

2080 & 2160 East Wellington Road Environmental Assessment



Prepared For

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TABLE OF CONTENTS

1	INTRODUCTION	1
1.1	GENERAL PROPERTY DESCRIPTION	1
2	METHODS	2
2.1	BACKGROUND INFORMATION REVIEW.....	2
2.2	FIELD ASSESSMENT.....	3
2.2.1	<i>Watercourse Assessment</i>	4
2.2.2	<i>Terrestrial Assessment</i>	6
3	RESULTS.....	6
3.1	BACKGROUND INFORMATION REVIEW.....	6
3.1.1	<i>Watercourses</i>	6
3.1.2	<i>Terrestrial</i>	7
3.2	FIELD ASSESSMENT.....	10
3.2.1	<i>Watercourses</i>	10
3.2.2	<i>Terrestrial</i>	25
3.2.2.1	<i>Vegetation and Ecological Communities</i>	25
3.2.2.2	<i>Wildlife</i>	27
4	CONCLUSION AND DISCUSSION	28
4.1	WATERCOURSES	28
4.2	TERRESTRIAL	29
5	RECOMMENDATIONS.....	30
5.1	GENERAL RECOMMENDATIONS	30
5.2	IN-STREAM WORKS.....	32
6	REPORT LIMITATIONS	33
7	REFERENCES	34

LIST OF APPENDICES

Appendix A	Proposed Zoning Plan.....	A-1
Appendix B	Site Photos	B-2
Appendix C	Figure 2 East Wellington Industrial Subdivision Field Results and Potential Aquatic Setbacks	C-1

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LIST OF TABLES

Table 1: Summary of field assessment activities undertaken by EDI since 2011.	3
Table 2: Summary of Results from the Background Information Review.....	7
Table 3: Plant species at risk with potential for occurrence within the Property.....	8
Table 4: Wildlife species at risk with potential for occurrence within the Property area.	9
Table 5: Ecological communities at risk with potential for occurrence within the Property area	9
Table 6: Minimum potential Leave Strip widths for each stream reach.	29

LIST OF FIGURES

Figure 1 : Conservation Data Centre map showing no rare element occurrences on the Properties (red outline).	8
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1 INTRODUCTION

EDI Environmental Dynamics Inc. was retained by East Wellington Developments Limited Partnership, to conduct an Environmental Assessment (EA), as per the City of Nanaimo (the City) requirements to support planned rezoning for future development of an industrial subdivision at 2080 & 2160 East Wellington Road (the Properties) in Nanaimo, BC. The City requires an Environmental Assessment to be submitted with rezoning applications to identify “watercourses, wildlife and bird habitat, discharges to air and water, land disturbance and clearing, and proposed mitigation”. The current rezoning application is to establish industrial zoning (I2) within the portion of 2160 East Wellington that currently has residential (R1) zoning. The Proposed Zoning Plan (Appendix A) identifies a conceptual road alignment thorough 2160 East Wellington Road.

As specific, future development details and layouts are not known at this rezoning phase, this EA was focused on identifying sensitive features such as watercourses and riparian areas, the potential for key species at risk, and important habitats that occur at or near the Properties. A background review of existing information on potential environmental values at the Properties was conducted along with several site visits at different times of year by aquatic and terrestrial specialists. The report includes some discussion regarding key anticipated/potential environmental impacts, avoidance, mitigation and offsetting strategies, and typical environmental permitting considerations associated with future development phases.

EDI's involvement with the Properties began with the previous owner/Proponent, which included assessments and preliminary permitting activities for a planned industrial subdivision between 2011 and 2014. Permitting did not proceed beyond initial applications/discussions and the Properties were left undeveloped since then.

1.1 GENERAL PROPERTY DESCRIPTION

The Properties occur on the west side of the Nanaimo Parkway along a relatively flat, forested area between the highway and the top of a substantial bluff feature that overlooks the Millstone River valley. The Properties are now relatively undeveloped but have been affected by several historic developments and activities including Nanaimo Parkway and Parkway Trail construction, residential uses, farming within wetland areas, subsurface coal mining, and sanitary sewer construction. Several old roads and driveways occur on the Properties, which are now part of a larger network of pathways criss-crossing throughout the Properties, and which provide connections to the Nanaimo Parkway Trail, East Wellington Road, and the Tourism Nanaimo Visitor Centre (2450 Northfield Road) located within Northfield Rotary Outlook Park. Several areas within the Properties are extensively used, without permission, by unhoused people, which has lead to disturbances to the natural environment (minor clearing, trampling, fire damage, and extensive garbage and debris accumulations). The Properties overlap with several Development Permit Areas (DPAs) including: DPA 1 (Environmentally Sensitive Areas), DPA 4 (Abandoned Mine Workings Hazard), DPA 5 (Wildfire Hazard), and DPA 7 (Nanaimo Parkway Design).

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The Properties contain of a variety of ecosystem types that include young to maturing forest, terrestrial herbaceous, rock bluff, wetland, and riparian. Throughout much of the Properties there are shallow soils overlying conglomerate bedrock, and exposed bedrock occurs in several areas (naturally and where soils are disturbed by roads and trails). There are several wetlands and streams with the subject properties, most of which drain to a seasonally flooded agricultural field and wetland that has a ditched outlet to Boxwood Creek, a known fish bearing stream that flows southeast along Nanaimo Parkway before draining into Millstone River.

2 METHODS

This EA was scoped to address the typical biological/environmental information to determine site constraints for development and to inform regulatory requirements associated with environmental aspects. It consisted of both a background information review and an on-site field survey and generally followed the provincial Terms of Reference for an Urban Bio-inventory (MOE 2001).

2.1 BACKGROUND INFORMATION REVIEW

Background information was gathered for watercourses, wildlife, and vegetation, including invasive species, using data available through several online databases. Preliminary lists were developed for ecosystem types, known species occurrence records, and potential for species at risk. The databases that were queried included:

- Ministry of Environment BC Species and Ecosystem Explorer (<http://a100.gov.bc.ca/pub/eswp/>)
- EcoCat (Provincial Ecological Reports Catalogue) (<http://www.env.gov.bc.ca/ecocat/>)
- Wildlife Tree Stewardship Atlas (<http://cmnmaps.ca/WITS/>)
- Great Blue Heron Atlas (<http://cmnmaps.ca/GBHE/>)
- BC Conservation Data Centre (BC CDC) (<http://maps.gov.bc.ca/ess/hm/cdc/>)
- Ministry of Environment Habitat Wizard (<https://maps.gov.bc.ca/ess/hm/habwiz/>)
- Sensitive Habitat Inventory & Mapping (<https://www.cmnmaps.ca/shim2020/>)
- NanaimoMap (<https://nanmap.nanaimo.ca/Html5Viewer/index.html?viewer=NanaimoMap>)
- Garry Oak Ecosystems Recovery Team (<https://goert.ca/>)

The BC CDC online mapping tool was accessed to determine known locations of all listed (at risk) wildlife and plant species and ecological communities in and near the Property, including the occurrence of provincial Red- and Blue-listed species and ecological communities. The search included all listed wildlife, plants, and ecological communities.

The BC CDC's BC Species and Ecosystem Explorer (BCSEE) was searched for rare plant and wildlife species that have the potential to occur in the area. The search for rare plant species included vascular and non-vascular species, and the search for rare wildlife species included vertebrate and invertebrate species. Rare species included those listed on Schedule 1 of the federal Species at Risk Act (SARA), and species on the BC



Ministry of Environment's provincial Red or Blue lists. The search parameters used to obtain these results were for species occurring in the Regional District of Nanaimo area within the Coastal Douglas-fir (CDF) biogeoclimatic (BGC) zone in forested and non-forested habitats of coniferous, deciduous, or mixed wood. This list was further refined based on site-specific factors, including habitat types known to occur within the Property from the site visits, species current known ranges, and Conservation Data Center records in the vicinity of the Property. A search of the BCSEE was also conducted for rare ecological communities that could potentially occur in the Property within the Coastal Douglas Fir moist maritime (CDFmm) subzone. This list was also refined based on site-specific factors and known characteristics from the field assessment.

2.2 FIELD ASSESSMENT

The field assessments focused on identifying environmentally sensitive terrestrial and aquatic features at and near the Properties. Recent field assessments were conducted in 2022 and 2023 and were focused on expanding upon the information collected by EDI between 2011 and 2014. The following table summarizes the assessments and reviews completed by EDI.

Table 1: Summary of field assessment activities undertaken by EDI since 2011.

Date	Activities Conducted
Feb. 8, 2011	Initial site assessment to locate and characterize primary watercourses.
Mar. 14 to 15, 2011	Fish sampling within each of the potentially fish bearing watercourses.
Jul. 14, 2011	Amphibian breeding habitat survey. Rare plant survey in riparian areas.
Feb. 24, 2012	Review watercourses during high flow event. Flag the high water mark of Stream 1, Reach 3.
Jan. 28 to 29, 2014	Follow-up fish sampling within each potentially fish bearing watercourses.
Feb. 7, 2014	Preliminary terrestrial assessment.
May 16, 2014	Rare plant survey in upland areas.
Jun. 15, 2022	Follow-up rare plant survey in upland areas. Wetland assessments.
Dec. 12 to 14, 2022	Wetland assessments and flagging. Stream assessments and flagging.
Jan. 13, 2023	Wetland flagging during high flow event. Terrestrial assessments.
Jan. 18, 2023	Flag Stream 4 high water mark during high flow event.
Feb. 15, 2023	Site review and meeting with project team members.
Jul. 18, 2023	Confirmation that previously observed flowering plant is not a listed species.
Aug. 23, 2023	Site review to evaluate beaver dam during low flow conditions.
Aug. 30, 2023	Site review to check for recent beaver activity in/near wetlands.



