

## FORESHORE AND ENVIRONMENTAL DEVELOPMENT PERMIT APPLICATION

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DATE: September 11, 2024

TO: Stephanie Louie, Manager of Environmental Protection – District of West Vancouver  
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CC: Nevin Sanhga – Carrera Management Corporation ([nevin@carreramc.com](mailto:nevin@carreramc.com)); Carman Kwan – Architectural Collective ([carman@architecturalcollective.com](mailto:carman@architecturalcollective.com))

FROM: Jeremy Appleton, RPBio & ISA Arborist, and Assunta McCullough, RPBio – Roe Environmental Inc.

**Re: Proposed Development of Navy Jack House at 1768 Argyle Avenue, District of West Vancouver**

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### Introduction

Roe Environmental Inc. (Roe) has been retained by Carman Kwan (Architectural Collective Inc.) to assess the environmental implications of redevelopment of the Navy Jack House at 1768 Argyle Avenue (the "Property") within the District of West Vancouver (DWV). The Navy Jack House was built in 1873 and is considered to be one of BC's oldest homes, and an asset to the community of West Vancouver. Although it is not currently in use, the home has significant heritage value. Redevelopment of the home for public visitation was determined to be a priority by local stakeholders and the District of West Vancouver.

This address is applicable to both the Foreshore Development Permit (FDP) and Environmental Development Permit (EDP) Areas. This report and attached drawings form part of the District of West Vancouver's FDP and EDP applications which restricts development within 15 meters of the natural boundary of the ocean, and between five and 15 meters of the top of any watercourse bank (the "setbacks"), respectively. Outlined in this report is an assessment of existing environmental conditions and recommended mitigations for the protection of the environment during construction to minimize impacts to intertidal, foreshore, and riparian habitat.

### Existing Conditions

Roe visited the Property on December 19, 2023. The Property is located on the shore of Burrard Inlet and immediately west of Lawson Creek. It contains a single-family home, a deck, and an outdoor veranda with a small parking area. The majority of the home is surrounded by a concrete retaining wall and chainlink fence. To the north of the property is Argyle Avenue and a CN railway, and to the south is a walking trail (Centennial Seawalk) contained within John Lawson Park. Beyond the walking trail is the beach and foreshore of Burrard Inlet. Lawson Creek abuts the property to the east and is contained by a concrete flume. To the west of the property a similarly-sized lot owned by DWV forms part of John



Lawson Park. The immediate area falls under 'Ambleside Community Use Zone 5' which permits the presence of parks and playgrounds, park accessory uses, and the Navy Jack House. A portion of the home, the existing deck, and the concrete retaining wall are located beyond the 15 m setback from the legal natural boundary of the ocean. Conversely the existing dwelling is located entirely within the 15 m watercourse setback of Lawson Creek.

## Foreshore Habitat

### 15 m Foreshore Setback

The foreshore area slopes gently between the Property boundary and the ocean. The observed natural boundary was located at the high-water mark (HWM), where the upper intertidal area met the Centennial Seawalk. The observed boundary differed slightly from what was indicated according to plan 16965. The boundary was delineated with large boulders and large driftwood logs and is included in the site figures (Figure 1). Vegetation observed within 15 m of the observed natural boundary included beach grasses (*Fescue* sp.), Nootka rose (*Rosa nutkana*), snowberry (*Symphoricarpos albus*), salal (*Gaultheria shallon*), osoberry (*Oemleria cerasiformis*), and western red cedar (*Thuja plicata*). Invasive vegetation included bamboo (*Poaceae* spp.), and Himalayan blackberry (*Rubus discolor*). No rare, threatened, or endangered plants or plant communities were observed on the Property during the assessment.

### Upper Intertidal/Beach Area

Beach habitat existed to the south of the observed natural boundary. The substrate in this area primarily consisted of gravel, sand, and cobble, with presence of logs and driftwood. Although a detailed investigation of marine flora and fauna was not conducted, marine algae and seaweed were present. The value of this area was considered moderate/ high; although it is regularly visited by beach users it is generally considered undisturbed.

