



PHOENIX

ENVIRONMENTAL SERVICES LTD. 505 - 1755 WEST BROADWAY, VANCOUVER, BC V6J 4S5 604-689-3888

December 23, 2020

Glenn Richardson
RBD Victoria Inc. and GRD Victoria Inc.
#41A 1145 Inlet Street
Coquitlam, BC
V3B 6E8

Dear Mr. Richardson:

Re: Environmental Impact Assessment – 1160 Victoria Drive, Port Coquitlam, B.C.

Phoenix Environmental Services Ltd. (Phoenix) is pleased to present this Environmental Impact Assessment report for the property located at 1160 Victoria Drive in Port Coquitlam (the Site). This report has been updated from an earlier draft report dated March 2019 in order to address the latest plans for the proposed residential subdivision at the Site. The latest plans reflect comments from the City of Port Coquitlam regarding preliminary development concepts as well as through stakeholder consultation (the Hyde Creek Watershed Society). This Environmental Impact Assessment has been carried out to address the City of Port Coquitlam's requirements for a Watercourse Development Permit (Watercourse DP) as specified under Division 10 – Watercourse Protection DPs under the City of Port Coquitlam Development Procedures Bylaw 2001, No. 3296.

This Environmental Impact Assessment (EIA) provides a description of existing environmental conditions of the Site such as vegetation communities, stream and aquatic habitats, and wildlife habitats, including Provincially-listed Species at Risk. This EIA also identifies the applicable Watercourse Protection Areas (WPA) under the City's Official Community Plan (OCP) Bylaw No. 3838; Watercourse Protection. This report also describes the proposed single-family residential re-development concept for the Site, provides an assessment of potential environmental impacts and recommends associated mitigation measures.

1 INTRODUCTION

The City of Port Coquitlam Official Community Plan (OCP) designates lands within 50 m of watercourses as Development Permit Areas and requires an Environmental Assessment as part of the Watercourse Development Permit (Watercourse DP) process, for any activities that impact watercourses. The Site is intersected by a watercourse that conveys flows from a storm sewer extending south from Victoria Avenue and discharges into a ravine situated in a City road allowance (Newberry St.) to the west of the Site, then flows in an angle southeastward through a natural channel in the south part of the Site, and enters into a storm sewer system at Lynnwood Avenue to the south of the Site. The Site is currently occupied by a single-family dwelling and barn accessed by a driveway from Victoria Drive.

The City's OCP identifies a need for new residential lots and states that there is some opportunity to create new lots through consolidation and subdivision of existing lots. The unnamed stream on the Site has been observed by Phoenix to be a permanent non-fish bearing watercourse ("Class B nutrient stream"), which under the OCP, Section 9.8 Watercourse Protection, is subject to a streamside riparian setback extending 30 m from the watercourse top of bank. The unnamed stream is a tributary of Hyde Creek, connecting



via the storm sewer network. The streams flow return from the storm sewer to an open channel in a vacant lot at 3940 Ambleside Close to the southeast of the Site. The subject unnamed stream provides flow and nutrient export to fish populations present in Hyde Creek, and as such functions as fish habitat.

In order to re-develop the Site for single-family residential lots, the Site owners, RBD Victoria Inc. and GRD Victoria Inc., propose to realign the unnamed stream at the Site so that it flows parallel to the western property boundary. In addition, connecting upstream fish migration from Watkins Creek into the unnamed stream is proposed via a new stream channel through the existing park land southwest of the Site extending from Watkins Creek and through a fish passable culvert that will include baffles to allow fish from Watkins Creek to access the unnamed stream at the Site.

A Preliminary Site Plan has been prepared by H.Y. Engineering showing the proposed single-family development and stream realignment for the Site (see Appendix C). As per Section 9.8 of the OCP, if a stream is fish bearing, a 30-m streamside setback is required; except in agricultural, single residential or duplex zones, where a 15-m setback applies. By realigning the unnamed stream to drain through a fish passable culvert to Watkins Creek, the subject unnamed stream will become a fish-bearing stream; which will change the stream classification to Class A such that a 15-m streamside setback is applicable at the Site as a single-family residential site. The remainder of the Site outside of the 15-m setback from the realigned stream top of bank is proposed to be developed as per the Proposed Subdivision Plan (Appendix C – Lot Grading Plan) and in accordance with the City's densification plan.

This report provides a biophysical inventory of the Site including a description of topographic and geologic features, vegetation communities, streams and aquatic habitat, wildlife and wildlife habitat, and potential occurrence of Species at Risk. This report also describes the measures incorporated into the proposed plan to provide aquatic and terrestrial habitat conservation, enhancement and restoration opportunities, protection of key environmental features, and the mitigation measures to be taken toward environmentally sound construction methods and development at the Site.

This EIA report is intended to support an application for a Watercourse Protection Development Permit. This EIA report is also intended to facilitate further review by the City of Port Coquitlam of the proposed residential subdivision planned for the Site such that City comments on the acceptability and any required modifications to the proposed development plan for the Site can be obtained.

2 PROJECT DESCRIPTION

The proposed development of the Site entails construction of 25 single-family residential lots accessed by new streets within the Site extending from Lynwood Avenue at the south edge of the Site. The proposed lot layout and streets are shown on the Lot Grading Plan prepared by H.Y. Engineering and presented in Appendix C.

The Site will be re-graded to meet existing elevations at Victoria Drive to the north, the unopened Newberry St. road allowance at the northwest edge of the Site, and the existing rear yards of the adjacent single-family residential lots to the east along Wedgewood Street. The internal new roads will be sloped 4-5% eastward and 4% southward to Lynwood Street. Storm sewers will collect stormwater runoff from the proposed new lots and convey stormwater from the Site into a different storm sewer catchment that



drains east along Lynwood Avenue to a storm outfall to Smiling Creek, another tributary of Hyde Creek, east of the intersection of Lynwood Ave. and Alderwood Avenue.

The proposed development includes realigning the unnamed stream on the Site so that it flows predominantly south parallel to the western property boundary. The proposed stream realignment will enable fish migration from Watkins Creek to the southwest of the Site via a fish passable culvert into the unnamed stream at the Site that is presently non-fish bearing. The proposed realignment of the existing stream extends off of the existing stream a short distance downstream of the ravine containing the existing stream in the unopened Newberry St. road allowance and along mid-western edge of the Site. The existing stream within the ravine will be unaltered. The new stream alignment will avoid a grove of large cedar trees and will entail excavation of a new stream channel south through a partly forested area of the Site to a new fish-passable culvert to be constructed near the southwest corner of the Site. In addition, a new stream will be constructed to the east of the existing ravine and north of the existing stream. The new stream to the north of the existing stream will receive base flows from a flow-splitter manhole to be installed into the existing storm sewer beneath the unopened Newberry Street road allowance, which will divert a portion of existing stormwater flows to another manhole east within the Site and then south into the new stream channel to the north of the existing stream at the Site.

To provide fish migration into the new stream alignments within the Site, and the existing ravine stream, a culvert with baffles and embedded gravels in the bottom of the culvert between the baffles will be constructed across Lynwood Ave. and Alderwood Ave. as a fishway. The alignment of the proposed fishway is constrained by sanitary pump station infrastructure at the southwest corner of Lynwood and Alderwood Ave. and by existing underground utilities under both streets. The proposed alignment of the fishway culvert results in the shortest length of fish-passable culvert. A new stream channel will be constructed through the City park to the southwest of the Site along an alignment minimizing tree loss and following existing topography to Watkins Creek just upstream of existing log and boulder bank revetments at a bend in Watkins Creek. The grades of the new channel within the park will enable salmonids and other fish in Watkins Creek to migrate upstream and through the fishway (fish-passable culvert) into the new stream network at the Site.

Refer to the Phoenix drawing, Channel Realignment and Setback Map, presented in Appendix A for an overview of the new streams at the Site and the nearby park connected by the fishway to Watkins Creek, including a detail inset for the new stream in the park to Watkins Creek. Refer to H.Y. Engineering drawings, Stream Plan and Profile and the Lot Grading Plan, presented in Appendix C. The H.Y. Stream Plan and Profile drawing (Appendix C) presents inset details for the proposed fish passable culvert / fishway, as well as channel profiles for the new streams at the Site.

3 METHODS

Phoenix conducted a preliminary field assessment on November 20, 2017, and a complete field assessment on March 5, 2019, to determine the location of any watercourses, wildlife use and presence, vegetation communities, invasive species, and any environmentally significant features. Phoenix also attended the Site on April 12, 2018 to assess the water levels of the stream.

Prior to the field assessments, Phoenix reviewed the City's PoCoMAP mapping database to identify mapped watercourses and associated fisheries watercourse classifications, and existing land use and riparian area characteristics. As the Site is located on Victoria Drive, which is the boundary between Port



Coquitlam and Coquitlam, the City of Coquitlam's GIS mapping database (QtheMap) was also reviewed for environmental features, watercourses, and infrastructure that should be considered in relation to the Site. Aerial photos, topography (0.5 m contours), and zoning designations have been reviewed by Phoenix. Phoenix has also reviewed the Ministry of Environment's (MOE) Conservation Data Centre (CDC) database of known and potential occurrences of provincially-listed (i.e., red-listed or blue-listed) plant and animal species, and federally-listed species on Schedule 1 of the Species at Risk Act (SARA) and the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). Phoenix also conducted a search of the Fisheries Information Data Queries (FIDQ) database for the onsite and adjacent streams.

A land and topographic survey was completed on January 10, 2018 by Vernon C. Goudal & Associates which identified the top of bank for the existing watercourses on site, as well as structures, infrastructure, encumbrances, roads and significant tree stands on site. The top of bank shown on the topographic survey is based on top of bank flagging by another environmental consultant. The top of bank locations shown on the topographic survey have been assessed by Phoenix to be accurate for the purposes of this Environmental Impact Assessment of the the Site and proposed residential re-development. The Land and Topographic Survey is included as Appendix D.

An arborist assessment was conducted by Stickleback Environmental on December 27 and 28, 2017 to document the trees on/near the Site and give recommendations for tree retention and removal for the proposed development and watercourse realignment. The arborist report is available separately and has been referenced for this EIA.

A geotechnical assessment was completed by Cornerstone Geo-Structural Engineering Ltd. on January 9 and 12, 2018. The geotechnical assessment report is attached as Appendix E.

4 SITE DESCRIPTION

The Site is 1.73 hectares in size and comprises one legal lot at 1160 Victoria Drive in Port Coquitlam. The Site is located at the northern boundary of Port Coquitlam. Properties and services to the north fall under the jurisdiction of Coquitlam.

The Site is occupied by a single-family residential dwelling with a detached garage and a pool. There is also a small horse stable/barn to the east of the residence along the eastern property boundary. The Site is currently zoned RS3 (to accommodate and regulate detached dwellings on large lots with at least 30 m [~100 ft.] wide lots). The Site is bounded to the east, west and south by residential lots zoned RS1 (to accommodate and regulate detached dwelling units on lots that are at least 15 m [50 ft.] wide).

To the southwest of the Site is Hyde Creek Nature Park. Within Hyde Creek Nature Park, Watkins Creek extends from the northwest at Apel Drive and flows east towards the Site coming to within 60 m of the southwest corner of the Site. Watkins Creek then turns south and conveys flows into Hyde Creek which flows into De Boville Slough which in turn drains to the Pitt River. Watkins Creek is classified and mapped (PoCoMAP) as a permanent, fish-bearing stream.

To the north of the Site is predominantly residential multi-family homes (townhouses) and an Elementary School in Coquitlam.

The location of the Site in Port Coquitlam is shown on Figure 1.



Figure 1: Site Location in Port Coquitlam (PoCoMAP, 2019).

5 TOPOGRAPHY AND GEOLOGY

The Site topography is gently sloping to the south with a small east-west slope bisecting the Site approximately midway. A small unnamed stream is entrenched in a steep-sided ravine that flows along the western boundary of the Site for approximately 35 m before the stream turns southeastward and enters a storm sewer at Lynnwood Ave. near the centre of the south boundary of the Site. Where the stream turns southeastward, the ravine opens to a broad, relatively flat area in the south-central part of the Site. Gentle slopes from the east and west adjoin the low-lying area in the south-central area of the Site where the existing unnamed stream at the Site meanders in shallow and bifurcated channels with couple of wet seepage zones along the east (left) banks of the stream channel. Refer to the topographic survey drawing in Appendix D for additional details on the topographic features and existing stream at the Site.

The Geological Survey of Canada describes the surficial geology of the Site area as Vashon Drift and Caplano sediments (VD) which consist of glacial drift including: lodgement and minor flow till, lenses and interbeds of substratified glaciofluvial sand to gravel, and lenses and interbeds of glaciolacustrine laminated stony silt; up to 25 m thick but in most places less than 8 m thick (correlates with Va, b); overlain by glaciomarine and marine deposits similar to Cd normally less than 3 m but in places up to 10 m thick. Marine derived lag gravel normally less than 1 m thick containing marine shells casts has been found mantling till and glaciomarine deposits up to 175 m above sea level; above 175 m till is mantled by bouldery gravel that may be in part ablation till, in part colluvium, and in part marine shore in origin.



This Site and vicinity are listed as Unclassified in the BC Soil Survey mapping (Soils of the Langley-Vancouver Map Area, Luttmerding, 1980).

The geotechnical report (see Appendix E) describes the site topography as sloping gently to the south with a drop in elevation towards the central portion of the lot with slope heights varying from 1.0 m to 2.0 m and slope gradients not exceeding 50%. Based on analysis of five test holes (TH) dug at the Site, the soils were described as topsoil which is underlain by till described as very stiff, moist/wet, clayey silt, with the exception of TH-3 where soils consisted of random fill (found only in test hole 3) underlain by soft clayey silt which is underlain by till as described above.

The geotechnical assessment has concluded that the proposed development is feasible provided the recommendations in the geotechnical report are followed (refer to Appendix E – Geotechnical Report).

6 WATERCOURSES

The Site is within the drainage catchment area (i.e. watershed) of Hyde Creek. Hyde Creek (Watershed Code: 100-026700-07200-97700) is a permanent fish bearing stream under Port Coquitlam's Watercourse Protection classification system. Hyde Creek supports 6 species of salmonids including coho salmon (*Oncorhynchus kisutch*), chum salmon (*O. keta*), pink salmon (*O. gorbuscha*), Chinook salmon (*O. tshawytscha*), cutthroat trout (*O. clarkii*), and both rainbow and steelhead trout (*O. mykiss*), as well as other fish species (e.g. Lamprey, sculpin, and threespine stickleback). Hyde Creek is one of the primary drainage catchments in Port Coquitlam.

The Site is located near Hyde Creek Nature Park. Within Hyde Creek Nature Park, Watkins Creek flows near the southwestern corner of the Site and conveys flows into Hyde Creek. Although Watkins Creek (Watershed Code: 100-026700-07200-97700-1743) has no records of fish presence in the Province of BC's Fish Inventory Data Queries (FIDQ) database, coho and chum salmon have been observed spawning at or above the confluence with Hyde Creek as per the Hyde Creek Integrated Watershed Management Plan.

An unnamed stream enters the Site from the western property boundary via a storm sewer outfall extending south from Victoria Drive. The stream conveys stormwater flows from a 450 mm concrete storm main, located to the west of the Site, across the southwestern corner of the Site and drains into the storm sewer system to the south of the Site through a 375 mm concrete culvert at Lynwood Avenue. Flows from this storm sewer system flow through the single-family residential subdivision to the south of the Site and are conveyed into Hyde Creek.

The unnamed stream at the Site is shown in PoCoMap as a storm ditch (non-permanent, non-fish bearing). However, based on field observations by Phoenix in November 2017, it has been determined that the existing unnamed watercourse at the Site should be classified as Class B stream (permanent, non-fish-bearing). The existing unnamed stream has been observed by Phoenix to be flowing in November 2017 and April 2018, as well as during a Site visit on March 5, 2019 after a period of 7 days with no rain (as per City of Coquitlam Rainfall Monitoring – Flow works – Burke Mountain Rain Gauge). During the Site visit on March 5, 2019 flow volumes in the stream appeared to be larger towards Lynwood Avenue than at the storm sewer outfall area at the head of the ravine, indicating that the stream is also groundwater fed. There were also groundwater seepages observed along the east side of the low-lying reach of the stream in the south-central area of the Site.



Due to the change in classification from a storm ditch to a permanent Class B (non-fish bearing) stream, the setback that should be applied as per the OCP Section 9.8 Watercourse Protection is 30 m measured from the stream (or ravine) top of bank. However, if the subject stream is made fish accessible and becomes fish-bearing, the streamside setback would be 15 m from stream/ravine top of bank.

The northernmost reach of the unnamed stream is confined within a steep-sided ravine within the adjacent unopened (Newberry St.) road allowance to the west of the Site. The stream flows south and slightly east within the ravine until it crosses the western property line of the Site where the ravine condition ends. The stream appears to have been diverted by a large boulder and adjacent slope to the south causing the stream to bend and flow southeast across an area with fairly flat topography. Refer to the Photos in Appendix B for additional details regarding features along the stream and within the Site.

Within the Site, the stream meanders for approximately 75 m, and then the channel becomes braided for approximately 40 m before rejoining to a single channel and passing over an apparently constructed boulder weir. Beyond the weir, the stream channel becomes braided again for approximately 45 m and once again rejoins to a single stream channel for approximately 30 m before passing through a headwall into the storm sewer system at Lynwood Avenue. There are multiple seepages near where the stream channel is braided that convey groundwater into the stream and contribute to the flows. There are indications of higher flows along the stream within the low-lying areas. However, the high flow events do not appear to be substantially variable; that is, the stream at the Site appears to have relatively stable baseflows. While having a storm sewer source of flows, in addition to groundwater-based low flows, the higher velocity and volume flows associated with storm events has not scoured a deep stream channel; except near the storm outfall where the existing ravine slope on the west side has eroded and undermined an adjacent wood retaining wall. Rather, the stream channels throughout the Site are shallow (<30 cm bank height) with low flows around 5- 10 cm deep. The stream substrate comprises predominantly sand, silt and gravel with some scattered boulders and some areas of high silt/organics, particularly near the south end of the stream near the storm sewer inlet headwall at Lynwood Avenue.

