



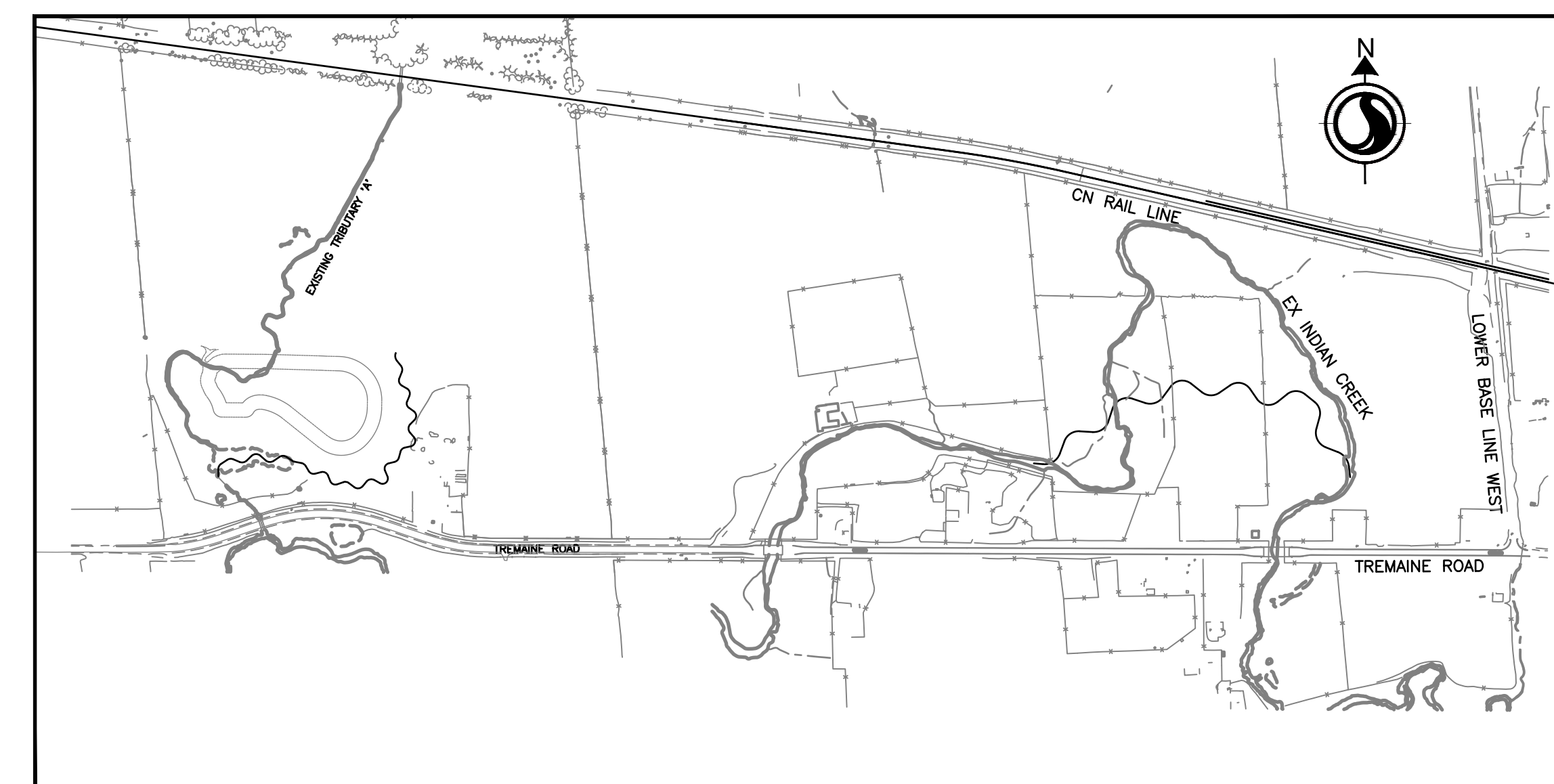
CANADIAN NATIONAL RAILWAY

Milton, ON

MILTON LOGISTICS HUB - NATURAL CHANNEL DESIGN FOR INDIAN CREEK AND TRIBUTARY A

ISSUED FOR: FOR CONSTRUCTION
2021.07.30

PROJECT NUMBER: 160960844



KEY PLAN

INDEX

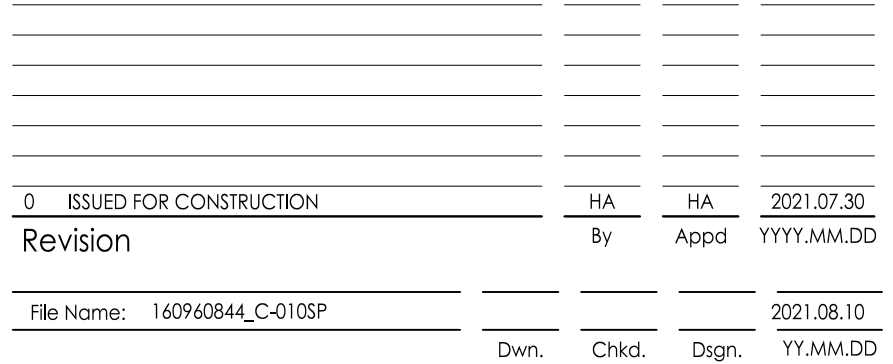
SHEET NO.	DESCRIPTION
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01-C-201	TRIBUTARY A - PLAN & PROFILE - STA. 0+250 TO END
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01-C-211	INDIAN CREEK - PLAN & PROFILE - STA. 0+000 TO STA. 0+290
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01-C-500	CONSTRUCTION NOTES
01-C-501	DETAILS AND NOTES
01-C-502	DETAILS AND NOTES
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01-L-300	TRIBUTARY A - PLANTING PLAN
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01-L-311	INDIAN CREEK - PLANTING PLAN
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01-L-501	PLANTING NOTES AND DETAILS



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Notes

- Key Map NTS.



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MILTON LOGISTICS HUB - NATURAL CHANNEL
DESIGN FOR INDIAN CREEK AND TRIBUTARY A

Milton, ON

Title
OVERVIEW AND INDEX SHEET

Project No.
160960844

Revision	Sheet
0	1 of 1

Scale 0 30 90 150m
1:3000

Drawing No.
01-C-010



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Notes

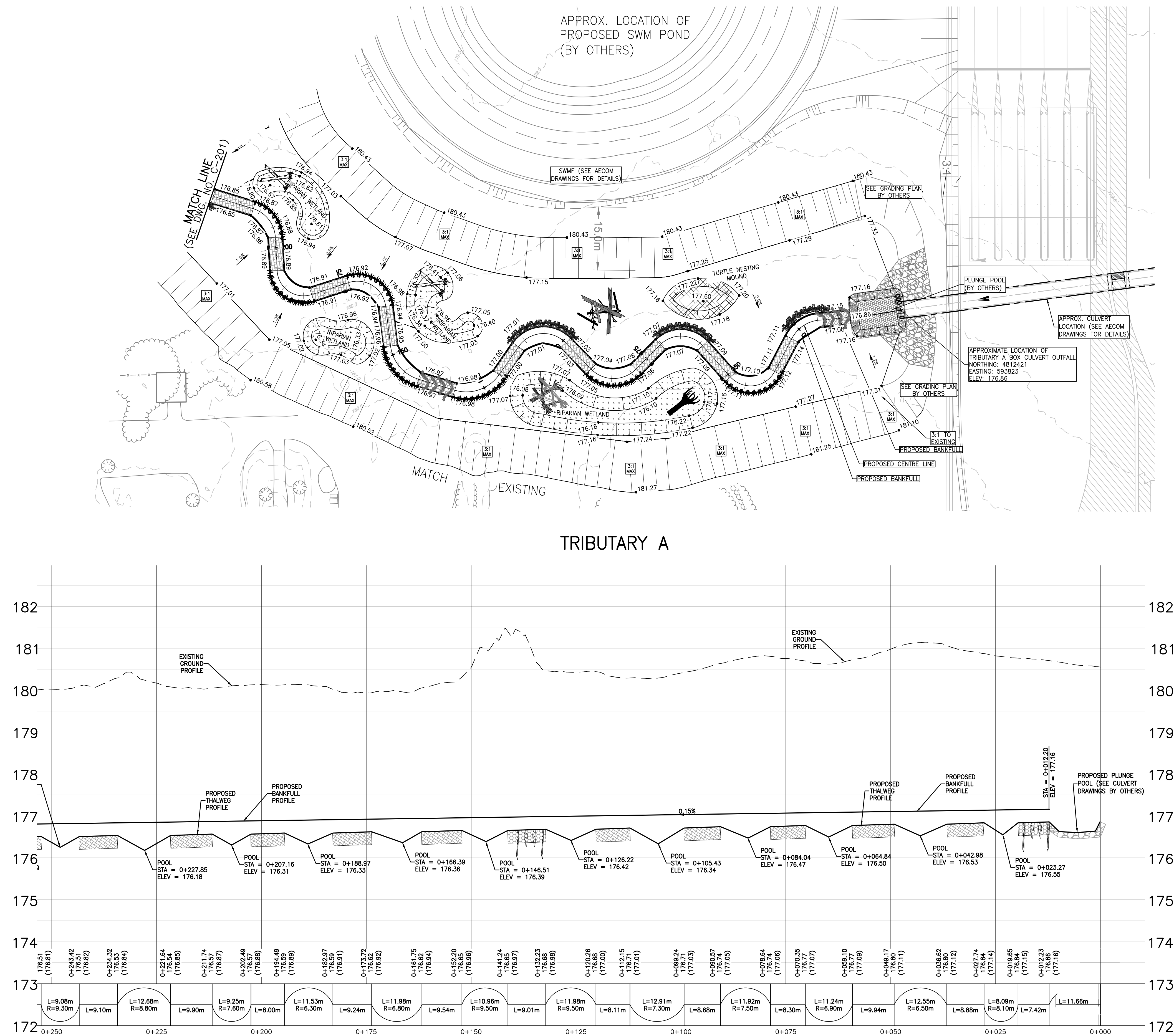
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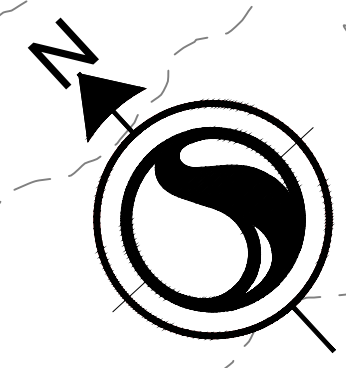
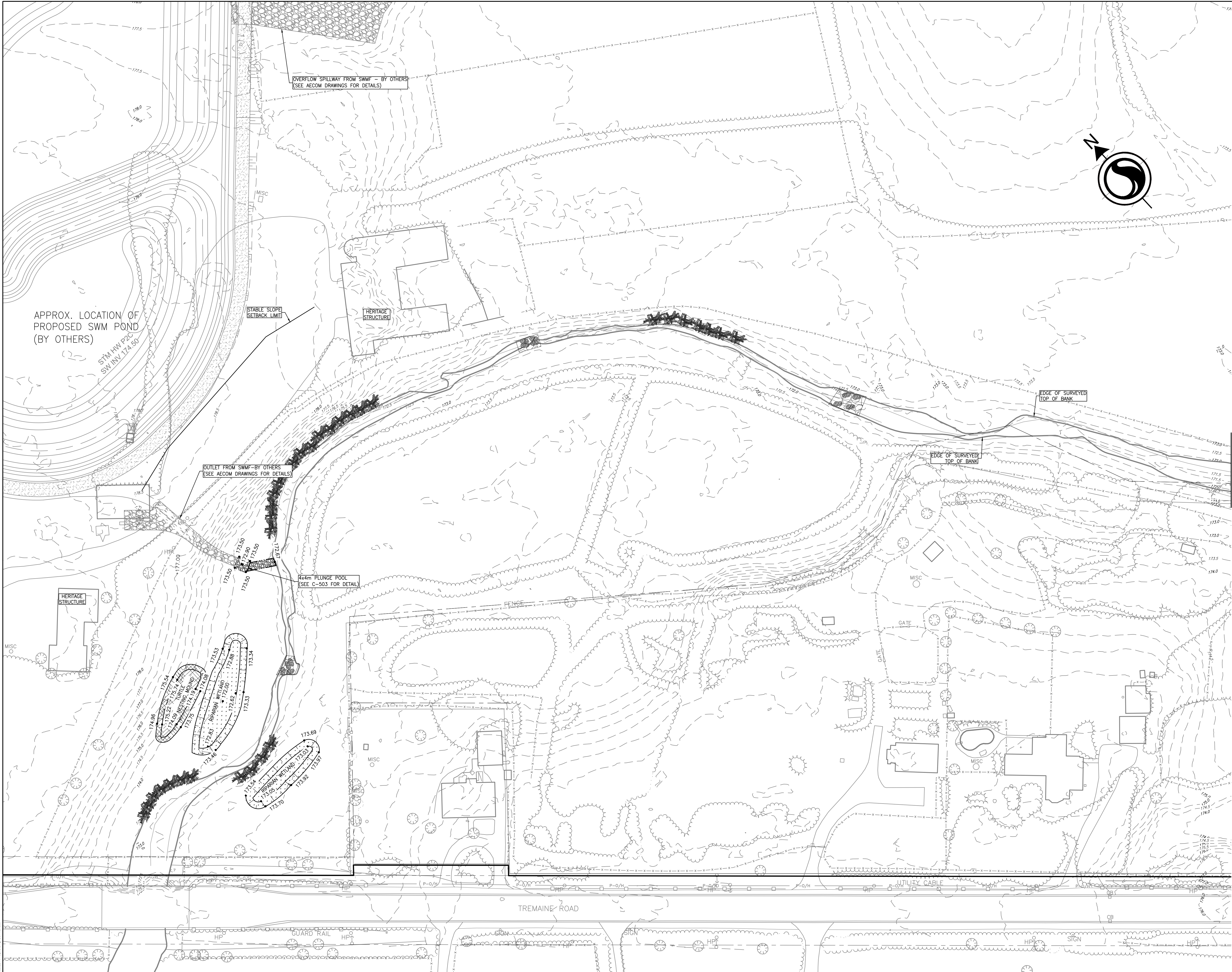


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Revision 0 Sheet 2 of 29 Drawing No. 01-C-200



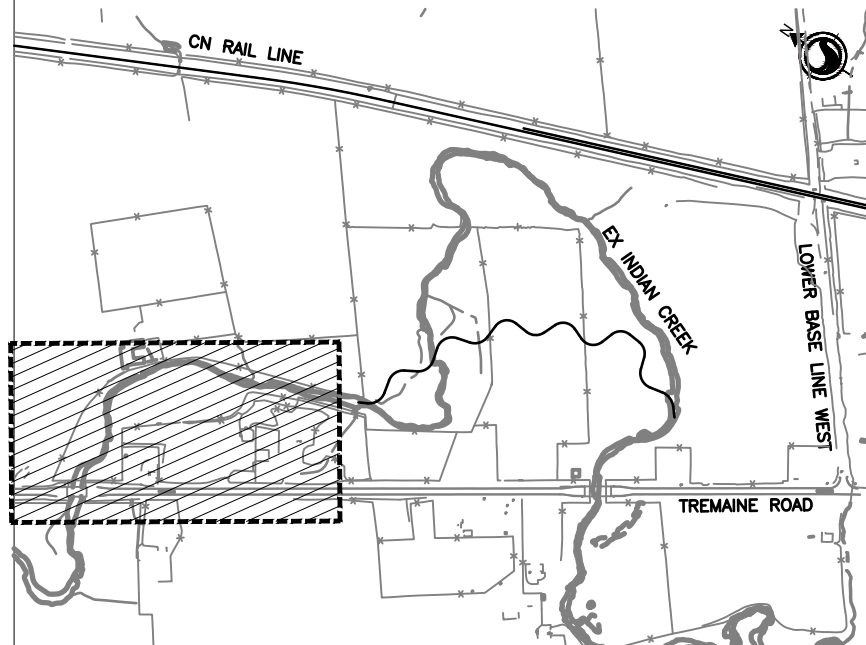


Stantec
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PROJECTION: UNIVERSAL TRANSVERSE MERCATOR
(UTM, ZONE 17, 18N100W)
DATUM: NAD 83 (CSRS)
 2. ORIGINAL GROUND TOPOGRAPHY BASED ON UDAR SURVEY RECEIVED (NOV. 2014) AND SUPPLEMENTED BY STANTEC CONSULTING (MAY 2014, AUG. 2014 & JUNE 2015)

Key Map NTS.



- Legend**
- WOOD DEBRIS TOE PROTECTION
 - BOULDER CLUSTER & SPAWNING SUBSTRATE
 - OUTLET CHANNEL

NOTE:
SEE DRAWING L-310 FOR LANDSCAPE ENHANCEMENTS

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Revision		By	Appd	YYYY.MM.DD	
File Name:	160960844_C-210ST			2021.02.17	
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Client/Project
CANADIAN NATIONAL RAILWAY

MILTON LOGISTICS HUB - NATURAL CHANNEL DESIGN FOR INDIAN CREEK AND TRIBUTARY A

Milton, ON

Title
INDIAN CREEK ENHANCEMENT ZONE PLAN



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ORIGINAL SHEET - ARCH D



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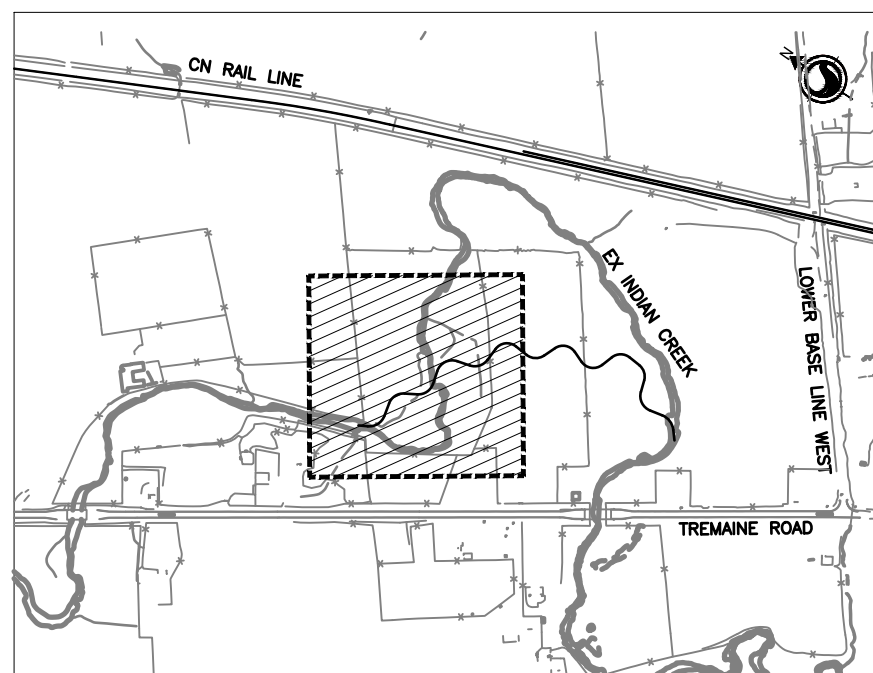
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PROJECTION: UNIVERSAL TRANSVERSE MERCATOR
(UTM, ZONE 17, CM81'00"W)
DATUM: NAD 83 (CSRS)
- ORIGINAL GROUND TOPOGRAPHY BASED ON UDAR SURVEY RECEIVED (NOV. 2014) AND SUPPLEMENTED BY STANTEC CONSULTING (MAY 2014, AUG. 2014 & JUNE 2015)

Key Map NTS.



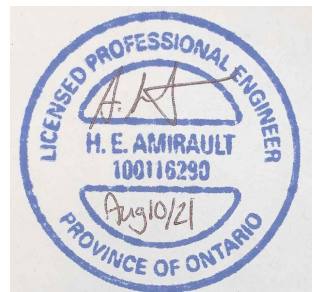
Legend

- 0+125.45 — STATION
377.60 — THALWEG ELEVATION
(338.10) — BANKFULL ELEVATION
L=18.6 — CENTRE LINE LENGTH
R=17.5 — POOL RADIUS OF CURVATURE
- PROFILE BAND
LEGEND SEE
C-500 FOR
SECTIONS AND
DETAILS
- WOOD DEBRIS TOE PROTECTION
 - LOG-ROCK J-HOOK WITH ROOT WAD
 - ROCK + LOG CONSTRUCTED RIFFLE
 - AUGMENTED RIFFLE
 - OUTLET CHANNEL
 - PROPOSED CONTOURS
 - EXISTING CONTOURS
 - GRADE
 - PROPOSED ELEVATION
 - ROOTWARD
 - LOG TANGLE
 - CROSS LOG

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Revision		By	Appd	YYYY.MM.DD
File Name:	160960844_C-2111ST			2021.02.17
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MILTON LOGISTICS HUB - NATURAL CHANNEL
DESIGN FOR INDIAN CREEK AND TRIBUTARY A

Milton, ON

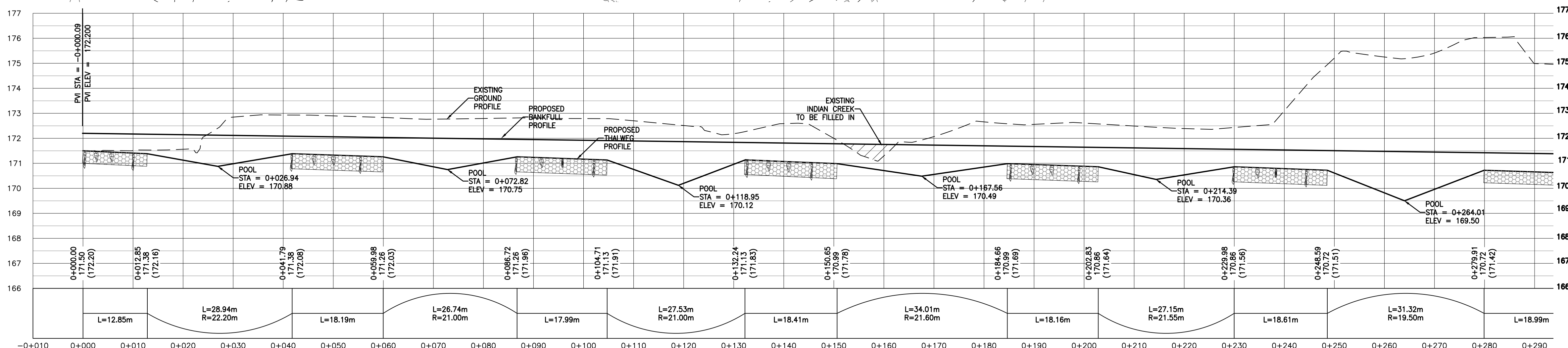
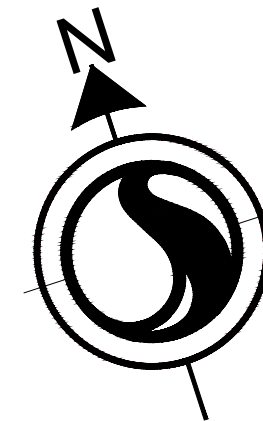
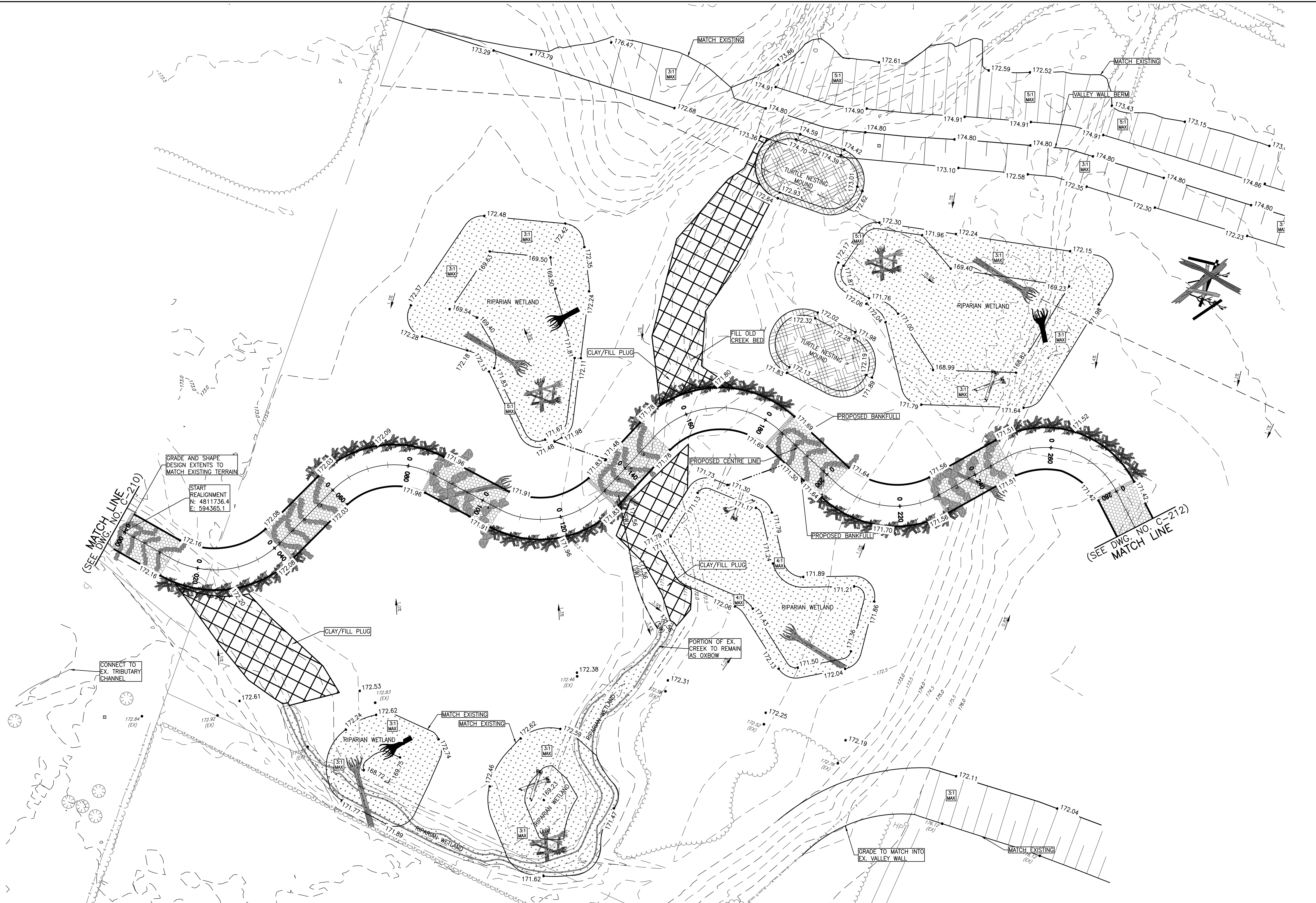
Title
INDIAN CREEK
PLAN AND PROFILE
STA 0+000 TO STA 0+290

Project No. 160960844
Scale 1:500H 0 5 15 25m
1:100V 0 1 2 3 5m

Revision Sheet Drawing No.

0 5 of 29

01-C-211





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DATUM: NAD 83 (CSRS)
2. ORIGINAL GROUND TOPOGRAPHY BASED ON LIDAR SURVEY RECEIVED (NOV, 2014) AND SUPPLEMENTED BY STANTEC CONSULTING (MAY 2014, AUG. 2014 & JUNE 2015)

Key Map	NTS.
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The diagram illustrates various stream restoration techniques and their components, organized into a grid-like structure with icons and text labels.

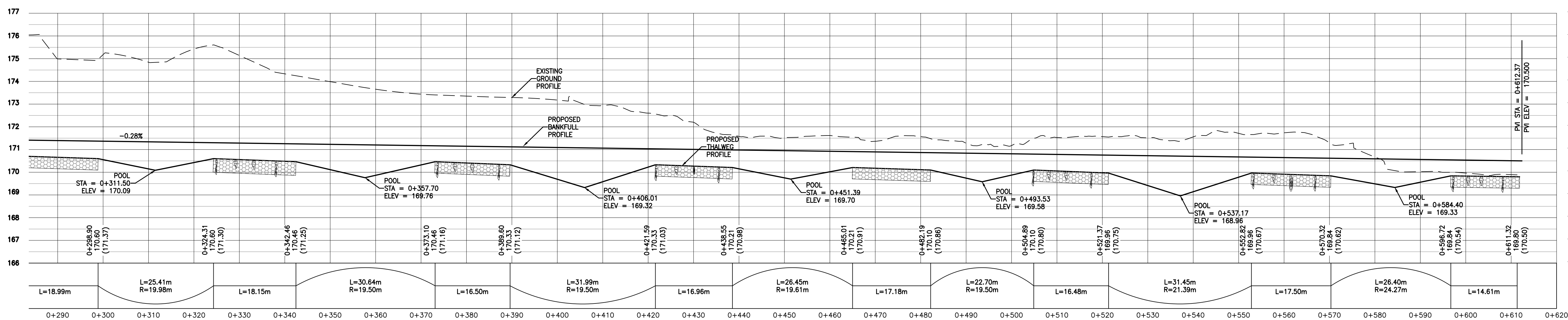
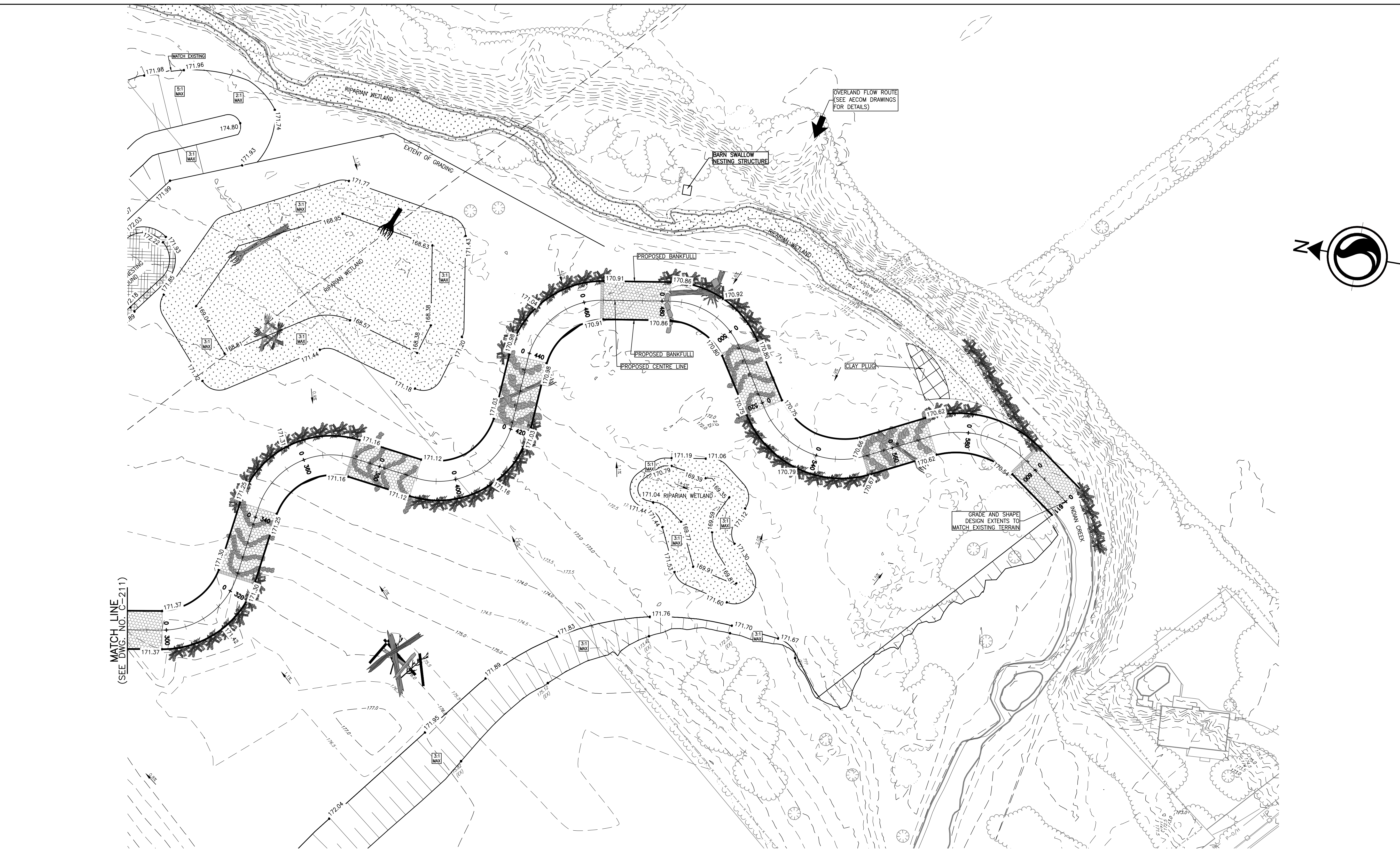
- WOOD DEBRIS TOE PROTECTION:** An icon showing a pile of logs and branches at the downstream end of a structure.
- ROCK CONSTRUCTED RIFFLE:** An icon showing a series of stacked rocks forming a riffle.
- SPAWNING SUBSTRATE:** An icon showing a rectangular structure with a grid of small circles, representing a spawning substrate.
- AUGMENTED RIFFLE:** An icon showing a rectangular structure with a grid of small circles, representing an augmented riffle.
- OUTLET CHANNEL:** An icon showing a dashed line representing an outlet channel.
- PROPOSED CONTOURS:** An icon showing a solid line with a label "349.0" above it, representing proposed contours.
- EXISTING CONTOURS:** An icon showing a dashed line with a label "349.0" below it, representing existing contours.
- GRADE:** An icon showing a solid line with a label "3.2%" above it, representing the stream grade.
- PROPOSED ELEVATION:** An icon showing a solid line with a label "176.03" above it, representing the proposed elevation.
- ROOTWARD:** An icon showing a hand pointing towards a structure, representing the direction of rootward movement.
- LOG TANGLE:** An icon showing a pile of logs and branches forming a tangle.
- CROSS LOG:** An icon showing a single log placed across a stream channel.
- ROCK + LOG CONSTRUCTED RIFFLE:** An icon showing a structure made of both rocks and logs, representing a rock and log constructed riffle.

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Milton, ON

Revision	Sheet	Drawing No.
0	6 of 29	01 C 212

01-C-212



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ORIGINAL SHEET - ARCH D



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Notes

- Key Map NTS.



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Milton, ON

01-C-400



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Notes

- Key Map NTS.

GENERAL NOTES

- ### NOTES FOR WORKING NEAR WATER

- ### STREAM CONSTRUCTION

- ### SEQUENCE OF EROSION AND SEDIMENT CONTROL INSTALLATION

1. INSTALL EROSION AND SEDIMENT CONTROL MEASURES AS SHOWN.
2. CN WILL RETAIN QUALIFIED STAFF TO REMOVE ANY FISH FROM STANDING WATER FOLLOWING WORK AREA ISOLATION.
3. ESTABLISH PUMP AROUND DIVERSION.
4. COMPLETE PROPOSED STREAM REALIGNMENT AND IN-STREAM FEATURES AS DETAILED ON DRAWING SHEETS C-200 TO C-952
5. STABILIZE SLOPES AND DISTURBED AREAS AND IMPLEMENT PLANTING PLAN (L1-300 TO L-502).

MONITORING

SITE MONITORING WILL BE CARRIED OUT AT VARIOUS MILESTONES BY THE OWNER'S REPRESENTATIVE. (NUMBERED BELOW):

1. ONCE ALL EROSION AND SEDIMENT CONTROL MEASURES INSTALLED;
2. DURING INSTALLATION OF DIVERSION PUMPING;
3. DURING ANY FISH RESCUE;
4. DURING INSTALLATION OF SUBSTRATE AND IN-STREAM FEATURES OF THE PROPOSED STREAM; AND
5. PRIOR TO EROSION AND SEDIMENT CONTROL MEASURE REMOVAL.

STREAM CONSTRUCTION SEQUENCING PLAN

IN-WATER WORK MAY TAKE PLACE BETWEEN JULY 1ST AND MARCH 15TH. NO IN-WATER WORK SHALL TAKE PLACE WITHOUT NOTIFYING THE CONTRACT ADMINISTRATOR.