2.2.1 WATERCOURSE ASSESSMENT

A Senior Terrestrial Ecologist with substantial wetland experience completed wetland ecosystem assessments throughout the Properties, which included detailed analysis of soils, vegetation, and hydrology. The goals of these assessments were to identify and delineate the ecological boundaries of all wetlands that may be affected by proposed future development activities and to determine where ecological boundaries (as defined by the specific methodologies followed) may extend beyond the *wetland boundary* as defined by the City of Nanaimo's Zoning Bylaw.

Wetland ecosystem assessments were completed based on the Alberta Wetland Identification and Delineation Directive (Government of Alberta 2015). The Regional Supplement to the Corps of Engineers Wetland Delineation manual: Western Mountains, Valleys, and Coast Region (Version 2.0) (U.S. Army Corps of Engineers 2010) was also referenced especially to assist with assessments of vernal pools. The edge of each wetland was delineated in the field and not initially completed as a desktop exercise. The methods used to identify ecological boundaries were chosen with the goal of appropriately identifying boundaries in accordance with the Water Sustainability Act (WSA) and recent, unofficial guidance from provincial staff (Ministry of Water, Land and Resource Stewardship) to EDI staff and other Qualified Environmental Professionals.

A combination of soil and vegetation indicators was used to define ecological boundaries. When possible, obvious transitions in vegetation from wetland to upland was used but, in areas that contained transitional plant communities containing a mix of both wetland and upland species, a combination of soil and vegetation indicators was used to determine the boundary.

Soil pits were dug by hand using a shovel to a minimum depth of 30 cm to characterize the soils and to evaluate hydric soil criteria i.e. mottled or gleyed soils (MacKenzie and Moran 2004). When necessary, deeper soil investigations were completed using a soil auger. A soil auger was also used to efficiently identify the boundary between wetland and upland ecosystems when wetland extents were delineated and flagged.

Wetland ecosystem assessments occurred during the December 12 to 14, 2022 field assessments, outside of the plant growing season which made plant identification difficult. Soil indicators such as the presence of mottles and seepage were the primary wetland delineation characteristics used.

The City of Nanaimo's Zoning Bylaw defines wetlands broadly as "*land that is inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal conditions does support vegetation typically adapted for life in saturated soil conditions, including swamps, marshes, bogs, estuaries and similar areas*". The Zoning Bylaw requires watercourse leave strips for wetlands to be measured from the *wetland boundary*, which is defined as: "*the high water mark or water level in wetlands, ponds, and lakes that are reached during annual winter flood events, as indicated by the presence of soil subject to regular inundation and/ or vegetation that is typically adapted for life in submerged, semi-submerged or saturated soil conditions*". The City does not provide a methodology for precise, repeatable determination of wetland boundary. Wetland boundaries identified by this definition may not be precisely the same location as the wetland ecosystem boundary determined by the methods referenced above, which place more emphasis on the presence of wetland soil indicators (mottling and gleying) within 30 of the ground surface and which do not consider the high water mark as the primary indicator of the boundary. Where wetland areas transition



gradually rather than abruptly to upland areas, differing methodologies and definitions can sometimes lead to differing boundaries.

To determine the *wetland boundary* as defined by the Zoning Bylaw, an assessment was conducted during a substantial winter high water event following significant and prolonged rainfall (January 13, 2023). During this site visit there was substantial flow within watercourses throughout the property including Stream 1, Reach 1, which most watercourses on the Properties drain into.

The wetland boundary shown on the site plan is the boundary identified in accordance with the Zoning Bylaw definition, which emphasizes a determination of the high water mark. The wetland ecosystem boundary is identified on the site plan as Potential WSA Wetland Boundary. This description was chosen to reflect that the WSA (and related official guideline and policy documents) does not currently reference a thorough wetland delineation methodology, but it is understood that an official methodology and/or policy may be developed sometime in the near future. In most locations, the wetland boundary (with a focus on the high water mark) aligned with the wetland ecosystem boundary but, in other locations, the wetland ecosystem boundary extended well beyond the wetland boundary.

The wetland ecosystem boundary at Millstone Trib, Reach 2 and Stream 5, Reach 2 was not used to show boundaries on Figure 2 because these boundaries were the same or smaller than the wetland boundary defined by the Zoning Bylaw. As Millstone Trib, Reach 2 is not located on the Properties and is within the Regional District of Nanaimo, it is applicable to the Riparian Areas Protection Regulation and, in this case, the *stream boundary* as defined by the RAPR is to be used. For this particular wetland, the observed high water mark extended well beyond the wetland ecosystem boundary, and we concluded that *stream boundary* and *wetland boundary* are at the same location here.

Vernal pools are described as being seasonal depressional sites that occur under West Coast climate conditions. These seasonal depressions are covered by shallow water for variable periods from winter to spring and may be completely dry for most of the summer and fall. These areas are often bedrock-controlled, closed small basins. In BC, vernal pools are classed under the Hydrogenic Group which includes a disparate suite of ecosystems that are affected by specialized water conditions not covered by other groups such as wetlands (Mackenzie 2012). Vernal pools are sometimes indirectly connected to each other by small drainages described as vernal swales. The typical vegetation associated with vernal pools are annual and perennial herbs that are adapted to grow during the autumn or early spring when soils are saturated. Mackenzie and Moran (2004) do not describe vernal pools as a class of wetland.

As previous stream assessment and fish sampling works were completed by EDI, stream assessments of the small creek features conducted in 2022 and 2023 focussed on thoroughly and accurately identifying the high water mark for the purposes of assigning the minimum potential riparian setback widths under the Riparian Areas Protection Regulation (RAPR) and/or the City of Nanaimo's typical assigned watercourse leave strips. The latter are measured from the Top of Bank; however, in all locations the small creek features were not within a ravine, so the Top of Bank is located at the high water mark. Watercourse boundaries were identified during appropriate high flow periods following significant winter rainfall events, which was important as some watercourse segments are extremely difficult to locate during drier times of the year. In addition, we noted



general watercourse characteristics (widths and gradients), aquatic habitat values, and connectivity to other watercourses. These watercourse descriptions are suitable for assignment of typical setbacks for the purposes of rezoning and subdivision but are likely not adequate for any planned future development within and adjacent to streams where detailed, site-specific information may be needed (e.g. stream crossings for roads and services).

2.2.2 TERRESTRIAL ASSESSMENT

Terrestrial studies were undertaken to determine the presence of any significant constraints to development such as raptor nests and to determine the presence of any significant environmental sensitivities such as rare species occurrences. A generalized vegetation and ecosystem assessment was completed, and ecosystems were documented and characterized. Evidence of wildlife utilization was recorded including direct observations of individuals, vocalizations, tracks, game trails, scat, browsed vegetation, bones, feathers and nests. Utilization potential was deduced from an analysis of habitat features, observations, and any evidence of utilization. Habitat types were assessed with a focus on determining suitability for species at risk potentially occurring on site. Relevant information regarding vegetation and wildlife from previous studies of the Property was incorporated into the appropriate results section.

Prior to completing the rare plant survey, a list of rare plant species from the federal Species at Risk Registry and the BC Conservation Data Centre that could potentially occur within the Project area was prepared.

A targeted rare plant survey was completed based on the species list of rare plants and their habitat requirements. Areas with the potential for rare plant habitat (e.g. wetlands, vernal pools, rocky bluffs) and areas where rare plants had been previously observed/suspected were searched. A wandering survey of target areas was conducted. In addition to targeted surveys, any potential rare plant observed while in transit between sites or while completing wetland surveys were also identified.

3 RESULTS

3.1 BACKGROUND INFORMATION REVIEW

3.1.1 WATERCOURSES

There was little information discovered online regarding watercourses within and adjacent to the Properties. Provincial databases do not display any watercourses within and adjacent to the Properties. With the exception of previous fish sampling data submitted to the Province by EDI for previous fish sampling efforts conducted in 2011 and 2014, there were no provincial records of fish presence/absence. The previous sampling data submitted by EDI indicated that no fish were captured within the streams on the Properties (only the main streams with some potential to inhabit fish were sampled).



The City of Nanaimo's online mapping application, NanaimoMap, identifies Boxwood Creek (aka Hanelt Creek) east and north of the Properties, and two watercourses within the Properties referred to herein as Stream 1, Reach 1 (a creek requiring a 15 m watercourse leave strip measured from *Top of Bank*) and Stream 1, Reach 2 (a wetland requiring a 15 m watercourse leave strip measured from the *wetland boundary*). Mapped locations of these watercourses that are identified on NanaimoMap are meant to be confirmed on the ground by qualified professionals, along with the identification and mapping of any previously unmapped watercourse features.

Previous watercourse data collected by EDI in the field are described in the field assessment results section (3.2.1), along with the information collected more recently.

3.1.2 TERRESTRIAL

The *CDC iMap* has no rare element occurrence overlapping the Property area. (Figure 1). Table 2 provides a summary of key findings from the background information review. The Property is within the Coastal Douglas Fir moist maritime (CDFmm) subzone.

Table 2: Summary of Results from the Background Information Review.

