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## HIGHWAY 93 SOUTH BANFF – WINDERMERE HIGHWAY CULVERT REPLACEMENT SINCLAIR CREEK (KM 100.6)

KOOTENAY NATIONAL PARK, BRITISH COLUMBIA

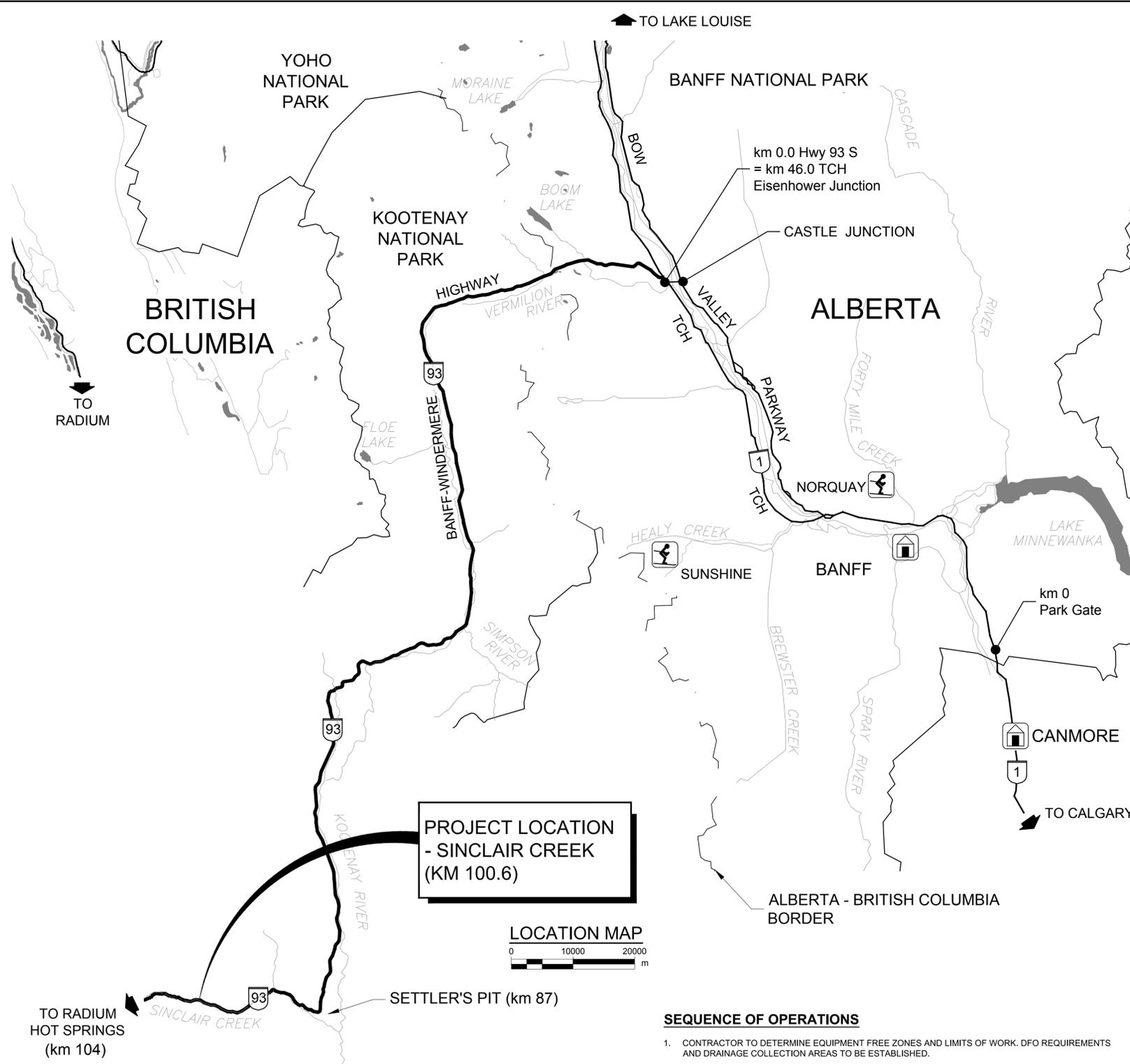
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PROJECT NO. 1079-01

MAR 2018

00-C6-S000



**PROJECT LOCATION  
- SINCLAIR CREEK  
(KM 100.6)**



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**SEQUENCE OF OPERATIONS**

- CONTRACTOR TO DETERMINE EQUIPMENT FREE ZONES AND LIMITS OF WORK. DFO REQUIREMENTS AND DRAINAGE COLLECTION AREAS TO BE ESTABLISHED.
- CONTRACTOR TO SUBMIT AN ENVIRONMENTAL PROTECTION PLAN (EPP), CHANNEL EXCAVATION PLAN, TEMPORARY CHANNEL DIVERSION AND DAMMING PLAN FOR APPROVAL BY THE DEPARTMENTAL REPRESENTATIVE. REFER TO SHEETS S103 AND S104 FOR THE TENTATIVE LOCATION OF THE CHANNEL DIVERSION PIPES AND EXTENT OF CHANNEL EXCAVATION.
- CONTRACTOR TO SUBMIT TRAFFIC ACCOMMODATION PLAN AND INSTALL TEMPORARY BARRIERS AND FENCES AS REQUIRED TO CREATE A SAFE WORKING AREA.
- DEWATERING THE SOIL IN ADVANCE OF THE EXCAVATION MAY BE NECESSARY FOR EXCAVATION STABILITY AND SEEPAGE CONTROL.
- INSTALL GEOTEXTILE FILTERS, BARRIERS AND SEDIMENT TRAPS ALONG WORK AREAS AS REQUIRED.
- REMOVAL OF EXISTING CULVERT, PORTION OF HEAD WALLS AND FILL MATERIAL TO BE COMPLETED IN THE DRY, WORKING FROM THE DOWNSTREAM END BACK. SUMPS AND FILTERS SHALL BE KEPT AHEAD OF THE WORK TO INTERCEPT AND TRAP DRAINAGE AND SILT.
- ALL REMOVED ACP FROM THE PARKING LOT AND ALL MATERIALS RESULTING FROM DEMOLITION AND REMOVAL OF THE EXISTING STEEL PIPE ARCH CULVERT TO BE HAULED AND DISPOSED OUTSIDE OF PARK AT CONTRACTOR'S EXPENSE.
- INSTALL NEW CULVERT IN THE DRY IN COMPLIANCE WITH ENVIRONMENTAL ASSESSMENT RESTRICTIONS.
- COMPLETE REROUTING CHANNEL FLOW INTO NEW CULVERT. SEDIMENT TRAPS AND BARRIERS TO BE PLACED TO CAPTURE SILT AND DELETERIOUS MATERIALS AND TO DIRECT FLOW INTO NEW CULVERT.
- CONTRACTOR TO MINIMIZE DISTURBANCE TO ALL NATURAL FEATURES AT BOTH UPSTREAM AND DOWNSTREAM OF THE CHANNEL.

**GENERAL NOTES**

- ALL DIMENSIONS SHOWN ON SHEETS S101 & S103 ARE IN METRES. ALL OTHER SHEETS ARE DIMENSIONED IN MILLIMETERS.
- ALL DIMENSIONS AND DETAILS SHOWN ON THESE DRAWINGS PERTINENT TO NEW CONSTRUCTION AND EXISTING STRUCTURES SHALL BE VERIFIED IN THE FIELD BY THE CONTRACTOR BEFORE STARTING CONSTRUCTION.
- CULVERT FLOWS MUST BE MAINTAINED THROUGHOUT THE PROJECT. WATER NEEDS TO BE CONTROLLED WITH COFFERDAMS, PUMPS, AND PIPING AS APPROPRIATE. ENSURE THAT ALL ENVIRONMENTAL REQUIREMENTS ARE MET.
- DESIGN SPECIFICATION: CAN/CSA S6-14
- DESIGN LOADS:
  - SELFWEIGHT OF THE PRECAST BOX UNITS
  - VERTICAL EARTH PRESSURE DUE TO FILL HEIGHT (MAX FILL HEIGHT ABOVE THE BOX SECTION= 3.0m)
  - LATERAL EARTH PRESSURE FROM BACKFILL ON THE SIDES OF THE BOX UNITS
  - COMPACTION SURCHARGE: 12 KPa
  - LIVE LOAD: BCL 625 TRUCKS PLUS DYNAMIC LOAD ALLOWANCE (AS PER CLAUSE 3.8.4.5 OF S6-14). THE PRESSURE DISTRIBUTION ON THE BOX UNITS DUE TO LIVE LOAD SHALL BE AS PER CLAUSE 7.8.5.3.3 OF S6-14.
  - EARTHQUAKE LOADS AS PER CLAUSE 7.8.4.4 OF S6-14.
- FACTORED SOIL BEARING CAPACITY AT CULVERT INSTALLATION ELEVATION IS 150 kPa (ULS).
- THE CONTRACTOR SHALL DESIGN THE CONCRETE CULVERT WITH LIFE EXPECTANCY OF 75 YEARS AND SUBMIT THE DESIGN DRAWINGS DULY SIGNED AND STAMPED BY THE PROFESSIONAL ENGINEER REGISTERED OR LICENSED TO PRACTICE IN THE PROVINCE OF BRITISH COLUMBIA TO PARKS CANADA AGENCY FOR APPROVAL BEFORE ANY WORK IS STARTED.

**MATERIALS AND FABRICATION**

- ALL CAST-IN-PLACE AND PRECAST CONCRETE UNITS SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 45 MPa AT 28 DAYS WITH MINIMUM AIR CONTENT OF 6%.
- ALL REINFORCING BARS AND BARS NOTED AS DOWELS SHALL BE DEFORMED REINFORCEMENT CONFORMING TO CAN/CSA G30.18-09 (2014), GRADE 400 UNLESS NOTED OTHERWISE.
- WELDED WIRE REINFORCEMENT (WWR) SHALL BE MADE OF DEFORMED WIRES AND CONFORM TO ASTM A1064/A1064M.
- MINIMUM CLEAR CONCRETE COVER TO REINFORCING STEEL SHALL BE AS FOLLOWS:
 

• PRECAST CONCRETE UNITS	40 mm
• CAST-IN-PLACE CONCRETE EXPOSED TO EARTH	70 mm
• CONCRETE CAST DIRECTLY AGAINST EARTH	100 mm
- ALL LAPS FOR REINFORCING STEEL FOR SPLICES SHALL BE AS FOLLOWS:
 

BAR SIZE	LAP LENGTH (mm)
10M	400
15M	600
20M	700
25M	1100
- A REINFORCING STEEL SCHEDULE, AND PLAN SHOWING LAYOUT OF THE PRECAST UNITS SHALL BE PREPARED BY THE CONTRACTOR AND SUBMITTED TO PARKS CANADA AGENCY FOR REVIEW AND APPROVAL.
- THE PRECAST UNITS SHALL CONFORM TO THE FABRICATION REQUIREMENTS OF ASTM C1433M-16B.
- JOINTS FOR PRECAST UNITS SHALL BE TONGUE AND GROOVE TYPE CONFORMING TO THE REQUIREMENTS OF SECTION 9 OF ASTM C1433M-16B.

**INSTALLATION AND BACKFILLING**

- PRECAST CONCRETE BOX CULVERT SECTIONS SHALL BE ERECTED AND LAID IN PLACE AS PER MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS. SECTIONS SHALL BE LAID WITH THE GROOVE END OF EACH SECTION UP-GRADE. PLACEMENT OF THE BOX SECTIONS SHALL START AT THE DOWNSTREAM END AND PROCEED UPSTREAM.
- THE JOINT OPENINGS BETWEEN ADJACENT PRECAST SECTIONS SHALL NOT EXCEED 10 mm. THE SECTIONS SHALL BE DRAWN TOGETHER WITH A MINIMUM OF FOUR MECHANICAL CONNECTORS PER JOINT. AFTER INSTALLATION, CONNECTORS SHALL BE REMOVED.
- THE JOINTS SHALL BE SEALED WITH CONTINUOUS FLEXIBLE WATER TIGHT BUTYL RUBBER SEALANT CONFORMING TO THE REQUIREMENTS OF ASTM C990-09. ALL JOINTS SHALL BE TRIMMED CLEAN ON THE INSIDE AFTER SEALING.
- A 600 mm WIDE POLYOLEFIN BACKED EXTERIOR JOINT WRAP CONFORMING TO THE REQUIREMENTS OF ASTM C990-09 SHALL BE PLACED ON TOP AND SIDES OF EACH PRECAST UNIT CENTERED OVER THE JOINT.
- LIFTING HOLES SHALL BE FILLED WITH CONCRETE PLUGS OR WITH AN APPROVED NON-SHRINKABLE GROUT.
- DOWEL REINFORCING BARS TO BE INSTALLED WITH A MINIMUM EMBEDMENT OF 150 mm INTO EXISTING CONCRETE HEAD WALLS AND PRECAST END UNIT. THE SPACING OF THE DOWELS SHALL BE AS SHOWN ON SHEETS S107 AND S108.
- CONTRACTOR IS FULLY RESPONSIBLE FOR ADEQUATE PROTECTION OF ALL UTILITIES, SERVICES, STRUCTURES, ETC., DURING CONSTRUCTION OPERATIONS.
- EXCAVATION SHALL BE DONE TO LINES AND GRADES SHOWN ON THE DRAWINGS TO ALLOW FOR PLACEMENT AND COMPACTION OF ALL BEDDING AND BACKFILL MATERIALS. ADDITIONAL SUB-CUT MAY BE REQUIRED FOR THE REMOVAL AND REPLACEMENT OF THE SOFT MATERIALS ENCOUNTERED DIRECTLY BELOW THE CULVERT FOUNDATION WITH COMPACTED GRANULAR FILL AS PER THE DIRECTION OF THE GEOTECHNICAL ENGINEER. PLEASE REFER TO GEOTECHNICAL REPORT TITLED "GEOTECHNICAL INVESTIGATION FOR TWO CULVERT REPLACEMENTS (KILOMETRES 95.6 AND 100.6) ALONG HIGHWAY 93S IN KOOTENAY NATIONAL PARK, BC" FOR PREPARATION OF SUBGRADE AND ADDITIONAL SUBCUT.
- STRUCTURAL BACKFILL SHALL CONSIST OF APPROVED GRANULAR MATERIAL. BACKFILL MATERIAL SHALL BE PLACED AND COMPACTED IN AN UNFROZEN CONDITION, MEET THE SPECIFIED GRADATION, CONTAIN NO ROCKS EXCEEDING 50 mm IN DIAMETER AND SHALL BE FREE OF LARGE OR FROZEN LUMPS, WOOD, OR OTHER UNSUITABLE MATERIAL. BACKFILLING IS NOT ALLOWED ON FROZEN SUBSTRATE OR WHEN AIR TEMPERATURE IS BELOW 0°C.
- THE STRUCTURAL FILLS SHALL BE PLACED IN MAXIMUM LIFTS OF 150 mm AND COMPACTED TO A 98% OF STANDARD PROCTOR DENSITY WITH OPTIMUM MOISTURE CONTENT TO BE WITHIN ± 1%.
- BACKFILL SHALL BE PLACED IN SIMULTANEOUS EQUAL LIFTS ON BOTH SIDES OF CULVERT.
- TOP OF BACKFILL ELEVATION SHALL BE WITHIN 150 mm ON BOTH SIDES OF CULVERT AT ALL TIMES.
- CONTRACTOR SHALL SUBMIT SURFACE DRAINAGE SCHEME (DITCHING, SUMPS AND PUMPS) FOR MANAGING SURFACE RUNOFF AND DRAINAGE DURING CONSTRUCTION TO THE DEPARTMENTAL REPRESENTATIVE FOR REVIEW AND APPROVAL AT LEAST TWO WEEKS PRIOR TO COMMENCEMENT OF CONSTRUCTION WORK.
- PRE-APPROVED GRANULAR MATERIALS SHALL MEET THE BC MOTI GRADATION SPECIFICATIONS FOR CRUSHED BASE COURSE AGGREGATES.
- GEOTEXTILE FILTER FABRIC SHOWN SHALL MEET THE FOLLOWING REQUIREMENTS:

WOVEN GEOTEXTILE FILTER FABRIC SPECIFICATIONS AND PHYSICAL PROPERTIES		NON-WOVEN GEOTEXTILE FILTER FABRIC SPECIFICATIONS AND PHYSICAL PROPERTIES	
GRAB STRENGTH	1275 N	GRAB STRENGTH	CLASS 250
ELONGATION (FAILURE)	15%	ELONGATION (FAILURE)	50%
PUNCTURE STRENGTH	275 N	PUNCTURE STRENGTH	550 N
TRAPEZOIDAL TEAR	475 N	TRAPEZOIDAL TEAR	350 N
MINIMUM FABRIC LAP TO BE 1000mm		MINIMUM FABRIC LAP TO BE 1000mm	

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NOTES:  
1. COORDINATES SHOWN ARE IN UTM, NAD 83, ZONE 11, W117D (TYP.).

