

**LOCATION PLAN**  
Scale: N.T.S.

DRAWINGS LIST		
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1	G-000	LOCATION PLAN AND DRAWINGS LIST
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7	SW-110	SITE 1 - DEMOLITION PLAN
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9	SW-121	SITE 1 - WILDLIFE TRAIL PLAN AND PROFILE STATION 10+080 TO 10+380
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23	SW-240	SITE 2 - TYPICAL SECTIONS
24	SW-241	SITE 2 - SLOPE TREATMENT DETAILS
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STAMPED AND SIGNED BY:  
MICHAEL J. GALLANT, P.ENG  
DATE: JAN 30, 2018**

**APEGA PERMIT TO PRACTICE NO. P07929**

Rev	Date	Des	Dwn	Chk	Description of Revision
0	JUN 29/2017	MG	ROK	AKS	REVISION INFO RESET FOR TENDERING
1	OCT.02/2017	MG	ROK	AKS	UPDATED DRAWING LIST FOR TENDER
2	JAN 30/2018	MG	ROK	AKS	ISSUED FOR CONSTRUCTION
3	NOV 01/2019	MG	MAR	AKS	AS-BUILT

**BIOENGINEERING DEMONSTRATION  
AND EDUCATION PROJECT  
LOCATION PLAN AND DRAWINGS LIST**

**ALBERTA ENVIRONMENT AND PARKS  
BIOENGINEERING DEMONSTRATION AND EDUCATION PROJECT**

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**PLAN**  
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- NOTES:**
- REFER TO DWG. G-020 FOR LEGEND AND GENERAL NOTES.

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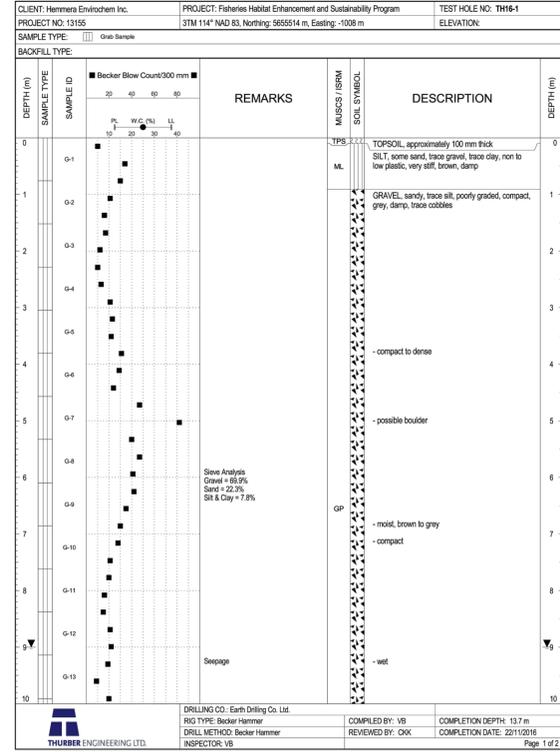
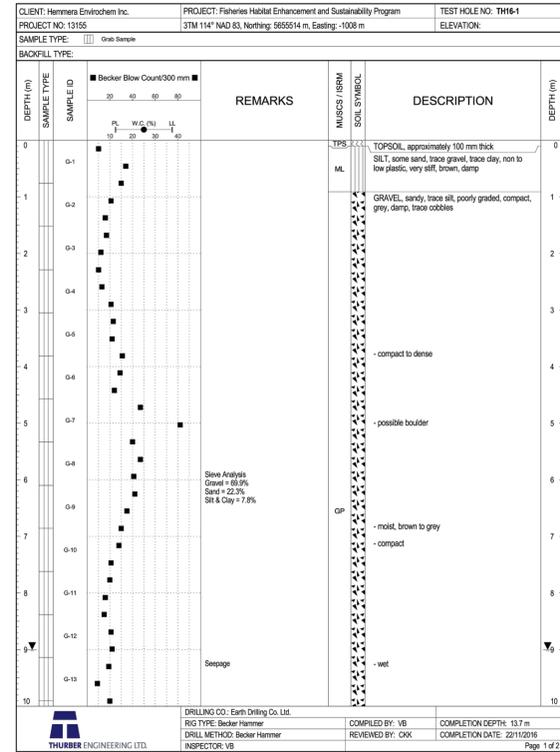
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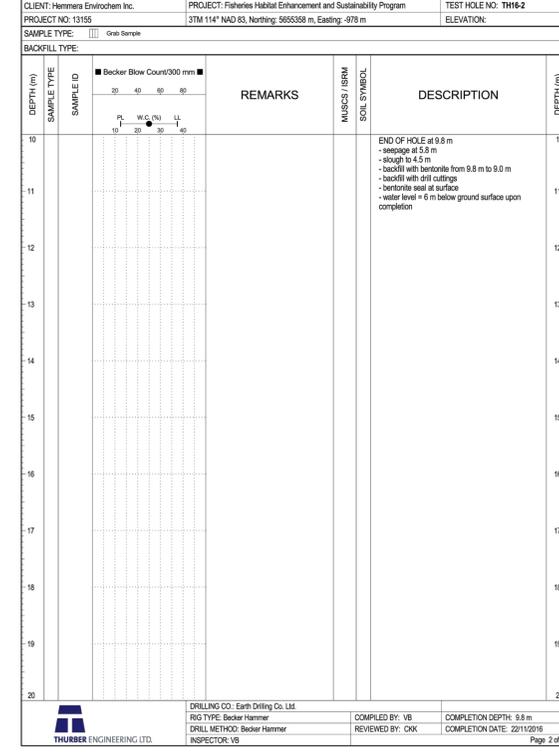
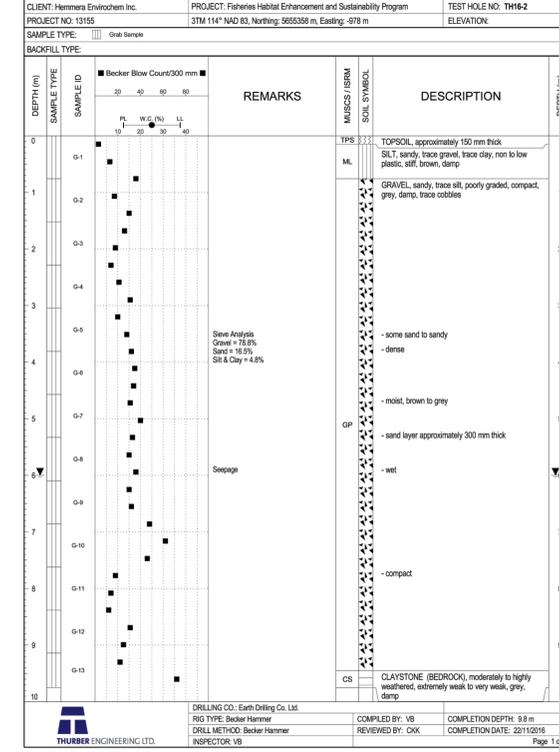
**BIOENGINEERING DEMONSTRATION  
AND EDUCATION PROJECT  
KEY PLAN AND GENERAL ARRANGEMENT**

Project No: **3552-004** Drawing No. **G-010** Rev. **2**  
Group: **CIVIL**





**BOREHOLE LOG TH16 - 1**  
Scale: N.T.S.



**BOREHOLE LOG TH16 - 2**  
Scale: N.T.S.

**kwl KERR WOOD LEIDAL**  
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Tel: 250 352 2757  
www.terraerosion.com

- NOTES:**
- REFER TO DWG. G-020 FOR LEGEND AND GENERAL NOTES.
  - GEOTECHNICAL BORE HOLE LOGS PROVIDED BY THURBER ENGINEERING LTD. NOV. 2016.

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**BIOENGINEERING DEMONSTRATION AND EDUCATION PROJECT**

**BOREHOLE LOGS**

Project No: <b>3552-004</b>	Drawing No.	Rev.
Group: <b>CIVIL</b>	<b>G-030</b>	<b>2</b>

**NOTES:**

- REFER TO DWG. G-020 FOR LEGEND AND GENERAL NOTES.
- GOOD HOUSEKEEPING PRACTICES ITEMS:
  - PROPER PLACEMENT AND PROTECTION OF STOCKPILE SOILS AND MATERIALS. PLACEMENT OF MATERIALS ON A CITY OF CALGARY STREET OR WHERE WIND/WATER COULD TRANSPORT MATERIAL OFF-SITE IS PROHIBITED UNDER THE CITY OF CALGARY STREET BYLAW. STOCKPILES ARE TO BE PROPERLY PLACED AND PROTECTED ON SITE SO MATERIAL WILL NOT BE ERODED TO OFF-SITE AREAS, INCLUDING STORM INLETS.
  - CONTROL OF MUD TRACK OUT DURING CONSTRUCTION, USUALLY BY MEANS OF A WELL MAINTAINED CONSTRUCTION ENTRANCE/EXIT ON ALL ACCESS LOCATIONS, SUPPLEMENTED WITH PERIODIC STREET SWEEPING IF REQUIRED.
  - DUST CONTROL MUST BE IMPLEMENTED ON SITE, WHEN REQUIRED.
  - INSTALL DOWN-GRADE PERIMETER PROTECTION (SUCH AS SILT FENCE, COMPOST SOCKS OR FIBER ROLLS) TO PROTECT OFF-SITE AREAS FROM STORMWATER RUNOFF AND SEDIMENTATION DURING CONSTRUCTION.
  - TEMPORARY SEDIMENT CONTROL AT ANY STORM INLETS REQUIRES PRIOR WRITTEN APPROVAL BY THE CITY OF CALGARY. ONE OF THE FORMS OF WRITTEN APPROVAL IS APPROVED EROSION AND SEDIMENT CONTROL DRAWINGS. WHEN INSTALLING INLET PROTECTION MAKE SURE THAT THEY MATCH WHAT IS SHOWN ON THE APPROVED DRAWINGS. FOR MOST SITES, THE ONLY LOCATION WHERE INLET PROTECTION WOULD BE APPROVED IS DIRECTLY ADJACENT TO A GRAVEL PAD OR STOCKPILE. FAILURE TO OBTAIN APPROVAL CAN LEAD TO FINES UNDER THE CITY OF CALGARY DRAINAGE BYLAW. PLEASE CONTACT THE CITY OF CALGARY WATER SERVICES (CALL 3-1-1) FOR MORE INFORMATION IF YOU WISH TO USE INLET PROTECTION ON OR NEAR YOUR GOOD HOUSEKEEPING SITE.
- GENERAL ITEMS:
  - INSPECTIONS OF ALL EROSION AND SEDIMENT CONTROL MEASURES BY THE CONTRACTOR DURING THE CONSTRUCTION PERIOD MUST BE COMPLETED AND DOCUMENTED DAILY AND DURING, OR WITHIN 24 HOURS OF, HEAVY SNOWMELT AND HEAVY AND/OR PROLONGED RAINFALL, OR WITHIN 12 HOURS OF HEAVY PRECIPITATION WITHIN ANY 24 HOUR PERIOD, OR PRECIPITATION OR SNOWMELT ON WET OR THAWING SOILS. INSPECTION DOCUMENTATION MUST CONTAIN NOTES REGARDING DAMAGE AND DEFICIENCIES OBSERVED.
  - IMMEDIATE ACTION MUST BE TAKEN BY THE CONTRACTOR WHEN THE NEED FOR MAINTENANCE OR REPAIR OF EROSION AND SEDIMENT CONTROL MEASURES IS IDENTIFIED FOR THE ONGOING PERFORMANCE OF THE MEASURES.
  - THE CONSULTANT SHOULD INSPECT THE EROSION AND SEDIMENT CONTROL MEASURES EVERY 7 DAYS AND FOLLOWING HEAVY RAINSTORMS OR SNOWMELT EVENTS AND ADVISE THE CONTRACTOR IMMEDIATELY OF ANY AREAS OF CONCERN.
  - ANY OFF-SITE RELEASES OF SEDIMENT-LADEN WATER OR OTHER CONTAMINANTS TO A STORM DRAINAGE SYSTEM OR THE ENVIRONMENT MUST BE IMMEDIATELY REPORTED BY CALLING 1-800-222-6514 AND 3-1-1.
  - PRIOR AUTHORIZATION (A DRAINAGE OR DEWATERING PERMIT) IS REQUIRED FROM THE CITY OF CALGARY PRIOR TO PUMPING OR DIRECTING IMPOUNDED SURFACE WATER AND/OR GROUNDWATER INTO A STORM SEWER. MORE INFORMATION ON PERMITS IS AVAILABLE AT WWW.CALGARY.CA/WGS OR BY CONTACTING 3-1-1.
  - LONGER TERM STOCKPILES (IN PLACE MORE THAN 30 DAYS) MUST BE COVERED OR STABILIZED WITH MULCH AND TACKIFIER, VEGETATION COVER OR OTHER SUITABLE MEASURES. STOCKPILES IN PLACE LESS THAN 30 DAYS MUST HAVE FUNCTIONAL SEDIMENT CONTROL PRACTICES ON THE DOWN-GRADE SIDE OF THE PILE THAT WILL CONTAIN SEDIMENT (SILT FENCE, FIBER ROLLS, COMPOST SOCKS, ETC.). SOIL WINDROWED DURING UTILITY EXCAVATIONS SHOULD BE PLACED UP-GRADE OF THE TRENCH; IN THE ABSENCE OF OTHER SPECIFIC REGULATORY OR PROJECT REQUIREMENTS, MAXIMUM LENGTH OF OPEN EXCAVATION PRIOR TO BACKFILLING AND STABILIZATION IS 150 m.
  - DURING A CONSTRUCTION SHUTDOWN (DEFINED AS ANY EXTENDED PERIOD OF TIME DURING WHICH THE CONTRACTOR IS NOT ACTIVELY DEVELOPING THE PROJECT SITE AND MAY NO LONGER HAVE PERSONNEL OR EQUIPMENT ON SITE), EROSION AND SEDIMENT CONTROL MEASURES MUST STILL BE MAINTAINED, INCLUDING WINTER SHUTDOWNS AND SPRING FRESHET PRIOR TO CONSTRUCTION RE-START.
  - ALL CATCHBASIN INLET PROTECTION MUST BE REMOVED AT FINAL ACCEPTANCE CERTIFICATE.

**NOTES (CONT):**

- EXISTING CITY OF CALGARY FIRE DEPARTMENT BOAT RAMP NOTES:
- CITY OF CALGARY FIRE DEPARTMENT REQUIRES UNOBSTRUCTED ACCESS TO THE BOAT RAMP.
  - DO NOT STOCKPILE MATERIAL OR STORE EQUIPMENT IN SUCH A MANNER THAT MAY OBSTRUCT ACCESS TO THE BOAT LAUNCH.
  - DO NOT LEAVE EQUIPMENT UNATTENDED ON THE ACCESS ROAD OR NEAR THE BOAT LAUNCH THAT MAY OBSTRUCT ACCESS TO THE BOAT LAUNCH.
- LAYDOWN AND STOCKPILE AREA RECLAMATION NOTES
- LAYDOWN AND STOCKPILE AREAS TO BE RECLAIMED TO PRE-CONSTRUCTION OR BETTER CONDITION PER THE SPECIFICATIONS

**LEGEND:**

- SILT FENCING
- - - TURBIDITY CURTAIN
- - - ISOLATION ALIGNMENT
- [Hatched Box] SITE ACCESS
- [Hatched Box] CONTRACTOR LAYDOWN AND STOCKPILE AREA
- [Hatched Box] CONTRACTOR OFFICE AND PARKING AREA
- [Hatched Box] DE-WATERING SEDIMENT CONTROL AREA
- [Cloud Shape] TREE PROTECTION AREA

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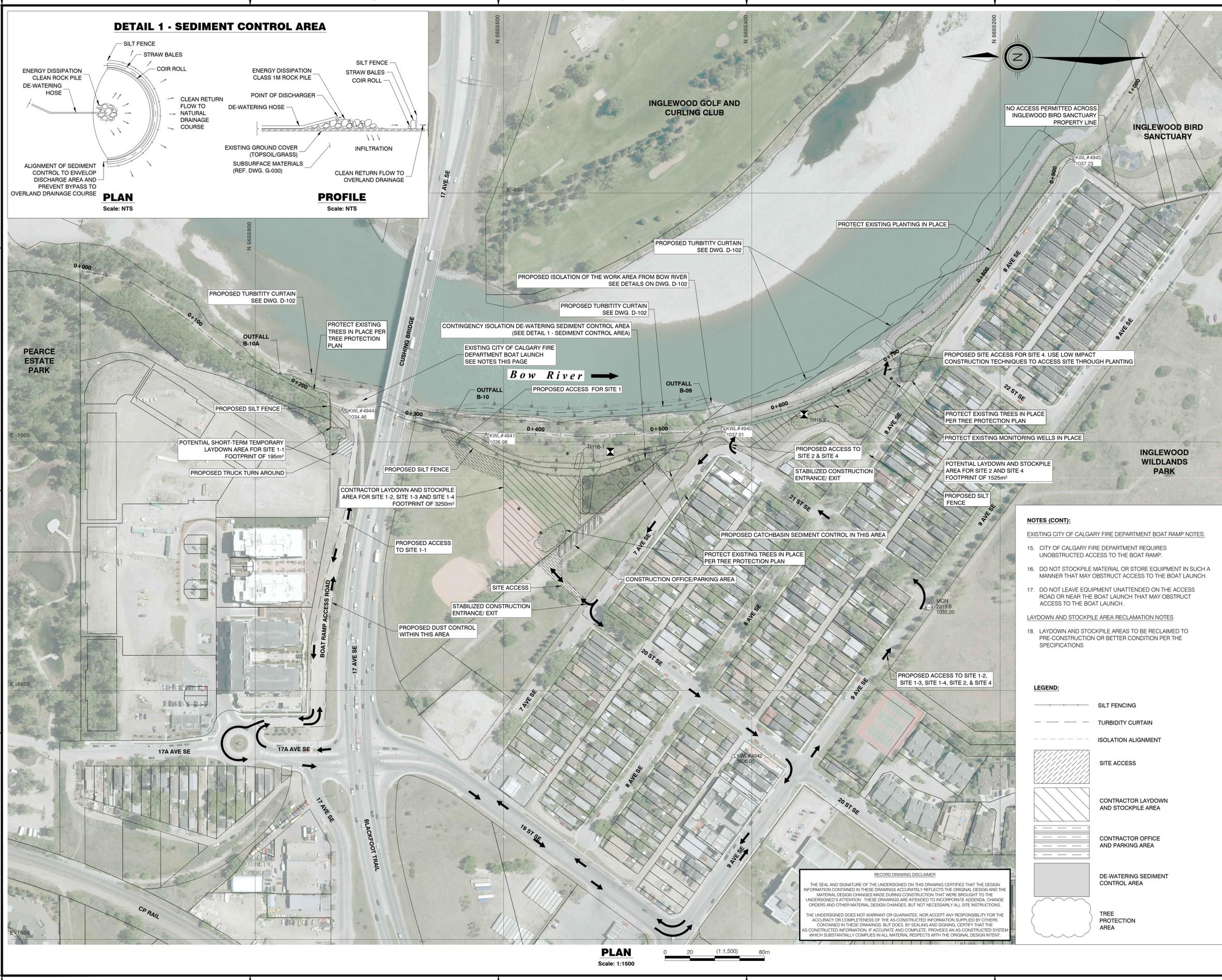
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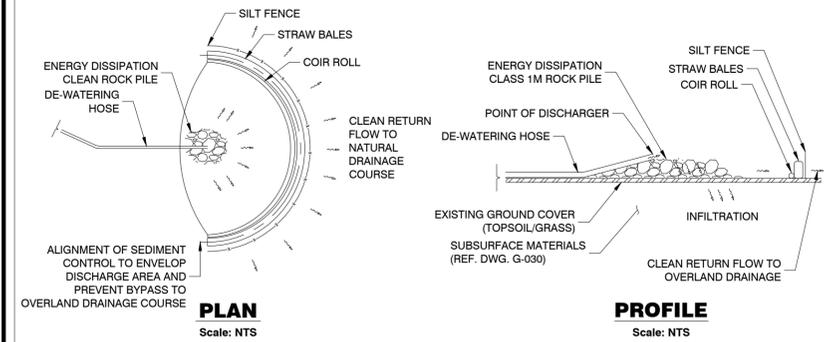
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**BIOENGINEERING DEMONSTRATION AND EDUCATION PROJECT**  
**EROSION AND SEDIMENT CONTROL PLAN**



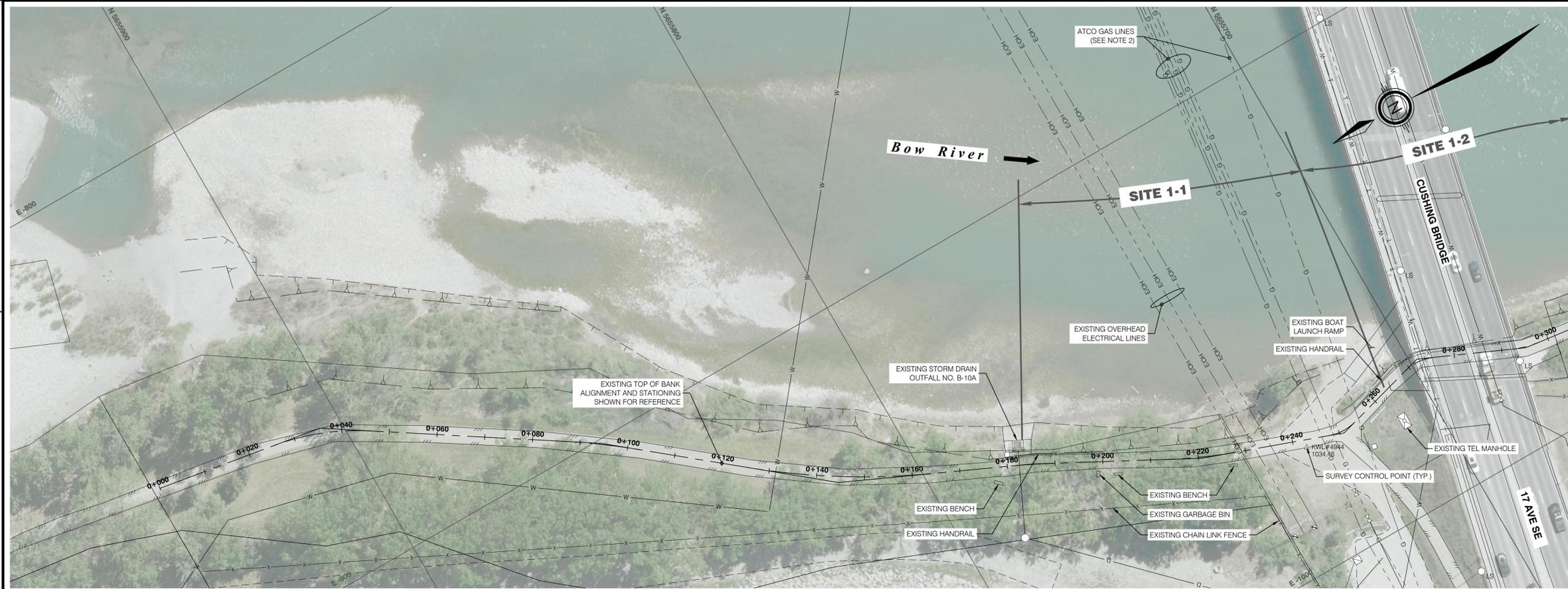
**DETAIL 1 - SEDIMENT CONTROL AREA**



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**PLAN**  
Scale: 1:500



**NOTES:**

- 1. REFER TO DWG G-020 FOR LEGEND AND GENERAL NOTES
- 2. ATCO GAS DISPOSITION (ROE1239)

**LEGEND:**

- RIPRAP STOCKPILE
- LARGE WOODY DEBRIS STOCKPILE
- EXISTING MONITORING WELL

**RECORD DRAWING DISCLAIMER**  
THE SEAL AND SIGNATURE OF THE UNDERSIGNED ON THIS DRAWING CERTIFIES THAT THE DESIGN INFORMATION CONTAINED IN THESE DRAWINGS ACCURATELY REFLECTS THE ORIGINAL DESIGN AND THE MATERIAL DESIGN CHANGES MADE DURING CONSTRUCTION THAT WERE BROUGHT TO THE UNDERSIGNED'S ATTENTION. THESE DRAWINGS ARE INTENDED TO INCORPORATE ADDENDA, CHANGE ORDERS AND OTHER MATERIAL DESIGN CHANGES, BUT NOT NECESSARILY ALL SITE INSTRUCTIONS.  
THE UNDERSIGNED DOES NOT WARRANT OR GUARANTEE, NOR ACCEPT ANY RESPONSIBILITY FOR THE ACCURACY OR COMPLETENESS OF THE AS-CONSTRUCTED INFORMATION SUPPLIED BY OTHERS CONTAINED IN THESE DRAWINGS, BUT DOES, BY SEALING AND SIGNING, CERTIFY THAT THE AS-CONSTRUCTED INFORMATION, IF ACCURATE AND COMPLETE, PROVIDES AN AS-CONSTRUCTED SYSTEM WHICH SUBSTANTIALLY COMPLIES IN ALL MATERIAL RESPECTS WITH THE ORIGINAL DESIGN INTENT.

