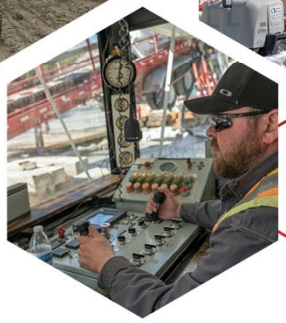
Enbridge

Line 5 – Bad River HDD Crossing

HDD INADVERTENT RETURN MITIGATION AND CONTINGENCY PLAN

12/2/2022

PROPRIETARY & CONFIDENTIAL



MICHELS®
TRENCHLESS, INC.

MICHELS TRENCHLESS INCORPORATED (MTI)

INADVERTENT RETURN MITIGATION AND CONTINGENCY PLAN

ENBRIDGE LINE 5 PROJECT

MP 24 – 30-INCH BAD RIVER HDD CROSSING

I. SITE SPECIFIC HDD INFORMATION

In preparing the site-specific Inadvertent Return Mitigation and Contingency Plan for this crossing, the following information has been considered:

- HDD Length: 1,788’
- Notable Obstacles: CN Railroad tracks, Bad River, multiple wetlands, and Copper Falls Drive
- Length of Wetlands: 672’ (east of the Bad River), 268’ (east of Copper Falls Drive), 75’ (surrounding the exit point)
- Waterbody Information: The Bad River is approximately 70’ wide, and less than 5’ deep at the crossing location
- Depth of HDD Under Applicable Wetlands: Minimum of 30’
- Depth of HDD Under Waterbody: Minimum of 47’

II. DRILLING FLUID PLAN

Essential to any successful HDD installation is the selection and proper utilization of drilling fluid, which consists primarily of water and dehydrated bentonite clay. Bentonite is a naturally occurring, non-toxic, inert substance that meets NSF/ANSI-60 Drinking Water Additive Standards and is frequently used for drilling potable water wells. The primary environmental impact of an inadvertent release of drilling fluid into a water body is a temporary increase in local turbidity until the drilling fluid dissipates with the current or settles out. Bentonite serves many purposes in the HDD process, including:

- Cleans the drilled cuttings from the bore hole
- Cools downhole drilling tools
- Transports cuttings to the surface
- Creates a wall cake within the annulus which aids in stabilizing the bore hole and prevents fluid loss into the formation
- Provides lubrication for the drill string and downhole assembly, reducing frictional forces
- Drives a downhole motor for rock drilling
- Provides hydrostatic fluid pressure in the bore hole to offset groundwater and formation pressures

The selected drilling fluid for this crossing consists of water (approximately 96%) and bentonite clay (approximately 4%). MTI has access to several different brands of bentonite. The selection of which brand to use is typically based on price, availability, and proximity to the proposed drill site. The following brands all have similar characteristics and provide the results described above:

- Max Gel

- Super-Gel X
- Bara-Kade
- AMC Gel
- SW-101

The bentonite will be mixed in a tank with a volume of up to 5,000 gallons, depending on mud rig size, in accordance with the manufacturer's recommendations. Approximately 15 to 20 pounds of powder bentonite will be mixed with 100 gallons of water and will be used throughout the entire drilling process to establish and maintain optimum drilling fluid properties. MTI maintains fluid performance through the daily sampling, testing, and recording of fluid properties during drilling operations. This provides the MTI Mud Technician the information needed to make educated recommendations regarding maintenance of efficient drilling fluid rheology consistent with hole stabilization and limiting of inadvertent surface returns.

Once the drilling fluid is thoroughly mixed to an acceptable consistency, it is pumped from the mud tank to the back end of the drilling rig. From there it is injected under high pressure through the drill stem at a rate of 300 to 800 gpm until it is expended through one or more nozzles in the drill bit. The spent drilling fluid, mixed with accumulated cuttings, flows back through the annular space between the drill stem and the formation wall. Drilling fluid eventually returns to the entry pit where it is pumped by a 6 hp submersible pump to the fluid recycling and processing system.

The first phase of the fluid processing system displaces solid returns at the shakers. Heavy solids are sifted out by a shaker with screens and transported from the site by dump truck to a disposal site. The scalped cuttings containing medium fines and reusable drilling fluid are pumped to the next phase of processing, which takes place at the desilter/mud cleaning unit. The heavier cuttings are again processed out for disposal while the recycled drilling fluid is pumped back and reused in the drilling process.