Information Source	Key Findings
Wildlife Tree Stewardship Atlas	No Known Bald Eagle nests in the area, closest > 1.7 km away.
Great Blue Heron Atlas	No known heron colonies in the area.
Habitat Wizard/CDC iMap	No listed ecological communities or other element occurrences.
BCSEE	Listed species with the potential to occur on the Property include 5 plant and 9 wildlife species (see Tables 3 and 4 below).
NanaimoMap	DPA 1: Wetland and DPA 7: Nanaimo Parkway Designation
Garry Oak Ecosystem Recovery Team (2004)	Historic and current Garry Oak ecosystems are mapped as occurring in the area. Historically, a large portion of the site was shown to be 100% Garry oak associated ecosystems. Currently (2003), a smaller portion of the site was shown to only be up to 10% Garry oak associated ecosystems.

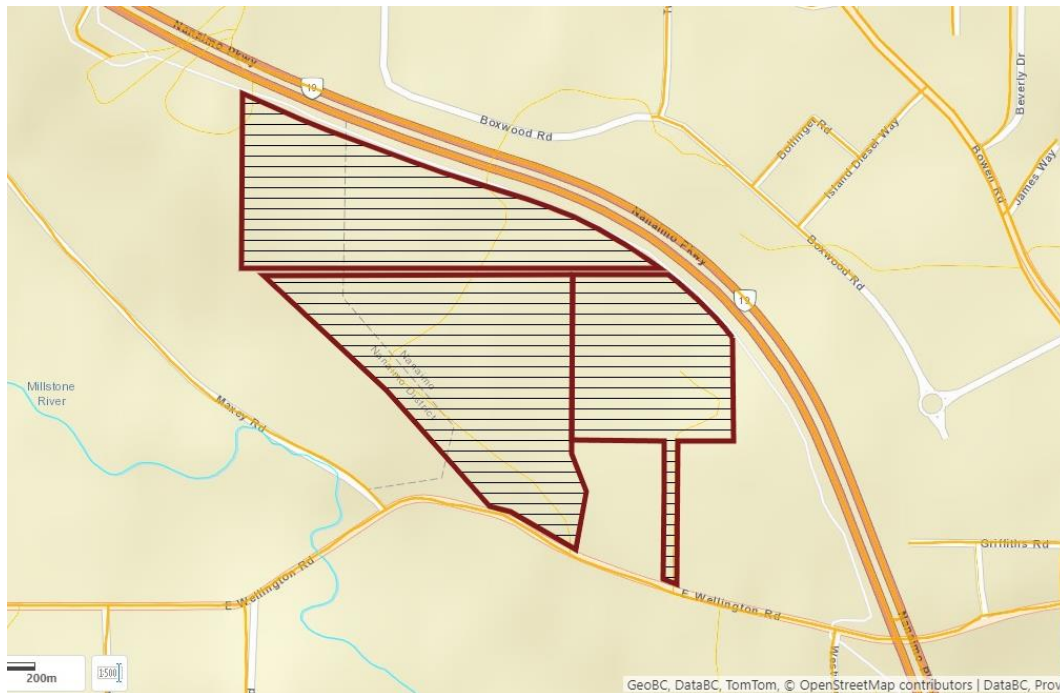


Figure 1 : Conservation Data Centre map showing no rare element occurrences on the Properties (red outline).

The BC Species and Ecosystem Explorer (BCSEE) identified ten vascular and 1 non-vascular plant species at risk that have the potential to occur within the Property area (Table 3). Several of these species are associated with Garry oak ecosystems and have moderate potential to occur due to the presence of this habitat type within the Property.

Table 3: Plant species at risk with potential for occurrence within the Property

Common Name	Scientific Name	COSEWIC	SARA	BC List
slimleaf onion	<i>Allium amplexans</i>			Blue
deltoid balsamroot	<i>Balsamorhiza deltoidea</i>	E (Apr 2009)	1-E (Jun 2003)	Red
phantom orchid	<i>Cephalanthera austini</i>	E (Nov 2014)	1-T (2003)	Red
Washington springbeauty	<i>Claytonia washingtoniana</i>			Red
coastal wood fern	<i>Dryopteris arguta</i>	SC(May 2021)	1-SC (2003)	Blue
Macoun's meadow-foam	<i>Limnanthes macounii</i>	T (Nov 2004)	1-T (Aug 2006)	Red
fern-leaved desert-parsley	<i>Lomatium dissectum</i> var. <i>dissectum</i>			Red
white meconella	<i>Meconella oregana</i>	E (May 2005)	1-E (Aug 2006)	Red
purple sanicle	<i>Sanicula bipinnatifida</i>	T (May 2001)	1-T (Jun 2003)	Red
white-top aster	<i>Sericocarpus rigidus</i>	SC (Apr 2009)	1-SC (Jun 2003)	Red
Howell's triteleia	<i>Triteleia howellii</i>	E (May 2003)	1-E (Jan 2005)	Red
Lindley's microseris	<i>Uropappus lindleyi</i>	E (Mar 2008)	1-E (Feb 2010)	Red



white-lip rein orchid	<i>Platanthera epheMERantha</i>	Blue
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* COSEWIC/SARA Codes: SC: Special Concern; T: Threatened; NAR: Not at Risk; E: Endangered.

A total of 9 at risk wildlife species including, two amphibian species, six avian species, and one mammal species, at risk have the potential to occur within the Property (Table 4).

Table 4. Wildlife species at risk with potential for occurrence within the Property area.

Common Name	Scientific Name	COSEWIC	SARA	BC List
Western Toad	<i>Anaxyrus boreas</i>	SC (Nov 2012)	1-SC (Jun 2018)	Yellow
Northern Red-legged Frog	<i>Rana aurora</i>	SC (May 2015)	1-SC (May 2005)	Blue
Great Blue Heron, fannini subspecies	<i>Ardea herodias fannini</i>	SC (Mar 2008)	1-SC (Feb 2010)	Blue
Common Nighthawk	<i>Chordeiles minor</i>	SC (May 2018)	1-SC (Feb 2010)	Yellow
Northern Pygmy-owl, swarthi subspecies	<i>Glaucidium gnoma swarthi</i>			Blue
Olive-sided Flycatcher	<i>Contopus cooperi</i>	SC (May 2018)	1-T (Feb 2010)	
Western Screech-Owl, kennicottii subspecies	<i>Megascops kennicottii kennicottii</i>	T (May 2012)	1-T (Jan 2005)	Blue
Band-tailed Pigeon	<i>Patagioenas fasciata</i>	SC (May 2021)	1-SC (Feb 2011)	Blue
Little Brown Myotis	<i>Myotis lucifugus</i>	E (Nov 2013)	1-E (Dec 2014)	Yellow

Ten at-risk forested ecological communities were identified that have the potential to occur within the Property area (Table 5). It should be noted that an occurrence of the listed site series does not indicate an occurrence of the associated ecological community; rather, it identifies the potential for that ecological community to occur there, which typically occurs at the climax state. In forested ecosystems, this is represented by old forest stands, which do not occur on the Properties.

Table 5. Ecological communities at risk with potential for occurrence within the Property area

Common Name	Scientific Name	BC List	BGC Zone/Series	Ecosystem Group
Douglas-fir / dull Oregon-grape	<i>Pseudotsuga menziesii</i> / <i>Mahonia nervosa</i>	Red	CDFmm/01	Terrestrial Realm - Forest: Coniferous - mesic
grand fir / dull Oregon-grape	<i>Abies grandis</i> / <i>Mahonia nervosa</i>	Red	CDFmm/04	Terrestrial Realm - Forest: Coniferous - mesic
grand fir / three-leaved foamflower	<i>Abies grandis</i> / <i>Tiarella trifoliata</i>	Red	CDFmm/06	Terrestrial Realm - Forest: Coniferous - moist/wet
Douglas-fir - arbutus	<i>Pseudotsuga menziesii</i> - <i>Arbutus menziesii</i>	Red	CDFmm/02	Terrestrial Realm - Forest: Coniferous - dry
Douglas-fir / Alaska oniongrass	<i>Pseudotsuga menziesii</i> / <i>Melica subulata</i>	Red	CDFmm/03	Terrestrial Realm - Forest: Coniferous - dry
western redcedar / vanilla-leaf	<i>Thuja plicata</i> / <i>Achlys triphylla</i>	Red	CDFmm/12	Terrestrial Realm - Forest: Coniferous - moist/wet



Common Name	Scientific Name	BC List	BGC Zone/Series	Ecosystem Group
Western Redcedar / Osoberry	<i>Thuja plicata</i> / <i>Oemleria cerasiformis</i>	Red	CDFmm/13	Terrestrial Realm - Forest: Coniferous - moist/wet
western redcedar / sword fern - skunk cabbage	<i>Thuja plicata</i> / <i>Polystichum munitum</i> - <i>Lysichiton americanus</i>	Blue	CDFmm/11; CDFmm/Ws53	Terrestrial Realm - Forest: Coniferous - moist/wet; Wetland Realm - Mineral Wetland Group: Swamp Wetland Class (Ws)
western redcedar - Douglas-fir / Oregon beaked-moss	<i>Thuja plicata</i> - <i>Pseudotsuga menziesii</i> / <i>Eurhynchium oreganum</i>	Red	CDFmm/05	Terrestrial Realm - Forest: Coniferous - moist/wet
Garry oak / California brome	<i>Quercus garryana</i> / <i>Bromus carinatus</i>	Red	CDFmm/00	Terrestrial Realm - Forest: Broadleaf - dry
Wallace's selaginella / reindeer lichens	<i>Selaginella wallacei</i> / <i>Cladina</i> spp.	Blue	CDFmm/00	Terrestrial Realm - Grassland Group (G): Grassland Class (Gg); Terrestrial Realm - Rock Group (R): Rock Outcrop Class (Ro)

3.2 FIELD ASSESSMENT

Field assessments were completed by EDI biologists on several occasions as described in Section 2.2. The most recent terrestrial field work was completed on January 13, 2023. The field assessment included a general characterization of upland components of the site, wildlife use observations, and identification of plant and wildlife species encountered.

