

## **Enbridge**

### **2018 Waterbody Survey Protocols (Rev 0)**

PRESENTED BY MERJENT, INC.  
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## 1.0 SCOPE

The objective of the 2018 Waterbody Field Survey Protocols is to ensure that Merjent and its subconsultants implement consistent field data collection procedures for waterbody surveys. The 2018 Waterbody Survey Protocol incorporates all applicable agency and client requirements to facilitate timely and complete permitting applications.

## 2.0 SURVEY PROTOCOLS

Crews will delineate and collect data for all waterbody features encountered in the environmental survey corridor as follows:

- Waterbodies <10 feet between Ordinary High Water Marks (“OHWM”) will be delineated by capturing the centerline of the waterbody bed.
- Waterbodies >10 feet will be delineated by capturing the OHWM along each bank. The OHWM will be identified according to U.S. Army Corps of Engineers (“USACE”) Regulatory Guidance Letter (No. 05-05, December 7, 2005) *Subject: Ordinary High Water Mark Identification*.
- Surveys will require the collection of a waterbody observation point and completion of a waterbody observation form for each waterbody.

## 2.1 SAFETY

Safety is a priority for Enbridge and Merjent. Compliance with all safety requirements is mandated by Enbridge and Merjent. For specific information on safety requirements, please refer to the Merjent *Field Crew Handbook* and the Spread-Specific Safety Plans.

## 3.0 TYPICAL SURVEY PROTOCOL

Waterbody surveys will be completed in conjunction with wetland surveys. The entire environmental survey corridor will be walked (as far as safe conditions allow). This will minimize the chance of missing features that may affect permitting or mitigation. All waterbodies will be delineated regardless of potential jurisdictional status.

### Flow Regime Classifications

Flow regime will be defined as ephemeral, intermittent, or perennial.

1. Ephemeral waterbodies – Defined as those features with an obvious bed and bank, and are inundated following spring thaw and after periods of rainfall. These features otherwise lack hydrology.
2. Intermittent waterbodies – Defined as those features with an obvious bed and bank, but likely have water present within the feature throughout the growing season. These features will additionally show evidence of sorting or stratification of materials (cobble, sand, organic matter). During other seasons, these features generally lack hydrology.
3. Perennial waterbodies – Defined as those features with an obvious bed and bank, and possess hydrology consistently throughout the year, regardless of season.

## Waterbodies within Wetland Complexes

There may be situations where a waterbody feature is surrounded by poorly developed floating organic mat, leading to safety concerns for field crews. Under these circumstances, the waterbody feature would be digitized based on high resolution aerial photography. However, all pertinent data for the waterbody data form would be collected to the extent possible given the environmental conditions.

## Beaver Channels

Beaver channels will be delineated as waterbody features within a wetland complex when:

- The waterbody feature has been identified on the Minnesota Public Waters Inventory; or
- The channel is well defined with obvious flow.

A loosely constructed series of beaver channels within a wetland complex will not be delineated by field crews due to safety concerns. Additionally, crews may have a situation where the beaver channel has been either identified on the Public Waters Inventory or the channel is well defined with obvious flow, but the feature is surrounded by poorly formed organic soils, making it difficult for crews to safely delineate the boundaries.

Under either of these circumstances, the crews will complete a waterbody data form, noting the presence of beaver activity in the attributes, and this will serve notice that the feature has been observed. This information will then be used to digitize the boundary of the waterbody feature based on the most recent aerial photo during the GIS data review.

## Roadside Ditches

As outlined in the safety plans, no digging may occur in roadside ditches due to the increased likelihood that buried facilities will be present. Roadside ditches may fall into one of the three following categories:

The crews will delineate roadside ditches as wetlands when:

- They are entirely vegetated and dominated by hydrophytic vegetation; and
- A bed and bank are not present (i.e., no OHWM).

“Roadside ditch wetlands” will use the Wetland ID nomenclature outlined in the Wetland Survey Protocol, and only the vegetation and hydrology section of the USACE wetland determination data form will be filled out. Indicate in the soil comments, “Soils not sampled due to safety requirements – soils assumed hydric”).

The crews will delineate roadside ditches as waterbodies when:

- A bed and bank are present (i.e., OHWM present).