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No.	Date	Description	Drawn by Dessiné par	Approved Approuvé

Revision / Revision	
A	Detail number A Numéro de détail
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Consultant's Name / Nom de l'expert-conseil: **AECOM**

Eng. Stamp / Sceau de l'ingénieur: [Professional Engineer Stamp]

Parks Canada / Parcs Canada

Asset Management Western and Northern Region / Gestion des biens Région de l'Ouest et du Nord

**Canada**

Project title/Titre du projet:  
**HIGHWAY 93 SOUTH  
BANFF – WINDERMERE HWY  
CULVERT REPLACEMENT  
SINCLAIR CREEK (KM 100.6)**

Drawing title/Titre du dessin:  
**LOCATION MAP & GENERAL NOTES**

Surveyed by/Arpenté par <b>SA</b>	Drawn by/Dessiné par <b>ES</b>	Date <b>2018-01-29</b>
Designed by/Conçeut par <b>SM</b>	Reviewed by/Revisé par <b>BS</b>	Scale/Echelle <b>AS SHOWN</b>
Client Acceptance/Acceptation du client		Approved by/Approuvé par
Project No./N° du projet <b>1079-01</b>		Asset No./N° du bien <b>-</b>
Drawing Set No./N° de série du dessin <b>60547362-C6</b>		Sheet No./N° de la feuille <b>S100</b>

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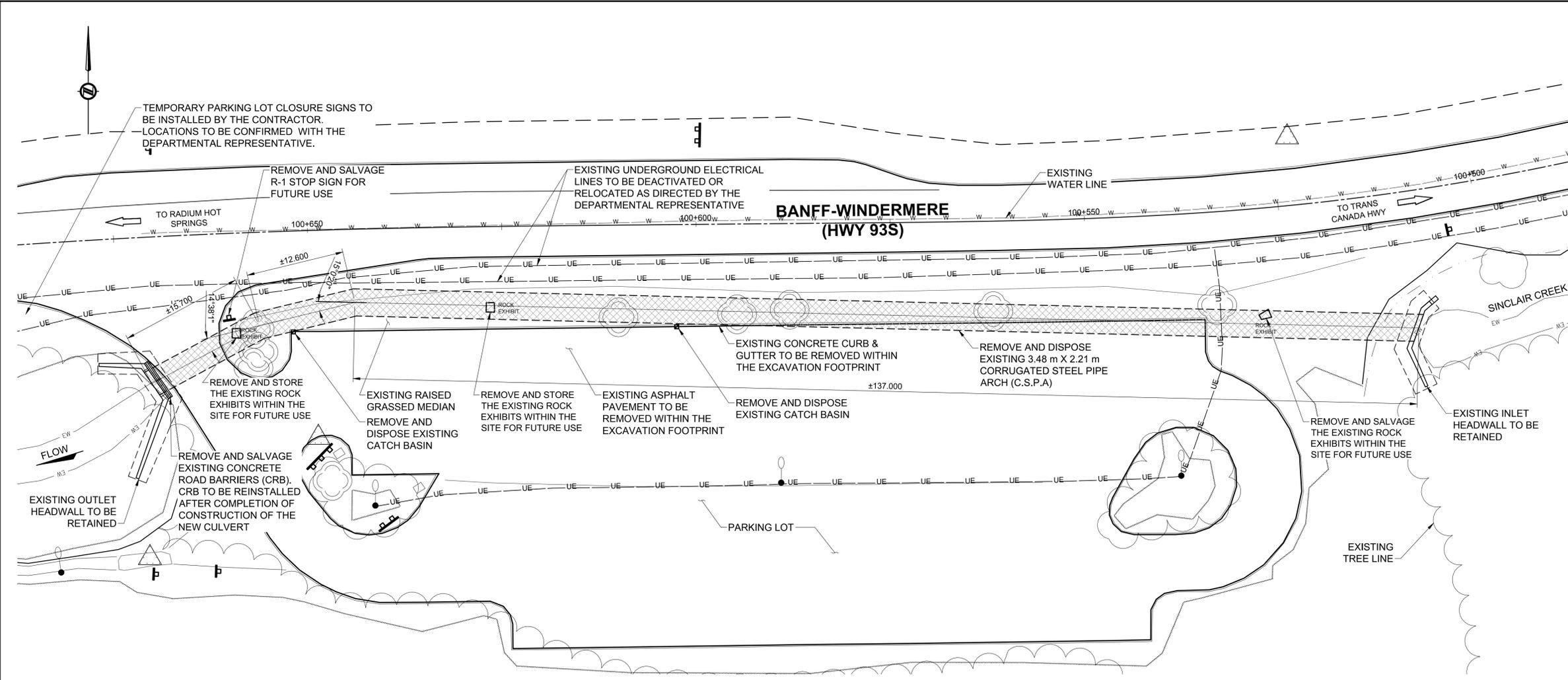
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<b>AECOM</b>	

**Parks Canada** / **Parcs Canada**  
Asset Management Western and Northern Region / Gestion des biens Région de l'Ouest et du Nord

**Canada**



**PLAN**  
Scale 1:300

**LEGEND:**  
[Hatched Box] DENOTES DEMOLITION AREA

**DEMOLITION NOTES**

- SEE SEQUENCE OF OPERATIONS NOTES ON SHEET S-100 FOR REQUIREMENTS OF HANDLING EXISTING STREAM FLOW DURING DEMOLITION.
- GEOMETRY AND LAYOUT OF THE EXISTING HEADWALLS, WINGWALLS, FOOTINGS AND STEEL PIPE ARCH CULVERT ARE BASED ON INFORMATION OBTAINED FROM EXISTING DESIGN INFORMATION. THE ACCURACY OF THIS INFORMATION HAS NOT BEEN VERIFIED. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO FIELD CONFIRM ALL NECESSARY DIMENSIONS SUCH THAT THE WORK CAN BE CONSTRUCTED AS SHOWN ON THESE DRAWINGS. THE CONTRACTOR SHALL INFORM THE DEPARTMENT OF ANY DISCREPANCIES IDENTIFIED FROM THAT INFORMATION SHOWN IN THIS DRAWING.
- CONTRACTOR SHALL COORDINATE WITH THE UTILITY OWNERS FOR DEACTIVATION AND RELOCATION (IF REQUIRED) OF THE EXISTING UTILITIES BEFORE COMMENCEMENT OF ANY DEMOLITION OR EXCAVATION WORK.
- THE PORTIONS OF THE HEADWALLS SHALL BE REMOVED USING SAWCUT AS SHOWN ON SHEET S102. ALL RAILING, STONE FACING, STONE WORK ON THE WALLS SHALL BE REMOVED WITHOUT ANY DAMAGE TO THE EXISTING WALLS. ANY DETERIORATED CONCRETE SHALL BE REMOVED TO THE SOUND CONCRETE USING HAND TOOLS.
- ALL MATERIALS RESULTING FROM DEMOLITION AND REMOVAL OF THE EXISTING STEEL PIPE ARCH CULVERT SHALL BE HAULED AND DISPOSED OUTSIDE OF PARK AT CONTRACTOR'S EXPENSE.

**EQUIPMENT PERMITTED FOR CONCRETE DEMOLITION**

- JACKHAMMERS AND CHIPPING HAMMERS HEAVIER THAN NOMINAL 15kg SHALL NOT BE USED TO REMOVE CONCRETE.
- ONCE THE REINFORCING STEEL IS REACHED, JACKHAMMER OR MECHANICAL CHIPPING TOOLS SHALL NOT BE OPERATED AT AN ANGLE IN EXCESS OF 45 DEGREES MEASURED FROM THE SURFACE OF THE CONCRETE.
- MECHANICAL SCABBLERS OF 8 Nm (6 ft-lb) IMPACT, GRINDERS OR SHOTBLASTING, CAPABLE OF REMOVING THE CONCRETE AND PRODUCING AN ANGULAR FINISHED SURFACE.
- CONCRETE CUTTING SAWS CAPABLE OF SAWING TO THE DEPTHS INDICATED ON THE DRAWINGS.
- HAND TOOLS SUCH AS HAMMERS AND CHISELS.

Project title/Titre du projet  
**HIGHWAY 93 SOUTH  
BANFF – WINDERMERE HWY  
CULVERT REPLACEMENT  
SINCLAIR CREEK (KM 100.6)**

Drawing title/Titre du dessin  
**EXISTING CULVERT LAYOUT  
AND DEMOLITION PLAN**

Surveyed by/Arpenté par <b>SA</b>	Drawn by/Dessiné par <b>ES</b>	Date <b>2018-01-29</b>
Designed by/Conçue par <b>SM</b>	Reviewed by/Revisé par <b>BS</b>	Scale/Echelle <b>AS SHOWN</b>
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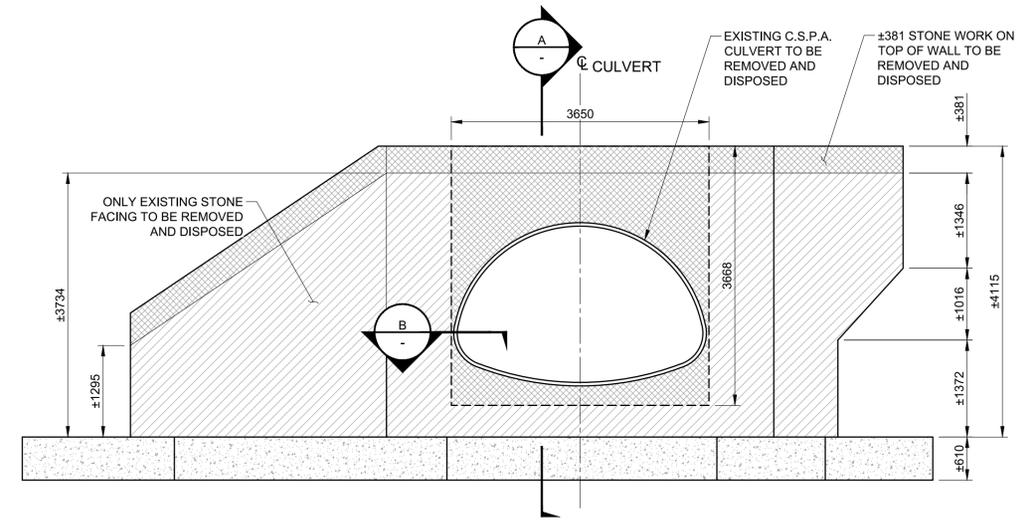
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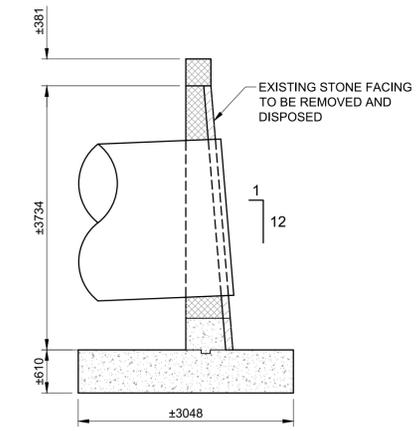
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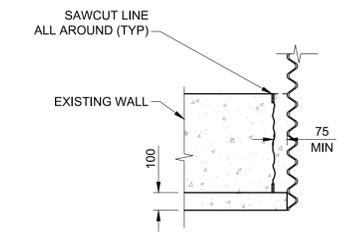
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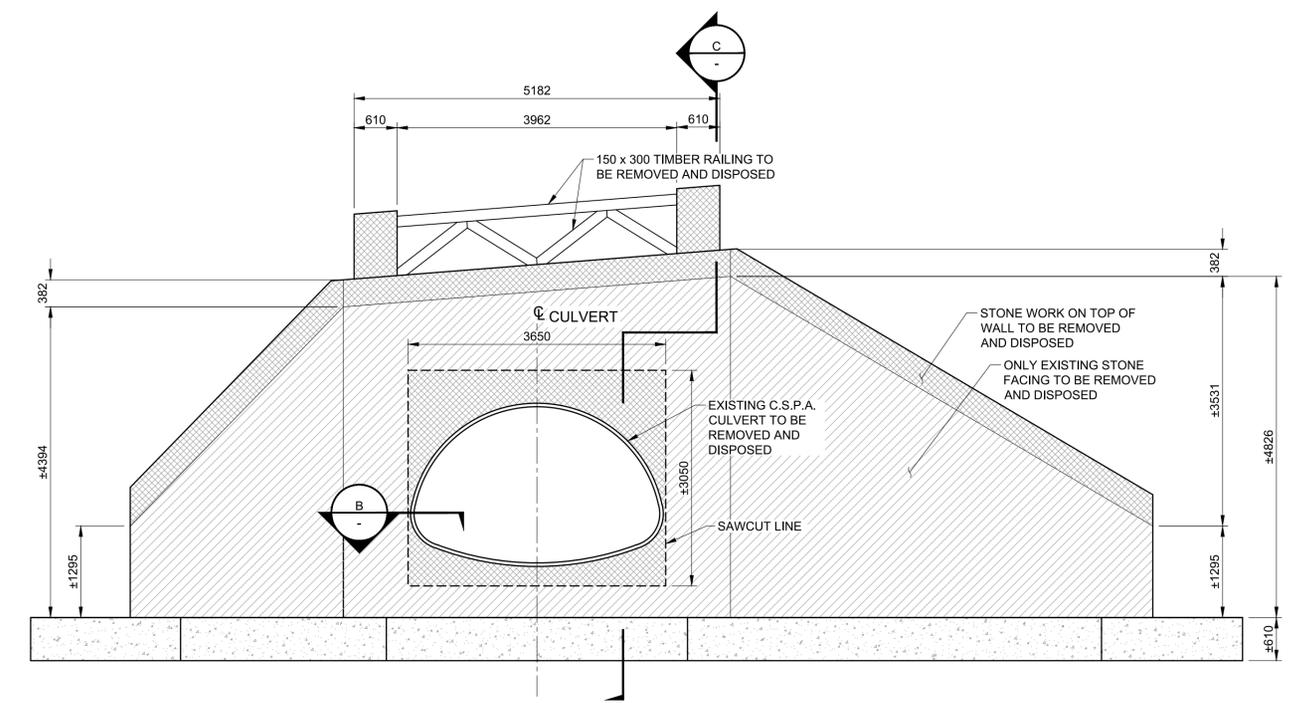
**INLET - ELEVATION**  
Scale 1:50



