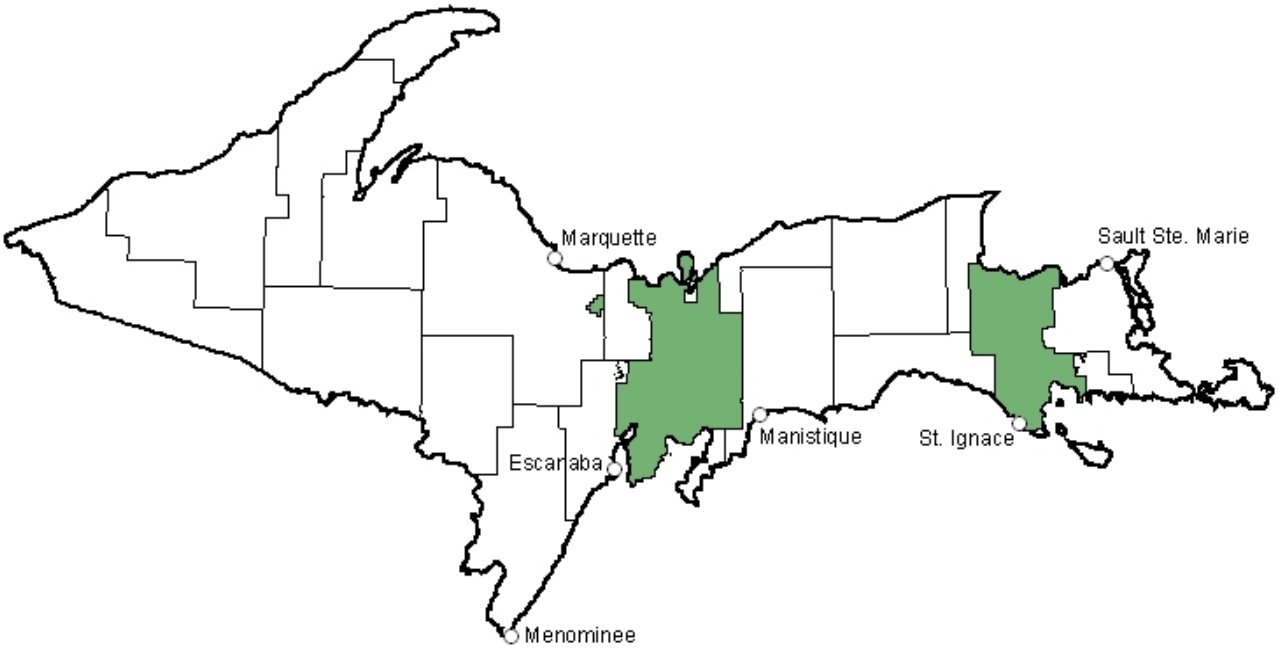
ENBRIDGE ENERGY, LIMITED PARTNERSHIP

HIAWATHA NATIONAL FOREST
PIPELINE OPERATION AND MAINTENANCE PLAN



Version 2

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Enbridge Energy, Limited Partnership

Hiawatha National Forest

Operation and Maintenance Acceptance Under Special Use Permit 4012-01

This O&M Plan has been accepted by the following representative of Enbridge and the Forest Supervisor of the Hiawatha National Forest.

_____ Date: 1/26/10

Kristen Benson
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_____ Date: 2.3.10

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HIAWATHA NATIONAL FOREST
PIPELINE OPERATION AND MAINTENANCE PLAN

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DEFINITIONS

Authorized Officer *- Any Forest Service employee who has the delegated authority to issue, grant, amend, renew, suspend or revoke special use authorizations. This would be a Regional Forester, Forest Supervisor, or District Ranger.*

Categorical Exclusion *- A category of actions which do not individually or cumulatively have a significant effect on the human environment and which have been found to have no such effect in procedures adopted by a Federal agency and for which, neither an environmental assessment nor an environmental impact statement is required.*

Cathodic Protection *- A technique used to reduce the corrosion of a metal surface by making it the cathode of an electrochemical cell. This technique is applied by installing a network of metal rods (anodes) in the ground, wired to a rectifier, and used to make the potential for metal loss occur on the anodes and not the pipeline. This is known as an "impressed system." In the case where the metal rods are wired directly to the pipeline the configuration is known as a "sacrificial anode system."*

Cultural Resource *- The physical remains of past human cultural systems in places or sites of importance in human history or prehistory.*

Diameter at Breast Height (DBH) *- The diameter of a standing tree at a point four feet six inches from ground level.*

Extraordinary Activities *- Emergencies or similar events that require immediate attention.*

Endangered Species Act of December 28, 1973 (ESA) *- The Secretary of Agriculture is directed to "establish and implement a program to conserve fish, wildlife, and plants," including Federally listed species (16 U.S.C. 1534 et seq.). Section 7 directs Federal departments and agencies to ensure that actions authorized, funded, or carried out by them are not likely to jeopardize the continued existence of any threatened or endangered species or result in the destruction or adverse modification of their critical habitats.*

Historic Properties *- Includes buildings, structures, districts, objects and sites included in, or eligible for inclusion in, the National Register of Historic Places. The term includes artifacts, records, and remains related to such properties, and properties of traditional religious and cultural importance to Indian tribes that meet the National Register Criteria in 36 CFR part 60.*

Forest Plan *- A long-range plan for management of a designated area of National Forest System lands. This Plan will provide management direction for all management programs and practices, resource uses, and resource protection measures on these lands.*

Heavily Silt-Laden *- A water quality descriptor meaning, in general terms, that visible settling of sediment is evident after a few minutes in a clear glass jar.*

Looping *- The technique of laying an additional pipeline alongside an existing one when additional capacity is desired.*

Merchantable Timber - A tree greater than or equal to five inches in diameter at breast height.

Milepost *-Locations along the pipeline are referenced by milepost. The pipelines traverse the Hiawatha National Forest from west to east by mileposts 1352 to 1387 (Westside) and 1460 to 1474 (eastside) respectively (refer to Appendix A).*

National Forest System Lands (NFS Lands) *- National Forests, National Grasslands, and other related lands for which the Forest Service is assigned administrative responsibility.*

National Pollution Discharge Elimination System (NPDES) Permit *-These permits regulate the discharge of wastewater generated during operation and maintenance of the pipeline including trench dewatering.*

National Environmental Policy Act (NEPA) *– The National Environmental Policy Act (40 Code of Federal Regulations 1500., 1969, as amended) is the foundation of modern American environmental protection. Federal agencies are required to take a "hard look" at potential environmental consequences of their proposed management actions, and mesh their environmental, economic, and social objectives. Agencies are required to prepare environmental analyses, with input from state and local governments, Indian tribes, the public, and other federal agencies, when they consider a proposal for a major federal action.*

Non-Native Invasive Species *– A plant or animal, including its seeds, eggs, spores or other biological material that is non-native to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm (Executive Order 13112).*

Permit Administrator *- A Forest Service employee who acts on the behalf of the Authorized Officer in the administration of the Special Use Permit.*

Pig *- An inspection tool used to internally inspect pipeline integrity.*

Right-of-Way *- Land authorized to be used or occupied for the construction, operation, maintenance, and termination of a project or facility passing over, upon, under, or through such land.*

Scraper Trap *- An above ground device attached to the pipeline used to introduce internal inspection or cleaning tools.*

Section 106 of the National Historical Preservation Act (NHPA) *- A law which requires federal agencies to take into account the effects of actions on historic properties and affords the SHPO and Advisory Council on Historic Preservation a reasonable opportunity to comment. The responsibilities extend to all federal agencies, and all kinds of federal actions, including those carried out by non-federal parties under federal permit, license, or funding.*

Special Use Permit *- A special use authorization that provides permission, without conveying an interest in land, to occupy and use NFS lands or facilities for specified purposes. A copy of Enbridge's Special Use Permit is provided in Appendix B.*

State Historic Preservation Officer (SHPO) *– Administers the historic preservation program in the State.*

1. INTRODUCTION

Enbridge Energy, Limited Partnership (Enbridge) owns and operates a liquid hydrocarbon transmission pipeline that traverses the Hiawatha National Forest (HNF) in the Upper Peninsula of Michigan (see Appendix A – Location Maps). The pipeline is currently authorized to operate under the provisions of Special Use Permit (SUP) 4012-01 issued by the Forest Service on March 14, 1996.

Enbridge's pipeline system consists of single 30-inch-diameter pipeline, that crosses about 21.2 miles of HNF-owned land within the proclamation boundary of the West Unit of the HNF (between approximate Enbridge pipeline milepost (MP) 1352.44 and MP 1386.73) and 11 miles of HNF-owned land within the proclamation boundary of the East Unit of the HNF (between approximate MP 1459.56 and MP 1473.48). Private land holdings do occur scattered along the pipeline system between the proclamation boundaries of the Forest.

Periodically, Enbridge is required to perform operation and maintenance (O&M) activities on its pipeline system within the HNF to keep it operational and in good repair, and to comply with U.S. Department of Transportation (DOT) safety regulations. O&M activities on federal lands managed by the HNF are allowed in accordance with Enbridge's SUP. This Operation and Maintenance Plan (O&M Plan) was established in accordance with Condition 28 of Enbridge's SUP, and provides procedures for O&M project notification, review, and implementation on HNF-managed lands.

Activities on HNF lands must comply with provisions specified in NEPA, Section 106 of NHPA, and ESA (see definitions). Under these laws a review is required on all activities on NFS lands. The level of review is determined by degree of disturbance, public interest and resources involved. Generally, routine maintenance actions do not individually or cumulatively have significant effects on the quality of the human environment and, therefore, may be categorically excluded from documentation in an environmental assessment or environmental impact statement. However, a project file is needed and the decision to proceed must be documented in a decision memo.

Most O&M activities can be anticipated in advance or expected to occur regularly as a part of the ongoing maintenance and safe operation of the pipeline, while emergency situations require immediate attention. This document provides a detailed discussion of the environmental best management practices (BMPs) that Enbridge will implement during O&M activities. The O&M Plan will be updated to reflect future conditions or changes in pipeline operation and Forest Service (FS) policy. Enbridge and the HNF will meet semi-annually on a date mutually agreed upon to discuss any necessary changes/modifications to the O&M Plan.

As part of this O&M Plan, Enbridge will establish a reimbursable collection agreement and financial account with the HNF to cover HNF's costs associated with review of O&M activities. An initial sum of $5,000 U.S. will be deposited into the account and drawn against by the HNF on an as needed basis. Enbridge will restore the balance per terms of the collection agreement.

Contact Information

Enbridge has designated a primary contact person who has decision-making authority to discuss Enbridge's O&M projects with the HNF. Likewise, the HNF has designated a Permit Administrator who acts on behalf of the Authorized Officer in the administration of the SUP. The Permit Administrator is the primary point of contact between Enbridge and the HNF. The Authorized Officer has the authority to issue, grant, amend, renew, suspend, or revoke special use authorizations that may be necessary for O&M activities. A listing of key personnel is provided in Table 1.

Table 1 - Pipeline Operations and Maintenance Contacts

EMERGENCY CONTACTS:

Organization	Name	Phone / e-mail
Enbridge Energy	24 hour Emergency Number	(800) 858-5253
Hiawatha National Forest	Thomas A. Schmidt Forest Supervisor 2727 N. Lincoln Road Escanaba, MI 49829	Office (906) 786-4062 Home (906) 789-7940 taschmidt@fs.fed.us

REGULAR CONTACTS:

Org.	Contact	Phone / Fax / e-mail	Office Address	Position Title
HNF	Susan Alexander	(906) 789-3327 Fax: (906)-789-3311 smalexander@fs.fed.us	2727 N. Lincoln Road Escanaba, MI 49829	Realty Specialist / O&M Coordinator
	Ken Guillard	(906) 643-7900 ext.141 Fax (906) 634-8759 kguillard@fs.fed.us	1798 West U.S. Hwy 2 St. Ignace, MI 49781	East Zone Engineer / Contact Back-up
	Greg Gardner	(906) 474-6442 ext. 124 Fax (906) 474-9122 ggardner@fs.fed.us	8181 US Hwy 41 Rapid River, MI 49878	West Zone Engineer / Contact Back-up
	Jessica Stuntebeck	(414) 297-3342 jjstuntebeckl@fs.fed.us	Forest Service, Eastern Region, R9 626 E. Wisconsin Ave Milwaukee, WI 53202	Hazmat Specialist
	Steve Nurse	(906) 789-3322 Fax (906) 789-3311 snurse@fs.fed.us	2727 N. Lincoln Road Escanaba, MI 49829	Fire Management Officer
	John Franzen	(906) 789-3308 Fax (906) 789-3311 jfranzen@fs.fed.us	2727 N. Lincoln Road Escanaba, MI 49829	Heritage Resource Program Leader
Enbridge	Kris Benson	(715) 394-1572 Fax (715) 394-1570 Cell (218) 348-1177 Kristen.Benson@enbridge.com	119 N. 25th St. E. Superior, WI 54880	Senior Environmental Analyst
	Mark Olson	(715) 394-1419 Fax (715) 394-1405 Mark.Olson@Enbridge.com	119 N. 25th St. E. Superior, WI 54880	Right-of-Way Agent
	Robert Steede	(715) 394-1433 Fax (715) 394-1570 Robert.Steede@Enbridge.com	119 N. 25th St. E. Superior, WI 54880	Supervisor, Liquids Pipelines

2. OPERATION AND MAINTENANCE ACTIVITIES

Activity Definitions

O&M activities range from pedestrian walkovers of the pipeline, to routine vegetation clearing on the pipeline right-of-way, to periodic pipe excavations of the pipeline. Most O&M activites occur within Enbridge's 60-foot-wide permanent right-of-way. In consultation with the HNF, Enbridge developed several criteria that define which O&M activities are routine and allowable under the O&M Plan. O&M activities are divided into three categories based on impact level: No Disturbance, Minor Disturbance, and Disturbance Activities.

All O&M activities must avoid impacts to Threatened, Endangered, or Sensitive species (TES) (by following conservation measures developed through preparation of a Biological Evaluation), and cultural resource (CR) sites (by limiting the size of the ground disturbance to that of the original construction footprint). The three categories of O&M activity levels vary by size of the project, and/or potential impact to waterbodies as summarized below and in Table 2:

- ***No Disturbance Activities*** occur within the 60-foot-wide permanent right-of-way and do not involve mechanized vegetation clearing or ground disturbance, or occur entirely within the fenced enclosure of an existing pump station or valve site.

- ***Minor Disturbance Activities*** are also contained within the 60-foot-wide permanent right-of-way, but do involve mechanized vegetation clearing and small scale excavations (less than 200 feet in length) of the pipeline to allow for physical inspections and/or maintenance work. Minor Disturbance Activities do not include working in perennial waterbodies.

- ***Disturbance Activities*** may occur outside of the 60-foot-wide permanent right-of-way and include excavations greater than 200 feet in length of the pipeline, and may include working in perennial waterbodies.

Table 2 – O&M Activity Level Screening Criteria

Activity Level	TES & CR	ROW work-space limits	Waterbodies
No Disturbance	Avoid impacts	Within 60 feet	No
Minor Disturbance	Avoid impacts	Within 60 feet	No
Disturbance	Avoid impacts	May Occur Outside 60 feet	Yes

Projects that deviate from these criteria are outside the scope of this O&M Plan and the project authorizations described in the O&M Plan. These types of projects will be reviewed on a site-specific basis and may require biological field surveys; additional HNF review; and a separate NEPA analysis, documentation, and decision. Sections 2.1, 2.2, and 2.3 list common O&M activities and provide a more detailed discussion of the environmental criteria applicable to each activity level.

Outside of routine O&M activities, an emergency situation could also occur resulting from unforeseen events that require immediate response. These situations are outside the scope of this O&M Plan; however, Enbridge would implement the procedures in the O&M Plan as feasible during the emergency response activities and, through consultation with the HNF, would work to address environmental concerns including those that may arise during post-emergency activities and restoration.

Sensitive Environmental Resource Areas

Sensitive environmental resources may be present at locations along the pipeline right-of-way, and may include:

1. Federally listed, candidate, or proposed species and their critical habitats;
2. Regional Forester Sensitive Species;
3. Wild and Scenic River crossings; and/or
4. HNF Management Areas.

Through development of this O&M Plan, Enbridge and the HNF have identified locations where sensitive environmental resources are known to occur along the right-of-way, and identified conservation measures that must be followed during O&M activities to protect those resources. This information is included in Appendix B. When Enbridge identifies an O&M activity, Enbridge's O&M Coordinator will review the O&M project location against the resource location and conservation measure information in Appendix B, and follow the notification process described below.

Enbridge and the HNF recognize that the locations of sensitive environmental resources and/or conservation measures may change over time. Enbridge and the HNF will coordinate annually to review changes in regulations, species designations, or species occurrences and distribution along the corridor identified through surveys; all of which may warrant modification to conservation measures contained in Appendix B. At this coordination meeting, the parties will revise, remove, or develop new conservation measures for the O&M Plan needed to reflect changes in species occurrences along the pipeline corridor.

Notification and Review Process

O&M Activities vary in complexity and potential environmental impacts. Many O&M activities are small in scope and impact such that a project-specific review is not necessary because the evaluation of these types of projects were considered with the development of this O&M Plan. By evaluating potential O&M project impacts now for routine O&M activities that may occur in the future, HNF review time for those O&M projects can be greatly reduced. This process allows for quicker regulatory processing, reducing unplanned HNF staff resource time requirements, and allows Enbridge to complete the O&M activity in a timely manner, which is necessary for operating the pipeline.

If a proposed O&M project activity <u>can</u> be completed in accordance with the conservation measures included in Appendix B, then the O&M activity will proceed according the Notification and Review Process described below, and Enbridge will follow its general BMPs discussed in Section 3.0.

If a proposed O&M project activity cannot be completed in accordance with the conservation measures included in Appendix B, then the O&M activity will require further coordination with and approval from the HNF during the notification period described below, to develop project-specific procedures in addition to the general BMPs discussed in Section 3.0.

No Disturbance Activities do not require prior notification to, or approval from the HNF. These projects are automatically authorized by way of implementing this O&M Plan. Although many No Disturbance Activities are pre-approved, note that one environmental resource area in Appendix B carries a work timing restriction for even No Disturbance Activities.

