AQUAPARIAN
Environmental Consulting Ltd.

July 5, 2024

Jonathan Behnke
Regional Parks Planner
Parks Services, Regional District of Nanaimo
1490 Springhill Road
Parksville BC, V9P 2T2
T: 250-248-4744 x3670 C: 250-268-4295

Via Email: jbehnke@rdn.bc.ca

RE: ENVIRONMENTAL IMPACT ASSESSMENT
NILE CREEK BRIDGE CONSTRUCTION PROJECT
REGIONAL DISTRICT OF NANAIMO

1.0 INTRODUCTION

Aquaparian Environmental Consulting Ltd. (Aquaparian) was retained by the Regional District of Nanaimo (RDN) to complete an Environmental Impact Assessment (EIA) and Environmental Protection Plan (EPP) for the construction of a pedestrian bridge over Nile Creek located within Electoral Area H of the RDN in Qualicum Beach, BC. The plan is to remove a derelict and unsafe pedestrian bridge and construct a new pedestrian bridge to the west with trail connections to the Nile Creek Trail. The new bridge is planned within the Ministry of Transportation and Infrastructure (MoTI) right-of-way to the west of the E&N Railway corridor. A site location map is included as Figure 1 and a selection of site photographs taken by Aquaparian during the April 10, 2024 site assessment is included as Appendix A.

A review of the RDN webmap identifies the project site is subject to the RDN Freshwater and Fish Habitat Development Permit Area (DPA) for Nile Creek and is identified with a “Riparian Vegetation” Sensitive Ecosystem polygon on both sides of the watercourse (Figure 2).

As understood, the existing pedestrian foot bridge requires removal and replacement due to its deteriorating condition. The proposed new bridge is a clear span bridge design. Detailed engineering drawings for the bridge design have been provided by Herold Engineering Ltd and are included with this report as Appendix B. The site access is from the Nile Creek Trailhead at the west end of Charlton Drive and then following the access road west under the railway trestle to the site location along Nile Creek approximately 70m west of the trestle.

Impacts to the environment as a result of this project are expected to be short-term and temporary if mitigation measures included in this report and the Environmental Protection Plan (EPP) which is included with this report as Appendix C are implemented. As such, the project is not expected to result in the death of fish or the Harmful Alteration, Disruption or Destruction (HADD) of fish habitat as defined under Section 35 of the new *Fisheries Act* (2019). Based on this determination the project is not expected to require a Fisheries and Oceans Canada (DFO) project review submission.

Clear span bridge stream crossings require a provincial "Notice of Authorized Change" under the *Water Sustainability Act* (WSA) Section 11 be submitted to the province at least 45 days prior to scheduled work to authorize "works in and around water." The Notification is to be submitted in the same calendar year as the proposed work. As understood, in-stream work is limited to rip rap bank armouring under the bridge alignment; the bridge abutments are above the top of bank. Aquaparian will submit a Section 11 Notification in association with the proposed bridge.

2.0 PROJECT DESCRIPTION

The old, derelict, 15m long clear-span pedestrian bridge located in private property to the west of the E&N Railway corridor has been deemed unsafe and will be removed and the new bridge will be installed in the MoTI right-of-way to the west of the existing bridge. Decommissioning of the old wooden bridge may require cutting with chainsaws to remove sections or use of a crane to remove steel girders. If a crane is used, then it is expected that the crane can be parked on the access road above the bridge location to lift the bridge clear. Removal of vegetation is not expected to be required for the decommissioning work, but tree topping may be required for crane clearance.

The new pedestrian bridge is to be constructed approximately 29m to the west of the old bridge and is to be approximately 1.1m wide and 20m long. The new bridge will be constructed of steel beam with timber decking, posts and timber handrails and designed to fully span the creek with cast-in-place footings supported on compacted structural fill located above the high water mark. This design requires excavation and fill placement for abutments and rip rap armour on the riverbanks down to the water line and embedded at the toe of slope.

Heavy machinery including crane and mini excavator will enter the site along the existing access road and clearing of riparian forest vegetation and grading (including import of fill) will be required on both sides of the creek from the stream bed to the footings of the bridge. The south abutment is accessible by the existing road and dirt trail. The north side is not accessible. The installation of a construction skyline or temporary work bridge or crane will be required to transport equipment and materials to the north side of the creek. It is expected that a concrete pumper truck can be parked on the access road to the south of the creek to deliver concrete

with a boom arm for both cast-in-place footings. Steel girders are expected to be installed by crane located at the south access road. Tree topping or pruning may be required for crane clearance during girder installation involving trees to the northeast of the access road. Once the construction contractor is retained, construction methodology will be confirmed.

The clearing of new trail sections connecting the new bridge to the existing Nile Creek trail system is to be completed in a subsequent phase of the project. This EIA is for bridge removal, new bridge construction and trail construction between the existing gravel access trail and the south end of the new bridge.

3.0 REGULATORY FRAMEWORK

Federal *Fisheries Act* Section 35: Fish and fish habitat protection provisions, as well as some of the regulations that support these provisions include the following:

- No person shall carry on any work, undertaking or activity, other than fishing, that results in the death of fish; and,
- No person shall carry on any work, undertaking or activity that results in the harmful alteration, disruption or destruction of fish habitat. The definition of harmful alteration, disruption or destruction of fish habitat is any temporary or permanent change to fish habitat that directly or indirectly impairs the habitat's capacity to support one or more life processes of fish.

Federal *Fisheries Act* Section 36: Environment and Climate Change Canada administers Section 36 of the *Fisheries Act*, the key pollution prevention provision, prohibiting the deposit of deleterious substances into waters frequented by fish, unless authorized by regulations under the *Fisheries Act* or other federal legislation. A deleterious substance can be any substance that, if added to any water, would degrade or alter its quality such that it could be harmful to fish, fish habitat or the use of fish by people.

***Federal Species-at-Risk Act*.** The *Act* is a key federal government commitment to prevent wildlife species from becoming extinct and secure the necessary actions for their recovery. It provides for the legal protection of wildlife species and the conservation of their biological diversity. For most extirpated, endangered and threatened species, the *Species at Risk Act* (SARA) applies automatically only on federal lands. This includes national parks, national marine conservation areas, national historic sites and other protected heritage areas administered by Parks Canada. SARA also applies automatically on provincial and territorial lands and waters for species also protected under the *Migratory Birds Convention Act*, or aquatic species as defined in the *Fisheries Act*. Under SARA, provincial and territorial governments are given the first opportunity to protect species and critical habitat found on non-federal lands. However, the Governor in Council on the recommendation of the Minister of the Environment, may order that

certain SARA restrictions apply on provincial or territorial lands. Critical habitat of species is protected after it has been identified in a recovery strategy or action plan.

Federal *Migratory Birds Convention Act, 1994*. Most species of birds in Canada are protected under this act. “Migratory birds” are defined by Article I of the Convention which names the families and sub-families of birds protected, and provides some clarification of the species included. In general, birds not falling under federal jurisdiction within Canada include grouse, quail, pheasants, ptarmigan, hawks, owls, eagles, falcons, cormorants, pelicans, crows, jays, kingfishers, and some species of blackbirds.

The Migratory Birds Regulations, 2022 (MBR), provides protection to migratory bird nests when they are considered to have a high conservation value for migratory birds. The migratory bird nesting season for the project area is March 15 - August 15. The MBR prohibits the damage, destruction, removal or disturbance of nests of all migratory birds when there is a live bird or viable egg, or if the nest was built by a species that is listed in Schedule 1 of the regulation. Schedule 1 lists 18 species which are protected year-round unless their nests are shown to have been abandoned for a designated period of time depending on the species. In BC, there are only two Schedule 1 species; great blue heron are protected for 24 months after reporting the nest is unoccupied, and pileated woodpecker are protected for 36 months after reporting unoccupied.

Provincial *Water Sustainability Act.* Works in and about a stream under Section 11 of the *Water Sustainability Act* requires that a person may only make “changes in and about a stream” under an Approval or Notice of Authorized Change. “Changes in and about a stream” means: any modification to the nature of the stream including the land, vegetation, natural environment or flow of water within the stream, or any activity or construction within the stream channel that has or may have an impact on a stream.

Section 34 of the Provincial *Wildlife Act*, states that a person commits an offence if the person, except as provided by regulation, possesses, takes, injures, molests or destroys:
(a) a bird or its egg,
(b) the nest of an eagle, peregrine falcon, gyrfalcon, osprey, heron or burrowing owl, or
(c) the nest of a bird not referred to in paragraph (b) when the nest is occupied by a bird or its egg.

Heritage Conservation Act. All archaeological sites, recorded or not, are protected under the *Heritage Conservation Act* and must not be altered or damaged without a site alteration permit from the Archaeology Branch. No recorded archaeological sites have been identified within the subject parcel.

4.0 BACKGROUND

The following section provides a general overview of biophysical attributes and land use of the site documented by government databases, crown publications and from Aquaparian's reconnaissance of the site.

4.1 BIOGEOCLIMATIC ZONE

The proposed bridge is located within the Moist Maritime Coastal Douglas-fir Subzone (CDFmm). The CDFmm is restricted to low elevations along southeast Vancouver Island from Bowser to Victoria, the Gulf Islands south of Cortes Island, and a narrow strip along the Sunshine Coast near Halfmoon Bay. Elevational limits range from sea level to approximately 150m. The CDFmm lies in the rainshadow of the Vancouver Island and Olympic Mountains resulting in warm, dry summers and mild, wet winters. Growing seasons are very long and feature pronounced water deficits on zonal and drier sites. The CDFmm represents the mildest climate in Canada *(Green and Klinka, 1994).*

The CDFmm classification is dominated by Douglas fir (*Pseudotsuga menziesii*), grand fir (*Abies grandis*), and western red cedar (*Thuja plicata*) trees. The understory typically includes salal (*Gaultheria shallon*), dull Oregon-grape (*Mahonia nervosa*), oceanspray (*Holodiscus discolor*) and Oregon beaked moss (*Kindbergia oregana*). Less prominent species include baldhip rose (*Rosa gymnocarpa*), snowberry (*Symphoricarpos albus*), western trumpet honeysuckle (*Lonicera ciliosa*), vanilla leaf (*Achlys triphylla*) and electrified cat's tail moss (*Rhytidiadelphus triquetrus*) (*Green and Klinka, 1994*). Site vegetation is representative of the CDFmm.

4.2 HABITAT WIZARD

Nile Creek (watershed Code: 920-494300) is a ~13km major fish-bearing stream that discharges into the Strait of Georgia in Qualicum Bay. A review of the provincial Habitat Wizard atlas identifies that Nile Creek is known to support the following fish species:

- Coho salmon (*Oncorhynchus kisutch*);
- Chum salmon (*O. keta*);
- Pink salmon (*O. gorbuscha*);
- Residential cutthroat (*O. clarkii*);
- Coastal cutthroat (*O. clarkii clarkii*);
- Rainbow trout (*O. mykiss*); and,
- Steelhead (*O. mykiss*).

4.3 WILDLIFE TREE STEWARDSHIP ATLAS & GREAT BLUE HERON ATLAS

A review of the Wildlife Tree Stewardship Atlas (WiTS) identifies that no mapped bald eagle nests are located within or near the project area. The closest mapped eagle nest is located over 600m away. No eagle nests were identified in or near the project area during the site visit.

A review of the Great Blue Heron Atlas did not identify any great blue heron nest trees or nest colonies within or near the project area. The nearest mapped heron nest tree is located over 2.5 km away. No heron nests were identified in or near the project area during the site visit.

4.4 BC CONSERVATION DATA CENTRE

Provincially Red-Listed species includes any ecological community, and indigenous species and subspecies that is extirpated, endangered, or threatened in British Columbia. Red-listed species and sub-species may be legally designated as, or may be considered candidates for legal designation as Extirpated, Endangered or Threatened under the *Wildlife Act*. Blue-Listed species include any ecological community, and indigenous species and subspecies considered to be of special concern (formerly vulnerable) in British Columbia.

A search of occurrence records for designated rare or endangered plant and animal species for the study area with the British Columbia Conservation Data Centre (BC CDC) resulted in one record of rare ecological plant community (Douglas fir / Dull Oregon grape) within or near the subject site. The BC CDC iMap has been included as Figure 3. This mapped occurrence is a provincially red-listed second-growth forest ecosystem located to the south of the proposed bridge location along the trail that proceeds north from the end of Linx Road. The bridge replacement project is expected to require minimal tree and understory vegetation clearing for bridge abutments and trees are to be replaced so impact to this ecosystem is expected to be minimal.

