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The Payne Firm, Inc.
Environmental Consultants

SAMPLING AND ANALYSIS PLAN #3

DATE: August 11, 2008

SUBJECT: Surface Water, Sediment, Sediment Pore Water, and Shallow Soil Investigation

PROJECT NO.: RCRA 3008(h) Consent Order RCRA-05-2007-0011
Bway Corporation
Cincinnati, Ohio OHD 004 253 225
Project No. 0654.13.05

1. OBJECTIVES

This Sampling and Analysis Plan (SAP) outlines the surface water, sediment, sediment pore water, and shallow soil sampling tasks that will be undertaken at the Bway Corporation Metal Container Manufacturing Facility, located in Cincinnati, Ohio (Bway). This work is being conducted to satisfy requirements of a September 13, 2007 Administrative Order of Consent (Order) between the United States Environmental Protection Agency (U.S. EPA) Region 5 and Bway. The areas to be sampled were identified in the *U.S. EPA RCRA Corrective Action Current Conditions Report* (CCR; Payne 2007) and U.S. EPA's December 6, 2007 comments on the CCR.

The purposes of the sampling event are to (1) to determine if there has been a release of hazardous waste or hazardous constituents to surface water, sediment, sediment pore water and/or surface soil at or adjacent to the facility; and (2) to provide an initial assessment of the potential for site-related ecological impacts from past releases of hazardous waste or hazardous constituents to surface water, sediment, and surface soil. It is anticipated that this will be a phased approach, such that decisions regarding the need for further investigation will be made based on professional judgment following a qualitative data review, including the magnitude of the concentrations, spatial distributions, and a comparison with relevant risk-based screening criteria and background levels. Depending on these initial results, additional characterization samples may be collected to further evaluate potential surface water, sediment, sediment pore water and shallow soil impacts, if any.

Specific objectives of the scope of work include investigation of the following areas and environmental media:

- ☐ Solid Waste Management Unit (SWMU) 22 – Storage Pond: surface water & sediment
- ☐ SWMU 23 – Land Application Treatment Area: surface soil
- ☐ Area of Interest (AOI) B – Suspect Former Process Wastewater Sewer Discharge: surface water, sediment and pore water
- ☐ AOI C – Historical Debris Area: surface soil, surface water & sediment

2. WORK TO BE COMPLETED

A. Surface Water Sampling

Surface water samples will be collected from the following areas: (1) the closed quarry pond owned by Martin Marietta to the east and north of the facility associated with the outfall from AOI B (6 samples); (2) the two closed quarry ponds on-Facility within AOI C (3 samples from each pond); and (3) the storage pond on-Facility within SWMU 22 (3 samples). At AOI B, six surface water samples will be collected in the immediate vicinity of the suspected sewer line discharge point (see Figure SAP 3A). The sample locations for AOI C and SWMU 22 will be evenly distributed within the ponds as shown on Figure SAP 3A. Surface water sampling methodology is provided in Section 3A below.

All surface water samples will be analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), including alkylated polycyclic aromatic hydrocarbons (PAHs), TAL total and dissolved metals, hardness, pH and total and dissolved organic carbon (TOC and DOC).

In addition, as part of the surface water investigation, an evaluation of the water depth and the general topography of the pond bottom will be evaluated through depth to bottom measurements spaced at approximately 100 feet intervals across the pond. At each location, water quality measurements as described in Section 3A will also be collected.

B. Sediment Sampling

Surface sediment (i.e., the biologically active zone 0-0.5 feet below sediment surface) samples will be collected from the following areas: (1) the closed quarry pond owned by Martin Marietta to the east and north of the facility associated with the outfall from AOI B (6 samples); (2) the two closed quarry ponds on-Facility within AOI C (3 samples from each pond); and (3) the storage pond on-Facility within SWMU 22 (3 samples). The sediment samples will be collocated, if possible, with the surface water sample locations described in Section 2A above. In addition, sediment cores will be collected as close as possible to the three near shore sediment sampling locations to assess lithology. Sediment sampling methodology is provided in Section 3B below.

