Campbell River (Elk Falls) Canyon Spawning Gravel Delivery System

FWCP Project Number 16.CBR.02

Prepared for

Fish and Wildlife Compensation Program
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and

DFO
Recreational Fisheries Conservation Partnerships Program

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April 2016

Executive Summary

Following construction of the John Hart dam on the upper Campbell River in 1953, natural recruitment of spawning substrates in the Elk Falls Canyon and the lower river was significantly reduced, leading to "gravel poor" habitat in those reaches. Increasing spawning habitat and egg to fry survival for the remnant population steelhead and Chinook are important steps in the recovery of these stocks in the Campbell River watershed.

The infrastructure, as built, will allow for approximately 0.5 m^3 of spawning gravel to be dumped at a time using an overhead skyline spanning the canyon. A gravel staging area has been selected, located adjacent to the existing footbridge that crosses the wood stave penstocks on BC Hydro property, and accessible using tandem axle gravel trucks. Tracked skidsteers (aka Bobcats) will transport the gravel from the staging area through the park, using both existing pedestrian and new trails, to the skyline and bucket. The skyline bucket will be loaded directly by the skidsteer and then lowered out over the canyon. Spawning gravel will be released remotely along the skyline as determined by a spotter from the suspension bridge.

Once gravel is released, the skyline bucket is retrieved using a high-powered hydraulic winch for reloading. It is anticipated that this infrastructure will be used every 1-2 years, and loading over 200 m^3/year in order to adequately supply the canyon reach with sufficient spawning gravel for various salmonid species.

After liability and ownership status was resolved in November 2015, final designs and contractor selection occurred early in 2016. On February 22, 2016, construction of the spawning gravel delivery system commenced. Completed and tested on March 24, 2016, some gravel was successfully delivered into the Canyon tail-out pool below Elk Falls. Though some modification are required before the next use – planned for summer 2016, the project was successfully completed.

Total cost of this project was approximately $160,000 and was funded by DFO Recreational Fisheries Conservation Partnerships Program (RFCPP), Fish and Wildlife Compensation Program (FWCP), The Campbell River Salmon Foundation (CRSF), and Living Rivers – Georgia Basin/ Vancouver Island (GBLR).

TABLE OF CONTENTS

1.0 INTRODUCTION

The Campbell River flows east from Strathcona Provincial Park, entering Johnstone Strait at the City of Campbell River. Draining an area of 1,744 km^2, the Campbell River is Vancouver Island's second largest watershed, having a mean annual reservoir discharge of 87 cubic meters per second (cms) at John Hart Dam, and 103 cms downstream near the river's mouth.

The 1.8 km of Elk Falls Canyon (Map 1), located immediately upstream of the John Hart powerhouse tailrace (JHT), remains accessible to anadromous salmonids. The reach is characterized by incised bedrock geology with relatively narrow channel widths and a distinct rapid-pool hydraulic character. Substrates are typically very large as a result of historically high flows, usually related to winter rain-on-snow events and spills from John Hart Dam.

Prior to 1999, spawning gravel in the Elk Falls canyon was extremely limited, with only a few small, isolated patches. In July 1999, BC Hydro, Ministry of Environment, Lands and Parks and DFO contracted LGL Ltd. and the BC Conservation Foundation (BCCF) to install 75 cubic meters of washed 6 inch minus gravel in the tail-out of the Elk Falls plunge pool.

Since 2002, spawning gravel has been introduced to Elk Falls canyon five times using heavy lift helicopters (Pellett 2012). Although each project achieved target loading rates, cost per unit was high (~$650/cubic meter), compared to more conventional means of delivery. Bulk loading concepts were previously explored under a BC Hydro funded project entitled, "Campbell River (Elk Falls) canyon spawning gravel placement - feasibility of a land based conveyance system" (McCulloch and Silvestri 2006). Two delivery options were subsequently identified, but based on cost and potential impacts to the Provincial Park neither was seriously considered at the time.

In 2015, construction of a new suspension bridge just downstream of Elk Falls has preempted the future ability to replenish gravel using helicopters, as the proposed bridge is directly under required flight paths. Given the new proposal, an opportunity to re-visit a bulk gravel loading strategy was presented. The initial project concept and layout was developed in 2014/15 by

Herold Engineering and used as a base for more detailed construction plans included in this fiscal year accomplishments.

Annual monitoring since 2002 has shown significant use of introduced spawning gravel by all salmon and trout species occurring in Campbell River. As expected, large rain events and subsequent water releases down the Elk Falls Canyon have displaced a significant portion of the gravel from preferred locations. As a result, periodic additions of spawning gravel, via bulk loading, will likely be part of a long term rehabilitation and maintenance plan for the Campbell River John Hart Facility.

Upon reviewing the McCulloch and Silvestri 2006 report and discussing possible options with engineers, it was decided that the most effective way to bulk load gravel into this location was to use an overhead skyline and trolley bucket design. This basically involves a temporary cable that spans the canyon on which a remote release trolley bucket can run. The trolley can hold just under 0.5 m^3 of gravel and is loaded with the use of a tracked skid steer (bobcat) from a gravel stockpile located about 100 m away, near the penstock footbridge.

2.0 GOALS AND OBJECTIVES

The primary goals and objectives of this project were to increase the quantity/quality of spawning gravel in the Elk Falls Canyon reach toward levels identified by Burt (2003). The increase in gravel would ultimately increase the freshwater productivity of the system's remnant populations of summer and winter steelhead stocks (*Oncorhynchus mykiss*) as well as Chinook (*O. tshawytscha*), Coho (*O. kisutch*), and Chum (*O. keta*) salmon. Increasing spawning habitat and egg to fry survival for the remnant population of summer and winter steelhead are important steps in the recovery of these stocks in the Campbell River watershed (Lill 2002).

A long term goal of the gravel placement project is to increase the abundance of gravel in Elk Falls Canyon to levels capable of supporting all salmonids species occurring in this reach. Although gravel loading levels do not appear to have been set in previous documents, the 2016/17 grant application for spawning gravel delivery at Elk Falls includes a provision for NHC ltd. to complete a gravel assessment. NHC ltd. will determine an appropriate 'Gravel Budget' and associated long term targets for gravel placement at the bulk loading site.

4.0 METHODS/RESULTS

4.1 Permitting and Planning

Engineering Design/Signoff

Matt Seyd (P. Eng, Herold Engineering) was retained to design and oversee construction for all structural components of the project. Preliminary design was completed in 2014/15 with DFO RFCPP funds. After a number of iterations and site visits, Draft Plans were completed in December 2015 and Issued for Construction (IFC) plans were competed in February 2016,

shortly before construction began (Appendix 1). IFC drawings included specifications for the following: Cable length/size, plan and profile, specific anchor locations, anchor sizes, South Tower specifications and full trolley design specifications.

A geotechnical engineer, Michael Cullen (P. Eng), was also retained to provide advice on rock competency, anchor locations and depth specifications, tower subgrade conditions and provide oversite/signoff on the anchor strength and testing results (Appendix 1).

Park Use Permit

Given the work site was located within a Provincial Park (Elk Falls), a Parks Use Permit (PUP) was required and an amendment was submitted in May, 2015. However, final plan drawings weren't available until Dec 2015, and as a result the PUP was not signed off until February 2016 (PUP No. 105443, Appendix 2). Steve Toth (RP Bio), was hired to complete a Level 2 Environmental Impact Assessment of the proposed construction works (Appendix 2). His review found little lasting impacts from the constructed infrastructure and that the benefit of the gravel input far outweighed short term park and footprint impacts. BCCF worked closely with Parks Staff, Brent Blackmun, to ensure parks features and aspects were maintained and impacts were kept to a minimum.

Liability Ownership

As a project condition of the FWCP funding agreement, asset ownership and consequential liability of the structure and its long term use was required before project fuinds were released. This provided a challenge for this project in the beginning stages and resulted in lengthy delays and instream work outside typical fisheries windows. In efforts to meet this condition, BCCF staff approached BC Hydro, DFO, BC Parks, Local NGO Campbell River Salmon Foundation and MoFLNRO to determine if any entity would be willing to sign off as the project owner and take on the associated long term liability risks and potential maintenance costs with the structure – however no entity was willing to accept this responsibility.

After some time, BCCF project managers invited some members of the BCCF board of directors for an onsite tour. After discussion, the BCCF board decided that the potential long term liability risk for this project was small and should not stop the construction of this important project. As a result, the board agreed that BCCF alone would take on the risks and assume ownership of the infrastructure.

Section 9 and DFO notifications.

A Section 9 Notification (File # 1003311) was submitted on January 28, 2016, and approval was given February 11, 2016 via e-mail. Though under new Fisheries Act Legislation, DFO has no formal method for application for habitat restoration projects, BCCF staff did go through the Self-Assessment Review for Projects Near Water process as outlined on the DFO website (http://www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html). Furthermore, discussions with DFO staff (Tom Rutherford, Shannon Anderson and Wilf Leudke) were ongoing and unofficial 'approval' was given via e-mail to test the system outside normal fisheries windows.

Parks Closure Notices

Prior to commencement of construction, BCCF was required as part of the PUP agreement to give advance notice to potential park users of any trail closures or impacts the project may have on the trial system. On February 19, 2016, a news story was published in the CR Mirror outlining the project background, the general project plan and listed trail closures and potential delays (Appendix 3). Similar notifications were included on the BC Parks website, and FWCP website. A sign was also erected approximately two weeks prior to construction to inform regular park users of potential disruptions.

In addition, the local radio stations, The Eagle 97.3 FM and The Goat 98.9 FM, included brief public advisories and project background on February 22, 2016. The radio stations also included corresponding stories on their respective websites.

Safety and BC Hydro Permitting

All pertinent safety processes were followed and necessary permits obtained, these include, but are not limited to, the following:

1. BCCF supplied BC Hydro with a Safety Plan to conform to general FWCP safety requirements
2. BCCF obtained and signed a Permission to Enter Agreement Between BCCF and BC Hydro and Power Authority
3. BCCF supplied, on behalf of PGH Consulting Ltd. (the Prime Contractor for the project) a completed Permit to Work Procedure (#16-001) to access/pass through SNC Lavalin (BC Hydro Prime Contractor) controlled areas.
4. PGH Consulting Ltd. submitted a notice of work to Worksafe BC
5. PGH Consulting Ltd. provided a detailed Safety Management Plan to BC Hydro for review and acceptance.
6. PGH Consulting Ltd. provided a detailed Environmental Management Plan to BC Hydro for review and acceptance
7. BCCF/PGH Consulting contacted Ecofish Research Ltd. and remained in contact for the duration of the project to ensure any crew conflicts/ risks were avoided.
8. PGH Consulting Ltd, informed BC Hydro/SNC Lavalin of plans for each week and access requirements through SNC Lavalin controlled areas.
9. Three BCCF staff obtained WPP CAT A & B safety courses provided by BC Hydro in case of any requirements for staff to work in the canyon floor.

4.2 Construction

On January 12, 2016 a kick-off meeting with Parks, FWCP and BC Hydro occured to ensure appropriate timing and project requirements. BCCF invited four companies to provide lump sum estimates on the construction/testing portion of the project: JR Construction, Pacific Industrial Marine, Axis Mountain Technical, and PGH Consulting. Only Axis and PGH provided estimates, based on price, experience, and capability, PGH consulting of Courtenay BC was selected as the Prime Contractor (PC) for construction.

PGH and BCCF staff collectively surveyed the falling right-of-way (Photo 1), and surveyed in the South Tower (Photo 2), and North Anchor Location (Photo 3) during the week of February

15, 2016. As a result some minor adjustments were made to the South Tower locations to avoid some large trees.

Construction commenced February 23, 2016. Falling trail right-of-way, South Tower area and trolley right-of-way occurred on February 23 and was completed in one day (Photos 4 and 5). A hazard tree assessment and removal of any hazard trees near the work zone was also carried out on February 23. Trail upgrades and new trail construction (Photos 6, 7 and 8) were completed on February 24 and 25. During this time the trails near the construction area were kept closed to ensure public safety. A small tracked excavator (5 ton) was used to clear the right-of-way areas and remove overburden. Overburden was removed from the park and coarse woody debris left onsite as per BC Parks request. A bobcat and transport bin were used to move materials between the work site and the staging area. A '3 inch minus' crush material was used to construct and top the trail, it was also compacted with a diesel plate compactor to ensure a durable and well-draining trail surface. Excavations for the South Tower footings took place on February 26 (Photo 9), as did subgrade soil assessment by the Geotechnical engineer.

Footings for the South Tower structure were formed, poured and back filled the following week (February 29 – March 4; Photo 10). The north side anchors were drilled and installed on March 8 (Photo 11). The same week, cedar railings were installed along the Millennium Trail at the request of BC Parks (Photo 12). The tie back anchors were drilled and installed March 15 and 16, and pull tested on March 21. The South Tower structure (Photo 13), prefabricated at CR Metals in Campbell River, was erected and installed on March 17 and 18. Soon after pull testing was complete, the tie back anchors were fastened to the South Tower and the 7/8 inch wire rope (the 'skyline') was installed between the South Tower and the North Anchor and tightened to capacity using a large turnbuckle (Photo 14). On Wednesday March 23, the trolley bucket was hung on the skyline cable and ready for testing (Photo 15).

4.3 Testing

Testing occurred on March 24, 2016. BCCF and PGH crews were onsite to complete the test. Ten cubic yards of double washed spawning gravel (6 inch minus/medium drain rock mix) was stockpiled at the staging area (Photo 16). The hydraulic winch (Braden model BG4B; Photo 17) was installed on the winch pad and loaded with 5/16 inch galvanized wire rope and connected to the trolley bucket. Once all items were in place and the area cleared, a tracked skidsteer (aka bobcat) was used to load the trolley bucket with the spawning gravel (Photo 18). The first drop (photo 19) went smoothly, with gravel hitting the target area (Photo 20). The second drop released early due to operator error, but still made the canyon floor. During the third drop, due to an engineering oversite, the trolley bucket malfunctioned (Photo 21) and as a result the bearing housings were ruined (Photo 22). After some assessment it was determined that the re-design and repairs of the trolley would likely take 1-2 weeks; consequently, the project team de-mobilized the equipment and removed the skyline cable the same afternoon.

5.0 CONCLUSION/RECOMMENDATIONS

Though there was only a small amount of gravel installed in the river, the overall project can definitely be considered a success. After some lengthy up-front project challenges to meet all funding conditions, and a substantial amount of pre-planning and safety coordination, the project came together and was completed on time and on budget. Repairs to the trolley bucket are currently underway and a simple change to a portion of the bucket will solve the problem. The two main objectives of the project, infrastructure installation and system testing, were both complete. With some minor adjustments project staff are confident that the target of 250 m^3 of spawning gravel slated for install in the 2016 fisheries window is definitely achievable.

It is recommended that the length of the main skyline cable be shortened by approximately 0.5 m to allow for greater ability to tighten the cable as it stretches over time. It is also recommended that a bin type bobcat attachment be used to transfer gravel from the staging area to the South Tower loading location. This will keep park disturbance to a minimum as one bin will provide approximately six trolley bucket loads reducing the number of trips required in a given day by a factor of six. Also some '3 inch crush' material should be provided in the next project cycle to surface the turn around and staging area which at the end of this project became very muddy and difficult to drive trucks and equipment through.

6.0 ACKNOWLEDGEMENTS

Thanks are extended to Brent Blackmun of BC Parks who facilitated the Parks Use Permit and helped to develop a safe, low impact strategy for securing trails and facilities in Elk Falls Provincial Park. PGH Consulting provided excellent service and flexibility to some changing design requirements and performed well under tight timelines and budgets. Thanks to all the project partners and funders including, but not limited to; DFO RFCPP, BC Hydro, Fish & Wildlife Compensation Program, Campbell River Salmon Foundation and Living Rivers – Georgia Basin/Vancouver Island programs. Also BC Parks, local DFO staff Tom Rutherford, FLNRO staff Mike McCulloch and Grant Bracher. BC Hydro staff, Trevor Oussoren, Eva Wichmann, Amy Stevenson and Stephen Watson among others. BCCF administration/ support staff and the rest of the project team.

Prepared with financial support of:
Fish and Wildlife Compensation Program on behalf of its program partners BC Hydro, the Province of BC, Fisheries and Oceans Canada, First Nations and public stakeholders.

7.0 REFERENCES

Burt, D.W. 2003. A 5-year restoration plan for the Lower Campbell River. *Prepared for* Fisheries and Oceans Canada, Ministry of Water, Land and Air Protection and the Campbell River Gravel Committee. 54 pp plus appendices.

Lill, A.F. 2002. Greater Georgia Basin steelhead recovery action plan. *Prepared for* Pacific Salmon Foundation, Vancouver, BC and the Province of British Columbia. 107 pp.

McCulloch M.P. and S. Silvestri. 2006. Campbell River (Elk Falls) canyon spawning gravel placement - feasibility of a land based conveyance system. *Prepared for* BC Hydro Bridge Coastal Restoration Program Burnaby, BC.

Pellett, K. 2012. Campbell River (Elk Falls) canyon spawning gravel placement, 2011. *Prepared for* BC Hydro Bridge Coastal Restoration Program Burnaby, BC, and Living Rivers - Georgia Basin/Vancouver Island.

8.0 CONFIRMATION OF FWCP RECOGNITION

On February 19, 2016, a news story was published in the CR Mirror (Appendix 3), it included a brief project background, benefits, and listed the main funding sources of the project, including FWCP. The project was also printed on the FWCP website and BC Parks websites. Two local radio stations, *The Eagle 97.3 FM* and *The Goat 98.9 FM*, included brief public advisories and project background on February 21, 2016, this also included corresponding stories on their respective websites.

A 24”x40” interpretative sign (Appendix 3) is also in final draft stages, and is planned on being installed along the Millennium Trail in Elk Falls Provincial Park. The sign mentions FWCP as a primary funding source for the project. Sign installation is projected to occur before May 15, 2016.

9.0 PHOTOGRAPHIC RECORD

Photo 1.Trail right-of-way pre-construction, February 15, 2016.

Photo 2. South Tower location, pre-construction, February 15, 2016.

Photo 3. North anchor locations, pre-construction February 15, 2016.

Photo 4. Falling hazard trees, trail right-of-way and South Tower location. February 23, 2016.

Photo 5. Trail right-of-way falling, February 23, 2016.

Photo 6. Clearing trail right of way and South Tower location, February 24, 2016.

Photo 7. Removing overburden for access trail February 24, 2016.

