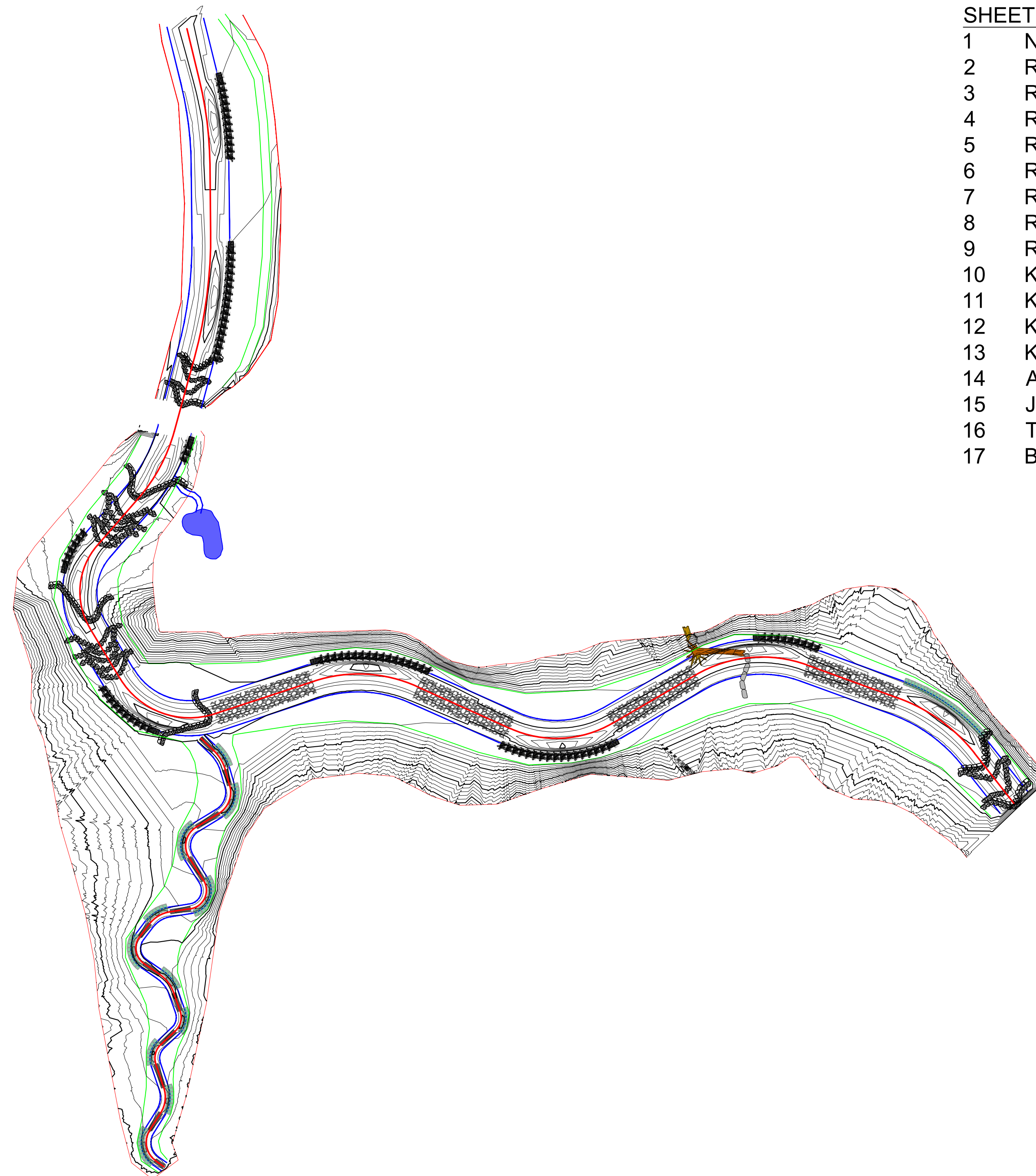
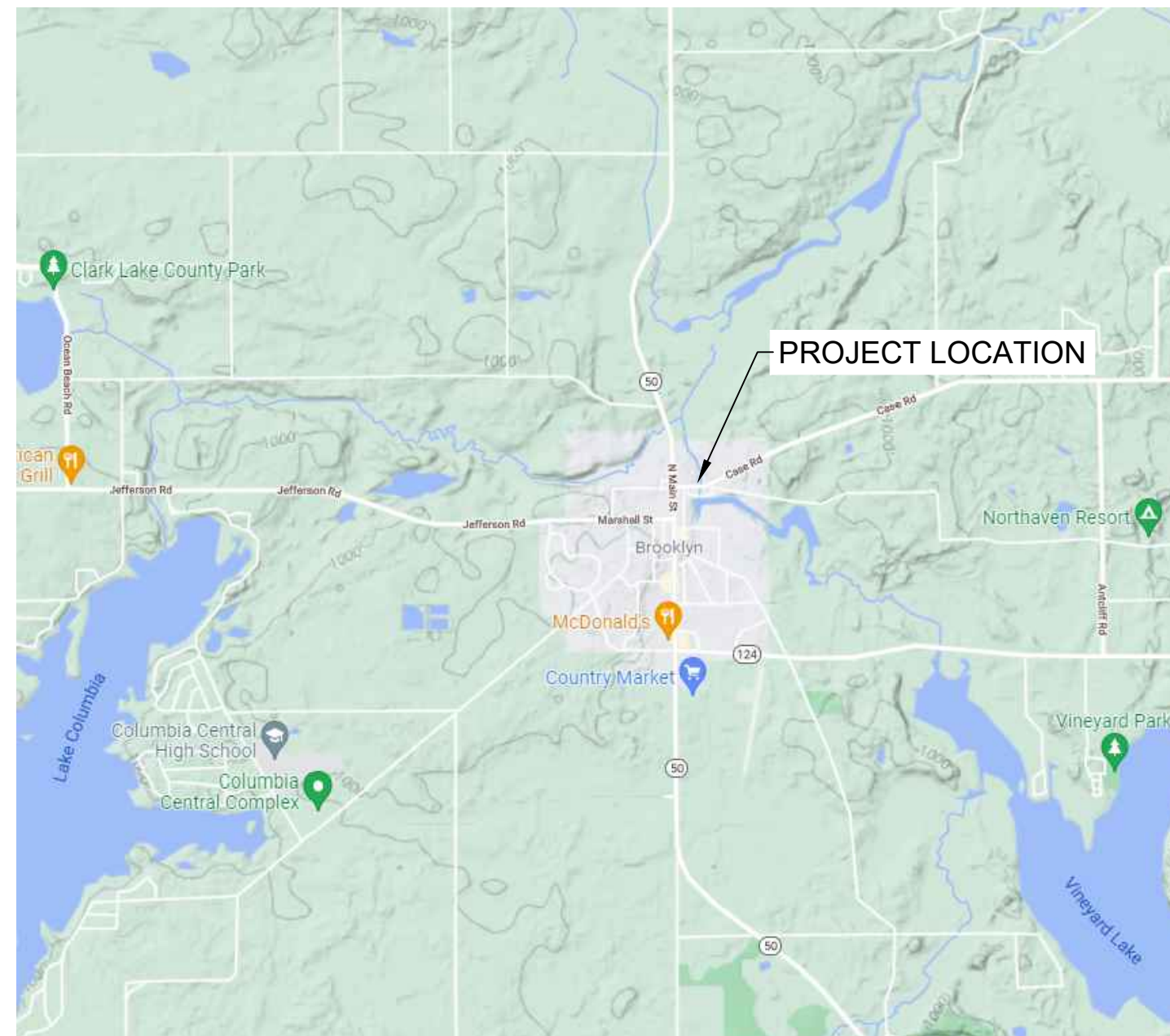


NOT FOR CONSTRUCTION

RIVER RAISIN - MILL STREET BROOKLYN DAM RESTORATION

NEAR BROOKLYN
JACKSON COUNTY, MI

01/11/2023



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River Raisin
WATERSHED COUNCIL

Partner - Protect - Preserve

320 SPRINGBROOK AVE.
ADRIAN, MI 49221



NISWANDER
ENVIRONMENTAL, LLC.

9436 MALTBY ROAD
BRIGHTON, MI 48116

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NOTES:
GENERAL CONSTRUCTION NOTES:

1. THE WORK ON THIS PROJECT SHALL ADHERE TO THE FOLLOWING SPECIFICATIONS, STANDARDS AND/OR REGULATIONS:
2. INSTREAM STRUCTURES SHALL BE INSTALLED AS THE CHANNEL IS BEING CONSTRUCTED AND NOT POST CONSTRUCTION. FILTER FABRIC INSTALLED AS PART OF THE INSTREAM STRUCTURE SHALL BE NONWOVEN GEOTEXTILE, (I.E. MIRAFI 170N SERIES) OR ENGINEER'S APPROVED ALTERNATIVE, UNLESS OTHERWISE SPECIFIED IN STRUCTURE DETAILS OR SPECIFICATIONS.
3. WHERE PRACTICABLE, EXISTING TREES AND VEGETATION SHOULD BE LEFT IN PLACE TO FACILITATE NATURAL REGENERATION AND SOIL STABILIZATION.
4. DEFINITIONS:
 - A. BANKFULL ELEVATION IS THE POINT OF INCIPIENT FLOODING IN AN ALLUVIAL CHANNEL. THIS ELEVATION IS THE REFERENCE FOR DEPTHS ON OR ALONG THE CHANNEL PROFILE AND STRUCTURES DESCRIBED IN THESE SHEETS.
 - B. THE BANKFULL BENCH IS A CONSTRUCTED FLOODPLAIN ADJACENT TO THE CHANNEL. THE BANKFULL BENCH IS CONSTRUCTED AT THE BANKFULL ELEVATION.
 - C. THE THALWEG IS THE LOWEST PORTION OF THE CHANNEL.
 - D. THE INNER BERM IS THE LOWER BENCH INSIDE THE CHANNEL TYPICALLY SUBMERGED UNDER LOW FLOW CONDITIONS.
 - E. THE VANE LENGTH IS THE STRAIGHT LINE DISTANCE BETWEEN THE VANE ARM AND A LINE TANGENT TO THE STREAMBANK AT THE POINT WHERE THE VANE ARM INTERSECTS THE STREAMBANK.
 - F. THE VANE ANGLE IS THE ANGLE BETWEEN THE VANE ARM AND A LINE TANGENT TO THE STREAMBANK AT THE POINT WHERE THE VANE ARM INTERSECTS THE STREAMBANK.
 - G. SOD MATS ARE GRASS AND WILLOW TRANSPLANTS THAT STILL CONTAIN ROOTING DEPTH. APPROXIMATELY 9-12IN OF DEPTH WILL BE NEEDED WHEN HARVESTING THE SOD MATS.
5. THE CONTRACTOR SHALL STAKE OUT THE PROPOSED STREAM CENTERLINE FOR REVIEW BY THE ENGINEER BEFORE INITIATING EXCAVATION. DEPENDING ON ENCOUNTERED CONDITIONS SOME SHIFTING OF THE STREAM CHANNEL MAY BE NECESSARY. ANY COST ASSOCIATED WITH CHANGING STRUCTURE LOCATIONS OR ALIGNMENT SHALL BE CONSIDERED INCIDENTAL TO CONSTRUCTION. STAKING MAY BE OMITTED FOR PORTIONS OF THE STREAM WHEN SURVEY-GRADE GPS IS USED TO CONSTRUCT THE CHANNEL. IF GPS IS USED IN LIEU OF STAKING THE CHANNEL IN THE FIELD, THE CONTRACTOR ASSUMES ALL RESPONSIBILITY FOR THE STREAM BEING CONSTRUCTED AS DESIGNED, INCLUDING ANY ISSUES RELATED TO PROJECTIONS, BASE POINTS OR CONVERSION OF DIGITAL TERRAIN MODELS.
6. PRIOR TO CLEARING AND GRUBBING, CONTRACTOR SHALL MARK THE LIMITS OF CLEARING FOR VERIFICATION OF INTENT BY THE ENGINEER. SOME MINOR ADJUSTMENT OF CHANNEL ALIGNMENT MAY BE REQUIRED TO PRESERVE TREES OR MINIMIZE IMPACTS.
7. ANY HARVESTING OF WILLOWS AND SOD FROM ONSITE MUST BE APPROVED BY THE ENGINEER.
8. CONTRACTOR SHALL MINIMIZE, TO THE MAXIMUM EXTENT POSSIBLE, IMPACTS TO THE ADJACENT TREES. CONSTRUCTION EQUIPMENT TRACKS AND PATHWAYS SHALL BE GRADED AND RECONTOURED AFTER CONSTRUCTION TO PREVENT RILL AND GULLY EROSION.
9. THE PROPOSED GRADING IS SHOWN ON THESE PLAN SHEETS. THE CONTRACTOR MAY EXTEND THE LIMITS OF DISTURBANCE ONLY WITH THE APPROVAL OF THE ENGINEER.
10. CONTRACTOR SHALL USE AN EXCAVATOR WITH A HYDRAULIC THUMB TO INSTALL INSTREAM STRUCTURES.
11. CHANNEL RELOCATION WORK SHALL BE COMPLETED AND STABILIZED PRIOR TO ALLOWING FLOW TO ENTER INTO THE NEWLY CONSTRUCTED STREAM CHANNEL. THE CONTRACTOR SHALL NOT OPEN UP MORE THAN 200 FEET OF CHANNEL WITHOUT EROSION CONTROL BLANKET IN PLACE OR BY APPROVAL OF THE ENGINEER.
12. THE PROPOSED STREAM CHANNEL SHALL BE CONSTRUCTED BY FIRST GRADING THE FLOODPLAIN ADJACENT TO THE CHANNEL TO THE ELEVATION INDICATED ON THESE PLANS. THIS MAY BE DONE AS GENERAL EXCAVATION. THE PROPOSED STREAM CHANNEL SHALL THEN BE EXCAVATED TO THE PROPER DEPTHS INDICATED ON THESE PLANS. THIS SHALL BE DONE AS SPECIALIZED EXCAVATION AND IS TYPICALLY ACCOMPLISHED WITH A TRACKED EXCAVATOR. THE PLAN AND

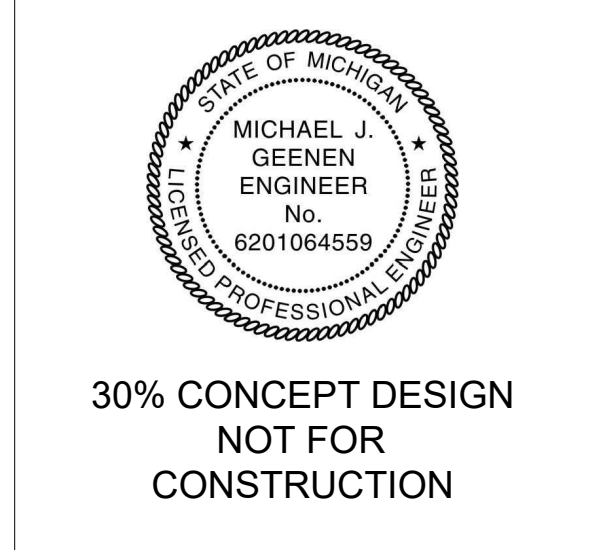
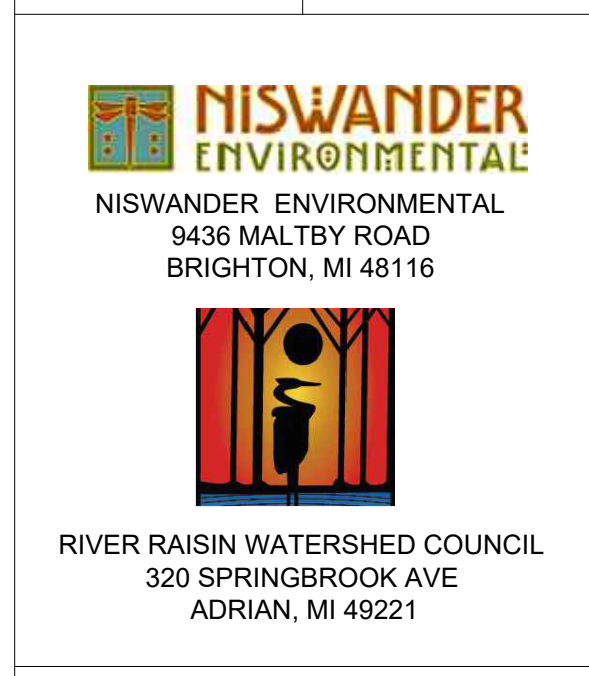
- PROFILES SHOWN PROVIDE WIDTHS AND SLOPES FOR CONSTRUCTING THE CHANNEL TO THE APPROPRIATE DIMENSIONS. THE THALWEG CAN FIRST BE EXCAVATED TO THE POINT INDICATED ON THE PROFILE. EXCAVATION AND FINE GRADING OF THE CROSS SECTIONS SHALL THEN BE PERFORMED AS SHOWN ON THE TYPICAL SECTIONS AND PROPOSED CONTOURS. ANY STOCKPILING OF MATERIALS OR "DOUBLE HANDLING" NECESSARY TO BUILD THE CHANNEL SHALL BE CONSIDERED INCIDENTAL TO CONSTRUCTION.
12. IF THE EXISTING GROUND IS LESS THAN 0.2 FEET HIGHER THAN THE PROPOSED BANKFULL ELEVATION, IT IS NOT NECESSARY TO EXCAVATE MATERIAL TO THE PROPOSED ELEVATION SHOWN ON THE PROFILE. IF THE GROUND IS LESS THAN 0.2 FEET LOWER THAN THE PROPOSED BANKFULL ELEVATION, IT IS NOT NECESSARY TO PLACE FILL TO THE PROPOSED ELEVATION SHOWN ON THE PROFILE.
 13. THE SURFACE OF ALL INSTREAM STRUCTURES SHALL BE FINISHED TO A SMOOTH LINE IN ACCORDANCE WITH THE LINES, GRADES, AND SECTIONS OR ELEVATIONS SHOWN ON THE PLANS. THE DEGREE OF FINISH FOR THE VANE SLOPES AND INVERT ELEVATIONS SHALL BE WITHIN 0.1 VERTICAL FEET OF THE GRADES AND ELEVATIONS INDICATED. ALL GAPS OR VOIDS BETWEEN THE ROCKS SHALL BE PLUGGED WITH SMALL GRAVEL TO FORM A TIGHT-FITTING SEAL TO PREVENT WATER FROM PENETRATING THE STRUCTURE.
 14. CONSTRUCTION SPECIFICATIONS FOR BANKFULL CHANNEL DIMENSIONS OR CROSS SECTIONS WILL BE HELD TO THE DIMENSIONS SHOWN ON THE TYPICAL SECTIONS. ELEVATIONS SHALL BE CONSTRUCTED WITHIN +/- 0.1 VERTICAL FEET; WIDTHS AND MEAN DEPTHS MUST FALL WITHIN THE RANGES SHOWN IN THE DRAWINGS.
 15. THE INSTREAM STRUCTURE BID ITEMS SHALL INCLUDE ALL LABOR AND MATERIALS NECESSARY TO CONSTRUCT THE STRUCTURE. BID ITEMS INCLUDE SEEDING, PLANTING, MULCH AND EROSION CONTROL BLANKETS AND INCLUDE ALL LABOR AND MATERIALS NECESSARY TO STABILIZE AREAS DISTURBED DURING CONSTRUCTION OF STRUCTURES. AFTER THE STRUCTURE IS COMPLETE AND FLOW IS RESTORED TO THE CHANNEL, SOME ADJUSTMENT TO THE STRUCTURE OR ADDITIONAL STABILIZATION MEASURES MAY BE NECESSARY TO ACHIEVE THE DESIRED EFFECT. ANY COSTS ASSOCIATED WITH THESE ADJUSTMENTS SHALL BE CONSIDERED INCIDENTAL TO CONSTRUCTION.
 16. THE CONSTRUCTED STREAM CHANNEL SHALL BE STABILIZED AS SOON AS POSSIBLE BY SEEDING IN ACCORDANCE WITH THE PLOT SCHEDULE, ADDING STRAW MULCH TO BARE SOIL, LOOSENING THE SOIL AS DIRECTED BY THE ON-SITE INSPECTOR, AND SEEDING OF THE BANKFULL BENCH SHALL BE IN ACCORDANCE WITH THE PLANTING PLAN.
 17. IF THE TIMING OF PROJECT IS SUCH THAT RIPARIAN SEED MIX CANNOT BE PLACED IN THE FALL, THEN THE CONTRACTOR SHALL SEED WITH TEMPORARY COVER ACCORDING TO THE EROSION AND SEDIMENT PLAN OR APPROVED BY THE ENGINEER UNTIL RIPARIAN MIX CAN BE SEEDED IN THE SPRING.
 18. THE HARVESTING AND INSTALLATION OF LIVE STAKES SHALL BE PERFORMED ONLY DURING THE DORMANT SEASON. CONTRACTOR SHALL NOTIFY ENGINEER 7 DAYS PRIOR TO HARVESTING TO REVIEW AND APPROVE ALL HARVESTING SITES. UPON APPROVAL BY ENGINEER, THE CONTRACTOR SHALL BE RESPONSIBLE FOR HARVESTING AND TRANSPORTING THE LIVE STAKE CUTTINGS TO THE JOB SITE.
 19. LIVE STAKES SHALL BE INSTALLED ALONG THE OUTSIDE MEANDER BEND AND ALONG RIFFLES WHERE INDICATED ON THE DRAWINGS AND DETAILS. LIVE STAKES SHALL BE INSTALLED INTO THE EROSION CONTROL BLANKET IN ADDITION TO THE DEAD STAKES.
 20. EXCESS SPOIL MATERIAL MAY BE SPREAD AND GRADED ONSITE OR IN THE ONSITE PIT AS APPROVED BY THE ENGINEER. PLACEMENT OF ANY ON-SITE OR OFF-SITE SPOIL MATERIAL SHALL BE CONSIDERED INCIDENTAL TO CONSTRUCTION.
 21. TOPSOIL SHALL BE REMOVED FROM EXCAVATION AND SPOIL AREAS AND STOCKPILED PRIOR TO CUT OR FILL AND RE-APPLIED TO AREAS AFTER ROUGH GRADING IS COMPLETE. SIX INCHES OF TOPSOIL SHALL BE PLACED ON DISTURBED AREAS TO MEET GRADE. STOCKPILING AND PLACEMENT OF TOPSOIL SHALL BE CONSIDERED INCIDENTAL TO CONSTRUCTION AND APPROVED BY THE ENGINEER.
 22. SPOIL AREAS SHALL BE SEEDED WITH TEMPORARY VEGETATION WITHIN 7 DAYS FOLLOWING GRADING.
 23. THE PLACEMENT OF STRAW MULCH SHALL OCCUR A MAXIMUM 48 HOURS AFTER SEEDING. MULCH WILL BE SPREAD TO COVER THE INSTALLED AREAS AT A MINIMUM RATE OF 1.5 TONS PER ACRE. MULCH SHALL BE KEPT OUT OF THE CROWNS OF SHRUBS AND GROUND COVER.
 24. IF SOFT SOILS ARE ENCOUNTERED WHEN RECONSTRUCTING STREAM BANKS, RESTORE BANK WITH SOD MAT COVERING ALONG RIFFLES AND WOOD TOE SOD MAT ALONG BENDS OR ANOTHER APPROVED

- ALTERNATIVE FROM THE ON-SITE INSPECTOR/ENGINEER..
25. CONTRACTOR SHALL CALL FOR UTILITY MARKING AT LEAST 48 HOURS PRIOR TO START OF CONSTRUCTION.
 26. IT MAY BE NECESSARY FOR THE CONTRACTOR TO CONTACT THE COUNTY CLERK TO DETERMINE WHAT UTILITY COMPANIES HAVE FACILITIES IN THE PROJECT AREA. LOCATING UTILITIES IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR. THE ENGINEER AND PROJECT OWNER WILL NOT BE RESPONSIBLE FOR ANY DAMAGES TO UTILITIES.
 27. CONTRACTOR SHALL UTILIZE NATIVE MATERIAL FROM THE SITE WHERE AVAILABLE AND ALLOWED BY THE ENGINEER. NATIVE MATERIAL THAT CAN BE FOUND ON SITE INCLUDE TREES THAT CAN PROVIDE LIVE STAKES AND TREES THAT CAN BE USED FOR LOG STRUCTURES AND WOOD DEBRIS.
 27. AFTER CONSTRUCTION, THE ROADS LEADING TO CONSTRUCTION ACCESS POINT SHALL BE RESTORED TO AS GOOD OR BETTER CONDITION THAN BEFORE CONSTRUCTION AT THE ENGINEER'S DISCRETION.
 28. FOOTER DEPTH ON ALL STRUCTURES REQUIRING FOOTERS SHALL BE AT LEAST 6 TIMES GREATER THAN THE DROP BETWEEN THE STRUCTURE AND THE FOOTERED STRUCTURE DIRECTLY UPSTREAM OR APPROVED BY THE ONSITE ENGINEER.
- EROSION/SEDIMENTATION CONTROL NOTES:
1. ALL CONTROL MEASURES SHALL BE CHECKED, AND REPAIRED AS NECESSARY, MONTHLY IN DRY PERIODS, AND WITHIN 24 HOURS AFTER ANY RAINFALL AT THE SITE. DAILY CHECKING AND, IF NECESSARY, REPAIRING SHALL BE DONE DURING PROLONGED RAINFALLS. THE PERMITTEE SHALL MAINTAIN WRITTEN RECORDS OF SUCH CHECKS AND REPAIRS ON-SITE AT ALL TIMES, AND RECORDS SHALL BE SUBJECT TO INSPECTION AT ANY REASONABLE TIME.
 2. THE CONSTRUCTION ACCESS POINTS SHALL BE MAINTAINED AS REQUIRED TO PREVENT SILT/SEDIMENT FROM LEAVING THE SITE. THIS INCLUDES BUT IS NOT LIMITED TO WASH DOWN OF THE CONSTRUCTION ACCESS POINTS, INSTALLING AND UTILIZING A VEHICLE WASH DOWN AREA, INSTALLING ADDITIONAL STONE, ETC.
 3. ANY AND ALL SILT/SEDIMENTATION SHALL BE FREQUENTLY REMOVED FROM THE SILT FENCE, DITCHES, CHECK DAMS AND RETENTION AREAS AND AT THE END OF CONSTRUCTION. THESE AREAS SHALL BE COMPLETELY FREE OF SILT/SEDIMENTATION AND SHALL BE STABILIZED AS STATED IN THE PLANS AND SPECIFICATIONS.
 4. EROSION AND SEDIMENT CONTROL BEST MANAGEMENT PRACTICES (BMP'S) ALONG THE PERIMETER OF THE DISTURBED AREAS SHALL BE INSTALLED PRIOR TO DISTURBANCE ACTIVITY. OTHER BMP'S SHALL BE INSTALLED AS SOON AS CONSTRUCTION SEQUENCES ALLOW.
 5. TEMPORARY DIVERSION OF RUNOFF/RUNON WATER SHALL BE INSTALLED AS NEEDED TO FACILITATE CONSTRUCTION OR AS DIRECTED ON-SITE BY THE ENGINEER.
 6. ALL DISTURBED AREAS SHALL BE PERMANENTLY STABILIZED IMMEDIATELY AFTER THE COMPLETION OF THE FINAL GRADING OPERATION. AREAS REQUIRING COIR MATTING SHALL BE SEEDED AND MULCHED FOR STABILIZATION PRIOR TO THE INSTALLATION OF THE MATTING.
 7. TEMPORARY STABILIZATION OF DISTURBED AREAS MUST BE INITIATED IMMEDIATELY WHENEVER WORK TOWARD PROJECT COMPLETION AND FINAL STABILIZATION OF ANY PORTION OF THE SITE HAS TEMPORARILY CEASED AND WILL NOT RESUME FOR A PERIOD EXCEEDING THIRTEEN (13) CALENDAR DAYS. THOSE AREAS SHALL BE SEEDED AND MULCHED IN ACCORDANCE WITH THE PLANS AND SPECIFICATIONS.
 8. NECESSARY MEASURES SHALL BE TAKEN TO PRODUCE AND MAINTAIN AN ACCEPTABLE STAND OF GRASS. SAID MEASURES TO INCLUDE (BUT NOT LIMITED TO) WATERING, RE-SEEDING, REGRADING ERODED AREAS, RE-FERTILIZING, ETC.
 9. CONTRACTOR IS RESPONSIBLE FOR KEEPING MUD AND DEBRIS OFF CITY ROADS AND ROW'S. CLEANUP IS REQUIRED DAILY.
 10. ALL TEMPORARY MEASURES SHALL BE REMOVED ONCE ACCEPTABLE PERMANENT STABILIZATION IS ACHIEVED. THE ENGINEER SHALL DETERMINE IF THE PERMANENT STABILIZATION IS ACCEPTABLE.
 11. ALL EROSION AND SEDIMENT CONTROL MEASURES SHALL BE DESIGNED AND INSTALLED USING APPLICABLE BMP'S AND IN ACCORDANCE WITH CONDITIONS OF APPROVAL LISTED IN REGULATORY APPROVALS. IF CONFLICTS ARISE BETWEEN THESE REQUIREMENTS, THE MORE STRINGENT SHALL APPLY.
 12. CONTRACTOR SHALL KEEP A COPY OF THE APPLICABLE BMP'S AND REGULATORY PERMITS/APPROVALS ON SITE AT ALL TIMES FOR THE

- LIFE OF THE PROJECT.
- SEQUENCE OF CONSTRUCTION NOTES:
1. PERFORM THE NECESSARY ACTIVITIES RELATED TO HAVING A CONSTRUCTION ACCESS POINT PRIOR TO MOBILIZING AND STAGING EQUIPMENT ON SITE. SEE CONSTRUCTION ACCESS POINT DETAIL ON SHEET ##.
 2. ONCE THE CONSTRUCTION ACCESS POINTS ARE CREATED, BEGIN TO MOBILIZE THE CONSTRUCTION EQUIPMENT ONTO THE SITE STAGING AREA.
 3. ONCE STEP 2 IS COMPLETE, IMPLEMENT ALL OF THE EROSION AND SEDIMENT CONTROL MEASURES AS SHOWN ON THE PLANS. SEE EROSION AND SEDIMENT CONTROL PLANS ON SHEET ## AND ## FOR DETAILS.
 4. BEGIN TO PERFORM THE CLEARING AND GRUBBING THAT IS REQUIRED WITHIN THE LIMITS OF DISTURBANCE ON THE SITE.
 5. ONCE THE CLEARING AND GRUBBING IS COMPLETED, BEGIN TO PERFORM A ROUGH GRADING OF THE CHANNEL WITH THE CONSTRUCTION EQUIPMENT TO THE DESIGN ELEVATIONS INDICATED ON THE PLAN AND PROFILE SHEETS FOUND ON PAGES ##. SEE TYPICAL SECTION DETAILS ON SHEET ##.
 6. BEGIN TO INSTALL THE GRADE CONTROL STRUCTURES ALONG THE GRADED CHANNEL AT REQUIRED LOCATIONS INDICATED IN THE PLAN AND PROFILE SHEETS. SEE BOULDER CONSTRUCTED RIFFLE AND TOEWOOD WITH SOD MATS DETAIL ON SHEETS ## AND ## RESPECTIVELY.
 7. ONCE ALL GRADE CONTROL STRUCTURES HAVE BEEN INSTALLED AT THE SITE, BEGIN TO PERFORM GRADING OF THE BANKFULL BENCH TO THE DESIGN ELEVATION INDICATED ON THE PLAN AND PROFILE SHEETS.
 8. ONCE THE BANKFULL BENCH HAS BEEN GRADED TO DESIGN SPECIFICATION, MOVE ALL EQUIPMENT TO STAGING AREAS.
 9. PERFORM THE MULCHING, SEEDING, PLANTING OPERATIONS ASSOCIATED WITH THE PLANTING PLAN SHEET FOUND ON PAGE ##, TAKING CARE TO MINIMIZE DISTURBANCE TO THE GRADED BANKFULL BENCH. SEE PLANTING PLAN DETAIL ON SHEET
- OTHER NOTES:
1. THE ELEVATIONS SHOWN HEREIN ARE BASED ON DATA SURVEY THAT ENCOMPASSES THE EXISTING GROUND SURFACE FROM WHICH ALL COMPUTATIONS FOR CUT/FILL ARE BASED. SLIGHT DISCREPANCIES BETWEEN THE EXISTING GROUND DIGITAL SURFACE AND FIELD CONDITIONS CAN RESULT IN SIGNIFICANT VARIATIONS IN TOTAL EXCAVATED QUANTITIES. THUS, THE CONTRACTOR SHALL COMPARE QUANTITIES OF MATERIAL EXCAVATED TO THOSE SHOWN ON THE PLANS TO MANAGE THE MOVEMENT OF MATERIAL ACROSS THE SITE.
 2. THE AGREED UPON INTENT OF THIS GRADING PLAN IS TO MAINTAIN A "LIVE" SURFACE SO THAT ANY CHANGES THAT ARISE DURING CONSTRUCTION CAN BE QUICKLY ENCOMPASSED INTO THE THREE-DIMENSIONAL SURFACE GENERATED DURING THIS DESIGN PROCESS. AS SUCH, FINE TUNING OF THE SURFACE THAT WOULD ELIMINATE THE APPEARANCE OF JAGGED CONTOUR LINES WHERE SLIGHT VARIATIONS BETWEEN THE EXISTING AND PROPOSED SURFACES WAS NOT COMPLETED.
 3. ALL HAZARDOUS SUBSTANCES USED FOR THIS PROJECT (PAINT, OIL, GREASE, AND OTHER PETROLEUM PRODUCTS) SHALL BE STORED IN ACCORDANCE WITH AN APPROVED SPILL RESPONSE AND CONTROL PLAN. THESE SUBSTANCES SHALL BE STORED AWAY FROM DRAINS AND DITCHES IN WATERTIGHT CONTAINERS. DISPOSAL OF THESE SUBSTANCES SHALL BE APPROVED BY AN OWNER OF 5SSR. DAILY INSPECTIONS SHALL BE PERFORMED FOR LEAK DETECTION. IF LEAKS OCCUR, APPROPRIATE ACTION SHALL BE TAKEN TO CONTAIN AND REMEDIATE THE SPILL. ADEQUATE TRASH CONTAINERS SHALL BE KEPT ON SITE FOR THE DISPOSAL OF CONSTRUCTION MATERIAL WASTE. NECESSARY MEASURES SHALL BE TAKEN TO PREVENT ANY GARBAGE OR OTHER POLLUTANTS FROM ENTERING THE "WATERS OF UNITED STATES."
 4. THE CONTRACTOR WILL BE PROVIDED WITH A 2000 FORMAT DWG FILE, LN3 AND TN3 FILES OF THE GRADING PLAN LINework AND SURFACE.

