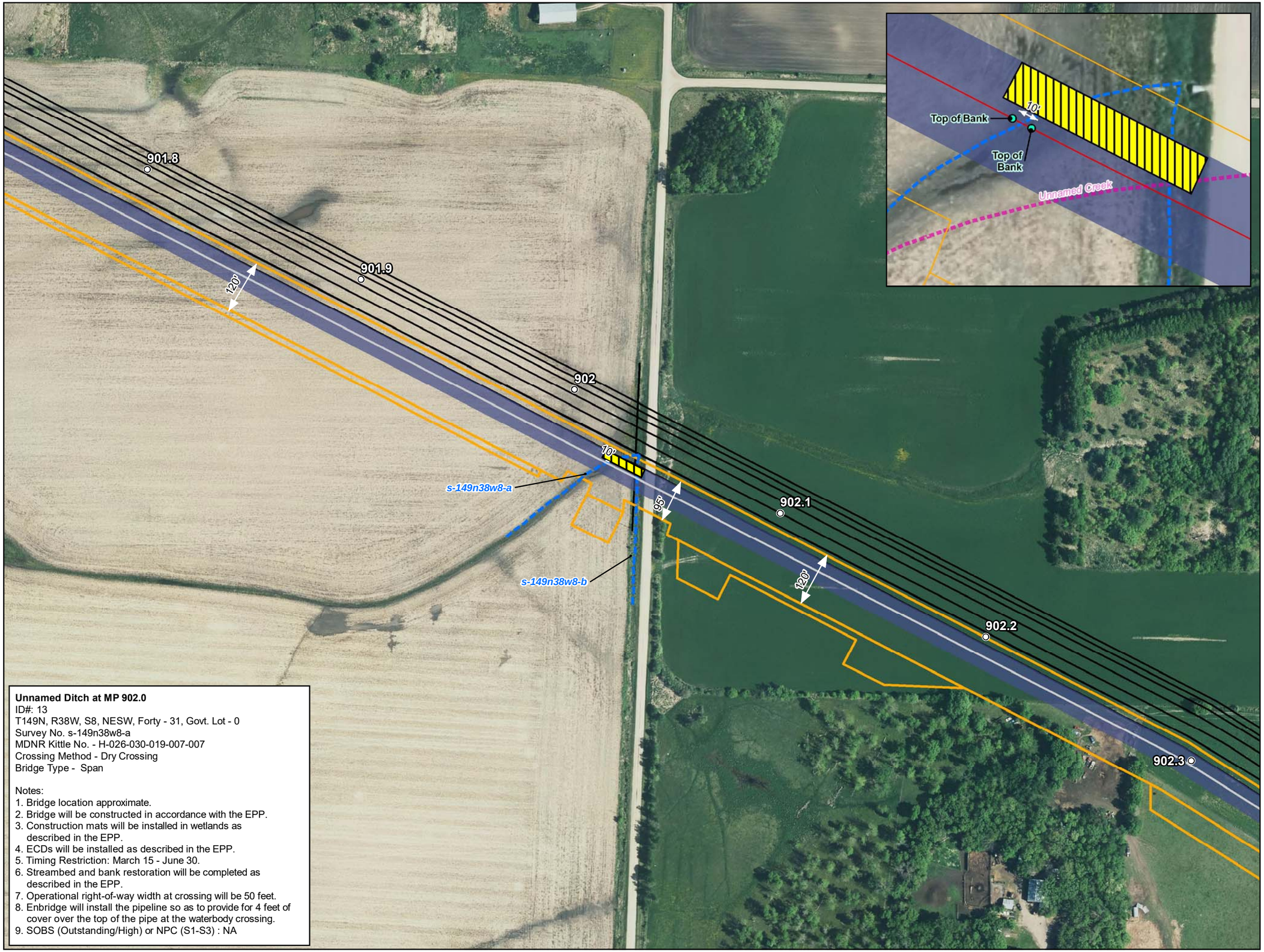
MDNR ID No. 13: MP 902; Unnamed Ditch (H-026-030-019-007-007)



Unnamed Ditch at MP 902.0
ID#: 13
T149N, R38W, S8, NESW, Forty - 31, Govt. Lot - 0
Survey No. s-149n38w8-a
MDNR Kittle No. - H-026-030-019-007-007
Crossing Method - Dry Crossing
Bridge Type - Span

Notes:
1. Bridge location approximate.
2. Bridge will be constructed in accordance with the EPP.
3. Construction mats will be installed in wetlands as described in the EPP.
4. ECDs will be installed as described in the EPP.
5. Timing Restriction: March 15 - June 30.
6. Streambed and bank restoration will be completed as described in the EPP.
7. Operational right-of-way width at crossing will be 50 feet.
8. Enbridge will install the pipeline so as to provide for 4 feet of cover over the top of the pipe at the waterbody crossing.
9. SOBS (Outstanding/High) or NPC (S1-S3) : NA

0 100 200 Feet
1 inch = 200 feet

N W E S

- Milepost
- Proposed L3R Centerline
- Existing Utility
- Existing Utility
- Permanent Right-of-Way
- Construction Right-of-Way/ATWS
- Bridge
- Field Delineated Waterbody

Line 3 Replacement Project

Crossing Plan

ID# 13
Survey No. s-149n38w8-a

Unnamed Ditch

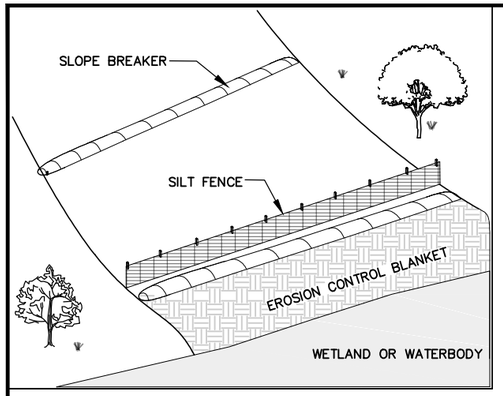
Clearwater County, Minnesota

ENBRIDGE

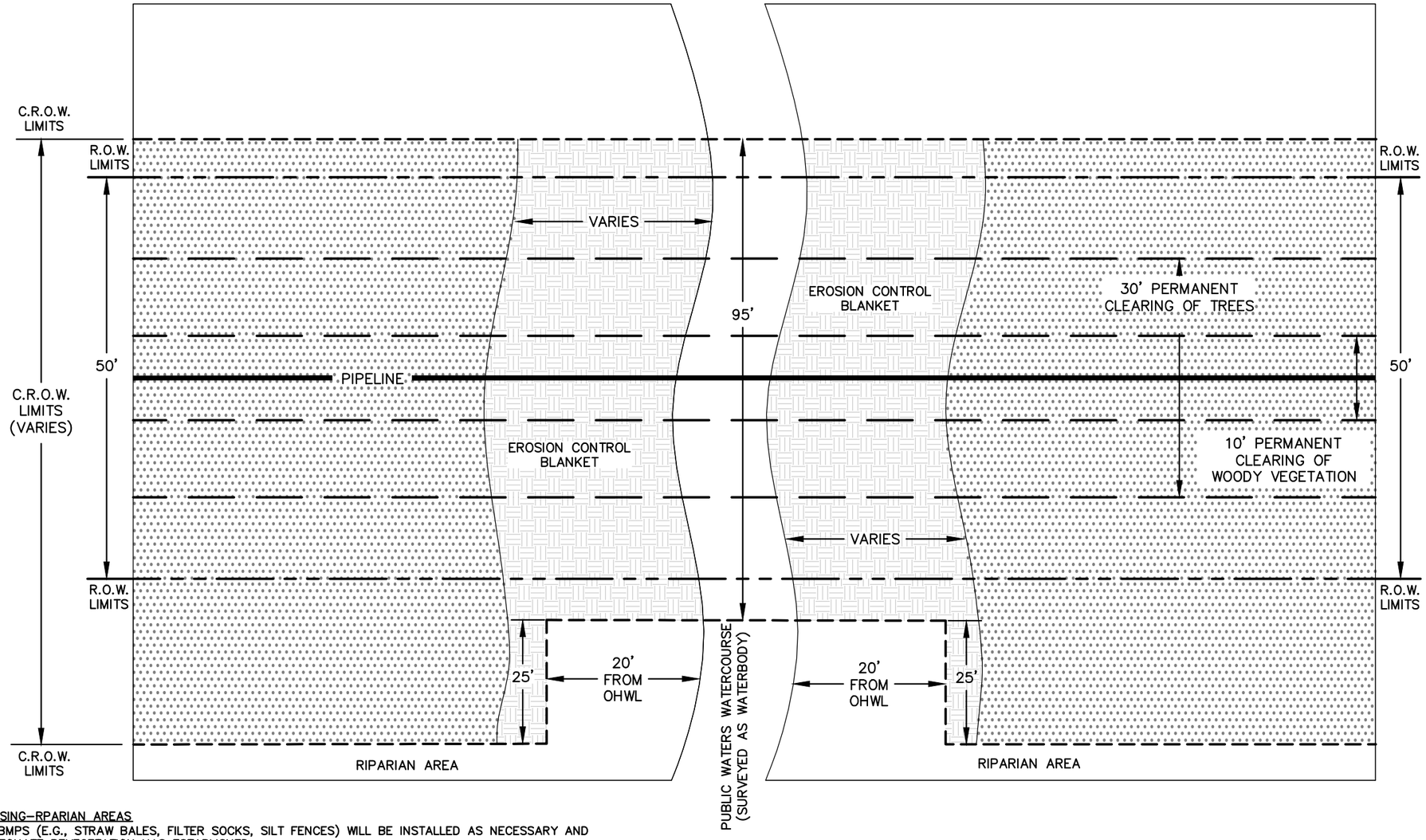
October 2020

For Environmental Review Purposes Only

Source: Z:\Clients\E_H\Enbridge\Line_3_Full_Replacement\Permitting\State\Public_Waters\2020_09\Figures\L3R_Waters_App_Dry_Crossing_Mod_Dry_2020_09.mxd
Date: (10/7/2020)



SEEDING AREA



PUBLIC WATERS WATERCOURSE (SURVEYED AS WATERBODY) CROSSING–RPARIAN AREAS

1) PRIOR TO DISTURBANCE, EROSION AND SEDIMENT CONTROL BMPS (E.G., STRAW BALES, FILTER SOCKS, SILT FENCES) WILL BE INSTALLED AS NECESSARY AND WILL REMAIN IN PLACE UNTIL THE AREA HAS STABILIZED AND ADEQUATE REVEGETATION HAS ESTABLISHED.

2) ENBRIDGE WILL RESTORE THE BANKS AS NEAR AS PRACTICABLE TO PRE–CONSTRUCTION CONDITIONS UNLESS THE SLOPE IS DETERMINED BY TO BE UNSTABLE. WHERE THE SLOPE OF THE BANKS IS DETERMINED TO BE UNSTABLE OR HAS THE POTENTIAL TO ERODE OR FAIL, THE BANKS WILL BE RESHAPED TO TRANSITION THE DISTURBED AREAS INTO THE NATURAL STREAM BANK WITH THE INTENT TO STABILIZE THE BANK AND CREATE A BLENDED, NATURAL APPEARANCE.

3) SOIL STABILIZATION WILL BE INITIATED WITHIN 24 HOURS AFTER INSTALLATION OF THE CROSSING USING THE OPEN CUT TRENCH METHOD AND PRIOR TO RESTORING FLOW USING THE DAM AND PUMP OR FLUME METHOD, UNLESS SITE AND PERMIT CONDITIONS DELAY PERMANENT INSTALLATION.

4) PERMANENT SLOPE BREAKERS WILL BE INSTALLED AT THE BASE OF SLOPED APPROACHES TO PREVENT SEDIMENT FLOW INTO WATERBODIES AS DESCRIBED IN THE EPP (FIGURE 20):

a. PERMANENT SLOPE BREAKERS WILL BE INSTALLED TO MINIMIZE CONCENTRATED OR SHEET FLOW RUNOFF IN DISTURBED AREAS IN ACCORDANCE WITH THE FOLLOWING MAXIMUM ALLOWABLE SPACING UNLESS OTHERWISE SPECIFIED IN PERMIT CONDITIONS.

i.

SLOPE (%)	APPROXIMATE SPACING (FT)
1. <5	250
2. >5–15	200
3. 15–25	150
4 >25	<100

5) WATERBODY BANKS WILL BE SEEDED WITH AN APPROPRIATE SEED MIX AS SPECIFIED IN THE EPP (SECTION 7.8) AND COVERED WITH AN EROSION CONTROL BLANKET.

6) WHERE A WATERBODY IS LOCATED WITHIN A WETLAND, ENBRIDGE WILL RE–SEED THE BANKS WITH THE APPLICABLE WETLAND SEED MIX DESCRIBED IN THE EPP (SECTION 7.7).

7) ADDITIONAL VEGETATION REQUIREMENTS MAY ALSO BE CONTAINED WITHIN PROJECT–SPECIFIC PERMITS

ISSUED FOR PERMIT 12/13/19

NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMIT	AJM	12/13/19	KEH	KD
A	ISSUED FOR REVIEW	AJM	12/10/19	KEH	KD

DWN. BY: AJM — DATE: 12/10/19
CHK. KEH
PROJ. ENGR. DG
PROJ. MGR. KD
CLIENT APP.

ENBRIDGE

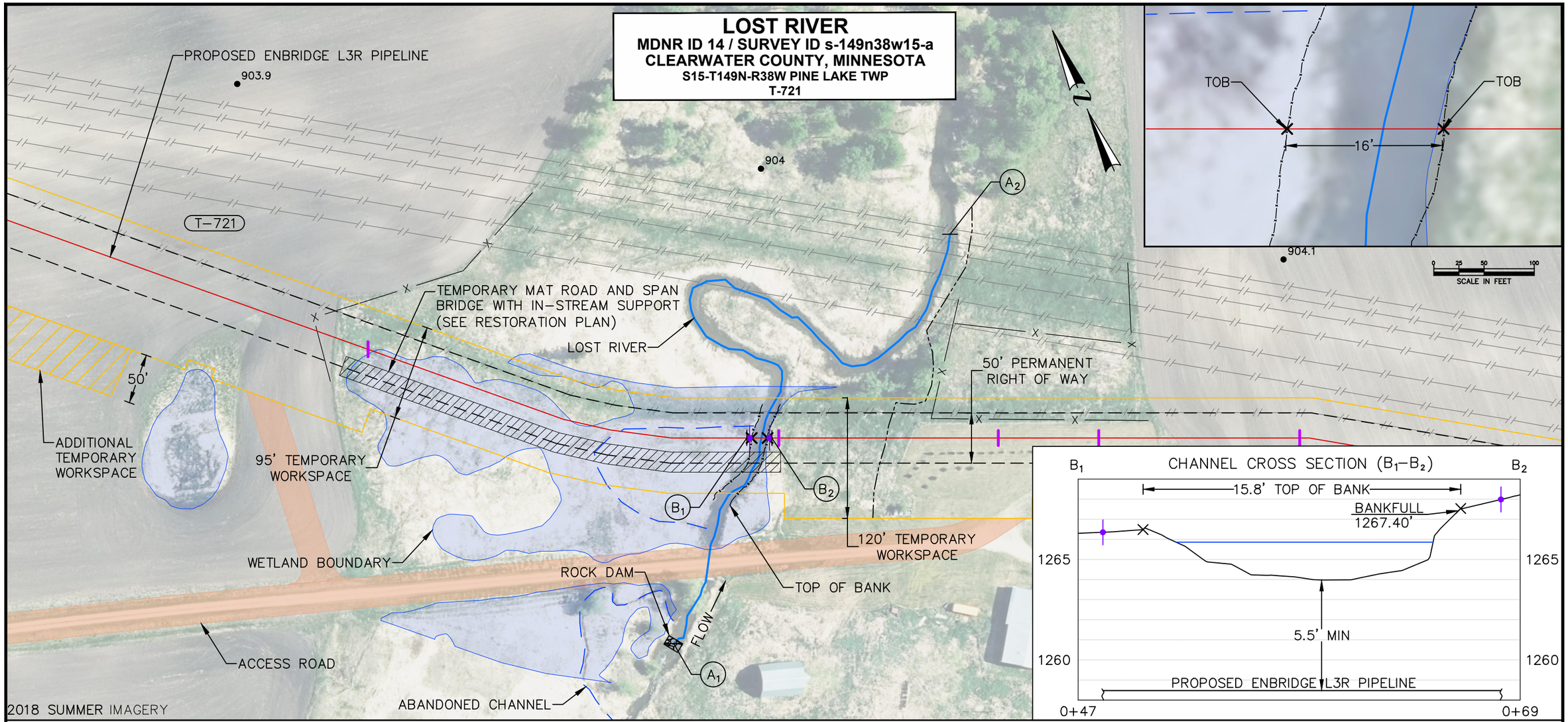
LINE 3 REPLACEMENT
PUBLIC WATERS WATERCOURSE (SURVEYED AS WATERBODY) CROSSING TYPICAL FINAL STREAM BANK STABILIZATION & EROSION CONTROL

SCALE: NTS — DWG. NO.

MDNR ID No. 14: MP 904; Lost River (H-026-030-019-007)

LOST RIVER

MDNR ID 14 / SURVEY ID s-149n38w15-a
CLEARWATER COUNTY, MINNESOTA
S15-T149N-R38W PINE LAKE TWP
T-721

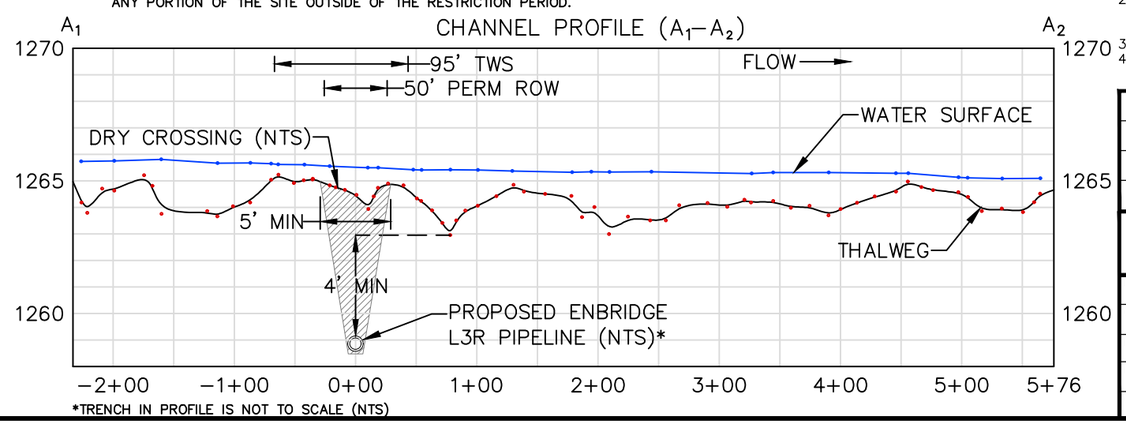


NOTES
1. NO FEMA DIGITAL FLOODPLAIN DATA AVAILABLE
2. SOBS (O/H) OR NPC (S1–3): N/A
3. MDNR REGION 1 PWI – COOL/WARM WATER FISHERY: MARCH 15 – JUNE 30. 24–HOUR SOIL STABILIZATION REQUIRED WITHIN 200 FEET DURING RESTRICTION.
4. WHEN WORKING WITHIN "WORK IN WATER RESTRICTIONS", STABILIZE ALL EXPOSED SOIL AREAS WITHIN 200 FEET OF THE WATER'S EDGE, AND THAT DRAIN TO THAT WATER, WITHIN 24 HOURS. STABILIZATION WILL BE INITIATED IMMEDIATELY AND COMPLETED WITHIN 7 CALENDAR DAYS WHENEVER CONSTRUCTION ACTIVITY HAS PERMANENTLY/ TEMPORARILY CEASED ON ANY PORTION OF THE SITE OUTSIDE OF THE RESTRICTION PERIOD.

LEGEND

- PROPOSED ENBRIDGE L3R PIPELINE
- OTHER PIPELINE
- PERMANENT RIGHT OF WAY
- TEMPORARY WORKSPACE
- WATERBODY (ROSGEN SURVEY – THALWEG)
- FENCE
- TERRACE
- ABANDONED CHANNEL
- TEMPORARY MAT ROAD AND SPAN BRIDGE
- ROCK DAM
- ACCESS ROAD
- WETLAND
- ADDITIONAL TEMPORARY WORKSPACE
- MN–XX–XX–XXX.XXX — TRACT ID
- ROSGEN SURVEY POINT – WATER SURFACE
- ROSGEN SURVEY POINT – RIVER BOTTOM (THALWEG)
- PROPOSED INCREASED DEPTH OF COVER EXTENT
- TOP OF BANK
- TRENCH BREAKER (LOCATIONS ARE APPROXIMATE)

FOR ENVIRONMENTAL REVIEW PURPOSES ONLY



*TRENCH IN PROFILE IS NOT TO SCALE (NTS)

CHANNEL CROSS SECTION NOTE:
1. CHANNEL LOCATIONS, DIMENSIONS, AND/OR ELEVATIONS ARE BASED ON 2020 TOPOGRAPHIC/BATHYMETRIC SURVEY(S), AND AS SUCH DO NOT REFLECT CHANGES TO THE CHANNEL THAT MAY HAVE OCCURRED SINCE THAT TIME.
2. DEPTH OF COVER AT CENTERLINE WAS DEVELOPED USING THE BOTTOM ELEVATION OF THE DEEPEST UPSTREAM OR DOWNSTREAM POOL WITHIN THE SURVEYED REACH, UNLESS OTHERWISE NOTED IN APPLICATION MATERIALS.
3. MEAN MEANDER BELT WIDTH: 216'
4. MEANDER WIDTH RATIO: 9.35

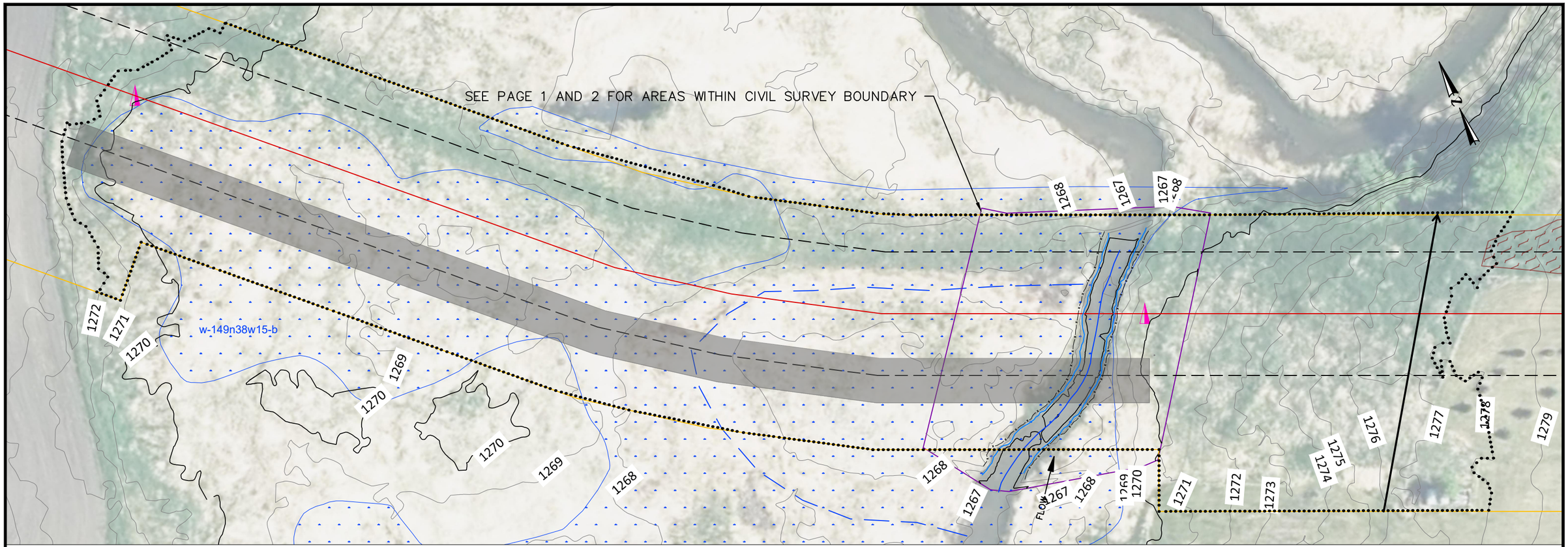
NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
0	ISSUED FOR PERMIT APPLICATION	AJJ	10/2020	BAB	BAB

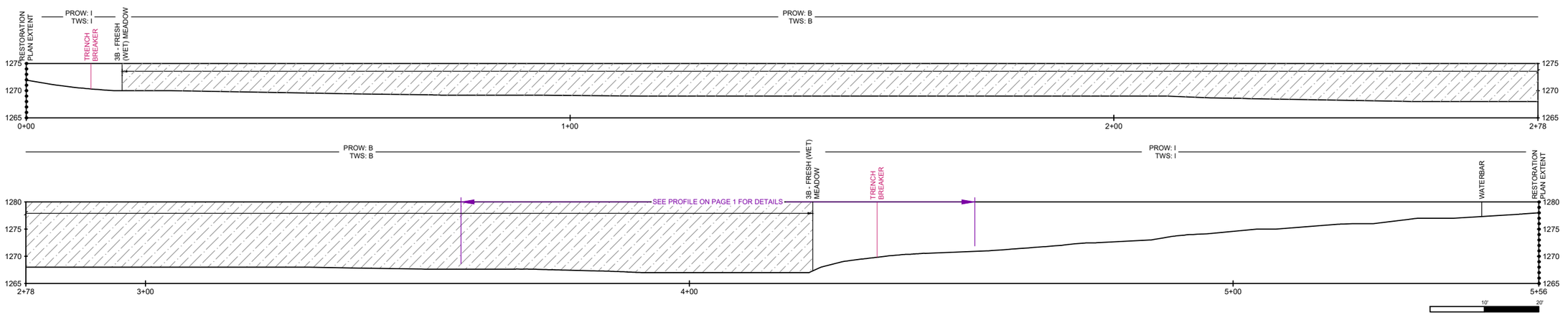
ENBRIDGE

DWN. BY: AJJ	DATE 10/2020
CHK.	
PROJ. ENGR.	
PROJ. MGR.	
CLIENT APP.	

PROPOSED ENBRIDGE L3R PIPELINE
PRIMARY METHOD – DRY CROSSING
CROSSING OF LOST RIVER
ENBRIDGE MP 904.0
CLEARWATER COUNTY, MINNESOTA

SCALE: NOTED
DWG. NO.: B–93–5.84–MDNR–14–0





BWSR SEED MIX	B: RIPARIAN NE (34–361); I: MESIC PRAIRIE NW (35–441)
SOBS (O/H) or NPC (S1-3)	N/A

1. ELEVATIONS OUTSIDE OF THE AREA WITHIN CIVIL SURVEY BOUNDARY ARE DERIVED FROM LIDAR. ENBRIDGE WILL RESTORE THE AREAS ADJACENT TO THE PUBLIC WATER WITHIN THE MDNR EXPANDED RESTORATION BOUNDARY TO PRE–CONSTRUCTION CONDITIONS.
2. MDNR REGION 1 PWI – COOL/WARM WATER FISHERY: MARCH 15 – JUNE 30. 24–HOUR SOIL STABILIZATION REQUIRED WITHIN 200 FEET DURING RESTRICTION.
3. AIR PHOTOS ARE FROM 2018 ENBRIDGE AERIAL PHOTOGRAPHY.
4. ADDITIONAL ON–THE GROUND PHOTOS MAY BE TAKEN PRIOR TO CONSTRUCTION AT MDNR REQUEST.
5. PRE–CONSTRUCTION PHOTOS WILL BE USED TO AID IN RESTORATION.
6. SEE GENERAL NOTES PAGE FOR ADDITIONAL DETAIL.
7. SEE THE PLANTING PLAN FOR ADDITIONAL DETAIL REGARDING SEEDING PRACTICES AND SEED MIXES AT PUBLIC WATER CROSSINGS.
8. ON PUBLIC LANDS AND WHEREVER PRACTICABLE AT WATERBODY CROSSINGS, ENBRIDGE WILL USE WILDLIFE–FRIENDLY EROSION AND SEDIMENT CONTROL BMPS THAT CONTAIN BIODEGRADABLE NETTING (CATEGORY 3N OR 4N NATURAL FIBER) AND WILL AVOID THE USE OF PLASTIC MESH (SECTIONS 1.17.1 AND 2.6.1 OF THE EPP).
9. WHEN WORKING WITHIN "WORK IN WATER RESTRICTIONS", STABILIZE ALL EXPOSED SOIL AREAS WITHIN 200 FEET OF THE WATER'S EDGE, AND THAT DRAIN TO THAT WATER, WITHIN 24 HOURS. STABILIZATION WILL BE INITIATED IMMEDIATELY AND COMPLETED WITHIN 7 CALENDAR DAYS WHENEVER CONSTRUCTION ACTIVITY HAS PERMANENTLY/ TEMPORARILY CEASED ON ANY PORTION OF THE SITE OUTSIDE OF THE RESTRICTION PERIOD.

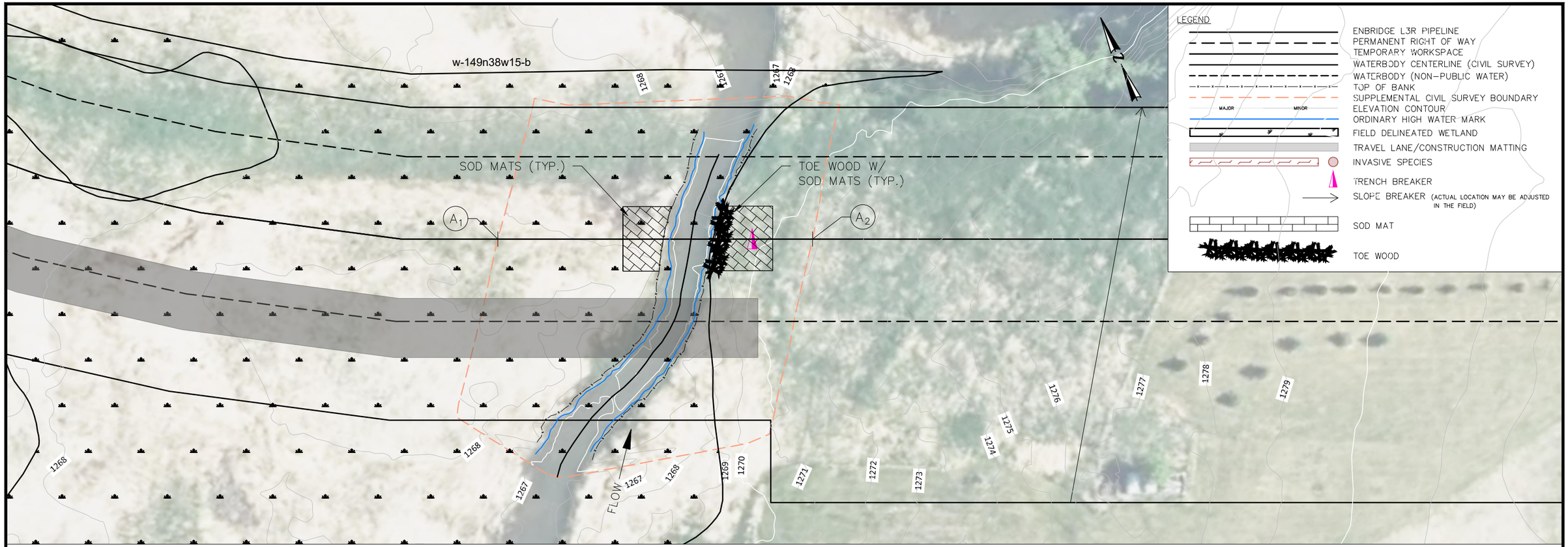
LEGEND

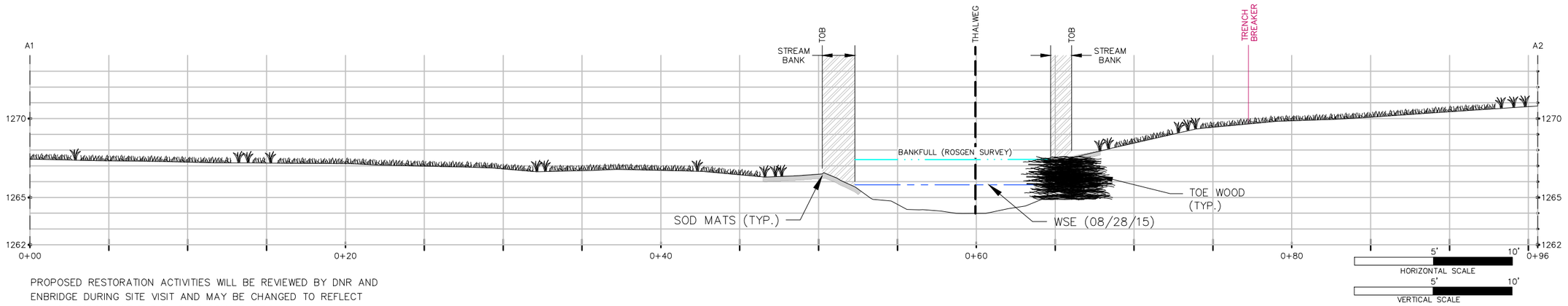
- ENBRIDGE L3R PIPELINE
- PERMANENT RIGHT OF WAY
- TEMPORARY WORKSPACE
- WATERBODY CENTERLINE (CIVIL SURVEY)
- WATERBODY (NON–PUBLIC WATER)
- PUBLIC WATER CIVIL SURVEY BOUNDARY
- MDNR EXPANDED RESTORATION BOUNDARY
- TOP OF BANK
- ELEVATION CONTOUR (MAJOR / MINOR)
- ORDINARY HIGH WATER MARK
- FIELD DELINEATED WETLAND
- TRAVEL LANE/CONSTRUCTION MATTING
- INVASIVE SPECIES
- TRENCH BREAKER
- PERMANENT SLOPE BREAKER (ACTUAL LOCATION MAY BE ADJUSTED IN THE FIELD)
- 1 – SHALLOW, OPEN WATER
- 2B – SHALLOW MARSH
- 3A – SEDGE MEADOW
- 3B – FRESH (WET) MEADOW
- 5A – SHRUB–CARR
- 5B – ALDER THICKET
- 6A – HARDWOOD SWAMP
- 6B – CONIFEROUS SWAMP

NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING	MJT	10/2020		
A	ISSUED FOR REVIEW	MJT	09/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
LOST RIVER– MP 904.0 – MDNR ID 14
RE–VEGETATION PLAN: EXPANDED EXTENT

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP–904.0–001A	1A/5





PROPOSED RESTORATION ACTIVITIES WILL BE REVIEWED BY DNR AND ENBRIDGE DURING SITE VISIT AND MAY BE CHANGED TO REFLECT SITE CONDITIONS AT THE TIME OF CONSTRUCTION.

FEATURE ID	s-149n38w15-a; IFC ID: S-159.0
CROSSING TYPE	DRY CROSSING
PROPOSED RESTORATION (SEE DETAILS FOR LIVE STAKING, TRANSPLANTS, AND SHRUB SPECIES IF APPLICABLE)	SOD MATS; BRUSH - TOE WOOD
WITHIN OR ADJACENT WETLAND	FRESH WET MEADOW
BWSR SEED MIX	RIPARIAN NE (34-361)
DOMINANT WETLAND VEGETATION	1. PHALARIS ARUNDIANCEA
SOBS (O/H) or NPC (S1-3)	N/A

NOTES

1. CONSTRUCTION TIMING RESTRICTIONS
   1.1. MDNR REGION 1 PWI - COOL/WARM WATER FISHERY: MARCH 15 - JUNE 30.
   1.2. WHEN WORK OCCURS WITHIN "WORK IN WATER RESTRICTIONS", ALL EXPOSED SOIL AREAS WITHIN 200 FEET OF THE WATER'S EDGE, AND THAT DRAIN TO THAT WATER, WILL BE STABILIZED WITHIN 24 HOURS DURING THE RESTRICTION PERIOD. STABILIZATION OF ALL EXPOSED SOILS WITHIN 200 FEET OF THE PUBLIC WATER'S EDGE, AND THAT DRAIN TO THAT WATER, WILL BE INITIATED IMMEDIATELY AND COMPLETED WITHIN 7 CALENDAR DAYS WHENEVER CONSTRUCTION ACTIVITY HAS PERMANENTLY OR TEMPORARILY CEASED ON ANY PORTION OF THE SITE OUTSIDE OF THE RESTRICTION PERIOD
2. WORK SHALL BE CONDUCTED IN ACCORDANCE WITH APPLICABLE STANDARDS IN ENBRIDGE'S EPP AND VMP FOR PUBLIC LANDS AND WATERS. THE SPECIFICATIONS WITHIN THIS SSRP MAY MODIFY OR REPLACE THESE STANDARDS.
3. SEE GENERAL NOTES PAGE FOR ADDITIONAL DETAIL.
4. INFORMATION REGARDING SEEDING SPECIFICATIONS, SEED BED PREPARATION TECHNIQUES, ETC. ARE DESCRIBED IN THE PLANTING PLAN CONTAINED WITHIN THE VMP.
5. TRENCH BREAKER LOCATION IS APPROXIMATE PENDING FIELD VERIFICATION (EPP SECTION 1.13)

ENBRIDGE

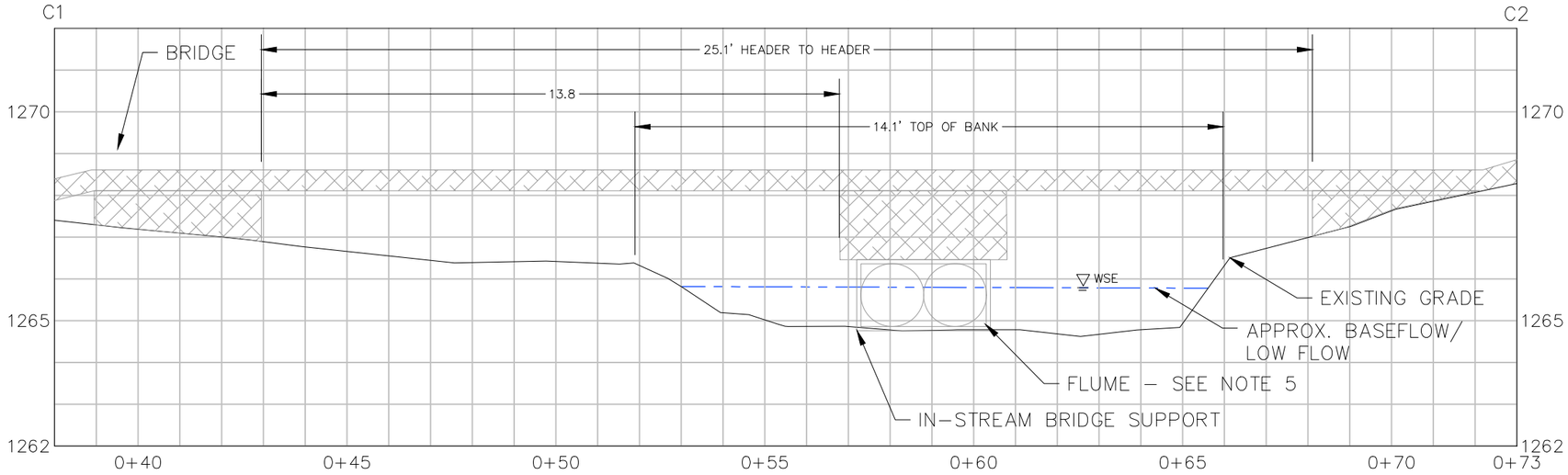
NO.	REVISION-DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

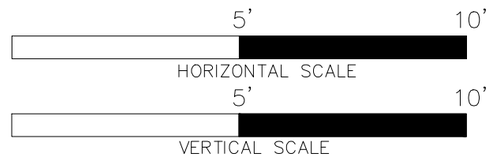
ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE-SPECIFIC RESTORATION PLAN
LOST RIVER- MP 904.0 - MDNR ID 14
RE-VEGETATION PLAN

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP-904.0-001	1/6

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

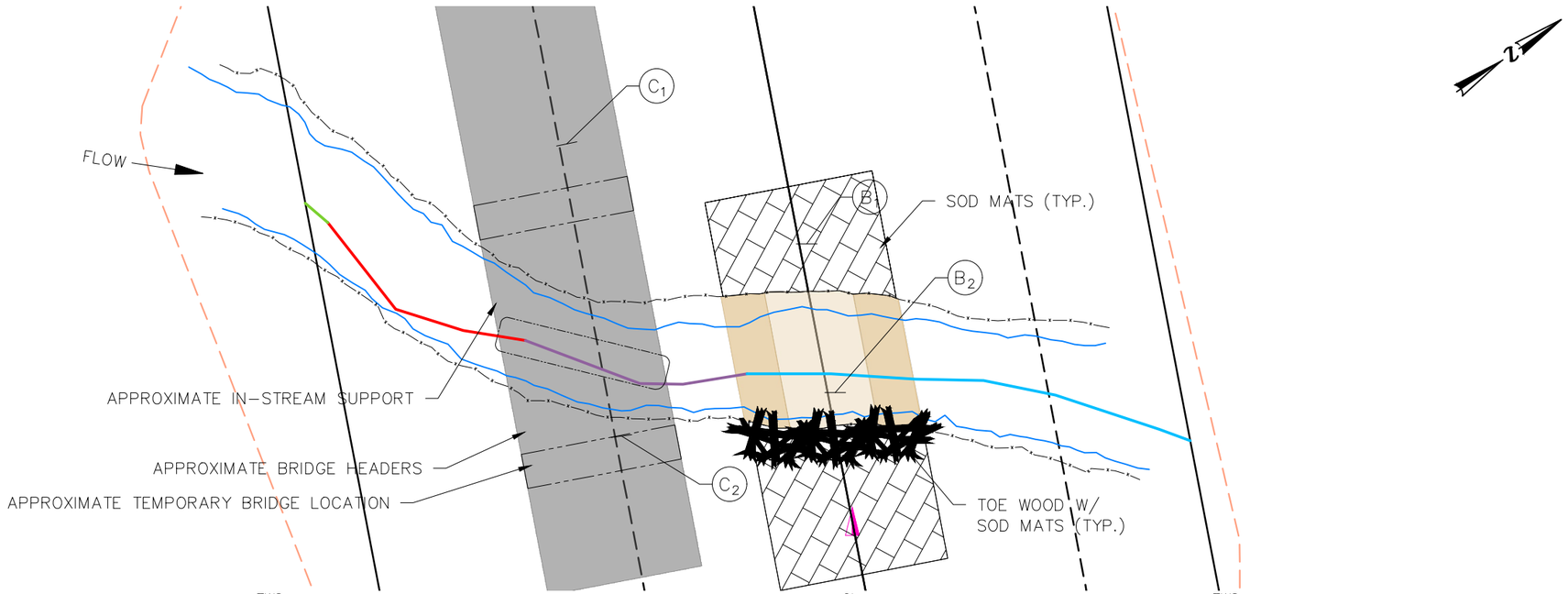
BANK RESTORATION (BRIDGE)

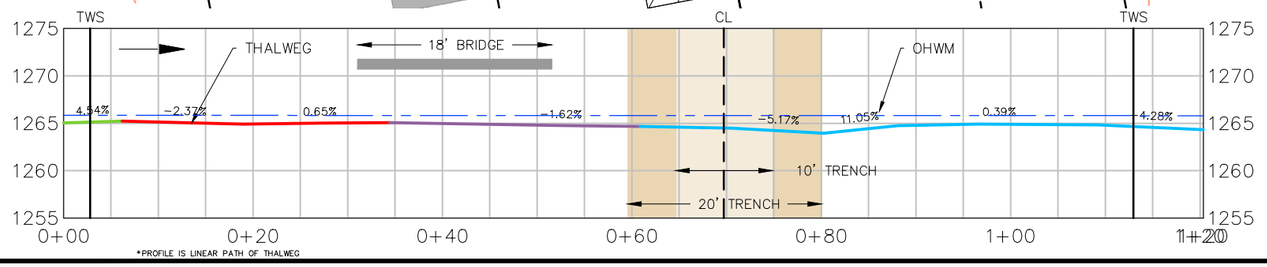




*APPROXIMATE WSE IS PROVIDED FOR CONSTRUCTION RELATED ACTIVITIES.

STREAMBED RESTORATION





NOTES

1. TRANSITIONS BETWEEN EXISTING CHANNEL FEATURES (BED, BANK, FLOODPLAIN) AND PROPOSED RESTORED TRENCH CROSSING WILL BE SMOOTH AND EVENLY GRADED WITHOUT ABRUPT OR PROTRUDING OBSTRUCTIONS.
2. MINIMIZE DISTURBANCE OF BED MATERIALS AND FEATURES DURING CONSTRUCTION OF THE TRENCH AND INSTALLATION AND REMOVAL OF IN–STREAM SUPPORT.
3. BED AND/OR BANK MATERIALS TEMPORARILY ADJUSTED OR REMOVED DURING CONSTRUCTION SHALL BE PLACED IN THE APPROXIMATE ORIGINAL LOCATION DURING RESTORATION. MATERIALS SHALL BE FIELD ADJUSTED DURING PLACEMENT BASE ON THE OBSERVED FLOW PATH AT THE TIME OF CONSTRUCTION.
4. ALIGNMENT OF IN–STREAM SUPPORT SHALL BE FIELD ADJUSTED BASED ON FLOW PATH TO PROTECT CHANNEL BANKS.
5. SEE RESTORATION SHEET FOR B1–B2 CROSS SECTION.

LEGEND

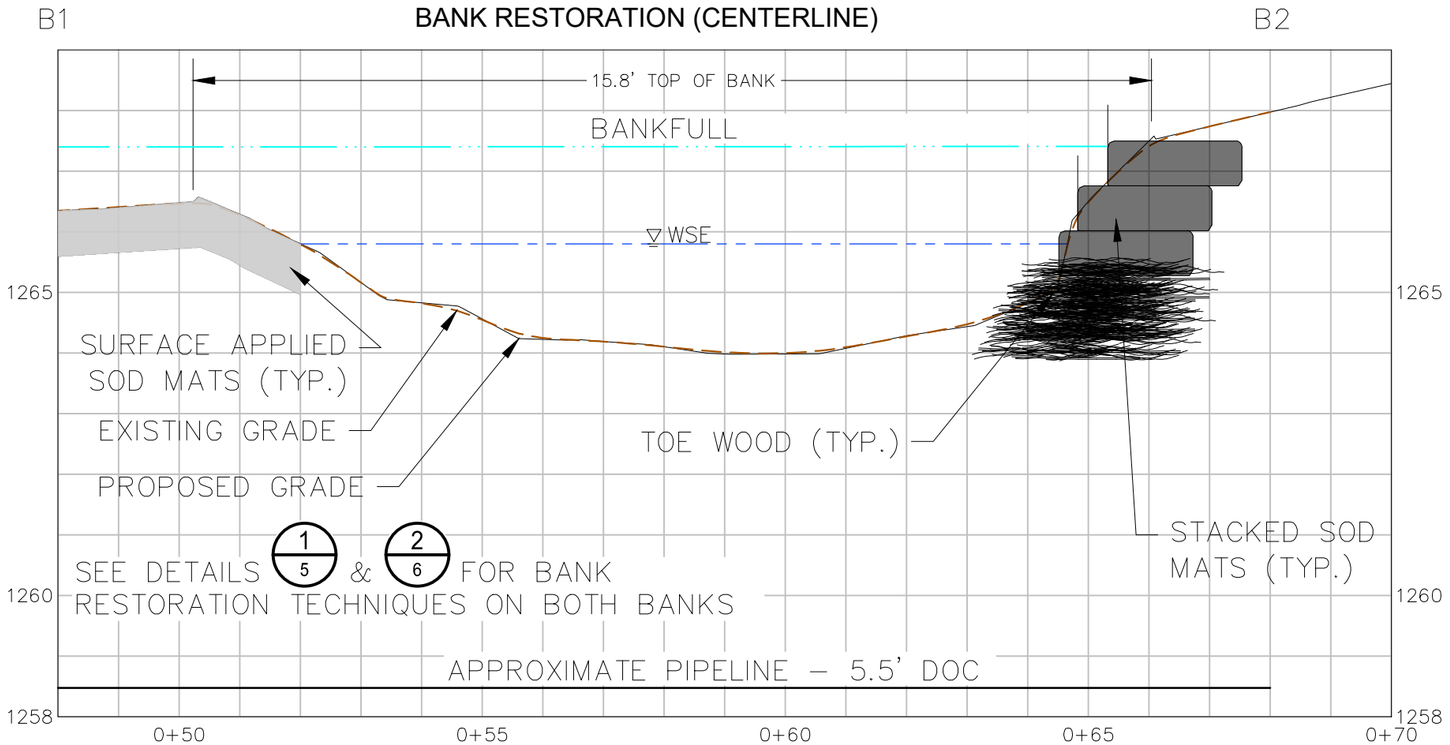
- ENBRIDGE L3R PIPELINE
- PERMANENT RIGHT OF WAY
- TEMPORARY WORKSPACE
- WATERBODY – RIFFLE (ROSGEN SURVEY)
- WATERBODY – POOL (ROSGEN SURVEY)
- WATERBODY – RUN (ROSGEN SURVEY)
- WATERBODY – GLIDE (ROSGEN SURVEY)
- CONTOUR (1' INTERVAL) (MAJOR / MINOR)
- TOP OF BANK
- ORDINARY HIGH WATER MARK
- FIELD DELINEATED WETLAND
- TRAVEL LANE/CONSTRUCTION MATTING
- TRENCH – 10'
- TRENCH – 20'

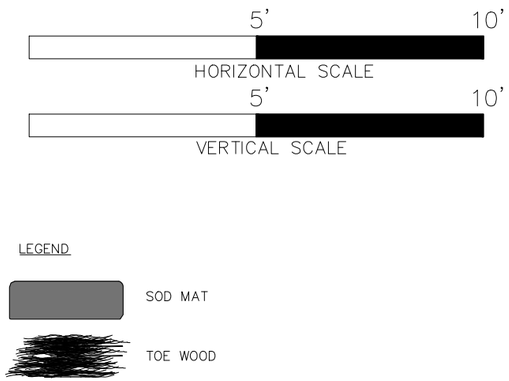
NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
LOST RIVER– MP 904.0 – MDNR ID 14
STABILIZATION PLAN

SCALE	DWG. NO.	PAGE NO.
	SSRP–904.0–002	2/6

PLOTTED SIZE: ANSI FULL BLEED B (17x11)





RESTORATION NOTES:

GENERAL

1. REFER TO RESTORATION DETAIL SHEETS FOR ADDITIONAL INFORMATION RELATED TO PROPOSED RESTORATION MEASURES.
2. REFER TO SITE PHOTOS FOR INFORMATION ON PRE-CONSTRUCTION CROSSING CONDITIONS AND TO PROVIDE ADDITIONAL GUIDANCE FOR RESTORATION EFFORTS.

TOE WOOD

1. ROUGH GRADE CHANNEL BED FEATURES INCLUDING PLACEMENT OF SUBSTRATE.
2. INSTALL FOOTER LOG(S) ALONG PROPOSED TOE OF SLOPE. FOOTER LOGS SHOULD BE ANGLED TO ALLOW FOR TOE ALIGNMENT TO GENERALLY MATCH THE EXISTING CURVE AND EVENLY TRANSITION FROM UPSTREAM TO DOWNSTREAM.
3. PUSH FOOTER LOG INTO SOIL APPLY A SMALL AMOUNT OF GRAVEL OR STONE AS NEEDED TO PREVENT FLOATATION OF FOOTER LOG PRIOR TO PLACING WOODY DEBRIS.
4. PLACE A LAYER WOODY DEBRIS IN 6" TO 8" LIFTS, APPLY 3"-4" GRAVEL AND/OR SOIL FILL AND COMPACT WITH EXCAVATOR BUCKET. WASH FILL MATERIAL INTO WOODY DEBRIS MATRIX WITH WATER FROM CHANNEL. APPLY ADDITIONAL LAYERS "AS NEEDED" TO REACH THE SPECIFIED TOE WOOD HEIGHT.
5. PLACE STACKED SOD MATS ABOVE TOE WOOD. THE USE OF TRANSPLANTS OR FABRIC LIFTS MAY BE FIELD APPROVED BY ENBRIDGE IN CONSULTATION WITH MN DNR.

SOD MATTING

1. REMOVE 15 LINEAR FEET OF VEGETATED MATS ON EITHER SIDE OF THE STREAM CROSSING USING ONSITE EQUIPMENT WHICH CAN UNDERCUT THE VEGETATION FOR REMOVAL. SMALL SHRUBS AND/OR TREES WITHIN THE SOD MATS ARE ACCEPTABLE AND SHOULD NOT BE REMOVED.
2. DEPENDING ON THE LEVEL OF SATURATION AT THE TIME OF REMOVAL, IT MAY BE DIFFICULT TO OBTAIN INTACT CONSOLIDATED MATS, BUT GENERALLY THE NATIVE VEGETATION WILL BE RETAINED AND CAPTURED FOR PLACEMENT.
3. SOD MATS CAN BE TRANSPLANTED DURING ANY SEASON.
4. SOD MAT WILL BE PLACED ON CLEAR GROUND OR MATS WITHIN THE WORKSPACE.
5. MONITOR MATS TO SUPPORT SURVIVABILITY; WATERING MAY BE NEEDED.
6. PRIOR TO PLACEMENT OF SOD MATS FINISH GRADE CHANNEL BANK AND ADJACENT FLOODPLAIN APPLICATION AREA TO PROVIDE A SMOOTH AND EVEN SURFACE. SUBGRADE ELEVATION SHOULD ALLOW FOR THE FINISHED SOD SURFACE TO TRANSITION EVENLY WITH THE CHANNEL BANKS UPSTREAM AND DOWNSTREAM OF THE INSTALLATION AREA. AVOID ABRUPT CHANGES IN GRADE.
7. RETURN THE VEGETATED MATS WILL BE RETURNED/SET IN PLACE WITH ONSITE EQUIPMENT.
    a. SURFACE APPLIED SOD MATTING SHOULD BE PLACED WITH THE LONG SIDE PERPENDICULAR TO THE CHANNEL / FLOW.
    b. STACKED SOD MATTING SHOULD BE PLACED WITH THE LONG SIDE PARALLEL TO THE CHANNEL / FLOW.
8. IF SUFFICIENT SOD IS NOT AVAILABLE FROM THE STREAM BANKS ADDITIONAL SOD MAY BE TAKEN FROM THE ADJACENT CONSTRUCTION WORKSPACE.
9. WHEN PLACING SOD MATS, DO NOT LEAVE LARGE GAPS BETWEEN EACH SOD MAT AS NON-NATIVE VEGETATION WILL QUICKLY ATTEMPT TO COLONIZE THESE VOIDS.
10. 1WATER SOD MATS AFTER REPLACEMENT IF CONDITIONS ARE HOT AND DRY. DAMP AND/OR FROZEN SOD MATS DO NOT REQUIRE WATERING.
11. THE TOP MAT AND/OR OTHER MATS CAN BE ANCHORED WITH A LIVE AND/OR DEAD STOUT STAKE TO ENSURE THAT IT DOES NOT MOBILIZE DURING A FLOOD EVENT BEFORE THE ROOTS HAVE ESTABLISHED.
12. THE VEGETATED MATS WILL BE REPLACED AS SOON AS PRACTICAL FOLLOWING BACKFILLING OF THE TRENCH AND STABILIZED PER THE TIMING REQUIREMENTS DESCRIBED IN SECTION 1.9.1 OF THE EPP.

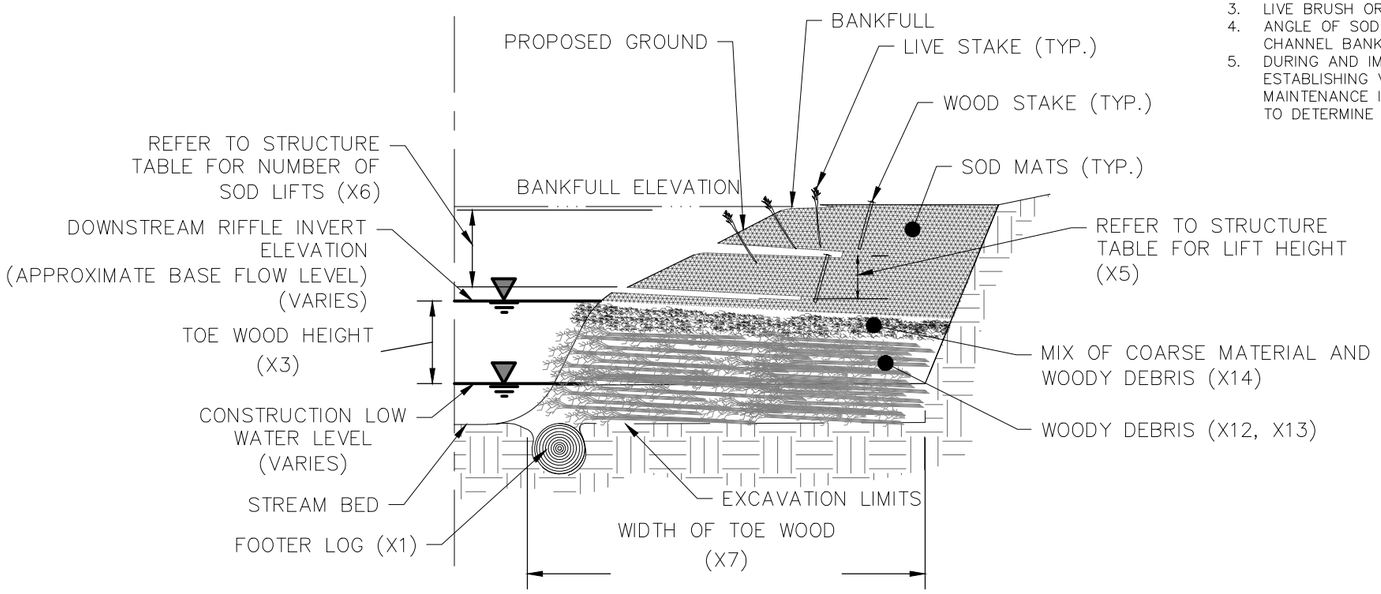
NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
LOST RIVER – MP 904.0 – MDNR ID 14
SITE SPECIFIC DETAILS

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP–904.0–004	3/6

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

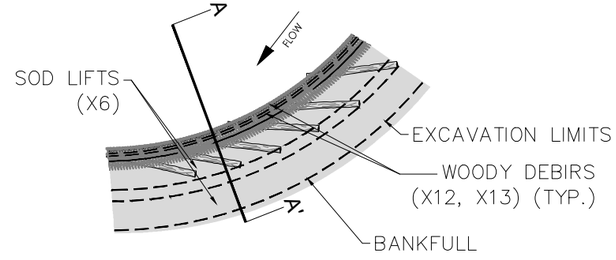
TOE WOOD DIMENSIONS			
VARIABLE	**VALUE**	**TYPICAL UNIT**	**DESCRIPTION**
X1	6.0 - 10.0	IN.	FOOTER LOG DIAMETER
X2	8.0 - 12.0	FT.	FOOTER LOG LENGTH
X3	18.0	IN.	TOE WOOD HEIGHT
X4	SEE SHEET 3	N/A	MATCH TYPICAL SECTION
X5	SEE SHEET 5	FT.	SOD LIFT HEIGHT
X6	3.0	#	SOD LIFTS
X7	8.0 - 10.0	FT.	TOE WOOD WIDTH
X8	3.0 - 6.0	FT.	SOD LIFT WIDTH
X9	24.0	IN.	WOOD STAKE LENGTH
X10	4.0	IN.	WOOD STAKE WIDTH (TOP)
X11	0.5	IN.	WOOD STAKE WIDTH (BOTTOM)
X12	1/2 - 3.0	IN.	WOODY DEBRIS DIAMETER
X13	8.0 - 12.0	FT.	WOODY DEBRIS LENGTH
X14	3" MINING GRAVEL WITH FINES	%	SELECT COARSE MATERIAL BACKFILL (BY VOLUME)



SECTION A-A'

TOE WOOD EXAMPLE

NOTES:
1. WOODY MATERIAL OF APPROPRIATE SIZE CONSISTING OF LOGS, TRUNKS, LIMBS, BRANCHES, AND SMALLER WOODY DEBRIS INCLUDING TOPS OR SLASH. ON-SITE WOODY MATERIAL IS PREFERRED.
2. WOODY DEBRIS SHOULD BE GREEN OR RELATIVELY GREEN AND MAY CONSIST OF HARDWOODS, CONIFERS, OR A COMBINATION OF BOTH.
3. LIVE BRUSH OR OTHER BANK VEGETATION MAY BE INCORPORATED.
4. ANGLE OF SOD MAT SURFACE SHALL MATCH THE PROPOSED CHANNEL CROSS SECTION AND PROVIDE A SMOOTH AND EVEN CHANNEL BANK SURFACE BETWEEN UPSTREAM AND DOWNSTREAM BANKS.
5. DURING AND IMMEDIATELY AFTER CONSTRUCTION, BANK SLOPES ABOVE THE WOOD TOE ARE VULNERABLE TO EROSION. ESTABLISHING VEGETATION OR OTHER COVER MATERIAL AS SOON AS POSSIBLE WILL HELP REDUCE EROSION. ADDITIONAL MAINTENANCE IS NOT EXPECTED ONCE VEGETATION ESTABLISHES. INSPECTION AFTER LARGE FLOW EVENTS MAY BE ADVISABLE TO DETERMINE IF ANY MATERIAL MOVEMENT OR UNEXPECTED SCOUR HAS OCCURRED.



PLAN VIEW AT BANKFULL ELEVATION

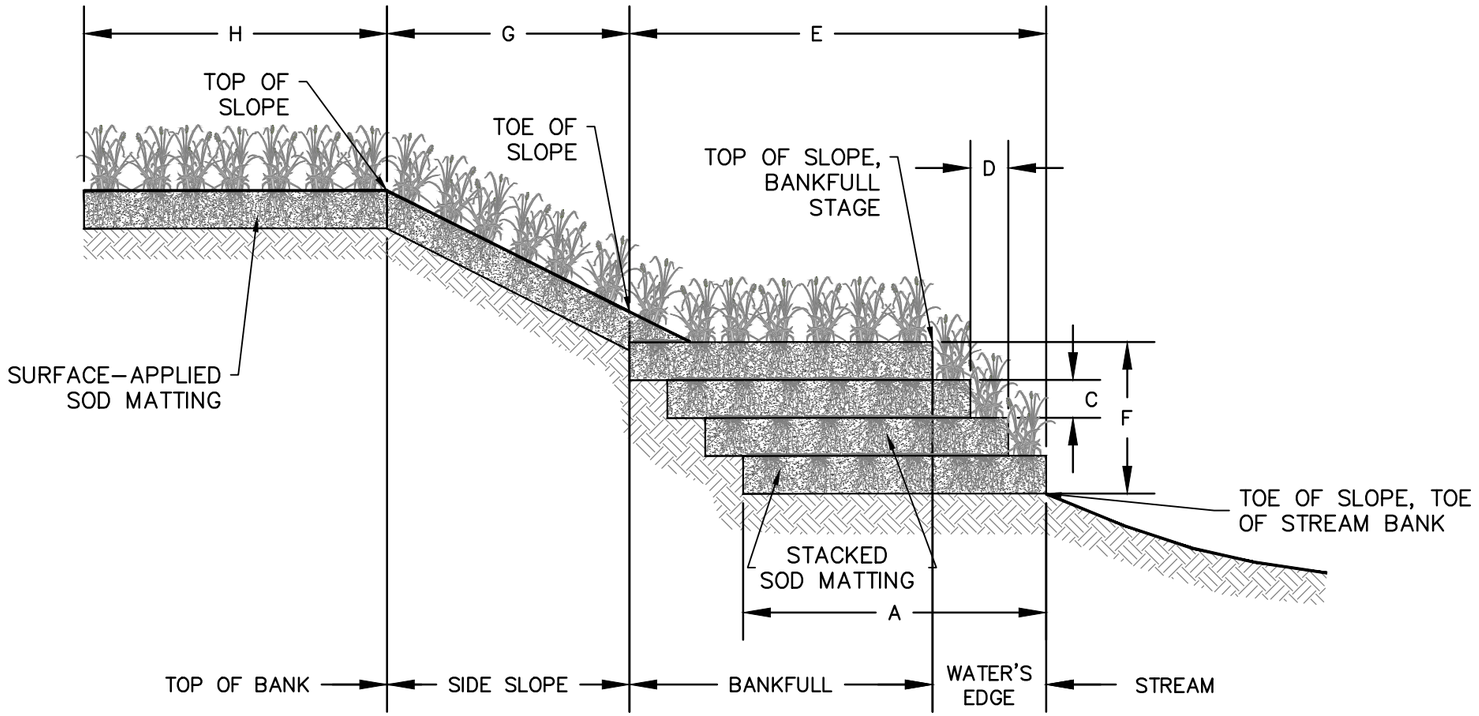
1 TOE WOOD DETAIL

NO.	REVISION-DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

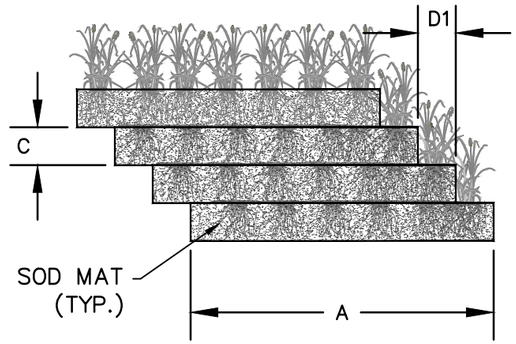
ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE-SPECIFIC RESTORATION PLAN
LOST RIVER - MP 904.0 - MDNR ID 14
SITE SPECIFIC DETAILS

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP-904.0-004	4/6

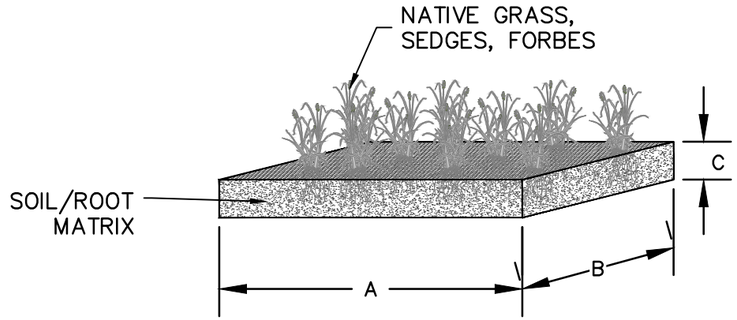
PLOTTED SIZE: ANSI FULL BLEED B (17x11)



CROSS SECTION



STACKED SOD MATTING DETAIL



SOD MAT DETAIL

DIMENSION[1]	NAME	TYPICAL UNIT	VALUE	DESCRIPTION
A	SOD MAT WIDTH	FEET	3–4	WIDTH OF INDIVIDUAL SOD MAT.
B	SOD MAT LENGTH	FEET	3–6	LENGTH OF INDIVIDUAL SOD MAT.
C	SOD MAT THICKNESS	INCHES	9	THICKNESS OF INDIVIDUAL SOD MAT.
D	STACKED SOD MAT SETBACK	INCHES	6+/–	THE DISTANCE BETWEEN THE EDGES OF SOD MATS STACKED TO FORM A SLOPE
E	WIDTH OF STACKED SOD MATS	FEET	10–20	WIDTH OF A BANK CREATED BY STACKED SOD MATS
F	HEIGHT OF STACKED SOD MATS	FEET	3	HEIGHT OF A SLOPE CREATED BY STACKED SOD MATS
G	WIDTH OF SURFACE- APPLIED SOD MATS	FEET	10–20	WIDTH OF A SLOPE STABILIZED WITH SURFACE-APPLIED SOD MATS
H	TOP OF BANK SOD MATTING DISTANCE	FEET	10	DISTANCE SOD MATTING IS INSTALLED ON THE TOP OF BANK

NOTES:

1. DIMENSION LABELS ARE REFERENCED IN THE DETAIL DRAWINGS.

SOD MAT EXAMPLES

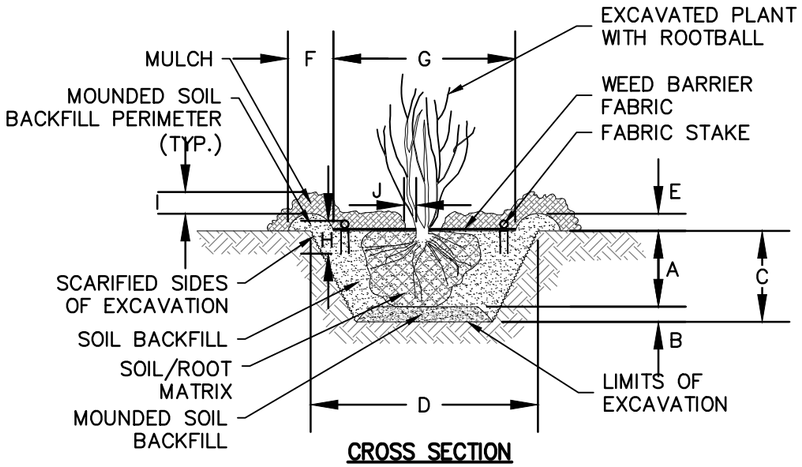
1 SOD MATTING DETAIL

NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
LOST RIVER – MP 904.0 – MDNR ID 14
SITE SPECIFIC DETAILS

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP–904.0–004	5/6

PLOTTED SIZE: ANSI FULL BLEED B (17x11)



CROSS SECTION

DIMENSION[2]	NAME	TYPICAL UNIT	VALUE	DESCRIPTION
A	PLANTING DEPTH	VARIES	N/A	PLANTING DEPTH OF THE TRANSPLANT.
B	HEIGHT OF MOUNDED SOIL BACKFILL	INCHES	N/A	HEIGHT OF MOUNDED LOOSE SOIL PLACED INTO OVER-EXCAVATED PLANTING PIT.
C	DEPTH OF PLANTING PIT	VARIES	N/A	DEPTH OF THE PLANTING PIT; ACCOMMODATES DIMENSION OF SOIL AND EXCAVATED ROOTS AS WELL AS MOUNDED LOOSE SOIL AT BOTTOM OF PIT.
D	WIDTH OF PLANTING PIT	VARIES	N/A	OVER-EXCAVATED WIDTH OF THE PLANTING PIT; ACCOMMODATES THE WIDTH OF THE EXCAVATED SOIL AND ROOTS.
E	HEIGHT OF MOUNDED SOIL PERIMETER	INCHES	N/A	HEIGHT OF SOIL BERM CONSTRUCTED ALONG THE PERIMETER OF THE PLANTING PIT; HELPS RETAIN WATER.
F	WIDTH OF MOUNDED SOIL PERIMETER	INCHES	N/A	WIDTH OF SOIL BERM CONSTRUCTED ALONG THE PERIMETER OF THE PLANTING PIT; HELPS RETAIN WATER.
G	WIDTH OF WEED BARRIER FABRIC (OPTIONAL)	INCHES	N/A	WIDTH OF FABRIC PLACED ON SURFACE TO CONTROL WEEDS WITHIN THE MOUNDED SOIL PERIMETER; TRANSPLANTS TYPICALLY HAVE GRASSES, LEAF MATTER, ETC. ATTACHED AND DO NOT REQUIRE WEED BARRIER FABRIC.
H	FABRIC STAKE LENGTH (OPTIONAL)	INCHES	N/A	LENGTH OF STAPLES/SPIKES USED TO SECURE WEED BARRIER FABRIC
I	THICKNESS OF MULCH (OPTIONAL)	INCHES	N/A	THICKNESS OF MULCH, IF NECESSARY. TRANSPLANTS TYPICALLY HAVE GRASSES, LEAF MATTER, ETC. ATTACHED AND DO NOT REQUIRE MULCH.
J	GAP BETWEEN MULCH AND PLANT STEM/TRUNK (OPTIONAL)	INCHES	N/A	ROOM BETWEEN PLANT STEM/TRUNK AND MULCH. TRANSPLANTS TYPICALLY HAVE GRASSES, LEAF MATTER, ETC. ATTACHED

NOTES:
1. DATA ARE FOR TRANSPLANTED VEGETATION.
2. DIMENSION LABELS ARE REFERENCED IN THE DETAIL DRAWINGS.

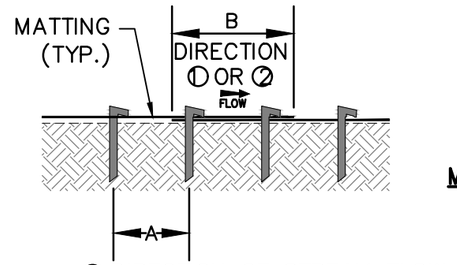
TRANSPLANTS EXAMPLES

1 TRANSPLANTING DETAIL

DIMENSION[2]	NAME	TYPICAL UNIT	VALUE	DESCRIPTION
A	MATTING STAKE SPACING	FEET, INCHES	3 O.C.	SPACING BETWEEN EROSION CONTROL MATTING STAKES USED TO FASTEN THE MATTING TO THE SOIL
B	MATTING OVERLAP	FEET, INCHES	18	AMOUNT OF EROSION CONTROL MATTING OVERLAP IF MULTIPLE PIECES AND/OR ROLLS OF MATTING ARE USED. OVERLAP VARIES DEPENDING ON THE LOCATION OF THE OVERLAP WITH RESPECT TO POSITION ON THE SLOPE, LOCATION OF THE MATTING (EDGE OR END), AND PRODUCT SPECIFICATIONS.
C	MATTING ANCHOR TRENCH DEPTH	FEET, INCHES	6 (MIN)	DEPTH OF TRENCH INTO WHICH EDGE OF EROSION CONTROL MATTING IS ANCHORED AT THE TOP AND/OR TOE OF A SLOPE.
D	MATTING ANCHOR TRENCH WIDTH	FEET, INCHES	12	WIDTH OF TRENCH INTO WHICH EDGE OF EROSION CONTROL MATTING IS ANCHORED AT THE TOP AND/OR TOE OF A SLOPE.
E	TOP OF SLOPE ANCHOR TRENCH SETBACK	FEET, INCHES	12	TOP OF SLOPE ANCHOR TRENCH DISTANCE FROM THE TOP OF SLOPE. TOP OF SLOPE REFERS TO TOP OF SIDE SLOPE, BANK SLOPE, TERRACE SLOPE, BANKFULL, ETC.
F	MATTING STAKE LENGTH	INCHES	12	LENGTH OF EROSION CONTROL MATTING STAKES USED TO FASTEN THE MATTING TO THE SOIL

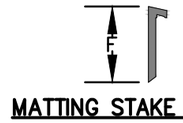
NOTES:
1. DIMENSION LABELS ARE REFERENCED IN THE DETAIL DRAWINGS.
2. O.C. ON CENTER.
3. STAPLES NOT PERMITTED.

2 EROSION CONTROL MATTING DETAIL



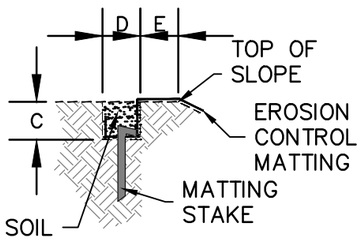
① DIRECTION OF STREAM FLOW
② DIRECTION DOWN THE BANK SLOPE

MATTING OVERLAP DETAIL

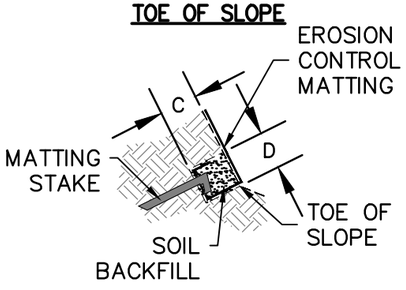


MATTING STAKE DETAIL

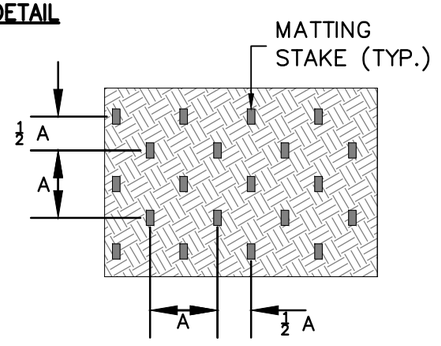
TOP OF SLOPE



TOE OF SLOPE



MATTING ANCHOR DETAIL



MATTING STAKE PATTERN DETAIL

NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
LOST RIVER – MP 904.0 – MDNR ID 14
SITE SPECIFIC DETAILS

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP–904.0–004	6/6

ENBRIDGE

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

1 CENTERLINE – FACING NORTH BANK

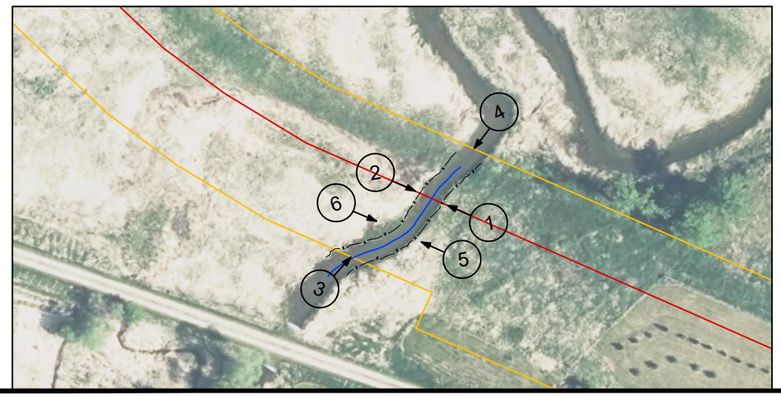
2 CENTERLINE – FACING SOUTH BANK

3 EDGE OF WORKSPACE – FACING DOWNSTREAM

4 EDGE OF WORKSPACE – FACING UPSTREAM

5 BRIDGE – FACING NORTH BANK

6 BRIDGE – FACING SOUTH BANK



NOTES:

1. AIR PHOTOS ARE FROM 2018 ENBRIDGE AERIAL PHOTOGRAPHY.
2. ADDITIONAL ON–THE GROUND PHOTOS MAY BE TAKEN PRIOR TO CONSTRUCTION AT MDNR REQUEST.
3. PRE–CONSTRUCTION PHOTOS WILL BE USED TO AID IN RESTORATION.

NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING	MJT	10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
LOST RIVER – MP 904.0 – MDNR ID 14
PHOTO PAGE

SCALE	DWG. NO.	PAGE NO.
	SSRP–904.0–005	5/5

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

GENERAL

1. THE SPECIFICATIONS WITHIN THIS SSRP MAY MODIFY OR REPLACE PROJECT–WIDE STANDARDS PRESENTED IN THE EPP. WHERE MATERIAL WITHIN THESE SSRPS EXCEEDS STANDARD CONSTRUCTION MEASURES IN THE EPP, THESE SSRPS SUPERSEDE THE EPP.

2. CONSTRUCTION AND RESTORATION OF WATERBODY CROSSINGS WILL FOLLOW THESE GENERAL STEPS:

   A. SITE CLEARING
   B. INSTALLATION OF TEMPORARY EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICES ("BMPS")
   C. BRIDGE INSTALLATION
   D. EXCAVATION/BACKFILLING OF THE WATERBODY INCLUDING:
      - SOD SAVING TOPSOIL SEGREGATION AT NON–WOODED SITES
      - STREAMBED MATERIAL SEGREGATION
      - PIPE INSTALLATION
      - BACKFILL, INCLUDING IMPLEMENTATION OF CONSTRUCTION–RELATED RESTORATION METHODS (I.E., TOE WOOD)
   E. REPLACEMENT OF STREAMBED MATERIAL AND TOPSOIL/SOD LAYER
   F. RESTORATION OF STREAM BANKS TO PRE–CONSTRUCTION CONTOURS
   G. IF FINAL GRADING NOT POSSIBLE AT THE TIME, TEMPORARY STABILIZATION AND REPLACEMENT/REINFORCEMENT OF TEMPORARY BMPS
   H. AFTER FINAL GRADING, PERMANENT SEEDING AND/OR WOODY VEGETATION RESTORATION, STABILIZATION AND REPLACEMENT/REINFORCEMENT OF TEMPORARY BMPS
   I. BRIDGE REMOVAL DURING FINAL RESTORATION AFTER STABILIZATION AND PERMANENT SEEDING
   J. POST–CONSTRUCTION MONITORING

CROSSING METHODS

1. ALL WATERBODY AND WETLAND CROSSINGS WILL BE CONDUCTED IN COMPLIANCE WITH SECTION 2.0 AND SECTION 3.0 OF THE ENVIRONMENTAL PROTECTION PLAN ("EPP"), RESPECTIVELY. SECTION 2.0 AND 3.0 OF THE WINTER CONSTRUCTION PLAN PRESENTS MODIFICATIONS FOR WATERBODY AND WETLAND CONSTRUCTION METHODS, RESPECTIVELY, IN WINTER CONDITIONS.

2. ENBRIDGE'S SUMMARY OF CONSTRUCTION METHODS AND PROCEDURES (THE "PROCEDURES," APPENDIX A OF THE EPP) OUTLINES THE VARIOUS CONSTRUCTION METHODS THAT ENBRIDGE MAY UTILIZE TO CONSTRUCT THROUGH WATERBODIES AND WETLANDS/BASINS AS PRESENTED ON THESE SITE–SPECIFIC RESTORATION PLANS ("SSRPS").

   A. DRY CROSSING (ISOLATED) METHODS (INCLUDING THE DRY CROSSING AND MODIFIED DRY CROSSING METHOD) ARE DESCRIBED SECTIONS 4.3 OF THE PROCEDURES, AND IN SECTIONS 2.5.2 AND 2.5.3 AND FIGURES 23 AND 24 OF THE EPP.
   B. THE BORE METHOD (NON–PRESSURIZED) IS DESCRIBED IN SECTION 3.5 OF THE PROCEDURES, AND SECTION 4.0 OF THE EPP.
   C. THE MODIFIED UPLAND CONSTRUCTION (WETLAND) METHOD IS DESCRIBED IN SECTION 3.3 OF THE PROCEDURES, AND SECTION 3.0 AND FIGURES 30 TO 34 OF THE EPP.
   D. ALTHOUGH NOT PROPOSED AS A PRIMARY METHOD AT THESE SSRP WATERBODIES, THE OPEN CUT (NON–ISOLATED) WATERBODY CROSSING METHOD IS DESCRIBED IN SECTION 4.1 OF THE PROCEDURES, AND SECTION 2.5.1 AND FIGURE 24 OF THE EPP.
   E. ALTHOUGH NOT PROPOSED AS A PRIMARY METHOD AT THESE SSRP WATERBODIES, THE PUSH–PULL METHOD IS DESCRIBED IN SECTION 3.4 OF THE PROCEDURES, AND SECTION 3.7.1 AND FIGURES 35 AND 36 OF THE EPP.

CLEARING/VEGETATION REMOVAL

1. STUMPS WITHIN THE TRENCH LINE WILL BE COMPLETELY REMOVED, GROUND, AND/OR HAULED OFF–SITE TO AN APPROVED LOCATION. TREE STUMPS OUTSIDE THE TRENCH LINE WILL BE GROUND BELOW NORMAL GROUND SURFACE TO FACILITATE A SAFE WORK AREA AND TO ALLOW TOPSOIL REMOVAL, IF NECESSARY. IN SOME CIRCUMSTANCES, TREE STUMPS OUTSIDE THE TRENCH LINE MAY BE COMPLETELY REMOVED TO ALLOW FOR A SAFE WORK AREA AND HAULED OFF–SITE TO AN APPROVED LOCATION AS OUTLINED IN SECTION 1.8.3 OF THE EPP.

2. CLEARING WILL BE CONDUCTED IN WATERBODIES AND WETLANDS AS OUTLINED IN SECTION 2.2 AND 3.2 OF THE EPP, RESPECTIVELY. CHIPS, MULCH, OR MECHANICALLY CUT WOODY DEBRIS SHALL NOT BE STOCKPILED IN A WETLAND. HYDRO–AX DEBRIS, OR SIMILAR CAN BE LEFT IN THE WETLAND IF SPREAD EVENLY IN THE CONSTRUCTION WORKSPACE TO A DEPTH THAT WILL ALLOW FOR NORMAL REVEGETATION, AS DETERMINED BY THE EI. CHIPPING IS NOT ALLOWED ON PUBLIC LANDS. ON PUBLIC LANDS, MULCH AND MECHANICALLY CUT WOODY DEBRIS MUST BE UNIFORMLY BROADCAST TO LESS THAN 2–INCH THICKNESS AND IN A MANNER THAT MAINTAINS VISIBLE GROUND.

3. ENBRIDGE WILL PROPERLY INSTALL AND MAINTAIN REDUNDANT SEDIMENT CONTROL MEASURES IMMEDIATELY AFTER CLEARING AND PRIOR TO INITIAL GROUND DISTURBANCE AT SURFACE WATERS LOCATED WITHIN 50 FEET OF THE PROJECT AND WHERE STORMWATER FLOWS TO THE SURFACE WATER (REFER TO THE ENVIRONMENTAL PLAN SHEETS IN THE SWPPP), AND WITHIN 100 FEET OF SPECIAL AND IMPAIRED WATERS, INCLUDING TROUT STREAMS.

4. ON PUBLIC LANDS AND WHEREVER PRACTICABLE AT WATERBODY CROSSINGS, ENBRIDGE WILL USE WILDLIFE–FRIENDLY EROSION AND SEDIMENT CONTROL BMPS THAT CONTAIN BIODEGRADABLE NETTING (CATEGORY 3N OR 4N NATURAL FIBER) AND WILL AVOID THE USE OF PLASTIC MESH (SECTIONS 1.17.1 AND 2.6.1 OF THE EPP).

TEMPORARY STABILIZATION

1. ON PORTIONS OF THE PROJECT WHERE WORK WILL BE OCCURRING DURING APPLICABLE "WORK IN WATER RESTRICTIONS" FOR PUBLIC WATERS (REFER TO SECTION 2.1), ALL EXPOSED SOIL AREAS WITHIN 200 FEET OF THE WATER'S EDGE, AND THAT DRAIN TO THAT WATER, WILL BE STABILIZED WITHIN 24 HOURS DURING THE RESTRICTION PERIOD. STABILIZATION OF ALL EXPOSED SOILS WITHIN 200 FEET OF THE PUBLIC WATER'S EDGE, AND THAT DRAIN TO THAT WATER, WILL BE INITIATED IMMEDIATELY AND COMPLETED WITHIN 7 CALENDAR DAYS WHENEVER CONSTRUCTION ACTIVITY HAS PERMANENTLY OR TEMPORARILY CEASED ON ANY PORTION OF THE SITE OUTSIDE OF THE RESTRICTION PERIOD. THESE AREAS WILL BE IDENTIFIED ON THE ENVIRONMENTAL PLAN SHEETS ACCOMPANYING THE SWPPP.

2. HYDRO–MULCH AND LIQUID TACKIFIER CAN BE USED IN PLACE OF CERTIFIED WEED–FREE STRAW OR HAY MULCH WITH PRIOR APPROVAL FROM ENBRIDGE. ALL HYDROMULCH AND LIQUID TACKIFIER PRODUCTS USED WILL BE ON THE APPLICABLE STATE DOT PRODUCT LIST. HYDRO–MULCH AND LIQUID TACKIFIER PRODUCTS CONTAINING PLASTIC/POLYPROPYLENE FIBER ADDITIVES AND MALACHITE GREEN (COLORANT) WILL NOT BE UTILIZED ON THIS PROJECT. APPLICATION RATES WILL BE AT THE MANUFACTURER'S RECOMMENDED RATE. ENBRIDGE WILL AVOID THE USE OF HYDROMULCH ON PUBLIC LANDS; HOWEVER, ENBRIDGE MAY USE HYDROMULCH ON STEEP SLOPES TO PREVENT EROSION UNTIL PERMANENT COVER HAS BEEN ESTABLISHED AS OUTLINED IN SECTION 1.8.3 OF THE EPP.

RESTORATION AND STABILIZATION

1. ENBRIDGE WILL RESTORE THE STREAM BANKS AS NEAR AS PRACTICABLE TO PRE–CONSTRUCTION CONDITIONS UNLESS THAT SLOPE IS DETERMINED TO BE UNSTABLE. IF THE SLOPE IS CONSIDERED UNSTABLE, ENBRIDGE WILL RESHAPE THE BANKS TO PREVENT SLUMPING. FOR PUBLIC WATERS, ENBRIDGE WILL RETURN THE BANK TO PRE–CONSTRUCTION CONTOURS, UNLESS OTHERWISE DIRECTED BY THE SITE–SPECIFIC RESTORATION PLAN. IF ENBRIDGE CANNOT RESTORE TO PRE–CONSTRUCTION CONTOURS AT A PUBLIC WATER, ENBRIDGE WILL CONSULT WITH THE MDNR BEFORE PROCEEDING FURTHER AS OUTLINED IN SECTION 2.6 OF THE EPP.

2. UNSTABLE SOILS AND/OR SITE–SPECIFIC FACTORS SUCH AS STREAM VELOCITY AND FLOW DIRECTION MAY REQUIRE ADDITIONAL RESTORATION EFFORTS, SUCH AS INSTALLATION OF WOODY VEGETATION, GEOTEXTILE FABRIC, OR TREE, LOG, ROOTWAD, OR BOULDER REVETMENTS TO STABILIZE DISTURBED STREAM BANKS (SEE FIGURE 29) AS OUTLINED IN SECTION 2.6.2 OF THE EPP. ENBRIDGE WILL WORK WITH THE MDNR TO ENSURE ALL WORK/ADJUSTMENTS ARE APPROVED AND ARE CONDUCTED WITHIN APPLICABLE TIMING RESTRICTIONS.

3. IN UPLAND AND WETLAND AREAS, CLEANUP AND ROUGH GRADING WILL OCCUR AS OUTLINED IN SECTIONS 1.16 AND 3.9 OF THE EPP. ENBRIDGE WILL BACKFILL THE TRENCH TO AN ELEVATION SIMILAR TO THE ADJACENT AREAS OUTSIDE THE TRENCH LINE AND WILL ADD A SLIGHT CROWN OF APPROXIMATELY 3 TO 6 INCHES (DEPENDING ON SOIL TYPE) OVER THE BACKFILLED TRENCH TO ALLOW FOR SUBSIDENCE. GENERALLY, EXCESS SUBSOIL DISPLACED BY THE PIPE INSTALLATION WILL BE SPREAD ACROSS THE PORTION OF THE CONSTRUCTION WORKSPACE WHERE TOPSOIL REMOVAL HAS OCCURRED. ANY REMAINING EXCESS SUBSOIL WILL BE REMOVED AND DISPOSED OF AT AN APPROVED OFF–SITE LOCATION AS NEEDED TO ENSURE CONTOURS ARE RESTORED TO AS NEAR AS PRACTICABLE TO PRE–CONSTRUCTION CONDITIONS.

4. REVEGETATION ACTIVITIES WILL OCCUR AS OUTLINED IN SECTION 7.0 OF THE EPP. SEED MIXES AT PUBLIC WATERS WILL BE SELECTED AND APPLIED AS INDICATED IN THE PLANTING PLAN, WHICH IS APPENDIX A OF THE POST–CONSTRUCTION VEGETATION MANAGEMENT PLAN FOR PUBLIC LANDS AND WATERS ("VMP"). SEED MIXES RELATIVE TO THESE SSRP CROSSINGS ARE CODED AS FOLLOWS:

A	EMERGENT (34–181)	G	DRY PRAIRIE GENERAL (35–221)
B	RIPARIAN NE (34–361)	H	MESIC PRAIRIE GENERAL (35–241)
C	RIPARIAN S&W (34–261)	I	MESIC PRAIRIE NW (35–441)
D	WET MEADOW NE (34–371)	J	DRY PRAIRIE NORTHWEST (35–421)
E	WET MEADOW S&W (34–271)	K	WOODLAND EDGE NE (36–311)
F	WETLAND REHABILITATION (34–171)	L	NATURAL REVEGETATION

5. ENBRIDGE WILL NOT SEED STANDING WATER OR WOODED (PSS AND PFO) WETLAND COMMUNITIES. NATURAL REVEGETATION WILL TAKE PLACE FROM EXISTING PLANT MATERIAL AND ROOT STOCK IN THESE COMMUNITIES.

6. ALL MATERIALS USED FOR CONSTRUCTION OF THE PROJECT MUST BE REMOVED FROM THE SITE.

7. ENBRIDGE WILL CONDUCT POST–CONSTRUCTION MONITORING IN ACCORDANCE WITH THE POST–CONSTRUCTION MONITORING PLAN FOR WETLANDS AND WATERBODIES, AND IN ACCORDANCE WITH THE VMP FOR THE UPLAND PORTIONS OF THE PROJECT ON PUBLIC LANDS.

NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING	MJT	10/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN

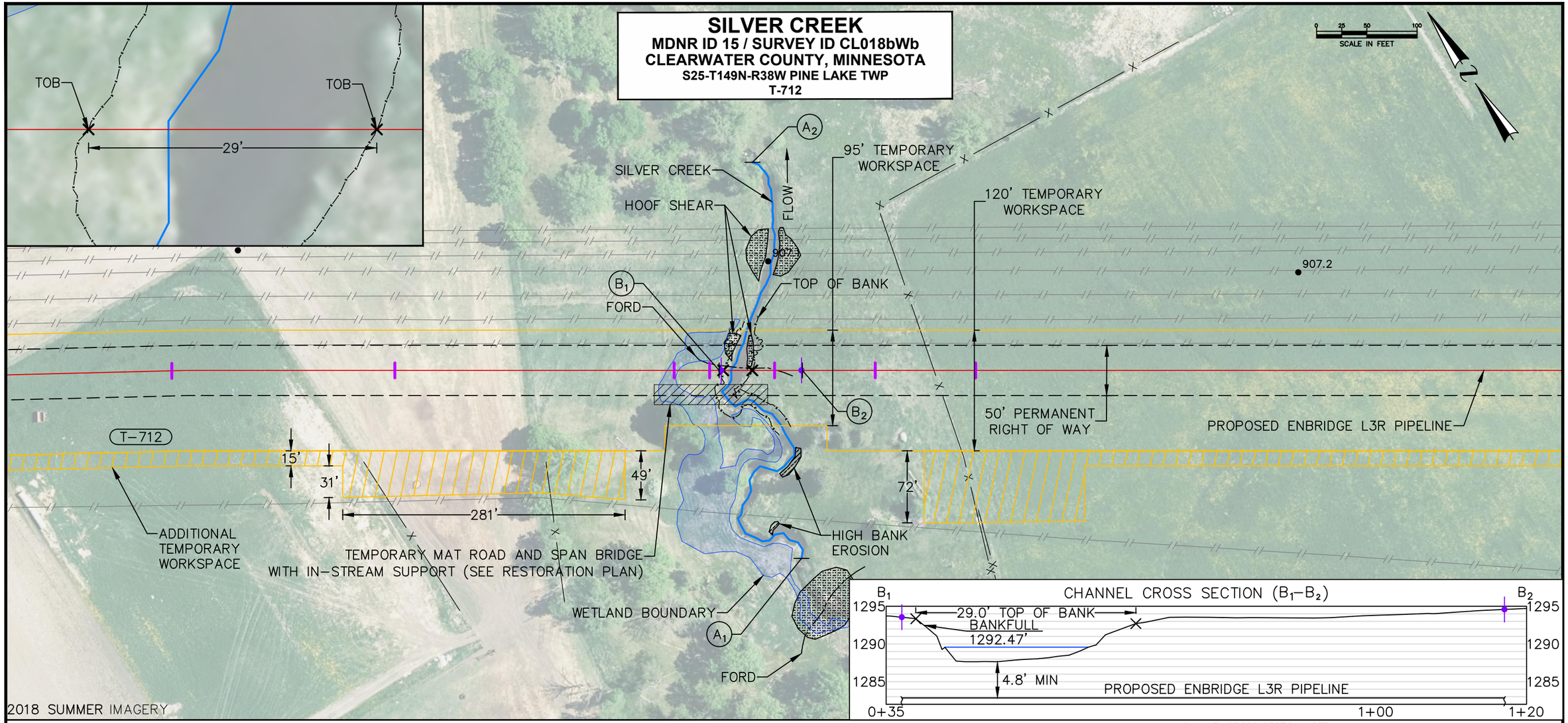
CONSTRUCTION NOTES

SCALE	DWG. NO.	PAGE NO.
	SSRP–NOTES	

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

MDNR ID No. 15: MP 907.1; Silver Creek (H-026-030-019-007-005)

SILVER CREEK
MDNR ID 15 / SURVEY ID CL018bWb
CLEARWATER COUNTY, MINNESOTA
S25-T149N-R38W PINE LAKE TWP
T-712



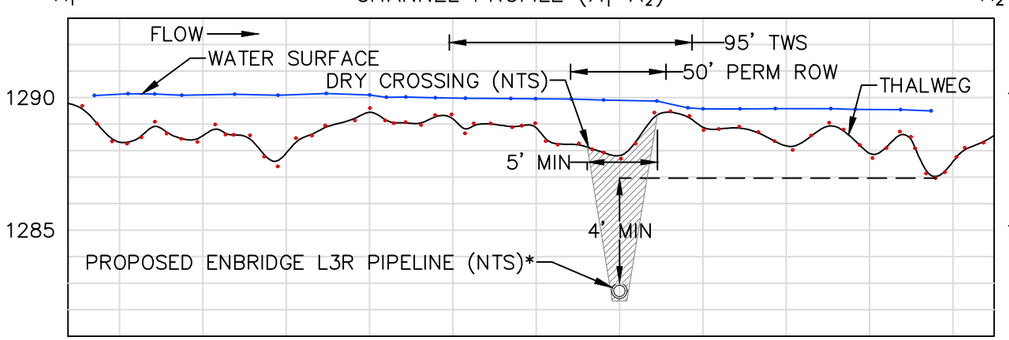
NOTES
1. NO FEMA DIGITAL FLOODPLAIN DATA AVAILABLE
2. SOBS (O/H) OR NPC (S1-3): N/A
3. MDNR REGION 1 PWI - COOL/WARM WATER FISHERY: MARCH 15 - JUNE 30. 24-HOUR SOIL STABILIZATION REQUIRED WITHIN 200 FEET DURING RESTRICTION.
4. WHEN WORKING WITHIN "WORK IN WATER RESTRICTIONS", STABILIZE ALL EXPOSED SOIL AREAS WITHIN 200 FEET OF THE WATER'S EDGE, AND THAT DRAIN TO THAT WATER, WITHIN 24 HOURS. STABILIZATION WILL BE INITIATED IMMEDIATELY AND COMPLETED WITHIN 7 CALENDAR DAYS WHENEVER CONSTRUCTION ACTIVITY HAS PERMANENTLY/ TEMPORARILY CEASED ON ANY PORTION OF THE SITE OUTSIDE OF THE RESTRICTION PERIOD.

