MDNR ID No. 49: MP 1048; Moose River (M-117-012)

MOOSE RIVER
MDNR ID 49 / SURVEY ID CA163aWB
CASS COUNTY, MINNESOTA
S2-T139N-R25W BEULAH TWP
MN-CA-C5-163.000

TWO BEAVER DAMS NORTH OF WORKSPACE BREACHED. (1) 500'–600' NORTH OF WORKSPACE, (2) 300' NORTH OF WORKSPACE

MN–CA–C5–163.000

WETLAND BOUNDARY

MN–CA–C5–163.000

SCALE IN FEET 0 25 50 100

N

MOOSE RIVER

FLOW

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

120' TEMPORARY WORKSPACE

100'

75'

150'

50'

100'

75'

PIKUS FOREST RD NE (GRAVEL)

MDNR

100'

75'

50' PERMANENT RIGHT OF WAY

95' TEMPORARY WORKSPACE

PROPOSED ENBRIDGE L3R PIPELINE

1047.9

1048 BOB

TOP OF BANK

TOB

14'

1048.1

A_1

A_2

B_1

B_2

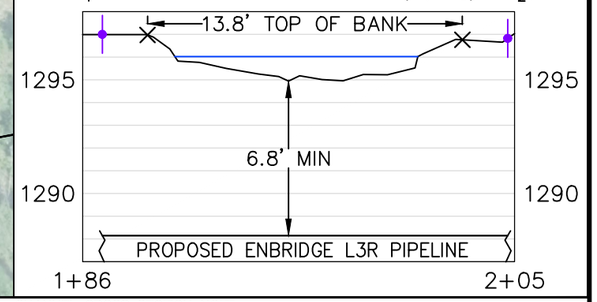
OHP

MDNR

MN–CA–C5–163.300

2018 SUMMER IMAGERY

B_1 CHANNEL CROSS SECTION (B_1–B_2) B_2

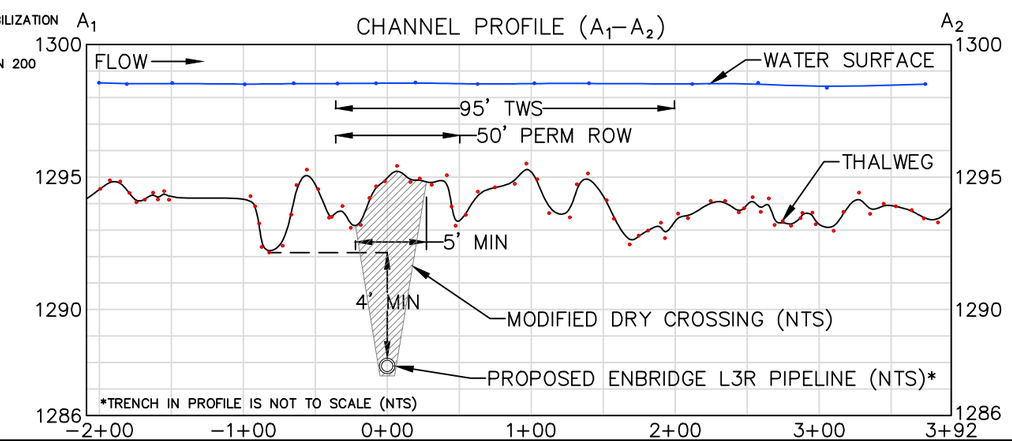


NOTES
1. NO FEMA DIGITAL FLOODPLAIN DATA AVAILABLE
2. NO BANKFUL DATA AVAILABLE
3. SOBS (O/H) OR NPC (S1–3): N/A
4. MDNR REGION 1 PWI – COOL/WARM WATER FISHERY: MARCH 15 – JUNE 30. 24–HOUR SOIL STABILIZATION REQUIRED WITHIN 200 FEET DURING RESTRICTION.
5. MDNR LAND – SEE UTILITY LICENSE FOR PUBLIC LAND. NO CLEARING: JUNE–JULY.
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.

LEGEND
- PROPOSED ENBRIDGE L3R PIPELINE
- PERMANENT RIGHT OF WAY
- TEMPORARY WORKSPACE
- WATERBODY (ROSGEN SURVEY – THALWEG)
- OHP — OVERHEAD POWER
- TRACT BOUNDARY
- MDNR — MINNESOTA DEPARTMENT OF NATURAL RESOURCES (MDNR) BOUNDARY
- TEMPORARY MAT ROAD AND SPAN BRIDGE
- 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

CHANNEL PROFILE (A_1–A_2)



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

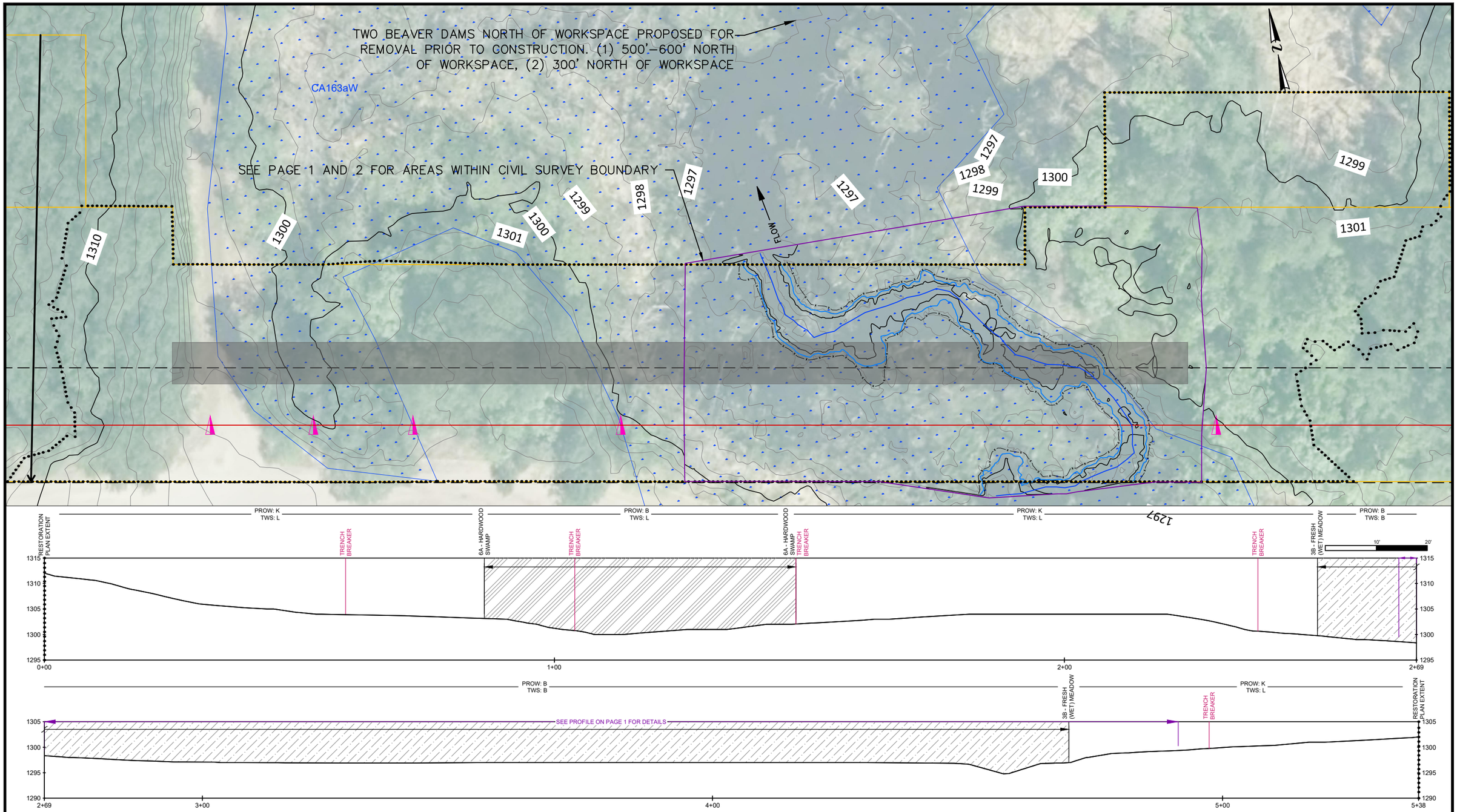
NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
0	ISSUED FOR PERMIT APPLICATION	AJJ	10/2020	BAB	BAB

ENBRIDGE

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

PROPOSED ENBRIDGE L3R PIPELINE
PRIMARY METHOD – MODIFIED DRY CROSSING
CROSSING OF MOOSE RIVER
ENBRIDGE MP 1048.0
CASS COUNTY, MINNESOTA

SCALE: NOTED
DWG. NO.: B–93–5.84–MDNR–49–0



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–PRELIM); 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.

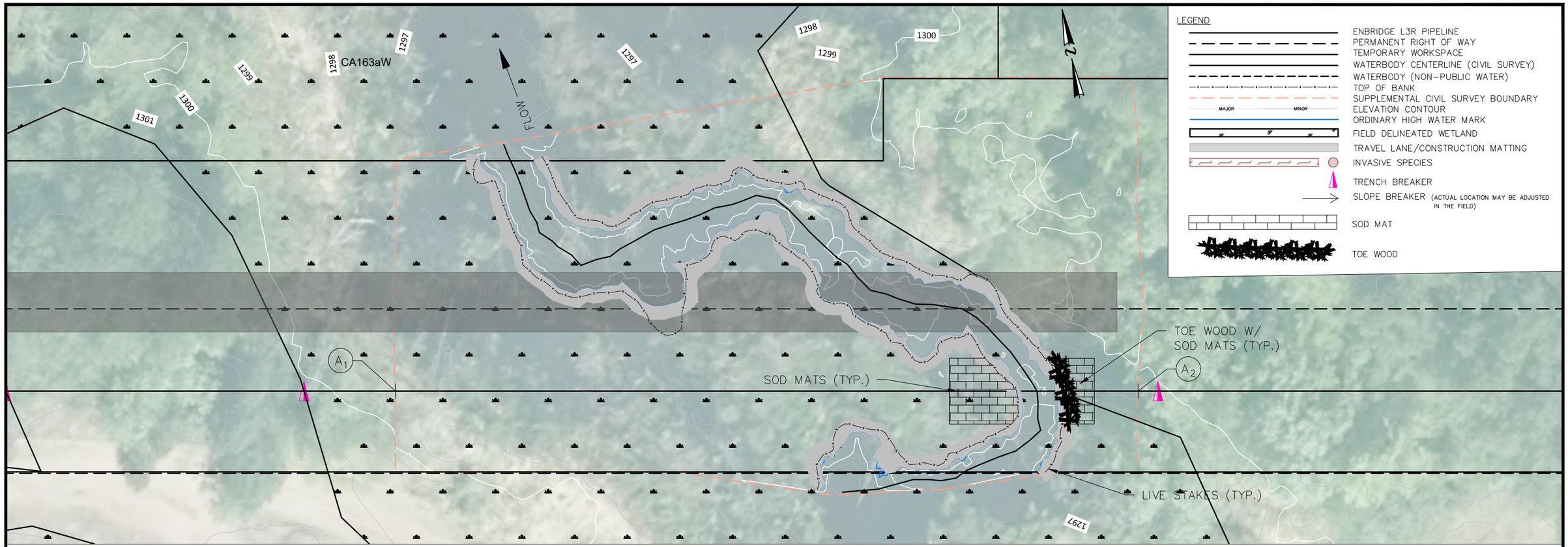
LEGEND

- 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 (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

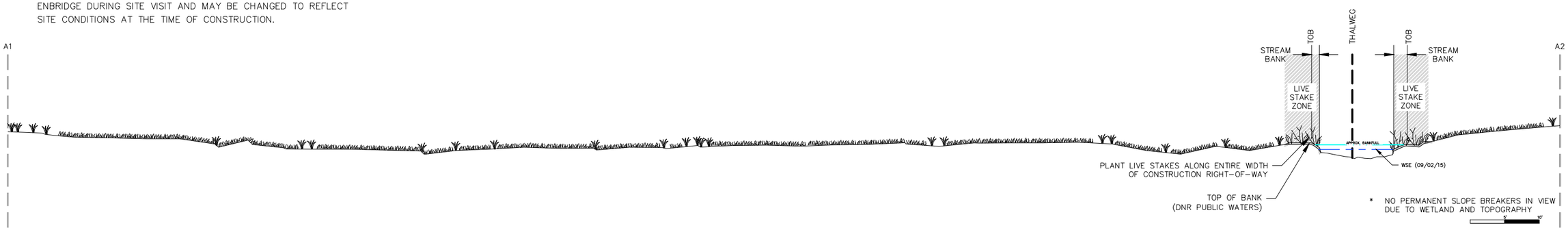
NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING	MJT	10/2020		
A	ISSUED FOR REVIEW	MJT	09/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
MOOSE RIVER – MP 1048.0 – MDNR ID 49
RE–VEGETATION PLAN: EXPANDED EXTENT

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP–1048.0–001A	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	CA163aWB; IFC ID: S-243.0
CROSSING TYPE	MODIFIED 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. CALAMAGROSTIS CANADENSIS 3. ALNUS INCANA 2. PHALARIS ARUNDINACEA
SOBS (O/H) or NPC (S1-3)	NO (MODERATE-PRELIM); 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. TWO BEAVER DAMS NORTH OF WORKSPACE PROPOSED FOR REMOVAL PRIOR TO CONSTRUCTION.
7. SITE WITHIN PEAT BASIN - SOURCE: SSURGO

ENBRIDGE

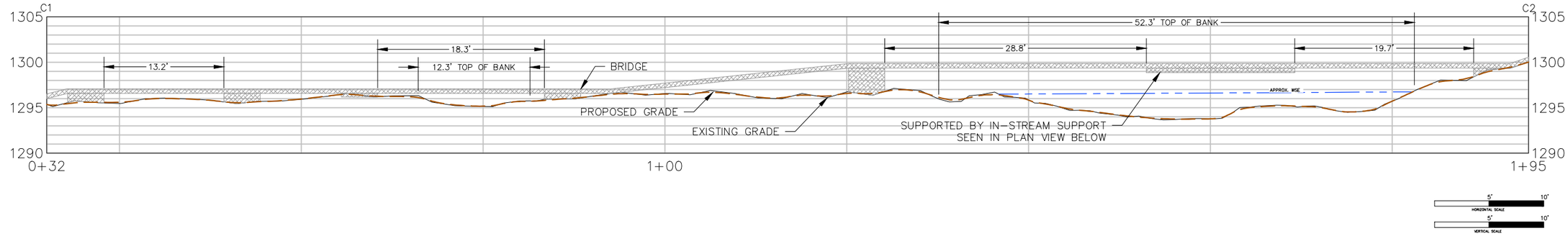
NO.	REVISION-DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE-SPECIFIC RESTORATION PLAN
MOOSE RIVER - MP 1048.0 - MDNR ID 49
RE-VEGETATION PLAN

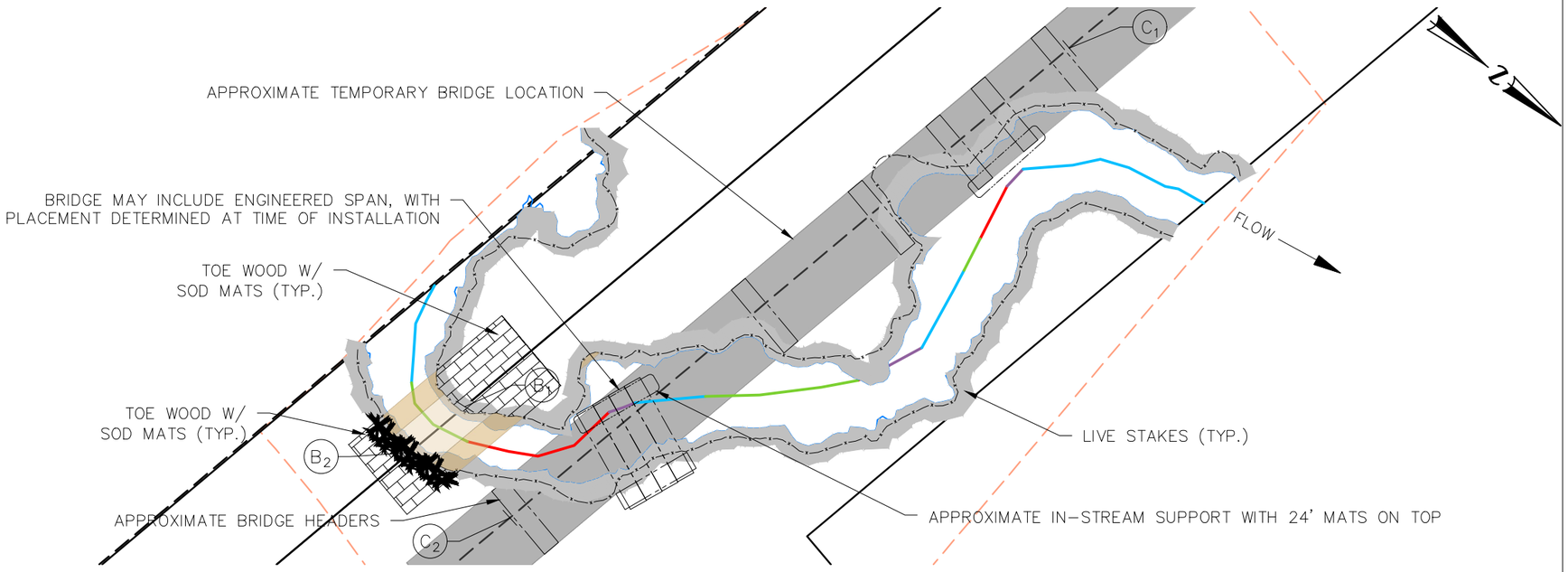
SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP-1048.0-001	1/7

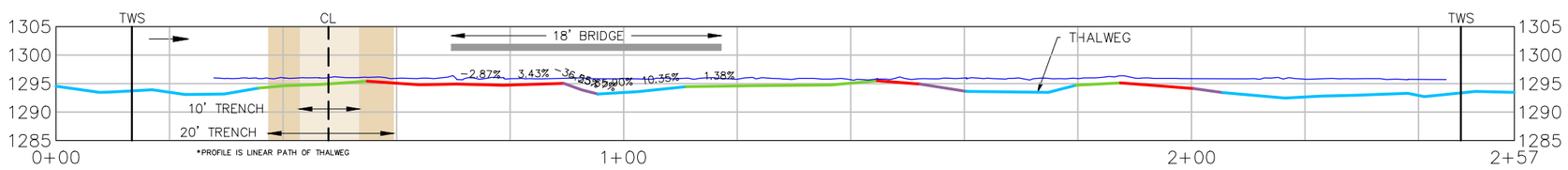
PLOTTED SIZE: ANSI FULL BLEED B (17x11)

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'

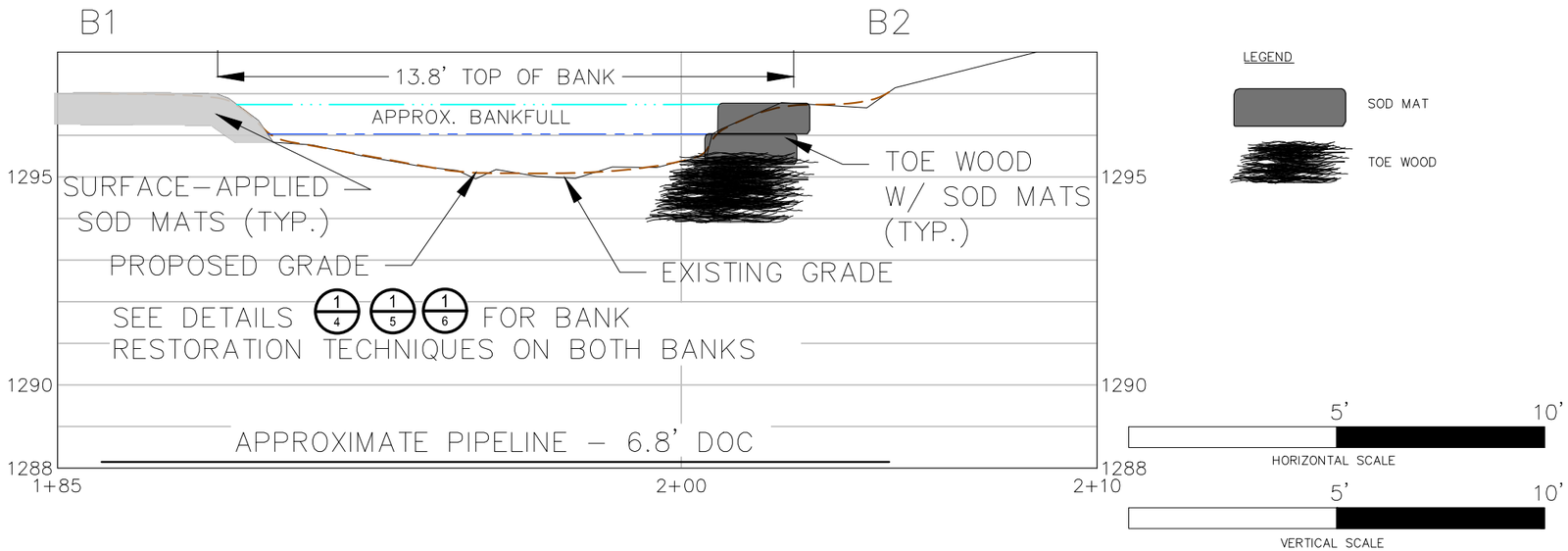
NO.	REVISION-DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE-SPECIFIC RESTORATION PLAN
MOOSE RIVER – MP 1048.0 – MDNR ID 49
STABILIZATION PLAN

SCALE	DWG. NO.	PAGE NO.
	SSRP-1048.0-002	2/7

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

BANK RESTORATION (CENTERLINE)



	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

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.
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.
15. 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.

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.

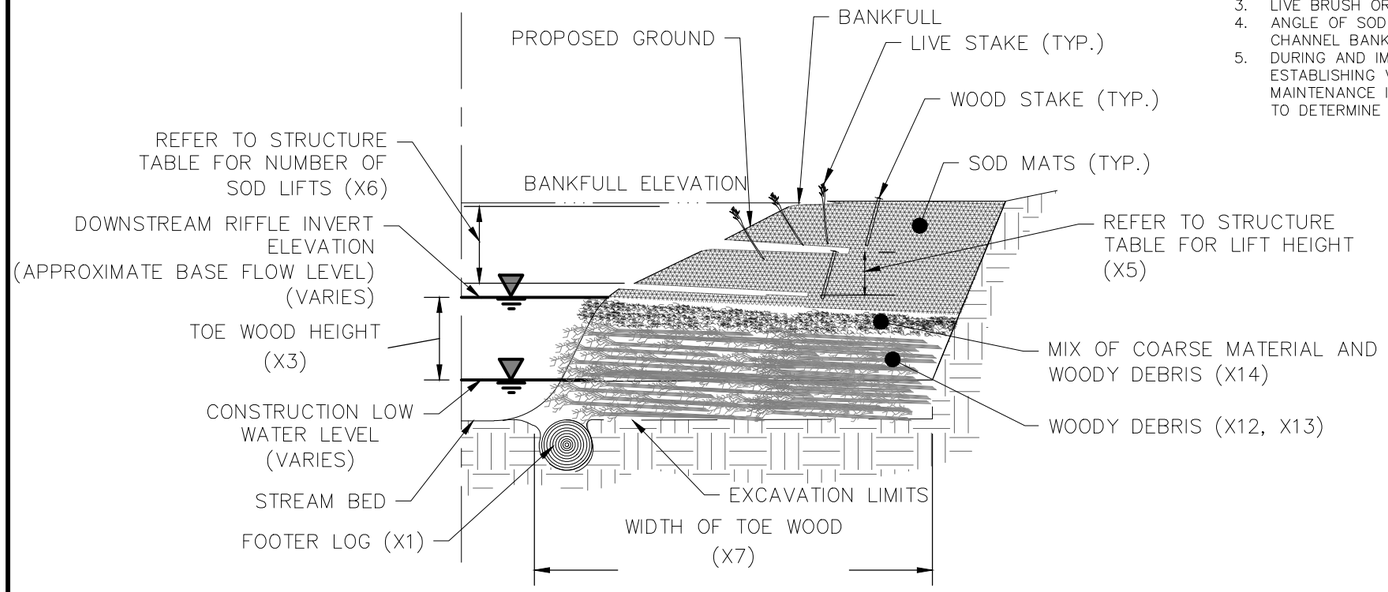
NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR APPROVAL		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
MOOSE RIVER – MP 1048.0 – MDNR ID 49
SITE SPECIFIC DETAILS

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP–1048.0–003	3/7

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

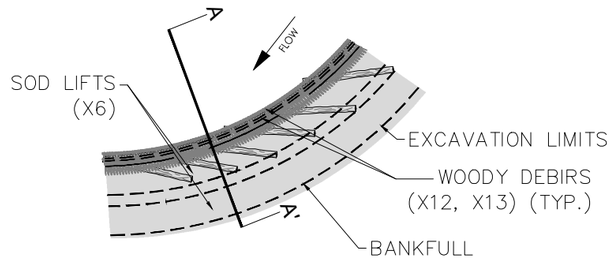
TOE WOOD DIMENSIONS			
VARIABLE	**VALUE**	**TYPICAL UNIT**	**DESCRIPTION**
X1	6.0 - 10.0	IN.	FOOTER LOG DIAMETER
X2	8.0 - 12.0	FT.	FOOTER LOG LENGTH
X3	12.0	IN.	TOE WOOD HEIGHT
X4	SEE SHEET 3	N/A	MATCH TYPICAL SECTION
X5	SEE SHEET 5	N/A	SOD LIFT HEIGHT
X6	2.0	#	SOD LIFTS
X7	8.0 - 10.0	FT.	TOE WOOD WIDTH
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

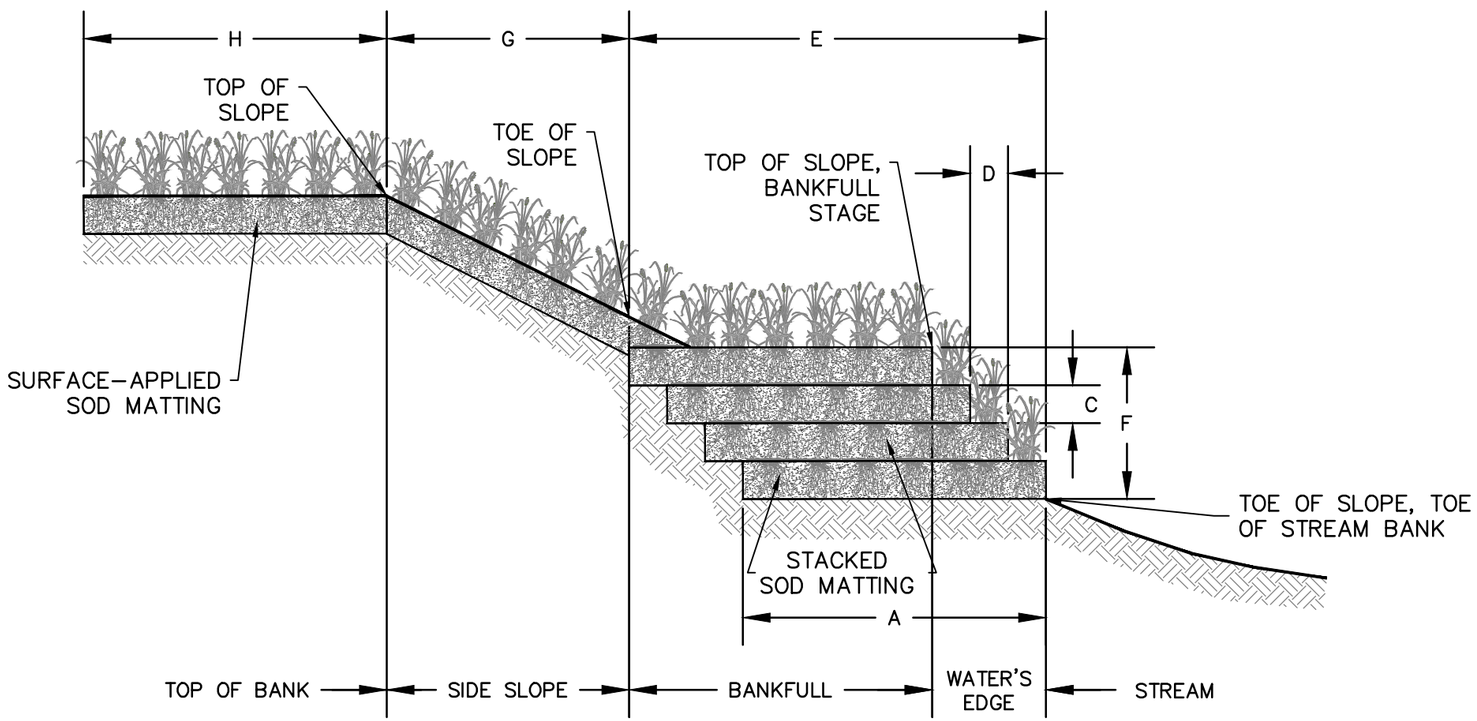
1 TOE WOOD DETAIL

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

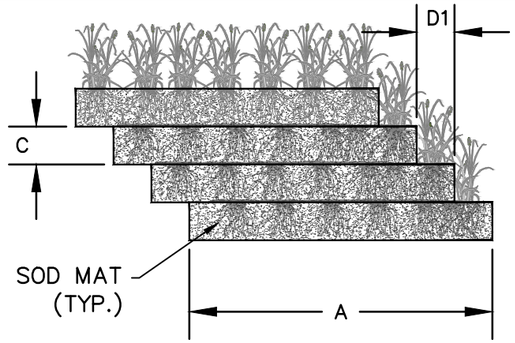
ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE-SPECIFIC RESTORATION PLAN
MOOSE RIVER - MP 1048.0 - MDNR ID 49
SITE SPECIFIC DETAILS

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP-1048.0-004	4/8

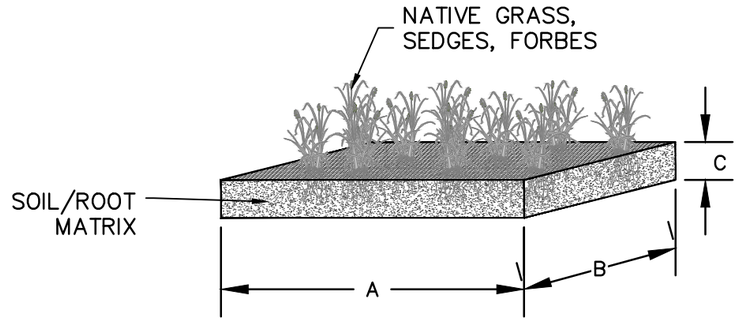
PLOTTED SIZE: ANSI FULL BLEED B (17x11)



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	VARIES	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	2	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
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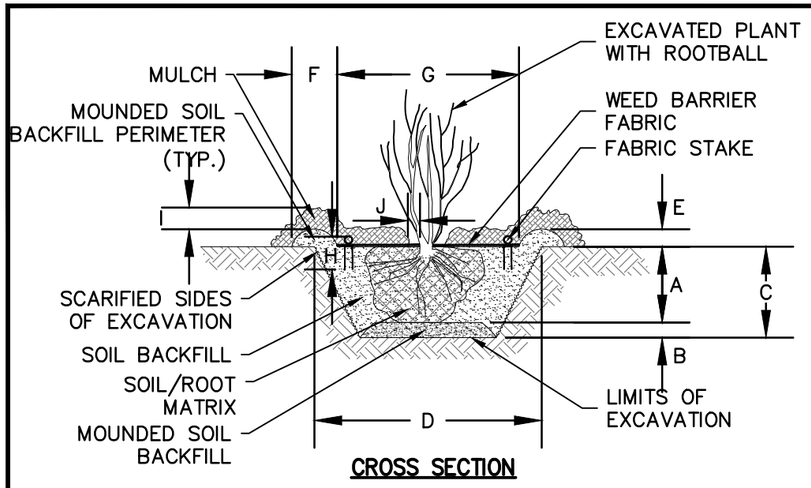
ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
MOOSE RIVER – MP 1048.0 – MDNR ID 49
SITE SPECIFIC DETAILS

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP–1048.0–004	5/7

PLOTTED SIZE: ANSI FULL BLEED B (17x11)



CROSS SECTION

DIMENSION[2]	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.