Extensive stream and wetland assessments were conducted between December 12, 2022 and January 18, 2023 to capture saturated conditions that only occur seasonally.

Key findings from the field assessment are depicted in Figure 2 (Appendix C).

3.2.1 WATERCOURSES

Boxwood Creek

Boxwood Creek (also known as Hanelt Creek) is a ditched watercourse that conveys flow from a large wetland area spanning both sides of Northfield Road, south to Millstone River. The ditch adjacent to the Properties was constructed in the early 1990's during construction of the Nanaimo Parkway. The ditch is primarily within a blasted bedrock trench, which forms part of the highway cross-section. Where Boxwood Creek is adjacent to the subject property it flows within the ditch along the southbound lane of the highway (Photo 1). Here the creek is between the highway and the Parkway Trail, which is an approximately 3 m wide paved trail.

Boxwood Creek is known to contain cutthroat trout. Fish sampling was conducted in the section of creek immediately upstream of the Nanaimo Parkway in 2008 and only cutthroat trout were captured (Steve Toth, R.P.Bio. pers. comm.). In 2009 EDI (formerly known as Streamline Environmental Consulting Ltd.) conducted a fish salvage for a culvert installation on a tributary to Boxwood Creek. This tributary flows into



Boxwood Creek immediately upstream (east) of the Nanaimo Parkway. Only cutthroat trout were captured during the fish salvage. Trout have been frequently observed by EDI staff within the portions of Boxwood Creek that are adjacent to the subject Properties. Most were quite small, but some were larger than 200 mm in length.

Given the proximity to Millstone River, which is known to contain several species of fish within the reach that Boxwood Creek flows into, it is likely that at least the lower sections of Boxwood Creek would contain other species of fish at some times of the year. In addition to cutthroat trout, salmonids that are likely to inhabit the lower portion of Boxwood Creek include steelhead, rainbow trout and coho salmon. This is based on the good quality habitat observed in the lower portion of Boxwood Creek and on the species known to occur in the mid to upper reaches of Millstone River.

All streams within the Properties are within the catchment area of Boxwood Creek and only Stream 4 is not connected by surface flow to Boxwood Creek.

Stream 1, Reach 1

Stream 1, Reach 1 is a narrow, ditched watercourse that flows into Boxwood Creek a short distance downstream of the Properties. All the watercourses within the Properties drain into Stream 1. Only the uppermost portion of Reach 1 is within the Properties; the remainder of the reach is located within a property to the east.

Immediately upstream of the confluence with Boxwood Creek there is an approximately 2.0 m high waterfall/cascade feature that is a full, permanent barrier to upstream fish migration (Photo 1). Fish within Boxwood Creek cannot migrate into Stream 1 due to the presence of this permanent feature. The waterfall appears to have been created when bedrock was blasted to create the ditch in which Boxwood Creek flows. There is no plunge pool beneath the waterfall, which further limits any potential for fish to attempt to migrate above the barrier.

Upstream of the waterfall, the stream flows within a narrow, low gradient, excavated channel that is approximately 2.1 m wide (Photos 2 and 3). As the stream is ditched, it is relatively straight, it lacks aquatic habitat complexity, and no large, deep pools are present.

The bedrock-controlled outlet significantly limits surface flow and shallow subsurface flow connectivity between the watercourses within the Properties and Boxwood Creek. The waterfall outlet only flows during the wettest months of the year. Over several years of observation, the waterfall outlet does not typically begin to have any flow until late fall, after several periods of heavy rainfall have occurred. It flows intermittently through much of the late fall to early spring seasons, interrupted by extended periods of dry weather.

This stream is considered non-fish bearing. Two separate sampling events using multiple sampling techniques have occurred and no fish were captured or observed in Reaches 1, 2 and 3 as well as in some tributary streams.

Aquatic habitat in Reach 1 is limited as the ditched stream lacks habitat complexity. Some amphibians may utilize this reach for breeding habitat (especially at the upstream end that is closer to the wetland) and are likely to use the stream for foraging and hydration.



Photo 1. Feb. 8, 2011. 2 m high waterfall and cascade at Stream 1 confluence with Boxwood Creek between Parkway Trail and Nanaimo Parkway.



Photo 2. Dec. 12, 2022. View looking upstream at Stream 1, Reach 1 a short distance upstream of the waterfall.



Photo 3. Dec. 12, 2022. View looking downstream at Stream 1, Reach 1 immediately downstream of the wetland (Reach 2).

Stream 1, Reach 2 (Wetland)

Stream 1 Reach 2 is a wetland complex composed of an excavated pond, a graminoid marsh with patches of shrubby swamp, and forested swamp along the edge within the open, historically farmed area (Photos 4 and 5). Old ditches occur within the wetland that promote drainage for agricultural purposes. The main ditch that drains west to east is overgrown with dense shrubs. The south edge of the wetland complex consists of a narrow band of a cedar dominated swamp, which transitions into the Douglas fir dominated riparian area. Near the east boundary of the wetland complex, there is an excavated pond, which drains out into the excavated outlet channel (Reach 1).

A large patch of a cedar dominated swamp occurs in the northern portion of the wetland complex. This large, treed swamp patch had some slightly raised “drier” patches that contained Douglas fir with a salal and dull Oregon grape understory. Within the northeast portion of this treed swamp area, there is a small shrubby swamp within a slight depression that seasonally contains deeper water. At the Parkway Trail, this shrubby swamp is connected to Boxwood Creek via a PVC pipe beneath the trail.

During high water events it may be possible for fish to enter the small, shrubby swamp from Boxwood Creek. Fish sampling was conducted in 2011 and in 2014 and no fish were captured or observed in the swamp. While no fish were captured, the PVC pipe appeared to be at least partially plugged and it may be possible for fish to migrate into the swamp during high creek flows when the PVC pipe is draining freely. During low to moderate creek flows, the PVC pipe is above the wetted portion of Boxwood Creek and fish would not be able to access it.

While non-fish bearing (except perhaps at the small shrubby swamp near the Parkway Trail), Stream 1, Reach 2 provides habitat suitable for numerous wildlife species, including amphibian breeding habitat within open water areas. In particular, the excavated pond at the east end has good quality breeding habitat potential for many species of amphibians as it is wetted year- round, it is exposed to sunlight, and it contains aquatic



vegetation (potential egg mass attachment sites). Several American bullfrogs (an invasive species) were observed in the pond on July 14, 2011.



Photo 4. Mar. 15, 2011. Looking northwest at Stream 1, Reach 2 (portion that was a seasonally flooded agricultural field).



Photo 5. Jun. 6, 2022. Looking northwest at Stream 1, Reach 2 (portion that was a seasonally flooded agricultural field).



Photo 6. Jun. 6, 2022. Looking northwest at Stream 1, Reach 2 (portion that contains a large pond that drains into Reach 1).



Photo 7. Mar. 15, 2011. Seasonally flooded, swamp that is adjacent to Boxwood Creek and is considered potentially fish bearing.

Stream 1, Reach 3 (Wetland)

Reach 3 begins where the open, agricultural field portion of the broader Stream 1 wetland complex ends. Reach 3 is a shrubby, alder dominated swamp that transitions into red alder, western red cedar and Douglas fir riparian and upland areas. This shrubby swamp complex was delineated primarily based on soil characteristics. The boundary between the shrub dominated swamp area and the riparian area was flagged and is the area where no distinct mottles were observed within the top 30 cm of the soil layer.

As shown in Figure 2, an old overgrown beaver dam (Photo 7) is present near the east boundary of this reach and an old beaver lodge was observed near the west end. The beaver dam creates open water areas within Reach 3.



The sanitary sewer alignment that was constructed several years ago (1978) crosses at a narrow point near the middle of Reach 3. At the crossing, granular fill has been placed, which disrupts the natural flow of water from west to east. Shallow water was observed flowing over the fill material near the mid-point of the crossing. It appeared likely that the crossing has caused some additional flooding of water upstream (to the west), which may have unnaturally extended the wetland boundary; however, wetland characteristics prior to installation are unknown.

Fish sampling in Reach 3 and in downstream reaches has confirmed that this reach is non-fish bearing. This reach likely provides habitat suitable for amphibian breeding.



Photo 8. Aug. 23, 2023. Looking east at overgrown beaver dam and pooling water at the upstream (west) side of the beaver dam.



Photo 9. Jun. 17, 2023. Old beaver lodge near west end of Stream 1, Reach 3.



Photo 10. Dec. 12, 2022. Looking west at northwest end of Stream 1, Reach 3. A Barred Owl is observed roosting on a Douglas fir tree at north edge of wetland (centre of photo).

Stream 3

Stream 3 is a shallow, narrow drainage that flows south from the Parkway Trail ditch where a small culvert conveys flow from the ditch between the highway and the Parkway Trail. Stream 3 flows into Stream 1, Reach 2 at the forested edge of the wetland. A ditch along the edge of the agricultural field here conveys flow toward the centre of Reach 2 and into a ditch that drains eastward across the middle of the field. Within the forested area (Photo 11), the drainage has a discontinuous channel – in some areas there is well defined stream channel and in other areas flow is spread out over the forest floor and not confined within a channel. Where the drainage enters the field, it becomes a linear, constructed ditch that flows along an old fence that is between the forest and the field. Just upstream of the forest edge, the stream had well-defined channel with an average width of 1.6 m and a gradient of 1 to 2%.