The stream top of bank was observed by Phoenix to be between 0.5 m and 1.3 m wide and follows the stream channel, not the bottom of the slope along the east side as is indicated on the Land and Topographic Survey. However, there are two seepage zones adjacent to the stream and the east slope which are delineated as the top of bank on the topographic survey. These low-lying seepage areas are part of the stream and this EIA has applied the surveyed top of banks shown on the topographic survey (Appendix D).

7 VEGETATION COMMUNITIES

The Site is located within the Coastal Western Hemlock dry maritime sub-zone (CWHdm), as described by the Biogeoclimatic Ecosystem Classification (BEC) system developed for the Province of British Columbia. Coastal Western Hemlock dry maritime forests are typically dominated by Douglas-fir (*Pseudotsuga menziesii*), western red cedar (*Thuja plicata*), and western hemlock (*Tsuga heterophylla*) with a shrub understory of salal (*Gaultheria shallon*) and red huckleberry (*Vaccinium parvifolium*) and less commonly vine maple (*Acer circinatum*), bracken fern (*Pteridium aquilinum*) and sword fern (*Polystichum munitum*).

Tree species noted at the Site in the arborist report (Stickleback Environmental) are red alder (*Alnus rubra*), black cottonwood (*Populus trichocarpa*), western red cedar (*Thuja plicata*), Sitka spruce (*Picea*



sitchensis), fruit trees (*Prunus sp.*), shore pine (*Pinus contorta*), Norway spruce (*Picea abies*), big-leaf maple (*Acer macrophyllum*), and bitter cherry (*Prunus emarginata*).

The Site appears to have been used as a hobby farm historically. There was a small stable/barn that still had hay present, although it is now being used as a storage shed and for recreation. The Site can be divided roughly north to south along the hill slope with the upper area around the house and to the north as disturbed/farm areas and the southern area has been left to naturalize with scattered mature trees and shrub and field grass-dominated riparian vegetation along the unnamed stream channel.

The invasive plants noted on the Site include Himalayan blackberry (*Rubus armeniacus*), yellow archangel (*Lamium galeobdolon*), English holly (*Ilex aquifolium*), English ivy (*Hedera helix*), morning glory (*Calystegia sepium*), reed canary grass (*Phalaris arundinacea*), bamboo (*Phyllostachys sp.*), and English laurel (*Prunus laurocerasus*).

7.1 Mature Riparian Mixed Forest Vegetation Type

The riparian vegetation within the ravine consists mainly of mature trees including Norway spruce, western red cedar, red alder, big-leaf maple, and western hemlock. The understory within the ravine is fairly sparse but is dominated by English ivy and yellow archangel with some sword fern.

The southern area of the Site is dominated by mature red alder and black cottonwood with some western red cedar, and big-leaf maple. There are large stands of hardhack to the south of the house and north of the unnamed stream. Along the unnamed stream channel within the Site there is extensive reed canary grass. Some skunk cabbage has been observed within the stream channel towards the western property boundary. The remainder of the southern portion of the site is dominated by salmonberry thickets with some blackberry, particularly along Lynwood Ave.

7.2 Disturbed Vegetation Type

The northern half of the Site is upslope of the stream and associated riparian area. The area immediately surrounding the house is maintained lawn with some ornamental garden plants (e.g. rhododendron) next to the house. There is a large patch of bamboo between the house and the stable/barn. Directly in front (north) of the house, underneath some large and decadent fruit trees, there is circular standpipe and cap within a wooden box that had the appearance as a possible well. Beyond the fruit trees, there is a large open area that has been used as a fire pit. To the north of the fire pit, a number of large fruit trees had been planted. There was a large area to the north of the stable/barn that appeared to have been mulched with heavy black plastic and had salmonberry planted in rows for cultivation. These areas all appeared to be overgrown. The fruit trees were in need of heavy pruning and there was morning glory growing on top of the salmonberry thickets indicating that they had not been maintained. To the south of the stable/barn, there is a large patch of reed canary grass that had some cold-frame greenhouse structures and raised planter box present indicating that this was intended to be a garden area.

The rest of the northern area consists of stands of hardhack, salmonberry, and blackberry. There are mature alder trees along the northern property boundary. In the northwest corner, the trees are mainly bitter cherry and alder with a cedar hedge along the property boundary on the north and west. In the northeast corner, the trees are a mixture of deciduous and conifers including big-leaf maple, red alder,



Norway spruce, Sitka spruce and shore pine. Cedar hedging extends along neighbouring house lots to the east.

8 WILDLIFE

8.1 Observed Wildlife and Wildlife Habitats

The primary wildlife habitats on the Site are associated with the mixed mature riparian forest along the unnamed stream. There is some wildlife value in the overgrown agricultural area, the stable/barn, and the mature trees that are clustered in the northeast and northwest corners of the Site. During the field assessments, these areas were observed for any wildlife presence, wildlife use, or specific wildlife features.

During the Site visit on March 6, 2019 there were many songbirds foraging, calling, displaying breeding behaviours, and travelling through the site. The species observed on the Site include northern flicker, fox sparrow, black-capped chickadee, dark-eyed junco, American robin, varied thrush, Anna's hummingbird, spotted towhee, song sparrow, winter wren, and northwestern crow. An old barn swallow nest is present within the rafters of the stable/barn as well as numerous paper wasp nests.

No raptor nests have been observed at or near the Site during the site visits. There are several suitable trees on and near the Site that offered suitable perching habitat for raptors, but with limited potential for nesting due to surrounding residential uses. The Site offers some foraging habitat for raptors due to the overgrown previous agricultural uses (i.e. the salmonberry plantation) and tall field grass areas.

Phoenix observed several wildlife trees within the Site. A wildlife tree is any standing dead or living tree with special features that provide present or future critical habitats for the maintenance or enhancement of wildlife. There was evidence of woodpecker feeding on some of the wildlife trees (i.e. northern flicker and red-breasted sapsucker).

No mammals were observed during the site visit; however, upon speaking with the resident of the house to the southwest of the Site, raccoons, coyote, black bear and black-tailed deer have been observed using a wildlife trail that begins within the adjacent road allowance at the south and follows the stream into the ravine area. The neighbour said that bear have been using the area heavily as a corridor between Hyde Creek Regional Park and areas to the north in Coquitlam. Phoenix observed evidence of bear scratching on a downed log along the wildlife trail. It is expected that the Site would also support or provide habitat for small mammal species (e.g. skunk, opossum, shrew, vole, bats) that are common within riparian forests and suburban areas.

8.2 Potential Rare, Threatened or Endangered Wildlife and Plant Species

Phoenix has reviewed the Ministry of Environment's (MOE) Conservation Data Centre (CDC) database of known and potential occurrences of provincially listed (i.e., red-listed or blue-listed) plant and animal species and federally listed species from Schedule 1 of the Species at Risk Act (SARA) and from the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) candidate list. Search parameters were: Lower Mainland, Chilliwack Forest District, Metro Vancouver, Coastal Western Hemlock Biogeoclimatic Zone. A short list of rare and endangered wildlife and plant species at risk which may potentially or occasionally occur at the Site has been narrowed down from CDC list. This has been



informed by Phoenix's experience in this area and nearby sites in Coquitlam, and the limited habitat capability of the subject suburban disturbed site.

No species at risk have been observed on the Site during any of the Site visits conducted. However, an intact barn swallow (*Hirundo rustica*) nest has been observed within the stable/barn. Barn swallows use the same nest over multiple years, slowly increasing the size of the nest each year which could indicate active use by barn swallows. There was also evidence of an old barn swallow nest location nearby, but the nest was absent. The barn swallow nest was not active during the Site visit; however, the Site visit occurred outside of the breeding period. It is also possible that the observed barn swallow nest has become inactive. There is low potential for species at risk to be utilizing the other disturbed areas of the Site, except for potential bird foraging within the old fruit trees and salmonberry plantation, or roosting within the mature trees around the Site.

The riparian forest area and wetted portions along the unnamed stream could provide suitable foraging habitat for occasional use Great Blue Heron (*Ardea herodias fannini*), olive-sided flycatcher (*Contopus cooperi*), barn swallow (*Hirundo rustica*), and Band-tailed Pigeon (*Patagioenas fasciata*). Northern red-legged frog (*Rana aurora*) may use the stream for movement and foraging.

8.3 Mapped Known Occurrences of Species at Risk

The BC-CDC mapping tool also has been referenced to determine if there are any known species at risk occurrences or ecosystems of concern at or near the Site. No mapped known occurrences of species and ecological communities at risk were reported on the Site.

There is a polygon for green heron (*Butorides virescens*) approximately 850 m east of the Site. The Site does not offer suitable habitat for green heron.

9 ENVIRONMENTAL PROTECTION

The primary environmental impacts associated with the proposed residential re-development at the Site are alteration of existing stream habitat at the Site, the loss of trees for proposed new lots and streets, soil excavation and re-grading with associated potential for erosion and sedimentation, and modified site hydrology through increases in impervious ground surfaces and re-direction of existing stormwater drainage.

The proposed development of the Site entails construction of 25 single-family residential lots accessed by new streets within the Site extending from Lynwood Avenue at the south edge of the Site. The Site will be re-graded to match the elevations of surrounding lands and to construct a more even slope across the central area of the Site from north to south. The Lot Grading Plan in Appendix C shows proposed lot grades for each lot, as well as the minimum building elevations (MBE) for each building at each lot. Environmental mitigation and protection associated with re-grading of the Site will require stabilization of exposed soils and other erosion and sediment controls during site clearing, utilities installation, house-building and yard area landscaping. Environmental mitigation and protection during site clearing will entail avoiding tree removals during the bird breeding period or being preceded by a songbird nesting survey to protect trees or shrubs containing an active nest (i.e. nests containing bird eggs and young birds).



The existing unnamed stream on the Site is proposed to be realigned so that it flows predominantly south parallel to the western property boundary. The proposed stream realignment will enable fish migration from Watkins Creek southwest of the Site via a fish passable culvert into the unnamed stream at the Site that is presently non-fish bearing. The proposed stream realignment along the west edge of the south half of the Site will protect a prominent grove of large cedar trees at the opening of the existing ravine and nearby to the west of the new stream channel alignment. Within Hyde Creek Regional Park, a small channel will be constructed to connect the culvert to Watkins Creek. The proposed channel has been flagged by Phoenix and is shown on the Channel Realignment and Setback Map in Appendix A. A mature alder tree will be impacted by the construction of the stream channel along with two immature big-leaf maple trees and some vine maples. A new stream will also be constructed north of the existing stream and east of the existing ravine as shown on Channel Realignment and Setback Map in Appendix A. To construct the proposed new stream and realigned stream, much of the new stream alignment will require excavation below existing ground surfaces. The excavations for the new channel at the north are around 2 m, while those along the realigned stream in the south part of the Site are shallower. Along the southern realigned channel, there will be a defined stream channel top of bank and beyond the new stream top of bank, there will be graded slopes that are flatter than 3H:1V to meet the existing grades along the west edge of the Site. Refer to the Stream Plan and Profile drawing by H.Y. Engineering, as well as the stream cross-section drawings, in Appendix C for additional details. Environmental protection will include commonly applied best management practices (BMP) for in-stream works (ISW) such as adherence to low risk construction timing windows (August-September), construction works in isolation of flowing water, and enhancing stream morphology and habitat complexity within the new stream channels. Environmental protection of stream and riparian habitat will also be achieved by dedicating the stream and riparian habitats at the Site to the City as natural area park.

9.1 Fish and Fish Habitat Protection

The proposed new streams at the Site will become accessible to salmonids and other fish species that can migrate into the realigned and new stream, as well as the existing ravine stream, through installation of a fishway/fish passable culvert across Lynwood and Alderwood Ave. and connecting the fishway to a new stream channel through Hyde Creek Nature Park to Watkins Creek. By establishing fish access to the Site, the existing and proposed new streams will become fish-bearing, Class A streams. This would result in fish habitat enhancement and qualitative gains in fish habitat at the Site.

As per Section 9.8 of the OCP, if a stream is fish bearing, a 30-m streamside setback is required; except in agricultural, single residential or duplex zones, where a 15-m setback applies. Refer to the Channel Realignment and Setback Map by Phoenix in Appendix A. The Channel Realignment and Setback Map shows 15-m and 30-m setback lines that extend from the existing ravine stream reach within the Site and adjacent road allowance and into residential lots adjacent to the west. The existing stream and ravine will be retained and protected within the Site by proposed streamside setbacks and park dedication of those streamside setback areas. The proposed realigned stream at the south and new stream to the north are shown with proposed top of banks in dark blue and high water marks in light blue. The proposed setbacks, which are 15 m from top of bank, are shown in bold red lines. The proposed new streamside setbacks will not impose streamside setbacks on any of the adjacent lots that are not already subject to streamside setbacks (upon any future re-development). The alignment of the proposed fish-passable culvert/fishway is shown by a green line across the existing streets. The Channel Realignment and Setback Map also presents an inset showing the proposed new stream channel within Hyde Creek Nature Park connecting Watkins Creek to the proposed fishway. Existing spot elevations and surveyed significant trees



are also more visible in the inset map. The proposed realigned stream and new streams at the Site and in the Park avoid losses of existing trees as much as possible; particularly within Hyde Creek Nature Park.

Also presented in Appendix A is the Habitat Balance Map prepared by Phoenix. The Habitat Balance Map has used the existing topographic survey as a base and includes the proposed new roads for the residential development at the Site as part of the map base. As with the Channel Realignment and Setback Map, the Habitat Balance Map shows the proposed new streams at the Site and in the Park outlined in blue. The existing unnamed stream within the ravine and the lower reach that will be eliminated and replaced by the new realigned stream and new stream to the north are outlined in blue and the portions to be lost for the proposed residential lots is shaded in orange hatching. A 15-m streamside setback boundary along the existing stream is shown on the Habitat Balance Map by a bold red line. As it is proposed for the existing and realigned stream to be made fish accessible by extending a new channel west along the south Site boundary to the proposed fish-passable culvert inlet, a 15-m streamside setback has been applied to the existing and realigned stream for the purposes of the Habitat Balance comparison of existing fish habitat losses to proposed fish habitat gains on a quantitative basis (e.g. square metre loss to square metre gain).

On the basis that the City may accept the streamside setback for the southern realigned stream channel extending into the unopened (Newberry St.) road allowance, and relative to the 15-m setback that applies to the new stream to the north of the existing stream, the area outside of the existing stream setback is shown with green hatching on the Habitat Balance Map as added streamside setback area within the proposed park dedication. As noted on the Habitat Balance Map, with the proposed stream realignment and new stream at the Site and proposed residential lot development, the loss of existing riparian fish habitat (1,602 m²) is offset by gains in additional riparian fish habitat (1,891 m²), with a net gain (289 m²) of riparian habitat. The loss of existing wetted stream habitat would be 581 m², is offset by 741 m² of new wetted stream habitat; resulting is net gain of 160 m² of wetted fish habitat under the proposed development plan for the Site. While there will be quantitative net gains in fish habitat, there will also be qualitative gains in fish habitat associated with improved stream channel morphology (e.g. pools and riffles, increased stream depth at low flows) and enhanced streamside vegetation by planting overhanging new shrubs and trees for greater insect drop, leaf litter and shading than is currently provided by the existing stream habitat to be lost to the proposed development.

Fish habitat protection can also be implemented during the construction phase of the new stream and realigned stream at the Site and in the Hyde Creek Nature Park. The alignment of the new streams has been selected to avoid loss of existing mature trees as much as possible. The new stream channels can be constructed in isolation of flowing water by temporary diversion of flows around the work areas and continued flows into the existing storm sewers draining to Hyde Creek. Construction can be timed for August-September which is the regional least risk window for carrying out instream works. Environmental monitoring during channel construction can enable amphibian salvage and release prior to de-watering the existing stream for temporary pump-around of stream flows, minimizing siltation during temporary diversion and restoration of flows into new channels, avoidance and mitigation (with project arborist involvement) of damage to critical root zones for trees to be retained, placement of gravel substrates in new channels, planting of streambank vegetation, construction of the fish-passable culvert, and similar impact mitigation measures.

Further environmental protection of fish habitat would be achieved by dedicating the streamside areas at the Site to the City as park. Dedicating the streamside setback areas and park to the City will afford greater



safeguarding of the fish habitat at the Site than by restrictive covenant. As shown on the Lot Grading Plan in Appendix C, the proposed lots adjacent to the new streamside setback area conform with the streamside setback boundaries.

9.2 Wildlife and Wildlife Habitat Protection

The most valuable wildlife habitat on the Site is located within the riparian forest associated along the unnamed stream, particularly along the western boundary of the Site. The riparian area includes many of the mature trees on the Site, wildlife corridors, coarse woody debris, and habitat for birds, small mammals, and bats. Through review of the March 2019 draft EIA, an on-site meeting and commentary provided by the Hyde Creek Watershed Society, the development proposal for the Site now includes designation of the unopened Newberry St. road allowance as a wildlife corridor, as shown shaded in light green on the Habitat Balance Map in Appendix A.

Prior to works beginning on Site, a temporary no-clearing barrier fence (wood frame, 2X4, orange snow fence) should be erected along / around the protected area. The protection fencing should extend to protect the roots and drip lines of trees at the edge of the clearing areas. All trees designated to be retained outside of the SPEA and park areas must be protected including their tree root zone with protective fencing. If a post-clearing Hazard Tree Risk Assessment identifies any potential danger trees, cutting of those trees to wildlife trees should be considered, wherever possible. Some large coarse woody debris (trunks, root wads) from tree clearing can be retained and placed within the SPEA as habitat enhancement, but branches and slash should be removed to avoid unnecessary fire hazard. The invasive plants throughout the Site should be removed and controlled in conjunction with implementation and maintenance of restoration planting areas. The primary invasive species at this Site is Himalayan blackberry; although there is also English holly, English ivy, yellow archangel (*Lamium*), English laurel, morning glory, and reed canary grass present on the Site or within the ravine adjacent to the Site. Clearing and removal of invasive species should avoid the spreading of seeds or plant material around the site or transplanted off-site.

The stable/barn provides nesting habitat for Barn Swallows which are listed as a threatened species in Canada (COSEWIC, May 2011). While the direct cause of population decline in barn swallows is not well understood, it is known that with increasing modernization of agricultural buildings, a loss of artificial nesting sites is occurring as well as the loss of open agricultural areas for foraging. As a balance for the loss of the nesting habitat with the stable/barn, artificial barn swallow nesting structures could be built within the SPEA to provide nesting habitat for this species.