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RIVER RAISIN - MILL STREET
 BROOKLYN DAM RESTORATION
 NEAR BROOKLYN
 JACKSON COUNTY, MI
 NOT FOR CONSTRUCTION
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 RIVER RAISIN AND KEDRON DRAIN
 NOTES SHEET

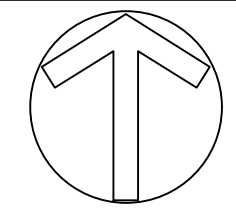


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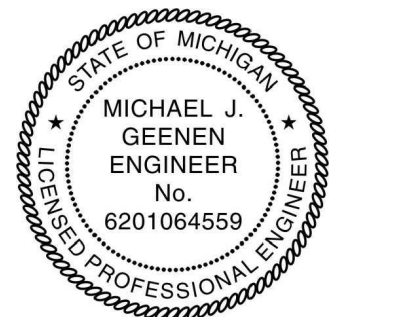
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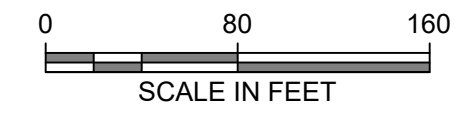
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RIVER RAISIN - MILL STREET
 BROOKLYN DAM RESTORATION
 NEAR BROOKLYN
 JACKSON COUNTY, MI
 NOT FOR CONSTRUCTION
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 RIVER RAISIN AND KEDRON DRAIN
 PROJECT PLAN VIEW



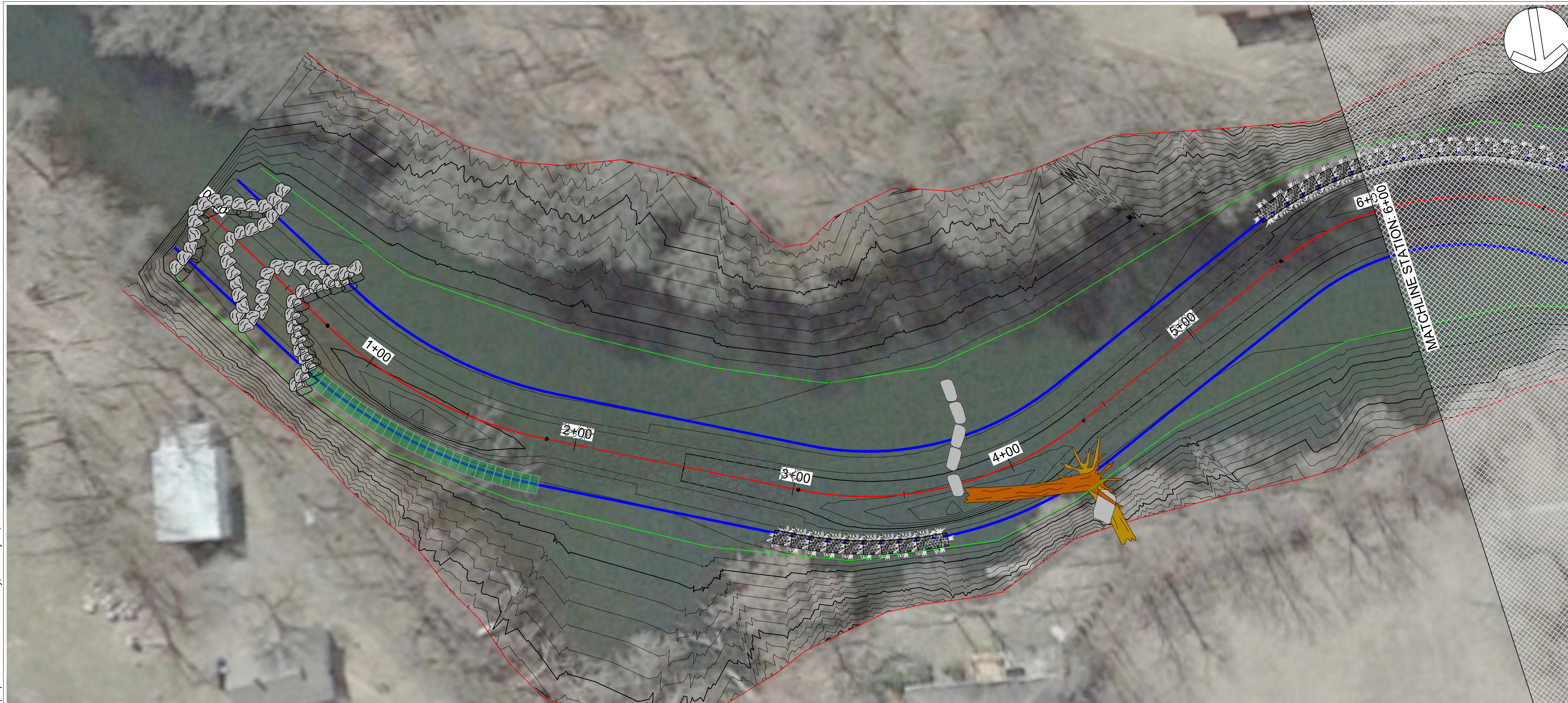
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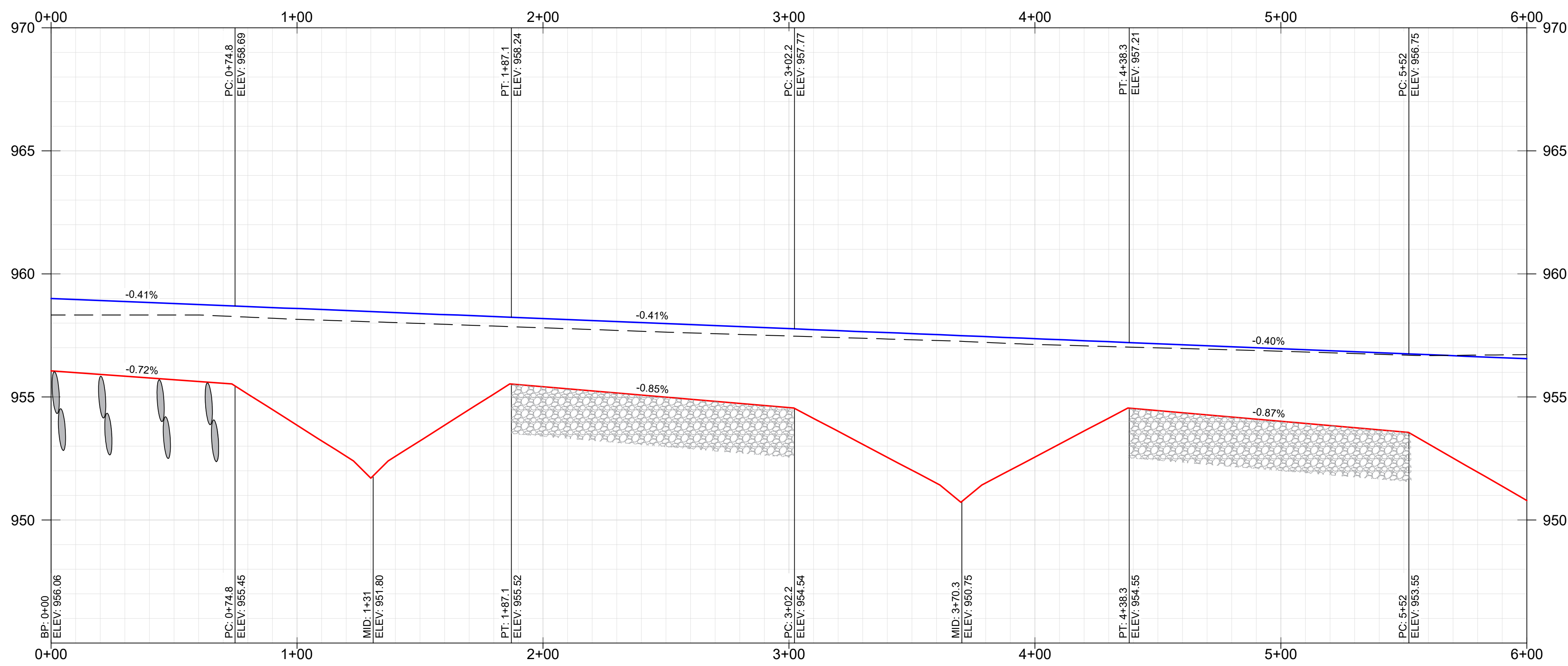
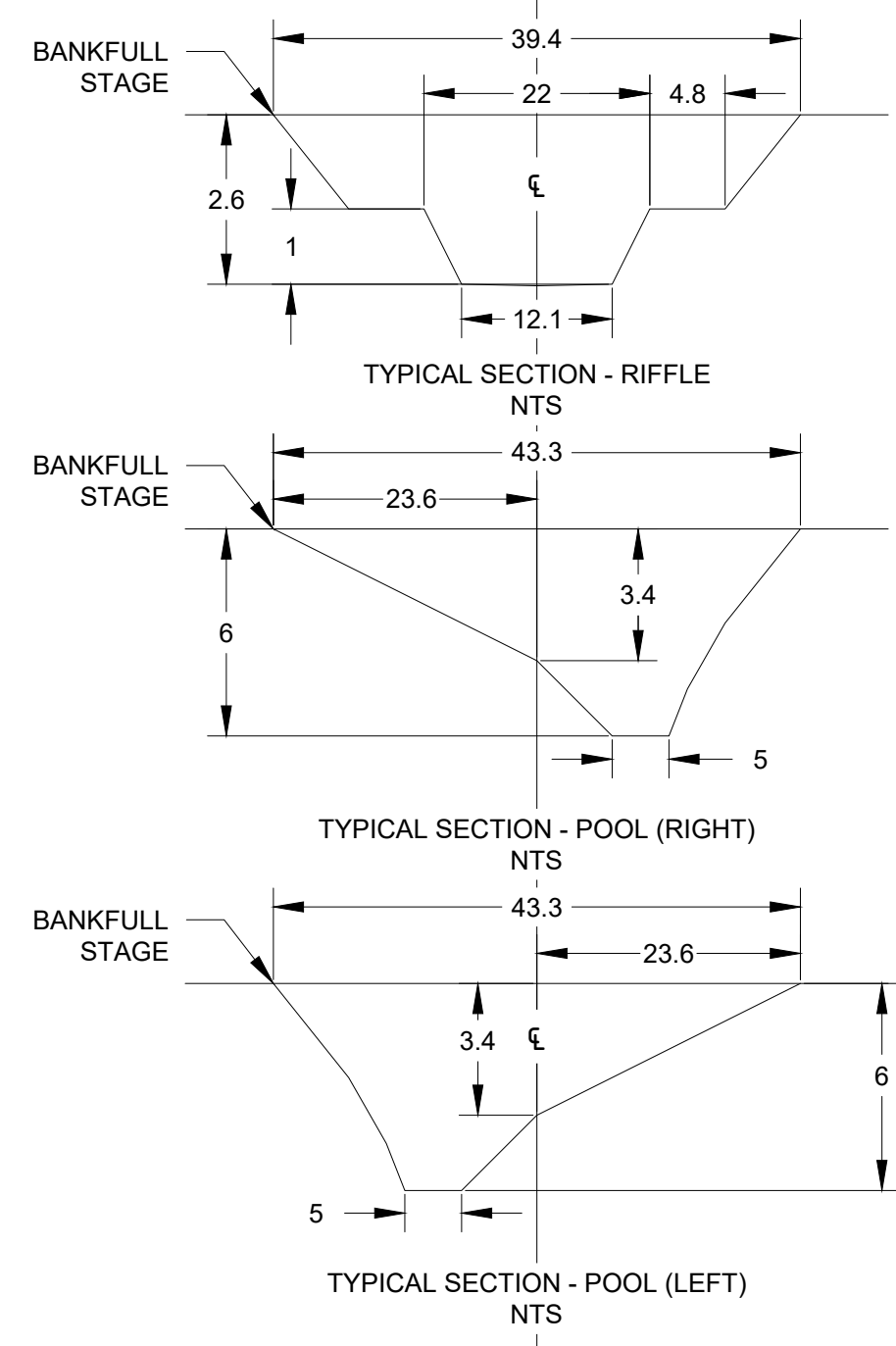


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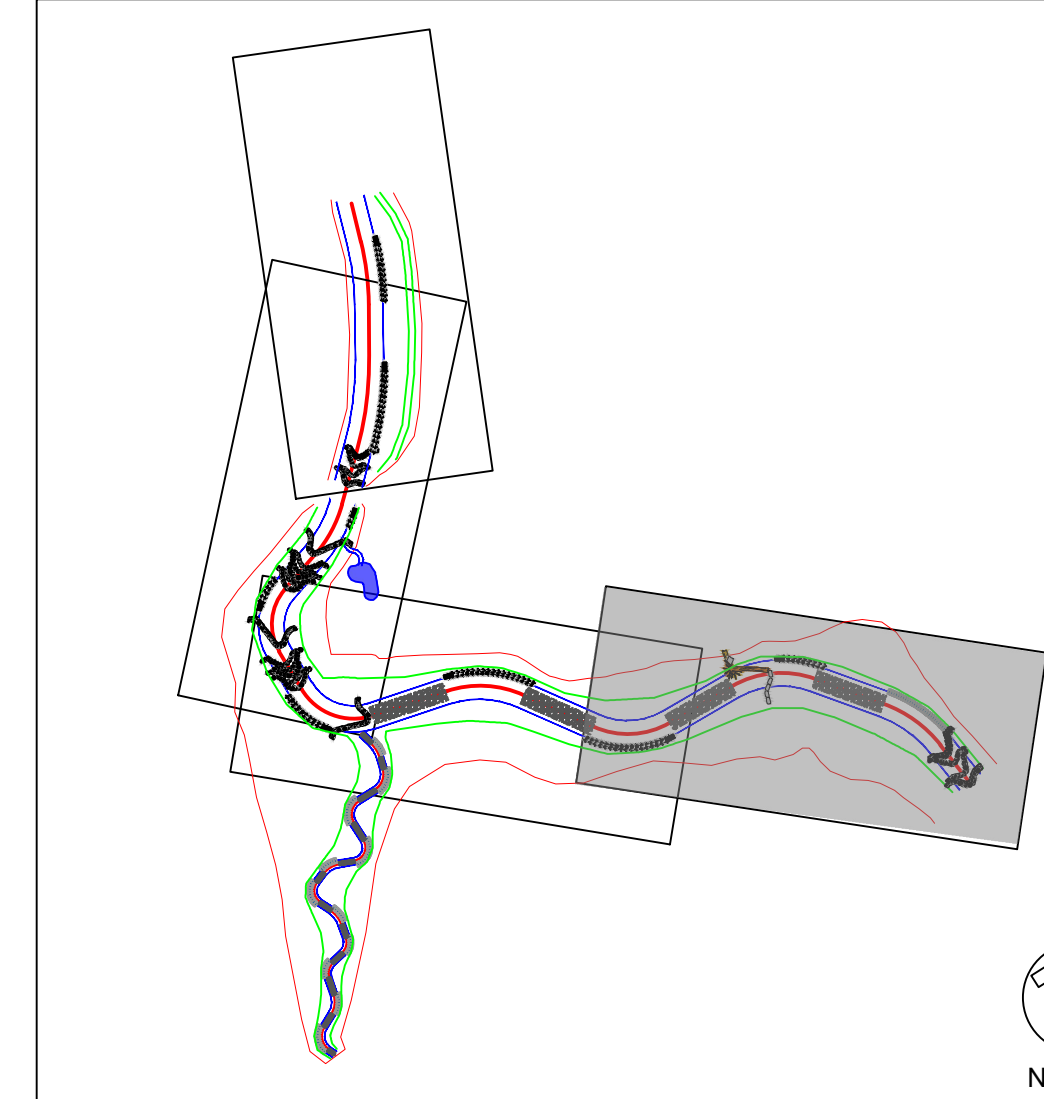
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- PLAN LEGEND**
- PROPOSED STREAM CENTER LINE
 - PROPOSED GEOMORPHIC CHANNEL TOB
 - (483) PROPOSED MAJOR CONTOUR
 - PROPOSED MINOR CONTOUR
 - 479 EXISTING MAJOR CONTOUR
 - EXISTING MINOR CONTOUR
 - LOG OR ROCK J-HOOK
 - BOULDER RIFFLE GRADE CONTROL
 - TOE WOOD
 - AUGMENTED RIFFLE
- PROFILE LEGEND**
- PROPOSED STREAM CENTER LINE
 - PROPOSED BANKFULL TOB
 - EXISTING GROUND



Raisin River Design Alignment - SCALE: HOR 1" = 30'; VERT 1" = 3'



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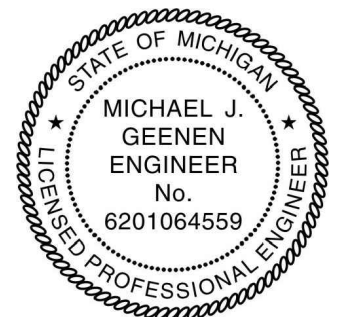
RIVER RAISIN - MILL STREET
 BROOKLYN DAM RESTORATION
 NEAR BROOKLYN
 JACKSON COUNTY, MI

NOT FOR CONSTRUCTION
 30% CONCEPT DESIGN - DRAFT
 RIVER RAISIN
 PLAN PROFILE SHEET 1

NISWANDER ENVIRONMENTAL
 NISWANDER ENVIRONMENTAL
 9436 MALTBY ROAD
 BRIGHTON, MI 48116

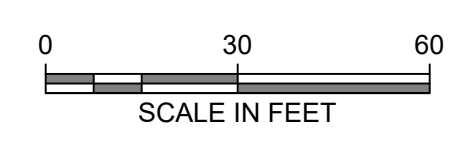


RIVER RAISIN WATERSHED COUNCIL
 320 SPRINGBROOK AVE
 ADRIAN, MI 49221

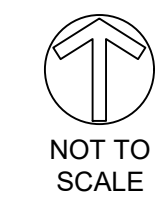


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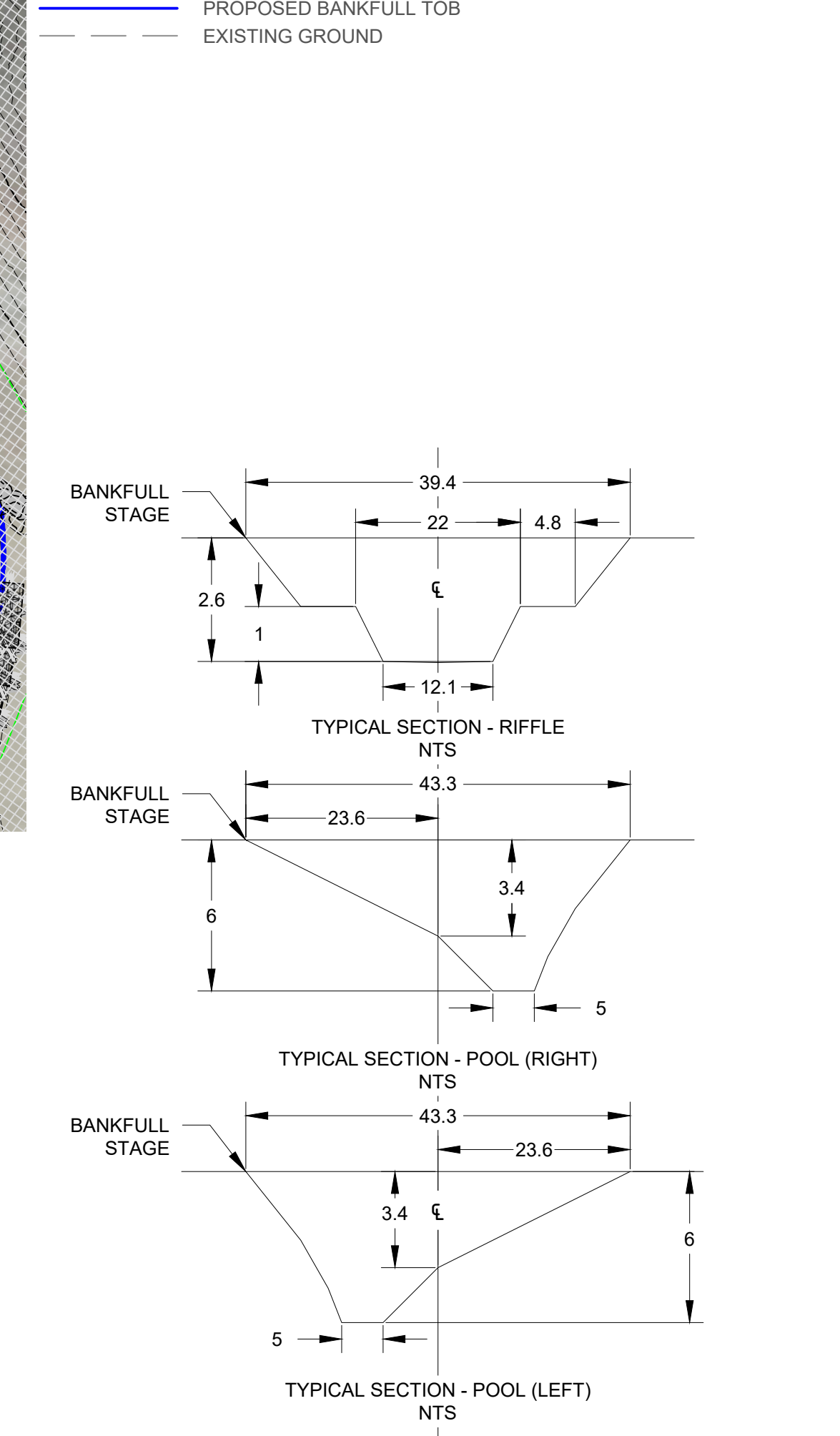
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REV	DESCRIPTION	APPRV
1	30% CONCEPT DESIGN	XX
		XX
		XX
		XX
		XX
		XX
		XX
		XX
		XX

RIVER RAISIN - MILL STREET BROOKLYN DAM RESTORATION NEAR BROOKLYN JACKSON COUNTY, MI	
NOT FOR CONSTRUCTION 30% CONCEPT DESIGN - DRAFT RIVER RAISIN PLAN PROFILE SHEET 2	



NISWANDER ENVIRONMENTAL
NISWANDER ENVIRONMENTAL
9436 MALTBY ROAD
BRIGHTON, MI 48116

RIVER RAISIN WATERSHED COUNCIL
320 SPRINGBROOK AVE
ADRIAN, MI 49221

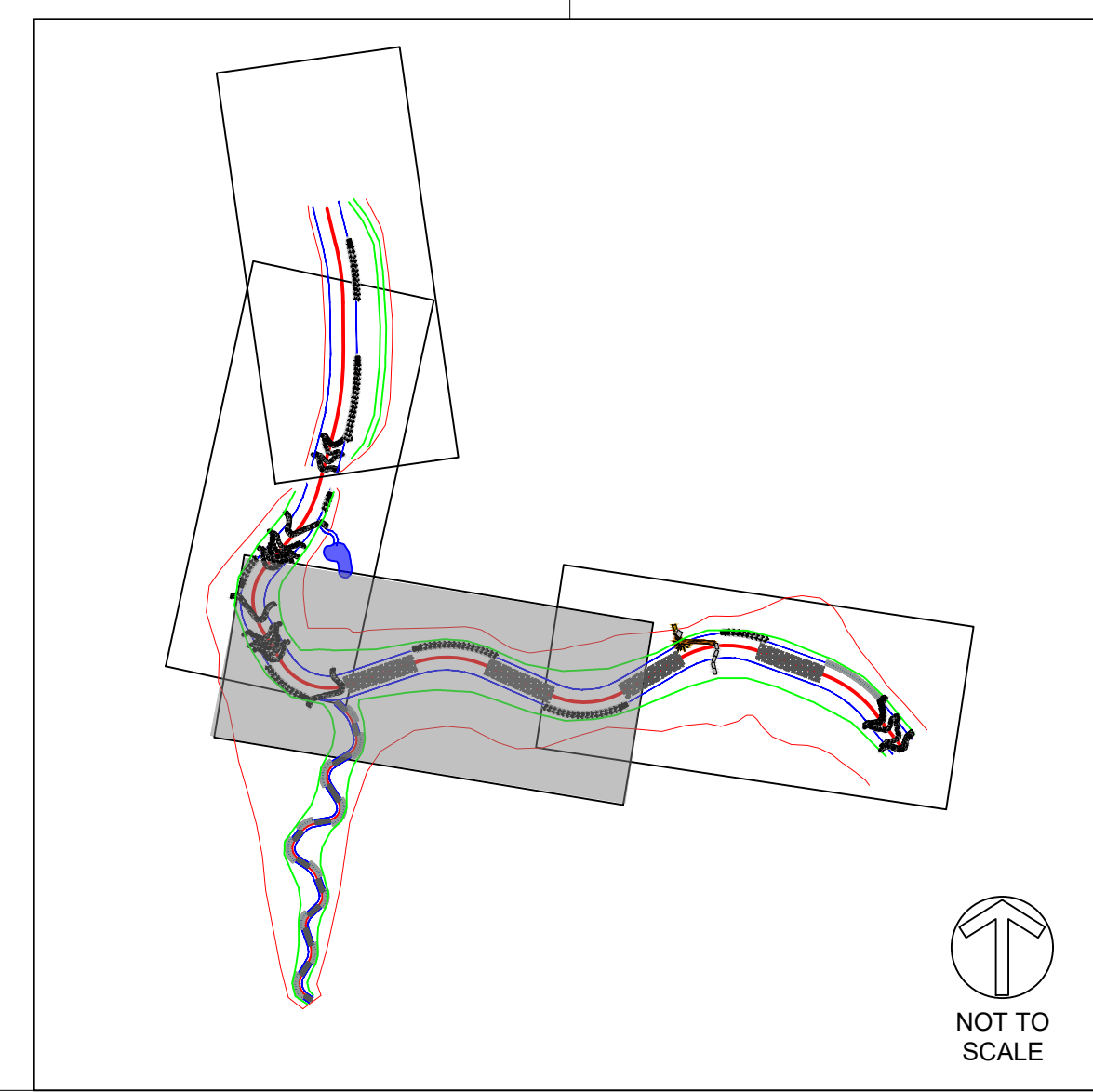
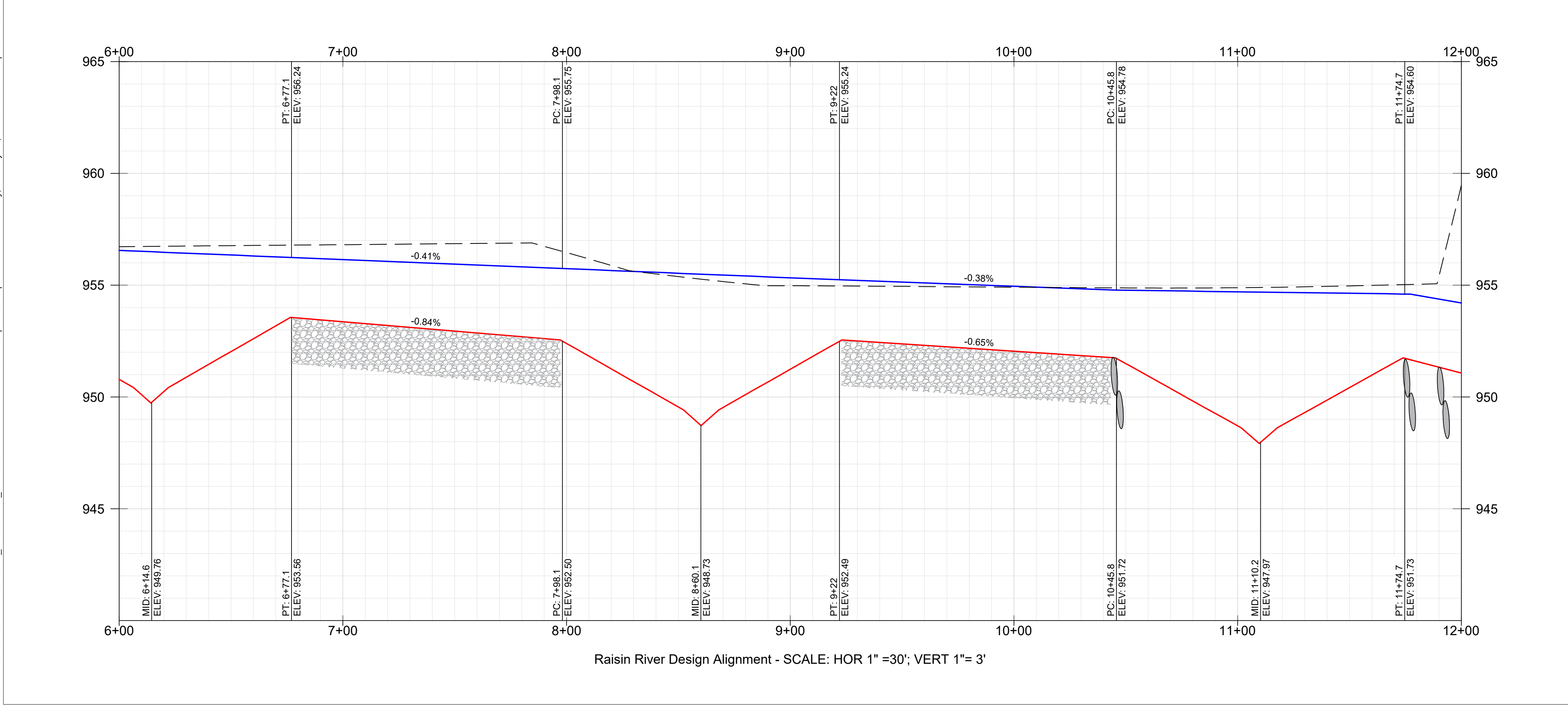
STATE OF MICHIGAN
MICHAEL J. GEENEN
ENGINEER
No. 6201064559
LICENSED PROFESSIONAL ENGINEER

