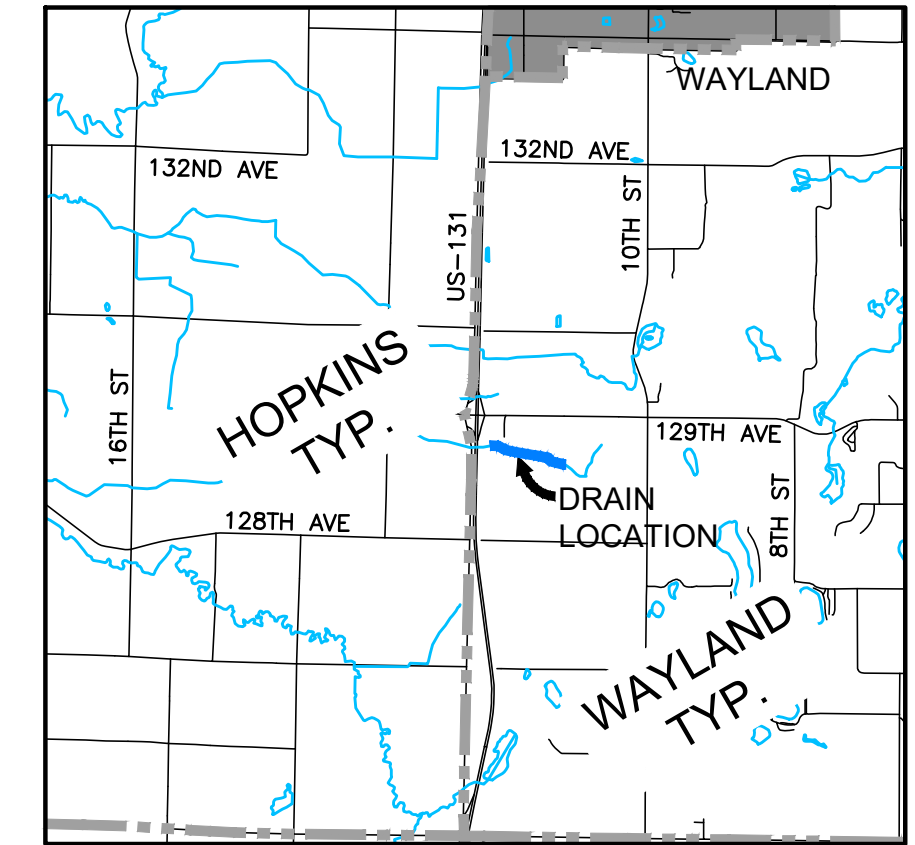




PIERCE DRAIN EXTENSION

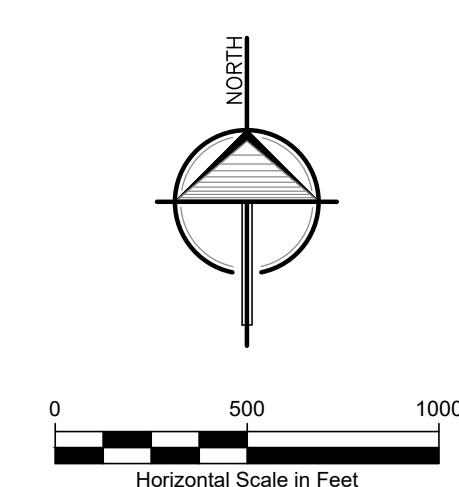
Section 19, T3N, R11W
Wayland Township, Allegan County, Michigan



VICINITY MAP
NOT TO SCALE

- INDEX OF SHEETS**
- CS - COVER SHEET**
 - C1 - PLAN & PROFILE**
(STA. 14+50 - 29+50)
 - C2 - WETLAND RESTORATION**
 - C3 - DETAILS**
 - C4 - SESC PLAN**

- LEGEND**
- ENCLOSED CHANNEL DRAIN
 - OPEN CHANNEL DRAIN
 - DRAINAGE DISTRICT BOUNDARY
 - SECTION LINE
 - TOWNSHIP LINE
 - ROADS
 - PROPERTY LINES
 - SECTION NUMBERS
 - SHEET NUMBERS



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2121 3 Mile Rd. NW
Walker, MI 49544
Ph: 616-301-7886
www.LREMI.com

ENGINEERS & SURVEYORS

REVISIONS:	NO.	ISSUED FOR	DATE
	1.	PRELIMINARY DESIGN REVIEW	01/25/2024
	2.	OWNER REVIEW	02/02/2024

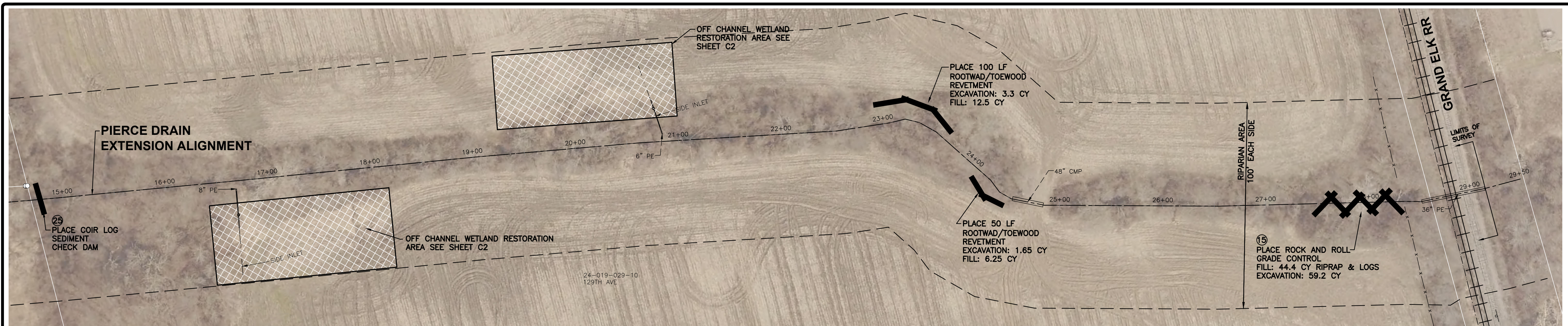
CLIENT: GUN LAKE TRIBE
SHELEYSVILLE, MICHIGAN

PROJECT: PIERCE DRAIN EXTENSION
WAYLAND TOWNSHIP, ALLEGAN COUNTY, MICHIGAN

PROJECT NUMBER:	DATE
23-155	12/2023
SURVEYED BY: CVF	01/20/2024
DESIGNED BY: AWS	12/2023
DRAFTED BY: LGG	01/24/2024
QA/QC: DJF	