“Roadside ditch waterbodies” will use the Waterbody ID nomenclature outlined below in this document.

The crews will not delineate roadside ditches and will consider roadside ditches as upland ditches when:

- They are entirely vegetated and dominated by facultative upland and upland species (not a wetland); and
- A bed and bank are not present (i.e., no OHWM).

### **Photo Documentation**

The purpose of photos is to visually capture the surveyed waterbody at the time of survey. Two representative photographs should be taken of each waterbody. The first photo will be perpendicular to the waterbody. The second photo will be parallel to the waterbody. Using a mobile tablet computer (tablet) or other collection equipment:

- Photos should be taken in the landscape (horizontal) orientation.
- The tablet should be set to geotag each photo (geotagging should be active by default).
- Photos should be representative of the waterbody.
- Photos should not be taken looking into the sun. When possible, the sun should be at the back of the photographer.
- The camera should be held level with the horizon such that the top quarter of the photo captures the sky (assuming flat topography and open conditions).

### **Special Resources**

Special resources, such as waterbodies with special state or federal designations, will be identified during the desktop review and included as a separate effort.

## **4.0 FIELD DATA COLLECTION**

Data collection is limited to the bounds of the environmental survey corridor. Data will be collected electronically using a GPS datalogger and tablet (or similar equipment). Survey teams will consist of two people. Recommended division of responsibility is as follows:

- Crew Member A will operate a sub-meter GPS datalogger (i.e., Trimble GeoXT) to GPS the waterbody OHWMs or centerline.
- Crew Member B will operate a tablet to collect waterbody parameter data, which includes:
  - Waterbody observation point form information and location; and
  - Photo, caption, and location.

### **4.1 DATA PROCESSING**

#### **4.1.1 Daily Data Upload**

All data collected with the GPS datalogger will be converted to a GIS shapefile format and uploaded nightly to Merjent's SharePoint site. Merjent shall review this data to confirm daily progress in the field.

All other data collected via tablet, or otherwise, will be uploaded to Merjent's SharePoint site on a daily basis.

The daily uploaded data (GIS, tablet data and photos) shall be considered "raw" data that has not undergone post-processing, QA/QC, or editing. Merjent shall review all raw data to confirm completeness.

### 4.1.2 Post-Processed Data

Spatial data collected in the field will be post-processed by Merjent’s subconsultant. Line data of wetlands and waterbodies will be processed into appropriate polygons and lines. The subconsultant will QA/QC attribute data collected by Crew Member B on the tablets. GIS data will also include point data representing data collection points. The Feature ID of wetland polygons and waterbody lines must match that of the point data.

Post-processing of the data will include edits to waterbody lines. Waterbody observation forms may also require editing following collection in the field.

An updated, contractor QA/QC geodatabase of all GIS data, and updated data sheets are due Mondays at 9:00 a.m. CDT. This data shall include all data collected up to eight days prior to the due date (i.e., the May 21 data submittal shall include all data collected through May 14). Merjent will conduct an additional QA/QC review of all data submitted.

### 4.1.3 Coordinate System

The following coordinate systems and projections will be used for all field collected data. The transition shall occur at the North Dakota/Minnesota state border.

- North Dakota: North Dakota State Plane North, NAD 83 U.S. feet
- Minnesota and Wisconsin: Minnesota State Plane North, NAD 83 (2011) U.S. feet

### 4.1.4 Electronic Devices

#### Trimble GeoXT

Sub-meter-accuracy Trimble GeoXT units will be used to electronically delineate the OHWMs or centerlines of waterbodies within the environmental survey corridor.

#### Mobile Tablet Computer

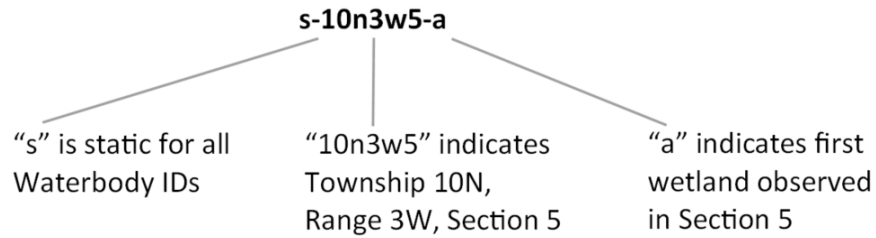
Waterbody observation point forms, and photos will be collected using a tablet.