Aquatic habitat in Stream 3 is limited as the stream is shallow, narrow and lacks deep pools. The habitat value is considered low. Amphibians are unlikely to utilize this stream for breeding habitat but may use the stream for foraging and hydration. Fish sampling in Stream 3 and in downstream watercourses has confirmed that this stream is non-fish bearing.



Photo 11. Dec. 12, 2022. Looking upstream at segment of Stream 3 with a well-defined channel, just upstream of the old agricultural field.

Stream 4

Stream 4 is an ephemeral stream with unusual characteristics. It occurs throughout a gently sloped area with shallow soils over bedrock. It's likely that without impermeable bedrock immediately below the surface, this stream would not have any surface flow. Since the catchment area is small and the gradient is gentle, water would likely drain into the ground without bedrock near the surface. At the upstream end, large, shallow pools of water perched on bedrock form during the wettest seasons of the year. During prolonged rain events, water discharges from these pools and follows a shallow, often indiscernible depression in the gently sloped forest. During moderately wet conditions, surface flow is intermittently visible on the forest floor and there a couple short segments of narrow, shallow channel approximately 0.5 to 1 m in width. The high water mark was flagged following a significant rainfall event in the winter. During these significantly wet conditions, surface connectivity is continuous but, in several locations, shallow water spreads out significantly over the forest floor.

Near the downstream end of the mapped stream, the flow path is disrupted by an existing sanitary sewer alignment that was constructed several years ago (1978). Stream 4 flows along the sewer alignment for several metres, then drains across it and into the forest, where it goes subsurface. As such, the lower portion of the stream does not have surface connection to any watercourses downstream (even during significant wet weather periods of the year).

A small tributary drainage (Stream 4a) flows into the stream from the north. This tributary has similar characteristics to Stream 4 (ponding water that is rarely connected by surface flow). Surface water connectivity to Stream 4 was only observed after a significantly wet period in January of 2023.

Stream 4 is unlikely to provide habitat suitable for amphibian breeding. The areas of the drainage that contain surface water during the wetter months of the year are quite shallow (typically less than 10 to 20 cm) and are not expected to have a long enough hydro-period to support larval and juvenile life cycle stages.

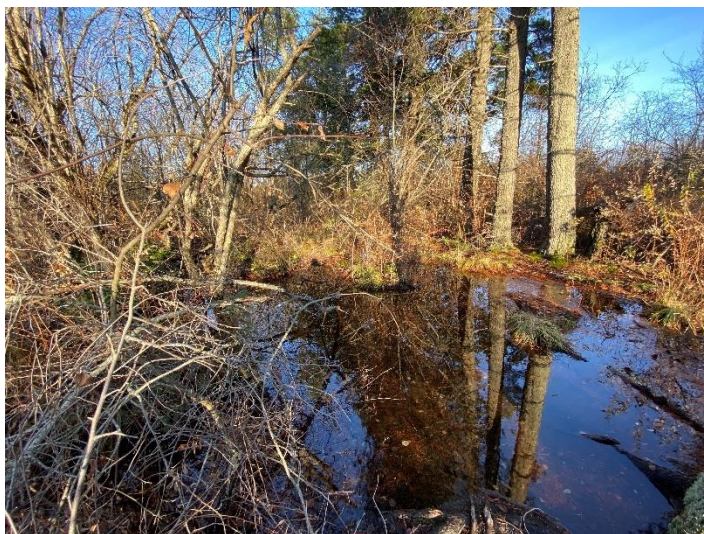


Photo 12. Dec. 12, 2022. Looking south at pooling water at the upstream extent of Stream 4.



Photo 13. Dec. 14, 2022. Looking upstream at a segment of Stream 4 with a well-defined, narrow channel.



Photo 14. Dec. 14, 2022. Looking upstream at a segment of Stream 4 without a well-defined channel (water flows over the forest floor along an indistinct drainage path).

Stream 5, Reach 1

Stream 5, Reach 1 is a short, narrow, shallow, and ephemeral stream that flows from a small wetland (Reach 2) and into Stream 1, Reach 3. The stream only flows during the wetter periods of the year. The flow path is reasonably distinct but there is not a well-defined channel with banks and alluvial substrates. The habitat quality is poor due to a lack of flow and lack of any deep-water sections.



Photo 15. Jan. 13, 2023. Looking upstream at Stream 5, Reach 1 following a significant rainfall event.

Stream 5, Reach 2 (Wetland)

Stream 5, Reach 2 is a small, shrubby swamp. It was delineated mostly based on soil characteristics including seepage and mottles within 30 cm of the surface. The boundary was flagged following a significant rainfall event when the extent of surface water was easily observed. The lower part of the wetland contains a distinct

depression with deeper water, whereas the upper part of the wetland is a shallow depression in the forest floor with small puddles that are connected by subsurface water.



Photo 16. Jan. 13, 2023. Looking upstream at upstream extent of Stream 5, Reach 2 following a significant rainfall event.

Stream 6

Stream 6 is a small watercourse feature that has been described herein as a stream. While it has some wetland characteristics at the upstream end (seasonally ponded water) the wetland assessment conducted on the Properties found that this area was not technically a wetland ecosystem (insufficient vegetation characteristics). This feature rarely contains surface water but during the wettest periods of the year, it contains substantial, shallow ponding water that flows into a short, narrow drainage feature before discharging into Stream 1, Reach 3. As it is a natural source of water supply and contains surface water for a portion of the year, it is considered to be a stream under the Water Sustainability Act definition and ‘stream’ was considered to be the best characterization for this watercourse.

Stream 6 has poor quality aquatic habitat due to a lack of surface flow much of the year. It is unlikely to provide important habitat for amphibians or other wildlife.



Photo 17. Jan. 13, 2023. Looking upstream at ponding water within upper portion of Stream 6 following a significant rainfall event.



Photo 18. Jan. 13, 2023. Looking downstream at lower portion of Stream 6 immediately upstream of Stream 1, Reach 3 following a significant rainfall event.

Isolated Pond

The Isolated Pond occurs along the existing panhandle access into 2080 East Wellington where a narrow driveway crosses the east side of the pond. The main part of the pond is to the west of the road. The small feature consists of relatively deep, ponding water within a localized depression. The pond does not connect by surface flow to any other watercourses. The pond appears to remain wetted throughout most or all of the year and may provide suitable breeding habitat for some amphibians.



Photo 19. Dec. 14, 2022. View of western part of Isolated Pond.



Photo 20. Dec. 14, 2022. View from existing driveway of eastern part of Isolated Pond.

Millstone Tributary, Reach 1

Millstone Tributary is an unmapped, first order stream that drains south near the west boundary of the subject property, crosses beneath Maxey Road and drains into Millstone River. Millstone Tributary does not overlap with the Properties; however, it's required riparian area has some slight overlap. This section of the watercourse is located within the Regional District of Nanaimo, not the City of Nanaimo. The stream was previously assessed by EDI during a riparian assessment for a property in the Regional District of Nanaimo that is west of the subject property.

Reach 1 begins where flow discharges from the wetland reach above. Here there is a narrow, shallow but distinct stream channel with a bedrock bed. A short distance downstream from the wetland outlet, the channel drains down a steep ravine that extends to the toe of slope and then it flows towards Millstone River.

The stream adjacent to the Properties contains no fish habitat or amphibian breeding habitat: the channel is narrow, water is shallow, there are no deep pools, and flow is minimal.



Photo 21. Jan. 13, 2023. Looking downstream at Millstone Tributary, Reach 1 following a significant rainfall event. This section of channel is just below the wetland reach and just above the steep ravine.

Millstone Tributary, Reach 2

Millstone Tributary, Reach 2 is a wetland that is characterized by moist soils and seasonally wetted, shallow pools of water. Wetland delineation was based on observed flooding during a substantial high water event that occurred in early 2023. The wetland is classed as a shrubby swamp dominated by alder with patches of Himalayan blackberry and spurge laurel. This swamp is within a forested area dominated by small Douglas fir with some shore pine.

This wetland contains no fish habitat or amphibian breeding habitat: the discontinuous, seasonally ponded areas are too shallow (typically less than 10 cm).

The wetland receives seasonal overflow from a constructed pond that is adjacent to the Tourism Nanaimo Visitor Centre: a shallow ditch conveys flow from the pond, along the south side of the Parkway Trail, and discharges to the upper portion of Reach 2 (Wetland).



Photo 22. Jan. 13, 2023. Looking upstream at Millstone Tributary, Reach 2 following a significant rainfall event.



Photo 23. Jan. 13, 2023. Looking west at the ditched outlet of the constructed pond adjacent to the Tourism Nanaimo Visitor Centre following a significant rainfall event.

3.2.2 TERRESTRIAL

3.2.2.1 Vegetation and Ecological Communities

The overall Project area is in the Coastal Douglas Fir moist maritime CDFmm BGC unit. A diverse group of terrestrial habitats was encountered on the site including forested, non-forested rock outcrops, herbaceous meadow, and regenerating forest of differing age classes. Detailed delineation of the extent of the ecosystems was not part of the scope of work; however, a general description is provided below, and representative photos are provided in Appendix B. Additional forest cover information is provided in the project's Preliminary Tree Management Plan (Strathcona Forestry Consulting 2024).



The terrestrial components of the site consisted of multiple ecosystem units generally divided by a forested area in the central east portion of the Property surrounding the wetland and a heterogeneous mix of forest and non-forest areas on the west and north portions of the Property. The Property has evidence of disturbance throughout which included land clearing, residential development, trails, and ATV use which is most abundant in the sensitive rock outcrop areas. Although generally the forests areas consisted of young forest, a few veteran trees and relatively intact maturing forest with few invasives were encountered in a few small areas.