Seal:  
**ORIGINAL IFC DRAWINGS  
STAMPED AND SIGNED BY:  
MICHAEL J. GALLANT, P.ENG  
DATE: JAN 30, 2018**

**APEGA PERMIT TO PRACTICE NO. P07929**

Rev	Date	Des	Dwn	Chk	Description of Revision
0	JUN 29/2017	MG	ROK	AKS	REVISION INFO RESET FOR TENDERING
1	JAN 30/2018	MG	ROK	AKS	ISSUED FOR CONSTRUCTION
2	SEP 16/2019	MG	MAR	AKS	AS-BUILT

**BIOENGINEERING DEMONSTRATION  
AND EDUCATION PROJECT**  
**SITE 1  
EXISTING CONDITIONS PLAN**

Project No: **3552-004** Drawing No. **SW-100** Rev. **2**  
Group: **CIVIL**

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R:\3550-3552-004\501 Drawings\3. Production Drawings\3552-004\_SW-110\_Rcd.dwg  
 Project No: 3552-004  
 Group: CIVIL  
 Date: 2019-01-31 10:09 AM  
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- NOTES:**
- REFER TO DWG G-020 FOR LEGEND AND GENERAL NOTES
  - ATCO GAS DISPOSITION (ROE1239)

- LEGEND:**
-  PATH REMOVAL
  -  CLEARING, GRUBBING, STRIPPING BOUNDARY

**RECORD DRAWING DISCLAIMER**

THE SEAL AND SIGNATURE OF THE UNDERSIGNED ON THIS DRAWING CERTIFIES THAT THE DESIGN INFORMATION CONTAINED IN THESE DRAWINGS ACCURATELY REFLECTS THE ORIGINAL DESIGN AND THE MATERIAL DESIGN CHANGES MADE DURING CONSTRUCTION THAT WERE BROUGHT TO THE UNDERSIGNED'S ATTENTION. THESE DRAWINGS ARE INTENDED TO INCORPORATE ADDENDA, CHANGE ORDERS AND OTHER MATERIAL DESIGN CHANGES, BUT NOT NECESSARILY ALL SITE INSTRUCTIONS.

THE UNDERSIGNED DOES NOT WARRANT OR GUARANTEE, NOR ACCEPT ANY RESPONSIBILITY FOR THE ACCURACY OR COMPLETENESS OF THE AS-CONSTRUCTED INFORMATION SUPPLIED BY OTHERS CONTAINED IN THESE DRAWINGS, BUT DOES, BY SEALING AND SIGNING, CERTIFY THAT THE AS-CONSTRUCTED INFORMATION, IF ACCURATE AND COMPLETE, PROVIDES AN AS-CONSTRUCTED SYSTEM WHICH SUBSTANTIALLY COMPLIES IN ALL MATERIAL RESPECTS WITH THE ORIGINAL DESIGN INTENT.

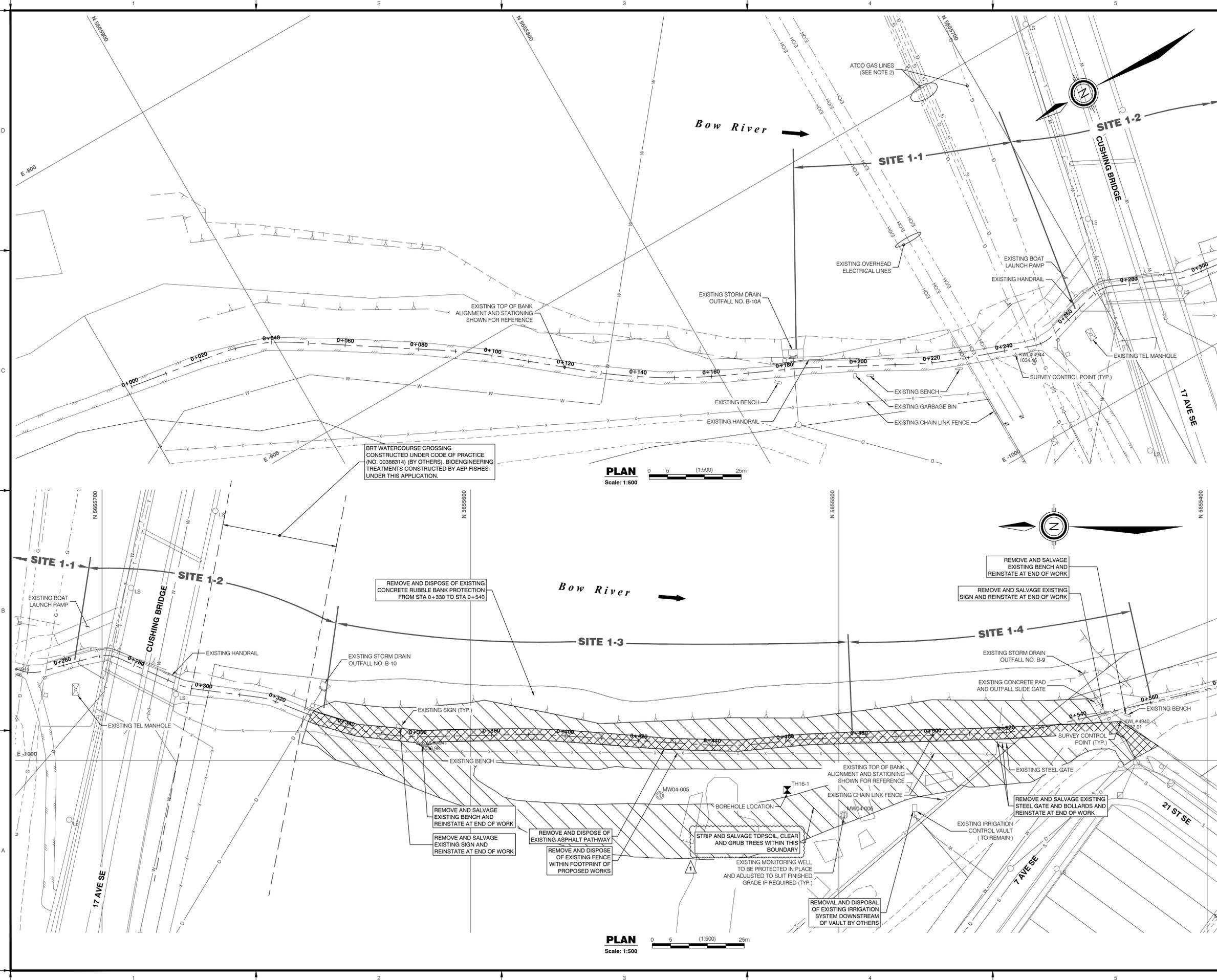
Seal:  
  
 ORIGINAL IFC DRAWINGS  
 STAMPED AND SIGNED BY:  
 MICHAEL J. GALLANT, P.ENG  
 DATE: JAN 30, 2018

**APEGA PERMIT TO PRACTICE NO. P07929**

Rev	Date	Des	Dwn	Chk	Description of Revision
0	JUN 29/2017	MG	ROK	AKS	REVISION INFO RESET FOR TENDERING
1	JAN 30/2018	MG	ROK	AKS	REVISED DEMOLITION LEADER
2	SEP 16/2019	MG	MAR	AKS	AS-BUILT

**BIOENGINEERING DEMONSTRATION AND EDUCATION PROJECT**  
**SITE 1**  
**DEMOLITION PLAN**

Project No: **3552-004**      Drawing No. **SW-110**      Rev. **2**  
 Group: **CIVIL**



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- NOTES:**
- REFER TO DWG G-020 FOR LEGEND AND GENERAL NOTES
  - ATCO GAS DISPOSITION (ROE1239)
- EXISTING CITY OF CALGARY FIRE DEPARTMENT BOAT RAMP NOTES:**
- CITY OF CALGARY FIRE DEPARTMENT REQUIRES UNOBSTRUCTED ACCESS TO THE BOAT RAMP.
  - DO NOT STOCKPILE MATERIAL OR STORE EQUIPMENT IN SUCH A MANNER THAT MAY OBSTRUCT ACCESS TO THE BOAT LAUNCH.
  - DO NOT LEAVE EQUIPMENT UNATTENDED ON THE ACCESS ROAD OR NEAR THE BOAT LAUNCH THAT MAY OBSTRUCT ACCESS TO THE BOAT LAUNCH.

**LEGEND:**

- PROPOSED EARTH WORKS SLOPE
- PROPOSED EARTH WORKS BENCH
- PROPOSED RIPRAP
- PROPOSED VEGETATED RIPRAP

**SURVEY DATA:**  
 AS-BUILT DATA RECEIVED FROM DFH ON 2019-08-15,  
 2019-08-21 AND 2019-08-21.

**RECORD DRAWING DISCLAIMER**  
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Seal:  
**ORIGINAL IFC DRAWINGS  
 STAMPED AND SIGNED BY:  
 MICHAEL J. GALLANT, P.ENG  
 DATE: JAN 30, 2018**

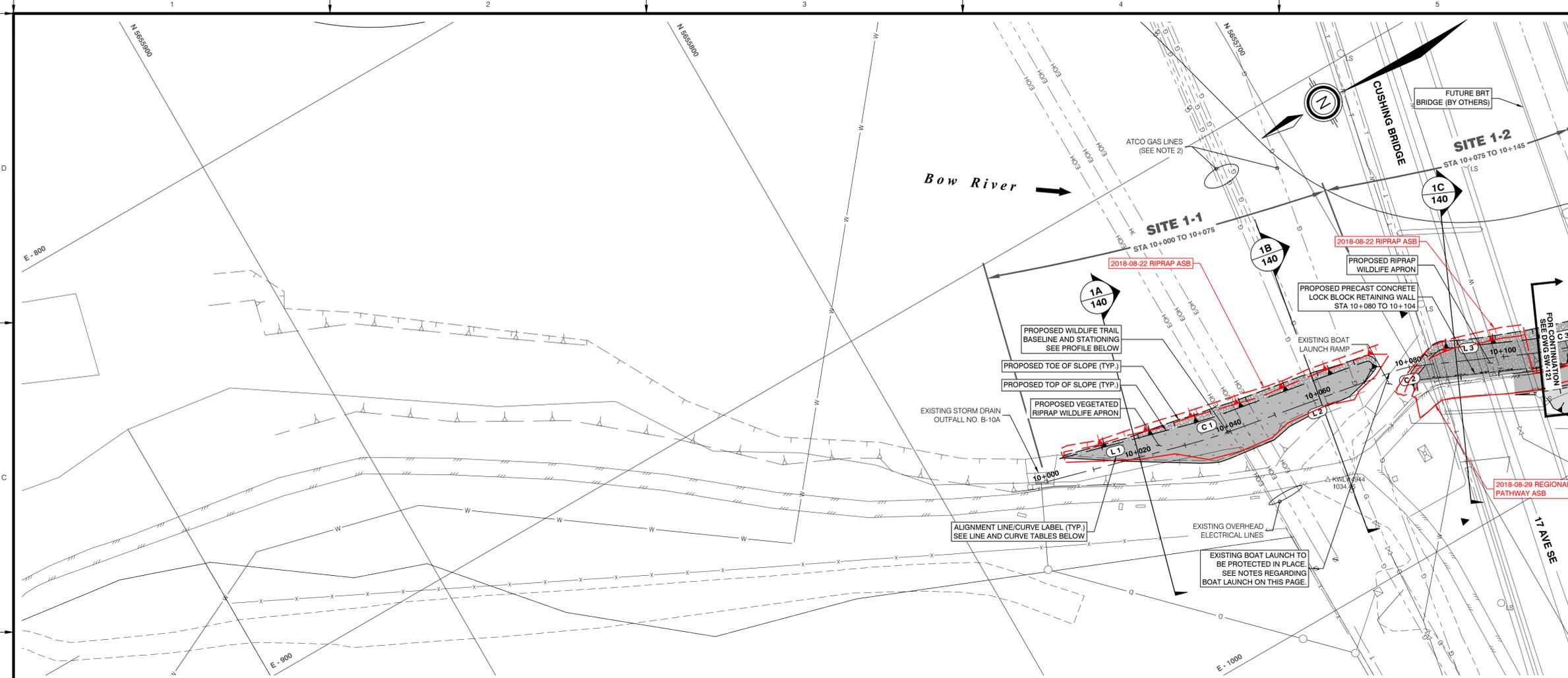
**APEGA PERMIT TO PRACTICE NO. P07929**

Rev	Date	Des	Dwn	Chk	Description of Revision
0	JUN 29/2017	MG	ROK	AKS	ISSUED INFO RESET FOR TENDERING
1	JAN 30/2018	MG	ROK	AKS	ISSUED FOR CONSTRUCTION
2	SEP 16/2019	MG	SDP	AKS	AS-BUILT

**BIOENGINEERING DEMONSTRATION AND EDUCATION PROJECT**

**SITE 1  
 WILDLIFE TRAIL PLAN AND PROFILE  
 STATION 10+000 TO 10+100**

Project No: **3552-004** Drawing No. **SW-120** Rev. **2**  
 Group: **CIVIL**

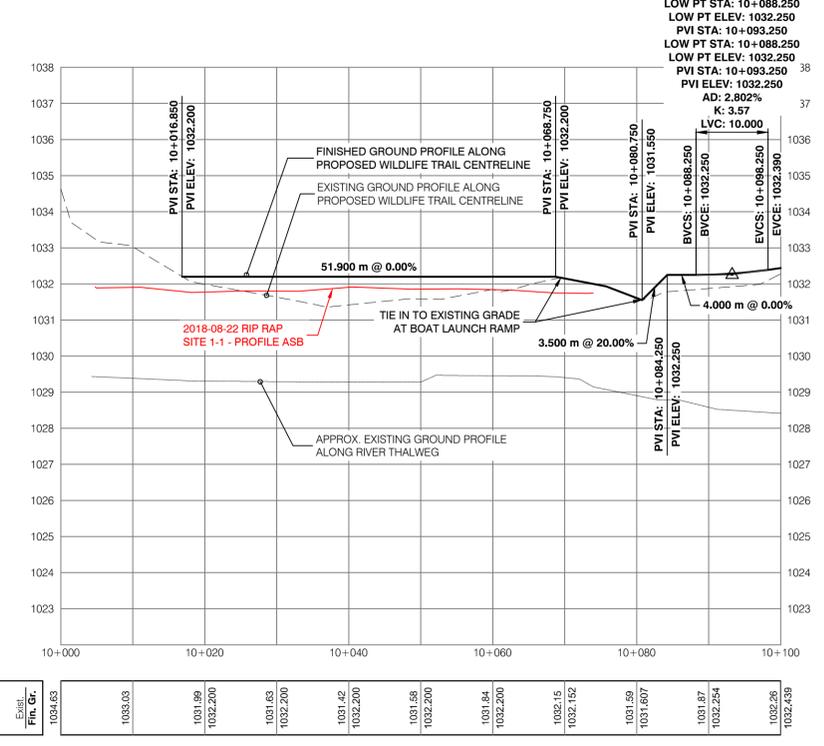


**PLAN**  
 Scale: 1:500



ALIGNMENT LINE DATA						
LINE #	START STATION	END STATION	LENGTH	AZIMUTH	START COORDINATES	END COORDINATES
L 1	10+000.000	10+030.928	30.928 m	195° 14' 04"	N=5655778.939 E=-946.200	N=5655749.098 E=-954.327
L 2	10+040.082	10+077.059	36.977 m	189° 59' 23"	N=5655740.167 E=-956.325	N=5655703.751 E=-962.740
L 3	10+081.953	10+103.720	21.767 m	204° 00' 34"	N=5655699.083 E=-964.167	N=5655679.199 E=-973.024
L 4	10+122.649	10+144.582	21.933 m	193° 09' 51"	N=5655661.284 E=-979.048	N=5655639.927 E=-984.043
L 5	10+146.250	10+228.517	82.266 m	183° 36' 25"	N=5655638.279 E=-984.286	N=5655556.176 E=-989.462
L 6	10+229.150	10+283.197	54.046 m	179° 58' 32"	N=5655555.542 E=-989.482	N=5655501.496 E=-989.458
L 7	10+283.320	10+326.557	43.236 m	180° 41' 07"	N=5655501.372 E=-989.459	N=5655458.139 E=-989.976
L 8	10+346.988	10+380.000	33.012 m	168° 58' 46"	N=5655437.827 E=-988.139	N=5655405.423 E=-981.829

ALIGNMENT CURVE DATA										
CURVE #	RADIUS	DELTA	CURVE LENGTH	TANGENT LENGTH	BEG. CURVE STATION	END CURVE STATION	BEG. CURVE COORDINATES	END CURVE COORDINATES	PI COORDINATES	CENTER OF CURVE COORDINATES
C 1	100.000	5°14'42"	9.154	4.580	10+030.928	10+040.082	N=5655740.098 E=-954.327	N=5655740.167 E=-956.325	N=5655744.678 E=-955.531	N=5655722.821 E=-957.841
C 2	20.000	14°01'12"	4.894	2.459	10+077.059	10+081.953	N=5655703.751 E=-962.740	N=5655699.083 E=-964.167	N=5655701.329 E=-963.166	N=5655707.220 E=-982.436
C 3	100.000	10°50'43"	18.929	9.493	10+103.720	10+122.649	N=5655679.199 E=-973.024	N=5655661.284 E=-979.048	N=5655670.528 E=-976.886	N=5655638.510 E=-981.676
C 4	10.000	9°33'25"	1.668	0.836	10+144.582	10+146.250	N=5655639.927 E=-984.043	N=5655638.279 E=-984.286	N=5655639.113 E=-984.234	N=5655637.650 E=-974.306
C 5	10.000	3°37'54"	0.634	0.317	10+228.517	10+229.150	N=5655556.176 E=-989.482	N=5655555.542 E=-989.482	N=5655555.859 E=-989.482	N=5655555.547 E=-979.482
C 7	100.000	11°42'21"	20.431	10.251	10+326.557	10+346.988	N=5655458.139 E=-989.976	N=5655437.827 E=-988.139	N=5655447.889 E=-990.099	N=5655456.943 E=-989.983



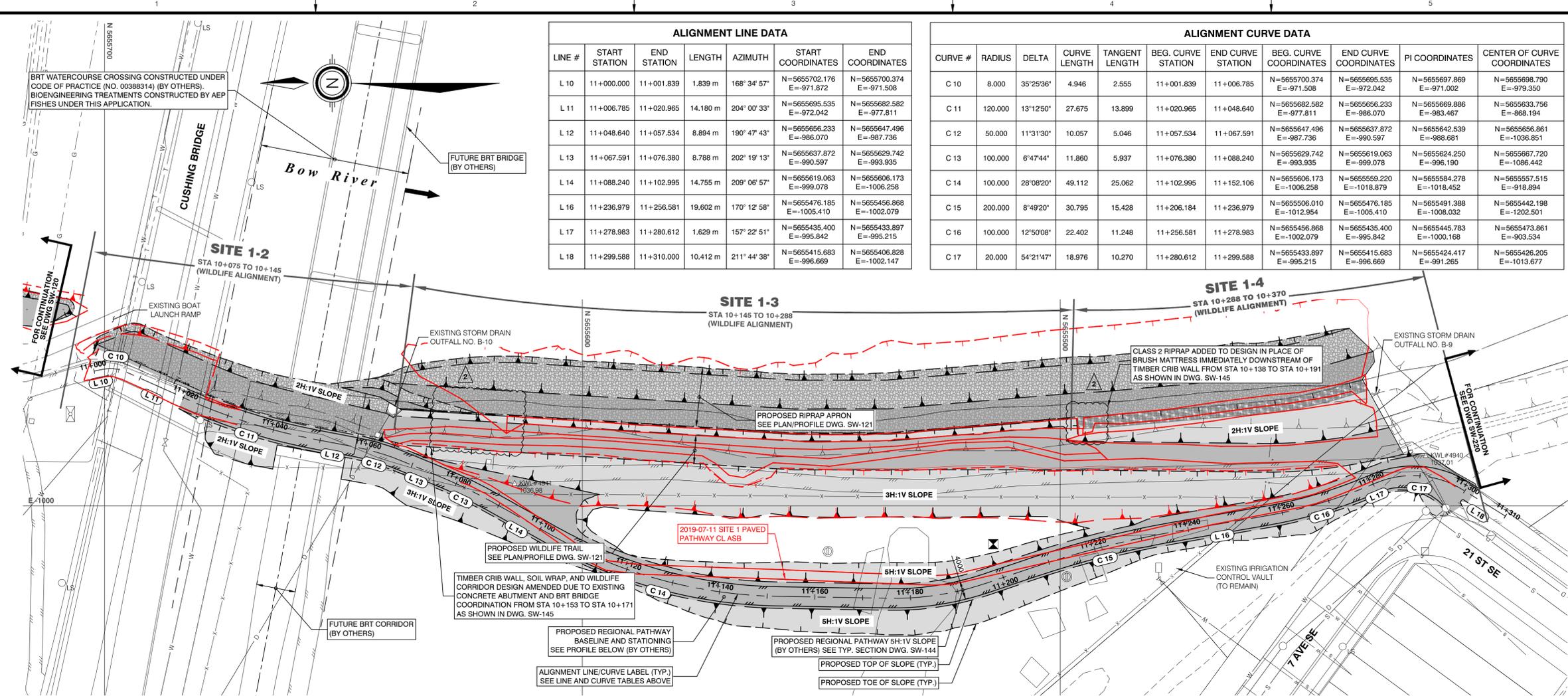
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1031.42	1032.20
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1031.84	1032.20
1032.15	1032.152
1031.69	1031.697
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1032.26	1032.439

**PROFILE**  
 Scale: H 1:500 V 1:100



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ALIGNMENT LINE DATA						
LINE #	START STATION	END STATION	LENGTH	AZIMUTH	START COORDINATES	END COORDINATES
L 10	11+000.000	11+001.839	1.839 m	168° 34' 57"	N=5655702.176 E=-971.508	N=5655700.374 E=-971.508
L 11	11+006.785	11+020.965	14.180 m	204° 00' 33"	N=5655695.535 E=-972.042	N=5655682.582 E=-977.811
L 12	11+048.640	11+057.534	8.894 m	190° 47' 43"	N=5655656.233 E=-986.070	N=5655647.496 E=-987.736
L 13	11+067.591	11+076.380	8.788 m	202° 19' 13"	N=5655637.872 E=-990.597	N=5655629.742 E=-993.935
L 14	11+088.240	11+102.995	14.755 m	209° 06' 57"	N=5655619.063 E=-999.078	N=5655606.173 E=-1006.258
L 16	11+236.979	11+256.581	19.602 m	170° 12' 58"	N=5655476.185 E=-1005.410	N=5655456.868 E=-1002.079
L 17	11+278.983	11+280.612	1.629 m	157° 22' 51"	N=5655435.400 E=-995.842	N=5655433.897 E=-995.215
L 18	11+299.588	11+310.000	10.412 m	211° 44' 38"	N=5655415.683 E=-996.669	N=5655406.828 E=-1002.147

ALIGNMENT CURVE DATA											
CURVE #	RADIUS	DELTA	CURVE LENGTH	TANGENT LENGTH	BEG. CURVE STATION	END CURVE STATION	BEG. CURVE COORDINATES	END CURVE COORDINATES	PI COORDINATES	CENTER OF CURVE COORDINATES	
C 10	8.000	35°25'36"	4.946	2.555	11+001.839	11+006.785	N=5655700.374 E=-971.508	N=5655695.535 E=-972.042	N=5655697.869 E=-971.002	N=5655698.790 E=-979.350	
C 11	120.000	13°12'50"	27.675	13.899	11+020.965	11+048.640	N=5655682.582 E=-977.811	N=5655656.233 E=-986.070	N=5655669.886 E=-983.467	N=5655633.756 E=-988.194	
C 12	50.000	11°31'30"	10.057	5.046	11+057.534	11+067.591	N=5655647.496 E=-987.736	N=5655637.872 E=-990.597	N=5655642.539 E=-988.681	N=5655656.861 E=-1036.851	
C 13	100.000	6°47'44"	11.860	5.937	11+076.380	11+088.240	N=5655629.742 E=-993.935	N=5655619.063 E=-996.190	N=5655624.250 E=-996.190	N=5655667.720 E=-1086.442	
C 14	100.000	28°08'20"	49.112	25.062	11+102.995	11+152.106	N=5655606.173 E=-1006.258	N=5655559.220 E=-1018.879	N=5655584.278 E=-1018.452	N=5655557.515 E=-918.894	
C 15	200.000	8°49'20"	30.795	15.428	11+206.184	11+236.979	N=5655506.010 E=-1012.954	N=5655476.185 E=-1005.410	N=5655491.388 E=-1008.032	N=5655442.198 E=-1202.501	
C 16	100.000	12°50'08"	22.402	11.248	11+256.581	11+278.983	N=5655456.868 E=-1002.079	N=5655435.400 E=-995.842	N=5655445.783 E=-1000.168	N=5655473.861 E=-903.534	
C 17	20.000	54°21'47"	18.976	10.270	11+280.612	11+299.588	N=5655433.897 E=-995.215	N=5655415.683 E=-996.669	N=5655424.417 E=-991.265	N=5655426.205 E=-1013.677	

**kwl KERR WOOD LEIDAL**  
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 E calgary@kwl.ca

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 308 Hart St. Nelson, B.C. V1L 5N5  
 Tel: 250 352 2757  
 www.terraerosion.com

**NOTES:**  
 1. REFER TO DWG G-020 FOR LEGEND AND GENERAL NOTES

**LEGEND:**

- PROPOSED EARTHWORKS SLOPE
- PROPOSED EARTHWORKS BENCH
- PROPOSED RIPRAP
- PROPOSED BRUSH MATTRESS

**SURVEY DATA:**  
 AS-BUILT DATA RECEIVED FROM DFH ON 2019-08-15,  
 2019-08-21 AND 2019-08-21.

**RECORD DRAWING DISCLAIMER:**  
 THE SEAL AND SIGNATURE OF THE UNDERSIGNED ON THIS DRAWING CERTIFIES THAT THE DESIGN INFORMATION CONTAINED IN THESE DRAWINGS ACCURATELY REFLECTS THE ORIGINAL DESIGN AND THE MATERIAL DESIGN CHANGES MADE DURING CONSTRUCTION THAT WERE BROUGHT TO THE UNDERSIGNED'S ATTENTION. THESE DRAWINGS ARE INTENDED TO INCORPORATE ADDENDA, CHANGE ORDERS AND OTHER MATERIAL DESIGN CHANGES, BUT NOT NECESSARILY ALL SITE INSTRUCTIONS. THE UNDERSIGNED DOES NOT WARRANT OR GUARANTEE, NOR ACCEPT ANY RESPONSIBILITY FOR THE ACCURACY OR COMPLETENESS OF THE AS-CONSTRUCTED INFORMATION SUPPLIED BY OTHERS CONTAINED IN THESE DRAWINGS, BUT DOES, BY SEALING AND SIGNING, CERTIFY THAT THE AS-CONSTRUCTED INFORMATION, IF ACCURATE AND COMPLETE, PROVIDES AN AS-CONSTRUCTED SYSTEM WHICH SUBSTANTIALLY COMPLIES IN ALL MATERIAL RESPECTS WITH THE ORIGINAL DESIGN INTENT.