Photo 8. Newly constructed access trail to South Tower location of compacted '3 inch minus' fractured rock, February 25, 2016.

Photo 9. Excavation for South Tower footings and winch pad, February 25, 2016.

Photo 10. Forms for South Tower footing, March 3, 2016.

Photo 11. North side anchors, drilled and cast March 9, 2016.

Photo 12. Newly constructed cedar fencing alone Millennium Trail, March 10, 2016.

Photo 13. Erected South Tower structure, March 18, 2016.

Photo 14. Looking out along the newly installed skyline towards the north cliff face, March 23, 2016.

Photo 15. Fully installed south tower and gravel trolley ready for testing, March 24, 2016.

Photo 16. Spawning gravel stockpiled at staging area, being moved to South Tower loading area by tracked bobcat, March 24, 2016.

Photo 17. Hydraulic winch installed on concrete winch pad, March 24, 2016.

Photo 18. Loading the trolley bucket with washed spawning gravel for test release, March 24, 2016.

Photo 19. Gravel trolley bucket mid release, first test March 24, 2016.

Photo 20. Spawning gravel target alignment in the first pool tail-out below Elk Falls. March 24, 2016.

Photo 21. Failed trolley bucket, third load, March 24, 2016.

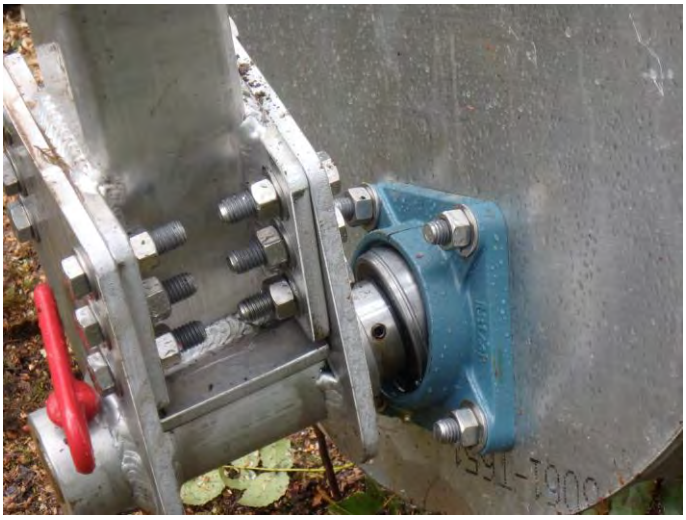


Photo 22. Cracked bearing housing on the trolley bucket. March 24, 2016.

APPENDIX 1

ENGINEERING DOCUMENTS

ELK FALLS GRAVEL DUMP
ELK FALLS PROVINCIAL PARK
BC CONSERVATION FOUNDATION

DRAWING LIST

DRAWING NUMBER	DESCRIPTION
3238–002–S00	COVER SHEET AND DRAWING LIST
3238–002–S01	GENERAL NOTES
3238–002–S02	PLAN AND PROFILE – TROLLEY CABLE
3238–002–S03	PLAN AND PROFILE – ACCESS PATH
3238–002–S04	ELEVATION, SECTIONS AND DETAILS
3238–002–S05	TROLLEY ELEVATION, SECTION AND DETAILS

HEROLD ENGINEERING
3701 Shenton Rd, Nanaimo, BC V9T 2H1
Tel: 250–751–8558 Fax: 250–751–8559
Email: mail@heroldengineering.com

HEROLD PROJECT No.
3238–002

GENERAL NOTES:

1.0 GENERAL

1.1 DESIGN LOADS

LIVE LOAD: 1000 KG – BUCKET AND PAYLOAD COMBINED

1.2 READ STRUCTURAL DRAWINGS IN CONJUNCTION WITH ALL OTHER CONTRACT DRAWINGS AND DOCUMENTS. REPORT ANY CONFLICTS TO THE ENGINEER BEFORE COMMENCING WORK.

1.3 VERIFY ALL DIMENSIONS AND ELEVATIONS PRIOR TO CONSTRUCTION.

1.4 NOTIFY ENGINEER 48 HOURS IN ADVANCE FOR INSPECTION OF STRUCTURAL CONNECTIONS BEFORE COVERING UP.

1.5 CONTRACTOR'S RESPONSIBILITY: THESE DRAWINGS SHOW COMPLETED STRUCTURAL COMPONENTS. THE REQUIRED TEMPORARY BRACING AND SHORING TO PERFORM THE WORK SAFELY IS THE RESPONSIBILITY OF THE CONTRACTOR.

1.6 ENVIRONMENTAL WORK PROCEDURES, TIMING, AND SPECIAL PRECAUTIONS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS AND LIMITATIONS OF THE FEDERAL DEPARTMENT OF FISHERIES AND OCEANS, AND THE PROVINCIAL MINISTRY OF WATER, LAND AND AIR PROTECTION.

1.7 SUBMIT SHOP DRAWINGS FOR REVIEW PRIOR TO FABRICATION.

1.8 ELEVATIONS ARE IN METRES AND DIMENSIONS ARE IN MILLIMETRES.

1.9 UNDER NO CIRCUMSTANCES ARE DRAWINGS TO BE SCALED.

1.10 QUALITY ASSURANCE QUALIFICATION OF CONTRACTOR AND SUPERINTENDENT: THE CONTRACTOR SHALL BE FULLY CONVERSANT WITH ALL SAFETY PROCEDURES AND REGULATIONS RELATING TO CONSTRUCTION, AND SHALL EMPLOY STAGING AND OTHER SAFETY PROVISIONS AS SPECIFIED ELSEWHERE AND REQUIRED BY THE WORKERS COMPENSATION BOARD REGULATIONS.

2.0 ENVIRONMENTAL CONSTRUCTION REQUIREMENTS

2.1 ALL TREES AND ROOTS TO BE PRESERVED WHERE POSSIBLE. ALL DISTURBED AREAS TO BE RESEEDED WITH NATIVE GRASS MIX. ANY SHRUBS OR TREES REMOVED MUST BE REPLACED AND THE AREA IS TO BE COVERED IN STRAW MULCH UPON COMPLETION.

3.0 CAST-IN-PLACE CONCRETE

3.1 ALL CONCRETE WORK SHALL CONFORM TO THE REQUIREMENTS OF CAN/CSA A23.1-06 AND A23.2-06.

3.2 CONCRETE MIXES SHALL CONFORM TO CAN/CSA A23.1-06 AND A23.2-06 AND SHALL HAVE THE FOLLOWING PROPERTIES:

CLASS	28 DAY STRENGTH	MAXIMUM AGGREGATE SIZE	MAXIMUM SLUMP	AIR CONTENT	EXPOSURE
ALL ITEMS	30 MPa	19mm	80mm	5% TO 8%	F-1

3.4 REINFORCING STEEL TO CONFORM TO CSA SPECIFICATION G30.18M, GRADE 400, UNLESS NOTED OTHERWISE.

3.5 LAP OF BARS FOR SPLICES TO BE 40 x BAR DIAMETER, UNLESS NOTED OTHERWISE.

3.6 PROVIDE A 20mm CHAMFER ON ALL EXPOSED EDGES OF CONCRETE, UNLESS NOTED OTHERWISE.

3.7 CONCRETE FINISHES SHALL BE IN ACCORDANCE WITH CAN/CSA A23.1-06.

3.8 ALL CONCRETE CURING SHALL BE IN ACCORDANCE WITH CAN/CSA A23.1-06. SPECIAL PRECAUTIONS SHALL BE TAKEN AS NOTED IN CSA A23.1 FOR PLACING AND CURING CONCRETE ABOVE 27° C AND BELOW 5° C.

3.9 MINIMUM CONCRETE COVER TO REINFORCING SHALL BE 50mm, UNLESS NOTED OTHERWISE.

3.10 REINFORCEMENT ABBREVIATIONS:

H2E HOOK 2-ENDS, STANDARD HOOK
H1E HOOK 1-END, STANDARD HOOK
H2E600 HOOK 2-ENDS, 600 LONG HOOKS
15M1600 15M STRAIGHT BAR, 1600 LONG

4.0 GROUT

4.1 GROUT TO BE NON SHRINK, 50MPa.

5.0 ALUMINUM

5.1 GRAVEL BUCKET MATERIAL TO BE ALUMINUM UNLESS NOTED OTHERWISE. ALUMINUM SHALL BE 6061-T6.

5.2 STRUCTURES TO BE DESIGNED AND FABRICATED IN ACCORDANCE WITH CAN3-S157-M83.

5.3 ALL WELDING SHALL BE IN ACCORDANCE WITH CSA W59.2-M 1991 (R2013). FABRICATING SHOP TO BE CERTIFIED TO CSA W47.2-11 (R2015) DIVISION 2 OR BETTER.

5.4 PROVIDE A MINIMUM 6mm FILLET WELD OR EQUIVALENT FOR CONNECTIONS, UNLESS NOTED OTHERWISE.

5.5 GRIND SMOOTH ALL SHARP EDGES.

6.0 STEEL

6.1 ALL STEEL WORK SHALL BE IN ACCORDANCE WITH CSA-S16-09 AND THE REVIEWED SHOP DRAWINGS.

6.2 WHERE WELD SIZE NOT SHOWN, USE MINIMUM 8mm FILLET.

6.3 ALL WELDING SHALL BE IN ACCORDANCE WITH CSA W59-13. FABRICATING SHOP TO HAVE A MINIMUM DIVISION 2 CERTIFICATION BY THE CANADIAN WELDING BUREAU TO THE REQUIREMENTS OF CSA W47.1-09 (R2014). THE FABRICATOR SHALL SUBMIT PROOF OF CERTIFICATION PRIOR TO START OF WORK.

7.0 WELDING INSPECTIONS

7.1 ALL INSPECTIONS SHALL BE PERFORMED BY A COMPANY CERTIFIED TO CSA W178.2 TO LEVEL 2, FOR THE RELEVANT CLASS OF INSPECTION AND HEREAFTER REFERRED TO AS THE INSPECTOR. INSPECTION PROCEDURES SHALL BE AS OUTLINED BELOW.

7.2 ALL WELDS SHALL BE INSPECTED OR TESTED BY NON-DESTRUCTIVE MEANS (X-RAY OR ULTRASONIC) AS REQUIRED BY A THIRD PARTY WELD INSPECTOR ENGAGED BY THE CONTRACTOR, UPON REQUEST BY THE ENGINEER.

7.3 ALL FAILURES IDENTIFIED BY THE TESTING AND INSPECTIONS SHALL BE CORRECTED AT THE CONTRACTOR'S EXPENSE. COST OF ADDITIONAL TESTING TO CONFIRM CONFORMANCE WITH SPECIFICATIONS SHALL BE BORNE BY THE CONTRACTOR.

7.4 SUBMIT ALL TEST REPORTS TO HEROLD ENGINEERING FOR REVIEW. DO NOT COVER MEMBERS AND THEIR CONNECTIONS WITHOUT THE APPROVAL OF THE STRUCTURAL ENGINEER.

8.0 COATINGS

8.1 COATINGS SHALL CONSIST OF A 2 PART ALIPHATIC POLYURETHANE OR EPOXY TOP COAT APPLIED OVER A COMPATIBLE ZINC RICH PRIMER.

8.2 COATINGS SHALL BE SUITABLE FOR CONTINUOUS OUTDOOR EXPOSURE, FIELD TOUCH-UPS AND RE-COATING.

8.3 SURFACE PREPARATIONS AND COATINGS APPLICATION SHALL BE IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS.

8.4 TOP COAT COLOR SHALL BE "B.C. PARKS METRO BROWN".

9.0 MISCELLANEOUS STEEL CONNECTIONS

9.1 BOLTED CONNECTIONS SHALL UTILIZE ASTM A325 GALVANIZED. BOLTS COMPLETE WITH NUTS AND MALLEABLE IRON WASHERS AND RUBBER WASHERS (TO SEPARATE STEEL FROM ALUMINUM), UNLESS OTHERWISE SHOWN ON DRAWINGS.

10.0 MISCELLANEOUS ALUMINUM CONNECTIONS

10.1 BOLTED CONNECTIONS SHALL UTILIZE ASTM F593 GROUP 1 AND F594 GROUP 1 FASTENERS.

11.0 WIRE ROPE

11.1 ALL WIRE ROPE TO BE 16x9 IWRC WITH EIPS MATERIAL USED.

11.2 PERMANENTLY INSTALLED CABLE SHALL BE GALVANIZED.

12.0 CAST IN PLACE ANCHORS

12.1 ALL CAST-IN-PLACE ANCHORS BOLTS TO BE ASTM F1554 GRADE 55 – GALVANIZED.

13.0 ADHESIVE ANCHORS

13.1 ALL ANCHORS ARE TO BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S WRITTEN INSTRUCTIONS.

13.2 UNLESS NOTED OTHERWISE ADHESIVE ANCHORS SHALL BE HILTI 'HAS' ROD. REFER TO DRAWINGS FOR ANCHOR LOCATIONS, SIZES, CENTRES AND EMBEDMENT LENGTH. USE HILTI HY200 MAX OR HILTI HIT RE500 ADHESIVE AS NOTED BELOW.

USE HILTI HIT HY200 MAX WHEN;
A QUICK CURE IS REQUIRED,
CONDITIONS ARE DRY,
HOLES ARE HAMMER DRILLED,
HOLES ARE NOT OVER-SIZED,
BASE MATERIAL TEMPERATURE IS ABOVE 5° CELSIUS

USE HILTI HIT RE500 WHEN;
EXTENDED WORKING TIME IS REQUIRED AND CURE TIME IS NOT CRITICAL,
HOLES ARE DRILLED USING DIAMOND CORE, PNEUMATIC OR HAMMER DRILLS,
DEEP EMBEDMENT IS SPECIFIED,
THE APPLICATION IS UNDERWATER, OR HOLES ARE OVERSIZED.

13.3 HOLES FOR ADHESIVE ANCHORS SHALL BE CLEANED OUT WITH HIGH PRESSURE AIR AND THEN A BRUSH PRIOR TO ANCHOR INSTALLATION.

13.4 INSTALLERS OF HILTI PRODUCTS SHALL HAVE RECEIVED TRAINING BY HILTI (CANADA) CORP. IN THE USE OF THE SPECIFIED PRODUCTS. THE GENERAL CONTRACTOR SHALL PROVIDE THE DESIGN ENGINEER WITH A LETTER STATING THAT THIS TRAINING HAS BEEN COMPLETED.

14.0 ABBREVIATIONS

CL. – CLEAR
℄ – CENTRELINE
CP. – COMPLETE PENETRATION
C/W – COMPLETE WITH
DWG. – DRAWING
EL. – ELEVATION
I.D. – INSIDE DIAMETER
LLH – LONG LEG HORIZONTAL
LLV – LONG LEG VERTICAL
MAX. – MAXIMUM
MIN. – MINIMUM
N.T.S. – NOT TO SCALE
OPP. – OPPOSITE
PL. – PLATE
R – RADIUS
SIM. – SIMILAR
S.S. – STAINLESS STEEL
T.O. – TOP OF
TYP. – TYPICAL
U/S – UNDERSIDE
U.N.O. – UNLESS NOTED OTHERWISE
WP – WORK POINT

ISSUED FOR CONSTRUCTION

No.	DATE yy.mm.dd	ISSUED FOR
A	2016.02.11	CLIENT REVIEW
0	2016.02.12	CONSTRUCTION

SUB CONSULTANT

DRAFTED: PHU
DRAFTING REVIEW:
DESIGNED: MQCS
DESIGN REVIEW: S/S

HEROLD ENGINEERING
3701 Shenton Rd, Nanaimo, BC V9T 2H1
Tel: 250-751-8558 Fax: 250-751-8559
Email: mail@heroldengineering.com