It is recommended that any land clearing and tree removal be timed to avoid the songbird breeding window (March 15 to August 1). If tree removal and land clearing activities cannot avoid this construction timing window, then songbird nesting surveys will need to be conducted by a QEP to ensure compliance with the B.C. Wildlife Act provisions protecting birds, eggs and their young. While no raptor nests were observed on site during the assessment, prior to land clearing beginning, a survey should be conducted to confirm that no raptors are nesting in any trees on or near the site due to the active use of this site as a raptor perching and foraging habitat.



9.3 Stormwater Management

While adequate conservation of fish and aquatic habitat is important for sustaining fish habitat functions, stormwater management plays an important role in preventing and minimizing impacts to existing watercourses through channel erosion, bank failure, siltation and water quality degradation. A common impact associated with residential redevelopment is an alteration of the hydrologic regime, typically because of extensive areas of permeable ground surfaces which slow and infiltrate rainwater runoff are replaced with impervious ground surfaces such as buildings, road, driveways, and sidewalks.

The development of a Stormwater Management Plan is recommended once initial feasibility of the proposed residential subdivision at the Site has been determined. The Stormwater Management Plan should incorporate measures to separate sources of stormwater to increase infiltration of stormwater to slow, sink and spread stormwater as much as possible. Water quality treatment prior to stormwater leaving the Site should also be incorporated into the Stormwater Management Plan.

The proposed development and preliminary servicing plan (Appendix C) would direct stormwater from lots and streets within the development area into a different storm sewer network than that receiving flows from the existing stream at the Site. Both storm sewer networks eventually discharge into Hyde Creek, and it appears unlikely that the re-directed storm sewer discharge from the development area at the Site will reduce flow contributions into Hyde Creek or Smiling Creek

10 CONCLUSIONS AND RECOMMENDATIONS

This Environmental Impact Assessment has included a review of available information and field assessments of the key environmental attributes at the Site including vegetation communities, stream and aquatic habitats, wildlife habitat, and wildlife use at the Site. The redevelopment plan for the subject Site would entail clearing of all structures on the Site, many of the existing mature deciduous and coniferous trees, and construction of 25 single family residential lots with associated internal roads, driveway and landscaped yard spaces. The proposed development includes realigning the existing unnamed stream on the Site so that it flows predominantly south parallel to the western property boundary. The proposed stream realignment will enable fish migration from Watkins Creek southwest of the Site through a fish passable culvert into the unnamed stream at the Site that is presently non-fish bearing.

This Environmental Impact Assessment has determined that the existing unnamed stream is currently a permanent, non-fish bearing stream ("Class B nutrient stream"), and with the width of existing and potential vegetation, is subject to a streamside setback area that is 30 m from the top of bank. By connecting a realigned stream and new stream through a fish passable culvert to Watkins Creek, the streams at the Site can become Class A, fish-bearing streams; for which in single-family residential areas the applicable streamside setback extends 15 m from top of bank. As shown on the Habitat Balance Map by Phoenix (Appendix A), the loss of existing riparian fish habitat is offset by additional new riparian fish habitat and the loss of existing wetted fish habitat will be offset by new wetted fish habitat, for a net gain in fish habitat. In addition, there will be qualitative gains in the new fish habitat features to be construct at the Site as part of the proposed development plan

The most valuable wildlife habitat on the Site is located within the riparian forest associated along the unnamed stream, particularly along the western boundary of the Site. The riparian area includes many of



the mature trees on the Site, wildlife corridors, coarse woody debris, and habitat for birds, small mammals, and bats. The impacts on wildlife habitat at the Site can be mitigated by retaining mature trees where possible, protecting tree root protection zones around retained trees, by avoiding impacts to breeding birds, and safeguarding the most valuable wildlife habitat along the west edge of the Site with a park dedication to the City. In addition, a proposed wildlife corridor will extend along the unopened road allowance of Newberry St. which is known to be used as an existing wildlife corridor by local residents.

Changes to the hydrologic regime at the Site can be mitigated by incorporating best management practices (e.g. slow, sink and spread stormwater) into a Stormwater Management Plan once an acceptable development layout has been confirmed through discussions with the City regarding a forthcoming rezoning and subdivision application. This EIA report has been prepared in support of a Watercourse Protection Development Permit application for the Site.

CLOSURE

It is hoped that this Environmental Impact Assessment has adequately described environmental features at the Site, the proposed development plan for the existing rural residential lot, probable impacts associated with the planned residential development, including effective measures to mitigate potential impacts and to protect and enhance key environmental values at the Site.

Please contact us if you require any clarification or additional information regarding this report.

Sincerely,

Phoenix Environmental Services Ltd.

Ken Lambertsen, R.P.Bio.
Principal

Charlotte Adamson, M.Sc., BIT
Project Biologist

Enclosures: Appendix A - Figures
 Appendix B – Photos
 Appendix C – Engineering Drawings, H.Y. Engineering Inc.
 Appendix D – Land and Topographic Survey
 Appendix E – Geotechnical Report

c.c. City of Port Coquitlam



APPENDIX A

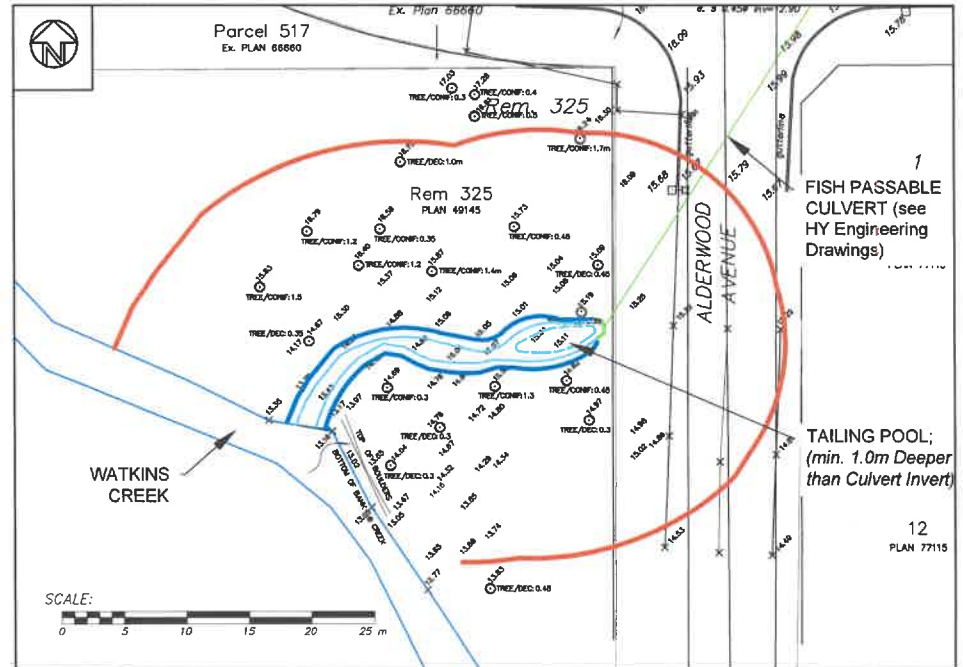
Figures



LEGEND:

- 1160 Victoria Drive, Port Coquitlam, BC
- Existing Watercourse
- Surveyed Top of Bank (TOB)
- NEW Watercourse(s)
- SETBACK FROM NEW WATERCOUSES (15 m)
- NEW High Water Marks
- Storm Sewer / Culverts / Headwalls
- Existing Setback (15 / 30 m)
- Pooling Areas (min. 1.0m deeper than adjacent culvert inverts)
- Proposed Park Boundary

INSET OF TIE-IN TO WATKINS CREEK:

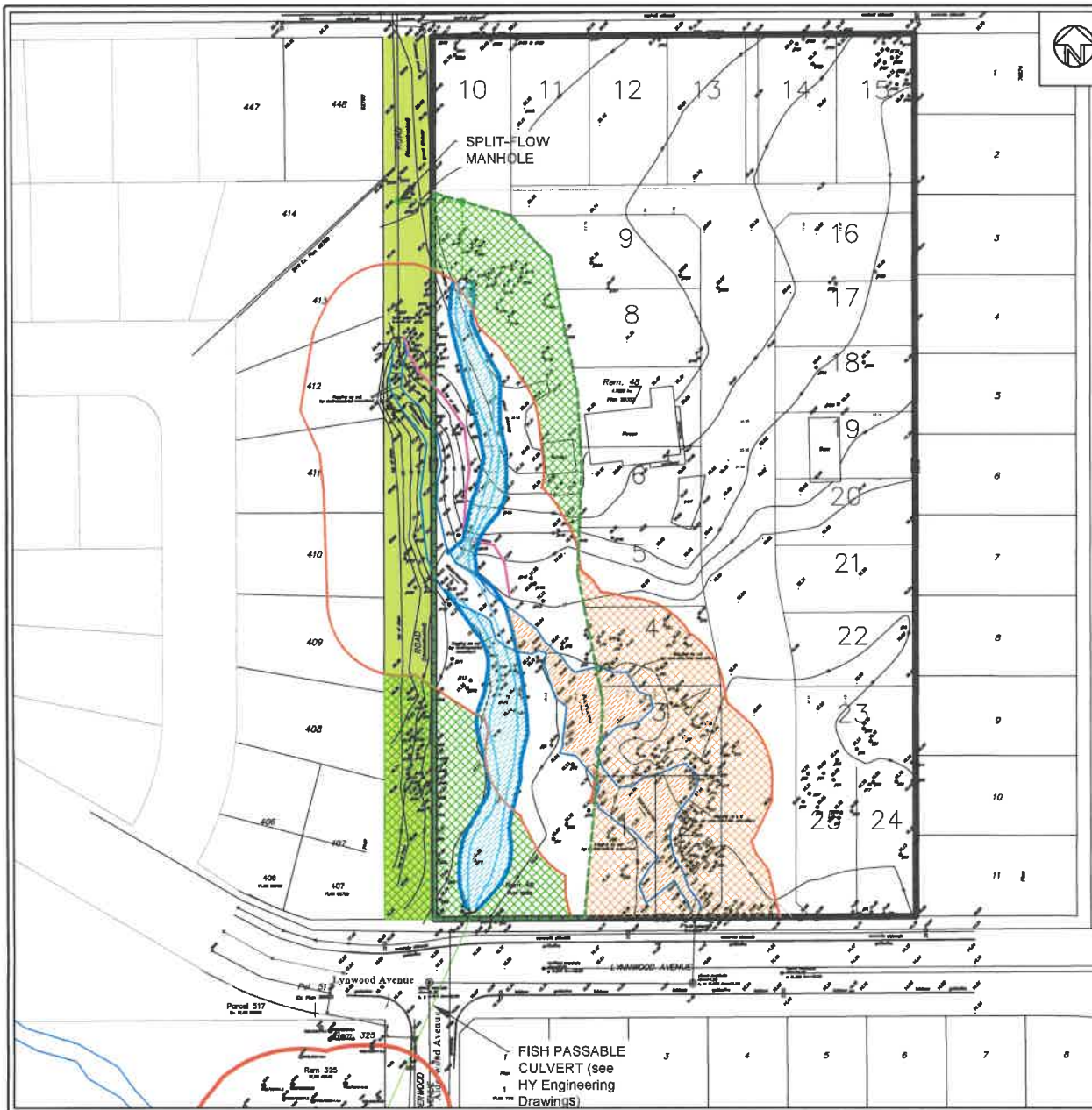


CHANNEL REALIGNMENT & SETBACK MAP

Glenn Richardson
1160 Victoria Drive,
Port Coquitlam, BC



DATE: DEC, 2020 DRAWN BY: NGL SCALE: As Shown DWG: 1160_Victoria - Richardson.dwg



LEGEND:

- Site Boundary (1160 Victoria Drive)
- Existing Stream / High Water Mark
- Surveyed Top of Bank (TOB)
- SETBACK (15m)
- Proposed New / Realigned Stream
- Proposed Park Boundary
- Wildlife Corridor

- RIPARIAN AREA LOSS (within 15m of TOB) = 1,602 m²
- RIPARIAN AREA GAIN (outside of 15m of TOB) = 1,891 m²

Net Riparian Gain = 289 m²

- STREAM / WETTED LOSS = 581 m²
- STREAM / WETTED GAIN = 741 m²

Net Wetted Gain = 160 m²

HABITAT BALANCE MAP

Glenn Richardson
1160 Victoria Drive,
Port Coquitlam, BC



DATE: DEC. 2020 DRAWN BY: NGL SCALE: As Shown DWG: 1160_Victoria - Richardson.dwg



APPENDIX B

Photos



Photo 1: Storm water outfall to the unnamed stream.



Photo 2: View of the unnamed stream within the ravine adjacent to the Site.





Photo 3: The unnamed stream turns and continues to flow southeast towards the center of the Site. A small gravel bar has formed in front of the boulder.



Photo 4: View of the unnamed stream as it flows across the Site. The width of the stream was between 0.5 m to 1.3 m.





Photo 5: View of the unnamed stream where braiding of the stream was occurring. A tree had fallen into the stream channel which may have changed the flow of the stream. There were groundwater seepages along the toe of the slope in this area contributing to stream flows.



Photo 6: A man-made rock berm was located within the stream channel in between two areas where the stream was braided.





Photo 7: View of the unnamed stream where it becomes braided near the center of the Site. The substrate in this area was siltier with high organic matter.



Photo 8: View of the headwall and culvert where the unnamed stream discharges into the storm sewer that crosses Lynwood Avenue.





Photo 9: Sand and gravel substrate that was typical within most of the unnamed stream channel.



Photo 10: View of the house on the Site. Surrounding the house was grass and some landscaped garden areas. To the east of the house (shown on the left in the photo) was a large patch of bamboo that extended almost to the barn.





Photo 11: View of the small stable/barn on the Site.



Photo 12: View of the area to the north of the house that was being used as a fire pit.





Photo 13: View of the well located just to the north of the house on the other side of the driveway.



Photo 14: The area to the south of the stable/barn appeared to be in the process of being converted into a garden.





Photo 15: View of some of the overgrown fruit trees that had been planted at the northern end of the Site.



Photo 16: View of the salmonberry plantation to the north of the stable/barn.





Photo 17: The area within the salmonberry had thick black plastic which was acting as a mulch to prevent weeds from growing.



Photo 18: A barn swallow nest was observed inside the stable/barn in the rafters of the first floor.





Photo 19: An old stump along the unnamed stream had signs of woodpecker feeding on it.



Photo 20: A wildlife trail that enters the site from the southwest corner and continues up to and along the unnamed stream within the ravine.





Photo 21: Signs of bear scratching were evident on this downed log along the wildlife trail.



Photo 22: View from Alderwood Ave. towards Hyde Creek Regional Park where the stream realignment will be undertaken.





Photo 23: View from within Hyde Creek Regional Park towards Alderwood Ave. where the stream realignment will be undertaken showing the vegetation that will be impacted. The pink flagging denotes the proposed stream edges.



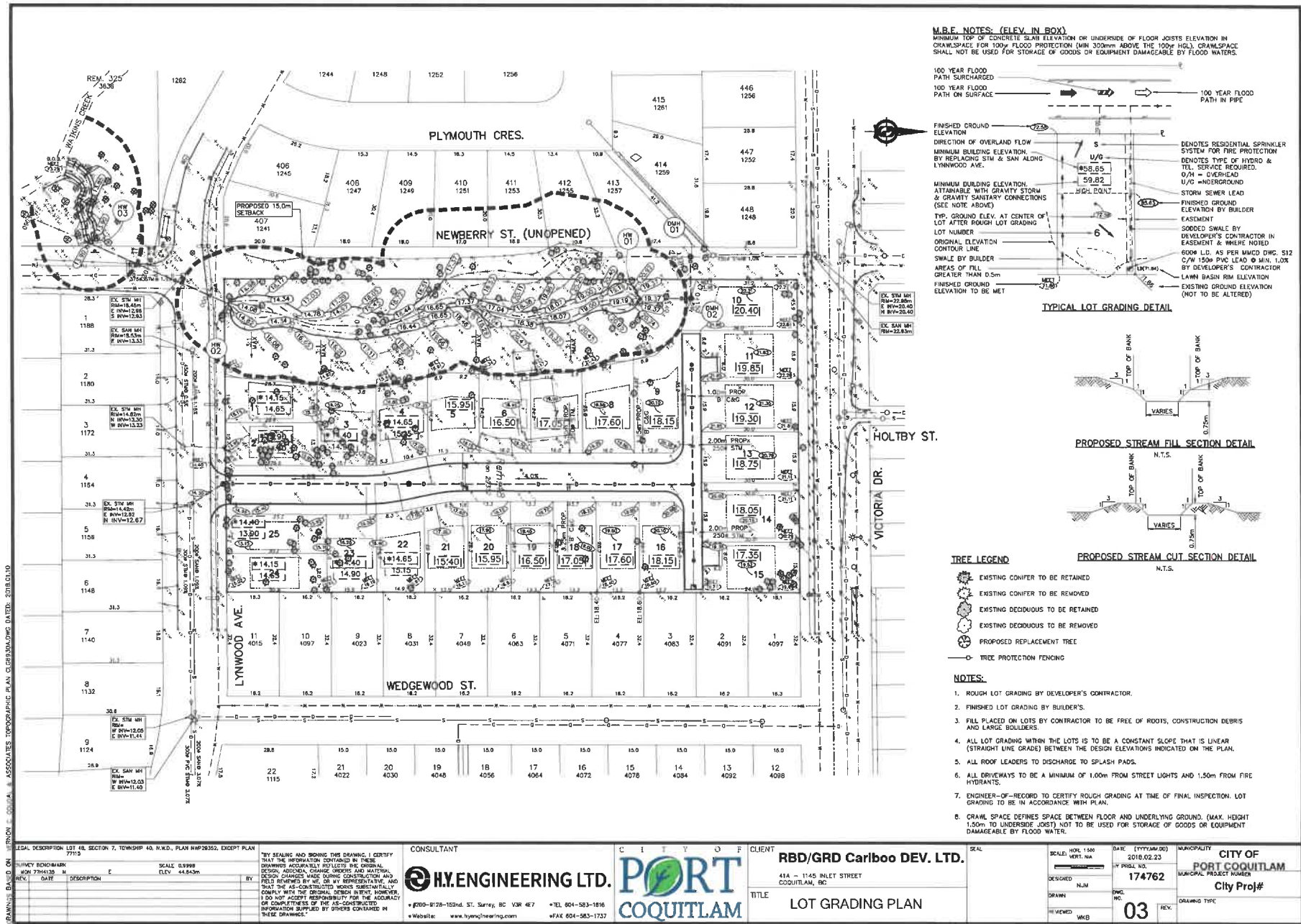
Photo 24: View of the bank of Watkins Creek where the new stream will be constructed.