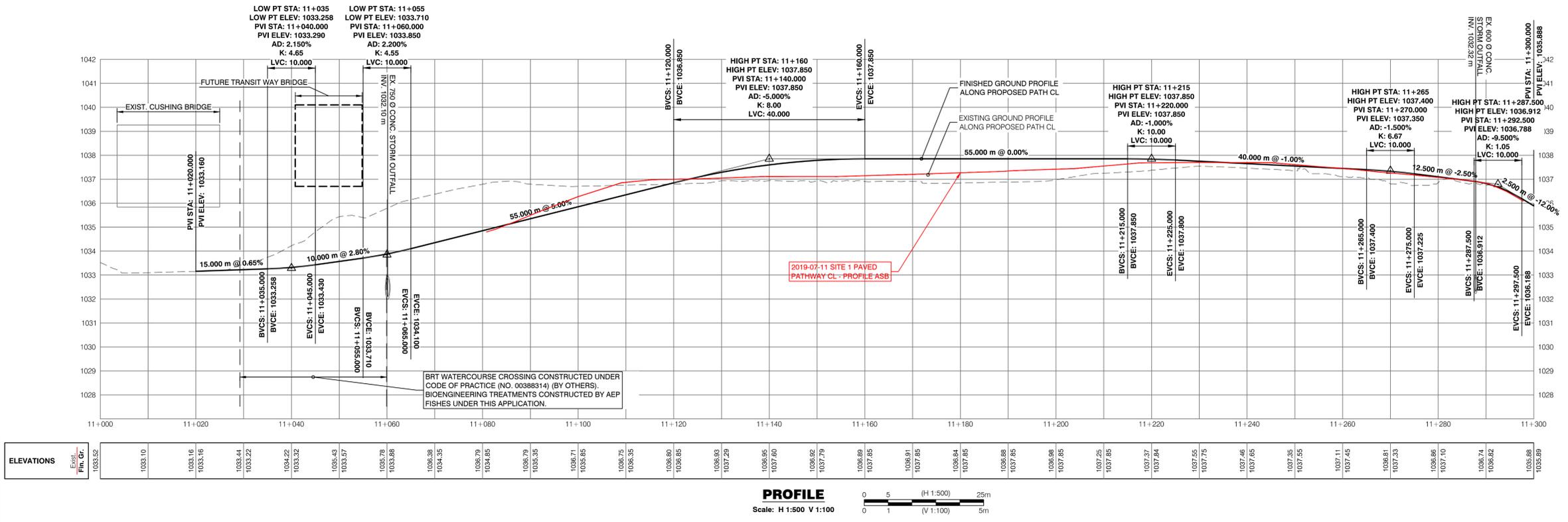
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 STAMPED AND SIGNED BY:  
**MICHAEL J. GALLANT, P. ENG**  
 DATE: JAN 30, 2018

**APEGA PERMIT TO PRACTICE NO. P07929**

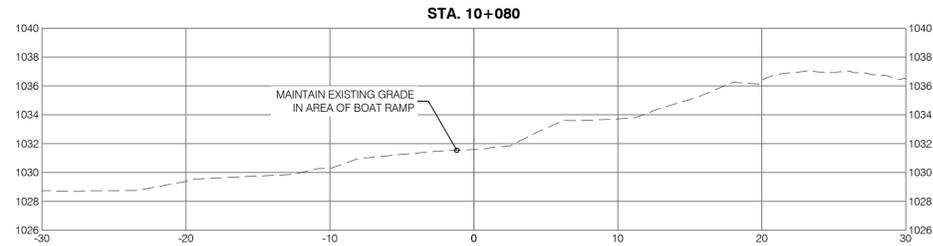
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0	JUN 29/2017	MG	ROK	AKS	REVISION INFO RESET FOR TENDERING
1	JAN 30/2018	MG	ROK	AKS	ISSUED FOR CONSTRUCTION
2	AUG 08/2018	MG	ROK	AKS	ADDED NOTE
3	SEP 16/2019	MG	MAR	AKS	AS-BUILT

**BIOENGINEERING DEMONSTRATION AND EDUCATION PROJECT**  
**SITE 1**  
**REGIONAL PATHWAY PLAN AND PROFILE**  
**STATION 11+000 TO 11+300**

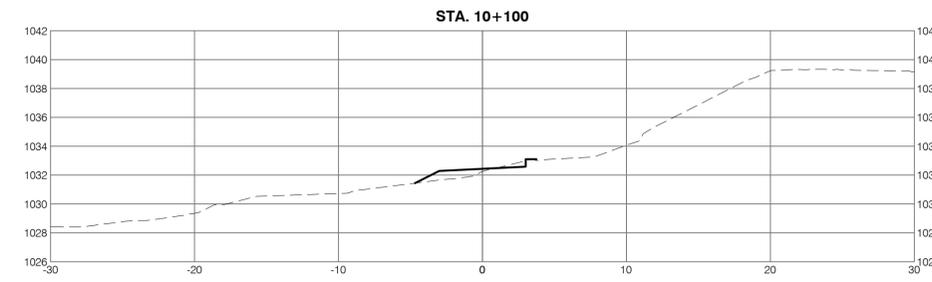
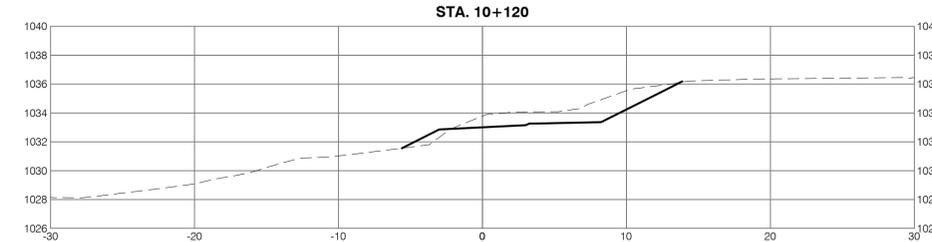
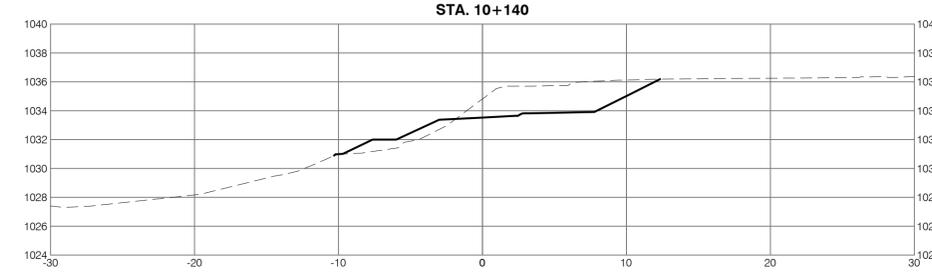
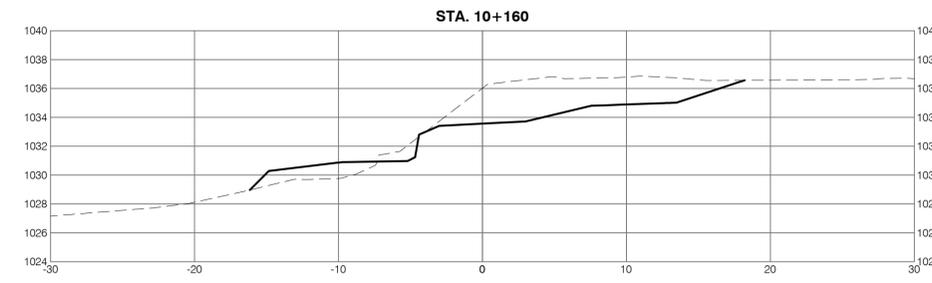
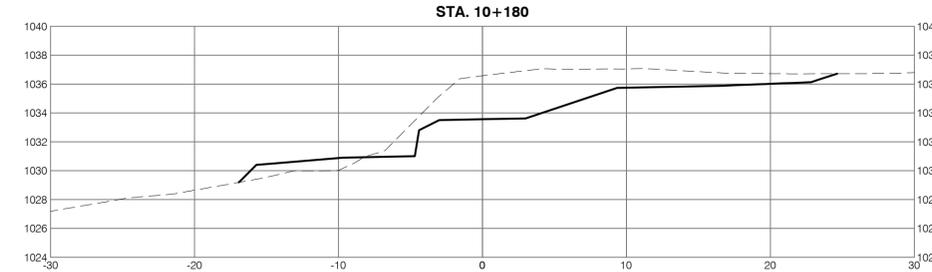
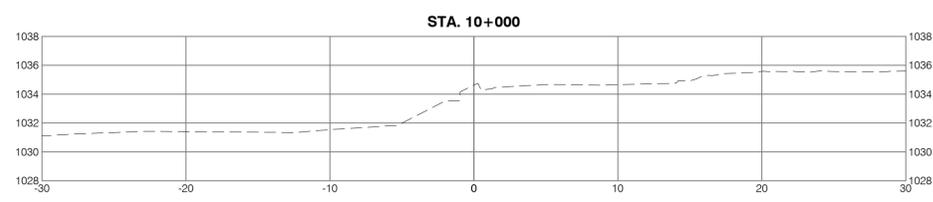
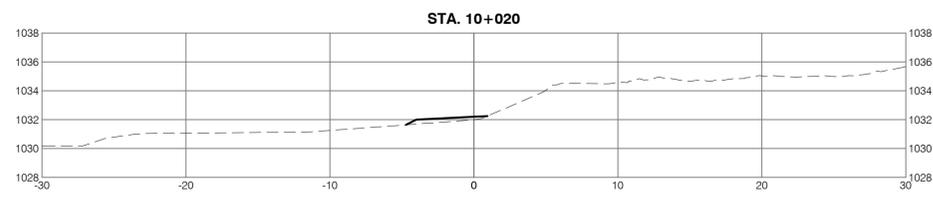
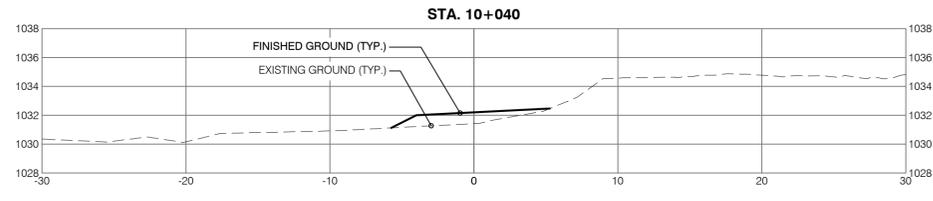
Project No. **3552-004** Drawing No. **SW-122** Rev. **3**  
 Group **CIVIL**



**PROFILE**  
 Scale: H 1:500 V 1:100



REFER TO SECTION SHOWN IN DWG. SW-145



**SECTIONS**  
Scale: 1:250



**NOTES:**

1. REFER TO DWG G-020 FOR LEGEND AND GENERAL NOTES
2. SECTIONS ARE SAMPLED ALONG WILDLIFE TRAIL ALIGNMENT LOOKING DOWNSTREAM. REFER TO DRAWING SW-120 FOR ALIGNMENT LAYOUT INFORMATION.
3. STATIONS 10+108 TO 10+140 ARE WITHIN BRT WATERCOURSE CROSSING CONSTRUCTED UNDER CODE OF PRACTICE NO. 00388314 (BY OTHERS). BIOENGINEERING TREATMENTS BY AEP FISHES UNDER THIS APPLICATION.

**RECORD DRAWING DISCLAIMER**

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Seal:

ORIGINAL IFC DRAWINGS  
STAMPED AND SIGNED BY:  
MICHAEL J. GALLANT, P.ENG  
DATE: JAN 30, 2018

APEGA PERMIT TO PRACTICE NO. P07929

Rev	Date	Des	Dwn	Chk	Description of Revision
0	JUN.29/2017	MG	ROK	AKS	REVISION INFO RESET FOR TENDERING
1	JAN.30/2018	MG	ROK	AKS	ISSUED FOR CONSTRUCTION
2	AUG.08/2018	MG	ROK	AKS	REMOVED SECTION 10+160 AND ADDED NOTE
3	SEP.16/2019	MG	MAR	AKS	AS-BUILT

**BIOENGINEERING DEMONSTRATION  
AND EDUCATION PROJECT**

**SITE 1  
STATION SECTIONS  
STATION 10+000 TO 10+180**

Project No.	<b>3552-004</b>	Drawing No.	<b>SW-130</b>	Rev.	<b>3</b>
Group	<b>CIVIL</b>				



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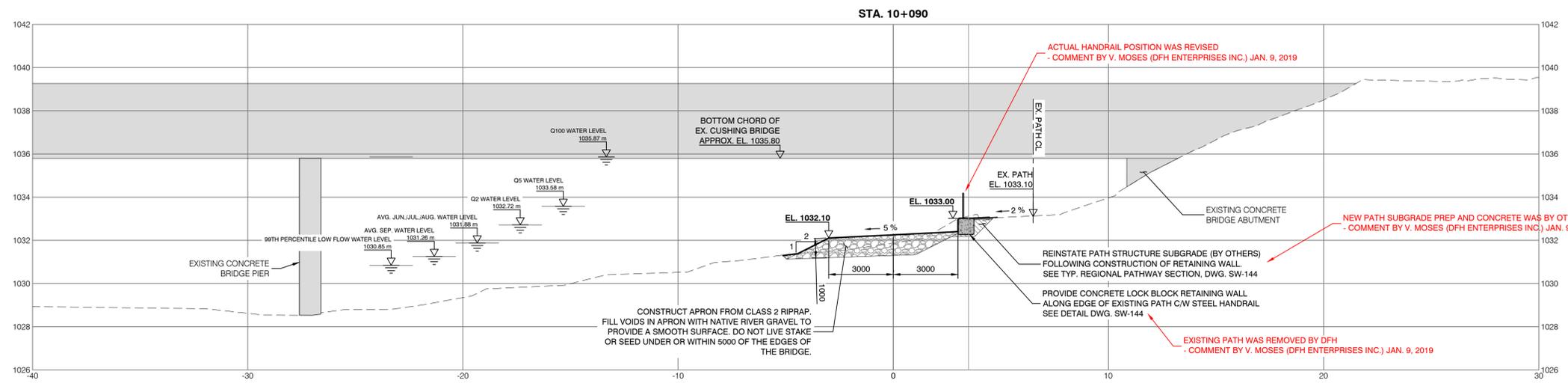
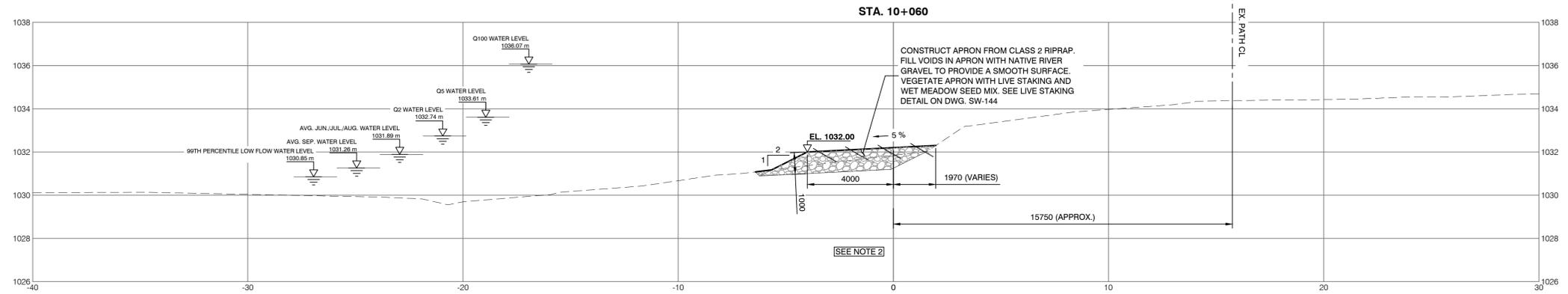
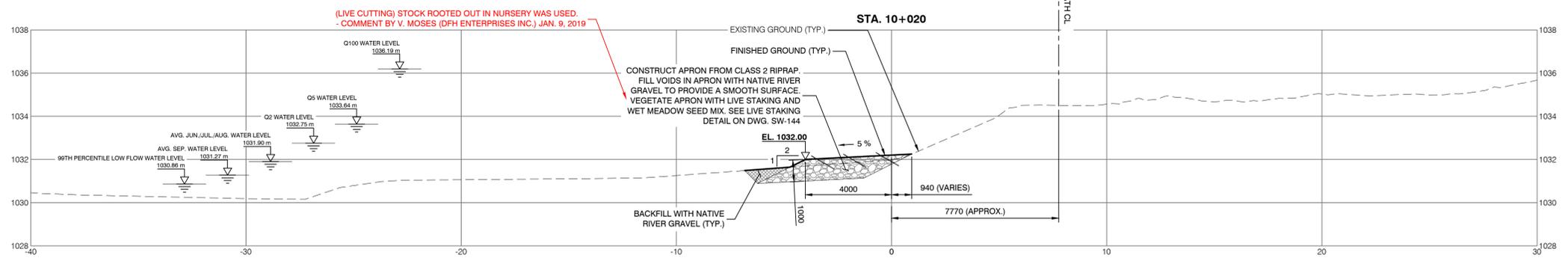
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**NOTES:**

1. REFER TO DWG G-020 FOR LEGEND AND GENERAL NOTES
2. ACTIVE AND ABANDONED ATCO GAS LINES IN CLOSE PROXIMITY, REFERENCE CROSSING NO. 17-233S BY ATCO GAS (DISPOSITION NO. ROE 1239). SUBJECT TO EXECUTED ATCO GAS WALKWAY CORRIDOR WITH LANDSCAPING AND TEMPORARY WORK SPACE PROXIMITY AGREEMENT.



**RECORD DRAWING DISCLAIMER**

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DATE: JAN 30, 2018

APEGA PERMIT TO PRACTICE NO. P07929

Rev	Date	Des	Dwn	Chk	Description of Revision
0	JUN 29/2017	MG	ROK	AKS	REVISION INFO RESET FOR TENDERING
1	JAN 30/2018	MG	ROK	AKS	ISSUED FOR CONSTRUCTION
2	OCT 28/2019	MG	MAR	AKS	AS-BUILT

**BIOENGINEERING DEMONSTRATION AND EDUCATION PROJECT**

**SITE 1**

**TYPICAL SECTIONS - SHEET 1**



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Tel: 250 352 2757  
www.terraerosion.com