The sediment samples are being collected from AOI C and SWMU 22 to address U.S. EPA's December 6, 2007 comment letter on the November 8, 2007 CCR, which requested shallow soil samples for ecological assessment purposes at these areas. As sediment is the most ecologically relevant media in areas such as SMWU 22, sediment sampling is anticipated instead of shallow soil sampling. Because of the size and drainage characteristics of AOI C, shallow soil samples will also be collected near the water bodies as discussed in Section 2D to supplement the sediment sampling.

All surface sediment samples will be analyzed for VOCs, SVOCs, including alkylated PAHs, TAL metals, TOC, grain size and pH, with contingent analyses for acid volatile sulfide and simultaneously extracted metals (AVS-SEM) if warranted based on total metal concentrations.

C. Sediment Pore Water Sampling



As requested by USEPA in a teleconference meeting on August 5, 2008, sediment pore water samples will be collected within the closed quarry pond owned by Martin Marietta to assess water quality in the ground-water/surface-water transition-zone. The sediment pore water samples will be collocated, if possible, with the three near shore surface water/sediment sampling locations associated with AOI B. At each of the three locations, one sediment pore water sample will be collected within 0-0.5 feet below sediment surface (i.e., the biologically active zone), and one pore water sample will be collected at a depth of at least 2 feet below sediment surface, depending on the sediment characteristics and sampling equipment limitations. Sediment pore water sampling methodology is provided in Section 3C below.

All sediment pore water samples (0.5 feet interval at a depth of at least 2 feet below sediment surface) collected using direct pore water sampling methods (see Section 3C) will be analyzed for VOCs, SVOCs, TAL total and dissolved metals, hardness, pH, TOC, and DOC.

D. Surface Soil Sampling

In accordance with USEPA's December 6, 2007 comment letter, shallow surface soil (i.e., 0-0.5 feet below ground surface [bgs]) samples will be collected from within AOI C (6 samples) to supplement the six sediment samples collected from within the ponds. These shallow soil sampling locations will be field determined and biased to areas of sediment deposition and/or wetland soil characteristics. In addition, in accordance with USEPA's December 6, 2007 comments, surface (i.e., 0-2 feet bgs) soil samples (12 samples) will be collected from within SWMU 23 to characterize surface soil within the waste water treatment plant effluent spray field (see Figure SAP 3A). The samples will be collected from representative locations within the radius of influence of the spray field sprinkler heads. Surface soil sampling methodology is provided in Section 3D below.

All surface soil samples collected in AOIs/SMWUs will be analyzed for VOCs, SVOCs, TAL metals and pH.

3. SAMPLING METHODOLOGY

The field activities associated with surface water, sediment, and soil sampling will follow applicable Standard Operating Procedures (SOPs) as provided in the Quality Assurance Project Plan (QAPP).

A. Surface Water

Surface water samples will be collected before sediment sampling is initiated. Prior to surface water sampling, field measurements of pH, temperature, specific conductance, dissolved oxygen, and turbidity will be recorded using a multiparameter water quality meter. The instrument will be calibrated according to the manufacturer's instructions each day prior to use.

Depending on the water depth, a small boat may be used for sample collection. At each sampling location, grab samples of surface water will be collected into a dedicated 2-liter plastic sample container (i.e., transfer container) that has not been pre-preserved.



Sampling containers will be held upgradient of the field personnel, if appropriate. Grab samples will be collected from within the lower two-thirds of the water column. Surface water from the 2-liter transfer container will be placed into sample containers, containing preservative, if appropriate. Prior to shipment, and as soon as possible after collection, those samples designated for dissolved metals analysis will be filtered using a peristaltic pump and 0.45 micron mesh filter; the resulting filtrate will be placed into a pre-preserved sample container and labeled for dissolved metals analysis.

Surface water samples will be labeled immediately after collection. The information on the sample label will include the project name, sample identification, sample date and time, and the analyses requested.