Additives may be deemed necessary based on evaluations and recommendations made by the Mud Technician during drilling and hole opening operations. If the need for drilling fluid additives does arise, it is anticipated that all additives used will be listed on the Wisconsin Department of Natural Resources Approved Horizontal Directional Drilling Products List.

III. PREVENTION – CONTAINMENT – COMMUNICATION

This section elaborates on measures to be implemented by MTI if an inadvertent release of drilling fluid occurs despite prevention efforts. Hydraulic fracture, also known as hydrofracture, is a phenomenon that occurs when drilling fluid pressure in the annular space of the drilled hole exceeds the strength of the surrounding soil, resulting in plastic deformation and fracturing. Uncontrolled expansion and fracture propagation in the soil surrounding the borehole can serve as a means by which drilling fluid can flow into the formation, resulting in lost circulation. In some cases, drilling fluid that is lost to the formation can flow up to the ground surface at locations other than the HDD end points, resulting in an inadvertent drilling fluid return.

Although hydrofracture may be one mechanism by which inadvertent drilling fluid returns occur, it is not the only one. In fact, it is thought that inadvertent returns due to true hydrofracture occur in only a small percentage of cases. Drilling fluid flows in the path of least resistance. Ideally, that path is through the annulus of the drilled hole and back to the drilling fluid containment pits at the HDD endpoints. However, the path of least resistance may also

be through naturally occurring subsurface features such as fissures in the soil, shrinkage cracks, or porous deposits of gravel. Drilling fluid may also flow to the surface along existing piers, piles, utility poles, or other structures.

Prior to the commencement of drilling operations, MTI will inform construction personnel of the responsible parties for release containment and response. MTI will ensure that the appropriate response personnel and containment equipment are on site.

Prevention

MTI drilling personnel are trained in the safe handling and use of drilling fluids and materials associated with directional drilling. Every project has a designated supervisory person responsible for implementation and execution of environmental policy, safety monitoring and reports, and implementation of mitigation plans. The Project Supervisor is well-versed in the written procedures and policies and is responsible for carrying them out.

Prevention of accidental spills of drilling fluid during HDD operations in the following areas is accomplished by the following actions. The responsible person follows proper protocol and established procedures for their job assignment.

Area of Potential Spill	Responsible Personnel	Preventative Action
Mud Containment Pits: Potential overflow located at excavated entry and exit areas.	**Driller:** Closely monitor fluid returns in the drill entry pit in view of the drill survey trailer to maintain appropriate levels.	**Response:** Contain Area. If fluid level becomes high, run pump continuously in pit until safe level is achieved. Add multiple pumps if required.
Hoses: Possible leaks at the connection between tanks and sump pumps.	**Mud Technician:** Inspect hose connections every day for leaks and wear while maintaining a full stock of replacement parts in the supply trailer.	**Response:** Contain Area. Repair leaks and replace worn-out hoses and parts.
Containment Tanks: Potential overflow or leak at soil separation, cuttings containment and solids control tanks.	**Mud Technician:** Continuously observe and control fluid levels and flow from a birds-eye view located on the top deck of the mud mixing/soil separation rig.	**Response:** Contain Area. If solid control tanks reach overflow point, pump down to manageable level. May have to pump excess fluid/cuttings to vac truck or other storage tank. Maintain exterior valves.
Frac Tanks: Potential overflow or leak at temporary holding tank for drill cuttings and fluids. At exterior valve location.	**Mud Technician:** Continuously observe levels and flow from a birds-eye view located on the top deck of the mud mixing/soil separation rig.	**Response:** Contain Area. If solid control tanks reach overflow point, pump down to manageable level. May have to pump excess fluid/cuttings to vac

		truck or other storage tank. Maintain exterior valves.
Vac Trucks/Dump Trucks: Possible leak or release at valve location or worn hose.	**Vac Truck Driver:** Maintain equipment in proper working order and follow specific guidelines in operation of vacuum and valves.	**Response:** Contain Area. If solid control tanks reach overflow point, pump down to manageable level. May have to pump excess fluid/cuttings to vac truck.

During construction, MTI personnel will be aware of the importance of timely detection and response actions with respect to any release of drilling fluid. MTI personnel will have appropriate operational communication equipment, with the ability to communicate directly with the drilling rig operator, available at all times. The absence of an open bore hole conduit or the presence of a major formation fracture can lead to partial, and potentially total, loss of drilling fluid circulation.

