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Enbridge Line 6B MP 608
Marshall, MI Pipeline Release

2013 Submerged Oil Removal and Assessment Work Plan

Prepared for United States Environmental Protection Agency

Enbridge Energy, Limited Partnership

Approved: May 13, 2013

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FIGURES

ATTACHMENTS

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LIST OF ACRONYMS

AMS Addendum	*Air Monitoring and Sampling Addendum to the Sampling and Analysis Plan* approved by U.S. EPA on May 3, 2012
AOS	*apparent opening size*
ATS	Ann Arbor Technical Services, Inc.
bss	Below Sediment Surface
BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes
Containment	Containment Structures
CSD	Cylindrical Sampling Device
CWA	Clean Water Act
EI	Environmental Inspector
Enbridge	Enbridge Energy, Limited Partnership
°F	degrees Fahrenheit
FI	Final Inspector
ft	feet
ft^2	square feet
ft^3	cubic feet
GAC	Granular Activated Carbon
GC/FID	Gas Chromatography with Flame Ionization Detection
GC/MS-SIM	Gas Chromatography with Low Resolution Mass Spectrometry using Selected Ion Monitoring
GDT	Geotextile Dewatering Test
GIS	Geographical Information System
GLNPO	Great Lakes National Program Office
gpm	gallons per minute
GPS	Global Positioning System
HASP	Health and Safety Plan
HBT	Hanging Bag Test
LDB	Left Descending Bank
Line 6B	The pipeline owned by Enbridge Energy, Limited Partnership that runs just south of Marshall, Michigan
MDEQ	Michigan Department of Environmental Quality
MP	Mile Post
NAVD88	North American Vertical Datum of 1988
NEBA	Net Environmental Benefit Analysis
NPDES	National Pollutant Discharge Elimination System
NTU	Nephelometric Turbidity Unit
OI	Operations Inspector
PCBs	Polychlorinated Biphenyls
ppb	parts per billion
PVC	Polyvinyl chloride
QAPP	Quality Assurance Project Plan
Quantification Report	*Supplement to the Response Plan for Downstream Impacted Areas Commonly Referred to as the "Quantification of Submerged Oil Report"* submitted to U.S. EPA on March 21, 2013
RDB	Right Descending Bank
RDT	Rapid Dewatering Test
RTK-GPS	Real Time Kinematic-Global Positioning Systems
SAP	Sampling and Analysis Plan
Sediment Trap Plan	*2012 Sediment Trap Monitoring and Maintenance Plan* approved by the U.S. EPA on July 10, 2012
the Order	Order pursuant to §311(c) of the Clean Water Act (Docket No. CWA 1321-5-13-001) for Recovery of Submerged Oil from the Enbridge Line 6B Discharge near Marshall, MI

2011-2012 CWP	*Addendum to the Response Plan for Downstream Impacted Areas, August 2, 2010 (Revised August 17, 2010 per U.S. EPA August 17, 2010 letter), Supplement to Source Area Response Plan, and Supplement to Response Plan for Downstream Impacted Areas, Referred to as Operations and Maintenance Work Plan Commonly referred to as "Consolidated Work Plan from Fall 2011 through Fall 2012"*
U.S. EPA	United States Environmental Protection Agency
USGS	United States Geological Survey
VOCs	Volatile Organic Compounds
Work Plan	2013 Submerged Oil Removal and Assessment Work Plan
WQ SOP	*Water Quality Measurement Standard Operating Procedure* approved by the MDEQ on September 22, 2011
WSS	Walling Suspended Sediment
WTTD Plan	Enbridge Line 6B MP 608 Pipeline Release Marshall, Michigan; *Waste Treatment, Transportation, and Disposal Plan.* Approved by U.S. EPA on May 17, 2011.
yd^3	cubic yards

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1.0 INTRODUCTION

This 2013 Submerged Oil Removal and Assessment Work Plan (Work Plan) is submitted in response to the United States Environmental Protection Agency (U.S. EPA) Final Administrative *Order pursuant to §311(c) of the Clean Water Act (Docket No. CWA 1321-5-13-001) for Recovery of Submerged Oil from the Enbridge Line 6B Discharge near Marshall, MI* (the Order), issued to Enbridge Energy, Limited Partnership (Enbridge) on March 14, 2013 (U.S. EPA, 2013a) requiring further response actions. The U.S. EPA issued the Order pursuant to the authority under Section 311(c) of the Federal Water Pollution Control Act, 33 U.S.C § 1321(c), as amended (commonly referred to as the Clean Water Act (CWA)). This Work Plan also incorporates comments provided in the letter, *U.S. EPA's Disapproval of April 4, 2013 Submittal in response to the March 14, 2013 Order (Docket No. CWA 1321-5-13-001) for Recovery of Submerged Oil from the Enbridge Line 6B Discharge near Marshall, MI,* dated April 11, 2013 (U.S. EPA, 2013b).

1.1 Background

On July 26, 2010, Enbridge discovered a release of crude oil from the pipeline owned by Enbridge that runs just south of Marshall, Michigan (Line 6B) in the vicinity of its pump station. The Enbridge Line 6B crude oil release was a below grade level via a break in the pipeline at Mile Post (MP) 608, which emerged onto the ground surface, flowed over land following the natural topography into Talmadge Creek, and proceeded to flow downstream into the Kalamazoo River. Following the release, Enbridge performed extensive response activities under the direction of the U.S. EPA and the Michigan Department of Environmental Quality (MDEQ) to remove oil from the Kalamazoo River system in response to the release.

1.2 Regulatory Framework

As required by the Order, all dredging operations and submerged oil reassessment and supplemental data collection activities will be performed in accordance with Section 311(c) of the Clean Water Act, 33 U.S.C. § 1321(c), as amended by the Oil Pollution Act of 1990, and 33 U.S.C. § 2701 et seq. Activities referenced in this Work Plan will also be performed in accordance with all federal, state, and local regulations.

1.3 Purpose and Objectives

This Work Plan outlines activities to dredge portions of the Kalamazoo River containing submerged oil; perform submerged oil reassessment activities at select locations along the Kalamazoo River from the confluence with Talmadge Creek downstream through the Morrow Lake Delta to Morrow Lake Dam; collect scientific data and surface water measurements to assist with ongoing submerged oil reassessment; continue oil sheen/globule management activities; install, monitor, and maintain containment devices; air monitoring/sampling; water, sediment and/or soil sampling; and, disposal of waste materials. Activities and tasks described herein will be performed during the calendar year 2013 subject to final approved scope of work, permitting, weather conditions, and other unforeseen circumstances beyond Enbridge's control.

The main objectives of this Work Plan are to provide detailed information regarding the proposed dredging operations, including provisions to prevent downstream migration of submerged oil and/or surface sheen and oil globules, and to provide information on performing submerged oil reassessment and poling activities in various locations in the Kalamazoo River. Other objectives of this Work Plan are to collect supplemental data as appropriate to further assess suspended sediment concentrations; collect surface water/sediment temperature and Kalamazoo River flow and stage data; and, perform sheen management throughout portions of the Kalamazoo River.

1.4 Health and Safety Requirements

An Enbridge *Health and Safety Plan* submitted on April 30, 2013 (Enbridge, 2013a) (HASP) has been developed to present a consolidated set of rules, safe work practices, and procedures related to the Enbridge Line 6B response activities. Enbridge site-specific training will address health and safety and provide guidance in order to prevent incidents and injuries to site workers. The site-specific training is required by all contractors who will be working on-site. All contractors will ensure each worker has completed the Enbridge health and safety training prior to work commencing.

It will be the responsibility of the worker to be familiar with the procedures outlined within this work plan, with site-specific procedures, the current site-specific HASP, work plans under which the work will be conducted, and proper data collection and documentation of response activities.

1.5 Organizational Structure

An organizational structure has been established in conjunction with the U.S. EPA to optimize implementation of this Work Plan. The organizational structure chart for the project is included as *Attachment A*. The organizational structure will be adopted into the Incident Action Plan and will be used throughout dredging operations. The organizational structure is dynamically designed to be refined and modified to adapt to changing project conditions and shifting command emphasis.

1.6 Other Work Plan Activities

As outlined in the Order, Enbridge will continue to comply with the following plans and supplements, addenda, and/or modifications to the listed plans, which were submitted and approved by U.S. EPA:

- *Quality Assurance Project Plan* (QAPP) (Enbridge, 2010a) approved by the U.S. EPA on August 19, 2010,
- *Analytical Quality Assurance Plan Version 2.3* (Enbridge, 2012a) approved by the U.S. EPA on December 21, 2012,
- HASP,
- *Sampling and Analysis Plan (SAP)* (Enbridge, 2010b) approved by the U.S. EPA on August 19, 2010,
- *Waste Treatment, Transportation and Disposal Plan (WTTD Plan)* (Enbridge, 2011a) approved by the U.S. EPA on May 20, 2011 (WTTD Plan),
- Dredge Operation Procedures and Guidelines (*Attachment B*),
- *Supplement to Source Area Response Plan and Supplement to Response Plan for Downstream Impacted Areas Referred to as Operations and Maintenance Work Plan* (Enbridge, 2010c) approved by the U.S. EPA on October 7, 2010,
- *Addendum to the Response Plan for Downstream Impacted Areas, August 2, 2010 (Revised August 17, 2010 per U.S. EPA August 17, 2010 letter), Supplement to Source Area Response Plan, and Supplement to Response Plan for Downstream Impacted Areas, Referred to as Operations and Maintenance Work Plan, Commonly referred to as "Consolidated Work Plan from Fall 2011 through Fall 2012"* (Enbridge, 2011b) approved by the U.S. EPA on December 21, 2012 (2011-2012 CWP), and

- *2012 Morrow Lake Delta and Morrow Lake Monitoring and Management Plan* (Enbridge, 2012b) approved by the U.S. EPA on November 15, 2012 (2012 MLD/MLMM Plan) (*Attachment C*).

On April 11, 2013, Enbridge resubmitted a permit application to the MDEQ to reinstall the E 4.0 containment system structures in the Morrow Lake Delta. As required, the E 4.0 Containment System will be reinstalled in accordance with the *2012 Morrow Lake Delta Containment Strategy Design and Engineering Considerations Technical Memorandum* (Enbridge, 2012c) approved by U.S. EPA on June 26, 2012. The permit (MDEQ Permit #13-39-0012-P) was issued on April 30, 2013.

Enbridge will continue to comply with the *Sediment Trap Monitoring and Maintenance Plan* (Enbridge, 2012d) approved by the U.S. EPA on July 10, 2012 (Sediment Trap Plan), including *Appendix J* of the Order. The *Kalamazoo River-Subsurface Sediment Structures (14 Sites)-MDEQ Permit Application Submittal to Conduct Proposed Kalamazoo River Response Actions Pursuant to Parts 31, 301, and 303 of NREPA* (Enbridge, 2012e) submitted to the MDEQ on April 29, 2012 will be modified to include sediment trap dredging if a poling trigger threshold is reached as outlined in the Sediment Trap Plan. The permit application will be submitted to MDEQ for approval.

Enbridge will analyze the sediment samples previously collected from the cylindrical sampling devices (CSDs) in 2012 as well as CSD samples collected in 2013 for the analytical parameters identified in *Appendix J* of the Order:

- Polycyclic aromatic hydrocarbon and sulfur heterocyclic compounds including alkyl homologues by gas chromatography with low resolution mass spectrometry using selected ion monitoring (Gas Chromatography/Mass Spectrometry-Selected Ion Monitoring (GC/MS-SIM) using U.S. EPA Method 8270D),
- Saturated hydrocarbons by gas chromatography with flame ionization detection (GC/FID) (based on U.S. EPA Method 8015),
- Total extractable hydrocarbons representing the total aromatic and aliphatic hydrocarbon content of sample extracts after silica gel clean-up and analysis by GC/FID,
- Particle size distribution analysis, and
- Total organic carbon.

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2.0 PRE-DREDGE ACTIVITIES

This Work Plan outlines dredging operations at locations defined by U.S. EPA as exhibiting 'heavy' and 'moderate' poling delineations. Poling delineations were determined using 2012 poling data. Amendments to the 'heavy' and 'moderate' poling delineations within this Work Plan may be modified upon completion of a Spring 2013 Reassessment (see *Section 5.3*). Proposed dredging areas are shown in *Figure 1*. The following locations are to be dredged in accordance with the Order:

- MP 4.50 to MP 5.80 - upstream of Ceresco Dam, including the Ceresco/MP 5.75 sediment trap,
- MP 10.40 N - sediment trap,
- MP 13.90 to MP 15.70 - upstream of the Kalamazoo Dam at Battle Creek, (i.e., Mill Ponds area, including the MP 14.75 right descending bank (RDB) sediment trap),
- MP 21.50 RDB - sediment trap, and
- MP 36.50 to MP 39.85 - Morrow Lake, Morrow Lake Delta, and adjacent locations including the Delta Z/MP 37.50 sediment trap.

2.1 Location and Access

Dredge operation areas, including access and haul routes, dredge/dewatering/mixing pad locations, and equipment laydown areas have been identified and are shown on *Figure 2*. *Section 3.1* through *Section 3.5* contains details on proposed dredging methods and sequence of dredging operations. Best efforts to secure site access and obtain permits are already underway in an attempt to accelerate completion of the dredge operations. Enbridge will continue to work closely with the U.S. EPA and MDEQ to facilitate a timely completion of required permitting and river access for dredging operations.

2.2 Public River Access During Dredging Operations

Portions of the Kalamazoo River planned for dredging operations will be closed for public access. The Kalamazoo River public access points upstream and downstream of dredging operations will have navigational buoys placed pursuant to Michigan Department of Natural Resources and MDEQ permitting. Enbridge and U.S. EPA intentions for the river closure plan are to limit the loss of river availability yet still maintain public and worker safety awareness. The following river closure plan for each dredge location is anticipated:

- MP 4.50 to MP 5.80 - River closure includes immediately downstream of Saylors Landing at MP 2.25 to the Ceresco Dam at MP 5.80,
- MP 10.40 N and MP 13.90 to MP 15.70 - River closure for the two dredge locations includes immediately downstream of Historic Bridge Park at MP 9.50 downstream to MP 15.70 at the Battle Creek raceway,
- MP 21.50 RDB - No river closure for this dredge location is anticipated, and
- MP 36.50 to MP 39.85 - River closure includes MP 36.50 downstream through MP 38.50 in Morrow Lake.

Prior to dredging operations, Enbridge will consider lengthening sections between the proposed ingress/egress routes for the public, minimizing river closure.

2.3 Hydraulic Dredging Means and Methods

Hydraulic dredging methods will be evaluated for dredge locations along the Kalamazoo River. Selected hydraulic dredges will be 8-inch and/or 12-inch based on the specific conditions at each dredging location, which include depth of the water to accommodate dredge vessel draft requirements, depth of the dredge cut, and availability of laydown area for sediment dewatering. Debris encountered during dredging operations will be handled in accordance with the *Debris Management Plan* presented in *Attachment B*.

2.3.1 Dewatering Pad Construction

The dewatering pads will be designed and constructed to accommodate the necessary volume for the planned dredging operation, including retention of staged materials, a full shift of dredging slurry, and 24-hours of stormwater from a 10-year storm event. The dewatering pad will have an impervious polyethylene liner and a drainage layer slightly sloped to a sump and overlain with a stone or geotextile working surface. Dewatering pads will be constructed with existing on-site soil and/or clean imported fill.

2.3.2 Dewatering of Sediment and Conditioning

Hydraulic dredge operations will pump sediment and carriage water as a dredge slurry to the dewatering pad via a discharge pipe. Polymer will be injected into the slurry pipeline before entering geotextile tubes. A polymer will flocculate the sediment and allow water to separate (see *Section 2.4.2* for additional details). The separated water, also called weep water, will filter through the geotextile tube to the drainage layer and flow to a sump where the water will be pumped through the treatment system.

2.3.3 Geotextile Tube Operations and Solidification

Geotextile tubes will be used and monitored during hydraulic dredging operations to evaluate 'fill and rest' cycles until maximum capacity has been obtained in accordance with the *Geotextile Tube Handling Plan* presented in *Attachment B*. Once a geotextile tube is at maximum capacity and dewatering is completed, waste characterization will be performed in accordance with the WTTD Plan. Upon characterization, the dredged material will be transported to a U.S. EPA approved landfill or other State of Michigan approved location(s) for disposal.

If necessary, agents may be added to the dredged material to assist with the sediment solidification process prior to offsite disposal at a U.S. EPA approved landfill or other State of Michigan approved location(s). At this time, solidification agents are currently being evaluated in bench scale treatability studies.

2.3.4 Water Treatment and Discharge

The water treatment system will consist of several multi-bag filters and activated carbon filtration and be operated in accordance with the *Water Treatment Plant Operations Plan* presented in *Attachment B*. Bag filtration canisters will remove particulates in the weep water and will be followed by granular activated carbon (GAC) canisters for removal of soluble phase organics before discharge to the river. Throughout dredging operations, any water treatment systems shutdown will be in accordance with the *Water Treatment Plant Short and Long Term Shutdown Plan* presented in *Attachment B*.

Treated water (effluent) will be discharged back into the Kalamazoo River in accordance with the appropriate National Pollutant Discharge Elimination System (NPDES) permits and testing will be conducted in accordance with the *Water Treatment Plant Sampling Plan* presented in *Attachment B*. Media from the water treatment and discharge systems will be disposed off-site at a U.S. EPA approved facility in accordance with the WTTD Plan.

2.4 Mechanical Dredging Means and Methods

Mechanical dredging will use conventional excavators and a bucket attachment on the excavator arm or the patented SedVac® system, which uses an industrial vacuum loader. The equipment can either work from the shore, be amphibious, or can be mounted on barges for riverine use. Mechanically dredged sediment will either be placed by the operator into a hopper equipped with a pump to hydraulically convey the slurry to a dewatering/mixing pad, loaded into an all-terrain off road truck or placed in an enclosed roll off or vacuum box

in a temporary on-site staging location. Dredged sediment will be pumped or hauled to a dewatering/mixing pad for processing. After reaching the dewatering/mixing pad, the sediment may be handled in the same manner as hydraulically dredged sediment (as described above). Debris encountered during dredging operations will be handled in accordance with the *Debris Management Plan* presented in *Attachment B*.

2.4.1 Temporary On-site Dewatering/Mixing Pads

The mechanically dredged materials may be transported to a temporary upland dewatering/mixing pad. The dewatering/mixing pad will be constructed using existing on-site soil and/or clean imported fill. An impermeable liner will be placed over the dewatering/mixing pad to collect dredged material. A metal mixing structure will be placed within the dewatering/mixing pad to facilitate sediment solidification prior to off-site disposal at a U.S. EPA approved landfill or other State of Michigan approved location(s).

2.4.2 Sediment Solidification

If necessary, solidification agents may be added to the dredged material to assist with the sediment solidification process prior to offsite disposal in accordance with the WTTD Plan. Disposal will be at a U.S. EPA approved landfill or other State of Michigan approved location(s). At this time, solidification agents are currently being evaluated in bench scale treatability studies.

2.5 Bench Scale Tests

The bench scale tests involve various tests ranging from polymer evaluation to rapid dewatering tests (RDT). During the polymer evaluation, a sample is exposed to several different cationic and anionic polymers, as well as other types of flocculants, to determine which works best for enhancing separation of water from solids. Once a polymer type and dose has been established, the RDT is performed using a small swath of geotextile tubes in the form of a cone, treating the material with the preferred polymer dose, then pouring the treated material into the cone-shaped geotextile tubes and observing rate of retention, clarity of decant, and achievable percent solids of the dewatered material.

Once bench scale testing has concluded, the next step is to move to a hanging bag test (HBT), or geotextile dewatering test (GDT). The HBT involves a geotextile configured to a bag that hangs from a scaffold and the GDT involves a ‘pillow’ sized geotextile tube placed on a drainable surface. Both tests have similar objectives: to evaluate whether or not particular slurries will dewater; to test the polymer scheme developed during the bench scale

testing; and, to gather baseline data for estimating the rate of solids capture and material consolidation of a larger scale. Both tests involve the process of mixing small batches of slurry to the consistency that will most likely be experienced in the field, mixing in polymer, and injecting into the preferred geotextile tube.

2.6 Environmental Protection and Regulatory Compliance

This section summarizes the regulatory requirements applicable to dredge operations. Upon submitting permit applications or requests for modifications of existing permits to the MDEQ and/or other agencies, Enbridge shall concurrently provide copies of these submittals to U.S. EPA. This includes, but is not limited to: dredge permits, buoy permits, NPDES permits, and soil erosion control permits.

2.6.1 MDEQ Water Resources Division Dredge Permit Preparations

Enbridge is currently developing permit applications for dredging operations. Permits for individual dredge locations will be submitted in accordance with all state and federal regulations. Permit applications for submerged oil/sediment removal volumes will be based on a "worst case" of 'heavy'/'moderate' poling delineations for each dredge area using all available 2012 data, a depth estimate corresponding to the average soft sediment thickness (to be provided by the U.S. EPA), and shall include a 20% contingency volume estimate. Dredging volumes based on "worst case" including contingency is for permitting uses only and will be adjusted following the Spring 2013 Reassessment if necessary. When dredging permit applications are submitted to the MDEQ, U.S. EPA will concurrently receive a copy.

2.6.2 Michigan NPDES Permit

NPDES permits have been issued for dredging operations by the MDEQ. If needed, additional NPDES permits required for dredging operations will be obtained prior to startup.

2.6.3 Release/Spill Reporting

Releases or spills will be communicated to U.S. EPA and MDEQ staff and follow Enbridge's established site procedures which take precedence over contractor reporting protocol. Additional information regarding contractor spill response operational procedures and guidelines is presented in *Attachment B*.

2.7 Dredge Operating Procedures and Guidelines

Site-specific operating procedures and guidelines have been developed by the dredge contractor for the project and are included as *Attachment B*. However, it should be noted that Enbridge procedures and policies established for work on this project take precedence over contractor's procedures and guidelines.

2.7.1 Field Team Roles and Responsibilities

Field team personnel roles and responsibilities will be established prior to initiation of dredging operations and will include U.S. EPA and MDEQ involvement.

2.7.2 Field Data Collection and Documentation

Field data forms will serve as a daily record of events, observations, and measurements collected during dredging operations. Information will be recorded and include site locations, site descriptions, field measurements, and field observations.

2.7.3 Dredge Poling Procedures

Poling procedures during dredging will be conducted in a similar fashion as outlined in *Section 5.2*. Poling results will be described using the Poling Field Observation Flowchart shown in *Figure 3*. If 'heavy' or 'moderate' indications of sheen and/or oil globules are observed, additional dredging may be conducted.

All decisions not to dredge beyond depths presented on the tables in *Section 3.1.3.2, Section 3.2.3.2, Section 3.3.3.2, Section 3.4.3.2,* and *Section 3.5.4.2* will be subject to the approval of U.S. EPA following collection of poling data associated with dredging operations. If sheening following dredge operations is observed, Enbridge reserves the right to discuss with U.S. EPA whether the sheening is associated with Line 6B oil or oil from other sources, prior to initiating additional dredging.

2.7.4 Dredge Completeness Inspections

Inspections will proceed through the Operations Inspector (OI) and Environmental Inspector (EI) who are responsible for documenting the dredging completion operations through the use of hydrographic bathymetry surveys. Hydrographic bathymetry survey methods for dredged elevations will be conducted daily utilizing single beam sonar and Real Time Kinematic-Global Positioning Systems (RTK-GPS). Throughout dredging operations, survey data will be confirmed against projected dredge elevations and the pre-dredge hydrographic bathymetry data. Final dredge elevations will be confirmed by Enbridge to document dredge completion. After the dredged locations, or portions of, have achieved agreed endpoints

(i.e., poling results of 'light' to 'none' following daily dredge operations), Enbridge and the U.S. EPA will confirm completion of dredging operations at the specific location.

2.7.5 Preventative Maintenance

Equipment will be inspected daily (using Inspection Checklists) to document operating condition. Equipment fueling will be conducted in accordance with the *Equipment Fueling Plan* presented in *Attachment B*. Inspection logs will be kept in the equipment and/or on-site. Equipment maintenance activities will be logged on a maintenance log and equipment will not be used until it is documented to be in safe operating condition. Equipment will be maintained on a schedule based on the manufacturer's recommendations.

2.7.6 Quality Assurance / Quality Control

An Enbridge OI and EI are responsible for the execution of dredging operations. In a combined effort, both the OI and EI will monitor the progress of the dredge operations to achieve successful end points (i.e., poling results of 'light' and 'none' following daily dredge operations).

2.8 Evaluation of Legacy Contamination

At the request of the U.S. EPA, analytical data were previously compiled to assess the potential for impacts to sediment quality from legacy sites. This section summarizes the sediment sampling events in the Kalamazoo River and Morrow Lake that included the analysis of polychlorinated biphenyls (PCBs). PCBs were analyzed for and detected in sediment during the course of the Enbridge Line 6B release response activities. These data were collected by Enbridge and the U.S. EPA Great Lakes National Program Office (GLNPO) during monitoring and submerged oil recovery sampling events. The sampling events are described and the analytical results are summarized in the following sections.

Based upon sampling to date, it appears that historic sediments in the areas to be dredged are likely to contain hazardous substances. Enbridge's planned legacy data gap evaluation will assist in better understanding the extent of such contamination to the extent that dredging removes these contaminants, Enbridge will be remediating this historic contamination. This is a benefit that extends beyond remediation of Line 6B crude oil. Enbridge reserves the right to work with U.S. EPA to develop an approach to addressing these materials that does not expose Enbridge to additional liability as a result of this environmental benefit.

2.8.1 Sampling Events

During the 2010 submerged oil recovery assessment, Enbridge collected sediment samples for routine monitoring. The U.S. EPA GLNPO also collected sediment samples to monitor sediment quality following the release.

Grab sediment samples were collected twice weekly and analyzed for PCBs from August 18, 2010 through and including October 23, 2010 as part of a routine sediment quality monitoring program. Grab samples consisted of surficial sediment collected from approximately the top 6 inches. A total of 622 samples (including duplicates) were submitted to ALS-Holland and Test America Laboratories for analysis of a suite of parameters that included PCBs.

Monitoring sample locations were selected to provide initial characterization data and then subsequently, routine locations were established at approximately mile intervals in Kalamazoo River and within Morrow Lake. Targeted sample depths were 0 to 0.5 feet below sediment surface (bss).

Sediment samples were collected by U.S. EPA GLNPO to monitor the effects of the release on sediment quality in Morrow Lake and to establish a routine monitoring program. The sediment samples were collected approximately twice weekly and analyzed for PCBs from July 30, 2010 through and including August 25, 2010. Sample locations were selected to provide spatial coverage and to target areas most likely to have sediment deposition. Targeted sample depths were from 0 to 0.25 feet bss.

The analytical data for the sediment monitoring sampling program is presented in *Table 1* of *Attachment D*. The sample locations, frequency of detections, and maximum detected concentrations are shown on *Figure 1* of *Attachment D*. Laboratory reports containing results were previously submitted to the agency in the *Report to U.S. EPA* (Enbridge, 2010d) submitted to the U.S. EPA and the MDEQ on November 27, 2010. The analytical data for the submerged oil recovery sampling event is presented on *Table 2* of *Attachment D*. Sample locations and frequency of detections and maximum detected concentrations shown on *Figure 1* of *Attachment D*. The analytical data for the U.S. EPA GLNPO monitoring program is presented on *Table 3* of *Attachment D* and summarized on *Figure 1* of *Attachment D*.

2.8.2 Legacy Contamination Data Gap Evaluation

Enbridge is currently developing a work plan to further evaluate the nature and extent of potential legacy site impacts within the proposed dredge locations. The work plan will be submitted to the U.S. EPA for approval prior to initiating the Legacy Contamination Data Gap Evaluation. The proposed dredge depth and extent may be modified, subject to U.S. EPA approval, based on the results of the investigation.

2.8.2.1 Residual Cover

Based on conclusions of the Legacy Contamination Data Gap Evaluation, application of residuals cover may be considered. Examples of residuals cover use on similar projects to manage legacy contamination issues will be supplied in a supplement to this Work Plan. If residuals cover is deemed beneficial following the Legacy Contamination Data Gap Evaluation, Enbridge will submit a plan for U.S. EPA approval.

2.9 Pre-Dredge Surveys

A pre-dredge hydrographic bathymetry survey will be performed to establish existing river bed sediment elevations within the dredge locations in accordance with the *Survey Plan* presented in *Attachment B*. The survey will be conducted using single beam sonar and RTK-GPS referenced to the local plane coordinate system and the North American Vertical Datum of 1988 (NAVD88). Survey base stations will be used at benchmarks and control points in the vicinity of dredge locations to link with RTK-GPS positioning and heading systems for dredge control systems. Throughout dredging operations, data will be confirmed against projected dredge elevations and the pre-dredge hydrographic bathymetry survey data.

3.0 DREDGING OPERATIONS

Sediment removal and material handling (e.g., dewatering/solidification, etc.) in riverine environments is complex in nature. Therefore, removal production rates and time necessary to dewater are influenced by sediment consistency, moisture content, and volume of debris. A more practical and accepted approach would be to allow maximum flexibility in all operations using adaptive management techniques embraced by U.S. EPA (Pine River Superfund Site, St. Louis, Michigan and Fawn River Restoration, Orland, Indiana). Anticipated operations on the Kalamazoo River are more complex than these projects as the Kalamazoo River operations equate to performing five removal projects concurrently. An

evaluation of the overall operational performance will allow identification of potential adjustments to increase performance or schedule compression. It is critical that these adjustments to the conditions within each of the dredge locations of the Kalamazoo River be implemented on a timely basis, with all parties recognizing that modifications may occur. The following sections describe the operations that may be performed in connection with the dredging of sediment and debris removal for the Kalamazoo River using industry accepted methodologies.

3.1 MP 4.50 to MP 5.80 Dredging

The location from MP 4.50 to MP 5.80 is an anthropogenic depositional area located immediately upstream of Ceresco Dam, which includes the Ceresco sediment trap shown in *Figure 1*.

As an alternative to dredging, Enbridge is currently considering removal of the Ceresco Dam at MP 5.80 to restore the Kalamazoo River to its natural flow. If Enbridge determines that such a project is in the best interest of stakeholders, it will formally present an alternative to the U.S. EPA for approval.

3.1.1 Mobilization and Site Preparation

Dredge equipment (e.g., boats, excavators, pipe, etc.) will be sanitized in accordance with the *Invasive Species Plan* presented as *Attachment B* and mobilized to boat launch C 0.4 for deployment. Personnel will mobilize equipment to the MP 4.50 to MP 5.80 dredge location. Personnel will receive site orientation training addressing health and safety, traffic control, spill prevention, and other relevant topics specific to MP 4.50 to MP 5.80 dredging operations. Enbridge will establish on-site office facilities at the Ceresco Dredge location.

Site preparation will include both landward and riverine activities, which are summarized in *Section 3.1.2.1*. Landward site preparation will include containment development and construction, dredge pad location and construction, installation of dewatering pads, development of decontamination areas, and installation of water treatment systems. Dredge operation areas including access and haul routes, dredge/dewatering/mixing pad locations, and equipment laydown areas have been identified and are shown on *Figure 2*.

Riverine site preparation will include construction of discharge piping, location of dredge anchor points, and establishment of survey measurements and control. Utilities will be

located throughout the dredging area prior to start up and updated per Enbridge protocol (i.e., refresh Michigan utility survey tickets every 14 days).

3.1.2 Sequence of Work

Work sequencing will provide project task prioritization, time management, and work efficiency. Dredge operations work sequencing is divided into the following three phases:

- Phase One - Pre-Dredge Activities,
- Phase Two - Dredge Route, and
- Phase Three - Post-Dredge Activities.

3.1.2.1 Phase One – Pre-Dredge Activities

Phase one of dredging operations will consist of the installation of the river containment structures and turbidity controls, installation of dredge piping and pipe testing, establishment of survey controls, and dredge deployment.

The installation of containment structures (Containment) will be required to minimize downstream migration of sediment, sheen, and/or oil globules throughout dredging operations. Containment will consist of surface boom attached to a combination of high flow permeable and non-permeable turbidity curtain installed and anchored to the river bed along the center channel from MP 4.50 to MP 5.80 (see *Section 3.1.3.3* for additional detail). Enbridge is also considering the installation of a sheet pile wall above Ceresco Dam upstream of the spillway to assist with flow control and provide an anchoring point for Containment. However, prior to the installation of the sheet piling, a Ceresco Dam inspection and geotechnical evaluation will be performed. Based on the results of the geotechnical evaluation, a feasibility determination will be made on whether this location could support sheet piling.

Pipe (e.g., slurry, weep water, etc.) installation is required to facilitate dredging operations. The pressurized pipe, including the initial section of slurry pipe will be tested prior to system startup in accordance with the *Pipe Testing Plan* presented in *Attachment B*. The pipe will be pressurized for a period of 30 minutes and visually inspected for leaks. This process will continue until passing results are achieved and no leaks are observed.

After initial testing, changes to header, distribution piping, weep water piping, and treated water discharge piping are expected to be minor. Additional pressurized pipe testing is not expected during operations. However, it may be necessary to periodically remove and add

slurry piping as dredging operations progress. Prior to removing sections of slurry piping, the pipe will be flushed with clean water to remove any remaining sediment. After slurry piping is added, clean water will be pumped through the pipe at design flow and pressure, and the slurry piping will be visually inspected for leaks before transitioning to pumping sediment.

3.1.2.2 Phase Two – Dredge Route

Phase two of dredging operations will consist of the planned dredging route summarized below:

- Initiate access channel dredging operations at the river boat launch area C 0.4 by creating a draft depth as required along the RDB to gain access to MP 4.50,
- Environmentally dredge the RDB from MP 4.75 to the former railroad trestle,
- Transition dredging operations along the RDB to the Left Descending Bank (LDB) at MP 4.50,
- Environmentally dredge poling delineations south of center line and LDB at MP 4.50,
- Transition dredge on RDB to approximately MP 4.90 and then transition dredging operations to the LDB,
- Environmentally dredge LDB from MP 4.90 to MP 5.50,
- Transition dredging operations to RDB and travel to MP 5.60,
- Environmentally dredge LDB at MP 5.60,
- Remove curtain and anchoring devices from MP 4.50 to the former railroad trestle,
- Environmentally dredge LDB from the former railroad trestle to a designated standoff distance, and
- Dredge will reposition on RDB below former railroad trestle and environmental dredging will continue to the designated standoff distance from Ceresco Dam.

The above outlined approach may change depending on actual site conditions. Large debris (e.g., stumps, logs, etc.), which may become entangled in the dredge head will be removed and disposed of at a U.S. EPA approved landfill or other State of Michigan location(s).

3.1.2.3 Phase Three – Post Dredge Activities

The third phase of dredging operations will consist of the removal of Containment, piping and dredge equipment, and landward support facilities (e.g., dewatering pads, water treatment locations, etc.). Equipment will be decontaminated in accordance with the established procedures for equipment decontamination (see *Section 4.3*).

3.1.3 Dredging

Proposed dredging operations, including methods, volume to be removed, containment, and water quality monitoring and water treatment are outlined below.

3.1.3.1 Dredging Method

Sediments may be removed from dredge locations utilizing an 8-inch diameter hydraulic dredge. Production rates depend on the following criteria: depth of cut; in-situ bulk density; slurry percent solids; pipe length; and, elevation changes between dredge and dewatering pad. Dredging production rates between 350 and 450 cubic yards (yd^3) per day with 70% efficiency is expected.

3.1.3.2 Dredge Template (Area, Depth, and Volume)

Dredging areas defined under the Order are based on 2012 'heavy' and 'moderate' poling data as recommended by the U.S. EPA. Dredging depth is based on 2012 average soft sediment depths collected during poling as recommended by the U.S. EPA, compared to initial depth estimates, which were conservatively based on the analysis of sediment samples completed by Ann Arbor Technical Services, Inc. (ATS). Worse case dredging depth is based on 2012 average soft sediment thickness collected during poling as recommended by the U.S. EPA.

The following table provides an adjusted summary of the potential dredging volume for MP 4.50 to MP 5.80 as recommended by the U.S. EPA. Submerged oil/sediment removal volumes were based on a "worst case" of 'heavy'/'moderate' poling delineations for each dredge area using all available 2012 data, a depth of 2-feet corresponding to the average soft sediment thickness (provided by the U.S. EPA), and includes a 20% contingency volume estimate (see *Section 2.6.1*). Amendments to the 'heavy' and 'moderate' poling delineations may be modified upon completion of the Spring 2013 Reassessment (see *Section 5.3*). Amendments to dredge depths may also be modified based on the Spring 2013 Reassessment and/or completion of the Legacy Contamination Data Gap Evaluation (see *Section 2.8.2*).

Area	Approx. Area (acres)	Approx. Area Square Feet (ft^2)	Approx. Dredge Cut Feet (ft.)	Approx. Dredge Volume Cubic Feet (ft^3)	Approx. Dredge Volume (yd^3)	"Worst Case" Including Contingency Volume (yd^3)
MP 4.50 to MP 5.80	23.75	1,034,451	2	2,068,902	76,626	91,952

3.1.3.3 Containment

Containment will be installed upon MDEQ permit issuance. Containment may consist of 5/16-inch polyvinyl chloride (PVC) coated top, mid, and bottom tension cables, 12-inch or 8-inch closed foam flotation covered by 22-ounce PVC coated polyester and tool free universal end connections with reinforced anchor points. Impermeable fabric will consist of 22-ounce or 24-ounce PVC coated polyester. Permeable fabric will consist of 10% open area, non-woven monofilament geotextile filter fabric (apparent opening size (AOS) – US Sieve No. 40; Flow rate – 140 gallons per minute (gpm) per ft^2). The bottom will consist of two 5/16-inch or two ½-inch ballast chains. Curtain anchors will vary by location, and will include shoreline and island trees or H-beams, 2-inch schedule 40 steel posts or T-posts and anchors, if required. If necessary to alleviate heavy flows, sheet piling and chain link fence may be installed in conjunction with curtain to help partially deflect or contain flow. Sheet piling, if installed, may be heavy duty Z-section steel sheeting. Methods to install the sheet piling would be high frequency driver-extractor or push methodology. Chain link fencing, if installed, may be utilized to reinforce curtain segments on the opposite side of flow. Containment monitoring will be conducted daily and necessary repairs or maintenance will be performed.

3.1.3.4 Water Quality Monitoring

Water quality monitoring throughout dredging operations will be conducted in accordance with the *Water Quality Measurement Standard Operating Procedure* (Enbridge, 2011c) approved by the MDEQ on September 22, 2011 (WQ SOP). This document provides specific provisions for turbidity monitoring and reporting. For example, if monitoring shows excessive sediment re-suspension (i.e., turbidity greater than 50 Nephelometric Turbidity Units (NTUs) or two times background, whichever is greater), operational controls will be implemented. An example of an operational control would be to deploy turbidity curtains to prevent re-suspended material from migrating downstream.

3.1.3.5 Conveyance

The dredge discharge slurry will be pumped from the dredge via the onboard 8-inch hydraulic pump. A booster pump station(s) may be installed to maintain desired slurry pumping velocity in the piping between the dredge and the sediment dewatering pad. The booster pump will be placed on a floating platform or on shore as appropriate. Pipe leak testing will be conducted prior to use as referenced in *Section 3.1.2.1*.

3.1.4 Chemical Conditioning

Dredge slurry will be pumped to the sediment dewatering pad via the dredge discharge pipe. The dredge slurry will be conditioned once it reaches the dewatering pad with polymer to promote flocculation and separation of solid material from the carriage water. The desired dosage, based on bench scale testing (see *Section 2.5*), will be entered into the polymer feed controls system.

3.1.5 Dewatering of Sediment

Dredged sediment will be pumped into geotextile tubes for dewatering. The geotextile tubes will be situated on a dewatering pad located in the staging area. The dewatering pad will be constructed to accommodate proposed dredge volumes. The dewatering pad will be constructed by compaction of the existing soil base, installation of an impermeable liner, and placement of a layer of drainage aggregate as a working surface. Design assumptions include approximately 1,000 yd^3 of dredged sediment for each geotextile tube.

3.1.5.1 Geotextile Tubes

The dredged slurry will generally consist of 2% to 15% sediment to water ratio. The slurry is pumped through a header pipe and distributed into a polymer feed control system with valves directing the flow of slurry into geotextile tubes. The system utilizes a polymer to settle out the solids while a pump is connected to the other end to aid in the removal of water.

Once a geotextile tube is full, flow is diverted to another geotextile tube while the full geotextile tube dewaters. The geotextile tube will go through 'fill and rest' cycles until it reaches its full capacity as per the manufacture's specifications. Operators will monitor the geotextile tubes throughout dredging operations. Once the geotextile tube is at capacity and dewatering is sufficient, it will be opened to allow an excavator to place the sediment for staging.

3.1.5.2 Containment and Collection of Weep Water

The dewatering pad will be designed within a containment berm, which will be sloped toward a sump with approximately one hour of water treatment system capacity. Water drained to the dewatering pad (i.e., weep water), including storm water, will be collected in the sump and treated within an on-site temporary water treatment system. The dewatering pad will be designed to accommodate approximately one day of dredge production plus a 10-year storm event.

3.1.5.3 Water Treatment and Discharge

Water collected in the sump will be pumped to a water treatment system, which includes several multi-bag filters and GAC vessels. The treatment system will be sized to meet the discharge requirements of <20 parts per billion (ppb) of total benzene, toluene, ethybenzene, and xylenes (BTEX). The water treatment contractor will provide a licensed Wastewater Treatment Operator and treatment system operators to monitor discharge requirements per the NPDES permit.

The anticipated water treatment discharge flow rate will be between 1,500 gpm and 3,000 gpm with a maximum capacity of 4,000 gpm. This flow rate can be adjusted manually based on the level of water within the dewatering pad and the efficiency of the treatment system.

The GAC vessels will provide tertiary water treatment prior to discharge back to the Kalamazoo River in accordance with the NPDES permit. Eight GAC vessels, each containing 10,000 pounds of GAC, are capable of treating 500 gpm each. It is anticipated that four treatment trains (comprised of two GAC vessels), identified as A, B, C, and D, will be connected to operate in parallel to treat a maximum capacity of 4,000 gpm. The differential pressure across the GAC vessels will be monitored for signs of plugging and/or physical fouling due to suspended solids and/or biological growth.

Treated water will be discharged in accordance with the NPDES permit. Effluent will be discharged into the Kalamazoo River using a vertical riser pipe with a dispersion cap. The discharge pipe and vertical riser will be mounted to a floating dock set away from the shoreline. The discharge point will be visually monitored to confirm no riverbed erosion is occurring. Additional monitoring will be conducted in accordance with the NPDES permit, and corrective actions initiated if warranted.

3.2 MP 13.90 – MP 15.70 Dredging

This location is an impoundment upstream of the Kalamazoo Dam in Battle Creek including the MP 14.75 RDB sediment trap, shown in *Figure 1*. Although the North and South Mill Ponds are included in this location, these areas will not be included in the dredging operations.

3.2.1 Mobilization and Site Preparation

Dredge equipment (e.g.,., boats, excavators, pipe, etc.) will be sanitized in accordance with the *Invasive Species Plan* presented *as Attachment B* and will be deployed from the most

advantageous point at this dredging location. Contractor personnel will mobilize equipment to this dredge location. Contactor personnel will receive site orientation training addressing health and safety, traffic control, spill prevention, and other relevant topics specific to MP 13.90 to MP 15.70 dredging operations. Enbridge will establish on-site office facilities at this location.

Site preparation will include both landward and riverine activities which are summarized in *Section 3.2.2.1*. Landward site preparation will include containment development and construction, dredge pad location and construction, installation of dewatering pads, development of decontamination areas and installation of water treatment systems. Dredge operation areas including access and haul routes, dredge/dewatering/mixing pad locations, and equipment laydown areas have been identified and are shown on *Figure 2.*

Riverine site preparation will include construction of discharge piping, location of dredge anchor points, and establishment of survey measurements and control. Utilities will be located throughout the dredging area prior to startup and updated per Enbridge protocol (i.e., refresh Michigan utility survey tickets every 14 days).

3.2.2 Sequence of Work

Work sequencing will provide project task prioritization, time management, and work efficiency. Dredge operations work sequencing is divided into the following three phases:

- Phase One - Pre-Dredge Activities,
- Phase Two - Dredge Route, and
- Phase Three - Post-Dredge Activities.

3.2.2.1 Phase One – Pre-Dredge Activities

Phase one of dredging operations will consist of the installation of the river containment structures and turbidity controls, installation of dredge piping and pipe testing, establishment of survey controls, and dredge deployment.

The installation of Containment will be required to minimize downstream migration of sediment, sheen, and/or oil globules throughout dredging operations. Containment will consist of surface boom attached to a combination of high flow permeable turbidity curtain installed to full river depth along the both the LDB and the RDB from MP 13.90 to MP 15.70.

Pipe (e.g., slurry, weep water, etc.) installation is required to facilitate dredging operations. The pressurized pipe, including the initial section of slurry pipe, will be tested prior to system

startup in accordance with the *Pipe Testing Plan* presented in *Attachment B*. The piping will be pressurized for a period of 30 minutes and visually inspected for leaks. This process will continue until passing results are achieved and no leaks are observed.

After initial testing, changes to header, distribution piping, weep water piping, and treated water discharge piping are expected to be minor. Additional pressurized pipe testing is not expected during operations. However, it may be necessary to periodically remove and add slurry piping as dredging operations progress. Prior to removing sections of slurry piping, the pipe will be flushed with clean water to remove any remaining sediment. After slurry piping is added, clean water will pumped through the pipe at design flow and pressure, and the slurry pipe will be visually inspected for leaks before transitioning to pumping sediment.

3.2.2.2 Phase Two – Dredge Route

Phase two of dredging operations will consists of the planned dredging route summarized below:

- Access for this dredge area has not been finalized; however, appropriate measures will be employed to gain access to MP 14.00,
- Environmentally dredge LDB at MP 14.00 to MP 14.75,
- Transition dredging operations to RDB at MP 14.25,
- Environmentally dredge RDB from MP 14.25 to MP 14.75,
- Transition dredging operations to RDB at MP 15.00,
- Environmentally dredge RDB at MP 15.00,
- Transition dredging operations to LDB at MP 15.00,
- Environmentally dredge LDB from MP 15.00 to MP 15.25,
- Transition dredging operations to RDB at MP 15.50,
- Environmentally dredge RDB at MP 15.50,
- Transition dredging operations to LDB at MP 15.50,
- Environmentally dredge LDB from MP 15.50 to MP 15.75,
- Dredge will be removed and repositioned near MP 15.75, and
- Environmentally dredge LDB and RDB at MP 15.75 (downstream of culverts) from shore.

The above outlined approach may change depending on actual site conditions. Large debris (e.g., stumps, logs, etc.), which may become entangled in the dredge head will be removed and disposed of at a U.S. EPA approved landfill or other State of Michigan location(s).

3.2.2.3 Phase Three – Post Dredge Activities

The third phase of dredging operations will consist of the removal of Containment, piping and dredge equipment, and landward support facilities (e.g., dewatering pads, water treatment locations, etc.). Equipment will be decontaminated in accordance with the established procedures for equipment decontamination (see *Section 4.3*).

3.2.3 Dredging

Proposed dredging operations, including methods, volume to be removed, containment, and water quality monitoring and water treatment are outlined below.

3.2.3.1 Dredging Method

Sediments may be removed from the dredge locations utilizing an 8-inch diameter hydraulic dredge. Production rates depend on the following criteria: depth of cut; in-situ bulk density; slurry percent solids; pipe length; and, elevation changes between dredge and dewatering pad. Dredging production rates between 350 and 450 yd^3 per day with 70% efficiency is expected.

3.2.3.2 Dredge Template (Area, Depth, and Volume)

Dredging areas defined under the Order are based on 2012 'heavy' and 'moderate' poling data as recommended by the U.S. EPA. Dredging depth is based on 2012 average soft sediment depths collected during poling as recommended by the U.S. EPA, compared to initial depth estimates, which were conservatively based on the analysis of sediment samples completed ATS. Worse case dredging depth is based on 2012 average soft sediment thickness collected during poling as recommended by the U.S. EPA.

The following table provides an adjusted summary of a potential dredging volume for MP 13.90 to MP 15.70 as recommend by the U.S. EPA. Submerged oil/sediment removal volumes were based on a "worst case" of 'heavy'/'moderate' poling delineations for each dredge area using all available 2012 data, a depth of 1.5-feet corresponding to the average soft sediment thickness (provided by the U.S. EPA), and includes a 20% contingency volume estimate (see *Section 2.6.1*). Amendments to the 'heavy' and 'moderate' poling delineations may be modified upon completion of the Spring 2013 Reassessment (see *Section 5.3*). Amendments to dredge depths may also be modified based on the Spring 2013 Reassessment and/or completion of the Legacy Contamination Data Gap Evaluation (see *Section 2.8.2*).

Area	Approx. Area (acres)	Approx. Area (ft^2)	Approx. Dredge Cut (ft.)	Approx. Dredge Volume (ft^3)	Approx. Dredge Volume (yd^3)	"Worst Case" Including Contingency Volume (yd^3)
MP 13.90 to MP 15.70	7.64	332,872	1.5	499,308	18,493	22,192

3.2.3.3 Containment

Containment will be installed upon MDEQ permit issuance. Containment may consist of 5/16-inch PVC coated top, mid, and bottom tension cables, 12-inch or 8-inch closed foam flotation covered by 22-ounce PVC coated polyester and tool free universal end connections with reinforced anchor points. Impermeable fabric will consist of 22-ounce or 24-ounce PVC coated polyester. Permeable fabric will consist of 10% open area, non-woven monofilament geotextile filter fabric (AOS – US Sieve No. 40; Flow rate – 140 gpm/ft^2). The bottom will consist of two 5/16-inch or two ½-inch ballast chains. Curtain anchors will vary by location, and will include shoreline and island trees or H beams, 2-inch schedule 40 steel posts or, T-posts and anchors, if required. If necessary to alleviate heavy flows, sheet piling and chain link fence may be installed in conjunction with curtain to help partially deflect or contain flow. Sheet piling, if installed, may be heavy duty Z-section steel sheet. Methods to install the sheet piling may require a high frequency driver-extractor or push methodology. Chain link fencing, if installed, may be utilized to reinforce curtain segments on the opposite side of flow. Containment monitoring will be conducted daily and necessary repairs or maintenance will be performed.

3.2.3.4 Water Quality Monitoring

Water quality monitoring throughout dredging operations will be conducted in accordance with the WQ SOP. This document provides specific provisions for turbidity monitoring and reporting of the results. For example, if monitoring shows excessive sediment re-suspension (i.e., turbidity greater than 50 NTUs or two times background, whichever is greater), operational controls will be implemented. An example of an operational control would be to deploy turbidity curtains to prevent re-suspended material from migrating downstream.

3.2.3.5 Conveyance

The dredge discharge slurry will be pumped from the dredge via the onboard 8-inch hydraulic pump. A booster pump station(s) may be installed to maintain desired slurry pumping velocity in the piping between the dredge and the sediment dewatering pad. The

booster pump will be placed on a floating platform or on shore as appropriate. Pipe leak testing will be conducted prior to use as referenced in *Section* 3.2.2.1.

3.2.4 Chemical Conditioning

Dredge slurry will be pumped to the sediment dewatering pad via the dredge discharge pipe. The dredge slurry will be conditioned once it reaches the dewatering pad with polymer to promote flocculation and separation of solid material from the carriage water. The desired dosage, based on bench scale testing (see *Section 2.5*), will be entered into the polymer feed controls system.

3.2.5 Dewatering of Sediment

Dredged sediment will be pumped into geotextile tubes for dewatering. The geotextile tubes will be situated on a dewatering pad located in the staging area. The dewatering pad will be constructed to accommodate proposed dredge volumes. The dewatering pad will be constructed by compaction of the existing soil base, installation of an impermeable liner, and placement of a layer of drainage aggregate as a working surface. Design assumptions include approximately 1,000 yd^3 of dredged sediment for each geotextile tube.

3.2.5.1 Geotextile Tubes

The dredged slurry will generally consist of 2% to 15% sediment to water ratio. The slurry is pumped through a header pipe and distributed into a polymer feed control system with valves directing the flow of the slurry into geotextile tubes. The system utilizes a polymer to settle out the solids while a pump is connected to the other end to aid in the removal of water.

Once a geotextile tube is at capacity, flow is diverted to another geotextile tube while the full geotextile tube dewaters. The geotextile tube will go through 'fill and rest' cycles until it reaches its full capacity as per the manufacture's specifications. Operators will monitor the geotextile tubes throughout dredging operations. Once the geotextile tube is at capacity and dewatering is sufficient, it will be opened to allow an excavator to place the sediment for staging.

3.2.5.2 Containment and Collection of Weep Water

The dewatering pad will be designed within a containment berm, which will be sloped toward a sump with approximately one hour of water treatment system capacity. Water drained to the dewatering pad (i.e., weep water), including storm water, will be collected in the sump and treated within an on-site temporary water treatment system. The dewatering pad will be

designed to accommodate approximately one day of dredge production plus a 10-year storm event.

3.2.5.3 Water Treatment and Discharge

Water collected in the sump will be pumped to a water treatment system, which includes several multi-bag filters and GAC vessels. The treatment system will be sized to meet the discharge requirements of <20 ppb of total BTEX. The water treatment contractor will provide a licensed Wastewater Treatment Operator and treatment system operators to monitor discharge requirements per the NPDES permit.

The anticipated water treatment discharge flow rate will be between 1,000 gpm and 1,500 gpm with a maximum capacity of 2,000 gpm. This flow rate can be adjusted manually based on the level of water within the dewatering pad and the efficiency of the treatment system.

The GAC vessels will provide tertiary water treatment prior to discharge back to the Kalamazoo River in accordance with the NPDES permit. Four GAC vessels, each containing 10,000 pounds of GAC, are capable of treating 500 gpm each. It is anticipated that two treatment trains (comprised of two GAC vessels), identified as A and B, are connected to operate in parallel to treat a maximum capacity of 2,000 gpm. The differential pressure across the GAC vessels will be monitored for signs of plugging and/or physical fouling due to suspended solids and/or biological growth.

Treated water will be discharged in accordance with the NPDES permit. Effluent will be discharged into the Kalamazoo River using a vertical riser pipe with a dispersion cap. The discharge pipe and vertical riser will be mounted to a floating dock set away from the shore line. The discharge point will be visually monitored to confirm no riverbed erosion is occurring. Additional monitoring will be conducted in accordance with the NPDES permit, and corrective actions initiated if warranted.

3.3 MP 36.50 to MP 39.85 Dredging

This location includes portions of the Morrow Lake Delta and Morrow Lake upstream of the Morrow Lake Dam, shown in *Figure 1*. The Morrow Lake Delta location includes the Delta Z sediment trap. Dredging operations will be limited to the eastern-most portion of Morrow Lake.

3.3.1 Mobilization and Site Preparation

Dredge equipment (e.g., boats, excavators, pipe, etc.) will be sanitized in accordance with the *Invasive Species Plan* presented as *Attachment B* and deployed from boat launch E 4.0. Personnel and equipment will be mobilized to the Morrow Lake Delta and Morrow Lake location. Personnel will receive site orientation training addressing health and safety, traffic control, spill prevention, and other relevant topics specific to Morrow Lake Delta and Morrow Lake dredging operations. Enbridge will establish on-site office facilities at this location.

Site preparation will include both landward and riverine activities, which are summarized in *Section 3.3.2.1*. Landward site preparation will include containment development and construction, dredge pad location and construction, installation of dewatering pads, development of decontamination areas, and installation of water treatment systems. Dredge operation areas including access and haul routes, dredge/dewatering/mixing pad locations, and equipment laydown areas have been identified and are shown on *Figure 2.*

Riverine site preparation will include construction of discharge piping, locate dredge anchor points, and establish survey measurements and control. Utilities will be located throughout the dredging area prior to startup and updated per Enbridge protocol (i.e., refresh Michigan utility survey tickets every 14 days).

3.3.2 Sequence of Work

Work sequencing will provide project task prioritization, time management, and work efficiency. Dredge operations work sequencing is divided into the following three phases:

- Phase One - Pre-Dredge Activities,
- Phase Two - Dredge Route, and
- Phase Three - Post-Dredge Activities.

3.3.2.1 Phase One – Pre-Dredge Activities

Phase one of dredging operations will consist of the installation of the river containment structures and turbidity controls, installation of dredge piping and pipe testing, establishment of survey controls, and dredge deployment.

The installation of Containment will be required to minimize downstream migration of sediment, sheen, and/or oil globules throughout dredging operations. Containment will consist of surface boom attached to a combination of high flow permeable turbidity curtain

installed to full river depth in various positions from MP 36.50 to MP 39.85 (see *Section 3.3.3.3* for additional detail).

Pipe (e.g., slurry, weep water, etc.) installation is required to facilitate dredging operations. The pressurized pipe, including the initial section of slurry pipe, will be tested prior to system startup in accordance with the *Pipe Testing Plan* presented in *Attachment B*. The piping will be pressurized for a period of 30 minutes and visually inspected for leaks. This process will continue until passing results are achieved and no leaks are observed.

After initial testing, changes to header, distribution piping, weep water piping, and treated water discharge piping are expected to be minor. Additional pressurized pipe testing is not expected during operations. However, it may be necessary to periodically remove and add slurry piping as dredging operations progress. Prior to removing sections of slurry piping, the pipe will be flushed with clean water to remove any remaining sediment. After slurry piping is added, clean water will pumped through the pipe at design flow and pressure, and the slurry pipe will be visually inspected for leaks before transitioning to pumping sediment.

3.3.2.2 Phase Two – Dredge Route

Phase two of dredging operations will consist of the planned dredging route summarized below:

- Initiate access channel dredging operations by creating a draft depth up to MP 36.50,
- Environmentally dredge RDB at MP 36.50 to MP 37.25,
- Transition dredging operations to LDB at MP 36.50,
- Environmentally dredge LDB from MP 36.50 to MP 37.75,
- Transition dredging operations to center channel at MP 36.50,
- Environmentally dredge center channel at MP 36.50 to MP 37.75,
- Transition dredging operations to RDB at MP 38.00 (North Cove),
- Environmentally dredge RDB from MP 38.00,
- Transition operation to LDB at MP 38.00 (South Cove), and
- Environmentally dredge LDB at MP 38.00.

The above outlined approach may change depending on actual site conditions. Large debris (e.g., stumps, logs, etc.) which may become entangled in the dredge head will be removed and disposed of at a U.S. EPA approved landfill or State of Michigan location(s).

3.3.2.3 Phase Three – Post Dredge Activities

The third phase of dredging operations will consist of the removal of the Containment, pipe and dredge equipment, and landward support facilities (e.g., dewatering pads, water treatment locations, etc.). Equipment will be decontaminated in accordance with the established procedures for equipment decontamination (see *Section 4.3*).

3.3.3 Dredging

Proposed dredging operations including methods, volume to be removed, containment, and water quality monitoring and water treatment are outlined below.

3.3.3.1 Dredging Method

Sediments may be removed from the dredge locations utilizing a combination of 12-inch and 8-inch diameter hydraulic dredges. Production rates depend on the following criteria: depth of cut; in-situ bulk density; slurry percent solids; pipe length; and, elevation changes between dredge and dewatering pad. Dredging production rates between 350 and 1,200 yd^3 per day, depending on number of dredges, with 70% efficiency expected.

3.3.3.2 Dredge Template (Area, Depth, and Volume)

Dredging areas defined under the Order are based on 2012 'heavy' and 'moderate' poling data as recommended by the U.S. EPA. Dredging depth is based on 2012 average soft sediment depths collected during poling as recommended by the U.S. EPA, compared to initial depth estimates, which were conservatively based on the analysis of sediment samples completed by ATS. Worse case dredging depth is based on 2012 average soft sediment thickness collected during poling as recommended by the U.S. EPA.

The following table provides an adjusted summary of a potential dredging volume for MP 36.50 to MP 39.85 as recommended by the U.S. EPA. Submerged oil/sediment removal volumes were based on a "worst case" of 'heavy'/'moderate' poling delineations for each dredge area using all available 2012 data, a depth of 1.5-feet corresponding to the average soft sediment thickness (provided by the U.S. EPA), and includes a 20% contingency volume estimate (see *Section 2.6.1*). Amendments to the 'heavy' and 'moderate' poling delineations may be modified upon completion of the Spring 2013 Reassessment (see *Section 5.3*). Amendments to dredge depths may also be modified based on the Spring 2013 Reassessment and/or completion of the Legacy Contamination Data Gap Evaluation (see *Section 2.8.2*).

Area	Approx. Area (acres)	Approx. Area (ft^2)	Approx. Dredge Cut (ft.)	Approx. Dredge Volume (ft^3)	Approx. Dredge Volume (yd^3)	"Worst Case" Including Contingency Volume (yd^3)
MP 36.50 to MP 39.85	100.51	4,378,204	1.5	6,567,305	243,234	291,881

3.3.3.3 Containment

Containment will be installed upon MDEQ permit issuance. Containment may consist of 5/16-inch PVC coated top, mid, and bottom tension cables, 12-inch or 8-inch closed foam flotation covered by 22-ounce PVC coated polyester, and tool free universal end connections with reinforced anchor points. Impermeable fabric will consist of 22-ounce or 24-ounce PVC coated polyester. Permeable fabric will consist of 10% open area, non-woven monofilament geotextile filter fabric (AOS – US Sieve No. 40; Flow rate – 140 gpm/ft^2). The bottom will consist of two 5/16-inch or two ½-inch ballast chains. Curtain anchors will vary by location, and will include shoreline and island trees or H beams, 2-inch schedule 40 steel posts or T-posts and anchors, if required. If necessary to alleviate heavy flows, sheet piling and chain link fence may be installed in conjunction with curtain to help partially deflect or contain flow. Sheet piling, if installed, may be heavy duty Z-section steel sheet pile. Methods to install the sheet piling may require a high frequency driver-extractor or push methodology. Chain link fencing, if installed, may be utilized to reinforce curtain segments on the opposite side of flow. Containment monitoring will be conducted daily and necessary repairs or maintenance will be performed.

3.3.3.4 Water Quality Monitoring

Water quality monitoring throughout dredging operations will be conducted in accordance with the WQ SOP. This document provides specific provisions for turbidity monitoring and reporting of the results. For example, if monitoring shows excessive sediment re-suspension (i.e., turbidity greater than 50 NTUs or two times background, whichever is greater), operational controls will be implemented. An example of an operational control would be to deploy turbidity curtains to prevent re-suspended material from migrating downstream.

3.3.3.5 Conveyance

The dredge discharge slurry will be pumped from the dredge via the onboard 12-inch and 8-inch hydraulic pumps. A booster pump station(s) may be installed to maintain desired slurry pumping velocity the piping between the dredge and the sediment dewatering pad. The

booster pump will be placed on a floating platform or on shore as appropriate. Pipe leak testing will be conducted prior to use as referenced in *Section 3.3.2.1*.

3.3.4 Chemical Conditioning

Dredge slurry will be pumped to the sediment dewatering pad via the dredge discharge pipe. The dredge slurry will be conditioned once it reaches the dewatering pad with polymer to promote flocculation and separation of solid material from the carriage water. The desired dosage, based on bench scale testing (see *Section 2.5*), will be entered into the polymer feed controls system.

3.3.5 Dewatering of Sediment

Dredged sediment will be pumped into geotextile tubes for dewatering. The geotextile tubes will be situated on a dewatering pad located in the staging area. The dewatering pad will be constructed to accommodate proposed dredge volumes. The dewatering pad will be constructed by compaction of the existing soil base, installation of an impermeable liner, and placement of a layer of drainage aggregate as a working surface. Design assumptions include approximately 1,000 yd^3 of dredged sediment for each geotextile tube.

3.3.5.1 Geotextile Tubes

The dredged slurry will generally consist of 2% to 15% sediment to water ratio. The slurry is pumped through a header pipe and distributed into a polymer feed control system with valves directing the flow of the slurry into geotextile tubes. The system utilizes a polymer to settle out the solids while a pump is connected to the other end to aid in the removal of water.

Once a geotextile tube is at capacity, flow is diverted to another geotextile tube while the full geotextile tube dewaters. The geotextile tube will go through 'fill and rest' cycles until it reaches its full capacity as per the manufacture's specifications. Operators will monitor the geotextile tubes throughout dredging operations. Once the geotextile tube is at capacity and dewatering is sufficient, it will be opened to allow an excavator to place the sediment for staging.

3.3.5.2 Containment and Collection of Weep Water

The dewatering pad will be designed within a containment berm, which will be sloped toward a sump with approximately one hour of water treatment system capacity. Water drained to the dewatering pad (i.e., weep water), including storm water, will be collected in the sump and treated within an on-site temporary water treatment system. The dewatering pad will be

designed to accommodate approximately one day of dredge production plus a 10-year storm event.

3.3.5.3 Water Treatment and Discharge

Water collected in the sump will be pumped to a water treatment system, which includes several multi-bag filters and GAC vessels. The treatment system will be sized to meet the discharge requirements of <20 ppb of total BTEX. The water treatment contractor will provide a licensed Wastewater Treatment Operator and treatment system operators to monitor discharge requirements per the NPDES permit.

The anticipated water treatment discharge flow rate will be between 1,500 gpm and 9,500 gpm with a maximum capacity of 10,000 gpm. This flow rate can be adjusted manually based on the level of water within the dewatering pad and the efficiency of the treatment system.

The GAC vessels will provide tertiary water treatment prior to discharge back to the Kalamazoo River in accordance with the NPDES permit. Multiple GAC vessels, each containing up to 20,000 pounds of GAC, are capable of treating 1,000 gpm each. The differential pressure across the GAC vessels will be monitored for signs of plugging and/or physical fouling due to suspended solids and/or biological growth.

Treated water will be discharged in accordance with the NPDES permit. Effluent will be discharged into the Kalamazoo River using a vertical riser pipe with a dispersion cap. The discharge pipe and vertical riser will be mounted to a floating dock set away from the shoreline. The discharge point will be visually monitored to confirm no riverbed erosion is occurring. Additional monitoring will be conducted in accordance with the NPDES permit, and corrective actions initiated if warranted.

3.4 MP 10.40 N Sediment Trap Dredging

MP 10.40 N is a sediment trap located in a backwater area, shown in *Figure 1.*

3.4.1 Mobilization and Site Preparation

Dredge equipment (e.g., boats, excavators, pipe, etc.) will be sanitized in accordance with the *Invasive Species Plan* presented as *Attachment B* and access will be obtained into MP 10.40 N sediment trap from LDB and across the river. Access will consist of the installation of a floating bridge should river water elevation allow. In the event that river water elevation is not sufficient to install the floating bridge, a culvert bridge may be

constructed. Personnel and equipment will be mobilized to the MP 10.40 N sediment trap location. Personnel will receive site orientation training addressing health and safety, traffic control, spill prevention, and other relevant topics specific to MP 10.40 N sediment trap dredging operations. Enbridge will establish on-site office facilities at this location.

Site preparation will include both landward and riverine activities, which are summarized in *Section 3.4.2.1*. Landward site preparation will include containment development and construction, dredge pad location and construction, installation of dewatering pads, development of decontamination areas, and installation of water treatment systems. Dredge operation areas, including access and haul routes, dredge/dewatering/mixing pad locations, and equipment laydown areas have been identified and are shown on *Figure 2.*

Riverine site preparation will include the construction of discharge piping, locate dredge anchor points, and establish survey measurements and control. Utilities will be located throughout the dredging area prior to startup and updated per Enbridge protocol (i.e., refresh Michigan utility survey tickets every 14 days).

3.4.2 Sequence of Work

Work sequencing will provide project task prioritization, time management, and work efficiency. Dredge operations work sequencing is divided into the following three phases:

- Phase One - Pre-Dredge Activities,
- Phase Two - Dredge Route, and
- Phase Three - Post-Dredge Activities.

3.4.2.1 Phase One – Pre-Dredge Activities

Phase one of dredging operations will consist of the installation of the river containment structures and turbidity controls, installation of dredge piping and pipe testing, establishment of survey controls, and dredge deployment.

The installation of Containment will be required to minimize downstream migration of sediment sheen, and/or oil globules throughout dredging operations. Containment will consist of surface boom attached to a combination of high flow permeable turbidity curtain installed to full river depth along the RDB upstream of the eddy at MP 10.40 N sediment trap (see *Section 3.4.3.3* for additional detail).

Pipe (e.g., slurry, weep water, etc.) installation may be required to facilitate dredging operations. The pressurized pipe, including the initial section of slurry pipe, will be tested

prior to system startup in accordance with the *Pipe Testing Plan* presented in *Attachment B*. The piping will be pressurized for a period of 30 minutes and visually inspected for leaks. This process will continue until passing results are achieved and no leaks are observed.

After initial testing, changes to header, distribution piping, weep water piping, and treated water discharge piping are expected to be minor. Additional pressurized pipe testing is not expected during operations. However, it may be necessary to periodically remove and add slurry piping as dredging operations progress. Prior to removing sections of slurry piping, the pipe will be flushed with clean water to remove any remaining sediment. After slurry piping is added, clean water will pumped through the piping at design flow and pressure, and the slurry pipe will be visually inspected for leaks before transitioning to pumping sediment.

3.4.2.2 Phase Two – Dredge Routes

Phase two of dredging operations will consist of environmentally dredging the location on the RDB at MP 10.40 N sediment trap. Dredge operations will utilize either mechanical removal from long reach excavator(s) or a SedVac® system. Using mechanical techniques, dredged sediment will be placed in small tracked trucks and transported to the dewatering/mixing pad. If a SedVac® system is used, dredged sediments will be transported via slurry pipe to the dewatering/mixing pad.

The above outlined approach may change depending on actual site conditions. Large debris (e.g., stumps, logs, etc.), which may impede dredging operations, will be removed and disposed of at a U.S. EPA approved landfill or State of Michigan location(s).

3.4.2.3 Phase Three – Post Dredge Activities

The third phase of dredging operations will consist of the removal of the Containment, piping and dredge equipment, and landward support facilities (e.g., dewatering pads, water treatment locations, etc.). Equipment will be decontaminated in accordance with the established procedures for equipment decontamination (see *Section 4.3*).

3.4.3 Dredging

Proposed dredging operations including methods, volume to be removed, containment, water quality monitoring, and water treatment are outlined below.

3.4.3.1 Dredging Method

Sediments may be removed from the dredge locations utilizing a mechanical dredge or SedVac® system. Dredging production rate of 200 yd^3 per day with 70% efficiency are expected.

3.4.3.2 Dredge Template (Area, Depth, and Volume)

The dredge area is defined under the Order based on the 'heavy' and 'moderate' poling results from the 2012 Sediment Trap Baseline Poling Round. Dredging depth at this location is based on soft sediment from poling conducted in 2012. The following table provides a summary of a potential dredging volume for MP 10.40 N with a "worst case" including contingency as recommended by the U.S. EPA. Submerged oil/sediment removal volumes estimates are based on 'heavy' and 'moderate' poling delineations and a 1-foot dredge cut. A "worst case" including contingency dredge volume has been calculated increasing the initial anticipated dredge volume (320 yd^3) by a factor of 20 percent. The "worst case" including contingency dredge volume was established for permit purposes only. Amendments to the 'heavy' and 'moderate' poling delineations may be modified upon completion of the Spring 2013 Reassessment (see *Section 5.3*). Amendments to dredge depths may also be modified based on the Spring 2013 Reassessment and/or completion of the Legacy Contamination Data Gap Evaluation (see *Section 2.8.2*).

Area	Approx. Area (acres)	Approx. Area (ft^2)	Approx. Dredge Cut (ft.)	Approx. Dredge Volume (ft^3)	Approx. Dredge Volume (yd^3)	"Worst Case" Including Contingency Volume (yd^3)
MP 10.40 N	0.2	8,600	1	8,600	320	384

3.4.3.3 Containment

Containment will be installed upon MDEQ permit issuance. Containment may consist of 5/16-inch PVC coated top, mid and bottom tension cables, 12-inch or 8-inch closed foam flotation covered by 22-ounce PVC coated polyester, and tool free universal end connections with reinforced anchor points. Impermeable fabric will consist of 22-ounce or 24-ounce PVC coated polyester. Permeable fabric will consist of 10% open area, non-woven monofilament geotextile filter fabric (AOS – US Sieve No. 40; Flow rate – 140 gpm/ft^2). The bottom will consist of two 5/16-inch or two ½-inch ballast chains. Curtain anchors will vary by location, and will include shoreline and island trees or H beams, 2-inch

schedule 40 steel posts or T-posts and anchors, if required. If necessary to alleviate heavy flows, sheet piling and chain link fence may be installed in conjunction with curtain to help partially deflect or contain flow. Sheet piling, if installed, may be heavy duty Z-section steel sheet. Methods to install the sheet piling may require a high frequency driver-extractor or push methodology. Chain link fencing, if installed, may be utilized to reinforce curtain segments on the opposite side of flow. Containment monitoring will be conducted daily and necessary repairs or maintenance will be performed.

3.4.3.4 Water Quality Monitoring

Water quality monitoring throughout dredging operations will be conducted in accordance with the WQ SOP. This document provides specific provisions for turbidity monitoring and reporting of the results. For example, if monitoring showed excessive sediment re-suspension (i.e., turbidity greater than 50 NTUs or two times background, whichever is greater), operational controls will be implemented. An example of an operational control would be to deploy turbidity curtains to prevent re-suspended material from migrating downstream.

3.4.3.5 Conveyance

The dredge discharge slurry from dredging operations will either be pumped via the SedVac® system at a flow rate ranging from 100 gpm to 500 gpm or transported to the dewatering/mixing pad via small tracked trucks. Pipe leak testing will be conducted prior to use as referenced in *Section 3.4.2.1*.

3.4.4 Water Treatment and Discharge

Water collected from mechanical dredging will be pumped to a water treatment system, which includes several multi-bag filters and GAC vessels, or taken by vacuum truck to a different treatment area. If an on-site treatment system will be used, it will be sized to meet the discharge requirements of <20 ppb of total BTEX. The water treatment contractor will provide a licensed Wastewater Treatment Operator and treatment system operators to monitor discharge requirements per the NPDES permit.

If an on-site water treatment system is used, the anticipated water treatment discharge flow rate will be between 100 gpm and 500 gpm with a maximum capacity of 500 gpm. This flow rate can be adjusted manually based on the level of water within the dewatering pad and the efficiency of the treatment system.

The GAC vessels for the on-site treatment system will provide tertiary water treatment prior to discharge back to the Kalamazoo River in accordance with the NPDES permit. Two to four GAC vessels, each containing between 2,000 and 8,000 pounds of GAC, are capable of treating 100 to 500 gpm each. It is anticipated that two treatment trains (comprised of two GAC vessels), identified as A and B, are connected to operate in parallel to treat a maximum capacity of 500 gpm. The differential pressure across the GAC vessels will be monitored for signs of plugging and/or physical fouling due to suspended solids and/or biological growth.

