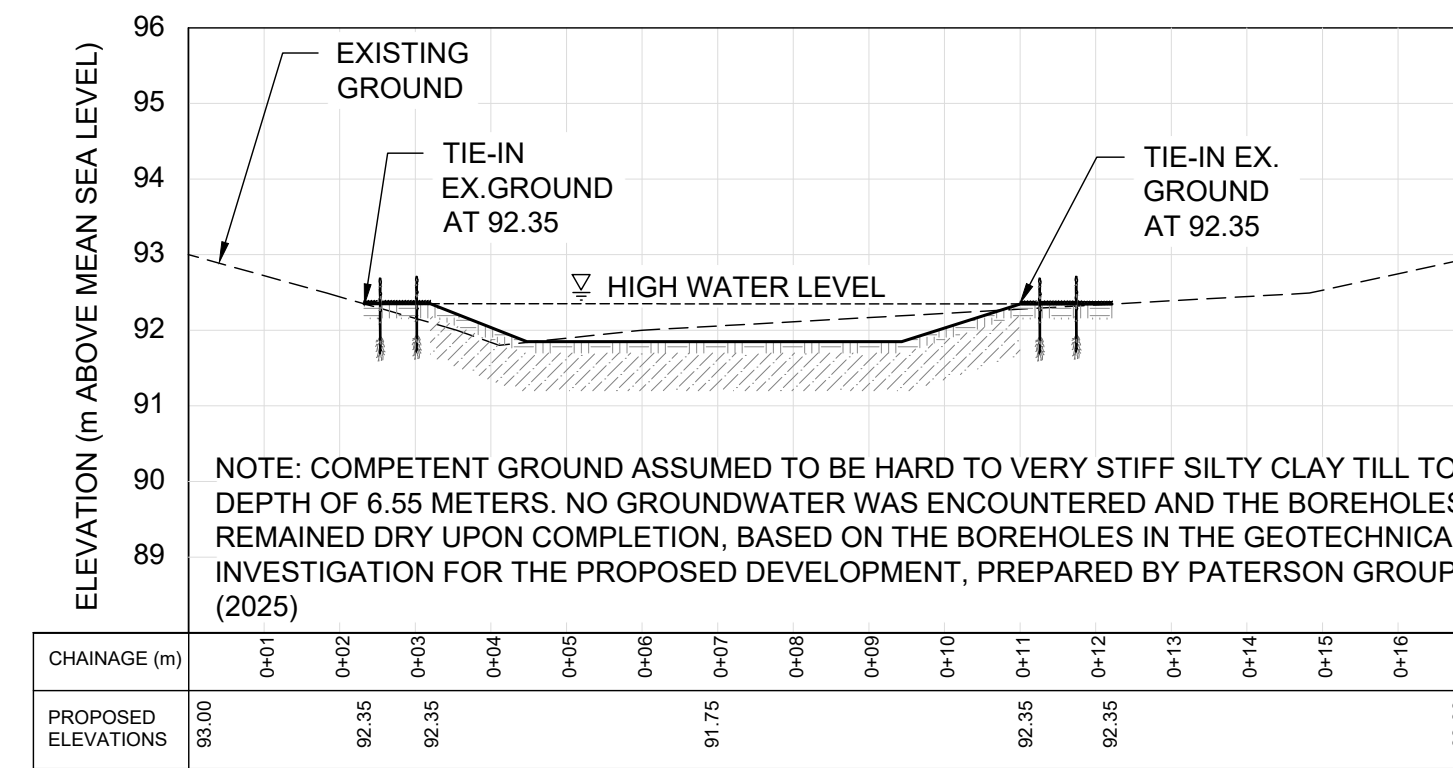


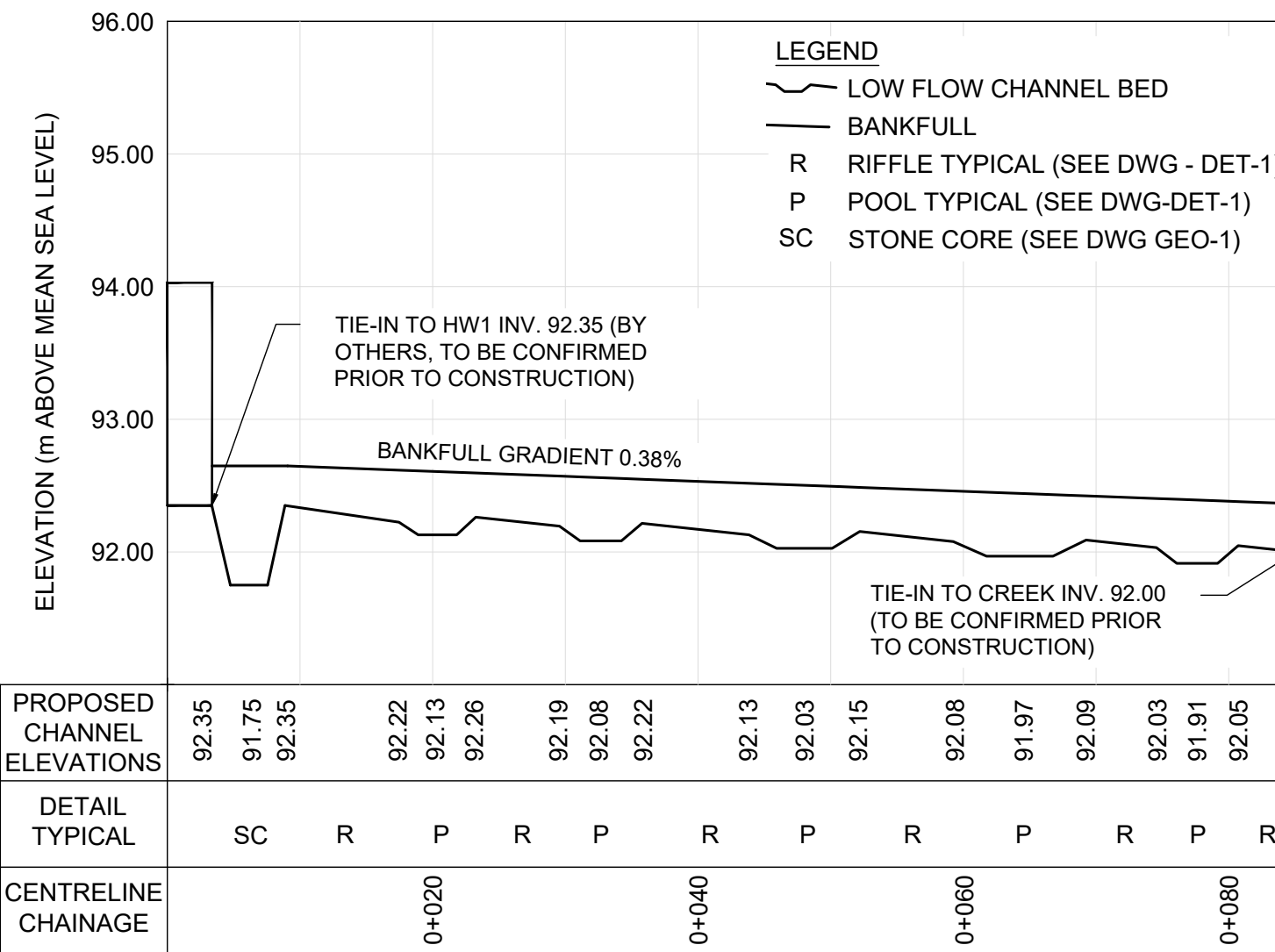
**PLANFORM**  
1:250

- LEGEND**
- CHANEL CENTRELINE
  - RIFFLE (SEE DWG DET-1)
  - POOL (SEE DWG DET-1)
  - STONE CORE (SEE DWG GEO-1)
  - NATURALIZED ENERGY DISSIPATOR (SEE DWG GEO-1)
  - 100% BIODEGRADABLE EROSION CONTROL BLANKET AND LIVE STAKES (SEE DWG DET-1)
  - BASKING LOG (SEE DWG DET-1)