The BC Species and Ecosystems Explorer database was reviewed to determine rare or threatened plant and animal species that have the potential to be found in the project area. Aquaparian has identified that the following “at-risk” species have a reasonable potential to occur at the study site. These species are discussed briefly below:

Great blue heron (*Ardeaherodias fannini*): Blue-listed
Great blue heron is a large wading bird residing along the Pacific coast from southeastern Alaska south to Washington. Nests are colonially in tall Sitka spruce, western red cedar, western hemlock, pine, red alder, big leaf maple and black cottonwood. Isolation from disturbance appears to be an important factor in nest site selection. Foraging habitat includes aquatic areas generally less than 0.5 m deep, such as: marine intertidal areas, estuaries, riparian areas, wetlands, freshwater lakes, and muskegs. These areas are generally within 5 km

of the nest site, although some areas have been identified up to 33 km away. (*BC CDC*). The mature trees within the project area and foraging areas along the creek may provide suitable habitat for this species; however, no heron nesting trees were identified in or near the project site.

Northern Pygmy-owl (*Glaucidium gnoma swarthi*): Blue-listed
Their occurrence status is confident or certain for the Nanaimo area as a year-round resident and confirmed breeder. This species requires veteran large diameter trees with cavities or potential for nest cavities to provide breeding habitat. This species is widely but sparsely distributed on Vancouver Island and Gulf Islands. Populations are believed to be declining from habitat loss due to expanding urbanization, past timber harvesting on Crown Land and private land, and potential predation from Barred Owls, but empirical data is lacking. Over time, as second growth forests on Crown Land develop into mature stands with old features, where human encroachment through urbanization does not convert forest land, habitat availability should increase. Forest edges are preferred for foraging, as per Provincial Status Report (2003) and IWMS (2004), including disturbed forest edges, wetlands, and riparian areas. *(BC CDC).* There are a number of large diameter, veteran western redcedar and Douglas fir trees within the riparian forest of the study area that may support this species. Trees are to be checked for nesting cavities prior to clearing.

Northern red-legged frog (*Rana aurora):* Blue-listed
Range extends from southwestern British Columbia, including Vancouver Island in Canada, south along the coast of the United States. Red-legged Frogs have been observed in a variety of aquatic and terrestrial habitats typically at elevations below 500 m. They breed in shallow, littoral zones of lakes, temporary and permanent pools and wetlands, and bogs and fens regardless of size but in close proximity to forest; tadpoles associate with benthic habitats. Lotic habitats with little to no flow may be utilized by red-legged frogs, and riparian areas are important for newly metamorphosed froglets. Outside of the breeding season, red-legged frogs utilize shady cool forests as “core” habitat and primarily utilize all forest and woodland types, but individuals are occasionally found in more open and rural areas such as shrubland/chaparral, cropland/hedgerow, old fields, and suburban/orchard *(BC CDC).* The wet, floodplain area on the north side of the creek may support this species. The typical amphibian breeding season is between late February to early April. The bridge replacement works are not expected to impact this species.

Olive-sided flycatcher (*Contopus cooperi*): Blue-listed
This bird species is considered an indicator species of the coniferous forest biome throughout North America, although occasionally found in mixed deciduous/coniferous forests. They are frequent users of coniferous forest and riparian forest habitats and their occurrence is identified as confident or certain occurrence in the Nanaimo area. They are aerial insectivores. Olive-sided flycatchers make the longest migrations of any flycatcher nesting in North America. Nests

are placed most often in conifers (Harrison 1978, 1979), on horizontal limbs from two to 15 m from the ground (Harrison 1979, Peck and James 1987). This bird is a widespread breeder across southern BC found in moderate numbers that are thought to be declining, possibly due to loss of suitable breeding and foraging habitats *(BC CDC).* The forest habitat within the project area would be suitable to support this species. This project is not expected to impact this species if vegetation removal is completed outside of the migratory bird nesting season (March 15 – August 15) or a pre-clearing bird nest survey is completed by a Qualified Environmental Professional.

Pacific Sideband Snail (*Monadenia fidelis):* Blue-listed
These snails are found all around the Georgia Basin, north to Growler Cove, West Cracroft Island and Broughton Archipelago. In deciduous, mixed or coniferous forests generally (i.e. fir, cedar, big-leaf maple and alders), but also sometimes in open woods and grassy places, such as Garry Oak (*Quercus garryana*) meadows and seashore sand spits. It is predominantly a species of the coastal lowlands. Adult snails are most often encountered in spring when crawling in the open on the ground or climbing up the trunks of shrubs and trees *(BC CDC).* The moist mixed canopy environment within the property may provide suitable habitat for this species. The bridge replacement project is unlikely to impact this species since vegetation removal will be minimal.

Townsend's Big-Eared Bat (*Corynorhinus townsendii*): Blue-listed
Piaggio and Perkins (2005) concluded that subspecies *townsendii* is broadly distributed from the Pacific coast of the United States and British Columbia (including Vancouver Island) southward to coastal regions of the Sonoran Desert in Mexico, eastward to the Colorado Plateau and the Black Hills. These bats are nonmigratory or move moderate distances between breeding and nonbreeding sites. Nightly foraging bouts may be localized near the day roost or may cover more than 150 km. Throughout much of the known range, these bats commonly occur in mesic habitats characterized by coniferous and deciduous forests (Kunz and Martin 1982), but they occupy a broad range of habitats (e.g., see Handley 1959). On the West Coast, Townsend's big-eared bats are found regularly in forested regions and buildings, and in areas with a mosaic of woodland. Maternity roosts in British Columbia exist in buildings and caves (Reid et al. 2010). Diet includes various flying insects often obtained near the foliage of trees and shrubs; the species may feed primarily on moths (Barbour and Davis 1969, Leslie and Clark 2002, Dodd 2006) Their occurrence status is confident or certain for the Nanaimo area. *(BC CDC).* The study area provides forested areas suitable for this species for foraging activity. Since required tree removal for this project is minimal and roosts are generally in caves or buildings, it is unlikely that this project will impact this species.

Wandering Salamander (*Aneides vagrans*): Blue-listed
This terrestrial salamander species has a widespread occurrence on Vancouver Island, including remote areas. The species can be found in moist coniferous forests and forest edges.

Logs are the primary microhabitat in spring, summer and fall on Vancouver Island. They lay eggs in cavities in rotten logs, in rock crevices, under bark or among vegetation. This salamander feeds on small arthropods and is inactive in cold temperatures and hot, dry weather (*BC CDC*). The terrestrial habitat within the property is suitable for this species; much large woody debris is available along the forest floor of this site. The small-scale bridge replacement is not expected to have a negative impact on this species.

Western Screech-owl (*Megascops kennicottii kennicottii*): Blue-listed
This species is resident from south-coastal and southeastern Alaska, south through coastal British Columbia to coastal Oregon (Cannings and Angell 2001). Occurrence records identifies them as confident or certain for the Nanaimo area and a year-round resident and confirmed breeder. Western Screech-Owls are non-migratory and depend year-round on older trees with cavities for roosting and during the breeding season for nesting. There is an apparent precipitous decline in numbers in core area of its range, i.e., lower mainland and southeast Vancouver Island, particularly since 2000, and earlier, in some areas. Preliminary analysis of Christmas Bird Count data from 1988 to 2004 indicated that on Vancouver Island numbers have declined 17% annually, while in the lower mainland numbers declined 32% annually (Elliot 2006). On the south coast of British Columbia, population decline is thought to be linked to the recent arrival of Barred Owls that are known to depredate and out-compete screech-owls. Barred Owls are expected to continue their range and density expansion northwards, potentially impacting screech-owl populations outside their core range. Urbanization and conversion of wooded areas to agricultural lands in the southern portion of the range reduces habitat. Populations are also impacted by forestry operations that reduce dead trees and snags that provide roosting and nesting cavities. In local areas where habitat degradation has reduced the number of potential roosting and nesting cavities, effort should be made to erect artificial nest boxes (*BC CDC).* Forest habitat in the study area provides suitable habitat for this species. Since required tree removal for this project is minimal and nests are generally in dead trees and snags, it is unlikely that this project will impact this species. The one dead alder tree that is to be removed did not appear to be large enough or have any nesting cavities.

Western Water Shrew (*Sorex navigator brooksi*): Blue-listed
Endemic to Vancouver Island. A relatively rare shrew dependent on suitable aquatic/riparian habitat, found over a large part of Vancouver Island. They are dependent on the presence of high-quality intact riparian systems. They live in a diverse range of stream habitats, from narrow to wide streams, from slow-moving to moderately-fast flowing waters. They are found at low elevations, in a variety of forest types and age classes, as long as the riparian corridor is intact. It is threatened by urbanization in the southeast part of the island and by forestry over much of its range (*BC CDC*). The Nile Creek riparian area may provide suitable habitat for this elusive rodent. The small-scale bridge replacement is not expected to have a negative impact on this species.

5.0 SITE DESCRIPTION

Aquaparian completed a site assessment of the project area April 10, 2024 . Accessed to the site is from the end of Charlton Drive, then follow the gravel access road west through the gate and under the train trestle. The proposed bridge location is approximately 70m west of the trestle. The access road is wide enough to allow vehicle and heavy machinery access. The slope is moderate over a distance of ~15m from the access road down to the creek. The access road is ~4m above the grade of the creek.

Nile Creek is approximately 8m wide at the proposed bridge location with vertical cut banks approximately ~1m high with exposed roots along the top of bank. Stream bed substrate at the proposed bridge location is comprised of boulder and cobble.

Riparian vegetation along the stream banks is comprised of a canopy of western redcedar (*Thuja plicata*), western hemlock (*Tsuga heterophylla*), bigleaf maple (*Acer macrophyllum*) and red alder (*Alnus rubra*) with an understory of salmonberry (*Rubus spectabilis*), sword fern (*Polystichum munitum*), licorice fern (*Polypodium glycyrrhiza*), bracken fern (*Pteridium aquilinum*), deer fern (*Blechnum spicant*), red huckleberry (*Vaccinium parvifolium*), red elderberry (*Sambucus racemosa*), dull-Oregon grape (*Mahonia nervosa*), trailing blackberry (*Rubus ursinus*) and moss species. Old tree stumps were observed within the second-growth forest habitat. Some of the cedar and fir trees within the riparian habitat are mature. Danger trees leaning towards the creek were observed to the west of the proposed bridge location.

No trees are located within the bridge abutment footprint on the south side of the creek and it appears that three red alder trees that are 30-40cm in diameter will require removal on the north side as well as two tree stumps. One of the alder trees is dead.

A salmonberry-dominated wet area that was identified by Aquaparian on the north side of the creek has been mapped and included on the site plan. This wet and hummocky area appears to be an old side channel of the creek and would now be considered as part of the fluvial floodplain with potential flooding during the winter wet season. The proposed bridge footprint is to the east outside of the old side channel.

6.0 IMPACT ASSESSMENT

Construction activities with a potential to result in impacts to the creek include: vegetation removal, excavation, import of subgrade fill, concrete pouring for bridge abutment installation. Potential risks include sedimentation, accidental spills and/or deleterious substances being released to Nile Creek or the floodplain area. Measures to prevent deleterious substances from entering watercourses have been included in the Environmental Protection Plan (EPP) for this

project (Appendix C). Preservation of water quality during the construction works is the primary concern.

Three trees are expected to be removed for this project on the north side of the creek in the area of the bridge abutment and a small clearing area of understorey vegetation in the bridge abutment and level approach pad area. Other trees may need to be removed for machine access on the south side of the creek between the access road and the south abutment as well as some removal of understory vegetation for excavator access and south abutment construction and backfilling. Some tree topping or pruning may be necessary for crane clearance. Vegetation removal is to be kept to a minimum and within clearly marked clearing boundaries. Any disturbed area must be restored to functioning riparian forest habitat.

No Pileated woodpecker foraging holes or nesting cavities were observed in trees within the project footprint. A dead wildlife tree with abundant woodpecker holes was observed on the south side of the access road ~5m to the west of the yellow flagging and ~10m south of the access road. This tree is not to be disturbed during this project. Vegetation clearing in the migratory bird nesting season (March 15-August 15) will require a pre-clearing nest survey within 3-5 days of proposed clearing.

7.0 CONCLUSION

Aquaparian was retained by the RDN to complete an Environmental Impact Assessment for the proposed replacement of a small pedestrian bridge located across Nile Creek in Qualicum Beach, BC.

Based on findings in this EIA, it is Aquaparian's professional opinion that, if all mitigation measures outlined in this report and the attached EPP are followed, the proposed bridge replacement is not expected to have any lasting negative impacts on wildlife, wildlife habitat, fish or fish habitat. Because the work will occur around a stream, a Section 11 *Water Sustainability Act* Notification will be filed by Aquaparian on behalf of the RDN.