The forested area in the central east portion on the Property was dominated by the zonal site series ecosystem of Douglas-fir / dull Oregon-grape (CDFmm/01) ecological community at structural stage 5 (young forest). This ecosystem is dominated by Douglas fir and generally has a dense salal and dull Oregon-grape shrub layer. On moister and richer sites near the large wetland the grand fir / three-leaved foamflower CDFmm/06 was encountered in the young forest stage. Douglas-fir along with western redcedar, red alder and understory containing sword fern, salmonberry and salal are typical for this ecosystem. On drier poorer sites Douglas-fir – arbutus (CDFmm/02) unit was encountered. These sites typically have a mix of Douglas fir, arbutus with lodgepole pine and the occasional Garry oak. Shrub species included ocean spray, salal, dull Oregon-grape and Garry oak. These ecosystems, represent a provincially Red-listed communities in their climax state (typically structural stage 7 old forest). As it is a young forest, these stands do not yet meet the criteria to be considered as a Red-listed community.

On the western and northern portion of the Property a mix of non-forested and forested ecosystems dominated by the Wallace's selaginella/reindeer lichen (CDFmm/00-SC) ecosystem unit. This unit is non-forested, occurs on shallow to very shallow soils, and is typical of rock outcrops. The open, non-tree and non-shrub aspects of this unit are dominated by mosses while the transition forest edges are associated with arbutus, Garry oak, Scotch broom, and other shrub species along with some grasses and abundant moss. These sites have signs of human disturbance including roads and trails. The forested portion of this area had a mix of the units described above including the CDFmm/01 and CDFmm/02.

Garry oak ecosystems have historically been present in the area across the study site (Miller et al 2004). Remnant Garry oak associated ecosystems are present, typically of the thin soil type but are highly disturbed and fragmented. Vernal pools (which can be associated with Garry Oak ecosystems) occur throughout the site, several such locations are shown on Figure 2. Vernal pools provide a unique specialized habitat that support a diverse array of flora and fauna including rare and endangered species. A comprehensive delineation and classification of potential Garry oak associated ecosystems was not within the scope of this assessment. Of note a comprehensive, standardized classification system for Garry oak and associated ecosystems has not been adopted by provincial and other agencies (Fuchs 2001), making delineation challenging. Despite this, there is potential for some patches of Garry oak ecosystem to occur on the site.

A rare plant survey was conducted as part of the initial assessment in 2011. This initial assessment noted observations of the provincially blue-listed slimleaf onion (*Allium amplexans*) in several places including an open meadow area and within a cluster near the southwest boundary of the Project area, just north of East Wellington Road. Also, a cluster of rein orchids was observed just south of the large wetland complex (Stream 1, Reach 2) and it was not possible to determine whether this cluster of orchids are the blue-listed species of rein orchid known as the white-lip rein orchid (*Platanthera ephemerantha*). A follow-up survey conducted in the



summer of 2023 determined that these were not a listed rein orchid species. No SARA listed plant species were identified during the previous or recent rare plant surveys or while completing wetland assessments. During the June 2022 follow up rare plant survey, the provincially blue-listed slimleaf onion was only observed just outside of the southern portion of the Properties (Figure 2). No other provincially listed plant species were observed. The rare plant surveys are intended to assist with determining the importance of various habitats to rare plants. The surveys are not meant to guarantee the absence of all rare species.

Invasive plant species were extensive throughout the Properties. Invasive species included Scotch broom, spurge Laurel, English holly, and Himalayan blackberry with extensive reed canary grass in the large wetland area (Stream 1, Reach 2). No noxious weeds, listed and managed under the *BC Weed Control Act* (1996) were observed although a comprehensive invasive species assessment was not conducted.

3.2.2.2 Wildlife

Overall, moderate use and observations of wildlife were made on the Property. Due to time of year and time of day of the terrestrial field assessments, bird observations were limited to common overwintering species. Bird species observed throughout the field programs by EDI included Great Horned Owl, Barred Owl, Northern Flicker, Chestnut-backed Chickadee, Red-breasted Nuthatch, Varied Thrush, American Robin, Pacific Wren, Song Sparrow, Anna's Hummingbird, Dark-eyed Junco, and Spotted Towhee. Most of these birds are considered migratory birds and are common overwintering species which may also breed in the area. Several other species of migratory bird are expected to occur at the site, and several species have the potential to use the site for breeding. Evidence of use by black-tailed deer included trails, pellets, browse and beds which were concentrated in the southern portion of the property. Pacific treefrogs were heard calling occasionally near the wetted portions of the Property. Additional species that have been previously documented are relatively common throughout the Nanaimo area include, American beaver, black bear, raccoon, eastern cottontail and red squirrel.

During the assessment it was concluded that there are no Bald Eagle or heron nests on the property but that the larger trees have some moderate potential to support stick nests of some raptor species. The potential for Bald Eagle nests to be constructed on the site in the near future is relatively low due to lack of historic use of the area and limited foraging opportunities for eagles in the vicinity. Other raptors including Red-tailed Hawk, Merlin and Cooper's hawk have the potential to nest in the area and nests of these species have been identified in previous studies. A juvenile Great Horned Owl was observed in 2022 which indicates that nesting may occur on or near the Properties. Several dead and decaying wildlife trees with sign of woodpecker foraging were observed throughout the forested areas particularly in the central and southern portion of the Property. Fresh sign was limited but included Pileated Woodpecker foraging cavities. No Pileated Woodpecker nesting cavities were observed.



4 CONCLUSION AND DISCUSSION

4.1 WATERCOURSES

Watercourses and riparian areas (leave strips) are the primary constraint to future development of the Properties. Table 6 summarizes the required and/or potential minimum required leave strips for each watercourse (note that only Boxwood Creek, Stream 1, Reach 1 and Stream 1, Reach 2 have predetermined setbacks as per City of Nanaimo OCP and Zoning Bylaws and as shown on NanaimoMap). The Proposed Zoning Plan (Appendix A) and Figure 2 (Appendix C) depict the leave strips areas described in Table 6. While all but one watercourse (a portion of Stream 1, Reach 2 that is connected to Boxwood Creek) within the Properties are non-fish bearing, most streams flow into fish habitat (Boxwood Creek, a known fish-bearing tributary to Millstone River), and are thus important in terms of providing water, food, and nutrients to downstream fish habitat. Small streams on the property including Stream 3, Stream 4, Stream 5 (Reach 1), Stream 6, and Millstone Tributary (Reach 1) are ephemeral, narrow and shallow, and they provide relatively low aquatic habitat values for wildlife such as amphibians. The smaller wetland areas (Stream 5 [Reach 2], and Millstone Tributary [Reach 2]) only contain surface water during the wetter portions of the year and provide relatively low aquatic habitat values for wildlife such as amphibians. Most streams and wetlands feed into the larger wetland ecosystem complex within the middle of the Properties. These substantial wetland areas provide some good quality aquatic habitats for wildlife including amphibians, waterfowl, and beavers (although no beavers have been recently observed). These wetlands likely provide numerous other ecological benefits and ecosystem services including but not limited to temperature regulation, flow regulation, flood prevention, groundwater recharge, carbon storage and relatively high biodiversity values.

Vernal pools occur throughout the site and several such locations are shown on Figure 2. As described previously, these shallow, disconnected pools over bedrock are not considered to be wetlands and are not thought to be applicable under the Water Sustainability Act since they are disconnected from other streams and are not a natural source of water supply.



Table 6. Minimum potential Leave Strip widths for each stream reach.

Stream	Reach	Leave Strip	Measured From	Comments
Boxwood Cr	Reach 1	7.5 m	Top of Bank	This feature and its required Leave Strip width are shown on NanaimoMap. Actual watercourse and Leave Strip boundaries are as shown on Figure 2 and Appendix A.
Stream 1	Reach 1	15 m	Top of Bank	This feature and its required Leave Strip width are shown on NanaimoMap. Actual watercourse and Leave Strip boundaries are as shown on Figure 2 and Appendix A.
Stream 1	Reach 2	15 m*	Wetland Boundary	This feature and its required Leave Strip width are shown on NanaimoMap. Actual watercourse and Leave Strip boundaries are as shown on Figure 2 and Appendix A.
Stream 1	Reach 3	15 m*	Wetland Boundary	Typical leave strip required by the City for wetlands.
Stream 3	Reach 1	10 m	Stream Boundary	Minimum required by RAPR
Stream 4	Reach 1	7.5 m	Top of Bank	Typical leave strip required by the City for streams not connected to fish habitat (not RAPR applicable)
Stream 5	Reach 1	10 m	Stream Boundary	Minimum required by RAPR
Stream 5	Reach 2	15 m	Wetland Boundary	Typical leave strip required by the City for wetlands
Stream 6	Reach 1	10 m	Stream Boundary	Minimum required by RAPR
Isolated Pond	N/A	7.5 m	Wetland Boundary	Typical leave strip required by the City for isolated wetlands
Millstone Trib	Reach 1	10 m	Stream Boundary	Minimum required by RAPR
Millstone Trib	Reach 2	15 to 30 m	Wetland Boundary	Minimum required by RAPR (15 m on all sides except 30 m due south of southern boundary)

*To avoid potential non-compliance with the Water Sustainability Act, unless authorized through a Section 11 Change Approval, area of protection is to be extended to conserve wetland ecosystem boundaries that extend beyond Leave Strip boundaries as identified through the detailed wetland mapping methods implemented by EDI (see Figure 2, which identifies 3 locations where ecosystem boundaries extend beyond the 15 m Leave Strip boundaries, which are measured from the wetland *boundary* as defined by the Zoning Bylaw).