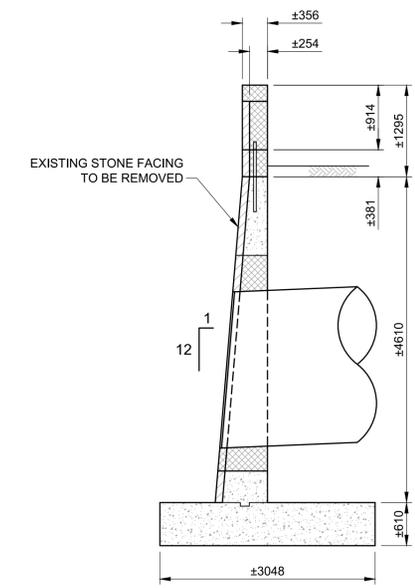
**A SECTION**  
Scale 1:50



**B SECTION**  
Scale 1:20



**OUTLET - ELEVATION**  
Scale 1:50



**C SECTION**  
Scale 1:50

- LEGEND:**
- DENOTES EXISTING CONCRETE AREA
  - DENOTES DEMOLITION AREA
  - DENOTES FACING DEMOLITION AREA

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Drawing title/Titre du dessin:  
**DEMOLITION DETAILS  
EXISTING END TREATMENT**

Surveyed by/Arpenté par <b>SA</b>	Drawn by/Dessiné par <b>ES</b>	Date <b>2018-01-29</b>
Designed by/Concept par <b>SM</b>	Reviewed by/Revisé par <b>BS</b>	Scale/Echelle <b>AS SHOWN</b>
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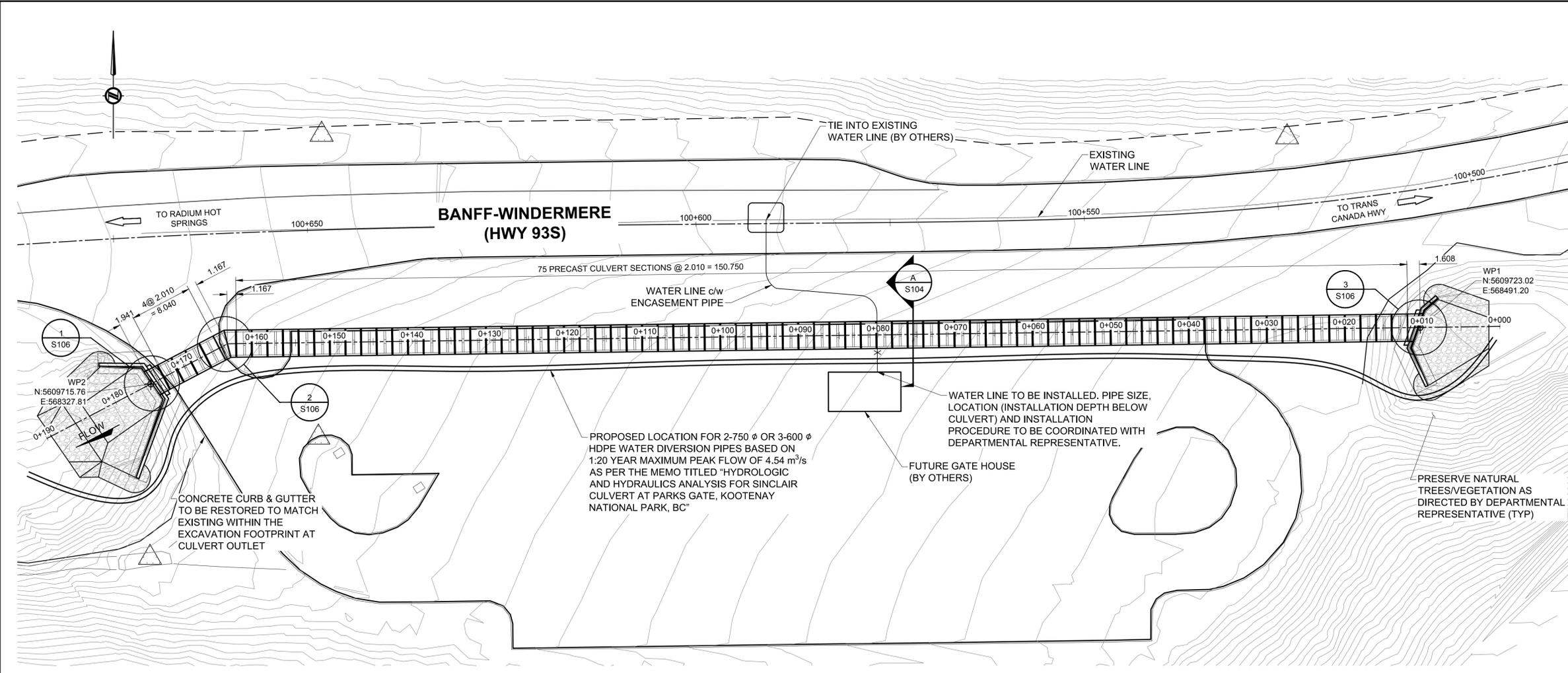
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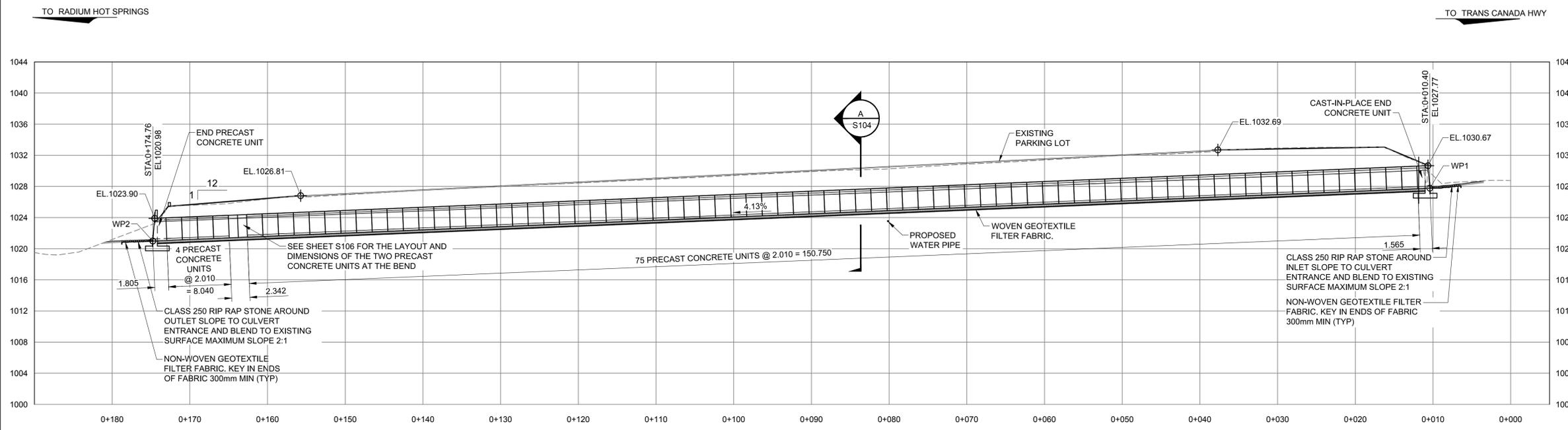
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**PLAN**  
Scale 1:300



**ELEVATION**  
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<b>AECOM</b>	

Parks Canada	Parcs Canada
Asset Management Western and Northern Region	Gestion des biens Région de l'Ouest et du Nord
<b>Canada</b>	

Project title/Titre du projet  
**HIGHWAY 93 SOUTH BANFF - WINDERMERE HWY CULVERT REPLACEMENT SINCLAIR CREEK (KM 100.6)**

Drawing title/Titre du dessin  
**NEW CULVERT LAYOUT**

Surveyed by/Arpenté par <b>SA</b>	Drawn by/Dessiné par <b>ES</b>	Date <b>2018-01-29</b>
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Linear dimensions in millimetres / Dimensions linéaires en millimètres

Consultant's Name / Nom de l'expert-conseil



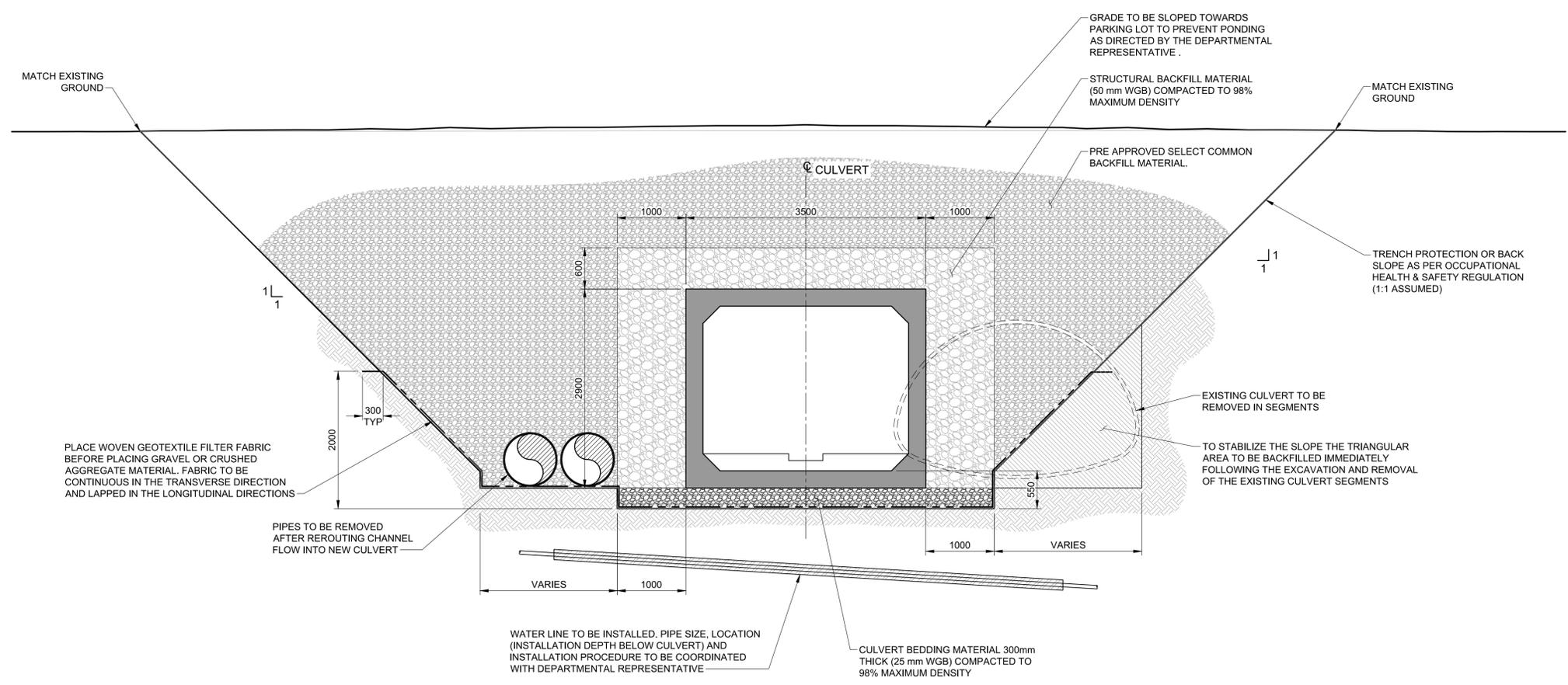
Parcs Canada / Parc Canada  
Asset Management Western and Northern Region / Gestion des biens Région de l'Ouest et du Nord



Project title/Titre du projet  
**HIGHWAY 93 SOUTH  
BANFF – WINDERMERE HWY  
CULVERT REPLACEMENT  
SINCLAIR CREEK (KM 100.6)**

Drawing title/Titre du dessin  
**CULVERT BACKFILL DETAILS**

Surveyed by/Arpenté par <b>SA</b>	Drawn by/Dessiné par <b>ES</b>	Date <b>2018-01-29</b>
Designed by/Concept par <b>SM</b>	Reviewed by/Revisé par <b>BS</b>	Scale/Echelle <b>AS SHOWN</b>
Client Acceptance/Acceptation du client		Approved by/Approuvé par
Date		Date
Project No./N° du projet <b>1079-01</b>	Asset No./N° du bien <b>-</b>	Sheet No./N° de la feuille <b>S104</b>
Drawing Set No./N° de série du dessin <b>60547362-C6</b>		