B. Sediment

Surface sediment samples will be collected for analysis from depositional areas as close as practical to the pre-designated sampling locations. Locations will be selected to provide sample representativeness, considering substrate for benthic organisms, consistency in grain size, and absence of plant material. Depending on site conditions, it may be preferable to not take a shallow sample at a given location, rather than to collect coarse-grained material from the surface or fine-grained material from a depth that is below the biologically active zone (i.e., greater than 0-0.5 feet bgs). Such field modifications may result in collection of fewer than the proposed number of sediment samples, in order to ensure the representativeness and quality of all sediment samples collected.

Surface sediment samples will be collected using a grab sampler (either stainless steel scoops or a Ponar Type sampler, depending on the depth of the water). If using a Ponar Type sampler, the sampler will be lowered through the water to the underlying sediment until refusal. The sampler will then be brought to the surface. Any free water from the scoops or Ponar will be carefully decanted.

Two types of sediment samples will be collected: composite and discrete samples. Composite samples will be used for most chemical analyses to satisfy total sample volume requirements and will consist of several sediment grab samples from within each sampling location. Prior to filling the sample containers, sediment from all of the grab samples taken from a single location will be placed in a stainless steel bowl and mixed using a plastic spoon until it is visually observed to be homogeneous; excessive mixing will be avoided to maximize sample integrity. Visible plant material (roots, shoots, leaves) and rocks will be removed prior to filling sample containers. Sample containers should be packed as full as possible to minimize empty head space. Discrete sediment samples will be collected for certain analyses (i.e., VOCs and AVS-SEM) to minimize artifacts associated with changes in oxidation-reduction potential (redox) conditions or excess handling. Discrete samples will not be homogenized prior to filling sampling containers and will be packed as full as possible to minimize empty head space.

Sediment samples will be labeled immediately after collection. The information on the sample label will include the project name, sample identification, sample date and time, and the analyses requested. Upon completion, a licensed surveyor will locate the coordinates and elevations of the sampling locations, if appropriate.



C. Sediment Pore Water

Sediment pore water samples (two depths each) will be collocated with the three near shore sediment sample locations and collected using a direct pore water sampler (e.g., push point sampler, piezometer, Trident probe). For the deep pore water sample, the sampler will be inserted as deep as possible into the sediment, but at least 2 feet below the sediment surface. Pore water will be collected from the probe and placed immediately and directly into appropriate sample containers. Prior to shipment, and as soon as possible after collection, those samples designated for dissolved metals analysis will be filtered using a peristaltic pump and 0.45 micron mesh filter; the resulting filtrate will be placed into a pre-preserved sample container and labeled for dissolved metals analysis.

Alternatively, if direct pore water samplers do not provide an effective and efficient method to obtain sediment pore water (e.g., samplers clog due to fine-grained sediment), then a direct-push sampler will be used to collect the pore water samples. Sufficient saturated sediment volume will be collected from the appropriate depths (0-0.5 feet and at least 2 feet below the sediment surface) using the direct-push sampler. The sediment will be placed into unpreserved sample containers and sent to the analytical laboratory for extraction of pore water using centrifugation, with analysis for total chromium only due to the prohibitively large quantity of sediment that would be needed to obtain sufficient pore water for analysis of the full project chemical list.

Pore water samples will be labeled immediately after collection. The information on the sample label will include the project name, sample identification, sample date and time, and the analyses requested.

D. Surface Soil

Shallow surface soil samples from the 0-0.5 feet interval will be collected within AOI C using a trowel or decontaminated hand auger. Surface soil (i.e., 0-2 feet bgs) sampling locations within SWMU 23 will be preferentially sampled with direct-push Geoprobe[®] rig equipment if access is available. If access is not available, then the locations will be hand-augured. All borings will be abandoned to the ground surface in accordance with project SOPs.

Soil samples will be labeled immediately after collection. The information on the sample label will include the project name, sample identification, sample date and time, and the analyses requested. Upon completion, a licensed surveyor will locate the coordinates and elevations of the sampling locations, if appropriate.

4. SAMPLING CONTAINERS, IDENTIFICATION, ANALYSIS AND PRESERVATION

The surface water samples will be labeled as SW-01[date], sediment samples will be labeled as SED-01[date].