8.0 CLOSURE

This report has been completed in accordance with generally accepted biological practices and is based on site assessments, previous studies, background information from government databases and regulations current as of the time of writing this report. Anticipated impacts are based on the proposed development plan appended to this report provided by the client at the time of writing this report. If the design changes, Aquaparian is to be provided an opportunity to assess the proposed changes and revise the report accordingly. No other warranty is made, either expressed or implied.

Aquaparian trusts that the information provided in this report meets your requirements. Any questions regarding information provided in this document, please contact the undersigned at (250) 591-2258.

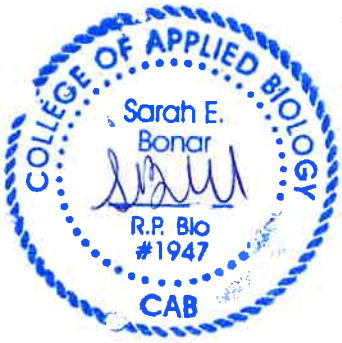
Respectfully submitted,

AQUAPARIAN ENVIRONMENTAL CONSULTING LTD.

Prepared by:

Crystal Campbell
Environmental Technician

Revised by:



Sarah Bonar, B.Sc. R.P.Bio
Senior Project Biologist / Principal

https://netorg5387218.sharepoint.com/sites/Shared/Shared Documents/Documents/Projects/Projects/N870 Nile Creek Bridge Crossing/Nile Creek Bridge EIA May 2024.docx

8.0 REFERENCES

BC Community Mapping Network. 2024. Wildlife Tree Stewardship (WiTS). Available: https://www.cmnbc.ca/atlasgallery/wildlife-tree-stewardship/. (Accessed May 2, 2024).

BC Community Mapping Network. 2024. Great Blue Heron Management Team. Available: https://www.cmnbc.ca/atlasgallery/great-blue-heron-gbhe-management-team/ (Accessed May 2, 2024).

BC Conservation Data Centre. 2024. BC Species and Ecosystems Explorer. B.C. Ministry of Environment, Victoria B.C.
Available: http://a100.gov.bc.ca/pub/eswp/ (Accessed May 2, 2024).

B.C. Ministry of Environment. 2005. A Users Guide to Working In and Around Water - Understanding the Regulation under British Columbia's *Water Act*.
http://www.env.gov.bc.ca/wsd/water_rights/cabinet/working_around_water.pdf

BC Ministry of Environment. 2024. Habitat Wizard Database. Available: http://webmaps.gov.bc.ca/imf5/imf.jsp?site=moe_habwiz (Accessed May 2, 2024).

Develop with Care: Environmental Guidelines for Urban and Rural Land Development in British Columbia. 2006.
http://www.env.gov.bc.ca/wld/documents/bmp/devwithcare2006/develop_with_care_intro.html

Fisheries and Oceans Canada. 1992. Land Development Guidelines for the Protection of Aquatic Habitat. http://www.dfo-mpo.gc.ca/Library/165353.pdf

Fisheries and Oceans Canada. 2014. Does DFO Need to Review My Project?
http://neia.org/wp-content/uploads/2013/07/01-Bret-Pilgrim-Does-DFO-Need-to-Review-My-Project.pdf

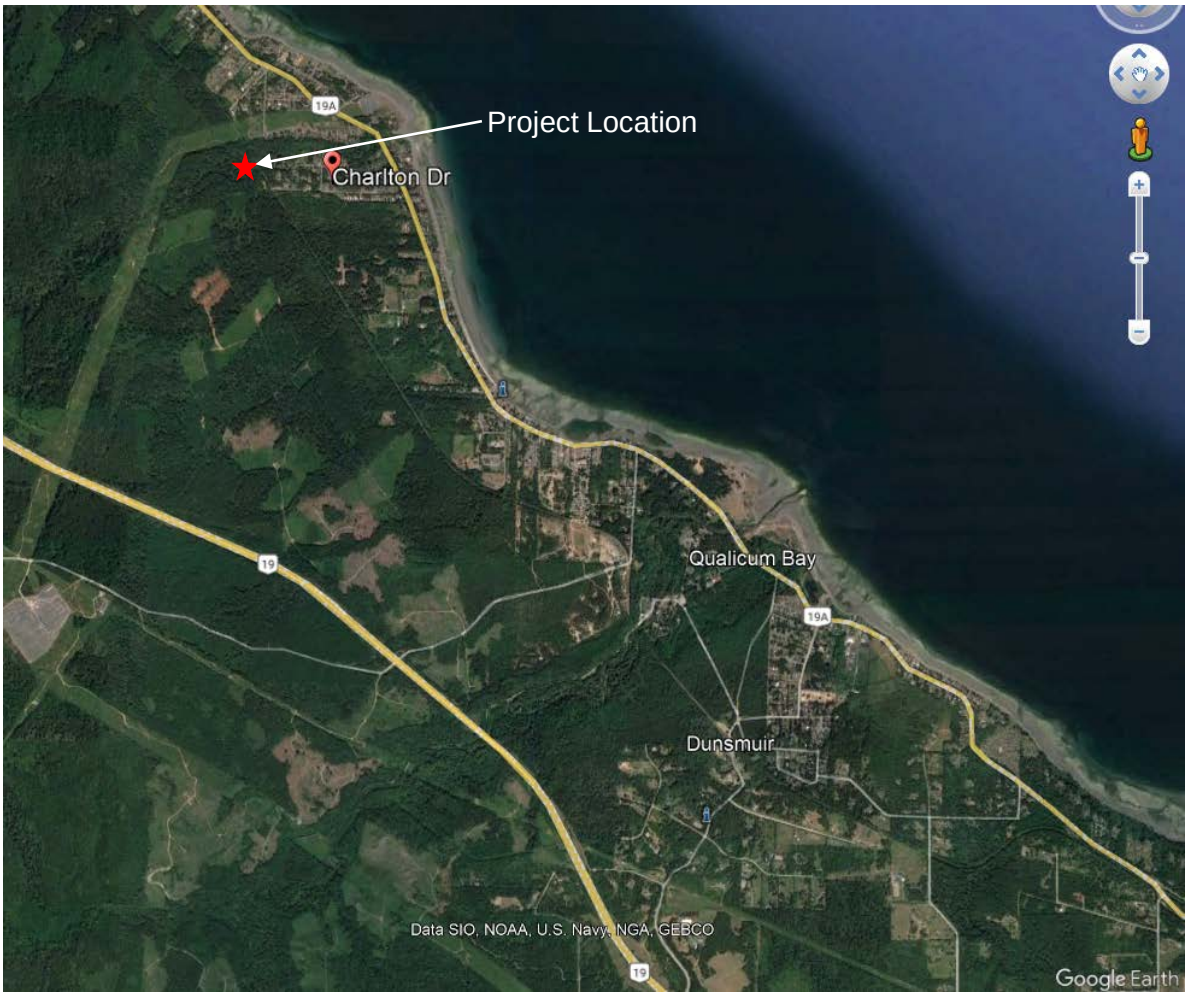
Green, R.N., Klinka, K. 1994. A field guide for site identification and interpretation for the Vancouver Forest Region. Land Management Handbook No. 28. Ministry of Forests, Research Branch, Victoria, B.C.

Regional District of Nanaimo website: https://www.rdn.bc.ca/. (Accessed May 2, 2024).

FIGURE 1

SITE LOCATION MAP

Site Location Map
Nile Creek Bridge
Off End of Charleton Drive Qualicum BC



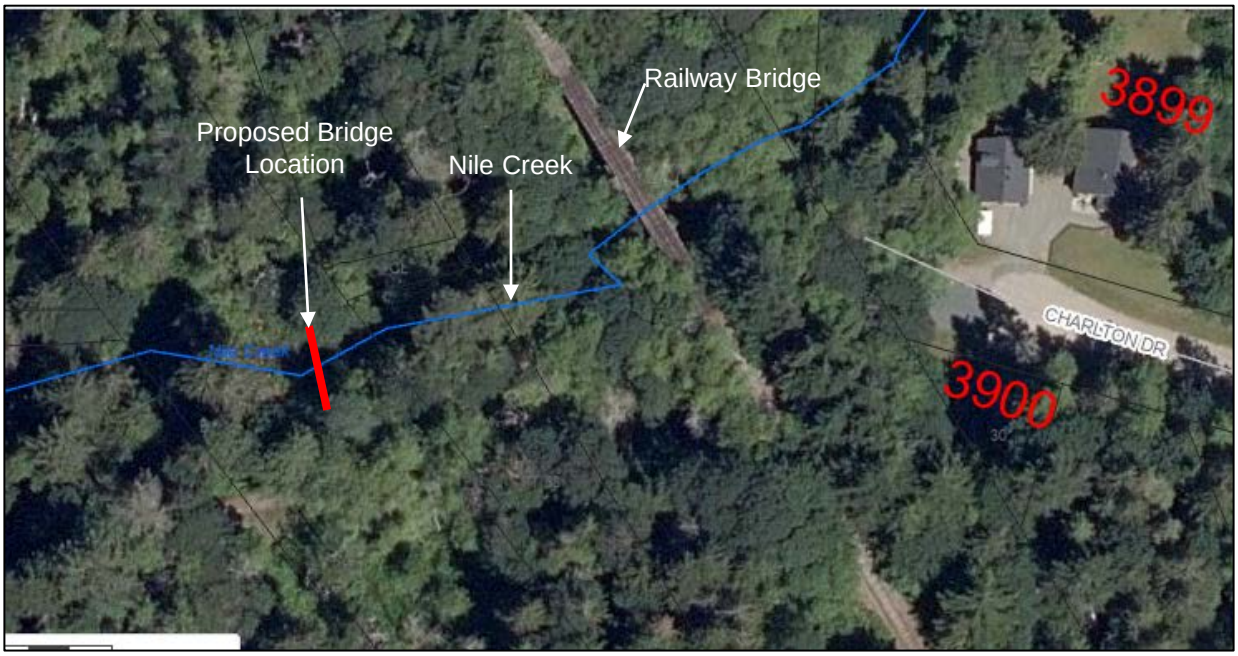


FIGURE 2

RDN WEBMAP

Figure 2. RDN Map showing mapped watercourses and sensitive ecosystems

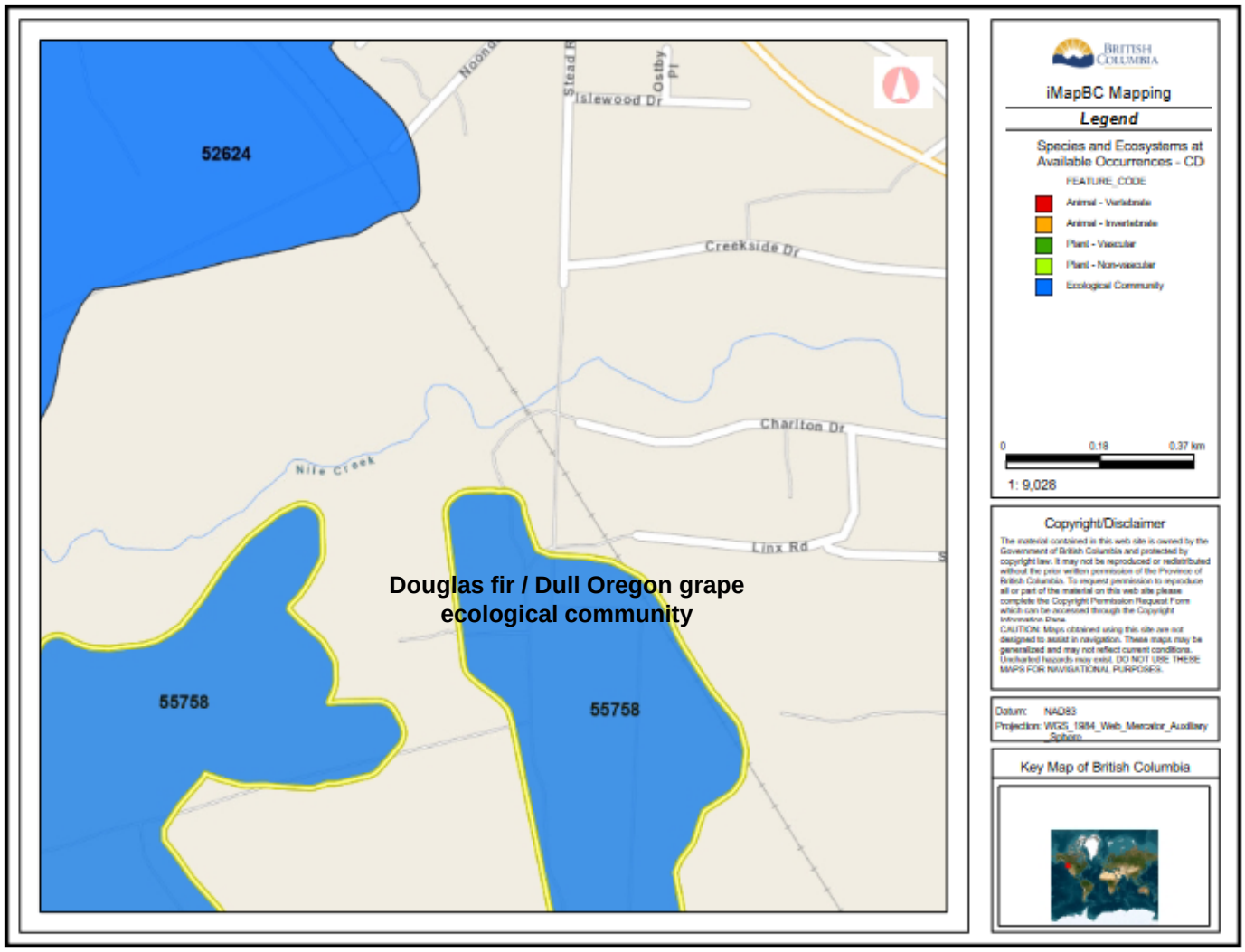


LEGEND:

FIGURE 3

BC CONSERVATION DATA CENTRE IMAP RESULTS

Figure 3. Provincial iMap Database Search Results
Nile Creek Bridge



APPENDIX A

SITE PHOTOGRAPHS

Nile Creek Bridge Project
Qualicum Beach, BC
Photo Sheet 1



Photo 1. The site access for the Nile Creek bridge replacement project is the access road at the west end of Charlton Drive that goes west under the railway trestle.