While it is impossible to determine the precise nature of this type of fluid loss, it is possible to accurately monitor for it by watching for a significant difference between the rates the fluid is being pumped down hole and the rate it returns to the surface. The drilling fluid pumping rate and the rate of drilling fluid return to the surface is constantly monitored by the driller while the drilling is progressing. The driller will know immediately if an unusually high volume of drilling fluid is being lost down hole, depending on the ground conditions encountered in the crossing and taking into account the volume used to fill the bore hole. If the rig operator identifies a sustained loss in drilling fluid pressure or a loss of circulation, the following steps will be taken:

- Temporarily cease drilling operations, including pump shut down
- Dispatch experienced observers to monitor the area in the vicinity of the crossing for inadvertent drilling fluid returns at the ground surface
- Identify the position of the drill head in relation to the point of entry
- Restart the pump and stroke the bore hole up and down in 30-foot stroke lengths up to 6 times, but no fewer than 2, in an effort to size the bore hole annulus and reopen the circulation pathway
- Drilling fluid properties may be modified to aid in reestablishing circulation
- Personnel will continuously monitor for inadvertent fluid returns as long as the pump remains on
- Based on the driller's discretion, stroke length may be increased up to 90 feet or beyond the point at which circulation is believed to be lost

If circulation is reestablished, drilling will proceed as usual. If drilling fluid returns continue to diminish, or are lost completely, MTI will consult with the Owner before drilling resumes. The HDD alignment will be continually monitored for surficial drilling fluid as drilling proceeds.

Containment

Containment, response, and clean-up equipment will be available on both sides of the HDD crossing location prior to the commencement in order to assure a timely response in the event of an inadvertent drilling fluid release. Containment and response equipment includes but is not limited to:

- Straw bales and staking
- Pre-filled sandbags
- Turbidity curtain
- Check dams
- Silt fence
- Plastic sheeting and/or geotextile fabric
- Shovels, brooms, buckets, and other appropriate hand tools
- Pumps and sufficient hoses
- Fluid storage tanks
- Backhoe
- Vacuum truck
- Small boat (for larger rivers and open water wetlands as necessary)
- Light plant/generator

If an inadvertent drilling fluid release is observed, MTI will assess to determine the amount of fluid being released and the potential for the release to reach sensitive resource areas (e.g., wetlands, waterbodies). If an inadvertent return is discovered along the alignment and the amount of surficial drilling fluid is not great enough to allow practical collection, the affected area will be diluted with fresh water and allowed to dry and dissipate naturally. If the amount of surficial returns exceeds that which can be suitably contained with hand placed containment barriers, small collection sumps (less than 3.8 cubic meters) will be used to pump fluid back to the solids control system. Response measures will vary based on the location of the inadvertent release as discussed below.

Upland and Terrestrial Locations

When drilling fluid returns are observed to be continuously surfacing above ground at an accessible upland location, the following procedure will be followed:

- Immediately cease pumping drilling fluid
- Notify on-site contractor supervisor and Owner representative as required by the communication plan
- Contain the location such that the drilling fluid cannot migrate across the ground surface
- Excavate a small sump at the location and provide a means for the fluid to be returned to either the drilling fluid system or a disposal site (i.e., pump through hose or into tanker)
- Continue drilling operations after Owner representative approval
- Maintain the integrity of the containment measures, and monitor the fluid returns as required to ensure that no additional surface migration occurs
- Carry out clean-up once inadvertent returns are contained/controlled

Wetland and Waterbody Locations

When drilling fluid returns are observed to be continuously surfacing above ground at an inaccessible location (i.e., wetlands or waterbodies), the following procedure will be followed:

- Immediately cease pumping drilling fluid

- Notify on-site contractor supervisor and Owner representative as required by the communication plan
- Evaluate the release and implement appropriate containment measures
- Evaluate the recovery measures to determine the most effective collection method
- Ensure that all reasonable measures within the limitations of the technology have been taken to reestablish drilling fluid circulation
- Upon approval from Owner representative, continue drilling with the minimum amount of drilling fluid required to penetrate the formation and successfully install the product line
- Maintain the integrity of the containment measures and monitor the fluid returns as required to ensure that no additional surface migration occurs
- Carry out clean-up once inadvertent returns are contained/controlled
- Consult with Owner and regulatory agencies to evaluate the circumstances of the release, discuss additional containment or cleanup requirements, and determine whether and under what conditions drilling may proceed

Clean-up

The following clean-up measures are to be considered as appropriate:

- Drilling fluid will be cleaned up by hand using shovels, buckets, and soft-bristled brooms as possible without causing extensive damage to existing vegetation
- Containment structures will be pumped out and the ground surface scraped to bare topsoil without causing undue loss of topsoil or damage to existing and adjacent vegetation
- Material will be collected in containers for temporary storage prior to removal from the site

Following clean-up activities, restoration of affected areas will be completed in accordance with all applicable local, state, and federal permits in addition to project environmental requirements.