## Riparian Habitat

### 15 m Watercourse Setback

The 15 m riparian area to the west of Lawson Creek was characterized by development, with the home located immediately to the west of the creek and a landscaped lawn located to the east. Vegetation within the 15 m setback was considered sparse and included significant presence of invasive plants. Native species observed within 15 m of the top of bank of Lawson Creek included many of the same species detected within the 15 m foreshore setback, in addition to invasive plants such as Herb Robert geranium (*Gernaium robertianum*), common periwinkle (*Vinca minor*), and butterfly bush (*Buddleja davidii*). Tree species identified within the 15 m watercourse setback included western red cedar (*Thuja plicata*), paper birch (*Betula papyrifera*), and cherry (*Rosaceae* sp.). Vegetation within the 5 m setback of Lawson Creek included beach grass (*Fescue* sp.), paper birch (*Betula papyrifera*), and cherry (*Rosaceae* sp.), and as well as invasive bamboo (*Poaceae* spp.), English holly (*Ilex aquifolium*), and Himalayan blackberry (*Rubus discolor*). The trees and shrubs within 5 m of Lawson Creek provide minor amounts of shade, insect drop, and litter fall. Although the habitat within the 15 m and 5 m watercourse setbacks is heavily disturbed, several native bird and animal species tolerant to disturbance are likely to utilize the area.



## Aquatic Habitat

The lower reaches of Lawson Creek have been heavily modified to mitigate flood hazards. The reach adjacent to the Navy Jack house is contained within a flume which is constructed of concrete on the sides and bottom. Baffles have been placed within the flume to support salmon that are migrating upstream to spawn. Although there is limited presence of streambed materials in the flume, significant restoration efforts at the estuary of Lawson Creek in 2007 have resulted in cobble and boulder substrate which facilitates upstream migration at a variety of tides. Several species and life stages are known to inhabit Lawson Creek, including Coho salmon, Chum salmon, and Coastal Cutthroat Trout (Habitat Wizard, 2023) (Pacific Streamkeepers, 2017). Overall Lawson Creek provides valuable habitat for fish, birds, and invertebrates.

## Photo-documentation



Photo 1: View of the Navy Jack house with chainlink fence surrounding the site.



Photo 2: View of the concrete flume with Lawson Creek, adjacent to the house.



Photo 3: View of the concrete retaining wall separating the Property from the Centennial Seawalk.



Photo 4: View of the large boulders located at the observed natural boundary.



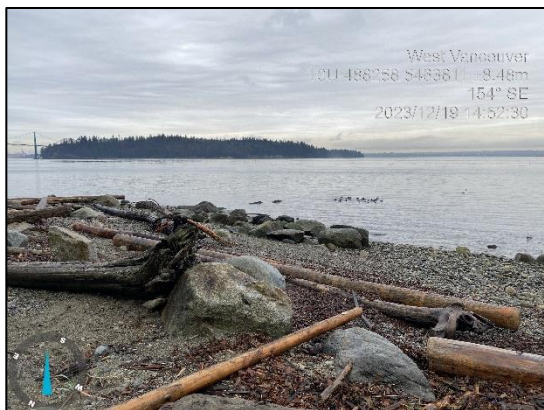


Photo 5: View of the beach substrate downslope of the home.



Photo 6: View of the riparian vegetation looking downstream, showing blackberry and bamboo invasion.

## Proposed Development

The building will undergo significant renovations with the intent of preserving its heritage value. The proposed development consists of renovating the home to include a reduced main floor area, a 73 m<sup>2</sup> addition to the west of the home, restoration of the original deck, addition of a second deck and patio with retractable walls, construction of new access paths, and a garbage and recycling area to the rear of the building. The home will be open to public visitation and managed for commercial purposes such as food or beverage services. The house will be restored to the original footprint, with the eastern edge being 1.43 m horizontal distance from Lawson Creek. The flood construction level set out in the NE-2 Guidelines<sup>1</sup> (16<sup>th</sup> to 19<sup>th</sup> Street) is 4.66m geodetic.

## Habitat Balance

Habitat impacts and gains between the top-of-bank (TOB) of Lawson Creek and the 15 m setback resulting from the renovation and removal of structures were calculated using AutoCAD, and are presented in Table 1 below and attached in Figure 1: *Habitat Balance*.

Table 1. Habitat impacts and gains related to the renovation of Navy Jack House.

Habitat Impacts	
<b>5 m → 15 m setback</b>	
Construction of addition, pathway and parking area	- 63 m <sup>2</sup>
Habitat Gains	
<b>Top of bank → 5 m setback</b>	

<sup>1</sup><https://westvancouver.ca/sites/default/files/media/documents/OCP%20Bylaw%204985%2C%202018%20-%20Schedule%20ii%20-%20Updated%20Copy%20Aug%2C%202023.pdf>



Removal of parking areas, decks, and retaining walls	+ 26 m <sup>2</sup>
<b>5 m → 15 m setback</b>	
Removal of parking area and driveway	+ 72 m <sup>2</sup>
<b>Net Habitat Impact</b>	<b>+35 m<sup>2</sup></b>

### Tree Removal

Ten trees will be removed and nine trees will be retained to facilitate restoration of the Navy Jack house, as recommended by Diamondhead Consulting (2024). Of the ten trees to be removed, trees #35 and #36 are located within the 15 m foreshore setback, and trees #12, #36, and #38 are located within the 15 m watercourse setback. Tree replacement criteria for all tree removals has been included in the Riparian Planting Plan (Figure 2). Additional shrubs are included in the Riparian Planting Plan to ensure tree replacement criteria is met.