1. INSTALL SILT FENCE ALONG WATERCOURSE TO PROTECT EXISTING WATERCOURSE FROM CONSTRUCTION TRAFFIC AND AROUND STAGING AREA(S).
2. INSTALL SILT FENCING AND COFFER DAMS TO ISOLATE WORK AREA, PUMP STREAM FLOWS AROUND WORK AREA ACCORDING TO WATER MANAGEMENT PLAN OR WILL RETAIN QUALIFIED STAFF TO PERFORM FISH RESCUE IN ISOLATED WORK AREA.
3. DE-WORK WORK AREA BY PUMPING.
5. REMOVE TREES / OTHER VEGETATION AS SHOWN ON REMOVAL PLAN (C-950 to C-952), APPROPRIATE SPECIES OF TREE CANOPIES, LOGS AND BRUSH SHALL BE STORED ON SITE FOR REUSE IN RECONSTRUCTION.
6. COMMENCE CONSTRUCTION OF PROPOSED STREAM, COMMENCING WORKS AT THE DOWNSTREAM END.
7. TOPSOIL SHALL BE STRIPPED AND SET ASIDE, THEN REPLACED ON BANKS AND VALLEY WALLS AS APPROPRIATE AS WORK MOVES UPSTREAM.
8. QUALITY ENGINEER, GEOMORPHOLOG OR REPRESENTATIVE THEREOF SHALL BE PRESENT DURING THE CONSTRUCTION OF THE STREAM WORKS.
9. COMPLETED AREAS OF STREAM CONSTRUCTION SHALL BE STABILIZED WITH COIR MATTING AND SEEDS ACCORDING TO THE APPROVED PLANTING PLAN AS THE PROJECT PROCEEDS DOWNSTREAM.
10. INSTALL SILT FENCE TO PROTECT WATERCOURSE FROM UNSTABILIZED UPLAND AREAS AND CONSTRUCTION TRAFFIC.
11. REPEAT STEPS 2 TO 11 AS REQUIRED TO COMPLETE STREAM WORKS.
12. IMPLEMENT FULL PLANTING PLAN.

NOTES

- WATER INTAKES OR OUTLET PIPES TO BE SCREENED TO PREVENT ENTRAINMENT OR IMPINGEMENT OF FISH.
- WATER PUMPED DURING DE-WATERING ACTIVITIES MUST BE DISCHARGED IN SUCH A MANNER AS TO MINIMIZE IN-STREAM EROSION AND SEDIMENTATION. POSSIBLE ALTERNATIVES INCLUDE USING A FILTER BAG, DISCHARGING INTO A VEGETATED AREA AT LEAST 30 m FROM THE WATERCOURSE OR DISCHARGING INTO AN APPROPRIATELY SIZED SETTLING BASIN, ETC.

UNDERGROUND SERVICES

1. CONTRACTOR SHALL VERIFY ELEVATION AND LOCATION OF ANY EXISTING UNDERGROUND SERVICES PRIOR TO COMMENCING SITE WORK AND SHALL NOTIFY THE CONTRACT ADMINISTRATOR OF ANY CONFLICTS BETWEEN DRAWINGS AND LOCATED SERVICES.
2. THE CONTRACTOR TO RESTORE ALL OFF-SITE AFFECTED PROPERTY TO ORIGINAL CONDITION.

EROSION CONTROL NOTES

1. ALL SILT FENCING TO BE INSTALLED PRIOR TO COMMENCEMENT OF ANY AREA GRADING, EXCAVATION OR DEMOLITION.
2. EROSION CONTROL FENCE TO BE PLACED AROUND THE BASE OF ALL STOCKPILES. ALL STOCKPILES TO BE KEPT A MINIMUM OF 2.5 m FROM ALL PROPERTY LINES.
3. EROSION CONTROL FABRIC TO BE INSTALLED UNDER CONSTRUCTION ENTRANCE. CONSTRUCTION VEHICLE ENTRANCE TO CONSIST OF CLEANED OR REPLACED 200mm thick, 50 mm stone. STONE TO BE TAKEN UP AND CLEANED OR REPLACED WHEN ACCUMULATIONS COVER 50% OF TOP OF STONE (SEE DETAIL). CONSTRUCTION ENTRANCE TO BE A MINIMUM OF 5.0 m WIDE AND 20.0 m LONG. CONTRACTOR TO ENSURE ALL VEHICLES LEAVE THE SITE VIA THE CONSTRUCTION ENTRANCE.
4. EROSION PROTECTION TO BE PROVIDED AROUND ALL STORM AND SANITARY MANHOLES AND/OR CATCHBASINS.
5. ADDITIONAL EROSION CONTROL MEASURES MAY BE REQUIRED AS SITE WORKS PROGRESSES. THE CONTRACTOR TO PROVIDE ALL ADDITIONAL EROSION CONTROL STRUCTURES.
6. EROSION AND SEDIMENT CONTROLS WILL BE MONITORED ON A DAILY BASIS, AFTER PRECIPITATION AND RAIN EVENTS, AND ANY NECESSARY REPAIRS WILL BE COMPLETED WITHIN 24 HOURS. SHOULD THE CONTROLS NOT SERVE THEIR INTENDED PURPOSE THEY WILL BE CORRECTED OR REPLACED.
7. SEDIMENTS TO BE REMOVED WHEN ACCUMULATIONS REACH A MAXIMUM OF ONE THIRD (1/3) THE HEIGHT OF THE SILT FENCE. THE CONTRACTOR SHALL REMOVE AND DISPOSE OFF-SITE ACCUMULATED SEDIMENT FROM ALL BARRIERS TO THE LEVEL OF EXISTING GRADE, IN A MANNER THAT AVOIDS SEDIMENT ESCAPE TO THE DOWNSTREAM SIDE OF DEVICE. ALL BARRIERS SHALL REMAIN IN PLACE UNTIL AFTER THE SURROUNDING GROUND HAS BEEN RESTORED.
8. ALL DISTURBED AREAS TO BE MAINTAINED IN PLACE UNTIL ALL DISTURBED GROUND SURFACES HAVE BEEN RE-STABILIZED EITHER BY MATTING OR RESTORATION OF VEGETATIVE GROUND COVER.
9. NO ALTERNATIVE METHODS OF EROSION CONTROL PROTECTION SHALL BE PERMITTED UNLESS APPROVED BY THE CONTRACT ADMINISTRATOR.
10. THE CONTRACTOR IS RESPONSIBLE FOR REMOVING SEDIMENTS FROM THE REGIONAL ROAD AND SIDEWALKS AT THE END OF EACH WORK DAY.
11. THE CONTRACTOR SHALL MAINTAIN THE SITE DURING THE PERIOD OF EROSION CONTROL. EROSION CONTROL SHALL BE INSTALLED AND MAINTAINED, CONTRACTOR TO COMPLY WITH THE ENGINEER'S INSTRUCTIONS TO INSTALL, MODIFY, OR MAINTAIN EROSION CONTROL WORKS.

CONSTRUCTION PHASING AND ACCESS PLAN

1. THE CONTRACTOR SHALL SUBMIT A CONSTRUCTION PHASING AND ACCESS PLAN TO THE CONSULTANT AND CN FOR APPROVAL, AT LATEST SEVEN (7) DAYS PRIOR TO THE PLANNED START OF CONSTRUCTION. CONSTRUCTION ACTIVITIES MAY NOT COMMENCE UNTIL THE CONSTRUCTION PHASING AND ACCESS PLAN HAS BEEN APPROVED BY THE CONSULTANT AND CN.
2. SITE ACCESS AND STAGING SHALL MINIMIZE DISTURBANCE TO ALL WATERCOURSES AND THE SURROUNDING NATURAL AREAS.
3. STREAM CONSTRUCTION TO TAKE PLACE FROM DOWNSTREAM TO UPSTREAM WHERE POSSIBLE.
4. THE CONSTRUCTION PHASING AND ACCESS PLAN SHALL RECOGNIZE THE FOLLOWING GENERAL SEQUENCING OF EVENTS REQUIRED FOR STREAM CONSTRUCTION PROJECTS, AND SHALL BE A PRELIMINARY AS APPROVED BY THE CONSULTANT AND CN:
 - a. CN SHALL INSTALL WATER MANAGEMENT AND EROSION AND SEDIMENT CONTROL MEASURES IN ACCORDANCE WITH THE PRE-APPROVED WATER MANAGEMENT AND EROSION AND SEDIMENT CONTROL PLANS. DO NOT COMMENCE DEWATERING OF THE CONSTRUCTION AREA.
 - b. CN WILL RETAIN QUALIFIED STAFF TO PERFORM FISH RESCUE FOLLOWING WORK AREA ISOLATION. CONTRACTOR TO COORDINATE IN ACCORDANCE WITH FISH SALVAGE PLAN.
 - c. DEWATER CONSTRUCTION AREA.
 - d. COMPLETE CONSTRUCTION OF BANK STABILIZATION, INCLUDING ALL GRADING AND BANK PROTECTION STRUCTURE INSTALLATIONS AND CROSS-SECTIONS AS DETAILED ON PLAN (C-200 – C-212), AND DETAIL (FIGURE C-500 TO C-504) DRAWINGS.
5. COMPLETED AREAS SHALL BE SEEDED/PLANTED ACCORDING TO THE PLANTING PLAN (L-300 TO L-301 AND L-500 TO L-501) AS WORK PROCEEDS UPSTREAM.

WATER MANAGEMENT PLAN:

1. THE CONTRACTOR SHALL SUBMIT A WATER MANAGEMENT PLAN TO THE CONSULTANT AND CN FOR APPROVAL AT LEAST SEVEN (7) DAYS PRIOR TO THE PLANNED START OF CONSTRUCTION. CONSTRUCTION ACTIVITIES MAY NOT COMMENCE UNTIL THE WATER MANAGEMENT PLAN HAS BEEN APPROVED BY THE CONSULTANT AND BY THE OWNER.
2. THE WATER MANAGEMENT PLAN SHALL SPECIFY BEST MANAGEMENT PRACTICES WITH RESPECT TO WORKING IN THE WET, AS THEY APPLY TO THE SITE AND CONSTRUCTION PHASING PLAN. THE WATER MANAGEMENT PLAN SHALL ALSO SPECIFY ANY OTHER DRAINAGE STRATEGIES WHICH MINIMIZE THE IMPACTS OF WORKING IN THE WET.

HIGH FLOW CONTINGENCY PLAN:

1. THE CONTRACTOR SHALL SUBMIT A HIGH FLOW CONTINGENCY PLAN TO THE CONSULTANT AND ON FOR APPROVAL AT LEAST SEVEN (7) DAYS PRIOR TO THE PLANNED START OF CONSTRUCTION. CONSTRUCTION ACTIVITIES MAY NOT COMMENCE UNTIL THE HIGH FLOW CONTINGENCY PLAN HAS BEEN APPROVED BY THE CONSULTANT THE BY OWNER.
2. THE HIGH-FLOW CONTINGENCY PLAN SHALL OUTLINE THE ACTIONS WHICH SHALL BE TAKEN IF AN UNEXPECTED STORM ARISES AND THE RESULTING HIGH FLOWS CAUSE CONSTRUCTION TO CEASE, FOR REASONS OF SAFETY OR DAMAGE TO THE BANK STABILIZATION CONSTRUCTION. ACTIONS SHALL INCLUDE, BUT NOT BE LIMITED TO THE FOLLOWING:
 - a. THE CONTRACTOR SHALL HAVE THE CAPACITY TO REMOVE ALL ITEMS FROM THE REGIONAL FLOODPLAIN THAT WOULD HAVE THE CAPACITY TO CAUSE AN OBSTRUCTION TO FLOW OR REPRESENT A POTENTIAL SPILL HAZARD (E.G., FUEL TANKS, UNFIXED EQUIPMENT, ETC.).

EROSION AND SEDIMENT CONTROL PLAN:

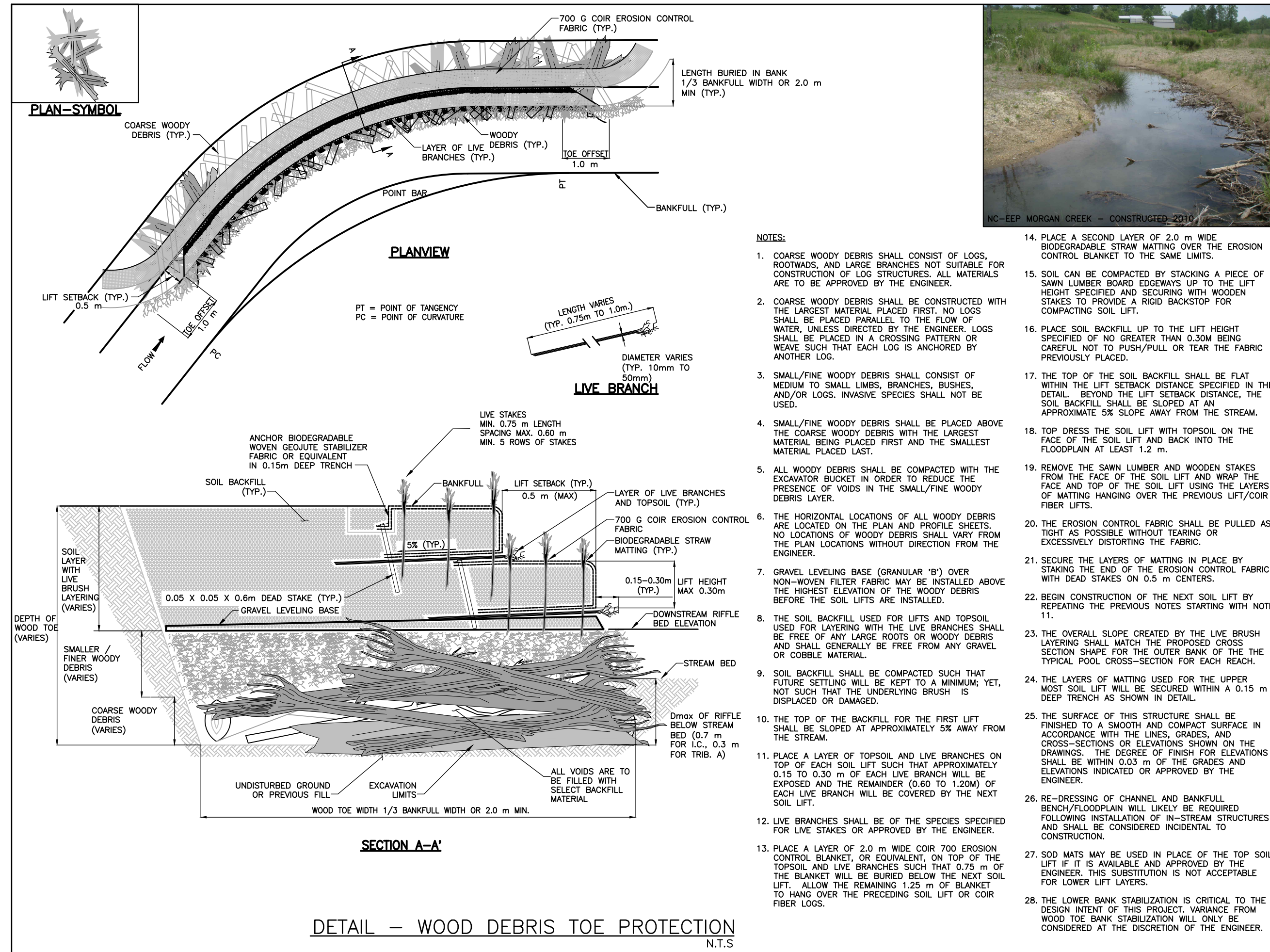
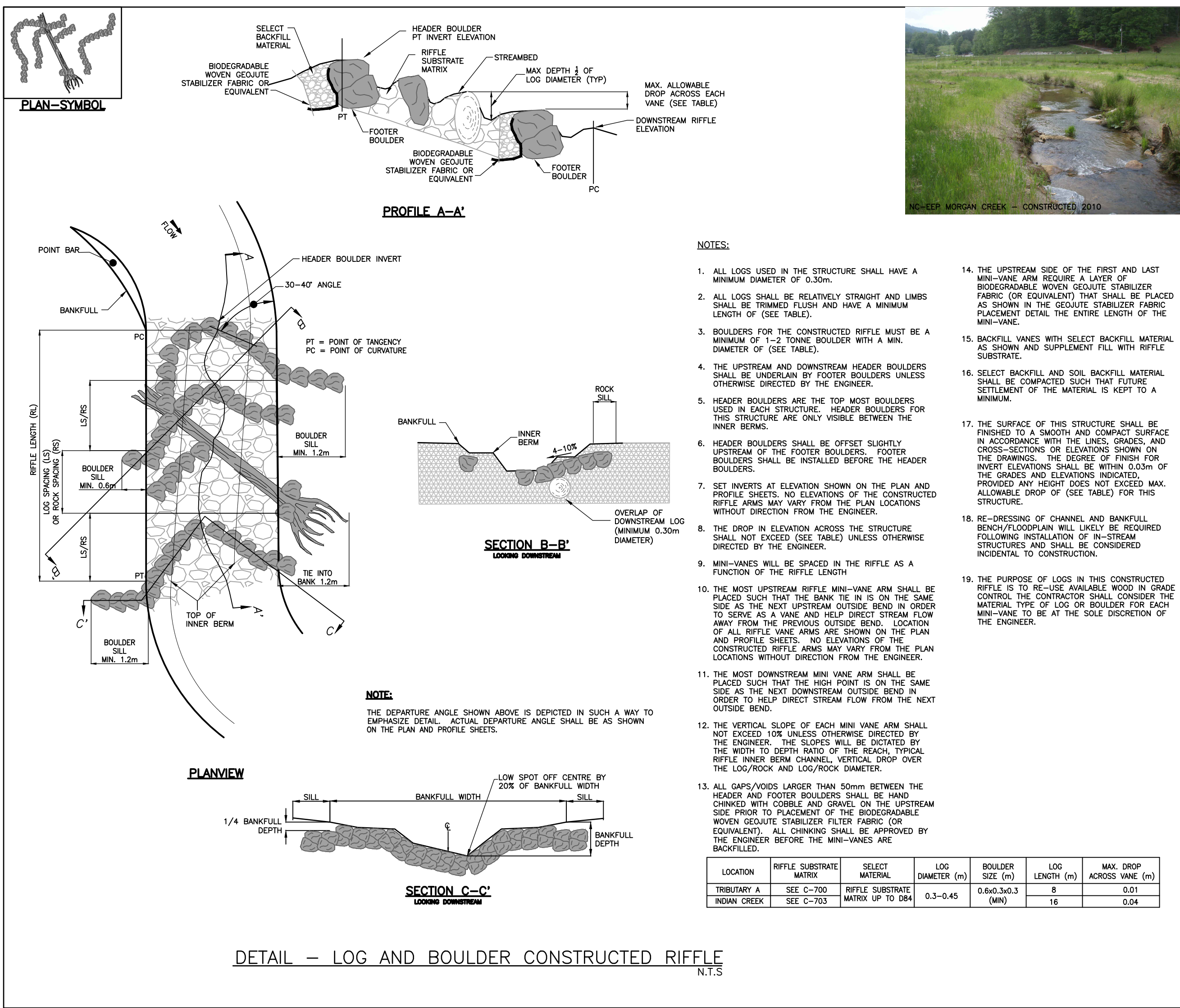
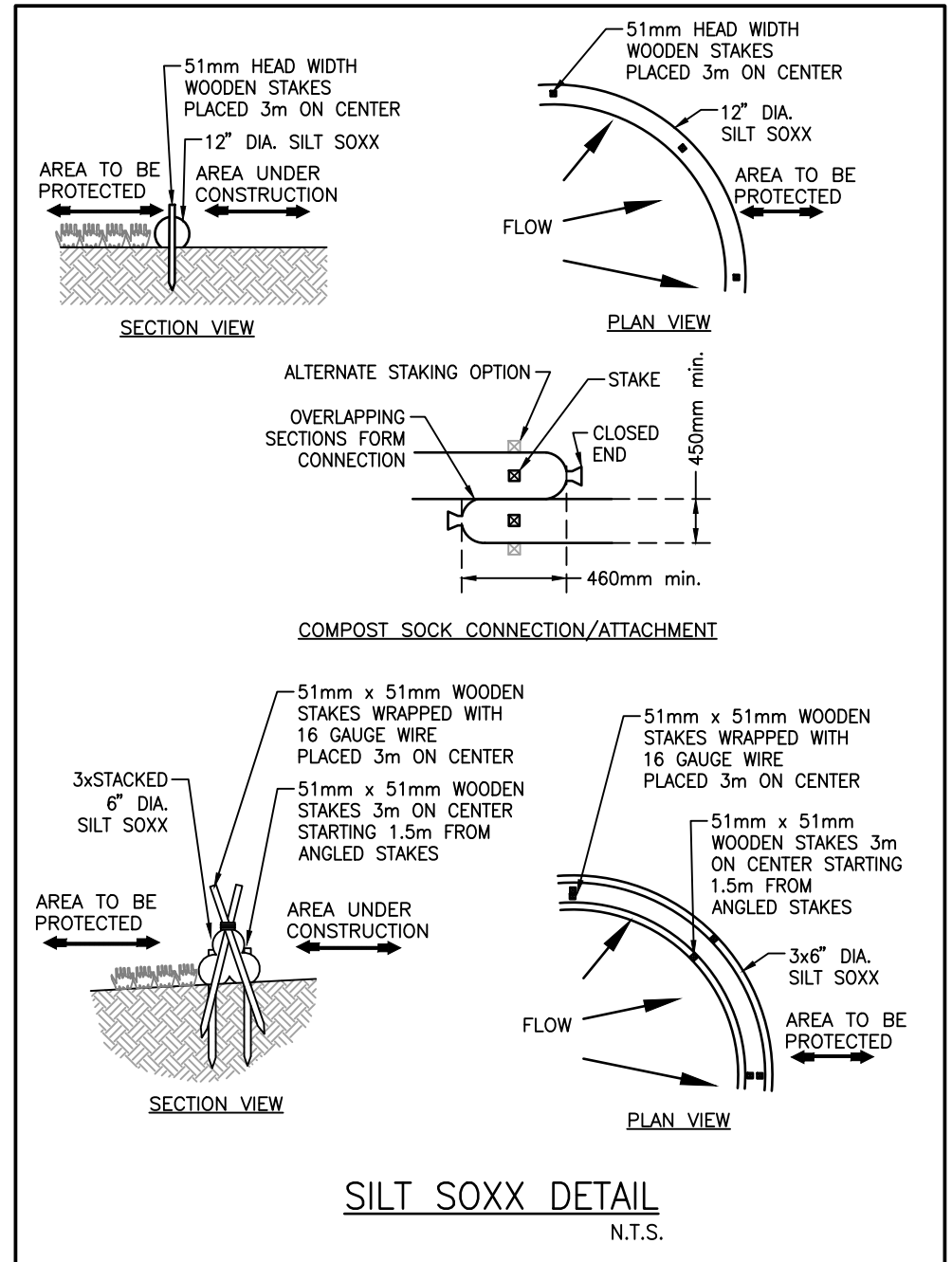
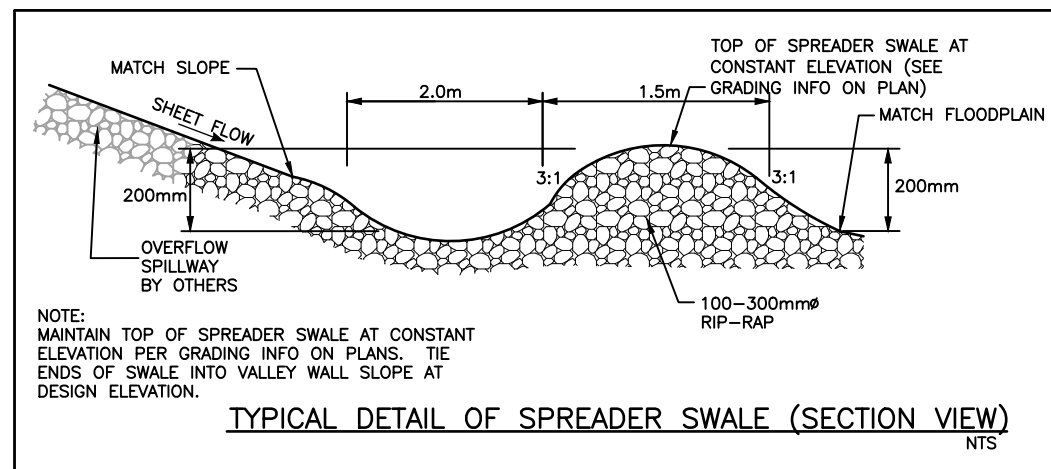
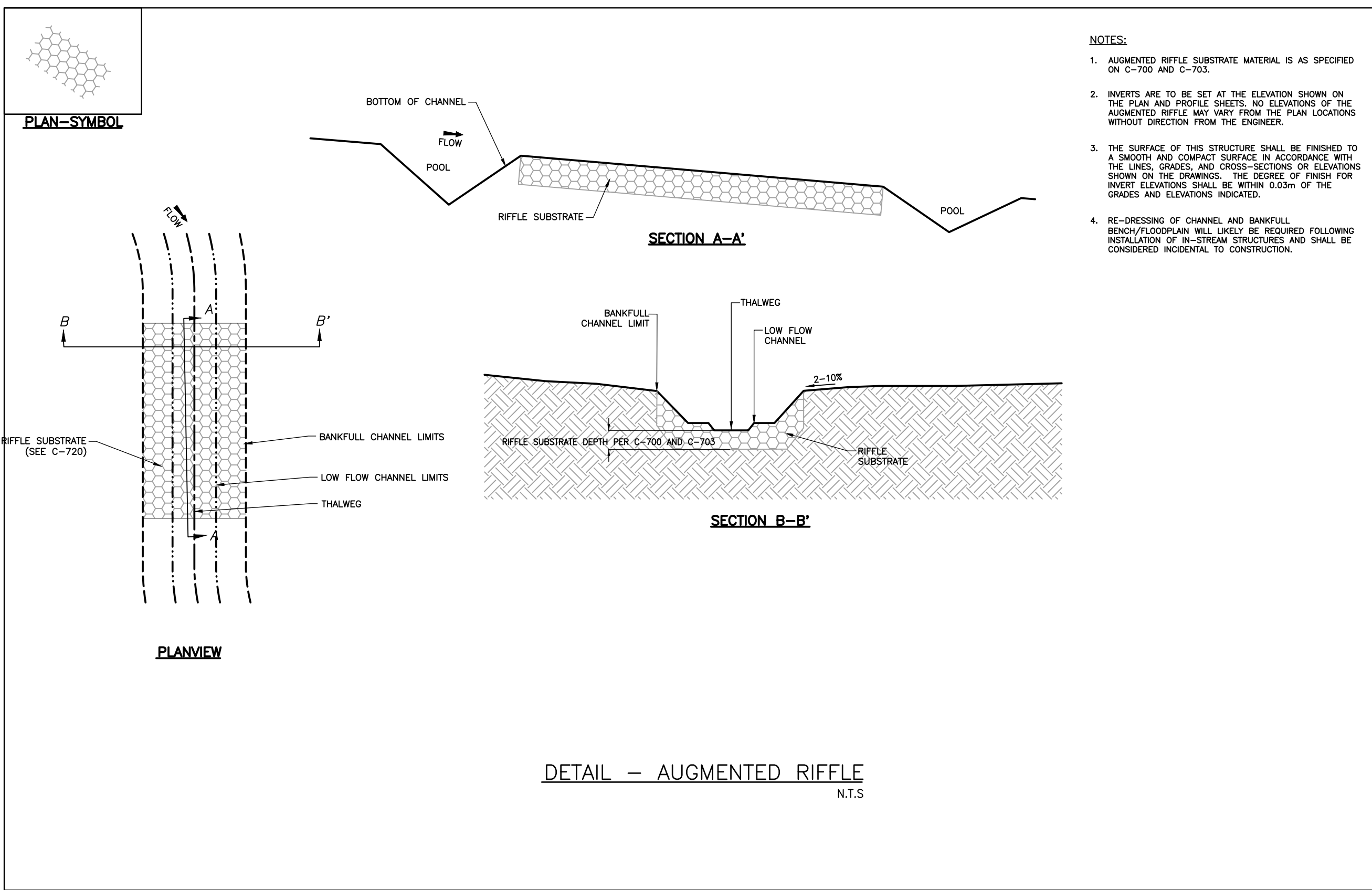
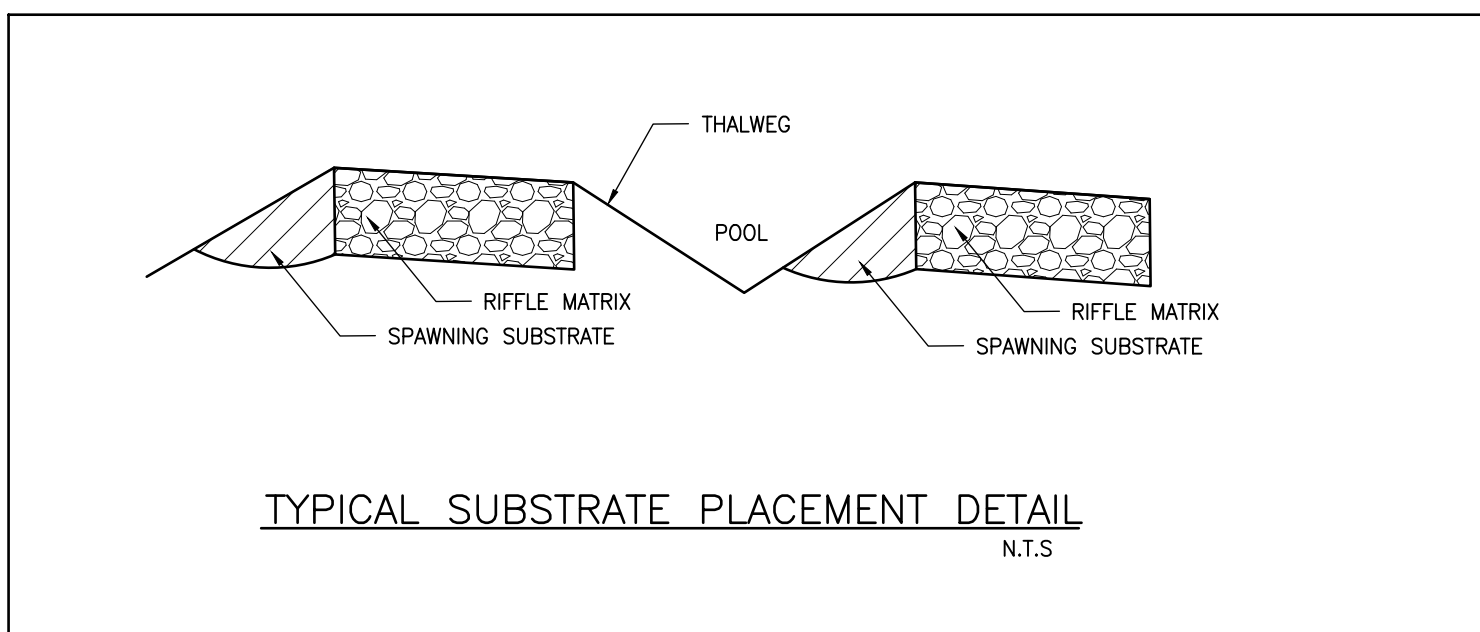
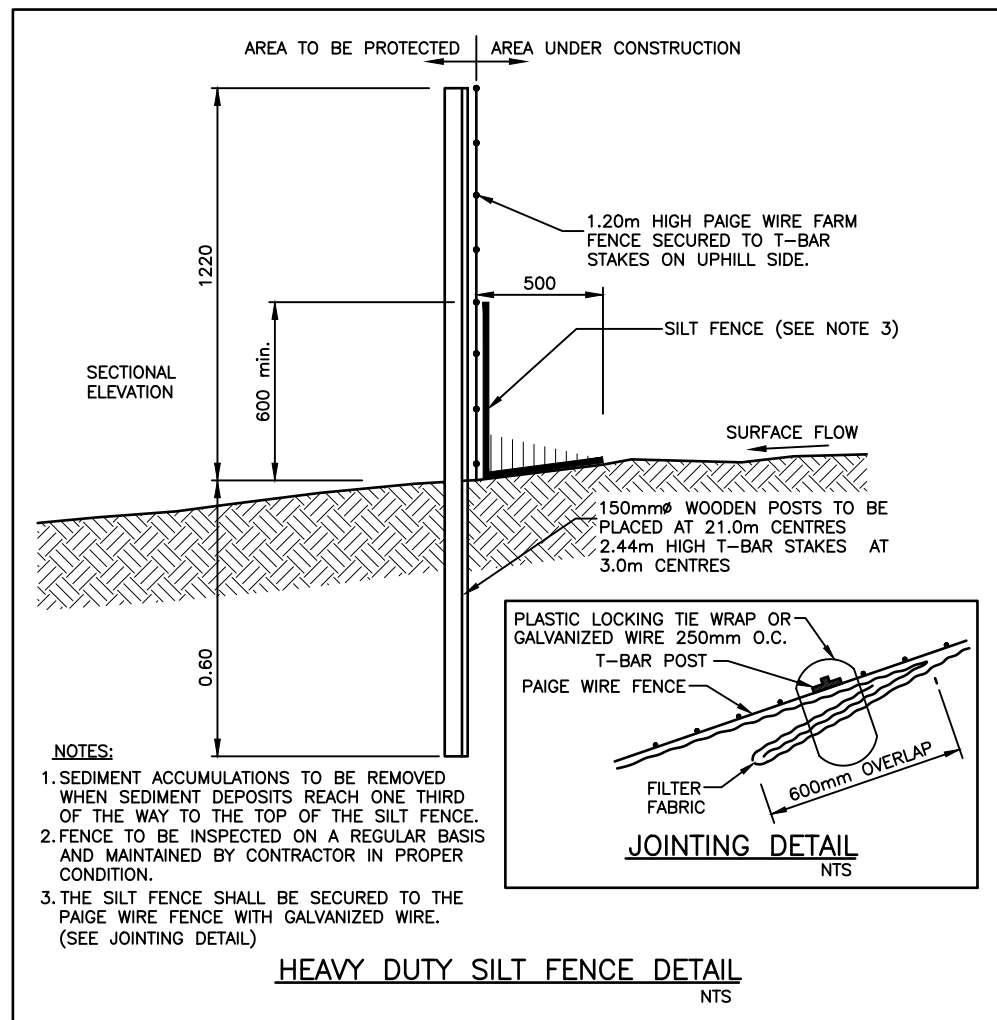
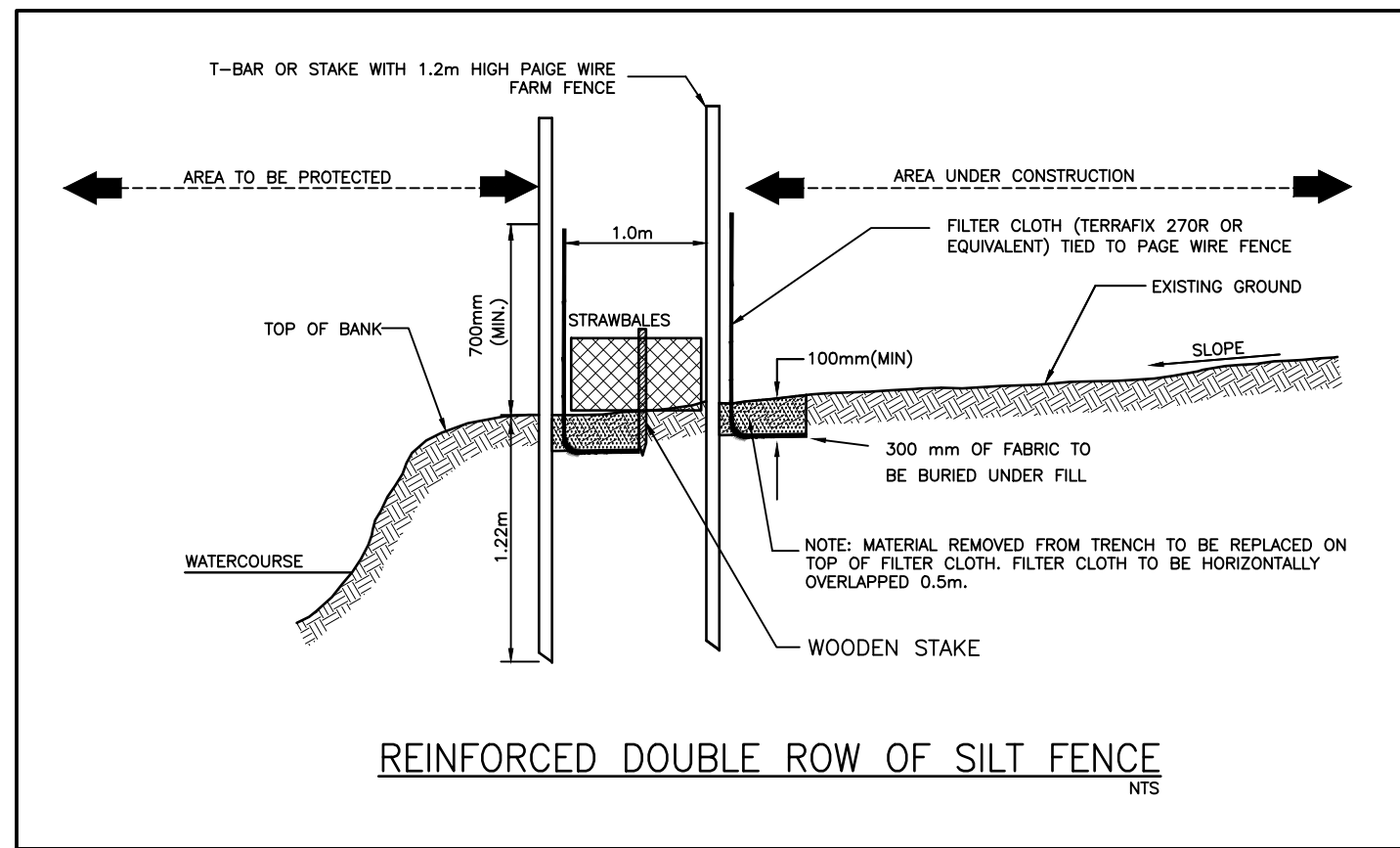
1. THE EROSION AND SEDIMENT CONTROL PLAN MUST BE SUBMITTED TO THE CONSULTANT AND CN FOR APPROVAL AT LEAST SEVEN (7) DAYS PRIOR TO THE PLANNED START OF CONSTRUCTION. CONSTRUCTION MAY NOT COMMENCE UNTIL THE EROSION AND SEDIMENT CONTROL PLAN HAS BEEN APPROVED BY THE CONSULTANT AND THE CITY.
2. THE EXACT CONFIGURATION OF THE EROSION AND SEDIMENT CONTROL PLAN WILL BE DEPENDENT ON THE CONTRACTOR'S CONSTRUCTION PHASING. THE PREPARATION OF THE EROSION AND SEDIMENT CONTROL PLAN IS THE RESPONSIBILITY OF THE CONTRACTOR.
3. THE EROSION AND SEDIMENT CONTROL PLAN WILL INCORPORATE THE FOLLOWING PRINCIPLES AS THEY APPLY TO THE SITE AND CONSTRUCTION PHASING PLAN:
 - THE EROSION AND SEDIMENT CONTROL PLAN SHALL ADHERE TO ANY AND ALL PERMIT REQUIREMENTS FROM MUNICIPAL, PROVINCIAL, AND/OR FEDERAL AGENCIES.
 - EROSION AND SEDIMENT CONTROLS WILL BE IMPLEMENTED PRIOR TO AND DURING THE CONSTRUCTION PHASES.
 - EROSION CONTROL (THE PREVENTION OF EROSION OF SOIL FROM THE LANDSCAPE) FROM DISTURBED SURFACES SHALL BE ACHIEVED THROUGH THE USE OF PRUDENT CONSTRUCTION PHASING AND EROSION CONTROL MEASURES (E.G., COIR FIBER MATTING) WHERE NECESSARY.
 - SEDIMENT CONTROL (THE TRAPPING OF SEDIMENT BEING CARRIED BY RUNOFF) SHALL BE ACHIEVED USING APPROPRIATELY INSTALLED SEDIMENT TRAPPING MEASURES SUCH AS SLOTTED SEDIMENT TRAPS, TURBIDITY CURTAINS, AS NECESSARY. AREAS TO BE PROTECTED INCLUDE STAGING AREAS, TREE CLEARING AND GRUBBING AREAS, TREE PRESERVATION AREAS, AREAS DELINEATED ON THE FIGURE, AND ALL OTHER WORK AREAS.
 - TRAPPED SEDIMENTS AND CONTROLS ARE TO BE REMOVED ONLY AFTER THE SOILS OF THE CONSTRUCTION AREA HAVE BEEN STABILIZED AND ADEQUATELY RE-VEGETATED, UNLESS SEDIMENTS HAVE ACCUMULATED TO A DEPTH OF ONE THIRD (1/3) THE HEIGHT OF THE SEDIMENT CONTROL. TO THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL OF SEDIMENTS IN A MANNER THAT AVOIDS SEDIMENT RELEASE TO THE DOWNSTREAM SIDE OF THE SEDIMENT CONTROL DEVICE. THE DISPOSAL LOCATION AND METHOD OF DISPOSAL OF REMOVED SEDIMENT MUST BE APPROVED BY THE CONSULTANT AND BY THE OWNER. ALL SEDIMENT CONTROL DEVICES SHALL REMAIN IN PLACE UNTIL AFTER THE SURROUNDING GROUND HAS BEEN PERMANENTLY STABILIZED ACCORDING TO THE PLANTING PLAN (L-300 TO L-501).
 - SITE ACCESS AND STAGING WILL MINIMIZE DISTURBANCE TO ALL WATERCOURSES AND NATURAL AREAS. ANY MATERIAL STOCKPILED ON SITE WILL BE KEPT AT A SAFE DISTANCE FROM ANY SENSITIVE NATURAL FEATURES AND CONTAINED SUCH THAT SEDIMENT DOES NOT ENTER THE WATERCOURSE (EITHER FLOWING OR DEWATERED).
 - MATERIALS REMOVED OR STOCKPILED DURING CONSTRUCTION (E.G., EXCAVATED SOIL, BACKFILL MATERIAL) MUST BE DEPOSITED, STORED, AND CONTAINED IN A MANNER TO ENSURE SEDIMENT DOES NOT ENTER A WATER BODY AND WILL BE APPROPRIATELY STORED, AS APPROVED BY THE CONSULTANT AND BY THE OWNER. AREAS CONTAINING EXPOSED SOILS OR STOCKPILED MATERIALS WILL BE ISOLATED USING APPROPRIATE SEDIMENT CONTROL DEVICES TO PREVENT THE ENTRY OF SEDIMENT INTO THE WATERCOURSE.
 - ALL ACTIVITIES, INCLUDING MAINTENANCE PROCEDURES, WILL BE CONTROLLED TO PREVENT THE ENTRY OF PETROLEUM PRODUCTS, DEBRIS, RUBBLE, CONCRETE OR OTHER DELETERIOUS SUBSTANCES INTO THE WATER.
 - VEHICULAR REFUELLING AND MAINTENANCE WILL BE CONDUCTED A MINIMUM OF 30 METRES AWAY FROM ANY AQUATIC RESOURCE TO AVOID POTENTIAL IMPACTS IN THE EVENT THAT AN ACCIDENTAL SPILL OCCURS. IF A GAS PUMP IS USED FOR FLOW DIVERSION AND IT IS NOT POSSIBLE TO ACHIEVE THE 30 m DISTANCE FROM AQUATIC RESOURCES, A CONTAINMENT SYSTEM SHOULD BE IMPLEMENTED TO PREVENT ACCIDENTAL SPILLS OR LEAKS FROM THE CRACKS.
 - EROSION AND SEDIMENT CONTROL STRATEGIES ARE NOT STATIC AND MAY NEED TO BE UPDATED/MENDED AS SITE CONDITIONS CHANGE TO MINIMIZE SEDIMENT-LADEN RUNOFF FROM LEAVING THE WORK AREAS. IF, FOR ANY REASON, THE INSTALLED EROSION AND SEDIMENT CONTROLS ARE NOT EFFECTIVE IN PREVENTING THE EROSION AND SUBSEQUENT RELEASE OF SEDIMENT OR OTHER DELETERIOUS SUBSTANCES INTO THE WATERCOURSE, ALTERNATIVE MEASURES SHALL BE IMPLEMENTED IMMEDIATELY AT THE CONTRACTOR'S EXPENSE TO MINIMIZE POTENTIAL ECOLOGICAL IMPACTS. ANY REQUIRED UPDATES OR AMENDMENTS ARE THE RESPONSIBILITY OF THE CONTRACTOR.
 - NO EXCESS EARTH OR GRANULAR MATERIALS SHALL BE LEFT IN AREAS WHERE IT WILL BE SUBJECT TO EROSION INTO THE CREEK CHANNEL.
 - ALL DISTURBED AREAS WILL BE STABILIZED IMMEDIATELY UPON COMPLETION OF GRADING WORK. STABILIZATION WILL CONSIST OF REVEGETATION AS PER THE PLANTING PLAN FIGURE L-300 TO L-501.

