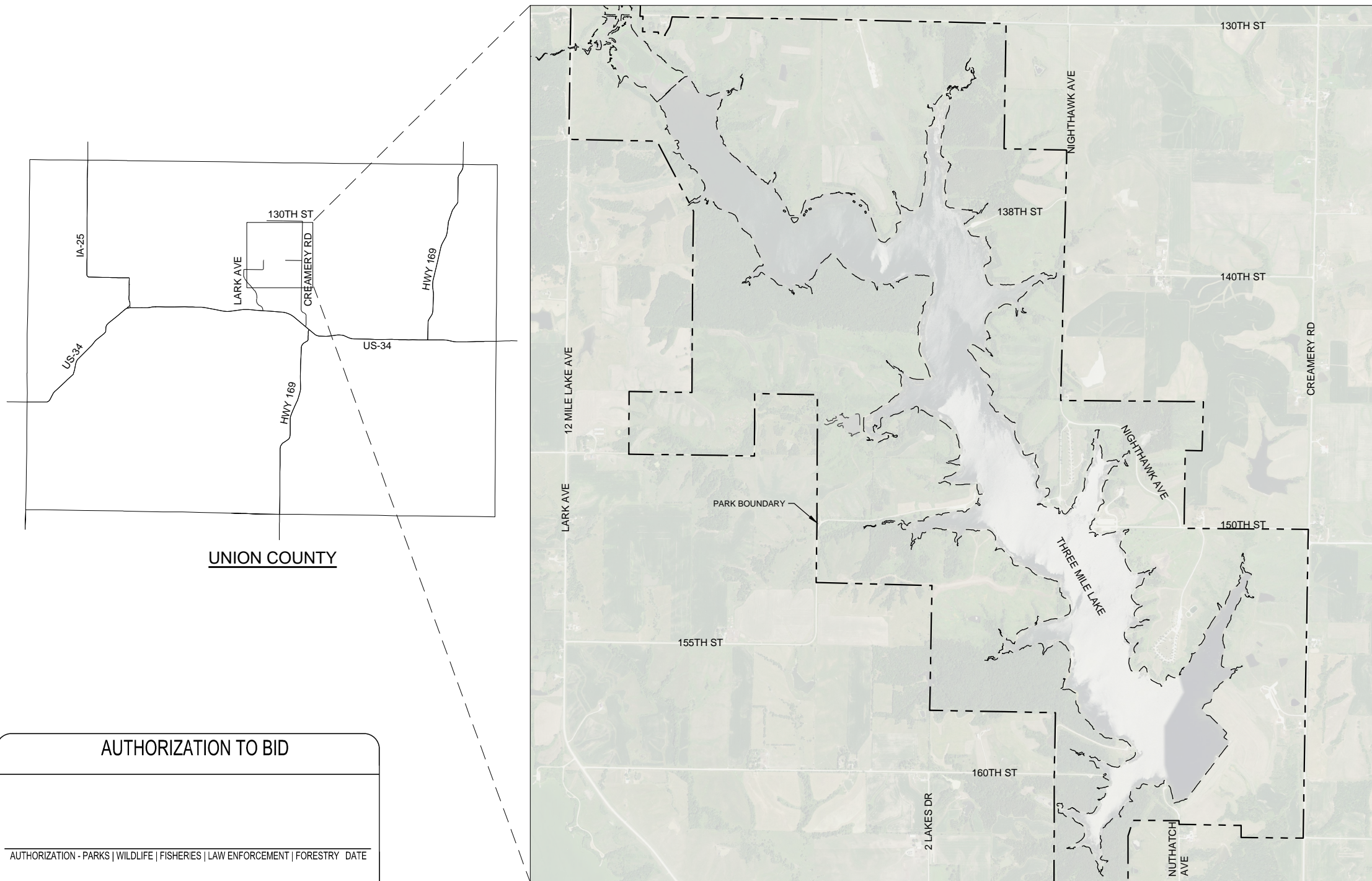


# THREE MILE LAKE RESTORATION PHASE 2



IOWA DEPARTMENT OF  
NATURAL RESOURCES



SITE MAP

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UNION COUNTY

THREE MILE LAKE RESTORATION PHASE 2  
 IOWA DEPARTMENT OF NATURAL RESOURCES  
 UNION COUNTY, IOWA  
 2023

ENGINEER'S SEAL

REVISIONS	
NO.	DATE

DESIGNED BY: SEM  
 DRAWN BY: CKW  
 QA / QC BY: MKS  
 PROJECT NO.: 007-20-01  
 DATE: 02.13.2023

TITLE  
**COVER SHEET**

SHEET  
**A.1**

AUTHORIZATION TO BID

---

AUTHORIZATION - PARKS | WILDLIFE | FISHERIES | LAW ENFORCEMENT | FORESTRY DATE \_\_\_\_\_

---

ENGINEERING BUREAU CHIEF \_\_\_\_\_ DATE \_\_\_\_\_

I HEREBY CERTIFY THAT THIS ENGINEERING DOCUMENT WAS PREPARED BY ME OR UNDER MY DIRECT PERSONAL SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF IOWA.

*Michael K. Sotak* 2-14-23  
 MICHAEL K. SOTAK DATE  
 LICENSE NO: 16681  
 MY LICENSE RENEWAL DATE IS: 12-31-24  
 PAGES OR SHEETS COVERED BY THIS SEAL:  
**ALL SHEETS**

**GENERAL NOTES:**

- THE LOCATIONS OF ALL AERIAL AND UNDERGROUND UTILITY FACILITIES ARE APPROXIMATE OR MAY NOT BE INDICATED IN THESE PLANS. UNDERGROUND FACILITIES, WHETHER INDICATED OR NOT, SHALL BE LOCATED AND FLAGGED BY THE CONTRACTOR AND UTILITY COMPANIES 48 HOURS BEFORE WORK IS STARTED. VERIFY UTILITY LOCATIONS BY CONTACTING THE IOWA ONE CALL (ONLINE AT WWW.IOWONECALL.COM AND/OR CALL 811). THE CONTRACTOR SHALL BE REQUIRED TO NOTIFY AND COORDINATE ALL NECESSARY UTILITY SERVICE INTERRUPTIONS WITH THE OWNERS. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO PROTECT ALL EXISTING UTILITIES, PAVEMENT, STRUCTURES, FENCES, POLES, SIGNS, TREES, IRRIGATION LINES, SPRINKLER HEADS, SUB- DRAINS AND OTHER IMPROVEMENTS NOT DESIGNATED FOR REMOVAL. ANY DAMAGE CAUSED BY THE CONTRACTOR'S OPERATIONS SHALL BE REPAIRED BY THE CONTRACTOR AT THE CONTRACTOR'S EXPENSE.
- CONTOURS SHOWN ON THE PLANS ARE 2 FT CONTOURS FROM LIDAR & 2 FT CONTOUR BATHYMETRY FROM IDNR. ELEVATIONS CALLED OUT ON THE PLANS ARE REFERENCED TO NAVD 88 VERTICAL DATUM. HORIZONTAL CONTROL IS NAD83 IOWA STATE PLANE NORTH.
- THE CONTRACTOR SHALL CONDUCT ALL OPERATIONS AND MAINTAIN CONSTRUCTION WORK AREA IN A SAFE MANNER IN ACCORDANCE WITH OSHA COMPLIANCE.
- CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING ALL TEMPORARY MARKERS, LIGHTS, SIGNS, FLAGMEN, BARRICADES AND OTHER PROTECTIVE DEVICES TO PROVIDE ADEQUATE TRAFFIC CONTROL. THIS SHALL INCLUDE ANY BARRICADES OR SIGNS NECESSARY FOR PEDESTRIAN TRAIL CLOSURE.
- ELECTRONIC GRADING FILES AND EXISTING UTILITIES AND WETLANDS CAN BE PROVIDED BY ENGINEER UPON REQUEST.
- CONTRACTOR IS RESPONSIBLE FOR REPAIRING DAMAGE TO ROADS USED AS HAUL ROUTES. CONDITIONS PRIOR TO CONSTRUCTION TO BE DOCUMENTED BY THE CONTRACTOR AND MUST BE RESTORED TO ORIGINAL CONDITIONS OR BETTER BY SMOOTHING COMPACTED SOILS PRIOR TO FINISHED GRADING AND SEEDING WITH SPECIFIED MIX AND METHODS.
- ACCESS ROUTES IDENTIFIED TO EACH SITE MUST BE STRICTLY ABIDED TO. CONTRACTOR MAY PROPOSE ALTERNATE ROUTES FOR APPROVAL BY FIELD ENGINEER PRIOR TO MOBILIZATION.
- THE QUANTITIES SHOWN FOR SEEDING INCLUDE ALL NON-PAVED AREAS WITHIN THE LIMITS OF CONSTRUCTION AND DOES NOT ACCOUNT FOR ANY AREA THAT IS DISTURBED OUTSIDE THE LIMITS OF CONSTRUCTION. DISTURBED AREAS OUTSIDE THE LIMITS OF CONSTRUCTION MUST BE RESTORED, SEEDED, AND MULCHED AND WILL BE CONSIDERED INCIDENTAL TO THE PROJECT.
- BORROW MATERIAL TO BE OBTAINED FROM EACH POND AS DESCRIBED ON PLAN SHEETS. COORDINATE WITH FIELD ENGINEER TO DETERMINE SUITABLE FILL MATERIAL. IF SUITABLE MATERIAL CANNOT BE OBTAINED ON SITE AS DESCRIBED, CONTRACTOR TO COORDINATE WITH FIELD ENGINEER.
- ALL SEEDED AREAS MUST BE HYDROMULCHED.
- CLEARING AND GRUBBING TO BE PERFORMED ONLY IN LOCATIONS NECESSARY TO CONSTRUCT/BORROW AND ACCESS THE SITE. CONTRACTOR SHALL LIMIT CONSTRUCTION OPERATIONS TO MINIMIZE CLEARING AND GRUBBING EXTENTS.
- TREES/SHRUBS AND ANY UNUSABLE FILL MATERIAL EXCAVATED, TO OBTAIN BORROW, TO BE SPOILED ON SITE IN EXISTING TREADED AREA OUTSIDE OF PROPOSED AREAS OF CONSTRUCTION OR PERMANENT POOL, UNLESS DIRECTED OTHERWISE ON PLAN SHEETS.
- PROTECT BY WHATEVER MEANS REQUIRED ALL FENCES, SIGNS, STRUCTURES, DRIVES, SIDEWALKS, STREETS, BUSHES, TREES, ETC. SHOWN TO REMAIN OUTSIDE OR INSIDE THE LIMITS OF CONSTRUCTION.
- THE OWNER SHALL RESERVE THE RIGHT TO SALVAGE ANY MATERIALS.
- REPAIR OR REPLACE ITEMS THAT ARE DAMAGED AS A RESULT OF DEMOLITION OR CONSTRUCTION TO MATCH OR IMPROVE EXISTING CONDITIONS.
- CONTRACTOR TO ATTEND THE PRE-CONSTRUCTION CONFERENCE WITH OWNER, ENGINEER, AND OTHER PROJECT STAKEHOLDERS.
- RAMPS AND HAUL ROUTES THAT THE CONTRACTOR CONSTRUCTS FOR HAULING MATERIAL AND TRANSPORTING EQUIPMENT SHALL BE CONSIDERED INCIDENTAL TO MOBILIZATION.
- CONTRACTOR RESPONSIBLE FOR SETTING AND MAINTAINING TEMPORARY CONTROL POINTS REQUIRED FOR CONSTRUCTION. CONTRACTOR IS RESPONSIBLE FOR ALL SURVEY AND STAKING REQUIREMENTS. GPS FILES ARE AVAILABLE UPON REQUEST.

**PERMITTING NOTES**

- NO TREE CLEARING PERMITTED BETWEEN APRIL 1 AND SEPTEMBER 30.
- CONTRACTOR MUST DEVELOP ALL DOCUMENTATION REQUIRED TO APPLY FOR AND OBTAIN THE NPDES PERMIT GRANTED BY IOWA DEPARTMENT OF NATURAL RESOURCES. CONTRACTOR MUST ADHERE TO THE REQUIREMENTS OF THE NPDES PERMIT AND SWPPP (SHEET S.1). CONTRACTOR TO IMPLEMENT COVER CROP ON ALL DISTURBED AREAS IMMEDIATELY UPON COMPLETION OF GRADING OPERATIONS AT SITE IN ACCORDANCE WITH PROJECT SPECIFICATIONS.
- CONTRACTOR MUST ADHERE TO THE REQUIREMENTS OF THE 404 PERMIT GRANTED BY THE UNITED STATES ARMY CORPS OF ENGINEERS FOR THIS PROJECT. A COPY OF THE REQUIREMENTS WILL BE PROVIDED TO THE SELECTED CONTRACTOR, OR UPON REQUEST.
- DELINEATED WETLANDS ARE SHOWN ON THE PLANS. CONTRACTOR SHALL LIMIT ALL CONSTRUCTION ACTIVITIES FROM ENCRACING UPON WETLAND AREAS, EXCEPT LOCATIONS SPECIFICALLY DESIGNATED IN THE CONSTRUCTION DRAWINGS. WETLAND AREAS THAT ARE TEMPORARILY DISTURBED DUE TO CONSTRUCTION ACTIVITIES SHALL BE RESTORED AND RESEEDED WITH THE WETLAND SEEDING MIX AS DETAILED IN THE PROJECT SPECIFICATIONS.
- AVOID WETLANDS UNLESS INDICATED ON SHEETS.

**BASE BID QUANTITIES**

**GENERAL**

ITEM	UNITS	QUANTITY
MOBILIZATION	LS	1
CLEARING AND GRUBBING	LS	1
EROSION CONTROL (SWPPP)	LS	1
SURVEY AND STAKING	LS	1
SEEDING - GRASS SEED MIX	AC	5.3

**BMP 1**

ITEM	UNITS	QUANTITY
STRIP, STOCKPILE AND REPLACE 9" TOPSOIL	CY	1763
EARTH EMBANKMENT	CY	5412
12" SMP	LF	74
CLASS "E" ROCK RIPRAP	TN	13
STANDARD FLEXAMAT	SF	16142
FLEXAMAT 10NW	SF	11021
SEEDING - GRASS SEED MIX	AC	0.5
SEEDING - COVER CROP	AC	1.1
TIMBER POLE	EA	4

**BMP 2**

ITEM	UNITS	QUANTITY
STRIP, STOCKPILE AND REPLACE 9" TOPSOIL	CY	1872
EARTH EMBANKMENT	CY	5822
12" SMP	LF	28
FLEXAMAT 10NW	SF	21212
SEEDING - GRASS SEED MIX	AC	0.2
SEEDING - COVER CROP	AC	1.5
TIMBER POLE	EA	4

**BMP 20**

ITEM	UNITS	QUANTITY
WATER HANDLING	LS	1
REMOVE AND DISPOSE OF EXISTING 24" CMP	LF	83
STRIP, STOCKPILE AND REPLACE 9" TOPSOIL	CY	126
TRENCH EXCAVATION, STOCKPILE AND BACKFILL	CY	1752
42" SMP	LF	82
DREDGE	CY	12000
CLASS "B" ROCK RIPRAP	TN	2
SEEDING - GRASS SEED MIX	AC	0.1
TIMBER POLE	EA	4

**BMP 20 SPOILS**

ITEM	UNITS	QUANTITY
EARTH EMBANKMENT	CY	1572
12" SOLID WALL PVC & APPURTENANCES	LF	65
12" PERFORATED PVC RISER W/ SOCK	EA	1
CLASS "E" ROCK RIPRAP	TN	4
SEEDING - COVER CROP	AC	3.7

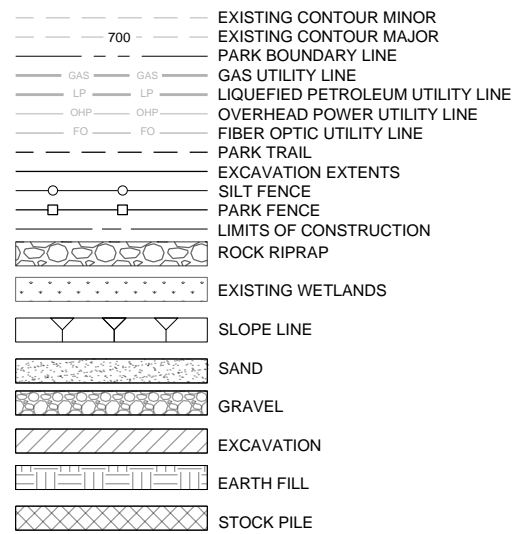
**IN-LAKE SITE DIKE**

ITEM	UNITS	QUANTITY
EARTH EMBANKMENT	CY	4,863
OVEREXCAVATION	CY	2,804
STRIP AND STOCKPILE 9" TOPSOIL	CY	1,176
FLEXAMAT 10NW	SF	53,101
FLEXAMAT ANCHOR SYSTEM	LS	1
SEEDING - COVER CROP	AC	1.8

**SHORELINE PROTECTION**

ITEM	UNITS	QUANTITY
STANDARD EROSION PROTECTION CLASS "E" ROCK RIPRAP	TN	1323
STANDARD EROSION PROTECTION EXCAVATION	CY	928
SPECIAL SHORELINE PROTECTION CLASS "E" ROCK RIPRAP	TN	10726

**LEGEND**



**ABBREVIATIONS**

- AC - ACRES
- CL - CENTERLINE
- CY - CUBIC YARD
- EL - ELEVATION
- FT - FEET
- MAX - MAXIMUM
- MIN - MINIMUM
- SY - SQUARE YARD
- SWPPP - STORM WATER POLLUTION PREVENTION PLAN
- TYP - TYPICAL
- EA - EACH
- TN - TON
- LS - LUMP SUM
- DIA - DIAMETER
- FES - FLARED END SECTION
- MFG - MANUFACTURER
- SMP - STRUCTURAL MECHANICAL PIPING

**JETTY EXTENSION**

ITEM	UNITS	QUANTITY
EMBANKMENT	CY	2852
OVEREXCAVATION	CY	1050
LOW GRADE CLASS "D" ROCK	TN	6550
CLASS "E" ROCK RIPRAP	TN	610
LIMESTONE CHIPS	TN	24

**JETTY BENCH 2**

ITEM	UNITS	QUANTITY
EMBANKMENT	CY	55
CLASS "E" ROCK RIPRAP	TN	162
LIMESTONE CHIPS	TN	11
PEA GRAVEL	TN	23

**JETTY BENCH 3**

ITEM	UNITS	QUANTITY
EMBANKMENT	CY	217
LOW GRADE CLASS "D" ROCK	TN	80
CLASS "E" ROCK RIPRAP	TN	190
LIMESTONE CHIPS	TN	18
PEA GRAVEL	TN	25

**FISH HABITAT**

ITEM	UNITS	QUANTITY
STANDARD ROCK REEF (21 TN OF PEA GRAVEL AND 219 TN OF RIPRAP)	EA	4
DOUBLE WIDE ROCK REEF (42 TN OF PEA GRAVEL AND 250 TN OF RIPRAP)	EA	4
ROCK FIELD (519 TN OF RIPRAP)	EA	4
ROCK PILES (225 TN OF RIPRAP, ROW OF 15 PILES WITH 15 TN EACH)	EA	5
SPAWNING BED (22 TN OF PEA GRAVEL)	EA	30

**STREAM MITIGATION**

ITEM	UNITS	QUANTITY
EXCAVATION (LOCAL SPOIL)	CY	650
TRENCH AND BACKFILL	CY	45
PLACE 9" TOPSOIL	CY	204
CLASS "E" ROCK RIPRAP	TN	201
CLASS "B" ROCK RIPRAP	TN	220
18"-24" DIA HARDWOOD LOGS	EA	10
LIVE STAKES	EA	36
SEEDING - FLOODPLAIN SEED MIX	AC	3.3
SEEDING - COVER CROP	AC	6.4

**BID ALTERNATE QUANTITIES**

**JETTY BENCH 1 - BID ALTERNATE #1**

ITEM	UNITS	QUANTITY
EMBANKMENT	CY	204
LOW GRADE CLASS "D" ROCK	TN	400
CLASS "E" ROCK RIPRAP	TN	284
LIMESTONE CHIPS	TN	21
PEA GRAVEL	TN	39

**FISH HABITAT - BID ALTERNATE #2**

ITEM	UNITS	QUANTITY
STANDARD ROCK REEF (21 TN OF PEA GRAVEL AND 219 TN OF RIPRAP)	EA	2
ROCK FIELD (519 TN OF RIPRAP)	EA	4
ROCK PILES (225 TN OF RIPRAP, ROW OF 15 PILES WITH 15 TN EACH)	EA	2

**CONTACT INFORMATION**

IOWA DEPARTMENT OF NATURAL RESOURCES  
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 515.238.2458  
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 DES MOINES, IA 50309  
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 MR. MICHAEL SOTAK, PE, D.WRE  
 402.502.7131  
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 12702 WESTPORT PARKWAY, SUITE 300  
 OMAHA, NEBRASKA 68138

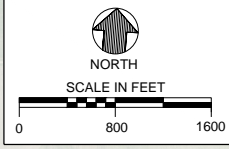
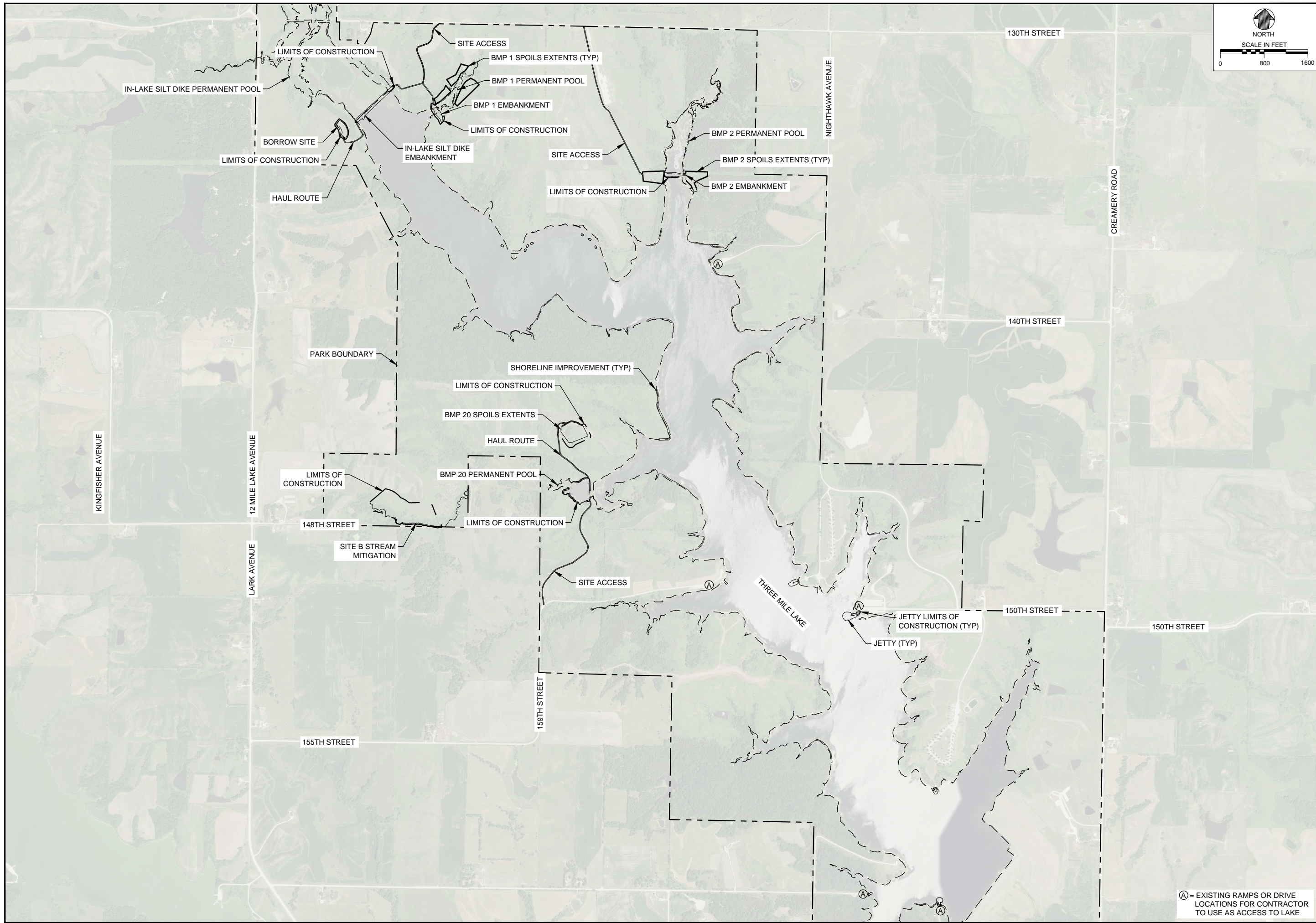
THREE MILE LAKE RESTORATION PHASE 2  
 IOWA DEPARTMENT OF NATURAL RESOURCES  
 UNION COUNTY, IOWA  
 2023

ENGINEER'S SEAL

REVISIONS	
NO.	DATE

DESIGNED BY: SEM  
 DRAWN BY: CKW  
 QA / QC BY: MKS  
 PROJECT NO.: 007-20-01  
 DATE: 02.13.2023

**TITLE**  
**GENERAL NOTES**



THREE MILE LAKE RESTORATION PHASE 2  
IOWA DEPARTMENT OF NATURAL RESOURCES  
UNION COUNTY, IOWA  
2023

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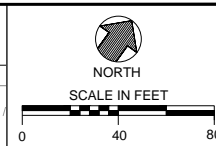
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DRAWN BY: CKW  
QA / QC BY: MKS  
PROJECT NO.: 007-20-01  
DATE: 02.13.2023

TITLE  
**SITE MAP**

Ⓐ = EXISTING RAMPS OR DRIVE  
LOCATIONS FOR CONTRACTOR  
TO USE AS ACCESS TO LAKE

SITE	DRAINAGE AREA (AC)	PERMANENT POOL EL	PERMANENT POOL SURFACE AREA (AC)	PERMANENT POOL STORAGE VOLUME (AC-FT)	PERMANENT POOL AVERAGE DEPTH (FT)	CAPACITY TO INFLOW RATIO*	WQV STORM EL	2-YR STORM EL	10-YR STORM EL
BMP 1	469	1154	2.7	7.4	2.7	0.02	1154.9	1156.7	1158.0