COVER SHEET

CS



MISCELLANEOUS QUANTITIES

MOBILIZATION (10% MAX) 1 LS
 SESC MEASURES 1 LS
 OPEN CHANNEL SEEDING 1,365 LF
 MULCH BLANKET 6,200 SY

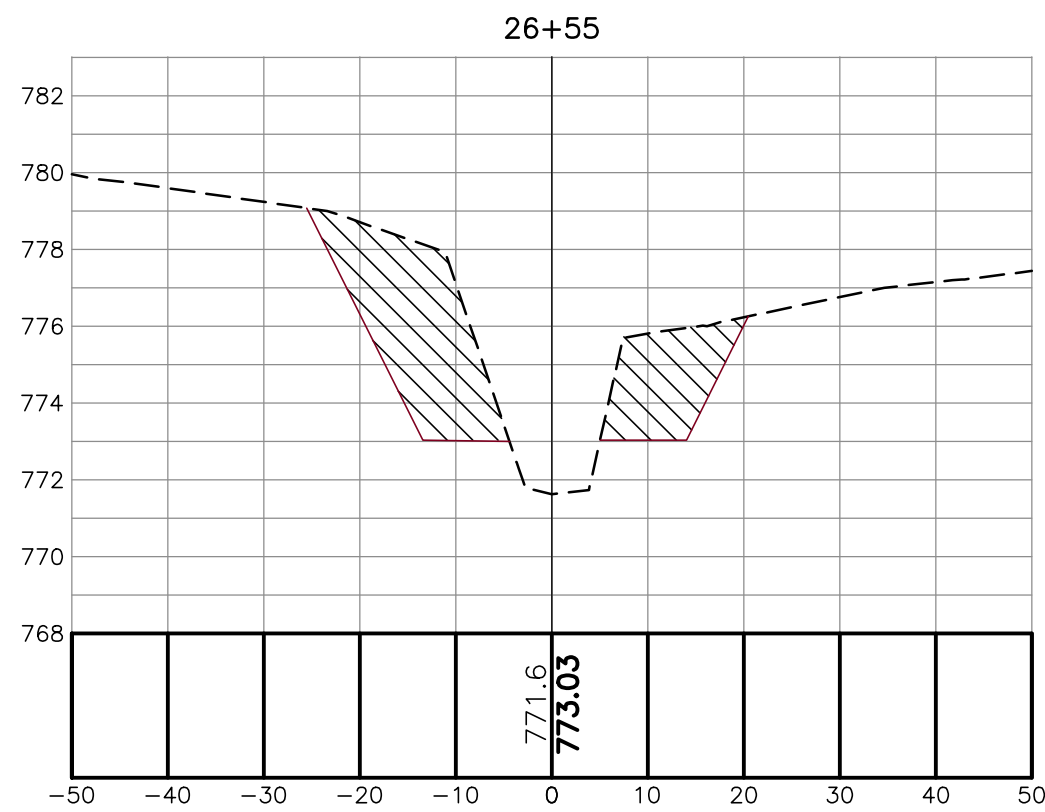
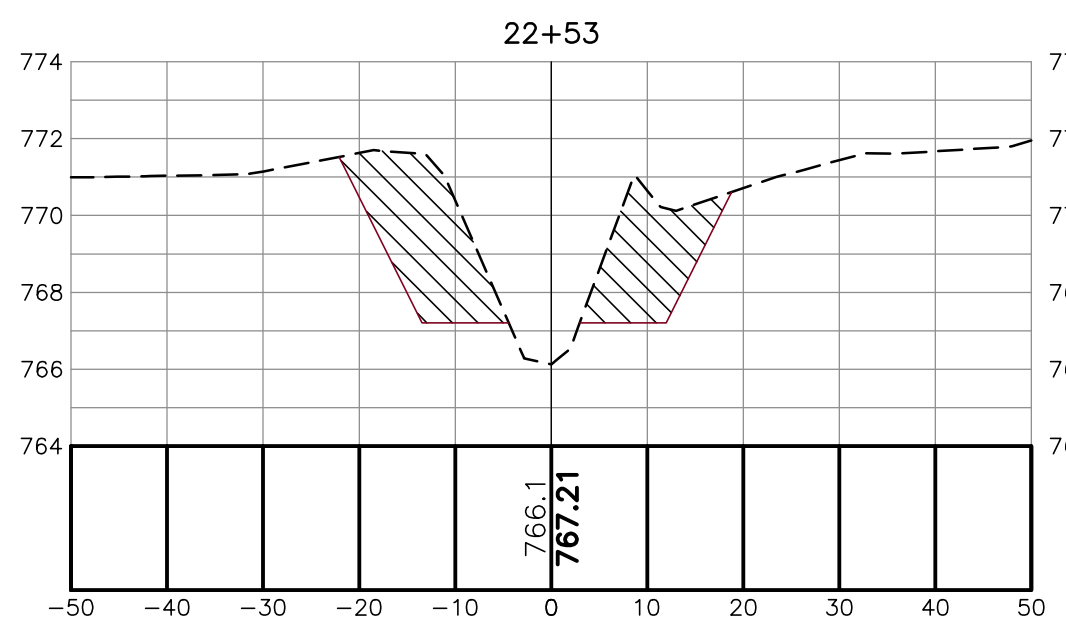
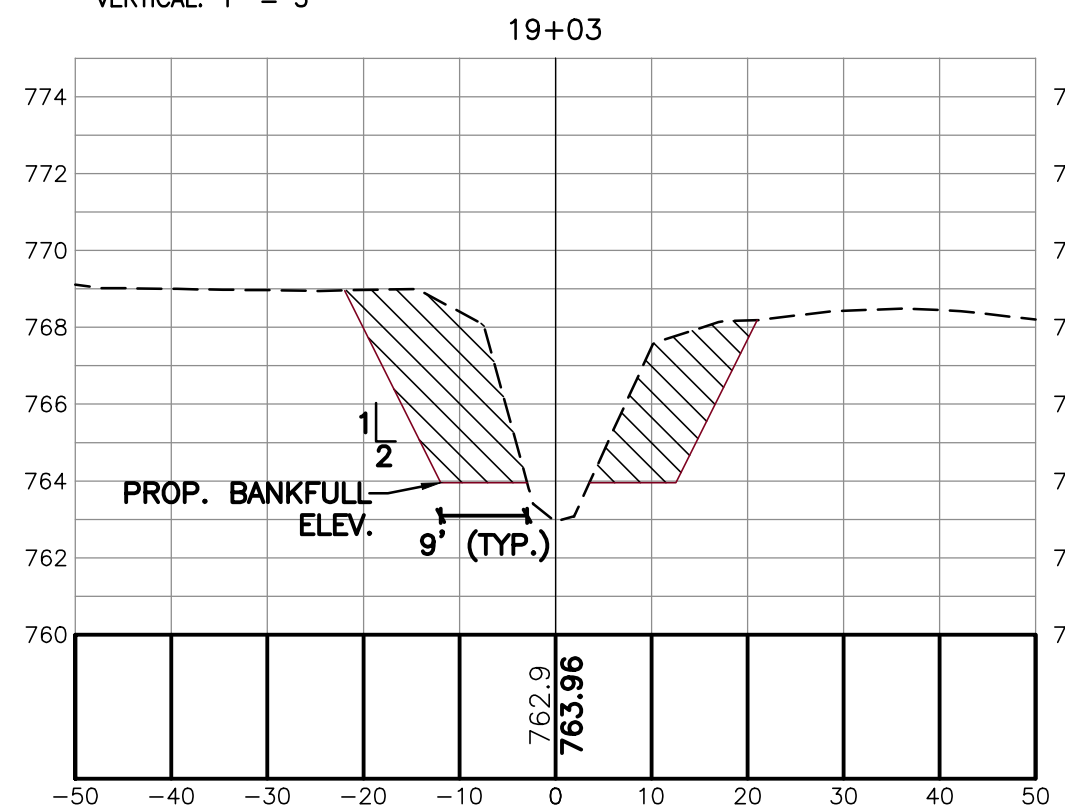
SUMMARY OF REGULATED ACTIVITIES

ACTIVITY: FILL	LENGTH (FT)	WIDTH (FT)	DEPTH (FT)	CROSS SECTIONAL AREA (SF)	VOLUME (CY)
RIPRAP SPILLWAY 1	9	6	1.5	54	3
RIPRAP SPILLWAY 2	9	6	1.5	54	3
LOG REVETMENT 1	100	2.25	1.5	225	12.5
LOG REVETMENT 2	50	2.25	1.5	112.5	6.25
ROCK & ROLL	85	9.4	1.5	799	44.4

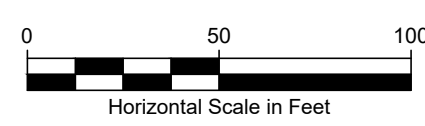
ACTIVITY: EXCAVATION	LENGTH (FT)	WIDTH (FT)	DEPTH (FT)	CROSS SECTIONAL AREA (SF)	VOLUME (CY)
ROCK & ROLL	85	9.4	2	799	59.2
LOG REVETMENT 1	100	1.32	0.66	87	3.3
LOG REVETMENT 2	50	1.32	0.66	799	1.65

CROSS SECTIONS

SCALE: HORIZONTAL: 1" = 20'
 VERTICAL: 1" = 5'



PLAN VIEW

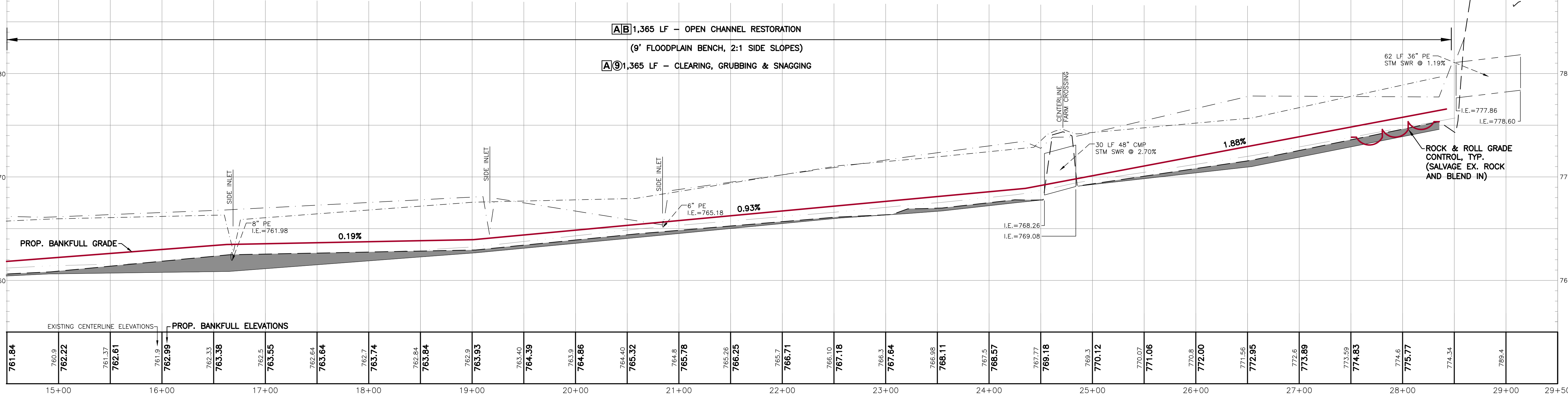


LEGEND

WETLAND (USFWS NATIONAL WETLAND INVENTORY)

NOTES

- CLEAR, GRUB AND SNAG AREAS AS NECESSARY TO ACCESS AND COMPLETE THE WORK. REMOVE AND DISPOSE OF ALL MATERIAL IN ACCORDANCE WITH THE CONTRACT SPECIFICATIONS.
- SALVAGE AND RESPRAD TOPSOIL, SEED AND MULCH ALL DISTURBED AREAS. PAID FOR BY LF AS OPEN CHANNEL SEEDING.
- MULCH BLANKET AREAS AS DIRECTED BY ENGINEER. PAID FOR BY SY AS MULCH BLANKET.
- QUANTITIES WILL NOT BE PAID ABOVE THE CONTRACT AMOUNT UNLESS AUTHORIZED BY ENGINEER.



CENTERLINE PROFILE

SCALE: HORIZONTAL: 1" = 50'
 VERTICAL: 1" = 5'



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21213 Mile Rd. NW
 Walker, MI 49544
 Ph: 616-301-7866
 www.LREMI.com