  - BRUSH MATTRESS BANK TREATMENT (SEE DWG DET-1)



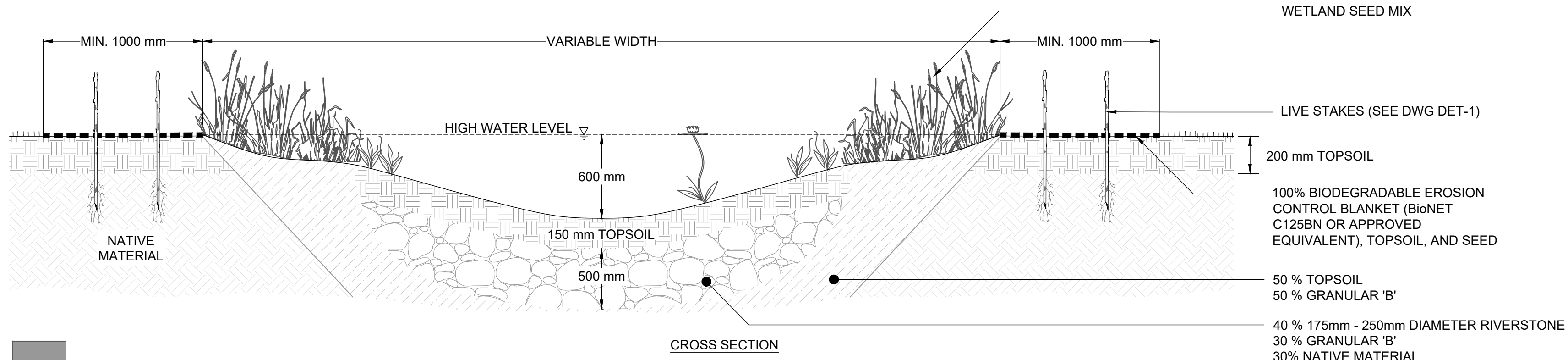
**CROSS SECTION A -A'**  
1:100

CHAINAGE (m)	0+01	0+02	0+03	0+04	0+05	0+06	0+07	0+08	0+09	0+10	0+11	0+12	0+13	0+14	0+15	0+16	0+17
PROPOSED ELEVATIONS	93.00	92.35	92.35	91.75	92.35	92.35	92.35	92.35	92.35	92.35	92.35	92.35	92.35	92.35	92.35	92.35	92.00

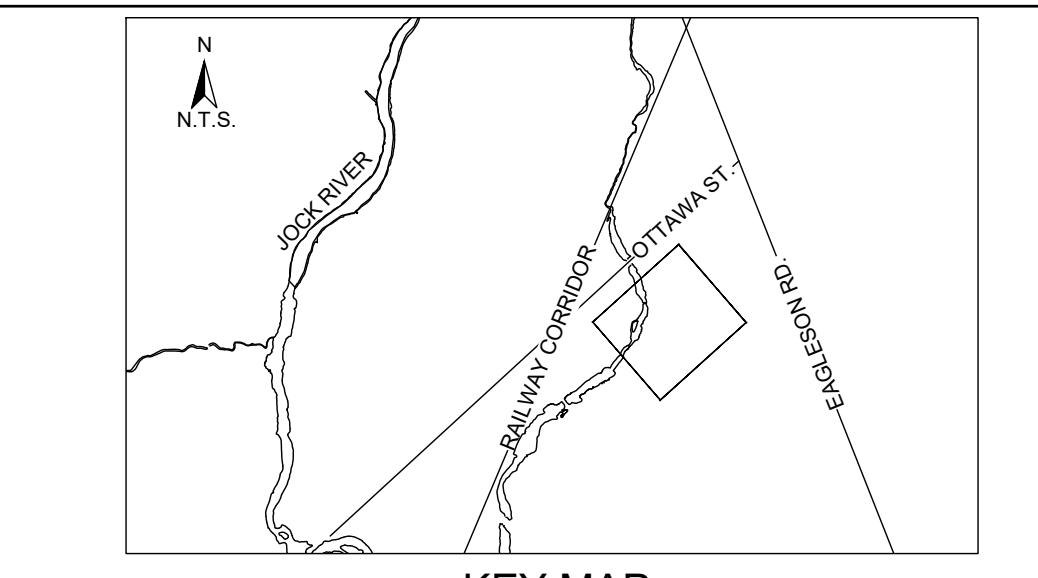
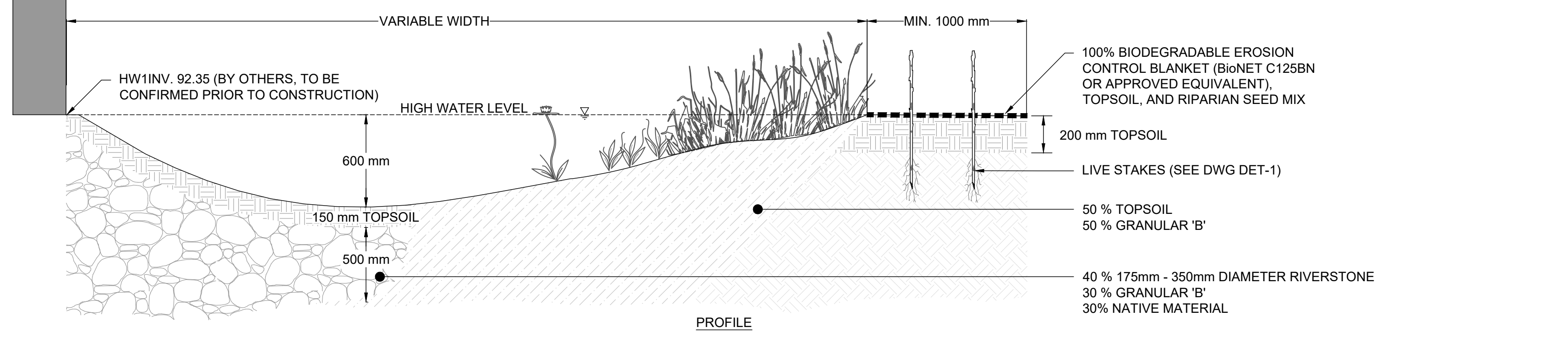