NOTE: IN ADDITION TO BEING RESPONSIBLE FOR ENSURING THAT THE PRESCRIBED MEASURES ARE INSTITUTED AND FUNCTIONING AS INTENDED, THE CONTRACTOR IS ALSO RESPONSIBLE FOR IMPLEMENTING ANY INTERIM OR EMERGENCY MEASURES AS NECESSARY, TO ENSURE THAT NO SEDIMENT IS DISCHARGED TO THE WATERCOURSE. THE FOLLOWING EXTRA EQUIPMENT/MATERIALS ARE TO BE KEPT ON SITE AS A CONTINGENCY, IN CASE THE PROPOSED CONTROL MEASURES ARE BREACHED:

- SILT FENCE
- FILTER CLOTH
- FILTER BAGS (AT LEAST 1 PER INSTALLED BAG)
- PUMPS (AT LEAST 1 PER INSTALLED PUMP)
- CLEAN RIP-RAP (FREE OF FINES) FOR ROCK CHECK DAMS
- METER BAGS AND CLEAN GRAVEL (FREE OF FINES)
- ANY ADDITIONAL MATERIAL DEEMED NECESSARY TO REPAIR/REMEDIATE PROPOSED MEASURES, OR TO ADEQUATELY DEAL WITH UNEXPECTED HIGH FLOWS.

FISH SALVAGE PLAN

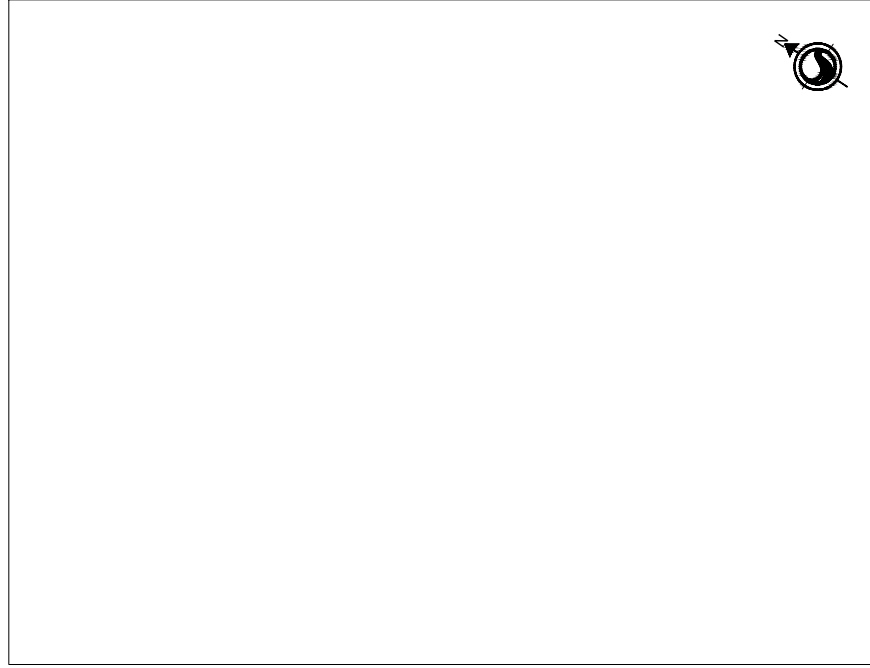
1. THE CONTRACTOR SHALL SUBMIT A FISH SALVAGE PLAN TO THE OWNER AND CONSULTANT FOR APPROVAL AT LEAST SEVEN (7) DAYS PRIOR TO THE PLANNED START OF CONSTRUCTION.
2. D2. THE FISH SALVAGE PLAN SHALL INCLUDE COORDINATION WITH THE OWNER'S QUALIFIED FISHERIES BIOLOGIST TO COMPLETE ANY REQUIRED FISH RESCUES PRIOR TO THE START OF IN-WATER CONSTRUCTION ACTIVITIES. IT SHALL ALSO INCLUDE THE COORDINATION OF ADDITIONAL FISH RESCUES AT ANY POINT DURING CONSTRUCTION IF THE NET (OR BARRIER) IS DAMAGED OR OVERTOPPED.
3. AS PART OF THE COORDINATION OF FISH RESCUES, THE CONTRACTOR SHALL NOTIFY THE OWNER AND CONSULTANT AT LEAST 72 HOURS PRIOR TO ANY PLANNED FISH REMOVAL ACTIVITIES.
4. THE CONTRACTOR IS RESPONSIBLE FOR INSTALLING AND MAINTAINING FISH BARRIERS.



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PROJECTION: UNIVERSAL TRANSVERSE MERCATOR (UTM, ZONE 17, CN8100W)
DATUM: NAD 83 (CSRS)
2. ORIGINAL GROUND TOPOGRAPHY BASED ON LIDAR SURVEY RECEIVED (NOV. 2014) AND SUPPLEMENTED BY STANTEC CONSULTING (MAY 2014, AUG. 2014 & JUNE 2015)

Key Map NTS.



Legend

LOCATION	RIFFLE SUBSTRATE	SELECT MATERIAL	LOG DIAMETER (m)	BOULDER SIZE (m)	LOG LENGTH (m)	MAX DROP ACROSS VANE (m)
TRIBUTARY A	SEE C-700	RIFFLE SUBSTRATE	0.3-0.45	0.6-0.3m (MN)	8	0.01
INDIAN CREEK	SEE C-703	MATRIX UP TO D84	0.3-0.45	0.6-0.3m (MN)	16	0.04

LOCATION	RIFFLE SUBSTRATE	SELECT MATERIAL	LOG DIAMETER (m)	BOULDER SIZE (m)	LOG LENGTH (m)	MAX DROP ACROSS VANE (m)
TRIBUTARY A	SEE C-700	RIFFLE SUBSTRATE	0.3-0.45	0.6-0.3m (MN)	8	0.01
INDIAN CREEK	SEE C-703	MATRIX UP TO D84	0.3-0.45	0.6-0.3m (MN)	16	0.04



LOCATION	RIFFLE SUBSTRATE	SELECT MATERIAL	LOG DIAMETER (m)	BOULDER SIZE (m)	LOG LENGTH (m)	MAX DROP ACROSS VANE (m)
TRIBUTARY A	SEE C-700	RIFFLE SUBSTRATE	0.3-0.45	0.6-0.3m (MN)	8	0.01
INDIAN CREEK	SEE C-703	MATRIX UP TO D84	0.3-0.45	0.6-0.3m (MN)	16	0.04

LOCATION	RIFFLE SUBSTRATE	SELECT MATERIAL	LOG DIAMETER (m)	BOULDER SIZE (m)	LOG LENGTH (m)	MAX DROP ACROSS VANE (m)
TRIBUTARY A	SEE C-700	RIFFLE SUBSTRATE	0.3-0.45	0.6-0.3m (MN)	8	0.01
INDIAN CREEK	SEE C-703	MATRIX UP TO D84	0.3-0.45	0.6-0.3m (MN)	16	0.04

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Client/Project
CANADIAN NATIONAL RAILWAY

MILTON LOGISTICS HUB - NATURAL CHANNEL DESIGN FOR INDIAN CREEK AND TRIBUTARY A

DETAILS AND NOTES

Project No. 160960844 Drawing No. 01-C-501

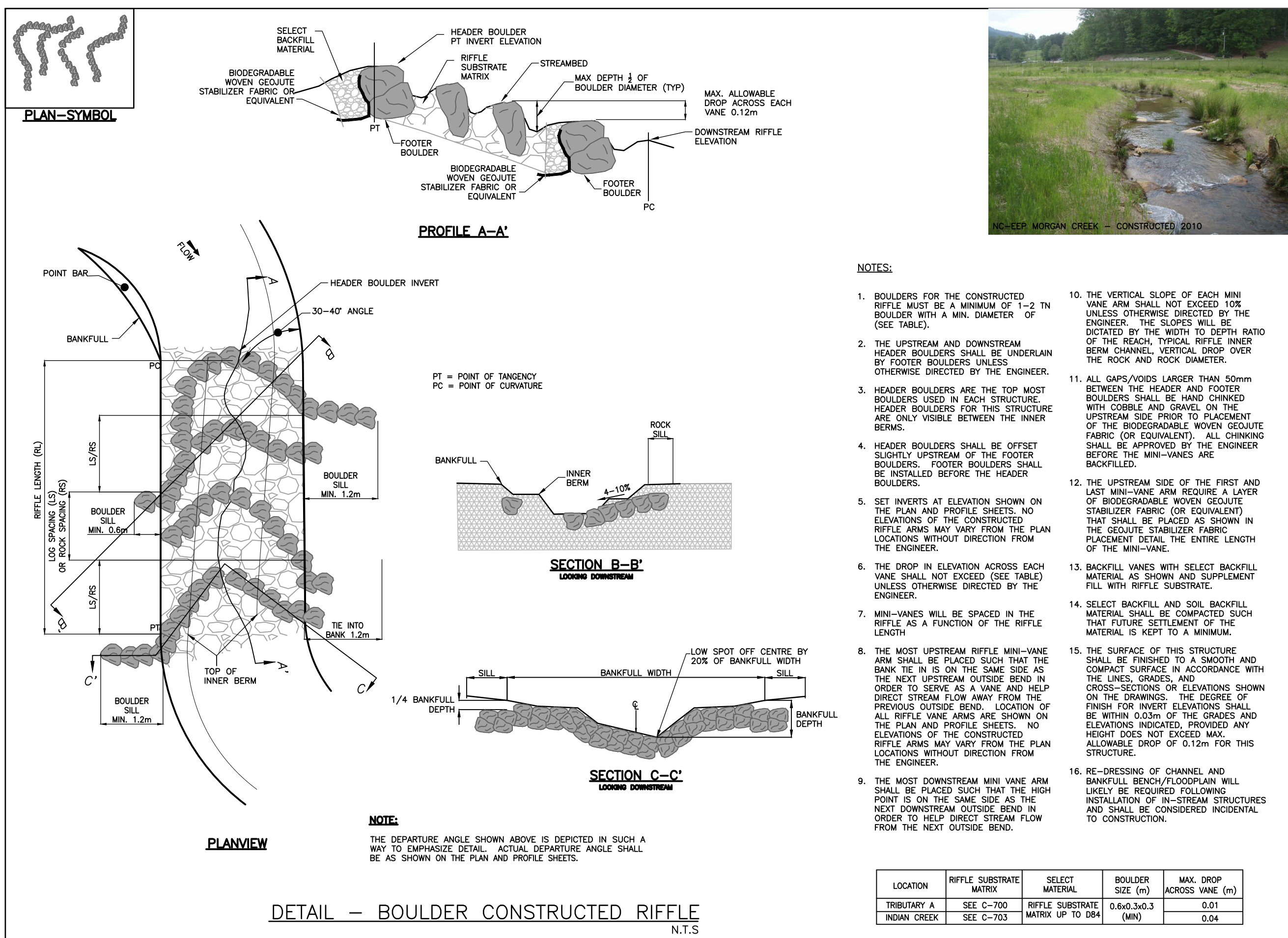
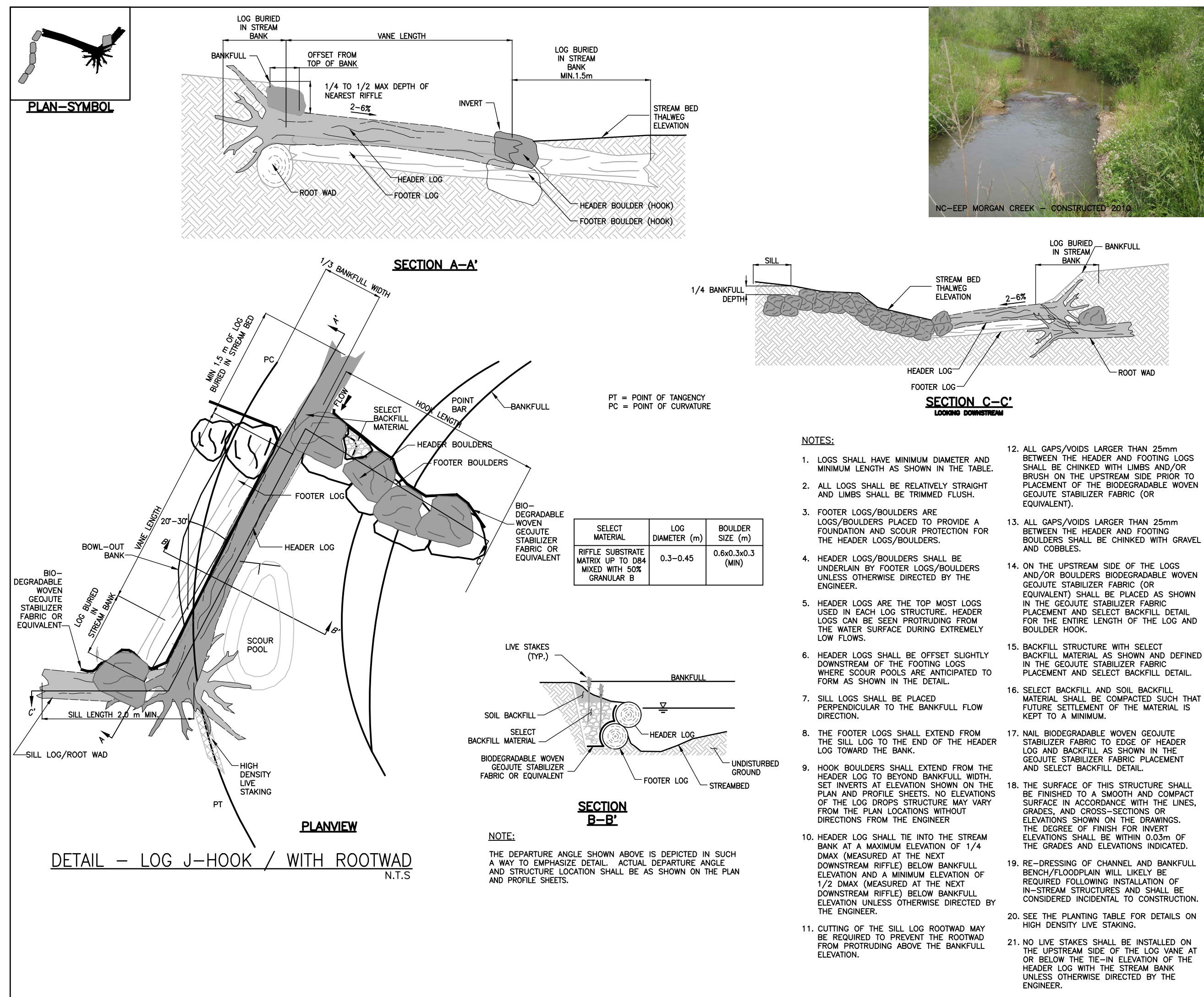
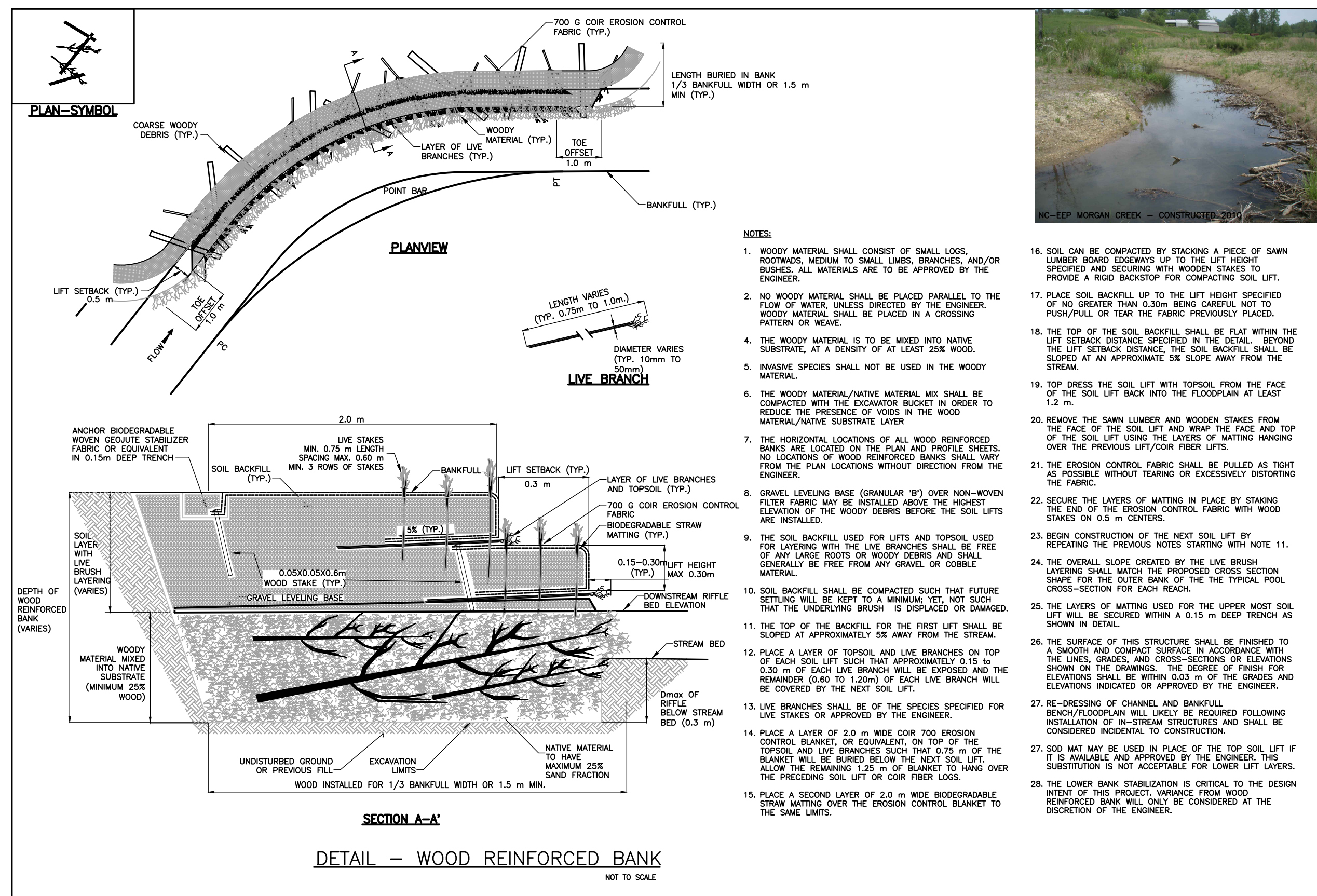
Revision 0 Sheet 9 of 29



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Notes

- Key Map NTS.



LOCATION	RIFLE SUBSTRATE MATRIX	SELECT MATERIAL	BOULDER SIZE (m)	MAX. DROP ACROSS VANE (m)
TRIBUTARY A	SEE C-700	RIFLE SUBSTRATE	0.6x0.3x0.3	0.01
INDIAN CREEK	SEE C-703	MATRIX UP TO D84	(MIN)	0.04

0	ISSUED FOR CONSTRUCTION	HA	HA 2021.07.30
Revision		By	Appd YYYY.MM.DD
File Name: 160960844_C-500DT	RJB	HEA	HEA 2021.01.25
	Dwn.	Ckhd.	Dsgn. YY.MM.DD

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CANADIAN NATIONAL RAILWAY

MILTON LOGISTICS HUB - NATURAL CHANNEL
DESIGN FOR INDIAN CREEK AND TRIBUTARY A

Milton, ON

Title _____

DETAILS AND NOTES

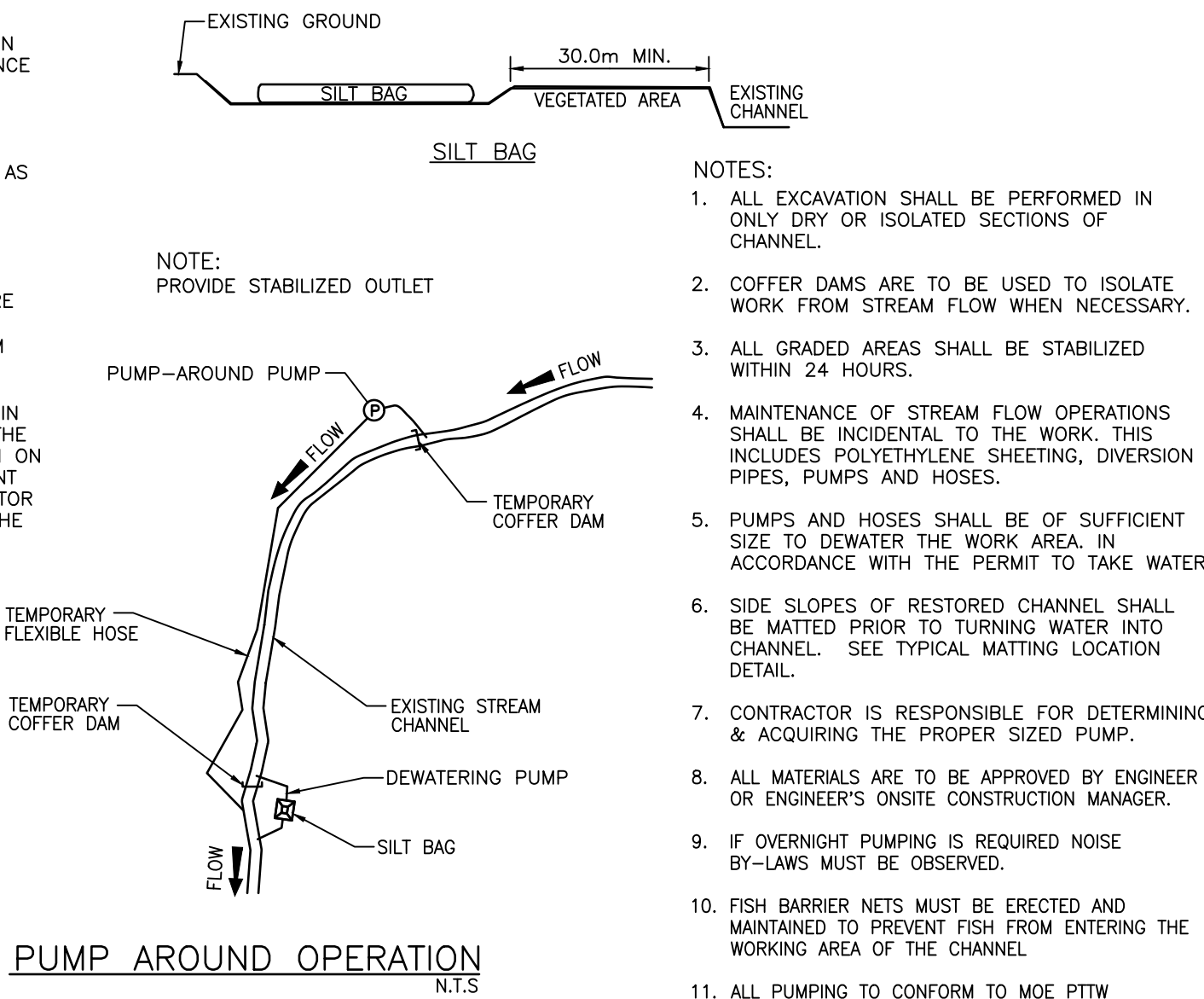
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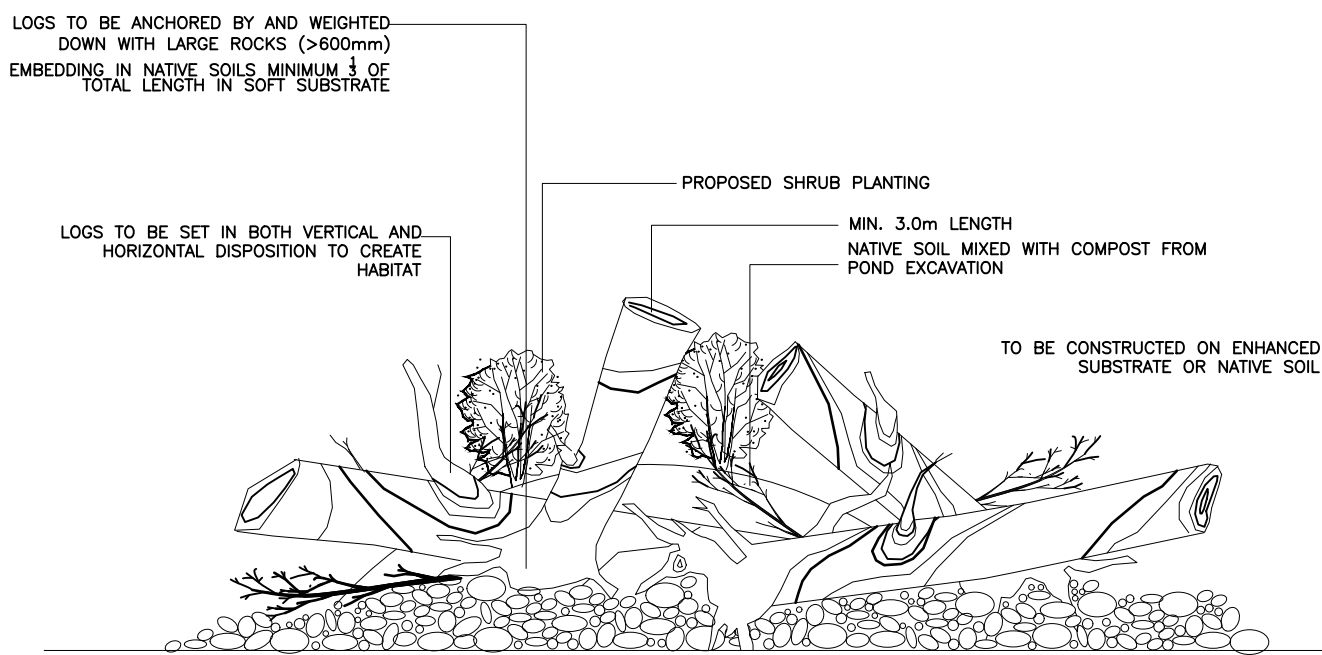
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SEQUENCE OF CONSTRUCTION FOR TYPICAL WORK AREA

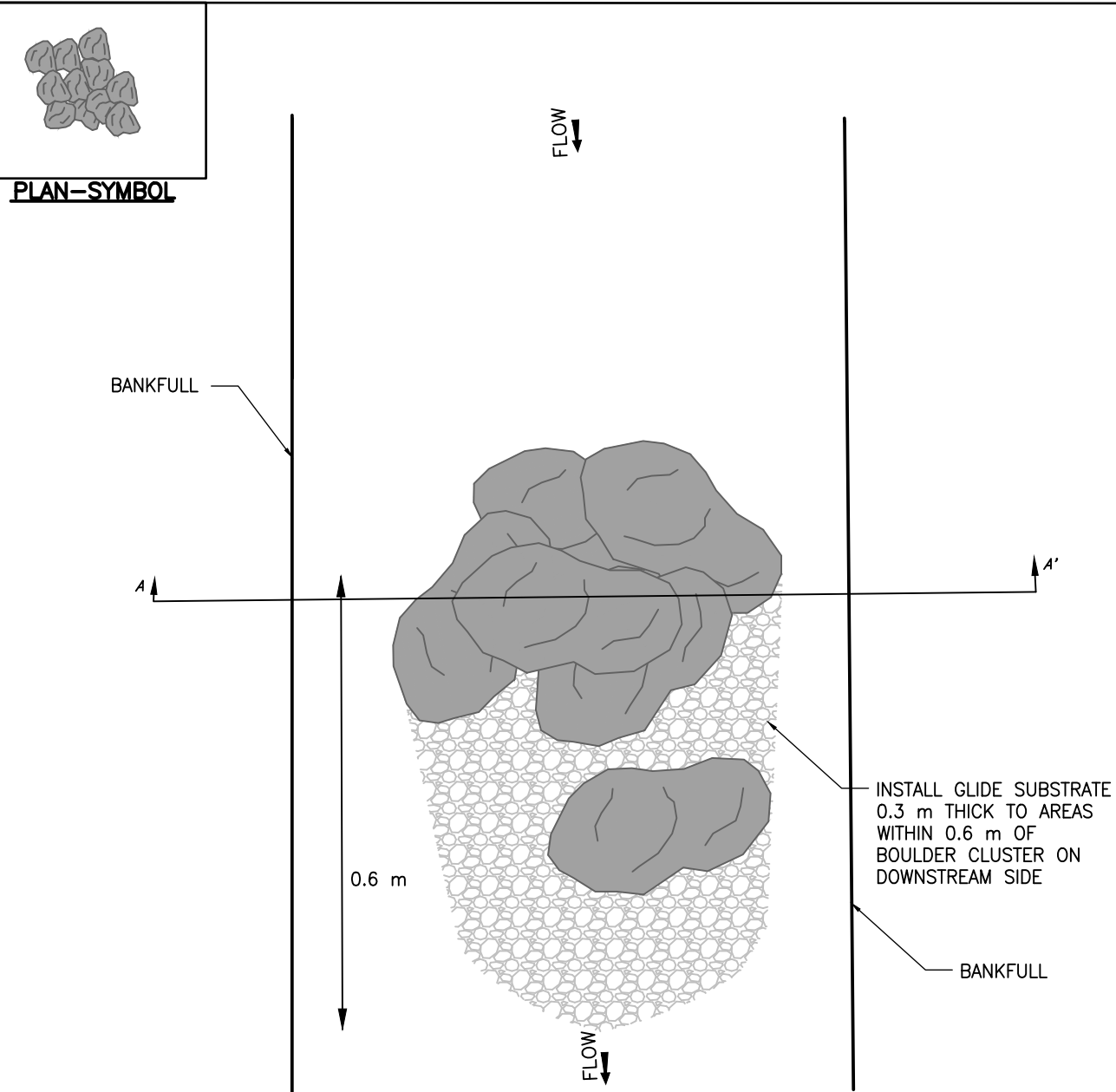
1. INSTALL SILT BAGS AS REQUIRED.
2. INSTALL UPSTREAM PUMP AND TEMPORARY FLEXIBLE HOSE.
3. PLACE UPSTREAM COFFER DAM AND BEGIN PUMPING OPERATIONS FOR STREAM DIVERSION OR AS OUTLINED IN THE APPROVED WATER MANAGEMENT PLAN AND COMMENCE FISH SALVAGE AS REQUIRED.
4. PLACE DOWNSTREAM COFFER DAM AND PUMPING APPARATUS. DEWATER ENTRAPPED AREA. AREA TO BE DEWATERED SHALL BE EQUAL TO ONE DAY'S WORK OR AS OUTLINED IN THE APPROVED WATER MANAGEMENT PLAN.
5. PERFORM STREAM RESTORATION WORK IN ACCORDANCE WITH THE PLANS.
6. EXCAVATE ANY ACCUMULATED SILT AND DEWATER BEFORE REMOVAL OF COFFER DAMS. REMOVE COFFER DAMS, PUMPS, AND TEMPORARY FLEXIBLE HOSE. (DOWNSTREAM COFFER DAMS FIRST).
7. ALL GRADING AND STABILIZATION MUST BE COMPLETED IN ONE DAY WITHIN THE PUMP AROUND AREAS BETWEEN THE COFFER DAMS. THE COFFER DAM LOCATIONS AS SHOWN ON THIS SHEET ONLY SHOW THE UPPER AND LOWER EXTENT OF WORK FOR EACH STREAM SEGMENT. THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE LOCATION OF THE COFFER DAM(S) FOR EACH DAY'S WORK.
8. REMOVE COFFER AND PUMPING EQUIPMENT.
9. REMOVE SILT BAGS AND STABILIZE BASE AREA.
10. STABILIZE DISTURBED AREA WITH SEED, MULCH AND PLANTINGS AS PER LANDSCAPE PLAN.