LRE
 ENGINEERS & SURVEYORS

REVISIONS:	NO.	ISSUED FOR	DATE
	1.	PRELIMINARY DESIGN REVIEW	01/25/2024
	2.	OWNER REVIEW	02/02/2024

CLIENT: GUN LAKE TRIBE
 SHELEVILLE, MICHIGAN

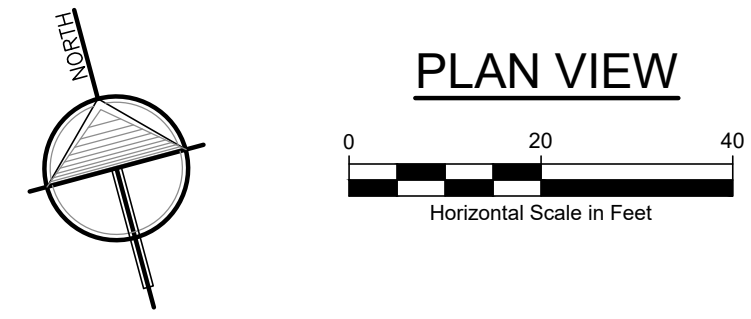
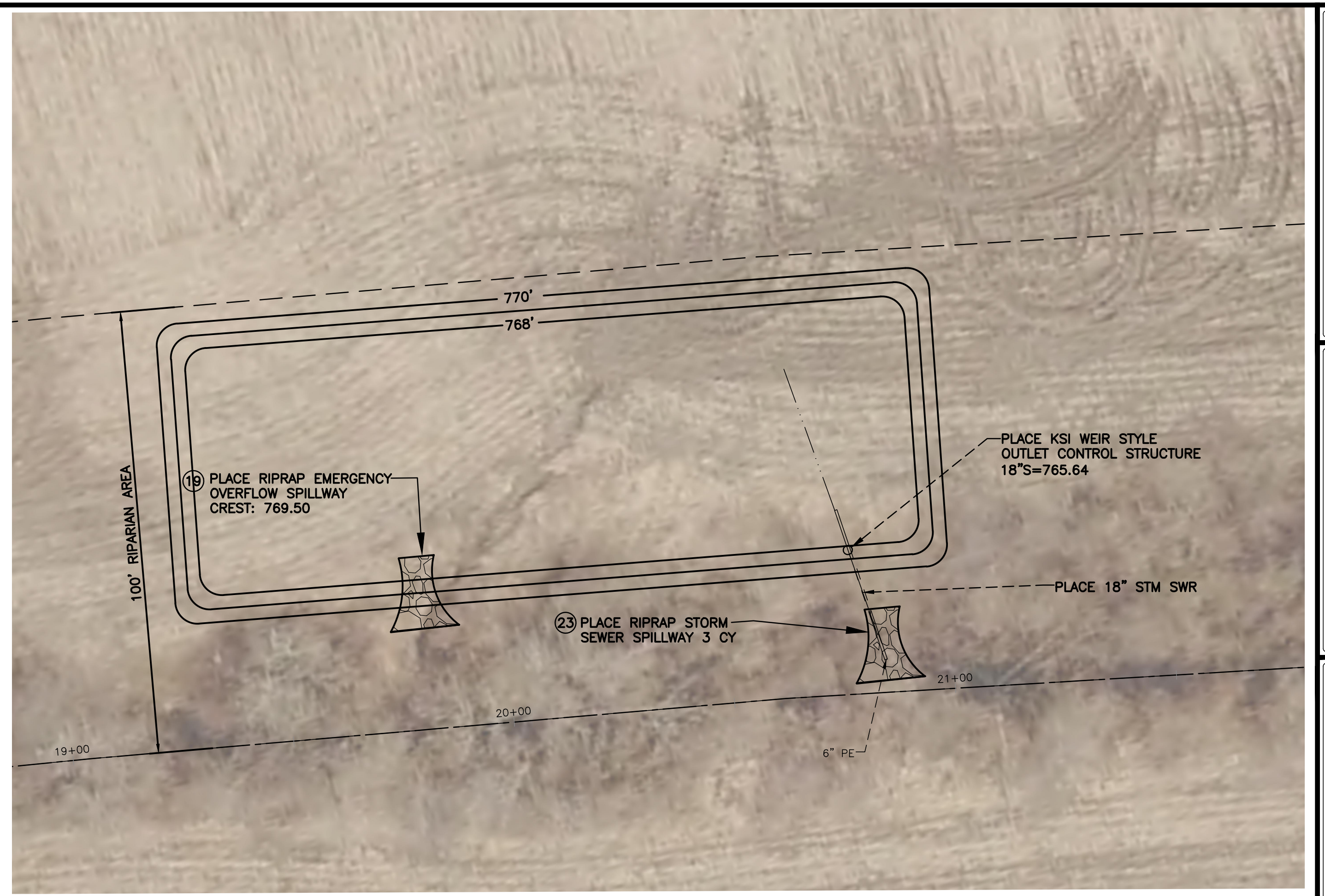
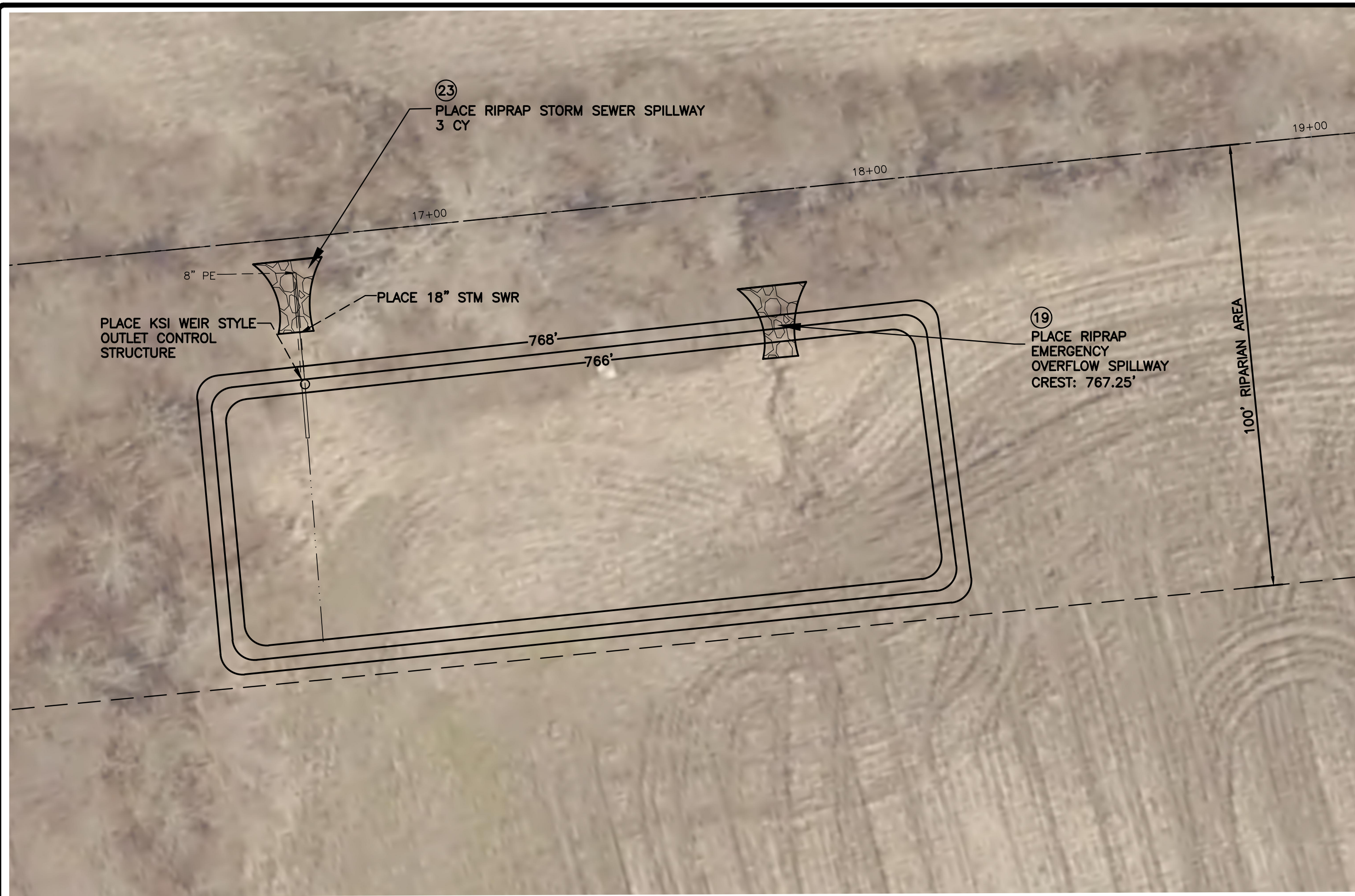
PROJECT: PIERCE DRAIN EXTENSION
 WAYLAND TOWNSHIP, ALLEGAN COUNTY, MICHIGAN