**PROFILE**  
H = 1:500; V=1:50

PROPOSED CHANNEL ELEVATIONS	92.35	91.75	92.35	92.22	92.13	92.26	92.19	92.08	92.22	92.13	92.03	92.15	92.08	91.97	92.09	92.03	91.91	92.05	92.00
DETAIL TYPICAL	SC	R	P	R	P	R	R	P	R	P	R	P	R	P	R	P	R		
CENTRELINE CHAINAGE			0+020				0+040				0+060						0+080		



**STONE CORE NATURALIZED ENERGY DISSIPATER**  
N.T.S.



**KEY MAP**  
N.T.S.

- GENERAL NOTES**
1. THE ACCOMPANYING CHANNEL REALIGNMENT TECHNICAL DESIGN BRIEF PREPARED BY GEO MORPHIX LTD. (2025) PROVIDES ADDITIONAL DESIGN DETAILS AND DIRECTION FOR IMPLEMENTATION AND IS TO BE REVIEWED IN CONJUNCTION WITH THIS DRAWING SET.
  2. ALL CONTRACT DRAWINGS, SPECIFICATIONS AND APPLICABLE PERMITS MUST BE KEPT ON SITE DURING CONSTRUCTION FOR REFERENCE.
  3. THE CONTRACTOR MUST NOTIFY THE DESIGNER AND CONTRACT ADMINISTRATOR OF THE INTENT TO COMMENCE WORK AT LEAST 48 HOURS IN ADVANCE.
  4. THE CONTRACTOR IS RESPONSIBLE FOR ALL UTILITY LOCATES.
  5. LAYOUT MUST BE REVIEWED AND APPROVED BY THE DESIGNER / DESIGNER REPRESENTATIVE, DESIGNATED ENGINEER, AND THE CONTRACT ADMINISTRATOR.
  6. CONSTRUCTION OBSERVATION IS TO BE PERFORMED BY A CERTIFIED FLUVIAL GEOMORPHOLOGIST OR EXPERIENCED ENVIRONMENTAL INSPECTOR UNDER DIRECTION FROM THE DESIGNER.
  7. ON-SITE SUPPORT FROM PROJECT ENGINEERS (E.G. GEOTECHNICAL, HYDROLOGICAL, AND/OR WATER RESOURCES ENGINEERS) REQUIRED TO ASSESS AND ENSURE FAVOURABLE SURFICIAL AND SUBSURFACE CONDITIONS TO SUPPORT CHANNEL REALIGNMENT CONSTRUCTION.
  8. BE ADVISED THAT THE LOCAL REGULATORY BODY MAY, AT ANY TIME, WITHDRAW THIS PERMISSION, IF, IN THE OPINION OF THE AUTHORITY, THE CONDITIONS OF THE PERMIT ARE NOT BEING COMPLIED WITH. THIS APPROVAL DOES NOT EXEMPT THE PROPERTY OWNER/APPLICANT FROM THE PROVISIONS OF ANY OTHER FEDERAL, PROVINCIAL OR MUNICIPAL STATUTES, REGULATIONS OR BY-LAWS, OR ANY RIGHTS UNDER COMMON LAW.

- TIMING OF WORKS**
1. WORKS SHALL BE COMPLETED DURING THE DESIGNATED IN-WATER WORKS WINDOW (JULY 15TH TO MARCH 15TH) SET OUT BY MINRDFO.
  2. TREE CLEARING IS TO BE COMPLETED OUTSIDE THE BIRD NESTING SEASON (APRIL 15TH TO AUGUST 31ST) AND THE BAT ROOSTING WINDOW (APRIL 1ST TO SEPTEMBER 30TH) TO COMPLY WITH THE FEDERAL MIGRATORY BIRDS CONVENTION ACT AND THE PROVINCIAL ENDANGERED SPECIES ACT. ANY TREES THAT REQUIRE REMOVAL OUTSIDE OF THIS TIMING WINDOW MUST FIRST BE INSPECTED BY A QUALIFIED BIOLOGIST TO DETERMINE THE PRESENCE OF NESTING BIRDS OR BATS.
  3. THE WEATHER FORECAST SHOULD BE CONTINUALLY MONITORED TO ENSURE THAT WORKS ARE UNDERTAKEN ONLY DURING FAVOURABLE WEATHER CONDITIONS.
  4. COMPLETE THE WORKS WITH MINIMAL AVOIDABLE INTERRUPTIONS ONCE THEY COMMENCE.

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1. ALL CONSTRUCTION EQUIPMENT AND MATERIALS (IMPORTED OR EXCAVATED) MUST BE STORED AT LEAST 30 m AWAY FROM ANY WATERBODY IN A STABLE AREA ABOVE THE ACTIVE FLOODPLAIN, OR IN A DESIGNATED STAGING/STORAGE AREA.
  2. IN THE EVENT OF AN UNEXPECTED STORM, ALL UNFIXED ITEMS THAT HAVE THE POTENTIAL TO CAUSE A SPILL OR AN OBSTRUCTION TO FLOW MUST BE MOVED TO A STABLE AREA ABOVE ACTIVE FLOODPLAIN.
  3. STOCKPILES MUST BE LOCATED OUTSIDE THE ISOLATED WORK AREAS.
  4. STABILIZE TEMPORARILY OR PERMANENTLY ANY DISTURBED AREAS AS WORK PROGRESSES, OR SOON AS CONDITIONS ALLOW.
  5. MINIMIZE THE AREA OF DISTURBANCE TO THE EXTENT POSSIBLE. ALL DISTURBED GROUND LEFT INACTIVE FOR MORE THAN 30 DAYS SHALL BE STABILIZED USING APPROPRIATE EROSION CONTROL MEASURES AND AN APPROPRIATE SEED MIX AS NOTED WITHIN THE FINAL APPROVED RESTORATION PLAN.
  6. ALL VEGETATION ADJACENT TO THE WORK AREA MUST BE PROTECTED AND DELIMITED WITH CONSTRUCTION FENCING OR TREE PROTECTION BARRIERS.
  7. ALL GRADES IN THE AREA REGULATED BY THE CONSERVATION AUTHORITY MUST BE MAINTAINED OR MATCHED, UNLESS OTHERWISE AUTHORIZED IN THE APPLICABLE PERMIT.
  8. AN AFTER-HOURS CONTACT NUMBER IS TO BE VISIBLY POSTED ON-SITE FOR EMERGENCIES. ALL THE PLANS SHOULD HAVE NAME AND CONTACT INFO OF THE PERSON RESPONSIBLE FOR ESC MEASURES.