## 4.2 FIELD DATA ID NOMENCLATURE

### 4.2.1 Waterbody ID Nomenclature

Each waterbody will be labeled in the following manner:

- “s”; Township; Range; Section; Alphabetical Designation
  - “s” – Each Waterbody ID begins with a static “s”
  - Township – Unique USGS Township where the subject feature is located
  - Range – Unique USGS Range where the subject feature is located
  - Sections – Unique USGS Section where the subject feature is located
  - Alphabetical designation in consecutive order within the Township, Range, Section (“TRS”)
    - If there are more than 26 waterbodies located within a TRS, the lettering designation will continue as “aa”, “ab”, “ac”, etc.



Example 1 (above): s-10n3w5-a is the first waterbody delineated within Section 5 of Township 10 N, Range 3W. Note the usage of hyphens.

## Photos

Photo IDs should match Waterbody IDs.

### 4.2.2 Data Collection Fields

#### Waterbody Line Data – collected on a Trimble GeoXT:

1. Feature\_ID – See above for naming convention.
2. Survey\_Date – Date data was collected in the field. Format should be month/day/year (xx/xx/xxxx).
3. Staff – Three-letter initials in all caps for all crew members (i.e., ABC/DEF).
4. Flow Regime – Identify the appropriate flow regime (ephemeral, intermittent, or perennial).

#### Waterbody Observation Point – collected on a Trimble GeoXT:

1. Feature\_ID – See above for naming convention.
2. Survey\_Date – Date data was collected in the field. Format should be month/day/year (xx/xx/xxxx).
3. Flow Regime – Identify the appropriate flow regime (ephemeral, intermittent, or perennial).

#### Waterbody Observation Data – collected on a tablet:

1. Feature ID – See above for naming convention.
2. Date – Date data was collected in the field. Format should be month/day/year (xx/xx/xxxx).
3. Investigators – Three-letter initial for all crew members (i.e., ABC/DEF).
4. County – County the wetland is located in.
5. Flow Regime – Identify the appropriate community type (i.e., R2UB, R4B, etc.).
6. Flow Rate – Estimate the flow rate in meters per second.
7. Flow Direction – Direction of stream flow.
8. Substrate – Dominant stream bed substrate material.
9. Ordinary High Water Mark Width – The width of the OHWM in feet from the top of the OHWM on one bank to the other.
10. Ordinary High Water Mark Height – The height of the OHWM in feet from the bed of the waterbody.
11. Top of Bank Width – The width between the tops of the banks in feet.

12. Left Bank Height – The Left Bank Height in feet. The bank is the height from the base of the feature (from the bed not the water surface) to the top of the bank.
13. Left Bank Slope – Enter the slope class in degrees. Examples: 0° is flat, 90° is vertical.
14. Right Bank Height – The Right Bank Height in feet. The bank is the height from the base of the feature (from the bed not the water surface) to the top of the bank.
15. Right Bank Slope – Enter the slope class in degrees. Examples: 0° is flat, 90° is vertical.
16. Ordinary High Water Mark Criteria – Select the criteria used to determine the OHWM.
17. Riffles – Are riffles present (shallow, fast, and turbulent water running over rocks)?
18. Runs – Are runs present (deep, fast water and little or no disturbance)?
19. Pools – Are pools present (deep, slow water)?
20. Mussels – Is there evidence of mussels in the waterbody (e.g., shells)?
21. Dominant Plants – List the top three dominant plants for each strata present (e.g., tree, shrub, herb, vine).
22. Notes – Relevant information observed by crews in the field.

## **5.0 DATA REVIEW PROCESS**

### **5.1.1 Field QA/QC**

All geospatial data created and maintained by Merjent shall be subject to QA/QC, which may include checks for completeness, physical consistency, logical consistency, positional accuracy, thematic accuracy, and temporal accuracy. Please reference the Geospatial Data Management Plan (“GDMP”) for additional information about field data QA/QC.