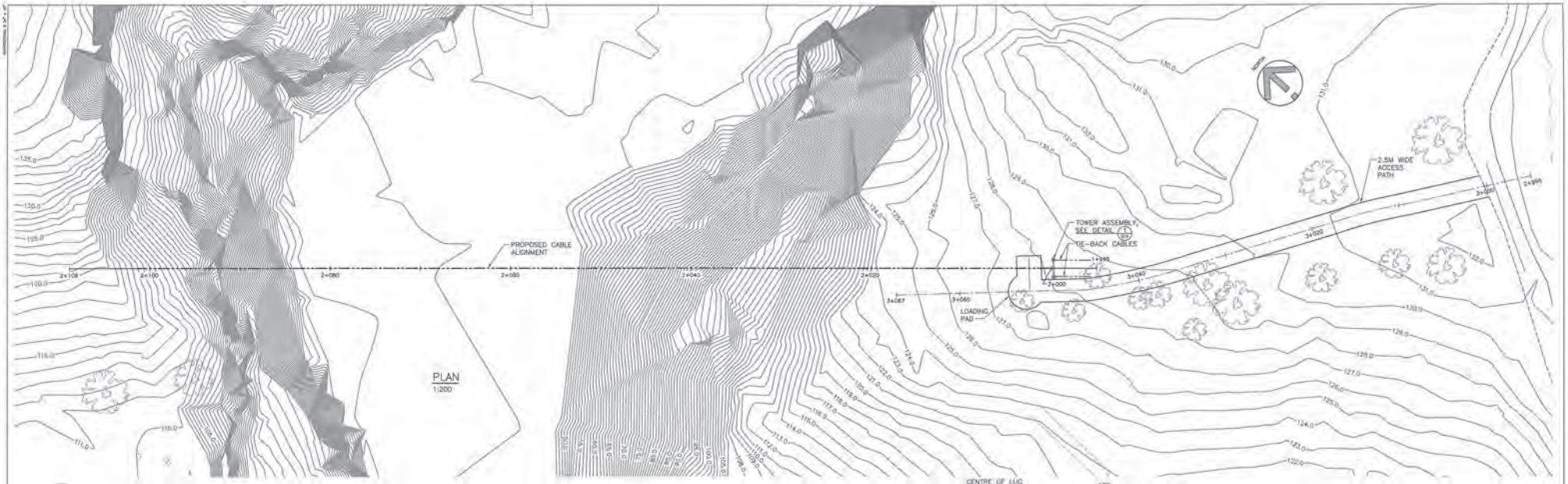
ENGINEERS SEAL
2016.02.12

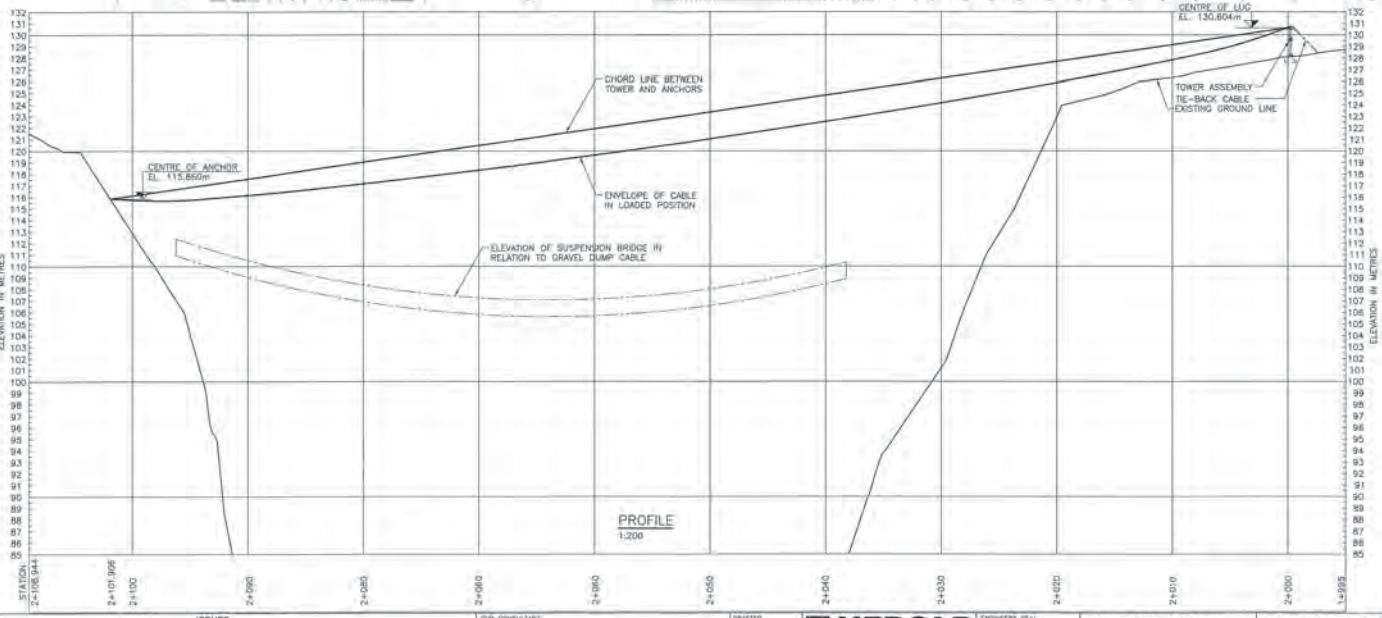
GENERAL NOTES

ELK FALLS GRAVEL DUMP
ELK FALLS PROVINCIAL PARK
CAMPBELL RIVER
BC CONSERVATION FOUNDATION

HEL PROJECT No.: 3238-002
CLIENT DWG. No.: N/A
SCALE: NONE
PERMIT No.: N/A
HEL DRAWING No.: S01
REVISION: 0

DESTROY ALL DRAWINGS SHOWING PREVIOUS REVISION





ISSUED FOR CONSTRUCTION

NOTES:

1. FOR GENERAL NOTES, SEE DWG. S01.

ISSUES								
No.	DATE	ISSUED FOR	No.	DATE	ISSUED FOR	No.	DATE	ISSUED FOR
A	2015.05.28	CLIENT REVIEW						
B	2015.12.18	CLIENT REVIEW						
C	2016.02.11	CLIENT REVIEW						
0	2016.02.12	CONSTRUCTION						

SUB-CONSULTANT

DRAFTED	PHU
DRAFTING REVIEW	
DESIGNED	MDCS
DESIGN REVIEW	SJS

HEROLD ENGINEERING
3331 Shenton Rd, Nanaimo, BC V9T 2H1
Tel: 250-751-8558 Fax: 250-751-8559
Email: info@heroldengineering.com

ENGINEER'S SEAL

2016.02.12

ELK FALLS GRAVEL DUMP
PLAN AND PROFILE
- TROLLEY CABLE

ELK FALLS GRAVEL DUMP
ELK FALLS PROVINCIAL PARK
CAMPBELL RIVER
BC CONSERVATION FOUNDATION

HEL PROJECT No.	3238-002
CLIENT DWG. No.	N/A
SCALE	1:200
FORMAT No.	N/A
HEL DRAWING No.	S02
REVISION	0

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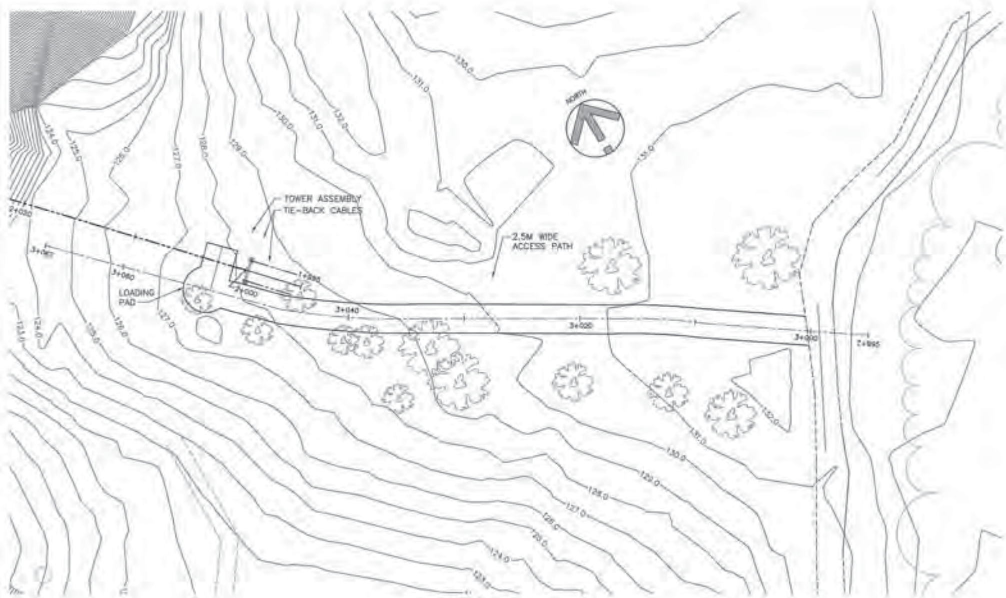
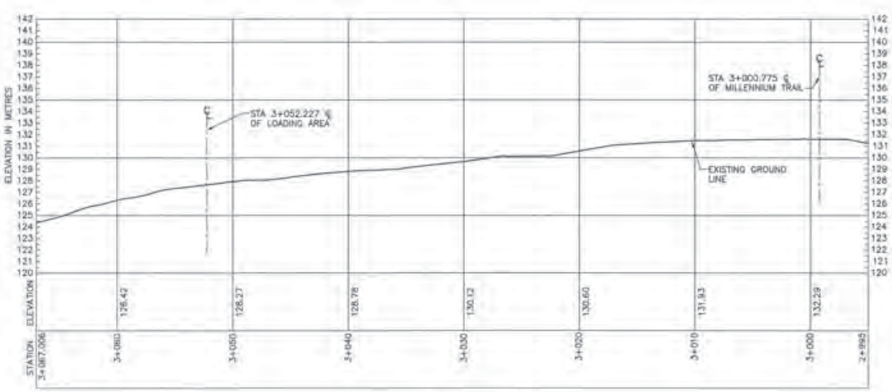


PLAN
1:200



PROFILE
1:200

ISSUED FOR CONSTRUCTION

NOTES:

1. FOR GENERAL NOTES, SEE DWG. S01.

ISSUES								
No.	DATE	ISSUED FOR	No.	DATE	ISSUED FOR	No.	DATE	ISSUED FOR
A	2016.02.11	CLIENT REVIEW						
0	2016.02.12	CONSTRUCTION						

SUB-CONSULTANT

DRAFTED: PHU
DRAFTING REVIEW
DESIGNED: MOCS
DESIGN REVIEW: SJS

HEROLD ENGINEERING
3701 Shenton Rd. Nanaimo, BC V9T 2H1
Tel: 250-751-8558 Fax: 250-751-8559
Email: mail@heroldengineering.com

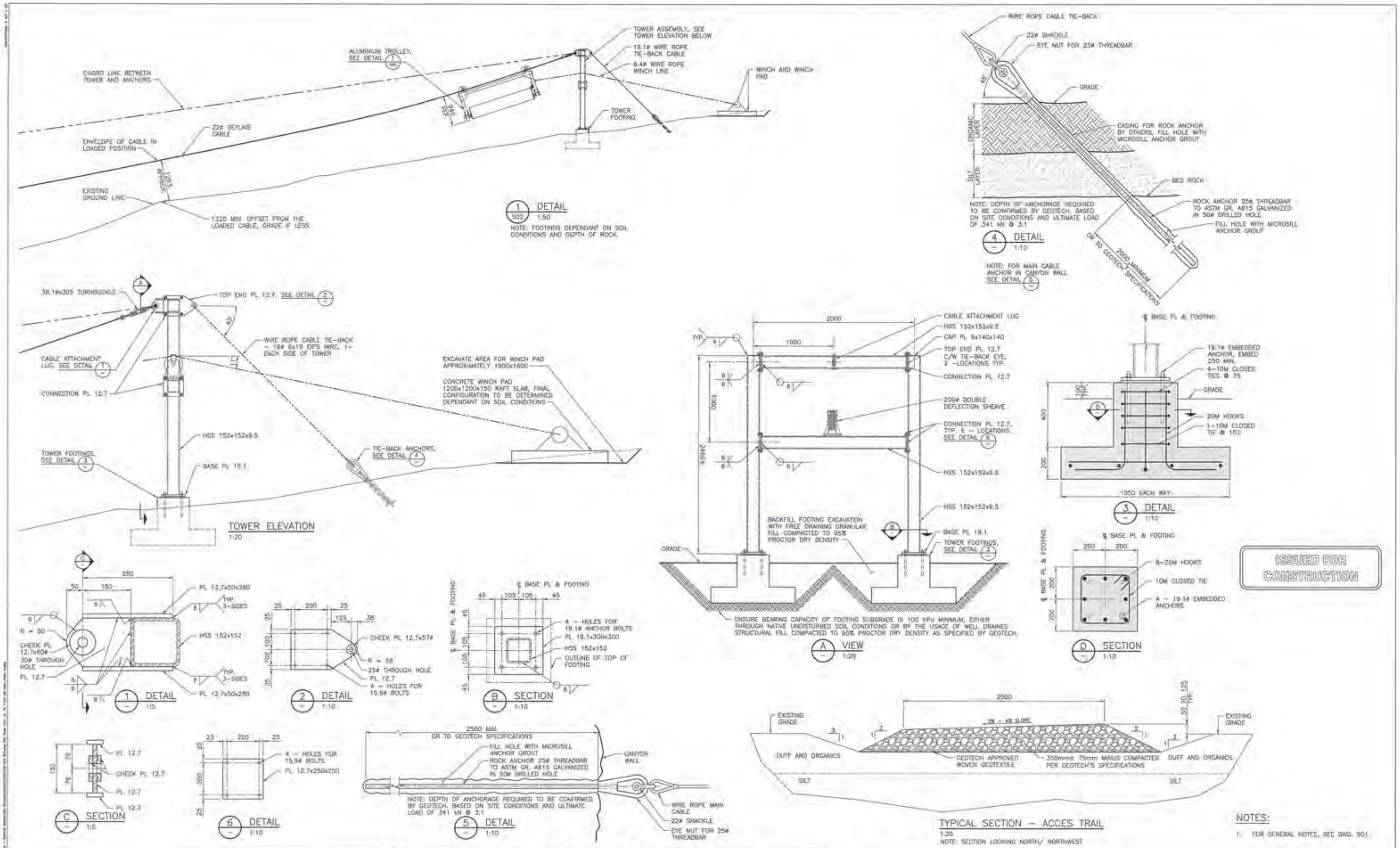
ENGINEERS SEAL
2016.02.12

ELK FALLS GRAVEL DUMP
PLAN AND PROFILE - ACCESS PATH

ELK FALLS GRAVEL DUMP
ELK FALLS PROVINCIAL PARK
CAMPBELL RIVER
BC CONSERVATION FOUNDATION

HEL PROJECT No. 3238-002	CLIENT DWG. No. N/A
SCALE 1:200	PERMIT No. N/A
HEL DRAWING No. S03	REVISION 0

DESTROY ALL DRAWINGS SHOWING PREVIOUS REVISION



TYPICAL SECTION - ACCES TRAIL
1:20
NOTE: SECTION LOOKING NORTH/ NORTHWEST

NOTES:

1. FOR GENERAL NOTES, SEE DWG. S01

ISSUES

No.	DATE	ISSUED FOR
A	2015.05.28	CLIENT REVIEW
B	2015.12.18	CLIENT REVIEW
C	2016.02.11	CLIENT REVIEW
D	2016.02.12	CONSTRUCTION

DRAFTED: PHU
DRAFTING REVIEW:
DESIGNED: MOOS
DESIGN REVIEW: SJS

HEROLD ENGINEERING

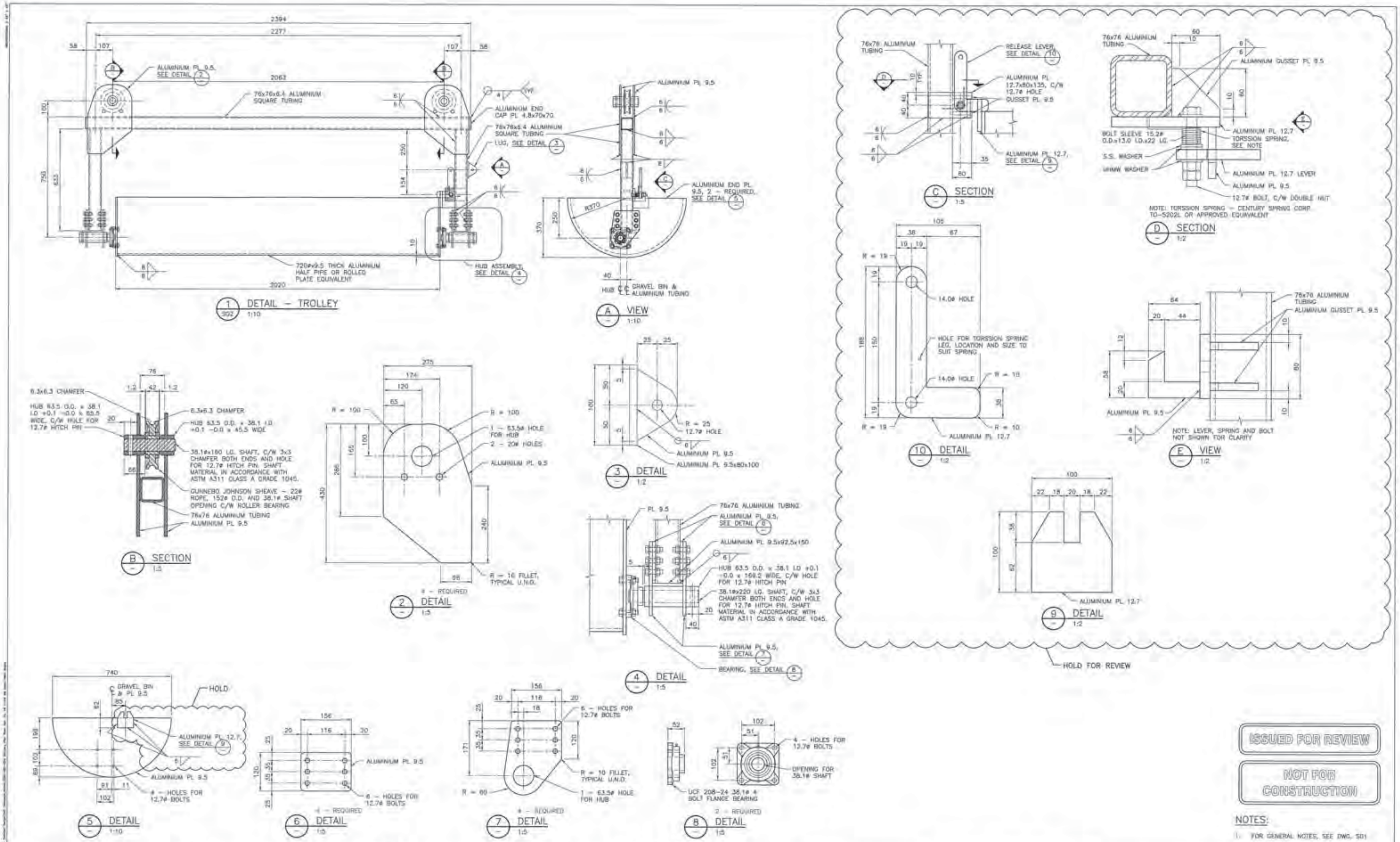
ENGINEERS SEAL: 2016.02.12

ELEVATION, SECTIONS AND DETAILS

ELK FALLS GRAVEL DUMP
ELK FALLS PROVINCIAL PARK
CAMPBELL RIVER
BC CONSERVATION FOUNDATION

HEL PROJECT No.: 3236-002
CLIENT DWG. No.: N/A
SCALE: AS SHOWN
PERMIT No.: N/A
HEL DRAWING No.: S04
REVISION: D

DESTROY ALL DRAWINGS SHOWING PREVIOUS REVISION



ISSUED FOR REVIEW

NOT FOR CONSTRUCTION

NOTES:

1. FOR GENERAL NOTES, SEE DWG. S01

ISSUES		
No.	DATE	ISSUED FOR
A	2015.08.08	CLIENT REVIEW
B	2016.03.11	CLIENT REVIEW

HEROLD ENGINEERING

TROLLEY
ELEVATION, SECTION AND DETAILS

ELK FALLS GRAVEL DUMP
ELK FALLS PROVINCIAL PARK
CAMPBELL RIVER
BC CONSERVATION FOUNDATION

HEL PROJECT No. 3238-002	CLIENT DWG. No. N/A
SCALE AS SHOWN	PERMIT No. N/A
HEL DRAWING No. S05	REVISION B

DESTROY ALL DRAWINGS SHOWING PREVIOUS REVISION

2282 Seabank Road
Courtenay, B.C. V9J 1Y1
Phone (250) 339-2633
Cell (250) 703-6775

March 27, 2016

Campbell River Gravel Delivery System
Geotechnical Engineering Sign-off

Michael Cullen Geotechnical Ltd (MCG) provided preliminary design recommendations for the geotechnical aspects of the Campbell River gravel delivery system in our report "Geotechnical Assessment Campbell River Gravel Delivery System" dated March 2015. At the time of construction several field modifications were made to the original design; MCG provided updated recommendations to fit field conditions and design changes.