30% CONCEPT DESIGN
NOT FOR CONSTRUCTION

DATE: 01/11/2023
SCALE (34"X22"): 1" = 30'
SCALE (17"X11"): 1" = 60'

0 30 60
SCALE IN FEET

SHEET NUMBER
4 OF 17

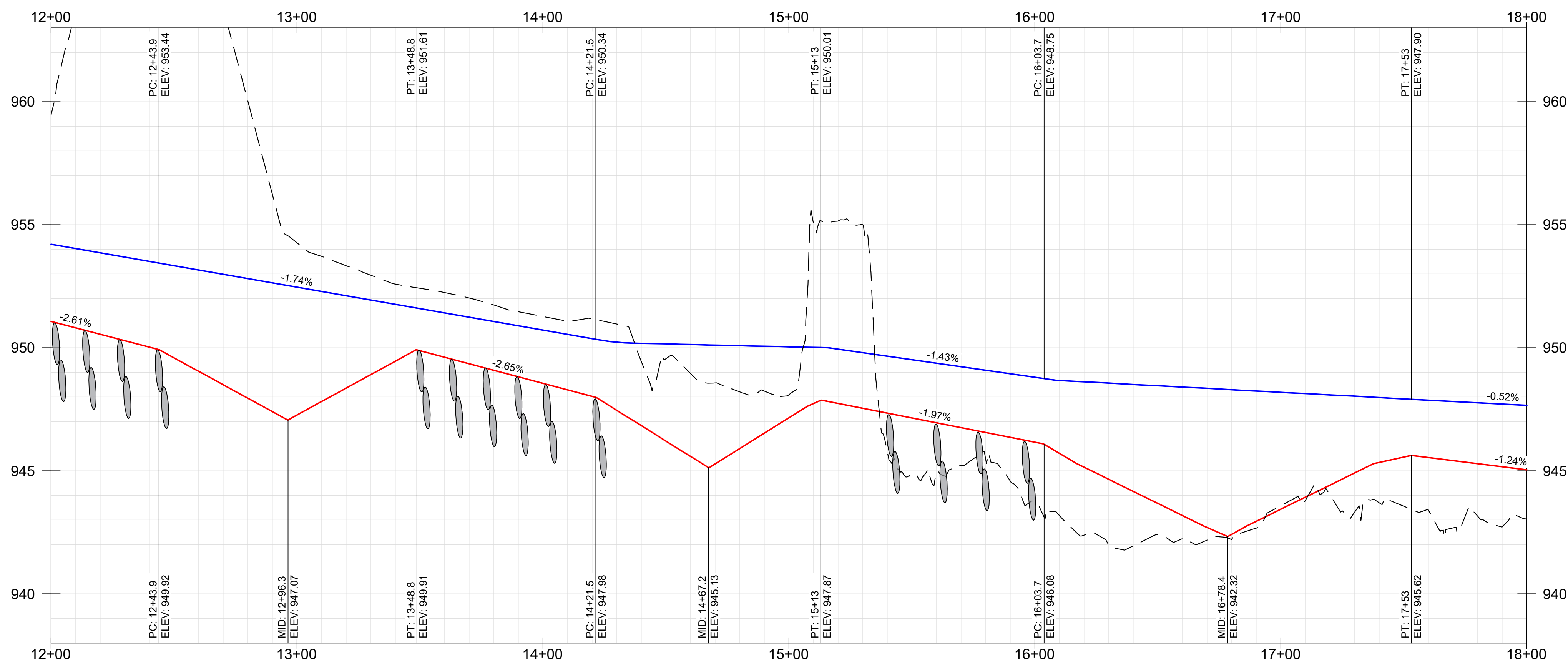
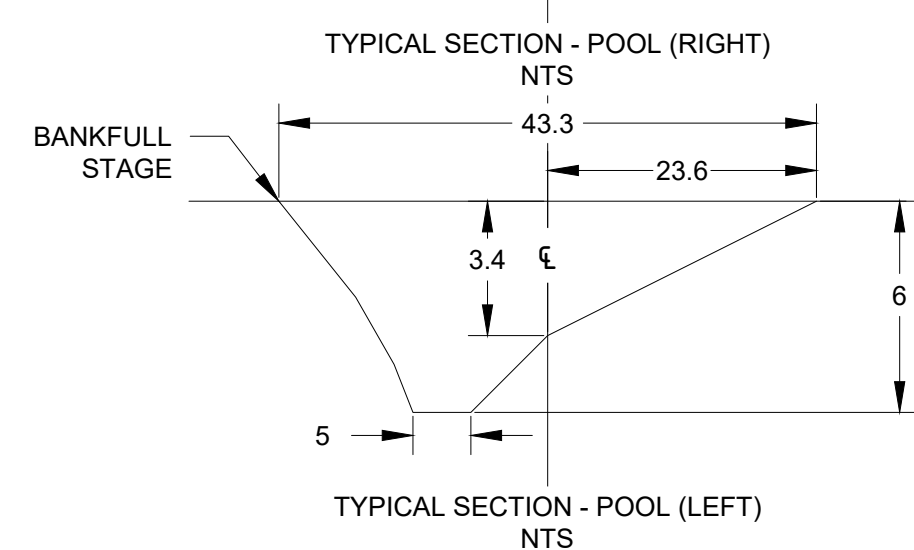
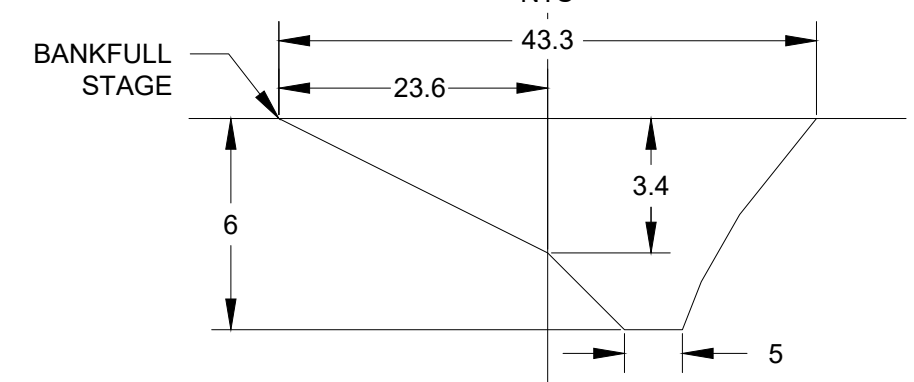
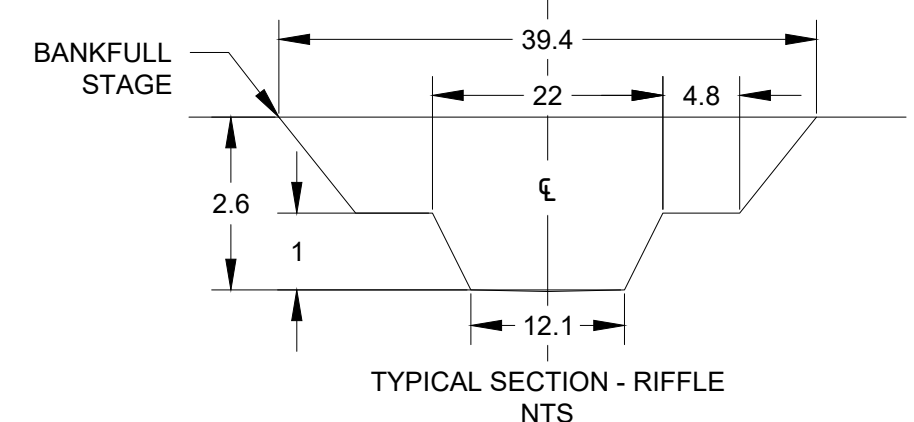


C:\USERS\MICHAID\PROBOX2022\BROOKLYN DAM\C3D\SHEETS\PLANPRO.DWG | MICHA | SAVED: Wednesday, January 11, 2023 2:23:04 PM | ACAD CTB | PLOTTED: Wednesday, January 11, 2023 3:14:32 PM

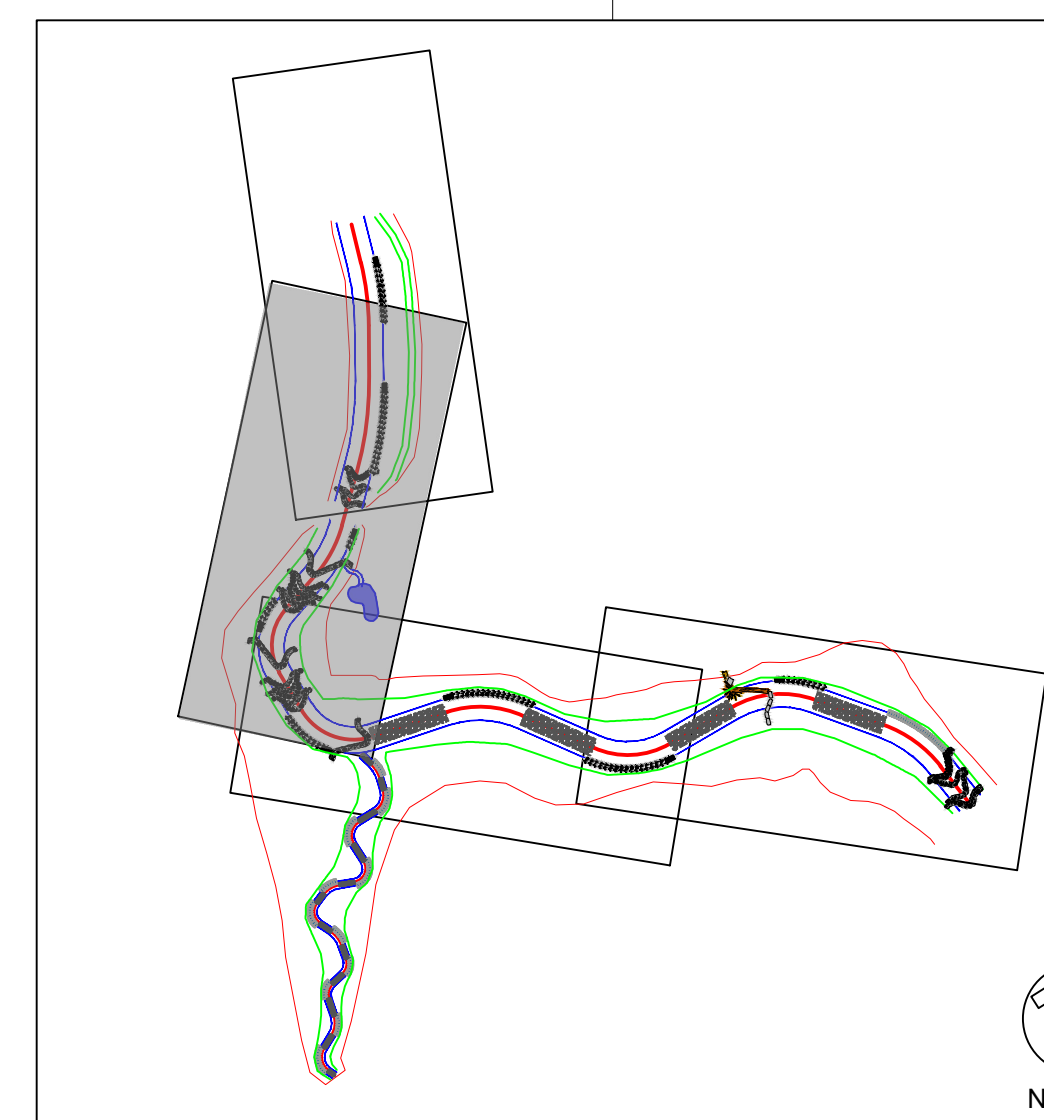


- PLAN LEGEND**
- PROPOSED STREAM CENTER LINE
 - PROPOSED GEOMORPHIC CHANNEL TOB
 - (483) PROPOSED MAJOR CONTOUR
 - PROPOSED MINOR CONTOUR
 - 479 EXISTING MAJOR CONTOUR
 - EXISTING MINOR CONTOUR
 - LOG OR ROCK J-HOOK
 - BOULDER RIFFLE GRADE CONTROL
 - TOE WOOD
 - AUGMENTED RIFFLE

- PROFILE LEGEND**
- PROPOSED STREAM CENTER LINE
 - PROPOSED BANKFULL TOB
 - - - EXISTING GROUND



Raisen River Design Alignment - SCALE: HOR 1" = 30'; VERT 1" = 3'

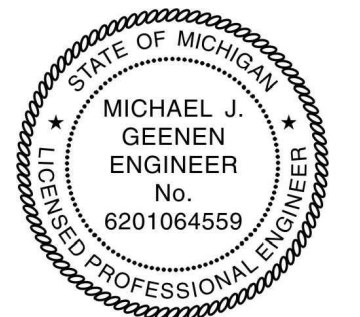


APPROVED BY: MUG	CHECKED BY: CB	DRAWN BY: MUG
XX	30% CONCEPT DESIGN	XX
XX		XX
XX		XX
XX		XX
XX		XX
XX		XX
XX		XX
XX		XX
XX		XX
XX		XX
XX		XX

**RIVER RAISIN - MILL STREET
 BROOKLYN DAM RESTORATION
 NEAR BROOKLYN
 JACKSON COUNTY, MI**
 NOT FOR CONSTRUCTION
 30% CONCEPT DESIGN - DRAFT
 RIVER RAISIN
 PLAN PROFILE SHEET 3

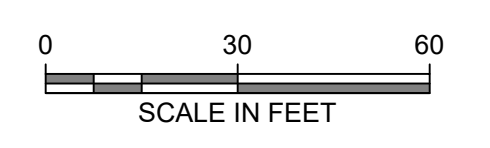


RIVER RAISIN WATERSHED COUNCIL
320 SPRINGBROOK AVE
ADRIAN, MI 49221

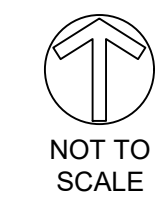


30% CONCEPT DESIGN
NOT FOR
CONSTRUCTION

DATE: 01/11/2023
SCALE (34"X22"): 1" = 30'
SCALE (17"X11"): 1" = 60'



SHEET NUMBER
5 OF 17



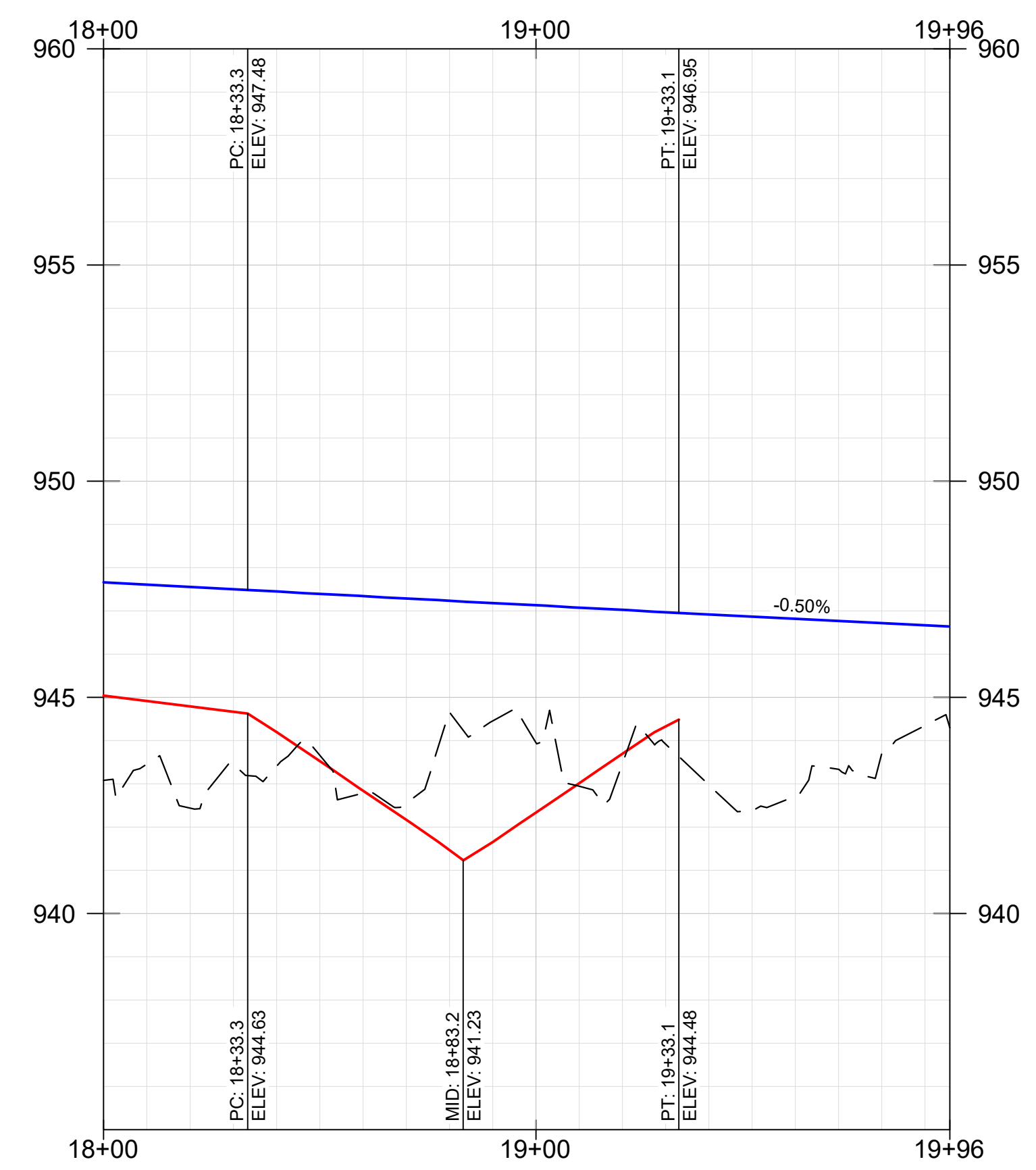
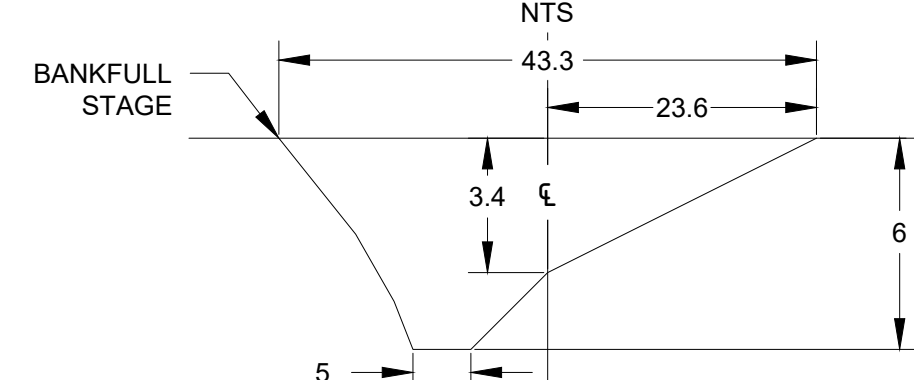
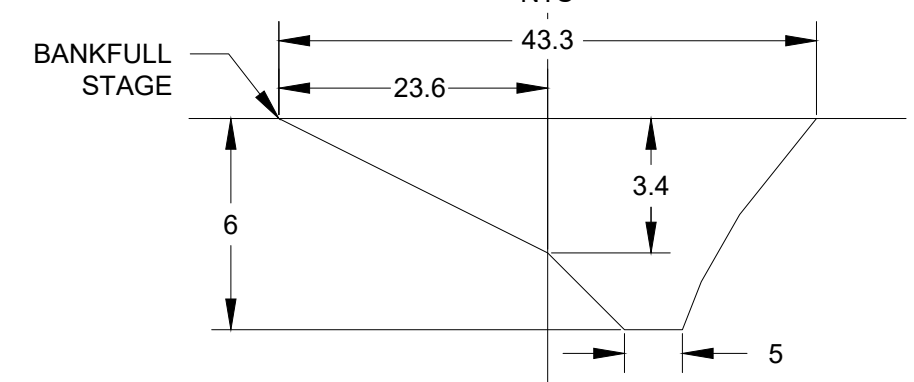
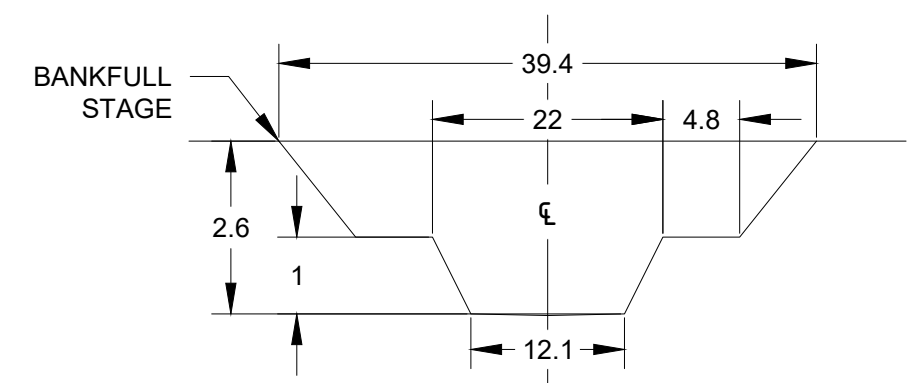
NOT TO SCALE

C:\USERS\MICHAID\PROJ\2022_BROOKLYN_DAM\3DSHEETS\PLANPRO.DWG | MICHA | SAVED: Wednesday, January 11, 2023 2:23:04 PM | ACAD.CTB | PLOTTED: Wednesday, January 11, 2023 3:14:56 PM

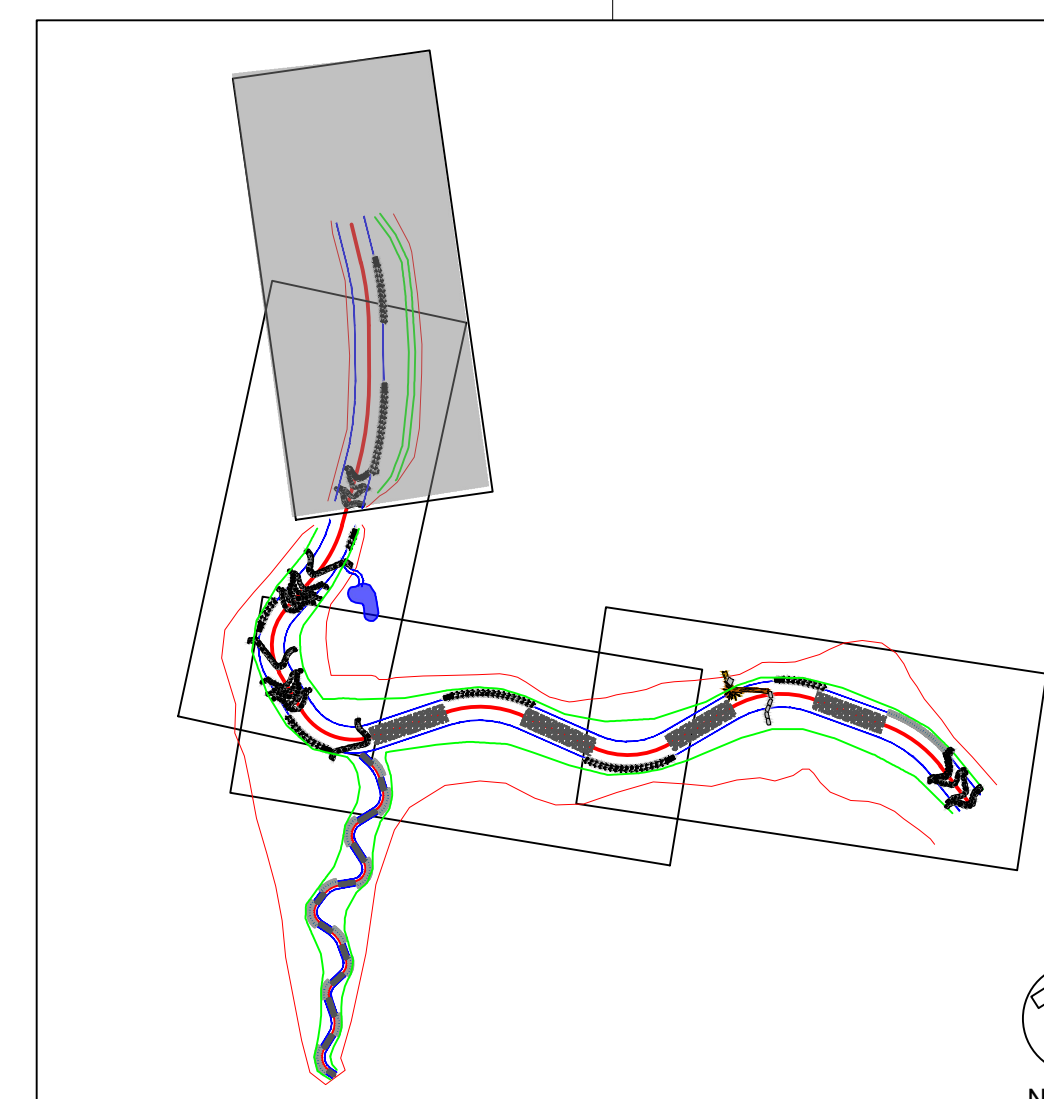


- PLAN LEGEND**
- PROPOSED STREAM CENTER LINE
 - PROPOSED GEOMORPHIC CHANNEL TOB
 - (483) PROPOSED MAJOR CONTOUR
 - PROPOSED MINOR CONTOUR
 - 479 EXISTING MAJOR CONTOUR
 - EXISTING MINOR CONTOUR
 - LOG OR ROCK J-HOOK
 - BOULDER RIFFLE GRADE CONTROL
 - TOE WOOD
 - AUGMENTED RIFFLE

- PROFILE LEGEND**
- PROPOSED STREAM CENTER LINE
 - PROPOSED BANKFULL TOB
 - - - EXISTING GROUND

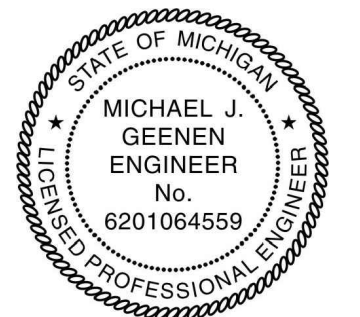


Raisen River Design Alignment - SCALE: HOR 1" = 30'; VERT 1" = 3'



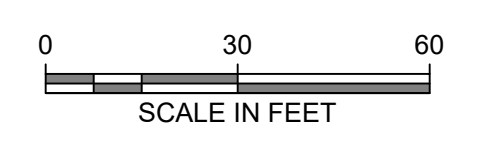
APPROVED BY: MUG	CHECKED BY: CB	DRAWN BY: MUG
APPROV	DESCRIPTION	
1	30% CONCEPT DESIGN	XX
XX		XX
XX		XX
XX		XX
XX		XX
XX		XX
XX		XX
XX		XX
XX		XX
XX		XX