Treated water will be discharged in accordance with the NPDES permit. Effluent will be discharged into the Kalamazoo River using a vertical riser pipe with a dispersion cap. The discharge pipe and vertical riser will be mounted to a floating dock set away from the shoreline. The discharge point will be visually monitored to confirm no riverbed erosion is occurring. Additional monitoring will be conducted in accordance with the NPDES permit, and corrective actions initiated if warranted.

3.5 MP 21.50 RDB Sediment Trap Dredging

MP 21.50 RDB sediment trap is an oxbow located downstream of the City of Battle Creek Wastewater Treatment Plant, shown in *Figure 1.*

3.5.1 Mobilization and Site Preparation

Dredge equipment (e.g., boats, excavators, pipe, etc.) will be sanitized in accordance with the *Invasive Species Plan* presented as *Attachment B* and access will be obtained adjacent to the oxbow from the main road. Personnel and equipment will be mobilized to the oxbow at MP 21.50 RDB sediment trap location. Personnel will receive site orientation training addressing health and safety, traffic control, spill prevention, and other relevant topics specific to MP 21.50 RDB sediment trap dredging operations. Enbridge will establish on-site office facilities at this location.

Site preparation will include both landward and riverine activities, which are summarized in *Section 3.5.2.1*. Landward site preparation will include containment development and construction, dredge pad location and construction, installation of dewatering pads, development of decontamination areas and installation of water treatment systems. Dredge operation areas, including access and haul routes, dredge/dewatering/mixing pad locations, and equipment laydown areas have been identified and are shown on *Figure 2.*

Riverine site preparation will include construction of discharge piping, locate dredge anchor points, and establish survey measurements and control. Utilities will be located throughout the dredging area prior to startup and updated per Enbridge protocol (i.e., refresh Michigan utility survey tickets every 14 days).

3.5.2 Sequence of Work

Work sequencing will provide project task prioritization, time management, and work efficiency. Dredge operations work sequencing is divided into the following three phases:

- Phase One - Pre-Dredge Activities,
- Phase Two - Dredge Route, and
- Phase Three - Post-Dredge Activities.

3.5.2.1 Phase One – Pre-Dredge Activities

Phase One of dredging operations will consist of the installation of the river containment structures and turbidity controls, installation of dredge piping and pipe testing, establishment of survey controls, and dredge deployment.

The installation of Containment will be required to minimize downstream migration of sediment sheen and/or oil globules throughout dredging operations. Containment may consist of surface boom attached to a combination of high flow permeable turbidity curtain installed to full river depth along the RDB at the upstream and downstream openings of the oxbow at MP 21.50 RDB sediment trap (see *Section 3.5.3.3* for additional detail).

Piping (e.g., slurry, weep water, etc.) installation is required to facilitate dredging operations. The pressurized pipe, including the initial section of slurry piping, will be tested prior to system startup in accordance with the *Pipe Testing Plan* presented in *Attachment B*. The piping will be pressurized for a period of 30 minutes and visually inspected for leaks. This process will continue until passing results are achieved and no leaks are observed.

After initial testing changes to header, distribution piping, weep water piping, and treated water discharge piping are expected to be minor. Additional pressurized pipe testing is not expected during operations. However, it may be necessary to periodically remove and add slurry piping as dredging operations progress. Prior to removing sections of slurry piping, the pipe will be flushed with clean water to remove any remaining sediment. After slurry piping is added, clean water will pumped through the pipe at design flow and pressure, and the slurry pipe will be visually inspected for leaks before transitioning to pumping sediment.

3.5.2.2 Phase Two – Dredge Routes

Phase Two of dredging operations consists of the following planned dredging routes:

- Access for this dredge area has not been finalized; however, appropriate measures will be employed to gain access to MP 21.50 RDB, and
- Environmentally dredge oxbow area MP 21.50 RDB.

The above outlined approach may change depending on actual site conditions. Large debris (e.g., stumps, logs, etc.), which may become entangled in the dredge head will be removed and disposed of at a U.S. EPA approved landfill or State of Michigan location(s).

3.5.2.3 Phase Three – Post Dredge Activities

The third phase of dredging operations will consist of the removal of the Containment, pipe and dredge equipment, and landward support facilities (e.g., dewatering pads, water treatment locations, etc.). Equipment will be decontaminated in accordance with the established procedures for equipment decontamination (see *Section 4.3*).

3.5.3 Dredging

Proposed dredging operations including methods, volume to be removed, containment, and water quality monitoring and water treatment are outlined below.

3.5.3.1 Dredging Method

Sediments may be removed from the dredge locations utilizing an 8-inch diameter hydraulic dredge, mechanical dredge and/or a SedVac® system. Production rates depend on the following criteria: depth of cut; in-situ bulk density; slurry percent solids; pipe length; and, elevation changes between dredge and dewatering pad. Dredging production rates between 350 and 450 yd^3 per day with 70% efficiency is expected.

3.5.3.2 Dredge Template (Area, Depth, and Volume)

The dredge area is defined under the Order based on the 'heavy' and 'moderate' poling results from the 2012 Sediment Trap Baseline Poling Round. Dredging depth at this location is based on soft sediment from poling conducted in 2012. The following table provides a summary of a potential dredging volume for MP 21.50 RDB with a "worst case" including contingency as recommended by the U.S. EPA. Submerged oil/sediment removal volumes estimates are based on 'heavy' and 'moderate' poling delineations and a 1-foot dredge cut. A "worst case" including contingency dredge volume has been calculated increasing the initial anticipated dredge volume (4,500 yd^3) by a factor of 20 percent. The "worst case"

including contingency dredge volume was established for permit purposes only. Amendments to the 'heavy' and 'moderate' poling delineations may be modified upon completion of the Spring 2013 Reassessment (see *Section 5.3*). Amendments to dredge depths may also be modified based on the Spring 2013 Reassessment and/or completion of the Legacy Contamination Data Gap Evaluation (see *Section 2.8.2*).

Area	Approx. Area (acres)	Approx. Area (ft^2)	Approx. Dredge Cut (ft.)	Approx. Dredge Volume (ft^3)	Approx. Dredge Volume (yd^3)	"Worst Case" Including Contingency Volume (yd^3)
MP 21.50 RDB	2.75	120,250	1	120,250	4,500	5,400

3.5.3.3 Containment

Containment will be installed upon MDEQ permit issuance. Containment may consist of 5/16-inch PVC coated top, mid and bottom tension cables, 12-inch or 8-inch closed foam flotation covered by 22-ounce PVC coated polyester, and tool free universal end connections with reinforced anchor points. Impermeable fabric will consist of 22-ounce or 24-ounce PVC coated polyester. Permeable fabric will consist of 10% open area, non-woven monofilament geotextile filter fabric (AOS – US Sieve No. 40; Flow rate – 140 gpm/ft^2). The bottom will consist of two 5/16-inch or two ½-inch ballast chains. Curtain anchors will vary by location, and will include shoreline and island trees or H beams, 2-inch schedule 40 steel posts or T-posts and anchors if required. If necessary to alleviate heavy flows, sheet piling and chain link fence may be installed in conjunction with curtain to help partially deflect or contain flow. Sheet piling, if installed, may be heavy duty Z-section steel sheet. Methods to install the sheet piling may require a high frequency driver-extractor or push methodology. Chain link fencing, if installed, may be utilized to reinforce curtain segments on the opposite side of flow. Containment monitoring will be conducted daily and necessary repairs or maintenance will be performed.

3.5.3.4 Water Quality Monitoring

Water quality monitoring throughout dredging operations will be conducted in accordance with the WQ SOP. This document provides specific provisions for turbidity monitoring and reporting of the results. For example, if monitoring shows excessive sediment re-suspension (i.e., turbidity greater than 50 NTUs or two times background, whichever is greater), operational controls will be implemented. An example of an operational control

would be to deploy turbidity curtains to prevent re-suspended material from migrating downstream.

3.5.3.5 Conveyance

The dredge discharge slurry from dredging operations will be pumped at a flow rate ranging from 1,000 to 2,000 gpm. Pipe leak testing will be conducted prior to use as referenced in *Section 3.5.2.1*.

3.5.4 Chemical Conditioning

The dredge slurry will be pumped to the sediment dewatering/mixing pad via the dredge discharge pipe. The dredge slurry will be conditioned once it reaches the dewatering/mixing pad with polymer to promote flocculation and separation of solid material from the carriage water. The desired dosage based on bench scale testing (see *Section 2.5*) will be entered into the polymer feed controls system.

3.5.5 Dewatering of Sediment

Dredged sediment will be pumped into geotextile tubes for dewatering. The geotextile tubes will be situated on a dewatering pad located in the staging area. The dewatering pad will be constructed to accommodate proposed dredge volumes. The dewatering pad will be constructed by compaction of the existing soil base, installation of an impermeable liner, and placement of a layer of drainage aggregate as a working surface. Design assumptions include approximately 1,000 yd^3 of dredged sediment for each geotextile tube.

3.5.5.1 Geotextile Tubes

The dredged slurry will generally consist of 2% to 15% sediment to water ratio. The slurry is pumped through a header pipe and distributed into a polymer feed control system with valves directing the flow of the slurry into geotextile tubes. The system utilizes a polymer to settle out the solids while a pump is connected to the other end to aid in the removal of water.

Once a geotextile tube is at capacity, flow is diverted to another geotextile tube while the full geotextile tube dewaters. The geotextile tube will go through ‘fill and rest’ cycles until it reaches its full capacity as per the manufacture’s specifications. Operators will monitor the geotextile tubes during dredging operations. Once the geotextile tube is full of sediment and dewatering is sufficient, it will be opened to allow an excavator to place the sediment for staging.

3.5.5.2 Containment and Collection of Weep Water

The dewatering/mixing pad will be designed within a containment berm, which will be sloped toward a sump with approximately one hour of water treatment system capacity. Water drained to the dewatering/mixing pad (i.e., weep water), including storm water, will be collected in the sump and treated within an on-site temporary water treatment system. The dewatering/mixing pad may be designed to accommodate approximately one day of dredge production plus a 10-year storm event.

3.5.5.3 Water Treatment and Discharge

Water collected in the sump will be pumped to a water treatment system, which includes several multi-bag filters and GAC vessels. The treatment system will be sized to meet the discharge requirements of <20 ppb of total BTEX. The water treatment contractor will provide a licensed Wastewater Treatment Operator and treatment system operators to monitor discharge requirements per the NPDES permit.

The anticipated water treatment discharge flow rate will be between 1,000 gpm and 1,500 gpm with a maximum capacity of 2,000 gpm. This flow rate can be adjusted manually based on the level of water within the dewatering pad and the efficiency of the treatment system.

The GAC vessels will provide tertiary water treatment prior to discharge back to the Kalamazoo River in accordance with the NPDES permit. Four GAC vessels, each containing 10,000 pounds of GAC, are capable of treating 1,000 to 2,000 gpm each. It is anticipated that two treatment trains (comprised of two GAC vessels), identified as A and B, are connected to operate in parallel to treat a maximum capacity of 2,000 gpm. The differential pressure across the GAC vessels will be monitored for signs of plugging and/or physical fouling due to suspended solids and/or biological growth.

Treated water will be discharged in accordance with the NPDES permit. Effluent will be discharged into the Kalamazoo River using a vertical riser pipe with a dispersion cap. The discharge pipe and vertical riser will be mounted to a floating dock set an appropriate distance from the shore line. The discharge point will be visually monitored to confirm no riverbed erosion is occurring. Additional monitoring will be conducted in accordance with the NPDES permit, and corrective actions initiated if warranted.

4.0 POST DREDGE ACTIVITIES

Post dredge activities will include performing a poling reassessment, demobilization/decontamination of dredge equipment, summarizing waste management documentation, and reporting.

4.1 Post Dredge Poling Reassessment

The post dredge poling reassessment will be conducted in 2013, should conditions allow. The methods and procedures to be followed are further described in *Section 5.2*.

4.2 Post Dredge Survey

The post dredge hydrographic survey will consist of a compilation of daily bathymetric data collected from dredge equipment (as outlined in *Section 2.7.4*). Dredges will be equipped with positioning hardware and dredge control software that monitors the horizontal and vertical position of the cutting head for hydraulic dredges or the bucket for mechanical dredges. During dredge operations, information recorded by the dredge control software will be used to confirm target elevations have been reached as dredging progresses. The dredge control software will provide output showing both daily dredging locations covered and cumulative areas dredged. Preliminary dredging volumes will be estimated from the dredge control surveys on a daily basis and refined following review of sediment disposal bill of lading records. Survey data collected during dredging activities will be compiled into a composite survey that provides coverage of dredged areas.

4.3 Demobilization and Decontamination

As deemed necessary by Enbridge, temporary facilities and utilities, personnel, equipment, and materials may be removed from the area. Construction equipment will be decontaminated before leaving the area in accordance with the *Decontamination Plan* presented in *Attachment B*. Cleaning methods for equipment may include brushing and or pressure washing to remove potentially contaminated material, as necessary. As part of decontamination efforts, all non-porous surfaces (e.g., pipes, fittings, appurtenances, pumps, vessels, etc.) that have come into contact with sediment and/or filtrate will be cleaned as follows:

4.3.1 Dredging Equipment and Ancillary Items

- All portions of the sediment dewatering and water treatment systems will be flushed

in place with river water supplied by the hydraulic dredge. Rinsing will be considered complete when at least three system volumes of river water have passed through the system. A sample will be collected from the flocculant valve and analyzed for total BTEX once pipe flushing has been completed.

- If total BTEX results are less than 20 ppb per the NPDES permit, the system will be drained and discharged to the river. If total BTEX is greater than 20 ppb, the flushing process will be repeated and a follow-up sample will be collected and analyzed.
- Media from treatment vessels will be disposed off-site at an U.S. EPA approved facility.
- All treatment vessels will be triple rinsed utilizing a pressure washer and an Enbridge approved degreasing solution (if needed).

4.3.2 Heavy Equipment

- Heavy equipment will be tracked, driven, or otherwise placed on the dewatering pads,
- All equipment will be triple rinsed utilizing a pressure washer and an Enbridge approved degreasing solution (if needed),
- All water collected on the dewatering pad will be pumped through an on-site water treatment plant (e.g., bag filters, GAC vessels, etc.),
- Debris collected on the dewatering pad will be placed in roll off boxes for off-site transportation and disposal, and
- Equipment will be demobilized from the project once dredging operations and decontamination has been completed.

4.3.3 Personnel Decontamination and Demobilization

- Contamination reduction zones will be delineated at entrance to the dredge sediment treatment areas. Specific facility and/or site ingress/egress points will be established. At each of these locations a personnel decontamination station will be provided in accordance with the *Decontamination Plan* presented in *Attachment B*. The Decontamination Station will consist of: boot wash, glove removal and refuse storage area, hand wash, and exit.
- Personnel will be dismissed from the project as required by Project Management.

4.3.4 Decontamination Water Management

Decontamination operations will be conducted on the dewatering pads with the exception of personnel decontamination. Equipment will be placed on timber mats or other structures that separate the equipment from the dewatering pad surface. Water collected on the dewatering pad will be directed toward the water treatment plant. Decontamination water will be treated in an on-site water treatment plant or an approved water treatment facility as approved by the WTTD Plan.

4.4 Waste Management

Waste generated during the dredging and dewatering activities will be handled in accordance with the U.S. EPA approved WTTD Plan, all approved addendums, supplements, and revisions.

4.4.1 Characterization

Sediment included in the proposed dredge locations will be characterized prior to dredge activities commencing. Representative waste characterization samples will be collected from each of the five dredge locations and analyzed in accordance with the WTTD Plan and any additional parameters needed as requested by disposal facilities.

In addition, dredged sediments will be characterized relative to their density, geotechnical classification, chemical composition, and water content to determine eligibility for use as alternative daily cover. Prior to the dewatered sediment being removed for disposal, additional characterization may be required. If deemed necessary, characterization of each geotextile tube will be conducted by dividing each geotextile tube into four quadrants based on the actual dimensions of the geotextile tube (150-foot long and 75-foot in circumference). One composite sediment sample may be collected as required comprised of one grab sample from each of the four quadrants.

4.4.2 Material Sampling

Prior to the transportation of dewatered dredged sediments to a disposal facility, one paint filter test and one single point aliquot of sediment will be collected from each representative storage container as described in the direct loading procedure outlined in the A*ddendum to the revised Waste Treatment, Transportation and Disposal Plan (May 20, 2011) Commonly Referred to as the "Waste Characterization and Oil Recovery Sampling for Soils and Sediment"* (Enbridge, 2011d) approved by the U.S. EPA on June 20, 2011.

4.4.3 Waste Consolidation

Waste consolidation will be accomplished through one or more of the following methods:

- The typical pressurized operation of the geotextile tubes consolidates the waste,
- Vibration of the tubes, if required, to further consolidates the waste, and
- Stacking of tubes one on top of another consolidates the waste in the lower tube.

4.4.4 Waste Solidification

Waste that does not meet the disposal criteria of the landfill(s) will be solidified prior to off-site transportation. The waste will be mixed with an U.S. EPA approved reagent using a hydraulic excavator or a pug mill. Processed waste will be stockpiled and allowed to 'cure' prior to loading and off-site transportation and disposal.

4.4.5 Transportation

Transportation as part of dredging operations will be required to comply with the State of Michigan trucking standards, regulations and Enbridge procedures including but not limited to the following:

- All truck loads will have manifest or other appropriate shipping document, prior to leaving the site to the disposal facility,
- Meet all Department of Transportation standards,
- Meet all Enbridge safety requirements,
- Be lined prior to loading of materials,
- All trucks will follow approved routes to the disposal facility, and,
- Contractor will clean public roadways which have been impacted by project related trucking.

4.5 Contingencies

This work plan presents a strategy to implement dredging operations at five major depositional areas in the Kalamazoo River system. Adverse weather or river conditions may delay or impact the efficiency and timing of removal efforts. As well, other key constraints that may impact implementation or schedule aspects include land access or other logistical constraints. Notably, riparian landowners in the Morrow Lake Delta have expressed concerns regarding mobilization of legacy contaminants and additionally have not provided the required approvals and property access to implement the work. Within actual dredge activities, target areas may require further response methods based on site conditions

encountered during operations. This work plan is intended to recover Line 6B oil, the projects may experience schedule creep if dredging volumes increase due to rework being required. As new situations arise, Enbridge will react swiftly, in consultation with the U.S. EPA and MDEQ, to develop a response strategy to achieve the necessary end points.

4.6 Dredge Completion Report

A Completion Report will be prepared and submitted to U.S. EPA and MDEQ upon completion of the dredging/dewatering activities (one report will be issued for the five areas). The report will include at a minimum a summary of the work performed, pre- and post-dredge condition assessment information, daily field reports, and photographic documentation.

5.0 SUBMERGED OIL REASSESSMENT

Submerged oil reassessment activities will be conducted at select locations along the Kalamazoo River from the confluence with Talmadge Creek downstream through the Morrow Lake Delta to Morrow Lake Dam. Additional locations downstream of Morrow Lake Dam will also be re-assessed. Reassessment locations are shown on *Figure 4*.

5.1 Objectives

The submerged oil reassessment will include poling of river sediments to compare with data sets obtained from submerged oil reassessment activities conducted during previous events (2010, 2011, and 2012) at various target areas within the Kalamazoo River system; assist in making determinations as to the distribution and relative quantity of submerged oil remaining in the Kalamazoo River system; and, assist in 2013 dredging operations (as outlined above).

5.2 Methods and Procedures

Procedures for completing the submerged oil reassessment are presented in the 2011-2012 CWP. The reassessment activities will include poling of soft sediments in targeted depositional areas. Data associated with the poling reassessment include water depth, pole advancement depth into the soft sediment (thickness), bed characteristics, GPS coordinates, and the relative amount of sheen and/or oil globules observed at the water surface.

Water depth data will be collected using an 8-inch diameter disk attached to the end of an aluminum pole approximately 2-inches in diameter marked at 0.1-foot intervals. At each

poling location, the disc will gradually be lowered to the top of the sediment bed, and the depth from the water surface to the top of soft sediment (water depth) will be recorded to the nearest 0.1-foot.

Soft sediment thickness data will be collected using a pole without a disk and marked at intervals of 0.1-foot. The pole will be pushed vertically through the sediment until advancement is restricted. The depth to sediment surface (water depth) and maximum poling depth into the soft sediment will determine the soft sediment thickness at each location. A description of the sediment type will be documented based on the poling results (e.g., soft sediment – silt over sand).

An approximate determination of the relative amount of submerged oil at each poling location will be made by using the pole with an 8-inch diameter disk to agitate the soft sediment. Following agitation, the amount of sheen and/or oil globules observed at the water surface will be described using the same categories as the 2012 field season ('heavy', 'moderate', 'light', or 'none'). Poling results will be described using the Poling Field Observation Flowchart shown in *Figure 3*. If 'heavy' or 'moderate' indications of sheen and/or oil globules are observed, the locations will be delineated by additional step-out poling. Poling teams will work away from 'heavy' or 'moderate' locations until they have documented either a 'light' or 'none' poling classification.

A GPS unit will be used to document the coordinates for each poling location. All poling locations will be surveyed during the project to the extent practicable using a differential GPS unit with sub-meter accuracy. The horizontal coordinate system will be the Michigan State Plane Coordinate System, South zone, referenced to the North American Datum 1983, in international feet.

5.3 Spring 2013 Reassessment

The Spring 2013 Reassessment will be conducted to establish the current conditions of the Kalamazoo River from the confluence with Talmadge Creek downstream through the Morrow Lake Delta to Morrow Lake Dam at select locations. Poling at target areas for the Spring 2013 Reassessment will include the following locations:

- All locations where 'heavy' or 'moderate' submerged oil was identified during the 2010, 2011, and 2012 field seasons, including areas identified during 2011 and 2012 Late Summer Reassessment,

- Within all 2011 and 2012 focus areas,
- At areas where Net Environmental Benefits Analysis (NEBA) recommended more frequent monitoring,
- At select transect locations from 2011 and 2012 reassessment,
- Throughout the entire footprint of Morrow Lake, and
- At other areas directed by the U.S. EPA.

Figure 4 shows the Spring 2013 Reassessment target areas and transects. The Spring 2013 Reassessment methods and procedures will be conducted as outlined above and in the 2011-2012 CWP and subsequent procedural revisions. Poling activities will be conducted when sediment and water temperatures reach 60 degrees Fahrenheit (°F) and above. Sediment and water temperature data will be obtained and documented in accordance with the *Water and Sediment Temperature Collection Standard Operating Procedure* (Enbridge, 2012f) approved by the U.S. EPA on September 13, 2012.

Scaled maps (i.e., both hard copy and geographical information system (GIS) format) of poling results and polygons delineating 'heavy' and 'moderate' areas will be provided to the U.S. EPA within approximately one week upon completion of the activities.

5.4 Morrow Lake Delta and Morrow Lake

Morrow Lake Delta and the Morrow Lake poling activities will be conducted as outlined in the 2012 MLD/MLMM Plan. Updated poling locations for Morrow Lake Delta and the Morrow Lake monitoring are shown in *Figure 5*. Water and sediment temperatures of 60°F or above during Morrow Lake Delta and Morrow Lake monitoring activities will not be required for this activity.

5.5 Monitoring Downstream of the Morrow Lake Dam

Seasonal poling activities downstream of Morrow Lake Dam identified in the 2011-2012 CWP and subsequent revisions will be conducted in the spring, summer, and fall of 2013. Poling will not be conducted within 300 feet of the downstream location of the Morrow Lake Dam in accordance with the Federal Energy Regulatory Commission Guidelines for Public Safety at Hydropower Projects. *Figure 4* shows the downstream of the Morrow Lake Dam poling locations, including NEBA recommended monitoring points. Poling activities will be conducted when sediment and water temperatures reach 60°F and above.

5.6 Data Collection and Documentation

Electronic field data forms will serve as a daily record of events, observations, and measurements collected during submerged oil reassessment activities. Information will be recorded electronically and will include names of field personnel, date and time, location of activity, site description, field measurements, and field observations. Paper copies of the field forms will be printed and filed for hard copy backup of all data collected. Electronic data will be stored in a GIS database.

5.7 Data Analysis and Transmittal

Enbridge will review data generated during Spring 2013 Reassessment activities to evaluate additional collection needs and to assist in making amendments to the 'heavy' and 'moderate' poling delineations for the planned dredging operations. Data will be transmittal to the U.S. EPA in electronic GIS format.

6.0 SUPPLEMENTAL DATA COLLECTION

Supplemental data will be collected as appropriate to further assess suspended sediment concentrations throughout the Kalamazoo River from upstream of the confluence with Talmadge Creek to the Morrow Lake Dam. The following section summarizes the proposed additional data collection activities.

6.1 Walling Tube Installation, Collection, and Analysis

Re-suspension and migration of submerged oil and oil-containing sediment will be evaluated through the use of time-integrated in-situ Walling suspended sediment (WSS) samplers (Phillips et al., 2000). WSS samplers were previously collected during the 2012 field season and were placed on hold at the laboratory. In accordance with the Order, the 2012 WSS samples will be analyzed for analytical parameters identified in *Appendix J* of the Order. In addition, WSS samplers will be re-installed during the 2013 field season according to the 2011-2012 CWP as shown in *Figure 6*.

6.1.1 Installation

WSS samplers will be re-installed during the 2013 field season at the following locations:

- Two groupings of WSS samplers will be placed in the Kalamazoo River upstream of the confluence with Talmadge Creek,

- One grouping of WSS samplers will be placed in Talmadge Creek upstream of the confluence with the Kalamazoo River,
- Three groupings of WSS samplers will be placed within the Ceresco impoundment,
- One grouping of WSS samplers will be placed downstream of the Dickman Road culverts and upstream of the Kalamazoo River Dam,
- One grouping of WSS samplers will be placed mid-channel upstream of the 20th Street Bridge,
- One grouping of WSS samplers will be placed mid-channel downstream of the 35th Street Bridge,
- Two groupings of WSS samplers will be placed near the upstream area within the neck of the Morrow Lake Delta, and
- Nine groupings of WSS samplers will be placed within the sediment fan of Morrow Lake.

6.1.2 Collection

Monitoring and sampling of the WSS samplers will be conducted on a monthly basis from May through November 2013, or after a large flow event (i.e., 2,000 cubic feet per second). The WSS samplers will be removed from the river before freeze up.

6.1.3 Analysis

Upon removal from the samplers, and after required preparation, the suspended sediment samples will be placed into laboratory supplied containers and submitted to the analytical laboratory for analysis (as outlined below).

Enbridge will provide tabulated weights of the suspended sediment samples to the U.S. EPA in a timely manner for evaluation for potential compositing. Specifically, if sample recovery is insufficient to complete the analysis, prioritization of samples for compositing samples will be conducted as directed by the U.S. EPA. Samples and data handling will be conducted in accordance with the QAPP.

WSS samples will be analyzed for the following parameters in accordance with *Appendix J* of the Order:

- Polycyclic aromatic hydrocarbon and sulfur heterocyclic compounds including alkyl homologues by GC/MS-SIM using U.S. EPA Method 8270D,
- Saturated hydrocarbons by GC/FID based on U.S. EPA Method 8015,

- Total extractable hydrocarbons representing the total aromatic and aliphatic hydrocarbon content of sample extracts after silica gel clean-up and analysis by GC/FID,
- Particle size distribution analysis, and
- Total organic carbon.

6.2 Support for Hydrodynamic and Sediment Transport Modeling

Other scientific data may be collected, if directed by U.S. EPA, which may include but not limited to: poling data, streambed sediment core collection, collection of location or elevation survey data, erodibility measurements or experiments, and flow velocity or discharge measurements.

7.0 TEMPERATURE AND RIVER FLOW/STAGE MONITORING

Kalamazoo River water and sediment temperatures and flow/stage data will continue to be collected to monitor changing conditions.

7.1 Surface Water and Sediment Temperature Collection

Surface water and sediment temperature readings will continue to be collected daily at the seven boat launch areas as well as during the Spring 2013 Reassessment and 2013 sediment trap monitoring events. Surface water and sediment temperature readings may be collected at additional locations as directed by U.S. EPA.

Activities will be completed in accordance with the *Water and Sediment Temperature Collection Standard Operating Procedure* (Enbridge, 2012f) approved by the U.S. EPA on September 13, 2012.

7.2 Kalamazoo River Flow and Stage Data

Kalamazoo River flow and stage data will continue to be obtained from the three existing United States Geological Survey stream flow gauging stations located near Marshall, Michigan (Station ID 04103500); Battle Creek, Michigan (Station ID 04105500); and, Comstock, Michigan (Station ID 04106000). Enbridge may also collect stage data at additional locations as directed by the U.S. EPA.

8.0 SHEEN MANAGEMENT

As required by the U.S. EPA, sheen management activities will be conducted on the Kalamazoo River during the 2013 field season. Enbridge will continue the current sheen management program where sheen and/or oil globules emerge to the surface waters of the Kalamazoo River.

8.1 Sheen Testing

Enbridge will continue to test sheen observations as necessary using all current methods including: stick test, jar shake test, hexane test, and ultraviolet fluorescence testing. Sheen testing will be completed in accordance with the *Sheen Differentiation Methods Standard Operating Procedure* (Enbridge, 2012h) submitted to the U.S. EPA on May 11, 2012 and the *Sheen SOP Validation Data Collection Form* (Enbridge, 2012i) submitted May 10, 2012.

8.2 Sheen Sampling and Analysis

Enbridge may continue to collect sheen samples for chemical fingerprinting analysis from locations where sheen is observed on the water surface or from overbank areas. Sheen sampling will follow the procedures outlined in *Attachment E*, *Recommended Sheen Sample Collection Procedure* (U.S. EPA, 2012). Enbridge will provide U.S. EPA with sufficient notification prior to sample collection. U.S. EPA will provide a representative to oversee sheen sample collection activities. If U.S. EPA representation is not available, sheen sample collection may proceed with the knowledge that subsequent analytical data from this event may not be recognized by U.S. EPA. All samples will be tracked in the Fingerprinting Analysis Schedule weekly deliverable to U.S. EPA. All sheen samples results will be submitted to the U.S. EPA within 24 hours of receipt by Enbridge.

8.3 Sheen Response

Sheen response activities will be conducted as warranted and follow the protocols established by Enbridge in concurrence with U.S. EPA.

8.3.1 Response to Observed Sheen

A Response to Observations of Oil Sheen flowchart presented as *Attachment F* will be used to assist in evaluating the presence and recovery of sheen. Enbridge will dispatch sheen sweep crews in a timely manner to recover sheen using a snare fashioned onto a sweep bar.

8.3.2 Routine Sheen Sweeps

Routine sheen sweeps in the Kalamazoo River may be conducted to manage non-work areas where sheen is observed. As conditions warrant, routine sheen sweeps may be deployed to target locations, as determined by historical sites with sheen observations and recurring sheen observations.

8.3.3 Control Point Boom Installation and Maintenance

If necessary, the deployment of control point boom, or other surface boom will be conducted to control sheen.

8.4 Sheen Tracking

Enbridge will continue to update and maintain the Sheen Tracking Master Table, including documenting observations by the situation team(s), aerial overflights, routine sheen sweep teams, public complaints, and any other observations. Updates to the Sheen Tracking Master Table will be provided to U.S. EPA on a weekly basis.

9.0 AIR MONITORING AND SAMPLING

Enbridge will conduct air monitoring and sampling during dredging activities in accordance with the *Air Monitoring and Sampling Addendum to the Sampling and Analysis Plan* (Enbridge, 2012g) approved by U.S. EPA on May 3, 2012 (AMS Addendum). Specifically the AMS Addendum requires Enbridge to conduct real-time air monitoring and/or air sampling in the following areas:

- Real-time air monitoring in work areas where oil recovery activities occur,
- Real-time air monitoring for work area perimeters, if elevated volatile organic compounds (VOCs) or benzene are detected during work area air monitoring, within close proximity to residential areas,
- Air sampling for work area perimeters, if continuous elevated VOCs or benzene levels are detected during work area perimeter air monitoring, within close proximity to residential areas as directed by U.S. EPA, and
- Air monitoring and sampling in other areas in response to odor complaints.

Data gathered in the above mentioned areas will be used to assess the potential for worker and community exposures associated with dredging operations. Data will also be used to determine the implementation of additional engineering or administrative controls.

10.0 ADDITIONAL WATER, SEDIMENT, AND/OR SOIL SAMPLE COLLECTION

In the event of a large flood event (i.e., two year or higher), at endpoints (e.g., completion of dredging) or if requested by U.S. EPA, additional surface water, sediment and soil sampling, and focus poling activities may be conducted. The activities will be conducted in accordance with Enbridge standard operating procedures and guidelines, SAPs, and the QAPP approved by the U.S. EPA.

11.0 DISPOSAL

In accordance with the WTTD Plan, wastes will be disposed at a U.S. EPA approved disposal facility or other State of Michigan approved location(s).

12.0 UPDATE OF EXISTING DOCUMENTS

The existing WTTD Plan, QAP, SAP, and the HASP may be updated as appropriate to perform the work under the Order.

13.0 PROJECT SCHEDULE

A project schedule in Gantt format is presented in *Attachment G* for major work activities including outline of critical tasks, which may be modified based on numerous factors including approval of this Work Plan by U.S. EPA, river and weather conditions, access, and permitting. The critical tasks outlined in the Gantt chart will show planned dredging timelines for each individual dredge area, including estimated dates for permit applications and permit issuance. Updates to the schedule will be ongoing throughout the project and will be presented to the U.S. EPA and MDEQ as needed to indicate significant change. If any project schedule line items are adjusted after the Spring 2013 Reassessment is performed, Enbridge shall still meet the completion date of December 31, 2013 required by the Order.

14.0 REFERENCES

Enbridge, 2010a. Enbridge Energy, Limited Partnership Line 6B MP 608 Marshall, Michigan Pipeline Release; *Quality Assurance Project Plan*. Approved August 19, 2010.

Enbridge, 2010b. Enbridge Energy, Limited Partnership Line 6B MP 608 Marshall, Michigan Pipeline Release; *Sampling and Analysis Plan*. Approved August 19, 2010.

Enbridge, 2010c. Enbridge Energy, Limited Partnership Line 6B MP 608 Marshall, Michigan Pipeline Release; *Supplement to Source Area Response Plan and Supplement to Response Plan for Downstream Impacted Areas Referred to as Operations and Maintenance Work Plan*. Approved October 7, 2010.

Enbridge, 2010d. Enbridge Energy, Limited Partnership Line 6B MP 608 Marshall, Michigan Pipeline Release; *Report to U.S. EPA*. November 27, 2010.

Enbridge, 2011a. Enbridge Energy, Limited Partnership Line 6B MP 608 Marshall, Michigan Pipeline Release; *Waste Treatment, Transportation and Disposal Plan* (WTTD Plan), Approved May 20, 2011.

Enbridge, 2011b. Enbridge Energy, Limited Partnership Line 6B MP 608 Marshall, Michigan Pipeline Release; *Addendum to the Response Plan for Downstream Impacted Areas, August 2, 2010 (Revised August 17, 2010 per U.S. EPA August 17, 2010 letter), Supplement to Source Area Response Plan, and Supplement to Response Plan for Downstream Impacted Areas, Referred to as Operations and Maintenance Work Plan, Commonly referred to as "Consolidated Work Plan from Fall 2011 through Fall 2012"*, Approved December 21, 2011.

Enbridge, 2011c. Enbridge Energy, Limited Partnership Line 6B MP 608 Marshall, Michigan Pipeline Release; *Water Quality Measurement Standard Operating Procedure,* Approved September 22, 2011.

Enbridge, 2011d. Enbridge Energy, Limited Partnership Line 6B MP 608 Marshall, Michigan Pipeline Release; A*ddendum to the revised Waste Treatment, Transportation and Disposal Plan (May 20, 2011) Commonly Referred to as the "Waste Characterization and Oil Recovery Sampling for Soils and Sediment"*, Approved June 20, 2011.

Enbridge, 2012a. Enbridge Energy, Limited Partnership Line 6B MP 608 Marshall, Michigan Pipeline Release; Analytical Quality Assurance Plan Version 2.3. Approved December 21, 2012

Enbridge, 2012b. Enbridge Energy, Limited Partnership Line 6B MP 608 Marshall, Michigan Pipeline Release; *2012 Morrow Lake Delta and Morrow Lake Monitoring and Management Work Plan,* Approved November 15, 2012.

Enbridge 2012c. Enbridge Energy, Limited Partnership Line 6B MP 608 Marshall, Michigan Pipeline Release; *2012 Morrow Lake Delta Containment Strategy Design and Engineering Considerations Technical Memorandum.* Approved June 26, 2012.

Enbridge, 2012d. Enbridge Energy, Limited Partnership Line 6B MP 608 Marshall, Michigan Pipeline Release; *Sediment Trap Monitoring and Maintenance Plan.* Approved July 10, 2012.

Enbridge, 2012e. Enbridge Energy, Limited Partnership Line 6B MP 608 Pipeline Release Marshall, Michigan; *Kalamazoo River-Subsurface Sediment Structures (14 Sites)-MDEQ Permit Application Submittal to Conduct Proposed Kalamazoo River Response Actions Pursuant to Parts 31, 301, and 303 of NRPEPA.* April 29, 2012.

Enbridge, 2012f. Enbridge Energy, Limited Partnership Line 6B MP 608 Marshall, Michigan Pipeline Release; *Water and Sediment Temperature Collection Standard Operating Procedure,* Approved September 13, 2012.

Enbridge, 2012g. Enbridge Energy, Limited Partnership Line 6B MP 608 Pipeline Release Marshall, Michigan; *Air Monitoring & Sampling Addendum to the Sampling & Analysis Plan.* Approved May 3, 2012.

Enbridge, 2012h. Enbridge Energy, Limited Partnership Line 6B MP 608 Pipeline Release Marshall, Michigan; *Sheen Differentiation Methods Standard Operating Procedure.* May 11, 2012.

Enbridge, 2012i. Enbridge Energy, Limited Partnership Line 6B MP 608 Pipeline Release Marshall, Michigan; *Sheen SOP Validation Data Collection Form.* May 10, 2012.

Enbridge, 2013a. Enbridge Energy, Limited Partnership Line 6B MP 608 Marshall, Michigan Pipeline Release; *Supplement to the Response Plan for Downstream Impacted Areas Commonly Referred to as the "Quantification of Submerged Oil Report",* March 21, 2013.

Enbridge, 2013b. Enbridge Energy, Limited Partnership Line 6B MP 608 Marshall, Michigan Pipeline Release; *Health and Safety Plan Rev. 7,* April 30, 2013.

Phillips et. al, 2000. *Time-integrated sampling of fluvial suspended sediment: a simple methodology for small catchments*. November 17, 2000.

U.S. EPA, 2012. *Recommended Sheen Sample Collection Procedure*. April 26, 2012.

U.S. EPA, 2013a. "Order pursuant to §311(c) of the Clean Water Act (Docket No. CWA 1321-5-13-001) for Recovery of Submerged Oil from the Enbridge Line 6B Discharge near Marshall, MI", dated March 14, 2013.

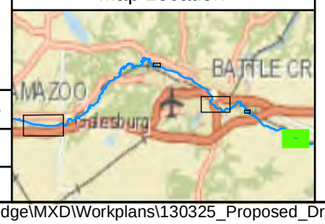
U.S. EPA, 2013b. *U.S. EPA's Disapproval of April 4, 2013 Submittal in response to the March 14, 2013 Order (Docket No. CWA 1321-5-13-001) for Recovery of Submerged Oil from the Enbridge Line 6B Discharge near Marshall, Michigan.* April 11, 2013

Figures

ENBRIDGE

Drawn:	GM	4/29/2013
Approved:	MS	4/29/2013
Project #:	60284509	

Map Location



Legend

- Dredge Area Footprints Based on 2012 Worst Case Heavy/Moderate Poling Results
- Enbridge 2012 Heavy/Moderate Delineations
- Proposed Dredge Area
- Sediment Trap Site Boundary
- Quarter Mile Grid Segments

* Sediment Trap Poling in Sediment Traps, Spring 2012 Poling Outside of Sediment Traps

N

0 250 500 1,000

Scale in Feet

FIGURE 1
PROPOSED DREDGE AREA
MP 4.50 - MP 5.80
SHEET 1 OF 5

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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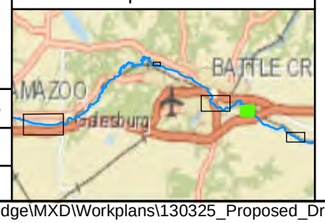
Aerial Photography Date: April 2011 over 2010

ENBRIDGE

Drawn:	GM	4/29/2013
Approved:	MS	4/29/2013
Project #:	60284509	

Map Location



Legend

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- Enbridge 2012 Heavy/Moderate Delineations
- Proposed Dredge Area
- Sediment Trap Site Boundary
- Quarter Mile Grid Segments

* Sediment Trap Poling in Sediment Traps, Spring 2012 Poling Outside of Sediment Traps

N

0 75 150 300

Scale in Feet

FIGURE 1
PROPOSED DREDGE AREA
MP 10.40 N
SHEET 2 OF 5

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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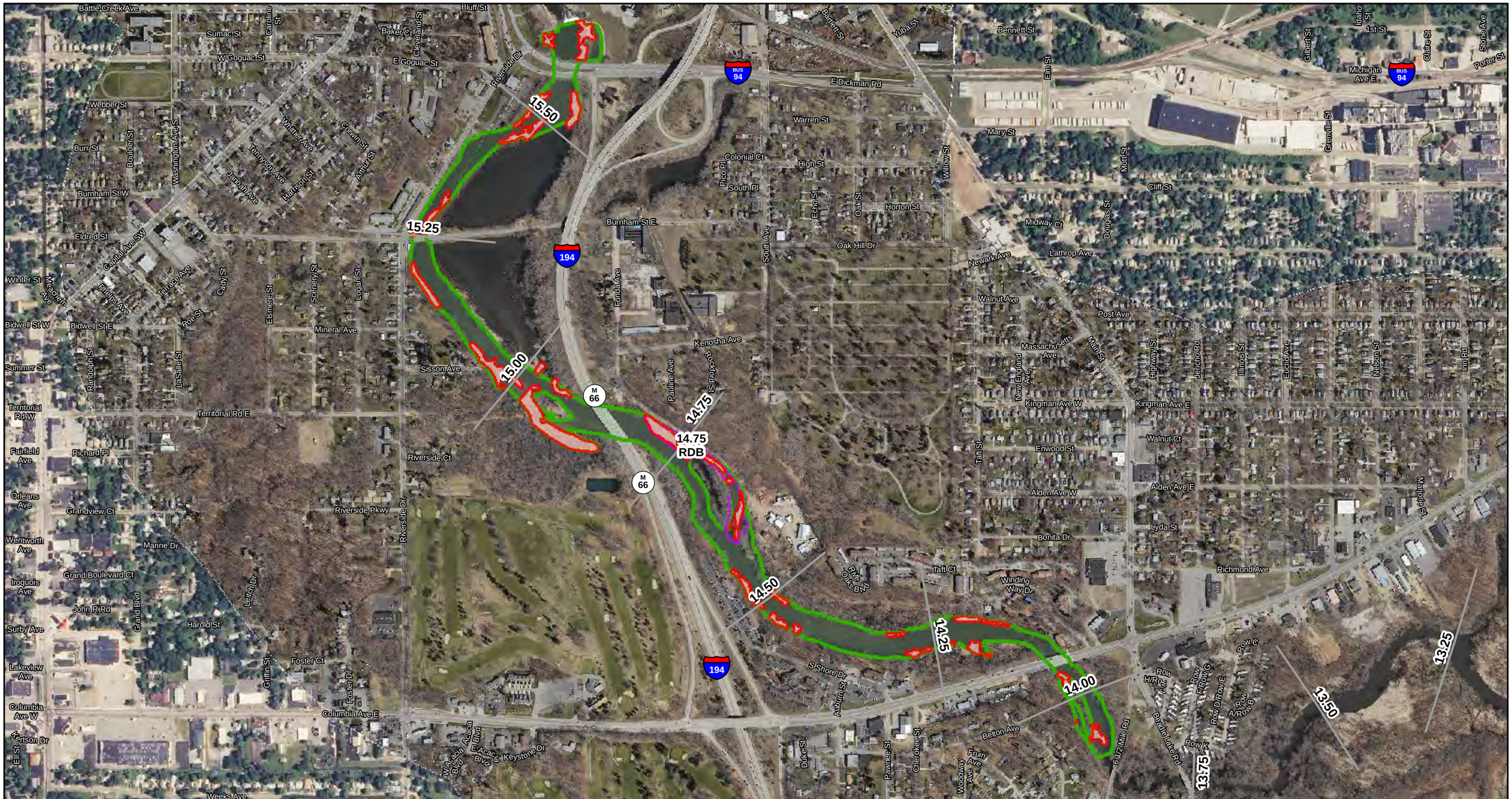
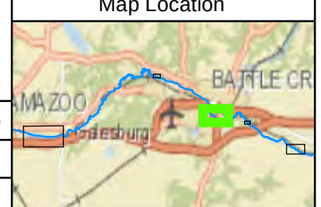
Aerial Photography Date: April 2011 over 2010



ENBRIDGE		
Drawn:	GM	4/29/2013
Approved:	MS	4/29/2013
Project #:	60284509	

Map Location



Legend

- Dredge Area Footprints Based on 2012 Worst Case Heavy/Moderate Poling Results
- Enbridge 2012 Heavy/Moderate Delineations
- Proposed Dredge Area
- Sediment Trap Site Boundary
- Quarter Mile Grid Segments

* Sediment Trap Poling in Sediment Traps, Spring 2012 Poling Outside of Sediment Traps

N

0 350 700 1,400

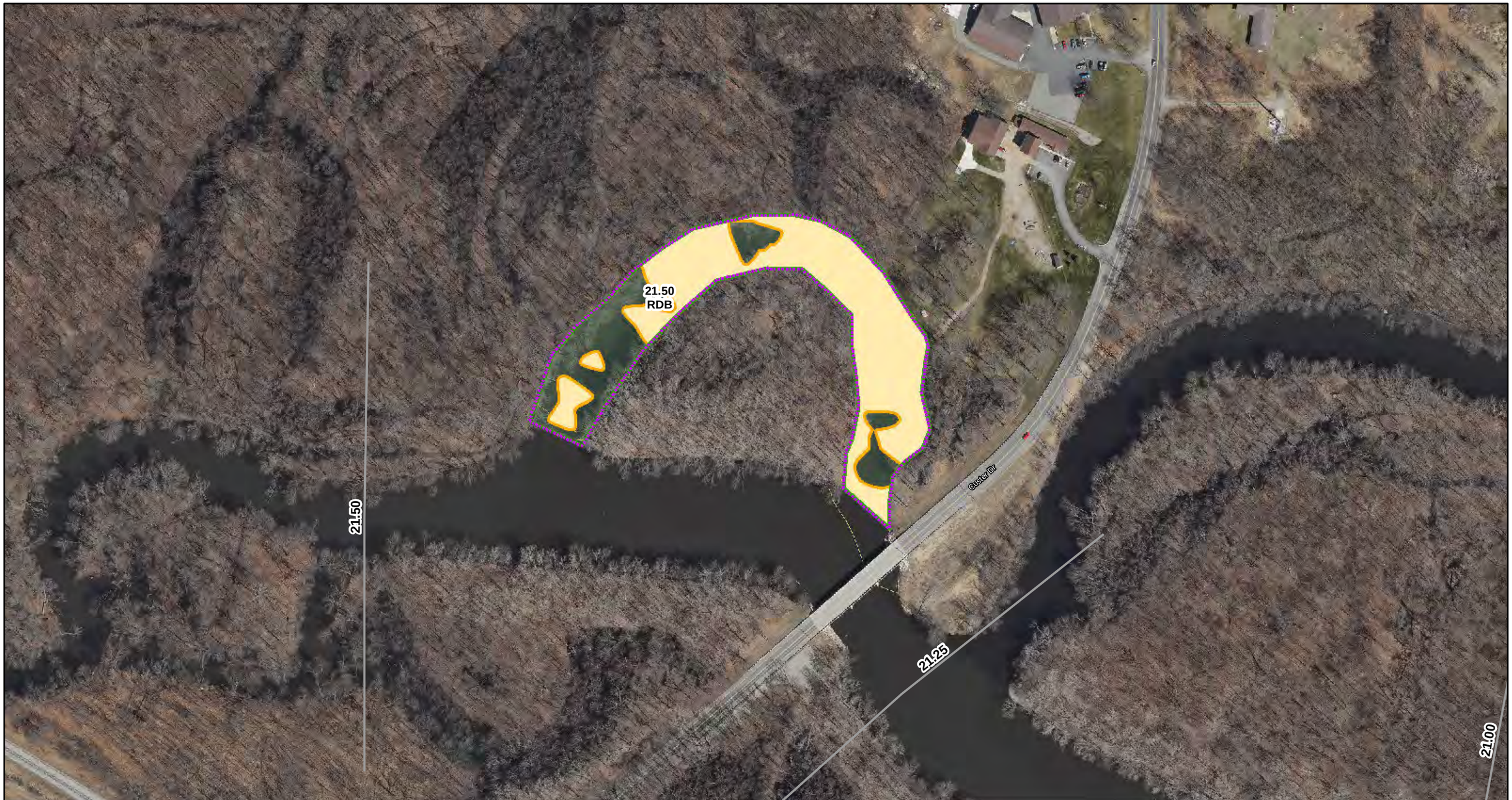
Scale in Feet

FIGURE 1
PROPOSED DREDGE AREA
MP 13.90 - MP 15.70
SHEET 3 OF 5

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

Z:\Work\GIS\Submerged_Oil\2013_Dredge\MXD\Workplans\130325_Proposed_Dredge_Areas_CWP.mxd

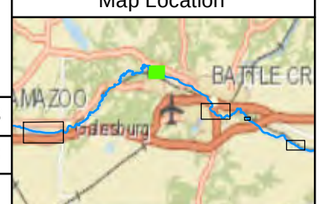
Aerial Photography Date: April 2011 over 2010



ENBRIDGE

Drawn:	GM	4/29/2013
Approved:	MS	4/29/2013
Project #:	60284509	

Map Location



Legend

- Dredge Area Footprints Based on 2012 Worst Case Heavy/Moderate Poling Results
- Enbridge 2012 Heavy/Moderate Delineations
- Proposed Dredge Area
- Sediment Trap Site Boundary
- Quarter Mile Grid Segments

* Sediment Trap Poling in Sediment Traps, Spring 2012 Poling Outside of Sediment Traps

N

0 100 200 400

Scale in Feet

FIGURE 1
PROPOSED DREDGE AREA
MP 21.50 RDB
SHEET 4 OF 5

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

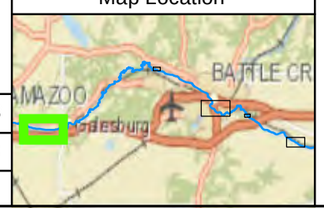
Z:\Work\GIS\Submerged_Oil\2013_Dredge\MXD\Workplans\130325_Proposed_Dredge_Areas_CWP.mxd

Aerial Photography Date: April 2011 over 2010

ENBRIDGE

Drawn:	GM	4/29/2013
Approved:	MS	4/29/2013
Project #:	60284509	

Map Location



Legend

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- Enbridge 2012 Heavy/Moderate Delineations
- Proposed Dredge Area
- Sediment Trap Site Boundary
- Quarter Mile Grid Segments

* Sediment Trap Poling in Sediment Traps, Spring 2012 Poling Outside of Sediment Traps

N

0 550 1,100 2,200

Scale in Feet

FIGURE 1
PROPOSED DREDGE AREA
MP 36.50 - MP 39.85
SHEET 5 OF 5

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

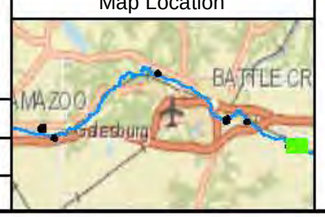
Z:\Work\GIS\Submerged_Oil\2013_Dredge\MXD\Workplans\130325_Proposed_Dredge_Areas_CWP.mxd

Aerial Photography Date: April 2011 over 2010

ENBRIDGE

Drawn:	KK	4/22/2013
Approved:	MS	4/22/2013
Project #:	60284509	

Map Location



- Timber Mat Access Road
- Staging/Parking Area
- WTP
- Administrative Area
- Decant Sump
- Temporary Boat Docks
- Loading Platform
- Floating Bridge
- Sediment Bagfield
- Trailers
- Parking & Administration Area
- Gravel Staging Pad
- Parking Area
- Pugmill Processing Area
- Pugmill Stockpile Area
- Access Road
- Stockpile Area
- Soil Stockpile Area
- Pumping Sump
- Conveyance/Discharge Line

N

0 170 340 680

Scale in Feet

FIGURE 2
PROPOSED DREDGE
OPERATION AREAS
C0.4 BOAT LAUNCH-MP 4.50 to MP 5.80
SHEET 1 OF 7
ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

Path: Z:\Work\GIS\Submerged_Oil\2013_Dredge\MXD\Workplans\130325_Figure_2_Proposed_Dredge_Areas_Detail_CWP.mxd

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ENBRIDGE

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Project #:	60284509	

Map Location

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- Staging/Parking Area
- WTP
- Administrative Area
- Decant Sump
- Temporary Boat Docks
- Loading Platform
- Floating Bridge
- Sediment Bagfield
- Trailers
- Parking & Administration Area
- Gravel Staging Pad
- Parking Area
- Pugmill Processing Area
- Pugmill Stockpile Area
- Access Road
- Stockpile Area
- Soil Stockpile Area
- Pumping Sump
- Conveyance/Discharge Line

N

0 50 100 200

Scale in Feet

FIGURE 2
PROPOSED DREDGE
OPERATION AREAS
MP 4.50 to MP 5.90
SHEET 2 OF 7
ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

Path: Z:\Work\GIS\Submerged_Oil\2013_Dredge\MXD\Workplans\130325_Figure_2_Proposed_Dredge_Areas_Detail_CWP.mxd

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ENBRIDGE

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- Staging/Parking Area
- WTP
- Administrative Area
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- Loading Platform
- Floating Bridge
- Sediment Bagfield
- Trailers
- Parking & Administration Area
- Gravel Staging Pad
- Parking Area
- Pugmill Processing Area
- Pugmill Stockpile Area
- Access Road
- Stockpile Area
- Soil Stockpile Area
- Pumping Sump
- Conveyance/Discharge Line

N

0 75 150 300

Scale in Feet

FIGURE 2
PROPOSED DREDGE
OPERATION AREAS
MP 10.40 N
SHEET 3 OF 7
ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

Path: Z:\Work\GIS\Submerged_Oil\2013_Dredge\MXD\Workplans\130325_Figure_2_Proposed_Dredge_Areas_Detail_CWP.mxd

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ENBRIDGE

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Approved:	MS	4/22/2013
Project #:	60284509	

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- Staging/Parking Area
- WTP
- Administrative Area
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- Floating Bridge
- Sediment Bagfield
- Trailers
- Parking & Administration Area
- Gravel Staging Pad
- Parking Area
- Pugmill Processing Area
- Pugmill Stockpile Area
- Access Road
- Stockpile Area
- Soil Stockpile Area
- Pumping Sump
- Conveyance/Discharge Line

N

0 75 150 300

Scale in Feet

FIGURE 2
PROPOSED DREDGE
OPERATION AREAS
MP 13.90 to MP 15.70
SHEET 4 OF 7
ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

Path: Z:\Work\GIS\Submerged_Oil\2013_Dredge\MXD\Workplans\130325_Figure_2_Proposed_Dredge_Areas_Detail_CWP.mxd

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ENBRIDGE

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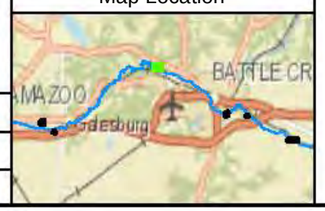
Project #:	60284509	

Map Location



- Timber Mat Access Road
- Staging/Parking Area
- WTP
- Administrative Area
- Decant Sump
- Temporary Boat Docks
- Loading Platform
- Floating Bridge
- Sediment Bagfield
- Trailers
- Parking & Administration Area
- Gravel Staging Pad
- Parking Area
- Pugmill Processing Area
- Pugmill Stockpile Area
- Access Road
- Stockpile Area
- Soil Stockpile Area
- Pumping Sump
- Conveyance/Discharge Line

N

0 40 80 160

Scale in Feet

FIGURE 2
PROPOSED DREDGE
OPERATION AREAS
MP 21.50 RDB
SHEET 5 OF 7
ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

Path: Z:\Work\GIS\Submerged_Oil\2013_Dredge\MXD\Workplans\130325_Figure_2_Proposed_Dredge_Areas_Detail_CWP.mxd

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Project #:	60284509	

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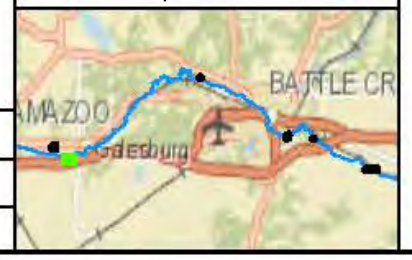


- Timber Mat Access Road
- Staging/Parking Area
- WTP
- Administrative Area
- Decant Sump
- Temporary Boat Docks
- Loading Platform
- Floating Bridge
- Sediment Bagfield
- Trailers
- Parking & Administration Area
- Gravel Staging Pad
- Parking Area
- Pugmill Processing Area
- Pugmill Stockpile Area
- Access Road
- Stockpile Area
- Soil Stockpile Area
- Pumping Sump
- Conveyance/Discharge Line

N

0 40 80 160

Scale in Feet

FIGURE 2
PROPOSED DREDGE
OPERATION AREAS
MORROW DELTA/MORROW LAKE
SHEET 6 OF 7
ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

Path: Z:\Work\GIS\Submerged_Oil\2013_Dredge\MXD\Workplans\130325_Figure_2_Proposed_Dredge_Areas_Detail_CWP.mxd

Aerial Photography Date: April 2011

ENBRIDGE

Drawn:	KK	4/22/2013
Approved:	MS	4/22/2013
Project #:	60284509	

Map Location

- Timber Mat Access Road
- Staging/Parking Area
- WTP
- Administrative Area
- Decant Sump
- Temporary Boat Docks
- Loading Platform
- 890 Floating Bridge
- 887 Sediment Bagfield
- Trailers
- Parking & Administration Area
- Gravel Staging Pad
- Parking Area
- Pugmill Processing Area
- Pugmill Stockpile Area
- Access Road
- Stockpile Area
- Soil Stockpile Area
- Pumping Sump
- Conveyance/Discharge Line

N

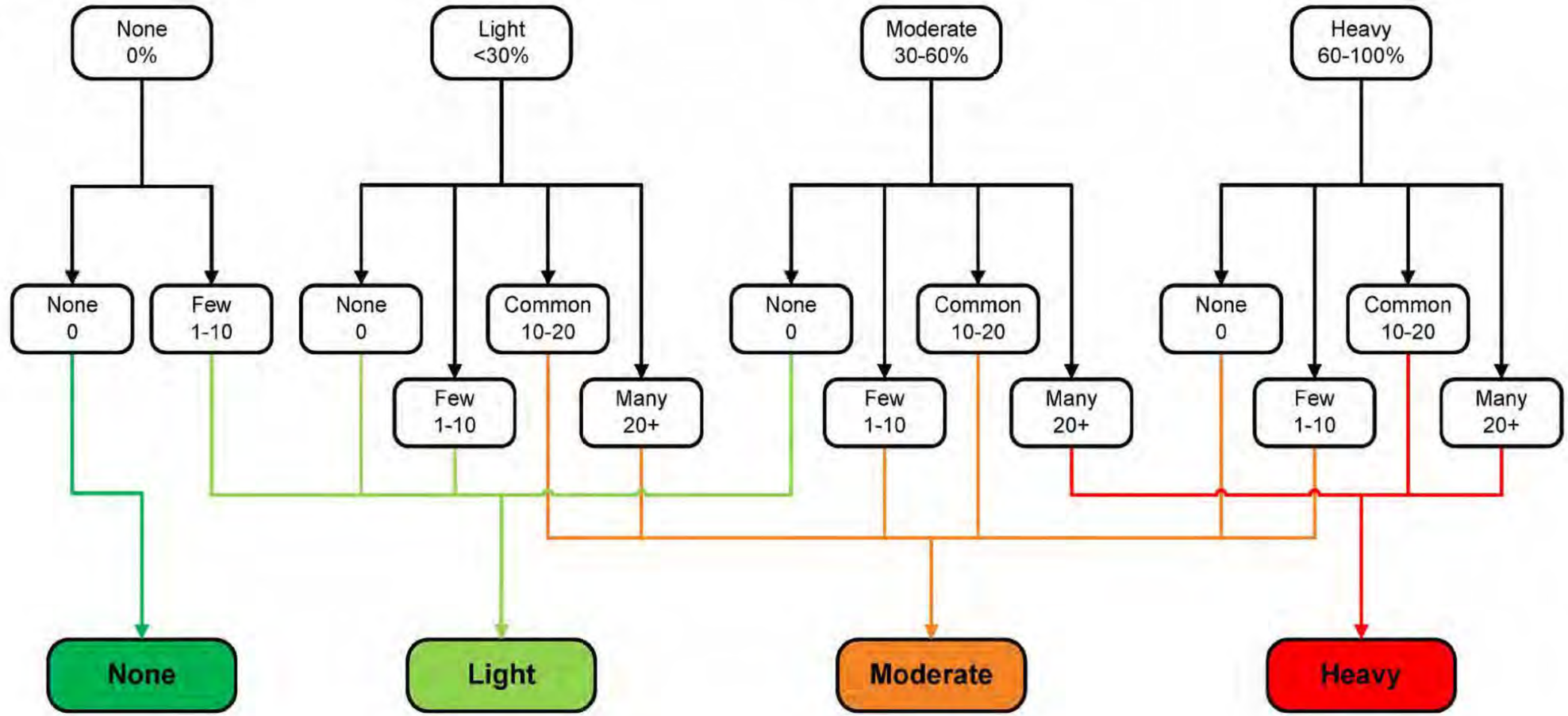
0 100 200 400

Scale in Feet

FIGURE 2
PROPOSED DREDGE
OPERATION AREAS
MORROW DELTA/MORROW LAKE
SHEET 7 OF 7
ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

Path: Z:\Work\GIS\Submerged_Oil\2013_Dredge\MXD\Workplans\130325_Figure_2_Proposed_Dredge_Areas_Detail_CWP.mxd

Aerial Photography Date: April 2011



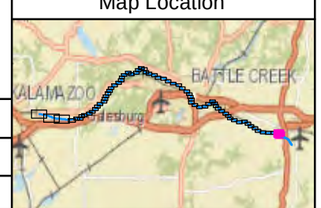
Notes:
1. Percent coverage per square yard
2. Number of globules per square yard

ENBRIDGE Drawn: CW Approved: EE Project#: 60284509		FIGURE 3 POLING FIELD OBSERVATION FLOWCHART ENBRIDGE LINE 6B MP 608 MARSHALL, MI PIPELINE RELEASE ENBRIDGE ENERGY, LIMITED PARTNERSHIP

ENBRIDGE

Drawn:	GM	4/29/2013
Approved:	MS	4/29/2013
Project #:	60284509	

Map Location



2013 Spring Poling Locations include the following:

- Areas NEBA Recommended More Frequent Monitoring
- 2010 Heavy & Moderate Poling Delineation Area
- Spring 2011 Heavy & Moderate Poling Delineation Area
- Fall 2011 Heavy & Moderate Poling Delineation Area
- Spring 2012 Heavy & Moderate Poling Delineation Area
- Poling Focus Areas from 2011
- Additional Focus Areas from 2012
- Late Summer Reassessment 2012 Target Areas
- Additional Survey Areas from LSR 2012 Heavy and Moderate Poling Points
- Morrow Lake Footprint
- 2011 & 2012 Transect Poling Locations
- Park/Launch Access Poling Areas
- Bridge Access Poling Areas

LSR 2012 Poling Points

- Heavy
- Moderate
- Quarter Mile Grid Segment

Number of poling locations within each area will be dependent on site conditions. Full transects will have a minimum of 3 locations. 2011 Poling Focus Areas include 2010 Poling Areas.

N

0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 1 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

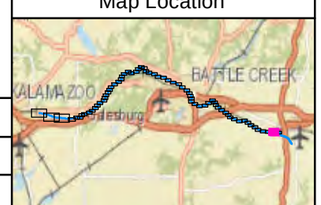
Z:\Work\GIS\2013_SO_Reassessment\MXDs\130430_Proposed_2013_Poling.mxd

Aerial Photography Date: April 2011

ENBRIDGE

Drawn:	GM	4/29/2013
Approved:	MS	4/29/2013
Project #:	60284509	

Map Location



2013 Spring Poling Locations include the following:

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N

0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 2 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

Z:\Work\GIS\2013_SO_Reassessment\MXDs\130430_Proposed_2013_Poling.mxd

Aerial Photography Date: April 2011

ENBRIDGE

Drawn:	GM	4/29/2013
Approved:	MS	4/29/2013
Project #:	60284509	

Map Location

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N

0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 3 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

Z:\Work\GIS\2013_SO_Reassessment\MXDs\130430_Proposed_2013_Poling.mxd

Aerial Photography Date: April 2011

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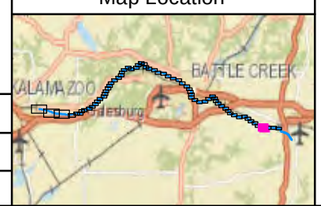
Map Location



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N

0 200 400

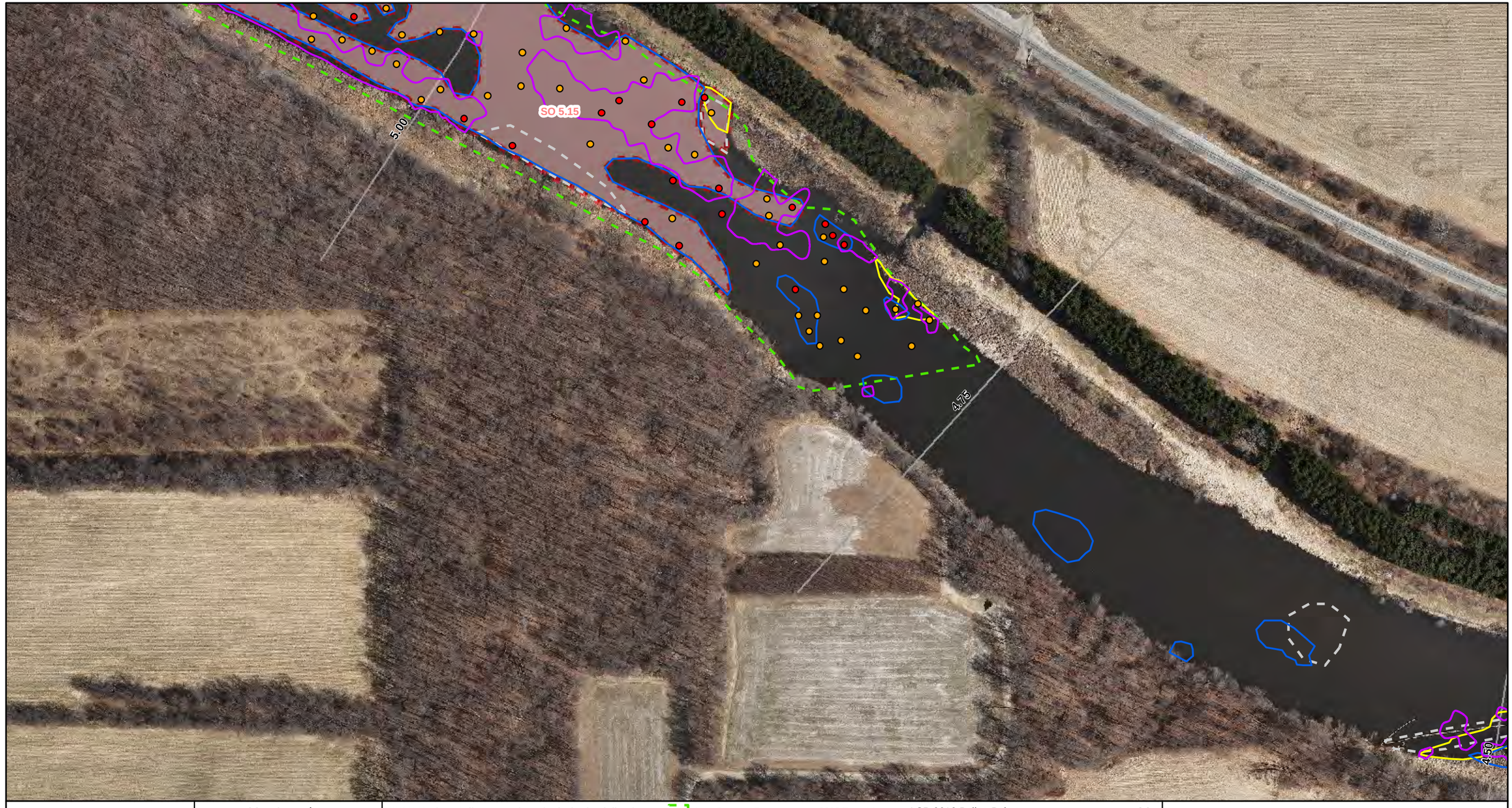
Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 4 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

Z:\Work\GIS\2013_SO_Reassessment\MXDs\130430_Proposed_2013_Poling.mxd

Aerial Photography Date: April 2011



ENBRIDGE

Drawn:	GM	4/29/2013
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Project #:	60284509	

Map Location

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N

0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 5 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

Z:\Work\GIS\2013_SO_Reassessment\MXDs\130430_Proposed_2013_Poling.mxd

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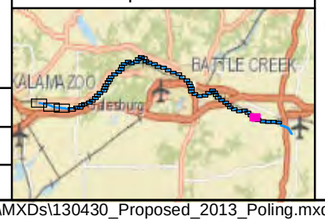
Map Location



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N

0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 6 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

Z:\Work\GIS\2013_SO_Reassessment\MXDs\130430_Proposed_2013_Poling.mxd

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N

0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 7 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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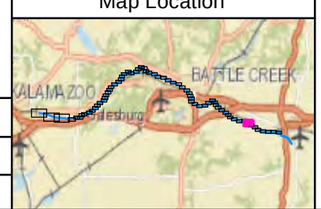
Map Location



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- Heavy
- Moderate
- Quarter Mile Grid Segment

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N

0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 8 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

Z:\Work\GIS\2013_SO_Reassessment\MXDs\130430_Proposed_2013_Poling.mxd

Aerial Photography Date: April 2011

ENBRIDGE

Drawn:	GM	4/29/2013
Approved:	MS	4/29/2013
Project #:	60284509	

Map Location

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- Park/Launch Access Poling Areas
- Bridge Access Poling Areas

LSR 2012 Poling Points

- Heavy
- Moderate
- Quarter Mile Grid Segment

Number of poling locations within each area will be dependent on site conditions. Full transects will have a minimum of 3 locations. 2011 Poling Focus Areas include 2010 Poling Areas.

N

0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 9 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

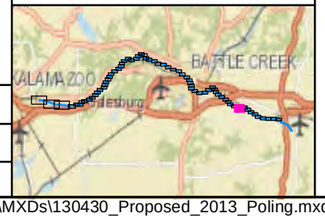
Z:\Work\GIS\2013_SO_Reassessment\MXDs\130430_Proposed_2013_Poling.mxd

Aerial Photography Date: April 2011

ENBRIDGE

Drawn:	GM	4/29/2013
Approved:	MS	4/29/2013
Project #:	60284509	

Map Location



2013 Spring Poling Locations include the following:

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- Fall 2011 Heavy & Moderate Poling Delineation Area
- Spring 2012 Heavy & Moderate Poling Delineation Area
- Poling Focus Areas from 2011
- Additional Focus Areas from 2012
- Late Summer Reassessment 2012 Target Areas
- Additional Survey Areas from LSR 2012 Heavy and Moderate Poling Points
- Morrow Lake Footprint
- 2011 & 2012 Transect Poling Locations
- Park/Launch Access Poling Areas
- Bridge Access Poling Areas

LSR 2012 Poling Points

- Heavy
- Moderate
- Quarter Mile Grid Segment

Number of poling locations within each area will be dependent on site conditions. Full transects will have a minimum of 3 locations. 2011 Poling Focus Areas include 2010 Poling Areas.

N

0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 10 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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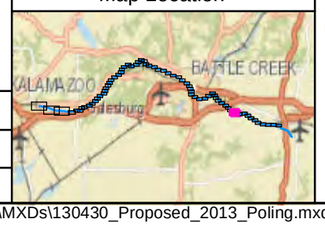
Aerial Photography Date: April 2011

ENBRIDGE

Drawn:	GM	4/29/2013
Approved:	MS	4/29/2013
Project #:	60284509	

Map Location



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LSR 2012 Poling Points

- Heavy
- Moderate
- Quarter Mile Grid Segment

Number of poling locations within each area will be dependent on site conditions. Full transects will have a minimum of 3 locations. 2011 Poling Focus Areas include 2010 Poling Areas.

N

0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 11 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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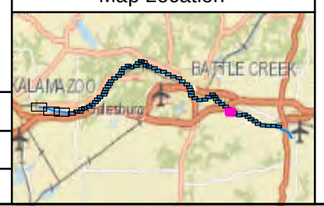
Aerial Photography Date: April 2011

ENBRIDGE

Drawn:	GM	4/29/2013
Approved:	MS	4/29/2013
Project #:	60284509	

Map Location



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- Park/Launch Access Poling Areas
- Bridge Access Poling Areas

LSR 2012 Poling Points

- Heavy
- Moderate
- Quarter Mile Grid Segment

Number of poling locations within each area will be dependent on site conditions. Full transects will have a minimum of 3 locations. 2011 Poling Focus Areas include 2010 Poling Areas.