**A BACKFILL SECTION**  
S103 Scale 1:40

**GENERAL NOTE**

1. FOR CULVERT INSTALLATION, BACKFILLING AND COMPACTION REQUIREMENTS REFER TO SHEET S100.

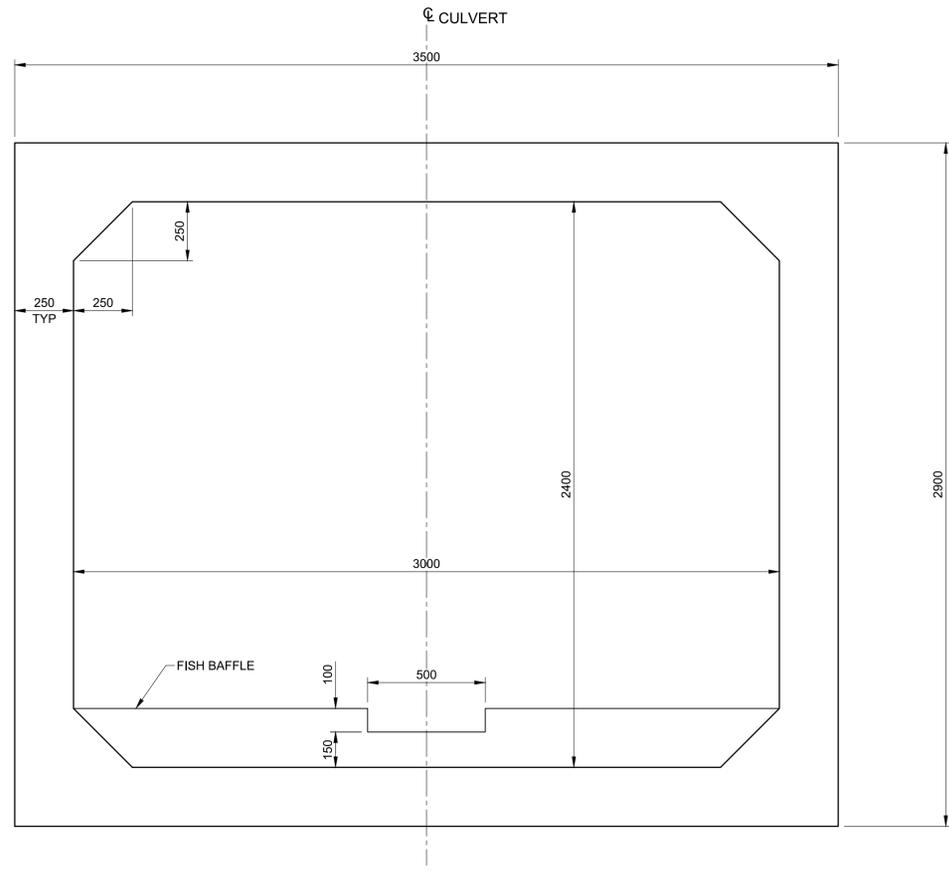
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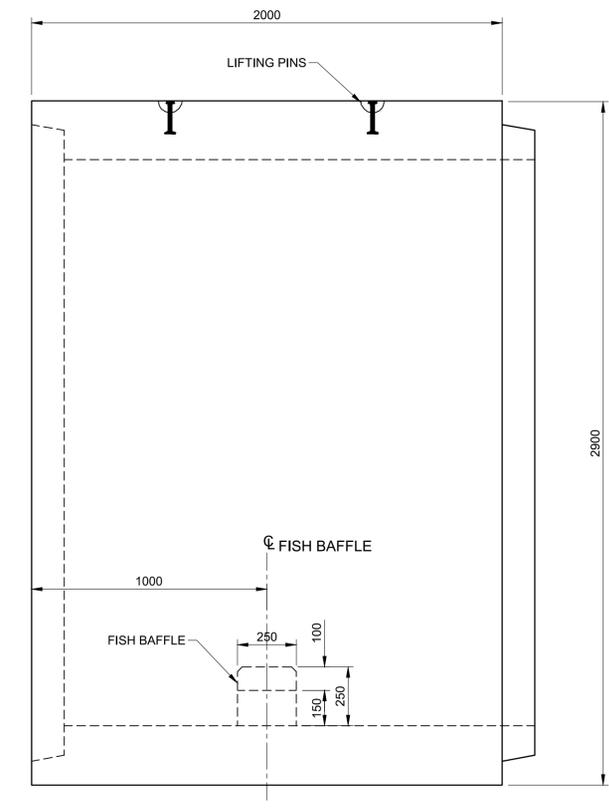
THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE EXISTENCE, LOCATION AND ELEVATION OF ALL SUCH UTILITIES AND/OR STRUCTURES AND IS RESPONSIBLE FOR NOTIFYING THE APPROPRIATE COMPANY, DEPARTMENT OR PERSON(S) OF ITS INTENTION TO CARRY OUT ITS OPERATIONS.

NOTES:  
1. COORDINATES SHOWN ARE IN UTM, NAD 83, ZONE 11, W117D (TYP.).

**NOT FOR CONSTRUCTION**



**PRECAST CULVERT - TYPICAL SECTION**  
Scale 1:15



**PRECAST CULVERT - TYPICAL ELEVATION**  
Scale 1:15

**GENERAL NOTES**

1. FOR CONCRETE AND REINFORCING STEEL NOTES REFER TO SHEET S100.
2. FOR MATERIALS AND FABRICATION SEE NOTES ON SHEET S100.
3. CONTRACTOR MAY PROPOSE A DIFFERENT SEGMENT LENGTH FOR THE PRECAST BOX SECTIONS AND SUBMIT THE REVISED CULVERT LAYOUT FOR APPROVAL FROM DEPARTMENTAL REPRESENTATIVE.
4. THE SPACING OF FISH BAFFLE SHALL NOT EXCEED 2000 mm BETWEEN ADJACENT PRECAST BOX SECTIONS AS PER THE MEMO TITLED "FISH PASSAGE DESIGN FOR SINCLAIR CULVERT AT PARKS GATE, KOOTENAY NATIONAL PARK, BC".

0	2018.03.01	REISSUED FOR TENDER	BS	SM
No.	Date	Description	Drawn by Dessiné par	Approved Approuvé

Revision / Revision	
A	Detail number A Numéro de détail
B	Sheet number B Numéro de la feuille
Linear dimensions in millimetres	
Dimensions linéaires en millimètres	

Consultant's Name Nom de l'expert-conseil	Eng. Stamp Sceau de l'ingénieur
<b>AECOM</b>	

Parks Canada Asset Management Western and Northern Region	Parks Canada Gestion des biens Région de l'Ouest et du Nord
<b>Canada</b>	

Project title/Titre du projet  
**HIGHWAY 93 SOUTH  
BANFF – WINDERMERE HWY  
CULVERT REPLACEMENT  
SINCLAIR CREEK (KM 100.6)**

Drawing title/Titre du dessin  
**PRECAST CULVERT DETAILS**

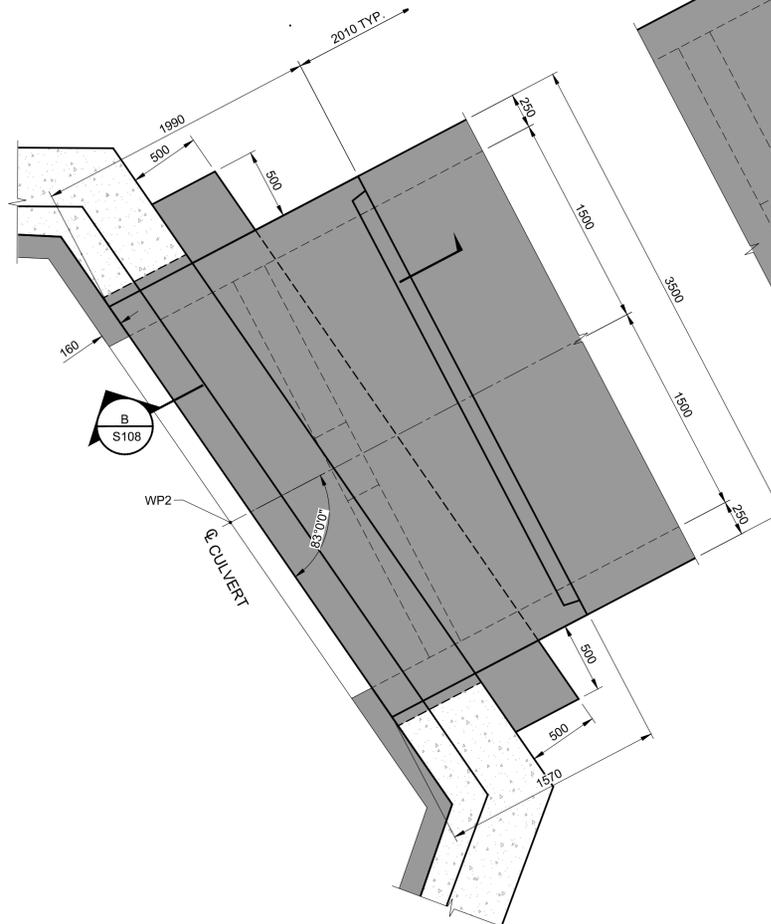
Surveyed by/Arpenté par <b>SA</b>	Drawn by/Dessiné par <b>ES</b>	Date <b>2018-01-29</b>
Designed by/Conçeut par <b>SM</b>	Reviewed by/Revisé par <b>BS</b>	Scale/Echelle <b>AS SHOWN</b>
Client Acceptance/Acceptation du client		Approved by/Approuvé par
Date		Date
Project No./N° du projet <b>1079-01</b>	Asset No./N° du bien <b>-</b>	Sheet No./ N° de la feuille <b>S105</b>
Drawing Set No./N° de série du dessin <b>60547362-C6</b>		

**LEGEND:**

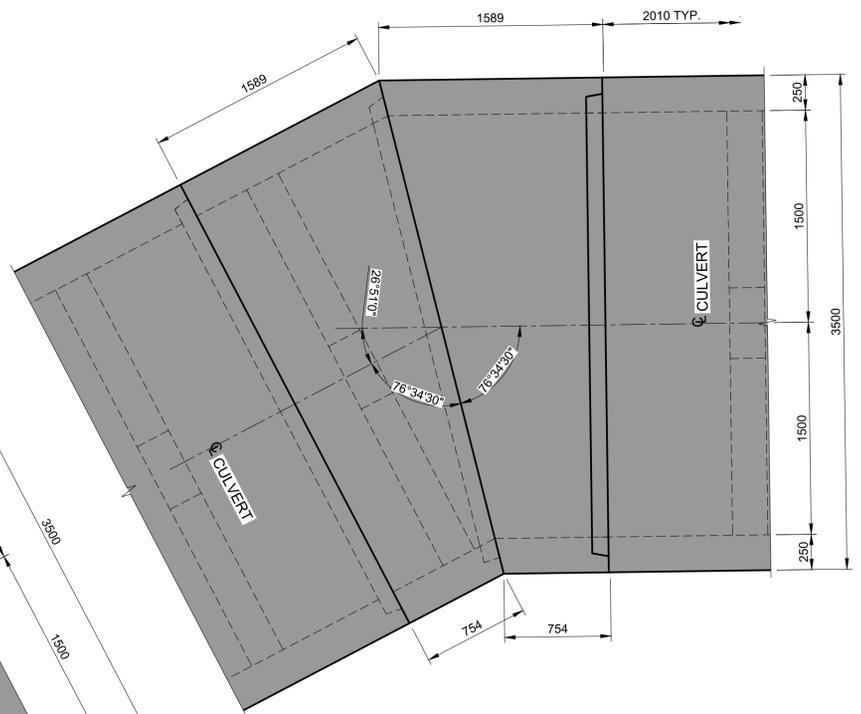
-  DENOTES NEW CONSTRUCTION CONCRETE AREA
-  DENOTES EXISTING CONCRETE AREA

**GENERAL NOTES**

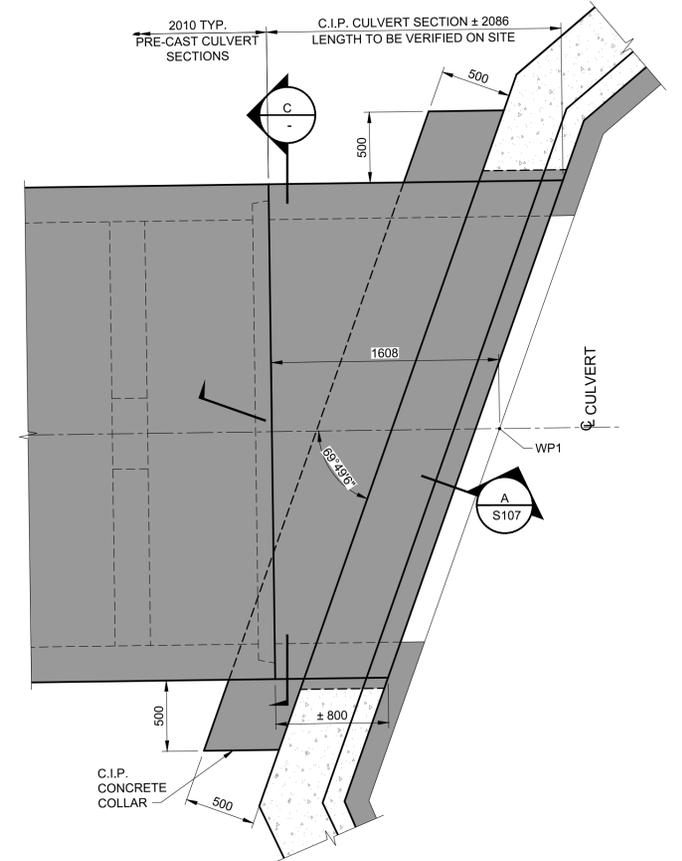
1. FOR CONCRETE AND REINFORCING STEEL NOTES REFER TO SHEET S100.
2. FOR MATERIALS AND FABRICATION REFER TO NOTES SHEET S100.
3. CONTRACTOR MAY PROPOSE A PRECAST CONCRETE END SECTION AT INLET END INSTEAD OF A CAST-IN-PLACE SECTION. THE PRECAST SECTION WILL BE ACCEPTABLE AS LONG IT CAN BE PLACED FLUSH WITH THE FRONT FACE OF THE HEADWALL.