PROJECT NUMBER: 23-155

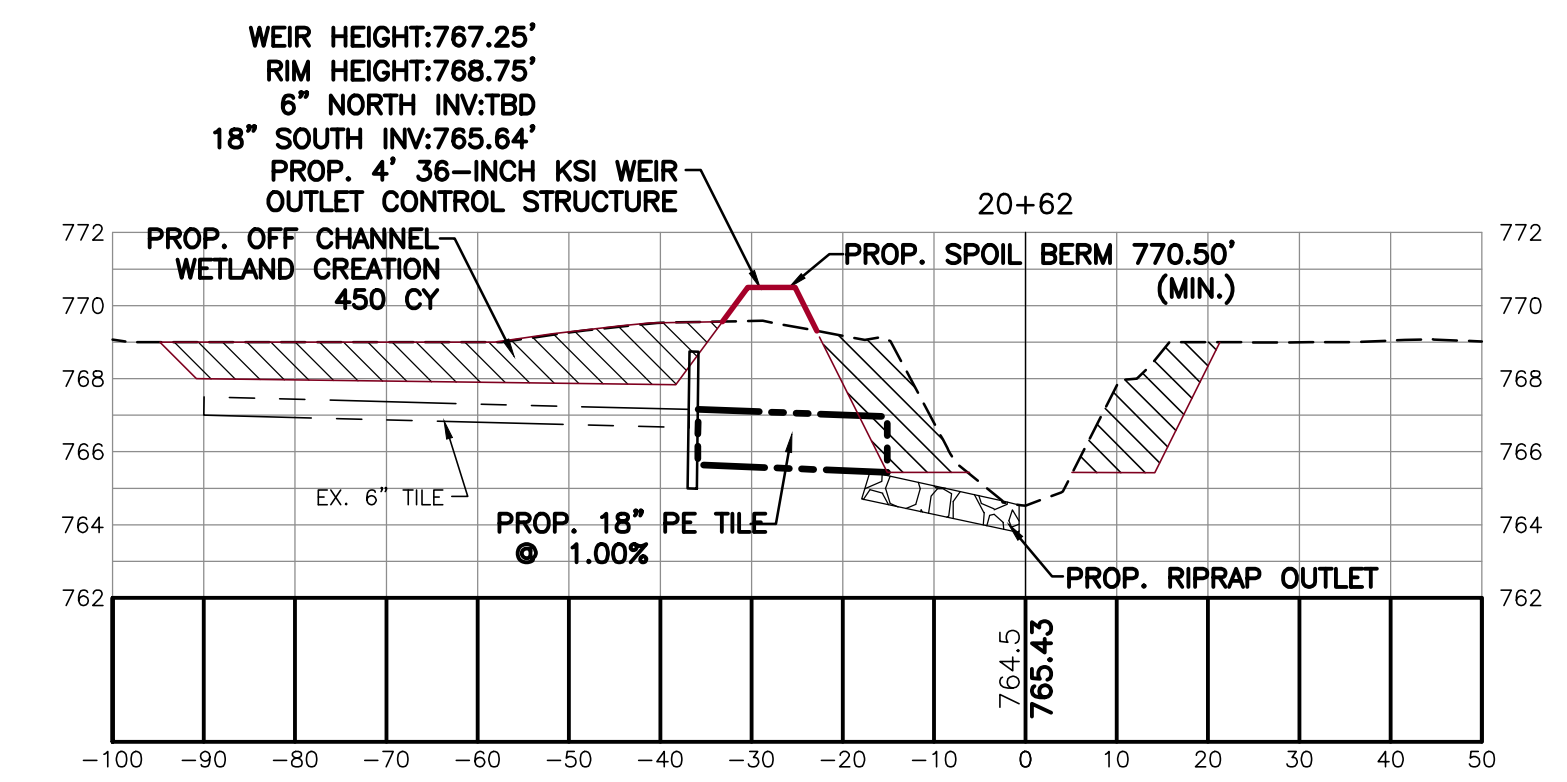
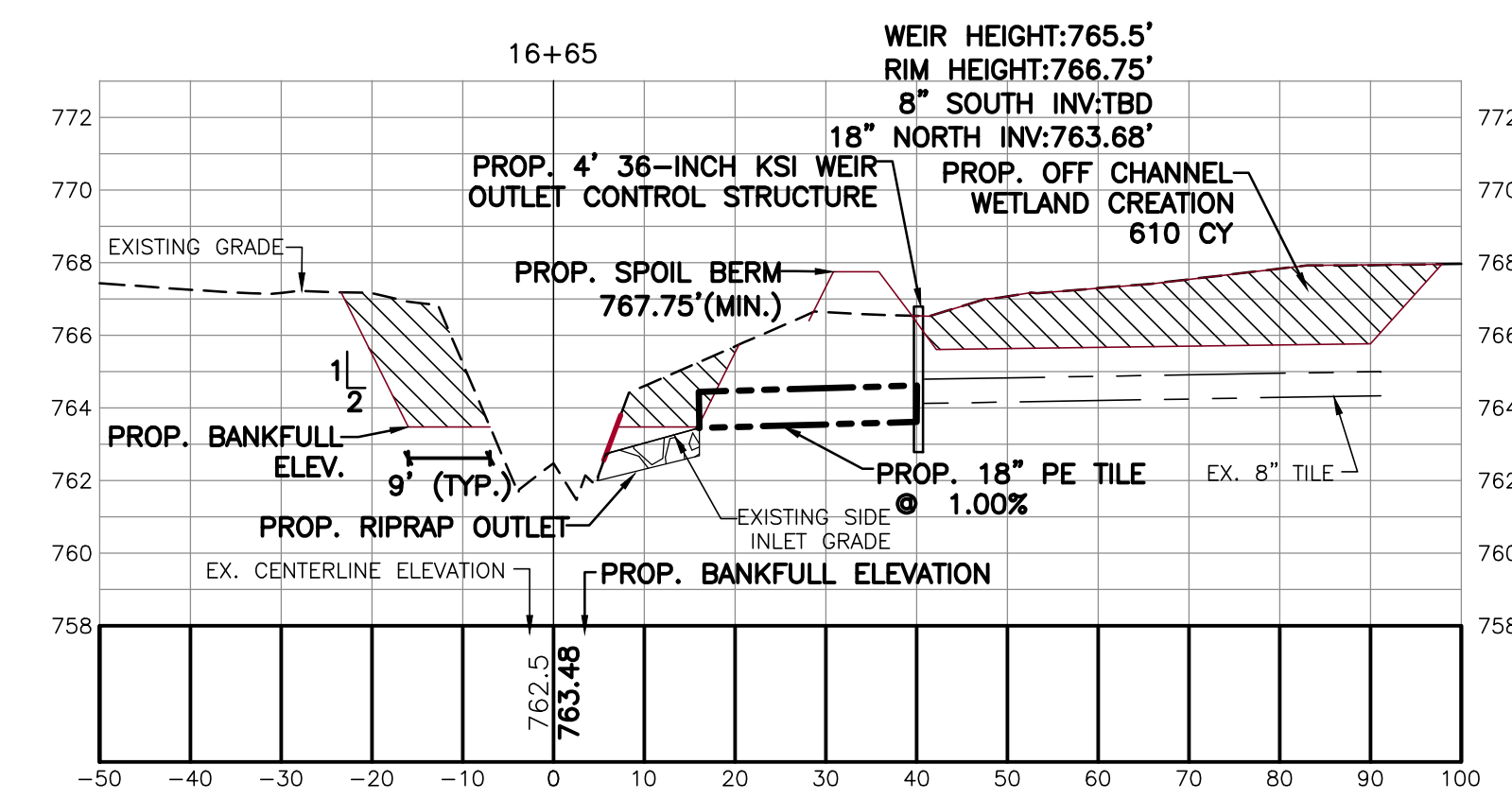
DATE	DESIGNED BY	DRAFTED BY	QA/QC
12/2023	CJF	LGG	DJF
01/20/2024	AWIS	LGG	DJF
12/2023	AWIS	LGG	DJF
01/24/2024	AWIS	LGG	DJF

SHEET NAME: PLAN & PROFILE
 STA: 14+50 - 29+50

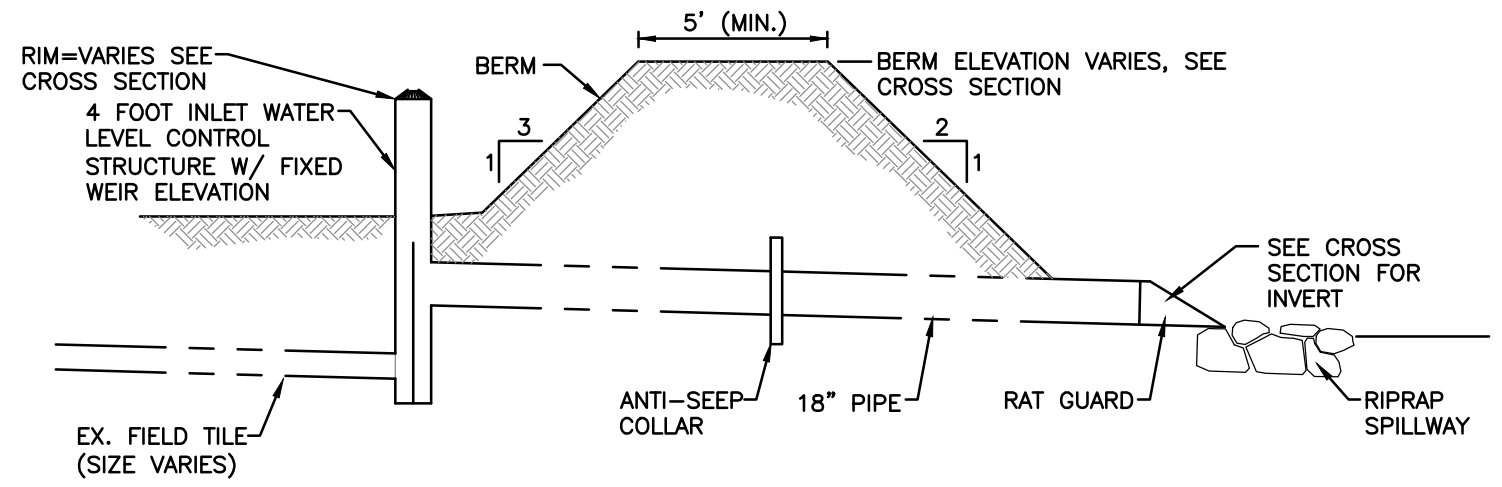
SHEET NUMBER: C1



CROSS SECTIONS
SCALE: HORIZONTAL: 1" = 20'
VERTICAL: 1" = 5'



- NOTES**
1. CLEAR, GRUB AND SNAG AREAS AS NECESSARY TO ACCESS AND COMPLETE THE WORK. REMOVE AND DISPOSE OF ALL MATERIAL IN ACCORDANCE WITH THE CONTRACT SPECIFICATIONS.
 2. SALVAGE AND RE-SPREAD TOPSOIL, SEED AND MULCH ALL DISTURBED AREAS. PAID FOR BY LF AS OPEN CHANNEL SEEDING.
 3. MULCH BLANKET AREAS AS DIRECTED BY ENGINEER. PAID FOR BY SY AS MULCH BLANKET.
 4. QUANTITIES WILL NOT BE PAID ABOVE THE CONTRACT AMOUNT UNLESS AUTHORIZED BY ENGINEER.



INLET WATER CONTROL STRUCTURE & TYPICAL BERM DETAIL
NOT TO SCALE

2123 Mile Rd. NW
Walker, MI 49544
Ph: 616-301-7886
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LRE
ENGINEERS & SURVEYORS

NO.	ISSUED FOR	DATE
1.	PRELIMINARY DESIGN REVIEW	01/25/2024
2.	OWNER REVIEW	02/02/2024

CLIENT: GUN LAKE TRIBE
SHELEYSVILLE, MICHIGAN

PROJECT: PIERCE DRAIN EXTENSION
WAYLAND TOWNSHIP, ALLEGAN COUNTY, MICHIGAN

PROJECT NUMBER:	DATE
23-155	12/2023
SURVEYED BY: CJF	01/20/2024
DESIGNED BY: AWS	12/2023
DRAFTED BY: LGG	01/24/2024
QA/QC: DJF	