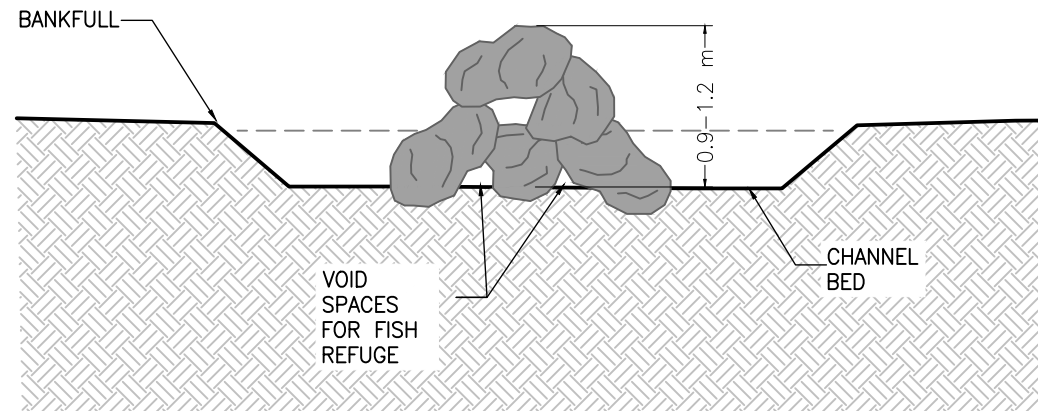
- NOTES:
1. ALL EXCAVATION SHALL BE PERFORMED IN ONLY DRY OR ISOLATED SECTIONS OF CHANNEL.
 2. COFFER DAMS ARE TO BE USED TO ISOLATE WORK FROM STREAM FLOW WHEN NECESSARY.
 3. ALL GRADED AREAS SHALL BE STABILIZED WITHIN 24 HOURS.
 4. MAINTENANCE OF STREAM FLOW OPERATIONS SHALL BE INCIDENTAL TO THE WORK. THIS INCLUDES POLYETHYLENE SHEETING, DIVERSION PIPES, PUMPS AND HOSES.
 5. PUMPS AND HOSES SHALL BE OF SUFFICIENT SIZE TO DEWATER THE WORK AREA. IN ACCORDANCE WITH THE PERMIT TO TAKE WATER.
 6. SIDE SLOPES OF RESTORED CHANNEL SHALL BE MATTED PRIOR TO TURNING WATER INTO CHANNEL. SEE TYPICAL MATTING LOCATION DETAIL.
 7. CONTRACTOR IS RESPONSIBLE FOR DETERMINING & ACQUIRING THE PROPER SIZED PUMP.
 8. ALL MATERIALS ARE TO BE APPROVED BY ENGINEER OR ENGINEER'S ONSITE CONSTRUCTION MANAGER.
 9. IF OVERNIGHT PUMPING IS REQUIRED NOISE BY-LAWS MUST BE OBSERVED.
 10. FISH BARRIER NETS MUST BE ERECTED AND MAINTAINED TO PREVENT FISH FROM ENTERING THE WORKING AREA OF THE CHANNEL.
 11. ALL PUMPING TO CONFORM TO MOE PTTW.



LOG TANGLE MOUND
N.T.S.

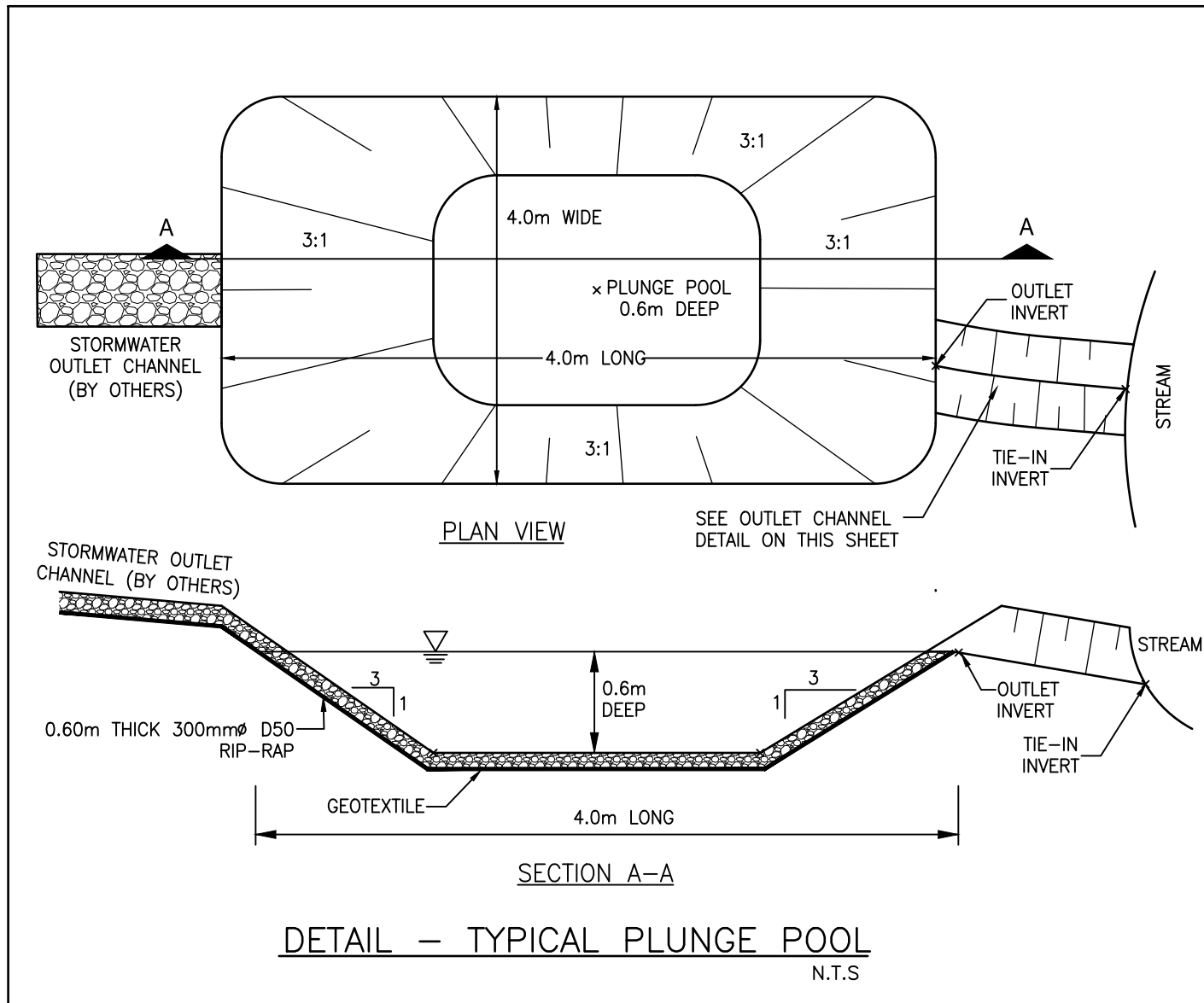
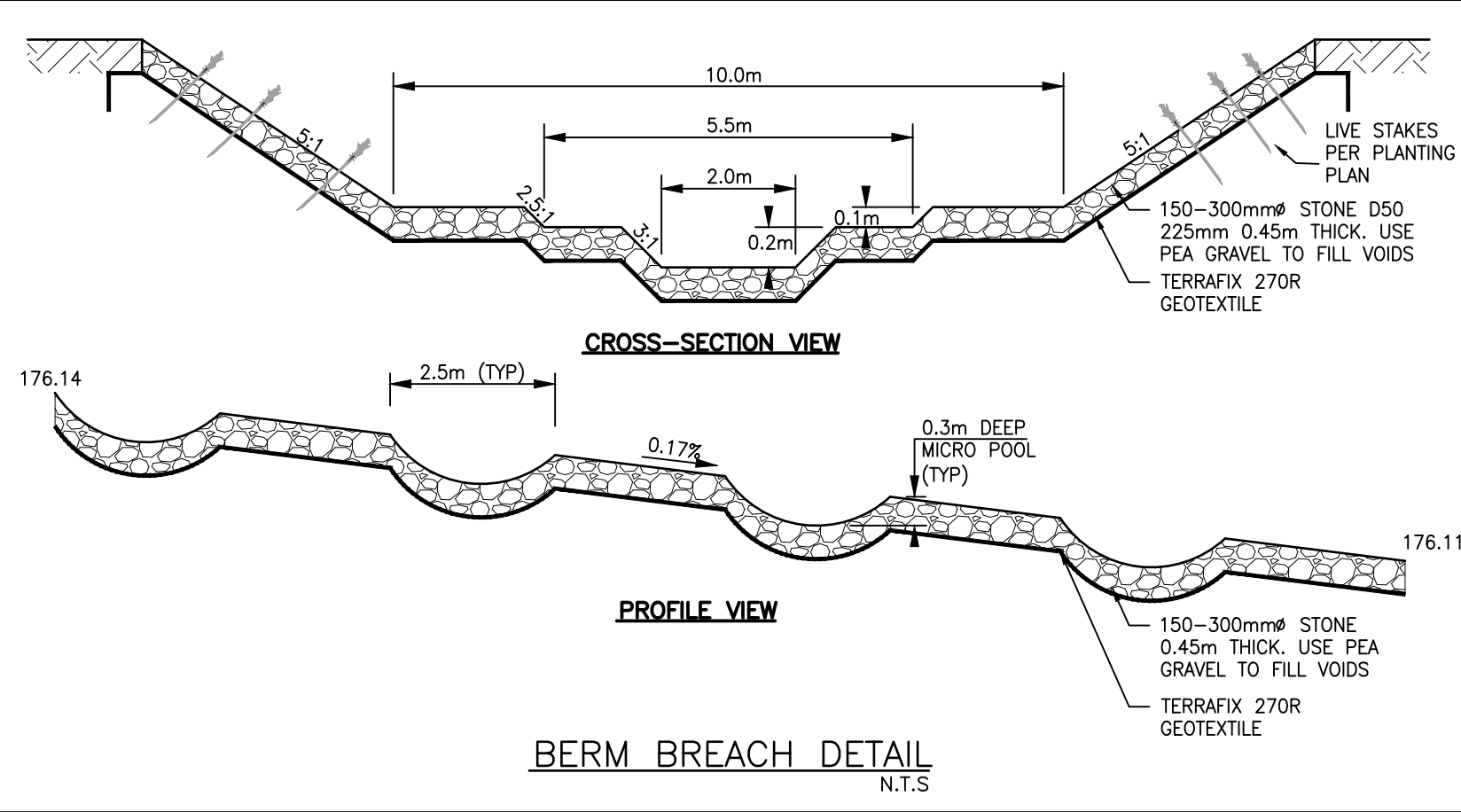


DETAIL - BOULDER CLUSTER
N.T.S.

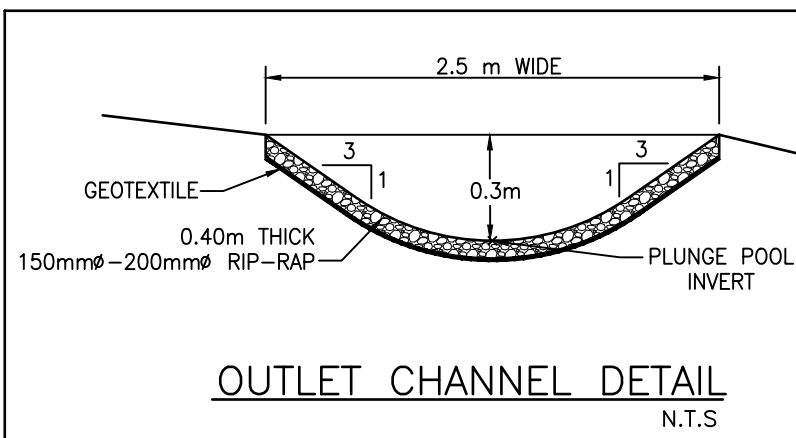


SECTION A-A'

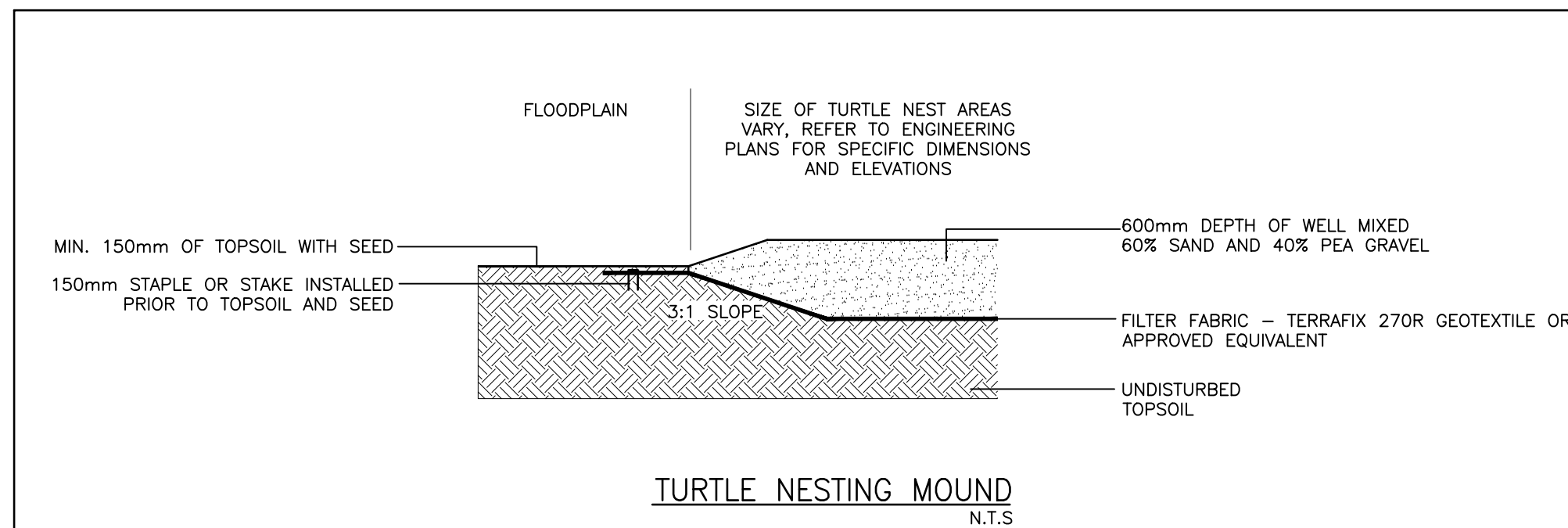
- NOTES:
1. 0.3-0.9 m Ø BOULDERS.
 2. PILE BOULDERS IN GROUPINGS OF 5-10 BOULDERS.
 3. PILE BOULDERS TO CREATE HOLLOW SPACES WITHIN CLUSTER.
 4. PLACE OCCASIONAL BOULDER 0.2-0.3 m AWAY FROM CLUSTER GROUPINGS.
 5. ADD GLIDE SUBSTRATE TO DOWNSTREAM SIDE OF BOULDER CLUSTER



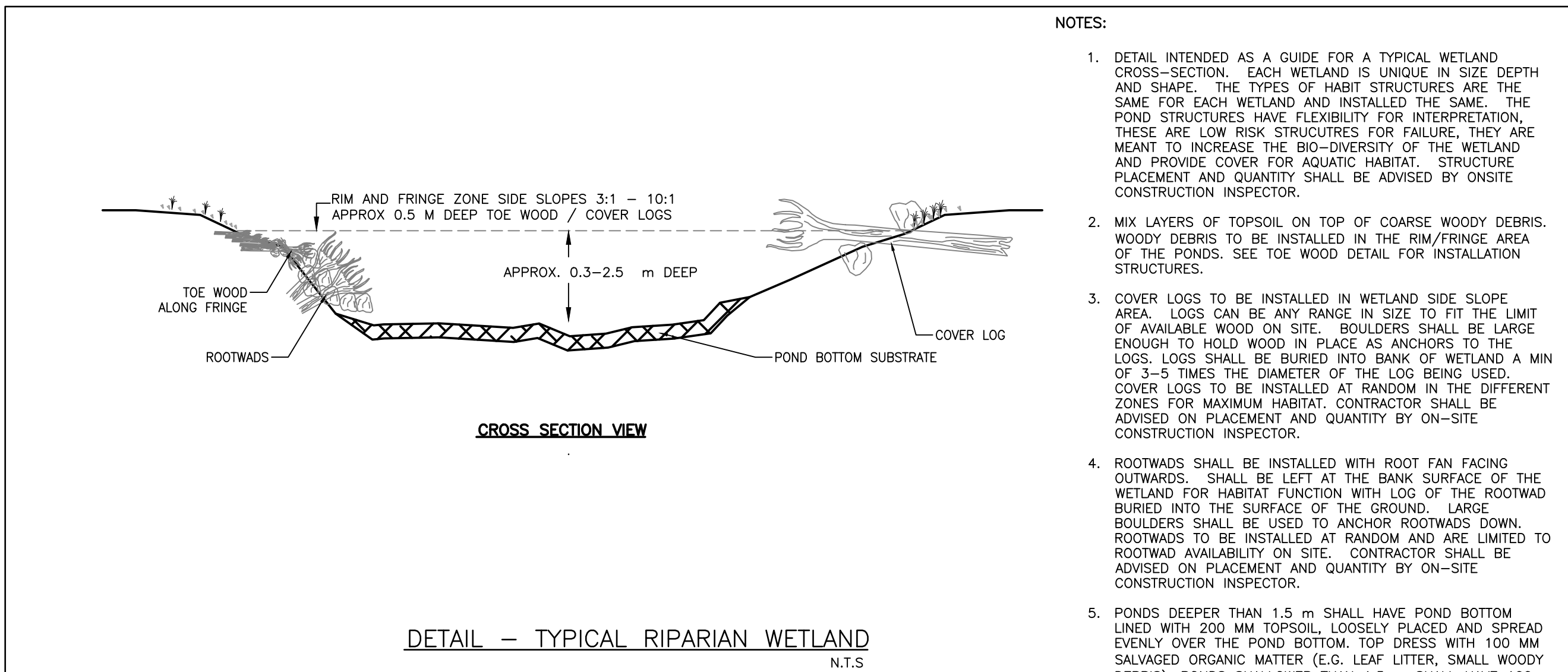
DETAIL - TYPICAL PLUNGE POOL
N.T.S.



OUTLET CHANNEL DETAIL
N.T.S.



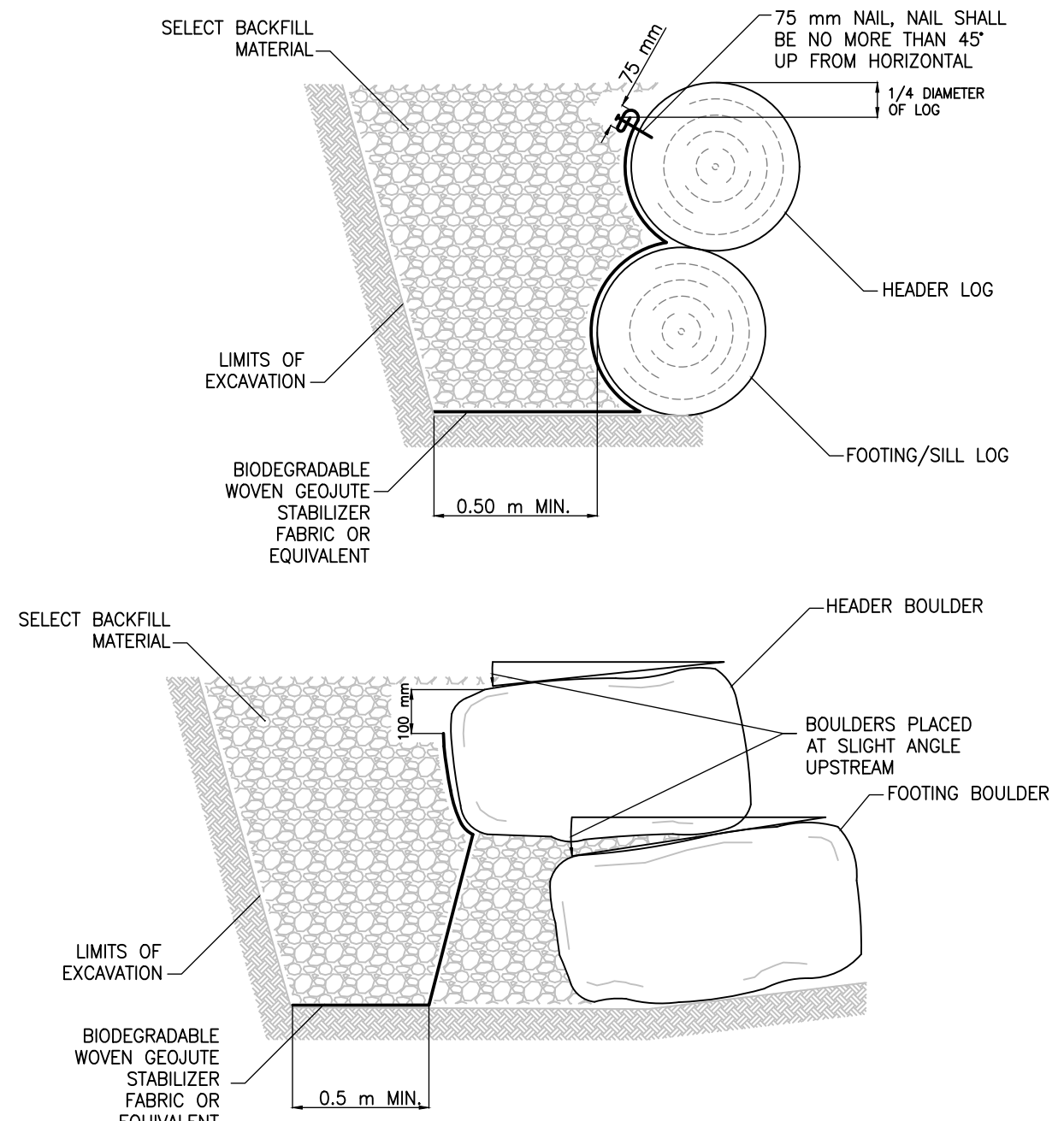
TURTLE NESTING MOUND
N.T.S.



DETAIL - TYPICAL RIPARIAN WETLAND
N.T.S.

- NOTES:
1. BIODEGRADABLE WOVEN GEOJUTE STABILIZER FABRIC (OR EQUIVALENT) SHALL EXTEND FROM THE BOTTOM OF THE FOOTER LOG/ROCK OR LIMITS OF EXCAVATION, WHICHEVER IS LOWER, UP TO 3/4 THE DIAMETER OF THE HEADER LOG OR 10 mm FROM THE TOP OF THE HEADER BOULDER UNLESS OTHERWISE DIRECTED BY THE ENGINEER.
 2. PRIOR TO SECURING THE BIODEGRADABLE WOVEN GEOJUTE STABILIZER FABRIC (OR EQUIVALENT) TO HEADER LOGS, TWO 75 mm FOLDS SHALL BE PLACED IN THE UPPER END OF THE FABRIC CREATING THREE LAYERS OF FABRIC FOR THE NAIL TO PENETRATE PRIOR TO REACHING THE LOG.
 3. SECURE THE BIODEGRADABLE WOVEN GEOJUTE STABILIZER FABRIC TO THE HEADER LOG BY NAILING 75 mm 10d GALVANIZED ROOFING NAILS OR APPROVED EQUIVALENT THE ENTIRE LENGTH OF THE LOG, 0.15 m ON CENTER.
 4. SELECT BACKFILL MATERIAL SHALL CONSIST OF THE MATERIAL SPECIFIED WITHIN A SPECIFIC DETAIL OR APPROVED BY THE ENGINEER.

DETAIL - GEOTEXTILE PLACEMENT AND SELECT BACKFILL
N.T.S.



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Key Map N.T.S.