The soil samples will be labeled as B-01/02-04/ [date] and sediment pore water samples will be labeled as SPW-01 [date] where:



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B-01/02-04/ [date], Location identification;
B-01/02-04/ [date], Interval of sample in feet below ground surface;
B-01/02-04/ [date], Date of Sample Collection.

Soil and water samples will be analyzed to meet the regulated thresholds in compliance with USEPA. The QAPP outlines the appropriate analytical methods, sample containers, holding times and preservatives for the constituents of interest.

Excess soil/sediment and water will be contained in 55-gallon drums stored at the Bway facility. Upon characterization of the investigation derived waste, the Bway environmental manager will coordinate disposal.

5. SAMPLE HANDLING AND SHIPMENT

Samples will be labeled immediately after collection. The information on the sample label will include the project name, sample identification, sample date and time, and the analyses requested. Samples will be shipped to and analyzed by the project laboratory, as discussed above.

6. FIELD DOCUMENTATION

6.1 Field Logbook

A field logbook will be used to record facts and circumstances of the sampling event. Information recorded in the logbook/field form will include the following:

- Name of sampling personnel;
- Sample location;
- Time and date;
- Weather conditions;
- Sample type (i.e. grab, composite, etc.); and
- Pertinent sample data.

6.2 Chain-of-Custody

Chain-of-custody documentation will accompany each sample shipment. The chain-of-custody record will record the project name, type of sample collected, date of sample collection, name(s) of the person(s) responsible for sample collection, date of custody transfer, signature of the person relinquishing and accepting sample custody, and other pertinent information.

7. EQUIPMENT DECONTAMINATION

Decontamination procedures include:

- Field Equipment coming into contact with contaminated materials (e.g., direct-push shoe and rods or hand auger, stainless steel scoops or Ponar sampler, etc.) will be decontaminated in accordance with the Payne Firm SOPs 5-1 (Decontamination of Soil Sampling Equipment). Disposable one-time use sampling equipment will be discarded after each use (e.g., plastic bailers and tubing);
- Decontamination procedures include:



- Scrub the sampling equipment in a non-phosphate detergent solution (Bucket #1);
- Rinse thoroughly with distilled water (Bucket #2);
- Rinse thoroughly with a 1% hydrochloric acid solution (Bucket #3)
- Rinse thoroughly with distilled water and allow to air dry; (Bucket #4);
- Rinse with methanol and allow to air dry; (Bucket #5)
- Rinse thoroughly with distilled water and allow to air dry (Bucket #6);
- If oil or notable contamination is present, the field coordinator should determine if additional decontamination methods are necessary.

Decontamination solutions will be contained and new solutions used periodically during each day of sampling. All decontamination solutions will be contained and properly disposed.

8. QUALITY ASSURANCE

Sample collection, quality assurance/quality control procedures, and employment of data quality objectives will be conducted by the Payne Firm in accordance with the QAPP. The general level of the QC effort will consist of one field duplicate, one field equipment rinseate, one field blank, and one matrix spike/matrix spike duplicate (MS/MSD) per 20 investigative samples. One VOC trip blank sample will be prepared by the laboratory and will be included along with each shipment of aqueous VOC samples. VOC trip blanks will be preserved by the laboratory in the same manner as the investigative samples.

- The trip blank samples will be identified as: TB01/ [date]. The trip blank sample will be analyzed for VOCs only.
- The duplicate samples will be collected at the discretion of the field coordinator. The duplicate samples will be identified successively as: DUP01/ [date], DUP02/ [date], etc. The duplicate sample will be analyzed for the same parameters as the original sample.
- The rinse water sample will be collected after the sample equipment has been properly decontaminated at the end of the day. The sample will be collected by pouring laboratory grade water over the equipment, as appropriate, into the appropriate sample containers. The laboratory grade water will be provided by the project laboratory. The rinse water sample will be labeled as: RIN01/ [date]. This QA/QC sample will be analyzed for VOCs, SVOCs and metals.
- The field blank sample will be collected by filling laboratory grade water directly into the appropriate sample containers. The field blank sample will be labeled as FB01/ [date]. The field blank sample location should be noted in the field notes. This QA/QC sample will be analyzed for VOCs.
- One MS/MSD will be collected for every 20 or fewer investigative samples. MS/MSD water samples must be collected at triple volume for VOC and double the volume for extractable organics. No additional volume is required for solid samples.
- At the beginning of each day, the organic vapor analyzer and the water quality meter will be calibrated. Calibration results will be documented in the log book.