### Planting Plan

Three polygons totalling 114 m<sup>2</sup> are proposed for restoration as seen in **Figure 2: Riparian Planting Plan**. The Riparian Planting Plan compliments planting plans L1-L5 provided by Prospect and Refuge (2024) which provide plant prescriptions for the entire site. Following construction, the planting polygons should be fully restored with suitable native plant species at a density of 1.5 plants per m<sup>2</sup>.

All invasive plant species that can be removed safely within both 15 m setbacks must be removed prior to planting the Planting Areas. Invasive species are to be removed and disposed of according to best management practices. Invasive species must be controlled and managed to ensure ongoing success of the Riparian Planting Plan. Removal of invasive vegetation and implementation of the Riparian Planting Plan will provide greater biodiversity of native plants on the Property, providing better foraging habitat for birds and more diverse habitat for invertebrates. The planting areas will provide shade, detritus, and high-quality nutrients to the foreshore and riparian areas. Further details regarding removal of invasive species, as well as preparation and implementation of the Riparian Planting Plan are included in **Figure 3: Riparian Planting Plan Details**.

## Construction Environmental Mitigation Measures

### Tree Protection

As per DWV *Tree Bylaw* No. 4892, 2016, tree protection fencing and signage must be installed and maintained to prevent damage to retained trees or their root systems during construction activities. Fencing should be constructed around any trees that are to be retained, and if practicable, located beyond the Critical Root Zones (CRZs) of trees. CRZs, or Protection Zones as per Schedule A – Tree Protection Specifications of DWV’s *Tree Bylaw*, indicate a minimum fence distance from the tree of six times DBH. Departures or alterations from required tree protection measures should be completed under the direction of a Certified Arborist, and tree protection measures should be inspected and approved prior to the commencement of development works. Any ground disturbance (*e.g.* excavation, backfilling,



compaction, etc.) or changes in grade from existing in the CRZs must occur under the supervision of a Certified Arborist. Therefore, any excavation for the dwelling near any retained trees will require Arborist approval and supervision.

## Concrete Works

Concrete or cementitious water spills into marine or fresh waters have the potential to raise pH levels of the water which can harm or kill fish. Cured concrete may still pose a risk to pH levels of water when broken or reduced to dust. The following measures must be implemented to mitigate cementitious spills into the watercourse:

- Concrete and grouting works must be conducted in isolation of water or site run-off, and during dry weather.
- Cast-in-place concrete or cementitious grouting must be covered with polyethylene sheeting and remain isolated from water until cured (minimum 72 hours) to help prevent toxic concrete leachate from releasing to the receiving environment.
- All materials associated with concrete pours shall be contained to prevent the release of deleterious substances, including sediment, debris, concrete, leachate concrete fines, wash or concrete water.
- All concrete machinery wash-down, including concrete delivery trucks, pumping equipment, hoses, and associated tools, shall be completed in a manner to prevent cementitious water from entering a watercourse, the marine environment, or a drainage basin.
- The QEP will be present during concrete work and will monitor pH immediately downslope of the isolated worksite until the concrete works are completed.
- Due care will be taken to ensure broken concrete or waste materials do not enter the marine environment during demolition. Installation of silt fencing and/or silt socks will intercept chunks and finer debris anticipated from demolition.
- All concrete debris or dust will be collected and removed from site; if debris is stockpiled, it will be stored outside of the 15 m setback and it will be covered with polyethylene sheeting until it is removed from site for disposal.

The QEP may request that compressed carbon dioxide (CO<sub>2</sub>), a two-stage regulator, and diffuser hose apparatus be staged on site should the QEP deem a risk of discharging alkaline concrete leachate exists. Carbon dioxide treatment shall be implemented upon the request of the QEP.