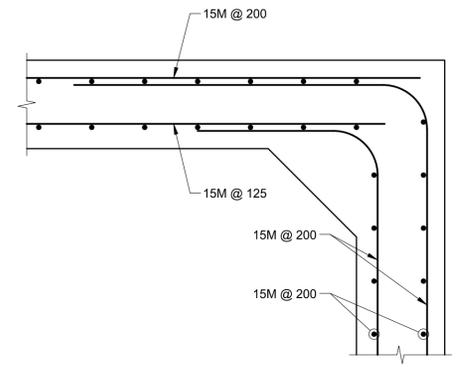
**1 | DETAIL**  
S103 Scale 1:25



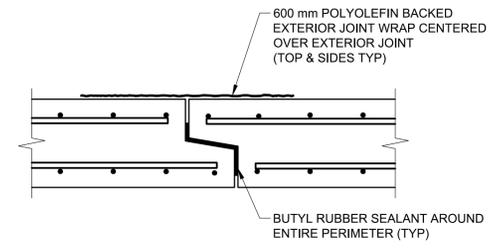
**2 | DETAIL**  
S103 Scale 1:25



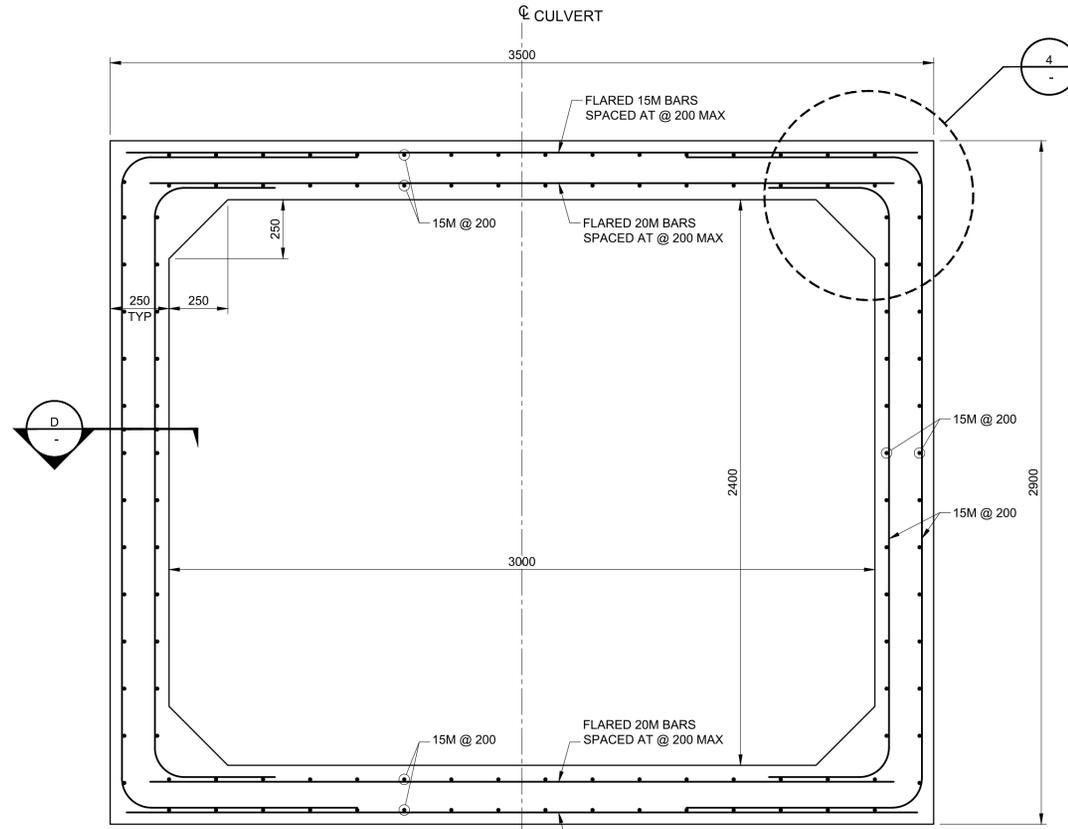
**3 | DETAIL**  
S103 Scale 1:25



**4 | DETAIL**  
Scale 1:10



**D | SECTION**  
Scale 1:10



**C | CULVERT - C.I.P. SECTION AT INLET**  
Scale 1:15

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NOTES:  
1. COORDINATES SHOWN ARE IN UTM, NAD 83, ZONE 11, W117D (TYP.).

**NOT FOR CONSTRUCTION**

0	2018.03.01	REISSUED FOR TENDER	BS	SM
No.	Date	Description	Drawn by Dessiné par	Approved Approuvé

Revision / Revision	
A	Detail number A Numéro de détail
B	Sheet number B Numéro de la feuille

Linear dimensions in millimetres / Dimensions linéaires en millimètres

Consultant's Name Nom de l'expert-conseil	Eng. Stamp Sceau de l'ingénieur
<b>AECOM</b>	

 Parks Canada	Parcs Canada
Asset Management Western and Northern Region	Gestion des biens Région de l'Ouest et du Nord
<b>Canada</b>	

Project title/Titre du projet  
**HIGHWAY 93 SOUTH  
BANFF – WINDERMERE HWY  
CULVERT REPLACEMENT  
SINCLAIR CREEK (KM 100.6)**

Drawing title/Titre du dessin  
**CULVERT DETAILS**

Surveyed by/Arpenté par <b>SA</b>	Drawn by/Dessiné par <b>ES</b>	Date <b>2018-01-29</b>
Designed by/Conçue par <b>SM</b>	Reviewed by/Revisé par <b>BS</b>	Scale/Echelle <b>AS SHOWN</b>
Client Acceptance/Acceptation du client		Approved by/Approuvé par
Project No./N° du projet <b>1079-01</b>	Asset No./N° du bien <b>-</b>	Sheet No./N° de la feuille <b>S106</b>
Drawing Set No./N° de série du dessin <b>60547362-C6</b>		

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NOTES:  
1. COORDINATES SHOWN ARE IN UTM, NAD 83, ZONE 11, W117D (TYP.).

**NOT FOR CONSTRUCTION**

0	2018.03.01	REISSUED FOR TENDER	BS	SM
No.	Date	Description	Drawn by Dessiné par	Approved Approuvé

Revision / Revision	
A	Detail number A Numéro de détail
B	Sheet number B Numéro de la feuille
	Linear dimensions in millimetres
	Dimensions linéaires en millimètres

Consultant's Name Nom de l'expert-conseil	Eng. Stamp Sceau de l'ingénieur
<b>AECOM</b>	

 Parks Canada	Parcs Canada
Asset Management Western and Northern Region	Gestion des biens Région de l'Ouest et du Nord
<b>Canada</b>	

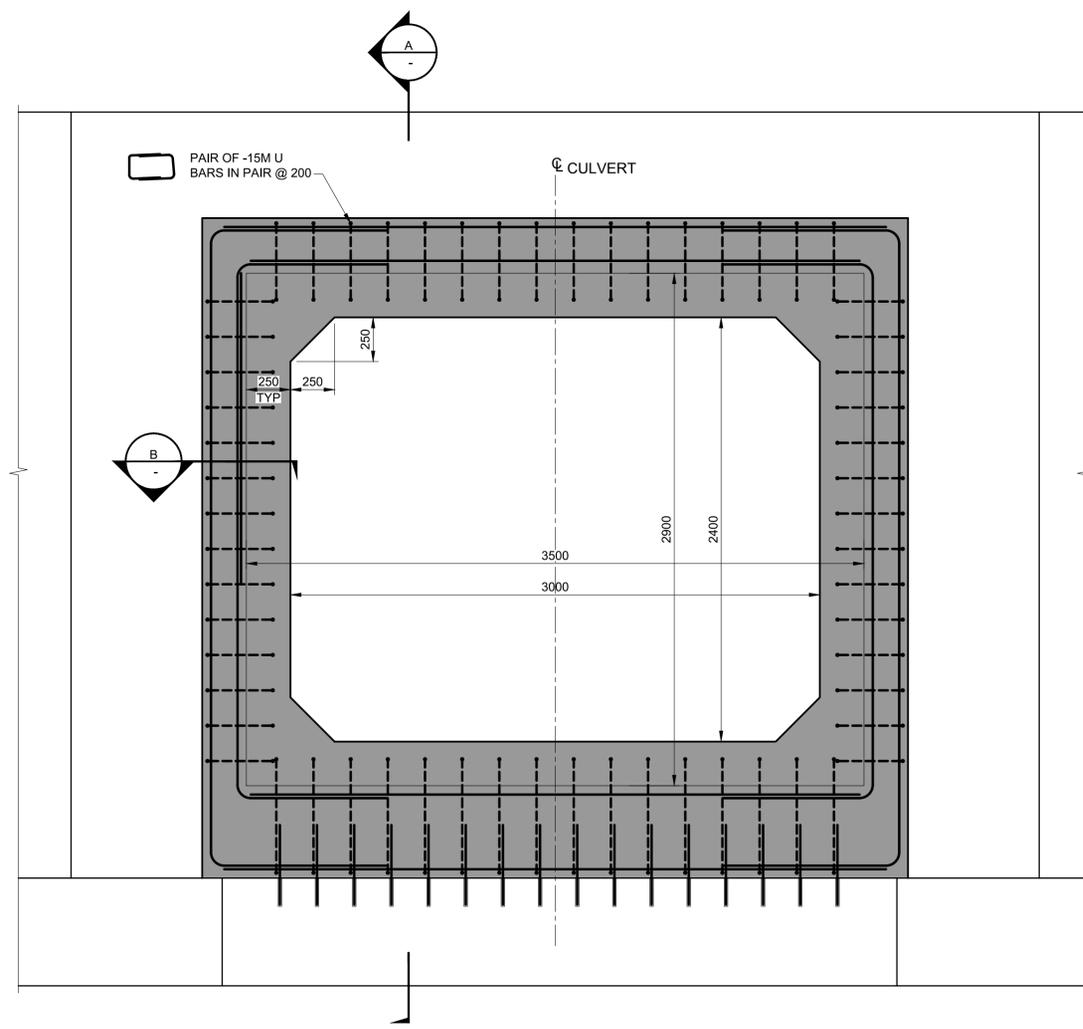
Project title/Titre du projet

**HIGHWAY 93 SOUTH  
BANFF – WINDERMERE HWY  
CULVERT REPLACEMENT  
SINCLAIR CREEK (KM 100.6)**

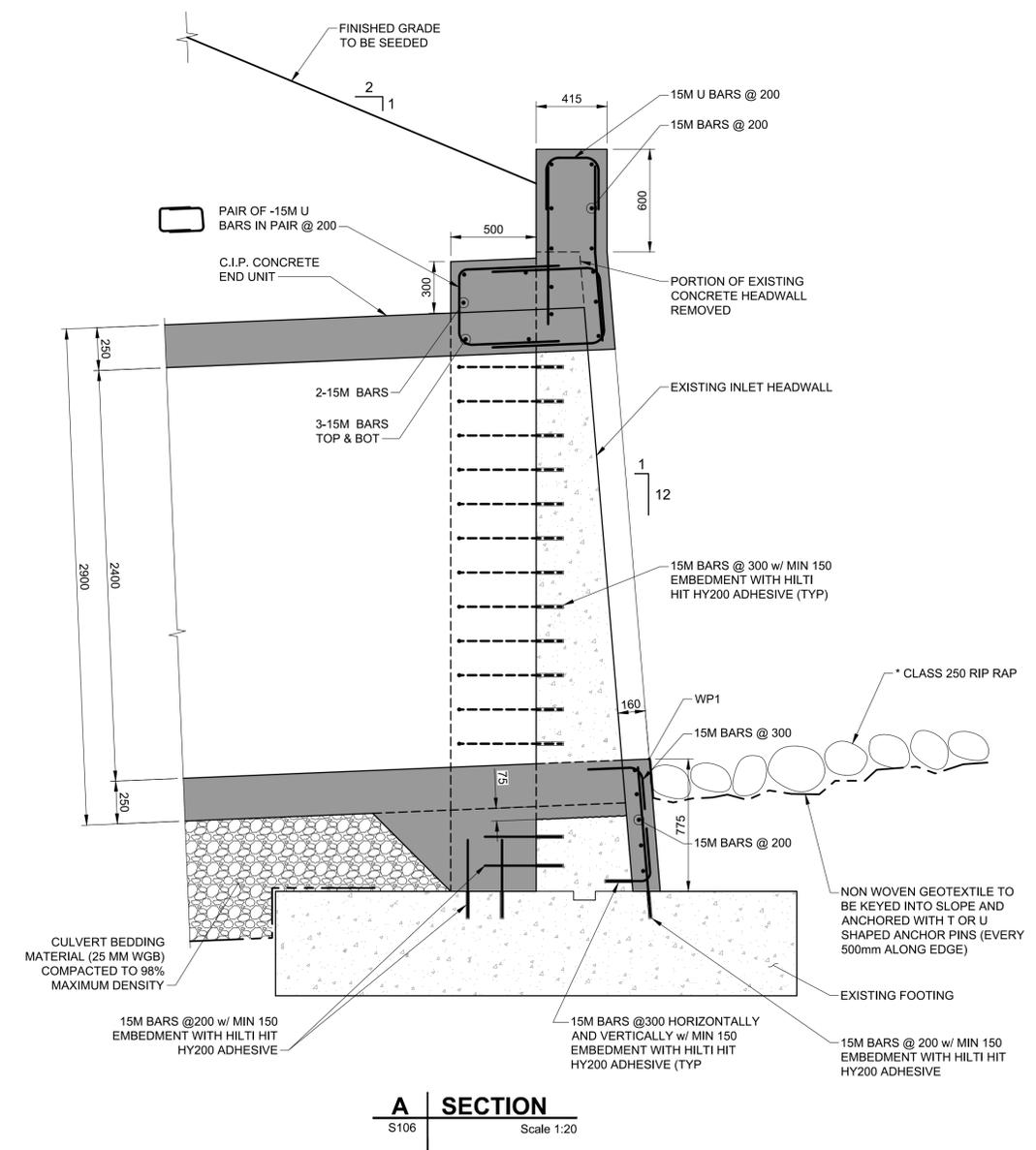
Drawing title/Titre du dessin

**CULVERT INLET DETAILS**

Surveyed by/Arpenté par <b>SA</b>	Drawn by/Dessiné par <b>ES</b>	Date <b>2018-01-29</b>
Designed by/Conçeut par <b>SM</b>	Reviewed by/Revisé par <b>BS</b>	Scale/Echelle <b>AS SHOWN</b>
Client Acceptance/Acceptation du client		Approved by/Approuvé par
Project No./N° du projet <b>1079-01</b>	Asset No./N° du bien <b>-</b>	Sheet No./ N° de la feuille <b>S107</b>
Drawing Set No./N° de série du dessin <b>60547362-C6</b>		

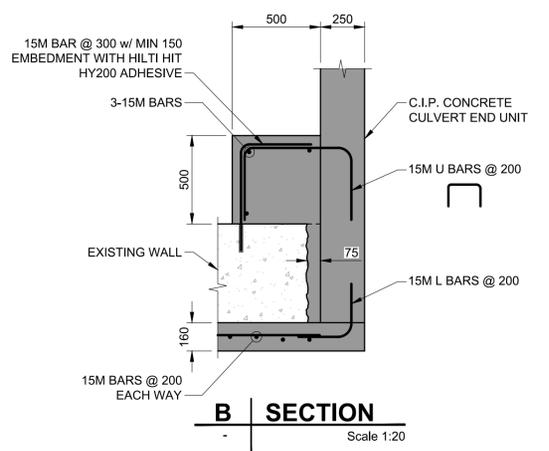


**CULVERT INLET DETAILS**  
(LOOKING FROM BACKSIDE OF THE HEADWALL)  
Scale 1:20



**A SECTION**  
S106 Scale 1:20

**NOTE**  
\* FOR RIPRAP NOTES REFER TO SHEET S111



**B SECTION**  
Scale 1:20

**CULVERT END TREATMENT NOTES**

- CONTRACTOR SHALL INSTALL THE REINFORCING DOWEL BARS USING HILTI HIT-HY 200 SYSTEM AT THE LOCATIONS SHOWN ON SHEETS S107 & S108.
- CONTRACTOR SHALL USE APPROPRIATE SIZE OF DRILL BITS AS PER THE MANUFACTURER'S RECOMMENDATION FOR THE SIZES OF REBARS SHOWN ON THE DRAWINGS. CARE SHOULD BE TAKEN NOT TO DAMAGE TO ANY EXISTING REINFORCING.
- THE CONCRETE SURFACES SHALL BE DRY AND THE HOLES SHALL BE CLEANED THOROUGHLY USING COMPRESSED AIR AS PER MANUFACTURER'S RECOMMENDATION PRIOR TO INSTALLATION OF THE DOWELS. ALSO, THE CONCRETE TEMPERATURE SHALL BE WITHIN THE MANUFACTURER'S SPECIFIED TEMPERATURE RANGE DURING DOWEL INSTALLATION.
- ANY VOIDS UNDERNEATH THE FOOTING SHALL BE FILLED WITH FILLCRETE.
- THE REINFORCING BARS FOR THE WALLS SHALL BE INSTALLED AS SHOWN ON SHEETS S107 & S108.
- CONTRACTOR SHALL USE CONCRETE FORMLINER AND CONCRETE PIGMENTS IN THE CONCRETE MIX TO CREATE A STONE FACING FOR THE WALLS RESEMBLING TO EXISTING STONE FACING OR APPROVED EQUIVALENT.

