

October 29, 2009

Mr. Scott Miller
Remedial Project Manager
U.S. Environmental Protection Agency
Region IV, Superfund North Florida Section
61 Forsyth Street, SW
Atlanta, GA 30303-3104

Subject: Groundwater Extraction Rates for Surficial and UF Aquifers
Koppers Inc. Site, Gainesville, FL

Dear Mr. Miller:

This purpose of this letter is to summarize historical and projected groundwater extractions rates for the Surficial and Upper Floridan (UF) Aquifers at the Koppers Inc. portion (the Site) of the Cabot Carbon/ Koppers Superfund site in Gainesville, Florida. The historical groundwater extraction rates summarized in this letter for the Surficial Aquifer were obtained from monthly monitoring of groundwater extraction rates since the containment system was installed in 1995 (Quarterly, Semi-Annual and Annual Groundwater Monitoring Reports 1995-2009). The projected groundwater extraction rates for the UF Aquifer were obtained from simulations performed with the calibrated numerical model previously developed for the Site (GeoTrans, 2004). The following is a summary of groundwater extraction rates projected for the Surficial and UF Aquifers. In addition, this letter provides a description of model simulations performed to evaluate groundwater extraction rates for the UF Aquifer at FW-22B.

Surficial Aquifer Groundwater Extraction

A hydraulic-containment system has been in continuous operation at the Site since 1995. The hydraulic-containment system was installed to capture impacted groundwater that was potentially flowing off Site towards the northeast. The hydraulic-containment system consists of 14 shallow groundwater extraction wells located along the eastern and northern Site property boundary.

Individual wells that comprise the hydraulic-containment system had average groundwater pumping rates of around 2 to 2.5 gpm from 1995 to 2005 (Quarterly, Semi-Annual and Annual Groundwater Monitoring Reports 1995-2005, see reference list). The total pumping rate for the system averaged around 30 gpm during this same time period. The total pumping rate for the system from 2006 to 2008 averaged around 20 gpm and the total pumping rate from January to June 2009 averaged approximately 18 gpm.

Starting in July 2009 an Interim Remedial Measure (IRM) was implemented to augment the existing containment system. The IRM consisted of installing four, approximately 260 feet long, horizontal-drain pipes adjacent to the four former source areas. Each horizontal-drain pipe will extract groundwater at approximately 10-12 gpm. The IRM was started in July 2009 with reduced pumping rates. During a 2-month period (July to August) the four horizontal-drain pipes were pumped at a total rate of 21 gpm and the property boundary wells were pumped at approximately 23 gpm, resulting in a total Surficial Aquifer groundwater extraction rate of 44 gpm (Written communication FTS, September 9, 2009).

Once the upgrade of the treatment system components is complete, the total pumping rate for the horizontal drains is projected to increase to approximately 40 gpm and total groundwater extraction at the property boundary wells will average around 20 gpm for a total extraction rate for the Surficial Aquifer of approximately 60 gpm. Table 1 presents a summary of historical and projected Surficial Aquifer groundwater extraction rates.

Upper Floridan Aquifer Groundwater Extraction

Currently, there is no groundwater extraction at the Site for the UF Aquifer; however, a workplan was recently submitted and approved by the U.S. EPA to convert FW-6 and FW-21B to groundwater extraction wells. In addition, preliminary discussions have taken place between Beazer and the U.S. EPA concerning a request to perform groundwater extraction in the vicinity of FW-22B.

Constituent impacts at FW-6 have been hypothesized to be associated with vertical leakage through wellbore seals. An independent panel of groundwater experts was assembled by Beazer to: 1) Perform a technical evaluation of Site data; 2) Develop potential conceptual models to help explain constituent impacts to UF Aquifer; and 3) Recommend potential IRMs to address UF Aquifer impacts at these wells. The results of the independent panel review were presented in a summary report (Beazer, 2008). One of the recommendations resulting from this independent panel review was to implement limited groundwater pumping at FW-6 and FW-21B to capture vertical leakage occurring through the wellbore seal. The panel recommended pumping rates on the order of 1 to 2 gpm at each of the two wells. Beazer submitted the IRM Floridan Aquifer workplan to implement this recommendation (GeoTrans, 2008), which was approved by the U. S. EPA (2009).