**RIVER RAISIN - MILL STREET
 BROOKLYN DAM RESTORATION
 NEAR BROOKLYN
 JACKSON COUNTY, MI**
 NOT FOR CONSTRUCTION
 30% CONCEPT DESIGN - DRAFT
 RIVER RAISIN
 PLAN PROFILE SHEET 4



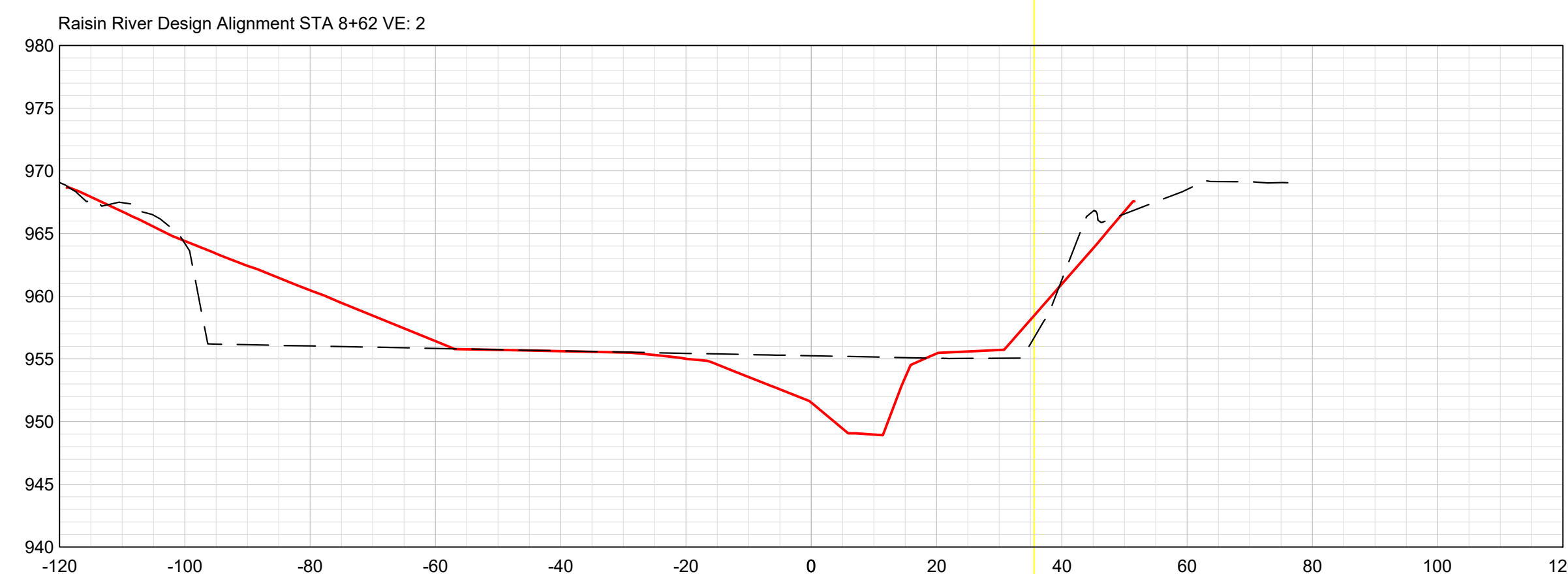
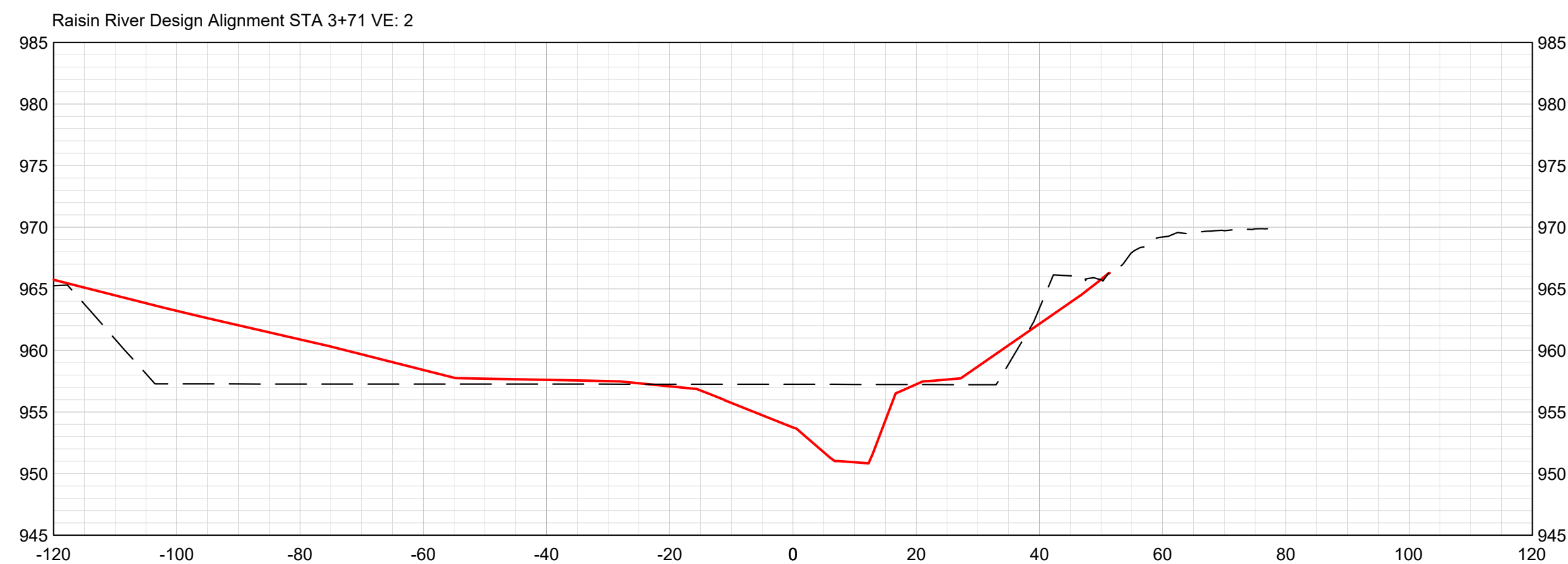
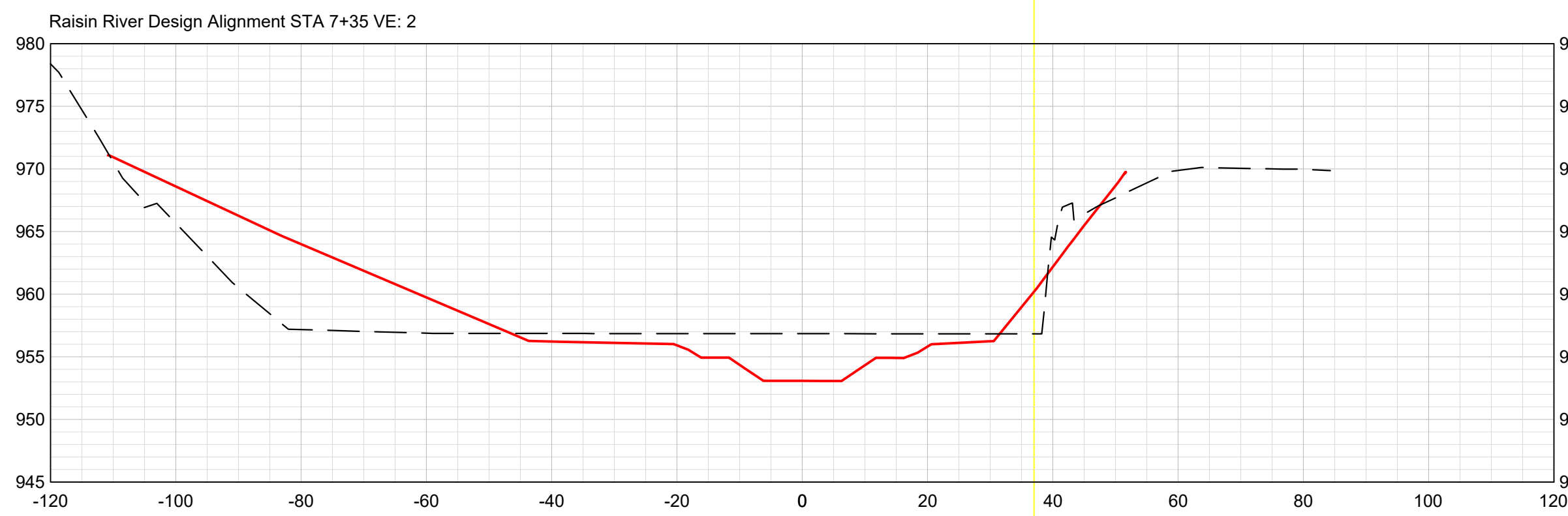
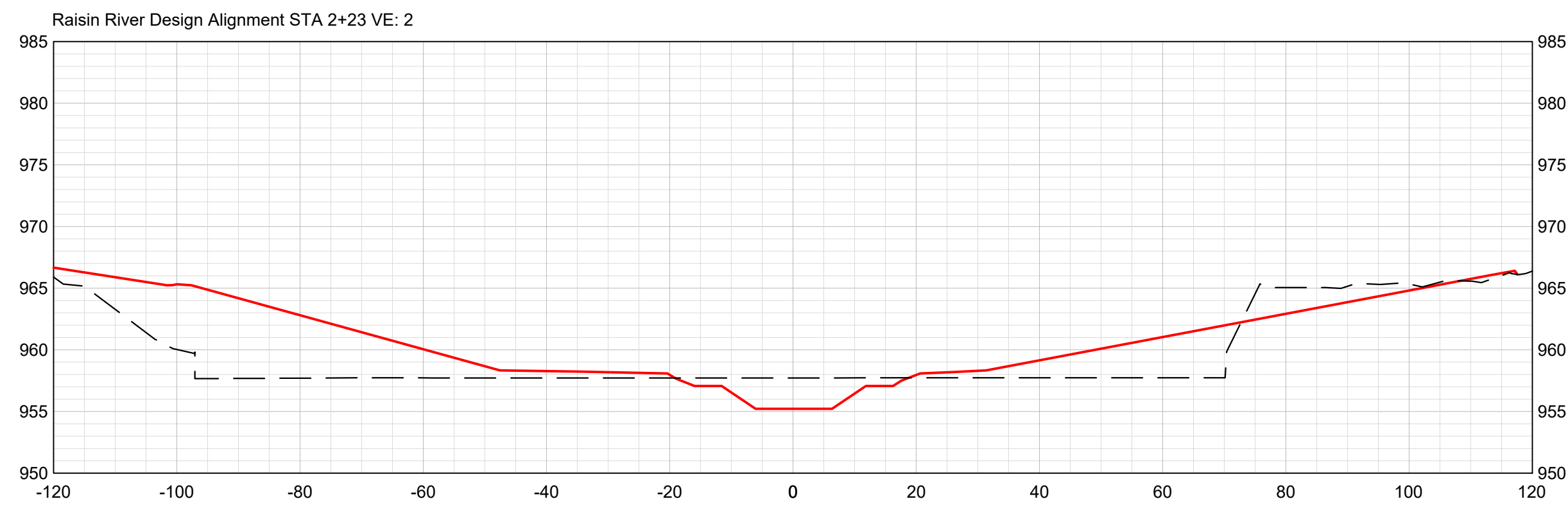
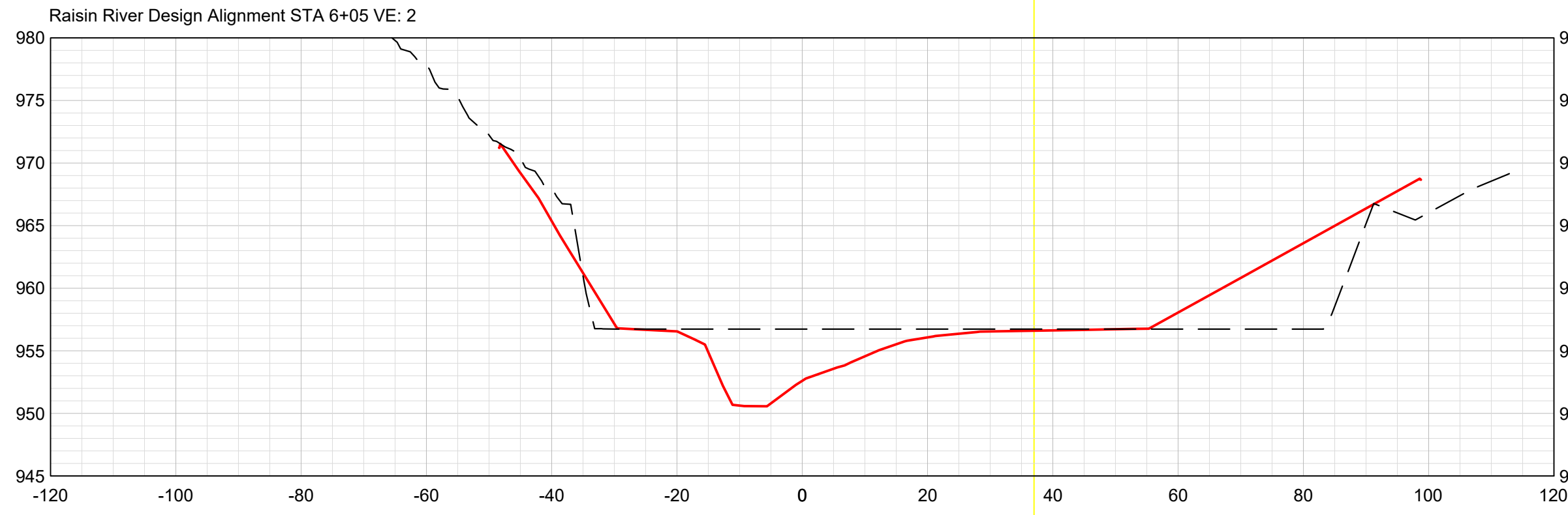
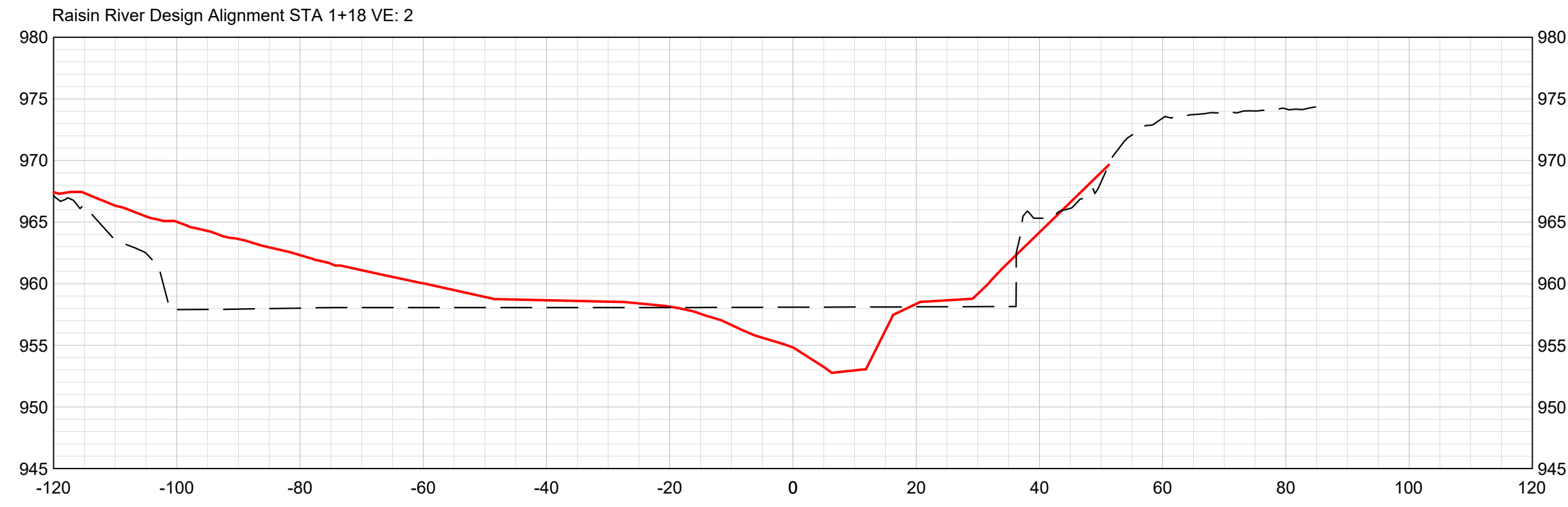
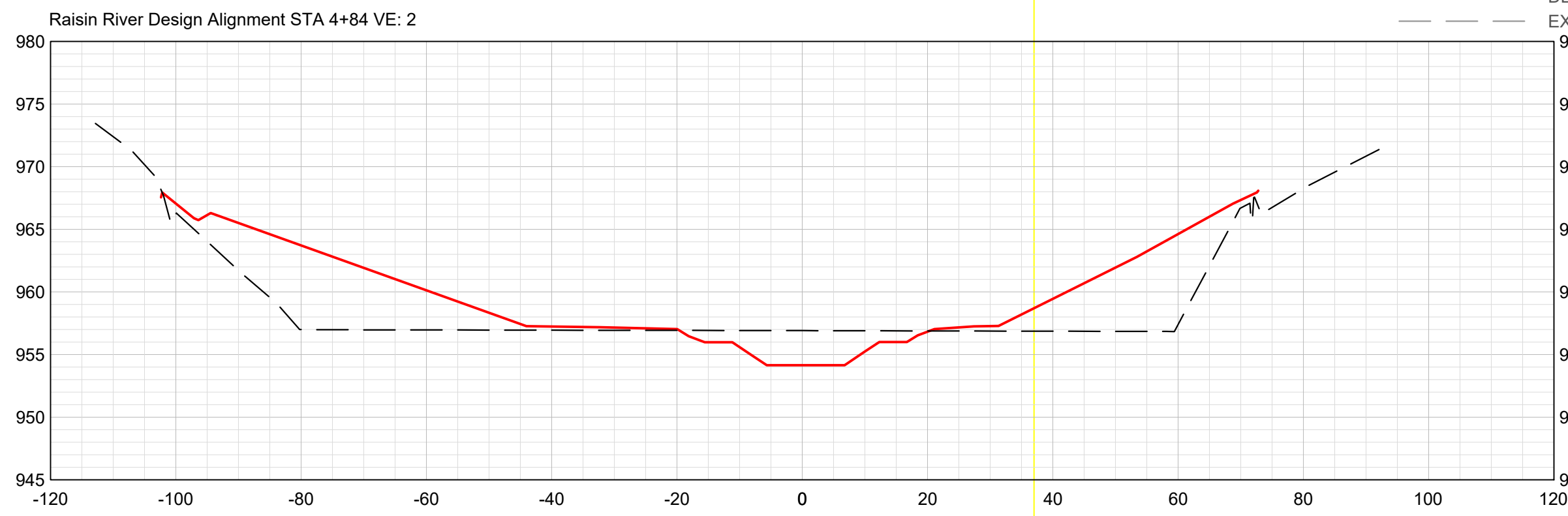
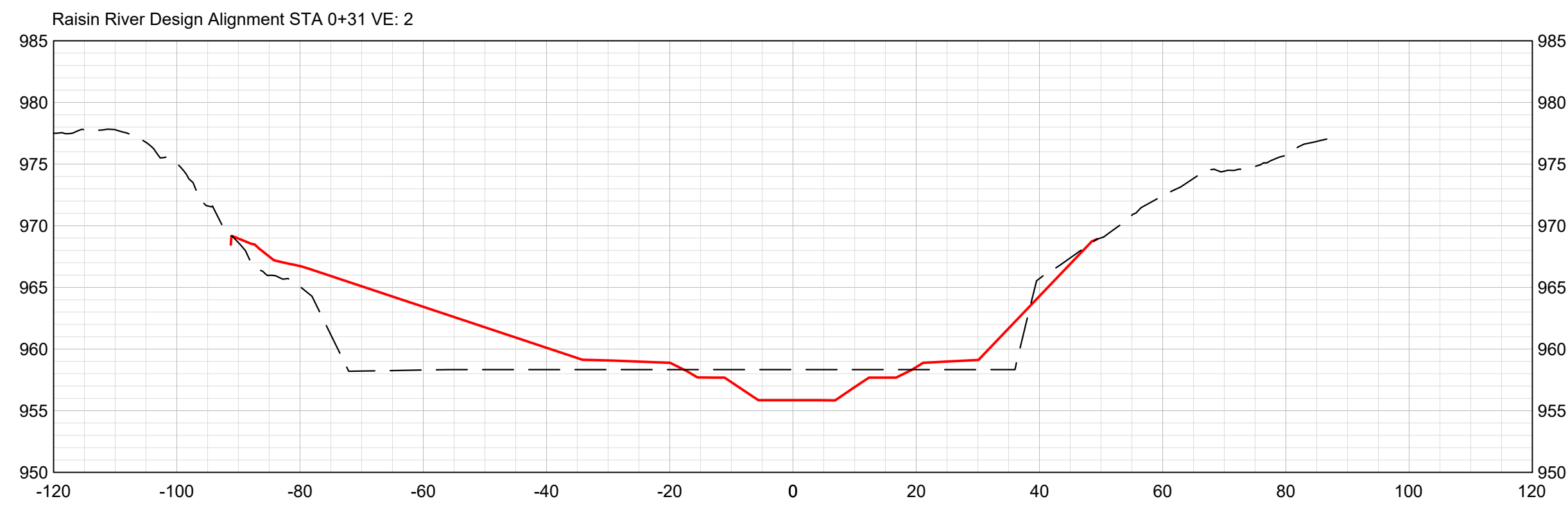
30% CONCEPT DESIGN
 NOT FOR
 CONSTRUCTION

DATE: 01/11/2023
 SCALE (34"X22"): 1" = 30'
 SCALE (17"X11"): 1" = 60'



SHEET NUMBER
 6 OF 17

C:\USERS\MICHAID\PROBOX2022\BROOKLYN DAM\C3D\SHEETS\SECTIONS.DWG | MICHA | SAVED | Wednesday, January 11, 2023 2:22:16 PM | ACAD.CTB | PLOTTED: Wednesday, January 11, 2023 3:15:31 PM



SECTION LEGEND
 ——— DESIGN SURFACE
 - - - EXISTING GROUND

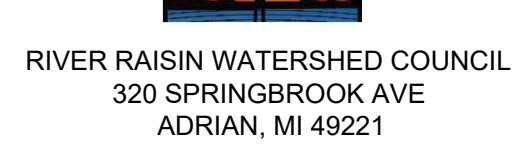
APPROVED BY: TL	CHECKED BY: CB	DRAWN BY: MJG
REV	DESCRIPTION	APPRV
1	30% CONCEPT DESIGN	XX
		XX
		XX
		XX
		XX
		XX
		XX
		XX
		XX
		XX

