grouting itself is the essential component of all the decommissioning methods. The grout seals the borehole and any portion of the monitoring well that may be left in the ground. Because dirt and foreign objects can fall into an open well, whenever possible a well should be sealed first with grout before attempting subsequent decommissioning steps.

For the purpose of these decommissioning procedures, the well seal is defined as the bentonite seal above the sand pack. Aside from obvious channeling by in-flowing surface water around the well, an indication of the well seal integrity may be obtained through review of the boring logs and/or a comparison of groundwater elevations if the well is part of a cluster. Any problems noted on the boring logs pertaining to the well seal, such as bridging of bentonite pellets or running sands, or disparities between field notes (if available) and the well log would indicate the potential for a poor (compromised) well seal.

If the well seal is not compromised and there is no confining layer present, a single-stem, 2-inch PVC, monitoring well can be satisfactorily decommissioned by grouting it in-place. If the seal is compromised, casing perforation may be called for as discussed in Section 2.2.

As discussed in Section 2.4 and its sub-sections, this method is specified for the bedrock portion of a well, and is used for decommissioning small diameter cased wells. Grouting in-place involves filling the casing with grout to a level of five feet below the land surface, cutting the well casing at the five-foot depth, and removing the top portion of the casing and associated well materials from the ground. The casing must be grouted according to the procedures in Section 6. In addition, the upper five feet of the borehole is filled to land surface and restored according to the procedures described in Section 7.

For open-hole bedrock wells, the procedure involves filling the opening with grout to the top of rock according to the procedures in Section 5. A thicker grout may be required to fill any bedrock voids. If excessive grout is being lost down-hole, consider grouting in stages to reduce the pressure caused by the height of the grout column.

The standard mix with the maximum amount of allowable water will be required to penetrate the well screen and sand pack when a well assembly has been installed within a bedrock hole. For an assembly such as this, the grout should be mixed thinly enough to penetrate the slots and sand pack. The grout mixes are discussed in Sections 6.1 and 6.2.

## 2.2 Casing Perforating/Grouting In-Place

Casing perforation followed by grouting in-place is the preferred method to use if there is poor documentation of the grouting of the well annulus, or the annulus was allowed to be back-filled with cuttings. The grout will squeeze through the perforations to seal any porous zones along the outside of the casing. The procedure involves puncturing, cutting or splitting the well casing and screen followed by grouting the well. A variety of commercial equipment is available for perforating casings and screens in wells with four-inch or larger inside diameters. Due to the diversity of applications, experienced contractors must recommend a specific technique based on site-specific conditions. A minimum of four rows of perforations several inches long around the circumference of the pipe and a minimum of five perforations per linear foot of casing or screen is recommended (American Society for Testing and Materials, Standard D 5299-99, 1999). After the perforating is complete, the borehole must be grouted according to the procedures in Section 6 and the upper five feet of borehole restored according to the procedures in Section 7.

## 2.3 Casing Pulling

Casing pulling should be used in cases where the materials of the well assembly are to be recycled, or the well assembly must be removed to clear the site for future excavation or re-development. Casing pulling is an acceptable method to use when no contamination is present; contamination is present but the well does not penetrate a confining layer; and when both contamination and a confining layer are present but the contamination cannot cross the confining layer. Additionally, the well construction materials and well depth must be such that pulling will not break the riser. When contamination is likely to cross the confining layer during pulling, a temporary casing can be used. See Section 2.4.

Casing pulling involves removing the well casing by lifting. Grout is to be added during pulling; the grout will fill the space once occupied by the material being withdrawn. An acceptable procedure to remove casing involves puncturing the bottom of the well or using a casing cutter to cut away the screen, grouting, using jacks to free casing from the hole, and lifting the casing out by using a drill rig, backhoe, crane, or other suitable equipment. Additional grout must be added to the casing as it is withdrawn. Grout mixing and placement procedures are provided in Section 6. In wells or well points in which the bottom cannot be punctured, the casing or screened interval will be perforated or cut away prior to being filled with grout. This procedure should be followed for wells installed in collapsible formations or for highly contaminated wells.

At sites in which well casings have been grouted into the top of bedrock, the casing pulling procedure should not be attempted unless the casing can be first cut or freed from the rock.

*should fill the monitoring well with grout before removing the outer protective casing.* This will ensure that the well is properly sealed regardless of any problems later when removing the protective casing. Remove the protective casing or road box vault initially only if the stick-up or vault will interfere with subsequent down-hole work which must be done before grouting. This down-hole work may include puncturing, perforating or cutting the screen or riser. But as a general procedure don't remove the protective casing or road box until after initial grouting is complete.