The north side anchors were moved to a more accessible location on a bench. The bedrock at the location was reviewed by Michael Cullen and updated recommendations for the anchor installation provided verbally and in a series of emails. The drilling contractor (Pacific Blasting) reported that the #10 anchors were installed in holes drilled 2.9m into the rock with resin, and that the rock beyond 1m depth was competent. The anchors were load tested to 75% of yield (320 kN) by the drilling contractor. The bolts passed the 2 minute hold test. The installation and test results are appended. It should be noted that these bolts are loaded perpendicular to the head such that pull out performance is not a credible mode of failure.

The following information was proved by Western Grater for the anchors on the south side:

- Anchor embedment in competent rock = 2.3m
- Casing length to rock = 1.8m
- Casing embedment into rock = 0.4m
- Total casing length = 2.2m
- Total anchor length = 4.5m
- Total Bags of Microsil Grout = 4 Bags per hole

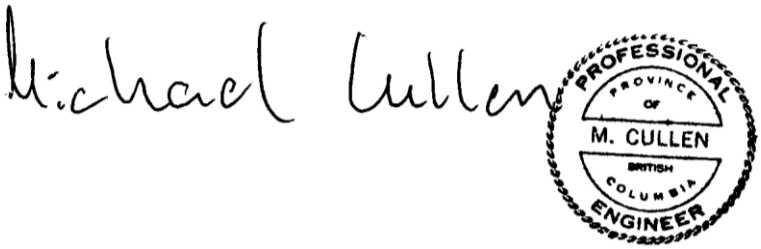
The anchors were proof tested by Western Grater and the results of these tests are appended. The results indicate acceptable performance consistent with our recommendations.

During construction Michael Cullen attended site once to review the subgrade foundation soils for the south side tower pad. The exposed soils consisted of dense silty sand free of organics. The bearing capacity of these soils was judged to be greater than 100 kPa. A 0.3m thick fill pad consisting of crushed gravel was used to create a level surface at design grade. The fill was compacted with 3 passes of a 1000lb plate compactor. The structural fill pad did not extend out laterally a minimum of 0.5m as per our recommendations; this deficiency could conceivably result in some differential settlement. It is understood from discussions with the structural engineer and client that some overall settlement is tolerable but excessive differential settlement is not. We recommend that checks of the tower plumb be completed with every use to confirm that excessive differential settlement has not occurred.

Based on our site review, coupled with correspondence with the structural engineer and contractor during construction, we are satisfied that the construction was completed in general conformance with the geotechnical recommendations we provided in pre-construction documents and field design amendments issued during the course of construction.

Please do not hesitate to contact us if you require additional information.

Sincerely
Michael Cullen Geotechnical Ltd.
per



Michael Cullen P.Eng.

Anchor Proof Test Record

Project: Elk Falls Gravel Dump | Job No: 1516-08016 | WESTERN GRATER Contracting Ltd.
Anchor No.: 1 | Customer: PGH | 790 Industrial Way, Victoria, BC. V9B 6E2
Tested by: Lorne Belanger | Weather: Rain | Date of test: 03/21/16 | Ph: 250-478-4225 Fax: 250-478-7065

Tendon size:		25	mm	Anchor length,	La	=	4500	mm	Jack type/I.D.:	60 Ton	
Steel grade:	517/	690	MPa	Bond length,	Lb	=	4500	mm	Piston area:	6,000	sq.mm
Steel area, As =		510	mm2	Free length,	Lf	=	0	mm	Pressure gauge No.:	60T	
E-modulus, Es =		204500	MPa	Jack length,	Lj	=	325	mm	Working load, Pw =	0.6 Pu =	211 kN
Tensile strength, Pu =		352	kN	Lmin = 0.8Lf+Lj		=	325	mm	Alignment load, Al =	0.1 Pw =	21 kN
Ground condition:		6" Steel Casing		Lmax = Lf+Lj+Lb/2		=	2575	mm	Max. test load Pt =	1 Pw =	211 kN

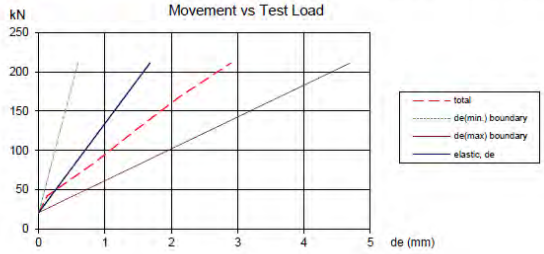
Load vs Movement

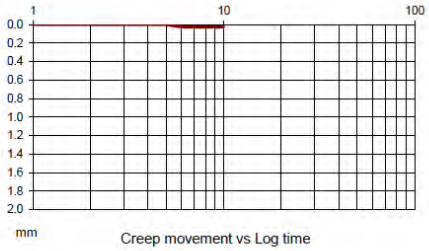
Test Stage	Test Load Pt (kN)	Pressure Gauge Psi	Dial Gauge Reading (total movement) (in)	(mm)	Elastic movement de= dn-dr	Boundary line limits de(min)= (Pt-Al)Lmin / As*Es	de(max)= (Pt-Al)Lmax / As*Es
0.10 Al	21	326	0.000	0.00		0.00	0.00
0.20 Pw	42	651	0.005	0.13		0.07	0.52
0.40 Pw	84	1302	0.033	0.84		0.20	1.56
0.60 Pw	127	1962	0.058	1.47		0.33	2.61
0.80 Pw	169	2611	0.084	2.13		0.46	3.65
0.90 Pw	190	2939	0.099	2.51		0.53	4.17
1.00 Pw	211	3264	0.114	2.90	1.68	0.59	4.69
dr @ Al	21	326	0.049	1.2446	0.00	LOCK OFF = PASSIVE	

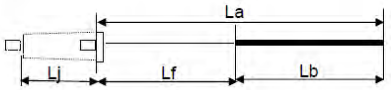
Creep test at Load, 1 Pw = 211 kN

time (min)	Dial gauge reading in	mm	δ (mm)
1	0.114	2.90	0.00
2	0.114	2.90	0.00
3	0.114	2.90	0.00
5	0.114	2.90	0.00
6	0.115	2.92	0.03
8	0.115	2.92	0.03
10	0.115	2.92	0.03

(= dn)







Actual elongation from Po to 1.0Pw:
d =de(@Pt)*Pw/(Pt-Al) = 1.86 mm

Anchor Proof Test Record

Project: Elk Falls Gravel Dump | Job No: 1516-08016 | WESTERN GRATER Contracting Ltd.
Anchor No.: 2 | Customer: PGH | 790 Industrial Way, Victoria, BC. V9B 6E2
Tested by: Lorne Belanger | Weather: Rain | Date of test: 03/21/16 | Ph: 250-478-4225 Fax: 250-478-7065

Tendon size:		25	mm	Anchor length,	La	=	4500	mm	Jack type/I.D.:	60 Ton	
Steel grade:	517/	690	MPa	Bond length,	Lb	=	4500	mm	Piston area:	6,000	sq.mm
Steel area, As =		510	mm2	Free length,	Lf	=	0	mm	Pressure gauge No.:	60T	
E-modulus, Es =		204500	MPa	Jack length,	Lj	=	325	mm	Working load, Pw =	0.6 Pu =	211 kN
Tensile strength, Pu =		352	kN	Lmin = 0.8Lf+Lj		=	325	mm	Alignment load, Al =	0.1 Pw =	21 kN
Ground condition:		6" Steel Casing		Lmax = Lf+Lj+Lb/2		=	2575	mm	Max. test load Pt =	1 Pw =	211 kN

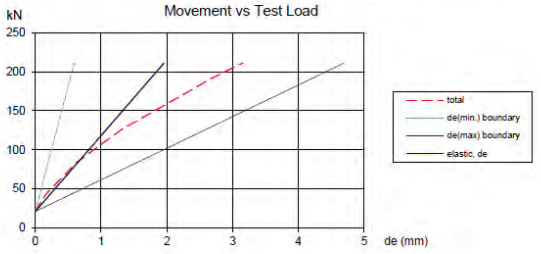
Load vs Movement

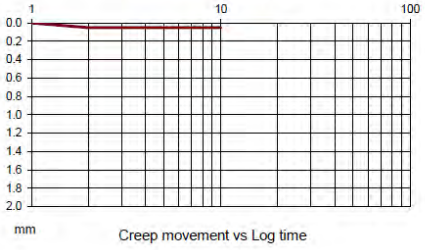
Test Stage	Test Load Pt (kN)	Pressure Gauge Psi	Dial Gauge Reading (total movement) (in)	(mm)	Elastic movement de= dn-dr	Boundary line limits de(min)= (Pt-Al)Lmin / As*Es	de(max)= (Pt-Al)Lmax / As*Es
0.10 Al	21	326	0.000	0.00		0.00	0.00
0.20 Pw	42	651	0.006	0.15		0.07	0.52
0.40 Pw	84	1302	0.025	0.64		0.20	1.56
0.60 Pw	127	1962	0.052	1.32		0.33	2.61
0.80 Pw	169	2611	0.087	2.21		0.46	3.65
0.90 Pw	190	2939	0.104	2.64		0.53	4.17
1.00 Pw	211	3264	0.124	3.15	1.96	0.59	4.69
dr @ Al	21	326	0.049	1.2446	0.00	LOCK OFF = PASSIVE	

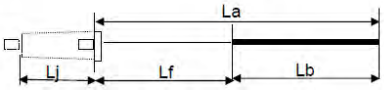
Creep test at Load, 1 Pw = 211 kN

time (min)	Dial gauge reading in	mm	δ (mm)
1	0.124	3.15	0.00
2	0.126	3.20	0.05
3	0.126	3.20	0.05
5	0.126	3.20	0.05
6	0.126	3.20	0.05
8	0.126	3.20	0.05
10	0.126	3.20	0.05

(= dn)







Actual elongation from Po to 1.0Pw:
d =de(@Pt)*Pw/(Pt-Al) = 2.17 mm

North Side Anchor Installation and testing

Pacific
BLASTING & DEMOLITION

BLASTING / ROCKWORK

Rock Anchor Log

Project: Elk Falls Rock Anchors - 1016-09016

Anchor No.	# 1	# 2			
Anchor Location	Elk river	"			
Hole Depth	9.5'	" "			
Bar Type	# 10	# 10			
Date Drilled	Feb 3 / 16	" "			
Drill Log (Draw lines on hole and indicate depth, soft ground, fractures, seams, etc. Notes can be made at the bottom of the drill hole.)	3' loose; solid	good hole			
Driller	Mark Bradley Brent [illegible]	" "			
Date Installed	Feb 5 /16	" "			
Grout/Resin	6 resin and type-lup Grout	" "			
Anchor Test (kips)	72 kips	" "			
Date Tested	Feb 9 /16	" "			
Passed / Failed	Passed	Passed			
Tested By	Norman Coyne	" "			

pacificblasting.com | Part of NorLand | Anything. Possible.

Burnaby Office | 3183 Norland Avenue, Burnaby BC V5B 3A9 | P 604 291 1255 | F 604 291 2813
U.S. Office | 9458 Depot Road, Lynden Washington | P 360 318 1711

APPENDIX 2

PERMITS AND AUTHORIZATIONS

Jeramy Damborg

From: Roden, Jacqueline FLNR:EX <Jacqueline.Roden@gov.bc.ca>
Sent: February-10-16 1:35 PM
To: Jeramy Damborg
Cc: Bracher, Grant FLNR:EX
Subject: Response to Section 9 Notification - 1003311 - Campbell River
Attachments: VI-HabitatOfficer_TermsandConditions_Feb11.pdf

Habitat Officer Grant Bracher has reviewed your application and you may proceed with your proposed changes with the following conditions:

- Have an environmental monitor onsite.
- Take appropriate erosion and sediment control measures.

Notifications received by this office will be used to plan and carry out on-site inspections and monitoring during and after the works are completed.

This email provides direction under Section 9 of the *Water Act* only, and does not constitute permission or consent under any other Act or Authority. It is your responsibility to consult with Fisheries and Oceans Canada (DFO) and the local government (municipality or regional district) to determine if there are any additional requirements for your proposed works.

Thank you,

Jacqueline Roden
Administrative Assistant
Phone (250) 751-7352
Forest Lands and Natural Resource Operations

From: Roden, Jacqueline FLNR:EX
Sent: Tuesday, February 9, 2016 4:17 PM
To: 'jdamborg@bccf.com'
Subject: Section 9 Notification - 1003311 - Campbell River

File: 1003311
Tracking Number: 100156351

Elk Falls Provincial Park
Impact Assessment
Level 2 - Detailed Screen Report

Prepared for

British Columbia Conservation Foundation

PO Box 7

#1 – 7217 Lantzville Road

Lantzville, BC V0R 2H0

Prepared by:

S.P. Toth, AScT, R.P.Bio.

Toth and Associates Environmental Services

6821 Harwood Drive

Lantzville, B.C. V0R 2H0

June, 2015

Toth and Associates Environmental Services
6821 Harwood Drive, Lantzville, B.C. V0R 2H0
Tel: (250) 390-7602 Fax: (250) 390-7603
E-mail: stoth@shaw.ca

EXECUTIVE SUMMARY

The British Columbia Conservation Foundation (BCCF) is proposing the installation of a skyline cable spawning gravel delivery system in Elk Falls Canyon, downstream of the Rotary Club of Campbell River's suspension bridge and trails in the day use area of Elk Falls Provincial Park.

This project is designed to provide an effective alternative to helicopter gravel placements in Elk Falls Canyon. Recent construction of the suspension bridge near the helicopter drop site has inhibited the potential use of a helicopter. A land based system will provide certainty to future placements and is expected to significantly lower the cost per unit of spawning gravel delivered to the river.

A Level 2 Impact Assessment report was completed for the Rotary Club of Campbell River's suspension bridge, viewing platforms and trails (Econ Consulting, February 2014). As the proposed skyline cable is within the Rotary Club's suspension bridge study area the results of that Level 2 assessment are pertinent to this project and are included within this level 2-detailed screen report along with information specific to the proposed skyline cable project footprint.

The valued components identified for the Rotary Club's suspension bridge project were reviewed in context with BCCF's proposed skyline cable gravel delivery system and the following set of values were identified for the skyline cable gravel delivery system.

- Wildlife
- Recreational Use
- Air Quality
- Visual Impact
- Fish / Fish Habitat
- Birds in Flight
- Rock Bluff Ecosystems
- Slope Stability
- Public Health and Safety - Public Risk
- Archaeological

This detailed screen concluded that most of the identified interactions will have low environmental impacts and/or result in positive environmental impacts with significant fish habitat, social and economic benefits. Negative impacts and cumulative effects can be managed through impact mitigation measures during construction / operations and through project design and public information. This detailed assessment recommends that the project be approved.

This report has been prepared on behalf of the BC Conservation Foundation for the proposed Elk Falls Canyon Skyline Spawning Gravel Delivery System project. The assessment has been prepared in accordance with the policies and procedures outlined in the BC Parks Impact Assessment Manual and User Guide (April 1999).

Steve Toth, AScT. R.P.Bio.

Toth and Associates Environmental Services
Tel. (250) 390-7602

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF PHOTOGRAPHS

APPENDIXES

Introduction

The British Columbia Conservation Foundation (BCCF) is proposing the installation of a skyline cable spawning gravel delivery system in Elk Falls Canyon, downstream of the Rotary Club of Campbell River's suspension bridge and trails in the day use area of Elk Falls Provincial Park.

This project is proposed as an effective alternative to helicopter gravel placements in Elk Falls Canyon. The recent completion of the suspension bridge and trail system immediately upstream of the helicopter drop site has inhibited the continued use of a helicopter. A land based system will provide certainty to future placements and is expected to significantly lower the cost per unit of spawning gravel delivered to the river.

The majority of the access to the proposed skyline cable site is via the existing upgraded trails that lead to the suspension bridge and viewing platform with minimal new access trail and infrastructure footprint.

The project has support from A-Tleygay Fisheries Society, BC Parks, Campbell River Salmon Foundation, and Fisheries and Oceans Canada. The gravel placement project has been widely reported in local papers.

BC Parks has indicated that it supports BCCF funding applications for continued assessment, design, construction, and trial placements for this infrastructure in the park. This project has the potential to significantly restore and enhance fisheries related conservation and recreation values on the Campbell River.

BC Parks Staff has indicated that the proposed project warranted a more detailed evaluation (Level 2 screen) to be prepared by the proponent. This report constitutes the level 2 detailed screening assessment.

Scope of Detailed Screen Assessment

The scope of this assessment addresses those actions directly related to the project proposal. This includes the following primary components of the project:

- New access trail construction from the existing gravel trail to the skyline cable infrastructure footprint on the south side of the canyon;
- The skyline cable anchor site on the north side of the canyon; and,
- Access via existing trails to the gravel loading area on the south side of the canyon.

Project Area Description

Elk Falls Park has some of the finest year-round fishing, and is one of the most popular parks on Vancouver Island. It has an elaborate network of trails, picnic areas, a campground, and a stand of old growth Douglas fir, and is within 2 km of downtown Campbell River (BC Parks, 2010).

Access to the project area is from the new parking lot on BC Hydro Property to the west of the falls that connects with the project area via an overpass bridging the John Hart Dam penstock and connects to the Millennium Trail. The trail extends northeast from the Millennium trail along the top of a bank for approximately 120m to where a Skid-Steer trail will be constructed to deliver gravel to the new skyline cable infrastructure on the south side of the Elk Falls Canyon approximately 50 m east of the top of the stairways to the new Elk Falls Suspension Bridge (FIGURE 1).

The project site is located within a Young Forest stage second growth stand of coastal Douglas-fir, western hemlock and western redcedar representative of the eastern variant of the Coastal Western Hemlock Very Dry Maritime (CWHxm1) biogeoclimatic zone. The canyon walls consist of sparsely vegetated rock bluff and cliff ecosystem habitats that include warm and cool aspect bare rock walls, and areas where thin soils support extensive moss cover and sparse vascular plant vegetation.

Terrestrial Ecosystem Mapping covering the entire project area was prepared by Hemmera for an Environmental Assessment of BC Hydro's John Hart Generating Station Replacement Project (JHGSP) in 2012. The environmental assessment provides a comprehensive assessment and description of the biogeoclimatic, socio-economic, archaeological and cultural status and features of the JHGSP area, which includes the skyline cable project area.