Legend

0	ISSUED FOR CONSTRUCTION	HA	HA	2021.07.30
Revision	By	Appd	YYYY.MM.DD	
File Name:	160960844_C-500DT	RJB	HEA	2021.08.13
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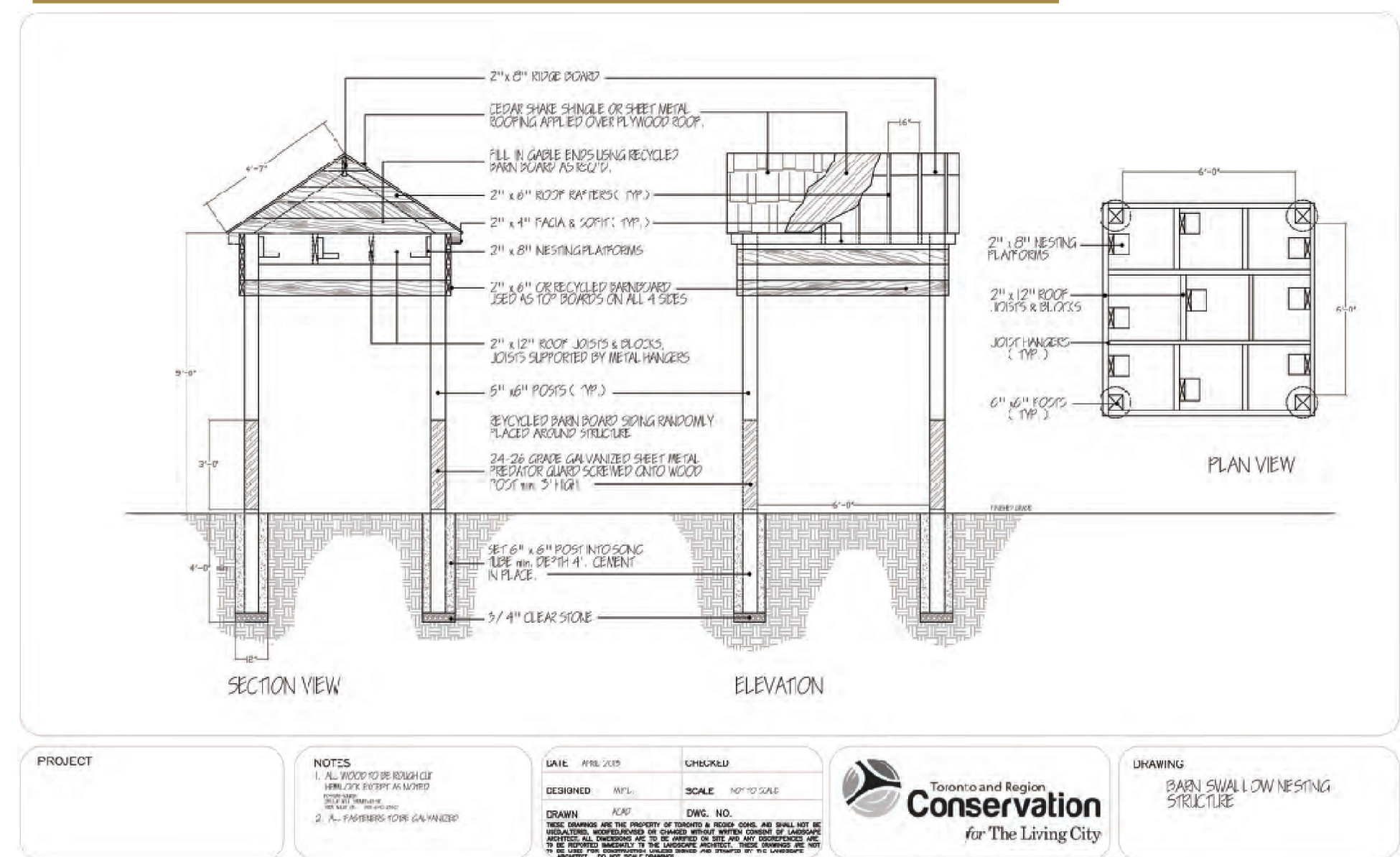
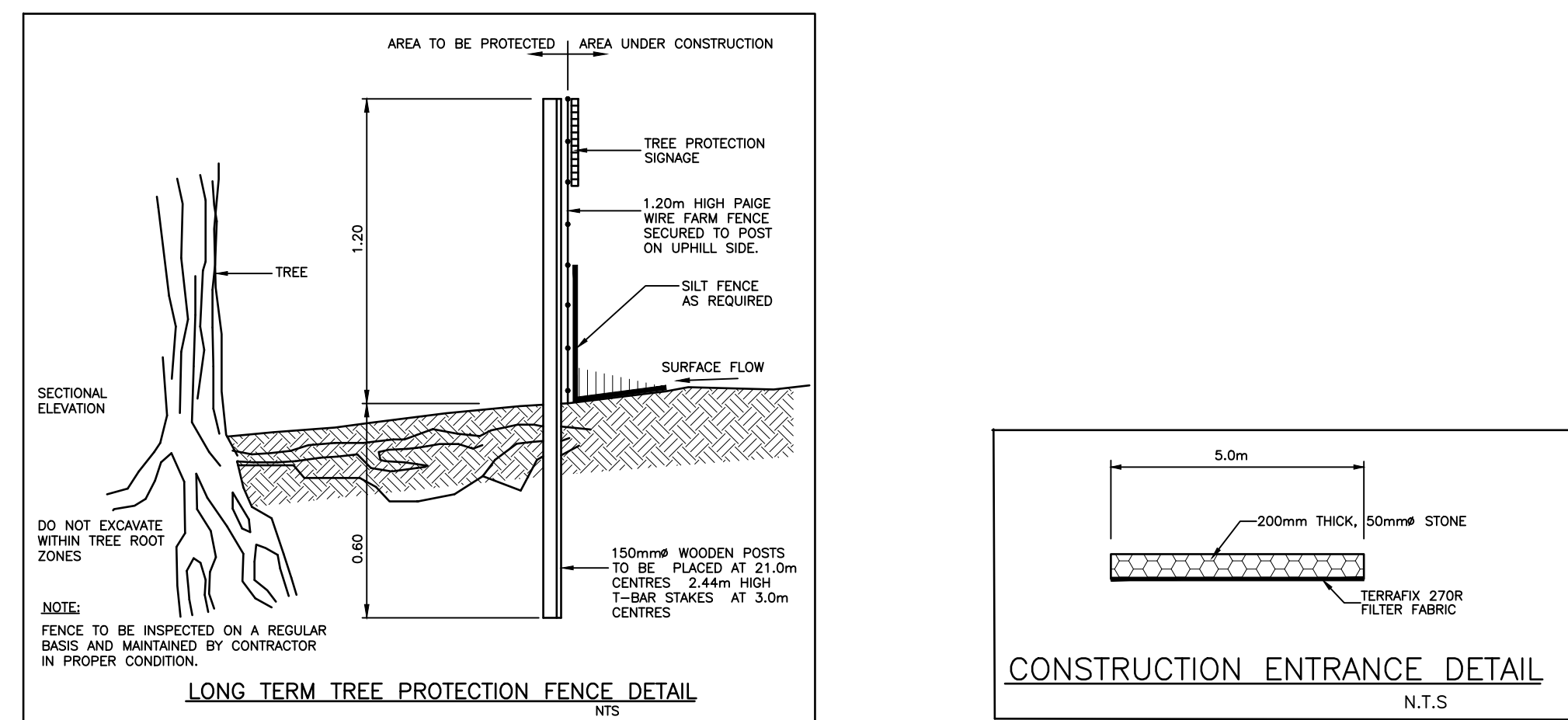
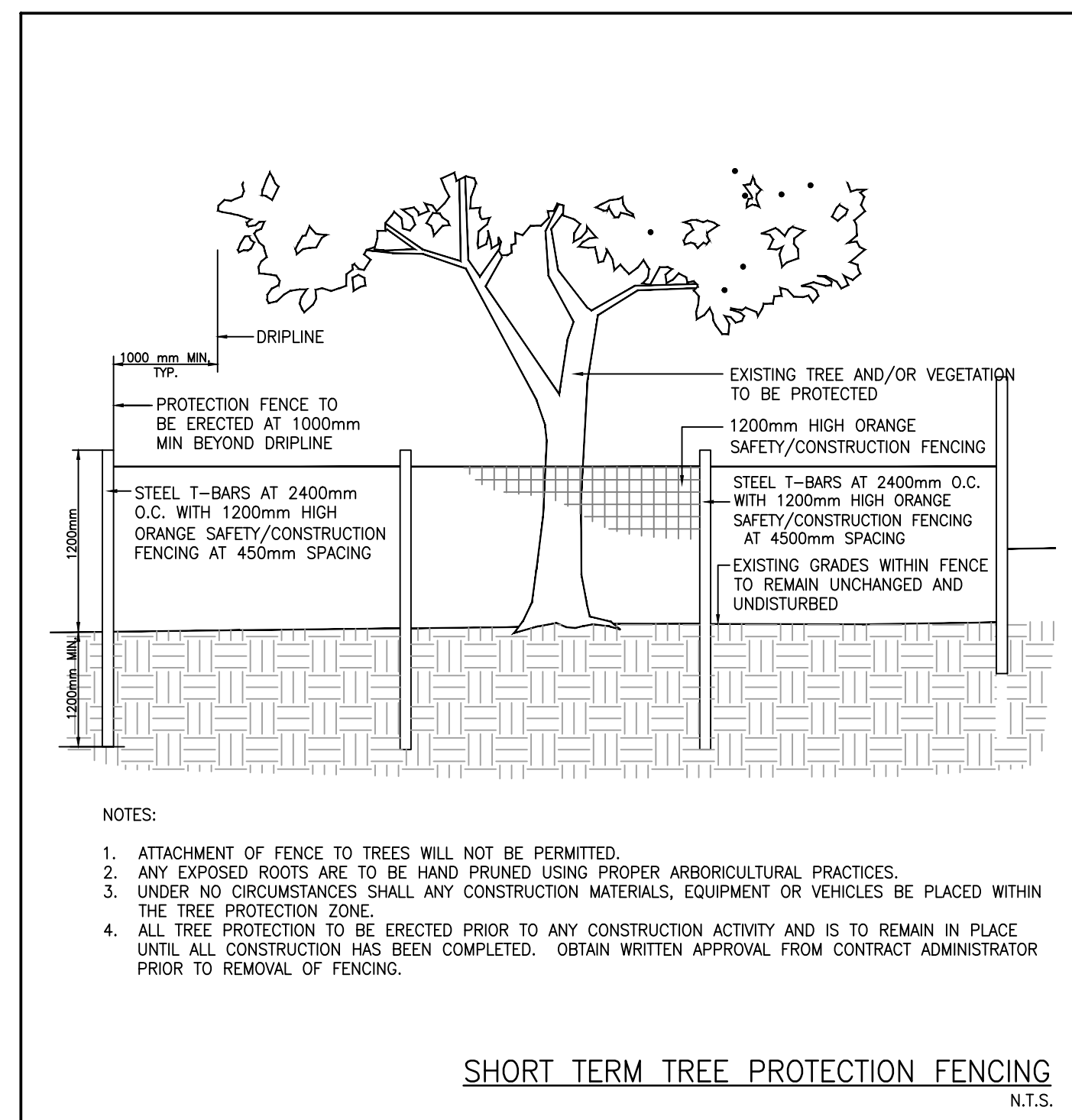
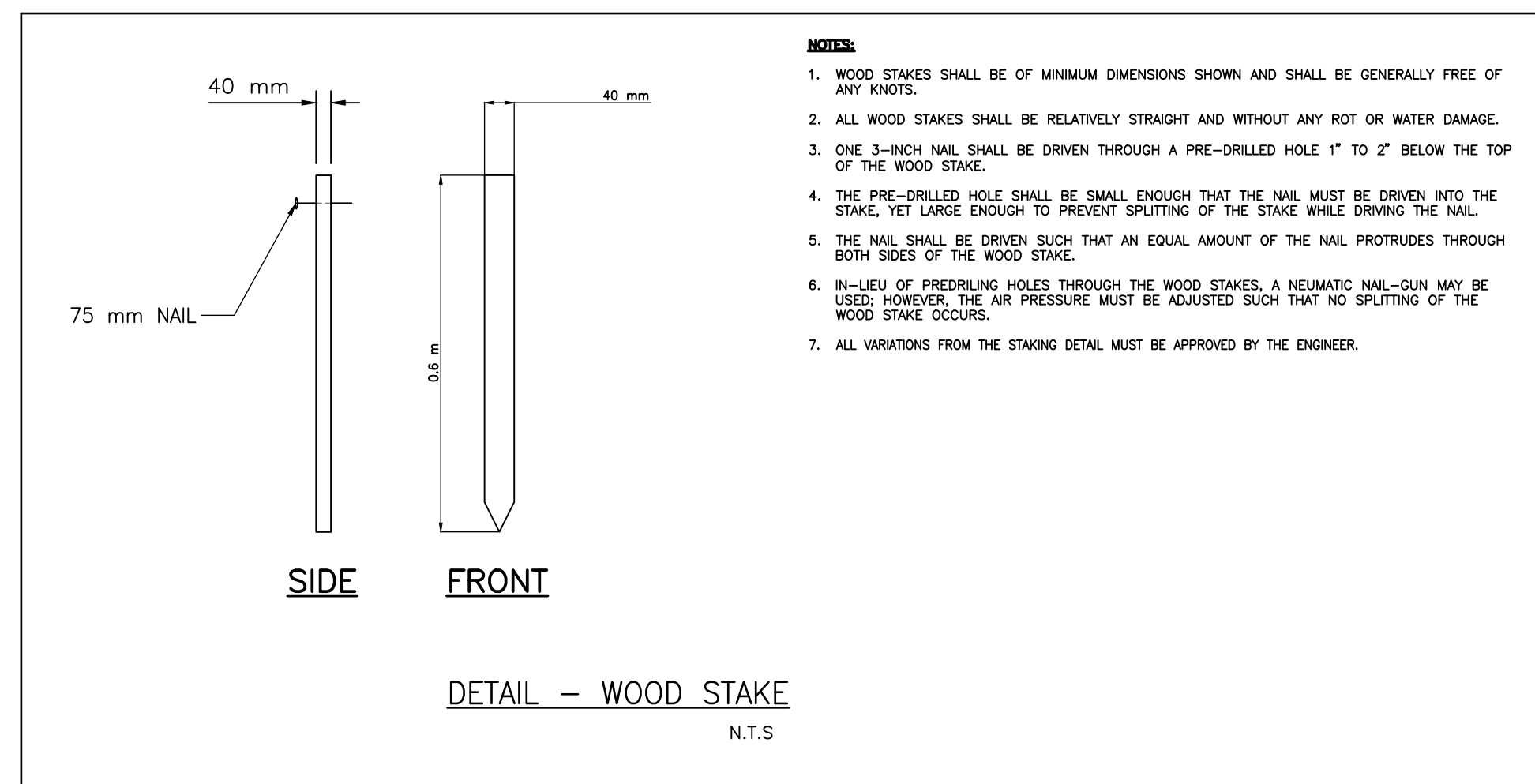
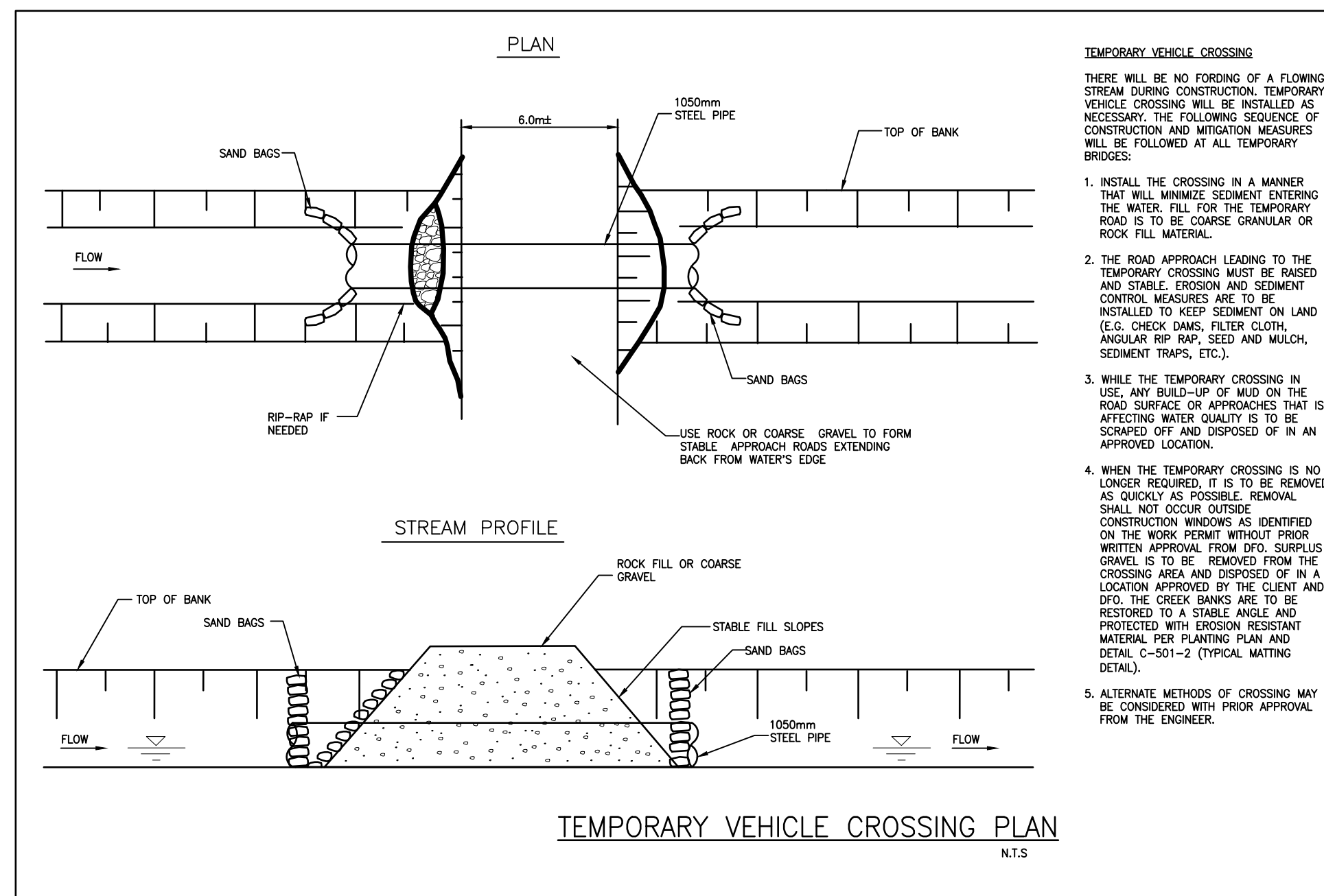
MILTON LOGISTICS HUB - NATURAL CHANNEL
DESIGN FOR INDIAN CREEK AND TRIBUTARY A

Milton, ON

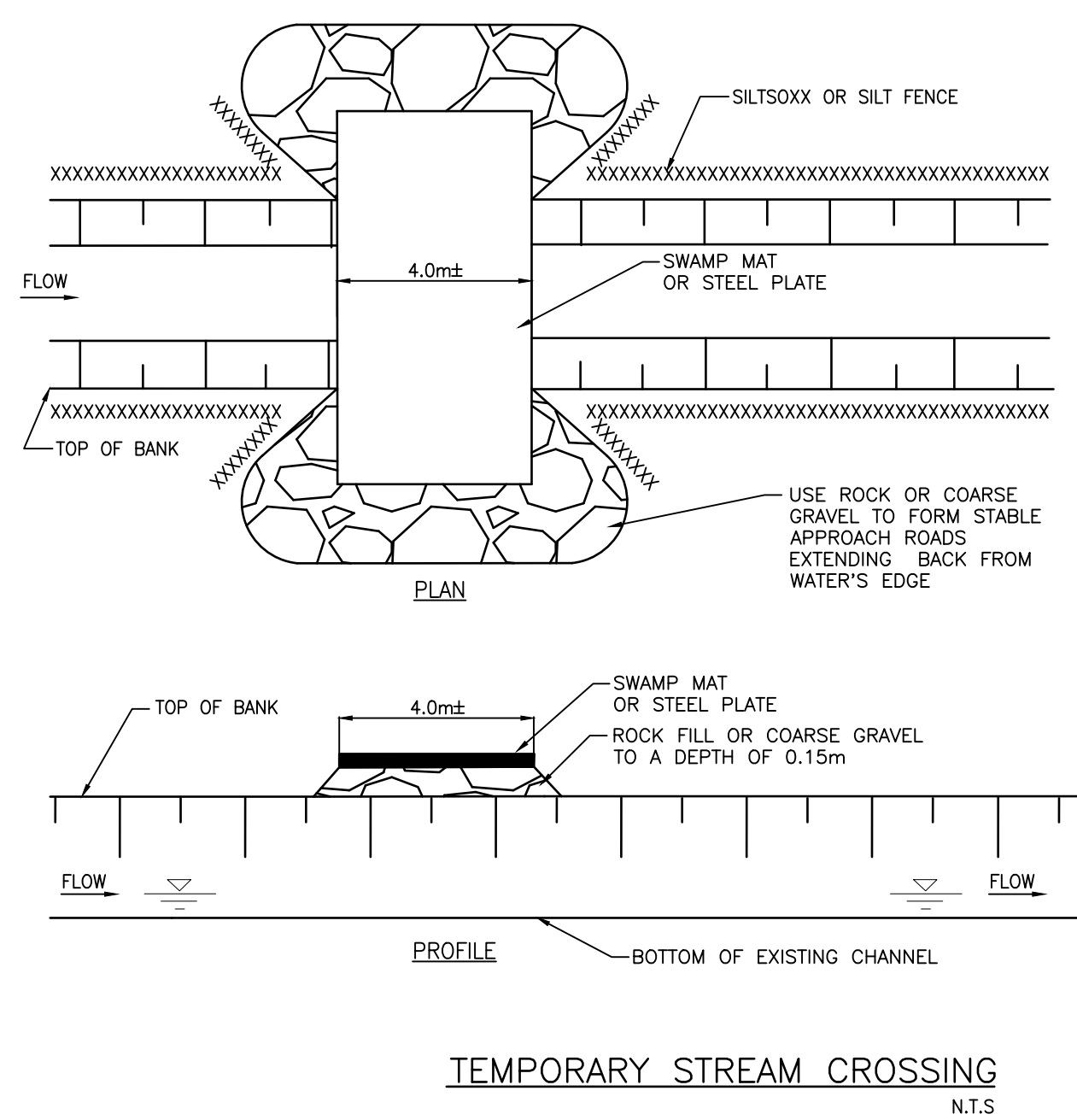
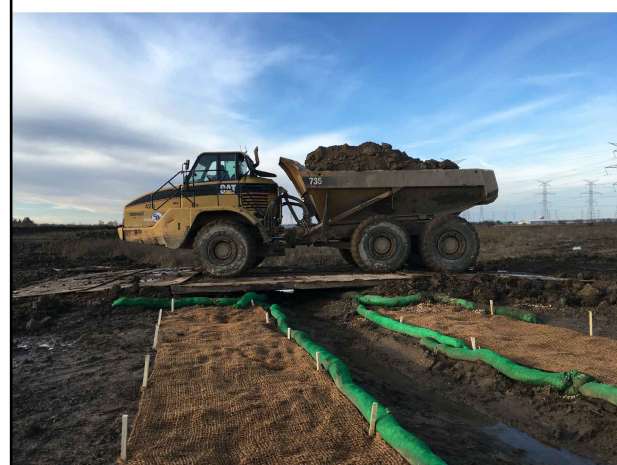
Title
DETAILS AND NOTES

Project No. Scale
160960844

Revision Sheet Drawing No.
0 11 of 29 01-C-503



BARN SWALLOW NESTING STRUCTURE
N.T.S.



TEMPORARY VEHICLE CROSSING

THERE WILL BE NO FORDING OF A FLOWING STREAM DURING CONSTRUCTION. TEMPORARY VEHICLE CROSSING WILL BE LIMITED TO THE ROAD APPROACHES TO THE BRIDGE. THE ROAD APPROACHES AND CONSTRUCTION AND MITIGATION MEASURES WILL BE FOLLOWED AT ALL TEMPORARY BRIDGES:

1. DIVERT FLOWS FROM WORK AREA PER APPROVED WATER MANAGEMENT PLAN.
2. INSTALL THE CROSSING IN A MANNER THAT WILL MINIMIZE SEDIMENT ENTERING THE WATER. FILL FOR THE TEMPORARY ROAD IS TO BE COARSE GRANULAR OR ROCK FILL MATERIAL. THE ROAD APPROACH LEADING TO THE TEMPORARY CROSSING SHALL BE CONSTRUCTED TO BE PROTECTED FROM EROSION. CONSTRUCTION MEASURES ARE TO BE INSTALLED TO KEEP THE ROAD AND APPROACHES FREE OF SEDIMENT, LOGS, LIMB, RIP RAP, SEED AND MULCH, SEDIMENT TRAPS, ETC.).
3. WHILE THE TEMPORARY CROSSING IS IN USE, ANY BUILD-UP OF MUD ON THE ROAD SURFACE OR APPROACHES THAT IS AFFECTING THE QUALITY OF THE WATER IS TO BE REMOVED AND DISPOSED OF IN AN APPROVED LOCATION.
4. WHEN THE TEMPORARY CROSSING IS NO LONGER REQUIRED, IT IS TO BE REMOVED AND THE ROAD APPROACHES ARE TO BE RESTORED. SHALL NOT OCCUR DURING CONSTRUCTION WINDOWS AS IDENTIFIED ON THE WORK PERMIT. SURPLUS GRASS IS TO BE PLANTED IN THE ROAD APPROACHES TO BE RESTORED TO A NATURAL OFFSITE. THE CREEK BANKS ARE TO BE RESTORED TO A NATURAL STATE PER PERMITS AND REQUIREMENTS AND PROTECTED WITH EROSION RESISTANT MATERIAL PER PLANTING PLAN AND EROSION CONTROL MATING.
5. ALTERNATE METHODS OF CROSSING MAY BE DEVELOPED AND CONSIDERED WITH PRIOR APPROVAL FROM THE ENGINEER.

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Key Map NTS

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MILTON LOGISTICS HUB - NATURAL CHANNEL
DESIGN FOR INDIAN CREEK AND TRIBUTARY A

Milton, ON

Title

DETAILS AND NOTES

Project No.	Scale
160960844	

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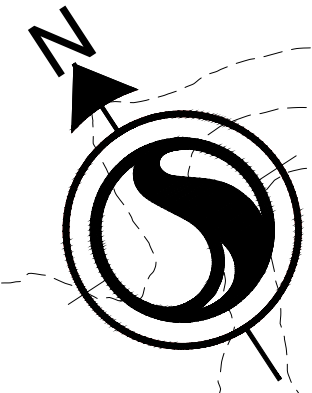
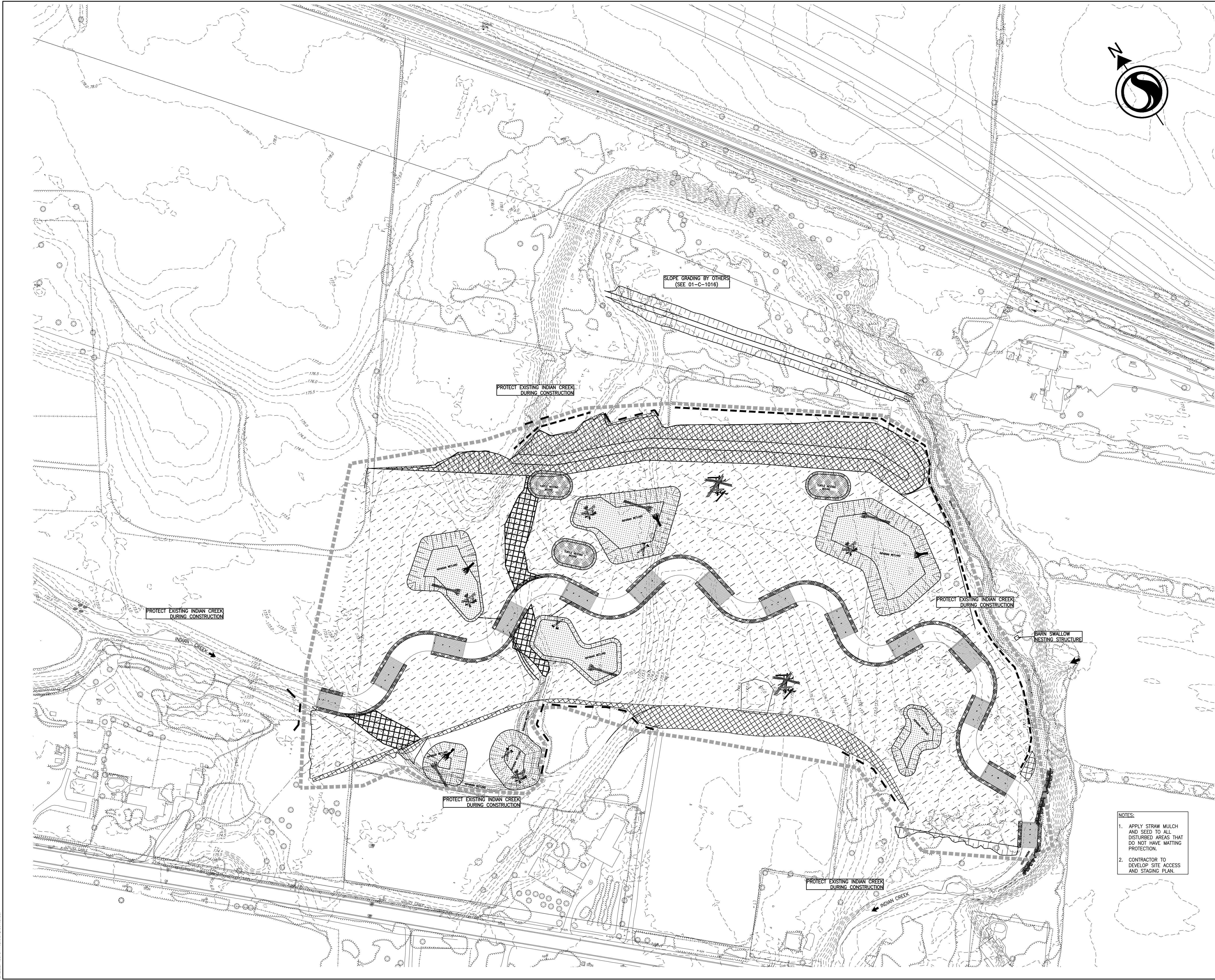
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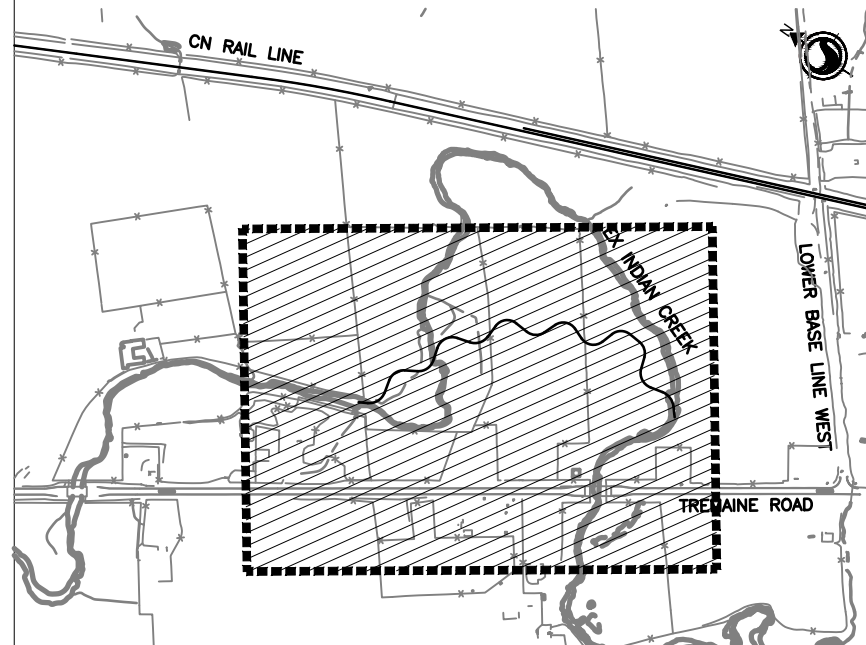
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DATUM: NAD 83 (CSRS)
 - ORIGINAL GROUND TOPOGRAPHY BASED ON LIDAR SURVEY RECEIVED (NOV. 2014) AND SUPPLEMENTED BY STANTEC CONSULTING (MAY 2014, AUG. 2014 & JUNE 2015)

Key Map NTS.




- Legend
- LIMIT OF CONSTRUCTION
 - SWALE
 - COIR MATTING
 - JUTE MATTING
 - STRAW MATTING
 - CONSTRUCTION ENTRANCE
 - RIP RAP
 - ROCK CHECK DAM
 - SILT FENCE
 - SNOW FENCE
 - SHORT TERM TREE PROTECTION
 - LONG TERM TREE PROTECTION

0	ISSUED FOR CONSTRUCTION	HA	HA	2021.07.30	
Revision		By	Appd	YYYY.MM.DD	
File Name:	160960844_C-601EC			2021.03.05	
		Dwn.	Chkd.	Dsgn.	YY.MM.DD

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Client/Project
CANADIAN NATIONAL RAILWAY

MILTON LOGISTICS HUB - NATURAL CHANNEL
DESIGN FOR INDIAN CREEK AND TRIBUTARY A

Milton, ON

Title
INDIAN CREEK
SEDIMENT AND EROSION
CONTROL PLAN

Project No.
160960844

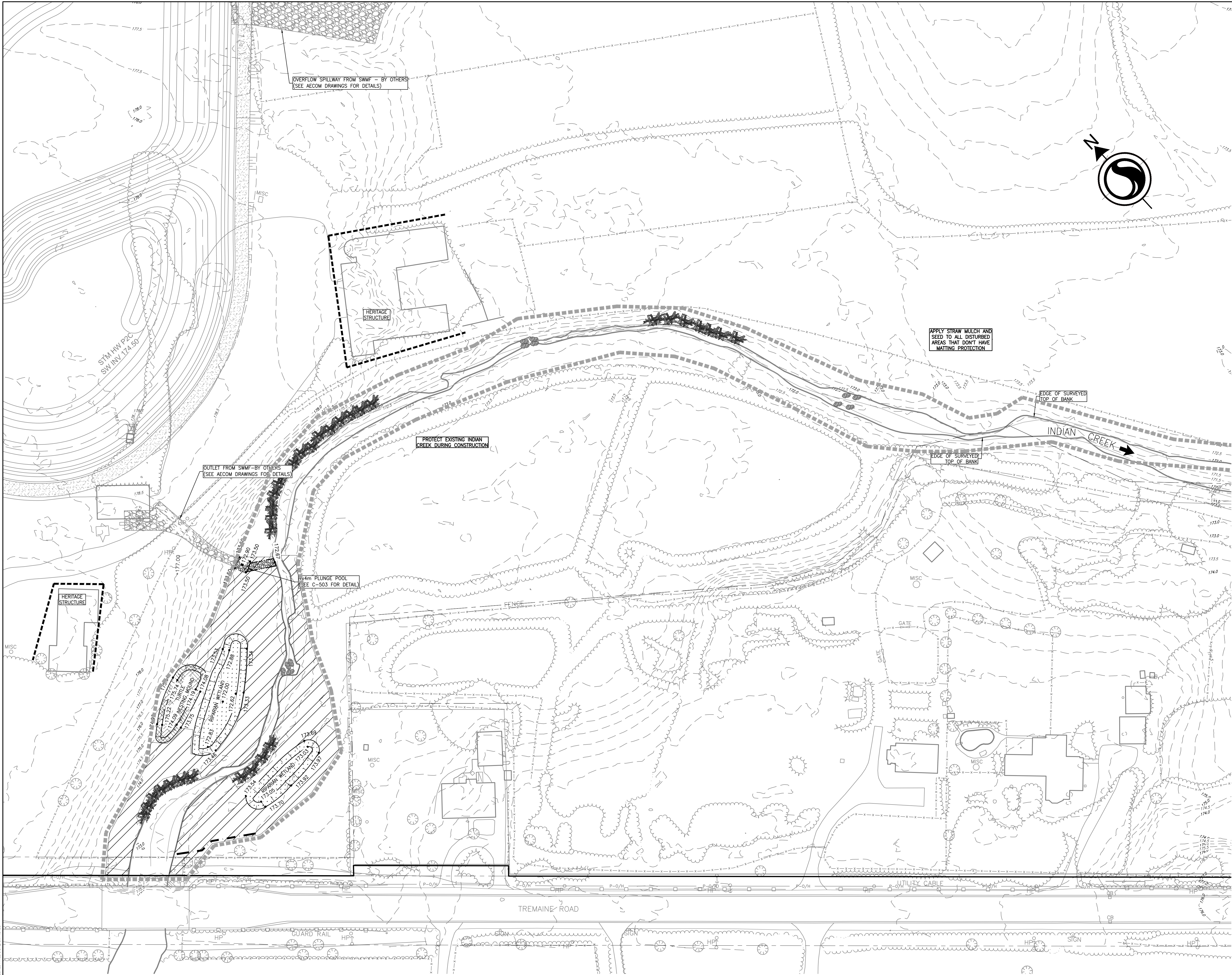
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1:1000

0 10 30 50m

Revision
0

Sheet
14 of 29

Drawing No.
01-C-601



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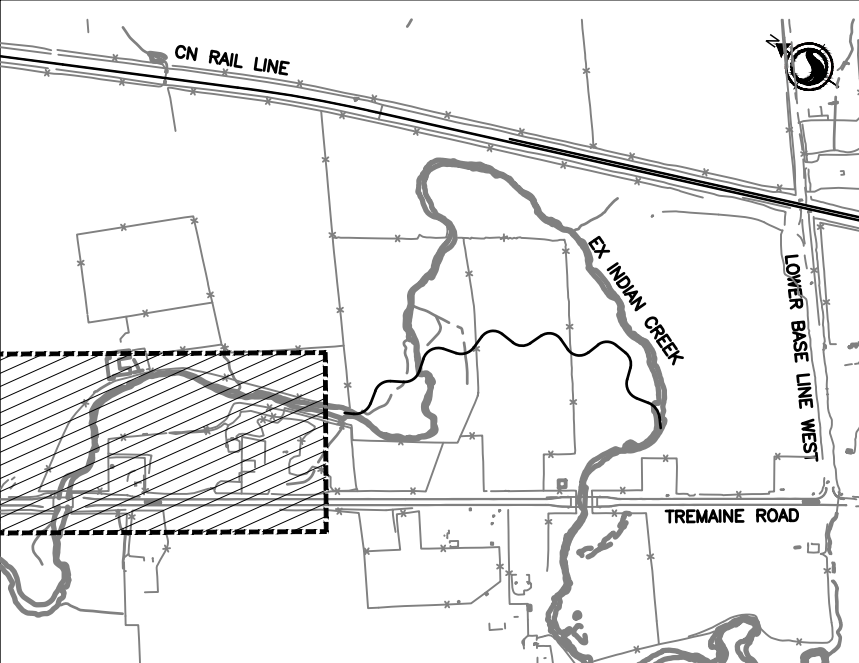
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Key Map NTS.



- Legend
- LIMIT OF CONSTRUCTION
 - SWALE
 - NO STRIPPING
 - TREE REMOVAL
 - EROSION CONTROL BLANKET
 - CONSTRUCTION ENTRANCE
 - SILT FENCE
 - SNOW FENCE
 - SHORT TERM TREE FENCE
 - LONG TERM TREE FENCE
 - SEDIMENT BASIN SLOPES

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				2021.02.12
				YY-MM-DD

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Client/Project
CANADIAN NATIONAL RAILWAY

MILTON LOGISTICS HUB - NATURAL CHANNEL
DESIGN FOR INDIAN CREEK AND TRIBUTARY A

Milton, ON

Title
UPPER INDIAN CREEK
SEDIMENT AND EROSION
CONTROL PLAN

Project No.
160960844

Scale
1:500

Revision
0

Sheet
15 of 29

Drawing No.
01-C-602

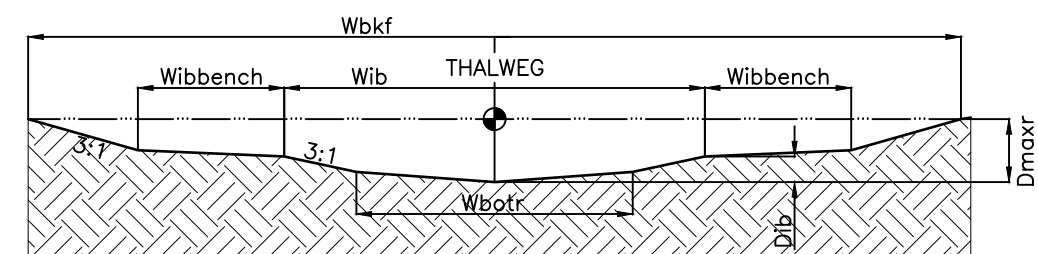




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Notes

- Key Map NTS.



TYPICAL SECTION - RIFFLE MID-POINT
N.T.S.

MIRROR ABOUT CENTERLINE FOR POOL LEFT

The diagram illustrates a cross-section of a riverbed. A dashed line represents the Thalweg profile. Key points and dimensions are labeled: Wpb1, Wpb2, Wbkt, Wbtp, and Thalweg. Slopes are indicated as 8.3%, 12.5%, and 12.5%. The maximum depth is labeled Dmax.

NOTES: - ALL CROSS SECTIONS ARE SHOWN LOOKING IN THE DOWNSTREAM DIRECTION
- - GRADE POINT IS THE CENTERLINE OF THE STREAM
- ALL SHARP CORNERS SHOULD BE ROUNDED

TYPICAL SECTION – POOL RIGHT
N.T.S.

THE RIFFLE SUBSTRATE MATRIX SHALL BE PREPARED BY MIXING OR PLACING IN LAYERS SUCH THAT THE SMALLER MATERIAL FILLS THE VOIDS BETWEEN THE LARGER MATERIAL. RIFFLE SUBSTRATE SHALL BE PLACED 0.30m THICK AT BOULDER CONSTRUCTED RIFFLES.

BOULDERS WITH A MINIMUM DIMENSION OF 0.40m(W)x0.40m(D)x0.60m(L) SHALL BE INDIVIDUALLY SELECTED FOR USE IN THE STRUCTURES. BOULDERS SHALL BE RELATIVELY FLAT ON EITHER SIDE IN THE SAME DIMENSION, ESPECIALLY THE LONG DIMENSION.