Minor Disturbance Activities do require a prior notification to the HNF (either 7-day or 14-day), but do not require project specific approval by the HNF. These activities are automatically authorized by way of implementing this O&M Plan, provided that no unusual circumstance has developed since the last annual coordination meeting between Enbridge and the HNF. If this situation occurs, the HNF Permit Administrator must advise Enbridge of its specific concern within the notification review time period. If the HNF does not respond within the notification review period, Enbridge may proceed with the project.

The prior notification period is set at either 7 days or 14 days depending on the location of the proposed O&M work in relation to the sensitive resources listed in Appendix B. If the O&M activity occurs at a location where no sensitive resources are identified in Appendix B, then the prior notification period is 7 days. Conversely, if the O&M activity occurs at a location where a sensitive resource is identified in Appendix B, then the prior notification period is 14 days.

Disturbance Activities do require prior notification to the HNF and project-specific approval. The schedule for prior notification to, and review by the HNF of a Disturbance Activity project will be coordinated on a case-specific basis between Enbridge and the HNF Permit Administrator. While Disturbance Activities are larger maintenance projects and can require more review time, the process still needs to move at a progressive pace, balancing thoroughness and timeliness, as a Disturbance Activity such as an integrity inspection may indicate metal loss, denting, and/or cracking that could result in triggering an emergency situation if an immediate repair is warranted. The O&M project notification and HNF review process are summarized below in Table 3.

Table 3 – O&M Project Notification and Review Summary

Activity Level	HNF Notification Timing	Additional HNF Consent Needed
No Disturbance	None	No
Minor Disturbance	**7 Days** – for locations not listed as sensitive resources in Appendix B	No
	14 Days – for locations listed as sensitive resources in Appendix B	No
Disturbance	Coordinate Timeline	Yes

The prior notification for Minor Disturbance and Disturbance Activities will be provided via e-mail to the HNF Permit Administrator and will include the following information:

1) Project Description: Information relative to the activity, function or need, location, schedule (with completion dates), equipment, access, and other pertinent information;

2) Anticipated Environmental Impacts: An overview of potential impacts;

3) Activity-Specific Construction Techniques & Mitigation Measures: A listing of specific or unique measures that may apply; and

4) General Environmental Protection Measures (refer to Section 3): A listing of environmental BMPs, which are discussed in Section 3, to be implemented as necessary for the specific location and nature of the activity.

If an emergency situation were to occur, Enbridge will respond immediately to ensure continued safe operation of the pipeline. Emergency situations do not require prior notification to the HNF, nor do they need additional HNF approval. Enbridge will notify and apprise the HNF Permit Administrator of an emergency situation within eight hours of taking remedial action as more fully described in section 2.4.

2.1. No Disturbance Activities

No Disturbance Activities are those that do not involve mechanized right-of-way vegetation clearing, or mechanized ground disturbance, or are activities that occur entirely within the fenced enclosure of an existing pump station or valve site. Project sites can be readily accessed from existing Forest Service or other public roads, and will not impact streams, wetlands, or other known sensitive features. Enbridge will implement relevant measures discussed in the O&M Plan (see "General Measures" in Section 3).

2.1.1. Simple Maintenance/Housekeeping:

Description: To the extent Enbridge observes or is informed about minor concerns on its right-of-way, it will take steps to rectify the situation. Such matters may include:

- Removing third-party trash.
- Inspecting complaints or responding to reports of activities on the right-of-way and/or that occur on or near road right-of-ways or access points.
- Routine grass mowing of road ditches and around road crossing markers.

Potential Environmental Impacts: None anticipated.

Activity Specific Construction Techniques and Mitigation Measures: Typically none.

General Environmental Protection Measures (refer to Section 3): General Measures.

2.1.2. Washing and Painting Existing Facilities:

Description: Enbridge operates one pump station on the HNF, the Rapid River Station at MP 1356.7, and three valve sites on HNF land, at MPs 1356.7 and 1373.2. Washing and painting of existing developed aboveground facilities is part of Enbridge's normal maintenance. Washing may utilize high-pressure water and detergent. Painting may involve limited sandblasting.

Potential Environmental Impacts: None anticipated.

Activity Specific Construction Techniques and Mitigation Measures:

- Maintain work to existing developed facility or valve site area.
- Solvents are not to be used within 100 feet of a water body. Store paint, solvents, or any other hazardous materials securely and not within 100 feet of a water body.
- Contain and recover sandblast material.
- Avoid erosion associated with washing or painting activities.
- Limit wash water run-off (overland flow) to right-of-way.

General Environmental Protection Measures (refer to Section 3):

- General Measures.
- Spill Containment and Countermeasure.

2.1.3. Non-Invasive Integrity Surveys:

Description: Both under U.S. Department of Transportation (DOT) regulatory requirements and in accordance with sound business management, Enbridge undertakes various pipeline integrity surveys that. Such surveys include routine aerial patrols (typically via helicopter) or internal pipeline inspections via electronic tools moving through the pipeline. These surveys sometimes do require that Enbridge staff or contractors conduct walkovers of the right-of-way.

Potential Environmental Impacts: None Anticipated.

Activity Specific Construction Techniques and Mitigation Measures: Typically none.

General Environmental Protection Measures (refer to Section 3): General Measures.

2.1.4. Civil Survey, Close Interval Survey, or Other Right-of-Way Surveys:

Description: Enbridge or its contractors may periodically conduct civil surveys to collect information on the pipeline, topography and surface features on the right-of-way. Civil surveys will normally be performed by walking the right-of-way, but ATV or light vehicle traffic may be required in some areas. If necessary, a limited amount of brush may be removed in order to establish line-of-site.

Enbridge also periodically conducts “close interval surveys” to assess the performance of cathodic protection systems from one point to another along the pipeline. A close interval survey provides information detailing where the protective coating is in need of repair. The survey typically involves two to three people walking the right-of-way with backpack equipment taking soil and other electric potential readings. Minor brush removal may be necessary and ATV or other light vehicle traffic is possible, though normally not necessary.

Enbridge may employ other non-invasive surveys or reconnaissance in advance of maintenance work or major projects. Such surveys also would typically involve foot traffic and possible ATV or light vehicle traffic.

Potential Environmental Impacts:
- Minor hand vegetation clearing.
- Minor disturbance from ATV or vehicle traffic.

Activity Specific Construction Techniques and Mitigation Measures:
- Minimize impact area and equipment traffic.
- Access from existing Forest Service or public roadways, and right-of-way.

General Environmental Protection Measures (refer to Section 3): General Measures.

2.1.5. Pipeline Marker and Survey Monument Repair or Installation:

Description: Markers indicating the pipeline's location are required by DOT pipeline safety regulations at road crossings, certain stream crossings and other locations. The markers indicate the presence of the pipeline, provide basic information (e.g., indicating the type of pipeline), and are marked with a phone number for pipeline emergencies or other inquiries. Typically, marking posts have already been installed, during the restoration phase of past projects. However, over time marking posts may need to be repaired or additional marking posts may be needed. Installation and repair of pipeline marking posts typically requires minimal excavation and is usually done by hand. If mechanical excavation is required, the work will be considered a Minor Disturbance Activity. Access by ATV or light vehicles is typically required for non-road crossing marker locations.

Enbridge may also install GPS survey monuments which typically consist of a simple steel rod and plastic cap assembly. They are normally located on or near the right-of-way at selected road crossings and are installed by setting in a small hole or hammering into place.

Potential Environmental Impacts: Minor disturbance from ATV or vehicle traffic.

Activity Specific Construction Techniques and Mitigation Measures:
- Minimize impact area and equipment traffic.
- Access from existing Forest Service or public roadways, and right-of-way.

General Environmental Protection Measures (refer to Section 3): General Measures.

2.1.6. Minor Installations at Existing Facilities:

Description: Enbridge may add piping, communication, or other equipment or small buildings at existing developed facilities, i.e. at pump station or valve sites. These activities typically involve limited grading, excavation, or other potential ground disturbances within Enbridge's right-of-way in the immediate area of existing facility. Ground disturbance for these activities varies but work sites are typically less than 5,000 square feet (50 feet by 100 feet).

Potential Environmental Impacts:
- Minor turf vegetation clearing.

- Soil disturbance from grading or excavation.

Activity Specific Construction Techniques and Mitigation Measures:
- Maintain work to existing developed facility.
- Minimize total impact area and equipment traffic.

General Environmental Protection Measures (refer to Section 3):
- General Measures.
- Erosion and Sediment Control.
- Dewatering.
- Permanent Erosion and Site Restoration.
- Spill Containment and Countermeasure.

2.1.7. ATV Barrier, Fencing, or Other Access Barrier Installation or Repair:

Description: Enbridge may construct, or agree to maintain or repair, various access barriers at or near road crossings to limit unauthorized vehicle traffic on the right-of-way. If a new barrier is required on NFS lands, Enbridge would coordinate in advance with HNF regarding design, installation, and maintenance matters.

Potential Environmental Impacts:
- Localized clearing, grading, rutting, erosion, or other disturbance.
- Erosion if poorly installed or maintained.

Activity Specific Construction Techniques and Mitigation Measures:
- Minimize impact area and equipment traffic.
- Access from existing Forest Service or public roadways, and right-of-way.
- Restore and revegetate the barrier or area as needed to aid long-term stability (see Section 3.7).

General Environmental Protection Measures (refer to Section 3):
- General Measures.
- Erosion and Sediment Control.
- Permanent Erosion and Site Restoration.

2.2. Minor Disturbance Activities

Minor Disturbance Activities have minor or short-term environmental impacts, do not impact known sensitive sites or resources (e.g., features listed in Appendix B) or perennial waterbodies, and result in only limited or localized ground disturbance. These activities require a 7-day advanced notification to the HNF, providing project specific information.

2.2.1. Cathodic Protection Installation and Repair:

Description: Enbridge installs and maintains cathodic protection systems to protect the pipeline from corrosion. A cathodic protection system typically consists of a rectifier and a "ground bed" of sacrificial anodes (inert metal rods) buried in trenches from 50 to 500 feet in length near the pipeline. The rectifier converts AC to DC power and creates a

very low voltage gradient so the pipeline acts as a cathode, the metal rods as anodes. Anodes corrode and cathodes do not; therefore, the pipeline is protected from corrosion. Because cathodic protection systems require a power source, they are usually located near roads.

Maintenance, repair or upgrades of existing cathodic protection systems and test leads within the maintained right-of-way are considered Minor Disturbance Activities. Limited excavation may be required for this maintenance work. Equipment typically utilized includes a track- or rubber-tired hoe or tractor, drill rig, or a trench-excavating machine, and the work is completed in one to three days. Installations of new cathodic protection facilities (e.g., a new anode ground bed) are considered Minor Disturbance Activities, if they are installed within Enbridge's permanent right-of-way. If a new cathodic protection facility cannot be kept within the right-of-way, it will be considered a Disturbance Activity.

Potential Environmental Impacts:

- Vegetation clearing.
- Minor Rutting or other soil disturbance from equipment, ATV or vehicle traffic, or from localized excavation.
- Spread of invasive and/or noxious plants.

Activity Specific Construction Techniques and Mitigation Measures:

- Minimize impact area and equipment traffic.
- Access from existing Forest Service or public roadways, and right-of-way.

General Environmental Protection Measures (refer to Section 3):

- General Measures.
- Erosion and Sediment Control (if applicable).
- Dewatering.
- Permanent Erosion and Site Restoration.
- Control of Invasive and/or Noxious Plants.

2.2.2. Sub-Surface Investigations:

Description: Occasionally Enbridge may need to conduct soil borings on the right-of-way. These borings may be required in the planning stages of a construction project or as part of a remedial investigation. Standard drilling rigs are used where access and soil conditions are adequate, while low ground pressure ATV-type rigs will be used in or near wetland areas, soft soils or other sensitive areas. If clearing outside of the permanent right-of-way is necessary, Enbridge will coordinate in advance with HNF to determine special requirements. Borings and bore-hole abandonment (i.e., grouting) will be done in accordance with state standards. In some instances the borehole may be completed with a monitoring or recovery well. In these cases, long-term access to the well as part of a monitoring or remediation program may be required.

Potential Environmental Impacts:

- Rutting or soil disturbance from the drill rig.
- Improperly handling of bore-hole cuttings and grout cement.

- Spread of invasive and/or noxious plants.

Activity Specific Construction Techniques and Mitigation Measures:
- Pre-plan bore holes and minimize impact area from drill rig.
- In situations with soft soils or in wetlands where excessive rutting will occur use low ground pressure equipment, construction mats, or complete borings under frozen ground conditions.
- Minimize total impact area and other equipment traffic.
- Remove or disperse drill cuttings in an upland area; cleanup and haul away excess grout cement.

General Environmental Protection Measures (refer to Section 3):
- General Measures.
- Erosion and Sediment Control (if applicable).
- Permanent Erosion and Site Restoration (if applicable).
- Control of Invasive and/or Noxious Plants.
- Streams and Wetlands.

2.2.3. Routine Right-of-Way Clearing and Brushing:

Description: Enbridge periodically (typically every three to five years) clears vegetation from the existing right-of-way corridor in order to facilitate inspections, maintain a safe and apparent corridor, and allow access for maintenance activities or emergencies. Clearing typically involves tracked or rubber-tired equipment traveling down the right-of-way for cutting brush and trees as well as hand-held brush saws or other manual methods. Small cuttings will be left in place, non-merchantable timber and slash will be disposed of in upland areas, hauled off-site, or chipped and spread on the right-of-way. If burning is proposed, Enbridge will consult with HNF and other authorities to obtain necessary authorization or permits.

Potential Environmental Impacts:
- Rutting or soil disturbance from equipment.
- Erosion on slopes.
- Impact to plants or wildlife.
- Spread of invasive and/or noxious plants.
- Visual impacts at perennial waterbody crossings.

Activity Specific Construction Techniques and Mitigation Measures:
- In wetland areas, low ground pressure equipment will be utilized or clearing will occur in winter when soils are frozen.
- Refueling machinery and equipment will occur in upland areas.
- Routine clearing activities will not be conducted between April 15 and August 1 to avoid potential disturbance to wildlife nesting activities.
- Steep slopes and slopes leading to water bodies will be cleared by hand, leaving adequate herbaceous or low shrub cover to avoid erosion.
- Potential impacts to visual screening of sensitive feature crossings and/or other environmentally sensitive areas shall be avoided/minimized (see Appendix B).

General Environmental Protection Measures (refer to Section 3):

- General Measures.
- Road Protection Measures.
- Erosion and Sediment Control (if applicable).
- Streams and Wetlands.
- Spill Containment and Countermeasure.
- Control of Invasive and/or Noxious Plants.

2.2.4. Pipe and Pipe Coating Inspection and Repair less than 200 feet in length:

Description: Integrity surveys identify locations where excavations of the pipeline to allow physical inspection of the pipe or its coating are required. Track hoes are used to excavate a ditch approximately 20 feet wide, by about 8 feet deep along the length of the pipe segment needing inspection. When necessary, the old coating is removed via scraping and sandblasting, and new coating applied. If the pipe itself is in need of repair, Enbridge may weld sleeves onto the line, or in some cases remove defective sections and install a new section of pipe. Inspection and repair criteria follow strict USDOT and industry standards. Inspection and repair excavations less than 200 feet in length are considered Minor Disturbance Activities while projects greater than 200 feet in length are considered Disturbance Activities (see section 2.3).

Potential Environmental Impacts:

- Soil disturbance from equipment traffic and excavation work; topsoil mixing.
- Impact to plants or wildlife.
- Erosion and sedimentation.
- Spread of invasive and/or noxious plants.

Activity Specific Construction Techniques and Mitigation Measures:

- Work will be accessed from existing Forest Service or public roads and down the right-of-way in consideration of shortest distance and impact. Alternate access, if feasible, may be requested in situations to lessen environmental impact and/or shorten the access route. Any alternate access will be subject to HNF review and approval.
- Area of impact shall be limited to the existing pipeline right-of-way.
- Erosion control measures shall be installed and maintained as needed.
- Sandblasting by-products and residual in the excavation shall be contained collected to the extent practical. Sandblasting material shall be an inert type such as Black Beauty or Black Jack.
- Safety fence shall be installed around open excavations when left unattended for a long period of time (e.g., overnight).
- Site restoration measures and time/season constraints (e.g., seeding windows) shall be recognized (refer to Section 3).

General Environmental Protection Measures (refer to Section 3):

- General Measures.
- Road Protection Measures.
- Control of Non-Native Invasive Plants.
- Erosion and Sediment Control.

- Streams and Wetlands.
- Dewatering.
- Permanent Erosion and Site Restoration.
- Spill Containment and Countermeasure.

2.3. Disturbance Activities

A Disturbance Activity project is a pipe integrity repair project that exceeds 200 feet in length. Pipe excavations for these projects may require the use of workspace outside the permanent right-of-way, and may require in-stream work. These projects require site-specific approvals from the HNF prior to initiating the work activity. In addition, these activities are likely to trigger other federal, state, and local environmental permits or approvals.

When planning work that may be considered a Disturbance Activity, Enbridge will consult with the HNF and provide advance notification of the planned activity. By this means, HNF staff and Enbridge can work to identify and resolve project-specific issues and appropriately tailor plans to address environmental concerns. Environmental impacts and typical mitigation measures for Disturbance Activities would be similar to those described above is section 2.2.4, and include the following:

Potential Environmental Impacts:

- Soil disturbance from equipment traffic and excavation work; topsoil mixing.
- Impact to plants or wildlife.
- Erosion and sedimentation.
- Spread of invasive and/or noxious plants.

Activity Specific Construction Techniques and Mitigation Measures:

- Work will be accessed from existing Forest Service or public roads and down the right-of-way in consideration of shortest distance and impact. Alternate access, if feasible, may be requested in situations to lessen environmental impact and/or shorten the access route. Any alternate access will be subject to HNF review and approval.
- Area of impact shall be limited to the existing pipeline right-of-way.
- Erosion control measures shall be installed and maintained as needed.
- Sandblasting by-products and residual in the excavation shall be contained collected to the extent practical. Sandblasting material shall be an inert type such as Black Beauty or Black Jack.
- Safety fence shall be installed around open excavations when left unattended for a long period of time (e.g., overnight).
- Site restoration measures and time/season constraints (e.g., seeding windows) shall be recognized (refer to Section 3).

General Environmental Protection Measures (refer to Section 3):

- General Measures.
- Road Protection Measures.
- Control of Non-Native Invasive Plants.
- Erosion and Sediment Control.

- Streams and Wetlands.
- Dewatering.
- Permanent Erosion and Site Restoration.
- Spill Containment and Countermeasure.