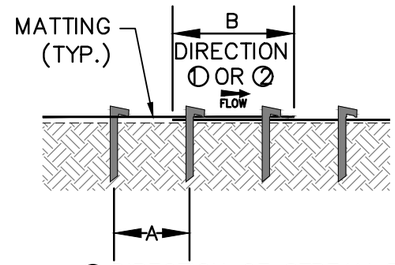
TRANSPLANTS EXAMPLES

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

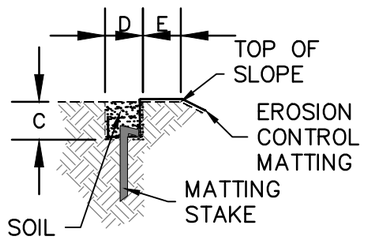


① DIRECTION OF STREAM FLOW
② DIRECTION DOWN THE BANK SLOPE

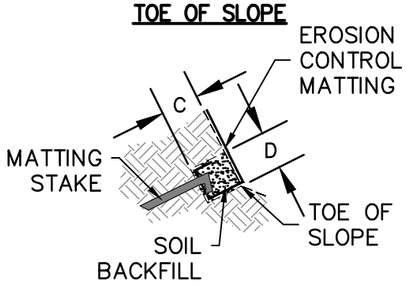
MATTING OVERLAP DETAIL

MATTING STAKE DETAIL

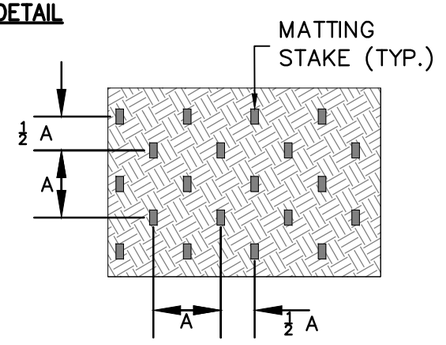
TOP OF SLOPE



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		
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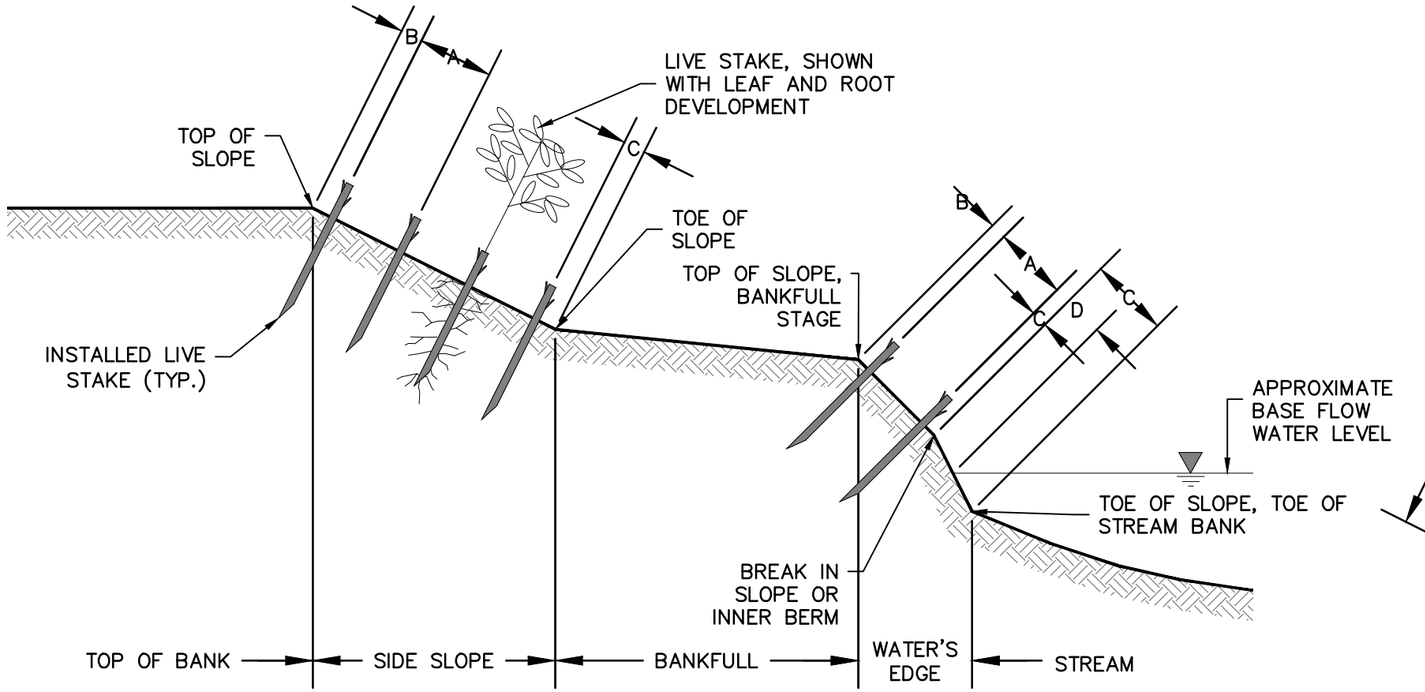
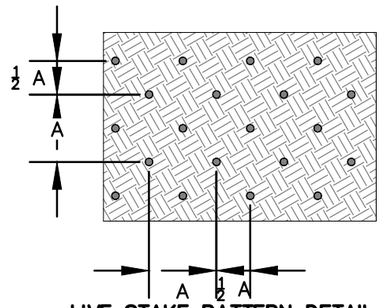
ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
MOOSE RIVER – MP 1048.0 – MDNR ID 49
SITE SPECIFIC DETAILS

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP–1048.0–004	6/7

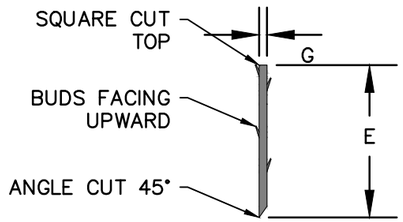
PLOTTED SIZE: ANSI FULL BLEED B (17x11)



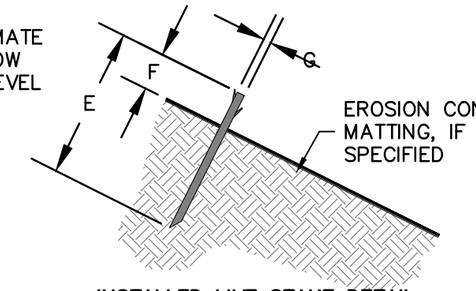
CROSS SECTION



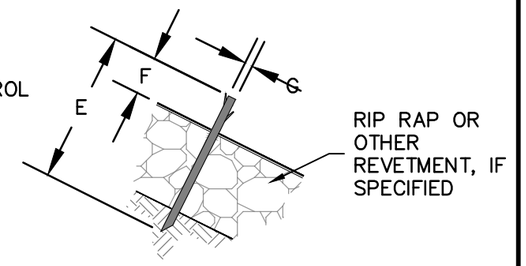
LIVE STAKE PATTERN DETAIL



LIVE STAKE DETAIL



INSTALLED LIVE STAKE DETAIL



INSTALLED JOINT PLANTING DETAIL

DIMENSION[1]	NAME	TYPICAL UNIT	VALUE	DESCRIPTION
A	LIVE STAKE SPACING	FEET	3 O.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	FEET	1239.0	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	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 – 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

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ENBRIDGE LINE 3 REPLACEMENT PROJECT
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MOOSE RIVER – MP 1048.0 – MDNR ID 49
SITE SPECIFIC DETAILS

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NOTED	SSRP–1048.0–004	7/7

ENBRIDGE

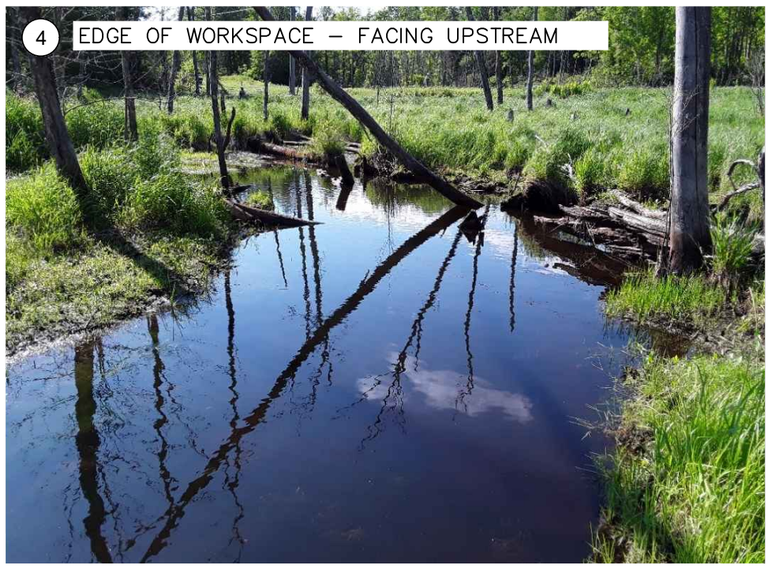
PLOTTED SIZE: ANSI FULL BLEED B (17x11)

1 CENTERLINE – FACING WEST BANK

2 CENTERLINE – FACING EAST BANK

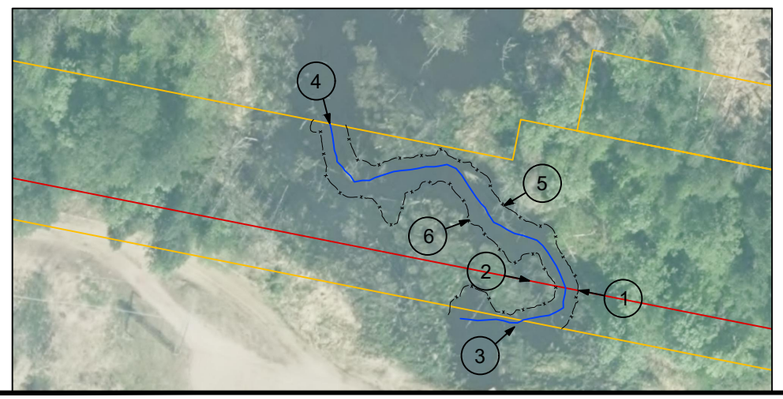
3 EDGE OF WORKSPACE – FACING DOWNSTREAM

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.

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ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
MOOSE RIVER – MP 1048.0 – MDNR ID 49
PHOTO PAGE

SCALE	DWG. NO.	PAGE NO.
	SSRP–1048.0–005	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. 50: MP 1053.4; Unnamed Stream (M-117-012-002)

UNNAMED STREAM
MDNR ID 50 / SURVEY ID AI020aWB
AITKIN COUNTY, MINNESOTA
S36-T51N-R27W NORTHWEST AITKIN TWP
MN-AI-C5-020.000

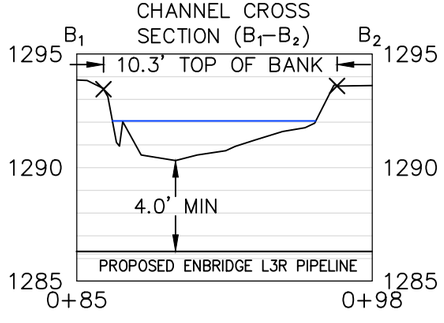
MN–AI–C5–020.200
MN–AI–C5–020.000
MN–AI–C5–021.000
FLOW
WETLAND BOUNDARY
BEAVER DAM
IMPOUNDMENT LIMITS
TOP OF BANK
120' TEMPORARY WORKSPACE
100'
75'
95' TEMPORARY WORKSPACE
TEMPORARY MAT ROAD AND SPAN BRIDGE (SEE RESTORATION PLAN)
50' PERMANENT RIGHT OF WAY
PROPOSED ENBRIDGE L3R PIPELINE
1053.3
1053.4
1053.5
B_1
B_2
OHP
TOB
10'
0 25 50 100 SCALE IN FEET
N
2018 SUMMER IMAGERY

NOTES
1. NO FEMA DIGITAL FLOODPLAIN DATA AVAILABLE
2. NO ROSGEN DATA AVAILABLE
3. SOBS (O/H) OR NPC (S1–3): N/A
4. CROSSING PROPOSED FOR WINTER CONSTRUCTION BASED ON DECEMBER 1, 2020 START DATE
5. MDNR REGION 2 PWI – COOL/WARM WATER FISHERY: MARCH 15 – JUNE 30. 24–HOUR SOIL STABILIZATION REQUIRED WITHIN 200 FEET DURING RESTRICTION.
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.

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

FOR ENVIRONMENTAL REVIEW PURPOSES ONLY

CHANNEL CROSS SECTION (B_1–B_2)



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

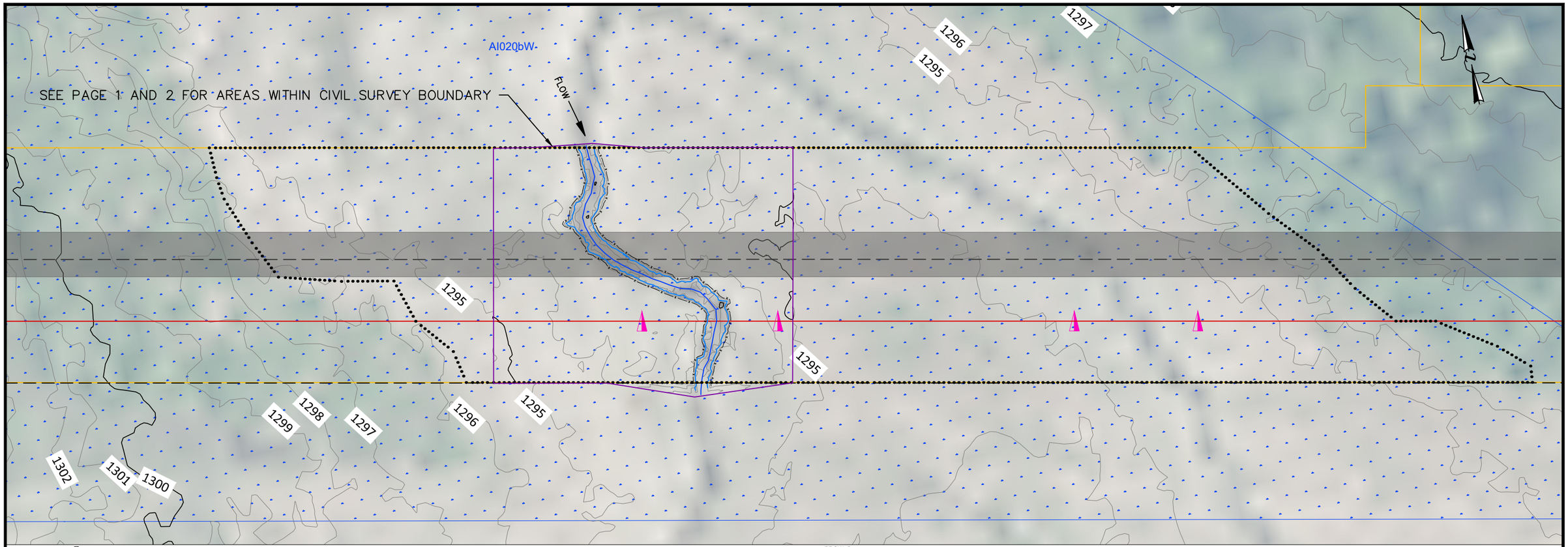
NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
0	ISSUED FOR PERMIT APPLICATION	AJJ	10/2020	BAB	BAB

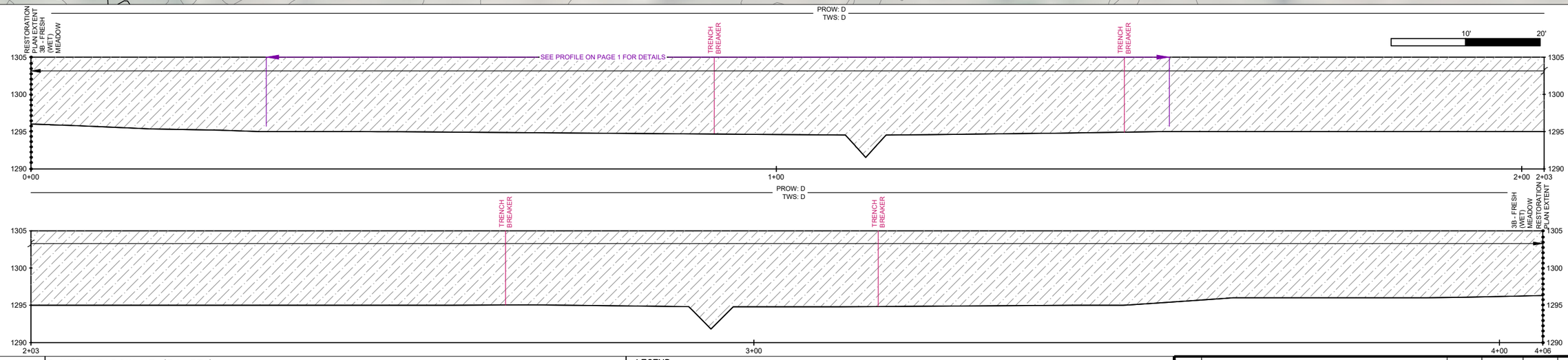
ENBRIDGE

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

PROPOSED ENBRIDGE L3R PIPELINE
PRIMARY METHOD – DRY CROSSING
CROSSING OF UNNAMED STREAM
ENBRIDGE MP 1053.4
AITKIN COUNTY, MINNESOTA

SCALE: NOTED
DWG. NO.: B–93–5.84–MDNR–50–0





BWSR SEED MIX	D: WET MEADOW NE (34–371)
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 2 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.

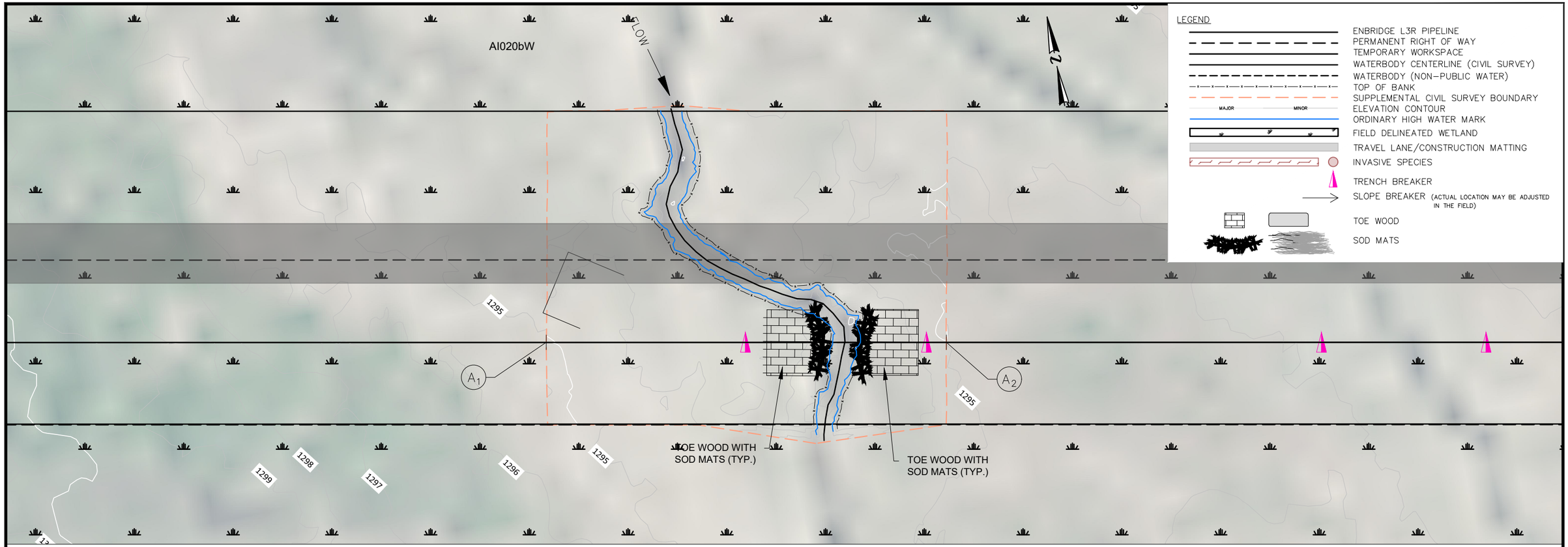
LEGEND

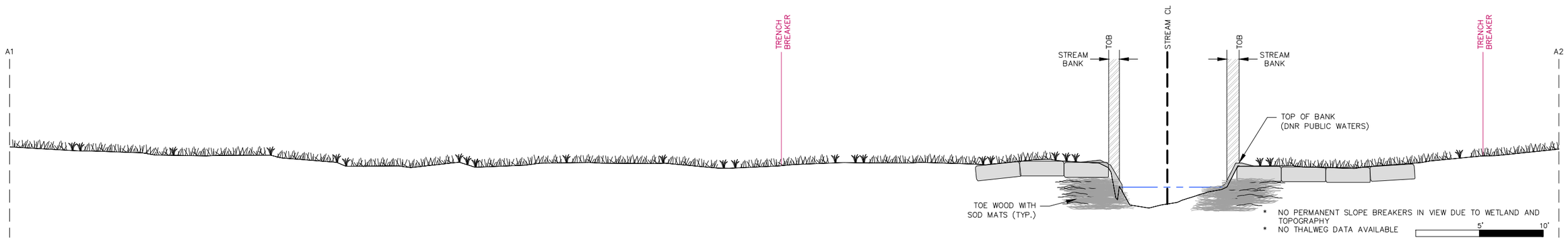
- ENBRIDGE L3R PIPELINE
- PERMANENT RIGHT OF WAY
- TEMPORARY WORKSPACE
- WATERBODY CENTERLINE (CIVIL SURVEY)
- WATERBODY (NON–PUBLIC WATER)
- PUBLIC WATER CIVIL SURVEY BOUNDARY
- MDNR EXPANDED RESTORATION BOUNDARY
- TOP OF BANK
- ELEVATION CONTOUR
- ORDINARY HIGH WATER MARK
- FIELD DELINEATED WETLAND
- 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
UNNAMED STREAM – MP 1053.4 – MDNR ID 50
RE–VEGETATION PLAN: EXPANDED EXTENT

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP–1053.4–001A	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	AI020aWB; IFC ID: S-247.0
CROSSING TYPE	DRY CROSSING
PROPOSED RESTORATION (SEE DETAILS FOR LIVE STAKING, TRANSPLANTS, AND SHRUB SPECIES IF APPLICABLE)	BRUSH - TOE WOOD; SOD MATS
WITHIN OR ADJACENT WETLAND	FRESH WET MEADOW
BWSR SEED MIX	WET MEADOW NE (34-371)
DOMINANT WETLAND VEGETATION	1. CALAMAGROSTIS CANADENSIS 2. SOLIDAGO GIGANTEA
SOBS (O/H) or NPC (S1-3)	NO (MODERATE); N/A

NOTES:

1. CONSTRUCTION TIMING RESTRICTIONS
   1.1. MDNR REGION 2 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 - 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)
6. CROSSING PROPOSED FOR WINTER CONSTRUCTION BASED ON DECEMBER 1, 2020 START DATE.

ENBRIDGE

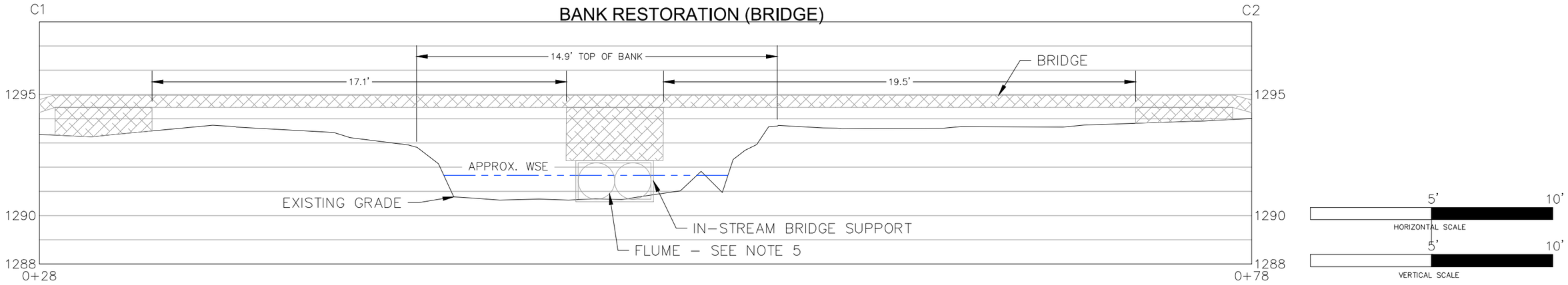
NO.	REVISION-DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE-SPECIFIC RESTORATION PLAN
UNNAMED STREAM - MP 1053.4 - MDNR ID 50
RE-VEGETATION PLAN

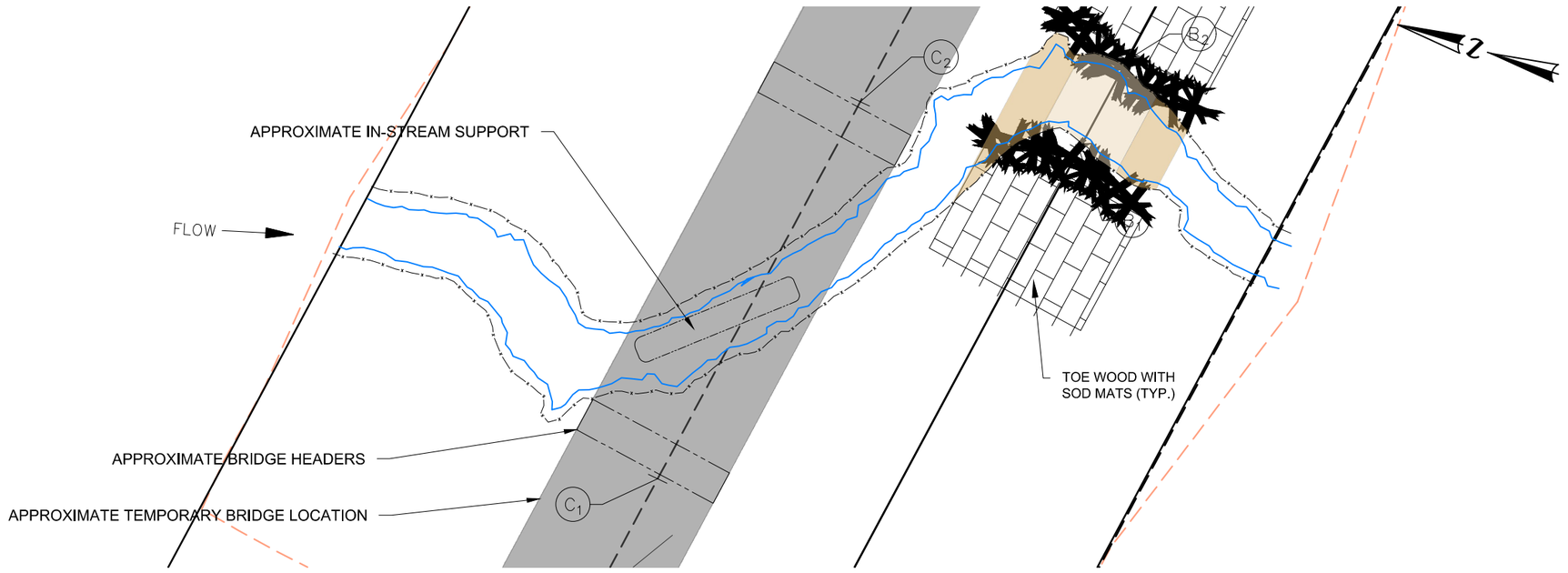
SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP-1053.4-001	1/6

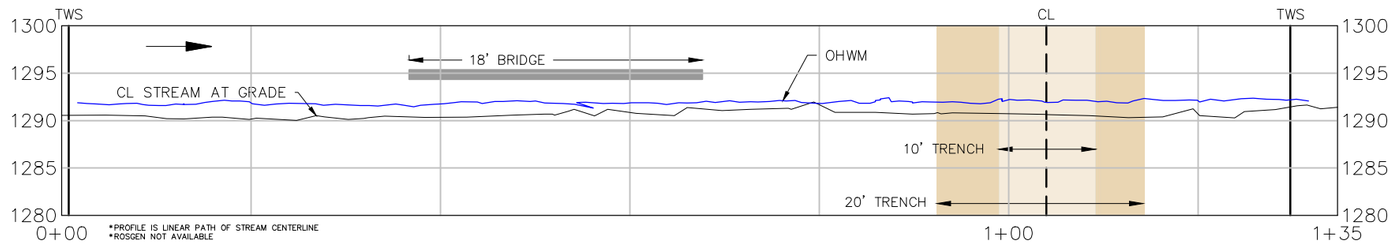
PLOTTED SIZE: ANSI FULL BLEED B (17x11)

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.
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'

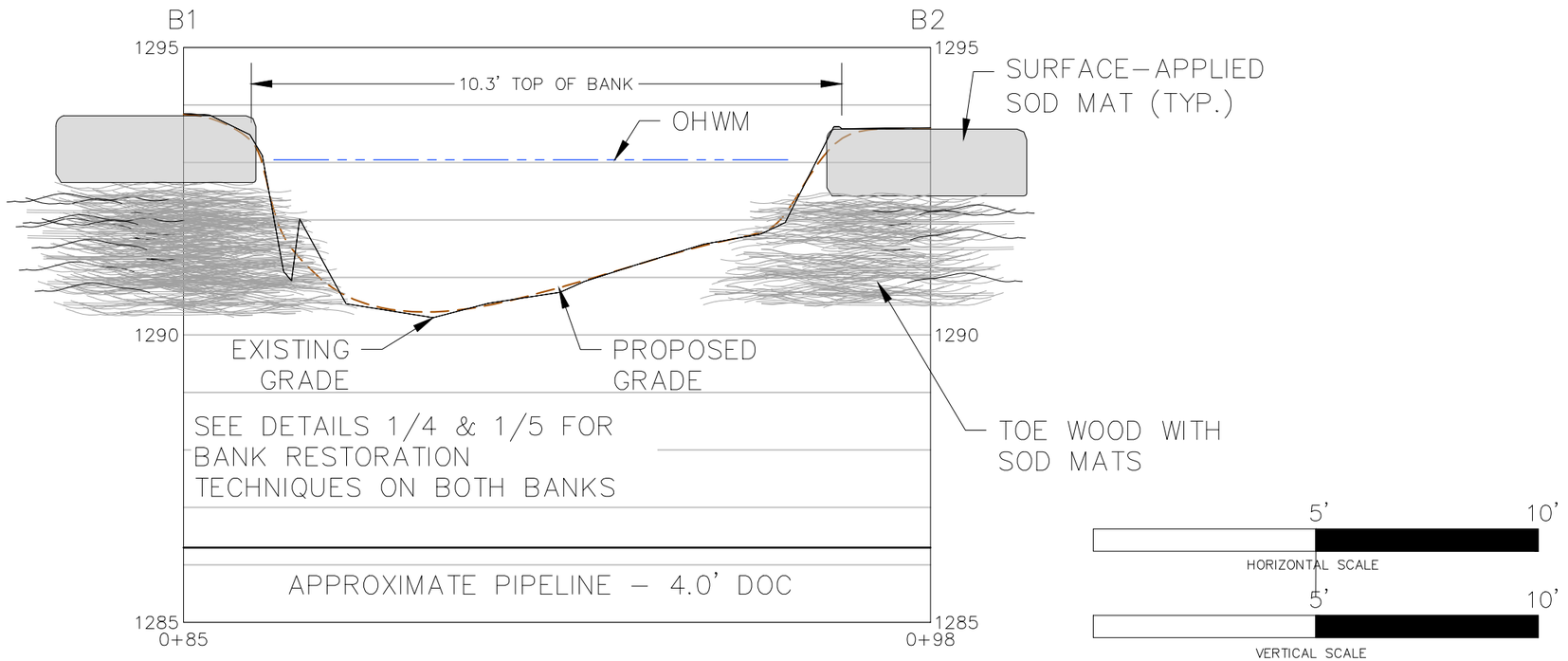
NO.	REVISION-DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE-SPECIFIC RESTORATION PLAN
UNNAMED STREAM – MP 1053.4 – MDNR ID 50
STABILIZATION PLAN

SCALE	DWG. NO.	PAGE NO.
	SSRP-1053.4-002	2/6

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.

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. 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.