## Bird Nest Surveys

Clearing of trees or vegetation should be done outside the peak nesting season, March 1 to August 31, and in accordance with the Wildlife Act, if possible. Prior to the start of works, during the most sensitive nesting periods for passerine birds (generally March 1 to August 31) a precautionary bird nest survey will be conducted. No active raptor nests were observed during the site visit; however, raptor nest surveys are required between February and October and will be conducted in conjunction with the precautionary passerine bird nest survey. If any active nests or species of management concern are identified, the Qualified Environmental Professional (QEP) may conduct additional monitoring during construction and



implement restrictions (e.g., buffers appropriate to the work activity and bird species) until the nest is no longer active or there is no concern regarding the identified species of management concern. Additional bird nest surveys are required during periods of inactive construction or if the Works begin in a new area that did not previously receive a bird nest survey; the QEP will provide guidance regarding the validity period of the bird nest survey. Nest surveys are required following *Environment & Climate Change Canada's Guidelines to Reduce Risk to Migratory Birds*<sup>2</sup> and to avoid contravention of the *Canada Migratory Birds Convention Act* and Section 34 of the *BC Wildlife Act*. Additional mitigations will be determined at the discretion of the QEP.

## General Environmental Mitigation Measures

As part of the proposed works, the following general environmental mitigation measures shall be implemented during construction:

- Construction fencing should be installed near or on top of the flume in a manner that separates the Property from Lawson Creek. This could be completed by removing the existing chainlink fence and installing temporary rental fencing, or leaving the chainlink fence and removing it once the project is complete, or a combination thereof. Silt fencing should be placed along the bottom of the construction fencing and additional layers of silt fencing or landscape cloth should be placed along the top, as a means of separating the creek from the Property. This will protect the creek from sediment, as well as construction dust and debris;
- Machinery arriving on site will be clean and free of sediment or plant material;
- Any stockpiled material left on site for more than 24 hrs will be covered with 6 mm polyethylene sheeting (or similar material) and securely fastened in place prior to and during inclement weather (*i.e.*, over 25 mm in 24 hrs) to prevent erosion and sediment-laden water runoff;
- Erosion and sediment control structures (such as silt fencing, straw wattles, etc.) should be installed between all work areas and the natural boundary;
- Street sweeping/cleaning will be conducted if sediment is tracked out onto Argyle Avenue;
- Catch basin protection (*e.g.*, filter socks) will be installed on adjacent catch basins and maintained regularly;
- Native vegetation within the 15 m setback should be retained where possible;
- Cut slopes or disturbed slopes that are not bedrock will be covered with polyethylene sheeting ("poly") to minimize erosion;
- All clearing of vegetation should occur outside the peak nesting season, March 1 to August 31, and in accordance with the Wildlife Act, if possible;
- Material import and export activities to and from the Subject Property will implement invasive species best management practices to prevent the spread and proliferation of invasive species;
- All imported material will be clean and/or free of contamination;

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<sup>2</sup> <https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds/reduce-risk-migratory-birds.html>



- All fuel-operated machinery shall have a readily accessible spill containment kit with an adequate amount of materials to respond to all potential leaks. All staff shall be trained in spill response. A spill of any substance of reportable quantity that is toxic, polluting, or deleterious to aquatic life, shall be immediately reported to the Environmental Emergency Program (EEP) Incident Reporting Hotline (1-800-663-3456) and DFO's observe, record and report hotline (1-800-465-4336);
- A spill kit will be kept on-site throughout the duration of the works;
- Equipment containing petroleum products must be inspected daily to identify any leaks and wearing parts before they fail; and,
- Leaking equipment or wearing parts will be repaired/replaced before continuing service.
- If required by DWV, the Owner will engage an appropriately qualified Erosion and Sediment Control (ESC) Supervisor to prepare a formal ESC plan and monitor compliance with the approved ESC Plan. As a DWV requirement, ESC inspections would occur as per the following schedule:
  - Biweekly inspections **June 01 –September 30** ("dry season");
  - Weekly inspections **October 01 – May 31** ("wet season"); and
  - As required during or immediately following precipitation events exceeding **20 mm within 24 hours**.

It is the responsibility of the owner and/or developer to contact their ESC Supervisor prior to commencing ground disturbance activities. It is recommended that a pre-construction meeting be held to ensure that contractors are aware of the ESC requirements.