2.4. Emergencies

Enbridge is prepared to respond and coordinate with relevant agencies, to protect public health and the environment. An emergency is defined here as a pipeline rupture, integrity inspection indications requiring an immediate repair, or any other adverse symptom that may potentially incur an imminent risk to human health or the environment. Some pipeline integrity inspection results can trigger an emergency response dependent upon the amount of metal loss, size of dent or crack, position of anomaly discovered, and other factors affecting pipeline integrity.

In the event an emergency situation occurs within NFS lands, the HNF Permit Administrator will be notified and apprised of the situation within eight hours of taking remedial action. Enbridge will implement procedures within the O&M Plan as feasible during emergency response activities and, via consultation with HNF, will work to address environmental concerns, including those that may arise during post-emergency activities, restoration, and follow-up inspection. The HNF will be copied on written correspondence with relevant state and federal regulatory agencies regarding the extraordinary activity.

3. ENVIRONMENTAL PROTECTION – STANDARD MEASURES

This section describes measures that Enbridge and/or its contractors will implement as needed for operation and maintenance work within the HNF. These principles and practices help ensure environmental protection and regulatory compliance. It should also be noted that each project is unique; therefore, implementation of these measures must be tailored to project-specific circumstances. As a reference to this section, schematics detailing Operation and Maintenance best management practices are presented in Appendix C. Environmental protection measures are organized into the following sections:

3.1 Coordination of Oversight/General Measures
3.2 Road Protection Measures
3.3 Control of Invasive and/or Noxious Plants
3.4 Erosion and Sediment Control
3.5 Streams and Wetlands
3.6 Trench Dewatering
3.7 Permanent Erosion Control and Site Restoration
3.8 Spill Containment and Countermeasure

3.1. Coordination of Oversight/General Measures

Protection of the environment, compliance with regulatory requirements, and maintaining good relations with land managing agencies are of utmost importance to Enbridge. Through careful planning and proper implementation of protective measures and best management practices, these goals can be met. Toward this end, Enbridge will:

- Contact the HNF in advance of projects as specified in Section 2 and Table 3.
- Identify and obtain necessary regulatory permits and approvals.
- Conduct work within the existing right-of-way corridor. In the event the proposed activity cannot be accomplished in the right-of-way, Enbridge will obtain additional HNF approvals as needed.
- Clearly stake and flag the limits of the right-of-way /worksite prior to initiating work.
- Use existing federal, state and local roads to access the maintenance area. HNF access roads will be restored to their pre-maintenance condition. Road modifications such as blading, filling, and widening of curves will not be allowed unless specifically approved by the HNF in writing.
- Designate an environmental representative or inspector to monitor O&M activities in the field for compliance with this Plan. If an activity has the potential to cause environmental damage, the environmental representative or inspector will have the authority to stop activity until corrective actions can be implemented.
- Leave work sites in an organized and safe manner at the end of each workday.
- Install safety fence around open excavations when left unattended for a long period of time (*e.g.*, overnight).
- Collect and contain trash and construction waste on a daily basis. Wastes must be properly stored and disposed in accordance with applicable regulations. In no case is waste to be left along the right-of-way or buried in the trench.
- Coordinate with the HNF (as needed) to conduct follow-up inspections, including photo documentation to monitor success of restoration.
- Attend semi-annual meetings with HNF staff to discuss any needed modifications to the O&M Plan, upcoming work, and status of on-going activities.

3.2. Road Protection Measures

3.2.1. Equipment Transportation:

Tracked vehicles used on O&M projects will be transported to the work site on rubber-tired trailers. At paved road crossings, tracked vehicles will cross on rubber mats, tires, plywood sheets, steel plates, or similar protective materials to prevent damage to the road surface.

3.2.2. Erosion Control:

When applicable, temporary sediment barriers will be installed at the base of slopes adjacent to roads to minimize the possibility of sedimentation from the roadway. Ingress and egress to the right-of-way will be maintained to minimize tracking onto roads. Where relevant, a combination of matting, culvert installation, or crushed stone pads placed on geotextile fabric, may be installed at access points. If mud is tracked onto a roadway, it will be shoveled off as soon as possible and placed in a sediment containment area.

3.2.3. Road Closures:

If it is necessary to temporarily close roads during O&M activities, the following measures will be used. Roads will be identified by road signs and barricades which indicate detours and closings. "Road Closed Ahead" and "Detour Ahead" signs will be placed on the roadside at a minimum of 500-foot intervals beginning 1,500 feet from the closure and detour intersection. Detour signs will be used as needed to clearly identify the detour route. If the road must remain open for residential access, then a "Road Closed to Thru Traffic" sign will be used. Barricades left in place during nighttime hours will be equipped with reflectors and warning lights. Signs and barricades will be removed shortly after the maintenance activity has been completed.

In general, the amount of time needed to cross a road and restore it to its original condition will be limited to 24 hours. Road closure extensions to 48 hours may be approved by the HNF on a case-by-case basis. At roads that provide access to private land within the HNF, private landowners will be notified of the proposed schedule for road closures, and equipment, such as steel plates, will be available at the work site to allow landowner passage, if requested.

3.3. Control of Non-Native Invasive Plant Species

Use of the pipeline corridor has the potential to spread non-native invasive plant (NNIP) populations. Measures will be taken to control the introduction and spread of invasive plants during O&M activities. A list of invasive species of concern that are known to exist within the HNF is included in Table 4.

To reduce the potential for introduction or spread of undesirable vegetation, construction equipment will be cleaned before being brought onto HNF managed lands. Enbridge will take reasonable measures so that construction equipment (*e.g.*, bulldozers, trackhoes, sideboom tractors, mowers) is free of soil, seeds, vegetative matter, or other debris that could contain or hold seeds. Cleaning will involve removing soil, seeds, vegetative matter, or other debris from equipment tracks and/or other parts. Cleaning methods include high-pressure water, compressed air, or other means to remove soil and debris. If HNF personnel or Enbridge representatives determine that unclean equipment was brought onto the HNF, it will be removed immediately.

Enbridge will provide training on the identification and removal of invasive plant species to appropriate internal personnel to facilitate awareness of non-native invasive plants and help prevent inadvertent spreading.

Table 4: Hiawatha National Forest Invasive Plant Priority List	
Common Name	Scientific Name
Garlic mustard	*Alliaria petiolata*
Lesser burdock	*Arctium minus*
Japanese barberry	*Berberis thunbergii*
Smooth brome	*Bromus inermis*
Spotted Knapweed	*Centaurea biebersteinii*
Diffuse knapweed	*Centaurea duffusa*
Canada thistle	*Cirsium arvense*
Marsh thistle	*Cirsium palustre*
Bull thistle	*Cirsium vulgare*
Crown vetch	*Coronilla varia*
Leafy spurge	*Euphorbia esula*
Common St. Johnswort	*Hypericum perforatum* L.
Tartarian honeysuckle	*Lonicera tatarica*
Morrow honeysuckle	*Lonicera morrowii*
Japanese honeysuckle	*Lonicera japonica*
Hybrid honeysuckle	*Lonicera x bella* Zabel
Purple loosestrife	*Lythrum salicaria*
White sweet clover	*Melilotus alba*
Yellow sweet clover	*Melilotus officinalis*
Eurasian water milfoil	*Myriophyllum spicatum*
Wild parsnip	*Pastinaca sativa*
Reed canary grass*	*Phalaris arundinacia*
Common reed*	*Phragmites australis*
Scotch Pine	*Pinus sylvestris*
Common buckthorn	*Thamnus cathartica*
Glossy buckthorn	*Rhamnus frangula*
Common tansy	*Tanacetum vulgare*
**Phalaris arundinacea* and *Phragmites australis* could potentially be represented within the HNF by populations of native and non-native origin.	

If invasive plants are present in work areas and access routes, Enbridge will implement the following measures:

- Invasive and/or noxious plant populations shall be removed by manual and/or mechanical methods prior to maintenance activities,
- Invasive and/or noxious plant populations found at access points (road/corridor crossing) will be removed, avoided, or crossed after construction mats have been placed over the affected area,
- Construction equipment shall be cleaned before traveling from an area of known invasive and/or noxious plant populations to another area,
- Straw and straw bales (not hay) will be used for mulch, sediment barriers, and dewatering devices, and
- Seed used for temporary and permanent revegetation will be weed free.

Enbridge will work with the HNF to rectify problem areas of medium and high priority non-native invasive plant identified within the pipeline right-of-way.

3.4. Erosion and Sediment Control

3.4.1. Topsoil Segregation:

The replacement of topsoil improves the potential for establishing good vegetative cover upon completion of work. Generally, topsoil and subsoil exhibit different colors and/or textures. To prevent mixing with subsoil during pipeline maintenance activities, topsoil depths greater than two inches will be stripped from the work area. The following guidelines should be followed:

- Topsoil shall be stripped to the depth it is present (up to 12 inches). In some areas, topsoil may be only a few inches thick while in other areas it may exceed two feet. Proper topsoil removal occurs when the colors of both topsoil and subsoil are visible in approximately equal proportions as blading occurs.
- Topsoil piles shall be separated from subsoil piles; the base of the piles should be three feet or more apart.

3.4.2. Temporary Erosion Control Measures:

Temporary erosion control measures include temporary slope breakers, sediment barriers and mulch, described below. A few key principles apply in all cases for temporary control measures:

- Proper installation.
- Installed immediately after initial disturbance.
- Re-installed where required (such as after backfill).
- Inspected and properly maintained throughout construction until permanent erosion control is established and/or restoration is complete.

Temporary Slope Breakers:
Also known as temporary berms, diversion berms, or water bars, temporary slope breakers divert water away from disturbed areas and reduce runoff velocities down steep slopes. Typical materials for construction include soil, sand bags, silt fence, or staked straw bales.

Temporary slope breakers (see Appendix C) shall be installed in accordance with Table 5, and constructed to the following specifications:

- Soil berms are to be installed with a two to eight percent out-slope, with a four foot base and a height of 1.5 feet.
- Soil berms are to be constructed of compacted earth (not topsoil, except for surface of permanent berms).
- The outfall of temporary slope breakers shall be directed toward appropriate energy dissipating devices (*e.g.*, well vegetated area, silt fence, rock apron), and off the construction area if possible.
- Slope breakers shall be regularly inspected and maintained.

Table 5:Spacing For Temporary Slope Breakers 1/	
Slope Percent	**Spacing**
2	250
5	135
10	80
15	60
20	45
30	35

1/ If slope distance is less than ½ distance specified, no slope breaker is required.

Slope breakers are effective control measures immediately above disturbed areas to prevent upslope runoff from reaching the site, and at the base of slopes leading to streams or wetlands to contain and divert runoff and sediment.

Temporary Sediment Barriers:

Temporary sediment barriers (see Appendix C) stop the flow of sediment. Typical materials include silt fence or staked (weed-free) straw bales. Temporary sediment barriers should be installed as follows:

- At the base of approaches to streams and wetlands.
- Between the disturbed area and any waters edge.
- At the base of sloped approaches to road crossings.
- As necessary to hold sediment on site.

Sediment barriers shall be regularly inspected (typically weekly and also within 24 hours of significant rainfall). When the depth of sediment reaches one third of the height of a sediment barrier, the barrier will be replaced and/or the sediment removed. Ineffective sediment barriers shall be promptly repaired or replaced (within 24 hours upon discovery). Sediment barriers shall be removed from an area when it is successfully restored.

Undisturbed vegetation acts as an effective sediment barrier. Wherever possible, a buffer of undisturbed vegetation between disturbed areas and potential receptors of off-site sediment (water bodies, wetlands, roads, etc.) shall be maintained.

Mulch:

Mulch acts to stabilize the soil surface by limiting soil movement and the availability of soil to enter runoff. Typical materials include straw, erosion control fabrics such as "curlex", or jute blanket. If straw mulch is used, this material must be certified “weed-free” and shall be applied sparingly to seeded areas. When required, the locations and application rates for mulch shall be as follows:

- Before seeding, if final clean-up will be delayed longer than 10 days or if construction is interrupted for extended periods.

- On all slopes within 100 feet of wetlands and waterbodies at a rate of two to three tons per acre.
- At other locations as needed at two tons per acre to cover >75% of the ground surface.
- Along or on slopes >8%.

Mulch shall be crimped or otherwise anchored. Erosion control fabric shall be installed and properly anchored on re-contoured stream banks and other steep slopes.

3.5. Streams and Wetlands

The following requirements and procedures provide guidance for work near streams, and in and near wetlands.

General:

- Equipment shall not be washed, lubricated, or refueled within 100 feet of streams or wetlands.
- Maintenance crews shall have sufficient supplies of absorbent and barrier materials on-hand for containment and recovery of spills.
- Sediment barriers are to be installed across the full width of the right-of-way, parallel to the stream or wetland, immediately after clearing. Straw bales located across the active portion of the work area, may be removed when work is being conducted, however, shall be replaced each night to prevent the flow of spoil into a stream.
- Dewatering measures shall be implemented as outlined in Section 3.6.
- Guidelines in Section 3.8 under "Spill Prevention, Containment, and Countermeasures" will be followed.
- Trench plugs shall be used at stream and wetland crossings to prevent diversion of water into upland portions of the pipeline trench and to keep accumulated trench water out of the waterbody. Trench plugs will be sized to withstand upslope water pressure.

Bridging:

Where equipment must travel from one side of a waterbody to the other and there is no adequate upland access to both sides of the stream, bridges will be installed across the streams to allow equipment, except clearing equipment, to cross the streams. Each piece of clearing equipment will be allowed one pass through a waterbody. Preparations for and the installation of temporary bridges will cause minimal disturbances and all exposed soil will be protected with erosion control measures. Bridges will be removed immediately after restoration is complete. Bridges will not be required in the winter when waterbodies are frozen and the ice across the waterbody can support construction equipment. Ice may be thickened by applying water to the crossing location and allowing it to freeze, or by piling snow on the surface then flooding it with water and allowing it to freeze. Water typically would be obtained from the waterbody being crossed.

Equipment bridges will be designed to withstand the maximum foreseeable flow of the stream, and shall not restrict flow or pool water while the bridge is in place. Bridges will be constructed with clean materials and maintained to minimize soil from equipment from falling into the water. Where feasible, temporary bridges will be constructed using timber mats (see Appendix C) or

other suitable single-spans. Bridge spans over 20 feet wide may require in-stream support. As an alternative, clean rock and flume bridges may be used with prior agency approval. (see Appendix C). In rare instances, equipment will be allowed to ford the waterbody provided that the bed and banks of the waterbody are appropriately stable. Generally, however, intermittent streams will be crossed using timber construction mats place across the stream banks.

Wetlands:

Due to the typically unstable nature of wetland soils and in order to preserve wetland hydrology and function, special practices under certain circumstances are necessary for some operation and maintenance activities. These measures are as follows:

- Topsoil segregation shall be limited to the area over the proposed excavation and stored separately from the subsoil to avoid excessive disruption of wetland soils. Where topsoil segregation is not practical (*e.g.*, unstable or inundated wetlands), vegetation and trees shall be cut at ground level, leaving root systems intact. All trimmings and slash are to be removed from the wetland.
- Segregated up to 12 inches of topsoil, where feasible.
- Low ground pressure equipment shall be used or equipment shall be operated from timber mats or timber rip-rap to minimize rutting, soil compaction or soil mixing. Timber mats or timber rip-rap shall be removed upon completion of the work.
- Equipment passage through wetlands shall be minimized.
- Extra work areas within the right-of-way (such as staging areas and additional spoil storage areas) shall be located at least 100 feet away from wetland boundaries, where topographic conditions permit; otherwise these areas shall be at least 10 feet from the wetland's edge.
- When trench dewatering is required, water will be filtered through geotextile filter bags, straw bale structures, or discharged into an adjacent well-vegetated upland (refer to the figures in Appendix C).
- Original contours shall be restored and segregated topsoil shall be replaced to the original horizon. No crown shall be left over the trench, except in winter when crowning may be required due to frozen soil conditions and final grading will occur as weather permits;
- Work shall be completed, cleaned-up and restored as quickly as possible;
- If standing water is not present, annual ryegrass may be planted at a rate of 40 pounds per acre.
- Application of fertilizer or lime is not permitted in wetlands.
- Sites shall be monitored in collaboration with HNF staff to ensure successful revegetation.

3.6. Trench Dewatering

Dewatering may be necessary to create a dry excavation/work area during maintenance activities. Dewatering will be performed in accordance with applicable water appropriation and discharge permits and conducted in a manner which will prevent soil erosion and off-site sedimentation.

To prevent run-off into streams, wetlands, drainage ditches, etc., dewatering discharge will be directed to a well-vegetated upland area. If a suitable upland area is not available, discharges

shall be directed through a non-woven sediment filter bag or a straw bale/silt fence dewatering structure which discharges into a vegetated area (see Appendix C). Filter bags and dewatering structures shall be maintained in a functional condition throughout dewatering activity; (*e.g.* clogged or ripped bags must be replaced) and accumulated sediment from the filter bags shall be disbursed in a suitable upland location.

3.7. Permanent Erosion Control and Site Restoration

Site restoration and installation of permanent soil erosion and sediment control structures should begin as soon as possible upon completion of the work (see Appendix C). All extraneous debris including trash, excess rock, timber, slash, and other construction debris, shall be removed. Timber and slash shall be disposed of in accordance with HNF recommendations. Final grading shall restore pre-construction contours, topsoil and drainages, unless directed otherwise by the HNF. A crown may be left over the trench in upland areas to account for soil settling.

After final grade, slopes are to be stabilized with erosion control structures to ensure long-term restoration and stability. These may include the following:

- Installation of permanent slope breakers (berms) in accordance with the design and spacing provided previously (Table 5).
- Installation of berms, erosion control fabric, rip-rap, or mulch on stream banks and sloped approaches exceeding 5% slopes adjacent to streams and wetlands.
- Placement of berms, erosion control blanket, rip-rap, or mulch on all slopes over 15%.
- Preparation and seeding of banks and slopes with appropriate seed mixes as soon as possible; apply erosion control blanket or mulch <u>after</u> seeding.
- Restoration of swales so that the bottom is flat. Previously vegetated swales are to be seeded and mulched.
- Till and/or chisel plow compacted soils to loosen and increase water infiltration. Tilling/plowing shall be conducted along the contour to minimize downslope channeling.
- Temporary erosion control measures, as appropriate (see Section 3.4.2).

As with temporary erosion control measures, permanent erosion control features must be inspected and maintained as necessary to minimize unwanted sedimentation. The success of revegetation will also be monitored and corrective measures implemented if results are poor. Photo documentation is recommended as part of post-activity inspection and monitoring. Results/status of post-activity monitoring will be discussed during semi-annual meetings between Enbridge and the HNF.