The procedure for removing the protective casing of a well depends upon the decommissioning method specified for the monitoring well. The variety of protective casings available preclude developing a specific removal procedure but often one can simply break up the concrete seal surrounding the casing and jack or hoist the protective casing out of the ground. A check should be made during pulling to ensure that the inner well casing is not being hoisted with the protective casing. If this occurs, the well casing should be cut off after the base of the protective casing is lifted above the land surface. At well locations where the riser has been extended, the burial of a previous concrete pad may require the excavation of soil to the top of the concrete pad to remove the well.

Steel well casing should be removed approximately five feet below the land surface so as to be below the frost line and out of the way of any subsequent shallow digging. The upper five feet of casing and the protective casing can be removed in one operation if a casing cutter is used.

Waste handling and disposal must be consistent with the methods used for the other well materials unless an alternate disposal method can be employed (i.e., steam cleaning followed by disposal as non-hazardous waste).

## 6.0 SELECTING, MIXING, AND PLACING GROUT

This section gives recipes for the "standard grout mixture" and the thicker "special grout mixture." Mixing and placing grout is also discussed in this section. The goal of well decommissioning is to eliminate the capability of water to travel up or down within the volume of the former well and its boring. Success depends upon the correct grout mixture and placement where it is needed. There are two types of grout mixes that may be used to seal monitoring wells: a standard mix and a special mix. Both mixes use Type 1 Portland cement and four percent bentonite by weight. However, the special mix uses a smaller volume of water and is used in situations where excessive loss of the standard grout mix is possible (e.g., highly-fractured bedrock or coarse gravels).

### 6.1 Standard Grout Mixture

For most boreholes, the following standard mixture will be used:

- One 94-pound bag Type I Portland cement;
- 3.9 pounds powdered bentonite; and
- 7.8 gallons potable water.

Slightly more water may be used in order to penetrate a sand pack when a well screen transects multiple flow zones. This mixture results in a grout with a bentonite content of four percent by weight and will be used in all cases except in boreholes where excessive use of grout is anticipated. In these cases a special thicker mixture will be used.

### 6.2 Special Mixture

In cases where excessive use of grout is anticipated, such as high permeability formations and highly fractured or cavernous bedrock formations, the following special mixture will be used:

- one 94-pound bag type I Portland cement;
- 3.9 pounds powdered bentonite;
- 1 pound calcium chloride; and
- 6.0-7.8 gallons potable water (depending on desired thickness).

The special mixture results in a grout with a bentonite content of four percent by dry weight. It is thicker than the standard mixture because it contains less water. This grout is expected to set faster than the Standard Grout Mixture due to the added calcium chloride. The least amount of water that can be added for the mixture to be readily pumpable is 6 gallons per 94-pound bag of cement.

### 6.3 Grout Mixing Procedure

To begin the grout-mixing procedure, calculate the volume of grout required to fill the borehole. If possible, the mixing basin should be large enough to hold all of the grout necessary for the borehole.

Mix grout until a smooth, homogeneous mixture is achieved. Grout can be mixed manually or with a mechanized mixer. Colloidal mixers should not be used as they tend to excessively decrease the thickness of the grout for the above recipes.

### 6.4 Grout Placement

This guidance requires that grout be placed in the well from the bottom to the top by means of a "tremie." A tremie is a pipe, a hose or a tube extending from the grout supply to the bottom of the well. The tremie delivers the grout all the way down through the water column without its being diluted and mixed with the water that may be present in the well. The tremie pipe or tube is withdrawn as (or after) the well is filled with grout.

Using the tremie, grout is placed in the borehole filling from the bottom to the top. Two-inch and larger wells should use tremie tubing of not less than 1-inch diameter. Smaller diameter wells will call for a smaller tremie pipe. Grout will then be pumped in until the grout appears at the land surface (when grouting open holes in bedrock, the grout level only needs to reach above the bedrock surface). Any groundwater displaced during grout placement, if known to be contaminated, will be contained for proper disposal.

At this time the rate of settling should be observed. If grouting the well in place, the well

casing remains in the hole. But if the decommissioning method has involved down-hole tools such as hollow-stem augers or temporary casing for overdrilling, these will be removed from the hole. As each section is removed, grout will be added to keep the level between 0 and 5 feet below grade. If the grout level drops below the land surface to an excessive degree, an alternate grouting method must be used. One possibility is to grout in stages; i.e., the first batch of grout is allowed to partially cure before a second batch of grout is added.