4.2 TERRESTRIAL

Terrestrial values of the site did not result in many specific constraints to planned development. Below is a brief summary of key findings:

- There were no wildlife features discovered that are provided year round legal protection.
 - There were no heron, raptor, or Pileated Woodpecker nests observed; however, new nests could be constructed in the future.
 - Any songbird and migratory bird nests present would only be protected while the nest is occupied.
- The only listed plant species encountered were slim leaf onion, which were located along the bluffs near and just outside of the property boundaries.
- No red-listed ecosystems were found to occur. While several had the potential to occur here, none of them were at a climax state (no old-growth forest for example) and would therefore not currently be considered red-listed.



- Two blue listed ecosystems were found to occur: western redcedar / sword fern – skunk cabbage (CDFmm/11), which overlaps with some of the wetland areas and Wallace's selaginella / reindeer lichens (CDFmm/00), which are the open, terrestrial herbaceous areas that are significantly disturbed by human activities and are often infested with invasive species. The Wallace's selaginella / reindeer lichens (CDFmm/00) ecosystem was found to be in better condition (less disturbance and less invasive species infestations) along the edge of the bluff. The current rezoning plan accommodates a recommended additional 5 m buffer to conserve the values of this area (Figure 2, Appendix C).
- Remnant, typically disturbed Garry oak associated ecosystems and vernal pools, occur on the site; however, Garry oak trees are present as small individual trees dispersed within the site, and no stands or larger trees were observed. A comprehensive delineation of these ecosystems was not completed but these habitats are considered to support a high diversity of flora and fauna.
- No mapped Sensitive Ecosystem Inventory (SEI) polygons occur within the property.
- Nine listed wildlife species have the potential to occur, all of which could utilize some of the habitats available at the site. These species were not observed during the site visits; however, dedicated searches were not attempted. Habitats for these species are not legally protected on provincial lands as there is not a provincial species at risk act. Conserving the streams, wetlands, and riparian areas in addition to forested areas along the Parkway DPA buffers will serve to maintain many of the key wildlife habitats and features for these listed species and for more common wildlife species. Furthermore, as these areas are connected to one another and to the adjacent undevelopable bluff area, important habitat connectivity and wildlife corridors would be provided.

5 RECOMMENDATIONS

The primary environmental objective of Environmental Assessment is to identify key environmental features so that developments are planned to minimize the potential for negative impacts to sensitive ecosystems and important habitat features. As the current application is only for rezoning, many of the site-specific details associated with future development phases are unknown. The following recommendations include general recommendations for future development planning as well as some site-specific recommendations associated with the proposed road alignment, which would require in-stream works.

5.1 GENERAL RECOMMENDATIONS

- Confirm the appropriate watercourse leave strip boundaries with the City of Nanaimo as per DPA 1 requirements. Future development (including subdivision) adjacent to watercourse leave strips will likely require fencing and signage to permanently delineate the required boundaries of these environmentally sensitive features.
- Prior to any planned development of the Properties, we recommend confirming whether any new policy or guidance documents have been provided by the Province of BC regarding wetland



boundary identification under the Water Sustainability Act (or any future legislation that applies to wetlands in BC). As previously discussed, the wetland ecosystem boundaries identified on Figure 2 were based on methods that are not officially tied to the WSA. It is understood that an official methodology and/or policy may be developed sometime in the near future. Furthermore, reevaluating some wetland boundaries during the growing season when herbaceous plants are readily identifiable may be beneficial to bolster wetland ecosystem information, which could result in less conservative wetland ecosystem boundaries than those shown on Figure 2, which relied more on soil characteristics during the late fall to early winter period.

- Figure 2 identifies some environmentally sensitive upland and riparian areas that are recommended for retention. These areas include the following:
 - Within the geotechnical setback identified from the bluff that is immediately west of 2060 East Wellington. In addition, where the geotechnical setback does not extend into the property, we recommend a 5 m setback from the property line. This recommendation is intended to add some additional protective buffer to the sensitive habitats that occur along the bluff, including areas where the provincially blue-listed slimleaf onion (*Allium amplexans*) were observed. No building can occur within the geotechnical setback and development setbacks within future lots are expected to preclude building right up to the property line. Therefore, reserving these beneficial areas is not expected to be a hardship for future development.
 - A maturing, moist forest area surrounded by streams and wetlands that is immediately north of Stream 1, Reach 3. This area is adjacent to a wetland ecosystem that extends beyond the City of Nanaimo's Leave Strip boundaries (as mentioned above).

Fencing and signage to permanently delineate the boundaries of these environmentally sensitive areas is recommended.

- Figure 2 identifies some upland areas that should be considered for retention where possible during future development planning and layout. These areas consist of higher value habitats and older forest areas that are adjacent to areas that will be protected as watercourse leave strips. It is not a requirement to protect these areas and, given the significant constraints on the Properties associated with riparian areas, inaccessible areas, geotechnically challenged areas, and the Parkway DPA buffers, it is understandable that protection of additional, optional areas may not be desired. Retention of these additional areas is not necessary given that they are not legally protected and because the protection of other areas throughout the Properties will serve to maintain many of the key wildlife habitats, corridors, and features of this area.
- If possible, any land clearing activities should be planned outside of the breeding bird window for eastern Vancouver Island, which extends from March 1 to August 31. Any clearing activities that are planned in this period should be preceded by preclearing nest surveys. Active nest sites must be identified and flagged so that the nest and the appropriate adjacent area can be left undisturbed until the young birds have fledged and left the nest. Nanaimo's tree protection bylaw specifies additional requirements associated with planned tree removal.
- Stick nests of species such as Bald Eagle and herons are offered protection under the provincial *Wildlife Act*, while Pileated Woodpecker nests and the active nests of migratory birds are protected



under the federal *Migratory Bird Convention Act*. Although no eagle nests were identified, and the potential is low, new nests are possible. Any future Bald Eagle or other protected nest trees must not be removed or disturbed without approval under the *Wildlife Act*, and suitable buffers and other measures should be established to avoid disturbance. Any eagle, heron, raptor, or Pileated Woodpecker nests discovered prior to, or during the course of development should be addressed on a case-by-case basis to determine the appropriate protection and impact mitigation measures. A preclearing survey should be conducted just prior to commencing any clearing on the Property to determine if any such nests are present. The pre-clearing survey should be conducted prior to any clearing activities, regardless of time of year. This is important to verify the presence/absence of new environmental features such as stick nests, cavity nests, dens, and snake hibernacula.

- A Construction Environmental Management Plan (CEMP) should be prepared for each phase of development, once detailed designs are complete and prior to commencing any site preparation works. The CEMP should include an Erosion and Sediment Control Plan, as well as specific measures on how to protect environmental features and species of interest. An invasive species management plan that describes how the spread of invasive plants such as Scotch broom, spurge laurel, Himalayan blackberry and English holly will be controlled should also be part of the CEMP. It is particularly important to prevent the additional spread of invasive species into the identified environmental protection areas.

5.2 IN-STREAM WORKS

Construction of the planned access road will require in-stream works where there is overlap with the Stream 1 wetland area. To provide access to the northern portion of 2160 East Wellington, the access road will need to cross the watercourse network that extends across the Properties. The Stream 1, Reach 3 crossing location was selected to minimize impacts to wetland and riparian areas. It occurs at a narrow part of the watercourse and this location is partially disturbed by the existing sanitary sewer crossing, which impedes the natural flow of water from west to east and may cause additional ponding upstream (west) of the crossing.

The existing panhandle driveway into 2080 East Wellington crosses the Isolated Pond. In the future, it may need to be widened and upgraded to meet appropriate transportation standards. This is unavoidable given the location of the pond relative to the panhandle. As the isolated pond is not connected to other watercourse features, its ecological importance is somewhat reduced. While unfortunate, the future widening of the road crossing over this pond is not likely to pose a significant permitting constraint.

Permitting for any in-stream works will be required including:

- City of Nanaimo Development Permit (DPA 1)
- BC Water Sustainability Act (WSA) Section 11 Notification or Change Approval.
- Submission of a Request for Review to the Department of Fisheries and Oceans (DFO) may be warranted to confirm that an Authorization is not required. Since the watercourses are non-fish bearing it is unlikely that an Authorization would be needed for the installation of standard road crossing structures and/or small encroachments into wetland areas. DFO review would not be



needed for any works in and around the Isolated Pond as it is not connected to downstream fish habitat.

The WSA permitting could require offsetting for impacts to wetland areas. Wetlands are currently a high conservation priority in BC, so offsetting through the WSA permitting process is being requested or required more regularly than in the recent past. Should offsetting be necessary through WSA permitting and/or the DPA 1 process, there are several opportunities available within the Properties including but not limited to:

- Increased riparian protection surrounding stream and wetland areas within the Properties. For example, the areas identified in Figure 2 as *Recommended for Retention* that are adjacent to riparian areas should be considered to use for any offsetting that may be necessary.
- Wetland enhancement (especially where wetlands have been disturbed by agricultural practices or where wetlands are overgrown with invasive species such as reed canarygrass).

6 REPORT LIMITATIONS

This report was prepared exclusively for East Wellington Developments LP. by EDI Environmental Dynamics Inc. The quality of information, conclusions and estimates contained therein are consistent with the level of effort expended and is based on: i) information available at the time of preparation; ii) data collected by EDI Environmental Dynamics Inc. and/or supplied by outside sources; and iii) the assumptions, conditions and qualifications set forth in the report. The report is intended to be used by East Wellington Developments LP. for the intended purpose as outlined by this report. Any other use or reliance on this report by any third party is at that party's sole risk.