LEGEND

- PROPOSED ENBRIDGE L3R PIPELINE
- OTHER PIPELINE
- PERMANENT RIGHT OF WAY
- TEMPORARY WORKSPACE
- WATERBODY (ROSGEN SURVEY - THALWEG)
- FENCE
- FORD
- TEMPORARY MAT ROAD AND SPAN BRIDGE
- HOOF SHEAR
- HIGH BANK EROSION
- WETLAND
- ADDITIONAL TEMPORARY WORKSPACE
- MN-XX-XX-XXX.XXX — TRACT ID
- ROSGEN SURVEY POINT - WATER SURFACE
- ROSGEN SURVEY POINT - RIVER BOTTOM (THALWEG)
- PROPOSED INCREASED DEPTH OF COVER EXTENT
- TOP OF BANK
- TRENCH BREAKER (LOCATIONS ARE APPROXIMATE)

FOR ENVIRONMENTAL REVIEW PURPOSES ONLY

CHANNEL PROFILE (A_1-A_2)



*TRENCH IN PROFILE IS NOT TO SCALE (NTS)

CHANNEL CROSS SECTION NOTE:
1. CHANNEL LOCATIONS, DIMENSIONS, AND/OR ELEVATIONS ARE BASED ON 2020 TOPOGRAPHIC/BATHYMETRIC SURVEY(S), AND AS SUCH DO NOT REFLECT CHANGES TO THE CHANNEL THAT MAY HAVE OCCURRED SINCE THAT TIME.
2. DEPTH OF COVER AT CENTERLINE WAS DEVELOPED USING THE BOTTOM ELEVATION OF THE DEEPEST UPSTREAM OR DOWNSTREAM POOL WITHIN THE SURVEYED REACH, UNLESS OTHERWISE NOTED IN APPLICATION MATERIALS.
3. MEAN MEANDER BELT WIDTH: 108'
4. MEANDER WIDTH RATIO: 4.09

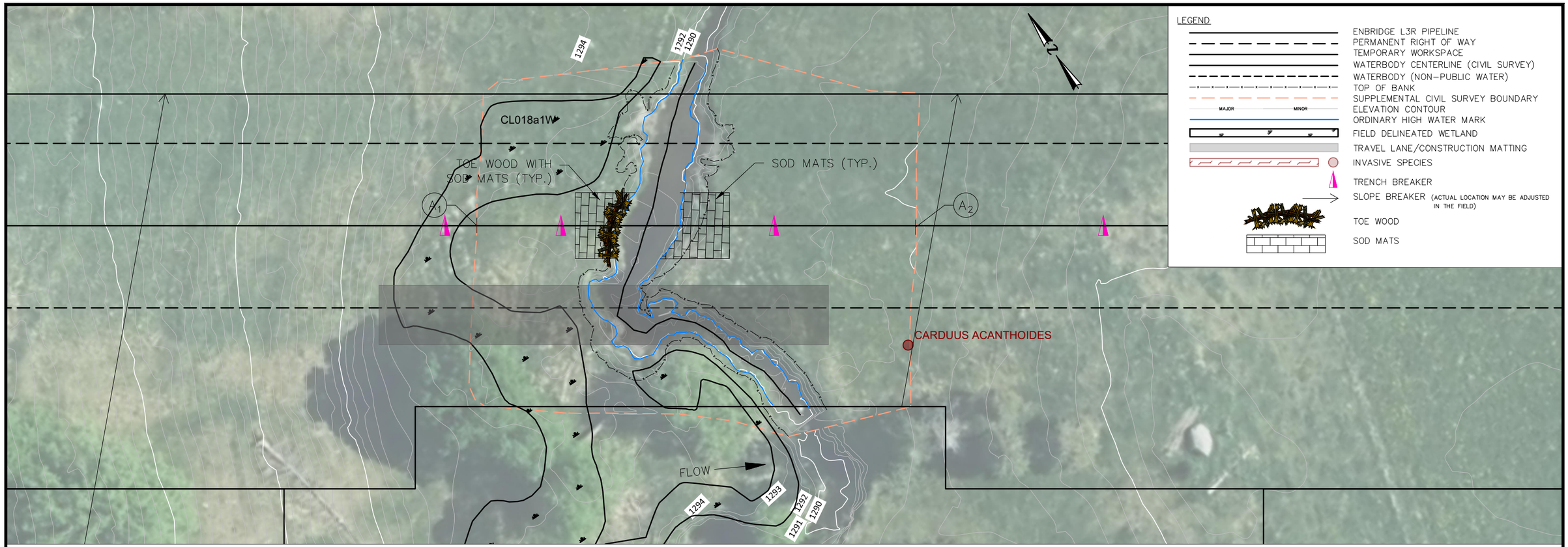
NO.	REVISION-DESCRIPTION	BY	DATE	CHK'D	APP'D
0	ISSUED FOR PERMIT APPLICATION	AJJ	10/2020	BAB	BAB

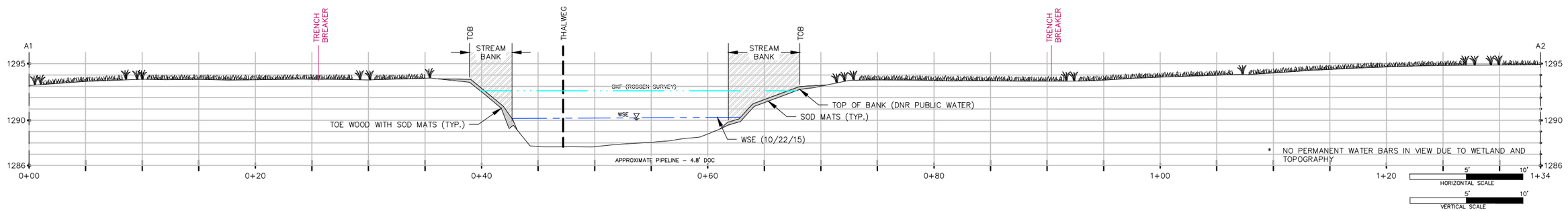
ENBRIDGE

DWN. BY: AJJ	DATE 10/2020
CHK.	
PROJ. ENGR.	
PROJ. MGR.	
CLIENT APP.	

PROPOSED ENBRIDGE L3R PIPELINE
PRIMARY METHOD - DRY CROSSING
CROSSING OF SILVER CREEK
ENBRIDGE MP 907.1
CLEARWATER COUNTY, MINNESOTA

SCALE: NOTED
DWG. NO.: B-93-5.84-MDNR-15-0





PROPOSED RESTORATION ACTIVITIES WILL BE REVIEWED BY DNR AND ENBRIDGE DURING SITE VISIT AND MAY BE CHANGED TO REFLECT SITE CONDITIONS AT THE TIME OF CONSTRUCTION.

FEATURE ID	CL018bWB; IFC ID: S-162.0
CROSSING TYPE	DRY CROSSING
PROPOSED RESTORATION (SEE DETAILS FOR LIVE STAKING, TRANSPLANTS, AND SHRUB SPECIES IF APPLICABLE)	EC BLANKET - NATURAL FIBER MPCA TYPE 3.B/MNDOT CATEGORY 4N
WITHIN OR ADJACENT WETLAND	FRESH WET MEADOW
BWSR SEED MIX	RIPARIAN NE (34-361)
DOMINANT WETLAND VEGETATION	1. PHALARIS ARUNDIANCEA 2. SCIRPUS ATROVIRENS
SOBS (O/H) or NPC (S1-3)	N/A

NOTES:
1. CONSTRUCTION TIMING RESTRICTIONS
   1.1. MDNR REGION 1 PWI - COOL/WARM WATER FISHERY: MARCH 15 - JUNE 30.
   1.2. WHEN WORK OCCURS WITHIN "WORK IN WATER RESTRICTIONS", ALL EXPOSED SOIL AREAS WITHIN 200 FEET OF THE WATER'S EDGE, AND THAT DRAIN TO THAT WATER, WILL BE STABILIZED WITHIN 24 HOURS DURING THE RESTRICTION PERIOD. STABILIZATION OF ALL EXPOSED SOILS WITHIN 200 FEET OF THE PUBLIC WATER'S EDGE, AND THAT DRAIN TO THAT WATER, WILL BE INITIATED IMMEDIATELY AND COMPLETED WITHIN 7 CALENDAR DAYS WHENEVER CONSTRUCTION ACTIVITY HAS PERMANENTLY OR TEMPORARILY CEASED ON ANY PORTION OF THE SITE OUTSIDE OF THE RESTRICTION PERIOD
2. WORK SHALL BE CONDUCTED IN ACCORDANCE WITH APPLICABLE STANDARDS IN ENBRIDGE'S EPP AND VMP FOR PUBLIC LANDS AND WATERS. THE SPECIFICATIONS WITHIN THIS SSRP MAY MODIFY OR REPLACE THESE STANDARDS.
3. SEE GENERAL NOTES PAGE FOR ADDITIONAL DETAIL.
4. INFORMATION REGARDING SEEDING SPECIFICATIONS, SEED BED PREPARATION TECHNIQUES, ETC. ARE DESCRIBED IN THE PLANTING PLAN CONTAINED WITHIN THE VMP.
5. TRENCH BREAKER LOCATION IS APPROXIMATE PENDING FIELD VERIFICATION (EPP SECTION 1.13)

ENBRIDGE

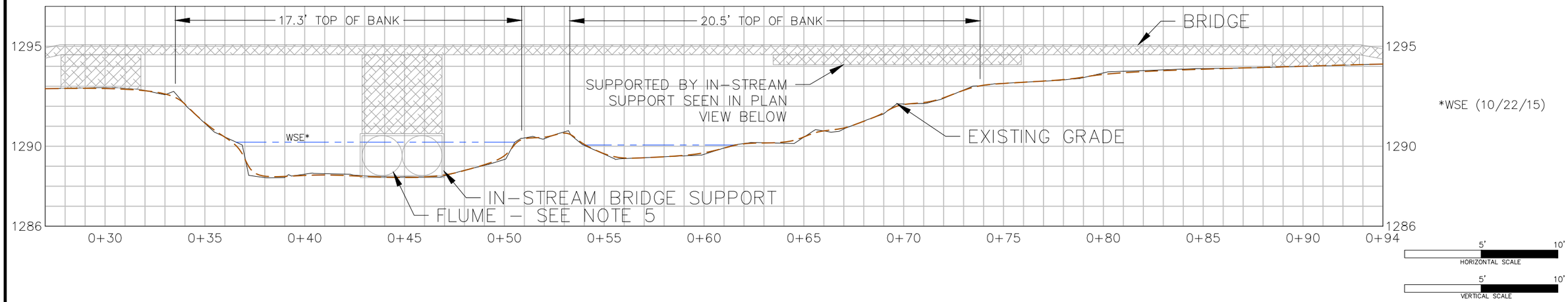
NO.	REVISION-DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE-SPECIFIC RESTORATION PLAN
SILVER CREEK - MP 907.1 - MDNR ID 15
RE-VEGETATION PLAN

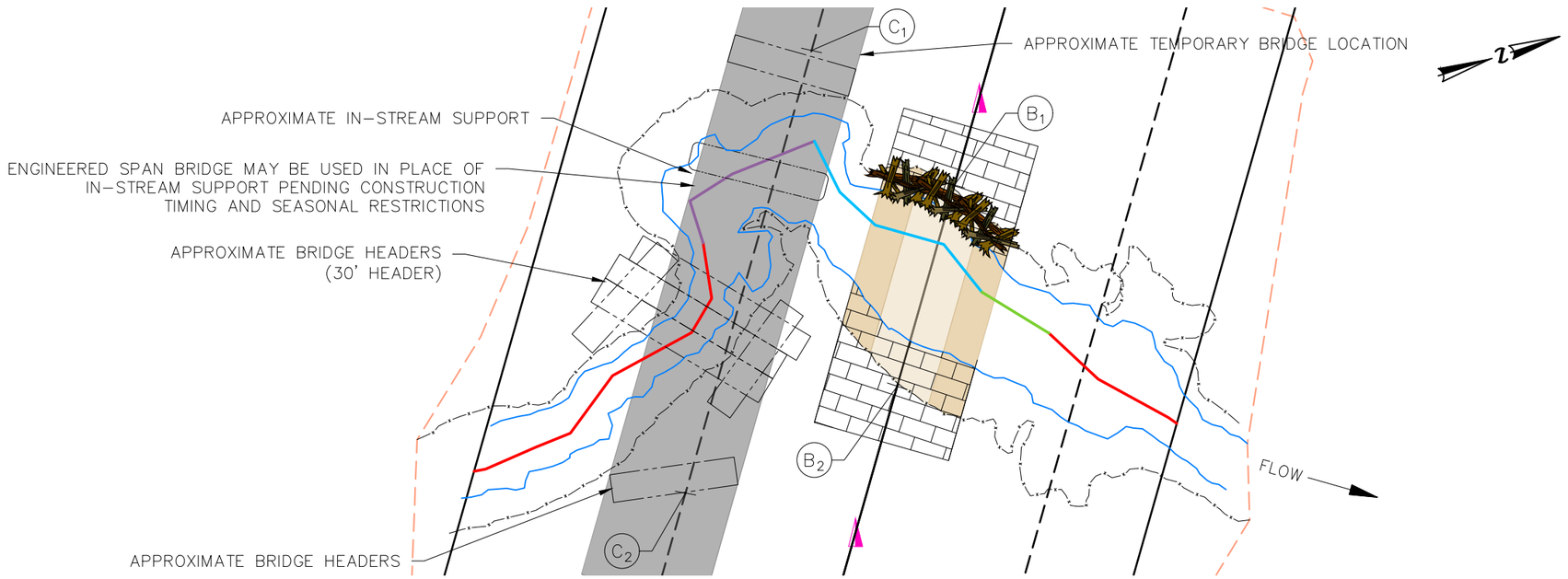
SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP-907.1-001	1/7

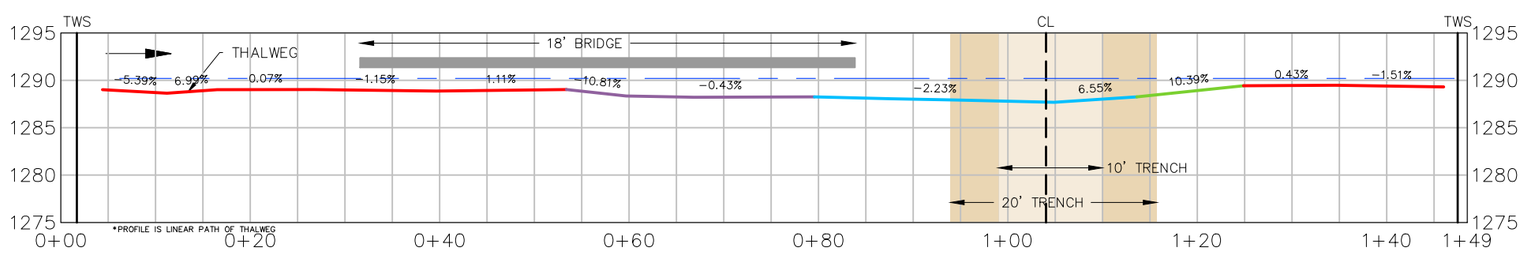
PLOTTED SIZE: ANSI FULL BLEED B (17x11)

BANK RESTORATION (BRIDGE)



STREAMBED RESTORATION





NOTES

1. TRANSITIONS BETWEEN EXISTING CHANNEL FEATURES (BED, BANK, FLOODPLAIN) AND PROPOSED RESTORED TRENCH CROSSING WILL BE SMOOTH AND EVENLY GRADED WITHOUT ABRUPT OR PROTRUDING OBSTRUCTIONS.
2. BANK MIGRATION POTENTIAL IS TO THE NORTH. PRIMARY FLOW IS LOCATED ON THE UPSTREAM SIDE OF THE CHANNEL.
3. PLACE MATS DIRECTLY ON TOP OF EXISTING VEGETATION TO AVOID OR MINIMIZE DISTURBANCE OF VEGETATION ON THE CHANNEL BANKS AND AT THE TOP OF THE STREAM BANK (LIMITED STUMP REMOVAL MAY BE REQUIRED).
4. SEE DETAIL SHEET FOR SPECIFIC RESTORATION METHODS AND DETAILS.
5. FLUMES SIZES MAY VARY BETWEEN 18–48 INCHES AND MUST EXTEND ABOVE OHWM OR SURFACE WATER AT TIME OF CONSTRUCTION, WHICHEVER IS GREATER.
6. USE OF CATTLE EXCLUSION MAY BE ADDRESSED DURING THE OPERATIONAL PHASE OF THE PROJECT, PENDING LANDOWNER DISCUSSION.
7. MINIMIZE DISTURBANCE OF BED MATERIALS AND FEATURES DURING CONSTRUCTION OF THE TRENCH AND INSTALLATION AND REMOVAL OF IN-STREAM SUPPORT
8. BED AND/OR BANK MATERIALS TEMPORARILY ADJUSTED OR REMOVED DURING CONSTRUCTION SHALL BE PLACED IN THE APPROXIMATE ORIGINAL LOCATION DURING RESTORATION. MATERIALS SHALL BE FIELD ADJUSTED DURING PLACEMENT BASE ON THE OBSERVED FLOW PATH AT THE TIME OF CONSTRUCTION.
9. ALIGNMENT OF IN-STREAM SUPPORT SHALL BE FIELD ADJUSTED BASED ON FLOW PATH TO PROTECT CHANNEL BANKS.
10. SEE RESTORATION SHEET FOR B1–B2 CROSS SECTION

LEGEND

- ENBRIDGE L3R PIPELINE
- PERMANENT RIGHT OF WAY
- TEMPORARY WORKSPACE
- WATERBODY – RIFFLE (ROSGEN SURVEY)
- WATERBODY – POOL (ROSGEN SURVEY)
- WATERBODY – RUN (ROSGEN SURVEY)
- WATERBODY – GLIDE (ROSGEN SURVEY)
- CONTOUR (1' INTERVAL) (MAJOR / MINOR)
- TOP OF BANK
- ORDINARY HIGH WATER MARK
- FIELD DELINEATED WETLAND
- TRAVEL LANE/CONSTRUCTION MATTING
- TRENCH – 10'
- TRENCH – 20'

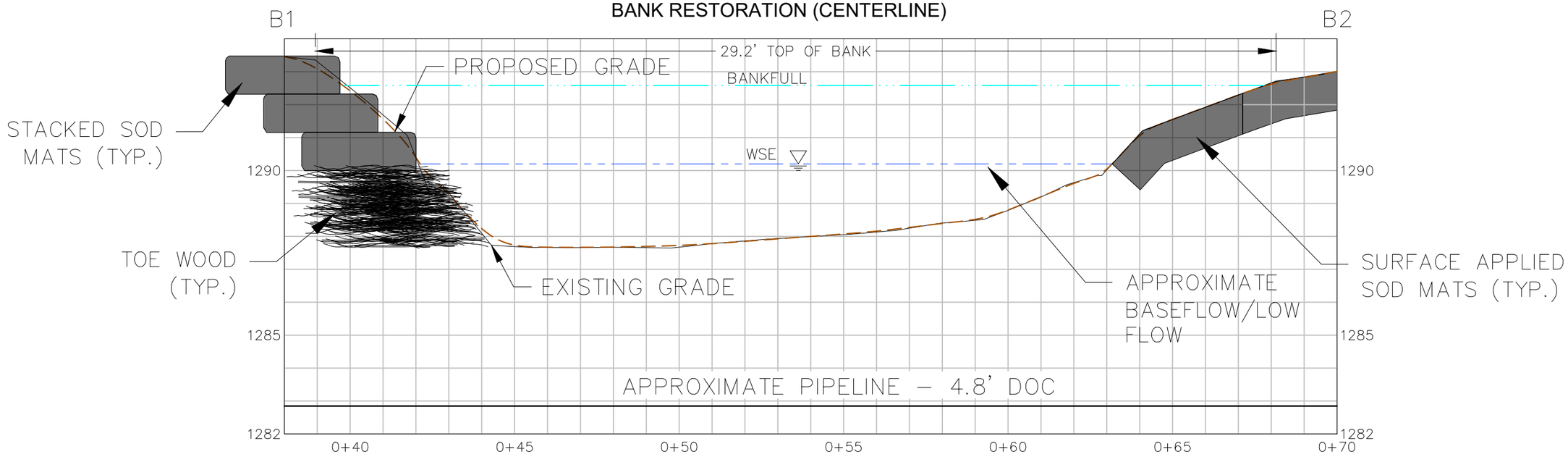
NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE-SPECIFIC RESTORATION PLAN
SILVER CREEK – MP 907.1 – MDNR ID 15
STABILIZATION PLAN

SCALE	DWG. NO.	PAGE NO.
	SSRP-907.1-002	2/7

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

BANK RESTORATION (CENTERLINE)



5' 10'
HORIZONTAL SCALE
5' 10'
VERTICAL SCALE

SEE DETAILS FOR BANK RESTORATION TECHNIQUES ON BOTH BANKS

1/4 2/5

LEGEND

SOD MAT

TOE WOOD

RESTORATION NOTES:

GENERAL

1. REFER TO RESTORATION DETAIL SHEETS FOR ADDITIONAL INFORMATION RELATED TO PROPOSED RESTORATION MEASURES.
2. REFER TO SITE PHOTOS FOR INFORMATION ON PRE-CONSTRUCTION CROSSING CONDITIONS AND TO PROVIDE ADDITIONAL GUIDANCE FOR RESTORATION EFFORTS.

TOE WOOD

1. ROUGH GRADE CHANNEL BED FEATURES INCLUDING PLACEMENT OF SUBSTRATE.
2. INSTALL FOOTER LOG(S) ALONG PROPOSED TOE OF SLOPE. FOOTER LOGS SHOULD BE ANGLED TO ALLOW FOR TOE ALIGNMENT TO GENERALLY MATCH THE EXISTING CURVE AND EVENLY TRANSITION FROM UPSTREAM TO DOWNSTREAM.
3. PUSH FOOTER LOG INTO SOIL APPLY A SMALL AMOUNT OF GRAVEL OR STONE AS NEEDED TO PREVENT FLOATATION OF FOOTER LOG PRIOR TO PLACING WOODY DEBRIS.
4. PLACE A LAYER WOODY DEBRIS IN 6" TO 8" LIFTS, APPLY 3"-4" GRAVEL AND/OR SOIL FILL AND COMPACT WITH EXCAVATOR BUCKET. WASH FILL MATERIAL INTO WOODY DEBRIS MATRIX WITH WATER FROM CHANNEL. APPLY ADDITIONAL LAYERS "AS NEEDED" TO REACH THE SPECIFIED TOE WOOD HEIGHT.
5. PLACE STACKED SOD MATS ABOVE TOE WOOD. THE USE OF TRANSPLANTS OR FABRIC LIFTS MAY BE FIELD APPROVED BY ENBRIDGE IN CONSULTATION WITH MN DNR.

SOD MATTING

1. REMOVE 15 LINEAR FEET OF VEGETATED MATS ON EITHER SIDE OF THE STREAM CROSSING USING ONSITE EQUIPMENT WHICH CAN UNDERCUT THE VEGETATION FOR REMOVAL. SMALL SHRUBS AND/OR TREES WITHIN THE SOD MATS ARE ACCEPTABLE AND SHOULD NOT BE REMOVED.
2. DEPENDING ON THE LEVEL OF SATURATION AT THE TIME OF REMOVAL, IT MAY BE DIFFICULT TO OBTAIN INTACT CONSOLIDATED MATS, BUT GENERALLY THE NATIVE VEGETATION WILL BE RETAINED AND CAPTURED FOR PLACEMENT.
3. SOD MATS CAN BE TRANSPLANTED DURING ANY SEASON.
4. SOD MAT WILL BE PLACED ON CLEAR GROUND OR MATS WITHIN THE WORKSPACE.
5. MONITOR MATS TO SUPPORT SURVIVABILITY; WATERING MAY BE NEEDED.
6. PRIOR TO PLACEMENT OF SOD MATS FINISH GRADE CHANNEL BANK AND ADJACENT FLOODPLAIN APPLICATION AREA TO PROVIDE A SMOOTH AND EVEN SURFACE. SUBGRADE ELEVATION SHOULD ALLOW FOR THE FINISHED SOD SURFACE TO TRANSITION EVENLY WITH THE CHANNEL BANKS UPSTREAM AND DOWNSTREAM OF THE INSTALLATION AREA. AVOID ABRUPT CHANGES IN GRADE.
7. RETURN THE VEGETATED MATS WILL BE RETURNED/SET IN PLACE WITH ONSITE EQUIPMENT.
8. SURFACE APPLIED SOD MATTING SHOULD BE PLACED WITH THE LONG SIDE PERPENDICULAR TO THE CHANNEL / FLOW.
9. STACKED SOD MATTING SHOULD BE PLACED WITH THE LONG SIDE PARALLEL TO THE CHANNEL / FLOW.
10. IF SUFFICIENT SOD IS NOT AVAILABLE FROM THE STREAM BANKS ADDITIONAL SOD MAY BE TAKEN FROM THE ADJACENT CONSTRUCTION WORKSPACE.
11. WHEN PLACING SOD MATS, DO NOT LEAVE LARGE GAPS BETWEEN EACH SOD MAT AS NON-NATIVE VEGETATION WILL QUICKLY ATTEMPT TO COLONIZE THESE VOIDS.
12. WATER SOD MATS AFTER REPLACEMENT IF CONDITIONS ARE HOT AND DRY. DAMP AND/OR FROZEN SOD MATS DO NOT REQUIRE WATERING.
13. THE TOP MAT AND/OR OTHER MATS CAN BE ANCHORED WITH A LIVE AND/OR DEAD STOUT STAKE TO ENSURE THAT IT DOES NOT MOBILIZE DURING A FLOOD EVENT BEFORE THE ROOTS HAVE ESTABLISHED.
14. THE VEGETATED MATS WILL BE REPLACED AS SOON AS PRACTICAL FOLLOWING BACKFILLING OF THE TRENCH AND STABILIZED PER THE TIMING REQUIREMENTS DESCRIBED IN SECTION 1.9.1 OF THE EPP.

NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

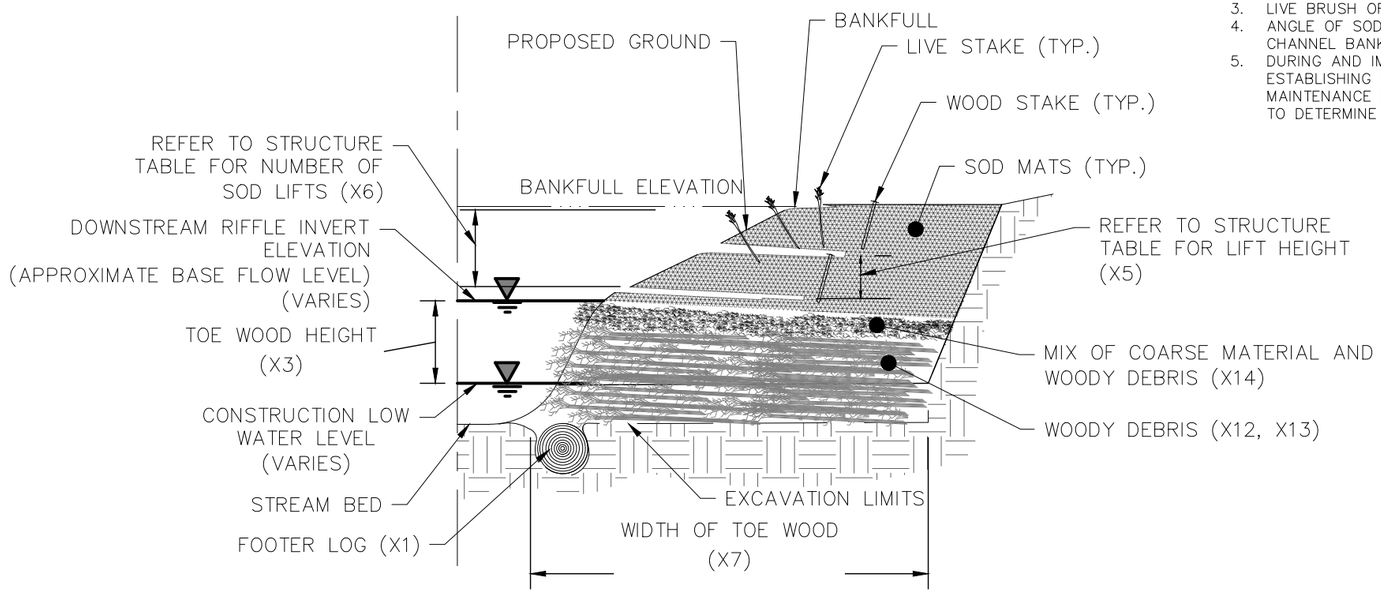
ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
SILVER CREEK – MP 907.1 – MDNR ID 15
SITE SPECIFIC DETAILS

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP–907.1–004	3/7

ENBRIDGE

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

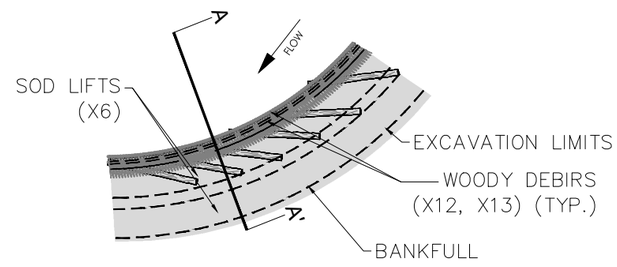
TOE WOOD DIMENSIONS			
VARIABLE	**VALUE**	**TYPICAL UNIT**	**DESCRIPTION**
X1	6.0 - 10.0	IN.	FOOTER LOG DIAMETER
X2	8.0 - 12.0	FT.	FOOTER LOG LENGTH
X3	18.0	IN.	TOE WOOD HEIGHT
X4	SEE SHEET 3	N/A	MATCH TYPICAL SECTION
X5	SEE SHEET 5	FT.	SOD LIFT HEIGHT
X6	3.0	#	SOD LIFTS
X7	8.0 - 10.0	FT.	TOE WOOD WIDTH
X8	3.0 - 6.0	FT.	SOD LIFT WIDTH
X9	24.0	IN.	WOOD STAKE LENGTH
X10	4.0	IN.	WOOD STAKE WIDTH (TOP)
X11	0.5	IN.	WOOD STAKE WIDTH (BOTTOM)
X12	1/2 - 3.0	IN.	WOODY DEBRIS DIAMETER
X13	8.0 - 12.0	FT.	WOODY DEBRIS LENGTH
X14	3" MINING GRAVEL WITH FINES	%	SELECT COARSE MATERIAL BACKFILL (BY VOLUME)



SECTION A-A'

TOE WOOD EXAMPLE

NOTES:
1. WOODY MATERIAL OF APPROPRIATE SIZE CONSISTING OF LOGS, TRUNKS, LIMBS, BRANCHES, AND SMALLER WOODY DEBRIS INCLUDING TOPS OR SLASH. ON-SITE WOODY MATERIAL IS PREFERRED.
2. WOODY DEBRIS SHOULD BE GREEN OR RELATIVELY GREEN AND MAY CONSIST OF HARDWOODS, CONIFERS, OR A COMBINATION OF BOTH.
3. LIVE BRUSH OR OTHER BANK VEGETATION MAY BE INCORPORATED.
4. ANGLE OF SOD MAT SURFACE SHALL MATCH THE PROPOSED CHANNEL CROSS SECTION AND PROVIDE A SMOOTH AND EVEN CHANNEL BANK SURFACE BETWEEN UPSTREAM AND DOWNSTREAM BANKS.
5. DURING AND IMMEDIATELY AFTER CONSTRUCTION, BANK SLOPES ABOVE THE WOOD TOE ARE VULNERABLE TO EROSION. ESTABLISHING VEGETATION OR OTHER COVER MATERIAL AS SOON AS POSSIBLE WILL HELP REDUCE EROSION. ADDITIONAL MAINTENANCE IS NOT EXPECTED ONCE VEGETATION ESTABLISHES. INSPECTION AFTER LARGE FLOW EVENTS MAY BE ADVISABLE TO DETERMINE IF ANY MATERIAL MOVEMENT OR UNEXPECTED SCOUR HAS OCCURRED.



PLAN VIEW AT BANKFULL ELEVATION

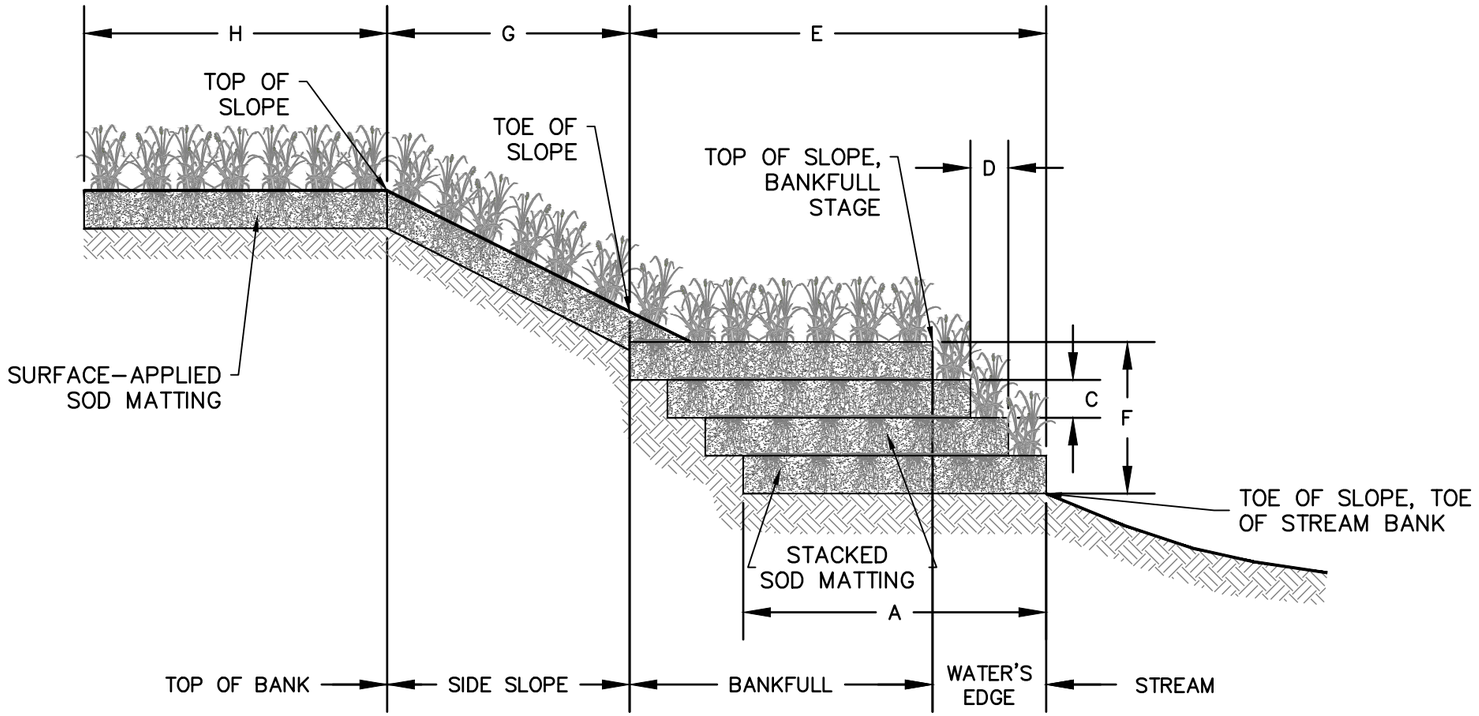
1 TOE WOOD DETAIL

NO.	REVISION-DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

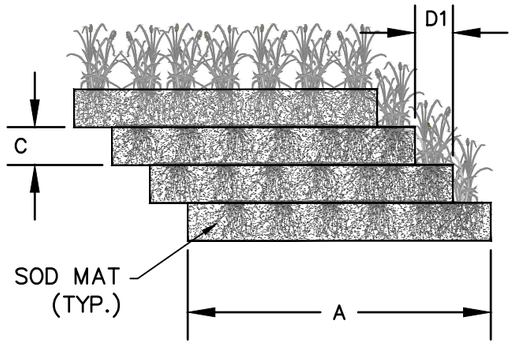
ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE-SPECIFIC RESTORATION PLAN
SILVER CREEK - MP 907.1 - MDNR ID 15
SITE SPECIFIC DETAILS

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP-907.1-004	4/7

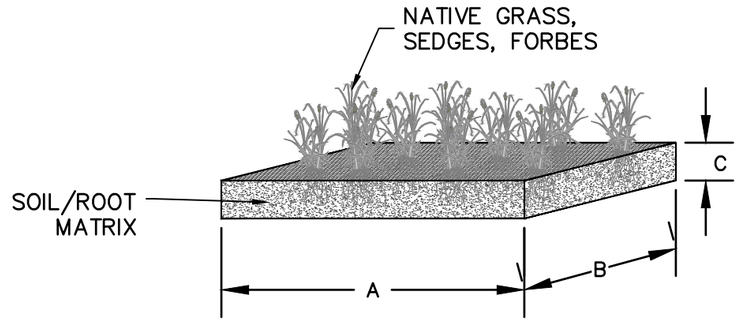
PLOTTED SIZE: ANSI FULL BLEED B (17x11)



CROSS SECTION



STACKED SOD MATTING DETAIL



SOD MAT DETAIL

DIMENSION	NAME	TYPICAL UNIT	VALUE	DESCRIPTION
A	SOD MAT WIDTH	FEET	3 – 4	WIDTH OF INDIVIDUAL SOD MAT.
B	SOD MAT LENGTH	FEET	3 –6	LENGTH OF INDIVIDUAL SOD MAT.
C	SOD MAT THICKNESS	INCHES	14	THICKNESS OF INDIVIDUAL SOD MAT.
D	STACKED SOD MAT SETBACK	FEET, INCHES	6 ±	THE DISTANCE BETWEEN THE EDGES OF SOD MATS STACKED TO FORM A SLOPE
E	WIDTH OF STACKED SOD MATS	FEET, INCHES	10 – 20	WIDTH OF A BANK CREATED BY STACKED SOD MATS
F	HEIGHT OF STACKED SOD MATS	FEET, INCHES	3	HEIGHT OF A SLOPE CREATED BY STACKED SOD MATS
G	WIDTH OF SURFACE- APPLIED SOD MATS	FEET, INCHES	10 –20	WIDTH OF A SLOPE STABILIZED WITH SURFACE-APPLIED SOD MATS
H	TOP OF BANK SOD MATTING DISTANCE	FEET	10	DISTANCE SOD MATTING IS INSTALLED ON THE TOP OF BANK
NOTES:				
1. DIMENSION LABELS ARE REFERENCED IN THE DETAIL DRAWINGS				

SOD MAT EXAMPLES

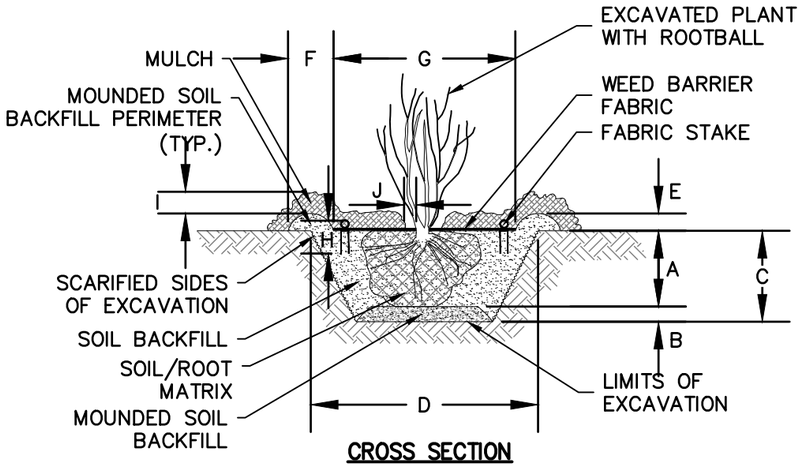
1 **SOD MATTING DETAIL**

NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
SILVER CREEK – MP 907.1 – MDNR ID 15
SITE SPECIFIC DETAILS

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP–907.1–004	5/7

PLOTTED SIZE: ANSI FULL BLEED B (17x11)



CROSS SECTION

DIMENSION[2]	NAME	TYPICAL UNIT	VALUE	DESCRIPTION
A	PLANTING DEPTH	VARIES	N/A	PLANTING DEPTH OF THE TRANSPLANT.
B	HEIGHT OF MOUNDED SOIL BACKFILL	INCHES	N/A	HEIGHT OF MOUNDED LOOSE SOIL PLACED INTO OVER-EXCAVATED PLANTING PIT.
C	DEPTH OF PLANTING PIT	VARIES	N/A	DEPTH OF THE PLANTING PIT; ACCOMMODATES DIMENSION OF SOIL AND EXCAVATED ROOTS AS WELL AS MOUNDED LOOSE SOIL AT BOTTOM OF PIT.
D	WIDTH OF PLANTING PIT	VARIES	N/A	OVER-EXCAVATED WIDTH OF THE PLANTING PIT; ACCOMMODATES THE WIDTH OF THE EXCAVATED SOIL AND ROOTS.
E	HEIGHT OF MOUNDED SOIL PERIMETER	INCHES	N/A	HEIGHT OF SOIL BERM CONSTRUCTED ALONG THE PERIMETER OF THE PLANTING PIT; HELPS RETAIN WATER.
F	WIDTH OF MOUNDED SOIL PERIMETER	INCHES	N/A	WIDTH OF SOIL BERM CONSTRUCTED ALONG THE PERIMETER OF THE PLANTING PIT; HELPS RETAIN WATER.
G	WIDTH OF WEED BARRIER FABRIC (OPTIONAL)	INCHES	N/A	WIDTH OF FABRIC PLACED ON SURFACE TO CONTROL WEEDS WITHIN THE MOUNDED SOIL PERIMETER; TRANSPLANTS TYPICALLY HAVE GRASSES, LEAF MATTER, ETC. ATTACHED AND DO NOT REQUIRE WEED BARRIER FABRIC.
H	FABRIC STAKE LENGTH (OPTIONAL)	INCHES	N/A	LENGTH OF STAPLES/SPIKES USED TO SECURE WEED BARRIER FABRIC
I	THICKNESS OF MULCH (OPTIONAL)	INCHES	N/A	THICKNESS OF MULCH, IF NECESSARY. TRANSPLANTS TYPICALLY HAVE GRASSES, LEAF MATTER, ETC. ATTACHED AND DO NOT REQUIRE MULCH.
J	GAP BETWEEN MULCH AND PLANT STEM/TRUNK (OPTIONAL)	INCHES	N/A	ROOM BETWEEN PLANT STEM/TRUNK AND MULCH. TRANSPLANTS TYPICALLY HAVE GRASSES, LEAF MATTER, ETC. ATTACHED

NOTES:
1. DATA ARE FOR TRANSPLANTED VEGETATION.
2. DIMENSION LABELS ARE REFERENCED IN THE DETAIL DRAWINGS.

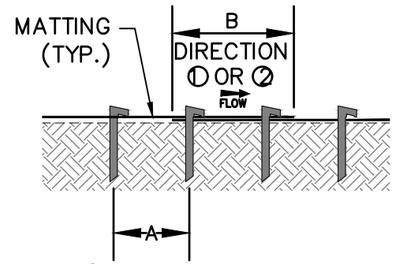
TRANSPLANTS EXAMPLES

1 TRANSPLANTING DETAIL

DIMENSION[1]	NAME	TYPICAL UNIT	VALUE	DESCRIPTION
A	MATTING STAKE SPACING	FEET, INCHES	3 O.C	SPACING BETWEEN EROSION CONTROL MATTING STAKES USED TO FASTEN THE MATTING TO THE SOIL
B	MATTING OVERLAP	FEET, INCHES	18	AMOUNT OF EROSION CONTROL MATTING OVERLAP IF MULTIPLE PIECES AND/OR ROLLS OF MATTING ARE USED. OVERLAP VARIES DEPENDING ON THE LOCATION OF THE OVERLAP WITH RESPECT TO POSITION ON THE SLOPE, LOCATION OF THE MATTING (EDGE OR END), AND PRODUCT SPECIFICATIONS.
C	MATTING ANCHOR TRENCH DEPTH	FEET, INCHES	6 (MIN)	DEPTH OF TRENCH INTO WHICH EDGE OF EROSION CONTROL MATTING IS ANCHORED AT THE TOP AND/OR TOE OF A SLOPE.
D	MATTING ANCHOR TRENCH WIDTH	FEET, INCHES	12	WIDTH OF TRENCH INTO WHICH EDGE OF EROSION CONTROL MATTING IS ANCHORED AT THE TOP AND/OR TOE OF A SLOPE.
E	TOP OF SLOPE ANCHOR TRENCH SETBACK	FEET, INCHES	12	TOP OF SLOPE ANCHOR TRENCH DISTANCE FROM THE TOP OF SLOPE. TOP OF SLOPE REFERS TO TOP OF SIDE SLOPE, BANK SLOPE, TERRACE SLOPE, BANKFULL, ETC.
F	MATTING STAKE LENGTH	INCHES	12	LENGTH OF EROSION CONTROL MATTING STAKES USED TO FASTEN THE MATTING TO THE SOIL

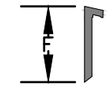
NOTES:
1. DIMENSION LABELS ARE REFERENCED IN THE DETAIL DRAWINGS.
2. O.C, ON CENTER
3. STAPLES ARE NOT PERMITTED

2 EROSION CONTROL MATTING DETAIL



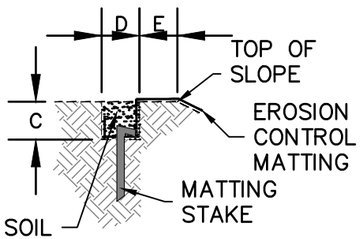
① DIRECTION OF STREAM FLOW
② DIRECTION DOWN THE BANK SLOPE

MATTING OVERLAP DETAIL

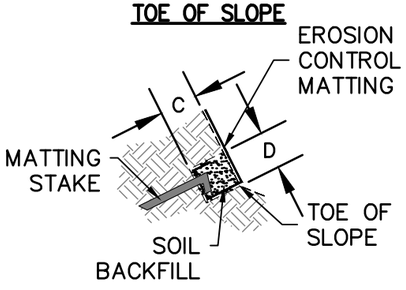


MATTING STAKE DETAIL

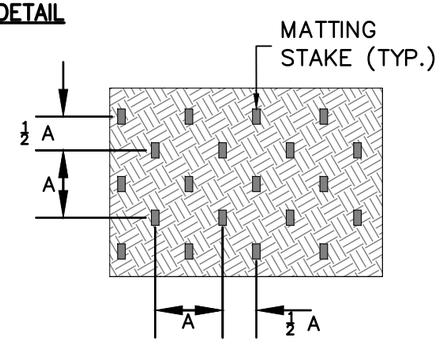
TOP OF SLOPE



TOE OF SLOPE



MATTING ANCHOR DETAIL



MATTING STAKE PATTERN DETAIL

NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
SILVER CREEK – MP 907.1 – MDNR ID 15
SITE SPECIFIC DETAILS

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP–907.1–004	6/7

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

1 CENTERLINE – FACING NORTH BANK

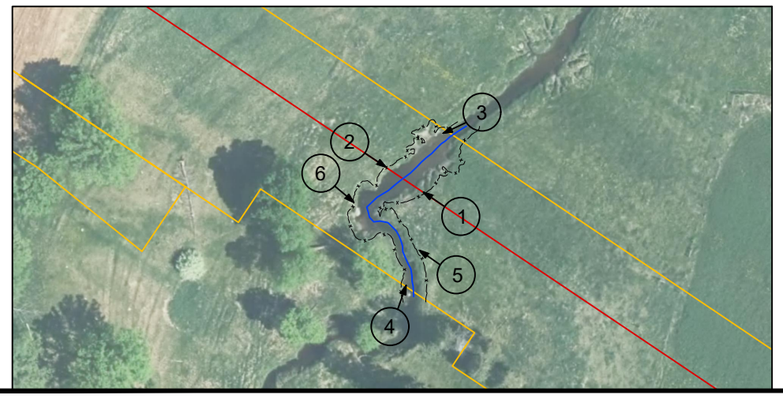
2 CENTERLINE – FACING SOUTH BANK

3 EDGE OF WORKSPACE – FACING DOWNSTREAM

4 EDGE OF WORKSPACE – FACING UPSTREAM

5 BRIDGE – FACING NORTH BANK

6 BRIDGE – FACING SOUTH BANK



NOTES:

1. AIR PHOTOS ARE FROM 2018 ENBRIDGE AERIAL PHOTOGRAPHY.
2. ADDITIONAL ON–THE GROUND PHOTOS MAY BE TAKEN PRIOR TO CONSTRUCTION AT MDNR REQUEST.
3. PRE–CONSTRUCTION PHOTOS WILL BE USED TO AID IN RESTORATION.

NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING	MJT	10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
SILVER CREEK – MP 907.1 – MDNR ID 15
PHOTO PAGE

SCALE	DWG. NO.	PAGE NO.
	SSRP–907.1–005	5/5

ENBRIDGE

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

GENERAL

1. THE SPECIFICATIONS WITHIN THIS SSRP MAY MODIFY OR REPLACE PROJECT–WIDE STANDARDS PRESENTED IN THE EPP. WHERE MATERIAL WITHIN THESE SSRPS EXCEEDS STANDARD CONSTRUCTION MEASURES IN THE EPP, THESE SSRPS SUPERSEDE THE EPP.

2. CONSTRUCTION AND RESTORATION OF WATERBODY CROSSINGS WILL FOLLOW THESE GENERAL STEPS:

   A. SITE CLEARING
   B. INSTALLATION OF TEMPORARY EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICES ("BMPS")
   C. BRIDGE INSTALLATION
   D. EXCAVATION/BACKFILLING OF THE WATERBODY INCLUDING:
      - SOD SAVING TOPSOIL SEGREGATION AT NON–WOODED SITES
      - STREAMBED MATERIAL SEGREGATION
      - PIPE INSTALLATION
      - BACKFILL, INCLUDING IMPLEMENTATION OF CONSTRUCTION–RELATED RESTORATION METHODS (I.E., TOE WOOD)
   E. REPLACEMENT OF STREAMBED MATERIAL AND TOPSOIL/SOD LAYER
   F. RESTORATION OF STREAM BANKS TO PRE–CONSTRUCTION CONTOURS
   G. IF FINAL GRADING NOT POSSIBLE AT THE TIME, TEMPORARY STABILIZATION AND REPLACEMENT/REINFORCEMENT OF TEMPORARY BMPS
   H. AFTER FINAL GRADING, PERMANENT SEEDING AND/OR WOODY VEGETATION RESTORATION, STABILIZATION AND REPLACEMENT/REINFORCEMENT OF TEMPORARY BMPS
   I. BRIDGE REMOVAL DURING FINAL RESTORATION AFTER STABILIZATION AND PERMANENT SEEDING
   J. POST–CONSTRUCTION MONITORING

CROSSING METHODS

1. ALL WATERBODY AND WETLAND CROSSINGS WILL BE CONDUCTED IN COMPLIANCE WITH SECTION 2.0 AND SECTION 3.0 OF THE ENVIRONMENTAL PROTECTION PLAN ("EPP"), RESPECTIVELY. SECTION 2.0 AND 3.0 OF THE WINTER CONSTRUCTION PLAN PRESENTS MODIFICATIONS FOR WATERBODY AND WETLAND CONSTRUCTION METHODS, RESPECTIVELY, IN WINTER CONDITIONS.

2. ENBRIDGE'S SUMMARY OF CONSTRUCTION METHODS AND PROCEDURES (THE "PROCEDURES," APPENDIX A OF THE EPP) OUTLINES THE VARIOUS CONSTRUCTION METHODS THAT ENBRIDGE MAY UTILIZE TO CONSTRUCT THROUGH WATERBODIES AND WETLANDS/BASINS AS PRESENTED ON THESE SITE–SPECIFIC RESTORATION PLANS ("SSRPS").

   A. DRY CROSSING (ISOLATED) METHODS (INCLUDING THE DRY CROSSING AND MODIFIED DRY CROSSING METHOD) ARE DESCRIBED SECTIONS 4.3 OF THE PROCEDURES, AND IN SECTIONS 2.5.2 AND 2.5.3 AND FIGURES 23 AND 24 OF THE EPP.
   B. THE BORE METHOD (NON–PRESSURIZED) IS DESCRIBED IN SECTION 3.5 OF THE PROCEDURES, AND SECTION 4.0 OF THE EPP.
   C. THE MODIFIED UPLAND CONSTRUCTION (WETLAND) METHOD IS DESCRIBED IN SECTION 3.3 OF THE PROCEDURES, AND SECTION 3.0 AND FIGURES 30 TO 34 OF THE EPP.
   D. ALTHOUGH NOT PROPOSED AS A PRIMARY METHOD AT THESE SSRP WATERBODIES, THE OPEN CUT (NON–ISOLATED) WATERBODY CROSSING METHOD IS DESCRIBED IN SECTION 4.1 OF THE PROCEDURES, AND SECTION 2.5.1 AND FIGURE 24 OF THE EPP.
   E. ALTHOUGH NOT PROPOSED AS A PRIMARY METHOD AT THESE SSRP WATERBODIES, THE PUSH–PULL METHOD IS DESCRIBED IN SECTION 3.4 OF THE PROCEDURES, AND SECTION 3.7.1 AND FIGURES 35 AND 36 OF THE EPP.

CLEARING/VEGETATION REMOVAL

1. STUMPS WITHIN THE TRENCH LINE WILL BE COMPLETELY REMOVED, GROUND, AND/OR HAULED OFF–SITE TO AN APPROVED LOCATION. TREE STUMPS OUTSIDE THE TRENCH LINE WILL BE GROUND BELOW NORMAL GROUND SURFACE TO FACILITATE A SAFE WORK AREA AND TO ALLOW TOPSOIL REMOVAL, IF NECESSARY. IN SOME CIRCUMSTANCES, TREE STUMPS OUTSIDE THE TRENCH LINE MAY BE COMPLETELY REMOVED TO ALLOW FOR A SAFE WORK AREA AND HAULED OFF–SITE TO AN APPROVED LOCATION AS OUTLINED IN SECTION 1.8.3 OF THE EPP.

2. CLEARING WILL BE CONDUCTED IN WATERBODIES AND WETLANDS AS OUTLINED IN SECTION 2.2 AND 3.2 OF THE EPP, RESPECTIVELY. CHIPS, MULCH, OR MECHANICALLY CUT WOODY DEBRIS SHALL NOT BE STOCKPILED IN A WETLAND. HYDRO–AX DEBRIS, OR SIMILAR CAN BE LEFT IN THE WETLAND IF SPREAD EVENLY IN THE CONSTRUCTION WORKSPACE TO A DEPTH THAT WILL ALLOW FOR NORMAL REVEGETATION, AS DETERMINED BY THE EI. CHIPPING IS NOT ALLOWED ON PUBLIC LANDS. ON PUBLIC LANDS, MULCH AND MECHANICALLY CUT WOODY DEBRIS MUST BE UNIFORMLY BROADCAST TO LESS THAN 2–INCH THICKNESS AND IN A MANNER THAT MAINTAINS VISIBLE GROUND.

3. ENBRIDGE WILL PROPERLY INSTALL AND MAINTAIN REDUNDANT SEDIMENT CONTROL MEASURES IMMEDIATELY AFTER CLEARING AND PRIOR TO INITIAL GROUND DISTURBANCE AT SURFACE WATERS LOCATED WITHIN 50 FEET OF THE PROJECT AND WHERE STORMWATER FLOWS TO THE SURFACE WATER (REFER TO THE ENVIRONMENTAL PLAN SHEETS IN THE SWPPP), AND WITHIN 100 FEET OF SPECIAL AND IMPAIRED WATERS, INCLUDING TROUT STREAMS.

4. ON PUBLIC LANDS AND WHEREVER PRACTICABLE AT WATERBODY CROSSINGS, ENBRIDGE WILL USE WILDLIFE–FRIENDLY EROSION AND SEDIMENT CONTROL BMPS THAT CONTAIN BIODEGRADABLE NETTING (CATEGORY 3N OR 4N NATURAL FIBER) AND WILL AVOID THE USE OF PLASTIC MESH (SECTIONS 1.17.1 AND 2.6.1 OF THE EPP).

TEMPORARY STABILIZATION

1. ON PORTIONS OF THE PROJECT WHERE WORK WILL BE OCCURRING DURING APPLICABLE "WORK IN WATER RESTRICTIONS" FOR PUBLIC WATERS (REFER TO SECTION 2.1), ALL EXPOSED SOIL AREAS WITHIN 200 FEET OF THE WATER'S EDGE, AND THAT DRAIN TO THAT WATER, WILL BE STABILIZED WITHIN 24 HOURS DURING THE RESTRICTION PERIOD. STABILIZATION OF ALL EXPOSED SOILS WITHIN 200 FEET OF THE PUBLIC WATER'S EDGE, AND THAT DRAIN TO THAT WATER, WILL BE INITIATED IMMEDIATELY AND COMPLETED WITHIN 7 CALENDAR DAYS WHENEVER CONSTRUCTION ACTIVITY HAS PERMANENTLY OR TEMPORARILY CEASED ON ANY PORTION OF THE SITE OUTSIDE OF THE RESTRICTION PERIOD. THESE AREAS WILL BE IDENTIFIED ON THE ENVIRONMENTAL PLAN SHEETS ACCOMPANYING THE SWPPP.

2. HYDRO–MULCH AND LIQUID TACKIFIER CAN BE USED IN PLACE OF CERTIFIED WEED–FREE STRAW OR HAY MULCH WITH PRIOR APPROVAL FROM ENBRIDGE. ALL HYDROMULCH AND LIQUID TACKIFIER PRODUCTS USED WILL BE ON THE APPLICABLE STATE DOT PRODUCT LIST. HYDRO–MULCH AND LIQUID TACKIFIER PRODUCTS CONTAINING PLASTIC/POLYPROPYLENE FIBER ADDITIVES AND MALACHITE GREEN (COLORANT) WILL NOT BE UTILIZED ON THIS PROJECT. APPLICATION RATES WILL BE AT THE MANUFACTURER'S RECOMMENDED RATE. ENBRIDGE WILL AVOID THE USE OF HYDROMULCH ON PUBLIC LANDS; HOWEVER, ENBRIDGE MAY USE HYDROMULCH ON STEEP SLOPES TO PREVENT EROSION UNTIL PERMANENT COVER HAS BEEN ESTABLISHED AS OUTLINED IN SECTION 1.8.3 OF THE EPP.

RESTORATION AND STABILIZATION

1. ENBRIDGE WILL RESTORE THE STREAM BANKS AS NEAR AS PRACTICABLE TO PRE–CONSTRUCTION CONDITIONS UNLESS THAT SLOPE IS DETERMINED TO BE UNSTABLE. IF THE SLOPE IS CONSIDERED UNSTABLE, ENBRIDGE WILL RESHAPE THE BANKS TO PREVENT SLUMPING. FOR PUBLIC WATERS, ENBRIDGE WILL RETURN THE BANK TO PRE–CONSTRUCTION CONTOURS, UNLESS OTHERWISE DIRECTED BY THE SITE–SPECIFIC RESTORATION PLAN. IF ENBRIDGE CANNOT RESTORE TO PRE–CONSTRUCTION CONTOURS AT A PUBLIC WATER, ENBRIDGE WILL CONSULT WITH THE MDNR BEFORE PROCEEDING FURTHER AS OUTLINED IN SECTION 2.6 OF THE EPP.

2. UNSTABLE SOILS AND/OR SITE–SPECIFIC FACTORS SUCH AS STREAM VELOCITY AND FLOW DIRECTION MAY REQUIRE ADDITIONAL RESTORATION EFFORTS, SUCH AS INSTALLATION OF WOODY VEGETATION, GEOTEXTILE FABRIC, OR TREE, LOG, ROOTWAD, OR BOULDER REVETMENTS TO STABILIZE DISTURBED STREAM BANKS (SEE FIGURE 29) AS OUTLINED IN SECTION 2.6.2 OF THE EPP. ENBRIDGE WILL WORK WITH THE MDNR TO ENSURE ALL WORK/ADJUSTMENTS ARE APPROVED AND ARE CONDUCTED WITHIN APPLICABLE TIMING RESTRICTIONS.

3. IN UPLAND AND WETLAND AREAS, CLEANUP AND ROUGH GRADING WILL OCCUR AS OUTLINED IN SECTIONS 1.16 AND 3.9 OF THE EPP. ENBRIDGE WILL BACKFILL THE TRENCH TO AN ELEVATION SIMILAR TO THE ADJACENT AREAS OUTSIDE THE TRENCH LINE AND WILL ADD A SLIGHT CROWN OF APPROXIMATELY 3 TO 6 INCHES (DEPENDING ON SOIL TYPE) OVER THE BACKFILLED TRENCH TO ALLOW FOR SUBSIDENCE. GENERALLY, EXCESS SUBSOIL DISPLACED BY THE PIPE INSTALLATION WILL BE SPREAD ACROSS THE PORTION OF THE CONSTRUCTION WORKSPACE WHERE TOPSOIL REMOVAL HAS OCCURRED. ANY REMAINING EXCESS SUBSOIL WILL BE REMOVED AND DISPOSED OF AT AN APPROVED OFF–SITE LOCATION AS NEEDED TO ENSURE CONTOURS ARE RESTORED TO AS NEAR AS PRACTICABLE TO PRE–CONSTRUCTION CONDITIONS.

4. REVEGETATION ACTIVITIES WILL OCCUR AS OUTLINED IN SECTION 7.0 OF THE EPP. SEED MIXES AT PUBLIC WATERS WILL BE SELECTED AND APPLIED AS INDICATED IN THE PLANTING PLAN, WHICH IS APPENDIX A OF THE POST–CONSTRUCTION VEGETATION MANAGEMENT PLAN FOR PUBLIC LANDS AND WATERS ("VMP"). SEED MIXES RELATIVE TO THESE SSRP CROSSINGS ARE CODED AS FOLLOWS:

A	EMERGENT (34–181)	G	DRY PRAIRIE GENERAL (35–221)
B	RIPARIAN NE (34–361)	H	MESIC PRAIRIE GENERAL (35–241)
C	RIPARIAN S&W (34–261)	I	MESIC PRAIRIE NW (35–441)
D	WET MEADOW NE (34–371)	J	DRY PRAIRIE NORTHWEST (35–421)
E	WET MEADOW S&W (34–271)	K	WOODLAND EDGE NE (36–311)
F	WETLAND REHABILITATION (34–171)	L	NATURAL REVEGETATION

5. ENBRIDGE WILL NOT SEED STANDING WATER OR WOODED (PSS AND PFO) WETLAND COMMUNITIES. NATURAL REVEGETATION WILL TAKE PLACE FROM EXISTING PLANT MATERIAL AND ROOT STOCK IN THESE COMMUNITIES.

6. ALL MATERIALS USED FOR CONSTRUCTION OF THE PROJECT MUST BE REMOVED FROM THE SITE.

7. ENBRIDGE WILL CONDUCT POST–CONSTRUCTION MONITORING IN ACCORDANCE WITH THE POST–CONSTRUCTION MONITORING PLAN FOR WETLANDS AND WATERBODIES, AND IN ACCORDANCE WITH THE VMP FOR THE UPLAND PORTIONS OF THE PROJECT ON PUBLIC LANDS.

NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING	MJT	10/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN

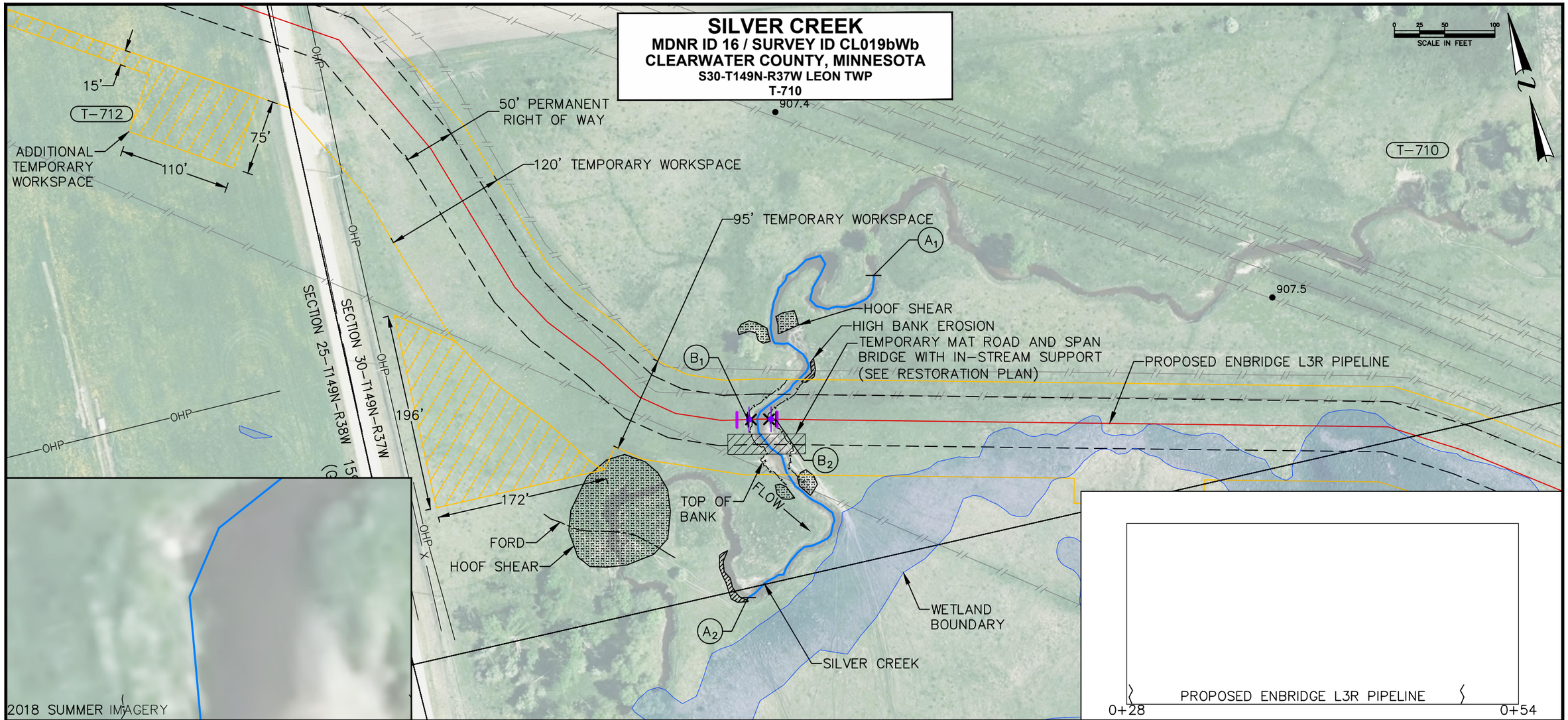
CONSTRUCTION NOTES

SCALE	DWG. NO.	PAGE NO.
	SSRP–NOTES	

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

MDNR ID No. 16: MP 907.4; Silver Creek (H-026-030-019-007-005)

SILVER CREEK
MDNR ID 16 / SURVEY ID CL019bWb
CLEARWATER COUNTY, MINNESOTA
S30-T149N-R37W LEON TWP
T-710



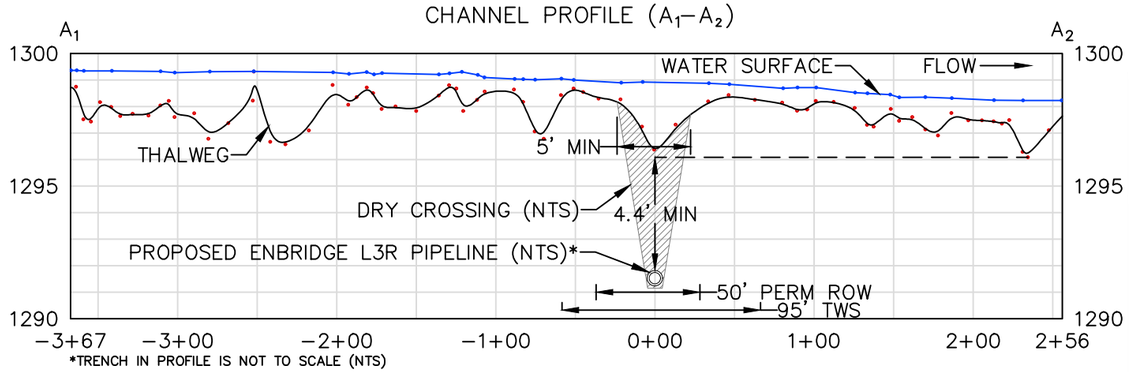
NOTES
1. NO FEMA DIGITAL FLOODPLAIN DATA AVAILABLE
2. SOBS (O/H) OR NPC (S1-3): N/A
3. MDNR REGION 1 PWI - COOL/WARM WATER FISHERY: MARCH 15 - JUNE 30. 24-HOUR SOIL STABILIZATION REQUIRED WITHIN 200 FEET DURING RESTRICTION.
4. WHEN WORKING WITHIN "WORK IN WATER RESTRICTIONS", STABILIZE ALL EXPOSED SOIL AREAS WITHIN 200 FEET OF THE WATER'S EDGE, AND THAT DRAIN TO THAT WATER, WITHIN 24 HOURS. STABILIZATION WILL BE INITIATED IMMEDIATELY AND COMPLETED WITHIN 7 CALENDAR DAYS WHENEVER CONSTRUCTION ACTIVITY HAS PERMANENTLY/ TEMPORARILY CEASED ON ANY PORTION OF THE SITE OUTSIDE OF THE RESTRICTION PERIOD.

LEGEND

	PROPOSED ENBRIDGE L3R PIPELINE
	OTHER PIPELINE
	PERMANENT RIGHT OF WAY
	TEMPORARY WORKSPACE
	WATERBODY (ROSGEN SURVEY - THALWEG)
	CENTERLINE OF ROAD
OHP	OVERHEAD POWER
X	FENCE
	FORD
	TRACT BOUNDARY
	TEMPORARY MAT ROAD AND SPAN BRIDGE
	HOOF SHEAR
	HIGH BANK EROSION
	WETLAND
	ADDITIONAL TEMPORARY WORKSPACE
MN-XX-XX-XXX.XXX	TRACT ID
	ROSGEN SURVEY POINT - WATER SURFACE
	ROSGEN SURVEY POINT - RIVER BOTTOM (THALWEG)
	PROPOSED INCREASED DEPTH OF COVER EXTENT
	TOP OF BANK
	TRENCH BREAKER (LOCATIONS ARE APPROXIMATE)

FOR ENVIRONMENTAL REVIEW PURPOSES ONLY

CHANNEL PROFILE (A_1-A_2)



*TRENCH IN PROFILE IS NOT TO SCALE (NTS)

CHANNEL CROSS SECTION NOTE:
1. CHANNEL LOCATIONS, DIMENSIONS, AND/OR ELEVATIONS ARE BASED ON 2020 TOPOGRAPHIC/BATHYMETRIC SURVEY(S), AND AS SUCH DO NOT REFLECT CHANGES TO THE CHANNEL THAT MAY HAVE OCCURRED SINCE THAT TIME.
2. DEPTH OF COVER AT CENTERLINE WAS DEVELOPED USING THE BOTTOM ELEVATION OF THE DEEPEST UPSTREAM OR DOWNSTREAM POOL WITHIN THE SURVEYED REACH, UNLESS OTHERWISE NOTED IN APPLICATION MATERIALS.
3. MEAN MEANDER BELT WIDTH: 177'
4. MEANDER WIDTH RATIO: 11.49

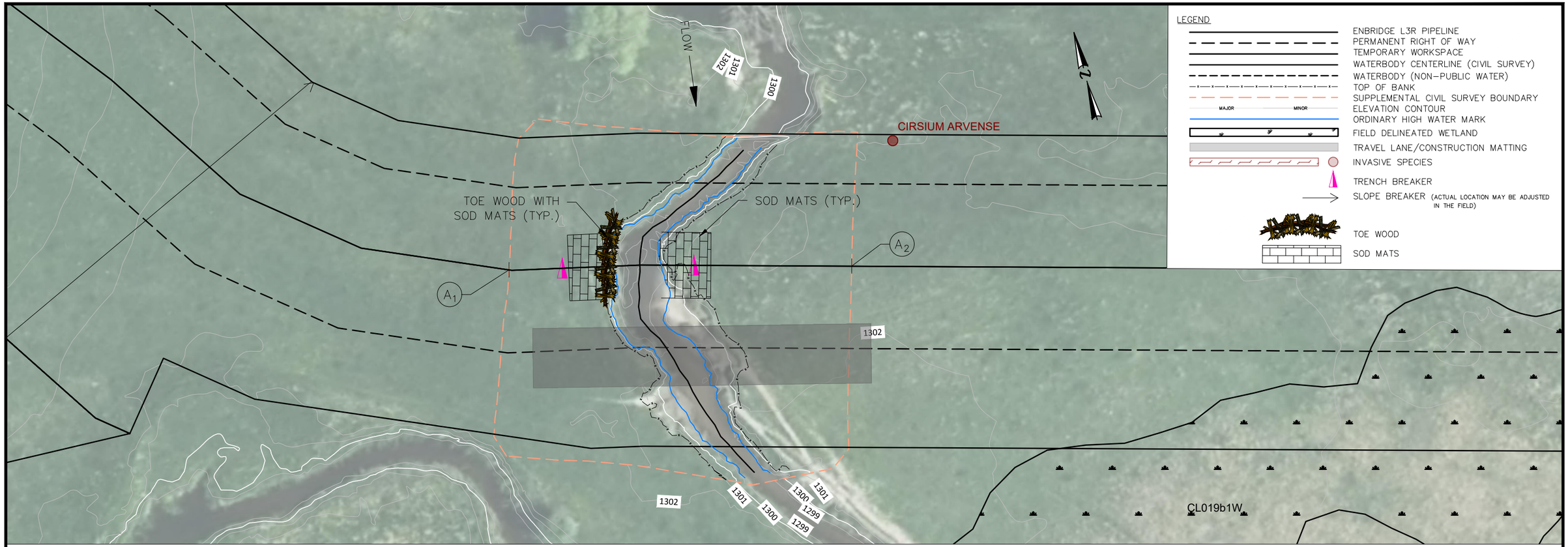
NO.	REVISION-DESCRIPTION	BY	DATE	CHK'D	APP'D
0	ISSUED FOR PERMIT APPLICATION	AJJ	10/2020	BAB	BAB

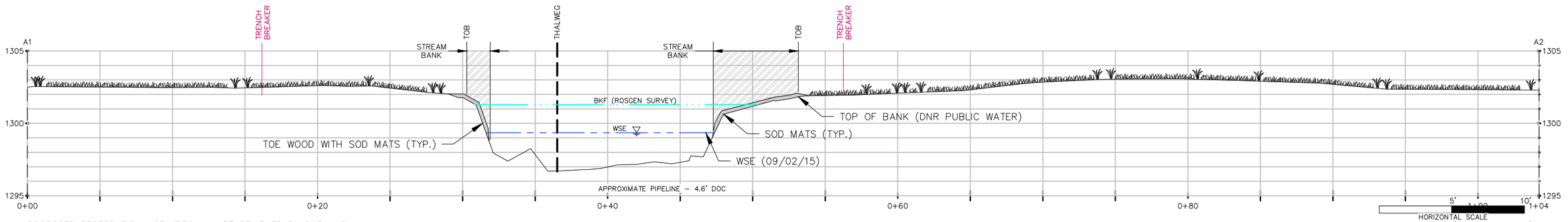
ENBRIDGE

DWN. BY: AJJ	DATE 10/2020
CHK.	
PROJ. ENGR.	
PROJ. MGR.	
CLIENT APP.	

PROPOSED ENBRIDGE L3R PIPELINE
PRIMARY METHOD - DRY CROSSING
CROSSING OF SILVER CREEK
ENBRIDGE MP 907.4
CLEARWATER COUNTY, MINNESOTA

SCALE: NOTED
DWG. NO.: B-93-5.84-MDNR-16-0





PROPOSED RESTORATION ACTIVITIES WILL BE REVIEWED BY DNR AND ENBRIDGE DURING SITE VISIT AND MAY BE CHANGED TO REFLECT SITE CONDITIONS AT THE TIME OF CONSTRUCTION.

FEATURE ID	CL019bWB; IFC ID: S-163.0
CROSSING TYPE	DRY CROSSING
PROPOSED RESTORATION (SEE DETAILS FOR LIVE STAKING, TRANSPLANTS, AND SHRUB SPECIES IF APPLICABLE)	EC BLANKET -NATURAL FIBER MPCA TYPE 3.B/MNDOT CATEGORY 4N; BRUSH – TOE WOOD
WITHIN OR ADJACENT WETLAND	N/A
BWSR SEED MIX	RIPARIAN NE (34-361)
DOMINANT WETLAND VEGETATION	1. PHALARIS ARUNDIANCEA 2. BROMUS INERMIS
SOBS (O/H) or NPC (S1-3)	N/A

NOTES
1. CONSTRUCTION TIMING RESTRICTIONS
   1.1.MDNR REGION 1 PWI – COOL/WARM WATER FISHERY: MARCH 15 – JUNE 30.
   1.2. WHEN WORK OCCURS WITHIN "WORK IN WATER RESTRICTIONS", ALL EXPOSED SOIL AREAS WITHIN 200 FEET OF THE WATER'S EDGE, AND THAT DRAIN TO THAT WATER, WILL BE STABILIZED WITHIN 24 HOURS DURING THE RESTRICTION PERIOD. STABILIZATION OF ALL EXPOSED SOILS WITHIN 200 FEET OF THE PUBLIC WATER'S EDGE, AND THAT DRAIN TO THAT WATER, WILL BE INITIATED IMMEDIATELY AND COMPLETED WITHIN 7 CALENDAR DAYS WHENEVER CONSTRUCTION ACTIVITY HAS PERMANENTLY OR TEMPORARILY CEASED ON ANY PORTION OF THE SITE OUTSIDE OF THE RESTRICTION PERIOD
2. WORK SHALL BE CONDUCTED IN ACCORDANCE WITH APPLICABLE STANDARDS IN ENBRIDGE'S EPP AND VMP FOR PUBLIC LANDS AND WATERS. THE SPECIFICATIONS WITHIN THIS SSRP MAY MODIFY OR REPLACE THESE STANDARDS.
3. SEE GENERAL NOTES PAGE FOR ADDITIONAL DETAIL.
4. INFORMATION REGARDING SEEDING SPECIFICATIONS, SEED BED PREPARATION TECHNIQUES, ETC. ARE DESCRIBED IN THE PLANTING PLAN CONTAINED WITHIN THE VMP.
5. TRENCH BREAKER LOCATION IS APPROXIMATE PENDING FIELD VERIFICATION (EPP SECTION 1.13)

ENBRIDGE

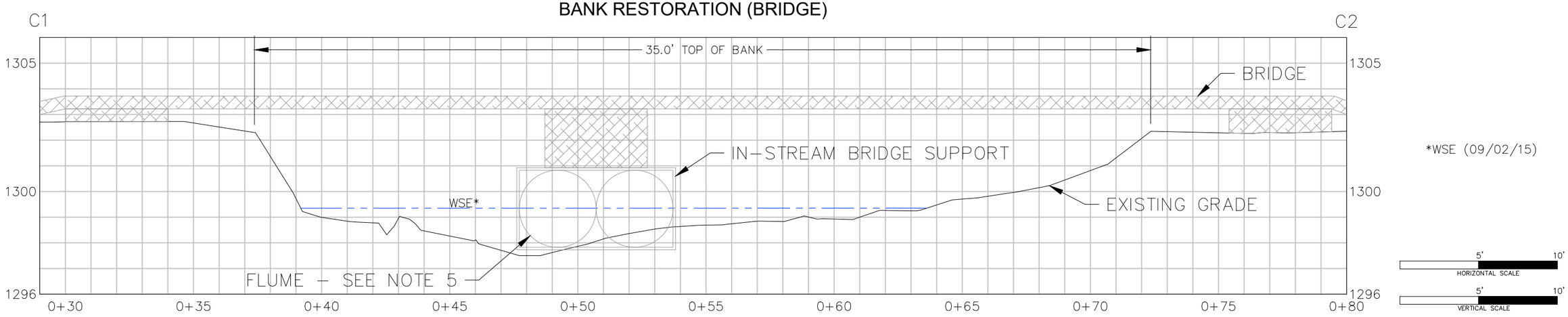
NO.	REVISION-DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE-SPECIFIC RESTORATION PLAN
SILVER CREEK – MP 907.4 – MDNR ID 16
RE-VEGETATION PLAN

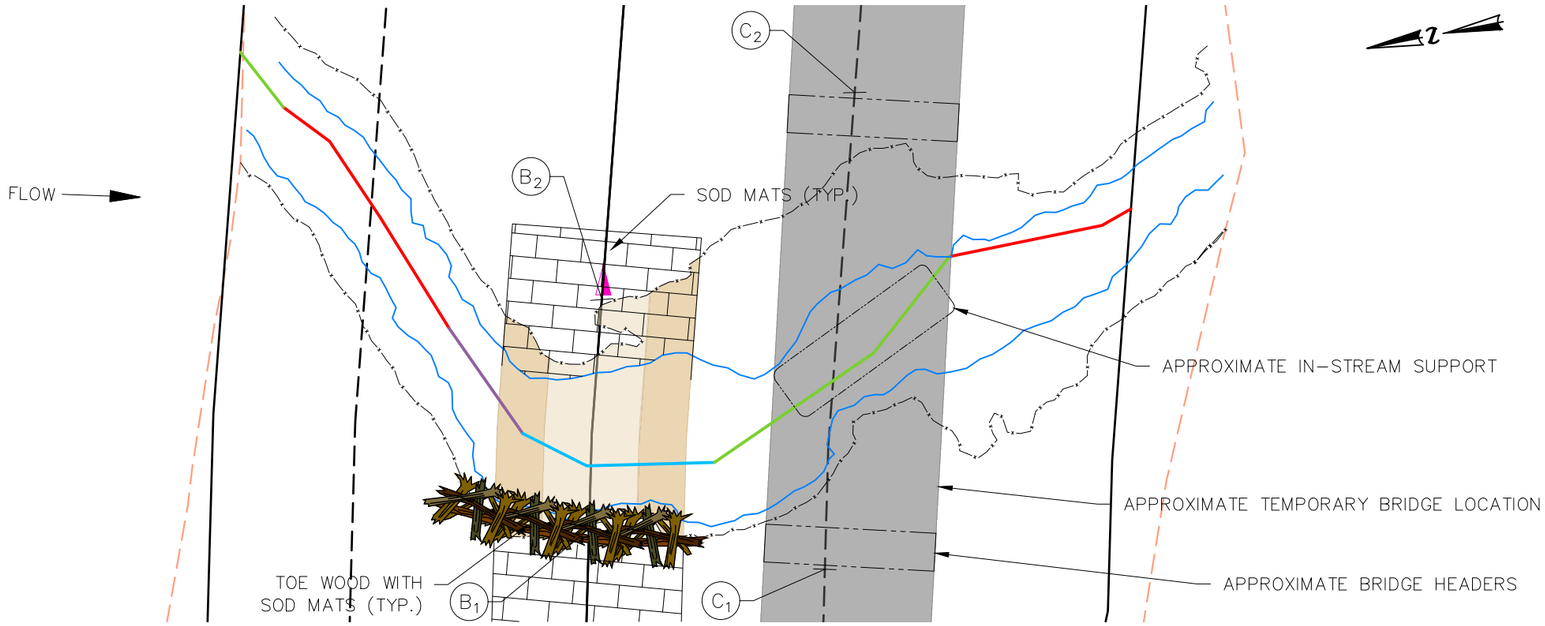
SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP-907.4-001	1/7

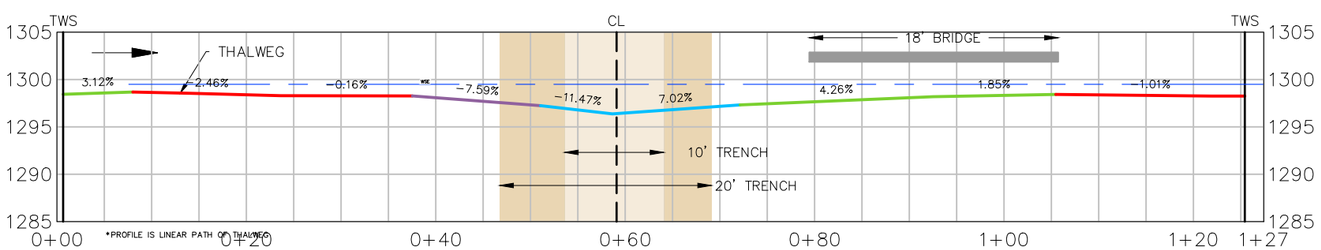
PLOTTED SIZE: ANSI FULL BLEED B (17x11)

BANK RESTORATION (BRIDGE)



STREAMBED RESTORATION





NOTES

1. TRANSITIONS BETWEEN EXISTING CHANNEL FEATURES (BED, BANK, FLOODPLAIN) AND PROPOSED RESTORED TRENCH CROSSING WILL BE SMOOTH AND EVENLY GRADED WITHOUT ABRUPT OR PROTRUDING OBSTRUCTIONS.
   1.1. BANK WILL BE RESTORED TO REMEDIATE EXISTING EROSION RESULTING FROM HOOF SHEER. CLEAN FILL OR EXCESS SOIL FOLLOWING PIPE INSTALLATION SHALL BE USED.
2. BANK MIGRATION POTENTIAL IS TO THE NORTH. PRIMARY FLOW IS LOCATED ON THE UPSTREAM SIDE OF THE CHANNEL.
3. PLACE MATS DIRECTLY ON TOP OF EXISTING VEGETATION TO AVOID OR MINIMIZE DISTURBANCE OF VEGETATION ON THE CHANNEL BANKS AND AT THE TOP OF THE STREAM BANK.
4. SEE DETAIL SHEET FOR SPECIFIC RESTORATION METHODS AND DETAILS.
5. FLUMES SIZES MAY VARY BETWEEN 18-48 INCHES AND MUST EXTEND ABOVE OHWM OR SURFACE WATER AT TIME OF CONSTRUCTION, WHICHEVER IS GREATER.
6. USE OF CATTLE EXCLUSION MAY BE ADDRESSED DURING THE OPERATIONAL PHASE OF THE PROJECT, PENDING LANDOWNER DISCUSSION.
7. MINIMIZE DISTURBANCE OF BED MATERIALS AND FEATURES DURING CONSTRUCTION OF THE TRENCH AND INSTALLATION AND REMOVAL OF IN-STREAM SUPPORT
8. BED AND/OR BANK MATERIALS TEMPORARILY ADJUSTED OR REMOVED DURING CONSTRUCTION SHALL BE PLACED IN THE APPROXIMATE ORIGINAL LOCATION DURING RESTORATION. MATERIALS SHALL BE FIELD ADJUSTED DURING PLACEMENT BASE ON THE OBSERVED FLOW PATH AT THE TIME OF CONSTRUCTION.
9. ALIGNMENT OF IN-STREAM SUPPORT SHALL BE FIELD ADJUSTED BASED ON FLOW PATH TO PROTECT CHANNEL BANKS.
10. SEE RESTORATION SHEET FOR B1-B2 CROSS SECTION.

LEGEND

- ENBRIDGE L3R PIPELINE
- PERMANENT RIGHT OF WAY
- TEMPORARY WORKSPACE
- WATERBODY - RIFFLE (ROSGEN SURVEY)
- WATERBODY - POOL (ROSGEN SURVEY)
- WATERBODY - RUN (ROSGEN SURVEY)
- WATERBODY - GLIDE (ROSGEN SURVEY)
- CONTOUR (1' INTERVAL) (MAJOR / MINOR)
- TOP OF BANK
- ORDINARY HIGH WATER MARK
- FIELD DELINEATED WETLAND
- TRAVEL LANE/CONSTRUCTION MATTING
- TRENCH - 10'
- TRENCH - 20'

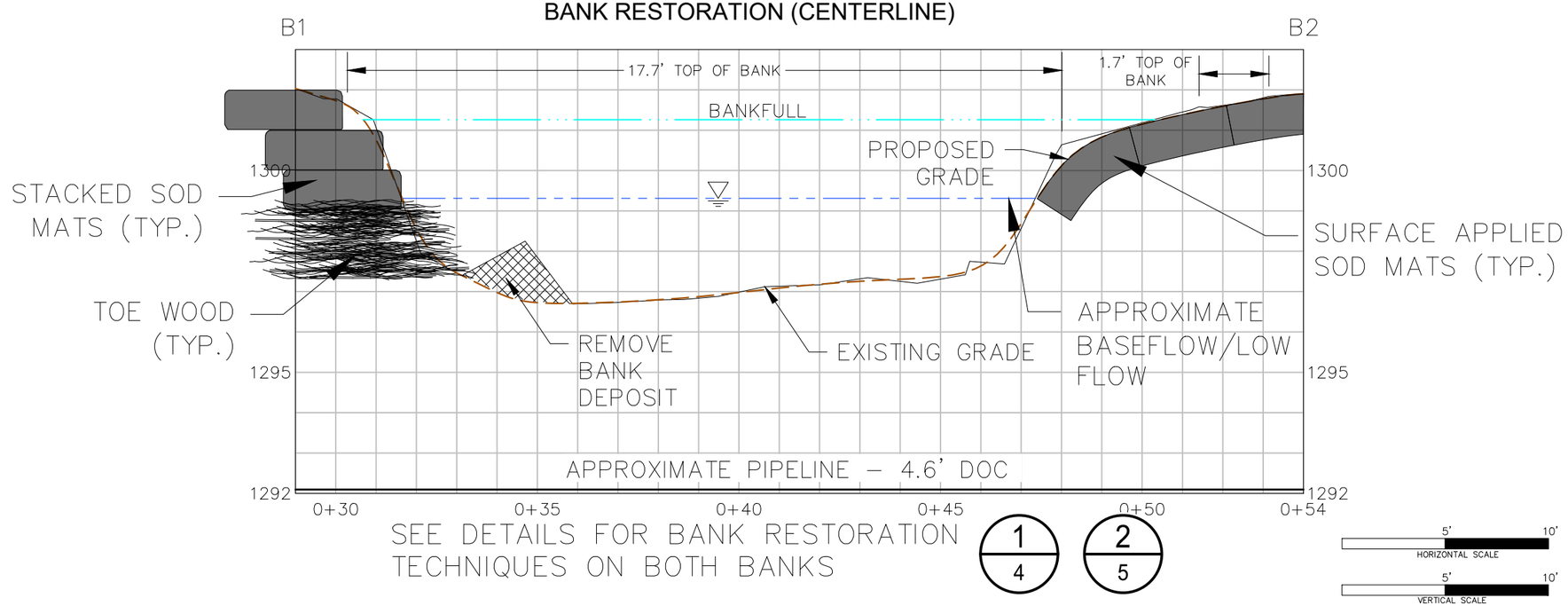
NO.	REVISION-DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE-SPECIFIC RESTORATION PLAN
SILVER CREEK - MP 907.4 - MDNR ID 16
STABILIZATION PLAN

SCALE	DWG. NO.	PAGE NO.
	SSRP-907.4-002	2/7

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

BANK RESTORATION (CENTERLINE)



RESTORATION NOTES:

GENERAL

1. REFER TO RESTORATION DETAIL SHEETS FOR ADDITIONAL INFORMATION RELATED TO PROPOSED RESTORATION MEASURES.
2. REFER TO SITE PHOTOS FOR INFORMATION ON PRE-CONSTRUCTION CROSSING CONDITIONS AND TO PROVIDE ADDITIONAL GUIDANCE FOR RESTORATION EFFORTS.
3. EROSION AND SEDIMENT CONTROL WILL BE LIMITED TO NATURAL FIBERS (I.E., CATEGORY 3N OR 4N IN THE 2016 & 2018 MNDOT STANDARDS SPECIFICATIONS FOR CONSTRUCTION).

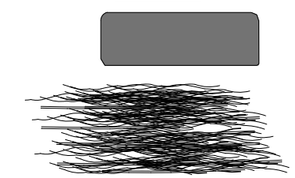
TOE WOOD

1. ROUGH GRADE CHANNEL BED FEATURES INCLUDING POOLS AND PLACEMENT OF SUBSTRATE.
2. INSTALL FOOTER LOG(S) ALONG PROPOSED TOE OF SLOPE. FOOTER LOGS SHOULD BE ANGLED TO ALLOW FOR TOE ALIGNMENT TO GENERALLY MATCH THE EXISTING CURVE AND EVENLY TRANSITION FROM UPSTREAM TO DOWNSTREAM.
3. PUSH FOOTER LOG INTO SOIL APPLY A SMALL AMOUNT OF GRAVEL OR STONE AS NEEDED TO PREVENT FLOATATION OF FOOTER LOG PRIOR TO PLACING WOODY DEBRIS.
4. PLACE A LAYER WOODY DEBRIS IN 6" TO 8" LIFTS, APPLY 3"-4" GRAVEL AND/OR SOIL FILL AND COMPACT WITH EXCAVATOR BUCKET. WASH FILL MATERIAL INTO WOODY DEBRIS MATRIX WITH WATER FROM CHANNEL. APPLY ADDITIONAL LAYERS "AS NEEDED" TO REACH THE SPECIFIED TOE WOOD HEIGHT.
5. PLACE STACKED SOD MATS ABOVE TOE WOOD. THE USE OF TRANSPLANTS OR FABRIC LIFTS MAY BE FIELD APPROVED BY ENBRIDGE IN CONSULTATION WITH MN DNR.

SOD MATTING

1. REMOVE VEGETATED MATS ON EITHER SIDE OF THE STREAM CROSSING USING ONSITE EQUIPMENT WHICH CAN UNDERCUT THE VEGETATION FOR REMOVAL. SMALL SHRUBS AND/OR TREES WITHIN THE SOD MATS ARE ACCEPTABLE AND SHOULD NOT BE REMOVED.
2. DEPENDING ON THE LEVEL OF SATURATION AT THE TIME OF REMOVAL, IT MAY BE DIFFICULT TO OBTAIN INTACT CONSOLIDATED MATS, BUT GENERALLY THE NATIVE VEGETATION WILL BE RETAINED AND CAPTURED FOR PLACEMENT.
3. SOD MATS CAN BE TRANSPLANTED DURING ANY.
4. SOD MAT WILL BE PLACED ON CLEAR GROUND OR MATS WITHIN THE WORKSPACE.
5. MONITOR MATS TO SUPPORT SURVIVABILITY; WATERING MAY BE NEEDED.
6. PRIOR TO PLACEMENT OF SOD MATS FINISH GRADE CHANNEL BANK AND ADJACENT FLOODPLAIN APPLICATION AREA TO PROVIDE A SMOOTH AND EVEN SURFACE. SUBGRADE ELEVATION SHOULD ALLOW FOR THE FINISHED SOD SURFACE TO TRANSITION EVENLY WITH THE CHANNEL BANKS UPSTREAM AND DOWNSTREAM OF THE INSTALLATION AREA. AVOID ABRUPT CHANGES IN GRADE.
7. VEGETATED MATS WILL BE RETURNED/SET IN PLACE WITH ONSITE EQUIPMENT.
   a. SURFACE APPLIED SOD MATTING SHOULD BE PLACED WITH THE LONG SIDE PERPENDICULAR TO THE CHANNEL / FLOW.
   b. STACKED SOD MATTING SHOULD BE PLACED WITH THE LONG SIDE PARALLEL TO THE CHANNEL / FLOW.
8. IF SUFFICIENT SOD IS NOT AVAILABLE FROM THE STREAM BANKS ADDITIONAL SOD MAY BE TAKEN FROM THE ADJACENT CONSTRUCTION WORKSPACE.
9. WHEN PLACING SOD MATS, DO NOT LEAVE LARGE GAPS BETWEEN EACH SOD MAT AS NON-NATIVE VEGETATION WILL QUICKLY ATTEMPT TO COLONIZE THESE VOIDS.
10. WATER SOD MATS AFTER REPLACEMENT IF CONDITIONS ARE HOT AND DRY. DAMP AND/OR FROZEN SOD MATS DO NOT REQUIRE WATERING.
11. THE TOP MAT AND/OR OTHER MATS CAN BE ANCHORED WITH A LIVE AND/OR DEAD STOUT STAKE TO ENSURE THAT IT DOES NOT MOBILIZE DURING A FLOOD EVENT BEFORE THE ROOTS HAVE ESTABLISHED.
12. THE VEGETATED MATS WILL BE REPLACED AS SOON AS PRACTICAL FOLLOWING BACKFILLING OF THE TRENCH AND STABILIZED PER THE TIMING REQUIREMENTS DESCRIBED IN SECTION 1.9.1 OF THE EPP.

LEGEND



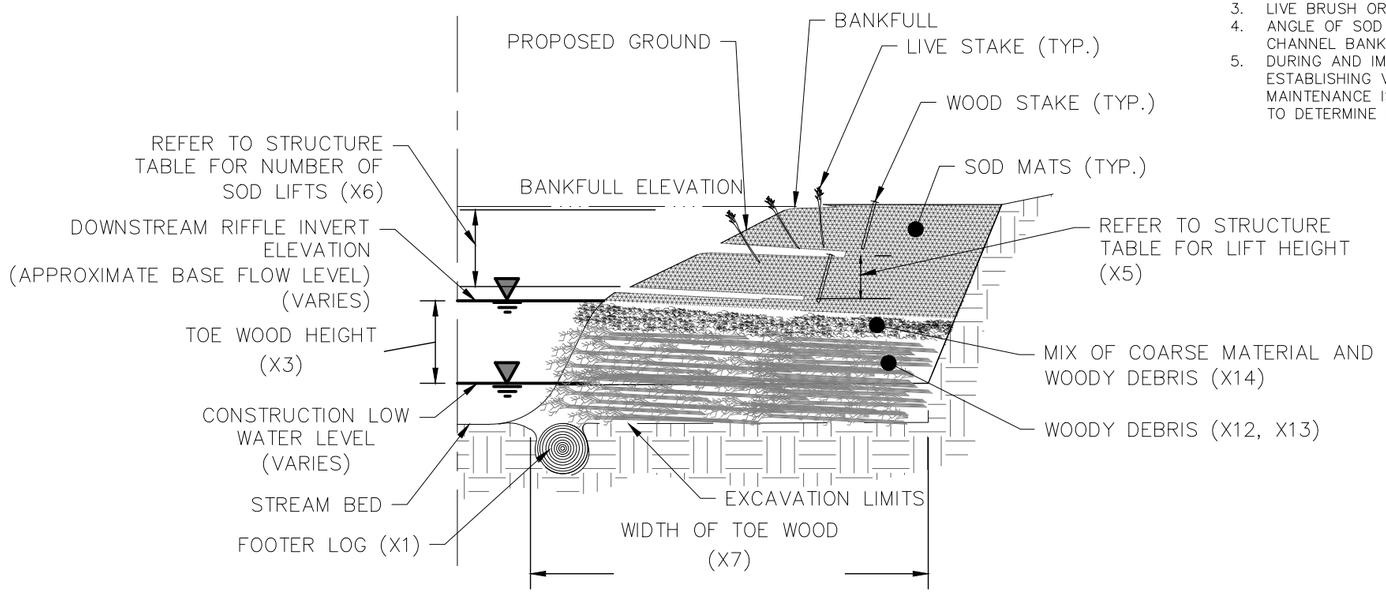
NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
SILVER CREEK – MP 907.4 – MDNR ID 16
SITE SPECIFIC DETAILS

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP–907.4–004	3/7

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

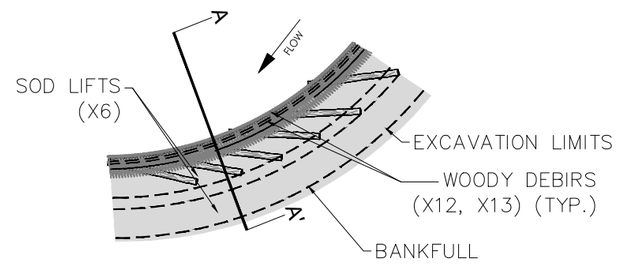
TOE WOOD DIMENSIONS			
VARIABLE	**VALUE**	**TYPICAL UNIT**	**DESCRIPTION**
X1	6.0 - 10.0	IN.	FOOTER LOG DIAMETER
X2	8.0 - 12.0	FT.	FOOTER LOG LENGTH
X3	18.0	IN.	TOE WOOD HEIGHT
X4	SEE SHEET 3	N/A	MATCH TYPICAL SECTION
X5	SEE SHEET 5	FT.	SOD LIFT HEIGHT
X6	3.0	#	SOD LIFTS
X7	8.0 - 10.0	FT.	TOE WOOD WIDTH
X8	3.0 - 6.0	FT.	SOD LIFT WIDTH
X9	24.0	IN.	WOOD STAKE LENGTH
X10	4.0	IN.	WOOD STAKE WIDTH (TOP)
X11	0.5	IN.	WOOD STAKE WIDTH (BOTTOM)
X12	1/2 - 3.0	IN.	WOODY DEBRIS DIAMETER
X13	8.0 - 12.0	FT.	WOODY DEBRIS LENGTH
X14	3" MINING GRAVEL WITH FINES	%	SELECT COARSE MATERIAL BACKFILL (BY VOLUME)



SECTION A-A'

TOE WOOD EXAMPLE

NOTES:
1. WOODY MATERIAL OF APPROPRIATE SIZE CONSISTING OF LOGS, TRUNKS, LIMBS, BRANCHES, AND SMALLER WOODY DEBRIS INCLUDING TOPS OR SLASH. ON-SITE WOODY MATERIAL IS PREFERRED.
2. WOODY DEBRIS SHOULD BE GREEN OR RELATIVELY GREEN AND MAY CONSIST OF HARDWOODS, CONIFERS, OR A COMBINATION OF BOTH.
3. LIVE BRUSH OR OTHER BANK VEGETATION MAY BE INCORPORATED.
4. ANGLE OF SOD MAT SURFACE SHALL MATCH THE PROPOSED CHANNEL CROSS SECTION AND PROVIDE A SMOOTH AND EVEN CHANNEL BANK SURFACE BETWEEN UPSTREAM AND DOWNSTREAM BANKS.
5. DURING AND IMMEDIATELY AFTER CONSTRUCTION, BANK SLOPES ABOVE THE WOOD TOE ARE VULNERABLE TO EROSION. ESTABLISHING VEGETATION OR OTHER COVER MATERIAL AS SOON AS POSSIBLE WILL HELP REDUCE EROSION. ADDITIONAL MAINTENANCE IS NOT EXPECTED ONCE VEGETATION ESTABLISHES. INSPECTION AFTER LARGE FLOW EVENTS MAY BE ADVISABLE TO DETERMINE IF ANY MATERIAL MOVEMENT OR UNEXPECTED SCOUR HAS OCCURRED.