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1. ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES MUST BE INSTALLED PRIOR TO START OF WORKS.
  2. FOLLOWING INSTALLATION OF THE PROPOSED ESC MEASURES, A QUALIFIED AGENT OF THE PROPONENT (E.G. CAN-CISEC CERTIFIED MONITOR) WILL CONDUCT REGULAR SITE VISITS TO MONITOR ALL WORKS, PARTICULARLY THE CONDITION OF THE ESC MEASURES. DEWATERING AND IN-OR NEAR-WATER WORKS SHOULD CONCERN ARISE. THE ENVIRONMENTAL MONITOR WILL CONTACT THE PROPONENT, THE CONSERVATION AUTHORITY, AND ANY OTHER APPROPRIATE PARTIES.
  3. EROSION AND SEDIMENT CONTROLS MUST BE MAINTAINED DURING CONSTRUCTION, AND ANY REQUIRED REPAIRS OR REPLACEMENTS MUST BE COMPLETED WITHIN 24 HOURS AFTER THEY HAVE BEEN IDENTIFIED DURING THE MONITORING.
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  9. IF EXCESSIVE SILTATION RESULTS FROM THE CONSTRUCTION ACTIVITIES, THE ON-SITE SUPERVISOR/INSPECTOR AND/OR THE LOCAL REGULATORY BODY RESERVE THE RIGHT TO REQUEST ADDITIONAL ESC MEASURES WHICH WOULD BE INSTALLED PRIOR TO FURTHER CONSTRUCTION ACTIVITIES.

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  2. ENSURE EQUIPMENT AND MACHINERY ARE IN GOOD OPERATING CONDITION (POWER WASHED, FREE OF LEAKS, EXCESS OIL, AND GREASE).
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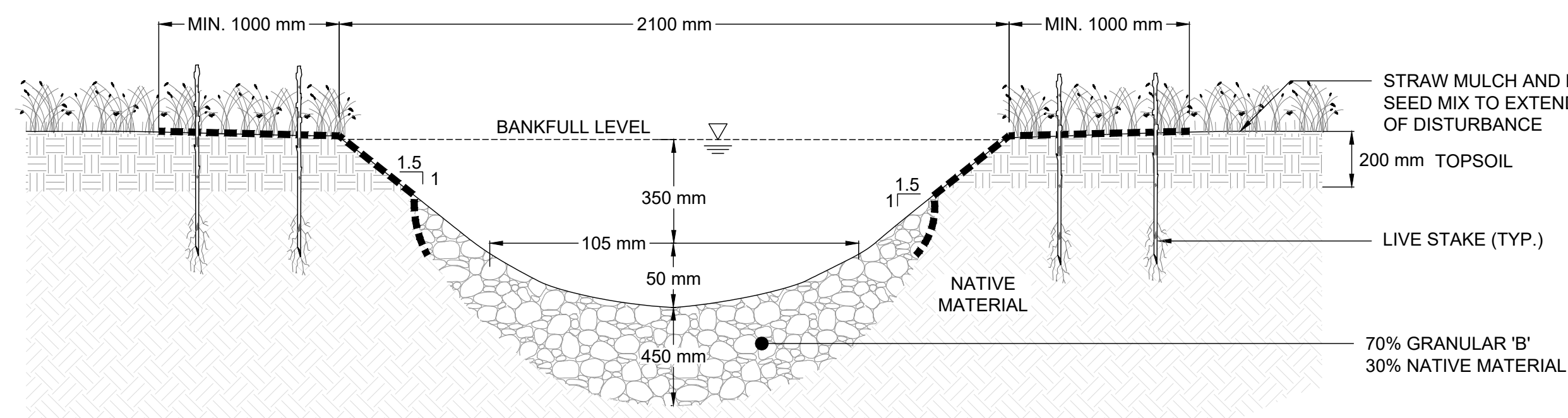
2.	25/09/30	SE	SECOND DETAILED DESIGN SUBMISSION
1.	25/03/07	LD	FIRST DETAILED DESIGN SUBMISSION
DESIGNED BY: LD/SE		CHECKED BY: PV	
DRAWN BY: SE		DATE: MARCH 2025	

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 36 Main St N., P.O. Box 205  
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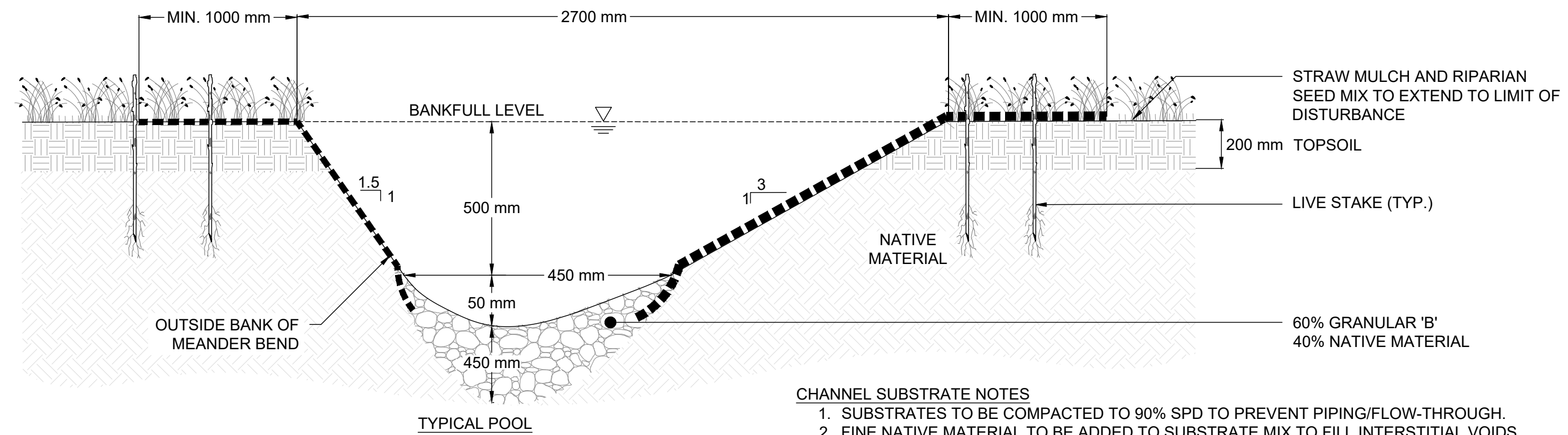
**TAMARACK RICHMOND**  
6038 OTTAWA STREET  
RICHMOND, ON