Soil preparation, seeding, and other steps to restore vegetative cover are extremely important, and should be implemented as follows. The seedbed shall be prepared using a disk, cultivator, drag, rake, or other equipment to loosen the soil. A seed drill is a preferred method for seeding larger areas; if broadcast or hydro-seeding is used, seed will be applied at double the recommended rate. A temporary cover will be seeded with 80 pounds per acre (drilled rate) of annual oats or rye for all upland sites except during winter work. No soil amendments will be used with the seeding of temporary cover.

Additional follow-up seeding of work sites may be recommended by the HNF. In these cases, permanent seeding will be conducted and applied uniformly at rates specified by the HNF. The seeding window for the permanent seed mix is April 1 through October 16. If seeding is outside the timing window for the permanent mix (*e.g.*, after winter work), revegetation of the corridor is accomplished by either dormant seeding or temporary seeding. If seeding cannot be accomplished, temporary erosion control measures shall be utilized and seeding will occur during the next growing season. The results of the revegetation activities shall be monitored and measures are taken to ensure that appropriate vegetative cover is established.

For unsaturated wetlands, seeding will consist of either annual oats or rye at a rate of 40 pounds per acre. Saturated wetlands areas will be allowed to revegetate naturally with the seed bank present in the soils. No fertilizer or soil amendments will be applied in wetlands.

3.8. Spill Prevention, Containment, and Countermeasure Plan

Various maintenance activities require the use of heavy equipment and potentially hazardous materials on the right-of-way. Potential sources of spills include tank leaks, machinery and equipment failure, and fuel handling/ transfer operations. To prevent spills from occurring, all workers handling fuels and other regulated substances shall be knowledgeable in spill prevention, containment, and cleanup procedures.

Spill Response Equipment:

Each work crew utilizing heavy equipment shall be supplied with spill response kits containing a sufficient quantity of absorbent and barrier materials in order to adequately contain and recover potential spills. Other tools and materials (*i.e.*, shovels, bolts, plastic sheeting) used to stop the flow of leaking tanks and pipes and temporarily store contaminated soils and materials shall be made also available on site. All on-site personnel shall be informed of the locations of spill control equipment and materials, and will have them readily accessible during O&M activities.

Construction Equipment Inspection:

Hoses, pipes, valves, and tanks will be regularly inspected for leaks and deterioration. Deterioration or leaks that are identified will be fully repaired prior to resuming use of the equipment on the project.

Storage of Petroleum Products:

Temporary storage locations for fuels, lubricants, waste oil, solvents, and any other regulated substances are identified prior to implementation of O&M activities and will be located in upland areas. Storage tanks and containers shall conform to all applicable industry codes. Secondary containment structures are utilized at each fuel storage site to provide a containment volume equal to 110 percent of the volume of the largest storage vessel.

Vehicle maintenance wastes shall be stored and disposed of in accordance with applicable environmental regulations. Materials containing oils, fuels, and other regulated substances (*e.g.*,

rags, filters) shall be stored and disposed of in accordance with applicable environmental regulations. Material Safety Data Sheets will be made available for all hazardous materials.

Refueling:

If fuel handling or transfer is necessary during O&M activities, fuels shall be dispensed only by authorized personnel during daylight hours in upland areas that are greater than 100 feet from wetlands and waterbodies, 200 feet from domestic water supply wells, and 400 feet from community water supply wells. Fuel dispensing operations shall not be left unattended. Trucks transporting fuel to on-site equipment shall travel only on approved access roads and/or the permanent corridor.

Portable equipment (*e.g.*, chainsaws etc.) shall be refueled in upland areas. Stationary equipment, such as dewatering pumps, may be refueled in wetlands using sealed containers with a capacity of no more than five gallons. In all cases, absorbent materials shall be placed directly below the refueling operation to contain any drips or small releases that may occur.

Spill Containment and Cleanup:

In the event of an equipment spill, the source of the spill shall be identified and contained immediately. Spill sites shall be evacuated as necessary to safeguard human health. Evacuation parameters include consideration for the potential of fire, explosion, and hazardous gases. Flowing spills are contained and/or absorbed before reaching surface waters or wetlands. Absorbent material(s) are placed over spills to minimize spreading and to reduce penetration into the soil. For larger spills on land, pooled material shall be pumped into tank trucks as soon as possible. Enbridge personnel or an emergency response contractor will excavate contaminated soil.

For spills on surface waters and/or in inundated wetlands, absorbent pads and/or absorbent booms shall be used to contain and recover released materials. These spill containment materials shall be on-site during operations to facilitate rapid deployment. Noticeably contaminated soils on stream banks and in wetlands shall be excavated, and placed on plastic sheeting within bermed areas away from the area.

Contaminated Materials:

All contaminated soils, absorbent materials, and other wastes shall be disposed of in accordance with all applicable federal, state, and local regulations.

Spill Notification:

In the event of a reportable spill, Enbridge shall notify the appropriate federal, state, and local agencies as soon as possible. These agencies include, but are not limited to:

National Response Center (Washington, DC)
Phone: (800) 424-8802 (24 hours)

HNF Permit Administrator (Sue Alexander)
Phone: (906) 789-3358

Michigan Department of Environmental Quality
Phone: (800)-292-4706

4. APPENDIX A

Location Maps

Map Document: (O:\200-GIS\GIS\Clients\Enbridge\O&M_projects\HNF O&M Plan\Enb HNF O&M Maps.mxd)
1/13/2010 -- 11:41:06 AM

- Cathodic Protection
- Stations
- Valves
- Rectifiers

1:24,000
1 inch equals 2,000 feet

0 1,000 2,000 Feet

N

Enbridge Pipeline O&M Plan
Hiawatha National Forest

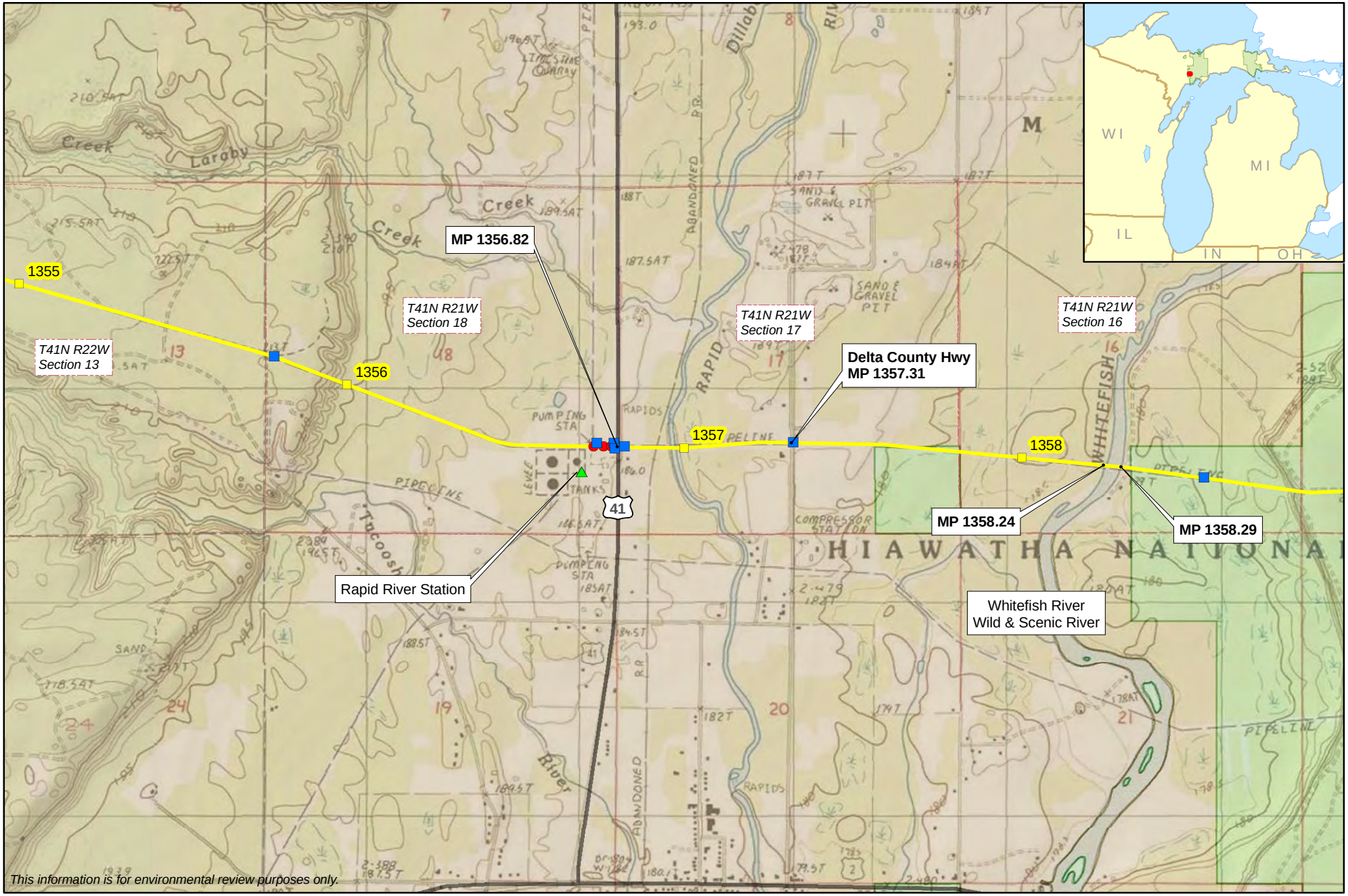
Pipeline Route Map

Map 1 of 16

ENBRIDGE

Revised: 01/13/10

Merjent



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Enbridge Pipeline O&M Plan
Hiawatha National Forest

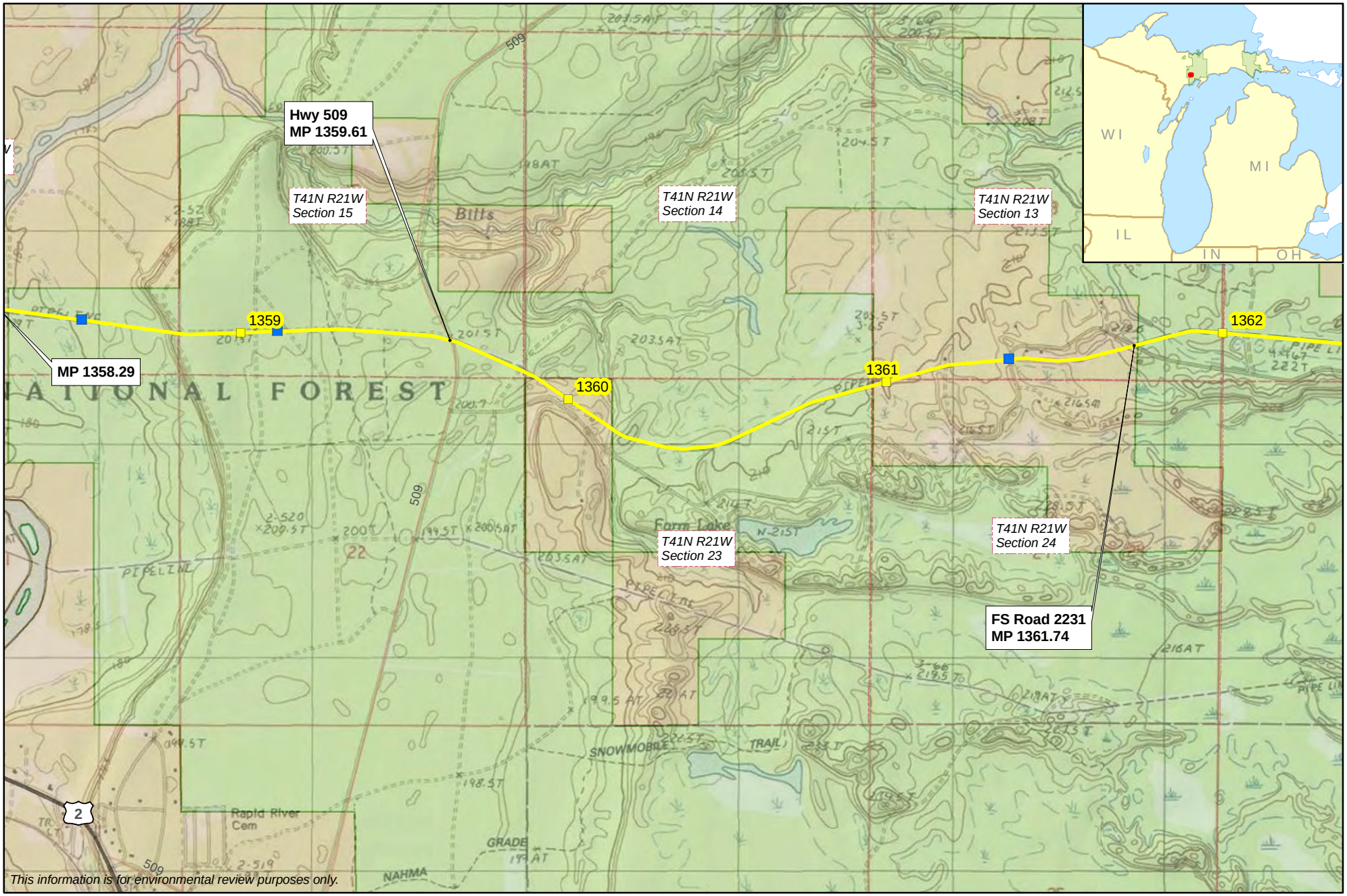
Pipeline Route Map

Map 2 of 16

ENBRIDGE

Revised: 01/13/10

Merjent



This information is for environmental review purposes only.

Map Document: (O:\200-GIS\GIS\Clients\Enbridge\O&M_projects\HNF O&M Plan\Enb HNF O&M Maps.mxd)
1/13/2010 -- 11:41:06 AM

- Cathodic Protection
- Stations
- Valves
- Rectifiers

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Enbridge Pipeline O&M Plan
Hiawatha National Forest

Pipeline Route Map

Map 3 of 16

ENBRIDGE

Revised: 01/13/10

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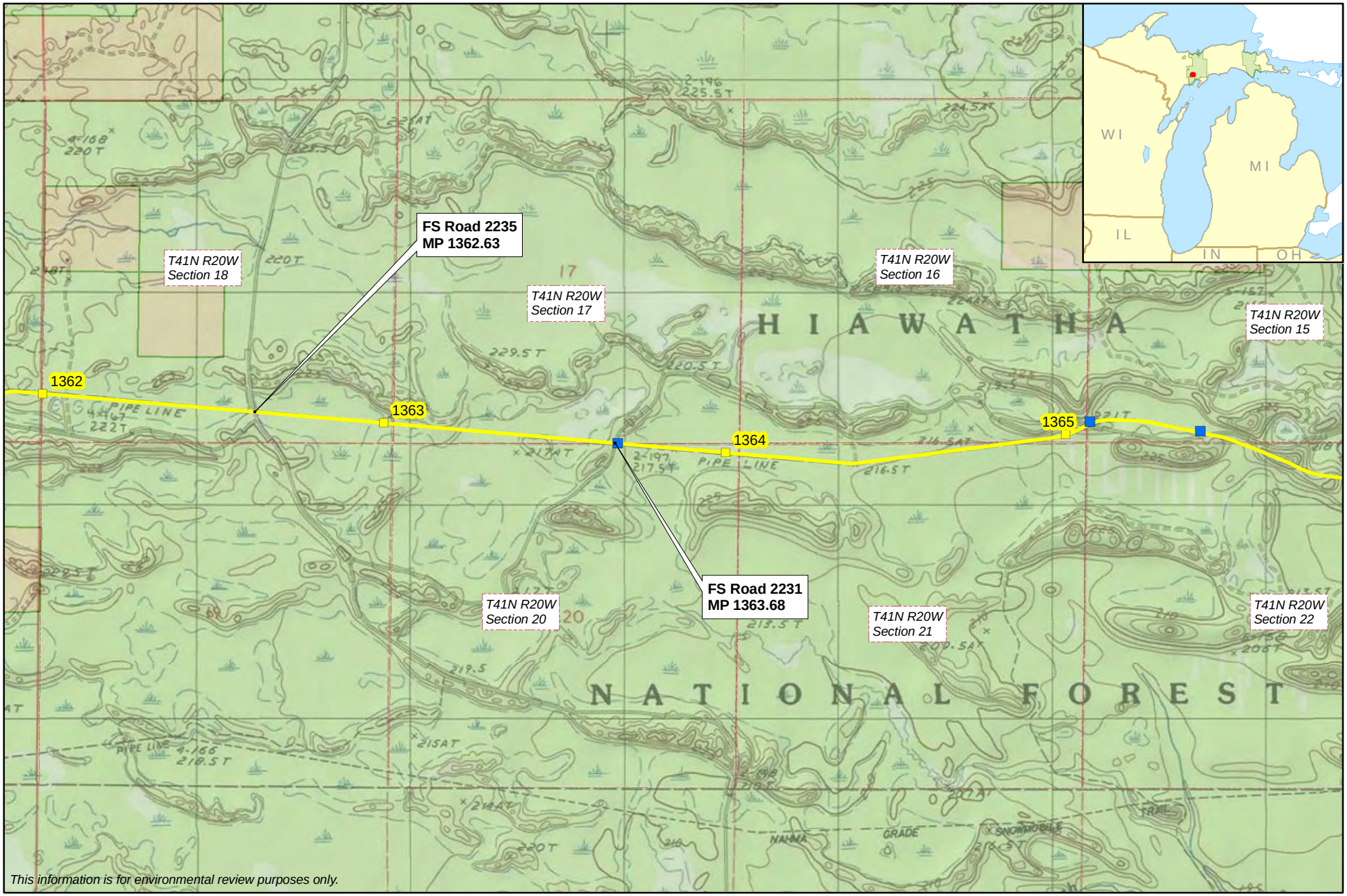

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- Cathodic Protection
- Stations
- Valves
- Rectifiers

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Enbridge Pipeline O&M Plan
Hiawatha National Forest