**LEGEND:**

-  DENOTES NEW CONSTRUCTION CONCRETE AREA
-  DENOTES EXISTING CONCRETE AREA

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NOTES:  
1. COORDINATES SHOWN ARE IN UTM, NAD 83, ZONE 11, W117D (TYP.).

**NOT FOR CONSTRUCTION**

0	2018.03.01	REISSUED FOR TENDER	BS	SM
No.	Date	Description	Drawn by Dessiné par	Approved Approuvé

Revision / Révision	
A	Detail number / A Numéro de détail
B	Sheet number / B Numéro de la feuille
Linear dimensions in millimetres / Dimensions linéaires en millimètres	

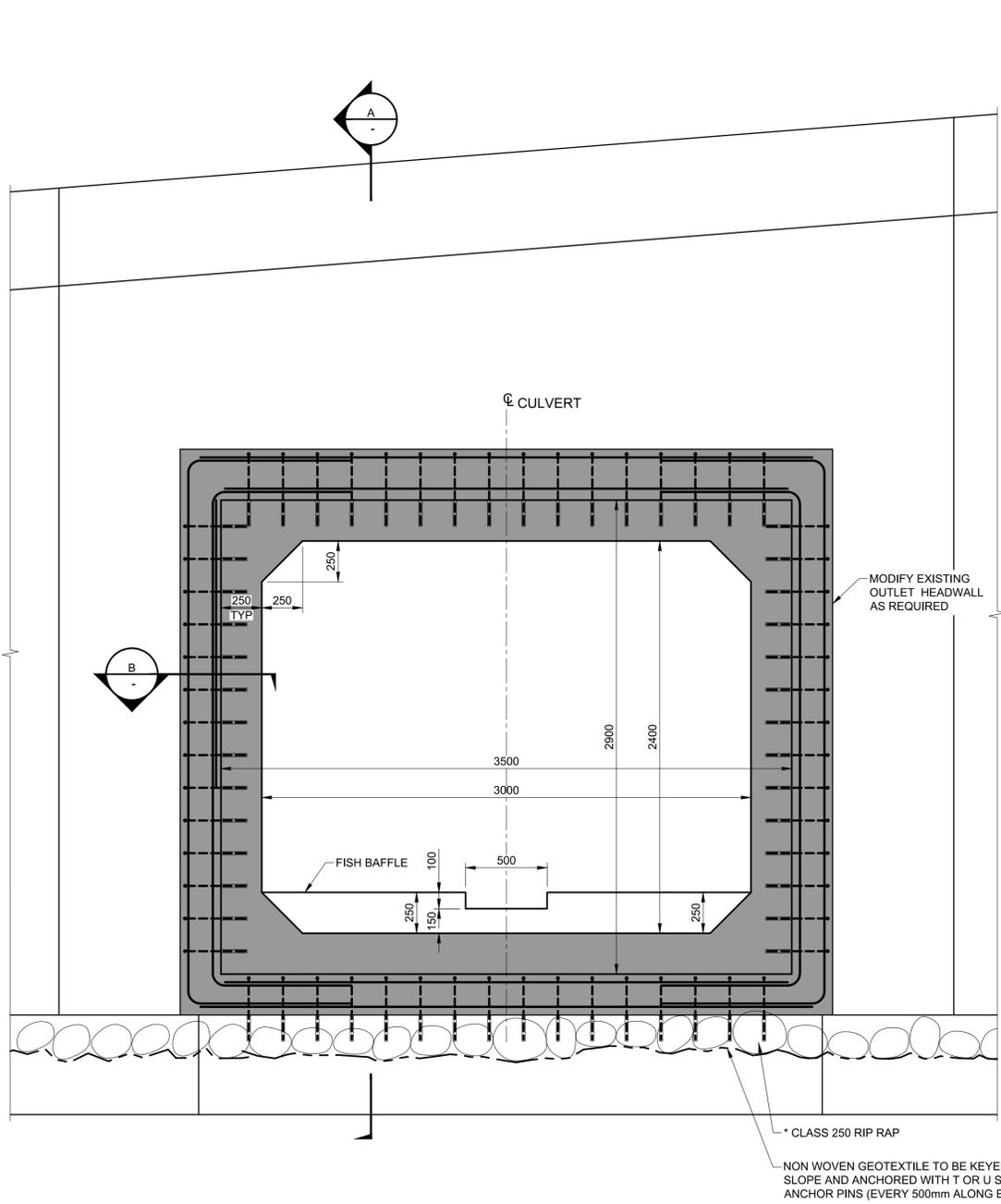
Consultant's Name / Nom de l'expert-conseil	Eng. Stamp / Sceau de l'ingénieur
<b>AECOM</b>	

Parks Canada	Parcs Canada
Asset Management Western and Northern Region	Gestion des biens Région de l'Ouest et du Nord
<b>Canada</b>	

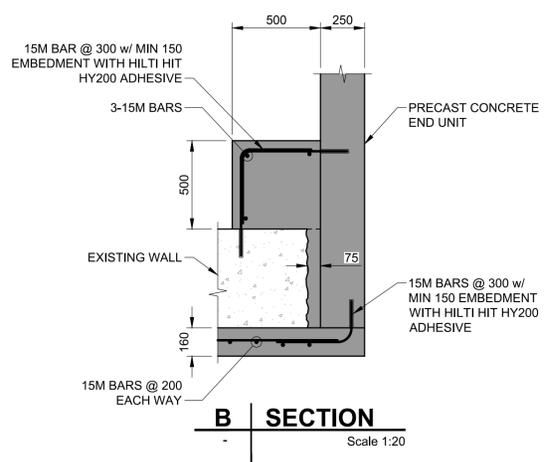
Project title/Titre du projet  
**HIGHWAY 93 SOUTH BANFF – WINDERMERE HWY CULVERT REPLACEMENT SINCLAIR CREEK (KM 100.6)**

Drawing title/Titre du dessin  
**CULVERT OUTLET DETAILS**

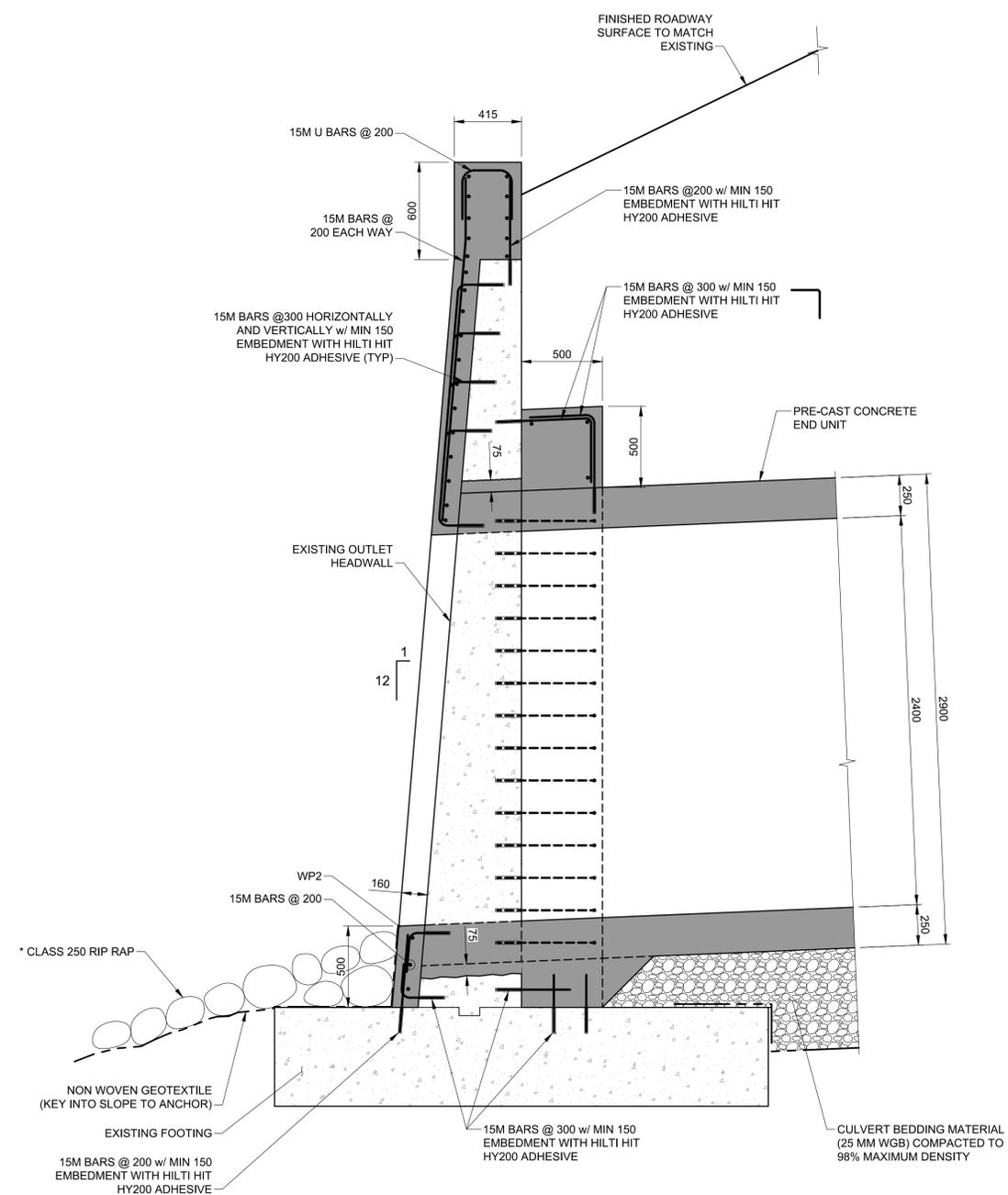
Surveyed by/Arpenté par <b>SA</b>	Drawn by/Dessiné par <b>ES</b>	Date <b>2018-01-29</b>
Designed by/Concept par <b>SM</b>	Reviewed by/Revisé par <b>BS</b>	Scale/Echelle <b>AS SHOWN</b>
Client Acceptance/Acceptation du client		Approved by/Approuvé par
Project No./N° du projet <b>1079-01</b>	Asset No./N° du bien <b>-</b>	Sheet No./N° de la feuille <b>S108</b>
Drawing Set No./N° de série du dessin <b>60547362-C6</b>		



**CULVERT OUTLET DETAILS**  
(LOOKING FROM BACKSIDE OF THE HEADWALL)  
Scale 1:20



**B SECTION**  
Scale 1:20



**A SECTION**  
S106 Scale 1:20

**NOTE**  
\* FOR RIPRAP NOTES REFER TO SHEET S111

**LEGEND:**  
■ DENOTES NEW CONSTRUCTION CONCRETE AREA  
□ DENOTES EXISTING CONCRETE AREA

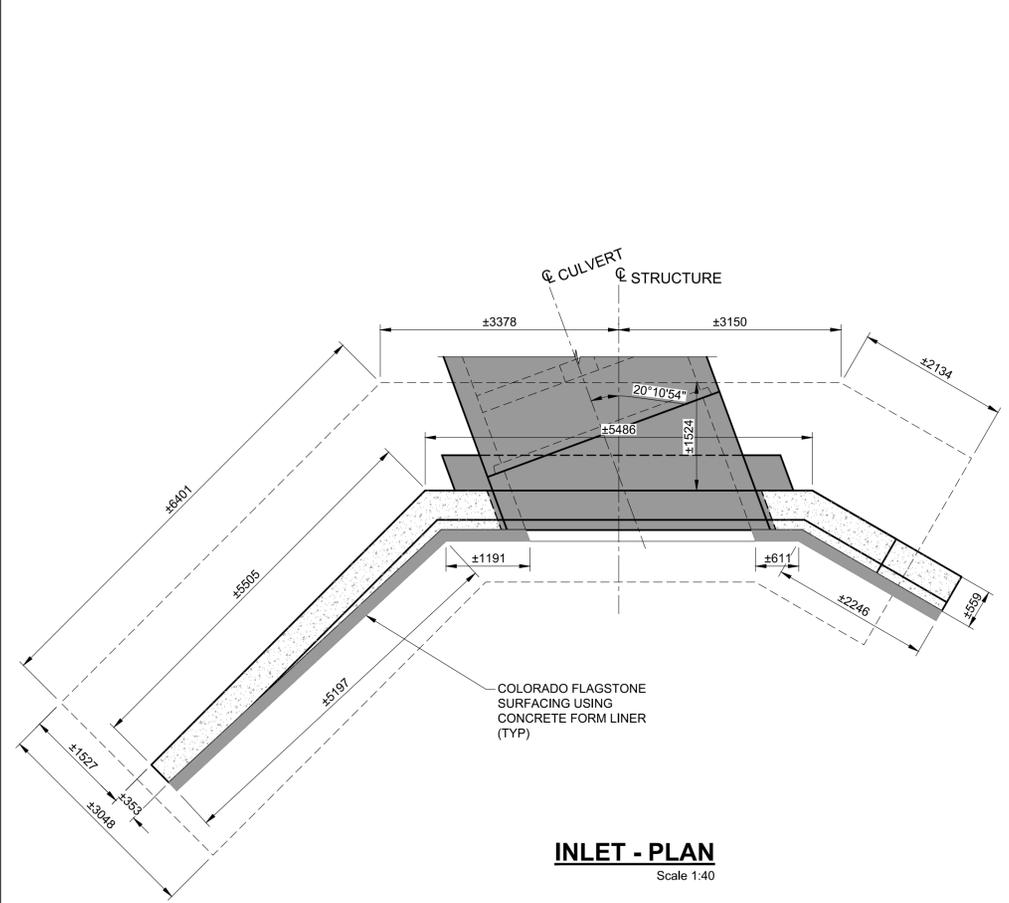
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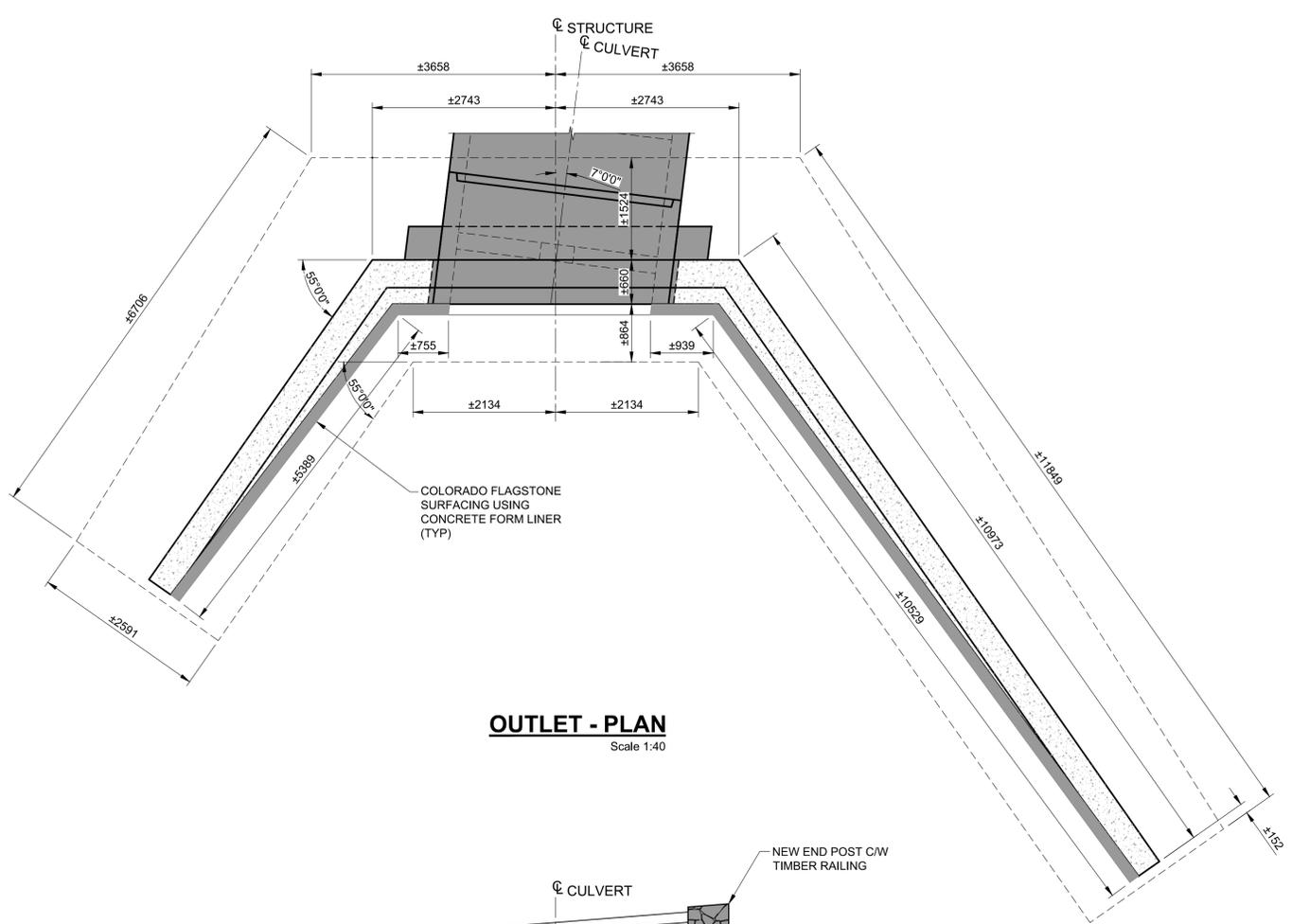
THE CONTRACTOR IS RESPONSIBLE FOR DETERMINING THE EXISTENCE, LOCATION AND ELEVATION OF ALL SUCH UTILITIES AND/OR STRUCTURES AND IS RESPONSIBLE FOR NOTIFYING THE APPROPRIATE COMPANY, DEPARTMENT OR PERSON(S) OF ITS INTENTION TO CARRY OUT ITS OPERATIONS.