As previously described in Section 5.0, the outer protective casing "stick-up" should be removed only after a well has been properly filled with grout. This will ensure that the well is properly sealed regardless of any breakage which may occur when removing the stick-up. It is important to reiterate that when either casing pulling or over-drilling are required, due to the uncertainty of successfully pulling a well or over-boring a well, we insist that the driller tremie grout the well first. Then without allowing the grout to dry, the driller proceeds with pulling the casing or over-drilling the well.

Upon completion of grouting, ensure that the final grout level is approximately five feet below land surface. A ferrous metal marker will be embedded in the top of the grout to indicate the location of the former monitoring well. Lastly, a fabric "utility" marking should be placed one foot above the grout so an excavator can see it clearly.

## 7.0 BACKFILLING AND SITE RESTORATION

The uppermost five feet of the borehole at the land surface should be filled with material physically similar to the natural soils. The surface of the borehole should be restored to the condition of the area surrounding the borehole. For example, concrete or asphalt will be patched with concrete or asphalt of the same type and thickness, grassed areas will be seeded, and topsoil will be used in other areas. All solid waste materials generated during the decommissioning process must be disposed of properly.

## 8.0 DOCUMENTATION

A form which may be used in the field to record the decommissioning construction is included as Figure 3. Additional documentation may be required by a DEC project manager and samples are included in Appendix A. Programs within the DEC that maintain geographic data on monitoring wells strive to keep that data up to date. Owners of these data sets must be notified when a well is decommissioned. Historical groundwater quality data is linked to monitoring well locations so when a well is decommissioned, existing GIS data must be updated to reflect that fact but the coordinate location in the GIS database should not be eliminated. A metal detector may not be able to detect a deeply buried marker so if this locator is important for future utility runs or foundations, a map should be submitted to the property owner and the town engineer showing the decommissioned well locations. Global Positioning System (GPS) coordinates should be indicated on this map. Lastly, whatever documentation is produced should be provided to the property owner, the DEC, and all other parties involved.

FIGURE 1

**SITE NAME:**

SITE ID.: _____
INSPECTOR: _____
DATE/TIME: _____
WEll ID.: _____

MONITORING WELL FIELD INSPECTION LOG
NYSDEC WELL DECOMMISSIONING PROGRAM

| | YES | NO |
|---|---|---|
| WELL VISIBLE? (If not, provide directions below) ..... | | |
| WELL I.D. VISIBLE? ..... | | |
| WELL LOCATION MATCH SITE MAP? (if not, sketch actual location on back)..... | | |

WELL I.D. AS IT APPEARS ON PROTECTIVE CASING OR WELL: .....

| | YES | NO |
|---|---|---|
| SURFACE SEAL PRESENT? ..... | | |
| SURFACE SEAL COMPETENT? (If cracked, heaved etc., describe below) ..... | | |
| PROTECTIVE CASING IN GOOD CONDITION? (If damaged, describe below) ..... | | |

HEADSPACE READING (ppm) AND INSTRUMENT USED..... _____
TYPE OF PROTECTIVE CASING AND HEIGHT OF STICKUP IN FEET (If applicable) _____
PROTECTIVE CASING MATERIAL TYPE: ..... _____
MEASURE PROTECTIVE CASING INSIDE DIAMETER (Inches): ..... _____

| | YES | NO |
|---|---|---|
| LOCK PRESENT? ..... | | |
| LOCK FUNCTIONAL? ..... | | |
| DID YOU REPLACE THE LOCK? ..... | | |
| IS THERE EVIDENCE THAT THE WELL IS DOUBLE CASED? (If yes,describe below) | | |
| WELL MEASURING POINT VISIBLE? ..... | | |

MEASURE WELL DEPTH FROM MEASURING POINT (Feet): ..... _____
MEASURE DEPTH TO WATER FROM MEASURING POINT (Feet): ..... _____
MEASURE WELL DIAMETER (Inches): ..... _____
WELL CASING MATERIAL: ..... _____
PHYSICAL CONDITION OF VISIBLE WELL CASING: ..... _____
ATTACH ID MARKER (if well ID is confirmed) and IDENTIFY MARKER TYPE ..... _____
PROXIMITY TO UNDERGROUND OR OVERHEAD UTILITIES..... _____

DESCRIBE ACCESS TO WELL: (Include accessibility to truck mounted rig, natural obstructions, overhead power lines, proximity to permanent structures, etc.); ADD SKETCH OF LOCATION ON BACK, IF NECESSARY.