Pipeline Route Map

Map 4 of 16

ENBRIDGE

Revised: 01/13/10

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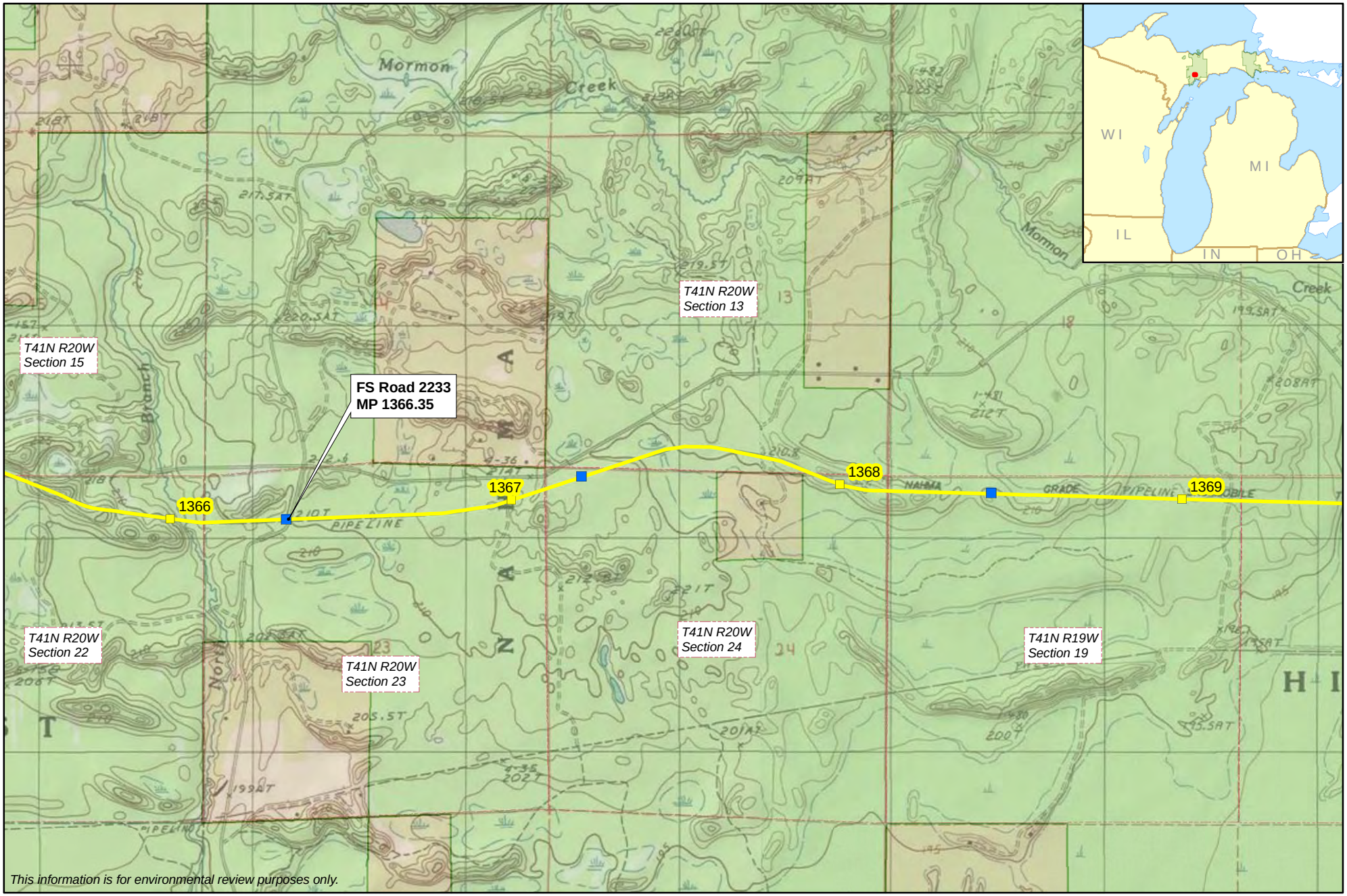

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- Cathodic Protection
- Stations
- Valves
- Rectifiers

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Enbridge Pipeline O&M Plan
Hiawatha National Forest

Pipeline Route Map

Map 5 of 16

ENBRIDGE

Revised: 01/13/10

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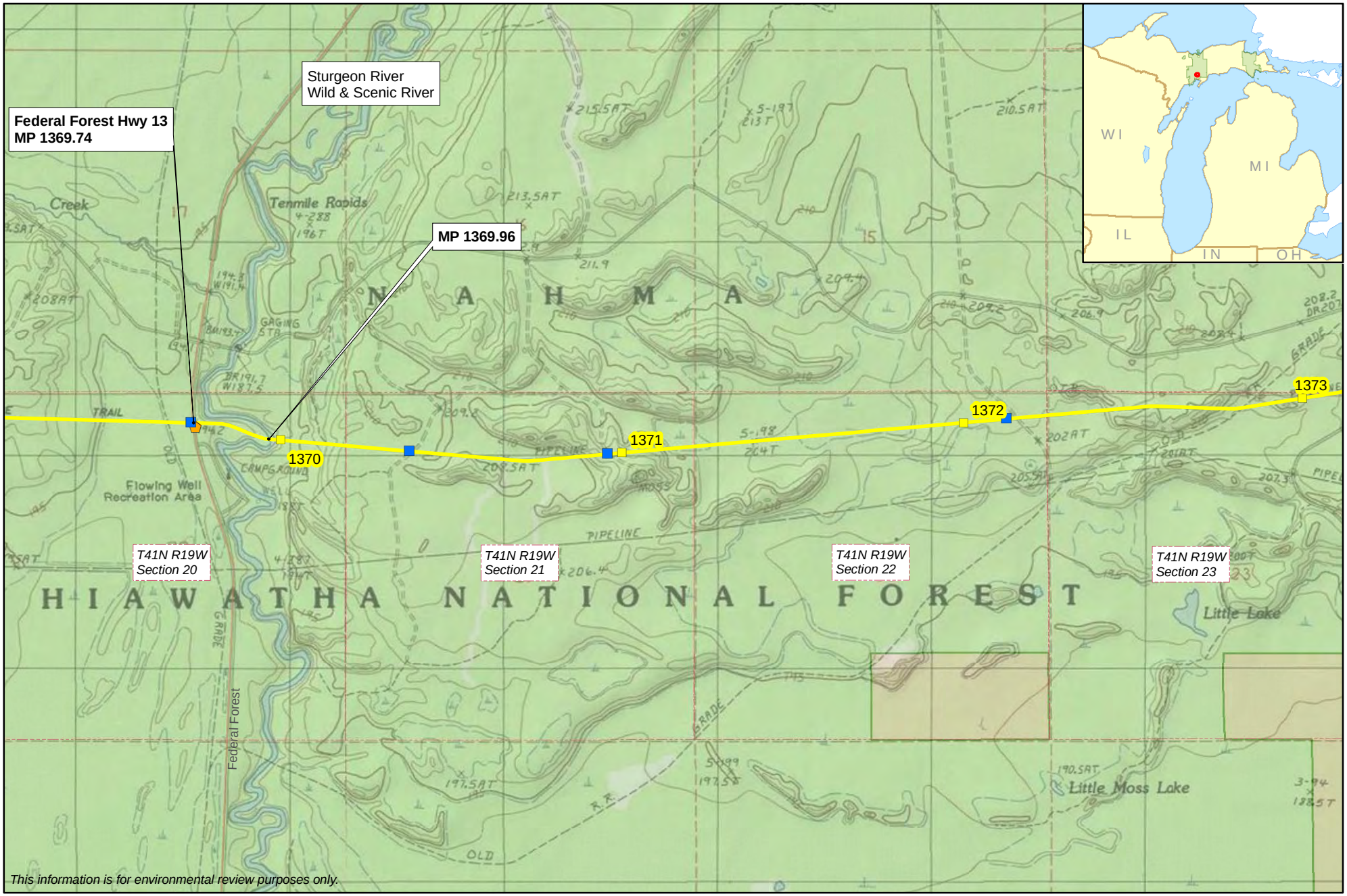

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- Cathodic Protection
- Stations
- Valves
- Rectifiers

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Enbridge Pipeline O&M Plan
Hiawatha National Forest

Pipeline Route Map

Map 6 of 16

ENBRIDGE

Revised: 01/13/10

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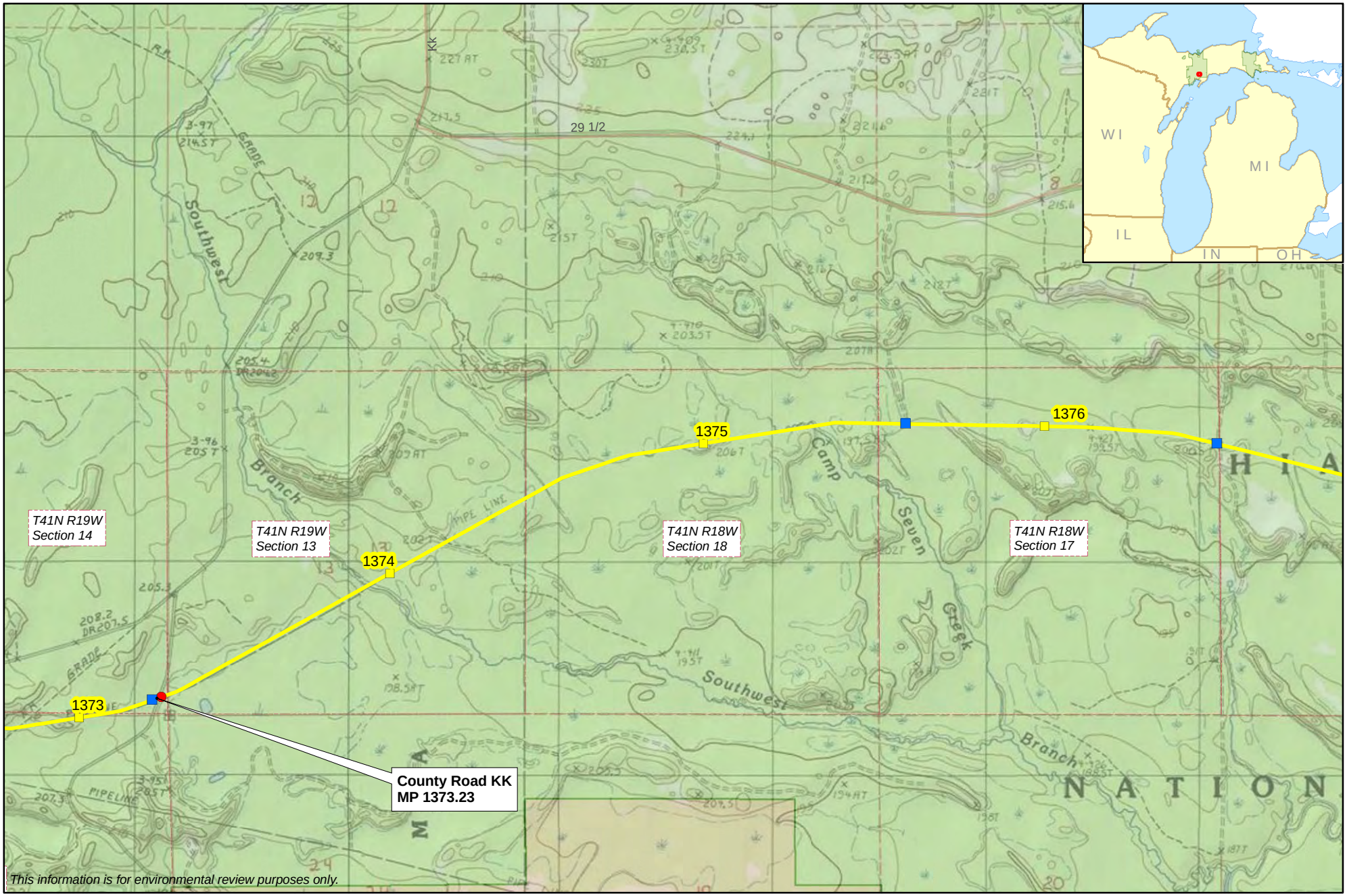

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- Cathodic Protection
- Stations
- Valves
- Rectifiers

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Enbridge Pipeline O&M Plan
Hiawatha National Forest

Pipeline Route Map

Map 7 of 16

ENBRIDGE

Revised: 01/13/10

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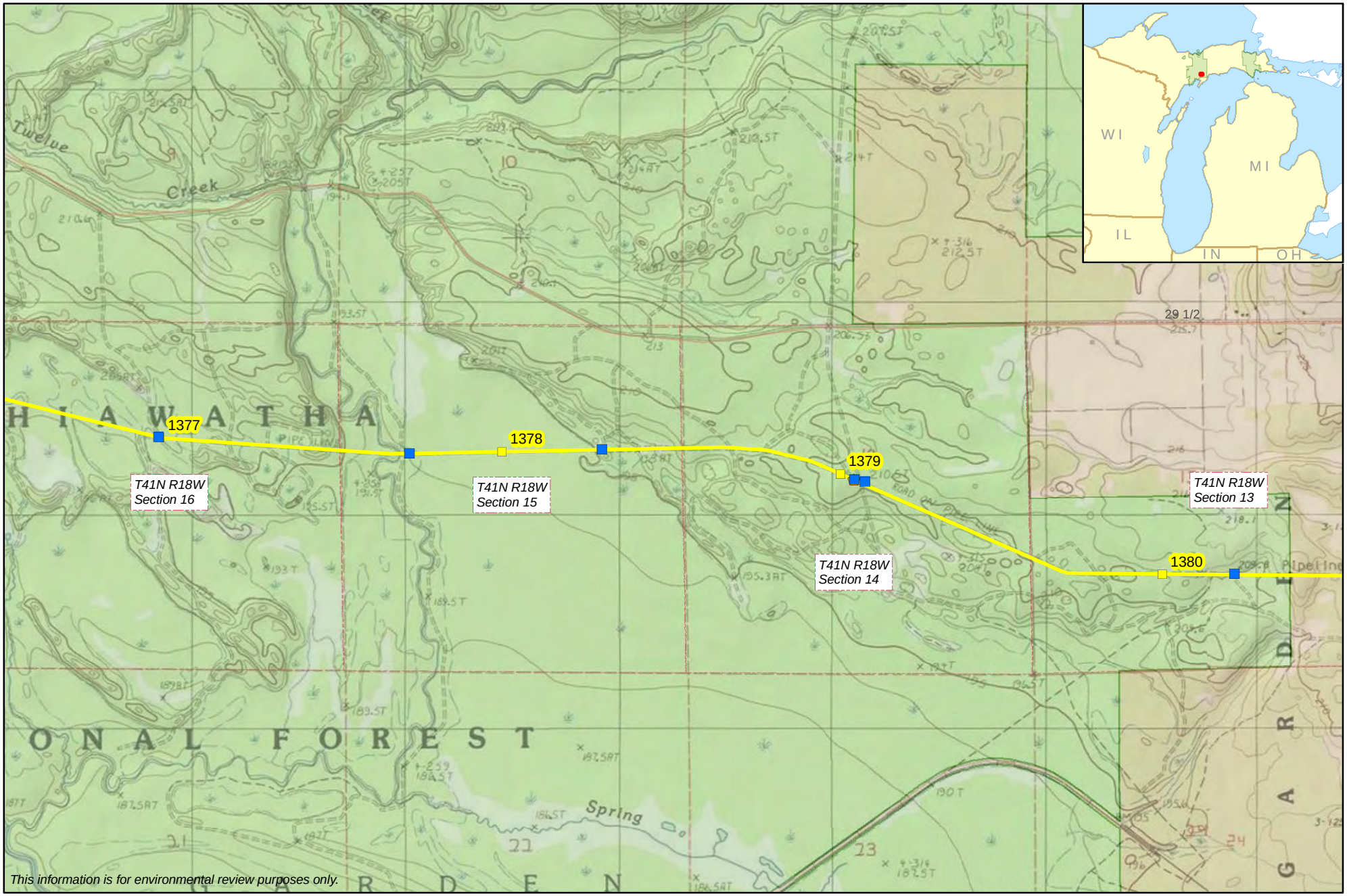

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- Cathodic Protection
- Stations
- Valves
- Rectifiers

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1 inch equals 2,000 feet

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Enbridge Pipeline O&M Plan
Hiawatha National Forest

Pipeline Route Map

Map 8 of 16

ENBRIDGE

Revised: 01/13/10

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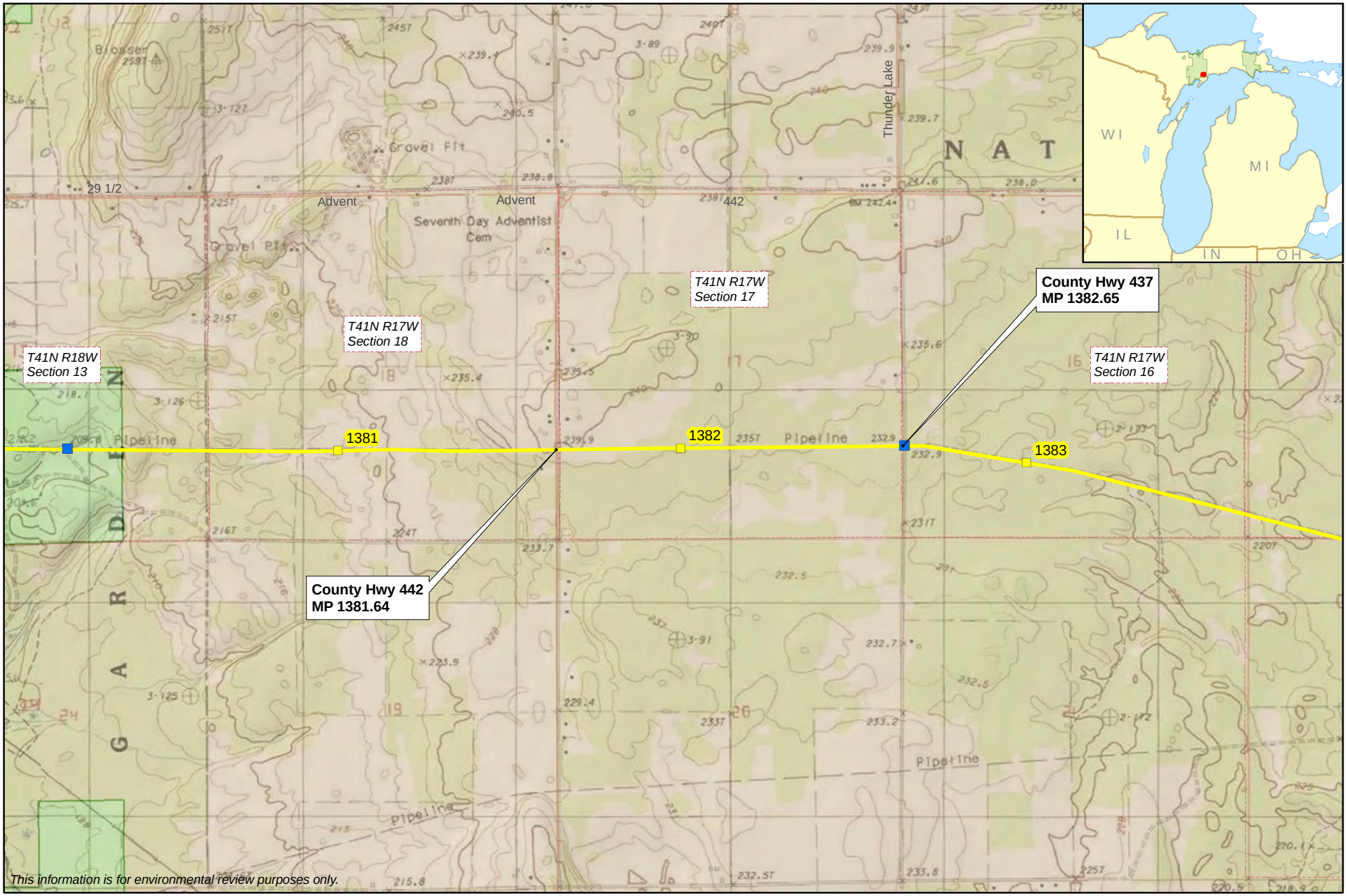

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- Valves
- Rectifiers

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Enbridge Pipeline O&M Plan
Hiawatha National Forest

Pipeline Route Map

Map 9 of 16

ENBRIDGE

Revised: 01/13/10 Merjent

This information is for environmental review purposes only.