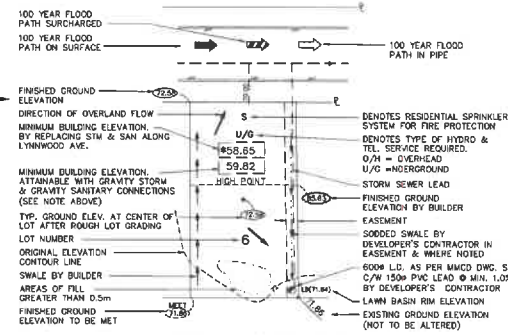


APPENDIX C

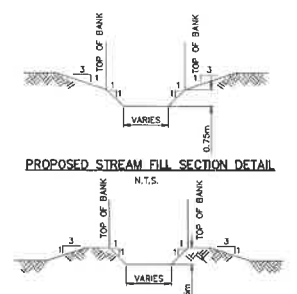
Engineering Drawings, H.Y. Engineering Inc.



M.B.E. NOTES: (ELEV. IN BOX)
MINIMUM TOP OF CONCRETE SLAB ELEVATION OR UNDERSIDE OF FLOOR JOISTS ELEVATION IN CRAWLSPACE FOR 100YR FLOOD PROTECTION (MIN 300mm ABOVE THE 100YR HGL). CRAWLSPACE SHALL NOT BE USED FOR STORAGE OF GOODS OR EQUIPMENT DAMAGEABLE BY FLOOD WATERS.



TYPICAL LOT GRADING DETAIL



PROPOSED STREAM FILL SECTION DETAIL



PROPOSED STREAM CUT SECTION DETAIL

- TREE LEGEND**
- EXISTING CONIFER TO BE RETAINED
 - EXISTING CONIFER TO BE REMOVED
 - EXISTING DECIDUOUS TO BE RETAINED
 - EXISTING DECIDUOUS TO BE REMOVED
 - PROPOSED REPLACEMENT TREE
 - TREE PROTECTION FENCING
- NOTES:**
- ROUGH LOT GRADING BY DEVELOPER'S CONTRACTOR.
 - FINISHED LOT GRADING BY LOT'S.
 - FILL PLACED ON LOTS BY CONTRACTOR TO BE FREE OF ROOTS, CONSTRUCTION DEBRIS AND LARGE BOULDERS.
 - ALL LOT GRADING WITHIN THE LOTS IS TO BE A CONSTANT SLOPE THAT IS LINEAR (STRAIGHT LINE GRADE) BETWEEN THE DESIGN ELEVATIONS INDICATED ON THE PLAN.
 - ALL ROOF LEADERS TO DISCHARGE TO SPLASH PADS.
 - ALL DRIVEWAYS TO BE A MINIMUM OF 1.00m FROM STREET LIGHTS AND 1.50m FROM FIRE HYDRANTS.
 - ENGINEER-OF-RECORD TO CERTIFY ROUGH GRADING AT TIME OF FINAL INSPECTION. LOT GRADING TO BE IN ACCORDANCE WITH PLAN.
 - CRAWL SPACE DEFINES SPACE BETWEEN FLOOR AND UNDERLYING GROUND. (MAX. HEIGHT 1.50m TO UNDERSIDE JOIST) NOT TO BE USED FOR STORAGE OF GOODS OR EQUIPMENT DAMAGEABLE BY FLOOD WATERS.

LEGAL DESCRIPTION LOT 16, SECTION 7, TOWNSHIP 40, R.W.D., PLAN RWP28352, EXCEPT PLAN 7715

REV.	DATE	DESCRIPTION	BY
1	2018-02-23	ISSUED FOR PERMIT	HY

"BY SEALING AND SIGNING THIS DRAWING, I CERTIFY THAT THE INFORMATION CONTAINED IN THESE DRAWINGS ACCURATELY REPRESENTS THE ORIGINAL DESIGN, INCLUDING ALL CHANGES AND MATERIAL DESIGN CHANGES MADE DURING CONSTRUCTION AND FIELD REVISIONS BY ME OR MY REPRESENTATIVE AND THAT THE AS-CONSTRUCTED WORKS SUBSTANTIALLY COMPLY WITH THE ORIGINAL DESIGN INTENT. HOWEVER, I DO NOT ACCEPT RESPONSIBILITY FOR THE ACCURACY OR COMPLETENESS OF THE AS-CONSTRUCTED INFORMATION SUPPLIED BY OTHERS CONTAINED IN THESE DRAWINGS."

CONSULTANT

HYENGINEERING LTD.

100-1012-1012nd St. Surrey, BC V4M 4E7
Website: www.hyengineering.com

TEL: 604-583-1818
FAX: 604-583-1737

CITY OF PORT COQUITLAM

CLIENT

RBD/GRD Cariboo DEV. LTD.

41A - 1145 INLET STREET COQUITLAM, BC

TITLE

LOT GRADING PLAN

SCALE: HORIZ 1:500 VERT 1:10

DESIGNED: NLM

DRAWN: MKB

DATE: 2018-02-23

PROJECT NO: 174762

DWG. NO: 03

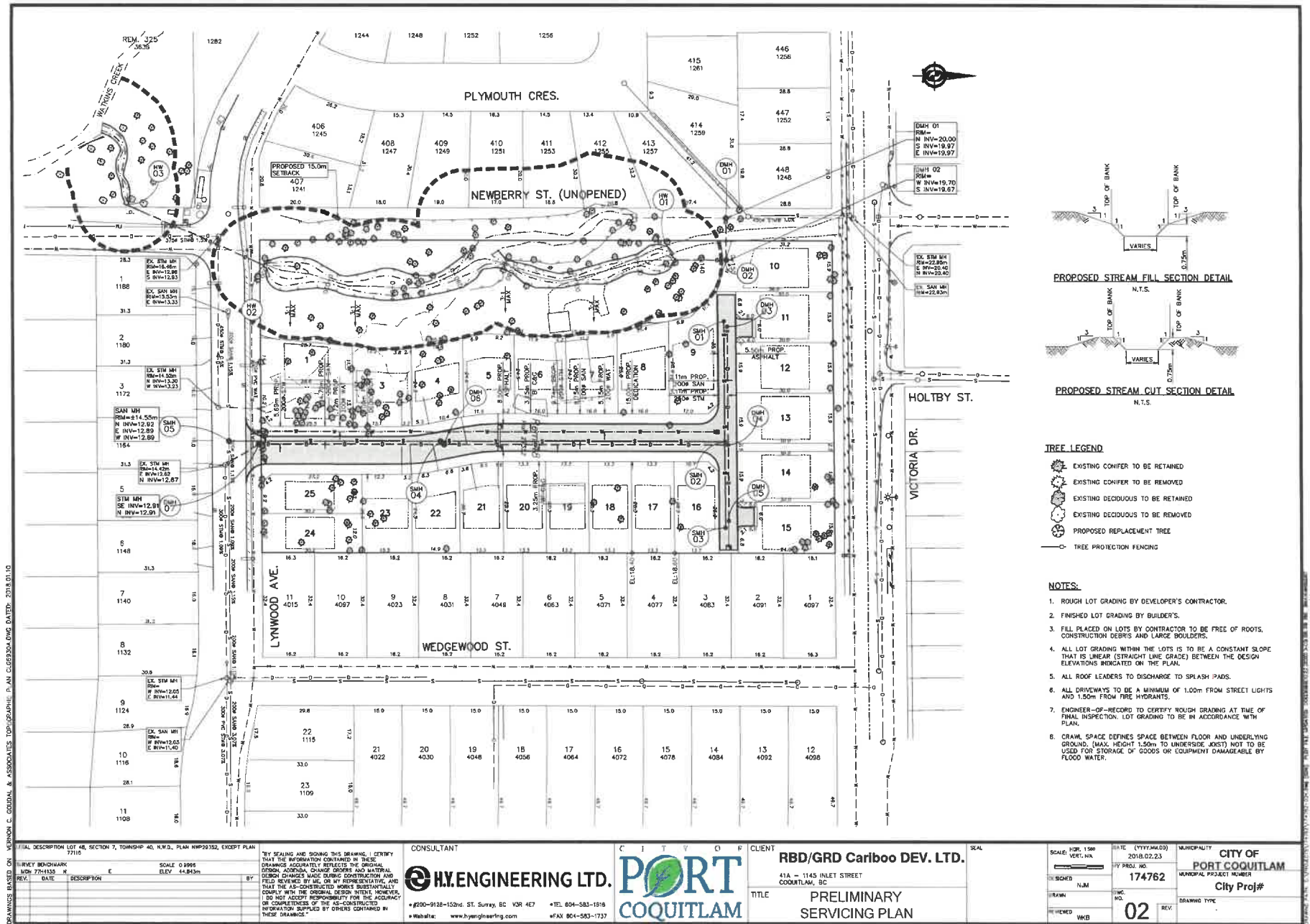
REV: 0

CITY OF PORT COQUITLAM

MUNICIPAL PROJECT NUMBER

City Proj#

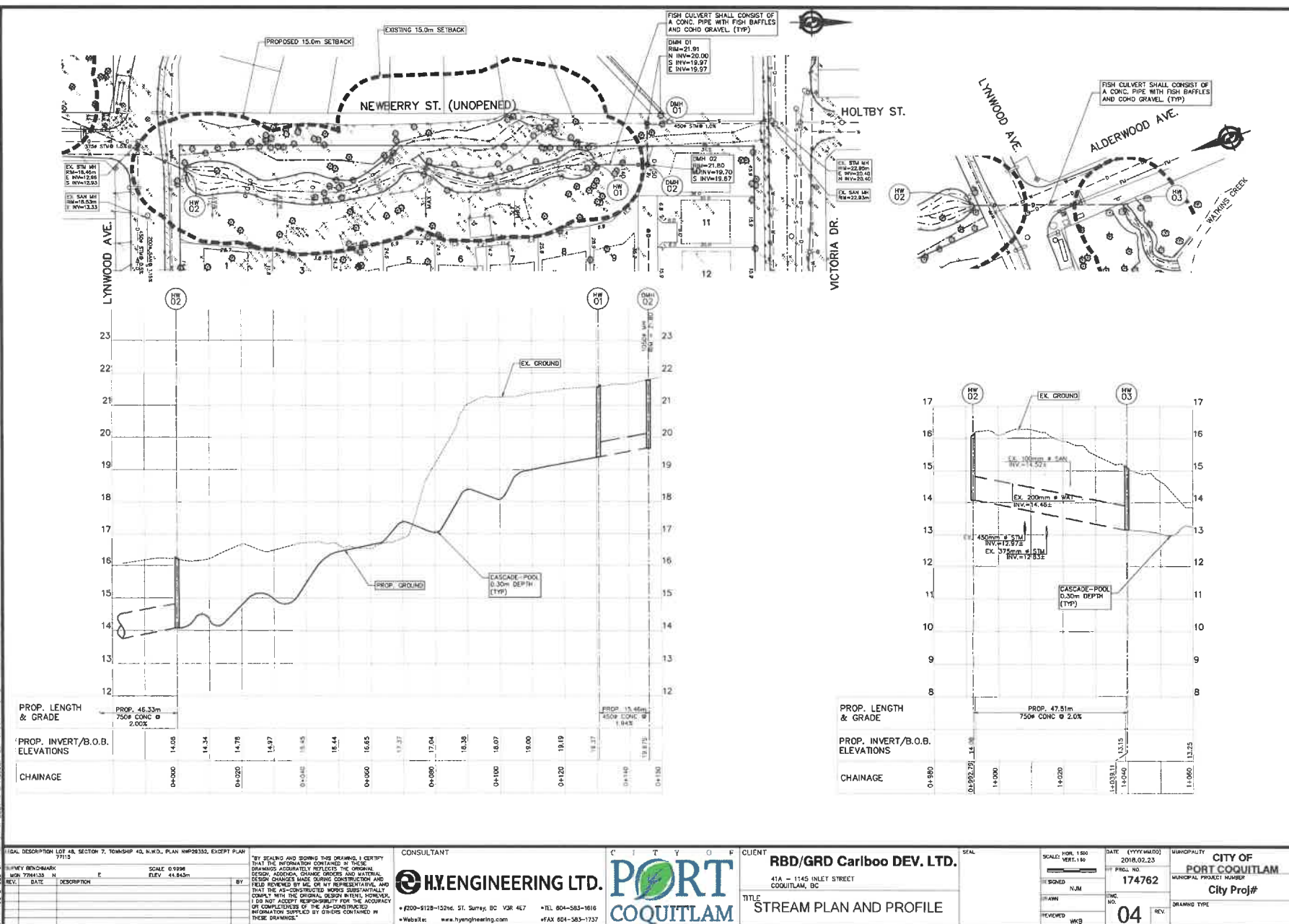
DRAWING TYPE



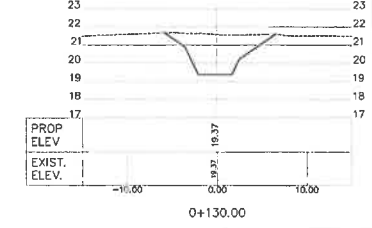
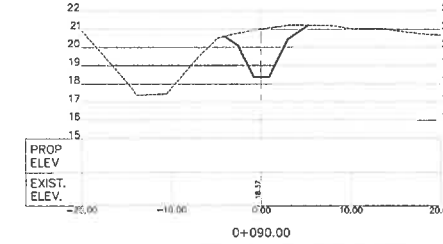
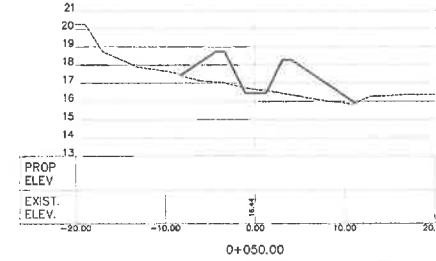
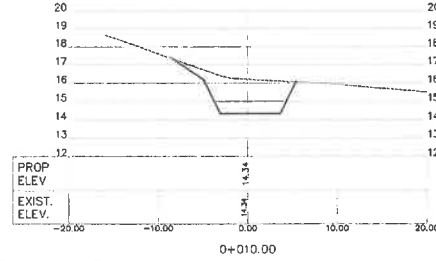
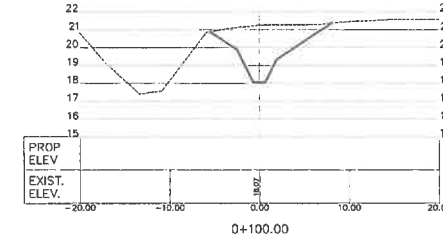
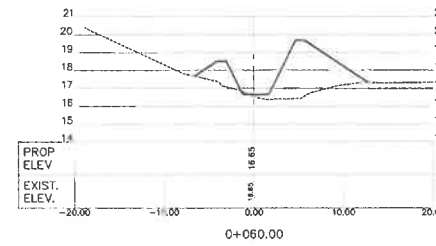
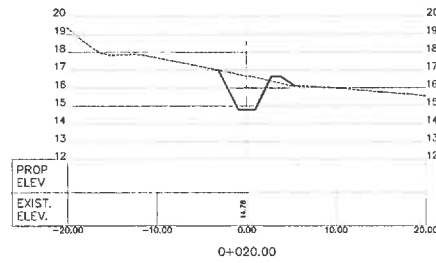
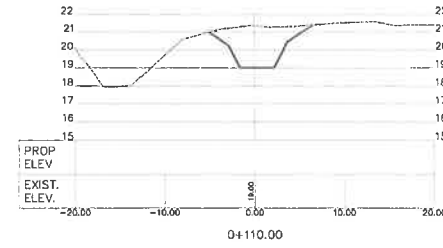
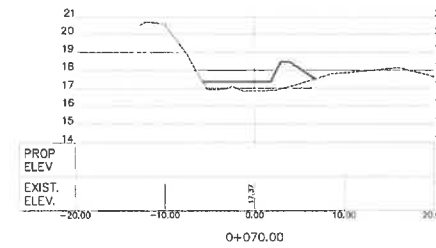
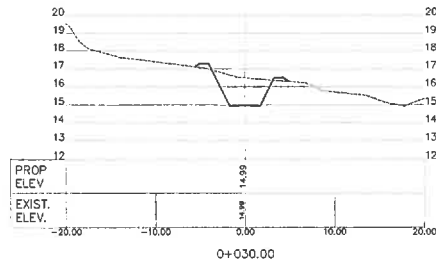
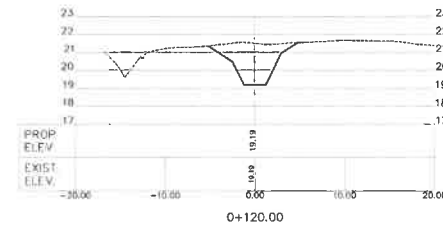
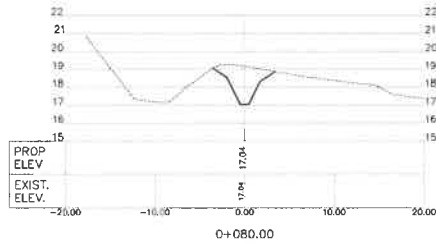
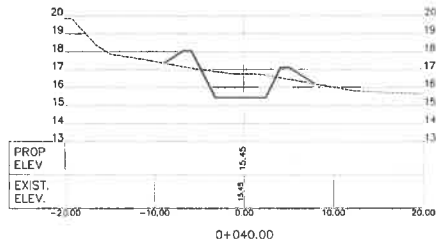
DRAWINGS BASED ON: VERMION C. COUDAL & ASSOCIATES TOP-GRADE PLAN CUG5304.DWG DATED: 2015.01.10

DESTROY ALL PRINTS BEARING PREVIOUS NUMBER

FRAMING BASED ON VERSION C.00, DIAL & ASSOCIATES TOPOGRAPHIC PLAN C-06933A.DWG DATED 2018.01.10



CHANGES BASED ON: VERSION: E. COQUILAM & ASSOCIATES: TOPOGRAPHIC PLAN: C1069320A.DWG: DATED: 2018.01.10



LEGAL DESCRIPTION: LOT 44, SECTION 7, TOWNSHIP 40, N.W. 1/4, PLAN NWP29352, EXCEPT PLAN 77115

REV.	DATE	DESCRIPTION	BY
1	2018.01.10	ISSUED FOR PERMIT	HY

SCALE: 0.9896
ELEV. 44.845m

"BY SEALING AND SIGNING THIS DRAWING, I CERTIFY THAT THE INFORMATION CONTAINED IN THESE DRAWINGS ACCURATELY REFLECTS THE ORIGINAL DESIGN. ADDITIONAL CHANGE ORDERS AND MATERIAL DESIGN CHANGES MADE DURING CONSTRUCTION AND FIELD REVISIONS BY ME OR MY REPRESENTATIVE, I DO NOT ACCEPT RESPONSIBILITY FOR THE ACCURACY OR COMPLETENESS OF THE AS-CONSTRUCTED INFORMATION SUPPLIED BY OTHERS CONTAINED IN THESE DRAWINGS."