**NOTES:**  
1. REFER TO DWG. G-020 FOR LEGEND AND GENERAL NOTES

**RECORD DRAWING DISCLAIMER**  
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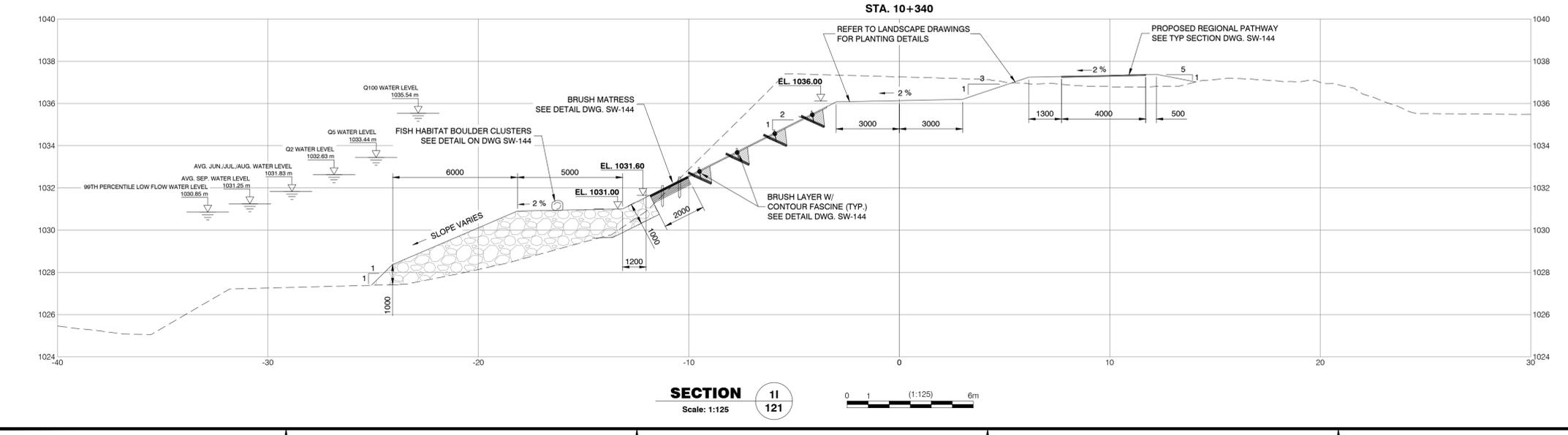
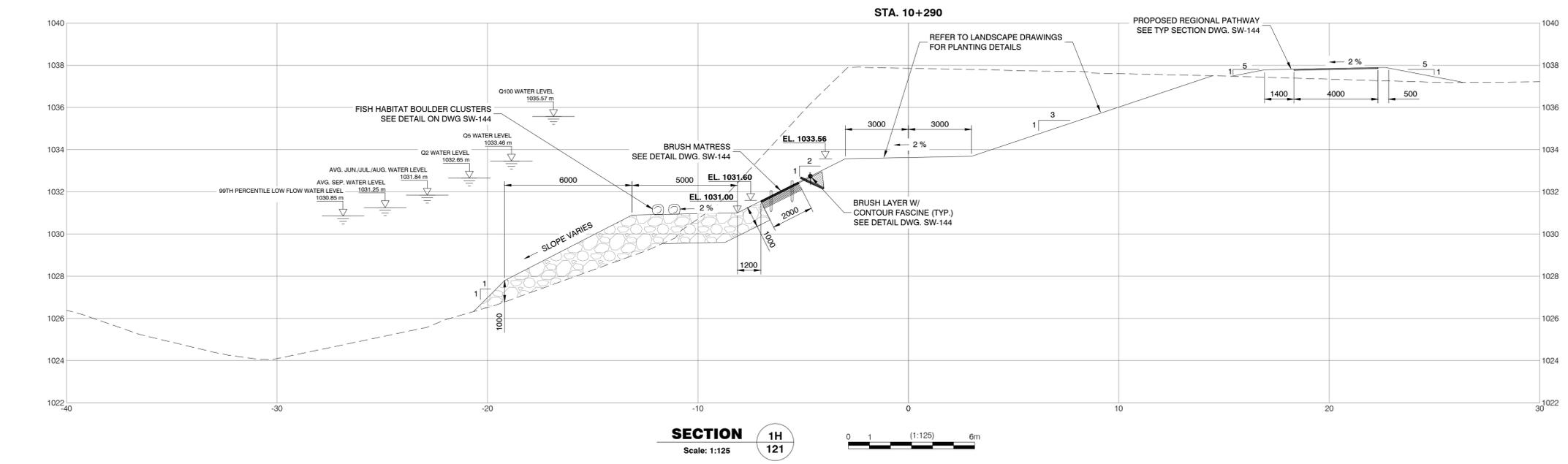
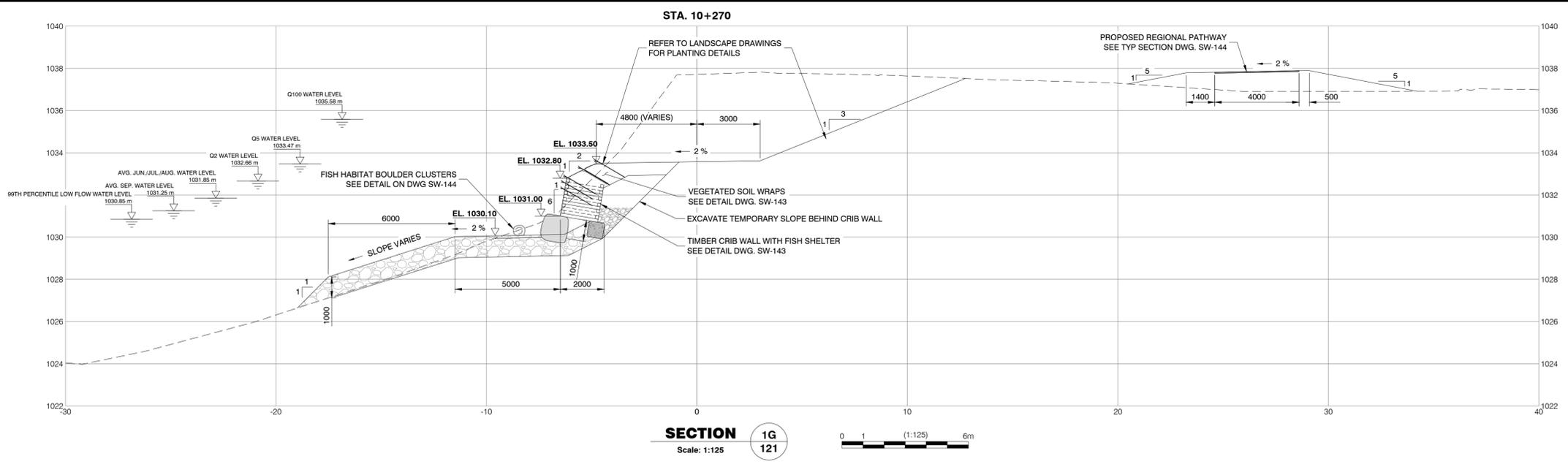
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**ORIGINAL IFC DRAWINGS  
STAMPED AND SIGNED BY:  
MICHAEL J. GALLANT, P.ENG  
DATE: JAN 30, 2018**

**APEGA PERMIT TO PRACTICE NO. P07929**

Rev	Date	Des	Dwn	Chk	Description of Revision
0	JUN 29/2017	MG	ROK	AKS	REVISION INFO RESET FOR TENDERING
1	JAN 30/2018	MG	ROK	AKS	ISSUED FOR CONSTRUCTION
2	SEP 16/2019	MG	MAR	AKS	AS-BUILT

**BIOENGINEERING DEMONSTRATION  
AND EDUCATION PROJECT**  
**SITE 1  
TYPICAL SECTIONS - SHEET 3**

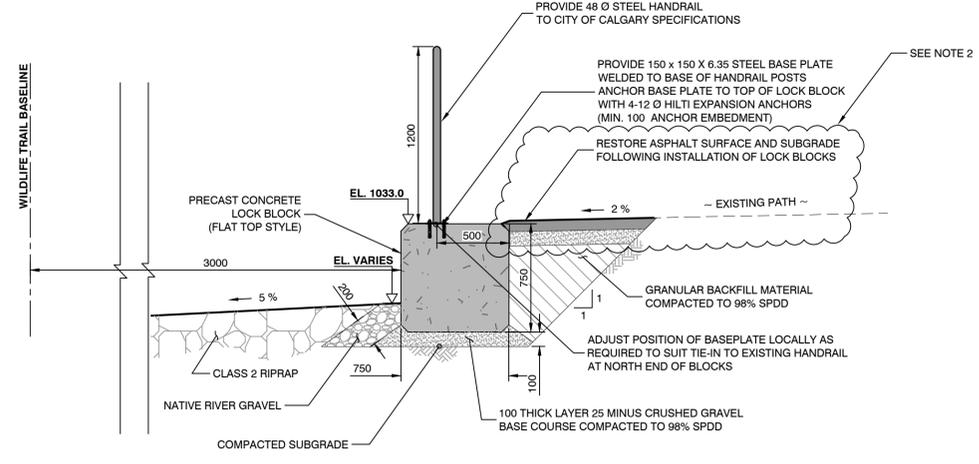
Project No: **3552-004** Drawing No. **SW-142** Rev. **2**  
Group: **CIVIL**



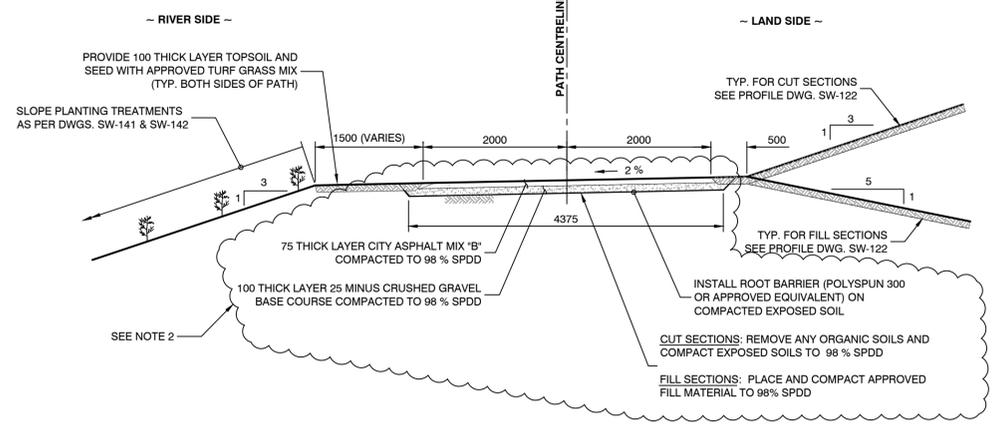


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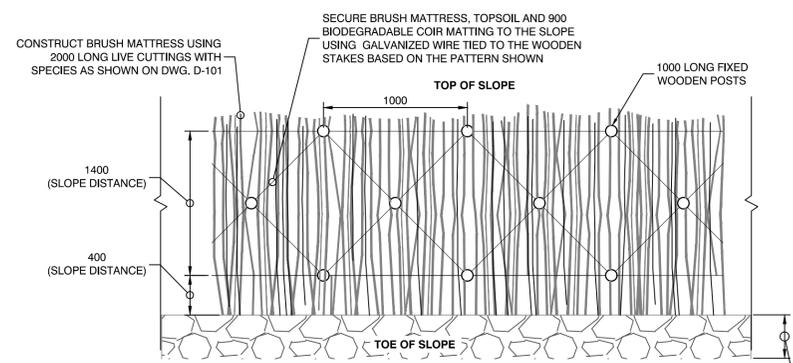
- NOTES:**
- REFER TO DWG. G-020 FOR LEGEND AND GENERAL NOTES
  - REGIONAL PATHWAY (ASPHALT) TO BE CONSTRUCTED BY OTHERS AND DOES NOT FALL UNDER THIS CONTRACT.



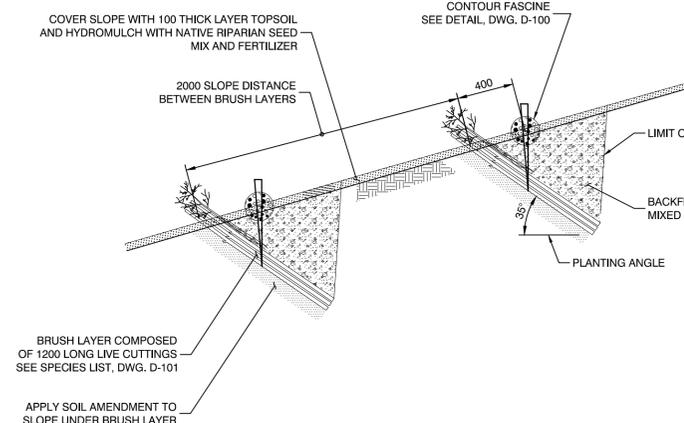
**LOCK BLOCK WALL AND HANDRAIL DETAIL (CUSHING BRIDGE)**  
Scale: 1:25



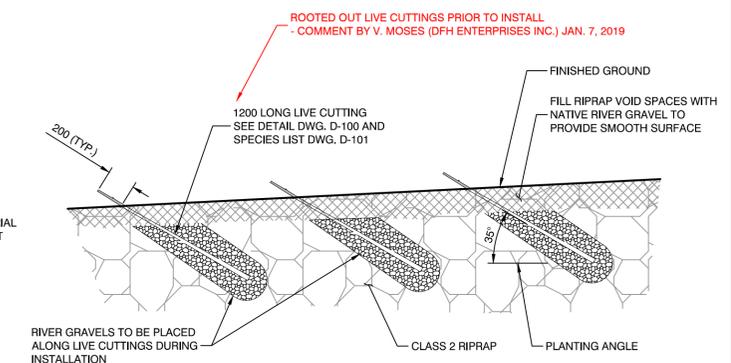
**REGIONAL PATHWAY TYP. SECTION**  
Scale: 1:50



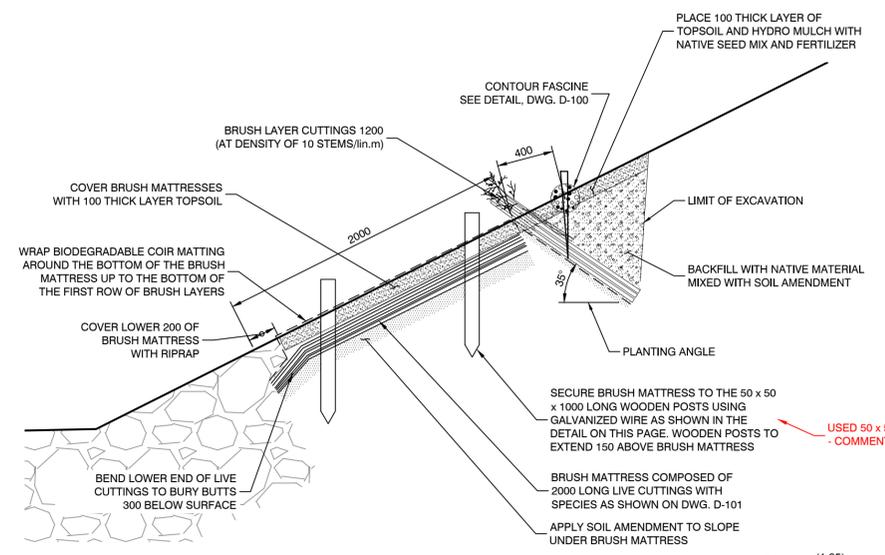
**BRUSH MATTRESS WITH ROCK TOE DETAIL - PLAN**  
Scale: 1:25



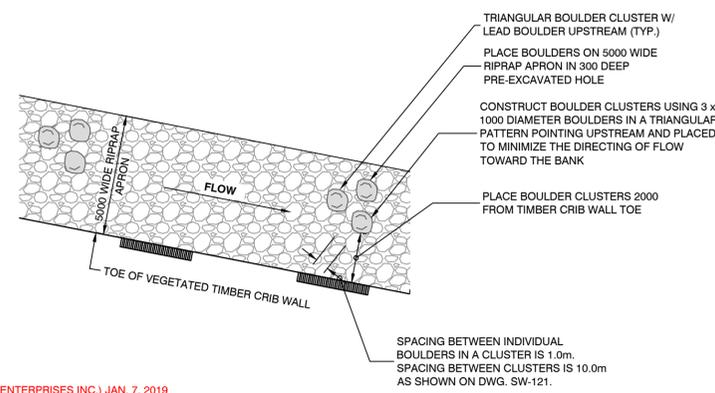
**BRUSH LAYER W/ CONTOUR FASCINE DETAIL**  
Scale: 1:25



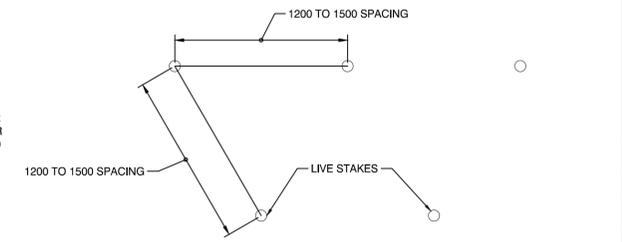
**APRON LIVE STAKING DETAIL**  
Scale: 1:25



**BRUSH MATTRESS WITH ROCK TOE DETAIL - SECTION**  
Scale: 1:25



**FISH HABITAT BOULDER CLUSTER DETAIL**  
Scale: 1:150



**APRON LIVE STAKING SPACING PLAN**  
Scale: 1:25

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Seal:  
 ORIGINAL IFC DRAWINGS  
 STAMPED AND SIGNED BY:  
 MICHAEL J. GALLANT, P.ENG.  
 DATE: JAN 30, 2018

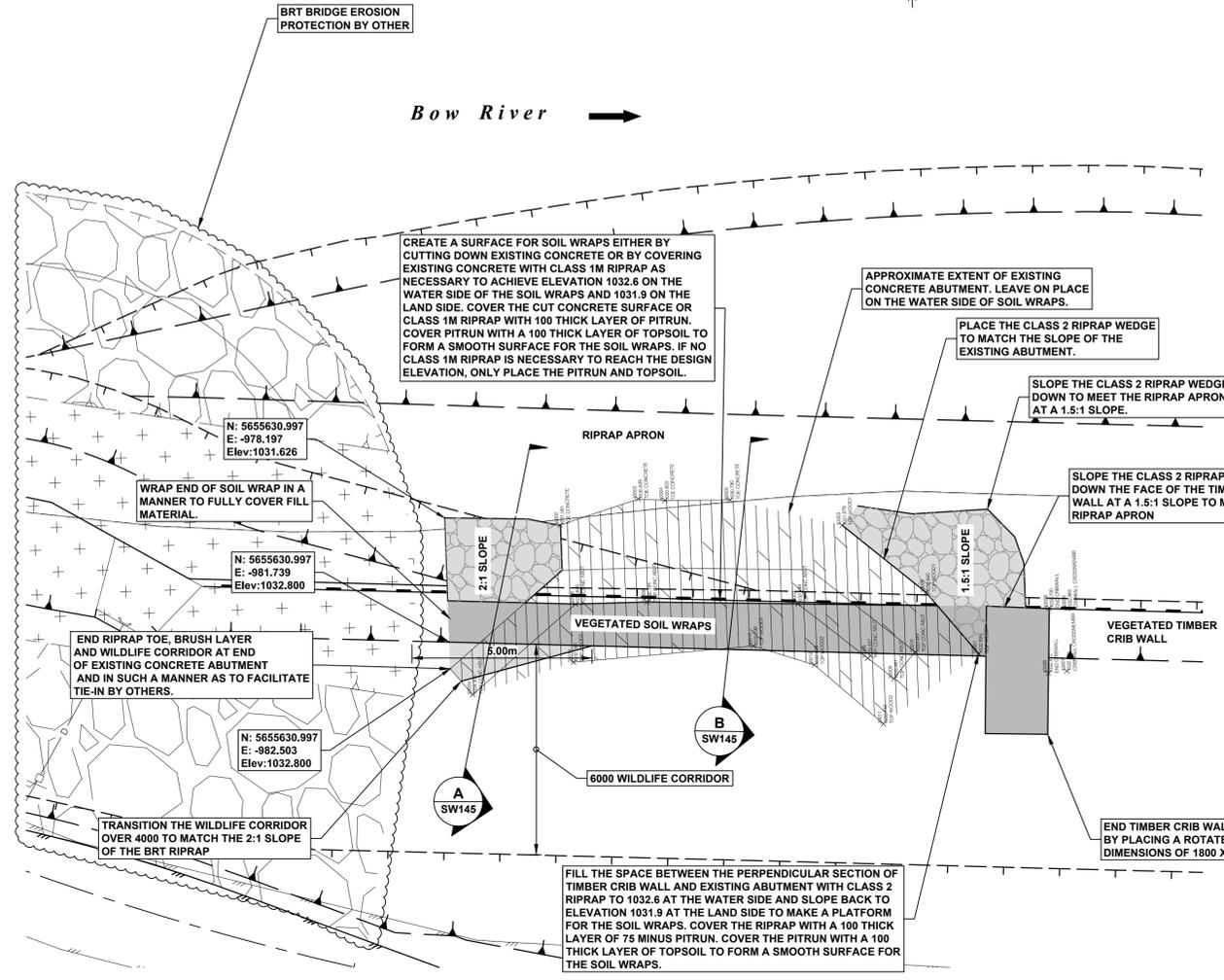
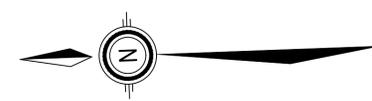
**APEGA PERMIT TO PRACTICE NO. P07929**

Rev	Date	Des	Dwn	Chk	Description of Revision
0	Jun.29/2017	MG	ROK	AKS	ISSUE INFO RESET FOR TENDERING
1	JAN.30/2018	MG	ROK	AKS	REVISION FOR CONSTRUCTION
2	OCT.28/2019	MG	MAR	AKS	AS-BUILT

**BIOENGINEERING DEMONSTRATION AND EDUCATION PROJECT**  
**SITE 1 MISCELLANEOUS DETAILS**

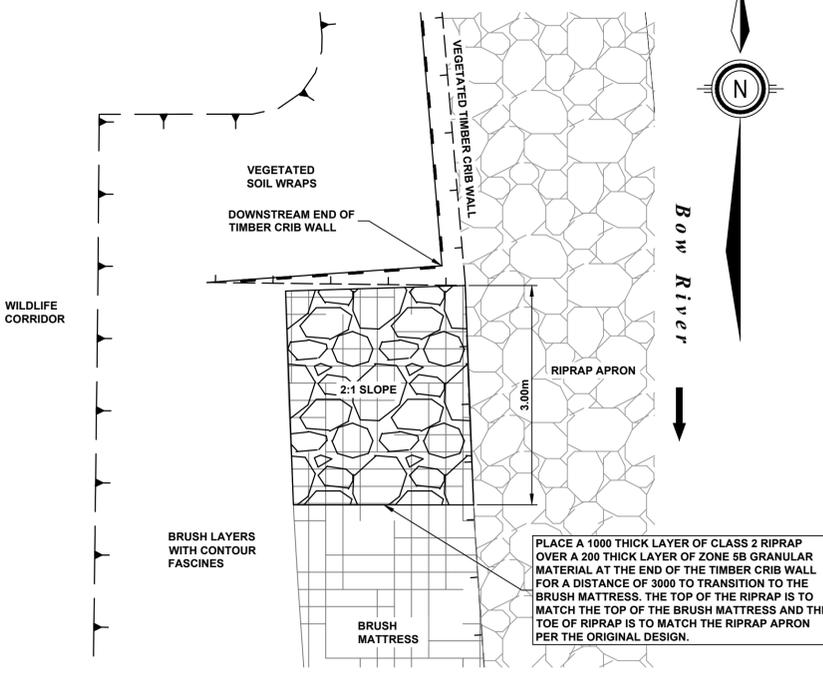
**NOTES:**

- REFER TO DWG G-020 FOR LEGEND AND GENERAL NOTES
- THERE ARE NO CHANGES TO THE HYDROLOGY OR MODELLED WATER LEVELS DURING FLOOD CONDITIONS AS A RESULT OF THE CHANGES IN THE DESIGN.



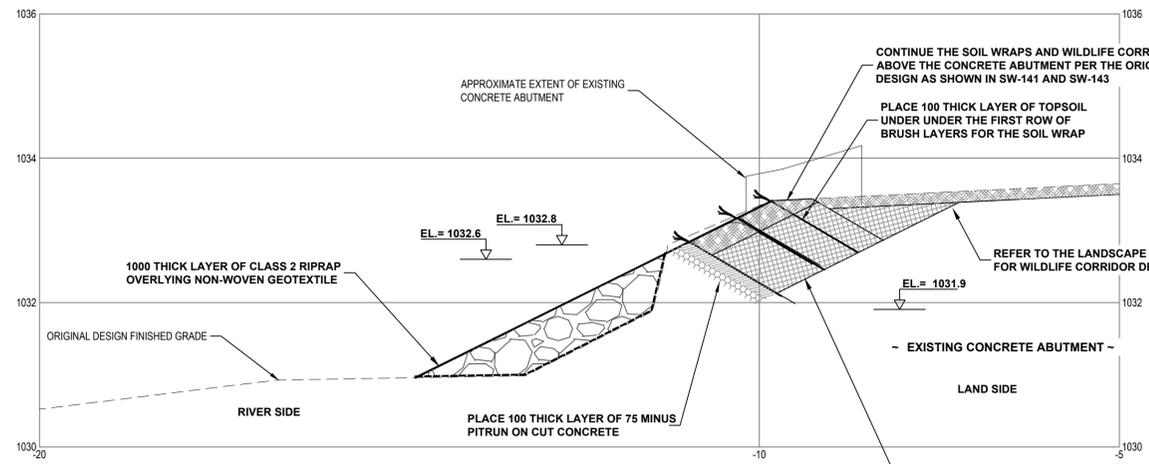
**UPSTREAM END OF TIMBER CRIB WALL - PLAN**

Scale: 1:100



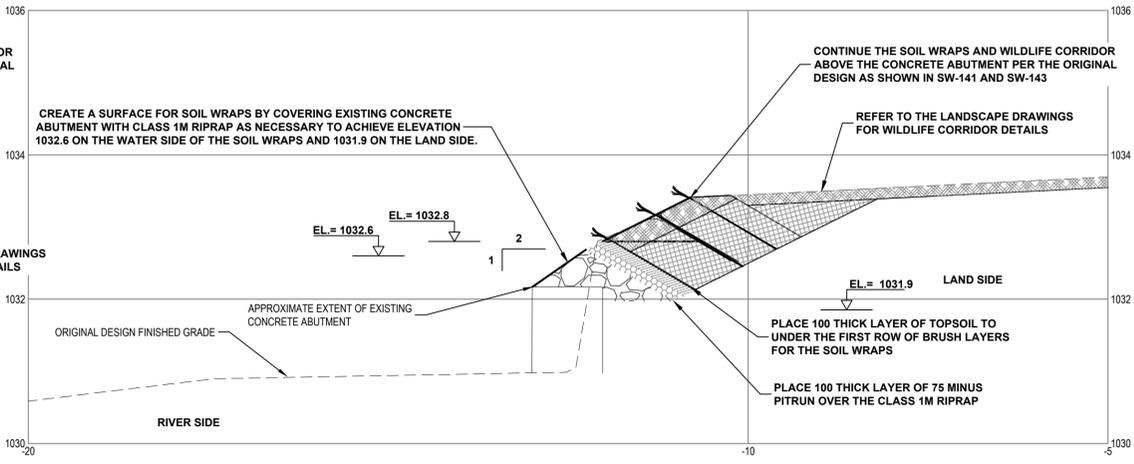
**DOWNSTREAM END OF TIMBER CRIB WALL - PLAN**

Scale: 1:50



**SECTION A**  
SW145

Scale: 1:50



**SECTION B**  
SW145

Scale: 1:50

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DATE: JAN 30, 2018**

Rev	Date	Des	Dwn	Chk	Description of Revision
1	AUG.03/2018	MG	ROK	AKS	ISSUED FOR CONSTRUCTION
2	SEP.16/2019	MG	MAR	AKS	AS-BUILT

**BIOENGINEERING DEMONSTRATION  
AND EDUCATION PROJECT**  
**SITE 1  
ABUTMENT PLAN AND SECTIONS**

Project No.	3552-004	Drawing No.	SW-145	Rev.	2
Group	CIVIL				

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SAVED: 2016/05/17, 2:36 AM

Paper Size: ANSI D  
At Full Size, this border measures 320 mm x 800 mm

0 10 50 100  
millimeters

**NOTES:**

- REFER TO DWG G-020 FOR LEGEND AND GENERAL NOTES.
- AS CONSTRUCTED ARRANGEMENT SHOWN ON THIS DRAWING IS BASED ON FIELD MEASUREMENTS AND HAS NOT BEEN CONFIRMED BY SURVEY. CONTRACTOR TO NOTIFY ENGINEER OF DISCREPANCIES.
- THIS DRAWING SUPPLEMENTS DWG. SW-143 TO PROVIDE ADDITIONAL STRUCTURAL SUPPORT TO THE BOTTOM STRETCHERS WHERE SHOWN.
- MEASUREMENTS PERTAINING TO SUPPORT ROCKS INCLUDING ROCK DIMENSIONS, SPACING, AND STRETCHER SPANS ARE APPROXIMATE DUE TO THE VARIABILITY OF THE ROCKS.
- SUPPORT JACKS TO HAVE MINIMUM 2 TONNE CAPACITY PER SUPPORT. SUPPORT JACKS TO BE USED AND FASTENED TO TIMBER SUPPORTS AND BEARING PLATE. JACKS TO PERMIT ADJUSTMENT OF THE SUPPORT TO THE VEGETATED TIMBER CRIB WALL BOTTOM WATER SIDE STRETCHER. STEEL ANGLE BEARING DIMENSIONS 150mm x 300mm. SUPPORT JACKS AND INSTALLATION TO PROVIDE SUFFICIENT RANGE OF MOTION FOR POST INSTALLATION ADJUSTMENTS AS REQUIRED. METALWORK TO BE SUITABLE FOR RIVER ENVIRONMENT.
- SEALED SHOP DRAWING SUBMISSIONS AND MATERIAL SPECIFICATIONS ARE REQUIRED FOR REVIEW AND APPROVAL BY THE ENGINEER FOR ALL SUPPLIED AND FABRICATED COMPONENTS.