\*CAPACITY TO INFLOW RATIO BASED ON VOLUME AT PERMANENT POOL ELEVATION



ENGINEER'S SEAL

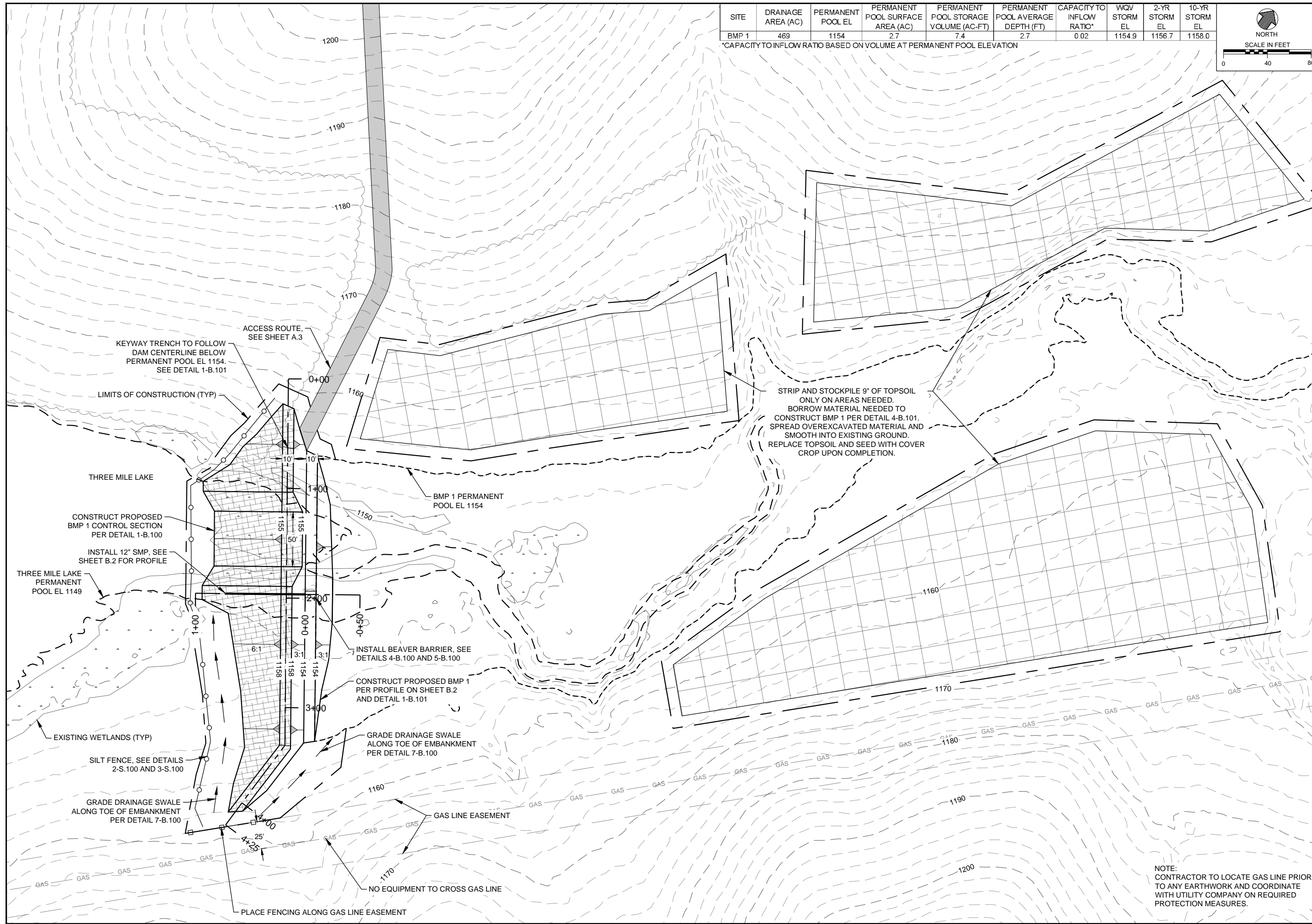
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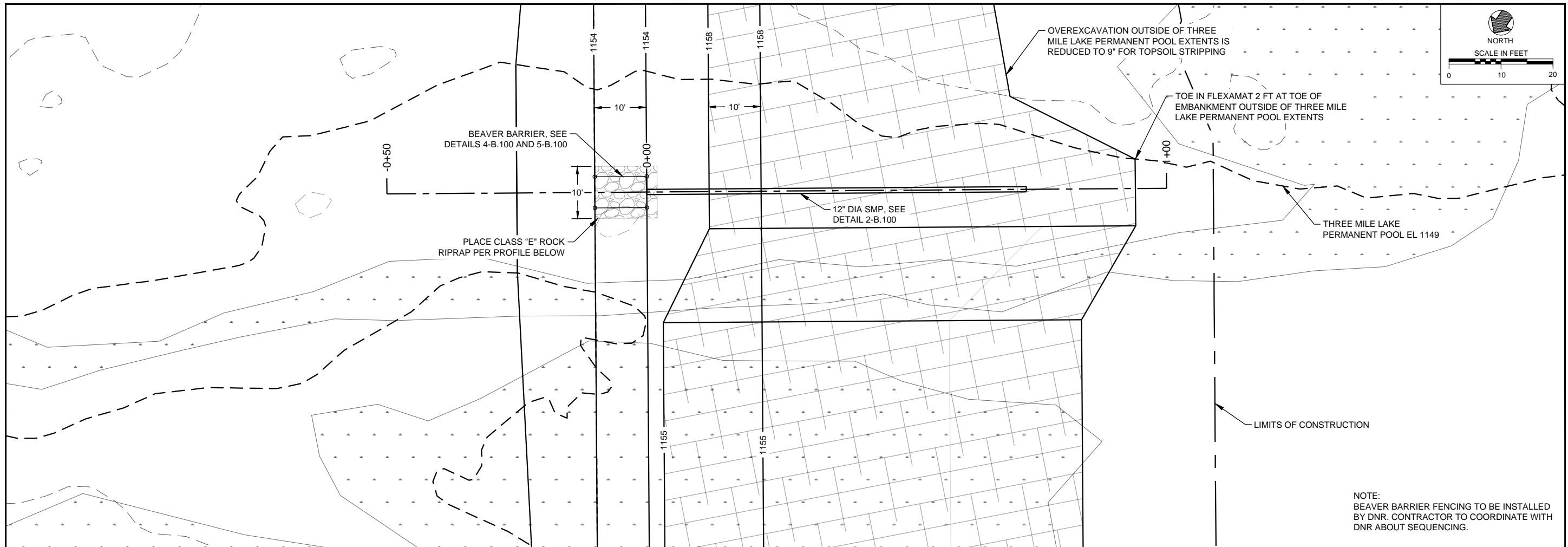
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TITLE  
**BMP 1  
SITE PLAN**

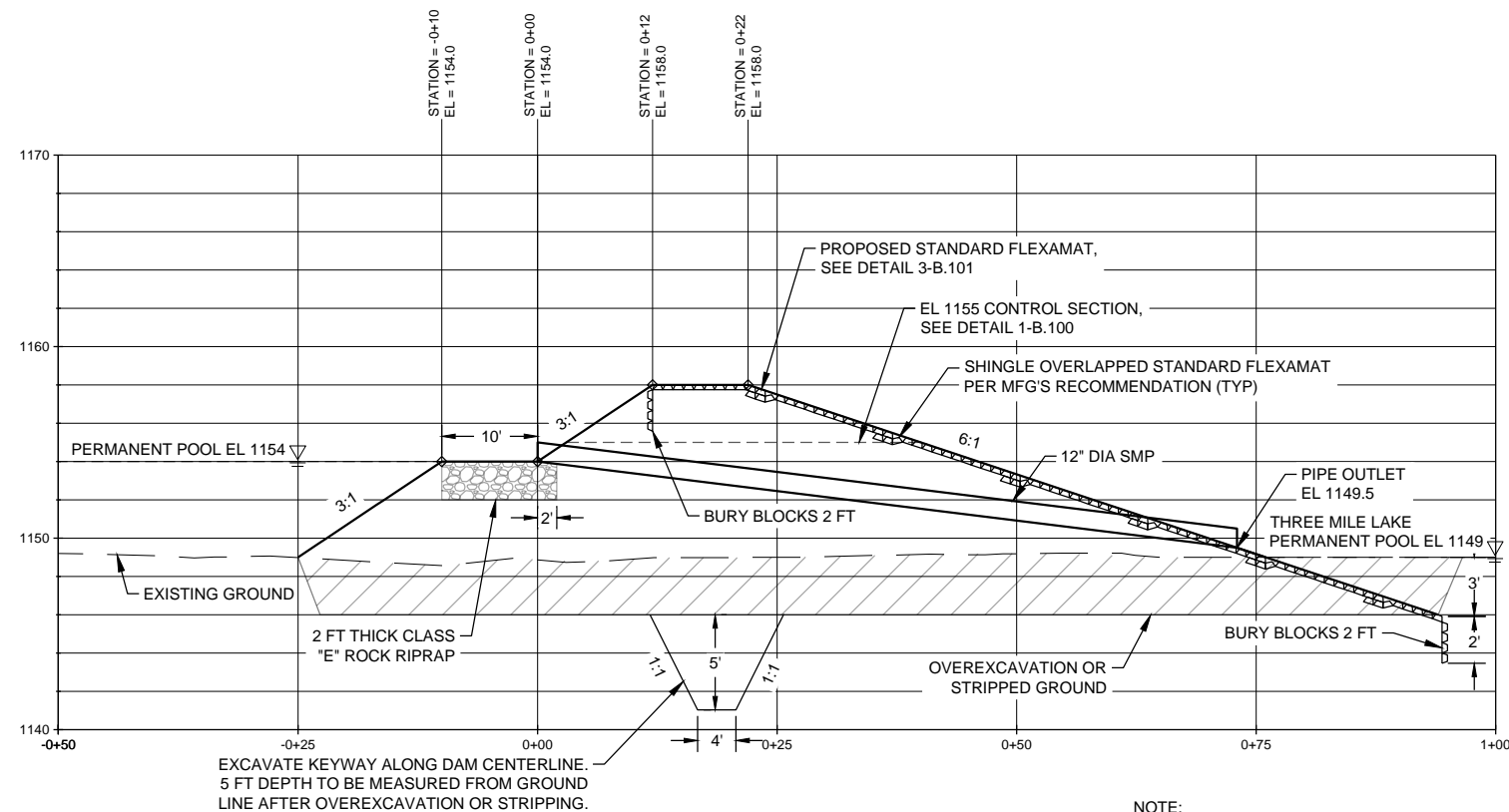
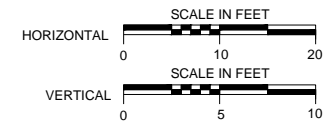
SHEET  
**B.1**



NOTE:  
CONTRACTOR TO LOCATE GAS LINE PRIOR  
TO ANY EARTHWORK AND COORDINATE  
WITH UTILITY COMPANY ON REQUIRED  
PROTECTION MEASURES.



PLAN VIEW



PROFILE VIEW

NOTE:  
OVEREXCAVATE SOFT SEDIMENT BELOW FOOTPRINT OF EMBANKMENT TO NATIVE SOILS. 1,759 CY OF OVEREXCAVATION IS REQUIRED TO PLACE FILL BUT IS SUBSIDIARY TO FILL. AN ESTIMATE OF 3 FT WITHIN THREE MILE LAKE PERMANENT POOL EXTENTS AND 9" OUTSIDE OF THE POOL EXTENTS WERE USED TO CALCULATE QUANTITIES. CONTRACTOR MAY NEED TO EXCAVATE DEEPER TO REACH NATIVE SOILS WITHIN THREE MILE LAKE PERMANENT POOL EXTENTS AS COORDINATED WITH FIELD ENGINEER. CONTRACTOR SHALL SPOIL THE OVEREXCAVATED MATERIAL LOCALLY PER SHEET B.1. COORDINATE FINAL LOCATION WITH THE FIELD ENGINEER.

THREE MILE LAKE RESTORATION PHASE 2  
IOWA DEPARTMENT OF NATURAL RESOURCES  
UNION COUNTY, IOWA  
2023

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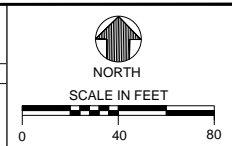
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TITLE  
BMP 1 PLAN AND PROFILE

SHEET  
B.2

SITE	DRAINAGE AREA (AC)	PERMANENT POOL EL	PERMANENT POOL SURFACE AREA (AC)	PERMANENT POOL STORAGE VOLUME (AC-FT)	PERMANENT POOL AVERAGE DEPTH (FT)	CAPACITY TO INFLOW RATIO*	WQV STORM EL	2-YR STORM EL	10-YR STORM EL
BMP 2	1104	1150	10.2	229	2.2	0.02	1150.9	1152.7	1154.0

\*CAPACITY TO INFLOW RATIO BASED ON VOLUME AT PERMANENT POOL ELEVATION



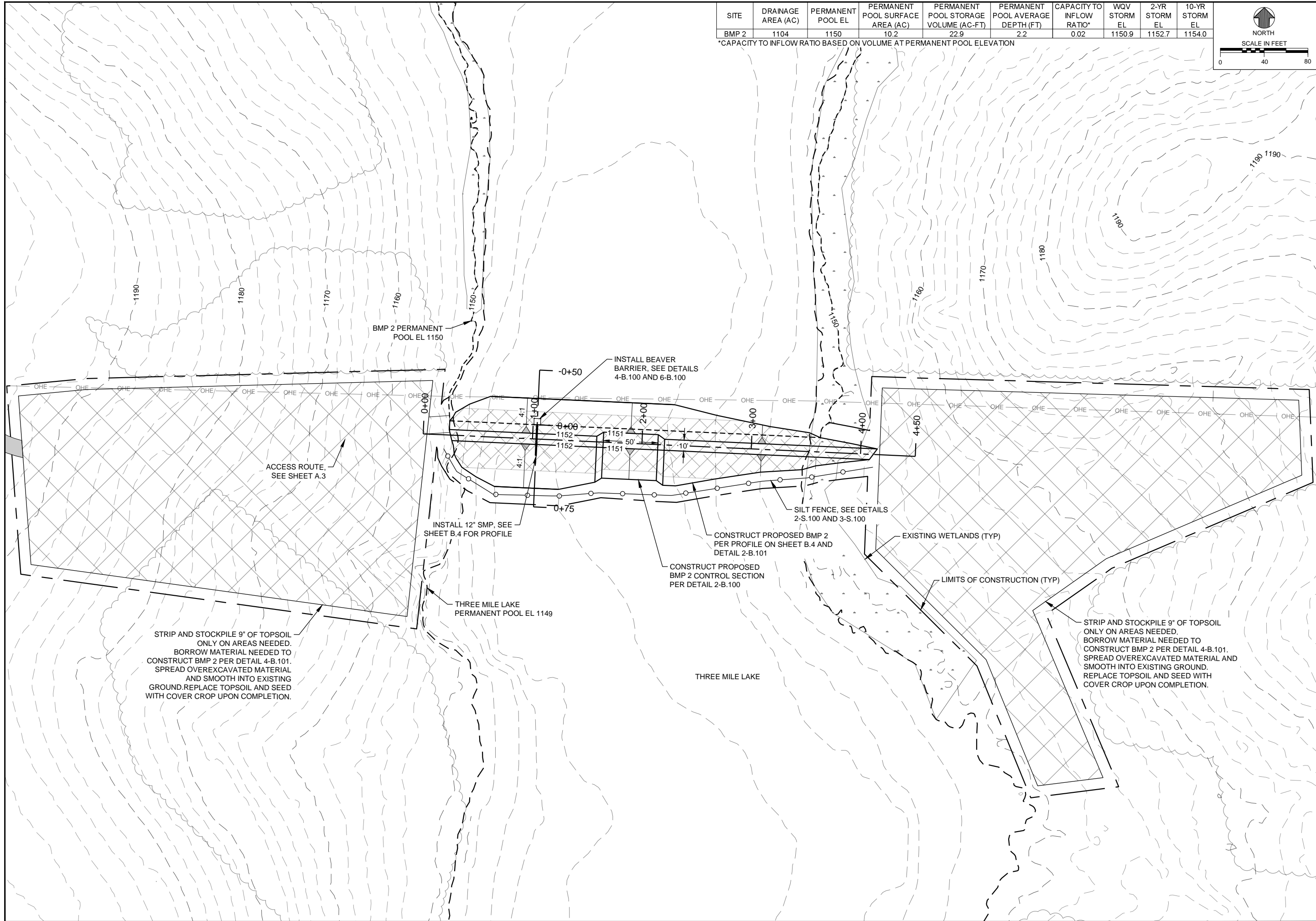
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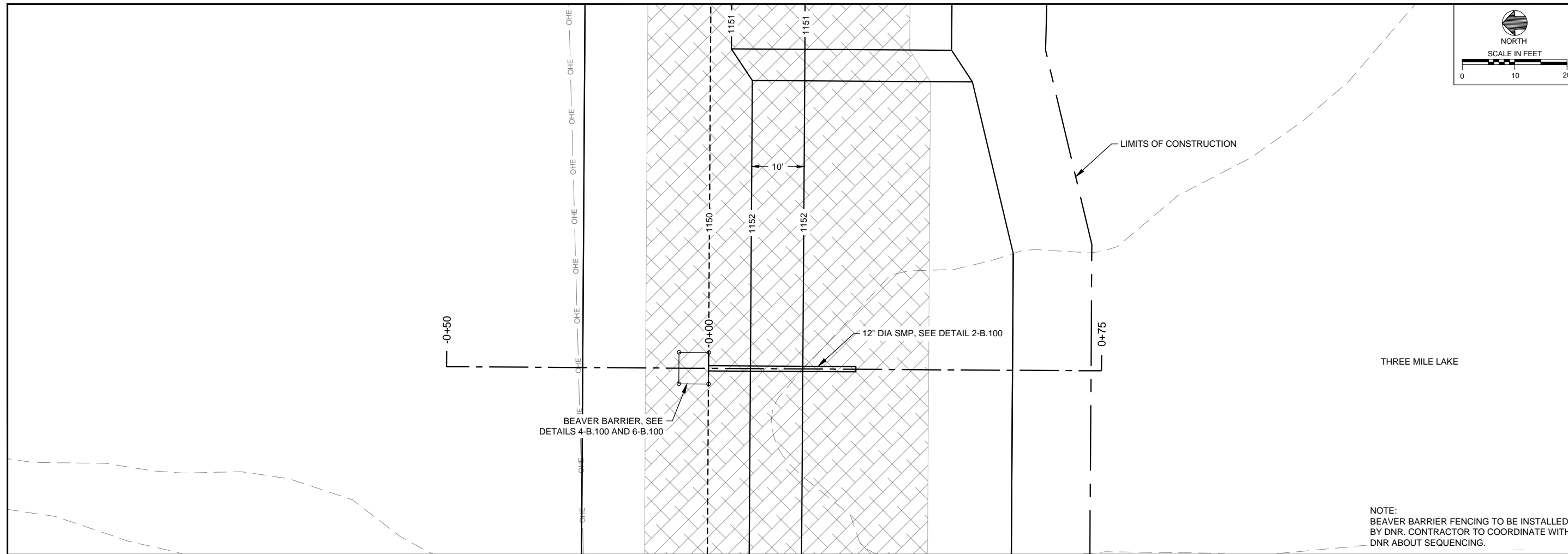
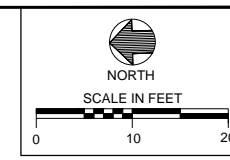
TITLE  
**BMP 2  
SITE PLAN**

SHEET  
**B.3**

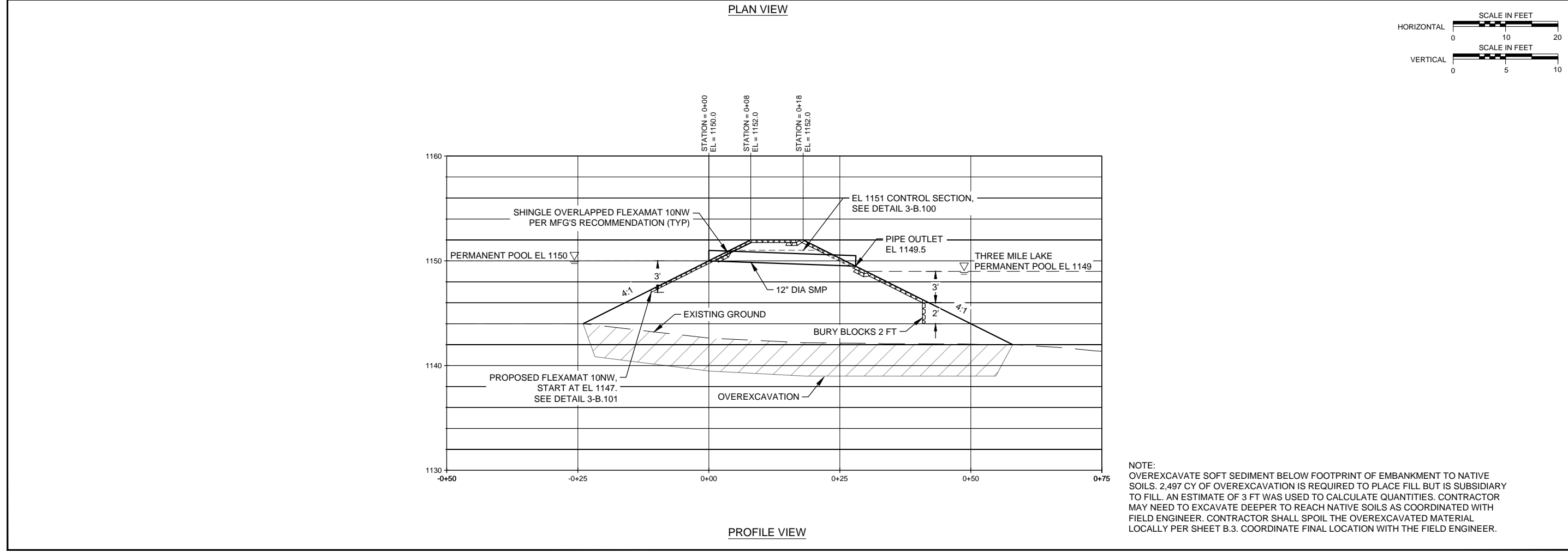
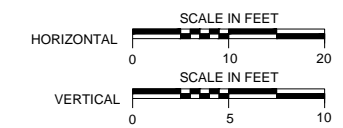


STRIP AND STOCKPILE 9" OF TOPSOIL ONLY ON AREAS NEEDED. BORROW MATERIAL NEEDED TO CONSTRUCT BMP 2 PER DETAIL 4-B.101. SPREAD OVEREXCAVATED MATERIAL AND SMOOTH INTO EXISTING GROUND. REPLACE TOPSOIL AND SEED WITH COVER CROP UPON COMPLETION.

STRIP AND STOCKPILE 9" OF TOPSOIL ONLY ON AREAS NEEDED. BORROW MATERIAL NEEDED TO CONSTRUCT BMP 2 PER DETAIL 4-B.101. SPREAD OVEREXCAVATED MATERIAL AND SMOOTH INTO EXISTING GROUND. REPLACE TOPSOIL AND SEED WITH COVER CROP UPON COMPLETION.



PLAN VIEW



PROFILE VIEW

NOTE:  
OVEREXCAVATE SOFT SEDIMENT BELOW FOOTPRINT OF EMBANKMENT TO NATIVE SOILS. 2,497 CY OF OVEREXCAVATION IS REQUIRED TO PLACE FILL BUT IS SUBSIDIARY TO FILL. AN ESTIMATE OF 3 FT WAS USED TO CALCULATE QUANTITIES. CONTRACTOR MAY NEED TO EXCAVATE DEEPER TO REACH NATIVE SOILS AS COORDINATED WITH FIELD ENGINEER. CONTRACTOR SHALL SPOIL THE OVEREXCAVATED MATERIAL LOCALLY PER SHEET B.3. COORDINATE FINAL LOCATION WITH THE FIELD ENGINEER.

ENGINEER'S SEAL

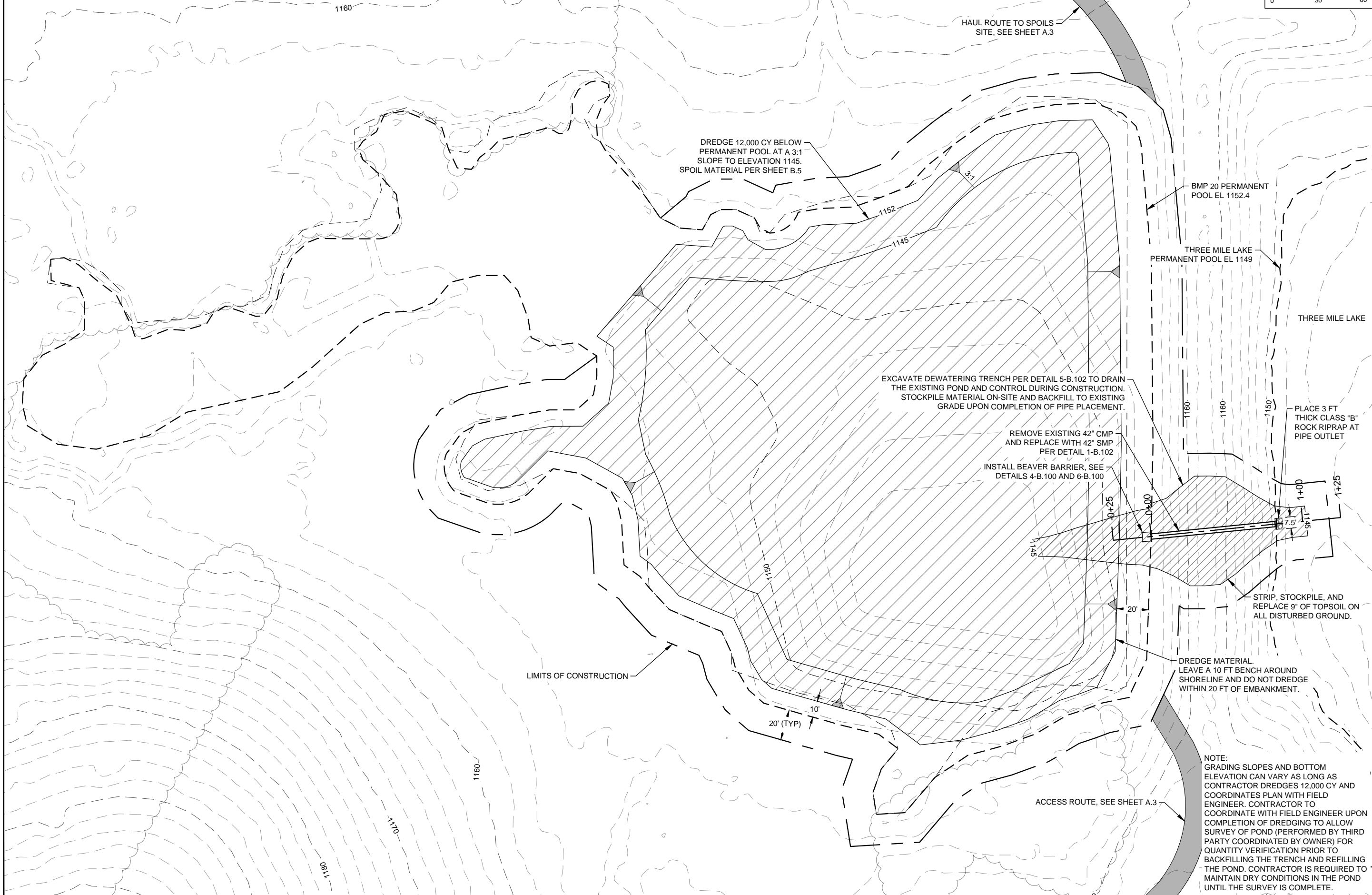
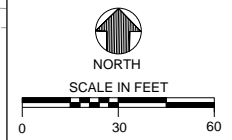
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TITLE  
**BMP 2 PLAN AND PROFILE**