N

0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 12 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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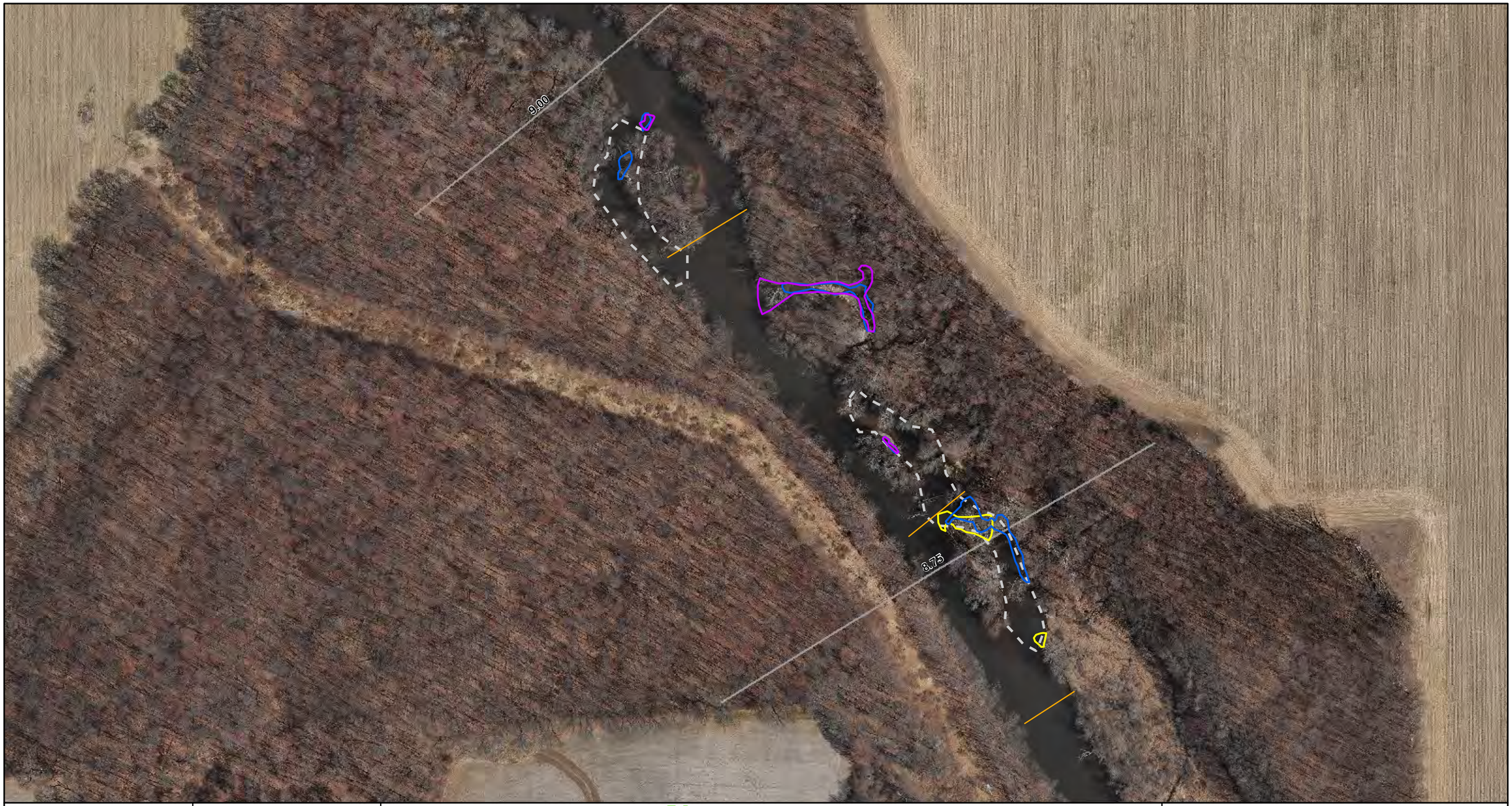
Aerial Photography Date: April 2011



ENBRIDGE

Drawn:	GM	4/29/2013
Approved:	MS	4/29/2013
Project #:	60284509	

Map Location

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- Park/Launch Access Poling Areas
- Bridge Access Poling Areas

LSR 2012 Poling Points

- Heavy
- Moderate
- Quarter Mile Grid Segment

Number of poling locations within each area will be dependent on site conditions. Full transects will have a minimum of 3 locations. 2011 Poling Focus Areas include 2010 Poling Areas.

N

0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 13 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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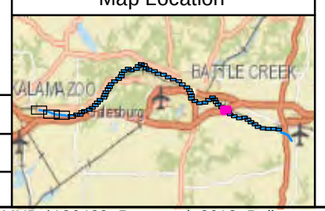
Aerial Photography Date: April 2011

ENBRIDGE

Drawn:	GM	4/29/2013
Approved:	MS	4/29/2013
Project #:	60284509	

Map Location



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- Bridge Access Poling Areas

LSR 2012 Poling Points

- Heavy
- Moderate
- Quarter Mile Grid Segment

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N

0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 14 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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Aerial Photography Date: April 2011

ENBRIDGE

Drawn:	GM	4/29/2013
Approved:	MS	4/29/2013
Project #:	60284509	

Map Location

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LSR 2012 Poling Points

- Heavy
- Moderate
- Quarter Mile Grid Segment

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N

0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 15 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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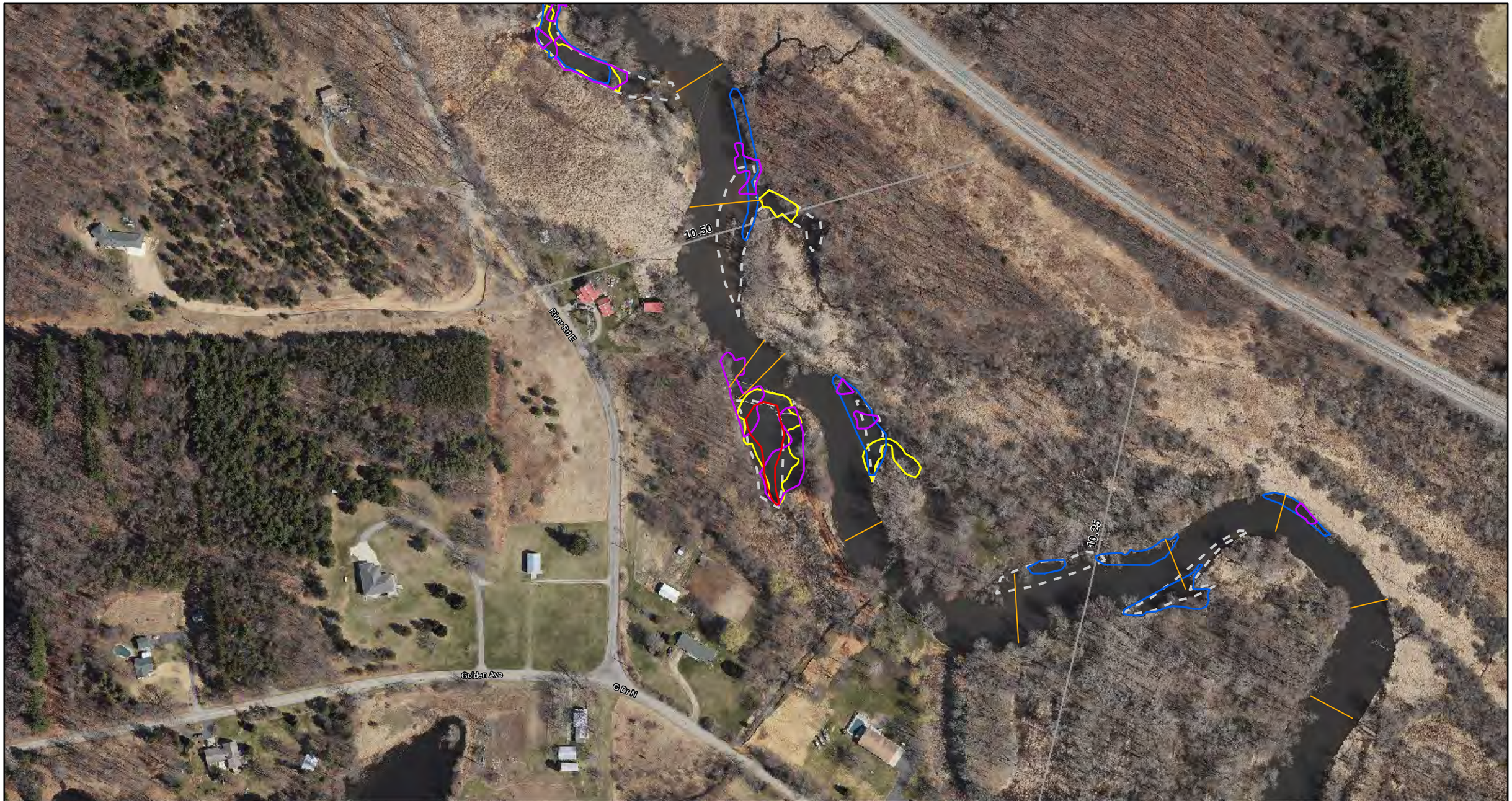
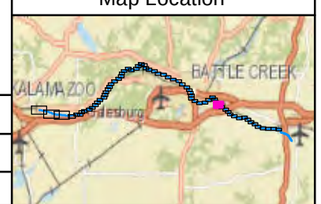
Aerial Photography Date: April 2011



ENBRIDGE

Drawn:	GM	4/29/2013
Approved:	MS	4/29/2013
Project #:	60284509	

Map Location



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LSR 2012 Poling Points

- Heavy
- Moderate
- Quarter Mile Grid Segment

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N

0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 16 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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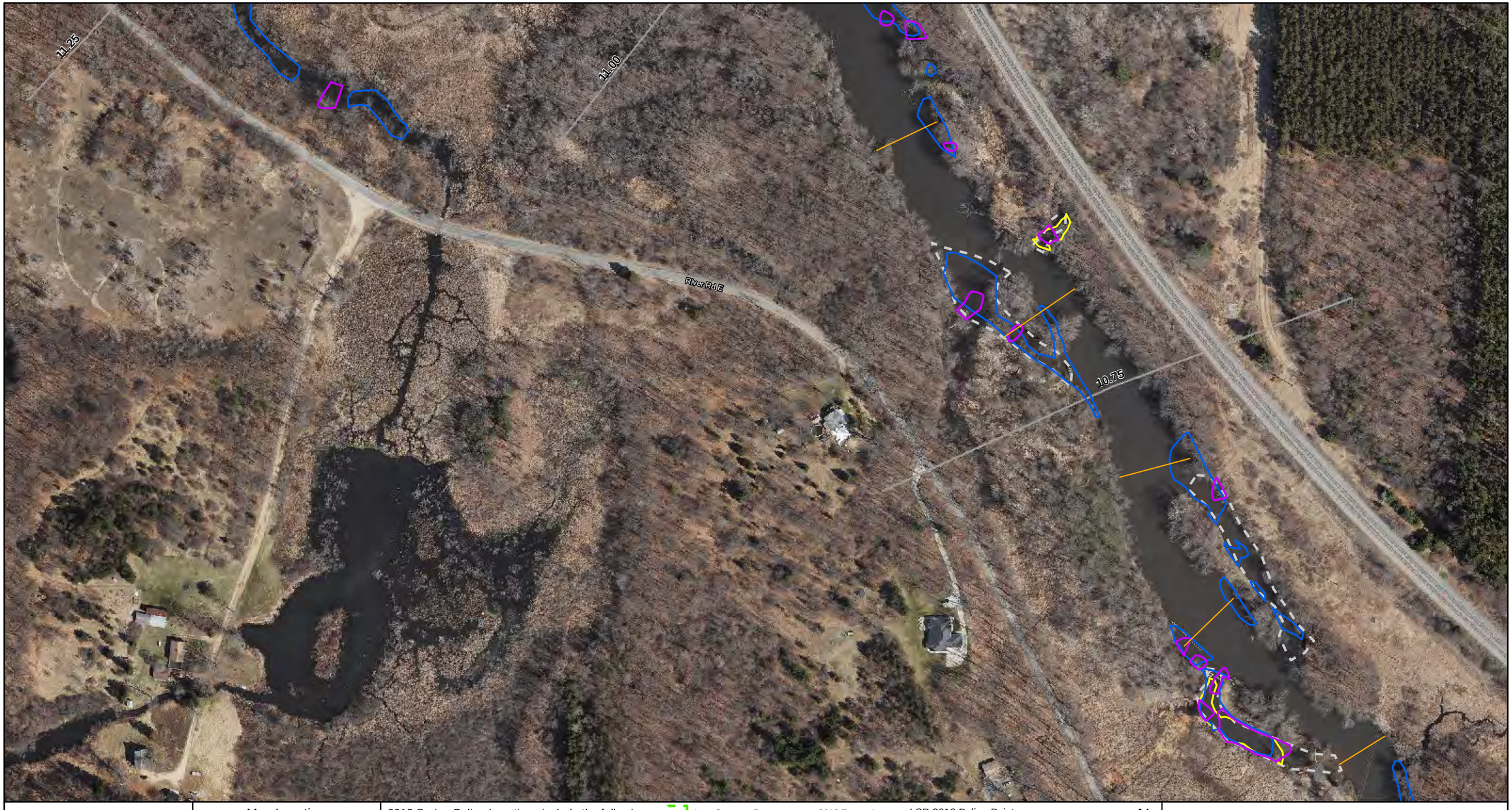
Aerial Photography Date: April 2011



ENBRIDGE

Drawn:	GM	4/29/2013
Approved:	MS	4/29/2013
Project #:	60284509	

Map Location

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LSR 2012 Poling Points

- Heavy
- Moderate
- Quarter Mile Grid Segment

Number of poling locations within each area will be dependent on site conditions. Full transects will have a minimum of 3 locations. 2011 Poling Focus Areas include 2010 Poling Areas.

N

0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 17 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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Aerial Photography Date: April 2011

ENBRIDGE

Drawn:	GM	4/29/2013
Approved:	MS	4/29/2013
Project #:	60284509	

Map Location

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N

0 200 400

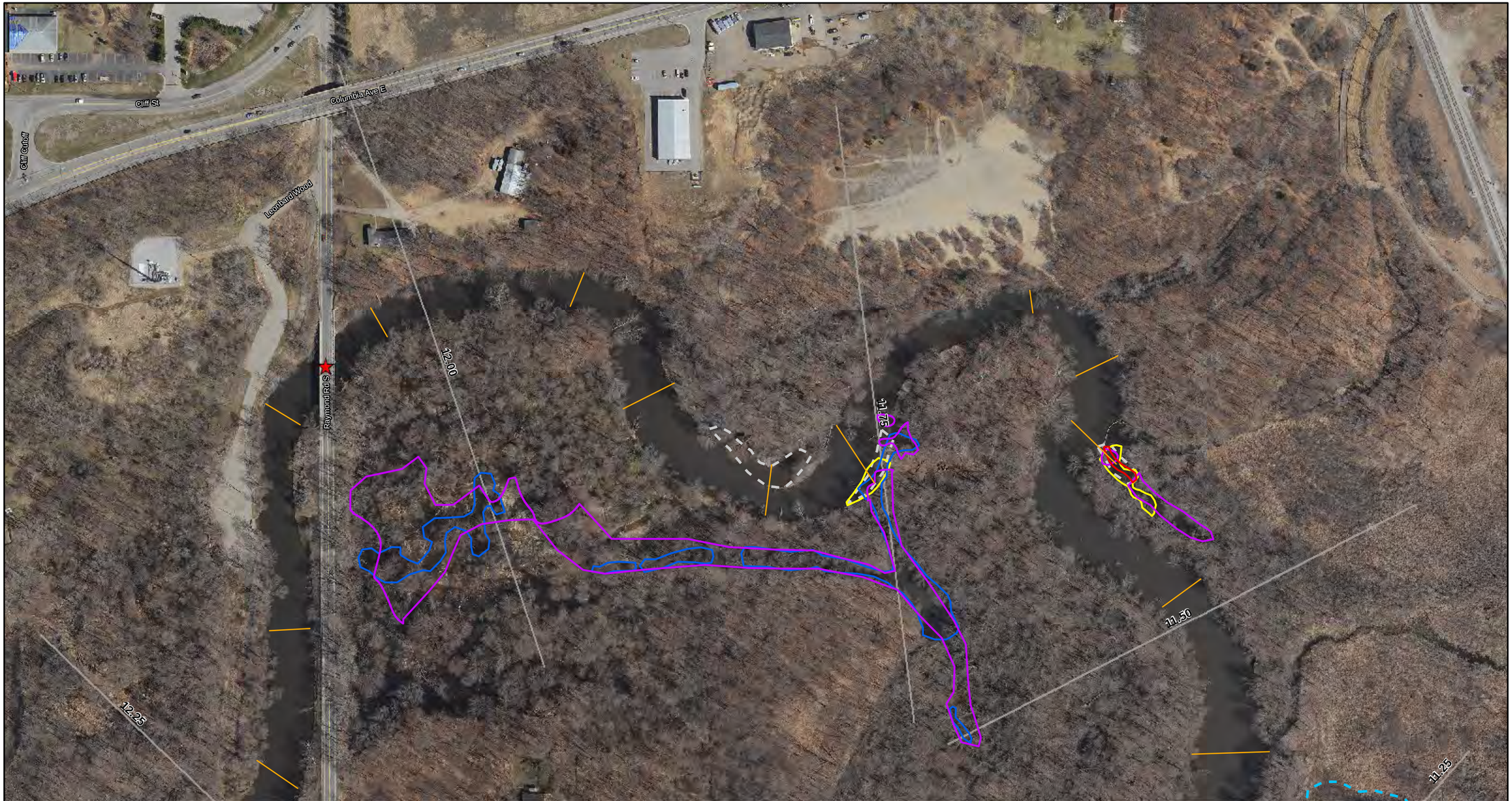
Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 18 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

Z:\Work\GIS\2013_SO_Reassessment\MXDs\130430_Proposed_2013_Poling.mxd

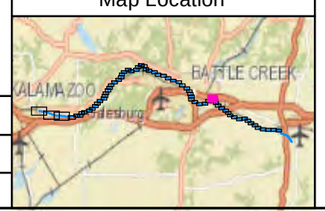
Aerial Photography Date: April 2011



ENBRIDGE

Drawn:	GM	4/29/2013
Approved:	MS	4/29/2013
Project #:	60284509	

Map Location



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LSR 2012 Poling Points

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- Moderate
- Quarter Mile Grid Segment

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N

0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 19 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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Aerial Photography Date: April 2011

ENBRIDGE

Drawn:	GM	4/29/2013
Approved:	MS	4/29/2013
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Map Location

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LSR 2012 Poling Points

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- Moderate
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N

0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 20 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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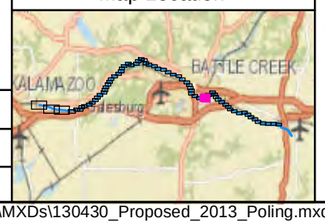
Aerial Photography Date: April 2011

ENBRIDGE

Drawn:	GM	4/29/2013
Approved:	MS	4/29/2013
Project #:	60284509	

Map Location



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- Moderate
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N

0 200 400

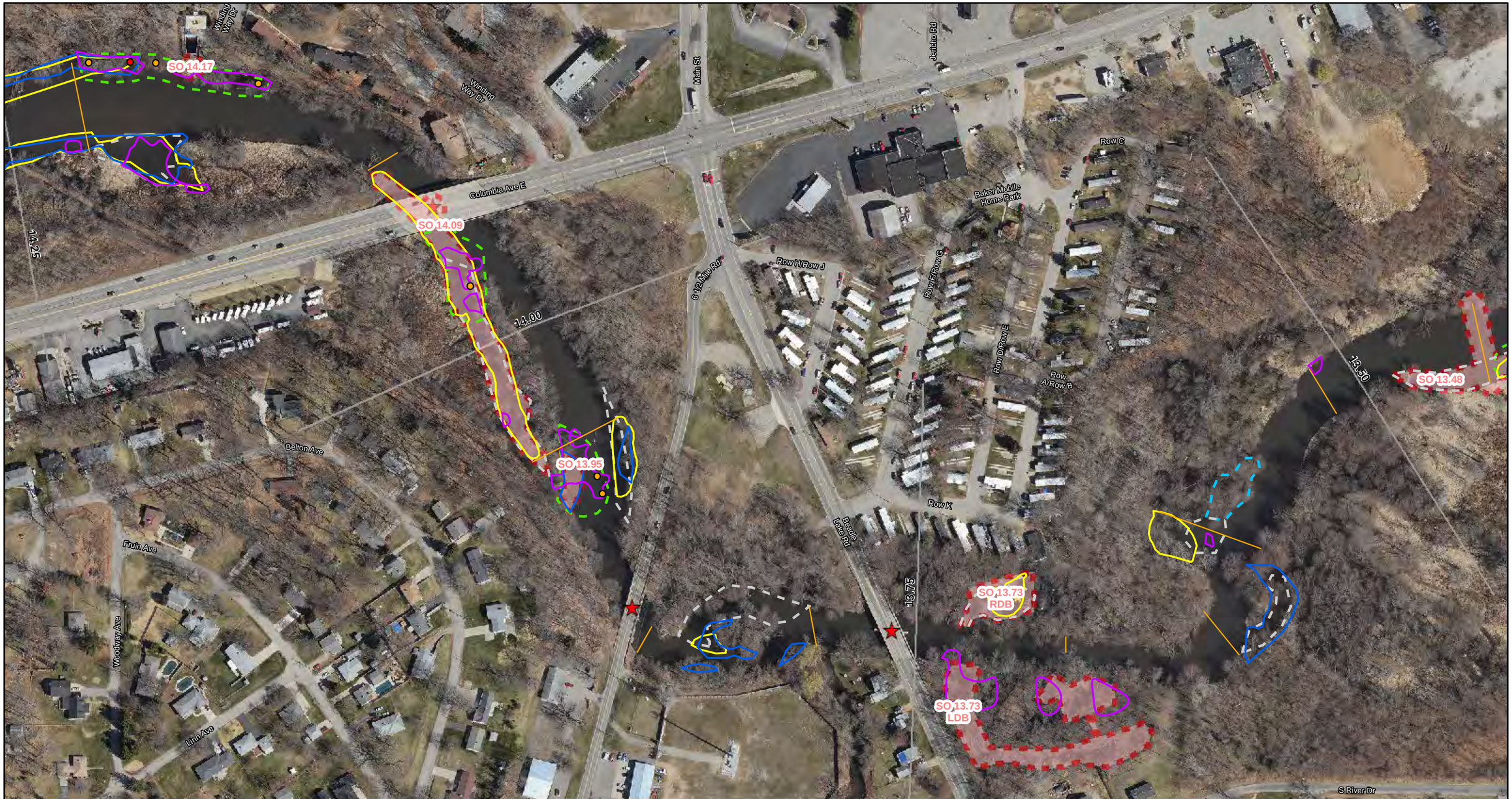
Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 21 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

Z:\Work\GIS\2013_SO_Reassessment\MXDs\130430_Proposed_2013_Poling.mxd

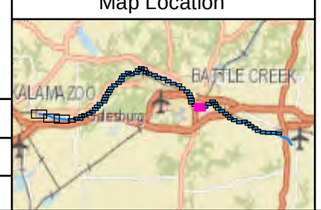
Aerial Photography Date: April 2011



ENBRIDGE

Drawn:	GM	4/29/2013
Approved:	MS	4/29/2013
Project #:	60284509	

Map Location



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LSR 2012 Poling Points

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N

0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 22 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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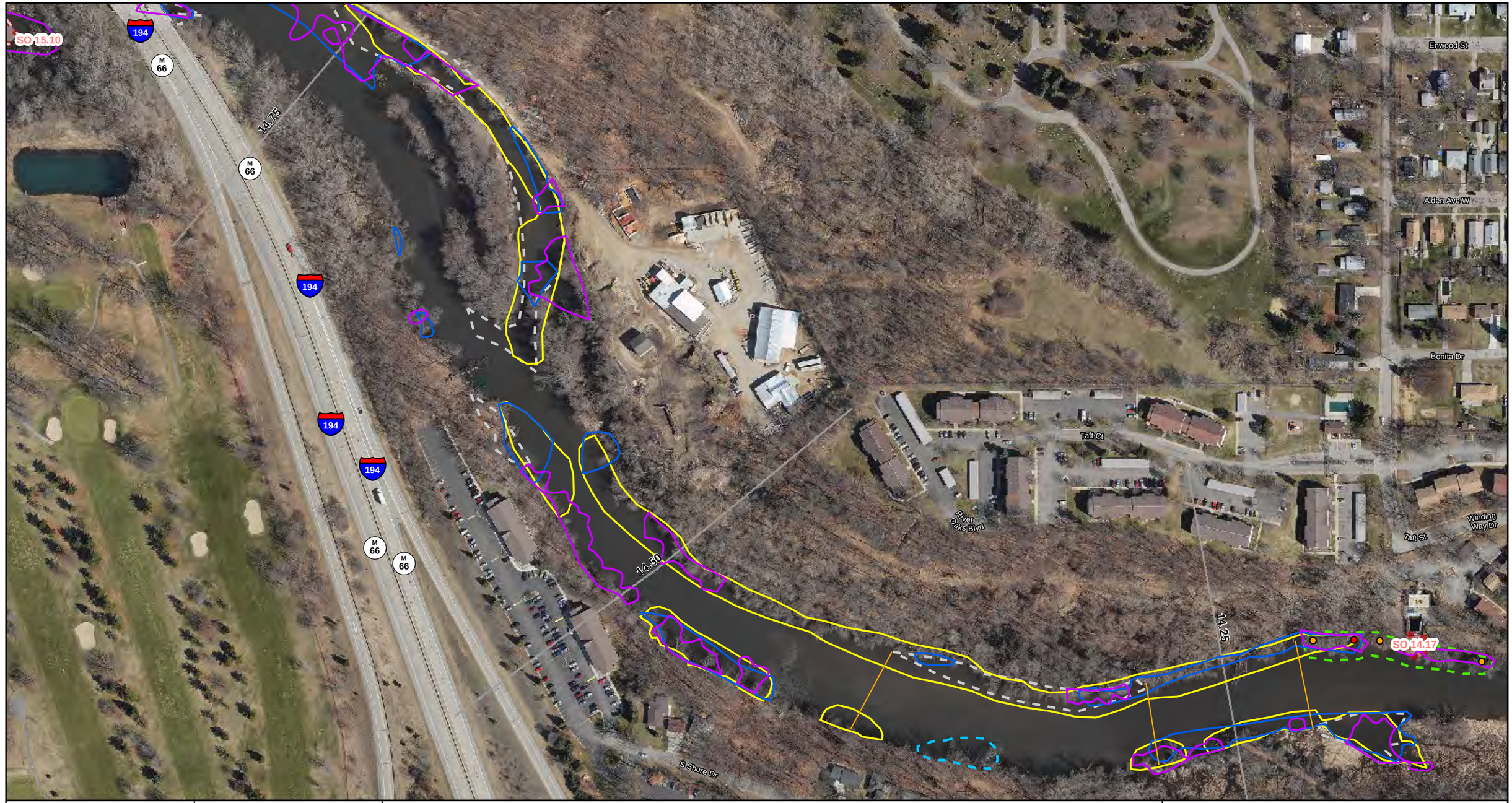
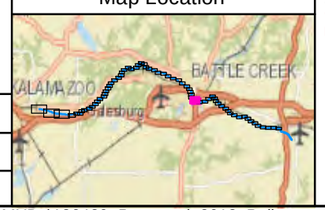
Aerial Photography Date: April 2011



ENBRIDGE

Drawn:	GM	4/29/2013
Approved:	MS	4/29/2013
Project #:	60284509	

Map Location



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LSR 2012 Poling Points

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N

0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 23 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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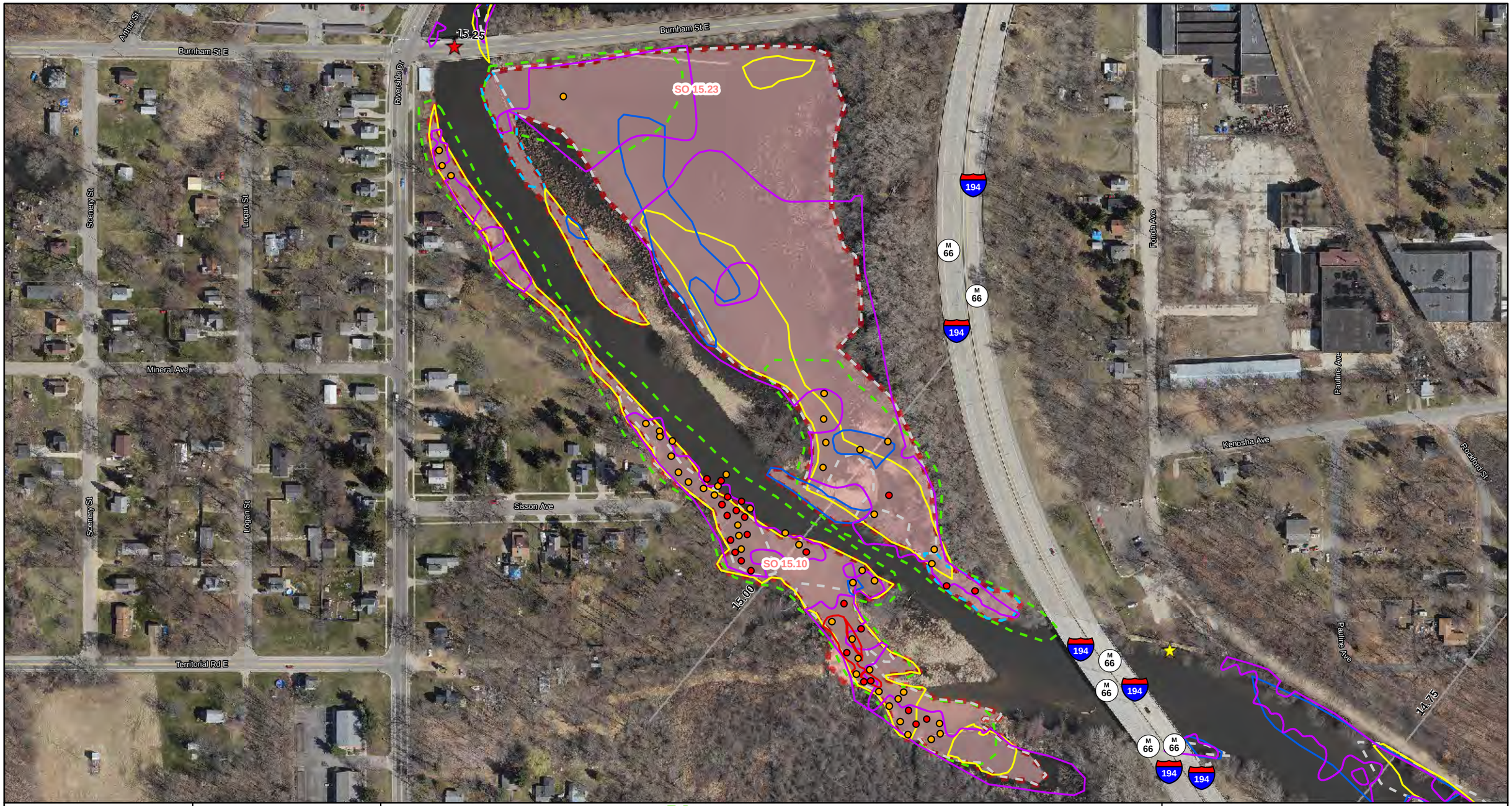
Aerial Photography Date: April 2011



Drawn:	GM	4/29/2013
Approved:	MS	4/29/2013
Project #:	60284509	

Map Location

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N

0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 24 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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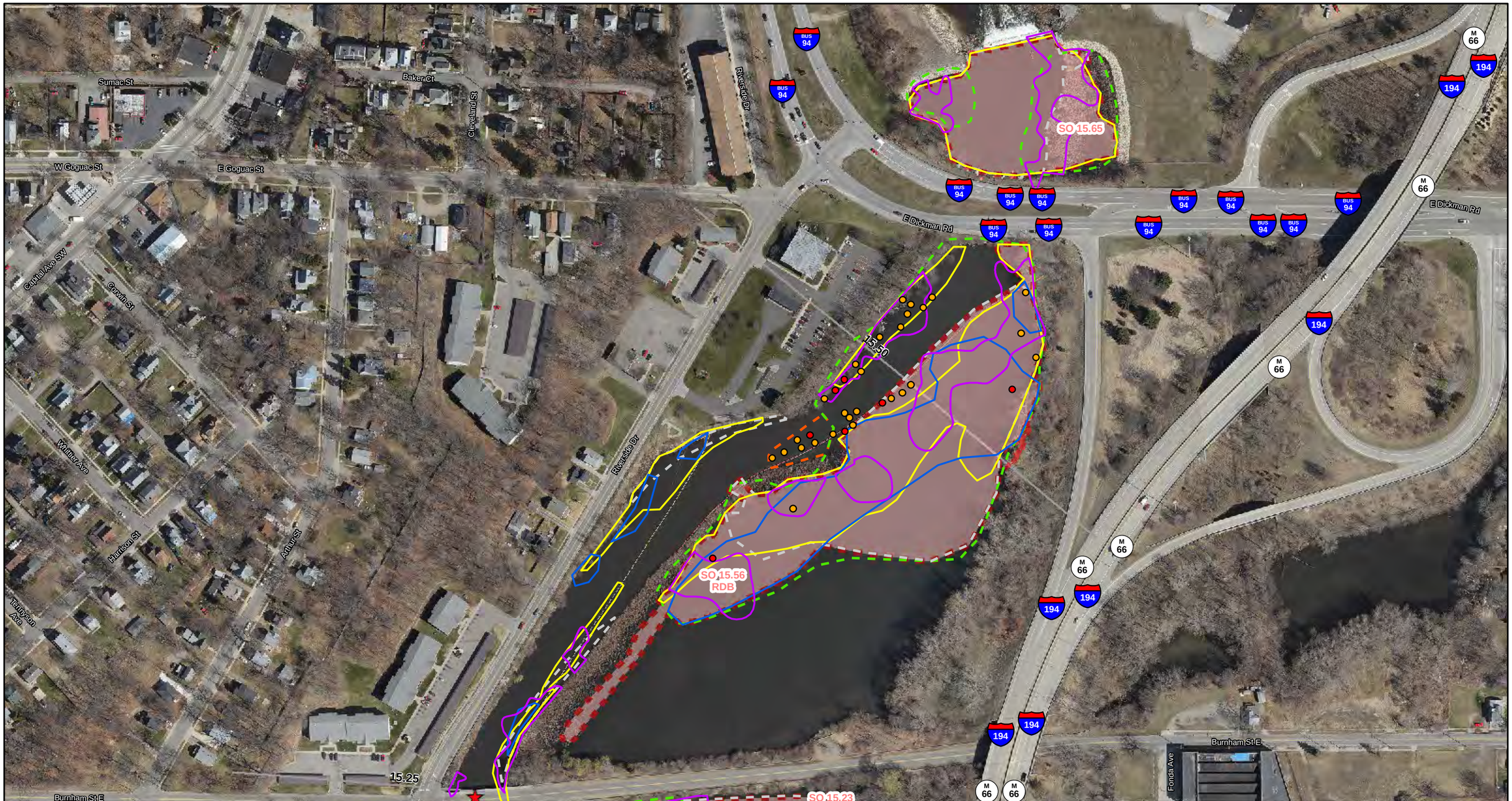
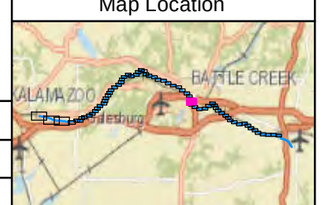
Aerial Photography Date: April 2011



Drawn:	GM	4/29/2013
Approved:	MS	4/29/2013
Project #:	60284509	

Map Location



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- Bridge Access Poling Areas

LSR 2012 Poling Points

- Heavy
- Moderate
- Quarter Mile Grid Segment

Number of poling locations within each area will be dependent on site conditions. Full transects will have a minimum of 3 locations. 2011 Poling Focus Areas include 2010 Poling Areas.

N

0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 25 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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N

0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 26 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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Aerial Photography Date: April 2011

ENBRIDGE

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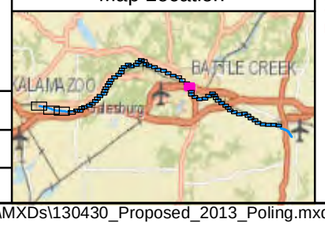
Project #:	60284509	

Map Location



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N

0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 27 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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N

0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 28 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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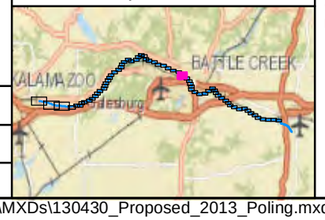
Map Location



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0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 29 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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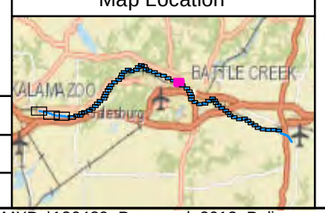

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N

0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 30 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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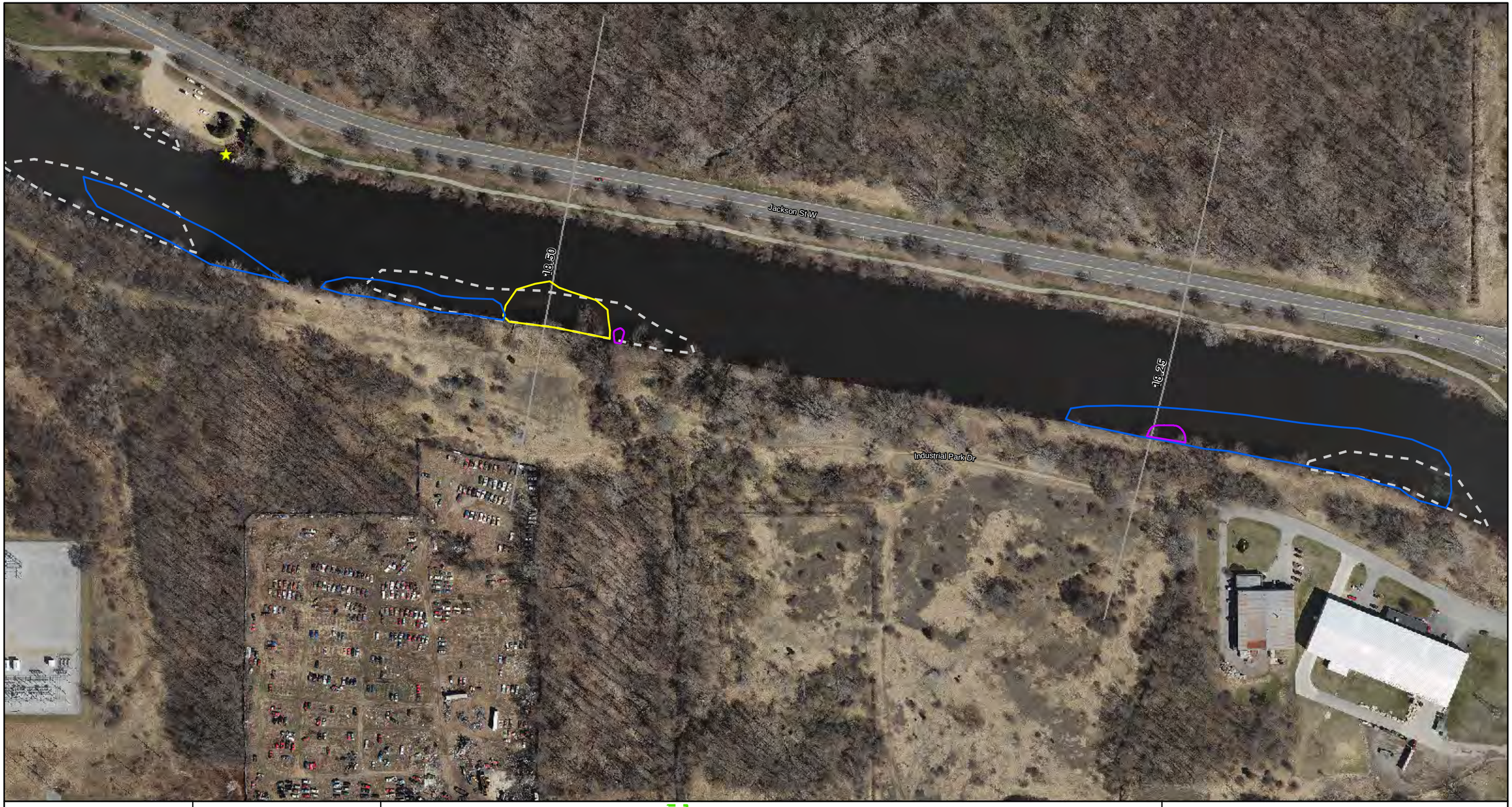

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Map Location

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N

0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 31 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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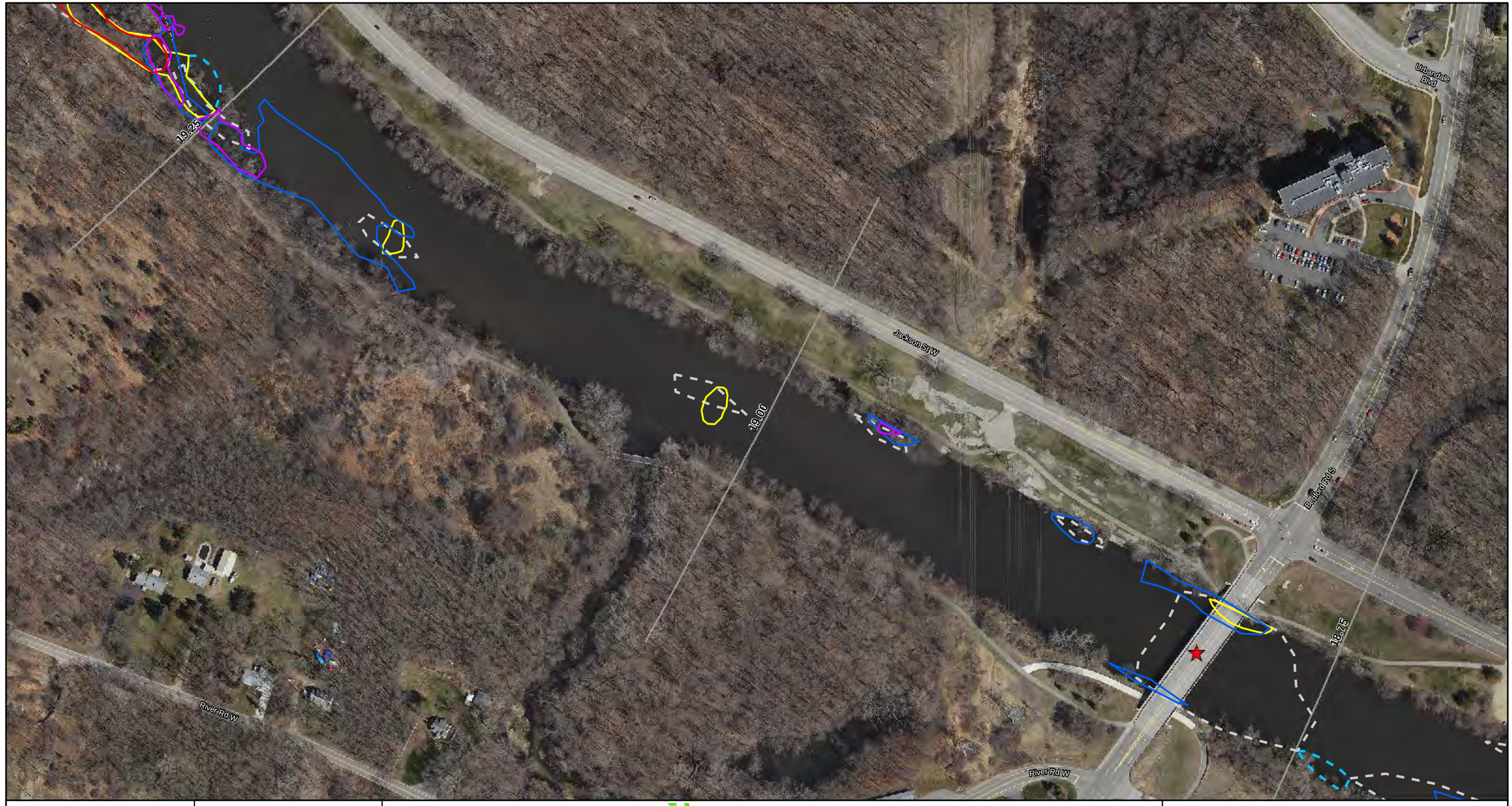

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N

0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 32 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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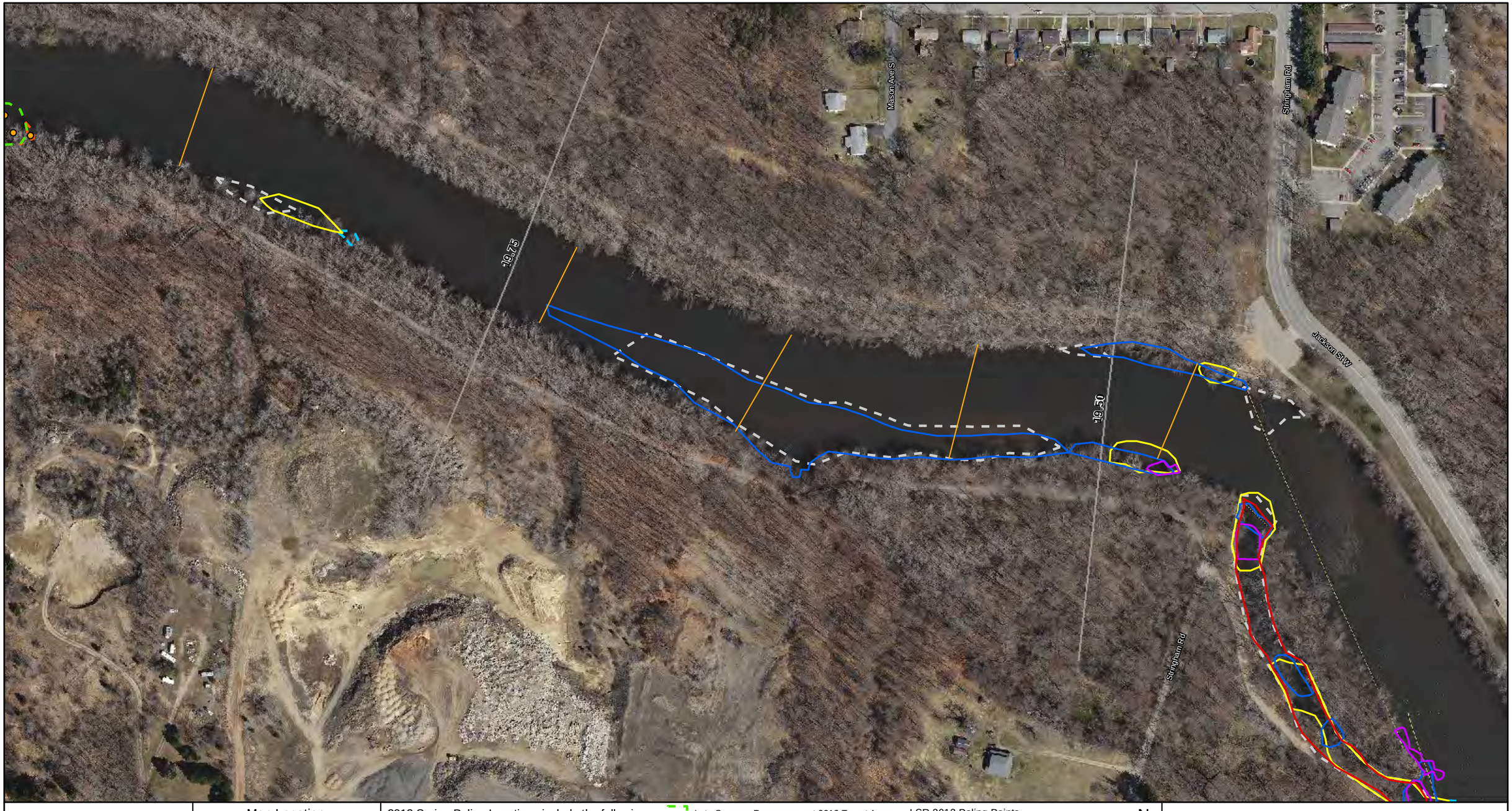

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0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 33 OF 67

ENBRIDGE LINE 6B MP 608
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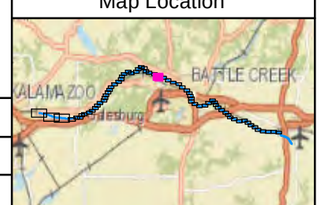

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N

0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 34 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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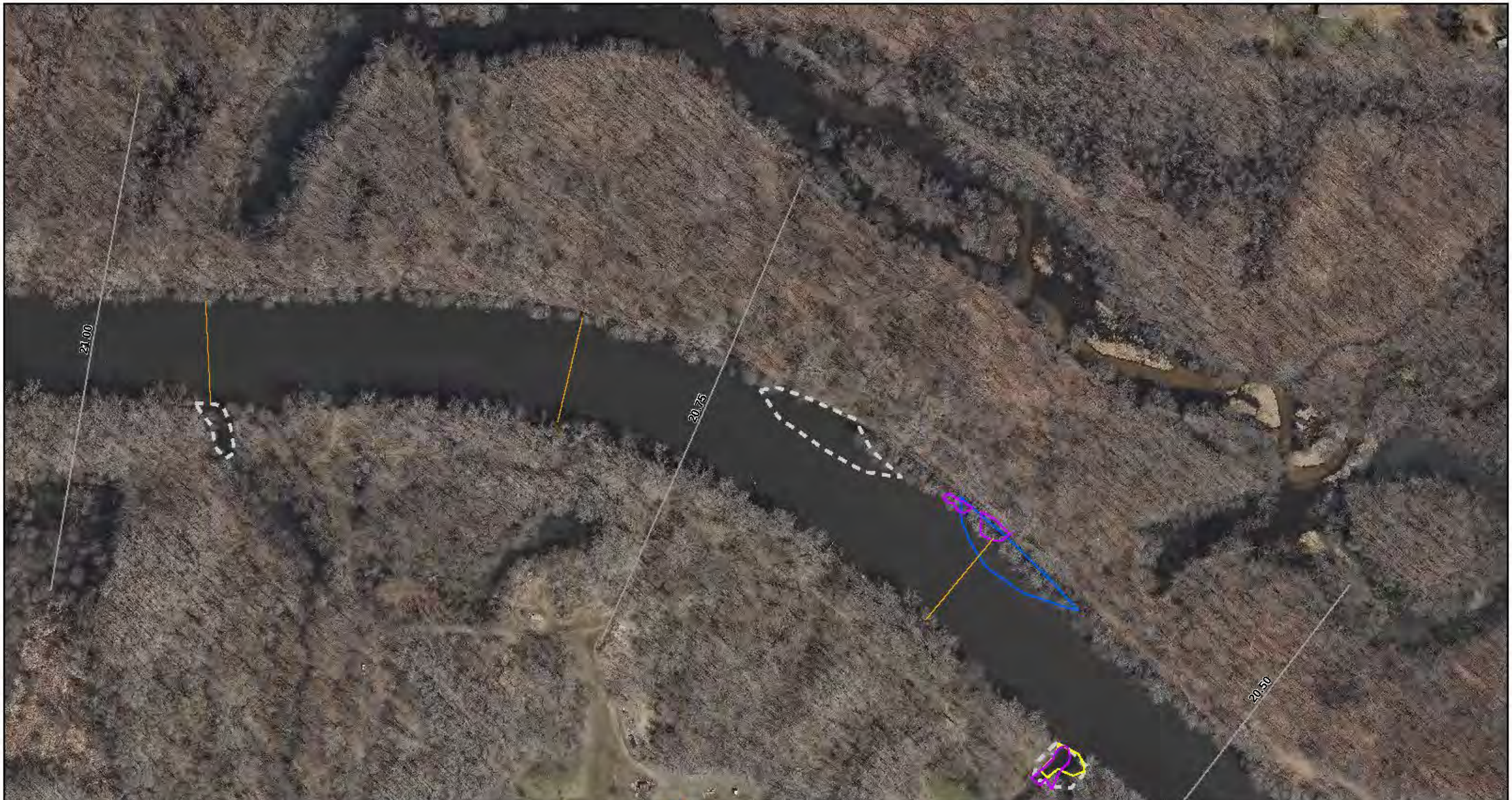

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0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 35 OF 67

ENBRIDGE LINE 6B MP 608
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ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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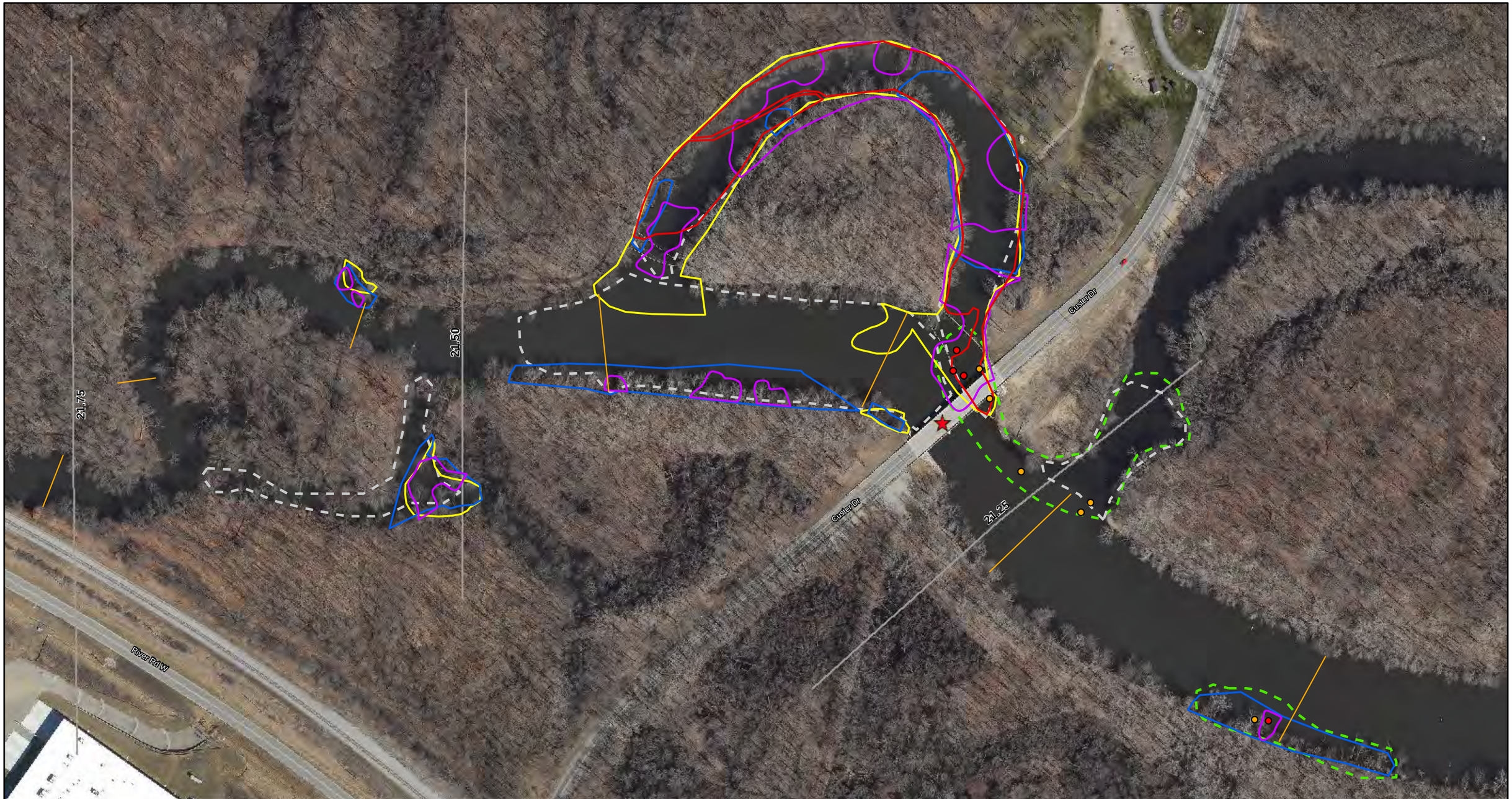

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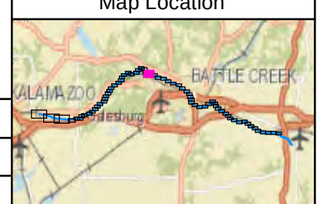

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0 200 400

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FIGURE 4
PROPOSED 2013 POLING
SHEET 36 OF 67

ENBRIDGE LINE 6B MP 608
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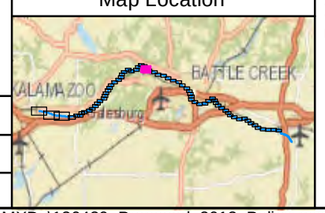

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FIGURE 4
PROPOSED 2013 POLING
SHEET 37 OF 67

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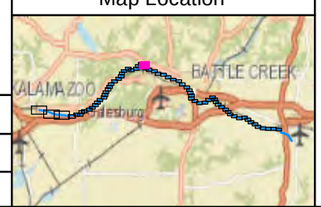

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FIGURE 4
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SHEET 38 OF 67

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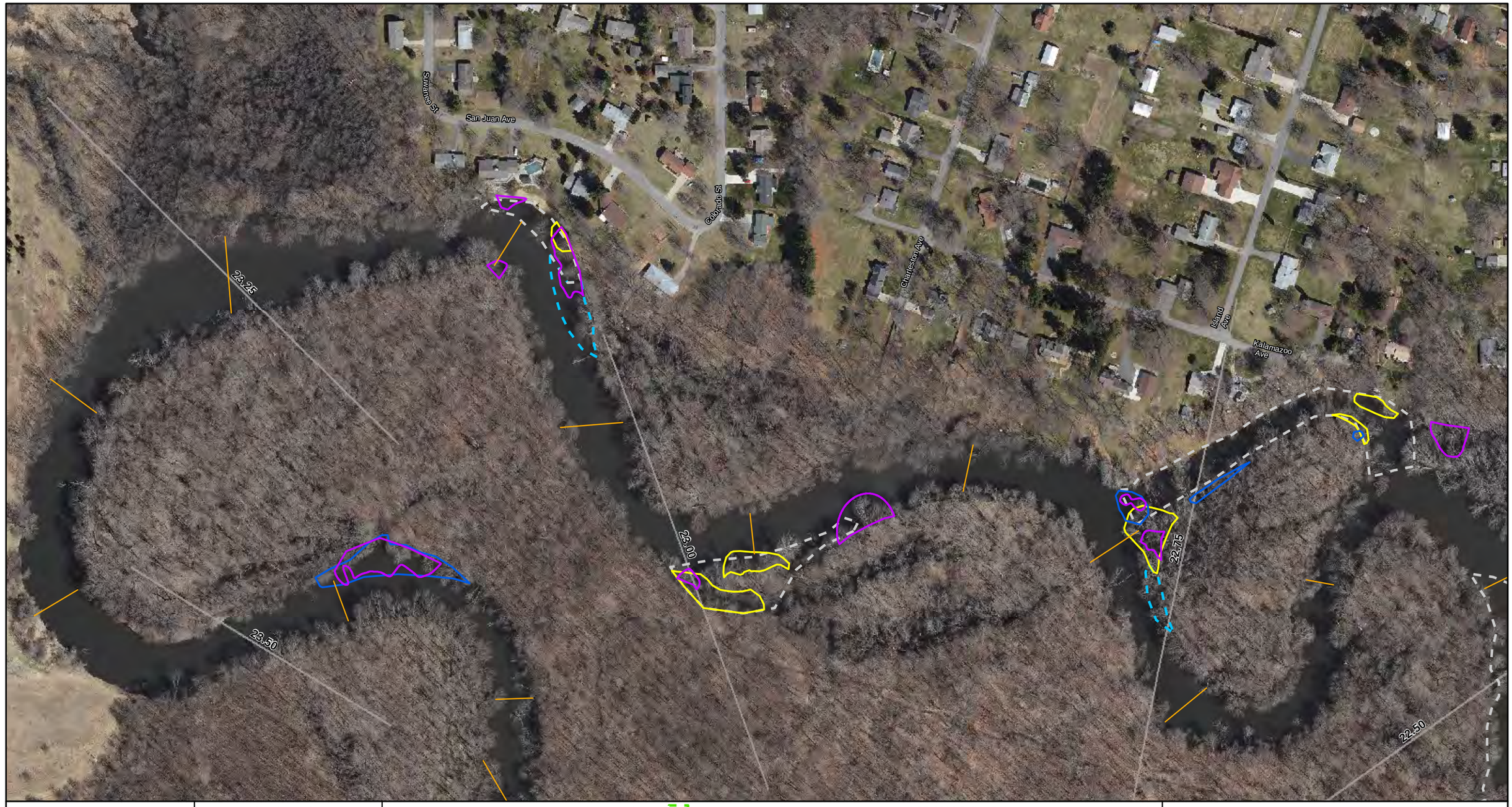

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FIGURE 4
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SHEET 39 OF 67

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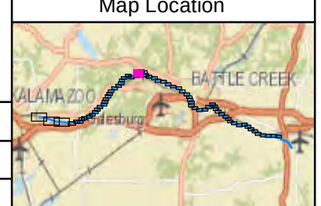

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- Morrow Lake Footprint
- 2011 & 2012 Transect Poling Locations
- Park/Launch Access Poling Areas
- Bridge Access Poling Areas

LSR 2012 Poling Points

- Heavy
- Moderate
- Quarter Mile Grid Segment

Number of poling locations within each area will be dependent on site conditions. Full transects will have a minimum of 3 locations. 2011 Poling Focus Areas include 2010 Poling Areas.

N

0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 40 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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Aerial Photography Date: April 2011

ENBRIDGE

Drawn:	GM	4/29/2013
Approved:	MS	4/29/2013
Project #:	60284509	

Map Location

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- Additional Focus Areas from 2012
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LSR 2012 Poling Points

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N

0 200 400

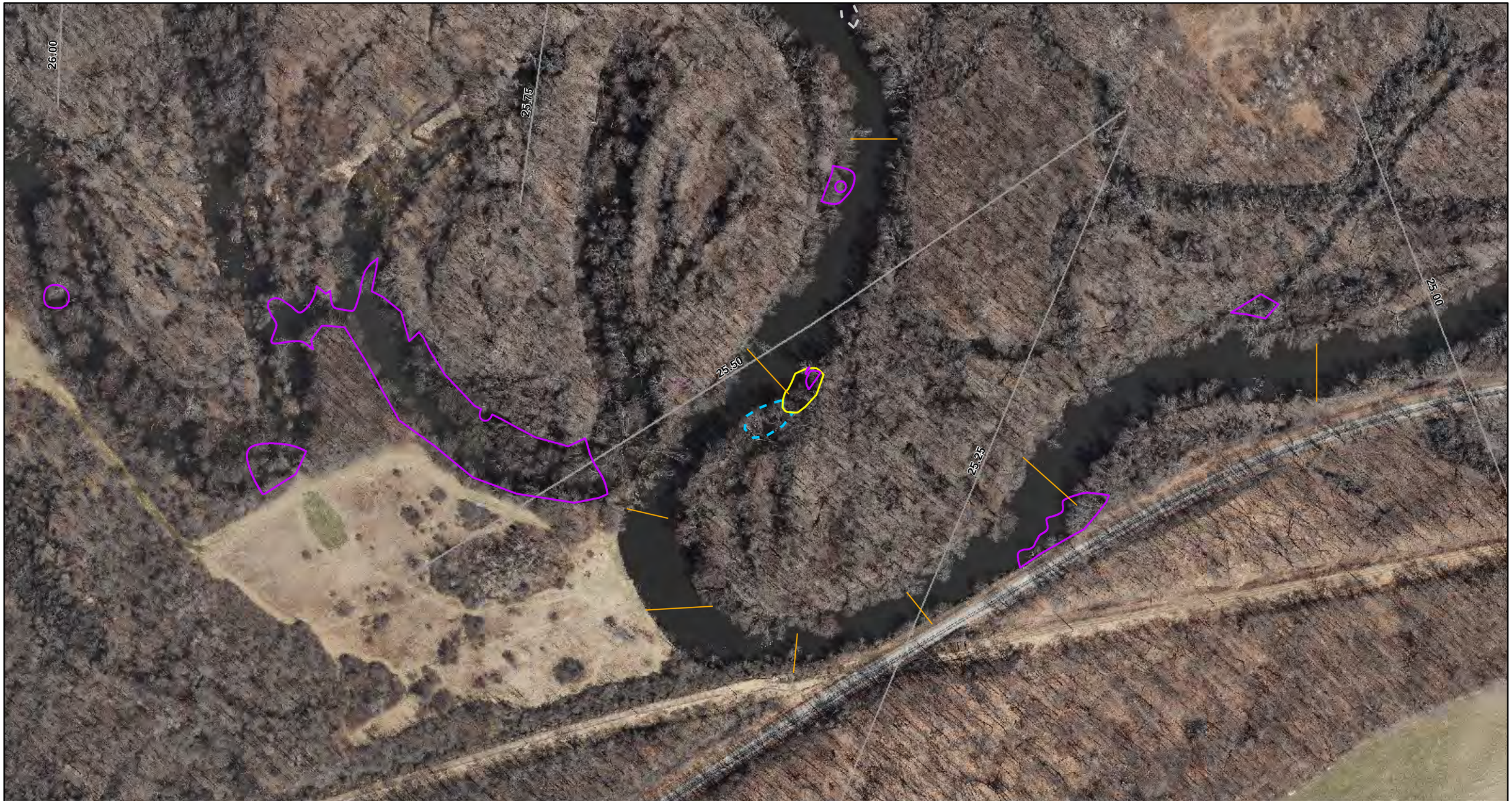
Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 41 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

Z:\Work\GIS\2013_SO_Reassessment\MXDs\130430_Proposed_2013_Poling.mxd

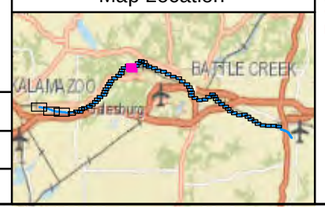
Aerial Photography Date: April 2011



ENBRIDGE

Drawn:	GM	4/29/2013
Approved:	MS	4/29/2013
Project #:	60284509	

Map Location



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LSR 2012 Poling Points

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- Moderate
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N

0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 42 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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Aerial Photography Date: April 2011

ENBRIDGE

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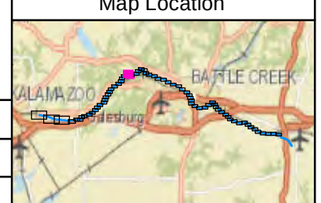
Project #:	60284509	

Map Location



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LSR 2012 Poling Points

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- Quarter Mile Grid Segment

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N

0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 43 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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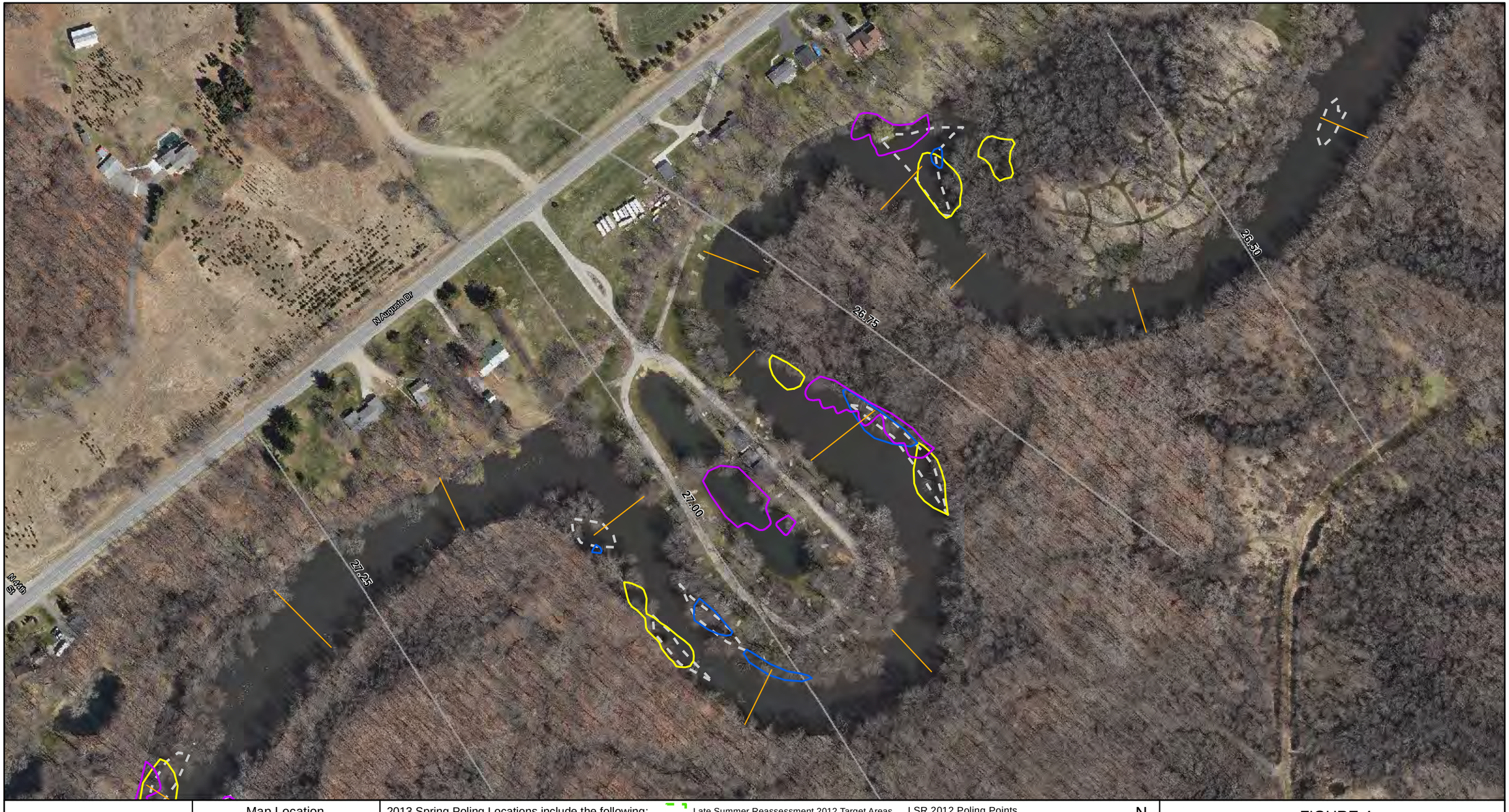
Aerial Photography Date: April 2011



ENBRIDGE

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Project #:	60284509	

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LSR 2012 Poling Points

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N

0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 44 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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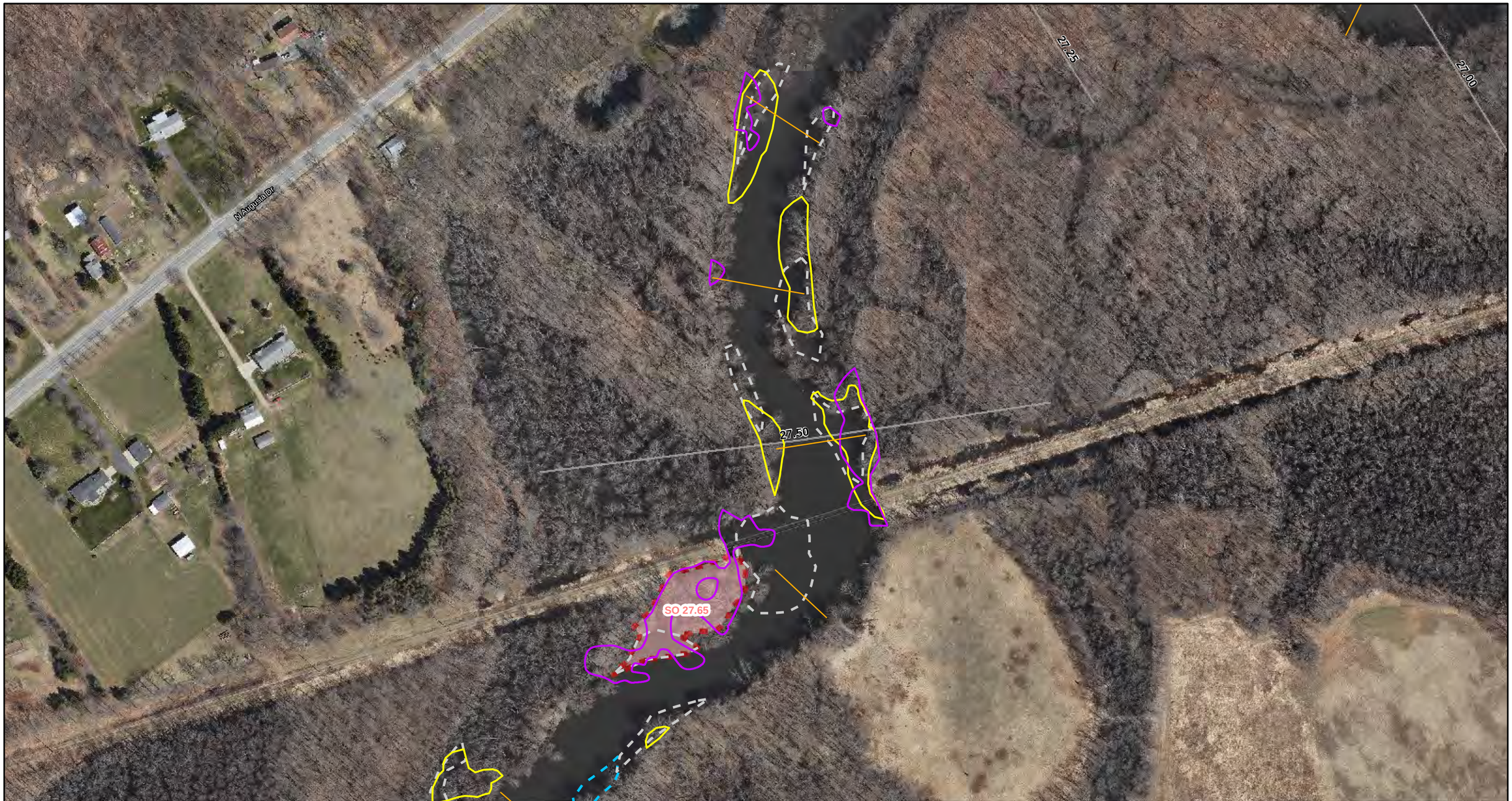
Aerial Photography Date: April 2011



Drawn:	GM	4/29/2013
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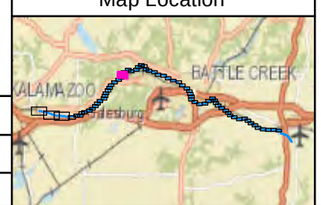
Project #:	60284509	

Map Location



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N

0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 45 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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Aerial Photography Date: April 2011

ENBRIDGE

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Approved:	MS	4/29/2013
Project #:	60284509	