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'

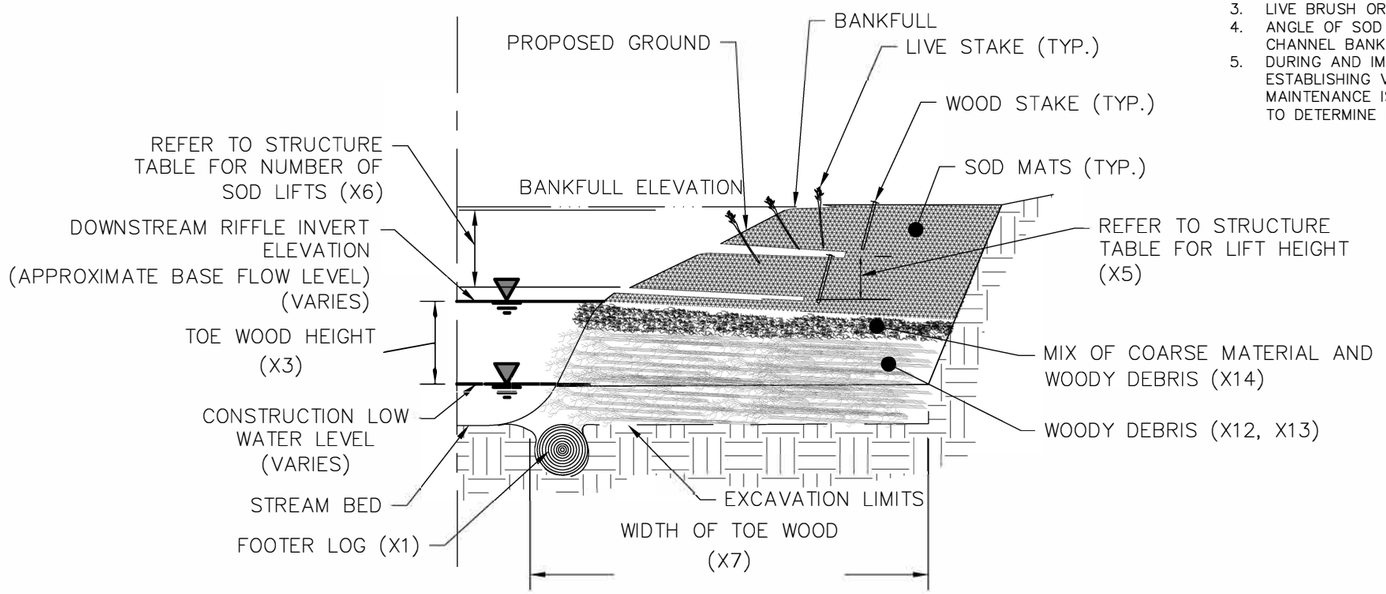
NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
UNNAMED STREAM – MP 1053.4 – MDNR ID 50
SITE SPECIFIC DETAILS

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP–1053.4–004	3/6

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

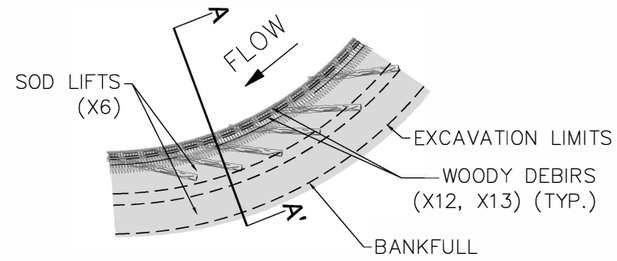
TOE WOOD DIMENSIONS			
VARIABLE	**VALUE**	**TYPICAL UNIT**	**DESCRIPTION**
X1	6.0 - 10.0	IN.	FOOTER LOG DIAMETER
X2	8.0 - 12.0	FT.	FOOTER LOG LENGTH
X3	18-30	IN.	TOE WOOD HEIGHT
X4	SEE SHEET 3	N/A	MATCH TYPICAL SECTION
X5	SEE SHEET 5	IN.	SOD LIFT HEIGHT
X6	1.0	#	SOD LIFTS
X7	8.0 - 10.0	FT.	TOE WOOD WIDTH
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)



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

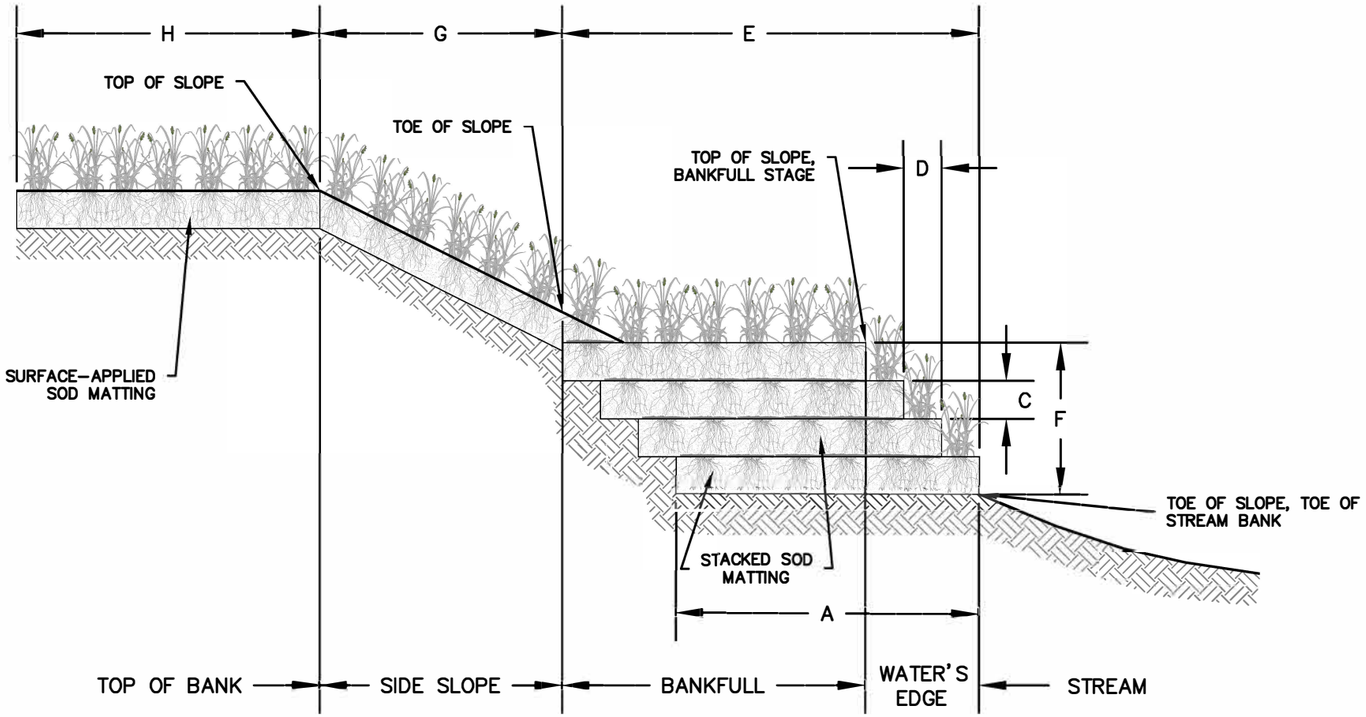
1 TOE WOOD DETAIL

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

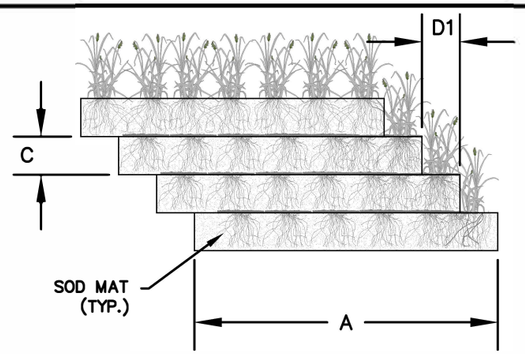
ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE-SPECIFIC RESTORATION PLAN
UNNAMED STREAM - MP 1053.4 - MDNR ID 50
SITE SPECIFIC DETAILS

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP-1053.4-004	4/6

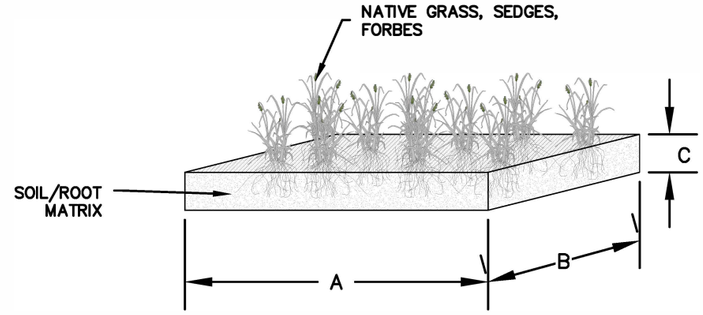
PLOTTED SIZE: ANSI FULL BLEED B (17x11)



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	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 1053.4 – MDNR ID 50
TYPICAL STREAM DETAILS

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP–1053.4–005	5/6

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

1 CENTERLINE – FACING WEST BANK

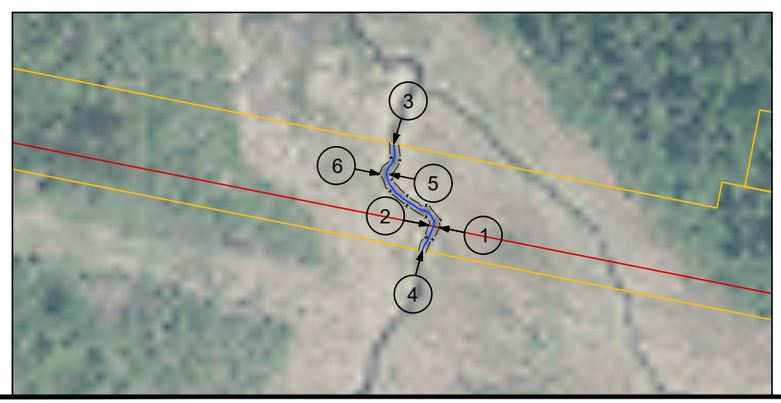
2 CENTERLINE – FACING EAST BANK

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
UNNAMED RIVER – MP 1053.4 – MDNR ID 50
PHOTO PAGE

SCALE	DWG. NO.	PAGE NO.
	SSRP–1053.4–005	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. 51: MP 1056.6; Moose Lake (Public Water Basin) / Tributary to Moose Lake (Non-Public Water)

MOOSE LAKE/TRIBUTARY TO MOOSE LAKE

MDNR ID 51 / SURVEY ID w-51n26w33-b
AITKIN COUNTY, MINNESOTA
S33-T51N-R26W MACVILLE TWP
MN-AI-C5-034.200

SCALE IN FEET 0 25 50 100

MN-AI-035.000 | MN-AI-036.000 | MN-AI-C5-034.200

OHP

ADDITIONAL TEMPORARY WORKSPACE

INSTALLED PEATLAND MONITORING WELL

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

50' PERMANENT RIGHT OF WAY

120' TEMPORARY WORKSPACE

PROPOSED ENBRIDGE L3R PIPELINE

MDNR

TOB

1056.5 | 1056.6 | 1056.7

WETLAND BOUNDARY

4'

566'

95' TEMPORARY WORKSPACE

TOP OF BANK

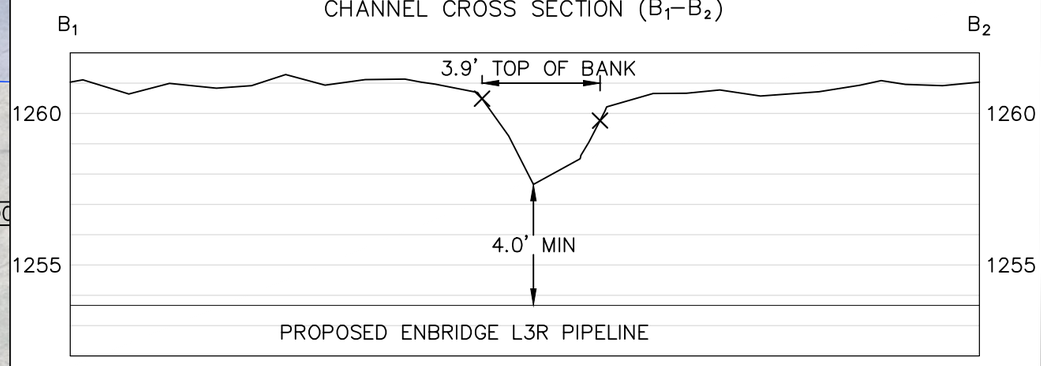
FLOW

TRIBUTARY TO MOOSE LAKE

A_1 A_2 B_1 B_2

2018 SUMMER IMAGERY

CHANNEL CROSS SECTION (B_1–B_2)



NOTES

1. BANKFULL DATA NOT AVAILABLE
2. SOBS (O/H) OR NPC (S1–3): N/A
3. CROSSING PROPOSED FOR WINTER CONSTRUCTION BASED ON DECEMBER 1, 2020 START DATE
4. MDNR REGION 2 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.

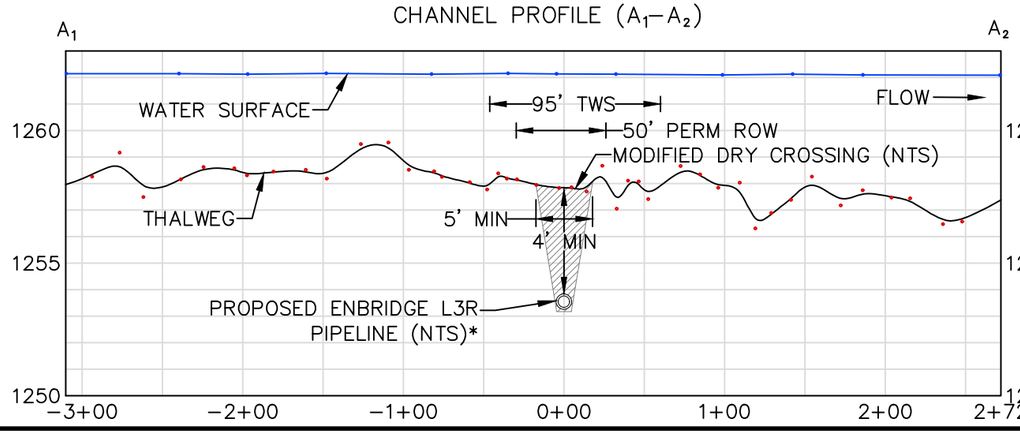
LEGEND

- PROPOSED ENBRIDGE L3R PIPELINE
- PERMANENT RIGHT OF WAY
- TEMPORARY WORKSPACE
- WATERBODY (ROSGEN SURVEY – THALWEG)
- OHP — OVERHEAD POWER
- TRACT BOUNDARY
- PWI BOUNDARY
- MDNR — MINNESOTA DEPARTMENT OF NATURAL RESOURCES (MDNR) 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)
- TOP OF BANK
- TRENCH BREAKER (LOCATIONS ARE APPROXIMATE)

FOR ENVIRONMENTAL REVIEW PURPOSES ONLY

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)



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

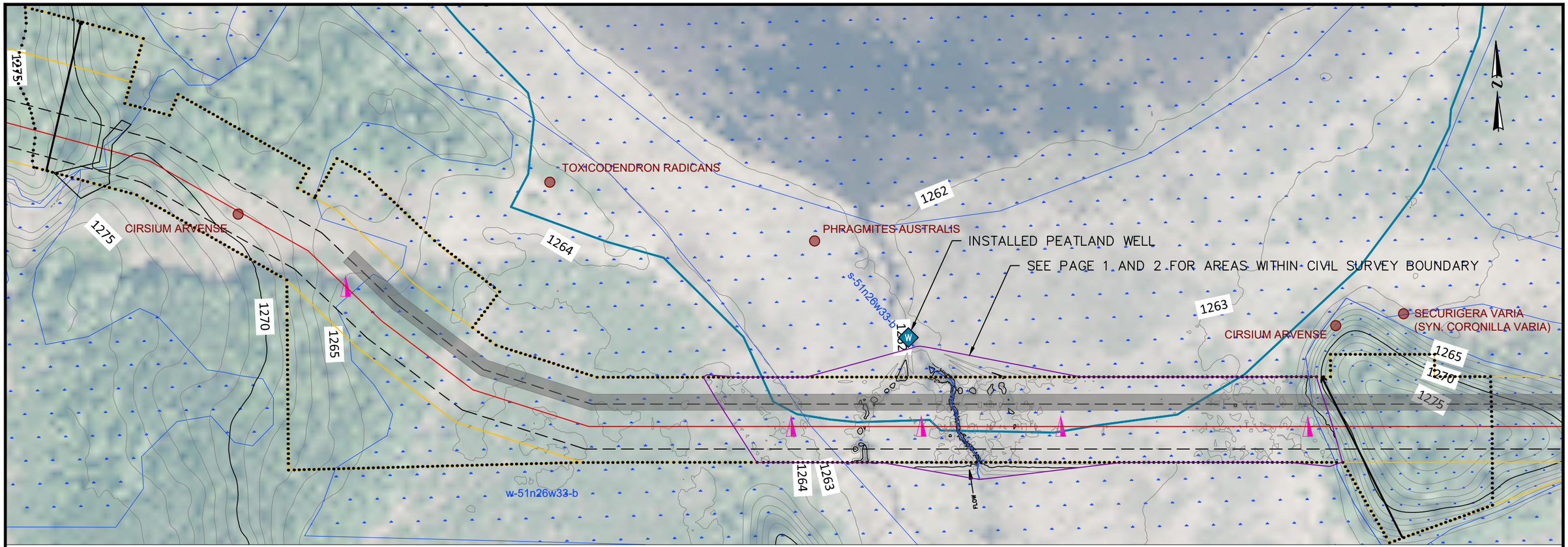
NO.	REVISION-DESCRIPTION	BY	DATE	CHK'D	APP'D
0	ISSUED FOR PERMIT APPLICATION	AJJ	10/2020	BAB	BAB

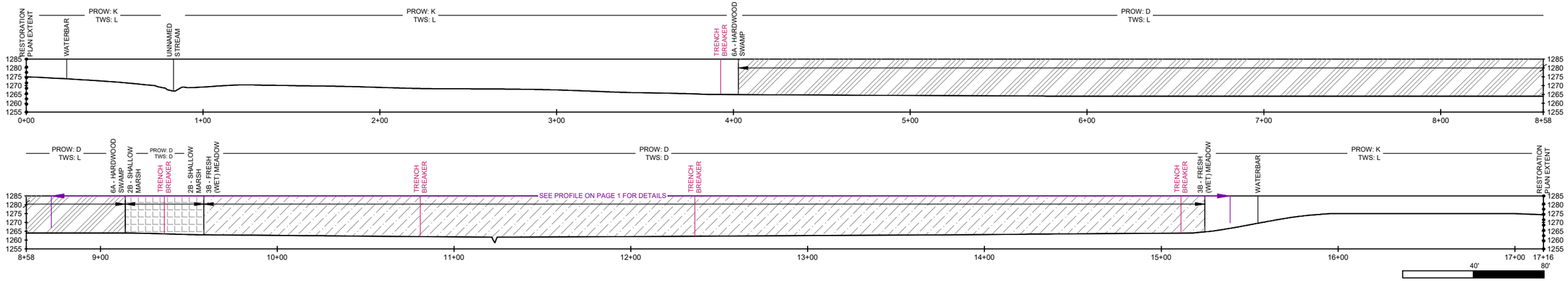
ENBRIDGE

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

PROPOSED ENBRIDGE L3R PIPELINE
OPEN CUT (WETLAND)/MODIFIED DRY CROSING (TRIBUTARY) CROSSING OF MOOSE LAKE/TRIBUTARY TO MOOSE LAKE
ENBRIDGE MP 1056.6
AITKIN COUNTY, MINNESOTA

SCALE: NOTED
DWG. NO.: B-93-5.84-MDNR-51-0





BWSR SEED MIX	D: WET MEADOW NE (34–371); 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. 24–HOUR SOIL STABILIZATION REQUIRED WITHIN 200 FEET DURING RESTRICTION: MARCH 15 – JUNE 30.
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.

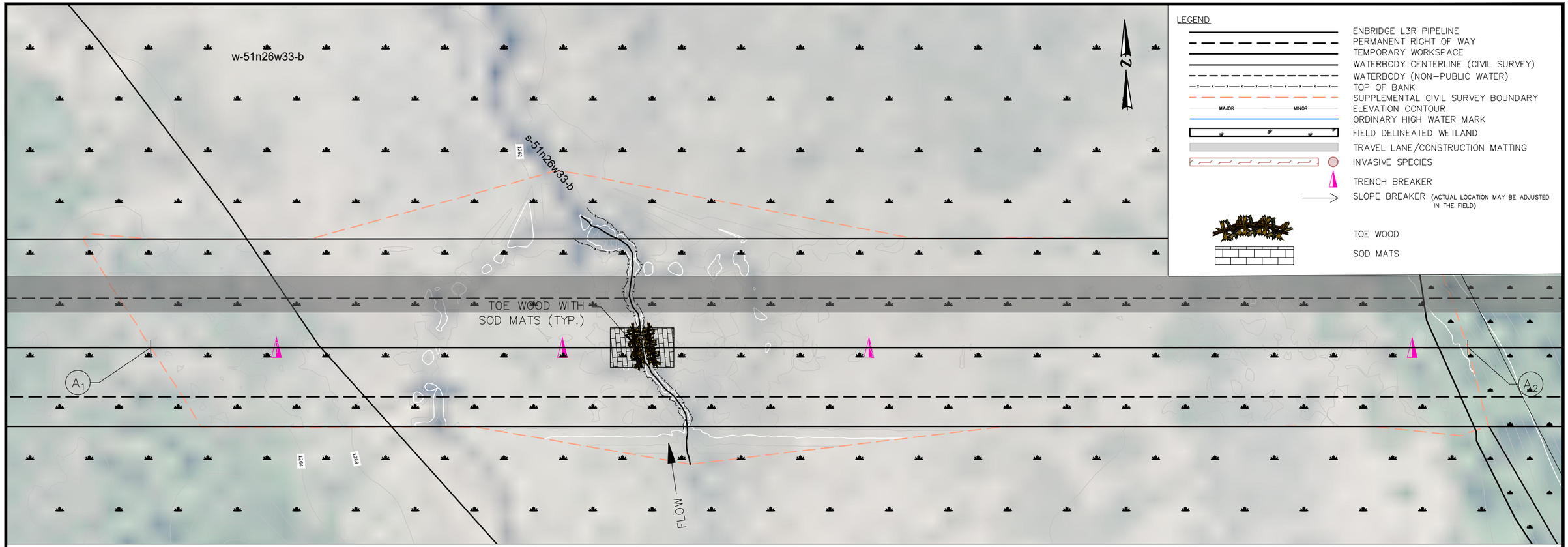
LEGEND

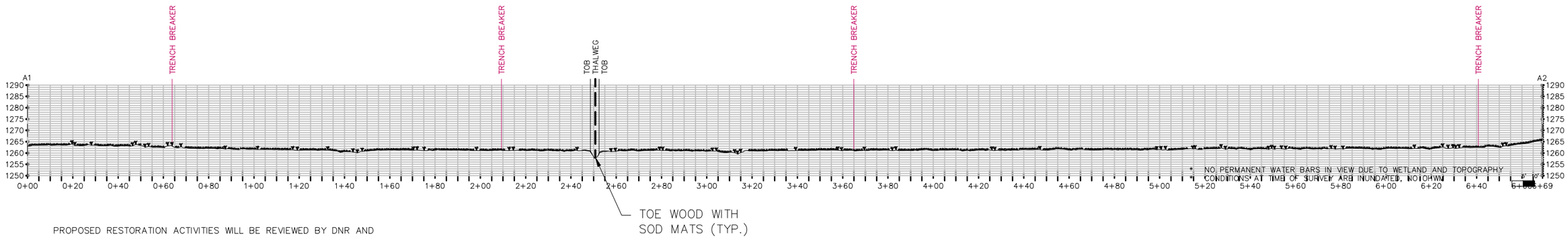
- ENBRIDGE L3R PIPELINE
- PERMANENT RIGHT OF WAY
- TEMPORARY WORKSPACE
- WATERBODY CENTERLINE (CIVIL SURVEY)
- WATERBODY (NON–PUBLIC WATER)
- PUBLIC WATER CIVIL SURVEY BOUNDARY
- MDNR EXPANDED RESTORATION BOUNDARY
- TOP OF BANK
- ELEVATION CONTOUR (MAJOR / MINOR)
- ORDINARY HIGH WATER MARK
- FIELD DELINEATED 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
MOOSE LAKE/TRIB TO MOOSE LAKE – MP 1056.5 – MDNR ID 51
RE–VEGETATION PLAN: EXPANDED EXTENT

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP–1056.5–001A	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	w-51n26w33-b; IFC ID: W-1499.0
CROSSING TYPE	MODIFIED DRY CROSSING
PROPOSED RESTORATION (SEE DETAILS FOR LIVE STAKING, TRANSPLANTS, AND SHRUB SPECIES IF APPLICABLE)	BRUSH – TOE WOOD; SOD MATS
WITHIN OR ADJACENT WETLAND	HARDWOOD SWAMP
BWSR SEED MIX	WET MEADOW NE (34-371)
DOMINANT WETLAND VEGETATION	1. CALAMAGROSTIS CANADENSIS 3. CAREX LACUSTRIS 2. CAREX STRICTA 4. ALNUS INCANA
SOBS (O/H) or NPC (S1-3)	N/A

NOTES
1. CONSTRUCTION TIMING RESTRICTIONS
   1.1.N/A – DELINEATED AS WETLAND (HARDWOOD SWAMP)
   1.2. WILD RICE: APRIL 1 – JULY 15
   1.3. 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: MARCH 15 – JUNE 30.
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. CROSSING PROPOSED FOR WINTER CONSTRUCTION BASED ON DECEMBER 1, 2020 START DATE
7. SITE WITHIN PEAT BASIN – SOURCE: SSURGO

ENBRIDGE

NO.	REVISION-DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
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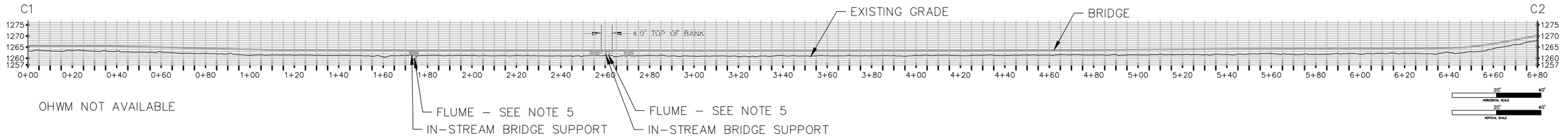
ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE-SPECIFIC RESTORATION PLAN
MOOSE LAKE/TRIB TO MOOSE LAKE – MP 1056.5 – MDNR ID 51
RE-VEGETATION PLAN

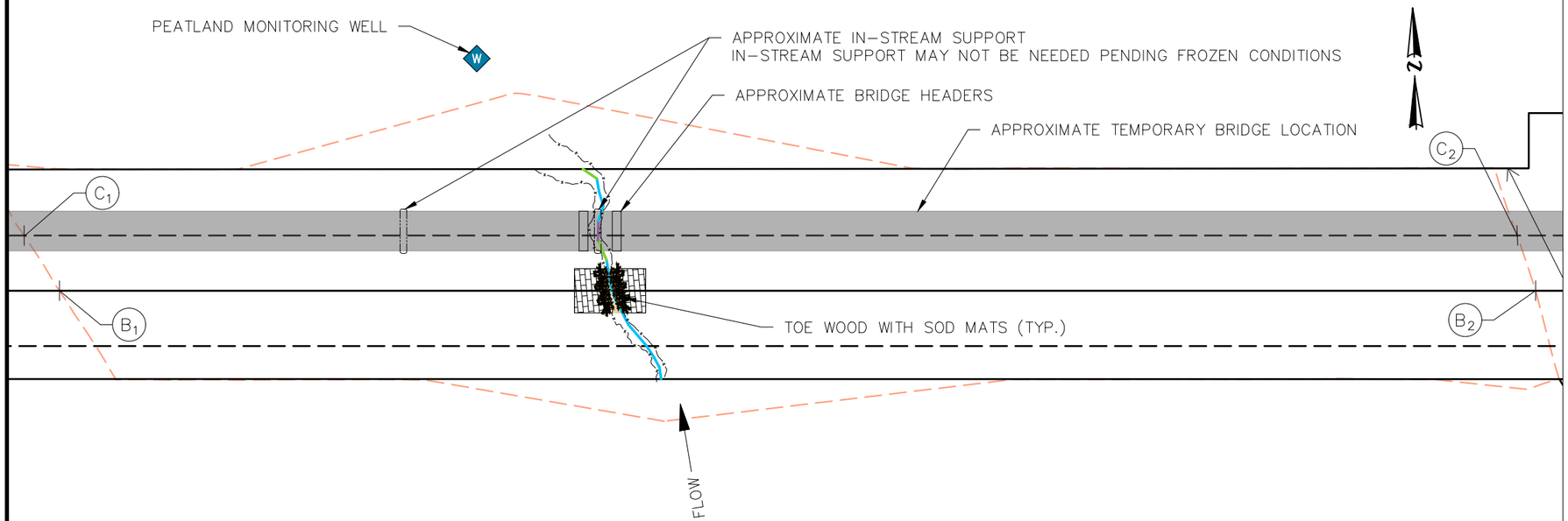
SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP-1056.5-001	1/6

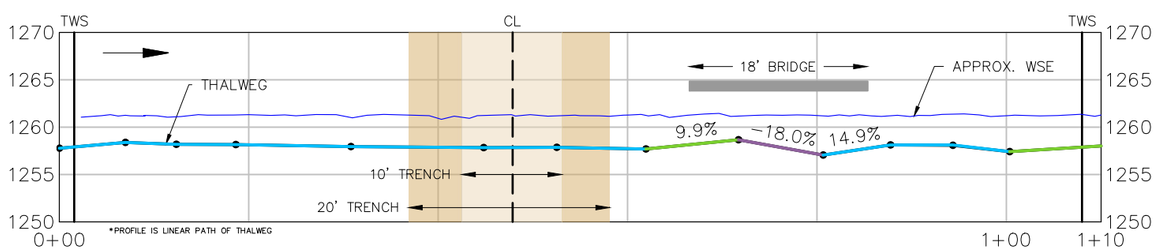
PLOTTED SIZE: ANSI FULL BLEED B (17x11)

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 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. 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'

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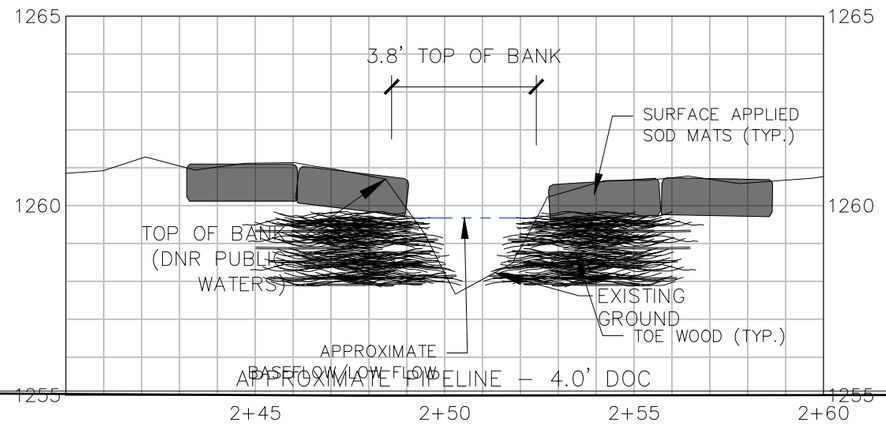
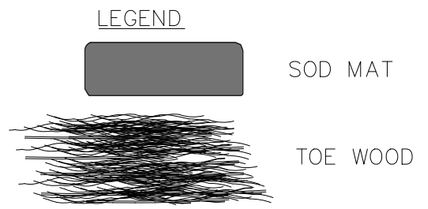
ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
MOOSE LAKE/TRIB TO MOOSE LAKE – MP 1056.5 – MDNR ID 51
STABILIZATION PLAN

SCALE	DWG. NO.	PAGE NO.
	SSRP–1056.5–002	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

4' 8' HORIZONTAL SCALE

4' 8' VERTICAL SCALE

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. TRENCH IS LOCATED WITHIN AN EXISTING RIFFLE, AS SUCH, THE BED MATERIAL SHALL BE EXCAVATED AND TEMPORARILY STOCKPILED TO BE REINSTALLED AS PART OF CHANNEL BED AND TOE OF BANK RESTORATION EFFORTS. REFER TO RESTORATION CROSS SECTION AND BED PROFILE SHEET 2 TO MAINTAIN THE EXISTING BED FEATURE GRADE CONTROL.
4. RIFFLE MATERIAL IS NATURALLY COMMINGLED WITH A VARIETY OF PARTICLE SIZES TO PROMOTE CHANNEL SURFACE FLOWS. MATERIAL THICKNESS GENERALLY EXTENDS TO A DEPTH OF 1.5 TO 2 TIMES THE LARGEST SURFACE PARTICLE. RESTORED CHANNEL RIFFLE SECTION SHALL INCLUDE RANDOMLY SORTED MATERIALS.

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. 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. 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.