PLAN VIEW AT BANKFULL ELEVATION

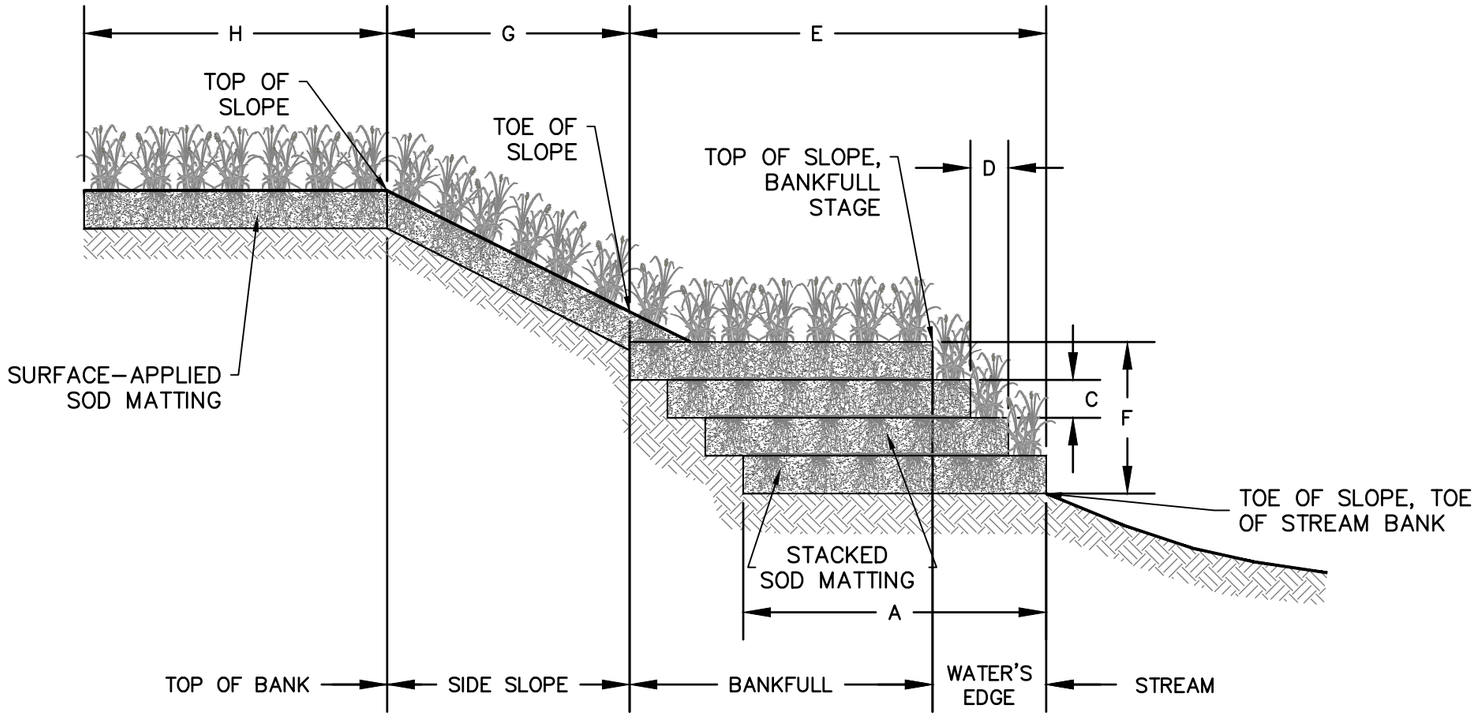
1 TOE WOOD DETAIL

NO.	REVISION-DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

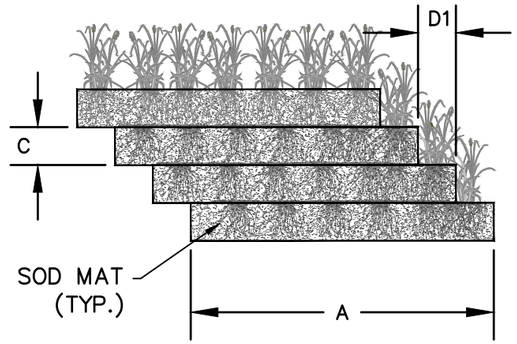
ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE-SPECIFIC RESTORATION PLAN
SILVER CREEK - MP 907.4 - MDNR ID 16
SITE SPECIFIC DETAILS

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP-907.4-004	4/7

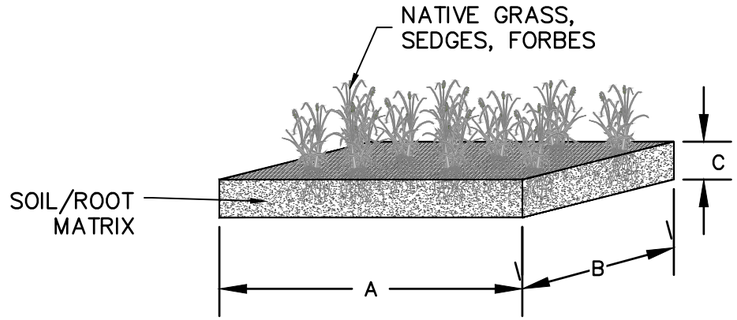
PLOTTED SIZE: ANSI FULL BLEED B (17x11)



CROSS SECTION



STACKED SOD MATTING DETAIL



SOD MAT DETAIL

DIMENSION[1]	NAME	TYPICAL UNIT	VALUE	DESCRIPTION
A	SOD MAT WIDTH	FEET	3 – 4	WIDTH OF INDIVIDUAL SOD MAT.
B	SOD MAT LENGTH	FEET	3 – 6	LENGTH OF INDIVIDUAL SOD MAT.
C	SOD MAT THICKNESS	INCHES	12	THICKNESS OF INDIVIDUAL SOD MAT.
D	STACKED SOD MAT SETBACK	FEET, INCHES	6 ±	THE DISTANCE BETWEEN THE EDGES OF SOD MATS STACKED TO FORM A SLOPE
E	WIDTH OF STACKED SOD MATS	FEET, INCHES	10 – 20	WIDTH OF A BANK CREATED BY STACKED SOD MATS
F	HEIGHT OF STACKED SOD MATS	FEET, INCHES	3	HEIGHT OF A SLOPE CREATED BY STACKED SOD MATS
G	WIDTH OF SURFACE- APPLIED SOD MATS	FEET, INCHES	10 – 20	WIDTH OF A SLOPE STABILIZED WITH SURFACE-APPLIED SOD MATS
H	TOP OF BANK SOD MATTING DISTANCE	FEET	10	DISTANCE SOD MATTING IS INSTALLED ON THE TOP OF BANK

NOTES:

1. DIMENSION LABELS ARE REFERENCED IN THE DETAIL DRAWINGS.

SOD MAT EXAMPLES

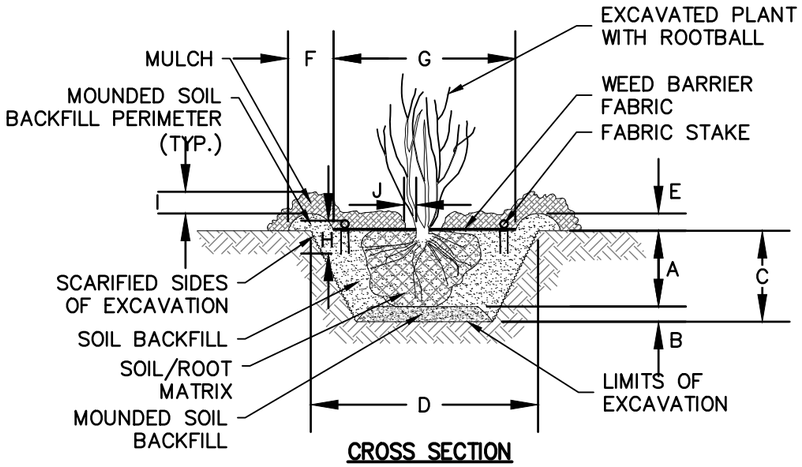
1 SOD MATTING DETAIL

NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
SILVER CREEK – MP 907.4 – MDNR ID 16
SITE SPECIFIC DETAILS

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP–907.4–004	5/7

PLOTTED SIZE: ANSI FULL BLEED B (17x11)



CROSS SECTION

DIMENSION[2]	NAME	TYPICAL UNIT	VALUE	DESCRIPTION
A	PLANTING DEPTH	VARIES	N/A	PLANTING DEPTH OF THE TRANSPLANT.
B	HEIGHT OF MOUNDED SOIL BACKFILL	INCHES	N/A	HEIGHT OF MOUNDED LOOSE SOIL PLACED INTO OVER-EXCAVATED PLANTING PIT.
C	DEPTH OF PLANTING PIT	VARIES	N/A	DEPTH OF THE PLANTING PIT; ACCOMMODATES DIMENSION OF SOIL AND EXCAVATED ROOTS AS WELL AS MOUNDED LOOSE SOIL AT BOTTOM OF PIT.
D	WIDTH OF PLANTING PIT	VARIES	N/A	OVER-EXCAVATED WIDTH OF THE PLANTING PIT; ACCOMMODATES THE WIDTH OF THE EXCAVATED SOIL AND ROOTS.
E	HEIGHT OF MOUNDED SOIL PERIMETER	INCHES	N/A	HEIGHT OF SOIL BERM CONSTRUCTED ALONG THE PERIMETER OF THE PLANTING PIT; HELPS RETAIN WATER.
F	WIDTH OF MOUNDED SOIL PERIMETER	INCHES	N/A	WIDTH OF SOIL BERM CONSTRUCTED ALONG THE PERIMETER OF THE PLANTING PIT; HELPS RETAIN WATER.
G	WIDTH OF WEED BARRIER FABRIC (OPTIONAL)	INCHES	N/A	WIDTH OF FABRIC PLACED ON SURFACE TO CONTROL WEEDS WITHIN THE MOUNDED SOIL PERIMETER; TRANSPLANTS TYPICALLY HAVE GRASSES, LEAF MATTER, ETC. ATTACHED AND DO NOT REQUIRE WEED BARRIER FABRIC.
H	FABRIC STAKE LENGTH (OPTIONAL)	INCHES	N/A	LENGTH OF STAPLES/SPIKES USED TO SECURE WEED BARRIER FABRIC
I	THICKNESS OF MULCH (OPTIONAL)	INCHES	N/A	THICKNESS OF MULCH, IF NECESSARY. TRANSPLANTS TYPICALLY HAVE GRASSES, LEAF MATTER, ETC. ATTACHED AND DO NOT REQUIRE MULCH.
J	GAP BETWEEN MULCH AND PLANT STEM/TRUNK (OPTIONAL)	INCHES	N/A	ROOM BETWEEN PLANT STEM/TRUNK AND MULCH. TRANSPLANTS TYPICALLY HAVE GRASSES, LEAF MATTER, ETC. ATTACHED

NOTES:
1. DATA ARE FOR TRANSPLANTED VEGETATION.
2. DIMENSION LABELS ARE REFERENCED IN THE DETAIL DRAWINGS.

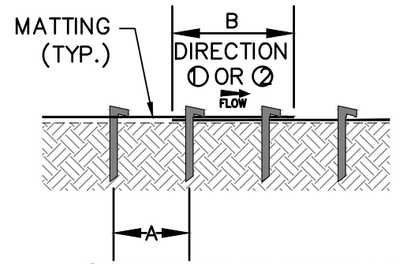
TRANSPLANTS EXAMPLES

1 TRANSPLANTING DETAIL

DIMENSION[1]	NAME	TYPICAL UNIT	VALUE	DESCRIPTION
A	MATTING STAKE SPACING	FEET, INCHES	3 O.C	SPACING BETWEEN EROSION CONTROL MATTING STAKES USED TO FASTEN THE MATTING TO THE SOIL
B	MATTING OVERLAP	FEET, INCHES	18	AMOUNT OF EROSION CONTROL MATTING OVERLAP IF MULTIPLE PIECES AND/OR ROLLS OF MATTING ARE USED. OVERLAP VARIES DEPENDING ON THE LOCATION OF THE OVERLAP WITH RESPECT TO POSITION ON THE SLOPE, LOCATION OF THE MATTING (EDGE OR END), AND PRODUCT SPECIFICATIONS.
C	MATTING ANCHOR TRENCH DEPTH	FEET, INCHES	6 (MIN)	DEPTH OF TRENCH INTO WHICH EDGE OF EROSION CONTROL MATTING IS ANCHORED AT THE TOP AND/OR TOE OF A SLOPE.
D	MATTING ANCHOR TRENCH WIDTH	FEET, INCHES	12	WIDTH OF TRENCH INTO WHICH EDGE OF EROSION CONTROL MATTING IS ANCHORED AT THE TOP AND/OR TOE OF A SLOPE.
E	TOP OF SLOPE ANCHOR TRENCH SETBACK	FEET, INCHES	12	TOP OF SLOPE ANCHOR TRENCH DISTANCE FROM THE TOP OF SLOPE. TOP OF SLOPE REFERS TO TOP OF SIDE SLOPE, BANK SLOPE, TERRACE SLOPE, BANKFULL, ETC.
F	MATTING STAKE LENGTH	INCHES	12	LENGTH OF EROSION CONTROL MATTING STAKES USED TO FASTEN THE MATTING TO THE SOIL

NOTES:
1. DIMENSION LABELS ARE REFERENCED IN THE DETAIL DRAWINGS.
2. O.C, ON CENTER
3. STAPLES ARE NOT PERMITTED

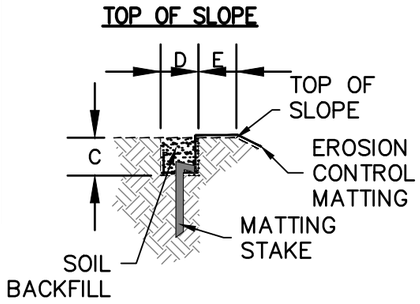
2 EROSION CONTROL MATTING DETAIL

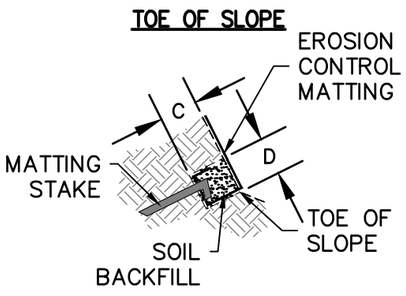


① DIRECTION OF STREAM FLOW
② DIRECTION DOWN THE BANK SLOPE

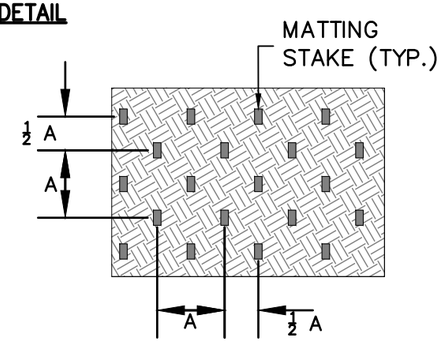
MATTING OVERLAP DETAIL

MATTING STAKE DETAIL





MATTING ANCHOR DETAIL



MATTING STAKE PATTERN DETAIL

NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
SILVER CREEK – MP 907.4 – MDNR ID 16
SITE SPECIFIC DETAILS

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP–907.4–004	6/7

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

1 CENTERLINE – FACING WEST BANK

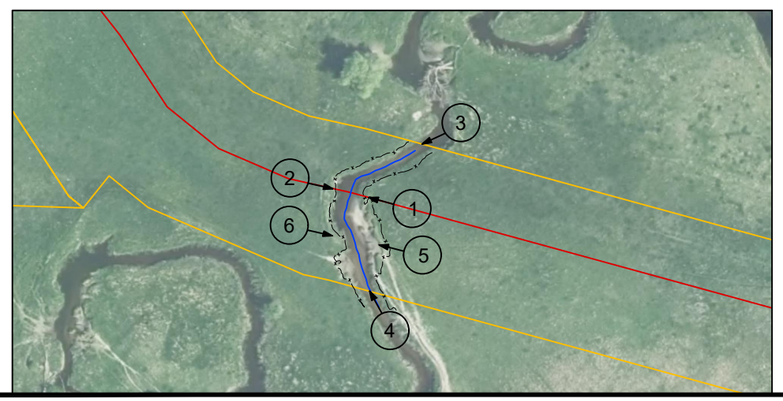
2 CENTERLINE – FACING EAST BANK

3 EDGE OF WORKSPACE – FACING DOWNSTREAM

4 EDGE OF WORKSPACE – FACING UPSTREAM

5 BRIDGE – FACING WEST BANK

6 BRIDGE – FACING EAST BANK



NOTES:

1. AIR PHOTOS ARE FROM 2018 ENBRIDGE AERIAL PHOTOGRAPHY.
2. ADDITIONAL ON–THE GROUND PHOTOS MAY BE TAKEN PRIOR TO CONSTRUCTION AT MDNR REQUEST.
3. PRE–CONSTRUCTION PHOTOS WILL BE USED TO AID IN RESTORATION.

NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING	MJT	10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
SILVER CREEK – MP 907.4 – MDNR ID 16
PHOTO PAGE

SCALE	DWG. NO.	PAGE NO.
	SSRP–907.4–005	5/5

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

GENERAL

1. THE SPECIFICATIONS WITHIN THIS SSRP MAY MODIFY OR REPLACE PROJECT–WIDE STANDARDS PRESENTED IN THE EPP. WHERE MATERIAL WITHIN THESE SSRPS EXCEEDS STANDARD CONSTRUCTION MEASURES IN THE EPP, THESE SSRPS SUPERSEDE THE EPP.

2. CONSTRUCTION AND RESTORATION OF WATERBODY CROSSINGS WILL FOLLOW THESE GENERAL STEPS:

   A. SITE CLEARING
   B. INSTALLATION OF TEMPORARY EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICES ("BMPS")
   C. BRIDGE INSTALLATION
   D. EXCAVATION/BACKFILLING OF THE WATERBODY INCLUDING:
      - SOD SAVING TOPSOIL SEGREGATION AT NON–WOODED SITES
      - STREAMBED MATERIAL SEGREGATION
      - PIPE INSTALLATION
      - BACKFILL, INCLUDING IMPLEMENTATION OF CONSTRUCTION–RELATED RESTORATION METHODS (I.E., TOE WOOD)
   E. REPLACEMENT OF STREAMBED MATERIAL AND TOPSOIL/SOD LAYER
   F. RESTORATION OF STREAM BANKS TO PRE–CONSTRUCTION CONTOURS
   G. IF FINAL GRADING NOT POSSIBLE AT THE TIME, TEMPORARY STABILIZATION AND REPLACEMENT/REINFORCEMENT OF TEMPORARY BMPS
   H. AFTER FINAL GRADING, PERMANENT SEEDING AND/OR WOODY VEGETATION RESTORATION, STABILIZATION AND REPLACEMENT/REINFORCEMENT OF TEMPORARY BMPS
   I. BRIDGE REMOVAL DURING FINAL RESTORATION AFTER STABILIZATION AND PERMANENT SEEDING
   J. POST–CONSTRUCTION MONITORING

CROSSING METHODS

1. ALL WATERBODY AND WETLAND CROSSINGS WILL BE CONDUCTED IN COMPLIANCE WITH SECTION 2.0 AND SECTION 3.0 OF THE ENVIRONMENTAL PROTECTION PLAN ("EPP"), RESPECTIVELY. SECTION 2.0 AND 3.0 OF THE WINTER CONSTRUCTION PLAN PRESENTS MODIFICATIONS FOR WATERBODY AND WETLAND CONSTRUCTION METHODS, RESPECTIVELY, IN WINTER CONDITIONS.

2. ENBRIDGE'S SUMMARY OF CONSTRUCTION METHODS AND PROCEDURES (THE "PROCEDURES," APPENDIX A OF THE EPP) OUTLINES THE VARIOUS CONSTRUCTION METHODS THAT ENBRIDGE MAY UTILIZE TO CONSTRUCT THROUGH WATERBODIES AND WETLANDS/BASINS AS PRESENTED ON THESE SITE–SPECIFIC RESTORATION PLANS ("SSRPS").

   A. DRY CROSSING (ISOLATED) METHODS (INCLUDING THE DRY CROSSING AND MODIFIED DRY CROSSING METHOD) ARE DESCRIBED SECTIONS 4.3 OF THE PROCEDURES, AND IN SECTIONS 2.5.2 AND 2.5.3 AND FIGURES 23 AND 24 OF THE EPP.
   B. THE BORE METHOD (NON–PRESSURIZED) IS DESCRIBED IN SECTION 3.5 OF THE PROCEDURES, AND SECTION 4.0 OF THE EPP.
   C. THE MODIFIED UPLAND CONSTRUCTION (WETLAND) METHOD IS DESCRIBED IN SECTION 3.3 OF THE PROCEDURES, AND SECTION 3.0 AND FIGURES 30 TO 34 OF THE EPP.
   D. ALTHOUGH NOT PROPOSED AS A PRIMARY METHOD AT THESE SSRP WATERBODIES, THE OPEN CUT (NON–ISOLATED) WATERBODY CROSSING METHOD IS DESCRIBED IN SECTION 4.1 OF THE PROCEDURES, AND SECTION 2.5.1 AND FIGURE 24 OF THE EPP.
   E. ALTHOUGH NOT PROPOSED AS A PRIMARY METHOD AT THESE SSRP WATERBODIES, THE PUSH–PULL METHOD IS DESCRIBED IN SECTION 3.4 OF THE PROCEDURES, AND SECTION 3.7.1 AND FIGURES 35 AND 36 OF THE EPP.

CLEARING/VEGETATION REMOVAL

1. STUMPS WITHIN THE TRENCH LINE WILL BE COMPLETELY REMOVED, GROUND, AND/OR HAULED OFF–SITE TO AN APPROVED LOCATION. TREE STUMPS OUTSIDE THE TRENCH LINE WILL BE GROUND BELOW NORMAL GROUND SURFACE TO FACILITATE A SAFE WORK AREA AND TO ALLOW TOPSOIL REMOVAL, IF NECESSARY. IN SOME CIRCUMSTANCES, TREE STUMPS OUTSIDE THE TRENCH LINE MAY BE COMPLETELY REMOVED TO ALLOW FOR A SAFE WORK AREA AND HAULED OFF–SITE TO AN APPROVED LOCATION AS OUTLINED IN SECTION 1.8.3 OF THE EPP.

2. CLEARING WILL BE CONDUCTED IN WATERBODIES AND WETLANDS AS OUTLINED IN SECTION 2.2 AND 3.2 OF THE EPP, RESPECTIVELY. CHIPS, MULCH, OR MECHANICALLY CUT WOODY DEBRIS SHALL NOT BE STOCKPILED IN A WETLAND. HYDRO–AX DEBRIS, OR SIMILAR CAN BE LEFT IN THE WETLAND IF SPREAD EVENLY IN THE CONSTRUCTION WORKSPACE TO A DEPTH THAT WILL ALLOW FOR NORMAL REVEGETATION, AS DETERMINED BY THE EI. CHIPPING IS NOT ALLOWED ON PUBLIC LANDS. ON PUBLIC LANDS, MULCH AND MECHANICALLY CUT WOODY DEBRIS MUST BE UNIFORMLY BROADCAST TO LESS THAN 2–INCH THICKNESS AND IN A MANNER THAT MAINTAINS VISIBLE GROUND.

3. ENBRIDGE WILL PROPERLY INSTALL AND MAINTAIN REDUNDANT SEDIMENT CONTROL MEASURES IMMEDIATELY AFTER CLEARING AND PRIOR TO INITIAL GROUND DISTURBANCE AT SURFACE WATERS LOCATED WITHIN 50 FEET OF THE PROJECT AND WHERE STORMWATER FLOWS TO THE SURFACE WATER (REFER TO THE ENVIRONMENTAL PLAN SHEETS IN THE SWPPP), AND WITHIN 100 FEET OF SPECIAL AND IMPAIRED WATERS, INCLUDING TROUT STREAMS.

4. ON PUBLIC LANDS AND WHEREVER PRACTICABLE AT WATERBODY CROSSINGS, ENBRIDGE WILL USE WILDLIFE–FRIENDLY EROSION AND SEDIMENT CONTROL BMPS THAT CONTAIN BIODEGRADABLE NETTING (CATEGORY 3N OR 4N NATURAL FIBER) AND WILL AVOID THE USE OF PLASTIC MESH (SECTIONS 1.17.1 AND 2.6.1 OF THE EPP).

TEMPORARY STABILIZATION

1. ON PORTIONS OF THE PROJECT WHERE WORK WILL BE OCCURRING DURING APPLICABLE "WORK IN WATER RESTRICTIONS" FOR PUBLIC WATERS (REFER TO SECTION 2.1), ALL EXPOSED SOIL AREAS WITHIN 200 FEET OF THE WATER'S EDGE, AND THAT DRAIN TO THAT WATER, WILL BE STABILIZED WITHIN 24 HOURS DURING THE RESTRICTION PERIOD. STABILIZATION OF ALL EXPOSED SOILS WITHIN 200 FEET OF THE PUBLIC WATER'S EDGE, AND THAT DRAIN TO THAT WATER, WILL BE INITIATED IMMEDIATELY AND COMPLETED WITHIN 7 CALENDAR DAYS WHENEVER CONSTRUCTION ACTIVITY HAS PERMANENTLY OR TEMPORARILY CEASED ON ANY PORTION OF THE SITE OUTSIDE OF THE RESTRICTION PERIOD. THESE AREAS WILL BE IDENTIFIED ON THE ENVIRONMENTAL PLAN SHEETS ACCOMPANYING THE SWPPP.

2. HYDRO–MULCH AND LIQUID TACKIFIER CAN BE USED IN PLACE OF CERTIFIED WEED–FREE STRAW OR HAY MULCH WITH PRIOR APPROVAL FROM ENBRIDGE. ALL HYDROMULCH AND LIQUID TACKIFIER PRODUCTS USED WILL BE ON THE APPLICABLE STATE DOT PRODUCT LIST. HYDRO–MULCH AND LIQUID TACKIFIER PRODUCTS CONTAINING PLASTIC/POLYPROPYLENE FIBER ADDITIVES AND MALACHITE GREEN (COLORANT) WILL NOT BE UTILIZED ON THIS PROJECT. APPLICATION RATES WILL BE AT THE MANUFACTURER'S RECOMMENDED RATE. ENBRIDGE WILL AVOID THE USE OF HYDROMULCH ON PUBLIC LANDS; HOWEVER, ENBRIDGE MAY USE HYDROMULCH ON STEEP SLOPES TO PREVENT EROSION UNTIL PERMANENT COVER HAS BEEN ESTABLISHED AS OUTLINED IN SECTION 1.8.3 OF THE EPP.

RESTORATION AND STABILIZATION

1. ENBRIDGE WILL RESTORE THE STREAM BANKS AS NEAR AS PRACTICABLE TO PRE–CONSTRUCTION CONDITIONS UNLESS THAT SLOPE IS DETERMINED TO BE UNSTABLE. IF THE SLOPE IS CONSIDERED UNSTABLE, ENBRIDGE WILL RESHAPE THE BANKS TO PREVENT SLUMPING. FOR PUBLIC WATERS, ENBRIDGE WILL RETURN THE BANK TO PRE–CONSTRUCTION CONTOURS, UNLESS OTHERWISE DIRECTED BY THE SITE–SPECIFIC RESTORATION PLAN. IF ENBRIDGE CANNOT RESTORE TO PRE–CONSTRUCTION CONTOURS AT A PUBLIC WATER, ENBRIDGE WILL CONSULT WITH THE MDNR BEFORE PROCEEDING FURTHER AS OUTLINED IN SECTION 2.6 OF THE EPP.

2. UNSTABLE SOILS AND/OR SITE–SPECIFIC FACTORS SUCH AS STREAM VELOCITY AND FLOW DIRECTION MAY REQUIRE ADDITIONAL RESTORATION EFFORTS, SUCH AS INSTALLATION OF WOODY VEGETATION, GEOTEXTILE FABRIC, OR TREE, LOG, ROOTWAD, OR BOULDER REVETMENTS TO STABILIZE DISTURBED STREAM BANKS (SEE FIGURE 29) AS OUTLINED IN SECTION 2.6.2 OF THE EPP. ENBRIDGE WILL WORK WITH THE MDNR TO ENSURE ALL WORK/ADJUSTMENTS ARE APPROVED AND ARE CONDUCTED WITHIN APPLICABLE TIMING RESTRICTIONS.

3. IN UPLAND AND WETLAND AREAS, CLEANUP AND ROUGH GRADING WILL OCCUR AS OUTLINED IN SECTIONS 1.16 AND 3.9 OF THE EPP. ENBRIDGE WILL BACKFILL THE TRENCH TO AN ELEVATION SIMILAR TO THE ADJACENT AREAS OUTSIDE THE TRENCH LINE AND WILL ADD A SLIGHT CROWN OF APPROXIMATELY 3 TO 6 INCHES (DEPENDING ON SOIL TYPE) OVER THE BACKFILLED TRENCH TO ALLOW FOR SUBSIDENCE. GENERALLY, EXCESS SUBSOIL DISPLACED BY THE PIPE INSTALLATION WILL BE SPREAD ACROSS THE PORTION OF THE CONSTRUCTION WORKSPACE WHERE TOPSOIL REMOVAL HAS OCCURRED. ANY REMAINING EXCESS SUBSOIL WILL BE REMOVED AND DISPOSED OF AT AN APPROVED OFF–SITE LOCATION AS NEEDED TO ENSURE CONTOURS ARE RESTORED TO AS NEAR AS PRACTICABLE TO PRE–CONSTRUCTION CONDITIONS.

4. REVEGETATION ACTIVITIES WILL OCCUR AS OUTLINED IN SECTION 7.0 OF THE EPP. SEED MIXES AT PUBLIC WATERS WILL BE SELECTED AND APPLIED AS INDICATED IN THE PLANTING PLAN, WHICH IS APPENDIX A OF THE POST–CONSTRUCTION VEGETATION MANAGEMENT PLAN FOR PUBLIC LANDS AND WATERS ("VMP"). SEED MIXES RELATIVE TO THESE SSRP CROSSINGS ARE CODED AS FOLLOWS:

A	EMERGENT (34–181)	G	DRY PRAIRIE GENERAL (35–221)
B	RIPARIAN NE (34–361)	H	MESIC PRAIRIE GENERAL (35–241)
C	RIPARIAN S&W (34–261)	I	MESIC PRAIRIE NW (35–441)
D	WET MEADOW NE (34–371)	J	DRY PRAIRIE NORTHWEST (35–421)
E	WET MEADOW S&W (34–271)	K	WOODLAND EDGE NE (36–311)
F	WETLAND REHABILITATION (34–171)	L	NATURAL REVEGETATION

5. ENBRIDGE WILL NOT SEED STANDING WATER OR WOODED (PSS AND PFO) WETLAND COMMUNITIES. NATURAL REVEGETATION WILL TAKE PLACE FROM EXISTING PLANT MATERIAL AND ROOT STOCK IN THESE COMMUNITIES.

6. ALL MATERIALS USED FOR CONSTRUCTION OF THE PROJECT MUST BE REMOVED FROM THE SITE.

7. ENBRIDGE WILL CONDUCT POST–CONSTRUCTION MONITORING IN ACCORDANCE WITH THE POST–CONSTRUCTION MONITORING PLAN FOR WETLANDS AND WATERBODIES, AND IN ACCORDANCE WITH THE VMP FOR THE UPLAND PORTIONS OF THE PROJECT ON PUBLIC LANDS.

NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING	MJT	10/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN

CONSTRUCTION NOTES

SCALE	DWG. NO.	PAGE NO.
	SSRP–NOTES	

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

MDNR ID No. 17: MP 907.7; Silver Creek (H-026-030-019-007-005)

SILVER CREEK
MDNR ID 17 / SURVEY ID s-149n37w30-a
CLEARWATER COUNTY, MINNESOTA
S30-T149N-R37W LEON TWP
T-710A

T-710A

SCALE IN FEET 0 25 50 100

N

TOB TOB 27'

A_2 FLOW SILVER CREEK FORD HOOF SHEAR

907.7 907.8

FENCE FENCE HIGH BANK EROSION

TOP OF BANK B_1 B_2

WETLAND BOUNDARY

75'

ADDITIONAL TEMPORARY WORKSPACE

493'

120' TEMPORARY WORKSPACE

A_1

50' PERMANENT RIGHT OF WAY

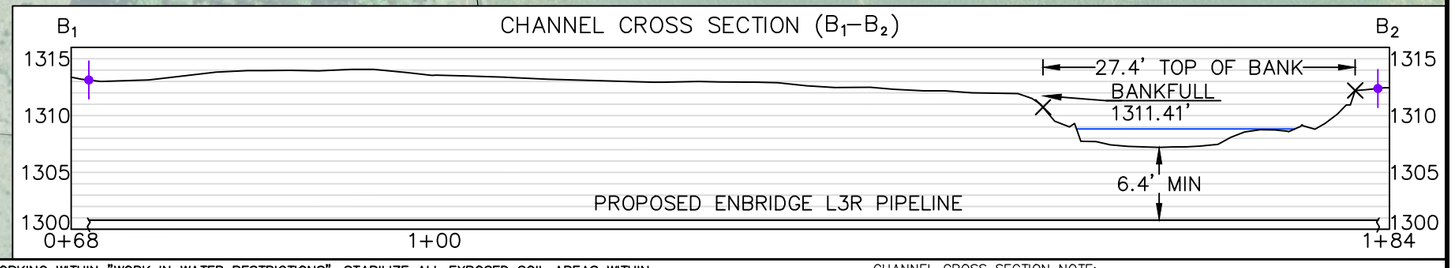
95' TEMPORARY WORKSPACE

PROPOSED ENBRIDGE L3R PIPELINE

TEMPORARY MAT ROAD AND SPAN BRIDGE WITH IN-STREAM SUPPORT (SEE RESTORATION PLAN)

2018 SUMMER IMAGERY

CHANNEL CROSS SECTION (B_1–B_2)

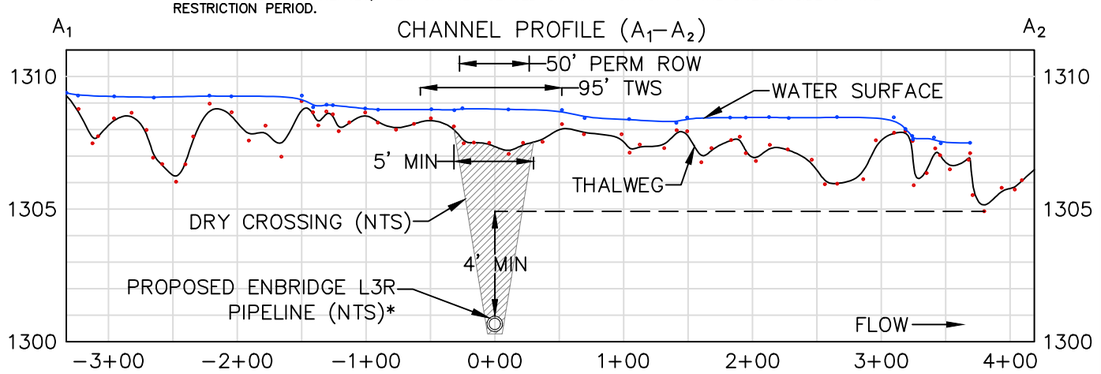


NOTES
1. NO FEMA DIGITAL FLOODPLAIN DATA AVAILABLE
2. SOBS (O/H) OR NPC (S1–3): N/A
3. MDNR REGION 1 PWI – COOL/WARM WATER FISHERY: MARCH 15 – JUNE 30. 24-HOUR SOIL STABILIZATION REQUIRED WITHIN 200 FEET DURING RESTRICTION.
4. WHEN WORKING WITHIN "WORK IN WATER RESTRICTIONS", STABILIZE ALL EXPOSED SOIL AREAS WITHIN 200 FEET OF THE WATER'S EDGE, AND THAT DRAIN TO THAT WATER, WITHIN 24 HOURS. STABILIZATION WILL BE INITIATED IMMEDIATELY AND COMPLETED WITHIN 7 CALENDAR DAYS WHENEVER CONSTRUCTION ACTIVITY HAS PERMANENTLY/ TEMPORARILY CEASED ON ANY PORTION OF THE SITE OUTSIDE OF THE RESTRICTION PERIOD.

LEGEND

- PROPOSED ENBRIDGE L3R PIPELINE
- OTHER PIPELINE
- PERMANENT RIGHT OF WAY
- TEMPORARY WORKSPACE
- WATERBODY (ROSGEN SURVEY – THALWEG)
- FENCE
- FORD
- TRACT BOUNDARY
- TEMPORARY MAT ROAD AND SPAN BRIDGE
- HOOF SHEAR
- HIGH BANK EROSION
- WETLAND
- ADDITIONAL TEMPORARY WORKSPACE
- MN–XX–XX–XXX.XXX TRACT ID
- ROSGEN SURVEY POINT – WATER SURFACE
- ROSGEN SURVEY POINT – RIVER BOTTOM (THALWEG)
- PROPOSED INCREASED DEPTH OF COVER EXTENT
- TOP OF BANK
- TRENCH BREAKER (LOCATIONS ARE APPROXIMATE)

CHANNEL PROFILE (A_1–A_2)



*TRENCH IN PROFILE IS NOT TO SCALE (NTS)

CHANNEL CROSS SECTION NOTE:
1. CHANNEL LOCATIONS, DIMENSIONS, AND/OR ELEVATIONS ARE BASED ON 2020 TOPOGRAPHIC/BATHYMETRIC SURVEY(S), AND AS SUCH DO NOT REFLECT CHANGES TO THE CHANNEL THAT MAY HAVE OCCURRED SINCE THAT TIME.
2. DEPTH OF COVER AT CENTERLINE WAS DEVELOPED USING THE BOTTOM ELEVATION OF THE DEEPEST UPSTREAM OR DOWNSTREAM POOL WITHIN THE SURVEYED REACH, UNLESS OTHERWISE NOTED IN APPLICATION MATERIALS.
3. MEAN MEANDER BELT WIDTH: 95'
4. MEANDER WIDTH RATIO: 4.77

NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
0	ISSUED FOR PERMIT APPLICATION	AJJ	10/2020	BAB	BAB

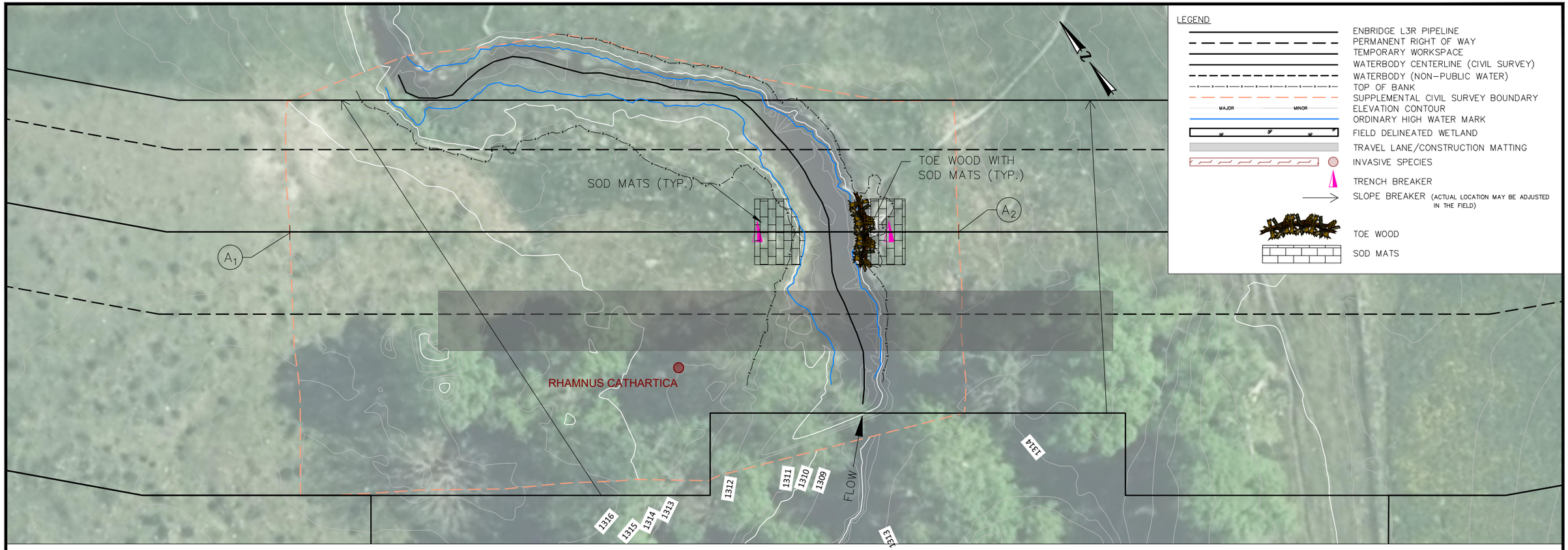
ENBRIDGE

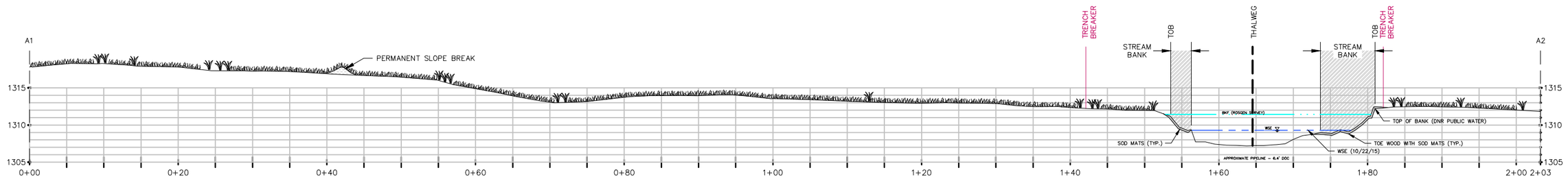
DWN. BY: AJJ	DATE 10/2020
CHK.	
PROJ. ENGR.	
PROJ. MGR.	
CLIENT APP.	

PROPOSED ENBRIDGE L3R PIPELINE
PRIMARY METHOD – DRY CROSSING
CROSSING OF SILVER CREEK
ENBRIDGE MP 907.7
CLEARWATER COUNTY, MINNESOTA

SCALE: NOTED
DWG. NO.: B–93–5.84–MDNR–17–0

FOR ENVIRONMENTAL REVIEW PURPOSES ONLY





PROPOSED RESTORATION ACTIVITIES WILL BE REVIEWED BY DNR AND ENBRIDGE DURING SITE VISIT AND MAY BE CHANGED TO REFLECT SITE CONDITIONS AT THE TIME OF CONSTRUCTION.

FEATURE ID	s-149n37w30-a; IFC ID: S-164.0
CROSSING TYPE	DRY CROSSING
PROPOSED RESTORATION (SEE DETAILS FOR LIVE STAKING, TRANSPLANTS, AND SHRUB SPECIES IF APPLICABLE)	EC BLANKET -NATURAL FIBER MPCA TYPE 3.B/MNDOT CATEGORY 4N; BRUSH - TOE WOOD
WITHIN OR ADJACENT WETLAND	N/A
BWSR SEED MIX	RIPARIAN NE (34-361)
DOMINANT WETLAND VEGETATION	1. PHALARIS ARUNDINACEA 3. SCIRPUS ATROVIRENS 2. CALAMAGROSTIS CANADENSIS
SOBS (O/H) or NPC (S1-3)	N/A

NOTES
1. CONSTRUCTION TIMING RESTRICTIONS
   1.1. MDNR REGION 1 PWI - COOL/WARM WATER FISHERY: MARCH 15 - JUNE 30.
   1.2. WHEN WORK OCCURS WITHIN "WORK IN WATER RESTRICTIONS", ALL EXPOSED SOIL AREAS WITHIN 200 FEET OF THE WATER'S EDGE, AND THAT DRAIN TO THAT WATER, WILL BE STABILIZED WITHIN 24 HOURS DURING THE RESTRICTION PERIOD. STABILIZATION OF ALL EXPOSED SOILS WITHIN 200 FEET OF THE PUBLIC WATER'S EDGE, AND THAT DRAIN TO THAT WATER, WILL BE INITIATED IMMEDIATELY AND COMPLETED WITHIN 7 CALENDAR DAYS WHENEVER CONSTRUCTION ACTIVITY HAS PERMANENTLY OR TEMPORARILY CEASED ON ANY PORTION OF THE SITE OUTSIDE OF THE RESTRICTION PERIOD
2. WORK SHALL BE CONDUCTED IN ACCORDANCE WITH APPLICABLE STANDARDS IN ENBRIDGE'S EPP AND VMP FOR PUBLIC LANDS AND WATERS. THE SPECIFICATIONS WITHIN THIS SSRP MAY MODIFY OR REPLACE THESE STANDARDS.
3. SEE GENERAL NOTES PAGE FOR ADDITIONAL DETAIL.
4. INFORMATION REGARDING SEEDING SPECIFICATIONS, SEED BED PREPARATION TECHNIQUES, ETC. ARE DESCRIBED IN THE PLANTING PLAN CONTAINED WITHIN THE VMP.
5. TRENCH BREAKER LOCATION IS APPROXIMATE PENDING FIELD VERIFICATION (EPP SECTION 1.13)

ENBRIDGE

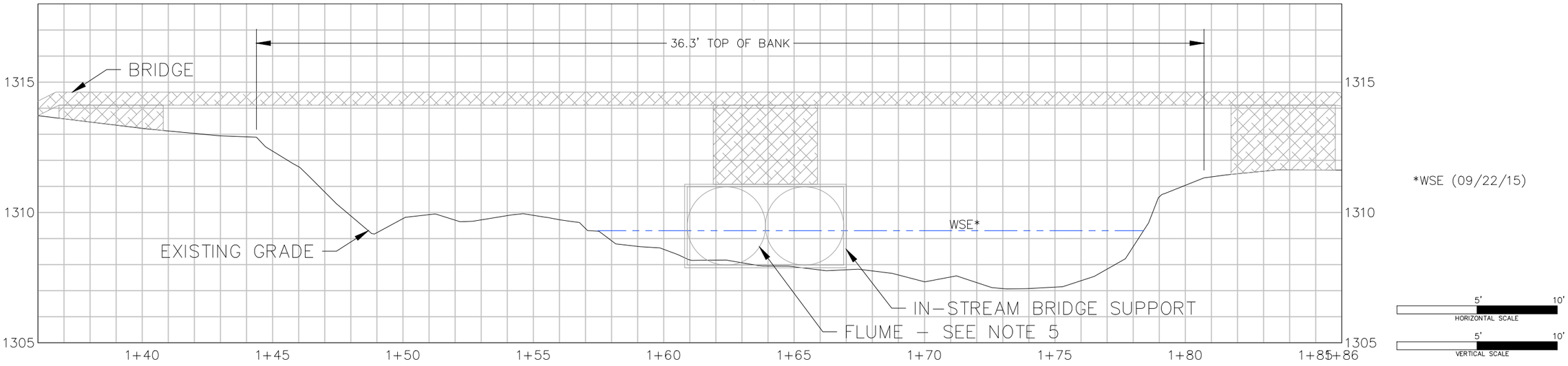
NO.	REVISION-DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE-SPECIFIC RESTORATION PLAN
SILVER CREEK - MP 907.7 - MDNR ID 17
RE-VEGETATION PLAN

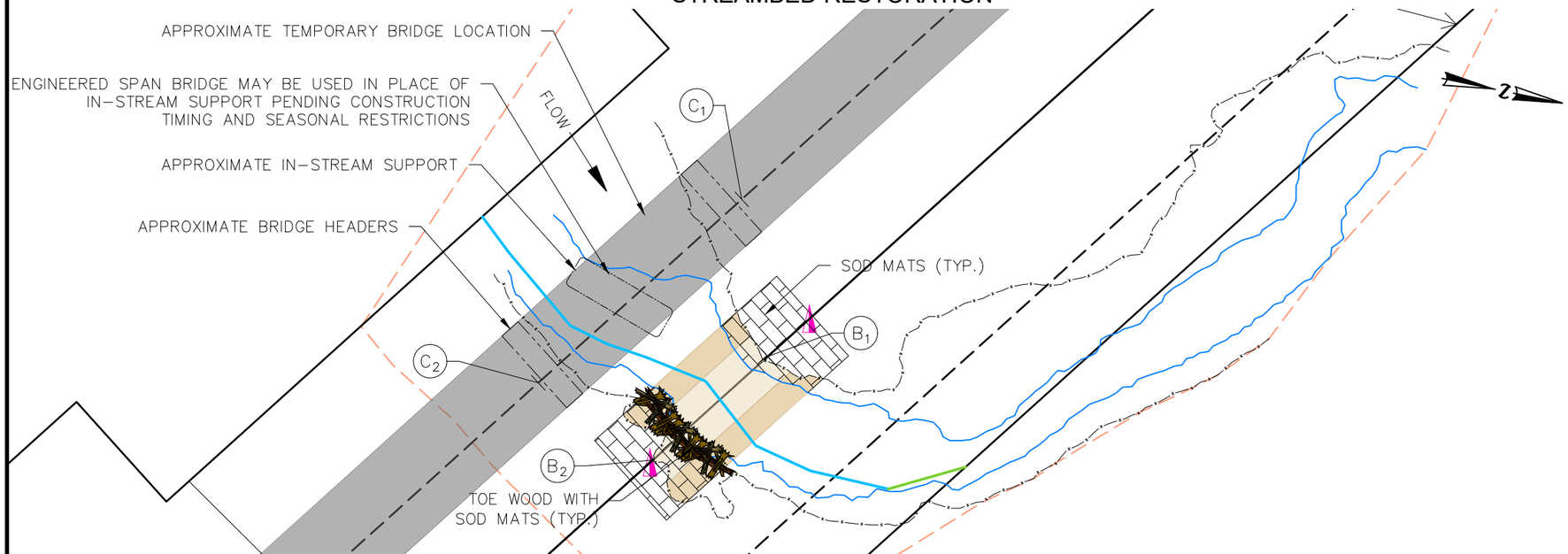
SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP-907.7-001	1/7

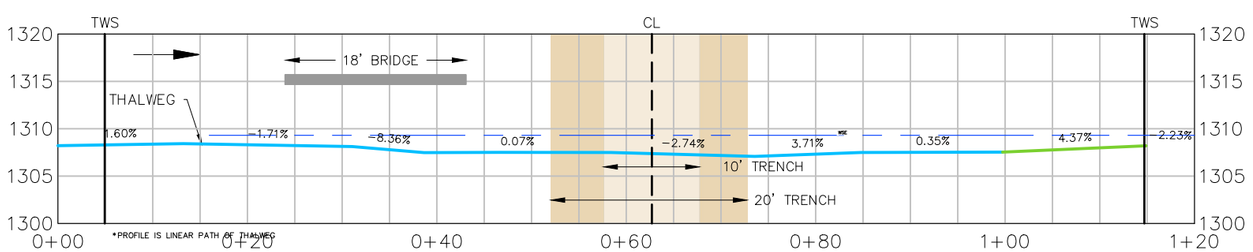
PLOTTED SIZE: ANSI FULL BLEED B (17x11)

BANK RESTORATION (BRIDGE)



STREAMBED RESTORATION





NOTES

1. TRANSITIONS BETWEEN EXISTING CHANNEL FEATURES (BED, BANK, FLOODPLAIN) AND PROPOSED RESTORED TRENCH CROSSING WILL BE SMOOTH AND EVENLY GRADED WITHOUT ABRUPT OR PROTRUDING OBSTRUCTIONS.
   1.1. BANK WILL BE RESTORED TO REMEDIATE EXISTING EROSION RESULTING FROM HOOF SHEER. CLEAN FILL OR EXCESS SOIL FOLLOWING PIPE INSTALLATION SHALL BE USED.
2. BANK MIGRATION POTENTIAL IS TO THE NORTH. PRIMARY FLOW IS LOCATED ON THE UPSTREAM SIDE OF THE CHANNEL.
3. PLACE MATS DIRECTLY ON TOP OF EXISTING VEGETATION TO AVOID OR MINIMIZE DISTURBANCE OF VEGETATION ON THE CHANNEL BANKS AND AT THE TOP OF THE STREAM BANK (LIMITED STUMP REMOVAL MAY BE REQUIRED).
4. SEE DETAIL SHEET FOR SPECIFIC RESTORATION METHODS AND DETAILS.
5. FLUMES SIZES MAY VARY BETWEEN 18-48 INCHES AND MUST EXTEND ABOVE OHWM OR SURFACE WATER AT TIME OF CONSTRUCTION, WHICHEVER IS GREATER.
6. USE OF CATTLE EXCLUSION MAY BE ADDRESSED DURING THE OPERATIONAL PHASE OF THE PROJECT, PENDING LANDOWNER DISCUSSION.
7. MINIMIZE DISTURBANCE OF BED MATERIALS AND FEATURES DURING CONSTRUCTION OF THE TRENCH AND INSTALLATION AND REMOVAL OF IN-STREAM SUPPORT
8. BED AND/OR BANK MATERIALS TEMPORARILY ADJUSTED OR REMOVED DURING CONSTRUCTION SHALL BE PLACED IN THE APPROXIMATE ORIGINAL LOCATION DURING RESTORATION. MATERIALS SHALL BE FIELD ADJUSTED DURING PLACEMENT BASE ON THE OBSERVED FLOW PATH AT THE TIME OF CONSTRUCTION.
9. ALIGNMENT OF IN-STREAM SUPPORT SHALL BE FIELD ADJUSTED BASED ON FLOW PATH TO PROTECT CHANNEL BANKS.
10. SEE RESTORATION SHEET FOR B1-B2 CROSS SECTION.

LEGEND

- ENBRIDGE L3R PIPELINE
- PERMANENT RIGHT OF WAY
- TEMPORARY WORKSPACE
- WATERBODY - RIFFLE (ROSGEN SURVEY)
- WATERBODY - POOL (ROSGEN SURVEY)
- WATERBODY - RUN (ROSGEN SURVEY)
- WATERBODY - GLIDE (ROSGEN SURVEY)
- CONTOUR (1' INTERVAL) (MAJOR / MINOR)
- TOP OF BANK
- ORDINARY HIGH WATER MARK
- FIELD DELINEATED WETLAND
- TRAVEL LANE/CONSTRUCTION MATTING
- TRENCH - 10'
- TRENCH - 20'

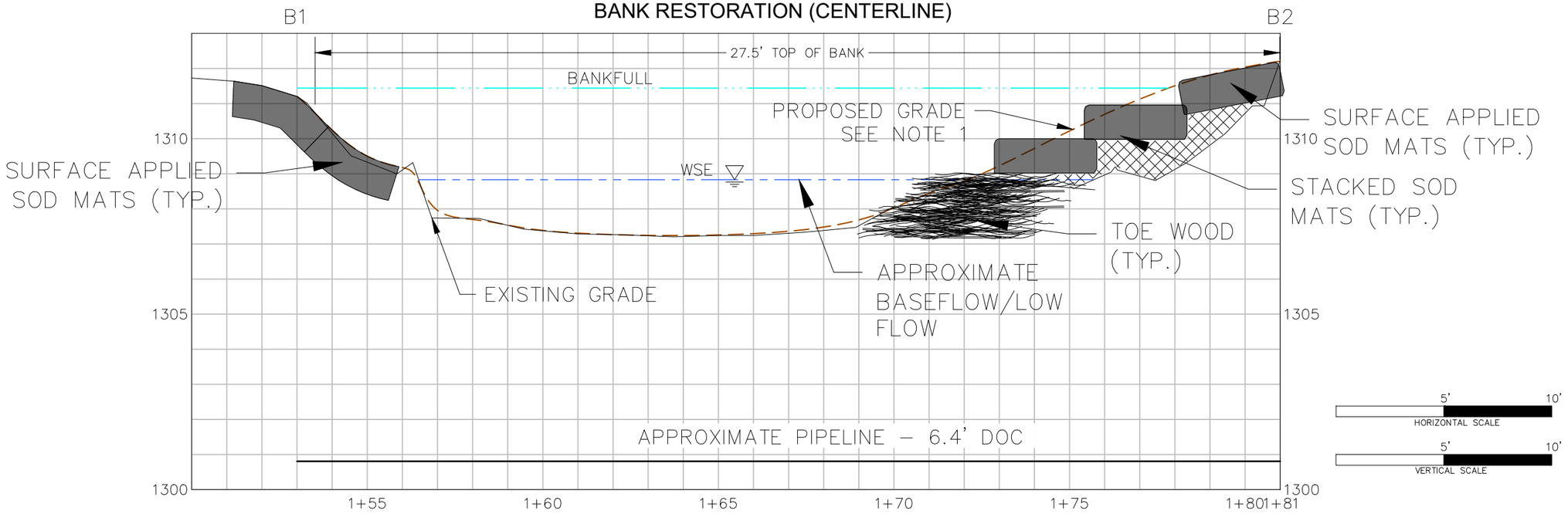
NO.	REVISION-DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE-SPECIFIC RESTORATION PLAN
SILVER CREEK - MP 907.7 - MDNR ID 17
STABILIZATION PLAN

SCALE	DWG. NO.	PAGE NO.
	SSRP-907.7-002	2/7

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

BANK RESTORATION (CENTERLINE)



SEE DETAILS FOR BANK RESTORATION TECHNIQUES ON BOTH BANKS (1/4) (2/5)

LEGEND

SOD MAT

TOE WOOD

RESTORATION NOTES:

GENERAL

1. REFER TO RESTORATION DETAIL SHEETS FOR ADDITIONAL INFORMATION RELATED TO PROPOSED RESTORATION MEASURES.
2. REFER TO SITE PHOTOS FOR INFORMATION ON PRE-CONSTRUCTION CROSSING CONDITIONS AND TO PROVIDE ADDITIONAL GUIDANCE FOR RESTORATION EFFORTS.
3. EROSION AND SEDIMENT CONTROL WILL BE LIMITED TO NATURAL FIBERS (I.E., CATEGORY 3N OR 4N IN THE 2016 & 2018 MNDOT STANDARDS SPECIFICATIONS FOR CONSTRUCTION).

TOE WOOD

1. ROUGH GRADE CHANNEL BED FEATURES INCLUDING POOLS AND PLACEMENT OF SUBSTRATE.
2. INSTALL FOOTER LOG(S) ALONG PROPOSED TOE OF SLOPE. FOOTER LOGS SHOULD BE ANGLED TO ALLOW FOR TOE ALIGNMENT TO GENERALLY MATCH THE EXISTING CURVE AND EVENLY TRANSITION FROM UPSTREAM TO DOWNSTREAM.
3. PUSH FOOTER LOG INTO SOIL APPLY A SMALL AMOUNT OF GRAVEL OR STONE AS NEEDED TO PREVENT FLOATATION OF FOOTER LOG PRIOR TO PLACING WOODY DEBRIS.
4. PLACE A LAYER WOODY DEBRIS IN 6" TO 8" LIFTS, APPLY 3"-4" GRAVEL AND/OR SOIL FILL AND COMPACT WITH EXCAVATOR BUCKET. WASH FILL MATERIAL INTO WOODY DEBRIS MATRIX WITH WATER FROM CHANNEL. APPLY ADDITIONAL LAYERS "AS NEEDED" TO REACH THE SPECIFIED TOE WOOD HEIGHT.
5. PLACE STACKED SOD MATS ABOVE TOE WOOD. THE USE OF TRANSPLANTS OR FABRIC LIFTS MAY BE FIELD APPROVED BY ENBRIDGE IN CONSULTATION WITH MN DNR.

SOD MATTING

1. REMOVE VEGETATED MATS ON EITHER SIDE OF THE STREAM CROSSING USING ONSITE EQUIPMENT WHICH CAN UNDERCUT THE VEGETATION FOR REMOVAL. SMALL SHRUBS AND/OR TREES WITHIN THE SOD MATS ARE ACCEPTABLE AND SHOULD NOT BE REMOVED.
2. DEPENDING ON THE LEVEL OF SATURATION AT THE TIME OF REMOVAL, IT MAY BE DIFFICULT TO OBTAIN INTACT CONSOLIDATED MATS, BUT GENERALLY THE NATIVE VEGETATION WILL BE RETAINED AND CAPTURED FOR PLACEMENT.
3. SOD MATS CAN BE TRANSPLANTED DURING ANY.
4. SOD MAT WILL BE PLACED ON CLEAR GROUND OR MATS WITHIN THE WORKSPACE.
5. MONITOR MATS TO SUPPORT SURVIVABILITY; WATERING MAY BE NEEDED.
6. PRIOR TO PLACEMENT OF SOD MATS FINISH GRADE CHANNEL BANK AND ADJACENT FLOODPLAIN APPLICATION AREA TO PROVIDE A SMOOTH AND EVEN SURFACE. SUBGRADE ELEVATION SHOULD ALLOW FOR THE FINISHED SOD SURFACE TO TRANSITION EVENLY WITH THE CHANNEL BANKS UPSTREAM AND DOWNSTREAM OF THE INSTALLATION AREA. AVOID ABRUPT CHANGES IN GRADE.
7. VEGETATED MATS WILL BE RETURNED/SET IN PLACE WITH ONSITE EQUIPMENT.
   a. SURFACE APPLIED SOD MATTING SHOULD BE PLACED WITH THE LONG SIDE PERPENDICULAR TO THE CHANNEL / FLOW.
   b. STACKED SOD MATTING SHOULD BE PLACED WITH THE LONG SIDE PARALLEL TO THE CHANNEL / FLOW.
8. IF SUFFICIENT SOD IS NOT AVAILABLE FROM THE STREAM BANKS ADDITIONAL SOD MAY BE TAKEN FROM THE ADJACENT CONSTRUCTION WORKSPACE.
9. WHEN PLACING SOD MATS, DO NOT LEAVE LARGE GAPS BETWEEN EACH SOD MAT AS NON-NATIVE VEGETATION WILL QUICKLY ATTEMPT TO COLONIZE THESE VOIDS.
10. WATER SOD MATS AFTER REPLACEMENT IF CONDITIONS ARE HOT AND DRY. DAMP AND/OR FROZEN SOD MATS DO NOT REQUIRE WATERING.
11. THE TOP MAT AND/OR OTHER MATS CAN BE ANCHORED WITH A LIVE AND/OR DEAD STOUT STAKE TO ENSURE THAT IT DOES NOT MOBILIZE DURING A FLOOD EVENT BEFORE THE ROOTS HAVE ESTABLISHED.
12. THE VEGETATED MATS WILL BE REPLACED AS SOON AS PRACTICAL FOLLOWING BACKFILLING OF THE TRENCH AND STABILIZED PER THE TIMING REQUIREMENTS DESCRIBED IN SECTION 1.9.1 OF THE EPP.

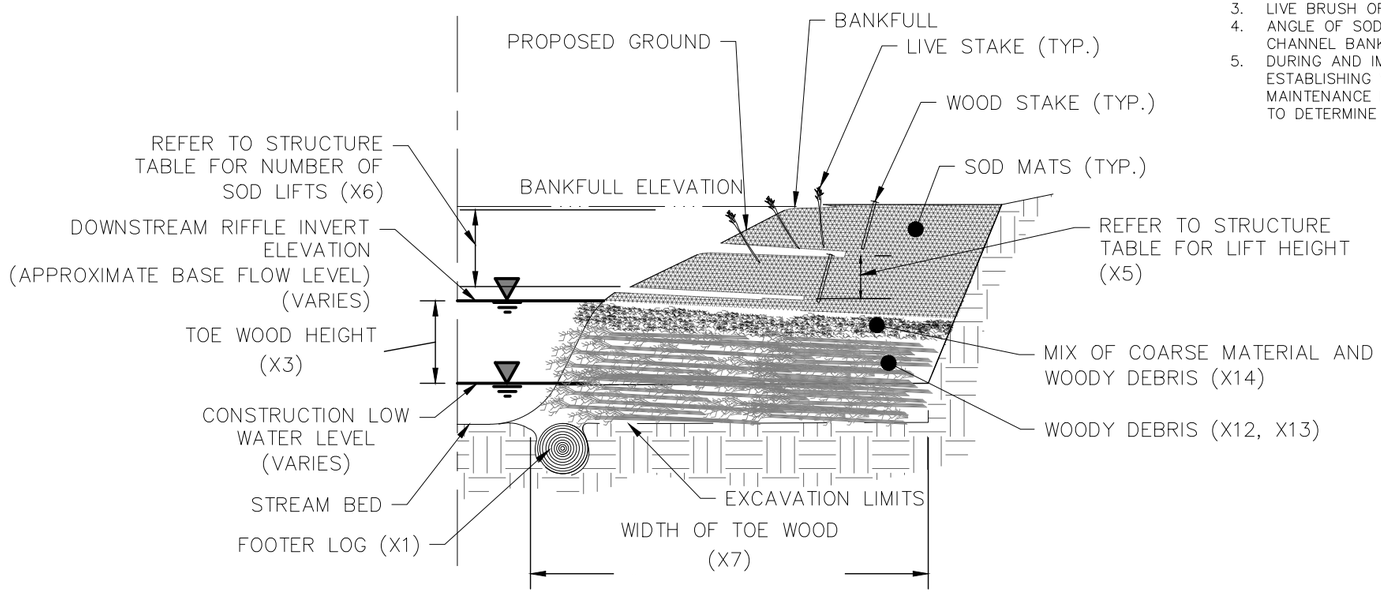
NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
SILVER CREEK – MP 907.7 – MDNR ID 17
SITE SPECIFIC DETAILS

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP–907.7–004	3/7

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

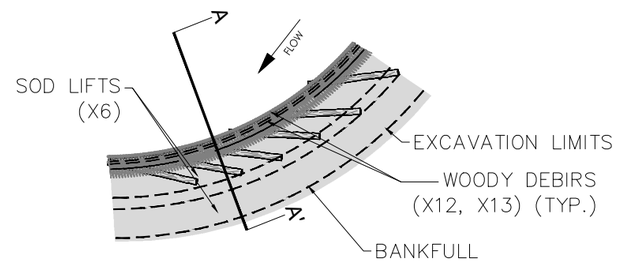
TOE WOOD DIMENSIONS			
VARIABLE	**VALUE**	**TYPICAL UNIT**	**DESCRIPTION**
X1	6.0 - 10.0	IN.	FOOTER LOG DIAMETER
X2	8.0 - 12.0	FT.	FOOTER LOG LENGTH
X3	18.0	IN.	TOE WOOD HEIGHT
X4	SEE SHEET 3	N/A	MATCH TYPICAL SECTION
X5	SEE SHEET 5	FT.	SOD LIFT HEIGHT
X6	3.0	#	SOD LIFTS
X7	8.0 - 10.0	FT.	TOE WOOD WIDTH
X8	3.0 - 6.0	FT.	SOD LIFT WIDTH
X9	24.0	IN.	WOOD STAKE LENGTH
X10	4.0	IN.	WOOD STAKE WIDTH (TOP)
X11	0.5	IN.	WOOD STAKE WIDTH (BOTTOM)
X12	1/2 - 3.0	IN.	WOODY DEBRIS DIAMETER
X13	8.0 - 12.0	FT.	WOODY DEBRIS LENGTH
X14	3" MINING GRAVEL WITH FINES	%	SELECT COARSE MATERIAL BACKFILL (BY VOLUME)



SECTION A-A'

TOE WOOD EXAMPLE

NOTES:
1. WOODY MATERIAL OF APPROPRIATE SIZE CONSISTING OF LOGS, TRUNKS, LIMBS, BRANCHES, AND SMALLER WOODY DEBRIS INCLUDING TOPS OR SLASH. ON-SITE WOODY MATERIAL IS PREFERRED.
2. WOODY DEBRIS SHOULD BE GREEN OR RELATIVELY GREEN AND MAY CONSIST OF HARDWOODS, CONIFERS, OR A COMBINATION OF BOTH.
3. LIVE BRUSH OR OTHER BANK VEGETATION MAY BE INCORPORATED.
4. ANGLE OF SOD MAT SURFACE SHALL MATCH THE PROPOSED CHANNEL CROSS SECTION AND PROVIDE A SMOOTH AND EVEN CHANNEL BANK SURFACE BETWEEN UPSTREAM AND DOWNSTREAM BANKS.
5. DURING AND IMMEDIATELY AFTER CONSTRUCTION, BANK SLOPES ABOVE THE WOOD TOE ARE VULNERABLE TO EROSION. ESTABLISHING VEGETATION OR OTHER COVER MATERIAL AS SOON AS POSSIBLE WILL HELP REDUCE EROSION. ADDITIONAL MAINTENANCE IS NOT EXPECTED ONCE VEGETATION ESTABLISHES. INSPECTION AFTER LARGE FLOW EVENTS MAY BE ADVISABLE TO DETERMINE IF ANY MATERIAL MOVEMENT OR UNEXPECTED SCOUR HAS OCCURRED.



PLAN VIEW AT BANKFULL ELEVATION

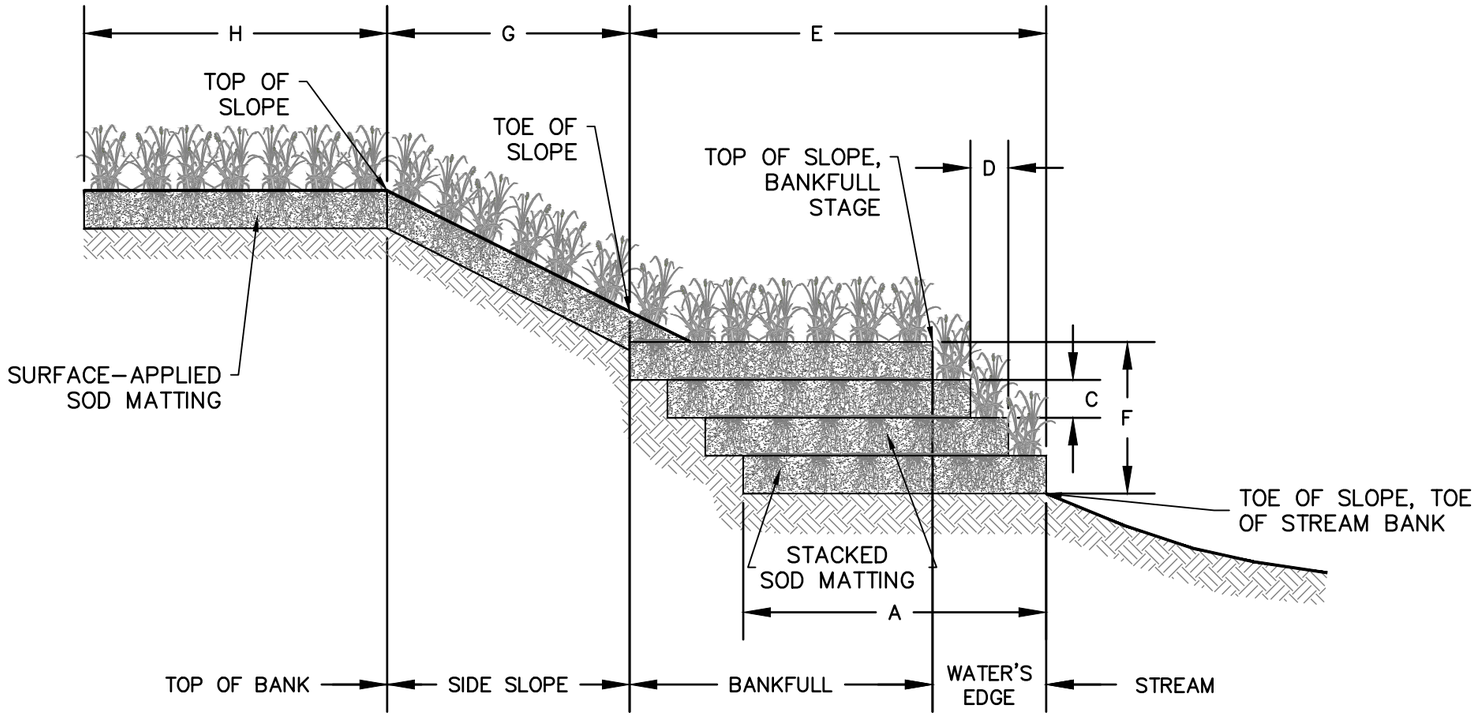
1 TOE WOOD DETAIL

NO.	REVISION-DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

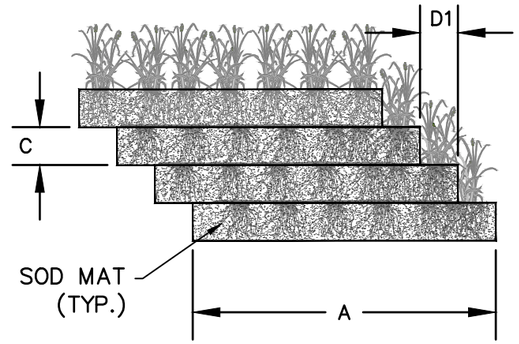
ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE-SPECIFIC RESTORATION PLAN
SILVER CREEK - MP 907.7 - MDNR ID 17
SITE SPECIFIC DETAILS

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP-907.7-004	4/7

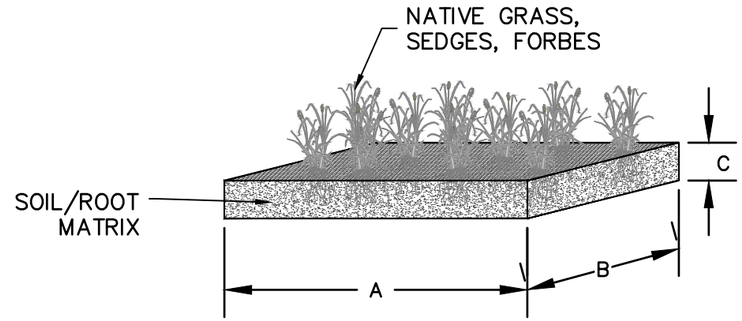
PLOTTED SIZE: ANSI FULL BLEED B (17x11)



CROSS SECTION



STACKED SOD MATTING DETAIL



SOD MAT DETAIL

DIMENSION[2]	NAME	TYPICAL UNIT	VALUE	DESCRIPTION
A	SOD MAT WIDTH	FEET	3 – 4	WIDTH OF INDIVIDUAL SOD MAT.
B	SOD MAT LENGTH	FEET	3 – 6	LENGTH OF INDIVIDUAL SOD MAT.
C	SOD MAT THICKNESS	INCHES	12	THICKNESS OF INDIVIDUAL SOD MAT.
D	STACKED SOD MAT SETBACK	FEET, INCHES	3	THE DISTANCE BETWEEN THE EDGES OF SOD MATS STACKED TO FORM A SLOPE
E	WIDTH OF STACKED SOD MATS	FEET, INCHES	10 – 20	WIDTH OF A BANK CREATED BY STACKED SOD MATS
F	HEIGHT OF STACKED SOD MATS	FEET, INCHES	2	HEIGHT OF A SLOPE CREATED BY STACKED SOD MATS
G	WIDTH OF SURFACE- APPLIED SOD MATS	FEET, INCHES	10 – 20	WIDTH OF A SLOPE STABILIZED WITH SURFACE-APPLIED SOD MATS
H	TOP OF BANK SOD MATTING DISTANCE	FEET	15	DISTANCE SOD MATTING IS INSTALLED ON THE TOP OF BANK
NOTES:				
1. DATA ARE FOR SOD MATTING THAT IS STACKED TO FORM A SLOPE OR SURFACE-APPLIED TO A SLOPE.				
2. DIMENSION LABELS ARE REFERENCED IN THE DETAIL DRAWINGS.				

SOD MATTING DETAIL

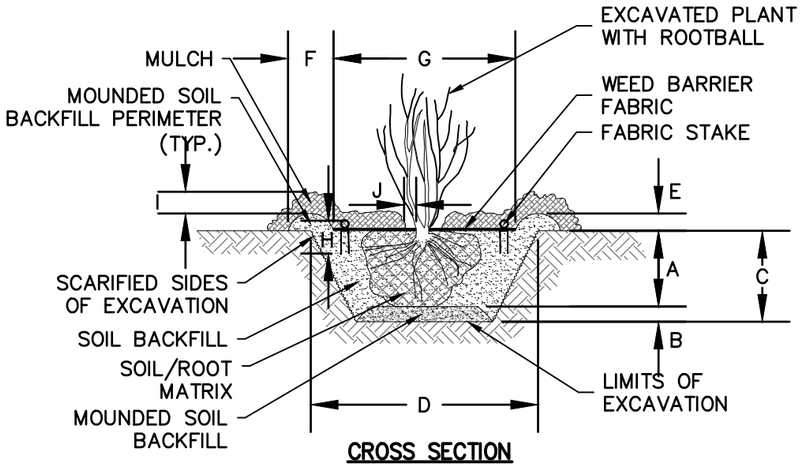
SOD MAT EXAMPLES

NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
SILVER CREEK – MP 907.7 – MDNR ID 17
SITE SPECIFIC DETAILS

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP–907.7–004	5/7

PLOTTED SIZE: ANSI FULL BLEED B (17x11)



CROSS SECTION

DIMENSION[2]	NAME	TYPICAL UNIT	VALUE	DESCRIPTION
A	PLANTING DEPTH	VARIES	N/A	PLANTING DEPTH OF THE TRANSPLANT.
B	HEIGHT OF MOUNDED SOIL BACKFILL	INCHES	N/A	HEIGHT OF MOUNDED LOOSE SOIL PLACED INTO OVER-EXCAVATED PLANTING PIT.
C	DEPTH OF PLANTING PIT	VARIES	N/A	DEPTH OF THE PLANTING PIT; ACCOMMODATES DIMENSION OF SOIL AND EXCAVATED ROOTS AS WELL AS MOUNDED LOOSE SOIL AT BOTTOM OF PIT.
D	WIDTH OF PLANTING PIT	VARIES	N/A	OVER-EXCAVATED WIDTH OF THE PLANTING PIT; ACCOMMODATES THE WIDTH OF THE EXCAVATED SOIL AND ROOTS.
E	HEIGHT OF MOUNDED SOIL PERIMETER	INCHES	N/A	HEIGHT OF SOIL BERM CONSTRUCTED ALONG THE PERIMETER OF THE PLANTING PIT; HELPS RETAIN WATER.
F	WIDTH OF MOUNDED SOIL PERIMETER	INCHES	N/A	WIDTH OF SOIL BERM CONSTRUCTED ALONG THE PERIMETER OF THE PLANTING PIT; HELPS RETAIN WATER.
G	WIDTH OF WEED BARRIER FABRIC (OPTIONAL)	INCHES	N/A	WIDTH OF FABRIC PLACED ON SURFACE TO CONTROL WEEDS WITHIN THE MOUNDED SOIL PERIMETER; TRANSPLANTS TYPICALLY HAVE GRASSES, LEAF MATTER, ETC. ATTACHED AND DO NOT REQUIRE WEED BARRIER FABRIC.
H	FABRIC STAKE LENGTH (OPTIONAL)	INCHES	N/A	LENGTH OF STAPLES/SPIKES USED TO SECURE WEED BARRIER FABRIC
I	THICKNESS OF MULCH (OPTIONAL)	INCHES	N/A	THICKNESS OF MULCH, IF NECESSARY. TRANSPLANTS TYPICALLY HAVE GRASSES, LEAF MATTER, ETC. ATTACHED AND DO NOT REQUIRE MULCH.
J	GAP BETWEEN MULCH AND PLANT STEM/TRUNK (OPTIONAL)	INCHES	N/A	ROOM BETWEEN PLANT STEM/TRUNK AND MULCH. TRANSPLANTS TYPICALLY HAVE GRASSES, LEAF MATTER, ETC. ATTACHED

NOTES:
1. DATA ARE FOR TRANSPLANTED VEGETATION.
2. DIMENSION LABELS ARE REFERENCED IN THE DETAIL DRAWINGS.

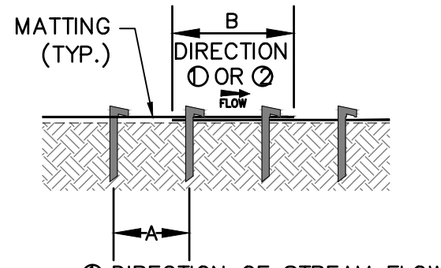
TRANSPLANTS EXAMPLES

1 TRANSPLANTING DETAIL

DIMENSION[1]	NAME	TYPICAL UNIT	VALUE	DESCRIPTION
A	MATTING STAKE SPACING	FEET, INCHES	3 O.C	SPACING BETWEEN EROSION CONTROL MATTING STAKES USED TO FASTEN THE MATTING TO THE SOIL
B	MATTING OVERLAP	FEET, INCHES	18	AMOUNT OF EROSION CONTROL MATTING OVERLAP IF MULTIPLE PIECES AND/OR ROLLS OF MATTING ARE USED. OVERLAP VARIES DEPENDING ON THE LOCATION OF THE OVERLAP WITH RESPECT TO POSITION ON THE SLOPE, LOCATION OF THE MATTING (EDGE OR END), AND PRODUCT SPECIFICATIONS.
C	MATTING ANCHOR TRENCH DEPTH	FEET, INCHES	6 (MIN)	DEPTH OF TRENCH INTO WHICH EDGE OF EROSION CONTROL MATTING IS ANCHORED AT THE TOP AND/OR TOE OF A SLOPE.
D	MATTING ANCHOR TRENCH WIDTH	FEET, INCHES	12	WIDTH OF TRENCH INTO WHICH EDGE OF EROSION CONTROL MATTING IS ANCHORED AT THE TOP AND/OR TOE OF A SLOPE.
E	TOP OF SLOPE ANCHOR TRENCH SETBACK	FEET, INCHES	12	TOP OF SLOPE ANCHOR TRENCH DISTANCE FROM THE TOP OF SLOPE. TOP OF SLOPE REFERS TO TOP OF SIDE SLOPE, BANK SLOPE, TERRACE SLOPE, BANKFULL, ETC.
F	MATTING STAKE LENGTH	INCHES	12	LENGTH OF EROSION CONTROL MATTING STAKES USED TO FASTEN THE MATTING TO THE SOIL

NOTES:
1. DIMENSION LABELS ARE REFERENCED IN THE DETAIL DRAWINGS.
2. O.C, ON CENTER
3. STAPLES ARE NOT PERMITTED

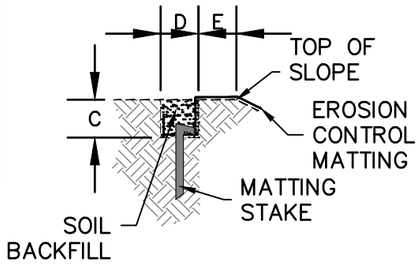
2 EROSION CONTROL MATTING DETAIL

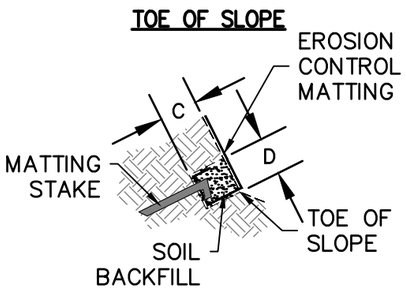


① DIRECTION OF STREAM FLOW
② DIRECTION DOWN THE BANK SLOPE

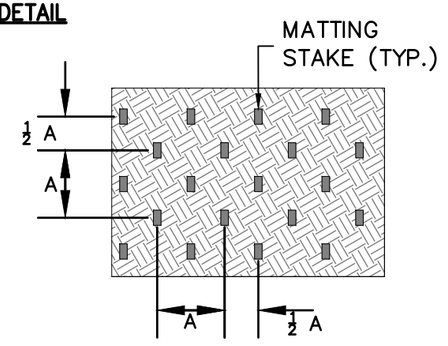
MATTING OVERLAP DETAIL

MATTING STAKE DETAIL





MATTING ANCHOR DETAIL



MATTING STAKE PATTERN DETAIL

NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
SILVER CREEK – MP 907.7 – MDNR ID 17
SITE SPECIFIC DETAILS

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP–907.7–004	6/7

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

1 CENTERLINE – FACING WEST BANK

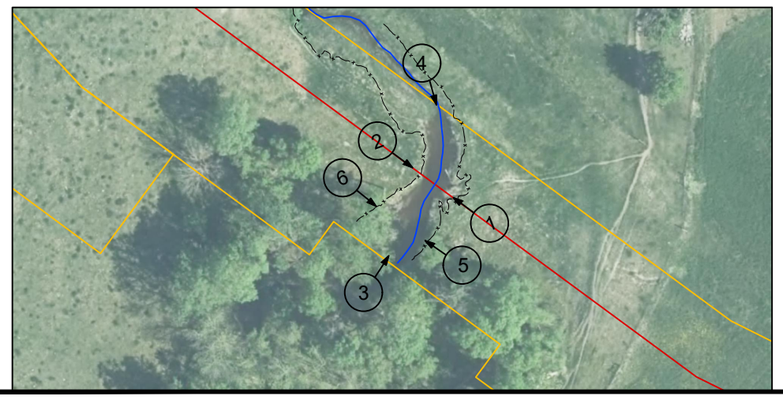
2 CENTERLINE – FACING EAST BANK

3 EDGE OF WORKSPACE – FACING DOWNSTREAM

4 EDGE OF WORKSPACE – FACING UPSTREAM

5 BRIDGE – FACING WEST BANK

6 BRIDGE – FACING EAST BANK



NOTES:

1. AIR PHOTOS ARE FROM 2018 ENBRIDGE AERIAL PHOTOGRAPHY.
2. ADDITIONAL ON–THE GROUND PHOTOS MAY BE TAKEN PRIOR TO CONSTRUCTION AT MDNR REQUEST.
3. PRE–CONSTRUCTION PHOTOS WILL BE USED TO AID IN RESTORATION.

NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING	MJT	10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
SILVER CREEK – MP 907.7 – MDNR ID 17
PHOTO PAGE

SCALE	DWG. NO.	PAGE NO.
	SSRP–907.7–005	5/5

ENBRIDGE

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

GENERAL

1. THE SPECIFICATIONS WITHIN THIS SSRP MAY MODIFY OR REPLACE PROJECT–WIDE STANDARDS PRESENTED IN THE EPP. WHERE MATERIAL WITHIN THESE SSRPS EXCEEDS STANDARD CONSTRUCTION MEASURES IN THE EPP, THESE SSRPS SUPERSEDE THE EPP.

2. CONSTRUCTION AND RESTORATION OF WATERBODY CROSSINGS WILL FOLLOW THESE GENERAL STEPS:

   A. SITE CLEARING
   B. INSTALLATION OF TEMPORARY EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICES ("BMPS")
   C. BRIDGE INSTALLATION
   D. EXCAVATION/BACKFILLING OF THE WATERBODY INCLUDING:
      - SOD SAVING TOPSOIL SEGREGATION AT NON–WOODED SITES
      - STREAMBED MATERIAL SEGREGATION
      - PIPE INSTALLATION
      - BACKFILL, INCLUDING IMPLEMENTATION OF CONSTRUCTION–RELATED RESTORATION METHODS (I.E., TOE WOOD)
   E. REPLACEMENT OF STREAMBED MATERIAL AND TOPSOIL/SOD LAYER
   F. RESTORATION OF STREAM BANKS TO PRE–CONSTRUCTION CONTOURS
   G. IF FINAL GRADING NOT POSSIBLE AT THE TIME, TEMPORARY STABILIZATION AND REPLACEMENT/REINFORCEMENT OF TEMPORARY BMPS
   H. AFTER FINAL GRADING, PERMANENT SEEDING AND/OR WOODY VEGETATION RESTORATION, STABILIZATION AND REPLACEMENT/REINFORCEMENT OF TEMPORARY BMPS
   I. BRIDGE REMOVAL DURING FINAL RESTORATION AFTER STABILIZATION AND PERMANENT SEEDING
   J. POST–CONSTRUCTION MONITORING

CROSSING METHODS

1. ALL WATERBODY AND WETLAND CROSSINGS WILL BE CONDUCTED IN COMPLIANCE WITH SECTION 2.0 AND SECTION 3.0 OF THE ENVIRONMENTAL PROTECTION PLAN ("EPP"), RESPECTIVELY. SECTION 2.0 AND 3.0 OF THE WINTER CONSTRUCTION PLAN PRESENTS MODIFICATIONS FOR WATERBODY AND WETLAND CONSTRUCTION METHODS, RESPECTIVELY, IN WINTER CONDITIONS.

2. ENBRIDGE'S SUMMARY OF CONSTRUCTION METHODS AND PROCEDURES (THE "PROCEDURES," APPENDIX A OF THE EPP) OUTLINES THE VARIOUS CONSTRUCTION METHODS THAT ENBRIDGE MAY UTILIZE TO CONSTRUCT THROUGH WATERBODIES AND WETLANDS/BASINS AS PRESENTED ON THESE SITE–SPECIFIC RESTORATION PLANS ("SSRPS").

   A. DRY CROSSING (ISOLATED) METHODS (INCLUDING THE DRY CROSSING AND MODIFIED DRY CROSSING METHOD) ARE DESCRIBED SECTIONS 4.3 OF THE PROCEDURES, AND IN SECTIONS 2.5.2 AND 2.5.3 AND FIGURES 23 AND 24 OF THE EPP.
   B. THE BORE METHOD (NON–PRESSURIZED) IS DESCRIBED IN SECTION 3.5 OF THE PROCEDURES, AND SECTION 4.0 OF THE EPP.
   C. THE MODIFIED UPLAND CONSTRUCTION (WETLAND) METHOD IS DESCRIBED IN SECTION 3.3 OF THE PROCEDURES, AND SECTION 3.0 AND FIGURES 30 TO 34 OF THE EPP.
   D. ALTHOUGH NOT PROPOSED AS A PRIMARY METHOD AT THESE SSRP WATERBODIES, THE OPEN CUT (NON–ISOLATED) WATERBODY CROSSING METHOD IS DESCRIBED IN SECTION 4.1 OF THE PROCEDURES, AND SECTION 2.5.1 AND FIGURE 24 OF THE EPP.
   E. ALTHOUGH NOT PROPOSED AS A PRIMARY METHOD AT THESE SSRP WATERBODIES, THE PUSH–PULL METHOD IS DESCRIBED IN SECTION 3.4 OF THE PROCEDURES, AND SECTION 3.7.1 AND FIGURES 35 AND 36 OF THE EPP.

CLEARING/VEGETATION REMOVAL

1. STUMPS WITHIN THE TRENCH LINE WILL BE COMPLETELY REMOVED, GROUND, AND/OR HAULED OFF–SITE TO AN APPROVED LOCATION. TREE STUMPS OUTSIDE THE TRENCH LINE WILL BE GROUND BELOW NORMAL GROUND SURFACE TO FACILITATE A SAFE WORK AREA AND TO ALLOW TOPSOIL REMOVAL, IF NECESSARY. IN SOME CIRCUMSTANCES, TREE STUMPS OUTSIDE THE TRENCH LINE MAY BE COMPLETELY REMOVED TO ALLOW FOR A SAFE WORK AREA AND HAULED OFF–SITE TO AN APPROVED LOCATION AS OUTLINED IN SECTION 1.8.3 OF THE EPP.

2. CLEARING WILL BE CONDUCTED IN WATERBODIES AND WETLANDS AS OUTLINED IN SECTION 2.2 AND 3.2 OF THE EPP, RESPECTIVELY. CHIPS, MULCH, OR MECHANICALLY CUT WOODY DEBRIS SHALL NOT BE STOCKPILED IN A WETLAND. HYDRO–AX DEBRIS, OR SIMILAR CAN BE LEFT IN THE WETLAND IF SPREAD EVENLY IN THE CONSTRUCTION WORKSPACE TO A DEPTH THAT WILL ALLOW FOR NORMAL REVEGETATION, AS DETERMINED BY THE EI. CHIPPING IS NOT ALLOWED ON PUBLIC LANDS. ON PUBLIC LANDS, MULCH AND MECHANICALLY CUT WOODY DEBRIS MUST BE UNIFORMLY BROADCAST TO LESS THAN 2–INCH THICKNESS AND IN A MANNER THAT MAINTAINS VISIBLE GROUND.

3. ENBRIDGE WILL PROPERLY INSTALL AND MAINTAIN REDUNDANT SEDIMENT CONTROL MEASURES IMMEDIATELY AFTER CLEARING AND PRIOR TO INITIAL GROUND DISTURBANCE AT SURFACE WATERS LOCATED WITHIN 50 FEET OF THE PROJECT AND WHERE STORMWATER FLOWS TO THE SURFACE WATER (REFER TO THE ENVIRONMENTAL PLAN SHEETS IN THE SWPPP), AND WITHIN 100 FEET OF SPECIAL AND IMPAIRED WATERS, INCLUDING TROUT STREAMS.

4. ON PUBLIC LANDS AND WHEREVER PRACTICABLE AT WATERBODY CROSSINGS, ENBRIDGE WILL USE WILDLIFE–FRIENDLY EROSION AND SEDIMENT CONTROL BMPS THAT CONTAIN BIODEGRADABLE NETTING (CATEGORY 3N OR 4N NATURAL FIBER) AND WILL AVOID THE USE OF PLASTIC MESH (SECTIONS 1.17.1 AND 2.6.1 OF THE EPP).

TEMPORARY STABILIZATION

1. ON PORTIONS OF THE PROJECT WHERE WORK WILL BE OCCURRING DURING APPLICABLE "WORK IN WATER RESTRICTIONS" FOR PUBLIC WATERS (REFER TO SECTION 2.1), ALL EXPOSED SOIL AREAS WITHIN 200 FEET OF THE WATER'S EDGE, AND THAT DRAIN TO THAT WATER, WILL BE STABILIZED WITHIN 24 HOURS DURING THE RESTRICTION PERIOD. STABILIZATION OF ALL EXPOSED SOILS WITHIN 200 FEET OF THE PUBLIC WATER'S EDGE, AND THAT DRAIN TO THAT WATER, WILL BE INITIATED IMMEDIATELY AND COMPLETED WITHIN 7 CALENDAR DAYS WHENEVER CONSTRUCTION ACTIVITY HAS PERMANENTLY OR TEMPORARILY CEASED ON ANY PORTION OF THE SITE OUTSIDE OF THE RESTRICTION PERIOD. THESE AREAS WILL BE IDENTIFIED ON THE ENVIRONMENTAL PLAN SHEETS ACCOMPANYING THE SWPPP.

2. HYDRO–MULCH AND LIQUID TACKIFIER CAN BE USED IN PLACE OF CERTIFIED WEED–FREE STRAW OR HAY MULCH WITH PRIOR APPROVAL FROM ENBRIDGE. ALL HYDROMULCH AND LIQUID TACKIFIER PRODUCTS USED WILL BE ON THE APPLICABLE STATE DOT PRODUCT LIST. HYDRO–MULCH AND LIQUID TACKIFIER PRODUCTS CONTAINING PLASTIC/POLYPROPYLENE FIBER ADDITIVES AND MALACHITE GREEN (COLORANT) WILL NOT BE UTILIZED ON THIS PROJECT. APPLICATION RATES WILL BE AT THE MANUFACTURER'S RECOMMENDED RATE. ENBRIDGE WILL AVOID THE USE OF HYDROMULCH ON PUBLIC LANDS; HOWEVER, ENBRIDGE MAY USE HYDROMULCH ON STEEP SLOPES TO PREVENT EROSION UNTIL PERMANENT COVER HAS BEEN ESTABLISHED AS OUTLINED IN SECTION 1.8.3 OF THE EPP.

RESTORATION AND STABILIZATION

1. ENBRIDGE WILL RESTORE THE STREAM BANKS AS NEAR AS PRACTICABLE TO PRE–CONSTRUCTION CONDITIONS UNLESS THAT SLOPE IS DETERMINED TO BE UNSTABLE. IF THE SLOPE IS CONSIDERED UNSTABLE, ENBRIDGE WILL RESHAPE THE BANKS TO PREVENT SLUMPING. FOR PUBLIC WATERS, ENBRIDGE WILL RETURN THE BANK TO PRE–CONSTRUCTION CONTOURS, UNLESS OTHERWISE DIRECTED BY THE SITE–SPECIFIC RESTORATION PLAN. IF ENBRIDGE CANNOT RESTORE TO PRE–CONSTRUCTION CONTOURS AT A PUBLIC WATER, ENBRIDGE WILL CONSULT WITH THE MDNR BEFORE PROCEEDING FURTHER AS OUTLINED IN SECTION 2.6 OF THE EPP.