Map Location

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LSR 2012 Poling Points

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N

0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 46 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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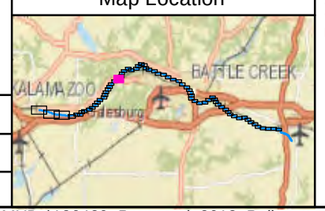
Aerial Photography Date: April 2011

ENBRIDGE

Drawn:	GM	4/29/2013
Approved:	MS	4/29/2013
Project #:	60284509	

Map Location



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N

0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 47 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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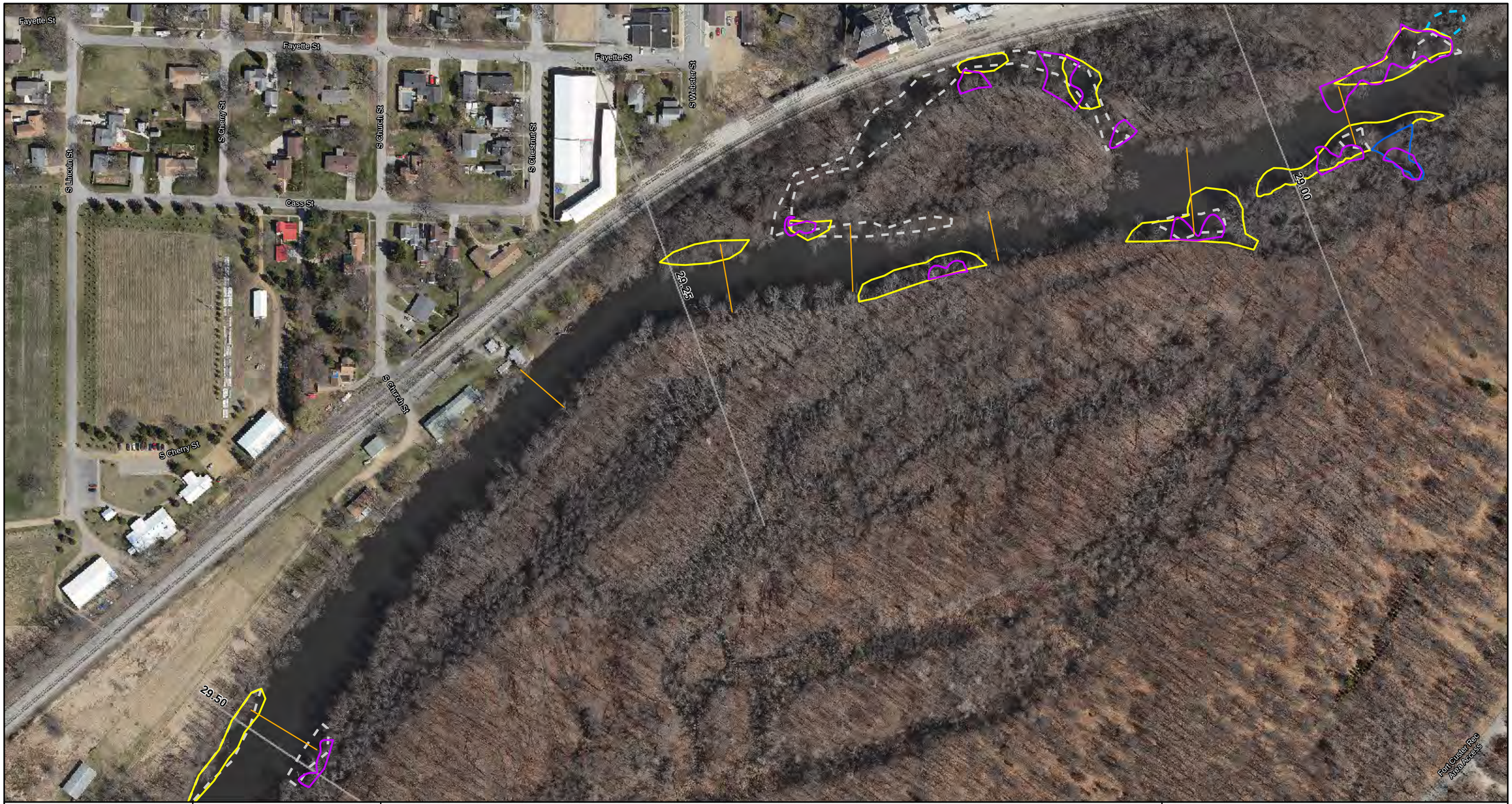
Aerial Photography Date: April 2011



ENBRIDGE

Drawn:	GM	4/29/2013
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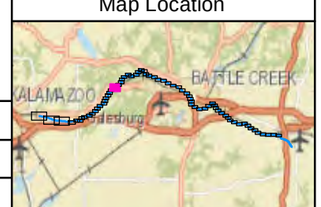
Project #:	60284509	

Map Location



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N

0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 48 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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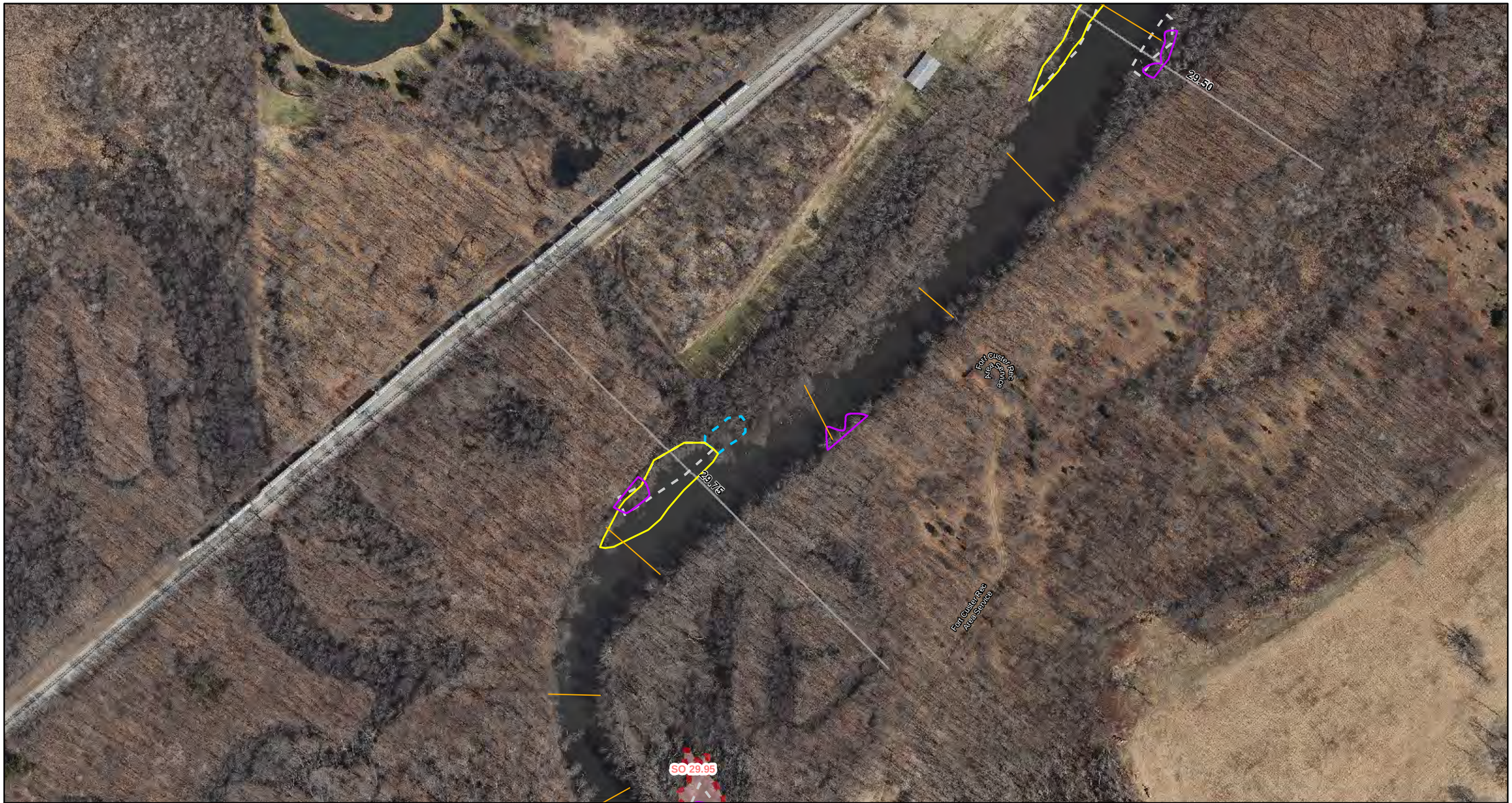
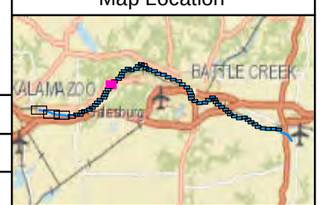
Aerial Photography Date: April 2011



ENBRIDGE

Drawn:	GM	4/29/2013
Approved:	MS	4/29/2013
Project #:	60284509	

Map Location



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N

0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 49 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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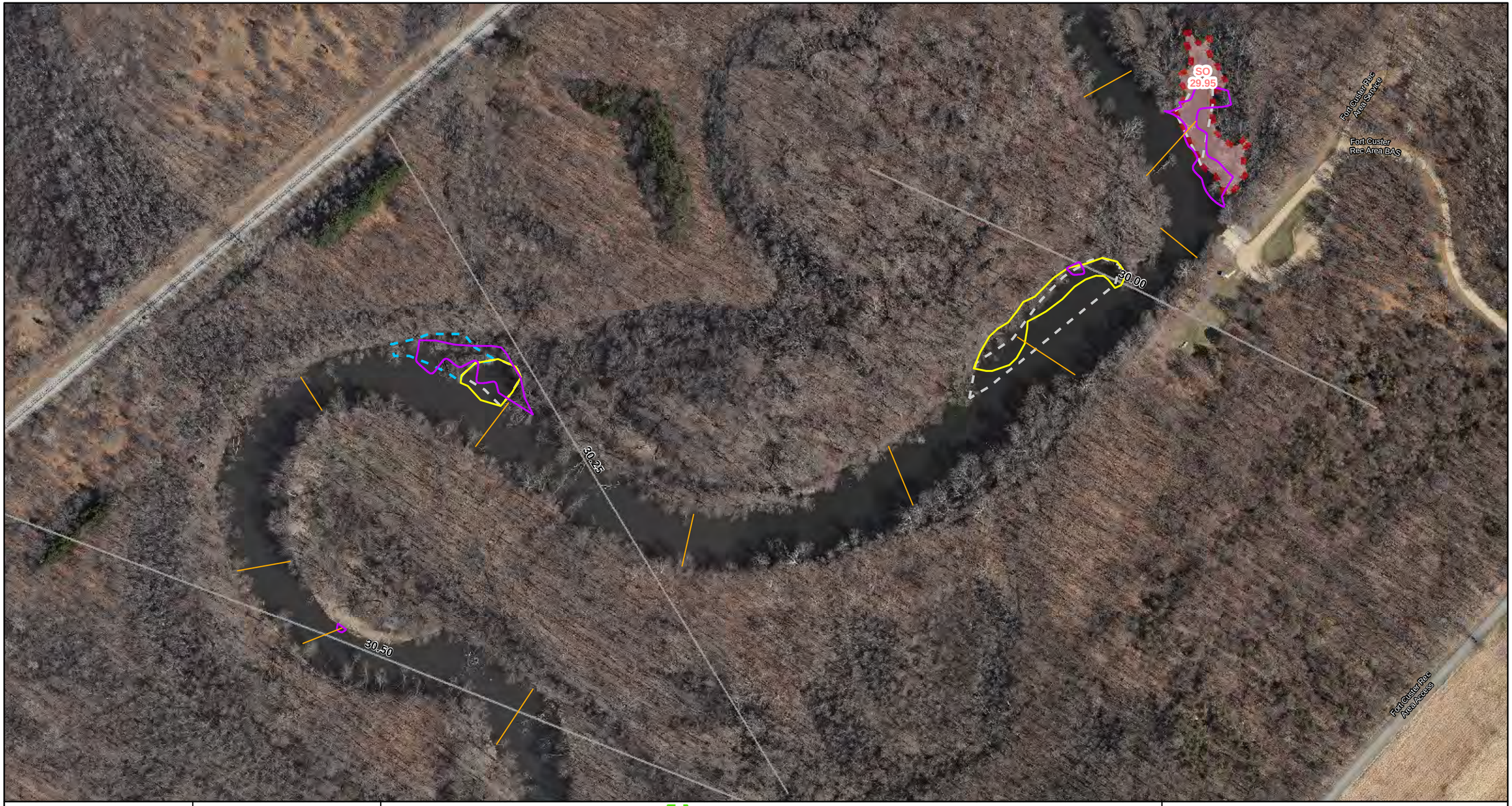
Aerial Photography Date: April 2011



ENBRIDGE

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Map Location

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N

0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 50 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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N

0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 51 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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Approved:	MS	4/29/2013
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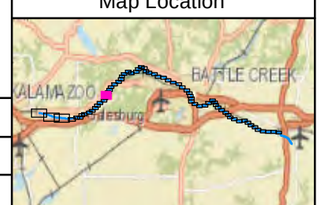
Map Location



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N

0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 52 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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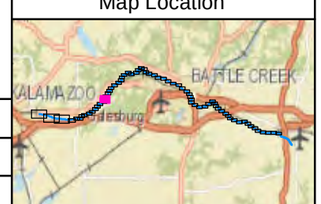

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0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 53 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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N

0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 54 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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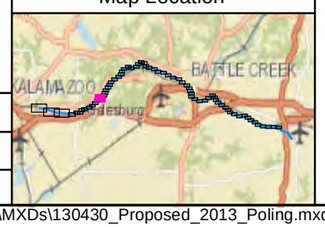
Map Location



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N

0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 55 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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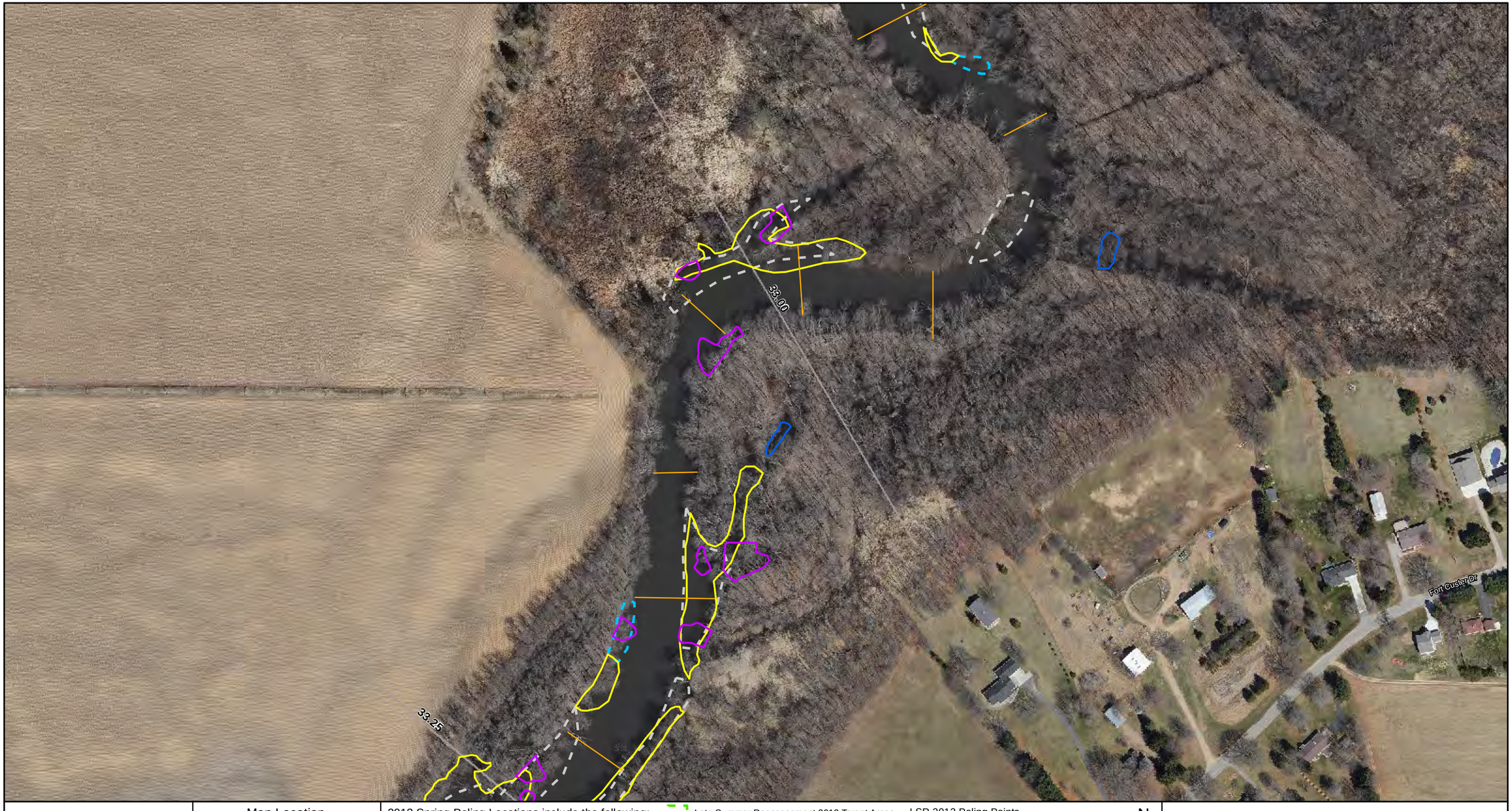
Aerial Photography Date: April 2011



ENBRIDGE

Drawn:	GM	4/29/2013
Approved:	MS	4/29/2013
Project #:	60284509	

Map Location

2013 Spring Poling Locations include the following:

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- Bridge Access Poling Areas

LSR 2012 Poling Points

- Heavy
- Moderate
- Quarter Mile Grid Segment

Number of poling locations within each area will be dependent on site conditions. Full transects will have a minimum of 3 locations. 2011 Poling Focus Areas include 2010 Poling Areas.

N

0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 56 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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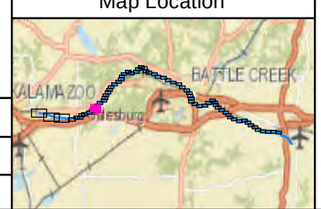
Aerial Photography Date: April 2011

ENBRIDGE

Drawn:	GM	4/29/2013
Approved:	MS	4/29/2013
Project #:	60284509	

Map Location



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N

0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 57 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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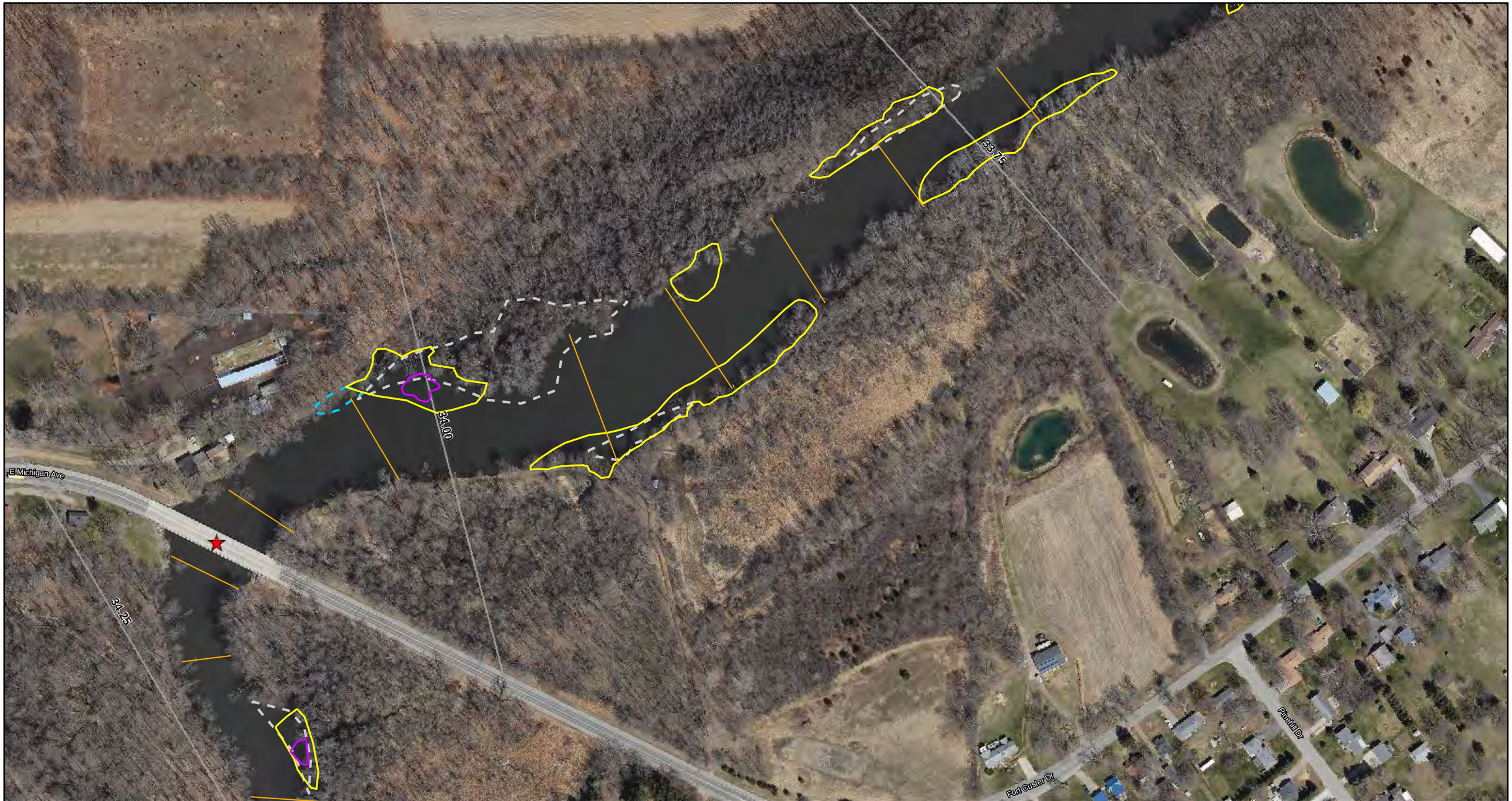
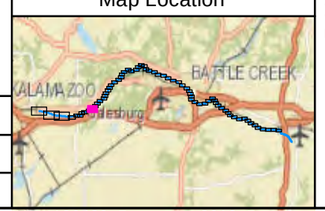
Aerial Photography Date: April 2011



ENBRIDGE

Drawn:	GM	4/29/2013
Approved:	MS	4/29/2013
Project #:	60284509	

Map Location



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N

0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 58 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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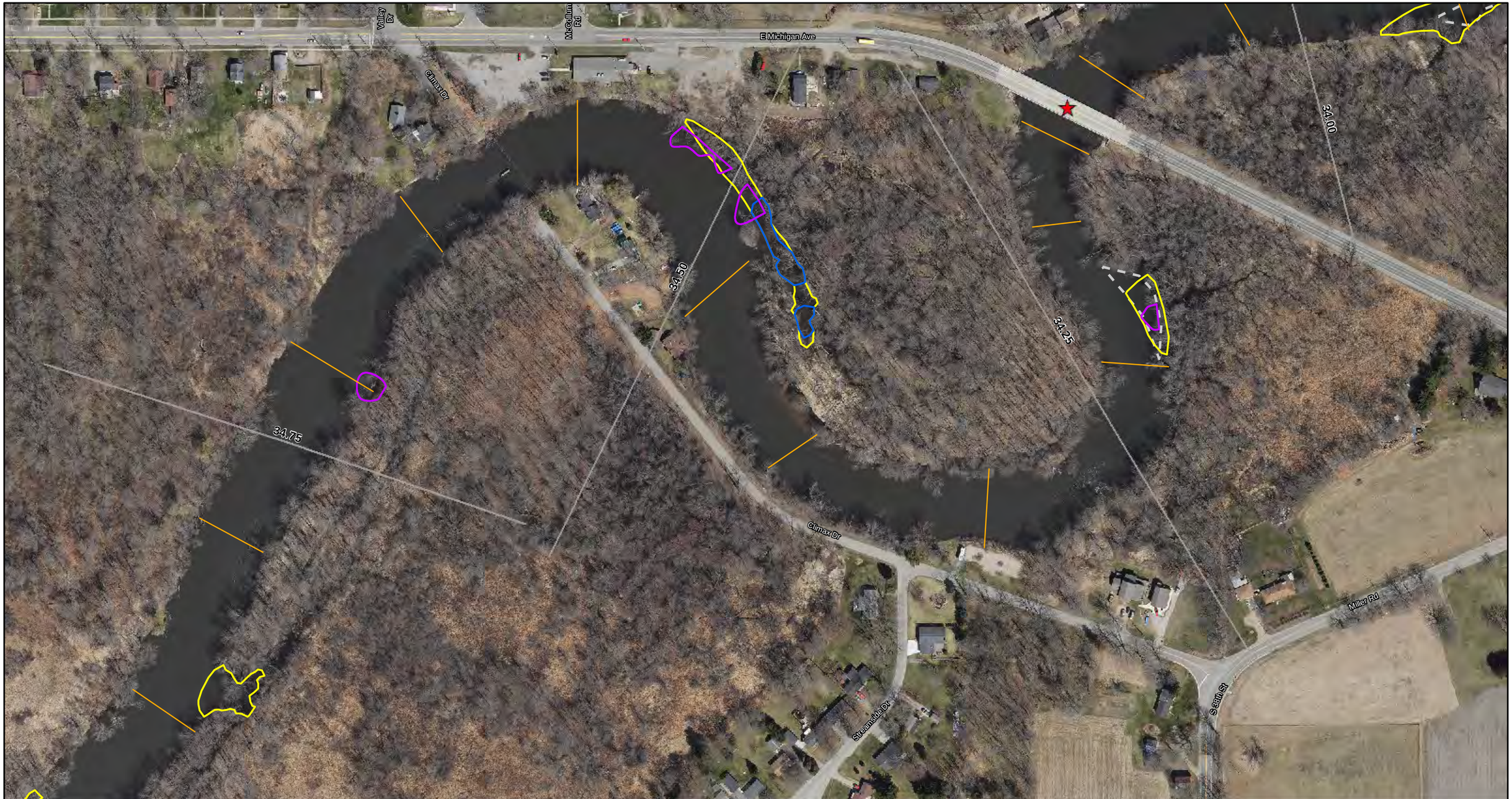
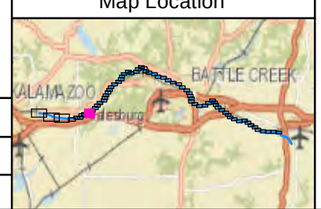
Aerial Photography Date: April 2011



ENBRIDGE

Drawn:	GM	4/29/2013
Approved:	MS	4/29/2013
Project #:	60284509	

Map Location



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N

0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 59 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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Aerial Photography Date: April 2011

ENBRIDGE

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Project #:	60284509	

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N

0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 60 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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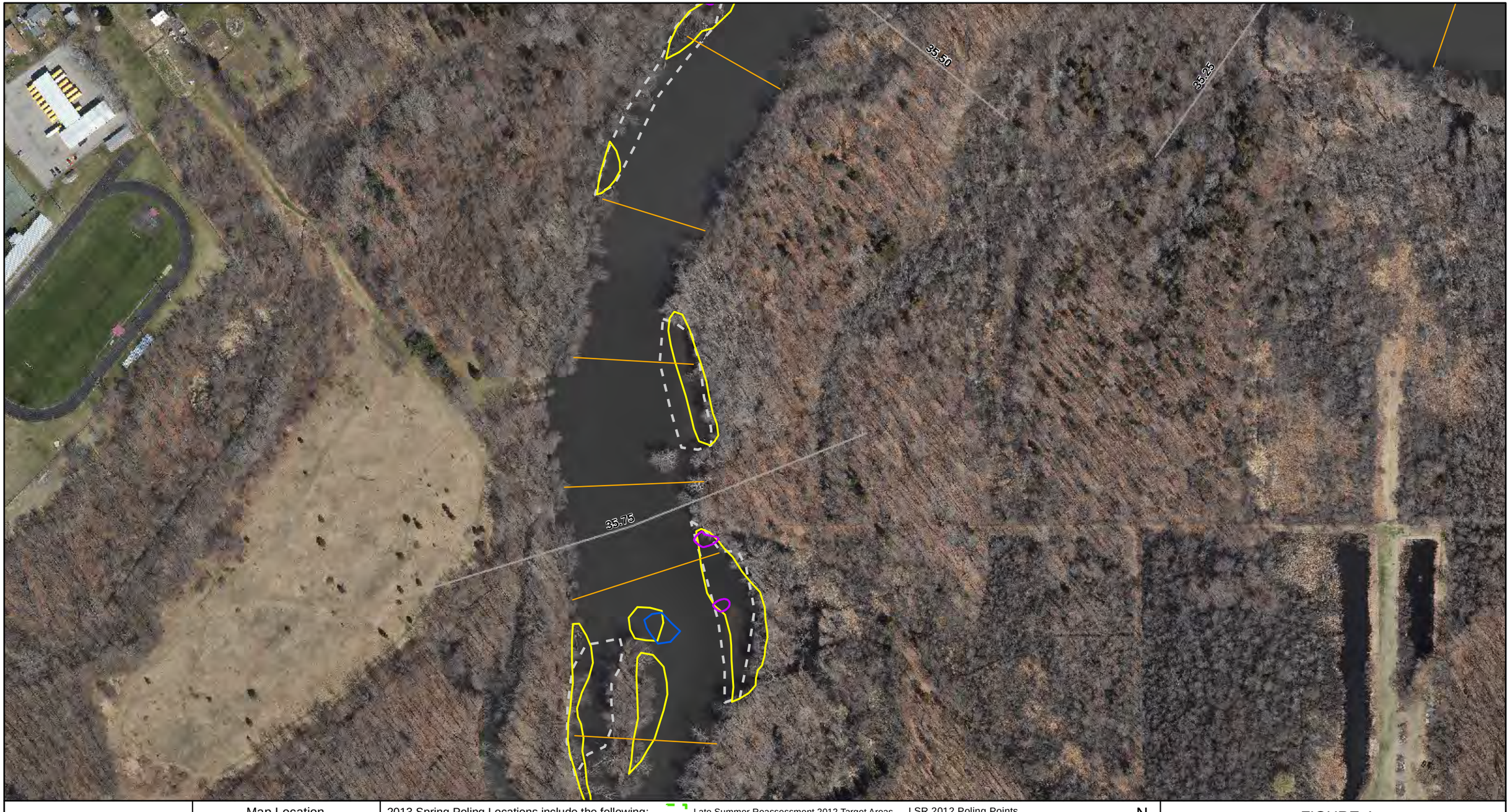
Aerial Photography Date: April 2011



ENBRIDGE

Drawn:	GM	4/29/2013
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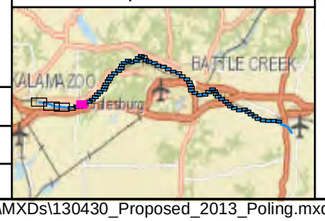
Project #:	60284509	

Map Location



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N

0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 61 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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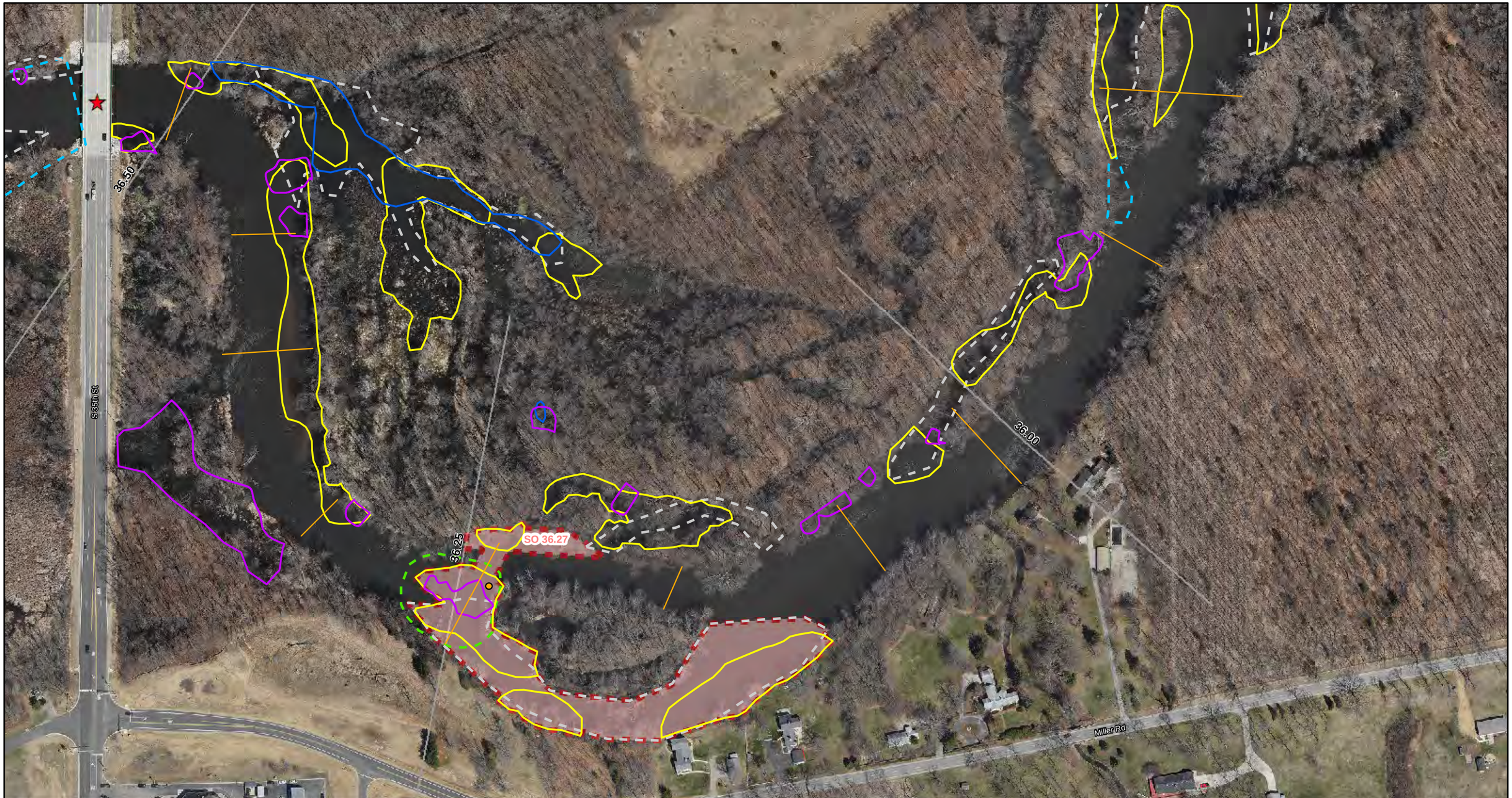
Aerial Photography Date: April 2011



ENBRIDGE

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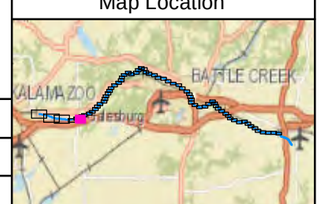
Project #:	60284509	

Map Location



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N

0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 62 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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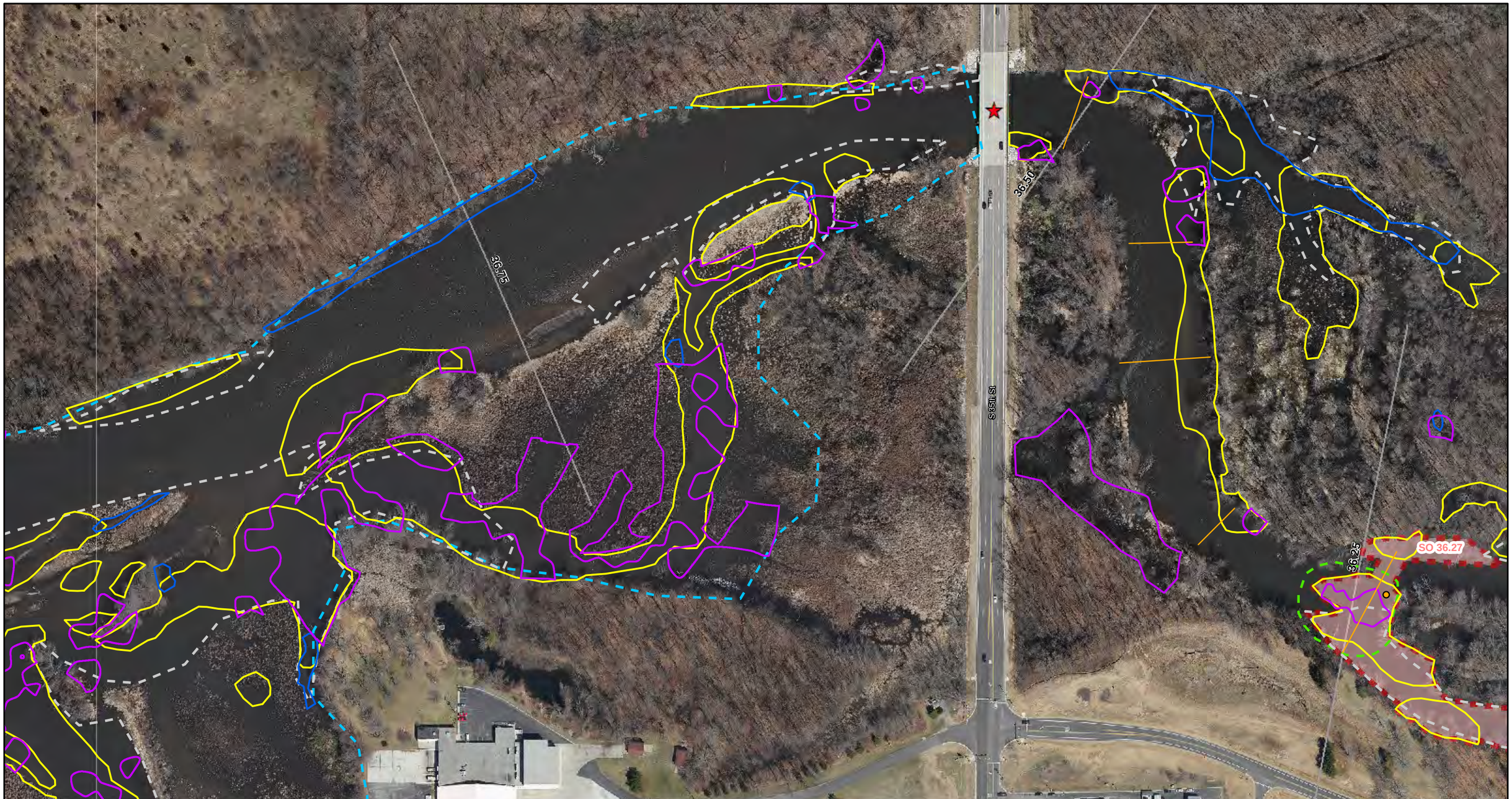
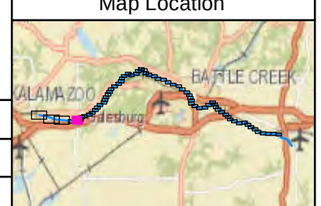
Aerial Photography Date: April 2011



ENBRIDGE

Drawn:	GM	4/29/2013
Approved:	MS	4/29/2013
Project #:	60284509	

Map Location



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N

0 200 400

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 63 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

Z:\Work\GIS\2013_SO_Reassessment\MXDs\130430_Proposed_2013_Poling.mxd

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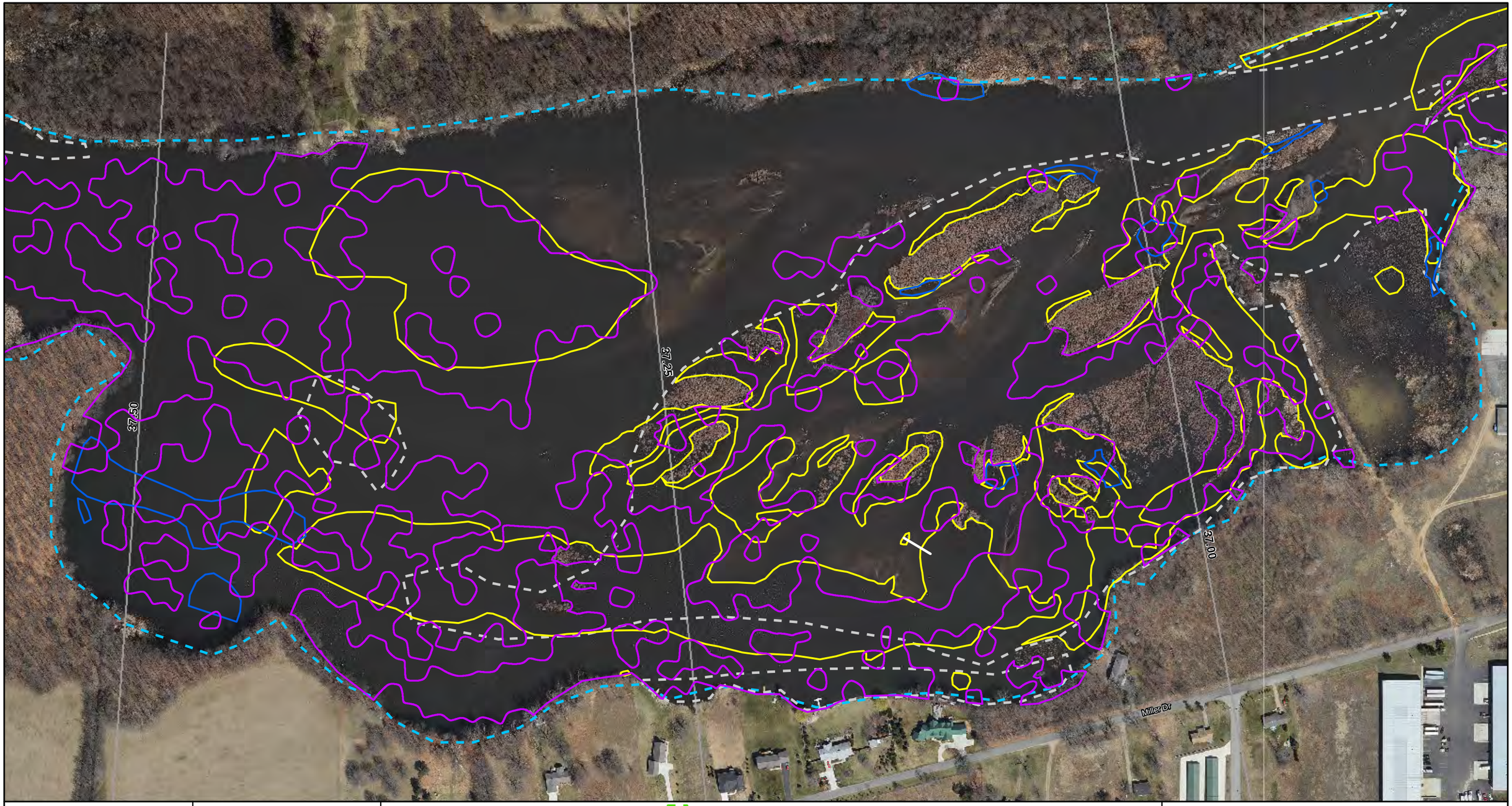

ENBRIDGE

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Approved:	MS	4/29/2013
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N

0 250 500

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 64 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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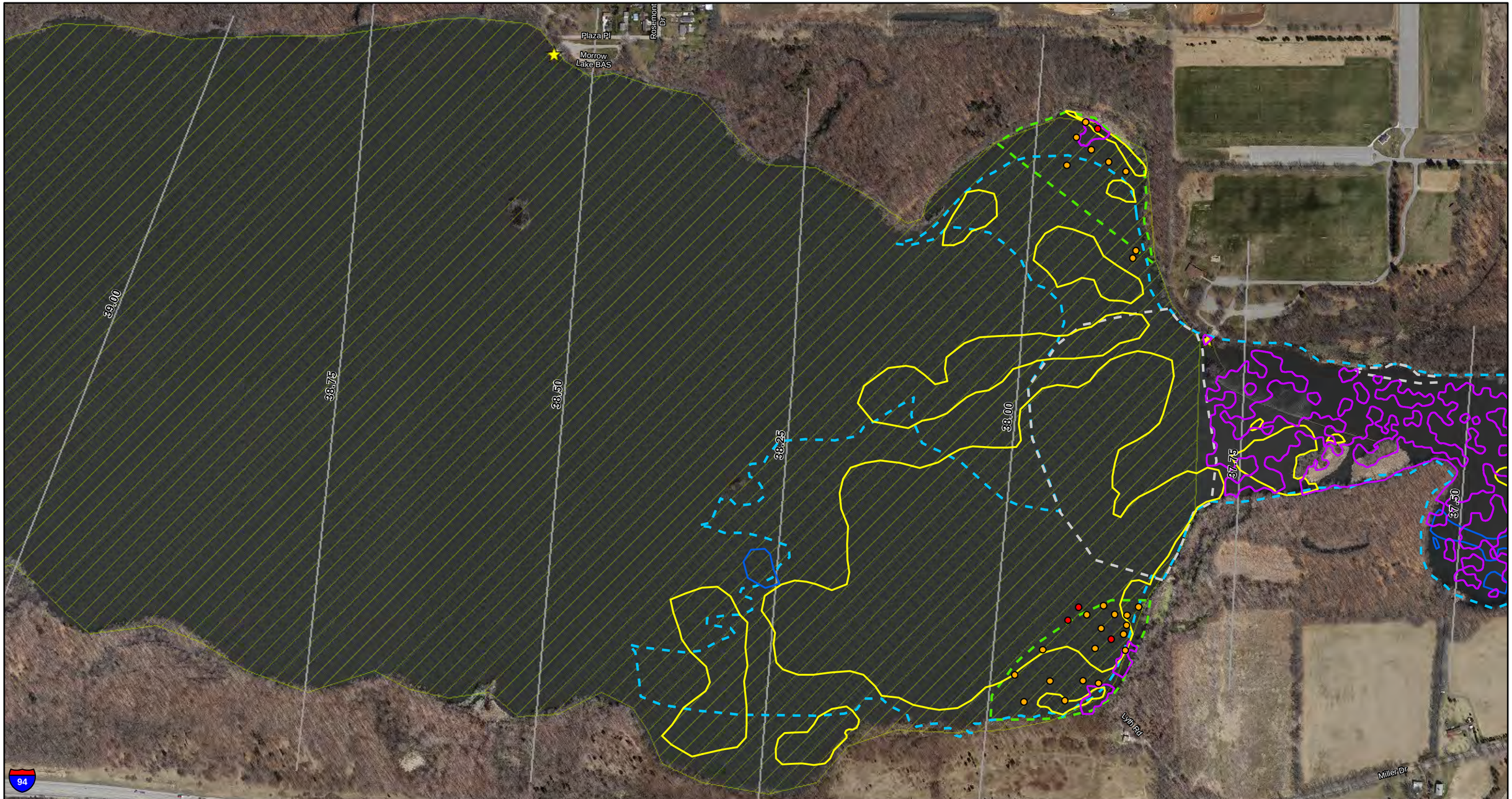

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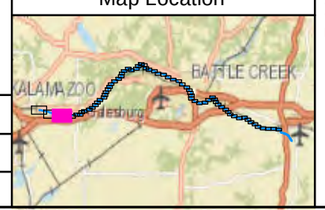

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N

0 500 1,000

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 65 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

Z:\Work\GIS\2013_SO_Reassessment\MXDs\130430_Proposed_2013_Poling.mxd

Aerial Photography Date: April 2011

ENBRIDGE

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N

0 500 1,000

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 66 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

Z:\Work\GIS\2013_SO_Reassessment\MXDs\130430_Proposed_2013_Poling.mxd

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ENBRIDGE		
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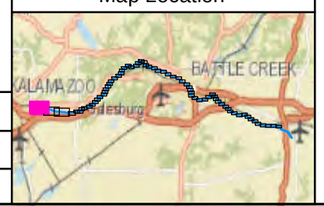
Map Location



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N

0 500 1,000

Scale in Feet

FIGURE 4
PROPOSED 2013 POLING
SHEET 67 OF 67

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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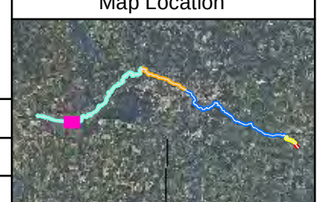
Aerial Photography Date: April 2011

ENBRIDGE

Drawn:	NS	5/1/2013
Approved:	EE	5/1/2013
Project #:	60284509	

Map Location



Legend

- Poling Monitoring Location
  - D - Morrow Lake Delta
  - M - Morrow Lake
  - N - Morrow Lake Neck
- **Proposed E 4.0 Containment System**
  - X-TEX Sediment Curtain
  - No Curtain
  - Anchor Point
- Approximate Sediment Fan Area
- Quarter Mile Grid Segment

N

0 200 400 800

Scale in Feet

FIGURE 5
2013 MORROW LAKE DELTA AND MORROW LAKE
POLING LOCATIONS AND PROPOSED E 4.0
CONTAINMENT SYSTEM
SHEET 1 OF 2

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

Z:\Work\GIS\2013_SO_Reassessment\MXDs\Lake_Delta_Monitoring\130430_2013_Morrow_Lake_and_Delta_Monitoring_Sheet1.mxd

Aerial Photography Date: April 2011

ENBRIDGE

Drawn:	NS	5/1/2013
Approved:	EE	5/1/2013
Project #:	60284509	

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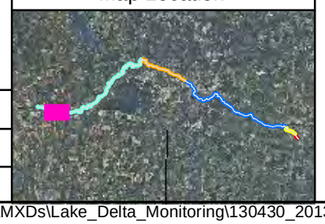

Legend

- Poling Monitoring Location
  - D - Morrow Lake Delta
  - M - Morrow Lake
  - N - Morrow Lake Neck

Proposed E 4.0 Containment System

- X-TEX Sediment Curtain
- No Curtain
- Anchor Point
- Approximate Sediment Fan Area
- Quarter Mile Grid Segment

N

0 350 700 1,400

Scale in Feet

FIGURE 5
2013 MORROW LAKE DELTA AND MORROW LAKE
POLING LOCATIONS AND PROPOSED E 4.0
CONTAINMENT SYSTEM
SHEET 2 OF 2

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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Aerial Photography Date: April 2011

ENBRIDGE

Drawn:	NS	5/1/2013
Approved:	EE	5/1/2013
Project #:	60284509	

Map Location

Legend

- Walling Tube
- Quarter Mile Grid Segments

N

0 100 200 400

Scale in Feet

FIGURE 6
WALLING TUBES LOCATIONS
SHEET 1 OF 6

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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Aerial Photography Date: April 2011

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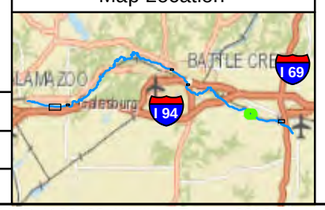

Legend

- Walling Tube
- Quarter Mile Grid Segments

N

0 75 150 300

Scale in Feet

FIGURE 6
WALLING TUBES LOCATIONS
SHEET 2 OF 6

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

Z:\Work\GIS\2012_SO_Reassessment\MXDs\130402_Walling_Tubes_2012.mxd

Aerial Photography Date: April 2011

ENBRIDGE

Drawn:	NS	5/1/2013
Approved:	EE	5/1/2013
Project #:	60284509	

Map Location

Legend

- Walling Tube
- Quarter Mile Grid Segments

N

0 50 100 200

Scale in Feet

FIGURE 6
WALLING TUBES LOCATIONS
SHEET 3 OF 6

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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N

0 50 100 200

Scale in Feet

FIGURE 6
WALLING TUBES LOCATIONS
SHEET 4 OF 6

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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ENBRIDGE

Drawn:	NS	5/1/2013
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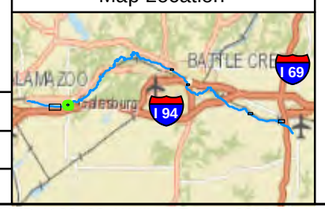
Map Location



Legend

- Walling Tube
- Quarter Mile Grid Segments

N

0 50 100 200

Scale in Feet

FIGURE 6
WALLING TUBES LOCATIONS
SHEET 5 OF 6

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
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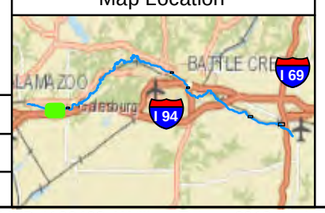


Legend

- Walling Tube
- Quarter Mile Grid Segments

N

0 200 400 800

Scale in Feet

FIGURE 6
WALLING TUBES LOCATIONS
SHEET 6 OF 6

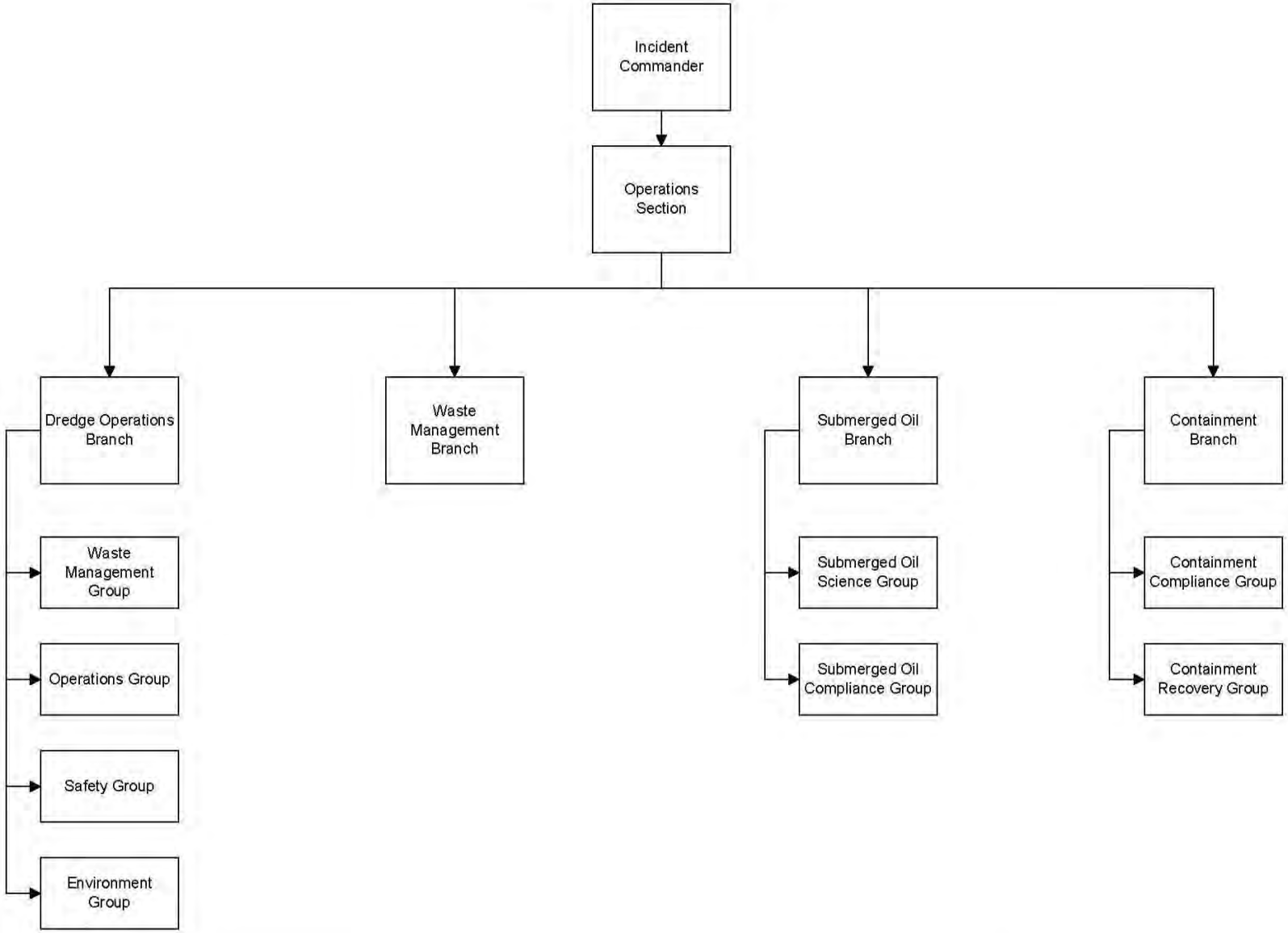
ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

Z:\Work\GIS\2012_SO_Reassessment\MXDs\130402_Walling_Tubes_2012.mxd

Aerial Photography Date: April 2011

Attachment A

Organizational Structure Chart



ENBRIDGE

Drawn: CW

Approved: NL

Project#: 60284509

ATTACHMENT A
ORGANIZATIONAL STRUCTURE CHART

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY,
LIMITED PARTNERSHIP

Attachment B
Dredge Operation Procedures and Guidelines

Debris Management Plan
For The
Enbridge Line 6B MP 608
Marshall, MI Pipeline Release

PREPARED FOR:
ENBRIDGE ENERGY LIMITED PARTNERSHIP
333 SOUTH KALAMAZOO DRIVE
MARSHALL, MI 49068

DATE PREPARED:
APRIL 30, 2013

1.0 Overview

The Debris Management Plan serves to define the process, equipment and areas to be used for the management of debris that will be encountered during dredging operations.

2.0 Methods

2.1 Personnel Qualifications

- Equipment operators must be properly trained and licensed, as appropriate, for the type and class of equipment that he or she is operating. Field personnel must be health and safety certified as specified by the Occupational Safety and Health Administration (OSHA) (29 CFR 1910.120(e)(3)(i)) to work on sites where hazardous materials may be present. Feld personnel will be trained to be familiar with the procedures outlined within this plan and the health and safety requirements for this project

2.2 Health and Safety

- The health and safety considerations for the work associated with this plan, including both potential physical and chemical hazards, are addressed in the Terra Contracting Services' Corporate Health and Safety Plan (HASP), Enbridge's site specific HASP, Terra's site specific HASP, and task specific Job Safety Analyses (JSA) forms. All work will be conducted in accordance with these HASPs and JSAs.

2.3 Equipment and Supplies

2.3.1 Supplies

Supplies will be primarily related to roll-off liners and personal protection equipment (PPE).

2.3.2 Equipment

The equipment required to facilitate debris removal will vary depending on the type of debris to be removed may consist of but not be limited to:

- Hydraulic excavators either on flexi floats, barge, or amphibious tracks (for loading and unloading),
- Transportation vessel (barge, pontoon, boat, etc.),
- Roll-off container, and
- Roll-off truck.

2.4 Procedure

2.4.1 Debris Collection

- All loose debris will be loaded directly into the material barges, boats, pontoons, or other transportation vessel (barge) at the dredge area,
- Only loose piling and concrete will be removed,
- Debris is defined as logs, lumber, anchors, chains, rope, cinderblocks, slag, tree stumps, scrap material, and other manmade or naturally deposited material located within the dredging area that is not sediment, and
- Vessels will not be loaded in excess of the rated capacity of the vessel.

2.4.2 Debris Transportation

- Once debris materials are loaded onto the material barge, the barge will be transported to the off-loading area, and
- The boat/barge combination will moor at the offloading area, where it will be unloaded using a material handler.

2.4.3 Debris Off-Loading

- Once debris arrives at the off-loading area, it will be physically sorted by a hydraulic excavator. This debris will be loaded into roll-off containers until load quantity is adequate for shipment to landfill.
- All debris will be tracked on manifests and landfill weight tickets.
- All trucks will be inspected prior to leaving site to ensure debris has been properly loaded and that the load is secure. Additionally, each truck will be appropriately tarped.

3.0 Records Management

3.1 Records Management

The field team is responsible for the accurate, objective and complete documentation of all field activities. The field team may carry copies of facility maps on which to record supplemental information, such as locations of sampling points and photographs. This information should be used as an aid to the field operations, and is not intended as a substitute for the official field log. A field log is kept in a bound notebook in indelible ink. The log book is kept in a secure location at all times when not in the possession of a field team member.

3.2 Analytical Data Packages and Records

Laboratory analytical data will be generated in accordance with project procedures to ensure project requirements are met. All analytical data will be retained on a secured server with restricted-access. Analytical data will be collected and maintained in accordance with the Quality Assurance Project Plan (QAPP).

3.3 Document Control Procedures

Terra maintains a central file for the project in its Kalamazoo, Michigan office. Documents to be maintained in the file include work plans, cost estimates, and other planning documents; deliverables and supporting documents; general correspondence such as meeting notes; field and analytical records; quality control (QC) checklists and audit reports; monthly progress reports; and other documents required by Enbridge. Terra will ensure all pertinent documents from outside sources, such as subcontractors are maintained in the project files. Terra will maintain project files for the life of the Enbridge contract. All project records will be maintained electronically on Terra's secured dedicated remote server, which is backed up on a regular basis.

4.0 References

1. Enbridge, 2013. Enbridge Line 6B MP 608 Pipeline Release; Marshall, Michigan*; Health and Safety Plan (HASP).* April 30, 2013.
2. Terra Contracting Services, 2013. Terra Contracting Services; Kalamazoo, Michigan; *Corporate Health and Safety Plan (HASP).* March 13, 2013
3. Terra Contracting Services, 2013. Terra Contracting Services; Kalamazoo, Michigan; *Enbridge Line 6B MP 608 Pipeline Release; Site Specific Health and Safety Plan (SSHASP).* TBD

Decontamination Plan
For The
Enbridge Line 6B MP 608
Marshall, MI Pipeline Release

PREPARED FOR:
ENBRIDGE ENERGY LIMITED PARTNERSHIP
333 KALAMAZOO DRIVE
MARSHALL, MI 49068

DATE PREPARED:
APRIL 30, 2013

1.0 Overview

The objective of the Decontamination Plan is to define the work areas where contact with contaminated media is possible, and the processes, equipment and areas to be used for the decontamination of the personnel and equipment required to complete the Scope of Work. This plan is currently written for level D personal protective equipment (PPE). If increased contamination levels are discovered during operations and level C is required, this plan will be revised accordingly. Standard PPE requirements for marine crews include wearing steel-toe boots/shoes, eye protection, hard hats, hearing protection (when appropriate), personal floatation devices (PFDs) when working on marine vessels or within a 10' distance of the water, and high visibility vests. Equipment utilized in the handling and processing of materials will be subject to decontamination at various point(s) in the work. Similarly, all personnel working within the exclusion zone (EZ) will be subject to decontamination procedures during the routine performance of the work scope.

- It is anticipated that decontamination will be required as follows: All trucks utilized for the off-site transportation of dredge material will exit the site via the tire wash to remove any residual soils that may have been accumulated during the loading process.
- All PPE utilized by employees working within the EZ will be removed in the Contamination Reduction Zone (CRZ) prior to entering the Support Zone (SZ).
- All heavy equipment will be decontaminated prior to being released from the site.
- Before leaving the site, the equipment will be power washed to remove any adhering sediments.

2.0 Methods

2.1 Personnel Qualifications

Field personnel must be health and safety certified as specified by the Occupational Safety and Health Administration (OSHA) (29 CFR 1910.120(e)(3)(i)) to work on sites where hazardous materials may be present. Field personnel will be trained to be familiar with the procedures outlined within this plan and the health and safety requirements for this project

2.2 Health and Safety

The health and safety considerations for the work associated with this plan, including both potential physical and chemical hazards, are addressed in the Terra Contracting Services' Corporate Health and Safety Plan (HASP), Enbridge's site specific HASP, Terra's site specific HASP, and task specific Job Safety Analyses (JSA) forms. All work will be conducted in accordance with these HASPs and JSAs.

2.3 Equipment and Supplies

2.3.1 Supplies

Supplies to be used to clean equipment may include, but not be limited to: PPE, cleanser and detergents, degreasers, spray bottle(s), rinse water, scrub brush/scrub pad(s), clean absorbent pads, towels, and polyethylene sheeting. Only approved cleaners and degreasers will be used in this process. Material Data Safety Sheets will be provided to Enbridge Safety and be available at the worksite for materials used.

2.3.2 Equipment

Much of the cleaning will be accomplished using manual methods such as scrub brushes and pads. A high temperature pressure washer will be used for heavy cleaning and to rinse equipment as necessary.

2.4 Procedure

2.4.1 Work Areas

The work area at each sediment processing area be defined into work zones as described in the HASP. An EZ will be established to isolate the area where all handling, processing, conveyance and loading of impacted materials will occur. Access to the EZ will be restricted to authorized personnel equipped with the appropriate level D PPE. All access to the EZ will be through the CRZ. The SZ is the area designated for all temporary material storage, staging, employee parking and administrative offices.

2.4.2 Personal Decontamination Stations

Personal decontamination stations will be used by personnel transitioning from the EZ to the SZ. This zone will be used to physically remove debris from PPE, remove or clean boots and establish clean conditions prior to making a full transition. This area will also be utilized for donning/doffing PPE as personnel return to or exiting the work zone.

2.4.3 Offloading Operations

The primary personal decontamination station will be located within the CRZ since this location will be utilized as the primary point of access and egress from the EZ. Secondary personal decontamination stations can be established on an as-needed basis. These locations will be utilized by personnel required for the regular and periodic maintenance of the dredging and pumping equipment. The following minimum components will be maintained at each of these locations:

- Boot Wash Station,
- Hand Cleaner,

- Eye Wash Station,
- Sanitary Facilities,
- Seating (to facilitate the donning and removal of PPE),
- PPE disposal containers, and
- Additional PPE, as required.

2.4.4 Dredge Crew

1. Operators
   - Before entry into the exclusion zone, all operators will be required to don a pair of protective over boots, a pair of protective inner (nitrile) gloves, hard hat, high visibility vest, PFD, hearing protection when applicable, and safety glasses.
   - Operators will not be required to wear coated, protective suits in the exclusion zone while walking to and from their equipment unless any deck/barge cleaning operations are occurring. If any deck/barge cleaning operations are in occurring, all required PPE will be worn.
   - If operators must pass through an exclusion zone to reach their equipment, operators will doff protective over boots before entering the cab of their equipment, and will don protective over boots before leaving protective cab. Inner gloves will be removed and placed in plastic bag inside cab once they are seated inside their protective cabs. Operators will don hard hats and a clean pair of inner gloves before leaving protective cabs. These requirements do not apply if the operator can reach the cab without passing through an exclusion zone.
   - Operators will be allowed to doff hard hats once seated in their protective equipment cab.
   - Operators will keep a clean, coated protective suit, a clean pair of inner (nitrile)/outer (nitrile) gloves, and a face shield in the cab of their equipment at all times, and will be required to don them at appropriate times.
   - Operator shall enter decontamination area prior to deckhands in order to provide them assistance in removal of coated, protective suits, after which they shall follow company decontamination procedures.
   - Operators will follow company decontamination procedures when leaving the exclusion zone.
   - Operators PPE requirements may be re-evaluated by the Site Safety Officer (SSO) and changes made based on information indicating the hazard controlled by the

PPE has been reduced or eliminated.

2. Deckhands
   - Before entry into the exclusion zone, deckhands will be required to don level D PPE, including PDFs.
   - If at any time a crew member's PPE becomes unsafe for use (ripped, torn, etc.) they are to leave the exclusion zone, follow company decontamination procedures, and don new PPE before returning to the exclusion zone for work.
   - Deckhands will follow company decontamination procedures when leaving exclusion zone.
   - Deckhands PPE requirements may be re-evaluated and changes made based on exposures observed.

2.4.5 Towing Crew

1. Boat Operators
   - Before entry into the exclusion zone, all operators will be required to don a pair of protective over boots, a pair of protective inner gloves, hard hat, high visibility vest, PFD, safety glasses, and hearing protection (when applicable).
   - Operators will not be required to wear coated protective suits in the exclusion zone while walking to and from their equipment unless any deck/barge cleaning operations are in effect. If any deck/barge cleaning operations are in effect, all required PPE will be worn.
   - Operators will doff protective over boots before entering the pilothouse, galley, or engine room of the vessel, and required to don protective over boots before leaving said areas of vessel.
   - Operators will be allowed to doff hard hats once inside the pilothouse, galley, or engine room of vessel. Inner gloves will be removed and placed in plastic bags inside said areas of vessel. Operators will don hard hats, and a clean pair of inner gloves before leaving said areas of vessel.
   - Operators will keep a clean coated protective suit, a clean pair of inner (nitrile)/outer (nitrile) gloves, and a face shield in the pilothouse of vessel at all times, and will be required to don them at appropriate times.
   - Operators shall enter decontamination area prior to deckhands in order to allow them assistance in removal of coated protective suits, after which they shall follow company decontamination procedures.

- Operators will follow company decontamination procedures when leaving the exclusion zone.
- Operators PPE may be re-evaluated, and changes made based on exposures observed.

2. Deckhands
   - Before entry into the exclusion zone, deckhands will be required to don Level D PPE, including PDFs.
   - If at any time a crew member's PPE becomes unsafe for use (ripped, torn, etc.) they are to leave the exclusion zone, follow company decontamination procedures, and don new PPE before returning to the exclusion zone for work.
   - Deckhands will follow company decontamination procedures when leaving exclusion zone.
   - Deckhands PPE may be re-evaluated by the SSO and changes made based on information indicating the hazard controlled by the PPE has been reduced or eliminated.

2.4.6 Tire Wash

All onsite vehicular traffic entering the EZ, including off-site disposal transporters, will require decontamination prior to being released from the site. This will be accomplished by driving through the tire wash. Fresh water will be supplied from a holding tank located adjacent to the tire wash. Each vehicle will also be visually inspected for fugitive debris prior to being released from the site.

2.4.6 Decontamination Pad

A decontamination pad will be established and will be used when heavy equipment and machinery are required to be decontaminated prior to exiting the EZ. Decontamination will be completed by employees wearing the appropriate PPE (Level D, protective coveralls, face shield) utilizing pressure washers supplied with clean water, hand tools and/or cleaners to remove any visual evidence of contaminated media. The decontamination pad will be isolated using physical barriers or berms to contain decontamination water associated with the work. This area will have a positive flow line to allow decontamination water to be transferred to the water treatment system sump.

2.4.6 Process Decontamination

Dredge equipment used will be decontaminated with a clean water rinse before leaving the site. Hand tools will be decontaminated by scrubbing with an approved detergent and

clean water rinse before leaving the exclusion zone. Wash water will be collected and processed through the water treatment plant.

3.0 Records Management

3.1 Records Management

The field team is responsible for the accurate, objective and complete documentation of all field activities. The field team may carry copies of facility maps on which to record supplemental information, such as locations of sampling points and photographs. This information should be used as an aid to the field operations, and is not intended as a substitute for the official field log. A field log is kept in a bound notebook in indelible ink. The log book is kept in a secure location at all times when not in the possession of a field team member.

3.2 Analytical Data Packages and Records

Not applicable

3.3 Document Control Procedures

Terra maintains a central file for the project in its Kalamazoo, MI office. Documents to be maintained in the file include work plans, cost estimates, and other planning documents; deliverables and supporting documents; general correspondence such as meeting notes; field and analytical records; quality control (QC) checklists and audit reports; monthly progress reports; and other documents required by Enbridge. Terra will ensure all pertinent documents from outside sources, such as subcontractors are maintained in the project files. Terra will maintain project files for the life of the Enbridge contract. All project records will be maintained electronically on Terra's secured dedicated remote server, which is backed up on a regular basis.

4.0 References

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2. Terra Contracting Services, 2013. Terra Contracting Services; Kalamazoo, Michigan; *Corporate Health and Safety Plan (HASP)*. March 13, 2013

3. Terra Contracting Services, 2013. Terra Contracting Services; Kalamazoo, Michigan; Enbridge Line 6B MP 608 Pipeline Release; *Site Specific Health and Safety Plan (SSHASP)*. TBD

Environmental and Spill Response Plan

For The

Enbridge Line 6B MP 608

Marshall, MI Pipeline Release

PREPARED FOR:
ENBRIDGE ENERGY LIMITED PARTNERSHIP
333 KALAMAZOO DRIVE
MARSHALL, MI 49068

DATE PREPARED:
APRIL 30, 2013

1.0 Overview

The Environmental and Spill Response Plan is to be initiated when the trigger-point quantity is exceeded by the substance spilled. In the case of Terra Contracting Services (Terra), the only applicable substances aboard its vessels are under the classification of oil in the CFR Vol. 40 Regulatory Spill Quantities. This includes oils, fuels, antifreeze or any petroleum product. According to the CFR, any amount of oil spilled is to be reported or at least any amount that causes sheen on the water or land. If a spill occurs, the Terra Project Manager is responsible for contacting the Enbridge Environmental Inspector (EI) assigned to the dredge location where the spill occurs. The Enbridge EI is responsible for communicating the incident through the chain of command in accordance with site specific reporting procedures.

2.0 Methods

2.1 Personnel Qualifications

- Supervisory personnel must be health and safety certified as specified by the Occupational Safety and Health Administration (OSHA) (29 CFR 1910.120(e)(4))
- Equipment operators must be properly trained and licensed, as appropriate, for the type and class of equipment that he or she is operating.
- Field personnel must be health and safety certified as specified by the OSHA (29 CFR 1910.120(e)(3)(i)and(7)) to work on sites where hazardous materials may be present. Field personnel will be trained to be familiar with the procedures outlined within this plan and the health and safety requirements for this project

2.2 Health and Safety

- The health and safety considerations for the work associated with this plan, including both potential physical and chemical hazards, are addressed in the Terra Contracting Services' Corporate Health and Safety Plan (HASP), Enbridge's site specific HASP, Terra's site specific HASP, and task specific Job Safety Analyses (JSA) forms. All work will be conducted in accordance with these HASPs and JSAs.

2.3 Equipment and Supplies

All equipment and supplies are detailed in the procedure section depending on the type of response required.

2.4 Procedure

2.4.1 Oil Spill Prevention Measures

As with any remediation project, the potential exists for an oil spill, both on land and on water. Such spills are generally extremely small and result in no significant impact to the environment. All oils, greases and fuels utilized in uplands operations will both be stored, and utilized, within the lined dewatering area, and therefore will be contained by location. The proposed project plan includes measures designed to reduce the potential of an operational spill to the maximum extent possible. In the event an oil spill were to occur in association with offshore operations, Terra has developed a response plan to quickly and effectively contain and recover any released oil. During the proposed project, the potential for an oil spill would be greatest in two operational areas of the project:

a. On shore at the staging areas to the surf zone, and
b. Offshore at the workboat or barge location.