CONSULTANT
HYENGINEERING LTD.
4100-9126-152nd ST. Surrey, BC V0R 4E7
Website: www.hyengineering.com

CITY OF PORT COQUITLAM

CLIENT: **RBD/GRD Cariboo DEV. LTD.**
41A - 1145 INLET STREET COQUITLAM, BC
TITLE: **DITCH- PLAN, PROFILE & X-SEC**

SCALE: HOR. 1:300
VERT. 1:10
DESIGNED: NUM
DRAWN: NUM
REVIEWED: WKB

DATE: (YYYYMMDD)
2018.02.23
PROJECT NO.: 174762
MUNICIPAL PROJECT NUMBER
CITY PROJ#
DRAWING TYPE

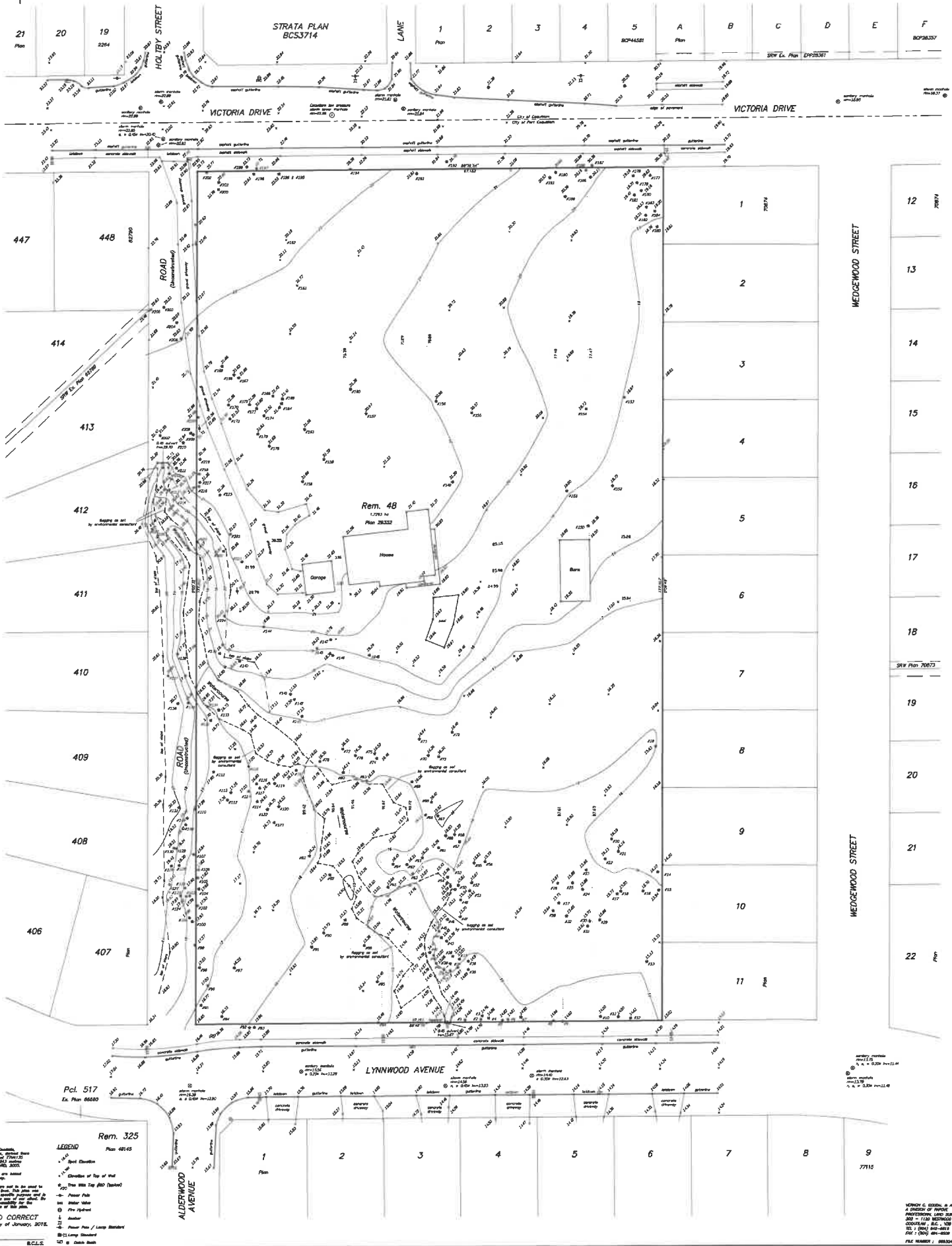
DESTROY ALL PRINTS BEARING PREVIOUS NUMBER



APPENDIX D

Land and Topographic Survey

PAGE# IDENTIFIER 001-627-251
CITY ADDRESS 1160 Victoria Drive
APT COGULUM, &C



CERTIFIED CORRECT

W. PAROYE R.C.L.S.

VERNON C. COOK, JR. ASSOCIATES
A DIVISION OF PAPER
PROFESSIONAL LAND SURVEYING INC.
303 - 1120 WESTWOOD STREET
COOKSTOWN, N.J., 07003
TEL : (908) 842-8888
FAX : (908) 884-8800
FILE NUMBER : 088304



APPENDIX E

Geotechnical Report

January 22nd, 2018

F.A.R. GROUP

Attn. Mr. Glenn Richardson
#41A 1145 Inlet Street
Coquitlam, BC V3B 6E8

Ref.: 1160 Victoria Drive, Port Coquitlam, BC – Proposed Single-Family Residential Development - Geotechnical Report

Dear Sirs:

As requested, Cornerstone Geo-Structural Engineering Ltd. (Cornerstone) conducted a geotechnical study at the above-referenced property for the construction of a proposed town home residential development. The purpose of the study is to assess the geotechnical subsoil conditions and conduct the assessment of potential geotechnical hazards affecting the site and provide recommendations for structural design and construction of the proposed building.

This report includes the description of the site, of the subsoil investigation carried out, summarizes the ground conditions, and provides geotechnical recommendations as stated above. The scope of this report is for geotechnical purposes only and does not include the study of environmental aspects of the site.

1. Site and Project Description

The subject site is located at 1160 Victoria Drive, in northern Port Coquitlam at the boundary with the City of Coquitlam, BC, in a parcel located south of Victoria Drive (See Figure 1). The lot, is identified with the following legal description:

LOT 48, SEC. 7, TWP. 40, NWD PLAN NWP29352 EXCEPT PLAN 77115

The property is also bounded by Lynwood Avenue to the south, by a strip of land corresponding to Newberry Street -non-built yet- to the west and by residential buildings to the east. At the time of conducting this study, the lot was occupied by a single-family dwelling and a shed, both to be demolished for the construction of the proposed development. The remainder of the lot is covered by trees, shrubs, grass and brush.

The geomorphological description of the site is shown in Section 4.2 of this report.

The proposed development consists of the subdivision of the for the construction of single-family residential buildings; the final lot layout is not defined at this moment but it is expected to range between 21 and 28 units; Figure 2, attached, shows one of the possible subdivision layouts. The homes are anticipated to be built using conventional timber structure.

2. Background Information

Cornerstone reviewed the following information relevant to the project:

- City of Port Coquitlam Official Community Plan, Bylaw No. 3838
- City of Port Coquitlam Zoning Bylaw No. 3630
- City of Port Coquitlam Building and Plumbing Bylaw No. 3710
- City of Port Coquitlam PoCo Map
- Topographic map, from PoCo Map
- Proposed lot layout by H.Y. Engineering Ltd., supplied by the client
- Geological Survey of Canada (GSC) Map 1484A - Surficial Geology New Westminster
- Geotechnical Information from Cornerstone archives on nearby projects

3. Geotechnical Investigation

The subsoil investigation was carried out on January 9, 2018. A Cornerstone's geotechnical engineer conducted a geotechnical site assessment and visual inspection on January 12, 2018. Five test holes (TH-1 through TH-5) were excavated using a track-mounted hoe excavator supplied by the client, to a maximum depth of 1.8 m. A Cornerstone's representative laid out the test holes, logged the soil conditions and collected soil samples for laboratory identification. The approximate location of the test holes was recorded using a handheld GPS. The location of the Test Holes (TH) is shown in Figures 2 and 3, attached.

The summary of the soil conditions and test hole logs are described in Section 4.3, below.

4. Geology, Geomorphology and Soil & Bedrock Condition

4.1 Geologic Setting

The Geological Survey of Canada GSC Map 1484a – Surficial Geology New Westminster (See Figure 4, below) and the BCGS Geology Map indicate that the materials underlying the area consist of Glacial Drift of the Vashon Drift and Capilano Sediments geologic unit (VC) including lodgment and minor flow till. An excerpt of the geological map at the area of interest is shown in Figure 4, below.

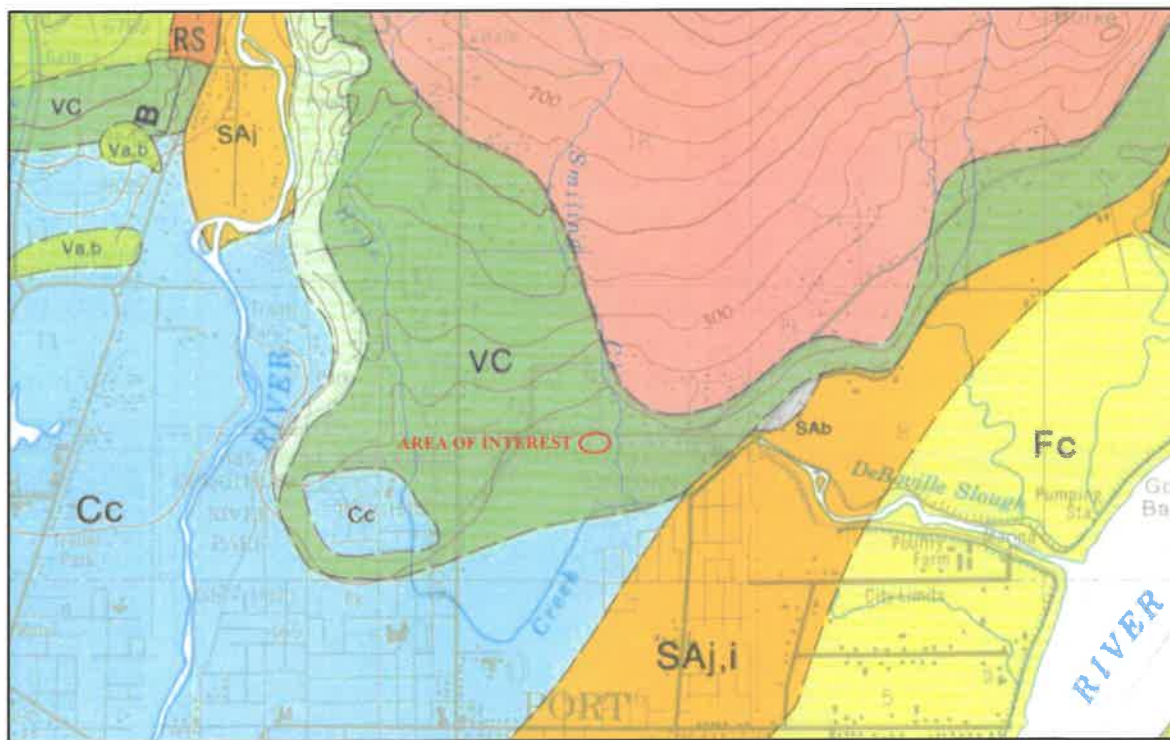


Figure 4. Geological Setting at the Area of Interest
 (Taken from GSC Map 1484a – Surficial Geology New Westminster)

4.2 Topography and Geomorphology

The site is located at the toe of Burke Mountain, between elevations 14 m.a.s.l and 23 m.a.s.l., sitting on hard, fine grained glacial soil deposits.

The topography of the parcel slopes gently to the south, with slopes gradients varying generally between 2% and 10%; a drop in elevations takes place towards the central portion of the lot, resulting in slopes gradients no exceeding 50% and slope heights varying from 1.0 m to 2.0m as seen in the topographic map shown in Figure 3.

A small a small water course traverses the lot from the center of the west property line towards the center of the south property line, approximately, and discharges into the city's storm system.

Due to the gentle topography, the soil characteristics and good vegetation coverage, no signs of soil instability or erosion are present over the property.

4.3 Subsoil Condition

Based on the Test Holes excavated, the soil units exposed are consistent with those described by the geologic map reviewed and can be summarized as follows:

- a. TOP SOIL & RANDOM FILL – Top soil varies in thickness from 0.3 m to 0.6 m; random fill, 1.2 m thick, found at TH-3 only. This layer overlies (b) or (c)
- b. CLAYEY SILT – Soft consistency; found at TH-3 only; 0.6 m thick, overlying (c)
- c. TILL – Very stiff, moist/wet, clayey silt; some fine sand seams observed at TH-4.

No water table or groundwater seepage was observed at the depth of investigation.

The detailed description of the soils at the Test Holes is shown below. The depths are measured from the top of the ground surface at each location.

Test Hole TH-1:

From 0.0 m to 0.6 m	Top soil
From 0.6 m to 1.5 m	Very stiff, moist/wet, mottled, light brown clayey silt
	End of Test Hole at 1.5m

No groundwater or water seepage observed at the depth of investigation.

Test Hole TH-2:

From 0.0 m to 0.6 m	Top soil
From 0.6 m to 1.5 m	Very stiff, moist/wet, mottled, light brown clayey silt
	End of Test Hole at 1.5m

No groundwater or water seepage observed at the depth of investigation.

Test Hole TH-3:

From 0.0 m to 1.2 m	Random fill
From 1.2 m to 1.8 m	Soft, wet, clayey silt
1.8 m	Very stiff, moist/wet, mottled, light brown clayey silt
	End of Test Hole at 1.8m

No groundwater or water seepage observed at the depth of investigation.

Test Hole TH-4:

From 0.0 m to 0.3 m	Top soil
From 0.3 m to 0.9 m	Stiff, moist/wet, mottled light brown clayey silt

From 0.9 m to 1.5 m Very stiff, moist/wet, mottled, light brown clayey silt
End of Test Hole at 1.5m
No groundwater or water seepage observed at the depth of investigation.

Test Hole TH-5:

From 0.0 m to 0.6 m Top soil
From 0.6 m to 1.5 m Very stiff, moist/wet, mottled, light brown clayey silt
End of Test Hole at 1.5m
No groundwater or water seepage observed at the depth of investigation.

5. Geotechnical Hazard Assessment

5.1 Area of Interest

The primary area to be assessed corresponds to the portion of terrain within the boundaries of the parcel identified in Section 1 of this report.

5.2 Methodology

The identification of geotechnical hazards was carried out based on the guidelines presented in the Hazard Acceptability Thresholds document (Cave, 1993). Slope stability analysis were carried out following the guidelines of APEGBC (2010). The methodology adopted to estimate the probability in this study is of qualitative character based on our field observations and desktop review.

5.3 Hazards

Seismic Hazard & Seismic Site Response

Based on the soil condition assessment and geological information reviewed for the site, the Site Classification for the structural design of the proposed building is C – “Very Dense Soil and Soft Rock” per the BC Building Code (2012).

Per the National Building Code of Canada (NBC 2010, Division B, Appendix C – Seismic Hazard), the parameters used to represent hazard for a specific geographical location are the 5%-damped horizontal spectral acceleration values for 0.2, 0.5, 1.0 and 2.0 second periods and the horizontal Peak Ground Acceleration (PGA) value that have a 2% probability of being exceeded in 50 years.

The Peak Ground Acceleration and spectral values -for Site Class C- to be used in the structural design for the 2% probability of exceedance in 50 years as provided by National Resources Canada (<http://www.earthquakescanada.nrcan.gc.ca>) are:

PGA = 0.46
Sa(0.2) = 0.928
Sa(0.5) = 0.623
Sa(1.0) = 0.316
Sa(2.0) = 0.167

Amplification factors Fa and Fv to be determined based on the above parameters and Site Classification, per the BC Building Code 2012.

Small Scale, Localized Landslides

Based on the topographic characteristics of the site and geomechanical properties of the soils present, the potential for small scale, localized landslides is non-existent and the assigned probability of occurrence is $\ll 1:10,000$ (See Table 1 for comparative purposes).

Table 1. Indicative Measures of Landslide Likelihood (Australian Geomechanics Society, 2000)

Level	Descriptor	Description	Indicative Annual probability
A	Almost Certain	The event is expected to occur	$> \approx 10^{-1}$
B	Likely	The event will probably occur under adverse conditions	$\approx 10^{-2}$
C	Possible	The event could occur under adverse conditions	$\approx 10^{-3}$
D	Unlikely	The event might occur under very adverse circumstances	$\approx 10^{-4}$
E	Rare	The event is conceivable but only under exceptional circumstances	$\approx 10^{-5}$
F	Not Credible	The event is inconceivable or fanciful	$< 10^{-6}$

Other Hazards

Other potential geotechnical hazards including mountain stream erosion or avulsion, debris flow / debris torrent, debris flood, rockfall, major catastrophic landslide and liquefaction were considered in our assessment and are deemed to be inexistent in this property.

6. Discussion and Recommendations

6.1 General

Based on the geotechnical assessment of the subject site, it is our professional opinion that the construction of the proposed building is feasible from a geotechnical point of view provided that the recommendations presented below are followed.

Unit 1B – 30508 Great Northern Ave, Abbotsford, BC V2T 6H4, Tel. 604-746-5070

6.2 Hazard Assessment

Based on the estimated likelihood of the hazard events described above, it is Cornerstone's professional opinion that the land may be used safely for the use intended provided that the recommendations described below are implemented. The above is based on the comparison of the assigned probabilities of occurrence of the hazards assessed to the Cave (1993) acceptability criteria.