2. UNSTABLE SOILS AND/OR SITE–SPECIFIC FACTORS SUCH AS STREAM VELOCITY AND FLOW DIRECTION MAY REQUIRE ADDITIONAL RESTORATION EFFORTS, SUCH AS INSTALLATION OF WOODY VEGETATION, GEOTEXTILE FABRIC, OR TREE, LOG, ROOTWAD, OR BOULDER REVETMENTS TO STABILIZE DISTURBED STREAM BANKS (SEE FIGURE 29) AS OUTLINED IN SECTION 2.6.2 OF THE EPP. ENBRIDGE WILL WORK WITH THE MDNR TO ENSURE ALL WORK/ADJUSTMENTS ARE APPROVED AND ARE CONDUCTED WITHIN APPLICABLE TIMING RESTRICTIONS.

3. IN UPLAND AND WETLAND AREAS, CLEANUP AND ROUGH GRADING WILL OCCUR AS OUTLINED IN SECTIONS 1.16 AND 3.9 OF THE EPP. ENBRIDGE WILL BACKFILL THE TRENCH TO AN ELEVATION SIMILAR TO THE ADJACENT AREAS OUTSIDE THE TRENCH LINE AND WILL ADD A SLIGHT CROWN OF APPROXIMATELY 3 TO 6 INCHES (DEPENDING ON SOIL TYPE) OVER THE BACKFILLED TRENCH TO ALLOW FOR SUBSIDENCE. GENERALLY, EXCESS SUBSOIL DISPLACED BY THE PIPE INSTALLATION WILL BE SPREAD ACROSS THE PORTION OF THE CONSTRUCTION WORKSPACE WHERE TOPSOIL REMOVAL HAS OCCURRED. ANY REMAINING EXCESS SUBSOIL WILL BE REMOVED AND DISPOSED OF AT AN APPROVED OFF–SITE LOCATION AS NEEDED TO ENSURE CONTOURS ARE RESTORED TO AS NEAR AS PRACTICABLE TO PRE–CONSTRUCTION CONDITIONS.

4. REVEGETATION ACTIVITIES WILL OCCUR AS OUTLINED IN SECTION 7.0 OF THE EPP. SEED MIXES AT PUBLIC WATERS WILL BE SELECTED AND APPLIED AS INDICATED IN THE PLANTING PLAN, WHICH IS APPENDIX A OF THE POST–CONSTRUCTION VEGETATION MANAGEMENT PLAN FOR PUBLIC LANDS AND WATERS ("VMP"). SEED MIXES RELATIVE TO THESE SSRP CROSSINGS ARE CODED AS FOLLOWS:

A	EMERGENT (34–181)	G	DRY PRAIRIE GENERAL (35–221)
B	RIPARIAN NE (34–361)	H	MESIC PRAIRIE GENERAL (35–241)
C	RIPARIAN S&W (34–261)	I	MESIC PRAIRIE NW (35–441)
D	WET MEADOW NE (34–371)	J	DRY PRAIRIE NORTHWEST (35–421)
E	WET MEADOW S&W (34–271)	K	WOODLAND EDGE NE (36–311)
F	WETLAND REHABILITATION (34–171)	L	NATURAL REVEGETATION

5. ENBRIDGE WILL NOT SEED STANDING WATER OR WOODED (PSS AND PFO) WETLAND COMMUNITIES. NATURAL REVEGETATION WILL TAKE PLACE FROM EXISTING PLANT MATERIAL AND ROOT STOCK IN THESE COMMUNITIES.

6. ALL MATERIALS USED FOR CONSTRUCTION OF THE PROJECT MUST BE REMOVED FROM THE SITE.

7. ENBRIDGE WILL CONDUCT POST–CONSTRUCTION MONITORING IN ACCORDANCE WITH THE POST–CONSTRUCTION MONITORING PLAN FOR WETLANDS AND WATERBODIES, AND IN ACCORDANCE WITH THE VMP FOR THE UPLAND PORTIONS OF THE PROJECT ON PUBLIC LANDS.

NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING	MJT	10/2020		

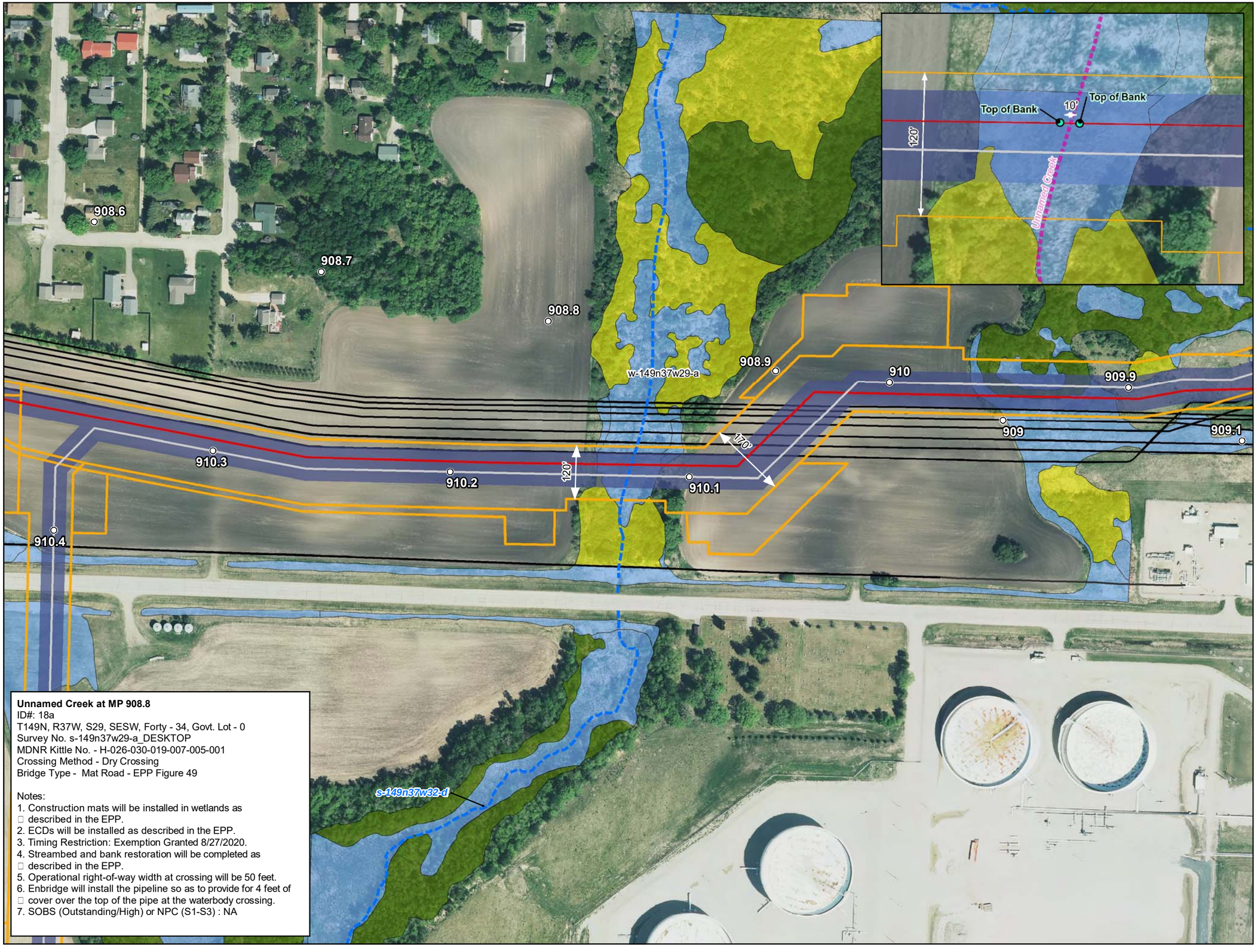
ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN

CONSTRUCTION NOTES

SCALE	DWG. NO.	PAGE NO.
	SSRP–NOTES	

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

MDNR ID No. 18a: MP 908.8; Unnamed Creek (H-026-030-019-007-005-001)



Unnamed Creek at MP 908.8
ID#: 18a
T149N, R37W, S29, SESW, Forty - 34, Govt. Lot - 0
Survey No. s-149n37w29-a_DESKTOP
MDNR Kittle No. - H-026-030-019-007-005-001
Crossing Method - Dry Crossing
Bridge Type - Mat Road - EPP Figure 49

Notes:
1. Construction mats will be installed in wetlands as described in the EPP.
2. ECDs will be installed as described in the EPP.
3. Timing Restriction: Exemption Granted 8/27/2020.
4. Streambed and bank restoration will be completed as described in the EPP.
5. Operational right-of-way width at crossing will be 50 feet.
6. Enbridge will install the pipeline so as to provide for 4 feet of cover over the top of the pipe at the waterbody crossing.
7. SOBS (Outstanding/High) or NPC (S1-S3) : NA

0 100 200 Feet
1 inch = 200 feet

N W E S

- Milepost
- Proposed L3R Centerline
- Existing Utility
- Existing Utility
- Permanent Right-of-Way
- Construction Right-of-Way/ATWS
- Field Delineated Waterbody

Delineated Wetlands
- PEM
- PFO
- PSS

Line 3 Replacement Project

Crossing Plan

ID# 18a
Survey No.
s-149n37w29-a_DESKTOP

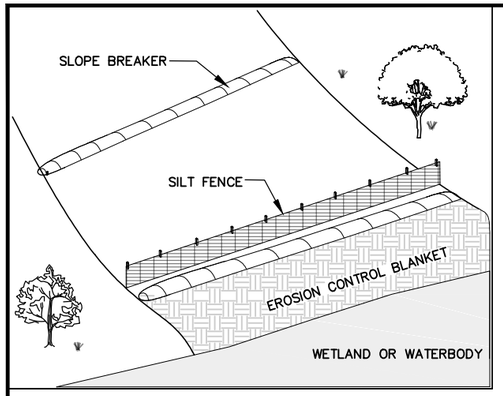
Unnamed Creek

Clearwater County, Minnesota

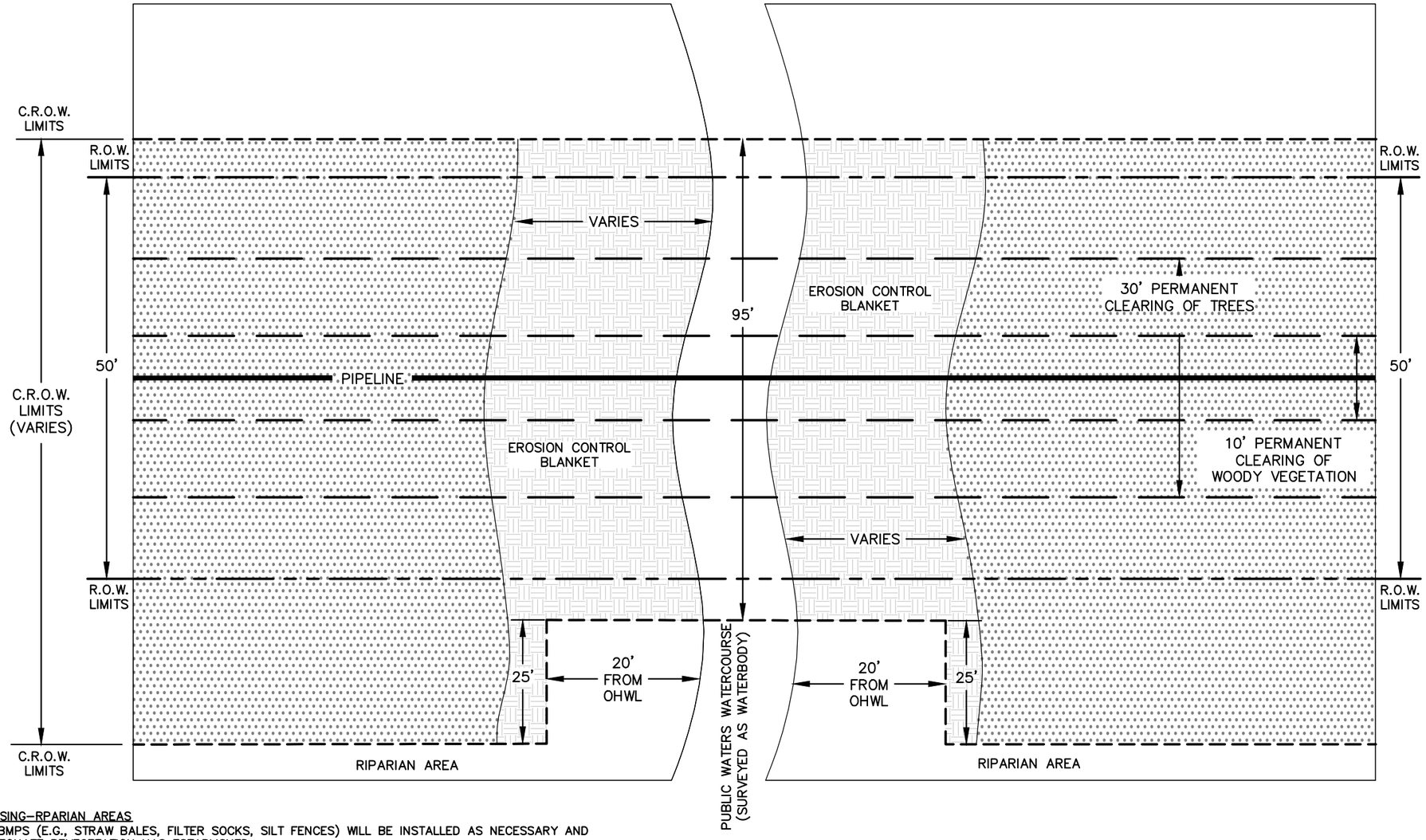
ENBRIDGE
October 2020

For Environmental Review Purposes Only

Source: Z:\Clients\E_P\Enbridge\Line_3_Full_Replacement\Permitting\State\Public_Waters\2020_09\Figures\L3R_W
Date: (10/7/2020)



SEEDING AREA



PUBLIC WATERS WATERCOURSE (SURVEYED AS WATERBODY) CROSSING–RPARIAN AREAS

1) PRIOR TO DISTURBANCE, EROSION AND SEDIMENT CONTROL BMPS (E.G., STRAW BALES, FILTER SOCKS, SILT FENCES) WILL BE INSTALLED AS NECESSARY AND WILL REMAIN IN PLACE UNTIL THE AREA HAS STABILIZED AND ADEQUATE REVEGETATION HAS ESTABLISHED.

2) ENBRIDGE WILL RESTORE THE BANKS AS NEAR AS PRACTICABLE TO PRE–CONSTRUCTION CONDITIONS UNLESS THE SLOPE IS DETERMINED BY TO BE UNSTABLE. WHERE THE SLOPE OF THE BANKS IS DETERMINED TO BE UNSTABLE OR HAS THE POTENTIAL TO ERODE OR FAIL, THE BANKS WILL BE RESHAPED TO TRANSITION THE DISTURBED AREAS INTO THE NATURAL STREAM BANK WITH THE INTENT TO STABILIZE THE BANK AND CREATE A BLENDED, NATURAL APPEARANCE.

3) SOIL STABILIZATION WILL BE INITIATED WITHIN 24 HOURS AFTER INSTALLATION OF THE CROSSING USING THE OPEN CUT TRENCH METHOD AND PRIOR TO RESTORING FLOW USING THE DAM AND PUMP OR FLUME METHOD, UNLESS SITE AND PERMIT CONDITIONS DELAY PERMANENT INSTALLATION.

4) PERMANENT SLOPE BREAKERS WILL BE INSTALLED AT THE BASE OF SLOPED APPROACHES TO PREVENT SEDIMENT FLOW INTO WATERBODIES AS DESCRIBED IN THE EPP (FIGURE 20):

a. PERMANENT SLOPE BREAKERS WILL BE INSTALLED TO MINIMIZE CONCENTRATED OR SHEET FLOW RUNOFF IN DISTURBED AREAS IN ACCORDANCE WITH THE FOLLOWING MAXIMUM ALLOWABLE SPACING UNLESS OTHERWISE SPECIFIED IN PERMIT CONDITIONS.

i.

SLOPE (%)	APPROXIMATE SPACING (FT)
1. <5	250
2. >5–15	200
3. 15–25	150
4 >25	<100

5) WATERBODY BANKS WILL BE SEEDED WITH AN APPROPRIATE SEED MIX AS SPECIFIED IN THE EPP (SECTION 7.8) AND COVERED WITH AN EROSION CONTROL BLANKET.

6) WHERE A WATERBODY IS LOCATED WITHIN A WETLAND, ENBRIDGE WILL RE–SEED THE BANKS WITH THE APPLICABLE WETLAND SEED MIX DESCRIBED IN THE EPP (SECTION 7.7).

7) ADDITIONAL VEGETATION REQUIREMENTS MAY ALSO BE CONTAINED WITHIN PROJECT–SPECIFIC PERMITS

ISSUED FOR PERMIT 12/13/19

NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMIT	AJM	12/13/19	KEH	KD
A	ISSUED FOR REVIEW	AJM	12/10/19	KEH	KD

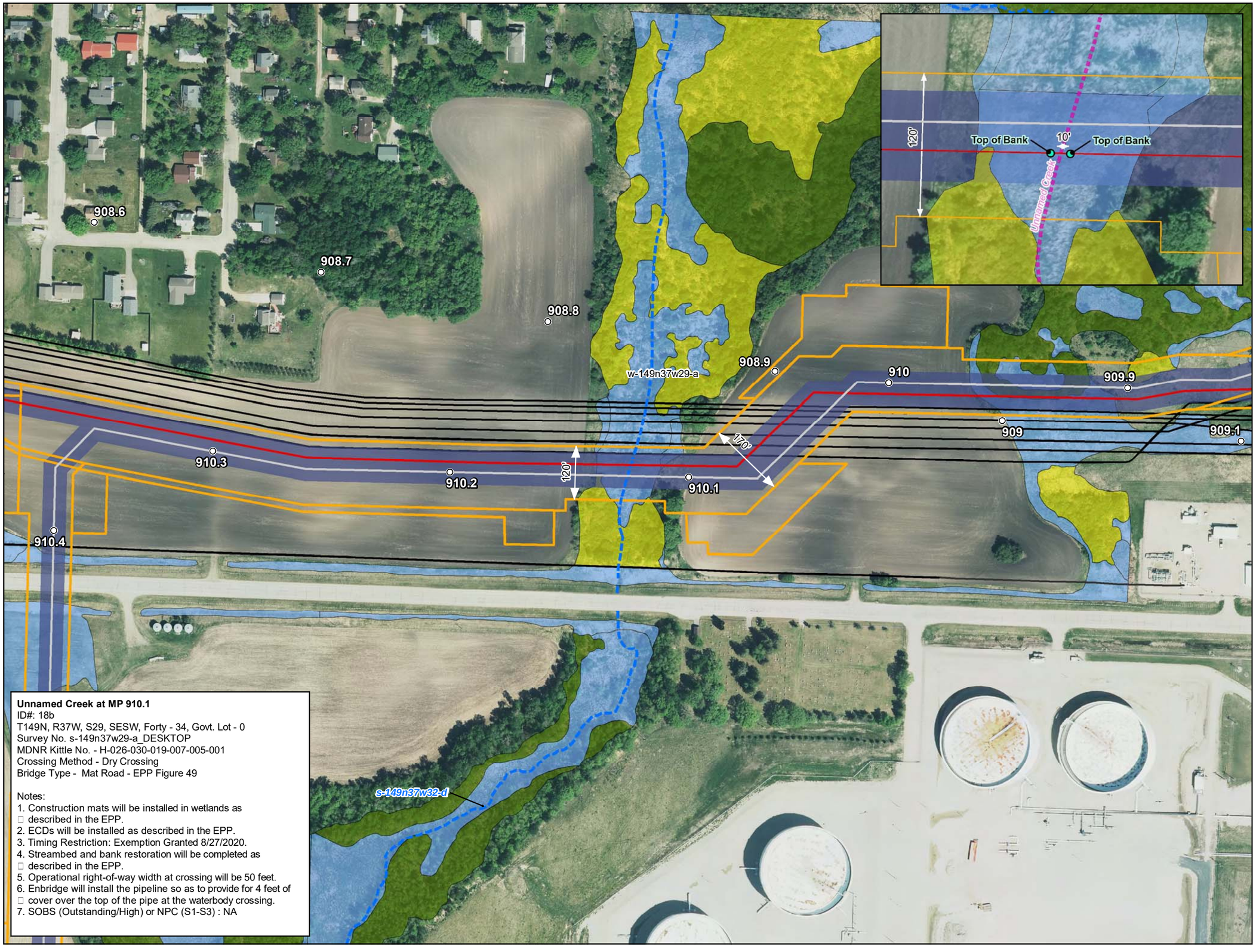
DWN. BY: AJM — DATE: 12/10/19
CHK. KEH
PROJ. ENGR. DG
PROJ. MGR. KD
CLIENT APP.

ENBRIDGE

LINE 3 REPLACEMENT
PUBLIC WATERS WATERCOURSE (SURVEYED AS WATERBODY) CROSSING TYPICAL FINAL STREAM BANK STABILIZATION & EROSION CONTROL

SCALE: NTS — DWG. NO.

MDNR ID No. 18b: MP 910.1; Unnamed Creek (H-026-030-019-007-005-001)



Unnamed Creek at MP 910.1
ID#: 18b
T149N, R37W, S29, SESW, Forty - 34, Govt. Lot - 0
Survey No. s-149n37w29-a_DESKTOP
MDNR Kittle No. - H-026-030-019-007-005-001
Crossing Method - Dry Crossing
Bridge Type - Mat Road - EPP Figure 49

Notes:
1. Construction mats will be installed in wetlands as described in the EPP.
2. ECDs will be installed as described in the EPP.
3. Timing Restriction: Exemption Granted 8/27/2020.
4. Streambed and bank restoration will be completed as described in the EPP.
5. Operational right-of-way width at crossing will be 50 feet.
6. Enbridge will install the pipeline so as to provide for 4 feet of cover over the top of the pipe at the waterbody crossing.
7. SOBS (Outstanding/High) or NPC (S1-S3) : NA

0 100 200 Feet
1 inch = 200 feet

N W E S

- Milepost
- Proposed L3R Centerline
- Existing Utility
- Existing Utility
- Permanent Right-of-Way
- Construction Right-of-Way/ATWS
- Field Delineated Waterbody

Delineated Wetlands
- PEM
- PFO
- PSS

Line 3 Replacement Project

Crossing Plan

ID# 18b
Survey No.
s-149n37w29-a_DESKTOP

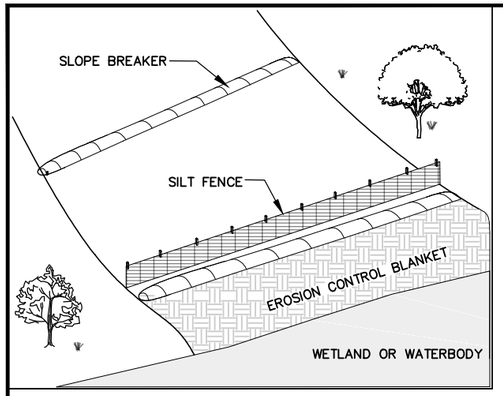
Unnamed Creek

Clearwater County, Minnesota

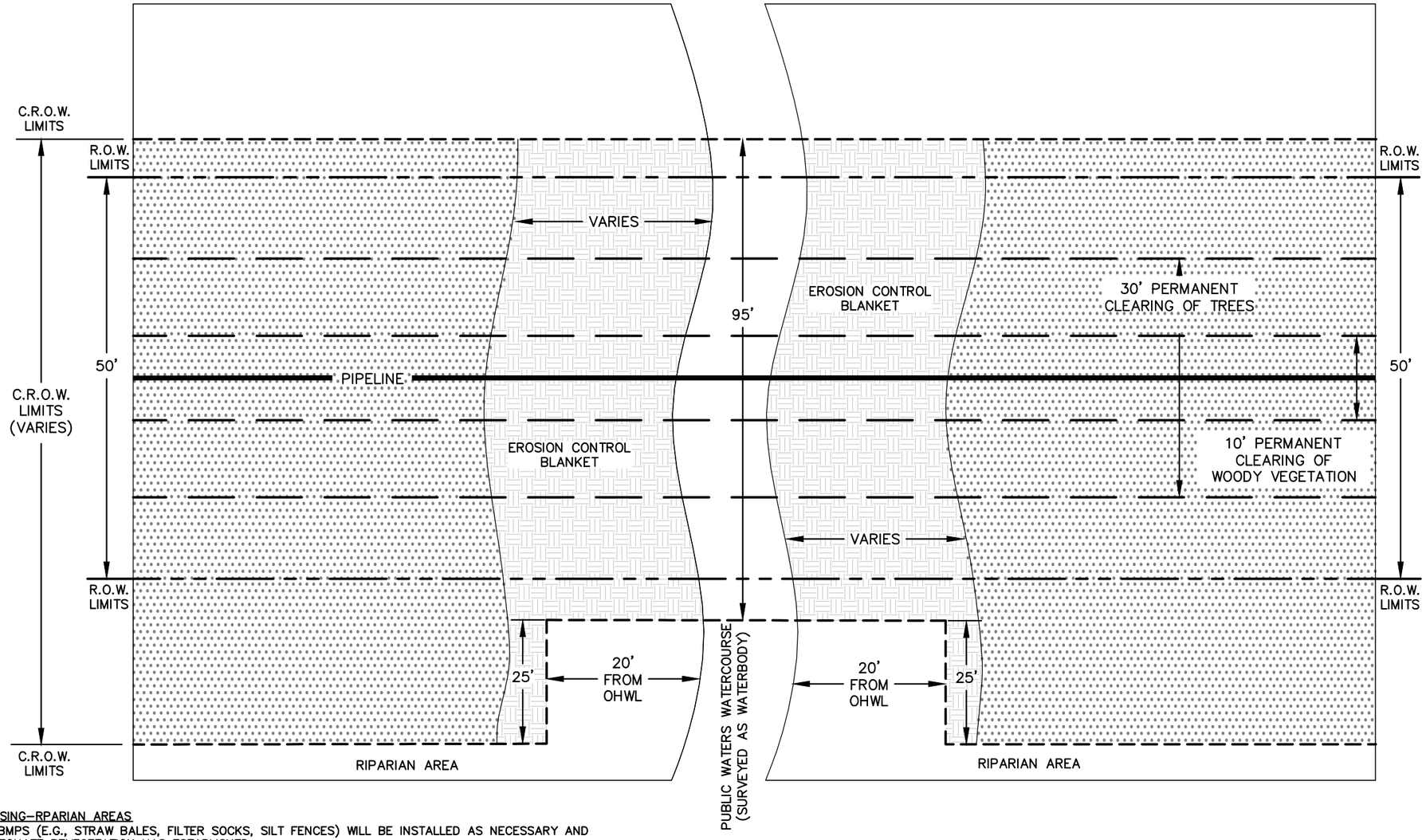
ENBRIDGE
October 2020

For Environmental Review Purposes Only

Source: Z:\Clients\E_P\Enbridge\Line_3_Full_Replacement\Permitting\State\Public_Waters\2020_09\Figures\L3R_W
Date: (10/7/2020)



SEEDING AREA



PUBLIC WATERS WATERCOURSE (SURVEYED AS WATERBODY) CROSSING–RPARIAN AREAS

1) PRIOR TO DISTURBANCE, EROSION AND SEDIMENT CONTROL BMPS (E.G., STRAW BALES, FILTER SOCKS, SILT FENCES) WILL BE INSTALLED AS NECESSARY AND WILL REMAIN IN PLACE UNTIL THE AREA HAS STABILIZED AND ADEQUATE REVEGETATION HAS ESTABLISHED.

2) ENBRIDGE WILL RESTORE THE BANKS AS NEAR AS PRACTICABLE TO PRE–CONSTRUCTION CONDITIONS UNLESS THE SLOPE IS DETERMINED BY TO BE UNSTABLE. WHERE THE SLOPE OF THE BANKS IS DETERMINED TO BE UNSTABLE OR HAS THE POTENTIAL TO ERODE OR FAIL, THE BANKS WILL BE RESHAPED TO TRANSITION THE DISTURBED AREAS INTO THE NATURAL STREAM BANK WITH THE INTENT TO STABILIZE THE BANK AND CREATE A BLENDED, NATURAL APPEARANCE.

3) SOIL STABILIZATION WILL BE INITIATED WITHIN 24 HOURS AFTER INSTALLATION OF THE CROSSING USING THE OPEN CUT TRENCH METHOD AND PRIOR TO RESTORING FLOW USING THE DAM AND PUMP OR FLUME METHOD, UNLESS SITE AND PERMIT CONDITIONS DELAY PERMANENT INSTALLATION.

4) PERMANENT SLOPE BREAKERS WILL BE INSTALLED AT THE BASE OF SLOPED APPROACHES TO PREVENT SEDIMENT FLOW INTO WATERBODIES AS DESCRIBED IN THE EPP (FIGURE 20):

a. PERMANENT SLOPE BREAKERS WILL BE INSTALLED TO MINIMIZE CONCENTRATED OR SHEET FLOW RUNOFF IN DISTURBED AREAS IN ACCORDANCE WITH THE FOLLOWING MAXIMUM ALLOWABLE SPACING UNLESS OTHERWISE SPECIFIED IN PERMIT CONDITIONS.

i.

SLOPE (%)	APPROXIMATE SPACING (FT)
1. <5	250
2. >5–15	200
3. 15–25	150
4 >25	<100

5) WATERBODY BANKS WILL BE SEEDED WITH AN APPROPRIATE SEED MIX AS SPECIFIED IN THE EPP (SECTION 7.8) AND COVERED WITH AN EROSION CONTROL BLANKET.

6) WHERE A WATERBODY IS LOCATED WITHIN A WETLAND, ENBRIDGE WILL RE–SEED THE BANKS WITH THE APPLICABLE WETLAND SEED MIX DESCRIBED IN THE EPP (SECTION 7.7).

7) ADDITIONAL VEGETATION REQUIREMENTS MAY ALSO BE CONTAINED WITHIN PROJECT–SPECIFIC PERMITS

ISSUED FOR PERMIT 12/13/19

NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMIT	AJM	12/13/19	KEH	KD
A	ISSUED FOR REVIEW	AJM	12/10/19	KEH	KD

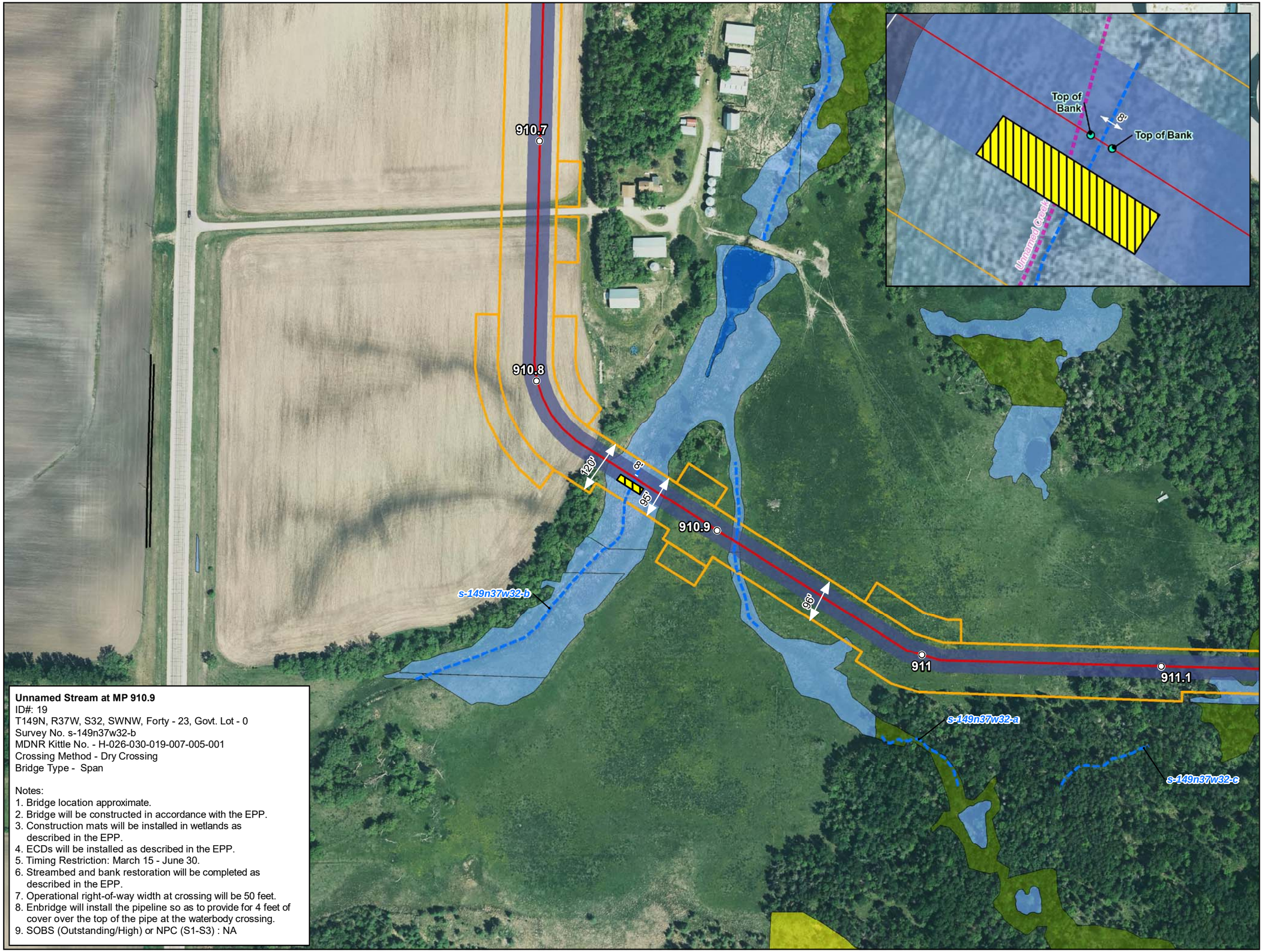
DWN. BY: AJM — DATE: 12/10/19
CHK. KEH
PROJ. ENGR. DG
PROJ. MGR. KD
CLIENT APP.

ENBRIDGE

LINE 3 REPLACEMENT
PUBLIC WATERS WATERCOURSE (SURVEYED AS WATERBODY) CROSSING TYPICAL FINAL STREAM BANK STABILIZATION & EROSION CONTROL

SCALE: NTS — DWG. NO.

MDNR ID No. 19: MP 910.9; Unnamed Stream (H-026-030-019-007-005-001)



Unnamed Stream at MP 910.9
ID#: 19
T149N, R37W, S32, SWNW, Forty - 23, Govt. Lot - 0
Survey No. s-149n37w32-b
MDNR Kittle No. - H-026-030-019-007-005-001
Crossing Method - Dry Crossing
Bridge Type - Span

Notes:
1. Bridge location approximate.
2. Bridge will be constructed in accordance with the EPP.
3. Construction mats will be installed in wetlands as described in the EPP.
4. ECDs will be installed as described in the EPP.
5. Timing Restriction: March 15 - June 30.
6. Streambed and bank restoration will be completed as described in the EPP.
7. Operational right-of-way width at crossing will be 50 feet.
8. Enbridge will install the pipeline so as to provide for 4 feet of cover over the top of the pipe at the waterbody crossing.
9. SOBS (Outstanding/High) or NPC (S1-S3) : NA

0 100 200 Feet
1 inch = 200 feet

N W E S

- Milepost
- Proposed L3R Centerline
- Existing Utility
- Permanent Right-of-Way
- Construction Right-of-Way/ATWS
- Bridge
- Field Delineated Waterbody

Delineated Wetlands
- PEM
- PFO
- PSS
- PUB

Line 3 Replacement Project

Crossing Plan

ID# 19
Survey No. s-149n37w32-b

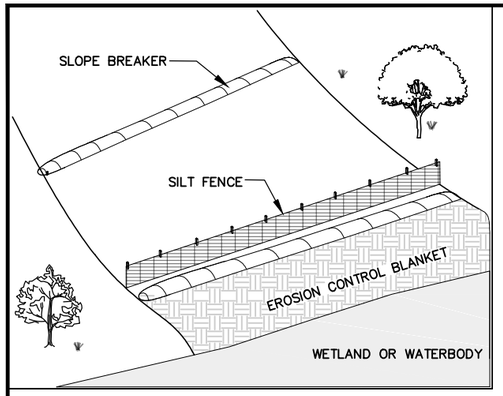
Unnamed Stream

Clearwater County, Minnesota

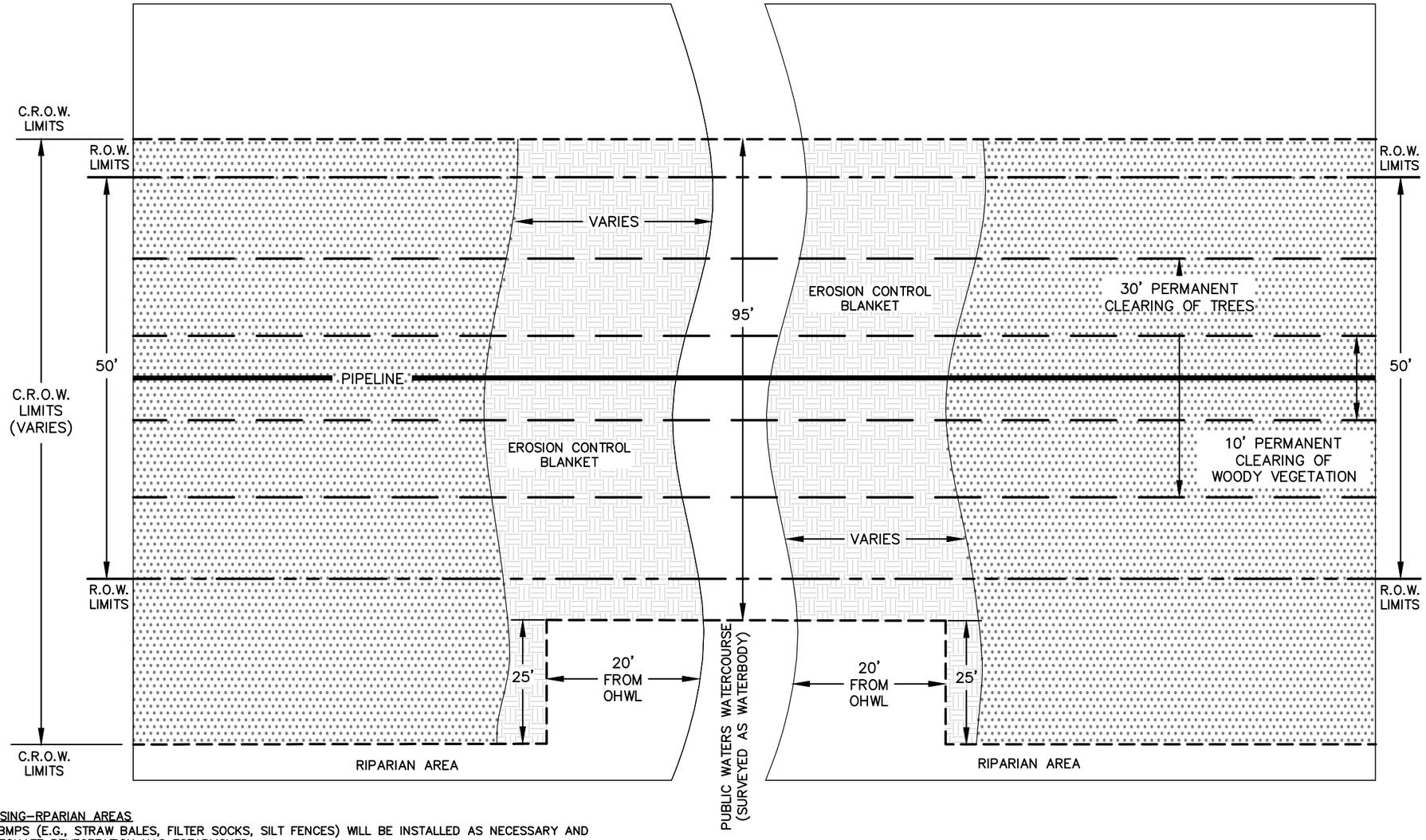
ENBRIDGE
October 2020

For Environmental Review Purposes Only

Source: Z:\Clients\E_H\Enbridge\Line_3_Full_Replacement\Permitting\State\Public_Waters\2020_09\Figures\L3R_Waters_App_Dry_Crossing_Mod_Dry_2020_09.mxd
Date: (10/7/2020)



SEEDING AREA



PUBLIC WATERS WATERCOURSE (SURVEYED AS WATERBODY) CROSSING–RPARIAN AREAS

1) PRIOR TO DISTURBANCE, EROSION AND SEDIMENT CONTROL BMPS (E.G., STRAW BALES, FILTER SOCKS, SILT FENCES) WILL BE INSTALLED AS NECESSARY AND WILL REMAIN IN PLACE UNTIL THE AREA HAS STABILIZED AND ADEQUATE REVEGETATION HAS ESTABLISHED.

2) ENBRIDGE WILL RESTORE THE BANKS AS NEAR AS PRACTICABLE TO PRE–CONSTRUCTION CONDITIONS UNLESS THE SLOPE IS DETERMINED BY TO BE UNSTABLE. WHERE THE SLOPE OF THE BANKS IS DETERMINED TO BE UNSTABLE OR HAS THE POTENTIAL TO ERODE OR FAIL, THE BANKS WILL BE RESHAPED TO TRANSITION THE DISTURBED AREAS INTO THE NATURAL STREAM BANK WITH THE INTENT TO STABILIZE THE BANK AND CREATE A BLENDED, NATURAL APPEARANCE.

3) SOIL STABILIZATION WILL BE INITIATED WITHIN 24 HOURS AFTER INSTALLATION OF THE CROSSING USING THE OPEN CUT TRENCH METHOD AND PRIOR TO RESTORING FLOW USING THE DAM AND PUMP OR FLUME METHOD, UNLESS SITE AND PERMIT CONDITIONS DELAY PERMANENT INSTALLATION.

4) PERMANENT SLOPE BREAKERS WILL BE INSTALLED AT THE BASE OF SLOPED APPROACHES TO PREVENT SEDIMENT FLOW INTO WATERBODIES AS DESCRIBED IN THE EPP (FIGURE 20):

a. PERMANENT SLOPE BREAKERS WILL BE INSTALLED TO MINIMIZE CONCENTRATED OR SHEET FLOW RUNOFF IN DISTURBED AREAS IN ACCORDANCE WITH THE FOLLOWING MAXIMUM ALLOWABLE SPACING UNLESS OTHERWISE SPECIFIED IN PERMIT CONDITIONS.

i.

SLOPE (%)	APPROXIMATE SPACING (FT)
1. <5	250
2. >5–15	200
3. 15–25	150
4 >25	<100

5) WATERBODY BANKS WILL BE SEEDED WITH AN APPROPRIATE SEED MIX AS SPECIFIED IN THE EPP (SECTION 7.8) AND COVERED WITH AN EROSION CONTROL BLANKET.

6) WHERE A WATERBODY IS LOCATED WITHIN A WETLAND, ENBRIDGE WILL RE–SEED THE BANKS WITH THE APPLICABLE WETLAND SEED MIX DESCRIBED IN THE EPP (SECTION 7.7).

7) ADDITIONAL VEGETATION REQUIREMENTS MAY ALSO BE CONTAINED WITHIN PROJECT–SPECIFIC PERMITS

ISSUED FOR PERMIT 12/13/19

NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMIT	AJM	12/13/19	KEH	KD
A	ISSUED FOR REVIEW	AJM	12/10/19	KEH	KD

DWN. BY: AJM — DATE: 12/10/19
CHK. KEH
PROJ. ENGR. DG
PROJ. MGR. KD
CLIENT APP.

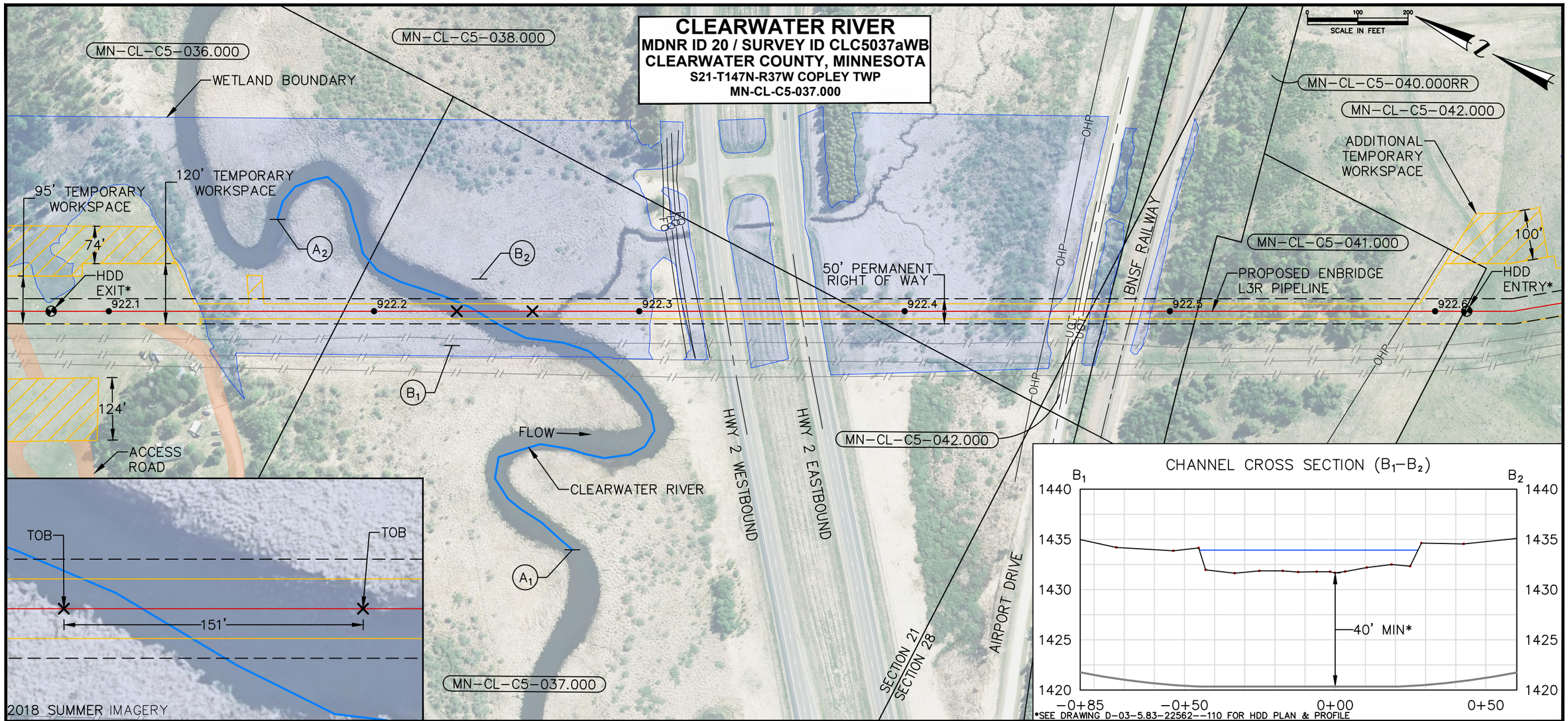
ENBRIDGE

LINE 3 REPLACEMENT
PUBLIC WATERS WATERCOURSE (SURVEYED AS WATERBODY) CROSSING TYPICAL FINAL STREAM BANK STABILIZATION & EROSION CONTROL

SCALE: NTS — DWG. NO.

MDNR ID No. 20: MP 922.2; Clearwater River (H-026-030-019)

CLEARWATER RIVER
MDNR ID 20 / SURVEY ID CLC5037aWB
CLEARWATER COUNTY, MINNESOTA
S21-T147N-R37W COPLEY TWP
MN-CL-C5-037.000



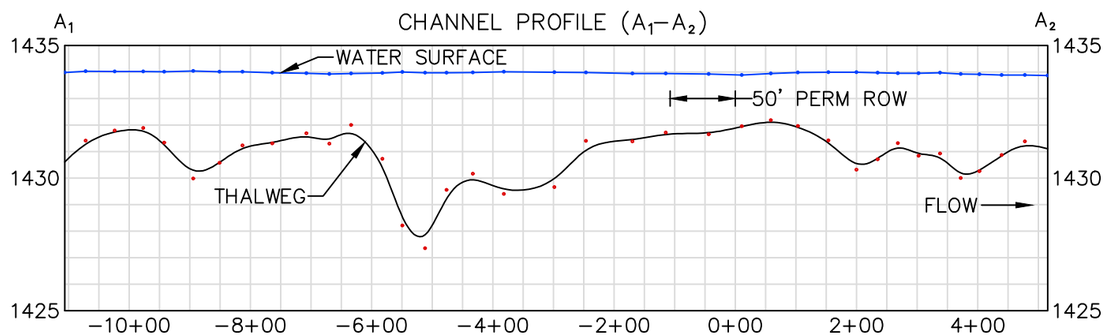
*SEE DRAWING D-03-5.83-22562--110 FOR HDD PLAN & PROFILE

NOTES
1. NO FEMA DIGITAL FLOODPLAIN DATA AVAILABLE
2. BANKFULL DATA NOT AVAILABLE
3. SOBS (O/H) OR NPC (S1–3): YES (HIGH SOBS)
4. MDNR REGION 1 PWI – COOL/WARM WATER FISHERY: MARCH 15 – JUNE 30. 24-HOUR SOIL STABILIZATION REQUIRED WITHIN 200 FEET DURING RESTRICTION.
5. WHEN WORKING WITHIN "WORK IN WATER RESTRICTIONS", STABILIZE ALL EXPOSED SOIL AREAS WITHIN 200 FEET OF THE WATER'S EDGE, AND THAT DRAIN TO THAT WATER, WITHIN 24 HOURS. STABILIZATION WILL BE INITIATED IMMEDIATELY AND COMPLETED WITHIN 7 CALENDAR DAYS WHENEVER CONSTRUCTION ACTIVITY HAS PERMANENTLY/ TEMPORARILY CEASED ON ANY PORTION OF THE SITE OUTSIDE OF THE RESTRICTION PERIOD.

CHANNEL CROSS SECTION NOTE:
1. CHANNEL LOCATIONS, DIMENSIONS, AND/OR ELEVATIONS ARE BASED ON 2015 TOPOGRAPHIC/BATHYMETRIC SURVEY(S), AND AS SUCH DO NOT REFLECT CHANGES TO THE CHANNEL THAT MAY HAVE OCCURRED SINCE THAT TIME.

LEGEND

- PROPOSED ENBRIDGE L3R PIPELINE
- OTHER PIPELINE
- PERMANENT RIGHT OF WAY
- TEMPORARY WORKSPACE
- WATERBODY (ROSGEN SURVEY – THALWEG)
- TRACT BOUNDARY
- ROAD CENTERLINE
- RAILROAD CENTERLINE
- OHP – OVERHEAD POWER
- UGT – UNDERGROUND TELEPHONE
- FO – FIBER OPTIC
- ACCESS ROAD
- WETLAND
- ADDITIONAL TEMPORARY WORKSPACE
- MN-XX-XX-XXX.XXX – TRACT ID
- ROSGEN SURVEY POINT – WATER SURFACE
- ROSGEN SURVEY POINT – RIVER BOTTOM (THALWEG)
- HDD ENTRY EXIT POINT
- TOP OF BANK



NO.	REVISION-DESCRIPTION	BY	DATE	CHK'D	APP'D
0	ISSUED FOR PERMIT APPLICATION	AJJ	10/2020	BAB	BAB

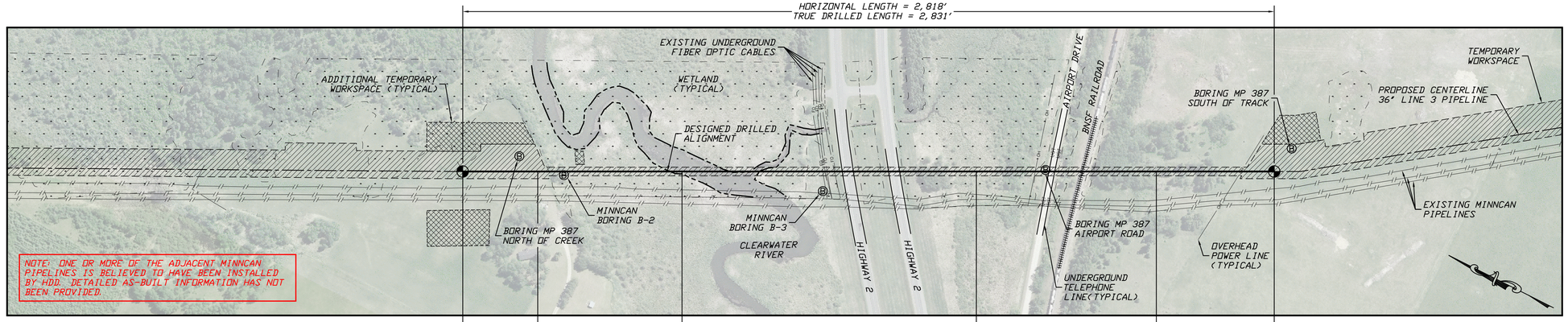
ENBRIDGE

DWN. BY: AJJ	DATE 10/2020
CHK.	
PROJ. ENGR.	
PROJ. MGR.	
CLIENT APP.	

PROPOSED ENBRIDGE L3R PIPELINE
PRIMARY METHOD – HDD
CROSSING OF CLEARWATER RIVER
ENBRIDGE MP 922.2
CLEARWATER COUNTY, MINNESOTA

SCALE: NOTED
DWG. NO.: B-93-5.84-MDNR-20-0

FOR ENVIRONMENTAL REVIEW PURPOSES ONLY



PLAN

SCALE: 1"=200'

EXIT POINT @ 8°
28+17.78, 1440.15
N 713674.47, E 2062583.64

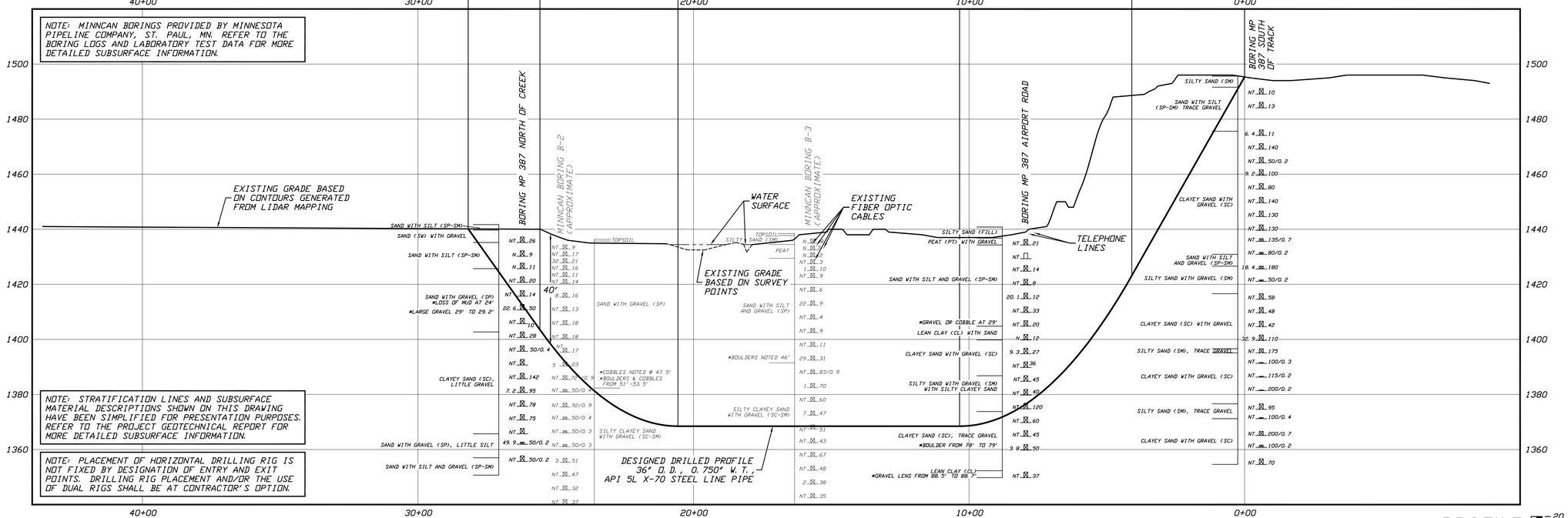
P.T. 8° SAG BEND
25+57.20, 1403.53

P.C. 8° SAG BEND
20+56.18, 1368.49
RADIUS = 3,600'

P.T. 10° SAG BEND
10+34.23, 1368.49

P.C. 10° SAG BEND
4+09.09, 1423.19
RADIUS = 3,600'

ENTRY POINT @ 10°
0+00.00, 1495.32
N 711151.46, E 2063838.34



PROFILE

SCALE: 1"=200' HORIZONTAL
1"= 20' VERTICAL

20
10
0
400 200 100 0

GENERAL LEGEND

DRILLED PATH ENTRY/EXIT POINT

GEOTECHNICAL LEGEND

BORING LOCATION

SPLIT SPOON SAMPLE

53 N 23 — PENETRATION RESISTANCE IN BLOWS PER FOOT FOR A 140 POUND HAMMER FALLING 30 INCHES
PERCENTAGE OF GRAVEL BY WEIGHT FOR SAMPLES CONTAINING GRAVEL

SHELBY TUBE SAMPLE

53 — PERCENTAGE OF GRAVEL BY WEIGHT FOR SAMPLES CONTAINING GRAVEL

GEOTECHNICAL NOTES

1. GEOTECHNICAL DATA (MP 387 BORINGS) PROVIDED BY BARR ENGINEERING COMPANY, DULUTH, MN. REFER TO THE PROJECT GEOTECHNICAL REPORT DATED JULY, 2014 FOR MORE DETAILED SUBSURFACE INFORMATION.
2. THE LETTER "N" TO THE LEFT OF A SAMPLE INDICATES THAT NO GRAVEL WAS OBSERVED IN THE SAMPLE. THE LETTERS "NT" INDICATE THAT GRAVEL WAS OBSERVED BUT NO GRADATION TEST WAS PERFORMED.
3. THE GEOTECHNICAL DATA IS ONLY DESCRIPTIVE OF THE LOCATIONS ACTUALLY SAMPLED. EXTENSION OF THIS DATA OUTSIDE OF THE ORIGINAL BORINGS MAY BE DONE TO CHARACTERIZE THE SOIL CONDITIONS, HOWEVER, COMPANY DOES NOT GUARANTEE THESE CHARACTERIZATIONS TO BE ACCURATE. CONTRACTOR MUST USE HIS OWN EXPERIENCE AND JUDGMENT IN INTERPRETING THIS DATA.

TOPOGRAPHIC SURVEY NOTES

1. TOPOGRAPHIC SURVEY DATA PROVIDED BY ENBRIDGE, SUPERIOR, WISCONSIN.
2. NORTHINGS AND EASTINGS ARE IN U.S. SURVEY FEET REFERENCED TO MINNESOTA STATE PLANE COORDINATES, NORTH ZONE, NAD 83.
3. ELEVATIONS ARE IN FEET REFERENCED TO NAVD 88.

DRILLED PATH NOTES

1. DRILLED PATH STATIONING IS IN FEET BY HORIZONTAL MEASUREMENT AND IS REFERENCED TO CONTROL ESTABLISHED FOR THE DRILLED SEGMENT.
2. DRILLED PATH COORDINATES REFER TO CENTERLINE OF PILOT HOLE AS OPPOSED TO TOP OF INSTALLED PIPE.

PILOT HOLE TOLERANCES

THE PILOT HOLE SHALL BE DRILLED TO THE TOLERANCES LISTED BELOW. HOWEVER, IN ALL CASES, RIGHT-OF-WAY RESTRICTIONS AND CONCERN FOR ADJACENT FACILITIES SHALL TAKE PRECEDENCE OVER THESE TOLERANCES.

1. ENTRY POINT: AS STAKED BY COMPANY
2. EXIT POINT: UP TO 10 FEET SHORT OR 20 FEET LONG RELATIVE TO THE DESIGNED EXIT POINT; UP TO 5 FEET RIGHT OR LEFT OF THE DESIGNED ALIGNMENT
3. ELEVATION: UP TO 2 FEET ABOVE AND 10 FEET BELOW THE DESIGNED PROFILE
4. ALIGNMENT: UP TO 5 FEET RIGHT OR LEFT OF THE DESIGNED ALIGNMENT
5. CURVE RADIUS: NO LESS THAN 2,400 FEET BASED ON A 3-JOINT AVERAGE (ASSUMING RANGE 2 DRILL PIPE)

PROTECTION OF EXISTING FACILITIES

CONTRACTOR SHALL UNDERTAKE THE FOLLOWING STEPS PRIOR TO COMMENCING DRILLING OPERATIONS.

1. CONTACT THE UTILITY LOCATION/NOTIFICATION SERVICE FOR THE CONSTRUCTION AREA.
2. POSITIVELY LOCATE AND STAKE ALL EXISTING UNDERGROUND FACILITIES. ANY FACILITIES LOCATED WITHIN 10 FEET OF THE DESIGNED DRILLED PATH SHALL BE EXPOSED.
3. MODIFY DRILLING PRACTICES AND DOWNHOLE ASSEMBLIES AS NECESSARY TO PREVENT DAMAGE TO EXISTING FACILITIES.

LINE 3 PIPELINE PROJECT

PLAN AND PROFILE
36-INCH PIPELINE CROSSING OF THE CLEARWATER RIVER BY HORIZONTAL DIRECTIONAL DRILLING

LOCATION: CLEARWATER COUNTY, MINNESOTA

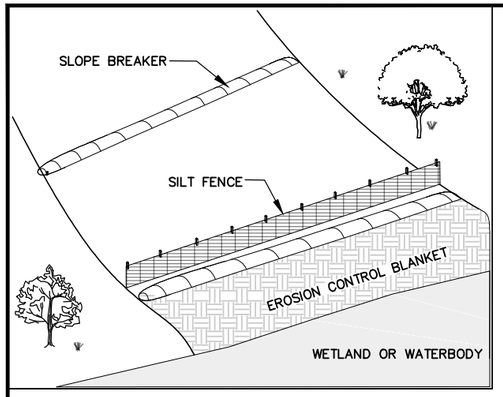
DRAWN	DATE	CHECKED	APPROVED	DRAWING NUMBER	REVISION
ACM	07/24/17	DMP	JSP	D-03-5.83-22562-D-110	D

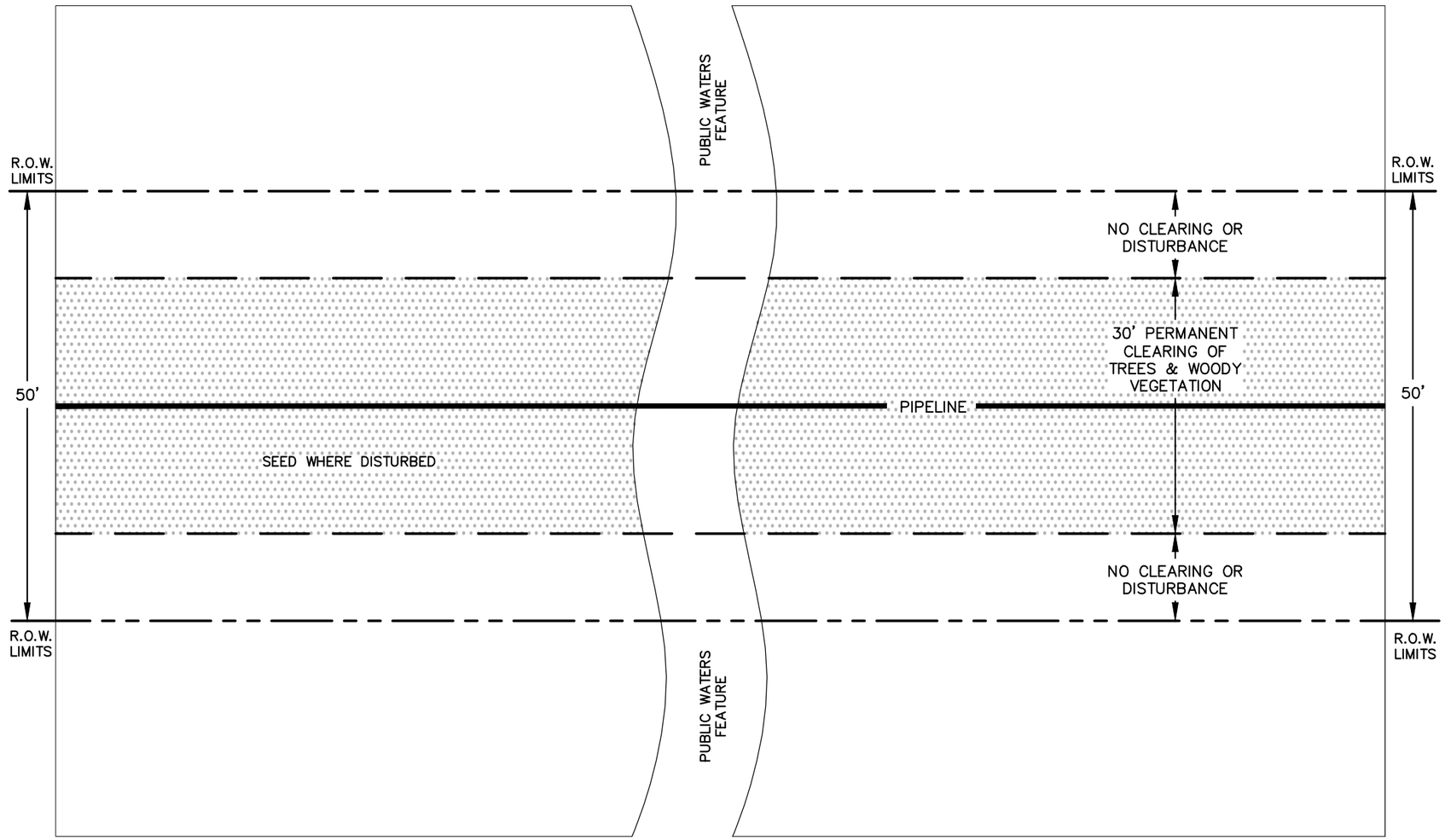
NO.	DATE	REVISION DESCRIPTION	BY	CHKD	APP.
A	07/24/17	ISSUE FOR CONSTRUCTION	ACM	DMP	JSP
B	09/29/17	UPDATE WORKSPACE	LKB	JSP	JSP
C	08/06/19	REVERSE/MODIFY ENDPOINTS AS DIRECTED BY ENBRIDGE	KWW	JSP	JSP
D	10/27/19	UPDATE WETLAND BOUNDARIES AND WORKSPACE	KWW	JSP	JSP

J.D. Hair & Associates, Inc.
Consulting Engineers
2424 East 21st Street
Suite 510
Tulsa, Oklahoma 74114

PROJECT NO.
Enbridge\1404

MILEPOST
D922





PUBLIC WATERS FEATURE - HDD CROSSING

1) DISTURBANCE OF THE ROW IS LIMITED TO THE 30-FOOT-WIDE CLEARING OF TREES AND WOODY VEGETATION AND IMPACTS RESULTING FROM TRAVEL LANES AND/OR BRIDGES.
2) ANY WETLAND OR WATERBODY BANK THAT IS DISTURBED WILL BE STABILIZED WITH EROSION AND SEDIMENT CONTROL BMP AND RESTORED TO AS NEAR AS PRACTICABLE TO PRE-CONSTRUCTION CONDITIONS.
3) PERMANENT REVEGETATION SEEDING OF DISTURBED WATERBODY BANKS WILL UTILIZE THE BWSR RIPARIAN SEED MIXES IN ACCORDANCE WITH THE EPP (SECTION 7.8).
4) PERMANENT REVEGETATION SEEDING OF DISTURBED WETLANDS WILL TAKE PLACE IN ACCORDANCE WITH THE EPP (SECTION 7.7). 7) IN DISTURBED WETLAND AREAS, THE APPROPRIATE SEED MIX WILL BE DETERMINED USING THE RESULTS OF PRE-CONSTRUCTION WETLAND IN DISTURBED WETLAND AREAS, HYDROLOGICAL CHARACTERISTICS, AND SITE-SPECIFIC CONDITIONS.

ISSUED FOR PERMIT 12/13/19

NO.	REVISION-DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMIT	AJM	12/13/19	KEH	KD
A	ISSUED FOR REVIEW	AJM	12/10/19	KEH	KD

DWN. BY:	AJM	DATE 12/10/19
CHK.	KEH	
PROJ. ENGR.	DG	
PROJ. MGR.	KD	
CLIENT APP.		

ENBRIDGE

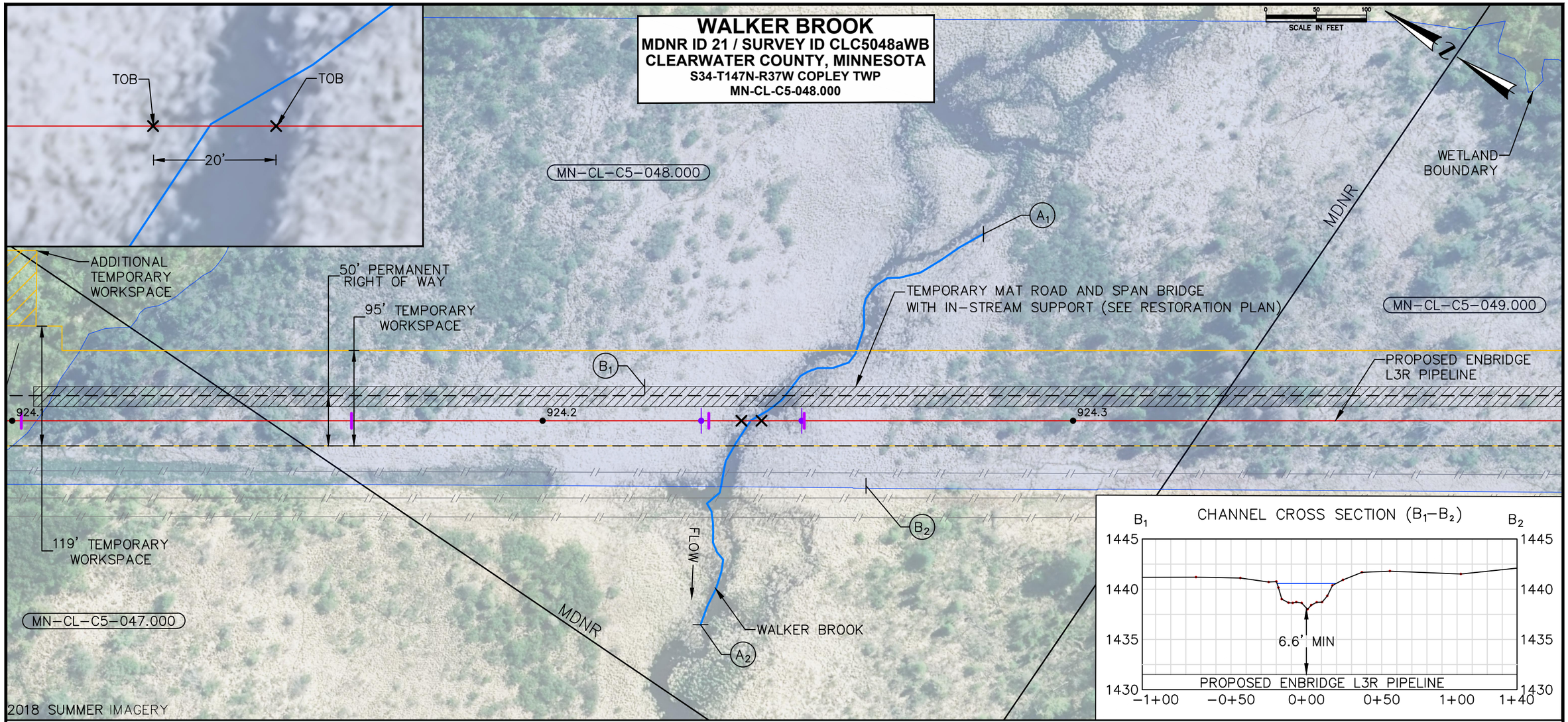
LINE 3 REPLACEMENT
PUBLIC WATERS HDD CROSSING TYPICAL
FINAL STREAM STABILIZATION & EROSION CONTROL

SCALE: NTS
DWG. NO.

MDNR ID No. 21: MP 924.2; Walker Brook (H-026-030-019-029)

WALKER BROOK

MDNR ID 21 / SURVEY ID CLC5048aWB
CLEARWATER COUNTY, MINNESOTA
S34-T147N-R37W COPLEY TWP
MN-CL-C5-048.000



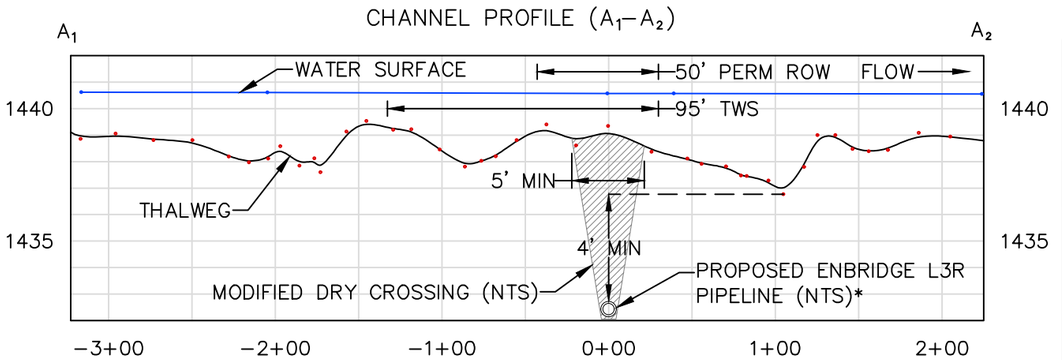
NOTES
1. NO FEMA DIGITAL FLOODPLAIN DATA AVAILABLE
2. BANKFULL DATA NOT AVAILABLE
3. SOBS (O/H) OR NPC (S1–3): N/A
4. MDNR REGION 1 PWI – COOL/WARM WATER FISHERY: MARCH 15 – JUNE 30. 24–HOUR SOIL STABILIZATION REQUIRED WITHIN 200 FEET DURING RESTRICTION
5. MDNR LAND – SEE UTILITY LICENSE FOR PUBLIC LANDS. NO CLEARING: JUNE–JULY

LEGEND

- PROPOSED ENBRIDGE L3R PIPELINE
- OTHER PIPELINE
- PERMANENT RIGHT OF WAY
- TEMPORARY WORKSPACE
- WATERBODY (ROSGEN SURVEY – THALWEG)
- TRACT BOUNDARY
- FENCE
- MDNR — MINNESOTA DEPARTMENT OF NATURAL RESOURCES (MDNR) BOUNDARY
- WETLAND
- ADDITIONAL TEMPORARY WORKSPACE
- MN–XX–XX–XXX.XXX — TRACT ID
- ROSGEN SURVEY POINT – WATER SURFACE
- ROSGEN SURVEY POINT – RIVER BOTTOM (THALWEG)
- PROPOSED INCREASED DEPTH OF COVER EXTENT
- TOP OF BANK
- TRENCH BREAKER (LOCATIONS ARE APPROXIMATE)

FOR ENVIRONMENTAL REVIEW PURPOSES ONLY

6. WHEN WORKING WITHIN "WORK IN WATER RESTRICTIONS", STABILIZE ALL EXPOSED SOIL AREAS WITHIN 200 FEET OF THE WATER'S EDGE, AND THAT DRAIN TO THAT WATER, WITHIN 24 HOURS. STABILIZATION WILL BE INITIATED IMMEDIATELY AND COMPLETED WITHIN 7 CALENDAR DAYS WHENEVER CONSTRUCTION ACTIVITY HAS PERMANENTLY/ TEMPORARILY CEASED ON ANY PORTION OF THE SITE OUTSIDE OF THE RESTRICTION PERIOD.



CHANNEL CROSS SECTION NOTE:
1. CHANNEL LOCATIONS, DIMENSIONS, AND/OR ELEVATIONS ARE BASED ON 2015 TOPOGRAPHIC/BATHYMETRIC SURVEY(S), AND AS SUCH DO NOT REFLECT CHANGES TO THE CHANNEL THAT MAY HAVE OCCURRED SINCE THAT TIME.
2. DEPTH OF COVER AT CENTERLINE WAS DEVELOPED USING THE BOTTOM ELEVATION OF THE DEEPEST UPSTREAM OR DOWNSTREAM POOL WITHIN THE SURVEYED REACH, UNLESS OTHERWISE NOTED IN APPLICATION MATERIALS.
3. MEAN MEANDER BELT WIDTH: N/A
4. MEANDER WIDTH RATIO: N/A

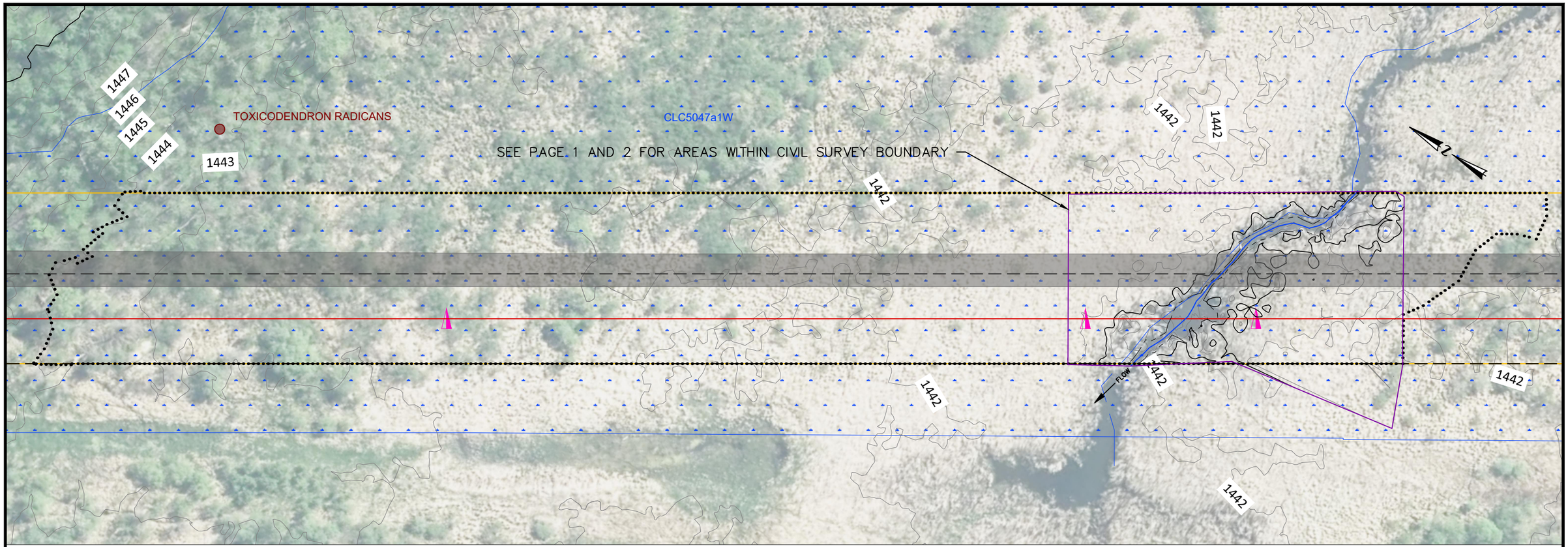
NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
0	ISSUED FOR PERMIT APPLICATION	AJJ	10/2020	BAB	BAB

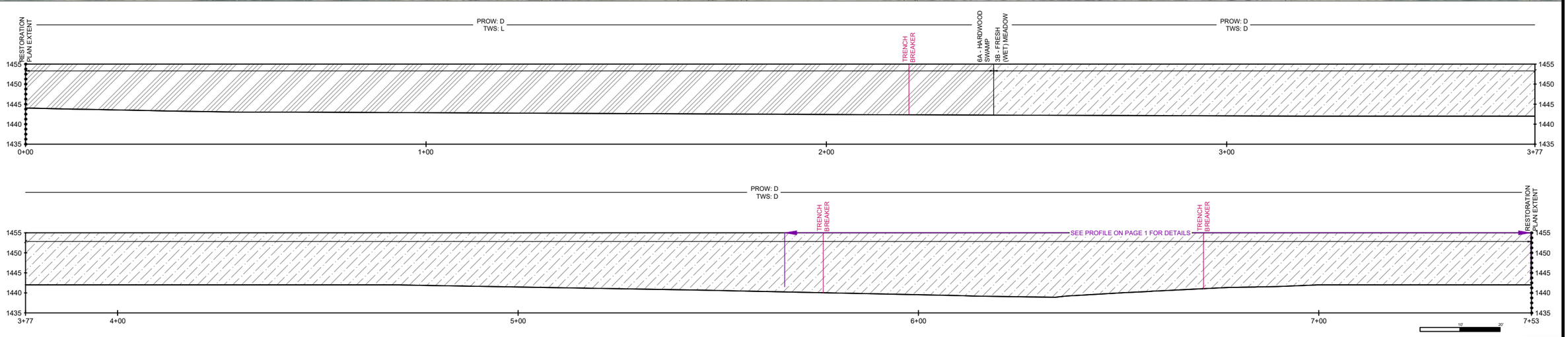
ENBRIDGE

DWN. BY: AJJ	DATE 10/2020
CHK.	
PROJ. ENGR.	
PROJ. MGR.	
CLIENT APP.	

PROPOSED ENBRIDGE L3R PIPELINE
PRIMARY METHOD – MODIFIED DRY CROSSING
CROSSING OF WALKER BROOK
ENBRIDGE MP 924.2
CLEARWATER COUNTY, MINNESOTA

SCALE: NOTED
DWG. NO.: B–93–5.84–MDNR–21–0





BWSR SEED MIX	D: WET MEADOW NE (34–371); L: NATURAL REVEGETATION
SOBS (O/H) or NPC (S1-3)	NO (MODERATE); NO (NOT S1–S3)

1. ELEVATIONS OUTSIDE OF THE AREA WITHIN CIVIL SURVEY BOUNDARY ARE DERIVED FROM LIDAR. ENBRIDGE WILL RESTORE THE AREAS ADJACENT TO THE PUBLIC WATER WITHIN THE MDNR EXPANDED RESTORATION BOUNDARY TO PRE–CONSTRUCTION CONDITIONS.
2. MDNR REGION 1 PWI – COOL/WARM WATER FISHERY: MARCH 15 – JUNE 30. 24–HOUR SOIL STABILIZATION REQUIRED WITHIN 200 FEET DURING RESTRICTION.
3. AIR PHOTOS ARE FROM 2018 ENBRIDGE AERIAL PHOTOGRAPHY.
4. ADDITIONAL ON–THE GROUND PHOTOS MAY BE TAKEN PRIOR TO CONSTRUCTION AT MDNR REQUEST.
5. PRE–CONSTRUCTION PHOTOS WILL BE USED TO AID IN RESTORATION.
6. SEE GENERAL NOTES PAGE FOR ADDITIONAL DETAIL.
7. SEE THE PLANTING PLAN FOR ADDITIONAL DETAIL REGARDING SEEDING PRACTICES AND SEED MIXES AT PUBLIC WATER CROSSINGS.
8. ON PUBLIC LANDS AND WHEREVER PRACTICABLE AT WATERBODY CROSSINGS, ENBRIDGE WILL USE WILDLIFE–FRIENDLY EROSION AND SEDIMENT CONTROL BMPS THAT CONTAIN BIODEGRADABLE NETTING (CATEGORY 3N OR 4N NATURAL FIBER) AND WILL AVOID THE USE OF PLASTIC MESH (SECTIONS 1.17.1 AND 2.6.1 OF THE EPP).
9. WHEN WORKING WITHIN "WORK IN WATER RESTRICTIONS", STABILIZE ALL EXPOSED SOIL AREAS WITHIN 200 FEET OF THE WATER'S EDGE, AND THAT DRAIN TO THAT WATER, WITHIN 24 HOURS. STABILIZATION WILL BE INITIATED IMMEDIATELY AND COMPLETED WITHIN 7 CALENDAR DAYS WHENEVER CONSTRUCTION ACTIVITY HAS PERMANENTLY/ TEMPORARILY CEASED ON ANY PORTION OF THE SITE OUTSIDE OF THE RESTRICTION PERIOD.

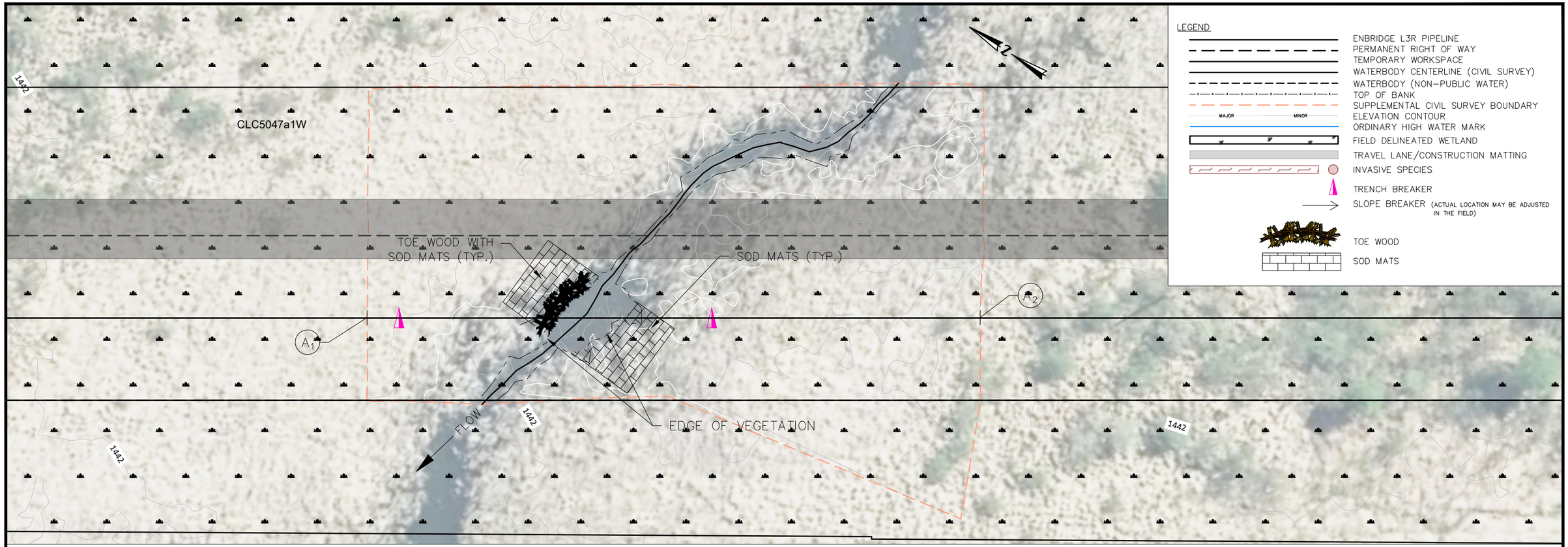
LEGEND

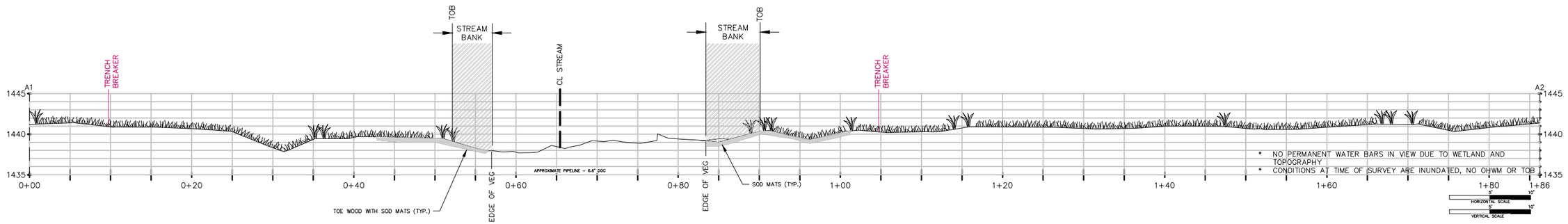
- ENBRIDGE L3R PIPELINE
- PERMANENT RIGHT OF WAY
- TEMPORARY WORKSPACE
- WATERBODY CENTERLINE (CIVIL SURVEY)
- WATERBODY (NON–PUBLIC WATER)
- PUBLIC WATER CIVIL SURVEY BOUNDARY
- MDNR EXPANDED RESTORATION BOUNDARY
- TOP OF BANK
- ELEVATION CONTOUR
- ORDINARY HIGH WATER MARK
- FIELD DELINEATED WETLAND
- TRAVEL LANE/CONSTRUCTION MATTING
- INVASIVE SPECIES
- TRENCH BREAKER
- PERMANENT SLOPE BREAKER (ACTUAL LOCATION MAY BE ADJUSTED IN THE FIELD)
- 1 – SHALLOW, OPEN WATER
- 2B – SHALLOW MARSH
- 3A – SEDGE MEADOW
- 3B – FRESH (WET) MEADOW
- 5A – SHRUB–CARR
- 5B – ALDER THICKET
- 6A – HARDWOOD SWAMP
- 6B – CONIFEROUS SWAMP

NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING	MJT	10/2020		
A	ISSUED FOR REVIEW	MJT	09/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
WALKER BROOK – MP 924.2 – MDNR ID 21
RE–VEGETATION PLAN: EXPANDED EXTENT

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP–924.2–001A	1A/5





PROPOSED RESTORATION ACTIVITIES WILL BE REVIEWED BY DNR AND ENBRIDGE DURING SITE VISIT AND MAY BE CHANGED TO REFLECT SITE CONDITIONS AT THE TIME OF CONSTRUCTION.

FEATURE ID	CLC5048aWB; IFC ID: S-178.0
CROSSING TYPE	MODIFIED DRY CROSSING
PROPOSED RESTORATION (SEE DETAILS FOR LIVE STAKING, TRANSPLANTS, AND SHRUB SPECIES IF APPLICABLE)	EC BLANKET -NATURAL FIBER MPCA TYPE 3.B/MNDOT CATEGORY 1 4N; BRUSH – TOE WOOD
WITHIN OR ADJACENT WETLAND	FRESH WET MEADOW
BWSR SEED MIX	WET MEADOW NE (34-371)
DOMINANT WETLAND VEGETATION	1. TYPHA X GLUACA
SOBS (O/H) or NPC (S1-3)	NO (MODERATE); NO (NOT S1-S3)

NOTES

1. CONSTRUCTION TIMING RESTRICTIONS
   1.1. MDNR REGION 1 PWI – COOL/WARM WATER FISHERY: MARCH 15 – JUNE 30.
   1.2. WHEN WORK OCCURS WITHIN "WORK IN WATER RESTRICTIONS", ALL EXPOSED SOIL AREAS WITHIN 200 FEET OF THE WATER'S EDGE, AND THAT DRAIN TO THAT WATER, WILL BE STABILIZED WITHIN 24 HOURS DURING THE RESTRICTION PERIOD. STABILIZATION OF ALL EXPOSED SOILS WITHIN 200 FEET OF THE PUBLIC WATER'S EDGE, AND THAT DRAIN TO THAT WATER, WILL BE INITIATED IMMEDIATELY AND COMPLETED WITHIN 7 CALENDAR DAYS WHENEVER CONSTRUCTION ACTIVITY HAS PERMANENTLY OR TEMPORARILY CEASED ON ANY PORTION OF THE SITE OUTSIDE OF THE RESTRICTION PERIOD
2. WORK SHALL BE CONDUCTED IN ACCORDANCE WITH APPLICABLE STANDARDS IN ENBRIDGE'S EPP AND VMP FOR PUBLIC LANDS AND WATERS. THE SPECIFICATIONS WITHIN THIS SSRP MAY MODIFY OR REPLACE THESE STANDARDS.
3. SEE GENERAL NOTES PAGE FOR ADDITIONAL DETAIL.
4. INFORMATION REGARDING SEEDING SPECIFICATIONS, SEED BED PREPARATION TECHNIQUES, ETC. ARE DESCRIBED IN THE PLANTING PLAN CONTAINED WITHIN THE VMP.
5. TRENCH BREAKER LOCATION IS APPROXIMATE PENDING FIELD VERIFICATION (EPP SECTION 1.13)
6. SITE WITHIN PEAT BASIN – SOURCE: SSURGO

ENBRIDGE

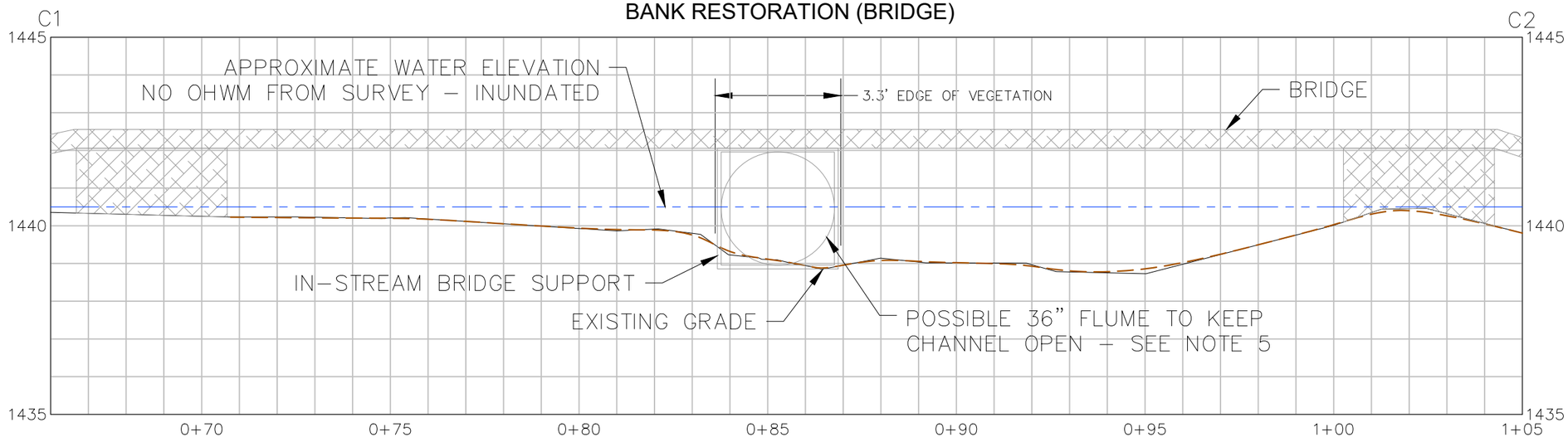
NO.	REVISION-DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE-SPECIFIC RESTORATION PLAN
WALKER BROOK – MP 924.2 – MDNR ID 21
RE-VEGETATION PLAN

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP-924.2-001	1/5

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

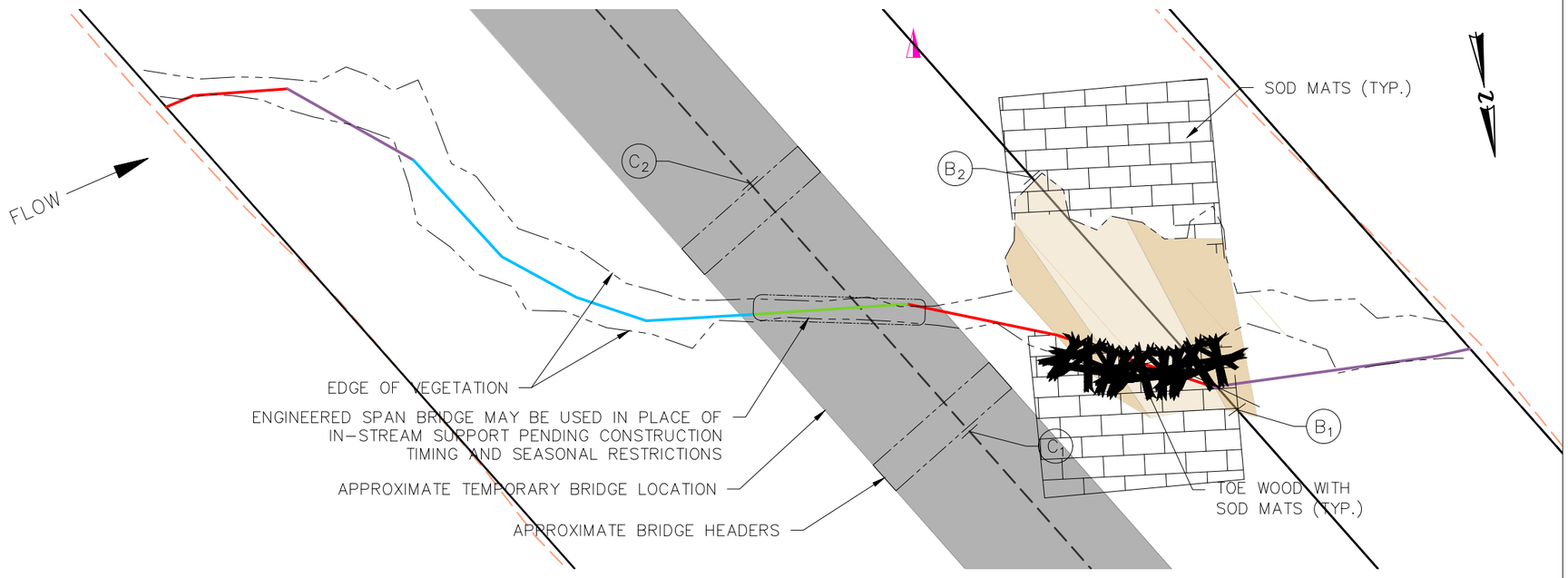
BANK RESTORATION (BRIDGE)

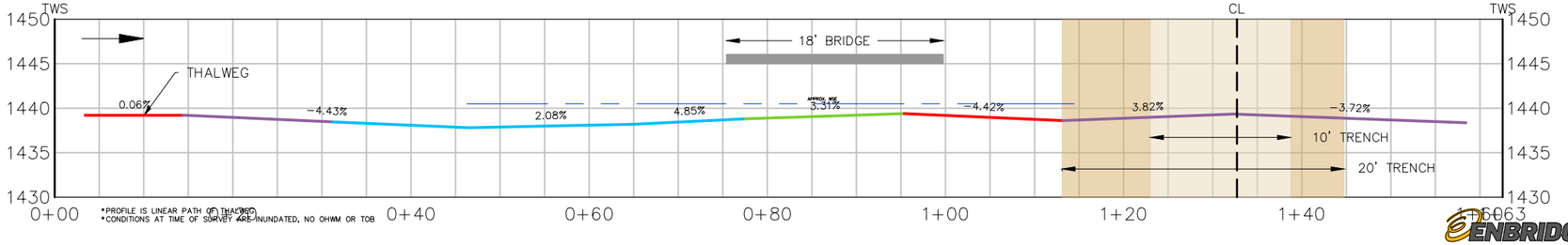


5' 10'
HORIZONTAL SCALE

5' 10'
VERTICAL SCALE

STREAMBED RESTORATION





*PROFILE IS LINEAR PATH OF THALWEG
*CONDITIONS AT TIME OF SURVEY ARE INUNDATED, NO OHWM OR TOB

NOTES

1. TRANSITIONS BETWEEN EXISTING CHANNEL FEATURES (BED, BANK, FLOODPLAIN) AND PROPOSED RESTORED TRENCH CROSSING WILL BE SMOOTH AND EVENLY GRADED WITHOUT ABRUPT OR PROTRUDING OBSTRUCTIONS.
2. BANK MIGRATION POTENTIAL IS LOW. PRIMARY FLOW IS LOCATED IN THE CENTER OF THE CHANNEL.
3. PLACE MATS DIRECTLY ON TOP OF EXISTING VEGETATION TO AVOID OR MINIMIZE DISTURBANCE OF VEGETATION ON THE CHANNEL BANKS AND AT THE TOP OF THE STREAM BANK.
4. SEE DETAIL SHEET FOR SPECIFIC RESTORATION METHODS AND DETAILS.
5. FLUMES SIZES MAY VARY BETWEEN 18-48 INCHES AND MUST EXTEND ABOVE OHWM OR SURFACE WATER AT TIME OF CONSTRUCTION, WHICHEVER IS GREATER.
6. MINIMIZE DISTURBANCE OF BED MATERIALS AND FEATURES DURING CONSTRUCTION OF THE TRENCH AND INSTALLATION AND REMOVAL OF IN-STREAM SUPPORT
7. BED AND/OR BANK MATERIALS TEMPORARILY ADJUSTED OR REMOVED DURING CONSTRUCTION SHALL BE PLACED IN THE APPROXIMATE ORIGINAL LOCATION DURING RESTORATION. MATERIALS SHALL BE FIELD ADJUSTED DURING PLACEMENT BASE ON THE OBSERVED FLOW PATH AT THE TIME OF CONSTRUCTION.
8. ALIGNMENT OF IN-STREAM SUPPORT SHALL BE FIELD ADJUSTED BASED ON FLOW PATH TO PROTECT CHANNEL BANKS.
9. SEE RESTORATION SHEET FOR B1-B2 CROSS SECTION.