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9. SAMPLING TEAM

Project Manager-Kevin D. Kallini, P.G.
Field Coordinator/Quality Assurance Officer-Matthew D. Birck
Field Samplers-Payne Firm

Surface Water/Sediment & Shallow Surface Soil Samplers
ENVIRON field personnel-Christopher M. Buzgo, Ph.D., Manager
ENVIRON field personnel-Katrina Leigh, Senior Ecologist

Pore Water Samplers
Payne Firm and ENVIRON-Christopher M. Buzgo and Katrina Leigh



Table 1: Surface Water, Pore Water, Shallow Soil/Sediment Sampling Methodology				
Area	Sampling Scope	Sample Determination Criteria	Purpose	Source
SWMU 22 - Storage Pond	Three (3) co-located sediment and surface water sampling locations: - surface water samples (VOCs, SVOCs including alkylated PAHs, TAL total and dissolved metals, hardness, pH, TOC and DOC) and - surface sediment samples from 0-0.5 feet (VOCs, SVOCs, including alkylated PAHs, TAL metals, contingent AVS/SEM metals, TOC, grain size and pH)	Three (3) locations selected to provide representative coverage of pond	Verify no past release of hazardous materials could pose an unacceptable risk to ecological receptors	Specified in USEPA's December 2007 CCR comment letter
SWMU 23 - Land application treatment area	Twelve (12) surface soil samples from 0-2 feet bgs (VOC, SVOC, TAL Metals and pH)	Twelve (12) locations to provide representative coverage of sprayfield	Verify no past release of hazardous materials could pose an unacceptable risk to ecological receptors	Specified in USEPA's December 2007 CCR comment letter
AOI B - Former Process Sewer Line	Six (6) co-located sediment and surface water locations and three (3) collocated pore water samples (near shore locations) collected at 2 depths (6 samples): - surface water and pore water1 samples (VOCs, SVOCs including alkylated PAHs, TAL total and dissolved metals, hardness, pH, TOC and DOC) - surface sediment samples from 0-0.5 feet (VOCs, SVOCs, including alkylated PAHs, TAL metals, contingent AVS/SEM metals, TOC, grain size and pH)	1 - existing outfall point, 1- historical outfall point, 1 - original outfall point for sediment, surface water and pore water and 3 (total) - north of each of the above locations	Characterize potential discharges to surface water, sediment and the ground water/surface water interface in the northern gravel pit pond.	Specified in the Section 5.23.3 of the CCR and verbal comments from USEPA on August 5, 2008 conference call.
AOI C - Historical debris area	Three (3) co-located surface water and sediment sample locations: - surface water samples (VOCs, SVOCs including alkylated PAHs, TAL total and dissolved metals, hardness, pH, TOC and DOC) - surface sediment samples from 0-0.5 feet (VOCs, SVOCs, including alkylated PAHs, TAL metals, contingent AVS/SEM metals, TOC, grain size and pH) in each of 2 small ponds Six (6) shallow soil samples from 0-0.5 feet bgs (VOCs, SVOCs, TAL Metals and pH)	Three (3) sediment/surface water locations to provide representative coverage in each of 2 ponds Six (6) shallow soil sampling locations biased to depositional areas and/or wetland soil characteristics	Verify no past release of hazardous materials could pose an unacceptable risk to ecological receptors	Specified in USEPA's December 2007 CCR comment letter
<u>Notes:</u>				
1 - Samples collected via direct pore water sampling methods will be analyzed for all parameters. Pore water collected via centrifugation, if appropriate will be analyzed for total chromium only.				