SITE	DRAINAGE AREA (AC)	PERMANENT POOL EL	PERMANENT POOL SURFACE AREA (AC)	PRE DREDGE PERMANENT POOL STORAGE VOLUME (AC-FT)	POST DREDGE PERMANENT POOL STORAGE VOLUME (AC-FT)	PRE DREDGE MEAN DEPTH (FT)	POST DREDGE MEAN DEPTH (FT)	PRE DREDGE C/RATIO*	POST DREDGE C/RATIO*
BMP 20	454	1152.4	3.7	7.2	14.8	1.9	4	0.02	0.03

\*CAPACITY TO INFLOW RATIO BASED ON VOLUME AT PERMANENT POOL ELEVATION



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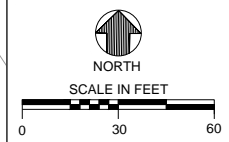
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TITLE  
**BMP 20  
SITE PLAN**

SHEET  
**B.5**





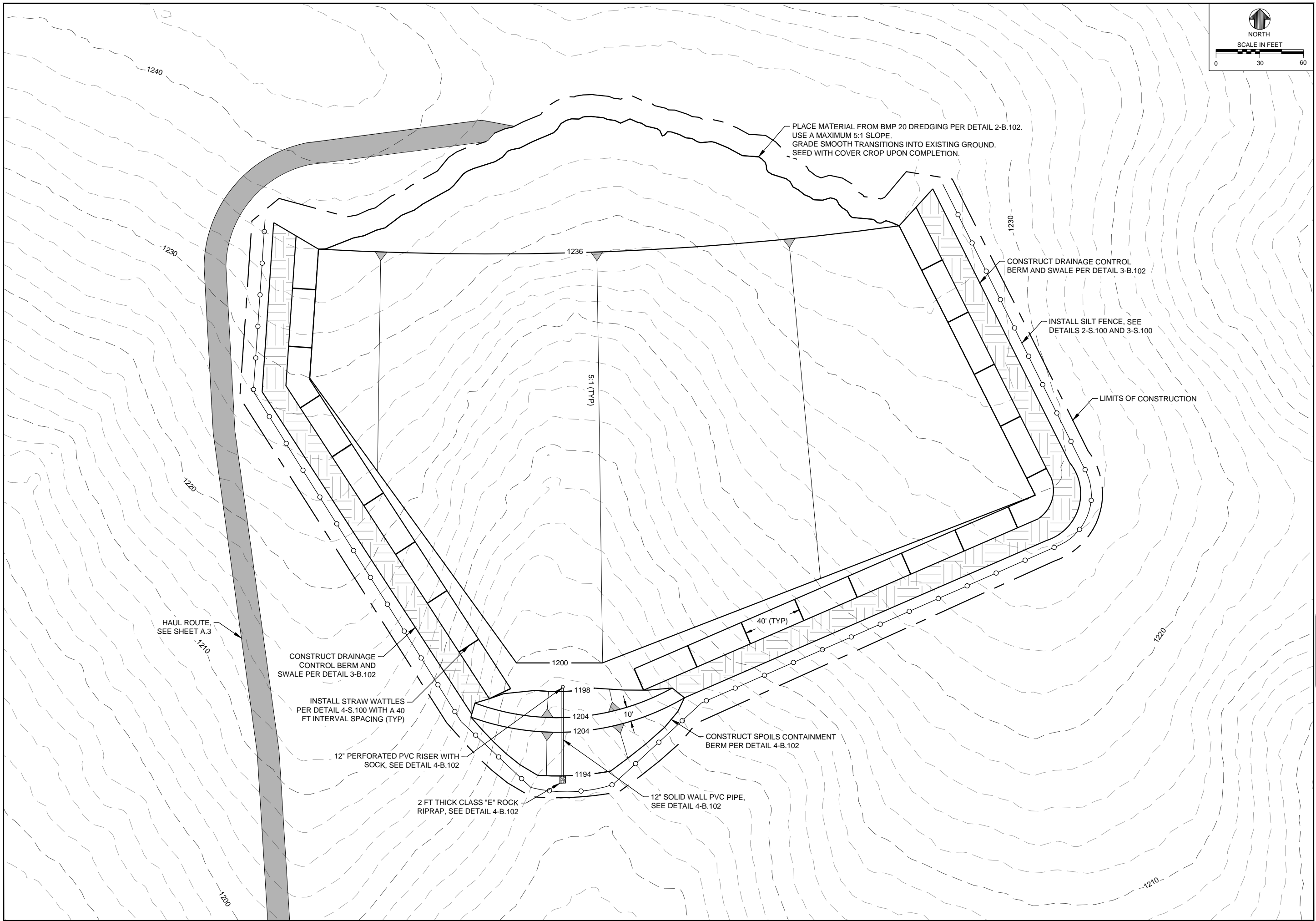
ENGINEER'S SEAL

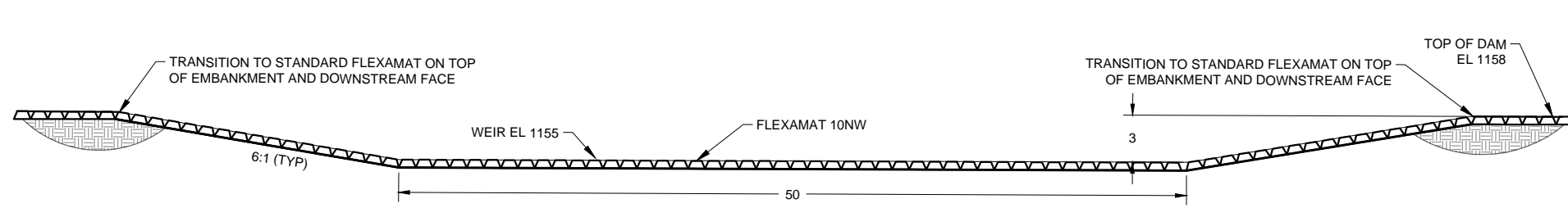
REVISIONS	
NO.	DATE

DESIGNED BY: SEM  
DRAWN BY: CKW  
QA / QC BY: MKS  
PROJECT NO.: 007-20-01  
DATE: 02.13.2023

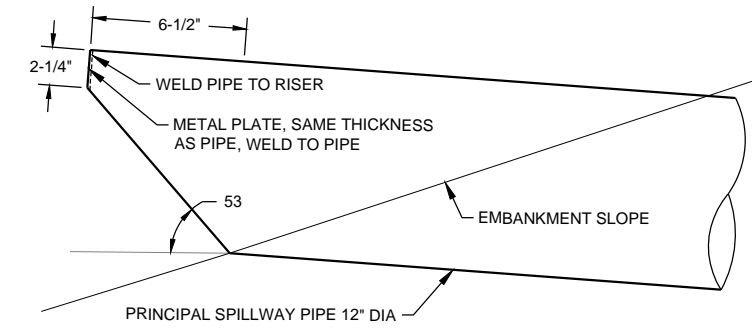
TITLE  
**BMP 20  
SPOILS PLAN**

SHEET  
**B.6**

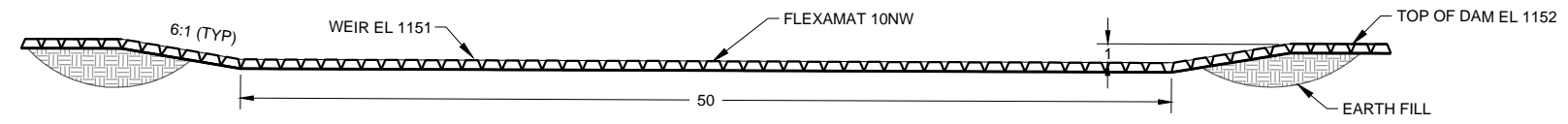




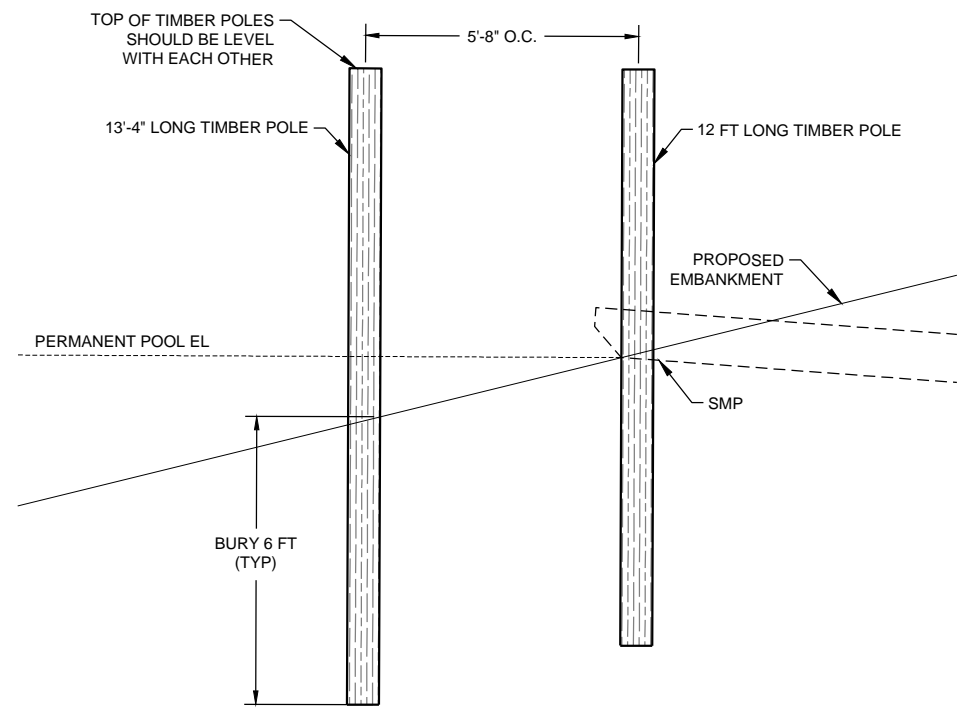
**PROPOSED BMP 1 CONTROL SECTION 1**  
NOT TO SCALE **B.100**



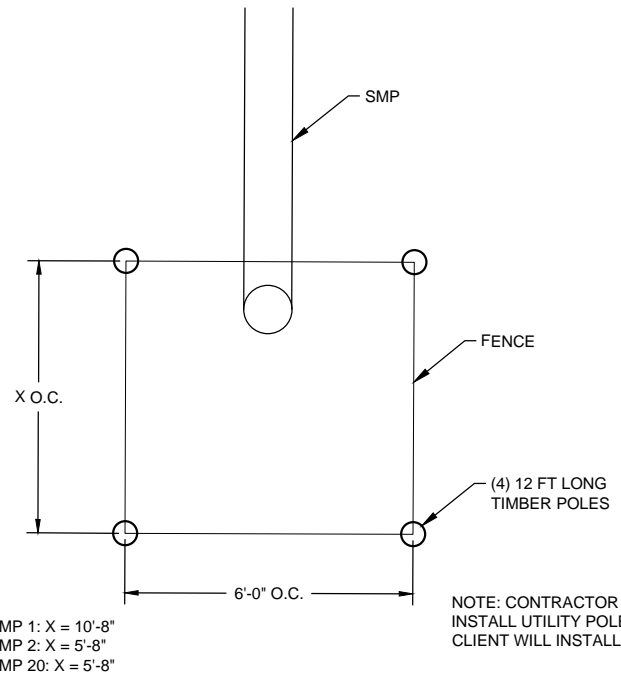
**12" SMP CANOPY INLET 2**  
NOT TO SCALE **B.100**



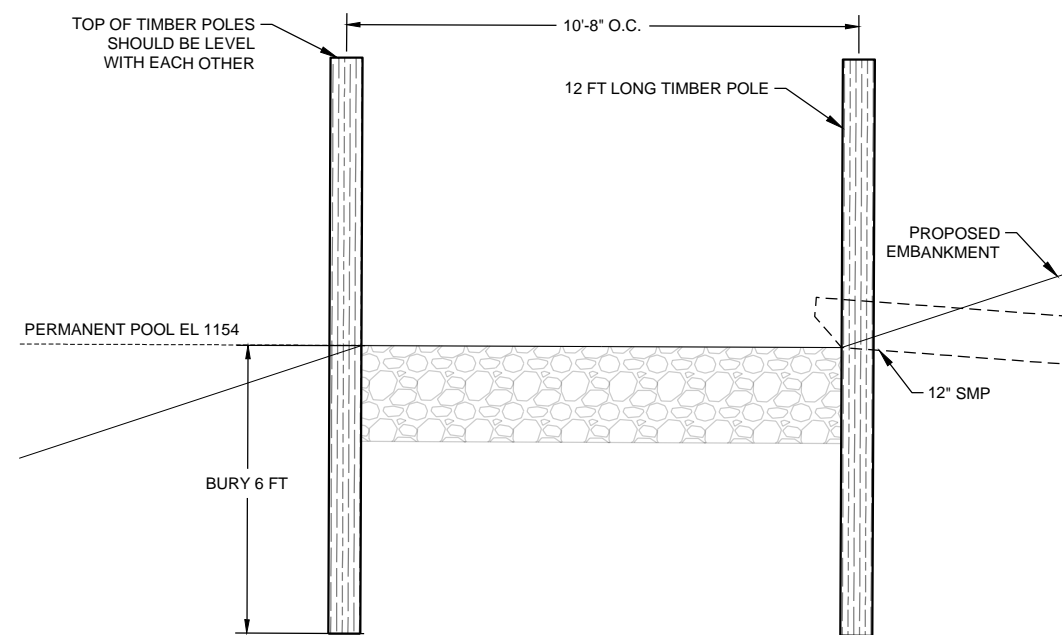
**PROPOSED BMP 2 CONTROL SECTION 3**  
NOT TO SCALE **B.100**



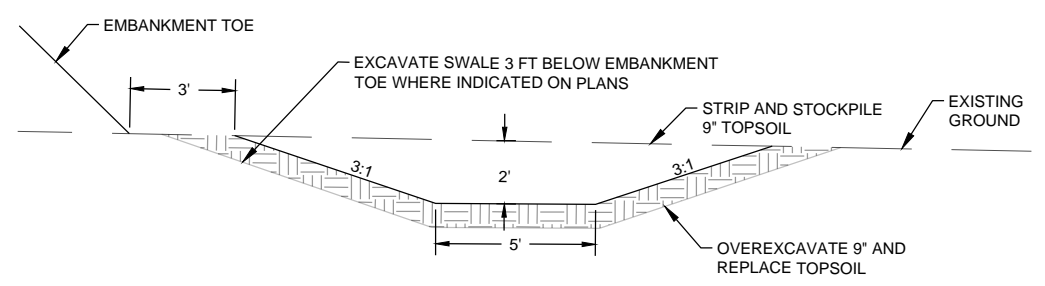
**BMP 2 AND 20 BEAVER BARRIER DETAIL 6**  
NOT TO SCALE **B.100**



**BEAVER BARRIER PLAN VIEW 4**  
NOT TO SCALE **B.100**



**BMP 1 BEAVER BARRIER DETAIL 5**  
NOT TO SCALE **B.100**

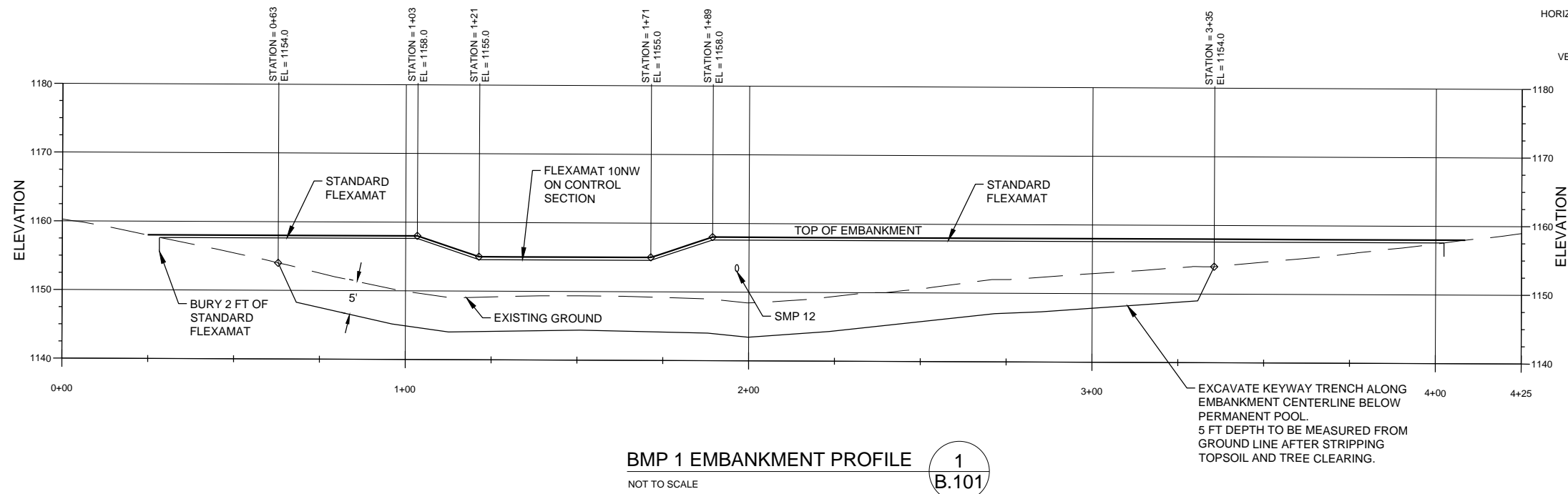


**DRAINAGE SWALE 7**  
NOT TO SCALE **B.100**

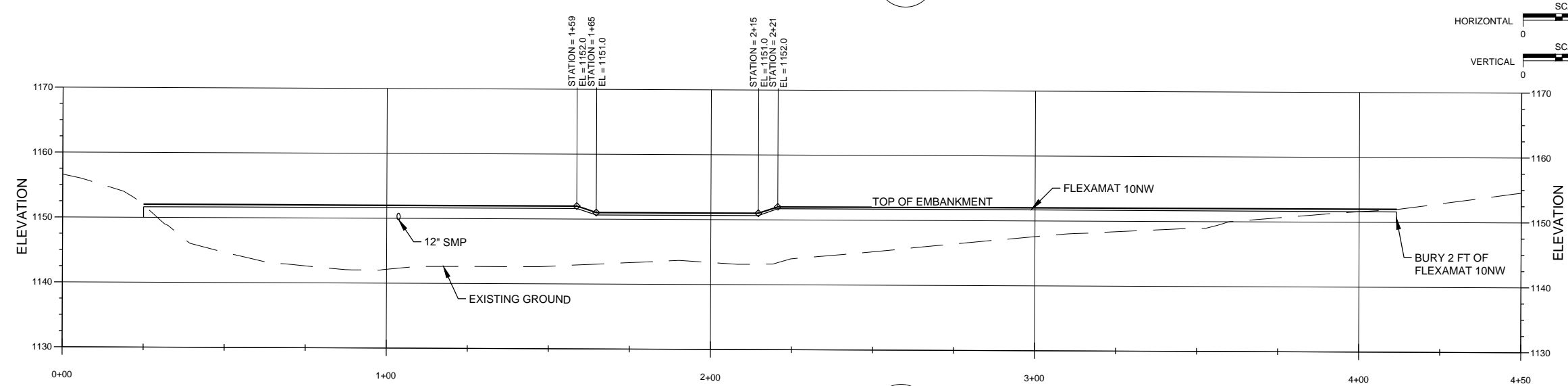
REVISIONS	
NO.	DATE

DESIGNED BY: SEM  
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QA / QC BY: MKS  
PROJECT NO.: 007-20-01  
DATE: 02.13.2023

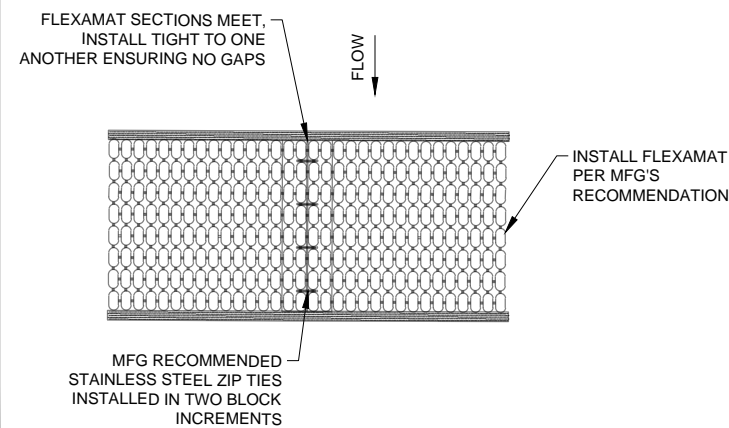
TITLE  
**BMP 1 AND 2 DETAILS**



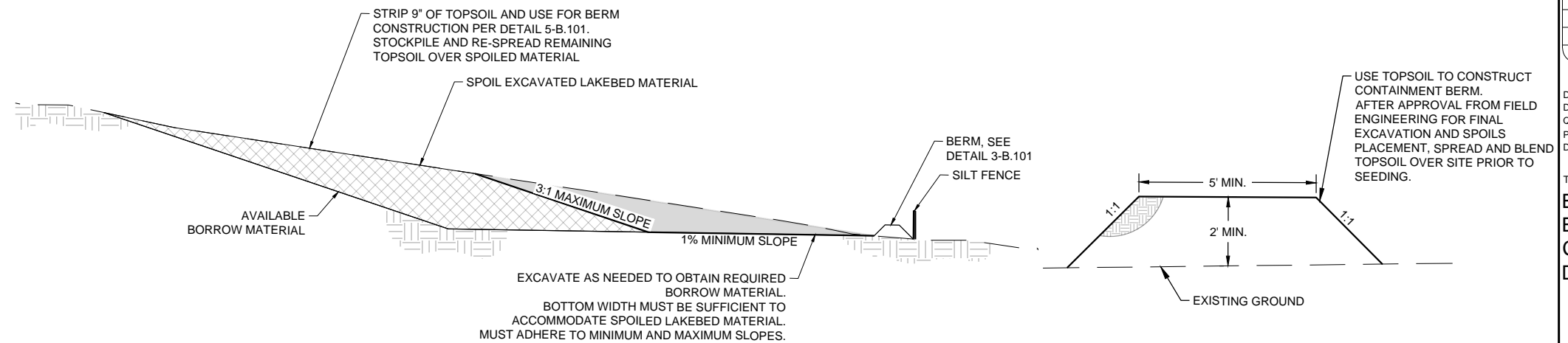
**BMP 1 EMBANKMENT PROFILE 1**  
NOT TO SCALE **B.101**



**BMP 2 EMBANKMENT PROFILE 2**  
NOT TO SCALE **B.101**



**FLEXAMAT CONNECTION DETAIL 3**  
NOT TO SCALE **B.101**



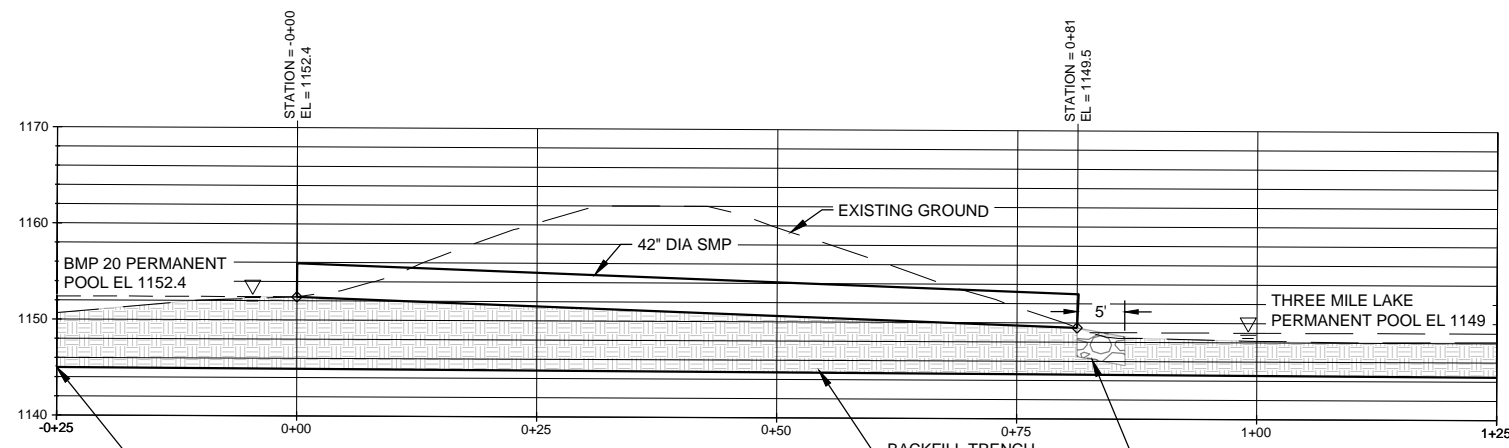
**BORROW AREA DETAIL 4**  
NOT TO SCALE **B.101**