Methodology

This level 2 detailed screening assessment has been conducted in accordance with the Level 2 Impact Assessment, Detailed Screen, policies and procedures outlined in the BC Parks Impact Assessment Manual and User Guide (April 1999).

In general, the impact assessment process involves the following steps:

1. Identification of Phases
2. Identification of Environmental and Social Values
3. Identification of Project Activities / Disturbances
4. Ranking Interactions between Activities/Disturbances and Values (Screening Matrix)
5. Identification of Potential Effects (Significance Matrix)
6. Ranking the Significance of Effects
7. Identifying Mitigation Opportunities (Cumulative Effects Screening Matrix)
8. Identification of Other Actions (Cumulative Effects Screening Matrix)
9. Identification of Other Effects (Cumulative Effects Screening Matrix)
10. Identification of Values
11. Ranking Interactions

The results of this assessment process are documented in the series of matrices contained in Appendix 2. Information required for the assessment was assembled from discussions with the proponent and review of the background information available / prepared for the project. This included the geotechnical report (Michael Cullen Geotechnical Ltd.) engineered design drawings (Herold Engineering), communications from BC Parks staff, background materials and project maps prepared by the proponent and for BC Parks, internet sources, and a field survey of the site.

The field survey of the site was conducted with BCCF on May 6, 2015 during which each of the components for the skyline cable location were reviewed and discussed. The field survey did not include an assessment of plant species below the lip of the canyon.

The Level 2 Impact Assessment report completed for the Rotary Club of Campbell River's suspension bridge (Econ Consulting, February 2014) and BC Hydro's Environmental Assessment of the John Hart Generating Station Replacement Project provided the background information and occurrence data for this screening report and made further research, field assessment and data collection unnecessary for the preparation of this report.

Description of Project Components

The following description of the project components are based on review of the project design, communication with BCCF and BC Parks staff and form the basis for the assessment of impacts and interactions in this assessment.

New access trail construction and skyline cable infrastructure footprint on the south side of the canyon

The new construction footprint of the project is calculated at approximately 250 m^2 and includes:

- 150 m^2 (3m wide x 50m long) for a Skid-Steer trail from the existing park trail to the gravel loading area at the south tower
- 100 m^2 (5m wide x 20m long) for the clearing area of the south tower, skyline cable and 3m x 4m concrete pad

The new access will involve construction of a narrow gravel surfaced excavated (cut+bench) Skid-Steer accessible road. Cross drains will be installed to maintain natural surface drainage and prevent trail erosion.

The clearing area of the south canyon skyline cable tower will include the installation of a concrete pad to support the skyline cable tower, a gravel loading area and clearing for the skyline cable to the lip of the canyon. A safety barrier fence will be installed around the tower and extend to lip of the canyon.

The skyline cable anchor site on the north side of the canyon,

The geotechnical assessment covered two possible locations for the north side cable anchors including: on top and set back from the crest of the rock bluff, and on the face of the bluff. Bedrock exposed at both locations is basalt considered to be of fair to good quality. An undercut slab is present just below the crest, if the bluff face location is selected this slab may need to be secured with rock bolts to make safe and protect the cable anchor. The cable anchors on top of the north bluff would involve:

- installing a minimum of 2 anchors set a minimum 2m apart with a minimum setback of 4m from the crest of the bluff (this setback may need to be adjusted once exact location is marked in field and moss removed). The vertical installation depth to be a minimum of 1.5m, with not less than 1m drilled into competent rock. Adjust depth if angled bolts are installed.

Access via existing trails to the gravel loading area on the south side of the canyon.
The width of the recently constructed trails associated with the Rotary Club's suspension bridge project took into consideration BCCF's potential need for motorized vehicle access to deliver gravel to the skyline cable gravel delivery system on the south side of the canyon. Little to no modifications are required for the existing trail access route.

Summary of Valued Components and Potential Impacts

The level 1 preliminary screen conducted by BC Parks for the Rotary Club's suspension bridge project identified the following broad values related to the project area:

- Wildlife
- Fisheries; Habitat
- Species at risk
- Ecosystems at risk
- Geologic phenomena
- Water quality
- Front country recreation
- Old growth structure (vets)
- Second-growth forest
- Viewscapes of Falls and Canyon
- Rock Bluff Ecosystems
- Wetland complex
- Aesthetics
- Economic
- Cultural/Spiritual
- First Nations
- Public safety
- Western-Hemlock, Douglas-fir - kindbergia SS5 and SS4 TEM polygons.
- Recreation
- Economic
- Public Health and Safety - Public Risk
- Archaeological
- Fish Habitat
- Slope Stability

The Level 2 Impact Assessment of the Rotary Club of Campbell River's suspension bridge (Econ Consulting, February 2014) selected the following valued components for the project:

Pillars	Level 1 Screening List	Level 2 Screening List
Environmental General Values: Soil Flora Fauna Water Ecosystem Function	Wildlife Fisheries; Habitat Species at risk Ecosystems at risk Geologic phenomena Water quality Western-Hemlock Douglas-fir-kindbergia SS5 and SS4 TEM polygons.	Old growth structure (vets) Second-growth forest Rock Bluff Ecosystems Wetland complex Slope Stability Fish Habitat
Economic	Front country recreation • Economic • Recreation	
Social	Front country recreation • Aesthetics • Recreation • Viewscapes of Falls and Canyon	
Heritage	Cultural/Spiritual • First Nations • Archaeological	
Health	Public safety	Public Health and Safety - Public Risk

The valued components identified for the Rotary Club's suspension bridge project were reviewed in context with BCCF's proposed skyline cable gravel delivery system and the following set of values were identified for the skyline cable gravel delivery system.

- Wildlife
- Recreational Use
- Air Quality
- Visual Impact
- Fish / Fish Habitat
- Birds in Flight
- Rock Bluff Ecosystems
- Slope Stability
- Public Health and Safety - Public Risk
- Archaeological

Conclusions and Recommendations

This level 2 detailed screen impact assessment concludes that the very small new construction and operational footprint of this project will cause minimal disturbance and physical, biological and environmental impact on the Park while providing significant social, cultural, economic and habitat enhancement benefits through continued spawning gravel delivery to the Elk Falls Canyon pool.

The assessment of impacts considered both the construction and operational stages of the project. The potential impacts were found to have low significance or were positive in nature. The most significant detrimental impacts were found to include:

- Potential impacts to aesthetic values due to construction of a section of new trail and skyline cable infrastructure on the south side of the canyon.
- Potential impacts on the CWHxm1 second growth forest within the project's new construction footprint area.

Some adverse impacts have been mitigated through design and appropriate low impact construction techniques, including:

- Construction will occur during favourable weather and dry soil conditions.
- Minimizing the required access footprint by selecting appropriate equipment, construction techniques and by managing access to the project site.
- Minimal project footprint within the sensitive rock bluff ecosystem.
- Designing and installing appropriate barrier systems and signage into the project design
- Designing a cable system that will hang from the north canyon wall when not in use to reduce the visual impact and potential for bird strike.

As the assessed adverse impacts on Elk Falls Provincial Park are very small compared to the positive benefits of the project, it is our recommendation that this project be approved as proposed.

Reference Material

- BC Parks Impact Assessment Process, Part 1, Policy, April 1999, Ministry of Environment, Lands and Parks, BC Parks, Parks and Ecological Reserves Management Branch

- BC Parks Impact Assessment Process, Part 2, Users Guide, April 1999, Ministry of Environment, Lands and Parks, BC Parks, Parks and Ecological Reserves Management Branch
- Guideline for the Selection of Valued Components and Assessment of Potential Effects, Environmental Assessment Office, Approved September 9, 2013
- Environmental Assessment, John Hart Generating Station Replacement Project, BC Hydro, Hemmera, March 2012
- Elk Falls Provincial Park Impact Assessment Level 2-Detailed Screen Report: Elk Falls Suspension Bridge Final – February 5, 2014. Prepared for The Rotary Club of Campbell River by Len Apedaile RPF, Econ Consulting.
- BC Species and Ecosystem Explorer website. BC Ministry of Environment. Searches for: Red and blue listed animal and plant species groups (incl vascular & non- vascular plants and lichens), occurring in the Campbell River Forest District, Strathcona Regional District, CWH biogeoclimatic zone, in Forest and Rock/Sparsely Vegetated Rock habitat types (incl Cliff and Rock/Sparsely Vegetated Rock habitat subtypes)
- BC Conservation Foundation grant application to BC Hydro's Coastal Fish and Wildlife Compensation Program for the Elk Falls Canyon Skyline Cable Gravel Delivery System
- Herold Engineering

Appendix 1: Maps

Figure 1. Part of Herold Engineering's Design Drawing - Plan

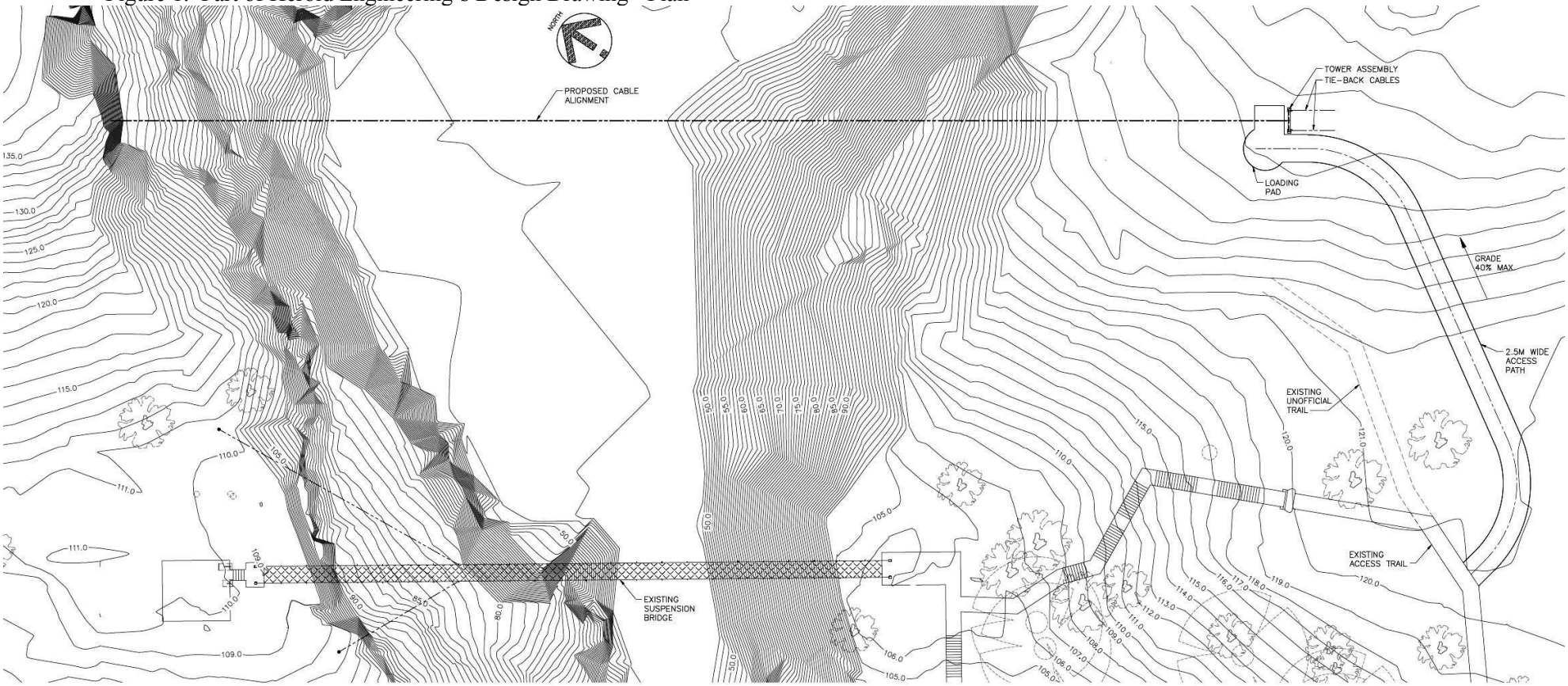
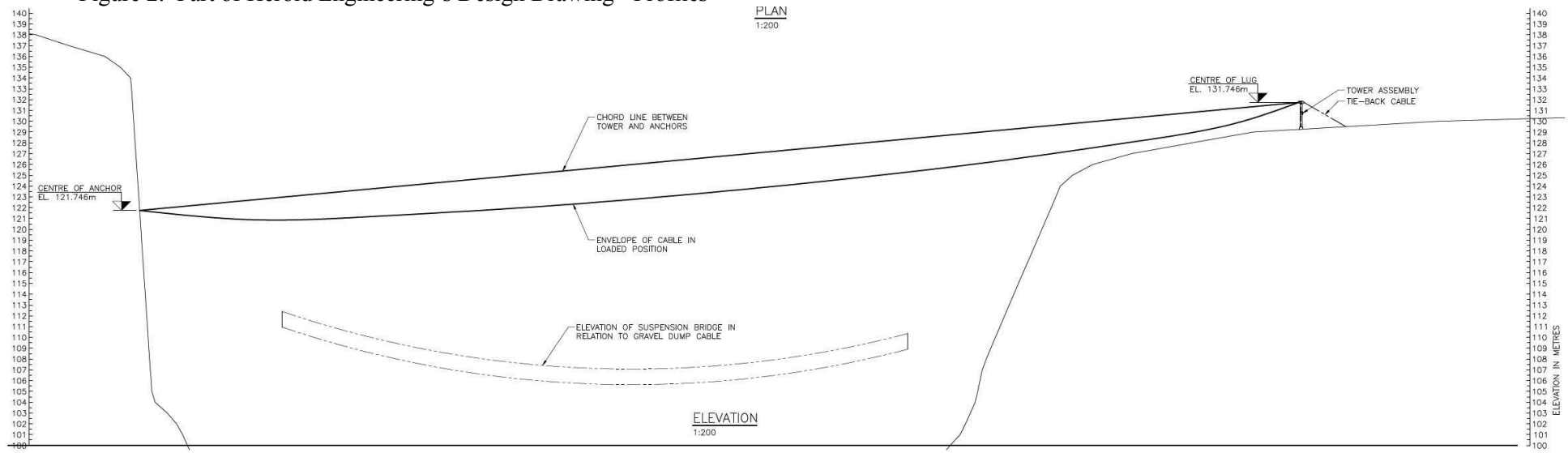


Figure 2. Part of Herold Engineering's Design Drawing - Profiles



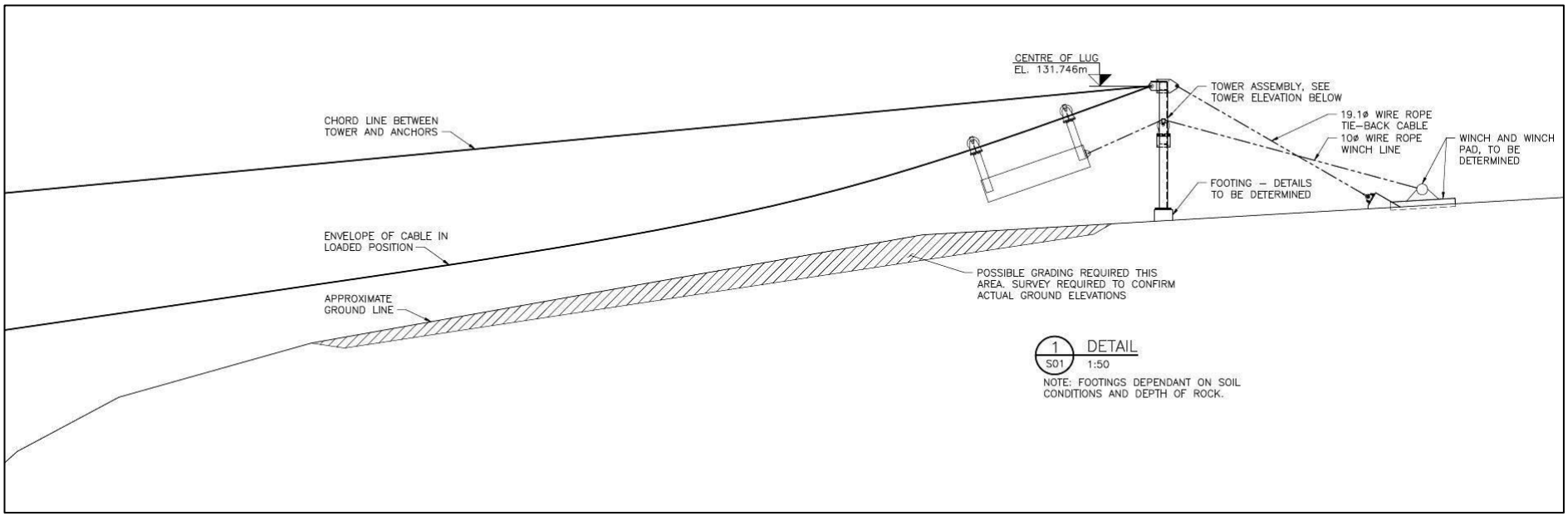
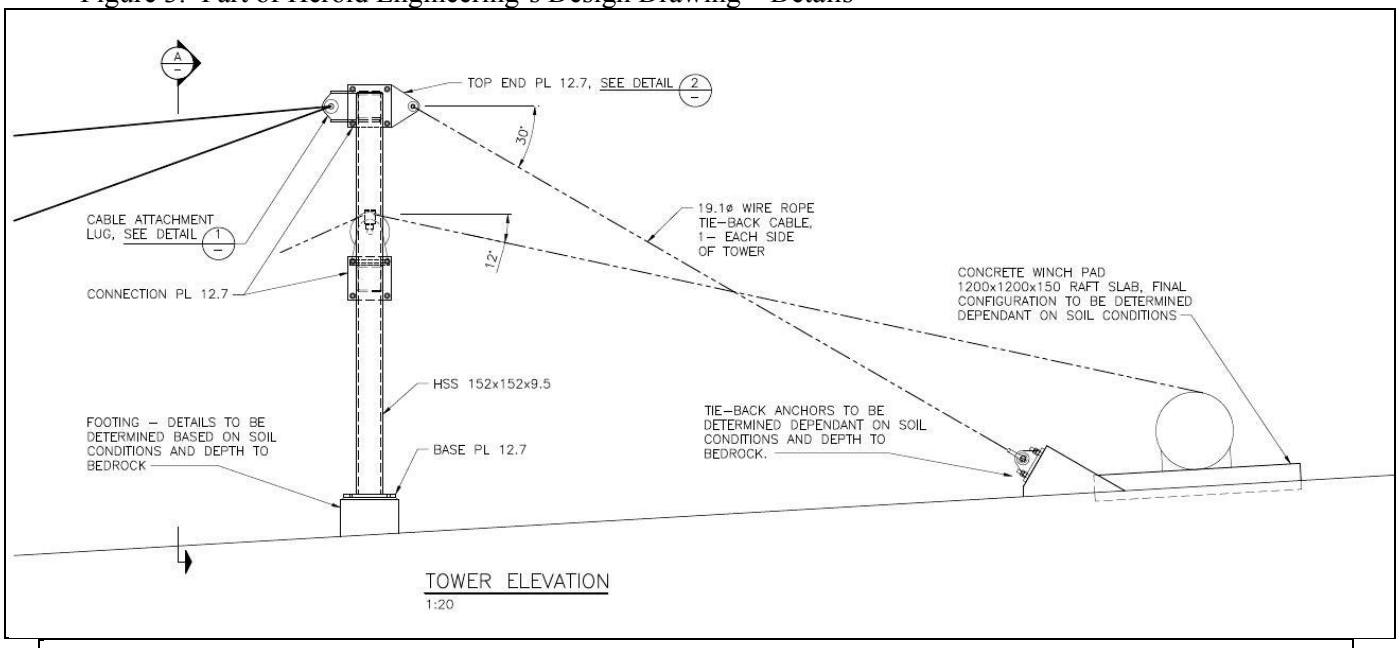