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Milton, ON

Project No. 160960844

01-C-700



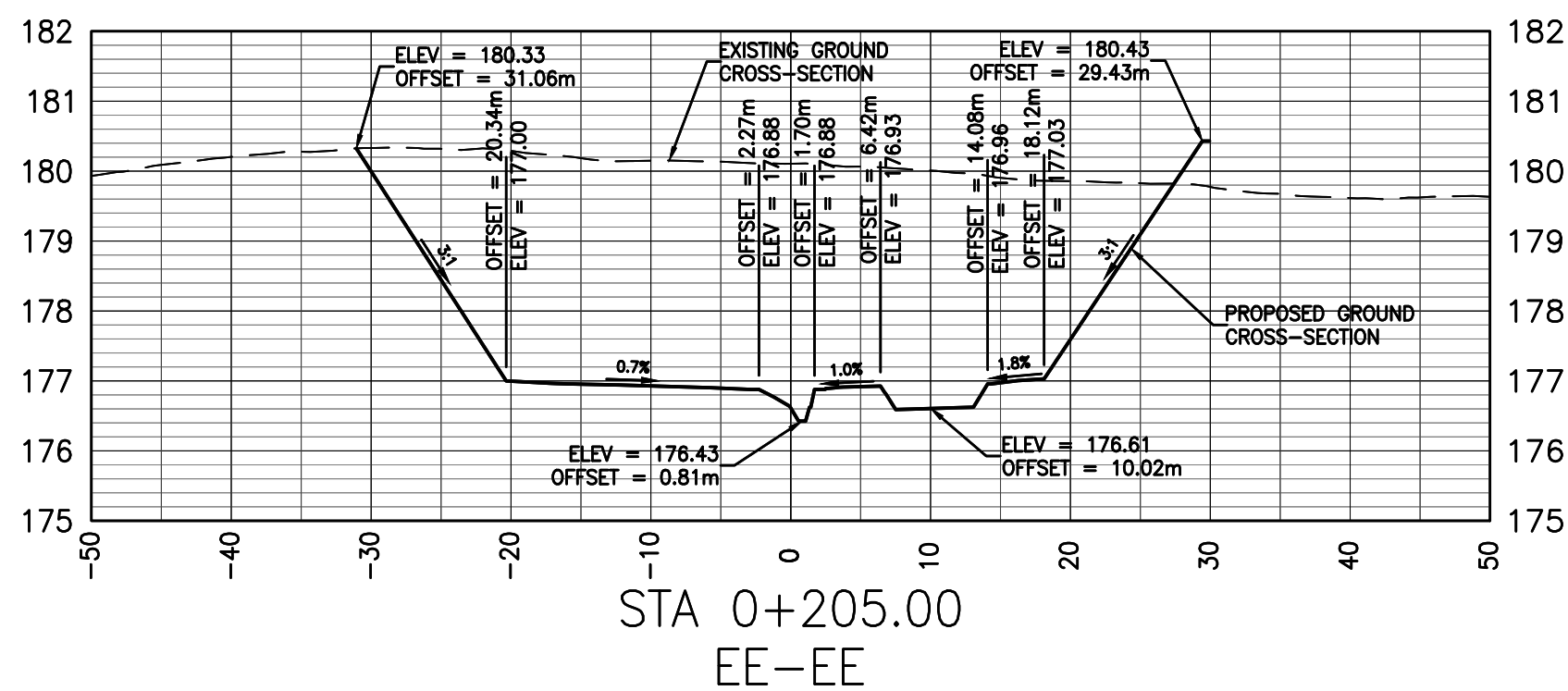
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NOTE: SECTIONS FACING DOWNSTREAM

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Revision	Sheet	Drawing No.
0	17 of 29	01 C 701

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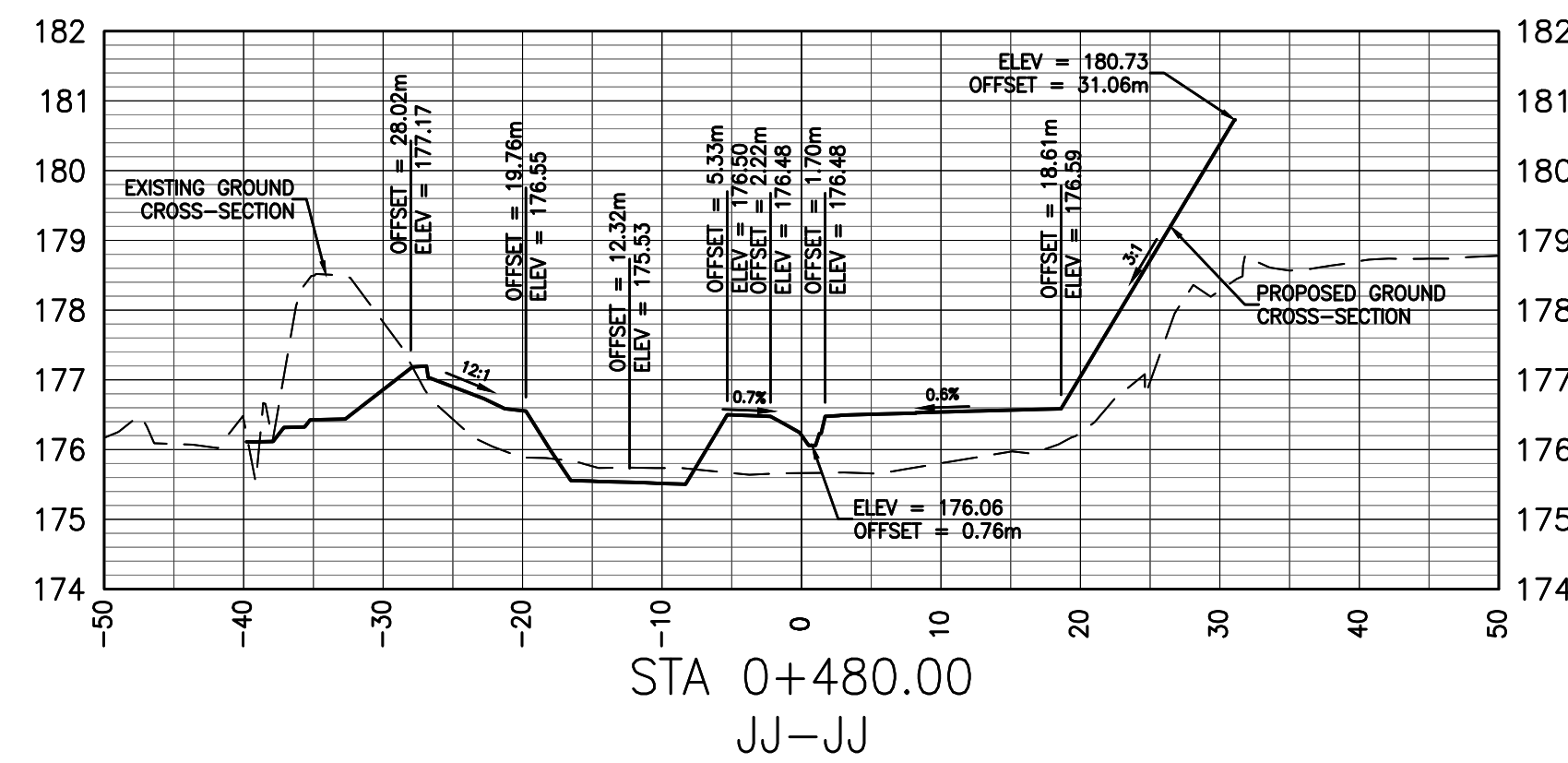
A map of the study area showing the location of the study site. The map includes a north arrow, a scale bar (0 to 1000 feet), and labels for 'DIXIE CREEK' and 'TREMAYNE ROAD'. The study site is marked with a star and labeled 'STUDY SITE'.

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		By	Dsgn.
			Appd.
			2021.07.30
			YYYY.MM.DD
Revision			
		By	Dsgn.
			Appd.
			2021.02.18
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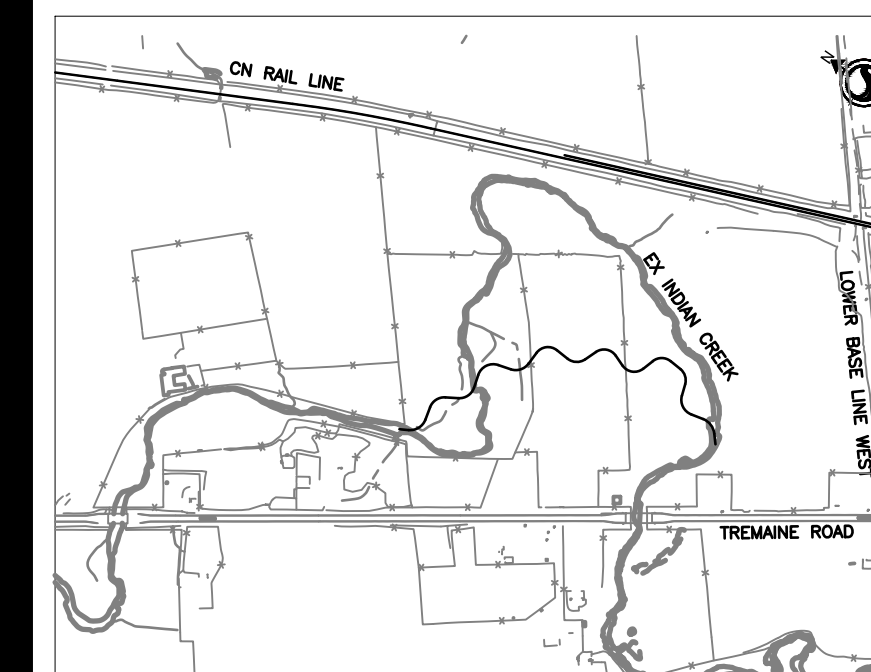
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Key Map NTS.



Legend

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Client/Project
CANADIAN NATIONAL RAILWAY

MILTON LOGISTICS HUB - NATURAL CHANNEL
DESIGN FOR INDIAN CREEK AND TRIBUTARY A

Milton, ON

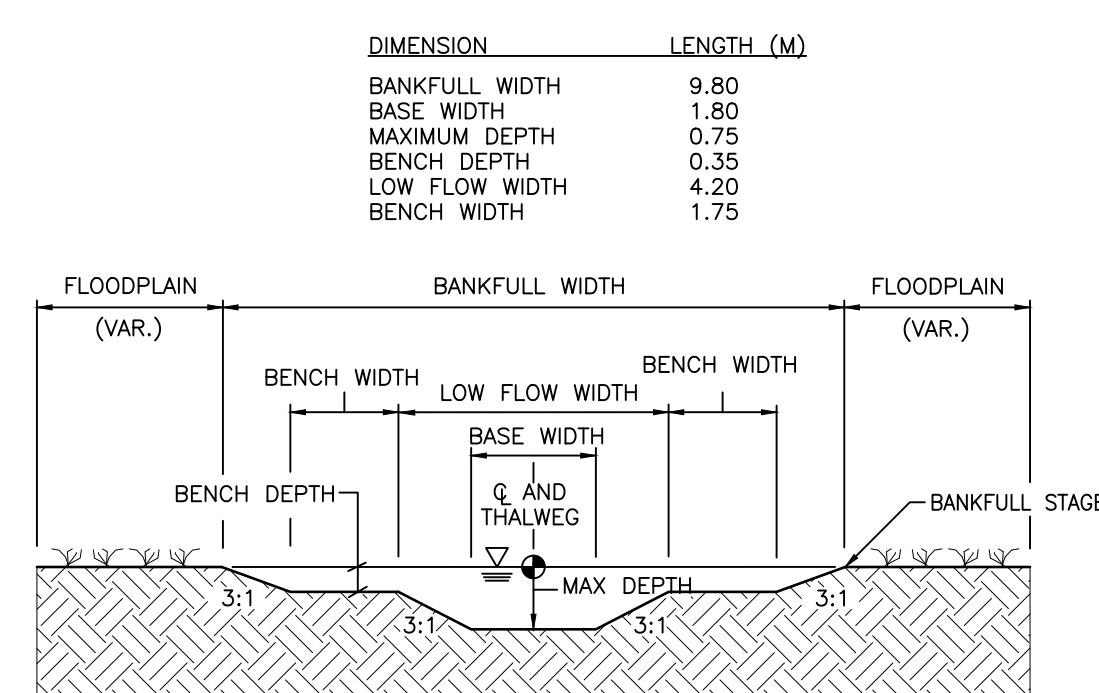
Title

INDIAN CREEK
CROSS SECTION LOCATIONS
AND TYPICAL CROSS SECTIONS

Project No. 160960844

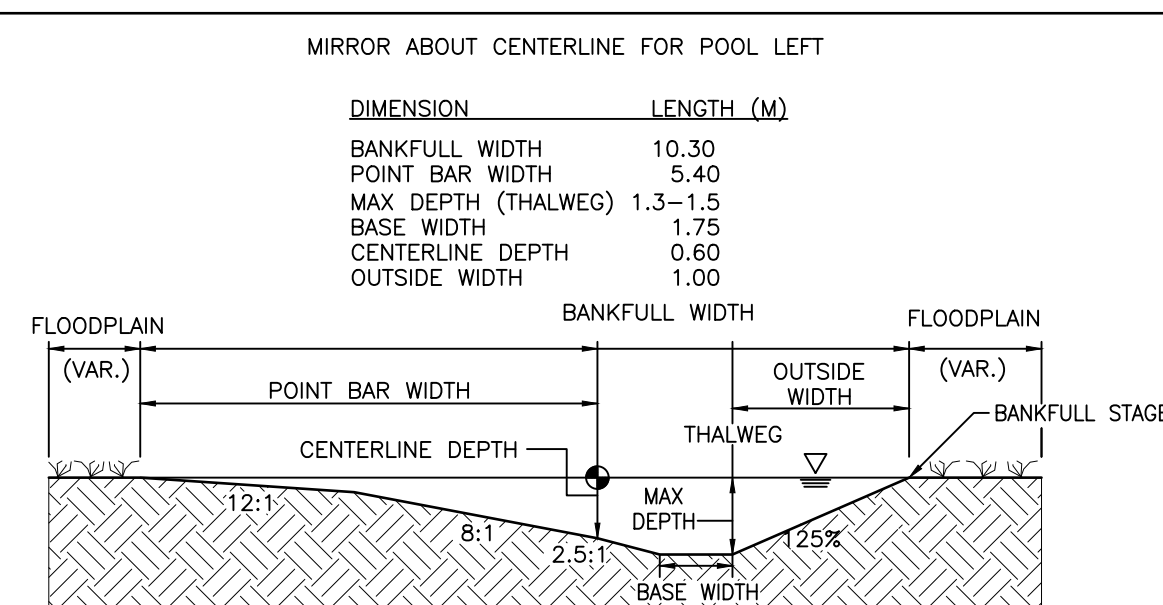
Scale 0 10 30 50
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Revision	Sheet	Drawing No.
0	19 of 29	01 C 703



NOTES: - ALL CROSS SECTIONS ARE SHOWN LOOKING IN THE DOWNSTREAM DIRECTION
 - - GRADE POINT IS THE CENTERLINE OF THE STREAM
 - ALL SHARP CORNERS SHOULD BE ROUNDED
 - RIFFLE BANKS TO BE STABILIZED WITH COIR MATTING OR WITH SOD MATS PER DETAIL

TYPICAL SECTION - RIFFLE



THALWEG (DEEPEST POINT IN A CROSS SECTION)
IS LOCATED IN OUTSIDE 1/3 OF BANKFULL
CHANNEL.

- NOTES: - ALL CROSS SECTIONS ARE SHOWN LOOKING IN THE DOWNSTREAM DIRECTION
 - GRADE POINT IS THE CENTERLINE OF THE STREAM
 - ALL SHARP CORNERS SHOULD BE ROUNDED
 - OUTSIDE OF THE MEANDER BEND WILL BE TREATED WITH WOODY DEBRIS TOE PROTECTION

TYPICAL SECTION - POOL RIGHT
N.T.S.

INDIAN CREEK RIFFLE SUBSTRATE	
MATRIX GRADATION	DIAMETER (mm)
D ₁₆	20
D ₃₀	90
D ₅₀	160
D ₈₄	180
D ₉₅	300
D ₁₀₀	400

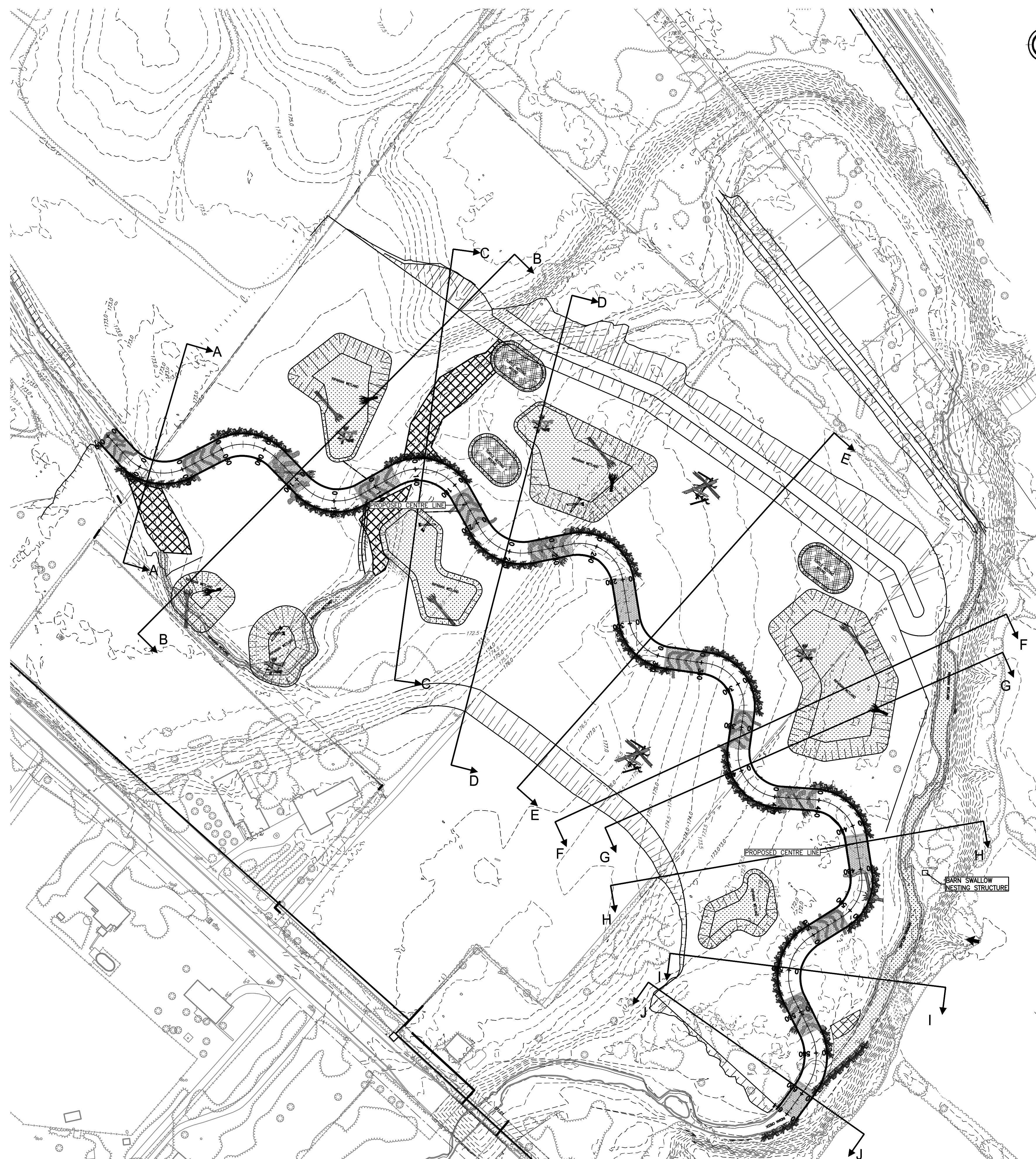
THE RIFFLE SUBSTRATE MATRIX SHALL BE PREPARED BY MIXING OR PLACING IN LAYERS SUCH THAT THE SMALLER MATERIAL FILLS THE VOIDS BETWEEN THE LARGER MATERIAL. RIFFLE SUBSTRATE SHALL BE PLACED 0.60m THICK AT ALL RIFFLES.

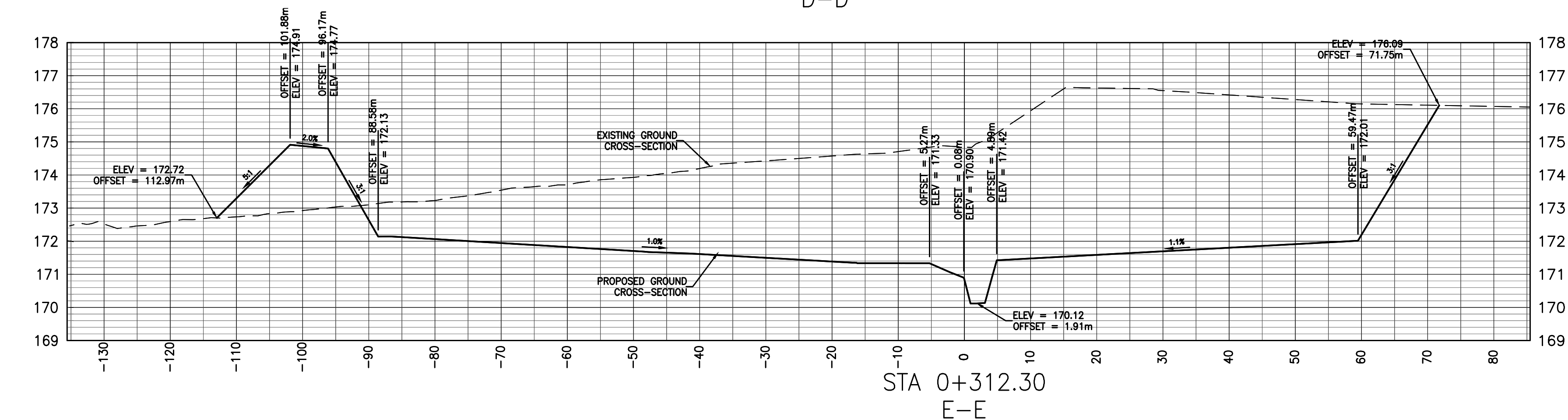
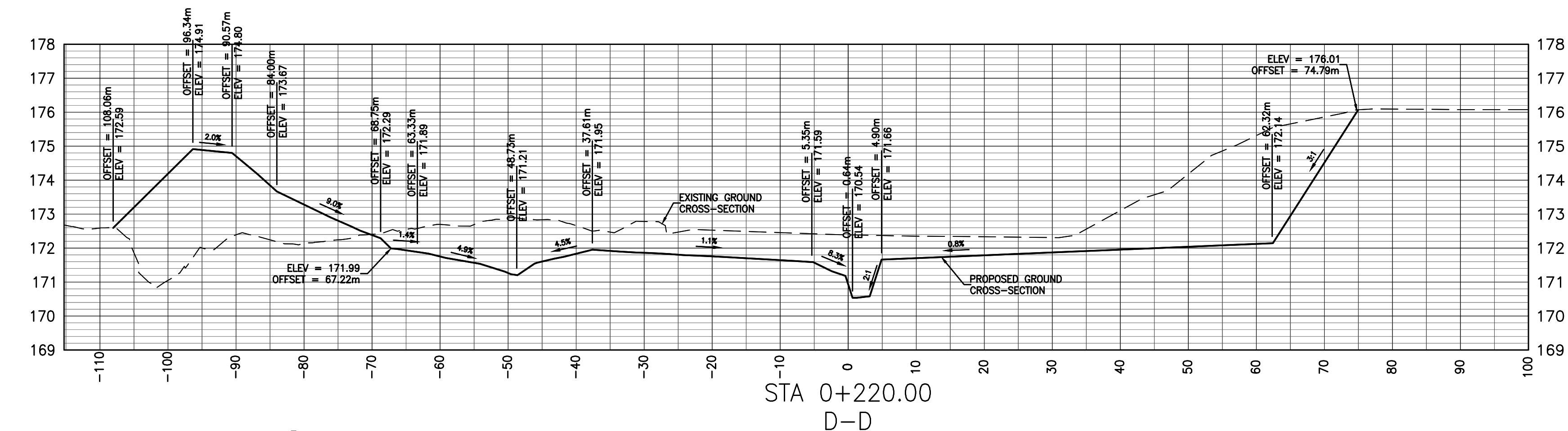
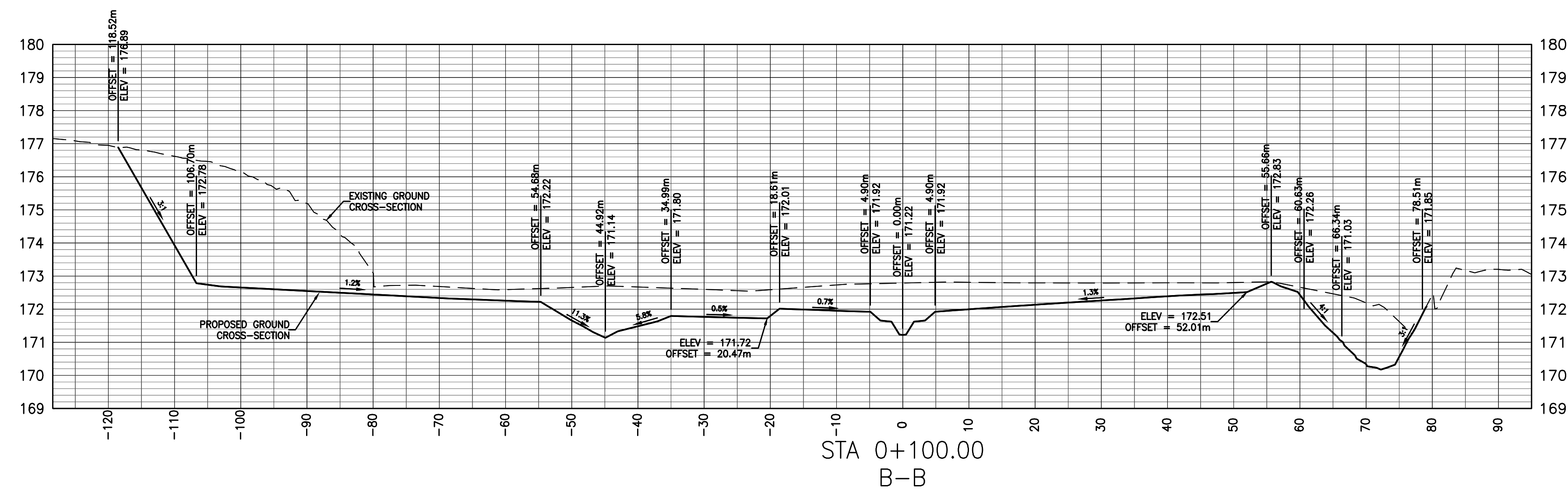
INDIAN CREEK	
SPAWNING SUBSTRATE	WELL GRADED SAND & GRAVEL 1-65mmø

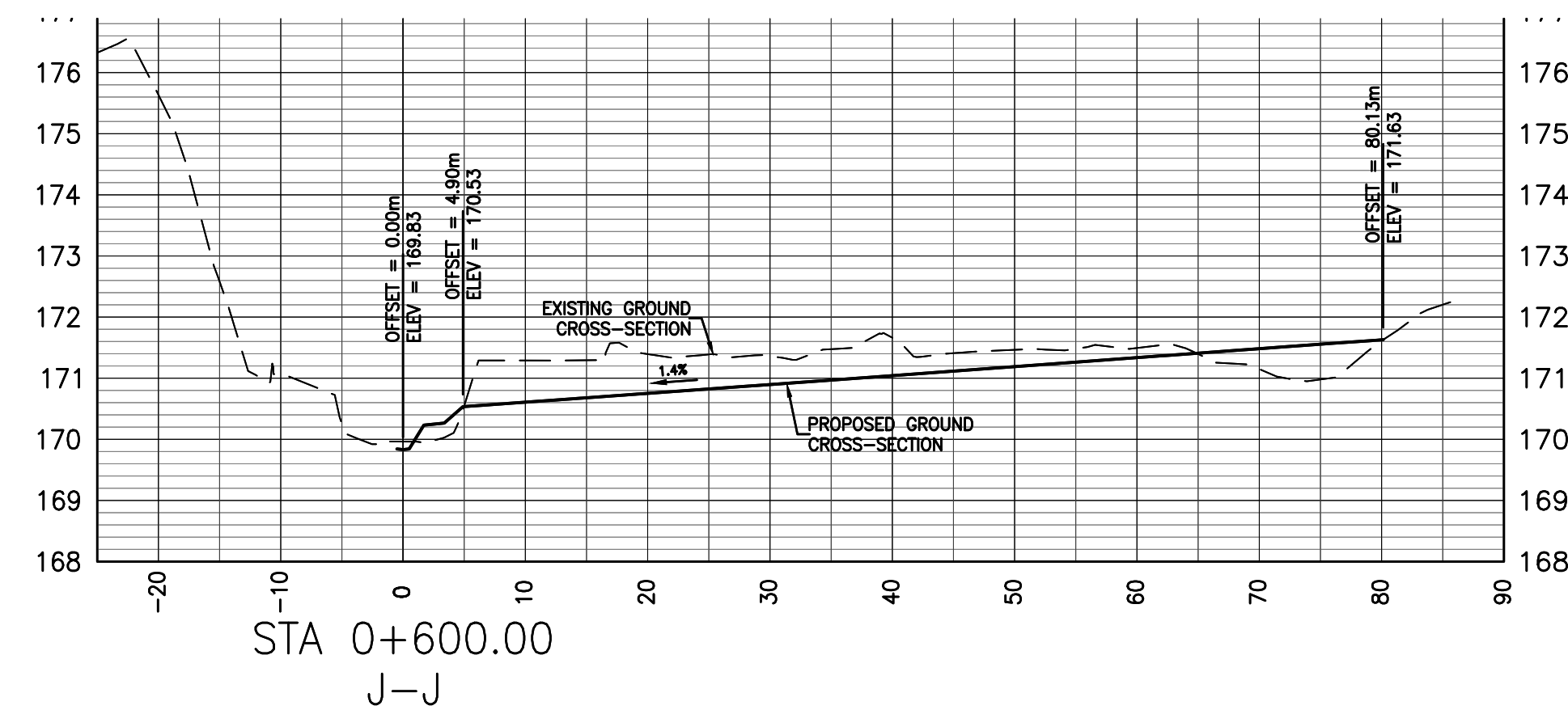
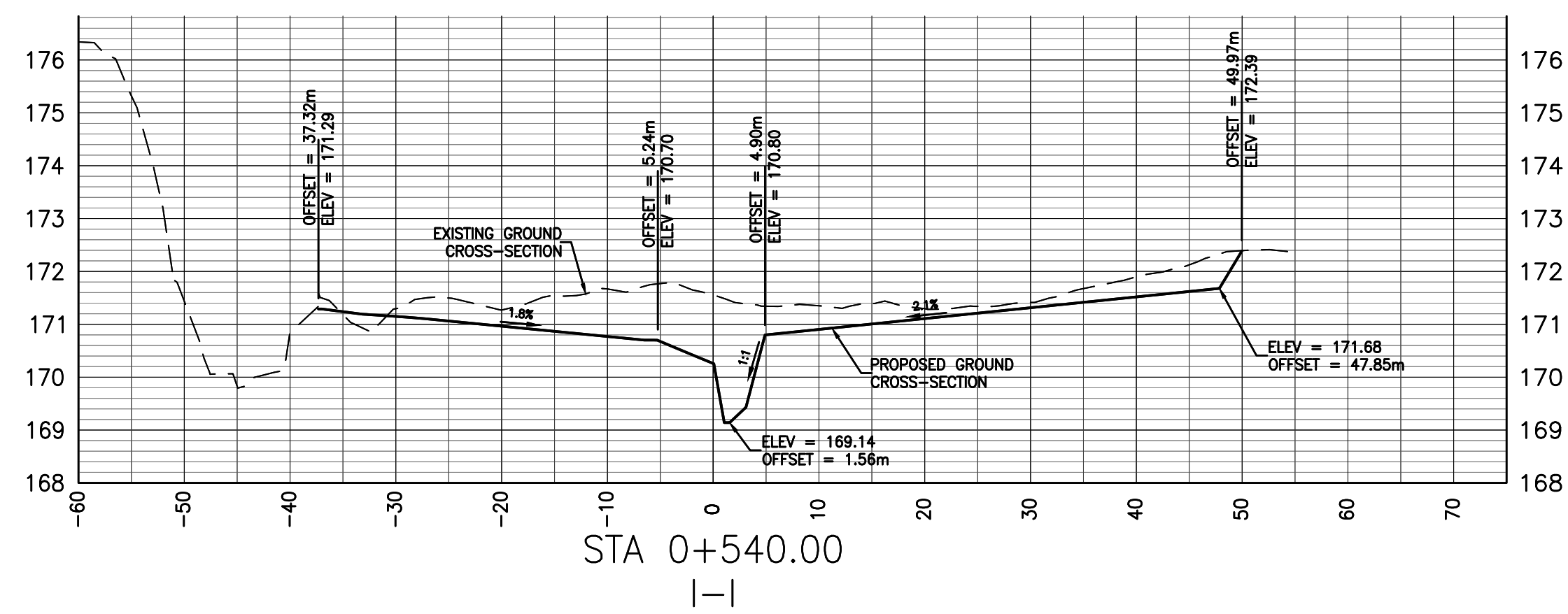
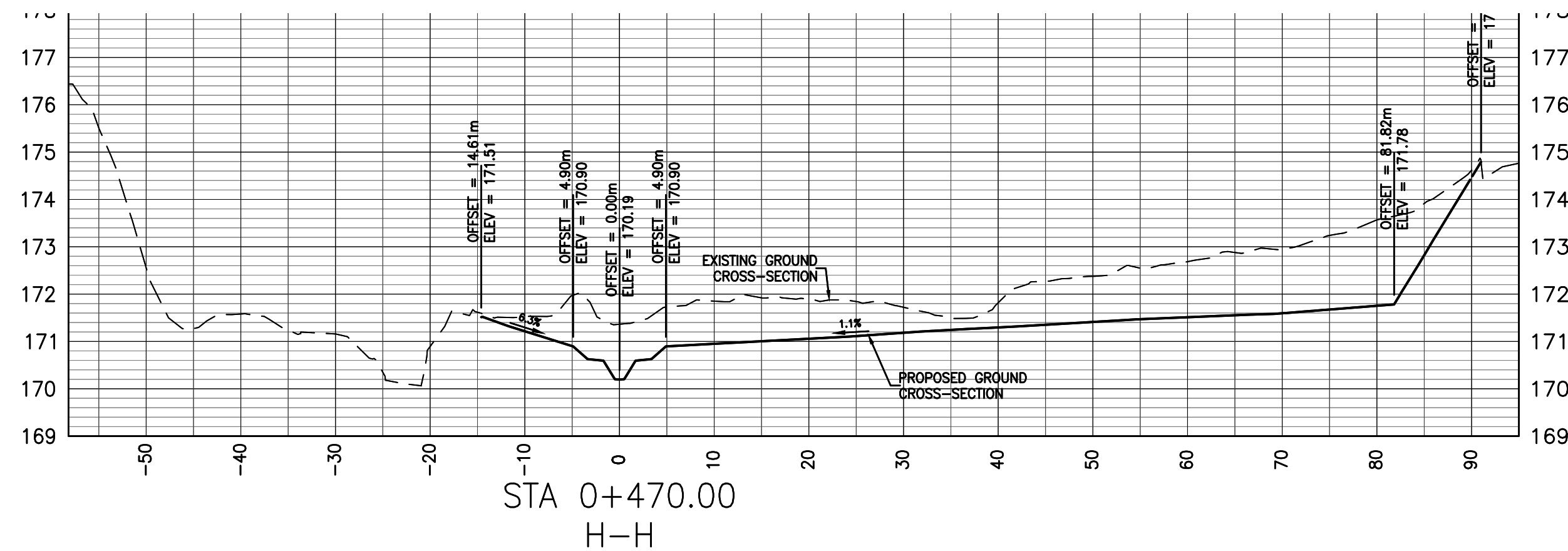
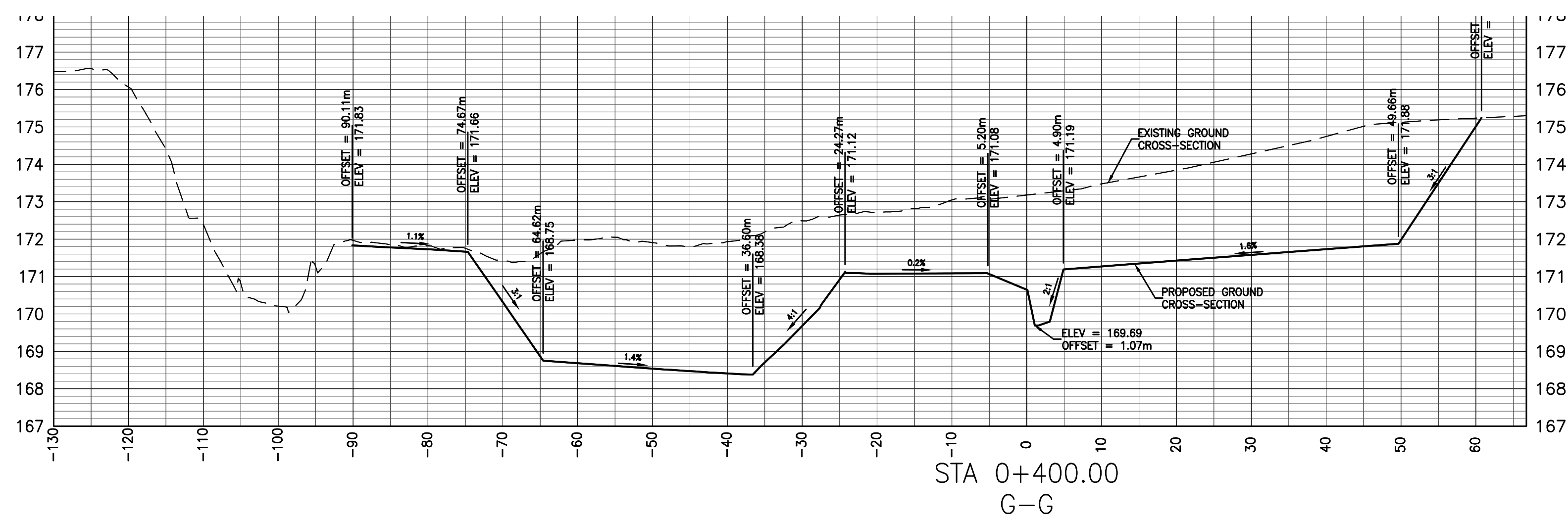
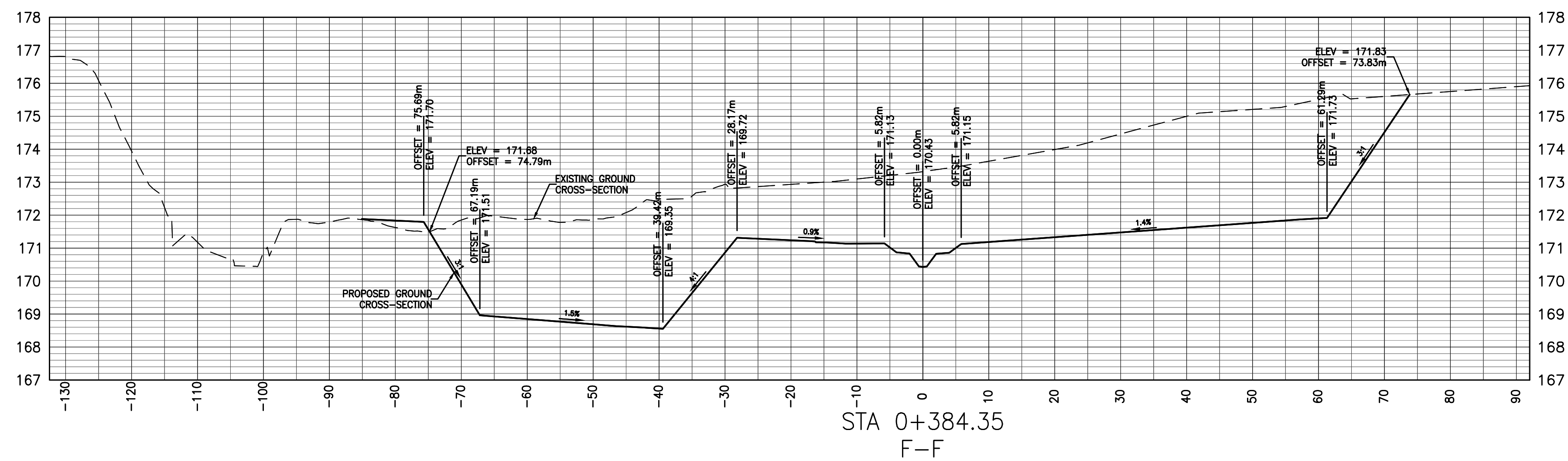
THE GLIDE MATRIX SHALL BE 1.0m LONG, FOR THE WIDTH OF THE LOW FLOW CHANNEL IN A 0.30m DEEP LAYER AT EACH GLIDE TO PROVIDE SPAWNING HABITAT.