Over the past year constituent impacts have been detected at monitoring well FW-22B. A conceptual model for the source of these impacts is vertical leakage of impacted groundwater into the UF Aquifer through the annular seal at monitoring well FW-6 and lateral transport to the FW-22B area. Once the approved IRM is implemented at FW-6 the source of the constituent impacts at FW-22B should be eliminated and the plume should dissipate. However in the interim, Beazer has been asked by the U. S. EPA to mitigate off-site migration of this plume via groundwater capture in the vicinity of this well. To better quantify groundwater extraction rates required to effectively capture

impacts, a model analysis was performed by Beazer. The following is a summary of the numerical model analysis of projected groundwater extraction rates for the UF Aquifer.

Numerical Model Simulation Approach

Numerical model simulations were performed to estimate groundwater extraction rates for the UF Aquifer with the three-dimensional groundwater flow model previously developed for the Site (GeoTrans, 2004). The numerical model simulations were based on the assumption that a continuous plume in the UTZ extends from FW-6 at the former North Lagoon through FW-20B, FW-12B and FW-22B. Two scenarios were performed to evaluate capture of a hypothetical constituent plume: 1) Scenario 1-- assumes that the width of the plume extends half the distance between the projected main axis of the plume and non-impacted wells perpendicular to the axis of the plume, with a hypothetical plume approximately 1000 feet long by 300 feet wide (Figure 1); and 2) Scenario 2 -- assumes that the width of the plume extends the entire distance between the central axis of the plume to non-impacted wells, resulting in a hypothetical plume of 1,200 feet long by 600 feet wide (Figure 1).

The calibrated numerical model was developed in 2004 prior to the installation of the 23 UF Aquifer wells (FW-10B through FW-26B, FW-22C through FW-26C, and FW-4C). The model was calibrated to a north-northeastern groundwater flow direction in the UF Aquifer consistent with historical well data at the Site. Subsequent to this calibration some of the new UF Aquifer wells indicate a north to northwestern groundwater flow direction from FW-6 to FW-22B. The model does not currently account for this localized anisotropic flow direction at the Site. In order to estimate groundwater capture extraction rates at the downgradient edge of the plume in the direction of groundwater flow, the plume was rotated north to northeastern consistent with the groundwater flow direction in the model. By rotating the plume in the direction of groundwater flow the model can more accurately predict groundwater extraction rates in the direction of the localized flow direction. Without this adjustment the model would incorrectly over predict groundwater extraction rates required to reverse regional hydraulic gradient directions.

Steady-state groundwater flow simulations were performed in conjunction with particle tracking to evaluate plume capture. A single particle was placed in each of the model grid cells encompassed by the constituent plume extent, resulting in a total of 65 particles for the smaller plume (Scenario 1) and 150 particles for the large plume (Scenario 2). The particles were placed 5 feet above the base of the UTZ to evaluate the potential of vertical constituent migration prior to being captured by the extraction well. The results of the simulations are presented below.

Scenario 1 (Smaller Plume--lateral extent halfway between non-impacted wells)

The model simulation for Scenario 1 is shown in Figure 2. The model predicts that all, but one of the 65 particles encompassed by the lateral extent of the plume was captured by a single well pumping at 20 gpm.

Scenario 2 (Larger Plume--lateral extent to non-impacted wells)

The model simulation for Scenario 2 is shown in Figure 3. The model predicts that all 150 particles encompassed by the larger plume lateral extent will be captured by three wells pumping at 20 gpm each for a total of 60 gpm.

Table 1 provides a summary of the projected UF Aquifer groundwater extraction rates for the IRM and model simulations. Should you require additional information, please feel free to contact me at (303) 665-4390.