In the event of an oil spill in one of these operational areas, Terra will respond with on-site personnel and equipment utilizing spill kits staged within 25 feet of all refueling locations, and all stationary mechanical apparatus. Additional skill kits will be available on all marine vessels. If an accident cannot be handled solely by on-site personnel and equipment, Terra will request the resources of its Environmental Response Division. Throughout any response effort, Terra will interact with federal, state and local government agencies as necessary.

2.4.2 Terra Response Team

Terra has established a response team consisting of an Onsite Response Team (ORT) and an Emergency Response Team (ERT). Both these teams are under the direction of the Project Manager, and are designed to provide Terra with the capability to respond quickly and effectively to a spill event. If a spill occurs at the project site, the initial response will be carried out by on-site personnel assigned to the ORT, who will utilize onsite response equipment. If the ORT requires immediate assistance, the Project Manager will assign as many additional offshore Terra personnel as needed to carry out response operations. If onsite personnel and equipment are unable to contain and recover the spilled oil, all or a portion of the ERT will be activated by the Project Manager.

All Terra personnel have used and/or are familiar with oil spill equipment kept in our inventory (i.e., oil absorbent rags, oil booms, shovels, etc.). Equipment is stocked and ready for use.

2.4.3 Onshore Spill Scenarios and Response Procedures

- Onshore Spill Scenario (Minor Spill) – the potential for a minor onshore spill during the project would be associated with the operation and utilization of equipment for site preparation operations. In the event of a release of oil, diesel fuel, or contaminated water, spill response procedures will be implemented by the ORT utilizing the onsite equipment.
- Onsite Equipment for Minor Onshore Spill Response – Includes 5 sorbent pads & 2 shovels. If additional sorbent pads and/or sorbent boom are needed, they will be supplied by Terra's main office stock or the following supplier: New Pig, Order by Phone: (800) 468-4647, Order by Fax: (800) 621-7447, Order On-Line @ www.newpig.com

c. Response Procedures (Minor Spill)

- Onsite Response Team Action: In the event of a spill during the project, the ORT shall assess spill size and determine whether such a spill can be safely and rapidly controlled. Onsite personnel shall immediately conduct containment control operations. As soon as possible, notify the Project Manager and provide information on the source of the spill, the type of product spilled and the status of control operations. At the direction of the Project Manager, onsite personnel shall deploy appropriate equipment and carry out response and recovery operations. Onsite absorbent materials and equipment shall be utilized to recover released oil, diesel, etc. Any contaminated soils shall be removed and/or remediated as per state regulations. Oil sorbent materials will be properly stored in suitable containers or plastic bags. Oil sorbent materials will be disposed of at a state approved disposal site.
- Project Manager Action: In the event of an onshore spill, the Project Manager will account for all personnel and ensure their safety and determine whether there is a threat of fire or explosion. If a threat of fire or explosion exists, suspend all control and/or response operations until the threat is eliminated. The Superintendent will assess the spill situation, determine the status of response operations, estimate the spill volume, and determine whether

containment bins and vacuum trucks are required to respond to spill. The Superintendent will notify the appropriate government agencies. The Project Manager will supervise response, clean-up and storage operations, complete response, clean-up and storage operations and file appropriate written reports to government agencies.

d. Onshore Spill Scenario (Small Scale Spill)

In the event that onsite equipment and personnel are not sufficient to contain and remediate a spill during onshore operations, the following procedures shall be implemented utilizing the onshore resources available from Terra.

e. Onshore Spill Response (Small Scale Spill)

- Project Manager Action: In the event of spill during the project that exceeds the capability of onsite personnel and equipment the Project Manager will begin ERT mobilization by contacting Terra Corporate. The Project Manager will assess the spill situation and request additional Terra personnel, if required and assess Terra equipment availability. The Project Manager will supervise ORT in the incorporation of Terra equipment and ERT personnel into response and recovery operations.

2.4.4 Offshore Spill Scenarios and Response Procedures

a. Offshore Spill Scenario (Minor Spill)

The potential for an offshore spill during the project would be from the leaking of the fuel or lubrication fluids. In the event of a release of oil or contaminated water, the spill response procedures will be implemented using offshore equipment listed below.

b. Offshore Equipment: Boats and dredges, bales of absorbent pads, enough 50 foot sections of absorbent oil boom to encompass the largest barge onsite, 1 gallon of Ecosolve 2000. Material Data Safety Sheets will be provided to Enbridge Safety and be available at the worksite for materials used.

c. Offshore Spill Response (Minor Spill)

- Onsite Response Team: In the event of an offshore spill during the project, the ORT will assess the spill size and determine whether such a spill can be safely and rapidly controlled. Onsite personnel will immediately conduct containment control operations (shut down operations, turn off all sources of ignition, deploy sorbent boom). As soon as possible, notify the Project Manager and provide the following information: the type of product spilled and

the status of control operations. The ORT will maintain source and oil slick surveillance. At the direction of the Project Manager, offshore personnel will deploy appropriate equipment and carry out response and recovery operations. Oil sorbent materials and any other oily debris recovered during response operations will be stored in suitable containers or plastic bags. Oil sorbent materials will be disposed of at a state approved disposal site.

- Project Manager Action: In the event of an offshore spill during the project, the Project Manager will account for all personnel and ensure their safety and determine whether there is a threat of fire or explosion. If a threat of fire or explosion exists, suspend all control and/or response operations until the threat is eliminated. The Project Manager will assess the spill situation by determining the source of the spill, determining the status of response operations, estimating the spill volume, estimating the speed and direction of the spills movement and determining whether offshore containment and recovery equipment is sufficient to respond to the spill situation successfully and completely. The Project Manager will notify the appropriate government agencies. The Project Manager will supervise response, clean-up and storage operations, complete response, clean-up and storage operations and file written reports with appropriate government agencies.

d. Offshore Spill Scenario (Small Scale/Major Spill)

In the event the offshore sorbent boom and personnel are insufficient to contain and remediate a spill during project operations, the following shall be implemented. Note: The potential for a major spill during offshore operations are considered to be remote due to size of the project.

- Project Manager: In the event of an offshore spill, the following procedures will be followed. If it is determined the offshore containment and recovery equipment is not adequate to respond to the spill, the Project Manager will contact Terra and mobilize the ERT. The Superintendent will supervise the incorporation of the ERT equipment and personnel into the containment and recovery of the operations of the ORT. Terra offshore response equipment will be deployed as available for spill response.

3.0 Records Management

3.1 Records Management

The field team is responsible for the accurate, objective and complete documentation of all field activities. The field team may carry copies of facility maps on which to record supplemental information, such as locations of sampling points and photographs. This information should be used as an aid to the field operations, and is not intended as a substitute for the official field log. A field log is kept in a bound notebook in indelible ink. The log book is kept in a secure location at all times when not in the possession of a field team member.

3.2 Analytical Data Packages and Records

Laboratory analytical data will be generated in accordance with project procedures to ensure project requirements are met. All analytical data will be retained on a secured server with restricted-access. Analytical data will be collected and maintained in accordance with the Quality Assurance Project Plan (QAPP).

3.3 Document Control Procedures

Terra maintains a central file for the project in its Kalamazoo, Michigan office. Documents to be maintained in the file include work plans, cost estimates, and other planning documents; deliverables and supporting documents; general correspondence such as meeting notes; field and analytical records; quality control (QC) checklists and audit reports; monthly progress reports; and other documents required by Enbridge. Terra will ensure all pertinent documents from outside sources, such as subcontractors are maintained in the project files. Terra will maintain project files for the life of the Enbridge contract. All project records will be maintained electronically on Terra's secured dedicated remote server, which is backed up on a regular basis.

4.0 References

1. Enbridge, 2013. Enbridge Line 6B MP 608 Pipeline Release; Marshall, Michigan*; Health and Safety Plan (HASP).* April 30, 2013.
2. Terra Contracting Services, 2013. Terra Contracting Services; Kalamazoo, Michigan; *Corporate Health and Safety Plan (HASP).* March 13, 2013
3. Terra Contracting Services, 2013. Terra Contracting Services; Kalamazoo, Michigan; Enbridge Line 6B MP 608 Pipeline Release; Site Specific Health and Safety Plan (SSHASP). TBD

Equipment Fueling Plan
For The
Enbridge Line 6B MP 608
Marshall, MI Pipeline Release

PREPARED FOR:
ENBRIDGE ENERGY LIMITED PARTNERSHIP
333 KALAMAZOO DRIVE
MARSHALL, MI 49068

DATE PREPARED:
APRIL 30, 2013

1.0 Overview

Three types of fueling operations will be performed during this project: Upland fueling, Upland to Marine fueling, and Marine fueling. All equipment fueling procedures and practices will be designed to prevent fuel spills and leaks. Regardless of type of fueling, absorbent pads, booms and fire extinguishers shall be present at all fueling locations.

2.0 Methods

2.1 Personnel Qualifications

Field personnel must be health and safety certified as specified by the Occupational Safety and Health Administration (OSHA) (29 CFR 1910.120(e)(3)(i)) to work on sites where hazardous materials may be present. Field personnel will be trained to be familiar with the procedures outlined within this plan and the health and safety requirements for this project.

2.2 Health and Safety

The health and safety considerations for the work associated with this plan, including both potential physical and chemical hazards, are addressed in the Terra Contracting Services' Corporate Health and Safety Plan (HASP), Enbridge's site specific HASP, Terra's site specific HASP, and task specific Job Safety Analyses (JSA) forms. All work will be conducted in accordance with these HASPs and JSAs.

2.3 Equipment and Supplies

- Spill Control Kits,
- Fire extinguishers,
- Grounding cables, and
- Personal Protection Equipment.

2.4 Procedure

2.4.1 At each fueling location before fueling, the fuel operator will:

- Establish communication with the operator in a piece of equipment before entering the equipment work zone.
- Be instructed to the location of the spill kit and fire extinguisher.
- Ensure all equipment is turned off.
- Inspect the area for hot work being conducted. If how work is being conducted postpone fueling operations until hot work has been completed.
- Ensure personnel in the work zone are aware that fueling are about to beginning.
- Inspect grounding cable between the fuel tank and equipment being fueled has a good connection.

- Check the dispenser hoses for cracks, holes, or leaks. Notify the site supervisor before refueling, if any problems are observed.

While fueling, the fuel operator will:

- Keep eyes off the nozzle while fueling to help reduce the risk of a possible spill,
- Keep a good metal to metal contact between the nozzle and the fuel tank, and
- Avoid overfilling fuel tank by allowing for fuel expansion.

2.4.2 Upland Fueling - Special Considerations

Special considerations for Upland Fueling include:

- Prior to fueling, equipment must be parked with enough space to travel between the pump and the equipment,
- Fuel will only be dispensed from mobile or portable tanks,
- Fueling will only occur at specified, level-grade locations at least 150 feet from any water body, and
- Spill control equipment will be set up under/around the fueling operation to capture spilled fuel if a spill occurs.

2.4.3 Upland to Marine Fueling - Special Considerations

Special considerations for Upland to Marine Fueling include:

- The fuel operator will re-check the dispenser hoses for cracks, holes, or leaks. The operator must notify the site supervisor before refueling, if any problems are observed.
- Fuel lines will not be allowed to enter the water.
- Fuel transfer from upland to marine vessel shall be performed in area with lighting that any leak or spill that may occur during night operations will be seen so that operations can be halted in a timely manner.
- Absorbent booms and pads are readily available in close proximity to the fueling operations to allow immediate deployment.

2.4.4 Marine Fueling - Special Considerations

In order to fuel safely and responsibly on water, all general considerations apply and the following special considerations apply:

Before beginning to fuel:

- Tie the fueling boat securely to the vessel to be fueled.
- Check to see that fuel lines, connections, and fuel vents are in good condition.

- All sources of ignition will be eliminated including: Engines, fans, electrical equipment, open flames, such as galley stoves and pilot lights.
- Shut off all fuel valves and verify that a fire extinguisher is within reach.

While filling the fuel tank:

- Use caution and fill the tank slowly to avoid spilling fuel into the boat's bilge or into the water. Use an oil-absorbent pad to catch drips or spills.

After fueling:

- Put the fill cap on tightly to prevent vapors from escaping.
- Wipe up any spilled fuel and properly dispose of the used paper towels or rags on shore.
- Open all windows, ports, doors, and other openings.
- If the vessel is equipped with a power ventilation system (exhaust blower), turn it on for at least four minutes before starting the engine to eliminate fuel vapors in the bilge.
- Before starting the engine, check the bilge and engine compartment for fuel vapors, if appropriate. Continue ventilating until fuel vapors cannot be detected.
- Start the engine and continue work activities.

3.0 Records Management

3.1 Records Management

Not applicable

3.2 Analytical Data Packages and Records

Not applicable

3.3 Document Control Procedures

Not applicable

4.0 References

1. Enbridge, 2012. Enbridge Line 6B MP 608 Pipeline Release; Marshall, Michigan*; Health and Safety Plan (HASP).* April 17, 2012.
2. Terra Contracting Services, 2013. Terra Contracting Services; Kalamazoo, Michigan; *Corporate Health and Safety Plan (HASP).* March 13, 2013
3. Terra Contracting Services, 2013. Terra Contracting Services; Kalamazoo, Michigan; *Enbridge Line 6B MP 608 Pipeline Release; Site Specific Health and Safety Plan (SSHASP).* TBD

Geotextile Tube Handling Plan
For The
Enbridge Line 6B MP 608
Marshall, MI Pipeline Release

PREPARED FOR:
ENBRIDGE ENERGY LIMITED PARTNERSHIP
333 KALAMAZOO DRIVE
MARSHALL, MI 49068

DATE PREPARED:
APRIL 30, 2013

1.0 Overview

Geotextile tubes will be utilized on at the various sites to facilitate the dewatering of dredged sediments. These tubes must be properly sized, transported, stored and installed to maximize their efficiencies. This plan discusses the various aspects in which they will be handled and used.

2.0 Methods

2.1 Personnel Qualifications

Field personnel must be health and safety certified as specified by the Occupational Safety and Health Administration (OSHA) (29 CFR 1910.120(e)(3)(i)) to work on sites where hazardous materials may be present. Field personnel will be trained to be familiar with the procedures outlined within this plan and the health and safety requirements for this project. Additionally, field personnel involved in the geotextile tube unloading, staging and deployment shall be certified as a telehandler / fork lift operator.

2.2 Health and Safety

The health and safety considerations for the work associated with this plan, including both potential physical and chemical hazards, are addressed in the Terra Contracting Services' Corporate Health and Safety Plan (HASP), Enbridge's site specific HASP, Terra's site specific HASP, and task specific Job Safety Analyses (JSA) forms. All work will be conducted in accordance with these HASPs and JSAs. Material Data Safety Sheets will be provided to Enbridge Safety and be available at the worksite for materials used.

2.3 Equipment and Supplies

- Equipment to be used during the handling may be either on site forklifts, telehandlers, or All-Terrain Vehicles (ATVs), or an equivalent type of equipment.
- Equipment to be used during filling of the geotextile tubes may consist of a combination of flat plate compactors, PVC tubing or other vibratory implements.
- Equipment to be used during the load out includes excavators and trucks.

2.4 Procedure

2.4.1 Unloading

Geotextile tubes will be factory rolled and delivered to the site on flatbed trucks. Geotextile tubes will be individually wrapped and labeled for length and direction of unroll.

The geotextile tubes will be transported to the site in trucks and unloaded at the site utilizing on site fork trucks.

2.4.2 Storing

Geotextile tubes that are on site will be covered to protect them from ultra violet (UV) light degradation.

2.4.3 Deploying

Fork trucks and/or ATVs, or telehandlers will be used to deploy the geotextile tubes in the dewatering pad. Site personnel will inspect the unrolled geotextile tubes for evidence of damage prior to its intended use.

2.4.4 Operating

The dredged sediment will consist of an approximate 10-15% slurry mixture. The mixture is pumped into a header pipe then distributed into a manifold system with valves to direct the flow of the slurry into non-woven textile tubes, also referenced as geotextile tubes. This system utilizes a flocculent to settle out the solids while a pump is connected to the other end to aid in the removal of water. The material safety data sheet for the flocculent will be provided prior to project commencement. Once a geotextile tube is full, flow is diverted to another geotextile tube while the full geotextile tube dewaters. The geotextile tubes will go through “fill and rest” cycles until it reaches its full capacity as specified by manufacture’s instructions. Operators will continuously monitor the geotextile tubes during filling and will also monitor shrinkage in geotextile tubes prior to fill cycles to evaluate the remaining capacity of each geotextile tube. Once the geotextile tube is full of sediment and dewatering is sufficient, it will be cut open to allow an excavator to place the sediment for staging.

3.0 Records Management

3.1 Records Management

The field team is responsible for the accurate, objective and complete documentation of all field activities. The field team may carry copies of facility maps on which to record supplemental information, such as locations of sampling points and photographs. This information should be used as an aid to the field operations, and is not intended as a substitute for the official field log. A field log is kept in a bound notebook in indelible ink. The log book is kept in a secure location at all times when not in the possession of a field team member.

3.2 Analytical Data Packages and Records

Not Applicable

3.3 Document Control Procedures

Terra maintains a central file for the project in its Kalamazoo, Michigan office. Documents to be maintained in the file include work plans, cost estimates, and other planning documents; deliverables and supporting documents; general correspondence such as meeting notes; field and analytical records; quality control (QC) checklists and audit reports; monthly progress reports; and other documents required by Enbridge. Terra will ensure all pertinent documents from outside sources, such as subcontractors are maintained in the project files. Terra will maintain project files for the life of the Enbridge contract. All project records will be maintained electronically on Terra's secured dedicated remote server, which is backed up on a regular basis.

4.0 References

1. Enbridge, 2013. Enbridge Line 6B MP 608 Pipeline Release; Marshall, Michigan*; Health and Safety Plan (HASP).* April 30, 2013.
2. Terra Contracting Services, 2013. Terra Contracting Services; Kalamazoo, Michigan; *Corporate Health and Safety Plan (HASP).* March 13, 2013
3. Terra Contracting Services, 2013. Terra Contracting Services; Kalamazoo, Michigan; *Enbridge Line 6B MP 608 Pipeline Release; Site Specific Health and Safety Plan (SSHASP).* TBD
4. U.S. Department of the Interior, 2012. Bureau of Reclamation Policy and Administration; Denver, Colorado; *Inspection and Cleaning Manual for Equipment and Vehicles to Prevent the Spread of Invasive Species, Technical Memorandum No. 86-68220-07-05.* June 2012

Invasive Species Plan
For The
Enbridge Line 6B MP 608
Marshall, MI Pipeline Release

PREPARED FOR:
ENBRIDGE ENERGY LIMITED PARTNERSHIP
333 KALAMAZOO DRIVE
MARSHALL, MI 49068

DATE PREPARED:
APRIL 30, 2013

1.0 Overview

According to the EPA, at least 25 non-native species of fish have entered the Great Lakes since the 1800s, including round goby, sea lamprey, Eurasian ruffe, alewife and others. These fish have had significant impacts on the Great Lakes food web by competing with native fish for food and habitat. Invasive animals have also been responsible for increased degradation of coastal wetlands; further degrading conditions are resulting in loss of plant cover and diversity. Non-native mussels and mollusks have also caused turmoil in the food chain. They have also nearly eliminated the native clam population in the ecosystem. The spiny water flea was the most recent species to enter the Great Lakes. The Great Lakes have also been troubled by fast-growing invasive plants such as common reed, reed canary grass, purple loosestrife, curly pondweed, Eurasian milfoil, frogbit, and two types of non-native cattails. Some of these plants are prolific seed producers, which allow them to spread rapidly over large areas. Invasive purple loosestrife, for example, are 2-3 meters tall and can produce 2.7 million seeds each year. Others reproduce from fragments of root or rhizome, which hinders removal and control. All have become established quickly in the Great Lakes, displacing the native plant populations that support wildlife habitat and prevent erosion. Their prevalence in recreational waters also hinders swimming and boating. The concept of successful prevention is the goal of all equipment inspection and cleaning processes and is the main purpose of this procedure. Prevention actions deny the entry of pest and invasive species into uninfested locations. This factor underpins all equipment inspection and cleaning methods: through prevention, the spread of these species from one place to another can be limited.

2.0 Methods

2.1 Personnel Qualifications

Field personnel must be health and safety certified as specified by the Occupational Safety and Health Administration (OSHA) (29 CFR 1910.120(e)(3)(i)) to work on sites where hazardous materials may be present. Field personnel will be trained to be familiar with the procedures outlined within this plan and the health and safety requirements for this project. Material Data Safety Sheets will be provided to Enbridge Safety and be available at the worksite for materials used.

2.2 Health and Safety

The health and safety considerations for the work associated with this plan, including both potential physical and chemical hazards, are addressed in the Terra Contracting Services'

Corporate Health and Safety Plan (HASP), Enbridge's site specific HASP, Terra's site specific HASP, and task specific Job Safety Analyses (JSA) forms. All work will be conducted in accordance with these HASPs and JSAs.

2.3 Equipment and Supplies

2.3.1 Supplies

Supplies to be used to clean equipment may include, but not be limited to: Bleach or other disinfectant, Kerosene, Spray Bottle(s), Rinse Water, Scrub Brush/Scrub Pad(s), Clean Absorbent Pads, Towels, and Polyethylene Sheeting. Only approved cleaners and degreasers will be used in this process.

2.3.2 Equipment

Much of the cleaning will be accomplished using manual methods such as scrub brushes and pads. A high temperature pressure washer will be used for heavy cleaning and to rinse equipment as necessary.

2.4 Procedure

2.4.1 New Equipment/Materials

Any equipment and or materials that are brought to this job site that are new and have not been used in any other environment, no inspection is necessary.

2.4.2 Equipment/Materials from within the Great Lakes Watershed

Any equipment and or materials that are brought to this job project from within the Great Lakes Watershed, an inspection will be required to ensure that the equipment is visually clean and an invasive species inspection in accordance with U.S. Department of the Interior, 2012. Bureau of Reclamation Policy and Administration; Denver, Colorado; *Inspection and Cleaning Manual for Equipment and Vehicles to Prevent the Spread of Invasive Species, Technical Memorandum No. 86-68220-07-05*, June 2012 (Manual) will be required.

2.4.3. Equipment/Materials from without the Great Lakes Watershed

Any equipment and or materials that are brought to this job project from outside the Great Lakes Watershed, an inspection will be required to ensure that the equipment is visually clean and an invasive species inspection in accordance with the Manual will be required.

3.0 Records Management

3.1 Records Management

The field team is responsible for the accurate, objective and complete documentation of all field activities. The field team may carry copies of facility maps on which to record supplemental information, such as locations of sampling points and photographs. This information should be used as an aid to the field operations, and is not intended as a substitute for the official field log. A field log is kept in a bound notebook in indelible ink. The log book is kept in a secure location at all times when not in the possession of a field team member.

3.2 Analytical Data Packages and Records

Laboratory analytical data will be generated in accordance with project procedures to ensure project requirements are met. All analytical data will be retained on a secured server with restricted-access. Analytical data will be collected and maintained in accordance with the Quality Assurance Project Plan (QAPP).

3.3 Document Control Procedures

Terra maintains a central file for the project in its Kalamazoo, MI office. Documents to be maintained in the file include work plans, cost estimates, and other planning documents; deliverables and supporting documents; general correspondence such as meeting notes; field and analytical records; quality control (QC) checklists and audit reports; monthly progress reports; and other documents required by Enbridge. Terra will ensure all pertinent documents from outside sources, such as subcontractors are maintained in the project files. Terra will maintain project files for the life of the Enbridge contract. All project records will be maintained electronically on Terra's secured dedicated remote server, which is backed up on a regular basis.

4.0 References

1. Enbridge, 2013. Enbridge Line 6B MP 608 Pipeline Release; Marshall, Michigan*; Health and Safety Plan (HASP).* April 30, 2013.
2. Terra Contracting Services, 2013. Terra Contracting Services; Kalamazoo, Michigan; *Corporate Health and Safety Plan (HASP).* March 13, 2013
3. Terra Contracting Services, 2013. Terra Contracting Services; Kalamazoo, Michigan; *Enbridge Line 6B MP 608 Pipeline Release; Site Specific Health and Safety Plan (SSHASP).* TBD

4. U.S. Department of the Interior, 2012. Bureau of Reclamation Policy and Administration; Denver, Colorado; *Inspection and Cleaning Manual for Equipment and Vehicles to Prevent the Spread of Invasive Species, Technical Memorandum No. 86-68220-07-05.* June 2012

Pipe Testing Plan
For The
Enbridge Line 6B MP 608
Marshall, MI Pipeline Release

PREPARED FOR:
ENBRIDGE ENERGY LIMITED PARTNERSHIP
333 KALAMAZOO DRIVE
MARSHALL, MI 49068

DATE PREPARED:
APRIL 30, 2013

1.0 Overview

The purpose of pipe testing is to validate the integrity of conveyance lines that will be used to transfer sediment and water slurry. Installation of four separate piping runs is anticipated: 1) slurry conveyance piping from the hydraulic dredges to the dewatering pads, 2) header and distribution piping connecting the slurry conveyance piping to geotextile tubes, 3) weep water piping to transfer geotextile tubes weep water from a collection sump to water treatment facilities, and 4) treated water discharge piping from the water treatment facilities to the discharge point at the river. Each of these piping runs will be tested following installation to verify pipe integrity.

2.0 Methods

2.1 Personnel Qualifications

Field personnel performing testing must be experienced in the use of pressure testing equipment and pumps. Personnel must be health and safety certified as specified by the Occupational Safety and Health Administration (OSHA) (29 CFR 1910.120(e)(3)(i)) to work on sites where hazardous materials may be present. Field personnel will be trained to be familiar with the procedures outlined within this plan and the health and safety requirements for this project.

2.2 Health and Safety

The health and safety considerations for the work associated with this plan, including both potential physical and chemical hazards, are addressed in the Terra Contracting Services' Corporate Health and Safety Plan (HASP), Enbridge's site specific HASP, Terra's site specific HASP, and task specific Job Safety Analyses (JSA) forms. All work will be conducted in accordance with these HASPs and JSAs.

2.3 Equipment and Supplies

- Pumps,
- Vents and valves,
- Pressure gages, and
- Personal Protection Equipment.

2.4 Procedure

2.4.1 Pressurized Pipe Testing

The pressurized pipe will be tested prior to system startup. Testing will be accomplished by positioning a hydrostatic pump at the lowest point in the system. With all vent locations open, water will be introduced until the existing air has been forced from the system. The vents will then be closed as the air pockets are evacuated until the system is full. The

hydrostatic pump will then be engaged to apply 1.5 times the anticipated operating pressure to the system. This test pressure will be applied for a period of 30 minutes, and then the pipe will be visually inspected for leaks. A 50-foot exclusion zone will be established to exclude non-essential personnel from the pipe during the initial pressurization and the 30 minute period wait period. If a leak is identified, repairs will be made and the process will be repeated. This process will continue until passing results are achieved.

2.4.2 Gravity Drain Pipe Testing

Gravity drain piping will be tested before initial use. A pump will be installed on the lower end of the piping section. This pipe will be filled and allowed to equilibrate to uniform temperature and pressure conditions. After equilibration, the pipe will be topped off and allowed to stand for a period of 30 minutes. After thirty minutes, the pipe will be visually inspected for leaks. If the test fails, the source of leaks will be identified and the pipe repaired prior to retesting.

2.4.3 Flow Testing

After pipeline installation and acceptance testing, the pipeline will be flow tested using clean water to ensure the pipe can carry design flow rates with acceptable pressure losses. After initial acceptance testing, changes to header, distribution piping, weep water piping, and treated water discharge piping are expected to be minor, and further pipe testing is not expected during operations. However, it will be necessary to periodically add and remove sediment conveyance piping as dredging progresses. Before removing sections of slurry conveyance piping, the pipe will be flushed with clean water until no slurry is exiting the pipe. After slurry conveyance piping is added, clean water will pumped through the pipe at design flow and pressure, and the sediment conveyance pipe will be visually inspected for leaks before switching to pumping sediment.

3.0 Records Management

3.1 Records Management

The field team is responsible for the accurate, objective and complete documentation of all field activities. The field team may carry copies of facility maps on which to record supplemental information, such as locations of sampling points and photographs. This information should be used as an aid to the field operations, and is not intended as a substitute for the official field log. A field log is kept in a bound notebook in indelible ink.

The log book is kept in a secure location at all times when not in the possession of a field team member.

3.2 Analytical Data Packages and Records

At the conclusion of all testing, a report will be prepared that details the following information:

- Date testing was conducted,
- Description and identification of the pipe tested,
- Test fluid and pressure,
- Remarks including description of leaks (type and location), and
- Remarks describing repairs/replacement performed to remedy excess leakage.

3.3 Document Control Procedures

Terra maintains a central file for the project in its Kalamazoo, MI office. Documents to be maintained in the file include work plans, cost estimates, and other planning documents; deliverables and supporting documents; general correspondence such as meeting notes; field and analytical records; quality control (QC) checklists and audit reports; monthly progress reports; and other documents required by Enbridge. Terra will ensure all pertinent documents from outside sources, such as subcontractors are maintained in the project files. Terra will maintain project files for the life of the Enbridge contract. All project records will be maintained electronically on Terra's secured dedicated remote server, which is backed up on a regular basis.

4.0 References

1. Enbridge, 2013. Enbridge Line 6B MP 608 Pipeline Release; Marshall, Michigan*; Health and Safety Plan (HASP).* April 30, 2013.
2. Terra Contracting Services, 2013. Terra Contracting Services; Kalamazoo, Michigan; *Corporate Health and Safety Plan (HASP).* March 13, 2013
3. Terra Contracting Services, 2013. Terra Contracting Services; Kalamazoo, Michigan; *Enbridge Line 6B MP 608 Pipeline Release; Site Specific Health and Safety Plan (SSHASP).* TBD

Survey Plan
For The
Enbridge Line 6B MP 608
Marshall, MI Pipeline Release

PREPARED FOR:
ENBRIDGE ENERGY LIMITED PARTNERSHIP
333 KALAMAZOO DRIVE
MARSHALL, MI 49068

DATE PREPARED:
APRIL 30, 2013

1.0 Overview

Pre-dredge, post-dredge and progress (interim) bathymetric surveys will be required for this project. The pre-dredge survey will cover the dredge location and progress (interim) surveys will take place at the riverine supervisor's discretion. The interim surveys may be sectioned by dredge management units, depending on dredging activities and will be confirmed against projected dredge elevations and the pre-dredge hydrographic survey data. The post-dredge hydrographic survey will consist of a compilation of daily bathymetric data collected from dredge equipment.

2.0 Methods

2.1 Personnel Qualifications

Field personnel performing testing must be experienced in the use of hydrographic surveying equipment, gathering and recording survey information, and data reduction and mapping techniques. Personnel must be health and safety certified as specified by the Occupational Safety and Health Administration (OSHA) (29 CFR 1910.120(e)(3)(i)) to work on sites where hazardous materials may be present. It is the responsibility of the field personnel to be familiar with the procedures outlined within this plan and the health and safety requirements for this project.

2.2 Health and Safety

The health and safety considerations for the work associated with this plan, including both potential physical and chemical hazards, are addressed in the Terra Contracting Services' Corporate Health and Safety Plan (HASP), Enbridge's site specific HASP, Terra's site specific HASP, and task specific Job Safety Analyses (JSA) forms. All work will be conducted in accordance with these HASPs and JSAs.

2.3 Equipment and Supplies

The following equipment will be used where appropriate:

- Single-beam sounder,
- Sound velocity probe,
- Dual Frequency Real Time Kinematic (RTK) global positioning systems (GPS) base and rover receivers,
- Radio data link,
- Other conventional survey equipment, including total stations, levels and hand tools, and
- Utility locating equipment.

2.4 Procedure

Initial control will be established from existing NGS control monuments or existing project control by static GPS observations. All control will be adjusted by least squares. Vertical control will be established by differential leveling or GPS.

Hydrographic survey methods for verifying dredged elevations will be by electronic means and calibrated to project datum prior to beginning of work.

For surveying existing conditions, surveys will be performed per USACE guidelines. Single beam surveys with a small boat will be used to collect data, and shots by hand will be used along the shoreline perimeter of the dredge area where access by boat is not feasible. Single beam survey path spacing will vary depending on the intended use of the data and can vary from random point cloud paths less than 10 feet apart for topography to 50 feet apart in smooth areas for simple sections. Or a single beam survey could follow a single path in an area of interest like a utility crossing.

Horizontal positioning shall be by GPS referenced to the local plane coordinate system. Vertical datum is International NAVD88. Benchmarks and control points will be established at access points for use with base stations to link with RTK GPS positioning and heading systems for dredge control systems.

All data will be corrected in real time for tidal variations and attitude of the boat. Surveys will be performed in accordance with USACE Hydrographic Survey Manual EM 1110-2-1003. Dependent on the depth of the hydrosphere, a combination of conventional surveys (Manual Depth Measurement Techniques; EM 1110-2-1003 Chapter 8) using sounding poles or RTK GPS, single-beam echosounders (SBES) (EM 1110-2-1003; Chapter 9) will be used.

Horizontal positioning for depth measurements will use electronic positioning modes or systems, or hybrid combinations of instrumental and electronic data measurement and recording systems to measure, adjust, correlate, print, plot, and record horizontal and vertical observations.

The Utility Survey will include performing QL B and QL C utility locates in accordance with CI/ASCE 38-02 Standard Guideline for Collection and Depiction of Subsurface Utility Data.

3.0 Records Management

3.1 Records Management

The field team is responsible for the accurate, objective and complete documentation of all field activities. The field team may carry copies of facility maps on which to record supplemental information, such as locations of sampling points and photographs. This information should be used as an aid to the field operations, and is not intended as a substitute for the official field log. A field log is kept in a bound notebook in indelible ink. The log book is kept in a secure location at all times when not in the possession of a field team member. In addition to the field log, survey data will be recorded in field electronic data recorders. Electronic survey data will be downloaded to a secure server for storage.

3.2 Analytical Data Packages and Records

The surveyor will provide surveys, raw survey data and related quantities for surveys. A two to three day turnaround time for results should be expected. A record drawing for each independent bathymetric survey containing unique identification numbers, project coordinates and elevation will be prepared. Data will be submitted in AutoCAD or Microstation format.

3.3 Document Control Procedures

Terra maintains a central file for the project in its Kalamazoo, Michigan office. Documents to be maintained in the file include work plans, cost estimates, and other planning documents; deliverables and supporting documents; general correspondence such as meeting notes; field and analytical records; quality control (QC) checklists and audit reports; monthly progress reports; and other documents required by Enbridge. Terra will ensure all pertinent documents from outside sources, such as subcontractors are maintained in the project files. Terra will maintain project files for the life of the Enbridge contract. All project records will be maintained electronically on Terra's secured dedicated remote server, which is backed up on a regular basis.

4.0 References

1. Enbridge, 2013. Enbridge Line 6B MP 608 Pipeline Release; Marshall, Michigan*; Health and Safety Plan (HASP).* April 30, 2013.
2. Terra Contracting Services, 2013. Terra Contracting Services; Kalamazoo, Michigan; *Corporate Health and Safety Plan (HASP).* March 13, 2013.

3. Terra Contracting Services, 2013. Terra Contracting Services; Kalamazoo, Michigan; *Enbridge Line 6B MP 608 Pipeline Release; Site Specific Health and Safety Plan (SSHASP).* TBD

Water Treatment Plant Operations Plan

For The

Enbridge Line 6B MP 608

Marshall, MI Pipeline Release

PREPARED FOR:
ENBRIDGE ENERGY LIMITED PARTNERSHIP
333 KALAMAZOO DRIVE
MARSHALL, MI 49068

DATE PREPARED:
APRIL 30, 2013

1.0 Overview

Granular Activated Carbon (GAC) systems will be utilized on at the various sites to treat the dredge slurry water once it has been filtered through the geotextile tubes. These GAC systems must be properly maintained and monitored to ensure compliance with the applicable discharge permits as well as to ensure continuous operations to maximize dredge efficiencies.

2.0 Methods

2.1 Personnel Qualifications

Field personnel must be health and safety certified as specified by the Occupational Safety and Health Administration (OSHA) (29 CFR 1910.120(e)(3)(i)) to work on sites where hazardous materials may be present. Field personnel will be trained to be familiar with the procedures outlined within this plan and the health and safety requirements for this project.

2.2 Health and Safety

The health and safety considerations for the work associated with this plan, including both potential physical and chemical hazards, are addressed in the Terra Contracting Services' Corporate Health and Safety Plan (HASP), Enbridge's site specific HASP, Terra's site specific HASP, and task specific Job Safety Analyses (JSA) forms. All work will be conducted in accordance with these HASPs and JSAs. Material Data Safety Sheets will be provided to Enbridge Safety and be available at the worksite for materials used.

2.3 Equipment and Supplies

2.3.1 Equipment associated with this may include;

- GAC systems of varying sizes,
- Electrical and/or diesel pumps ranging from 2-inch to 12-inch,
- Valving and pipe systems, and
- Electrical generators ranging from 5,000 kilowatts to 120,000 kilowatts.

2.3.2 Supplies

- Filter bags,
- Carbon, and
- Organoclay, if required.

2.4 Procedure

Water collected from the bag field will gravity flow into the sump for transfer into the process treatment system which may include clarification tanks, pumps, bag filters and granular activated carbon filters. Multiple sample ports and pressure gauges are located throughout treatment

system to monitor system performance. Each set of tanks are rated for up to 1,000 gallons per minute (gpm) with significant empty bed contact time to meet the discharge standards for the State of Michigan NPDES permit. Influent water will be pumped through a series of multi bag filters which can be isolated to perform operations and maintenance and the replacement of bag filters. Bag filters will be replaced whenever there is a 40 psi pressure differential on the filter. The Influent piping valves allows for maintenance of the bag filters without having to shut down the influent pumps. The water after running through the bag filters will enter into a manifold header feeding the granular activated carbon vessels. Each area of treatment will have build in excess capacity for a ten (10) year rain events. Carbon vessels will be monitor for pressure throughout the day and backwashing will occur after the carbon vessels sees a differential pressure of 25 psi or as needed. The backwash tank will be 18,000 gallon storage tank and as the backwash water is used it will be redirected into the geotextile field or tubes.

3.0 Records Management

3.1 Records Management

The field team is responsible for the accurate, objective and complete documentation of all field activities. The field team may carry copies of facility maps on which to record supplemental information, such as locations of sampling points and photographs. This information should be used as an aid to the field operations, and is not intended as a substitute for the official field log. A field log is kept in a bound notebook in indelible ink. The log book is kept in a secure location at all times when not in the possession of a field team member.

3.2 Analytical Data Packages and Records

Laboratory analytical data will be generated in accordance with project procedures to ensure project requirements are met. All analytical data will be retained on a secured server with restricted-access. Analytical data will be collected and maintained in accordance with the Quality Assurance Project Plan (QAPP).

3.3 Document Control Procedures

Terra maintains a central file for the project in its Kalamazoo, Michigan office. Documents to be maintained in the file include work plans, cost estimates, and other planning documents; deliverables and supporting documents; general correspondence such as meeting notes; field and analytical records; quality control (QC) checklists and audit reports; monthly progress reports; and other documents required by Enbridge. Terra will ensure all pertinent

documents from outside sources, such as subcontractors are maintained in the project files. Terra will maintain project files for the life of the Enbridge contract. All project records will be maintained electronically on Terra's secured dedicated remote server, which is backed up on a regular basis.

4.0 References

1. Enbridge, 2013. Enbridge Line 6B MP 608 Pipeline Release; Marshall, Michigan*; Health and Safety Plan (HASP).* April 30, 2013.
2. Terra Contracting Services, 2013. Terra Contracting Services; Kalamazoo, Michigan; *Corporate Health and Safety Plan (HASP).* March 13, 2013
3. Terra Contracting Services, 2013. Terra Contracting Services; Kalamazoo, Michigan; *Enbridge Line 6B MP 608 Pipeline Release; Site Specific Health and Safety Plan (SSHASP).* TBD
4. U.S. Department of the Interior, 2012. Bureau of Reclamation Policy and Administration; Denver, Colorado; *Inspection and Cleaning Manual for Equipment and Vehicles to Prevent the Spread of Invasive Species, Technical Memorandum No. 86-68220-07-05.* June 2012

Water Treatment Plant Sampling Plan

For The

Enbridge Line 6B MP 608

Marshall, MI Pipeline Release

PREPARED FOR:
ENBRIDGE ENERGY LIMITED PARTNERSHIP
333 KALAMAZOO DRIVE
MARSHALL, MI 49068

DATE PREPARED:
APRIL 30, 2013

1.0 Overview

Granular Activated Carbon (GAC) systems will be utilized on at the various sites to treat the dredge slurry water once it has been filtered through the geotextile tubes. These GAC systems must be properly maintained and monitored to ensure compliance with the applicable discharge permits as well as to ensure continuous operations to maximize dredge efficiencies. To ensure compliance with the permit, periodic samples are to be taken and tested in accordance with the permit.

2.0 Methods

2.1 Personnel Qualifications

Field personnel must be health and safety certified as specified by the Occupational Safety and Health Administration (OSHA) (29 CFR 1910.120(e)(3)(i)) to work on sites where hazardous materials may be present. Field personnel will be trained to be familiar with the procedures outlined within this plan and the health and safety requirements for this project.

2.2 Health and Safety

The health and safety considerations for the work associated with this plan, including both potential physical and chemical hazards, are addressed in the Terra Contracting Services' Corporate Health and Safety Plan (HASP), Enbridge's site specific HASP, Terra's site specific HASP, and task specific Job Safety Analyses (JSA) forms. All work will be conducted in accordance with these HASPs and JSAs.

2.3 Equipment and Supplies

2.3.1 Equipment associated with this may include;

- GAC systems of varying sizes.

2.3.2 Supplies

- Sample containers, and
- Personal protection equipment (PPE).

2.4 Procedures

Monitoring of effluent water will be conducted in accordance with the requirements as set by the Michigan Department of Environmental Quality NPDES Permits. This includes daily inspection, recording flow rates, and weekly and monthly sampling.

3.0 Records Management

3.1 Records Management

The field team is responsible for the accurate, objective and complete documentation of all field activities. The field team may carry copies of facility maps on which to record supplemental information, such as locations of sampling points and photographs. This information should be used as an aid to the field operations, and is not intended as a substitute for the official field log. A field log is kept in a bound notebook in indelible ink. The log book is kept in a secure location at all times when not in the possession of a field team member.

3.2 Analytical Data Packages and Records

Laboratory analytical data will be generated in accordance with project procedures to ensure project requirements are met. All analytical data will be retained on a secured server with restricted-access. Analytical data will be collected and maintained in accordance with the Quality Assurance Project Plan (QAPP).

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Terra maintains a central file for the project in its Kalamazoo, MI office. Documents to be maintained in the file include work plans, cost estimates, and other planning documents; deliverables and supporting documents; general correspondence such as meeting notes; field and analytical records; quality control (QC) checklists and audit reports; monthly progress reports; and other documents required by Enbridge. Terra will ensure all pertinent documents from outside sources, such as subcontractors are maintained in the project files. Terra will maintain project files for the life of the Enbridge contract. All project records will be maintained electronically on Terra's secured dedicated remote server, which is backed up on a regular basis.

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2. Terra Contracting Services, 2013. Terra Contracting Services; Kalamazoo, Michigan; *Corporate Health and Safety Plan (HASP).* March 13, 2013
3. Terra Contracting Services, 2013. Terra Contracting Services; Kalamazoo, Michigan; *Enbridge Line 6B MP 608 Pipeline Release; Site Specific Health and Safety Plan (SSHASP).* TBD

4. U.S. Department of the Interior, 2012. Bureau of Reclamation Policy and Administration; Denver, Colorado; *Inspection and Cleaning Manual for Equipment and Vehicles to Prevent the Spread of Invasive Species, Technical Memorandum No. 86-68220-07-05.* June 2012

Water Treatment Plant Short and Long Term Shutdown Plan

For The

Enbridge Line 6B MP 608

Marshall, MI Pipeline Release

PREPARED FOR:
ENBRIDGE ENERGY LIMITED PARTNERSHIP
333 KALAMAZOO DRIVE
MARSHALL, MI 49068

DATE PREPARED:
APRIL 15, 2013

1.0 Overview

Granular Activated Carbon (GAC) systems will be utilized at the various sites to treat the dredge slurry water once it has been filtered through the geotextile tubes. These GAC systems must be properly maintained and monitored to ensure compliance with the applicable discharge permits as well as to ensure continuous operations to maximize dredge efficiencies. There will be events, both planned and unplanned, where the system will need to be shut down for short to extended periods of time. It is essential that the system is properly secured so as to minimize or eliminate any restarting delays.

2.0 Methods

2.1 Personnel Qualifications

Field personnel must be health and safety certified as specified by the Occupational Safety and Health Administration (OSHA) (29 CFR 1910.120(e)(3)(i)) to work on sites where hazardous materials may be present. Field personnel will be trained to be familiar with the procedures outlined within this plan and the health and safety requirements for this project.

2.2 Health and Safety

The health and safety considerations for the work associated with this plan, including both potential physical and chemical hazards, are addressed in the Terra Contracting Services' Corporate Health and Safety Plan (HASP), Enbridge's site specific HASP, Terra's site specific HASP, and task specific Job Safety Analyses (JSA) forms. All work will be conducted in accordance with these HASPs and JSAs. Material Data Safety Sheets will be provided to Enbridge Safety and be available at the worksite for materials used.

2.3 Equipment and Supplies

2.3.1 Equipment associated with this may include;

- GAC systems of varying sizes,
- Electrical and/or diesel pumps ranging from 2-inch to 12-inch,
- Valving and pipe systems, and
- Electrical generators ranging from 5,000 kilowatts to 120,000 kilowatts.

2.3.2 Supplies

- Filter bags,
- Carbon, and
- Organoclay, if required.

2.4 Procedures

If the treatment system needs to be shut down for any reason, the transfer sump will be monitored and any existing water will be removed and treated before turning off the pumps. It is recommended that the effluent valves be closed to keep the granular activated carbon vessels full of water preventing air locks from forming. Before staring up the treatment plant, the bag filters will be replaced and all piping valves opened.

3.0 Records Management

3.1 Records Management

The field team is responsible for the accurate, objective and complete documentation of all field activities. The field team may carry copies of facility maps on which to record supplemental information, such as locations of sampling points and photographs. This information should be used as an aid to the field operations, and is not intended as a substitute for the official field log. A field log is kept in a bound notebook in indelible ink. The log book is kept in a secure location at all times when not in the possession of a field team member.

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2. Terra Contracting Services, 2013. Terra Contracting Services; Kalamazoo, Michigan; *Corporate Health and Safety Plan (HASP).* March 13, 2013
3. Terra Contracting Services, 2013. Terra Contracting Services; Kalamazoo, Michigan; *Enbridge Line 6B MP 608 Pipeline Release; Site Specific Health and Safety Plan (SSHASP).* TBD
4. U.S. Department of the Interior, 2012. Bureau of Reclamation Policy and Administration; Denver, Colorado; *Inspection and Cleaning Manual for Equipment and Vehicles to Prevent the Spread of Invasive Species, Technical Memorandum No. 86-68220-07-05.* June 2012

Attachment C

2012 Morrow Lake and Morrow Lake Delta Monitoring and Maintenance Plan

Approved

Enbridge Line 6B MP 608

Marshall, MI Pipeline Release

2012 Morrow Lake Delta and Morrow Lake Monitoring and Management Work Plan

Prepared for the United States Environmental Protection Agency

Enbridge Energy, Limited Partnership

Originally Submitted: August 28, 2012

Approved: November 15, 2012

Approved

FIGURES

ATTACHMENT

Approved

LIST OF ACRONYMS

CWA	Clean Water Act
Enbridge	Enbridge Energy, Limited Partnership
GPS	Global Positioning System
Line 6B	The pipeline owned by Enbridge Energy, Limited Partnership that runs just south of Marshall, Michigan
MP	Mile Post
U.S. EPA	United States Environmental Protection Agency

Approved

1.0 INTRODUCTION

This work plan has been developed upon written request on August 8, 2012 by the United States Environmental Protection Agency (U.S. EPA). The plan contains elements presented in the *Addendum to the Response Plan for Downstream Impacted Areas, August 2, 2010 (Revised August 17, 2010 per U.S. EPA August 17, 2010 letter), Supplement to Source Area Response Plan, and Supplement to Response Plan for Downstream Impacted Areas, Referred to as Operations and Maintenance Work Plan Commonly referred to as "Consolidated Work Plan from Fall 2011 through Fall 2012"* approved by the U.S. EPA on December 21, 2011 (Enbridge, 2011) for the Enbridge Energy, Limited Partnership (Enbridge) Line 6B Mile Post (MP) 608 oil release which occurred near Marshall, Michigan on July 26, 2010.

1.1 Regulatory Framework

As required by the U.S. EPA Removal Administrative Order Under Section 311(c) of the Clean Water Act (CWA), issued on July 27, 2010 to Enbridge Energy Partners, L.P., Docket Number: CWA 1321-5-10-001, all oil assessment, containment, and recovery activities will be performed in accordance with Section 311(c) of the CWA, 33 U.S.C. § 1321(c), as amended by the Oil Pollution Act of 1990 and 33 U.S.C. §2701 et seq. Paragraph 18 of the Removal Administrative Order and Paragraph 6 of the Supplement require, among other things, that Enbridge perform the following actions in response to the Line 6B release:

- Assess all oil-impacted areas and media,
- Contain all oil,
- Remediate/recover all submerged oil,
- Recover all oil sheen,
- Remediate all oil-containing soils,
- Remediate all oil-containing sediments, and
- Perform operations and maintenance activities as directed by the U.S. EPA.

In addition to the requirements cited above, all activities will be performed in accordance with all federal, state, and local regulations. This Morrow Lake Delta and Morrow Lake Monitoring and Management Plan does not address recovery of accumulated submerged oil. Submerged oil recovery will be addressed separately.

1.2 Purpose and Objective

The activities in this work plan are designed around monitoring and managing the further movement of submerged oil into and within Morrow Lake Delta and Morrow Lake related to the Line 6B release. The objectives of the work plan are to conduct ongoing monitoring of submerged oil movement into and within Morrow Lake and to routinely evaluate the effectiveness of the E 4.0 Containment System in mitigating further submerged oil migration into Morrow Lake. Activities and monitoring tasks described herein will be performed within Morrow Lake Delta and Morrow Lake.

2.0 2012 MORROW LAKE DELTA AND MORROW LAKE MONITORING

2.1 2012 Poling Activities

Enbridge will conduct poling activities as part of the scope of work in Morrow Lake Delta and Morrow Lake, or as directed by the U.S. EPA, at the fixed locations shown in *Figure 1*. Monitoring frequency will be once per month or after event driven river flow rates exceed 800 cubic feet per second at the Battle Creek gaging station (Station ID:04105500). The results of poling activities within Morrow Lake Delta and Morrow Lake will be used to assess the effectiveness of E 4.0 Containment System and the potential migration and distribution of additional submerged oil from Morrow Lake Delta into Morrow Lake.

2.1.1 Procedures

Poling will be performed using procedures developed and utilized during the 2012 Spring Submerged Oil Reassessment. The following poling data will be collected in accordance with the *Sediment Poling Standard Operating Procedure* submitted to U.S. EPA on May 11, 2012 (Enbridge, 2012):

- Measure water depth,
- Measure sediment, just above sediment, and surface water temperatures,
- Measure the soft sediment depth (first and second push techniques),
- Determine bed characteristics,
- Determine the presence/absence of submerged oil, and
- Collect global positioning system (GPS) coordinates.

A determination of the relative amount of submerged oil at each poling location will be made by using a pole with an 8-inch diameter disk to agitate the soft sediment. After agitation, the amount of oil/sheen observed at the water surface will be characterized using the 2012 Spring Submerged

Oil Reassessment Flow Chart shown in *Figure 2*. If “moderate” or “heavy” indications of submerged oil are observed, the area may be delineated with additional poling.

A GPS unit will be used to document the coordinates for each poling location using a differential GPS unit with sub-meter accuracy. The horizontal coordinate system will be the Michigan State Plane Coordinate System, South zone, referenced to the North American Datum 83, in international feet. The objectives of this plan are to conduct ongoing and routine monitoring for submerged oil migration and effectiveness of the E4.0 Containment System. The 60 degree Fahrenheit minimum water and sediment temperature requirement for submerged oil reassessment activities will not be required for the poling activities conducted under this plan. While water and sediment temperatures will continue to be collected during poling activities conducted pursuant to this plan, the poling data will be utilized strictly as an ongoing monitoring tool and will not be considered reassessment data.

2.2 E 4.0 Containment System

The E 4.0 Containment System consists of six segments (Locations A through F) in a gate style surface containment boom along with X-TEX curtain extending from the surface boom to the bottom of the water column leaving 50% of the water column open to flow. The gate style boom allows for navigation around the boom between Morrow Lake Delta and Morrow Lake. The intended purpose of the E 4.0 Containment System is to reduce downstream migration of potential submerged and floating crude oil. The location of the E 4.0 Containment System is presented in *Figure 1*. Enbridge has secured a Michigan Department of Environmental Quality Permit (# 12-39-0027-P) for the containment system.

2.2.1 E 4.0 Containment System Monitoring

The following monitoring activities will be performed on a monthly basis to monitor the effectiveness of the E 4.0 Containment System:

- Poling, and
- Turbidity measurements.

Poling data and turbidity measurements will be collected in Morrow Lake Delta along the E 4.0 Containment System where sediment curtain is present. Poling will be performed approximately 5 feet upstream of the sediment curtain and 10 to 20 feet downstream of the sediment curtain at approximate intervals of 25 feet between locations. Turbidity measurements will be collected

approximately 50 feet upstream of the sediment curtain and 75 feet downstream of the sediment curtain at approximate intervals of every 25 to 50 feet.

Bathymetry measurements will also be collected along the E4.0 Containment System where sediment curtain is still installed. The measurements will be collected at predetermined locations that are shown in *Figure 3*. Bathymetry measurements will be collected along transects parallel to flow, at four locations on the upstream side and four locations on the downstream side of the E 4.0 Containment System half curtains. The predetermined locations are collected at 5-foot intervals and spaced approximately 50 feet between locations along the boom with attached half curtain and collected as follows:

- A Total Station device (i.e., Trimble S6 Robotic Total Station, 1 arc second Robotic Total Station, or equivalent) with 2 millimeter accuracy will be used to collect sediment bed elevations at the predetermined locations.
- A profile will be generated for each transect using the total station data collected.

The following monitoring activities will be performed on a daily basis to maintain the E 4.0 Containment System:

- Measure and maintain the boom and curtain,
- Measure water depth,
- Monitor the inclination of the anchor system,
- Monitor the flow rates from United States Geological Survey Battle Creek gaging station 04105500, and
- Video the sediment curtain and mud-line.

Monitoring and maintenance activities will be recorded on daily data log sheets which is included as *Attachment A*. Enbridge will thoroughly evaluate, present, and discuss E 4.0 Containment System daily monitoring results with the U.S. EPA at least weekly, and more frequently if changed conditions warrant more frequent evaluation/presentation of results.

Prior to making any changes, including but not limited to configuration to the E4.0 Containment System, Enbridge will submit proposed changes to the U.S. EPA. Further, Enbridge shall not make any changes to the E4.0 Containment System without the prior approval from the U.S. EPA. Decommissioning of and/or recovery/removal of accumulated sediment from the E4.0 Containment

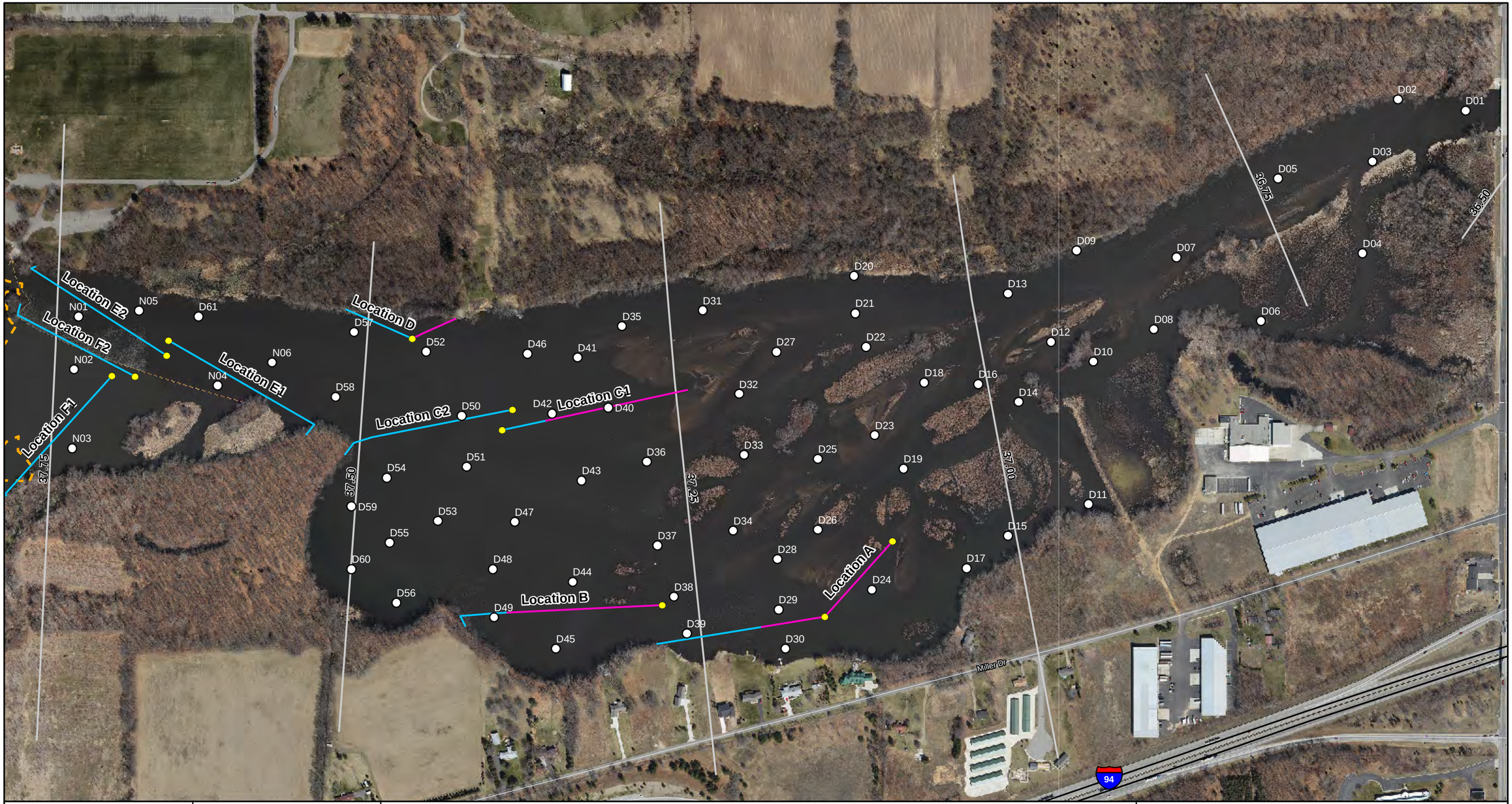
System will be proposed by Enbridge in separate work plan(s), and will not be performed until approved by the U.S. EPA.

3.0 REFERENCES

Enbridge, 2011. Enbridge Line 6B Pipeline Release, Marshall, Michigan*; Addendum to the Response Plan for Downstream Impacted Areas, August 2, 2010 (Revised August 17, 2010 per U.S. EPA August 17, 2010 letter), Supplement to Source Area Response Plan, and Supplement to Response Plan for Downstream Impacted Areas, Referred to as Operations and Maintenance Work Plan commonly referred to as Consolidated Work Plan from Fall 2011 through Fall 2012*. December 21, 2011.

Enbridge, 2012. Enbridge Line 6B Pipeline Release, Marshall, Michigan; *Sediment Poling Standard Operating Procedure.* May 11, 2012

Figures



ENBRIDGE

Drawn:	NS	8/28/2012
Approved:	EE	8/28/2012
Project #:	60246209	

Map Location

Legend

- Poling Monitoring Location
  - D - Morrow Lake Delta
  - M - Morrow Lake
  - N - Morrow Lake Neck
- **E 4.0 Containment System**
  - X-TEX Sediment Curtain
  - No Curtain
  - Anchor Point
- Approximate Sediment Fan Area
- Quarter Mile Grid Segment

N

0 200 400 800

Scale in Feet

FIGURE 1
2012 MORROW LAKE DELTA AND MORROW LAKE
POLING LOCATIONS AND E 4.0 CONTAINMENT SYSTEM
SHEET 1 OF 2

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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Aerial Photography Date: April 2011

ENBRIDGE

Drawn:	NS	8/28/2012
Approved:	EE	8/28/2012
Project #:	60246209	

Map Location

Legend

- Poling Monitoring Location
  - D - Morrow Lake Delta
  - M - Morrow Lake
  - N - Morrow Lake Neck
- **E 4.0 Containment System**
  - X-TEX Sediment Curtain
  - No Curtain
  - Anchor Point
- Approximate Sediment Fan Area
- Quarter Mile Grid Segment

N

0 350 700 1,400

Scale in Feet

FIGURE 1
2012 MORROW LAKE DELTA AND MORROW LAKE
POLING LOCATIONS AND E 4.0 CONTAINMENT SYSTEM
SHEET 2 OF 2

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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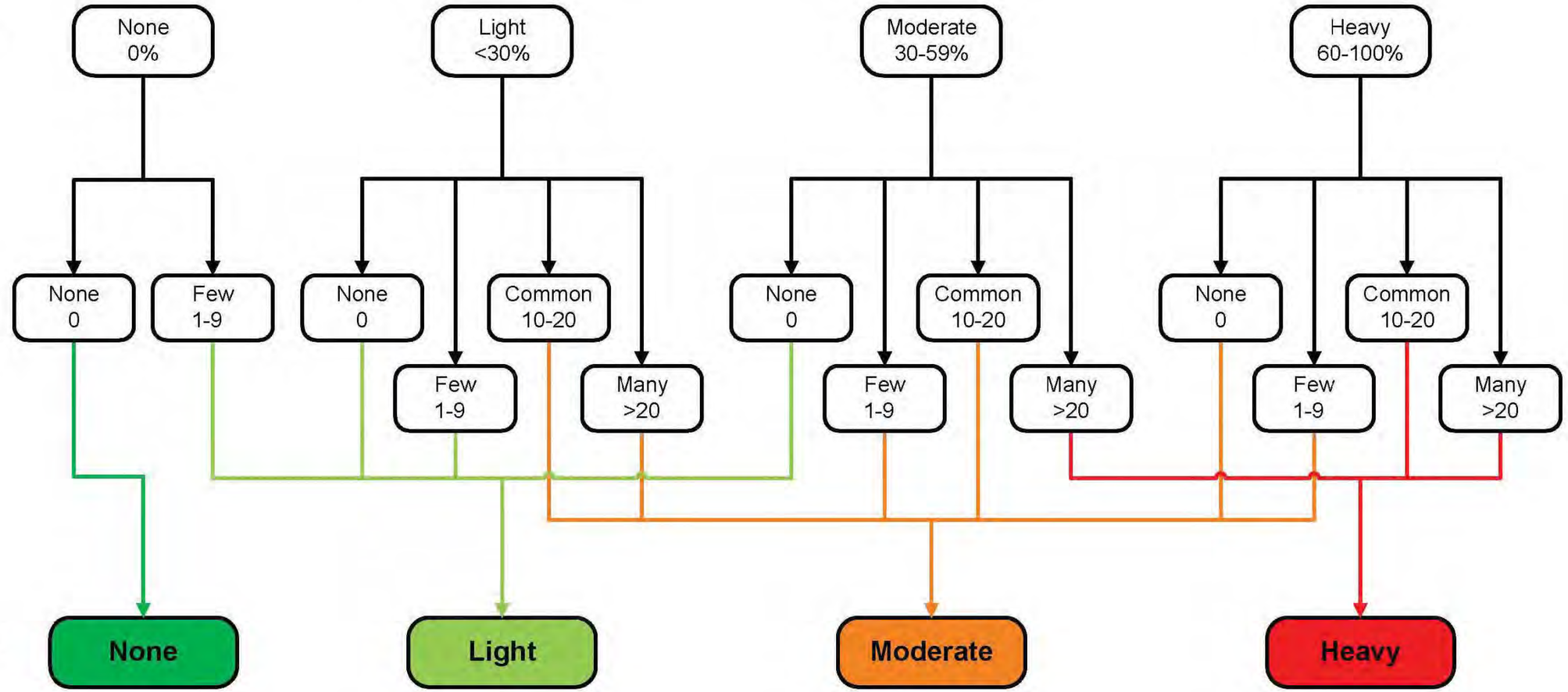
Aerial Photography Date: April 2011

Submerged Oil Field Observation Flowchart



Notes:
1. Percent coverage per square yard
2. Number of globules per square yard

ENBRIDGE	1. Percent sheen coverage per square yard. 2. Number of globules per square yard. 3. Globules are balls of oil larger than 4 millimeters. Flecks are particles of oil less than 4 millimeters. 20 flecks are equal to 1 globule. % = Percent
Drawn: CM 4/26/2012	
Approved: DBR 4/26/2012	
Project #: 106-4186	

FiGURE 2
2012 SPRING SUBMERGED OIL REASSESSMENT
FLOW CHART

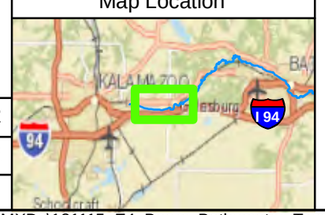
ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

Boom E2
Boom F2
Boom E1
Boom F1
Boom D
Boom C2
Boom C1
Boom B
Boom A
37.75
37.50
37.25

ENBRIDGE

Drawn:	NS	11/15/2012
Approved:	EE	11/15/2012
Project #:	60246209	

Map Location



Legend

Bathymetry Target Point
- Downstream
- Upstream

E 4.0 Containment Curtain
- X-TEX Sediment Curtain
- No Curtain

- Quarter Mile Grid Segments
- Approximate Flow Direction

N

0 125 250 500

Scale in Feet

FIGURE 3
E 4.0 BOOM AND CURTAIN BATHYMETRY OVERVIEW
SHEET 1 OF 12

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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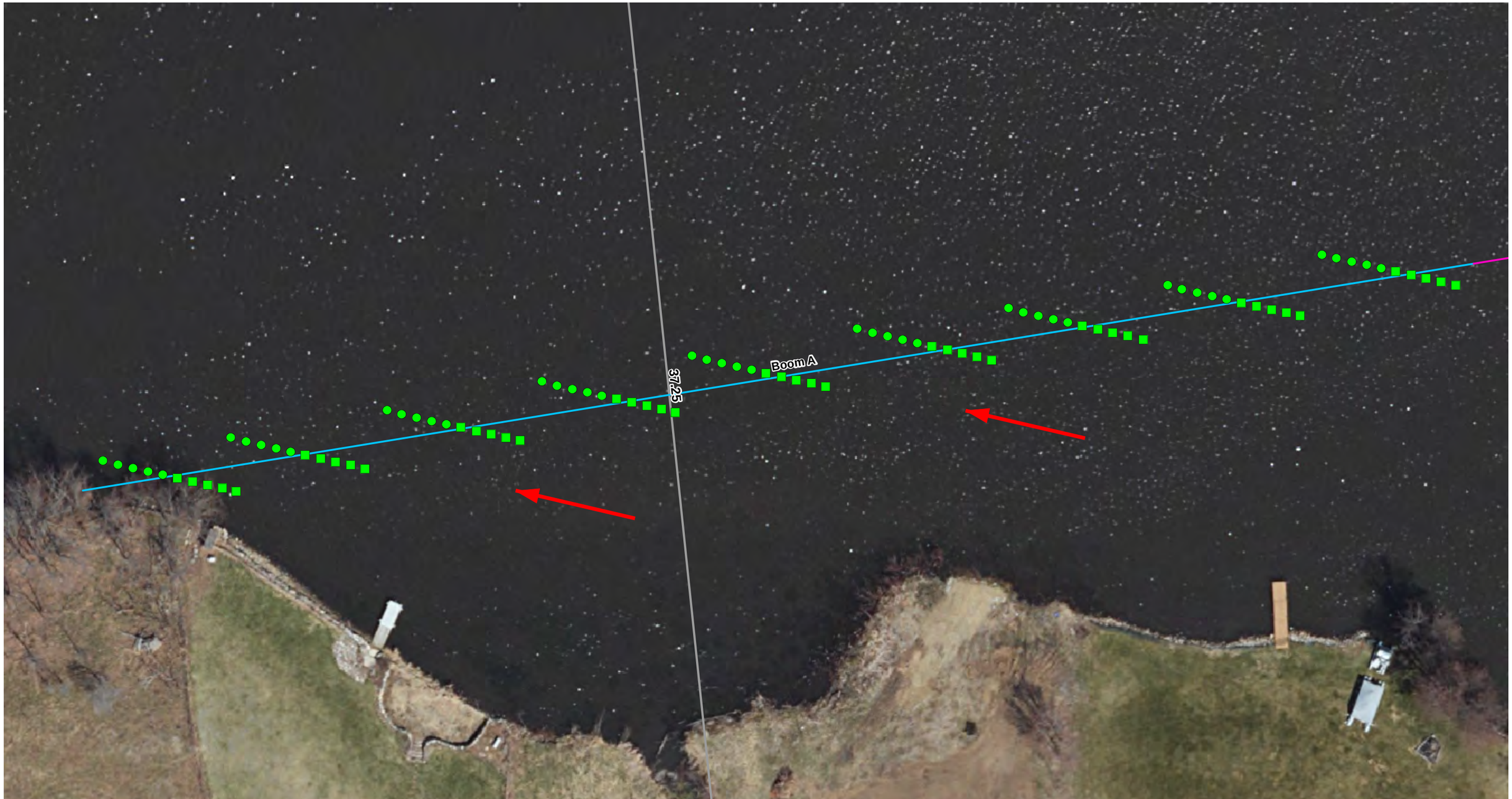
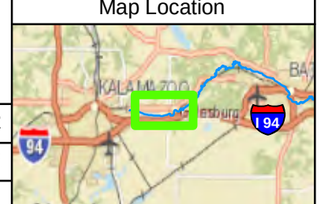
Aerial Photography Date: April 2011



Drawn:	NS	11/15/2012
Approved:	EE	11/15/2012
Project #:	60246209	

Map Location



Legend

Bathymetry Target Point
- Downstream
- Upstream

E 4.0 Containment Curtain
- X-TEX Sediment Curtain
- No Curtain

- Quarter Mile Grid Segments
- Approximate Flow Direction

N

0 15 30 60

Scale in Feet

FIGURE 3
E 4.0 BOOM AND CURTAIN BATHYMETRY
BOOM A
SHEET 2 OF 12

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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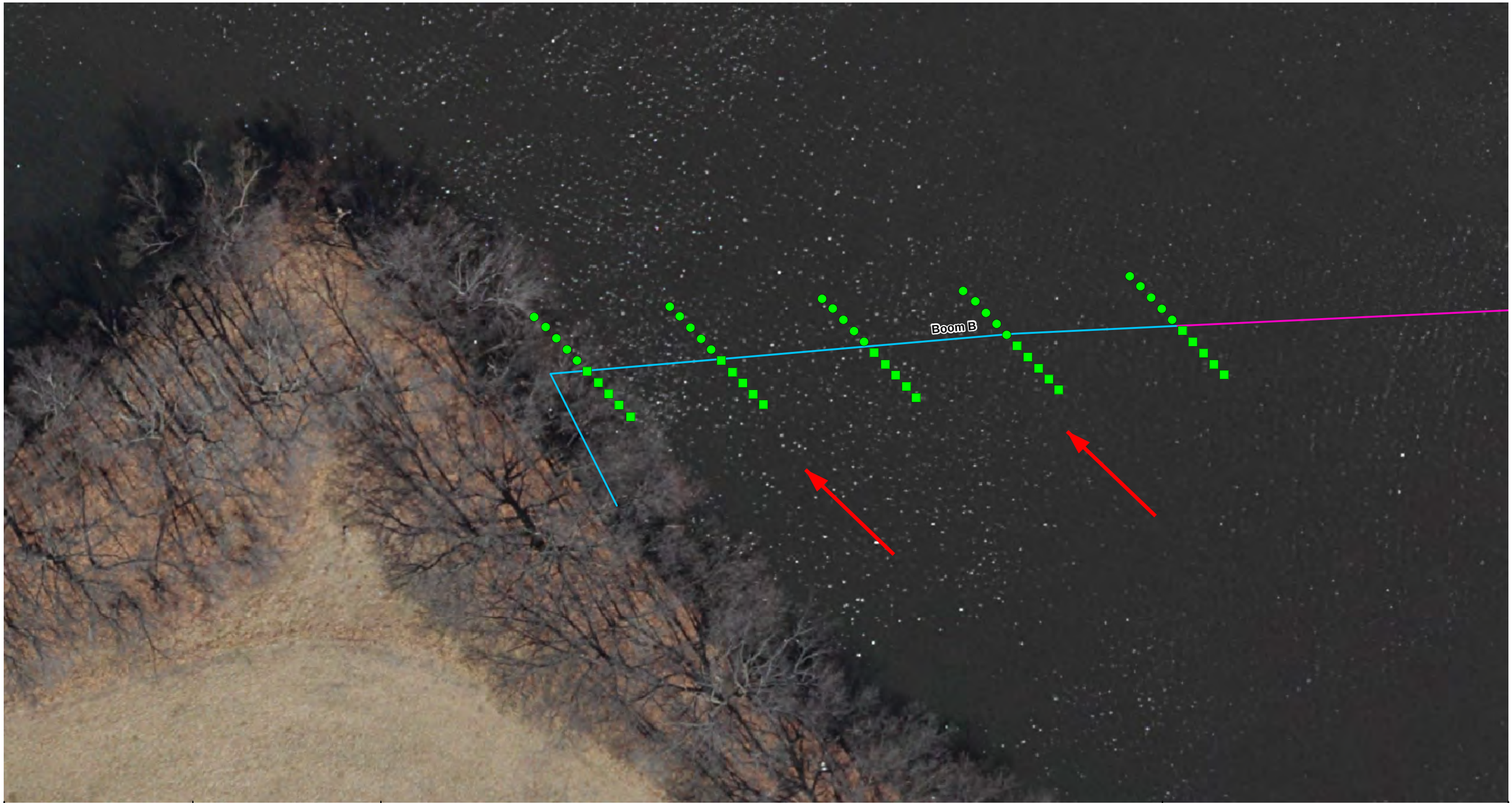
Aerial Photography Date: April 2011