**RIVER RAISIN - MILL STREET
 BROOKLYN DAM RESTORATION
 NEAR BROOKLYN
 JACKSON COUNTY, MI**

**NOT FOR CONSTRUCTION
 30% CONCEPT DESIGN - DRAFT
 RIVER RAISIN
 CROSS SECTION SHEET 1**



NISWANDER ENVIRONMENTAL
 NISWANDER ENVIRONMENTAL
 9436 MALTBY ROAD
 BRIGHTON, MI 48116



RIVER RAISIN WATERSHED COUNCIL
 320 SPRINGBROOK AVE
 ADRIAN, MI 49221



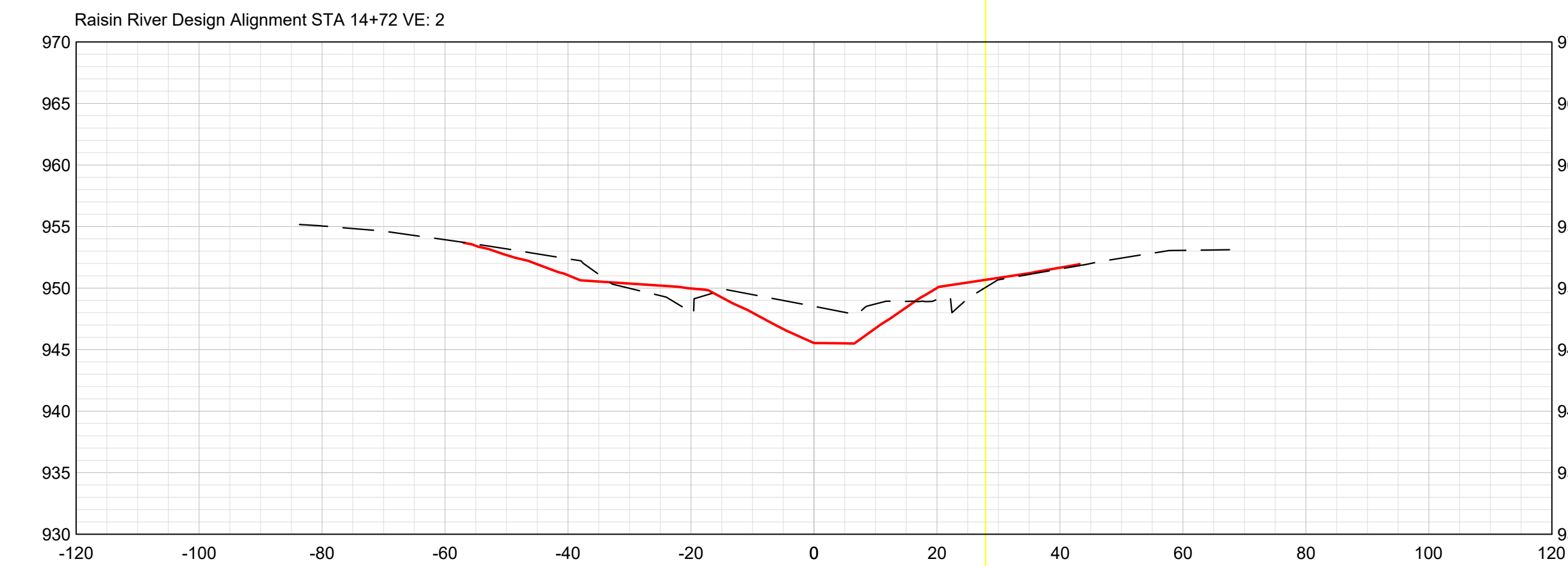
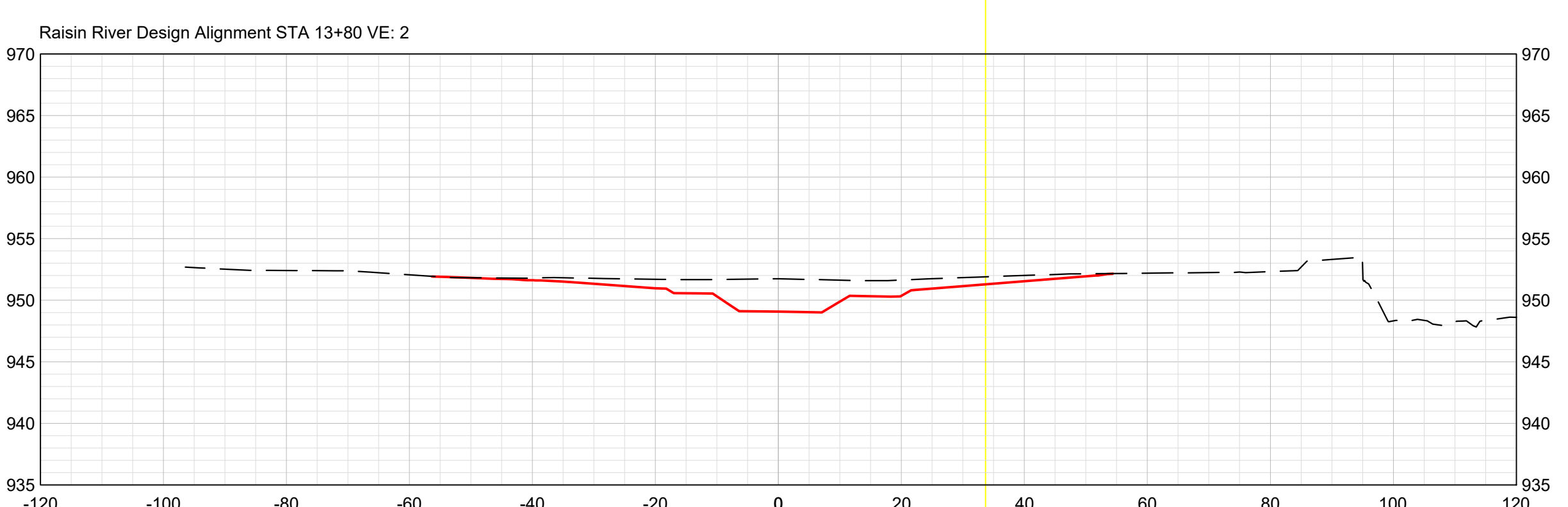
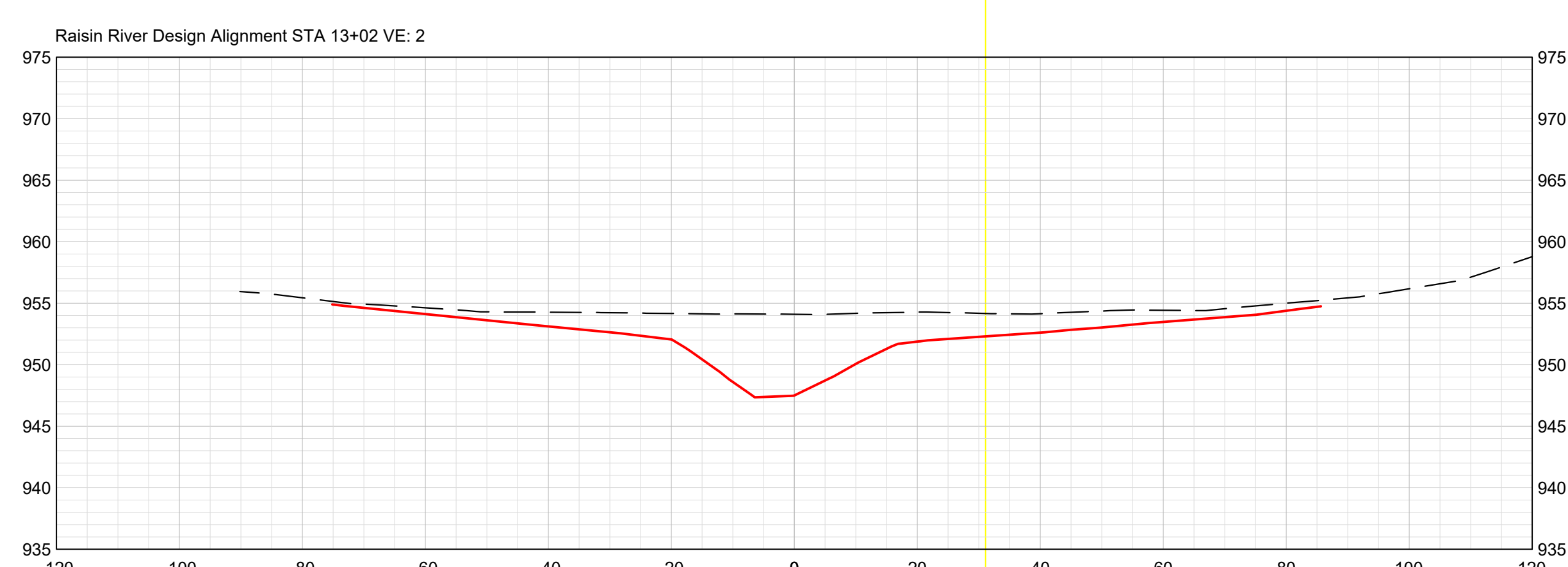
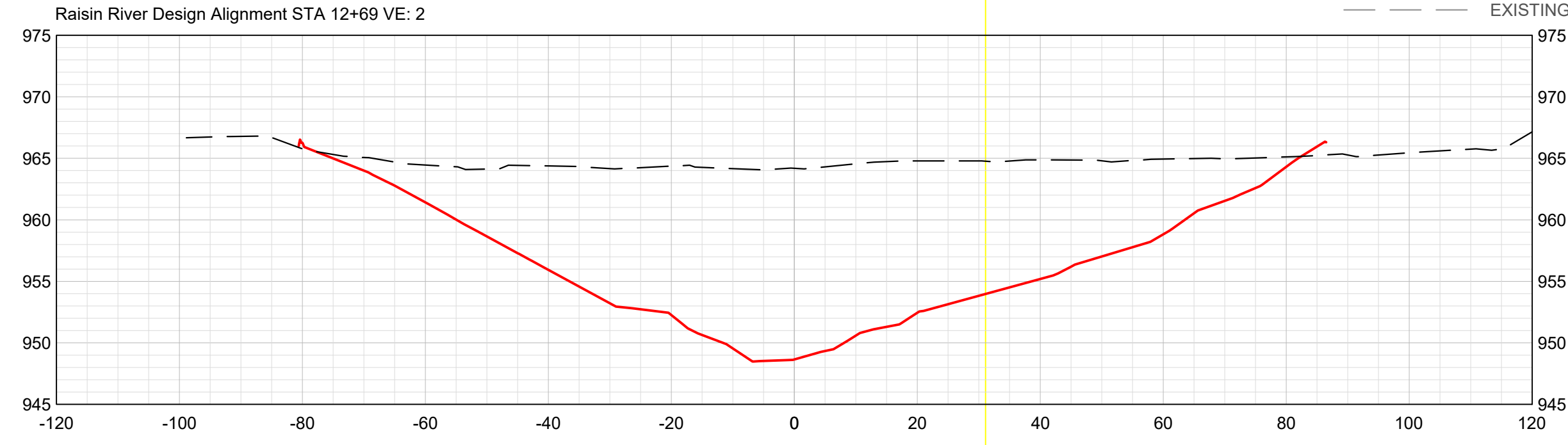
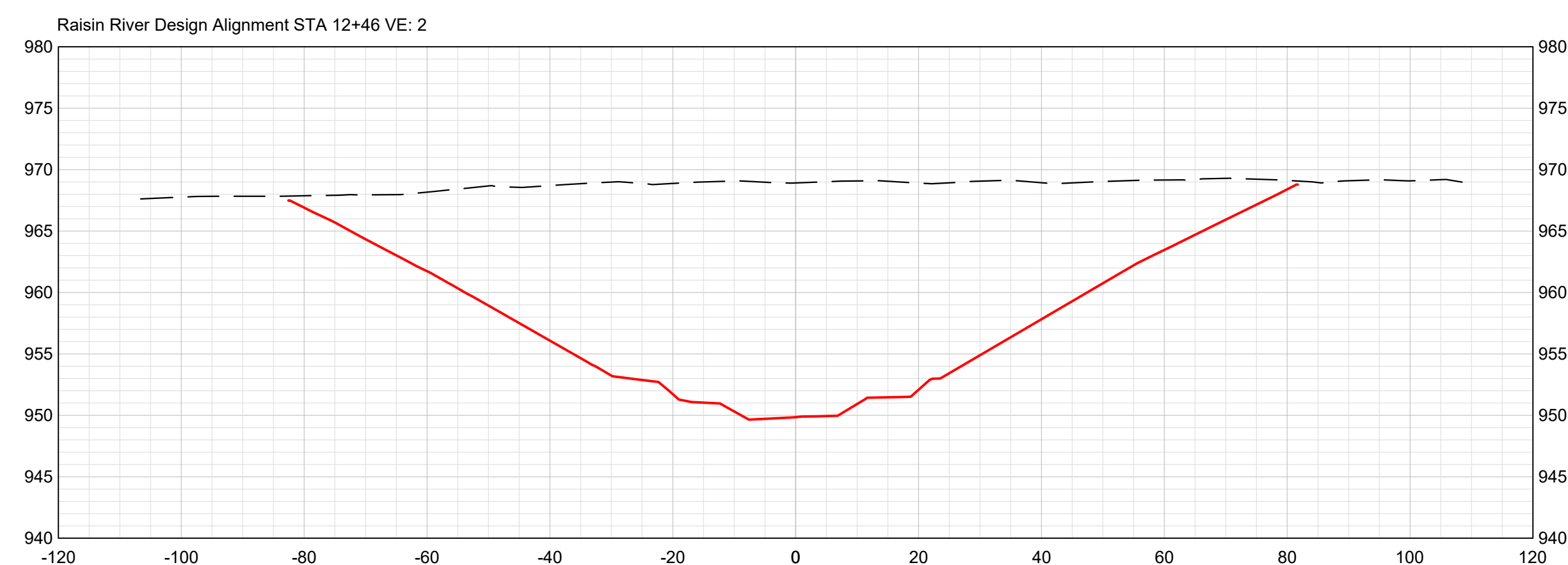
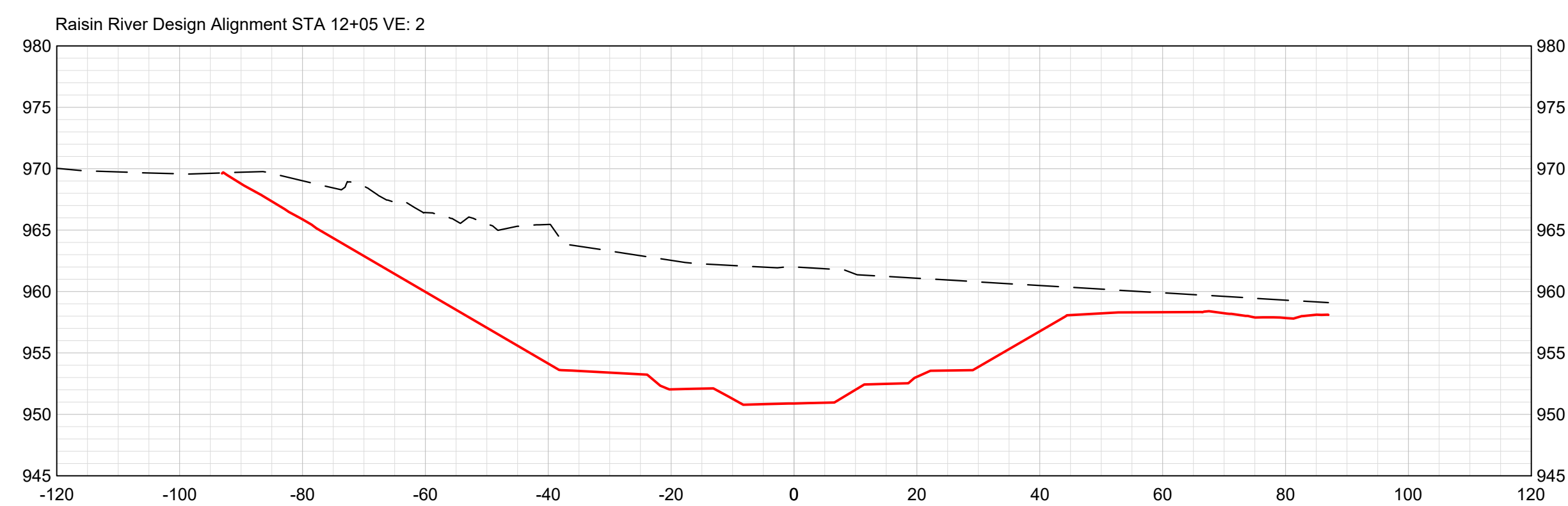
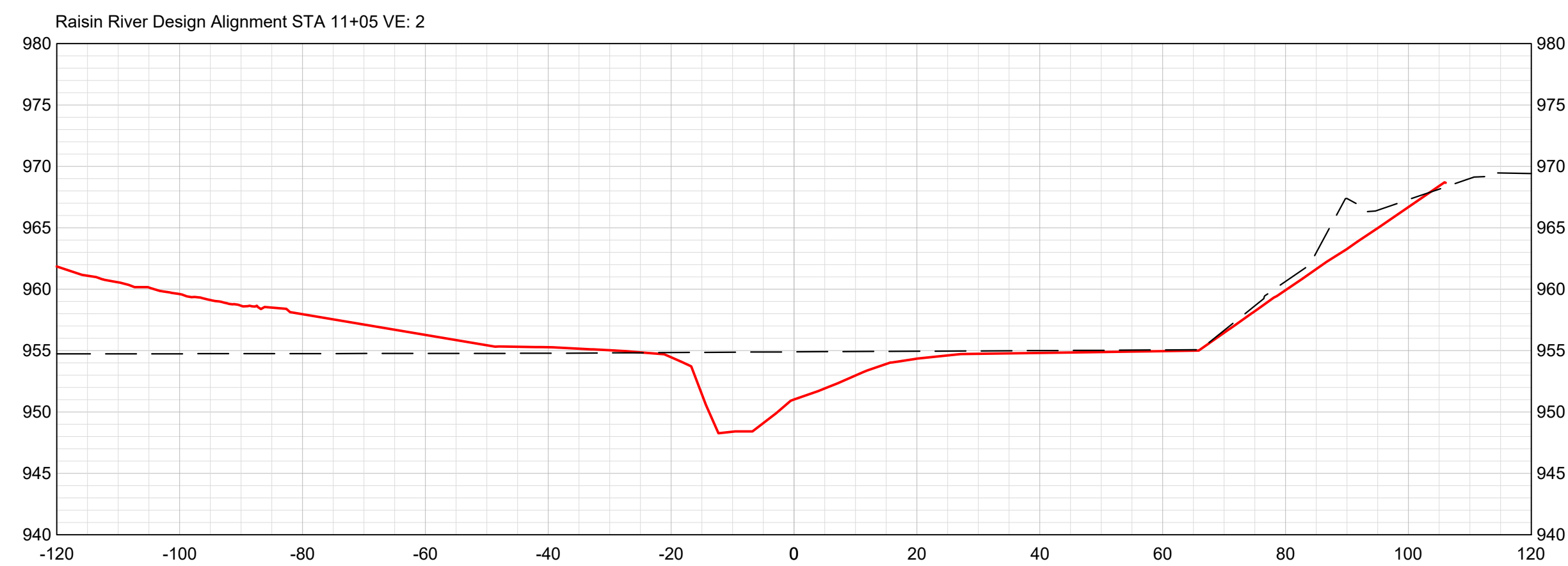
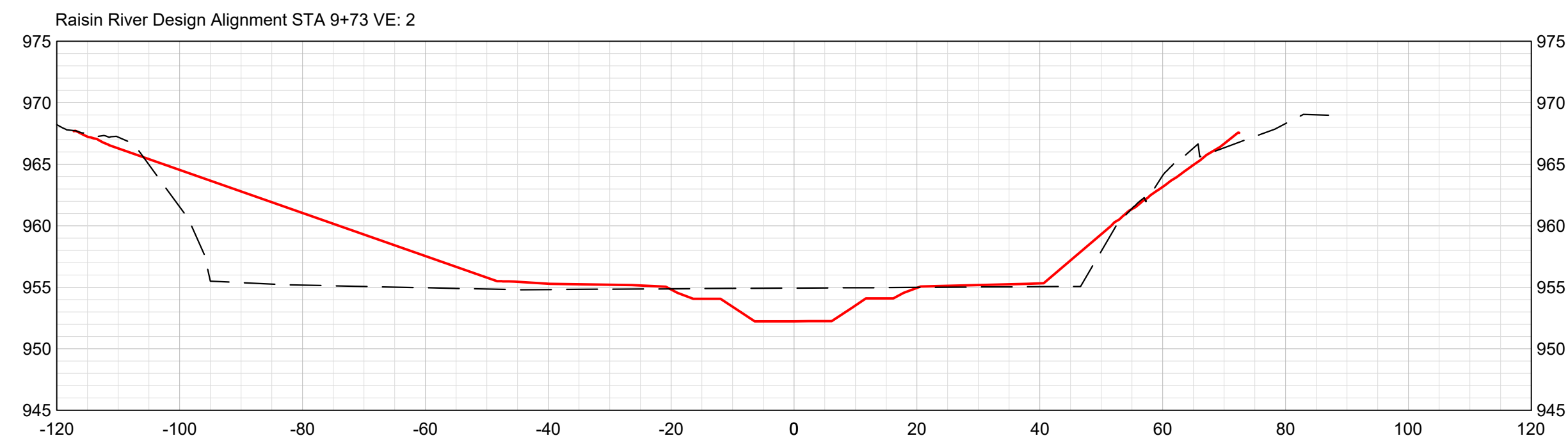
**30% CONCEPT DESIGN
 NOT FOR
 CONSTRUCTION**

DATE: 01/11/2023
 SCALE (34"X22"): 1" = 20'
 SCALE (17"X11"): 1" = 40'



**SHEET NUMBER
 7 OF 17**

C:\USERS\MICHAID\PROBOX2022\BROOKLYN_DAM\CS\DESIGN\SECTIONS\DWG | MICHA | SAVED | Wednesday, January 11, 2023 2:22:16 PM | ACAD.CTB | PLOTTED: Wednesday, January 11, 2023 3:15:44 PM



SECTION LEGEND
 ——— DESIGN SURFACE
 - - - EXISTING GROUND

APPROVED BY: TL	CHECKED BY: CB	DRAWN BY: MJG
REV	DESCRIPTION	APPRV
1	30% CONCEPT DESIGN	XX
		XX
		XX
		XX
		XX
		XX
		XX
		XX
		XX

RIVER RAISIN - MILL STREET
 BROOKLYN DAM RESTORATION
 NEAR BROOKLYN
 JACKSON COUNTY, MI

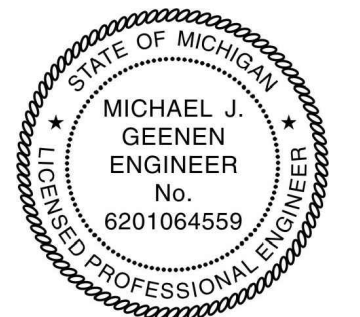
NOT FOR CONSTRUCTION
 30% CONCEPTUAL DESIGN - DRAFT
 RIVER RAISIN
 CROSS SECTION SHEET 2



NISWANDER ENVIRONMENTAL
 9436 MALTBY ROAD
 BRIGHTON, MI 48116

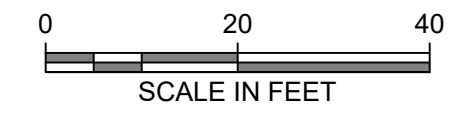


RIVER RAISIN WATERSHED COUNCIL
 320 SPRINGBROOK AVE
 ADRIAN, MI 49221



30% CONCEPT DESIGN
 NOT FOR
 CONSTRUCTION

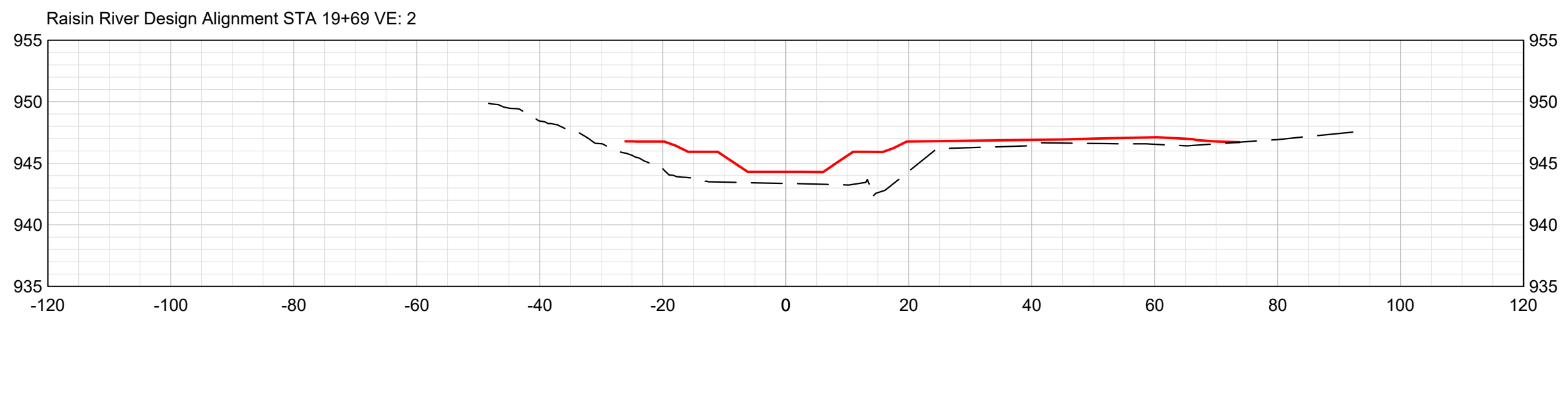
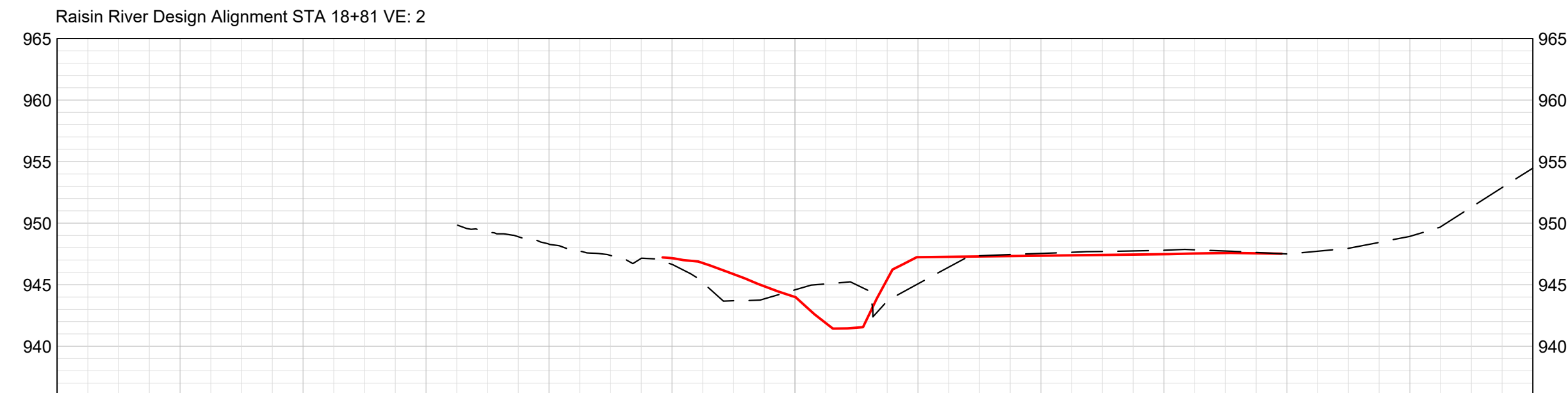
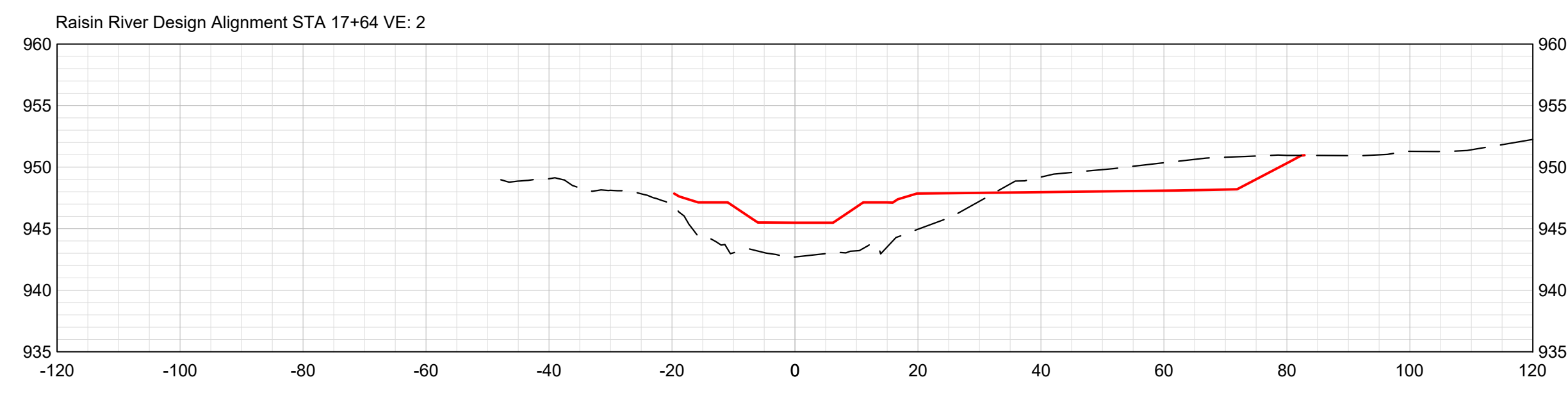
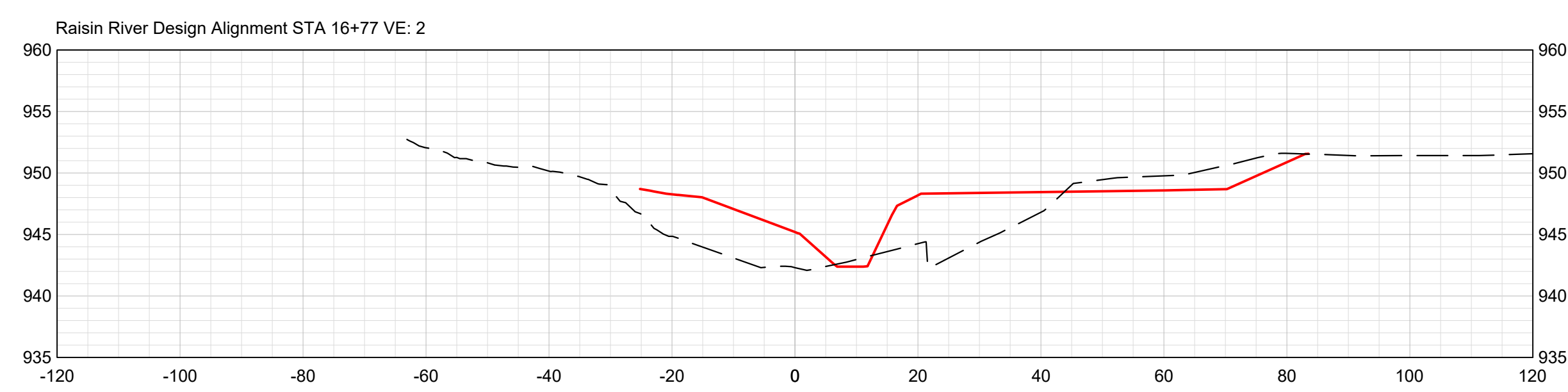
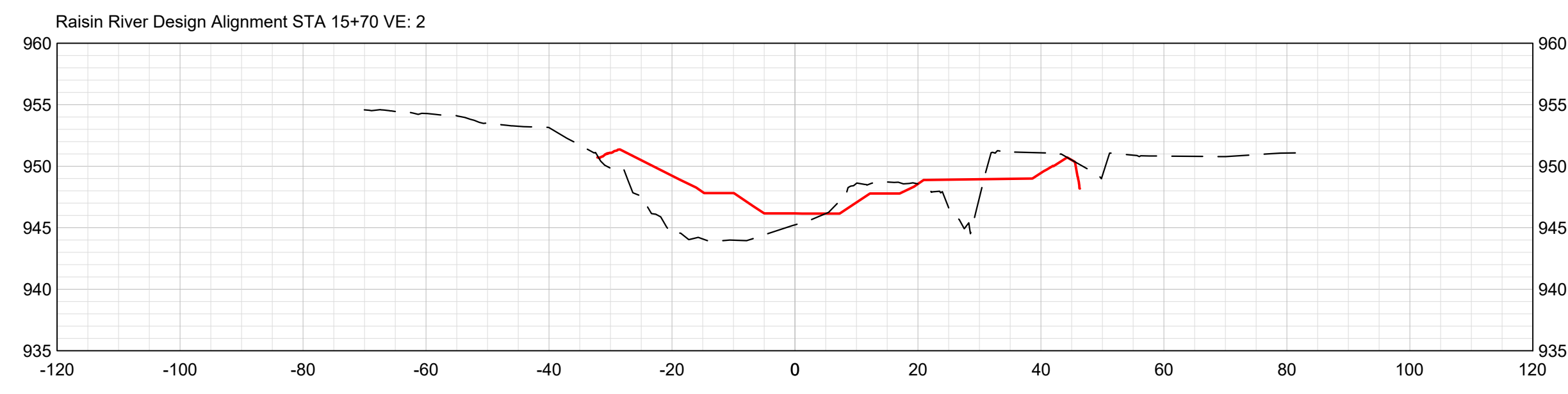
DATE: 01/11/2023
 SCALE (34"X22"): 1" = 20'
 SCALE (17"X11"): 1" = 40'



SHEET NUMBER
 8 OF 17

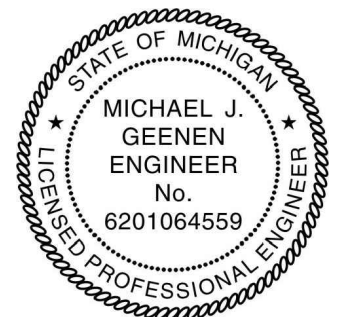
C:\USERS\MICHAID\PROBOX2022\BROOKLYN DAM\C3D\SHEETS\SECTIONS.DWG | MICHA | SAVED - Wednesday, January 11, 2023 2:22:16 PM | ACAD.CTB | PLOTTED: Wednesday, January 11, 2023 3:15:59 PM

SECTION LEGEND
 ——— DESIGN SURFACE
 - - - - - EXISTING GROUND



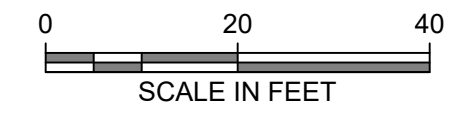
APPROVED BY: TL	CHECKED BY: CB	DRAWN BY: MJG
REV	DESCRIPTION	APPRV
1	30% CONCEPT DESIGN	XX
		XX
		XX
		XX
		XX
		XX
		XX
		XX
		XX

**RIVER RAISIN - MILL STREET
 BROOKLYN DAM RESTORATION
 NEAR BROOKLYN
 JACKSON COUNTY, MI**
 NOT FOR CONSTRUCTION
 30% CONCEPTUAL DESIGN - DRAFT
 RIVER RAISIN
 CROSS SECTION SHEET 3



30% CONCEPT DESIGN
 NOT FOR
 CONSTRUCTION

DATE: 01/11/2023
 SCALE (34"X22"): 1" = 20'
 SCALE (17"X11"): 1" = 40'