Map Document: (O:\200-GIS\GIS\Clients\Enbridge\O&M_projects\HNF O&M Plan\Enb HNF O&M Maps.mxd)
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- Stations
- Valves
- Rectifiers

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Enbridge Pipeline O&M Plan
Hiawatha National Forest

Pipeline Route Map

Map 10 of 16

ENBRIDGE

Revised: 01/13/10

Merjent

Map Document: (O:\200-G\S\GIS\Clients\Enbridge\O&M_projects\HNF O&M Plan\Enb HNF O&M Maps.mxd)
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- Cathodic Protection
- Stations
- Valves
- Rectifiers

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Enbridge Pipeline O&M Plan
Hiawatha National Forest

Pipeline Route Map

Map 11 of 16

ENBRIDGE

Revised: 01/13/10

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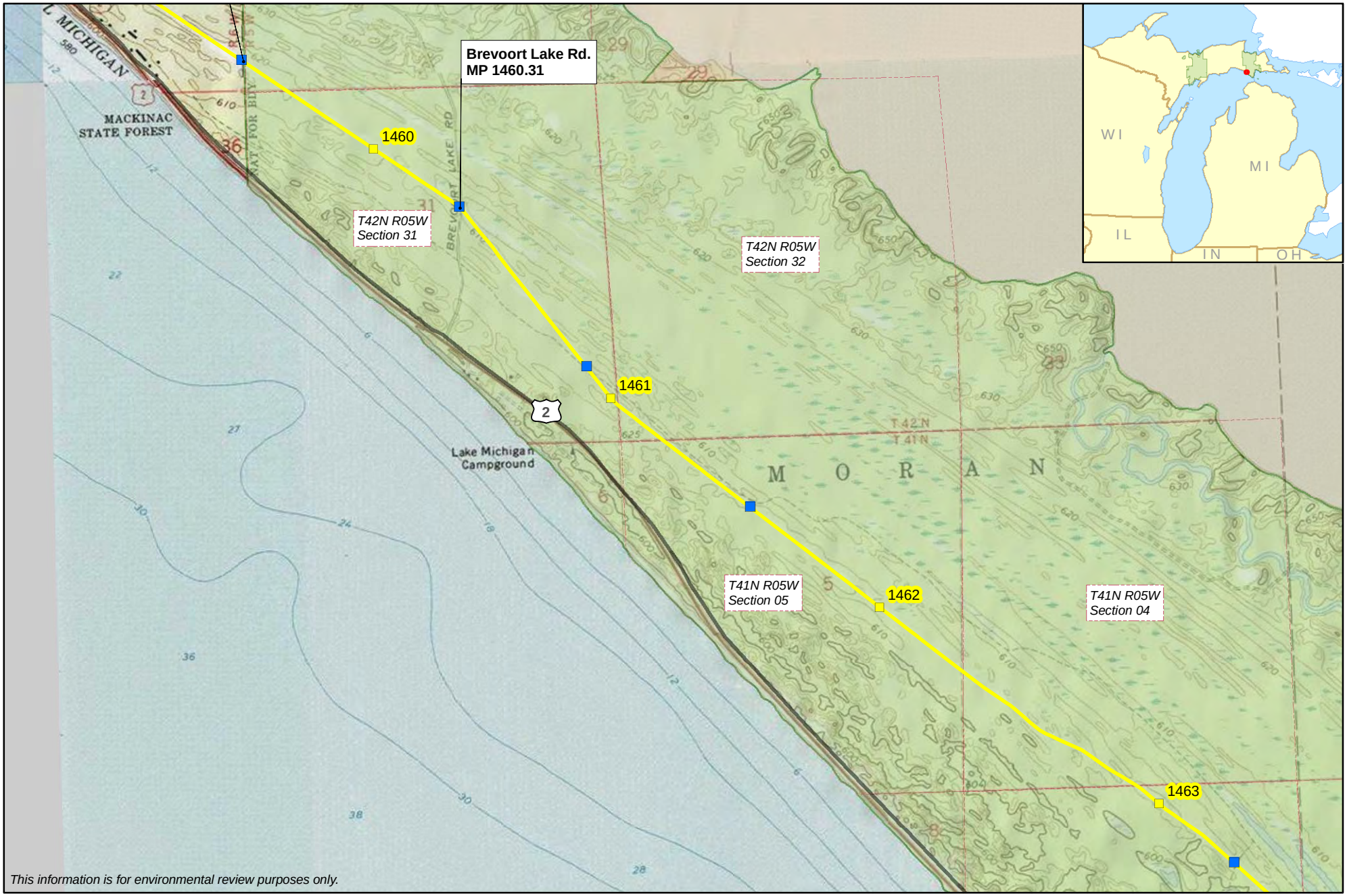

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- Cathodic Protection
- Stations
- Valves
- Rectifiers

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Enbridge Pipeline O&M Plan
Hiawatha National Forest

Pipeline Route Map

Map 12 of 16

ENBRIDGE

Revised: 01/13/10

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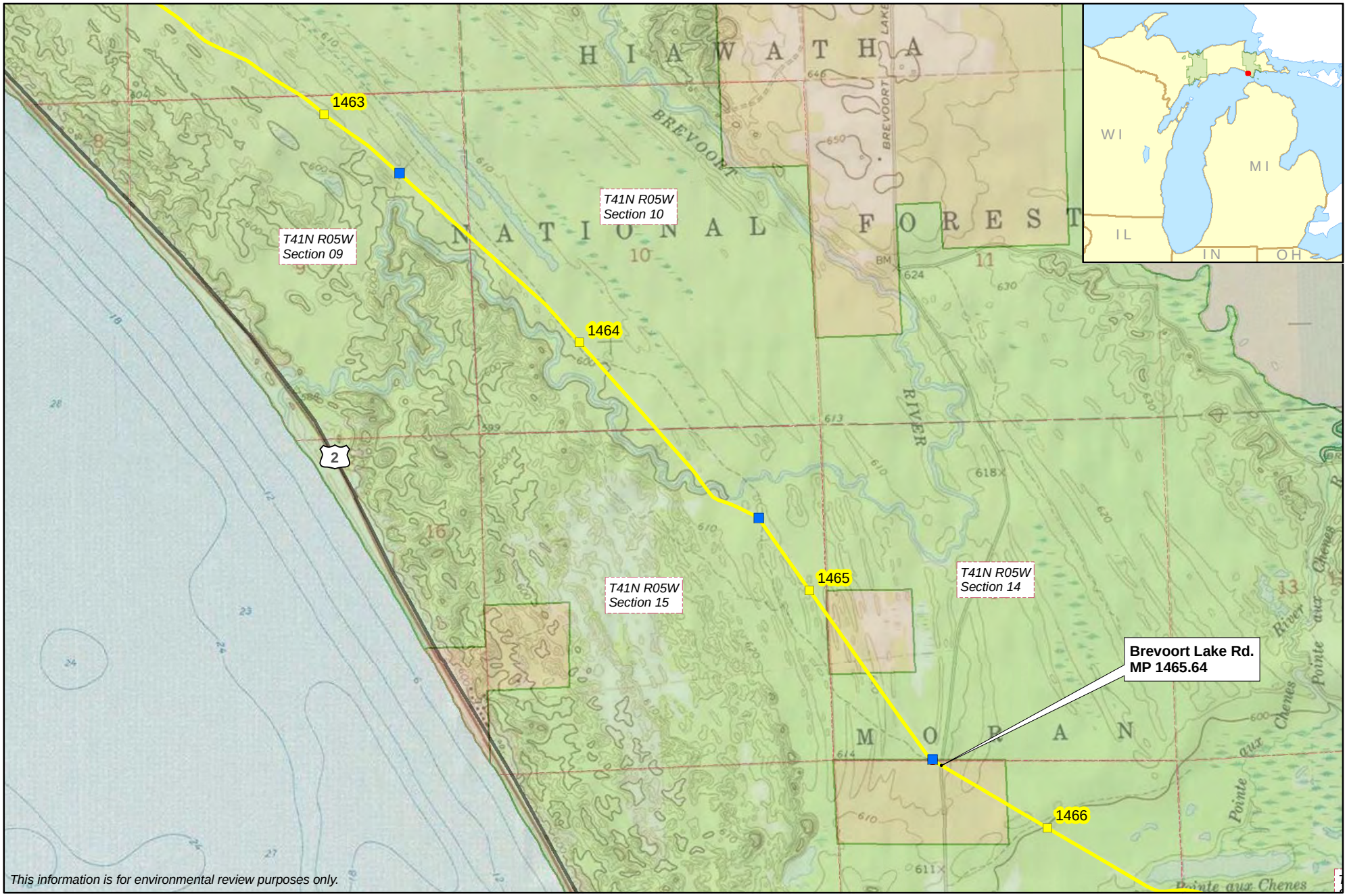

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Enbridge Pipeline O&M Plan
Hiawatha National Forest

Pipeline Route Map

Map 13 of 16

ENBRIDGE

Revised: 01/13/10

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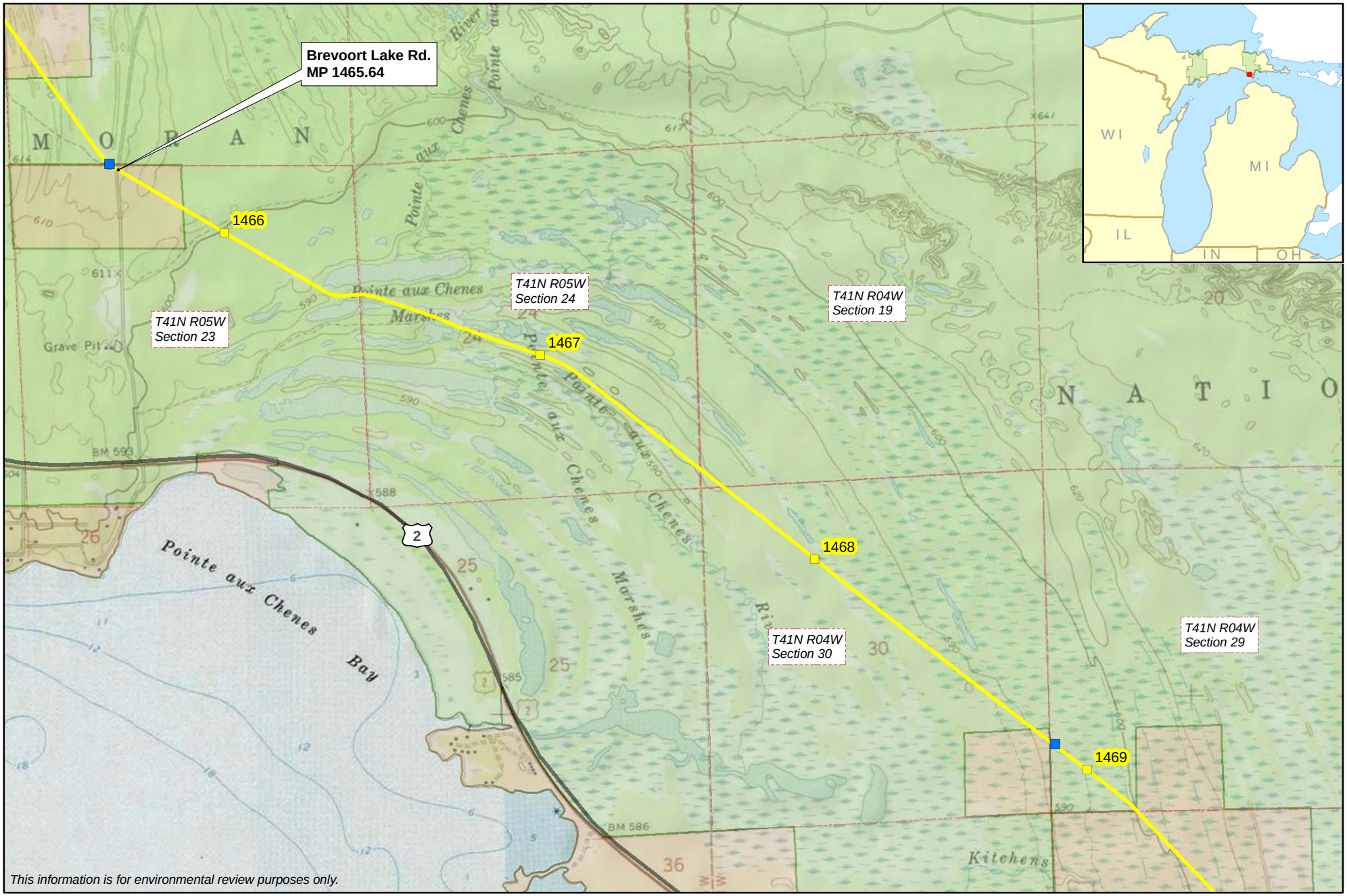

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Enbridge Pipeline O&M Plan
Hiawatha National Forest

Pipeline Route Map

Map 14 of 16

ENBRIDGE

Revised: 01/13/10

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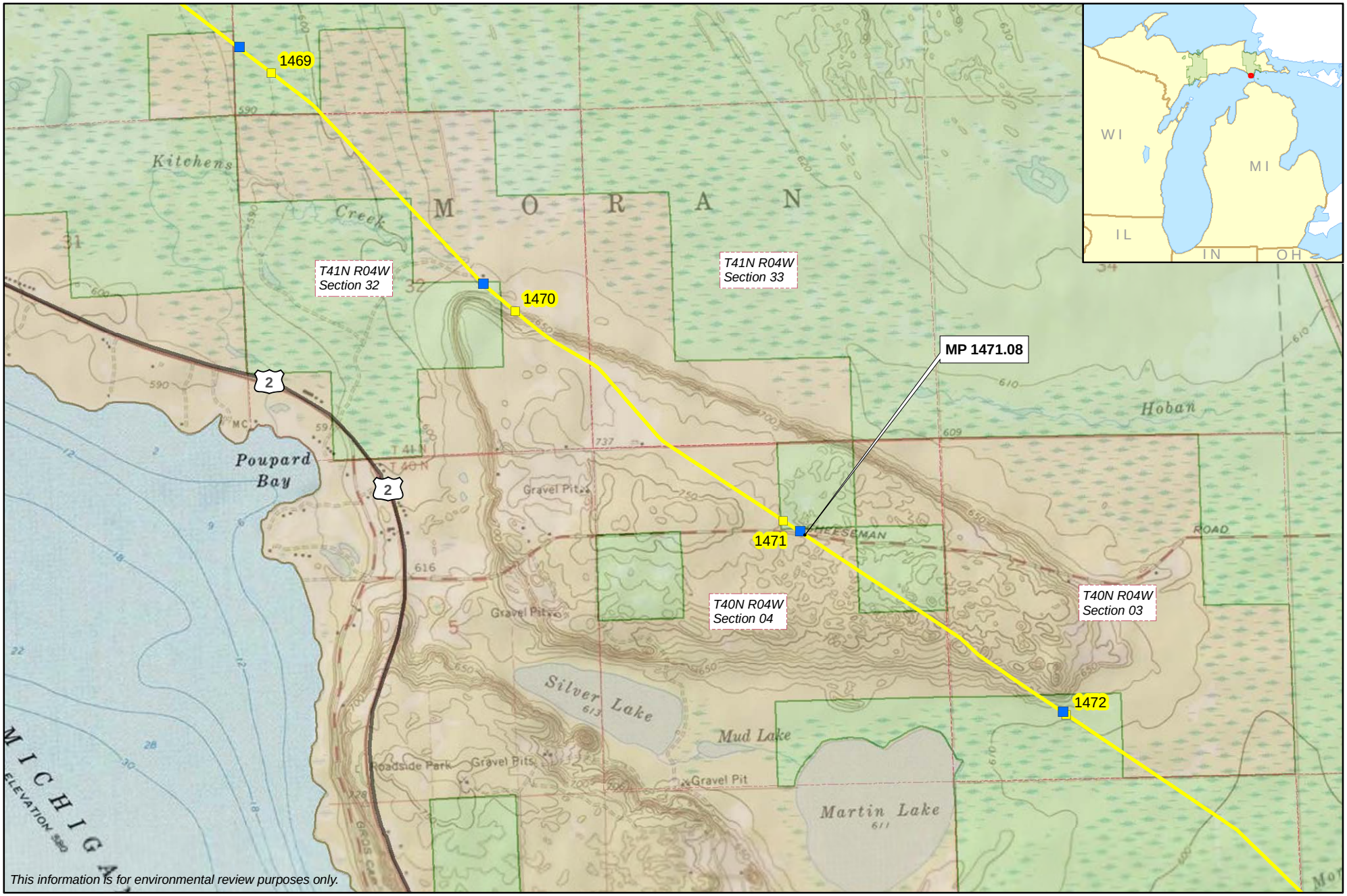

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- Cathodic Protection
- Stations
- Valves
- Rectifiers