Sincerely,



James R. Erickson, P.G.
Principal Hydrogeologist

Enclosure

cc: W. O'Steen, U.S. EPA
K. Helton, FDEP
M. Brouman, BEI
G. Council, GT

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TRC, 1998b. Quarterly Comprehensive Monitoring Report Fourth Quarter 1997, Cabot Carbon/Koppers Superfund Site. May 1998.

U. S. EPA, 2009. Email to Beazer. July 20, 2009.

Table 1. Groundwater Extraction Rates Projected for Surficial and Upper Floridan Aquifers, Koppers Inc. Site, Gainesville, FL

Surficial Aquifer Historical and Projected Groundwater Extraction Rates:

Property Boundary Wells (14 Wells Total)

- 1) 1995-2005: Averaged about 30 gpm (TRC, McLaren/Hart, and Retec, Quarterly, semi-annual and annual monitoring reports, 1995-2005);
- 2) 2006-2008: Averaged about 20 gpm (FTS, 2006-2008);
- 3) 2009 (Jan-June): Averaged about 18 gpm (FTS, 2009);

Property Boundary Wells (14) and Horizontal Trench Drains (4)

- 1) July-Aug 2009: Average approximately 44 gpm (Property Boundary wells @ 23 gpm and four trenches @ 21 gpm) (Written Communication FTS, 2009);
- 2) 2009- future: Average approximately 60 gpm (Property Boundary wells @ 20 gpm and four trenches @ 40 gpm) (GeoTrans, December 29, 2008, Revised as per comments January 16, 2009);

UF Aquifer Projected Groundwater Extraction Rates:

Model Simulations UTZ pumping capturing all GW flow across northern property boundary:

- 1) 4 wells @ 20 gpm/ea; total pumping of approximately 80 gpm





Projected IRM pumping at FW-21B and FW-6

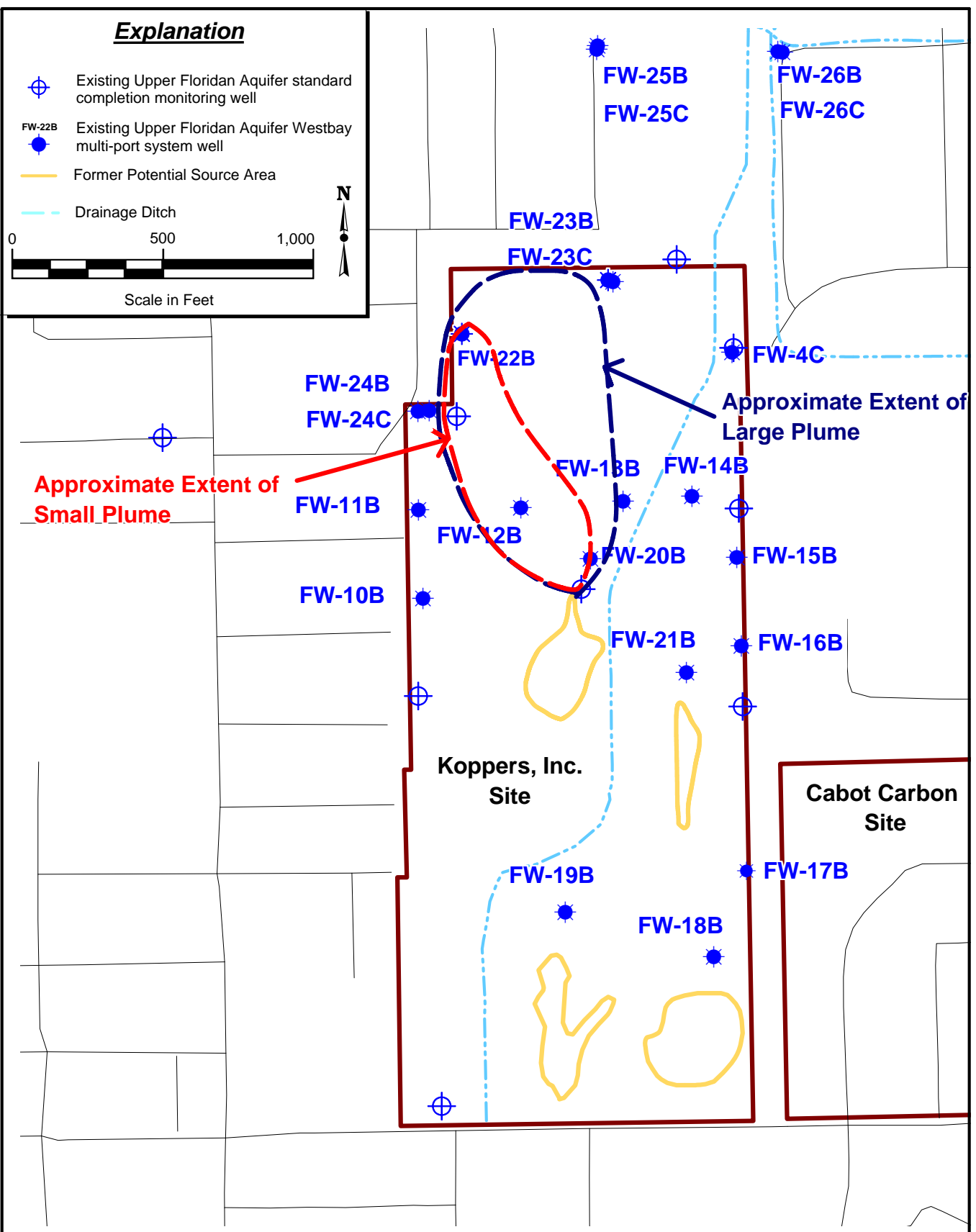
- 1) Approximately 1-2 gpm/ea well; total pumping of 2-4 gpm (GeoTrans, December 29, 2008)