Communication

Site Specific contacts are as follows:

Contacts	Phone No.	Affiliation
Drilling Contractor *On-Site Representative* TBD Project Manager		***Michels Trenchless Inc.***
Drilling Contractor *On-Site Representative* TBD Drill Superintendent-HDD RIG#1		***Michels Trenchless Inc.***
Drilling Contractor *On-Site Representative* TBD Drill Superintendent-HDD RIG#2 (If Needed)		***Michels Trenchless Inc.***
Drilling Contractor *Off-Site Representative* TBD Assist. Operations Manager		***Michels Trenchless Inc.***

In case of emergency, MTI will notify the on-site inspector who will refer to the communication plan. The representative chain of communication is as follows:

Contacts	Phone No.	Affiliation
After Hours Contact		

The Owner's Field Representative will contact the following Organizations as needed:

Contacts	Phone No.	Affiliation

IV. SITE SPECIFIC RESPONSE

Site Access and HDD Monitoring

The 30-inch Bad River crossing is located near pipeline milepost 24, roughly 20 miles south southeast of Ashland, Wisconsin and on the northern edge of Mellen, Wisconsin. It involves passing beneath a set of CN Railroad tracks, the Bad River, multiple wetlands, and Copper Falls Drive. The river has a width of approximately 70 feet from bank to bank at the crossing location and a typical depth of less than 5 feet when the survey was performed. The proposed HDD alignment will be established in a new right-of-way running west to east. The river, environmentally sensitive area, and most of the wetlands are within what look to be the Bad River flood plain, beyond which the elevation rises steadily when moving out from each proposed end point.

West of the railroad is densely treed while cultivated fields lie east of the prominent wetlands. For additional details relative to site access locations, the project alignment sheets should be consulted. Prior to commencing drilling operations vegetation will be cleared within proposed workspace, during which time construction matting could be placed in the wetlands along the drill path to support monitoring for, and response to, any potential inadvertent releases. Drill path monitoring will follow the measures described in the “Prevention” section of this plan.

Inadvertent Release Response and Clean-up

Initial response to an upland or wetland inadvertent release on the Bad River Crossing will follow procedures outlined in the “Containment” section of this plan. Low ground pressure equipment will conduct limited passes to assist personnel carrying containment materials to a release location if necessary.

If a release were to occur outside of the proposed workspace shown on the plan and profile drawing, MTI would mobilize lightweight containment materials (e.g. hay bales, silt fence, sand bags) on foot to the inadvertent return location to isolate the surficial drilling fluid immediately. Response to an inadvertent release within the Bad River would include placement of a turbidity curtain to isolate and envelop the released drilling fluid against the nearest bank of the river, as feasible. The turbidity curtain placement and drilling fluid recovery efforts are dependent on the water depth and bed features at the time and location of the release. As mentioned above, the average width of the river is approximately 70 feet and the average depth is less than 5 feet, therefore, multiple sections of turbidity curtains may be required. Once drilling fluid has been contained, a determination will be made as to the necessity for additional equipment or alternate access locations. Should an inadvertent drilling fluid return occur, drilling operations will only resume after receiving approval from Enbridge.

ATTACHMENT

WISCONSIN DEPARTMENT OF NATURAL RESOURCES APPROVED HORIZONTAL DIRECTIONAL DRILLING PRODUCTS LIST

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Wisconsin Department of Natural Resources Approved Horizontal Directional Drilling Products List

Note: This list is intended to supplement the Approved Drilling and Filling Sealing Products List including Heat Exchange Drillhole Products List and the National Sanitation Foundation (NSF) Drinking Water Treatment Chemicals NSF/ANSI/CAN 60-Health Effects List . Products on both lists are approved for use in Horizontal Directional Drilling in addition to the products listed below.