## Conclusions

### Foreshore Development Permit

Roe concludes that Guidelines NE2 for Foreshore Development Permit Areas are met as follows:

*Locate development in the least environmentally sensitive areas (e.g., areas that have been previously disturbed) to minimize impact to the ecology of the intertidal habitat.*

- **The proposed dwelling is predominately within the existing dwelling footprint. Several options were explored for relocation or removal of the home, with the final result being to redevelop in the same location. Encroachment into the foreshore should be minimized as much as practicable.**

*Encourage the preservation of healthy trees, shrubs, and hedges, or where necessary, their replacement with suitable species to the coastal environment.*

- **Two trees are proposed for removal within the 15 m foreshore setback. Restoration is proposed in areas disturbed during demolition and following removal of invasive species.**

*Where possible, natural or soft landscaping materials shall be used to protect the property and foreshore area, and create resiliency to coastal flooding.*

- **No hard landscaping is proposed to protect or armour the foreshore area.**





*The use of retaining walls and other "hard" surfaces such as seawalls and riprap armouring shall only be supported where a Professional Engineer has determined that "soft" approaches to shoreline stabilization are not appropriate given site-specific conditions and shall not increase scour and erosion of the foreshore area.*

- **No hard landscaping is proposed to protect or armour the foreshore area.**

*Consideration should be given to removing hard structures when not required and replacing with natural features to enhance the foreshore habitat.*

- **The concrete retaining wall will be removed, with the exception of the area that separates the Property from Lawson Creek.**

*For any reduction in the 15 metres setback from the natural boundary of the ocean, to allow for placement of a structure, an Environmental Assessment by a QEP shall be completed and include recommendations for protection and/or restoration required to minimize disruption to the physical and biological processes of the foreshore habitat*

- **Although a portion of the redevelopment is located closer than existing, the proposed footprint will not impact the physical and biological processes of the foreshore habitat.**

*Where native plant species or plant communities dependent on a marine shoreline habitat are identified as sensitive, rare, threatened, or endangered, and have been identified by a QEP for protection, their habitat areas shall be left undisturbed.*

- **No rare, threatened or endangered plants were observed within the accessible areas. Management of invasive species within the 15 m setback will improve the shoreline habitat.**

## Environmental Development Permit

Roe concludes that requirements for Environmental Development Permit Areas are met as follows:

*Locate development on portions of the site that are least environmentally sensitive.*

- **The addition to the home, including the new deck and patio, are proposed for the west side of the home away from Lawson Creek.**

*Avoid net loss of riparian habitat within 15 m of the top of the watercourse bank or edge of the wetland.*

- **The habitat balance for the proposed development demonstrates no net loss of riparian habitat.**

*Within 15 m of the top of the watercourse bank or edge of wetland, locate new buildings, structures and impervious/semi-impervious surfaces at least as far from the watercourse or wetland as any existing development.*

- **Within the 15 m setback, redevelopment is located within the existing historical footprint.**

*Keep free of new buildings, structures, and impervious/semi-impervious surfaces the area within 5 m of*



*the top of the watercourse bank or edge of the wetland.*

- **No new buildings or structures are proposed within the 5 m setback. A small portion (0.13 m) of the historical deck footprint does not fall under the existing roof overhang, however the historical footprint will be maintained for heritage value.**
- **A small portion of a new loading and access pad (approx. 5 m<sup>2</sup>) at the garbage and recycling area is proposed to exist within the 5m setback. This area is previously disturbed due to the presence of an existing concrete pad. A concrete curb should be placed on the watercourse side of this pad to prevent wash-water and surface drainage from entering Lawson Creek.**

*Enhance, and where feasible, restore watercourses in already developed areas to improve watercourse quality from uplands to inlets.*

- **The implementation of the Riparian Planting Plan will serve to provide additional habitat for local flora and fauna suited to native riparian conditions, and provide higher quality food and nutrients to downstream reaches of Lawson Creek.**

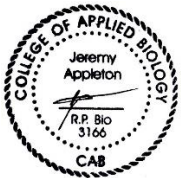
Please contact the undersigned if you require any additional information or clarification of the above.

## Endorsement

### Roe Environmental Inc.

#### Prepared by:

*The undersigned certifies the work described herein fulfills standards acceptable of a Registered Professional Biologist.*



*[Digital Copy, Original Signed]*

#### Jeremy Appleton, RP.Bio & ISA Arborist

Senior Biologist & Arborist

#### Reviewed and Endorsed by:

*The undersigned certifies the work described herein fulfills standards acceptable of a Registered Professional Biologist.*



*[Digital Copy, Original Signed]*

#### Assunta McCullough, RP.Bio

Senior Biologist

#### Attachments:

- Figure 1: Habitat Balance (2024-09-09, REV02)
- Figure 2: Planting Plan (2024-09-09, REV02)
- Figure 3: Riparian Restoration Plan Details (2024-09-09, REV02)