**BORROW SITE BERM 5**  
NOT TO SCALE **B.101**

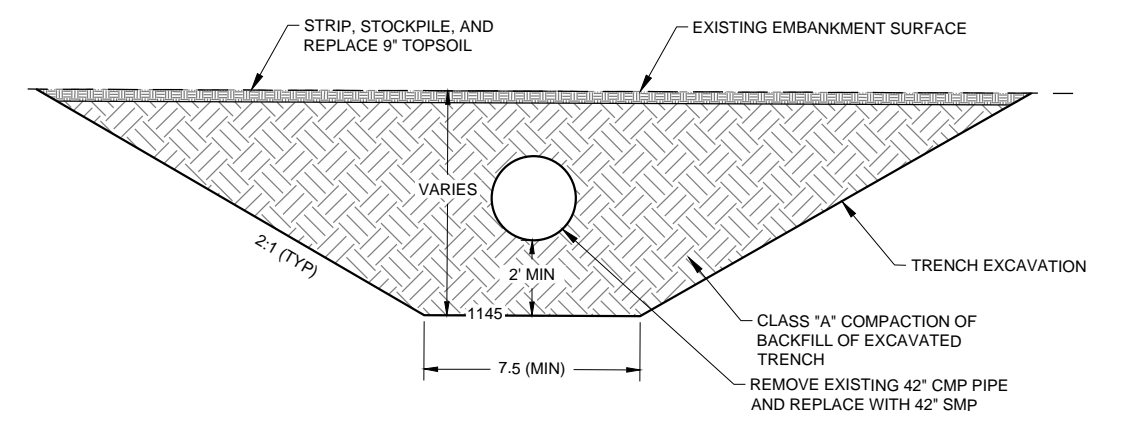
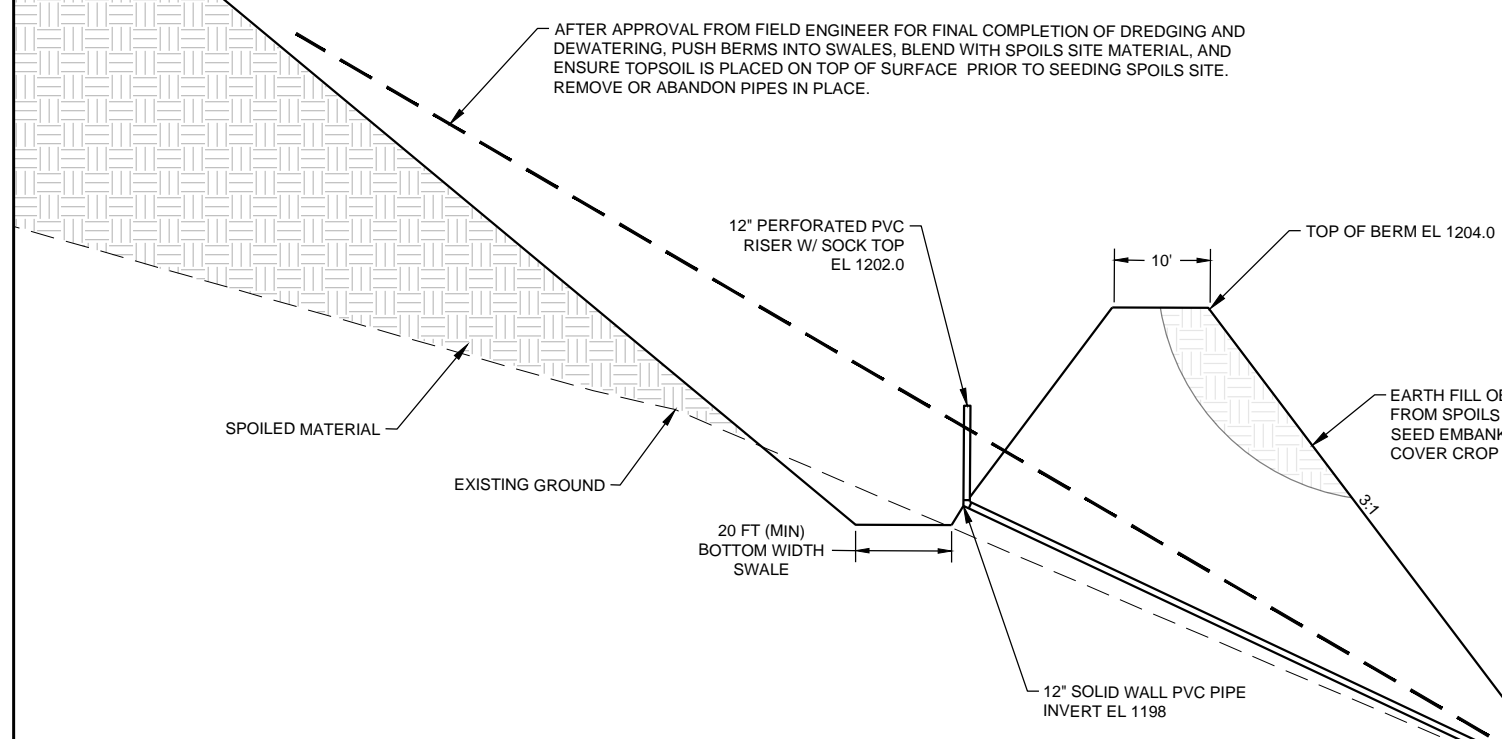
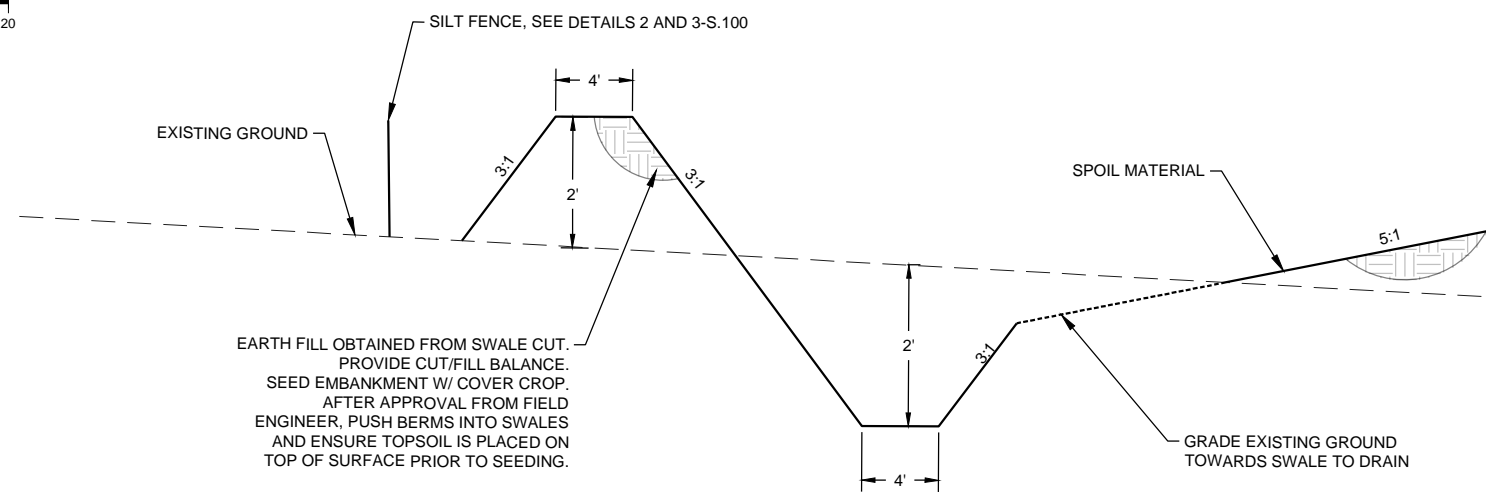
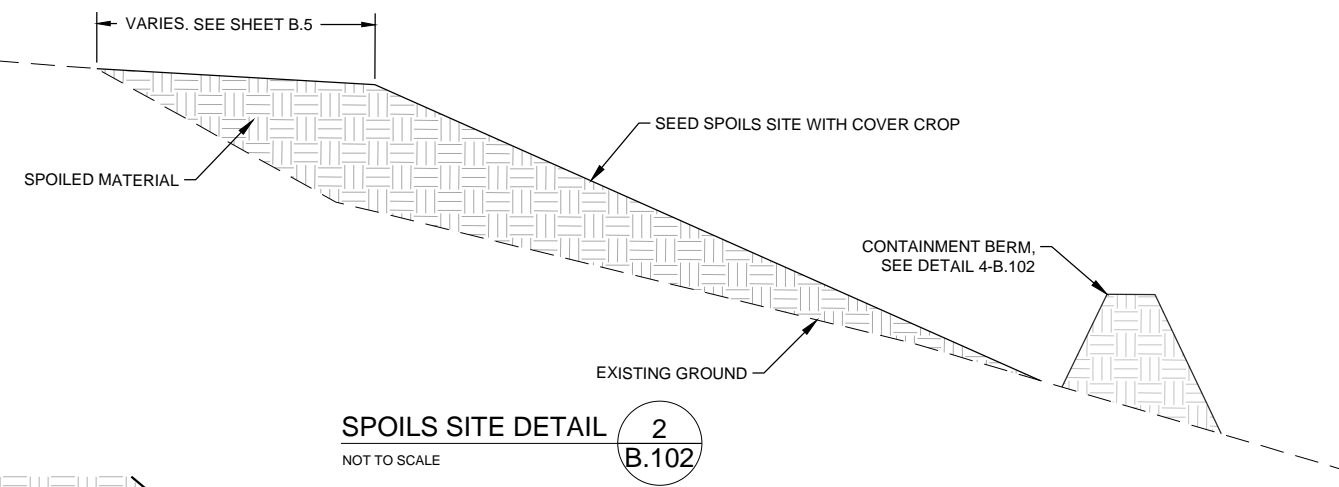
REVISIONS	
NO.	DATE

DESIGNED BY: SEM  
DRAWN BY: CKW  
QA / QC BY: MKS  
PROJECT NO.: 007-20-01  
DATE: 02.13.2023

TITLE  
**BMP 1 AND 2 EMBANKMENT CENTERLINE DETAILS**



**BMP 20 PIPE PROFILE 1**  
**B.102**  
SCALE IN FEET  
HORIZONTAL: 0 10 20  
VERTICAL: 0 10 20



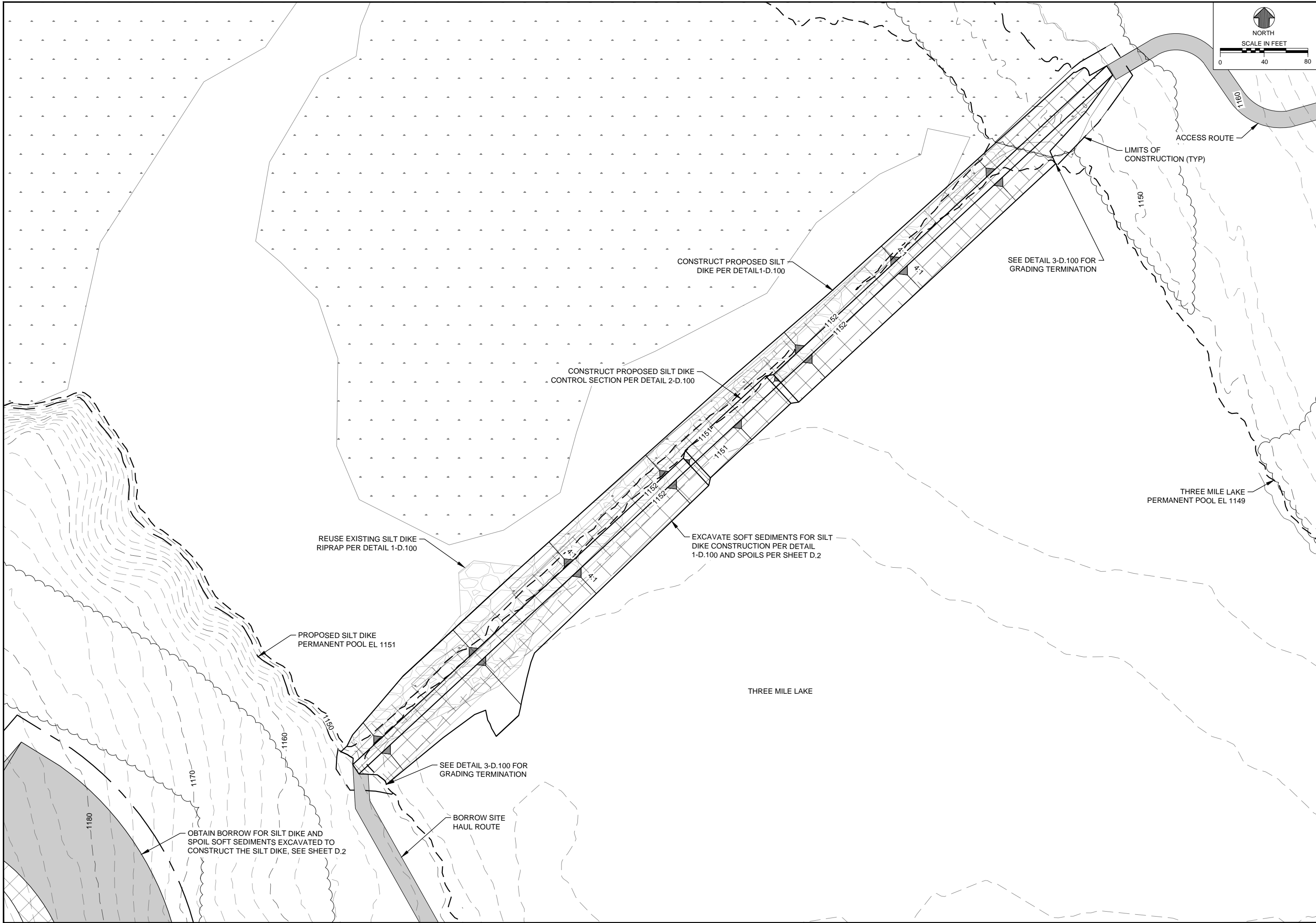
**SPOILS CONTAINMENT BERM DETAIL 4**  
**B.102**  
NOT TO SCALE  
10 FT LONG, 4 FT WIDE, 2 FT THICK CLASS "E" ROCK RIPRAP  
EXTEND RIPRAP 3 FT AROUND PIPE OUTLET

**TRENCH EXCAVATION & PIPE BACKFILL DETAIL 5**  
**B.102**  
NOT TO SCALE

REVISIONS	
NO.	DATE

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DRAWN BY: CKW  
QA / QC BY: MKS  
PROJECT NO.: 007-20-01  
DATE: 02.13.2023

TITLE  
**BMP 20**  
**DETAILS**

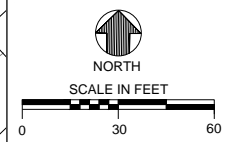


ENGINEER'S SEAL

REVISIONS	
NO.	DATE

DESIGNED BY: SEM  
DRAWN BY: CKW  
QA / QC BY: MKS  
PROJECT NO.: 007-20-01  
DATE: 02.13.2023

TITLE  
**IN-LAKE SILT  
DIKE PLAN**



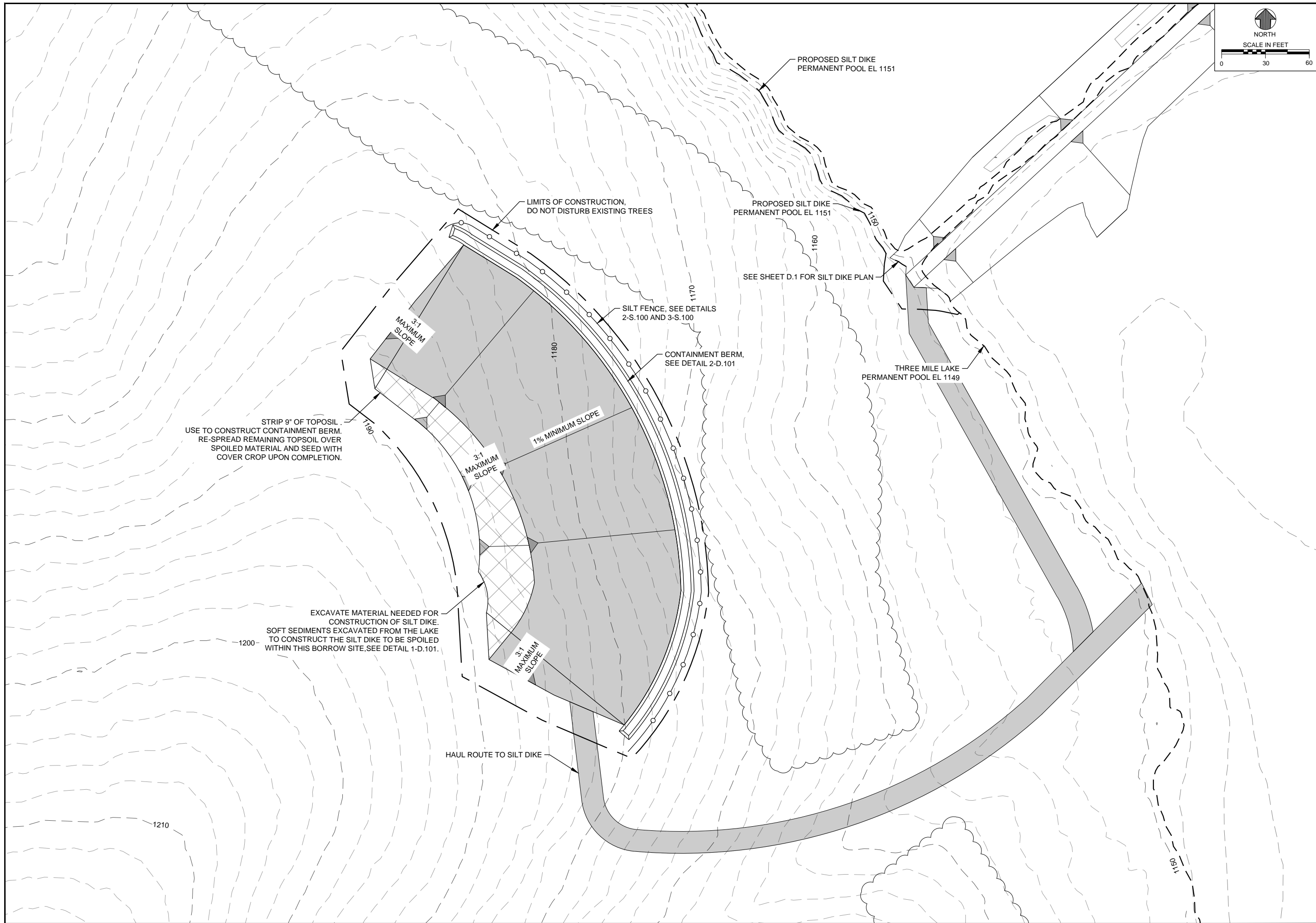
ENGINEER'S SEAL

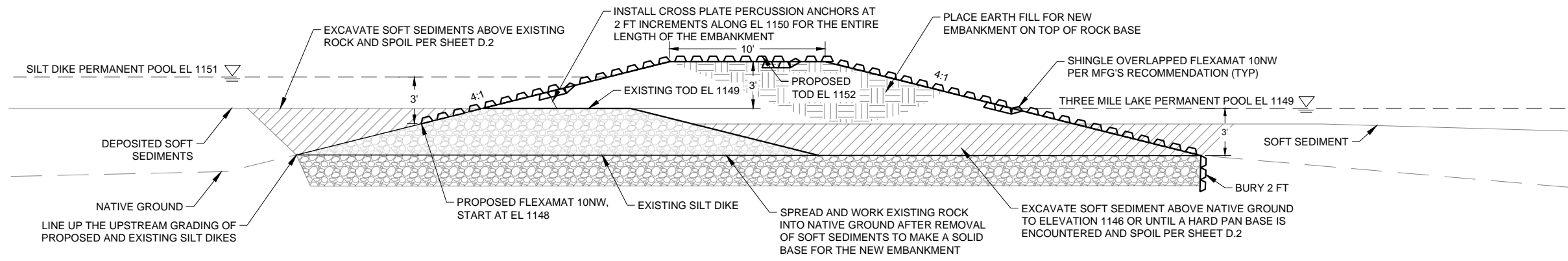
REVISIONS	
NO.	DATE

DESIGNED BY: SEM  
DRAWN BY: CKW  
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PROJECT NO.: 007-20-01  
DATE: 02.13.2023

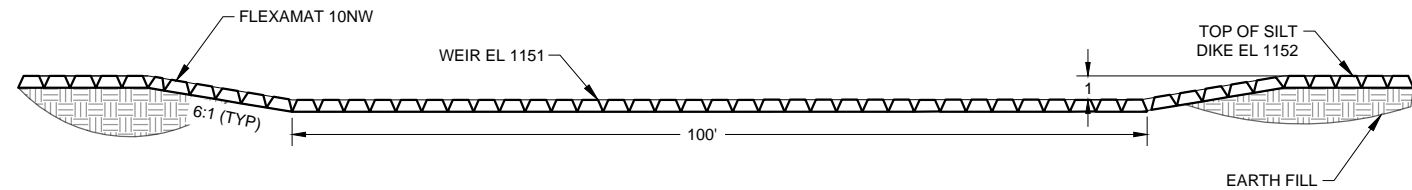
TITLE  
**BORROW  
SITE PLAN**

SHEET  
**D.2**

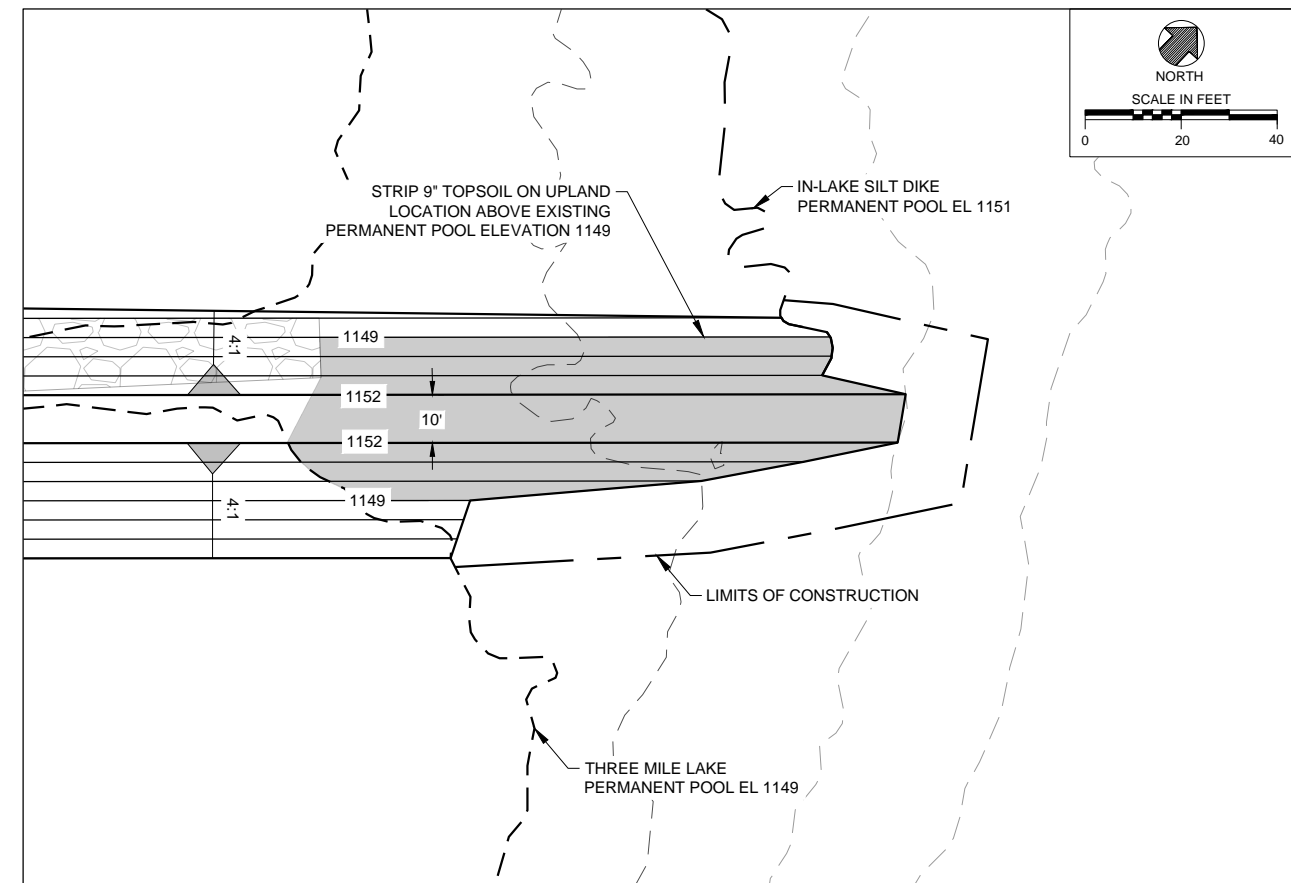
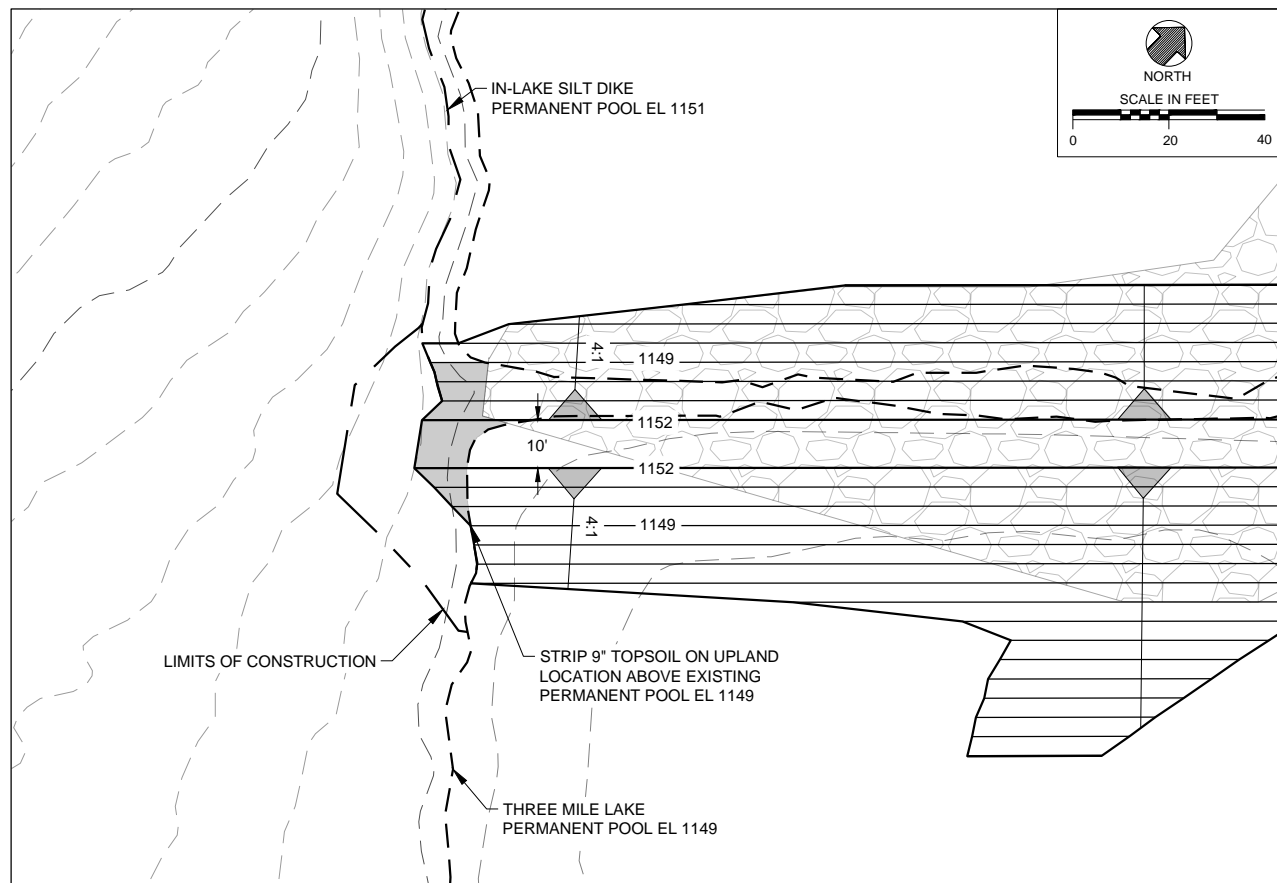