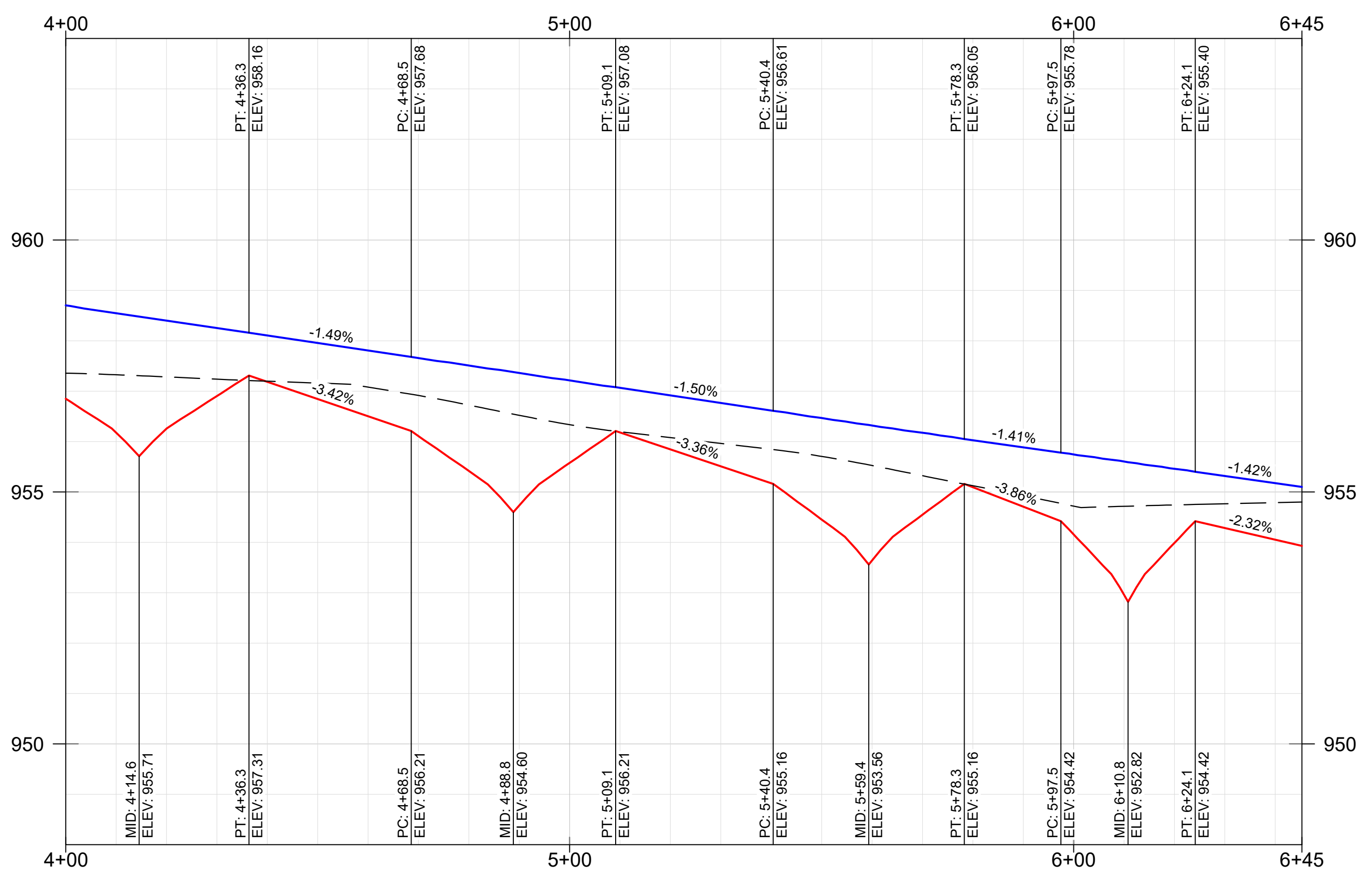
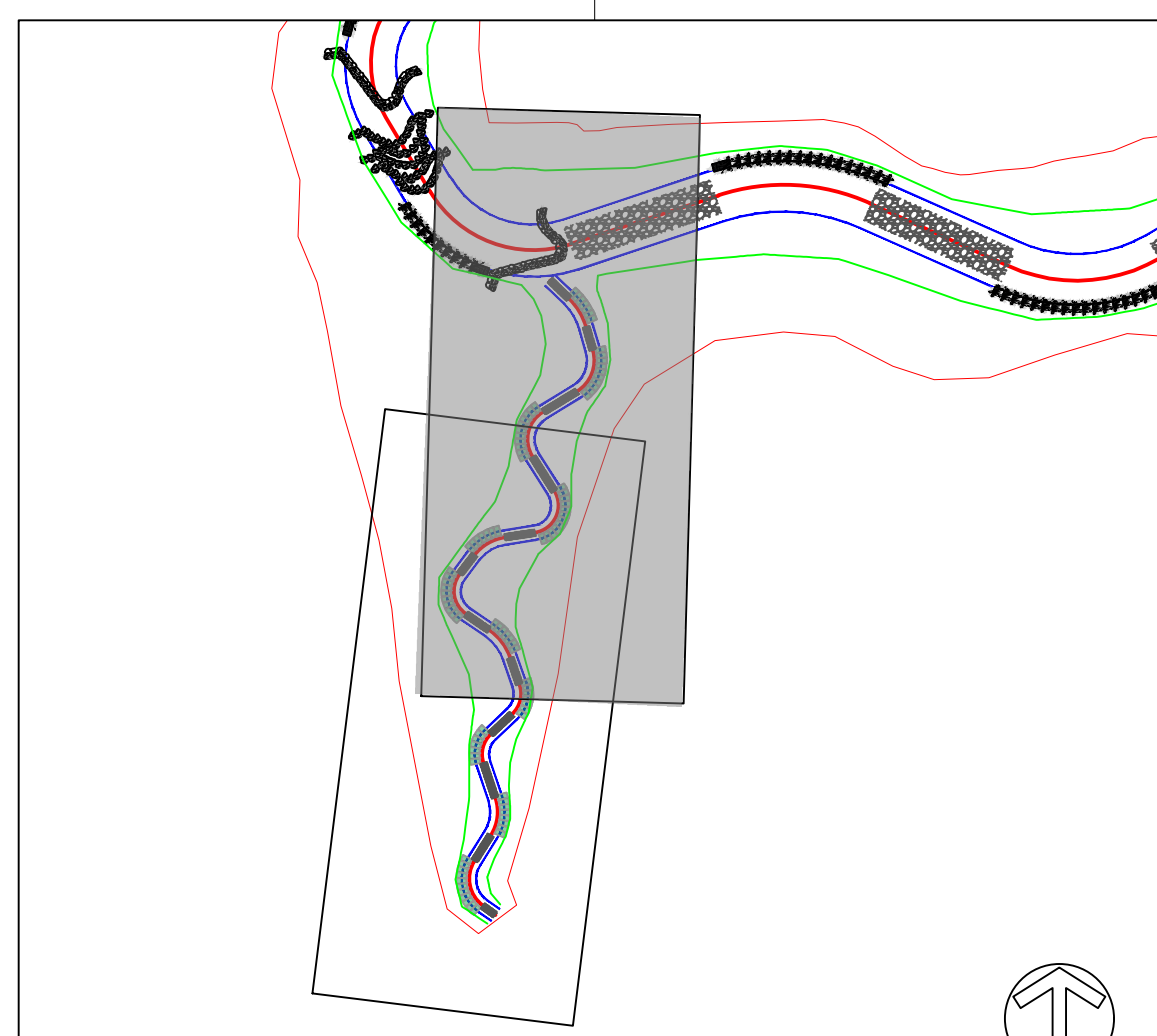
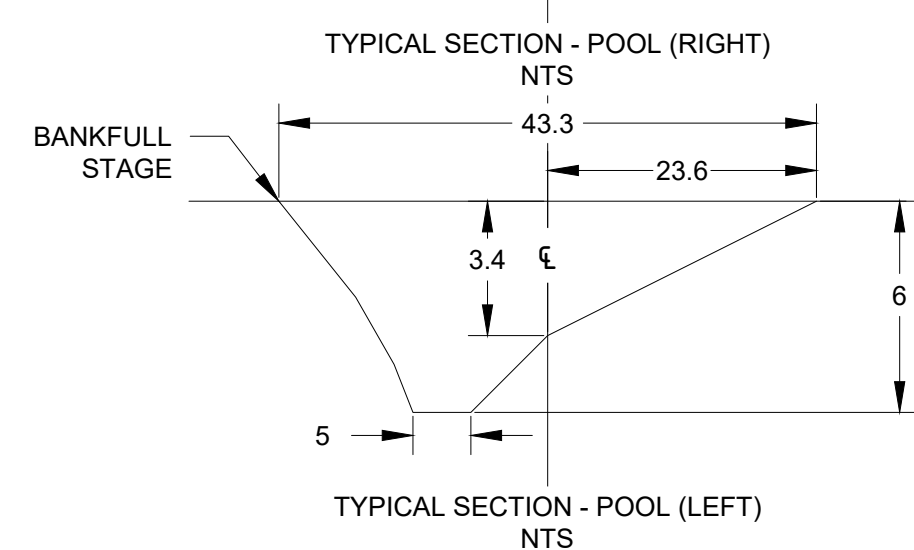
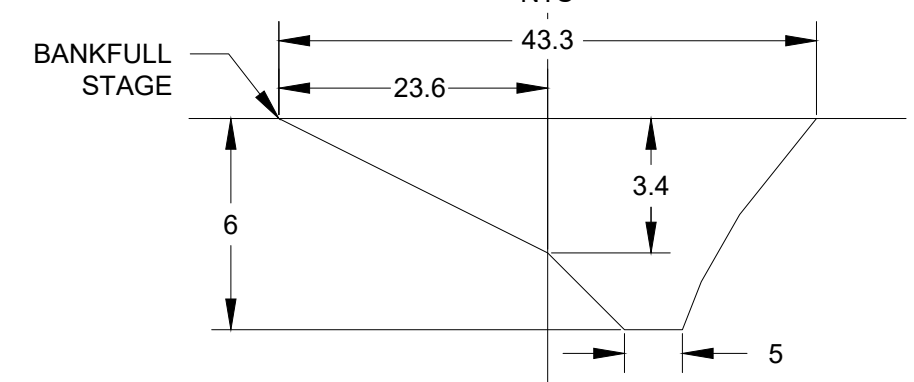
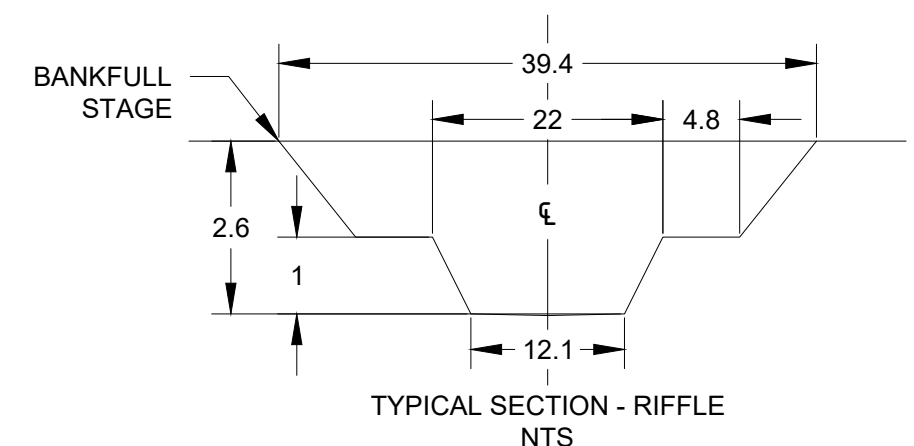
SHEET NUMBER
 9 OF 17

C:\USERS\MICHAID\PROBOX2022\BROOKLYN_DAM\C3D\SHEETS\PLANPROK.DWG | MICHA | SAVED: Wednesday, January 11, 2023 3:04:58 PM | ACAD.CTB | PLOTTED: Wednesday, January 11, 2023 3:17:24 PM



- PLAN LEGEND**
- PROPOSED STREAM CENTER LINE
 - PROPOSED GEOMORPHIC CHANNEL TOB
 - (483) PROPOSED MAJOR CONTOUR
 - PROPOSED MINOR CONTOUR
 - 479 EXISTING MAJOR CONTOUR
 - EXISTING MINOR CONTOUR
 - LOG OR ROCK J-HOOK
 - BOULDER RIFFLE GRADE CONTROL
 - TOE WOOD
 - AUGMENTED RIFFLE

- PROFILE LEGEND**
- PROPOSED STREAM CENTER LINE
 - PROPOSED BANKFULL TOB
 - EXISTING GROUND

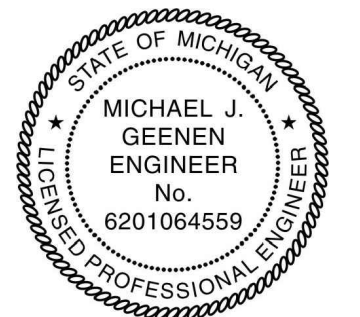


Kedron Drain Proposed Tributary Alignment - SCALE: HOR 1" = 30'; VERT 1" = 3'

APPROVED BY: MUG	CHECKED BY: CB	DESCRIPTION	DATE
XX	XX	30% CONCEPT DESIGN	XX
XX	XX		XX
XX	XX		XX
XX	XX		XX
XX	XX		XX
XX	XX		XX
XX	XX		XX
XX	XX		XX
XX	XX		XX
XX	XX		XX

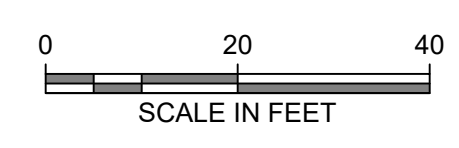
RIVER RAISIN - MILL STREET
BROOKLYN DAM RESTORATION
NEAR BROOKLYN
JACKSON COUNTY, MI

NOT FOR CONSTRUCTION
30% CONCEPT DESIGN - DRAFT
KEDRON DRAIN
PLAN PROFILE SHEET 2

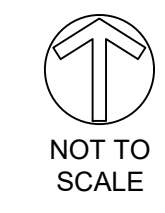


30% CONCEPT DESIGN
NOT FOR CONSTRUCTION

DATE: 01/11/2023
SCALE (34"X22"): 1" = 20'
SCALE (17"X11"): 1" = 40'

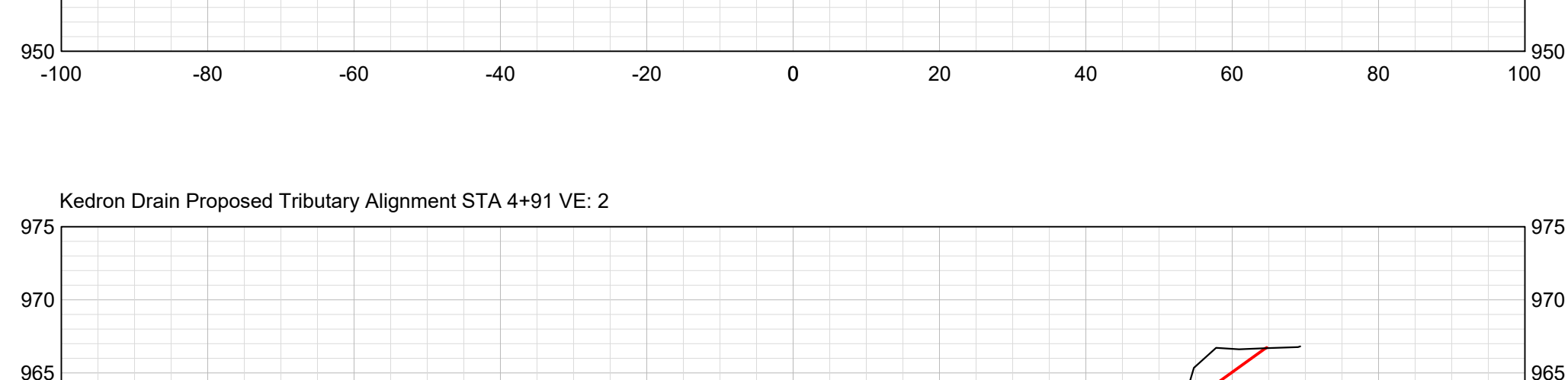
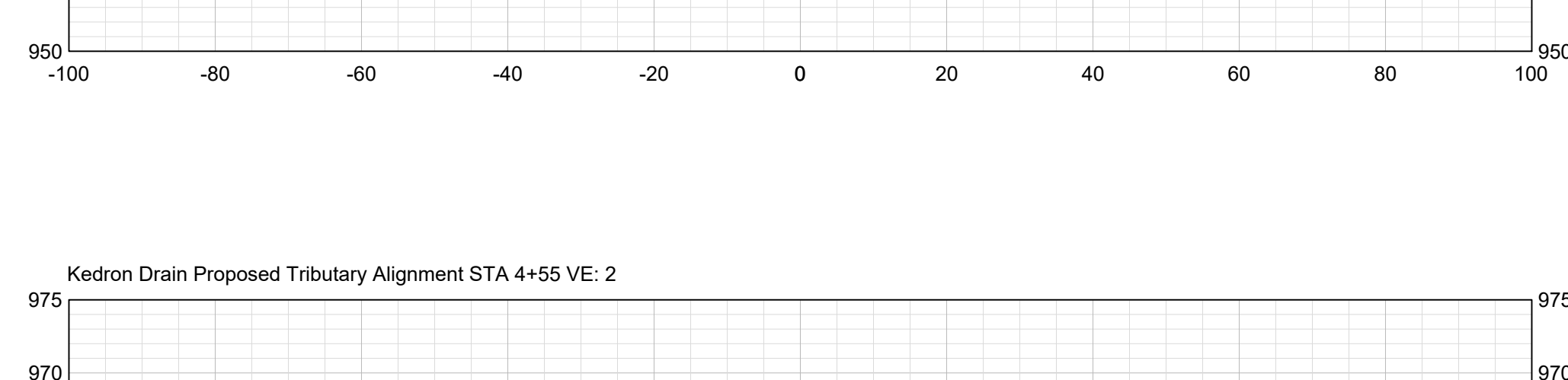
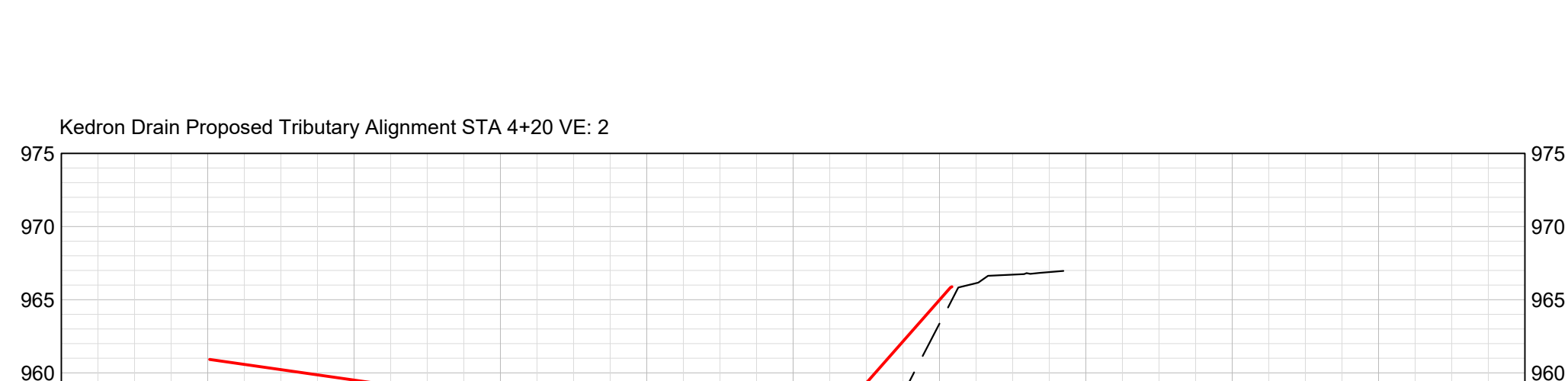
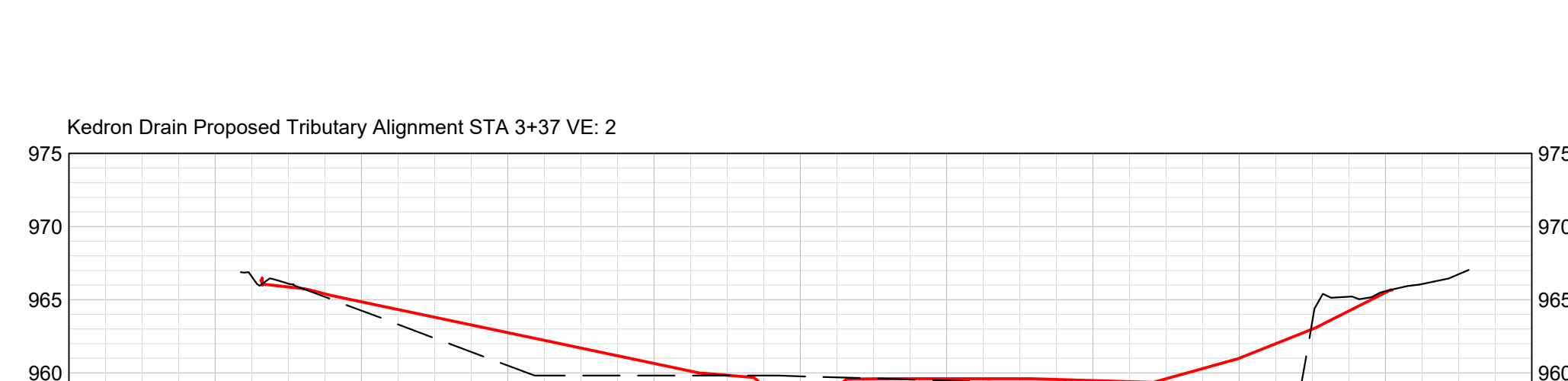
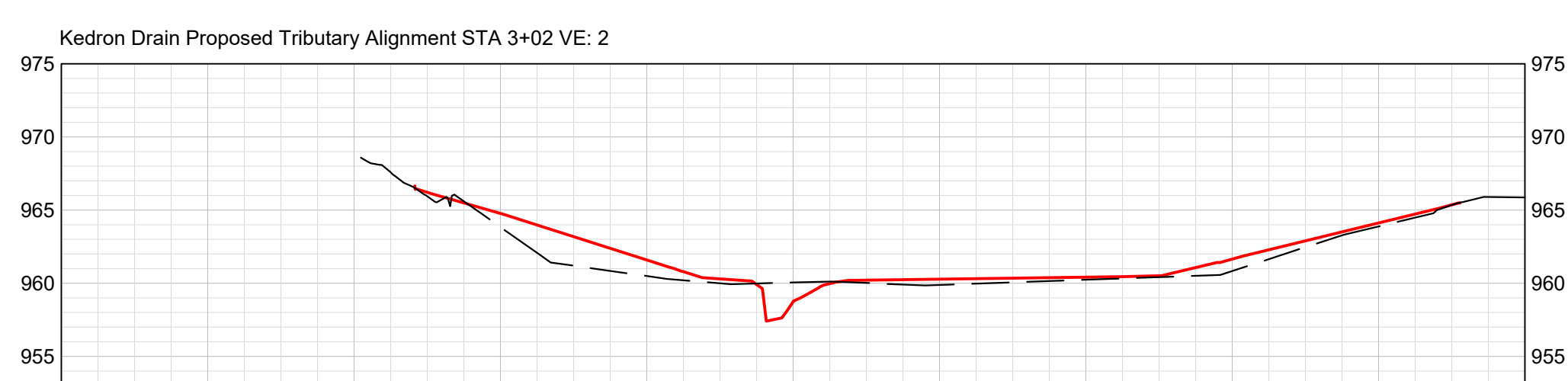
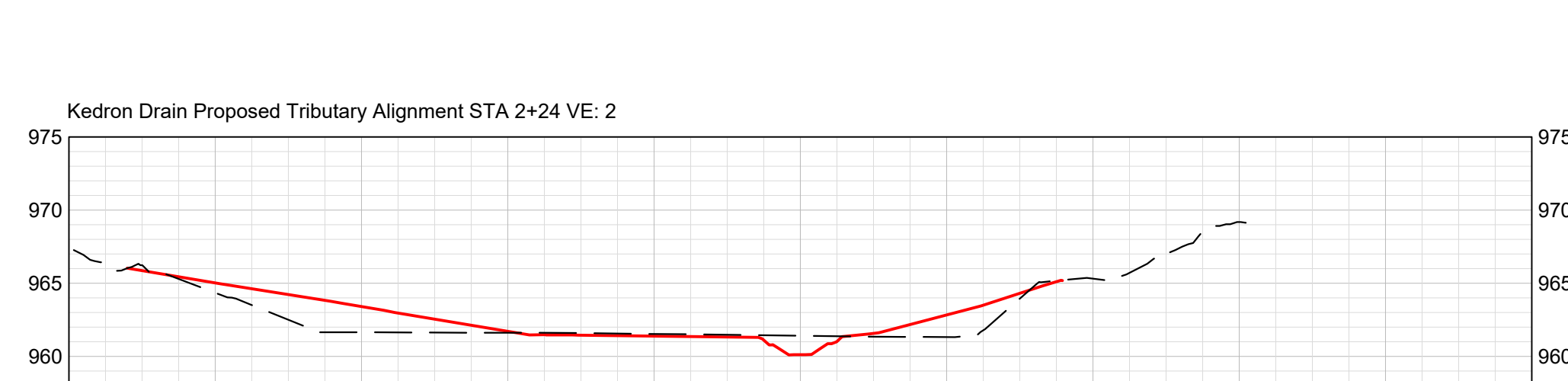
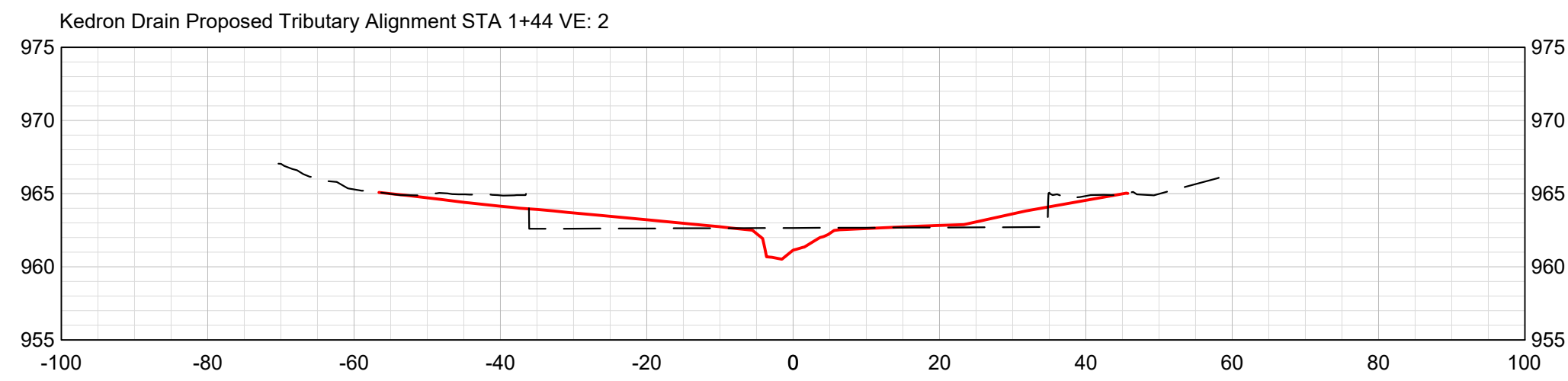
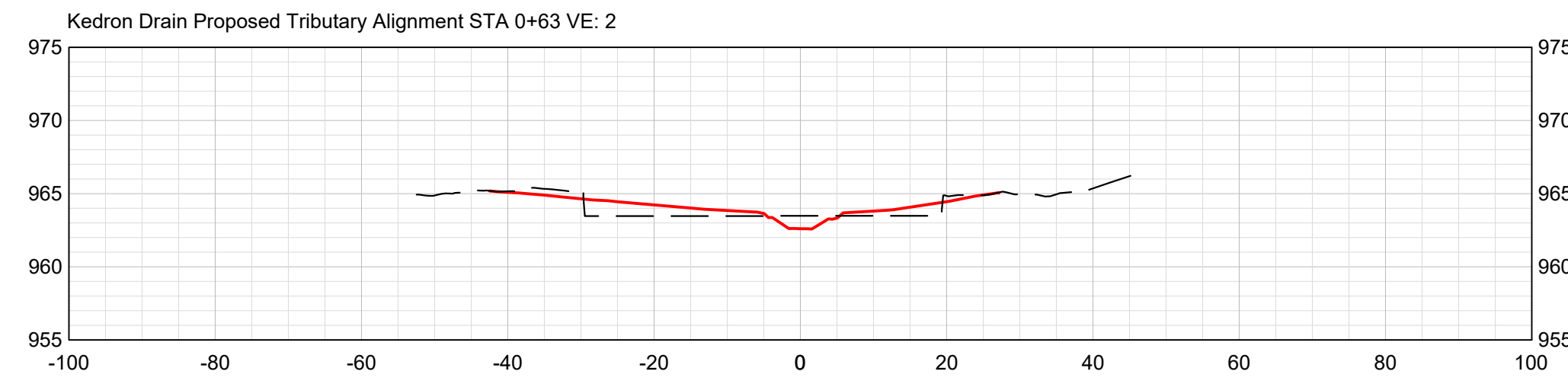
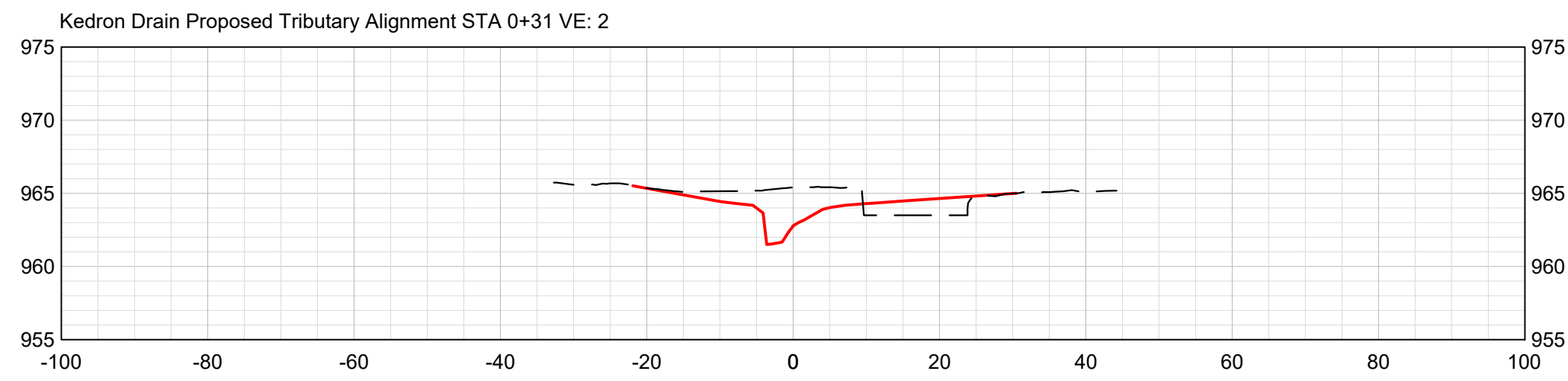
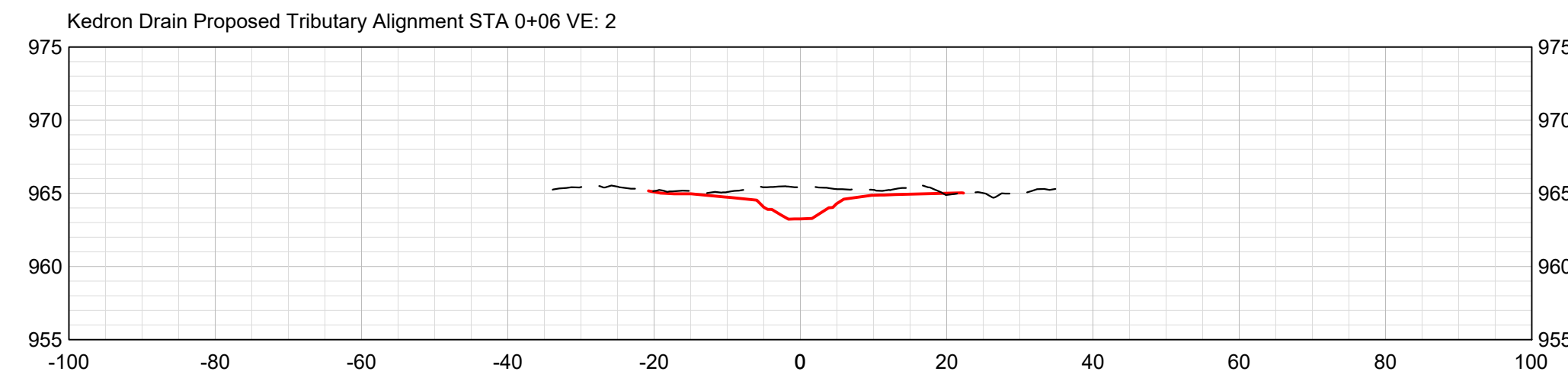