# Habitat Balance Within 15 m Top of Bank

## Habitat Impacts

**5-m → 15-m Setback**

Construction of addition, pathway and parking area

- 63 m<sup>2</sup>

## Habitat Gains

**ToB → 5-m Setback**

Removal of parking areas, decks, and retaining walls

+ 26 m<sup>2</sup>

**5-m → 15-m Setback**

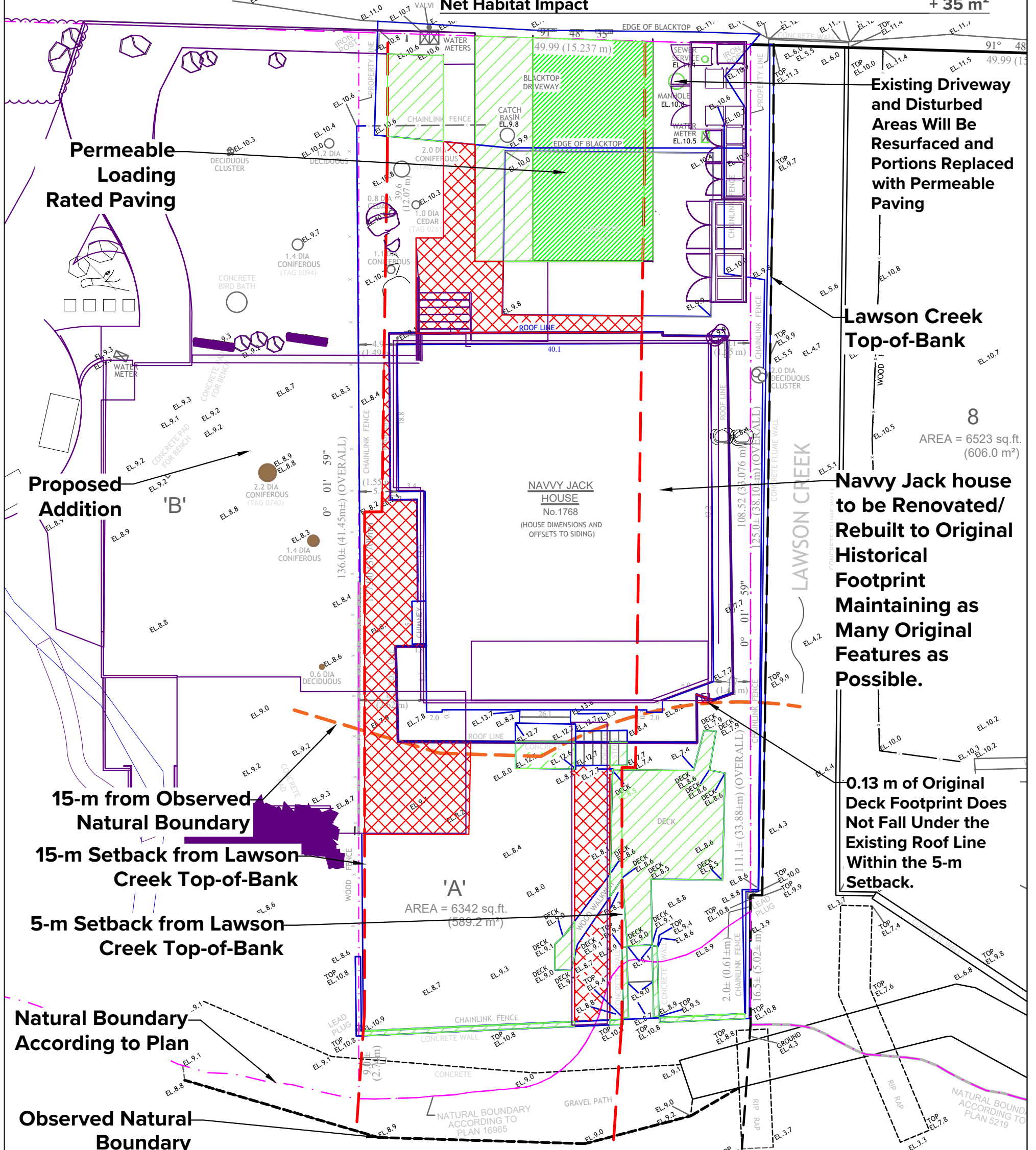
Removal of parking area and driveway

+ 72 m<sup>2</sup>

## Net Habitat Impact

+ 35 m<sup>2</sup>

Argyle Avenue



Existing Driveway and Disturbed Areas Will Be Resurfaced and Portions Replaced with Permeable Paving

Lawson Creek Top-of-Bank

8  
AREA = 6523 sq.ft. (606.0 m<sup>2</sup>)

Navy Jack house to be Renovated/ Rebuilt to Original Footprint Maintaining as Many Original Features as Possible.