Photo 2. Showing the access road near the proposed bridge location facing east back towards the trestle.



Photo 3. Showing the access road facing west.



Photo 4. Nile Creek is a significant fish-bearing watercourse. The channel is approximately 8m in width and riparian vegetation is intact second-growth forest.

Photo Sheet 2



Photo 5. The old derelict 1m wide pedestrian bridge crossing to the east of the proposed new bridge will be removed.



Photo 6. Another view of the old bridge to be removed.



Photo 7. The equipment access point on the south side of Nile Creek and on the north side of the access road where vegetation clearing will be required to access where the bridge abutment will be constructed down the slope.



Photo 8. Showing the slope down from the access pathway to the proposed bridge location on the south side of the creek.

Photo Sheet 3



Photo 9. Showing the proposed bridge crossing location to the west of the old bridge and within the MOTI right-of-way.



Photo 10. The north side of Nile Creek where the proposed bridge crossing will be located. It is expected that three 30-40cm diameter red alder trees will require removal for bridge abutment footprint.



Photo 11. Tree leaning towards the creek to the west of the proposed bridge location.



Photo 12. Showing a wildlife tree with woodpecker holes located on the south side of the access pathway.

APPENDIX B

HEROLD ENGINEERING LTD. DESIGN PACKAGE

REGIONAL DISTRICT OF NANAIMO

NILE CREEK
BRIDGE CROSSING

DRAWING LIST

DRAWING NUMBER	DESCRIPTION
0837-090-S00	COVER SHEET AND DRAWING LIST
0837-090-S01	GENERAL NOTES AND KEY PLAN
0837-090-S02	GENERAL ARRANGEMENT
0837-090-S03	PLAN AND ELEVATION
0837-090-S04	SECTIONS AND DETAILS
0837-090-S05	GIRDERS, DIAPHRAGMS AND BRACING
0837-090-S06	ABUTMENTS

ISSUED FOR TENDER

HEROLD ENGINEERING

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

HEROLD PROJECT No.
0837-090

File: H:\Projects\0837-090 Nile Creek Bridge Crossing\04S Drawings\Active\0837-090-S00.dwg Plot Time: Jun 27, 2024 - 5:24pm User: JCheffins
© Copyright reserved. This drawing remains the exclusive property of Herold Engineering Limited and may not be reused or reproduced without written consent of Herold Engineering Limited.

ARCHITECTURAL D 24" x 36"

GENERAL NOTES:

GENERAL

1. DESIGN LOADS

LIVE LOAD: 4.0 kPa PER CHBDC

SNOW LOAD: Ss = 2.0 kPa
Sr = 0.4 kPa

WIND LOAD: q = .635 kPa

2. READ STRUCTURAL DRAWINGS IN CONJUNCTION WITH ALL OTHER CONTRACT DRAWINGS AND DOCUMENTS. REPORT ANY CONFLICTS TO THE ENGINEER BEFORE COMMENCING WORK.
3. VERIFY ALL DIMENSIONS AND ELEVATIONS PRIOR TO CONSTRUCTION.
4. NOTIFY ENGINEER 48 HOURS IN ADVANCE FOR INSPECTION OF STRUCTURAL CONNECTIONS.
5. CONTRACTOR'S RESPONSIBILITY: THESE DRAWINGS SHOW COMPLETED STRUCTURAL COMPONENTS OF THE BRIDGE. THE REQUIRED TEMPORARY BRACING AND SHORING TO PERFORM THE WORK SAFELY IS THE RESPONSIBILITY OF THE CONTRACTOR.
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 AND THE CITY OF NANAIMO.
7. SUBMIT SHOP DRAWINGS FOR REVIEW PRIOR TO FABRICATION.
8. ELEVATIONS ARE IN METRES AND DIMENSIONS ARE IN MILLIMETRES.
9. UNDER NO CIRCUMSTANCES ARE DRAWINGS TO BE SCALED.
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.
11. SHOP DRAWINGS MUST BE SUBMITTED FOR APPROVAL A MINIMUM OF 2 WEEKS PRIOR TO START OF FABRICATION, FABRICATION MUST NOT COMMENCE PRIOR TO APPROVAL OF THE SHOP DRAWINGS BY THE OWNER'S REPRESENTATIVE.
12. METAL MILL TEST CERTIFICATES AND WELD INSPECTION REPORTS MUST BE SUBMITTED A MINIMUM OF 72 HOURS PRIOR TO TRANSPORTING COMPONENTS TO SITE. COMPONENTS MUST NOT BE SHIPPED PRIOR TO APPROVAL OF CERTIFICATES AND REPORT BY OWNER'S REPRESENTATIVE.
13. THE CONTRACTOR MUST PROVIDE 48 HOURS NOTICE TO THE OWNER'S REPRESENTATIVE FOR THE FOLLOWING REVIEWS TO BE PERFORMED.
- FABRICATION REVIEW, TO BE PERFORMED ONCE FABRICATION IS SUBSTANTIALLY COMPLETE AND PRIOR TO SHIPPING OF COMPONENTS.
- CONCRETE PRE-POUR REVIEW, TO BE PERFORMED ONCE REINFORCEMENT IS PLACED AND PRIOR TO CASTING OF ITEMS.
- FINAL INSTALLATION REVIEW, TO BE PERFORMED ONCE MAJORITY OF THE STRUCTURE IS INSTALLED.

14. ANY DEFICIENCIES NOTED DURING A FIELD REVIEW MUST BE CORRECTED PRIOR TO THE COMPLETION OF THE AFFECTED STAGE OF WORK.
15. ADDITIONAL FIELD REVIEWS MAY BE REQUIRED AT THE DISCRETION OF THE OWNER'S REPRESENTATIVE.

DEMOLITION

1. ALL EXISTING MATERIAL TO BE DISPOSED OF OFF SITE IN ACCORDANCE WITH ALL LOCAL, PROVINCIAL AND FEDERAL REGULATIONS.
2. DEMOLITION OF EXISTING STRUCTURES TO BE CARRIED OUT IN ACCORDANCE WITH CSA S350-M1580, CODE OF PRACTICE FOR SAFETY IN DEMOLITION OF STRUCTURES.

ENVIRONMENTAL CONSTRUCTION REQUIREMENTS

1. ALL WORKS ARE TO BE COMPLETED WITHIN THE FISHERIES WINDOW.
2. ACCESS TO THE PROJECT SITE IS TO BE EXCLUSIVELY FROM THE SOUTH SIDE OF THE NILE CREEK.
3. CONTRACTOR TO PROVIDE 48 HOURS NOTICE TO THE OWNER PRIOR TO ANY CONCRETE POURS.
4. AN ENVIRONMENTAL MONITOR, RETAINED BY THE OWNER, SHALL BE PRESENT DURING ANY CONCRETE POURS OR OTHER ACTIVITIES WITH ENVIRONMENTAL RISKS.
5. ANY MACHINERY OR EQUIPMENT OPERATED ON SITE SHALL BE CLEAN, FREE OF LEAKS AND IN GOOD WORKING CONDITION.
6. SPILL KITS SHALL BE AVAILABLE ON SITE AT ALL TIMES.
7. REFUELING OF ANY MACHINERY IS TO TAKE PLACE A MINIMUM OF 30M FROM THE TOP OF THE RIVER BANK.
8. ANY TEMPORARY WORKS INCLUDING ACCESS SCAFFOLDING SHALL BE INSTALLED IN A MANNER WHICH MINIMIZES REMOVAL OF, OR DAMAGE TO, EXISTING VEGETATION.
9. ANY CONCRETE AND CONCRETE WASH WATER IS TO BE CONTAINED AND MUST NOT ALLOWED TO ENTER THE RIVER.
10. ANY CAST-IN-PLACE CONCRETE MUST BE ISOLATED FROM THE RIVER FOR A MINIMUM OF 48 HOURS.
11. ALL TREES AND ROOTS TO BE PRESERVED WHERE POSSIBLE. ALL DISTURBED AREAS TO BE REMEDIATED IN ACCORDANCE WITH THE ENVIRONMENTAL MANAGEMENT PLAN.
11. ALL DEMOLISHED MATERIALS ARE TO BE REMOVED FROM SITE.
12. NO DEMOLISHED MATERIAL IS TO BE ALLOWED TO ENTER THE WATERWAY DURING DEMOLITION OR REMOVAL.

CAST-IN-PLACE CONCRETE

1. ALL CONCRETE WORK SHALL CONFORM TO THE REQUIREMENTS OF CAN/CSA A23.1 AND A23.2, LATEST EDITION.
2. CONCRETE MIXES SHALL CONFORM TO CAN/CSA A23.1 AND A23.2 AND SHALL HAVE THE FOLLOWING PROPERTIES:

CLASS	28 DAY STRENGTH	MAXIMUM AGGREGATE SIZE	MAXIMUM SLUMP	AIR CONTENT	EXPOSURE
ALL ITEMS	30 MPa	19mm	75mm	4% TO 7%	F-2

3. REINFORCING STEEL TO CONFORM TO CSA SPECIFICATION G30.18M, GRADE 400, UNLESS NOTED OTHERWISE.
4. LAP OF BARS FOR SPLICES TO BE 40 x BAR DIAMETER, UNLESS NOTED OTHERWISE.
5. PROVIDE A 20mm CHAMFER ON ALL EXPOSED EDGES OF CONCRETE, UNLESS NOTED OTHERWISE.
6. CONCRETE FINISHES SHALL BE IN ACCORDANCE WITH CAN/CSA A23.1.
7. ALL CONCRETE CURING SHALL BE IN ACCORDANCE WITH CAN/CSA A23.1. SPECIAL PRECAUTIONS SHALL BE TAKEN AS NOTED IN CSA A23.1 FOR PLACING AND CURING CONCRETE ABOVE 27° C AND BELOW 5° C.
8. MINIMUM CONCRETE COVER TO REINFORCING SHALL BE 50mm, UNLESS NOTED OTHERWISE.
9. 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

ANCHOR RODS

1. ALL ANCHOR RODS ARE TO MEET THE REQUIREMENTS OF ASTM F1554 GRADE 36.
2. ALL ANCHOR RODS ARE TO BE HOT DIP GALVANIZED IN ACCORDANCE WITH ASTM A153 CLASS C.

STEEL

1. ALL FABRICATED AND MISCELLANEOUS METAL TO MEET CSA G40.21 GRADE 350AT UNLESS NOTED OTHERWISE.
2. BOLTED CONNECTIONS BETWEEN STEEL COMPONENTS SHALL UTILIZE ASTM A325 TYPE 3 BOLTS OR GALVANIZED ASTM A325 TYPE 1 BOLTS COMPLETE WITH MATCHING NUTS AND WASHERS, UNLESS OTHERWISE SHOWN ON DRAWINGS.
3. FOR OTHER CONNECTIONS BOLTS, NUTS, MALLEABLE IRON WASHERS, LAG SCREWS, ARDOX SPIKES AND NAILS, SHALL BE HOT DIP GALVANIZED FOR EXTERIOR USE. NAILS AND SPIKES TO CONFORM TO CSA B111-1974, S406-92. BOLTS AND NUTS SHALL CONFORM TO ASTM A307.
4. WELDING SHALL BE IN ACCORDANCE WITH CSA W59 BY FABRICATORS AND ERECTORS CERTIFIED BY THE CANADIAN WELDING BUREAU TO CSA W47.1 (DIVISION 1 OR DIVISION 2).
5. ALL WELDS SHALL BE 6mm FILLET WELD MINUMUM, UNLESS NOTED OTHERWISE.