**PROPOSED SILT DIKE CROSS SECTION 1**  
NOT TO SCALE



**PROPOSED SILT DIKE CONTROL SECTION 2**  
NOT TO SCALE



**PROPOSED SILT DIKE TERMINATION DETAILS 3**  
NOT TO SCALE

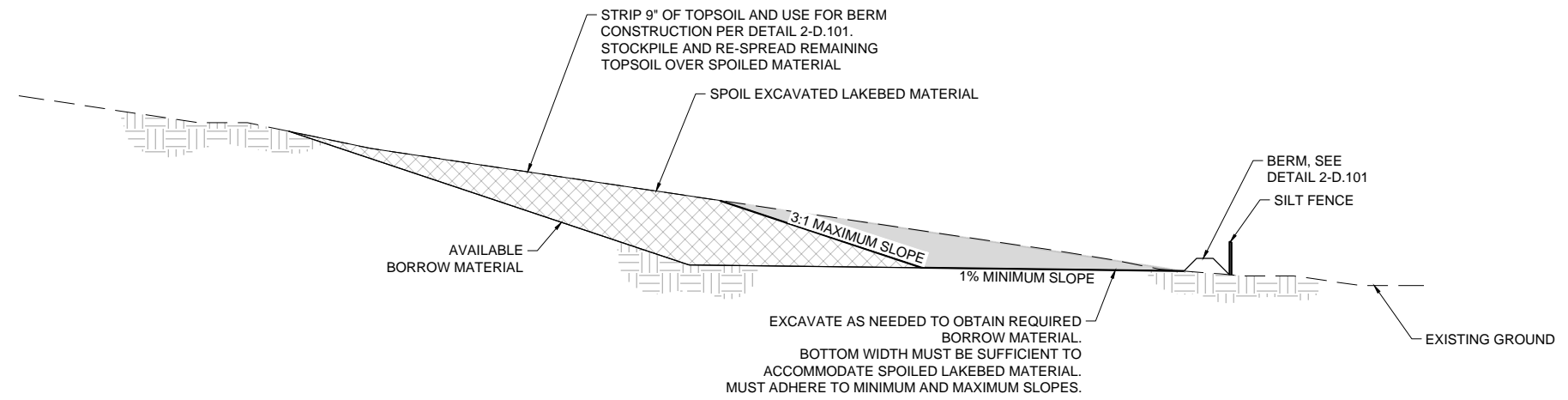
ENGINEER'S SEAL

REVISIONS	
NO.	DATE

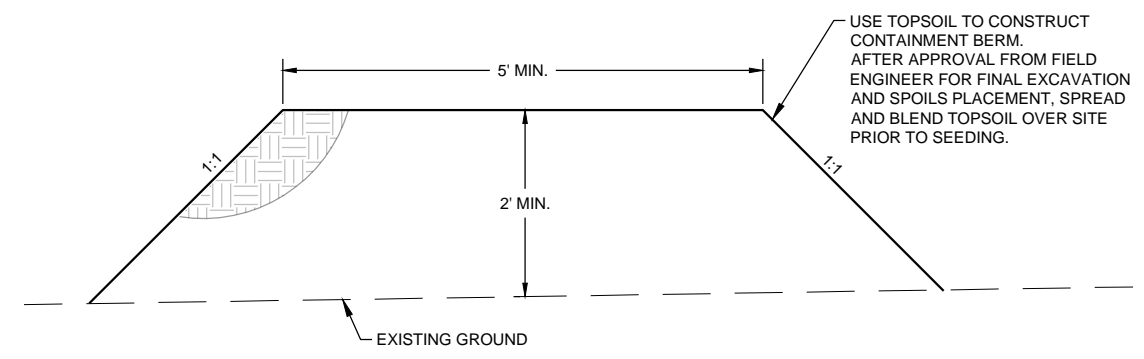
DESIGNED BY: SEM  
DRAWN BY: CKW  
QA / QC BY: MKS  
PROJECT NO.: 007-20-01  
DATE: 02.13.2023

TITLE  
**IN-LAKE SILT DIKE DETAILS**

SHEET  
**D.100**



**BORROW AREA DETAIL** 1  
NOT TO SCALE D.101



**BORROW SITE BERM** 2  
NOT TO SCALE D.101

THREE MILE LAKE RESTORATION PHASE 2  
IOWA DEPARTMENT OF NATURAL RESOURCES  
UNION COUNTY, IOWA  
2023

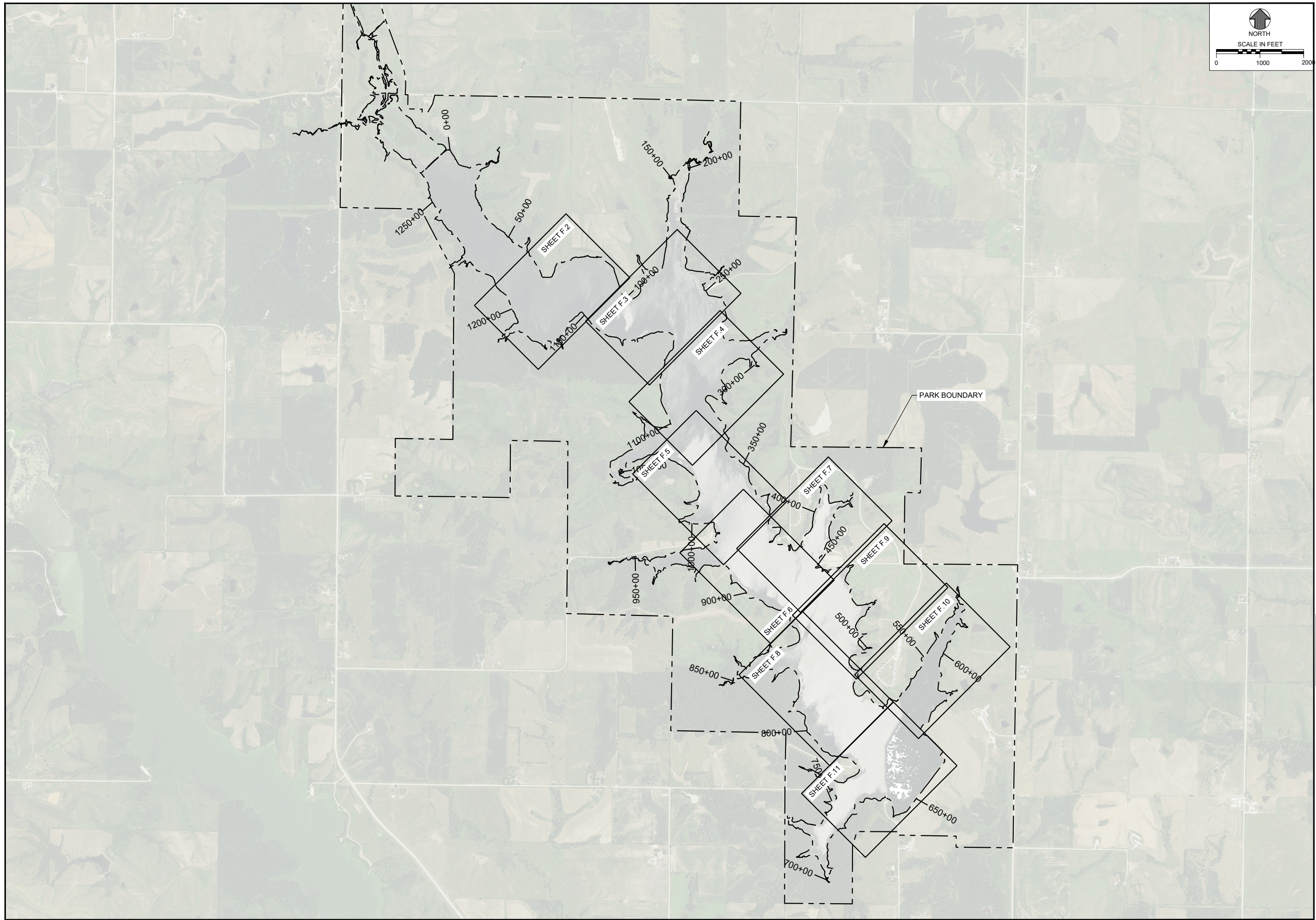
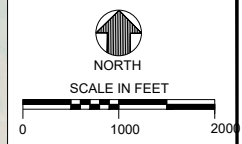
ENGINEER'S SEAL

REVISIONS	
NO.	DATE

DESIGNED BY: SEM  
DRAWN BY: CKW  
QA / QC BY: MKS  
PROJECT NO.: 007-20-01  
DATE: 02.13.2023

TITLE  
**BORROW SITE DETAILS**





THREE MILE LAKE RESTORATION PHASE 2  
IOWA DEPARTMENT OF NATURAL RESOURCES  
UNION COUNTY, IOWA  
2022

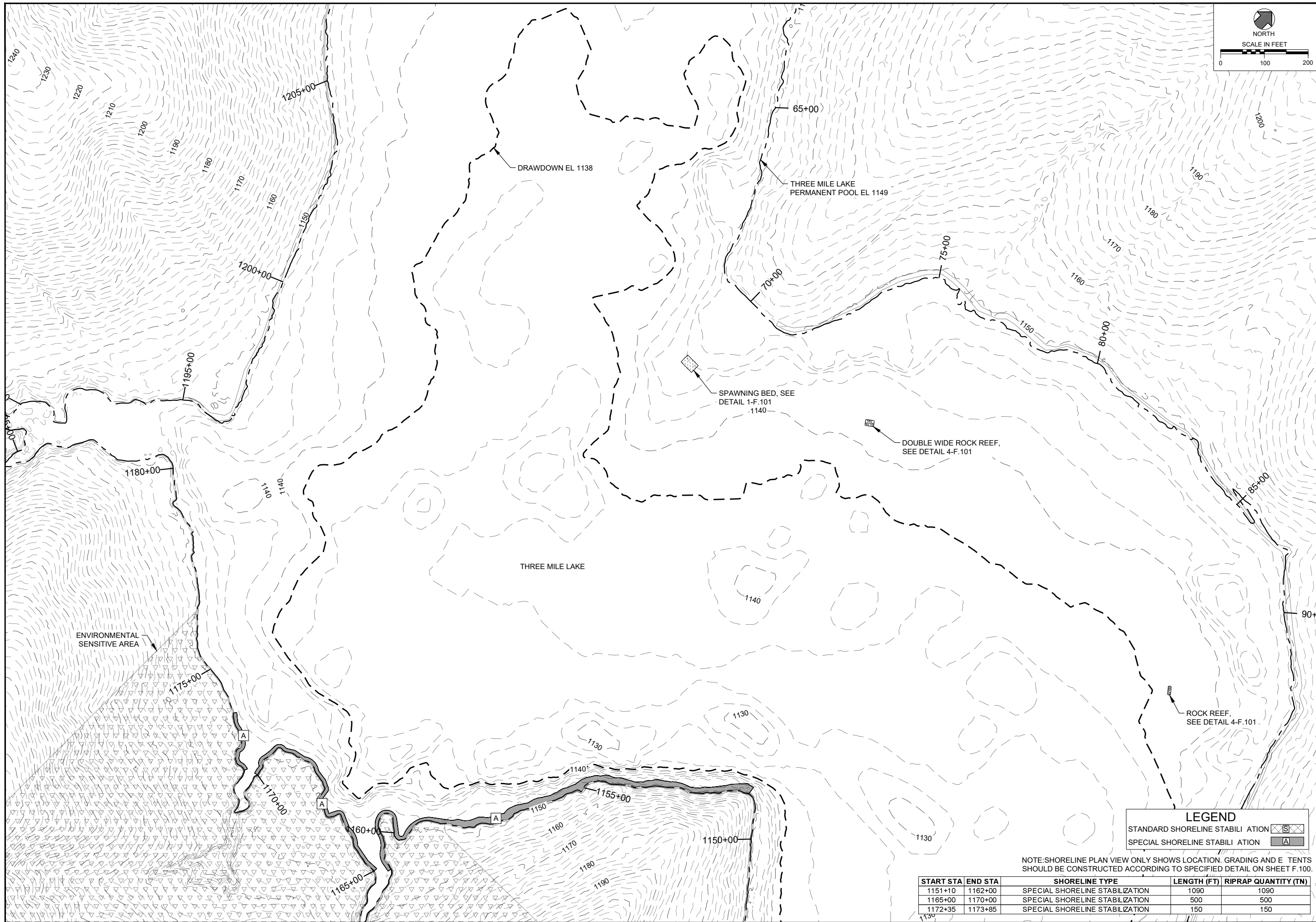
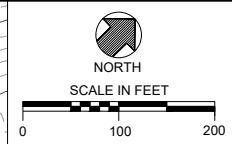
ENGINEER'S SEAL

REVISIONS	
NO.	DATE

DESIGNED BY: SEM  
DRAWN BY: CKW  
QA / QC BY: MKS  
PROJECT NO.: 007-20-01  
DATE: NOVEMBER 2022

TITLE  
**LAKE SHEET  
KEY**

SHEET  
**F.1**



THREE MILE LAKE RESTORATION PHASE 2  
IOWA DEPARTMENT OF NATURAL RESOURCES  
UNION COUNTY, IOWA  
2023

ENGINEER'S SEAL

REVISIONS	
NO.	DATE

DESIGNED BY: SEM  
DRAWN BY: CKW  
QA / QC BY: MKS  
PROJECT NO.: 007-20-01  
DATE: 02.13.2023

TITLE  
LAKE PLAN  
1 OF 10

SHEET  
**F.2**

**LEGEND**

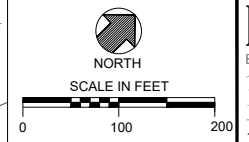
STANDARD SHORELINE STABILIZATION	
SPECIAL SHORELINE STABILIZATION	

NOTE: SHORELINE PLAN VIEW ONLY SHOWS LOCATION. GRADING AND E. TENTS SHOULD BE CONSTRUCTED ACCORDING TO SPECIFIED DETAIL ON SHEET F.100.

START STA	END STA	SHORELINE TYPE	LENGTH (FT)	RIPRAP QUANTITY (TN)
1151+10	1162+00	SPECIAL SHORELINE STABILIZATION	1090	1090
1165+00	1170+00	SPECIAL SHORELINE STABILIZATION	500	500
1172+35	1173+85	SPECIAL SHORELINE STABILIZATION	150	150

NOTE: SHORELINE PLAN VIEW ONLY SHOWS LOCATION. GRADING AND E TENTS SHOULD BE CONSTRUCTED ACCORDING TO SPECIFIED DETAIL ON SHEET F.100.

START STA	END STA	SHORELINE TYPE	LENGTH (FT)	RIPRAP QUANTITY (TN)
1131+08	1139+52	SPECIAL SHORELINE STABILIZATION	844	844
1121+51	1127+01	SPECIAL SHORELINE STABILIZATION	550	550
121+03	125+73	SPECIAL SHORELINE STABILIZATION	470	470
227+64	236+96	SPECIAL SHORELINE STABILIZATION	692	692
245+31	249+21	SPECIAL SHORELINE STABILIZATION	390	390
249+74	254+34	SPECIAL SHORELINE STABILIZATION	460	460



THREE MILE LAKE RESTORATION PHASE 2  
IOWA DEPARTMENT OF NATURAL RESOURCES  
UNION COUNTY, IOWA  
2023

ENGINEER'S SEAL

REVISIONS	
NO.	DATE

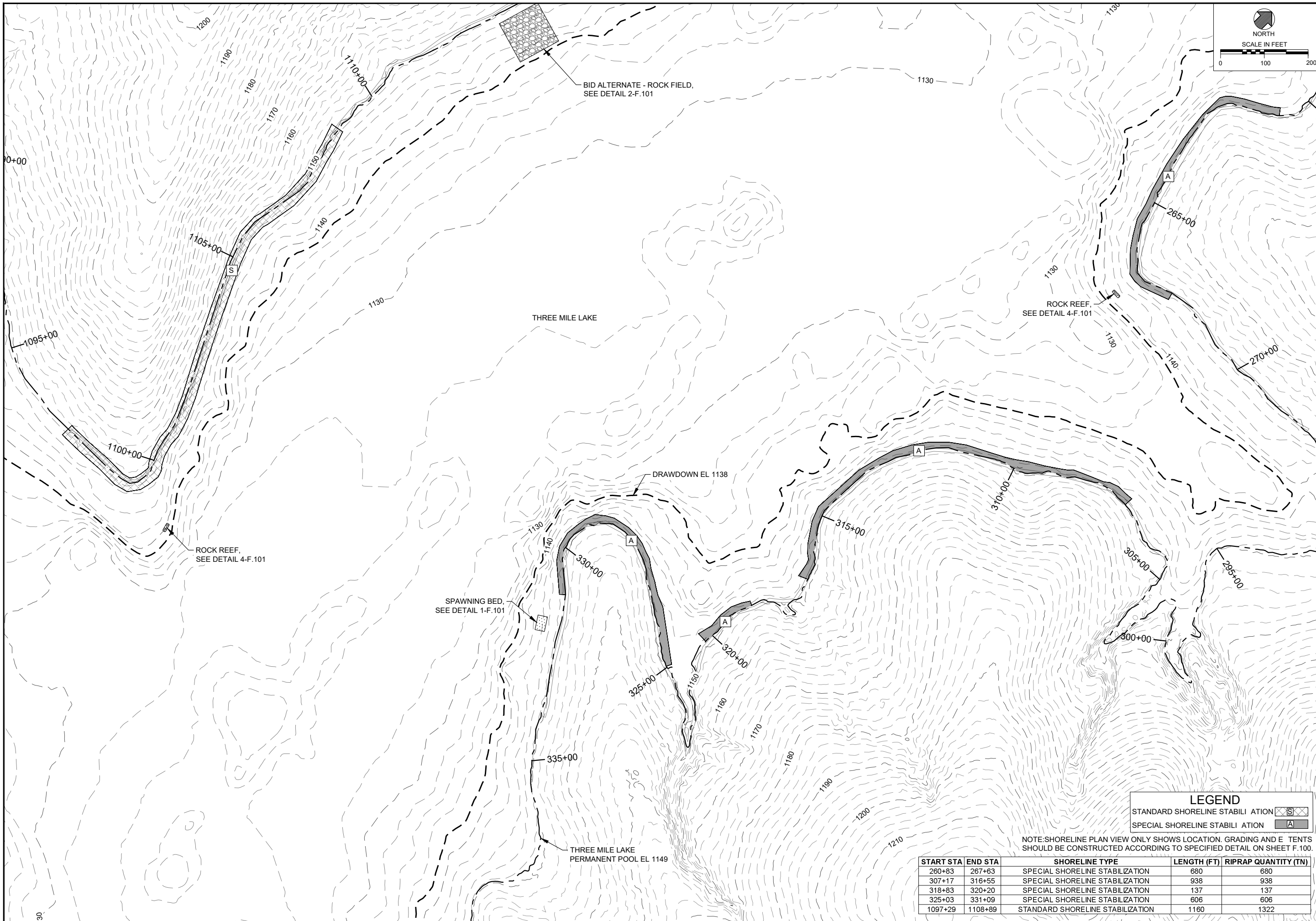
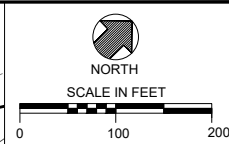
DESIGNED BY: SEM  
DRAWN BY: CKW  
QA / QC BY: MKS  
PROJECT NO.: 007-20-01  
DATE: 02.13.2023

TITLE  
LAKE PLAN  
2 OF 10

SHEET  
F.3

**LEGEND**

STANDARD SHORELINE STABILIZATION	
SPECIAL SHORELINE STABILIZATION	



THREE MILE LAKE RESTORATION PHASE 2  
IOWA DEPARTMENT OF NATURAL RESOURCES  
UNION COUNTY, IOWA  
2023

ENGINEER'S SEAL

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DRAWN BY: CKW  
QA / QC BY: MKS  
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DATE: 02.13.2023

TITLE  
LAKE PLAN  
3 OF 10

SHEET  
**F.4**

**LEGEND**

STANDARD SHORELINE STABILIZATION	
SPECIAL SHORELINE STABILIZATION	

NOTE: SHORELINE PLAN VIEW ONLY SHOWS LOCATION, GRADING AND ELEVATIONS. SHORELINE STABILIZATION SHOULD BE CONSTRUCTED ACCORDING TO SPECIFIED DETAIL ON SHEET F.100.

START STA	END STA	SHORELINE TYPE	LENGTH (FT)	RIPRAP QUANTITY (TN)
260+83	267+63	SPECIAL SHORELINE STABILIZATION	680	680
307+17	316+55	SPECIAL SHORELINE STABILIZATION	938	938
318+83	320+20	SPECIAL SHORELINE STABILIZATION	137	137
325+03	331+09	SPECIAL SHORELINE STABILIZATION	606	606
1097+29	1108+89	STANDARD SHORELINE STABILIZATION	1160	1322

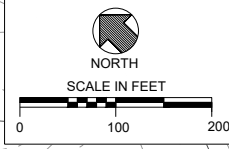
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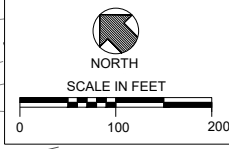
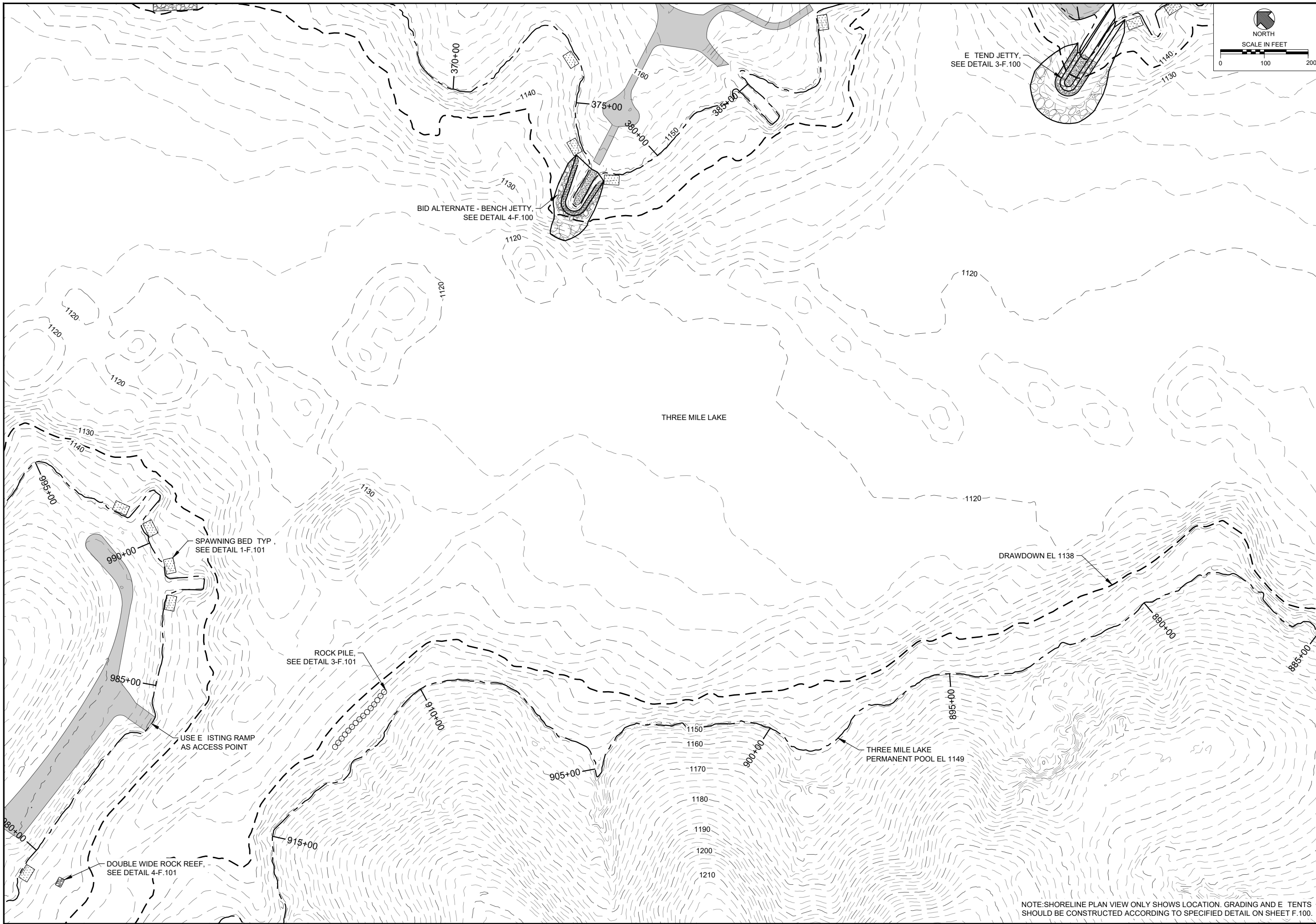
REVISIONS	
NO.	DATE

DESIGNED BY: SEM  
DRAWN BY: CKW  
QA / QC BY: MKS  
PROJECT NO.: 007-20-01  
DATE: 02.13.2023

TITLE  
LAKE PLAN  
4 OF 10

SHEET  
**F.5**





ENGINEER'S SEAL

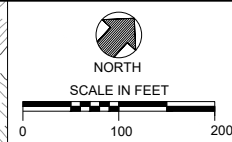
REVISIONS	
NO.	DATE

DESIGNED BY: SEM  
DRAWN BY: CKW  
QA / QC BY: MKS  
PROJECT NO.: 007-20-01  
DATE: 02.13.2023

TITLE  
**LAKE PLAN**  
5 OF 10

SHEET  
**F.6**

NOTE: SHORELINE PLAN VIEW ONLY SHOWS LOCATION, GRADING AND E-TENTS SHOULD BE CONSTRUCTED ACCORDING TO SPECIFIED DETAIL ON SHEET F.100.