0.13 m of Original Deck Footprint Does Not Fall Under the Existing Roof Line Within the 5-m Setback.

Permeable Loading Rated Paving

Proposed Addition 'B'

15-m from Observed Natural Boundary  
15-m Setback from Lawson Creek Top-of-Bank  
5-m Setback from Lawson Creek Top-of-Bank

Natural Boundary According to Plan

Observed Natural Boundary

- Habitat Impacts
- Habitat Gains
- Proposed Tree Removal
- Top of Bank
- Proposed Structures
- Habitat Gains - Permeable Paving
- Property Line
- Existing Structures
- 15-m from Observed Natural Boundary
- DWV Setbacks



1768 Argyle Avenue, DWV  
Environmental Development Permit Figures

## Riparian Planting Plan

Approximately 114 m<sup>2</sup> of planting is proposed at an average density of 1 plant per 1.5 m<sup>2</sup> within the identified Riparian Planting Area to accommodate for calculated habitat gains and increase the overall biological productivity of the watercourses riparian zone. All invasive plants within the Invasive Species Management Area must be removed prior to planting. Plant species should be selected with consideration to plant community, competitive nature, shade tolerance, growth rates and rate of spread. No more than 25% of one species may be selected from the plant list. Efforts will be taken to retain existing native vegetation in place or may be carefully removed, stored and transplanted to another area on the Subject Property. The following planting list is recommended; if plant species substitutions are desired due to reasons of aesthetics or plant stock availability, Roe Environmental Inc should be contacted at 604.987.5588 to review and comment.

### Coniferous Trees

(3.0 m spacing from other deciduous and coniferous trees)

Douglas fir (*Pseudotsuga menziesii*)  
Shore pine (*Pinus contorta*)

TOTAL - 1\*

\* coniferous trees must be purchased at a height of at least 1.2 m.

### Deciduous Trees

(1.5 - 3.0 m spacing from other deciduous and coniferous trees)

Douglas maple (*Acer glabrum var. douglasii*)  
Bigleaf maple (*Acer marcophyllum*)  
Arbutus (*Arbutus menziesii*)  
Red alder (*Alnus rubra*)

TOTAL - 5\*\*

\*\* deciduous trees must be purchased at a height of at least 1.2 m.

### Shrubs

(0.25 - 1.0 m spacing from other vegetation and purchased in minimum #1 or one gallon containers)

Oceanspray (*Holodiscus discolor*)  
Nootka rose (*Rosa nutkana*)  
Flowering Current (*Ribes sanguinem*)  
Snowberry (*Symphocarpos albus*)  
Oregon grape (*Mahonia aquifolium*)  
Saskatoon berry (*Amelanchier alnifolia*)  
Indian-plum (*Oemleria cerasiformis*)  
Sweet gale (*Myrica californica*)  
Salal (*Gaultheria shallon*)  
Kinnickinnick (*Arctostaphylos uva-ursi*)  
Honeysuckle (*Lonicera ciliosa*)  
Mock-orange (*Philadelphus lewisii*)  
Salmonberry (*Rubus spectabilis*)  
Black twinberry (*Lonicera involucrata*)  
Thimbleberry (*Rubus parviflorus*)  
Pacific ninebark (*Physocarpus capitatus*)

TOTAL - 70\*\*\*

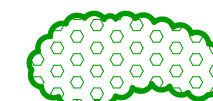
\*\*\*No more than 25% of one species may be selected from the plant list

## Landscape Riparian Planting Checklist

- Ensure the entire area is planted in the location identified in the adjacent figure depicting the Riparian Restoration Area
- Ensure a planting density of 1 plant per 1.5 m<sup>2</sup> (76 plants minimum in 114 m<sup>2</sup>)
- Ensure the Riparian Restoration Area contains the minimum number of plants of each type as shown in the list provided
- Ensure no new hard surfaces are present within the Riparian Restoration Area or Existing Riparian Area
- Ensure all invasive plants are removed from the Invasive Species Management Area
- Ensure species planted are from the list provided or have been approved by Roe



Existing Riparian Area (Must remain free of hard surfaces)



Riparian Planting Area (1 plant per 1.5 m<sup>2</sup>)