Wisconsin Pre-Approved HDD Drilling Fluid Products:

Approval Date	Manufacturer or Distributor	Product Name	Material(s)	Uses	Special Conditions
6/20/22	Baroid Fluid Services/Haliburton	Polyselect Power Swell	Proprietary ingredients	Lost circulation material	
6/20/22	Bentonite Performance Materials/Halliburton	Polyselect Power Xan	Xanthan gum	Viscosifier	
6/20/22	Cetco	Drill-terge	Non-ionic surfactant	Drilling detergent/wetting agent	
6/20/22	Cetco	Rel-Pac Xtra-low	Polyanionic cellulose	Filtration control	
6/20/22	Cetco	Suspend-IT	Polysaccharid gum	Cutting transport	
6/20/22	DCS Fluid Solutions	Clay Breaker	Quaternary Ammonium Compound	Clay Stabilizer	Requires project-specific pre-approval
6/20/22	DCS Fluid Solutions	Polymud	Mineral Oil	Viscosofier	Requires project-specific pre-approval
6/20/22	DCS Fluid Solutions	Sandmaster	Xanthan gum	Viscosofier	
6/20/22	DCS Fluid Solutions	SealPac HV	Polysaccharide	Fluid Loss Reduction	
6/20/22	DCS Fluid Solutions	TorqBreaker	Quaternary Ammonium Alkyl dimethyl ammonium chloride Ethanolamine	Surfactant	Requires project-specific pre-approval
6/20/22	Halliburton Energy Services	Polyselect DMD Soda Ash	sodium carbonate	Buffer	
6/20/22	Lost Circulation Specialists, Inc.	Magna Fiber	Mineral fiber	Lost circulation material	
10/20/22	Northstar Fluid Solutions	Lubra-Star Plus	Proprietary, derived from oleo chemicals	Water soluble lubricant	Use product purchased after 10/15/22

Wisconsin Department of Natural Resources Approved Horizontal Directional Drilling Products List

Approval Date	Manufacturer or Distributor	Product Name	Material(s)	Uses	Special Conditions
6/20/22	Northstar Fluid Solutions	Star-Plex	Poly Hydroxy Silicate, Proprietary Mg, Na, Al compounds	Viscosofier	

Last Update 10/20/2022

For review of products not on the pre-approved list, please submit the material safety data sheet and product sheets used for marketing to Samantha Whitens, Office of Energy Storm Water Engineer or Amy Minser, Statewide Storm Water Engineer. The safety data sheet or supplementary material must disclose the presence of any ingredients listed on Table 1 in s. NR 140.10, Wis. Adm. Code and Chemical List | Wisconsin Department of Health Services. Section NR 283.55, Wis. Adm. Code allows the department to handle trade secrets as confidential information. If information is considered a trade secret, confidential information should be provided in a separate document, clearly marked as confidential, and a request for confidentially should be provided as required in s. NR 2.19, Wis. Adm. Code. Disclosure of the information to the Wisconsin Department of Health Toxicologist may be required as part of the Department of Natural Resources review process.