_____

_____

_____

DESCRIBE WELL SETTING (For example, located in a field, in a playground, on pavement, in a garden, etc.) AND ASSESS THE TYPE OF RESTORATION REQUIRED.

_____

_____

IDENTIFY ANY NEARBY POTENTIAL SOURCES OF CONTAMINATION, IF PRESENT (e.g. Gas station, salt pile, etc.):

_____

_____

_____

REMARKS:

_____

_____

FIGURE 3

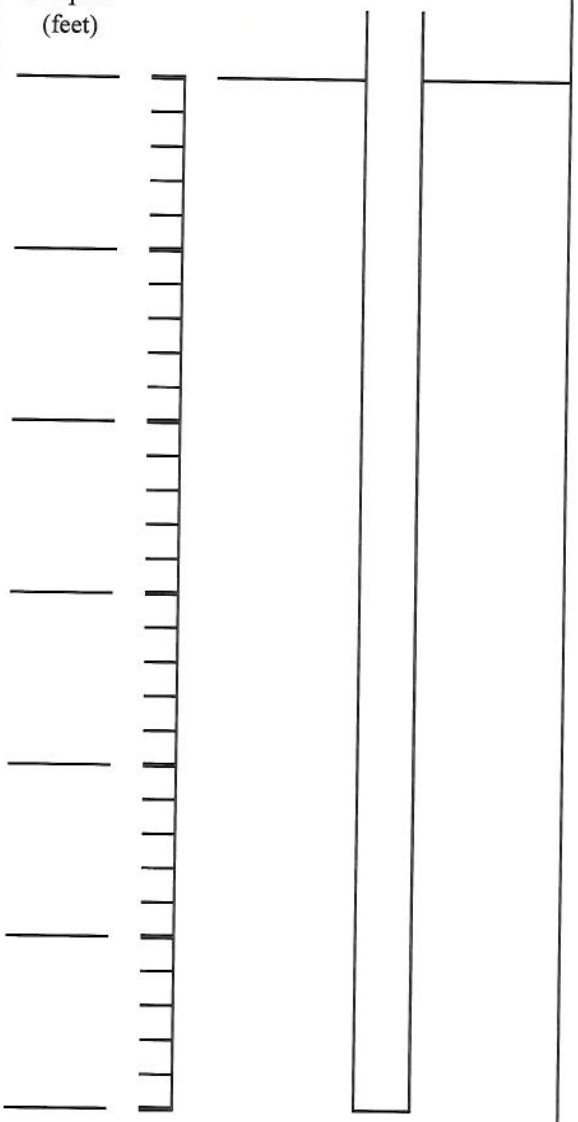
# WELL DECOMMISSIONING RECORD

| | |
|---|---|
| Site Name: | Well I.D.: |
| Site Location: | Driller: |
| Drilling Co.: | Inspector: |
| | Date: |

## DECOMMISSIONING DATA
(Fill in all that apply)

| | |
|---|---|
| **OVERDRILLING** | |
| Interval Drilled | |
| Drilling Method(s) | |
| Borehole Dia. (in.) | |
| Temporary Casing Installed? (y/n) | |
| Depth temporary casing installed | |
| Casing type/dia. (in.) | |
| Method of installing | |
| **CASING PULLING** | |
| Method employed | |
| Casing retrieved (feet) | |
| Casing type/dia. (in) | |
| **CASING PERFORATING** | |
| Equipment used | |
| Number of perforations/foot | |
| Size of perforations | |
| Interval perforated | |
| **GROUTING** | |
| Interval grouted (FBLS) | |
| # of batches prepared | |
| For each batch record: | |
| Quantity of water used (gal.) | |
| Quantity of cement used (lbs.) | |
| Cement type | |
| Quantity of bentonite used (lbs.) | |
| Quantity of calcium chloride used (lbs.) | |
| Volume of grout prepared (gal.) | |
| Volume of grout used (gal.) | |

## WELL SCHEMATIC*




| COMMENTS: |
|---|
| |
| |
| |

* Sketch in all relevant decommissioning data, including: interval overdrilled, interval grouted, casing left in hole, well stickup, etc.

Drilling Contractor

Department Representative