The recommendations made in this report are not meant to satisfy any potential slope stability, flood hazard or climate change considerations.



7 REFERENCES

- Fuchs, Marilyn A. 2001. Towards a Recovery Strategy for Garry Oak and Associated Ecosystems in Canada: Ecological Assessment and Literature Review. Technical Report GBEI/EC-00-030. Environment Canada, Canadian Wildlife Service, Pacific and Yukon Region.
- Government of Alberta. 2015. Alberta Wetland Identification and Delineation Directive. Water Policy Branch, Alberta Environment and Parks. Edmonton, Alberta.
- Green, R.N. and K. Klinka. 1994. A field guide for site identification and interpretation for the Vancouver Forest Region. Land Management Handbook Number 28. BC Ministry of Forests. Victoria, B.C.
- MacKenzie, W. H., and Jennifer R. Moran. 2004. Wetlands of British Columbia: A Guide to Identification. Land Management Handbook 52. Victoria, British Columbia: British Columbia, Ministry of Forests, Forest Science Program.
- MacKenzie, W.H. 2012. Biogeoclimatic ecosystem classification of non-forested ecosystems in British Columbia. Prov. B.C., Victoria, B.C. Tech. Rep. 068. www.for.gov.bc.ca/hfd/pubs/Docs/Tr/Tr068.htm
- Miller, Kate and Ted Lea. 2004 Historical Garry Oak Ecosystems of Nanaimo and Parksville Areas, British Columbia, Canada. 1:50,000 Map. Biodiversity Branch, B.C. Ministry of Water Land and Air Protection. Victoria, B.C.
- Strathcona Forestry Consulting Ltd. 2024. Preliminary Tree Management Plan MCC Legacy - East Wellington Road. Prepared for East Wellington Developments LP.
- U.S. Army Corps of Engineers. 2010. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0).
- U.S. Army Corps of Engineers. 2020. Regional Wetland Plants List: Western Mountains, Valleys, and Coastal Regions.

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APPENDICES



APPENDIX A PROPOSED ZONING PLAN

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APPENDIX B SITE PHOTOS



Appendix Photo B-1. Large patch of provincially blue-listed slimleaf onion observed just outside of the Properties during the targeted rare plant survey.



Appendix Photo B-2. Representative view of open, terrestrial herbaceous areas that are significantly disturbed by human activities and are often infested with invasive species (Scotch broom).



Appendix Photo B-3. Representative view of open, terrestrial herbaceous area with shallow vernal pools. Typical coniferous forest north of Stream 1, Reach 3 riparian areas shown in background.



Appendix Photo B-4. Typical maturing forest riparian area with western redcedar and Douglas fir.



Appendix Photo B-5. Representative view of bluff ecosystem adjacent to west boundary of Properties.



Appendix Photo B-6. Representative view of open, terrestrial herbaceous areas that are less disturbed by human activities and are less infested with invasive species. Typical coniferous forest shown in background

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**APPENDIX C FIGURE 2 EAST WELLINGTON
INDUSTRIAL SUBDIVISION
FIELD RESULTS AND
POTENTIAL AQUATIC
SETBACKS**

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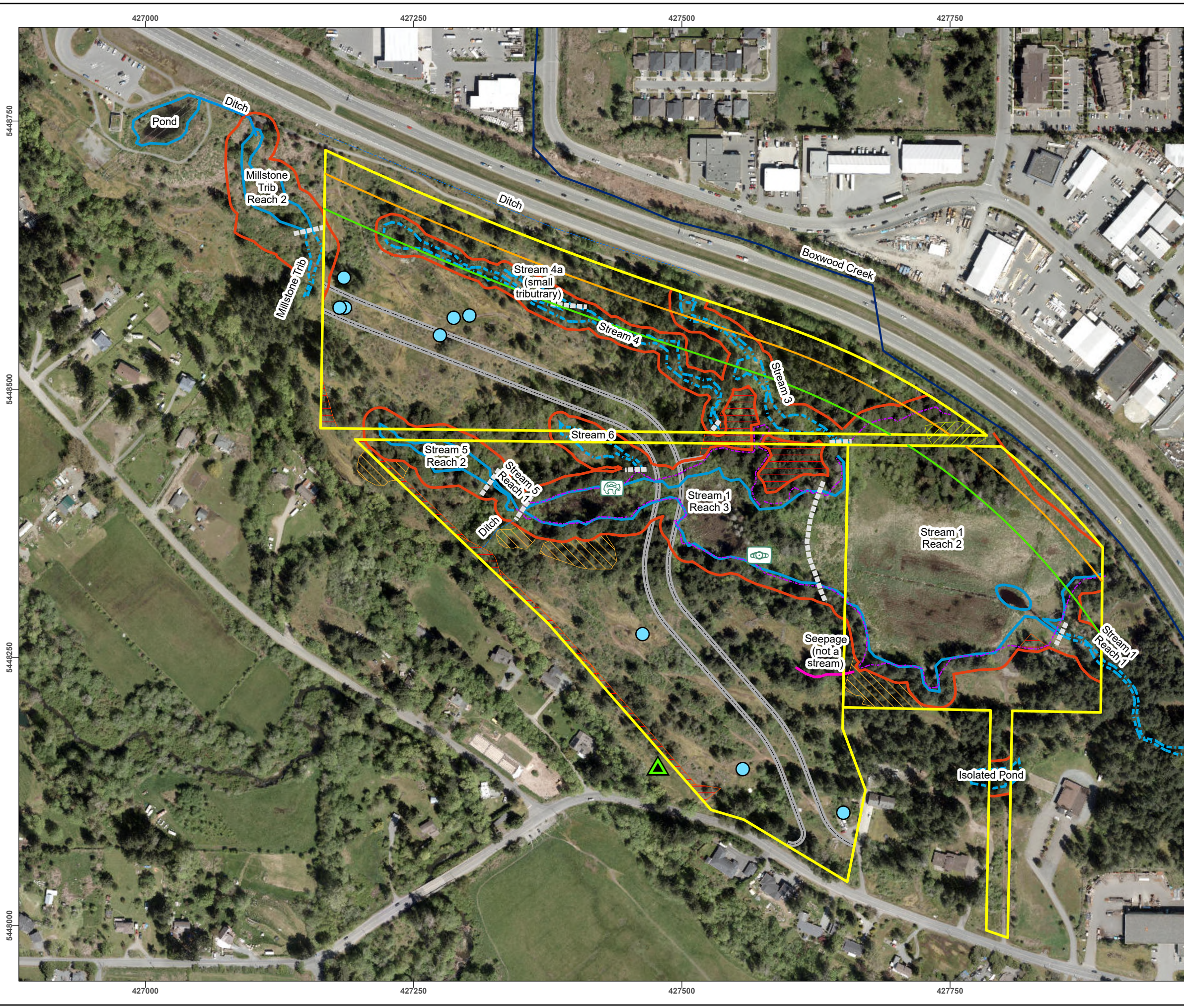
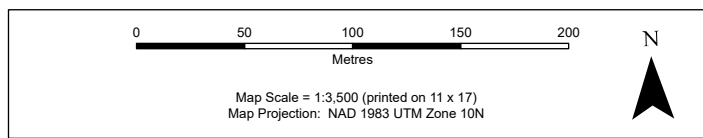
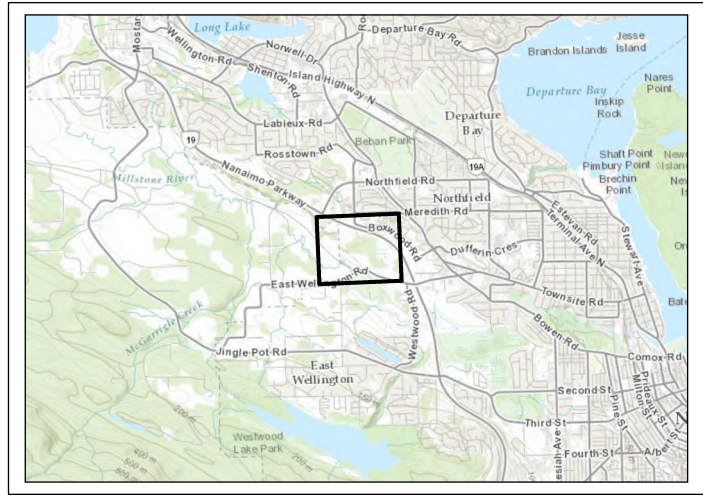


Figure 2. East Wellington Industrial Subdivision Field Results and Potential Aquatic Setbacks

- | | |
|----------------------------|-------------------------------------|
| Pooling Water/Vernal Pools | Wetland Boundary |
| slimleaf onion | Recommended Watercourse Leave Strip |
| Beaver Dam | Stream Boundary/Top of Bank |
| Beaver Lodge | Potential WSA Wetland Boundary |
| Conceptual Road Alignment | Character Protection Zone |
| Ditch | Tree Protection Zone |
| Seepage | Recommended For Retention |
| Boxwood Creek | Consider For Retention |
| Reach Break | Potentially Fish Bearing Wetland |
| | Subject Property |



Service Layer Credits: World Topographic Map: City of Nanaimo, Regional District of Nanaimo, Bureau of Land Management, Province of British Columbia, Esri Canada, Esri, HERE, Garmin, USGS, METI/NASA, NGA, EPA, USDA, AAFC, NRCan
World Imagery: City of Nanaimo, BC, Maxar

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