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ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
MOOSE LAKE/TRIB TO MOOSE LAKE – MP 1056.5 – MDNR ID 51
SITE SPECIFIC DETAILS

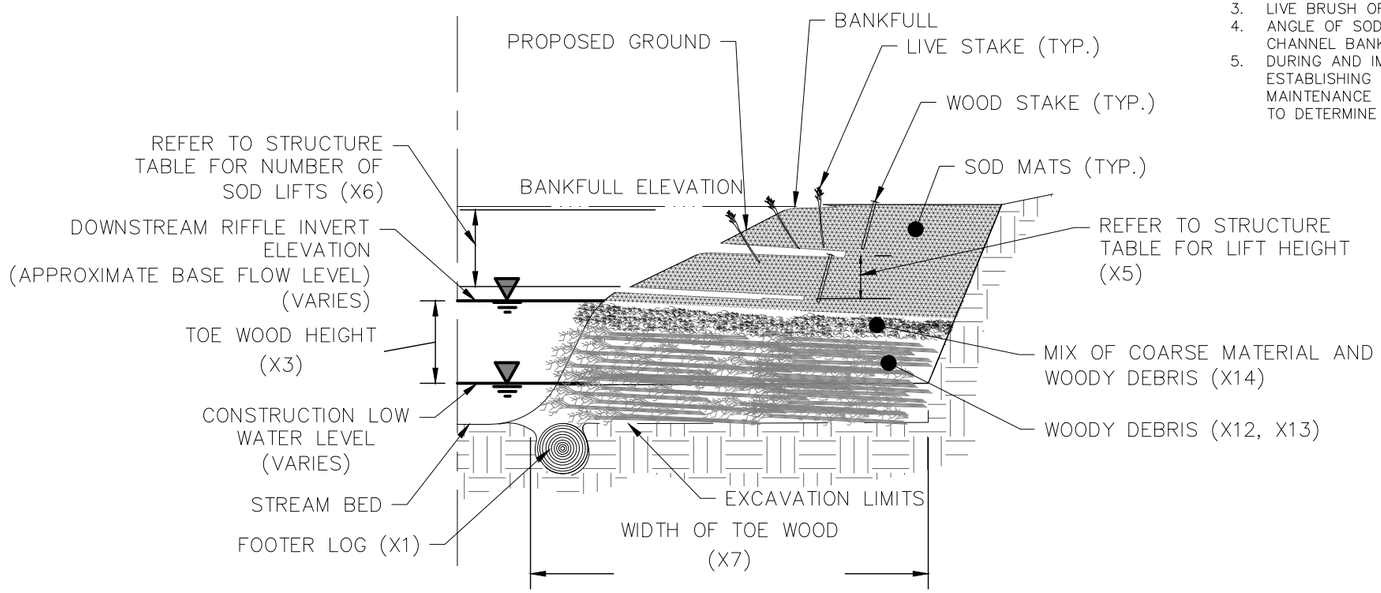
SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP–1056.5–004	3/6

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

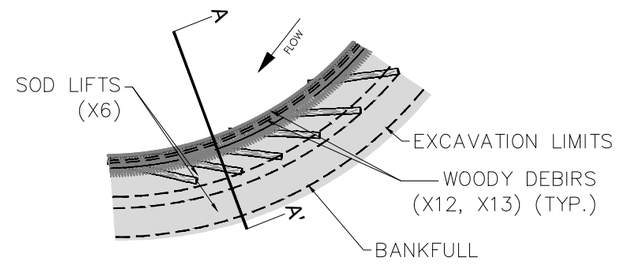
TOE WOOD DIMENSIONS			
VARIABLE	**VALUE**	**TYPICAL UNIT**	**DESCRIPTION**
X1	6.0 - 10.0	IN.	FOOTER LOG DIAMETER
X2	8.0 - 12.0	FT.	FOOTER LOG LENGTH
X3	12.0 - 24.0	IN.	TOE WOOD HEIGHT
X4	SEE SHEET 3	N/A	MATCH TYPICAL SECTION
X5	SEE SHEET 5	FT.	SOD LIFT HEIGHT
X6	1.0	#	SOD LIFTS
X7	8.0 - 10.0	FT.	TOE 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

NO.	REVISION-DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
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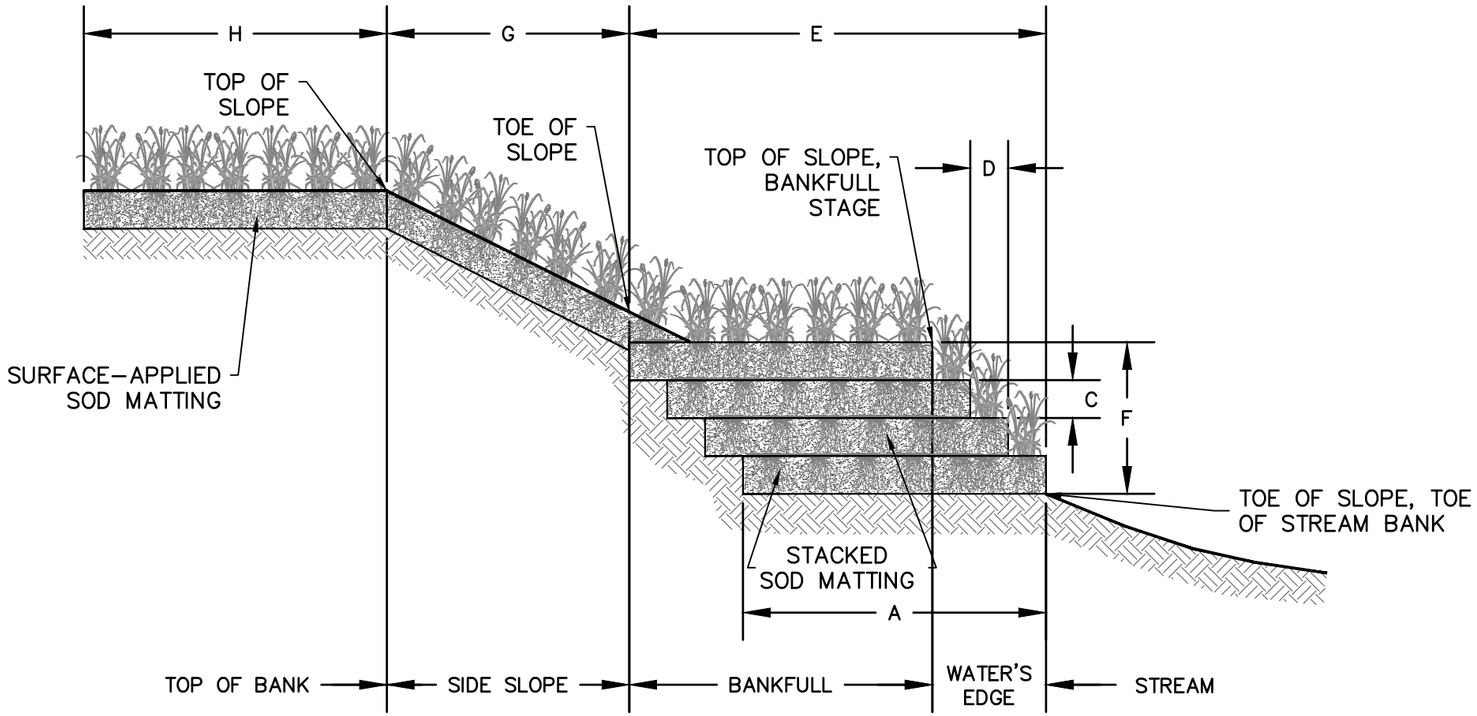
ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE-SPECIFIC RESTORATION PLAN
MOOSE LAKE/TRIB TO MOOSE LAKE - MP 1056.5 - MDNR ID 51
SITE SPECIFIC DETAILS

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP-1056.5-004	4/6

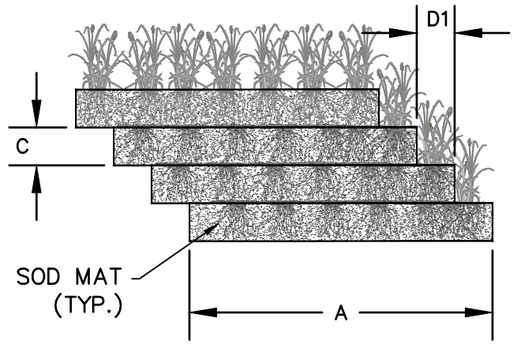
1 TOE WOOD DETAIL

ENBRIDGE

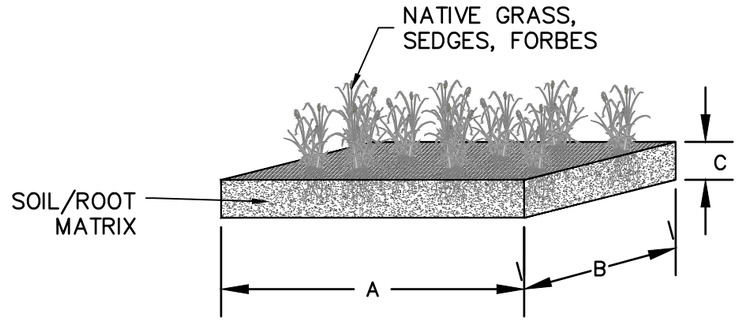
PLOTTED SIZE: ANSI FULL BLEED B (17x11)



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	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. DIMENSION LABELS ARE REFERENCED IN THE DETAIL DRAWINGS.

SOD MAT EXAMPLES

1 SOD MATTING DETAIL

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ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
MOOSE LAKE/TRIB TO MOOSE LAKE – MP 1056.5 – MDNR ID 51
SITE SPECIFIC DETAILS

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP–1056.5–004	5/6

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

1 CENTERLINE – FACING WEST BANK

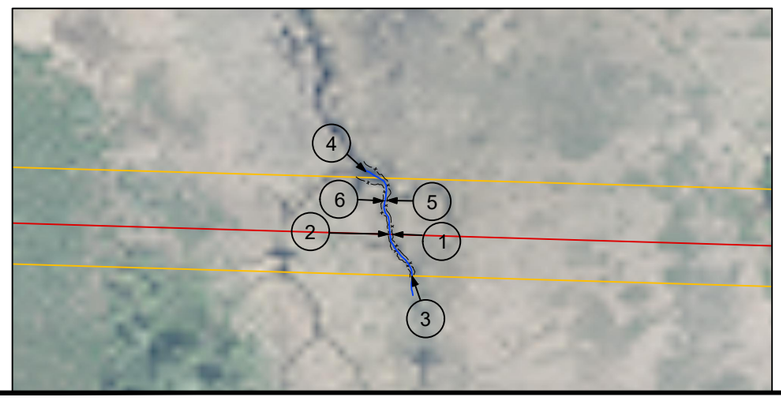
2 CENTERLINE – FACING EAST BANK

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.

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ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
MOOSE LAKE – MP 1056.5 – MDNR ID 51
PHOTO PAGE

SCALE	DWG. NO.	PAGE NO.
	SSRP–1056.5–005	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

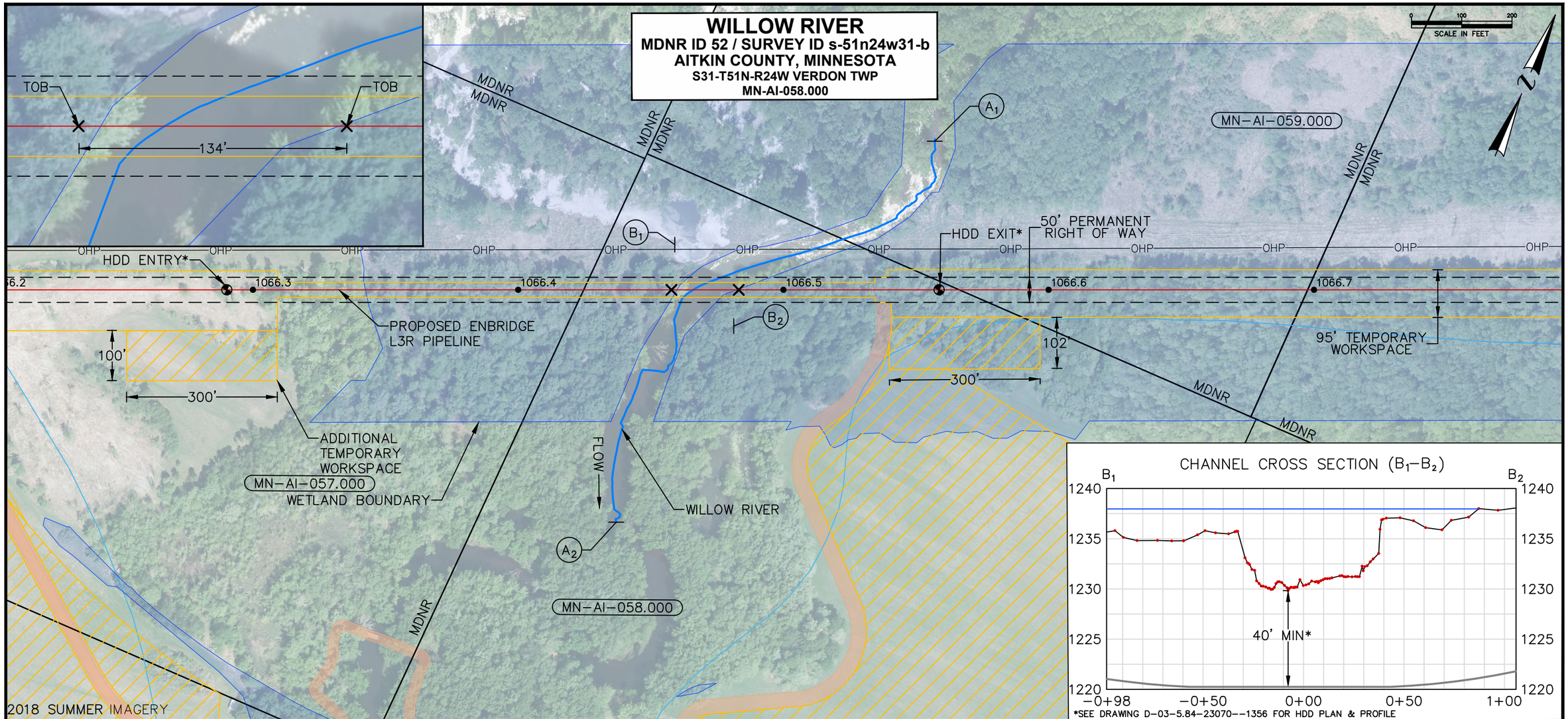
SCALE	DWG. NO.	PAGE NO.
	SSRP–NOTES	

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

MDNR ID No. 52: MP 1066.5; Willow River (M-117)

WILLOW RIVER

MDNR ID 52 / SURVEY ID s-51n24w31-b
AITKIN COUNTY, MINNESOTA
S31-T51N-R24W VERDON TWP
MN-AI-058.000



NOTES
1. BANKFULL DATA NOT AVAILABLE
2. SOBS (O/H) OR NPC (S1–3): YES (HIGH SOBS); YES (PARTIAL OVERLAP S1–S3)
3. MDNR REGION 2 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.

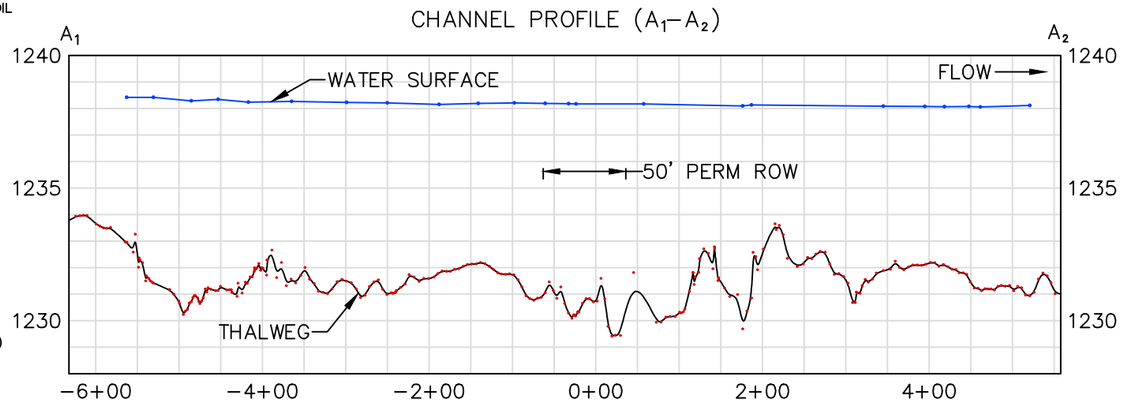
CHANNEL CROSS SECTION NOTE:
1. CHANNEL LOCATIONS, DIMENSIONS, AND/OR ELEVATIONS ARE BASED ON 2018 TOPOGRAPHIC/BATHYMETRIC SURVEY(S), AND AS SUCH DO NOT REFLECT CHANGES TO THE CHANNEL THAT MAY HAVE OCCURRED SINCE THAT TIME.

LEGEND

- PROPOSED ENBRIDGE L3R PIPELINE
- PERMANENT RIGHT OF WAY
- TEMPORARY WORKSPACE
- WATERBODY (ROSGEN SURVEY – THALWEG)
- FEMA FLOODPLAIN
- OHP — OVERHEAD POWER
- TRACT BOUNDARY
- MDNR — MINNESOTA DEPARTMENT OF NATURAL RESOURCES (MDNR) BOUNDARY
- 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)



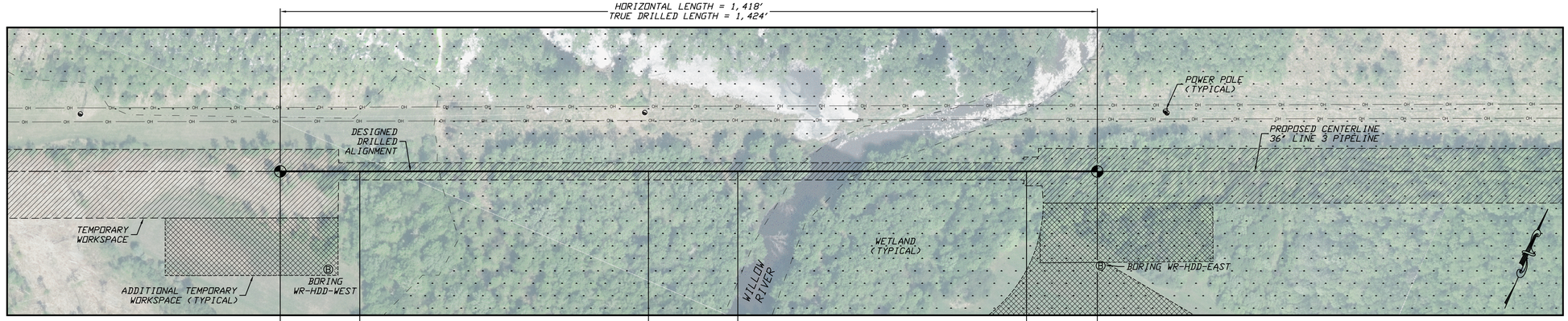
NO.	REVISION-DESCRIPTION	BY	DATE	CHK'D	APP'D
0	ISSUED FOR PERMIT APPLICATION	AJJ	10/2020	BAB	BAB

ENBRIDGE

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

PROPOSED ENBRIDGE L3R PIPELINE
PRIMARY METHOD – HDD
CROSSING OF WILLOW RIVER
ENBRIDGE MP 1066.4
AITKIN COUNTY, MINNESOTA

SCALE: NOTED
DWG. NO.: B-93-5.84-MDNR-52-0



PLAN

SCALE: 1"=100'

ENTRY POINT @ 8°
0+00.00, 1240.58
N 461004.31, E 2541018.08

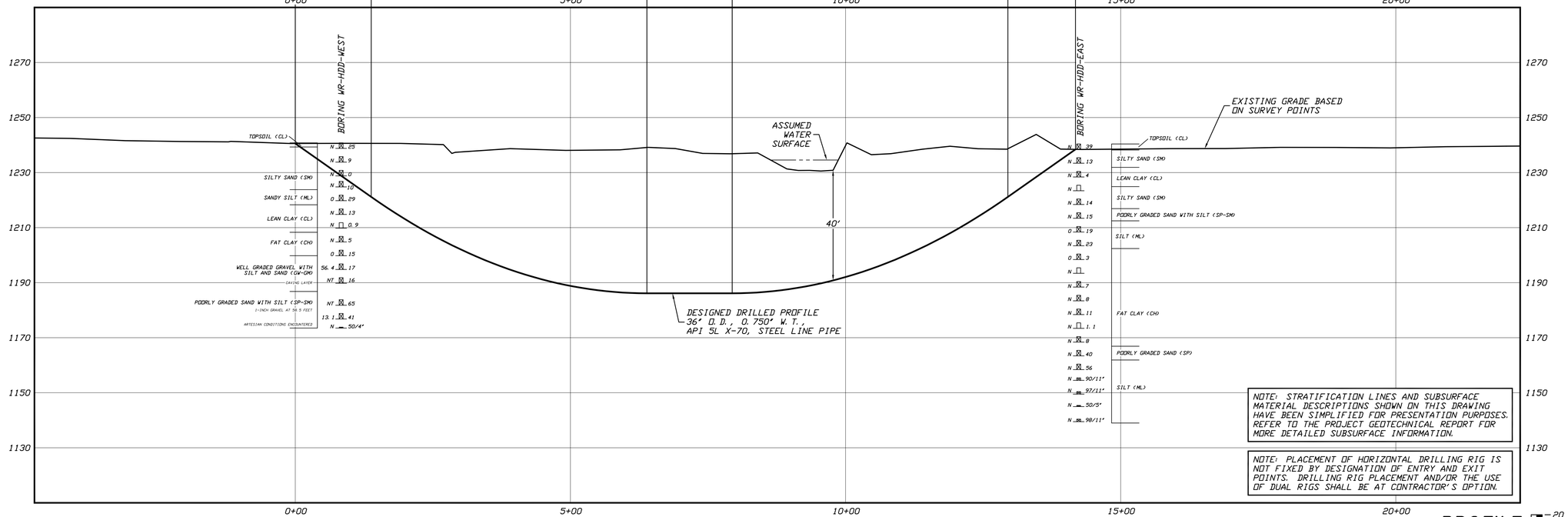
P.C. 8° SAG BEND
1+37.94, 1221.19
RADIUS = 3,600'

P.T. 8° SAG BEND
6+38.96, 1186.16

P.C. 8° SAG BEND
7+93.94, 1186.16
RADIUS = 3,600'

P.T. 8° SAG BEND
12+94.96, 1221.19

EXIT POINT @ 8°
14+17.83, 1238.46
N 461568.02, E 2542319.03



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"=100' HORIZONTAL
1"= 20' VERTICAL

GENERAL LEGEND

DRILLED PATH ENTRY/EXIT POINT

GEOTECHNICAL LEGEND

(B) BORING LOCATION

SPLIT SPOON SAMPLE

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

UNDISTURBED SAMPLE

53/ 1.2 — COMPRESSIVE STRENGTH IN TONS PER SQ. FT.

GEOTECHNICAL NOTES

1. GEOTECHNICAL DATA PROVIDED BY BARR ENGINEERING COMPANY, DULUTH, MN. REFER TO THE GEOTECHNICAL DATA REPORT DATED APRIL 2019 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 WILLOW RIVER
BY HORIZONTAL DIRECTIONAL DRILLING

LOCATION: AITKIN COUNTY, MINNESOTA

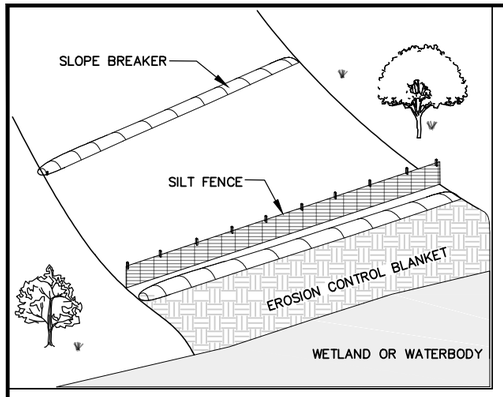
DRAWN	DATE	CHECKED	APPROVED	DRAWING NUMBER	REVISION
JSP	07/19/19	CDS	JSP	D-03-5.84-23070-C-1356	C

NO.	DATE	REVISION DESCRIPTION	BY	(CHK'D)	APP.
C	10/27/19	UPDATE WETLAND BOUNDARIES AND WORKSPACE	KWW	JSP	JSP
B	07/22/19	MODIFY HDD ENDPOINTS AS DIRECTED BY ENBRIDGE	JSP	CDS	JSP
A	07/19/19	ISSUE FOR CONSTRUCTION	JSP	JSP	JSP

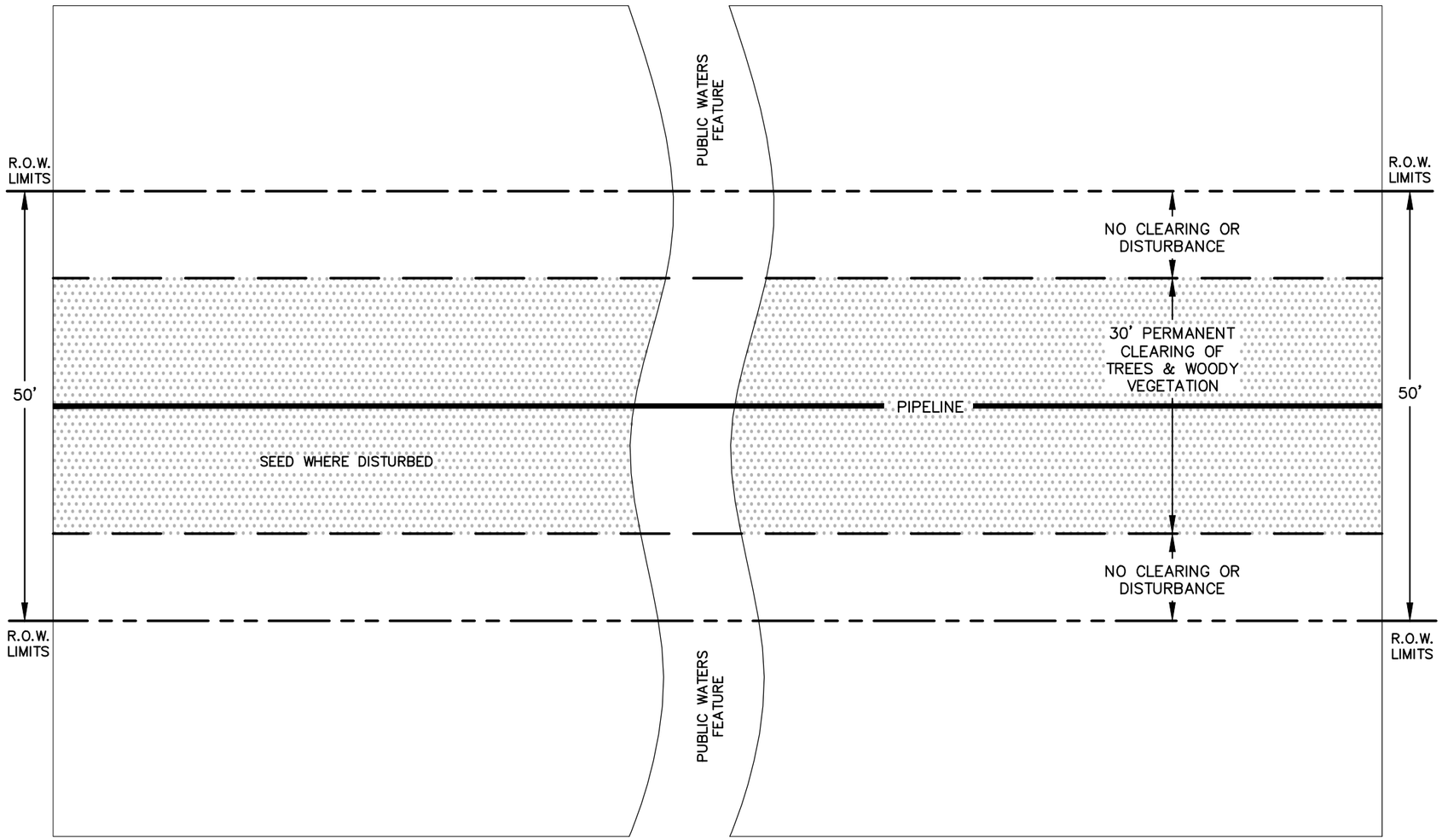
J.D. Hair & Associates, Inc.
Consulting Engineers
2424 East 21st Street
Suite 510
Tulsa, Oklahoma 74114

PROJECT NO.
Enbridge\1404

SHEET NO.
D1066



SEEDING AREA



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.

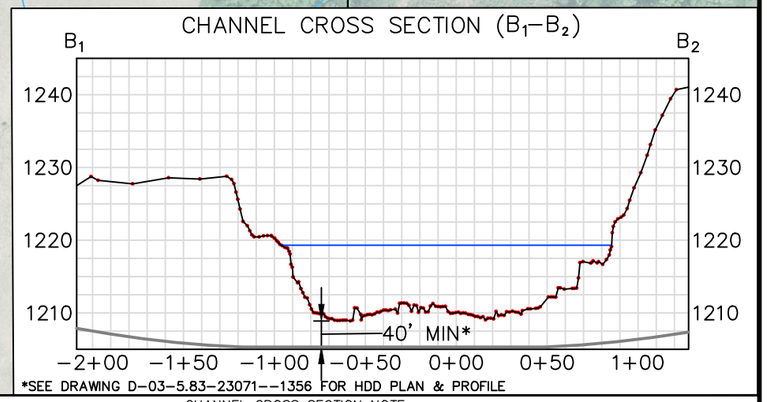
MDNR ID No. 53: MP 1069.7; Mississippi River (M)

MISSISSIPPI RIVER
MDNR ID 53 / SURVEY ID s-51n24w27-a
AITKIN COUNTY, MINNESOTA
S27-T51N-R24W VERDON TWP
MN-AI-068.000

SCALE IN FEET 0 100 200

MN-AI-067.000
WETLAND BOUNDARY
300'
100'
50' PERMANENT RIGHT OF WAY
1069.4
1069.5
1069.6
1069.7
1069.8
1069.9
HDD EXIT*
PROPOSED ENBRIDGE L3R PIPELINE
OHP
95' TEMPORARY WORKSPACE
MDNR
A_1
ROW-RA1
MN-AI-069.003
MN-AI-069.000
FLOW
B_1
B_2
ADDITIONAL TEMPORARY WORKSPACE
300'
75'
HDD ENTRY*
MN-AI-069.001
MN-AI-069.002
MISSISSIPPI RIVER
MN-AI-068.000
A_2
TOB
1069.7
245'
MN-AI-067.003
2018 SUMMER IMAGERY

CHANNEL CROSS SECTION (B_1–B_2)



*SEE DRAWING D-03-5.83-23071--1356 FOR HDD PLAN & PROFILE

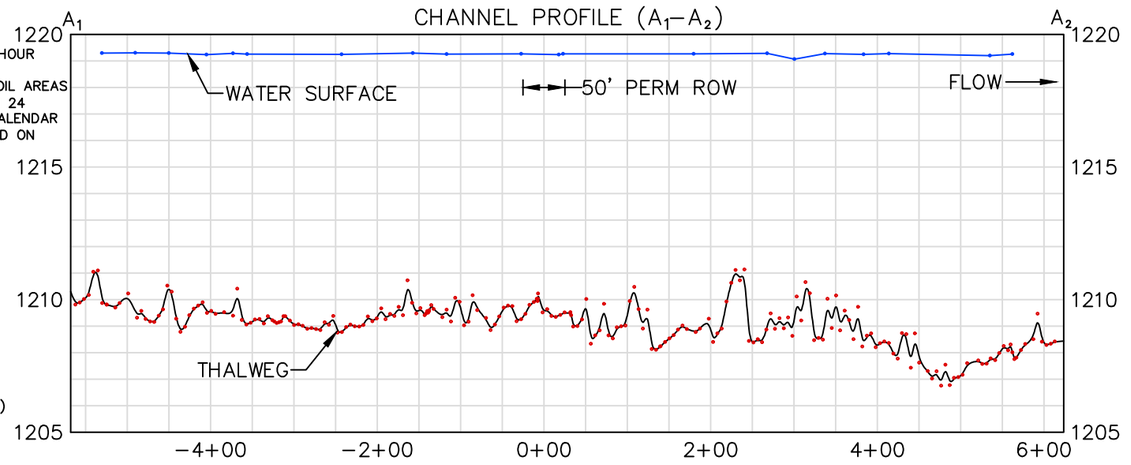
CHANNEL CROSS SECTION NOTE:
1. CHANNEL LOCATIONS, DIMENSIONS, AND/OR ELEVATIONS ARE BASED ON 2018 TOPOGRAPHIC/BATHYMETRIC SURVEY(S), AND AS SUCH DO NOT REFLECT CHANGES TO THE CHANNEL THAT MAY HAVE OCCURRED SINCE THAT TIME.