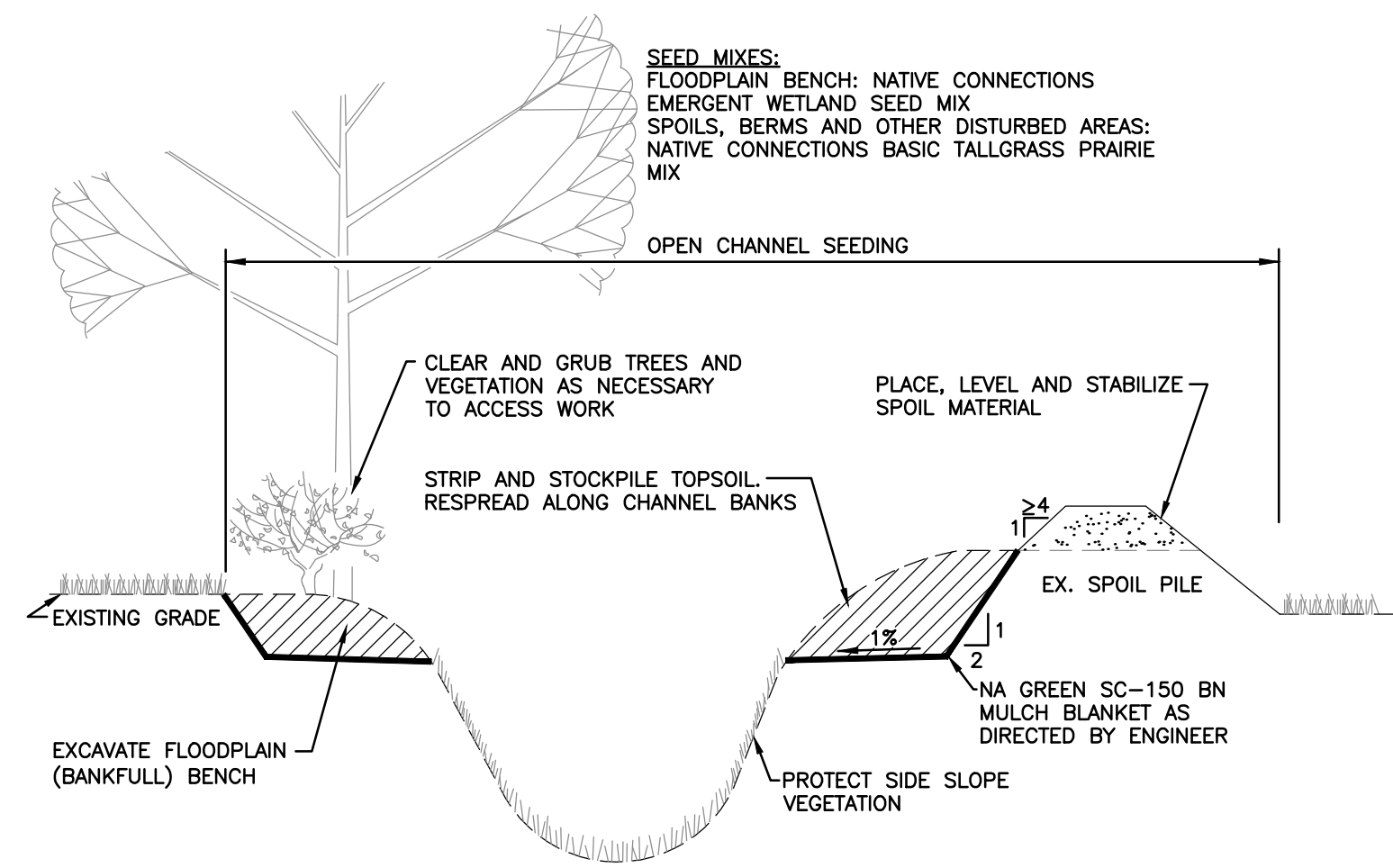
SHEET NAME: WETLAND RESTORATION

SHEET NUMBER: C2

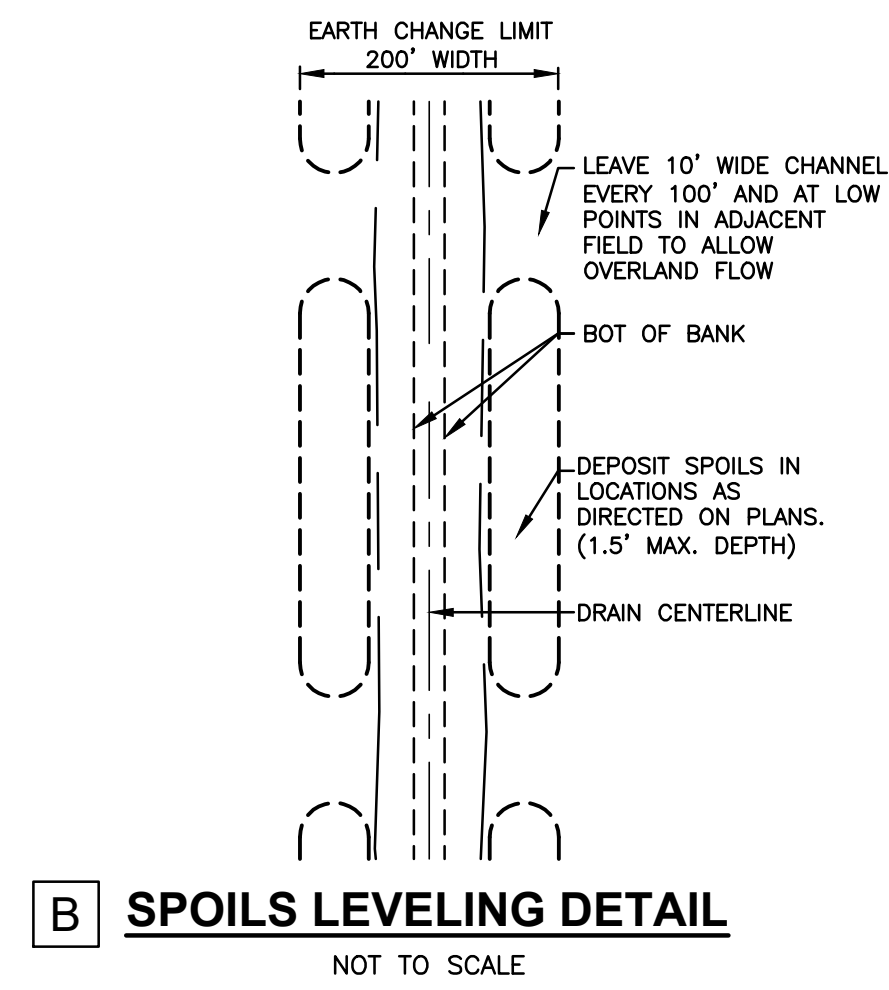


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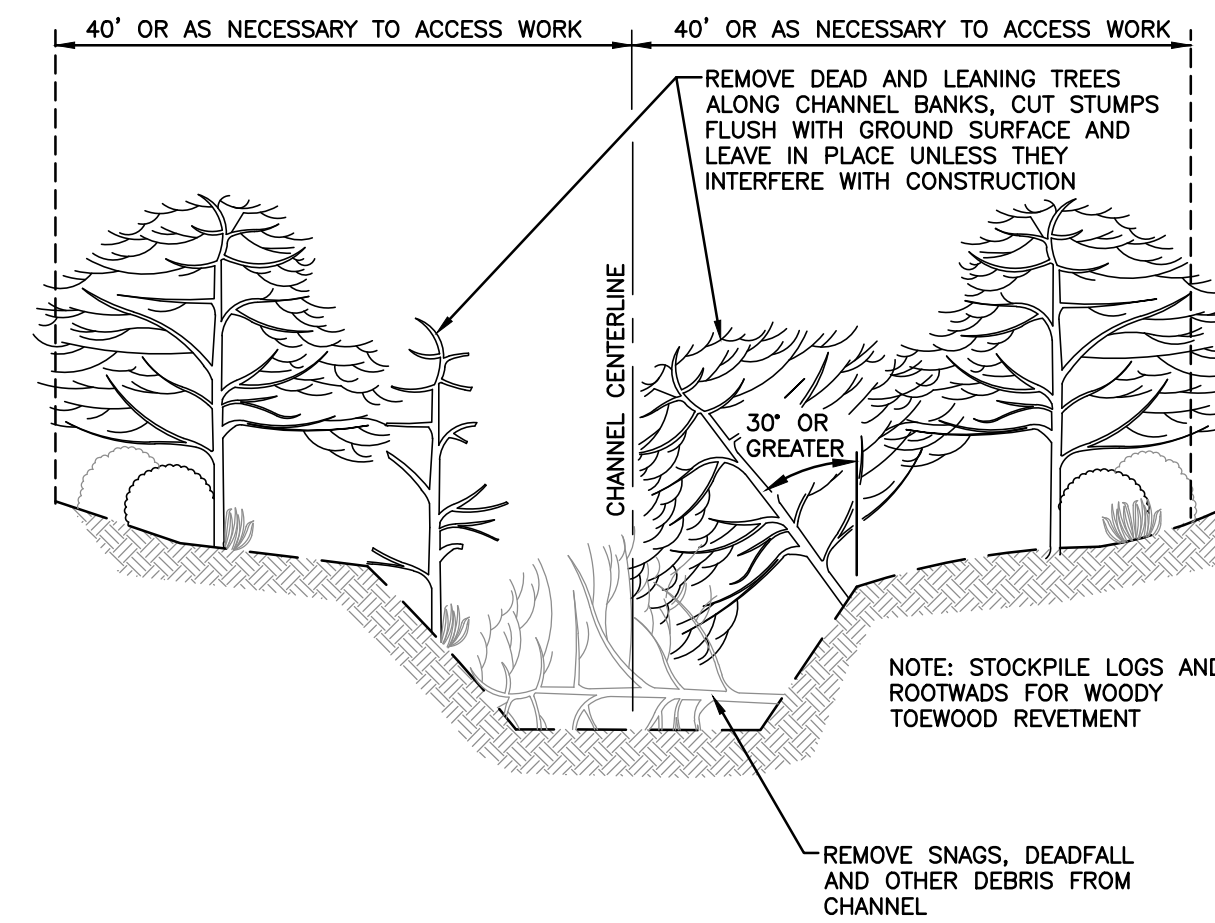
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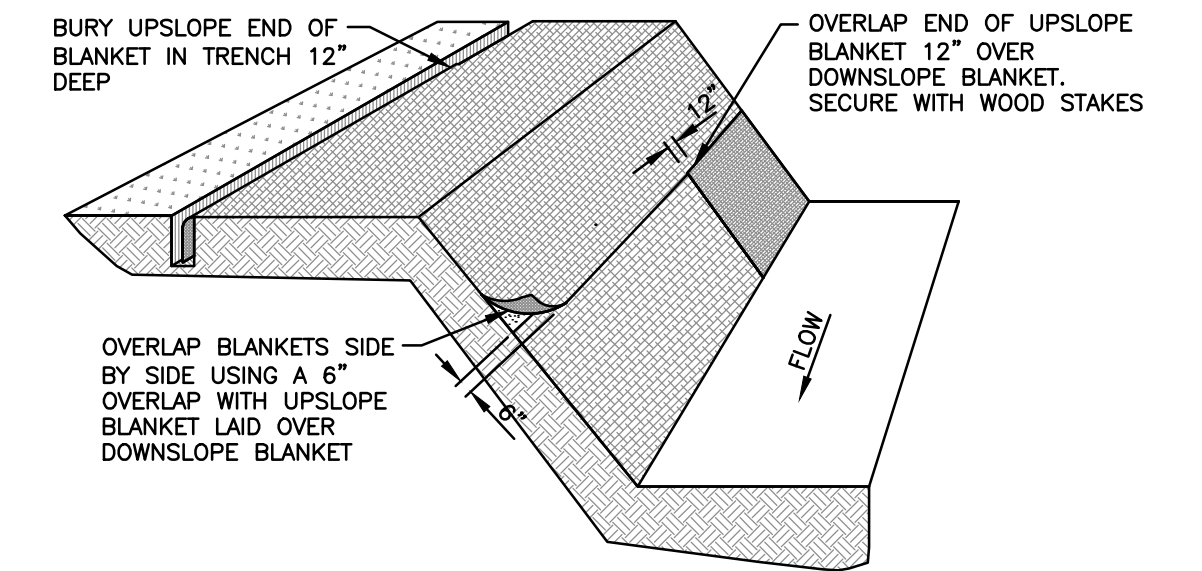
A B FLOODPLAIN BENCH EXCAVATION DETAIL
NOT TO SCALE