Figure 3. Part of Herold Engineering's Design Drawing – Details



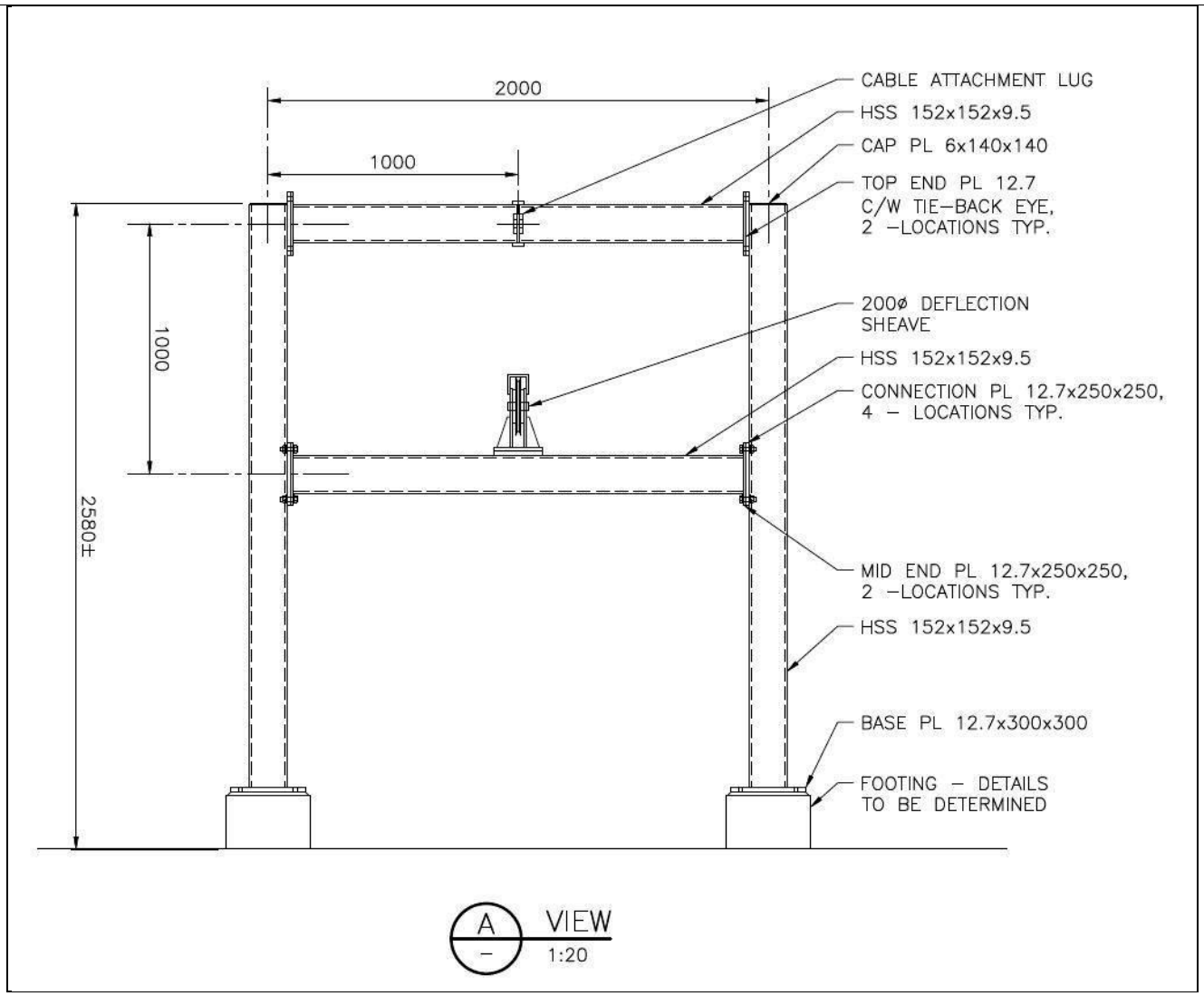
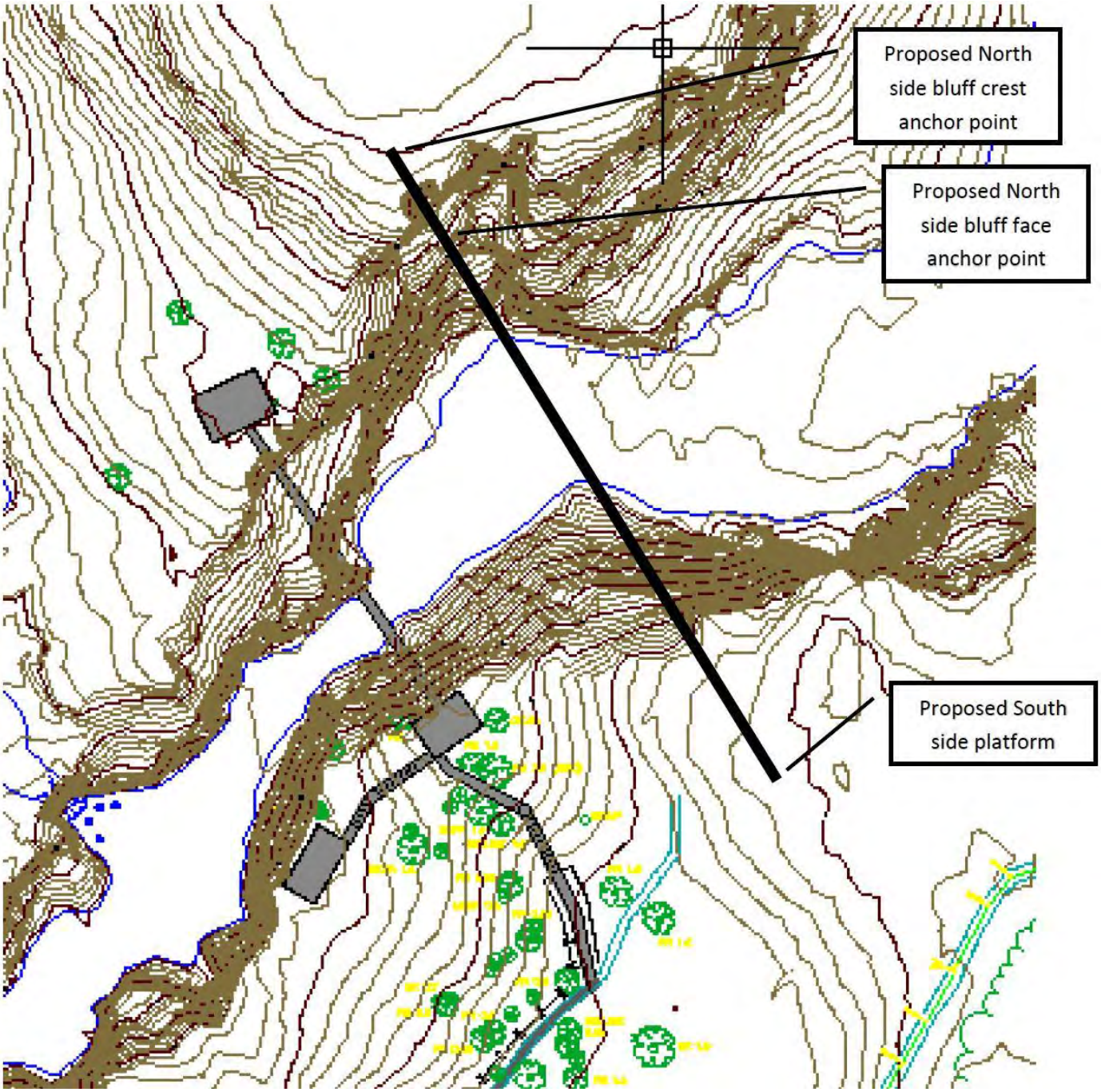


Figure 4. Design from Michael Cullen Geotechnical Ltd's report



Appendix 2: Level 2 Detailed Screening Matrices

File No.:

BC Parks Impact Assessment Process

Level 2, Detailed Screen Report: A. Screening Matrix

(See Users Guide, pp. 15 to 17)

Name of Action: **Elk Falls Canyon Spawning Gravel Delivery System**

Proponent: **British Columbia Conservation Foundation**

Review Date(s): **Page**: 1 of

Phase: Construction	**Values**									
	Wildlife	Recreational Use	Air Quality	Visual Impact	Fish / Fish Habitat	Birds in Flight	Rock Bluff Ecosystem	Slope Stability	Public Safety	Archaeological
Activity/Disturbance:										
Vegetation Removal	**L**	**M**[4, 5]		**M**[2]			**L**	**L**		
Soils Disturbance		**M**[4, 5]		**M**[2]			**L**	**L**		**L**
Machine Use / Presence	**L**	**M**[4, 5]	**L**	**M**[2]					**M**[4, 5]	
Accidental Spill	**L**	**L**			**L**[18]		**L**			
Skyline cable installation	**L**	**M**[4, 5]		**M**[2]	**H+**[1]	**M**[3]	**L**	**L**	**L**	

File No.: _____

BC Parks Impact Assessment Process

Level 2, Detailed Screen Report: A. Screening Matrix

(See Users Guide, pp. 15 to 17)

Name of Action: **Elk Falls Canyon Spawning Gravel Delivery System**

Proponent: **British Columbia Conservation Foundation**

Review Date(s): **Page**: 1 of

Phase: Operation	**Values**								
	Wildlife	Recreational Use	Air Quality	Visual Impact	Fish / Fish Habitat	Birds in Flight	Rock Bluff Ecosystem	Slope Stability	Public Safety
Activity/Disturbance:									
Machine Use / Presence	**L**	**M[4,5]**	**L**	**M[4,5]**					**M[4,5]**
Gravel delivery to Elk Falls Pool	**L**		**L**	**L**	**M[6]**	**M[3,7]**	**L**	**L**	

File No.:

BC Parks Impact Assessment Process

Level 2, Detailed Screen Report: B. Significance Matrix

(See Users Guide, pp. 18 to 20)

Name of Action: **Elk Falls Canyon Spawning Gravel Delivery System**

Proponent: **British Columbia Conservation Foundation**

Review Date (s): **Page:** of

Phase:	**Values**					
Construction	Visual Impact	Birds in flight	Fish / Fish Habitat	Public Safety	Recreational Use	
Interactions and Effects:						
Vegetation Removal						
• Reduced visual / aesthetic quality	**M[10]**				**M[10]**	
Soils Disturbance						
• Reduced visual / aesthetic quality	**M[13]**				**M[13]**	
Machine Use / Presence						
• Reduced visual / aesthetic quality • Machine / park users conflict	**M[11]**			**M[12]**	**M[11]**	
Skyline cable installation: • Positive effects of continued placement of spawning gravel • Construction related noise and activity, as well as skyline presence • Potential risk of birds / bats colliding with skyline	**M[9] - L**	**M[14]**	**H+[8]**		**M[9]**	

File No.:

BC Parks Impact Assessment Process

Level 2, Detailed Screen Report: B. Significance Matrix

(See Users Guide, pp. 18 to 20)

Name of Action: **Elk Falls Canyon Spawning Gravel Delivery System**

Proponent: **British Columbia Conservation Foundation**

Review Date (s): **Page:** of

Phase: Operation	**Values**				
	Visual Impact	Birds in flight	Fish / Fish Habitat	Public Safety	Recreational Use
Interactions and Effects:					
Machine Use / Presence:					
• Reduced visual / aesthetic quality • Machine / park users conflict	**M[15] - L**			**M[12]**	**M[15] - L**
Spawning gravel delivery:					
• Stress to fish caused by gravel dropped into water and localized temporary increase in turbidity • Potential for avian / skyline cable conflicts		**M[17] - L**	**M[16]**		

File No.: _____

BC Parks Impact Assessment Process
Level 2, Detailed Screen Report:
C. Cumulative Effects Screening Matrix

(See Users Guide, pp. 21 to 23)

Name of Action: **Elk Falls Canyon Spawning Gravel Delivery System**
Proponent: **British Columbia Conservation Foundation (BCCF)**
Review Date(s): _____ **Page:** _____ of _____

Effects Due to Action Under Review	**Other Actions**				
	Skyline cable gravel delivery system construction	Elk Falls Park suspension bridge and trails expansion	BC Hydro John Hart Generation upgrades		
Value: Wildlife					
Sensory Disturbance	L	L	L		
Contaminant Transport		L	L		
Habitat Loss and Fragmentation	L	L	L		
Viewshed Degradation		L	L		
Experiential Degradation		L	L		
Other:					
Value: Recreational use					
Sensory Disturbance	L	L	L		
Contaminant Transport	L	L	L		
Habitat Loss and Fragmentation		L	L		
Viewshed Degradation	L	L	L		
Experiential Degradation	L	L	L		
Other:					
Value: Air quality					
Sensory Disturbance		L	L		
Contaminant Transport	L	L	L		
Habitat Loss and Fragmentation		L	L		
Viewshed Degradation			L		
Experiential Degradation	L		L		
Other:					
Value: Visual impact					
Sensory Disturbance	L	L	L		
Contaminant Transport		L			
Habitat Loss and Fragmentation	L	L			

Viewshed Degradation	L	L	L		
Experiential Degradation	L	L	L		
Other:					
Value: Fish					
Sensory Disturbance	L	L	L		
Contaminant Transport		L	L		
Habitat Loss and Fragmentation			L		
Viewshed Degradation			L		
Experiential Degradation			L		
Other:					
Value: Birds					
Sensory Disturbance	L	L	L		
Contaminant Transport			L		
Habitat Loss and Fragmentation	L	L	L		
Viewshed Degradation			L		
Experiential Degradation		L	L		
Other:					

File No.: _____

BC Parks Impact Assessment Process
Level 2, Detailed Screen Report: D. Audit Record

(See Users Guide, pp. 14)

Name of Action: **Elk Falls Canyon Spawning Gravel Delivery System**
Proponent: **British Columbia Conservation Foundation**
Review Date(s): _____ **Page:** of

Audit #	Assumptions, Evidence, Data, Rationale	Data Source	Reliability of Data*
1	This project is designed to provide an effective alternative to helicopter gravel placements in Elk Falls Canyon. The recent construction of a suspension bridge near the helicopter drop site has inhibited the potential to use a helicopter. A land based system will provide certainty to future placements and will significantly lower the cost per unit of spawning gravel delivered to the river, while continuing to provide increased spawning success rates and associated recreational and socio-economic benefits Prior to 1999, spawning gravel in the Elk Falls canyon was extremely limited, with only a few small, isolated gravel patches. The BC Conservation Foundation has installed washed 6 inch minus spawning gravel in the tail-out of the Elk Falls pool (Gaboury 2000) in July of 1999, 2002, 2004, 2005, and 2008.	BCCF submission to BC Hydro's FWC program	Good
2	Based on the survey plan prepared by Herold Engineering and the field assessment, construction of the new access trail and the skyline cable crossing site will require removal of approximately 250 m^2 of vegetation, including shrub and herb layer and approximately 12 trees < 45 cm diameter. Construction of the skyline will involve installation of a concrete pad approximately 3 m x 4 m, on which will be constructed a metal tower support for the Skyline/winch system. The location of the new infrastructure will be on the south side of the Elk Falls Canyon approximately 50 m east of the top of the stairway to the new Elk Falls Suspension Bridge. The Skyline will run from the South Tower across Elk Falls Canyon and will be fastened to the North Canyon wall using 3 m rock anchors. Visual impacts related to the disturbance caused by construction associated with the skyline cable crossing are expected to result in reduced quality of recreational experience amongst some park users.	Herold Engineering Professional Knowledge	Good
3,7	Installation of the skyline has the potential to result in birds in flight colliding with the cables. When not in use the 18 mm skyline will be detached from the south tower and will hang from the north canyon wall so as to not obstruct any views from the new bridge or viewing platforms. To mitigate the risk of bird strikes during skyline operation we recommend that bird deflectors be mounted to the skyline cable system.	Professional Knowledge	Good
4,5	Machinery working at the site during construction and operations is expected to result in visual impacts and detraction from recreational experience for some park users. Operation of machinery on park trail systems also creates a risk to public safety. To mitigate the risk to public safety we recommend that barriers, signage, two-way radios and flag persons / spotters be used to control foot traffic and guide machinery during construction and operation activities.	Professional Knowledge	Good
6	Delivery of gravel to the river via the skyline cable system is expected to result in some increased level of stress to fish caused by gravel drop, the severity of which will be largely dependent upon project timing. Minor siltation is expected to occur during placement of the spawning gravels in the Elk Falls Canyon pool. The increased	Professional Knowledge	Good