NOTES
1. BANKFULL DATA NOT AVAILABLE
2. SOBS (O/H) OR NPC (S1–3): N/A
3. MDNR REGION 2 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
- PERMANENT RIGHT OF WAY
- TEMPORARY WORKSPACE
- WATERBODY (ROSGEN SURVEY – THALWEG)
- FEMA FLOODPLAIN
- OHP — OVERHEAD POWER
- TRACT BOUNDARY
- 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)
- HDD ENTRY EXIT POINT
- TOP OF BANK

CHANNEL PROFILE (A_1–A_2)

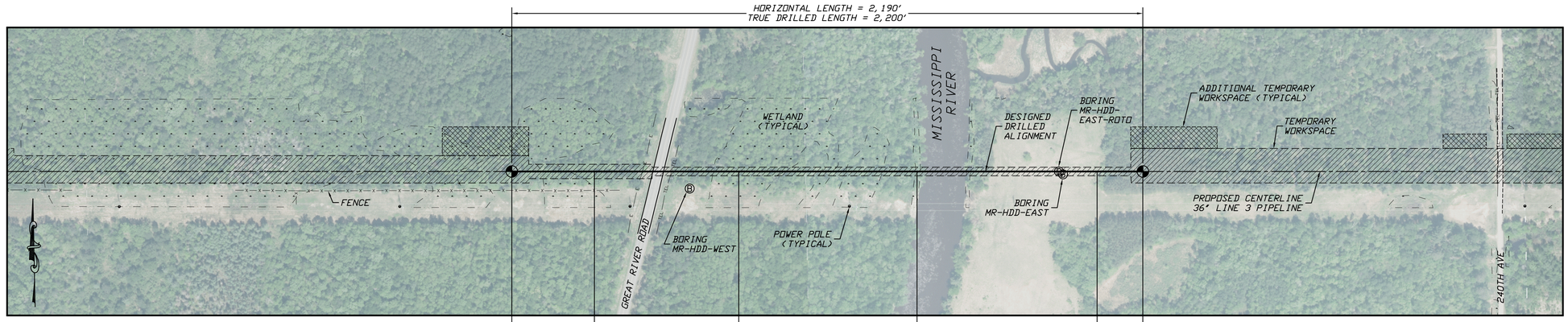


NO.	REVISION-DESCRIPTION	BY	DATE	CHK'D	APP'D
0	ISSUED FOR PERMIT APPLICATION	AJJ	10/2020	BAB	BAB

ENBRIDGE

DWN. BY: AJJ	DATE 10/2020	PROPOSED ENBRIDGE L3R PIPELINE PRIMARY METHOD – HDD CROSSING OF MISSISSIPPI RIVER ENBRIDGE MP 1069.7 AITKIN COUNTY, MINNESOTA	
CHK.			
PROJ. ENGR.			
PROJ. MGR.			
CLIENT APP.		SCALE NOTED	DWG. NO. B-93-5.84-MDNR-53-0

FOR ENVIRONMENTAL REVIEW PURPOSES ONLY



PLAN

SCALE: 1"=200'

EXIT POINT @ 8°
21+90.27, 1243.66
N 464412.05, E 2556852.00

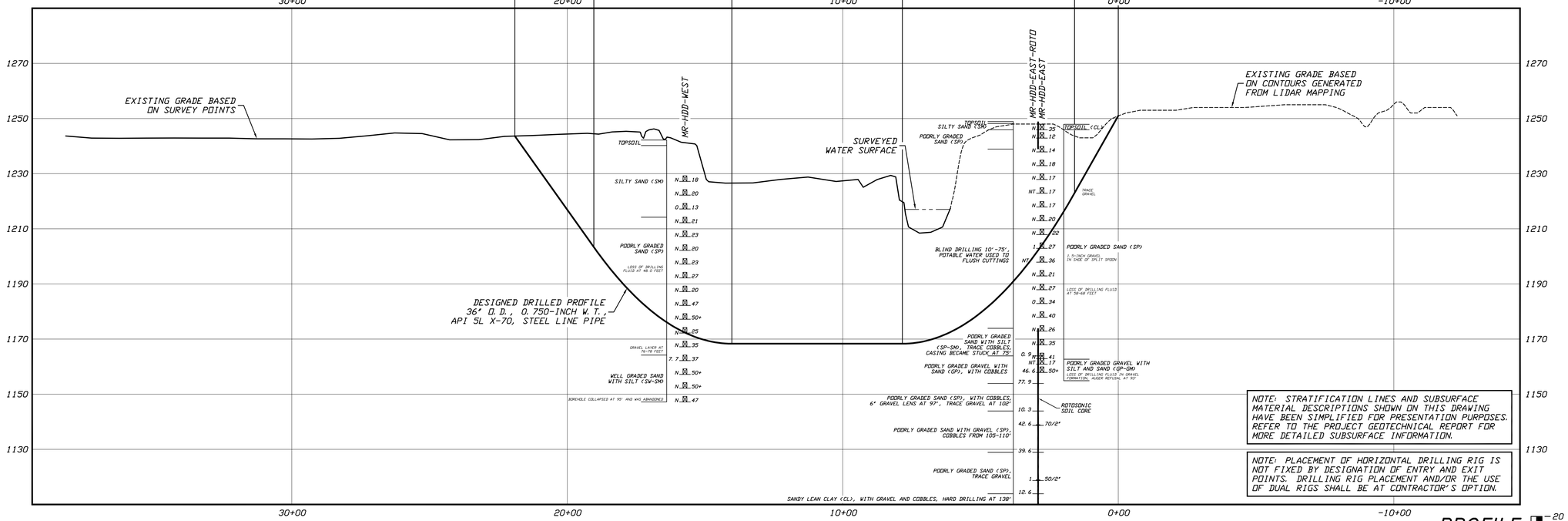
P.T. 8° SAG BEND
19+03.55, 1203.37

P.C. 8° SAG BEND
14+02.52, 1168.33
RADIUS = 3,600'

P.T. 10° SAG BEND
7+83.79, 1168.33

P.C. 10° SAG BEND
1+58.65, 1223.03
RADIUS = 3,600'

ENTRY POINT @ 10°
0+00.00, 1251.00
N 464367.80, E 2559041.83



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

400 200 100 0 — 20 10 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

ROTOSONIC SAMPLE

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

GEOTECHNICAL NOTES

1. GEOTECHNICAL DATA PROVIDED BY BARR ENGINEERING COMPANY, DULUTH, MN. REFER TO THE GEOTECHNICAL DATA REPORT DATED JUNE 2019 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: AITKIN COUNTY, MINNESOTA

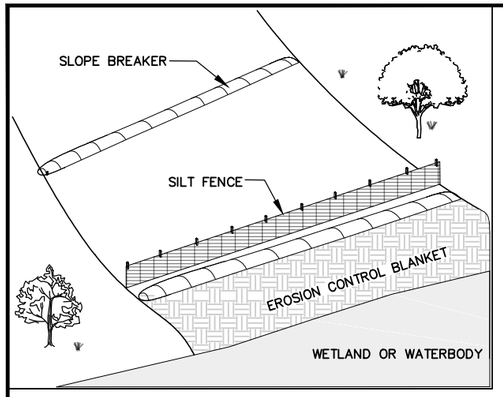
DRAWN	DATE	CHECKED	APPROVED	DRAWING NUMBER	
JSP	07/19/19	CDS	JSP	D-03-5.83-23071-C-1356	C

NO.	DATE	REVISION DESCRIPTION	BY	CHKD	APP.
C	10/27/19	UPDATE WETLAND BOUNDARIES AND WORKSPACE	KWW	JSP	JSP
B	07/22/19	MODIFY HDD ENDPOINTS AS DIRECTED BY ENBRIDGE	JSP	KWW	JSP
A	07/19/19	ISSUE FOR CONSTRUCTION	JSP	CDS	JSP

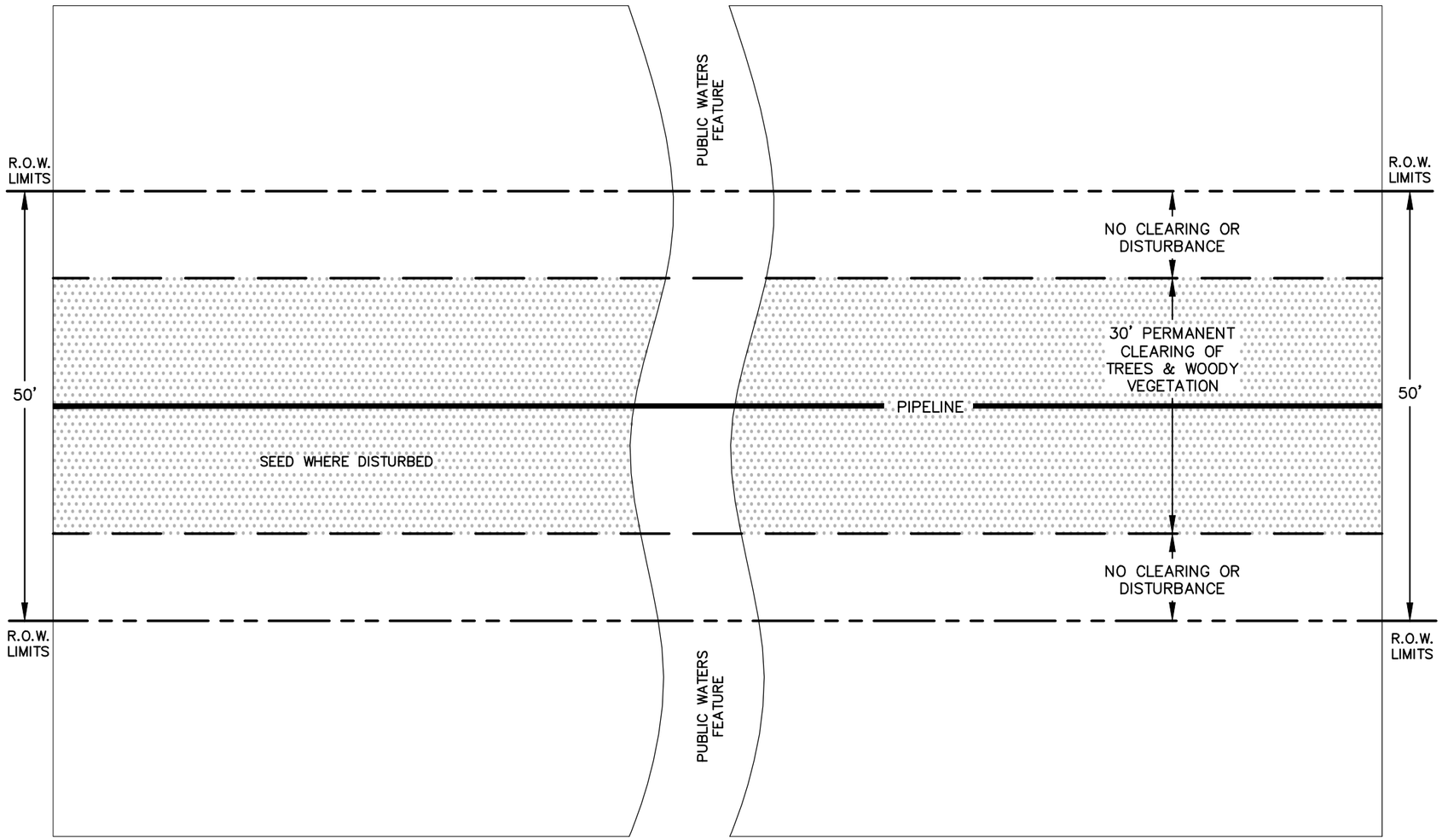
J.D.Hair&Associates,Inc.
Consulting Engineers
2424 East 21st Street
Suite 510
Tulsa, Oklahoma 74114

PROJECT NO.
Enbridge\1404

MILEPOST
D1069



SEEDING AREA



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

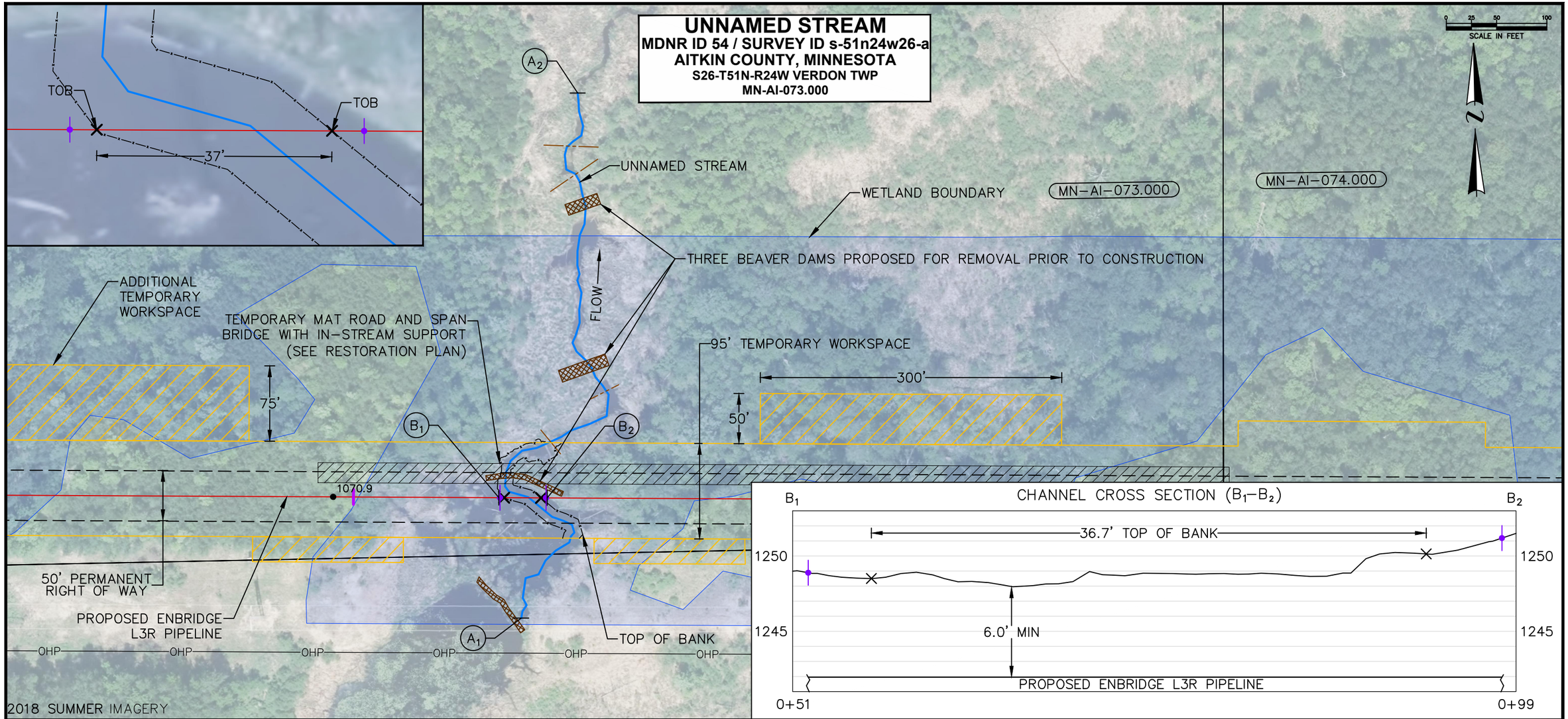
LINE 3 REPLACEMENT
PUBLIC WATERS HDD CROSSING TYPICAL
FINAL STREAM STABILIZATION & EROSION CONTROL

SCALE NTS | DWG. NO.

MDNR ID No. 54: MP 1070.9; Unnamed Stream (M-122-001)

UNNAMED STREAM

MDNR ID 54 / SURVEY ID s-51n24w26-a
AITKIN COUNTY, MINNESOTA
S26-T51N-R24W VERDON TWP
MN-AI-073.000

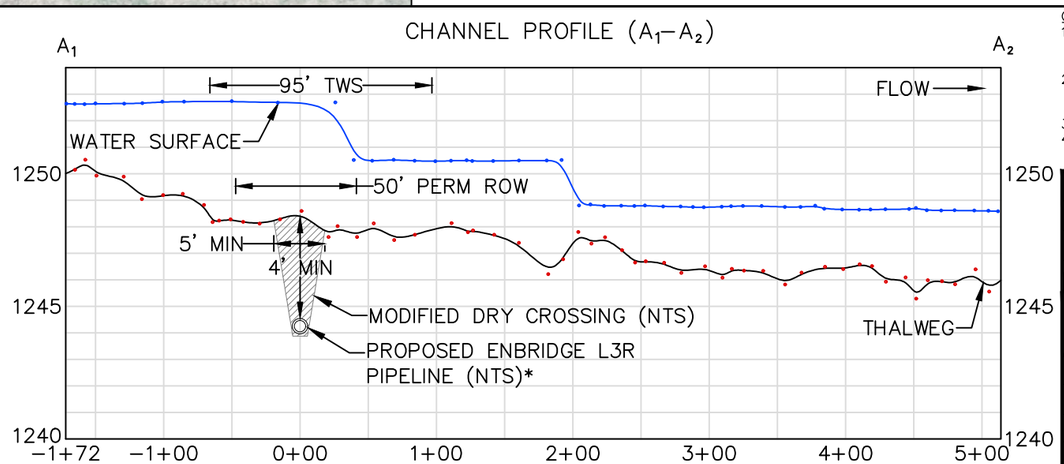


NOTES
1. BANKFULL DATA NOT AVAILABLE
2. SOBS (O/H) OR NPC (S1–3): N/A
3. CROSSING PROPOSED FOR WINTER CONSTRUCTION BASED ON DECEMBER 1, 2020 START DATE
4. TIMING RESTRICTION EXEMPTION GRANTED (10/08/2020).

LEGEND

- PROPOSED ENBRIDGE L3R PIPELINE
- PERMANENT RIGHT OF WAY
- TEMPORARY WORKSPACE
- WATERBODY (ROSGEN SURVEY – THALWEG)
- OHP — OVERHEAD POWER
- TRACT BOUNDARY
- WOODY DEBRIS
- TEMPORARY MAT ROAD AND SPAN BRIDGE
- BEAVER DAM
- WETLAND
- ADDITIONAL TEMPORARY WORKSPACE
- MN–XX–XX–XXX.XXX — TRACT ID
- ROSGEN SURVEY POINT – WATER SURFACE
- ROSGEN SURVEY POINT – RIVER BOTTOM (THALWEG)
- TOP OF BANK
- TRENCH BREAKER (LOCATIONS ARE APPROXIMATE)

FOR ENVIRONMENTAL REVIEW PURPOSES ONLY



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

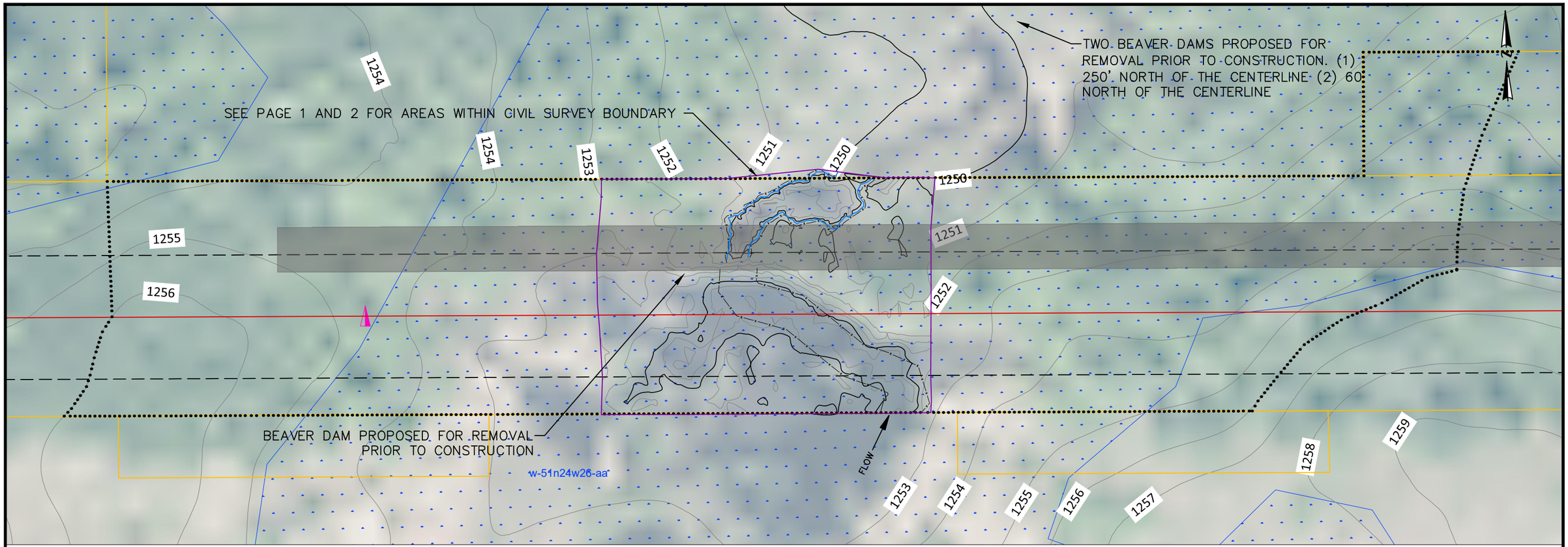
NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
0	ISSUED FOR PERMIT APPLICATION	AJJ	10/2020	BAB	BAB

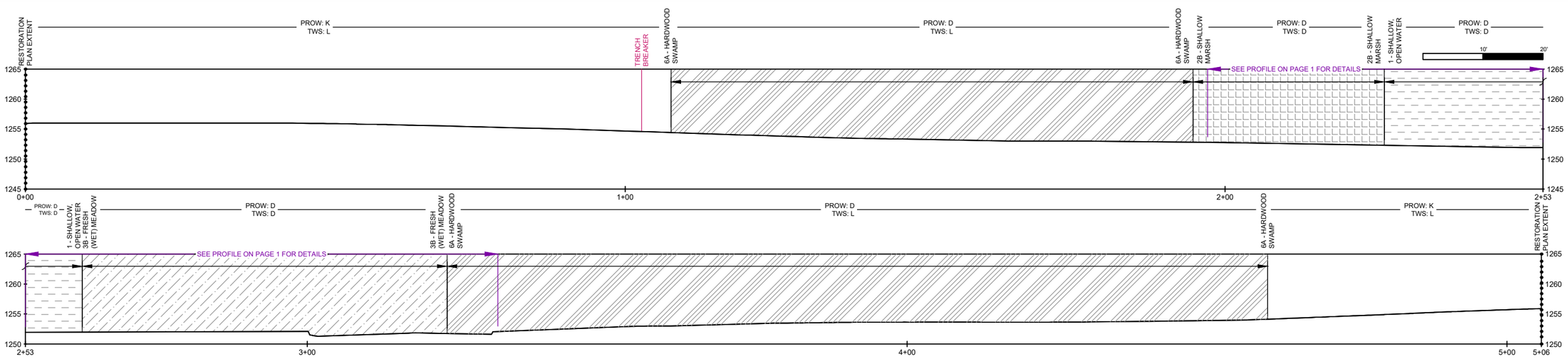
ENBRIDGE

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

PROPOSED ENBRIDGE L3R PIPELINE
PRIMARY METHOD – MODIFIED DRY CROSSING
CROSSING OF UNNAMED STREAM
ENBRIDGE MP 1070.9
AITKIN COUNTY, MINNESOTA

SCALE: NOTED
DWG. NO.: B–93–5.84–MDNR–54–0





BWSR SEED MIX	D: WET MEADOW NE (34–371); 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. TIMING RESTRICTION EXEMPTION GRANTED (10/08/2020).
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).

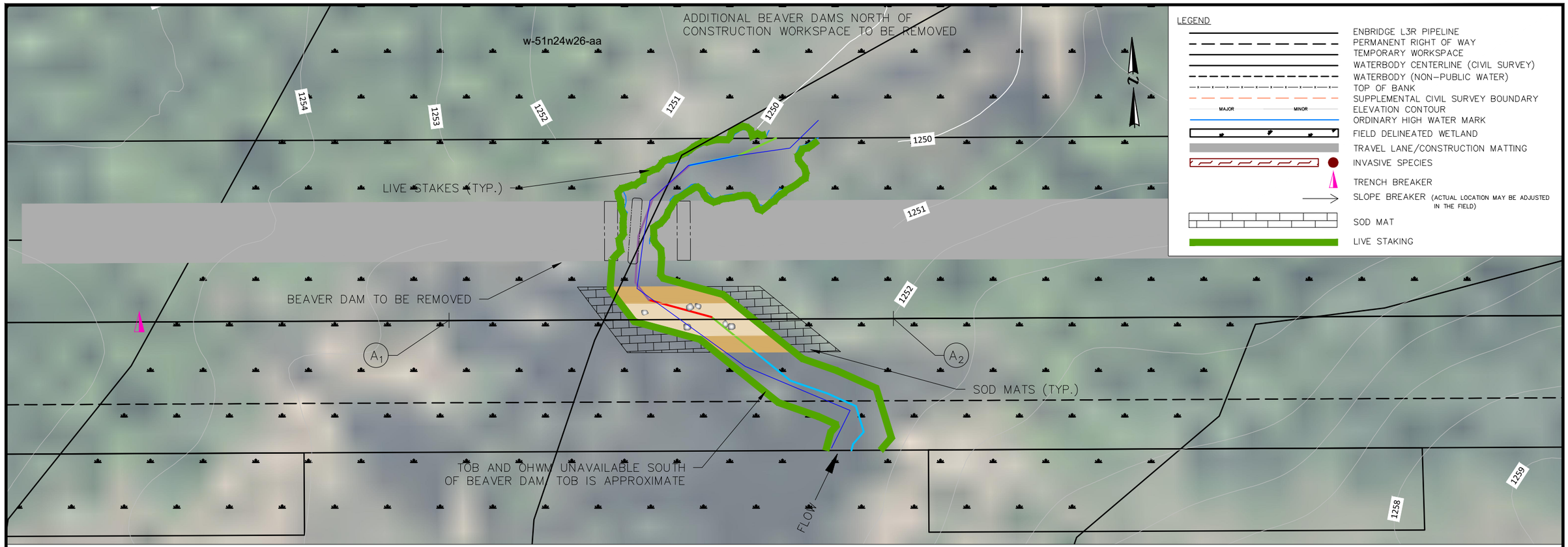
LEGEND

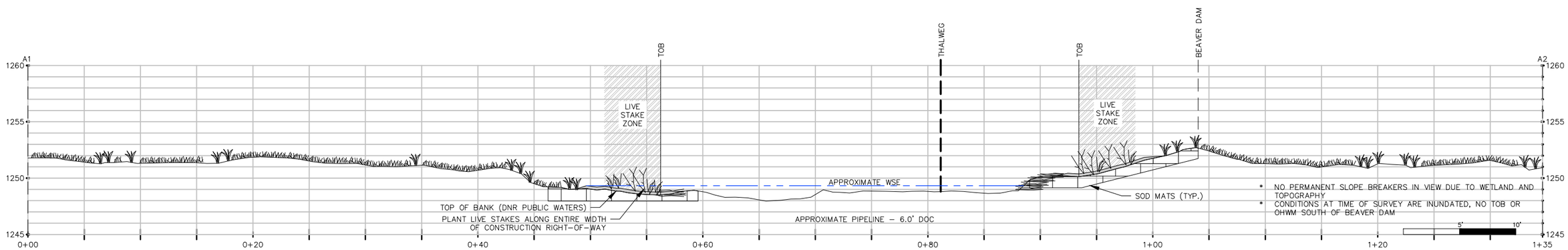
- ENBRIDGE L3R PIPELINE
- PERMANENT RIGHT OF WAY
- TEMPORARY WORKSPACE
- WATERBODY CENTERLINE (CIVIL SURVEY)
- WATERBODY (NON–PUBLIC WATER)
- PUBLIC WATER CIVIL SURVEY BOUNDARY
- MDNR EXPANDED RESTORATION BOUNDARY
- TOP OF BANK
- ELEVATION CONTOUR (MAJOR / MINOR)
- ORDINARY HIGH WATER MARK
- FIELD DELINEATED 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
UNNAMED STREAM – MP 1071.0 – MDNR ID 54
RE–VEGETATION PLAN: EXPANDED EXTENT

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP–1071.0–001A	1A/5





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

FEATURE ID	s-51n24w26-a; IFC ID: S-275.0
CROSSING TYPE	MODIFIED DRY CROSSING
PROPOSED RESTORATION (SEE DETAILS FOR LIVE STAKING, TRANSPLANTS, AND SHRUB SPECIES IF APPLICABLE)	SOD MATS
WITHIN OR ADJACENT WETLAND	SHALLOW MARSH/FRESH WET MEADOW/SHALLOW OPEN WATER
BWSR SEED MIX	WET MEADOW NE (34-371)
DOMINANT WETLAND VEGETATION	1. TYPHA X GLUACA 3. CAREX LACUSTRIS 2. PHALARIS ARUNDINACEA 4. ALNUS INCANA
SOBS (O/H) or NPC (S1-3)	N/A

NOTES

1. CONSTRUCTION TIMING RESTRICTIONS
   - 1.1. MDNR REGION 2 PWI – COLD WATER FISHERY: SEPTEMBER 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. CROSSING PROPOSED FOR WINTER CONSTRUCTION BASED ON DECEMBER 1, 2020 START DATE.

ENBRIDGE

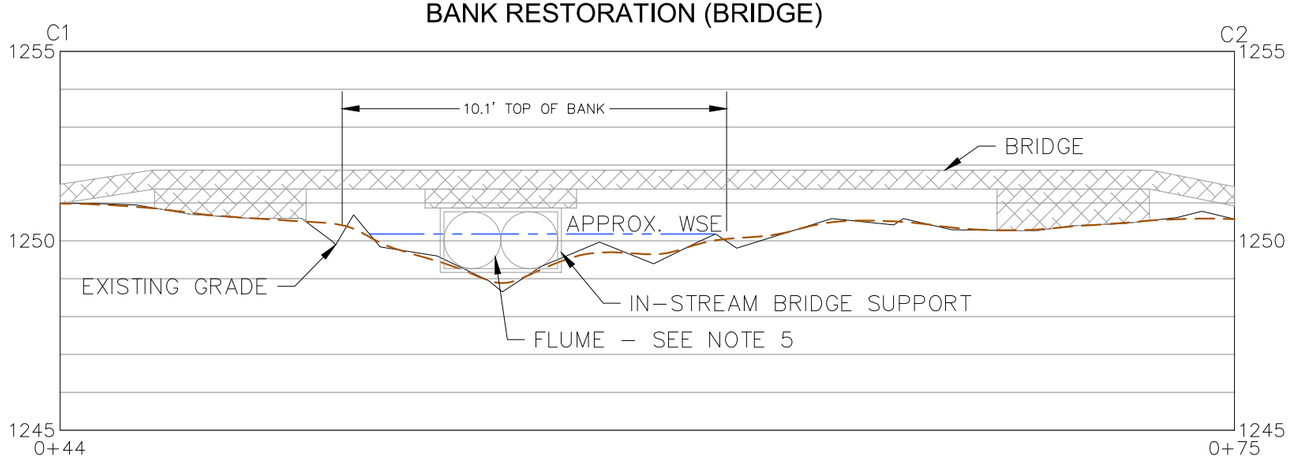
NO.	REVISION-DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

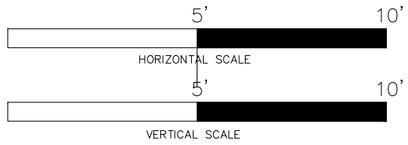
ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE-SPECIFIC RESTORATION PLAN
UNNAMED STREAM – MP 1071.0 – MDNR ID 54
RE-VEGETATION PLAN

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP-1071.0-001	1/7

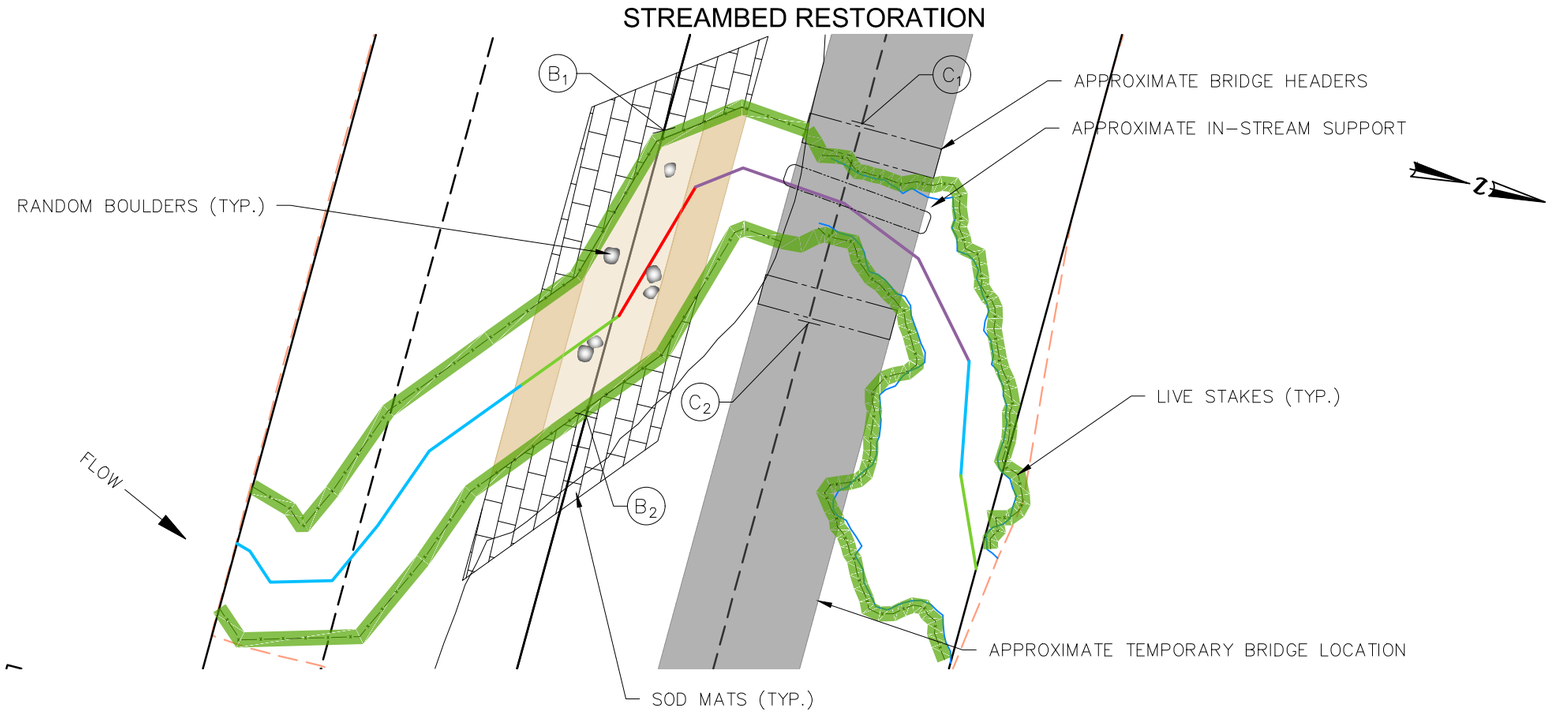
PLOTTED SIZE: ANSI FULL BLEED B (17x11)

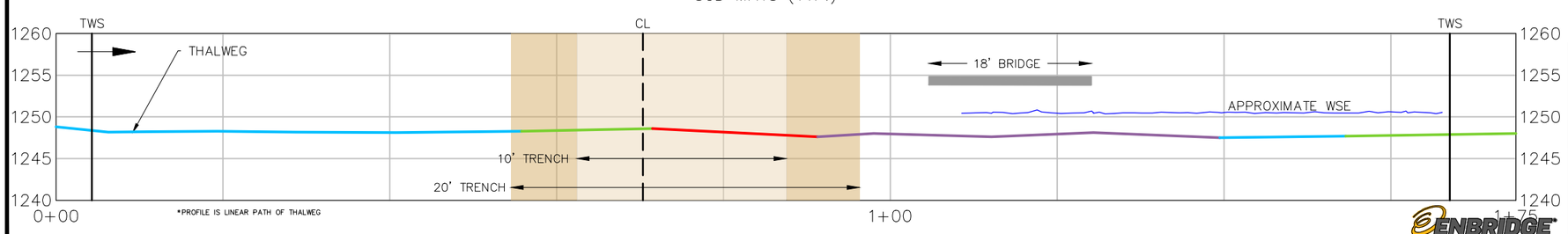
BANK RESTORATION (BRIDGE)





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.
3. MINIMIZE DISTURBANCE OF BED MATERIALS AND FEATURES DURING CONSTRUCTION OF THE TRENCH AND INSTALLATION AND REMOVAL OF IN-STREAM SUPPORT
4. 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.
5. ALIGNMENT OF IN-STREAM SUPPORT SHALL BE FIELD ADJUSTED BASED ON FLOW PATH TO PROTECT CHANNEL BANKS.
6. 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'

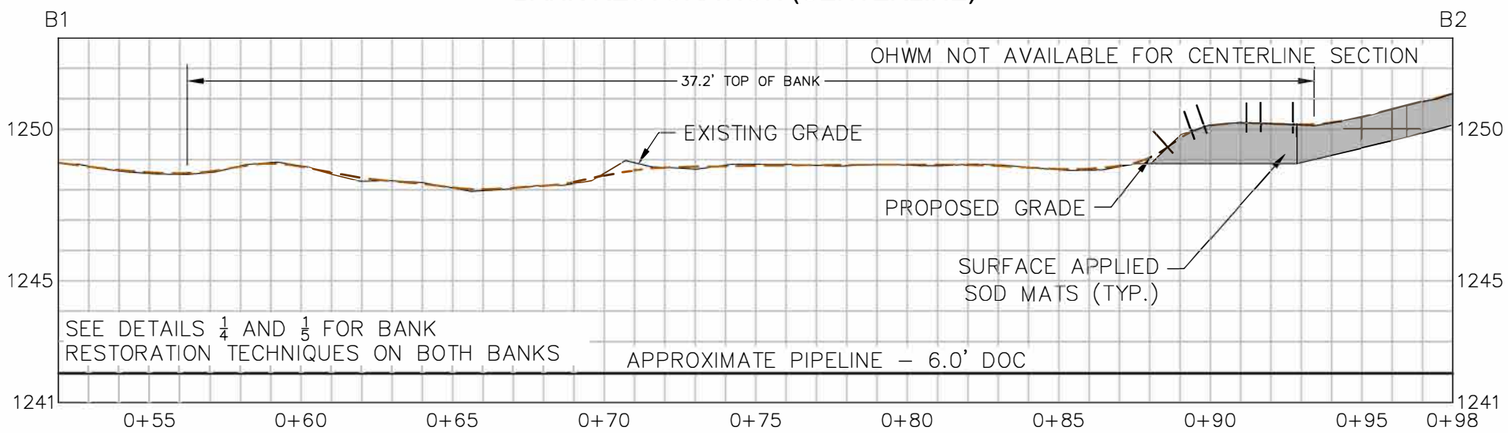
NO.	REVISION-DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE-SPECIFIC RESTORATION PLAN
UNNAMED STREAM – MP 1071.0 – MDNR ID 54
STABILIZATION PLAN

SCALE	DWG. NO.	PAGE NO.
	SSRP-1071.0-002	2/7

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

BANK RESTORATION (CENTERLINE)



LEGEND

SOD MAT

LIVE STAKES

5' 10'
HORIZONTAL SCALE

5' 10'
VERTICAL SCALE

	COMMON NAME	SCIENTIFIC NAME
LIVE STAKE SPECIES	ELDERBERRY	SAMBUCUS CANADENSIS
	RED-OSIER DOGWOOD	CORNUS STOLONIFERA
	SILKY DOGWOOD	CORNUS AMOMUM
TRANSPLANTS	SPECKELD ALDER	ALNUS INCANA
	DOGWOOD	CORNUS SPP.
SHRUB	BUSH HONEYSUCKLE	LONICERA TATARICA

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. NO WILLOW PLANTING AT TROUT STREAMS. 50% ELDERBERRY, 25% BUSH HONEYSUCKLE, AND 25% COMBINED DOGWOOD – ALDER.
4. (WHERE APPLICABLE) TRANSPLANTS AND/OR CONTAINER SHRUBS MAY BE SUBSTITUTED FOR LIVE STAKES BASED ON SITE SPECIFIC CONDITIONS.
   - 4.1. CONTAINER PLANTED SHRUBS ARE RECOMMENDED TO BE 18"– 24"IN SIZE.
   - 4.2. 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.
5. (WHERE APPLICABLE) TRANSPLANTS SHOULD BE EXCAVATED WITH A MINIMUM OF 12" SOIL, DIAMETER EQUAL TO PLANT DRIP LINE, AND LOOSE UNBOUND BALL.
6. 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

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 20 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 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.