SHEET NUMBER
11 OF 17



C:\USERS\MICHAEL\PROBOX2022\BROOKLYN_DAM\CADD\SHEETS\SECTIONS.DWG | MICHA | SAVED: Wednesday, January 11, 2023 2:22:16 PM | ACAD.CTB | PLOTTED: Wednesday, January 11, 2023 3:17:58 PM

SECTION LEGEND
 ——— DESIGN SURFACE
 - - - EXISTING GROUND



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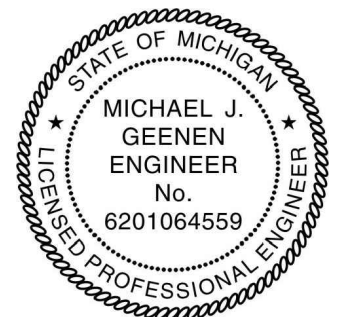
RIVER RAISIN - MILL STREET
 BROOKLYN DAM RESTORATION
 NEAR BROOKLYN
 JACKSON COUNTY, MI
 NOT FOR CONSTRUCTION
 30% CONCEPTUAL DESIGN - DRAFT
 KEDRON DRAIN
 CROSS SECTION SHEET 1



NISWANDER ENVIRONMENTAL
 9436 MALTBY ROAD
 BRIGHTON, MI 48116

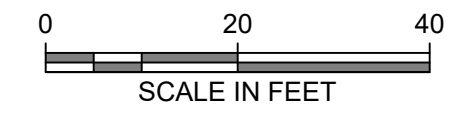


RIVER RAISIN WATERSHED COUNCIL
 320 SPRINGBROOK AVE
 ADRIAN, MI 49221



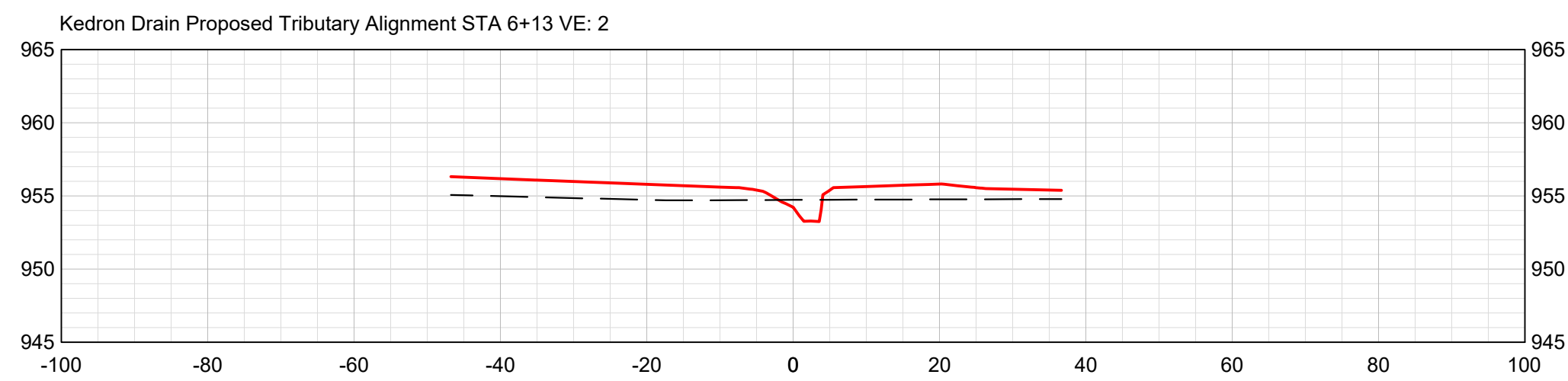
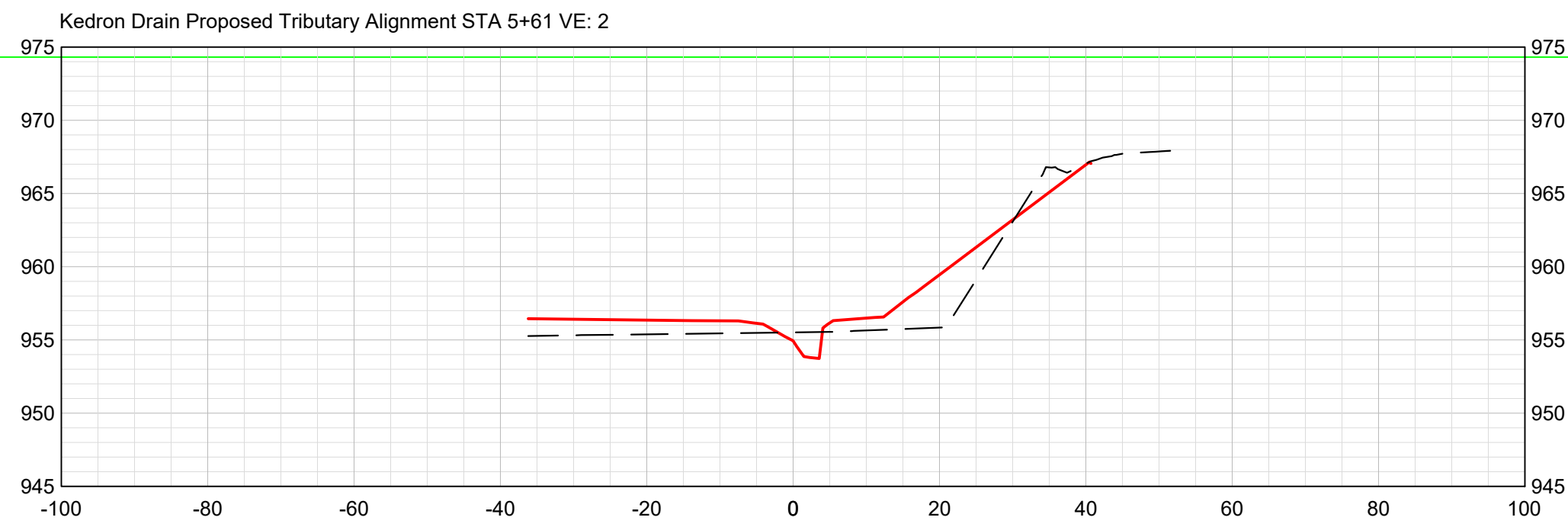
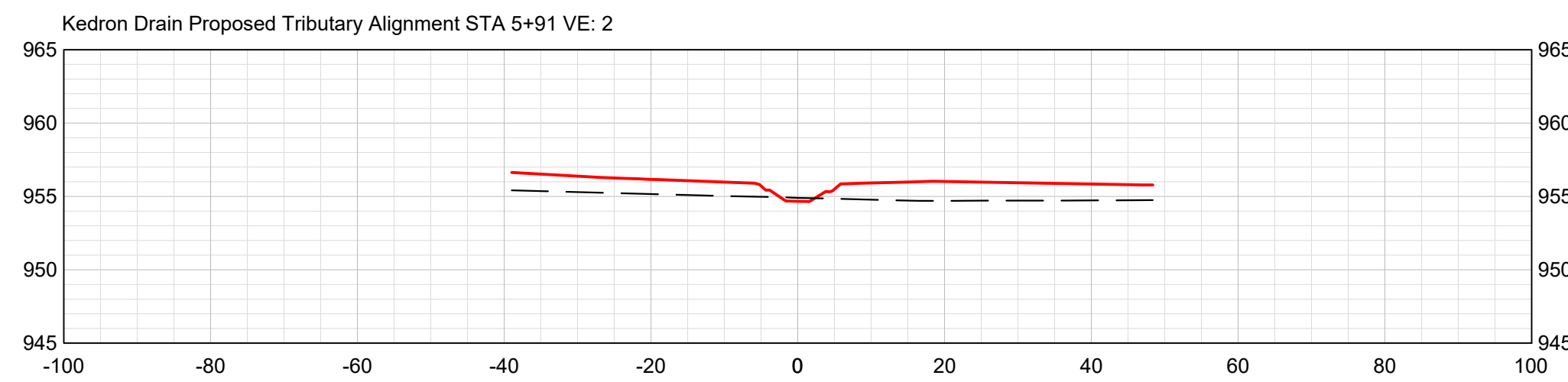
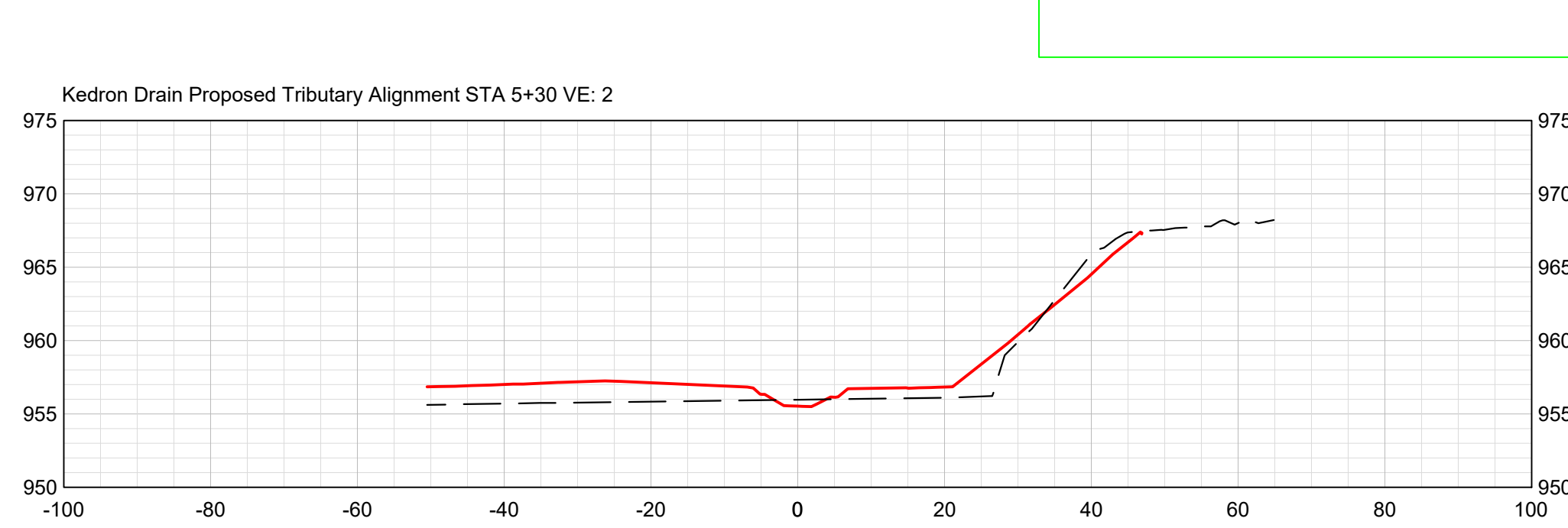
30% CONCEPT DESIGN
 NOT FOR
 CONSTRUCTION

DATE: 01/11/2023
 SCALE (34"X22"): 1" = 20'
 SCALE (17"X11"): 1" = 40'



SHEET NUMBER
 12 OF 17

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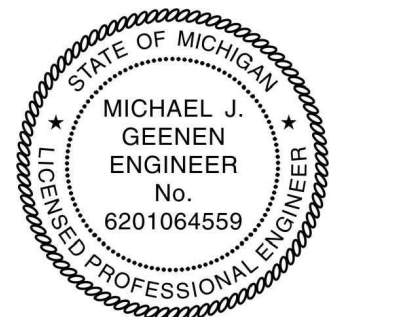


SECTION LEGEND
 ——— DESIGN SURFACE
 - - - EXISTING GROUND

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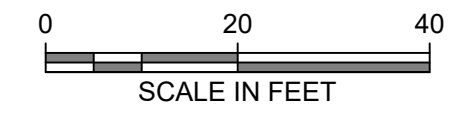
RIVER RAISIN - MILL STREET
 BROOKLYN DAM RESTORATION
 NEAR BROOKLYN
 JACKSON COUNTY, MI

NOT FOR CONSTRUCTION
 30% CONCEPTUAL DESIGN - DRAFT
 KEDRON DRAIN
 CROSS SECTION SHEET 2



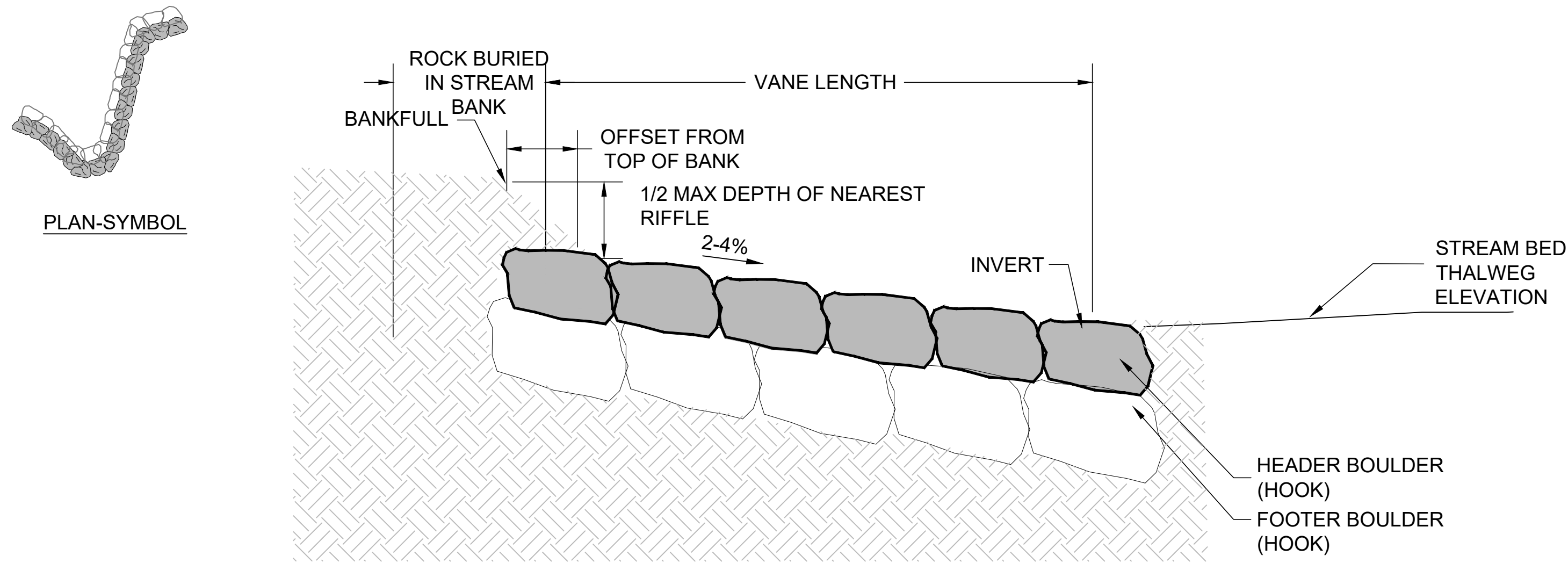
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DATE: 01/11/2023
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 SCALE (17"X11"): 1" = 40'



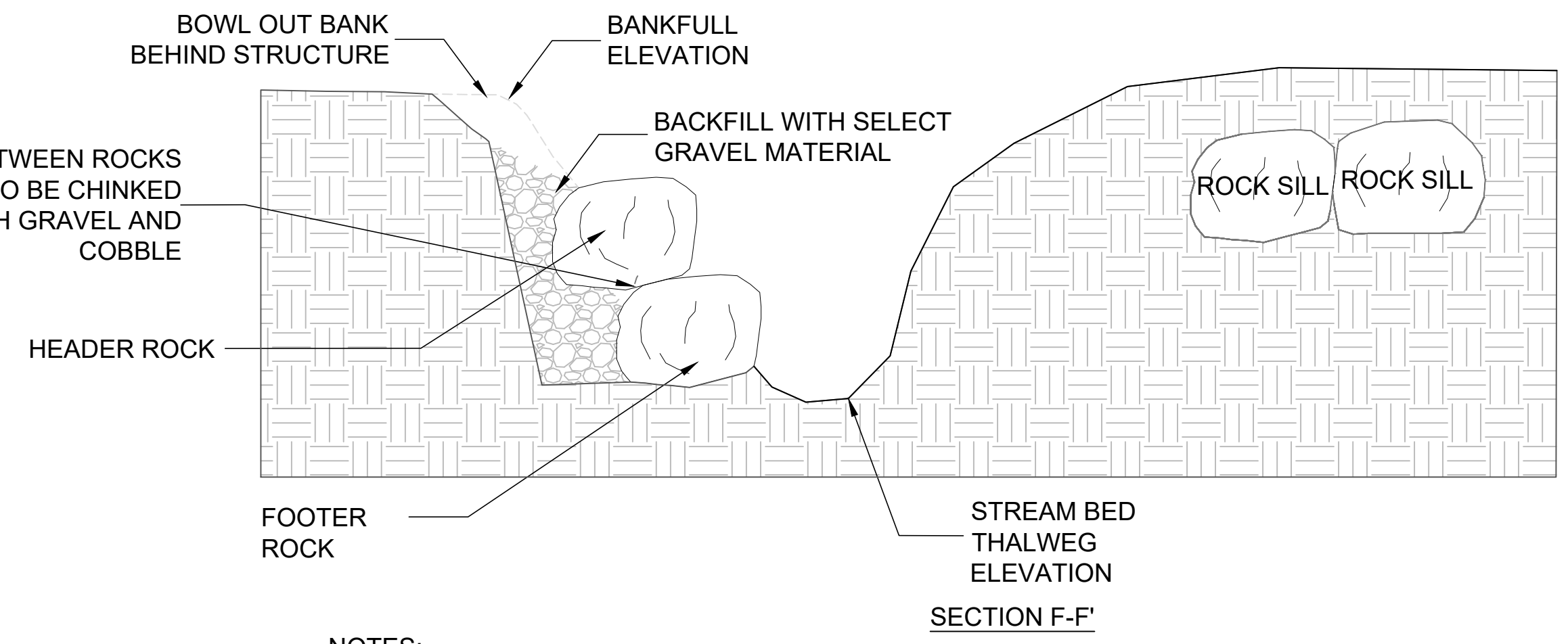
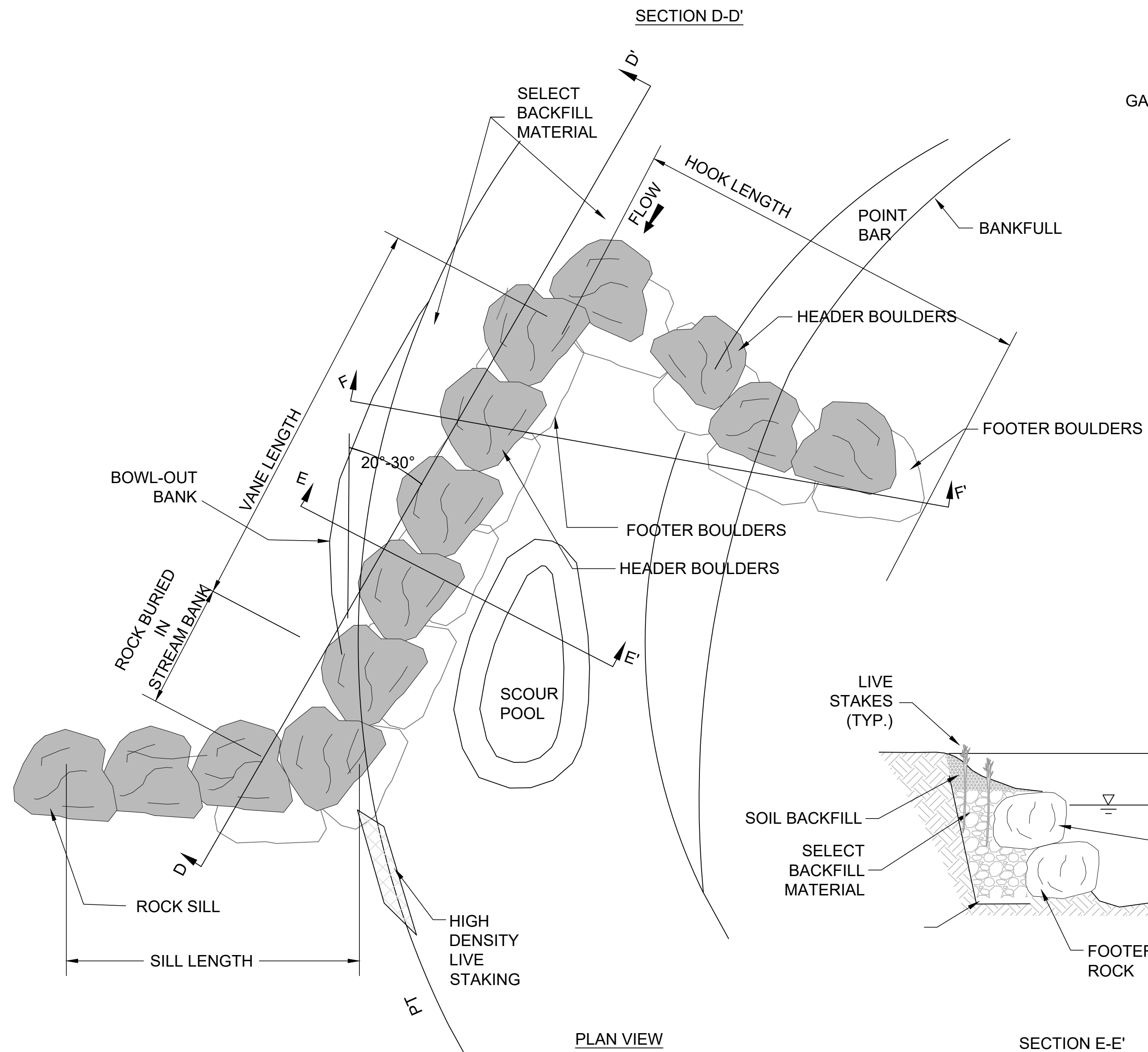
SHEET NUMBER
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C:\USERS\MICHAEL\PROJ\2022\BROOKLYN DAM\C3D\SHEETS\MASTERDETAIL.DWG | MICHA | SAVED: Wednesday, January 12, 2022 7:24:09 AM | ACAD.CTB | PLOTTED: Wednesday, January 11, 2023 3:18:21 PM



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RIVER RAISIN - MILL STREET
 BROOKLYN DAM RESTORATION
 NEAR BROOKLYN
 JACKSON COUNTY, MI
 NOT FOR CONSTRUCTION
 30% CONCEPTUAL DESIGN - DRAFT
 AUGMENTED RIFFLE DETAIL



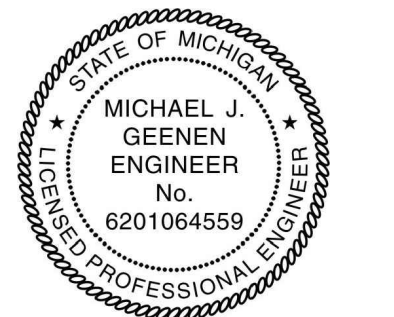
NOTES:

- BOULDERS FOR THE CONSTRUCTED RIFFLE MUST BE A MINIMUM OF 1-2 TN BOULDER WITH A MIN. DIAMETER OF 2-3FT.
- FOOTER BOULDERS ARE BOULDERS PLACED TO PROVIDE A FOUNDATION AND SCOUR PROTECTION FOR THE HEADER BOULDERS.
- HEADER BOULDERS SHALL BE UNDERLAIN BY FOOTER BOULDERS UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
- HEADER BOULDERS ARE THE TOP MOST BOULDER USED IN EACH STRUCTURE. ALL HEADER BULDERS CAN BE SEEN PARTIALLY PROTRUDING FROM THE WATER SURFACE DURING EXTREMELY LOW FLOWS.
- HEADER BOULDERS SHALL BE OFFSET SLIGHTLY DOWNSTREAM OF THE FOOTING BOULDERS WHERE SCOUR POOLS ARE ANTICIPATED TO FORM AS SHOWN IN THE DETAIL.
- SILL BOULDERS SHALL BE PLACED PERPENDICULAR TO THE BANKFULL FLOW DIRECTION.
- THE FOOTER BOULDERS SHALL EXTEND FROM THE SILL BOULDER TO THE END OF THE HEADER BOULDER TOWARD THE BANK.
- HOOK BOULDERS SHALL EXTEND FROM THE HEADER BOULDER TO BEYOND BANKFULL WIDTH.
- SET INVERTS AT ELEVATION SHOWN ON THE PLAN AND PROFILE SHEETS. INVERTS AND ELEVATIONS WILL BE PROVIDED TO THE CONTRACTOR AS A 2004 FORMAT DWG FILE. NO ELEVATIONS OF THE BOULDER DROPS STRUCTURE MAY VARY FROM THE PLAN LOCATIONS WITHOUT DIRECTIONS FROM THE ENGINEER.
- HEADER BOULDER SHALL TIE INTO THE STREAM BANK AT A MINIMUM ELEVATION OF 1/4 DMAX (MEASURED AT THE NEXT DOWNSTREAM RIFFLE) BELOW BANKFULL ELEVATION AND A MINIMUM ELEVATION OF 1/2 DMAX (MEASURED AT THE NEXT DOWNSTREAM RIFFLE) BELOW BANKFULL ELEVATION UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
- ALL GAPS/VOIDS LARGER THAN 1 INCH BETWEEN THE HEADER AND FOOTING BOULDERS SHALL BE CHINKED WITH GRAVEL AND COBBLES.
- ON THE UPSTREAM SIDE OF THE BOULDERS SELECT BACKFILL SHALL BE PLACED FOR THE ENTIRE LENGTH OF THE BOULDER HOOK AS SHOWN.
- SELECT BACKFILL AND SOIL BACKFILL MATERIAL SHALL BE COMPACTED SUCH THAT FUTURE SETTLEMENT OF THE MATERIAL IS KEPT TO A MINIMUM.
- THE SURFACE OF THIS STRUCTURE SHALL BE FINISHED TO A SMOOTH AND COMPACT SURFACE IN ACCORDANCE WITH THE LINES, GRADES, AND CROSS-SECTIONS OR ELEVATIONS SHOWN ON THE DRAWINGS. THE DEGREE OF FINISH FOR INVERT ELEVATIONS SHALL BE WITHIN 0.1 FT OF THE GRADES AND ELEVATIONS INDICATED.
- RE-DRESSING OF CHANNEL AND BANKFULL BENCH/FLOODPLAIN WILL LIKELY BE REQUIRED FOLLOWING INSTALLATION OF IN-STREAM STRUCTURES AND SHALL BE CONSIDERED INCIDENTAL TO CONSTRUCTION.
- SEE THE PLANTING TABLE FOR DETAILS ON HIGH DENSITY LIVE STAKING.
- NO LIVE STAKES SHALL BE INSTALLED ON THE UPSTREAM SIDE OF THE VANE AT OR BELOW THE TIE-IN ELEVATION OF THE HEADER LOG WITH THE STREAM BANK UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
- FOOTER DEPTH ON ALL STRUCTURES REQUIRING FOOTERS SHALL BE 6 TIMES GREATER THAN THE DROP BETWEEN THE STRUCTURE AND THE FOOTERED STRUCTURE DIRECTLY UPSTREAM.

NOTE:

THE DEPARTURE ANGLE SHOWN ABOVE IS DEPICTED IN SUCH A WAY TO EMPHASIZE DETAIL. ACTUAL DEPARTURE ANGLE AND STRUCTURE LOCATION SHALL BE AS SHOWN ON THE PLAN AND PROFILE SHEETS AND WILL BE PROVIDED TO THE CONTRACTOR AS A 2004 FORMAT DWG FILE AND LN3 FILE.