INDIAN CREEK		
BOULDERS		
LENGTH m	WIDTH m	DEPTH m
0.60	0.40	0.40

BOULDERS WITH A MINIMUM DIMENSION OF 0.40m(W)x0.40m(D)x0.60m(L) SHALL BE INDIVIDUALLY SELECTED FOR USE IN THE STRUCTURES. BOULDERS SHALL BE RELATIVELY FLAT ON EITHER SIDE IN THE SAME DIMENSION ESPECIALLY THE LONG DIMENSION.







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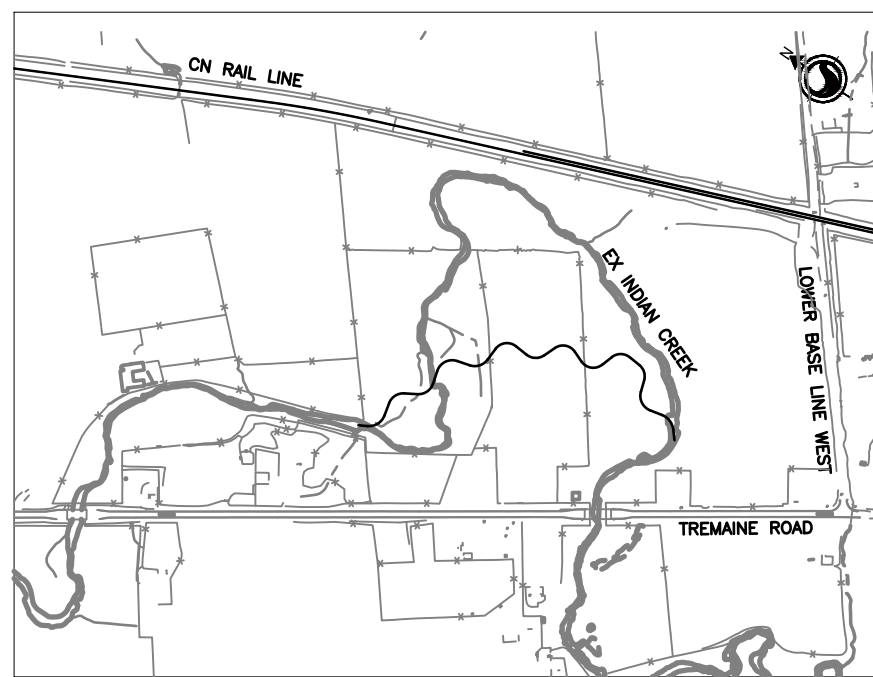
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Key Map NTS



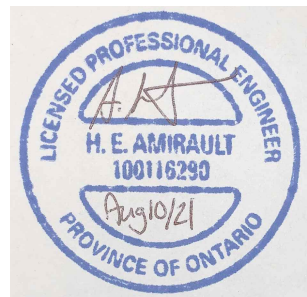
Legends

NOTE: SECTIONS FACING DOWNSTREAM

[illegible]

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Client/Project
CANADIAN NATIONAL RAILWAY

MILTON LOGISTICS HUB - NATURAL CHANNEL
DESIGN FOR INDIAN CREEK AND TRIBUTARY A

Milton, ON

Title
INDIAN CREEK
SECTIONS F-F TO J-J

Project No.
160960844

Scale
1:500H 0 5 15 25
1:100V 0 1 3 5m

Revision	Sheet	Drawing No.
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01-C-705



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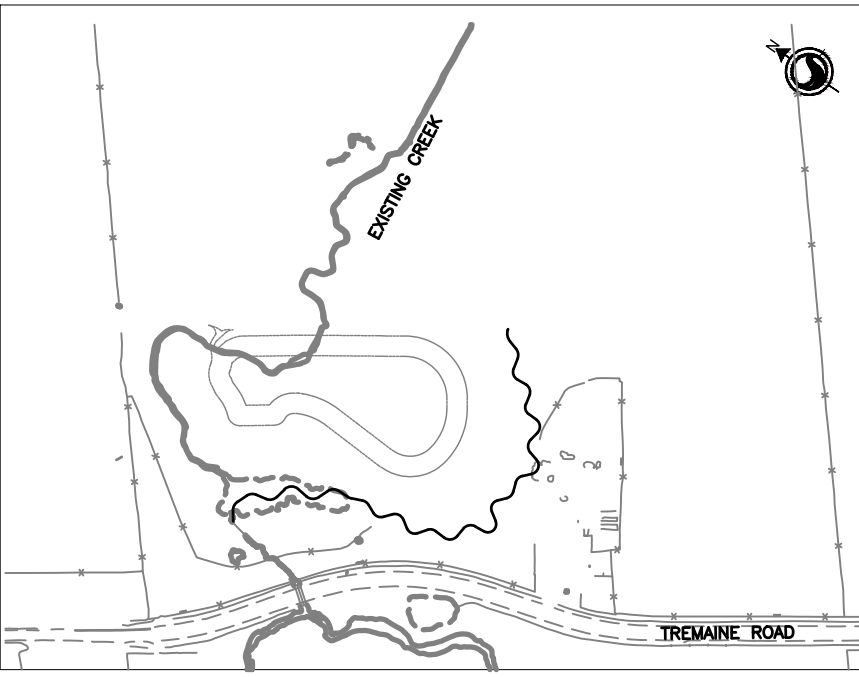
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Key Map NTS.



Legend

- TREE REMOVAL AREA
- TREE REMOVAL

CHANNEL REALIGNMENT

TO MINIMIZE IN-WATER WORK, THE CHANNEL WILL BE MOSTLY CONSTRUCTED OFFLINE. THE SECTIONS OF THE REALIGNMENT NOT IN CONTACT WITH THE EXISTING CHANNEL WILL BE CONSTRUCTED FIRST, FOLLOWED BY POINTS OF CONTACT WITH THE EXISTING CHANNEL MOVING FROM DOWNSTREAM TO UPSTREAM.

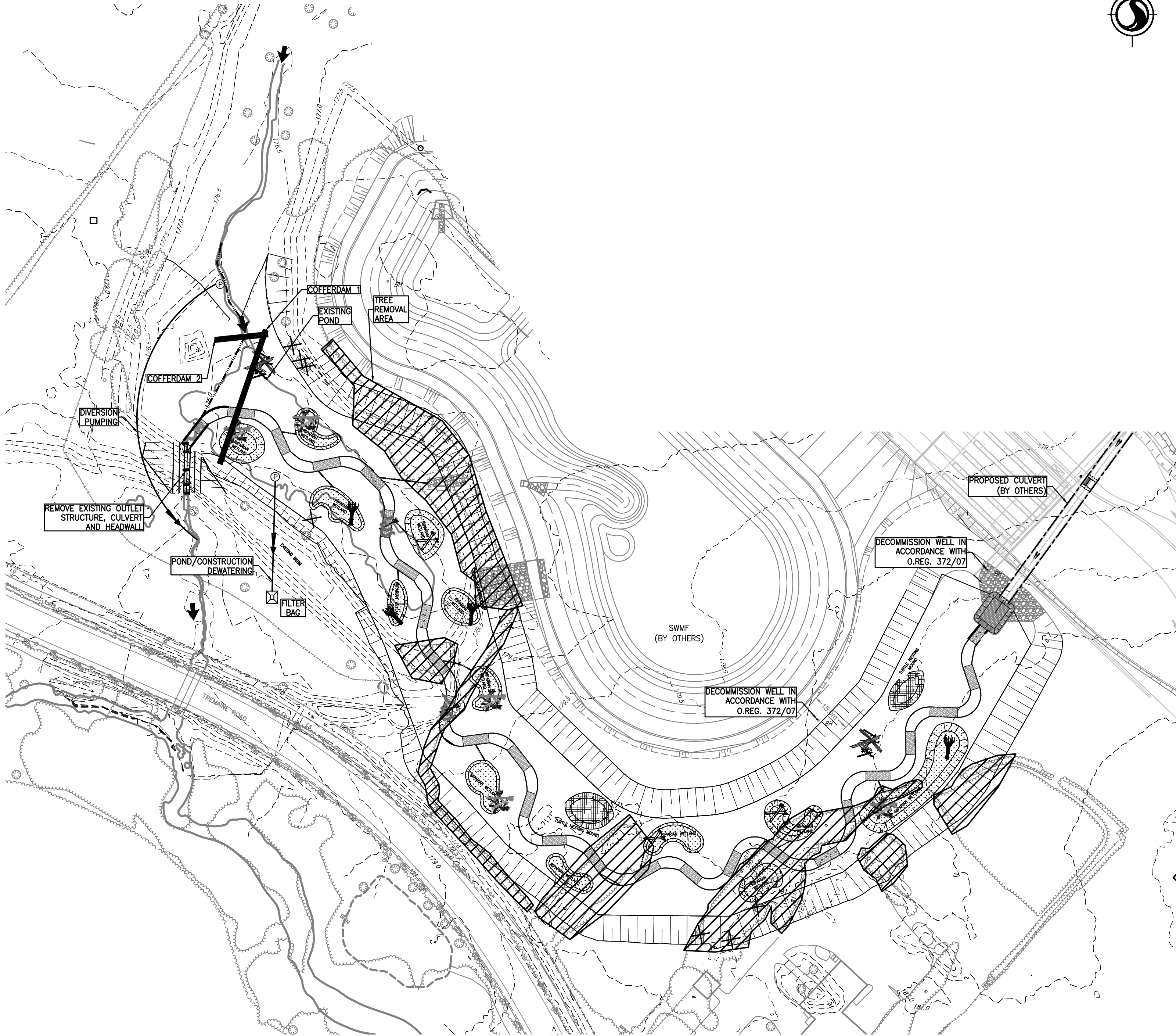
PHASE 1 - TRIBUTARY A REALIGNMENT

FLOW THROUGH EXISTING CHANNEL WILL CONTINUE. SINCE A PORTION OF THE REALIGNED CHANNEL WILL BE CONSTRUCTED WITHIN THE FOOTPRINT OF THE EXISTING AGRICULTURAL POND, COFFERDAM 1 TO BE INSTALLED TO ISOLATE THE POND ALLOWING IT TO BE DEWATERED. FISH RESCUE TO TAKE PLACE WITHIN POND PRIOR TO DEWATERING.

PHASE 2 - DOWNSTREAM TIE-IN

COFFERDAM 2 TO BE INSTALLED UPSTREAM OF THE TIE-IN LOCATION. FLOWS WILL BE PUMPED DOWNSTREAM OF THE BERM, ALLOWING FOR THE BREACH OF BERM AND TIE-IN TO THE EXISTING WATERCOURSE. COFFERDAM 1 TO BE REMOVED ONCE WATERCOURSE DIVERSION PUMPING IS IN PLACE. COFFERDAM 2 TO BE REMOVED AFTER TIE-IN CONSTRUCTION, BERM BREACH, AND STABILIZATION IS COMPLETE. FLOW WILL CONTINUE IN EXISTING CHANNEL UNTIL NEW CHANNEL IS ACTIVATED.

CONTRACTOR TO COORDINATE CULVERT TIE IN WITH CN



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Revision By Appd YYYY-MM-DD

File Name: 160960844_C-950CT Dwn. Chkd. Dgnr. 2021.01.25 YY-MM-DD

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Client/Project
CANADIAN NATIONAL RAILWAY

MILTON LOGISTICS HUB - NATURAL CHANNEL
DESIGN FOR INDIAN CREEK AND TRIBUTARY A

Milton, ON

Title
TRIBUTARY A
CONSTRUCTION PHASING/REMOVALS PLAN

Project No. 160960844 Scale 1:1000 0 10 30 50m

Revision 0 Sheet 22 of 29 Drawing No.


01-C-950




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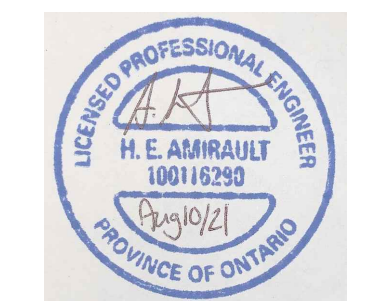
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 TREE REMOVAL AREA

 SITE ISOLATION

0	ISSUED FOR CONSTRUCTION	HA	HA
			2021.07.30
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			YYYY.MM.DD
File Name: 160960844_C-951 CT			2021.03.09
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Milton, ON

Project No.
160960844

Scale 0 10 30 50
1:1000

Revision	Sheet	Drawing No.
0	23 of 29	01 C 951

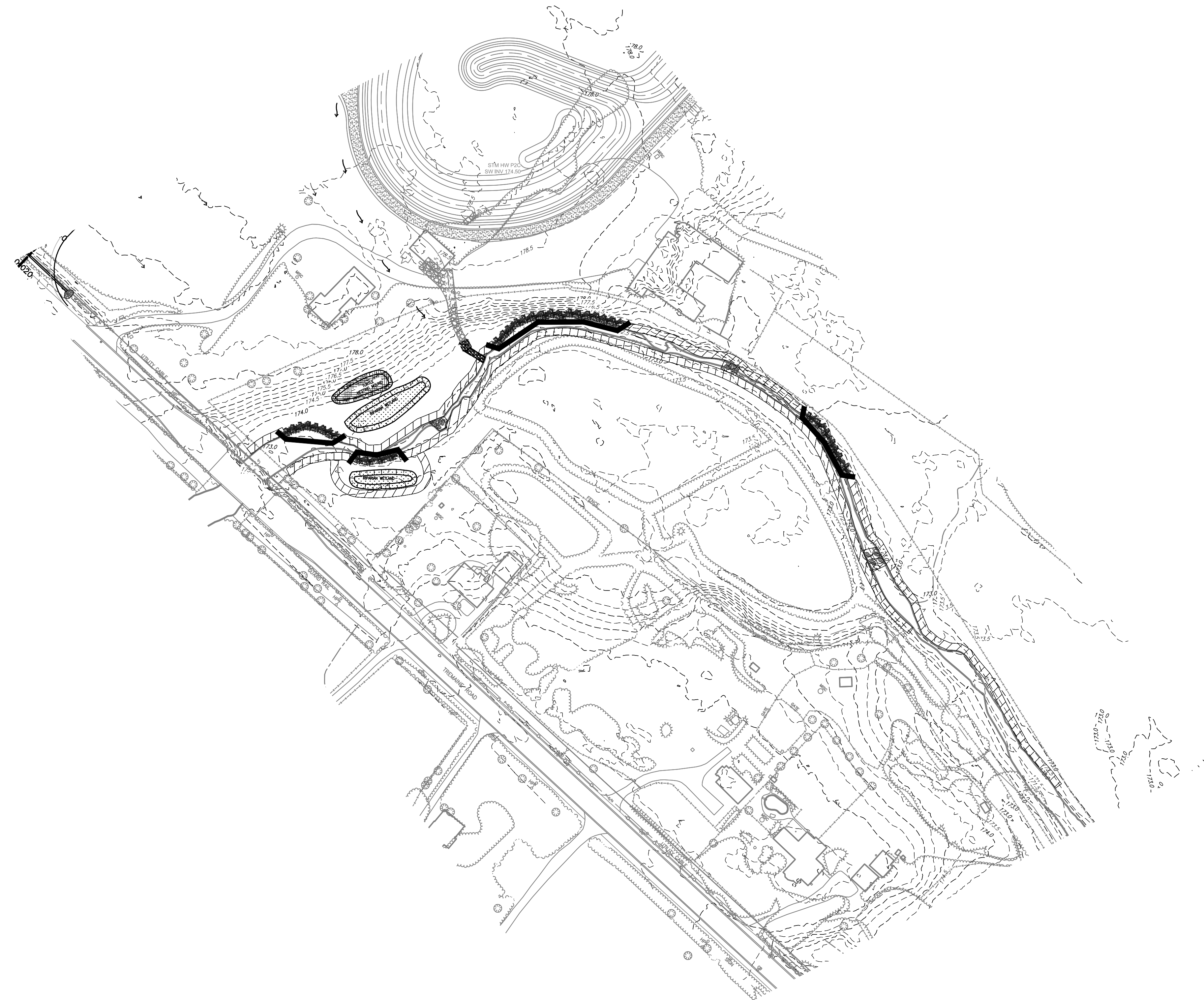
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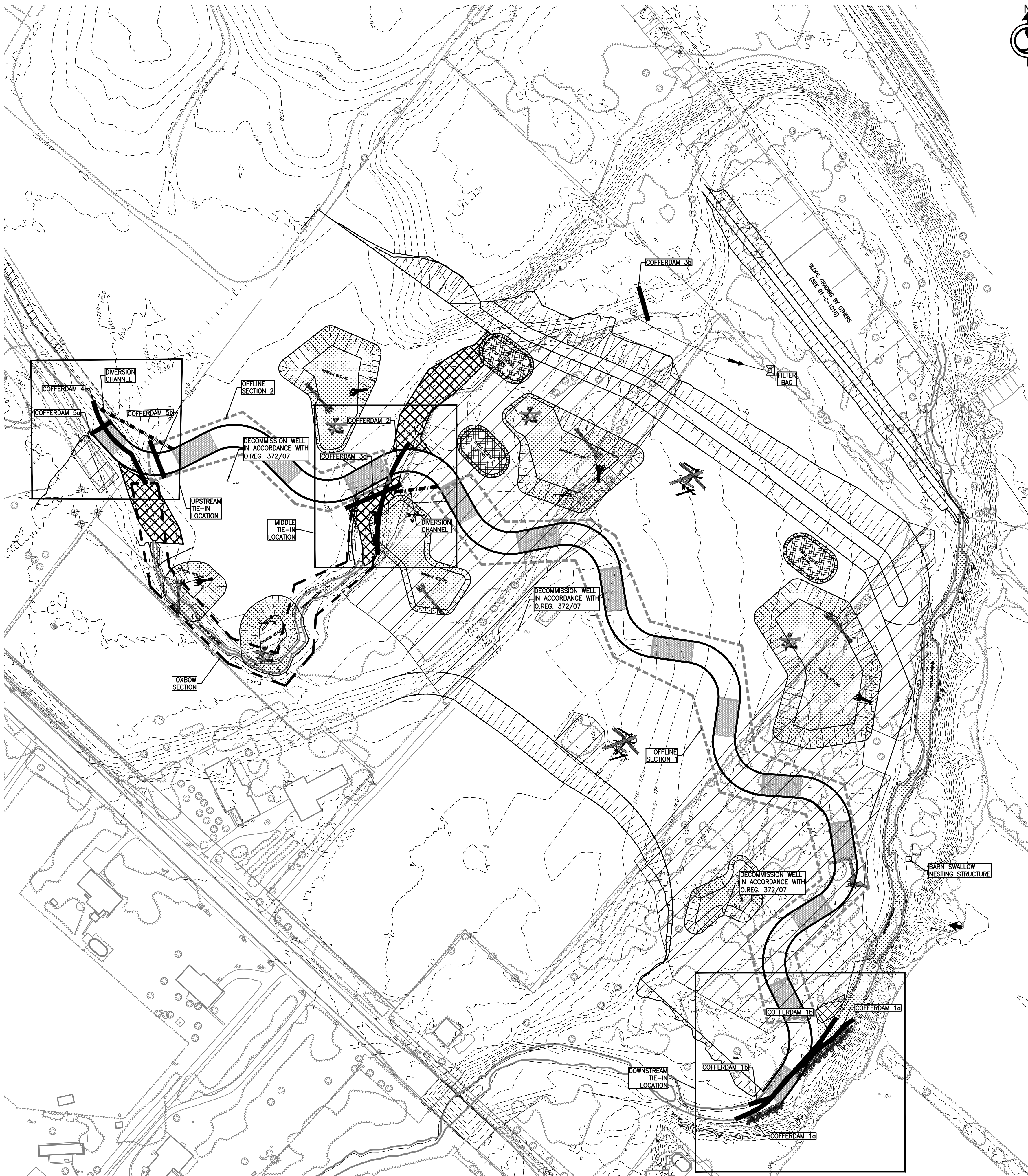


ENHANCEMENT STRUCTURES WILL BE CONSTRUCTED IN THE UPSTREAM SECTION OF INDIAN CREEK (IMMEDIATELY DOWNSTREAM OF TREMAINE ROAD). ENHANCEMENTS INCLUDING RIPARIAN WETLANDS AND TURTLE NESTING BEDS WILL BE CONSTRUCTED OUTSIDE OF THE EXISTING CHANNEL. CHANNEL ENHANCEMENTS WITHIN THE CHANNEL WILL INCLUDE BOULDER CLUSTERS AND WOODY DEBRIS TOE PROTECTION.

TO BE INSTALLED IN THE WET AS THE IMPACT OF CONSTRUCTING A COFFERDAM WILL BE GREATER THAN THE INSTALLATION OF THE BOULDER CLUSTER. BOULDERS AND GLIDE SUBSTRATE TO BE PLACED USING EQUIPMENT FROM THE CHANNEL BANKS. BOULDERS AND GLIDE SUBSTRATE TO BE CLEAN AND FREE OF FINES. IF TURBIDITY IS NOTED CONSTRUCTION TO BE PAUSED UNTIL WATER IS VISIBLY CLEAR.

THE WOODY DEBRIS TOE PROTECTION MAY BE INSTALLED IN THE WET OR IN THE DRY. EACH BANK THAT THE ENHANCEMENT IS TO BE INSTALLED ALONG WILL BE ISOLATED BY EITHER A TURBIDITY CURTAIN (WET) OR COFFERDAM (DRY). A FISH RESCUE WILL BE PERFORMED WITHIN THE ISOLATED AREA PRIOR TO CONSTRUCTION. AFTER CONSTRUCTION AND THE BANK HAS BEEN STABILIZED, THE COFFERDAM OR TURBIDITY CURTAIN WILL BE REMOVED.





CHANNEL REALIGNMENT

TO MINIMIZE IN-WATER WORK, THE CHANNEL WILL BE MOSTLY CONSTRUCTED OFFLINE. THE SECTIONS OF THE REALIGNMENT NOT IN CONTACT WITH THE EXISTING CHANNEL WILL BE CONSTRUCTED FIRST, FOLLOWED BY POINTS OF CONTACT WITH THE EXISTING CHANNEL MOVING FROM DOWNSTREAM TO UPSTREAM.

PHASE 1 - OFFLINE REALIGNMENT CONSTRUCTION

OFFLINE CHANNEL SECTIONS 1 AND 2 WILL BE COMPLETED

PHASE 2 - DOWNSTREAM TIE-IN LOCATION

COFFERDAM 1A TO BE INSTALLED TO ISOLATE THE LEFT BANK OF THE EXISTING CHANNEL WHERE THE DOWNSTREAM END OF THE REALIGNMENT TIES INTO THE EXISTING CHANNEL. WOODY DEBRIS TOE PROTECTION TO BE CONSTRUCTED. LEFT HALF OF THE MOST DOWNSTREAM RIFFLE TO BE CONSTRUCTED. ONCE THIS CONSTRUCTION IS COMPLETE AND BANKS ARE STABILIZED, COFFERDAM 1A MAY BE REMOVED. COFFERDAM 1B WILL THEN BE INSTALLED TO ISOLATE THE RIGHT BANK OF THE EXISTING CHANNEL. RIGHT BANK OF EXISTING CHANNEL TO BE REMOVED TO ALLOW FOR THE CONSTRUCTION OF THE DOWNSTREAM CONFLUENCE. RIGHT HALF OF THE MOST DOWNSTREAM RIFFLE TO BE CONSTRUCTED. ONCE CONSTRUCTION IS COMPLETE AND BANKS ARE STABILIZED, COFFERDAM 1B MAY BE REMOVED.

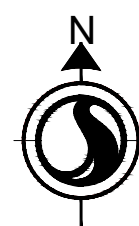
PHASE 3 - MIDDLE TIE-IN LOCATION (DOWNSTREAM OF OXBOW)

INSTALL BARRIER NETS AND PERFORM FISH RESCUE IN EXISTING CHANNEL BETWEEN DOWNSTREAM AND MIDDLE TIE IN LOCATIONS.

COFFERDAM 2 TO BE INSTALLED TO ISOLATE THE RIGHT BANK, ALLOWING FOR THE CONSTRUCTION OF A TEMPORARY DIVERSION CHANNEL. COFFER DAM 2 TO BE SLOWLY REMOVED TO ALLOW FLOWS INTO THE DIVERSION. COFFERDAMS 3A AND 3B TO BE INSTALLED TO BLOCK FLOWS TO THE EXISTING CHANNEL. FISH RESCUES TO BE PERFORMED AS REQUIRED WHILE WATER LEVELS DECREASE IN THE EXISTING CHANNEL AREA BETWEEN COFFERDAMS 3A AND 3B TO BE DEWATERED TO ALLOW FOR TIE-IN CONSTRUCTION, FILLING OF THE OLD CHANNEL ON THE NORTH SIDE OF THE STREAM, AND CONSTRUCTION OF THE FLOODPLAIN BERM. AFTER THESE AREAS ARE STABILIZED, COFFERDAMS 3A AND 3B MAY BE REMOVED AND DIVERSION CHANNEL FILLED AND RESTORED.

PHASE 4 - UPSTREAM TIE-IN LOCATION

COFFERDAM 4 TO BE INSTALLED TO ISOLATE THE LEFT BANK, ALLOWING FOR THE CONSTRUCTION OF A TEMPORARY DIVERSION CHANNEL. COFFERDAM 4 TO BE SLOWLY REMOVED TO ALLOW FLOWS INTO THE DIVERSION. COFFERDAMS 5A AND 5B TO BE INSTALLED BLOCKING FLOWS TO THE OXBOW SECTION. FISH RESCUE TO OCCUR IN THE OXBOW SECTION. OXBOW SECTION TO BE DEWATERED TO ALLOW FOR CONSTRUCTION OF THE UPSTREAM TIE-IN WITH THE NEW CHANNEL. OXBOW PLUGS AND ENHANCEMENTS. AFTER THESE AREAS ARE CONSTRUCTED AND STABILIZED, COFFERDAMS 5A AND 5B CAN BE REMOVED AND THE DIVERSION CHANNEL FILLED AND RESTORED.



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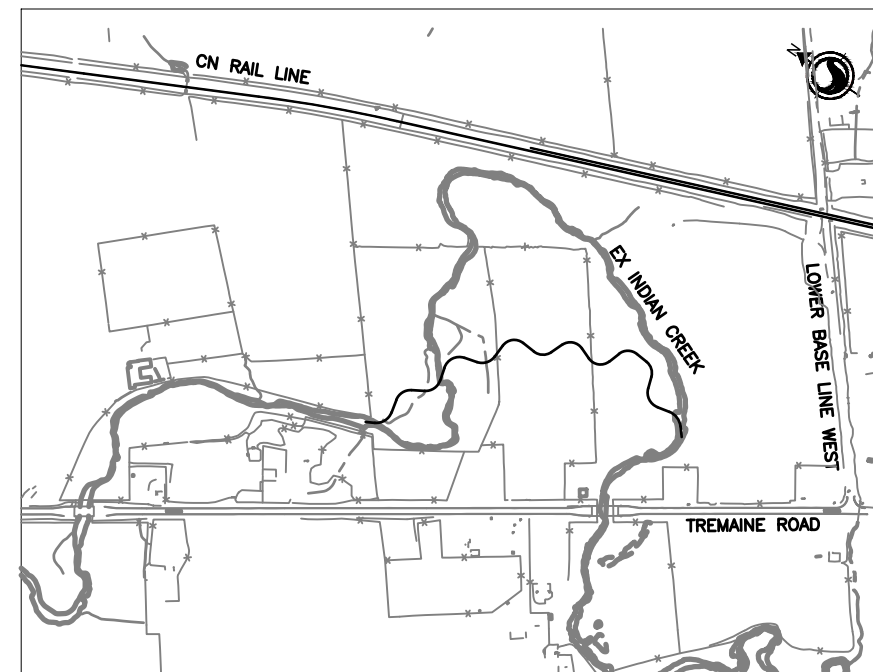
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Notes

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PROJECTION: UNIVERSAL TRANSVERSE MERCATOR
(UTM, ZONE 17, CMB100W)
DATUM: NAD 83 (CSRS)
- ORIGINAL GROUND TOPOGRAPHY BASED ON LIDAR SURVEY RECEIVED (NOV. 2014) AND SUPPLEMENTED BY STANTEC CONSULTING (MAY 2014, AUG. 2014 & JUNE 2015)

Key Map NTS.



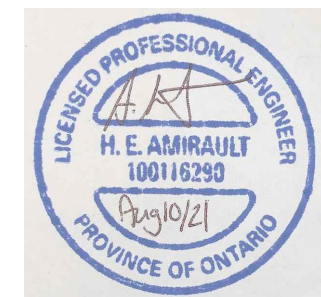
Legend

- TREE REMOVAL AREA
- TREE REMOVAL
- COFFERDAM
- DIVERSION CHANNEL

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Client/Project
CANADIAN NATIONAL RAILWAY

MILTON LOGISTICS HUB - NATURAL CHANNEL
DESIGN FOR INDIAN CREEK AND TRIBUTARY A

Milton, ON

Title
INDIAN CREEK
CONSTRUCTION PHASING/REMOVALS PLAN

Project No.
160960844

Scale
1:1000

Revision
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Sheet
24 of 29

Drawing No.
01-C-952



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Notes

- Key Map NTS.



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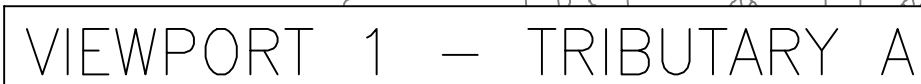
File Name: 160960844_L-300-PLANTING	MALM	HS	HS	2021.02.19
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Revision	Sheet	Drawing No.
0	25 of 29	01-L-300

01-L-300



PLANTING NOTES:

- ZONE 1: CHANNEL RIPARIAN (LOW FLOW CHANNEL TO 2 M ABOVE TOP OF BANK)**
- APPLY SEED MIX # 1 AND SEED MIX # 4 SIMULTANEOUSLY PER NOTES AND SCHEDULE (L-501)
 - PLANT LIVE STAKES FROM PLANT LIST (L-501) AT AN OVERALL DENSITY OF 4/m² WHERE TOE PROTECTION IS INSTALLED AND 7/10 M² ELSEWHERE ALONG CHANNEL. REFER TO DETAILS LD7 AND LD8 (L-500).
 - PLANT AT PERCENTAGES SHOWN IN PLANT LIST WITH SPECIES INTER-MIXED.

ZONE 2: FLOODPLAIN

- APPLY SEED MIX # 2 AND SEED MIX # 4 SIMULTANEOUSLY PER NOTES AND SCHEDULE (L-501)
- PLANT WITH TREES AND SHRUBS FROM PLANT LIST (L-501) IN CLUSTERS OF 10 TREES AND 25 SHRUBS. PLANT AT A DENSITY OF ONE CLUSTER PER 2000 m².
- PLANT FLOODPLAIN WITH MILKWEED PLUGS FROM PLANT LIST (L-501) IN CLUSTERS OF 72 PLUGS. PLANT AT A DENSITY OF ONE CLUSTER PER 500 m².
- PLANT AT PERCENTAGES SHOWN IN PLANT LIST WITH SPECIES INTER-MIXED.

ZONE 3: UPLAND (VALLEY WALLS AND OTHER DISTURBED UPLANDS)

- APPLY SEED MIX # 3 AND SEED MIX # 4 SIMULTANEOUSLY PER NOTES AND SCHEDULE (L-501)
- PLANT WITH TREES AND SHRUBS FROM PLANT LIST (L-501) IN CLUSTERS OF 10 TREES AND 25 SHRUBS. PLANT AT A DENSITY OF ONE CLUSTER PER 2000 m².
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- PLANT AT PERCENTAGES SHOWN IN PLANT LIST WITH SPECIES INTER-MIXED.

ZONE 4: RIPARIAN WETLANDS

- APPLY SEED MIX # 1 AND SEED MIX # 4 SIMULTANEOUSLY PER NOTES AND SCHEDULE (L-501)
- PLANT LIVE STAKES FROM PLANT LIST (L-501) IN A 2M BAND AROUND THE OUTSIDE PERIMETER OF THE WETLAND AT AN OVERALL DENSITY OF 4/m². REFER TO DETAILS LD7 AND LD8 (L-500).
- PLANT RIPARIAN WETLANDS WITH WETLAND PLUGS FROM PLANT LIST (L-501). PLANT AT A DENSITY OF 4/m² IN A 2 m band AROUND THE INSIDE PERIMETER OF THE WETLAND.
- PLANT AT PERCENTAGES SHOWN IN PLANT LIST WITH SPECIES INTER-MIXED.