6.3 Site Preparation

Top soil, fill, and any other deleterious or soft soils must be removed prior to construction of building footings or grading fills if necessary. The foundation soil must be inspected and approved by the geotechnical engineer prior to construction.

It is anticipated that due footings will be founded on the native till-deposits or on structural fill in case grading fills are required.

Temporary excavations into the stiff or very stiff glacial deposits can be carried out at a maximum inclination of 0.5H:1V (H=horizontal; V=vertical); excavations into fill or soft soils must be carried out at 1.5H:1V. Excavations at depths larger than 1.8 m must be supervised by a qualified geotechnical engineer.

If fills are required for grading purposes, structural fill compacted to a minimum density of 100% Standard Proctor Maximum Dry Density (SPMDD) must be placed under the supervision of the geotechnical engineer. The structural fill must extend to a minimum horizontal distance beyond the outer edge of the perimeter footings equal to the greater of: (i) two times the footing width or (ii) the thickness of the structural fill. Fill must be placed in 300 mm (1 ft.) thick loose lifts when compacted using large compaction equipment such as vibrating rollers. Lift thickness must be reduced to 150 mm in smaller plate compactors are used.

Cornerstone must approve the structural or grading fill prior to its use; it shall consist of sound, durable, well graded granular material, free of earth lumps or deleterious materials, with a maximum size of 75 mm and fine contents (material passing sieve 0.075 mm/No. 200) less than 12% and plasticity index measured on the fraction of soil passing sieve No. 40 lower than 6 percent.

Proctor compaction testing must be carried out on representative samples of any structural fill prior to its use in the project and the results submitted for Cornerstone's review.

Although no underground water or water seepage was observed during our subsoil investigation, a geotechnical engineer must inspect the excavation for basements and assess the need for permanent drainage measures.

A 100 mm min. thickness layer of granular material containing not more than 10% of material passing a 4 mm sieve, placed on top of the native foundation material, must be installed underneath Slabs-on-grade; a 0.15 mm poly vapor barrier must be installed in between the granular fill and the slab.

Roof and surface runoff water from yards and other areas must be collected and discharged into the storm system.

Due to the low permeability of the till-like soils present at the site, infiltration of storm water through rock pits is not feasible. The estimated percolation rate of these materials is greater than 120min/2.54cm.

6.4 Bearing Capacity

Footings founded on the native, very stiff till or on structural fill or, can be designed based on a factored bearing pressure (ULS condition) of 150 kPa ($\approx 3,000$ psf), for a resistance factor ϕ of 0.5. The serviceability (SLS condition) bearing pressure is 100 kPa ($\approx 2,000$ psf.).

This above allowable bearing pressures do not consider the effect of load inclination or proximity of the footings to the slope edge.

Strip footings must have a minimum width of 450 mm (18 in.) and pad (square) footings must have a minimum width of 900 mm (3 ft.), or larger as required by the structural engineer recommendations. A minimum burial depth of 450 mm must be provided for frost protection.

7. Review and Inspection

We recommend retaining Cornerstone Engineering to conduct the following activities:

- Review of final lot grading plan and foundation layout
- Excavation and foundation soil review

8. Limitations and Closure

The recommendations provided in this report are based on the analysis of the results of the subsoil investigation and geomorphological conditions of the site and our engineering judgement. Due the variable nature of the subsoil and limitations inherent to the subsoil investigation, unexpected conditions may be found; Cornerstone Geo-Structural Engineering must be informed by the client in this event to conduct the necessary reviews. This report has been prepared in accordance with general accepted engineering practice for the exclusive use of the client for the purposes stated. No other warranty, expressed or implied is made.

Reviewed,



German A. Cajigas Silva, M.Eng., P.Eng.
Senior Geotechnical Engineer



Jorge Silva, P.Eng.
Principal

APPENDIX 1. ATTACHMENTS

- Figure 1. General Site Location
- Figure 2. Proposed Lot Layout and Approximate Location of Test Holes
- Figure 3. Site Topography (From PoCo Map)

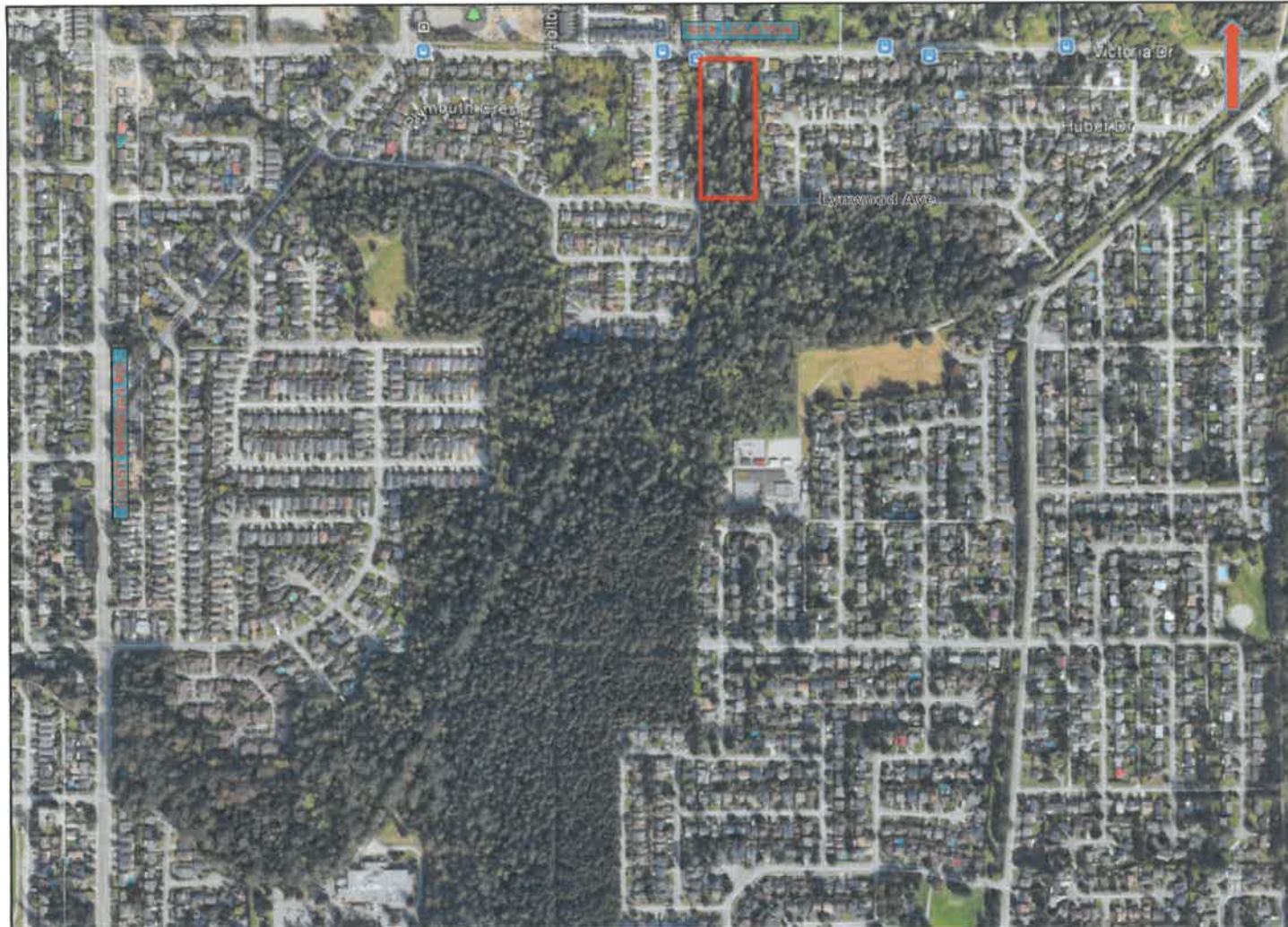
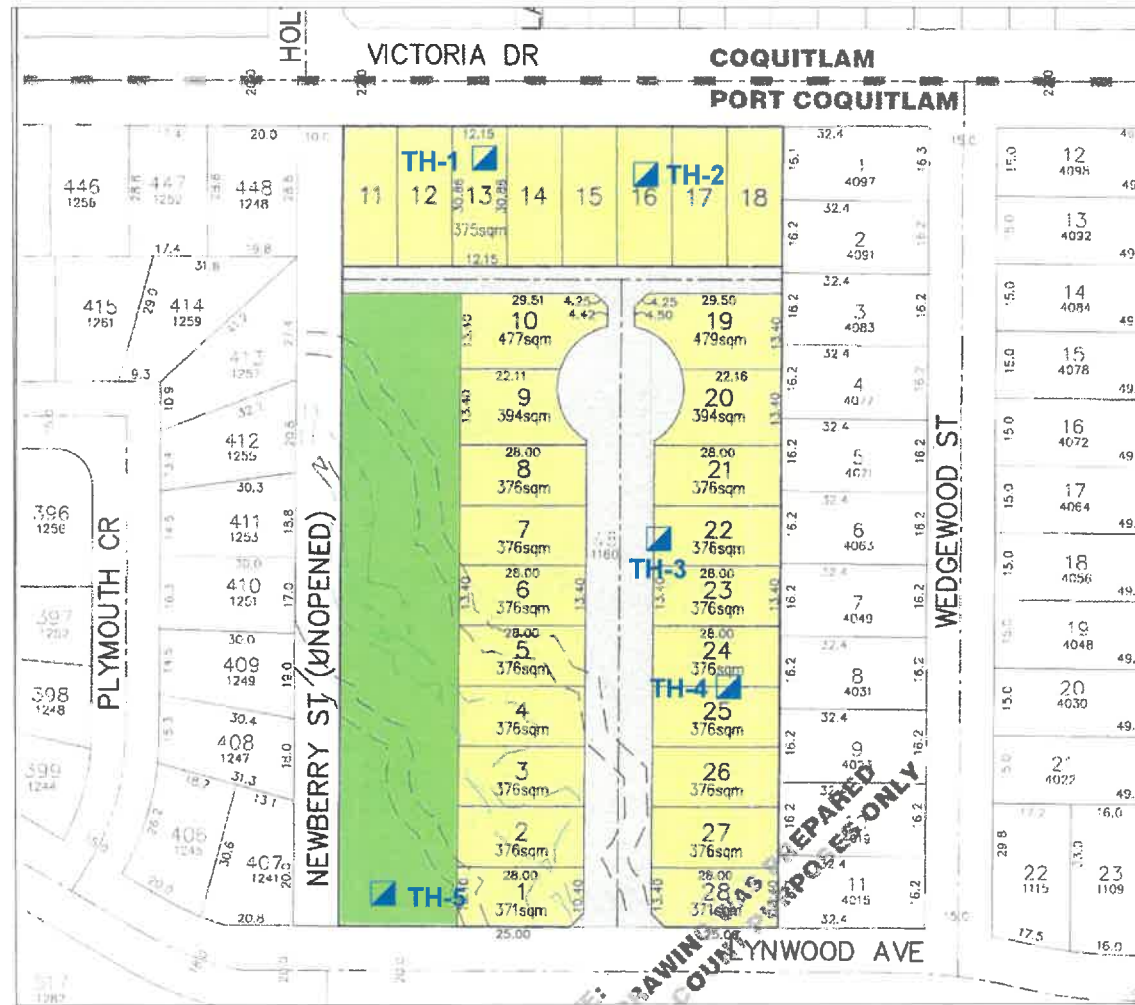


Figure 1. General Site Location (NTS – Taken from Google Earth)

Unit 1B – 30508 Great Northern Ave, Abbotsford, BC V2T 6H4, Tel. 604-746-5070



CORNERS ONE

GEO-STRUCTURAL ENGINEERING LTD.
18-30508 Great Northern Avenue
Abbotsford, BC, V2T 6H4
Phone/Fax : (604) 746 5070
Cell phone : (778) 928 7589
Email: cornerstoneng@shaw.ca
PROFESSIONAL SERVICES BUILT UPON THE ROCK

FIG. 2 PRELIMINARY LOT LAYOUT

SITE: 1160 VICTORIA DRIVE, PORT COQUITLAM, BC

CLIENT: F.A.R. GROUP

Drawn: German Cajigas

Revised: Jorge Silva

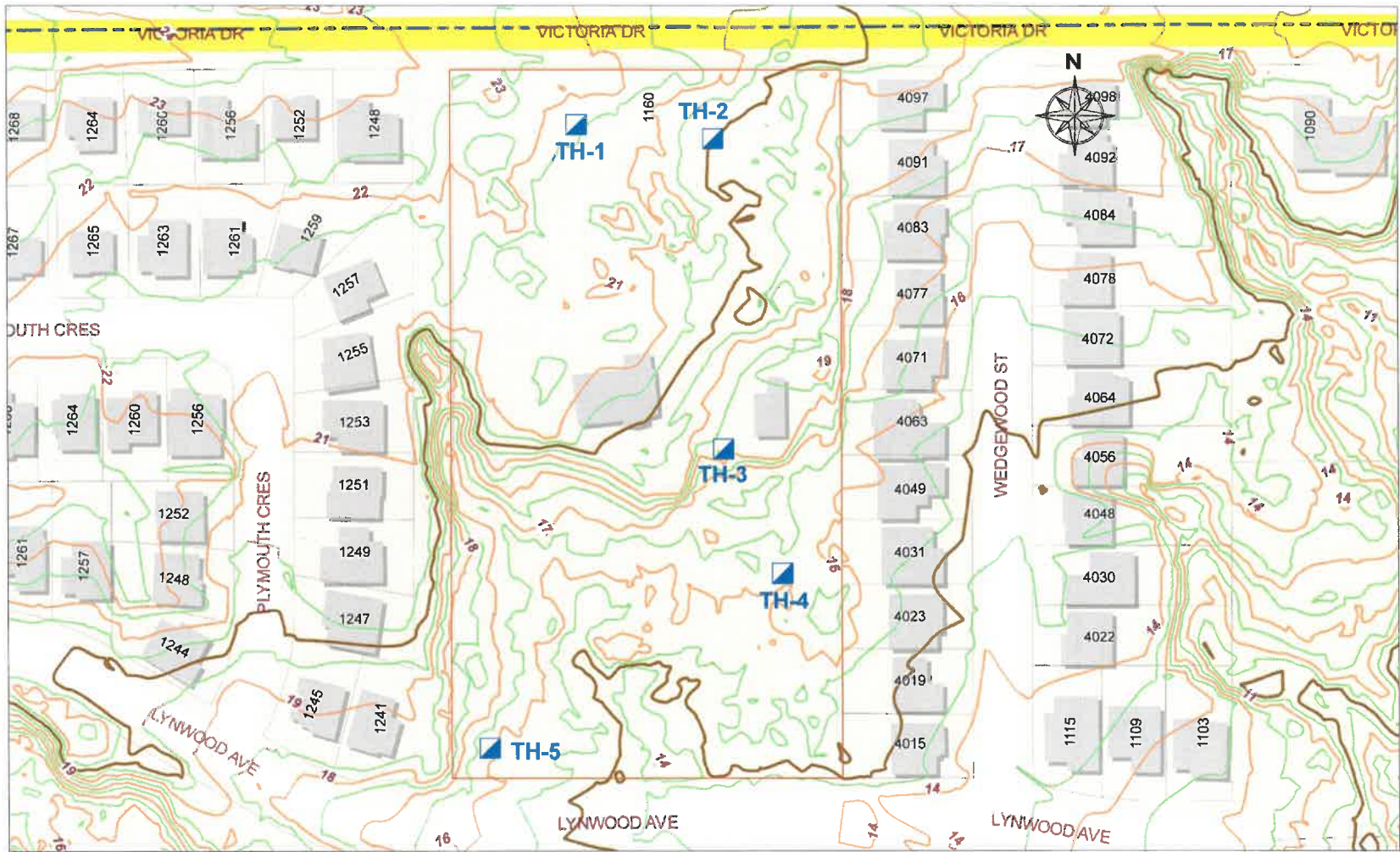
Date: January 22, 2018

SCALE: 1:1000

1/1

REVISIONS

0 ISSUED FOR BUILDING PERMIT



APPROXIMATE TOPOGRAPHY FROM POCO MAP



CORNERS + ONE

GEO-STRUCTURAL ENGINEERING LTD.
1B-30508 Great Northern Avenue
Abbotsford, BC, V2T 6H4
Phone/Fax : (604) 746 5070
Cell phone : (778) 928 7589
Email: cornerstoneng@shaw.ca
PROFESSIONAL SERVICES BUILT UPON THE ROCK

FIG. 3 SITE TOPOGRAPHY

CLIENT: F.A.R. GROUP

SITE: 1160 VICTORIA DRIVE, PORT COQUITLAM, BC

Drawn: German Cajigas

Date: January 22, 2018

Revised: Jorge Silva

SCALE: 1:1000

1/1

REVISIONS

0 ISSUED FOR BUILDING PERMIT

2022 Supplementary Project Information



SUPPLEMENTARY PROJECT OVERVIEW

STREAM REALIGNMENT & ENHANCEMENT
at 1160 Victoria Drive, Port Coquitlam, BC
Proponent: RBD Victoria Inc. & GRD Victoria Inc.

1. OVERVIEW

Phoenix Environmental Services Ltd. (Phoenix) has been retained by RBD Victoria Inc. and GRD Victoria Inc. (the proponent) to provide Qualified Environmental Professional services in support of a proposed 25 lot residential subdivision at 1160 Victoria Drive, Port Coquitlam, BC (the site). The site is currently occupied by a single-family dwelling, barn, and areas of lawn and gardens, and also contains part of a non-fish-bearing unnamed stream. The stream originates at a storm outlet in the unopened road allowance west-adjacent to the site, before flowing southeastward into the southern portion of the site and then into a storm sewer inlet at Lynwood Avenue to the south of the Site.

Modifications to the stream are proposed in order to facilitate development at the site and to enhance fish habitat. The proposed modifications, supported by the City of Port Coquitlam (the City), involve realigning the stream along the western edge of the site, which will include the City dedicating the road allowance as park area. The stream on site, which is currently non-fish-bearing, will be made accessible to fish through installation of a fish-passable culvert beneath Lynwood Avenue, and the creation of a new channel directing flows from the on-site stream to Watkins Creek, within Hyde Creek Nature Reserve. There will be no net loss of aquatic or riparian habitat associated with this realignment, and it is expected to result in an increase in fish-bearing area. The proposed realignment is considered the most appropriate option that will result in both enhanced fish habitat and increased residential density, and the design seeks to minimise impacts as much as possible (e.g. retaining riparian trees where possible, shortest possible fish-passable culvert, completing instream components as quickly as possible and during dry weather in reduced-risk window).