ATTACHMENT

EQUIPMENT AND CONTAINMENT SITE LAYOUT

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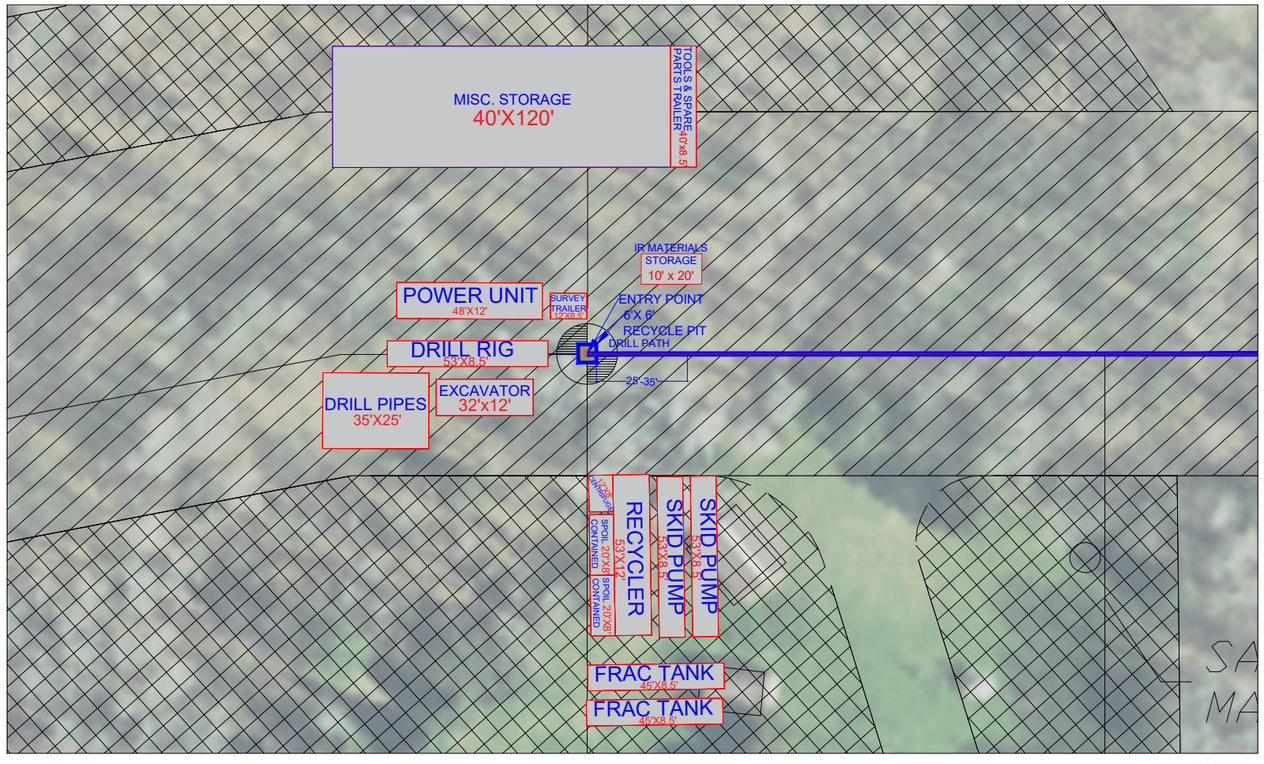
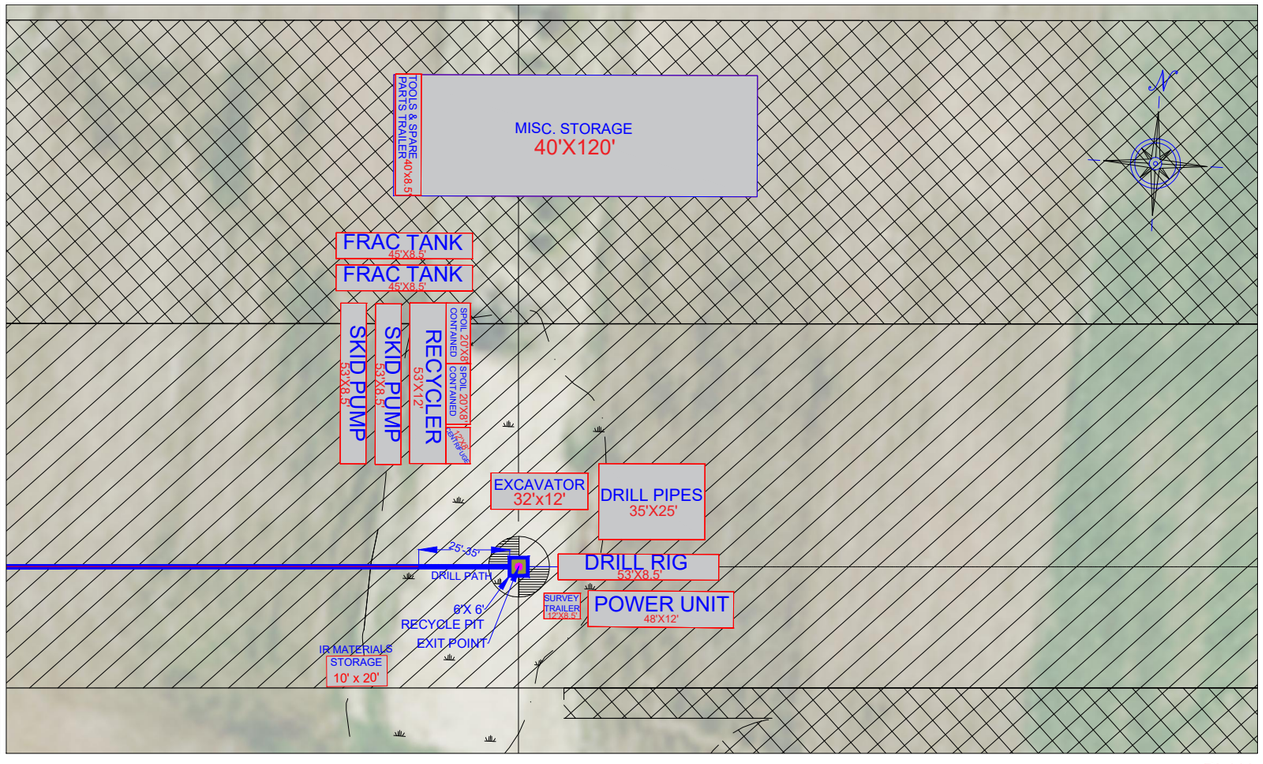