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RCRA 3008(h) Consent Order RCRA-05-2007-0011

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APPENDIX I: Data Objective Summary Form

Activity:	Sampling and Analysis Plan #3
Sample Media:	Surface Water
Sample Type:	Grab
Number of Samples:	15 total, divided as follows: AOI-B off-property quarry pond: 6; SWMU 23 on-property storage pond: 3; AOI C on-property quarry ponds: 3 ea.
QA/QC Samples:	1 field blanks
	1 field duplicates
	1 MS/MSD
	1 Trip blank per VOC cooler
	1 Equipment rinsate per day of sampling
Sampling Procedures:	See applicable SOPs attached to QAPP and SAP #3
Analytical Methods:	VOC, SVOCs including alkylated PAHs, TAL total and dissolved metals, hardness, pH, DOC and TOC.
Appropriate Analytical Levels:	ASL-IV
Activity:	Sampling and Analysis Plan #3
Sample Media:	Sediment
Sample Type:	Grab
Number of Samples:	15 total, divided as follows: AOI-B off-property quarry pond: 6; SWMU 23 on-property storage pond: 3; AOI C on-property quarry ponds: 3 ea.
QA/QC Samples:	1 field blanks
	1 field duplicates
	1 MS/MSD
	1 Trip blank per VOC cooler
	1 Equipment rinsate per day of sampling
Sampling Procedures:	See applicable SOPs attached to QAPP and SAP #3
Analytical Methods:	VOC, SVOCs including alkylated PAHs, TAL total and dissolved metals, contingent AVS/SEM metals, pH, grains size and TOC.
Appropriate Analytical Levels:	ASL-IV