ENBRIDGE

Drawn:	NS	11/15/2012
Approved:	EE	11/15/2012
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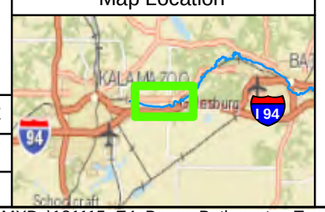
Map Location



Legend

Bathymetry Target Point
- Downstream
- Upstream

E 4.0 Containment Curtain
- X-TEX Sediment Curtain
- No Curtain

- Quarter Mile Grid Segments
- Approximate Flow Direction

N

0 15 30 60

Scale in Feet

FIGURE 3
E 4.0 BOOM AND CURTAIN BATHYMETRY
BOOM B
SHEET 3 OF 12

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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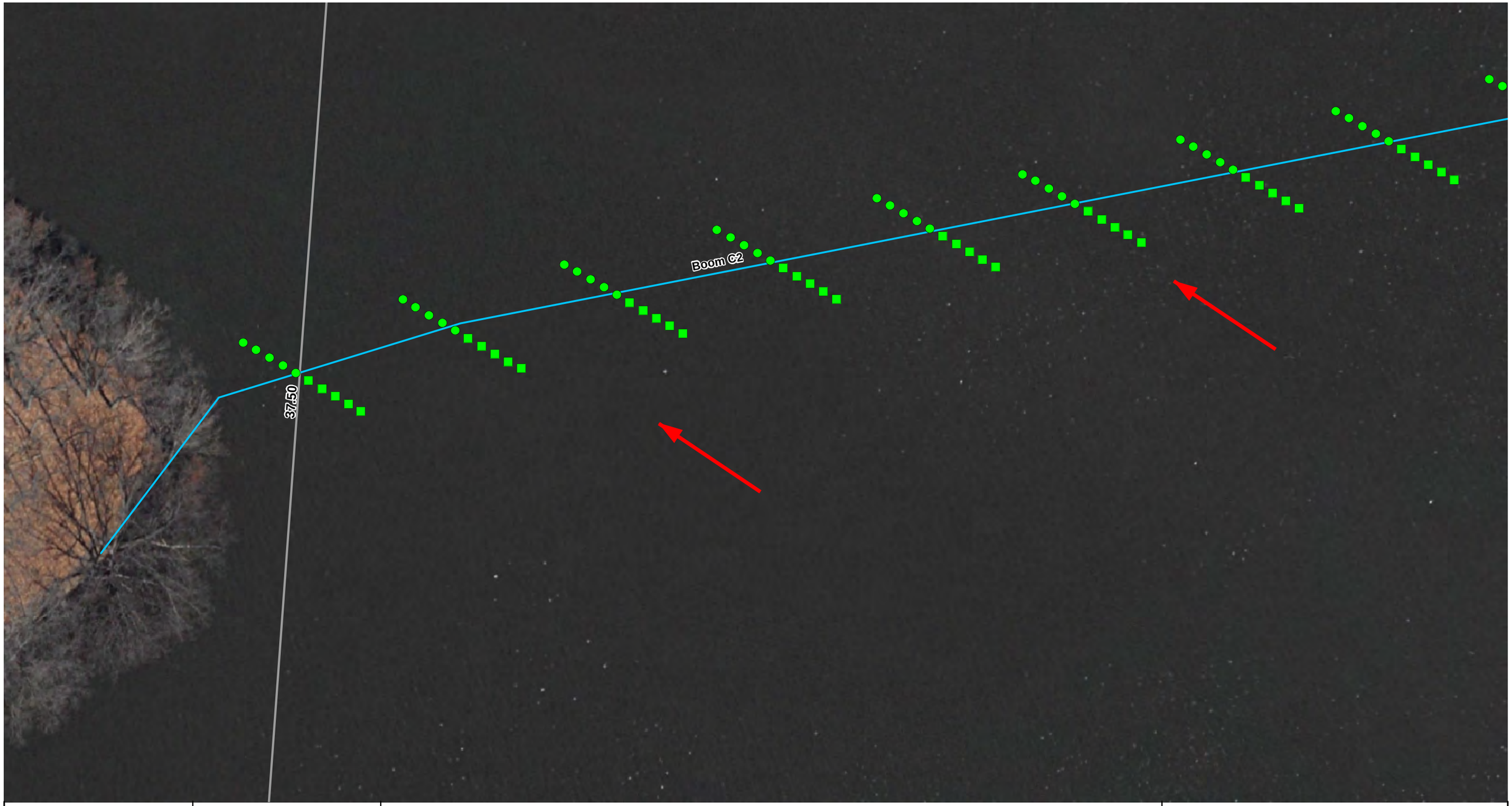
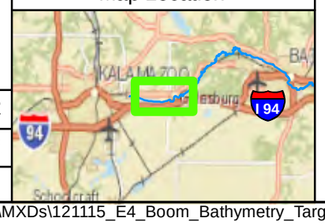
Aerial Photography Date: April 2011



ENBRIDGE

Drawn:	NS	11/15/2012
Approved:	EE	11/15/2012
Project #:	60246209	

Map Location



Legend

Bathymetry Target Point
- Downstream
- Upstream

E 4.0 Containment Curtain
- X-TEX Sediment Curtain
- No Curtain

- Quarter Mile Grid Segments
- Approximate Flow Direction

N

0 15 30 60

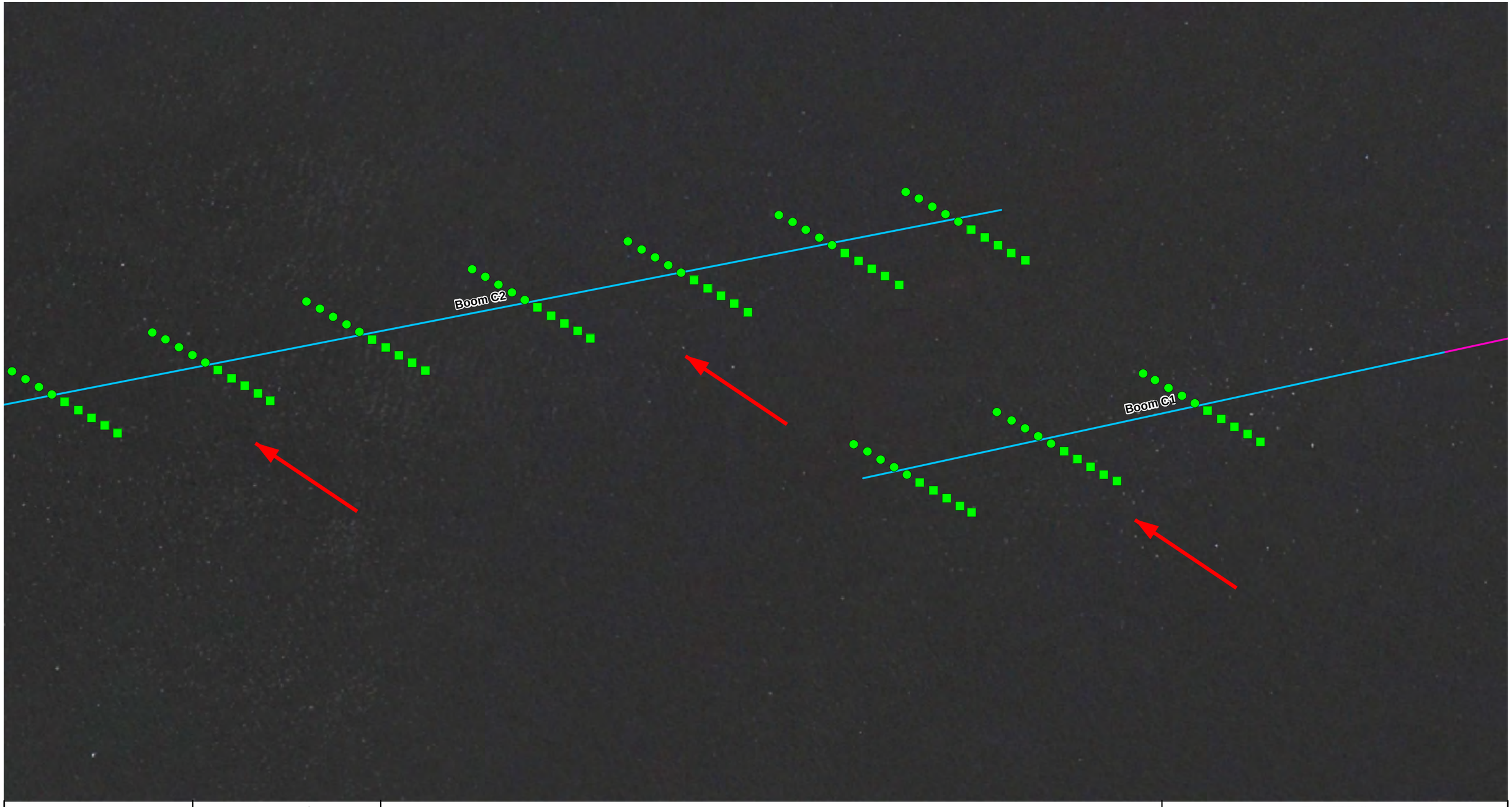
Scale in Feet

FIGURE 3
E 4.0 BOOM AND CURTAIN BATHYMETRY
BOOM C2
SHEET 4 OF 12

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

Z:\Work\GIS\2012_SO_Reassessment\MXDs\121115_E4_Boom_Bathymetry_Target_Transects_Sheets2-12.mxd

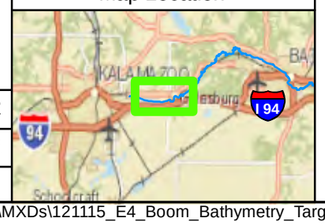
Aerial Photography Date: April 2011



ENBRIDGE

Drawn:	NS	11/15/2012
Approved:	EE	11/15/2012
Project #:	60246209	

Map Location



Legend

Bathymetry Target Point
- Downstream
- Upstream

E 4.0 Containment Curtain
- X-TEX Sediment Curtain
- No Curtain

- Quarter Mile Grid Segments
- Approximate Flow Direction

N

0 15 30 60

Scale in Feet

FIGURE 3
E 4.0 BOOM AND CURTAIN BATHYMETRY
BOOM C2/C1
SHEET 5 OF 12

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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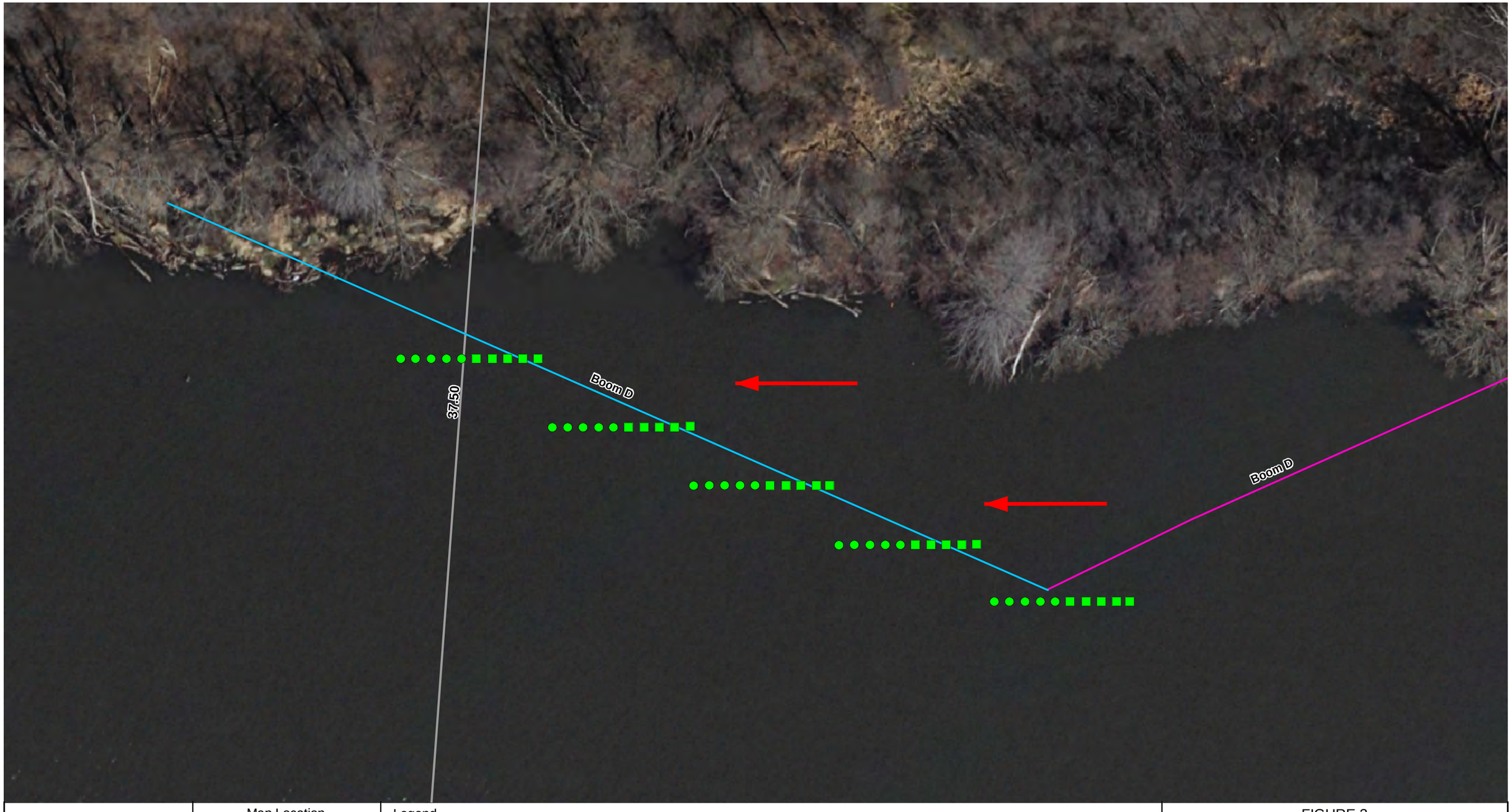
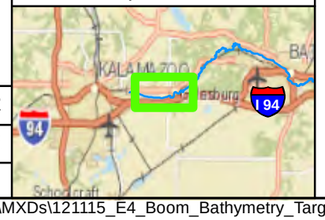
Aerial Photography Date: April 2011



ENBRIDGE

Drawn:	NS	11/15/2012
Approved:	EE	11/15/2012
Project #:	60246209	

Map Location



Legend

Bathymetry Target Point
- Downstream
- Upstream

E 4.0 Containment Curtain
- X-TEX Sediment Curtain
- No Curtain

- Quarter Mile Grid Segments
- Approximate Flow Direction

N

0 15 30 60

Scale in Feet

FIGURE 3
E 4.0 BOOM AND CURTAIN BATHYMETRY
BOOM D
SHEET 6 OF 12

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

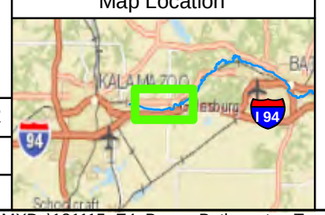
Z:\Work\GIS\2012_SO_Reassessment\MXDs\121115_E4_Boom_Bathymetry_Target_Transects_Sheets2-12.mxd

Aerial Photography Date: April 2011

ENBRIDGE

Drawn:	NS	11/15/2012
Approved:	EE	11/15/2012
Project #:	60246209	

Map Location



Legend

Bathymetry Target Point
- Downstream
- Upstream

E 4.0 Containment Curtain
- X-TEX Sediment Curtain
- No Curtain

- Quarter Mile Grid Segments
- Approximate Flow Direction

N

0 15 30 60

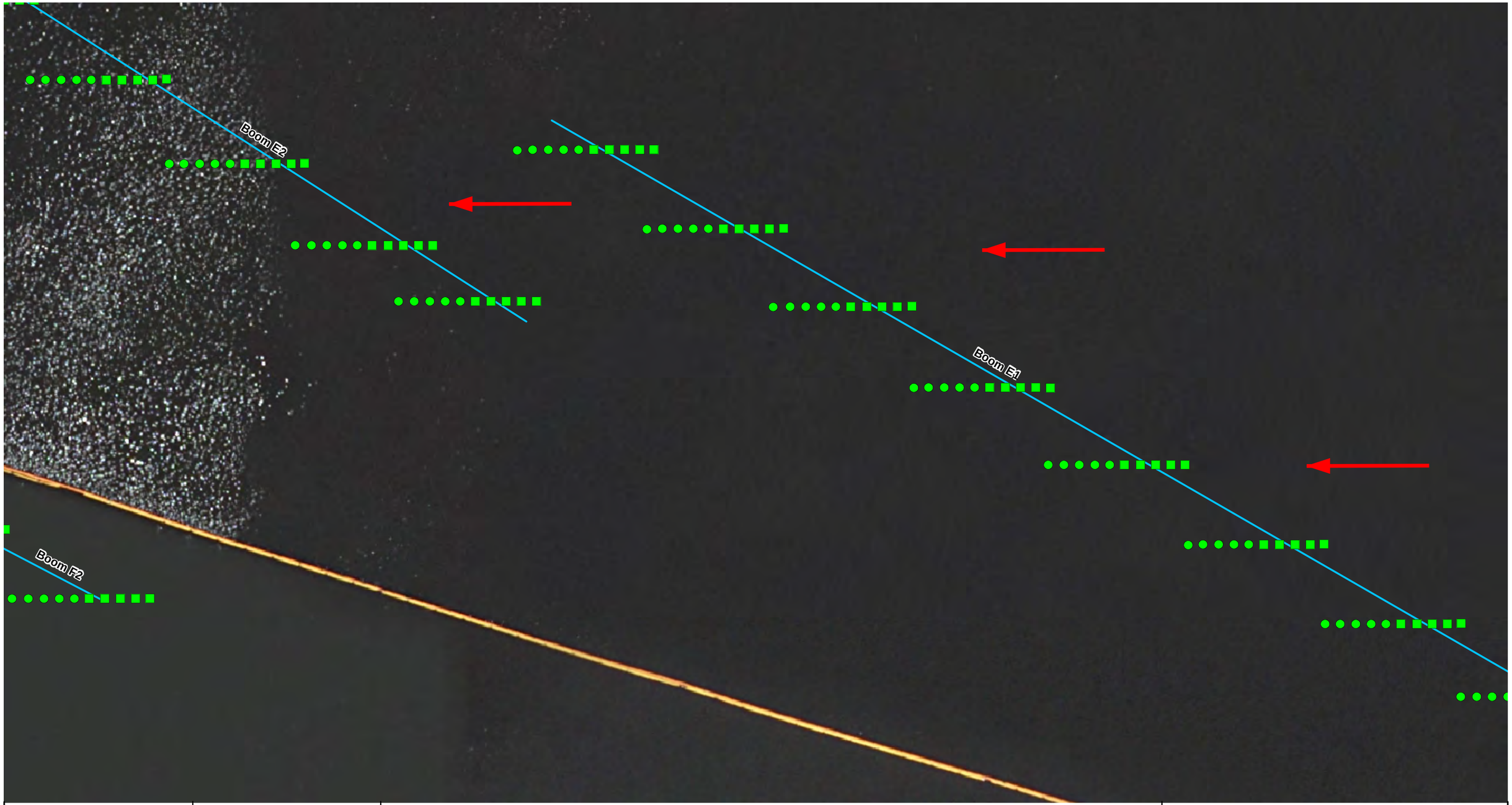
Scale in Feet

FIGURE 3
E 4.0 BOOM AND CURTAIN BATHYMETRY
BOOM E1
SHEET 7 OF 12

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

Z:\Work\GIS\2012_SO_Reassessment\MXDs\121115_E4_Boom_Bathymetry_Target_Transects_Sheets2-12.mxd

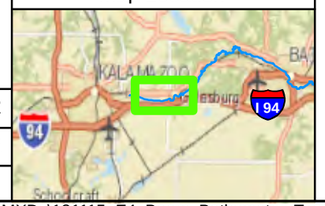
Aerial Photography Date: April 2011



ENBRIDGE

Drawn:	NS	11/15/2012
Approved:	EE	11/15/2012
Project #:	60246209	

Map Location



Legend

Bathymetry Target Point
- Downstream
- Upstream

E 4.0 Containment Curtain
- X-TEX Sediment Curtain
- No Curtain

- Quarter Mile Grid Segments
- Approximate Flow Direction

N

0 15 30 60

Scale in Feet

FIGURE 3
E 4.0 BOOM AND CURTAIN BATHYMETRY
BOOM E1/E2
SHEET 8 OF 12

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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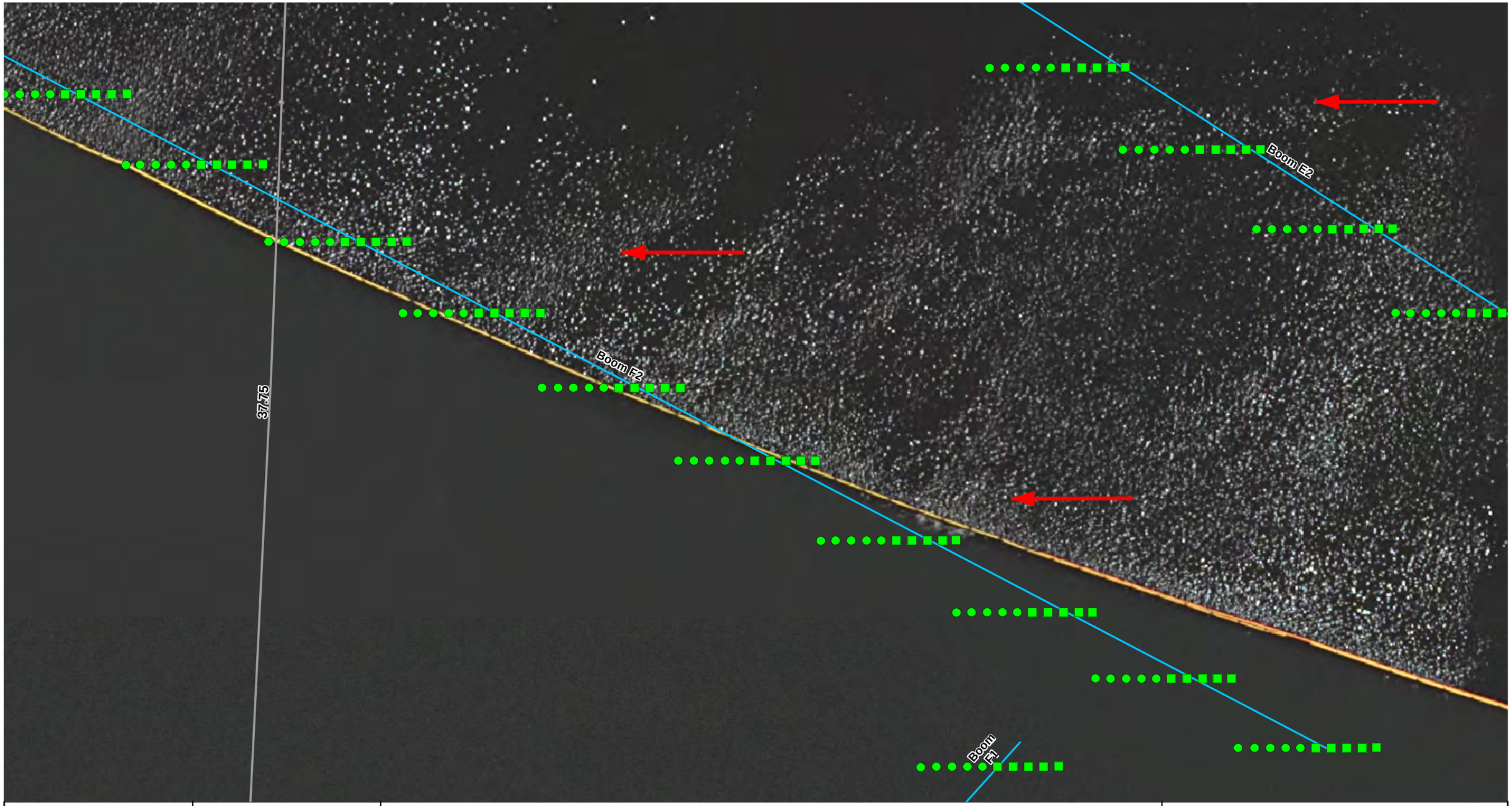
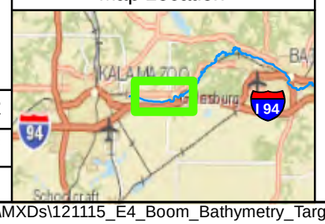
Aerial Photography Date: April 2011



ENBRIDGE

Drawn:	NS	11/15/2012
Approved:	EE	11/15/2012
Project #:	60246209	

Map Location



Legend

Bathymetry Target Point
- Downstream
- Upstream

E 4.0 Containment Curtain
- X-TEX Sediment Curtain
- No Curtain

- Quarter Mile Grid Segments
- Approximate Flow Direction

N

0 15 30 60

Scale in Feet

FIGURE 3
E 4.0 BOOM AND CURTAIN BATHYMETRY
BOOM E2/F2
SHEET 9 OF 12

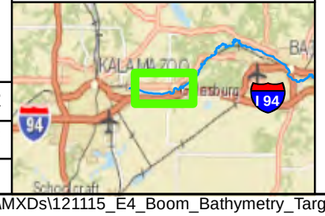
ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

Z:\Work\GIS\2012_SO_Reassessment\MXDs\121115_E4_Boom_Bathymetry_Target_Transects_Sheets2-12.mxd

Aerial Photography Date: April 2011

Drawn:	NS	11/15/2012
Approved:	EE	11/15/2012
Project #:	60246209	

Map Location



Legend

Bathymetry Target Point
- Downstream
- Upstream

E 4.0 Containment Curtain
- X-TEX Sediment Curtain
- No Curtain

- Quarter Mile Grid Segments
- Approximate Flow Direction

N

0 15 30 60

Scale in Feet

FIGURE 3
E 4.0 BOOM AND CURTAIN BATHYMETRY
BOOM E2/F2
SHEET 10 OF 12

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

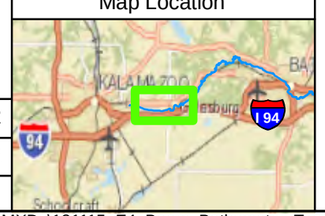
Z:\Work\GIS\2012_SO_Reassessment\MXDs\121115_E4_Boom_Bathymetry_Target_Transects_Sheets2-12.mxd

Aerial Photography Date: April 2011

ENBRIDGE

Drawn:	NS	11/15/2012
Approved:	EE	11/15/2012
Project #:	60246209	

Map Location



Legend

Bathymetry Target Point
- Downstream
- Upstream

E 4.0 Containment Curtain
- X-TEX Sediment Curtain
- No Curtain

- Quarter Mile Grid Segments
- Approximate Flow Direction

N

0 15 30 60

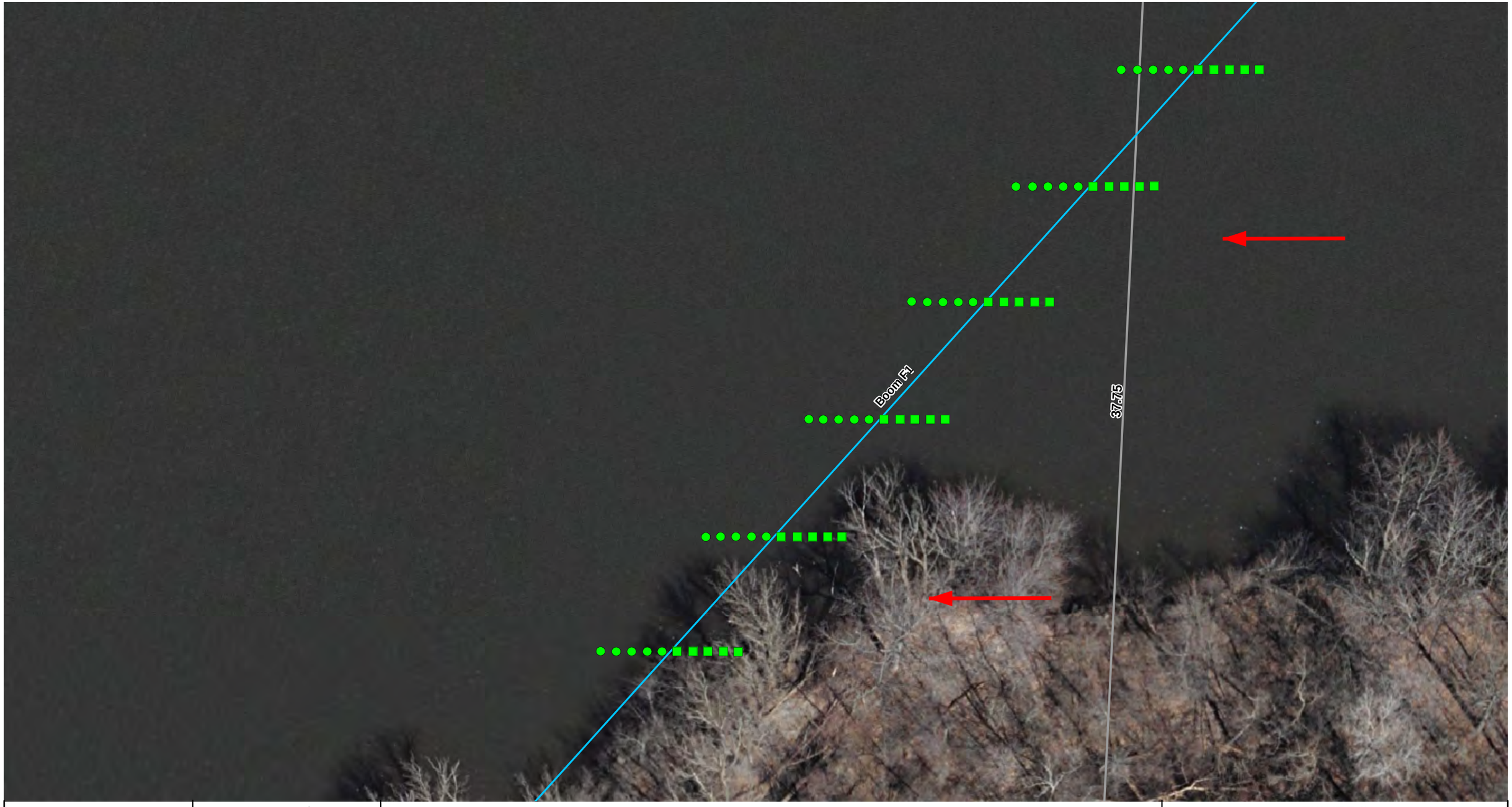
Scale in Feet

FIGURE 3
E 4.0 BOOM AND CURTAIN BATHYMETRY
BOOM F1
SHEET 11 OF 12

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

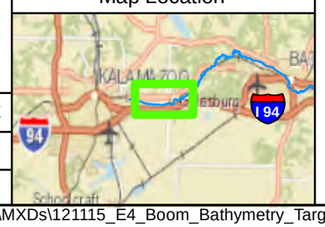
Z:\Work\GIS\2012_SO_Reassessment\MXDs\121115_E4_Boom_Bathymetry_Target_Transects_Sheets2-12.mxd

Aerial Photography Date: April 2011



Drawn:	NS	11/15/2012
Approved:	EE	11/15/2012
Project #:	60246209	

Map Location



Legend

Bathymetry Target Point
- Downstream
- Upstream

E 4.0 Containment Curtain
- X-TEX Sediment Curtain
- No Curtain

- Quarter Mile Grid Segments
- Approximate Flow Direction

N

0 15 30 60

Scale in Feet

FIGURE 3
E 4.0 BOOM AND CURTAIN BATHYMETRY
BOOM F1
SHEET 12 OF 12

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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Aerial Photography Date: April 2011

Attachment A

E 4.0 Curtain Monitoring Log

E 4.0 Curtain Monitoring

Date: _____

Location ID	Time of Inspection & Video	Video Taken (Y/N)	Video File ID	Curtain on Bottom	Anchor Inclination	Total Water Depth	Total Curtain Height	Comments

General Comments: * Note any deficiencies or repairs completed.

Attachment D

Legacy Contamination Tables and Figure

Table 1. SW Monitoring Sediment PCB Analytical Data
Enbridge Line 6B MP 608 Marshall, MI Pipeline Release
Enbridge Energy, Limited Partnership

	Location	C0048DCSEA	KRSE-001	KRSE-002	KRSE-003	KRSE-004	KRSE-005	KRSE-006	KRSE-007	KRSE-008	KRSE-009	KRSE-010	KRSE-011	KRSE-012	KRSE-013	KRSE-014	KRSE-015
	Date Collected	8/18/2010 1:00 PM	8/28/2010 11:55 AM	8/29/2010 12:12 PM	8/29/2010 2:18 PM	8/29/2010 3:08 PM	8/29/2010 3:41 PM	8/30/2010 11:20 AM	8/31/2010 12:10 PM	8/31/2010 1:40 PM	8/31/2010 2:55 PM	9/1/2010 1:45 PM	9/1/2010 3:20 PM	9/2/2010 3:35 PM	9/3/2010 11:20 AM	9/3/2010 2:50 PM	9/4/2010 12:40 PM
	Sample	SE08181300ARM1	SED08281155WPW1	SED08291212JPN1	SED08291418JPN1	SED08291508JPN1	SED08291541JPN1	SED08301120WPW1	SED08311210WPW1	SED08311340WPW1	SED08311455WPW1	SEC09011345WPW1	SEC09011520WPW1	SEC09021535WPW1	SEC09031120JPN1	SEC09031450JPN1	SEC09041240JPN1
	Depth	--	--	1 - 1.2 ft	2 - 2.5 ft	0.5 - 1 ft	1.5 - 2 ft	--	0 - 1 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	1 - 2 ft	0 - 1 ft	0 - 1 ft	--
Analyte	Units	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
PCB																	
Aroclor 1016	ug/kg	< 1200	< 57	< 45	< 47	< 60	< 57	< 27	< 18	< 20	< 21	< 28	< 49	< 33	< 23	< 35	< 27
Aroclor 1221	ug/kg	< 1200	< 57	< 45	< 47	< 60	< 57	< 27	< 18	< 20	< 21	< 28	< 49	< 33	< 23	< 35	< 27
Aroclor 1232	ug/kg	< 1200	< 57	< 45	< 47	< 60	< 57	< 27	< 18	< 20	< 21	< 28	< 49	< 33	< 23	< 35	< 27
Aroclor 1242	ug/kg	< 1200	< 57	**20**	**22**	< 60	< 57	< 27	< 18	< 20	< 21	< 28	< 49	< 33	**180**	< 35	< 27
Aroclor 1248	ug/kg	< 1200	< 57	< 45	< 47	< 60	< 57	< 27	< 18	< 20	< 21	< 28	< 49	< 33	< 23	< 35	< 27
Aroclor 1254	ug/kg	< 1200	**32**	**26**	**31**	< 60	< 57	**110**	**8.7**	**16**	**12**	< 28	< 49	**27**	**65**	**100**	< 27
Aroclor 1260	ug/kg	< 1200	< 57	< 45	< 47	< 60	< 57	< 27	< 18	< 20	< 21	< 28	< 49	< 33	< 23	< 35	< 27
Polychlorinated biphenyls (PCBs), total	ug/kg	---	---	---	---	---	---	**110**	**8.7**	**16**	**12**	< 28	< 49	**27**	**240**	**100**	< 27

	Location	KRSE-016	KRSE-017	KRSE-018	KRSE-019	KRSE-020	KRSE-021	KRSE-022	KRSE-023	KRSE-024	KRSE-025	KRSE-026	KRSE-027	KRSE-028	KRSE-029	KRSE-030	KRSE-031
	Date Collected	9/4/2010 4:30 PM	9/5/2010 1:10 PM	9/5/2010 3:30 PM	9/5/2010 4:25 PM	9/6/2010 12:15 PM	9/6/2010 2:15 PM	9/6/2010 3:35 PM	9/7/2010 2:45 PM	9/8/2010 11:45 AM	9/9/2010 12:10 PM	9/10/2010 1:40 PM	9/10/2010 2:45 PM	9/12/2010 3:50 PM	9/14/2010 9:35 AM	9/14/2010 10:53 AM	9/14/2010 12:00 PM
	Sample	SEC090416300JPN1	SEE09051310WPW1	SEE09051530WPW1	SEE09051625WPW1	SEE09061215WPW1	SEE09061415WPW1	SEE09061535WPW1	SEE09071445WPW1	SEE09081145WPW1	SED09091210WPW1	SED09101340WPW1	SED09101445WPW1	SED09121550JPN1	SE0091409 35JPN1	SE0091410 53JPN1	SE0091412 00JPN1
	Depth	--	2 - 2 ft	1 - 1 ft	2.5 - 2.5 ft	3 - 3 ft	1 - 1 ft	1 - 1 ft	1 - 2 ft	1 - 2 ft	0 - 1 ft	1 - 1.5 ft	1 - 1 ft	1.5 ft	0 - 3.5 ft	0 - 6 ft	0 - 6 ft
Analyte	Units	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
PCB																	
Aroclor 1016	ug/kg	< 23	< 20	< 22	< 22	< 19	< 20	< 35	< 21	< 24	< 25	< 23	< 31	< 23	< 63	< 78	< 76
Aroclor 1221	ug/kg	< 23	< 20	< 22	< 22	< 19	< 20	< 35	< 21	< 24	< 25	< 23	< 31	< 23	< 63	< 78	< 76
Aroclor 1232	ug/kg	< 23	< 20	< 22	< 22	< 19	< 20	< 35	< 21	< 24	< 25	< 23	< 31	< 23	< 63	< 78	< 76
Aroclor 1242	ug/kg	< 23	< 20	< 22	< 22	< 19	< 20	< 35	< 21	< 24	< 25	< 23	< 31	< 23	< 63	< 78	< 76
Aroclor 1248	ug/kg	< 23	< 20	< 22	< 22	< 19	< 20	< 35	< 21	< 24	< 25	< 23	**190**	< 23	< 63	< 78	< 76
Aroclor 1254	ug/kg	< 23	< 20	< 22	< 22	**38**	< 20	**110**	**11**	**200**	**48**	**100**	**140**	**38**	**89**	**60**	**63**
Aroclor 1260	ug/kg	< 23	< 20	< 22	< 22	< 19	< 20	< 35	< 21	< 24	< 25	< 23	< 31	< 23	< 63	< 78	< 76
Polychlorinated biphenyls (PCBs), total	ug/kg	< 23	< 20	< 22	< 22	**38**	< 20	**110**	**11**	**200**	**48**	**100**	**330**	**38**	**89**	**60**	**63**

Table 1. SW Monitoring Sediment PCB Analytical Data
Enbridge Line 6B MP 608 Marshall, MI Pipeline Release
Enbridge Energy, Limited Partnership

	Location	KRSE-100	KRSE-309	KRSE-310	KRSE-311	KRSE-312	KRSE-313	KRSE-314	KRSE-101	KRSE-200	KRSE-201	KRSE-202	KRSE-203	KRSE-204	KRSE-205	KRSE-205	KRSE-206
	Date Collected	9/1/2010 11:10 AM	9/29/2010 1:00 PM	9/29/2010 2:15 PM	9/29/2010 3:05 PM	9/30/2010 10:45 AM	9/30/2010 11:35 AM	10/1/2010 11:15 AM	9/1/2010 3:10 PM	9/9/2010 3:57 PM	9/13/2010 2:02 PM	9/13/2010 2:34 PM	9/13/2010 3:42 PM	9/14/2010 2:48 PM	9/5/2010 2:31 PM	9/14/2010 3:26 PM	9/15/2010 3:30 PM
	Sample	SEE090111 10JRP1	SEE092913 00WPW1	SEE092914 15WPW1	SEE092915 05WPW1	SEE093010 45WPW1	SEE093011 35WPW1	SED100111 15WPW1	SEE090115 10JRP1	SEE090915 57KAP1	SEE091314 02TDF1	SEE091314 34TDF1	SEE091315 42TDF1	SEE091414 48TDF1	SEE090514 31JRP1	SEE091415 26TDF1	SEE091515 30TDF1
	Depth	1 - 2 ft	1 - 1.5 ft	0.5 - 1 ft	0.5 - 1 ft	1.5 - 2 ft	1.5 - 2 ft	1.5 - 2 ft	2 - 3 ft	0 - 1 ft	--	--	--	--	2 - 3 ft	--	0 - 0.166667 ft
Analyte	Units	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
PCB																	
Aroclor 1016	ug/kg	< 41	< 21	< 32	< 23	< 190	< 21	< 24	< 72	< 21	< 23	< 21	< 21	< 27	< 51	< 20	< 24
Aroclor 1221	ug/kg	< 41	< 21	< 32	< 23	< 190	< 21	< 24	< 72	< 21	< 23	< 21	< 21	< 27	< 51	< 20	< 24
Aroclor 1232	ug/kg	< 41	< 21	< 32	< 23	< 190	< 21	< 24	< 72	< 21	< 23	< 21	< 21	< 27	< 51	< 20	< 24
Aroclor 1242	ug/kg	< 41	< 21	< 32	< 23	< 190	< 21	< 24	< 72	< 21	< 23	< 21	< 21	< 27	< 51	< 20	< 24
Aroclor 1248	ug/kg	< 41	< 21	< 32	< 23	< 190	< 21	< 24	< 72	< 21	< 23	< 21	< 21	< 27	< 51	< 20	< 24
Aroclor 1254	ug/kg	**72**	**15**	**21**	**37**	**2100**	**23**	**170**	**160**	**28**	**18**	**8.3**	**16**	**40**	< 51	< 20	**19**
Aroclor 1260	ug/kg	< 41	< 21	< 32	< 23	< 190	< 21	< 24	< 72	< 21	< 23	< 21	< 21	< 27	< 51	< 20	< 24
Polychlorinated biphenyls (PCBs), total	ug/kg	**72**	**15**	**21**	**37**	**2100**	**23**	**170**	**160**	**28**	**18**	**8.3**	**16**	**40**	< 51	< 20	**19**

	Location	KRSE-300	KRSE-301	KRSE-302	KRSE-303	KRSE-304	KRSE-305	KRSE-306	KRSE-307	KRSE-308	ML-1	ML-1	ML-1	ML-1	ML-1	ML-1	ML-1
	Date Collected	9/23/2010 11:30 AM	9/23/2010 1:30 PM	9/27/2010 1:30 PM	9/27/2010 4:00 PM	9/28/2010 11:30 AM	9/28/2010 1:00 PM	9/28/2010 2:00 PM	9/28/2010 3:30 PM	9/29/2010 11:15 AM	8/27/2010 12:15 PM	9/1/2010 10:50 AM	9/4/2010 9:50 AM	9/9/2010 10:10 AM	9/12/2010 2:50 PM	9/21/2010 11:55 AM	9/27/2010 11:30 AM
	Sample	SEE092311 30WPW1	SEE092313 30WPW1	SEE092713 30WPW1	SEE092716 00WPW1	SEE092811 30WPW1	SEE092813 00WPW1	SEE092814 00WPW1	SEE092815 30WPW1	SEE092911 15WPW1	SEE082712 15PML1	SEE090110 50PML1	SEE090409 50PML1	SEE090910 10PML1	SEE091214 50PML1	SEE092111 55JDF1	SEE092711 30JDF1
	Depth	1 - 1.5 ft	2 - 2.5 ft	1 - 1.5 ft	2 - 2.5 ft	0.5 - 1 ft	1 - 1.5 ft	2 - 2.5 ft	3 - 3.5 ft	1.5 - 2 ft	0 - 5.75 ft	--	5 - 6 ft	5 - 6 ft	0 - 5 ft	0 - 5.7 ft	0 - 4.3 ft
Analyte	Units	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
PCB																	
Aroclor 1016	ug/kg	< 38	< 23	< 21	< 38	< 26	< 50	< 44	< 19	< 22	< 150	< 73	< 69	< 65	< 71	< 71	< 69
Aroclor 1221	ug/kg	< 38	< 23	< 21	< 38	< 26	< 50	< 44	< 19	< 22	< 150	< 73	< 69	< 65	< 71	< 71	< 69
Aroclor 1232	ug/kg	< 38	< 23	< 21	< 38	< 26	< 50	< 44	< 19	< 22	< 150	< 73	< 69	< 65	< 71	< 71	< 69
Aroclor 1242	ug/kg	< 38	< 23	< 21	< 38	< 26	< 50	< 44	< 19	< 22	< 150	< 73	< 69	< 65	< 71	< 71	< 69
Aroclor 1248	ug/kg	< 38	< 23	< 21	< 38	< 26	< 50	< 44	< 19	< 22	< 150	< 73	< 69	< 65	< 71	< 71	< 69
Aroclor 1254	ug/kg	**300**	**26**	**14**	**28**	**35**	**200**	**88**	< 19	< 22	< 150	**320**	**110**	**150**	**190**	**140**	**190**
Aroclor 1260	ug/kg	< 38	< 23	< 21	< 38	< 26	< 50	< 44	< 19	< 22	< 150	< 73	< 69	< 65	< 71	< 71	< 69
Polychlorinated biphenyls (PCBs), total	ug/kg	**300**	**26**	**14**	**28**	**35**	**200**	**88**	< 19	**5.5**	---	**320**	**110**	**150**	**190**	**140**	**190**

Table 1. SW Monitoring Sediment PCB Analytical Data
Enbridge Line 6B MP 608 Marshall, MI Pipeline Release
Enbridge Energy, Limited Partnership

	Location	ML-1	ML-1	ML-1	ML-1	ML-1	ML-1	ML-2	ML-2	ML-2	ML-2	ML-2	ML-2	ML-2	ML-2	ML-2	ML-2
	Date Collected	10/3/2010 2:25 PM	10/7/2010 11:01 AM	10/11/2010 11:25 AM	10/15/2010 9:45 AM	10/19/2010 10:05 AM	10/23/2010 10:15 AM	8/27/2010 3:00 PM	9/1/2010 11:45 AM	9/4/2010 1:50 PM	9/9/2010 2:10 PM	9/13/2010 9:40 AM	9/17/2010 9:45 AM	9/21/2010 3:30 PM	9/27/2010 3:15 PM	10/4/2010 9:45 AM	10/7/2010 12:05 PM
	Sample	SEE10031425JDF1	SEE10071101PML1	SEE10111125JDF1	SEE10150945JDF1	SEE10191005JDF1	SEE10231015PML1	SEE08271500PML1	SEE09011145PML1	SEE09041350PML1	SEE09091410PML1	SEE09130940PML1	SEE09170945PML1	SEE09211530JDF1	SEE09271515JDF1	SEE10040945JDF1	SEE10071205PML1
	Depth	0 - 2.4 ft	0 - 4.75 ft	0 - 5.45 ft	0 - 5 ft	--	--	0 - 3.9 ft	--	3 - 4 ft	3 - 4 ft	0 - 3.7 ft	0 - 3.8 ft	0 - 3.9 ft	0 - 3.7 ft	0 - 3.5 ft	0 - 3 ft
Analyte	Units	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
PCB																	
Aroclor 1016	ug/kg	< 68	< 72	< 68	< 71	< 210	< 210	< 140	< 59	< 70	< 64	< 64	< 66	< 65	< 61	< 56	< 62
Aroclor 1221	ug/kg	< 68	< 72	< 68	< 71	< 210	< 210	< 140	< 59	< 70	< 64	< 64	< 66	< 65	< 61	< 56	< 62
Aroclor 1232	ug/kg	< 68	< 72	< 68	< 71	< 210	< 210	< 140	< 59	< 70	< 64	< 64	< 66	< 65	< 61	< 56	< 62
Aroclor 1242	ug/kg	< 68	< 72	< 68	< 71	< 210	< 210	< 140	< 59	< 70	< 64	< 64	< 66	< 65	< 61	< 56	< 62
Aroclor 1248	ug/kg	< 68	< 72	< 68	< 71	< 210	< 210	< 140	< 59	< 70	< 64	< 64	< 66	< 65	< 61	< 56	< 62
Aroclor 1254	ug/kg	**100**	**200**	**100**	**91**	< 210	< 210	< 140	**110**	< 70	**130**	**52**	**42**	< 65	**140**	**130**	**190**
Aroclor 1260	ug/kg	< 68	< 72	< 68	**24**	< 210	< 210	< 140	< 59	< 70	< 64	< 64	< 66	< 65	< 61	< 56	< 62
Polychlorinated biphenyls (PCBs), total	ug/kg	**100**	**200**	**100**	**110**	---	---	---	**110**	< 70	**130**	**52**	**42**	< 65	**140**	**130**	**190**

	Location	ML-2	ML-2	ML-2	ML-2	ML-3	ML-3	ML-3	ML-3	ML-3	ML-3	ML-3	ML-3	ML-3	ML-3	ML-3	ML-3
	Date Collected	10/11/2010 10:11 AM	10/16/2010 10:55 AM	10/19/2010 11:00 AM	10/23/2010 11:25 AM	8/28/2010 12:15 PM	9/1/2010 12:55 PM	9/5/2010 10:15 AM	9/9/2010 11:45 AM	9/13/2010 11:25 AM	9/17/2010 11:25 AM	9/22/2010 11:05 AM	9/29/2010 9:25 AM	10/4/2010 10:50 AM	10/7/2010 3:40 PM	10/11/2010 1:50 PM	10/16/2010 2:15 PM
	Sample	SEE10111011JDF1	SEE10161055JDF1	SEE10191100JDF1	SEE10231125PML1	SEE08281215PML1	SEE09011255PML1	SEE09051015PML1	SEE09091145PML1	SEE09131125PML1	SEE09171125PML1	SEE09221105JDF1	SEE09290925JDF1	SEE10041050JDF1	SEE10071540PML1	SEE10111350JDF1	SEE10161415JDF1
	Depth	0 - 3.25 ft	0 - 3.5 ft	--	--	2 - 4 ft	--	4 - 5 ft	4 - 5 ft	0 - 4.7 ft	0 - 4 ft	0 - 4.7 ft	0 - 4 ft	0 - 4.1 ft	0 - 3.8 ft	0 - 3.66 ft	0 - 4.1 ft
Analyte	Units	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
PCB																	
Aroclor 1016	ug/kg	< 62	< 63	< 190	< 200	< 120	< 68	< 63	< 64	< 68	< 64	< 62	< 60	< 56	< 60	< 61	< 63
Aroclor 1221	ug/kg	< 62	< 63	< 190	< 200	< 120	< 68	< 63	< 64	< 68	< 64	< 62	< 60	< 56	< 60	< 61	< 63
Aroclor 1232	ug/kg	< 62	< 63	< 190	< 200	< 120	< 68	< 63	< 64	< 68	< 64	< 62	< 60	< 56	< 60	< 61	< 63
Aroclor 1242	ug/kg	< 62	< 63	< 190	< 200	< 120	< 68	< 63	< 64	< 68	< 64	< 62	< 60	< 56	< 60	< 61	< 63
Aroclor 1248	ug/kg	< 62	< 63	< 190	< 200	< 120	< 68	< 63	< 64	< 68	< 64	< 62	< 60	< 56	< 60	< 61	< 63
Aroclor 1254	ug/kg	**83**	**130**	< 190	< 200	< 120	**79**	**130**	**140**	**110**	**69**	**90**	**140**	**160**	**150**	**94**	< 63
Aroclor 1260	ug/kg	< 62	**41**	< 190	< 200	< 120	< 68	< 63	< 64	< 68	< 64	< 62	< 60	< 56	< 60	< 61	< 63
Polychlorinated biphenyls (PCBs), total	ug/kg	**83**	**180**	---	---	---	**79**	**130**	**140**	**110**	**69**	**90**	**140**	**160**	**150**	**94**	< 63

Table 1. SW Monitoring Sediment PCB Analytical Data
Enbridge Line 6B MP 608 Marshall, MI Pipeline Release
Enbridge Energy, Limited Partnership

	Location	ML-3	ML-3	ML-4	ML-4	ML-4	ML-4	ML-4	ML-4	ML-4	ML-4	ML-4	ML-4	ML-4	ML-4	ML-4
	Date Collected	10/19/2010 11:55 AM	10/23/2010 2:35 PM	8/28/2010 3:05 PM	9/1/2010 3:45 PM	9/5/2010 11:30 AM	9/9/2010 3:15 PM	9/13/2010 3:05 PM	9/16/2010 10:45 AM	9/17/2010 2:15 PM	9/22/2010 2:40 PM	9/29/2010 10:35 AM	10/4/2010 11:50 AM	10/8/2010 12:31 PM	10/12/2010 9:30 AM	10/16/2010 3:30 PM	10/19/2010 2:15 PM
	Sample	SEE10191155JDF1	SEE10231435PML1	SEE08281505PML1	SEE09011545PML1	SEE09051130PML1	SEE09091515PML1	SEE09131505PML1	SEE09161045PML1	SEE09171415PML1	SEE09221440JDF1	SEE09291035JDF1	SEE10041150JDF1	SEE10081231PML1	SEE10120930JDF1	SEE10161530JDF1	SEE10191415JDF1
	Depth	--	--	3 - 4 ft	--	3 - 4 ft	3 - 4 ft	0 - 3.7 ft	--	0 - 3.9 ft	0 - 3.1 ft	0 - 2.5 ft	0 - 3.6 ft	--	0 - 4.33 ft	0 - 3.6 ft	--
Analyte	Units	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
PCB																	
Aroclor 1016	ug/kg	< 190	< 180	< 150	< 87	< 79	< 75	< 78	< 81	< 78	< 71	< 64	< 69	< 72	< 73	< 75	< 200
Aroclor 1221	ug/kg	< 190	< 180	< 150	< 87	< 79	< 75	< 78	< 81	< 78	< 71	< 64	< 69	< 72	< 73	< 75	< 200
Aroclor 1232	ug/kg	< 190	< 180	< 150	< 87	< 79	< 75	< 78	< 81	< 78	< 71	< 64	< 69	< 72	< 73	< 75	< 200
Aroclor 1242	ug/kg	< 190	< 180	< 150	< 87	< 79	< 75	< 78	< 81	< 78	< 71	< 64	< 69	< 72	< 73	< 75	< 200
Aroclor 1248	ug/kg	< 190	< 180	< 150	< 87	< 79	< 75	< 78	< 81	< 78	< 71	< 64	< 69	< 72	< 73	< 75	< 200
Aroclor 1254	ug/kg	< 190	< 180	< 150	**170**	**140**	**180**	**180**	**150**	**78**	**110**	**91**	**260**	**240**	**210**	**120**	< 200
Aroclor 1260	ug/kg	< 190	< 180	< 150	< 87	< 79	< 75	< 78	< 81	< 78	< 71	< 64	< 69	< 72	< 73	**40**	< 200
Polychlorinated biphenyls (PCBs), total	ug/kg	---	---	---	**170**	**140**	**180**	**180**	**150**	**78**	**110**	**91**	**260**	**240**	**210**	**160**	---

	Location	ML-5	ML-5	ML-5	ML-5	ML-5	ML-5	ML-5	ML-5	ML-5	ML-5	ML-5	ML-5	ML-6	ML-6	ML-6	ML-6
	Date Collected	8/29/2010 2:45 PM	9/1/2010 4:35 PM	9/5/2010 2:30 PM	9/9/2010 4:05 PM	9/13/2010 4:20 PM	9/17/2010 3:30 PM	9/22/2010 4:15 PM	9/29/2010 11:35 AM	10/4/2010 1:35 PM	10/12/2010 10:30 AM	10/17/2010 9:15 AM	10/19/2010 3:15 PM	8/29/2010 11:10 AM	9/2/2010 10:10 AM	9/6/2010 11:05 AM	9/10/2010 10:22 AM
	Sample	SEE08291445PML1	SEE09011635PML1	SEE09051430PML1	SEE09091605PML1	SEE09131320PML1	SEE09171530PML1	SEE09221615JDF1	SEE09291135JDF1	SEE10041335JDF1	SEE10121030JDF1	SEE10170915JDF1	SEE10191515JDF1	SEE08291110PML1	SEE09021010PML1	SEE09061105PML1	SEE09101022PML1
	Depth	--	--	3 - 4 ft	2 - 3 ft	0 - 2.8 ft	0 - 3.1 ft	0 - 3.3 ft	--	0 - 2.3 ft	0 - 2.83 ft	0 - 2.583 ft	--	--	8 - 9 ft	7 - 8 ft	1 - 8.6 ft
Analyte	Units	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
PCB																	
Aroclor 1016	ug/kg	< 57	< 60	< 61	< 69	< 67	< 62	< 59	< 48	< 58	< 58	< 46	< 220	< 120	< 80	< 76	< 87
Aroclor 1221	ug/kg	< 57	< 60	< 61	< 69	< 67	< 62	< 59	< 48	< 58	< 58	< 46	< 220	< 120	< 80	< 76	< 87
Aroclor 1232	ug/kg	< 57	< 60	< 61	< 69	< 67	< 62	< 59	< 48	< 58	< 58	< 46	< 220	< 120	< 80	< 76	< 87
Aroclor 1242	ug/kg	< 57	< 60	< 61	< 69	< 67	< 62	< 59	< 48	< 58	< 58	< 46	< 220	< 120	< 80	< 76	< 87
Aroclor 1248	ug/kg	< 57	< 60	< 61	< 69	< 67	< 62	< 59	< 48	< 58	< 58	< 46	< 220	< 120	< 80	< 76	< 87
Aroclor 1254	ug/kg	< 57	**190**	**200**	**94**	**87**	**66**	**59**	**72**	**220**	**160**	**160**	< 220	< 120	**280**	**200**	**63**
Aroclor 1260	ug/kg	< 57	< 60	< 61	< 69	< 67	< 62	< 59	< 48	< 58	< 58	< 46	< 220	< 120	< 80	< 76	< 87
Polychlorinated biphenyls (PCBs), total	ug/kg	---	**190**	**200**	**94**	**87**	**66**	**59**	**72**	**220**	**160**	**160**	---	---	**280**	**200**	**63**

Table 1. SW Monitoring Sediment PCB Analytical Data
Enbridge Line 6B MP 608 Marshall, MI Pipeline Release
Enbridge Energy, Limited Partnership

	Location	ML-6	ML-6	ML-6	ML-6	ML-6	ML-6	ML-6	ML-6	ML-6	ML-7	ML-7	ML-7	ML-7	ML-7	ML-7	ML-7
	Date Collected	9/14/2010 9:45 AM	9/18/2010 5:05 PM	9/23/2010 12:10 PM	9/29/2010 4:45 PM	10/4/2010 3:30 PM	10/8/2010 11:15 AM	10/12/2010 11:55 AM	10/17/2010 11:15 AM	10/20/2010 10:45 AM	8/30/2010 11:30 AM	9/2/2010 2:00 PM	9/6/2010 3:00 PM	9/10/2010 12:15 PM	9/14/2010 11:35 AM	9/18/2010 12:35 PM	9/23/2010 4:45 PM
	Sample	SEE09140945PML1	SEE09181705PML1	SEE09231210JDF1	SEE09291645JDF1	SEE10041530JDF1	SEE10081115PML1	SEE10121155JDF1	SEE10171115JDF1	SEE10201045JDF1	SEE08301130PML1	SEE09021400PML1	SEE09061500PML1	SEE09101215PML1	SEE09141135PML1	SEE09181235PML1	SEE09231645JDF1
	Depth	0 - 8.1 ft	--	0 - 7.2 ft	0 - 7.8 ft	0 - 7.5 ft	--	0 - 7.66 ft	0 - 8 ft	--	7 - 8 ft	8 - 9 ft	--	1 - 7.1 ft	0 - 7.1 ft	--	0 - 8.1 ft
Analyte	Units	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
PCB																	
Aroclor 1016	ug/kg	< 82	< 77	< 80	< 55	< 79	< 83	< 71	< 76	< 230	< 90	< 94	< 93	< 87	< 85	< 90	< 88
Aroclor 1221	ug/kg	< 82	< 77	< 80	< 55	< 79	< 83	< 71	< 76	< 230	< 90	< 94	< 93	< 87	< 85	< 90	< 88
Aroclor 1232	ug/kg	< 82	< 77	< 80	< 55	< 79	< 83	< 71	< 76	< 230	< 90	< 94	< 93	< 87	< 85	< 90	< 88
Aroclor 1242	ug/kg	< 82	< 77	< 80	< 55	< 79	< 83	< 71	< 76	< 230	< 90	< 94	< 93	< 87	< 85	< 90	< 88
Aroclor 1248	ug/kg	< 82	< 77	< 80	< 55	< 79	< 83	< 71	< 76	< 230	< 90	< 94	< 93	< 87	< 85	< 90	< 88
Aroclor 1254	ug/kg	**130**	**170**	**190**	**150**	**230**	**200**	**200**	**240**	< 230	**230**	**720**	**250**	**100**	**160**	**220**	**280**
Aroclor 1260	ug/kg	< 82	< 77	< 80	< 55	< 79	< 83	< 71	< 76	< 230	< 90	< 94	< 93	< 87	< 85	< 90	< 88
Polychlorinated biphenyls (PCBs), total	ug/kg	**130**	**170**	**190**	**150**	**230**	**200**	**200**	**240**	---	**230**	**720**	**250**	**100**	**160**	**220**	**280**

	Location	ML-7	ML-7	ML-7	ML-7	ML-7	ML-7	ML-8	ML-8	ML-8	ML-8	ML-8	ML-8	ML-8	ML-8	ML-8	ML-8
	Date Collected	9/30/2010 11:05 AM	10/5/2010 11:25 AM	10/9/2010 2:01 PM	10/13/2010 11:50 AM	10/17/2010 2:10 PM	10/20/2010 12:30 PM	8/30/2010 3:50 PM	9/3/2010 9:25 AM	9/7/2010 10:50 AM	9/10/2010 4:25 PM	9/14/2010 3:15 PM	9/19/2010 10:40 AM	9/25/2010 11:35 AM	9/30/2010 12:55 PM	10/5/2010 4:53 PM	10/9/2010 4:14 PM
	Sample	SEE09301105JDF1	SEE10051125PML1	SEE10091401PML1	SEE10131150JDF1	SEE10171410JDF1	SEE10201230JDF1	SEE08301550PML1	SEE09030925PML1	SEE09071050PML1	SEE09101625PML1	SEE09141515PML1	SEE09191040PML1	SEE09251135JDF1	SEE09301255JDF1	SEE10051653PML1	SEE10091614PML1
	Depth	0 - 7.1 ft	0 - 7.1 ft	0 - 6.75 ft	0 - 7.25 ft	0 - 7.583 ft	--	7 - 8 ft	--	8 - 9 ft	1 - 8 ft	0 - 8 ft	0 - 8.4 ft	0 - 8.1 ft	0 - 7.11 ft	0 - 7.4 ft	0 - 7.3 ft
Analyte	Units	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
PCB																	
Aroclor 1016	ug/kg	< 93	< 91	< 86	< 83	< 87	< 240	< 83	< 83	< 80	< 80	< 77	< 76	< 72	< 82	< 78	< 79
Aroclor 1221	ug/kg	< 93	< 91	< 86	< 83	< 87	< 240	< 83	< 83	< 80	< 80	< 77	< 76	< 72	< 82	< 78	< 79
Aroclor 1232	ug/kg	< 93	< 91	< 86	< 83	< 87	< 240	< 83	< 83	< 80	< 80	< 77	< 76	< 72	< 82	< 78	< 79
Aroclor 1242	ug/kg	< 93	< 91	< 86	< 83	< 87	< 240	< 83	< 83	< 80	< 80	< 77	< 76	< 72	< 82	< 78	< 79
Aroclor 1248	ug/kg	< 93	< 91	< 86	< 83	< 87	< 240	< 83	< 83	< 80	< 80	< 77	< 76	< 72	< 82	< 78	< 79
Aroclor 1254	ug/kg	**350**	**220**	**230**	**360**	**300**	< 240	**290**	**370**	**240**	**140**	**150**	**250**	**280**	**280**	**280**	**200**
Aroclor 1260	ug/kg	< 93	< 91	**83**	< 83	< 87	< 240	< 83	< 83	< 80	< 80	< 77	< 76	< 72	< 82	< 78	**65**
Polychlorinated biphenyls (PCBs), total	ug/kg	**350**	**220**	**310**	**360**	**300**	---	**290**	**370**	**240**	**140**	**150**	**250**	**280**	**280**	**280**	**260**

Table 1. SW Monitoring Sediment PCB Analytical Data
Enbridge Line 6B MP 608 Marshall, MI Pipeline Release
Enbridge Energy, Limited Partnership

	Location	ML-8	ML-8	ML-8	ML-9	ML-9	ML-9	ML-9	ML-9	ML-9	ML-9	ML-9	ML-9	ML-9	ML-9	ML-9	ML-9
	Date Collected	10/14/2010 10:15 AM	10/18/2010 10:35 AM	10/21/2010 10:35 AM	8/31/2010 10:45 AM	9/3/2010 11:00 AM	9/8/2010 10:10 AM	9/8/2010 12:05 PM	9/11/2010 10:15 AM	9/15/2010 10:15 AM	9/19/2010 3:30 PM	9/26/2010 12:15 PM	10/1/2010 11:20 AM	10/6/2010 12:05 PM	10/10/2010 10:10 AM	10/14/2010 11:50 AM	10/18/2010 12:10 PM
	Sample	SEE101410 15JDF1	SEE101810 35JDF1	SEE102110 35JDF1	SEE083110 45PML1	SEE090311 00PML1	SEE090810 10PML1	SEE090812 05PML1	SEE091110 15PML1	SEE091510 15PML1	SEE091915 30PML1	SEE092612 15JDF1	SEE100111 20JDF1	SEE100612 05PML1	SEE101010 10PML1	SEE101411 50JDF1	SEE101812 10JDF1
	Depth	0 - 7.33 ft	0 - 7.883 ft	--	--	--	7 - 8 ft	7 - 8 ft	0 - 7.4 ft	0 - 7.7 ft	0 - 7.6 ft	--	0 - 7.25 ft	0 - 6.9 ft	7.25 - 7.25 ft	0 - 7.08 ft	0 - 7 ft
Analyte	Units	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
PCB																	
Aroclor 1016	ug/kg	< 76	< 78	< 230	< 73	< 79	< 74	< 76	< 71	< 72	< 74	< 74	< 73	< 73	< 76	< 75	< 73
Aroclor 1221	ug/kg	< 76	< 78	< 230	< 73	< 79	< 74	< 76	< 71	< 72	< 74	< 74	< 73	< 73	< 76	< 75	< 73
Aroclor 1232	ug/kg	< 76	< 78	< 230	< 73	< 79	< 74	< 76	< 71	< 72	< 74	< 74	< 73	< 73	< 76	< 75	< 73
Aroclor 1242	ug/kg	< 76	< 78	< 230	< 73	< 79	< 74	< 76	< 71	< 72	< 74	< 74	< 73	< 73	< 76	< 75	< 73
Aroclor 1248	ug/kg	< 76	< 78	< 230	< 73	< 79	< 74	< 76	< 71	< 72	< 74	< 74	< 73	< 73	< 76	< 75	< 73
Aroclor 1254	ug/kg	**240**	**310**	< 230	**120**	**150**	**350**	**400**	**58**	**130**	**180**	**300**	**250**	**230**	**180**	**150**	**240**
Aroclor 1260	ug/kg	< 76	< 78	< 230	< 73	< 79	< 74	< 76	< 71	< 72	< 74	< 74	< 73	< 73	< 76	< 75	< 73
Polychlorinated biphenyls (PCBs), total	ug/kg	**240**	**310**	---	**120**	**150**	**350**	**400**	**58**	**130**	**180**	**300**	**250**	**230**	**180**	**150**	**240**

	Location	ML-9	ML-10	ML-10	ML-10	ML-10	ML-10	ML-10	ML-10	ML-10	ML-10	ML-10	ML-10	ML-10	MLSE-1	MLSE-2	MLSE-3
	Date Collected	10/21/2010 2:30 PM	8/31/2010 2:20 PM	9/3/2010 4:50 PM	9/12/2010 10:55 AM	9/15/2010 11:45 AM	9/20/2010 9:45 AM	9/26/2010 4:25 PM	10/3/2010 11:15 AM	10/6/2010 4:40 PM	10/10/2010 12:15 PM	10/14/2010 3:50 PM	10/18/2010 3:10 PM	10/22/2010 11:10 AM	8/27/2010 4:52 PM	8/27/2010 4:14 PM	8/27/2010 3:36 PM
	Sample	SEE102114 30JDF1	SEE083114 20PML1	SEE090316 50PML1	SEE091210 55PML1	SEE091511 45PML1	SEE092009 45PML1	SEE092616 25JDF1	SEE100311 15JDF1	SEE100616 40PML1	SEE101012 15PML1	SEE101415 50JDF1	SEE101815 10JDF1	SEE102211 10JDF1	SEE082716 52TWH1	SEE082716 14TWH1	SEE082715 36TWH1
	Depth	--	--	--	--	0 - 7 ft	--	--	0 - 6.25 ft	0 - 6.5 ft	6.66 - 6.66 ft	0 - 6.66 ft	0 - 6.883 ft	--	--	--	--
Analyte	Units	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
PCB																	
Aroclor 1016	ug/kg	< 200	< 85	< 76	< 73	< 74	< 78	< 76	< 79	< 68	< 77	< 75	< 77	< 200	< 53	< 58	< 46
Aroclor 1221	ug/kg	< 200	< 85	< 76	< 73	< 74	< 78	< 76	< 79	< 68	< 77	< 75	< 77	< 200	< 53	< 58	< 46
Aroclor 1232	ug/kg	< 200	< 85	< 76	< 73	< 74	< 78	< 76	< 79	< 68	< 77	< 75	< 77	< 200	< 53	< 58	< 46
Aroclor 1242	ug/kg	< 200	< 85	< 76	< 73	< 74	< 78	< 76	< 79	< 68	< 77	< 75	< 77	< 200	< 53	< 58	< 46
Aroclor 1248	ug/kg	< 200	< 85	< 76	< 73	< 74	< 78	< 76	< 79	< 68	< 77	< 75	< 77	< 200	< 53	< 58	< 46
Aroclor 1254	ug/kg	< 200	**210**	**220**	**290**	**200**	**180**	**190**	**160**	**170**	**140**	**150**	**230**	< 200	**43**	**80**	< 46
Aroclor 1260	ug/kg	< 200	< 85	< 76	< 73	< 74	< 78	< 76	< 79	< 68	< 77	< 75	< 77	< 200	< 53	< 58	< 46
Polychlorinated biphenyls (PCBs), total	ug/kg	---	**210**	**220**	**290**	**200**	**180**	**190**	**160**	**170**	**140**	**150**	**230**	---	---	---	---

Table 1. SW Monitoring Sediment PCB Analytical Data
Enbridge Line 6B MP 608 Marshall, MI Pipeline Release
Enbridge Energy, Limited Partnership

	Location	MLSE-4	MLSE-5	MLSE-6	MLSE-7	MLSE-8	MLSE-9	MLSE-11	MLSE-12	MLSE-13	MLSE-15	MLE-14	MLSE-10	SW-002	SW-002	SW-002	SW-002	SW-002
	Date Collected	8/28/2010 2:20 PM	8/28/2010 3:10 PM	8/28/2010 4:07 PM	8/29/2010 1:54 PM	8/29/2010 2:21 PM	8/29/2010 3:50 PM	8/30/2010 10:15 AM	8/30/2010 11:00 AM	8/30/2010 2:10 PM	8/30/2010 3:20 PM	8/30/2010 2:45 PM	8/30/2010 9:20 AM	9/20/2010 10:49 AM	9/23/2010 10:59 AM	9/27/2010 10:54 AM	9/30/2010 8:25 AM	10/4/2010 10:21 AM
	Sample	SEE08281420TWH1	SEE08281510TWH1	SEE08281607TWH1	SEE08291354KAP1	SEE08291421KAP1	SEE08291550KAP1	SEE08301015JRP1	SEE08301100JRP1	SEE08301410JRP1	SEE08301520JRP1	SEE08301445JRP1	SEE08300920JRP1	SEC09201049RRD1	SEC09231059JLS1	SEC09271054JLS1	SEC09300825JLS1	SEC10041021JLS1
	Depth	--	--	--	--	--	--	5 - 6 ft	3 - 4 ft	3 - 4 ft	6 - 7 ft	7 - 8 ft	5 - 6 ft	--	0 - 0.2 ft	0 - 0.4 ft	0 - 0.25 ft	0 - 0.25 ft
Analyte	Units	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
PCB																		
Aroclor 1016	ug/kg	< 120	< 110	< 170	< 69	< 110	< 86	< 64	< 22	< 25	< 140	< 64	< 41	< 21	< 20	< 21	< 21	< 20
Aroclor 1221	ug/kg	< 120	< 110	< 170	< 69	< 110	< 86	< 64	< 22	< 25	< 140	< 64	< 41	< 21	< 20	< 21	< 21	< 20
Aroclor 1232	ug/kg	< 120	< 110	< 170	< 69	< 110	< 86	< 64	< 22	< 25	< 140	< 64	< 41	< 21	< 20	< 21	< 21	< 20
Aroclor 1242	ug/kg	< 120	< 110	< 170	< 69	< 110	< 86	< 64	< 22	< 25	< 140	< 64	< 41	< 21	< 20	< 21	< 21	< 20
Aroclor 1248	ug/kg	< 120	< 110	< 170	< 69	< 110	< 86	< 64	< 22	< 25	< 140	< 64	< 41	< 21	< 20	< 21	< 21	< 20
Aroclor 1254	ug/kg	**98**	**58**	< 170	< 69	**250**	**75**	**960**	< 22	**130**	**2000**	**1100**	**270**	< 21	< 20	< 21	< 21	< 20
Aroclor 1260	ug/kg	< 120	< 110	< 170	< 69	< 110	< 86	< 64	< 22	< 25	< 140	< 64	< 41	< 21	< 20	< 21	< 21	< 20
Polychlorinated biphenyls (PCBs), total	ug/kg	---	---	---	---	---	---	**960**	< 22	**130**	**2000**	**1100**	**270**	< 21	< 20	< 21	< 21	< 20