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		
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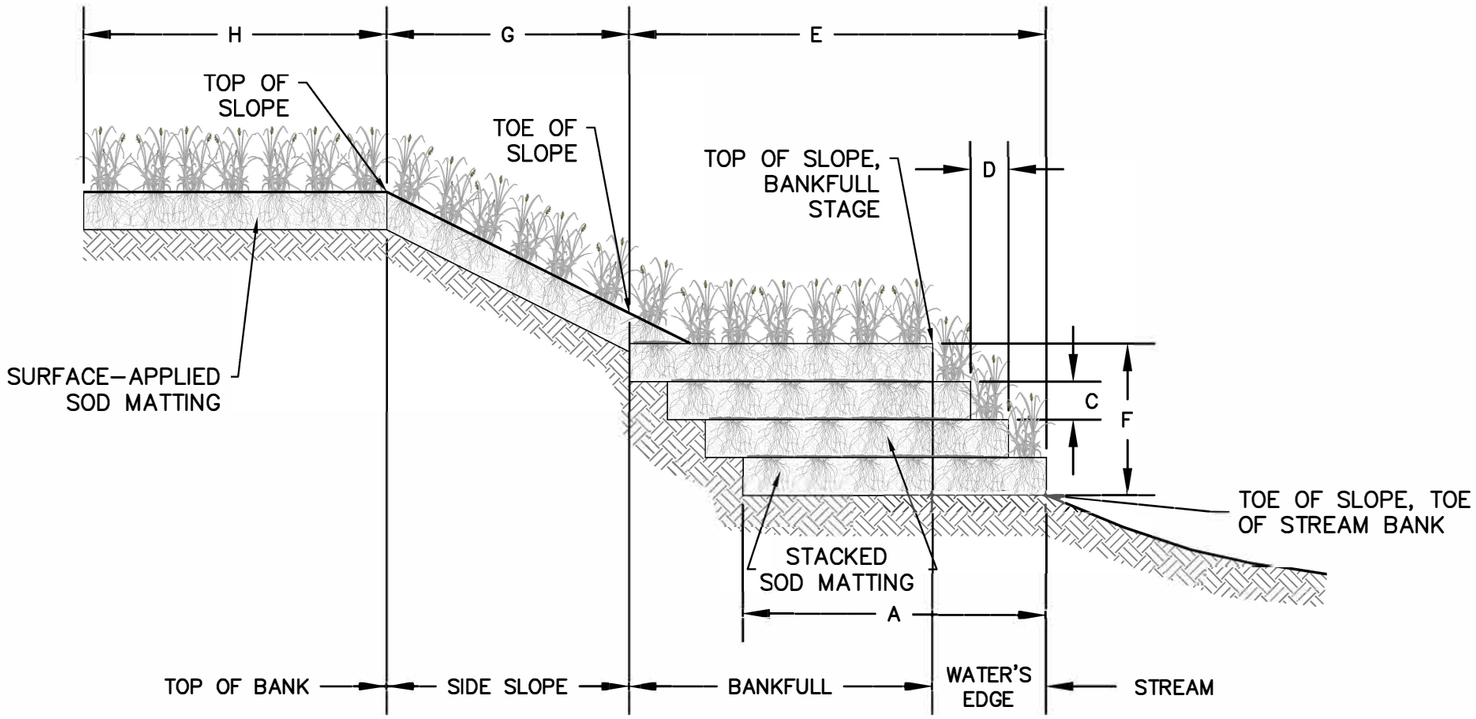
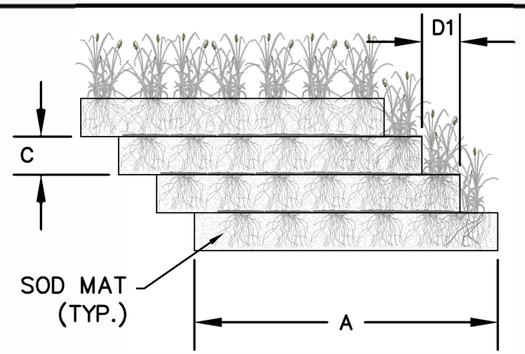
ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
UNNAMED STREAM – MP 1071.0 – MDNR ID 54
SITE SPECIFIC DETAILS

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP–1071.0–004	3/7

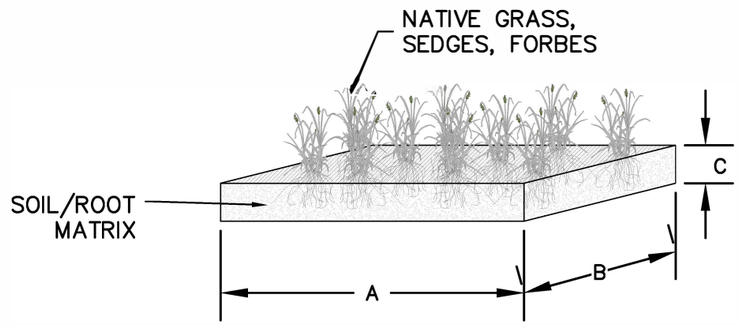
PLOTTED SIZE: ANSI FULL BLEED B (17x11)



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	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

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ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
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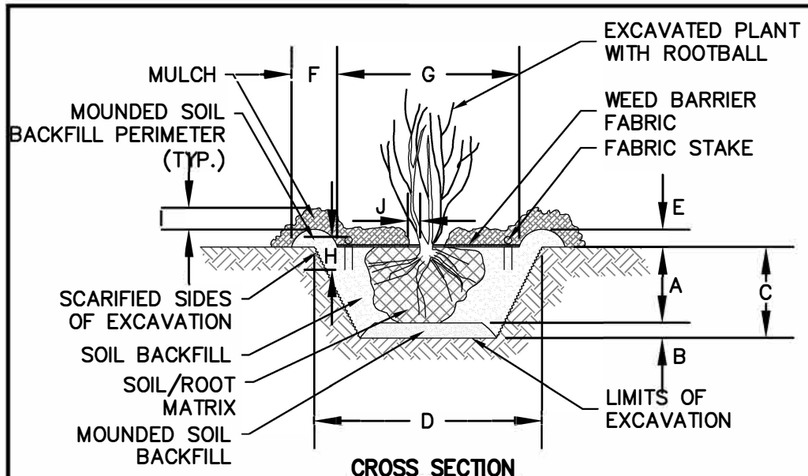
SITE SPECIFIC DETAILS

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP–1071.3–004	4/7

PLOTTED SIZE: ANSI FULL BLEED B (17x11)



CROSS SECTION

DIMENSION[2]	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.

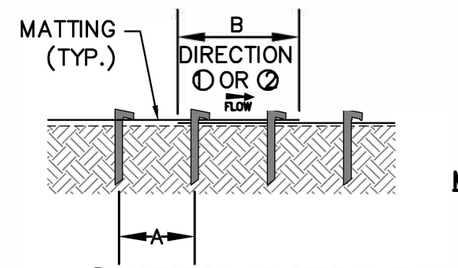
TRANSPLANTS EXAMPLES

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.

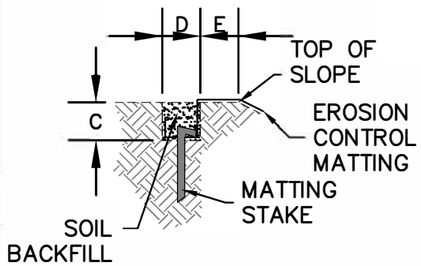
EROSION CONTROL MATTING DETAIL

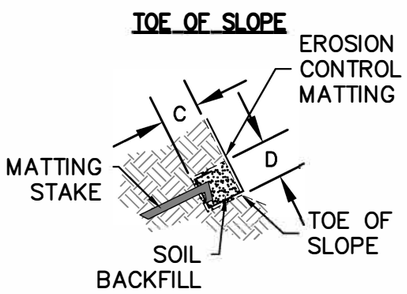


① DIRECTION OF STREAM FLOW
② DIRECTION DOWN THE BANK SLOPE

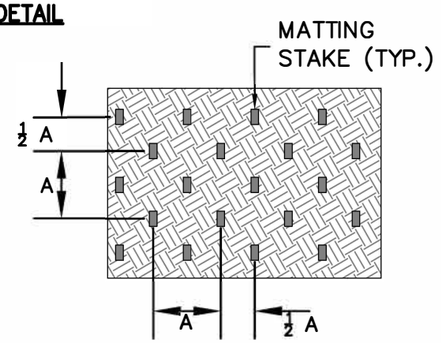
MATTING OVERLAP DETAIL

MATTING STAKE DETAIL





MATTING ANCHOR DETAIL



MATTING STAKE PATTERN DETAIL

NO.	REVISION-DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
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ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE-SPECIFIC RESTORATION PLAN
UNNAMED STREAM – MP 1071.0 – MDNR ID 54
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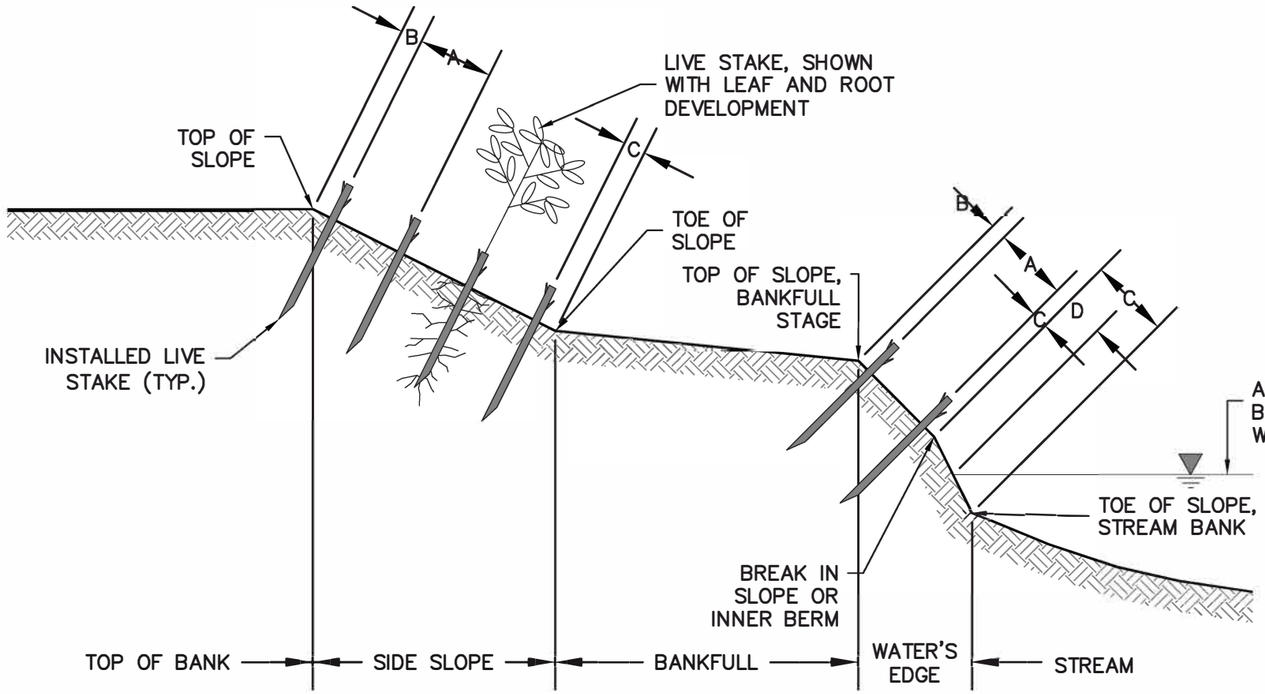
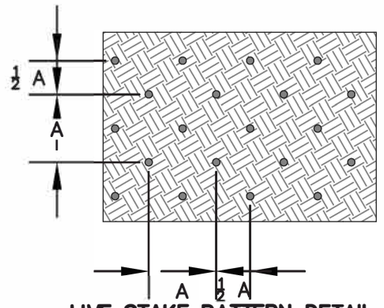
SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP-1071.3-005	5/7

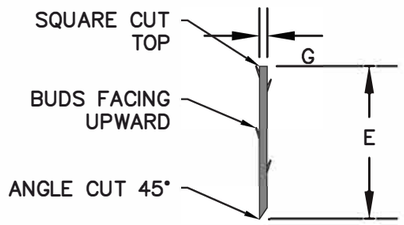
PLOTTED SIZE: ANSI FULL BLEED B (17x11)



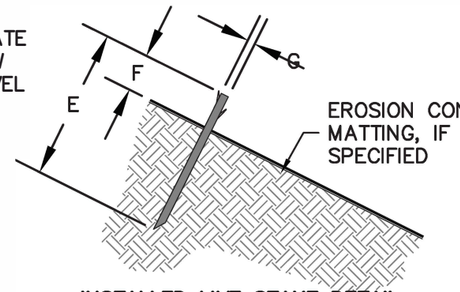
CROSS SECTION



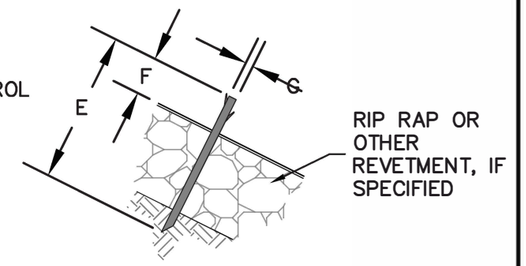
LIVE STAKE PATTERN DETAIL



LIVE STAKE DETAIL



INSTALLED LIVE STAKE DETAIL



INSTALLED JOINT PLANTING DETAIL

DIMENSION[1]	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	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	FEET	1239.0	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	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	½-1 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

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ENBRIDGE LINE 3 REPLACEMENT PROJECT
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NOTED	SSRP–1071.0–006	6/7

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

1 CENTERLINE – FACING WEST BANK

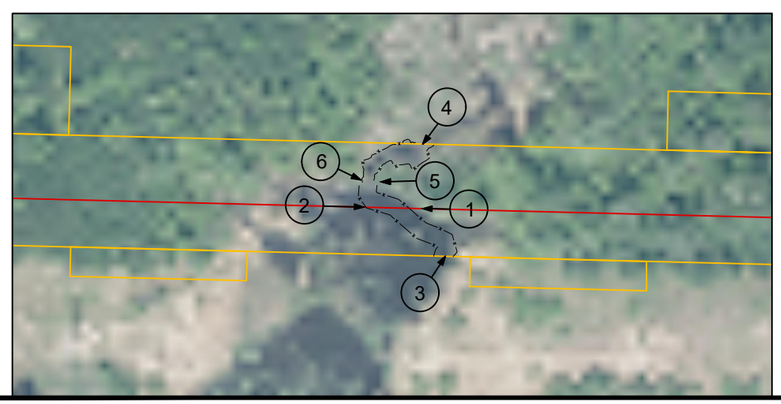
2 CENTERLINE – FACING EAST BANK

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.

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ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
UNNAMED RIVER – MP 1071.0 – MDNR ID 54
PHOTO PAGE

SCALE	DWG. NO.	PAGE NO.
	SSRP–1071.0–005	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

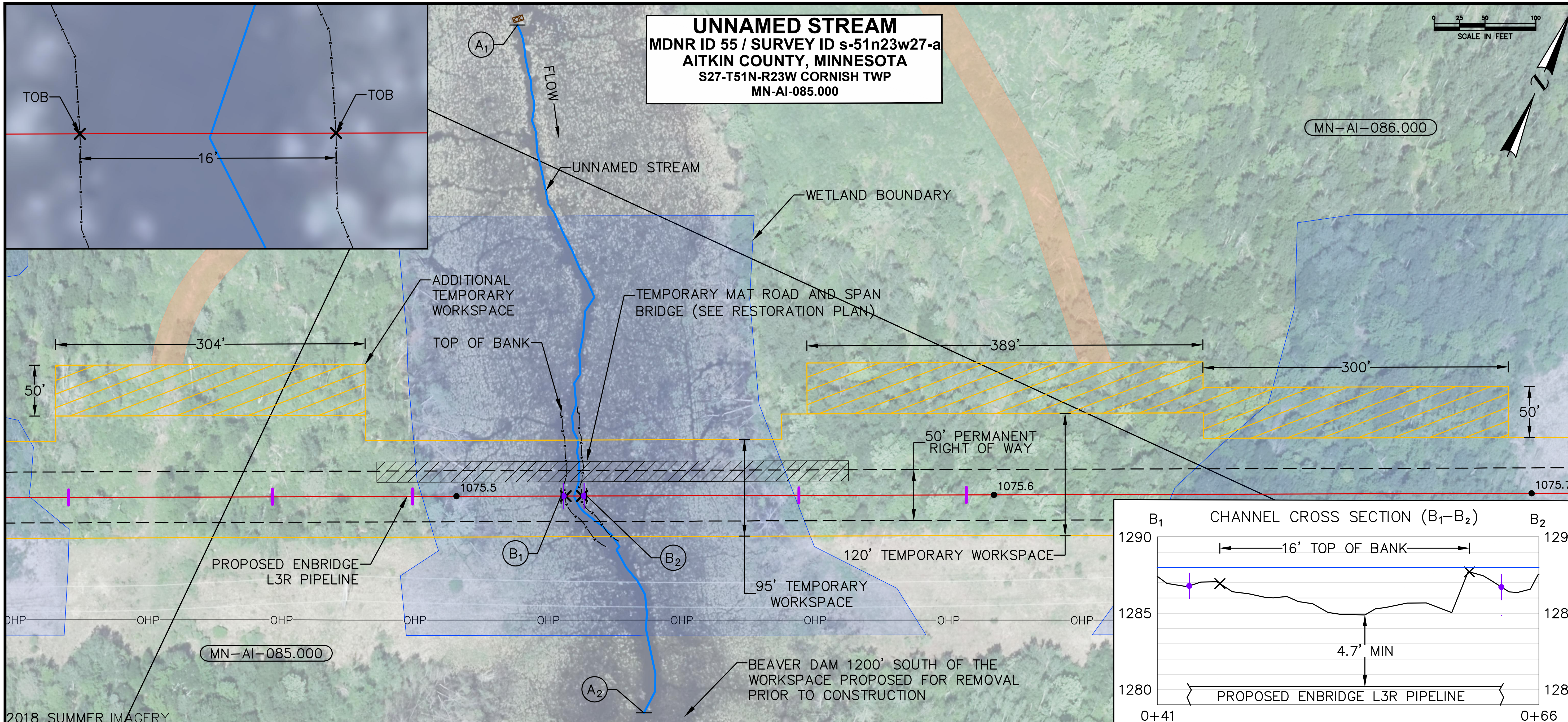
CONSTRUCTION NOTES

SCALE	DWG. NO.	PAGE NO.
	SSRP–NOTES	

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

MDNR ID No. 55: MP 1075.5; Unnamed Stream (M-120-005-001-005)

UNNAMED STREAM
MDNR ID 55 / SURVEY ID s-51n23w27-a
AITKIN COUNTY, MINNESOTA
S27-T51N-R23W CORNISH TWP
MN-AI-085.000

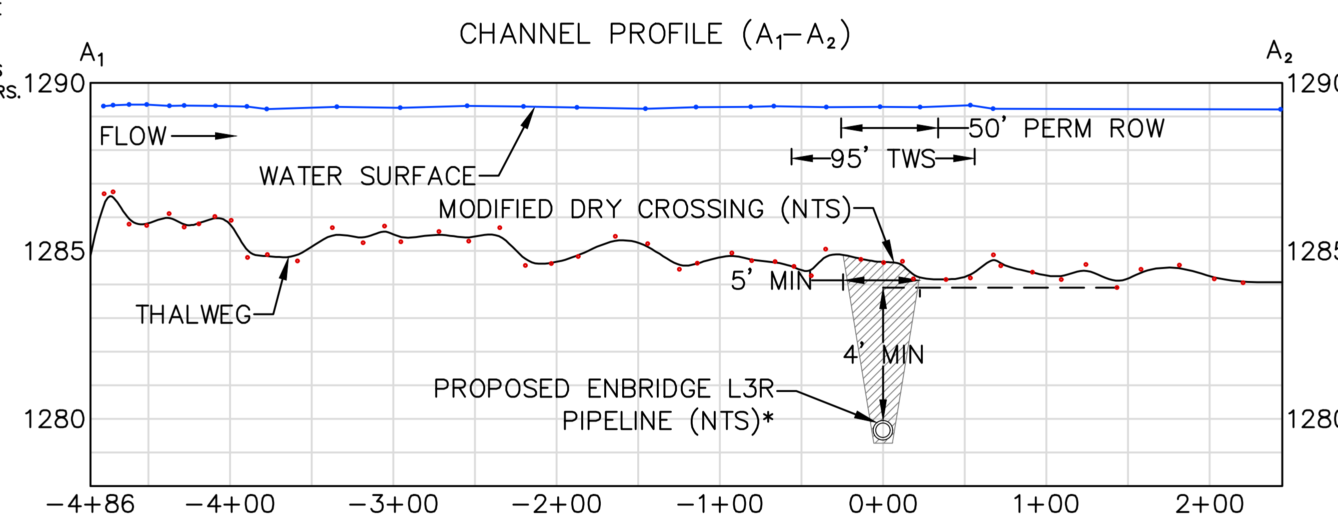


NOTES
1. BANKFULL DATA NOT AVAILABLE
2. SOBS (O/H) OR NPC (S1-3): HIGH SOBS
3. CROSSING PROPOSED FOR WINTER CONSTRUCTION BASED ON DECEMBER 1, 2020 START DATE
4. MDNR REGION 2 PWI – COOL/WARM WATER FISHERY: MARCH 15 – JUNE 30. 24-HOUR SOIL STABILIZATION REQUIRED WITHIN 200 FEET DURING RESTRICTION.
5. 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.

LEGEND
- PROPOSED ENBRIDGE L3R PIPELINE
- PERMANENT RIGHT OF WAY
- TEMPORARY WORKSPACE
- WATERBODY (ROSGEN SURVEY – THALWEG)
- OHP — OVERHEAD POWER
- TRACT BOUNDARY
- ACCESS ROAD
- TEMPORARY MAT ROAD AND SPAN BRIDGE
- BEAVER DAM
- 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

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.

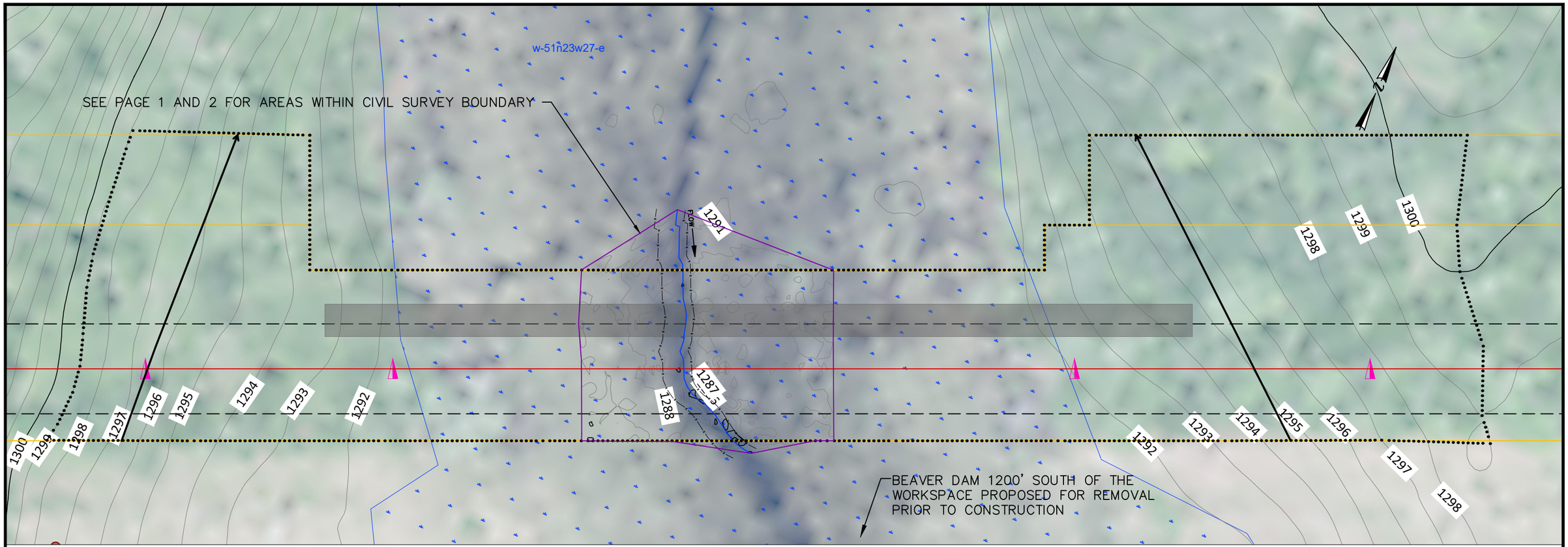


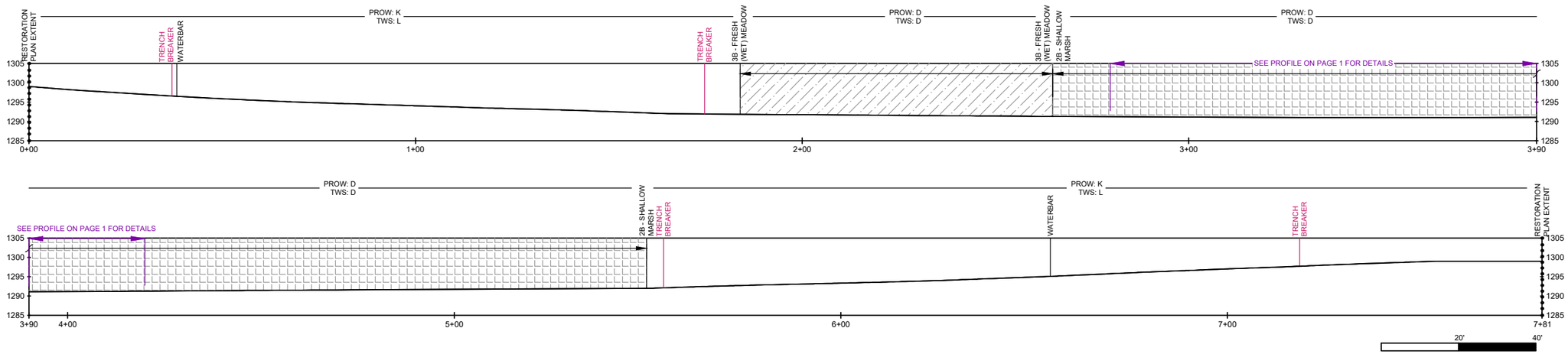
CHANNEL CROSS SECTION NOTE:
1. CHANNEL LOCATIONS, DIMENSIONS, AND/OR ELEVATIONS ARE BASED ON 2020 TOPOGRAPHIC/BATHYMETRIC SURVEY(S), AND AS SUCH DO NOT REFLECT CHANGES TO THE CHANNEL THAT MAY HAVE OCCURRED SINCE THAT TIME.
2. DEPTH OF COVER AT CENTERLINE WAS DEVELOPED USING THE BOTTOM ELEVATION OF THE 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 1075.5 AITKIN COUNTY, MINNESOTA
CHK.		
PROJ. ENGR.		
PROJ. MGR.		SCALE: NOTED
CLIENT APP.		DWG. NO.: B-93-5.84-MDNR-55-0





BWSR SEED MIX	D: WET MEADOW NE (34–371); K: WOODLAND EDGE NE (36–311); L: NATURAL REVEGETATION
SOBS (O/H) or NPC (S1-3)	HIGH SOBS; 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 2 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.