WELDING INSPECTIONS

1. ALL WELD INSPECTIONS ARE TO BE PERFORMED BY A THIRD PARTY COMPANY RETAINED BY THE CONTRACTOR AND CERTIFIED TO CSA W178.2
2. WELDING SHALL BE INSPECTED AS FOLLOWS:
- FILLET WELDS - OTHER - VISUAL - 25%
- CP WELDS - RADIOGRAPHIC OR ULTRASONIC - 100%

3. ANY FAILURES IDENTIFIED BY INSPECTOR SHALL BE CORRECTED AND RE-INSPECTED AT THE CONTRACTORS EXPENSE.
4. SUBMIT ALL INSPECTION REPORTS TO THE OWNER'S REPRESENTATIVE FOR REVIEW. DO NOT COVER MEMBERS AND THEIR CONNECTIONS WITHOUT THE APPROVAL OF THE STRUCTURAL ENGINEER.

TIMBER

1. ALL NEW TIMBER TO CONFORM TO CSA-O141-91 "SOFTWOOD LUMBER" TIMBER GRADES AND SPECIES AS FOLLOWS:

MEMBER	(FINISH)	SPECIES	GRADE
POSTS	ROUGH	YELL. CEDAR (NORTHERN SPECIES)	GROUP No. 1, OR BETTER
RAILS	(S4S)	YELL. CEDAR (NORTHERN SPECIES)	GROUP No. 1, OR BETTER
CAP	(S4S)	YELL. CEDAR (NORTHERN SPECIES)	GROUP No. 1, OR BETTER
DECKING	ROUGH	YELL. CEDAR (NORTHERN SPECIES)	GROUP No. 1, OR BETTER

2. ALL TIMBER CONSTRUCTION, DETAILS AND FASTENINGS SHALL CONFORM FULLY TO CSA O86, CURRENT EDITION.
3. PRE-DRILL ALL BOLT AND LAG SCREW SHANK HOLES (BUT NOT LEAD HOLES). BOLT HOLES SHOULD BE FULL LENGTH AND SIZE FOR MACHINE BOLTS.
4. NAILING STRIP TO BE HDPE MATERIAL, BROWN IN COLOUR. CONTRACTOR TO SUBMIT MATERIAL SPECIFICATIONS WITH BID.

ABBREVIATIONS

BRG.	-	BEARING
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
S4S	-	SMOOTH 4 SIDES
SIM.	-	SIMILAR
S.S.	-	STAINLESS STEEL
T.O.	-	TOP OF
TYP.	-	TYPICAL
U/S	-	UNDERSIDE
U.N.O.	-	UNLESS NOTED OTHERWISE
WP	-	WORK POINT

NORTH



KEY PLAN
N.T.S.

NOT FOR CONSTRUCTION

ISSUES

No.	DATE YYYY.MM.DD	ISSUED FOR
A	2022.08.24	CLIENT REVIEW
B	2024.05.14	CLIENT REVIEW
C	2024.06.27	TENDER

© Copyright reserved. This drawing remains the exclusive property of Herold Engineering Limited and may not be reused or reproduced without written consent of Herold Engineering Limited.

SUB CONSULTANT

DRAFTED PHU
DRAFTING REVIEW
DESIGNED GLG
DESIGN REVIEW MGCS

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

ENGINEERS SEAL
ENGINEERS AND GEOSCIENTISTS BC PRACTICE #1000201
PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA M.C.G. SEYD #29013
2024-06-27

GENERAL NOTES AND KEY PLAN

NILE CREEK BRIDGE CROSSING

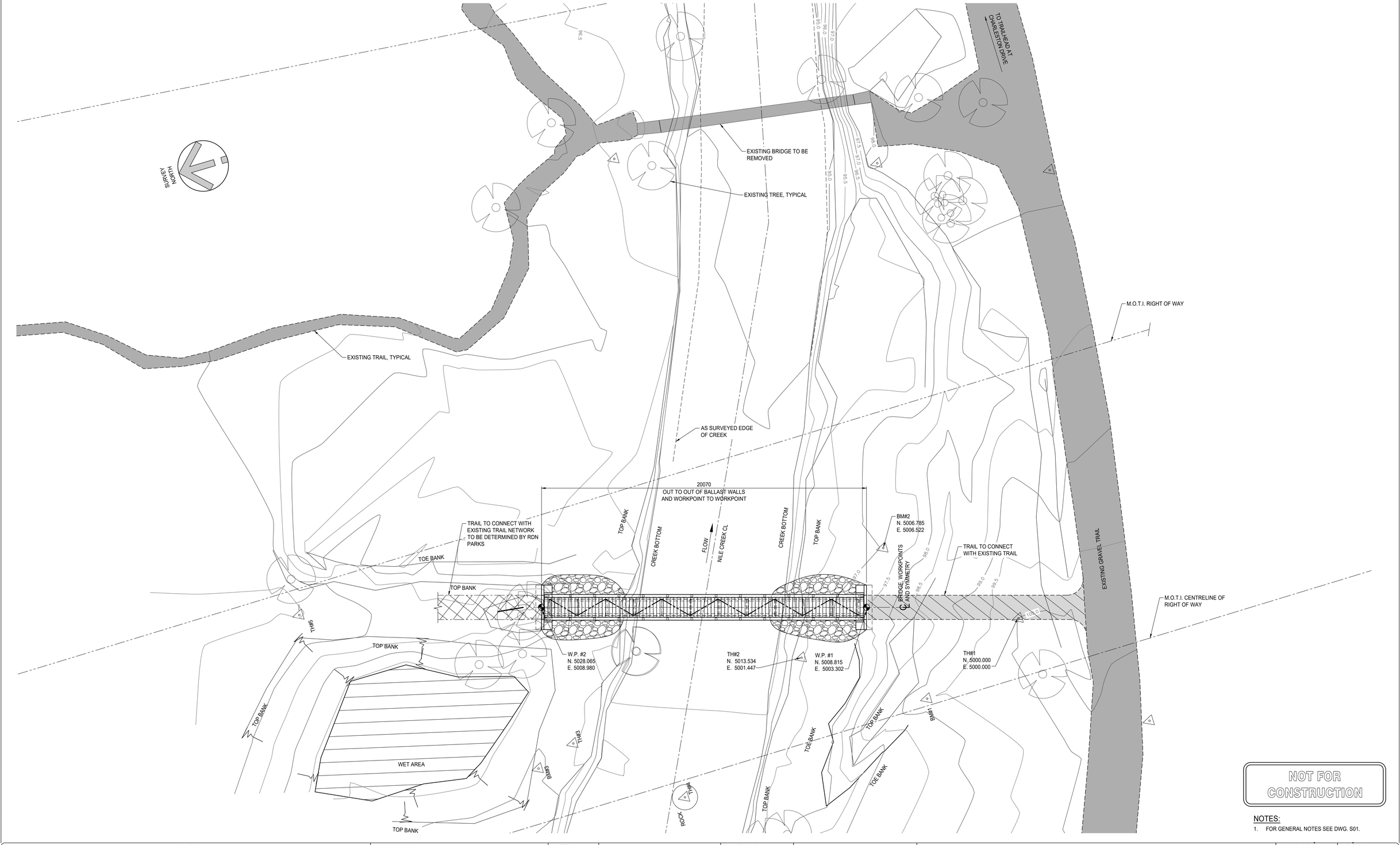
QUALICUM BAY
REGIONAL DISTRICT OF NANAIMO

HEL PROJECT No.	CLIENT DWG. No.
0837-090	N/A
SCALE	PERMIT No.
NONE	N/A
HEL DRAWING No.	REVISION
S01	C

DESTROY ALL DRAWINGS SHOWING PREVIOUS REVISION

File: H:\Projects\0837-090 Nile Creek Bridge Crossing\045 Drawings\Active\0837-090-S01.dwg Plot Time: Jun. 27, 24 8:33 by User: Jonathon Chettiea

ARCHITECTURAL D 24" x 36"



NOT FOR CONSTRUCTION

NOTES:

1. FOR GENERAL NOTES SEE DWG. S01.

ISSUES								
No.	DATE YYY.MM.DD	ISSUED FOR	No.	DATE YYY.MM.DD	ISSUED FOR	No.	DATE YYY.MM.DD	ISSUED FOR
A	2022.08.24	INFORMATION						
B	2023.09.28	CLIENT REVIEW						
C	2024.05.14	CLIENT REVIEW						
D	2024.06.27	TENDER						

© Copyright reserved. This drawing remains the exclusive property of Herold Engineering Limited and may not be reused or reproduced without written consent of Herold Engineering Limited.

SUB CONSULTANT

DRAFTED PHU

DRAFTING REVIEW

DESIGNED GLG

DESIGN REVIEW MGCS

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

ENGINEERS SEAL
PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA
M.C.G. SEYD
#20013
2024-06-27

GENERAL ARRANGEMENT

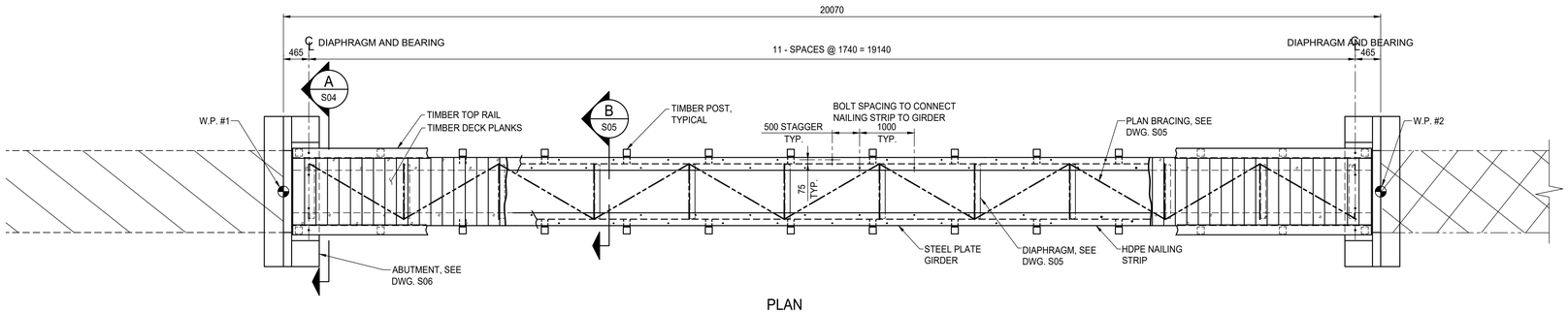
NILE CREEK BRIDGE CROSSING

QUALICUM BAY
REGIONAL DISTRICT OF NANAIMO

HEL PROJECT No. 0837-090	CLIENT DWG. No. N/A
SCALE 1:100	PERMIT No. N/A
HEL DRAWING No. S02	REVISION C

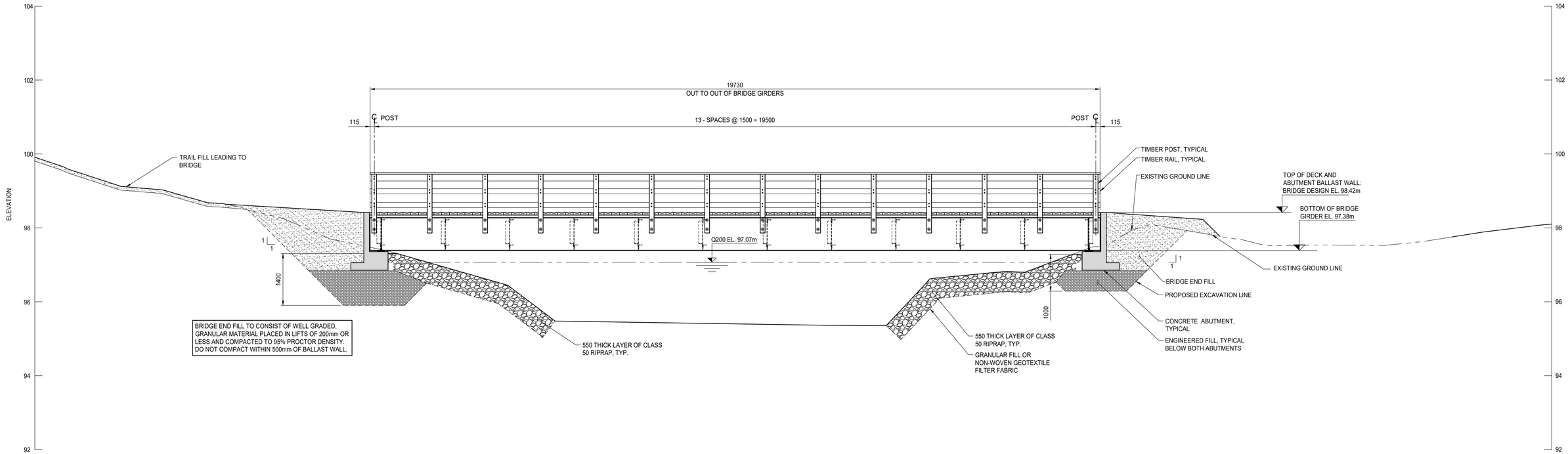
DESTROY ALL DRAWINGS SHOWING PREVIOUS REVISION

File: I:\Projects\0837-090 Nile Creek Bridge Crossing\CAD Drawings\Active\0837-090-S02.dwg Plot Time: Jun. 27, 24 5:13 PM User: Jonathon Charlton