B SPOILS LEVELING DETAIL
NOT TO SCALE

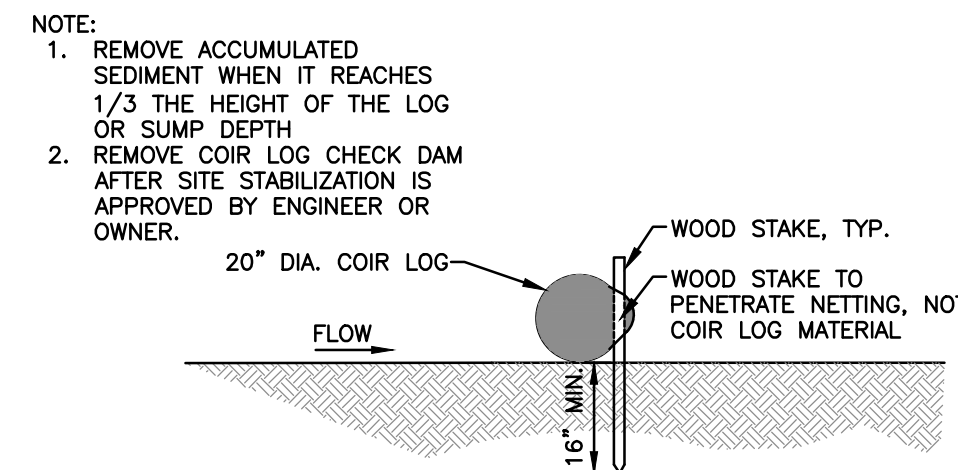


A 9 SELECTIVE CLEARING, GRUBBING & SNAGGING DETAIL
NOT TO SCALE

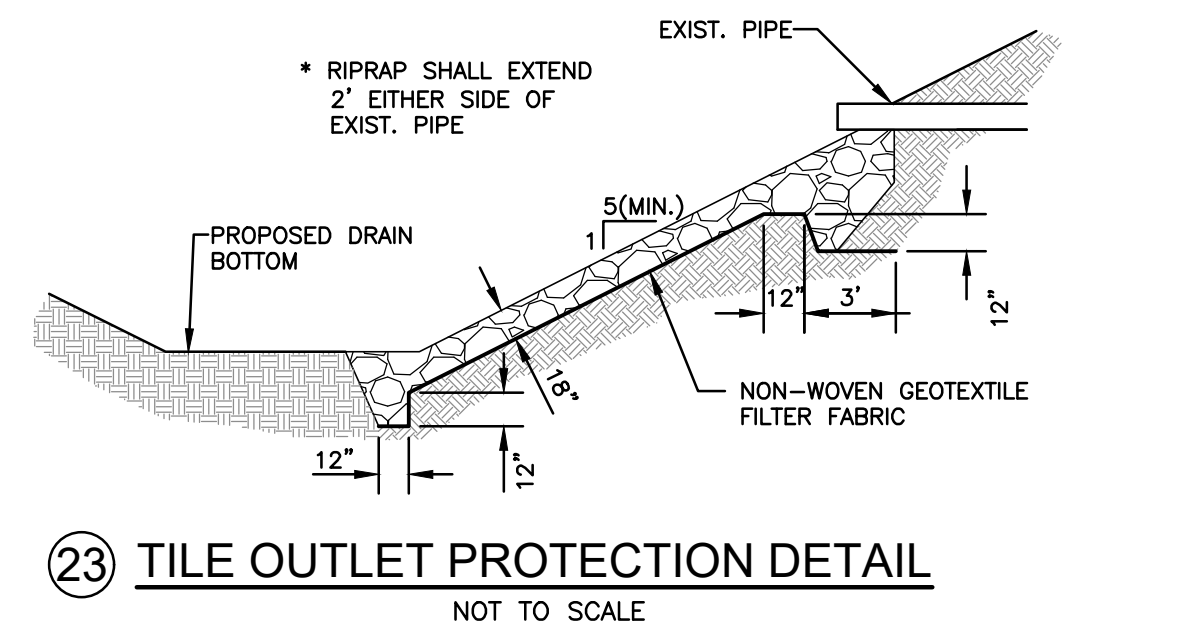


- NOTES:
1. PLACE MULCH BLANKET PARALLEL TO FLOW AND ANCHOR SECURELY.
2. STAPLES INSTALLED/SECURED ACCORDING TO MANUFACTURER'S SPECIFICATIONS.
3. MULCH BLANKET SHALL BE NA GREEN SC 150 BN OR EQUAL.

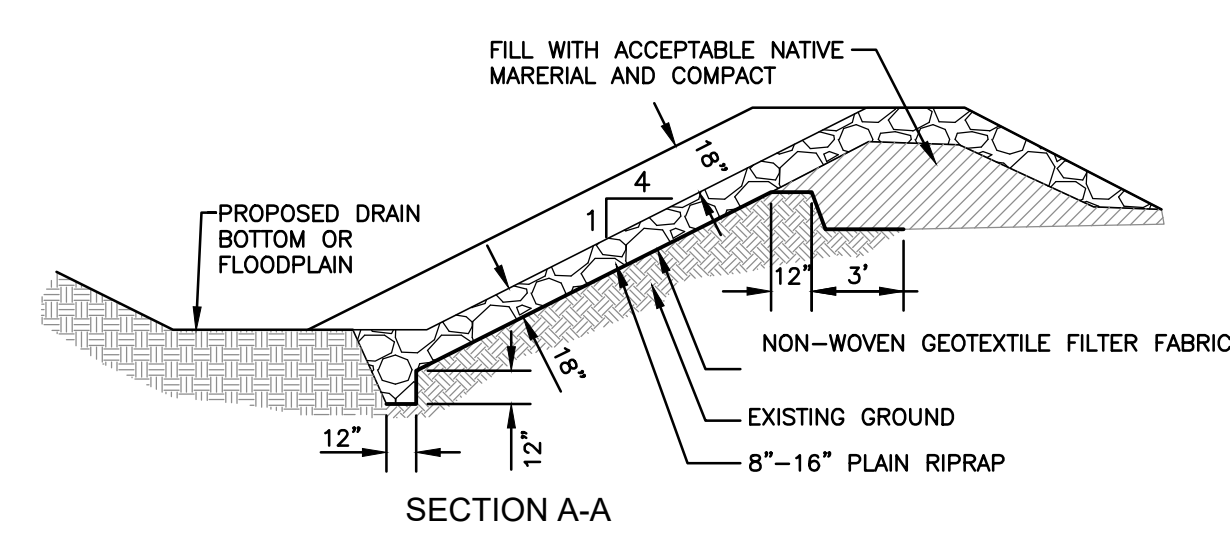
2 MULCH BLANKET
NOT TO SCALE



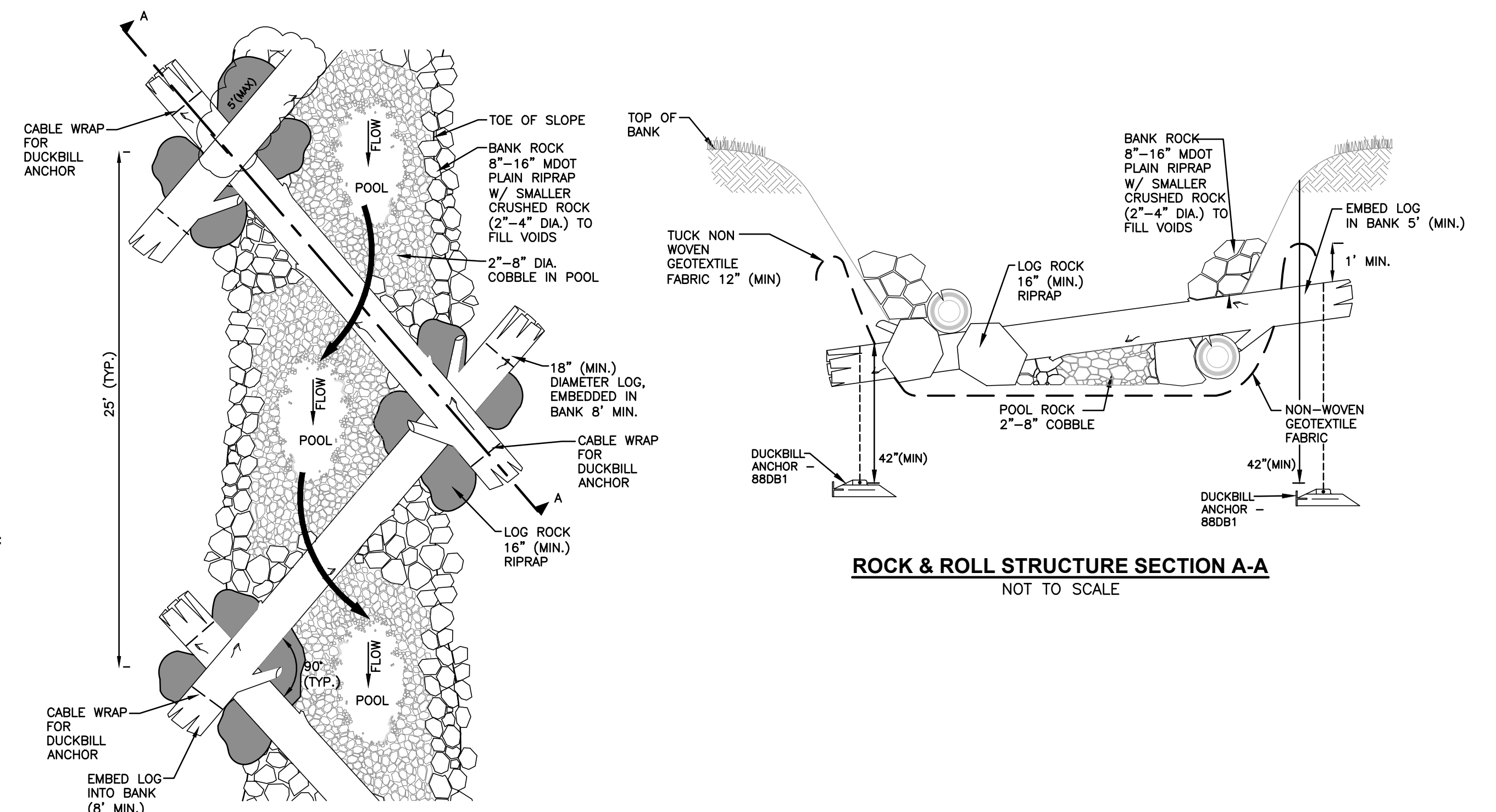
25 SEDIMENT CHECK DAM DETAIL
NOT TO SCALE