**MARLBOROUGH CREEK**  
SWMP OUTFALL DESIGN  
PLANFORM, CROSS-SECTION AND PROFILE

PROJECT No.: PN25011	DRAWING No.: GEO-1
SCALE: AS NOTED	SHEET 1 OF 2



TYPICAL RIFFLE

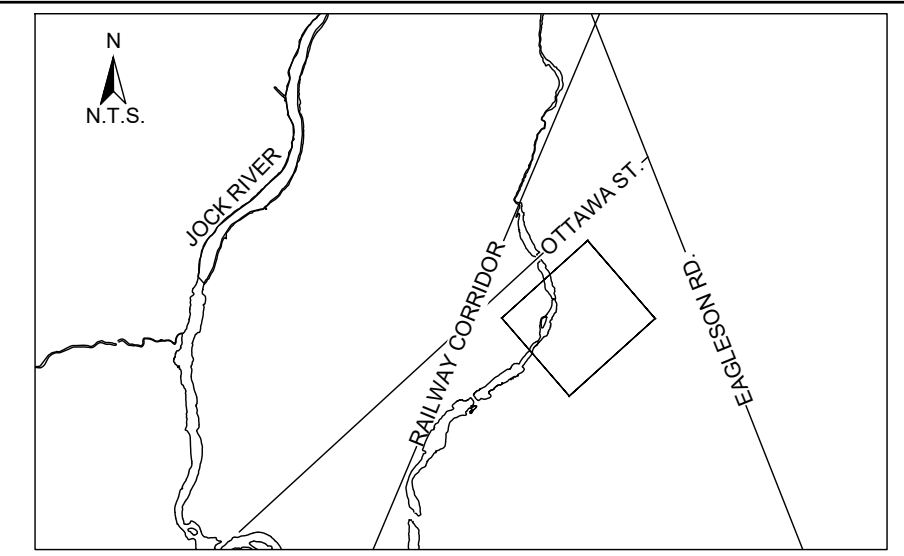


TYPICAL POOL

**CHANNEL CROSS SECTIONS**  
N.T.S.

**CHANNEL SUBSTRATE NOTES**

- SUBSTRATES TO BE COMPACTED TO 90% SPD TO PREVENT PIPING/FLOW-THROUGH.
- FINE NATIVE MATERIAL TO BE ADDED TO SUBSTRATE MIX TO FILL INTERSTITIAL VOIDS, AS REQUIRED.
- GRANULAR MIX TO BE SOURCED FROM PIT-RUN MATERIAL AND ROUNDED IN NATURE. NO CRUSHED ROCK, LIMESTONE OR POST-CONSTRUCTION MATERIALS ARE TO BE USED WITHIN THE CHANNEL. MATERIAL TO BE REVIEWED BY THE DESIGNER OR REPRESENTATIVE PRIOR TO INSTALLATION.



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N.T.S.

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**EROSION AND SEDIMENT CONTROL**