PLAN

1:50



NOTE: THE Q200 WATER LEVEL INDICATED IS APPROXIMATE AND BASED ON THE FOLLOWING:

- DRAINAGE AREA = 14.7 KM^2
- DRAINAGE ELEVATIONS = 980M AT TOP OF CREEK, 15M AT BRIDGE LOCATION FROM RDN PUBLIC VIEWER MAP
- HYDRAULIC OPENING AND LOCAL STREAM GRADIENT OF 0.035M/M FROM HEROLD ENGINEERING LIMITED SURVEY DATED 2022
- MANNING COEFFICIENT (LOCAL) = 0.05
- DESIGN APPROACH BY MOTI FOR DRAINAGE AREA UP TO 10KM^2
- LIMITED DATA LEAD TO ASSUMPTIONS AND METHODS SIMILARLY USED IN BC MOTI HYDROLOGY EXAMPLE FOR SMALLER AND NEAR BY THAMES CREEK.
- RESULTS INLINE WITH THAMES CREEK AND FINDINGS FROM SURVEY STATION LOCATION DOWNSTREAM.

NOT FOR CONSTRUCTION

NOTES:

1. FOR GENERAL NOTES SEE DWG. S01.

ISSUES

No.	DATE YYYY.MM.DD	ISSUED FOR
A	2023.09.18	CLIENT REVIEW
B	2024.05.16	CLIENT REVIEW
C	2024.06.27	TENDER

© Copyright reserved. This drawing remains the exclusive property of Herold Engineering Limited and may not be reused or reproduced without written consent of Herold Engineering Limited.

SUB CONSULTANT

DRAFTED PHU

DRAFTING REVIEW

DESIGNED GLG

DESIGN REVIEW MGCS

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

ENGINEERS SEAL
ENGINEERS AND GEOSCIENTISTS BC PRACTICE #1000201
PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA M.C.G. SEYD #29013
2024-06-27

PLAN AND ELEVATION

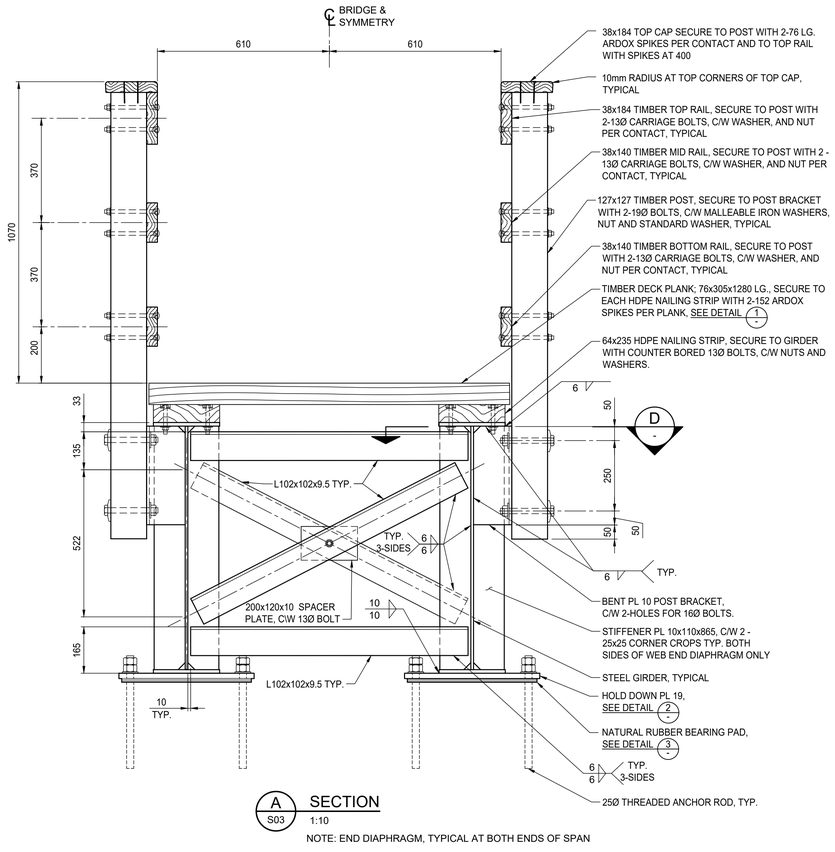
NILE CREEK BRIDGE CROSSING

QUALICUM BAY
REGIONAL DISTRICT OF NANAIMO

HEL PROJECT No.	CLIENT DWG. No.
0837-090	N/A
SCALE	PERMIT No.
AS NOTED	N/A
HEL DRAWING No.	REVISION
S03	C

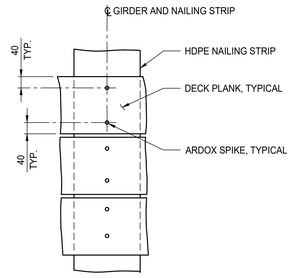
DESTROY ALL DRAWINGS SHOWING PREVIOUS REVISION

ARCHITECTURAL D 24" x 36"
File: N:\Projects\0837-090 Nile Creek Bridge Crossing\045 Drawings\Active\0837-090-S03.dwg Plot Time: Jun. 27, 24 3:35 PM User: Jonathon Chethina

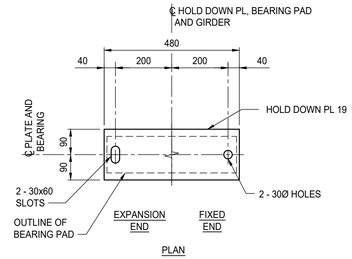


A S03 SECTION
1:10

NOTE: END DIAPHRAGM, TYPICAL AT BOTH ENDS OF SPAN

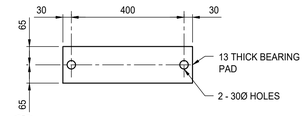


1 - DETAIL - PLAN
1:10



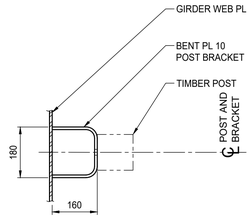
2 - DETAIL - HOLD DOWN PLATE
1:10

NOTE: 4-REQUIRED. FOR LOCATIONS, SEE S05.



3 - DETAIL - BEARING PAD
1:10

NOTE: 4-REQUIRED. FOR LOCATIONS, SEE S05.



D - SECTION
1:10

NOT FOR CONSTRUCTION

NOTES:
1. FOR GENERAL NOTES SEE DWG. S01.

ISSUES											
No.	DATE YYYY.MM.DD	ISSUED FOR	No.	DATE YYYY.MM.DD	ISSUED FOR	No.	DATE YYYY.MM.DD	ISSUED FOR
A	2024.05.16	CLIENT REVIEW						
B	2024.06.27	TENDER						

© Copyright reserved. This drawing remains the exclusive property of Herold Engineering Limited and may not be reused or reproduced without written consent of Herold Engineering Limited.

SUB CONSULTANT

DRAFTED PHU
DRAFTING REVIEW
DESIGNED GLG
DESIGN REVIEW MGCS

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

ENGINEERS SEAL
PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA
M.C.G. SEYD #26013
ENGINEERING PRACTICE #1000201
2024-06-27

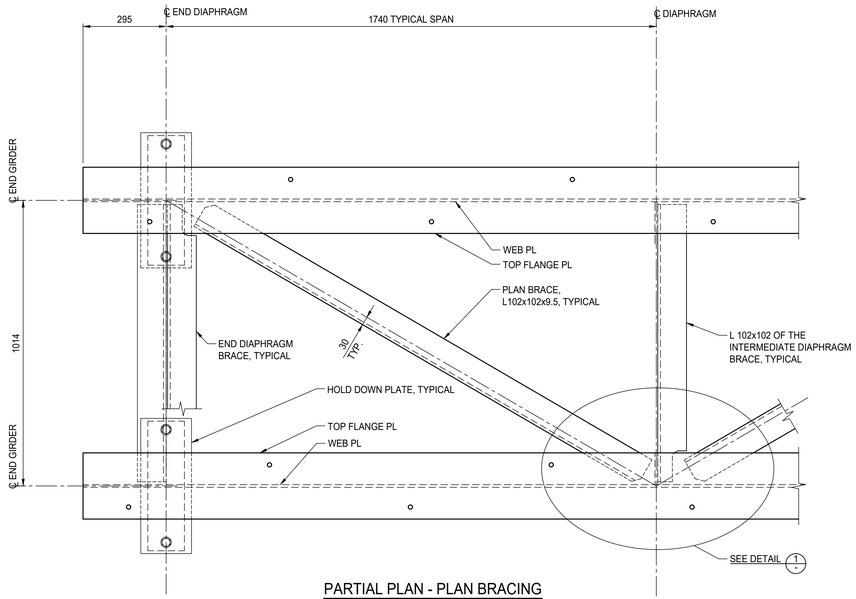
SECTIONS AND DETAILS

NILE CREEK BRIDGE CROSSING
QUALICUM BAY
REGIONAL DISTRICT OF NANAIMO

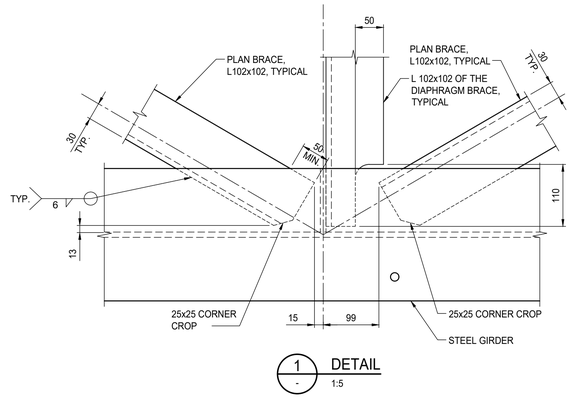
HEL PROJECT No.	CLIENT DWG. No.
0837-090	N/A
SCALE: AS NOTED	PERMIT No.: N/A
HEL DRAWING No.: S04	REVISION: B

DESTROY ALL DRAWINGS SHOWING PREVIOUS REVISION

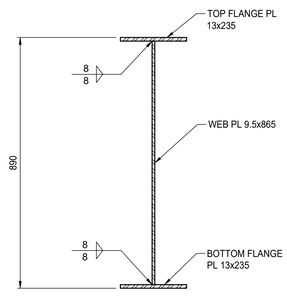
ARCHITECTURAL D 24" x 36"
File: \\Projects\0837-090 Nile Creek Bridge Crossing\045 Drawings\Autocad\0837-090-S04.dwg Plot Time: Jun. 27, 24 5:21 PM User: Jonathon Chaffee



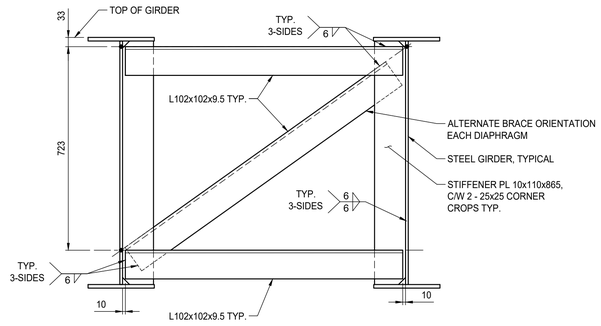
PARTIAL PLAN - PLAN BRACING
1:10



1/- DETAIL
1:5



SECTION - PLATE GIRDER
1:10



B/S03 SECTION
1:10

NOTE: INTERMEDIATE DIAPHRAGM 10 REQUIRED

NOT FOR CONSTRUCTION

NOTES:
1. FOR GENERAL NOTES SEE DWG. S01.