Estimated IRM pumping to capture FW-22B impacts

- 1) Scenario 1—One well pumping at approximately 20 gpm (GeoTrans Letter, September 29, 2009)
- 2) Scenario 2 (Larger Plume) – three wells pumping at 20 gpm/ea, total 60 gpm (GeoTrans Letter, September 29, 2009)

Explanation

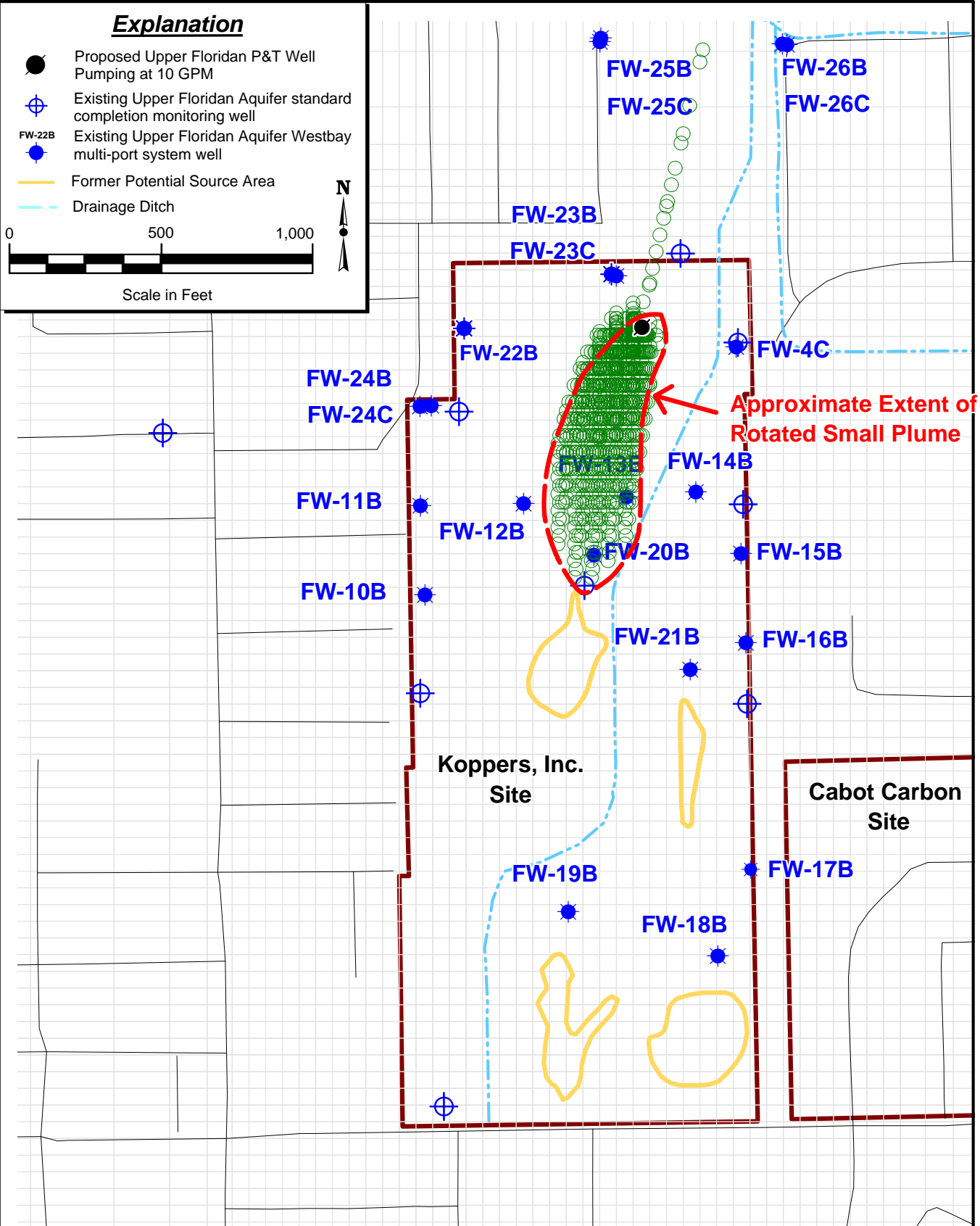
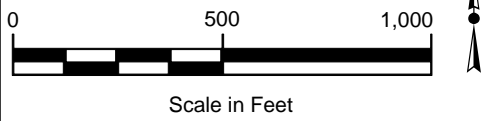
-  Existing Upper Floridan Aquifer standard completion monitoring well
 -  **FW-22B** Existing Upper Floridan Aquifer Westbay multi-port system well
 -  Former Potential Source Area
 -  Drainage Ditch
- 0 500 1,000
Scale in Feet



TITLE:		Small and Large Plume Areal Extents	
LOCATION:		Cabot Carbon/Koppers Superfund Site, Gainesville, Florida	
	CHECKED	JRE	FIGURE: 1
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	DATE	9/25/09	

Explanation

- Proposed Upper Floridan P&T Well Pumping at 10 GPM
- ⊕ Existing Upper Floridan Aquifer standard completion monitoring well
- FW-22B ● Existing Upper Floridan Aquifer Westbay multi-port system well
- Former Potential Source Area
- - - Drainage Ditch