	Location	SW-002	SW-002	SW-002	SW-002	SW-003	SW-003	SW-003	SW-003	SW-003	SW-003	SW-003	SW-005	SW-100	SW-100	SW-100	SW-100	SW-100
	Date Collected	10/7/2010 9:25 AM	10/11/2010 8:50 AM	10/14/2010 2:45 PM	10/18/2010 11:55 AM	8/27/2010 2:45 PM	8/31/2010 4:37 PM	9/10/2010 1:49 PM	9/13/2010 4:11 PM	9/17/2010 4:33 PM	9/20/2010 2:05 PM	9/23/2010 2:23 PM	10/21/2010 11:25 AM	9/15/2010 9:15 AM	9/17/2010 11:30 AM	9/20/2010 11:15 AM	9/22/2010 11:55 AM	9/29/2010 8:45 AM
	Sample	SEC10070925JLS1	SEB10110850PDS1	SEC10141445JLS1	SEC10181155JLS1	SEC08271445JLS1	SEC08311637JLS1	SEC09101349SKS1	SEC09131611JLS1	SEC09171633TDF1	SEC09201405RRD1	SEC09231423JLS1	SEE10211125NAC1	SEB09150915PMB1	SEB09171130PMB1	SEB09201115PMB1	SEB09221155SDD1	SEB09290845PMB1
	Depth	0 - 3 ft	0 - 3 ft	0 - 0.25 ft	0.167 - 0.25 ft	--	0 - 1 ft	0.3 - 0.75 ft	0 - 0.2 ft	--	--	0 - 0.2 ft	--	0 - 0.5 ft	0 - 6 ft	--	0 - 0.5 ft	0 - 0.5 ft
Analyte	Units	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
PCB																		
Aroclor 1016	ug/kg	< 20	< 19	< 20	< 20	< 48	< 28	< 23	< 26	< 21	< 22	< 23	< 57	< 31	< 29	< 30	< 26	< 35
Aroclor 1221	ug/kg	< 20	< 19	< 20	< 20	< 48	< 28	< 23	< 26	< 21	< 22	< 23	< 57	< 31	< 29	< 30	< 26	< 35
Aroclor 1232	ug/kg	< 20	< 19	< 20	< 20	< 48	< 28	< 23	< 26	< 21	< 22	< 23	< 57	< 31	< 29	< 30	< 26	< 35
Aroclor 1242	ug/kg	< 20	< 19	< 20	< 20	< 48	< 28	< 23	< 26	< 21	< 22	< 23	< 57	< 31	< 29	< 30	< 26	< 35
Aroclor 1248	ug/kg	< 20	< 19	< 20	< 20	< 48	< 28	**120**	< 26	< 21	< 22	**130**	< 57	< 31	< 29	< 30	< 26	< 35
Aroclor 1254	ug/kg	< 20	< 19	< 20	< 20	< 48	**47**	**43**	**66**	**46**	**58**	< 23	< 57	**25**	**27**	**20**	**18**	**26**
Aroclor 1260	ug/kg	< 20	< 19	< 20	< 20	< 48	< 28	< 23	< 26	< 21	< 22	< 23	< 57	< 31	< 29	< 30	< 26	< 35
Polychlorinated biphenyls (PCBs), total	ug/kg	< 20	< 19	< 20	< 20	---	**47**	**170**	**66**	**46**	**58**	**130**	---	**25**	**27**	**20**	**18**	**26**

Table 1. SW Monitoring Sediment PCB Analytical Data
Enbridge Line 6B MP 608 Marshall, MI Pipeline Release
Enbridge Energy, Limited Partnership

	Location	SW-100	SW-100	SW-100	SW-100	SW-100	SW-100	SW-100	SW-101	SW-101	SW-101	SW-101	SW-104	SW-104	SW-104	SW-104	SW-104	SW-104	SW-104
	Date Collected	10/2/2010 9:15 AM	10/4/2010 1:45 PM	10/7/2010 8:45 AM	10/11/2010 8:55 AM	10/14/2010 9:25 AM	10/18/2010 8:45 AM	10/21/2010 8:35 AM	8/28/2010 3:54 PM	9/1/2010 1:38 PM	9/4/2010 10:53 AM	9/8/2010 11:11 AM	9/20/2010 12:15 PM	9/22/2010 12:55 PM	9/27/2010 12:45 PM	9/30/2010 12:00 PM	10/4/2010 11:45 AM	10/7/2010 11:00 AM	10/11/2010 11:35 AM
	Sample	SEB10020 915PMB1	SEB10041 345PMB1	SEB10070 845PMB1	SEB10110 855RTV1	SEB10140 925CKC1	SEB10180 845PMB1	SEB10210 835PMB1	SEC08281 554JLS1	SEC09011 338JLS1	SEC09041 053SKS1	SEC09081 111SKS1	SEB09201 215PMB1	SEB09221 255SDD1	SEB09271 245PMB1	SEB09301 200PMB1	SEB10041 145PMB1	SEB10071 100PMB1	SEB101111 35RTV1
	Depth	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	--	--	0 - 0.5 ft	--	0 - 1 ft	--	2 - 3 ft	2 - 3 ft	--	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	--
Analyte	Units	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
PCB																			
Aroclor 1016	ug/kg	< 35	< 38	< 43	< 36	< 59	< 40	< 140	< 110	< 43	< 34	< 38	< 22	< 21	< 20	< 22	< 21	< 20	< 22
Aroclor 1221	ug/kg	< 35	< 38	< 43	< 36	< 59	< 40	< 140	< 110	< 43	< 34	< 38	< 22	< 21	< 20	< 22	< 21	< 20	< 22
Aroclor 1232	ug/kg	< 35	< 38	< 43	< 36	< 59	< 40	< 140	< 110	< 43	< 34	< 38	< 22	< 21	< 20	< 22	< 21	< 20	< 22
Aroclor 1242	ug/kg	< 35	< 38	< 43	< 36	< 59	< 40	< 140	< 110	< 43	< 34	< 38	< 22	< 21	< 20	< 22	< 21	< 20	< 22
Aroclor 1248	ug/kg	< 35	< 38	< 43	< 36	< 59	< 40	< 140	< 110	< 43	< 34	< 38	< 22	< 21	< 20	< 22	< 21	< 20	< 22
Aroclor 1254	ug/kg	**45**	**52**	**58**	**27**	< 59	**64**	< 140	< 110	**34**	< 34	**180**	< 22	< 21	< 20	< 22	< 21	< 20	< 22
Aroclor 1260	ug/kg	< 35	< 38	< 43	< 36	< 59	< 40	< 140	< 110	< 43	< 34	< 38	< 22	< 21	< 20	< 22	< 21	< 20	< 22
Polychlorinated biphenyls (PCBs), total	ug/kg	**45**	**52**	**58**	**27**	< 59	**64**	---	---	**34**	< 34	**180**	< 22	< 21	< 20	< 22	< 21	< 20	< 22

	Location	SW-104	SW-104	SW-104	SW-105	SW-105	SW-105	SW-105	SW-105	SW-105	SW-107	SW-107	SW-107	SW-107	SW-107	SW-107	SW-108	SW-108	SW-108
	Date Collected	10/14/2010 2:20 PM	10/18/2010 10:50 AM	10/21/2010 10:55 AM	8/28/2010 12:05 PM	8/30/2010 12:00 PM	9/1/2010 12:20 PM	9/2/2010 12:00 PM	9/4/2010 11:15 AM	9/8/2010 10:00 AM	9/9/2010 11:15 AM	9/13/2010 11:30 AM	9/15/2010 12:00 PM	9/20/2010 2:00 PM	9/22/2010 3:30 PM	9/27/2010 11:15 AM	10/15/2010 1:30 PM	10/19/2010 1:55 PM	10/22/2010 2:15 PM
	Sample	SEB10141 420CKC1	SEB10181 050PMB1	SEB10211 055PMB1	SEB08281 205PDS1	SE008301 200PDS1	SEB09011 220PDS1	SE009021 200PDS1	SEB09041 115PMB1	SEB09081 000PMB1	SE009091 115PMB1	SE009131 130PMB1	SE009151 200PMB1	SE009201 400PMB1	SE009221 530SDD1	SE009271 115PMB1	SEE10151 330PMB1	SEE10191 355NAC1	SEE102214 15MAE1
	Depth	--	0 - 0.5 ft	--	0 - 1 ft	0 - 1 ft	0 - 3 ft	0 - 1 ft	0 - 1 ft	--	0 - 1 ft	0 - 0.5 ft	--	--	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	--	--
Analyte	Units	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
PCB																			
Aroclor 1016	ug/kg	< 23	< 22	< 57	< 45	< 20	< 21	< 21	< 21	< 21	< 33	< 28	< 27	< 35	< 70	< 26	< 26	< 64	< 56
Aroclor 1221	ug/kg	< 23	< 22	< 57	< 45	< 20	< 21	< 21	< 21	< 21	< 33	< 28	< 27	< 35	< 70	< 26	< 26	< 64	< 56
Aroclor 1232	ug/kg	< 23	< 22	< 57	< 45	< 20	< 21	< 21	< 21	< 21	< 33	< 28	< 27	< 35	< 70	< 26	< 26	< 64	< 56
Aroclor 1242	ug/kg	< 23	< 22	< 57	< 45	< 20	< 21	< 21	< 21	< 21	< 33	< 28	< 27	< 35	< 70	< 26	< 26	< 64	< 56
Aroclor 1248	ug/kg	< 23	< 22	< 57	< 45	< 20	< 21	< 21	< 21	< 21	< 33	< 28	< 27	< 35	< 70	< 26	< 26	< 64	< 56
Aroclor 1254	ug/kg	< 23	< 22	< 57	< 45	< 20	< 21	**12**	< 21	**13**	< 33	< 28	< 27	< 35	< 70	< 26	< 26	< 64	< 56
Aroclor 1260	ug/kg	< 23	< 22	< 57	< 45	< 20	< 21	< 21	< 21	< 21	< 33	< 28	< 27	< 35	< 70	< 26	< 26	< 64	< 56
Polychlorinated biphenyls (PCBs), total	ug/kg	< 23	< 22	---	---	< 20	< 21	**12**	< 21	**13**	< 33	< 28	< 27	< 35	< 70	< 26	< 26	---	---

Table 1. SW Monitoring Sediment PCB Analytical Data
Enbridge Line 6B MP 608 Marshall, MI Pipeline Release
Enbridge Energy, Limited Partnership

	Location	SW-109	SW-109	SW-109	SW-109	SW-109	SW-109	SW-109	SW-110	SW-110	SW-110	SW-110	SW-110	SW-110	SW-111	SW-111	SW-111	SW-111
	Date Collected	8/26/2010 2:20 PM	8/30/2010 11:45 AM	9/3/2010 11:40 AM	9/6/2010 11:30 AM	9/9/2010 10:05 AM	9/13/2010 10:26 AM	9/20/2010 11:15 AM	10/2/2010 11:50 AM	10/8/2010 12:00 PM	10/13/2010 1:15 PM	10/15/2010 10:50 AM	10/19/2010 11:15 AM	10/22/2010 11:45 AM	8/28/2010 3:40 PM	9/1/2010 3:15 PM	9/5/2010 3:00 PM	9/8/2010 9:30 AM
	Sample	SEE08261 420RCM1	SEE08301 145MHS1	SEE09031 140MHS1	SEE09061 130MHS1	SEE09091 005RCM1	SEE09131 026RCM1	SEE09201 115RCM1	SEE10021 150RTV1	SEE10081 200PMB1	SEE10131 315RTV1	SEE10151 050CKC1	SEE10191 115PMB1	SEE102211 45PMB1	SEE08281 540JRP1	SEE09011 515JAW1	SEE09051 500JAW1	SEE09080 930JRP1
	Depth	9 - 10 ft	7 - 8 ft	8 - 9 ft	8 - 9 ft	8 - 9 ft	0 - 9 ft	--	--	0 - 0.5 ft	--	--	--	--	0 - 1 ft	--	0 - 1 ft	0 - 1 ft
Analyte	Units	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
PCB																		
Aroclor 1016	ug/kg	< 150	< 75	< 73	< 69	< 71	< 81	< 69	< 22	< 25	< 20	< 22	< 53	< 53	< 43	< 21	< 21	< 21
Aroclor 1221	ug/kg	< 150	< 75	< 73	< 69	< 71	< 81	< 69	< 22	< 25	< 20	< 22	< 53	< 53	< 43	< 21	< 21	< 21
Aroclor 1232	ug/kg	< 150	< 75	< 73	< 69	< 71	< 81	< 69	< 22	< 25	< 20	< 22	< 53	< 53	< 43	< 21	< 21	< 21
Aroclor 1242	ug/kg	< 150	< 75	< 73	< 69	< 71	< 81	< 69	< 22	< 25	< 20	< 22	< 53	< 53	< 43	< 21	< 21	< 21
Aroclor 1248	ug/kg	< 150	< 75	< 73	< 69	< 71	< 81	< 69	< 22	< 25	< 20	< 22	< 53	< 53	< 43	< 21	< 21	< 21
Aroclor 1254	ug/kg	< 150	**210**	**340**	**570**	**330**	**300**	**250**	**15**	**19**	< 20	< 22	< 53	< 53	< 43	**26**	**29**	< 21
Aroclor 1260	ug/kg	< 150	< 75	< 73	< 69	< 71	< 81	< 69	< 22	< 25	< 20	< 22	< 53	< 53	< 43	< 21	< 21	< 21
Polychlorinated biphenyls (PCBs), total	ug/kg	---	**210**	**340**	**570**	**330**	**300**	**250**	**15**	**19**	< 20	< 22	---	---	---	**26**	**29**	< 21

	Location	SW-111	SW-111	SW-115	SW-115	SW-115	SW-115	SW-116	SW-116	SW-117	SW-117	SW-117	SW-117	SW-117	SW-117	SW-117	SW-117	SW-117
	Date Collected	9/15/2010 9:15 AM	9/22/2010 10:45 AM	9/1/2010 11:55 AM	9/15/2010 12:23 PM	9/25/2010 3:45 PM	9/29/2010 11:45 AM	10/20/2010 12:25 PM	10/23/2010 12:30 PM	8/27/2010 6:25 PM	8/31/2010 11:27 AM	9/3/2010 10:31 AM	9/7/2010 10:50 AM	9/10/2010 10:29 AM	9/14/2010 10:56 AM	9/17/2010 10:25 AM	9/21/2010 10:15 AM	9/24/2010 4:45 PM
	Sample	SEE09150 915JRP1	SEE09221 045ARM1	SEE09011 155JAH1	SEE09151 223JAH1	SEE09251 545CKC1	SEE09291 145TDF1	SED10201 225NAC1	SED10231 230MAE1	SEC08271 825JLS1	SEC08311 127JLS1	SEC09031 031SKS1	SEC09071 050SKS1	SEC091010 29SKS1	SEC09141 056JLS1	SEC09171 025TDF1	SEC09211 015PMB1	SEC09241 645JLS1
	Depth	--	--	1 - 2 ft	--	--	0 - 0.1 ft	--	--	--	0 - 1 ft	2 - 3 ft	0 - 1 ft	2 - 2.2 ft	0 - 0.166667 ft	0 - 3.7 ft	--	0 - 2 ft
Analyte	Units	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
PCB																		
Aroclor 1016	ug/kg	< 22	< 21	< 32	< 23	< 52	< 49	< 54	< 62	< 45	< 22	< 21	< 22	< 21	< 20	< 23	< 22	< 21
Aroclor 1221	ug/kg	< 22	< 21	< 32	< 23	< 52	< 49	< 54	< 62	< 45	< 22	< 21	< 22	< 21	< 20	< 23	< 22	< 21
Aroclor 1232	ug/kg	< 22	< 21	< 32	< 23	< 52	< 49	< 54	< 62	< 45	< 22	< 21	< 22	< 21	< 20	< 23	< 22	< 21
Aroclor 1242	ug/kg	< 22	< 21	< 32	< 23	< 52	< 49	< 54	< 62	< 45	< 22	< 21	< 22	< 21	< 20	< 23	< 22	< 21
Aroclor 1248	ug/kg	< 22	< 21	< 32	< 23	< 52	< 49	< 54	< 62	< 45	< 22	< 21	< 22	< 21	< 20	< 23	< 22	< 21
Aroclor 1254	ug/kg	**21**	< 21	**180**	< 23	**140**	**110**	< 54	< 62	< 45	< 22	< 21	< 22	< 21	< 20	< 23	< 22	< 21
Aroclor 1260	ug/kg	< 22	< 21	< 32	< 23	< 52	< 49	< 54	< 62	< 45	< 22	< 21	< 22	< 21	< 20	< 23	< 22	< 21
Polychlorinated biphenyls (PCBs), total	ug/kg	**21**	< 21	**180**	< 23	**140**	**110**	---	---	---	< 22	< 21	< 22	< 21	< 20	< 23	< 22	< 21

Table 1. SW Monitoring Sediment PCB Analytical Data
Enbridge Line 6B MP 608 Marshall, MI Pipeline Release
Enbridge Energy, Limited Partnership

	Location	SW-117	SW-117	SW-117	SW-117	SW-117	SW-127	SW-127	SW-127	SW-127	SW-127	SW-127	SW-127	SW-127	SW-127	SW-127	SW-933	SW-933
	Date Collected	9/28/2010 11:15 AM	10/1/2010 10:15 AM	10/5/2010 10:15 AM	10/8/2010 10:45 AM	10/12/2010 11:59 AM	9/16/2010 9:00 AM	9/20/2010 3:30 PM	9/22/2010 4:45 PM	9/27/2010 9:45 AM	9/30/2010 9:30 AM	10/4/2010 9:00 AM	10/7/2010 2:00 PM	10/11/2010 2:45 PM	10/14/2010 6:20 PM	10/18/2010 1:55 PM	10/21/2010 1:45 PM	9/3/2010 4:45 PM	9/6/2010 3:25 PM
	Sample	SEC09281 115JLS1	SEC10011 015JLS1	SEC10051 015JLS1	SEC10081 045JLS1	SEC10121 159JLS1	SE009160 900PMB1	SE009201 530PMB1	SE009221 645SDD1	SE009270 945PMB1	SE009300 930PMB1	SE010040 900PMB1	SE010071 400PMB1	SE010111 445RTV1	SE010141 820CKC1	SE010181 355PMB1	SEO10211 345PMB1	SEE09031 645MHS1	SEE09061 525MHS1
	Depth	0 - 0.4 ft	0 - 0.25 ft	0 - 0.25 ft	0 - 0.25 ft	--	--	--	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	--	--	0 - 0.5 ft	--	9 - 10 ft	10 - 11 ft
Analyte	Units	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
PCB																			
Aroclor 1016	ug/kg	< 21	< 21	< 21	< 22	< 21	< 86	< 47	< 62	< 57	< 46	< 57	< 52	< 55	< 52	< 53	< 130	< 86	< 82
Aroclor 1221	ug/kg	< 21	< 21	< 21	< 22	< 21	< 86	< 47	< 62	< 57	< 46	< 57	< 52	< 55	< 52	< 53	< 130	< 86	< 82
Aroclor 1232	ug/kg	< 21	< 21	< 21	< 22	< 21	< 86	< 47	< 62	< 57	< 46	< 57	< 52	< 55	< 52	< 53	< 130	< 86	< 82
Aroclor 1242	ug/kg	< 21	< 21	< 21	< 22	< 21	< 86	< 47	< 62	< 57	< 46	< 57	< 52	< 55	< 52	< 53	< 130	< 86	< 82
Aroclor 1248	ug/kg	< 21	< 21	< 21	< 22	< 21	< 86	< 47	< 62	< 57	< 46	< 57	< 52	< 55	< 52	< 53	< 130	< 86	< 82
Aroclor 1254	ug/kg	< 21	< 21	< 21	< 22	< 21	< 86	**36**	< 62	**50**	< 46	< 57	< 52	**69**	< 52	< 53	< 130	**240**	**250**
Aroclor 1260	ug/kg	< 21	< 21	< 21	< 22	< 21	< 86	< 47	< 62	< 57	< 46	**41**	**37**	< 55	**63**	< 53	< 130	< 86	< 82
Polychlorinated biphenyls (PCBs), total	ug/kg	< 21	< 21	< 21	< 22	< 21	< 86	**36**	< 62	**50**	< 46	**41**	**37**	**69**	**63**	< 53	---	**240**	**250**

	Location	SW-933	SW-933	SW-933	SW-933	SW-933	SW-933	SW-933	SW-934	SW-934	SW-934	SW-934	SW-934	SW-934	SW-934	SW-934	SW-934	MP-26.75
	Date Collected	9/9/2010 2:10 PM	9/12/2010 11:05 AM	9/13/2010 2:45 PM	9/17/2010 2:45 PM	9/21/2010 11:12 AM	9/23/2010 12:05 PM	10/4/2010 11:38 AM	8/26/2010 2:45 PM	8/30/2010 3:30 PM	9/3/2010 11:15 AM	9/9/2010 10:25 AM	9/13/2010 9:55 AM	9/20/2010 4:45 PM	9/23/2010 11:30 AM	9/27/2010 10:25 AM	9/30/2010 12:55 PM	10/4/2010 1:55 PM	9/21/2010 3:20 PM
	Sample	SEE09091 410RCM1	SEE09121 105RCM1	SEE09131 445RCM1	SEE09171 445RCM1	SEE09211 112RCM1	SEE09231 205RCM1	SEE10041 138RCM1	SEE08261 445JRP1	SEE08301 530JAW1	SEE09031 115JAW1	SEE09091 025JRP1	SEE09130 955JRP1	SEE09201 645ARM1	SEE09231 130ARM1	SEE09271 025ARM1	SEE09301 255MAE1	SEE10041 355ARM1	SEE09211 520PMH1
	Depth	9 - 10 ft	--	0 - 9 ft	0 - 9 ft	--	--	0 - 9 ft	--	--	--	3 - 4 ft	4 - 5 ft	--	--	--	--	0 - 3.5 ft	0 - 1.5 ft
Analyte	Units	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
PCB																			
Aroclor 1016	ug/kg	< 81	< 86	< 77	< 72	< 60	< 23	< 76	< 66	< 63	< 62	< 61	< 56	< 62	< 59	< 59	< 59	< 50	< 20
Aroclor 1221	ug/kg	< 81	< 86	< 77	< 72	< 60	< 23	< 76	< 66	< 63	< 62	< 61	< 56	< 62	< 59	< 59	< 59	< 50	< 20
Aroclor 1232	ug/kg	< 81	< 86	< 77	< 72	< 60	< 23	< 76	< 66	< 63	< 62	< 61	< 56	< 62	< 59	< 59	< 59	< 50	< 20
Aroclor 1242	ug/kg	< 81	< 86	< 77	< 72	< 60	< 23	< 76	< 66	< 63	< 62	< 61	< 56	< 62	< 59	< 59	< 59	< 50	< 20
Aroclor 1248	ug/kg	< 81	< 86	< 77	< 72	< 60	< 23	< 76	**260**	< 63	< 62	< 61	< 56	< 62	< 59	< 59	< 59	< 50	< 20
Aroclor 1254	ug/kg	**260**	**78**	**200**	**110**	< 60	**20**	**400**	< 66	**170**	**130**	**110**	**36**	**180**	**170**	**220**	**210**	**180**	**7.9**
Aroclor 1260	ug/kg	< 81	< 86	< 77	< 72	< 60	< 23	< 76	< 66	< 63	< 62	< 61	< 56	< 62	< 59	< 59	< 59	< 50	< 20
Polychlorinated biphenyls (PCBs), total	ug/kg	**260**	**78**	**200**	**110**	< 60	**20**	**400**	**260**	**170**	**130**	**110**	**36**	**180**	**170**	**220**	**210**	**180**	**7.9**

Table 1. SW Monitoring Sediment PCB Analytical Data
Enbridge Line 6B MP 608 Marshall, MI Pipeline Release
Enbridge Energy, Limited Partnership

	Location	MP-27.0	MP-27.5	MP-27.5	MP28.5	MP-32.0	MSE-16	SW-001	SW-001	SW-001	SW-001	SW-001	SW-001	SW-001	SW-001	SW-001	SW-001	SW-001
	Date Collected	9/21/2010 11:33 AM	9/21/2010 10:40 AM	9/21/2010 2:40 PM	9/17/2010 2:58 PM	9/17/2010 10:42 AM	8/31/2010 10:10 AM	8/27/2010 4:30 PM	8/31/2010 11:30 AM	9/3/2010 10:15 AM	9/7/2010 11:30 AM	9/10/2010 10:25 AM	9/14/2010 10:30 AM	9/17/2010 10:00 AM	9/21/2010 11:40 AM	9/23/2010 10:15 AM	9/28/2010 11:15 AM	10/1/2010 11:15 AM	10/5/2010 9:15 AM
	Sample	SEE09211 133PMH1	SEE09211 040PMH1	SEE09211 440PMH1	SEE09171 458PMH1	SEE09171 042PMH1	SEE08311 010JRP1	SEC08271 630PDS1	SEC08311 130PDS1	SEC09031 015PDS1	SEC09071 130PMB1	SEC09101 025PMB1	SEC09141 030PMB1	SEC09171 000PMB1	SEC09211 140SDD1	SEC09231 015PMB1	SEC09281 115PMB1	SEC10011 115PMB1	SEC10050 915PMB1
	Depth	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1.7 ft	0 - 2 ft	9 - 10 ft	--	0 - 1 ft	0 - 1 ft	0 - 6 ft	0 - 6 ft	0 - 6 ft	0 - 6 ft	--	0 - 6 ft	--	0 - 0.5 ft	0 - 0.5 ft
Analyte	Units	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
PCB																			
Aroclor 1016	ug/kg	< 23	< 30	< 32	< 57	< 25	< 97	< 160	< 98	< 27	< 24	< 26	< 32	< 25	< 25	< 25	< 24	< 42	< 39
Aroclor 1221	ug/kg	< 23	< 30	< 32	< 57	< 25	< 97	< 160	< 98	< 27	< 24	< 26	< 32	< 25	< 25	< 25	< 24	< 42	< 39
Aroclor 1232	ug/kg	< 23	< 30	< 32	< 57	< 25	< 97	< 160	< 98	< 27	< 24	< 26	< 32	< 25	< 25	< 25	< 24	< 42	< 39
Aroclor 1242	ug/kg	< 23	< 30	< 32	< 57	< 25	< 97	< 160	< 98	< 27	< 24	< 26	< 32	< 25	< 25	< 25	< 24	< 42	< 39
Aroclor 1248	ug/kg	< 23	< 30	< 32	< 57	< 25	< 97	< 160	< 98	< 27	< 24	< 26	< 32	< 25	< 25	< 25	< 24	< 42	< 39
Aroclor 1254	ug/kg	**31**	**32**	**40**	**98**	< 25	**1400**	< 160	< 98	< 27	**21**	< 26	**14**	< 25	< 25	< 25	< 24	< 42	< 39
Aroclor 1260	ug/kg	< 23	< 30	< 32	< 57	< 25	< 97	< 160	< 98	< 27	< 24	< 26	< 32	< 25	< 25	< 25	< 24	< 42	< 39
Polychlorinated biphenyls (PCBs), total	ug/kg	**31**	**32**	**40**	**98**	< 25	**1400**	---	< 98	< 27	**21**	< 26	**14**	< 25	< 25	< 25	< 24	< 42	< 39

	Location	SW-001	SW-001	SW-001	SW-001	SW-001	SW-002	SW-002	SW-002	SW-002	SW-002	SW-002	SW-003	SW-003	SW-003	SW-003	SW-003	SW-003	SW-003
	Date Collected	10/8/2010 9:00 AM	10/12/2010 2:50 PM	10/15/2010 1:20 PM	10/19/2010 9:15 AM	10/22/2010 1:20 PM	8/30/2010 11:11 AM	9/2/2010 4:00 PM	9/6/2010 1:10 PM	9/9/2010 12:15 PM	9/13/2010 12:38 PM	9/16/2010 11:59 AM	9/27/2010 2:21 PM	9/30/2010 1:35 PM	10/4/2010 1:21 PM	10/7/2010 11:59 AM	10/11/2010 11:15 AM	10/15/2010 11:59 AM	10/18/2010 1:59 PM
	Sample	SEC10080 900PMB1	SEC10121 450RTV1	SEC10151 320CKC1	SEC10190 915PMB1	SEC10221 320PMB1	SEC08301 111JLS1	SEC09021 600JLS1	SEC09061 310SKS1	SEC09091 215SKS1	SEC09131 238JLS1	SEC09161 159JLS1	SEC09271 421JLS1	SEC09301 335JLS1	SEC10041 321JLS1	SEC10071 159JLS1	SEC10111 115PDS1	SEC10151 159JLS1	SEC10181 359JLS1
	Depth	0 - 0.5 ft	--	--	--	--	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0.1 - 0.2 ft	--	0 - 0.4 ft	0 - 0.25 ft	0 - 0.25 ft	0 - 3 ft	0 - 3 ft	0 - 0.25 ft	0.167 - 0.25 ft
Analyte	Units	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
PCB																			
Aroclor 1016	ug/kg	< 34	< 29	< 43	< 120	< 82	< 27	< 24	< 19	< 21	< 21	< 20	< 22	< 21	< 26	< 24	< 21	< 22	< 20
Aroclor 1221	ug/kg	< 34	< 29	< 43	< 120	< 82	< 27	< 24	< 19	< 21	< 21	< 20	< 22	< 21	< 26	< 24	< 21	< 22	< 20
Aroclor 1232	ug/kg	< 34	< 29	< 43	< 120	< 82	< 27	< 24	< 19	< 21	< 21	< 20	< 22	< 21	< 26	< 24	< 21	< 22	< 20
Aroclor 1242	ug/kg	< 34	< 29	< 43	< 120	< 82	< 27	< 24	< 19	< 21	< 21	< 20	< 22	< 21	< 26	< 24	< 21	< 22	< 20
Aroclor 1248	ug/kg	< 34	< 29	< 43	< 120	< 82	< 27	< 24	< 19	< 21	< 21	< 20	**110**	**220**	< 26	< 24	**210**	< 22	< 20
Aroclor 1254	ug/kg	< 34	< 29	< 43	< 120	< 82	< 27	**160**	< 19	**350**	< 21	< 20	< 22	**81**	< 26	**31**	< 21	< 22	**67**
Aroclor 1260	ug/kg	< 34	< 29	< 43	< 120	< 82	< 27	< 24	< 19	< 21	< 21	< 20	< 22	< 21	**33**	< 24	< 21	< 22	< 20
Polychlorinated biphenyls (PCBs), total	ug/kg	< 34	< 29	< 43	---	---	< 27	**160**	< 19	**350**	< 21	< 20	**110**	**300**	**33**	**31**	**210**	< 22	**67**

Table 1. SW Monitoring Sediment PCB Analytical Data
Enbridge Line 6B MP 608 Marshall, MI Pipeline Release
Enbridge Energy, Limited Partnership

	Location	SW-003	SW-004	SW-004	SW-004	SW-004	SW-004	SW-004	SW-004	SW-004	SW-004	SW-004	SW-004	SW-004	SW-004	SW-005	SW-005	SW-005
	Date Collected	10/21/2010 3:59 PM	9/6/2010 5:20 PM	9/10/2010 3:25 PM	9/14/2010 2:00 PM	9/21/2010 1:15 PM	9/24/2010 10:18 AM	9/28/2010 3:59 PM	10/1/2010 1:19 PM	10/5/2010 1:21 PM	10/8/2010 1:35 PM	10/12/2010 3:35 PM	10/15/2010 2:55 PM	10/19/2010 2:25 PM	10/22/2010 2:31 PM	9/23/2010 11:55 AM	9/27/2010 2:30 PM	9/30/2010 4:30 PM
	Sample	SEC10211 559JLS1	SED09061 720SWA1	SED09101 525SKS1	SED09141 400JLS1	SED09211 315PMB1	SED09241 018JLS1	SED09281 559JLS1	SED10011 319JLS1	SED10051 321JLS1	SED10081 335JLS1	SED10121 535JLS1	SED10151 455JLS1	SED10191 425JLS1	SED10221431J LS1	SEE09231 155CKC1	SEE09271 430TDF1	SEE09301 630TDF1
	Depth	--	0 - 1 ft	0 - 0.5 ft	0 - 0.166667 ft	--	0 - 0.1 ft	0 - 0.4 ft	0 - 0.25 ft	0 - 0.25 ft	0 - 0.25 ft	--	0 - 0.25 ft	--	--	--	0 - 0.1 ft	0 - 0.166667 ft
Analyte	Units	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
PCB																		
Aroclor 1016	ug/kg	< 55	< 20	< 20	< 43	< 22	< 21	< 21	< 21	< 21	< 22	< 20	< 22	< 52	< 50	< 24	< 25	< 22
Aroclor 1221	ug/kg	< 55	< 20	< 20	< 43	< 22	< 21	< 21	< 21	< 21	< 22	< 20	< 22	< 52	< 50	< 24	< 25	< 22
Aroclor 1232	ug/kg	< 55	< 20	< 20	< 43	< 22	< 21	< 21	< 21	< 21	< 22	< 20	< 22	< 52	< 50	< 24	< 25	< 22
Aroclor 1242	ug/kg	< 55	< 20	< 20	< 43	< 22	< 21	< 21	< 21	< 21	< 22	< 20	< 22	< 52	< 50	< 24	< 25	< 22
Aroclor 1248	ug/kg	< 55	< 20	< 20	< 43	< 22	< 21	< 21	< 21	< 21	< 22	< 20	< 22	< 52	< 50	< 24	< 25	< 22
Aroclor 1254	ug/kg	**110**	**14**	**22**	< 43	**39**	< 21	**21**	**21**	< 21	**26**	**20**	**28**	< 52	< 50	**33**	**31**	**19**
Aroclor 1260	ug/kg	< 55	< 20	< 20	< 43	< 22	< 21	< 21	< 21	< 21	< 22	< 20	< 22	< 52	< 50	< 24	< 25	< 22
Polychlorinated biphenyls (PCBs), total	ug/kg	---	**14**	**22**	< 43	**39**	< 21	**21**	**21**	< 21	**26**	**20**	**28**	---	---	**33**	**31**	**19**

	Location	SW-005	SW-005	SW-005	SW-005	SW-005	SW-100	SW-100	SW-100	SW-100	SW-100	SW-101	SW-101	SW-101	SW-101	SW-101	SW-101	SW-101
	Date Collected	10/4/2010 3:40 PM	10/7/2010 12:50 PM	10/11/2010 2:15 PM	10/14/2010 2:45 PM	10/18/2010 1:45 PM	8/28/2010 10:05 AM	9/1/2010 9:50 AM	9/4/2010 9:32 AM	9/8/2010 12:00 PM	9/11/2010 9:15 AM	9/11/2010 10:30 AM	9/15/2010 3:34 PM	9/19/2010 1:05 PM	9/22/2010 2:39 PM	9/25/2010 2:35 PM	9/29/2010 3:21 PM	10/2/2010 2:59 PM
	Sample	SEE10041 540TDF1	SEE10071 250TDF1	SEE10111 415PMB1	SEE10141 445WPW1	SEE10181 345NAC1	SEB08281 005PDS1	SEC09010 950PDS1	SEC09040 932PMB1	SEB09081 200PMB1	SEB09110 915PMB1	SEC09111 030SKS1	SEC09151 534JLS1	SEC09191 305TDF1	SEC09221439J LS1	SEC09251 435JLS1	SEC09291 521JLS1	SEC10021 459JLS1
	Depth	0 - 0.167 ft	0 - 2 ft	0 - 0.5 ft	0.5 - 1 ft	--	0 - 1 ft	0 - 3 ft	0 - 1 ft	--	0 - 6 ft	0 - 0.5 ft	--	0 - 2 ft	0 - 1.75 ft	0 - 0.4 ft	0 - 0.4 ft	--
Analyte	Units	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
PCB																		
Aroclor 1016	ug/kg	< 21	< 21	< 19	< 22	< 23	< 51	< 55	< 42	< 55	< 27	< 43	< 43	< 50	< 43	< 44	< 41	< 49
Aroclor 1221	ug/kg	< 21	< 21	< 19	< 22	< 23	< 51	< 55	< 42	< 55	< 27	< 43	< 43	< 50	< 43	< 44	< 41	< 49
Aroclor 1232	ug/kg	< 21	< 21	< 19	< 22	< 23	< 51	< 55	< 42	< 55	< 27	< 43	< 43	< 50	< 43	< 44	< 41	< 49
Aroclor 1242	ug/kg	< 21	< 21	< 19	< 22	< 23	< 51	< 55	< 42	< 55	< 27	< 43	< 43	< 50	< 43	< 44	< 41	< 49
Aroclor 1248	ug/kg	< 21	< 21	< 19	< 22	< 23	< 51	< 55	< 42	< 55	< 27	< 43	< 43	< 50	< 43	< 44	< 41	< 49
Aroclor 1254	ug/kg	**19**	**47**	**8.5**	**19**	**33**	< 51	**140**	**63**	**84**	**21**	**61**	**21**	< 50	**42**	**46**	**57**	**56**
Aroclor 1260	ug/kg	< 21	< 21	< 19	< 22	< 23	< 51	< 55	< 42	< 55	< 27	< 43	< 43	< 50	< 43	< 44	< 41	< 49
Polychlorinated biphenyls (PCBs), total	ug/kg	**19**	**47**	**8.5**	**19**	**33**	---	**140**	**63**	**84**	**21**	**61**	**21**	< 50	**42**	**46**	**57**	**56**

Table 1. SW Monitoring Sediment PCB Analytical Data
Enbridge Line 6B MP 608 Marshall, MI Pipeline Release
Enbridge Energy, Limited Partnership

	Location	SW-101	SW-101	SW-101	SW-101	SW-101	SW-101	SW-103	SW-103	SW-103	SW-103	SW-103	SW-103	SW-103	SW-103	SW-103	SW-103
	Date Collected	10/6/2010 1:21 PM	10/9/2010 1:10 PM	10/14/2010 9:59 AM	10/16/2010 3:15 PM	10/20/2010 3:59 PM	10/23/2010 12:45 PM	9/4/2010 2:25 PM	9/8/2010 1:39 PM	9/12/2010 1:11 PM	9/15/2010 11:51 AM	9/19/2010 10:16 AM	9/19/2010 10:16 AM	9/22/2010 12:00 PM	9/25/2010 12:31 PM	9/29/2010 12:25 PM	10/2/2010 11:59 AM	10/6/2010 11:32 AM
	Sample	SEC10061 321JLS1	SEC10091 310PDS1	SEC10140 959JLS1	SEC10161 515JLS1	SEC102015 59JLS1	SEB1023124 5JLS1	SEB09041 425SKS1	SEB09081 339SKS1	SEB09121 311SKS1	SEB09151 151JLS1	SEB09191 016TDF1	SEB09191 016TDF2	SEB09221 200JLS1	SEB09251 231JLS1	SEB09291 225JLS1	SEB10021 159JLS1	SEB10061 132JLS1
	Depth	0 - 0.25 ft	0 - 0.25 ft	0 - 0.25 ft	0 - 0.25 ft	--	--	2 - 3 ft	0 - 1 ft	--	--	--	--	0 - 1.75 ft	0 - 0.4 ft	0 - 0.4 ft	--	0 - 0.25 ft
Analyte	Units	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
PCB																		
Aroclor 1016	ug/kg	< 39	< 43	< 32	< 31	< 98	< 93	< 20	< 25	< 27	< 21	< 21	< 21	< 21	< 22	< 21	< 22	< 20
Aroclor 1221	ug/kg	< 39	< 43	< 32	< 31	< 98	< 93	< 20	< 25	< 27	< 21	< 21	< 21	< 21	< 22	< 21	< 22	< 20
Aroclor 1232	ug/kg	< 39	< 43	< 32	< 31	< 98	< 93	< 20	< 25	< 27	< 21	< 21	< 21	< 21	< 22	< 21	< 22	< 20
Aroclor 1242	ug/kg	< 39	< 43	< 32	< 31	< 98	< 93	< 20	< 25	< 27	< 21	< 21	< 21	< 21	< 22	< 21	< 22	< 20
Aroclor 1248	ug/kg	< 39	< 43	< 32	< 31	< 98	< 93	< 20	< 25	< 27	< 21	< 21	< 21	< 21	< 22	< 21	< 22	< 20
Aroclor 1254	ug/kg	< 39	< 43	**27**	**15**	< 98	< 93	< 20	< 25	< 27	< 21	< 21	< 21	< 21	< 22	< 21	< 22	< 20
Aroclor 1260	ug/kg	< 39	< 43	< 32	< 31	< 98	< 93	< 20	< 25	< 27	< 21	< 21	< 21	< 21	< 22	< 21	< 22	< 20
Polychlorinated biphenyls (PCBs), total	ug/kg	< 39	< 43	**27**	**15**	---	---	< 20	< 25	< 27	< 21	< 21	< 21	< 21	< 22	< 21	< 22	< 20

	Location	SW-103	SW-103	SW-103	SW-103	SW-103	SW-104	SW-104	SW-104	SW-104	SW-104	SW-104	SW-105	SW-105	SW-105	SW-105	SW-105	SW-105
	Date Collected	10/9/2010 11:00 AM	10/13/2010 11:05 AM	10/16/2010 12:15 PM	10/20/2010 12:35 PM	10/23/2010 10:55 AM	8/26/2010 2:20 PM	9/6/2010 12:45 PM	9/9/2010 12:45 PM	9/13/2010 1:00 PM	9/16/2010 10:30 AM	9/17/2010 2:32 PM	9/11/2010 10:45 AM	9/15/2010 10:45 AM	9/17/2010 1:00 PM	9/21/2010 9:45 AM	9/23/2010 12:15 PM	9/29/2010 10:45 AM
	Sample	SEB10091 100PDS1	SEB10131 105JLS1	SEB10161 215JLS1	SEB10201 235JLS1	SEB102310 55JLS1	SEC0826142 0PDS1	SEB09061 245PMB1	SEB09091 245PMB1	SEB09131 300PMB1	SEB09161 030PMB1	SED09171 432TDF1	SEB09111 045PMB1	SEB09151 045PMB1	SEB09171 300PMB1	SEB09210 945SDD1	SEB09231 215PMB1	SEB09291 045PMB1
	Depth	0 - 0.25 ft	0 - 0.25 ft	0 - 0.25 ft	--	--	0 - 0.5 ft	--	0 - 1 ft	0 - 0.5 ft	0 - 6 ft	--	0 - 6 ft	--	0 - 6 ft	--	0 - 6 ft	0 - 0.5 ft
Analyte	Units	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
PCB																		
Aroclor 1016	ug/kg	< 24	< 21	< 21	< 59	< 53	< 25	< 20	< 22	< 19	< 21	< 20	< 21	< 20	< 20	< 21	< 20	< 20
Aroclor 1221	ug/kg	< 24	< 21	< 21	< 59	< 53	< 25	< 20	< 22	< 19	< 21	< 20	< 21	< 20	< 20	< 21	< 20	< 20
Aroclor 1232	ug/kg	< 24	< 21	< 21	< 59	< 53	< 25	< 20	< 22	< 19	< 21	< 20	< 21	< 20	< 20	< 21	< 20	< 20
Aroclor 1242	ug/kg	< 24	< 21	< 21	< 59	< 53	< 25	< 20	< 22	< 19	< 21	< 20	< 21	< 20	< 20	< 21	< 20	< 20
Aroclor 1248	ug/kg	< 24	< 21	< 21	< 59	< 53	< 25	< 20	< 22	< 19	< 21	< 20	< 21	< 20	< 20	< 21	< 20	< 20
Aroclor 1254	ug/kg	< 24	< 21	< 21	< 59	< 53	< 25	< 20	< 22	< 19	< 21	**15**	**16**	< 20	< 20	**56**	< 20	< 20
Aroclor 1260	ug/kg	< 24	< 21	< 21	< 59	< 53	< 25	< 20	< 22	< 19	< 21	< 20	< 21	< 20	< 20	< 21	< 20	< 20
Polychlorinated biphenyls (PCBs), total	ug/kg	< 24	< 21	< 21	---	---	< 25	< 20	< 22	< 19	< 21	**15**	**16**	< 20	< 20	**56**	< 20	< 20

Table 1. SW Monitoring Sediment PCB Analytical Data
Enbridge Line 6B MP 608 Marshall, MI Pipeline Release
Enbridge Energy, Limited Partnership

	Location	SW-105	SW-105	SW-105	SW-105	SW-105	SW-105	SW-105	SW-107	SW-107	SW-107	SW-107	SW-107	SW-107	SW-107	SW-107	SW-107	SW-107
	Date Collected	10/2/2010 10:45 AM	10/4/2010 2:15 PM	10/7/2010 10:15 AM	10/11/2010 10:45 AM	10/14/2010 11:35 AM	10/18/2010 10:00 AM	10/21/2010 10:00 AM	8/26/2010 12:10 PM	9/2/2010 10:45 AM	9/6/2010 11:15 AM	9/30/2010 10:45 AM	10/4/2010 10:15 AM	10/7/2010 12:00 PM	10/11/2010 12:55 PM	10/14/2010 4:20 PM	10/18/2010 11:55 AM	10/21/2010 11:25 AM
	Sample	SEB10021 045PMB1	SEB10041 415PMB1	SEB10071 015PMB1	SEB10111 045RTV1	SEB10141 135CKC1	SEB101810 00PMB1	SEB1021100 0PMB1	SE0082612 10PDS1	SE00902104 5PDS1	SE009061 115PMB1	SE009301 045PMB1	SE010041 015PMB1	SE010071 200PMB1	SE010111 255RTV1	SE010141 620CKC1	SE010181 155PMB1	SEO10211 125PMB1
	Depth	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	--	--	0 - 0.5 ft	--	0 - 0.5 ft	0 - 1 ft	0 - 1 ft	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	--	--	0 - 0.5 ft	--
Analyte	Units	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
PCB																		
Aroclor 1016	ug/kg	< 21	< 21	< 22	< 25	< 24	< 23	< 66	< 40	< 37	< 34	< 29	< 25	< 29	< 32	< 54	< 33	< 80
Aroclor 1221	ug/kg	< 21	< 21	< 22	< 25	< 24	< 23	< 66	< 40	< 37	< 34	< 29	< 25	< 29	< 32	< 54	< 33	< 80
Aroclor 1232	ug/kg	< 21	< 21	< 22	< 25	< 24	< 23	< 66	< 40	< 37	< 34	< 29	< 25	< 29	< 32	< 54	< 33	< 80
Aroclor 1242	ug/kg	< 21	< 21	< 22	< 25	< 24	< 23	< 66	< 40	< 37	< 34	< 29	< 25	< 29	< 32	< 54	< 33	< 80
Aroclor 1248	ug/kg	< 21	< 21	< 22	< 25	< 24	< 23	< 66	< 40	< 37	< 34	< 29	< 25	< 29	< 32	< 54	< 33	< 80
Aroclor 1254	ug/kg	< 21	< 21	< 22	**11**	< 24	< 23	< 66	< 40	< 37	< 34	< 29	< 25	< 29	< 32	< 54	< 33	< 80
Aroclor 1260	ug/kg	< 21	< 21	< 22	< 25	< 24	< 23	< 66	< 40	< 37	< 34	< 29	< 25	< 29	< 32	< 54	< 33	< 80
Polychlorinated biphenyls (PCBs), total	ug/kg	< 21	< 21	< 22	**11**	< 24	< 23	---	< 40	< 37	< 34	< 29	< 25	< 29	< 32	< 54	< 33	---

	Location	SW-108	SW-108	SW-108	SW-108	SW-108	SW-108	SW-108	SW-108	SW-108	SW-108	SW-108	SW-108	SW-109	SW-109	SW-109	SW-109	SW-109
	Date Collected	9/3/2010 10:35 AM	9/7/2010 11:42 AM	9/10/2010 1:30 PM	9/14/2010 12:45 PM	9/16/2010 11:45 AM	9/20/2010 10:00 AM	9/22/2010 10:30 AM	9/28/2010 9:45 AM	10/1/2010 9:00 AM	10/5/2010 4:41 PM	10/8/2010 4:20 PM	10/12/2010 9:00 AM	9/23/2010 9:55 AM	9/30/2010 12:05 PM	10/7/2010 10:42 AM	10/14/2010 3:55 PM	10/18/2010 2:30 PM
	Sample	SEE09031 035SWA1	SEE09071 142SWA3	SEE09101 330PMB1	SEE09141 245PMB1	SEE09161 145PMB1	SEE092010 00PMB1	SEE0922103 0SDD1	SEE092809 45PMB1	SEE100109 00PMB1	SEE10051 641TDF1	SEE10081 620TDF1	SEE10120 900PMB1	SEE09230 955RCM1	SEE09301 205RCM1	SEE10071 042RCM1	SEE10141 555ARM1	SEE10181 430JWP1
	Depth	0 - 1 ft	0 - 1 ft	0 - 6 ft	0 - 6 ft	--	--	0 - 0.5 ft	--	0 - 0.5 ft	0 - 0.167 ft	0 - 0.1 ft	0 - 0.5 ft	--	0 - 0.75 ft	0 - 9 ft	0 - 8.417 ft	8 - 8 ft
Analyte	Units	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
PCB																		
Aroclor 1016	ug/kg	< 38	< 24	< 26	< 23	< 27	< 26	< 22	< 26	< 26	< 30	< 39	< 23	< 74	< 69	< 71	< 76	< 140
Aroclor 1221	ug/kg	< 38	< 24	< 26	< 23	< 27	< 26	< 22	< 26	< 26	< 30	< 39	< 23	< 74	< 69	< 71	< 76	< 140
Aroclor 1232	ug/kg	< 38	< 24	< 26	< 23	< 27	< 26	< 22	< 26	< 26	< 30	< 39	< 23	< 74	< 69	< 71	< 76	< 140
Aroclor 1242	ug/kg	< 38	< 24	< 26	< 23	< 27	< 26	< 22	< 26	< 26	< 30	< 39	< 23	< 74	< 69	< 71	< 76	< 140
Aroclor 1248	ug/kg	< 38	< 24	< 26	< 23	< 27	< 26	< 22	< 26	< 26	< 30	< 39	< 23	< 74	< 69	< 71	< 76	< 140
Aroclor 1254	ug/kg	< 38	**10**	< 26	< 23	< 27	< 26	< 22	**11**	< 26	< 30	< 39	< 23	**340**	**500**	**470**	**1100**	**2200**
Aroclor 1260	ug/kg	< 38	< 24	< 26	< 23	< 27	< 26	< 22	< 26	< 26	< 30	< 39	< 23	< 74	< 69	< 71	< 76	< 140
Polychlorinated biphenyls (PCBs), total	ug/kg	< 38	**10**	< 26	< 23	< 27	< 26	< 22	**11**	< 26	< 30	< 39	< 23	**340**	**500**	**470**	**1100**	**2200**

Table 1. SW Monitoring Sediment PCB Analytical Data
Enbridge Line 6B MP 608 Marshall, MI Pipeline Release
Enbridge Energy, Limited Partnership

	Location	SW-109	SW-110	SW-110	SW-110	SW-110	SW-110	SW-110	SW-110	SW-110	SW-110	SW-110	SW-111	SW-111	SW-111	SW-111	SW-111	SW-111
	Date Collected	10/21/2010 10:10 AM	8/28/2010 4:45 PM	9/1/2010 10:25 AM	9/4/2010 10:25 AM	9/8/2010 11:45 AM	9/11/2010 11:30 AM	9/14/2010 9:20 AM	9/19/2010 11:40 AM	9/22/2010 2:40 PM	9/25/2010 3:00 PM	9/29/2010 11:30 AM	9/25/2010 12:35 PM	9/29/2010 9:15 AM	10/6/2010 11:35 AM	10/9/2010 12:00 PM	10/12/2010 10:40 AM	10/17/2010 3:35 PM
	Sample	SEE10211010JWP1	SEE08281645CKC1	SEE09011025RTV1	SEE09041025RTV1	SEE09081145RTV1	SEE09111130RTV1	SEE09140920RTV1	SEE09191140JPN1	SEE09221440JPN1	SEE09251500SDD1	SEE09291130RTV1	SEE09251235ARM1	SEE09290915MAE1	SEE10061135ARM1	SEE10091200ARM1	SEE10121040ARM1	SEE10171535ARM1
	Depth	--	--	--	--	--	--	--	0 - 1.5 ft	0 - 1.5 ft	0 - 1 ft	--	--	--	0 - 1.5 ft	0 - 1.5 ft	--	0 - 1 ft
Analyte	Units	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
PCB																		
Aroclor 1016	ug/kg	< 180	< 37	< 23	< 24	< 24	< 34	< 140	< 29	< 30	< 39	< 20	< 22	< 24	< 21	< 160	< 20	< 28
Aroclor 1221	ug/kg	< 180	< 37	< 23	< 24	< 24	< 34	< 140	< 29	< 30	< 39	< 20	< 22	< 24	< 21	< 160	< 20	< 28
Aroclor 1232	ug/kg	< 180	< 37	< 23	< 24	< 24	< 34	< 140	< 29	< 30	< 39	< 20	< 22	< 24	< 21	< 160	< 20	< 28
Aroclor 1242	ug/kg	< 180	< 37	< 23	< 24	< 24	< 34	< 140	< 29	< 30	< 39	< 20	< 22	< 24	< 21	< 160	< 20	< 28
Aroclor 1248	ug/kg	< 180	< 37	< 23	< 24	< 24	< 34	< 140	< 29	< 30	< 39	< 20	< 22	< 24	< 21	< 160	< 20	< 28
Aroclor 1254	ug/kg	**560**	< 37	**16**	**28**	**62**	**60**	**62**	**25**	**25**	**60**	**8.8**	**20**	**47**	**44**	**1700**	**18**	**250**
Aroclor 1260	ug/kg	< 180	< 37	< 23	< 24	< 24	< 34	< 140	< 29	< 30	< 39	< 20	< 22	< 24	< 21	< 160	< 20	< 28
Polychlorinated biphenyls (PCBs), total	ug/kg	---	---	**16**	**28**	**62**	**60**	**62**	**25**	**25**	**60**	**8.8**	**20**	**47**	**44**	**1700**	**18**	**250**

	Location	SW-111	SW-111	SW-112	SW-112	SW-112	SW-112	SW-112	SW-112	SW-112	SW-112	SW-113	SW-113	SW-115	SW-115	SW-115	SW-115	SW-115
	Date Collected	10/19/2010 11:15 AM	10/22/2010 2:50 PM	9/28/2010 11:39 AM	10/1/2010 10:45 AM	10/5/2010 12:06 PM	10/8/2010 11:08 AM	10/12/2010 11:30 AM	10/15/2010 10:30 AM	10/19/2010 11:35 AM	10/22/2010 10:50 AM	8/28/2010 2:00 PM	9/1/2010 11:43 AM	8/28/2010 12:21 PM	10/2/2010 11:35 AM	10/6/2010 11:21 AM	10/9/2010 11:29 AM	10/13/2010 10:25 AM
	Sample	SEE10191115JWP1	SEE10221450DWS1	SEF09281139TDF1	SEF10011045TDF1	SEF10051206TDF3	SEF10081108TDF3	SEF10121130PMB3	SEF10151030PMB3	SEF10191135NAC3	SEF10221050MAE3	SEB08281400JLS1	SEB09011143JLS1	SE08281221JAH1	SEE10021135TDF1	SEE10061121TDF1	SEE10091129TDF1	SEE10131025PDS1
	Depth	--	--	0 - 0.1 ft	0 - 0.1 ft	0 - 0.167 ft	0 - 0.1 ft	0 - 0.5 ft	0 - 0.5 ft	--	--	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 0.167 ft	0 - 0.2 ft	0 - 0.1 ft	0 - 3 ft
Analyte	Units	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
PCB																		
Aroclor 1016	ug/kg	< 52	< 81	< 19	< 23	< 21	< 23	< 22	< 21	< 58	< 59	< 44	< 22	< 91	< 31	< 40	< 49	< 29
Aroclor 1221	ug/kg	< 52	< 81	< 19	< 23	< 21	< 23	< 22	< 21	< 58	< 59	< 44	< 22	< 91	< 31	< 40	< 49	< 29
Aroclor 1232	ug/kg	< 52	< 81	< 19	< 23	< 21	< 23	< 22	< 21	< 58	< 59	< 44	< 22	< 91	< 31	< 40	< 49	< 29
Aroclor 1242	ug/kg	< 52	< 81	< 19	< 23	< 21	< 23	< 22	< 21	< 58	< 59	< 44	< 22	< 91	< 31	< 40	< 49	< 29
Aroclor 1248	ug/kg	< 52	< 81	< 19	< 23	< 21	< 23	< 22	< 21	< 58	< 59	< 44	< 22	< 91	< 31	< 40	< 49	< 29
Aroclor 1254	ug/kg	< 52	**210**	**6.1**	**16**	< 21	< 23	< 22	**7.6**	< 58	< 59	< 44	< 22	< 91	**42**	**110**	**72**	**98**
Aroclor 1260	ug/kg	< 52	< 81	< 19	< 23	< 21	< 23	< 22	< 21	< 58	< 59	< 44	< 22	< 91	< 31	< 40	**31**	< 29
Polychlorinated biphenyls (PCBs), total	ug/kg	---	---	**6.1**	**16**	< 21	< 23	< 22	**7.6**	---	---	---	< 22	---	**42**	**110**	**100**	**98**

Table 1. SW Monitoring Sediment PCB Analytical Data
Enbridge Line 6B MP 608 Marshall, MI Pipeline Release
Enbridge Energy, Limited Partnership

	Location	SW-115	SW-115	SW-115	SW-116	SW-116	SW-116	SW-116	SW-116	SW-116	SW-116	SW-116	SW-116	SW-117	SW-117	SW-117	SW-118	SW-118
	Date Collected	10/16/2010 11:45 AM	10/20/2010 9:35 AM	10/23/2010 10:05 AM	8/27/2010 5:30 PM	9/3/2010 4:40 PM	9/7/2010 4:02 PM	9/29/2010 3:30 PM	10/2/2010 3:34 PM	10/6/2010 3:41 PM	10/9/2010 3:40 PM	10/13/2010 12:30 PM	10/16/2010 9:30 AM	10/15/2010 9:45 AM	10/19/2010 9:59 AM	10/22/2010 10:21 AM	8/27/2010 11:55 AM	8/31/2010 10:25 AM
	Sample	SED10161 145PMB1	SEE1020093 5NAC1	SEE1023100 5MAE1	SED08271 730SWA1	SED09031 640SWA3	SED09071 602SWA1	SED09291 530TDF1	SED10021 534TDF1	SED10061 541TDF1	SED10091 540TDF1	SED10131 230PDS1	SEE10160 930PMB1	SEC10150 945JLS1	SEC10190 959JLS1	SEC1022102 1JLS1	SEC08271 155PDS3	SEC08311 025PDS3
	Depth	0.167 - 0.5 ft	--	--	0 - 0.3 ft	0 - 1 ft	0 - 1 ft	0 - 0.1 ft	0 - 0.167 ft	0 - 0.2 ft	0 - 0.1 ft	0 - 3 ft	0.167 - 0.5 ft	0 - 0.25 ft	--	--	--	0 - 1 ft
Analyte	Units	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
PCB																		
Aroclor 1016	ug/kg	< 20	< 65	< 86	< 49	< 20	< 20	< 25	< 19	< 23	< 19	< 25	< 31	< 23	< 58	< 52	< 92	< 25
Aroclor 1221	ug/kg	< 20	< 65	< 86	< 49	< 20	< 20	< 25	< 19	< 23	< 19	< 25	< 31	< 23	< 58	< 52	< 92	< 25
Aroclor 1232	ug/kg	< 20	< 65	< 86	< 49	< 20	< 20	< 25	< 19	< 23	< 19	< 25	< 31	< 23	< 58	< 52	< 92	< 25
Aroclor 1242	ug/kg	< 20	< 65	< 86	**47**	< 20	< 20	< 25	< 19	< 23	< 19	< 25	< 31	< 23	< 58	< 52	< 92	< 25
Aroclor 1248	ug/kg	< 20	< 65	< 86	< 49	< 20	< 20	< 25	< 19	< 23	< 19	< 25	< 31	< 23	< 58	< 52	< 92	< 25
Aroclor 1254	ug/kg	< 20	< 65	< 86	**70**	< 20	**9.7**	**26**	< 19	**98**	< 19	< 25	**65**	< 23	< 58	< 52	< 92	< 25
Aroclor 1260	ug/kg	< 20	< 65	< 86	< 49	< 20	< 20	< 25	< 19	< 23	< 19	< 25	**25**	< 23	< 58	< 52	< 92	< 25
Polychlorinated biphenyls (PCBs), total	ug/kg	< 20	---	---	---	< 20	**9.7**	**26**	< 19	**98**	< 19	< 25	**90**	< 23	---	---	---	< 25

	Location	SW-118	SW-118	SW-118	SW-118	SW-118	SW-118	SW-118	SW-118	SW-118	SW-118	SW-118	SW-118	SW-118	SW-118	SW-120	SW-120
	Date Collected	9/3/2010 9:15 AM	9/7/2010 10:50 AM	9/10/2010 9:45 AM	9/14/2010 9:30 AM	9/17/2010 9:45 AM	9/21/2010 1:30 PM	9/23/2010 9:45 AM	9/28/2010 12:30 PM	10/1/2010 12:30 PM	10/5/2010 8:45 AM	10/8/2010 8:45 AM	10/12/2010 2:20 PM	10/15/2010 12:30 PM	10/19/2010 8:55 AM	10/22/2010 2:00 PM	9/23/2010 3:30 PM	9/30/2010 11:54 AM
	Sample	SEC09030 915PDS3	SEC0907105 0PMB3	SEC0910094 5PMB3	SEC09140 930PMB3	SEC09170 945PMB3	SEC09211 330SDD3	SEC09230 945PMB3	SEC09281 230PMB3	SEC10011 230PMB3	SEC10050 845PMB1	SEC10080 845PMB1	SEC10121 420RTV1	SEC10151 230CKC1	SEC10190 855PMB1	SEC1022140 0PMB1	SEE09231 530CKC1	SEE09301 154TDF3
	Depth	0 - 1 ft	0 - 6 ft	0 - 6 ft	0 - 6 ft	--	--	0 - 6 ft	--	0 - 0.5 ft	0 - 0.5 ft	0 - 0.5 ft	--	--	--	--	--	0 - 0.166667 ft
Analyte	Units	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
PCB																		
Aroclor 1016	ug/kg	< 21	< 23	< 24	< 26	< 24	< 32	< 31	< 24	< 26	< 39	< 41	< 28	< 36	< 91	< 84	< 20	< 40
Aroclor 1221	ug/kg	< 21	< 23	< 24	< 26	< 24	< 32	< 31	< 24	< 26	< 39	< 41	< 28	< 36	< 91	< 84	< 20	< 40
Aroclor 1232	ug/kg	< 21	< 23	< 24	< 26	< 24	< 32	< 31	< 24	< 26	< 39	< 41	< 28	< 36	< 91	< 84	< 20	< 40
Aroclor 1242	ug/kg	< 21	< 23	< 24	< 26	< 24	< 32	< 31	< 24	< 26	< 39	< 41	< 28	< 36	< 91	< 84	< 20	< 40
Aroclor 1248	ug/kg	< 21	< 23	< 24	< 26	< 24	< 32	< 31	< 24	< 26	< 39	< 41	< 28	< 36	< 91	< 84	< 20	< 40
Aroclor 1254	ug/kg	< 21	**11**	< 24	< 26	< 24	< 32	< 31	< 24	< 26	< 39	< 41	**32**	< 36	< 91	< 84	**12**	< 40
Aroclor 1260	ug/kg	< 21	< 23	< 24	< 26	< 24	< 32	< 31	< 24	< 26	< 39	< 41	< 28	< 36	< 91	< 84	< 20	< 40
Polychlorinated biphenyls (PCBs), total	ug/kg	< 21	**11**	< 24	< 26	< 24	< 32	< 31	< 24	< 26	< 39	< 41	**32**	< 36	---	---	**12**	< 40

Table 1. SW Monitoring Sediment PCB Analytical Data
Enbridge Line 6B MP 608 Marshall, MI Pipeline Release
Enbridge Energy, Limited Partnership

	Location	SW-120	SW-120	SW-120	SW-120	SW-120	SW-120	SW-120	SW-127	SW-127	SW-127	SW-127	SW-127	SW-127	SW-931	SW-931	SW-931	SW-931	SW-931
	Date Collected	10/4/2010 11:45 AM	10/7/2010 5:11 PM	10/11/2010 11:45 AM	10/14/2010 11:00 AM	10/18/2010 10:45 AM	10/21/2010 10:31 AM	10/21/2010 11:59 AM	8/26/2010 10:15 AM	8/30/2010 10:05 AM	9/2/2010 9:05 AM	9/6/2010 9:00 AM	9/9/2010 9:45 AM	9/13/2010 9:15 AM	9/6/2010 4:10 PM	9/9/2010 9:00 AM	9/13/2010 9:15 AM	9/20/2010 11:10 AM	9/23/2010 10:35 AM
	Sample	SEE10041 145TDF3	SEE10071 711TDF3	SEE10111 145PMB1	SEE10141 100WPW1	SEE10181 045NAC1	SEE10211 031NAC1	SEC10211 159JLS1	SE008261 015PDS1	SE008301 005PDS1	SE009020 905PDS1	SE009060 900PMB1	SE009090 945PMB1	SE009130 915PMB1	SEE09061 610JAW1	SEE09090 900JRP1	SEE09130 915JRP1	SEE09201 110ARM1	SEE09231 035ARM1
	Depth	0 - 0.167 ft	0 - 2 ft	0 - 0.5 ft	0.5 - 1 ft	--	--	--	0 - 0.5 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 1 ft	0 - 0.5 ft	--	4 - 5 ft	5 - 6 ft	--	--
Analyte	Units	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
PCB																			
Aroclor 1016	ug/kg	< 27	< 34	< 18	< 43	< 43	< 110	< 45	< 70	< 72	< 62	< 56	< 72	< 55	< 30	< 93	< 33	< 25	< 22
Aroclor 1221	ug/kg	< 27	< 34	< 18	< 43	< 43	< 110	< 45	< 70	< 72	< 62	< 56	< 72	< 55	< 30	< 93	< 33	< 25	< 22
Aroclor 1232	ug/kg	< 27	< 34	< 18	< 43	< 43	< 110	< 45	< 70	< 72	< 62	< 56	< 72	< 55	< 30	< 93	< 33	< 25	< 22
Aroclor 1242	ug/kg	< 27	< 34	< 18	< 43	< 43	< 110	< 45	< 70	< 72	< 62	< 56	< 72	< 55	< 30	< 93	< 33	< 25	< 22
Aroclor 1248	ug/kg	< 27	< 34	< 18	< 43	< 43	< 110	< 45	< 70	< 72	< 62	< 56	< 72	< 55	< 30	< 93	< 33	< 25	< 22
Aroclor 1254	ug/kg	**120**	< 34	**13**	**94**	**100**	< 110	< 45	< 70	< 72	< 62	< 56	**85**	**37**	**95**	**1800**	**71**	**23**	**390**
Aroclor 1260	ug/kg	< 27	< 34	< 18	< 43	< 43	< 110	< 45	< 70	< 72	< 62	< 56	< 72	< 55	< 30	< 93	< 33	< 25	< 22
Polychlorinated biphenyls (PCBs), total	ug/kg	**120**	< 34	**13**	**94**	**100**	---	---	< 70	< 72	< 62	< 56	**85**	**37**	**95**	**1800**	**71**	**23**	**390**

	Location	SW-931	SW-931	SW-931	SW-931	SW-931	SW-931	SW-931	SW-932	SW-932	SW-932	SW-932	SW-932	SW-932	SW-932	SW-932	SW-932	SW-932	SW-932
	Date Collected	9/27/2010 3:00 PM	9/30/2010 10:25 AM	10/4/2010 10:45 AM	10/7/2010 10:45 AM	10/15/2010 1:55 PM	10/20/2010 9:25 AM	10/23/2010 11:45 AM	8/27/2010 11:45 AM	8/31/2010 1:48 PM	9/5/2010 3:00 PM	9/10/2010 9:45 AM	9/14/2010 1:12 PM	9/17/2010 9:35 AM	9/20/2010 9:11 AM	9/25/2010 9:05 AM	9/28/2010 2:45 PM	10/1/2010 10:43 AM	10/5/2010 11:45 AM
	Sample	SEE09271 500ARM1	SEE09301 025MAE1	SEE10041 045ARM1	SEE10071 045ARM1	SEE10151 355ARM1	SEE10200 925JWP1	SEE10231 145JWP1	SEE08271 145RCM1	SEE08311 348MHS1	SEE09051 500MHS1	SEE09100 945RCM1	SEE09141 312RCM1	SEE09170 935RCM1	SEE09200 911RCM1	SEE09250 905RCM1	SEE09281 445RCM1	SEE10011 043RCM1	SEE10051 145RCM1
	Depth	--	--	--	--	0 - 4.5 ft	--	--	5.5 ft	3 - 4 ft	4 - 5 ft	1 - 3.5 ft	--	0 - 2.5 ft	--	--	0 - 2.6 ft	0 - 2 ft	--
Analyte	Units	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
PCB																			
Aroclor 1016	ug/kg	< 23	< 21	< 21	< 22	< 96	< 60	< 61	< 130	< 47	< 38	< 26	< 55	< 22	< 23	< 68	< 22	< 21	< 21
Aroclor 1221	ug/kg	< 23	< 21	< 21	< 22	< 96	< 60	< 61	< 130	< 47	< 38	< 26	< 55	< 22	< 23	< 68	< 22	< 21	< 21
Aroclor 1232	ug/kg	< 23	< 21	< 21	< 22	< 96	< 60	< 61	< 130	< 47	< 38	< 26	< 55	< 22	< 23	< 68	< 22	< 21	< 21
Aroclor 1242	ug/kg	< 23	< 21	< 21	< 22	< 96	< 60	< 61	< 130	< 47	< 38	< 26	< 55	< 22	< 23	< 68	< 22	< 21	< 21
Aroclor 1248	ug/kg	< 23	< 21	< 21	< 22	< 96	< 60	< 61	< 130	< 47	< 38	< 26	< 55	< 22	< 23	< 68	< 22	< 21	< 21
Aroclor 1254	ug/kg	**19**	**11**	**25**	**57**	**1500**	**120**	**260**	< 130	**140**	**61**	**25**	**46**	**14**	**33**	**210**	**14**	**7**	< 21
Aroclor 1260	ug/kg	< 23	< 21	< 21	< 22	**220**	< 60	< 61	< 130	< 47	< 38	< 26	< 55	< 22	< 23	< 68	< 22	< 21	< 21
Polychlorinated biphenyls (PCBs), total	ug/kg	**19**	**11**	**25**	**57**	**1700**	---	---	---	**140**	**61**	**25**	**46**	**14**	**33**	**210**	**14**	**7**	< 21

Table 1. SW Monitoring Sediment PCB Analytical Data
Enbridge Line 6B MP 608 Marshall, MI Pipeline Release
Enbridge Energy, Limited Partnership

	Location	SW-932	SW-932	SW-932	SW-932	SW-933	SW-933	SW-934	SW-935	SW-935	SW-935	SW-935	SW-935	SW-935	SW-935	SW-935	SW-935	SW-935
	Date Collected	10/7/2010 11:51 AM	10/14/2010 10:25 AM	10/18/2010 10:30 AM	10/21/2010 1:45 PM	8/26/2010 4:20 PM	8/30/2010 4:38 PM	10/7/2010 2:15 PM	8/28/2010 4:30 PM	9/1/2010 3:45 PM	9/5/2010 3:50 PM	9/12/2010 2:36 PM	9/17/2010 8:39 AM	9/19/2010 2:45 PM	9/22/2010 9:35 AM	9/26/2010 9:30 AM	9/29/2010 10:23 AM	10/6/2010 10:51 AM	10/8/2010 10:51 AM
	Sample	SEE10071 151RCM1	SEE10141 025ARM1	SEE10181 030JWP1	SEE10211 345JWP1	SEE08261 620RCM1	SEE08301 638MHS1	SEE10071 415ARM1	SEE08281 630RCM1	SEE09011 545MHS1	SEE09051 550MHS1	SEE09121 436RCM1	SEE09170 839RCM1	SEE09191 445RCM1	SEE09220 935RCM1	SEE09260 930RCM1	SEE09291 023RCM1	SEE10061 051RCM1	SEE10081 051RCM1
	Depth	0 - 2 ft	0 - 2 ft	1.4 - 1.4 ft	--	9 - 10 ft	9 - 10 ft	--	6 - 7 ft	6 - 7 ft	6 - 7 ft		0 - 7 ft	0 - 5.5 ft			0 - 6 ft	0 - 5.5 ft	0 - 0.333 ft
Analyte	Units	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
PCB																			
Aroclor 1016	ug/kg	< 43	< 35	< 20	< 87	< 180	< 79	< 93	< 170	< 87	< 83	< 80	< 75	< 75	< 77	< 74	< 81	< 75	< 76
Aroclor 1221	ug/kg	< 43	< 35	< 20	< 87	< 180	< 79	< 93	< 170	< 87	< 83	< 80	< 75	< 75	< 77	< 74	< 81	< 75	< 76
Aroclor 1232	ug/kg	< 43	< 35	< 20	< 87	< 180	< 79	< 93	< 170	< 87	< 83	< 80	< 75	< 75	< 77	< 74	< 81	< 75	< 76
Aroclor 1242	ug/kg	< 43	< 35	< 20	< 87	< 180	< 79	< 93	< 170	< 87	< 83	< 80	< 75	< 75	< 77	< 74	< 81	< 75	< 76
Aroclor 1248	ug/kg	< 43	< 35	< 20	< 87	< 180	< 79	< 93	< 170	< 87	< 83	< 80	< 75	< 75	< 77	< 74	< 81	< 75	< 76
Aroclor 1254	ug/kg	**130**	**260**	< 20	< 87	< 180	**290**	**1100**	< 170	**290**	**280**	**270**	**240**	**180**	**98**	**420**	**300**	**340**	**160**
Aroclor 1260	ug/kg	< 43	< 35	< 20	< 87	< 180	< 79	< 93	< 170	< 87	< 83	< 80	< 75	< 75	< 77	< 74	< 81	< 75	< 76
Polychlorinated biphenyls (PCBs), total	ug/kg	**130**	**260**	< 20	---	---	**290**	**1100**	---	**290**	**280**	**270**	**240**	**180**	**98**	**420**	**300**	**340**	**160**

	Location	SW-935	SW-935	SW-935	SW-935	SW-936	SW-936	SW-936	SW-936	SW-936	SW-936	SW-936	SW-936	SW-936	SW-936	SW-936	UNKNOWN	WS-935
	Date Collected	10/12/2010 2:15 PM	10/15/2010 10:55 AM	10/19/2010 10:10 AM	10/22/2010 10:55 AM	9/7/2010 9:30 AM	9/10/2010 9:20 AM	9/14/2010 9:45 AM	9/17/2010 12:00 PM	9/21/2010 11:20 AM	10/1/2010 11:25 AM	10/5/2010 2:15 PM	10/8/2010 10:35 AM	10/13/2010 10:35 AM	10/16/2010 11:15 AM	10/20/2010 10:35 AM	10/23/2010 11:00 AM	9/4/2010 11:15 AM	9/8/2010 10:20 AM
	Sample	SEE10121 415ARM1	SEE10151 055ARM1	SEE10191 010JWP1	SEE10221 055DWS1	SEE09070 930JRP1	SEE09100 920JRP1	SEE09140 945JRP1	SEE09171 200ARM1	SEE09211 120ARM1	SEE10011 125ARM1	SEE10051 415ARM1	SEE10081 035ARM1	SEE10131 035ARM1	SEE10161 115ARM1	SEE10201 035JWP1	SEE10231 100JWP1	SEE09041 115JAW1	SEE09081 020RCM1
	Depth	0 - 6.5 ft	0 - 6.5 ft			3 - 4 ft	1 - 2 ft	0 - 3 ft	0 - 2 ft	--	--	--	--	--	0 - 8.5 ft	--	--	--	--
Analyte	Units	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
PCB																			
Aroclor 1016	ug/kg	< 120	< 120	< 180	< 170	< 21	< 21	< 23	< 24	< 24	< 25	< 29	< 24	< 20	< 70	< 54	< 53	< 57	< 83
Aroclor 1221	ug/kg	< 120	< 120	< 180	< 170	< 21	< 21	< 23	< 24	< 24	< 25	< 29	< 24	< 20	< 70	< 54	< 53	< 57	< 83
Aroclor 1232	ug/kg	< 120	< 120	< 180	< 170	< 21	< 21	< 23	< 24	< 24	< 25	< 29	< 24	< 20	< 70	< 54	< 53	< 57	< 83
Aroclor 1242	ug/kg	< 120	< 120	< 180	< 170	< 21	< 21	< 23	< 24	< 24	< 25	< 29	< 24	< 20	< 70	< 54	< 53	< 57	< 83
Aroclor 1248	ug/kg	< 120	< 120	< 180	< 170	< 21	< 21	< 23	< 24	< 24	< 25	< 29	< 24	< 20	< 70	< 54	< 53	< 57	< 83
Aroclor 1254	ug/kg	**2000**	**1300**	< 180	< 170	< 21	**11**	< 23	**16**	**14**	**11**	**150**	< 24	< 20	**450**	< 54	< 53	**140**	**340**
Aroclor 1260	ug/kg	**500**	**370**	< 180	< 170	< 21	< 21	< 23	< 24	< 24	< 25	< 29	< 24	< 20	**120**	< 54	< 53	< 57	< 83
Polychlorinated biphenyls (PCBs), total	ug/kg	**2500**	**1600**	---	---	< 21	**11**	< 23	**16**	**14**	**11**	**150**	< 24	< 20	**580**	---	---	**140**	**340**

Notes:

Bold values are concentrations detected above the reporting limit.