23 TILE OUTLET PROTECTION DETAIL
NOT TO SCALE

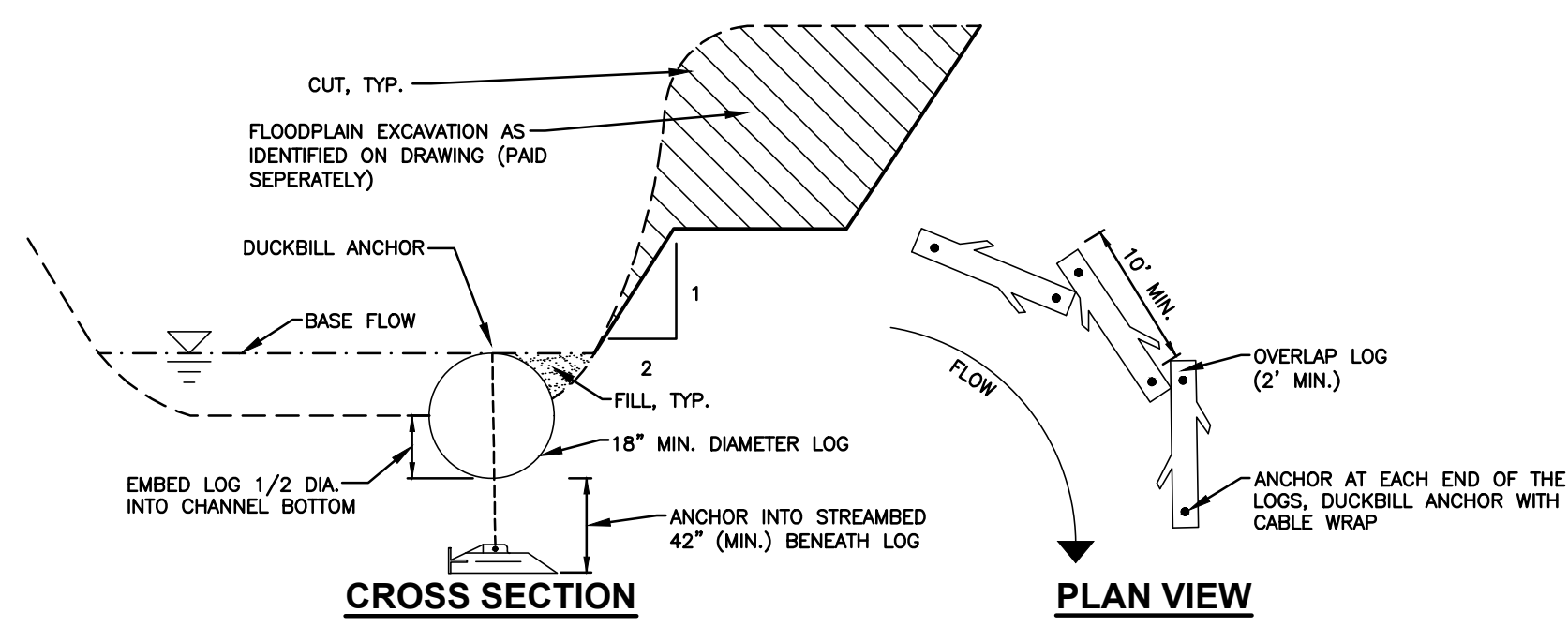


19 RIPRAP OVERFLOW SPILLWAY DETAIL
NOT TO SCALE

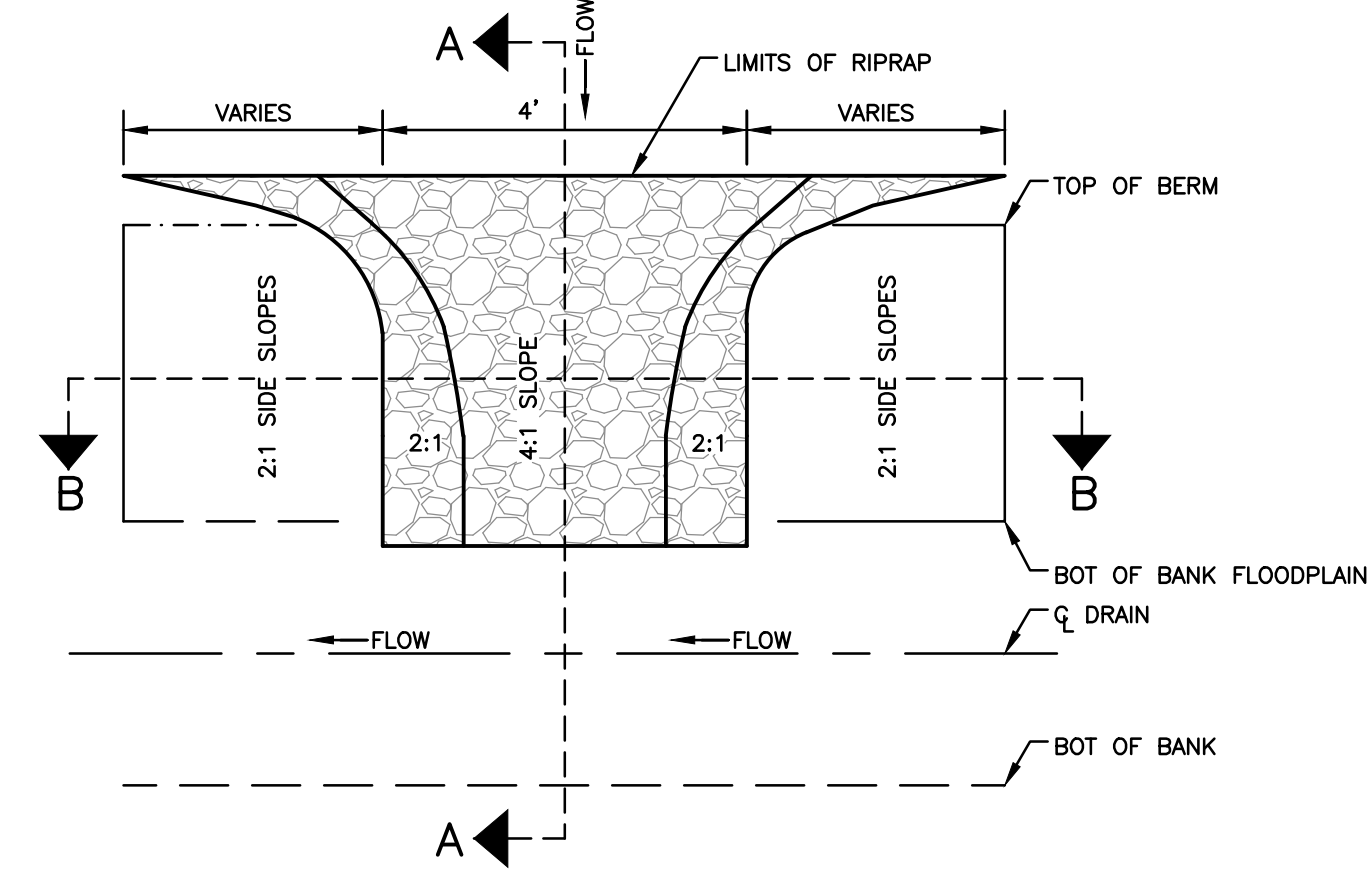


ROCK & ROLL STRUCTURE PLAN VIEW
NOT TO SCALE

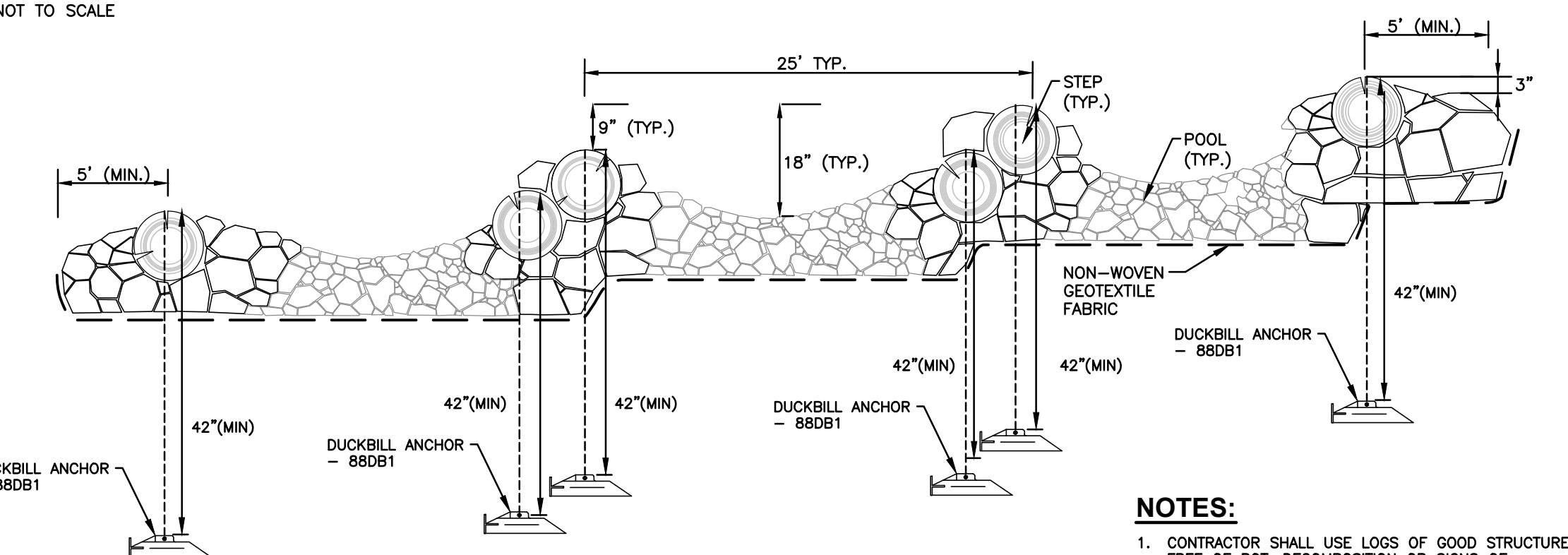
ROCK & ROLL STRUCTURE SECTION A-A
NOT TO SCALE



TOE WOOD REVETMENT DETAIL
NOT TO SCALE



19 RIPRAP OVERFLOW SPILLWAY DETAIL
NOT TO SCALE

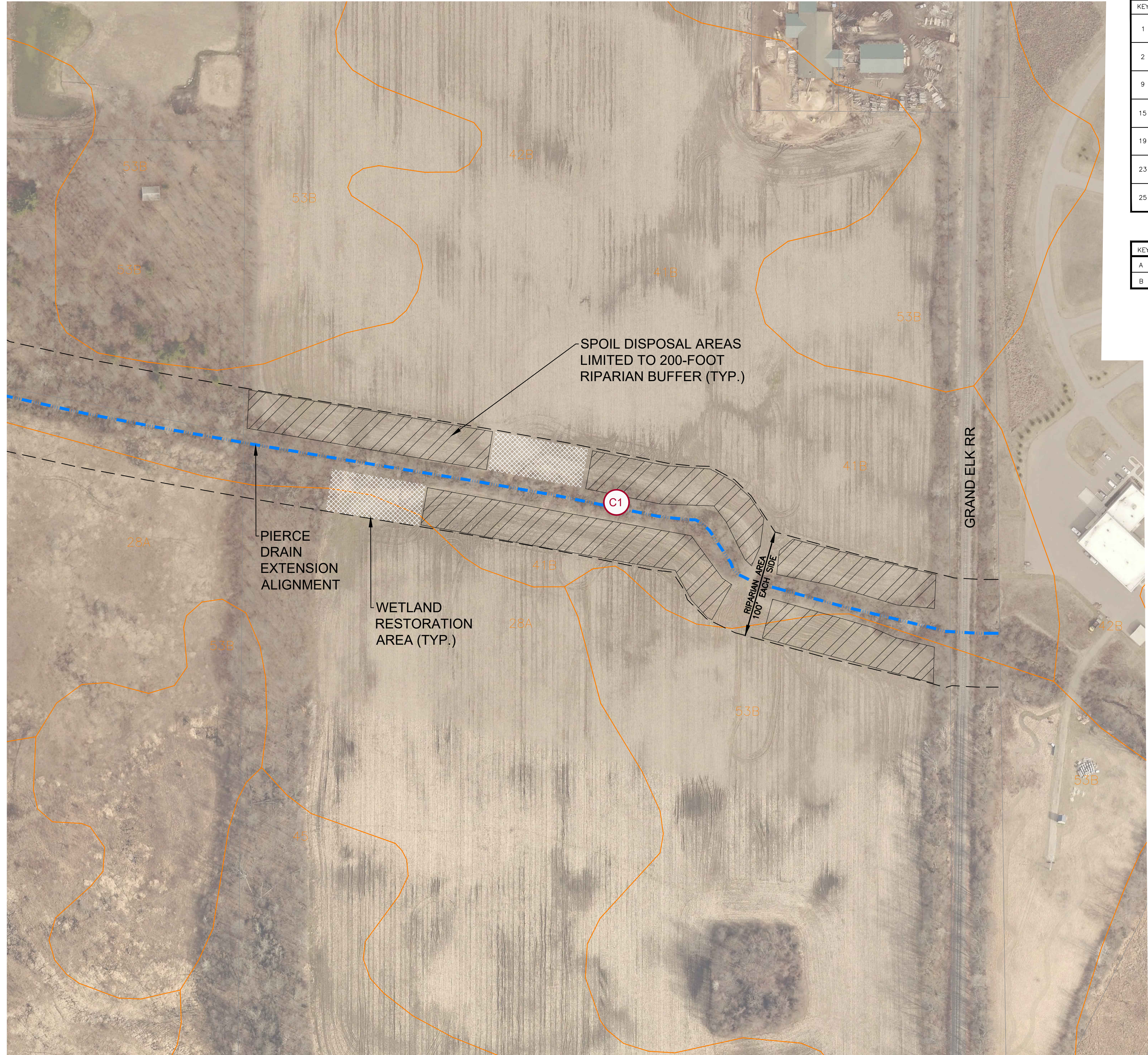


15 ROCK & ROLL STRUCTURE DETAIL
NOT TO SCALE

- NOTES:
1. CONTRACTOR SHALL USE LOGS OF GOOD STRUCTURE FREE OF ROT, DECOMPOSITION OR SIGNS OF DETERIORATION.

NO.	ISSUED FOR	DATE
1.	PRELIMINARY DESIGN REVIEW	01/25/2024
2.	OWNER REVIEW	02/02/2024

DATE	BY
12/2023	CIV
01/20/2024	AWIS
12/2023	LGG
01/24/2024	QA/QC DJF



MACDC UNIFIED KEYING SYSTEM EROSION CONTROL MEASURES (SESC)			
KEY	SESC MEASURE	SYMBOL	WHERE USED
1	Seeding		When bare soil is exposed, temporarily or permanently, to erosive forces from wind and or water on flat areas, mild slopes, grassed waterways and spillways, diversion ditches and dikes, borrow and stockpile areas, and spoil piles.
2	Mulch		On flat areas, slopes, grassed waterways and spillways, diversion ditches & dikes, borrow & stockpile areas, & spoil piles when areas are subject to raindrop impact, & erosive forces from wind or water.
9	Vegetation Removal without Grubbing		Retains existing root mat which assists in stabilizing slopes. Assists in the revegetation process by providing sprout growth. Reduces sheet flow velocities preventing rilling and gully. Discourages off-road vehicle use.
15	Riprap		Along drain banks, shorelines, or where concentrated flows occur, slows velocity, reduces erosion and sedimentation.
19	Armored Spillway		When concentrated flow must be conveyed down a drain bank or slope or discharge into another drain. Where slope failure or channel scour is observed or is likely to occur, or when runoff must be redirected around work in the drain.
23	Outfall Stabilization		In the stream or drain bank usually above the ordinary high water mark where an enclosed drain or tile discharges to an open drain.
25	Temporary Check Dam		In constructed and existing flow corridors to reduce flow velocities.