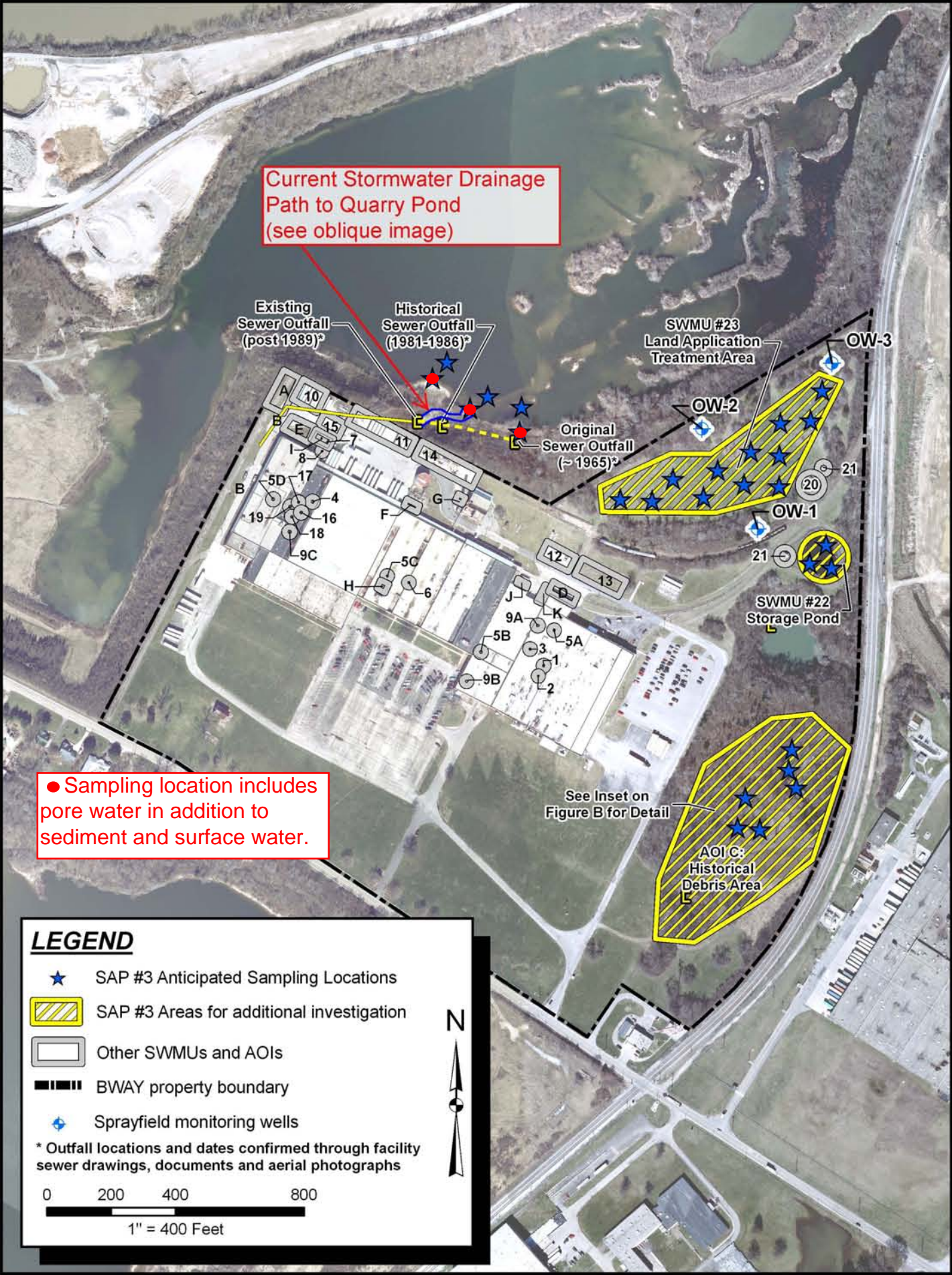
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Activity:	Sampling and Analysis Plan #3
Sample Media:	Sediment Pore Water
Sample Type:	Grab
Number of Samples:	6 total from AOI-B off-property quarry pond, collocated with near-shore surface water & sediment locations from two vertical intervals
QA/QC Samples:	1 field blanks
	1 field duplicates
	1 MS/MSD
	1 Trip blank per VOC cooler
	1 Equipment rinsate per day of sampling
Sampling Procedures:	See applicable SOPs attached to QAPP and SAP #3
Analytical Methods:	VOC, SVOCs including alkylated PAHs, TAL total and dissolved metals, hardness, pH, DOC and TOC.
Appropriate Analytical Levels:	ASL-IV
Activity:	Sampling and Analysis Plan #3
Sample Media:	Surface Soil
Sample Type:	Grab
Number of Samples:	12 total from SWMU 23 land-application sprayfield
QA/QC Samples:	1 field blanks
	1 field duplicates
	1 MS/MSD
	1 Trip blank per VOC cooler
	1 Equipment rinsate per day of sampling
Sampling Procedures:	See applicable SOPs attached to QAPP and SAP #3
Analytical Methods:	VOC, SVOCs, TAL metals, pH
Appropriate Analytical Levels:	ASL-IV