2 SUPPORTS NOT INSTALLED. CANNOT FIND DOCUMENT DETAILING WHICH TWO.  
- COMMENT BY V. MOSES (DFH ENTERPRISES INC.) JAN. 9, 2019

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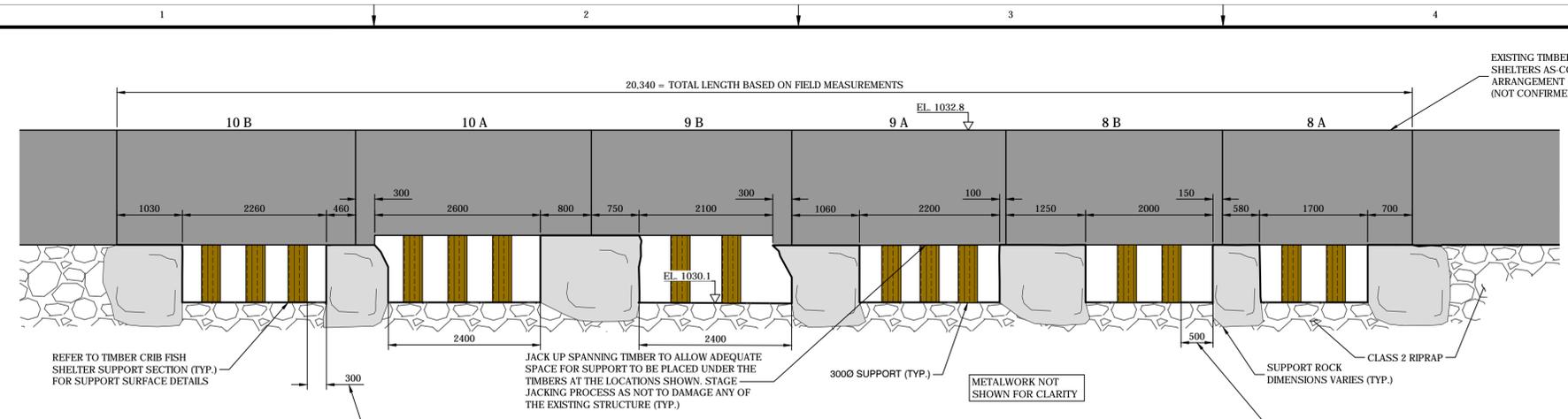
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APEGA PERMIT TO PRACTICE NO. P07929

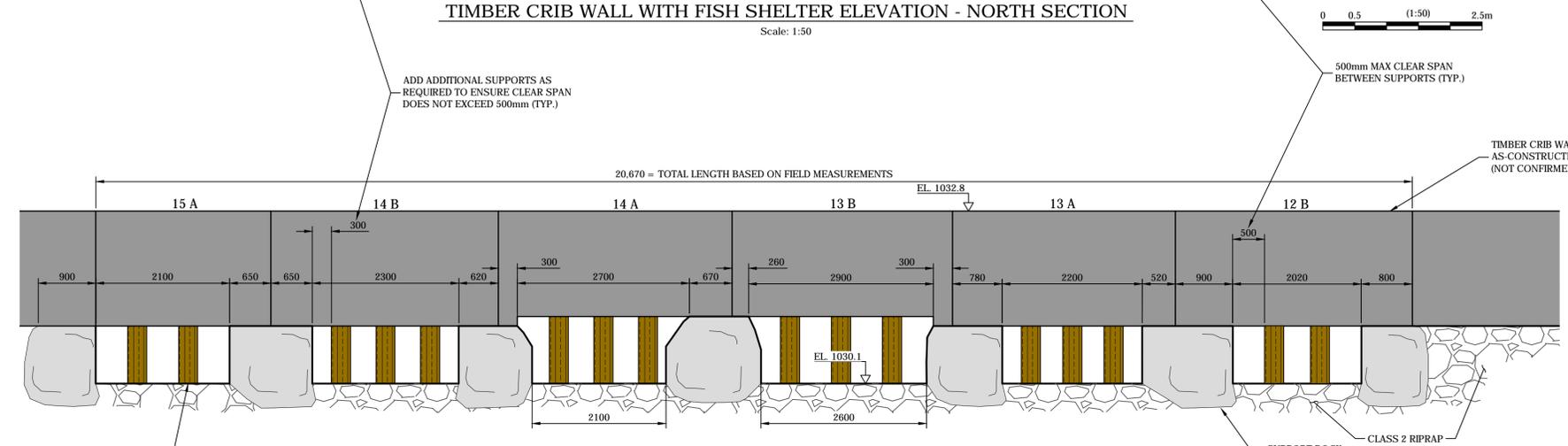
Rev	Date	Des	Dwn	Chk	Description of Revision
0	SEP.19/2018	AAM	CYP	AKS	ISSUED FOR CONSTRUCTION
1	SEP.21/2018	AAM	CYP	AKS	SUPPORT AND ISOLATION MODIFICATIONS
2	SEP.24/2018	AAM	CYP	AKS	SUPPORT AND ISOLATION MODIFICATIONS
3	OCT.28/2019	MG	MAR	AKS	AS-BUILT

**BIOENGINEERING DEMONSTRATION  
AND EDUCATION PROJECT**  
**SITE 1  
FISH SHELTER SUPPORTS**

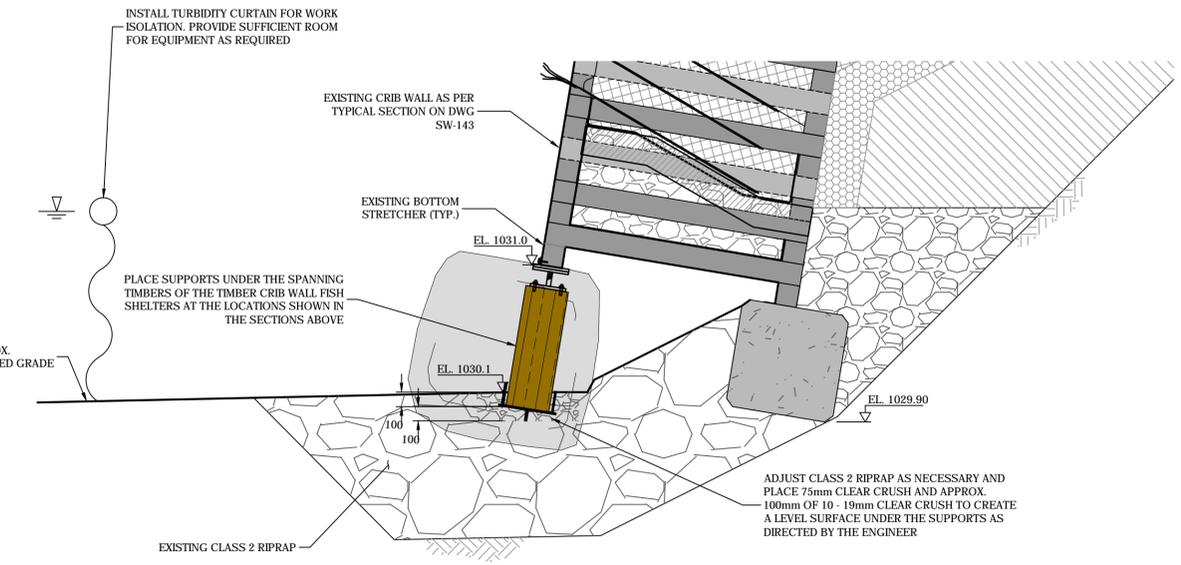
Project No. 3552-004  
Group CIVIL  
Drawing No. SW-146  
Rev. 3



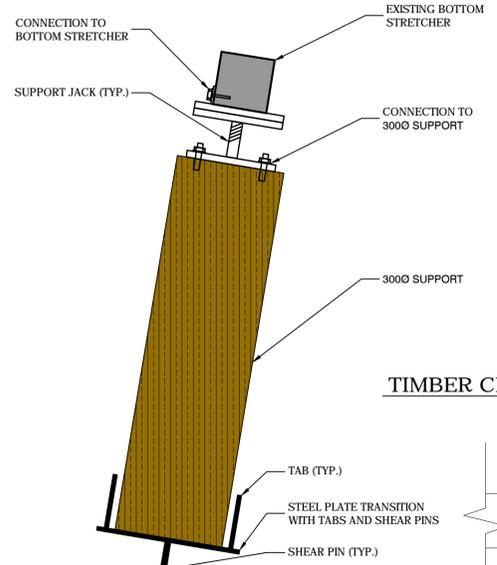
**TIMBER CRIB WALL WITH FISH SHELTER ELEVATION - NORTH SECTION**  
Scale: 1:50



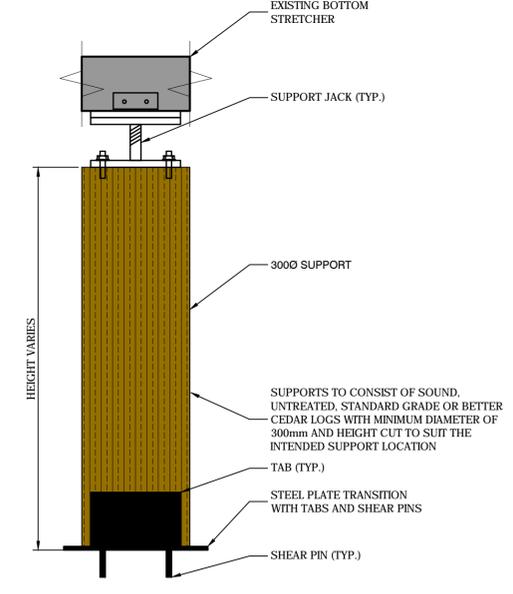
**TIMBER CRIB WALL WITH FISH SHELTER ELEVATION - SOUTH SECTION**  
Scale: 1:50



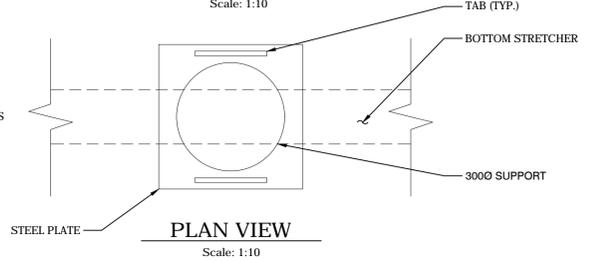
**TIMBER CRIB FISH SHELTER SUPPORT SECTION (TYP.)**  
Scale: 1:25



**SECTION VIEW**  
Scale: 1:10



**TIMBER CRIB WALL FISH SHELTER SUPPORT DETAIL**  
Scale: 1:10



**PLAN VIEW**  
Scale: 1:10

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SAVED: 2019-09-16 8:09 AM

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millimetres

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**NOTES:**

- REFER TO DWG. G-020 FOR LEGEND AND GENERAL NOTES

**LEGEND:**

- PROPOSED EARTH WORKS SLOPE
- PROPOSED EARTH WORKS BENCH
- PROPOSED EXTENTS OF TOPSOIL SALVAGE

**SURVEY DATA:**

AS-BUILT DATA RECEIVED FROM DFH ON 2019-08-15,  
2019-08-21 AND 2019-08-21.

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DATE: JAN 30, 2018**

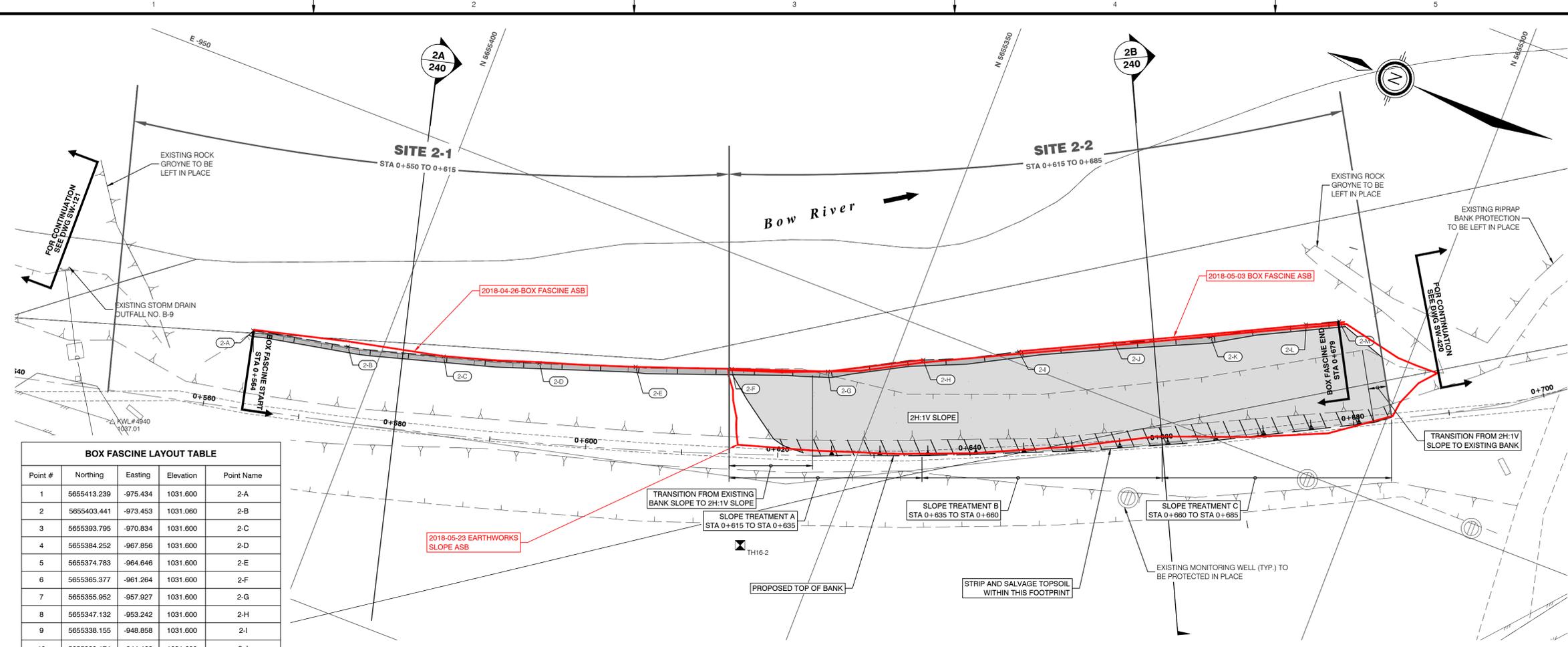
**APEGA PERMIT TO PRACTICE NO. P07929**

Rev	Date	Des	Dwn	Chk	Description of Revision
0	JUN 29/2017	MG	ROK	AKS	REVISION INFO RESET FOR TENDERING
1	JAN 30/2018	MG	ROK	AKS	ISSUED FOR CONSTRUCTION
2	SEP 16/2019	MG	MAR	AKS	AS-BUILT

**BIOENGINEERING DEMONSTRATION  
AND EDUCATION PROJECT**

**SITE 2  
PLAN AND PROFILE**

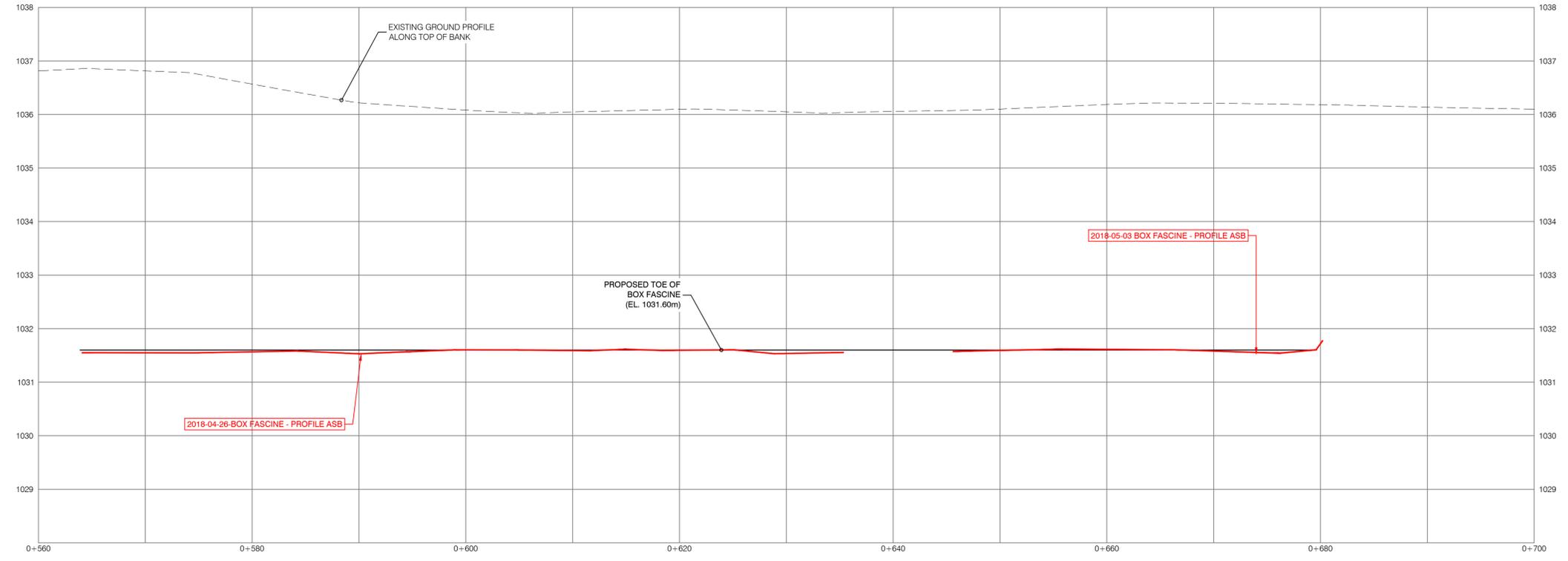
Project No: **3552-004** Drawing No. **SW-220** Rev. **2**  
Group: **CIVIL**