ISSUES								
No.	DATE YYYY.MM.DD	ISSUED FOR	No.	DATE YYYY.MM.DD	ISSUED FOR	No.	DATE YYYY.MM.DD	ISSUED FOR
A	2024.05.16	CLIENT REVIEW						
B	2024.06.27	TENDER						

© Copyright reserved. This drawing remains the exclusive property of Herold Engineering Limited and may not be reused or reproduced without written consent of Herold Engineering Limited.

SUB CONSULTANT

DRAFTED PHU
DRAFTING REVIEW
DESIGNED GLG
DESIGN REVIEW MGCS

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

ENGINEERS SEAL
ENGINEERS AND GEOSCIENTISTS BC PRACTICE #1000201
PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA M.C.G. SEYD #29013
2024-06-27

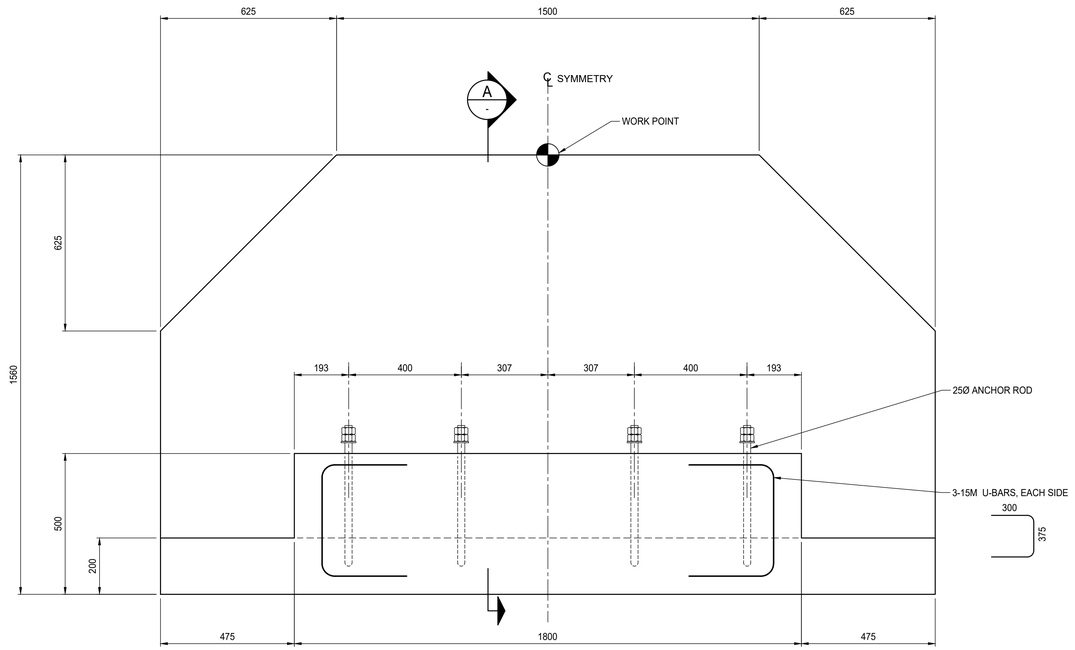
GIRDERS, DIAPHRAGMS AND BRACING

NILE CREEK BRIDGE CROSSING
QUALICUM BAY
REGIONAL DISTRICT OF NANAIMO

HEL PROJECT No.	CLIENT DWG. No.
0837-090	N/A
SCALE: AS NOTED	PERMIT No.: N/A
HEL DRAWING No.: S05	REVISION: B

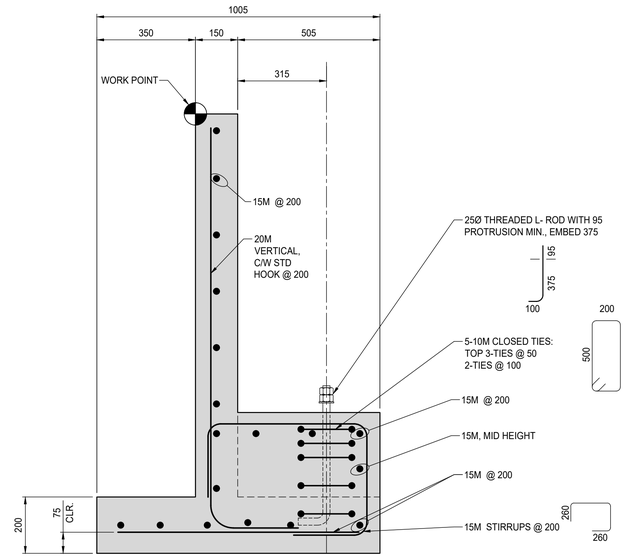
DESTROY ALL DRAWINGS SHOWING PREVIOUS REVISION

ARCHITECTURAL D 24" x 36"
File: X:\Projects\0837-090 Nile Creek Bridge Crossing\GAS Drawings\Active\0837-090-S05.dwg Plot Time: Jun. 27, 24 9:22 PM User: jonathan Chaffee



ELEVATION - FRONT

1:10



A - SECTION

1:10

NOT FOR CONSTRUCTION

NOTES:

1. FOR GENERAL NOTES SEE DWG. S01.

ISSUES								
No.	DATE YYYY.MM.DD	ISSUED FOR	No.	DATE YYYY.MM.DD	ISSUED FOR	No.	DATE YYYY.MM.DD	ISSUED FOR
A	2024.05.16	CLIENT REVIEW						
B	2024.06.27	TENDER						

© Copyright reserved. This drawing remains the exclusive property of Herold Engineering Limited and may not be reused or reproduced without written consent of Herold Engineering Limited.

SUB CONSULTANT

DRAFTED PHU

DRAFTING REVIEW

DESIGNED GLG

DESIGN REVIEW MGCS

HEROLD ENGINEERING

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

ENGINEERS SEAL

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA M.C.G. SEYD #29013 ENGINEER

PERMIT TO PRACTICE #1000201

2024-06-27

ABUTMENTS

NILE CREEK BRIDGE CROSSING

QUALICUM BAY

REGIONAL DISTRICT OF NANAIMO

HEL PROJECT No.	CLIENT DWG. No.
0837-090	N/A
SCALE: AS NOTED	PERMIT No.: N/A
HEL DRAWING No.: S06	REVISION: B

DESTROY ALL DRAWINGS SHOWING PREVIOUS REVISION

ARCHITECTURAL D 24" x 36"

File: \\Projects\0837-090 Nile Creek Bridge Crossing\045 Drawings\Active\0837-090-S06.dwg Plot Time: Jun. 27, 24 6:24 PM User: Jonathon Chaffins

APPENDIX C

ENVIRONMENTAL PROTECTION PLAN

AQUAPARIAN
Environmental Consulting Ltd.

July 2, 2024

Jonathan Behnke
Regional Parks Planner
Parks Services, Regional District of Nanaimo
1490 Springhill Road
Parksville BC, V9P 2T2
T: 250-248-4744 x3670 C: 250-268-4295

Via Email: jbehnke@rdn.bc.ca

RE: ENVIRONMENTAL PROTECTION PLAN
NILE CREEK BRIDGE CONSTRUCTION PROJECT

1.0 INTRODUCTION

Aquaparian Environmental Consulting Ltd. (Aquaparian) was retained by the Regional District of Nanaimo (RDN) to complete an Environmental Impact Assessment (EIA) and Environmental Protection Plan (EPP) for the construction of a new pedestrian bridge over Nile Creek located within Electoral Area H of the RDN in Qualicum Beach, BC.

The plan is to remove a derelict and unsafe pedestrian bridge and install a new clear-span pedestrian bridge a short distance to the west within the Ministry of Transportation and Infrastructure (MoTI) Right-of-Way with a new section of trail on each side connecting to the existing Nile Creek Trail. The following EPP is intended to provide the contractor with environmental protection measures to avoid or mitigate impacts to the stream (i.e. water quality, fish habitat) or the forest habitat while completing this project. The EPP is to be considered as a living document that may need to be amended to include and/or meet any terms and conditions that may be imposed by permits, licenses, or other approvals or as a result of design changes. This document is intended to support the Environmental Impact Assessment report but has been formatted as a stand-alone document that is to be provided to the construction contractor awarded to carry out the project. The contractor shall be required to review and have a copy of this document on site at all times during the construction of the project. The EPP has been created to mitigate potential environmental impacts during the construction phase of the project.

2.0 ENVIRONMENTAL MONITOR ROLES AND RESPONSIBILITIES

Environmental monitoring is expected to be completed on a part-time basis. High risk activities such as installation of poured in place bridge abutments and rip rap armouring the riverbanks will be monitored full-time while regular inspection for erosion and sediment control during construction of the approaches will be limited to part-time inspections. The role of the Environmental Monitor (EM) is to inspect, evaluate and report on the compliance and effectiveness of work practices and environmental protection and mitigation procedures as identified in this EPP and associated permits or approvals and to recommend and oversee improvements to the plan as necessary.

The EM shall have the authority to advise the contractor(s) to modify or halt construction operations that conflict with safe environmental practices and procedures. Mitigation measures include general objectives related to environmental protection and a site-specific action plan to control impacts to fish and wildlife during construction activities.

The contractor shall review this EPP document prior to the start of the project. The EM will hold a pre-construction meeting with the construction crew(s) to review environmental protection requirements identified within this document and all associated regulatory documents. During the construction phase of the project, the EM will have the primary responsibility to confirm that environmental management measures, controls and specifications are implemented in accordance with the EPP and are operating in compliance with terms and conditions of regulatory permits and approvals and Industry Best Management Practices (BMPs).

2.1 ROLES AND RESPONSIBILITIES OF THE EM

Roles and responsibilities of the EM include, but are not limited to the following:

- Have an understanding of all aspects of the project including the contract documents, project-related authorizations, agency guidelines and other documents, and confirm if all mitigation measures contained within are being appropriately implemented;
- Review the contractor's work plans to confirm if the conditions of the EPP are met, and make recommendations to address any deficiencies;
- Monitor contractor work activities as required and be on call should an emergency arise. A monitoring report is to be generated following every site inspection documenting project activities, mitigation measures and any recommendations made. Site photographs are to be included;

- Consult with the construction Project Manager should a Work Stoppage be necessary if environmental protection is compromised;
- Inventory contents of Emergency Spill Kits and confirm if they are appropriately stocked and maintained;
- Monitor on-site equipment and machinery for oil or fuel leaks and follow-up any repairs prior to machinery being mobilized on site;
- Complete Environmental Incident Reports (EIR) when required. The EM or project manager is to observe, document and report spills and spill cleanup and contact appropriate authorities (i.e. Emergency Management BC (EMBC)) in the event of an environmental incident or development of unforeseen site conditions with potential for serious environmental degradation;
- Complete regular inspection of the emergency response plan and spill containment / recovery equipment, and spill response training programs;
- Inspection of the effectiveness of contractor's construction waste management program; and,
- Review contractor final site cleanup.

2.2 CONTRACTOR ENVIRONMENTAL REPONSIBILITIES

The contractor's environmental responsibilities include:

- Be completely familiar with mitigation measures outlined in this EPP document;
- Implement and maintain mitigation measures to meet the objectives identified in this report;
- Frequent inspection of equipment for wear and leaks;
- Spill prevention and management, waste management and disposal;
- Maintain supplies of emergency spill management equipment and crew response training;
- Report spills to the EM and other relevant personnel/agencies as per the Spill Reporting Procedure (SRP); and,

- Work with the EM if additional measures are necessary to meet the guidelines set out in this report.

2.3 ENVIRONMENTAL INCIDENT REPORTS (EIR)

Spill prevention and emergency response procedures shall be communicated to all construction crew at the start of the project and thereafter at regular intervals throughout the contract. The EM will be required to report environmental incidents, including non-compliance issues to the Project Manager and to external agencies such as EMBC if required by the nature of the incident within 24 hours.

An environmental incident is one that has caused, or has the potential to cause, one or more of the following:

- Environmental damage;
- Adverse effects to fish, wildlife or other environmental resources;
- Adverse publicity with respect to the environment; and,
- Legal action with respect to violation of statutes or environmental damage.

Examples of an environmental incident include, but are not limited to:

- Spills of oil, hydraulic fluid or other hazardous chemicals; and,
- Discharges of deleterious substances into the freshwater environment.

An emergency contact list is to be generated by the contractor at the beginning of the project and the list is to be kept onsite and available to all crew members in the event of an emergency.

For incidents that pose a threat to the environment or human safety as identified by the *Environmental Management Act* Spill Reporting Regulation, the first external call shall be made to the EMBC (formerly PEP) 1-800-663-3456 (24 hour).