Sampling and Analysis Plan #3: Plan View

and

Oblique Perspectives Using a Digital Elevation Model

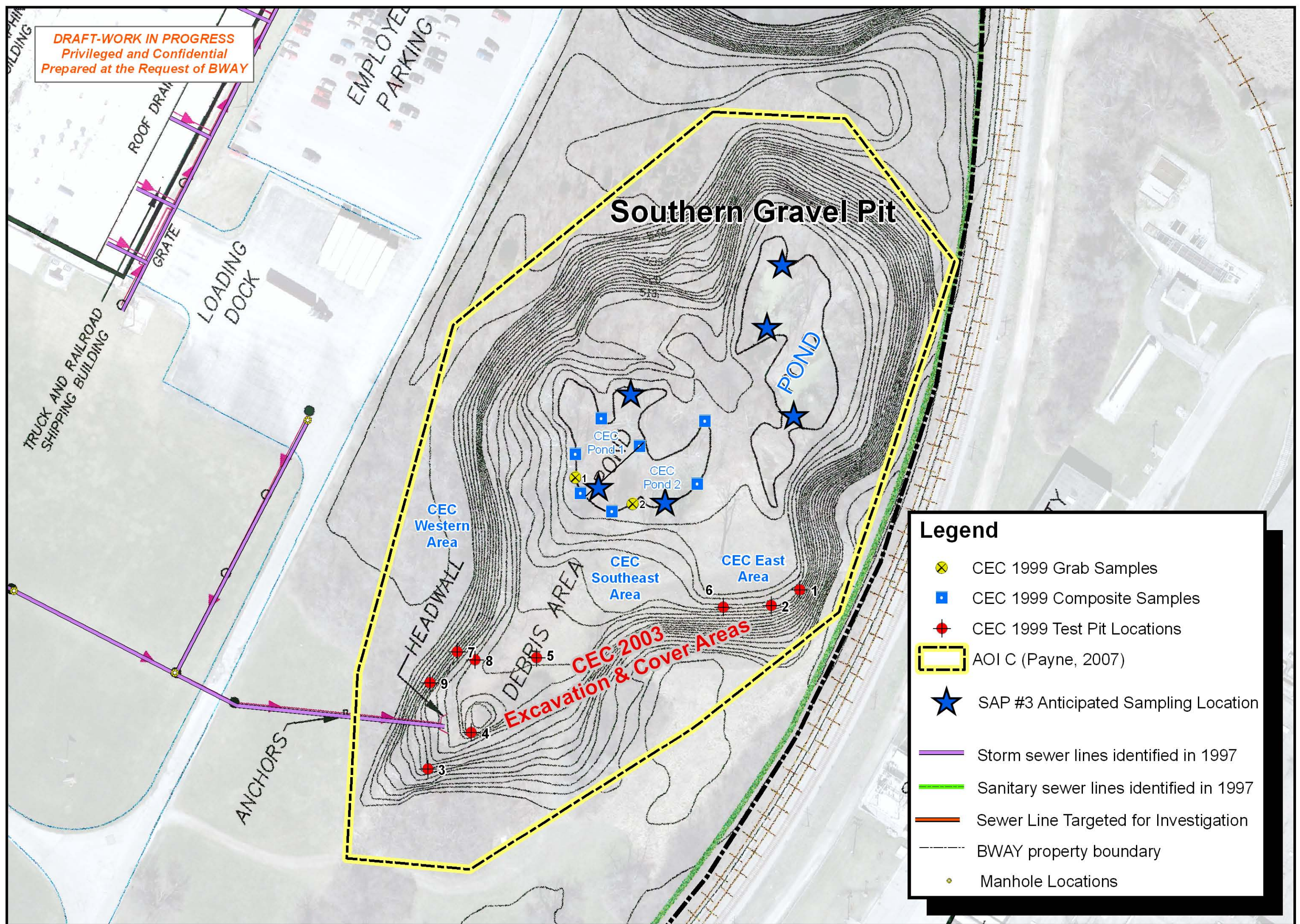


Sprayfield and Quarry Pond Sample Points as Viewed from the Northeast



BWAY Facility, Quarry Pond, and Sprayfield as Viewed from the West

DRAFT-WORK IN PROGRESS
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Prepared at the Request of BWAY



Legend

- CEC 1999 Grab Samples
- CEC 1999 Composite Samples
- CEC 1999 Test Pit Locations
- AOI C (Payne, 2007)
- SAP #3 Anticipated Sampling Location
- Storm sewer lines identified in 1997
- Sanitary sewer lines identified in 1997
- Sewer Line Targeted for Investigation
- BWAY property boundary
- Manhole Locations

PROJECT BWAY - RCRA Corrective Action

TITLE SAMPLING AND ANALYSIS PLAN #3
Surface Water, Sediment, and Shallow Soil Investigation

REFERENCE 2006 Orthophoto Courtesy CAGIS; 1998 Payne Firm Baseline Environmental Assessment (BEA) Appendix III: Summary of Sewer Network

FIGURE NO. SAP #3.4

DRAWN BY MDB

PROJECT NO. 654.13.05

DATE 6/30/08

REQUESTED BY KDK

FIGS: Projects\GIS 0654.13.05 Bway CA\WDa\RE\SAP3B.mxd



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