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Enbridge Pipeline O&M Plan
Hiawatha National Forest

Pipeline Route Map

Map 15 of 16

ENBRIDGE

Revised: 01/13/10

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Map Document: (O:\200-GIS\GIS\Clients\Enbridge\O&M_projects\HNF O&M Plan\Enb HNF O&M Maps.mxd)
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- Cathodic Protection
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- Valves
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Enbridge Pipeline O&M Plan
Hiawatha National Forest

Pipeline Route Map

Map 16 of 16

ENBRIDGE

Revised: 01/13/10

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5. APPENDIX B

Sensitive Environmental Resources and Conservation Measures

APPENDIX B – SENSITIVE ENVIRONMENTAL RESOURCES AND CONSERVATION MEASURES

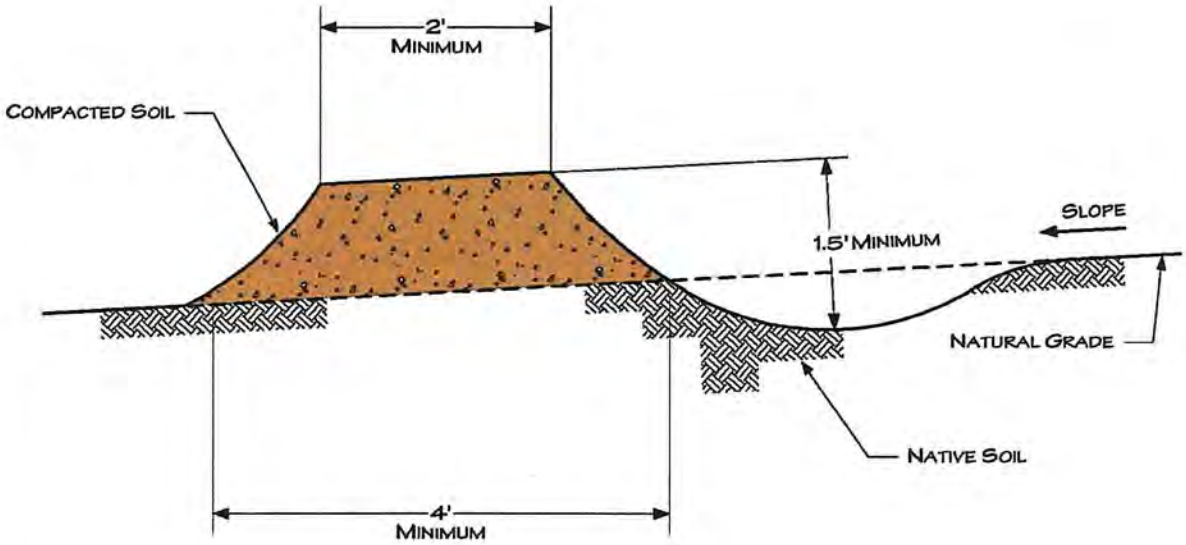
Milepost	Sensitive Resource	Status *	Conservation Measure
All	Nesting Migratory Birds	MBTA	Right-of-way brush clearing (a Minor Disturbance Activity) will not be conducted between April 15 and August 1 to avoid potential interference with bird nesting activities.
All	Potential Turtle Habitat at River Crossings	RFSS	For all Minor Disturbance and Disturbance Activities occurring at river crossings: 1. Do not stabilize or revegetate a river bank having all of the following characteristics: a. Full sun exposure to afternoon and evening sun (SW aspect). River banks that receive only morning sun are not suitable. b. Slope less than 40 degrees (turtle nest sites are usually located at least 5 feet higher than the water surface elevation). c. Sand or sand-gravel substrate with little or no ground vegetation (less than 20% ground cover). 2. Crossing locations at river banks that do not contain suitable habitat for nesting (e.g. do not meet the criteria in item 1.a. – c. above), must be evaluated to determine if the crossing location provides turtle access to adjacent suitable habitat. Turtle access must be maintained where adjacent areas contain known or suspected nesting sites, by installing a turtle ramp at the crossing after the bank is restored. Where reseeding is necessary, native plant materials shall be used. The turtle ramp shall be constructed of a low-profile wood structure with sod capping (this material is preferable to large rock or other material that results in a rough or slippery surface). 3. Where bank stabilization such as rip-rap is needed to control erosion caused by ongoing human activity, but nesting activity is known or suspected, project specific consultation with the HNF is required prior to commencing project activities to evaluate whether suitable habitat can be created nearby. The created habitat must have all of the essential characteristics listed in item 1 above and must be visible to turtles exiting the river.
1358.15 – 1358.4	Whitefish River	WSR Corridor	Confine vegetation clearing to a 10-foot-wide corridor centered over the pipeline within 200 feet on either side of the stream banks.
1358.24 – 1358.5	Bald eagle	RFSS	Project-specific consultation with the HNF is required prior to commencing Minor Disturbance or Disturbance Activities between MPs 1358.24 and 1358.5 (i.e. a 1/4–mile buffer zone circle around the nest) during the nesting season (February 15 through July 15).
1359.28 – 1360.28	Kirtland's warbler	FE	Project-specific consultation with the HNF and USFWS is required prior to commencing No Disturbance, Minor Disturbance or Disturbance Activities between MPs 1359.28 and 1360.28 during the nesting season (May 1 through September 15).

Milepost	Sensitive Resource	Status *	Conservation Measure
1365.6	Warpaint emerald dragonfly	RFSS	Confine all O&M Activities to the existing maintained 60-foot-wide permanent right-of-way at MP 1365.6. An occurrence of a Warpaint emerald dragonfly is confirmed in a wetland located approximately 200 feet north of the pipeline at MP 1365.6, north of a gravel road running parallel along the north side of the pipeline.
1369.96	Sturgeon River	WSR Corridor	Confine vegetation clearing to a 10-foot-wide corridor centered over the pipeline between Forest Federal Highway 13 (MP 1369.74) and MP 1370 (i.e. 200 feet on the east side of the stream bank).
1459.58 – 1473.48	Potential Hine's emerald dragonfly – wetland habitat	FE	Maintain a 50-foot shrub buffer around emergent wetlands between MPs 1459.56 and 1473.48. "No Disturbance Activities" are allowed within the buffer zone and wetland areas. Project-specific consultation with the HNF is required prior to conducting all Minor Disturbance or Disturbance Activities within the buffer zone and/or wetland.

* MBTA = Migratory Bird Treaty Act, WSR = Wild and Scenic River, FE = Federal Endangered, FT = Federal Threatened, RFSS = Region 9 Regional Forester Sensitive Species

6. APPENDIX C

Typical Schematics



NOTES

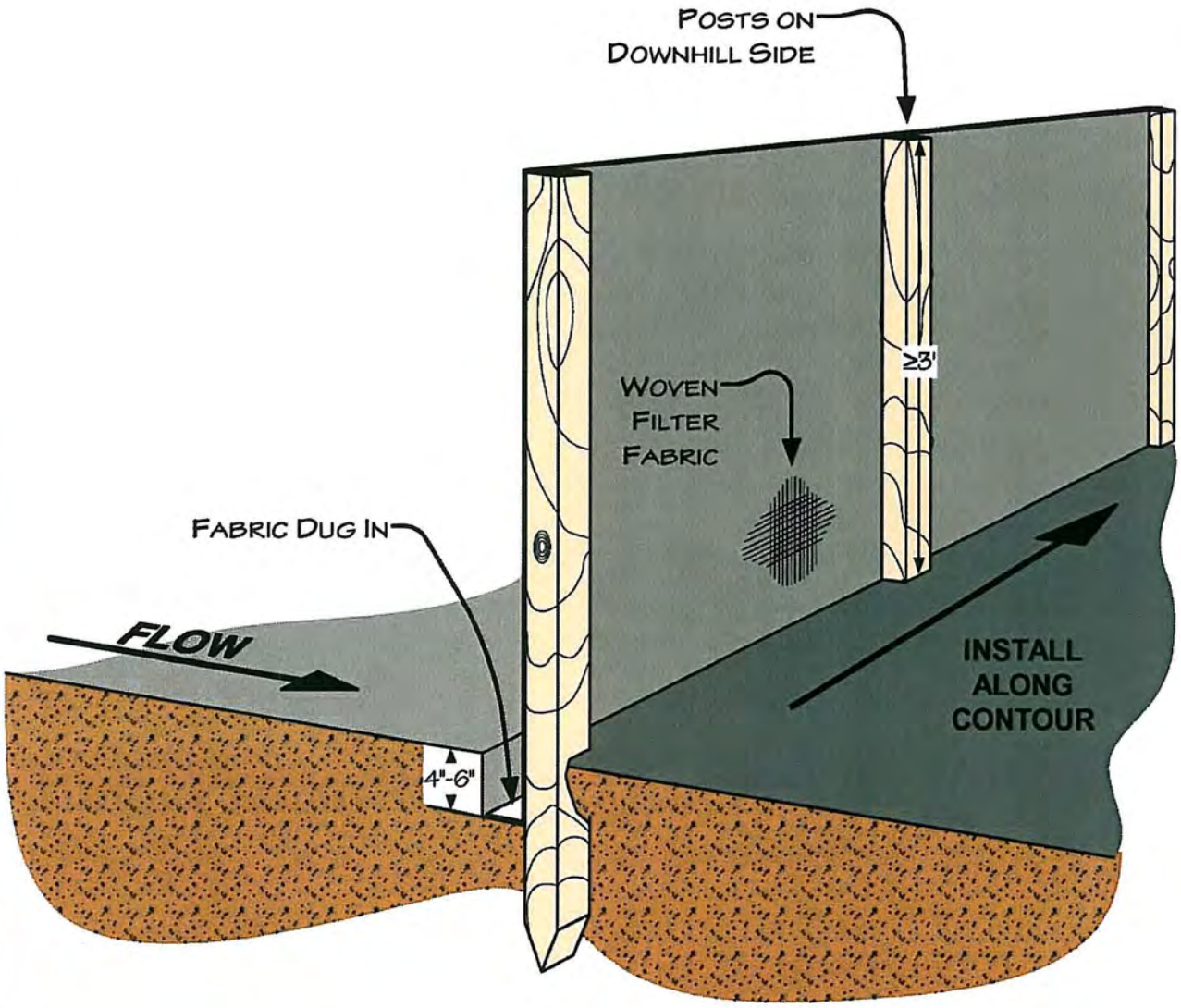
1. BERMS SHALL BE CONSTRUCTED WITH 2 TO 8 PERCENT OUTSLOPE.
2. BERMS SHALL BE OUTLETED TO WELL VEGETATED STABLE AREAS, SILT FENCES, STRAW/HAY BALES OR ROCK APRONS.
3. BERMS SHALL BE SPACED AS DESCRIBED IN CONSTRUCTION SPECIFICATIONS.
4. ADDITIONAL INFORMATION INCLUDED ON OTHER DRAWINGS.

For environmental review purposes only.

ENBRIDGE

Enbridge Energy, Limited Partnership
Slope Breaker - Elevation View

DATE:	5/25/01
REVISED:	2/7/03
SCALE:	NTS
DRAWN BY:	KMKENDALL
K:\575\20030207\BERMELEVA.VSD	

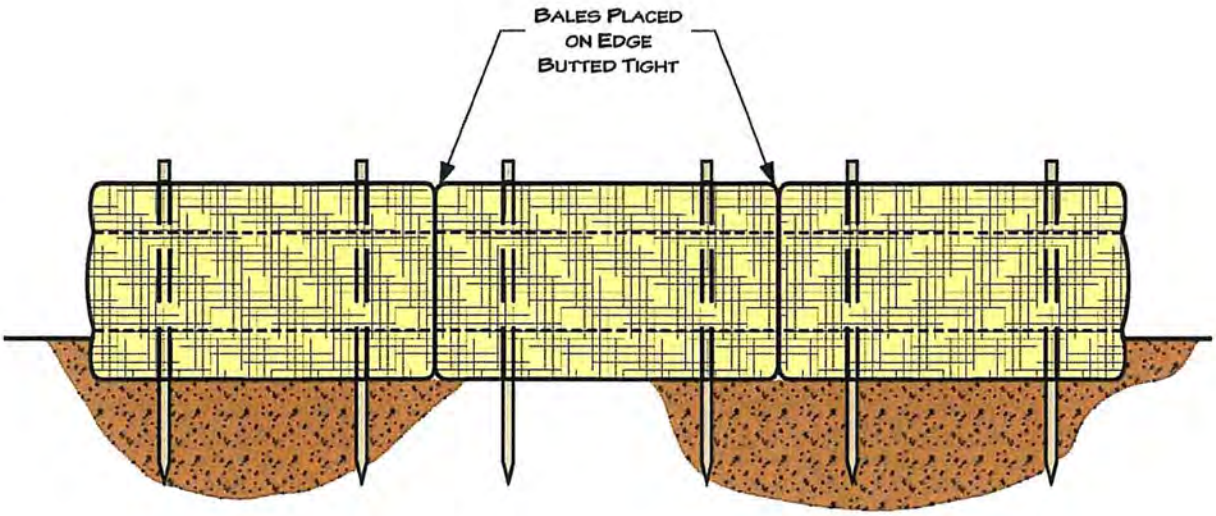


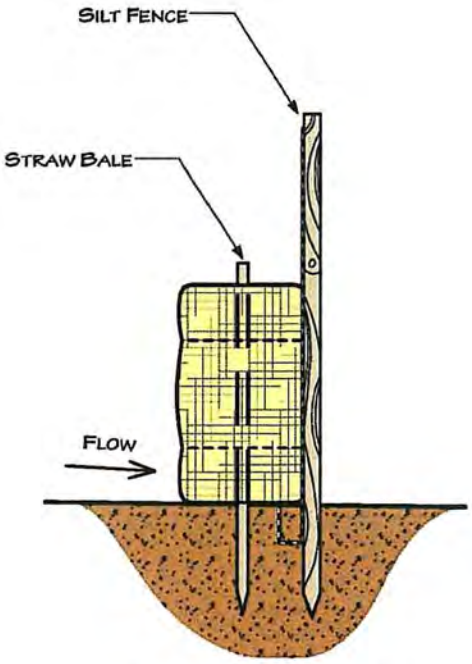
For environmental review purposes only.

ENBRIDGE

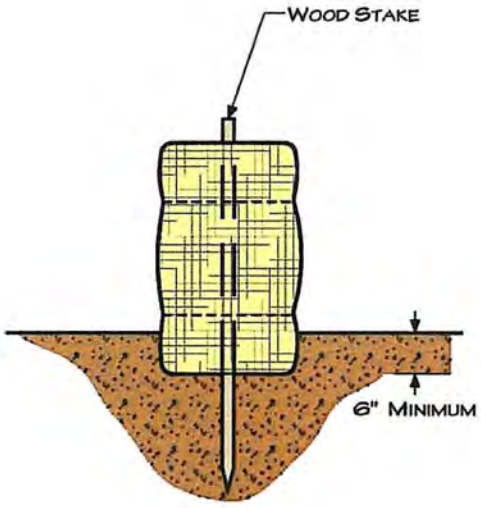
Enbridge Energy, Limited Partnership
Typical Silt Fence Installation

DATE: 5/25/01
REVISED: 2/7/03
SCALE: NTS
DRAWN BY: KMKENDALL
K:\575\20030207\SFENCEINST.VSD





STRAW/HAY BALES &
SILT FENCE



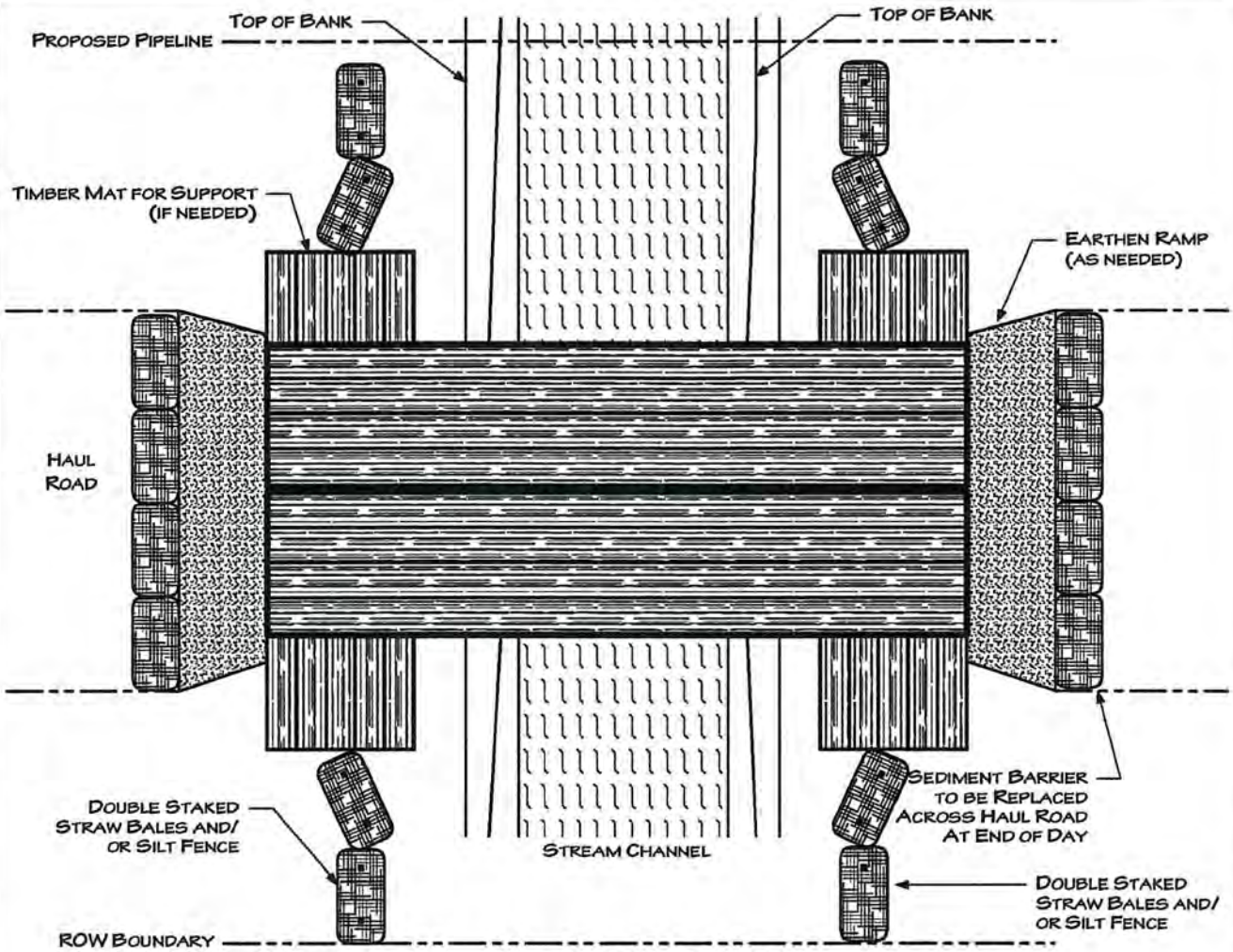
STRAW/HAY BALES ONLY

For environmental review purposes only.