DETAIL - BOULDER J-HOOK
 NOT TO SCALE



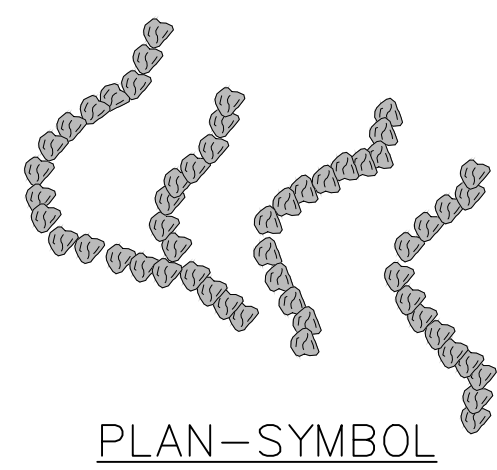
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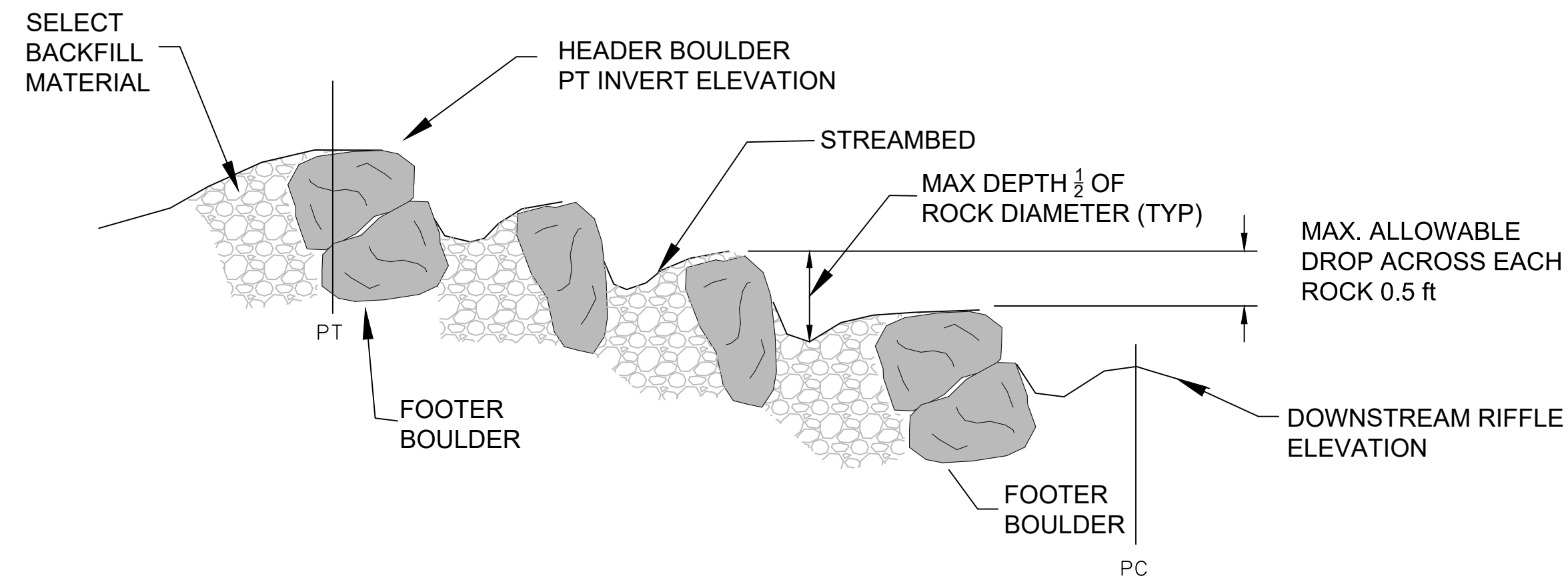
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SHEET NUMBER
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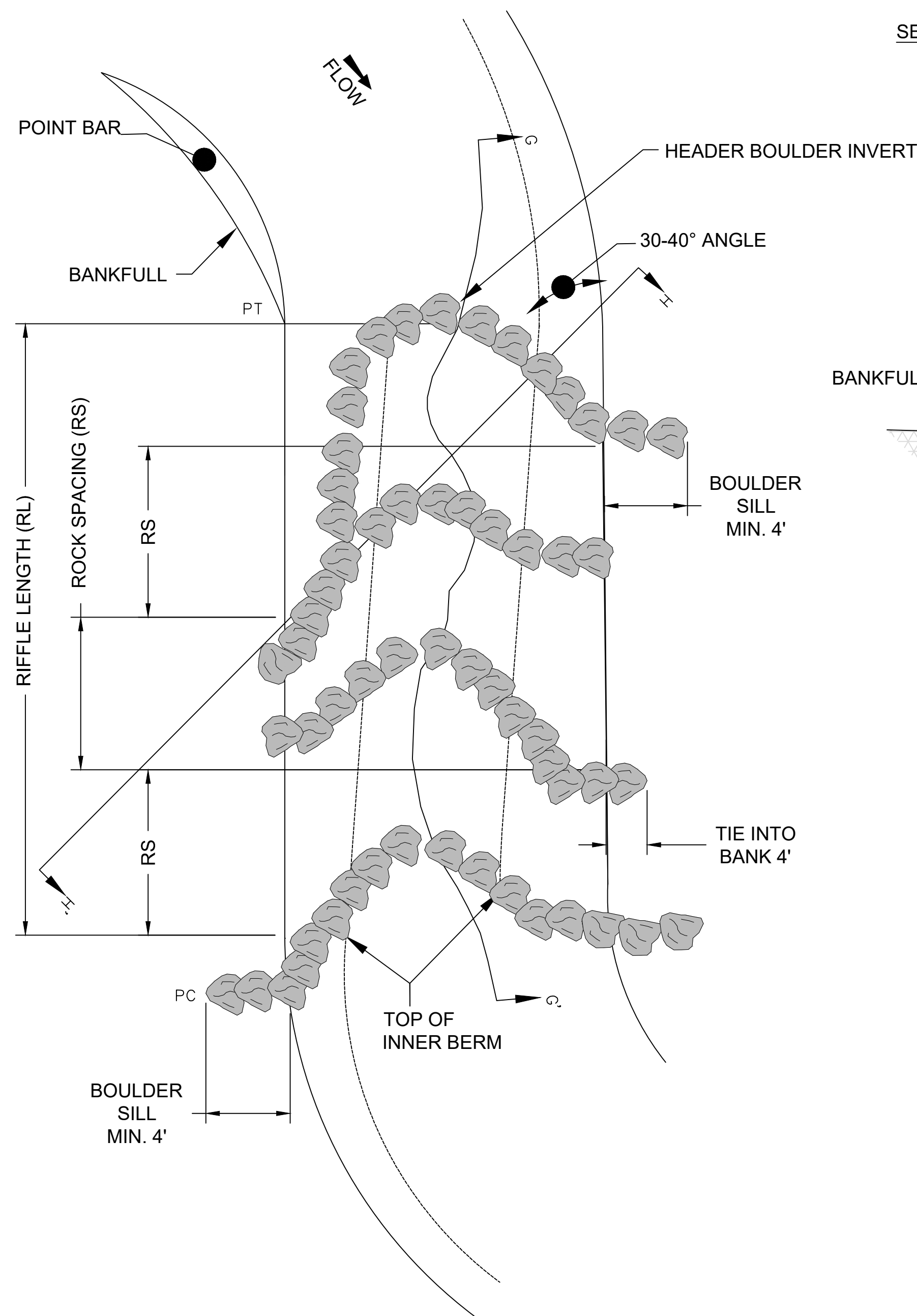
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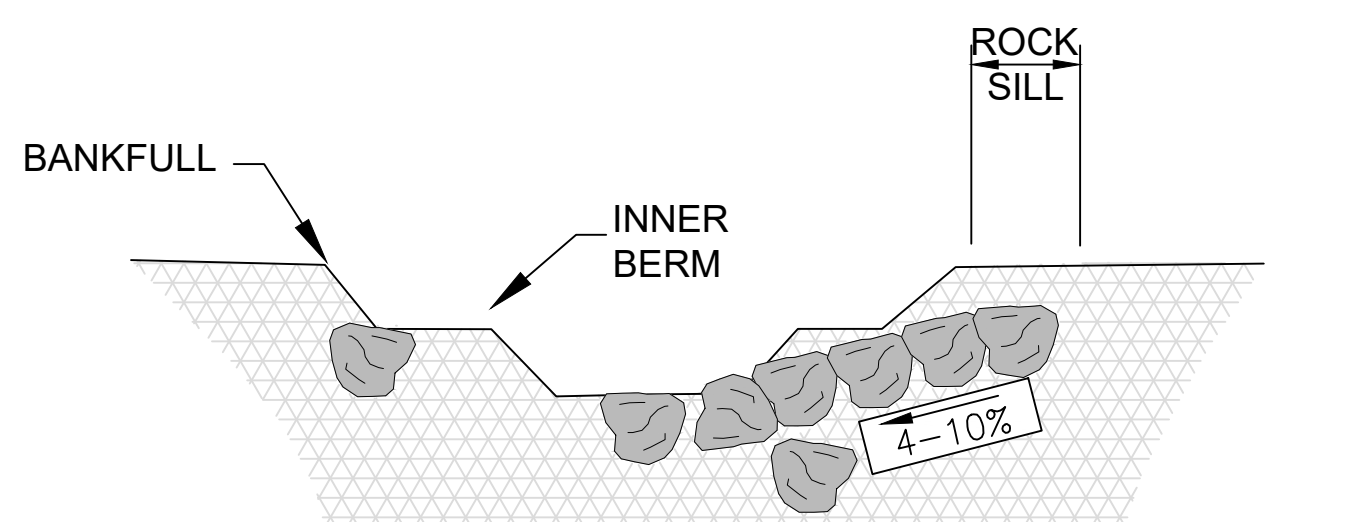
PLAN-SYMBOL



SECTION G-G'



PLAN VIEW



SECTION H-H'

DETAIL - BOULDER CONSTRUCTED RIFFLE
NOT TO SCALE



BOULDER CONSTRUCTED RIFFLE
CONSTRUCTED MARCH 2019

NOTES:

- BOULDERS FOR THE CONSTRUCTED RIFFLE MUST BE A MIN. DIAMETER OF 18".
- THE UPSTREAM AND DOWNSTREAM HEADER BOULDERS SHALL BE UNDERLAIN BY FOOTER BOULDERS UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
- HEADER BOULDERS ARE THE TOP MOST BOULDERS USED IN EACH STRUCTURE. HEADER BOULDERS FOR THIS STRUCTURE ARE ONLY VISIBLE BETWEEN THE INNER BERMS.
- HEADER BOULDERS SHALL BE OFFSET SLIGHTLY UPSTREAM OF THE FOOTER BOULDERS. FOOTER BOULDERS SHALL BE INSTALLED BEFORE THE HEADER BOULDERS.
- SET INVERTS AT ELEVATION SHOWN ON PLAN AND PROFILE SHEETS. INVERTS AND ELEVATIONS WILL BE PROVIDED TO THE CONTRACTOR AS A DWG FILE. NO ELEVATIONS OF THE CONSTRUCTED RIFFLE ARMS MAY VARY FROM THE PLAN LOCATIONS WITHOUT DIRECTION FROM THE ENGINEER.
- THE DROP IN ELEVATION ACROSS THE STRUCTURE SHALL NOT EXCEED 0.5FT UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
- MINI-VANES WILL BE SPACED IN THE RIFFLE AS A FUNCTION OF THE RIFFLE LENGTH.
- THE MOST UPSTREAM RIFFLE MINI-VANE ARM SHALL BE PLACED SUCH THAT THE BANK TIE-IN IS ON THE SAME SIDE AS THE NEXT UPSTREAM OUTSIDE BEND IN ORDER TO SERVE AS A VANE AND HELP DIRECT STREAM FLOW AWAY FROM THE PREVIOUS OUTSIDE BEND. LOCATION OF ALL RIFFLE VANE ARMS ARE SHOWN ON THE PLAN AND PROFILE SHEETS.
- THE MOST DOWNSTREAM MINI-VANE ARM SHALL BE PLACED SUCH THAT THE HIGH POINT IS ON THE SAME SIDE AS THE NEXT DOWNSTREAM OUTSIDE BEND IN ORDER TO HELP DIRECT STREAM FLOW FROM THE NEXT OUTSIDE BEND.
- THE VERTICAL SLOPE OF EACH MINI-VANE ARM SHALL NOT EXCEED 10% UNLESS OTHERWISE DIRECTED BY THE ENGINEER. THE SLOPES WILL BE DICTATED BY THE WIDTH-TO-DEPTH RATIO OF THE REACH, TYPICAL RIFFLE INNER BERM CHANNEL, VERTICAL DROP OVER THE LOG, AND LOG DIAMETER.
- ALL GAPS/VOIDS LARGER THAN 2" BETWEEN THE HEADER AND FOOTER BOULDERS SHALL BE HAND CHINKED WITH COBBLE AND GRAVEL ON THE UPSTREAM SIDE. ALL CHINKING SHALL BE APPROVED BY THE ENGINEER BEFORE THE MINI-VANES ARE BACKFILLED.
- BACKFILL VANES WITH SELECT BACKFILL MATERIAL AS SHOWN AND DEFINED IN THE CONSTRUCTED RIFFLE DETAIL. BACKFILL MATERIAL TO HAVE A GRADATION OF 25% BY VOLUME OF CLASS II RIP RAP, 25% BY VOLUME CLASS I RIP RAP, AND 50% BY VOLUME HARVESTED IN PLACE STREAM BED MATERIAL.
- SELECT BACKFILL AND SOIL BACKFILL MATERIAL SHALL BE COMPACTED SUCH THAT FUTURE SETTLEMENT OF THE MATERIAL IS KEPT TO A MINIMUM.
- THE SURFACE OF THIS STRUCTURE SHALL BE FINISHED TO A SMOOTH AND COMPACT SURFACE IN ACCORDANCE WITH THE LINES, GRADES, AND CROSS-SECTIONS OR ELEVATIONS SHOWN ON THE DRAWINGS. THE DEGREE OF FINISH FOR INVERT ELEVATIONS SHALL BE WITHIN 0.1' OF THE GRADES AND ELEVATIONS INDICATED, PROVIDED ANY HEIGHT DOES NOT EXCEED MAX. ALLOWABLE DROP OF 0.5' FOR THIS STRUCTURE.
- RE-DRESSING OF CHANNEL AND BANKFULL BENCH/FLOODPLAIN WILL LIKELY BE REQUIRED FOLLOWING INSTALLATION OF IN-STREAM STRUCTURES AND SHALL BE CONSIDERED INCIDENTAL TO CONSTRUCTION.
- FOOTER DEPTH ON ALL STRUCTURES REQUIRING FOOTERS SHALL BE 6 TIMES GREATER THAN THE DROP BETWEEN THE STRUCTURE AND THE FOOTER STRUCTURE DIRECTLY UPSTREAM.
- THE DEPARTURE ANGLE SHOWN ABOVE IS DEPICTED IN SUCH A WAY TO EMPHASIZE DETAIL. ACTUAL DEPARTURE ANGLE SHALL BE AS SHOWN ON THE PLAN AND PROFILE SHEETS WILL BE PROVIDED TO THE CONTRACTOR AS A DWG FILE AND LN3 FILE.

APPROVED BY: TL	CHECKED BY: CB	DRAWN BY: MUG
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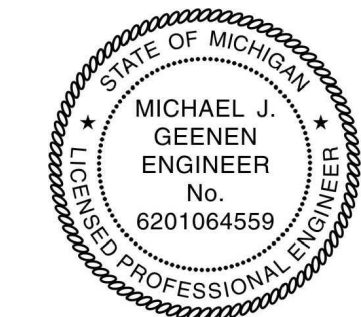
RIVER RAISIN - MILL STREET
BROOKLYN DAM RESTORATION
NEAR BROOKLYN
JACKSON COUNTY, MI
NOT FOR CONSTRUCTION
30% CONCEPTUAL DESIGN - DRAFT
J-HOOK DETAIL



NISWANDER ENVIRONMENTAL
9436 MALTBY ROAD
BRIGHTON, MI 48116



RIVER RAISIN WATERSHED COUNCIL
320 SPRINGBROOK AVE
ADRIAN, MI 49221



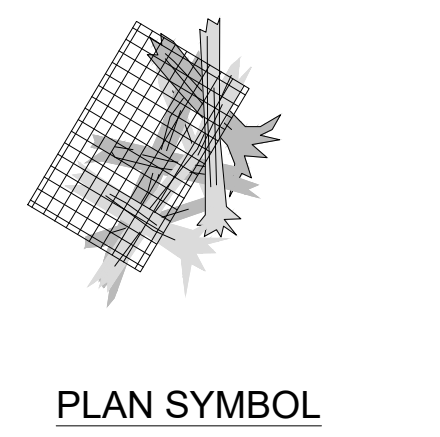
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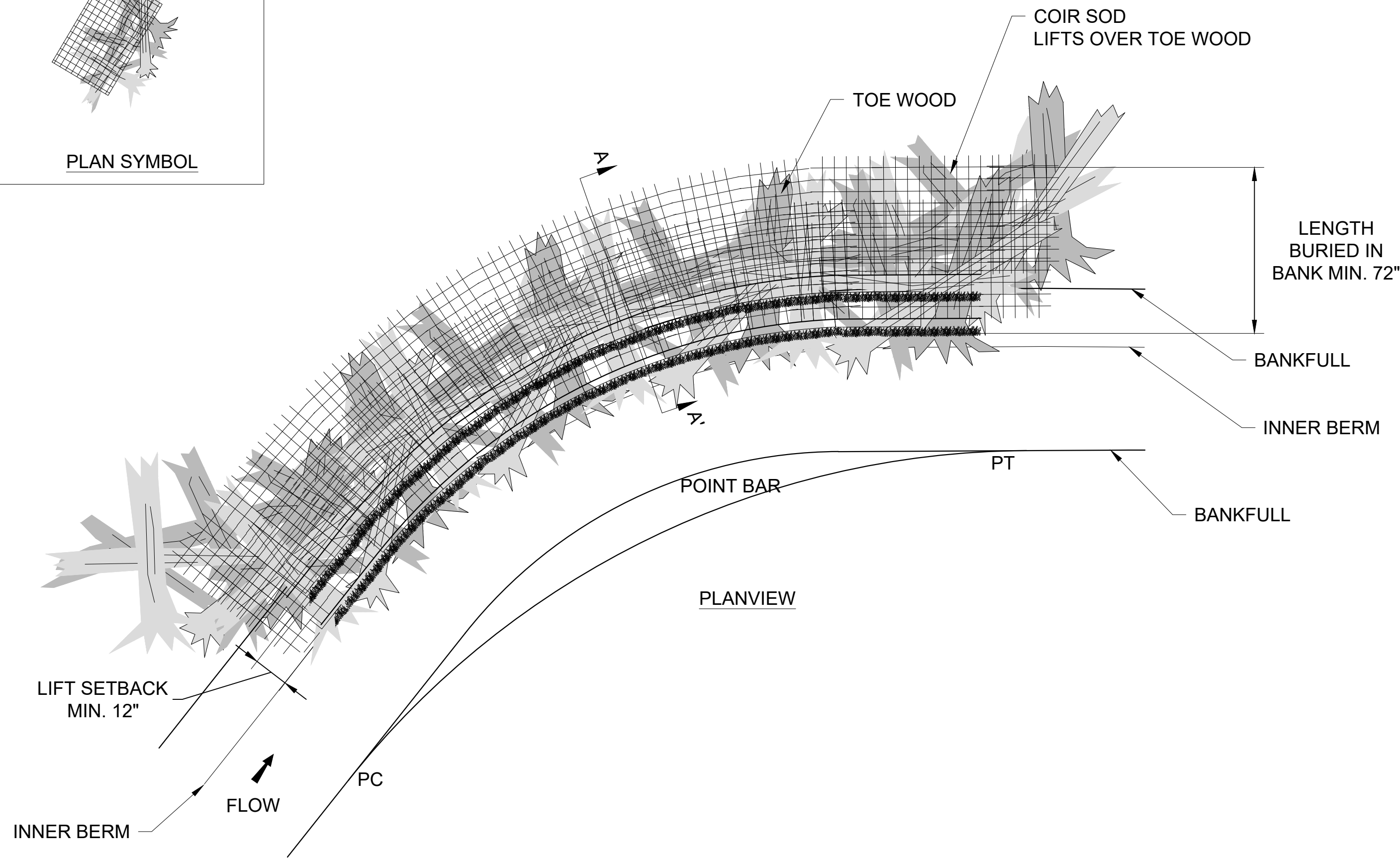
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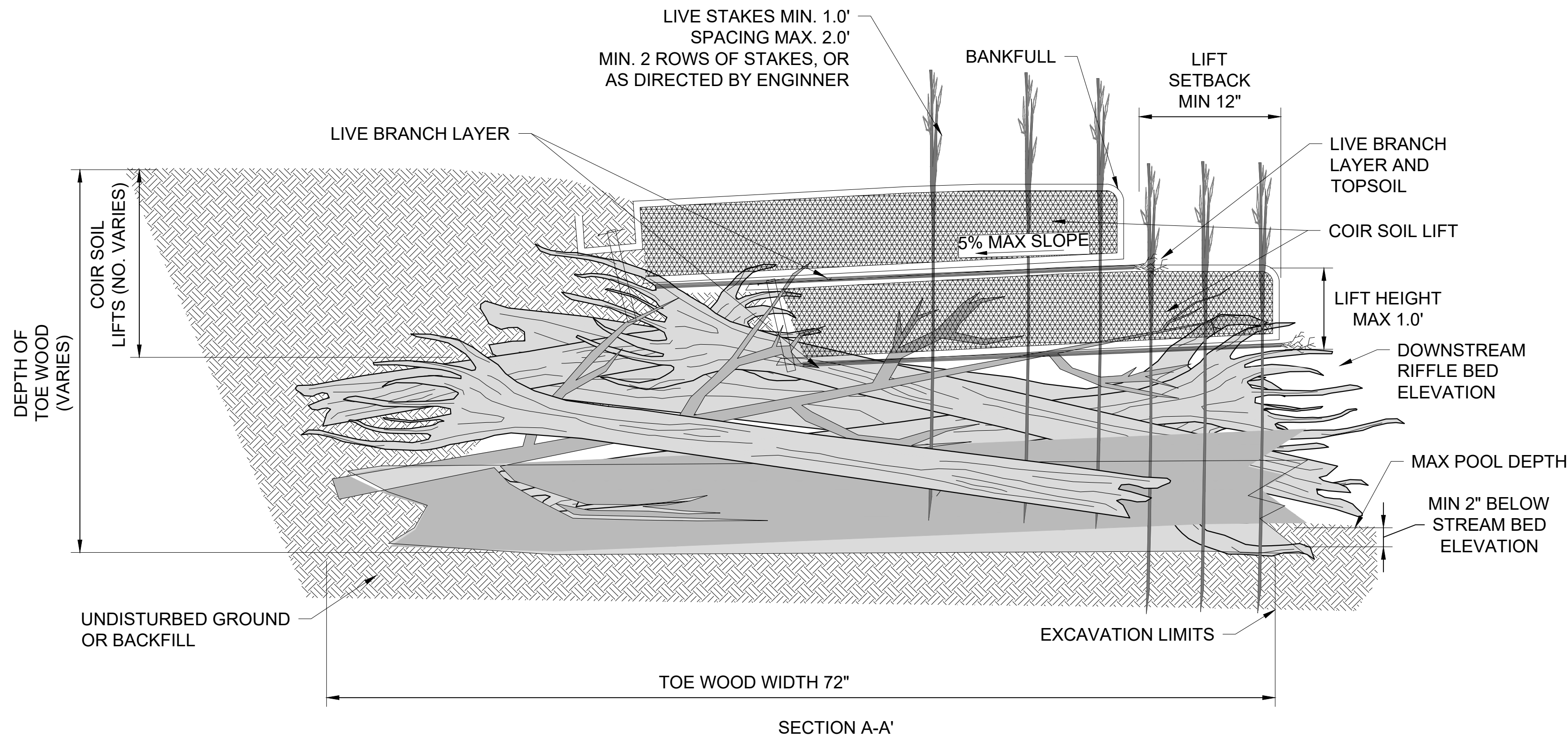
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PLAN SYMBOL



PLANVIEW



DETAIL - TOE WOOD WITH COIR SOIL LIFTS

NOT TO SCALE

RIVERSHARED DISCLAIMER

THESE EXAMPLE DRAWINGS CREATED BY RIVERSHARED ARE DESIGNED AND OFFERED AS EXAMPLES OF POTENTIAL ENGINEERING OPTIONS FOR WATERWAYS. NOTHING IN THESE DRAWINGS PROVIDES SUGGESTIONS OR DETERMINATIONS FOR HOW ANY PARTICULAR PROJECT IS OR SHOULD BE COMPLETED DUE TO THE NEED TO CONSIDER THE SPECIFIC ECOLOGICAL AND GEOLOGICAL FEATURES OF THE PROJECT AREA, ENGINEERING DISCRETION REGARDING ACHIEVING THE PURPOSE AND GOALS OF THE PROJECT WITHIN THE PROJECT AREA, AND SUCH OTHER DIFFERENCES THAT MAY EXIST FROM THE CONDITIONS ASSUMED IN THESE EXAMPLE DRAWINGS AND ANY PARTICULAR PROJECT. RIVERSHARED HAS NO ACTUAL OR INFERRED KNOWLEDGE OF YOUR PROJECT AND ADVISES YOU TO USE YOUR DISCRETION IN RELATION TO THESE EXAMPLE DRAWINGS. RIVERSHARED EXPLICITLY STATES THESE EXAMPLE DRAWINGS SHOULD NOT BE USED AS ANYTHING OTHER THAN EXAMPLES. ANY REFERENCE IN THESE EXAMPLE DRAWINGS BRANDS IS FOR INFORMATIONAL PURPOSES ONLY AND DOES NOT CONSTITUTE A RECOMMENDATION OR SUPPORT FOR ANY PRODUCT OR SERVICE OFFERED BY THE BRAND. TO THE EXTENT THERE IS A DISPUTE OR ISSUE ARISING OUT OF REFERENCE TO OR USE OF THESE DRAWINGS, THE USER AGREES TO ADDRESS SUCH ISSUES AT THE STATE COURTS LOCATED IN LARIMER COUNTY, COLORADO, REGARDLESS OF WHERE ANY REFERENCE TO THESE EXAMPLE DRAWINGS OCCUR OR OCCURRED.



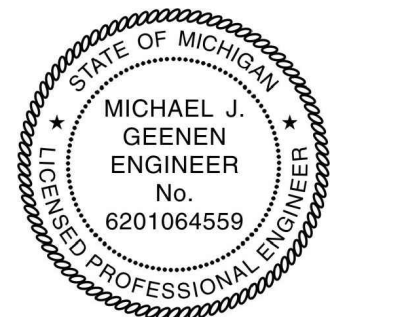
TOE WOOD WITH COIR SOIL LIFTS CONSTRUCTED

NOTES:

1. THIS STRUCTURE PROVIDES PROTECTION TO THE BANKS OF NEWLY CONSTRUCTED STREAM CHANNELS. WOODY DEBRIS OF ALL SIZES CAN BE USED IN THE CONSTRUCTION OF THIS STRUCTURE. THE STABILITY OF THE LOWER PORTION OF THE STREAMBANK IS CRITICAL TO THE SUCCESS OF THE PROJECT. THE INSTALLATION OF ALTERNATE BANK PROTECTION STRUCTURES (E.G., HAY/STRAW BALES) WILL ONLY BE CONSIDERED IF WOOD IS NOT AVAILABLE ONSITE.
2. COARSE/LARGE WOODY DEBRIS CONSISTS OF LOGS, ROOTWADS, AND LARGE BRANCHES WHICH ARE NOT SUITABLE FOR CONSTRUCTION OF LOG STRUCTURES. ALL MATERIALS ARE TO BE APPROVED BY THE ENGINEER.
3. A TRENCH SHALL BE EXCAVATED ALONG THE OUTER BANK OF THE POOL. THE ELEVATION OF THE TRENCH SHALL BE AT OR BELOW MAX. POOL DEPTH.
4. COARSE/LARGE WOODY DEBRIS SHALL BE INSTALLED IN THE TRENCH WITH THE LARGEST MATERIAL PLACED FIRST. THE LOGS OR WOOD MATERIAL SHALL BE PLACED PERPENDICULAR TO THE FLOW OF WATER. LOGS SHALL BE PLACED IN A CROSSING PATTERN OR WEAVE SUCH THAT EACH LOG/BRANCH IS ANCHORED BY ANOTHER LOG/BRANCH. THE COARSE/LARGE WOODY DEBRIS SHALL BE INSTALLED TO A HEIGHT OF 3/4 OF THE FINISHED HEIGHT OF THE WOODY DEBRIS WITH THE FINE/SMALL WOODY DEBRIS MAKING UP THE REMAINING 1/4 OF THE TOTAL HEIGHT.
5. FINE/SMALL WOODY DEBRIS CONSISTS OF MEDIUM TO SMALL LIMBS, BRANCHES, BUSHES, AND/OR SMALL LOGS. INVASIVE SPECIES SHALL NOT BE USED. ALL MATERIALS ARE TO BE APPROVED BY THE ENGINEER.
6. FINE/SMALL WOODY DEBRIS SHALL BE PLACED ON TOP OF THE COARSE/LARGE WOODY DEBRIS WITH THE LARGEST MATERIAL BEING PLACED FIRST AND THE SMALLEST MATERIAL PLACED LAST. THE FINE WOODY DEBRIS SHALL BE INSTALLED TO AN ELEVATION EQUAL TO THE INVERT OF THE DOWNTOWN RIFFLE.
7. ALL WOODY DEBRIS SHALL BE COMPACTED WITH THE EXCAVATOR BUCKET IN ORDER TO REDUCE THE PRESENCE OF VOIDS IN THE SMALL/FINE WOODY DEBRIS LAYER.
8. SELECT BACKFILL/TOPSOIL SHALL BE INSTALLED ON TOP OF WOODY DEBRIS TO CREATE A LEVEL SUBSTRATE FOR THE SOD MATS.
9. NATIVE SOD MATS SALVAGED ONSITE SHALL BE WEED FREE AND APPROXIMATELY 3' X 3' WITH A MINIMUM OF 8" OF INTACT SOIL AND ROOTMASS ATTACHED. LAYERS OF SOD MATS AND, IF NEEDED TO CREATE A FLAT SURFACE, TOPSOIL SHALL BE PLACED UNTIL THE FINISHED ELEVATION EQUALS THE ELEVATION OF BANKFULL.
10. SOD MATS SHALL BE INSTALLED IN LAYERS SO THAT THE FINISHED ELEVATION OF THE LAST SOD MAT MATCHES THE SPECIFIED BANKFULL ELEVATION.
11. THE SURFACE OF THIS STRUCTURE SHALL BE FINISHED TO A SMOOTH AND COMPACT SURFACE IN ACCORDANCE WITH THE LINES, GRADES, AND CROSS-SECTIONS OR ELEVATIONS SHOWN ON THE DRAWINGS. THE DEGREE OF FINISH FOR ELEVATIONS SHALL BE WITHIN +/- 0.05 FT OF THE GRADES AND ELEVATIONS INDICATED ON THE PLANS OR APPROVED BY THE ENGINEER
12. DRESSING OF CHANNEL AND BANKFULL BENCH/FLOODPLAIN WILL LIKELY BE REQUIRED FOLLOWING INSTALLATION OF BANK STRUCTURES AND SHALL BE CONSIDERED INCIDENTAL TO CONSTRUCTION.
13. LIVE STAKES SHALL BE OF SPECIES APPROVED BY THE ENGINEER. LIVE STAKES SHALL BE 2-3' LONG AND A MIN. OF 1" IN DIAMETER AND INSTALLED WITH 2/3 OF THE LENGTH BELOW GROUND WITH A MINIMUM OF 2 BUD SCARS BELOW THE GROUND AND 2 ABOVE GROUND.
14. LIVE STAKES SHALL BE PLACED ON THE SLOPE FROM THE INNER BERM TO HALF BANK FULL HEIGHT.
15. WOOD STAKES SHALL BE 1" X 2" AND A MINIMUM OF 18" LONG. WOODEN STAKES SHALL BE INSTALLED FROM THE HALF BANK FULL TO BANKFULL.

APPROVED BY: TL	CHECKED BY: CB	DRAWN BY: MUG
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RIVER RAISIN - MILL STREET
 BROOKLYN DAM RESTORATION
 NEAR BROOKLYN
 JACKSON COUNTY, MI
 NOT FOR CONSTRUCTION
 30% CONCEPTUAL DESIGN - DRAFT
 CONSTRUCTED BOULDER RIFFLE DETAIL



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NTS

SHEET NUMBER
 9 OF 10