LEGEND

- ENBRIDGE L3R PIPELINE
- PERMANENT RIGHT OF WAY
- TEMPORARY WORKSPACE
- WATERBODY – RIFFLE (ROSGEN SURVEY)
- WATERBODY – POOL (ROSGEN SURVEY)
- WATERBODY – RUN (ROSGEN SURVEY)
- WATERBODY – GLIDE (ROSGEN SURVEY)
- CONTOUR (1' INTERVAL) (MAJOR / MINOR)
- TOP OF BANK
- ORDINARY HIGH WATER MARK
- FIELD DELINEATED WETLAND
- TRAVEL LANE/CONSTRUCTION MATTING
- TRENCH – 10'
- TRENCH – 20'

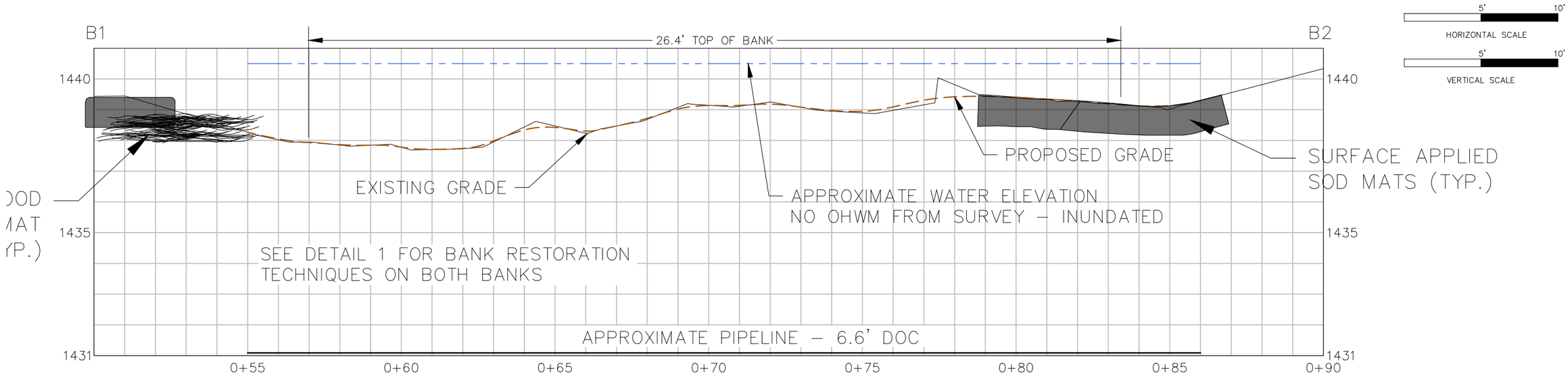
NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
WALKER BROOK – MP 924.2 – MDNR ID 21
STABILIZATION PLAN

SCALE	DWG. NO.	PAGE NO.
	SSRP–924.2–002	2/6

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

BANK RESTORATION (CENTERLINE)



SEE DETAILS FOR BANK RESTORATION TECHNIQUES ON BOTH BANKS (1/4) (1/5)

LEGEND

SOD MAT

TOE WOOD

RESTORATION NOTES:

GENERAL

1. REFER TO RESTORATION DETAIL SHEETS FOR ADDITIONAL INFORMATION RELATED TO PROPOSED RESTORATION MEASURES.
2. REFER TO SITE PHOTOS FOR INFORMATION ON PRE-CONSTRUCTION CROSSING CONDITIONS AND TO PROVIDE ADDITIONAL GUIDANCE FOR RESTORATION EFFORTS.

TOE WOOD

1. ROUGH GRADE CHANNEL BED FEATURES INCLUDING PLACEMENT OF SUBSTRATE.
2. INSTALL FOOTER LOG(S) ALONG PROPOSED TOE OF SLOPE. FOOTER LOGS SHOULD BE ANGLED TO ALLOW FOR TOE ALIGNMENT TO GENERALLY MATCH THE EXISTING CURVE AND EVENLY TRANSITION FROM UPSTREAM TO DOWNSTREAM.
3. PUSH FOOTER LOG INTO SOIL APPLY A SMALL AMOUNT OF GRAVEL OR STONE AS NEEDED TO PREVENT FLOATATION OF FOOTER LOG PRIOR TO PLACING WOODY DEBRIS.
4. PLACE A LAYER WOODY DEBRIS IN 6" TO 8" LIFTS, APPLY 3"-4" GRAVEL AND/OR SOIL FILL AND COMPACT WITH EXCAVATOR BUCKET. WASH FILL MATERIAL INTO WOODY DEBRIS MATRIX WITH WATER FROM CHANNEL. APPLY ADDITIONAL LAYERS "AS NEEDED" TO REACH THE SPECIFIED TOE WOOD HEIGHT.
5. PLACE STACKED SOD MATS ABOVE TOE WOOD. THE USE OF TRANSPLANTS OR FABRIC LIFTS MAY BE FIELD APPROVED BY ENBRIDGE IN CONSULTATION WITH MN DNR.

SOD MATTING

1. REMOVE VEGETATED MATS ON EITHER SIDE OF THE STREAM CROSSING USING ONSITE EQUIPMENT WHICH CAN UNDERCUT THE VEGETATION FOR REMOVAL. SMALL SHRUBS AND/OR TREES WITHIN THE SOD MATS ARE ACCEPTABLE AND SHOULD NOT BE REMOVED.
2. DEPENDING ON THE LEVEL OF SATURATION AT THE TIME OF REMOVAL, IT MAY BE DIFFICULT TO OBTAIN INTACT CONSOLIDATED MATS, BUT GENERALLY THE NATIVE VEGETATION WILL BE RETAINED AND CAPTURED FOR PLACEMENT.
3. SOD MATS CAN BE TRANSPLANTED DURING ANY SEASON.
4. SOD MAT WILL BE PLACED ON CLEAR GROUND OR MATS WITHIN THE WORKSPACE.
5. MONITOR MATS TO SUPPORT SURVIVABILITY; WATERING MAY BE NEEDED.
6. PRIOR TO PLACEMENT OF SOD MATS FINISH GRADE CHANNEL BANK AND ADJACENT FLOODPLAIN APPLICATION AREA TO PROVIDE A SMOOTH AND EVEN SURFACE. SUBGRADE ELEVATION SHOULD ALLOW FOR THE FINISHED SOD SURFACE TO TRANSITION EVENLY WITH THE CHANNEL BANKS UPSTREAM AND DOWNSTREAM OF THE INSTALLATION AREA. AVOID ABRUPT CHANGES IN GRADE.
7. RETURN THE VEGETATED MATS USING ONSITE EQUIPMENT.
   a. SURFACE APPLIED SOD MATTING SHOULD BE PLACED WITH THE LONG SIDE PERPENDICULAR TO THE CHANNEL / FLOW.
   b. STACKED SOD MATTING SHOULD BE PLACED WITH THE LONG SIDE PARALLEL TO THE CHANNEL / FLOW.
8. WHEN PLACING SOD MATS, DO NOT LEAVE LARGE GAPS BETWEEN EACH SOD MAT AS NON-NATIVE VEGETATION WILL QUICKLY ATTEMPT TO COLONIZE THESE VOIDS.
9. WATER SOD MATS AFTER REPLACEMENT IF CONDITIONS ARE HOT AND DRY. DAMP AND/OR FROZEN SOD MATS DO NOT REQUIRE WATERING.
10. THE TOP MAT AND/OR OTHER MATS CAN BE ANCHORED WITH A LIVE AND/OR DEAD STOUT STAKE TO ENSURE THAT IT DOES NOT MOBILIZE DURING A FLOOD EVENT BEFORE THE ROOTS HAVE ESTABLISHED.
11. THE VEGETATED MATS WILL BE REPLACED AS SOON AS PRACTICAL FOLLOWING BACKFILLING OF THE TRENCH AND STABILIZED PER THE TIMING REQUIREMENTS DESCRIBED IN SECTION 1.9.1 OF THE EPP.

TRANSPLANTS

1. SHRUBS AND/OR ALDER REMOVED FROM THE TRENCH AREA MAY BE USED IN LIEU OF SOD MATS IN ACCORDANCE WITH THE TRANSPLANT DETAIL.

NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
WALKER BROOK – MP 924.2 – MDNR ID 21
SITE SPECIFIC DETAILS

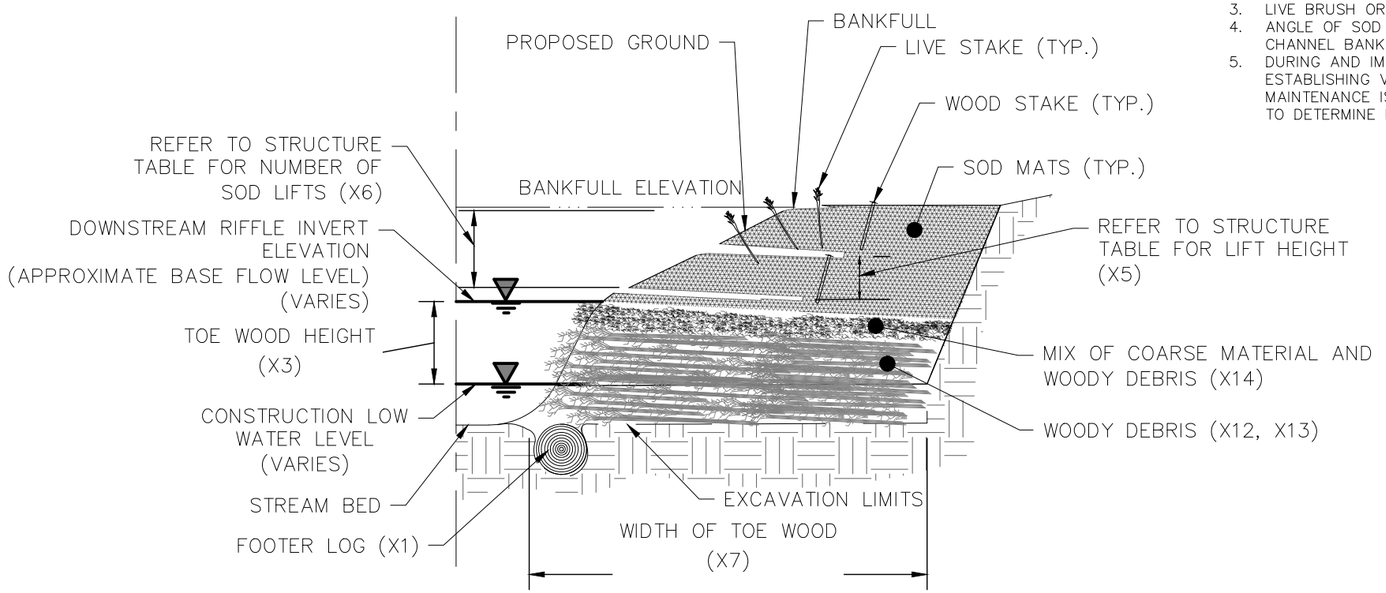
SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP–924.2–003	3/6

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

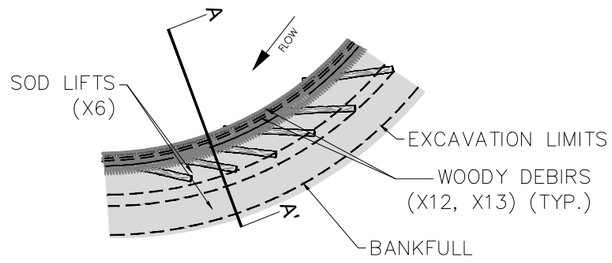
TOE WOOD DIMENSIONS			
VARIABLE	**VALUE**	**TYPICAL UNIT**	**DESCRIPTION**
X1	6.0 - 10.0	IN.	FOOTER LOG DIAMETER
X2	8.0 - 12.0	FT.	FOOTER LOG LENGTH
X3	3.0	FT.	TOE WOOD HEIGHT
X4	SEE SHEET 3	N/A	MATCH TYPICAL SECTION
X5	SEE SHEET 5	N/A	SOD LIFT HEIGHT
X6	1.0	#	SOD LIFTS
X7	8.0 - 10.0	FT.	TOE WOOD WIDTH
X8	3.0 - 6.0	FT.	SOD LIFT WIDTH
X9	24.0	IN.	WOOD STAKE LENGTH
X10	4.0	IN.	WOOD STAKE WIDTH (TOP)
X11	0.5	IN.	WOOD STAKE WIDTH (BOTTOM)
X12	1/2 - 3.0	IN.	WOODY DEBRIS DIAMETER
X13	8.0 - 12.0	FT.	WOODY DEBRIS LENGTH
X14	3" MINING GRAVEL WITH FINES	%	SELECT COARSE MATERIAL BACKFILL (BY VOLUME)

TOE WOOD EXAMPLE

NOTES:
1. WOODY MATERIAL OF APPROPRIATE SIZE CONSISTING OF LOGS, TRUNKS, LIMBS, BRANCHES, AND SMALLER WOODY DEBRIS INCLUDING TOPS OR SLASH. ON-SITE WOODY MATERIAL IS PREFERRED.
2. WOODY DEBRIS SHOULD BE GREEN OR RELATIVELY GREEN AND MAY CONSIST OF HARDWOODS, CONIFERS, OR A COMBINATION OF BOTH.
3. LIVE BRUSH OR OTHER BANK VEGETATION MAY BE INCORPORATED.
4. ANGLE OF SOD MAT SURFACE SHALL MATCH THE PROPOSED CHANNEL CROSS SECTION AND PROVIDE A SMOOTH AND EVEN CHANNEL BANK SURFACE BETWEEN UPSTREAM AND DOWNSTREAM BANKS.
5. DURING AND IMMEDIATELY AFTER CONSTRUCTION, BANK SLOPES ABOVE THE WOOD TOE ARE VULNERABLE TO EROSION. ESTABLISHING VEGETATION OR OTHER COVER MATERIAL AS SOON AS POSSIBLE WILL HELP REDUCE EROSION. ADDITIONAL MAINTENANCE IS NOT EXPECTED ONCE VEGETATION ESTABLISHES. INSPECTION AFTER LARGE FLOW EVENTS MAY BE ADVISABLE TO DETERMINE IF ANY MATERIAL MOVEMENT OR UNEXPECTED SCOUR HAS OCCURRED.



SECTION A-A'



PLAN VIEW AT BANKFULL ELEVATION

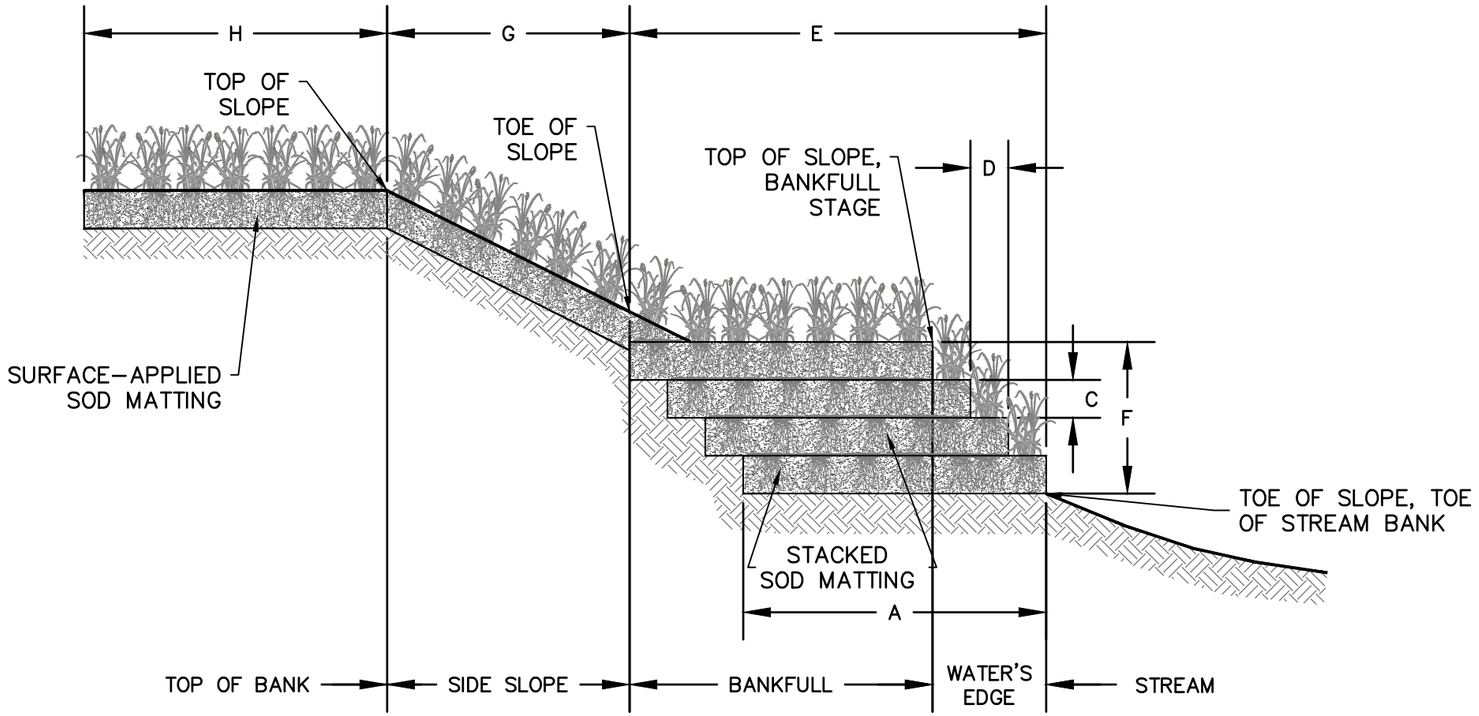
1 TOE WOOD DETAIL

NO.	REVISION-DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

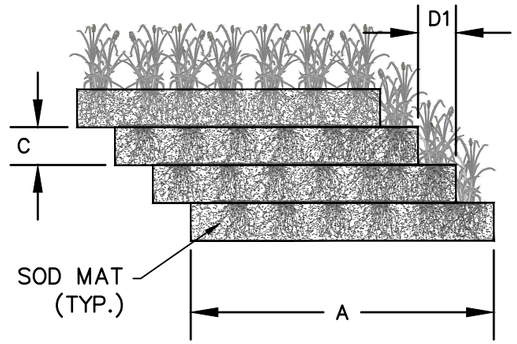
ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE-SPECIFIC RESTORATION PLAN
WALKER BROOK – MP 924.2 – MDNR ID 21
SITE SPECIFIC DETAILS

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP-924.2-004	4/6

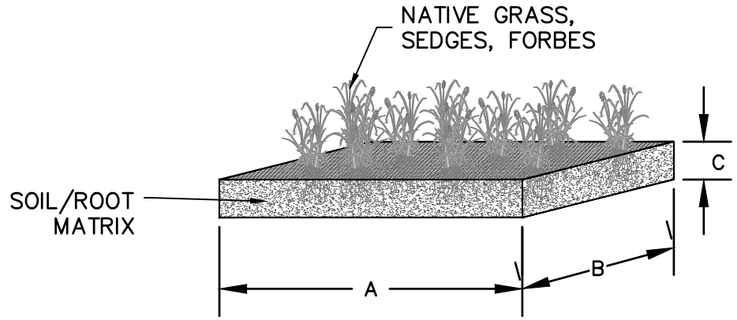
PLOTTED SIZE: ANSI FULL BLEED B (17x11)



CROSS SECTION



STACKED SOD MATTING DETAIL



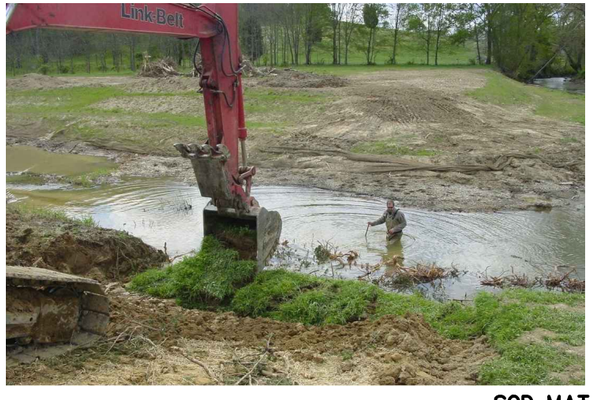
SOD MAT DETAIL

DIMENSION[1]	NAME	TYPICAL UNIT	VALUE	DESCRIPTION
A	SOD MAT WIDTH	FEET	3-4	WIDTH OF INDIVIDUAL SOD MAT.
B	SOD MAT LENGTH	FEET	3–6	LENGTH OF INDIVIDUAL SOD MAT.
C	SOD MAT THICKNESS	INCHES	12	THICKNESS OF INDIVIDUAL SOD MAT.
D	STACKED SOD MAT SETBACK	FEET, INCHES	N/A	THE DISTANCE BETWEEN THE EDGES OF SOD MATS STACKED TO FORM A SLOPE
E	WIDTH OF STACKED SOD MATS	FEET, INCHES	N/A	WIDTH OF A BANK CREATED BY STACKED SOD MATS
F	HEIGHT OF STACKED SOD MATS	FEET, INCHES	N/A	HEIGHT OF A SLOPE CREATED BY STACKED SOD MATS
G	WIDTH OF SURFACE- APPLIED SOD MATS	FEET, INCHES	10–20	WIDTH OF A SLOPE STABILIZED WITH SURFACE-APPLIED SOD MATS
H	TOP OF BANK SOD MATTING DISTANCE	FEET	15 (MIN)	DISTANCE SOD MATTING IS INSTALLED ON THE TOP OF BANK

NOTES:

1. DIMENSION LABELS ARE REFERENCED IN THE DETAIL DRAWINGS.

SOD MATTING DETAIL



SOD MAT EXAMPLES

NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
WALKER BROOK – MP 924.2 – MDNR ID 21
SITE SPECIFIC DETAILS

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP–924.2–004	5/6

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

1 CENTERLINE – FACING NORTH BANK

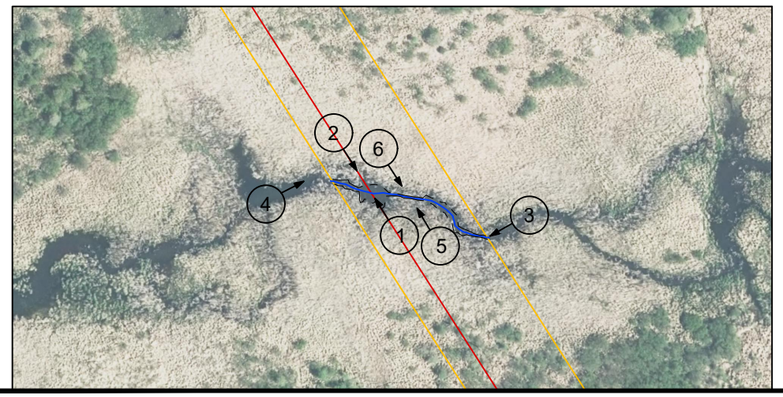
2 CENTERLINE – FACING SOUTH BANK

3 EDGE OF WORKSPACE – FACING DOWNSTREAM

4 EDGE OF WORKSPACE – FACING UPSTREAM

5 BRIDGE – FACING NORTH BANK

6 BRIDGE – FACING SOUTH BANK



NOTES:

1. AIR PHOTOS ARE FROM 2018 ENBRIDGE AERIAL PHOTOGRAPHY.
2. ADDITIONAL ON–THE GROUND PHOTOS MAY BE TAKEN PRIOR TO CONSTRUCTION AT MDNR REQUEST.
3. PRE–CONSTRUCTION PHOTOS WILL BE USED TO AID IN RESTORATION.

NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING	MJT	10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
WALKER BROOK – MP 924.2 – MDNR ID 21
PHOTO PAGE

SCALE	DWG. NO.	PAGE NO.
	SSRP–924.2–005	5/5

ENBRIDGE

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

GENERAL

1. THE SPECIFICATIONS WITHIN THIS SSRP MAY MODIFY OR REPLACE PROJECT–WIDE STANDARDS PRESENTED IN THE EPP. WHERE MATERIAL WITHIN THESE SSRPS EXCEEDS STANDARD CONSTRUCTION MEASURES IN THE EPP, THESE SSRPS SUPERSEDE THE EPP.

2. CONSTRUCTION AND RESTORATION OF WATERBODY CROSSINGS WILL FOLLOW THESE GENERAL STEPS:

   A. SITE CLEARING
   B. INSTALLATION OF TEMPORARY EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICES ("BMPS")
   C. BRIDGE INSTALLATION
   D. EXCAVATION/BACKFILLING OF THE WATERBODY INCLUDING:
      - SOD SAVING TOPSOIL SEGREGATION AT NON–WOODED SITES
      - STREAMBED MATERIAL SEGREGATION
      - PIPE INSTALLATION
      - BACKFILL, INCLUDING IMPLEMENTATION OF CONSTRUCTION–RELATED RESTORATION METHODS (I.E., TOE WOOD)
   E. REPLACEMENT OF STREAMBED MATERIAL AND TOPSOIL/SOD LAYER
   F. RESTORATION OF STREAM BANKS TO PRE–CONSTRUCTION CONTOURS
   G. IF FINAL GRADING NOT POSSIBLE AT THE TIME, TEMPORARY STABILIZATION AND REPLACEMENT/REINFORCEMENT OF TEMPORARY BMPS
   H. AFTER FINAL GRADING, PERMANENT SEEDING AND/OR WOODY VEGETATION RESTORATION, STABILIZATION AND REPLACEMENT/REINFORCEMENT OF TEMPORARY BMPS
   I. BRIDGE REMOVAL DURING FINAL RESTORATION AFTER STABILIZATION AND PERMANENT SEEDING
   J. POST–CONSTRUCTION MONITORING

CROSSING METHODS

1. ALL WATERBODY AND WETLAND CROSSINGS WILL BE CONDUCTED IN COMPLIANCE WITH SECTION 2.0 AND SECTION 3.0 OF THE ENVIRONMENTAL PROTECTION PLAN ("EPP"), RESPECTIVELY. SECTION 2.0 AND 3.0 OF THE WINTER CONSTRUCTION PLAN PRESENTS MODIFICATIONS FOR WATERBODY AND WETLAND CONSTRUCTION METHODS, RESPECTIVELY, IN WINTER CONDITIONS.

2. ENBRIDGE'S SUMMARY OF CONSTRUCTION METHODS AND PROCEDURES (THE "PROCEDURES," APPENDIX A OF THE EPP) OUTLINES THE VARIOUS CONSTRUCTION METHODS THAT ENBRIDGE MAY UTILIZE TO CONSTRUCT THROUGH WATERBODIES AND WETLANDS/BASINS AS PRESENTED ON THESE SITE–SPECIFIC RESTORATION PLANS ("SSRPS").

   A. DRY CROSSING (ISOLATED) METHODS (INCLUDING THE DRY CROSSING AND MODIFIED DRY CROSSING METHOD) ARE DESCRIBED SECTIONS 4.3 OF THE PROCEDURES, AND IN SECTIONS 2.5.2 AND 2.5.3 AND FIGURES 23 AND 24 OF THE EPP.
   B. THE BORE METHOD (NON–PRESSURIZED) IS DESCRIBED IN SECTION 3.5 OF THE PROCEDURES, AND SECTION 4.0 OF THE EPP.
   C. THE MODIFIED UPLAND CONSTRUCTION (WETLAND) METHOD IS DESCRIBED IN SECTION 3.3 OF THE PROCEDURES, AND SECTION 3.0 AND FIGURES 30 TO 34 OF THE EPP.
   D. ALTHOUGH NOT PROPOSED AS A PRIMARY METHOD AT THESE SSRP WATERBODIES, THE OPEN CUT (NON–ISOLATED) WATERBODY CROSSING METHOD IS DESCRIBED IN SECTION 4.1 OF THE PROCEDURES, AND SECTION 2.5.1 AND FIGURE 24 OF THE EPP.
   E. ALTHOUGH NOT PROPOSED AS A PRIMARY METHOD AT THESE SSRP WATERBODIES, THE PUSH–PULL METHOD IS DESCRIBED IN SECTION 3.4 OF THE PROCEDURES, AND SECTION 3.7.1 AND FIGURES 35 AND 36 OF THE EPP.

CLEARING/VEGETATION REMOVAL

1. STUMPS WITHIN THE TRENCH LINE WILL BE COMPLETELY REMOVED, GROUND, AND/OR HAULED OFF–SITE TO AN APPROVED LOCATION. TREE STUMPS OUTSIDE THE TRENCH LINE WILL BE GROUND BELOW NORMAL GROUND SURFACE TO FACILITATE A SAFE WORK AREA AND TO ALLOW TOPSOIL REMOVAL, IF NECESSARY. IN SOME CIRCUMSTANCES, TREE STUMPS OUTSIDE THE TRENCH LINE MAY BE COMPLETELY REMOVED TO ALLOW FOR A SAFE WORK AREA AND HAULED OFF–SITE TO AN APPROVED LOCATION AS OUTLINED IN SECTION 1.8.3 OF THE EPP.

2. CLEARING WILL BE CONDUCTED IN WATERBODIES AND WETLANDS AS OUTLINED IN SECTION 2.2 AND 3.2 OF THE EPP, RESPECTIVELY. CHIPS, MULCH, OR MECHANICALLY CUT WOODY DEBRIS SHALL NOT BE STOCKPILED IN A WETLAND. HYDRO–AX DEBRIS, OR SIMILAR CAN BE LEFT IN THE WETLAND IF SPREAD EVENLY IN THE CONSTRUCTION WORKSPACE TO A DEPTH THAT WILL ALLOW FOR NORMAL REVEGETATION, AS DETERMINED BY THE EI. CHIPPING IS NOT ALLOWED ON PUBLIC LANDS. ON PUBLIC LANDS, MULCH AND MECHANICALLY CUT WOODY DEBRIS MUST BE UNIFORMLY BROADCAST TO LESS THAN 2–INCH THICKNESS AND IN A MANNER THAT MAINTAINS VISIBLE GROUND.

3. ENBRIDGE WILL PROPERLY INSTALL AND MAINTAIN REDUNDANT SEDIMENT CONTROL MEASURES IMMEDIATELY AFTER CLEARING AND PRIOR TO INITIAL GROUND DISTURBANCE AT SURFACE WATERS LOCATED WITHIN 50 FEET OF THE PROJECT AND WHERE STORMWATER FLOWS TO THE SURFACE WATER (REFER TO THE ENVIRONMENTAL PLAN SHEETS IN THE SWPPP), AND WITHIN 100 FEET OF SPECIAL AND IMPAIRED WATERS, INCLUDING TROUT STREAMS.

4. ON PUBLIC LANDS AND WHEREVER PRACTICABLE AT WATERBODY CROSSINGS, ENBRIDGE WILL USE WILDLIFE–FRIENDLY EROSION AND SEDIMENT CONTROL BMPS THAT CONTAIN BIODEGRADABLE NETTING (CATEGORY 3N OR 4N NATURAL FIBER) AND WILL AVOID THE USE OF PLASTIC MESH (SECTIONS 1.17.1 AND 2.6.1 OF THE EPP).

TEMPORARY STABILIZATION

1. ON PORTIONS OF THE PROJECT WHERE WORK WILL BE OCCURRING DURING APPLICABLE "WORK IN WATER RESTRICTIONS" FOR PUBLIC WATERS (REFER TO SECTION 2.1), ALL EXPOSED SOIL AREAS WITHIN 200 FEET OF THE WATER'S EDGE, AND THAT DRAIN TO THAT WATER, WILL BE STABILIZED WITHIN 24 HOURS DURING THE RESTRICTION PERIOD. STABILIZATION OF ALL EXPOSED SOILS WITHIN 200 FEET OF THE PUBLIC WATER'S EDGE, AND THAT DRAIN TO THAT WATER, WILL BE INITIATED IMMEDIATELY AND COMPLETED WITHIN 7 CALENDAR DAYS WHENEVER CONSTRUCTION ACTIVITY HAS PERMANENTLY OR TEMPORARILY CEASED ON ANY PORTION OF THE SITE OUTSIDE OF THE RESTRICTION PERIOD. THESE AREAS WILL BE IDENTIFIED ON THE ENVIRONMENTAL PLAN SHEETS ACCOMPANYING THE SWPPP.

2. HYDRO–MULCH AND LIQUID TACKIFIER CAN BE USED IN PLACE OF CERTIFIED WEED–FREE STRAW OR HAY MULCH WITH PRIOR APPROVAL FROM ENBRIDGE. ALL HYDROMULCH AND LIQUID TACKIFIER PRODUCTS USED WILL BE ON THE APPLICABLE STATE DOT PRODUCT LIST. HYDRO–MULCH AND LIQUID TACKIFIER PRODUCTS CONTAINING PLASTIC/POLYPROPYLENE FIBER ADDITIVES AND MALACHITE GREEN (COLORANT) WILL NOT BE UTILIZED ON THIS PROJECT. APPLICATION RATES WILL BE AT THE MANUFACTURER'S RECOMMENDED RATE. ENBRIDGE WILL AVOID THE USE OF HYDROMULCH ON PUBLIC LANDS; HOWEVER, ENBRIDGE MAY USE HYDROMULCH ON STEEP SLOPES TO PREVENT EROSION UNTIL PERMANENT COVER HAS BEEN ESTABLISHED AS OUTLINED IN SECTION 1.8.3 OF THE EPP.

RESTORATION AND STABILIZATION

1. ENBRIDGE WILL RESTORE THE STREAM BANKS AS NEAR AS PRACTICABLE TO PRE–CONSTRUCTION CONDITIONS UNLESS THAT SLOPE IS DETERMINED TO BE UNSTABLE. IF THE SLOPE IS CONSIDERED UNSTABLE, ENBRIDGE WILL RESHAPE THE BANKS TO PREVENT SLUMPING. FOR PUBLIC WATERS, ENBRIDGE WILL RETURN THE BANK TO PRE–CONSTRUCTION CONTOURS, UNLESS OTHERWISE DIRECTED BY THE SITE–SPECIFIC RESTORATION PLAN. IF ENBRIDGE CANNOT RESTORE TO PRE–CONSTRUCTION CONTOURS AT A PUBLIC WATER, ENBRIDGE WILL CONSULT WITH THE MDNR BEFORE PROCEEDING FURTHER AS OUTLINED IN SECTION 2.6 OF THE EPP.

2. UNSTABLE SOILS AND/OR SITE–SPECIFIC FACTORS SUCH AS STREAM VELOCITY AND FLOW DIRECTION MAY REQUIRE ADDITIONAL RESTORATION EFFORTS, SUCH AS INSTALLATION OF WOODY VEGETATION, GEOTEXTILE FABRIC, OR TREE, LOG, ROOTWAD, OR BOULDER REVETMENTS TO STABILIZE DISTURBED STREAM BANKS (SEE FIGURE 29) AS OUTLINED IN SECTION 2.6.2 OF THE EPP. ENBRIDGE WILL WORK WITH THE MDNR TO ENSURE ALL WORK/ADJUSTMENTS ARE APPROVED AND ARE CONDUCTED WITHIN APPLICABLE TIMING RESTRICTIONS.

3. IN UPLAND AND WETLAND AREAS, CLEANUP AND ROUGH GRADING WILL OCCUR AS OUTLINED IN SECTIONS 1.16 AND 3.9 OF THE EPP. ENBRIDGE WILL BACKFILL THE TRENCH TO AN ELEVATION SIMILAR TO THE ADJACENT AREAS OUTSIDE THE TRENCH LINE AND WILL ADD A SLIGHT CROWN OF APPROXIMATELY 3 TO 6 INCHES (DEPENDING ON SOIL TYPE) OVER THE BACKFILLED TRENCH TO ALLOW FOR SUBSIDENCE. GENERALLY, EXCESS SUBSOIL DISPLACED BY THE PIPE INSTALLATION WILL BE SPREAD ACROSS THE PORTION OF THE CONSTRUCTION WORKSPACE WHERE TOPSOIL REMOVAL HAS OCCURRED. ANY REMAINING EXCESS SUBSOIL WILL BE REMOVED AND DISPOSED OF AT AN APPROVED OFF–SITE LOCATION AS NEEDED TO ENSURE CONTOURS ARE RESTORED TO AS NEAR AS PRACTICABLE TO PRE–CONSTRUCTION CONDITIONS.

4. REVEGETATION ACTIVITIES WILL OCCUR AS OUTLINED IN SECTION 7.0 OF THE EPP. SEED MIXES AT PUBLIC WATERS WILL BE SELECTED AND APPLIED AS INDICATED IN THE PLANTING PLAN, WHICH IS APPENDIX A OF THE POST–CONSTRUCTION VEGETATION MANAGEMENT PLAN FOR PUBLIC LANDS AND WATERS ("VMP"). SEED MIXES RELATIVE TO THESE SSRP CROSSINGS ARE CODED AS FOLLOWS:

A	EMERGENT (34–181)	G	DRY PRAIRIE GENERAL (35–221)
B	RIPARIAN NE (34–361)	H	MESIC PRAIRIE GENERAL (35–241)
C	RIPARIAN S&W (34–261)	I	MESIC PRAIRIE NW (35–441)
D	WET MEADOW NE (34–371)	J	DRY PRAIRIE NORTHWEST (35–421)
E	WET MEADOW S&W (34–271)	K	WOODLAND EDGE NE (36–311)
F	WETLAND REHABILITATION (34–171)	L	NATURAL REVEGETATION

5. ENBRIDGE WILL NOT SEED STANDING WATER OR WOODED (PSS AND PFO) WETLAND COMMUNITIES. NATURAL REVEGETATION WILL TAKE PLACE FROM EXISTING PLANT MATERIAL AND ROOT STOCK IN THESE COMMUNITIES.

6. ALL MATERIALS USED FOR CONSTRUCTION OF THE PROJECT MUST BE REMOVED FROM THE SITE.

7. ENBRIDGE WILL CONDUCT POST–CONSTRUCTION MONITORING IN ACCORDANCE WITH THE POST–CONSTRUCTION MONITORING PLAN FOR WETLANDS AND WATERBODIES, AND IN ACCORDANCE WITH THE VMP FOR THE UPLAND PORTIONS OF THE PROJECT ON PUBLIC LANDS.

NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING	MJT	10/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN

CONSTRUCTION NOTES

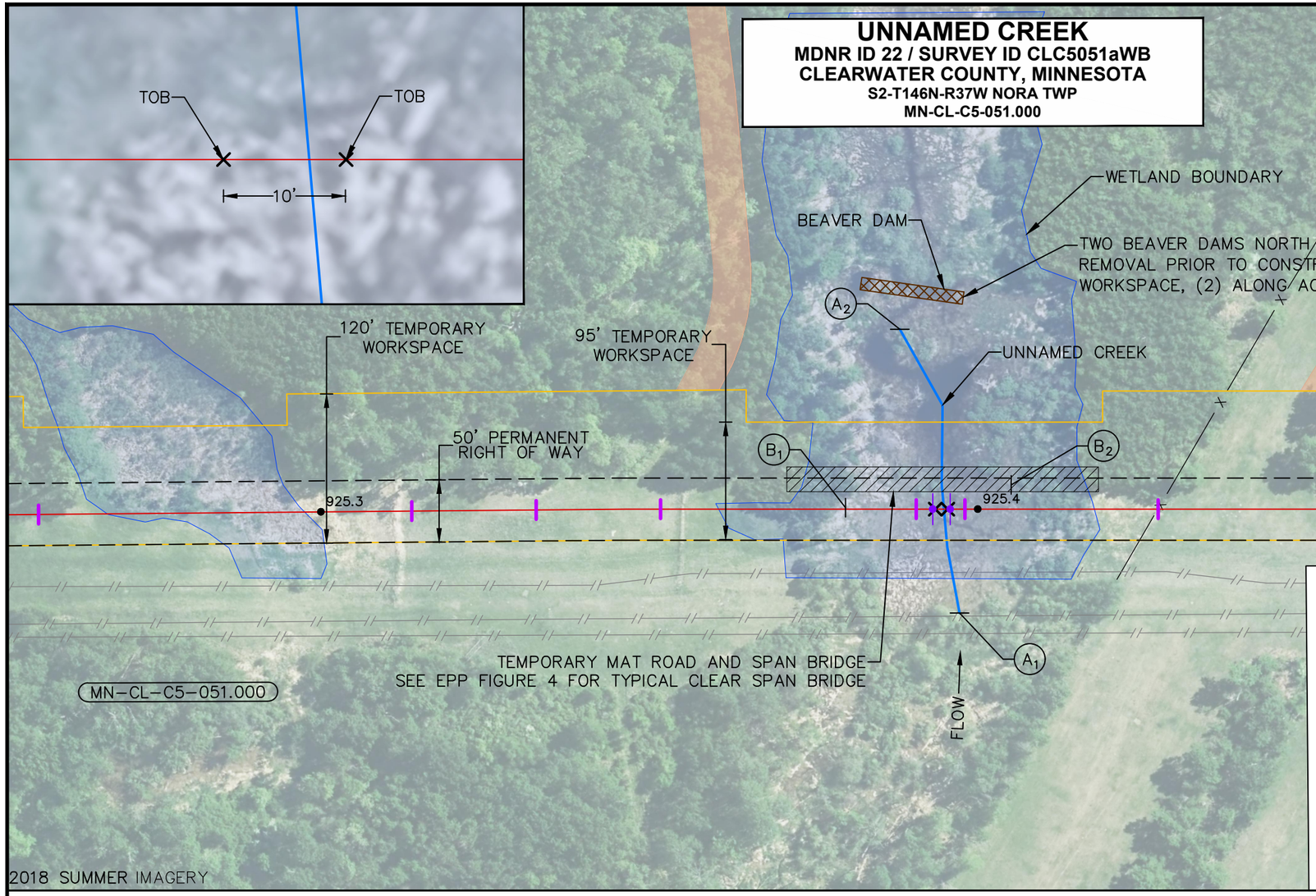
SCALE	DWG. NO.	PAGE NO.
	SSRP–NOTES	

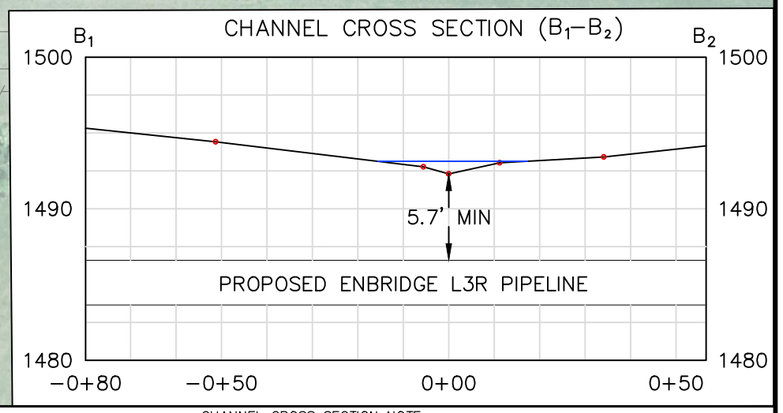
PLOTTED SIZE: ANSI FULL BLEED B (17x11)

MDNR ID No. 22: MP 925.4; Unnamed Creek (H-026-030-019-029-001)

UNNAMED CREEK
MDNR ID 22 / SURVEY ID CLC5051aWB
CLEARWATER COUNTY, MINNESOTA
S2-T146N-R37W NORA TWP
MN-CL-C5-051.000

SCALE IN FEET 0 50 100





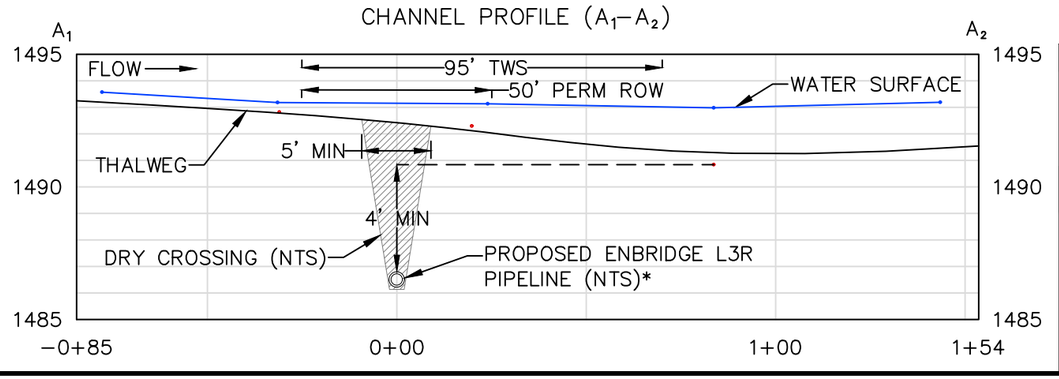
NOTES
1. NO FEMA DIGITAL FLOODPLAIN DATA AVAILABLE
2. BANKFULL DATA NOT AVAILABLE
3. SOBS (O/H) OR NPC (S1–3): N/A
4. MDNR REGION 1 PWI – COOL/WARM WATER FISHERY: MARCH 15 – JUNE 30. 24–HOUR SOIL STABILIZATION REQUIRED WITHIN 200 FEET DURING RESTRICTION.

LEGEND

- PROPOSED ENBRIDGE L3R PIPELINE
- OTHER PIPELINE
- PERMANENT RIGHT OF WAY
- TEMPORARY WORKSPACE
- WATERBODY (ROSGEN SURVEY – THALWEG)
- TRACT BOUNDARY
- FENCE
- BEAVER DAM
- ACCESS ROAD
- WETLAND
- ADDITIONAL TEMPORARY WORKSPACE
- MN–XX–XX–XXX.XXX — TRACT ID
- ROSGEN SURVEY POINT – WATER SURFACE
- ROSGEN SURVEY POINT – RIVER BOTTOM (THALWEG)
- PROPOSED INCREASED DEPTH OF COVER EXTENT
- TOP OF BANK
- TRENCH BREAKER (LOCATIONS ARE APPROXIMATE)

FOR ENVIRONMENTAL REVIEW PURPOSES ONLY

5. WHEN WORKING WITHIN "WORK IN WATER RESTRICTIONS", STABILIZE ALL EXPOSED SOIL AREAS WITHIN 200 FEET OF THE WATER'S EDGE, AND THAT DRAIN TO THAT WATER, WITHIN 24 HOURS. STABILIZATION WILL BE INITIATED IMMEDIATELY AND COMPLETED WITHIN 7 CALENDAR DAYS WHENEVER CONSTRUCTION ACTIVITY HAS PERMANENTLY/ TEMPORARILY CEASED ON ANY PORTION OF THE SITE OUTSIDE OF THE RESTRICTION PERIOD.



CHANNEL CROSS SECTION NOTE:
1. CHANNEL LOCATIONS, DIMENSIONS, AND/OR ELEVATIONS ARE BASED ON 2015 TOPOGRAPHIC/BATHYMETRIC SURVEY(S), AND AS SUCH DO NOT REFLECT CHANGES TO THE CHANNEL THAT MAY HAVE OCCURRED SINCE THAT TIME.
2. DEPTH OF COVER AT CENTERLINE WAS DEVELOPED USING THE BOTTOM ELEVATION OF THE DEEPEST UPSTREAM OR DOWNSTREAM POOL WITHIN THE SURVEYED REACH, UNLESS OTHERWISE NOTED IN APPLICATION MATERIALS.
3. MEAN MEANDER BELT WIDTH: N/A
4. MEANDER WIDTH RATIO: N/A

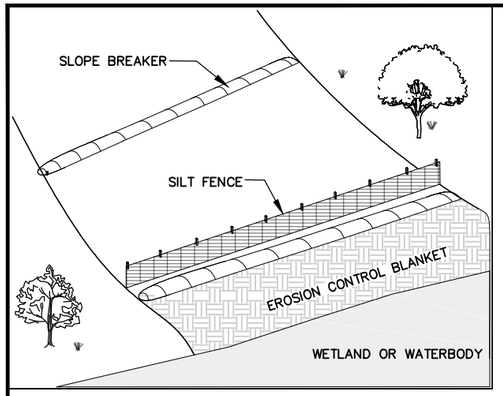
NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
0	ISSUED FOR PERMIT APPLICATION	AJJ	10/2020	BAB	BAB

ENBRIDGE

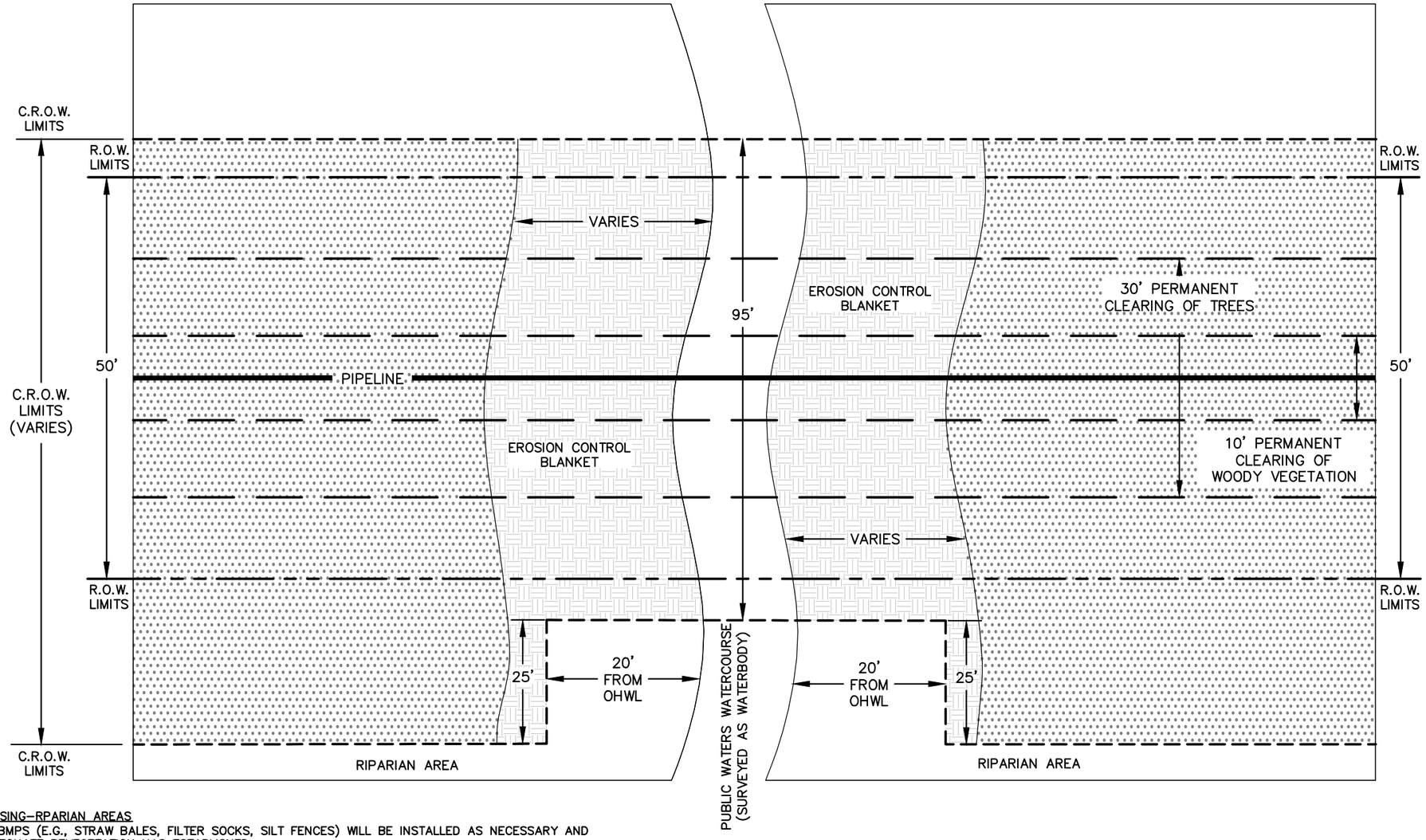
DWN. BY: AJJ	DATE 10/2020
CHK.	
PROJ. ENGR.	
PROJ. MGR.	
CLIENT APP.	

PROPOSED ENBRIDGE L3R PIPELINE
PRIMARY METHOD – DRY CROSSING
CROSSING OF UNNAMED CREEK
ENBRIDGE MP 925.4
CLEARWATER COUNTY, MINNESOTA

SCALE: NOTED
DWG. NO.: B–93–5.84–MDNR–22–0



SEEDING AREA



PUBLIC WATERS WATERCOURSE (SURVEYED AS WATERBODY) CROSSING–RPARIAN AREAS

1) PRIOR TO DISTURBANCE, EROSION AND SEDIMENT CONTROL BMPS (E.G., STRAW BALES, FILTER SOCKS, SILT FENCES) WILL BE INSTALLED AS NECESSARY AND WILL REMAIN IN PLACE UNTIL THE AREA HAS STABILIZED AND ADEQUATE REVEGETATION HAS ESTABLISHED.

2) ENBRIDGE WILL RESTORE THE BANKS AS NEAR AS PRACTICABLE TO PRE–CONSTRUCTION CONDITIONS UNLESS THE SLOPE IS DETERMINED BY TO BE UNSTABLE. WHERE THE SLOPE OF THE BANKS IS DETERMINED TO BE UNSTABLE OR HAS THE POTENTIAL TO ERODE OR FAIL, THE BANKS WILL BE RESHAPED TO TRANSITION THE DISTURBED AREAS INTO THE NATURAL STREAM BANK WITH THE INTENT TO STABILIZE THE BANK AND CREATE A BLENDED, NATURAL APPEARANCE.

3) SOIL STABILIZATION WILL BE INITIATED WITHIN 24 HOURS AFTER INSTALLATION OF THE CROSSING USING THE OPEN CUT TRENCH METHOD AND PRIOR TO RESTORING FLOW USING THE DAM AND PUMP OR FLUME METHOD, UNLESS SITE AND PERMIT CONDITIONS DELAY PERMANENT INSTALLATION.

4) PERMANENT SLOPE BREAKERS WILL BE INSTALLED AT THE BASE OF SLOPED APPROACHES TO PREVENT SEDIMENT FLOW INTO WATERBODIES AS DESCRIBED IN THE EPP (FIGURE 20):

a. PERMANENT SLOPE BREAKERS WILL BE INSTALLED TO MINIMIZE CONCENTRATED OR SHEET FLOW RUNOFF IN DISTURBED AREAS IN ACCORDANCE WITH THE FOLLOWING MAXIMUM ALLOWABLE SPACING UNLESS OTHERWISE SPECIFIED IN PERMIT CONDITIONS.

i.

SLOPE (%)	APPROXIMATE SPACING (FT)
1. <5	250
2. >5–15	200
3. 15–25	150
4 >25	<100

5) WATERBODY BANKS WILL BE SEEDED WITH AN APPROPRIATE SEED MIX AS SPECIFIED IN THE EPP (SECTION 7.8) AND COVERED WITH AN EROSION CONTROL BLANKET.

6) WHERE A WATERBODY IS LOCATED WITHIN A WETLAND, ENBRIDGE WILL RE–SEED THE BANKS WITH THE APPLICABLE WETLAND SEED MIX DESCRIBED IN THE EPP (SECTION 7.7).

7) ADDITIONAL VEGETATION REQUIREMENTS MAY ALSO BE CONTAINED WITHIN PROJECT–SPECIFIC PERMITS

ISSUED FOR PERMIT 12/13/19

NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMIT	AJM	12/13/19	KEH	KD
A	ISSUED FOR REVIEW	AJM	12/10/19	KEH	KD

DWN. BY: AJM — DATE: 12/10/19
CHK. KEH
PROJ. ENGR. DG
PROJ. MGR. KD
CLIENT APP.

ENBRIDGE

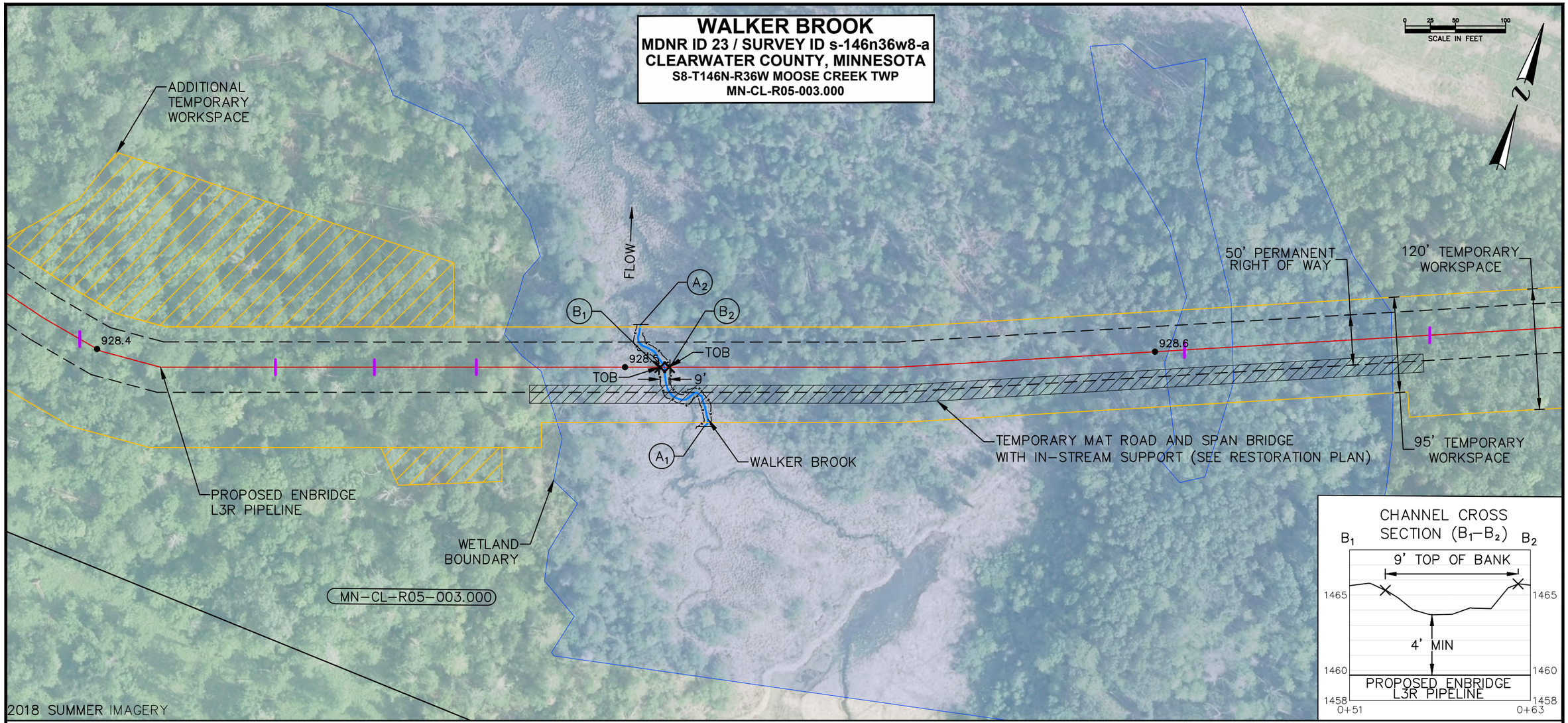
LINE 3 REPLACEMENT
PUBLIC WATERS WATERCOURSE (SURVEYED AS WATERBODY) CROSSING TYPICAL FINAL STREAM BANK STABILIZATION & EROSION CONTROL

SCALE: NTS — DWG. NO.

MDNR ID No. 23: MP 928.5; Walker Brook (H-026-030-019-029)

WALKER BROOK

MDNR ID 23 / SURVEY ID s-146n36w8-a
CLEARWATER COUNTY, MINNESOTA
S8-T146N-R36W MOOSE CREEK TWP
MN-CL-R05-003.000



CHANNEL CROSS SECTION (B_1–B_2)

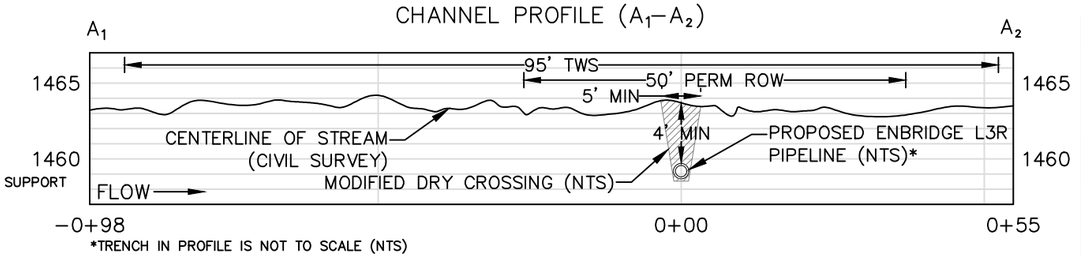
NOTES
1. NO FEMA DIGITAL FLOODPLAIN DATA AVAILABLE
2. NO ROSGEN DATA AVAILABLE
3. SOBS (O/H) OR NPC (S1–3): N/A
4. MDNR REGION 1 PWI – COOL/WARM WATER FISHERY: MARCH 15 – JUNE 30. 24–HOUR SOIL STABILIZATION REQUIRED WITHIN 200 FEET DURING RESTRICTION
5. WHEN WORKING WITHIN "WORK IN WATER RESTRICTIONS", STABILIZE ALL EXPOSED SOIL AREAS WITHIN 200 FEET OF THE WATER'S EDGE, AND THAT DRAIN TO THAT WATER, WITHIN 24 HOURS. STABILIZATION WILL BE INITIATED IMMEDIATELY AND COMPLETED WITHIN 7 CALENDAR DAYS WHENEVER CONSTRUCTION ACTIVITY HAS PERMANENTLY/ TEMPORARILY CEASED ON ANY PORTION OF THE SITE OUTSIDE OF THE RESTRICTION PERIOD.

LEGEND

- PROPOSED ENBRIDGE L3R PIPELINE
- OTHER PIPELINE
- PERMANENT RIGHT OF WAY
- TEMPORARY WORKSPACE
- WATERBODY
- TRACT BOUNDARY
- TEMPORARY MAT ROAD AND SPAN BRIDGE WITH IN–STREAM SUPPORT
- WETLAND
- ADDITIONAL TEMPORARY WORKSPACE
- MN–XX–XX–XXX.XXX — TRACT ID
- X — TOP OF BANK
- TRENCH BREAKER (LOCATIONS ARE APPROXIMATE)

FOR ENVIRONMENTAL REVIEW PURPOSES ONLY

CHANNEL PROFILE (A_1–A_2)



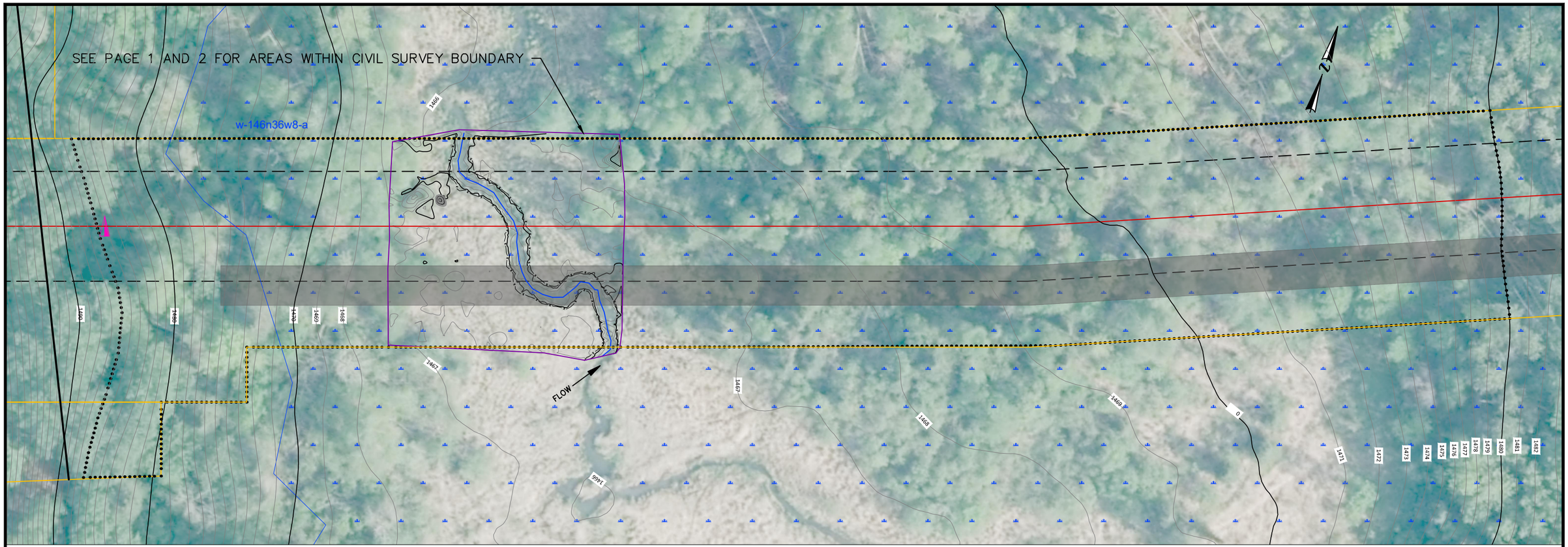
*TRENCH IN PROFILE IS NOT TO SCALE (NTS)

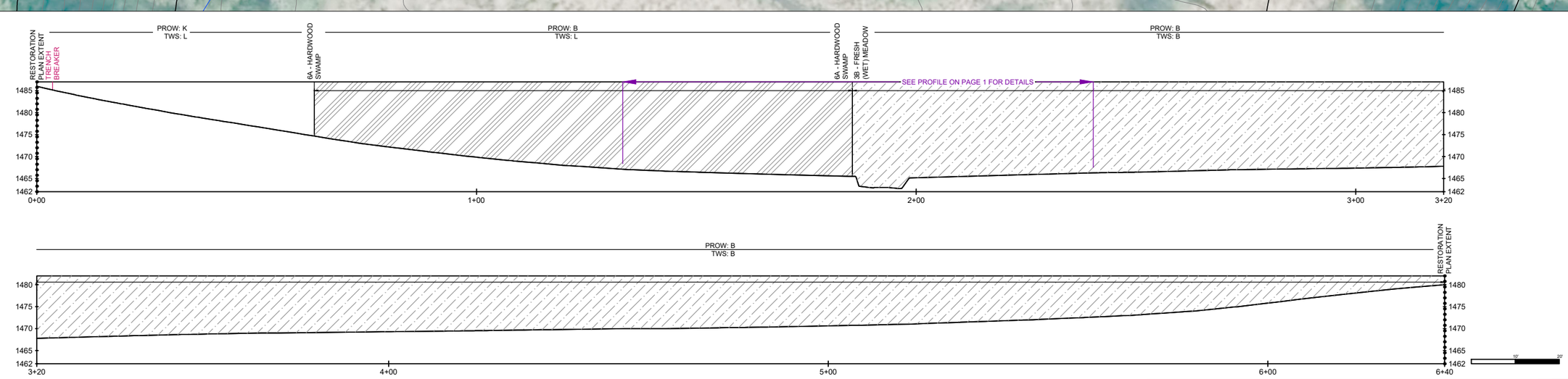
CHANNEL CROSS SECTION NOTE:
1. CHANNEL LOCATIONS, DIMENSIONS, AND/OR ELEVATIONS ARE BASED ON 2020 TOPOGRAPHIC/BATHYMETRIC SURVEY(S), AND AS SUCH DO NOT REFLECT CHANGES TO THE CHANNEL THAT MAY HAVE OCCURRED SINCE THAT TIME.
2. DEPTH OF COVER AT CENTERLINE WAS DEVELOPED USING THE BOTTOM ELEVATION OF THE DEEPEST UPSTREAM OR DOWNSTREAM POOL WITHIN THE SURVEYED REACH, UNLESS OTHERWISE NOTED IN APPLICATION MATERIALS.
3. MEAN MEANDER BELT WIDTH: N/A
4. MEANDER WIDTH RATIO: N/A

NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
0	ISSUED FOR PERMIT APPLICATION	AJJ	10/2020	BAB	BAB

ENBRIDGE

DWN. BY: AJJ	DATE 10/2020	PROPOSED ENBRIDGE L3R PIPELINE PRIMARY METHOD – MODIFIED DRY CROSSING CROSSING OF WALKER BROOK ENBRIDGE MP 928.5 CLEARWATER COUNTY, MINNESOTA	
CHK.			
PROJ. ENGR.			
PROJ. MGR.			
CLIENT APP.		SCALE NOTED	DWG. NO. B–93–5.84–MDNR–23–0





BWSR SEED MIX	B: RIPARIAN NE (34–361); K: WOODLAND EDGE NE (36–311); L: NATURAL REVEGETATION
SOBS (O/H) or NPC (S1-3)	NO (MODERATE); N/A

1. ELEVATIONS OUTSIDE OF THE AREA WITHIN CIVIL SURVEY BOUNDARY ARE DERIVED FROM LIDAR. ENBRIDGE WILL RESTORE THE AREAS ADJACENT TO THE PUBLIC WATER WITHIN THE MDNR EXPANDED RESTORATION BOUNDARY TO PRE–CONSTRUCTION CONDITIONS.
2. MDNR REGION 1 PWI – COOL/WARM WATER FISHERY: MARCH 15 – JUNE 30. 24–HOUR SOIL STABILIZATION REQUIRED WITHIN 200 FEET DURING RESTRICTION.
3. AIR PHOTOS ARE FROM 2018 ENBRIDGE AERIAL PHOTOGRAPHY.
4. ADDITIONAL ON–THE GROUND PHOTOS MAY BE TAKEN PRIOR TO CONSTRUCTION AT MDNR REQUEST.
5. PRE–CONSTRUCTION PHOTOS WILL BE USED TO AID IN RESTORATION.
6. SEE GENERAL NOTES PAGE FOR ADDITIONAL DETAIL.
7. SEE THE PLANTING PLAN FOR ADDITIONAL DETAIL REGARDING SEEDING PRACTICES AND SEED MIXES AT PUBLIC WATER CROSSINGS.
8. ON PUBLIC LANDS AND WHEREVER PRACTICABLE AT WATERBODY CROSSINGS, ENBRIDGE WILL USE WILDLIFE–FRIENDLY EROSION AND SEDIMENT CONTROL BMPS THAT CONTAIN BIODEGRADABLE NETTING (CATEGORY 3N OR 4N NATURAL FIBER) AND WILL AVOID THE USE OF PLASTIC MESH (SECTIONS 1.17.1 AND 2.6.1 OF THE EPP).
9. WHEN WORKING WITHIN "WORK IN WATER RESTRICTIONS", STABILIZE ALL EXPOSED SOIL AREAS WITHIN 200 FEET OF THE WATER'S EDGE, AND THAT DRAIN TO THAT WATER, WITHIN 24 HOURS. STABILIZATION WILL BE INITIATED IMMEDIATELY AND COMPLETED WITHIN 7 CALENDAR DAYS WHENEVER CONSTRUCTION ACTIVITY HAS PERMANENTLY/ TEMPORARILY CEASED ON ANY PORTION OF THE SITE OUTSIDE OF THE RESTRICTION PERIOD.

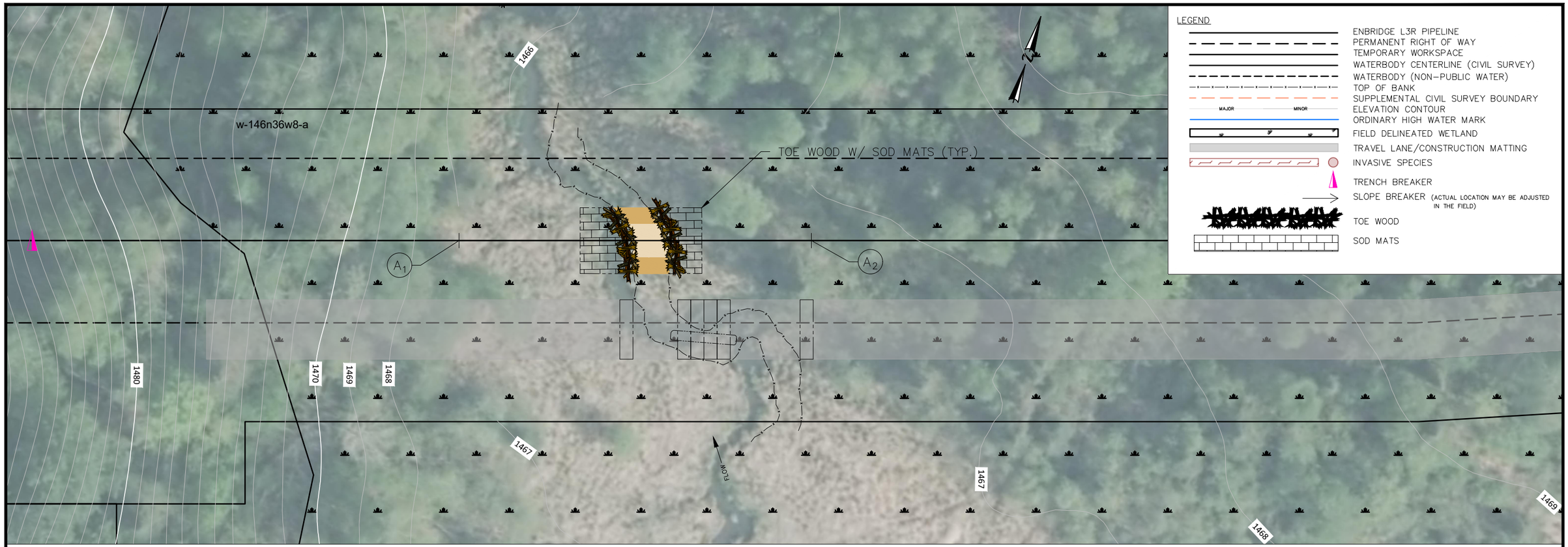
LEGEND

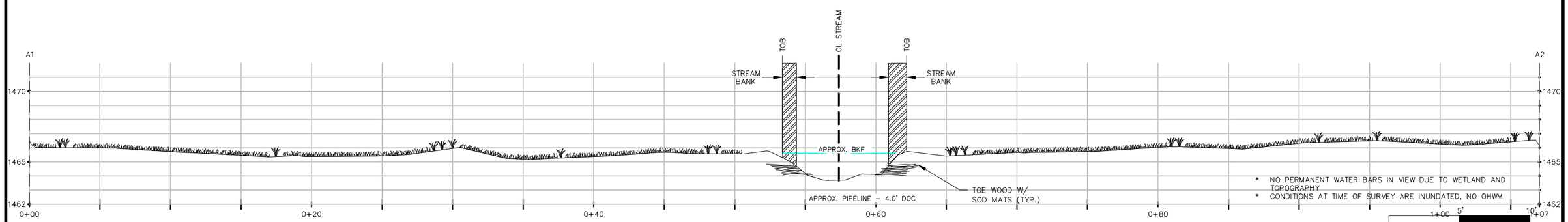
- ENBRIDGE L3R PIPELINE
- PERMANENT RIGHT OF WAY
- TEMPORARY WORKSPACE
- WATERBODY CENTERLINE (CIVIL SURVEY)
- WATERBODY (NON–PUBLIC WATER)
- PUBLIC WATER CIVIL SURVEY BOUNDARY
- MDNR EXPANDED RESTORATION BOUNDARY
- TOP OF BANK
- ELEVATION CONTOUR (MAJOR / MINOR)
- ORDINARY HIGH WATER MARK
- FIELD DELINEATED WETLAND
- TRAVEL LANE/CONSTRUCTION MATTING
- INVASIVE SPECIES
- TRENCH BREAKER
- PERMANENT SLOPE BREAKER (ACTUAL LOCATION MAY BE ADJUSTED IN THE FIELD)
- 1 – SHALLOW, OPEN WATER
- 2B – SHALLOW MARSH
- 3A – SEDGE MEADOW
- 3B – FRESH (WET) MEADOW
- 5A – SHRUB–CARR
- 5B – ALDER THICKET
- 6A – HARDWOOD SWAMP
- 6B – CONIFEROUS SWAMP

NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING	MJT	10/2020		
A	ISSUED FOR REVIEW	MJT	09/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
WALKER BROOK – MP 928.5 – MDNR ID 23
RE–VEGETATION PLAN: EXPANDED EXTENT

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP–928.5–001A	1A/5





PROPOSED RESTORATION ACTIVITIES WILL BE REVIEWED BY DNR AND ENBRIDGE DURING SITE VISIT AND MAY BE CHANGED TO REFLECT SITE CONDITIONS AT THE TIME OF CONSTRUCTION.

FEATURE ID	s–146n36w8–a; IFC ID: S–184.0
CROSSING TYPE	MODIFIED DRY CROSSING
PROPOSED RESTORATION (SEE DETAILS FOR LIVE STAKING, TRANSPLANTS, AND SHRUB SPECIES IF APPLICABLE)	EC BLANKET –NATURAL FIBER MPCA TYPE 3.B/MNDOT CATEGORY 4N; BRUSH – TOE WOOD
WITHIN OR ADJACENT WETLAND	HARDWOOD SWAMP/FRESH WET MEADOW
BWSR SEED MIX	RIPARIAN NE (34–361)
DOMINANT WETLAND VEGETATION	1. PHALARIS ARUNDINACEA 3. CAREX STRICTA 2. CALAMAGROSTIS CANADENSIS
SOBS (O/H) or NPC (S1-3)	NO (MODERATE); N/A

NOTES

1. CONSTRUCTION TIMING RESTRICTIONS
   1.1. MDNR REGION 1 PWI –COOL/WARM WATER FISHERY: MARCH 15 –JUNE 30.
   1.2. WHEN WORK OCCURS WITHIN "WORK IN WATER RESTRICTIONS", ALL EXPOSED SOIL AREAS WITHIN 200 FEET OF THE WATER'S EDGE, AND THAT DRAIN TO THAT WATER, WILL BE STABILIZED WITHIN 24 HOURS DURING THE RESTRICTION PERIOD. STABILIZATION OF ALL EXPOSED SOILS WITHIN 200 FEET OF THE PUBLIC WATER'S EDGE, AND THAT DRAIN TO THAT WATER, WILL BE INITIATED IMMEDIATELY AND COMPLETED WITHIN 7 CALENDAR DAYS WHENEVER CONSTRUCTION ACTIVITY HAS PERMANENTLY OR TEMPORARILY CEASED ON ANY PORTION OF THE SITE OUTSIDE OF THE RESTRICTION PERIOD
2. WORK SHALL BE CONDUCTED IN ACCORDANCE WITH APPLICABLE STANDARDS IN ENBRIDGE'S EPP AND VMP FOR PUBLIC LANDS AND WATERS. THE SPECIFICATIONS WITHIN THIS SSRP MAY MODIFY OR REPLACE THESE STANDARDS.
3. SEE GENERAL NOTES PAGE FOR ADDITIONAL DETAIL.
4. INFORMATION REGARDING SEEDING SPECIFICATIONS, SEED BED PREPARATION TECHNIQUES, ETC. ARE DESCRIBED IN THE PLANTING PLAN CONTAINED WITHIN THE VMP.
5. TRENCH BREAKER LOCATION IS APPROXIMATE PENDING FIELD VERIFICATION (EPP SECTION 1.13)

ENBRIDGE

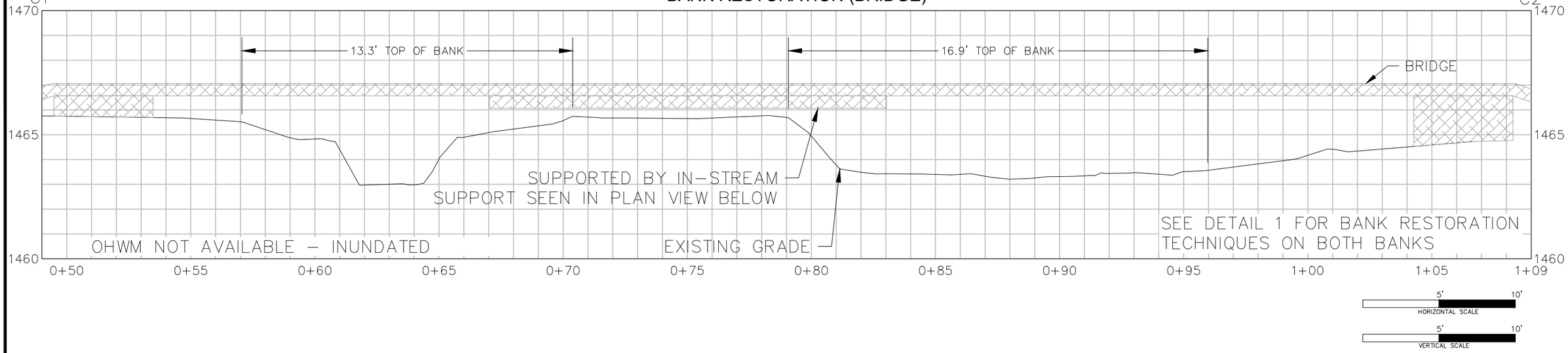
NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
WALKER BROOK – MP 928.5 – MDNR ID 23
RE–VEGETATION PLAN

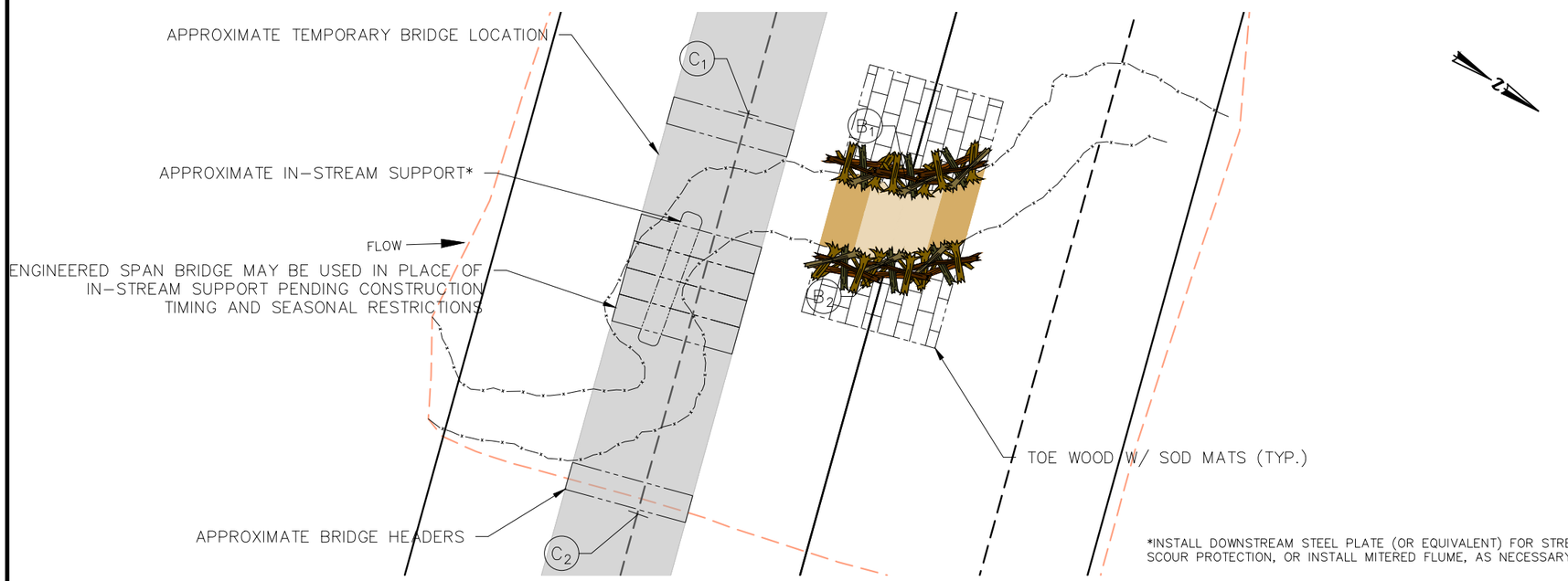
SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP–928.5–001	1/7

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

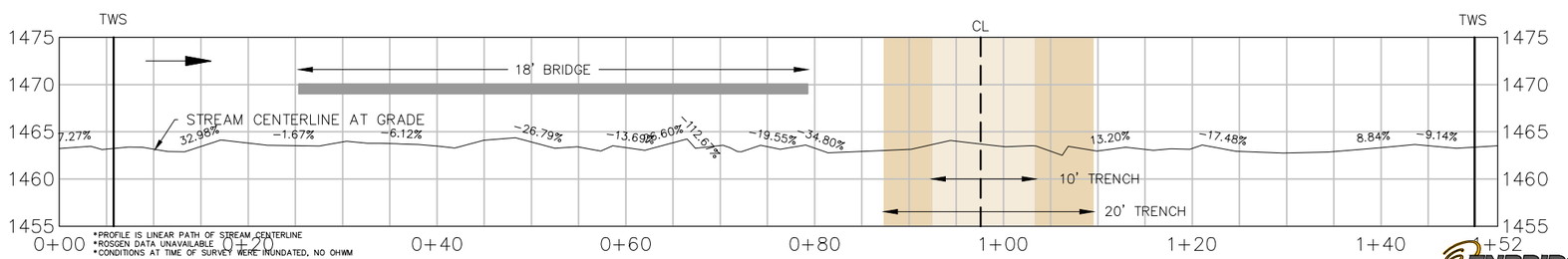
BANK RESTORATION (BRIDGE)



STREAMBED RESTORATION



*INSTALL DOWNSTREAM STEEL PLATE (OR EQUIVALENT) FOR STREAMBANK SCOUR PROTECTION, OR INSTALL MITERED FLUME, AS NECESSARY



*PROFILE IS LINEAR PATH OF STREAM CENTERLINE
*ROSGEN DATA UNAVAILABLE
*CONDITIONS AT TIME OF SURVEY WERE INUNDATED, NO OHWM

NOTES

1. TRANSITIONS BETWEEN EXISTING CHANNEL FEATURES (BED, BANK, FLOODPLAIN) AND PROPOSED RESTORED TRENCH CROSSING WILL BE SMOOTH AND EVENLY GRADED WITHOUT ABRUPT OR PROTRUDING OBSTRUCTIONS.
2. MINIMIZE DISTURBANCE OF BED MATERIALS AND FEATURES DURING CONSTRUCTION OF THE TRENCH AND INSTALLATION AND REMOVAL OF IN-STREAM SUPPORT
3. BED AND/OR BANK MATERIALS TEMPORARILY ADJUSTED OR REMOVED DURING CONSTRUCTION SHALL BE PLACED IN THE APPROXIMATE ORIGINAL LOCATION DURING RESTORATION. MATERIALS SHALL BE FIELD ADJUSTED DURING PLACEMENT BASE ON THE OBSERVED FLOW PATH AT THE TIME OF CONSTRUCTION.
4. ALIGNMENT OF IN-STREAM SUPPORT SHALL BE FIELD ADJUSTED BASED ON FLOW PATH TO PROTECT CHANNEL BANKS.
5. SEE RESTORATION SHEET FOR B1-B2 CROSS SECTION.

LEGEND

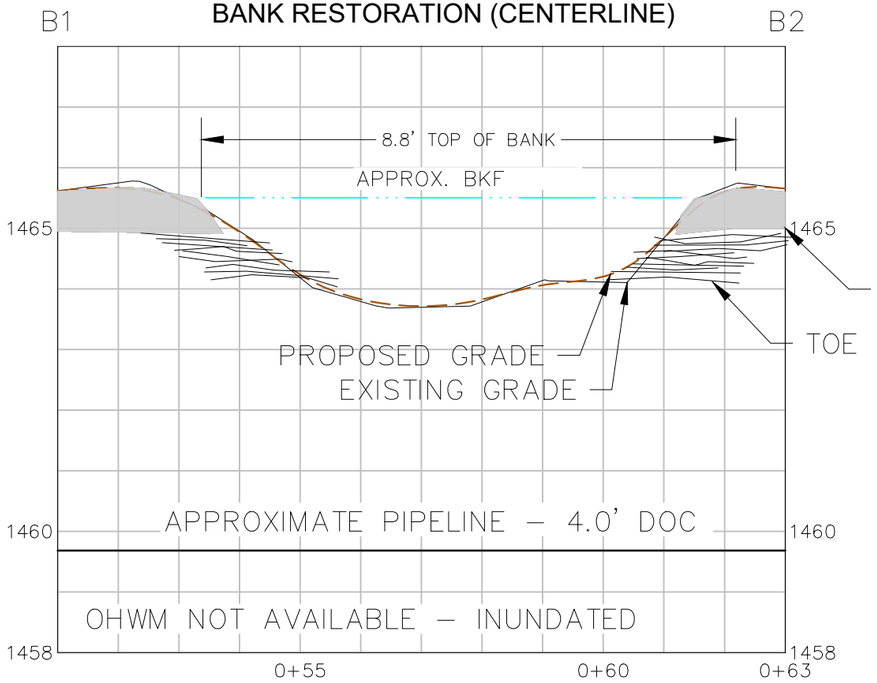
- ENBRIDGE L3R PIPELINE
- PERMANENT RIGHT OF WAY
- TEMPORARY WORKSPACE
- WATERBODY – RIFFLE (ROSGEN SURVEY)
- WATERBODY – POOL (ROSGEN SURVEY)
- WATERBODY – RUN (ROSGEN SURVEY)
- WATERBODY – GLIDE (ROSGEN SURVEY)
- CONTOUR (1' INTERVAL) (MAJOR / MINOR)
- TOP OF BANK
- ORDINARY HIGH WATER MARK
- FIELD DELINEATED WETLAND
- TRAVEL LANE/CONSTRUCTION MATTING
- TRENCH – 10'
- TRENCH – 20'

NO.	REVISION-DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

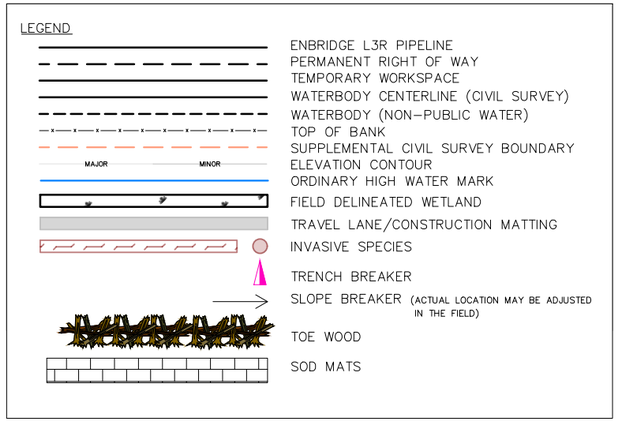
ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE-SPECIFIC RESTORATION PLAN
WALKER BROOK – MP 928.5 – MDNR ID 23
STABILIZATION PLAN

SCALE	DWG. NO.	PAGE NO.
	SSRP-928.5-002	2/7

PLOTTED SIZE: ANSI FULL BLEED B (17x11)



SEE DETAILS 1 & 3 FOR BANK RESTORATION TECHNIQUES ON BOTH BANKS



RESTORATION NOTES:

GENERAL

1. REFER TO RESTORATION DETAIL SHEETS FOR ADDITIONAL INFORMATION RELATED TO PROPOSED RESTORATION MEASURES.
2. REFER TO SITE PHOTOS FOR INFORMATION ON PRE-CONSTRUCTION CROSSING CONDITIONS AND TO PROVIDE ADDITIONAL GUIDANCE FOR RESTORATION EFFORTS.

TOE WOOD

1. ROUGH GRADE CHANNEL BED FEATURES INCLUDING PLACEMENT OF SUBSTRATE.
2. INSTALL FOOTER LOG(S) ALONG PROPOSED TOE OF SLOPE. FOOTER LOGS SHOULD BE ANGLED TO ALLOW FOR TOE ALIGNMENT TO GENERALLY MATCH THE EXISTING CURVE AND EVENLY TRANSITION FROM UPSTREAM TO DOWNSTREAM.
3. PUSH FOOTER LOG INTO SOIL APPLY A SMALL AMOUNT OF GRAVEL OR STONE AS NEEDED TO PREVENT FLOATATION OF FOOTER LOG PRIOR TO PLACING WOODY DEBRIS.
4. PLACE A LAYER WOODY DEBRIS IN 6" TO 8" LIFTS, APPLY 3"-4" GRAVEL AND/OR SOIL FILL AND COMPACT WITH EXCAVATOR BUCKET. WASH FILL MATERIAL INTO WOODY DEBRIS MATRIX WITH WATER FROM CHANNEL. APPLY ADDITIONAL LAYERS "AS NEEDED" TO REACH THE SPECIFIED TOE WOOD HEIGHT.
5. PLACE STACKED SOD MATS ABOVE TOE WOOD. THE USE OF TRANSPLANTS OR FABRIC LIFTS MAY BE FIELD APPROVED BY ENBRIDGE IN CONSULTATION WITH MN DNR.

SOD MATTING

1. REMOVE VEGETATED MATS ON EITHER SIDE OF THE STREAM CROSSING USING ONSITE EQUIPMENT WHICH CAN UNDERCUT THE VEGETATION FOR REMOVAL. SMALL SHRUBS AND/OR TREES WITHIN THE SOD MATS ARE ACCEPTABLE AND SHOULD NOT BE REMOVED.
2. DEPENDING ON THE LEVEL OF SATURATION AT THE TIME OF REMOVAL, IT MAY BE DIFFICULT TO OBTAIN INTACT CONSOLIDATED MATS, BUT GENERALLY THE NATIVE VEGETATION WILL BE RETAINED AND CAPTURED FOR PLACEMENT.
3. SOD MATS CAN BE TRANSPLANTED DURING ANY SEASON.
4. SOD MAT WILL BE PLACED ON CLEAR GROUND OR MATS WITHIN THE WORKSPACE.
5. MONITOR MATS TO SUPPORT SURVIVABILITY; WATERING MAY BE NEEDED.
6. PRIOR TO PLACEMENT OF SOD MATS FINISH GRADE CHANNEL BANK AND ADJACENT FLOODPLAIN APPLICATION AREA TO PROVIDE A SMOOTH AND EVEN SURFACE. SUBGRADE ELEVATION SHOULD ALLOW FOR THE FINISHED SOD SURFACE TO TRANSITION EVENLY WITH THE CHANNEL BANKS UPSTREAM AND DOWNSTREAM OF THE INSTALLATION AREA. AVOID ABRUPT CHANGES IN GRADE.
7. RETURN THE VEGETATED MATS USING ONSITE EQUIPMENT.
    a. SURFACE APPLIED SOD MATTING SHOULD BE PLACED WITH THE LONG SIDE PERPENDICULAR TO THE CHANNEL / FLOW.
    b. STACKED SOD MATTING SHOULD BE PLACED WITH THE LONG SIDE PARALLEL TO THE CHANNEL / FLOW.
8. WHEN PLACING SOD MATS, DO NOT LEAVE LARGE GAPS BETWEEN EACH SOD MAT AS NON-NATIVE VEGETATION WILL QUICKLY ATTEMPT TO COLONIZE THESE VOIDS.
9. WATER SOD MATS AFTER REPLACEMENT IF CONDITIONS ARE HOT AND DRY. DAMP AND/OR FROZEN SOD MATS DO NOT REQUIRE WATERING.
10. THE TOP MAT AND/OR OTHER MATS CAN BE ANCHORED WITH A LIVE AND/OR DEAD STOUT STAKE TO ENSURE THAT IT DOES NOT MOBILIZE DURING A FLOOD EVENT BEFORE THE ROOTS HAVE ESTABLISHED.
11. THE VEGETATED MATS WILL BE REPLACED AS SOON AS PRACTICAL FOLLOWING BACKFILLING OF THE TRENCH AND STABILIZED PER THE TIMING REQUIREMENTS DESCRIBED IN SECTION 1.9.1 OF THE EPP.

TRANSPLANTS

1. SHRUBS AND/OR ALDER REMOVED FROM THE TRENCH AREA MAY BE USED IN LIEU OF SOD MATS IN ACCORDANCE WITH THE TRANSPLANT DETAIL.

NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
WALKER BROOK – MP 928.5 – MDNR ID 23
SITE SPECIFIC DETAILS

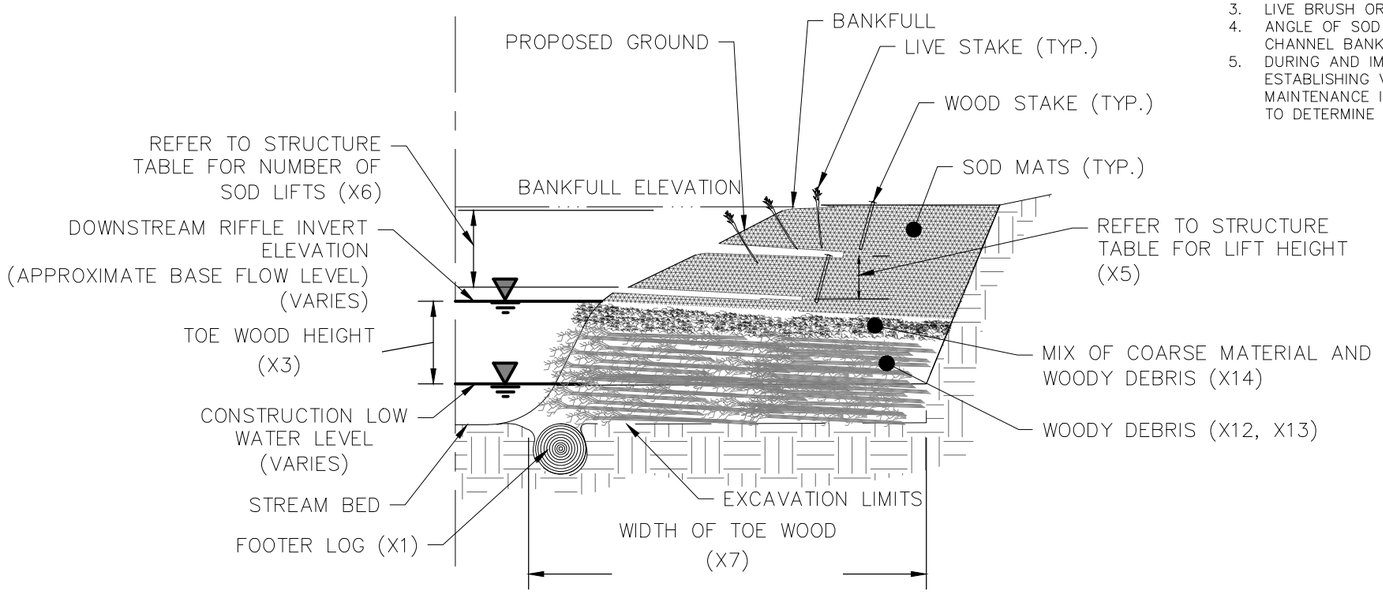
SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP–928.5–004	3/7

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

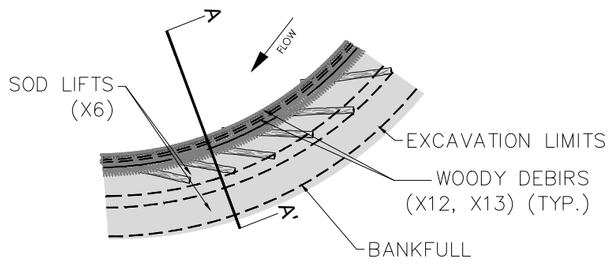
TOE WOOD DIMENSIONS			
VARIABLE	**VALUE**	**TYPICAL UNIT**	**DESCRIPTION**
X1	6.0 - 10.0	IN.	FOOTER LOG DIAMETER
X2	8.0 - 12.0	FT.	FOOTER LOG LENGTH
X3	18.0	IN.	TOE WOOD HEIGHT
X4	SEE SHEET 3	N/A	MATCH TYPICAL SECTION
X5	SEE SHEET 5	FT.	SOD LIFT HEIGHT
X6	3.0	#	SOD LIFTS
X7	8.0 - 10.0	FT.	TOE WOOD WIDTH
X8	3.0 - 6.0	FT.	SOD LIFT WIDTH
X9	24.0	IN.	WOOD STAKE LENGTH
X10	4.0	IN.	WOOD STAKE WIDTH (TOP)
X11	0.5	IN.	WOOD STAKE WIDTH (BOTTOM)
X12	1/2 - 3.0	IN.	WOODY DEBRIS DIAMETER
X13	8.0 - 12.0	FT.	WOODY DEBRIS LENGTH
X14	3" MINING GRAVEL WITH FINES	%	SELECT COARSE MATERIAL BACKFILL (BY VOLUME)

TOE WOOD EXAMPLE

NOTES:
1. WOODY MATERIAL OF APPROPRIATE SIZE CONSISTING OF LOGS, TRUNKS, LIMBS, BRANCHES, AND SMALLER WOODY DEBRIS INCLUDING TOPS OR SLASH. ON-SITE WOODY MATERIAL IS PREFERRED.
2. WOODY DEBRIS SHOULD BE GREEN OR RELATIVELY GREEN AND MAY CONSIST OF HARDWOODS, CONIFERS, OR A COMBINATION OF BOTH.
3. LIVE BRUSH OR OTHER BANK VEGETATION MAY BE INCORPORATED.
4. ANGLE OF SOD MAT SURFACE SHALL MATCH THE PROPOSED CHANNEL CROSS SECTION AND PROVIDE A SMOOTH AND EVEN CHANNEL BANK SURFACE BETWEEN UPSTREAM AND DOWNSTREAM BANKS.
5. DURING AND IMMEDIATELY AFTER CONSTRUCTION, BANK SLOPES ABOVE THE WOOD TOE ARE VULNERABLE TO EROSION. ESTABLISHING VEGETATION OR OTHER COVER MATERIAL AS SOON AS POSSIBLE WILL HELP REDUCE EROSION. ADDITIONAL MAINTENANCE IS NOT EXPECTED ONCE VEGETATION ESTABLISHES. INSPECTION AFTER LARGE FLOW EVENTS MAY BE ADVISABLE TO DETERMINE IF ANY MATERIAL MOVEMENT OR UNEXPECTED SCOUR HAS OCCURRED.



SECTION A-A'



PLAN VIEW AT BANKFULL ELEVATION

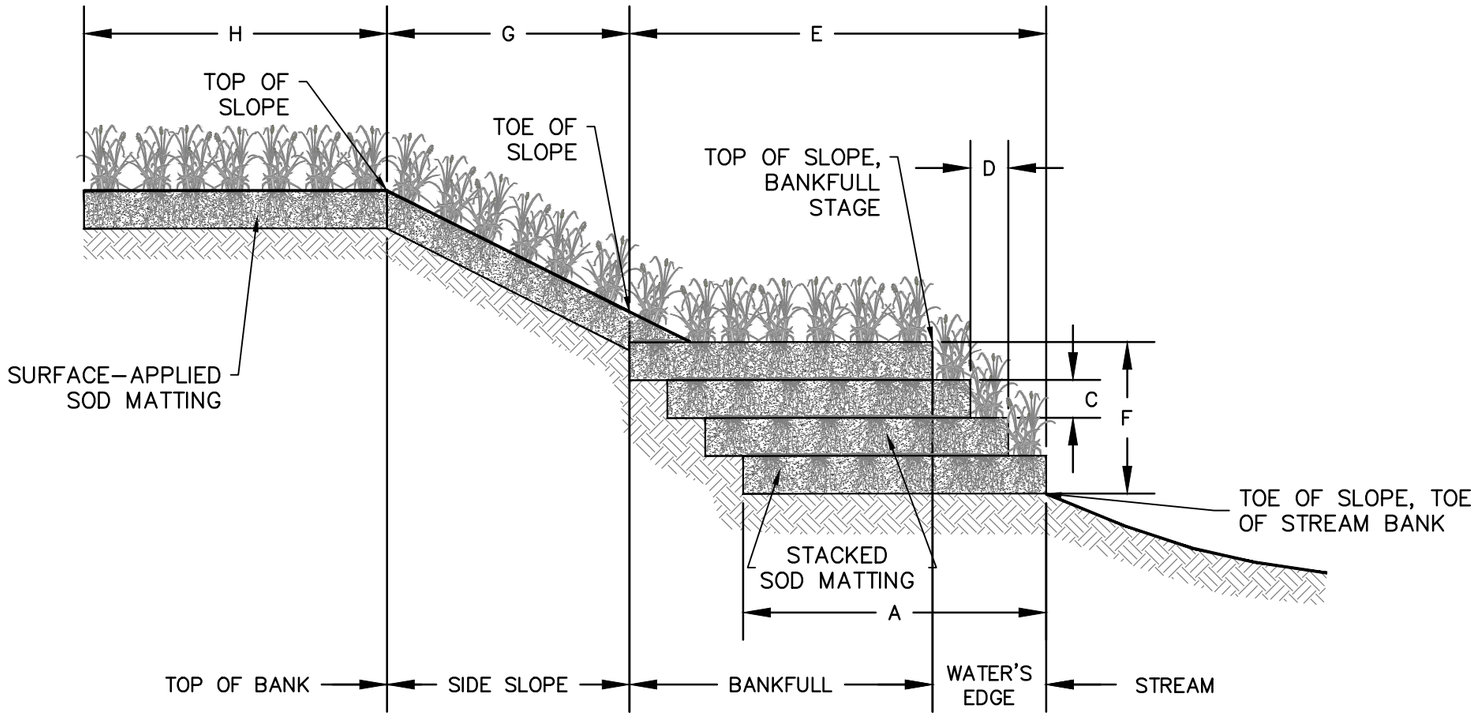
1 TOE WOOD DETAIL

NO.	REVISION-DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

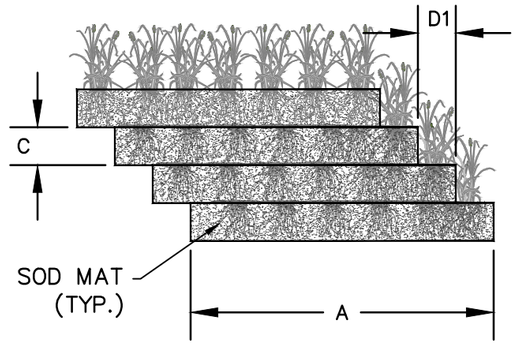
ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE-SPECIFIC RESTORATION PLAN
WALKER BROOK – MP 928.5 – MDNR ID 23
SITE SPECIFIC DETAILS

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP-928.5-004	4/7

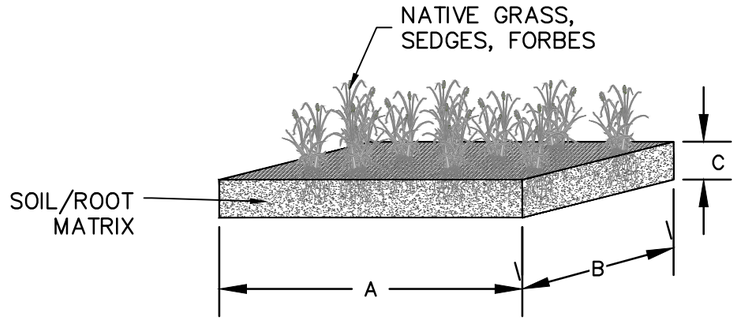
PLOTTED SIZE: ANSI FULL BLEED B (17x11)



CROSS SECTION



STACKED SOD MATTING DETAIL



SOD MAT DETAIL

DIMENSION[2]	NAME	TYPICAL UNIT	VALUE	DESCRIPTION
A	SOD MAT WIDTH	FEET	3–4	WIDTH OF INDIVIDUAL SOD MAT.
B	SOD MAT LENGTH	FEET	3–6	LENGTH OF INDIVIDUAL SOD MAT.
C	SOD MAT THICKNESS	INCHES	12	THICKNESS OF INDIVIDUAL SOD MAT.
D	STACKED SOD MAT SETBACK	FEET	N/A	THE DISTANCE BETWEEN THE EDGES OF SOD MATS STACKED TO FORM A SLOPE
E	WIDTH OF STACKED SOD MATS	FEET	N/A	WIDTH OF A BANK CREATED BY STACKED SOD MATS
F	HEIGHT OF STACKED SOD MATS	FEET	N/A	HEIGHT OF A SLOPE CREATED BY STACKED SOD MATS
G	WIDTH OF SURFACE- APPLIED SOD MATS	FEET	10–20	WIDTH OF A SLOPE STABILIZED WITH SURFACE-APPLIED SOD MATS
H	TOP OF BANK SOD MATTING DISTANCE	FEET	10	DISTANCE SOD MATTING IS INSTALLED ON THE TOP OF BANK

NOTES:

1. DATA ARE FOR SOD MATTING THAT IS STACKED TO FORM A SLOPE OR SURFACE-APPLIED TO A SLOPE.
2. DIMENSION LABELS ARE REFERENCED IN THE DETAIL DRAWINGS.

SOD MATTING DETAIL

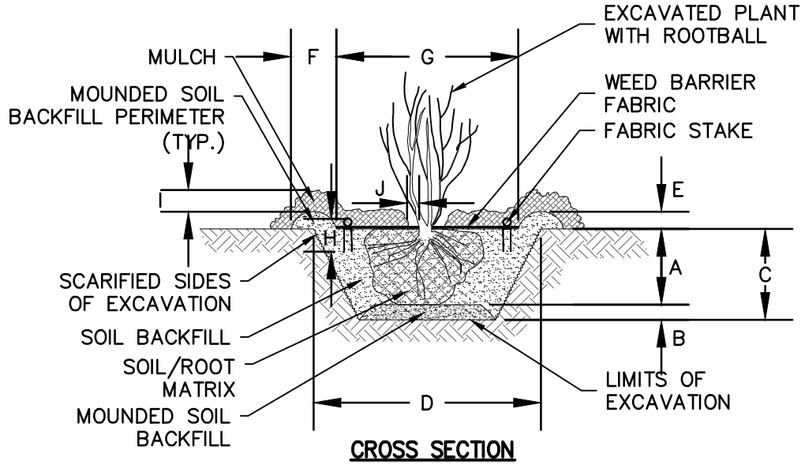
SOD MAT EXAMPLES

NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
WALKER BROOK – MP 928.5 – MDNR ID 23
SITE SPECIFIC DETAILS

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP–928.5–004	5/7

PLOTTED SIZE: ANSI FULL BLEED B (17x11)



CROSS SECTION

DIMENSION	NAME	TYPICAL UNIT	VALUE	DESCRIPTION
A	PLANTING DEPTH	INCHES	12–18	PLANTING DEPTH OF THE TRANSPLANT.
B	HEIGHT OF MOUNDED SOIL BACKFILL	INCHES	N/A	HEIGHT OF MOUNDED LOOSE SOIL PLACED INTO OVER-EXCAVATED PLANTING PIT.
C	DEPTH OF PLANTING PIT	INCHES	12–18	DEPTH OF THE PLANTING PIT; ACCOMMODATES DIMENSION OF SOIL AND EXCAVATED ROOTS AS WELL AS MOUNDED LOOSE SOIL AT BOTTOM OF PIT.
D	WIDTH OF PLANTING PIT	FEET	3–5	OVER-EXCAVATED WIDTH OF THE PLANTING PIT; ACCOMMODATES THE WIDTH OF THE EXCAVATED SOIL AND ROOTS.
E	HEIGHT OF MOUNDED SOIL PERIMETER	INCHES	0–2	HEIGHT OF SOIL BERM CONSTRUCTED ALONG THE PERIMETER OF THE PLANTING PIT; HELPS RETAIN WATER.
F	WIDTH OF MOUNDED SOIL PERIMETER	INCHES	0–6	WIDTH OF SOIL BERM CONSTRUCTED ALONG THE PERIMETER OF THE PLANTING PIT; HELPS RETAIN WATER.
G	WIDTH OF WEED BARRIER FABRIC (OPTIONAL)	INCHES	N/A	WIDTH OF FABRIC PLACED ON SURFACE TO CONTROL WEEDS WITHIN THE MOUNDED SOIL PERIMETER; TRANSPLANTS TYPICALLY HAVE GRASSES, LEAF MATTER, ETC. ATTACHED AND DO NOT REQUIRE WEED BARRIER FABRIC.
H	FABRIC STAKE LENGTH (OPTIONAL)	INCHES	N/A	LENGTH OF STAPLES/SPIKES USED TO SECURE WEED BARRIER FABRIC
I	THICKNESS OF MULCH (OPTIONAL)	INCHES	N/A	THICKNESS OF MULCH, IF NECESSARY. TRANSPLANTS TYPICALLY HAVE GRASSES, LEAF MATTER, ETC. ATTACHED AND DO NOT REQUIRE MULCH.
J	GAP BETWEEN MULCH AND PLANT STEM/TRUNK (OPTIONAL)	INCHES	N/A	ROOM BETWEEN PLANT STEM/TRUNK AND MULCH. TRANSPLANTS TYPICALLY HAVE GRASSES, LEAF MATTER, ETC. ATTACHED

NOTES:

1. DIMENSION LABELS ARE REFERENCED IN THE DETAIL DRAWINGS.

TRANSPLANTS EXAMPLES

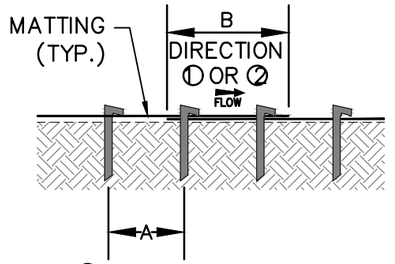
TRANSPLANTING DETAIL

DIMENSION[2]	NAME	TYPICAL UNIT	VALUE	DESCRIPTION
A	MATTING STAKE SPACING	FEET, INCHES	N/A	SPACING BETWEEN EROSION CONTROL MATTING STAKES USED TO FASTEN THE MATTING TO THE SOIL
B	MATTING OVERLAP	FEET, INCHES	N/A	AMOUNT OF EROSION CONTROL MATTING OVERLAP IF MULTIPLE PIECES AND/OR ROLLS OF MATTING ARE USED. OVERLAP VARIES DEPENDING ON THE LOCATION OF THE OVERLAP WITH RESPECT TO POSITION ON THE SLOPE, LOCATION OF THE MATTING (EDGE OR END), AND PRODUCT SPECIFICATIONS.
C	MATTING ANCHOR TRENCH DEPTH	FEET, INCHES	N/A	DEPTH OF TRENCH INTO WHICH EDGE OF EROSION CONTROL MATTING IS ANCHORED AT THE TOP AND/OR TOE OF A SLOPE.
D	MATTING ANCHOR TRENCH WIDTH	FEET, INCHES	N/A	WIDTH OF TRENCH INTO WHICH EDGE OF EROSION CONTROL MATTING IS ANCHORED AT THE TOP AND/OR TOE OF A SLOPE.
E	TOP OF SLOPE ANCHOR TRENCH SETBACK	FEET, INCHES	N/A	TOP OF SLOPE ANCHOR TRENCH DISTANCE FROM THE TOP OF SLOPE. TOP OF SLOPE REFERS TO TOP OF SIDE SLOPE, BANK SLOPE, TERRACE SLOPE, BANKFULL, ETC.
F	MATTING STAKE LENGTH	INCHES	N/A	LENGTH OF EROSION CONTROL MATTING STAKES OR STAPLES USED TO FASTEN THE MATTING TO THE SOIL

NOTES:

1. DATA ARE FOR EROSION CONTROL MATTING APPLIED TO STREAM BANK SLOPES.
2. DIMENSION LABELS ARE REFERENCED IN THE DETAIL DRAWINGS.

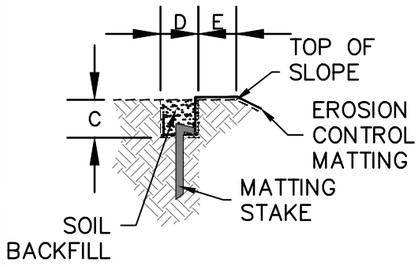
EROSION CONTROL MATTING DETAIL



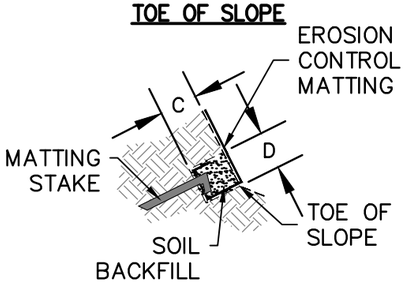
① DIRECTION OF STREAM FLOW
② DIRECTION DOWN THE BANK SLOPE

MATTING OVERLAP DETAIL

MATTING STAKE DETAIL

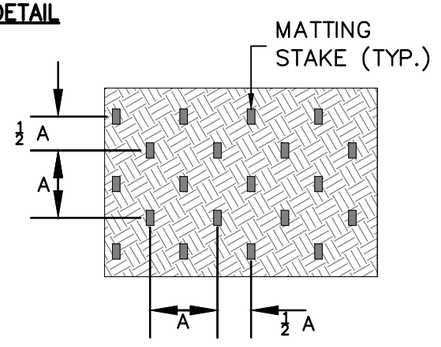


TOP OF SLOPE



TOE OF SLOPE

MATTING ANCHOR DETAIL



MATTING STAKE PATTERN DETAIL

NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
WALKER BROOK – MP 928.5 – MDNR ID 23
SITE SPECIFIC DETAILS

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP–928.5–004	6/7

ENBRIDGE

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

1 CENTERLINE – FACING WEST BANK

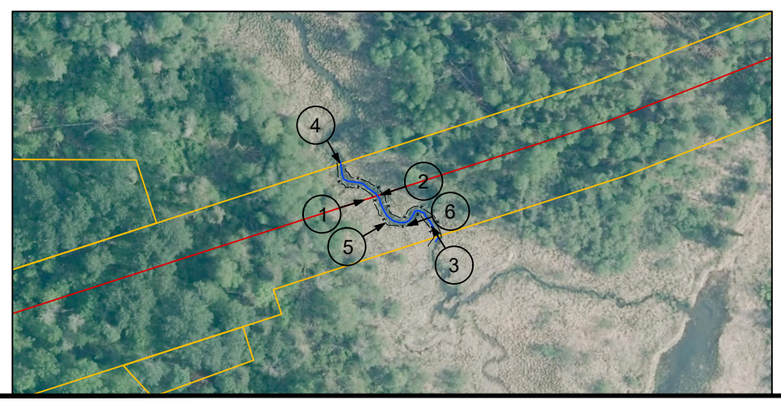
2 CENTERLINE – FACING EAST BANK

3 EDGE OF WORKSPACE – FACING DOWNSTREAM

4 EDGE OF WORKSPACE – FACING UPSTREAM

5 BRIDGE – FACING WEST BANK

6 BRIDGE – FACING EAST BANK



NOTES:

1. AIR PHOTOS ARE FROM 2018 ENBRIDGE AERIAL PHOTOGRAPHY.
2. ADDITIONAL ON–THE GROUND PHOTOS MAY BE TAKEN PRIOR TO CONSTRUCTION AT MDNR REQUEST.
3. PRE–CONSTRUCTION PHOTOS WILL BE USED TO AID IN RESTORATION.

NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING	MJT	10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
WALKER BROOK – MP 928.5 – MDNR ID 23
PHOTO PAGE

SCALE	DWG. NO.	PAGE NO.
	SSRP–928.5–005	5/5

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

GENERAL

1. THE SPECIFICATIONS WITHIN THIS SSRP MAY MODIFY OR REPLACE PROJECT–WIDE STANDARDS PRESENTED IN THE EPP. WHERE MATERIAL WITHIN THESE SSRPS EXCEEDS STANDARD CONSTRUCTION MEASURES IN THE EPP, THESE SSRPS SUPERSEDE THE EPP.

2. CONSTRUCTION AND RESTORATION OF WATERBODY CROSSINGS WILL FOLLOW THESE GENERAL STEPS:

   A. SITE CLEARING
   B. INSTALLATION OF TEMPORARY EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICES ("BMPS")
   C. BRIDGE INSTALLATION
   D. EXCAVATION/BACKFILLING OF THE WATERBODY INCLUDING:
      - SOD SAVING TOPSOIL SEGREGATION AT NON–WOODED SITES
      - STREAMBED MATERIAL SEGREGATION
      - PIPE INSTALLATION
      - BACKFILL, INCLUDING IMPLEMENTATION OF CONSTRUCTION–RELATED RESTORATION METHODS (I.E., TOE WOOD)
   E. REPLACEMENT OF STREAMBED MATERIAL AND TOPSOIL/SOD LAYER
   F. RESTORATION OF STREAM BANKS TO PRE–CONSTRUCTION CONTOURS
   G. IF FINAL GRADING NOT POSSIBLE AT THE TIME, TEMPORARY STABILIZATION AND REPLACEMENT/REINFORCEMENT OF TEMPORARY BMPS
   H. AFTER FINAL GRADING, PERMANENT SEEDING AND/OR WOODY VEGETATION RESTORATION, STABILIZATION AND REPLACEMENT/REINFORCEMENT OF TEMPORARY BMPS
   I. BRIDGE REMOVAL DURING FINAL RESTORATION AFTER STABILIZATION AND PERMANENT SEEDING
   J. POST–CONSTRUCTION MONITORING

CROSSING METHODS

1. ALL WATERBODY AND WETLAND CROSSINGS WILL BE CONDUCTED IN COMPLIANCE WITH SECTION 2.0 AND SECTION 3.0 OF THE ENVIRONMENTAL PROTECTION PLAN ("EPP"), RESPECTIVELY. SECTION 2.0 AND 3.0 OF THE WINTER CONSTRUCTION PLAN PRESENTS MODIFICATIONS FOR WATERBODY AND WETLAND CONSTRUCTION METHODS, RESPECTIVELY, IN WINTER CONDITIONS.

2. ENBRIDGE'S SUMMARY OF CONSTRUCTION METHODS AND PROCEDURES (THE "PROCEDURES," APPENDIX A OF THE EPP) OUTLINES THE VARIOUS CONSTRUCTION METHODS THAT ENBRIDGE MAY UTILIZE TO CONSTRUCT THROUGH WATERBODIES AND WETLANDS/BASINS AS PRESENTED ON THESE SITE–SPECIFIC RESTORATION PLANS ("SSRPS").

   A. DRY CROSSING (ISOLATED) METHODS (INCLUDING THE DRY CROSSING AND MODIFIED DRY CROSSING METHOD) ARE DESCRIBED SECTIONS 4.3 OF THE PROCEDURES, AND IN SECTIONS 2.5.2 AND 2.5.3 AND FIGURES 23 AND 24 OF THE EPP.
   B. THE BORE METHOD (NON–PRESSURIZED) IS DESCRIBED IN SECTION 3.5 OF THE PROCEDURES, AND SECTION 4.0 OF THE EPP.
   C. THE MODIFIED UPLAND CONSTRUCTION (WETLAND) METHOD IS DESCRIBED IN SECTION 3.3 OF THE PROCEDURES, AND SECTION 3.0 AND FIGURES 30 TO 34 OF THE EPP.
   D. ALTHOUGH NOT PROPOSED AS A PRIMARY METHOD AT THESE SSRP WATERBODIES, THE OPEN CUT (NON–ISOLATED) WATERBODY CROSSING METHOD IS DESCRIBED IN SECTION 4.1 OF THE PROCEDURES, AND SECTION 2.5.1 AND FIGURE 24 OF THE EPP.
   E. ALTHOUGH NOT PROPOSED AS A PRIMARY METHOD AT THESE SSRP WATERBODIES, THE PUSH–PULL METHOD IS DESCRIBED IN SECTION 3.4 OF THE PROCEDURES, AND SECTION 3.7.1 AND FIGURES 35 AND 36 OF THE EPP.

CLEARING/VEGETATION REMOVAL

1. STUMPS WITHIN THE TRENCH LINE WILL BE COMPLETELY REMOVED, GROUND, AND/OR HAULED OFF–SITE TO AN APPROVED LOCATION. TREE STUMPS OUTSIDE THE TRENCH LINE WILL BE GROUND BELOW NORMAL GROUND SURFACE TO FACILITATE A SAFE WORK AREA AND TO ALLOW TOPSOIL REMOVAL, IF NECESSARY. IN SOME CIRCUMSTANCES, TREE STUMPS OUTSIDE THE TRENCH LINE MAY BE COMPLETELY REMOVED TO ALLOW FOR A SAFE WORK AREA AND HAULED OFF–SITE TO AN APPROVED LOCATION AS OUTLINED IN SECTION 1.8.3 OF THE EPP.

2. CLEARING WILL BE CONDUCTED IN WATERBODIES AND WETLANDS AS OUTLINED IN SECTION 2.2 AND 3.2 OF THE EPP, RESPECTIVELY. CHIPS, MULCH, OR MECHANICALLY CUT WOODY DEBRIS SHALL NOT BE STOCKPILED IN A WETLAND. HYDRO–AX DEBRIS, OR SIMILAR CAN BE LEFT IN THE WETLAND IF SPREAD EVENLY IN THE CONSTRUCTION WORKSPACE TO A DEPTH THAT WILL ALLOW FOR NORMAL REVEGETATION, AS DETERMINED BY THE EI. CHIPPING IS NOT ALLOWED ON PUBLIC LANDS. ON PUBLIC LANDS, MULCH AND MECHANICALLY CUT WOODY DEBRIS MUST BE UNIFORMLY BROADCAST TO LESS THAN 2–INCH THICKNESS AND IN A MANNER THAT MAINTAINS VISIBLE GROUND.

3. ENBRIDGE WILL PROPERLY INSTALL AND MAINTAIN REDUNDANT SEDIMENT CONTROL MEASURES IMMEDIATELY AFTER CLEARING AND PRIOR TO INITIAL GROUND DISTURBANCE AT SURFACE WATERS LOCATED WITHIN 50 FEET OF THE PROJECT AND WHERE STORMWATER FLOWS TO THE SURFACE WATER (REFER TO THE ENVIRONMENTAL PLAN SHEETS IN THE SWPPP), AND WITHIN 100 FEET OF SPECIAL AND IMPAIRED WATERS, INCLUDING TROUT STREAMS.

4. ON PUBLIC LANDS AND WHEREVER PRACTICABLE AT WATERBODY CROSSINGS, ENBRIDGE WILL USE WILDLIFE–FRIENDLY EROSION AND SEDIMENT CONTROL BMPS THAT CONTAIN BIODEGRADABLE NETTING (CATEGORY 3N OR 4N NATURAL FIBER) AND WILL AVOID THE USE OF PLASTIC MESH (SECTIONS 1.17.1 AND 2.6.1 OF THE EPP).

TEMPORARY STABILIZATION

1. ON PORTIONS OF THE PROJECT WHERE WORK WILL BE OCCURRING DURING APPLICABLE "WORK IN WATER RESTRICTIONS" FOR PUBLIC WATERS (REFER TO SECTION 2.1), ALL EXPOSED SOIL AREAS WITHIN 200 FEET OF THE WATER'S EDGE, AND THAT DRAIN TO THAT WATER, WILL BE STABILIZED WITHIN 24 HOURS DURING THE RESTRICTION PERIOD. STABILIZATION OF ALL EXPOSED SOILS WITHIN 200 FEET OF THE PUBLIC WATER'S EDGE, AND THAT DRAIN TO THAT WATER, WILL BE INITIATED IMMEDIATELY AND COMPLETED WITHIN 7 CALENDAR DAYS WHENEVER CONSTRUCTION ACTIVITY HAS PERMANENTLY OR TEMPORARILY CEASED ON ANY PORTION OF THE SITE OUTSIDE OF THE RESTRICTION PERIOD. THESE AREAS WILL BE IDENTIFIED ON THE ENVIRONMENTAL PLAN SHEETS ACCOMPANYING THE SWPPP.

2. HYDRO–MULCH AND LIQUID TACKIFIER CAN BE USED IN PLACE OF CERTIFIED WEED–FREE STRAW OR HAY MULCH WITH PRIOR APPROVAL FROM ENBRIDGE. ALL HYDROMULCH AND LIQUID TACKIFIER PRODUCTS USED WILL BE ON THE APPLICABLE STATE DOT PRODUCT LIST. HYDRO–MULCH AND LIQUID TACKIFIER PRODUCTS CONTAINING PLASTIC/POLYPROPYLENE FIBER ADDITIVES AND MALACHITE GREEN (COLORANT) WILL NOT BE UTILIZED ON THIS PROJECT. APPLICATION RATES WILL BE AT THE MANUFACTURER'S RECOMMENDED RATE. ENBRIDGE WILL AVOID THE USE OF HYDROMULCH ON PUBLIC LANDS; HOWEVER, ENBRIDGE MAY USE HYDROMULCH ON STEEP SLOPES TO PREVENT EROSION UNTIL PERMANENT COVER HAS BEEN ESTABLISHED AS OUTLINED IN SECTION 1.8.3 OF THE EPP.

RESTORATION AND STABILIZATION

1. ENBRIDGE WILL RESTORE THE STREAM BANKS AS NEAR AS PRACTICABLE TO PRE–CONSTRUCTION CONDITIONS UNLESS THAT SLOPE IS DETERMINED TO BE UNSTABLE. IF THE SLOPE IS CONSIDERED UNSTABLE, ENBRIDGE WILL RESHAPE THE BANKS TO PREVENT SLUMPING. FOR PUBLIC WATERS, ENBRIDGE WILL RETURN THE BANK TO PRE–CONSTRUCTION CONTOURS, UNLESS OTHERWISE DIRECTED BY THE SITE–SPECIFIC RESTORATION PLAN. IF ENBRIDGE CANNOT RESTORE TO PRE–CONSTRUCTION CONTOURS AT A PUBLIC WATER, ENBRIDGE WILL CONSULT WITH THE MDNR BEFORE PROCEEDING FURTHER AS OUTLINED IN SECTION 2.6 OF THE EPP.

2. UNSTABLE SOILS AND/OR SITE–SPECIFIC FACTORS SUCH AS STREAM VELOCITY AND FLOW DIRECTION MAY REQUIRE ADDITIONAL RESTORATION EFFORTS, SUCH AS INSTALLATION OF WOODY VEGETATION, GEOTEXTILE FABRIC, OR TREE, LOG, ROOTWAD, OR BOULDER REVETMENTS TO STABILIZE DISTURBED STREAM BANKS (SEE FIGURE 29) AS OUTLINED IN SECTION 2.6.2 OF THE EPP. ENBRIDGE WILL WORK WITH THE MDNR TO ENSURE ALL WORK/ADJUSTMENTS ARE APPROVED AND ARE CONDUCTED WITHIN APPLICABLE TIMING RESTRICTIONS.

3. IN UPLAND AND WETLAND AREAS, CLEANUP AND ROUGH GRADING WILL OCCUR AS OUTLINED IN SECTIONS 1.16 AND 3.9 OF THE EPP. ENBRIDGE WILL BACKFILL THE TRENCH TO AN ELEVATION SIMILAR TO THE ADJACENT AREAS OUTSIDE THE TRENCH LINE AND WILL ADD A SLIGHT CROWN OF APPROXIMATELY 3 TO 6 INCHES (DEPENDING ON SOIL TYPE) OVER THE BACKFILLED TRENCH TO ALLOW FOR SUBSIDENCE. GENERALLY, EXCESS SUBSOIL DISPLACED BY THE PIPE INSTALLATION WILL BE SPREAD ACROSS THE PORTION OF THE CONSTRUCTION WORKSPACE WHERE TOPSOIL REMOVAL HAS OCCURRED. ANY REMAINING EXCESS SUBSOIL WILL BE REMOVED AND DISPOSED OF AT AN APPROVED OFF–SITE LOCATION AS NEEDED TO ENSURE CONTOURS ARE RESTORED TO AS NEAR AS PRACTICABLE TO PRE–CONSTRUCTION CONDITIONS.

4. REVEGETATION ACTIVITIES WILL OCCUR AS OUTLINED IN SECTION 7.0 OF THE EPP. SEED MIXES AT PUBLIC WATERS WILL BE SELECTED AND APPLIED AS INDICATED IN THE PLANTING PLAN, WHICH IS APPENDIX A OF THE POST–CONSTRUCTION VEGETATION MANAGEMENT PLAN FOR PUBLIC LANDS AND WATERS ("VMP"). SEED MIXES RELATIVE TO THESE SSRP CROSSINGS ARE CODED AS FOLLOWS:

A	EMERGENT (34–181)	G	DRY PRAIRIE GENERAL (35–221)
B	RIPARIAN NE (34–361)	H	MESIC PRAIRIE GENERAL (35–241)
C	RIPARIAN S&W (34–261)	I	MESIC PRAIRIE NW (35–441)
D	WET MEADOW NE (34–371)	J	DRY PRAIRIE NORTHWEST (35–421)
E	WET MEADOW S&W (34–271)	K	WOODLAND EDGE NE (36–311)
F	WETLAND REHABILITATION (34–171)	L	NATURAL REVEGETATION

5. ENBRIDGE WILL NOT SEED STANDING WATER OR WOODED (PSS AND PFO) WETLAND COMMUNITIES. NATURAL REVEGETATION WILL TAKE PLACE FROM EXISTING PLANT MATERIAL AND ROOT STOCK IN THESE COMMUNITIES.

6. ALL MATERIALS USED FOR CONSTRUCTION OF THE PROJECT MUST BE REMOVED FROM THE SITE.

7. ENBRIDGE WILL CONDUCT POST–CONSTRUCTION MONITORING IN ACCORDANCE WITH THE POST–CONSTRUCTION MONITORING PLAN FOR WETLANDS AND WATERBODIES, AND IN ACCORDANCE WITH THE VMP FOR THE UPLAND PORTIONS OF THE PROJECT ON PUBLIC LANDS.

NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING	MJT	10/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN

CONSTRUCTION NOTES

SCALE	DWG. NO.	PAGE NO.
	SSRP–NOTES	

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

MDNR ID No. 24: MP 931.7; Unnamed Stream (M-161-004-009)

UNNAMED STREAM
MDNR ID 24 / SURVEY ID s-146n36w15-a
CLEARWATER COUNTY, MINNESOTA
S15-T146N-R36W MOOSE CREEK TWP
MN-CL-R05-012.000

MN-CL-R05-010.000

MN-CL-R05-012.000

WETLAND BOUNDARY

0 25 50 100
SCALE IN FEET

N

A_2

BEAVER DAM

FLOW

TOP OF BANK

UNNAMED TRIBUTARY
SURVEY ID s-146n36w15-b

125'

25'

150'

148'

42'

50'

25'

120' TEMPORARY WORKSPACE

50'PERMANENT
RIGHT OF WAY

B_2

931.5

931.6

931.7

B_1

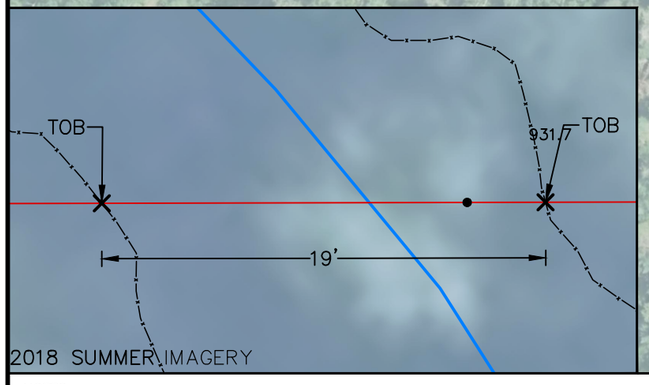
95' TEMPORARY WORKSPACE

PROPOSED ENBRIDGE L3R PIPELINE

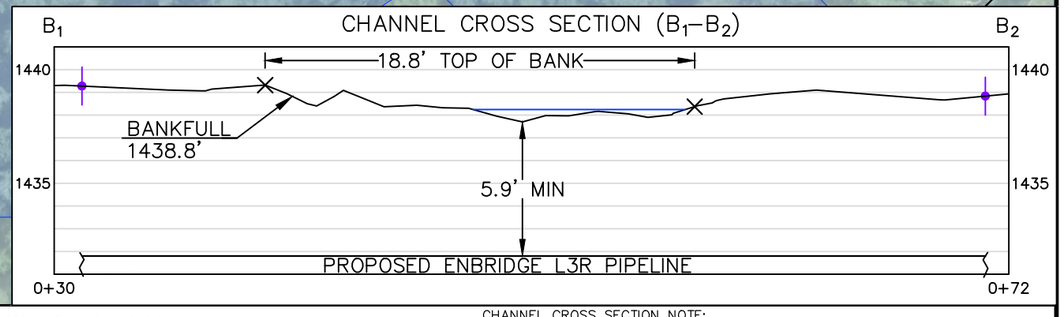
UNNAMED STREAM
SURVEY ID s-146n36w15-a

A_1

TEMPORARY MAT ROAD AND SPAN BRIDGE WITH
IN-STREAM SUPPORT (SEE RESTORATION PLAN)



CHANNEL CROSS SECTION (B_1–B_2)



NOTES
1. NO FEMA DIGITAL FLOODPLAIN DATA AVAILABLE
2. SOBS (O/H) OR NPC (S1–3): N/A
3. MDNR REGION 1 PWI – COOL/WARM WATER FISHERY: MARCH 15 – JUNE 30. 24–HOUR SOIL STABILIZATION REQUIRED WITHIN 200 FEET DURING RESTRICTION.
4. WHEN WORKING WITHIN "WORK IN WATER RESTRICTIONS", STABILIZE ALL EXPOSED SOIL AREAS

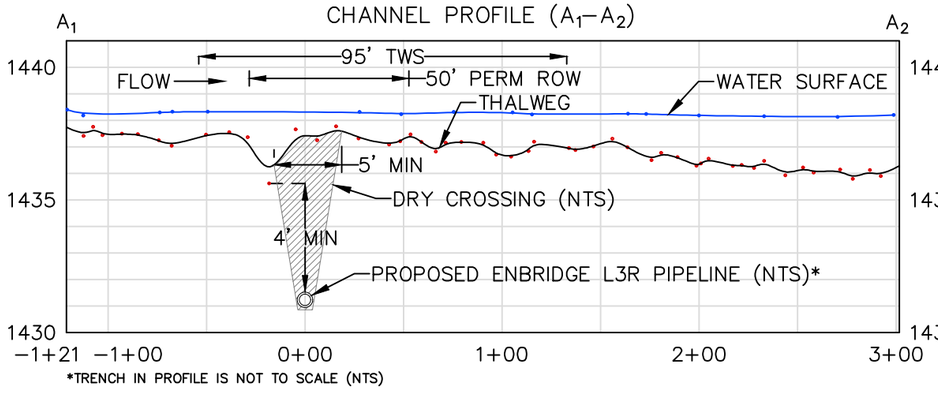
LEGEND

- PROPOSED ENBRIDGE L3R PIPELINE
- OTHER PIPELINE
- PERMANENT RIGHT OF WAY
- TEMPORARY WORKSPACE
- WATERBODY (ROSGEN SURVEY – THALWEG)
- FENCE
- TRACT BOUNDARY
- TEMPORARY MAT ROAD AND SPAN BRIDGE
- BEAVER DAM
- WETLAND
- MN–XX–XX–XXX.XXX — TRACT ID
- ROSGEN SURVEY POINT – WATER SURFACE
- ROSGEN SURVEY POINT – RIVER BOTTOM (THALWEG)
- PROPOSED INCREASED DEPTH OF COVER EXTENT
- TOP OF BANK
- TRENCH BREAKER (LOCATIONS ARE APPROXIMATE)

FOR ENVIRONMENTAL REVIEW PURPOSES ONLY

WITHIN 200 FEET OF THE WATER'S EDGE, AND THAT DRAIN TO THAT WATER, WITHIN 24 HOURS. STABILIZATION WILL BE INITIATED IMMEDIATELY AND COMPLETED WITHIN 7 CALENDAR DAYS WHENEVER CONSTRUCTION ACTIVITY HAS PERMANENTLY/ TEMPORARILY CEASED ON ANY PORTION OF THE SITE OUTSIDE OF THE RESTRICTION PERIOD.

CHANNEL PROFILE (A_1–A_2)



*TRENCH IN PROFILE IS NOT TO SCALE (NTS)

CHANNEL CROSS SECTION NOTE:
1. CHANNEL LOCATIONS, DIMENSIONS, AND/OR ELEVATIONS ARE BASED ON 2020 TOPOGRAPHIC/BATHYMETRIC SURVEY(S), AND AS SUCH DO NOT REFLECT CHANGES TO THE CHANNEL THAT MAY HAVE OCCURRED SINCE THAT TIME.
2. DEPTH OF COVER AT CENTERLINE WAS DEVELOPED USING THE BOTTOM ELEVATION OF THE DEEPEST UPSTREAM OR DOWNSTREAM POOL WITHIN THE SURVEYED REACH, UNLESS OTHERWISE NOTED IN APPLICATION MATERIALS.
3. MEAN MEANDER BELT WIDTH: 28'
4. MEANDER WIDTH RATIO: 2.89

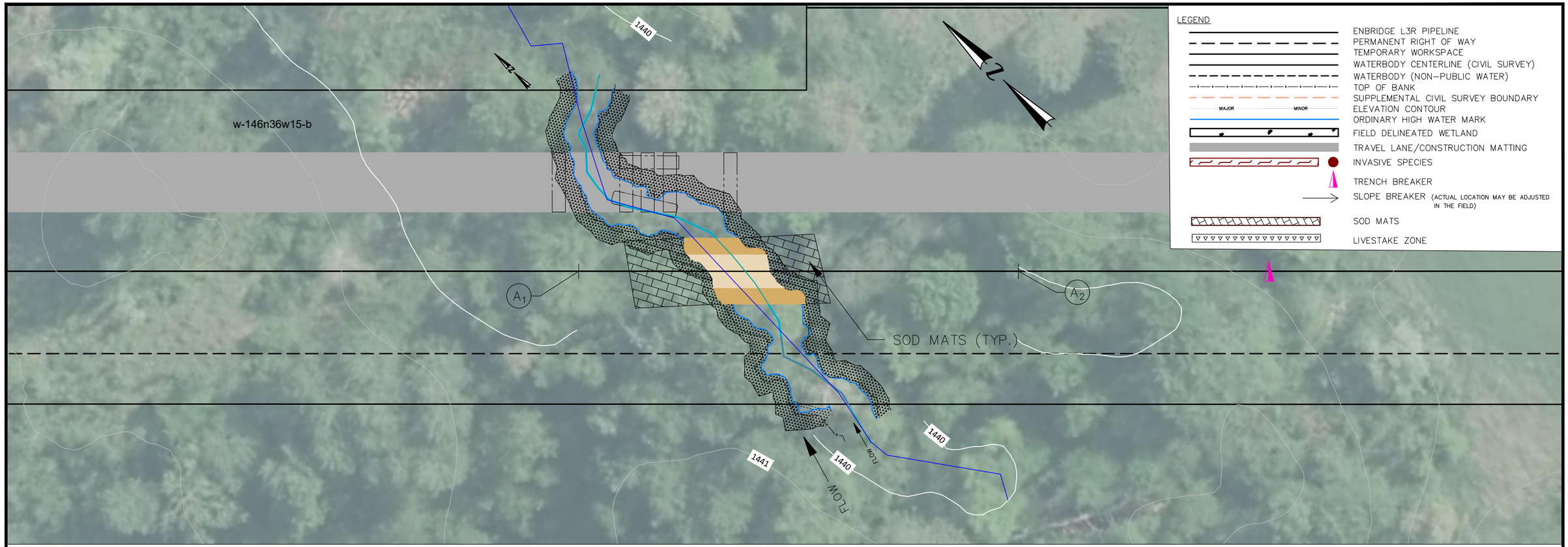
NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
0	ISSUED FOR PERMIT APPLICATION	AJJ	10/2020	BAB	BAB

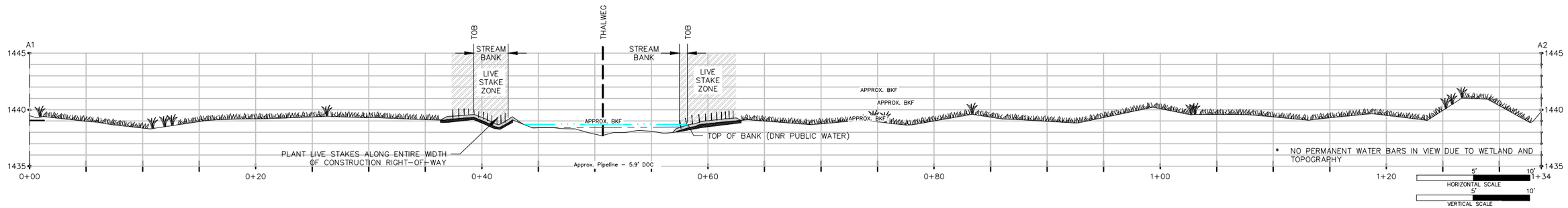
ENBRIDGE

DWN. BY: AJJ	DATE 10/2020
CHK.	
PROJ. ENGR.	
PROJ. MGR.	
CLIENT APP.	

PROPOSED ENBRIDGE L3R PIPELINE
PRIMARY METHOD – DRY CROSSING
CROSSING OF UNNAMED STREAM
ENBRIDGE MP 931.7
CLEARWATER COUNTY, MINNESOTA

SCALE: NOTED
DWG. NO.: B–93–5.84–MDNR–24–0





PROPOSED RESTORATION ACTIVITIES WILL BE REVIEWED BY DNR AND ENBRIDGE DURING SITE VISIT AND MAY BE CHANGED TO REFLECT SITE CONDITIONS AT THE TIME OF CONSTRUCTION.

FEATURE ID	s-146n36w15-a; IFC ID: S-186.0
CROSSING TYPE	DRY CROSSING
PROPOSED RESTORATION (SEE DETAILS FOR LIVE STAKING, TRANSPLANTS, AND SHRUB SPECIES IF APPLICABLE)	EC BLANKET – NATURAL FIBER MPCA TYPE 3.B/MNDOT CATEGORY 4N
WITHIN OR ADJACENT WETLAND	HARDWOOD SWAMP
BWSR SEED MIX	RIPARIAN NE (34-361)
DOMINANT WETLAND VEGETATION	1. PHALARIS ARUNDINACEA 3. ALNUS INCANA 2. CALAMAGROSTIS CANADENSIS 4. FRAXINUS NIGRA
SOBS (O/H) or NPC (S1-3)	N/A

NOTES

1. CONSTRUCTION TIMING RESTRICTIONS
   1.1. MDNR REGION 1 PWI - COOL/WARM WATER FISHERY: MARCH 15 - JUNE 30.
   1.2. WHEN WORK OCCURS WITHIN "WORK IN WATER RESTRICTIONS", ALL EXPOSED SOIL AREAS WITHIN 200 FEET OF THE WATER'S EDGE, AND THAT DRAIN TO THAT WATER, WILL BE STABILIZED WITHIN 24 HOURS DURING THE RESTRICTION PERIOD. STABILIZATION OF ALL EXPOSED SOILS WITHIN 200 FEET OF THE PUBLIC WATER'S EDGE, AND THAT DRAIN TO THAT WATER, WILL BE INITIATED IMMEDIATELY AND COMPLETED WITHIN 7 CALENDAR DAYS WHENEVER CONSTRUCTION ACTIVITY HAS PERMANENTLY OR TEMPORARILY CEASED ON ANY PORTION OF THE SITE OUTSIDE OF THE RESTRICTION PERIOD
   1.3. WILD RICE: APRIL 1 - JULY 15
2. WORK SHALL BE CONDUCTED IN ACCORDANCE WITH APPLICABLE STANDARDS IN ENBRIDGE'S EPP AND VMP FOR PUBLIC LANDS AND WATERS. THE SPECIFICATIONS WITHIN THIS SSRP MAY MODIFY OR REPLACE THESE STANDARDS.
3. SEE GENERAL NOTES PAGE FOR ADDITIONAL DETAIL.
4. INFORMATION REGARDING SEEDING SPECIFICATIONS, SEED BED PREPARATION TECHNIQUES, ETC. ARE DESCRIBED IN THE PLANTING PLAN CONTAINED WITHIN THE VMP.
5. TRENCH BREAKER LOCATION IS APPROXIMATE PENDING FIELD VERIFICATION (EPP SECTION 1.13)

NO.	REVISION-DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

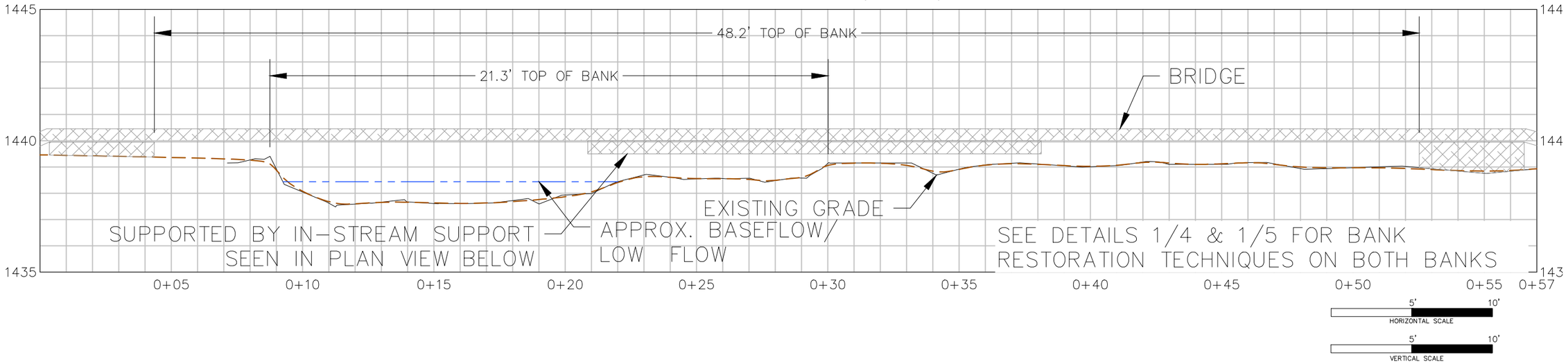
ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE-SPECIFIC RESTORATION PLAN
UNNAMED STREAM – MP 931.7 – MDNR ID 24
RE-VEGETATION PLAN

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP-931.7-001	1/5

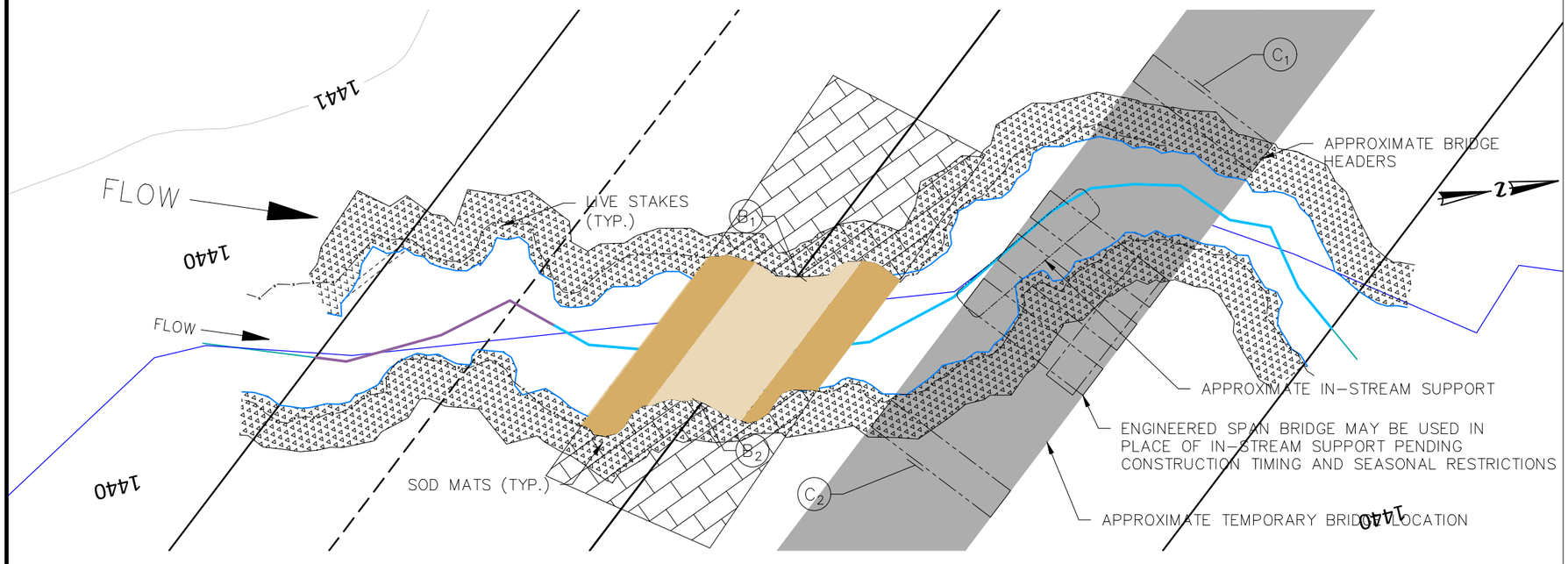
PLOTTED SIZE: ANSI FULL BLEED B (17x11)

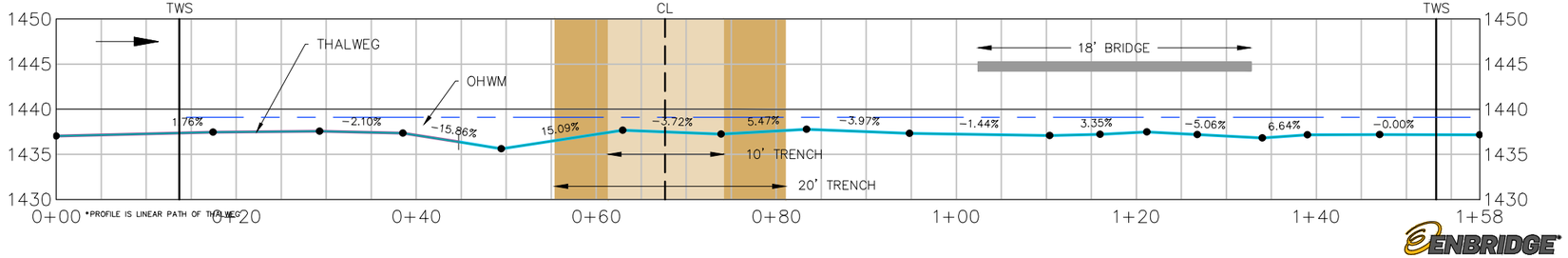
Xref .\L3_SSRP_BASE SPREAD .dwg

BANK RESTORATION (BRIDGE)



STREAMBED RESTORATION





NOTES

1. TRANSITIONS BETWEEN EXISTING CHANNEL FEATURES (BED, BANK, FLOODPLAIN) AND PROPOSED RESTORED TRENCH CROSSING WILL BE SMOOTH AND EVENLY GRADED WITHOUT ABRUPT OR PROTRUDING OBSTRUCTIONS.
2. BANK MIGRATION POTENTIAL IS LOW. PRIMARY FLOW IS LOCATED IN THE CENTER OF THE CHANNEL.
3. PLACE MATS DIRECTLY ON TOP OF EXISTING VEGETATION TO AVOID OR MINIMIZE DISTURBANCE OF VEGETATION ON THE CHANNEL BANKS AND AT THE TOP OF THE STREAM BANK (LIMITED STUMP REMOVAL MAY BE REQUIRED).
4. SEE DETAIL SHEET FOR SPECIFIC RESTORATION METHODS AND DETAILS.
5. FLUMES SIZES MAY VARY BETWEEN 18–48 INCHES AND MUST EXTEND ABOVE OHWM OR SURFACE WATER AT TIME OF CONSTRUCTION, WHICHEVER IS GREATER.
6. MINIMIZE DISTURBANCE OF BED MATERIALS AND FEATURES DURING CONSTRUCTION OF THE TRENCH AND INSTALLATION AND REMOVAL OF IN-STREAM SUPPORT.
7. BED AND/OR BANK MATERIALS TEMPORARILY ADJUSTED OR REMOVED DURING CONSTRUCTION SHALL BE PLACED IN THE APPROXIMATE ORIGINAL LOCATION DURING RESTORATION. MATERIALS SHALL BE FIELD ADJUSTED DURING PLACEMENT BASE ON THE OBSERVED FLOW PATH AT THE TIME OF CONSTRUCTION.
8. ALIGNMENT OF IN-STREAM SUPPORT SHALL BE FIELD ADJUSTED BASED ON FLOW PATH TO PROTECT CHANNEL BANKS.
9. SEE RESTORATION SHEET FOR B1–B2 CROSS SECTION.

LEGEND

- ENBRIDGE L3R PIPELINE
- PERMANENT RIGHT OF WAY
- TEMPORARY WORKSPACE
- WATERBODY – RIFFLE (ROSGEN SURVEY)
- WATERBODY – POOL (ROSGEN SURVEY)
- WATERBODY – RUN (ROSGEN SURVEY)
- WATERBODY – GLIDE (ROSGEN SURVEY)
- CONTOUR (1' INTERVAL) (MAJOR / MINOR)
- TOP OF BANK
- ORDINARY HIGH WATER MARK
- FIELD DELINEATED WETLAND
- TRAVEL LANE/CONSTRUCTION MATTING
- TRENCH – 10'
- TRENCH – 20'

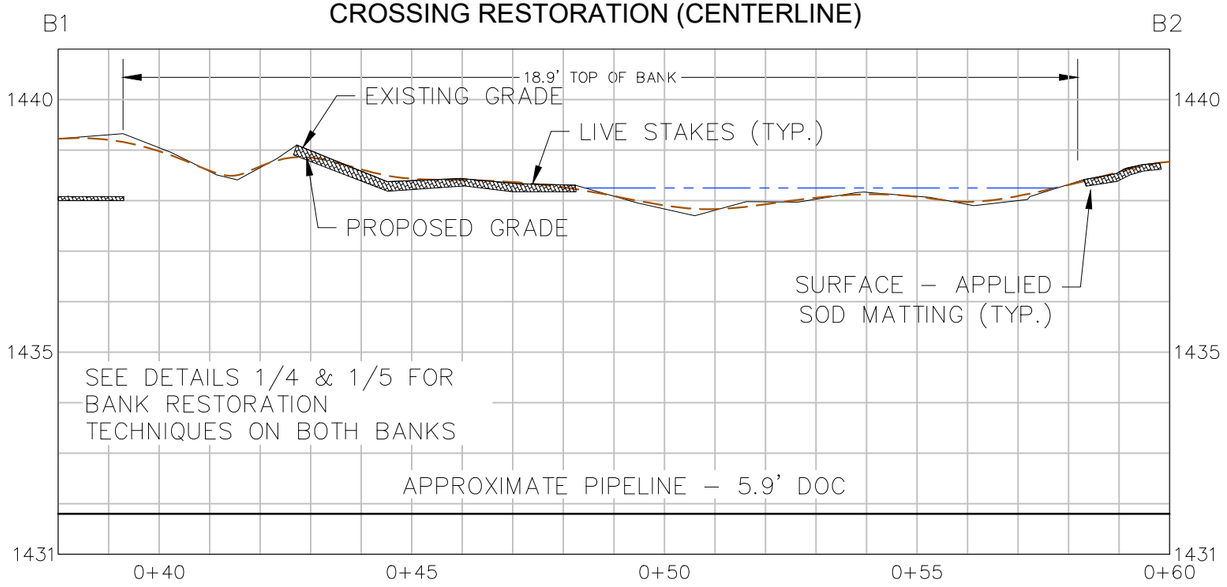
NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
UNNAMED STREAM – MP 931.7 – MDNR ID 24
STABILIZATION PLAN

SCALE	DWG. NO.	PAGE NO.
	SSRP–931.7–002	2/5

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

CROSSING RESTORATION (CENTERLINE)



5' 10'
HORIZONTAL SCALE

5' 10'
VERTICAL SCALE

LEGEND

- ENBRIDGE L3R PIPELINE
- WATERBODY CENTERLINE (CIVIL SURVEY)
- WATERBODY (NON-PUBLIC WATER)
- SUPPLEMENTAL CIVIL SURVEY BOUNDARY
- ORDINARY HIGH WATER MARK
- SOD MATS

	COMMON NAME	SCIENTIFIC NAME
LIVE STAKE SPECIES	ELDERBERRY	SAMBUCUS CANADENSIS
	HIGH BUSH CRANBERRY	VIBURNUM OPOLUS (TRILOBUM)
	RED-OSIER DOGWOOD	CORNUS STOLONIFERA
	SILKY DOGWOOD	CORNUS AMOMUM
TRANSPLANTS	SPECKELD ALDER	ALNUS INCANA
	WILLOW	SALIX SPP.
	DOGWOOD	CORNUS SPP.
SHRUB	NONE	NONE

1. PRELIMINARY SPECIES. PRIOR TO RESTORATION ACTIVITIES, ALL SPECIES WILL BE REQUIRED TO BE VERIFIED AS NATIVE AND FOUND WITHIN THE COUNTY WHERE PLANTED ON MNTAXA.
2. LIVE STAKE SPECIES SELECTION: USE AT LEAST THREE (3) SPECIES WITH NO MORE THAN 60% OF ANY ONE (1) SPECIES; ALTERNATIVE SPECIES MAY BE SELECTED BASED ON SITE CONDITIONS AND AVAILABILITY. ALTERNATIVE SPECIES SHOULD BE REVIEWED AGAINST USDA DATA BASE FOR MN NATIVE SPECIES.
3. (WHERE APPLICABLE) TRANSPLANTS AND/OR CONTAINER SHRUBS MAY BE SUBSTITUTED FOR LIVE STAKES BASED ON SITE SPECIFIC CONDITIONS.
   - 3.1. CONTAINER PLANTED SHRUBS ARE RECOMMENDED TO BE 18"– 24" IN SIZE.
   - 3.2. CONTAINER PLANTED SHRUBS SPACING: 1 SHRUB PER 3 LINEAR FEET OF BANK, ADDITIONAL ROWS SPACED 3 FEET APART, AND 3–5 SHRUBS OF THE SAME SPECIES.
4. (WHERE APPLICABLE) TRANSPLANTS SHOULD BE EXCAVATED WITH A MINIMUM OF 12" SOIL, DIAMETER EQUAL TO PLANT DRIP LINE, AND LOOSE UNBOUND BALL.
5. LIVE STAKE SPACING (WHERE APPLICABLE): STAGGER 1 STAKE PER 3 LINEAR FEET OF STREAM BANK IN 2 – 3 ROWS SPACED 1 FOOT APART. PLACE FIRST ROW ALONG TOP OF BANK (BANKFULL) AND THE LOWER ROW(S) BETWEEN THE TOP OF BANK AND OHWM

3 VEGETATION CHART

RESTORATION NOTES:

GENERAL

1. REFER TO RESTORATION DETAIL SHEETS FOR ADDITIONAL INFORMATION RELATED TO PROPOSED RESTORATION MEASURES.
2. REFER TO SITE PHOTOS FOR INFORMATION ON PRE-CONSTRUCTION CROSSING CONDITIONS AND TO PROVIDE ADDITIONAL GUIDANCE FOR RESTORATION EFFORTS.

SOD MATTING

1. REMOVE 15 LINEAR FEET OF VEGETATED MATS ON EITHER SIDE OF THE STREAM CROSSING USING ONSITE EQUIPMENT WHICH CAN UNDERCUT THE VEGETATION FOR REMOVAL. SMALL SHRUBS AND/OR TREES WITHIN THE SOD MATS ARE ACCEPTABLE AND SHOULD NOT BE REMOVED.
2. DEPENDING ON THE LEVEL OF SATURATION AT THE TIME OF REMOVAL, IT MAY BE DIFFICULT TO OBTAIN INTACT CONSOLIDATED MATS, BUT GENERALLY THE NATIVE VEGETATION WILL BE RETAINED AND CAPTURED FOR PLACEMENT.
3. SOD MATS CAN BE TRANSPLANTED DURING ANY SEASON.
4. SOD MAT WILL BE PLACED ON CLEAR GROUND OR MATS WITHIN THE WORKSPACE.
5. MONITOR MATS TO SUPPORT SURVIVABILITY; WATERING MAY BE NEEDED.
6. PRIOR TO PLACEMENT OF SOD MATS FINISH GRADE CHANNEL BANK AND ADJACENT FLOODPLAIN APPLICATION AREA TO PROVIDE A SMOOTH AND EVEN SURFACE. SUBGRADE ELEVATION SHOULD ALLOW FOR THE FINISHED SOD SURFACE TO TRANSITION EVENLY WITH THE CHANNEL BANKS UPSTREAM AND DOWNSTREAM OF THE INSTALLATION AREA. AVOID ABRUPT CHANGES IN GRADE.
7. VEGETATED MATS WILL BE RETURNED/SET IN PLACE WITH ONSITE EQUIPMENT.
   a. SURFACE APPLIED SOD MATTING SHOULD BE PLACED WITH THE LONG SIDE PERPENDICULAR TO THE CHANNEL / FLOW.
   b. STACKED SOD MATTING SHOULD BE PLACED WITH THE LONG SIDE PARALLEL TO THE CHANNEL / FLOW.
8. WHEN PLACING SOD MATS, DO NOT LEAVE LARGE GAPS BETWEEN EACH SOD MAT AS NON-NATIVE VEGETATION WILL QUICKLY ATTEMPT TO COLONIZE THESE VOIDS.
9. WATER SOD MATS AFTER REPLACEMENT IF CONDITIONS ARE HOT AND DRY. DAMP AND/OR FROZEN SOD MATS DO NOT REQUIRE WATERING.
10. THE TOP MAT AND/OR OTHER MATS CAN BE ANCHORED WITH A LIVE AND/OR DEAD STOUT STAKE TO ENSURE THAT IT DOES NOT MOBILIZE DURING A FLOOD EVENT BEFORE THE ROOTS HAVE ESTABLISHED.
11. THE VEGETATED MATS WILL BE REPLACED AS SOON AS PRACTICAL FOLLOWING BACKFILLING OF THE TRENCH AND STABILIZED PER THE TIMING REQUIREMENTS DESCRIBED IN SECTION 1.9.1 OF THE EPP.

LIVE STAKING

1. CLEANLY REMOVE ALL SIDE BRANCHES AND THE TOP GROWTH, AND FASHION THE CUTTINGS INTO LIVE STAKES AS DEPICTED IN THE DETAIL DRAWING. AN OPTION DURING PREPARATION IS TO PAINT AND SEAL THE TOP OF THE LIVE STAKE BY DIPPING THE TOP 1-2 INCHES INTO A 50-50 MIX OF LIGHT-COLORED LATEX PAINT AND WATER. SEALING THE TOP OF STAKE WILL REDUCE THE POSSIBILITY OF DESICCATION, ASSURE THE STAKES ARE PLANTED WITH THE TOP UP, AND MAKES THE STAKES MORE VISIBLE FOR SUBSEQUENT PLANTING EVALUATIONS.
2. USE A PUNCH BAR OR HAND AUGER TO CREATE A NARROW PILOT HOLE, PERPENDICULAR TO THE SLOPE, THROUGH ANY EROSION CONTROL MATTING, RIP RAP, OR OTHER REVETMENT, FILTER FABRIC, ETC., IF PRESENT, AND DEEP ENOUGH TO INTERCEPT THE WATER TABLE. THE HOLE SHOULD BE ONLY AS LARGE AS NECESSARY TO INSTALL THE LIVE STAKE WITHOUT DAMAGE WHILE ENSURING THE HIGHEST AMOUNT OF STAKE-SOIL CONTACT.
3. INSERT THE POINTED END OF THE LIVE STAKE INTO THE PILOT HOLE. TAMP INTO THE GROUND WITH A DEAD BLOW HAMMER TAKING CARE NOT TO SPLIT OR OTHERWISE DAMAGE THE LIVE STAKE. USE WATER, SOIL BACKFILL, TAMPING, ETC. TO ACHIEVE GOOD SOIL-TO-STEM CONTACT AND REMOVE AIR POCKETS.
4. USE ONSITE EQUIPMENT TO APPLY WATER FROM THE CHANNEL AFTER INSTALLATION.
5. ALL CUTS SHOULD BE CLEAN AND SMOOTH. NO CRACKED OR SPLIT LIVE STAKES SHOULD BE USED. IF THEY SPLIT DURING TAMPING, THEY SHOULD BE CUT BELOW THE CRACK OR REPLACED.
6. THE SPECIFIED NUMBER OF LIVE STAKES SHOULD BE INSTALLED INTO THE SOIL AND PROTRUDE ABOVE THE SOIL AND ANY SOD MATTING, MULCHING, EROSION CONTROL MATTING, RIP RAP, OR OTHER REVETMENT.
7. LIVE STAKES SHOULD NOT MOVE AFTER INSTALLATION; ENSURING IT IS IN FIRM CONTACT WITH THE SOIL.
8. IT IS IMPORTANT TO ENSURE THAT THE UPSTREAM AND DOWNSTREAM ENDS OF THE LIVE STAKING A MERGE SMOOTHLY INTO THE UNDISTURBED BANK BEYOND THE PROJECT AREA. THE RATE OF INSTALLING LIVE STAKES SHOULD TAPER OFF GRADUALLY TO BLEND IN WITH THE EXISTING VEGETATION.

NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

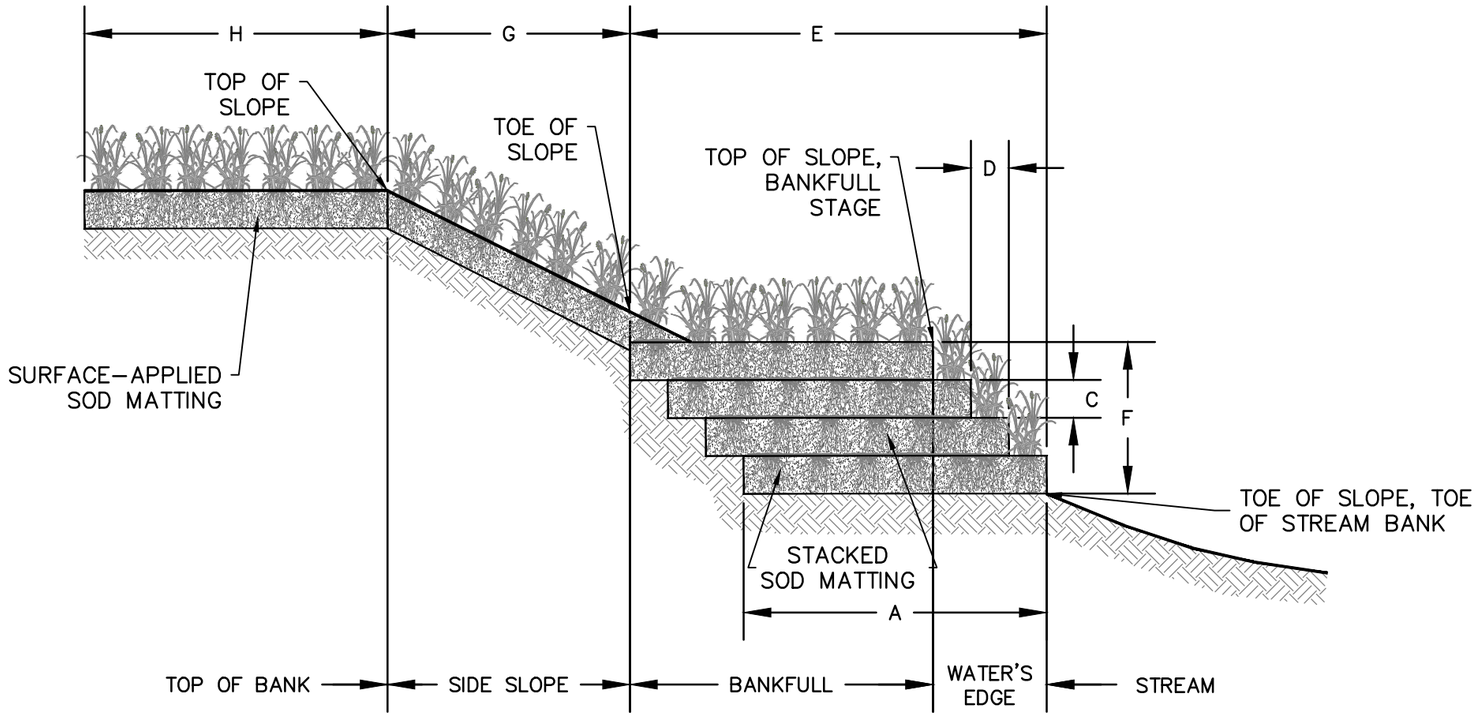
ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
UNNAMED STREAM – MP 931.7 – MDNR ID 24
SITE SPECIFIC DETAILS

ENBRIDGE

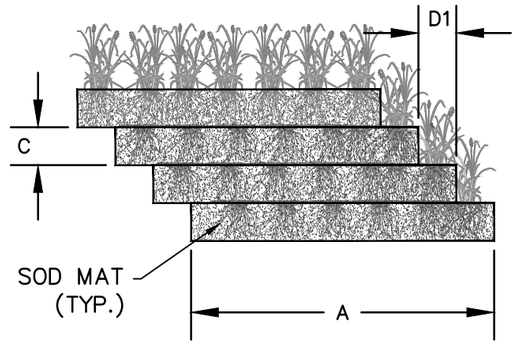
SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP–931.7–004	3/5

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

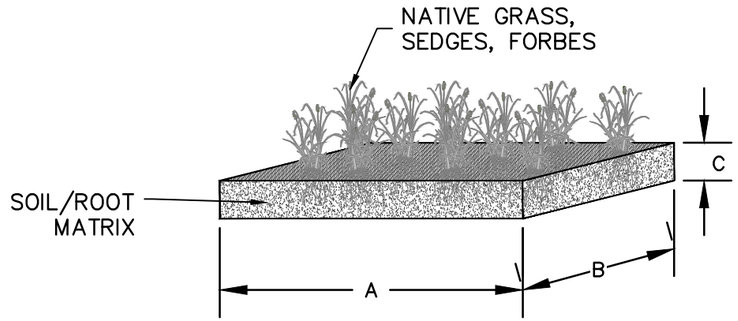
Xref \L3_SSRP_PAGE SPREAD.dwg



CROSS SECTION



STACKED SOD MATTING DETAIL



SOD MAT DETAIL

DIMENSION[2]	NAME	TYPICAL UNIT	VALUE	DESCRIPTION
A	SOD MAT WIDTH	FEET	3 - 4	WIDTH OF INDIVIDUAL SOD MAT.
B	SOD MAT LENGTH	FEET	3 - 6	LENGTH OF INDIVIDUAL SOD MAT.
C	SOD MAT THICKNESS	INCHES	12	THICKNESS OF INDIVIDUAL SOD MAT.
D	STACKED SOD MAT SETBACK	FEET, INCHES	N/A	THE DISTANCE BETWEEN THE EDGES OF SOD MATS STACKED TO FORM A SLOPE
E	WIDTH OF STACKED SOD MATS	FEET, INCHES	N/A	WIDTH OF A BANK CREATED BY STACKED SOD MATS
F	HEIGHT OF STACKED SOD MATS	FEET, INCHES	N/A	HEIGHT OF A SLOPE CREATED BY STACKED SOD MATS
G	WIDTH OF SURFACE- APPLIED SOD MATS	FEET	10 - 20	WIDTH OF A SLOPE STABILIZED WITH SURFACE-APPLIED SOD MATS
H	TOP OF BANK SOD MATTING DISTANCE	FEET	15	DISTANCE SOD MATTING IS INSTALLED ON THE TOP OF BANK

NOTES:

1. DATA ARE FOR SOD MATTING THAT IS STACKED TO FORM A SLOPE OR SURFACE-APPLIED TO A SLOPE.
2. DIMENSION LABELS ARE REFERENCED IN THE DETAIL DRAWINGS.

SOD MATTING DETAIL

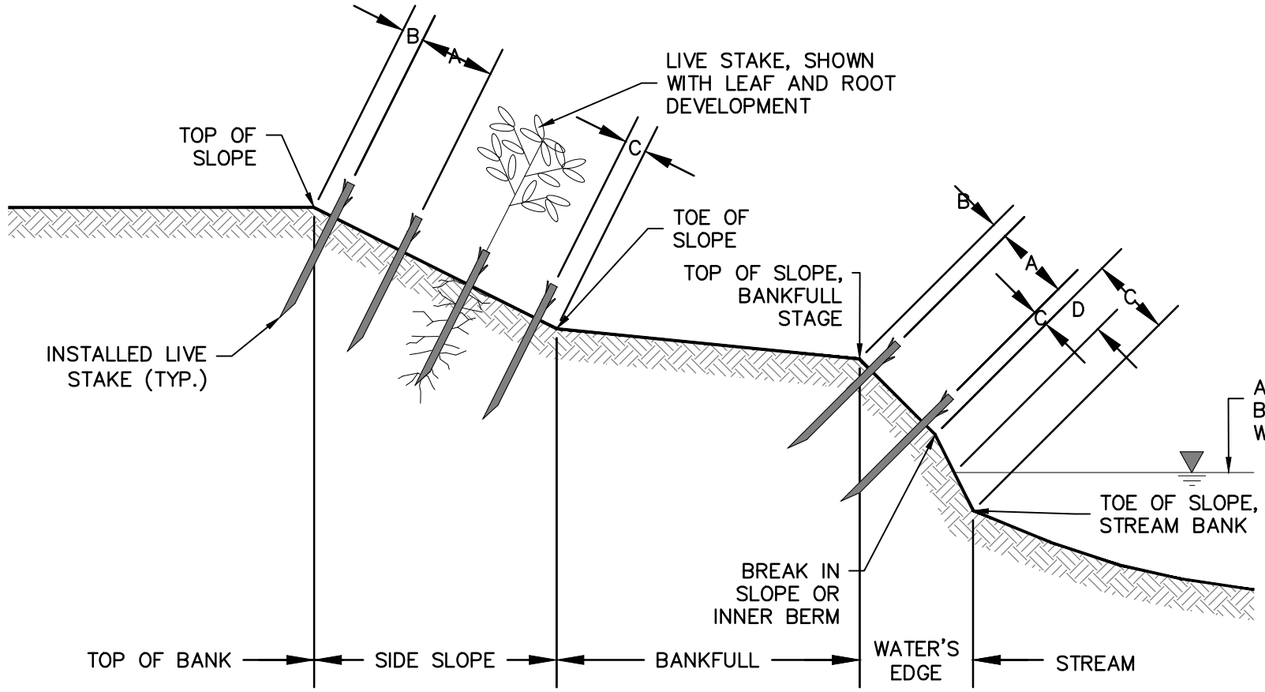
SOD MAT EXAMPLES

NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

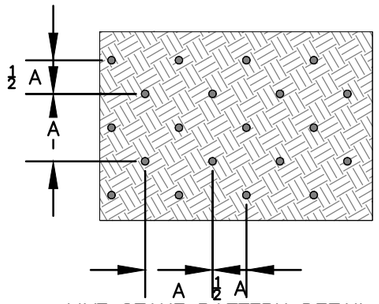
ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
UNNAMED STREAM – MP 931.7 – MDNR ID 24
SITE SPECIFIC DETAILS

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP–931.7–004	4/5

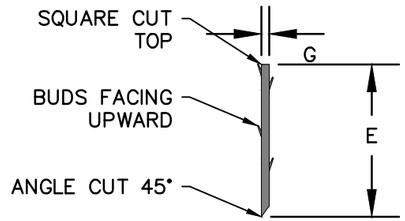
PLOTTED SIZE: ANSI FULL BLEED B (17x11)



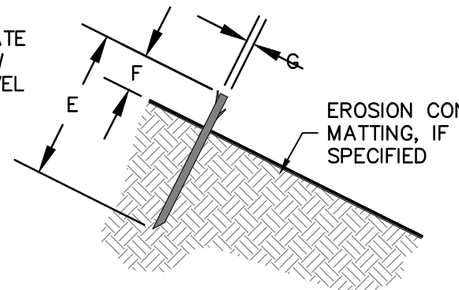
CROSS SECTION



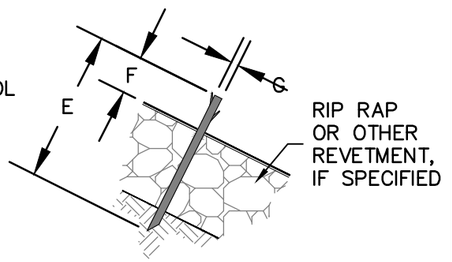
LIVE STAKE PATTERN DETAIL



LIVE STAKE DETAIL



INSTALLED LIVE STAKE DETAIL



INSTALLED JOINT PLANTING DETAIL

DIMENSION[2]	NAME	TYPICAL UNIT	VALUE	DESCRIPTION
A	LIVE STAKE SPACING	FEET	3 OC	SPACING BETWEEN INDIVIDUALLY INSTALLED LIVE STAKES. STAKES CAN BE PLACED IN A TRIANGULAR GRID (NRCS 2007A) OR RANDOMLY (NRCS 2007A, IOWA DNR 2006). RECOMMEND SPECIES DIVERSITY THROUGHOUT PROJECT AREA.
B	LIVE STAKE – TOP OF SLOPE PLACEMENT	FEET	0 - 3	POSITION OF LIVE STAKE RELATIVE TO THE TOP OF A SLOPE
C	LIVE STAKE – TOE OF SLOPE PLACEMENT	FEET	0 - 3	POSITION OF LIVE STAKE RELATIVE TO THE TOE OF A SLOPE
D	LIVE STAKE – BASE FLOW RELATIONSHIP	FEET	1438.5 +/-	PLACEMENT OF LOWER ROW OF LIVE STAKES RELATIVE TO THE APPROXIMATE BASE FLOW WATER LEVEL WITH CONSIDERATION GIVEN TO DURATION OF INUNDATION DURING BANKFULL AND OTHER HIGH FLOW EVENTS.
E	LIVE STAKE LENGTH	INCHES	24 - 36	LENGTH OF PREPARED DORMANT LIVE CUTTING FROM WOODY PLANT TO BE USED AS LIVE STAKE. LENGTH SHOULD BE SUFFICIENT TO REACH LOW-FLOW WATER TABLE ELEVATION.
F	LIVE STAKE PROTRUSION	FEET	3 - 4	DISTANCE INSTALLED LIVE STAKE SHOULD PROTRUDE ABOUT 20% FROM THE GROUND. AT LEAST TWO BUDS OR BUD SCARS SHOULD BE PRESENT ABOVE THE GROUND IN THE FINAL INSTALLATION, DEPENDING ON THE SURROUNDING VEGETATION HEIGHT.
G	LIVE STAKE DIAMETER	INCHES	½ - 1½	DIAMETER OF PREPARED DORMANT LIVE CUTTING FROM WOODY PLANT TO BE USED AS LIVE STAKE – TYPICALLY CITE A PERMISSIBLE MINIMUM AND MAXIMUM DIAMETER.
NOTES:				
1. DIMENSION LABELS ARE REFERENCED IN THE DETAIL DRAWINGS.				

LIVE STAKE PLANTINGS DETAIL

LIVE STAKE EXAMPLE

NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITF–SPFCIFIC RFSTORATION PLAN
UNNAMED STREAM – MP 931.7 – MDNR ID 24
SITE SPECIFIC DETAILS

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP–931.7–004	4/5

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

1 CENTERLINE – FACING WEST BANK

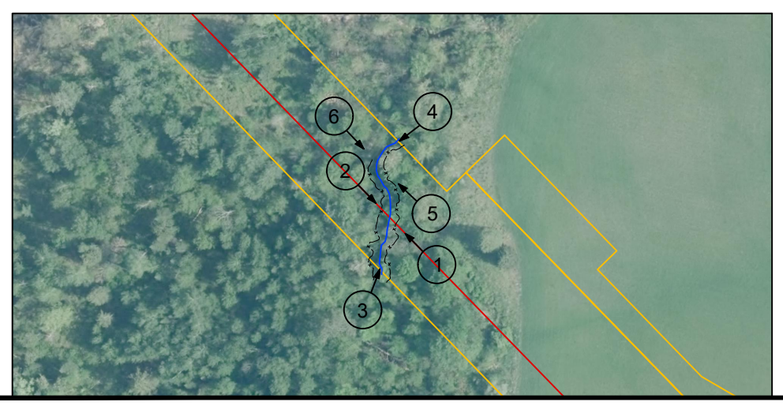
3 EDGE OF WORKSPACE – FACING DOWNSTREAM

5 BRIDGE – FACING WEST BANK

2 CENTERLINE – FACING EAST BANK

4 EDGE OF WORKSPACE – FACING UPSTREAM

6 BRIDGE – FACING EAST BANK



NOTES:

1. AIR PHOTOS ARE FROM 2018 ENBRIDGE AERIAL PHOTOGRAPHY.
2. ADDITIONAL ON–THE GROUND PHOTOS MAY BE TAKEN PRIOR TO CONSTRUCTION AT MDNR REQUEST.
3. PRE–CONSTRUCTION PHOTOS WILL BE USED TO AID IN RESTORATION.

NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING	MJT	10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
UNNAMED STREAM – MP 931.7 – MDNR ID 24
PHOTO PAGE

SCALE	DWG. NO.	PAGE NO.
	SSRP–931.7–005	5/5

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

GENERAL

1. THE SPECIFICATIONS WITHIN THIS SSRP MAY MODIFY OR REPLACE PROJECT–WIDE STANDARDS PRESENTED IN THE EPP. WHERE MATERIAL WITHIN THESE SSRPS EXCEEDS STANDARD CONSTRUCTION MEASURES IN THE EPP, THESE SSRPS SUPERSEDE THE EPP.

2. CONSTRUCTION AND RESTORATION OF WATERBODY CROSSINGS WILL FOLLOW THESE GENERAL STEPS:

   A. SITE CLEARING
   B. INSTALLATION OF TEMPORARY EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICES ("BMPS")
   C. BRIDGE INSTALLATION
   D. EXCAVATION/BACKFILLING OF THE WATERBODY INCLUDING:
      - SOD SAVING TOPSOIL SEGREGATION AT NON–WOODED SITES
      - STREAMBED MATERIAL SEGREGATION
      - PIPE INSTALLATION
      - BACKFILL, INCLUDING IMPLEMENTATION OF CONSTRUCTION–RELATED RESTORATION METHODS (I.E., TOE WOOD)
   E. REPLACEMENT OF STREAMBED MATERIAL AND TOPSOIL/SOD LAYER
   F. RESTORATION OF STREAM BANKS TO PRE–CONSTRUCTION CONTOURS
   G. IF FINAL GRADING NOT POSSIBLE AT THE TIME, TEMPORARY STABILIZATION AND REPLACEMENT/REINFORCEMENT OF TEMPORARY BMPS
   H. AFTER FINAL GRADING, PERMANENT SEEDING AND/OR WOODY VEGETATION RESTORATION, STABILIZATION AND REPLACEMENT/REINFORCEMENT OF TEMPORARY BMPS
   I. BRIDGE REMOVAL DURING FINAL RESTORATION AFTER STABILIZATION AND PERMANENT SEEDING
   J. POST–CONSTRUCTION MONITORING

CROSSING METHODS

1. ALL WATERBODY AND WETLAND CROSSINGS WILL BE CONDUCTED IN COMPLIANCE WITH SECTION 2.0 AND SECTION 3.0 OF THE ENVIRONMENTAL PROTECTION PLAN ("EPP"), RESPECTIVELY. SECTION 2.0 AND 3.0 OF THE WINTER CONSTRUCTION PLAN PRESENTS MODIFICATIONS FOR WATERBODY AND WETLAND CONSTRUCTION METHODS, RESPECTIVELY, IN WINTER CONDITIONS.

2. ENBRIDGE'S SUMMARY OF CONSTRUCTION METHODS AND PROCEDURES (THE "PROCEDURES," APPENDIX A OF THE EPP) OUTLINES THE VARIOUS CONSTRUCTION METHODS THAT ENBRIDGE MAY UTILIZE TO CONSTRUCT THROUGH WATERBODIES AND WETLANDS/BASINS AS PRESENTED ON THESE SITE–SPECIFIC RESTORATION PLANS ("SSRPS").

   A. DRY CROSSING (ISOLATED) METHODS (INCLUDING THE DRY CROSSING AND MODIFIED DRY CROSSING METHOD) ARE DESCRIBED SECTIONS 4.3 OF THE PROCEDURES, AND IN SECTIONS 2.5.2 AND 2.5.3 AND FIGURES 23 AND 24 OF THE EPP.
   B. THE BORE METHOD (NON–PRESSURIZED) IS DESCRIBED IN SECTION 3.5 OF THE PROCEDURES, AND SECTION 4.0 OF THE EPP.
   C. THE MODIFIED UPLAND CONSTRUCTION (WETLAND) METHOD IS DESCRIBED IN SECTION 3.3 OF THE PROCEDURES, AND SECTION 3.0 AND FIGURES 30 TO 34 OF THE EPP.
   D. ALTHOUGH NOT PROPOSED AS A PRIMARY METHOD AT THESE SSRP WATERBODIES, THE OPEN CUT (NON–ISOLATED) WATERBODY CROSSING METHOD IS DESCRIBED IN SECTION 4.1 OF THE PROCEDURES, AND SECTION 2.5.1 AND FIGURE 24 OF THE EPP.
   E. ALTHOUGH NOT PROPOSED AS A PRIMARY METHOD AT THESE SSRP WATERBODIES, THE PUSH–PULL METHOD IS DESCRIBED IN SECTION 3.4 OF THE PROCEDURES, AND SECTION 3.7.1 AND FIGURES 35 AND 36 OF THE EPP.

CLEARING/VEGETATION REMOVAL

1. STUMPS WITHIN THE TRENCH LINE WILL BE COMPLETELY REMOVED, GROUND, AND/OR HAULED OFF–SITE TO AN APPROVED LOCATION. TREE STUMPS OUTSIDE THE TRENCH LINE WILL BE GROUND BELOW NORMAL GROUND SURFACE TO FACILITATE A SAFE WORK AREA AND TO ALLOW TOPSOIL REMOVAL, IF NECESSARY. IN SOME CIRCUMSTANCES, TREE STUMPS OUTSIDE THE TRENCH LINE MAY BE COMPLETELY REMOVED TO ALLOW FOR A SAFE WORK AREA AND HAULED OFF–SITE TO AN APPROVED LOCATION AS OUTLINED IN SECTION 1.8.3 OF THE EPP.

2. CLEARING WILL BE CONDUCTED IN WATERBODIES AND WETLANDS AS OUTLINED IN SECTION 2.2 AND 3.2 OF THE EPP, RESPECTIVELY. CHIPS, MULCH, OR MECHANICALLY CUT WOODY DEBRIS SHALL NOT BE STOCKPILED IN A WETLAND. HYDRO–AX DEBRIS, OR SIMILAR CAN BE LEFT IN THE WETLAND IF SPREAD EVENLY IN THE CONSTRUCTION WORKSPACE TO A DEPTH THAT WILL ALLOW FOR NORMAL REVEGETATION, AS DETERMINED BY THE EI. CHIPPING IS NOT ALLOWED ON PUBLIC LANDS. ON PUBLIC LANDS, MULCH AND MECHANICALLY CUT WOODY DEBRIS MUST BE UNIFORMLY BROADCAST TO LESS THAN 2–INCH THICKNESS AND IN A MANNER THAT MAINTAINS VISIBLE GROUND.

3. ENBRIDGE WILL PROPERLY INSTALL AND MAINTAIN REDUNDANT SEDIMENT CONTROL MEASURES IMMEDIATELY AFTER CLEARING AND PRIOR TO INITIAL GROUND DISTURBANCE AT SURFACE WATERS LOCATED WITHIN 50 FEET OF THE PROJECT AND WHERE STORMWATER FLOWS TO THE SURFACE WATER (REFER TO THE ENVIRONMENTAL PLAN SHEETS IN THE SWPPP), AND WITHIN 100 FEET OF SPECIAL AND IMPAIRED WATERS, INCLUDING TROUT STREAMS.

4. ON PUBLIC LANDS AND WHEREVER PRACTICABLE AT WATERBODY CROSSINGS, ENBRIDGE WILL USE WILDLIFE–FRIENDLY EROSION AND SEDIMENT CONTROL BMPS THAT CONTAIN BIODEGRADABLE NETTING (CATEGORY 3N OR 4N NATURAL FIBER) AND WILL AVOID THE USE OF PLASTIC MESH (SECTIONS 1.17.1 AND 2.6.1 OF THE EPP).

TEMPORARY STABILIZATION

1. ON PORTIONS OF THE PROJECT WHERE WORK WILL BE OCCURRING DURING APPLICABLE "WORK IN WATER RESTRICTIONS" FOR PUBLIC WATERS (REFER TO SECTION 2.1), ALL EXPOSED SOIL AREAS WITHIN 200 FEET OF THE WATER'S EDGE, AND THAT DRAIN TO THAT WATER, WILL BE STABILIZED WITHIN 24 HOURS DURING THE RESTRICTION PERIOD. STABILIZATION OF ALL EXPOSED SOILS WITHIN 200 FEET OF THE PUBLIC WATER'S EDGE, AND THAT DRAIN TO THAT WATER, WILL BE INITIATED IMMEDIATELY AND COMPLETED WITHIN 7 CALENDAR DAYS WHENEVER CONSTRUCTION ACTIVITY HAS PERMANENTLY OR TEMPORARILY CEASED ON ANY PORTION OF THE SITE OUTSIDE OF THE RESTRICTION PERIOD. THESE AREAS WILL BE IDENTIFIED ON THE ENVIRONMENTAL PLAN SHEETS ACCOMPANYING THE SWPPP.

2. HYDRO–MULCH AND LIQUID TACKIFIER CAN BE USED IN PLACE OF CERTIFIED WEED–FREE STRAW OR HAY MULCH WITH PRIOR APPROVAL FROM ENBRIDGE. ALL HYDROMULCH AND LIQUID TACKIFIER PRODUCTS USED WILL BE ON THE APPLICABLE STATE DOT PRODUCT LIST. HYDRO–MULCH AND LIQUID TACKIFIER PRODUCTS CONTAINING PLASTIC/POLYPROPYLENE FIBER ADDITIVES AND MALACHITE GREEN (COLORANT) WILL NOT BE UTILIZED ON THIS PROJECT. APPLICATION RATES WILL BE AT THE MANUFACTURER'S RECOMMENDED RATE. ENBRIDGE WILL AVOID THE USE OF HYDROMULCH ON PUBLIC LANDS; HOWEVER, ENBRIDGE MAY USE HYDROMULCH ON STEEP SLOPES TO PREVENT EROSION UNTIL PERMANENT COVER HAS BEEN ESTABLISHED AS OUTLINED IN SECTION 1.8.3 OF THE EPP.

RESTORATION AND STABILIZATION

1. ENBRIDGE WILL RESTORE THE STREAM BANKS AS NEAR AS PRACTICABLE TO PRE–CONSTRUCTION CONDITIONS UNLESS THAT SLOPE IS DETERMINED TO BE UNSTABLE. IF THE SLOPE IS CONSIDERED UNSTABLE, ENBRIDGE WILL RESHAPE THE BANKS TO PREVENT SLUMPING. FOR PUBLIC WATERS, ENBRIDGE WILL RETURN THE BANK TO PRE–CONSTRUCTION CONTOURS, UNLESS OTHERWISE DIRECTED BY THE SITE–SPECIFIC RESTORATION PLAN. IF ENBRIDGE CANNOT RESTORE TO PRE–CONSTRUCTION CONTOURS AT A PUBLIC WATER, ENBRIDGE WILL CONSULT WITH THE MDNR BEFORE PROCEEDING FURTHER AS OUTLINED IN SECTION 2.6 OF THE EPP.

2. UNSTABLE SOILS AND/OR SITE–SPECIFIC FACTORS SUCH AS STREAM VELOCITY AND FLOW DIRECTION MAY REQUIRE ADDITIONAL RESTORATION EFFORTS, SUCH AS INSTALLATION OF WOODY VEGETATION, GEOTEXTILE FABRIC, OR TREE, LOG, ROOTWAD, OR BOULDER REVETMENTS TO STABILIZE DISTURBED STREAM BANKS (SEE FIGURE 29) AS OUTLINED IN SECTION 2.6.2 OF THE EPP. ENBRIDGE WILL WORK WITH THE MDNR TO ENSURE ALL WORK/ADJUSTMENTS ARE APPROVED AND ARE CONDUCTED WITHIN APPLICABLE TIMING RESTRICTIONS.

3. IN UPLAND AND WETLAND AREAS, CLEANUP AND ROUGH GRADING WILL OCCUR AS OUTLINED IN SECTIONS 1.16 AND 3.9 OF THE EPP. ENBRIDGE WILL BACKFILL THE TRENCH TO AN ELEVATION SIMILAR TO THE ADJACENT AREAS OUTSIDE THE TRENCH LINE AND WILL ADD A SLIGHT CROWN OF APPROXIMATELY 3 TO 6 INCHES (DEPENDING ON SOIL TYPE) OVER THE BACKFILLED TRENCH TO ALLOW FOR SUBSIDENCE. GENERALLY, EXCESS SUBSOIL DISPLACED BY THE PIPE INSTALLATION WILL BE SPREAD ACROSS THE PORTION OF THE CONSTRUCTION WORKSPACE WHERE TOPSOIL REMOVAL HAS OCCURRED. ANY REMAINING EXCESS SUBSOIL WILL BE REMOVED AND DISPOSED OF AT AN APPROVED OFF–SITE LOCATION AS NEEDED TO ENSURE CONTOURS ARE RESTORED TO AS NEAR AS PRACTICABLE TO PRE–CONSTRUCTION CONDITIONS.