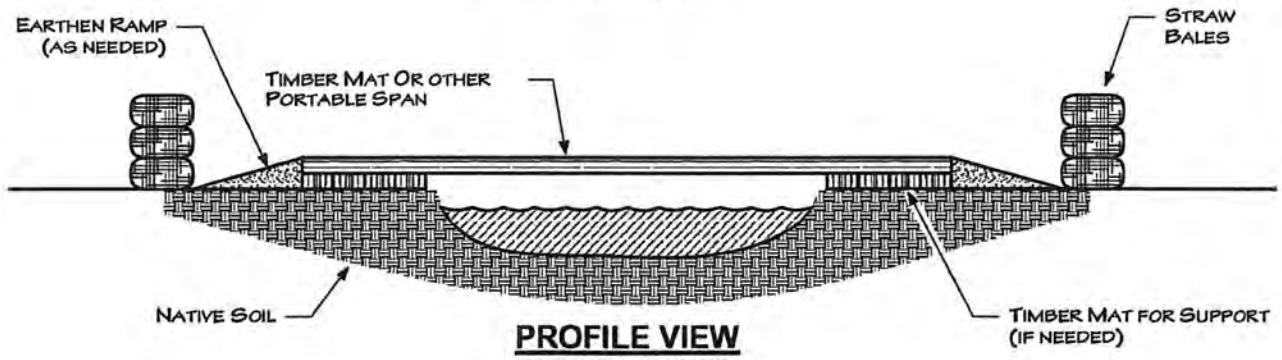
ENBRIDGE

Enbridge Energy, Limited Partnership
Typical Straw Bale Installation

DATE:	5/25/01
REVISED:	2/7/03
SCALE:	Not to Scale
DRAWN BY:	KMKENDALL
	K:\575\20030207\SBALEINST.VSD



PLAN VIEW
(NOT TO SCALE)



PROFILE VIEW
(NOT TO SCALE)

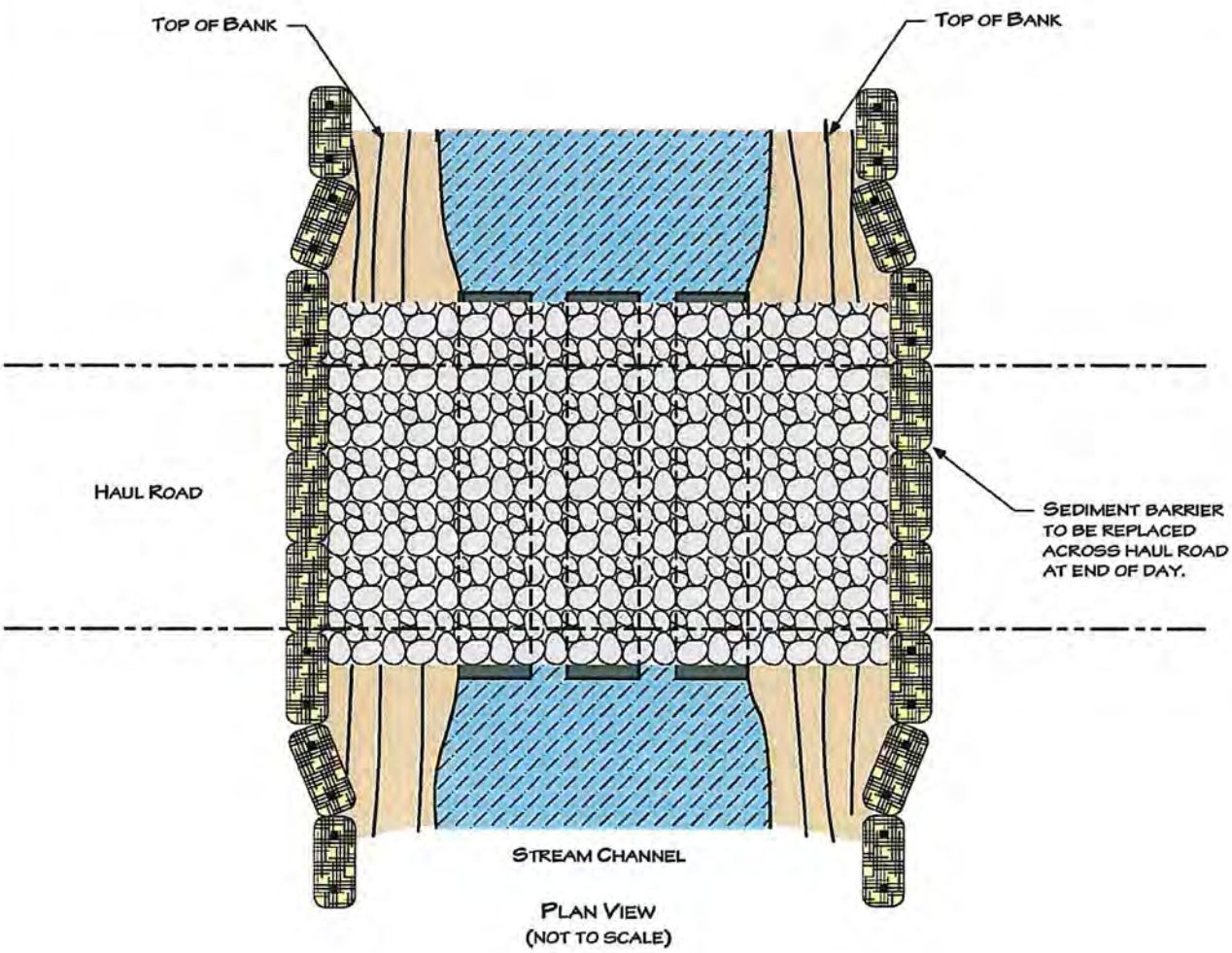
NOTE:
STRAW BALES SHALL BE PLACED ACROSS BRIDGE ENTRANCE EVERY NIGHT.

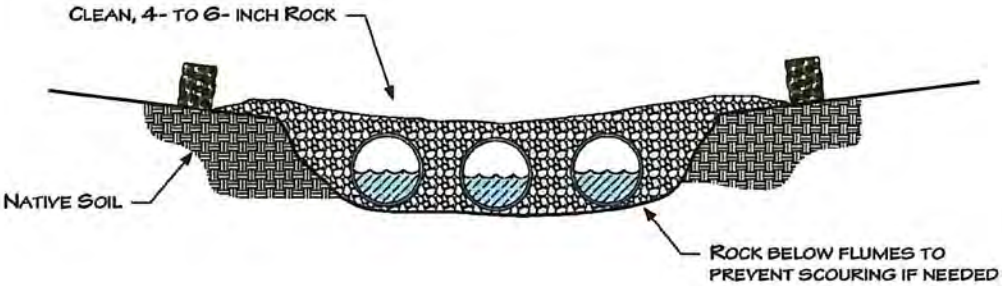
For environmental review purposes only

ENBRIDGE

Enbridge Energy, Limited Partnership
Typical Timber Mat Bridge

DATE: 5/15/02
REVISED: 2/10/03
SCALE: NTS
DRAWN BY: KJAnderson
K:\575\20030207\TIMBER MAT BRIDGE.VSD





NOTES:

1. STEEL FLUME PIPE(S) SIZED TO ALLOW FOR STREAM FLOW AND EQUIPMENT LOAD.
2. STRAW BALES SHALL BE PLACED ACROSS BRIDGE ENTRANCE EVERY NIGHT.
3. ADDITIONAL INFORMATION INCLUDED ON OTHER DRAWINGS.

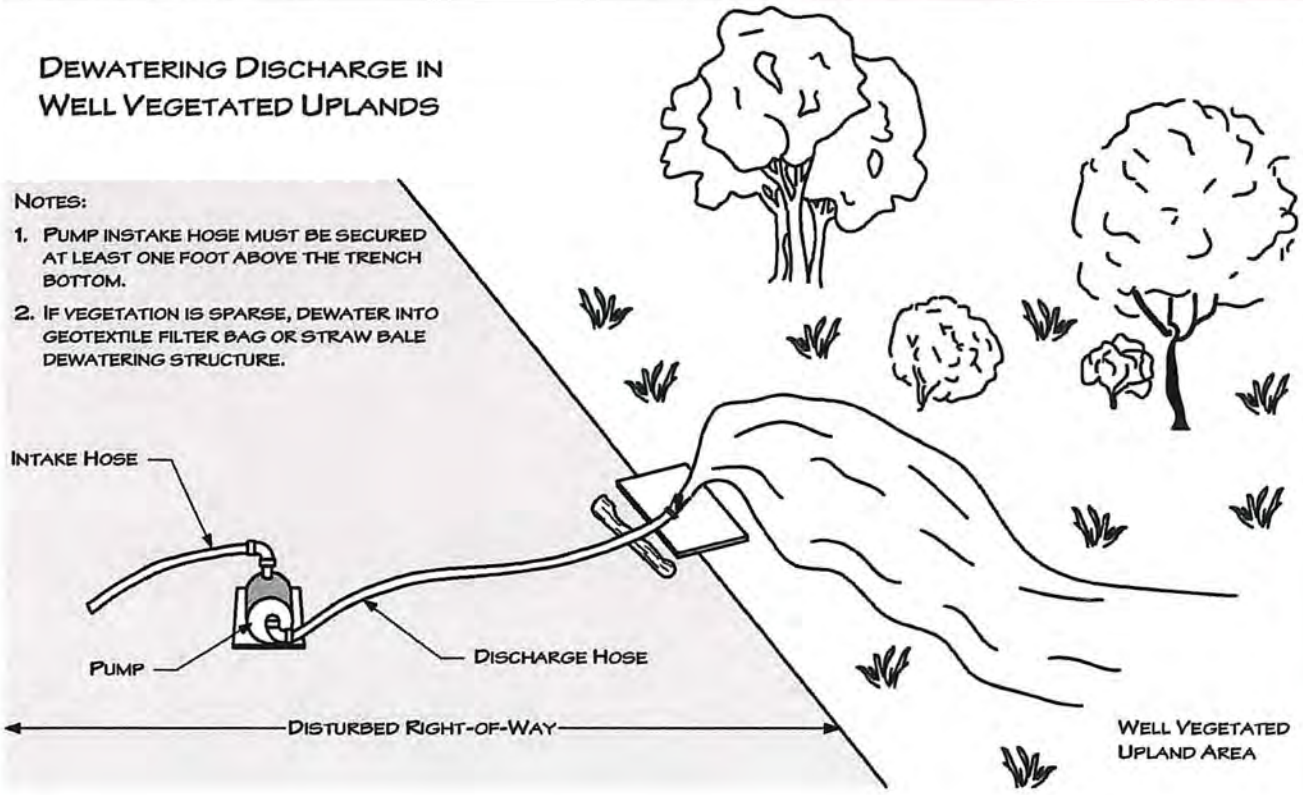
For environmental review purposes only.

ENBRIDGE

Enbridge Energy, Limited Partnership
Typical Rock Flume Bridge

DATE: 5/25/01
REVISED: 2/7/03
SCALE: NTS
DRAWN BY: KMKENDALL
K:\575\20030207\ROCKFLUME.VSD

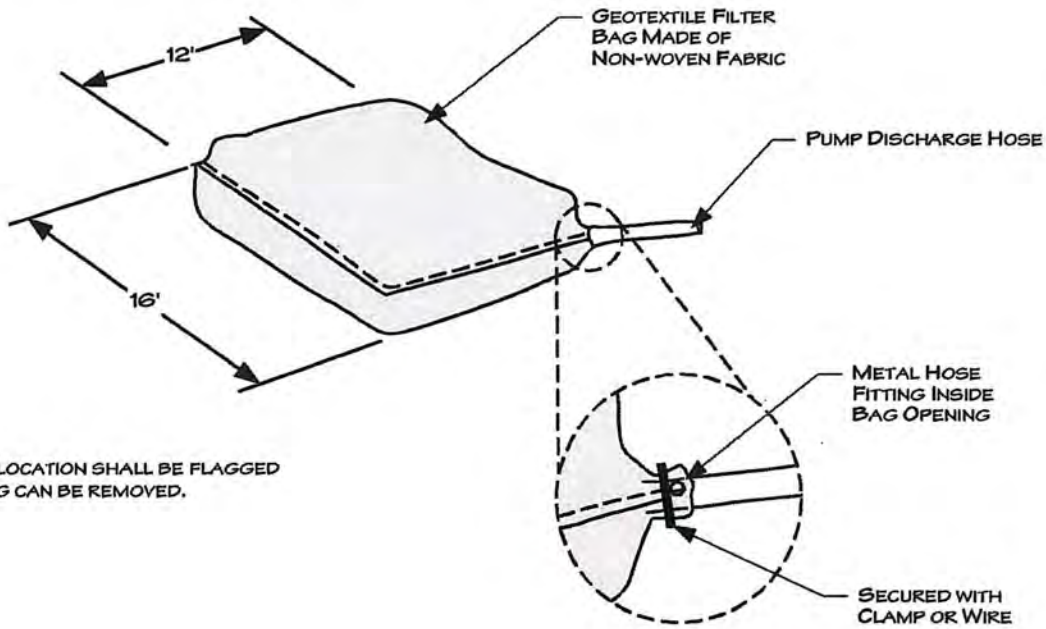
Dewatering Discharge in Well Vegetated Uplands



Notes:

1. Pump intake hose must be secured at least one foot above the trench bottom.
2. If vegetation is sparse, dewater into geotextile filter bag or straw bale dewatering structure.

Geotextile Filter Bag

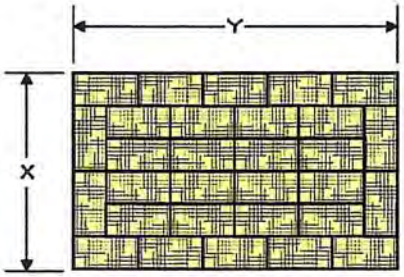


Note:

1. Filter bag location shall be flagged so that bag can be removed.

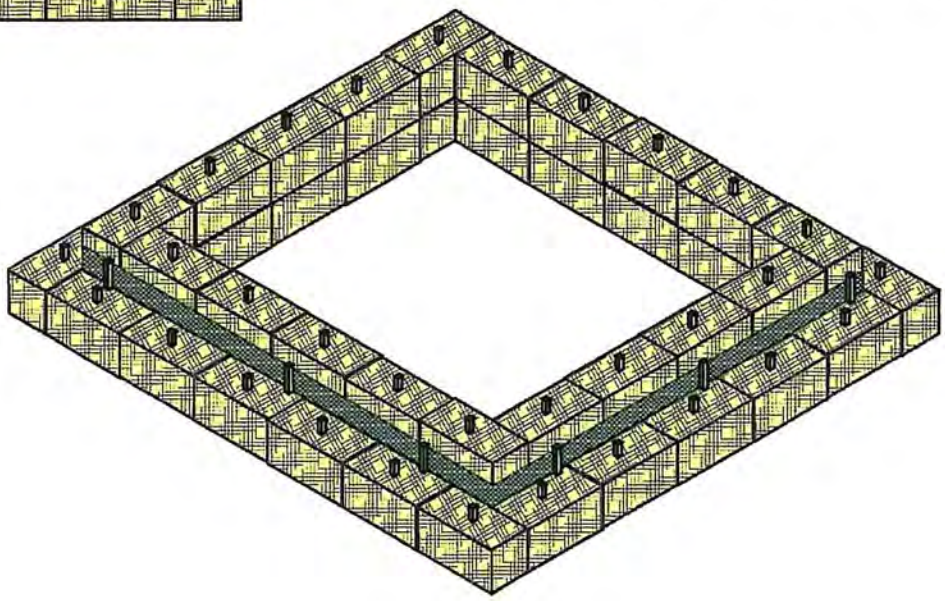
For environmental review purposes only.

ENBRIDGE	**Enbridge Energy, Limited Partnership** Typical Dewatering Measures	DATE: 5/25/01 REVISED: 2/7/03 SCALE: NTS DRAWN BY: KMKENDALL K:\575\20030207\DISFILTBAG.VSD

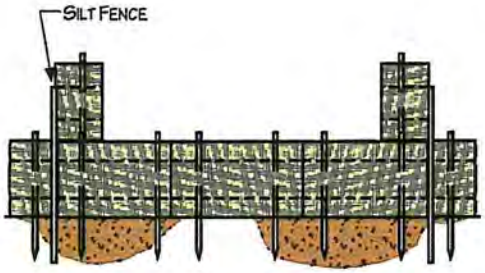


NOTES

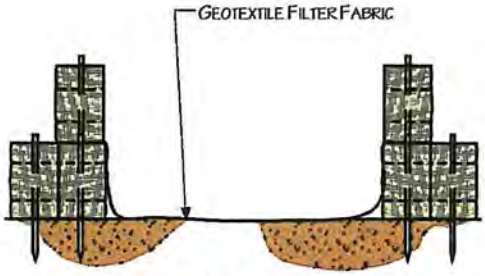
1. ARRANGE THE STRAW BALES TO THE X AND Y DIMENSIONS AS SPECIFICIED BELOW.
2. IF BOTTOM OF STRUCTURE IS NOT LINED WITH STRAW BALES (OPTION 1), LINE ENTIRE STRUCTURE WITH GEOTEXTILE FILTER FABRIC.



PERSPECTIVE VIEW



OPTION 1



OPTION 2

MINIMUM SUMP DIMENSIONS (FEET) X	Y	MAXIMUM PUMPING RATE GALLONS PER MINUTE
10	20	300
15	20	350
20	20	400
20	25	450
25	25	500
25	30	550
30	30	660

For environmental review purposes only.

ENBRIDGE

Enbridge Energy, Limited Partnership
Typical Straw-Bale Dewatering Structure

DATE: 5/25/01
REVISED: 05/29/02
SCALE: NTS
DRAWN BY: KMKENDALL
K:\575\20030207\SBALEDEWAT.VSD