MACDC UNIFIED KEYING SYSTEM - ROUTINE MAINTENANCE ACTIVITIES	
KEY	BEST MANAGEMENT PRACTICE
A	Debris Removal
B	Sediment Removal

TIMING AND SEQUENCE OF CONSTRUCTION

CONSTRUCTION ACTIVITY	ACTIVITY BY MONTH								
	MONTH 1			MONTH 2					
	1	2	3	4	5	6	7	8	9
1. MOBILIZE EQUIPMENT ON SITE									
2. PLACE TEMPORARY SESC MEASURES									
3. CLEAR AND GRUB SITE AS NECESSARY									
4. STRIP AND STOCKPILE TOPSOIL									
5. EXCAVATE TWO-STAGE CHANNEL FLOODPLAIN									
6. EXCAVATE AND PLACE ROCK & ROLL STRUCTURE									
7. EXCAVATE & PLACE ROOTWAD/LOG REVEITEMT									
8. EXCAVATE WETLAND AREA AND PLACE OUTLET STRUCTURE									
9. BUILD BERM AND GRADE SPOILS									
10. RESTORE DISTURBED AREAS WITH SEED AND MULCH									
11. REMOVE SESC CONTROL MEASURES*									

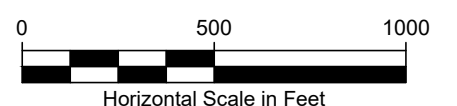
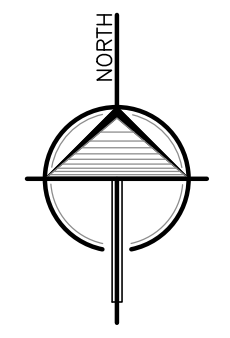
*NOTE: TEMPORARY CONTROL MEASURES TO BE REMOVED ONCE VEGETATION IS ESTABLISHED AND SITE IS STABILIZED.

LEGEND

- ENCLOSED CHANNEL DRAIN
- OPEN CHANNEL DRAIN
- ROADS
- PROPERTY LINES
- SECTION NUMBERS
- SHEET NUMBERS

SOILS INFORMATION

- 8B Glynwood clay loam, 1 to 6 percent slopes
- 11B Oshemo-Chelsea complex, 0 to 6 percent slopes
- 11C Oshemo-Chelsea complex, 6 to 12 percent slopes
- 18 Pits
- 21B Capac-Wixom complex, 1 to 4 percent slopes
- 28A Rimer loamy sand, 0 to 4 percent slopes
- 33A Kibbie fine sandy loam, 0 to 3 percent slopes
- 34 Aquents, sandy and loamy
- 41B Blount silt loam, 1 to 4 percent slopes
- 42B Metamora sandy loam, 1 to 4 percent slopes
- 44B Chelsea loamy fine sand, 0 to 6 percent slopes
- 45 Pewamo silt loam
- 53B Oakville fine sand, loamy substratum, 0 to 6 percent slopes
- HgtacA Houghton muck, lake moderated, 0 to 1 percent slopes
- W Water



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ENGINEERS & SURVEYORS

PROJECT NUMBER: 23-155

SHEET NUMBER: C4

DATE: 12/2023

DESIGNED BY: LGG

DRAFTED BY: LGG

QA/QC: DJF

DATE: 01/25/2024

PRELIMINARY REVIEW: []

OWNER REVIEW: []

CLIENT: GUN LAKE TRIBE
SHELEYSVILLE, MICHIGAN

PROJECT: PIERCE DRAIN EXTENSION
WAYLAND TOWNSHIP, ALLEGAN COUNTY, MICHIGAN

SHEET NAME: SESC PLAN

C4