4. REVEGETATION ACTIVITIES WILL OCCUR AS OUTLINED IN SECTION 7.0 OF THE EPP. SEED MIXES AT PUBLIC WATERS WILL BE SELECTED AND APPLIED AS INDICATED IN THE PLANTING PLAN, WHICH IS APPENDIX A OF THE POST–CONSTRUCTION VEGETATION MANAGEMENT PLAN FOR PUBLIC LANDS AND WATERS ("VMP"). SEED MIXES RELATIVE TO THESE SSRP CROSSINGS ARE CODED AS FOLLOWS:

A	EMERGENT (34–181)	G	DRY PRAIRIE GENERAL (35–221)
B	RIPARIAN NE (34–361)	H	MESIC PRAIRIE GENERAL (35–241)
C	RIPARIAN S&W (34–261)	I	MESIC PRAIRIE NW (35–441)
D	WET MEADOW NE (34–371)	J	DRY PRAIRIE NORTHWEST (35–421)
E	WET MEADOW S&W (34–271)	K	WOODLAND EDGE NE (36–311)
F	WETLAND REHABILITATION (34–171)	L	NATURAL REVEGETATION

5. ENBRIDGE WILL NOT SEED STANDING WATER OR WOODED (PSS AND PFO) WETLAND COMMUNITIES. NATURAL REVEGETATION WILL TAKE PLACE FROM EXISTING PLANT MATERIAL AND ROOT STOCK IN THESE COMMUNITIES.

6. ALL MATERIALS USED FOR CONSTRUCTION OF THE PROJECT MUST BE REMOVED FROM THE SITE.

7. ENBRIDGE WILL CONDUCT POST–CONSTRUCTION MONITORING IN ACCORDANCE WITH THE POST–CONSTRUCTION MONITORING PLAN FOR WETLANDS AND WATERBODIES, AND IN ACCORDANCE WITH THE VMP FOR THE UPLAND PORTIONS OF THE PROJECT ON PUBLIC LANDS.

NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING	MJT	10/2020		

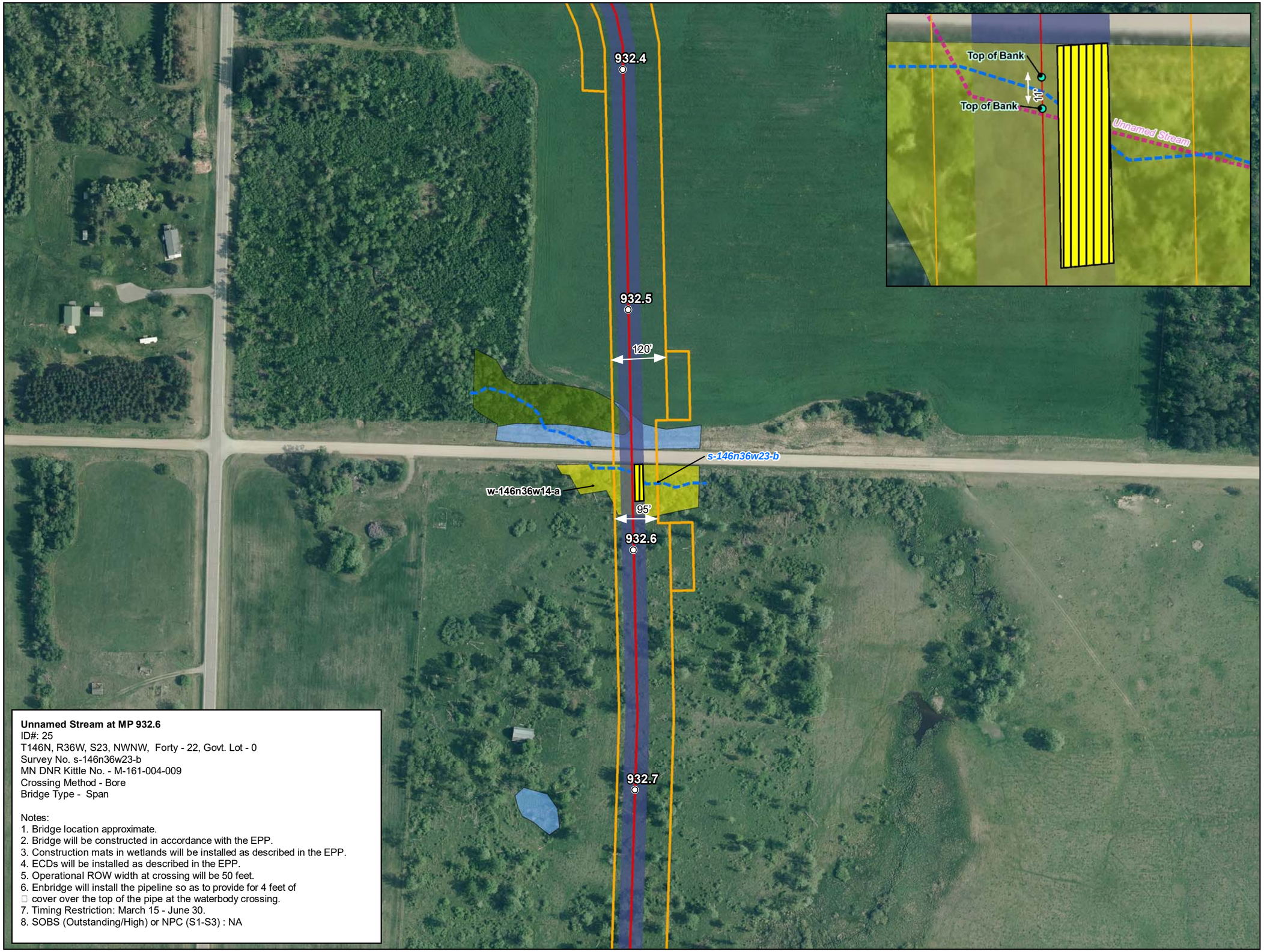
ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN

CONSTRUCTION NOTES

SCALE	DWG. NO.	PAGE NO.
	SSRP–NOTES	

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

MDNR ID No. 25: MP 932.6; Unnamed Stream (M-161-004-009)



Unnamed Stream at MP 932.6
ID#: 25
T146N, R36W, S23, NWNW, Forty - 22, Govt. Lot - 0
Survey No. s-146n36w23-b
MN DNR Kittle No. - M-161-004-009
Crossing Method - Bore
Bridge Type - Span

Notes:
1. Bridge location approximate.
2. Bridge will be constructed in accordance with the EPP.
3. Construction mats in wetlands will be installed as described in the EPP.
4. ECDs will be installed as described in the EPP.
5. Operational ROW width at crossing will be 50 feet.
6. Enbridge will install the pipeline so as to provide for 4 feet of
□ cover over the top of the pipe at the waterbody crossing.
7. Timing Restriction: March 15 - June 30.
8. SOBS (Outstanding/High) or NPC (S1-S3) : NA

0 100 200 Feet
1 inch = 200 feet

N
W E
S

- Milepost
- Proposed L3R Centerline
- Permanent Right-of-Way
- Construction Right-of-Way/ATWS
- Bridge
- Field Delineated Waterbody

Delineated Wetlands
- PEM
- PFO
- PSS

Line 3 Replacement Project

Crossing Plan

ID# 25
Survey No. s-146n36w23-b

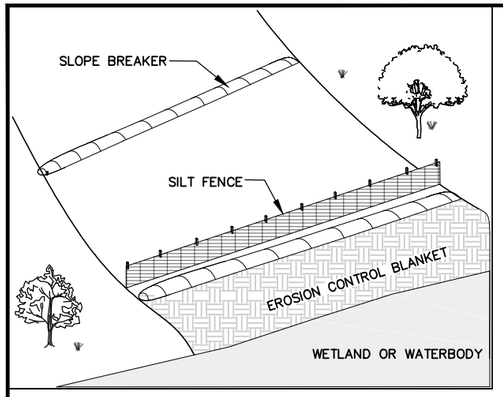
Unnamed Stream

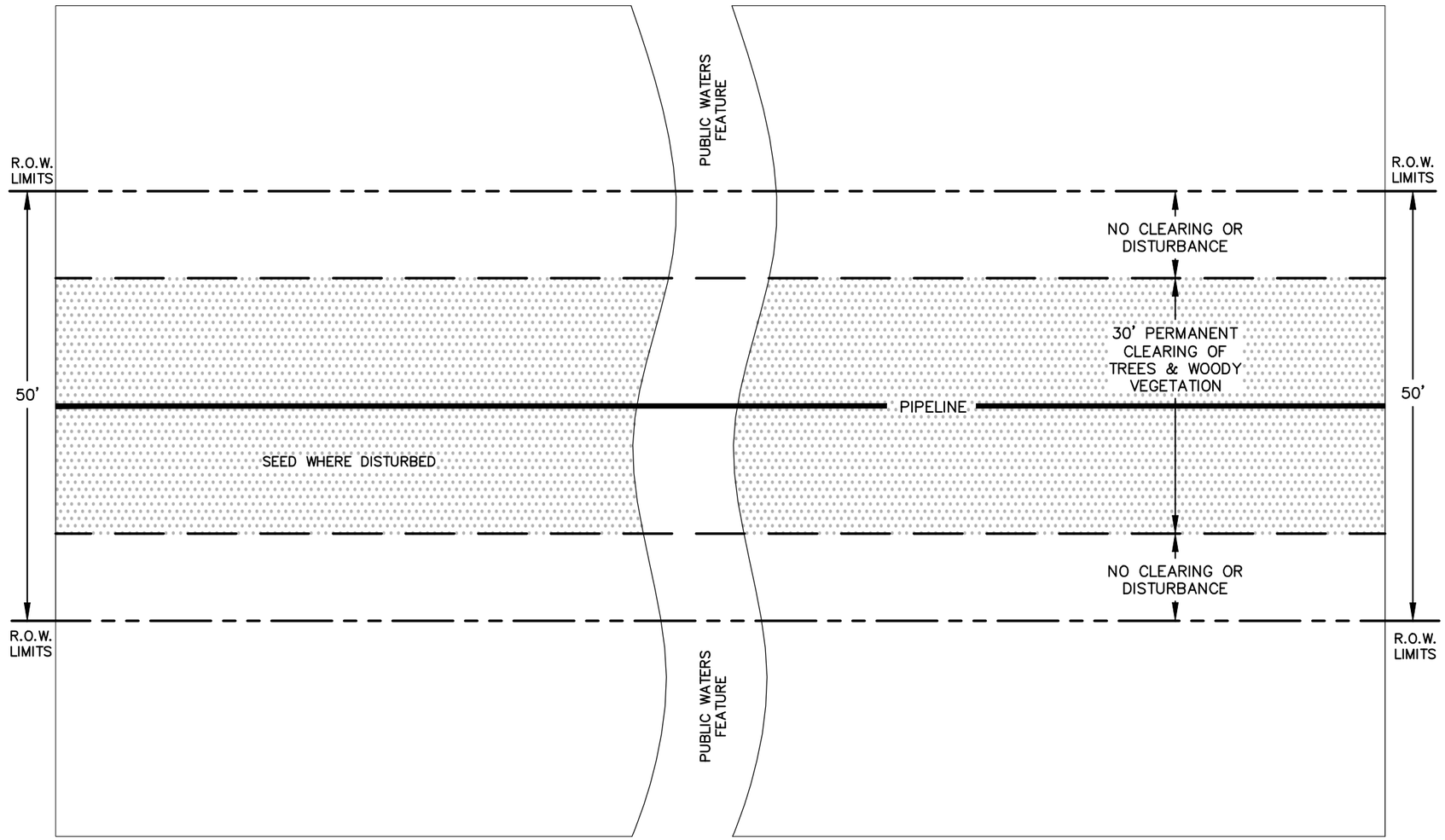
Clearwater County, Minnesota

ENBRIDGE
October 2020

For Environmental Review Purposes Only

Source: Z:\Clients\E_H\Enbridge\Line_3_Full_Replacement\Permitting\State\Public_Waters\2020_09\Figures\L3R_Waters_App_Bore_2020_09.mxd
Date: (10/7/2020)





PUBLIC WATERS FEATURE - HDD CROSSING

1) DISTURBANCE OF THE ROW IS LIMITED TO THE 30-FOOT-WIDE CLEARING OF TREES AND WOODY VEGETATION AND IMPACTS RESULTING FROM TRAVEL LANES AND/OR BRIDGES.
2) ANY WETLAND OR WATERBODY BANK THAT IS DISTURBED WILL BE STABILIZED WITH EROSION AND SEDIMENT CONTROL BMP AND RESTORED TO AS NEAR AS PRACTICABLE TO PRE-CONSTRUCTION CONDITIONS.
3) PERMANENT REVEGETATION SEEDING OF DISTURBED WATERBODY BANKS WILL UTILIZE THE BWSR RIPARIAN SEED MIXES IN ACCORDANCE WITH THE EPP (SECTION 7.8).
4) PERMANENT REVEGETATION SEEDING OF DISTURBED WETLANDS WILL TAKE PLACE IN ACCORDANCE WITH THE EPP (SECTION 7.7). 7) IN DISTURBED WETLAND AREAS, THE APPROPRIATE SEED MIX WILL BE DETERMINED USING THE RESULTS OF PRE-CONSTRUCTION WETLAND IN DISTURBED WETLAND AREAS, HYDROLOGICAL CHARACTERISTICS, AND SITE-SPECIFIC CONDITIONS.

ISSUED FOR PERMIT 12/13/19

NO.	REVISION-DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMIT	AJM	12/13/19	KEH	KD
A	ISSUED FOR REVIEW	AJM	12/10/19	KEH	KD

DWN. BY:	AJM	DATE 12/10/19
CHK.	KEH	
PROJ. ENGR.	DG	
PROJ. MGR.	KD	
CLIENT APP.		

ENBRIDGE

LINE 3 REPLACEMENT
PUBLIC WATERS HDD CROSSING TYPICAL
FINAL STREAM STABILIZATION & EROSION CONTROL

SCALE: NTS
DWG. NO.

MDNR ID No. 26: MP 933.1; Unnamed Stream (M-161-004-009)

UNNAMED STREAM

MDNR ID 26 / SURVEY ID s-146n36w23-c_DESKTOP
CLEARWATER COUNTY, MINNESOTA
S23-T146N-R36W MOOSE CREEK TWP
MN-CL-R05-017.000

SCALE IN FEET 0 25 50 100

N

TEMPORARY MAT ROAD AND SPAN BRIDGE (SEE RESTORATION PLAN)

WETLAND BOUNDARY

UNNAMED STREAM

FLOW

A_2

A_1

B_1

B_2

TOB

TOB

6'

933

933.1

933.2

50'PERMANENT RIGHT OF WAY

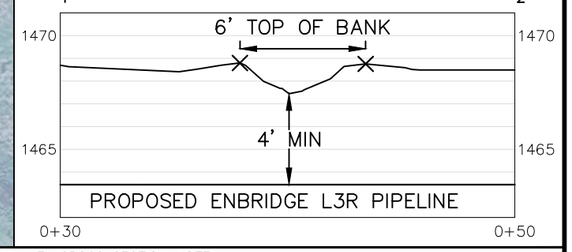
95' TEMPORARY WORKSPACE

PROPOSED ENBRIDGE L3R PIPELINE

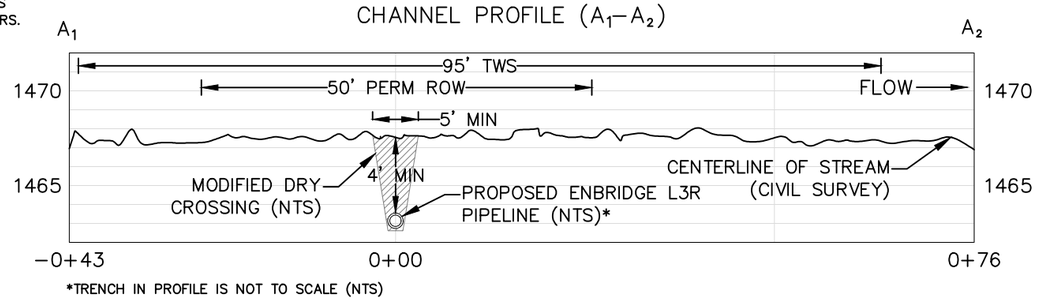
MN-CL-R05-017.000

2018 SUMMER IMAGERY

CHANNEL CROSS SECTION (B_1–B_2)



CHANNEL PROFILE (A_1–A_2)



*TRENCH IN PROFILE IS NOT TO SCALE (NTS)

NOTES
1. NO FEMA DIGITAL FLOODPLAIN DATA AVAILABLE
2. NO ROSGEN DATA AVAILABLE
3. SOBS (O/H) OR NPC (S1–3): N/A
4. MDNR REGION 1 PWI – COOL/WARM WATER FISHERY: MARCH 15 – JUNE 30. 24–HOUR SOIL STABILIZATION REQUIRED WITHIN 200 FEET DURING RESTRICTION.
5. WHEN WORKING WITHIN "WORK IN WATER RESTRICTIONS", STABILIZE ALL EXPOSED SOIL AREAS WITHIN 200 FEET OF THE WATER'S EDGE, AND THAT DRAIN TO THAT WATER, WITHIN 24 HOURS. STABILIZATION WILL BE INITIATED IMMEDIATELY AND COMPLETED WITHIN 7 CALENDAR DAYS WHENEVER CONSTRUCTION ACTIVITY HAS PERMANENTLY/ TEMPORARILY CEASED ON ANY PORTION OF THE SITE OUTSIDE OF THE RESTRICTION PERIOD.

LEGEND

- PROPOSED ENBRIDGE L3R PIPELINE
- OTHER PIPELINE
- PERMANENT RIGHT OF WAY
- TEMPORARY WORKSPACE
- WATERBODY
- TEMPORARY MAT ROAD AND SPAN BRIDGE
- WETLAND
- MN–XX–XX–XXX.XXX — TRACT ID
- TOP OF BANK
- TRENCH BREAKER (LOCATIONS ARE APPROXIMATE)

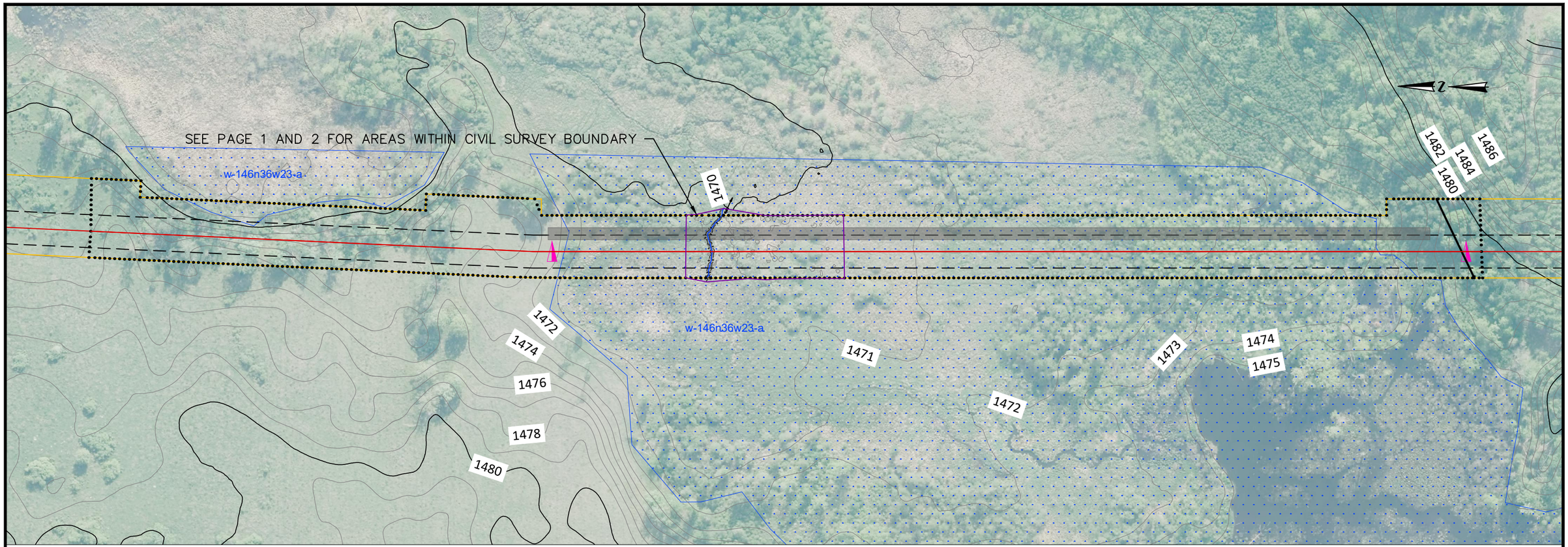
CHANNEL CROSS SECTION NOTE:
1. CHANNEL LOCATIONS, DIMENSIONS, AND/OR ELEVATIONS ARE BASED ON 2020 TOPOGRAPHIC/BATHYMETRIC SURVEY(S), AND AS SUCH DO NOT REFLECT CHANGES TO THE CHANNEL THAT MAY HAVE OCCURRED SINCE THAT TIME.
2. DEPTH OF COVER AT CENTERLINE WAS DEVELOPED USING THE BOTTOM ELEVATION OF THE DEEPEST UPSTREAM OR DOWNSTREAM POOL WITHIN THE SURVEYED REACH, UNLESS OTHERWISE NOTED IN APPLICATION MATERIALS.
3. MEAN MEANDER BELT WIDTH: N/A
4. MEANDER WIDTH RATIO: N/A

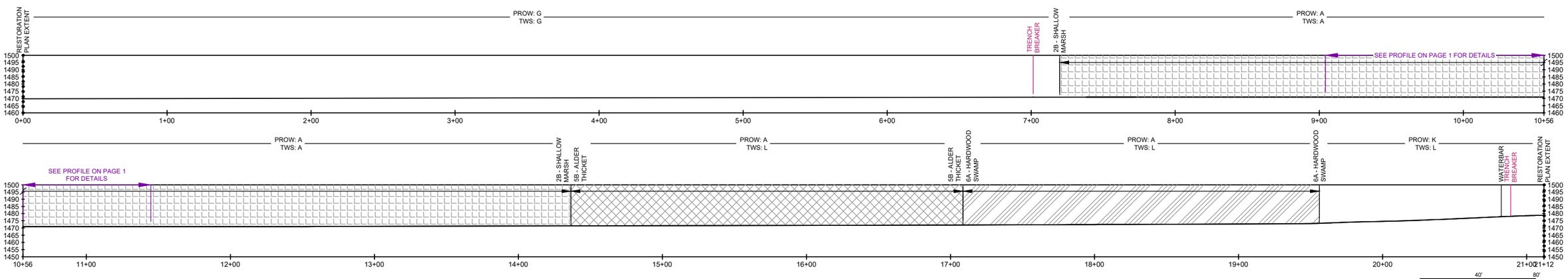
NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
0	ISSUED FOR PERMIT APPLICATION	AJJ	10/2020	BAB	BAB

ENBRIDGE

DWN. BY: AJJ	DATE 10/2020	PROPOSED ENBRIDGE L3R PIPELINE PRIMARY METHOD – MODIFIED DRY CROSSING CROSSING OF UNNAMED STREAM ENBRIDGE MP 933.1 CLEARWATER COUNTY, MINNESOTA
CHK.		
PROJ. ENGR.		
PROJ. MGR.		
CLIENT APP.		SCALE: NOTED — DWG. NO.: B–93–5.84–MDNR–26–0

FOR ENVIRONMENTAL REVIEW PURPOSES ONLY





BWSR SEED MIX	A: EMERGENT (34–181); G: DRY PRAIRIE GENERAL (35–221); K: WOODLAND EDGE NE (36–311); L: NATURAL REVEGETATION
SOBS (O/H) or NPC (S1-3)	N/A

1. ELEVATIONS OUTSIDE OF THE AREA WITHIN CIVIL SURVEY BOUNDARY ARE DERIVED FROM LIDAR. ENBRIDGE WILL RESTORE THE AREAS ADJACENT TO THE PUBLIC WATER WITHIN THE MDNR EXPANDED RESTORATION BOUNDARY TO PRE–CONSTRUCTION CONDITIONS.
2. MDNR REGION 1 PWI – COOL/WARM WATER FISHERY: MARCH 15 – JUNE 30. 24–HOUR SOIL STABILIZATION REQUIRED WITHIN 200 FEET DURING RESTRICTION.
3. AIR PHOTOS ARE FROM 2018 ENBRIDGE AERIAL PHOTOGRAPHY.
4. ADDITIONAL ON–THE GROUND PHOTOS MAY BE TAKEN PRIOR TO CONSTRUCTION AT MDNR REQUEST.
5. PRE–CONSTRUCTION PHOTOS WILL BE USED TO AID IN RESTORATION.
6. SEE GENERAL NOTES PAGE FOR ADDITIONAL DETAIL.
7. SEE THE PLANTING PLAN FOR ADDITIONAL DETAIL REGARDING SEEDING PRACTICES AND SEED MIXES AT PUBLIC WATER CROSSINGS.
8. ON PUBLIC LANDS AND WHEREVER PRACTICABLE AT WATERBODY CROSSINGS, ENBRIDGE WILL USE WILDLIFE–FRIENDLY EROSION AND SEDIMENT CONTROL BMPS THAT CONTAIN BIODEGRADABLE NETTING (CATEGORY 3N OR 4N NATURAL FIBER) AND WILL AVOID THE USE OF PLASTIC MESH (SECTIONS 1.17.1 AND 2.6.1 OF THE EPP).
9. WHEN WORKING WITHIN "WORK IN WATER RESTRICTIONS", STABILIZE ALL EXPOSED SOIL AREAS WITHIN 200 FEET OF THE WATER'S EDGE, AND THAT DRAIN TO THAT WATER, WITHIN 24 HOURS. STABILIZATION WILL BE INITIATED IMMEDIATELY AND COMPLETED WITHIN 7 CALENDAR DAYS WHENEVER CONSTRUCTION ACTIVITY HAS PERMANENTLY/ TEMPORARILY CEASED ON ANY PORTION OF THE SITE OUTSIDE OF THE RESTRICTION PERIOD.

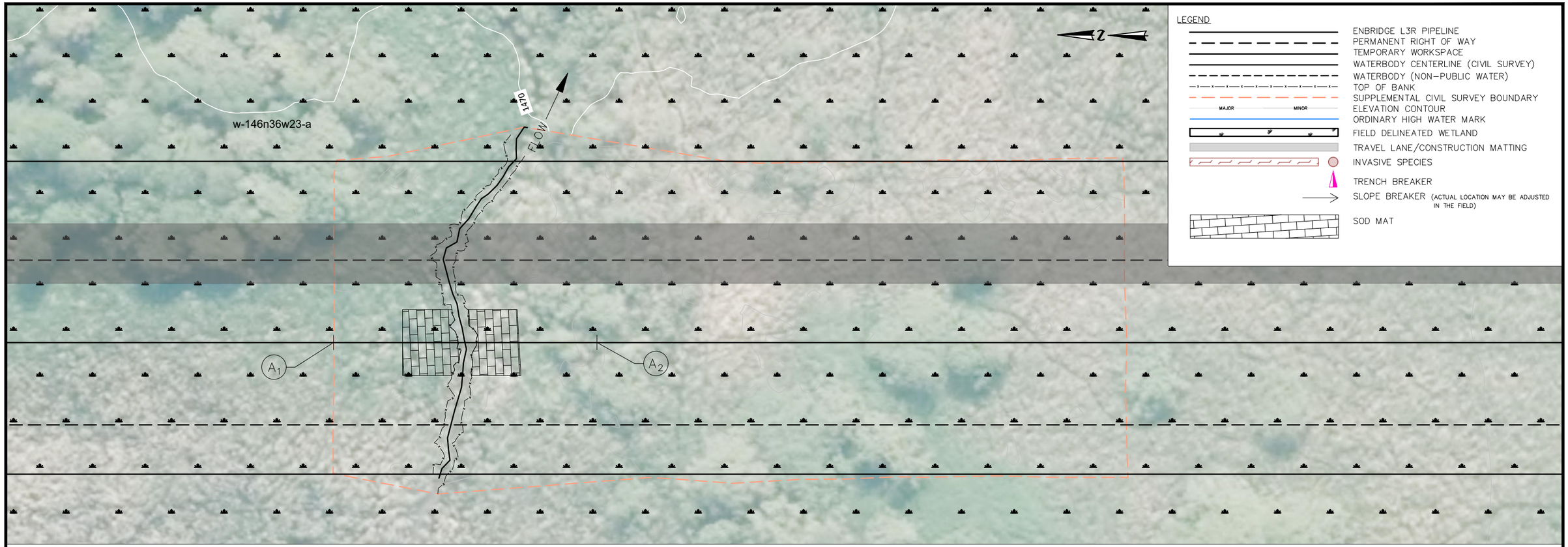
LEGEND

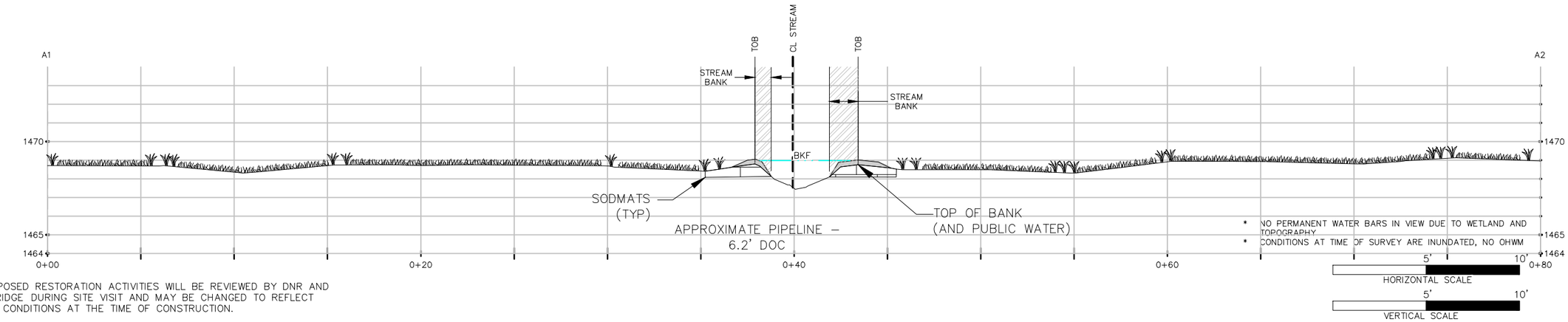
- ENBRIDGE L3R PIPELINE
- PERMANENT RIGHT OF WAY
- TEMPORARY WORKSPACE
- WATERBODY CENTERLINE (CIVIL SURVEY)
- WATERBODY (NON–PUBLIC WATER)
- PUBLIC WATER CIVIL SURVEY BOUNDARY
- MDNR EXPANDED RESTORATION BOUNDARY
- TOP OF BANK (MAJOR / MINOR)
- ELEVATION CONTOUR
- ORDINARY HIGH WATER MARK
- FIELD DELINEATED WETLAND
- TRAVEL LANE/CONSTRUCTION MATTING
- INVASIVE SPECIES
- TRENCH BREAKER
- PERMANENT SLOPE BREAKER (ACTUAL LOCATION MAY BE ADJUSTED IN THE FIELD)
- 1 – SHALLOW, OPEN WATER
- 2B – SHALLOW MARSH
- 3A – SEDGE MEADOW
- 3B – FRESH (WET) MEADOW
- 5A – SHRUB–CARR
- 5B – ALDER THICKET
- 6A – HARDWOOD SWAMP
- 6B – CONIFEROUS SWAMP

NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING	MJT	10/2020		
A	ISSUED FOR REVIEW	MJT	09/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
UNNAMED STREAM – MP 933.1 – MDNR ID 26
RE–VEGETATION PLAN: EXPANDED EXTENT

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP–933.1–001A	1A/5





PROPOSED RESTORATION ACTIVITIES WILL BE REVIEWED BY DNR AND ENBRIDGE DURING SITE VISIT AND MAY BE CHANGED TO REFLECT SITE CONDITIONS AT THE TIME OF CONSTRUCTION.

FEATURE ID	s-146n36w23-c_DESKTOP; IFC ID: S-188.1
CROSSING TYPE	DRY CROSSING
PROPOSED RESTORATION (SEE DETAILS FOR LIVE STAKING, TRANSPLANTS, AND SHRUB SPECIES IF APPLICABLE)	EC BLANKET -NATURAL FIBER MPCA TYPE 3.B/MNDOT CATEGORY 4N
WITHIN OR ADJACENT WETLAND	SHALLOW MARSH
BWSR SEED MIX	EMERGENT (34-181)
DOMINANT WETLAND VEGETATION	1. TYPHA X GLUACA 2. CAREX LACUSTRIS
SOBS (O/H) or NPC (S1-3)	N/A

NOTES

1. CONSTRUCTION TIMING RESTRICTIONS
   - 1.1. MDNR REGION 1 PWI - COOL/WARM WATER FISHERY: MARCH 15 - JUNE 30.
   - 1.2. WHEN WORK OCCURS WITHIN "WORK IN WATER RESTRICTIONS", ALL EXPOSED SOIL AREAS WITHIN 200 FEET OF THE WATER'S EDGE, AND THAT DRAIN TO THAT WATER, WILL BE STABILIZED WITHIN 24 HOURS DURING THE RESTRICTION PERIOD. STABILIZATION OF ALL EXPOSED SOILS WITHIN 200 FEET OF THE PUBLIC WATER'S EDGE, AND THAT DRAIN TO THAT WATER, WILL BE INITIATED IMMEDIATELY AND COMPLETED WITHIN 7 CALENDAR DAYS WHENEVER CONSTRUCTION ACTIVITY HAS PERMANENTLY OR TEMPORARILY CEASED ON ANY PORTION OF THE SITE OUTSIDE OF THE RESTRICTION PERIOD
2. WORK SHALL BE CONDUCTED IN ACCORDANCE WITH APPLICABLE STANDARDS IN ENBRIDGE'S EPP AND VMP FOR PUBLIC LANDS AND WATERS. THE SPECIFICATIONS WITHIN THIS SSRP MAY MODIFY OR REPLACE THESE STANDARDS.
3. SEE GENERAL NOTES PAGE FOR ADDITIONAL DETAIL.
4. INFORMATION REGARDING SEEDING SPECIFICATIONS, SEED BED PREPARATION TECHNIQUES, ETC. ARE DESCRIBED IN THE PLANTING PLAN CONTAINED WITHIN THE VMP.
5. TRENCH BREAKER LOCATION IS APPROXIMATE PENDING FIELD VERIFICATION (EPP SECTION 1.13)

ENBRIDGE

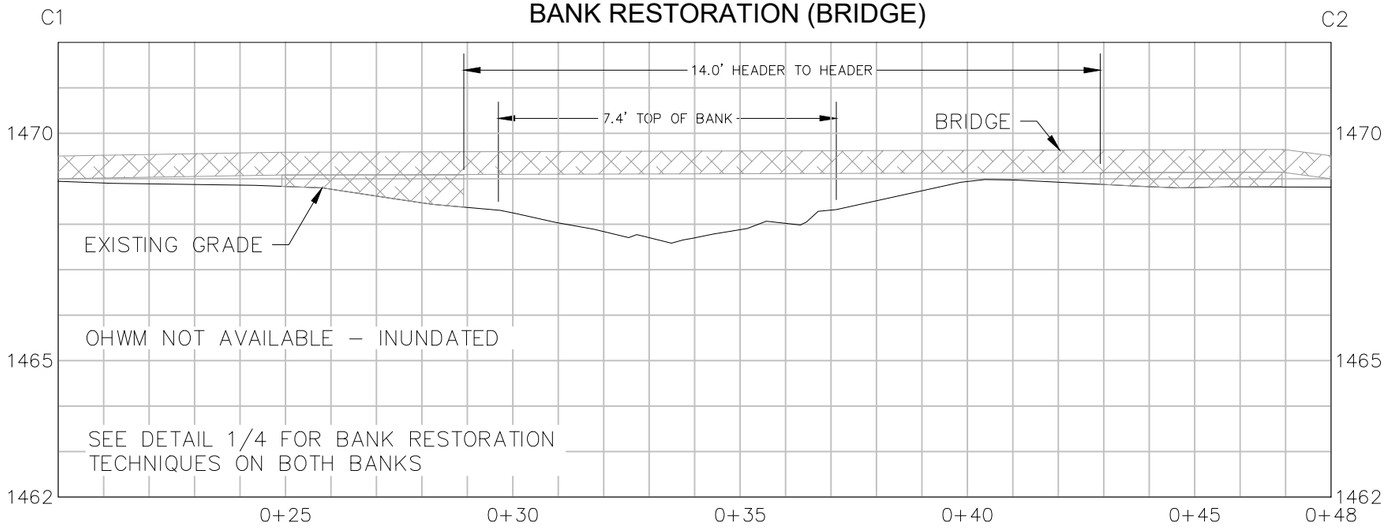
NO.	REVISION-DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

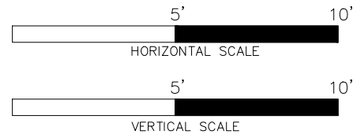
ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE-SPECIFIC RESTORATION PLAN
UNNAMED STREAM – MP 933.1 – MDNR ID 26
RE-VEGETATION PLAN

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP-933.1-001	1/8

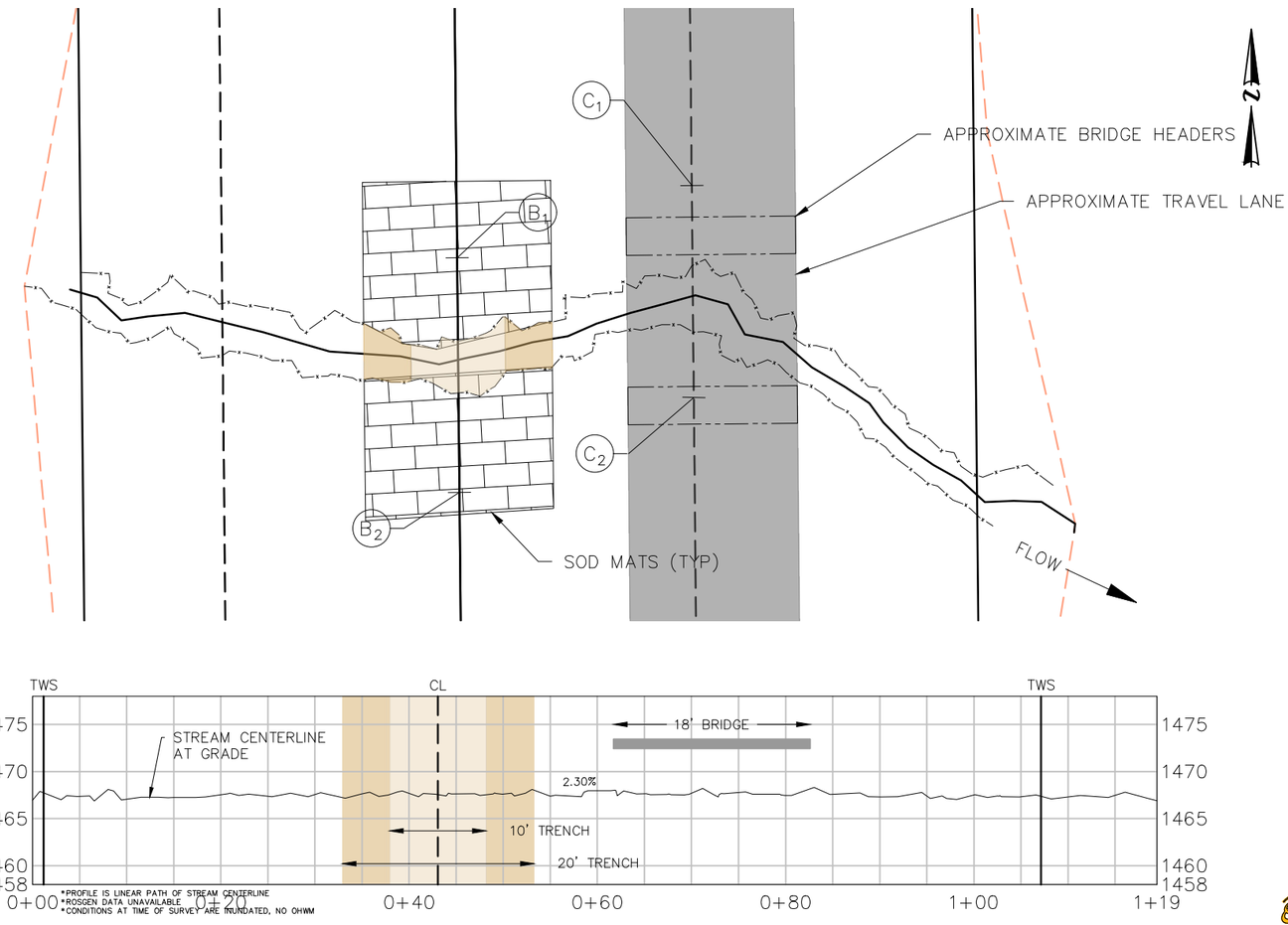
PLOTTED SIZE: ANSI FULL BLEED B (17x11)

BANK RESTORATION (BRIDGE)





STREAMBED RESTORATION



NOTES

1. TRANSITIONS BETWEEN EXISTING CHANNEL FEATURES (BED, BANK, FLOODPLAIN) AND PROPOSED RESTORED TRENCH CROSSING WILL BE SMOOTH AND EVENLY GRADED WITHOUT ABRUPT OR PROTRUDING OBSTRUCTIONS.
2. BANK MIGRATION POTENTIAL IS LOW. PRIMARY FLOW IS LOCATED IN THE CENTER OF THE CHANNEL.
3. PLACE MATS DIRECTLY ON TOP OF EXISTING VEGETATION TO AVOID OR MINIMIZE DISTURBANCE OF VEGETATION ON THE CHANNEL BANKS AND AT THE TOP OF THE STREAM BANK.
4. SEE DETAIL SHEET FOR SPECIFIC RESTORATION METHODS.
5. MINIMIZE DISTURBANCE OF BED MATERIALS AND FEATURES DURING CONSTRUCTION OF THE TRENCH
6. BED AND/OR BANK MATERIALS TEMPORARILY ADJUSTED OR REMOVED DURING CONSTRUCTION SHALL BE PLACED IN THE APPROXIMATE ORIGINAL LOCATION DURING RESTORATION. MATERIALS SHALL BE FIELD ADJUSTED DURING PLACEMENT BASE ON THE OBSERVED FLOW PATH AT THE TIME OF CONSTRUCTION.
7. SEE RESTORATION SHEET FOR B1-B2 CROSS SECTION.

LEGEND

- ENBRIDGE L3R PIPELINE
- PERMANENT RIGHT OF WAY
- TEMPORARY WORKSPACE
- WATERBODY – RIFFLE (ROSGEN SURVEY)
- WATERBODY – POOL (ROSGEN SURVEY)
- WATERBODY – RUN (ROSGEN SURVEY)
- WATERBODY – GLIDE (ROSGEN SURVEY)
- CONTOUR (1' INTERVAL) (MAJOR / MINOR)
- TOP OF BANK
- ORDINARY HIGH WATER MARK
- FIELD DELINEATED WETLAND
- TRAVEL LANE/CONSTRUCTION MATTING
- TRENCH – 10'
- TRENCH – 20'

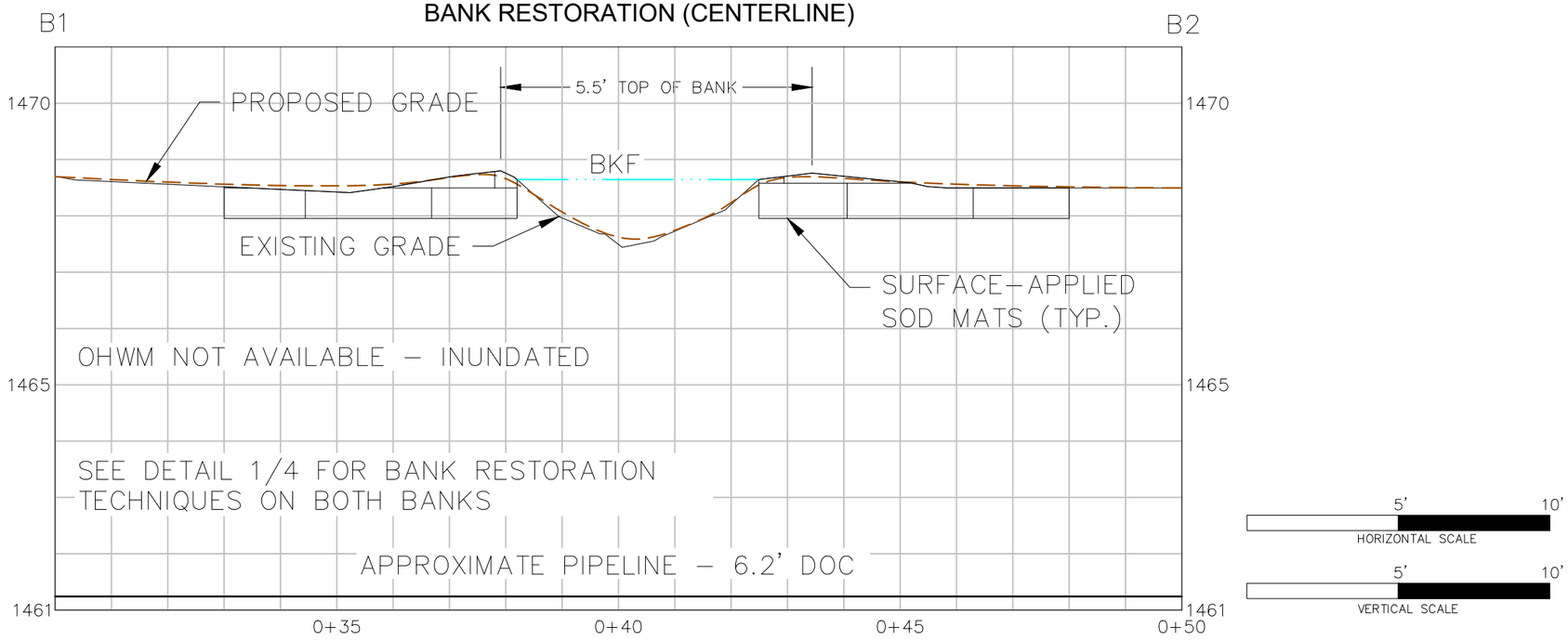
NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
UNNAMED STREAM – MP 933.1 – MDNR ID 26
STABILIZATION PLAN

SCALE	DWG. NO.	PAGE NO.
	SSRP–933.1–002	2/8

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

BANK RESTORATION (CENTERLINE)



RESTORATION NOTES:

GENERAL

1. REFER TO RESTORATION DETAIL SHEETS FOR ADDITIONAL INFORMATION RELATED TO PROPOSED RESTORATION MEASURES.
2. REFER TO SITE PHOTOS FOR INFORMATION ON PRE-CONSTRUCTION CROSSING CONDITIONS AND TO PROVIDE ADDITIONAL GUIDANCE FOR RESTORATION EFFORTS.

SOD MATTING

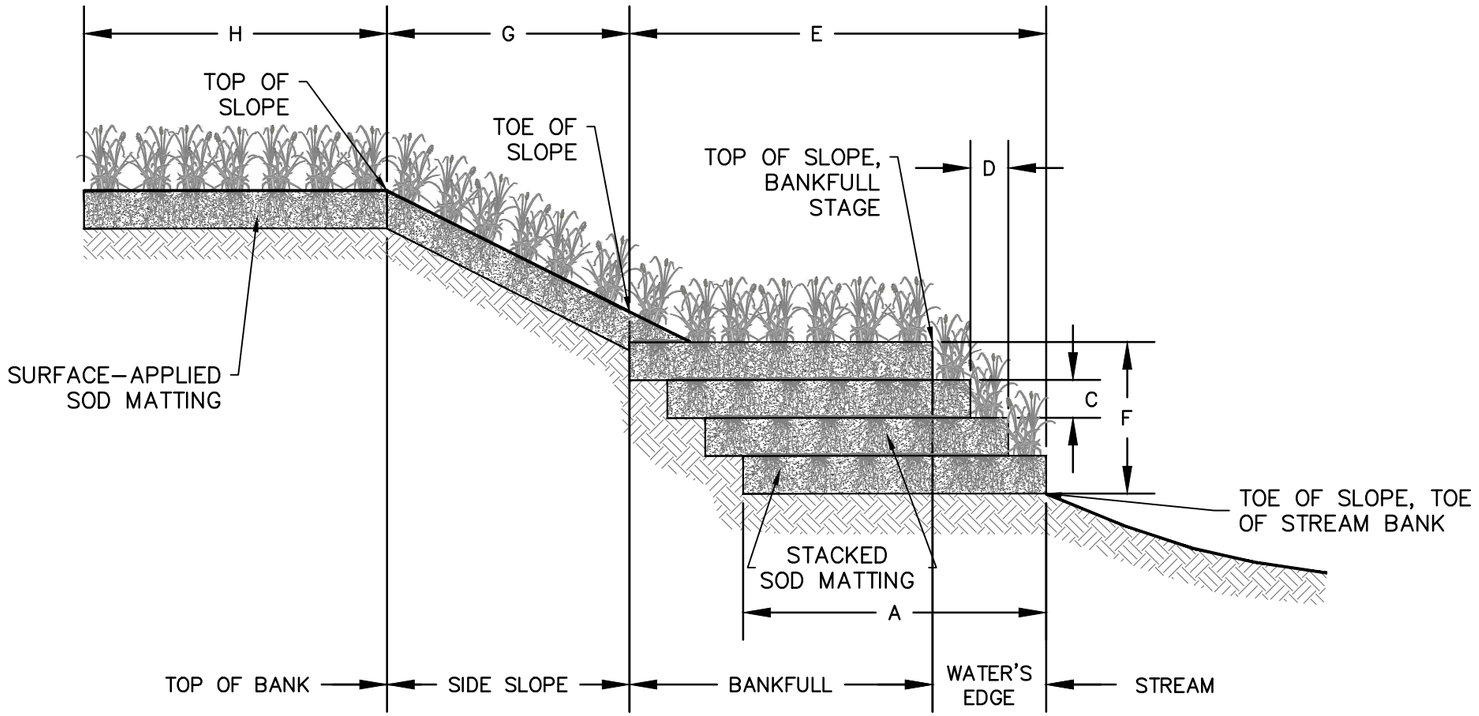
1. REMOVE 15 LINEAR FEET OF VEGETATED MATS ON EITHER SIDE OF THE STREAM CROSSING USING ONSITE EQUIPMENT WHICH CAN UNDERCUT THE VEGETATION FOR REMOVAL. SMALL SHRUBS AND/OR TREES WITHIN THE SOD MATS ARE ACCEPTABLE AND SHOULD NOT BE REMOVED.
2. DEPENDING ON THE LEVEL OF SATURATION AT THE TIME OF REMOVAL, IT MAY BE DIFFICULT TO OBTAIN INTACT CONSOLIDATED MATS, BUT GENERALLY THE NATIVE VEGETATION WILL BE RETAINED AND CAPTURED FOR PLACEMENT.
3. SOD MATS CAN BE TRANSPLANTED DURING ANY SEASON.
4. SOD MAT WILL BE PLACED ON CLEAR GROUND OR MATS WITHIN THE WORKSPACE.
5. MONITOR MATS TO SUPPORT SURVIVABILITY; WATERING MAY BE NEEDED.
6. PRIOR TO PLACEMENT OF SOD MATS FINISH GRADE CHANNEL BANK AND ADJACENT FLOODPLAIN APPLICATION AREA TO PROVIDE A SMOOTH AND EVEN SURFACE. SUBGRADE ELEVATION SHOULD ALLOW FOR THE FINISHED SOD SURFACE TO TRANSITION EVENLY WITH THE CHANNEL BANKS UPSTREAM AND DOWNSTREAM OF THE INSTALLATION AREA. AVOID ABRUPT CHANGES IN GRADE.
7. RETURN THE VEGETATED MATS USING ONSITE EQUIPMENT.
    a. SURFACE APPLIED SOD MATTING SHOULD BE PLACED WITH THE LONG SIDE PERPENDICULAR TO THE CHANNEL / FLOW.
    b. STACKED SOD MATTING SHOULD BE PLACED WITH THE LONG SIDE PARALLEL TO THE CHANNEL / FLOW.
8. WHEN PLACING SOD MATS, DO NOT LEAVE LARGE GAPS BETWEEN EACH SOD MAT AS NON-NATIVE VEGETATION WILL QUICKLY ATTEMPT TO COLONIZE THESE VOIDS.
9. WATER SOD MATS AFTER REPLACEMENT IF CONDITIONS ARE HOT AND DRY. DAMP AND/OR FROZEN SOD MATS DO NOT REQUIRE WATERING.
10. THE TOP MAT AND/OR OTHER MATS CAN BE ANCHORED WITH A LIVE AND/OR DEAD STOUT STAKE TO ENSURE THAT IT DOES NOT MOBILIZE DURING A FLOOD EVENT BEFORE THE ROOTS HAVE ESTABLISHED.
11. THE VEGETATED MATS WILL BE REPLACED AS SOON AS PRACTICAL FOLLOWING BACKFILLING OF THE TRENCH AND STABILIZED PER THE TIMING REQUIREMENTS DESCRIBED IN SECTION 1.9.1 OF THE EPP.

NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

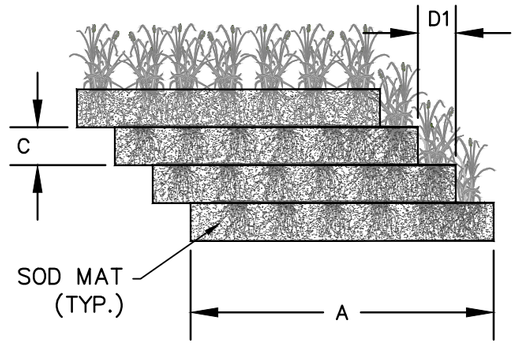
ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
UNNAMED STREAM – MP 933.1 – MDNR ID 26
SITE SPECIFIC DETAILS

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP–933.1–004	3/8

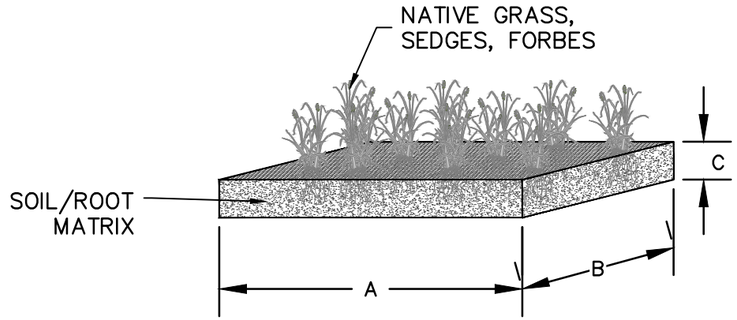
PLOTTED SIZE: ANSI FULL BLEED B (17x11)



CROSS SECTION



STACKED SOD MATTING DETAIL



SOD MAT DETAIL

DIMENSION[1]	NAME	TYPICAL UNIT	VALUE	DESCRIPTION
A	SOD MAT WIDTH	FEET	3–4	WIDTH OF INDIVIDUAL SOD MAT.
B	SOD MAT LENGTH	FEET	3–6	LENGTH OF INDIVIDUAL SOD MAT.
C	SOD MAT THICKNESS	INCHES	12 MIN	THICKNESS OF INDIVIDUAL SOD MAT.
D	STACKED SOD MAT SETBACK	FEET, INCHES	N/A	THE DISTANCE BETWEEN THE EDGES OF SOD MATS STACKED TO FORM A SLOPE
E	WIDTH OF STACKED SOD MATS	FEET, INCHES	N/A	WIDTH OF A BANK CREATED BY STACKED SOD MATS
F	HEIGHT OF STACKED SOD MATS	FEET, INCHES	N/A	HEIGHT OF A SLOPE CREATED BY STACKED SOD MATS
G	WIDTH OF SURFACE- APPLIED SOD MATS	FEET, INCHES	10–20	WIDTH OF A SLOPE STABILIZED WITH SURFACE-APPLIED SOD MATS
H	TOP OF BANK SOD MATTING DISTANCE	FEET	10	DISTANCE SOD MATTING IS INSTALLED ON THE TOP OF BANK

NOTES:

1. DIMENSION LABELS ARE REFERENCED IN THE DETAIL DRAWINGS.

SOD MATTING DETAIL

SOD MAT EXAMPLES

NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
UNNAMED STREAM – MP 933.1 – MDNR ID 26
SITE SPECIFIC DETAILS

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP–933.1–004	5/8

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

1 CENTERLINE – FACING NORTH BANK

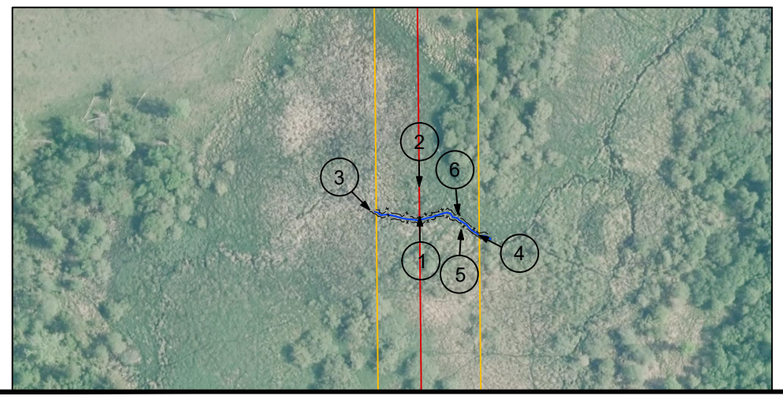
2 CENTERLINE – FACING SOUTH BANK

3 EDGE OF WORKSPACE – FACING DOWNSTREAM

4 EDGE OF WORKSPACE – FACING UPSTREAM

5 BRIDGE – FACING NORTH BANK

6 BRIDGE – FACING SOUTH BANK



NOTES:

1. AIR PHOTOS ARE FROM 2018 ENBRIDGE AERIAL PHOTOGRAPHY.
2. ADDITIONAL ON–THE GROUND PHOTOS MAY BE TAKEN PRIOR TO CONSTRUCTION AT MDNR REQUEST.
3. PRE–CONSTRUCTION PHOTOS WILL BE USED TO AID IN RESTORATION.

NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING	MJT	10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
UNNAMED STREAM – MP 933.1 – MDNR ID 26
PHOTO PAGE

SCALE	DWG. NO.	PAGE NO.
	SSRP–933.1–005	5/5

ENBRIDGE

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

GENERAL

1. THE SPECIFICATIONS WITHIN THIS SSRP MAY MODIFY OR REPLACE PROJECT–WIDE STANDARDS PRESENTED IN THE EPP. WHERE MATERIAL WITHIN THESE SSRPS EXCEEDS STANDARD CONSTRUCTION MEASURES IN THE EPP, THESE SSRPS SUPERSEDE THE EPP.

2. CONSTRUCTION AND RESTORATION OF WATERBODY CROSSINGS WILL FOLLOW THESE GENERAL STEPS:

   A. SITE CLEARING
   B. INSTALLATION OF TEMPORARY EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICES ("BMPS")
   C. BRIDGE INSTALLATION
   D. EXCAVATION/BACKFILLING OF THE WATERBODY INCLUDING:
      - SOD SAVING TOPSOIL SEGREGATION AT NON–WOODED SITES
      - STREAMBED MATERIAL SEGREGATION
      - PIPE INSTALLATION
      - BACKFILL, INCLUDING IMPLEMENTATION OF CONSTRUCTION–RELATED RESTORATION METHODS (I.E., TOE WOOD)
   E. REPLACEMENT OF STREAMBED MATERIAL AND TOPSOIL/SOD LAYER
   F. RESTORATION OF STREAM BANKS TO PRE–CONSTRUCTION CONTOURS
   G. IF FINAL GRADING NOT POSSIBLE AT THE TIME, TEMPORARY STABILIZATION AND REPLACEMENT/REINFORCEMENT OF TEMPORARY BMPS
   H. AFTER FINAL GRADING, PERMANENT SEEDING AND/OR WOODY VEGETATION RESTORATION, STABILIZATION AND REPLACEMENT/REINFORCEMENT OF TEMPORARY BMPS
   I. BRIDGE REMOVAL DURING FINAL RESTORATION AFTER STABILIZATION AND PERMANENT SEEDING
   J. POST–CONSTRUCTION MONITORING

CROSSING METHODS

1. ALL WATERBODY AND WETLAND CROSSINGS WILL BE CONDUCTED IN COMPLIANCE WITH SECTION 2.0 AND SECTION 3.0 OF THE ENVIRONMENTAL PROTECTION PLAN ("EPP"), RESPECTIVELY. SECTION 2.0 AND 3.0 OF THE WINTER CONSTRUCTION PLAN PRESENTS MODIFICATIONS FOR WATERBODY AND WETLAND CONSTRUCTION METHODS, RESPECTIVELY, IN WINTER CONDITIONS.

2. ENBRIDGE'S SUMMARY OF CONSTRUCTION METHODS AND PROCEDURES (THE "PROCEDURES," APPENDIX A OF THE EPP) OUTLINES THE VARIOUS CONSTRUCTION METHODS THAT ENBRIDGE MAY UTILIZE TO CONSTRUCT THROUGH WATERBODIES AND WETLANDS/BASINS AS PRESENTED ON THESE SITE–SPECIFIC RESTORATION PLANS ("SSRPS").

   A. DRY CROSSING (ISOLATED) METHODS (INCLUDING THE DRY CROSSING AND MODIFIED DRY CROSSING METHOD) ARE DESCRIBED SECTIONS 4.3 OF THE PROCEDURES, AND IN SECTIONS 2.5.2 AND 2.5.3 AND FIGURES 23 AND 24 OF THE EPP.
   B. THE BORE METHOD (NON–PRESSURIZED) IS DESCRIBED IN SECTION 3.5 OF THE PROCEDURES, AND SECTION 4.0 OF THE EPP.
   C. THE MODIFIED UPLAND CONSTRUCTION (WETLAND) METHOD IS DESCRIBED IN SECTION 3.3 OF THE PROCEDURES, AND SECTION 3.0 AND FIGURES 30 TO 34 OF THE EPP.
   D. ALTHOUGH NOT PROPOSED AS A PRIMARY METHOD AT THESE SSRP WATERBODIES, THE OPEN CUT (NON–ISOLATED) WATERBODY CROSSING METHOD IS DESCRIBED IN SECTION 4.1 OF THE PROCEDURES, AND SECTION 2.5.1 AND FIGURE 24 OF THE EPP.
   E. ALTHOUGH NOT PROPOSED AS A PRIMARY METHOD AT THESE SSRP WATERBODIES, THE PUSH–PULL METHOD IS DESCRIBED IN SECTION 3.4 OF THE PROCEDURES, AND SECTION 3.7.1 AND FIGURES 35 AND 36 OF THE EPP.

CLEARING/VEGETATION REMOVAL

1. STUMPS WITHIN THE TRENCH LINE WILL BE COMPLETELY REMOVED, GROUND, AND/OR HAULED OFF–SITE TO AN APPROVED LOCATION. TREE STUMPS OUTSIDE THE TRENCH LINE WILL BE GROUND BELOW NORMAL GROUND SURFACE TO FACILITATE A SAFE WORK AREA AND TO ALLOW TOPSOIL REMOVAL, IF NECESSARY. IN SOME CIRCUMSTANCES, TREE STUMPS OUTSIDE THE TRENCH LINE MAY BE COMPLETELY REMOVED TO ALLOW FOR A SAFE WORK AREA AND HAULED OFF–SITE TO AN APPROVED LOCATION AS OUTLINED IN SECTION 1.8.3 OF THE EPP.

2. CLEARING WILL BE CONDUCTED IN WATERBODIES AND WETLANDS AS OUTLINED IN SECTION 2.2 AND 3.2 OF THE EPP, RESPECTIVELY. CHIPS, MULCH, OR MECHANICALLY CUT WOODY DEBRIS SHALL NOT BE STOCKPILED IN A WETLAND. HYDRO–AX DEBRIS, OR SIMILAR CAN BE LEFT IN THE WETLAND IF SPREAD EVENLY IN THE CONSTRUCTION WORKSPACE TO A DEPTH THAT WILL ALLOW FOR NORMAL REVEGETATION, AS DETERMINED BY THE EI. CHIPPING IS NOT ALLOWED ON PUBLIC LANDS. ON PUBLIC LANDS, MULCH AND MECHANICALLY CUT WOODY DEBRIS MUST BE UNIFORMLY BROADCAST TO LESS THAN 2–INCH THICKNESS AND IN A MANNER THAT MAINTAINS VISIBLE GROUND.

3. ENBRIDGE WILL PROPERLY INSTALL AND MAINTAIN REDUNDANT SEDIMENT CONTROL MEASURES IMMEDIATELY AFTER CLEARING AND PRIOR TO INITIAL GROUND DISTURBANCE AT SURFACE WATERS LOCATED WITHIN 50 FEET OF THE PROJECT AND WHERE STORMWATER FLOWS TO THE SURFACE WATER (REFER TO THE ENVIRONMENTAL PLAN SHEETS IN THE SWPPP), AND WITHIN 100 FEET OF SPECIAL AND IMPAIRED WATERS, INCLUDING TROUT STREAMS.

4. ON PUBLIC LANDS AND WHEREVER PRACTICABLE AT WATERBODY CROSSINGS, ENBRIDGE WILL USE WILDLIFE–FRIENDLY EROSION AND SEDIMENT CONTROL BMPS THAT CONTAIN BIODEGRADABLE NETTING (CATEGORY 3N OR 4N NATURAL FIBER) AND WILL AVOID THE USE OF PLASTIC MESH (SECTIONS 1.17.1 AND 2.6.1 OF THE EPP).

TEMPORARY STABILIZATION

1. ON PORTIONS OF THE PROJECT WHERE WORK WILL BE OCCURRING DURING APPLICABLE "WORK IN WATER RESTRICTIONS" FOR PUBLIC WATERS (REFER TO SECTION 2.1), ALL EXPOSED SOIL AREAS WITHIN 200 FEET OF THE WATER'S EDGE, AND THAT DRAIN TO THAT WATER, WILL BE STABILIZED WITHIN 24 HOURS DURING THE RESTRICTION PERIOD. STABILIZATION OF ALL EXPOSED SOILS WITHIN 200 FEET OF THE PUBLIC WATER'S EDGE, AND THAT DRAIN TO THAT WATER, WILL BE INITIATED IMMEDIATELY AND COMPLETED WITHIN 7 CALENDAR DAYS WHENEVER CONSTRUCTION ACTIVITY HAS PERMANENTLY OR TEMPORARILY CEASED ON ANY PORTION OF THE SITE OUTSIDE OF THE RESTRICTION PERIOD. THESE AREAS WILL BE IDENTIFIED ON THE ENVIRONMENTAL PLAN SHEETS ACCOMPANYING THE SWPPP.

2. HYDRO–MULCH AND LIQUID TACKIFIER CAN BE USED IN PLACE OF CERTIFIED WEED–FREE STRAW OR HAY MULCH WITH PRIOR APPROVAL FROM ENBRIDGE. ALL HYDROMULCH AND LIQUID TACKIFIER PRODUCTS USED WILL BE ON THE APPLICABLE STATE DOT PRODUCT LIST. HYDRO–MULCH AND LIQUID TACKIFIER PRODUCTS CONTAINING PLASTIC/POLYPROPYLENE FIBER ADDITIVES AND MALACHITE GREEN (COLORANT) WILL NOT BE UTILIZED ON THIS PROJECT. APPLICATION RATES WILL BE AT THE MANUFACTURER'S RECOMMENDED RATE. ENBRIDGE WILL AVOID THE USE OF HYDROMULCH ON PUBLIC LANDS; HOWEVER, ENBRIDGE MAY USE HYDROMULCH ON STEEP SLOPES TO PREVENT EROSION UNTIL PERMANENT COVER HAS BEEN ESTABLISHED AS OUTLINED IN SECTION 1.8.3 OF THE EPP.

RESTORATION AND STABILIZATION

1. ENBRIDGE WILL RESTORE THE STREAM BANKS AS NEAR AS PRACTICABLE TO PRE–CONSTRUCTION CONDITIONS UNLESS THAT SLOPE IS DETERMINED TO BE UNSTABLE. IF THE SLOPE IS CONSIDERED UNSTABLE, ENBRIDGE WILL RESHAPE THE BANKS TO PREVENT SLUMPING. FOR PUBLIC WATERS, ENBRIDGE WILL RETURN THE BANK TO PRE–CONSTRUCTION CONTOURS, UNLESS OTHERWISE DIRECTED BY THE SITE–SPECIFIC RESTORATION PLAN. IF ENBRIDGE CANNOT RESTORE TO PRE–CONSTRUCTION CONTOURS AT A PUBLIC WATER, ENBRIDGE WILL CONSULT WITH THE MDNR BEFORE PROCEEDING FURTHER AS OUTLINED IN SECTION 2.6 OF THE EPP.

2. UNSTABLE SOILS AND/OR SITE–SPECIFIC FACTORS SUCH AS STREAM VELOCITY AND FLOW DIRECTION MAY REQUIRE ADDITIONAL RESTORATION EFFORTS, SUCH AS INSTALLATION OF WOODY VEGETATION, GEOTEXTILE FABRIC, OR TREE, LOG, ROOTWAD, OR BOULDER REVETMENTS TO STABILIZE DISTURBED STREAM BANKS (SEE FIGURE 29) AS OUTLINED IN SECTION 2.6.2 OF THE EPP. ENBRIDGE WILL WORK WITH THE MDNR TO ENSURE ALL WORK/ADJUSTMENTS ARE APPROVED AND ARE CONDUCTED WITHIN APPLICABLE TIMING RESTRICTIONS.

3. IN UPLAND AND WETLAND AREAS, CLEANUP AND ROUGH GRADING WILL OCCUR AS OUTLINED IN SECTIONS 1.16 AND 3.9 OF THE EPP. ENBRIDGE WILL BACKFILL THE TRENCH TO AN ELEVATION SIMILAR TO THE ADJACENT AREAS OUTSIDE THE TRENCH LINE AND WILL ADD A SLIGHT CROWN OF APPROXIMATELY 3 TO 6 INCHES (DEPENDING ON SOIL TYPE) OVER THE BACKFILLED TRENCH TO ALLOW FOR SUBSIDENCE. GENERALLY, EXCESS SUBSOIL DISPLACED BY THE PIPE INSTALLATION WILL BE SPREAD ACROSS THE PORTION OF THE CONSTRUCTION WORKSPACE WHERE TOPSOIL REMOVAL HAS OCCURRED. ANY REMAINING EXCESS SUBSOIL WILL BE REMOVED AND DISPOSED OF AT AN APPROVED OFF–SITE LOCATION AS NEEDED TO ENSURE CONTOURS ARE RESTORED TO AS NEAR AS PRACTICABLE TO PRE–CONSTRUCTION CONDITIONS.

4. REVEGETATION ACTIVITIES WILL OCCUR AS OUTLINED IN SECTION 7.0 OF THE EPP. SEED MIXES AT PUBLIC WATERS WILL BE SELECTED AND APPLIED AS INDICATED IN THE PLANTING PLAN, WHICH IS APPENDIX A OF THE POST–CONSTRUCTION VEGETATION MANAGEMENT PLAN FOR PUBLIC LANDS AND WATERS ("VMP"). SEED MIXES RELATIVE TO THESE SSRP CROSSINGS ARE CODED AS FOLLOWS:

A	EMERGENT (34–181)	G	DRY PRAIRIE GENERAL (35–221)
B	RIPARIAN NE (34–361)	H	MESIC PRAIRIE GENERAL (35–241)
C	RIPARIAN S&W (34–261)	I	MESIC PRAIRIE NW (35–441)
D	WET MEADOW NE (34–371)	J	DRY PRAIRIE NORTHWEST (35–421)
E	WET MEADOW S&W (34–271)	K	WOODLAND EDGE NE (36–311)
F	WETLAND REHABILITATION (34–171)	L	NATURAL REVEGETATION

5. ENBRIDGE WILL NOT SEED STANDING WATER OR WOODED (PSS AND PFO) WETLAND COMMUNITIES. NATURAL REVEGETATION WILL TAKE PLACE FROM EXISTING PLANT MATERIAL AND ROOT STOCK IN THESE COMMUNITIES.

6. ALL MATERIALS USED FOR CONSTRUCTION OF THE PROJECT MUST BE REMOVED FROM THE SITE.

7. ENBRIDGE WILL CONDUCT POST–CONSTRUCTION MONITORING IN ACCORDANCE WITH THE POST–CONSTRUCTION MONITORING PLAN FOR WETLANDS AND WATERBODIES, AND IN ACCORDANCE WITH THE VMP FOR THE UPLAND PORTIONS OF THE PROJECT ON PUBLIC LANDS.

NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING	MJT	10/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN

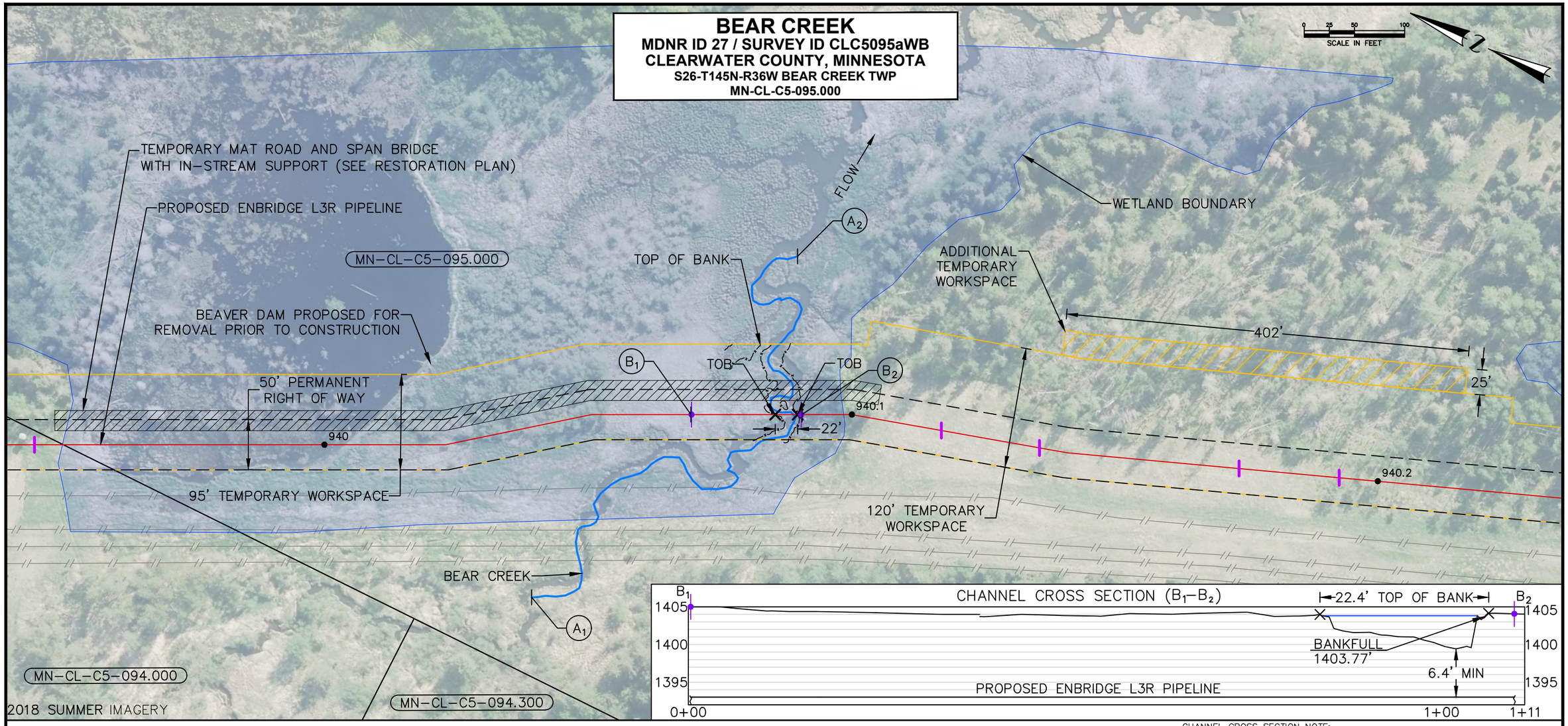
CONSTRUCTION NOTES

SCALE	DWG. NO.	PAGE NO.
	SSRP–NOTES	

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

MDNR ID No. 27: MP 940.1; Bear Creek (M-164)

BEAR CREEK
MDNR ID 27 / SURVEY ID CLC5095aWB
CLEARWATER COUNTY, MINNESOTA
S26-T145N-R36W BEAR CREEK TWP
MN-CL-C5-095.000

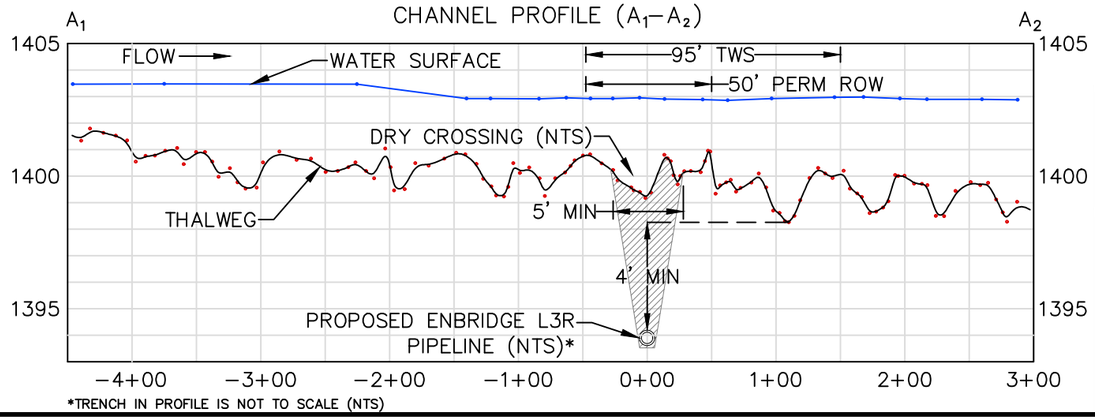


NOTES
1. NO FEMA DIGITAL FLOODPLAIN DATA AVAILABLE
2. SOBS (O/H) OR NPC (S1-3): N/A
3. MDNR REGION 1 PWI - COOL/WARM WATER FISHERY: MARCH 15 - JUNE 30. 24-HOUR SOIL STABILIZATION REQUIRED WITHIN 200 FEET DURING RESTRICTION.
4. WHEN WORKING WITHIN "WORK IN WATER RESTRICTIONS", STABILIZE ALL EXPOSED SOIL AREAS WITHIN 200 FEET OF THE WATER'S EDGE, AND THAT DRAIN TO THAT WATER, WITHIN 24 HOURS. STABILIZATION WILL BE INITIATED IMMEDIATELY AND COMPLETED WITHIN 7 CALENDAR DAYS WHENEVER CONSTRUCTION ACTIVITY HAS PERMANENTLY/ TEMPORARILY CEASED ON ANY PORTION OF THE SITE OUTSIDE OF THE RESTRICTION PERIOD

LEGEND

- PROPOSED ENBRIDGE L3R PIPELINE
- OTHER PIPELINE
- PERMANENT RIGHT OF WAY
- TEMPORARY WORKSPACE
- WATERBODY (ROSGEN SURVEY - THALWEG)
- TRACT BOUNDARY
- TEMPORARY MAT ROAD AND SPAN BRIDGE
- WETLAND
- ADDITIONAL TEMPORARY WORKSPACE
- MN-XX-XX-XXX.XXX — TRACT ID
- ROSGEN SURVEY POINT - WATER SURFACE
- ROSGEN SURVEY POINT - RIVER BOTTOM (THALWEG)
- PROPOSED INCREASED DEPTH OF COVER EXTENT
- TOP OF BANK
- TRENCH BREAKER (LOCATIONS ARE APPROXIMATE)

FOR ENVIRONMENTAL REVIEW PURPOSES ONLY



*TRENCH IN PROFILE IS NOT TO SCALE (NTS)

CHANNEL CROSS SECTION NOTE:
1. CHANNEL LOCATIONS, DIMENSIONS, AND/OR ELEVATIONS ARE BASED ON 2020 TOPOGRAPHIC/BATHYMETRIC SURVEY(S), AND AS SUCH DO NOT REFLECT CHANGES TO THE CHANNEL THAT MAY HAVE OCCURRED SINCE THAT TIME.
2. DEPTH OF COVER AT CENTERLINE WAS DEVELOPED USING THE BOTTOM ELEVATION OF THE DEEPEST UPSTREAM OR DOWNSTREAM POOL WITHIN THE SURVEYED REACH, UNLESS OTHERWISE NOTED IN APPLICATION MATERIALS.
3. MEAN MEANDER BELT WIDTH: 59'
4. MEANDER WIDTH RATIO: 4.68

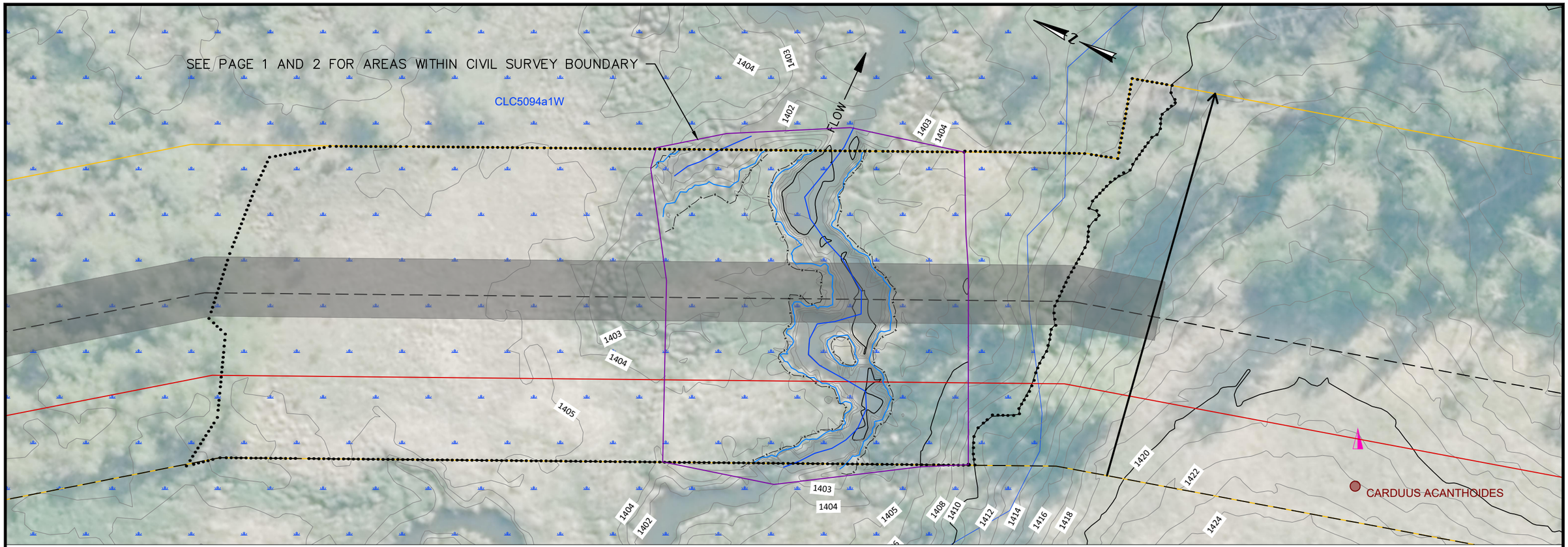
NO.	REVISION-DESCRIPTION	BY	DATE	CHK'D	APP'D
0	ISSUED FOR PERMIT APPLICATION	AJJ	10/2020	BAB	BAB

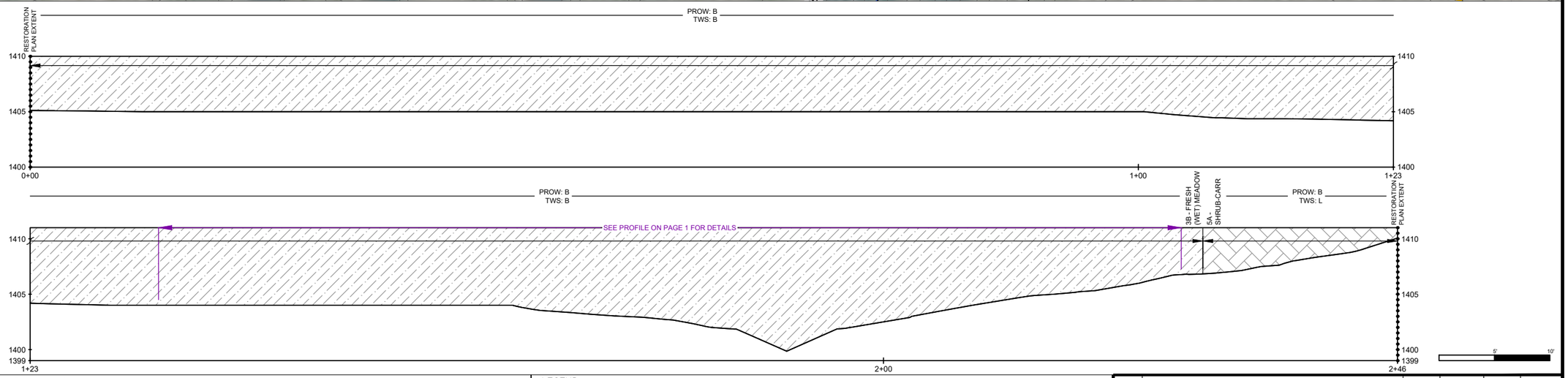
ENBRIDGE

DWN. BY: AJJ	DATE 10/2020
CHK.	
PROJ. ENGR.	
PROJ. MGR.	
CLIENT APP.	

PROPOSED ENBRIDGE L3R PIPELINE
PRIMARY METHOD - DRY CROSSING
CROSSING OF BEAR CREEK
ENBRIDGE MP 940.1
CLEARWATER COUNTY, MINNESOTA

SCALE: NOTED
DWG. NO.: B-93-5.84-MDNR-27-0





BWSR SEED MIX	B: RIPARIAN NE (34–361); L: NATURAL REVEGETATION
SOBS (O/H) or NPC (S1-3)	N/A

1. ELEVATIONS OUTSIDE OF THE AREA WITHIN CIVIL SURVEY BOUNDARY ARE DERIVED FROM LIDAR. ENBRIDGE WILL RESTORE THE AREAS ADJACENT TO THE PUBLIC WATER WITHIN THE MDNR EXPANDED RESTORATION BOUNDARY TO PRE–CONSTRUCTION CONDITIONS.
2. MDNR REGION 1 PWI – COOL/WARM WATER FISHERY: MARCH 15 – JUNE 30. 24–HOUR SOIL STABILIZATION REQUIRED WITHIN 200 FEET DURING RESTRICTION.
3. AIR PHOTOS ARE FROM 2018 ENBRIDGE AERIAL PHOTOGRAPHY.
4. ADDITIONAL ON–THE GROUND PHOTOS MAY BE TAKEN PRIOR TO CONSTRUCTION AT MDNR REQUEST.
5. PRE–CONSTRUCTION PHOTOS WILL BE USED TO AID IN RESTORATION.
6. SEE GENERAL NOTES PAGE FOR ADDITIONAL DETAIL.
7. SEE THE PLANTING PLAN FOR ADDITIONAL DETAIL REGARDING SEEDING PRACTICES AND SEED MIXES AT PUBLIC WATER CROSSINGS.
8. ON PUBLIC LANDS AND WHEREVER PRACTICABLE AT WATERBODY CROSSINGS, ENBRIDGE WILL USE WILDLIFE–FRIENDLY EROSION AND SEDIMENT CONTROL BMPS THAT CONTAIN BIODEGRADABLE NETTING (CATEGORY 3N OR 4N NATURAL FIBER) AND WILL AVOID THE USE OF PLASTIC MESH (SECTIONS 1.17.1 AND 2.6.1 OF THE EPP).
9. WHEN WORKING WITHIN "WORK IN WATER RESTRICTIONS", STABILIZE ALL EXPOSED SOIL AREAS WITHIN 200 FEET OF THE WATER'S EDGE, AND THAT DRAIN TO THAT WATER, WITHIN 24 HOURS. STABILIZATION WILL BE INITIATED IMMEDIATELY AND COMPLETED WITHIN 7 CALENDAR DAYS WHENEVER CONSTRUCTION ACTIVITY HAS PERMANENTLY/ TEMPORARILY CEASED ON ANY PORTION OF THE SITE OUTSIDE OF THE RESTRICTION PERIOD.

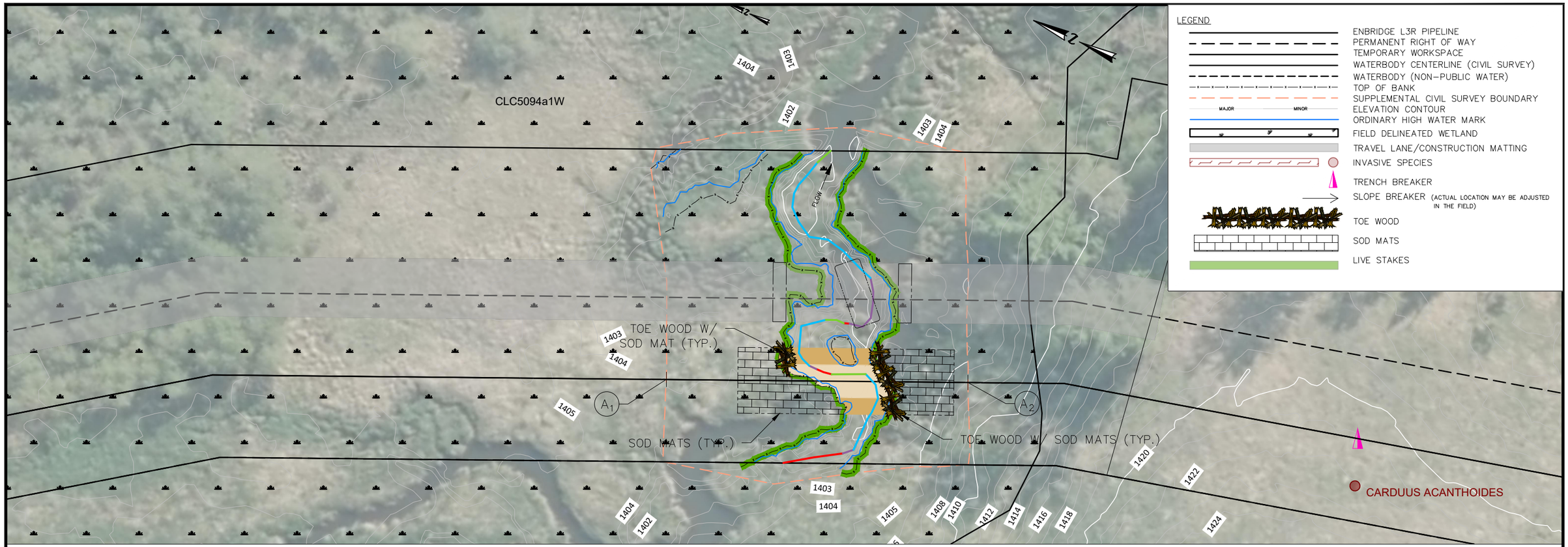
LEGEND

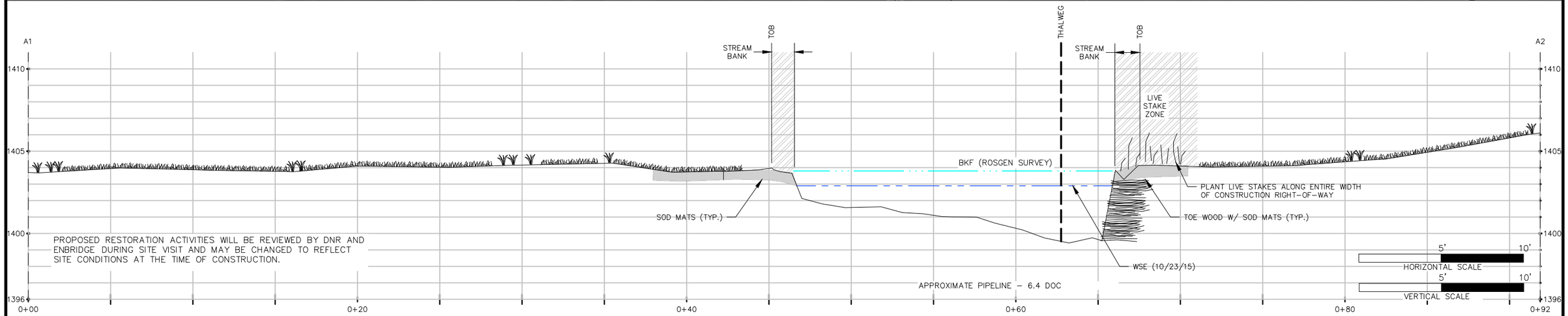
- ENBRIDGE L3R PIPELINE
- PERMANENT RIGHT OF WAY
- TEMPORARY WORKSPACE
- WATERBODY CENTERLINE (CIVIL SURVEY)
- WATERBODY (NON–PUBLIC WATER)
- PUBLIC WATER CIVIL SURVEY BOUNDARY
- MDNR EXPANDED RESTORATION BOUNDARY
- TOP OF BANK
- ELEVATION CONTOUR
- ORDINARY HIGH WATER MARK (MAJOR / MINOR)
- FIELD DELINEATED WETLAND
- TRAVEL LANE/CONSTRUCTION MATTING
- INVASIVE SPECIES
- TRENCH BREAKER
- PERMANENT SLOPE BREAKER (ACTUAL LOCATION MAY BE ADJUSTED IN THE FIELD)
- 1 – SHALLOW, OPEN WATER
- 2B – SHALLOW MARSH
- 3A – SEDGE MEADOW
- 3B – FRESH (WET) MEADOW
- 5A – SHRUB–CARR
- 5B – ALDER THICKET
- 6A – HARDWOOD SWAMP
- 6B – CONIFEROUS SWAMP

NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING	MJT	10/2020		
A	ISSUED FOR REVIEW	MJT	09/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
BEAR CREEK – MP 940.1 – MDNR ID 27
RE–VEGETATION PLAN: EXPANDED EXTENT

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP–940.1–001A	1A/5





FEATURE ID	CLC5095aWB; IFC ID: S-189.0
CROSSING TYPE	DRY CROSSING
PROPOSED RESTORATION (SEE DETAILS FOR LIVE STAKING, TRANSPLANTS, AND SHRUB SPECIES IF APPLICABLE)	EC BLANKET -NATURAL FIBER MPCA TYPE 3.B/MNDOT CATEGORY 4N; BRUSH - TOE WOOD
WITHIN OR ADJACENT WETLAND	FRESH WET MEADOW
BWSR SEED MIX	RIPARIAN NE (34-361)
DOMINANT WETLAND VEGETATION	1. PHALARIS ARUNDIANCEA 2. ALNUS INCANA
SOBS (O/H) or NPC (S1-3)	N/A

NOTES

1. CONSTRUCTION TIMING RESTRICTIONS
   - 1.1. MDNR REGION 1 PWI -COOL/WARM WATER FISHERY: MARCH 15 -JUNE 30.
   - 1.2. WHEN WORK OCCURS WITHIN "WORK IN WATER RESTRICTIONS", ALL EXPOSED SOIL AREAS WITHIN 200 FEET OF THE WATER'S EDGE, AND THAT DRAIN TO THAT WATER, WILL BE STABILIZED WITHIN 24 HOURS DURING THE RESTRICTION PERIOD. STABILIZATION OF ALL EXPOSED SOILS WITHIN 200 FEET OF THE PUBLIC WATER'S EDGE, AND THAT DRAIN TO THAT WATER, WILL BE INITIATED IMMEDIATELY AND COMPLETED WITHIN 7 CALENDAR DAYS WHENEVER CONSTRUCTION ACTIVITY HAS PERMANENTLY OR TEMPORARILY CEASED ON ANY PORTION OF THE SITE OUTSIDE OF THE RESTRICTION PERIOD
   - 1.3. WILD RICE: APRIL 1 -JULY 15
2. WORK SHALL BE CONDUCTED IN ACCORDANCE WITH APPLICABLE STANDARDS IN ENBRIDGE'S EPP AND VMP FOR PUBLIC LANDS AND WATERS. THE SPECIFICATIONS WITHIN THIS SSRP MAY MODIFY OR REPLACE THESE STANDARDS.
3. SEE GENERAL NOTES PAGE FOR ADDITIONAL DETAIL.
4. INFORMATION REGARDING SEEDING SPECIFICATIONS, SEED BED PREPARATION TECHNIQUES, ETC. ARE DESCRIBED IN THE PLANTING PLAN CONTAINED WITHIN THE VMP.
5. TRENCH BREAKER LOCATION IS APPROXIMATE PENDING FIELD VERIFICATION (EPP SECTION 1.13)

ENBRIDGE

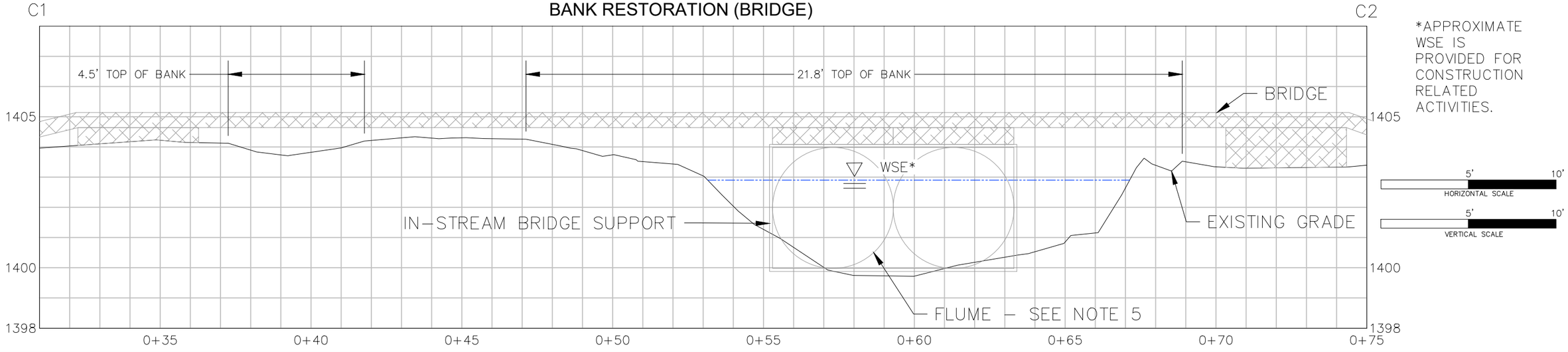
NO.	REVISION-DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE-SPECIFIC RESTORATION PLAN
BEAR CREEK - MP 940.1 - MDNR ID 27
RE-VEGETATION PLAN

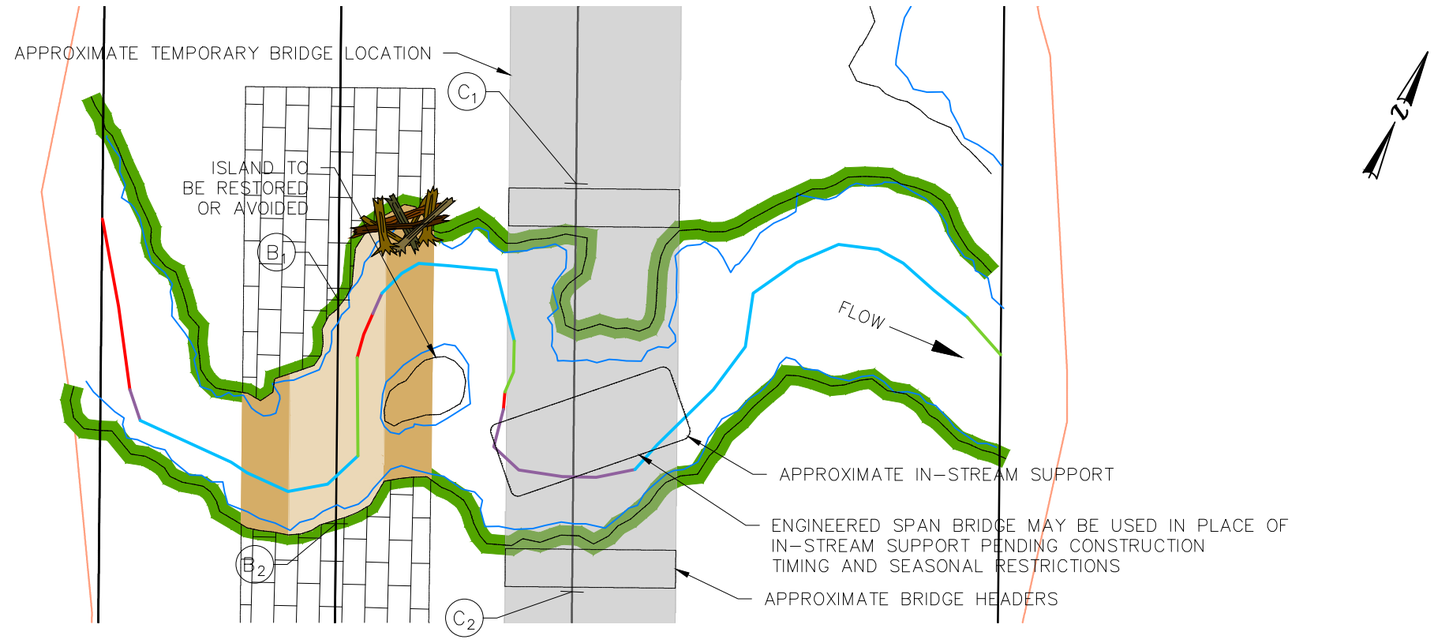
SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP-940.1-001	1/7

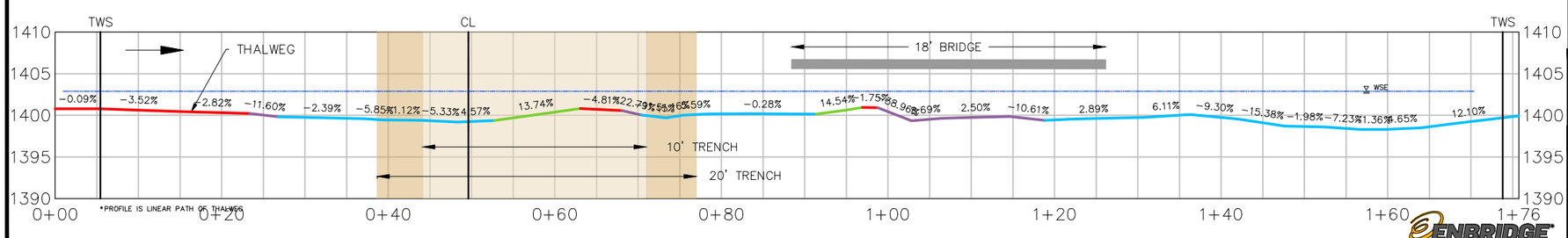
PLOTTED SIZE: ANSI FULL BLEED B (17x11)

BANK RESTORATION (BRIDGE)



STREAMBED RESTORATION





NOTES

1. TRANSITIONS BETWEEN EXISTING CHANNEL FEATURES (BED, BANK, FLOODPLAIN) AND PROPOSED RESTORED TRENCH CROSSING WILL BE SMOOTH AND EVENLY GRADED WITHOUT ABRUPT OR PROTRUDING OBSTRUCTIONS.
2. MINIMIZE DISTURBANCE OF BED MATERIALS AND FEATURES DURING CONSTRUCTION OF THE TRENCH AND INSTALLATION AND REMOVAL OF IN-STREAM SUPPORT
3. BED AND/OR BANK MATERIALS TEMPORARILY ADJUSTED OR REMOVED DURING CONSTRUCTION SHALL BE PLACED IN THE APPROXIMATE ORIGINAL LOCATION DURING RESTORATION. MATERIALS SHALL BE FIELD ADJUSTED DURING PLACEMENT BASE ON THE OBSERVED FLOW PATH AT THE TIME OF CONSTRUCTION.
4. ALIGNMENT OF IN-STREAM SUPPORT SHALL BE FIELD ADJUSTED BASED ON FLOW PATH TO PROTECT CHANNEL BANKS.
5. SEE RESTORATION SHEET FOR B1-B2 CROSS SECTION.