This Supplementary Project Overview has been prepared in support of the proposed stream realignment and enhancement, and is intended to provide a summary of pertinent information for authorisation applications under the BC Water Sustainability Act and Canada Fisheries Act. An Environmental Impact Assessment has also been prepared by Phoenix, dated December 23, 2020, which has been used to inform the design of the proposed work. Consultation with local residents and members of Hyde Creek Watershed Society (HCWS) has been initiated, and the HCWS President and Director are in general support of the project.



The proposed stream modifications are not expected to impact habitat downstream of the works nor alter groundwater connectivity. The proposed works are not expected to negatively impact nearby stakeholders or downstream licensees. Works will be conducted on the site and on City land (unopened Newberry Street road allowance, Lynwood Avenue, Hyde Creek Nature Reserve), and the City is in full support of the proposed development plan. The proposed development is considered to serve the public interest through provision of housing from subdivision of existing disturbed lots, consistent with identified needs in the City's OCP, and through enhancement of fish habitat.

1.1. PROPOSED WORKS

Please see the attached Development Plan, Grading Plan, and Servicing Plan for details of the proposed residential subdivision and associated infrastructure. Please refer to the attached Habitat Balance Plan, the Stream Restoration Plan, the Riparian Planting Plan, and the Stream Plan, Profile, and Sections drawings for details regarding the stream modifications.

The proposed development of the Site entails construction of 25 single-family residential lots accessed by new streets within the Site extending from Lynwood Avenue at the south edge of the Site. The Site will be re-graded to meet existing elevations at Victoria Drive to the north, the unopened Newberry St. road allowance at the northwest edge of the Site, and the existing rear yards of the adjacent single-family residential lots to the east along Wedgewood Street.

Storm sewers will collect stormwater runoff from the proposed new lots and convey stormwater from the Site into the existing 450 mm diameter City storm sewer within Lynwood Avenue. This small storm sewer network discharges to a Hyde Creek tributary that originates at the storm outfall within 3940 Ambleside Close. As the proposed stream modification will redirect the on-site stream flows to Watkins Creek, this represents a reduction of flows to the 3940 Ambleside watercourse. However, as the proposed development at site will direct to this watercourse stormwater from the residential development and any groundwater that is intercepted by foundation drainage, there is not expected to be a significant reduction in flows to this short tributary.

The existing stream on site is first contained within a north-south oriented ravine before turning southeastward upon leaving the ravine, shortly after forming braided channels at a location with groundwater seepages, and finally entering the Lynwood storm sewer. The stream realignment on site involves retention of the ravine section and modification of the channel south of the ravine to a north-south orientation, slightly offset from the ravine alignment to retain a mature cedar grove and to provide setbacks on the subject site (i.e. no new setbacks will be imposed on neighbouring residential properties). Although the ravine section of stream will remain, a split-flow manhole will be installed upslope of the ravine to divert some of the flows and create a new channel running broadly parallel to and east of the ravine, with a confluence of the two channels located as the ravine opens up.



A fish-passable culvert, including baffles and embedded gravels, will be installed from the realigned stream to a new channel extending from Watkins Creek to Alderwood Avenue. The culvert alignment is constrained by sanitary pump station infrastructure and other underground utilities, and the proposed alignment is deemed to be the shortest possible. The fish-passable culvert will be 47.51 m long and will have a slope of 2.0 %. The new channel within Hyde Creek Nature Reserve has been proposed based on existing topography and minimising impacts to existing trees.

The stream will feature enhancements intended to improve habitat for the fish expected to use this new stream section: particularly coho and chum salmon that have known spawning locations above the Watkins confluence with Hyde Creek. The stream design incorporates pools and riffles, boulders and coarse woody debris, and the cross-sectional morphology will increase stream depth at low flows. Tailing and outfall pools of 1.0 m or deeper than culvert inverts will be constructed. Riparian enhancements involve planting native shrubs and trees to improve insect drop, leaf litter, and shading over the stream.

The proposed stream modifications on site and within the unopened road allowance (i.e. excluding the short new channel to be created on Hyde Creek Nature Reserve) will result a net quantitative gain of both aquatic and riparian habitats, and are expected to result in considerable qualitative improvements to fish habitat. The area of aquatic loss of 581 m² (the southeast-oriented existing section of stream, predominantly braided and including groundwater seepages) will be offset by an aquatic gain of 856 m² (realigned channel at southwest of site and new channel from flow-split manhole), resulting in a 275 m² net gain. Based on the applicable municipal protected riparian areas of 15 m above top of bank, a calculated loss of 1623 m² of riparian area (the riparian area surrounding the braided channels and groundwater seepages) is offset by a gain of 1963 m², resulting in a net gain of 340 m² riparian area.

Although the proposed stream modifications involve the infill of a small area with seasonal groundwater seepages, the grading of the site and the elevation of the realigned stream channel is expected to result in groundwater in the site being intercepted by the realigned stream channel or, for the eastern portion of the site, drained by foundation drainage to the storm sewer that currently drains the existing stream.

As a result of the realignment Watkins Creek will receive flows from the on-site watercourse that currently drain to the 3940 Ambleside watercourse. Although both ultimately flow into Hyde Creek, this change will result in a section of Watkins Creek and Hyde Creek receiving an increase in flows. Because the catchment of the on-site watercourse is relatively small (i.e. small groundwater seepage on site and stormwater from residential lots on the south of Victoria Drive to the west of site), the redirection of these flows is not expected to result in impacts (e.g. increased erosion or flooding) to the natural channels of Watkins and Hyde Creek. As stormwater falling on the subject site and groundwater intercepted by foundation drainage will be directed to the 3940 Ambleside watercourse, the reduction in flows in this small tributary due



to redirecting the on-site watercourse will be mitigated and is not considered likely to result in a significant impact.

Instream Works

To construct the proposed new stream and realigned stream, much of the new stream alignment will require excavation below existing ground surfaces. The excavation depth for the new channel at the north is around 2 m, while that along the realigned stream in the south part of the Site is shallower. Along the southern realigned channel section, there will be a defined stream channel top of bank and beyond the new stream top of bank, there will be graded slopes that are flatter than 3H:1V to meet the existing grades along the west edge of the Site. Environmental protection will include commonly applied best management practices (BMP) for instream works such as adherence to low-risk construction timing windows (August 1 – September 15), conducting works in isolation of flowing water and during dry weather, and typical ESC measures. Long term environmental protection will be achieved by dedicating the stream and the 15 m from top of bank riparian habitats at the site to the City as natural area park, and by erecting fencing to limit encroachment from the new residential lots including during construction at the individual lots.

Isolation of flowing water at the stream on site can be achieved by plugging the stormwater outfall in the Newberry Street road allowance (or at the existing upstream manhole for installation of the new flow-split manhole) and bypass pumps can discharge to the existing stormwater inlet at Lynwood Avenue to avoid erosion. As the works are to be conducted in late summer, the seasonal groundwater seepages, likely formed by telluric seepage above the fine-textured native soils (clayey silts and firm till), are not expected to be actively discharging at the time of instream works. Should it be necessary, small sumps can be excavated such that any flows are able to be pumped to the Lynwood storm inlet.

Although the proposed alignment was chosen to minimise impacts to trees, several trees will require removal and other vegetation will be stripped for the work. No trees or vegetation should be removed between March 1 and September 1. Should removal of trees or vegetation during this period be unavoidable, a bird nesting survey will be conducted by Phoenix with particular focus on habitat features used by species-at-risk relevant to the site (see Habitat section, below, for further information). Excavation, fill, and grading will then proceed with the channel being dressed and disturbed soils being covered with straw and seed as works progress.

Construction of the new channel from the fish-culvert to Watkins Creek will also require isolating a small section of Watkins Creek so that the new channel can tie into the existing stream. Prior to any work within Watkins Creek a precautionary fish salvage will be conducted and the work area isolated with mesh exclusion fencing. The work will be conducted within a period of dry weather in August/September when Watkins Creek has low flows, and cofferdams will be installed within Watkins Creek to isolate the area of bank that will be modified, with



bypass pumps available to direct flows around the work area as necessary. A skilled operator and a small excavator will be used to carefully pull back the low bank of Watkins Creek without disturbing areas outside of the new watercourse. The new confluence will be graded, with its channel stabilised with cobble and any disturbed soils protected with erosion-control blankets or dense straw and seed. A cofferdam will then be installed immediately upstream of the new stabilised confluence such that works can continue upslope in isolation of Watkins Creek (note that no flows will be directed here until after installation of the culvert and completion of the on-site stream realignment). The Watkins Creek cofferdams will then be removed with any disturbed areas manually restored. Work will progress toward the location of the new fish-passable culvert, and the stream channel and riparian areas will be fully stabilised and dressed as works progress.

Environmental monitors will be present during the set-up, prior to reintroduction of flows, and any other environmentally-sensitive activities (Watkins Creek and riparian area, fish-passable culvert installation, creation of pools, weirs etc.), and will provide guidance throughout the instream works. The project arborist will be present for any work that is to occur within the dripline of retained trees. Should any dewatering be necessary during the works, turbid water will be pumped to on-site ESC facilities or to established vegetation away from watercourses. Spill kits will be maintained on site at all times.

2. SUPPLEMENTARY STREAM DESCRIPTION / INFORMATION

Phoenix have conducted field and watercourse assessments at 1160 Victoria Drive on November 20, 2017, April 12, 2018, and March 5, 2019. An arborist assessment was conducted by Stickleback Environmental on December 27 and 28, 2017. A geotechnical assessment was completed by Cornerstone Geo-Structural Engineering Ltd. on January 9 and 12, 2018.

The Site is 1.73 hectares in size and comprises one legal lot at 1160 Victoria Drive in Port Coquitlam. The Site is located at the northern boundary of Port Coquitlam. Properties and services to the north fall under the jurisdiction of Coquitlam. The Site is occupied by a single-family residential dwelling with a detached garage and a pool. There is also a small horse stable/barn to the east of the residence along the eastern property boundary. The Site is currently zoned RS3 (to accommodate and regulate detached dwellings on large lots with at least 30 m wide lots). The Site is bounded to the east, west and south by residential lots zoned RS1 (to accommodate and regulate detached dwelling units on lots that are at least 15 m wide).

To the southwest of the Site is Hyde Creek Nature Park. Within Hyde Creek Nature Park, Watkins Creek extends from the northwest at Apel Drive and flows east towards the Site coming to within 60 m of the southwest corner of the Site. Watkins Creek then turns south and conveys flows into Hyde Creek which flows into De Boville Slough which in turn drains to the Pitt River. Watkins Creek is classified and mapped (PoCoMAP) as a permanent, fish-bearing stream. To the



north of the Site is predominantly residential multi-family homes (townhouses) and an Elementary School in Coquitlam.

The Site topography is gently sloping to the south with a small east-west slope bisecting the Site approximately midway. The materials underlying the area consist of Vashon Drift and Capilano Sediments (VC) including lodgement and minor flow till, as per the Geological Survey of Canada Map 1484a. The soils at the site were described in the geotechnical assessment report as topsoil underlain by till described as very stiff, moist/wet, clayey silt, with the exception of one test pit (TH-3) where soils consisted of random fill underlain by soft clayey silt which is underlain by the till type described above. No groundwater or seepages were encountered during the geotechnical investigation, with test pits typically terminated at 1.5 m depth below ground surface and within the very stiff, moist or wet clayey silt. Based on this information, it is expected that the seepage feeding the stream is a seasonal telluric seepage within the surficial soils.

STREAM OVERVIEW

The Site is within the drainage catchment area (i.e. watershed) of Hyde Creek. Hyde Creek (Watershed Code: 100-026700-07200-97700) is a permanent fish bearing stream under Port Coquitlam's Watercourse Protection classification system. Hyde Creek supports 6 species of salmonids including coho salmon (*Oncorhynchus kisutch*), chum salmon (*O. keta*), pink salmon (*O. gorbuscha*), Chinook salmon (*O. tshawytscha*), cutthroat trout (*O. clarkii*), and both rainbow and steelhead trout (*O. mykiss*), as well as other fish species (e.g. Lamprey, sculpin, and threespine stickleback). Hyde Creek is one of the primary drainage catchments in Port Coquitlam.

The unnamed subject stream enters the Site from the western property boundary via a storm sewer outfall extending south from Victoria Drive. The stream conveys stormwater flows from a 450 mm concrete storm main, located to the west of the Site, across the southwestern corner of the Site and drains into the storm sewer system to the south of the Site through a 375 mm concrete culvert at Lynwood Avenue. This storm sewer network discharges at 3940 Ambleside Creek into a small tributary of Hyde Creek.

The unnamed stream at the Site is shown in PoCoMap as a storm ditch (non-permanent, non-fish bearing). However, based on field observations by Phoenix in November 2017, it has been determined that the existing unnamed watercourse at the Site should be classified as Class B stream (permanent, non-fish-bearing). The existing unnamed stream has been observed by Phoenix to be flowing in November 2017 and April 2018, as well as during a Site visit on March 5, 2019 after a period of 7 days with no rain (as per City of Coquitlam Rainfall Monitoring – Flow works – Burke Mountain Rain Gauge). During the Site visit on March 5, 2019 flow volumes in the stream appeared to be larger towards Lynwood Avenue than at the storm sewer the head of the ravine, indicating that the stream is also groundwater fed. There were also



groundwater seepages observed along the east side of the low-lying reach of the stream in the south-central area of the Site.

The northernmost reach of the unnamed stream is confined within a steep-sided ravine within the adjacent unopened (Newberry St.) road allowance to the west of the Site. The stream flows south and slightly east within the ravine until it crosses the western property line of the Site where the ravine condition ends. The stream appears to have been diverted by a large boulder and adjacent slope to the south causing the stream to bend and flow southeast across an area with fairly flat topography.

Within the Site, the stream meanders for approximately 75 m, and then the channel becomes braided for approximately 40 m before rejoining to a single channel and passing over an apparently constructed boulder weir. Beyond the weir, the stream channel becomes braided again for approximately 45 m and once again rejoins to a single stream channel for approximately 30 m before passing through a headwall into the storm sewer system at Lynwood Avenue. There are multiple seepages near where the stream channel is braided that convey groundwater into the stream and contribute to the flows. There are indications of higher flows along the stream within the low-lying areas. However, the high flow events do not appear to be substantially variable; that is, the stream at the Site appears to have relatively stable baseflows. While having a storm sewer source of flows, in addition to groundwater-based low flows, the higher velocity and volume flows associated with storm events has not scoured a deep stream channel; except near the storm outfall where the existing ravine slope on the west side has eroded and undermined an adjacent wood retaining wall. Rather, the stream channels throughout the Site are shallow (<30 cm bank height) with low flows around 5- 10 cm deep. The stream substrate comprises predominantly sand, silt and gravel with some scattered boulders and some areas of high silt/organics, particularly near the south end of the stream near the storm sewer inlet headwall at Lynwood Avenue.

The stream top of bank was observed by Phoenix to be between 0.5 m and 1.3 m wide and follows the stream channel, not the bottom of the slope along the east side as is indicated on the Land and Topographic Survey. However, there are two seepage zones adjacent to the stream and the east slope which are delineated as the top of bank on the topographic survey. These low-lying seepage areas are considered part of the stream.

The riparian vegetation within the ravine consists mainly of mature trees including Norway spruce, western red cedar, red alder, big-leaf maple, and western hemlock. The understory within the ravine is fairly sparse but is dominated by English ivy and yellow archangel with some sword fern.

The southern area of the Site is dominated by mature red alder and black cottonwood with some western red cedar, and big-leaf maple. There are large stands of hardhack to the south of the house and north of the unnamed stream. Along the unnamed stream channel within the Site there



is extensive reed canary grass. Some skunk cabbage has been observed within the stream channel towards the western property boundary. The remainder of the southern portion of the site is dominated by salmonberry thickets with some blackberry, particularly along Lynwood Ave.

HABITAT OVERVIEW

The primary wildlife habitats on the Site are associated with the mixed mature riparian forest along the unnamed stream. There is some wildlife value in the overgrown agricultural area, the stable/barn, and the mature trees that are clustered in the northeast and northwest corners of the Site. An old barn swallow nest is present within the rafters of the stable/barn and there are several suitable trees on and near the site that offered suitable perching habitat for raptors, but with limited potential for nesting due to surrounding residential uses.

No mammals were observed during the site visit; however, upon speaking with the resident of the house to the southwest of the Site, raccoons, coyote, black bear and black-tailed deer have been observed using a wildlife trail that begins within the adjacent unopened Newberry Street road allowance at the south and follows the stream into the ravine area. The neighbour said that bear have been using the area heavily as a corridor between Hyde Creek Regional Park and areas to the north in Coquitlam. Phoenix observed evidence of bear scratching on a downed log along the wildlife trail. It is expected that the Site would also support or provide habitat for small mammal species (e.g. skunk, opossum, shrew, vole, bats) that are common within riparian forests and suburban areas.

Phoenix has reviewed the Ministry of Environment's (MOE) Conservation Data Centre (CDC) database of known and potential occurrences of provincially listed (i.e., red-listed or blue-listed) plant and animal species and federally listed species from Schedule 1 of the Species at Risk Act (SARA) and from the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) candidate list. No species at risk have been observed on the site during any of the site visits conducted. However, the intact barn swallow (*Hirundo rustica*) nest in the barn may be reused in subsequent years. Barn swallows are SARA-listed as Threatened and are Provincially Blue-listed. In addition, the site is approximately 3 km from a known occurrence of a different Blue-listed species, which may use the barn or other areas on site. This species-at-risk is considered sensitive and the CDC does not allow the release of information without confidentiality agreements in place. However, Phoenix has reviewed information regarding the occurrence data and has incorporated the following mitigation measures:

- Phoenix must attend site prior to any access, work, or demolition within the barn or other disused buildings on site, in order to confirm that no species-at-risk are present. It is recommended that demolition is conducted between September and May, commencing within 72 hours of Phoenix having confirmed the absence of species-at-risk.
- No trees or vegetation should be removed between March 1 and September 1. Should removal of trees or vegetation during this period be unavoidable, a bird nesting survey



will be conducted by Phoenix with particular focus on habitat features used by species-at-risk relevant to the site. Due to the ecology of the sensitive species-at-risk, it may not be possible to discount presence during a typical bird survey and, as a precaution, particular trees (determined by the QEP) may require protection even where positive identification of the species-at-risk are not possible. As such, removal of vegetation (particularly any large trees that must be removed) between September and March is strongly recommended to minimise potential disturbance and survey effort.