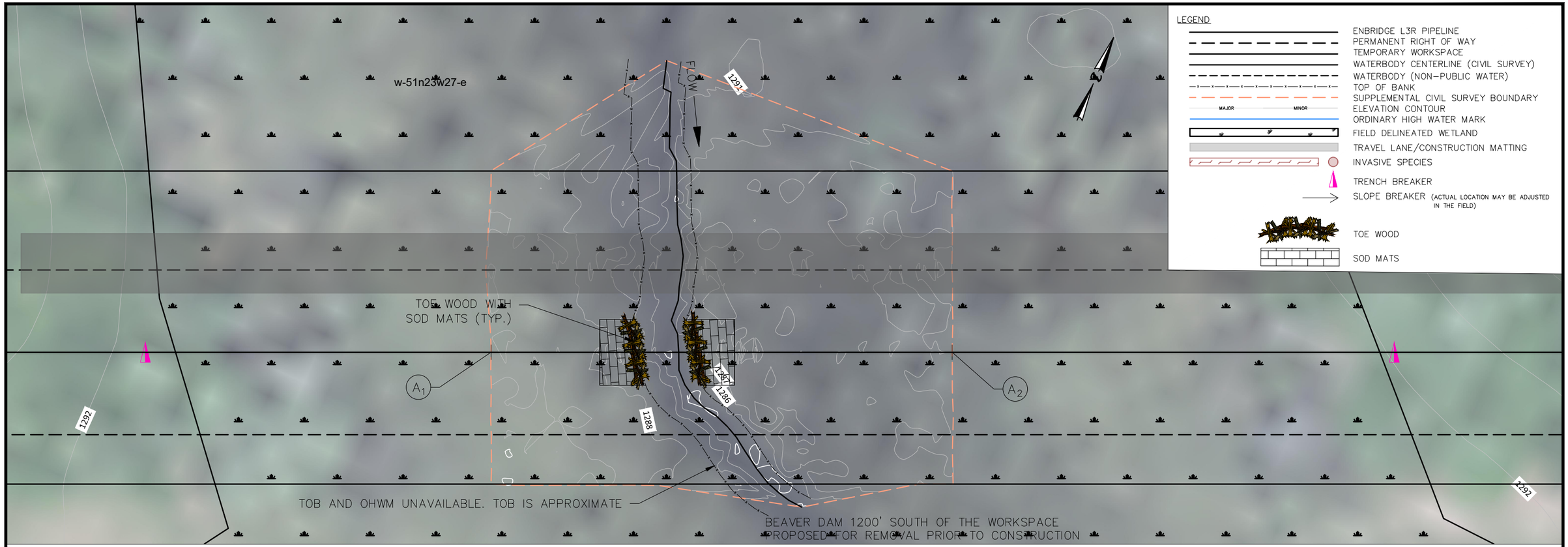
LEGEND

- 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

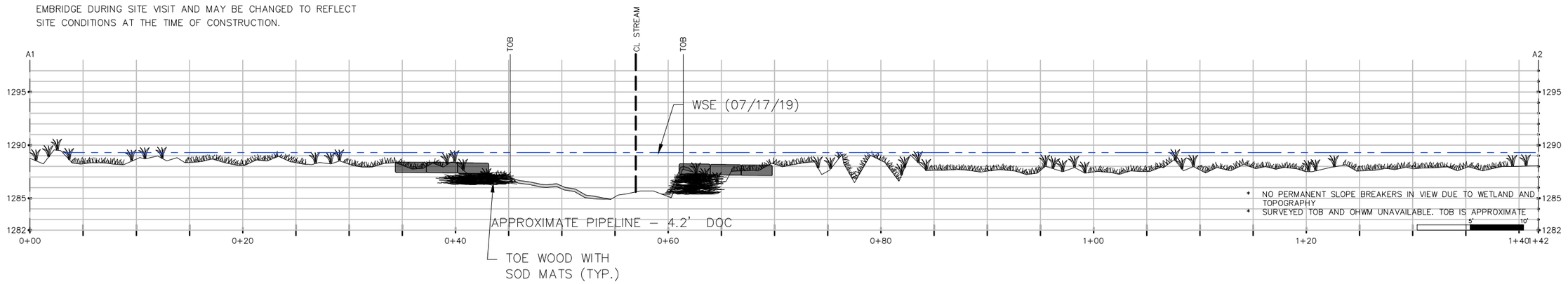
NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING	MJT	10/2020		
A	ISSUED FOR REVIEW	MJT	09/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
UNNAMED STREAM – MP 1075.5 – MDNR ID 55
RE–VEGETATION PLAN: EXPANDED EXTENT

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP–1075.5–001A	1A/5



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



FEATURE ID	s–51n23w27–a; IFC ID: S–279.0
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	SHALLOW MARSH
BWSR SEED MIX	WET MEADOW NE (34–371)
DOMINANT WETLAND VEGETATION	1. CAREX LACUSTRIS 2. UTRICULARIA VULGARIS
SOBS (O/H) or NPC (S1-3)	HIGH SOBS; NO (NOT S1–S3)

NOTES

1. CONSTRUCTION TIMING RESTRICTIONS
   1.1. MDNR REGION 2 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: APRIL1 – 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)
6. CROSSING PROPOSED FOR WINTER CONSTRUCTION BASED ON DECEMBER 1, 2020 START DATE.
7. SITE WITHIN PEAT BASIN – SURVEY ID P28–V.

ENBRIDGE

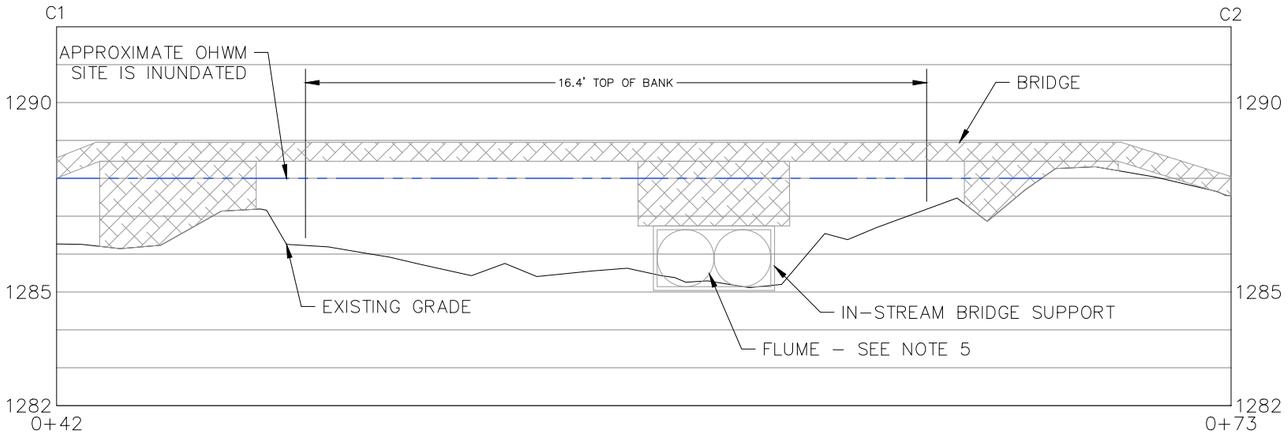
NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

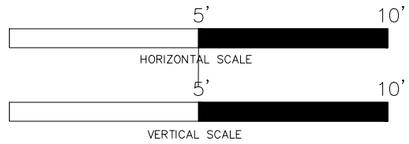
ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
UNNAMED STREAM – MP 1075.5 – MDNR ID 55
RE–VEGETATION PLAN

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP–1075.5–001	1/6

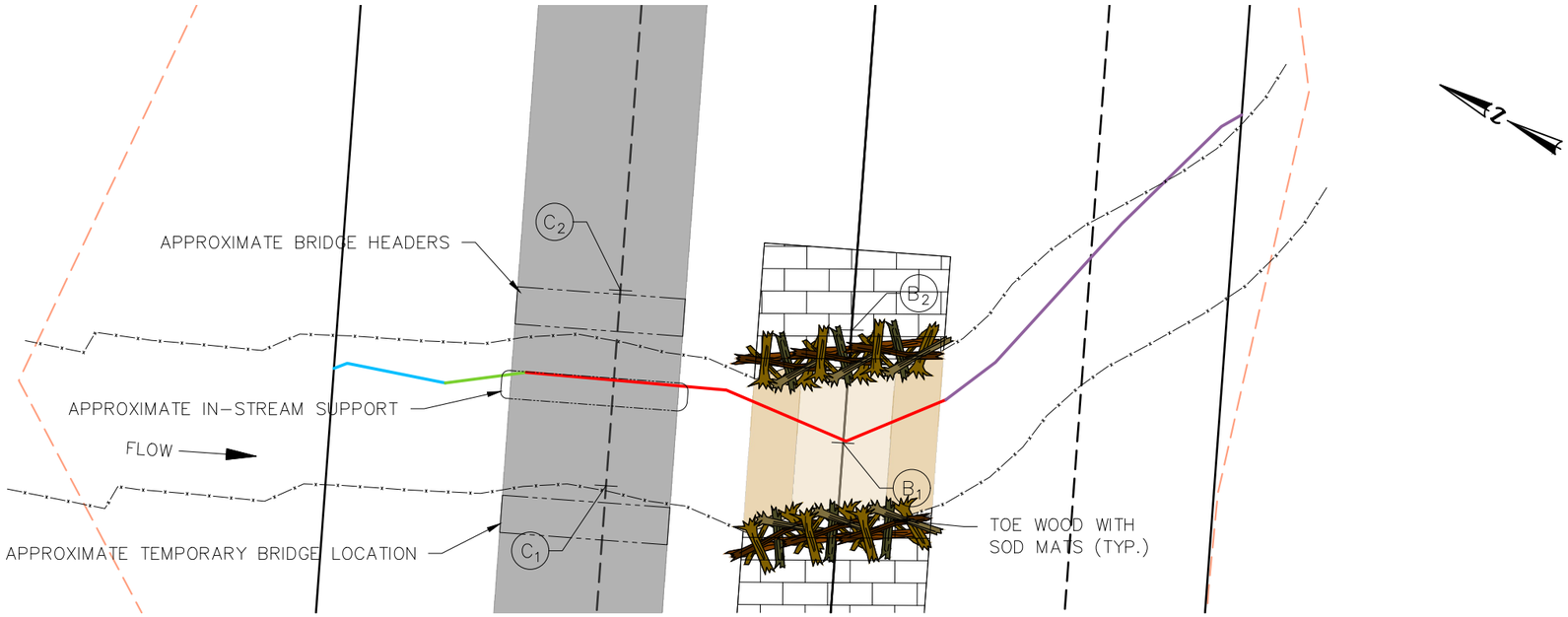
PLOTTED SIZE: ANSI FULL BLEED B (17x11)

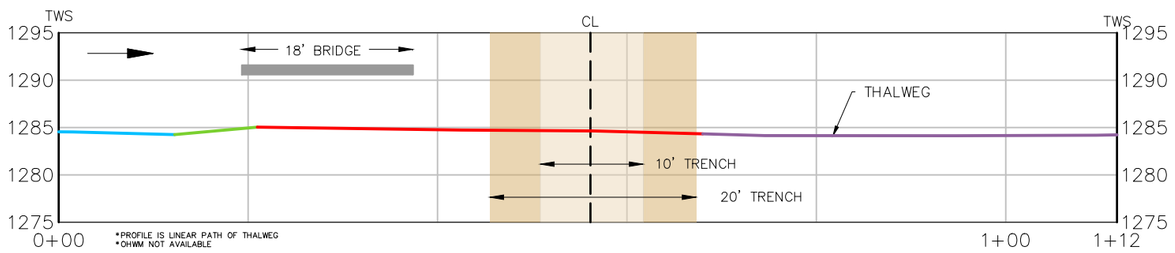
BANK RESTORATION (BRIDGE)





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. AVOID OR MINIMIZE DISTURBANCE OF VEGETATION ON THE CHANNEL BANKS AND AT THE TOP OF THE STREAM BANK – PLACE MATS DIRECTLY ON TOP OF EXISTING VEGETATION WITHIN 20' OF TOB (LIMITED STUMP 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. BANK STABILIZATION AND RESTORATION MAY VARY PENDING SITE CONDITIONS AND SEASON OF CONSTRUCTION.
7. WITH PROPOSED BEAVER DAM REMOVAL, SURFACE WATER IS EXPECTED TO RETURN TO A TRUE OHWM AND IN–STREAM SUPPORT CONFIGURATION MAY CHANGE.
8. MINIMIZE DISTURBANCE OF BED MATERIALS AND FEATURES DURING CONSTRUCTION OF THE TRENCH AND INSTALLATION AND REMOVAL OF IN–STREAM SUPPORT
9. 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.
10. ALIGNMENT OF IN–STREAM SUPPORT SHALL BE FIELD ADJUSTED BASED ON FLOW PATH TO PROTECT CHANNEL BANKS.
11. 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'

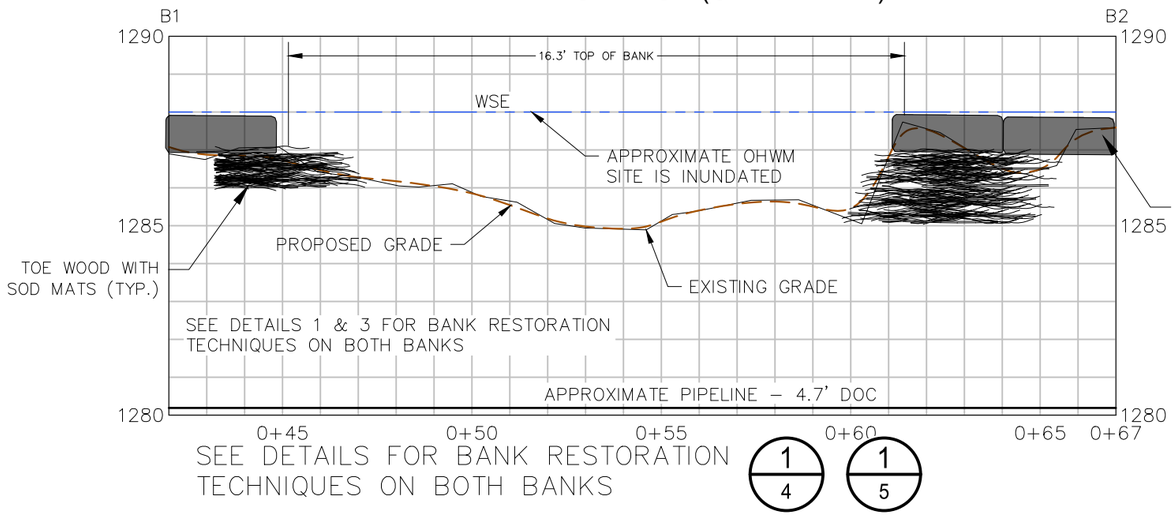
NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

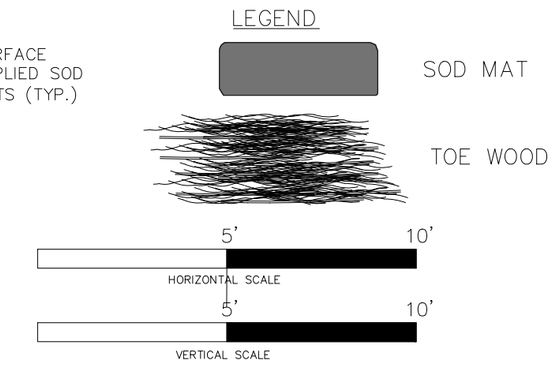
ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
UNNAMED STREAM – MP 1075.5 – MDNR ID 55
STABILIZATION PLAN

SCALE	DWG. NO.	PAGE NO.
	SSRP–1075.5–002	2/6

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. TRENCH IS LOCATED WITHIN AN EXISTING RIFFLE, AS SUCH, THE BED MATERIAL SHALL BE EXCAVATED AND TEMPORARILY STOCKPILED TO BE REINSTALLED AS PART OF CHANNEL BED AND TOE OF BANK RESTORATION EFFORTS. REFER TO RESTORATION CROSS SECTION AND BED PROFILE SHEET 2 TO MAINTAIN THE EXISTING BED FEATURE GRADE CONTROL.
4. RIFFLE MATERIAL IS NATURALLY COMMINGLED WITH A VARIETY OF PARTICLE SIZES TO PROMOTE CHANNEL SURFACE FLOWS. MATERIAL THICKNESS GENERALLY EXTENDS TO A DEPTH OF 1.5 TO 2 TIMES THE LARGEST SURFACE PARTICLE. RESTORED CHANNEL RIFFLE SECTION SHALL INCLUDE RANDOMLY SORTED MATERIALS.
5.

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. 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.

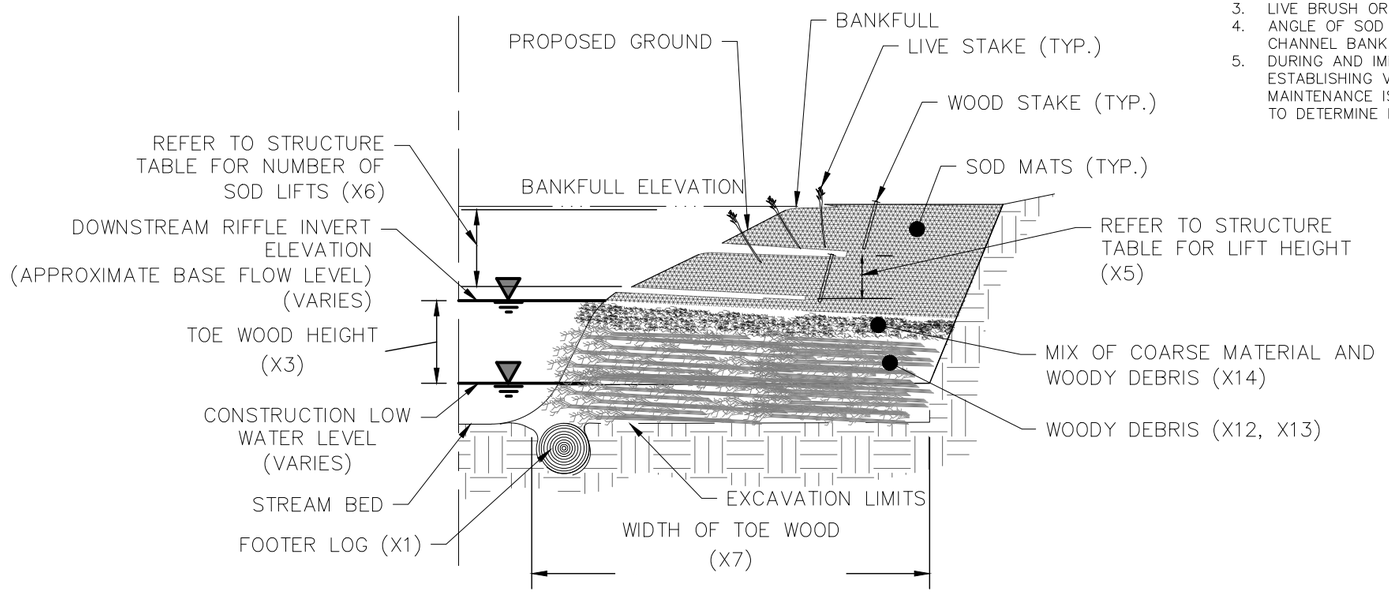
NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
UNNAMED STREAM – MP 1075.5– MDNR ID 55
SITE SPECIFIC DETAILS

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP–1075.5–004	3/6

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

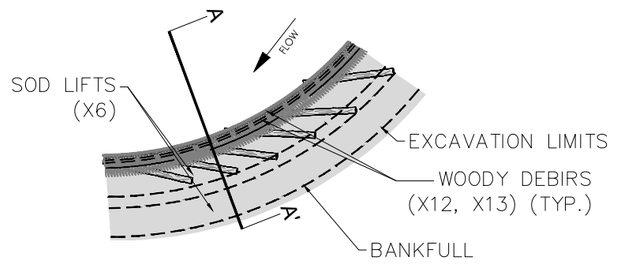
TOE WOOD DIMENSIONS			
VARIABLE	**VALUE**	**TYPICAL UNIT**	**DESCRIPTION**
X1	6.0 - 10.0	IN.	FOOTER LOG DIAMETER
X2	8.0 - 12.0	FT.	FOOTER LOG LENGTH
X3	12.0 - 24.0	IN.	TOE WOOD HEIGHT
X4	SEE SHEET 3	N/A	MATCH TYPICAL SECTION
X5	SEE SHEET 5	FT.	SOD LIFT HEIGHT
X6	1.0	#	SOD LIFTS
X7	8.0 - 10.0	FT.	TOE 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)



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

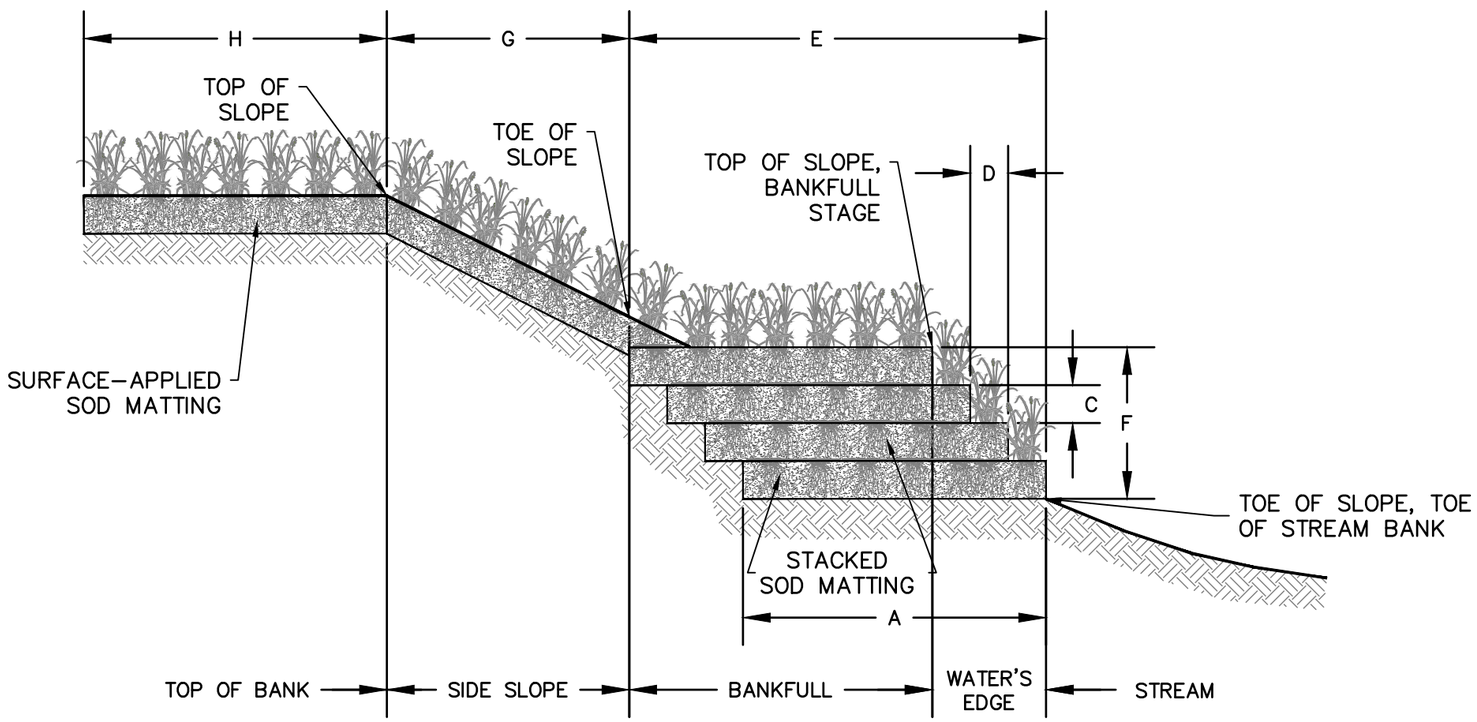
1 TOE WOOD DETAIL

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

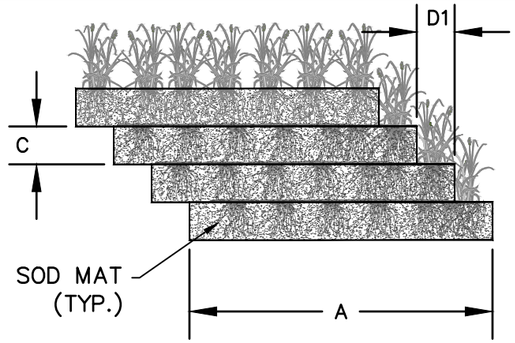
ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE-SPECIFIC RESTORATION PLAN
UNNAMED STREAM – MP 1075.5– MDNR ID 55
SITE SPECIFIC DETAILS

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP-1075.5-004	4/6

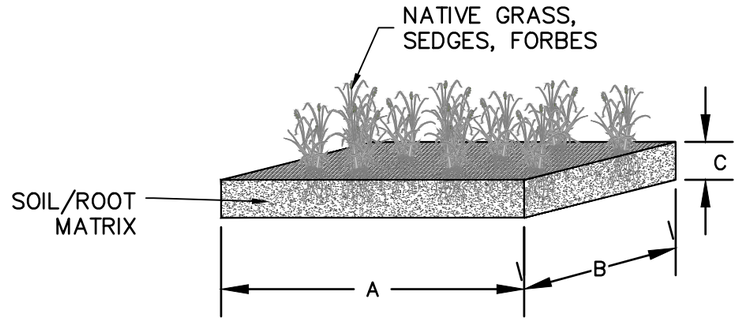
PLOTTED SIZE: ANSI FULL BLEED B (17x11)



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. 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
UNNAMED STREAM – MP 1075.5– MDNR ID 55
SITE SPECIFIC DETAILS

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP–1075.5–004	5/6

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

1 CENTERLINE – FACING WEST BANK

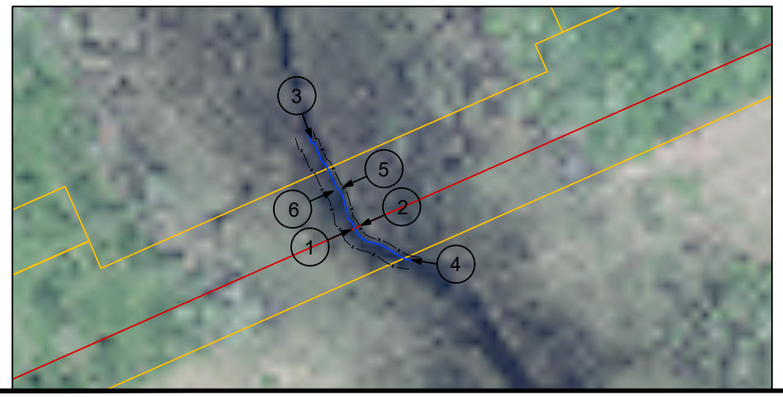
2 CENTERLINE – FACING EAST BANK

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
UNNAMED RIVER – MP 1075.5 – MDNR ID 55
PHOTO PAGE

SCALE	DWG. NO.	PAGE NO.
	SSRP–1075.5–005	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

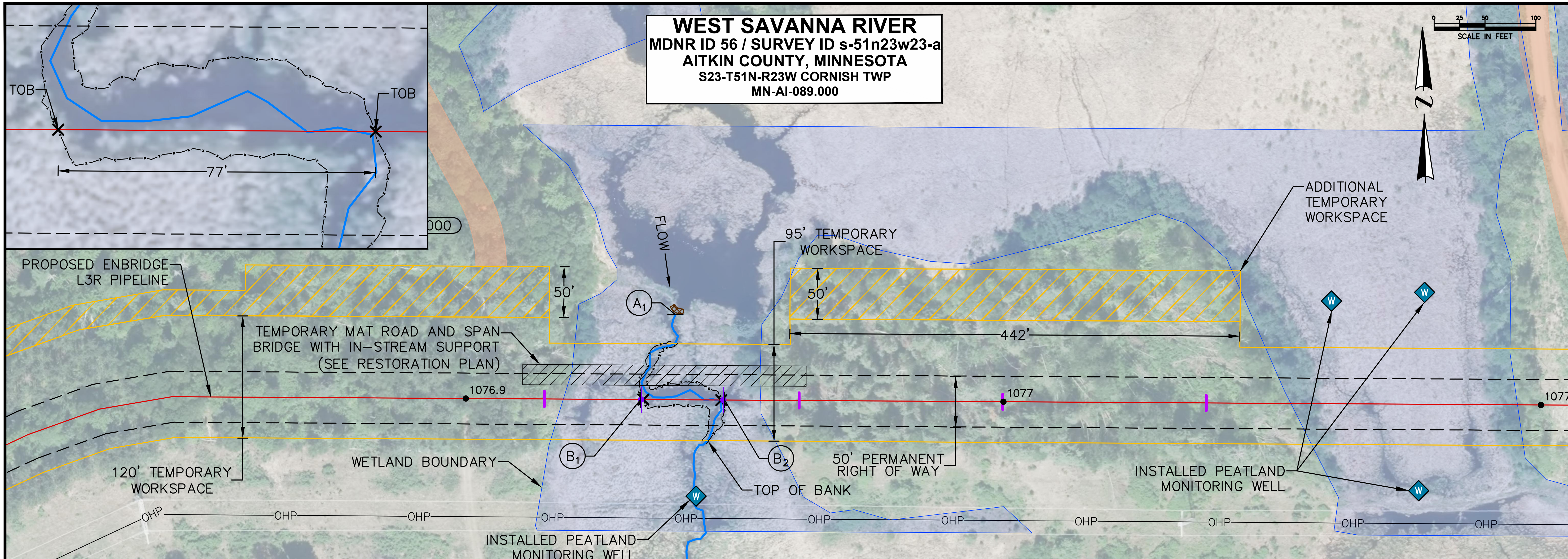
CONSTRUCTION NOTES

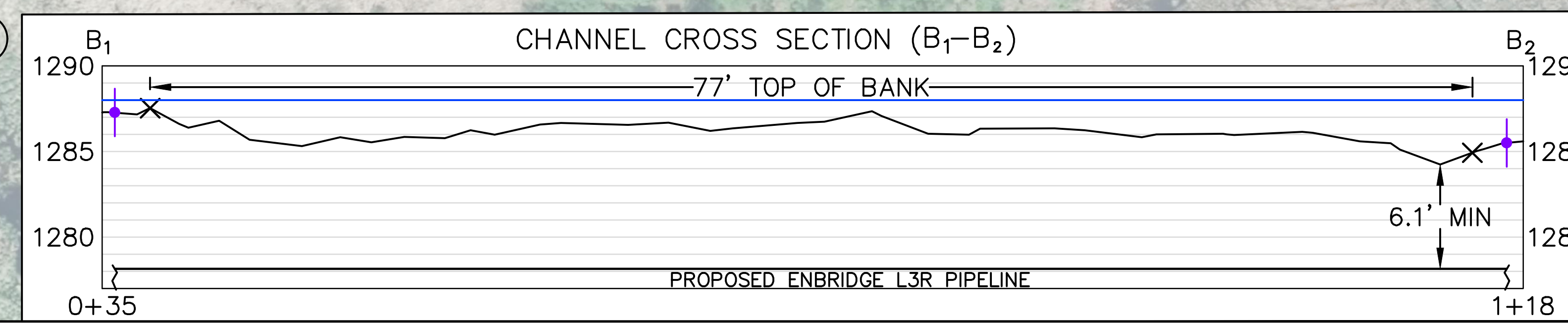
SCALE	DWG. NO.	PAGE NO.
	SSRP–NOTES	

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

MDNR ID No. 56: MP 1076.9; West Savanna River (M-120-005-001)

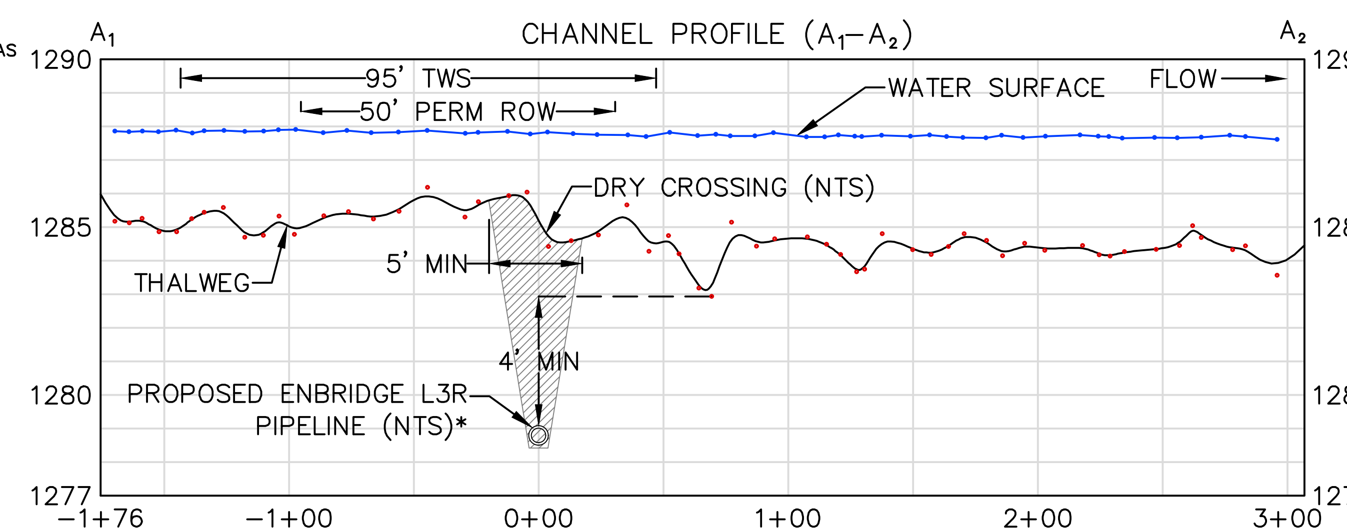
WEST SAVANNA RIVER
MDNR ID 56 / SURVEY ID s-51n23w23-a
AITKIN COUNTY, MINNESOTA
S23-T51N-R23W CORNISH TWP
MN-AI-089.000





NOTES
1. BANKFULL DATA NOT AVAILABLE
2. SOBS (O/H) OR NPC (S1–3): HIGH SOBS
3. CROSSING PROPOSED FOR WINTER CONSTRUCTION BASED ON DECEMBER 1, 2020 START DATE
4. MDNR REGION 2 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
- PERMANENT RIGHT OF WAY
- TEMPORARY WORKSPACE
- WATERBODY (ROSGEN SURVEY – THALWEG)
- OHP — OVERHEAD POWER
- TRACT BOUNDARY
- ACCESS ROAD
- TEMPORARY MAT ROAD AND SPAN BRIDGE
- BEAVER DAM
- 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)