THREE MILE LAKE RESTORATION PHASE 2  
IOWA DEPARTMENT OF NATURAL RESOURCES  
UNION COUNTY, IOWA  
2023

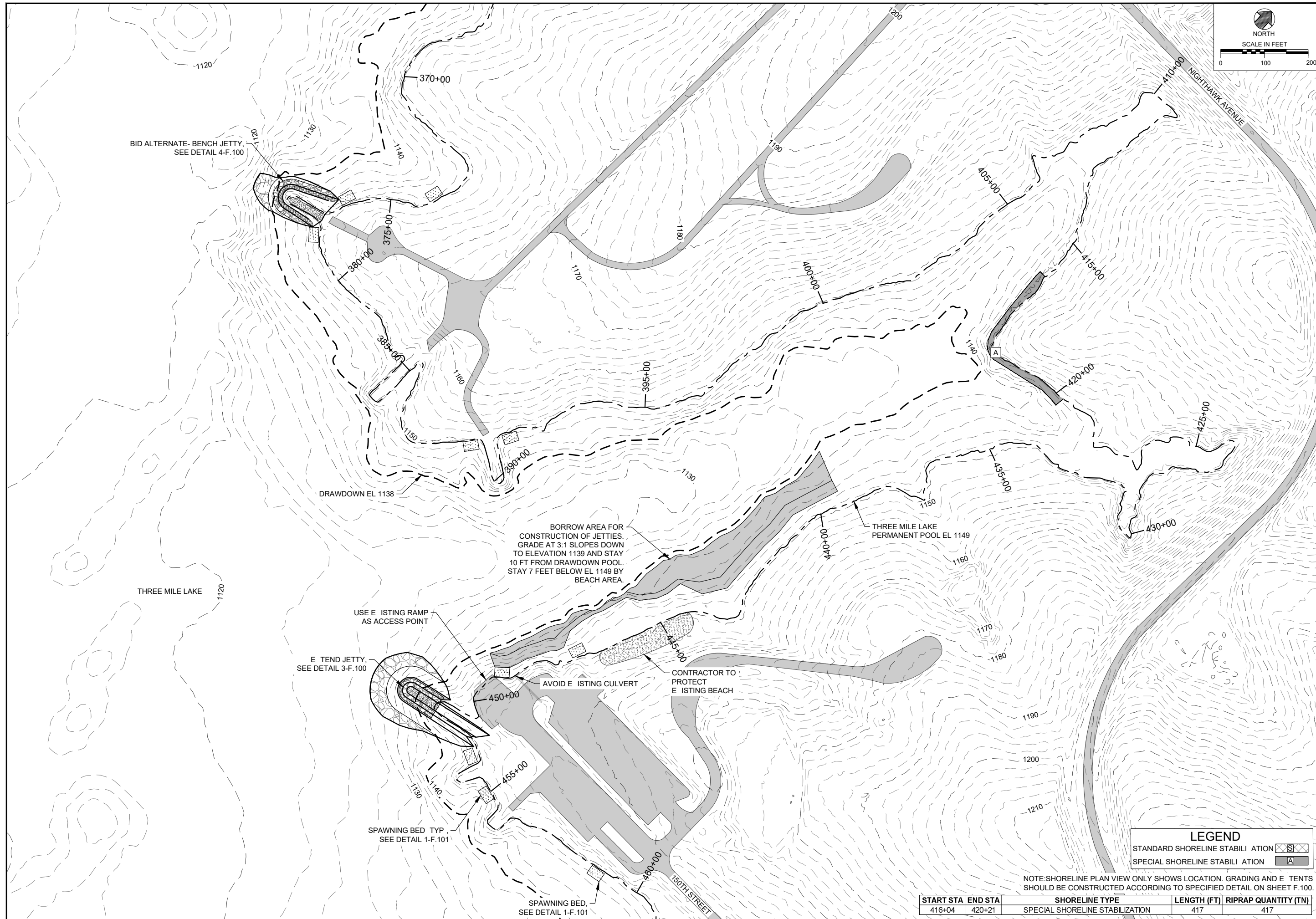
ENGINEER'S SEAL

REVISIONS	
NO.	DATE

DESIGNED BY: SEM  
DRAWN BY: CKW  
QA / QC BY: MKS  
PROJECT NO.: 007-20-01  
DATE: 02.13.2023

TITLE  
LAKE PLAN  
6 OF 10

SHEET  
**F.7**

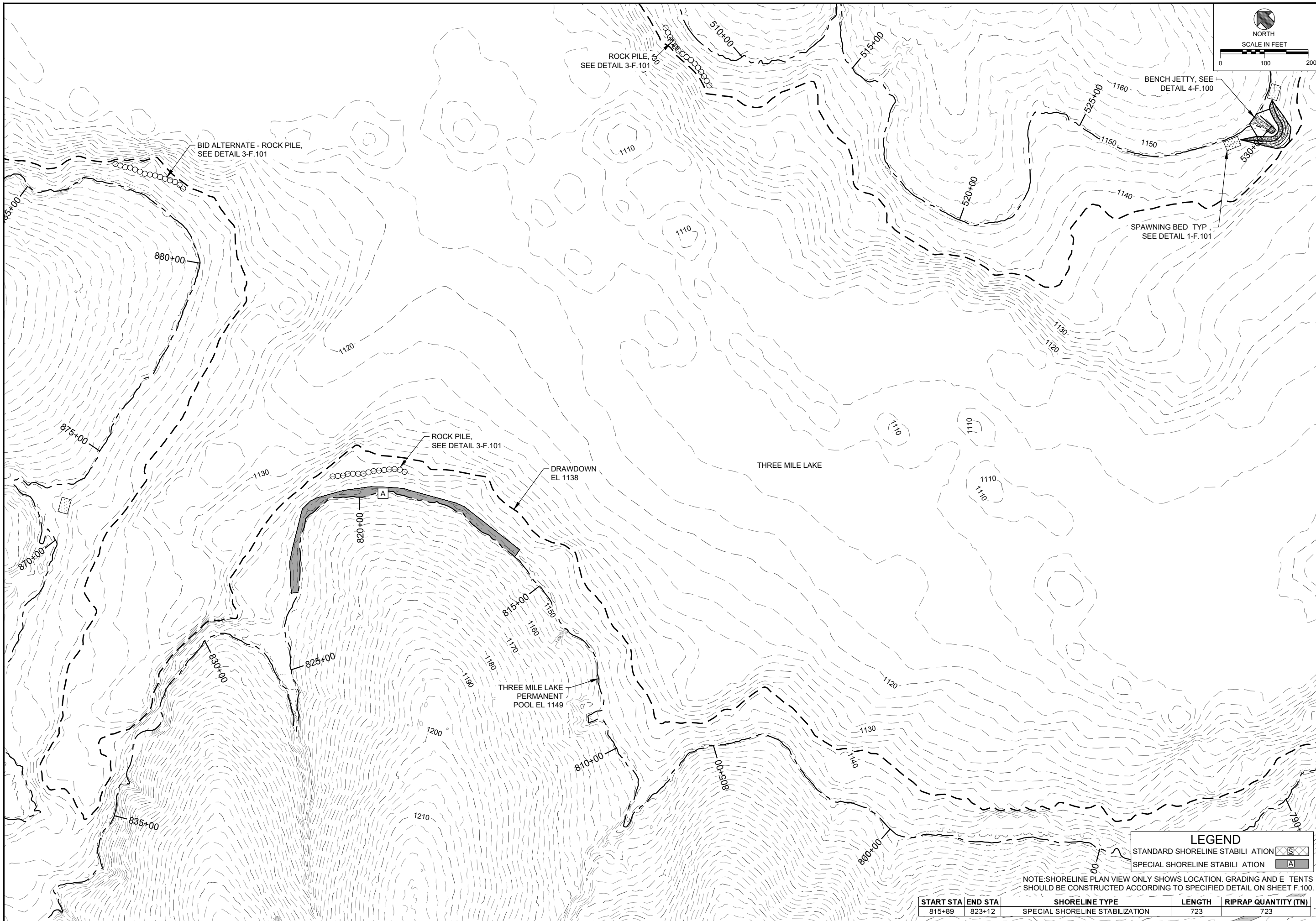
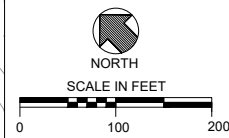


**LEGEND**

STANDARD SHORELINE STABILIZATION	
SPECIAL SHORELINE STABILIZATION	

NOTE: SHORELINE PLAN VIEW ONLY SHOWS LOCATION. GRADING AND E TENTS SHOULD BE CONSTRUCTED ACCORDING TO SPECIFIED DETAIL ON SHEET F.100.

START STA	END STA	SHORELINE TYPE	LENGTH (FT)	RIPRAP QUANTITY (TN)
416+04	420+21	SPECIAL SHORELINE STABILIZATION	417	417



THREE MILE LAKE RESTORATION PHASE 2  
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UNION COUNTY, IOWA  
2023

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DESIGNED BY: SEM  
DRAWN BY: CKW  
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PROJECT NO.: 007-20-01  
DATE: 02.13.2023

TITLE  
LAKE PLAN  
7 OF 10

SHEET  
**F.8**

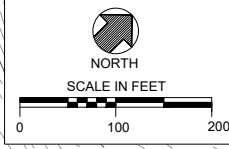
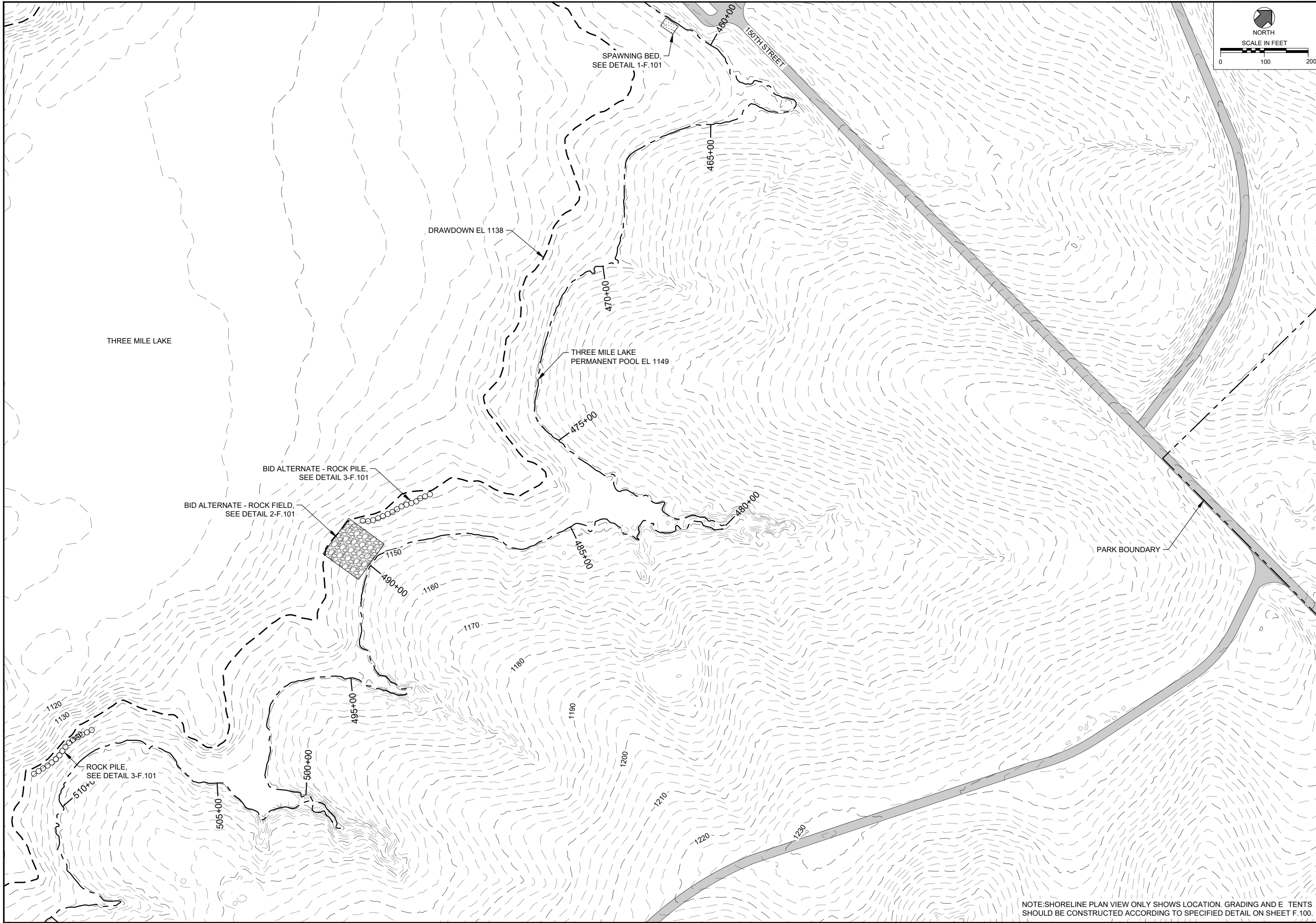
**LEGEND**

STANDARD SHORELINE STABILIZATION	
SPECIAL SHORELINE STABILIZATION	

NOTE: SHORELINE PLAN VIEW ONLY SHOWS LOCATION. GRADING AND ELEVATIONS SHOULD BE CONSTRUCTED ACCORDING TO SPECIFIED DETAIL ON SHEET F.100.

START STA	END STA	SHORELINE TYPE	LENGTH	RIPRAP QUANTITY (TN)
815+89	823+12	SPECIAL SHORELINE STABILIZATION	723	723





THREE MILE LAKE RESTORATION PHASE 2  
IOWA DEPARTMENT OF NATURAL RESOURCES  
UNION COUNTY, IOWA  
2023

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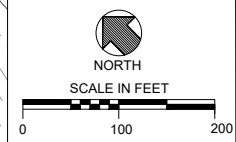
REVISIONS	
NO.	DATE

DESIGNED BY: SEM  
DRAWN BY: CKW  
QA / QC BY: MKS  
PROJECT NO.: 007-20-01  
DATE: 02.13.2023

TITLE  
LAKE PLAN  
8 OF 10

SHEET  
F.9

NOTE: SHORELINE PLAN VIEW ONLY SHOWS LOCATION. GRADING AND E. TENTS SHOULD BE CONSTRUCTED ACCORDING TO SPECIFIED DETAIL ON SHEET F.100.



THREE MILE LAKE RESTORATION PHASE 2  
IOWA DEPARTMENT OF NATURAL RESOURCES  
UNION COUNTY, IOWA  
2023

ENGINEER'S SEAL

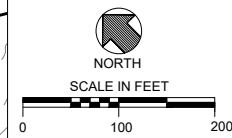
REVISIONS	
NO.	DATE

DESIGNED BY: SEM  
DRAWN BY: CKW  
QA / QC BY: MKS  
PROJECT NO.: 007-20-01  
DATE: 02.13.2023

TITLE  
LAKE PLAN  
9 OF 10

SHEET  
F.10

NOTE: SHORELINE PLAN VIEW ONLY SHOWS LOCATION. GRADING AND E. TENTS SHOULD BE CONSTRUCTED ACCORDING TO SPECIFIED DETAIL ON SHEET F.100.



ENGINEER'S SEAL

REVISIONS	
NO.	DATE

DESIGNED BY: SEM  
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PROJECT NO.: 007-20-01  
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TITLE  
LAKE PLAN  
10 OF 10

SHEET  
**F.11**



**LEGEND**

STANDARD SHORELINE STABILIZATION	
SPECIAL SHORELINE STABILIZATION	

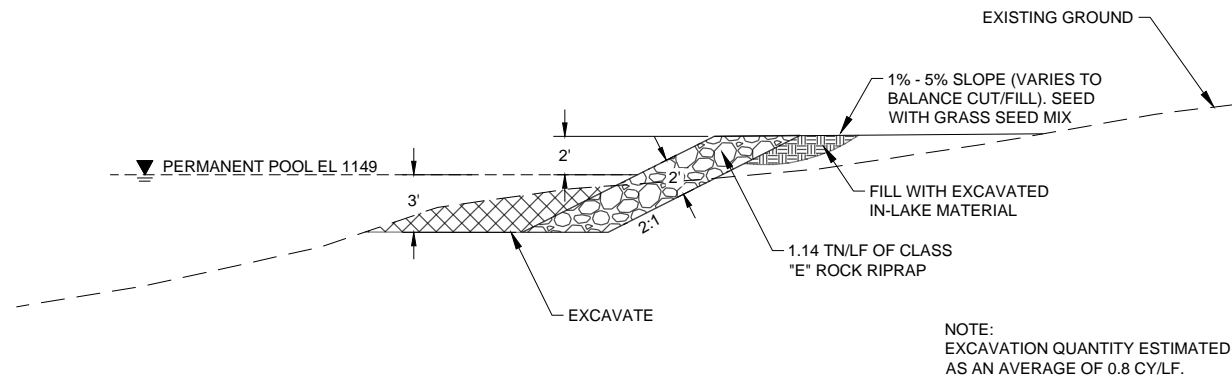
NOTE: SHORELINE PLAN VIEW ONLY SHOWS LOCATION. GRADING AND ELEVATIONS SHOULD BE CONSTRUCTED ACCORDING TO SPECIFIED DETAIL ON SHEET F.100.

START STA	END STA	SHORELINE TYPE	LENGTH (FT)	RIPRAP QUANTITY (TN)
654+18	656+71	SPECIAL SHORELINE STABILIZATION	253	253
663+98	668+72	SPECIAL SHORELINE STABILIZATION	474	474

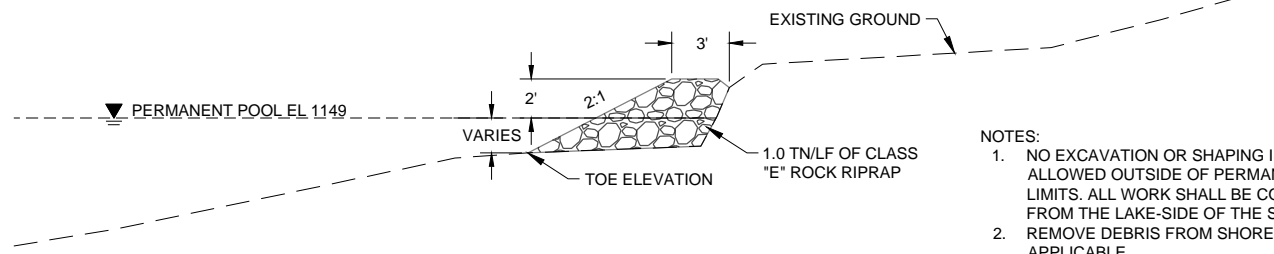
REVISIONS	
NO.	DATE

DESIGNED BY: SEM  
DRAWN BY: CKW  
QA / QC BY: MKS  
PROJECT NO.: 007-20-01  
DATE: 02.13.2023

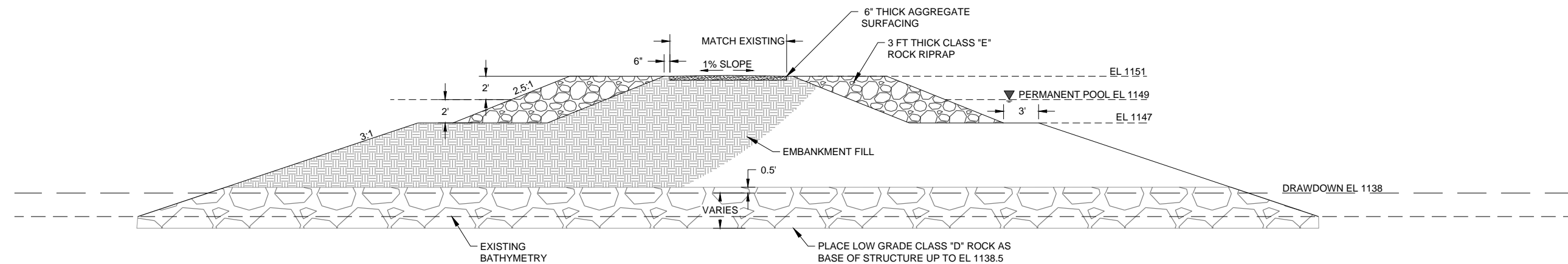
TITLE  
**SHORELINE  
DETAILS**



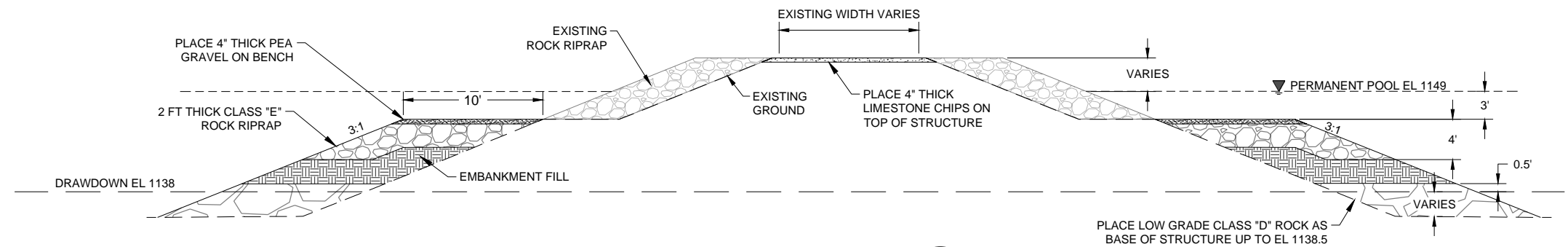
**STANDARD SHORELINE STABILIZATION** 1  
NOT TO SCALE F.100



**SPECIAL SHORELINE STABILIZATION** 2  
NOT TO SCALE F.100

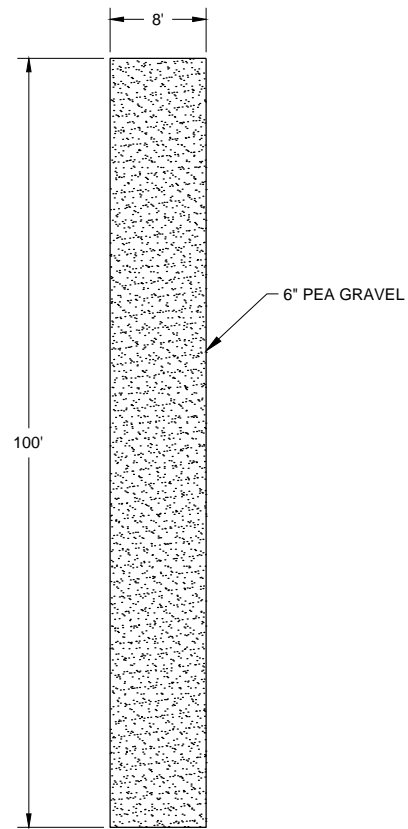


**JETTY EXTENSION DETAIL** 3  
NOT TO SCALE F.100

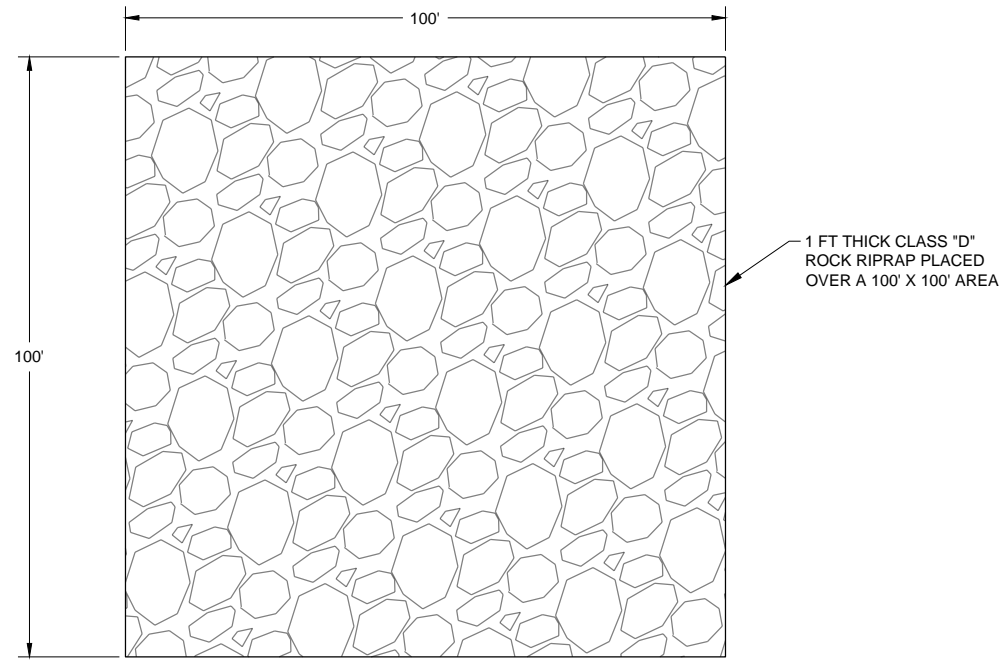


**JETTY BENCH DETAIL** 4  
NOT TO SCALE F.100

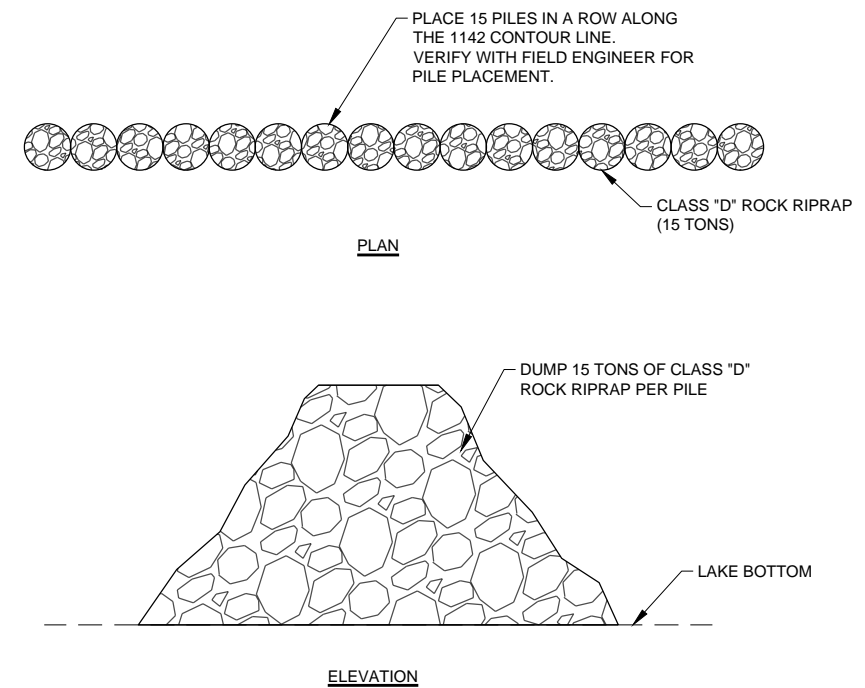
NOTE: VERIFY FINAL SHORELINE LOCATIONS WITH FIELD ENGINEER.



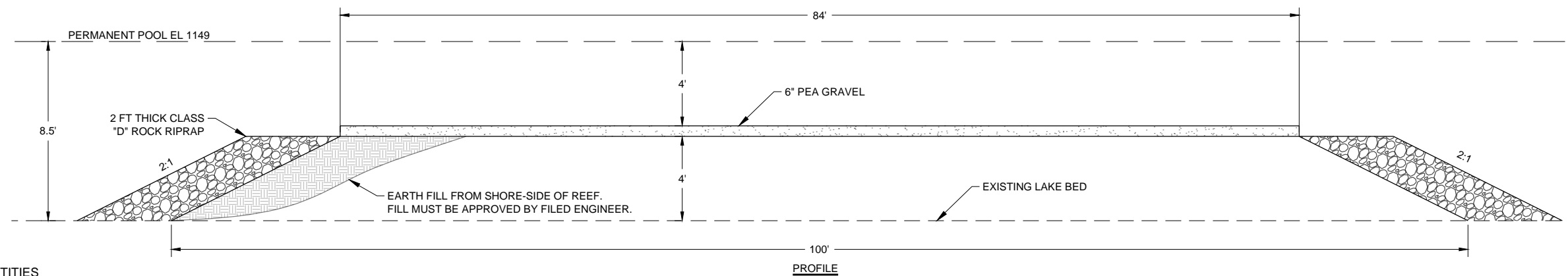
**SPAWNING BED DETAIL** 1  
NOT TO SCALE F.101



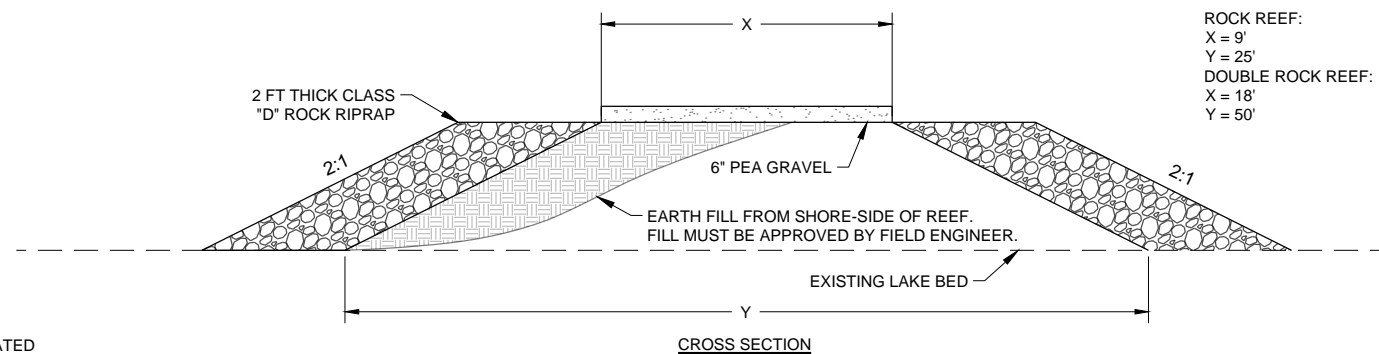
**ROCK FIELD DETAIL** 2  
NOT TO SCALE F.101



**ROCK PILE DETAIL** 3  
NOT TO SCALE F.101



PROFILE



CROSS SECTION

**STANDARD AND DOUBLE WIDE ROCK REEF DETAILS** 4  
NOT TO SCALE F.101

**FISH HABITAT QUANTITIES**

**STANDARD ROCK REEF**

ITEM	UNITS	QUANTITY
PEA GRAVEL	TN	21
CLASS "D" ROCK RIPRAP	TN	219
EMBANKMENT	CY	341

**DOUBLE WIDE ROCK REEF**

ITEM	UNITS	QUANTITY
PEA GRAVEL	TN	42
CLASS "D" ROCK RIPRAP	TN	250
EMBANKMENT	CY	682

**ROCK FIELD**

ITEM	UNITS	QUANTITY
CLASS "D" ROCK RIPRAP	TN	519

**ROCK PILE**

ITEM	UNITS	QUANTITY
CLASS "D" ROCK RIPRAP	TN	225

**SPAWNING BED**

ITEM	UNITS	QUANTITY
PEA GRAVEL	TN	22

**NOTES:**

1. THE ESTIMATED QUANTITIES REPRESENT THE TOTAL ESTIMATED QUANTITIES FOR A SINGLE STRUCTURE.
2. THE EMBANKMENT QUANTITY ESTIMATES ARE PROVIDED BASED ON AVAILABLE INFORMATION. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING ACTUAL QUANTITIES.