TITLE: Particle Pathlines from Small Plume in Ocala UTZ

LOCATION: Cabot Carbon/Koppers Superfund Site, Gainesville, Florida

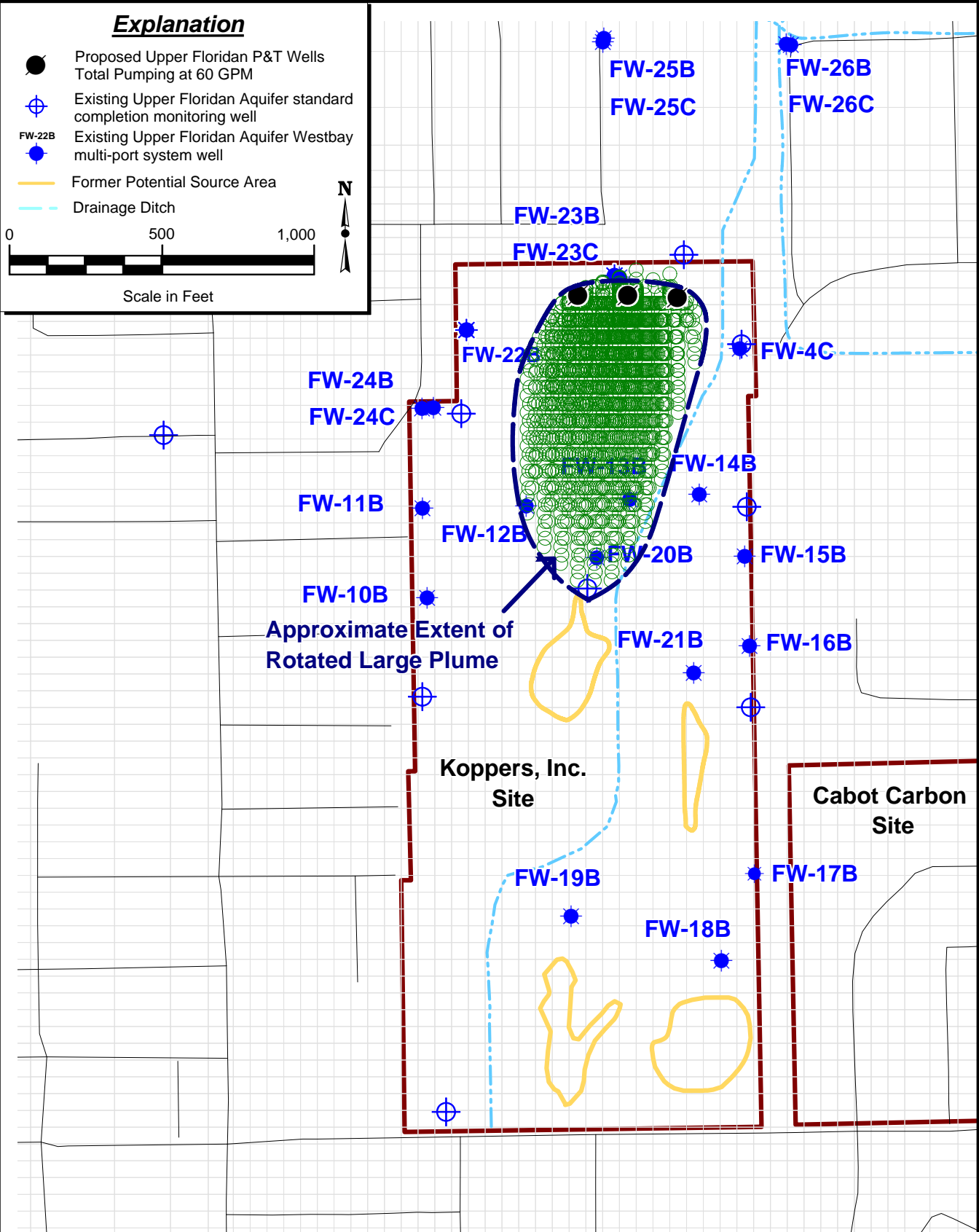


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FIGURE:
2

Explanation

- Proposed Upper Floridan P&T Wells
Total Pumping at 60 GPM
 - ⊕ Existing Upper Floridan Aquifer standard completion monitoring well
 - FW-22B Existing Upper Floridan Aquifer Westbay multi-port system well
 - Former Potential Source Area
 - - - Drainage Ditch
- 0 500 1,000
Scale in Feet



TITLE: Particle Pathlines from Large Plume in Ocala UTZ

LOCATION: Cabot Carbon/Koppers Superfund Site, Gainesville, Florida



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FIGURE:
3