ZONE 5: OTHER DISTURBED UPLANDS (NOT SHOWN ON PLAN)

- APPLY SEED MIX # 3 AND SEED MIX # 4 SIMULTANEOUSLY PER NOTES AND SCHEDULE [L-501] TO DISTURBED AREAS WITHIN ZONE 5.
- PLANT WITH TREES AND SHRUBS FROM PLANT LIST [L-501] IN CLUSTERS OF 10 TREES AND 25 SHRUBS. PLANT AT A DENSITY OF ONE CLUSTER PER 2000 m².
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ZONE 6: ADDITIONAL MONARCH ENHANCEMENT AREAS

- THIS PLANTING ZONE APPLIES TO UPLAND AREAS UNDISTURBED BY CONSTRUCTION (I.E., NO EXPOSED SOIL). DISTURBED UPLANDS WHICH OVERLAP WITH ZONE 6 SHOULD BE PLANTED ACCORDING TO ZONE 5 PLANTING NOTES.
- IN UNDISTURBED UPLANDS (MEADOW), PREPARE 10 PLOTS AT 500 m² EACH (22 m X 22 m OR 13 m RADIUS) BY APPLYING A NON-SELECTIVE HERBICIDE IN ACCORDANCE WITH AN APPLICABLE REGULATIONS AND TILLING OR DISCING TO REMOVE THE THATCH LAYER.
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OVERLAND FLOW
REFER TO AECOM
DRAWINGS FOR DETAILS

EX. CREEK
TO REMAIN
(DRAINAGE
SWALE
BY OTHERS)

OVERLAND FLOW OUTLET
(SEE OUTLET CHANNEL
DETAIL)

MERGE EX.
 FLOOD PLAIN
 INTO PROPOSED

EX. ~ 3.0m
HIGH BERM

BREACH EXISTING BERM. AS PER
DETAIL ON DRAWING C-503

TIE BERM BREACH INTO
EXISTING WATERCOURSE

OUTLET FROM SWMF-BY OTHERS
(SEE AECOM DRAWINGS
FOR DETAILS)

OVERFLOW SPILLWAY FROM SWMF-BY OTHER
(SEE AECOM DRAWINGS FOR DETAILS)

SWMF
(PLANTING P
BY OTHER

SWMF (SEE AECOM
DRAWINGS FOR DETAILS)

APPROX. CULVERT
LOCATION (SEE AECOM
DRAWINGS FOR DETAILS)

PLUNGE POOL

3:1 TO
EXISTING

3:1 TO
EXISTING



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Notes

- Key Map NTS.



- NOTES:
1. ZONE 1

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File Name: 160960844_L-310-PLANTING	MALM	HS	HS	2021.02.19
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OALS
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K009-60844
MEMBER

Milton, ON

Revision	Sheet	Drawing No.
0	26 of 29	01-1-310

01-L-310



PLANTING NOTES:

- ZONE 2: FLOODPLAIN
APPLY SEED MIX #

- ZONE 3: UPLAND (VALLEY WALLS AND OTHER DISTURBED UPLANDS)
APPLY SEED MIX # 2 AND SEED MIX # 4 SIMULTANEOUSLY PER

- ZONE 4: RIPARIAN WETLANDS
APPLY SEED MIX #1 AND

- ZONE 5: OTHER DISTURBED UPLANDS (NOT SHOWN ON PLAN)

- ZONE 6: ADDITIONAL MONARCH ENHANCEMENT AREAS

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MATCH LINE: REFER TO SHEET L-311 (VIEWPORT 3)

INDIAN CREEK ENHANCEMENT

PLANTING NOTES:

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MATCH LINE: REFER TO SHEET L-310 (VIEWPORT 2)

VIEWPORT 3 – INDIAN CREEK ENHANCEMENT

INDIAN CREEK REALIGNMENT



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Waterloo ON N2L 0A4
Tel: (519) 579-4410
www.stantec.com

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PROJECTION: UNIVERSAL TRANSVERSE MERCATOR
(UTM, ZONE 17, CMB100W)
DATUM: NAD 83 (CSRS)
- ORIGINAL GROUND TOPOGRAPHY BASED ON LIDAR SURVEY RECEIVED (NOV. 2014) AND SUPPLEMENTED BY STANTEC CONSULTING (MAY 2014, AUG. 2014 & JUNE 2015)**

Key Map NTS.



Legend

- ZONE 1 – RIPARIAN PLANTING
- ZONE 2 – FLOODPLAIN PLANTING
- ZONE 3 – UPLAND PLANTING
- ZONE 4 – WETLAND PLANTING
- HIGH DENSITY LIVESTAKING
- ZONE 6 – MONARCH HABITAT ENHANCEMENT AREA
- TURTLE NESTING MOUND REFER TO DETAIL ON SHEET L-501
- RIP RAP

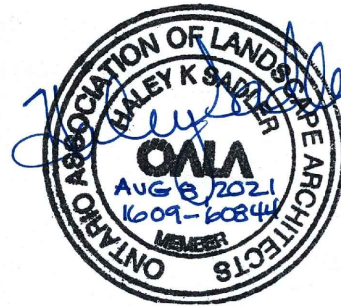
- NOTES:
- ZONE 5 SEEDING IS NOT SHOWN ON THE DRAWING.
 - DRAWINGS ARE TO BE READ IN CONJUNCTION WITH THE ENTIRE CONTRACT DRAWING SET.
 - AREAS TO BE SEEDING WITH SPECIFIED MIXES ARE TO BE REVIEWED AND APPROVED ON SITE BY LANDSCAPE ARCHITECT PRIOR TO INSTALLATION.
 - REFER TO ENGINEERING DRAWINGS FOR SITE GRADING, CHANNEL DESIGN AND EROSION AND SEDIMENT CONTROL.
 - REFER TO SHEET L-500 AND L-501 FOR RESTORATION DETAILS.
 - REFER TO SHEET L-501 FOR PLANT LIST AND SEEDING NOTES.

0 ISSUED FOR CONSTRUCTION HS HS 2021.07.30
Revision By Appd YYYY-MM-DD

File Name: 160960844_L-310-PLANTING M.A.M. HS HS 2021.02.19
Dwn. Chkd. Dgnr. YY-MM-DD

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Client/Project
CANADIAN NATIONAL RAILWAY

MILTON LOGISTICS HUB - NATURAL CHANNEL
DESIGN FOR INDIAN CREEK AND TRIBUTARY A

Milton, ON

Title
INDIAN CREEK
PLANTING PLAN B

Project No. 160960844 Scale 1:750 0 7.5 22.5 37.5m

Revision 0 Sheet 27 of 29 Drawing No.

01-L-311



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Notes

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(UTM, ZONE 17, CW81+90°W)
DATUM: NAD 83 (CSRS)
2. ORIGINAL GROUND TOPOGRAPHY BASED ON UJAR SURVEY RECEIVED [NOV. 2014] AND SUPPLEMENTED BY STANTEC CONSULTING (MAY 2014, AUG. 2014 & JUNE 2015)

ORIGINAL SHEET - ARCH D

SEED MIXES

Seed Mix # 1 - Channel Riparian and Wetland Riparian		
Conservation Halton Meadow Marsh Mix or approved other. Sow at a rate of 5 kg/ha.		
%	Common Name	Latin Name
25	Fowl Bluegrass	<i>Poa palustris</i>
25	Fox Sedge	<i>Carex vulpinoidea</i>
13	Blue Vervain	<i>Verbena hastata</i>
10	Meadow Sedge	<i>Carex granularis</i>
5	Dark Green Bulrush	<i>Scirpus atrovirens</i>
5	Soft Rush	<i>Juncus effusus</i>
2	Boneset	<i>Eupatorium perfoliatum</i>
2	Swamp Milkweed	<i>Asclepias incarnata</i>
2	Stalk Grain Sedge	<i>Carex stipata</i>
2	Tall Manna Grass	<i>Glyceria grandis</i>
2	Woolgrass	<i>Scirpus cyperinus</i>
2	Spotted Joe Pye Weed	<i>Eupatorium maculatum</i>
1	Bebb's Sedge	<i>Carex bebbii</i>
1	Blue Lobelia	<i>Lobelia siphilitica</i>
1	Grass Leaved Goldenrod	<i>Euthamia graminifolia</i>
1	Purple Stemmed Aster	<i>Symphyotrichum puniceum</i>
1	Square Stemmed Monkey Flower	<i>Mimulus ringens</i>

Seed Mix # 2 - Floodplain		
Conservation Halton Early Succession/Riparian Mix or approved other. Sow at a rate of 5 kg/ha.		
%	Common Name	Latin Name
25	Fowl Bluegrass	<i>Poa palustris</i>
20	Meadow Sedge	<i>Carex granularis</i>
10	Blue Vervain	<i>Verbena hastata</i>
10	Big Bluestem	<i>Andropogon gerardii</i>
10	Path Rush	<i>Juncus tenuis</i>
5	Black Eyed Susan	<i>Rudbeckia hirta</i>
5	Common Milkweed	<i>Asclepias syriaca</i>
4	Canada Goldenrod	<i>Solidago canadensis</i>
4	Virgin's Bower	<i>Clematis virginiana</i>
4	Wild Bergamot	<i>Monarda fistulosa</i>
1	Canada Anemone	<i>Anemone canadensis</i>
1	New England Aster	<i>Symphyotrichum novae-angliae</i>
1	Purple Stemmed Aster	<i>Symphyotrichum puniceum</i>

Seed Mix # 3 - Upland		
Conservation Halton Upland Dry Meadow Mix or approved other. Sow at a rate of 5 kg/ha.		
%	Common Name	Latin Name
20	Little Bluestem	<i>Schizachyrium scoparium</i>
15	Bottlebrush grass	<i>Erigeron phillyriaefolius</i>
15	Black Eyed Susan	<i>Rudbeckia hirta</i>
15	Meadow Sedge	<i>Carex granularis</i>
8	Canada Goldenrod	<i>Solidago canadensis</i>
8	Evening Primrose	<i>Oenothera biennis</i>
5	Common Milkweed	<i>Asclepias syriaca</i>
5	Virgin's Bower	<i>Clematis virginiana</i>
5	Wild Bergamot	<i>Monarda fistulosa</i>
1	Canada Anemone	<i>Anemone canadensis</i>
1	Grass Leaved Goldenrod	<i>Euthamia graminifolia</i>
1	Heart-Headed Aster	<i>Symphyotrichum cordifolium</i>
1	New England Aster	<i>Aster novae-angliae</i>

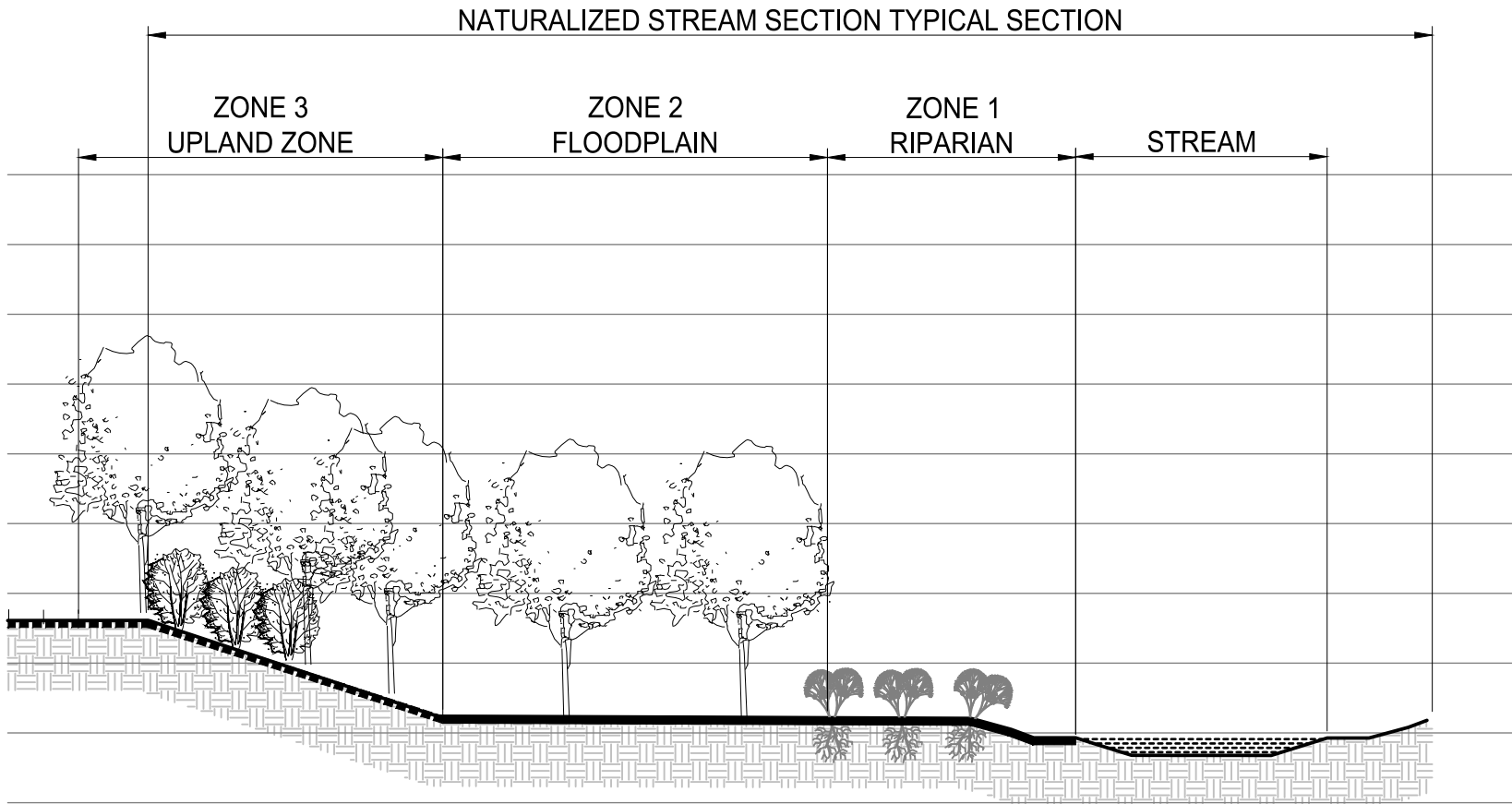
Seed Mix # 4 - Stabilization Mix		
Sow simultaneously with all other seed mixes at a rate of 25 kg/ha.		
%	Common Name	Latin Name
50	Canada Wild Rye	<i>Elymus canadensis</i>
50	Annual Oats	<i>Avena sativa</i>

PLANT LIST

SYM	%	Botanical Name	Common Name	HT (cm)	Root
DECIDUOUS TREES (Upland):					
As	15	<i>Acer saccharum</i>	Sugar Maple	150 cm	10 gal.
Bp	15	<i>Betula papyrifera</i>	Paper Birch	150 cm	10 gal.
Jv	20	<i>Juniperus virginiana</i>	Eastern Red Cedar	80 cm	5 gal.
Ps	20	<i>Prunus serotina</i>	Black Cherry	150 cm	10 gal.
Qr	15	<i>Quercus rubra</i>	Red Oak	150 cm	10 gal.
Ta	15	<i>Tilia americana</i>	Basswood	150 cm	10 gal.
DECIDUOUS SHRUBS (Upland):					
Aa	15	<i>Amelanchier arborea</i>	Juneberry	30 cm	1 gal.
Hv	15	<i>Hamamelis virginiana</i>	Witch Hazel	30 cm	1 gal.
Pp	15	<i>Prunus pensylvanica</i>	Pin Cherry	30 cm	1 gal.
Rt	20	<i>Rhus typhina</i>	Staghorn Sumac	30 cm	1 gal.
Rb	15	<i>Rosa blanda</i>	Smooth Wild Rose	30 cm	1 gal.
Ro	20	<i>Rubus odoratus</i>	Purple-flowering Raspberry	30 cm	1 gal.
DECIDUOUS TREES (Floodplain):					
AR	2	<i>Acer rubrum</i>	Red Maple	250	W.B
Ar	18	<i>Acer rubrum</i>	Red Maple	150 cm	10 gal.
AF	2	<i>Acer x freemanii</i>	Freeman's Maple	250	W.B
At	18	<i>Acer x freemanii</i>	Freeman's Maple	150 cm	10 gal.
PT	2	<i>Populus tremuloides</i>	Trembling Aspen	250	W.B
PI	18	<i>Populus tremuloides</i>	Trembling Aspen	150 cm	10 gal.
PB	2	<i>Populus balsamifera</i>	Balsam Poplar	250	W.B
Pb	18	<i>Populus balsamifera</i>	Balsam Poplar	150 cm	10 gal.
To	20	<i>Thuja occidentalis</i>	Eastern White Cedar	80 cm	5 gal.
DECIDUOUS SHRUBS (Floodplain):					
Ca	14	<i>Cornus amomum</i>	Silky Dogwood	30 cm	1 gal.
Cf	12	<i>Cornus foemina</i>	Gray Dogwood	30 cm	1 gal.
Iv	12	<i>Ilex verticillata</i>	Winterberry	30 cm	1 gal.
Rp	12	<i>Rosa palustris</i>	Swamp Rose	30 cm	1 gal.
Sb	12	<i>Salix bebbiana</i>	Bebb's Willow	30 cm	1 gal.
Sa	14	<i>Spirea alba</i>	Meadowsweet	30 cm	1 gal.
VI	12	<i>Viburnum lentago</i>	Nannyberry	30 cm	1 gal.
Vt	12	<i>Viburnum trilobum</i>	American Cranberry-bush	30 cm	1 gal.
LIVE STAKES (Riparian):					
Cs	34	<i>Cornus stolonifera</i>	Red Osier Dogwood	75 cm	live stake
Sd	33	<i>Salix discolor</i>	Pussy Willow	75 cm	live stake
Se	33	<i>Salix eriocephala</i>	Heartleaf Willow	75 cm	live stake

PLUGS (Floodplain and Upland):					
asy	75	<i>Asclepias syriaca</i>	Common Milkweed	1 yr. plug	0.5 m o.c., in groups of 72
atu	25	<i>Asclepias tuberosa</i>	Butterfly Milkweed	1 yr. plug	

PLUGS (Riparian Wetlands):					
apa	10	<i>Alisma plantago-aquatica</i>	Water-plantain	1 yr. plug	0.5 m
asi	5	<i>Asclepias incarnata</i>	Swamp Milkweed	1 yr. plug	0.5 m
cap	10	<i>Calla palustris</i>	Wild Calla	1 yr. plug	0.5 m
cas	10	<i>Carex stricta</i>	Tussock Sedge	1 yr. plug	0.5 m
cav	10	<i>Carex vulpinoidea</i>	Fox Sedge	1 yr. plug	0.5 m
chg	5	<i>Chelone glabra</i>	Turtlehead	1 yr. plug	0.5 m
irv	10	<i>Iris versicolor</i>	Blue Flag Iris	1 yr. plug	0.5 m
lem	10	<i>Lemna minor</i>	Little Duckweed	1 yr. plug	0.5 m
pea	10	<i>Polygonum amphibium</i>	Water Smartweed	1 yr. plug	0.5 m
sal	10	<i>Sagittaria latifolia</i>	Broad-leaved Arrowhead	1 yr. plug	0.5 m
scc	10	<i>Scirpus cyperinus</i>	Wool-grass	1 yr. plug	0.5 m



LD 9 TYPICAL CROSS-SECTION ELEVATION - TREATMENT ZONES N.T.S.

GENERAL NOTES:

- THIS DRAWING IS THE PROPERTY OF THE LANDSCAPE ARCHITECT AS AN INSTRUMENT OF SERVICE. IT MAY NOT BE REPRODUCED WITHOUT PRIOR WRITTEN CONSENT AND MUST BE RETURNED UPON REQUEST.
- THIS DRAWING FORMS PART OF A SET AND MAY NOT BE SEPARATED. THIS DRAWING MUST BE READ IN CONJUNCTION WITH ALL OTHER DRAWINGS IN THE SET AND ALL SPECIFICATIONS INCLUDED IN THE CONTRACT DOCUMENTS.
- ANY AMBIGUITY IN THE DRAWINGS OR DETAILS IS TO BE REPORTED TO THE LANDSCAPE ARCHITECT FOR DIRECTION. THIS DRAWING SHALL NOT BE USED FOR CONSTRUCTION UNLESS STAMPED AND SIGNED BY THE LANDSCAPE ARCHITECT. CONTRACTOR NOT TO PROCEED IN UNCERTAINTY.
- CONTRACTOR SHALL SUPPLY ALL MATERIALS IN QUANTITIES SUFFICIENT TO COMPLETE WORK SHOWN ON THESE DRAWINGS. ANY DISCREPANCIES SHALL BE REPORTED TO THE LANDSCAPE ARCHITECT FOR DIRECTION.
- IN THE EVENT OF A DISCREPANCY, QUANTITIES INDICATED ON THE PLANT LIST SHALL TAKE PRECEDENCE OVER THOSE INDICATED ON THE DRAWING.
- ALL MEASUREMENTS ARE METRIC. LAYOUT OF PLANT MATERIALS TO BE STAKED BY CONTRACTOR AND APPROVED BY THE LANDSCAPE ARCHITECT PRIOR TO PLANTING.
- CONTRACTOR TO VISIT THE SITE TO CONFIRM ALL SITE CONDITIONS PRIOR TO SUBMITTING BIDS. DISCREPANCIES TO BE REPORTED TO THE LANDSCAPE ARCHITECT/ENVIRONMENTAL INSPECTOR FOR CLARIFICATION.
- LIMITS OF WORK TO BE CLEARLY UNDERSTOOD BY THE CONTRACTOR PRIOR TO ANY WORK TAKING PLACE ON THE SITE. CONTRACTOR TO CONTACT LANDSCAPE ARCHITECT FOR DIRECTION IF CLARIFICATION IS REQUIRED.
- CONTRACTOR TO LOCATE AND STAKE ALL UTILITIES PRIOR TO ANY EXCAVATION WORK OR PLANTING ON THE SITE. DO NOT PLANT DIRECTLY ABOVE UTILITIES. REPORT ANY DISCREPANCIES TO THE LANDSCAPE ARCHITECT
- CONTRACTOR TO TAKE NECESSARY PRECAUTIONS TO PROTECT EXISTING SITE FEATURES UNLESS SPECIFIED FOR REMOVAL / DEMOLITION. THIS INCLUDES ALL SURVEY BARS, STAKES AND MONUMENTS. MAKE GOOD ANY DAMAGE.
- UNLESS NOTED FOR REMOVAL, ALL EXISTING VEGETATION IS TO BE PROTECTED FROM DAMAGE DURING CONSTRUCTION. PROTECTION METHODS TO BE APPROVED BY LANDSCAPE ARCHITECT/ENVIRONMENTAL INSPECTOR PRIOR TO PROCEEDING.
- UPON COMPLETION OF WORK EACH DAY, REMOVE ALL DEBRIS, GARBAGE AND SURPLUS MATERIALS FROM THE ACTIVE WORK SITE. KEEP THE SITE CLEAN AND USEABLE AT ALL TIMES.
- THE USE, HANDLING AND DISPOSAL OF CHEMICALS SHALL COMPLY WITH ALL APPLICABLE LEGISLATION AND REGULATIONS, INCLUDING, BUT NOT LIMITED TO, THE FEDERAL PEST CONTROL PRODUCTS ACT, FISHERIES ACT, AND FOOD AND DRUGS ACT, AND THE PROVINCIAL PESTICIDE CONTROL ACT, WILDLIFE ACT, WEED CONTROL ACT, PLANT PROTECTION ACT, AND WASTE MANAGEMENT ACT, TRANSPORTATION OF DANGEROUS GOODS ACT, AS WELL AS ANY MUNICIPAL OR REGIONAL DISTRICT LEGISLATION.

SEEDING NOTES:

- SEED ALL AREAS DISTURBED DURING CONSTRUCTION ACCORDING TO ZONES DESCRIBED AND SHOWN ON SHEET L-300, L-310 & L-311. TO PREPARE RESTORATION AREAS FOR SEEDING, SPREAD, LOOSEN AND FINE GRADE TOPSOIL.
- FOR SITE PREPARATION IN ZONE 6, HANDLING AND APPLICATION OF HERBICIDE SHALL BE DONE SOLELY BY PERSONS LEGALLY LICENSED OR CERTIFIED TO DO SO UNDER PROVINCIAL AND FEDERAL LEGISLATION.
- SEEDING OPERATIONS SHALL BE COMPLETED BETWEEN SPRING THAW AND JUNE 15TH FOR SPRING WORK, OR BETWEEN AUGUST 15TH AND OCTOBER 15TH FOR FALL WORK.
- APPLY NATIVE SEED MIX (SEED MIX 1, 2 OR 3) AND STABILIZATION MIX (SEED MIX 4) SIMULTANEOUSLY AT RATES PROVIDED IN THE PLANT LISTS.
- APPLY USING TERRASEED METHOD FOR ALL SLOPES GREATER THAN 5%. SEED MIX AND RATES AS NOTED. FOLLOW THE MANUFACTURER'S RECOMMENDATIONS FOR SEEDING METHOD(S).
- FOR BROADCAST SEEDING ON SHALLOW SLOPES, SOW ONE HALF OF THE SEED IN ONE DIRECTION AND THE REMAINDER AT RIGHT ANGLES TO THE FIRST PASS. LIGHTLY ROLL OR RAKE ENTIRE SEEDED AREA IMMEDIATELY AFTER SEEDING TO ENSURE GOOD CONTACT BETWEEN SEED AND SOIL.
- WATER ENTIRE AREA WITH A FINE SPRAY AFTER EACH AREA HAS BEEN SOWN. APPLY ENOUGH WATER TO ENSURE PENETRATION TO A SOIL DEPTH OF AT LEAST 50 MM.
- CONTRACTOR TO ENSURE ADEQUATE SEED MIX CATCH. SEEDED AREAS WILL BE ACCEPTED PROVIDED THAT A SUFFICIENT AMOUNT (80%) OF THE SEED HAS GERMINATED AND BECOME ESTABLISHED IN THE OPINION OF THE LANDSCAPE ARCHITECT.

PLANTING NOTES:

- PRIOR TO CONSTRUCTION THE ENVIRONMENTAL MONITOR IS TO VERIFY THAT THE SEDIMENT CONTROL AND TREE PROTECTION MEASURES HAVE BEEN IMPLEMENTED AS PER THE APPROVED PLANS.
- THE CONTRACTOR MUST NOTIFY THE LANDSCAPE ARCHITECT PRIOR TO THE COMMENCEMENT OF ANY PLANTING. CONTRACTOR SHALL SUPPLY ALL PLANTS AND MATERIALS IN QUANTITIES SUFFICIENT TO COMPLETE WORK SHOWN ON THIS DRAWING. ANY DISCREPANCIES BETWEEN QUANTITIES SHALL BE REPORTED TO THE LANDSCAPE ARCHITECT FOR DIRECTION.
- THE LANDSCAPE ARCHITECT IS TO BE CONTACTED FOR INSPECTION AND WRITTEN APPROVAL PRIOR TO PLANT MATERIAL ARRIVING ON SITE. THE LANDSCAPE ARCHITECT RESERVES THE RIGHT TO REJECT ANY PLANT MATERIALS THAT HAVE NOT BEEN INSPECTED AND APPROVED.
- PLANT MATERIAL COLLECTED FROM WILD SOURCES WILL NOT BE ACCEPTED UNLESS OTHERWISE NOTED. THE LANDSCAPE ARCHITECT RESERVES THE RIGHT TO REQUIRE THAT SUPPLIER INVOICES BE SUBMITTED FOR INSPECTION AND APPROVAL PRIOR TO ACCEPTANCE.
- DO NOT MAKE SUBSTITUTIONS OF MATERIALS, PRODUCTS OR QUANTITIES WITHOUT THE PRIOR WRITTEN APPROVAL OF THE LANDSCAPE ARCHITECT.
- STAKING (LAYOUT) OF PLANT MATERIALS TO BE APPROVED BY LANDSCAPE ARCHITECT PRIOR TO INSTALLATION. DRAWING MAY BE SCALED FOR APPROXIMATE LAYOUT OF INDIVIDUAL TREES AND PLANTING BEDS.
- ALL PLANT MATERIALS WILL BE PLANTED IN AN APPROVED TOPSOIL AT A DEPTH OF 300MM UNLESS OTHERWISE SPECIFIED. NO ADDITIONAL SOILS OR ADDITIVES WILL BE PERMITTED UNLESS APPROVED BY THE CONTRACT ADMINISTRATOR OR LANDSCAPE ARCHITECT AT NO ADDITIONAL COST. TOPSOIL TO BE FREE FROM WEEDS, SUBSOIL, ROOTS, STONES, LUMPS OF CLAY AND TOXIC MATERIAL.
- MILKWEED PLUGS IN ZONE 6 TO BE PLANTED DIRECTLY INTO NATIVE SOIL OF UNDISTURBED MEADOWS.
- PLANT MATERIALS SPECIFIED FOR THIS PROJECT WILL CONFORM TO THE CANADIAN NURSERY LANDSCAPE ASSOCIATION (CNLA) FOR SIZE, VARIETY, AND CONDITION AS INDICATED ON THE PLANT SCHEDULE SHOWN ON THESE DRAWINGS. ANY PLANT MATERIALS THAT DO NOT CONFORM (IN THE SOLE OPINION OF THE LANDSCAPE ARCHITECT) WILL BE PROMPTLY REMOVED FROM THE SITE AND REPLACED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER OR PROJECT.
- REMOVE DEAD AND/OR DAMAGED BRANCHES ON TREES OR SHRUBS. ALL PRUNING SHALL BE PERFORMED IN ACCORDANCE WITH STANDARD HORTICULTURAL PRACTICES AND APPROPRIATE TIMING FOR EACH SPECIES.
- PLANTS ARE NOT TO BE INSTALLED DURING EXTREME HEAT, DROUGHT, OR OTHER UNDESIRABLE CONDITIONS. THOROUGHLY WATER ALL PLANTS IMMEDIATELY AFTER INSTALLATION. CONTRACTOR NOT TO PROCEED IN UNCERTAINTY. CONTACT LANDSCAPE ARCHITECT FOR DIRECTION. THE CONTRACTOR IS REQUIRED TO WATER PLANT MATERIAL REGULARLY OR AS DIRECTED BY THE LANDSCAPE ARCHITECT DURING CONSTRUCTION AND THE WARRANTY PERIOD. PLANTS WILL BE WATERED WITHIN 48 HOURS OF A WRITTEN REQUEST BY THE LANDSCAPE ARCHITECT. FAILURE TO DO SO AFTER THE SECOND REQUEST WILL RESULT IN THIS WORK BEING UNDERTAKEN BY OTHERS. THE COST OF THIS WORK SHALL BE DEDUCTED FROM THE TOTAL CONTRACT PRICE.
- DO NOT PLANT IN DRAINAGE SWALES. WHERE PROPOSED DRAINAGE SWALES CONFLICT WITH PROPOSED PLANTINGS, CONTACT THE LANDSCAPE ARCHITECT FOR DIRECTION.
- ALL TREES AND SHRUBS ARE TO BE PLANTED IN ACCORDANCE WITH THE PLANTING DETAILS SHOWN ON THIS DRAWING.
- MINOR FIELD ADJUSTMENTS TO PLANT MATERIAL LOCATIONS MAY BE NECESSARY TO RESPOND TO THE LOCATIONS OF EXISTING PLANTS. CONTRACTOR TO REVIEW WITH LANDSCAPE ARCHITECT WHERE RELOCATIONS ARE NECESSARY. CONTRACTOR MUST RECEIVE APPROVAL FROM LANDSCAPE ARCHITECT PRIOR TO INSTALLATION.
- SHREDDED PINE MULCH OR AN APPROVED OTHER WILL BE SPREAD UNIFORMLY IN ALL PLANTING BEDS AND AROUND THE BASE OF ALL TREES AND SHRUBS TO A DEPTH OF 50MM. DO NOT PLACE MULCH IN DIRECT CONTACT WITH TRUNKS. ALLOW A 25MM MULCH FREE RING AROUND TRUNKS. PROVIDE A SAMPLE OF MULCH TO THE LANDSCAPE ARCHITECT FOR APPROVAL PRIOR TO INSTALLATION.
- INSTALL DIMEX ARBORESCENT TREE PROTECTOR OR EQUIVALENT TREE GUARDS ON ALL DECIDUOUS TREES OVER 100 CM IN HEIGHT. GUARDS ARE TO BE REMOVED AT THE END OF THE WARRANTY PERIOD.
- ALL LANDSCAPE WORKS WILL BE GUARANTEED FOR THE WARRANTY PERIOD FOLLOWING INSPECTION SUBSTANTIAL COMPLETION. PLANT MATERIAL, WHICH IS NOT IN A HEALTHY GROWING CONDITION TWO YEARS AFTER INSPECTION, SHALL BE REPLACED TO THE SATISFACTION OF THE LANDSCAPE ARCHITECT / CLIENT.
- THE CONTRACTOR IS RESPONSIBLE FOR LOCATION OF ALL UNDERGROUND SERVICES PRIOR TO EXCAVATION OF TREE PITS AND SHRUB BEDS.
- ALL STAKES AND ASSOCIATED TIES ARE TO BE REMOVED AT THE CONCLUSION OF THE WARRANTY PERIOD.
- CONTRACTOR TO IDENTIFY WITH OWNER AND LANDSCAPE ARCHITECT ANY MAINTENANCE REQUIREMENTS NECESSARY FOR WARRANTY PURPOSES.
- THE LANDSCAPE ARCHITECT RESERVES THE RIGHT TO REFUSE ACCEPTANCE OF ANY PLANT MATERIAL DISPLAYING POOR GROWTH HABITS, INJURY OR DISEASE. ANY PLANT MATERIAL REJECTED BY THE LANDSCAPE ARCHITECT WILL BE PROMPTLY REMOVED FROM THE SITE AND REPLACED WITH MATERIAL OF ACCEPTABLE QUALITY AT NO ADDITIONAL COST TO THE PROJECT.
- THE CONTRACT ADMINISTRATOR RESERVES THE RIGHT TO EXTEND CONTRACTOR'S WARRANTY RESPONSIBILITIES FOR AN ADDITIONAL YEAR IF, AT THE END OF INITIAL WARRANTY PERIOD, LEAF DEVELOPMENT AND GROWTH IS NOT SUFFICIENT TO ENSURE FUTURE SURVIVAL AS DETERMINED BY THE LANDSCAPE ARCHITECT.
- TREES AND SHRUBS TO BE PLANTED AT A RATIO OF 2.5 SHRUBS PER TREE. SEE PLANTING ZONE NOTES ON DRAWINGS L-300, L-310 AND L-311.



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Notes

- BENCHMARK:
ELEVATIONS ARE GEODETIC (CGVD 1928: 1978 ADJUSTMENT), DERIVED BY DIFFERENTIAL GPS OBSERVATIONS.
PROJECTION: UNIVERSAL TRANSVERSE MERCATOR
(UTM, ZONE 17, CMB100W)
DATUM: NAD 83 (CSRS)
- ORIGINAL GROUND TOPOGRAPHY BASED ON UDAR SURVEY RECEIVED (NOV. 2014) AND SUPPLEMENTED BY STANTEC CONSULTING (MAY 2014, AUG. 2014 & JUNE 2015)

- NOTES:
- DRAWINGS ARE TO BE READ IN CONJUNCTION WITH THE ENTIRE CONTRACT DRAWING SET.

0	ISSUED FOR CONSTRUCTION	HS	HS	2021.07.30
Revision		By	Appd	YYYY.MM.DD
File Name:	160960844_L-500-DT	MALM	HS	HS
		Dwn.	Chkd.	Dsgn.
				YY.MM.DD

Permit-Seal

ISSUED FOR CONSTRUCTION



Client/Project
CANADIAN NATIONAL RAILWAY

MILTON LOGISTICS HUB - NATURAL CHANNEL
DESIGN FOR INDIAN CREEK AND TRIBUTARY A

Milton, ON

Title
PLANTING NOTES AND DETAILS

Project No.	Scale
160960844	AS SHOWN
Revision	Sheet
0	29 of 29
Drawing No.	

01-L-501