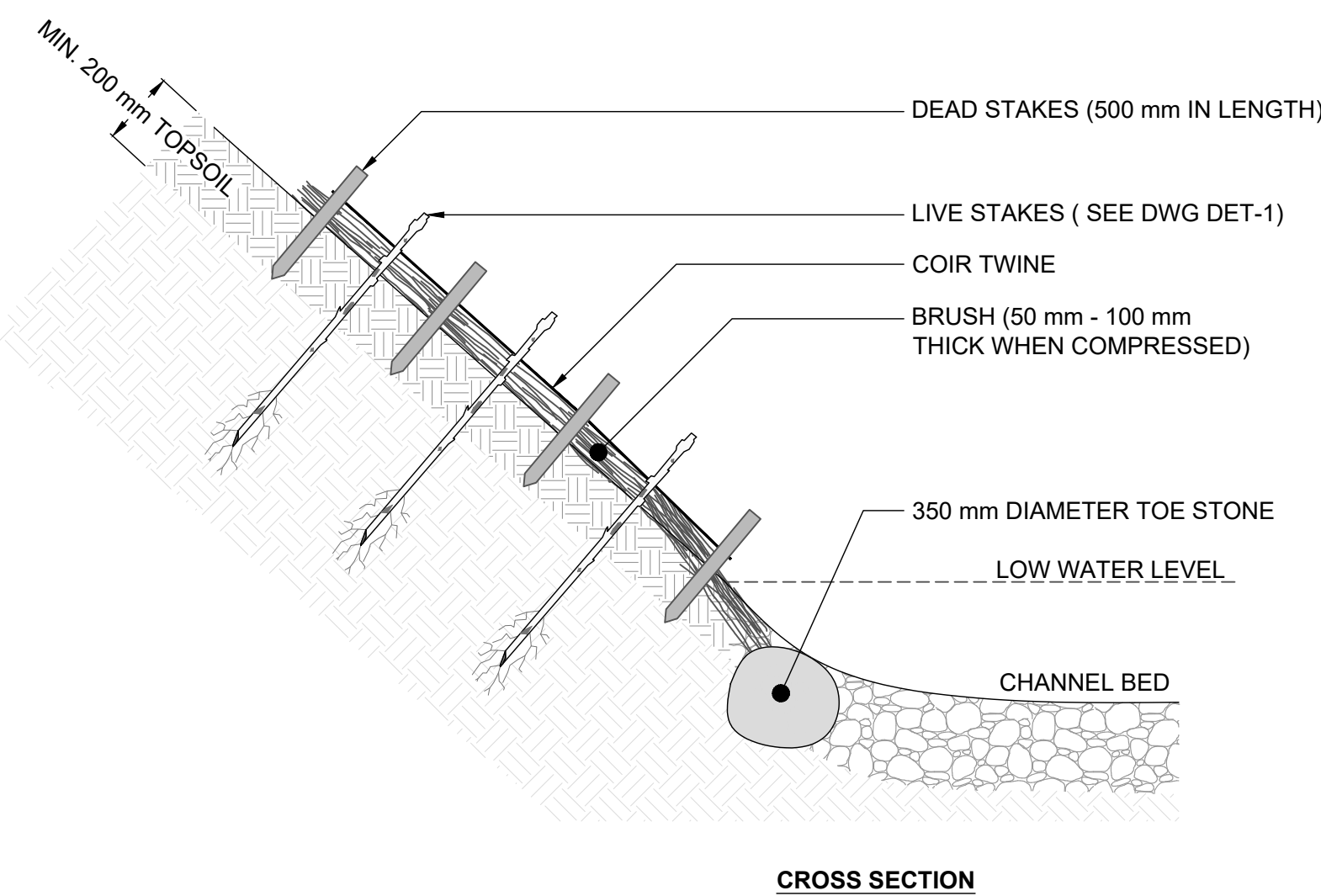
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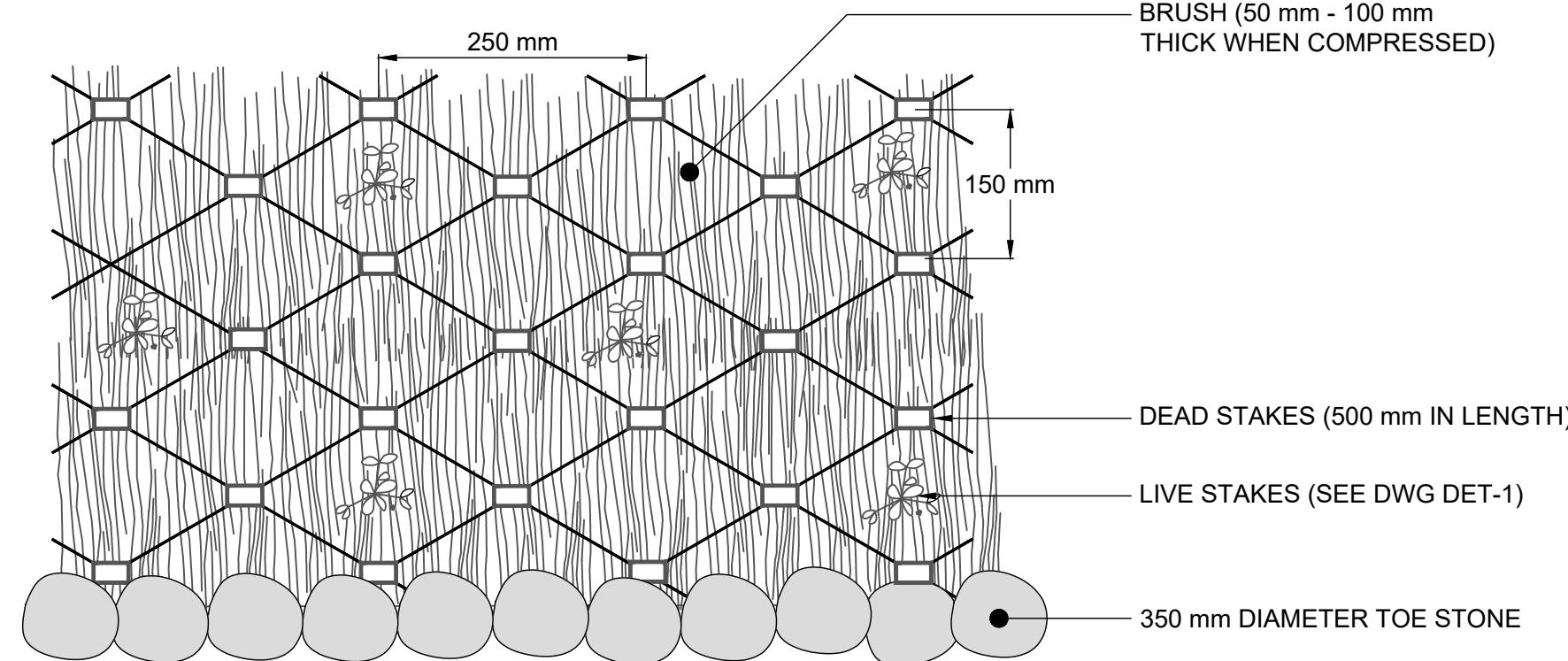


CROSS SECTION

**NOTES**

- LIVE BRANCHES TO CONSIST OF WILLOW AND DOGWOOD SPECIES, APPROXIMATELY 1 m IN LENGTH AND 50 mm - 100 mm IN WIDTH.
- LIVE STAKES ARE TO BE INSTALLED AT A DENSITY OF 3 STAKES PER SQUARE METRE.
- BRANCHES TO BE KEPT IN MOIST AND COLD CONDITION UNTIL INSTALLATION.
- BRUSH MATTRESS TO BE INSTALLED WHILE BRANCHES ARE DORMANT.
- BRANCHES MUST BE PLACED ON SLOPE WITH BUTT END TOWARDS VALLEY FLOOR AND PUSHED INTO SOIL.
- BRANCHES MUST BE FLEXIBLE ENOUGH TO CONFORM TO THE SLOPE SURFACE IRREGULARITIES.
- POUND DEAD STAKES TO HALF THEIR LENGTH INTO SOIL BETWEEN BRANCHES. THE COIR TWINE AROUND
- DEAD STAKES AND TIGHTLY OVER BRANCHES. USE A CLOVE HITCH TO SECURE STAKES. POUND STAKES INTO SLOPE TO COMPRESS BRANCHES AGAINST GROUND.
- TAMP LIVE STAKES BETWEEN DEAD STAKES.
- FILL VOIDS BETWEEN BRANCHES OF THE BRUSH MATTRESS WITH SOIL TO PROMOTE ROOTING.