NOTES:  
1. COORDINATES SHOWN ARE IN UTM, NAD 83, ZONE 11, W117D (TYP.).

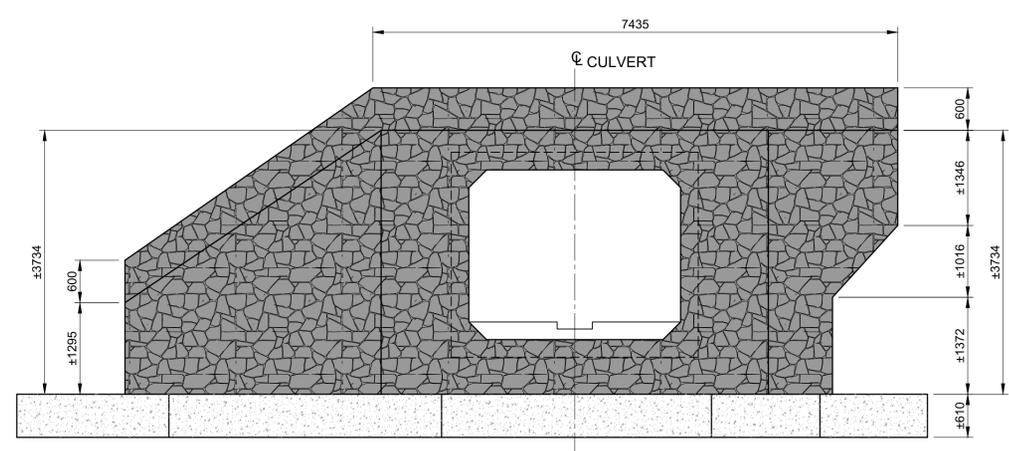
**NOT FOR CONSTRUCTION**



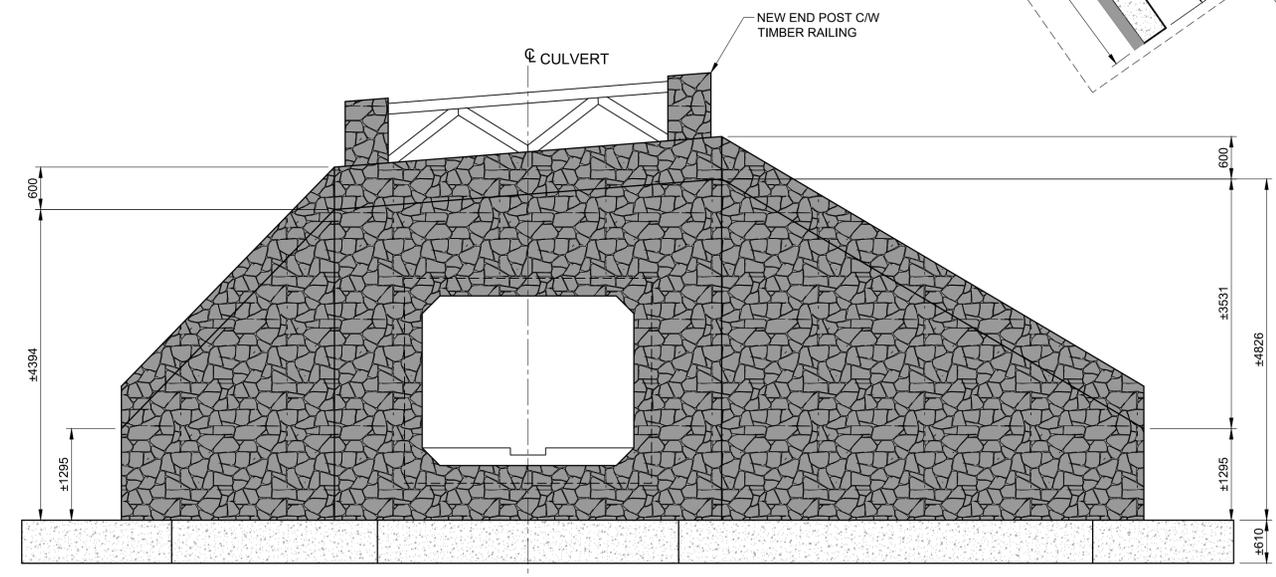
**INLET - PLAN**  
Scale 1:40



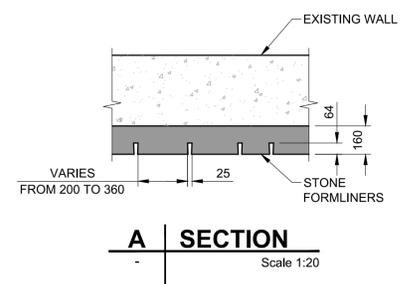
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Scale 1:40



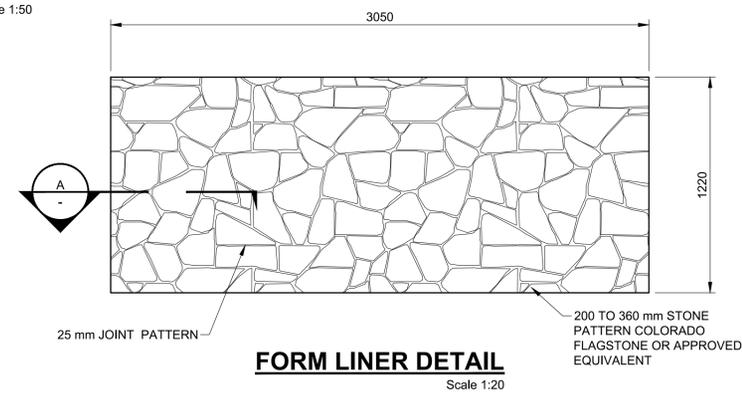
**INLET - ELEVATION**  
Scale 1:50



**OUTLET - ELEVATION**  
Scale 1:50



**A SECTION**  
Scale 1:20



**FORM LINER DETAIL**  
Scale 1:20

**LEGEND:**  
■ DENOTES NEW CONSTRUCTION CONCRETE AREA  
□ DENOTES EXISTING CONCRETE AREA

**NOTE:**  
1. REFER TO SHEETS S107 & S108 FOR LOCATIONS AND DETAILS OF DOWELS REINFORCING BARS FOR CONNECTING NEW CONCRETE TO EXISTING CONCRETE HEADWALL.

0	2018.03.01	REISSUED FOR TENDER	BS	SM
No.	Date	Description	Drawn by Dessiné par	Approved Approuvé

Revision / Revision	Detail number A	Sheet number B	A Numéro de détail	B Numéro de la feuille
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Linear dimensions in millimetres / Dimensions linéaires en millimètres

Consultant's Name / Nom de l'expert-conseil: **AECOM**

Eng. Stamp / Sceau de l'ingénieur: [Professional Engineer Seal]

Parks Canada / Parcs Canada

Asset Management Western and Northern Region / Gestion des biens Région de l'Ouest et du Nord

**Canada**

Project title/Titre du projet:  
**HIGHWAY 93 SOUTH BANFF – WINDERMERE HWY CULVERT REPLACEMENT SINCLAIR CREEK (KM 100.6)**

Drawing title/Titre du dessin:  
**CULVERT END TREATMENT**

Surveyed by/Arpenté par: SA	Drawn by/Dessiné par: ES	Date: 2018-01-29
Designed by/Concept par: SM	Reviewed by/Revisé par: BS	Scale/Echelle: AS SHOWN
Client Acceptance/Acceptation du client:		Approved by/Approuvé par:
Project No./N° du projet: 1079-01	Asset No./N° du bien: -	Sheet No./N° de la feuille: S109
Drawing Set No./N° de série du dessin: 60547362-C6		

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NOTES:  
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No.	Date	Description	Drawn by Dessiné par	Approved Approuvé

Revision / Revision

A	Detail number	A Numéro de détail
B	Sheet number	B Numéro de la feuille

Linear dimensions in millimetres / Dimensions linéaires en millimètres

Consultant's Name / Nom de l'expert-conseil

**AECOM**

Eng. Stamp / Sceau de l'ingénieur



**Canada**  
Parks Canada / Parcs Canada  
Asset Management Western and Northern Region / Gestion des biens Région de l'Ouest et du Nord

**Canada**

Project title/Titre du projet

**HIGHWAY 93 SOUTH  
BANFF – WINDERMERE HWY  
CULVERT REPLACEMENT  
SINCLAIR CREEK (KM 100.6)**

Drawing title/Titre du dessin

**HANDRAIL DETAILS  
AT CULVERT OUTLET HEADWALL**

Surveyed by/Arpenté par <b>SA</b>	Drawn by/Dessiné par <b>ES</b>	Date <b>2018-01-29</b>
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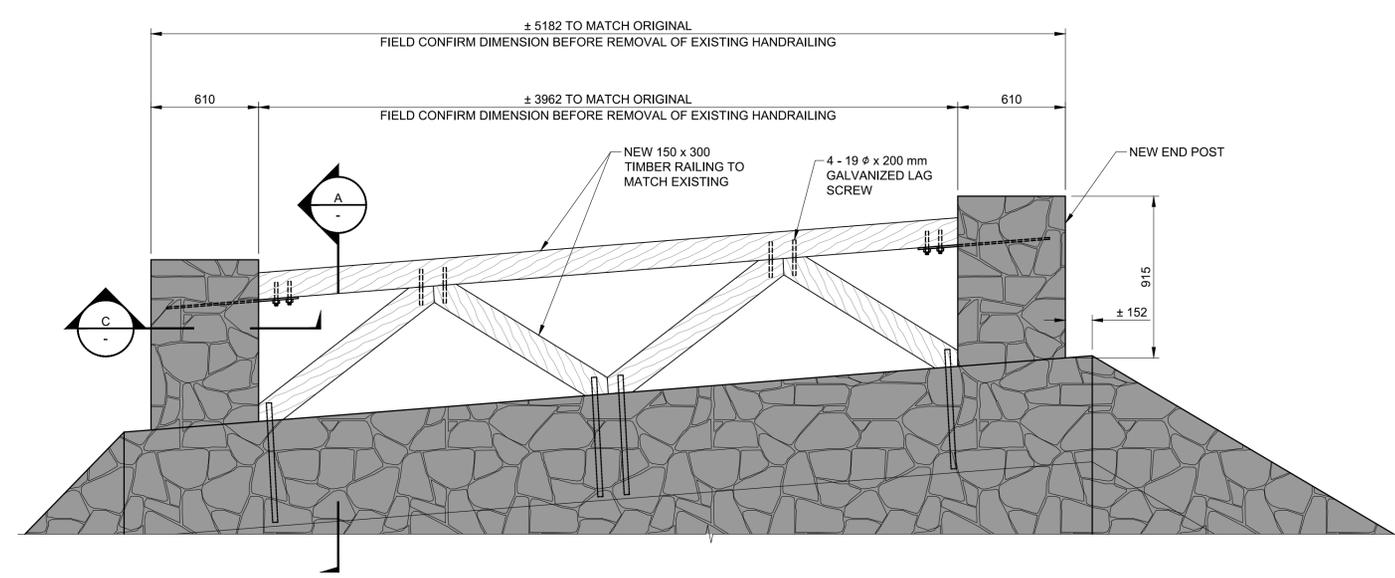
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Client Acceptance/Acceptation du client / Approved by/Approuvé par