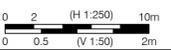
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3	5655393.795	-970.834	1031.600	2-C
4	5655384.252	-967.856	1031.600	2-D
5	5655374.783	-964.646	1031.600	2-E
6	5655365.377	-961.264	1031.600	2-F
7	5655355.952	-957.927	1031.600	2-G
8	5655347.132	-953.242	1031.600	2-H
9	5655338.155	-948.858	1031.600	2-I
10	5655329.174	-944.468	1031.600	2-J
11	5655320.109	-940.287	1031.600	2-K
12	5655311.318	-935.500	1031.600	2-L
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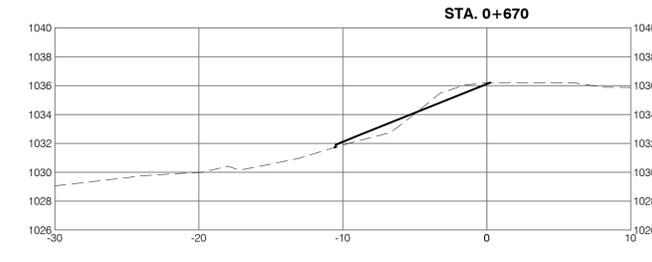
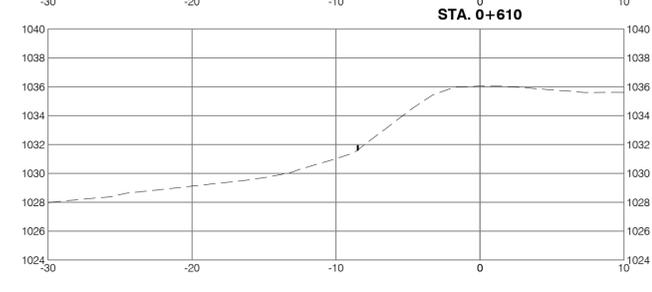
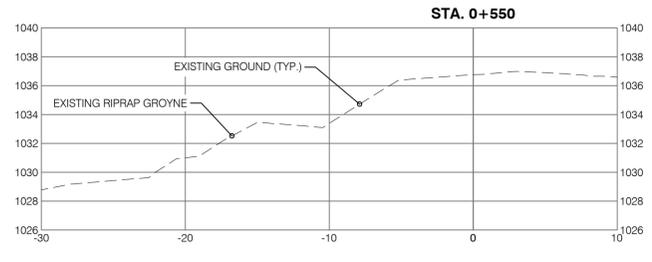
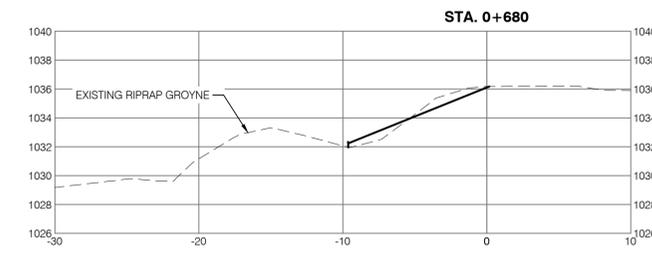
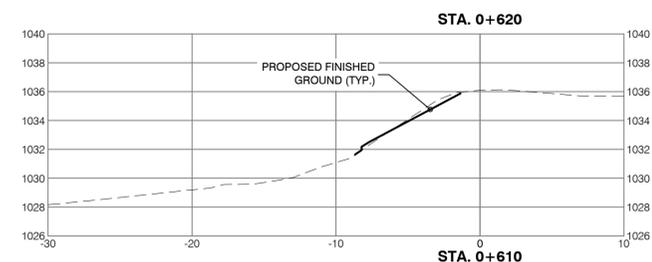
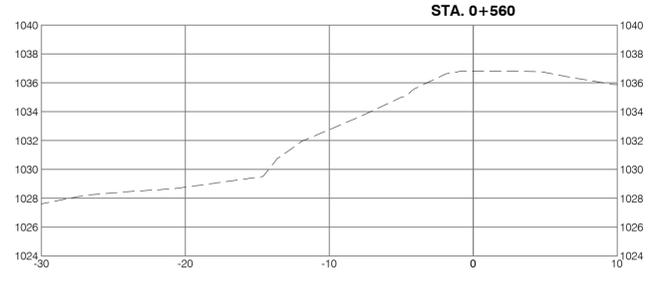
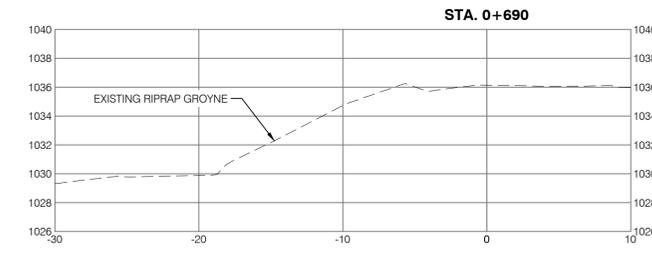
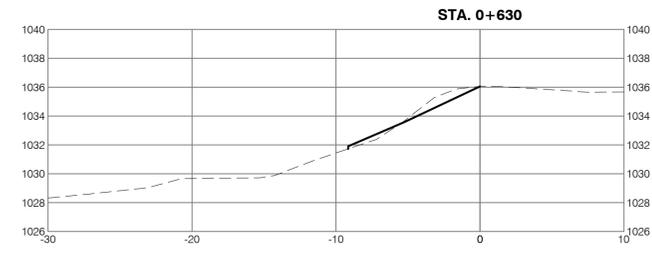
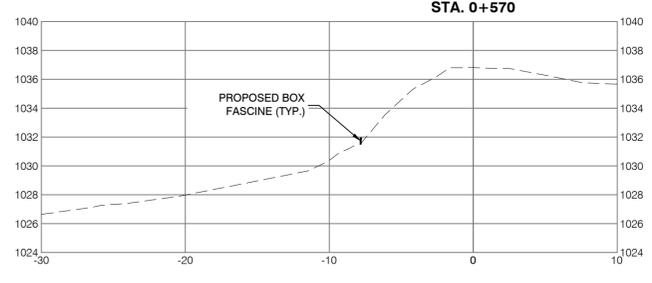
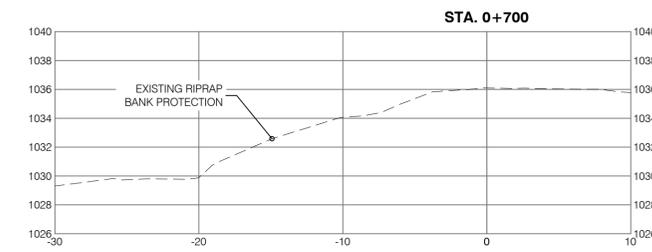
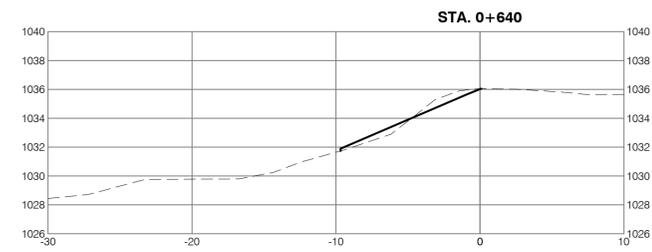
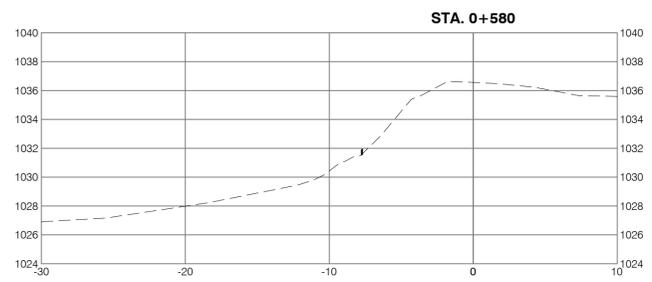
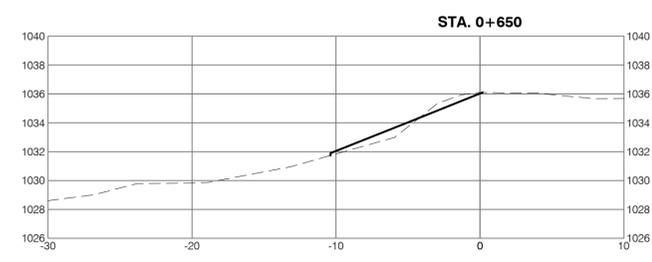
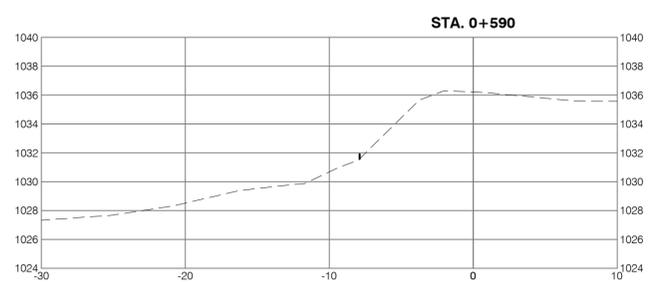
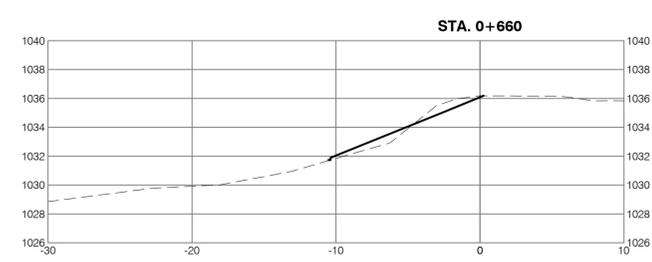
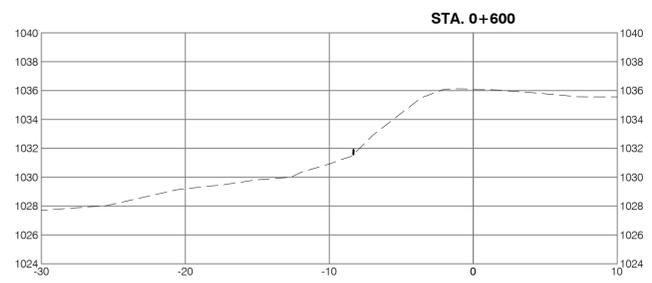
**PLAN**  
Scale: 1:250



**PROFILE**  
Scale: H 1:250 V 1:50



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 All Plot Settings: 520 mm x 800 mm  
 100 millimeters  
 50  
 10  
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**SECTIONS**  
 Scale: 1:250  
 0 2 10m  
 (1:250)

**kwj KERR WOOD LEIDAL**  
 consulting engineers  
 110 - 1212 1st Street SE  
 Calgary, AB T2G 2H8  
 T (403) 262-4241  
 E calgary@kwl.ca


**Terra Erosion Control Ltd.**  
 308 Hart St. Nelson, B.C. V1L 5N5  
 Tel: 250 352 2757  
 www.terraerosion.com

- NOTES:**
- REFER TO DWG. G-020 FOR LEGEND AND GENERAL NOTES
  - BANK SWALLOW COLONY FROM STATION 0+560 TO STATION 0+610. NO SLOPE TREATMENT

**RECORD DRAWING DISCLAIMER**  
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Seal:  
 ORIGINAL IFC DRAWINGS  
 STAMPED AND SIGNED BY:  
 MICHAEL J. GALLANT, P.ENG  
 DATE: JAN 30, 2018

**APEGA PERMIT TO PRACTICE NO. P07929**

Rev	Date	Des	Dwn	Chk	Description of Revision
0	JUN.29/2017	MG	ROK	AKS	REVISION INFO RESET FOR TENDERING
1	JAN.30/2018	MG	ROK	AKS	ISSUED FOR CONSTRUCTION
2	SEP.16/2019	MG	MAR	AKS	AS-BUILT

**BIOENGINEERING DEMONSTRATION  
 AND EDUCATION PROJECT**

**SITE 2  
 SECTIONS  
 STATION 0+550 TO 0+700**

Project No. **3552-004** Drawing No. **SW-230** Rev. **2**  
 Group **CIVIL**



SAVED: 2018-01-30 12:54 PM

Plot Size - ANSI D  
All Plot Sizes: This layout measures 520 mm x 800 mm

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50  
0  
millimeters

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**kwj** **KERR WOOD LEIDAL**  
consulting engineers  
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Calgary, AB T2G 2H8  
T (403) 262-4241  
E calgary@kwl.ca

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**NOTES:**  
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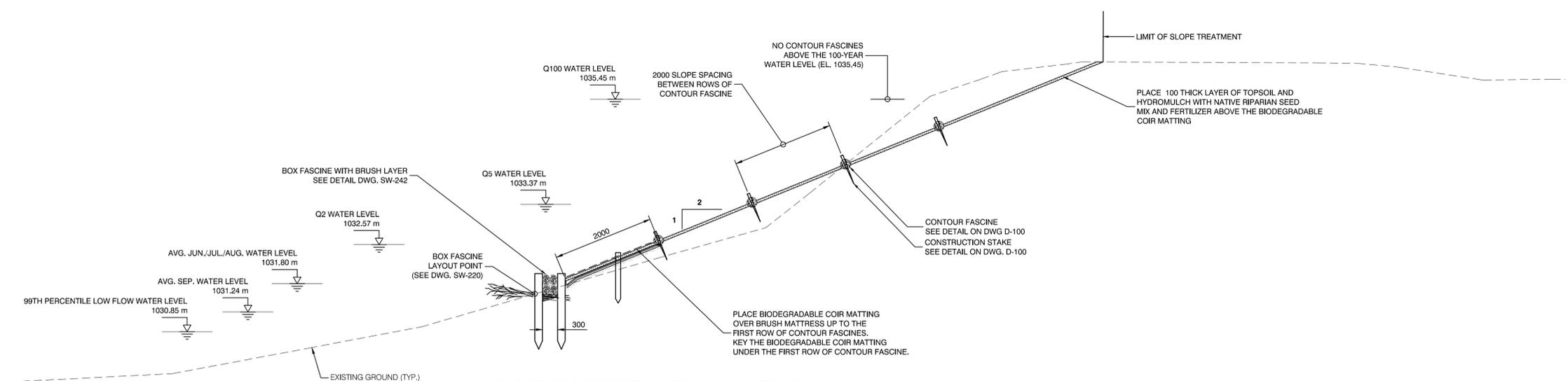
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**ORIGINAL IFC DRAWINGS  
STAMPED AND SIGNED BY:  
MICHAEL J. GALLANT, P.ENG  
DATE: JAN 30, 2018**

**APEGA PERMIT TO PRACTICE NO. P07929**

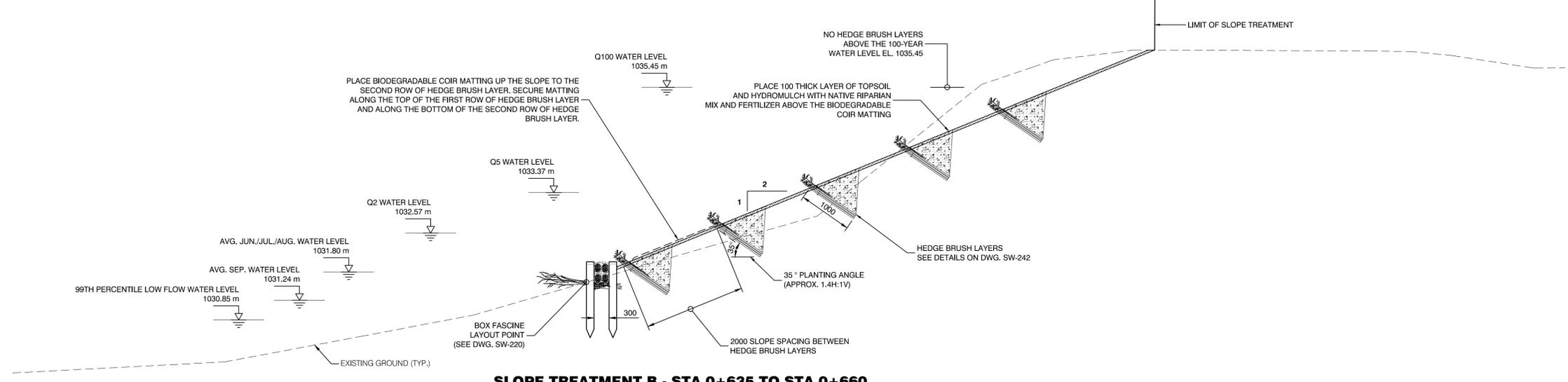
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1	JAN.30/2018	MG	ROK	AKS	ISSUED FOR CONSTRUCTION
2	SEP.16/2019	MG	MAR	AKS	AS-BUILT

**BIOENGINEERING DEMONSTRATION  
AND EDUCATION PROJECT  
SITE 2  
SLOPE TREATMENT DETAILS**

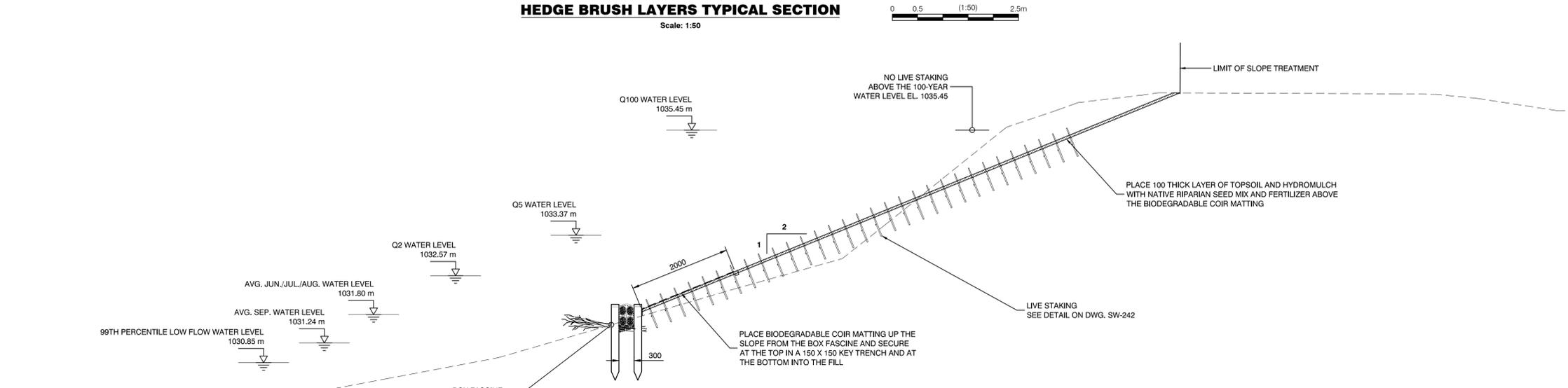
Project No. **3552-004** Drawing No. **SW-241** Rev. **2**  
Group **CIVIL**



**SLOPE TREATMENT A - STA 0+615 TO STA 0+635  
BRUSH MATTRESS WITH CONTOUR FASCINE TYPICAL SECTION**  
Scale: 1:50



**SLOPE TREATMENT B - STA 0+635 TO STA 0+660  
HEDGE BRUSH LAYERS TYPICAL SECTION**  
Scale: 1:50



**SLOPE TREATMENT C - STA 0+660 TO STA 0+685  
LIVE STAKING TYPICAL SECTION**  
Scale: 1:50

SAVED: 2019-10-28 12:29 PM

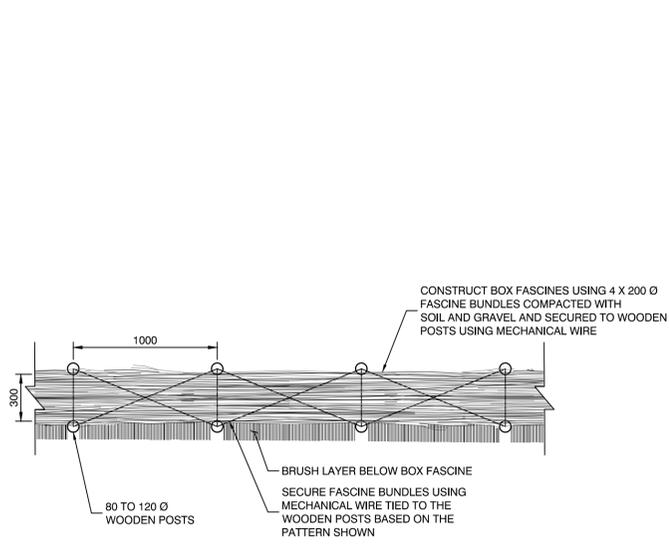
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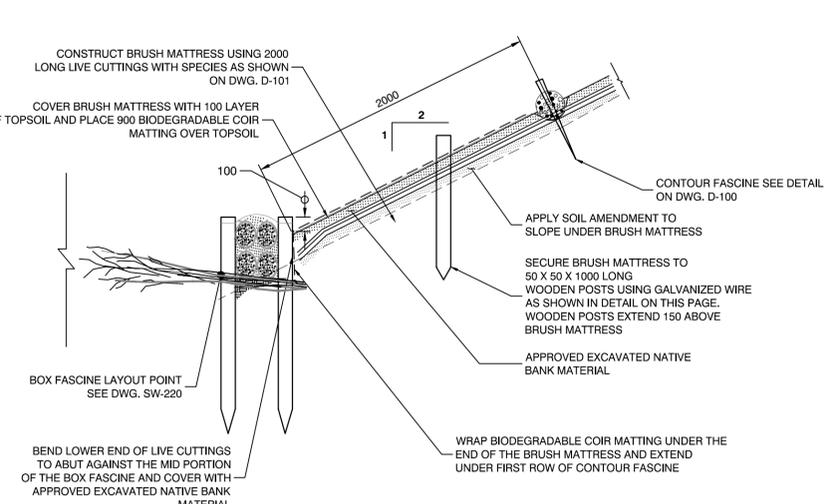
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- NOTES:**
- REFER TO DWG. G-020 FOR LEGEND AND GENERAL NOTES
  - BOX FASCINE TO BE BUILT USING 4 X 200 Ø FASCINE BUNDLES COMPACTED WITH SOIL AND GRAVEL

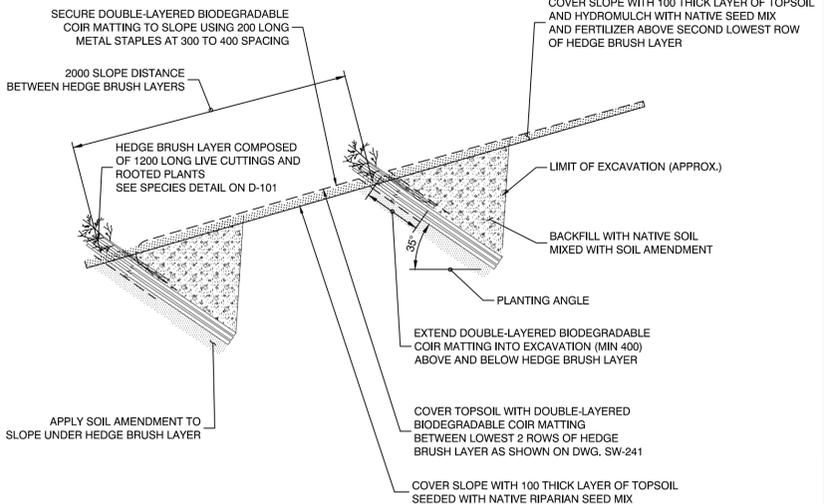
- LEGEND:**
- PROPOSED TOPSOIL
  - PROPOSED BACKFILL WITH NATIVE SOIL
  - PROPOSED BACKFILL WITH NATIVE SOIL



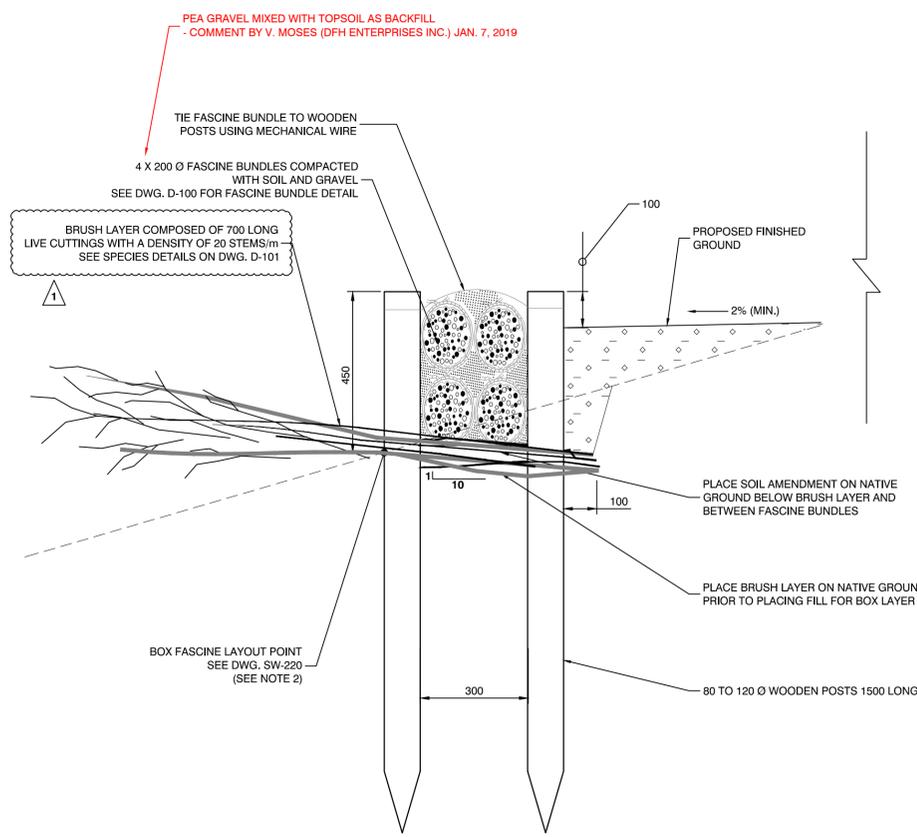
**BOX FASCINE DETAIL - PLAN**  
Scale: 1:25



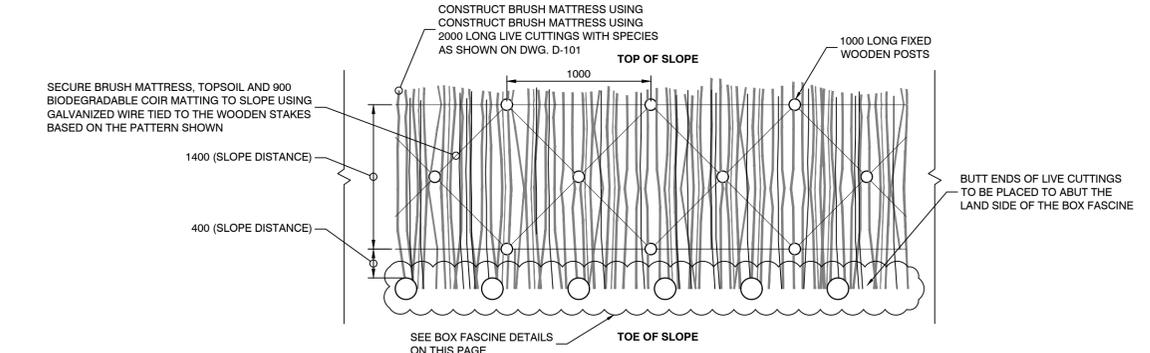
**BRUSH MATTRESS WITH BOX FASCINE TOE DETAIL - SECTION**  
Scale: 1:25



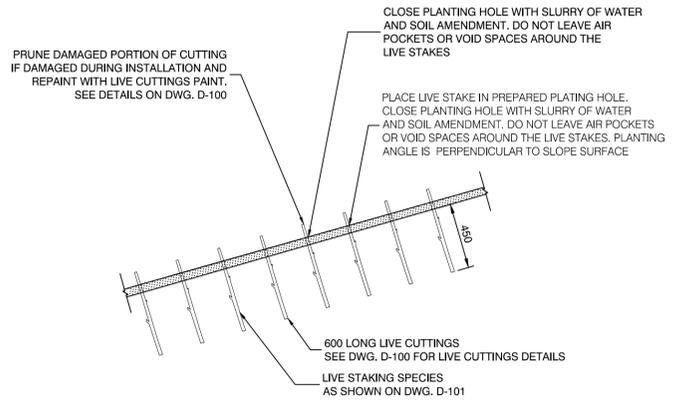
**HEDGE BRUSH LAYER DETAIL**  
Scale: 1:25



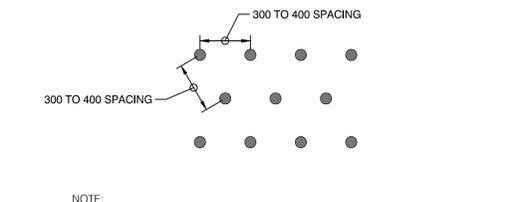
**BOX FASCINE DETAIL - SECTION**  
Scale: 1:10



**BRUSH MATTRESS DETAIL - PLAN**  
Scale: 1:25



**LIVE STAKING DETAIL - SECTION**  
Scale: 1:25



**LIVE STAKING SPACING - PLAN**  
Scale: 1:25

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Seal:

**ORIGINAL IFC DRAWINGS  
STAMPED AND SIGNED BY:  
MICHAEL J. GALLANT, P.ENG  
DATE: JAN 30, 2018**

**APEGA PERMIT TO PRACTICE NO. P07929**

Rev	Date	Des	Dwn	Chk	Description of Revision
0	JUN 29/2017	MG	ROK	AKS	REVISION INFO RESET FOR TENDERING
1	JAN 30/2018	MG	ROK	AKS	REVISED BRUSH LAYER DETAIL
2	OCT 28/2019	MG	MAR	AKS	AS-BUILT

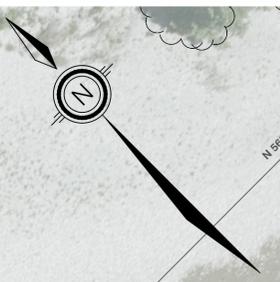
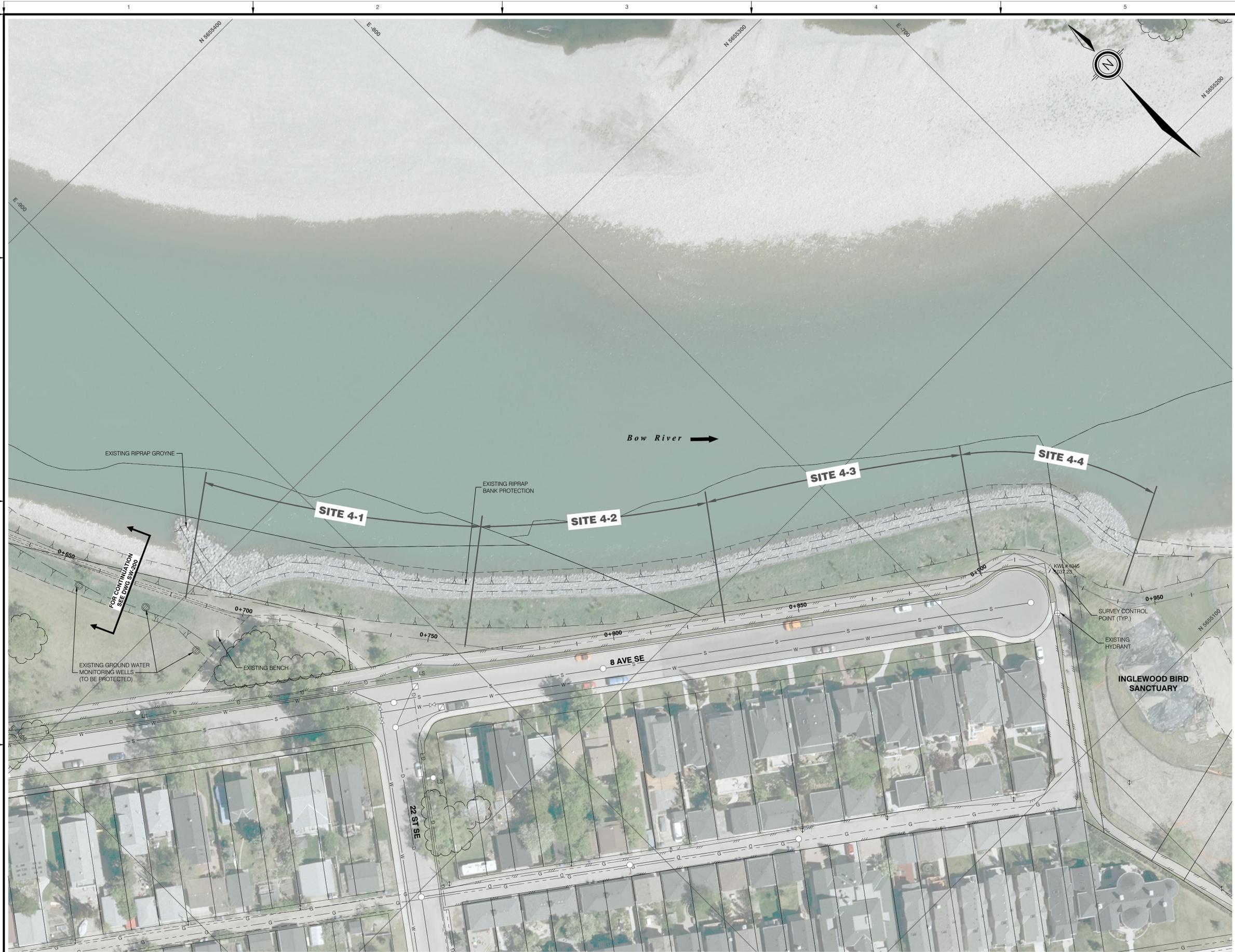
**BIOENGINEERING DEMONSTRATION  
AND EDUCATION PROJECT**

**SITE 2  
TYPICAL DETAILS**

Project No: **3552-004** Drawing No. **SW-242** Rev. **2**

Group: **CIVIL**

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 All Plot Size: This Scale measures 520 mm x 800 mm  
 100 millimeters  
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 2018/01/30



**kwl KERR WOOD LEIDAL**  
 consulting engineers  
 110 - 1212 1st Street SE  
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 E calgary@kwl.ca


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2	SEP.16/2019	MG	MAR	AKS	AS-BUILT

**BIOENGINEERING DEMONSTRATION  
 AND EDUCATION PROJECT**  
**SITE 4  
 EXISTING CONDITIONS PLAN**

Project No. **3552-004** Drawing No. **SW-400** Rev. **2**  
 Group **CIVIL**

**PLAN**  
 Scale: 1:500  
 0 5 10 25m

**NOTES:**

- REFER TO DWG. G-020 FOR LEGEND AND GENERAL NOTES
- CONSTRUCT THE RIPRAP VOID-FILL PER THE METHODS OUTLINED IN THE TABLE BELOW.
- EXISTING RIPRAP BANK TO BE LEFT IN PLACE FOR ALL OF SITE 4
- PROTECT EXISTING BANK RECLAMATION

RIPRAP VOID-FILLING METHOD	DESCRIPTION
A	PLANTING MEDIUM MECHANICALLY VIBRATED INTO EXISTING RIPRAP VOID SPACE
B	PLANTING MEDIUM SLURRY HYDRAULICALLY PLACED INTO EXISTING RIPRAP VOID SPACE
C	MIXED PITRUN AND TOPSOIL MECHANICALLY VIBRATED INTO EXISTING RIPRAP VOID SPACE
D	MIXED PITRUN AND TOPSOIL HYDRAULICALLY PLACED INTO EXISTING RIPRAP VOID SPACE

**LEGEND:**

- PROPOSED EARTHWORKS SLOPE
- PROPOSED EARTHWORKS BENCH
- SOIL COVERED RIPRAP  
STA. 0+705 TO STA. 0+760
- VOID-FILLED RIPRAP AND CONTAINER SHRUBS  
STA. 0+760 TO STA. 0+830
- VOID-FILLED RIPRAP AND JOINT PLANTING  
STA. 0+830 TO STA. 0+900

**SURVEY DATA:**  
AS-BUILT DATA RECEIVED FROM DFH ON 2019-08-15,  
2019-08-21 AND 2019-08-21.

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MICHAEL J. GALLANT, P.ENG  
DATE: JAN 30, 2018**

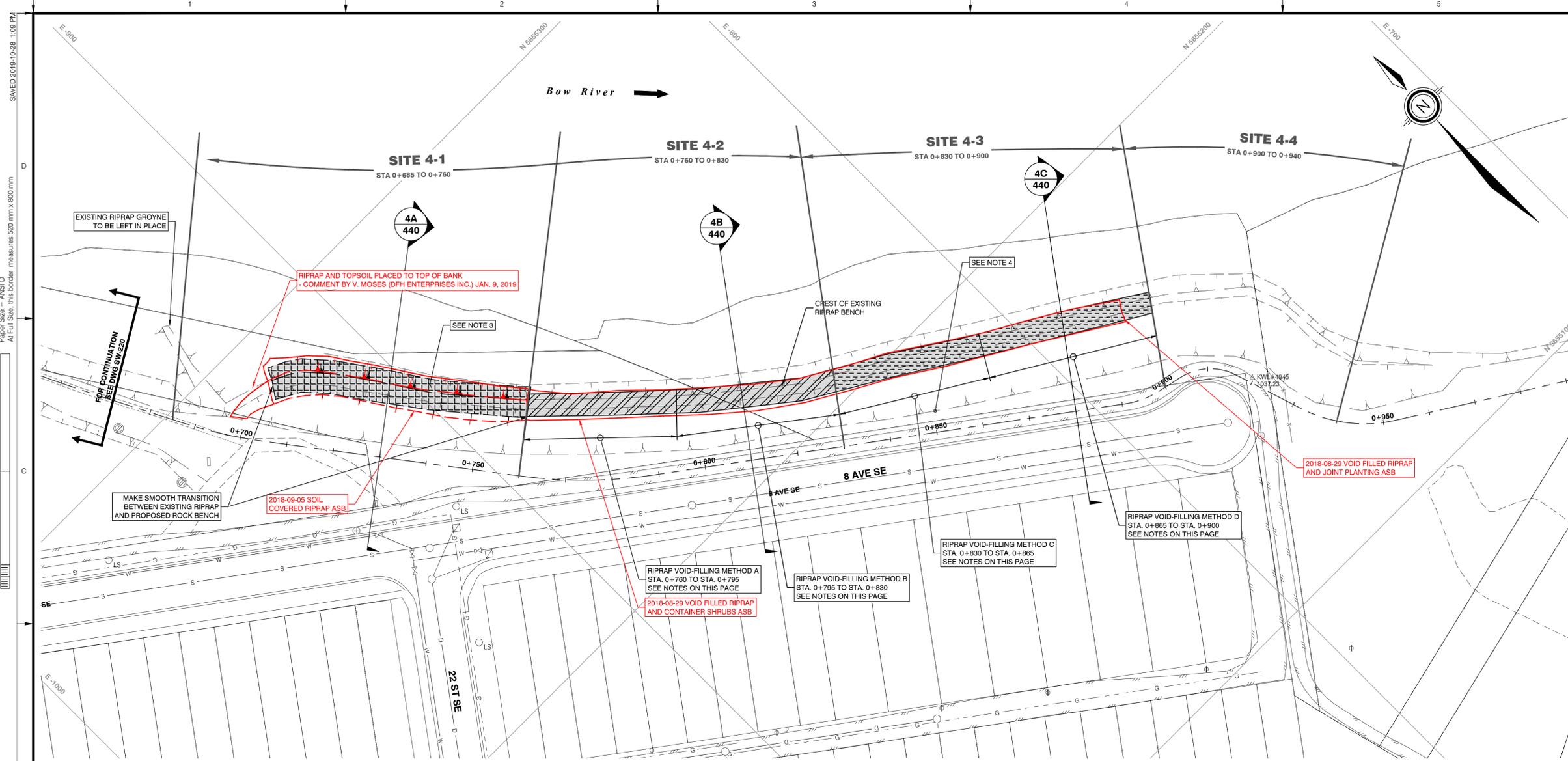
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2	OCT 28/2019	MG	MAR	AKS	AS-BUILT

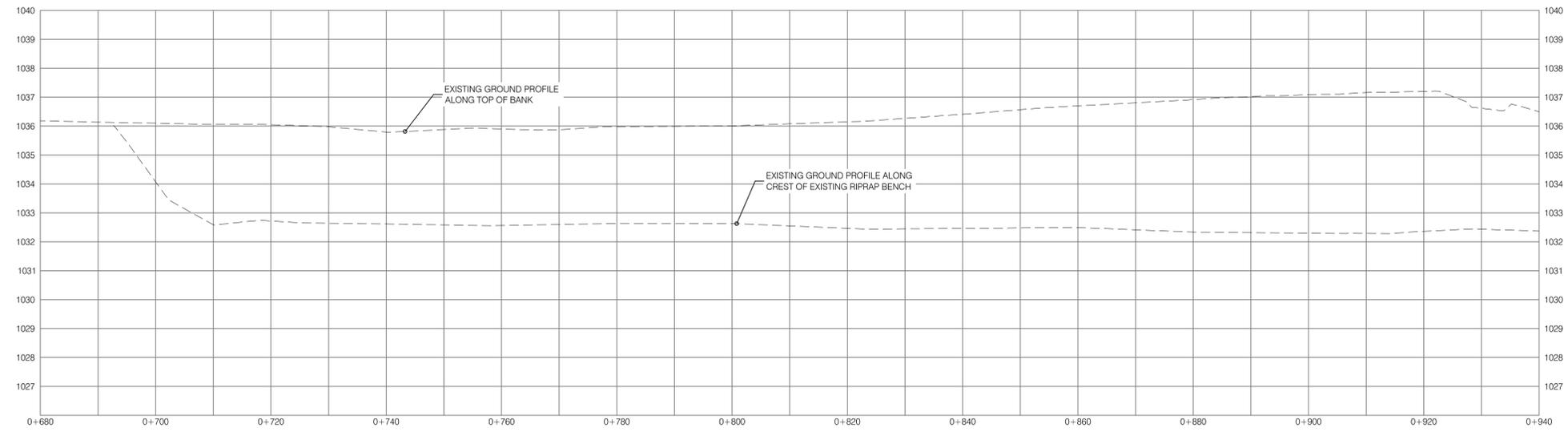
**BIOENGINEERING DEMONSTRATION  
AND EDUCATION PROJECT**

**SITE 4  
PLAN AND PROFILE**

Project No: **3552-004** Drawing No. **SW-420** Rev. **2**  
Group: **CIVIL**



**PLAN**  
Scale: 1:500

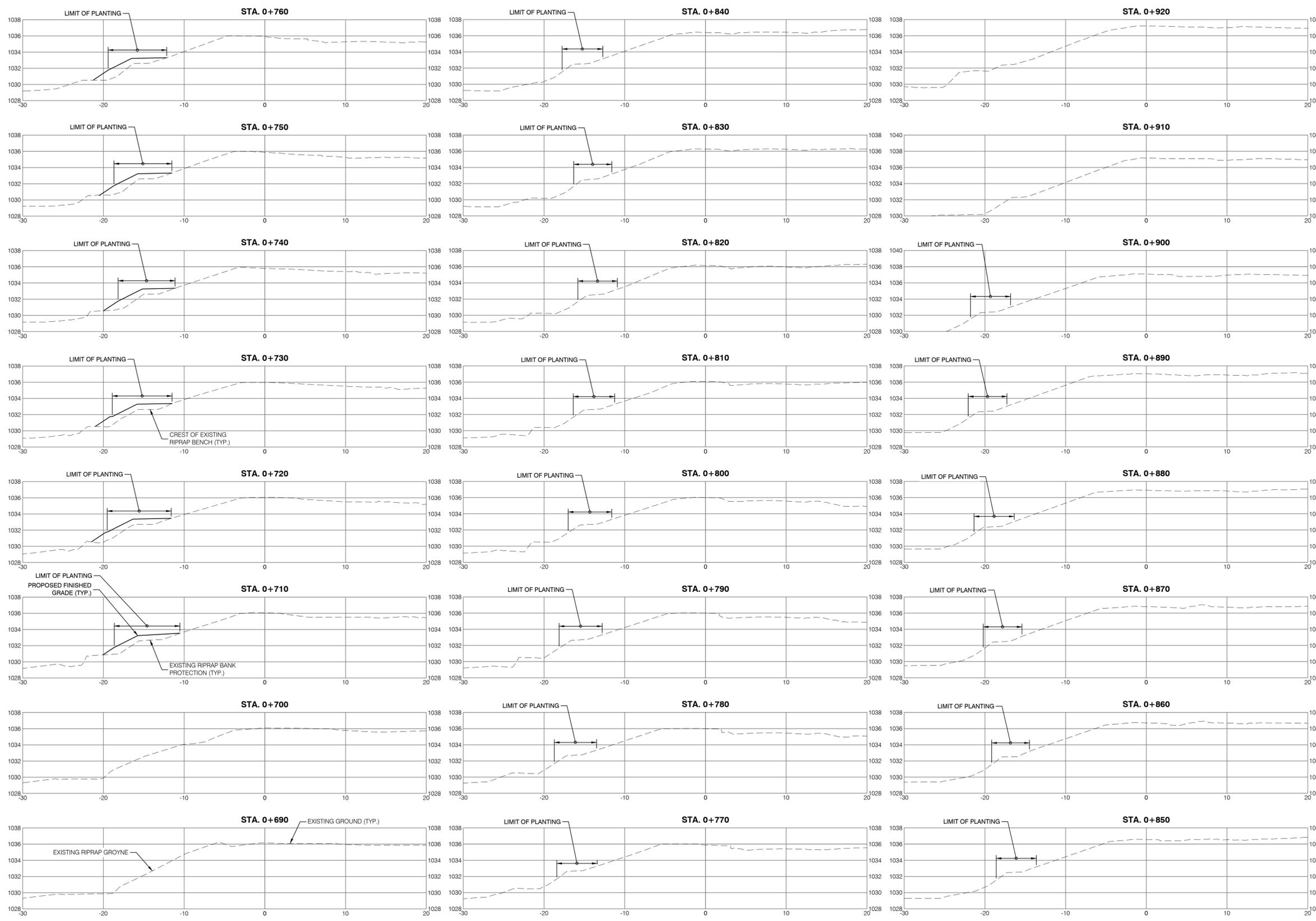


**PROFILE**  
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 100 millimeters  
 50  
 0 10

**NOTES:**  
 1. REFER TO DWG. G-020 FOR LEGEND AND GENERAL NOTES



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**BIOENGINEERING DEMONSTRATION  
 AND EDUCATION PROJECT**

**SITE 4  
 SECTIONS  
 STATION 0+690 TO 0+920**

Project No. **3552-004** Drawing No. **SW-430** Rev. **2**  
 Group **CIVIL**

**SECTIONS**  
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 0 1 (1:125) 6m  
 4B  
 420  
 0 1 (1:125) 6m  
 4C  
 420  
 0 1 (1:125) 6m

- NOTES:**
- REFER TO DWG. G-020 FOR LEGEND AND GENERAL NOTES
  - EXISTING SECTION DETAILS TAKEN FROM PHASE 2 - BANK RESTORATION OF BOW RIVER AT INGLEWOOD, CALGARY ISSUED FOR CONSTRUCTION DRAWINGS BY GOLDER ASSOCIATES LTD. (DATED NOV 2014).
  - RIPRAP VOID FILLING METHODS ARE DESCRIBED ON DWG. SW-420

**LEGEND:**

-  PROPOSED RIPRAP
-  PROPOSED GENERAL FILL
-  PROPOSED TOPSOIL

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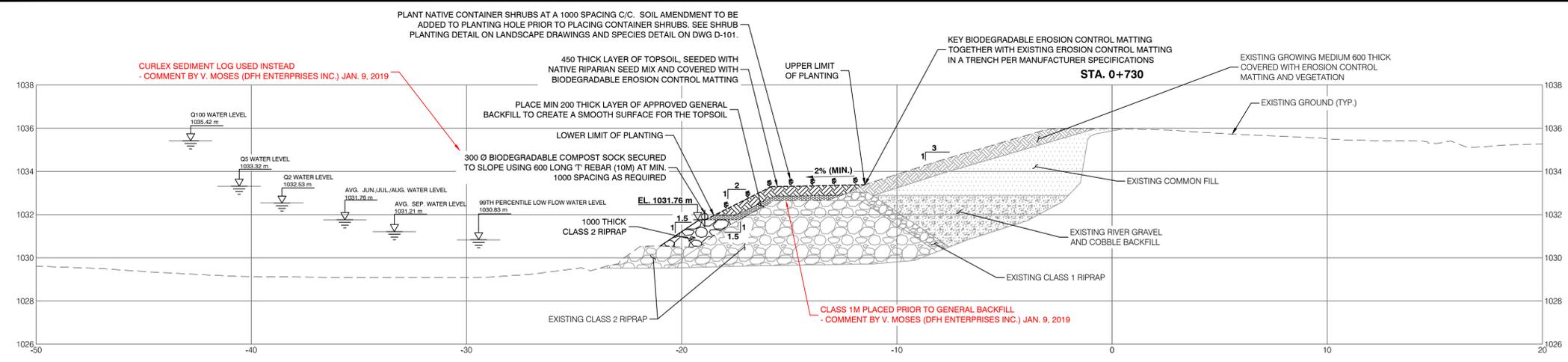
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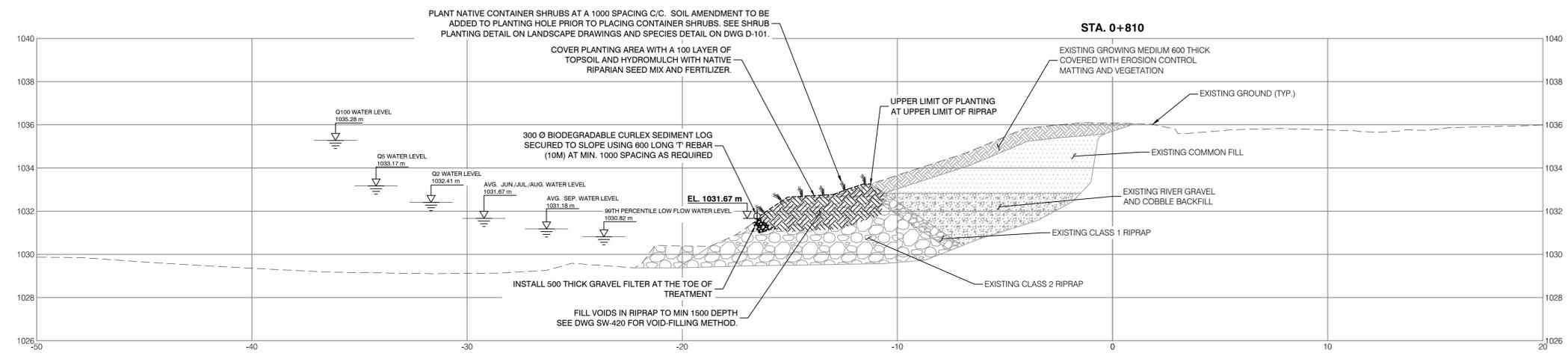
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**BIOENGINEERING DEMONSTRATION AND EDUCATION PROJECT**  
**SITE 4**  
**TYPICAL SECTIONS**

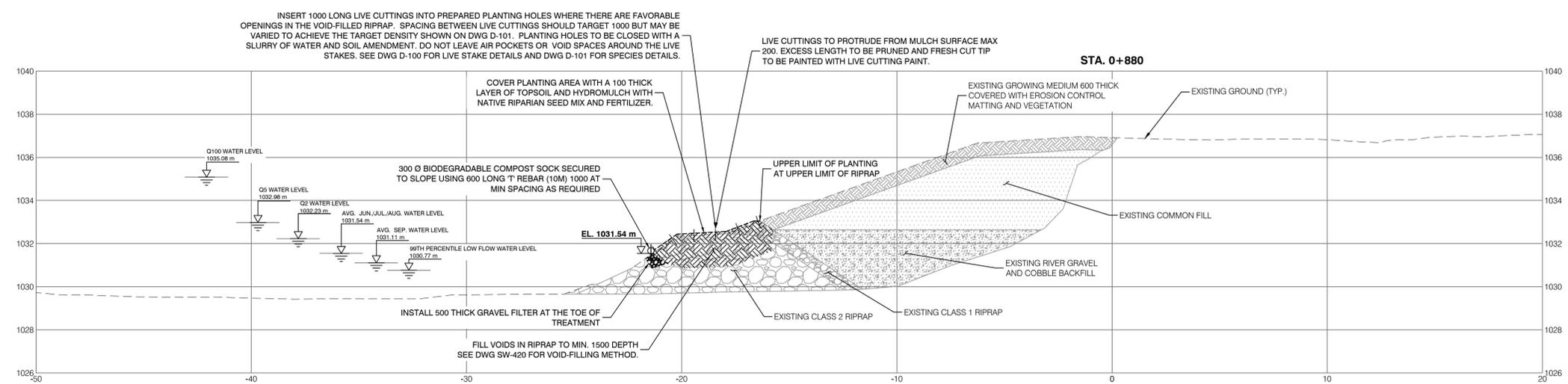
Project No: **3552-004**      Drawing No. **SW-440**      Rev. **2**  
 Group: **CIVIL**



**SOIL COVERED RIPRAP TYPICAL SECTION - STA. 0+705 TO STA. 0+760**  
 Scale: 1:125



**VOID-FILLED RIPRAP AND CONTAINER SHRUB PLANTING TYPICAL SECTION - STA. 0+760 TO STA. 0+830**  
 Scale: 1:125



**VOID-FILLED RIPRAP AND JOINT PLANTING TYPICAL SECTION - STA. 0+830 TO STA. 0+900**  
 Scale: 1:125

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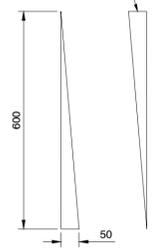
**NOTES:**

- REFER TO DWG. G-020 FOR LEGEND AND GENERAL NOTES
- CONTOUR FASCINE BUNDLES TO OVERLAP 300 WHEN INSTALLED

**LEGEND:**

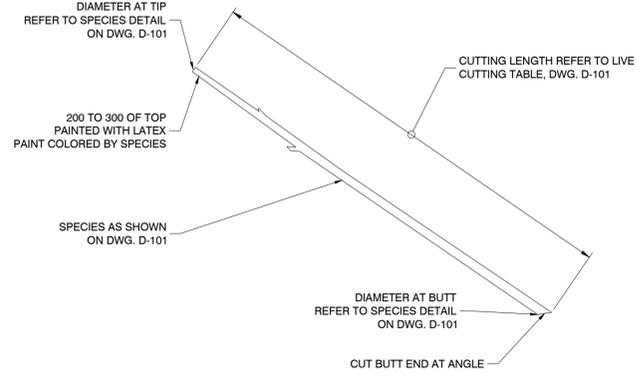


SAW 600 LONG 50 X 100 ROUGH LUMBER DIAGONALLY TO PROVIDE TWO STAKES.