**BRUSH MATTRESS**  
N.T.S.

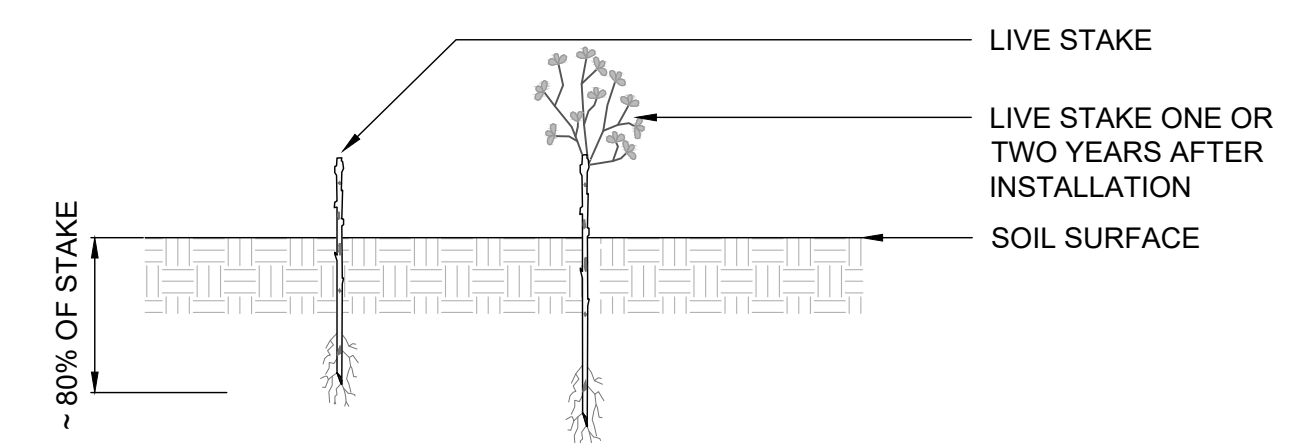


PLAN

**NOTES**

- QUANTITY TO BE DETERMINED BASED ON AREA OF DISTURBANCE TO BE RESTORED
- LIVE STAKES SHOULD BE FROM AT MINIMUM 2-YEAR OLD STOCK
- LIVE STAKES ARE TO BE INSTALLED AT A DENSITY OF 3 STAKES PER SQUARE METRE.
- LIVE STAKES SHOULD BE PRE-SOAKED (SUBMERGED IN WATER) FOR AT LEAST 24 HOURS AFTER HARVESTING AND IMMEDIATELY BEFORE INSTALLATION.
- LIVE STAKES SHOULD NOT BE STORED FOR A PERIOD LONGER THAN 2 DAYS, UNLESS THEY ARE BEING SOAKED.
- THE CONTRACTOR SHALL PROTECT PLANT MATERIALS FROM DRYING FROM THE TIME OF HARVEST UNTIL INSTALLED.
- LIVE STAKES ARE TO BE A MINIMUM OF 25 mm IN DIAMETER AND CUT TO A LENGTH OF 1000 mm.
- CUT ANGLE AT THE BOTTOM OF THE STAKE AND FLAT ON THE TOP.
- TRIM ALL SIDE BRANCHES WHILE TAKING CARE NOT TO DAMAGE THE BARK.
- INSTALL STAKES WITH BUDS POINTING UPWARDS AND THICKER STEM IN THE BED.
- LIVE STAKES SHOULD BE INSTALLED USING A LARGE RUBBER Mallet.
- 80% OF THE STAKE IS TO BE BELOW SURFACE.
- TAMP THE LIVE STAKE INTO THE GROUND AT RIGHT ANGLE TO THE SURFACE.
- IN COMPACT SOIL A PILOT HOLE SHOULD BE USED TO LIMIT DAMAGE TO THE STAKES. IF USING A PILOT HOLE REPACK SOIL AROUND THE LIVE STAKE.
- LIVE STAKES SHOULD STAND FIRM FROM THE SOIL FOLLOWING INSTALLATION.
- ALL STAKES NOT PLANTED TO THE SPECIFICATIONS ABOVE WILL BE REPLACED AT THE CONTRACTOR'S EXPENSE.

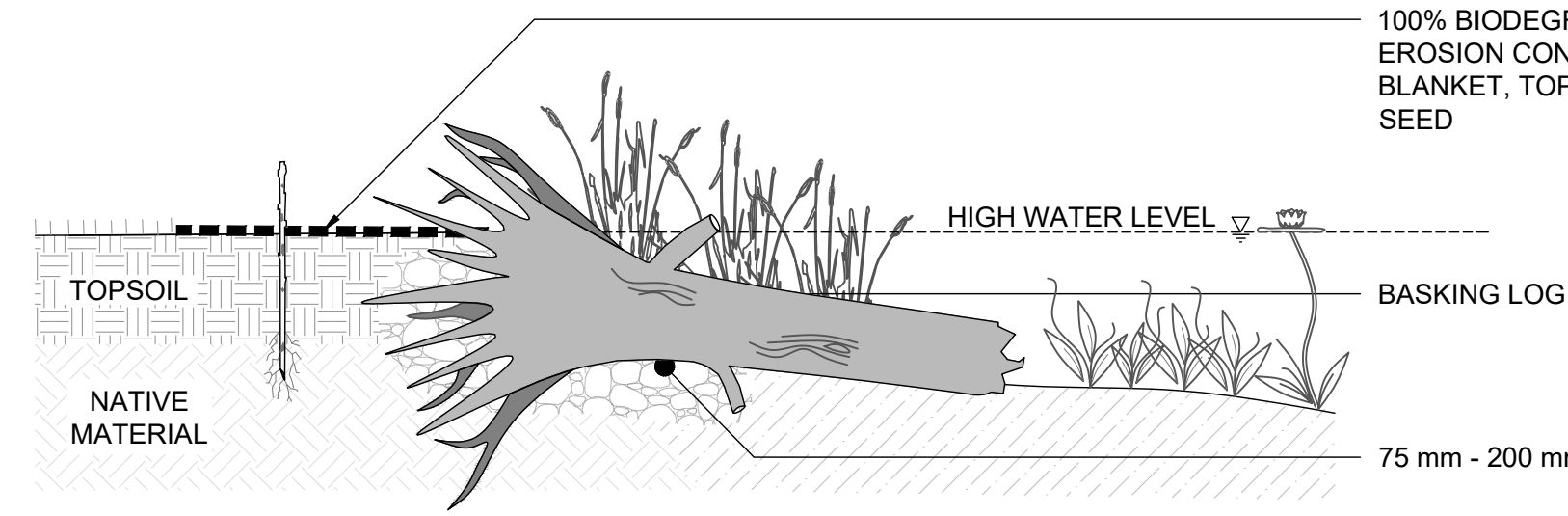
**LIVE STAKING**  
N.T.S.