	turbidity will dissipate quickly and be of a short duration. To mitigate turbidity, gravel will be pre-washed prior to arrival at the site.		
8	A land based system will significantly lower the cost per unit of spawning gravel delivered to the river, while continuing to provide increased spawning success rates and associated recreational and socio-economic benefits	BCCF submission to BC Hydro's FWC program	Good
9	Work in 2015 will include installing the anchor points for the "sky-line" on which the gravel bucket will ride, and completing structural design of the gravel loading/conveyance system. Activities in 2015 will also include installation and testing of the full gravel delivery system. While the presence of machinery and work crews is expected to result in an overall detraction in some park user's recreational and visual experience the proposed timeline for construction is brief at 1 – 2 weeks duration. With park user's that access the park on a frequent or daily basis the rate of detraction is expected to decrease over time with increased familiarity and understanding of the project.	BCCF submission to BC Hydro's FWC program Professional Knowledge	Good
10	The removal of approximately 250 m^2 of vegetation, including shrub and herb layer and approximately 12 trees < 45 cm diameter for the creation of the Skid-Steer access trail and skyline cable infrastructure on the south side of the Elk Falls Canyon is expected to result in some visual impact and decreased recreational experience. Signage posted on site informing park users of the purpose of the project would likely mitigate negative impressions. Removal of some tree cover within the project's footprint will result in an increased growth response from shrub and herb layer vegetation following construction of the project.	Professional Knowledge	Good
11	The noise and disturbance caused by machinery within the park is expected to result in a minor detraction from a visual impact / recreational use perspective.	Professional Knowledge	Good
12	The operation of machinery will be limited to the trail from the parking lot to the proposed skyline cable site on the south side of the canyon. Operation of machinery on park trail systems also creates a risk to public safety. To mitigate the risk to public safety we recommend that barriers, signage, two-way radios and flag persons / spotters be used to control foot traffic and guide machinery during construction and operation activities.	Professional Knowledge	Good
13	Soils disturbance resulting from the construction of the Skid-Steer trail and skyline infrastructure on the south side of the canyon is expected to result in minimal detraction for some park users from the expected recreational and visual experience. The area of soils disturbance is small and the visible aspect of the works will be of short duration.	Professional Knowledge	Good
14	There is some risk associated with the skyline cable installation and initial testing that the cable will pose a risk to birds and bats in flight. In order to mitigate the risk we recommend that that bird deflectors be mounted to the skyline cable system prior to installation.	Professional Knowledge	Good
15	Operation of the skyline cable to deposit spawning gravel in the tail-out of the Elk Falls Canyon Pool is expected to detract from the expected recreational and visual experience of some park users, while attracting others to the site to view the spawning gravel placement activities. The skyline will only be in operation for approximately < 1 week/year.	Professional Knowledge	Good
16	Delivery of spawning gravel to the Elk Falls Canyon Pool via the skyline cable system is expected to result in some increased level of stress to fish caused by gravel drop, the severity of which will be largely dependent upon project timing. Minor siltation is expected to occur during placement of the spawning gravels. The increased turbidity	Professional Knowledge	Good

	levels will dissipate quickly and be of a short duration. To mitigate turbidity, gravel will be pre-washed prior to arrival at the site.		
17	Installation of the skyline has the potential to result in birds in flight colliding with the cables. When not in use the 18 mm skyline will be detached from the south tower and will hang from the north canyon wall so as to not obstruct any views from the new bridge or viewing platforms. To mitigate the risk of bird strikes during skyline operation we recommend that bird deflectors be mounted to the skyline cable system.	Professional Knowledge	Good
18	Implementation of best management practices for spill prevention and response through regular equipment maintenance, vegetable based hydraulic fluids, and ensuring appropriate emergency spill response kits are on site will reduce the potential risk of environmental impacts in the event of a contaminant spill.	Professional Knowledge	Good

* Data judged to be good, fair, poor or unknown.

File No.: _____

BC Parks Impact Assessment Process
Level 2, Detailed Screen Report: E. Decision Statement

(See Users Guide, pp. 23 to 25)

Name of Action: _____
Proponent: _____
Review Date(s): _____
Lead Assessor: _____ **Page:** of

Summary

Positive Effects	**Adverse Effects**

Decision:
- ☐ Approve as proposed
- ☐ Approve with stated minor amendments
  - ☐ Major amendment(s) required to application, go back to Level 2, Detailed Screen
- ☐ Action warrants more detailed evaluation, go to Level 3, Full Impact Assessment Report
- ☐ Action rejected

Comments

Rationale for Decision (include any direction for Level 3):

Recommended Mitigation:

Other Terms and Conditions of Approval:

Decision reviewed by:

Title	Name	Comment
Title	Name	Comment
Title	Name	Comment
Title	Name	Comment

Approved by Regional Manager: _____

Date: _____

Appendix 3: Site Photographs

Photograph 1. View from the proposed Skid-Steer trail to the end of the existing gravel park trail.

Photograph 2. View from existing park trail to skyline cable site with approximate Skid-Steer trail.

Photograph 3. View from the start of the Skid-Steer trail to existing gravel park trail access route.

Photograph 4. View of vegetation at the skyline cable site on the south side of the canyon.

BRITISH COLUMBIA | Ministry of Environment

PARK USE PERMIT

LAND USE / OCCUPANCY

This Park Use Permit No. **105443** (the "Permit") is issued under the authority of the *Park Act*	(the "Park") **See "Management Plan Schedule, Permit Area Description" for a complete list of Parks and Protected Areas**

FROM:
HER MAJESTY THE QUEEN IN RIGHT OF THE PROVINCE OF BRITISH COLUMBIA, represented by the Minister responsible for the *Park Act* (the "Province") at the following address:

Ministry of Environment
BC Parks
West Coast Region
Central Coast/North Island
2080-A Labieux Road
Nanaimo BC V9T 6J9

TO:

The British Columbia Conservation Foundation

(the "Permittee") at the following address:

#3 - 1200 Princess Royal Avenue
Nanaimo BC V9S 3Z7

THE PROVINCE AND THE PERMITTEE AGREE AS FOLLOWS:

ARTICLE I - GRANT OF PERMIT

1.01 The Province, on the terms and conditions of this Permit, grants to the Permittee permission to enter upon and use that part of the Park (the "Permit Area") described, and for the purposes described, in the Management Plan Schedule.

ARTICLE II - TERM

2.01 The duration of this Permit is for a term of **10 years** commencing on **June 1, 2011** (the "Commencement Date") and ending on **May 31, 2021** (the "Expiration Date"), unless cancelled, terminated or renewed in accordance with the terms and conditions of this Permit.

ARTICLE III - FEES

3.01 The Permittee must pay to the Province a minimum fee (the "Permit Fee") of **$0.00 (plus applicable taxes)** prior to Commencement date and on each anniversary of the commencement date during the term of this Permit.

3.02 The Province may, by notice to the Permittee not less than 30 days prior to each anniversary of the Commencement Date, increase the Permit Fee to an amount solely determined by the Province at its discretion, and the Permittee must pay the increased amount.

3.03 The Permittee must pay interest to the Province on money payable by the Permittee and owing to the Province under this Permit, at the rate of interest prescribed by the *Financial Administration Act* in respect of money owing to the Province, which interest will be calculated from the date that the money becomes payable to the Province.

ARTICLE IV - INDEMNITY

4.01 The Permittee will indemnify and save harmless the Province, its servants, employees and agents against all losses, claims, damages, actions, costs and expenses that the Province, its servants, employees and agents may sustain, incur, suffer or be put to at any time arising, directly or indirectly, from any act or omission of the Permittee, its employees, agents, contractors and licensees under this Permit, except for any liability arising from any independent, negligent act of the Province.

ARTICLE V – SECURITY AND INSURANCE

5.01 On the Commencement Date, you will deliver to us Security in the amount of **$0.00** which will:

(a) guarantee the performance of your obligations under this Permit;

(b) be in the form required by us; and

(c) remain in effect until we certify, in writing, that you have fully performed your obligations under this Permit.

5.02 Despite section 5.01, your obligations under that section are suspended for so long as you maintain in good standing other security acceptable to us to guarantee the performance of your obligations under this Permit and all other Dispositions held by you.

5.03 We may use the Security for the payment of any costs and expenses incurred by us to perform any of your obligations under this Permit that are not performed by you and, if such event occurs, you will, within 30 days of that event, deliver further Security to us in an amount equal to the amount drawn down by us.

5.04 After we certify, in writing, that you have fully performed your obligations under this Permit, we will return to you the Security maintained under section 5.01, less all amounts drawn down by us under section 5.03.

5.05 You acknowledge that we may, from time to time, notify you to

(a) change the form or amount of the Security; and

(b) provide and maintain another form of Security in replacement of or in addition to the Security posted by you under this Permit;

and you will, within 60 days of receiving such notice, deliver to us written confirmation that the change has been made or the replacement or additional form of Security has been provided by you.

5.06 You must

(a) without limiting your obligations or liabilities under this Permit, at your expense, effect and keep in force during the Term the following insurance with insurers licensed to do business in Canada:

(i) **Commercial General Liability** insurance in an amount of not less than two million dollars **($2,000,000) inclusive per occurrence** insuring against liability for personal injury, bodily injury (including death) and property damage, including coverage for all accidents or occurrences on the Permit Area or any improvements. Such policy will include cross liability, liability assumed under contract, provision to provide 30 days advance notice to us of material change or cancellation, and include us as an additional insured.

(b) ensure that all insurance required to be maintained by you under this Permit is primary and does not require the sharing of any loss by any of our insurers;

(c) within 10 working days of the Commencement Date of this Permit, provide to us evidence of all required insurance in the form of a completed "Province of British Columbia Certificate of Insurance";

(d) if the required insurance policy or policies expire or are cancelled before the end of the Term of this Permit, provide within 10 working days of the cancellation or expiration, evidence of new or renewal policy or policies of all required insurance in the form of a completed "Province of British Columbia Certificate of Insurance";

(e) notwithstanding subsections (c) or (d) above, if requested by us, provide to us certified copies of the required insurance policies to be maintained by you under this Permit.

5.07 We may, acting reasonably, from time to time, require you to

(a) change the amount of insurance set out in subsection 5.06(a); and

(b) provide and maintain another type or types of insurance in replacement of or in addition to the insurance previously required to be maintained by you under this Permit;

and you will, within 60 days of receiving such notice, cause the amounts and types to be changed and deliver to us a completed "Province of British Columbia Certificate of Insurance" for all insurance then required to be maintained by you under this Permit.

5.08 You shall provide, maintain, and pay for any additional insurance which you are required by law to carry, or which you consider necessary to insure risks not otherwise covered by the insurance specified in this Permit in your sole discretion.

5.09 You waive all rights of recourse against us with regard to damage to your own property.

ARTICLE VI - COVENANTS OF THE PERMITTEE

6.01 The Permittee must:

(a) pay the Permit Fee and other money payable under this Permit when due at the address of the Province first written above or at such place as the Province may specify from time to time;

(b) pay when due all taxes, levies, charges and assessments that relate to operations of the Permittee under this Permit;

(c) comply with all laws, bylaws, orders, directions, ordinances and regulations of any competent governmental authority in any way affecting the Permit Area, the Park, its use and occupation or the Permittee's operations under this Permit;

(d) advise its employees, contractors, licensees, and agents of the laws and regulations respecting provincial parks and recreation areas and the conditions of this Permit respecting conduct in the permit Area;

(e) keep the Permit Area in a safe, clean and sanitary condition to the satisfaction of the Province and make safe, clean and sanitary any portion of the Permit Area that the Province may direct by notice in writing to the Permittee;

(f) remove from the Permit Area and the Park all garbage, debris and effluent resulting from its use of the Park and Permit Area under this Permit, except as otherwise permitted in the Management Plan Schedule;

(g) comply with all orders and directions made, verbally or in writing, by a park officer (as defined in the *Park Act*) relating to the Park, this Permit or the Permit Area;

(h) not construct, erect, place, repair, maintain or alter any building, fixture, equipment, structure or improvement in the Permit Area except as may be permitted by this Permit or with the prior written consent of the Province;

(i) take all reasonable precautions to prevent and suppress fires in the Permit Area;

(j) not interfere with free public access through, across and upon the Permit Area, unless otherwise specified in the Management Plan Schedule;

(k) not interfere with or disrupt the activities and operations of other Permittee's or users in the Park;

(l) use and occupy the Permit Area only in accordance with the provisions of this Permit;

(m) not remove, destroy, damage, disturb or exploit any natural resource (as that term is defined in the *Park Act*) or any archaeological or cultural artefact found in or on the Permit Area except as may be permitted by this Permit, and only then in accordance with the *Park Act* and all other applicable laws;

(n) not commit or allow any wilful or voluntary waste, damage or destruction in or upon the Permit Area;

(o) pay for or repair, as determined by the Province, any damage caused to the property of the Province by the Permittee, its employees, agents, contractors, or licensees;

(p) upon the expiration, cancellation or termination of this Permit:

(i) peaceably quit and deliver up possession of the Permit Area to the Province,

(ii) remove all chattels and improvements of the Permittee from the Permit Area within 30 days of the expiration, cancellation or sooner termination of this Permit, unless otherwise advised in writing, by the Province,

(iii) deliver to the Province possession of all equipment, furnishings, fixtures, chattels and improvements owned by the Province in a state of good repair and working order, and

(iv) restore the Permit Area to the satisfaction of the Province;

(v) and to the extent necessary, this covenant will survive the expiration, cancellation or termination of this Permit; and

(q) comply with all provisions of the schedules to this Permit.

ARTICLE VII - RIGHTS OF THE PROVINCE

7.01 The Province retains all rights in respect of the Park and Permit Area which are not expressly granted to the Permittee under this permit, including, without limitation:

(a) the right at all times for the Province, its authorized representatives, employees, and agents to have unimpeded access over and along all portions of the Permit Area and to inspect any portions of the Permit Area;

(b) the right at all times to construct, repair, alter and maintain buildings, equipment, structures and improvements upon the Permit Area; and

(c) the right to grant further rights in respect of the Park and Permit Area, provided that such rights do not unreasonably impede, obstruct or compete with the rights of the Permittee under this Permit.

ARTICLE VIII - NOTICE

8.01 Any notice required to be given by either party to the other will be deemed to be given if it is in writing and is delivered by hand or prepaid registered mail to the address first written above or any other address that may be specified in writing by a party and a notice will be deemed to be delivered, if mailed, eight days after the time of mailing except, in the case of a postal interruption, actual receipt is required.

8.02 Notwithstanding section 8.01, any written notice to be given by the Province to the Permittee under this Permit will be effectively given if it is posted in a conspicuous place on the Permit Area.

ARTICLE IX - RENEWAL

9.01 Not later than 140 days prior to the Expiration Date, the Permittee may, by notice in writing delivered to the Province, apply to the Province for a renewal of this Permit.

9.02 Provided that the Permittee is not in default under this Permit and subject to the terms of the *Park Act*, the Province may renew this Permit upon the terms and conditions determined by the Province.

9.03 The Permittee acknowledges that nothing in this Permit obligates the Province to renew this Permit and the Province's decision in that respect is entirely within its discretion

ARTICLE X - TRANSFER

10.01 The Permittee must not assign, transfer, sublicence or grant any of the rights or privileges granted by this Permit without the prior written consent of, and on the terms and conditions determined by, the Province.

10.02 If the Permittee is a corporation then a change in the control (as that term is defined in subsection 2(3) of the *Business Corporations Act*) of the Permittee without the prior written consent of the Province is deemed to be a breach of section 10.01.

ARTICLE XI - CANCELLATION

11.01 In the event that

(a) the Permittee defaults in the payment of the Permit Fee or other money payable under this Permit, and the default continues for 7 days after the giving of written notice of the default by the Province to the Permittee;

(b) the Permittee fails to perform or observe any of the terms or conditions of this Permit, other than the payment of money, and the failure is not remedied within a period specified by the Province;

(c) the Permittee has wilfully misrepresented information:

(I) on the application form which led to the granting of this Permit, or

(ii) required to be provided under the terms and conditions of this Permit;

(d) the Permit Area is damaged or destroyed by any cause whatsoever;

(e) the Park is closed by the Province;

(f) the Permittee files a petition in bankruptcy, is adjudged bankrupt, is petitioned into bankruptcy, makes an assignment for the benefit of its creditors, becomes insolvent or takes the benefit or protection of any statute for bankrupt or insolvent debtors;

(g) any of the Permittee's assets is seized in execution from the Permit Area;

(h) the Permittee, its employees, agents, contractors or licensees performs any act which in the opinion of the Province, affects the good standing or reputation of the Park, or adversely affects any other permit holder or park user within the Park;

the Province may cancel this Permit immediately by written notice to the Permittee.

11.02 In the event that the Permittee and the Province mutually agree in writing to terminate this Permit, the parties will be released and discharged from their obligations under this Permit, except as otherwise provided in this Permit.

11.03 The obligation of the Permittee

(a) to pay the Permit Fee and other money payable under this Permit; and

(b) to comply with Sections 4.01, 6.01(e), 6.01(o) and 6.01(p);

will survive the expiration, cancellation or termination of this Permit.

11.04 The Permittee will not be entitled to any compensation from the Province, in damages or otherwise, in respect of a cancellation or termination of this Permit.

ARTICLE XII - MISCELLANEOUS

12.01 This Permit may be inspected by the public at such times and at such places as the Province may determine.

12.02 Time is of the essence in this Permit.

12.03 Nothing in this Permit will be considered to have been waived by the Province unless such waiver is in writing.

12.04 During the term of this Permit, the Permittee will be an independent contractor and not the agent, employee or partner of the Province.

12.05 The Province will not be liable for any loss, damage, cost or expense resulting from the destruction of or damage to the Permittee's property or a disruption of the Permittee's operations under this Permit which result from strikes, flooding or other acts of God, vandalism, or any other interference to the Permittee's operation or property.

ARTICLE XIII- INTERPRETATION

13.01 In this Permit, unless the context otherwise requires, the singular includes the plural and the masculine includes the feminine, a corporation and body politic.

13.02 The captions and headings contained in the Permit are for convenience only and are not to be construed as defining or in any way limiting the scope or intent of the provisions of this Permit.

13.03 In this Permit, a reference to an enactment of the Province of British Columbia or of Canada includes a reference to any subsequent enactment of like effect, and unless the context otherwise requires, all statutes referred to in this Permit are enactments of the Province of British Columbia.

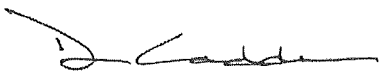
13.04 If any part of this Permit is found to be illegal or unenforceable, that part will be considered separate and severable and the remaining parts will be enforceable to the fullest extent permitted by law.

13.05 If all or part of the Permit Area is in a recreation area established or continued under the *Park Act*, this Permit is deemed to be a resource use permit as that term is defined in the *Park Act*.

13.06 All schedules to this Permit form an integral part of this Permit.

IN WITNESS WHEREOF the parties have duly executed this Permit.