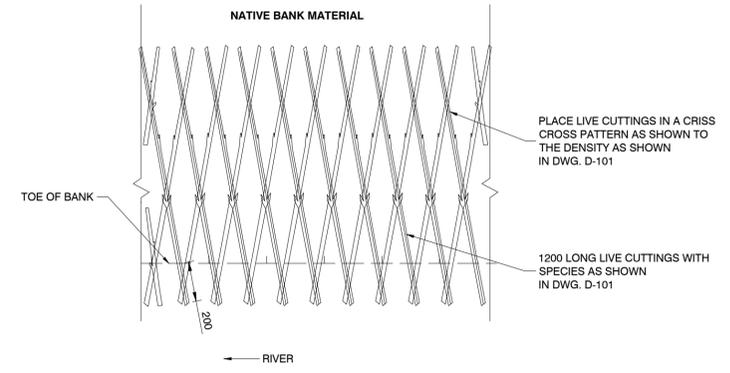


NOT USED. 25mm x 25mm x 450mm STAKES USED.  
- COMMENT BY V. MOSES JAN. 7, 2019

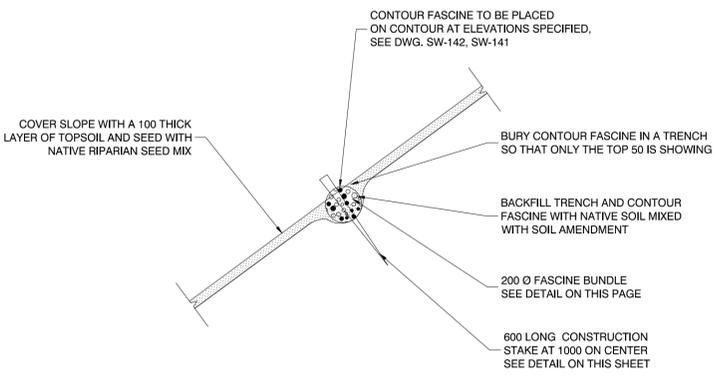
**CONSTRUCTION STAKE DETAIL**  
Scale: 1:10



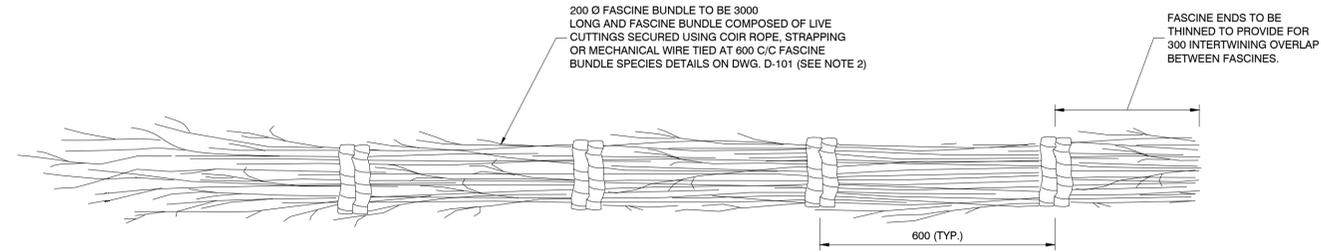
**LIVE CUTTING DETAIL**  
Scale: 1:10



**BRUSH LAYER DETAIL - PLAN**  
Scale: 1:20



**CONTOUR FASCINE DETAIL - SECTION**  
Scale: 1:25



**FASCINE BUNDLE DETAIL - PLAN**  
Scale: 1:10

**RECORD DRAWING DISCLAIMER**  
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Seal:  
  
 ORIGINAL IFC DRAWINGS  
 STAMPED AND SIGNED BY:  
 MICHAEL J. GALLANT, P.ENG.  
 DATE: JAN 30, 2018

**APEGA PERMIT TO PRACTICE NO. P07929**

Rev	Date	Des	Dwn	Chk	Description of Revision
0	JUN 29/2017	MG	ROK	AKS	REVISION INFO RESET FOR TENDERING
1	JAN 30/2018	MG	ROK	AKS	ISSUED FOR CONSTRUCTION
2	OCT 28/2019	MG	MAR	AKS	AS-BUILT

**BIOENGINEERING DEMONSTRATION AND EDUCATION PROJECT**  
**STANDARD DETAILS**

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 Calgary, AB T2G 2H8  
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 www.terraerosion.com

**NOTES:**  
 1. REFER TO DWG. G-020 FOR LEGEND AND GENERAL NOTES

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**APEGA PERMIT TO PRACTICE NO. P07929**

Rev	Date	Des	Dwn	Chk	Description of Revision
0	JUN 29/2017	MG	PAC	MG	REVISION INFO RESET FOR TENDERING
1	JAN 30/2018	MG	ROK	AKS	REVISED PLANT LISTS
2	FEB 12/2018	MG	ROK	AKS	REVISED STATIONING
3	OCT 28/2019	MG	MAR	AKS	AS-BUILT

**BIOENGINEERING DEMONSTRATION AND EDUCATION PROJECT**

**PLANTING SPECIES LISTS**

Project No:	<b>3552-004</b>	Drawing No.	<b>D-101</b>	Rev.	<b>3</b>
Group:	<b>CIVIL</b>				

**SITE 1-1 - VEGETATED RIPRAP APRON (STA 10+000 TO STA 10+075)**

PLANT LIST - LIVE STAKING PLANTING DENSITY - 4,444 stems/ha (SPACING OF 1.5m x 1.5m)

BOTANICAL NAME	COMMON NAME	% MIX	DENSITY (stems/ha)	STOCK TYPE	LENGTH (m)
SALIX EXIGUA	SANDBAR WILLOW	50	2,222	LIVE CUTTINGS	1.2
CORNUS STOLONIFERA	RED OSIER DOGWOOD	30	1,333	LIVE CUTTINGS	1.2
POPULUS BALSAMIFERA	BALSAM POPLAR	20	889	LIVE CUTTINGS	1.2

WET MEADOW SEED MIX APPLICATION RATE - 30 to 40 kg/ha

**SITE 1-3 AND SITE 1-4 - TIMBER CRIB WALL (STA 10+146 TO STA 10+288)**

PLANT LIST - BRUSH LAYER PLANTING DENSITY - 20 stems/lm

BOTANICAL NAME	COMMON NAME	% MIX	DENSITY (stems/lm)	STOCK TYPE	LENGTH (m)
SALIX LUTEA	YELLOW WILLOW	40	8	LIVE CUTTINGS	1.75 - 2.0
SALIX EXIGUA	SANDBAR WILLOW	40	8	LIVE CUTTINGS	1.5 - 2.0
CORNUS STOLONIFERA	RED OSIER DOGWOOD	20	4	LIVE CUTTINGS	1.5 - 2.0

**SITE 1-3 AND SITE 1-4 - SOIL WRAP (STA 10+146 TO STA 10+288)**

PLANT LIST - BRUSH LAYER PLANTING DENSITY - 10 stems/lm

BOTANICAL NAME	COMMON NAME	% MIX	DENSITY (stems/lm)	STOCK TYPE	LENGTH (m)
SALIX LUTEA	YELLOW WILLOW	40	5	LIVE CUTTINGS	1.75 - 2.0
SALIX EXIGUA	SANDBAR WILLOW	40	4	LIVE CUTTINGS	1.5 - 2.0
POPULUS BALSAMIFERA	BALSAM POPLAR	20	1	LIVE CUTTINGS	1.75 - 2.0

**SITE 1-4 - BRUSH MATTRESS (STA 10+288 TO STA 10+351)**

PLANT LIST - BRUSH MATTRESS PLANTING DENSITY - 40 stems/lm

BOTANICAL NAME	COMMON NAME	% MIX	DENSITY (stems/lm)	STOCK TYPE	LENGTH (m)
SALIX LUTEA	YELLOW WILLOW	50	20	LIVE CUTTINGS	2
SALIX BEBBIANA	BEAKED WILLOW	20	8	LIVE CUTTINGS	2
SALIX EXIGUA	SANDBAR WILLOW	20	8	LIVE CUTTINGS	1.5 - 2.0
CORNUS STOLONIFERA	RED OSIER DOGWOOD	10	4	LIVE CUTTINGS	1.5 - 2.0

PLANT LIST - CONTOUR FASCINE (>= 200mm DIAMETER)

BOTANICAL NAME	COMMON NAME	% MIX	DENSITY (stems/lm)	STOCK TYPE	BUNDLE LENGTH (m)
SALIX LUTEA	YELLOW WILLOW	35	N/A	LIVE CUTTINGS	
SALIX EXIGUA	SANDBAR WILLOW	30	N/A	LIVE CUTTINGS	
POPULUS BALSAMIFERA	BALSAM POPLAR	20	N/A	LIVE CUTTINGS	
FILLER*					3.3
ALNUS TENUIFOLIA*	RIVER ALDER	15	N/A	CUTTINGS	
POPULUS TREMULOIDES*	TREMBLING ASPEN				
BETULA OCCIDENTALIS*	WATER BIRCH				

\*NOTE: EACH CONTOUR FASCINE TO HAVE UP TO A MAXIMUM OF 15% FILLER MATERIAL OF THE SPECIES LISTED OR AS APPROVED BY SOIL BIOENGINEERING SPECIALIST

PLANT LIST - BRUSH LAYER PLANTING DENSITY - 10 stems/lm

BOTANICAL NAME	COMMON NAME	% MIX	DENSITY (stems/lm)	STOCK TYPE	LENGTH (m)
SALIX LUTEA	YELLOW WILLOW	40	4	LIVE CUTTINGS	1.2
SALIX EXIGUA	SANDBAR WILLOW	40	4	LIVE CUTTINGS	1.2
POPULUS BALSAMIFERA	BALSAM POPLAR	20	2	LIVE CUTTINGS	1.2

SLIGHT VARIANCE IN % MIX IN SOME BIOENGINEERING TREATMENTS. SEE RFI'S FOR DETAILS - COMMENT BY V. MOSES JAN. 7, 2019

**SITE 2-1 AND SITE 2-2 - BOX FASCINE (STA 0+560 TO STA 0+685)**

PLANT LIST - BRUSH LAYER PLANTING DENSITY - 20 stems/lm

BOTANICAL NAME	COMMON NAME	% MIX	DENSITY (stems/lm)	STOCK TYPE	LENGTH (m)
SALIX EXIGUA	SANDBAR WILLOW	50	10	LIVE CUTTINGS	0.7
CORNUS STOLONIFERA	RED OSIER DOGWOOD	50	10	LIVE CUTTINGS	0.7

PLANT LIST - BOX FASCINE PLANTING DENSITY - 4 FASCINE BUNDLES (>= 200mm DIAMETER) PER CROSS-SECTION

BOTANICAL NAME	COMMON NAME	% MIX	DENSITY (stems/lm)	STOCK TYPE	BUNDLE LENGTH (m)
SALIX LUTEA	YELLOW WILLOW	35	20	LIVE CUTTINGS	
SALIX EXIGUA	SANDBAR WILLOW	30	12	LIVE CUTTINGS	
SALIX BEBBIANA	BEAKED WILLOW	20	8	LIVE CUTTINGS	
FILLER*					3.3
ALNUS TENUIFOLIA*	RIVER ALDER	15	N/A	CUTTINGS	
POPULUS TREMULOIDES*	TREMBLING ASPEN				
BETULA OCCIDENTALIS*	WATER BIRCH				

\*NOTE: EACH FASCINE FOR THE BOX FASCINE TO HAVE UP TO A MAXIMUM OF 15% FILLER MATERIAL OF THE SPECIES LISTED OR AS APPROVED BY SOIL BIOENGINEERING SPECIALIST

**SITE 2-2 - SLOPE TREATMENT A (STA 0+615 TO STA 0+635)**

PLANT LIST - BRUSH MATTRESS PLANTING DENSITY - 40 stems/lm

BOTANICAL NAME	COMMON NAME	% MIX	DENSITY (stems/lm)	STOCK TYPE	LENGTH (m)
SALIX LUTEA	YELLOW WILLOW	40	16	LIVE CUTTINGS	2.0
SALIX BEBBIANA	BEAKED WILLOW	20	8	LIVE CUTTINGS	2.0
SALIX EXIGUA	SANDBAR WILLOW	20	8	LIVE CUTTINGS	1.5 - 2.0
CORNUS STOLONIFERA	RED OSIER DOGWOOD	20	8	LIVE CUTTINGS	1.5 - 2.0

PLANT LIST - CONTOUR FASCINE (>= 200mm DIAMETER)

BOTANICAL NAME	COMMON NAME	% MIX	DENSITY (stems/lm)	STOCK TYPE	BUNDLE LENGTH (m)
SALIX LUTEA	YELLOW WILLOW	35	N/A	LIVE CUTTINGS	
SALIX EXIGUA	SANDBAR WILLOW	30	N/A	LIVE CUTTINGS	
POPULUS BALSAMIFERA	BALSAM POPLAR	20	N/A	LIVE CUTTINGS	
FILLER*					3.3
ALNUS TENUIFOLIA*	RIVER ALDER	15	N/A	CUTTINGS	
POPULUS TREMULOIDES*	TREMBLING ASPEN				
BETULA OCCIDENTALIS*	WATER BIRCH				

\*NOTE: EACH CONTOUR FASCINE TO HAVE UP TO A MAXIMUM OF 15% FILLER MATERIAL OF THE SPECIES LISTED OR AS APPROVED BY SOIL BIOENGINEERING SPECIALIST

**SITE 2-2 - SLOPE TREATMENT B (STA 0+635 TO STA 0+660)**

PLANT LIST - HEDGE BRUSH LAYER PLANTING DENSITY - 10 stems/lm + 1 rooted stock alternating between the species noted below

BOTANICAL NAME	COMMON NAME	% MIX	DENSITY (stems/lm)	STOCK TYPE	LENGTH (m)
SALIX LUTEA	YELLOW WILLOW	40	4	LIVE CUTTINGS	1.2
SALIX EXIGUA	SANDBAR WILLOW	40	4	LIVE CUTTINGS	1.2
POPULUS BALSAMIFERA	BALSAM POPLAR	20	2	LIVE CUTTINGS	1.2
ALNUS TENUIFOLIA*	RIVER ALDER			#5 CONTAINER	0.8 - 1.0
CORNUS STOLONIFERA*	RED OSIER DOGWOOD			#5 CONTAINER	0.8 - 1.0

\*NOTE: ALTERNATE ROOTED STOCK SPECIES EACH METER

**SITE 2-2 - SLOPE TREATMENT C (STA 0+660 TO STA 0+685)**

PLANT LIST - LIVE STAKING PLANTING DENSITY - 100,000 stems/ha (SPACING OF 0.3m x 0.3m)

BOTANICAL NAME	COMMON NAME	% MIX	DENSITY (stems/ha)	STOCK TYPE	LENGTH (m)
SALIX LUTEA	YELLOW WILLOW	50	50,000	LIVE CUTTINGS	0.6
SALIX EXIGUA	SANDBAR WILLOW	20	20,000	LIVE CUTTINGS	0.6
CORNUS STOLONIFERA	RED OSIER DOGWOOD	10	10,000	LIVE CUTTINGS	0.6
POPULUS BALSAMIFERA	BALSAM POPLAR	20	20,000	LIVE CUTTINGS	0.6

**SITE 4-1 - SOIL COVERED RIPRAP (STA 0+705 TO STA 0+760)**

PLANT LIST - CONTAINER SHRUB PLANTINGS PLANTING DENSITY - 10,000 stems/ha (SPACING OF 1m X 1m)

BOTANICAL NAME	COMMON NAME	% MIX	DENSITY (stems/ha)	STOCK TYPE	STEM HEIGHT
SALIX EXIGUA	SANDBAR WILLOW	30	3,000	#1 CONTAINER	
CORNUS STOLONIFERA	RED OSIER DOGWOOD	30	3,000	#1 CONTAINER	
ALNUS TENUIFOLIA	RIVER ALDER	10	1,000	#1 CONTAINER	SEE SPECIFICATIONS
BETULA OCCIDENTALIS	WATER BIRCH	10	1,000	#1 CONTAINER	
POPULUS BALSAMIFERA*	BALSAM POPLAR	20	2,000	#1 CONTAINER	

\*NOTE: PLANT BALSAM POPLAR ON BENCH ONLY

**SITE 4-2 - VOID-FILLED RIPRAP AND CONTAINER SHRUB PLANTING (STA 0+760 TO STA 0+830)**

PLANT LIST - CONTAINER SHRUB PLANTINGS PLANTING DENSITY - 10,000 stems/ha (SPACING OF 1m X 1m)

BOTANICAL NAME	COMMON NAME	% MIX	DENSITY (stems/ha)	STOCK TYPE	STEM HEIGHT
SALIX EXIGUA	SANDBAR WILLOW	30	3,000	415D (PLUG)	
CORNUS STOLONIFERA	RED OSIER DOGWOOD	30	3,000	415D (PLUG)	
ALNUS TENUIFOLIA	RIVER ALDER	10	1,000	415D (PLUG)	SEE SPECIFICATIONS
BETULA OCCIDENTALIS	WATER BIRCH	10	1,000	415D (PLUG)	
POPULUS BALSAMIFERA	BALSAM POPLAR	20	2,000	415D (PLUG)	

**SITE 4-3 - VOID-FILLED RIPRAP AND LIVE STAKING (STA 0+830 TO STA 0+865)**

PLANT LIST - LIVE STAKING PLANTING DENSITY - 10,000 stems/ha (SPACING OF 1m x 1m)

BOTANICAL NAME	COMMON NAME	% MIX	DENSITY (stems/ha)	STOCK TYPE	LENGTH (m)
SALIX LUTEA	YELLOW WILLOW	40	4,000	LIVE CUTTINGS	1.0
SALIX EXIGUA	SANDBAR WILLOW	30	3,000	LIVE CUTTINGS	1.0
CORNUS STOLONIFERA	RED OSIER DOGWOOD	10	1,000	LIVE CUTTINGS	1.0
POPULUS BALSAMIFERA	BALSAM POPLAR	20	2,000	LIVE CUTTINGS	1.0

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At Full Size, this border measures 520 mm x 800 mm



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- NOTES:**
- REFER TO DWG. D-020 FOR LEGEND AND GENERAL NOTES
  - TURBIDITY CURTAIN TO BE WEIGHTED TO THE RIVER BED
  - INSTALL TEMPORARY TURBIDITY CURTAIN PRIOR TO START OF CONSTRUCTION AND REMOVE AT THE END OF CONSTRUCTION

- LEGEND:**
- PROPOSED RIPRAP
  - PROPOSED GENERAL FILL
  - PROPOSED TOPSOIL
  - PROPOSED CLEAN RIVER GRAVEL

**RECORD DRAWING DISCLAIMER**  
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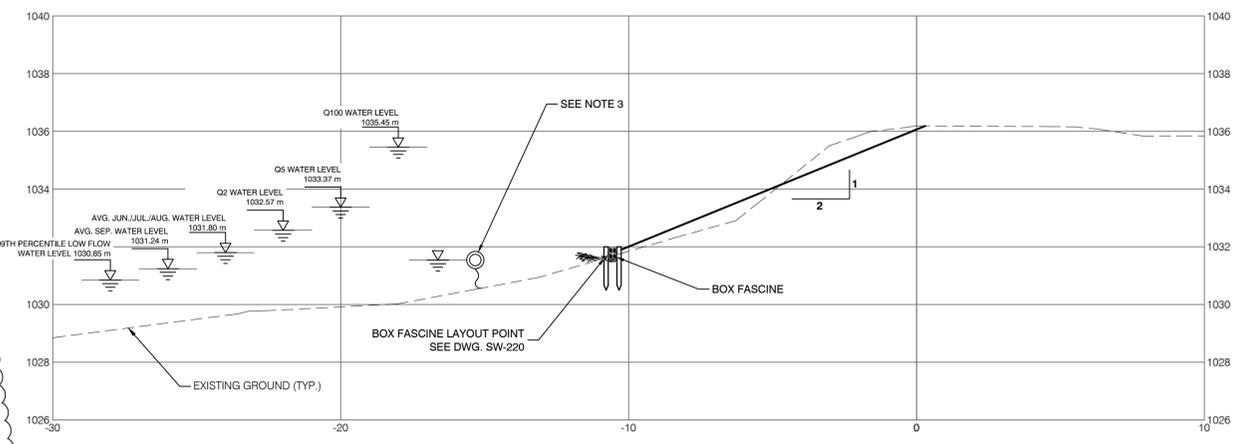
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**ORIGINAL IFC DRAWINGS  
STAMPED AND SIGNED BY:  
MICHAEL J. GALLANT, P.ENG  
DATE: JAN 30, 2018**

**APEGA PERMIT TO PRACTICE NO. P07929**

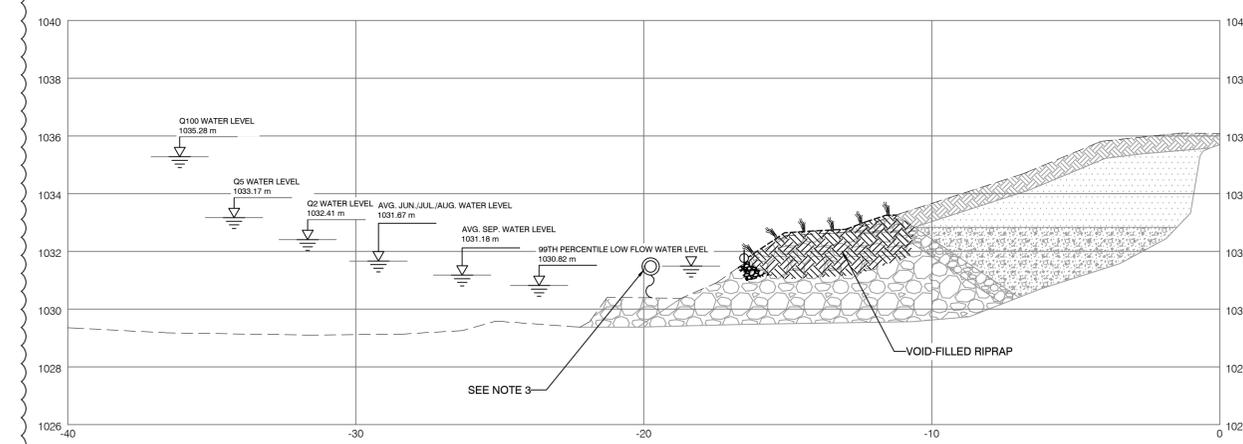
Rev	Date	Des	Dwn	Chk	Description of Revision
0	JUN 29/2017	MG	ROK	AKS	REVISION INFO RESET FOR TENDERING
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2	MAR 07/2018	MG	ROK	AKS	REVISED ISOLATION DETAIL
3	SEP 16/2019	MG	MAR	AKS	AS-BUILT

**BIOENGINEERING DEMONSTRATION  
AND EDUCATION PROJECT  
ISOLATION DETAILS**

Project No: **3552-004** Drawing No. **D-102** Rev. **3**  
Group: **CIVIL**



**SITE 2 - TYPICAL TURBIDITY CURTAIN DETAIL**  
Scale: 1:125



**SITE 4 - TYPICAL TURBIDITY CURTAIN DETAIL**  
Scale: 1:125

REFER TO AMEC FOSTER WHEELER DRAWING  
NO. E-100 FOR SITE ISOLATION DETAILS

2