LEGEND

- ENBRIDGE L3R PIPELINE
- PERMANENT RIGHT OF WAY
- TEMPORARY WORKSPACE
- WATERBODY – RIFFLE (ROSGEN SURVEY)
- WATERBODY – POOL (ROSGEN SURVEY)
- WATERBODY – RUN (ROSGEN SURVEY)
- WATERBODY – GLIDE (ROSGEN SURVEY)
- CONTOUR (1' INTERVAL) — MAJOR / MINOR
- TOP OF BANK
- ORDINARY HIGH WATER MARK
- FIELD DELINEATED WETLAND
- TRAVEL LANE/CONSTRUCTION MATTING
- TRENCH – 10'
- TRENCH – 20'

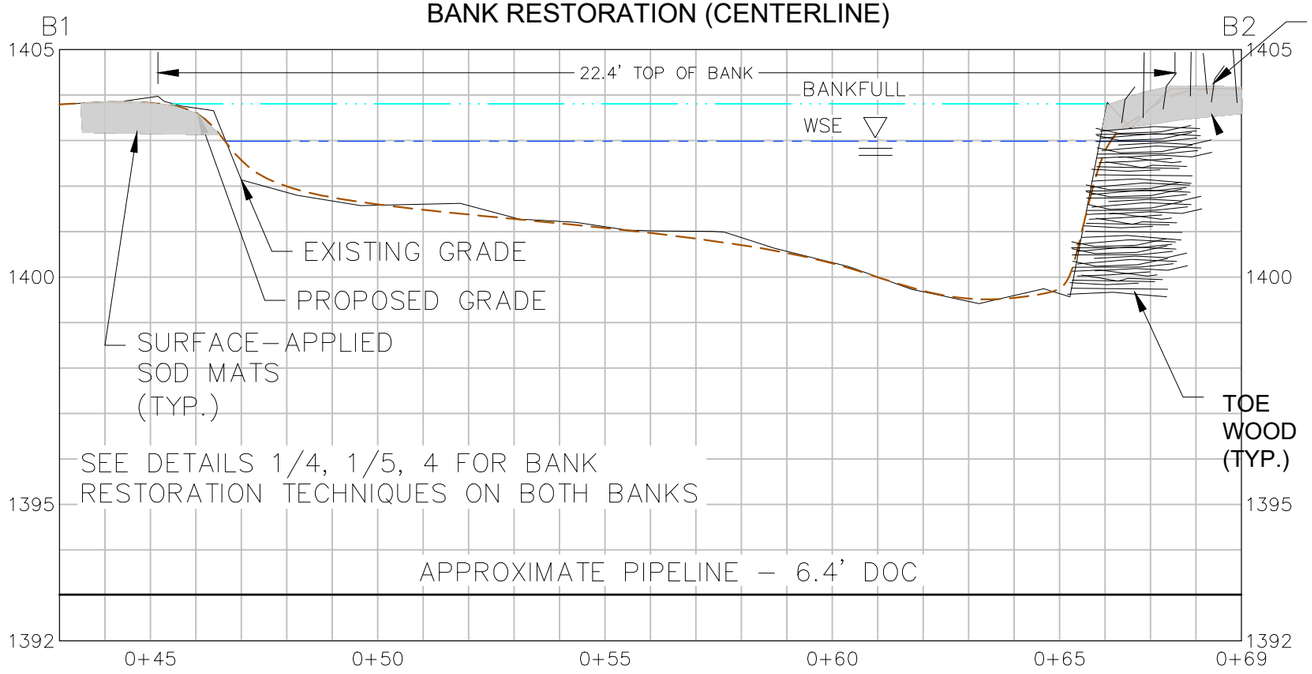
NO.	REVISION-DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE-SPECIFIC RESTORATION PLAN
BEAR CREEK – MP 940.1 – MDNR ID 27
STABILIZATION PLAN

SCALE	DWG. NO.	PAGE NO.
	SSRP-940.1-002	2/7

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

BANK RESTORATION (CENTERLINE)



5' 10'
HORIZONTAL SCALE

5' 10'
VERTICAL SCALE

LEGEND

- ENBRIDGE L3R PIPELINE
- PERMANENT RIGHT OF WAY
- TEMPORARY WORKSPACE
- WATERBODY CENTERLINE (CIVIL SURVEY)
- WATERBODY (NON-PUBLIC WATER)
- TOP OF BANK
- SUPPLEMENTAL CIVIL SURVEY BOUNDARY
- ELEVATION CONTOUR (MAJOR / MINOR)
- ORDINARY HIGH WATER MARK
- FIELD DELINEATED WETLAND
- TRAVEL LANE/CONSTRUCTION MATTING
- INVASIVE SPECIES
- TRENCH BREAKER
- SLOPE BREAKER (ACTUAL LOCATION MAY BE ADJUSTED IN THE FIELD)
- TOE WOOD
- SOD MATS
- LIVE STAKES

	COMMON NAME	SCIENTIFIC NAME
LIVE STAKE SPECIES	ELDERBERRY	SAMBUCUS CANADENSIS
	HIGH BUSH CRANBERRY	VIBURNUM OPOLUS (TRILOBUM)
	RED-OSIER DOGWOOD	CORNUS STOLONIFERA
	SILKY DOGWOOD	CORNUS AMOMUM
TRANSPLANTS	SPECKELD ALDER	ALNUS INCANA
	WILLOW	SALIX SPP.
	DOGWOOD	CORNUS SPP.
SHRUB	NONE	NONE

1. PRELIMINARY SPECIES. PRIOR TO RESTORATION ACTIVITIES, ALL SPECIES WILL BE REQUIRED TO BE VERIFIED AS NATIVE AND FOUND WITHIN THE COUNTY WHERE PLANTED ON MNTAXA.
2. LIVE STAKE SPECIES SELECTION: USE AT LEAST THREE (3) SPECIES WITH NO MORE THAN 60% OF ANY ONE (1) SPECIES; ALTERNATIVE SPECIES MAY BE SELECTED BASED ON SITE CONDITIONS AND AVAILABILITY. ALTERNATIVE SPECIES SHOULD BE REVIEWED AGAINST USDA DATA BASE FOR MN NATIVE SPECIES.
3. (WHERE APPLICABLE) TRANSPLANTS AND/OR CONTAINER SHRUBS MAY BE SUBSTITUTED FOR LIVE STAKES BASED ON SITE SPECIFIC CONDITIONS.
   - 3.1. CONTAINER PLANTED SHRUBS ARE RECOMMENDED TO BE 18"– 24" IN SIZE.
   - 3.2. CONTAINER PLANTED SHRUBS SPACING: 1 SHRUB PER 3 LINEAR FEET OF BANK, ADDITIONAL ROWS SPACED 3 FEET APART, AND 3–5 SHRUBS OF THE SAME SPECIES.
4. (WHERE APPLICABLE) TRANSPLANTS SHOULD BE EXCAVATED WITH A MINIMUM OF 12" SOIL, DIAMETER EQUAL TO PLANT DRIP LINE, AND LOOSE UNBOUND BALL.
5. LIVE STAKE SPACING (WHERE APPLICABLE): STAGGER 1 STAKE PER 3 LINEAR FEET OF STREAM BANK IN 2 – 3 ROWS SPACED 1 FOOT APART. PLACE FIRST ROW ALONG TOP OF BANK (BANKFULL) AND THE LOWER ROW(S) BETWEEN THE TOP OF BANK AND OHWM.

4 VEGETATION CHART

LIVE STAKE (TYP.)

RESTORATION NOTES:

GENERAL
1. REFER TO RESTORATION DETAIL SHEETS FOR ADDITIONAL INFORMATION RELATED TO PROPOSED RESTORATION MEASURES.
2. REFER TO SITE PHOTOS FOR INFORMATION ON PRE-CONSTRUCTION CROSSING CONDITIONS AND TO PROVIDE ADDITIONAL GUIDANCE FOR RESTORATION EFFORTS.

TOE WOOD
1. ROUGH GRADE CHANNEL BED FEATURES INCLUDING PLACEMENT OF SUBSTRATE.
2. INSTALL FOOTER LOG(S) ALONG PROPOSED TOE OF SLOPE. FOOTER LOGS SHOULD BE ANGLED TO ALLOW FOR TOE ALIGNMENT TO GENERALLY MATCH THE EXISTING CURVE AND EVENLY TRANSITION FROM UPSTREAM TO DOWNSTREAM.
3. PUSH FOOTER LOG INTO SOIL APPLY A SMALL AMOUNT OF GRAVEL OR STONE AS NEEDED TO PREVENT FLOATATION OF FOOTER LOG PRIOR TO PLACING WOODY DEBRIS.
4. PLACE A LAYER WOODY DEBRIS IN 6" TO 8" LIFTS, APPLY 3"-4" GRAVEL AND/OR SOIL FILL AND COMPACT WITH EXCAVATOR BUCKET. WASH FILL MATERIAL INTO WOODY DEBRIS MATRIX WITH WATER FROM CHANNEL. APPLY ADDITIONAL LAYERS "AS NEEDED" TO REACH THE SPECIFIED TOE WOOD HEIGHT.
5. PLACE STACKED SOD MATS ABOVE TOE WOOD. THE USE OF TRANSPLANTS OR FABRIC LIFTS MAY BE FIELD APPROVED BY ENBRIDGE IN CONSULTATION WITH MN DNR.

SOD MATTING
1. REMOVE 15 LINEAR FEET OF VEGETATED MATS ON EITHER SIDE OF THE STREAM CROSSING USING ONSITE EQUIPMENT WHICH CAN UNDERCUT THE VEGETATION FOR REMOVAL. SMALL SHRUBS AND/OR TREES WITHIN THE SOD MATS ARE ACCEPTABLE AND SHOULD NOT BE REMOVED.
2. DEPENDING ON THE LEVEL OF SATURATION AT THE TIME OF REMOVAL, IT MAY BE DIFFICULT TO OBTAIN INTACT CONSOLIDATED MATS, BUT GENERALLY THE NATIVE VEGETATION WILL BE RETAINED AND CAPTURED FOR PLACEMENT.
3. SOD MATS CAN BE TRANSPLANTED DURING ANY SEASON.
4. SOD MAT WILL BE PLACED ON CLEAR GROUND OR MATS WITHIN THE WORKSPACE.
5. MONITOR MATS TO SUPPORT SURVIVABILITY; WATERING MAY BE NEEDED.
6. PRIOR TO PLACEMENT OF SOD MATS FINISH GRADE CHANNEL BANK AND ADJACENT FLOODPLAIN APPLICATION AREA TO PROVIDE A SMOOTH AND EVEN SURFACE. SUBGRADE ELEVATION SHOULD ALLOW FOR THE FINISHED SOD SURFACE TO TRANSITION EVENLY WITH THE CHANNEL BANKS UPSTREAM AND DOWNSTREAM OF THE INSTALLATION AREA. AVOID ABRUPT CHANGES IN GRADE.
7. VEGETATED MATS WILL BE RETURNED/SET IN PLACE WITH ONSITE EQUIPMENT.
   a. SURFACE APPLIED SOD MATTING SHOULD BE PLACED WITH THE LONG SIDE PERPENDICULAR TO THE CHANNEL / FLOW.
   b. STACKED SOD MATTING SHOULD BE PLACED WITH THE LONG SIDE PARALLEL TO THE CHANNEL / FLOW.
8. WHEN PLACING SOD MATS, DO NOT LEAVE LARGE GAPS BETWEEN EACH SOD MAT AS NON-NATIVE VEGETATION WILL QUICKLY ATTEMPT TO COLONIZE THESE VOIDS.
9. WATER SOD MATS AFTER REPLACEMENT IF CONDITIONS ARE HOT AND DRY. DAMP AND/OR FROZEN SOD MATS DO NOT REQUIRE WATERING.
10. 1THE TOP MAT AND/OR OTHER MATS CAN BE ANCHORED WITH A LIVE AND/OR DEAD STOUT STAKE TO ENSURE THAT IT DOES NOT MOBILIZE DURING A FLOOD EVENT BEFORE THE ROOTS HAVE ESTABLISHED.
11. THE VEGETATED MATS WILL BE REPLACED AS SOON AS PRACTICAL FOLLOWING BACKFILLING OF THE TRENCH AND STABILIZED PER THE TIMING REQUIREMENTS DESCRIBED IN SECTION 1.9.1 OF THE EPP.

LIVE STAKING
1. CLEANLY REMOVE ALL SIDE BRANCHES AND THE TOP GROWTH, AND FASHION THE CUTTINGS INTO LIVE STAKES AS DEPICTED IN THE DETAIL DRAWING. AN OPTION DURING PREPARATION IS TO PAINT AND SEAL THE TOP OF THE LIVE STAKE BY DIPPING THE TOP 1-2 INCHES INTO A 50-50 MIX OF LIGHT-COLORED LATEX PAINT AND WATER. SEALING THE TOP OF STAKE WILL REDUCE THE POSSIBILITY OF DESICCATION, ASSURE THE STAKES ARE PLANTED WITH THE TOP UP, AND MAKES THE STAKES MORE VISIBLE FOR SUBSEQUENT PLANTING EVALUATIONS.
2. USE A PUNCH BAR OR HAND AUGER TO CREATE A NARROW PILOT HOLE, PERPENDICULAR TO THE SLOPE, THROUGH ANY EROSION CONTROL MATTING, RIP RAP, OR OTHER REVETMENT, FILTER FABRIC, ETC., IF PRESENT, AND DEEP ENOUGH TO INTERCEPT THE WATER TABLE. THE HOLE SHOULD BE ONLY AS LARGE AS NECESSARY TO INSTALL THE LIVE STAKE WITHOUT DAMAGE WHILE ENSURING THE HIGHEST AMOUNT OF STAKE-SOIL CONTACT.
3. INSERT THE POINTED END OF THE LIVE STAKE INTO THE PILOT HOLE. TAMP INTO THE GROUND WITH A DEAD BLOW HAMMER TAKING CARE NOT TO SPLIT OR OTHERWISE DAMAGE THE LIVE STAKE. USE WATER, SOIL BACKFILL, TAMPING, ETC. TO ACHIEVE GOOD SOIL-TO-STEM CONTACT AND REMOVE AIR POCKETS.
4. USE ONSITE EQUIPMENT TO APPLY WATER FROM THE CHANNEL AFTER INSTALLATION.
5. ALL CUTS SHOULD BE CLEAN AND SMOOTH. NO CRACKED OR SPLIT LIVE STAKES SHOULD BE USED. IF THEY SPLIT DURING TAMPING, THEY SHOULD BE CUT BELOW THE CRACK OR REPLACED.
6. THE SPECIFIED NUMBER OF LIVE STAKES SHOULD BE INSTALLED INTO THE SOIL AND PROTRUDE ABOVE THE SOIL AND ANY SOD MATTING, MULCHING, EROSION CONTROL MATTING, RIP RAP, OR OTHER REVETMENT.
7. LIVE STAKE SHOULD NOT MOVE AFTER INSTALLATION; ENSURING IT IS IN FIRM CONTACT WITH THE SOIL.
8. IT IS IMPORTANT TO ENSURE THAT THE UPSTREAM AND DOWNSTREAM ENDS OF THE LIVE STAKING A MERGE SMOOTHLY INTO THE UNDISTURBED BANK BEYOND THE PROJECT AREA. THE RATE OF INSTALLING LIVE STAKES SHOULD TAPER OFF GRADUALLY TO BLEND IN WITH THE EXISTING VEGETATION.

NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
BEAR CREEK – MP 940.1 – MDNR ID 27
SITE SPECIFIC DETAILS

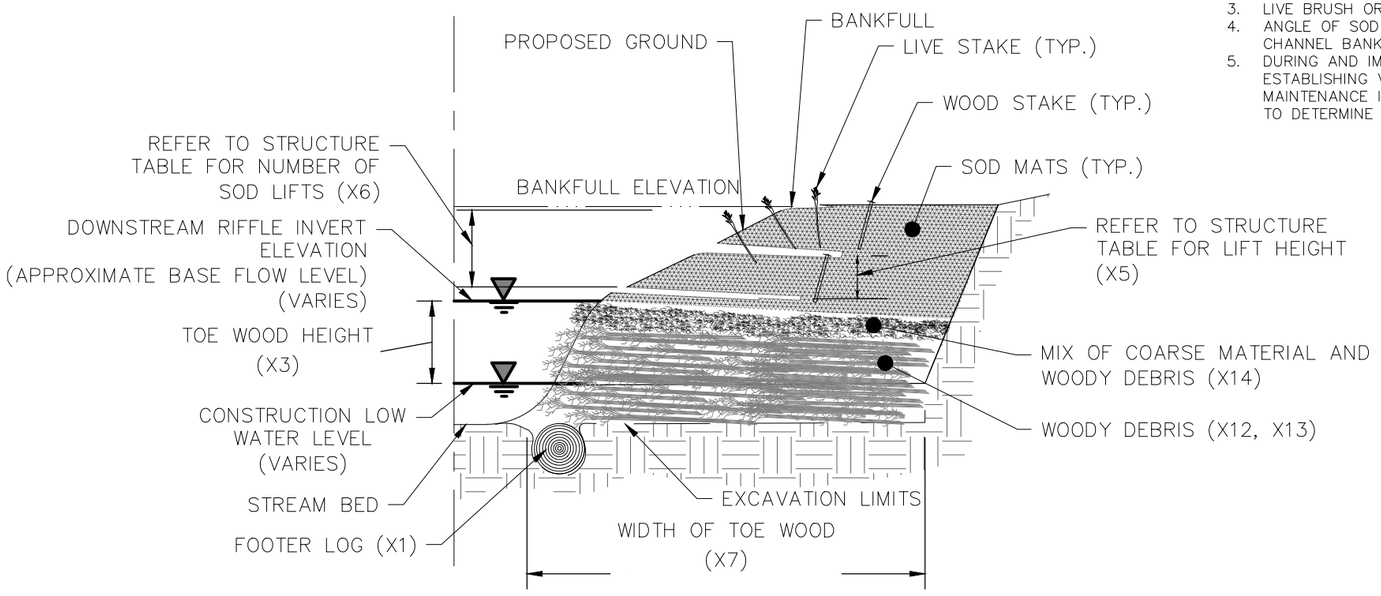
SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP–940.1–004	3/7

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

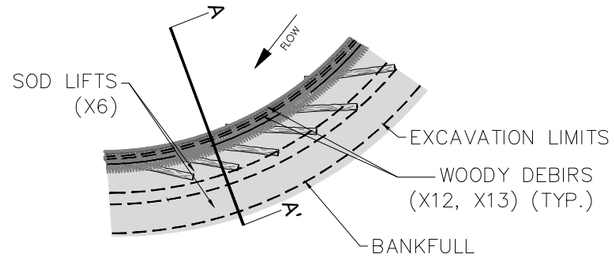
TOE WOOD DIMENSIONS			
VARIABLE	**VALUE**	**TYPICAL UNIT**	**DESCRIPTION**
X1	6.0 - 10.0	IN.	FOOTER LOG DIAMETER
X2	8.0 - 12.0	FT.	FOOTER LOG LENGTH
X3	18.0	IN.	TOE WOOD HEIGHT
X4	SEE SHEET 3	N/A	MATCH TYPICAL SECTION
X5	SEE SHEET 5	FT.	SOD LIFT HEIGHT
X6	3.0	#	SOD LIFTS
X7	8.0 - 10.0	FT.	TOE WOOD WIDTH
X8	3.0 - 6.0	FT.	SOD LIFT WIDTH
X9	24.0	IN.	WOOD STAKE LENGTH
X10	4.0	IN.	WOOD STAKE WIDTH (TOP)
X11	0.5	IN.	WOOD STAKE WIDTH (BOTTOM)
X12	1/2 - 3.0	IN.	WOODY DEBRIS DIAMETER
X13	8.0 - 12.0	FT.	WOODY DEBRIS LENGTH
X14	3" MINING GRAVEL WITH FINES	%	SELECT COARSE MATERIAL BACKFILL (BY VOLUME)

TOE WOOD EXAMPLE

NOTES:
1. WOODY MATERIAL OF APPROPRIATE SIZE CONSISTING OF LOGS, TRUNKS, LIMBS, BRANCHES, AND SMALLER WOODY DEBRIS INCLUDING TOPS OR SLASH. ON-SITE WOODY MATERIAL IS PREFERRED.
2. WOODY DEBRIS SHOULD BE GREEN OR RELATIVELY GREEN AND MAY CONSIST OF HARDWOODS, CONIFERS, OR A COMBINATION OF BOTH.
3. LIVE BRUSH OR OTHER BANK VEGETATION MAY BE INCORPORATED.
4. ANGLE OF SOD MAT SURFACE SHALL MATCH THE PROPOSED CHANNEL CROSS SECTION AND PROVIDE A SMOOTH AND EVEN CHANNEL BANK SURFACE BETWEEN UPSTREAM AND DOWNSTREAM BANKS.
5. DURING AND IMMEDIATELY AFTER CONSTRUCTION, BANK SLOPES ABOVE THE WOOD TOE ARE VULNERABLE TO EROSION. ESTABLISHING VEGETATION OR OTHER COVER MATERIAL AS SOON AS POSSIBLE WILL HELP REDUCE EROSION. ADDITIONAL MAINTENANCE IS NOT EXPECTED ONCE VEGETATION ESTABLISHES. INSPECTION AFTER LARGE FLOW EVENTS MAY BE ADVISABLE TO DETERMINE IF ANY MATERIAL MOVEMENT OR UNEXPECTED SCOUR HAS OCCURRED.



SECTION A-A'



PLAN VIEW AT BANKFULL ELEVATION

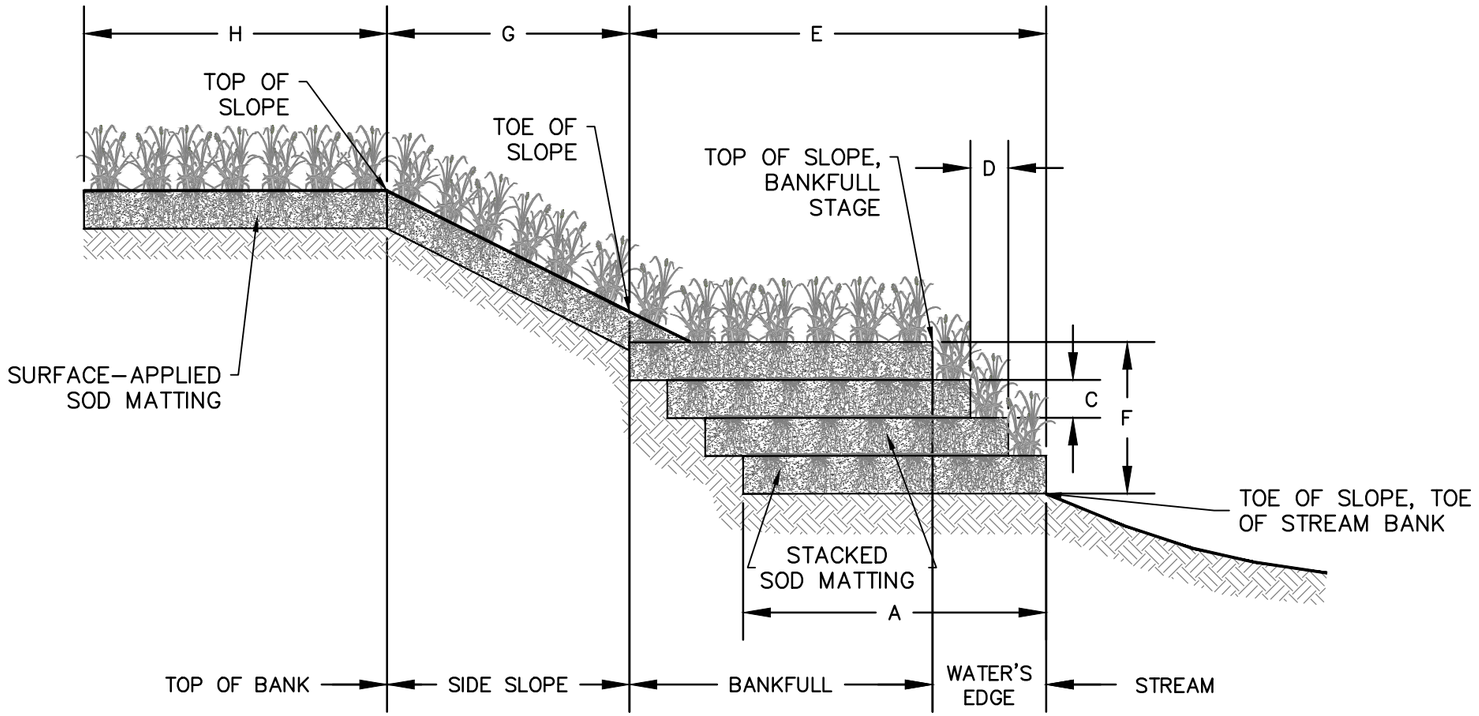
1 TOE WOOD DETAIL

NO.	REVISION-DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

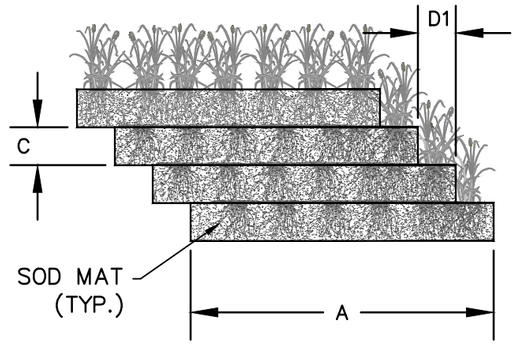
ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE-SPECIFIC RESTORATION PLAN
BEAR CREEK – MP 940.1 – MDNR ID 27
SITE SPECIFIC DETAILS

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP-940.1-004	4/7

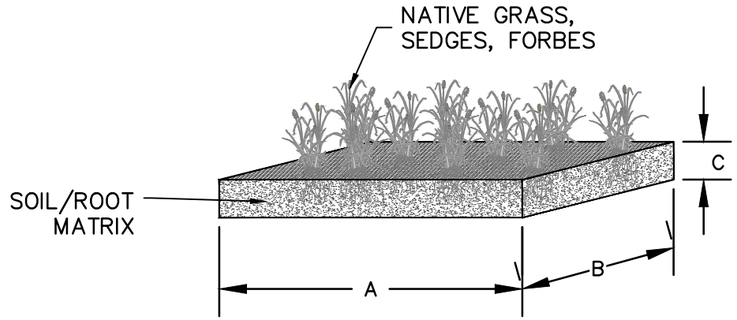
PLOTTED SIZE: ANSI FULL BLEED B (17x11)



CROSS SECTION



STACKED SOD MATTING DETAIL



SOD MAT DETAIL

DIMENSION	NAME	TYPICAL UNIT	VALUE	DESCRIPTION
A	SOD MAT WIDTH	FEET	3–4	WIDTH OF INDIVIDUAL SOD MAT.
B	SOD MAT LENGTH	FEET	3–6	LENGTH OF INDIVIDUAL SOD MAT.
C	SOD MAT THICKNESS	INCHES	12	THICKNESS OF INDIVIDUAL SOD MAT.
D	STACKED SOD MAT SETBACK	FEET, INCHES	N/A	THE DISTANCE BETWEEN THE EDGES OF SOD MATS STACKED TO FORM A SLOPE
E	WIDTH OF STACKED SOD MATS	FEET, INCHES	N/A	WIDTH OF A BANK CREATED BY STACKED SOD MATS
F	HEIGHT OF STACKED SOD MATS	FEET, INCHES	N/A	HEIGHT OF A SLOPE CREATED BY STACKED SOD MATS
G	WIDTH OF SURFACE- APPLIED SOD MATS	FEET	10–20	WIDTH OF A SLOPE STABILIZED WITH SURFACE-APPLIED SOD MATS
H	TOP OF BANK SOD MATTING DISTANCE	FEET	15	DISTANCE SOD MATTING IS INSTALLED ON THE TOP OF BANK

NOTES:

1. DIMENSION LABELS ARE REFERENCED IN THE DETAIL DRAWINGS.

SOD MATTING DETAIL

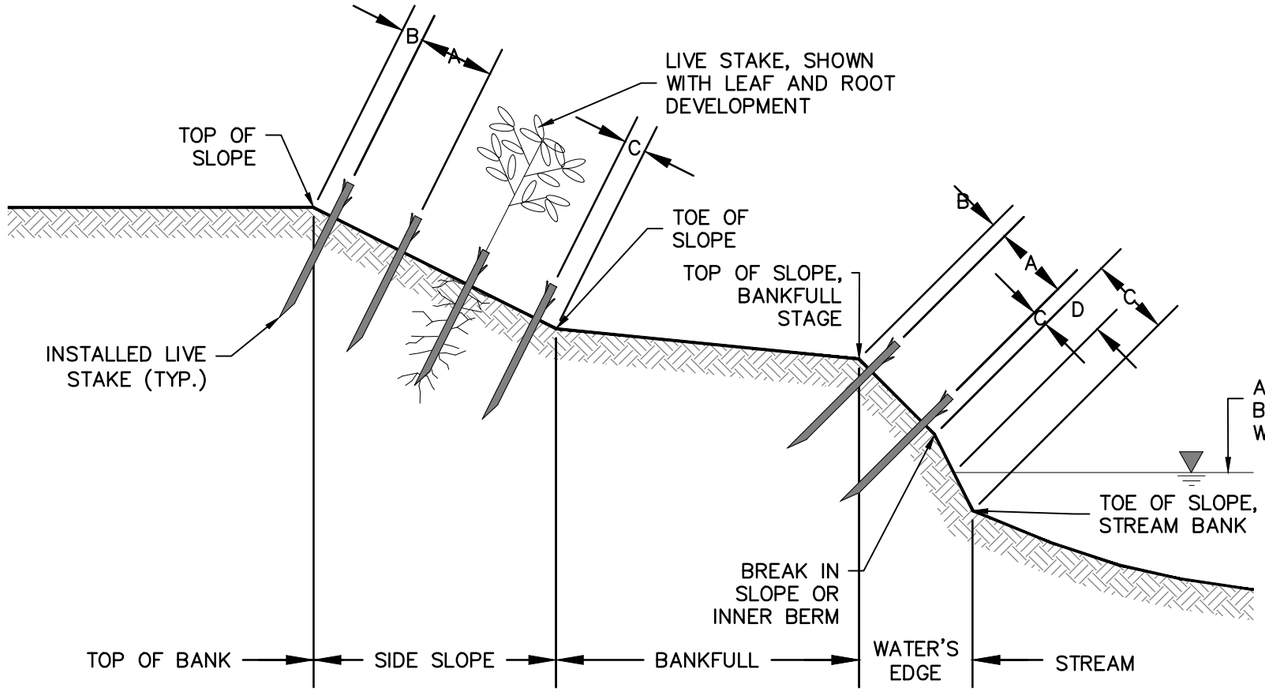
SOD MAT EXAMPLES

NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

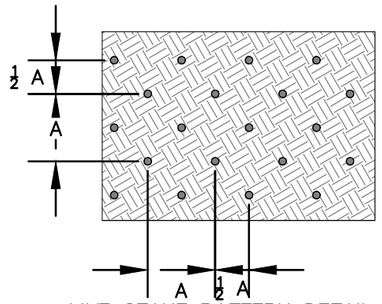
ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
LOST RIVER – MP 904.0 – MDNR ID 14
SITE SPECIFIC DETAILS

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP–904.0–004	5/7

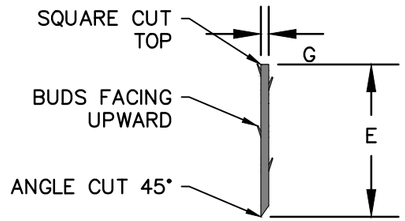
PLOTTED SIZE: ANSI FULL BLEED B (17x11)



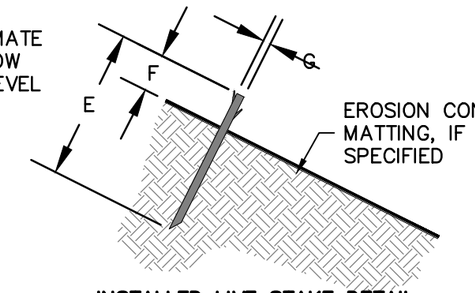
CROSS SECTION



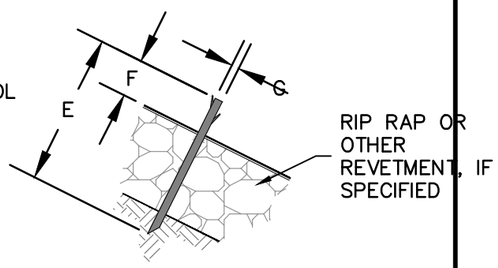
LIVE STAKE PATTERN DETAIL



LIVE STAKE DETAIL



INSTALLED LIVE STAKE DETAIL



INSTALLED JOINT PLANTING DETAIL

DIMENSION	NAME	TYPICAL UNIT	VALUE	DESCRIPTION
A	LIVE STAKE SPACING	FEET	3.0.C	SPACING BETWEEN INDIVIDUALLY INSTALLED LIVE STAKES. STAKES CAN BE PLACED IN A TRIANGULAR GRID (NRCS 2007A) OR RANDOMLY (NRCS 2007A, IOWA DNR 2006). RECOMMEND SPECIES DIVERSITY THROUGHOUT PROJECT AREA.
B	LIVE STAKE – TOP OF SLOPE PLACEMENT	INCHES	0–3	POSITION OF LIVE STAKE RELATIVE TO THE TOP OF A SLOPE
C	LIVE STAKE – TOE OF SLOPE PLACEMENT	INCHES	0–3	POSITION OF LIVE STAKE RELATIVE TO THE TOE OF A SLOPE
D	LIVE STAKE – BASE FLOW RELATIONSHIP	INCHES		PLACEMENT OF LOWER ROW OF LIVE STAKES RELATIVE TO THE APPROXIMATE BASE FLOW WATER LEVEL WITH CONSIDERATION GIVEN TO DURATION OF INUNDATION DURING BANKFULL AND OTHER HIGH FLOW EVENTS.
E	LIVE STAKE LENGTH	INCHES	24–36	LENGTH OF PREPARED DORMANT LIVE CUTTING FROM WOODY PLANT TO BE USED AS LIVE STAKE. LENGTH SHOULD BE SUFFICIENT TO REACH LOW-FLOW WATER TABLE ELEVATION.
F	LIVE STAKE PROTRUSION	INCHES	¾	DISTANCE INSTALLED LIVE STAKE SHOULD PROTRUDE ABOUT 20% FROM THE GROUND. AT LEAST TWO BUDS OR BUD SCARS SHOULD BE PRESENT ABOVE THE GROUND IN THE FINAL INSTALLATION, DEPENDING ON THE SURROUNDING VEGETATION HEIGHT.
G	LIVE STAKE DIAMETER	INCHES	½ – 1 ½	DIAMETER OF PREPARED DORMANT LIVE CUTTING FROM WOODY PLANT TO BE USED AS LIVE STAKE – TYPICALLY CITE A PERMISSIBLE MINIMUM AND MAXIMUM DIAMETER.

NOTES:

1. DIMENSION LABELS ARE REFERENCED IN THE DETAIL DRAWINGS.

LIVE STAKE PLANTINGS DETAIL

LIVE STAKE EXAMPLE

NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
LOST RIVER – MP 904.0 – MDNR ID 14
SITE SPECIFIC DETAILS

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP–904.0–004	6/7

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

1 CENTERLINE – FACING NORTH BANK

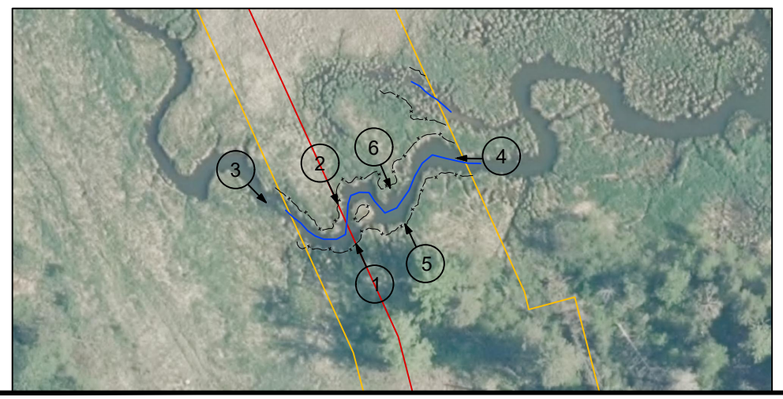
2 CENTERLINE – FACING SOUTH BANK

3 EDGE OF WORKSPACE – FACING DOWNSTREAM

4 EDGE OF WORKSPACE – FACING UPSTREAM

5 BRIDGE – FACING NORTH BANK

6 BRIDGE – FACING SOUTH BANK



NOTES:

1. AIR PHOTOS ARE FROM 2018 ENBRIDGE AERIAL PHOTOGRAPHY.
2. ADDITIONAL ON–THE GROUND PHOTOS MAY BE TAKEN PRIOR TO CONSTRUCTION AT MDNR REQUEST.
3. PRE–CONSTRUCTION PHOTOS WILL BE USED TO AID IN RESTORATION.

NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING	MJT	10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
BEAR CREEK – MP 940.1 – MDNR ID 27
PHOTO PAGE

SCALE	DWG. NO.	PAGE NO.
	SSRP–940.1–005	5/5

ENBRIDGE

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

GENERAL

1. THE SPECIFICATIONS WITHIN THIS SSRP MAY MODIFY OR REPLACE PROJECT–WIDE STANDARDS PRESENTED IN THE EPP. WHERE MATERIAL WITHIN THESE SSRPS EXCEEDS STANDARD CONSTRUCTION MEASURES IN THE EPP, THESE SSRPS SUPERSEDE THE EPP.

2. CONSTRUCTION AND RESTORATION OF WATERBODY CROSSINGS WILL FOLLOW THESE GENERAL STEPS:

   A. SITE CLEARING
   B. INSTALLATION OF TEMPORARY EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICES ("BMPS")
   C. BRIDGE INSTALLATION
   D. EXCAVATION/BACKFILLING OF THE WATERBODY INCLUDING:
      - SOD SAVING TOPSOIL SEGREGATION AT NON–WOODED SITES
      - STREAMBED MATERIAL SEGREGATION
      - PIPE INSTALLATION
      - BACKFILL, INCLUDING IMPLEMENTATION OF CONSTRUCTION–RELATED RESTORATION METHODS (I.E., TOE WOOD)
   E. REPLACEMENT OF STREAMBED MATERIAL AND TOPSOIL/SOD LAYER
   F. RESTORATION OF STREAM BANKS TO PRE–CONSTRUCTION CONTOURS
   G. IF FINAL GRADING NOT POSSIBLE AT THE TIME, TEMPORARY STABILIZATION AND REPLACEMENT/REINFORCEMENT OF TEMPORARY BMPS
   H. AFTER FINAL GRADING, PERMANENT SEEDING AND/OR WOODY VEGETATION RESTORATION, STABILIZATION AND REPLACEMENT/REINFORCEMENT OF TEMPORARY BMPS
   I. BRIDGE REMOVAL DURING FINAL RESTORATION AFTER STABILIZATION AND PERMANENT SEEDING
   J. POST–CONSTRUCTION MONITORING

CROSSING METHODS

1. ALL WATERBODY AND WETLAND CROSSINGS WILL BE CONDUCTED IN COMPLIANCE WITH SECTION 2.0 AND SECTION 3.0 OF THE ENVIRONMENTAL PROTECTION PLAN ("EPP"), RESPECTIVELY. SECTION 2.0 AND 3.0 OF THE WINTER CONSTRUCTION PLAN PRESENTS MODIFICATIONS FOR WATERBODY AND WETLAND CONSTRUCTION METHODS, RESPECTIVELY, IN WINTER CONDITIONS.

2. ENBRIDGE'S SUMMARY OF CONSTRUCTION METHODS AND PROCEDURES (THE "PROCEDURES," APPENDIX A OF THE EPP) OUTLINES THE VARIOUS CONSTRUCTION METHODS THAT ENBRIDGE MAY UTILIZE TO CONSTRUCT THROUGH WATERBODIES AND WETLANDS/BASINS AS PRESENTED ON THESE SITE–SPECIFIC RESTORATION PLANS ("SSRPS").

   A. DRY CROSSING (ISOLATED) METHODS (INCLUDING THE DRY CROSSING AND MODIFIED DRY CROSSING METHOD) ARE DESCRIBED SECTIONS 4.3 OF THE PROCEDURES, AND IN SECTIONS 2.5.2 AND 2.5.3 AND FIGURES 23 AND 24 OF THE EPP.
   B. THE BORE METHOD (NON–PRESSURIZED) IS DESCRIBED IN SECTION 3.5 OF THE PROCEDURES, AND SECTION 4.0 OF THE EPP.
   C. THE MODIFIED UPLAND CONSTRUCTION (WETLAND) METHOD IS DESCRIBED IN SECTION 3.3 OF THE PROCEDURES, AND SECTION 3.0 AND FIGURES 30 TO 34 OF THE EPP.
   D. ALTHOUGH NOT PROPOSED AS A PRIMARY METHOD AT THESE SSRP WATERBODIES, THE OPEN CUT (NON–ISOLATED) WATERBODY CROSSING METHOD IS DESCRIBED IN SECTION 4.1 OF THE PROCEDURES, AND SECTION 2.5.1 AND FIGURE 24 OF THE EPP.
   E. ALTHOUGH NOT PROPOSED AS A PRIMARY METHOD AT THESE SSRP WATERBODIES, THE PUSH–PULL METHOD IS DESCRIBED IN SECTION 3.4 OF THE PROCEDURES, AND SECTION 3.7.1 AND FIGURES 35 AND 36 OF THE EPP.

CLEARING/VEGETATION REMOVAL

1. STUMPS WITHIN THE TRENCH LINE WILL BE COMPLETELY REMOVED, GROUND, AND/OR HAULED OFF–SITE TO AN APPROVED LOCATION. TREE STUMPS OUTSIDE THE TRENCH LINE WILL BE GROUND BELOW NORMAL GROUND SURFACE TO FACILITATE A SAFE WORK AREA AND TO ALLOW TOPSOIL REMOVAL, IF NECESSARY. IN SOME CIRCUMSTANCES, TREE STUMPS OUTSIDE THE TRENCH LINE MAY BE COMPLETELY REMOVED TO ALLOW FOR A SAFE WORK AREA AND HAULED OFF–SITE TO AN APPROVED LOCATION AS OUTLINED IN SECTION 1.8.3 OF THE EPP.

2. CLEARING WILL BE CONDUCTED IN WATERBODIES AND WETLANDS AS OUTLINED IN SECTION 2.2 AND 3.2 OF THE EPP, RESPECTIVELY. CHIPS, MULCH, OR MECHANICALLY CUT WOODY DEBRIS SHALL NOT BE STOCKPILED IN A WETLAND. HYDRO–AX DEBRIS, OR SIMILAR CAN BE LEFT IN THE WETLAND IF SPREAD EVENLY IN THE CONSTRUCTION WORKSPACE TO A DEPTH THAT WILL ALLOW FOR NORMAL REVEGETATION, AS DETERMINED BY THE EI. CHIPPING IS NOT ALLOWED ON PUBLIC LANDS. ON PUBLIC LANDS, MULCH AND MECHANICALLY CUT WOODY DEBRIS MUST BE UNIFORMLY BROADCAST TO LESS THAN 2–INCH THICKNESS AND IN A MANNER THAT MAINTAINS VISIBLE GROUND.

3. ENBRIDGE WILL PROPERLY INSTALL AND MAINTAIN REDUNDANT SEDIMENT CONTROL MEASURES IMMEDIATELY AFTER CLEARING AND PRIOR TO INITIAL GROUND DISTURBANCE AT SURFACE WATERS LOCATED WITHIN 50 FEET OF THE PROJECT AND WHERE STORMWATER FLOWS TO THE SURFACE WATER (REFER TO THE ENVIRONMENTAL PLAN SHEETS IN THE SWPPP), AND WITHIN 100 FEET OF SPECIAL AND IMPAIRED WATERS, INCLUDING TROUT STREAMS.

4. ON PUBLIC LANDS AND WHEREVER PRACTICABLE AT WATERBODY CROSSINGS, ENBRIDGE WILL USE WILDLIFE–FRIENDLY EROSION AND SEDIMENT CONTROL BMPS THAT CONTAIN BIODEGRADABLE NETTING (CATEGORY 3N OR 4N NATURAL FIBER) AND WILL AVOID THE USE OF PLASTIC MESH (SECTIONS 1.17.1 AND 2.6.1 OF THE EPP).

TEMPORARY STABILIZATION

1. ON PORTIONS OF THE PROJECT WHERE WORK WILL BE OCCURRING DURING APPLICABLE "WORK IN WATER RESTRICTIONS" FOR PUBLIC WATERS (REFER TO SECTION 2.1), ALL EXPOSED SOIL AREAS WITHIN 200 FEET OF THE WATER'S EDGE, AND THAT DRAIN TO THAT WATER, WILL BE STABILIZED WITHIN 24 HOURS DURING THE RESTRICTION PERIOD. STABILIZATION OF ALL EXPOSED SOILS WITHIN 200 FEET OF THE PUBLIC WATER'S EDGE, AND THAT DRAIN TO THAT WATER, WILL BE INITIATED IMMEDIATELY AND COMPLETED WITHIN 7 CALENDAR DAYS WHENEVER CONSTRUCTION ACTIVITY HAS PERMANENTLY OR TEMPORARILY CEASED ON ANY PORTION OF THE SITE OUTSIDE OF THE RESTRICTION PERIOD. THESE AREAS WILL BE IDENTIFIED ON THE ENVIRONMENTAL PLAN SHEETS ACCOMPANYING THE SWPPP.

2. HYDRO–MULCH AND LIQUID TACKIFIER CAN BE USED IN PLACE OF CERTIFIED WEED–FREE STRAW OR HAY MULCH WITH PRIOR APPROVAL FROM ENBRIDGE. ALL HYDROMULCH AND LIQUID TACKIFIER PRODUCTS USED WILL BE ON THE APPLICABLE STATE DOT PRODUCT LIST. HYDRO–MULCH AND LIQUID TACKIFIER PRODUCTS CONTAINING PLASTIC/POLYPROPYLENE FIBER ADDITIVES AND MALACHITE GREEN (COLORANT) WILL NOT BE UTILIZED ON THIS PROJECT. APPLICATION RATES WILL BE AT THE MANUFACTURER'S RECOMMENDED RATE. ENBRIDGE WILL AVOID THE USE OF HYDROMULCH ON PUBLIC LANDS; HOWEVER, ENBRIDGE MAY USE HYDROMULCH ON STEEP SLOPES TO PREVENT EROSION UNTIL PERMANENT COVER HAS BEEN ESTABLISHED AS OUTLINED IN SECTION 1.8.3 OF THE EPP.

RESTORATION AND STABILIZATION

1. ENBRIDGE WILL RESTORE THE STREAM BANKS AS NEAR AS PRACTICABLE TO PRE–CONSTRUCTION CONDITIONS UNLESS THAT SLOPE IS DETERMINED TO BE UNSTABLE. IF THE SLOPE IS CONSIDERED UNSTABLE, ENBRIDGE WILL RESHAPE THE BANKS TO PREVENT SLUMPING. FOR PUBLIC WATERS, ENBRIDGE WILL RETURN THE BANK TO PRE–CONSTRUCTION CONTOURS, UNLESS OTHERWISE DIRECTED BY THE SITE–SPECIFIC RESTORATION PLAN. IF ENBRIDGE CANNOT RESTORE TO PRE–CONSTRUCTION CONTOURS AT A PUBLIC WATER, ENBRIDGE WILL CONSULT WITH THE MDNR BEFORE PROCEEDING FURTHER AS OUTLINED IN SECTION 2.6 OF THE EPP.

2. UNSTABLE SOILS AND/OR SITE–SPECIFIC FACTORS SUCH AS STREAM VELOCITY AND FLOW DIRECTION MAY REQUIRE ADDITIONAL RESTORATION EFFORTS, SUCH AS INSTALLATION OF WOODY VEGETATION, GEOTEXTILE FABRIC, OR TREE, LOG, ROOTWAD, OR BOULDER REVETMENTS TO STABILIZE DISTURBED STREAM BANKS (SEE FIGURE 29) AS OUTLINED IN SECTION 2.6.2 OF THE EPP. ENBRIDGE WILL WORK WITH THE MDNR TO ENSURE ALL WORK/ADJUSTMENTS ARE APPROVED AND ARE CONDUCTED WITHIN APPLICABLE TIMING RESTRICTIONS.

3. IN UPLAND AND WETLAND AREAS, CLEANUP AND ROUGH GRADING WILL OCCUR AS OUTLINED IN SECTIONS 1.16 AND 3.9 OF THE EPP. ENBRIDGE WILL BACKFILL THE TRENCH TO AN ELEVATION SIMILAR TO THE ADJACENT AREAS OUTSIDE THE TRENCH LINE AND WILL ADD A SLIGHT CROWN OF APPROXIMATELY 3 TO 6 INCHES (DEPENDING ON SOIL TYPE) OVER THE BACKFILLED TRENCH TO ALLOW FOR SUBSIDENCE. GENERALLY, EXCESS SUBSOIL DISPLACED BY THE PIPE INSTALLATION WILL BE SPREAD ACROSS THE PORTION OF THE CONSTRUCTION WORKSPACE WHERE TOPSOIL REMOVAL HAS OCCURRED. ANY REMAINING EXCESS SUBSOIL WILL BE REMOVED AND DISPOSED OF AT AN APPROVED OFF–SITE LOCATION AS NEEDED TO ENSURE CONTOURS ARE RESTORED TO AS NEAR AS PRACTICABLE TO PRE–CONSTRUCTION CONDITIONS.

4. REVEGETATION ACTIVITIES WILL OCCUR AS OUTLINED IN SECTION 7.0 OF THE EPP. SEED MIXES AT PUBLIC WATERS WILL BE SELECTED AND APPLIED AS INDICATED IN THE PLANTING PLAN, WHICH IS APPENDIX A OF THE POST–CONSTRUCTION VEGETATION MANAGEMENT PLAN FOR PUBLIC LANDS AND WATERS ("VMP"). SEED MIXES RELATIVE TO THESE SSRP CROSSINGS ARE CODED AS FOLLOWS:

A	EMERGENT (34–181)	G	DRY PRAIRIE GENERAL (35–221)
B	RIPARIAN NE (34–361)	H	MESIC PRAIRIE GENERAL (35–241)
C	RIPARIAN S&W (34–261)	I	MESIC PRAIRIE NW (35–441)
D	WET MEADOW NE (34–371)	J	DRY PRAIRIE NORTHWEST (35–421)
E	WET MEADOW S&W (34–271)	K	WOODLAND EDGE NE (36–311)
F	WETLAND REHABILITATION (34–171)	L	NATURAL REVEGETATION

5. ENBRIDGE WILL NOT SEED STANDING WATER OR WOODED (PSS AND PFO) WETLAND COMMUNITIES. NATURAL REVEGETATION WILL TAKE PLACE FROM EXISTING PLANT MATERIAL AND ROOT STOCK IN THESE COMMUNITIES.

6. ALL MATERIALS USED FOR CONSTRUCTION OF THE PROJECT MUST BE REMOVED FROM THE SITE.

7. ENBRIDGE WILL CONDUCT POST–CONSTRUCTION MONITORING IN ACCORDANCE WITH THE POST–CONSTRUCTION MONITORING PLAN FOR WETLANDS AND WATERBODIES, AND IN ACCORDANCE WITH THE VMP FOR THE UPLAND PORTIONS OF THE PROJECT ON PUBLIC LANDS.

NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING	MJT	10/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN

CONSTRUCTION NOTES

SCALE	DWG. NO.	PAGE NO.
	SSRP–NOTES	

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

MDNR ID No. 28: MP 941; Mississippi River (M)

MISSISSIPPI RIVER
MDNR ID 28 / SURVEY ID CLC5098aWB
CLEARWATER COUNTY, MINNESOTA
S35-T145N-R36W BEAR CREEK TWP
MN-CL-C5-098.000

SCALE IN FEET 0 87.5 175

MN-CL-C5-097.000

MN-CL-C5-099.000

MN-CL-C5-098.000

WETLAND BOUNDARY

95' TEMPORARY WORKSPACE

225'

75'

HDD ENTRY*

940.8

940.9

CR-40

50' PERMANENT RIGHT OF WAY

A_2

B_1

941

136'

FLOW

TOB

TOB

APPROXIMATE LOCATION OF TEMPORARY CLEAR SPAN BRIDGE
SEE HDD BRIDGE PLAN FOR TYPICAL CLEAR SPAN BRIDGE

941.1

ADDITIONAL TEMPORARY WORKSPACE

110'

HDD EXIT*

941.2

PROPOSED ENBRIDGE L3R PIPELINE

MISSISSIPPI RIVER

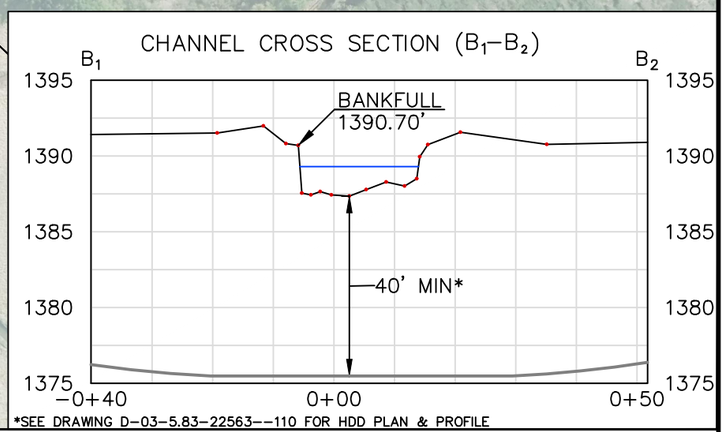
B_2

A_1

SECTION 26
SECTION 35

2018 SUMMER IMAGERY

CHANNEL CROSS SECTION (B_1–B_2)



*SEE DRAWING D-03-5.83-22563--110 FOR HDD PLAN & PROFILE

CHANNEL CROSS SECTION NOTE:
1. CHANNEL LOCATIONS, DIMENSIONS, AND/OR ELEVATIONS ARE BASED ON 2015 TOPOGRAPHIC/BATHYMETRIC SURVEY(S), AND AS SUCH DO NOT REFLECT CHANGES TO THE CHANNEL THAT MAY HAVE OCCURRED SINCE THAT TIME.

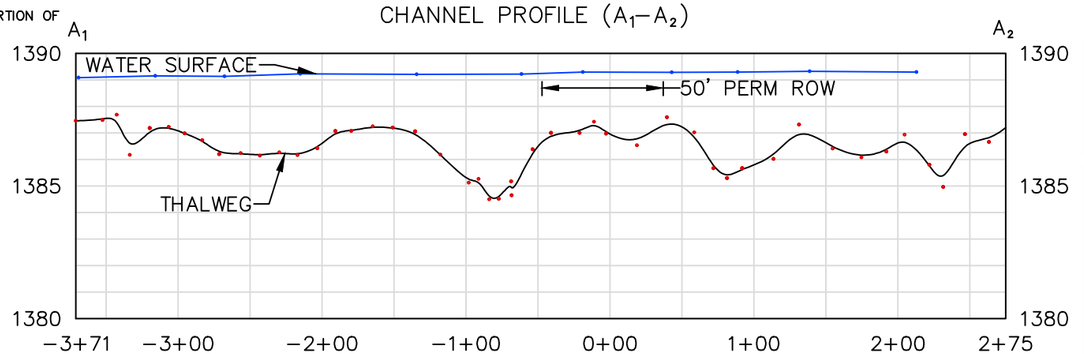
NOTES
1. NO FEMA DIGITAL FLOODPLAIN DATA AVAILABLE
2. SOBS (O/H) OR NPC (S1–3): YES (HIGH SOBS)
3. MDNR REGION 1 PWI – COOL/WARM WATER FISHERY: MARCH 15 – JUNE 30. 24-HOUR SOIL STABILIZATION REQUIRED WITHIN 200 FEET DURING RESTRICTION.
4. WHEN WORKING WITHIN "WORK IN WATER RESTRICTIONS", STABILIZE ALL EXPOSED SOIL AREAS WITHIN 200 FEET OF THE WATER'S EDGE, AND THAT DRAIN TO THAT WATER, WITHIN 24 HOURS. STABILIZATION WILL BE INITIATED IMMEDIATELY AND COMPLETED WITHIN 7 CALENDAR DAYS WHENEVER CONSTRUCTION ACTIVITY HAS PERMANENTLY/ TEMPORARILY CEASED ON ANY PORTION OF THE SITE OUTSIDE OF THE RESTRICTION PERIOD.

LEGEND

- PROPOSED ENBRIDGE L3R PIPELINE
- OTHER PIPELINE
- PERMANENT RIGHT OF WAY
- TEMPORARY WORKSPACE
- WATERBODY (ROSGEN SURVEY – THALWEG)
- TRACT BOUNDARY
- ROAD CENTERLINE
- FENCE
- ACCESS ROAD
- WETLAND
- ADDITIONAL TEMPORARY WORKSPACE
- MN-XX-XX-XXX.XXX — TRACT ID
- ROSGEN SURVEY POINT – WATER SURFACE
- ROSGEN SURVEY POINT – RIVER BOTTOM (THALWEG)
- HDD ENTRY EXIT POINT
- TOP OF BANK

FOR ENVIRONMENTAL REVIEW PURPOSES ONLY

CHANNEL PROFILE (A_1–A_2)



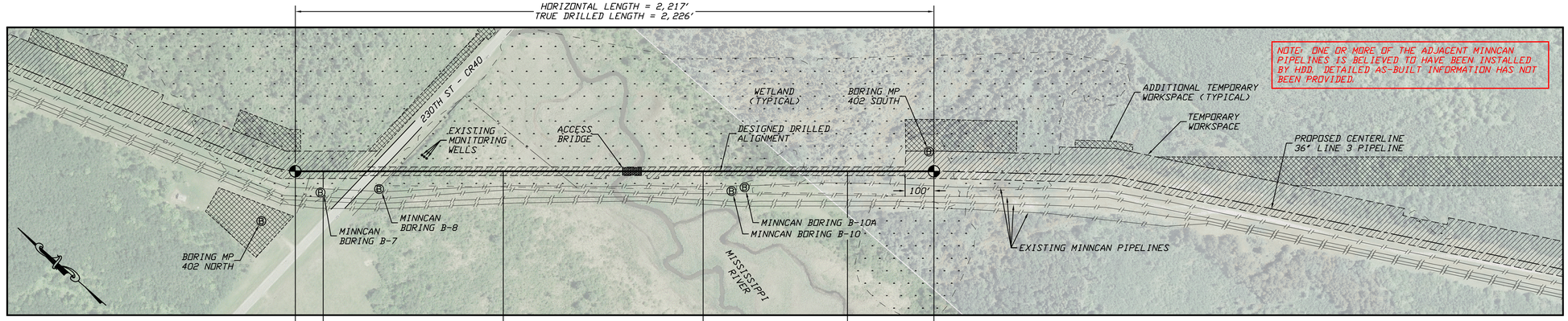
NO.	REVISION-DESCRIPTION	BY	DATE	CHK'D	APP'D
0	ISSUED FOR PERMIT APPLICATION	AJJ	10/2020	BAB	BAB

ENBRIDGE

DWN. BY: AJJ	DATE 10/2020
CHK.	
PROJ. ENGR.	
PROJ. MGR.	
CLIENT APP.	

PROPOSED ENBRIDGE L3R PIPELINE
PRIMARY METHOD – HDD
CROSSING OF MISSISSIPPI RIVER
ENBRIDGE MP 941.0
CLEARWATER COUNTY, MINNESOTA

SCALE: NOTED
DWG. NO.: B-93-5.84-MDNR-28-0



PLAN

SCALE: 1"=200'

ENTRY POINT @ 10°
0+00.00, 1398.75
N 641859.48, E 2100827.44

P.C. 10° SAG BEND
0+96.62, 1381.71
RADIUS = 3,600'

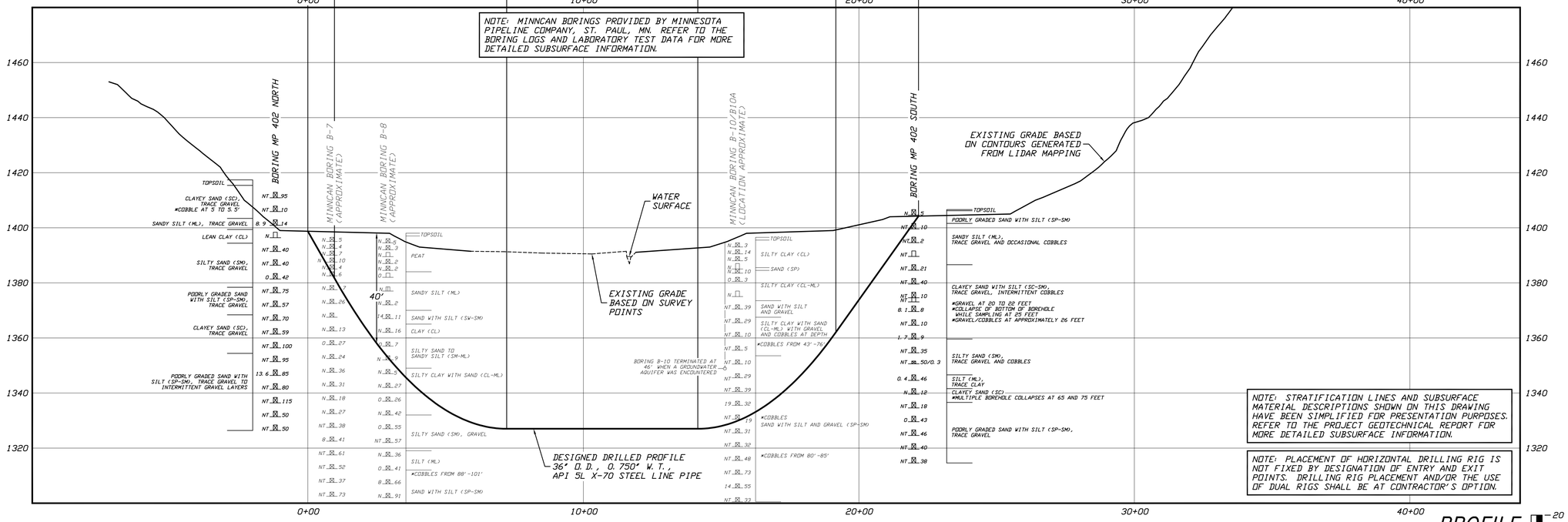
P.T. 10° SAG BEND
7+21.76, 1327.02

P.C. 8° SAG BEND
14+15.43, 1327.02
RADIUS = 3,600'

P.T. 8° SAG BEND
19+16.46, 1362.05

EXIT POINT @ 8°
22+16.63, 1404.24
N 640189.84, E 2102285.44

NOTE: MINNCAN BORINGS PROVIDED BY MINNESOTA PIPELINE COMPANY, ST. PAUL, MN. REFER TO THE BORING LOGS AND LABORATORY TEST DATA FOR MORE DETAILED SUBSURFACE INFORMATION.



NOTE: STRATIFICATION LINES AND SUBSURFACE MATERIAL DESCRIPTIONS SHOWN ON THIS DRAWING HAVE BEEN SIMPLIFIED FOR PRESENTATION PURPOSES. REFER TO THE PROJECT GEOTECHNICAL REPORT FOR MORE DETAILED SUBSURFACE INFORMATION.

NOTE: PLACEMENT OF HORIZONTAL DRILLING RIG IS NOT FIXED BY DESIGNATION OF ENTRY AND EXIT POINTS. DRILLING RIG PLACEMENT AND/OR THE USE OF DUAL RIGS SHALL BE AT CONTRACTOR'S OPTION.

PROFILE

SCALE: 1"=200' HORIZONTAL
1"= 20' VERTICAL

20 10 0
400 200 100 0

GENERAL LEGEND

DRILLED PATH ENTRY/EXIT POINT

GEOTECHNICAL LEGEND

B BORING LOCATION

SPLIT SPOON SAMPLE

53 N 23 — PENETRATION RESISTANCE IN BLOWS PER FOOT FOR A 140 POUND HAMMER FALLING 30 INCHES
PERCENTAGE OF GRAVEL BY WEIGHT FOR SAMPLES CONTAINING GRAVEL

SHELBY TUBE SAMPLE PUSH SAMPLE

53 NT — PERCENTAGE OF GRAVEL BY WEIGHT FOR SAMPLES CONTAINING GRAVEL

GEOTECHNICAL NOTES

1. GEOTECHNICAL DATA (MP 402 BORINGS) PROVIDED BY BARR ENGINEERING COMPANY, DULUTH, MN. REFER TO THE PROJECT GEOTECHNICAL REPORT DATED SEPTEMBER, 2014 FOR MORE DETAILED SUBSURFACE INFORMATION.
2. THE LETTER "N" TO THE LEFT OF A SAMPLE INDICATES THAT NO GRAVEL WAS OBSERVED IN THE SAMPLE. THE LETTERS "NT" INDICATE THAT GRAVEL WAS OBSERVED BUT NO GRADATION TEST WAS PERFORMED.
3. THE GEOTECHNICAL DATA IS ONLY DESCRIPTIVE OF THE LOCATIONS ACTUALLY SAMPLED. EXTENSION OF THIS DATA OUTSIDE OF THE ORIGINAL BORINGS MAY BE DONE TO CHARACTERIZE THE SOIL CONDITIONS, HOWEVER, COMPANY DOES NOT GUARANTEE THESE CHARACTERIZATIONS TO BE ACCURATE. CONTRACTOR MUST USE HIS OWN EXPERIENCE AND JUDGMENT IN INTERPRETING THIS DATA.

TOPOGRAPHIC SURVEY NOTES

1. TOPOGRAPHIC SURVEY DATA PROVIDED BY ENBRIDGE, SUPERIOR, WISCONSIN.
2. NORTHINGS AND EASTINGS ARE IN U.S. SURVEY FEET REFERENCED TO MINNESOTA STATE PLANE COORDINATES, NORTH ZONE, NAD 83.
3. ELEVATIONS ARE IN FEET REFERENCED TO NAVD 88.

DRILLED PATH NOTES

1. DRILLED PATH STATIONING IS IN FEET BY HORIZONTAL MEASUREMENT AND IS REFERENCED TO CONTROL ESTABLISHED FOR THE DRILLED SEGMENT.
2. DRILLED PATH COORDINATES REFER TO CENTERLINE OF PILOT HOLE AS OPPOSED TO TOP OF INSTALLED PIPE.

PILOT HOLE TOLERANCES

THE PILOT HOLE SHALL BE DRILLED TO THE TOLERANCES LISTED BELOW. HOWEVER, IN ALL CASES, RIGHT-OF-WAY RESTRICTIONS AND CONCERN FOR ADJACENT FACILITIES SHALL TAKE PRECEDENCE OVER THESE TOLERANCES.

1. ENTRY POINT: AS STAKED BY COMPANY
2. EXIT POINT: UP TO 10 FEET SHORT OR 20 FEET LONG RELATIVE TO THE DESIGNED EXIT POINT; UP TO 5 FEET RIGHT OR LEFT OF THE DESIGNED ALIGNMENT
3. ELEVATION: UP TO 2 FEET ABOVE AND 10 FEET BELOW THE DESIGNED PROFILE
4. ALIGNMENT: UP TO 5 FEET RIGHT OR LEFT OF THE DESIGNED ALIGNMENT
5. CURVE RADIUS: NO LESS THAN 2,400 FEET BASED ON A 3-JOINT AVERAGE (ASSUMING RANGE 2 DRILL PIPE)

PROTECTION OF EXISTING FACILITIES

CONTRACTOR SHALL UNDERTAKE THE FOLLOWING STEPS PRIOR TO COMMENCING DRILLING OPERATIONS.

1. CONTACT THE UTILITY LOCATION/NOTIFICATION SERVICE FOR THE CONSTRUCTION AREA.
2. POSITIVELY LOCATE AND STAKE ALL EXISTING UNDERGROUND FACILITIES. ANY FACILITIES LOCATED WITHIN 10 FEET OF THE DESIGNED DRILLED PATH SHALL BE EXPOSED.
3. MODIFY DRILLING PRACTICES AND DOWNHOLE ASSEMBLIES AS NECESSARY TO PREVENT DAMAGE TO EXISTING FACILITIES.

LINE 3 PIPELINE PROJECT

PLAN AND PROFILE
36-INCH PIPELINE CROSSING OF THE MISSISSIPPI RIVER BY HORIZONTAL DIRECTIONAL DRILLING

LOCATION: CLEARWATER COUNTY, MINNESOTA

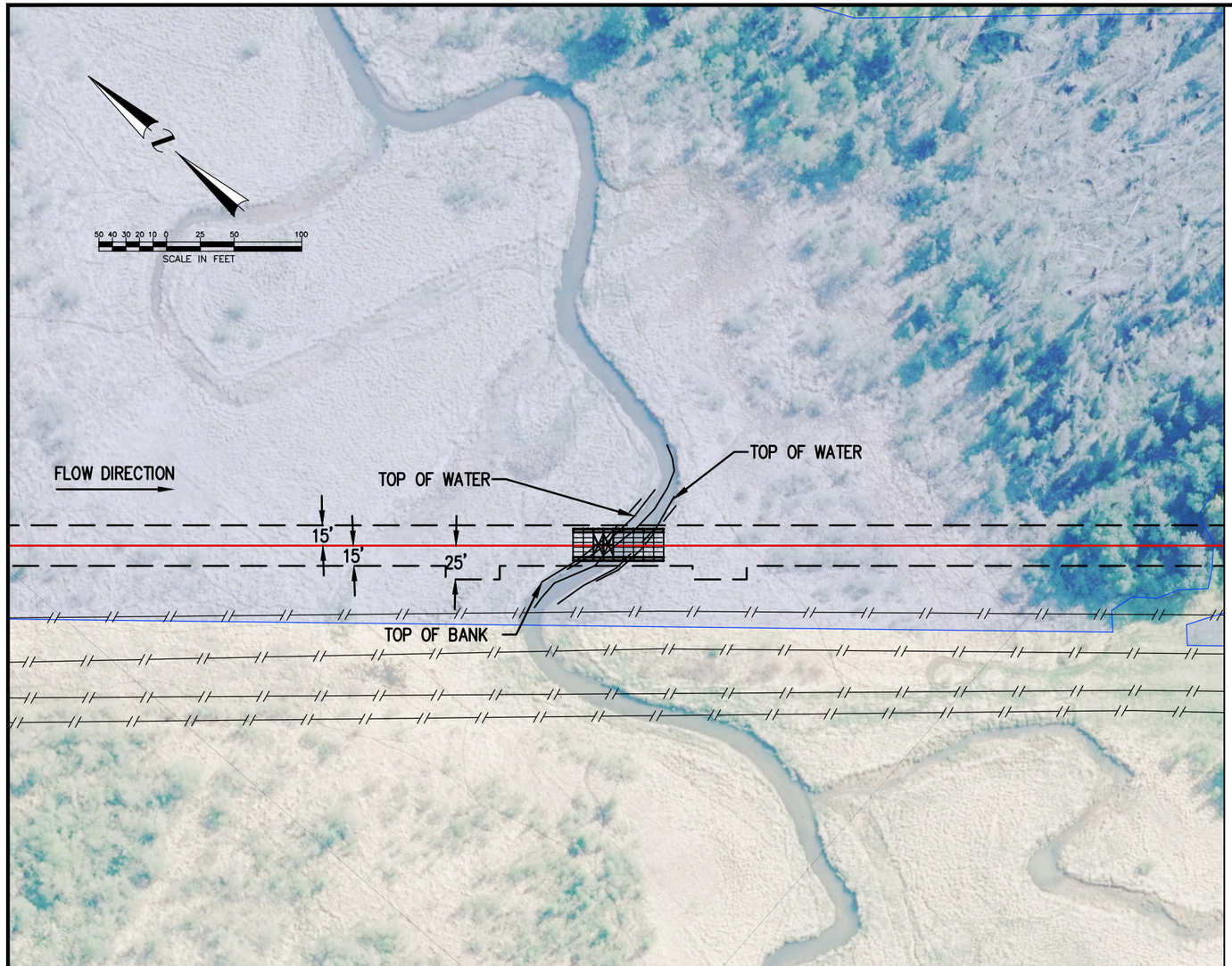
DRAWN	DATE	CHECKED	APPROVED	DRAWING NUMBER	REVISION
ACM	07/24/17	DMP	JSP	D-03-5.83-22563-D-110	D

NO.	DATE	REVISION DESCRIPTION	BY	CHK'D	APP.
D	10/27/19	UPDATE WETLAND BOUNDARIES AND WORKSPACE	KWW	JSP	JSP
C	10/09/19	UPDATE WORKSPACE & ADD BRIDGE	DLB	CDS	JSP
B	09/29/17	UPDATE WORKSPACE	LKB	JSP	JSP
A	07/24/17	ISSUE FOR CONSTRUCTION	ACM	DMP	JSP

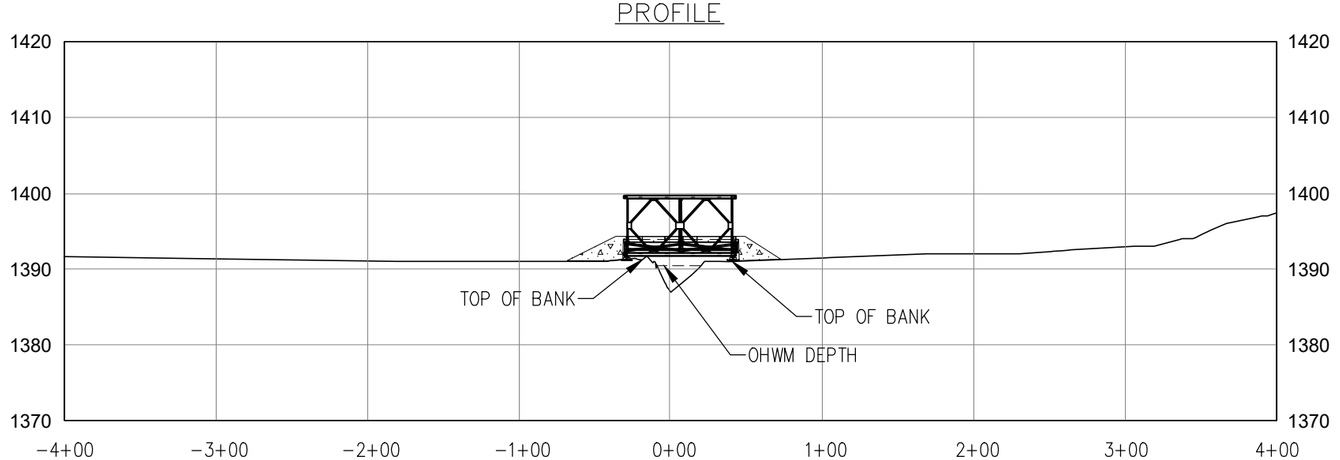
J.D. Hair & Associates, Inc.
Consulting Engineers
2424 East 21st Street
Suite 510
Tulsa, Oklahoma 74114

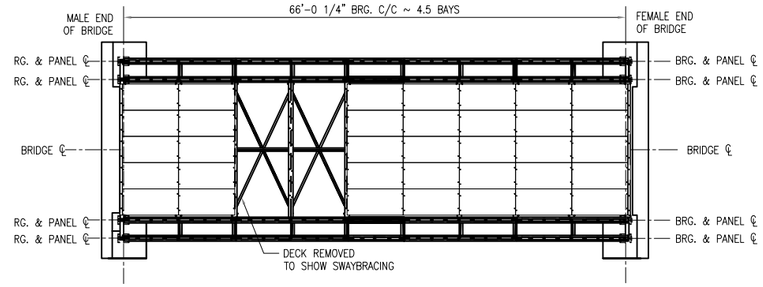
PROJECT NO.
Enbridge\1404

MILEPOST
D941

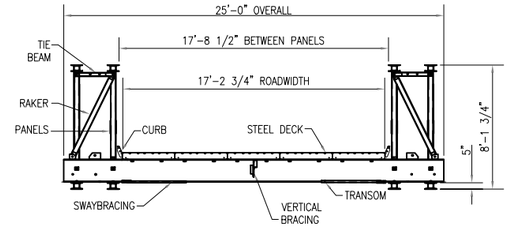


PROFILE





PLAN
NTS



SECTION
NTS

STREAM CLASSIFICATION:
REFER TO ENVIRONMENTAL PROTECTION PLAN (EPP) AND ENVIRONMENTAL ALIGNMENT SHEETS (EAS) FOR ALL STREAM CLASSIFICATION AND RESTRICTED ACTIVITY PERIOD (RAP) DETAILS

CONSTRUCTION NOTES:
CONTRACTOR WILL BE RESPONSIBLE FOR THE DESIGN OF THE TEMPORARY BRIDGE AS PER CONSTRUCTION NOTES THAT ARE LISTED BELOW AND APPLICABLE PERMIT CONDITIONS:

1. TEMPORARY BRIDGES USED FOR CONSTRUCTION SHALL BE DESIGNED AND CONSTRUCTED IN COMPLIANCE WITH MOST RECENT LOCAL GOVERNMENT AND ENVIRONMENTAL PERMITS AND PLANS. THE FOUNDATION AND INSTALLATION OF THE TEMPORARY BRIDGE SHALL PROVIDE FOR THE SAFE PASSAGE OF CONSTRUCTION VEHICLES, EQUIPMENT AND MATERIALS, MINIMIZE SOIL EROSION AND PROVIDE FOR PROPER DRAINAGE AS OUTLINED IN THE ENVIRONMENTAL PROTECTION PLAN (EPP).
2. PRIOR TO THE INSTALLATION AND USE OF A STRUCTURE GREATER THAN A SPAN OF 20 FEET, THE CONTRACTOR SHALL ENSURE THAT THE STRUCTURAL DOCUMENTATION SHALL INCLUDE BUT ARE NOT LIMITED TO THE FOLLOWING:
   - DESIGN, PLANS & SPECIFICATION SHEETS STAMPED BY A LICENSED PROFESSIONAL ENGINEER
   - STRUCTURES LOADING CAPACITY
   - INSTALLATION, REMOVAL AND MAINTENANCE INSTRUCTIONS
3. SIGNS SHOWING MAXIMUM LOADS AND SPEED LIMITS SHALL BE POSTED ON BOTH SIDES OF ALL BRIDGES. VISIBLE TO APPROACHING VEHICLES AND EQUIPMENT. ENBRIDGE RESERVES THE RIGHT TO EXECUTE INSPECTIONS VERIFYING THE CONTRACTOR IS IN COMPLIANCE WITH THEIR DOCUMENTS.
4. TEMPORARY "WARNING-PIPELINE CONSTRUCTION AHEAD" SIGNS MUST BE PLACED 400 FEET UPSTREAM AND DOWNSTREAM OF THE CROSSING ALONG THE WATERWAY AND AT ADDITIONAL LOCATIONS AS SUGGESTED BY THE MINNESOTA DEPARTMENT OF NATURAL RESOURCES. SIGNS MUST BE POSTED DURING FULL DURATION OF CROSSING CONSTRUCTION AND LEGIBLE AT A MINIMUM DISTANCE OF 100 FEET.
5. BRIDGE LOCATIONS SUPPORTS MUST BE PLACED BEYOND THE TOP OF BANK. CONTRACTOR MUST RECEIVE ENBRIDGE APPROVAL FOR FINAL BRIDGE LOCATION.
6. BRIDGE MUST BE DESIGNED TO HANDLE ALL REQUIRED LOADS DURING CONSTRUCTION.
7. THE BRIDGE HEIGHT WILL BE DESIGNED TO ALLOW FOR ADEQUATE CLEARANCE TO ALLOW RECREATIONAL USERS TO PASS SAFELY UNDER THE BRIDGE.
8. PER SECTION 2.4.2 OF THE EPP, BRIDGES WILL BE MAINTAINED TO PREVENT SOIL FROM ENTERING THE WATERBODY. SOIL THAT ACCUMULATES ON THE BRIDGE DECKING WILL BE REMOVED DAILY, OR AS DEEMED NECESSARY BY THE EI.
9. REFLECTIVE TAPE OR SIGNAGE SHALL BE USED ON THE EDGES OF THE BRIDGE AND THE RAILINGS.

DESIGN AND DRAWING NOTES:
1. GROUND PROFILE AND PLAN INFORMATION ARE DERIVED FROM SURVEY CONSULTANT DRAWING # 3638S-EAGLEX- 32-18-3-WS-22-R3, DATED SEPTEMBER 14, 2016.
2. THE SCALES OF THIS DRAWING ARE CONSIDERED RELIABLE ONLY AT ANSI D (22"x34") SIZE.
3. CHAINAGES ARE BASED ON THE ON HORIZONTAL MEASUREMENTS.
4. ALL DIMENSIONS ARE IN FEET UNLESS OTHERWISE NOTED.
5. BRIDGE DESIGN BASED ON DRAWINGS SUPPLIED BY RAPID SPAN STRUCTURES LTD. AND IS FOR INFORMATION ONLY.

ISSUED FOR CONSTRUCTION 10/13/2020

811 Know what's **below.** **Call** before you dig.

NO.	REVISION-DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR CONSTRUCTION	AM	10/13/2020	NKD	MB
A	ISSUED FOR REVIEW	AM	7/2/2019	NKD	MB

ENBRIDGE

DWN. BY: AM	DATE 7/2/2019
CHK. NKD	
PROJ. ENGR.	
PROJ. MGR.	
CLIENT APP.	

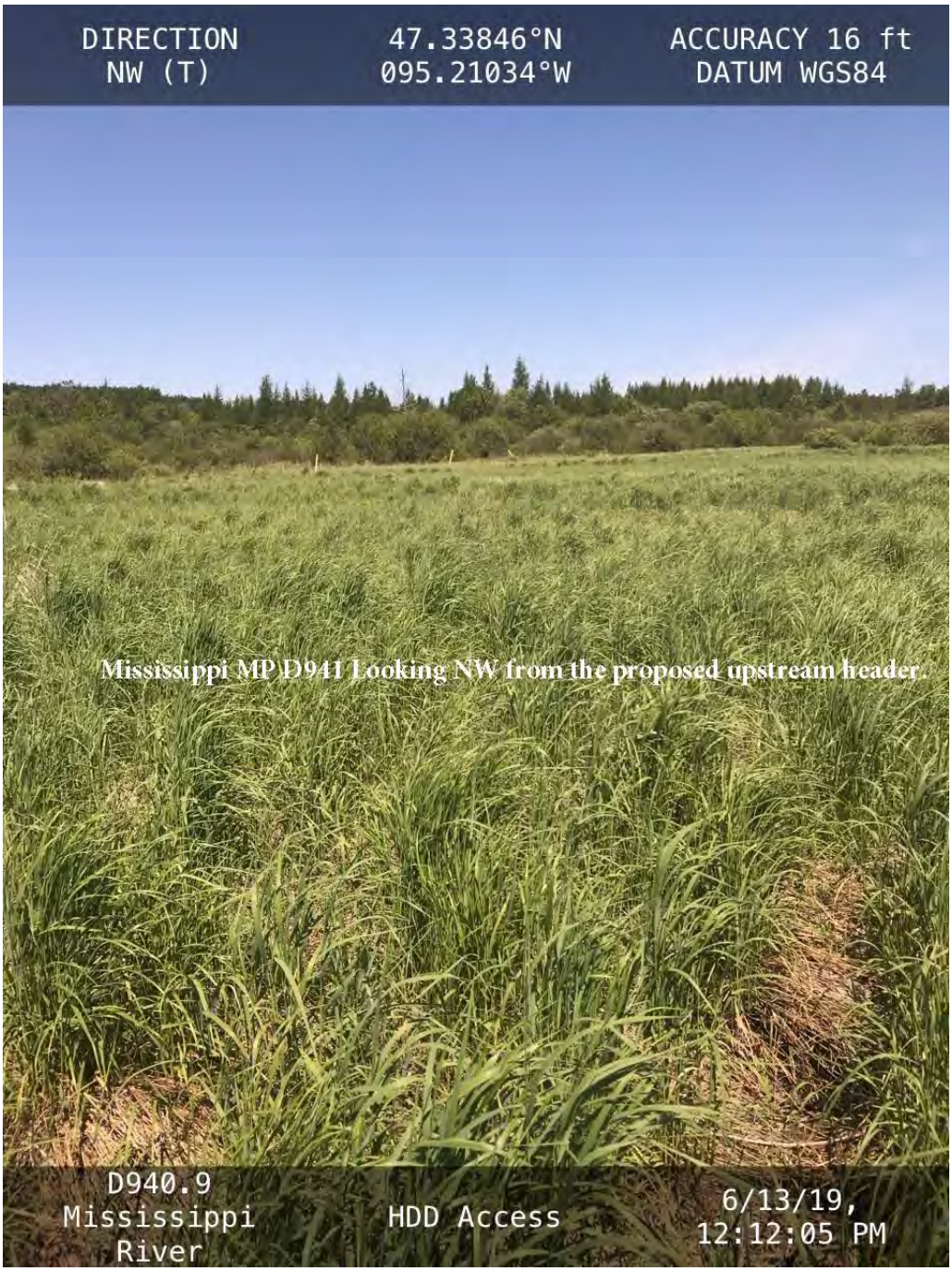
PROPOSED 36in. LINE 3 REPLACEMENT
CROSSING OF MISSISSIPPI RIVER

ENBRIDGE M.P. D941

SCALE	DWG. NO.
NOTED	B-3-5.84-23061-B-110

Milepost	MDNR License Application ID Number	Waterbody Name	County	Top-of-Bank Header-to-Header (feet)	Waterbody Width (feet) [b]	OHWM Depth (feet) [c]	Drawing Number
941.0	28	Mississippi River	Clearwater	65.0	35.0	3.5	B-3-5.84-23061-A-110

Crossing Location: The first Mississippi River Crossing is in Clearwater County at MP 941.0, and is situated just south of County Rd 40 and east of County Road 2. The bridge would be located on private land on either side of the crossing. The topography near the river is a relatively flat wetland area, with solid banks 1 to 2 feet down on both sides of the river.



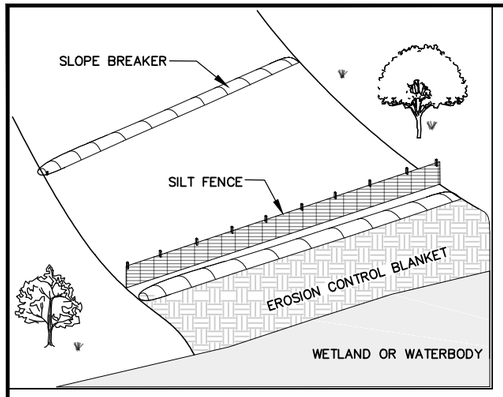

DIRECTION
SE (T)
47.33873°N
095.21030°W
ACCURACY 887 ft
DATUM WGS84
Mississippi River MP D941 Looking SE from the proposed downstream header.
D940.9
Mississippi
River
HDD Access
6/13/19,
12:27:10 PM

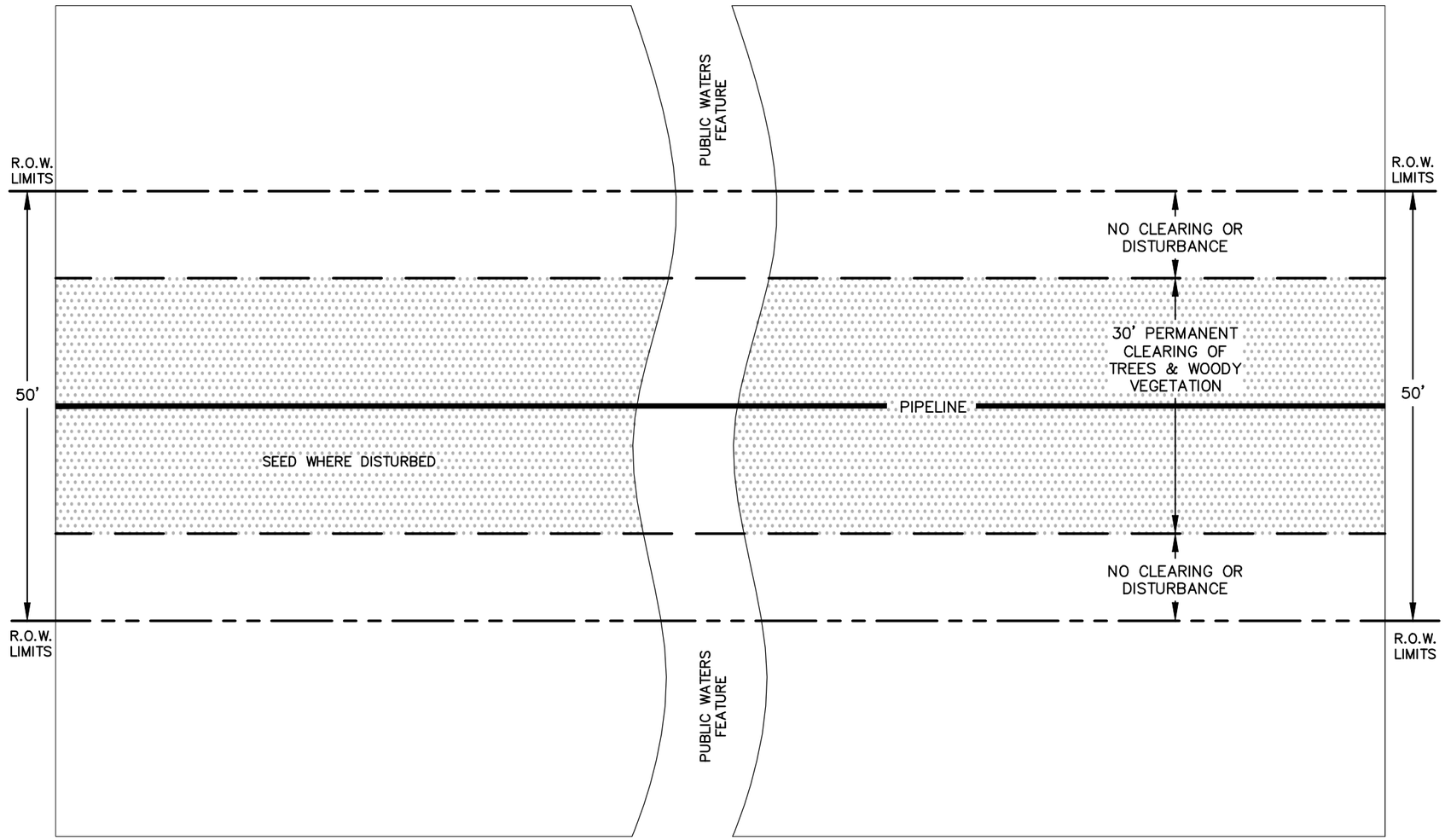
Bridge Description: A modular bridge would be built on site from pre-engineered and ready to assemble components. The design would consist of steel bracing, panels and decking. The bridge would have an approximately 18 foot travel lane, with a total width of 25 feet. The length of the bridge at this site would be 65 feet, allowing for a setback of at least 10 feet from the edge of bank on the upstream side and 20 feet on the opposite side, and on stable ground. Because the Pine River is designated as a Public Canoe Route, the bottom of the bridge will be at least 3 feet above the 50 year flood elevation.

Bridge Installation Method: Access to set the bridge would be easiest from the NW, coming off of CR-40 approximately 900 feet to the crossing location. The 30 foot ROW would be matted appropriately to allow safe passage of the Mainline Construction equipment. A 30 by 40 foot work space would be used on each side of the water body to set the bridge in place. Clearing of an additional 15 feet by 30 feet for this ATWS would be needed outside of the 30 foot wide ROW, but would be within the original 50' easement. Excavators, cranes and/or side booms would be stationed in these workspaces and used to position the bridge over the water body. The bridge and any support headers would be set 10 feet back from the edge of bank and secured by cables attached to temporary anchors on either side of the river. As this bridge will require no in-stream support, all work would occur outside the Ordinary High Water Mark and placement of the bridge would not affect the course, current or cross-section of the waterbody

Need of Bridge/Justification: Enbridge is proposing to install a bridge at this crossing location to avoid a large spread move that would result in impacts to local roadways, residents, and communities along the spread move travel path. At this location, the spread move is approximately 11 miles round trip, with an estimated 45-55 truckloads needed to complete the move. Currently, crews are planning to exit the ROW at CR-40. Due to the light load rating for the bridge just east of this location, the trucks would need to follow the road west to CR-2, turn south for 3 miles until turning left again onto 206th street. Crews would then follow this road until turning north onto Clearline Rd and driving one mile back to the ROW. A map of this travel path is included, below:

Installation of a bridge will allow all crews except for the clearing crews to remain on the construction right-of way and avoid the need to access public roads. Spread moves also require that Enbridge disassemble heavy equipment and make multiple travel trips around the spread moves to transport and reassemble equipment. Enbridge is also working with the MPCA to plan for inadvertent release of HDD drilling mud at all HDD locations. The construction of a mat road to the waterbody and a bridge across the feature would also provide for more rapid response to a release, should one occur.





PUBLIC WATERS FEATURE - HDD CROSSING

1) DISTURBANCE OF THE ROW IS LIMITED TO THE 30-FOOT-WIDE CLEARING OF TREES AND WOODY VEGETATION AND IMPACTS RESULTING FROM TRAVEL LANES AND/OR BRIDGES.
2) ANY WETLAND OR WATERBODY BANK THAT IS DISTURBED WILL BE STABILIZED WITH EROSION AND SEDIMENT CONTROL BMP AND RESTORED TO AS NEAR AS PRACTICABLE TO PRE-CONSTRUCTION CONDITIONS.
3) PERMANENT REVEGETATION SEEDING OF DISTURBED WATERBODY BANKS WILL UTILIZE THE BWSR RIPARIAN SEED MIXES IN ACCORDANCE WITH THE EPP (SECTION 7.8).
4) PERMANENT REVEGETATION SEEDING OF DISTURBED WETLANDS WILL TAKE PLACE IN ACCORDANCE WITH THE EPP (SECTION 7.7). 7) IN DISTURBED WETLAND AREAS, THE APPROPRIATE SEED MIX WILL BE DETERMINED USING THE RESULTS OF PRE-CONSTRUCTION WETLAND IN DISTURBED WETLAND AREAS, HYDROLOGICAL CHARACTERISTICS, AND SITE-SPECIFIC CONDITIONS.

ISSUED FOR PERMIT 12/13/19

NO.	REVISION-DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMIT	AJM	12/13/19	KEH	KD
A	ISSUED FOR REVIEW	AJM	12/10/19	KEH	KD

DWN. BY:	AJM	DATE 12/10/19
CHK.	KEH	
PROJ. ENGR.	DG	
PROJ. MGR.	KD	
CLIENT APP.		

ENBRIDGE

LINE 3 REPLACEMENT
PUBLIC WATERS HDD CROSSING TYPICAL
FINAL STREAM STABILIZATION & EROSION CONTROL

SCALE: NTS
DWG. NO.