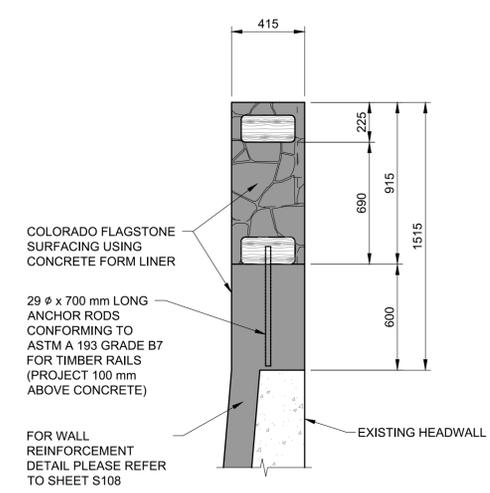
Date

Project No./N° du projet <b>1079-01</b>	Asset No./N° du bien <b>-</b>	Sheet No./N° de la feuille <b>S110</b>
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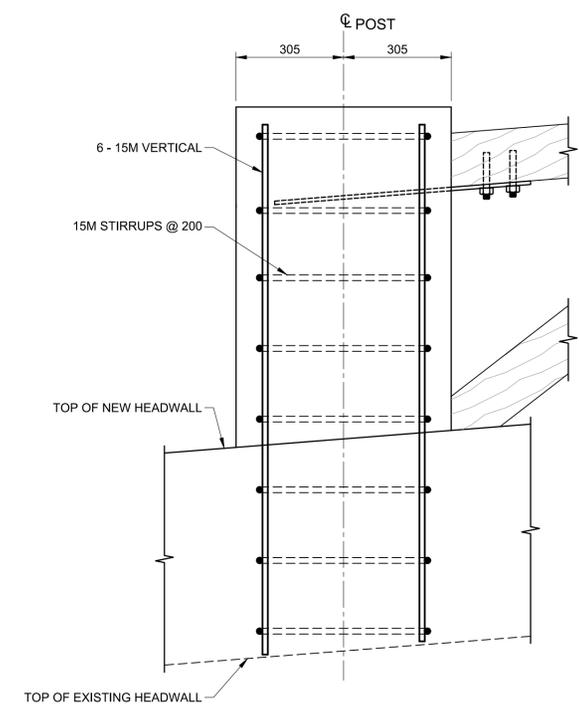
Drawing Set No./N° de série du dessin  
**60547362-C6**



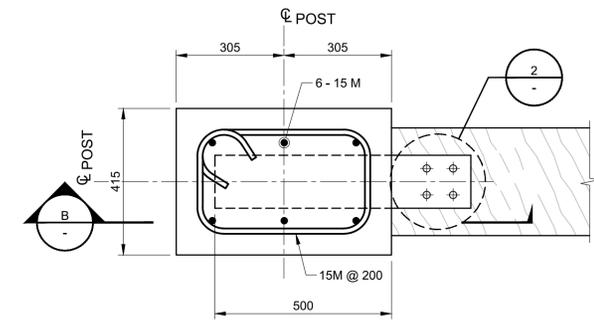
**OUTLET - RAILING DETAIL**  
Scale 1:20



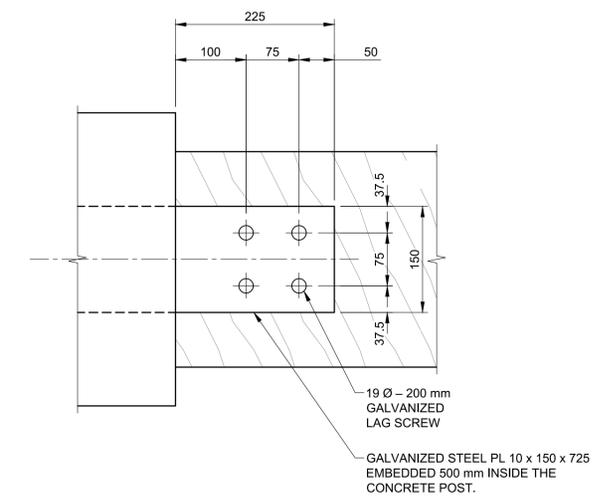
**A SECTION**  
Scale 1:20



**B SECTION**  
Scale 1:10



**C SECTION**  
Scale 1:10



**2 DETAIL**  
Scale 1:5

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**NOTICE:**  
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NOTES:  
1. COORDINATES SHOWN ARE IN UTM, NAD 83, ZONE 11, W117D (TYP).

**NOT FOR CONSTRUCTION**

0	2018.03.01	REISSUED FOR TENDER	BS	SM
No.	Date	Description	Drawn by Dessiné par	Approved Approuvé

Revision / Revision	
A	Detail number A Numéro de détail
B	Sheet number B Numéro de la feuille
	Linear dimensions in millimetres
	Dimensions linéaires en millimètres

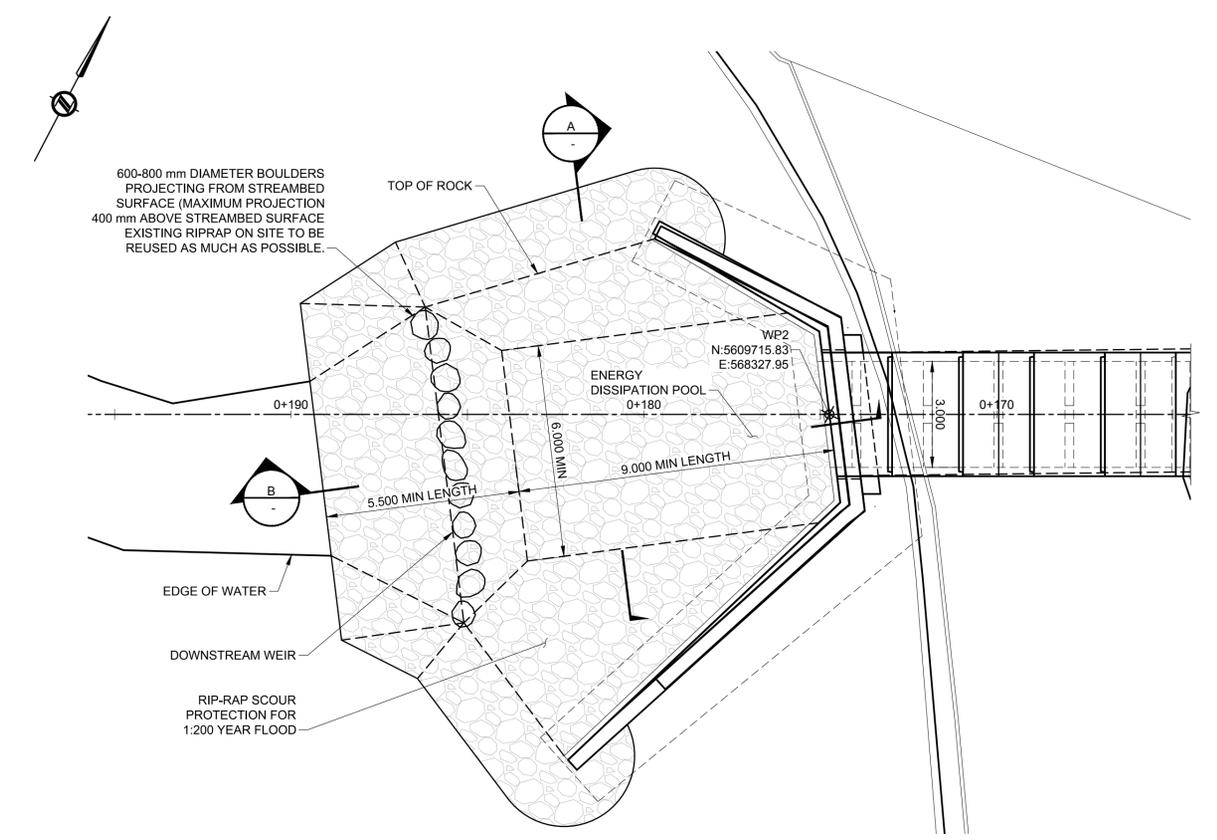
Consultant's Name Nom de l'expert-conseil	Eng. Stamp Scieu de l'ingénieur
<b>AECOM</b>	

 Parks Canada	Parcs Canada
Asset Management Western and Northern Region	Gestion des biens Région de l'Ouest et du Nord
<b>Canada</b>	

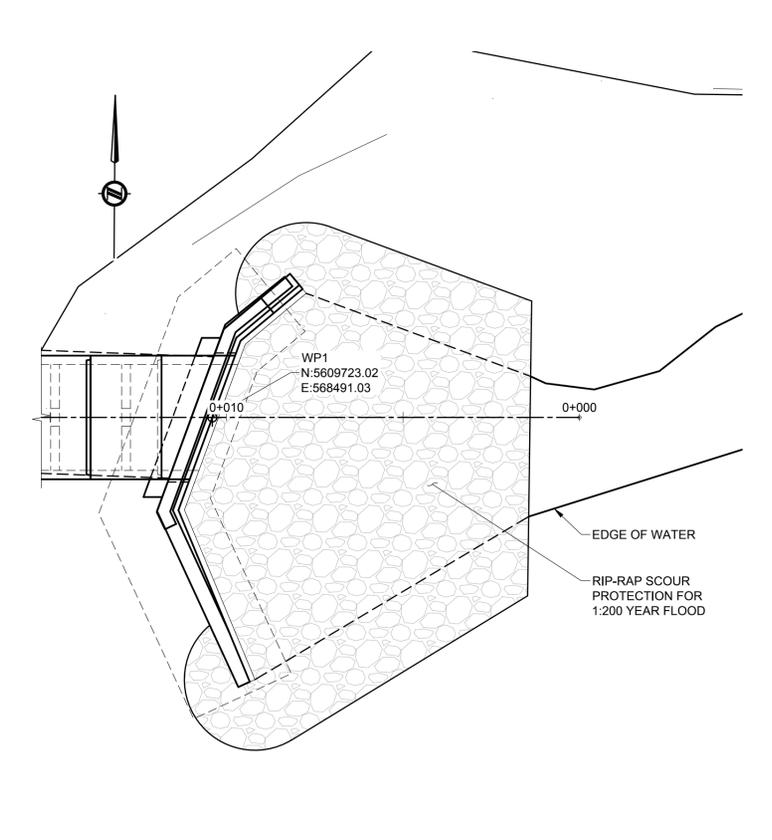
Project title/Titre du projet  
**HIGHWAY 93 SOUTH  
BANFF – WINDERMERE HWY  
CULVERT REPLACEMENT  
SINCLAIR CREEK (KM 100.6)**

Drawing title/Titre du dessin  
**INLET & OUTLET RIPRAP DETAILS**

Surveyed by/Arpenté par <b>SA</b>	Drawn by/Dessiné par <b>ES</b>	Date <b>2018-01-29</b>
Designed by/Concept par <b>SM</b>	Reviewed by/Revisé par <b>BS</b>	Scale/Echelle <b>AS SHOWN</b>
Client Acceptance/Acceptation du client		Approved by/Approuvé par
Date		Date
Project No./N° du projet <b>1079-01</b>	Asset No./N° du bien <b>-</b>	Sheet No./N° de la feuille <b>S111</b>
Drawing Set No./N° de série du dessin <b>60547362-C6</b>		



**OUTLET PLAN**  
Scale 1:100

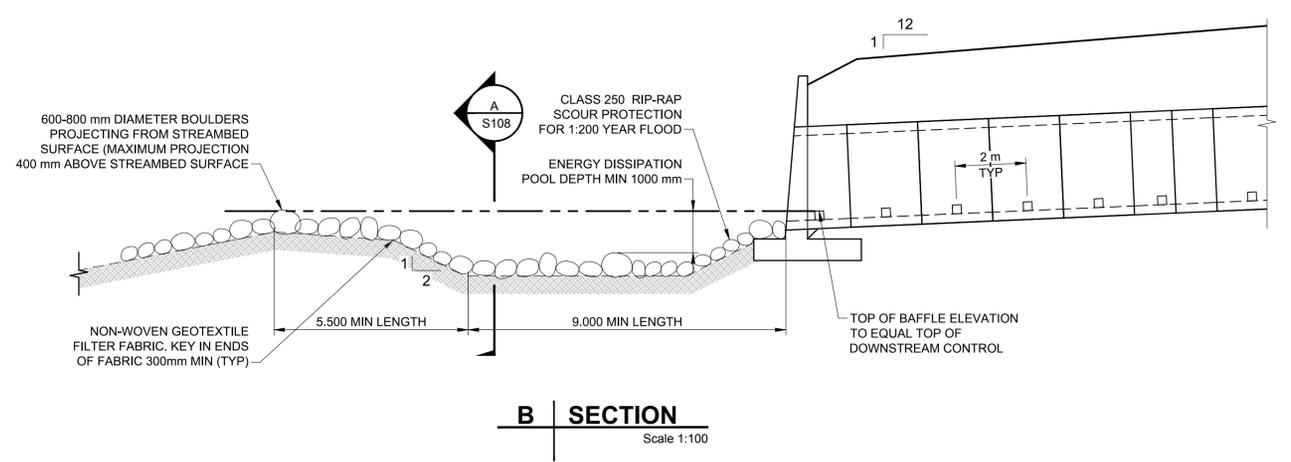


**INLET PLAN**  
Scale 1:100

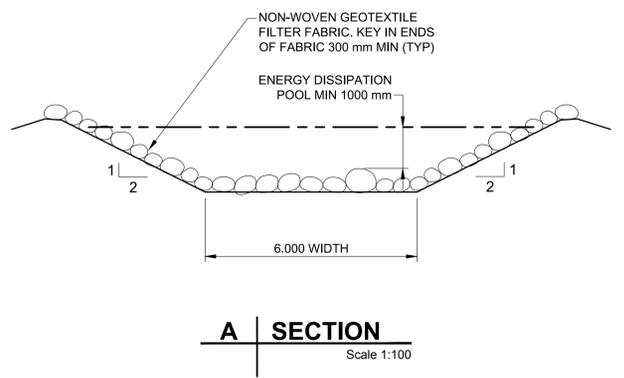
**GENERAL NOTES**

- FOR THE ENERGY DISSIPATION POOL HEAVY ROCK RIPRAP SHALL COVER THE AREA SHOWN ON THIS DRAWING.
- CLASS 250 RIPRAP TO BE PLACED TO THE ELEVATIONS SHOWN ON THIS DRAWINGS AND SHALL BE PLACED TO A MINIMUM THICKNESS OF 800 mm OVER AN AREA OF APPROXIMATELY 150 m² FOR OUTLET AND 75 m² FOR THE INLET, TOTAL = 225 m².
- EXISTING RIPRAP AT CULVERT INLET AND OUTLET TO BE REUSED WHERE FEASIBLE.
- PLACE NON-WOVEN GEOTEXTILE FILTER FABRIC UNDER ALL HEAVY ROCK RIPRAP.
- GEOTEXTILE FILTER FABRIC SHOWN SHALL MEET THE FOLLOWING REQUIREMENTS:

NON-WOVEN GEOTEXTILE FILTER FABRIC SPECIFICATIONS AND PHYSICAL PROPERTIES	
	CLASS 250
GRAB STRENGTH	900 N
ELONGATION (FAILURE)	50%
PUNCTURE STRENGTH	550 N
TRAPEZOIDAL TEAR	350 N
MINIMUM FABRIC LAP TO BE 1000mm	



**B SECTION**  
Scale 1:100



**A SECTION**  
Scale 1:100