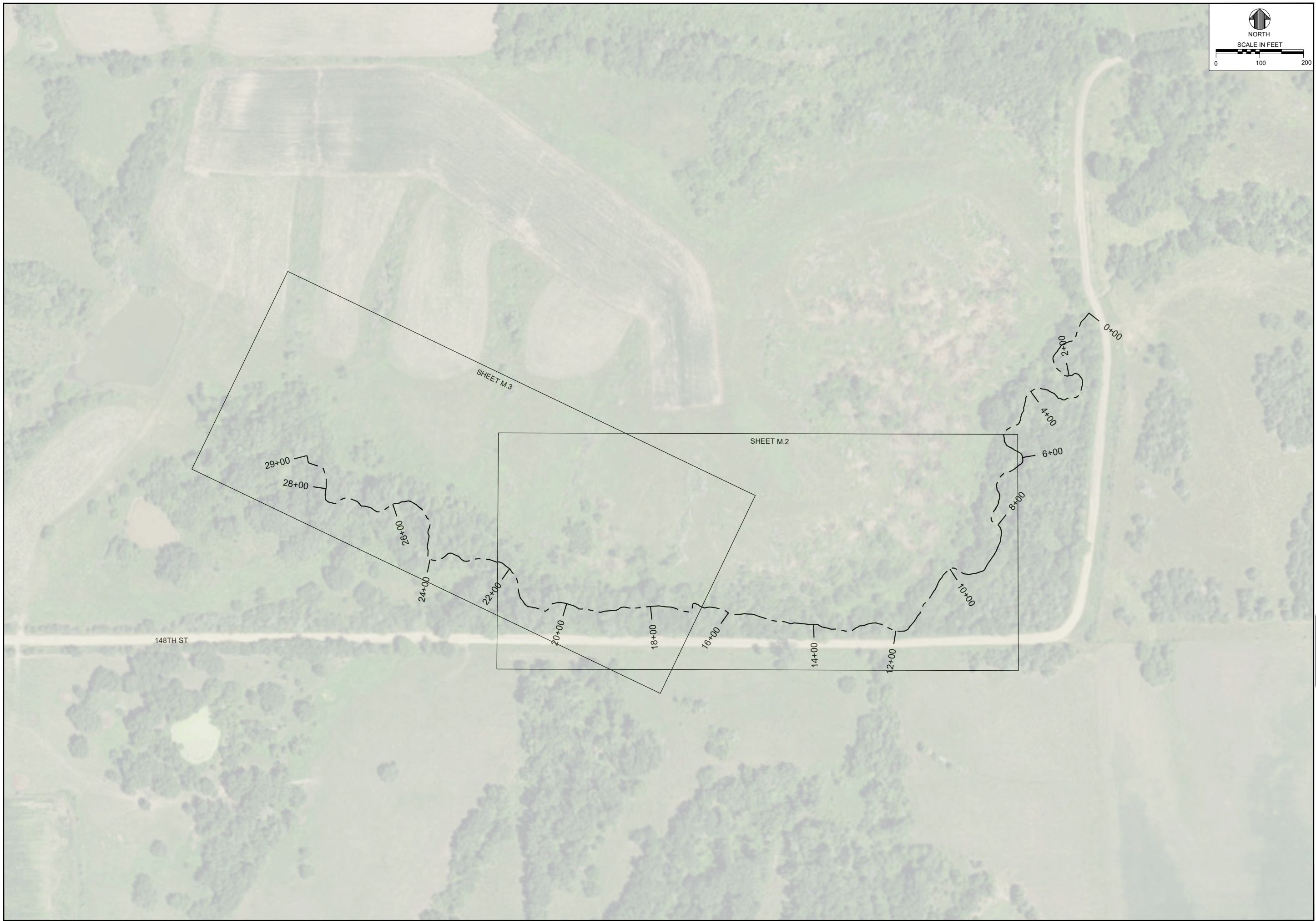
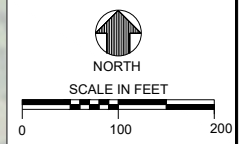
REVISIONS	
NO.	DATE

DESIGNED BY: SEM  
DRAWN BY: CKW  
QA / QC BY: MKS  
PROJECT NO.: 007-20-01  
DATE: 02.13.2023

TITLE  
**FISH HABITAT DETAILS**

SHEET  
**F.101**

NOTE: VERIFY FINAL FISH HABITAT LOCATIONS WITH FIELD ENGINEER.



THREE MILE LAKE RESTORATION PHASE 2  
IOWA DEPARTMENT OF NATURAL RESOURCES  
UNION COUNTY, IOWA  
2023

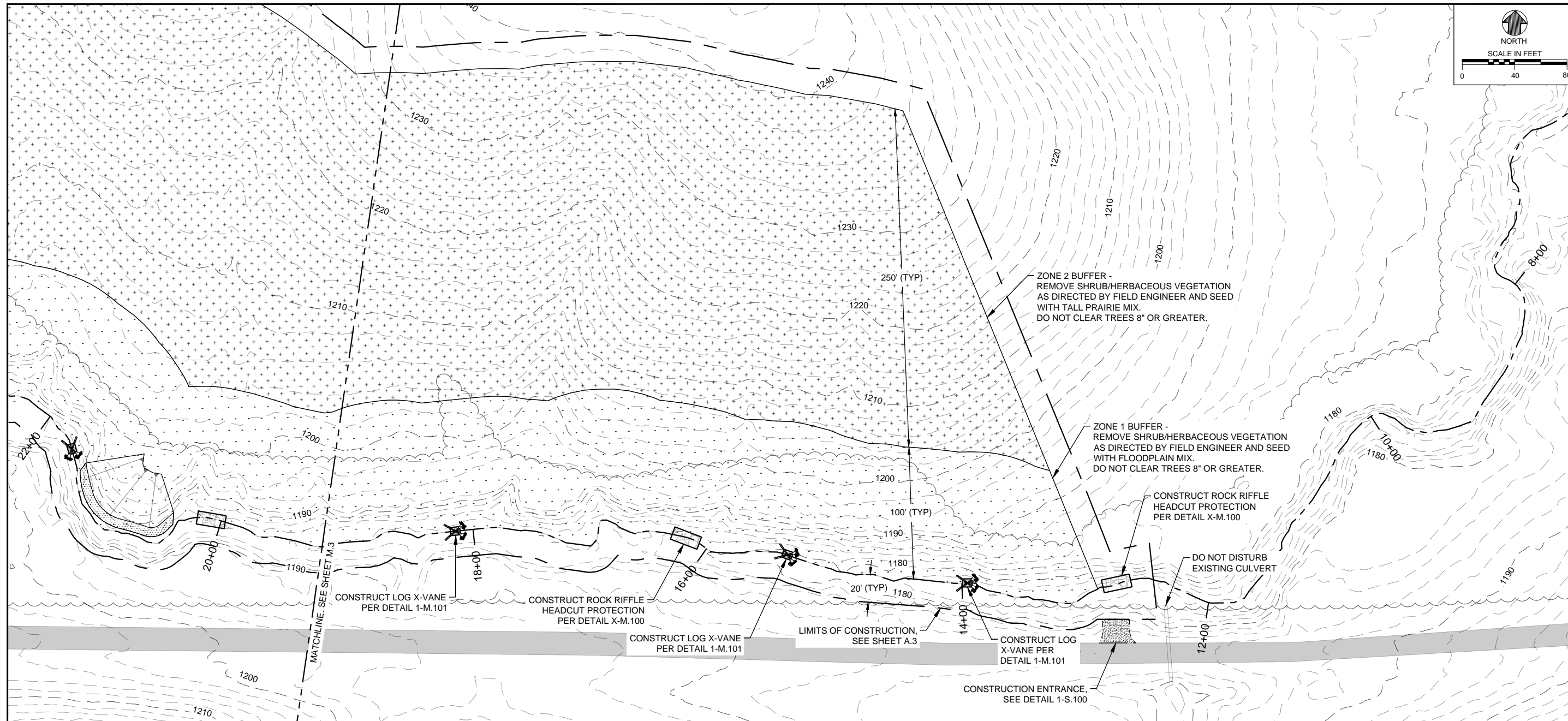
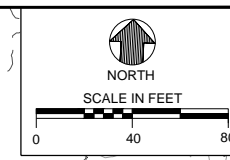
ENGINEER'S SEAL

REVISIONS	
NO.	DATE

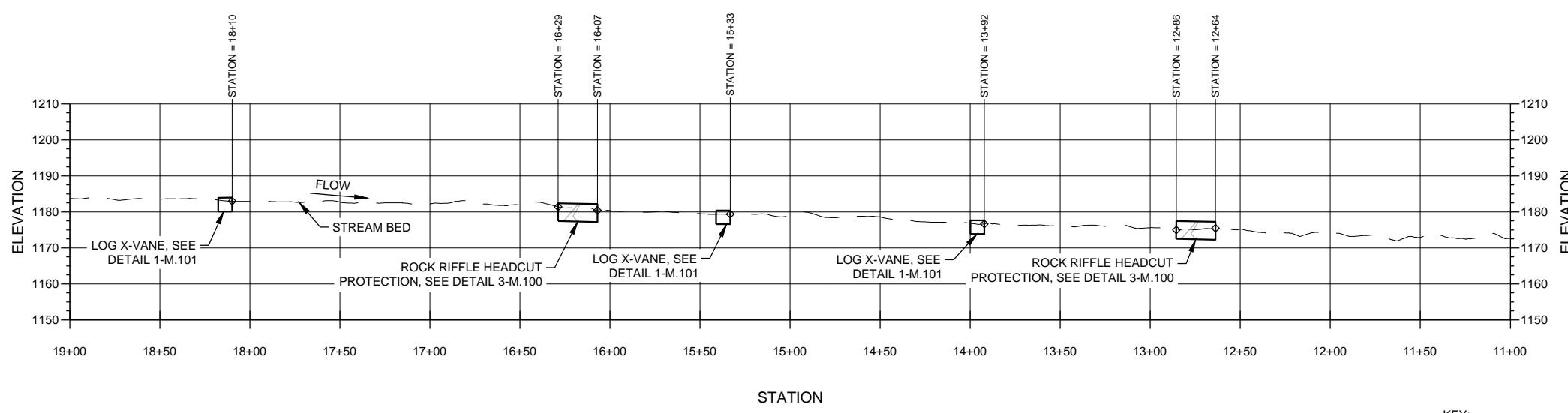
DESIGNED BY: SEM  
DRAWN BY: CKW  
QA / QC BY: MKS  
PROJECT NO.: 007-20-01  
DATE: 02.13.2023

TITLE  
**SITE B  
STREAM  
MITIGATION  
SHEET KEY**

SHEET  
**M.1**

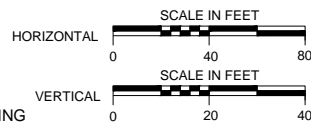


PLAN VIEW



PROFILE VIEW

KEY:  
RB - RIGHT BANK  
LB - LEFT BANK  
FBG - FLOODPLAIN BENCH GRADING



THREE MILE LAKE RESTORATION PHASE 2  
IOWA DEPARTMENT OF NATURAL RESOURCES  
UNION COUNTY, IOWA  
2023

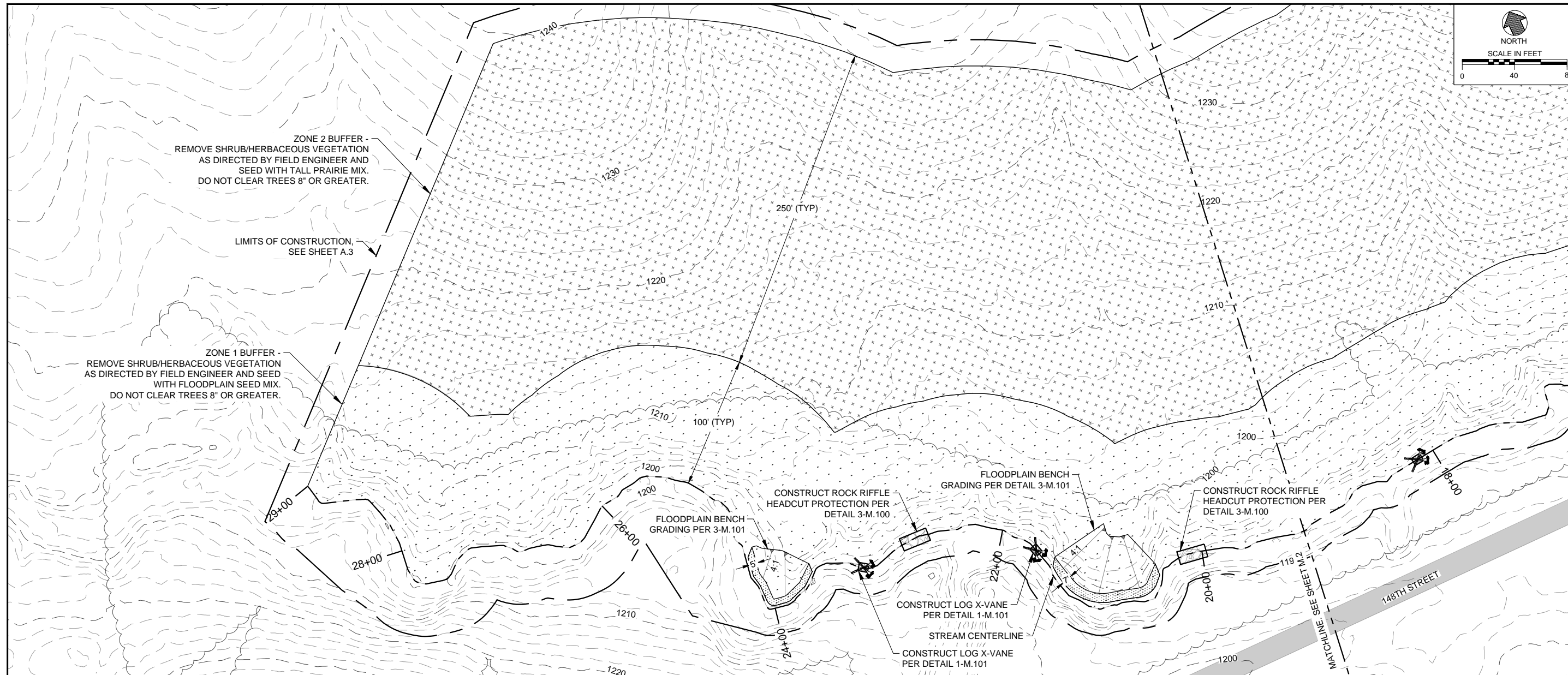
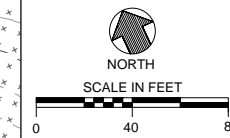
ENGINEER'S SEAL

REVISIONS	
NO.	DATE

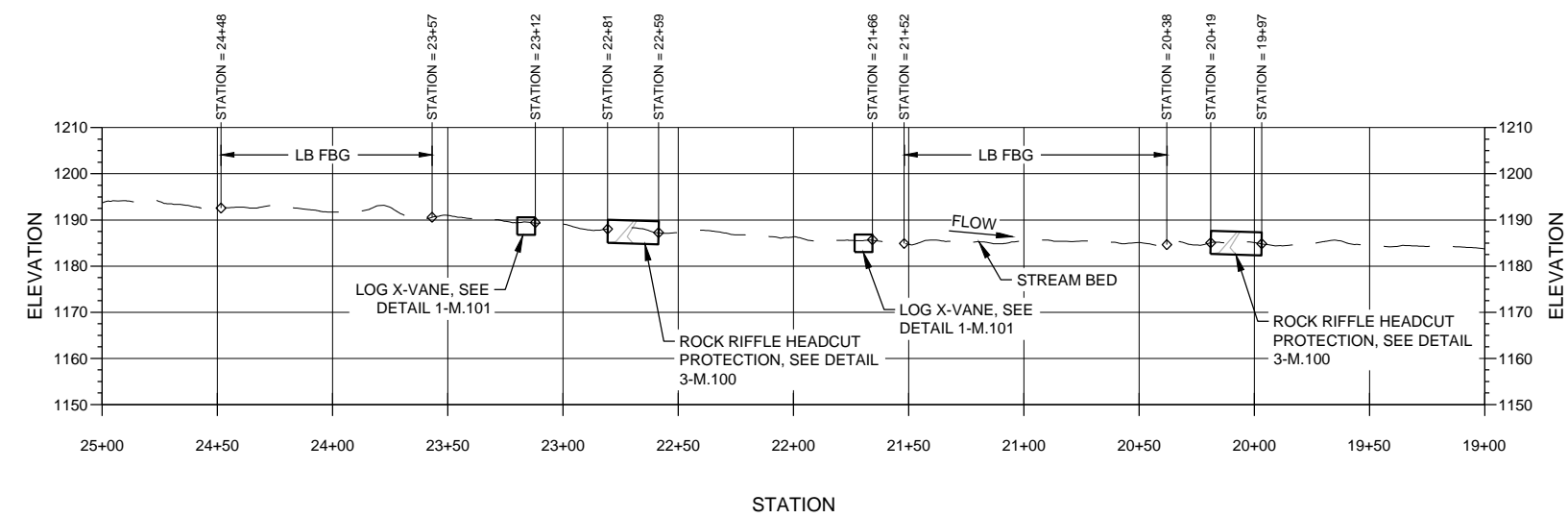
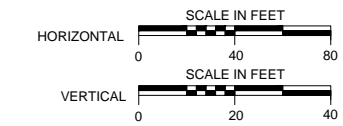
DESIGNED BY: SEM  
DRAWN BY: CKW  
QA / QC BY: MKS  
PROJECT NO.: 007-20-01  
DATE: 02.13.2023

TITLE  
SITE B  
STREAM  
MITIGATION  
PLAN AND  
PROFILE  
(1 OF 2)

SHEET  
**M.2**



**PLAN VIEW**



**PROFILE VIEW**

KEY:  
RB - RIGHT BANK  
LB - LEFT BANK  
FBG - FLOODPLAIN BENCH GRADING

THREE MILE LAKE RESTORATION PHASE 2  
IOWA DEPARTMENT OF NATURAL RESOURCES  
UNION COUNTY, IOWA  
2023

ENGINEER'S SEAL

REVISIONS	
NO.	DATE

DESIGNED BY: SEM  
DRAWN BY: CKW  
QA / QC BY: MKS  
PROJECT NO.: 007-20-01  
DATE: 02.13.2023

TITLE  
**SITE B  
STREAM  
MITIGATION  
PLAN AND  
PROFILE  
(2 OF 2)**

SHEET  
**M.3**





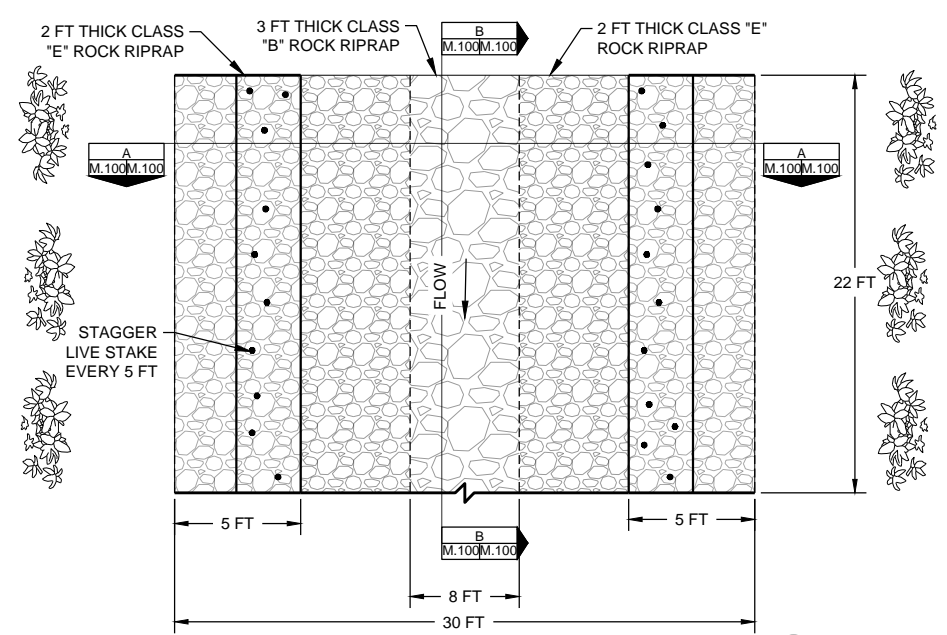
NOTE: SALVAGE AND REPLACE TOPSOIL FROM EXISTING BANKLINE. IF INSUFFICIENT QUANTITY LOCALLY, CONTRACTOR TO OBTAIN TOPSOIL FROM SPOILS AREA SHOWN ON M.6

STREAM BANK STABILIZATION DETAIL 1  
NOT TO SCALE

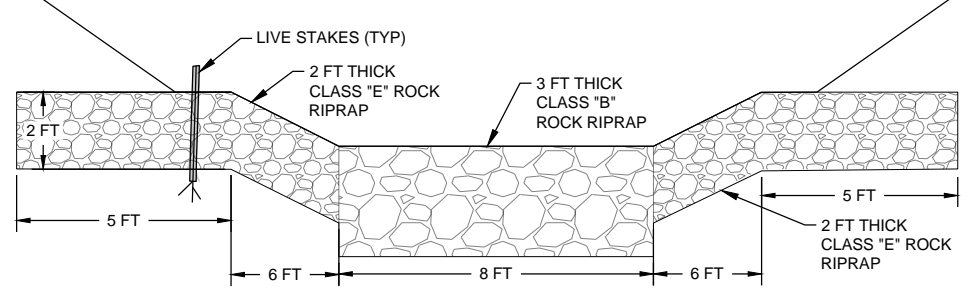
1  
M.100

STREAM BANK STABILIZATION DETAIL 2  
NOT TO SCALE

2  
M.100

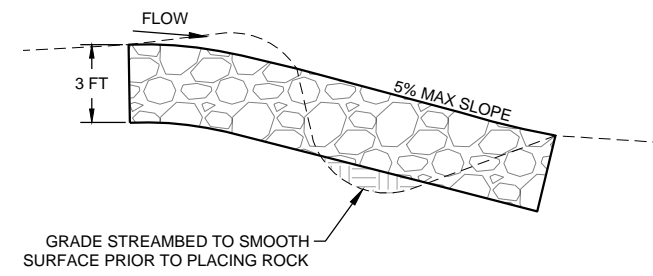


CONSTRUCTED ROCK RIFFLE PLAN VIEW  
3  
M.100



CONSTRUCTED ROCK RIFFLE CROSS SECTION  
A  
M.100

NOTE: CONTRACTOR TO IMPLEMENT WILLOW STAKING IN ACCORDANCE WITH GUIDANCE FOUND AT [HTTPS://WWW.LRP.USACE.ARMY.MIL/PORTALS/72/DOCS/REGULATORY/FOIA/PATRIOT/ENCLOSURE%201%20-%2009-0081-004.PDF](https://www.lrp.usace.army.mil/portals/72/docs/regulatory/foia/patriot/enclosure%201%20-%2009-0081-004.pdf)



CONSTRUCTED ROCK RIFFLE PROFILE AT HEADCUTS  
B  
M.100

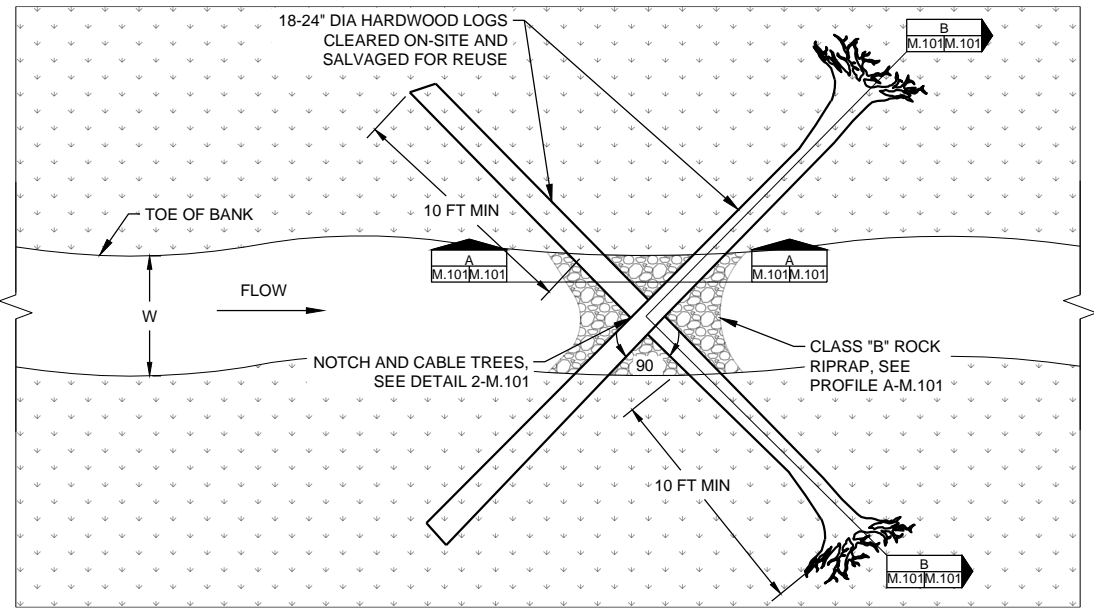
ENGINEER'S SEAL

REVISIONS	
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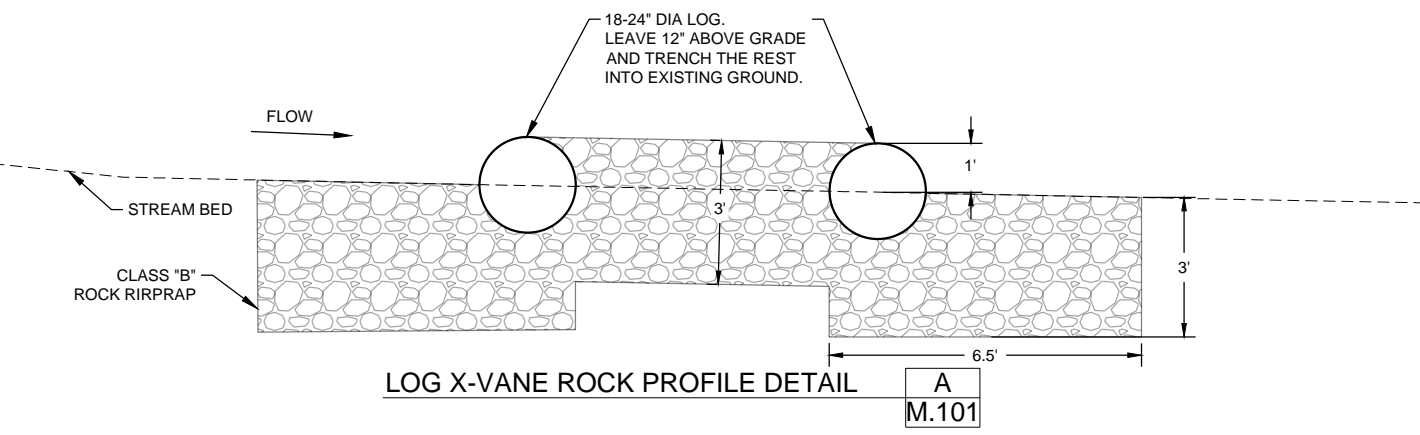
DESIGNED BY: SEM  
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PROJECT NO.: 007-20-01  
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TITLE  
**STREAM STABILIZATION DETAILS**