The Project Manager or EM (if on site) should be notified as early as possible following an incident and the spill must be documented by Environmental Incident Report (EIR). In addition, it may be necessary in some situations for the EM to notify regulatory agencies with respect to environmental incidents. Agency reporting requirements are provided in Table 1 and shall be included in any Spill Prevention and Emergency Response documentation prepared for the project.

TABLE 1. SPILL REPORTING MATRIX

Substance	Quantity	External Reporting Requirements	Internal Reporting Requirements
Any spill into water	**Any**	**EMBC**	**EIR**
Oil & waste oil	>100L	EMBC	EIR
Oil with >50ppm PCB	>1kg	EMBC	EIR
Flammable or non- flammable gas	10kg	EMBC	EIR
Toxic or corrosive waste	>5kg	EMBC	EIR
Hazardous waste	>5L	EMBC	EIR

Where a spill occurs, the person who immediately before the spill had possession, charge or control of the spilled substance shall take all reasonable and practical action, having due regard for the safety of the public and of himself or herself, to stop, contain and minimize the effects of the spill. Environmental incidents are to be reported to the project team within 24 hours.
The incident report is to include the following information:

(a) The reporting person's name and telephone number,

(b) The name and telephone number of the person who caused the spill,

(c) The location, date and time of the spill,

(d) The type and quantity of the substance spilled,

(e) The cause and effect of the spill,

(f) Details of action taken or proposed to comply with Section 3,

(g) A description of the spill location and of the area surrounding the spill,

(h) The details of further action contemplated or required,

(i) The names of agencies on the scene, and

(j) The names of other persons or agencies advised concerning the spill.

3.0 ENVIRONMENTAL PROTECTION PLANS (EPPS)

3.1 GENERAL ENVIRONMENTAL PROTECTION MEASURES

- Due to proximity to a fish bearing stream, all bridge work must be completed within the “least risk work window” June 15 – September 15 as per the Ministry of Environment. An extension may be applied for based on weather conditions in 2-week increments if necessary. Aquaparian will submit an extension request if necessary.

- The Environmental Monitoring (EM) will be provided by Aquaparian on a part-time basis for all activities with a potential risk to impact the stream, primarily for activities

around the stream bank. The EM is to conduct a project start-up meeting with the contractors to review requirements of this EPP and verify environmental protection equipment is on site including spill prevention kits, filter fabric, site safety signage, hazardous material storage, garbage storage, permits etc;

- Inspect and verify all equipment is in good working order, clean and free of leaks prior to mobilizing on site;
- Store food and food waste in a secure container during works and remove off site when personnel are not on site to prevent attracting wildlife;
- Remove equipment, fuel supplies and/or waste materials from the forest and project area at night to prevent wildlife from accessing it or causing a spill; and,
- Hazardous waste material generated in the course of the project (oil adsorbent pads, oily & grease covered rags, containers, etc.) shall be disposed of in compliance with hazardous waste regulations.

3.3 SPILL PREVENTION & REPORTING

Construction will require the use of heavy equipment (excavator and crane) and small gas power tools such as a chain saw. No equipment is to ford the stream to access the north side.

- The contractor is to have Spill Prevention & Reporting procedures and Emergency Response Plan in place prior to the start of works;
- All work will be conducted in a manner that does not result in the deposit of a toxic or deleterious substance into Nile Creek;
- Equipment fueling (if necessary) is to be completed in the upland at least 15m away from the stream and to be constantly monitored during fueling;
- Gerry cans of fuel (if used) are to be stored in containment such as a Rubbermaid tub with a tight-fitting lid when not in use to prevent spillage;
- The Environmental Monitor (EM) is to be informed of all fuel, oil and / or chemical spills that occur during the project;
- Containment, recovery and clean-up procedures are to be in place prior to the start of work;

- At least one spill containment boom should be on site for immediate deployment into the stream in case of accidental spill; and

- If a fuel or hydraulic oil spill occurs, the operator of the machine or equipment shall stop work immediately, address the immediate containment and clean-up of the spill and undertake the repair or replacement of the machinery before work is allowed to continue. The following spill response procedure is to be followed:

    1. MAKE THE AREA SAFE
    2. STOP THE FLOW (when possible)
    3. SECURE THE AREA
    4. CONTAIN THE SPILL
    5. NOTIFY/REPORT
    6. CLEAN-UP
    7. SPILL REPORT

1. MAKE THE AREA SAFE

- Evaluate risk to Personal/Public and Environmental Safety;
- Wear appropriate Personal Protective Equipment (PPE);
- Never rush in, always determine the product spilled before taking action;
- Warn people in the immediate vicinity; and,
- Ensure no ignition sources if spill is a flammable material.

2. STOP THE FLOW (when possible and safe to do so)

- Act quickly to reduce the risk of environmental impacts;
- Close valves, shut off pumps or plug holes/leaks; and,
- Stop the flow or the spill at its source.

3. SECURE THE AREA

- Limit access to the spill area; and,
- Prevent unauthorised entry onto the site.

4. CONTAIN THE SPILL

- Prevent spilled material from entering the stream;
- Use spill sorbent material or containment boom to contain the spill;
- If necessary, use a dyke or any other method to prevent any discharge on site; and,
- Make every effort to minimize contamination.

5. NOTIFY/REPORT

- Verbally report all spills to the EM and the Project Manager immediately. All spills to the freshwater environment are to be reported to **EMBC (1-800-663-3456)**.

6. CLEAN-UP

- Determine required cleanup options;
- Mobilize recovery equipment and cleanup crew and direct cleanup activities;
- Dispose of all equipment and/or material used in clean up (e.g., used sorbent, oil containment materials, etc.) in accordance with MFLNRO requirements;
- Accidental spills may produce hazardous wastes (e.g., material with > 3% oil by mass) and contaminated soil. All waste disposals must comply with the *Environmental Management Act* and Regulations; and
- Replenish spill response kits and equipment.

7. SPILL REPORT

- Provide necessary spill details. A spill report should be completed and submitted to the Project Manager within 24 hours of the incident documenting the type and volume of spill, clean up and if external reporting was required; and,
- The EM will have the authority to shut down the work should fish or fish habitat be at risk. If directed by the project manager, the EM will make an external call to EMBC if necessary.

3.2 VEGETATION REMOVAL

- Forest vegetation removal is required for equipment access and bridge alignment. The clearing area is to be kept to a minimum and clearly flagged prior to work. Keep within clearing boundaries;

- Trees that are in close proximity to the construction zone should be protected from damage. Install plastic snow-fencing around the drip line of adjacent trees to prevent compaction of root systems by heavy equipment;

- Vegetation removal should be done outside of the migratory bird nesting season (March 15 – August 15). If not, a pre-clearing nesting survey is to be completed by a Qualified Environmental Professional (Aquaparian) within a week of the proposed clearing date, preferably no more than three days prior;

- Remove brush piles from the site to prevent fire hazard;

- A dead wildlife tree with abundant woodpecker holes was observed on the south side of the access road ~5m to the west of the yellow flagging and ~10m south of the access road. This tree is not to be disturbed during this project unless it is deemed a workplace hazard.

3.2 EROSION AND SEDIMENT CONTROL

Sediment and erosion control measures will be required during removal of the existing bridge and during earthworks required to remove non-structural soils and placement of structural fill to support concrete abutments on the upper slopes above the riverbank and during rip rap installation on the riverbanks down to the typical summer river level. Measures are required to prevent sedimentation of Nile Creek as follows:

- Earthworks are to be completed in dry weather whenever possible;
- If soil stockpiles are to be stored for periods of time, they should be positioned at least 15m away from the stream and protected from erosion during rain events i.e. covered with poly or tarp. Preferably non-structural soils will be removed from the site.
- A silt fence is to be installed at the toe of slope of the stream banks prior to derelict bridge removal. Efforts should be made to prevent debris from falling into the river. If debris fall in it should be removed.
- Work site isolation is required for excavation of the stream banks. Prior to vegetation removal and excavation of non-structural soil, install a silt fence above the stream bank. Additional measures may be warranted to prevent soils or fines entering the stream during earth works.
- Prior to installation of rip rap, it may be necessary to isolate the work area from the stream flow if excavation into the stream bed is required to install and bury the toe of the rip rap. Installing a temporary dam around the base of the work area using sandbags and poly sheeting or similar. Depending on the stream flow, it may be necessary for the EM (Aquaparian) to conduct fish salvage prior to and during isolation dam installation.
- Upon completion, exposed soils should be covered with grass seed and straw or composted bark mulch to provide erosion control until the fall when plantings can be installed.

3.4 CONCRETE MANAGEMENT

As understood, the abutments of the bridge will be poured in place concrete supported on compacted structural fill. The following recommendations are provided for cast-in-place concrete works:

- Check the weather forecast and work during no or low precipitation weather conditions during concrete pours.

- No uncured concrete or concrete pour water is to enter the stream. High pH caused by uncured concrete is harmful to fish. Manage concrete pours (i.e. bridge footings) to prevent spillage; ensure the concrete forms have tight fitting joints and do not overtop forms, concrete delivery hoses and chutes have adequate seals to prevent spillage, cover drying concrete with plastic when necessary to protect from rain from contacting uncured concrete within the first 48 hours.

- No concrete equipment / tools are to be washed down near the stream. If necessary, excavate a small pit at least 15 m away from the stream, line it with plastic for waste and wash water. Once the concrete is cured it can be removed from the site. Waste concrete will not be allowed to enter the stream and will be disposed of offsite. and,

- A CO_2 tank with regulator, hose and gas diffuser is to be readily available during concrete work near the watercourse to be deployed if concrete is released into the creek.

3.4 RIPARIAN RESTORATION

- In the fall disturbed soils outside the trail alignment should be restored with native vegetation immediately to protect the stream banks from erosion.

- It is expected that three alder trees will require removal on the north side of the creek. Other tree removals on the south side may be necessary for equipment access. Small areas of understory clearing will also be required for equipment access, bridge abutments and approach pads. Trees are to be replaced following provincial tree replacement criteria:
    - 0 mm - 151 mm (6”) dbh - 2 replacement trees (min height 1.5 m), or, 4 shrubs (for up to 50% of trees being replaced in this range);
    - 152 mm - 304 mm (12”) dbh - 3 replacement trees (min height 1.5 m);
    - 305 mm - 456 mm (18”) dbh - 4 replacement trees (min height 2.0 m);
    - 457 mm - 609 mm (24”) dbh - 6 replacement trees (min height >¨ 2.0 m);
    - 610 mm - 914 mm (36”) dbh - 8 replacement trees (min height > 2.0 m).

- Recommended tree species for the site are Red alder in lower, moist soil locations and Douglas fir or Bigleaf maple in drier upland locations. Trees should be within the riparian zone of the creek and spaced at least 3m apart.

- Replace cleared understorey vegetation with native shrubs spaced 1m apart. Recommended species include: Snowberry, Nootka rose, Sword fern, Dull-Oregon

grape, Salal. Wetter location closer to the creek can be replanted with Salmonberry, Red elderberry and Red-osier dogwood.

- Plant in the early Spring or Fall and irrigate for at least the first two summer seasons to optimize survival. Pocket plant tree and shrub species with topsoil mixed with a handful of bone meal into the planting hole. Apply a layer of organic composted bark mulch to the planting area to help retain moisture.

4.0 CONCLUSION

This EPP has been formulated using standard environmental protection guidelines and regulations for working within and around a stream. Based on our findings in the Environmental Impact Assessment, the project is not expected to result in a negative impact to fish and fish habitat if all precautions outlined in this document are followed. Any negative impacts to riparian vegetation are expected to be minimal and impacted conditions are to be restored with native vegetation.

The contractor(s) will be required to review this document and the Environmental Protection Measures outlined within it prior to the commencement of works. The contractor is to have a copy of this document on site at start-up.

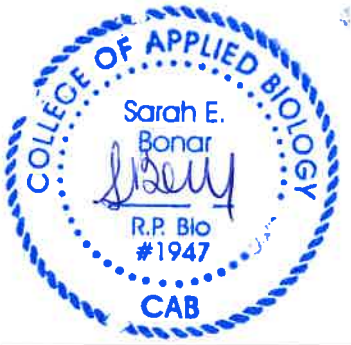
If there are any questions regarding the content of the EPP, please contact the undersigned.

AQUAPARIAN ENVIRONMENTAL CONSULTING LTD.

Prepared by:

Crystal Campbell
Environmental Technician

Reviewed by:



Sarah Bonar, B.Sc. R.P.Bio
Senior Biologist / Principal

https://netorg5387218.sharepoint.com/sites/Shared/Shared Documents/Documents/Projects/Projects/N870 Nile Creek Bridge Crossing/Nile Creek Bridge EPP.docx