[a] = Screening criteria listed for Aroclors are for Total PCBs, rather than individual Aroclors.

--- = not completed/not analyzed

ft = feet

Table 2. SO Recovery Sediment PCB Analytical Data
Enbridge Line 6B MP 608 Marshall, MI Pipeline Release
Enbridge Energy, Limited Partnership

	Location	SEKR3700C01	SEKR3700C01	SEKR3700C01	SEKR3700C01	SEKR3700C02	SEKR3700C02	SEKR3700C02	SEKR3700C02	SEKR3725C01	SEKR3725C01	SEKR3725C01	SEKR3725C01	SEKR3725C02	SEKR3725C02	SEKR3725C02	SEKR3725C03
	Date Collected	6/25/2011 9:33 AM	6/25/2011 9:33 AM	6/25/2011 9:33 AM	6/25/2011 9:33 AM	6/24/2011 2:29 PM	6/25/2011 10:55 AM	6/25/2011 10:55 AM	6/25/2011 10:55 AM	6/25/2011 8:20 AM	6/25/2011 8:20 AM	6/25/2011 8:20 AM	6/25/2011 8:20 AM	6/25/2011 11:45 AM	6/25/2011 11:45 AM	6/25/2011 11:45 AM	6/24/2011 3:37 PM
	Sample	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004
	Depth	0 - 0.4 ft	0.4 - 1 ft	1 - 1.5 ft	1.5 - 2 ft	1.5 - 2 ft	0 - 0.5 ft	0.5 - 1 ft	1 - 1.5 ft	0 - 0.4 ft	0.4 - 0.9 ft	0.9 - 1.4 ft	1.4 - 1.6 ft	0 - 0.3 ft	0.3 - 1 ft	1 - 1.7 ft	0.4 - 0.9 ft
Analyte	Units	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Duplicate
PCB																	
Aroclor 1016	ug/kg	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330
Aroclor 1221	ug/kg	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330
Aroclor 1232	ug/kg	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330
Aroclor 1242	ug/kg	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330
Aroclor 1248	ug/kg	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330
Aroclor 1254	ug/kg	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	**400**	**1100**	< 330	< 330	< 330
Aroclor 1260	ug/kg	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330
Polychlorinated biphenyls (PCBs), total	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 2. SO Recovery Sediment PCB Analytical Data
Enbridge Line 6B MP 608 Marshall, MI Pipeline Release
Enbridge Energy, Limited Partnership

	Location	SEKR3725C 03	SEKR3725C 03	SEKR3800C 04	SEKR3800C 05	SEKR3800C 05	SEKR3800C 05	SEKR3800C 05	SEKR3825C 01	SEKR3825C 01	SEKR3825C 01	SEKR3825C 01	SEKR3825C 01	SEKR3825C 02	SEKR3825C 02	SEKR3825C 02	SEKR3825C 02
	Date Collected	6/24/2011 3:37 PM	6/24/2011 3:37 PM	6/24/2011 8:55 AM	6/24/2011 12:11 PM	6/24/2011 12:11 PM	6/24/2011 12:11 PM	6/24/2011 12:11 PM	6/24/2011 1:18 PM	6/24/2011 1:18 PM	6/24/2011 1:18 PM	6/24/2011 1:18 PM	6/24/2011 1:18 PM	6/24/2011 12:32 PM	6/24/2011 12:32 PM	6/24/2011 12:32 PM	6/24/2011 12:32 PM
	Sample	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004
	Depth	0 - 0.4 ft	0.4 - 0.9 ft	0.8 - 1.5 ft	0 - 0.3 ft	0.3 - 0.7 ft	0.7 - 1.2 ft	1.2 - 1.7 ft	0.5 - 1 ft	0 - 0.5 ft	0.5 - 1 ft	1 - 1.5 ft	1.5 - 2 ft	0 - 0.4 ft	0.4 - 0.8 ft	0.8 - 1.1 ft	1.1 - 2 ft
Analyte	Units	Result	Result	Result	Result	Result	Result	Result	Duplicate	Result	Result	Result	Result	Result	Result	Result	Result
PCB																	
Aroclor 1016	ug/kg	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330
Aroclor 1221	ug/kg	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330
Aroclor 1232	ug/kg	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330
Aroclor 1242	ug/kg	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330
Aroclor 1248	ug/kg	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330
Aroclor 1254	ug/kg	< 330	< 330	< 330	< 330	< 330	< 330	< 330	**430**	< 330	**390**	< 330	< 330	< 330	< 330	**1300**	**620**
Aroclor 1260	ug/kg	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330
Polychlorinated biphenyls (PCBs), total	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 2. SO Recovery Sediment PCB Analytical Data
Enbridge Line 6B MP 608 Marshall, MI Pipeline Release
Enbridge Energy, Limited Partnership

	Location	SEKR3825C03	SEKR3825C03	SEKR3825C03	SEKR3825C04	SEKR3825C04	SEKR3825C04	SEKR3725C03	SEKR3725C03	SEKR3725C04	SEKR3725C04	SEKR3725C04	SEKR3725C04	SEKR3725C05	SEKR3725C05	SEKR3725C05	SEKR3725C05	SEKR3725C05
	Date Collected	6/24/2011 11:10 AM	6/24/2011 11:10 AM	6/24/2011 11:10 AM	6/24/2011 9:50 AM	6/24/2011 9:50 AM	6/24/2011 9:50 AM	6/24/2011 3:37 PM	6/24/2011 3:37 PM	6/24/2011 2:29 PM	6/24/2011 2:29 PM	6/24/2011 2:29 PM	6/25/2011 3:41 PM	6/25/2011 2:20 PM	6/25/2011 2:20 PM	6/25/2011 2:20 PM	6/25/2011 2:20 PM	6/25/2011 2:20 PM
	Sample	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004
	Depth	0 - 0.7 ft	0.7 - 1.2 ft	1.2 - 2 ft	0 - 0.7 ft	0 - 0.7 ft	0.7 - 1.1 ft	0.9 - 1.4 ft	1.4 - 1.7 ft	0 - 0.7 ft	0.7 - 1.1 ft	1.1 - 1.5 ft	1.5 - 2 ft	0 - 0.4 ft	0 - 0.4 ft	0.4 - 0.7 ft	0.7 - 1.3 ft	1.3 - 2 ft
Analyte	Units	Result	Result	Result	Duplicate	Result	Result	Result	Result	Result	Result	Result	Result	Duplicate	Result	Result	Result	Result
PCB																		
Aroclor 1016	ug/kg	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330
Aroclor 1221	ug/kg	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330
Aroclor 1232	ug/kg	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330
Aroclor 1242	ug/kg	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330
Aroclor 1248	ug/kg	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330
Aroclor 1254	ug/kg	< 330	**590**	**530**	**350**	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330
Aroclor 1260	ug/kg	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330
Polychlorinated biphenyls (PCBs), total	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 2. SO Recovery Sediment PCB Analytical Data
Enbridge Line 6B MP 608 Marshall, MI Pipeline Release
Enbridge Energy, Limited Partnership

	Location	SEKR3750 C01	SEKR3750 C01	SEKR3750 C01	SEKR3750 C01	SEKR3750 C02	SEKR3750 C02	SEKR3750 C02	SEKR3825 C04	SEKR3850 C01	SEKR3850 C01	SEKR3850 C01	SEKR3850 C01	SEKR3750 C02	SEKR3750 C03	SEKR3750 C03	SEKR3750 C03	SEKR3750 C03	SEKR3800 C01
	Date Collected	6/24/2011 2:26 PM	6/24/2011 2:26 PM	6/24/2011 2:26 PM	6/24/2011 2:26 PM	6/24/2011 1:33 PM	6/24/2011 1:33 PM	6/24/2011 1:33 PM	6/24/2011 9:50 AM	6/24/2011 11:40 AM	6/24/2011 11:40 AM	6/24/2011 11:40 AM	6/24/2011 11:40 AM	6/24/2011 1:33 PM	6/25/2011 1:30 PM	6/25/2011 1:30 PM	6/25/2011 1:30 PM	6/25/2011 1:30 PM	6/24/2011 9:20 AM
	Sample	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004
	Depth	0 - 0.3 ft	0.3 - 0.7 ft	0.7 - 1.4 ft	1.4 - 2 ft	0 - 0.5 ft	0.5 - 0.9 ft	0.9 - 1.5 ft	1.1 - 2 ft	0 - 0.2 ft	0.2 - 1 ft	1 - 1.7 ft	1.7 - 2 ft	1.5 - 2 ft	0 - 0.5 ft	0 - 0.5 ft	0.5 - 1 ft	1 - 1.6 ft	0 - 0.5 ft
Analyte	Units	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Duplicate	Result	Result	Result	Result
PCB																			
Aroclor 1016	ug/kg	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330
Aroclor 1221	ug/kg	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330
Aroclor 1232	ug/kg	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330
Aroclor 1242	ug/kg	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330
Aroclor 1248	ug/kg	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330
Aroclor 1254	ug/kg	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330
Aroclor 1260	ug/kg	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330
Polychlorinated biphenyls (PCBs), total	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 2. SO Recovery Sediment PCB Analytical Data
Enbridge Line 6B MP 608 Marshall, MI Pipeline Release
Enbridge Energy, Limited Partnership

	Location	SEKR3800 C01	SEKR3800 C01	SEKR3800 C01	SEKR3800 C02	SEKR3800 C02	SEKR3800 C02	SEKR3800 C02	SEKR3800 C03	SEKR3800 C03	SEKR3800 C03	SEKR3800 C04	SEKR3800 C04
	Date Collected	6/24/2011 9:20 AM	6/24/2011 9:20 AM	6/24/2011 9:20 AM	6/24/2011 10:38 AM	6/24/2011 10:38 AM	6/24/2011 10:38 AM	6/24/2011 10:38 AM	6/24/2011 8:36 AM	6/24/2011 8:36 AM	6/24/2011 8:36 AM	6/24/2011 8:55 AM	6/24/2011 8:55 AM
	Sample	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004	SEKR3700C **01S** 062511D004
	Depth	0.5 - 0.9 ft	0.9 - 1.5 ft	1.5 - 2 ft	0 - 0.6 ft	0.6 - 0.9 ft	0.9 - 1.5 ft	1.5 - 2 ft	0 - 0.3 ft	0.3 - 0.9 ft	0.9 - 1.6 ft	0 - 0.4 ft	0.4 - 0.8 ft
Analyte	Units	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
PCB													
Aroclor 1016	ug/kg	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330
Aroclor 1221	ug/kg	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330
Aroclor 1232	ug/kg	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330
Aroclor 1242	ug/kg	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330
Aroclor 1248	ug/kg	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330
Aroclor 1254	ug/kg	**830**	< 330	**700**	**460**	**950**	< 330	**540**	< 330	< 330	< 330	< 330	< 330
Aroclor 1260	ug/kg	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330	< 330
Polychlorinated biphenyls (PCBs), total	ug/kg	--	--	--	--	--	--	--	--	--	--	--	--

Notes:
Bold values are concentrations detected above the reporting limit.
ug/kg = micrograms per kilogram
--- = not completed/not analyzed
ft = feet

Table 3. U.S. EPA GLNPO Sediment PCB Analytical Data
Enbridge Line 6B MP 608 Marshall, MI Pipeline Release
Enbridge Energy, Limited Partnership

	Location	ML-01	ML-01	ML-01	ML-01	ML-01	ML-01	ML-01	ML-01	ML-01	ML-01
	Date Collected	7/30/2010 5:46 PM	8/1/2010 4:28 PM	8/5/2010 5:07 PM	8/10/2010 9:00 AM	8/12/2010 8:29 AM	8/14/2010 11:04 AM	8/16/2010 2:46 PM	8/16/2010 2:46 PM	8/19/2010 10:04 AM	8/21/2010 3:10 PM
	Sample	ML-01-S-073010	ML-01-S-080110	ML-01-S-080510	ML-01-S-081010	ML-01-S-081210	ML-01-S-081410	ML-01-S-081610	ML-01-S-081610-D	ML-01-S-081910	ML-01-S-082110
	Depth	--	--	0 - 3 in	0 - 3 in	0 - 3 in	0 - 3 in	3 -3 in	3 -3 in	3 -3 in	0 - 3 in
Analyte	Units	Result	Result	Result	Result	Result	Result	Result	Duplicate	Result	Result
PCB											
Aroclor 1016	ug/kg	< 0.42	< 0.45	< 0.47	< 0.47	< 0.47	< 0.44	< 0.49	< 0.44	--	< 0.43
Aroclor 1221	ug/kg	< 0.42	< 0.45	< 0.47	< 0.47	< 0.47	< 0.44	< 0.49	< 0.44	--	< 0.43
Aroclor 1232	ug/kg	< 0.42	< 0.45	< 0.47	< 0.47	< 0.47	< 0.44	< 0.49	< 0.44	--	< 0.43
Aroclor 1242	ug/kg	< 0.42	< 0.45	< 0.47	< 0.47	< 0.47	< 0.44	< 0.49	< 0.44	< 0.4	< 0.43
Aroclor 1248	ug/kg	< 0.42	< 0.45	**0.038**	< 0.47	< 0.47	< 0.44	< 0.49	< 0.44	--	< 0.43
Aroclor 1254	ug/kg	**0.17**	**0.078**	**0.12**	**0.098**	**0.088**	**0.085**	**0.058**	**0.052**	**0.056**	**0.051**
Aroclor 1260	ug/kg	< 0.42	< 0.45	< 0.47	< 0.47	< 0.47	< 0.44	< 0.49	< 0.44	< 0.4	< 0.43
Aroclor 1262	ug/kg	< 0.42	< 0.45	< 0.47	< 0.47	< 0.47	< 0.44	< 0.49	< 0.44	--	< 0.43
Aroclor 1268	ug/kg	< 0.42	< 0.45	< 0.47	< 0.47	< 0.47	< 0.44	< 0.49	< 0.44	--	< 0.43
Polychlorinated biphenyls (PCBs), total	ug/kg	--	--	--	--	--	--	--	--	--	--

ML-01	ML-02	ML-02	ML-01	ML-02	ML-02	ML-02	ML-02	ML-02	ML-02	ML-02	ML-02	ML-03
8/25/2010 10:03 AM	7/30/2010 3:25 PM	8/2/2010 7:57 AM	8/5/2010 1:39 PM	8/10/2010 10:04 AM	8/12/2010 9:54 AM	8/15/2010 8:48 AM	8/17/2010 8:44 AM	8/20/2010 2:20 PM	8/20/2010 2:20 PM	8/23/2010 11:06 AM	8/25/2010 9:42 AM	7/30/2010 8:10:00 PM
ML-01-S-082510	ML-02-S-073010	ML-02-S-080210	ML-02-S-080510	ML-02-S-081010	ML-02-S-081210	ML-02-S-081510	ML-02-S-081710	ML-02-S-082010	ML-02-S-082010-D	ML-02-S-082310	ML-02-S-082510	ML-03-S-073010
0 - 3 in		0 - 0 in	0 - 3 in	0 - 3 in	0 - 3 in	0 - 3 in	0 - 3 in	0 - 3 in	--	0 - 3 in	0 - 3 in	--
Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
< 0.44	< 0.35	< 0.4	< 0.4	< 0.43	< 0.41	< 0.38	< 0.36	< 0.38	< 0.38	< 0.37	< 0.42	< 0.32
< 0.44	< 0.35	< 0.4	< 0.4	< 0.43	< 0.41	< 0.38	< 0.36	< 0.38	< 0.38	< 0.37	< 0.42	< 0.32
< 0.44	< 0.35	< 0.4	< 0.4	< 0.43	< 0.41	< 0.38	< 0.36	< 0.38	< 0.38	< 0.37	< 0.42	< 0.32
< 0.44	< 0.35	< 0.4	< 0.4	< 0.43	< 0.41	< 0.38	< 0.36	< 0.38	< 0.38	< 0.37	< 0.42	< 0.32
< 0.44	< 0.35	< 0.4	< 0.4	< 0.43	< 0.41	< 0.38	< 0.36	< 0.38	< 0.38	< 0.37	< 0.42	< 0.32
0.092	**0.082**	**0.094**	**0.069**	**0.14**	**0.062**	< 0.38	**0.058**	**0.049**	**0.051**	**0.064**	**0.061**	**0.093**
< 0.44	< 0.35	< 0.4	< 0.4	< 0.43	< 0.41	< 0.38	< 0.36	< 0.38	< 0.38	< 0.37	< 0.42	< 0.32
< 0.44	< 0.35	< 0.4	< 0.4	< 0.43	< 0.41	< 0.38	< 0.36	< 0.38	< 0.38	< 0.37	< 0.42	< 0.32
< 0.44	< 0.35	< 0.4	< 0.4	< 0.43	< 0.41	< 0.38	< 0.36	< 0.38	< 0.38	< 0.37	< 0.42	< 0.32
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ML-03	ML-03	ML-03	ML-03	ML-03	ML-03	ML-03	ML-03	ML-03	ML-03	ML-03	ML-04	ML-04
7/30/2010 8:10 PM	8/2/2010 9:08 AM	8/5/2010 4:47 PM	8/10/2010 10:56 AM	8/12/2010 10:44 AM	8/12/2010 10:44 AM	8/14/2010 11:49 AM	8/16/2010 3:44 PM	8/20/2010 10:13 AM	8/23/2010 4:30 PM	8/25/2010 9:19 AM	7/31/2010 12:22 PM	8/4/2010 1:37 PM
ML-03-S-073010-D	ML-03-S-080210	ML-03-S-080510	ML-03-S-081010	ML-03-S-081210	ML-03-S-081210-D	ML-03-S-081410	ML-03-S-081610	ML-03-S-082010	ML-03-S-082310	ML-03-S-082510	ML-04-S-073110	ML-04-S-080410
--	0 - 3 in	0 - 3 in	0 - 3 in	0 - 3 in	0 - 3 in	0 - 3 in	0 - 3 in	0 - 3 in	0 - 3 in	0 - 3 in	--	0 - 3 in
Duplicate	Result	Result	Result	Result	Duplicate	Result	Result	Result	Result	Result	Result	Result
< 0.33	< 0.39	< 0.39	< 0.41	< 0.42	< 0.39	< 0.35	< 0.37	< 0.38	< 0.37	< 0.39	< 0.45	< 0.45
< 0.33	< 0.39	< 0.39	< 0.41	< 0.42	< 0.39	< 0.35	< 0.37	< 0.38	< 0.37	< 0.39	< 0.45	< 0.45
< 0.33	< 0.39	< 0.39	< 0.41	< 0.42	< 0.39	< 0.35	< 0.37	< 0.38	< 0.37	< 0.39	< 0.45	< 0.45
< 0.33	< 0.39	< 0.39	< 0.41	< 0.42	< 0.39	< 0.35	< 0.37	< 0.38	< 0.37	< 0.39	< 0.45	< 0.45
< 0.33	< 0.39	**0.059**	< 0.41	< 0.42	< 0.39	< 0.35	< 0.37	< 0.38	< 0.37	< 0.39	< 0.45	< 0.45
0.083	**0.079**	**0.088**	**0.15**	**0.073**	**0.071**	**0.059**	**0.06**	**0.065**	**0.063**	**0.054**	**0.17**	**0.11**
< 0.33	< 0.39	< 0.39	< 0.41	< 0.42	< 0.39	< 0.35	< 0.37	< 0.38	< 0.37	< 0.39	< 0.45	< 0.45
< 0.33	< 0.39	< 0.39	< 0.41	< 0.42	< 0.39	< 0.35	< 0.37	< 0.38	< 0.37	< 0.39	< 0.45	< 0.45
< 0.33	< 0.39	< 0.39	< 0.41	< 0.42	< 0.39	< 0.35	< 0.37	< 0.38	< 0.37	< 0.39	< 0.45	< 0.45
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ML-04	ML-04	ML-04	ML-04	ML-04	ML-04	ML-04	ML-04	ML-04	ML-05	ML-05	ML-05	ML-05
8/4/2010 1:37 PM	8/5/2010 3:25 PM	8/10/2010 3:08 PM	8/13/2010 8:58 AM	8/15/2010 9:35 AM	8/17/2010 11:29 AM	8/20/2010 3:33 PM	8/24/2010 10:44 AM	8/26/2010 10:13 AM	7/31/2010 11:14 AM	8/2/2010 10:14 AM	8/2/2010 10:14 AM	8/5/2010 4:05 PM
ML-04-S-080410-D	ML-04-S-080510	ML-04-S-081010	ML-04-S-081310	ML-04-S-081510	ML-04-S-081710	ML-04-S-082010	ML-04-S-082410	ML-04-S-082610	ML-05-S-073110	ML-05-S-080210	ML-05-S-080210-D	ML-05-S-080510
0 - 3 in	0 - 3 in	0 - 3 in	0 - 3 in	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 in	0 - 2 in	--	0 - 3 in	--	0 - 3 in
Duplicate	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Duplicate	Result
< 0.45	< 0.48	< 0.46	< 0.48	< 0.5	< 0.48	< 0.38	< 0.46	< 0.46	< 0.33	< 0.31	< 0.31	< 0.44
< 0.45	< 0.48	< 0.46	< 0.48	< 0.5	< 0.48	< 0.38	< 0.46	< 0.46	< 0.33	< 0.31	< 0.31	< 0.44
< 0.45	< 0.48	< 0.46	< 0.48	< 0.5	< 0.48	< 0.38	< 0.46	< 0.46	< 0.33	< 0.31	< 0.31	< 0.44
< 0.45	< 0.48	< 0.46	< 0.48	< 0.5	< 0.48	< 0.38	< 0.46	< 0.46	< 0.33	< 0.31	< 0.31	< 0.44
< 0.45	**0.088**	< 0.46	< 0.48	< 0.5	< 0.48	< 0.38	< 0.46	< 0.46	< 0.33	< 0.31	< 0.31	**0.54**
0.11	**0.15**	**0.17**	**0.094**	--	**0.086**	**0.057**	**0.089**	**0.11**	**0.12**	**0.049**	**0.045**	**0.47**
< 0.45	< 0.48	< 0.46	< 0.48	< 0.5	< 0.48	< 0.38	< 0.46	< 0.46	< 0.33	< 0.31	< 0.31	< 0.44
< 0.45	< 0.48	< 0.46	< 0.48	< 0.5	< 0.48	< 0.38	< 0.46	< 0.46	< 0.33	< 0.31	< 0.31	< 0.44
< 0.45	< 0.48	< 0.46	< 0.48	< 0.5	< 0.48	< 0.38	< 0.46	< 0.46	< 0.33	< 0.31	< 0.31	< 0.44
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ML-05	ML-05	ML-05	ML-05	ML-05	ML-05	ML-05	ML-06	ML-06	ML-06	ML-06	ML-06	ML-06
8/10/2010 3:56 PM	8/13/2010 9:53 AM	8/15/2010 10:32 AM	8/17/2010 9:46 AM	8/20/2010 3:33 PM	8/23/2010 5:23 PM	8/26/2010 10:13 AM	8/1/2010 9:28 AM	8/4/2010 3:15 PM	8/5/2010 8:10 AM	8/11/2010 8:13 AM	8/11/2010 8:13 AM	8/12/2010 1:45 PM
ML-05-S-081010	ML-05-S-081310	ML-05-S-081510	ML-05-S-081710	ML-05-S-082010	ML-05-S-082310	ML-05-S-082610	ML-06-S-080110	ML-06-S-080410	ML-06-S-080510	ML-06-S-081110	ML-06-S-081110-D	ML-06-S-081210
0 - 3 in	0 - 3 in	0 - 2 ft	0 - 2 ft	0 - 2 ft	0 - 2 in	0 - 2 in	--	0 - 3 in	0 - 3 in	0 - 3 in	0 - 3 in	0 - 3 in
Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Duplicate	Result
< 0.41	< 0.4	< 0.51	< 0.39	< 0.46	< 0.41	< 0.26	< 0.45	< 0.15	< 0.17	< 0.5	< 0.54	< 0.5
< 0.41	< 0.4	< 0.51	< 0.39	< 0.46	< 0.41	< 0.26	< 0.45	< 0.15	< 0.17	< 0.5	< 0.54	< 0.5
< 0.41	< 0.4	< 0.51	< 0.39	< 0.46	< 0.41	< 0.26	< 0.45	< 0.15	< 0.17	< 0.5	< 0.54	< 0.5
< 0.41	< 0.4	< 0.51	< 0.39	< 0.46	< 0.41	< 0.26	< 0.45	< 0.15	< 0.17	< 0.5	< 0.54	< 0.5
< 0.41	< 0.4	< 0.51	< 0.39	< 0.46	< 0.41	< 0.26	< 0.45	< 0.15	< 0.17	< 0.5	< 0.54	< 0.5
0.11	**0.071**	--	**0.09**	**0.052**	**0.062**	**0.06**	**0.21**	**0.015**	**0.031**	**0.14**	**0.13**	**0.11**
< 0.41	< 0.4	< 0.51	< 0.39	< 0.46	< 0.41	< 0.26	< 0.45	< 0.15	< 0.17	< 0.5	< 0.54	< 0.5
< 0.41	< 0.4	< 0.51	< 0.39	< 0.46	< 0.41	< 0.26	< 0.45	< 0.15	< 0.17	< 0.5	< 0.54	< 0.5
< 0.41	< 0.4	< 0.51	< 0.39	< 0.46	< 0.41	< 0.26	< 0.45	< 0.15	< 0.17	< 0.5	< 0.54	< 0.5
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ML-06	ML-06	ML-06	ML-06	ML-06	ML-07	ML-07	ML-07	ML-07	ML-07	ML-07	ML-07	ML-07	ML-07
8/15/2010 1:39 PM	8/17/2010 2:14 PM	8/20/2010 8:54 AM	8/23/2010 2:22 PM	8/25/2010 2:05 PM	8/1/2010 11:06 AM	8/4/2010 3:33 PM	8/6/2010 2:13 PM	8/11/2010 9:29 AM	8/13/2010 3:29 PM	8/16/2010 9:10 AM	8/18/2010 3:11 PM	8/21/2010 8:21 AM	8/24/2010 8:28 AM
ML-06-S-081510	ML-06-S-081710	ML-06-S-082010	ML-06-S-082310	ML-06-S-082510	ML-07-S-080110	ML-07-S-080410	ML-07-S-080610	ML-07-S-081110	ML-07-S-081310	ML-07-S-081610	ML-07-S-081810	ML-07-S-082110	ML-07-S-082410
0 - 3 in	0 - 3 in	0 - 3 in	0 - 3 in	0 - 3 in	--	0 - 3 in	0 - 3 in	0 - 3 in	0 - 3 in	0 - 3 in	0 - 3 in	0 - 3 in	0 - 3 in
Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
< 0.55	< 0.47	< 0.49	< 0.5	< 0.53	< 0.52	< 0.57	< 0.55	< 0.62	< 0.52	< 0.52	< 0.55	< 0.54	< 0.54
< 0.55	< 0.47	< 0.49	< 0.5	< 0.53	< 0.52	< 0.57	< 0.55	< 0.62	< 0.52	< 0.52	< 0.55	< 0.54	< 0.54
< 0.55	< 0.47	< 0.49	< 0.5	< 0.53	< 0.52	< 0.57	< 0.55	< 0.62	< 0.52	< 0.52	< 0.55	< 0.54	< 0.54
< 0.55	< 0.47	< 0.49	< 0.5	< 0.53	< 0.52	< 0.57	< 0.55	< 0.62	< 0.52	< 0.52	< 0.55	< 0.54	< 0.54
< 0.55	< 0.47	< 0.49	< 0.5	< 0.53	< 0.52	< 0.57	< 0.55	< 0.62	< 0.52	< 0.52	< 0.55	< 0.54	< 0.54
--	**0.083**	**0.082**	**0.079**	**0.1**	**0.12**	**0.17**	**0.088**	**0.18**	**0.17**	**0.074**	**0.1**	**0.13**	**0.067**
< 0.55	< 0.47	< 0.49	< 0.5	< 0.53	< 0.52	< 0.57	< 0.55	< 0.62	< 0.52	< 0.52	< 0.55	< 0.54	< 0.54
< 0.55	< 0.47	< 0.49	< 0.5	< 0.53	< 0.52	< 0.57	< 0.55	< 0.62	< 0.52	< 0.52	< 0.55	< 0.54	< 0.54
< 0.55	< 0.47	< 0.49	< 0.5	< 0.53	< 0.52	< 0.57	< 0.55	< 0.62	< 0.52	< 0.52	< 0.55	< 0.54	< 0.54
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ML-07	ML-08	ML-08	ML-08	ML-08	ML-08	ML-08	ML-08	ML-08	ML-08	ML-08	ML-09	ML-09
8/25/2010 11:06 AM	8/1/2010 12:48 PM	8/4/2010 2:56 PM	8/6/2010 3:31 PM	8/11/2010 3:05 PM	8/13/2010 11:13 AM	8/16/2010 10:10 AM	8/16/2010 10:10 AM	8/21/2010 10:53 AM	8/24/2010 9:31 AM	8/25/2010 3:56 PM	7/31/2010 4:07 PM	8/4/2010 2:35 PM
ML-07-S-082510	ML-08-S-080110	ML-08-S-080410	ML-08-S-080610	ML-08-S-081110	ML-08-S-081310	ML-08-S-081610	ML-08-S-081610-D	ML-08-S-082110	ML-08-S-082410	ML-08-S-082510	ML-09-S-073110	ML-09-S-080410
0 - 3 in	--	0 - 3 in	0 - 3 in	0 - 3 in	0 - 3 in	0 - 3 in	0 - 3 in	0 - 3 in	0 - 3 in	0 - 3 in	--	0 - 3 in
Result	Result	Result	Result	Result	Result	Result	Duplicate	Result	Result	Result	Result	Result
< 0.51	< 0.46	< 0.56	< 0.52	< 0.52	< 0.51	< 0.51	< 0.5	< 0.5	< 0.49	< 0.49	< 0.43	< 0.49
< 0.51	< 0.46	< 0.56	< 0.52	< 0.52	< 0.51	< 0.51	< 0.5	< 0.5	< 0.49	< 0.49	< 0.43	< 0.49
< 0.51	< 0.46	< 0.56	< 0.52	< 0.52	< 0.51	< 0.51	< 0.5	< 0.5	< 0.49	< 0.49	< 0.43	< 0.49
< 0.51	< 0.46	< 0.56	< 0.52	< 0.52	< 0.51	< 0.51	< 0.5	< 0.5	< 0.49	< 0.49	< 0.43	< 0.49
< 0.51	< 0.46	< 0.56	< 0.52	< 0.52	< 0.51	< 0.51	< 0.5	< 0.5	< 0.49	< 0.49	< 0.43	< 0.49
0.086	**0.25**	**0.14**	**0.093**	**0.13**	**0.13**	**0.12**	**0.046**	**0.071**	**0.14**	**0.06**	**0.15**	**0.14**
< 0.51	< 0.46	< 0.56	< 0.52	< 0.52	< 0.51	< 0.51	< 0.5	< 0.5	< 0.49	< 0.49	< 0.43	< 0.49
< 0.51	< 0.46	< 0.56	< 0.52	< 0.52	< 0.51	< 0.51	< 0.5	< 0.5	< 0.49	< 0.49	< 0.43	< 0.49
< 0.51	< 0.46	< 0.56	< 0.52	< 0.52	< 0.51	< 0.51	< 0.5	< 0.5	< 0.49	< 0.49	< 0.43	< 0.49
--	--	--	--	--	--	--	--	--	--	--	--	--

ML-09	ML-09	ML-09	ML-09	ML-09	ML-09	ML-09	ML-09	ML-10	ML-10	ML-10	ML-10	ML-10
8/5/2010 9:41 AM	8/11/2010 3:43 PM	8/14/2010 8:38 AM	8/18/2010 1:38 PM	8/21/2010 9:51 AM	8/24/2010 3:34 PM	8/24/2010 3:34 PM	8/25/2010 3:03 PM	7/31/2010 5:46 PM	8/4/2010 2:16 PM	8/6/2010 5:02 PM	8/11/2010 4:41 PM	8/14/2010 9:39 AM
ML-09-S-080510	ML-09-S-081110	ML-09-S-081410	ML-09-S-081810	ML-09-S-082110	ML-09-S-082410	ML-09-S-082410-D	ML-09-S-082510	ML-10-S-073110	ML-10-S-080410	ML-10-S-080610	ML-10-S-081110	ML-10-S-081410
0 - 3 in	0 - 3 in	0 - 3 in	0 - 3 in	0 - 3 in	0 - 3 in	0 - 3 in	0 - 3 in	--	0 - 3 in	0 - 3 in	0 - 3 in	0 - 3 in
Result	Result	Result	Result	Result	Result	Duplicate	Result	Result	Result	Result	Result	Result
< 0.48	< 0.47	< 0.46	< 0.47	< 0.46	< 0.42	< 0.44	< 0.44	< 0.45	< 0.45	< 0.47	< 0.52	< 0.49
< 0.48	< 0.47	< 0.46	< 0.47	< 0.46	< 0.42	< 0.44	< 0.44	< 0.45	< 0.45	< 0.47	< 0.52	< 0.49
< 0.48	< 0.47	< 0.46	< 0.47	< 0.46	< 0.42	< 0.44	< 0.44	< 0.45	< 0.45	< 0.47	< 0.52	< 0.49
< 0.48	< 0.47	< 0.46	< 0.47	< 0.46	< 0.42	< 0.44	< 0.44	< 0.45	< 0.45	< 0.47	< 0.52	< 0.49
< 0.48	< 0.47	< 0.46	< 0.47	< 0.46	< 0.42	< 0.44	< 0.44	< 0.45	< 0.45	< 0.47	< 0.52	< 0.49
0.14	**0.12**	**0.08**	**0.061**	**0.078**	**0.1**	**0.086**	**0.044**	**0.13**	**0.15**	**0.14**	**0.097**	**0.1**
< 0.48	< 0.47	< 0.46	< 0.47	< 0.46	< 0.42	< 0.44	< 0.44	< 0.45	< 0.45	< 0.47	< 0.52	< 0.49
< 0.48	< 0.47	< 0.46	< 0.47	< 0.46	< 0.42	< 0.44	< 0.44	< 0.45	< 0.45	< 0.47	< 0.52	< 0.49
< 0.48	< 0.47	< 0.46	< 0.47	< 0.46	< 0.42	< 0.44	< 0.44	< 0.45	< 0.45	< 0.47	< 0.52	< 0.49
--	--	--	--	--	--	--	--	--	--	--	--	--

Table 3. U.S. EPA GLNPO Sediment PCB Analytical Data
Enbridge Line 6B MP 608 Marshall, MI Pipeline Release
Enbridge Energy, Limited Partnership

ML-10	ML-10	ML-10	ML-10	ML-10	ML-10	ML-01
8/16/2010 11:24 AM	8/19/2010 8:52 AM	8/21/2010 1:57 PM	8/21/2010 1:57 PM	8/24/2010 2:03 PM	8/26/2010 8:26 AM	7/30/2010 5:46 PM
ML-10-S-081610	ML-10-S-081910	ML-10-S-082110	ML-10-S-082110-D	ML-10-S-082410	ML-10-S-082610	ML-01-W-A-073010
0 - 3 in	0 - 3 in	0 - 3 in	0 - 3 in	0 - 3 in	0 - 3 in	0 - 2 ft
Result	Result	Result	Duplicate	Result	Result	Result
< 0.46	--	< 0.44	< 0.43	< 0.45	< 0.45	< 0.2
< 0.46	< 0.46	< 0.44	< 0.43	< 0.45	< 0.45	< 0.2
< 0.46	--	< 0.44	< 0.43	< 0.45	< 0.45	< 0.2
< 0.46	--	< 0.44	< 0.43	< 0.45	< 0.45	< 0.2
< 0.46	--	< 0.44	< 0.43	< 0.45	< 0.45	< 0.2
0.076	**0.082**	**0.12**	**0.054**	**0.042**	**0.12**	< 0.2
< 0.46	--	< 0.44	< 0.43	< 0.45	< 0.45	< 0.2
< 0.46	--	< 0.44	< 0.43	< 0.45	< 0.45	< 0.2
< 0.46	--	< 0.44	< 0.43	< 0.45	< 0.45	< 0.2
--	--	--	--	--	--	--

Notes:
Bold values are concentrations detected above the reporting limit.
ug/kg = micrograms per kilogram
--- = not completed/not analyzed
ft = feet

SW-104
16/1
15 ug/kg

2.75
2.50
2.25
2.00
1.75
1.50
1.25
1.00
0.75
0.50
0.25
0.00

SW-105
19/5
56 ug/kg

SW-107
16/0

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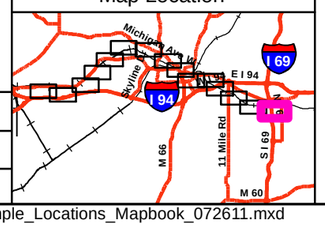
Map Location



Sampling Location

Quarter Mile Grid Segments

ML-9
14/13
400 ug/kg

Sample Location Name
Number of Samples Analyzed/Number of Samples Showing PCB Detection
Maximum PCB Detection Value

ML-9
14/13
400 ug/kg

Indicates Detection

ug/kg = micrograms per kilogram (sediment)

N

0 500 1,000 2,000

Scale in Feet

FIGURE 1
SEDIMENT SAMPLE LOCATIONS
ANALYZED FOR PCBs
Page 1 of 15
ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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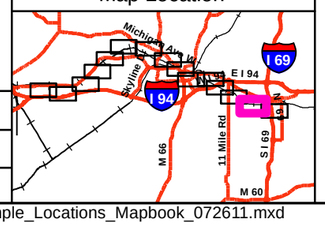
Map Location



Sampling Location

Quarter Mile Grid Segments

ML-9
14/13
400 ug/kg

Sample Location Name
Number of Samples Analyzed/Number of Samples Showing PCB Detection
Maximum PCB Detection Value

ML-9
14/13
400 ug/kg

Indicates Detection

ug/kg = micrograms per kilogram (sediment)

N

0 500 1,000 2,000

Scale in Feet

FIGURE 1
SEDIMENT SAMPLE LOCATIONS
ANALYZED FOR PCBs
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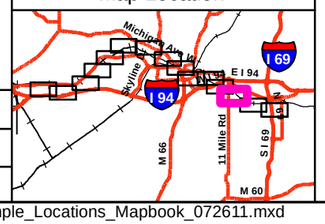
Map Location



Sampling Location

Quarter Mile Grid Segments

ML-9
14/13
400 ug/kg

Sample Location Name
Number of Samples Analyzed/Number of Samples Showing PCB Detection
Maximum PCB Detection Value

ML-9
14/13
400 ug/kg

Indicates Detection

ug/kg = micrograms per kilogram (sediment)

N

0 500 1,000 2,000

Scale in Feet

FIGURE 1
SEDIMENT SAMPLE LOCATIONS
ANALYZED FOR PCBs

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
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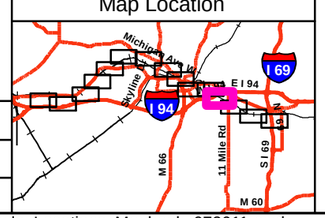
Map Location



Sampling Location

Quarter Mile Grid Segments

ML-9
14/13
400 ug/kg

Sample Location Name
Number of Samples Analyzed/Number of Samples Showing PCB Detection
Maximum PCB Detection Value

ML-9
14/13
400 ug/kg

Indicates Detection

ug/kg = micrograms per kilogram (sediment)

N

0 500 1,000 2,000

Scale in Feet

FIGURE 1
SEDIMENT SAMPLE LOCATIONS
ANALYZED FOR PCBs
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ENBRIDGE LINE 6B MP 608
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SW-002
15/2
350 ug/kg

12.00
11.75
11.50
12.25
11.25
11.00
12.50
10.75
10.50
10.25
10.00
9.75
9.50

SW-118
17/2
32 ug/kg

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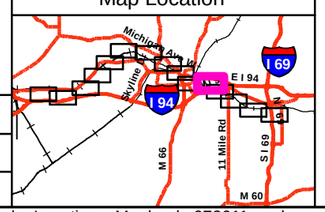
Map Location



Sampling Location

Quarter Mile Grid Segments

ML-9
14/13
400 ug/kg

Sample Location Name
Number of Samples Analyzed/Number of Samples Showing PCB Detection
Maximum PCB Detection Value

ML-9
14/13
400 ug/kg

Indicates Detection

ug/kg = micrograms per kilogram (sediment)

N

0 500 1,000 2,000

Scale in Feet

FIGURE 1
SEDIMENT SAMPLE LOCATIONS
ANALYZED FOR PCBs
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ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
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15.50
KRSE-011
1/0
KRSE-010
1/0
15.25
KRSE-012
1/1
27 ug/kg
KRSE-013
1/1
180 ug/kg
15.00
SW-117
17/0
14.75
KRSE-014
1/1
100 ug/kg
14.50
14.25
14.00
13.75
KRSE-015
1/0
13.50
13.25
KRSE-016
1/0
13.00
12.75
12.50
12.25
SW-002
15/2
350 ug/kg
12.00
11.75
11.50
11.25
11.00

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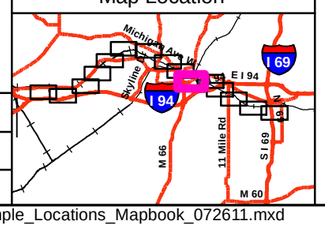
Project #:	60162778	

Map Location



Sampling Location

Quarter Mile Grid Segments

ML-9
14/13
400 ug/kg

Sample Location Name
Number of Samples Analyzed/Number of Samples Showing PCB Detection
Maximum PCB Detection Value

ML-9
14/13
400 ug/kg

Indicates Detection

ug/kg = micrograms per kilogram (sediment)

N

0 500 1,000 2,000

Scale in Feet

FIGURE 1
SEDIMENT SAMPLE LOCATIONS
ANALYZED FOR PCBs

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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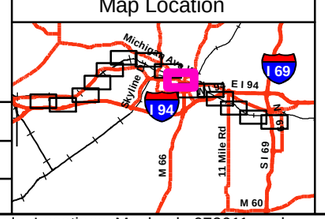
Map Location



Sampling Location

Quarter Mile Grid Segments

ML-9
14/13
400 ug/kg

Sample Location Name
Number of Samples Analyzed/Number of Samples Showing PCB Detection
Maximum PCB Detection Value

ML-9
14/13
400 ug/kg

Indicates Detection

ug/kg = micrograms per kilogram (sediment)

N

0 500 1,000 2,000

Scale in Feet

FIGURE 1
SEDIMENT SAMPLE LOCATIONS
ANALYZED FOR PCBs

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
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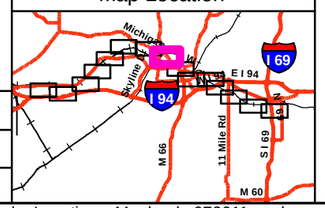
Map Location



Sampling Location

Quarter Mile Grid Segments

ML-9
14/13
400 ug/kg

Sample Location Name
Number of Samples Analyzed/Number of Samples Showing PCB Detection
Maximum PCB Detection Value

ML-9
14/13
400 ug/kg

Indicates Detection

ug/kg = micrograms per kilogram (sediment)

N

0 500 1,000 2,000

Scale in Feet

FIGURE 1
SEDIMENT SAMPLE LOCATIONS
ANALYZED FOR PCBs

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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KRSE-026
1/1
100 ug/kg

UNKNOWN
1/1
140 ug/kg

KRSE-028
1/1
38 ug/kg

KRSE-027
1/1
190 ug/kg

SW-116
11/5
98 ug/kg

KRSE-001
1/1
32 ug/kg

KRSE-002
1/1
26 ug/kg

KRSE-003
1/1
31 ug/kg

KRSE-005
1/0

KRSE-314
1/1
170 ug/kg

SW-004
13/8
39 ug/kg

KRSE-004

22.00
21.75
21.50
21.00
20.75
20.50
20.25
20.00
19.75
19.50
19.25

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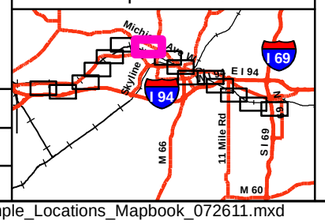
Map Location



Sampling Location

Quarter Mile Grid Segments

ML-9
14/13
400 ug/kg

Sample Location Name
Number of Samples Analyzed/Number of Samples Showing PCB Detection
Maximum PCB Detection Value

ML-9
14/13
400 ug/kg

Indicates Detection

ug/kg = micrograms per kilogram (sediment)

N

0 500 1,000 2,000

Scale in Feet

FIGURE 1
SEDIMENT SAMPLE LOCATIONS
ANALYZED FOR PCBs
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ENBRIDGE LINE 6B MP 608
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Map Location

Sampling Location

Quarter Mile Grid Segments

ML-9
14/13
400 ug/kg

Sample Location Name
Number of Samples Analyzed/Number of Samples Showing PCB Detection
Maximum PCB Detection Value

ML-9
14/13
400 ug/kg

Indicates Detection

ug/kg = micrograms per kilogram (sediment)

N

0 500 1,000 2,000

Scale in Feet

FIGURE 1
SEDIMENT SAMPLE LOCATIONS
ANALYZED FOR PCBs
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ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
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MP-27.5
2/2
40 ug/kg

KRSE-019
1/0

KRSE-018
1/0

27.75

KRSE-307
1/0

28.00

28.25

KRSE-305
1/1
200 ug/kg

SW-005
9/8
47 ug/kg

KRSE-306
1/1
88 ug/kg

28.75

KRSE-304
1/1
35 ug/kg

29.25

29.00

29.50

KRSE-303
1/1
28 ug/kg

29.75

KRSE-200
1/1
28 ug/kg

SW-115
12/7
180 ug/kg

30.25

30.50

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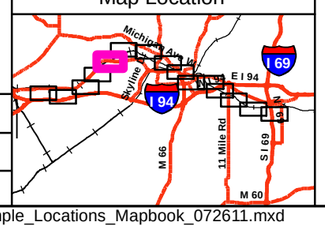
Map Location



Sampling Location

Quarter Mile Grid Segments

ML-9
14/13
400 ug/kg

Sample Location Name
Number of Samples Analyzed/Number of Samples Showing PCB Detection
Maximum PCB Detection Value

ML-9
14/13
400 ug/kg

Indicates Detection

ug/kg = micrograms per kilogram (sediment)

N

0 500 1,000 2,000

Scale in Feet

FIGURE 1
SEDIMENT SAMPLE LOCATIONS
ANALYZED FOR PCBs

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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Aerial Photography Date: April 2011 over 2010 County Aerial

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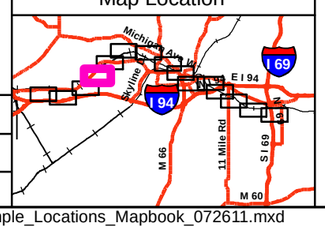
Project #:	60162778	

Map Location



Sampling Location

Quarter Mile Grid Segments

ML-9
14/13
400 ug/kg

Sample Location Name
Number of Samples Analyzed/Number of Samples Showing PCB Detection
Maximum PCB Detection Value

ML-9
14/13
400 ug/kg

Indicates Detection

ug/kg = micrograms per kilogram (sediment)

N

0 500 1,000 2,000

Scale in Feet

FIGURE 1
SEDIMENT SAMPLE LOCATIONS
ANALYZED FOR PCBs

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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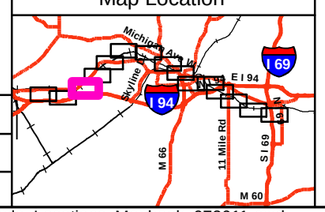
Map Location



Sampling Location

Quarter Mile Grid Segments

ML-9
14/13
400 ug/kg

Sample Location Name
Number of Samples Analyzed/Number of Samples Showing PCB Detection
Maximum PCB Detection Value

ML-9
14/13
400 ug/kg

Indicates Detection

ug/kg = micrograms per kilogram (sediment)

N

0 500 1,000 2,000

Scale in Feet

FIGURE 1
SEDIMENT SAMPLE LOCATIONS
ANALYZED FOR PCBs

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

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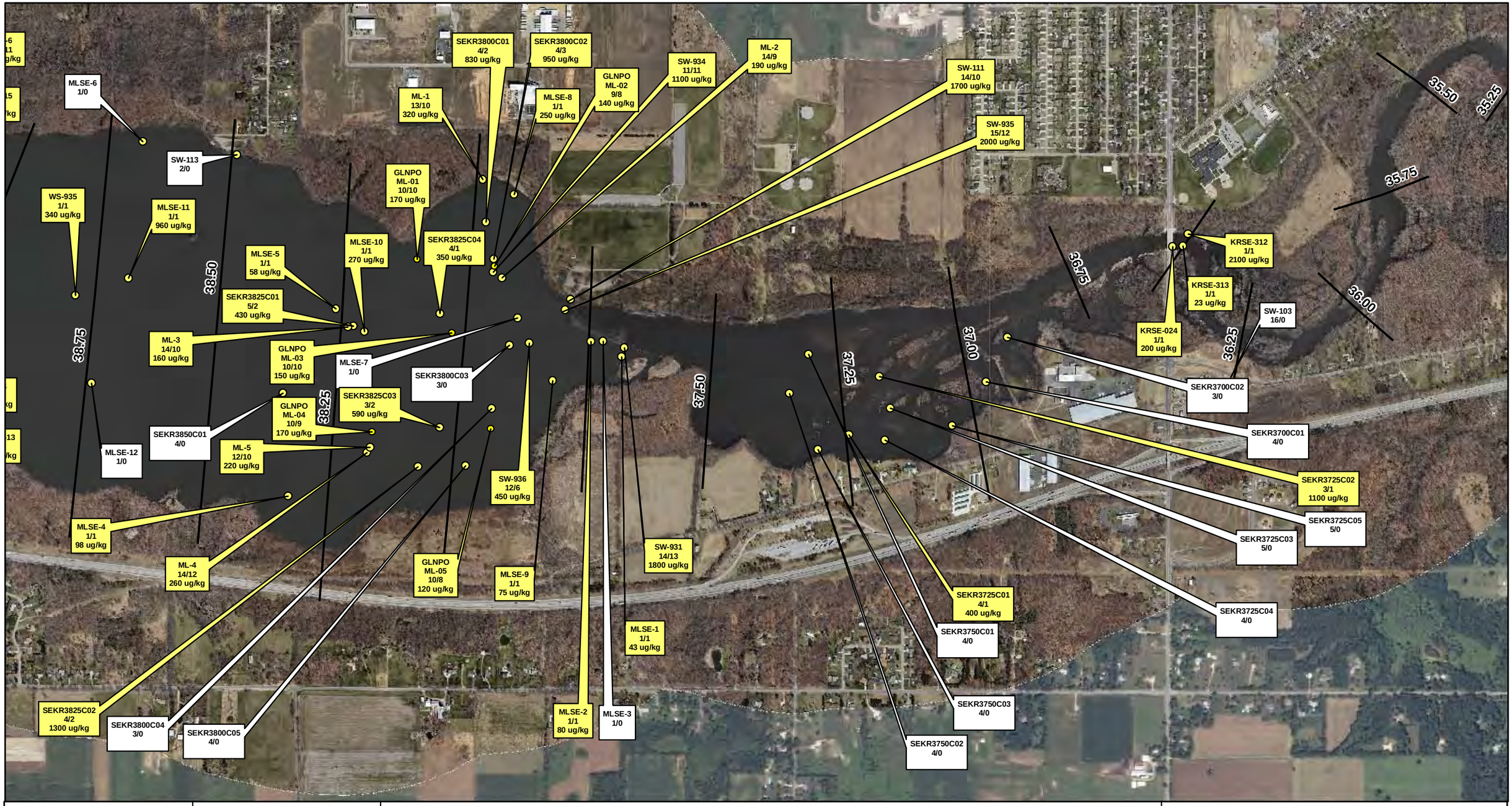
Aerial Photography Date: April 2011 over 2010 County Aerial



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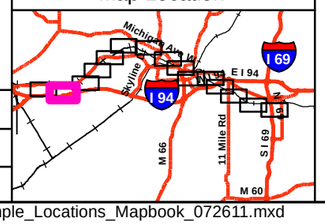
Project #:	60162778	

Map Location



Sampling Location

Quarter Mile Grid Segments

GLNPO = Great Lakes National Program Office (U.S. EPA)

ML-9 14/13 400 ug/kg

Sample Location Name
Number of Samples Analyzed/Number of Samples Showing PCB Detection
Maximum PCB Detection Value

ML-9 14/13 400 ug/kg

Indicates Detection

ug/kg = micrograms per kilogram (sediment)

N

0 500 1,000 2,000

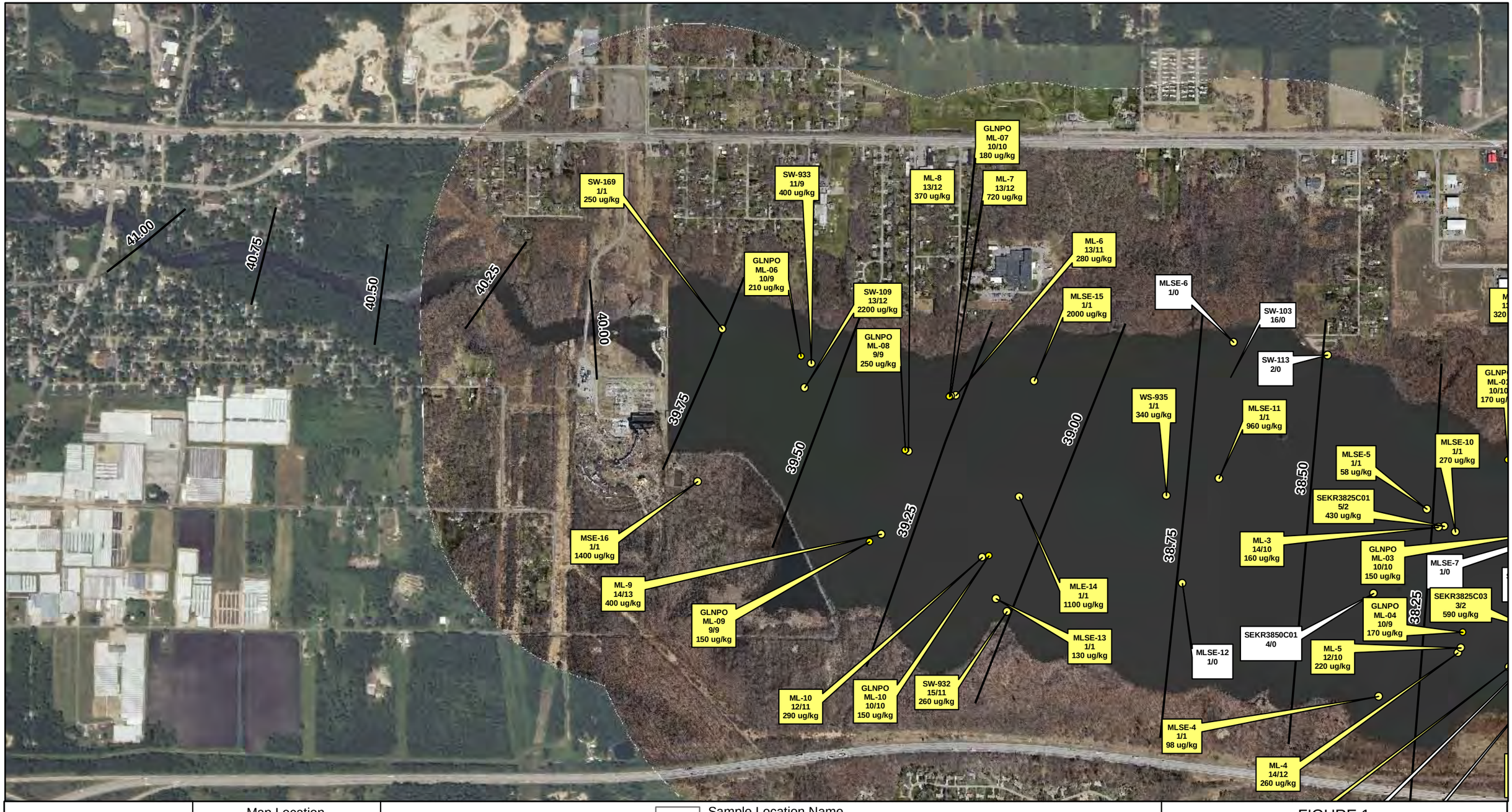
Scale in Feet

FIGURE 1
SEDIMENT SAMPLE LOCATIONS
ANALYZED FOR PCBs

ENBRIDGE LINE 6B MP 608
MARSHALL, MI PIPELINE RELEASE
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

Z:\Work\GIS\Miscellaneous\PCBs_Sample_Locations_Mapbook_072611.mxd

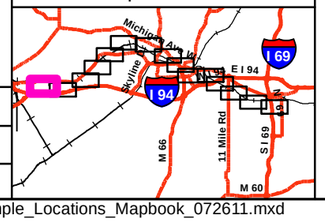
Aerial Photography Date: April 2011 over 2010 County Aerial



ENBRIDGE

Drawn:	DE	7/28/2011
Approved:	SG	7/28/2011
Project #:	60162778	

Map Location



Sampling Location

Quarter Mile Grid Segments

GLNPO = Great Lakes National Program Office (U.S. EPA)

ML-9 14/13 400 ug/kg — Sample Location Name; Number of Samples Analyzed/Number of Samples Showing PCB Detection; Maximum PCB Detection Value

ML-9 14/13 400 ug/kg — Indicates Detection

ug/kg = micrograms per kilogram (sediment)

N

0 500 1,000 2,000

Scale in Feet

FIGURE 1
SEDIMENT SAMPLE LOCATIONS
ANALYZED FOR PCBs
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ENBRIDGE LINE 6B MP 608
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Aerial Photography Date: April 2011 over 2010 County Aerial

Attachment E

Recommended Sheen Sample Collection Procedure

Recommended Sheen Sample Collection Procedure (4/26/2012)

Introduction

An oil sheen is a very thin layer of oil that floats on the surface of the water after an oil spill. Due to micro-layer nature of a sheen, standard methods for surface water oil collection are often ineffective.[1] A "Sheen Sampler" is a TFE-fluorocarbon polymer net (net) that has a high affinity for oil and has been demonstrated to collect a sufficient amount of oil for reliable chemical fingerprinting analysis. A standard sheen sampler (figure 1) consists of a nylon ring with a handle, and a net. To collect the oil sheen from the surface water, the sheen sampler is repeatedly passed back and forth through the surface water to collect as much of the sheen layer as possible. This sheen sampler is then sent to a laboratory where the oil is extracted from the net with solvent and analyzed for petroleum constituents. Given that only trace quantities of oil are collected, the sheen sampler must be free of extraneous hydrocarbon contamination and the method detection limits for the chemical analysis must be sufficient to reliably measure trace concentrations of hydrocarbons.

Figure 1. General Oceanics sheen sampler kit.

Equipment Preparation

As noted above, sheen samplers have a very high affinity to absorb hydrocarbons and as produced, contain trace amounts of these compounds (net blank) that may interfere with the sheen sample chemical analysis. In cases where the sheen sampler is used to collect a mousse or oil sample from the surface of the water, the mass of oil will generally be many

[1] For example, a surface water sample may be collected in such a way as to capture some of the sheen in the sample bottle. The whole water sample is then extracted with solvent and analyzed for petroleum constituents.

times greater than the net blank. However, as the mass of oil decreases (e.g., sheen), the net blank becomes more important[2] and must be carefully monitored.

To minimize the net blank contamination and improve the defensibility of the sheen data, each sheen sampler must be rigorously cleaned prior to use. The nylon ring handle is washed with laboratory grade soap and hot water followed by a de-ionized water rinse. Each net is extracted a minimum of 6 times with methylene chloride (DCM). The nets are then checked for cleanliness by testing approximately 10% of the nets cleaned in a batch by instrumental analysis. Each net is sealed in a Teflon® lined glass jar and each nylon ring is wrapped in solvent rinsed (DCM) aluminum foil. Once cleaned, the sheen samplers should be stored at room temperature in a clean environment away from combustion sources of hydrocarbons (e,g., auto exhaust). These samplers have a shelf life of approximately 3 months, after which they should be returned to the laboratory for re-cleaning and testing. An equipment blank (pre-cleaned sheen sampler) is used to monitor sheen blank contamination while clean sheen samplers are in storage or transported to the field. When sheen samples are collected, a clean unopened sheen net jar should be labeled as "Equipment Blank" and shipped back to the laboratory sheen samples. One equipment blank should be analyzed per sampling trip, or if a new batch[3] of sheen samplers are used.

Procedure

- Put on a pair of clean powder free nitrile gloves. The nylon ring handle or the TFE-Net should not be handled with bare hands. The oils from your skin can contaminate the net.
- Un-wrap the nylon ring handle from the foil pack and un-clip the pre-cleaned ring handle.
- Remove the TFE-Net from the glass jar and thread the net onto the nylon ring handle and re-clip the handle. Close the jar to keep clean.
- Sweep the TFE-Net back and forth through the water surface containing the sheen (within a defined area composing the sampled water) in a scooping motion several times. Eight (8) sweeps was indicated by Greimann et al. (2005) as optimal.
- Carefully un-clip the nylon ring handle, remove the TFE-Net and place the TFE-Net back in the original glass jar. Discard the ring handle.
- Place a label on the jar with field ID, date and time sampled and sampler.
- Samples should be stored and shipped either frozen or at < 6°C.
- In addition to the field samples one of the clean jars containing a TFE-Net will be used as an equipment and trip blank. Label the jar as equipment trip blank and ship back under chain-of-custody with the samples. One equipment trip blank should be analyzed per sampling trip or if a new batch of sheen samplers are used. The equipment trip blank (pre-cleaned sheen sampler) is used to monitor contamination from atmospheric sources while primary sheen samplers are exposed to the air. Open the trip blank jar (but do not remove or handle the net at all) immediately prior to removing the primary TFE-Net from its jar. Close the trip blank jar immediately after the primary TFE-Net (now containing sheen) is replaced back into its jar.
- Samples will be shipped overnight, under chain of custody, and either frozen or chilled at < 6°C to Alpha Analytical Lab in Mansfield, MA (address below).

[2] For example the hydrocarbons associated with the net blank may be equal to or greater than five times the sample petroleum contamination.
[3] A batch is defined as the group of sheen sampling units cleaned at one time.

Ship to:

Sue O’Neil
Alpha Analytical Laboratory
320 Forbes Blvd
Mansfield, MA 02048

Phone (508-844-4117)

References

Greimann, D.E., Zohn, A.I., Plourde, K.L., and Reilly, T.R. 1995. Teflon nets: A novel approach to thin film oil sampling, *in* International Oil Spill Conference, 14th, Long Beach, Calif., 1995, Proceedings. American Petroleum Institute, publ. 4620, p. 519.

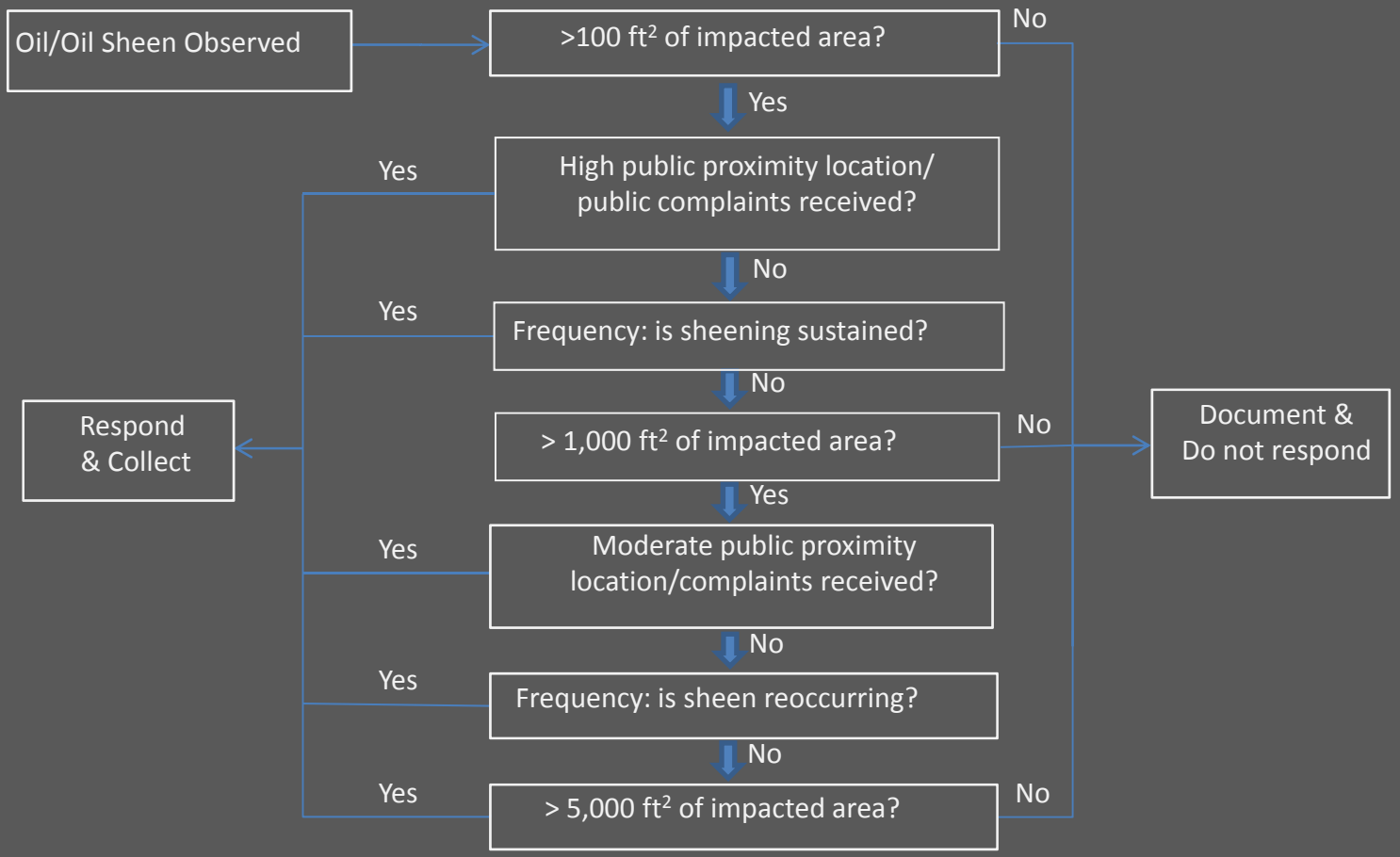
Greimann, D., Zohn, A., Plourde, K., and Reilly, T. 2005. Teflon nets: A novel approach to thin film oil sampling, *in* International Oil Spill Conference, Miami Beach, Fla., 2005, Proceedings. American Petroleum Institute, conf. paper, p. 8,302-8,305. http://www.iosc.org/papers_posters/02164.pdf

United States Coast Guard Marine Safety Laboratory. 2010. Sample handling & transmittal guide. Version 7, October 2010.

Attachment F

Response to Observations of Oil Sheen Flowchart

Emerging Oil Management Program Decision Flow Chart (RV 8/9/2012)



Attachment G

Project Schedule

ID	Task Name	Start	Finish
1	**Morrow Lake Delta and Morrow Lake Monitoring**	**Mon 4/8/13**	**Fri 12/6/13**
2	**Fixed Location Poling (9 Rounds)**	**Mon 4/8/13**	**Fri 12/6/13**
12	**E 4.0 Containment Poling (8 Rounds)**	**Mon 5/13/13**	**Fri 11/15/13**
21	**Seasonal Poling Assessment Downstream of Morrow Lake (3 Rounds)**	**Mon 5/20/13**	**Fri 10/18/13**
25	**Supplemental Data Collection**	**Mon 5/13/13**	**Fri 11/29/13**
26	Walling Tube Installation	Tue 4/30/13	Fri 5/3/13
27	**Walling Tube Sampling (6 Rounds)**	**Mon 6/10/13**	**Fri 11/29/13**
35	Walling Tube Removal	Mon 11/25/13	Fri 11/29/13
36	Surface Water/Sediment Temperature Data Collection (Daily excluding weekends)	Thu 4/4/13	Tue 12/31/13
37	Kalamazoo River Flow and Stream Data Collection (Daily excluding weekends)	Thu 4/4/13	Tue 12/31/13
38	Sheen Management	Thu 4/4/13	Tue 12/31/13
39	Air Monitoring	Mon 7/1/13	Tue 12/31/13
40	Additional Sample Collection (Surface Water, Sediment, and/or Soil)	Thu 4/4/13	Tue 12/31/13
41	Dredge Report	Tue 12/31/13	Mon 3/31/14
42			
43	Spring 2013 Poling Reassessment	Mon 5/20/13	Mon 7/1/13
44			
45	**Permitting**	**Mon 3/25/13**	**Mon 7/1/13**
46	Permit - E4 System Installation	Mon 3/25/13	Thu 4/25/13
47	NPDES Permit	Fri 4/19/13	Sun 5/19/13
48	SESC Permit	Tue 4/23/13	Sun 5/19/13
49	Permit - MP 4.50 - 5.80 Dredging	Wed 5/1/13	Mon 7/1/13
50	Permit - MP 13.90 - 15.70 Dredging	Wed 5/1/13	Mon 7/1/13
51	Permit - MP 36.50 - 39.85 Dredging	Wed 5/1/13	Mon 7/1/13
52	Permit - MP 10.40 N Dredging	Wed 5/1/13	Mon 7/1/13
53	Permit - MP 21.50 RDB Modification Dredging	Wed 5/1/13	Mon 7/1/13
54			
55	**Field Operations**	**Mon 4/29/13**	**Mon 5/13/13**
56	E4 System Installation	Mon 4/29/13	Mon 5/13/13
57			
58	**Dredging Field Operations**	**Mon 5/6/13**	**Tue 12/31/13**
59	**MP 4.50 - 5.80**	**Mon 6/3/13**	**Sat 10/19/13**
60	Site Prep	Mon 6/3/13	Sat 6/22/13
61	Mobilization	Mon 6/17/13	Sat 6/29/13
62	Sediment Removal	Mon 7/1/13	Tue 10/1/13
63	Water Treatment	Mon 7/1/13	Mon 10/7/13
64	Trans & Disposal	Mon 7/15/13	Tue 10/15/13
65	Demobilization	Tue 10/1/13	Sat 10/19/13
66			
67	**MP 13.90 - 15.70**	**Mon 6/3/13**	**Wed 9/25/13**
68	Site Prep	Mon 6/3/13	Sat 6/15/13
69	Mobilization	Mon 6/10/13	Sat 6/29/13
70	Sediment Removal	Mon 7/1/13	Wed 8/21/13
71	Water Treatment	Mon 7/1/13	Tue 8/27/13
72	Trans & Disposal	Mon 7/15/13	Wed 9/4/13
73	Demobilization	Thu 8/22/13	Wed 9/25/13
74			
75	**MP 21.50 RDB**	**Thu 8/29/13**	**Wed 10/30/13**
76	Site Prep	Thu 8/29/13	Wed 9/11/13
77	Mobilization	Thu 9/12/13	Wed 9/18/13
78	Sediment Removal	Wed 9/11/13	Thu 10/10/13
79	Water Treatment	Wed 9/11/13	Sat 10/12/13
80	Trans & Disposal	Fri 9/13/13	Sat 10/12/13
81	Demobilization	Fri 10/11/13	Wed 10/30/13
82			
83	**MP 36.50 - 39.85**	**Mon 5/6/13**	**Tue 12/31/13**
84	Site Prep	Mon 5/6/13	Mon 7/1/13
85	Mobilization	Mon 6/10/13	Sat 6/29/13
86	Sediment Removal	Mon 7/1/13	Thu 10/24/13
87	Water Treatment	Mon 7/1/13	Wed 10/30/13
88	Trans & Disposal	Sat 7/27/13	Wed 11/20/13
89	Demobilization	Mon 11/4/13	Tue 12/31/13
90			
91	**MP 10.40 N**	**Mon 7/1/13**	**Wed 8/21/13**
92	Site Prep	Mon 7/1/13	Sat 7/13/13
93	Mobilization	Mon 7/15/13	Sat 7/20/13
94	Sediment Removal	Mon 7/22/13	Wed 8/7/13
95	Water Treatment	Mon 7/22/13	Wed 8/7/13
96	Trans & Disposal	Mon 7/22/13	Wed 8/7/13
97	Demobilization	Thu 8/8/13	Wed 8/21/13
98			
99	Post Poling Assessment	Thu 8/22/13	Tue 12/31/13