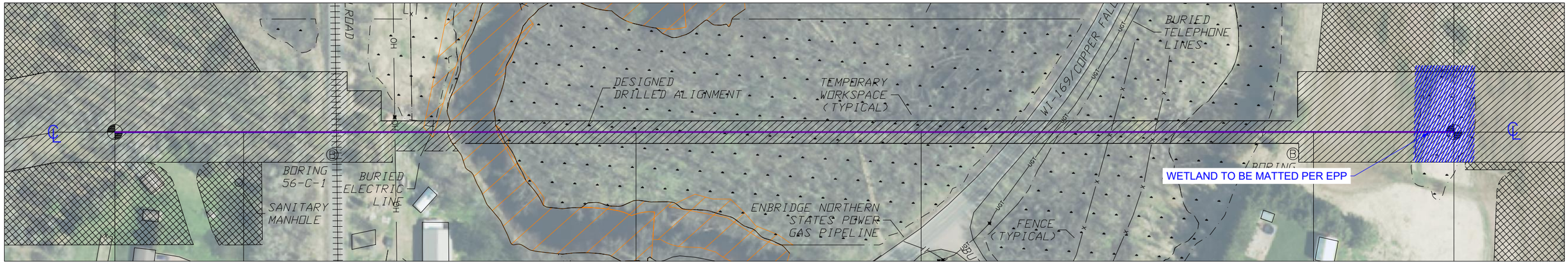
PLAN

SCALE: 1"=50'



PLAN

SCALE: 1"=50'



OVERALL PLAN VIEW

SCALE: 1" = 125'

CONSTRUCTION NOTES:

1. EROSION CONTROL MEASURES TO BE IMPLEMENTED IN ACCORDANCE WITH EPP.
2. IN THE EVENT OF INADVERTENT RETURNS, CONSTRUCTION EFFORTS SHALL CEASE UNTIL PERMITTED BY ENBRIDGE.

NOTES

1. PRELIMINARY DESIGNED DRAWING MAY BE MODIFIED IN FIELD BASED ON CONDITIONS ENCOUNTERED.
2. FIELD VERIFICATION OF STATIONS AND ELEVATIONS REQUIRED.
3. PLACEMENT OF DRILL RIG(S) IS NOT FIXED BY DESIGNATED ENTRY AND EXIT POINTS. MICHELS RESERVES THE RIGHT TO DETERMINE PLACEMENT OF DRILL RIG AND/OR NEED FOR DUAL RIGS (1-RIG AT ENTRY AND 1-RIG AT EXIT) FOR OVERALL SAFETY AND CONSTRUCTABILITY OF PROPOSED HDD CROSSING.
4. DRAWING IS PROPRIETARY TO MICHELS CORPORATION. ANY UNAUTHORIZED USE OF DUPLICATION IS STRICTLY PROHIBITED. RECEIPT OF THIS DRAWING SIGNIFIES ACCEPTANCE OF SAID CONDITIONS.

PRELIMINARY DRAWING

REVISIONS

NO.	DATE	REVISION DESCRIPTION	SOURCE DRAWING
A			
B			
C			
D			
E			
F			

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PHONE 920-583-3132 FAX 920-583-3133

DIRECTIONAL BORE FOR:
ENBRIDGE

PROJECT:
LINE 5 PIPELINE PROJECT

DRAWING:
CONCEPTUAL WORKSPACE DESIGN DRAWING

CROSSING REFERENCE:
MP24 - BAD RIVER HDD

PRODUCT PIPES SIZE (INCHES): 30"

LOCATION: ASHLAND COUNTY, WISCONSIN

DRAWN BY: C.L.G. JOB NUMBER: XXXXXXX

DATE: 11/18/22