114 m<sup>2</sup>



1768 Argyle Avenue, DWV  
Environmental Development Permit Figures

Figure 2: Riparian Planting Plan

REV 02

DATE 2024-09-09 DRAWN BY A.M. SCALE 1:200



**Invasive and Non-native Species**

All invasive plant species and non-native landscaped vegetation should be removed (with their root structures) within from the Riparian Planting polygon delineated in Figure 2. Invasive plant species located along fence lines, stairs, retaining walls, deck edges or steep slopes where machine access is restricted, or where vegetation may be integral to existing structural components or slope stability, should be removed by hand. Invasive species located in riparian areas where machine access is available may be managed through other mechanical means (e.g., use of a small-rubber tracked machine). Extensive species-specific information exists regarding the removal and control of invasive species, and if required, Roe Environmental Inc. can provide further direction during the landscaping/vegetation maintenance phase of the proposed works to ensure adequate removal and disposal. All root structures and local topsoil strata should be disposed of in an appropriate manner.

During the site assessment, the following invasive species were observed adjacent to and within the recommended Riparian Planting Areas:

**English ivy (*Hedera helix*)**

**Himalayan blackberry (*Rubus armeniacus*)**

**Spurge Laurel (*Daphne laureola*)**

**Purchasing, Site Preparation and Planting**

Botanical names should be referenced when purchasing to ensure accuracy and all specimens should be of guaranteed nursery stock. Purchased stock should be tagged with species name, and tags should be left on after planting for the purpose of planting confirmation. Nursery stock should be a minimum of two years old at purchase to ensure developed root systems and increase the likelihood of survival. Once plant stock is received onsite, specimens should be stored in a cool, shady location and watered regularly. Planting should be undertaken during the fall (Sep - Oct) or spring (Mar - Apr) for maximized probability of survival. Prior to planting, it should be ensured that adequate soil structure and nutrient content exist through appropriate storage of existing onsite material or import of organic growing medium. If growing medium is to be retained from onsite, consideration should be given to organic stockpile depth (no greater than 1.0m) and length of storage time (ideally less than 1 month) to maintain nutrient cycling, microbial activity and viability of native seed stock. Once placed, factors affecting soil compaction (i.e. traffic, machine movement, material storage) should also be considered. If material import is required for growing medium, it should be inert and certified free of invasive or noxious weed species. Holes should be dug 2-3 times larger than the size of the roots and soil should be non-compacted. Root ball untangling, pruning, splitting and burlap sack removal should be done in a means suitable to allowing the newly planted roots to spread and avoid root girdling. If in doubt, supplier planting prescriptions should be consulted. Regular watering and/or fertilizer application may also be required to ensure adequate recruitment.

The following plant spacings are included as a guideline, and clustering of plants around preferred microsities (e.g., woody debris, large trees, wetted depressions on dry sites, drier mounds on wet sites, etc.) is preferred to a standard grid formation. Course woody debris (CWD), if locally available, should be placed within the planting area to promote nutrient cycling and wildlife habitat, and to serve as native seedbanks. Shrubs should be purchased in minimum 1 gallon pots and planted 0.25 - 1.0 m away from other vegetation. Plant species locations should be selected in consultation with an experienced landscaper to determine shade and growing tolerances.

All acquired plant materials shall be healthy, with well developed root systems and top growth, and shall be free of disease, insect infestation and the following defects at all times: broken tops, torn roots and abrasions of bark on trunk and branches; dried out root systems; prematurely opened or damaged buds; dry, loose or broken ball of earth; evidence of heating, moulding, or freezing damage; thin, poor root or top systems, and abnormal leaf colour.

**NOTE TO CLIENT:** It is integral that prescriptions provided within this Riparian Restoration Plan (the "Plan") are adhered to, and if questions or concerns arise during Plan implementation, Roe Environmental Inc. or the District of West Vancouver (DWV) should be contacted to resolve potential issues with compliance. As release of municipal environmental security deposits are subject to DWV inspections, facilitating easy auditing by DWV is likely to save time and money, and result in full deposit return. Therefore, Roe recommends the owner should (1) retain a reputable landscape company to implement the Plan and provide "as-planted" figures, (2) consolidate and retain all documentation including plant purchase, landscaping and invasive plant removal receipts, and (3) Ensure all planted specimens are flagged (with species), or nursery tagged, and those tags remain in place until all conditions of the Development Permit are satisfied.



**1768 Argyle Avenue, DWV**  
**Environmental Development Permit Figures**

Figure 3: Riparian Restoration Plan Details		REV 02
DATE 2024-09-09	DRAWN BY A.M.	No Scale