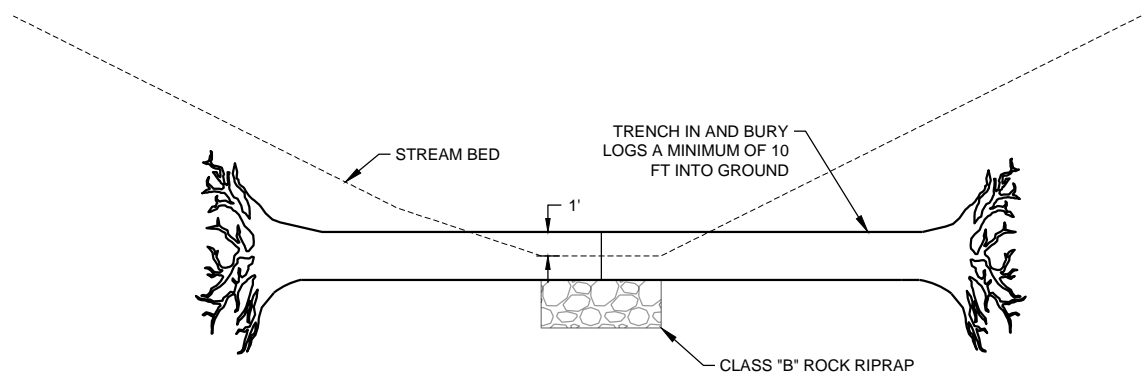
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**M.100**



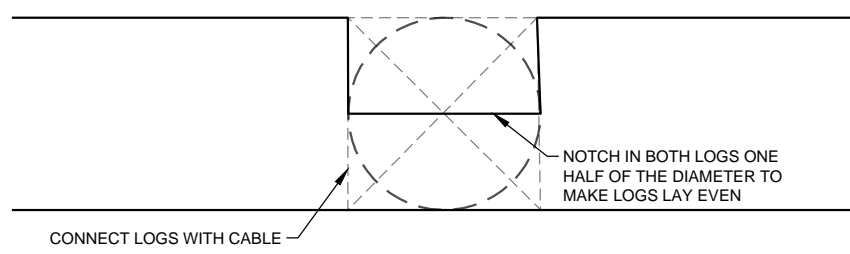
LOG X-VANE PLAN VIEW DETAIL **1**  
M.101



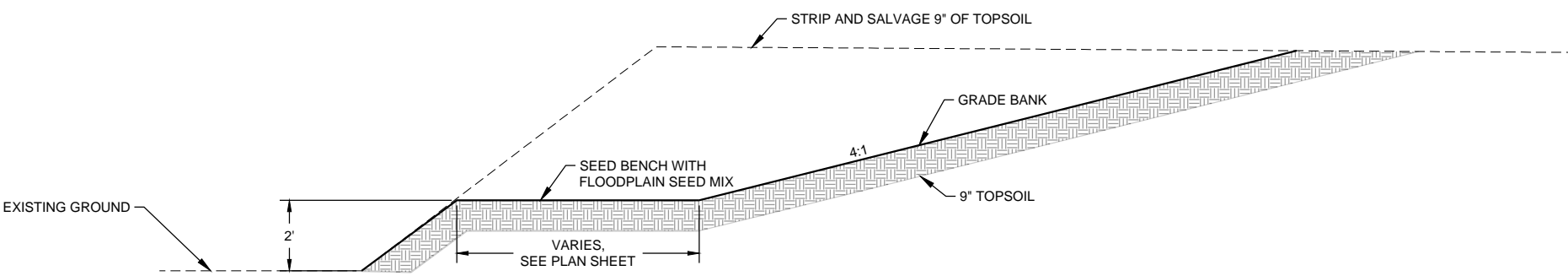
LOG X-VANE ROCK PROFILE DETAIL **A**  
M.101



LOG X-VANE CROSS SECTION **B**  
M.101



LOG CONNECTION DETAIL **2**  
M.101



FLOODPLAIN BENCH GRADING DETAIL **3**  
M.101

NOTE: SALVAGE AND REPLACE TOPSOIL FROM EXISTING BANKLINE. IF INSUFFICIENT QUANTITY LOCALLY, CONTRACTOR TO COORDINATE WITH FIELD ENGINEER FOR HILLSIDE LOCATION TO OBTAIN TOPSOIL FROM.

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TITLE  
**STREAM MITIGATION DETAILS**

**STORMWATER POLLUTION PREVENTION PLAN**

ALL CONTRACTORS/SUBCONTRACTORS SHALL CONDUCT THEIR OPERATIONS IN A MANNER THAT MINIMIZES EROSION AND PREVENTS SEDIMENTS FROM LEAVING THE PROJECT SITE OR ENTERING NEW OR EXISTING STORM WATER SYSTEMS. THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLIANCE AND IMPLEMENTATION OF THE STORM WATER POLLUTION PREVENTION PLAN (SWPPP) FOR THEIR ENTIRE CONTRACT. THIS RESPONSIBILITY SHALL BE FURTHER SHARED WITH SUBCONTRACTORS WHOSE WORK IS A SOURCE OF POTENTIAL POLLUTION AS DEFINED IN THIS SWPPP.

EROSION CONTROL IS A LUMP SUM PAYMENT AND INCLUDES ALL EROSION CONTROL ITEMS EXCEPT FOR HYDROMULCH, WHICH HAVE A LINE ITEM IN THE BID FORM. CONTRACTOR IS RESPONSIBLE FOR PLACEMENT, CLEAN OUT, AND MAINTENANCE OF ALL SWPPP ITEMS AND REMOVAL ONCE ENGINEER'S APPROVAL IS PROVIDED.

**1. SITE DESCRIPTION**

THIS SWPPP IS FOR THE CONSTRUCTION OF WATERSHED AND LAKE IMPROVEMENTS AT THREE MILE LAKE IN TOWNSHIP T73 N, RANGE 29 W, SECTIONS 19, 30, AND 31, AND TOWNSHIP T73 N, RANGE 30 W, SECTIONS 25. THIS PROJECT CONSISTS OF THE DREDGING OF ONE WATERSHED PONDS/EARTH IMPOUNDMENTS, ONE SPOILS BASIN, REPAIRS TO ONE IN-LAKE SILT DIKE, CONSTRUCTION OF TWO WATERSHED PONDS/EARTH IMPOUNDMENTS, STREAM MITIGATION, SHORELINE IMPROVEMENTS, PLACEMENT OF FISH HABITAT, AND INCIDENTAL WORK AS REQUIRED BY THE PLANS AND/OR THE DNR CONSTRUCTION INSPECTOR.

**POTENTIAL SOURCES OF POLLUTION:**

SITE SOURCES OF POLLUTION GENERATED AS A RESULT OF THIS WORK RELATE TO SILTS AND SEDIMENT WHICH MAY BE TRANSPORTED AS A RESULT OF A STORM EVENT. HOWEVER, THIS SWPPP PROVIDES CONVEYANCE FOR OTHER (NON-PROJECT RELATED) OPERATIONS. THESE OTHER OPERATIONS HAVE STORM WATER RUNOFF, THE REGULATION OF WHICH IS BEYOND THE CONTROL OF THIS SWPPP. POTENTIALLY THIS RUNOFF CAN CONTAIN VARIOUS POLLUTANTS RELATED TO SITE-SPECIFIC LAND USES. EXAMPLES ARE:

**RURAL AGRICULTURAL ACTIVITIES:**

RUNOFF FROM AGRICULTURAL LAND USE CAN POTENTIALLY CONTAIN CHEMICALS INCLUDING HERBICIDES, PESTICIDES, FUNGICIDES AND FERTILIZERS.

**2. CONTROLS**

AT DOWNGRADIENT LOCATIONS WHERE RUNOFF CAN MOVE FROM EACH CONSTRUCTION SITE, CONTROLS SHALL BE PLACED ALONG THE PERIMETER OF THE AREAS TO BE DISTURBED PRIOR TO BEGINNING GRADING, EXCAVATION OR CLEARING AND GRUBBING OPERATIONS. CONTROLS INCLUDE SILT FENCE, STRAW WADDLE (OR APPROVED EQUIVALENTS BY FIELD ENGINEER) AS LAID OUT ON THE SITE PLAN SHEETS. VEGETATION IN AREAS NOT NEEDED FOR CONSTRUCTION SHALL BE PRESERVED.

CONSTRUCTION ENTRANCES TO BE PLACED AT ALL LOCATIONS WHERE EQUIPMENT ENTERS AND EXITS EACH PROJECT SITE FROM PARK ROADS IN ORDER TO REDUCE SEDIMENT TRACK OUT. ANY SEDIMENT TRACK OUT THAT DOES OCCUR MUST BE REMOVED AND SPOILED ON SITE.

TEMPORARY STABILIZING SEEDING SHALL BE COMPLETED AS THE DISTURBED AREAS ARE CONSTRUCTED. IF CONSTRUCTION ACTIVITY IS NOT PLANNED TO OCCUR IN A DISTURBED AREA FOR AT LEAST 21 DAYS, THE AREA SHALL BE STABILIZED BY TEMPORARY SEEDING OR MULCHING WITHIN 14 DAYS. OTHER STABILIZING METHODS SHALL BE USED OUTSIDE THE SEEDING TIME PERIOD. TEMPORARY SEEDING AND MULCHING SHALL BE CONSIDERED INCIDENTAL TO THE PROJECT. UPON REACHING FINAL GRADES, HYDROMULCH WILL BE PLACED ON SLOPES AS INDICATED ON PLANS.

AS THE WORK PROGRESSES, ADDITIONAL EROSION CONTROL ITEMS MAY BE REQUIRED AS DETERMINED BY THE CONTRACTOR AFTER FIELD INVESTIGATION. THE CONTRACTOR WILL COMPLETE THE CONSTRUCTION WITH THE ESTABLISHMENT OF PERMANENT PERENNIAL VEGETATION OF ALL DISTURBED AREAS AND HYDROMULCH IN SPECIFIED LOCATIONS.

**OTHER CONTROLS:**

CONTRACTOR DISPOSAL OF UNUSED CONSTRUCTION MATERIALS AND CONSTRUCTION MATERIAL WASTES SHALL COMPLY WITH APPLICABLE STATE AND LOCAL WASTE DISPOSAL, SANITARY SEWER, OR SEPTIC SYSTEM REGULATIONS. IN THE EVENT OF A CONFLICT WITH OTHER GOVERNMENTAL LAWS, RULES AND REGULATIONS, THE MORE RESTRICTIVE LAWS, RULES OR REGULATIONS SHALL APPLY.

**APPROVED STATE OR LOCAL PLANS:**

DURING THE COURSE OF THIS CONSTRUCTION, IT IS POSSIBLE THAT SITUATIONS WILL ARISE WHERE UNKNOWN MATERIALS WILL BE ENCOUNTERED. WHEN SUCH SITUATIONS ARE ENCOUNTERED, THEY WILL BE HANDLED ACCORDING TO ALL FEDERAL, STATE, AND LOCAL REGULATIONS IN EFFECT AT THE TIME.

**3. MAINTENANCE**

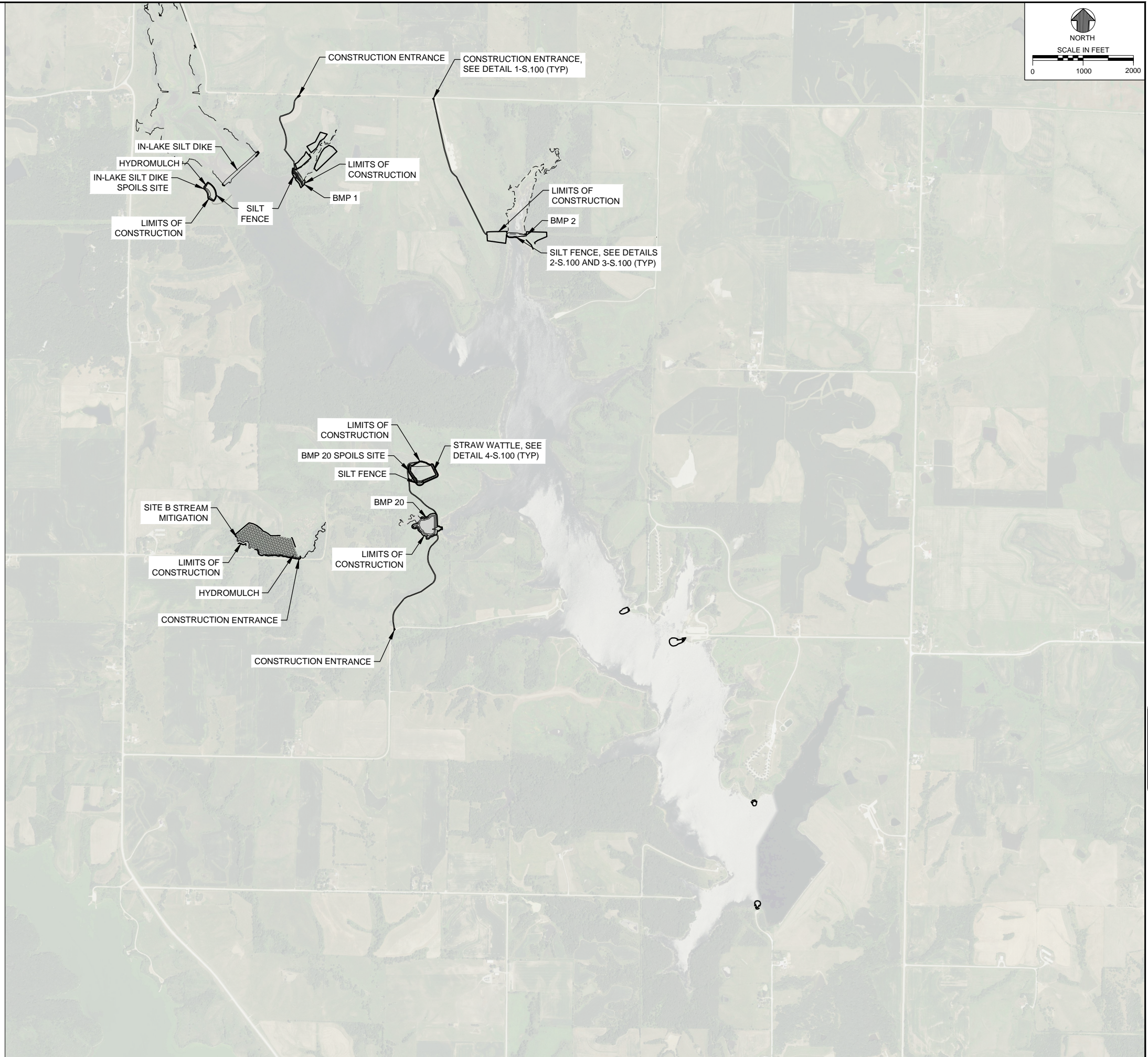
THE CONTRACTOR IS REQUIRED TO MAINTAIN ALL TEMPORARY EROSION CONTROL MEASURES IN PROPER WORKING ORDER, INCLUDING CLEANING, REPAIRING, OR REPLACING THEM THROUGHOUT THE CONTRACT PERIOD. CLEANING OF SILT CONTROL DEVICES SHALL BEGIN WHEN THE FEATURES HAVE LOST 50% OF THEIR CAPACITY.

**4. INSPECTIONS**

INSPECTIONS SHALL BE MADE JOINTLY BY THE CONTRACTOR AND THE CONTRACTING AUTHORITY EVERY SEVEN CALENDAR DAYS AND AFTER EACH RAIN EVENT THAT IS 1/2" OR GREATER. THE CONTRACTOR SHALL IMMEDIATELY BEGIN CORRECTIVE ACTION ON ALL DEFICIENCIES FOUND. THE FINDINGS OF THIS INSPECTION SHALL BE RECORDED IN THE PROJECT DIARY. THIS SWPPP MAY BE REVISED BASED ON THE FINDINGS OF THE INSPECTION. THE CONTRACTOR SHALL IMPLEMENT ALL REVISIONS. ALL CORRECTIVE ACTIONS SHALL BE COMPLETED WITHIN 3 CALENDAR DAYS OF THE INSPECTION.

**5. NON-STORM DISCHARGES**

THIS INCLUDES SUBSURFACE DRAINS (I.E. LONGITUDINAL AND STANDARD SUBDRAINS), SLOPE DRAINS AND BRIDGE END DRAINS. THE VELOCITY OF THE DISCHARGE FROM THESE FEATURES MAY BE CONTROLLED BY THE USE OF ROLLED EROSION CONTROL, OR RIPRAP.



ENGINEER'S SEAL

REVISIONS	
NO.	DATE

DESIGNED BY: SEM  
DRAWN BY: CKW  
QA / QC BY: MKS  
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TITLE  
**SWPP PLAN**

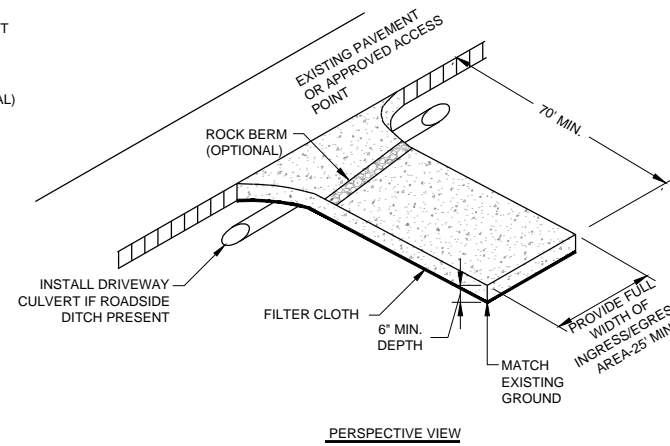
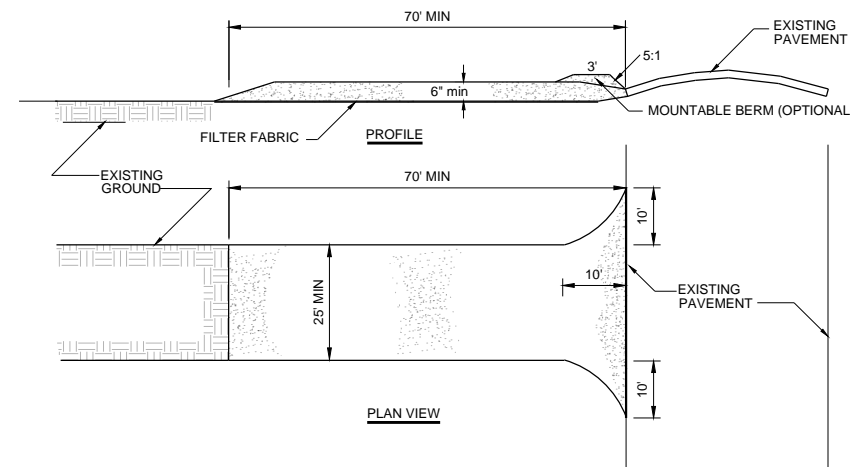
**FILTER FABRIC SPECIFICATIONS**

PROPERTY	TEST PROCEDURE	ENTRANCE	
		LIGHT DUTY	HEAVY DUTY
GRAB TENSILE STRENGTH	ASTM D-4632	180 LBS.	250 LBS.
GRAB ELONGATION @ FAILURE	ASTM D-4632	50%	60%
MULLEN BURST STRENGTH	ASTM D-3786	250 PSI.	380 PSI.
PUNCTURE STRENGTH	ASTM D-4833	90 LBS.	125 LBS.
APPARENT OPENING SIZE	ASTM D-4751	0.2 MM	0.2 MM
AGGREGATE DEPTH		6 IN.	10 IN.

LIGHT DUTY ENTRANCE SHALL BE DEFINED AS SITES THAT HAVE BEEN GRADED TO SUBGRADE AND WHERE MOST TRAVEL WOULD BE SINGLE AXLE VEHICLES AND AN OCCASIONAL MULTI-AXLE TRUCK.  
HEAVY DUTY ENTRANCE SHALL BE DEFINED AS SITES WITH ONLY ROUGH GRADING AND WHERE MOST TRAVEL WOULD BE MULTIAXLE VEHICLES.

**CONSTRUCTION SPECIFICATIONS**

- STONE SIZE - USE 2" STONE, OR RECLAIMED OR RECYCLED CONCRETE EQUIVALENT
- LENGTH - AS REQUIRED, BUT NOT LESS THAN 70 FEET (EXCEPT ON A SINGLE RESIDENCE LOT WHERE A 30 FOOT MINIMUM LENGTH WOULD APPLY).
- THICKNESS - NOT LESS THAN SIX (6) INCHES.
- WIDTH - TWENTY FIVE (25) FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS.
- FILTER FABRIC - WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE. FILTER WILL NOT BE REQUIRED ON A SINGLE FAMILY RESIDENCE LOT.
- SURFACE WATER - ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED ACROSS THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5H:1V SLOPES WILL BE PERMITTED.
- MAINTENANCE - THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.
- WASHING - WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHTS-OF-WAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.
- PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN.

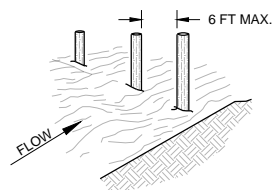


**STABILIZED CONSTRUCTION ENTRANCE**

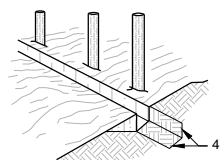
1  
S.100

NOT TO SCALE

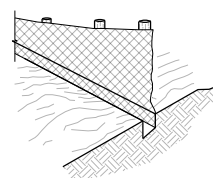
1. SET THE STAKES



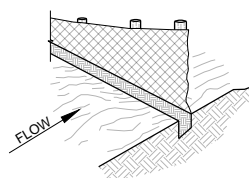
2. EXCAVATE A 4" X 4" TRENCH UPSLOPE ALONG THE LINE OF STAKES



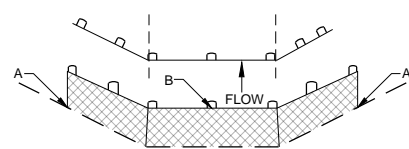
3. STAPLE FILTER MATERIAL TO STAKES AND EXTEND IT INTO THE TRENCH



4. BACKFILL AND COMPACT THE EXCAVATED SOIL



**SHEET FLOW INSTALLATION (PERSPECTIVE VIEW)**



POINTS A SHOULD BE HIGHER THAN POINT B

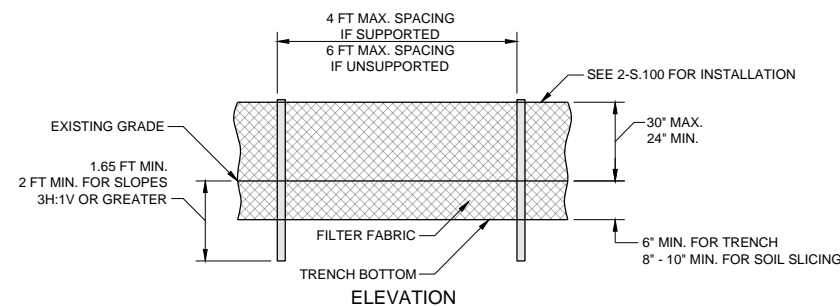
**DRAINAGEWAY INSTALLATION (ELEVATION)**

NOTE: STEEL FENCE POSTS SHOULD BE USED AS STAKES FOR ALL INSTALLATIONS

**SILT FENCE INSTALLATION**

2  
S.100

NOT TO SCALE



**SILT FENCE FABRIC SPECIFICATIONS**

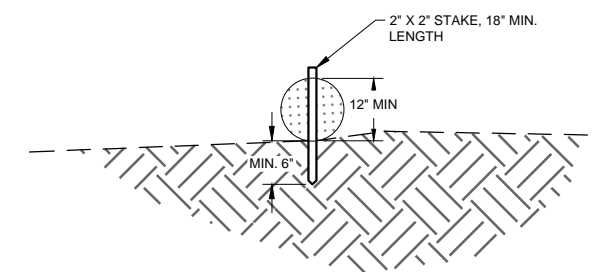
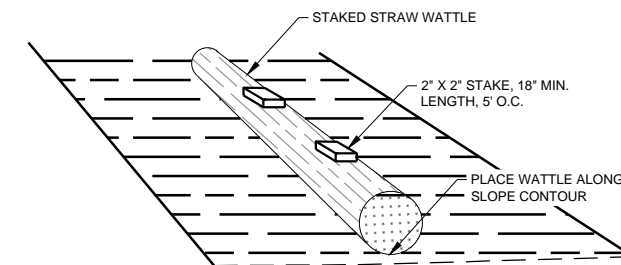
PROPERTY	TEST PROCEDURE	MIN. FABRIC VALUE
GRAB TENSILE STRENGTH	ASTM D-4632	100 LBS.
GRAB ELONGATION @ FAILURE	ASTM D-4632	15%
TRAPEZOID TEAR	ASTM D-4533	70 LBS.
MULLEN BURST STRENGTH	ASTM D-3786	250 PSI.
PUNCTURE STRENGTH	ASTM D-4833	50 LBS.
PERMITTIVITY	ASTM D-4491	0.07 SEC-1 MIN.
PERMEABILITY	ASTM D-4491	.005 CM/SEC
APPARENT OPENING SIZE	ASTM D-4751	0.90 MM
UV RESISTANCE(500 HRS)	ASTM D-4355	90%

% SLOPE	SLOPE	MAX. SPACING ON SLOPE
10% FLATTER	10:1 OR FLATTER	300 ft.
10%<-15	10:1-x<7.5:1	150 ft.
15%<-20	7.5:1-x<5:1	100 ft.
20%<-30	5:1-x<3.5:1	50 ft.
30%<-50	3.5:1-x<2:1	25 ft.

**SILT FENCE BARRIER**

3  
S.100

NOT TO SCALE



**STRAW WATTLE DETAIL**

4  
S.100

NOT TO SCALE

ENGINEER'S SEAL

REVISIONS	
NO.	DATE

DESIGNED BY: SEM  
DRAWN BY: CKW  
QA / QC BY: MKS  
PROJECT NO.: 007-20-01  
DATE: 02.13.2023

TITLE  
**SWPP  
DETAILS**