SCIENTIFIC NAME	COMMON NAME	QTY	CONDITION
<i>CORNUS STOLONIFERA</i>	RED OSIER DOGWOOD	245	1 m, LIVE STAKE
<i>SALIX BEBBIANA</i>	REBB'S WILLOW	245	1 m, LIVE STAKE
<i>SALIX DISCOLOR</i>	PUSSY WILLOW	245	1 m, LIVE STAKE
<i>SALIX INTERIOR</i>	SANDBAR WILLOW	245	1 m, LIVE STAKE
<i>SALIX LUCIDA</i>	SHINING WILLOW	245	1 m, LIVE STAKE

**EROSION CONTROL BLANKET SPECIFICATIONS**

- A BIODEGRADABLE EROSION CONTROL BLANKET (ECB) SHALL BE INSTALLED ON ALL DISTURBED NATURAL SURFACES FOLLOWING THE PLACEMENT OF TOPSOIL AND APPLICATION OF THE NATIVE SEED MIX.
- THE ECB MUST BE CONSTRUCTED OF 100% WOVEN COCONUT FIBRE (E.G., COIR) OR STRAW MAT WITHIN A GEOTEXTILE NETTING (TOP AND BOTTOM) WITH BIODEGRADABLE THREAD. NON-BIODEGRADABLE MATERIAL INCLUDING POLYPROPYLENE OR PLASTICS WITH A BIODEGRADABLE RATING ARE NOT ACCEPTABLE. THE MINIMUM WEIGHT OF THE ECB MUST BE 400 g/m<sup>2</sup> (12 oz./yrd<sup>2</sup>).
- TO INSTALL, THE ECB MUST BE UNROLLED DOWNSLOPE OR IN DIRECTION OF WATER FLOW. ADJACENT ECBs SHOULD OVERLAP A MINIMUM OF 150 mm ALONG THE EDGES. AT THE END OF EACH ROLL, FOLD BACK 100 mm TO 200 mm OF THE ECB. OVERLAP THIS 100 mm TO 200 mm OVER THE START OF THE NEXT ROLL. SECURE THE TWO LAYERS TO THE GROUND SECURELY.
- BIODEGRADABLE OR TAPERED WOODEN STAKES SHALL BE USED TO SECURE THE BLANKET. STAKES SHALL BE INSTALLED AT THE SPACING RECOMMENDED BY THE ECB MANUFACTURER TO PREVENT SURFACE RUNOFF FROM ERODING THE UNDERLYING SOIL.



**NOTES**

- ANCHOR AND SUPPORT BASKING LOGS WITH 75 mm - 200 mm STONE MIX.
- FIRMLY COMPACT STONE MIX TO PREVENT THROUGH FLOW.
- BURY 1/3 OF LOG INTO SOIL.
- LENGTH OF BASKING LOGS ARE TO BE INSTALLED 1000 - 1500 mm INTO WET AREA.
- BASKING LOGS TO BE A MINIMUM 500 mm IN DIAMETER AND 2000 - 2500 mm IN LENGTH.
- BASKING LOGS SHOULD BE ANGLED TO PROMOTE TURTLE BASKING.
- BASKING LOGS SHOULD BE A MIXTURE OF SUITABLE HARDWOOD AND SOFTWOOD SPECIES.

**BASKING LOG**  
N.T.S.

**RIPARIAN SEED MIX**

SCIENTIFIC NAME	COMMON NAME	PERCENTAGE
<i>ACORUS AMERICANUS</i>	SWEET FLAG	10
<i>ASCLEPIAS INCARNATA</i>	SWAMP MILKWEED	10
<i>CAREX SCOPARIA</i>	BLUNT BROOM SEDGE	15
<i>CAREX VULPINOIDEA</i>	FOX SEDGE	15
<i>ELYMUS VIRGINICUS</i>	VIRGINIA WILD RYE	15
<i>EUPATORIUM MACULATUM</i>	SPOTTED JOE PYE WEED	5
<i>SCIRPUS ATROVIRENS</i>	GREEN BULLRUSH	15
<i>SYMPHYOTRICHUM PUNICEUM</i>	PURPLE STEMMED ASTER	5
<i>VERBENA HASTATA</i>	BLUE VERVAIN	10

**NOTES:**

- APPLY SEED MIX AT A RATE OF 30 kg PER HECTARE.
- SEEDING SHALL OVERLAP ADJACENT GROUND COVER BY 300 mm.
- SIMULTANEOUSLY APPLY A NURSE CROP OF ANNUAL OATS (*AVENA SATIVA*) AT A RATE OF 30 kg PER HECTARE.
- WATER SOIL AFTER SEED APPLICATION.

**WETLAND SEED MIX**

SCIENTIFIC NAME	COMMON NAME	PERCENTAGE
<i>ASCLEPIAS INCARNATA</i>	SWAMP MILKWEED	5
<i>CAREX BEBBI</i>	REBB'S SEDGE	15
<i>CAREX LURIDA</i>	LURID SEDGE	4
<i>CAREX SCOPARIA</i>	BLUNT BROOM SEDGE	10
<i>CAREX VULPINOIDEA</i>	FOX SEDGE	10
<i>ELYMUS VIRGINICUS</i>	VIRGINIA WILD RYE	15
<i>EUPATORIUM PERFOLIATUM</i>	BONESET	2
<i>EUTROCIUM MACULATUM</i>	SPOTTED JOE PYE WEED	2
<i>GLYCERIA STRIATA</i>	FOWL MANNA GRASS	5
<i>JUNCUS EFFUSUS</i>	SOFT RUSH	5
<i>LOBELIA SIPHILITICA</i>	BLUE LOBELIA	1
<i>MIMULUS RINGENS</i>	MONKEY FLOWER	1
<i>SCIRPUS ATROVIRENS</i>	DARK GREEN BULLRUSH	5
<i>SCIRPUS CYPERINUS</i>	WOOLGRASS	5
<i>SYMPHYOTRICHUM NOVAE-ANGLIAE</i>	NEW ENGLAND ASTER	2
<i>SYMPHYOTRICHUM PILOSUM</i>	HEATH ASTER	2
<i>SYMPHYOTRICHUM PUNICEUM</i>	PURPLE STEMMED ASTER	1
<i>VERBENA HASTATA</i>	BLUE VERVAIN	10

**NOTES:**

- APPLY SEED MIX AT A RATE OF 30 kg PER HECTARE.
- SEEDING SHALL OVERLAP ADJACENT GROUND COVER BY 300 mm.
- SIMULTANEOUSLY APPLY A NURSE CROP OF ANNUAL OATS (*AVENA SATIVA*) AT A RATE OF 30 kg PER HECTARE.
- WATER SOIL AFTER SEED APPLICATION.

DATE	BY	REVISIONS
25/09/30	SE	SECOND DETAILED DESIGN SUBMISSION
25/03/07	LD	FIRST DETAILED DESIGN SUBMISSION

DESIGNED BY: LD/SE CHECKED BY: PV

DRAWN BY: SE DATE: MARCH 2025

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**MARLBOROUGH CREEK**  
**SWMP OUTFALL DESIGN**  
**OUTFALL AND RESTORATION DETAILS**

PROJECT No.: PN25011	DRAWING No.: DET-1
SCALE: AS NOTED	SHEET 2 OF 2