- To offset the loss of nesting sites caused by removal of the barn, artificial barn swallow nesting structures are to be built in or adjacent to the SPEA.
- Riparian planting will include native willow (*Salix spp.*), native cherry (*Prunus spp.*), and thimbleberry (*Rubus parviflorus*).

The riparian forest area and wetted portions along the unnamed stream could provide suitable foraging habitat for occasional use Great Blue Heron (*Ardea herodias fannini*), olive-sided flycatcher (*Contopus cooperi*), barn swallow (*Hirundo rustica*), and Band-tailed Pigeon (*Patagioenas fasciata*). Northern red-legged frog (*Rana aurora*) may use the stream for movement and foraging. The BC-CDC mapping tool also has been referenced to determine if there are any known species at risk occurrences or ecosystems of concern at or near the Site. No CDC mapped known occurrences of species and ecological communities at risk were reported on the Site. There is a polygon for green heron (*Butorides virescens*) approximately 850 m east of the Site. The Site does not offer suitable habitat for green heron. No aquatic species at risk or associated critical habitats are considered to be found or potentially found within a 1 km buffer surrounding the site, based on the DFO Aquatic Species at Risk Map.

The area surrounding the Site is characterised by a mixture of natural areas and residential areas. The natural areas are predominantly those associated with streams (in particular Hyde Creek Nature Reserve), but also include as-yet undeveloped lots within Coquitlam. The housing is generally single-family residential in Port Coquitlam (to the east, south, west) and multi-family residential in Coquitlam (to the north). Some older and larger residential lots remain in the area, including the subject site, but in general these lots are undergoing development to higher density housing. The subject site at its southwest and western edge, closest to Hyde Creek Nature Reserve, will be retained and enhanced as natural area and will include dedication of Newberry Street as a riparian area and wildlife corridor. Although wildlife travelling north-south to Hyde Creek Nature Reserve through the subject site must then pass through a residential/school area north of Victoria Drive, based on resident observations a variety of wildlife does use this corridor. As such, the dedication of riparian area as park land, associated with the proposed stream realignment, will protect this section of wildlife corridor in perpetuity.

2022 Construction Environmental Management Plan



CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN

RBD Victoria Inc. and GRD Victoria Inc.
1160 Victoria Drive, Port Coquitlam, BC

1. OVERVIEW

Phoenix Environmental Services Ltd. (Phoenix) has been retained by RBD Victoria Inc. and GRD Victoria Inc. (the proponent) to provide Qualified Environmental Professional services in support of a proposed 25 lot residential subdivision at 1160 Victoria Drive, Port Coquitlam, BC (the site). The following development activities at the site are environmentally-sensitive:

- Removal of existing structures and trees that may be used by Species at Risk;
- Realignment of an on-site stream, creation of new stream channels on site;
- Installation of a fish-passable culvert across Lynwood Avenue;
- Creation of a new stream channel to connect the fish-passable culvert to Watkins Creek (within Hyde Creek Nature Reserve); and
- Planting and maintaining riparian areas associated with the new and realigned stream channels.

The on-site stream is regulated under the Water Sustainability Act (WSA) and provides fish habitat value protected by the Canada Fisheries Act. No works are permitted within the on-site stream or its riparian area until authorised under the WSA. Disturbance to existing buildings and removal of large trees requires a QEP to confirm the absence of Species-at-Risk and active bird nests in the days preceding demolition, felling etc.

This Construction Environmental Management Plan (CEMP) is intended as a stand-alone document to outline the environmental protection requirements for contractors and others involved in the development. The CEMP details protection measures, best management practices, and contact information for the environmental management team.

2. ENVIRONMENTAL PROTECTION REQUIREMENTS

The proposed development involves removal of existing buildings (including a disused barn with indications of use by federally-listed (SARA) Threatened barn swallows), clearing of vegetation, regrading the site, realigning the on-site stream to the western edge of the site, installing a fish-passable culvert beneath Lynwood Avenue, creating a new channel (off-site) at Hyde Park Nature Reserve, and creation of the 25-lot subdivision including servicing. As many of these



activities have potential to impact fish and wildlife habitat, the restrictions below must be followed.

2.1. CONSTRUCTION ACTIVITIES

The following restrictions apply to clearing of vegetation, demolition and disassembly of existing buildings. These restrictions are required due to the potential for ongoing use of the site by Species at Risk, including barn swallows and other species known by the BC CDC to use the area containing the site:

- Phoenix must attend site prior to any access, work, or demolition within the barn or other disused buildings on site, in order to confirm that no species-at-risk are present. It is recommended that demolition is conducted between September and May, commencing within 72 hours of Phoenix having confirmed the absence of species-at-risk.
- No trees or vegetation should be removed between March 1 and September 1. Should removal of trees or vegetation during this period be unavoidable, a bird nesting survey will be conducted by Phoenix with additional focus on habitat features used by species-at-risk relevant to the site. Due to the ecology of the sensitive species-at-risk, it may not be possible to discount presence during a typical bird survey and, as a precaution, particular trees (determined by the QEP) may require protection even where positive identification of the species-at-risk is not possible. As such, removal of vegetation (particularly any large trees that must be removed) between September and March is strongly recommended to minimise potential disturbance and survey effort.

The below restrictions apply to any work within the existing on-site stream, any work within its riparian area (15 m from top of bank), and any work within Hyde Park Nature Reserve:

- Prior to commencement of development on site, the riparian area associated with the on-site stream (15 m from top of bank) is to be surveyed and marked with stakes, boundary tape, or temporary (e.g. snow) fencing.
- Work within the on-site stream, within 15 m of its top of bank, and within Hyde Park Nature Reserve (i.e. new channel and culvert install) is to be scheduled for dry weather during the fisheries reduced-risk window of August 1 to September 15. The exception to this is for the use of the existing driveway for access (i.e. for demolition of existing buildings), and works within the existing roadway (Lynwood Avenue).
- ESC measures are to be installed outside of the on-site stream 15 m streamside setback area prior to any development on site. If the existing driveway is to be used to access the buildings to be demolished, silt fencing must be installed at the edge of the roadway to protect the stream. Loose sediment, turbid water, and any other pollutants must be prevented from entering streams throughout development.



- ESC measures are to be installed in advance of any works within Hyde Park Nature Reserve, including the fish-passable culvert installation. The ESC measures are to be installed at the direction of the QEP.
- The environmental monitor must attend Site and confirm absence of wildlife, salvaging if necessary, in advance of any work within the on-site existing stream. The environmental monitor must conduct a fish salvage in Watkins Creek prior to isolation of the work area for the confluence with the new channel.
- The environmental monitor will be present for all environmentally-sensitive operations (isolation of flows, work within Hyde Park Nature Reserve, culvert installation, reintroduction of flows etc.) and will provide input throughout the instream works. The environmental monitor has the authority to stop work.
- All works below top of bank are to be conducted in isolation of flows. Cofferdams will be installed and/or storm pipes plugged and flows are to be maintained downstream of the work area with bypass pumps.
- Whenever possible, machinery shall be operated from above top of bank and on existing paved surfaces (e.g. the existing roadway).
- The project arborist will be present for any work that is to occur within the dripline of retained trees.
- Should dewatering be required, turbid water is to be pumped to on-site ESC facilities or to established vegetation distant from watercourses.
- Storage of material, equipment, and machinery shall occur distant from the watercourses and on paved surfaces wherever possible.

2.2. EROSION AND SEDIMENT CONTROL

Loose sediment, turbid water, and any other pollutants must be prevented from entering streams throughout development. An ESC Plan is to be developed and shall include:

- Silt fences are to be keyed in above top of bank of the existing stream (until modified under WSA authorisation) and above top of bank of the new sand realigned stream (once flows reintroduced).
- Stockpiling of soils or other erodible materials should be located more than 30 m from watercourses wherever possible. Should stockpiling near watercourses be necessary, the stockpiles are to be covered with anchored poly prior to rainfall and at the end of every day;
- Existing and new catch basins are to be protected (i.e. inlet silt sacks);



- Paved roads are to be frequently swept clean of tracked sediment to prevent tracking beyond the work area;
- Spare pumps should be maintained on Site. Should dewatering of excavations be required, turbid water must be pumped to detention ponds or to vegetated areas such that turbid water does not enter ditches. If a sump is excavated, the pump should be seated on ¾" clear crush.
- Washing of trucks or any materials or equipment that has been in contact with concrete must not be conducted within 30 m from ditches and at a designated area.
- Any disturbed soils should be covered with anchored poly or dense straw once the area is inactive and before the end of the day;
- Erosion control blankets may be required on the slopes of the new and realigned stream at the discretion of the ESC or environmental monitor.

Appointment of an ESC Monitor will be necessary to inspect ESC measures and report to the City.

2.3. SPILL MANAGEMENT PLAN

Please refer to the 2-page spill management plan appended to this document. The 'Spill Response' page should be displayed on Site such that personnel can properly respond to spills in the vicinity of watercourses.

2.4. PLANTING PLAN

An area of riparian planting is required in association with the instream works. Planting works will involve:

- A field visit by the environmental monitor prior to riparian planting works to verify and flag planting areas.
- All invasive species (e.g. Himalayan blackberry) will be grubbed out and removed from the Site prior to plant installation. Should they occur on Site, noxious species (e.g. knotweeds) will be managed appropriately under the direction of the environmental monitor. Invasive and noxious plants are to be bagged prior to transport and disposed of at approved locations.
- Should invasive species be encountered, ongoing management of invasive species is expected to occur at least three times during the growing season for the duration of the maintenance and monitoring period.



- Planting should occur in fall to promote plant survival. Planting during winter or summer may require frost protection or a watering schedule (following recommendations of environmental monitor).
- Any alterations made to the planting plan (e.g. planting locations, spacing, substitutions), must be approved by the environmental monitor.
- Maintenance and monitoring of the planting area must be conducted for a minimum period of three years. Annual monitoring assessments and reports are to be provided by the environmental monitor and will include plant survival rates, presence of invasive species, condition of restoration works, and measures required to address any deficiencies or issues. Monitoring at a greater frequency may be required, at the proponent's expense and the discretion of the environmental monitor, to ensure success of the planting area.
- Maintenance and monitoring will no longer be required after three years if shrub/herbaceous survival rates exceed 80 %, tree survival rates are 100 %, and the area is free of invasive vegetation.

3. ENVIRONMENTAL MANAGEMENT TEAM – ROLES AND RESPONSIBILITIES

The Environmental Management Team will include the QEP/Environmental Monitor (EM), the Developer, the Project Arborist, the ESC Monitor, and the Contractor. A brief description of key team members, their general roles and responsibilities, and lines of communication, is as follows:

Proponent (RBD Victoria Inc. and GRD Victoria Inc.)

Contact: Glenn Richardson

Direct Phone: --

Email:

- Owner (or representative of the owner) of the subject Site with overall responsibility for environmental compliance and supervision of General Contractor's performance in achieving and maintaining environmental compliance.
- Point of contact for General Contractor, Environmental Monitor, Project Arborist, and ESC Monitor
- Reviews and retains monitoring and/or construction inspection reports from EM, ESC Monitor, Project Arborist, and Project Engineer/Architect, and provides summaries as required to the Owner and Township including, where appropriate, the Parks Department.

General Contractor (TBD)



- Responsible for implementing environmental protection measures on-site, directly and indirectly through supervision of designated sub-contractors, as recommended and directed by Environmental Monitor, Project Arborist, and ESC Monitor.
- Coordinates and communicates with Environmental Monitor, Project Arborist, ESC Monitor and the Developer on implementation of environmental protection measures and provides recommendation on improving implementation.
- Reports directly to the Developer

Environmental Monitor (Phoenix Environmental Services Ltd.)

Contact: Ken Lambertsen, B.Sc., R.P.Bio - Senior Qualified Environmental Professional

Direct Phone: 604-255-1111

Email: ken.lambertsen@phoenixenv.com

- Supervise instream works (ditch infill, headwall installation) including conducting wildlife salvages.
- If required, provide songbird nesting surveys prior to any clearing works necessary between 1 March and 15 August.
- Supervision of installation and subsequent annual monitoring, for three years, the planting areas, including assessment of potential re-growth of invasive vegetation.
- Provide advice on best management practices for the mitigation and prevention of environmental impacts.
- Reports directly to the Developer.

Arborist (Stickleback Environmental Consulting Services)

Contact: TBD

Direct Phone: TBD

Email: TBD

- Designate and inspect the Tree Root Protection fencing installed by the General Contractor.
- Attend Site during excavation within 2.0 m of tree protection fencing, to review protection measures, undertake root pruning, direct low impact methods, and recommend BMPs.
- Supervise and inspect the planting of replacement trees where necessary.
- Reports directly to the Developer.



ESC Monitor (to be determined)

- Oversee and regularly inspect the implementation of ESC measures.
- Prepare ESC Monitoring reports for submission to the Township and provide copies to the Developer.
- Work with the General Contractor to respond to any appropriate changes or refinements to ESC measures as construction proceeds.
- Reports directly to the Developer.

4. ADDITIONAL CONTACTS

Land Owner – 1160 Victoria Drive (RBD Victoria Inc. and GRD Victoria Inc)

Land Owner – Roadways, Hyde Park Nature Reserve (City of Port Coquitlam)

Engineering (H.Y. Engineering Ltd.)



SPILL MANAGEMENT PLAN 1160 VICTORIA DRIVE – INSTREAM WORKS

This spill management plan outlines the spill avoidance and spill response plan associated with the proposed instream works (watercourse realignment, new watercourses, culvert install) at 1160 Victoria Drive and on adjacent City land. In general, the project is anticipated to have a low risk of spills. The greatest spill risk is likely associated with petroleum or antifreeze products leaking from vehicles or machinery operated above top of bank.

Spill Avoidance

The following risk mitigation procedures are recommended:

- All vehicles and machinery will be operated from above top of bank, using existing paved surfaces wherever possible.
- No refuelling will be allowed on unpaved surfaces or any surface within 30 m of any watercourse.
- No fuel storage shall occur within 30 m of any watercourse.
- No equipment maintenance or repair will be allowed within 30m of any watercourse. Any essential equipment maintenance or repair should occur as far as reasonably possible from watercourses.
- All waste liquids and products (filters, oily rags, etc.) will be removed from the Site on a regular basis by a duly-licensed contractor, and disposal records will be maintained.
- No concrete pours or washout areas will be present within 30 m of watercourses. Concrete use near to watercourses is limited to grouting and will be conducted during dry weather in isolated ditch sections. Any spilled concrete on site will be contained with earth berms and any material in contact with concrete will be properly disposed of.

Spill Kits

Spill kits are to be readily available in the vicinity of ongoing construction. At a minimum, each spill kit should contain sufficient hydrophobic absorbent material (e.g. oil absorbent pads and socks) to contain and clean up potential drips, leaks, or spills (e.g. ruptured hydraulic line), as well as gloves and heavy plastic bags to receive used absorbent materials and affected soils or wastes. Standard spill kits will contain the following, at minimum:

- | | |
|--|---|
| ■ 150 Absorbent Pads: 15" x 18" (Oil, Gas & Diesel) | ■ 2 Oil Absorbent Pillows: 18" by 18" |
| ■ 50 Universal Absorbent Pads (Antifreeze and Non-Haz) | ■ 1 Neoprene Drain Cover: 36" by 36" |
| ■ 6 Absorbent Socks: 3" by 4' | ■ 1 Jar of Plug n Dike (Leak Stop): 1 Lb. |
| ■ 4 Absorbent Socks: 3" by 8' | ■ 10 HD Hazmat Disposal Bags with Ties |
| ■ 2 Linkable Absorbent Boom Sections: 5" by 10' | ■ 2 Pairs of Nitrile Gloves |
| | ■ 1 Spill Instruction Sheet |
| | ■ 1 Laminated List of Contents |

Any heavy equipment should be affixed with spill "boom" kits containing absorbent pads/socks, which may be used for "first response" in the event of a spill from the equipment.

Signage on each kit should identify the contents to ensure that kits are fully stocked. Signage should also be placed on-Site to identify the locations of the spill kits. The location and contents of spill kits must be regularly monitored to ensure they are fully stocked and easily accessible.



Spill Response

A list identifying the response personnel and their contact numbers should be posted at strategic locations on the Site, including at site offices and inside spill kits. The lists will be updated regularly to ensure they have the most current information:

Emergency Management BC / Provincial Emergency Program (Spill Reporting)	1-800-663-3456
Fisheries and Oceans Canada	1-866-845-6776 604-607-4186
WorkSafeBC	1-800-661-2112 1-866-922-4357 (after hours EMERGENCY) 1-604-273-7711 (after hours EMERGENCY)
Site Supervisor	TBC -
Environmental Monitor	604-880-4055

The following presents the immediate steps required in response to a spill:

1. Identify the severity of emergency and associated injuries and/or casualties;
2. Locate the source of the spill or emergency, the immediate area of risk and the potential for the situation to escalate;
3. Initiate evacuation procedures for non-essential personnel if needed;
4. Implement procedures for the protection of personnel, property and the environment;
5. Alert the emergency response services (911) if appropriate;
6. Alert the Emergency Management BC Spill Reporting Hotline;
7. Mobilize resources to isolate the hazard; and
8. Begin clean-up procedures once all imminent hazards have been mitigated.

Equipment and vehicles may be required to be moved in order to access a spill area and undertake clean-up; this should occur only after the risks of such moving work have been assessed and deemed acceptable.

All spills of any amount that enter, or are likely to enter, a watercourse must be immediately reported to the Provincial Emergency Response (PEP) Spill Reporting Hotline (1-800-663-3456).

Any material (e.g. soil) impacted as a result of a spill, as well as the spill abatement materials used, must be disposed of by a duly-licensed contractor, and disposal records will be maintained.

Site remediation may be required depending on a variety of conditions including but not limited to: the size of the spill, type of hazardous substance, time between release and containment, location of the spill. A contaminated site specialist shall determine whether or not site assessment and/or remediation is required.