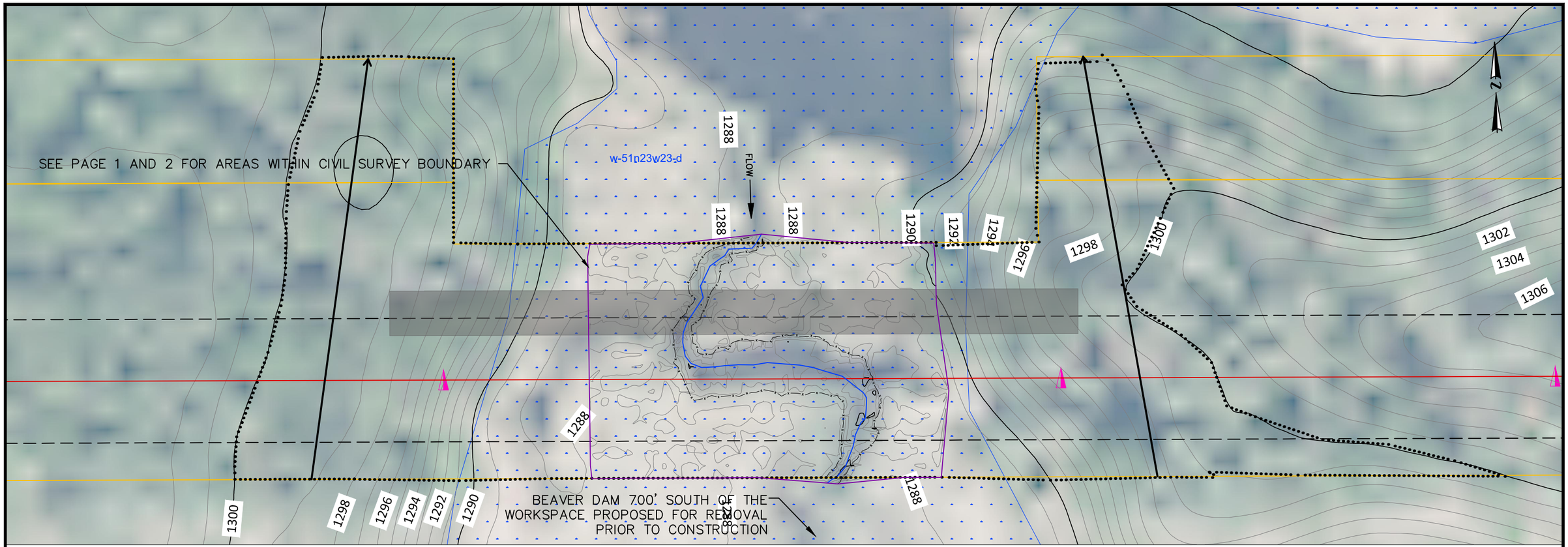
CHANNEL CROSS SECTION NOTE:
1. CHANNEL LOCATIONS, DIMENSIONS, AND/OR ELEVATIONS ARE BASED ON 2020 TOPOGRAPHIC/BATHYMETRIC SURVEY(S), AND AS SUCH DO NOT REFLECT CHANGES TO THE CHANNEL THAT MAY HAVE OCCURRED SINCE THAT TIME.
2. DEPTH OF COVER AT CENTERLINE WAS DEVELOPED USING THE BOTTOM ELEVATION OF THE 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

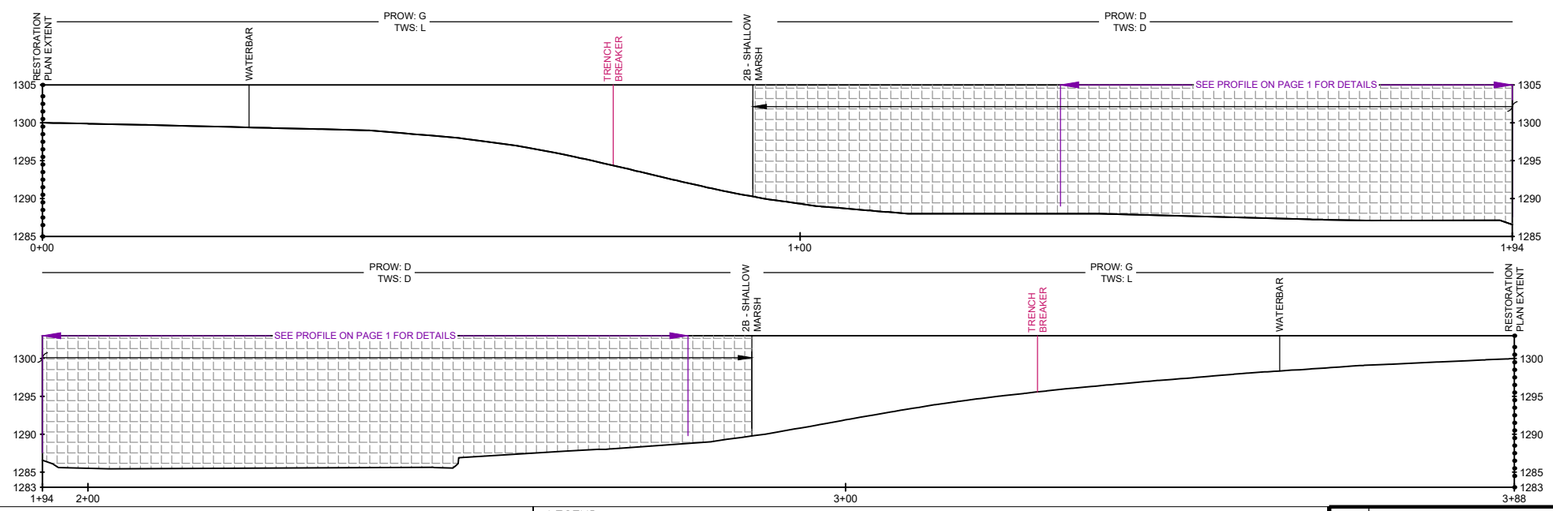
NO.	REVISION–DESCRIPTION	BY	DATE	CHK'D	APP'D
0	ISSUED FOR PERMIT APPLICATION	AJJ	10/2020	BAB	BAB

ENBRIDGE

DWN. BY: AJJ	DATE 10/2020	PROPOSED ENBRIDGE L3R PIPELINE PRIMARY METHOD – DRY CROSSING CROSSING OF WEST SAVANNA RIVER ENBRIDGE MP 1076.9 AITKIN COUNTY, MINNESOTA
CHK.		
PROJ. ENGR.		
PROJ. MGR.		
CLIENT APP.		
SCALE NOTED	DWG. NO. B-93-5.84-MDNR-56-0	

FOR ENVIRONMENTAL REVIEW PURPOSES ONLY





BWSR SEED MIX	D: WET MEADOW NE (34–371); G: DRY PRAIRIE GENERAL (35–221); L: NATURAL REVEGETATION
SOBS (O/H) or NPC (S1-3)	HIGH SOBS; 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 2 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.

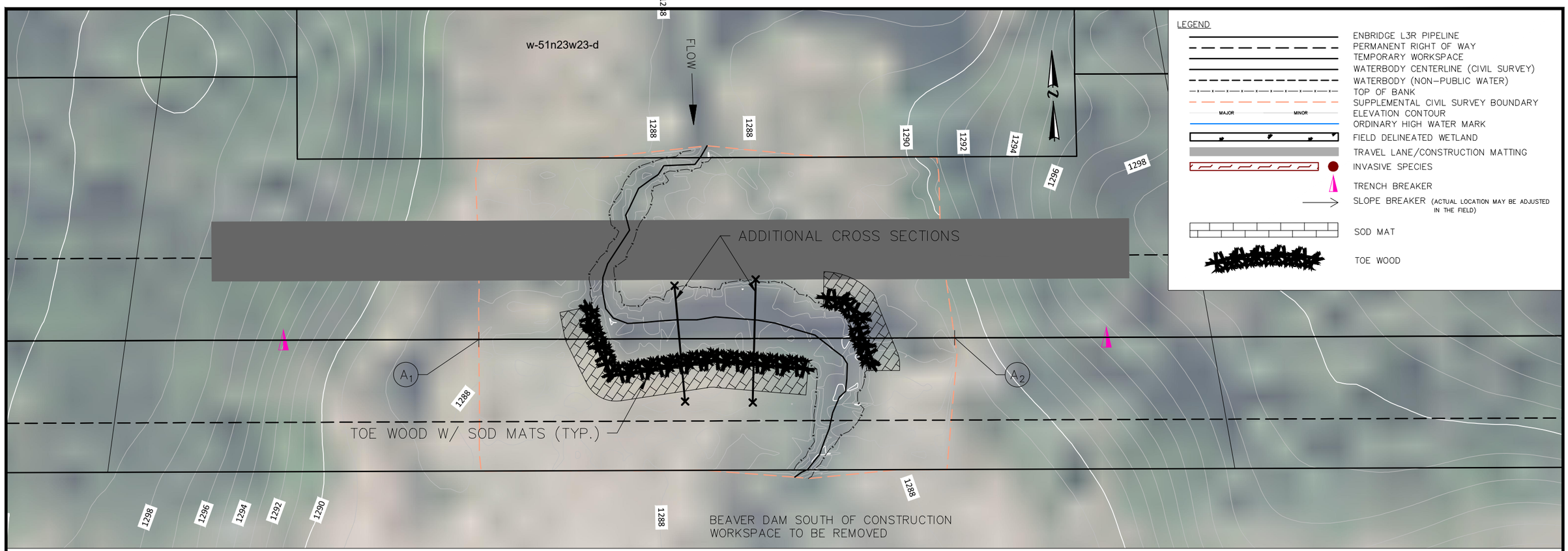
LEGEND

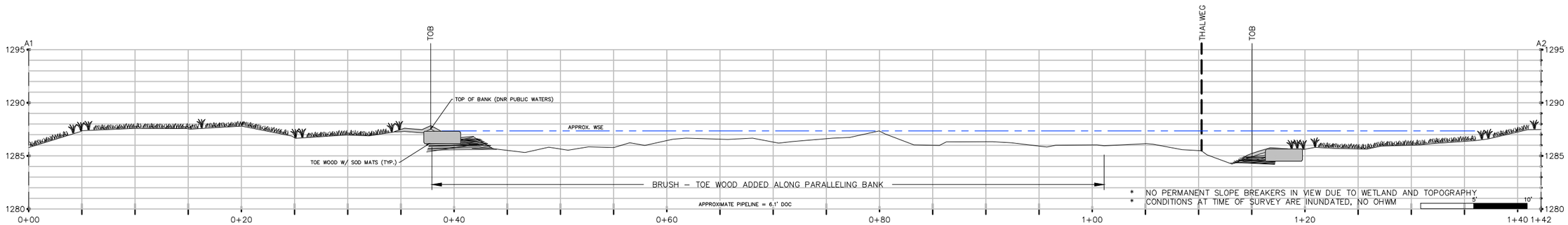
- ENBRIDGE L3R PIPELINE
- PERMANENT RIGHT OF WAY
- TEMPORARY WORKSPACE
- WATERBODY CENTERLINE (CIVIL SURVEY)
- WATERBODY (NON–PUBLIC WATER)
- PUBLIC WATER CIVIL SURVEY BOUNDARY
- MDNR EXPANDED RESTORATION BOUNDARY
- TOP OF BANK
- ELEVATION CONTOUR
- ORDINARY HIGH WATER MARK
- FIELD DELINEATED WETLAND
- 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
WEST SAVANNA RIVER – MP 1077.0 – MDNR ID 56
RE–VEGETATION PLAN: EXPANDED EXTENT

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP–1077.0–001A	1A/5





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

FEATURE ID	s-51n23w23-a; IFC ID: S-280.0
CROSSING TYPE	DRY CROSSING
PROPOSED RESTORATION (SEE DETAILS FOR LIVE STAKING, TRANSPLANTS, AND SHRUB SPECIES IF APPLICABLE)	BRUSH – TOE WOOD; SOD MATS
WITHIN OR ADJACENT WETLAND	SHALLOW MARSH
BWSR SEED MIX	WET MEADOW NE (34-371)
DOMINANT WETLAND VEGETATION	1. CALAMAGROSTIS CANADENSIS 3. CAREX STRICTA 2. PHALARIS ARUNDINACEA
SOBS (O/H) or NPC (S1-3)	HIGH SOBS; NO (NOT S1-S3)

NOTES
1. CONSTRUCTION TIMING RESTRICTIONS:
   1.1. MDNR REGION 2 PWI – COOL/WARM WATER FISHERY: MARCH 15 – JUNE 30.
   1.2. WHEN WORK OCCURS "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)
6. CROSSING PROPOSED FOR WINTER CONSTRUCTION BASED ON DECEMBER 1, 2020 START DATE.
7. SITE WITHIN PEAT BASIN – SURVEY ID P32-V.
8. ADDITIONAL CROSS-SECTIONS ARE TO BE SURVEYED PRIOR TO CONSTRUCTION. THE EXACT LOCATION OF THE CROSS-SECTIONS WILL BE FIELD DETERMINED.

ENBRIDGE

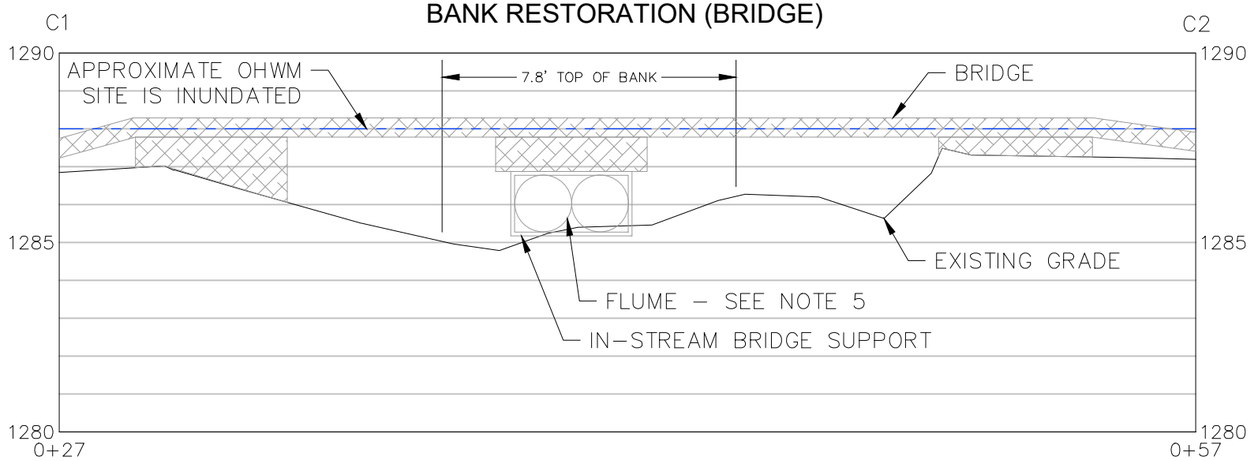
NO.	REVISION-DESCRIPTION	BY	DATE	CHK'D	APP'D
B	ISSUED FOR PERMITTING		10/2020		
A	ISSUED FOR REVIEW	MJT	08/2020		

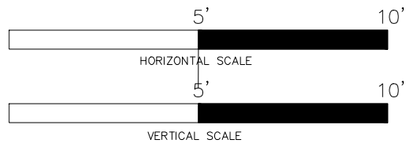
ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE-SPECIFIC RESTORATION PLAN
WEST SAVANNA RIVER – MP 1077.0 – MDNR ID 56
RE-VEGETATION PLAN

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP-1077.0-001	1/6

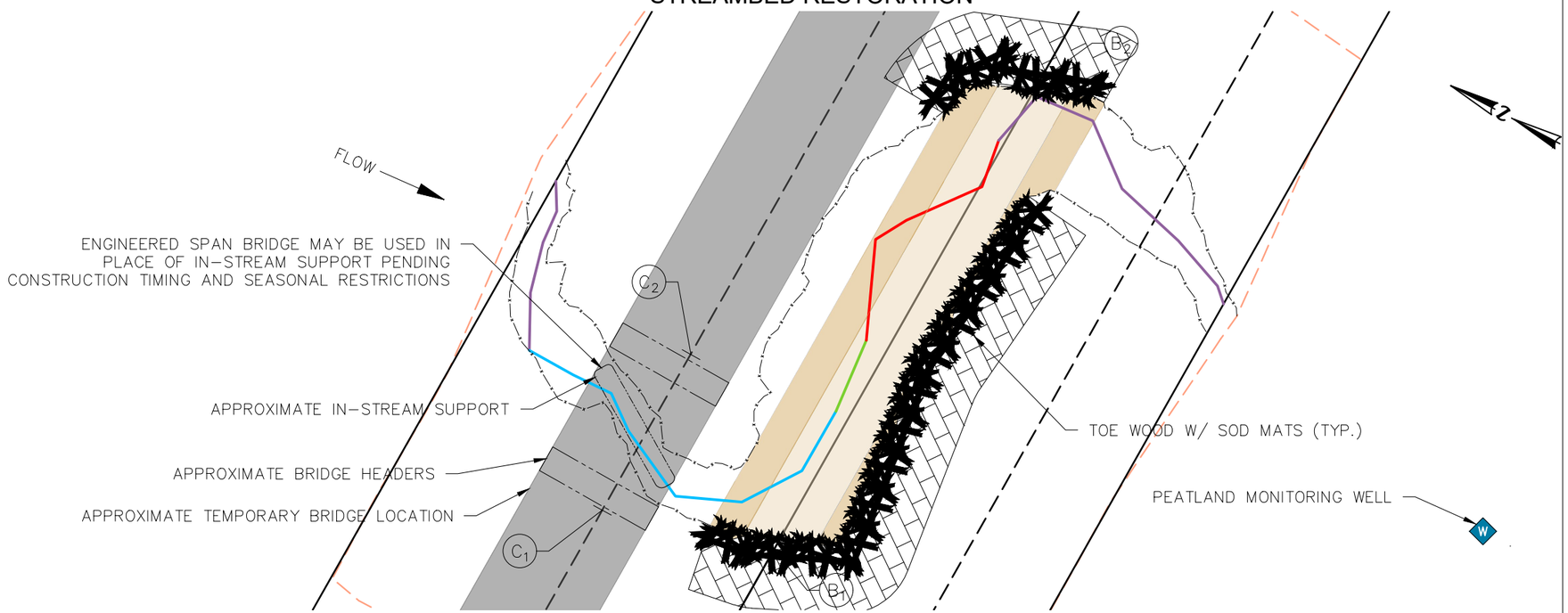
PLOTTED SIZE: ANSI FULL BLEED B (17x11)

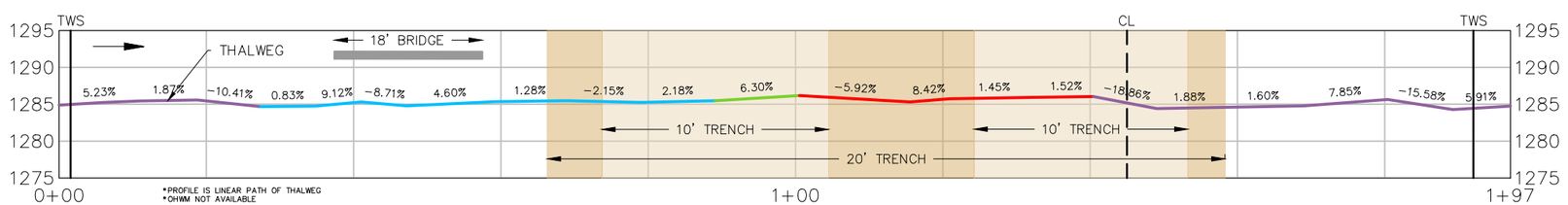
BANK RESTORATION (BRIDGE)





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 (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. BANK STABILIZATION AND RESTORATION MAY VARY PENDING SITE CONDITIONS AND SEASON OF CONSTRUCTION.
7. WITH PROPOSED BEAVER DAM REMOVAL, SURFACE WATER IS EXPECTED TO RETURN TO A TRUE OHWM AND IN–STREAM SUPPORT CONFIGURATION MAY CHANGE.
8. MINIMIZE DISTURBANCE OF BED MATERIALS AND FEATURES DURING CONSTRUCTION OF THE TRENCH AND INSTALLATION AND REMOVAL OF IN–STREAM SUPPORT
9. 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.
10. ALIGNMENT OF IN–STREAM SUPPORT SHALL BE FIELD ADJUSTED BASED ON FLOW PATH TO PROTECT CHANNEL BANKS.
11. 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'

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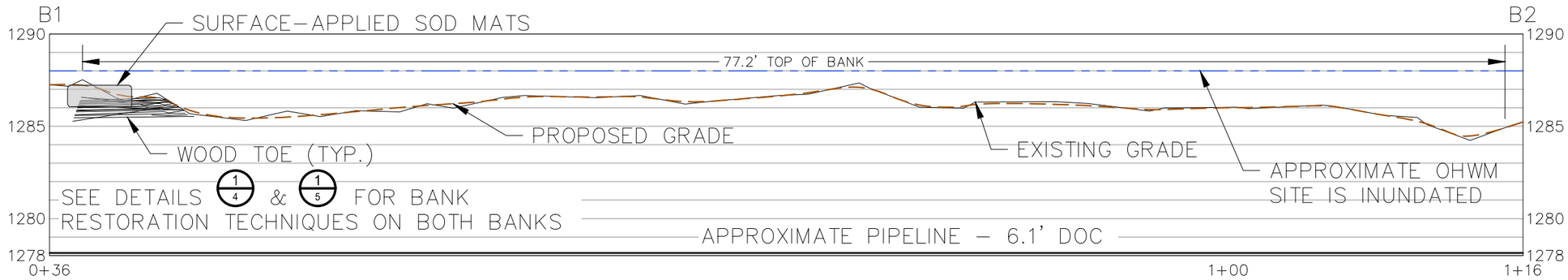
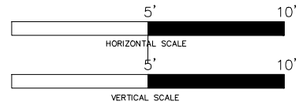
ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
WEST SAVANNA RIVER – MP 1077.0 – MDNR ID 56
STABILIZATION PLAN

SCALE	DWG. NO.	PAGE NO.
	SSRP–1077.0–002	2/6

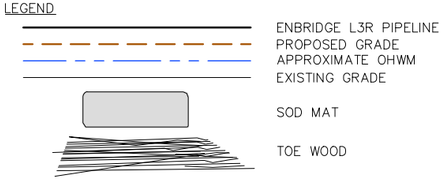
PLOTTED SIZE: ANSI FULL BLEED B (17x11)

BANK RESTORATION (CENTERLINE)





LEGEND



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. TRENCH IS LOCATED WITHIN AN EXISTING RIFFLE, AS SUCH, THE BED MATERIAL SHALL BE EXCAVATED AND TEMPORARILY STOCKPILED TO BE REINSTALLED AS PART OF CHANNEL BED AND TOE OF BANK RESTORATION EFFORTS. REFER TO RESTORATION CROSS SECTION AND BED PROFILE SHEET 2 TO MAINTAIN THE EXISTING BED FEATURE GRADE CONTROL.
4. GLIDE MATERIAL IS NATURALLY COMMINGLED WITH A VARIETY OF PARTICLE SIZES TO PROMOTE CHANNEL SURFACE FLOWS. MATERIAL THICKNESS GENERALLY EXTENDS TO A DEPTH OF 1.5 TO 2 TIMES THE LARGEST SURFACE PARTICLE. RESTORED CHANNEL RIFFLE SECTION SHALL INCLUDE RANDOMLY SORTED MATERIALS.

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. 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.

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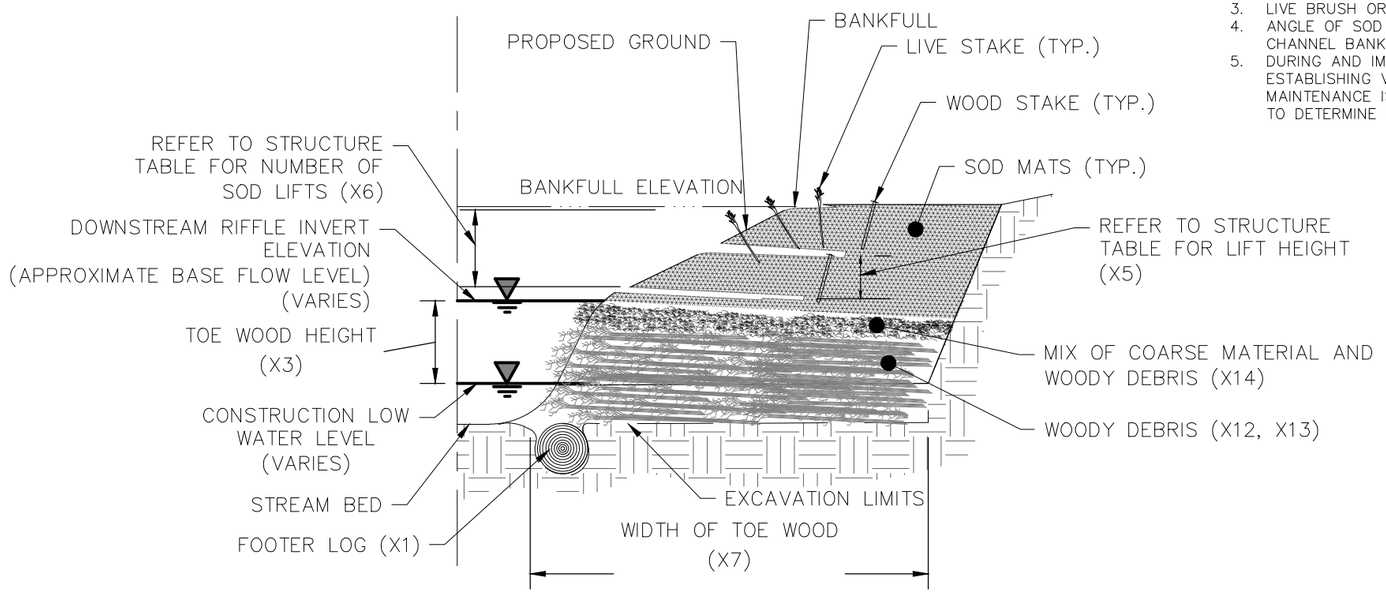
ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
WEST SAVANNA RIVER – MP 1077.0 – MDNR ID 56
SITE SPECIFIC DETAILS

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP–1077.0–004	3/6

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

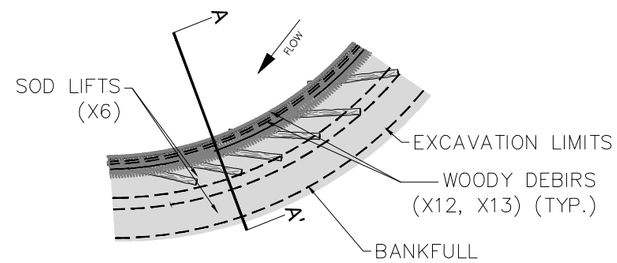
TOE WOOD DIMENSIONS			
VARIABLE	**VALUE**	**TYPICAL UNIT**	**DESCRIPTION**
X1	6.0 - 10.0	IN.	FOOTER LOG DIAMETER
X2	8.0 - 12.0	FT.	FOOTER LOG LENGTH
X3	12.0 - 18.0	IN.	TOE WOOD HEIGHT
X4	SEE SHEET 3	N/A	MATCH TYPICAL SECTION
X5	SEE SHEET 5	FT.	SOD LIFT HEIGHT
X6	1.0	#	SOD LIFTS
X7	8.0 - 10.0	FT.	TOE 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)



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

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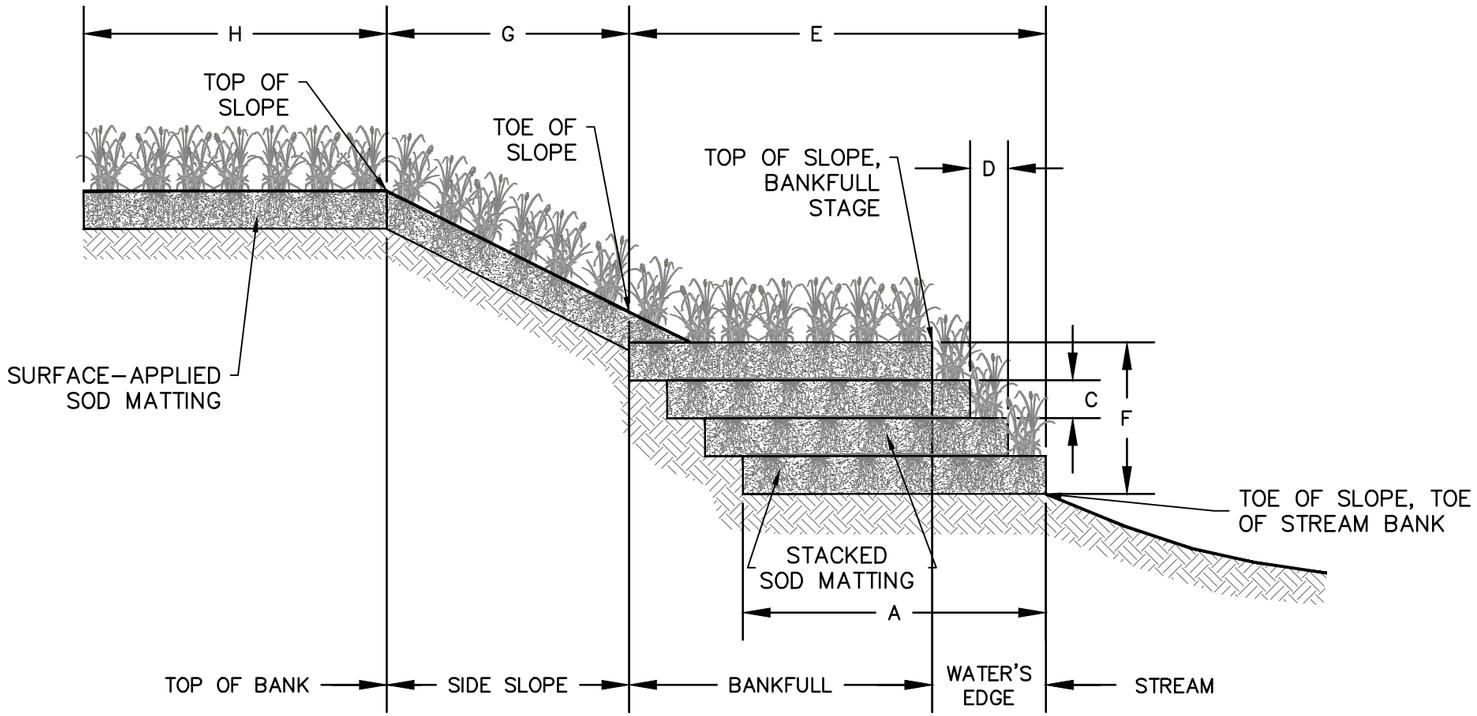
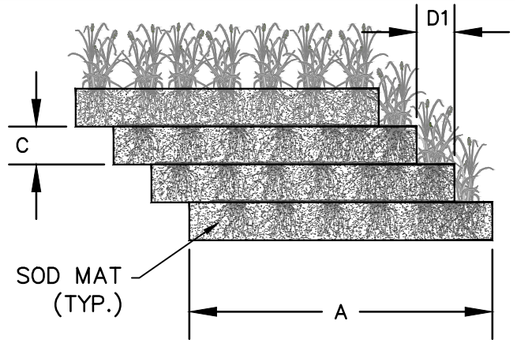
ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
WEST SAVANNA RIVER – MP 1077.0 – MDNR ID 56
SITE SPECIFIC DETAILS

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP–1077.0–004	4/6

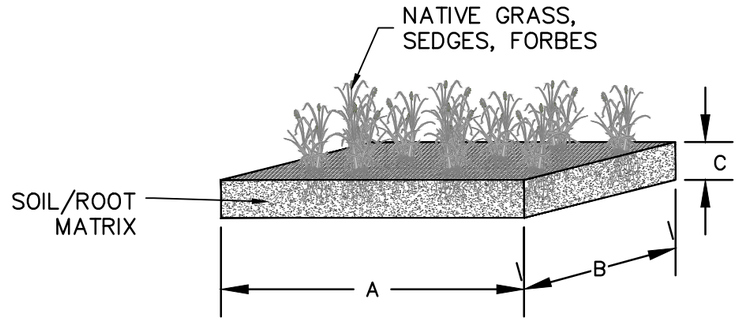
PLOTTED SIZE: ANSI FULL BLEED B (17x11)



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	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	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

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ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
WEST SAVANNA RIVER – MP –1077.0 – MDNR 56
SITE SPECIFIC DETAILS

SCALE	DWG. NO.	PAGE NO.
NOTED	SSRP–1077.0–004	5/6

PLOTTED SIZE: ANSI FULL BLEED B (17x11)

1 CENTERLINE – FACING WEST BANK

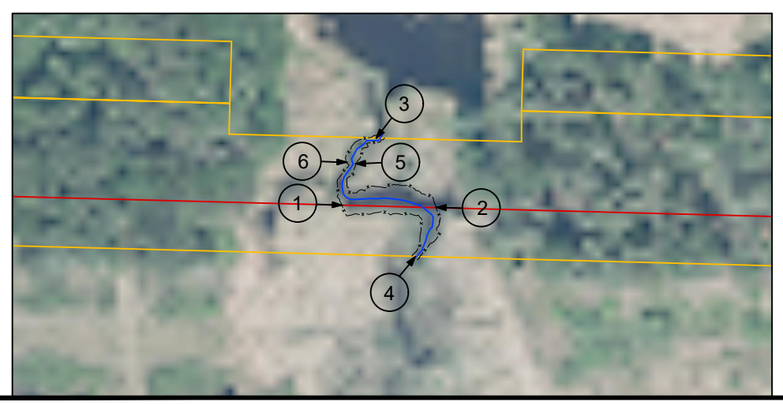
2 CENTERLINE – FACING EAST BANK

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.

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ENBRIDGE LINE 3 REPLACEMENT PROJECT
SITE–SPECIFIC RESTORATION PLAN
WEST SAVANNA RIVER – MP 1077.0 – MDNR ID 56
PHOTO PAGE

SCALE	DWG. NO.	PAGE NO.
	SSRP–1077.0–005	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)