SIGNED and **DELIVERED** on behalf of the **Province** by a duly authorized representative of the Province.



Duly Authorized Representative

Don Cadden
Print Name

Regional Director
Print Title

February 15, 2016
Date

MANAGEMENT PLAN SCHEDULE

PERMIT AREA DESCRIPTION

The Permittee is authorized to enter the Permit Area described below and outlined on the attached maps and drawings.

- **Elk Falls Park**

FEE(s)

Protected Land: **Elk Falls Park**

Activities: Restoration Project/Habitat Enhancement
Purpose: Access - The use of a defined area for a road, chairlift, trail, ski run or ski trail - Individual or group - Non industrial use. Fee charged for this purpose is for each protected land.
Fee Description: $500 or $60 per hectare, whichever is greater
Schedule K Ref: Part 3, Column 2, Item 3(a)

Fees:

Item	Number	Rate	Total
Minimum Base Fee	1	$0.00	$0.00

Sub Total (based on Fee Description above): $0.00

Sub Total: **$0.00**

Minimum Fee Required: **$0.00**
(plus applicable taxes)

Note: As per the *Park, Conservancy and Recreation Area Regulation*, Division 8 – Fees , section 53(6), no annual permit fee for this permit is payable for a non-profit organization as defined in the Regulation (e.g. the use or activity is of demonstrable benefit to the whole community and is consistent with the approved objectives of the park or protected area).

SPECIAL PROVISIONS

1. Purpose

This Permit is issued to the Permittee for the purpose of **instream fisheries habitat restoration and monitoring**, activities:

- Constructing, operating and maintaining an overland skid steer access trail, metal tower, cable system, anchoring points, fences, public control structures, and interpretive signs, for the purposes of transporting and placing critical spawning gravel into the Campbell River below Elk Falls at the Upper Canyon Pool.
- Ongoing annual fisheries related spawning gravel placement activities on the Campbell River locations in Elk Falls Park.
- Ongoing annual fisheries related spawning gravel placement activities using helicopter operations on the Campbell River in the canyon reaches in Elk Falls Park.
- Annual river swims and surveys in Elk Falls Park.

2. Permittee Designated Representative

The Permittee appoints the following representative to be responsible for liaison between BC Parks and the Permittee:

Name: Jeramy Damborg – British Columbia Conservation Foundation
Address: PO Box 7
#1 7217 Lantzville Road, Lantzville BC V0R 2H0
Telephone: 250 390 2525 Ext. 226
Email: jdamborg@bccf.com

3. BC Parks Contact Information

The Designated Representative must contact the Area Supervisor with any requirements or questions regarding this Park Use Permit. To determine the Area Supervisor responsible for the protected land(s) listed below, contact the associated regional office for this information.

Park, Protected Area or Conservancy Name	Contact Information
Elk Falls Park	Ministry of Environment, BC Parks West Coast Region Central Coast/North Island 2080-A Labieux Road Nanaimo BC V9T 6J9 *Regional Office:* (250) 751-3100 *Fax:* (250) 751-3103

4. Approved Construction Activities

The Permittee will be responsible for the construction of the facilities and structures as listed below and in accordance with the Permit locations and facility drawings attached in "*Schedule 1*" at the Elk Falls canyon, downstream from the suspension bridge site.

Cableway Structures and Associated Facilities

(a) **Access Location**

(i) A 40m.long x 2.5m wide Skid-Steer access trail finished with clean road base (6" minus crush) sloped to facilitate drainage. To include required ditch-work as per attached detail.

(ii) Approximately 30 meters of park standard fencing to match existing fence and control public access.

(iii) A BC Parks standard sign structure with project communication and education, regulatory information to advise public of unauthorized entry, safety etc.

(iv) A 4"x4" post and board assembly tied into the fence structure which will be removed for each gravel placement project.

(v) Minor modifications to widen existing trail features and curbs to accommodate skid steer access.

(b) **South Location – Steel tower and gravel pad facility**

(i) 3m.x 4m. gravel pad with bolt anchors and a 2.4 m. tall steel tower painted *Metro Brown.* As Per Drawing S03 attached in Schedule 1

(ii) A path cleared of taller vegetation for remote gravel bucket access along cable way, which may include shallow excavation approximately 0.3 m. deep 3 m. long, as per detail in Drawing S02.

(iii) Two tie back anchor points, and two 1m. x 1m. concrete footings for tower base. One 1.6 x1.6 m concrete pad for temporary installation of winch.

(c) **North Location – Cable system and anchors**

(i) Located as Per Herold Engineering Drawing S02, attached in Schedule 1

(ii) 120 m. long 18 mm. cable skyline that will require deactivation upon the completion of each gravel placement program.

(iii) One anchor installed between minimum 2.5 m. long anchor drilled and grouted on north canyon wall.

5. Construction Environmental Management and Restoration Plan

(a) The Permittee must submit a Construction Environmental Management and Restoration Plan to be approved by the BC Parks Area Supervisor. This plan must address all of the specific mitigation activities planned to reduce impacts on the Park, and plans to restore impacted areas using appropriate native species, coarse woody debris and naturalizing the areas affected. Works shall also include English Holly removal using best management practices and disposal from the project site if encountered.

(b) An area Restoration Plan will include restoring impacted areas with planted native vegetation (planting prescription will be submitted to and approved by BC Parks Area Supervisor) and if Park users are using new facilities for shortcutting, the restoration plan will include methods to address these concerns in the Permit Area. This plan will be developed and implemented by Toth and Associates during the construction phase. Best Management Practices for reducing the likelihood of introducing invasive plants and invasive plant materials (through equipment and materials brought into Park area) must be strictly adhered to:
http://www.env.gov.bc.ca/bcparks/conserve/bcparks-ip-guide.pdf.

6. Environmental Monitor

A qualified Environmental Monitor must be on site during construction and restoration activities.

7. Public / Park Communications

The Permittee must submit a local media release to communicate the project and the project construction activities and advise of any short term trail interruptions or closures through construction. The posting of on-site signs will also be required before and during construction activities.

8. Signs

A Park interpretive sign and any Permit Area control / safety / environment/ regulatory signs required must be provided and maintained by the Permittee on suitable mounting structure(s). Interpretive signs will showcase the nature of the project, fish species, and canyon habitat at appropriate nearby location/s. All signs must conform to BC Parks standards and guidance where required and be approved by the BC Parks Area Supervisor.

9. Gravel Placement Operations - Annual Operating Plans

The Permittee must submit an annual operating plan before May 1st of each year that outlines proposals and timing for each gravel placement season. This plan must include all of the Permittees operating and facility maintenance plans for the year and may include measures for specific Permit Area management identified by BC Parks. This plan must be approved by the BC Parks Area Supervisor and be inclusive of;

(a) **Annual Maintenance Plan:** Proposed for any physical works planned to operate and maintain all permitted structures and implement annual gravel placement in the Park. All to be complete in a manner that is safe and functional for permitted use and Park visitors. Works may include hazard tree evaluation and removal.

(b) **Public Safety and Control Measures:** To ensure that construction and operational activities do not unduly impact park visitors, implementation will require special consideration to ensure that Park visitors are permitted access in the safest way possible to existing high use recreation opportunities at the nearby bridge and viewing areas. This will require shorter closure periods, trained traffic control personnel and a modified approach to gravel hauling and placement during non-peak visitor hours, using shortest available routes to the site.

(c) **Communications Plan:** Proposed plans for submitting local media releases to communicate the annual project activities and advise of any short term trail interruptions Addressing on-site signage needs to control public and provide any required regulatory and interpretive signs.

(d) **Impact Monitoring and Actions:** Monitoring of the Permit Area and associated impacts will be required. The Permittee will be responsible for all restoration related activities to address any new conservation or recreation impacts risks such as trail shortcuts, public safety needs, planting, signage, new control facilities or trail re-surfacing to mitigate impacts of the skid steer machinery.

APPENDIX 3

MEDIA DOCUMENTS

the eagle fm 97.3
the island's best music mix

LISTEN LIVE

CONTESTS COMMUNITY EVENTS EAGLE INSIDERS MEET THE TEAM CONTACT US

LOCAL NEWS HEADLINES

Another Break, Enter and Theft

Comox Valley R-C-M-P are investigating another break, enter and theft of firearms.
Constable Rob Gardner says this latest one happened last Tuesday at a home in the 2100 block of Stirling Crescent in Courtenay.
Several weapons were stolen.
Anyone with information is asked to call R-C-M-P or Crime Stoppers.

Search Continues for Missing Bowser Man

Family and friends haven't given up their search for a missing Bowser man.
Eighty-one year old James Roberts was last seen on February 4th.
His son, Chuck, is thankful for the support shown to the family.
Roberts, who has dementia, is white, 6' 2" with short grey hair and green eyes.

Cortes Economic Planning Strategy

Cortes Island Business and Tourism Association has received some funding to conduct an economic planning strategy.
Carol London, the association's treasurer, says the study will look at new ways to bring economic activity and vitality back to the island.
Island Coastal Economic Trust has given the association 30-thousand dollars to conduct the study

Skyline Cable Project

B-C Conservation Foundation will begin work this week on installing a skyline cable across the Elk Falls canyon so gravel can be delivered to the riverbed for spawning salmon.
Foundation's Jeramy Damborg says delivering gravel this way, rather using a helicopter, will be much more cost effective.
Work on the project will get under way on Tuesday and should be done by the end of this week.

Campbell River Considers Waiving Service Dog Fees

Campbell River City Council is looking at eliminating licence fees for service dogs.
A local resident made the request.
City Clerk Peter Wipper says many other jurisdictions across the province waive the fees.
Council has asked staff to prepare a report on the issue for consideration.

FACEBOOK

The Eagle - 97.3
6,515 likes

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Spawning gravel placement project at Elk Falls

SHARE ON:

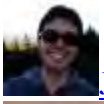
Justin Goulet — February 22, 2016

Photo courtesy of the BC Conservation Foundation

Starting today, the BC Conservation Foundation is leading a spawning gravel placement project in the waters around Elk Falls in Campbell River.

BCCF's project leader Jeramy Damborg says due to an absence of natural gravel in the waters, there is a lack of spawning ground for salmon and trout.

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Use Up/Down Arrow keys to increase or decrease volume.

He says the work will take a few weeks, and there will be some trail closures around the area to Elk Falls between February 24th and 26th.

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Use Up/Down Arrow keys to increase or decrease volume.

Damborg adds that the project is funded by BC Hydro, the Department of Fisheries and Oceans (DFO), and the Campbell River Salmon Foundation.

NEWS

Gravel placement project at Elk Falls will employ a different type of bridge

by Contributed - Campbell River Mirror
posted Feb 18, 2016 at 2:00 PM

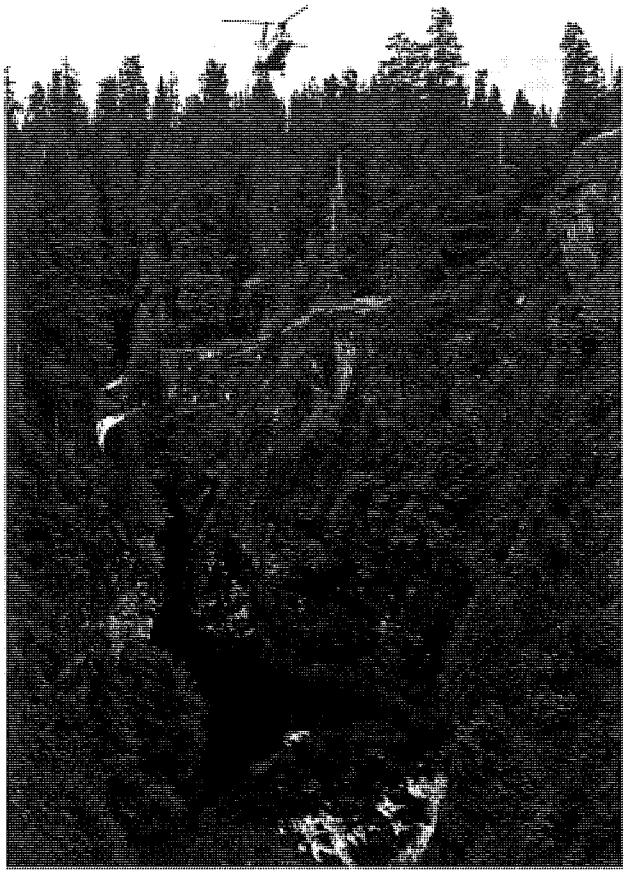
People have been going to the Elk Falls suspension bridge in droves since it opened last May, but fish restoration experts hope a different type of bridge will help increase fish numbers in the river below.

It's about the gravel in the river and fish that use it for spawning. Efficiencies have been found in its delivery to the canyon bottom. A different type of bridge, essentially a skyline, is getting ready to be installed.

The BC Conservation Foundation (BCCF) is leading a spawning gravel placement project that will begin Feb. 22. The first component is construction of a gravel loading pad and access trail on the south side of the canyon and the drilling of steel anchors into the north canyon wall.

A steel cable will be installed to carry a remote release gravel bucket to drop gravel into the river below. The cable will be placed about 30 metres downstream of the suspension bridge.

The cable will only be up when the gravel is being placed so there will be no visual obstructions from



Historically, gravel for fish spawning has been delivered by helicopter. Starting this year onward, gravel will be delivered via a skyline that's being installed by the BC Conservation Foundation. — Image Credit: Photo Courtesy BCCF

the suspension bridge, and the gravel will be brought in using existing and new trails.

"The creation of the John Hart dam in 1947 stopped the natural recruitment of gravel into the canyon from upstream," BCCF project lead, Jeramy Damborg, said in a press release.

"There's good fish habitat from the generating station up to Elk Falls. It's about 1.8 km long and provides spawning and rearing for Steelhead, Coho and Chinook, among other fish. Suitable spawning gravel within the canyon area is a limiting factor to fish production."

Since 1999, given the importance of gravel for fish productivity, gravel has been delivered six times. The very difficult access with the steep vertical canyon walls has meant the gravel has been delivered in buckets by a heavy lift helicopter, which is expensive with helicopter time costing $2 per second. Safety is another important consideration.

"We are anticipating that once the infrastructure is installed the new gravel placements will be about a quarter of the cost of the previous delivery method," says Damborg. "That means we can add more gravel on a more consistent basis, hopefully every one to two years."

Damborg says the gravel, once delivered, slowly moves and spreads downstream when flows released from the John Hart dam are increased.

BCCF is finalizing a Park Use Permit with BC Parks, the landowner, which outlines BCCF as the owner of the gravel delivery asset.

The total project cost is about $161,000. Funding was primarily provided by Fisheries and Oceans Canada, Fish and Wildlife Compensation Program (FWCP) and the Campbell River Salmon Foundation. FWCP has been the primary funding source for all six previous gravel projects in the canyon, and is a partnership between BC Hydro, the Province of B.C., Fisheries and Oceans Canada, First Nations and public stakeholders

"We would like to get the word out that the infrastructure works may last up to four weeks starting

Feb. 22," says Damborg. "We will have signage and sometimes flaggers to keep the public safe along the trail in conjunction of some trail closures or delays on Feb. 23. Then there will be full trail closures to Elk Falls from Feb. 24 to 26; people will be unable to access the falls.

"There may also be some short trail delays as we move equipment and materials in and out during the remainder of the construction period. Noise during drilling operations is also expected. We appreciate people's patience and apologise for any inconvenience."

Related Stories

- Chopper flies in to aid Elk Falls Suspension Bridge project
- Elk Falls suspension bridge opens Saturday
- Elk Falls suspension bridge could open next summer
- Bridging efforts in Elk Falls Provincial Park
- Elk Falls to roar again
- Elk Falls suspension bridge one step closer
- Foundation to replace spawning bed gravel

Elk Falls Provincial Park

Elk Falls Canyon
Spawning Gravel Delivery System

The John Hart Dam, constructed in 1947, has stopped natural gravel movement into the Upper Campbell River, through the Elk Falls Canyon and into the lower Campbell River. This gravel provides important spawning habitat for fish. Increasing spawning habitat and egg-to-fry survival for the river's Steelhead and Chinook populations are important steps in the recovery of these stocks in the Campbell River.

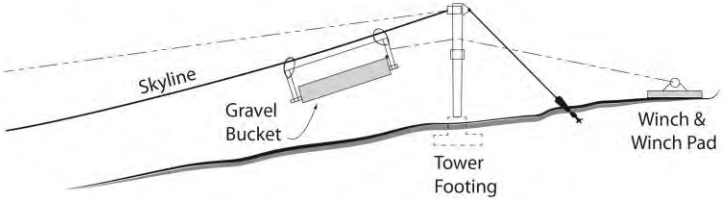
Gravel Placement as Habitat Enhancement

One way to improve spawning habitat for fish is to place extra gravel in the river as it's washed downstream by floods.

In the past, heavy lift helicopters were used to place spawning gravel in the river. This method was expensive and can no longer be used due to the location of the new suspension bridge.

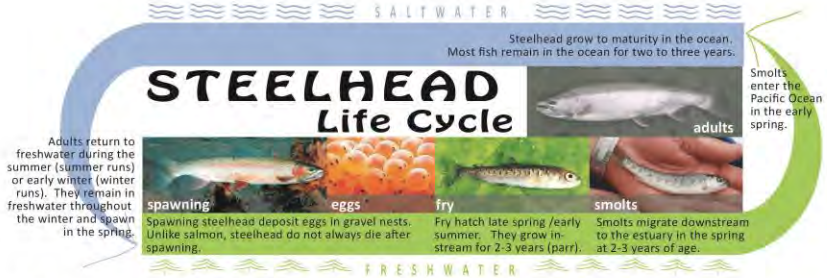
A new way to place gravel

A temporary overhead skyline is constructed across the canyon.



Gravel is stockpiled near the footbridge that crosses the BC Hydro penstocks and a small loader carries the gravel along park trails and loads it into the skyline bucket.

The skyline bucket is lowered out over the canyon and the gravel is dropped into the river below. Gravel placement is co-ordinated using a spotter from the suspension bridge. This process allows 0.5m³ (about 1 tonne) of gravel to be placed in-river at a time.



FWCP Fish & Wildlife Compensation Program
Fisheries and Oceans Canada / Pêches et Océans Canada
Living rivers Georgia Basin Vancouver Island
Campbell River Salmon Foundation
British Columbia Conservation Foundation

This project was funded by BC Hydro through Fish and Wildlife Compensation Program, DFO - Recreational Fisheries Conservation Partnership Program, Campbell River Salmon Foundation and Living Rivers.