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The District of North Vancouver

REPORT TO COUNCIL

March 15, 2017
File: 08.3060-20/044.16

AUTHOR: Erik Wilhelm, Development Planner

SUBJECT: Bylaws 8219, 8220 and 8221: OCP Amendment, Rezoning, and Housing Agreement: Townhouse Development at 1946-1998 Glenaire Drive

RECOMMENDATION:

THAT the “District of North Vancouver Official Community Plan Bylaw 7900, 2011, Amendment Bylaw 8219, 2017 (Amendment 23)” to amend the Official Community Plan (OCP) from “Residential Level 2: Detached Residential” (RES2) to “Residential Level 4: Transition Multifamily” (RES4) be given FIRST reading;

AND THAT the “District of North Vancouver Rezoning Bylaw 1350 (Bylaw 8220)” to rezone the properties at 1946, 1958, 1970, 1984 and 1998 Glenaire Drive from “Single-Family Residential 7200 Zone” (RS3) to “Comprehensive Development Zone 100” (CD100) be given FIRST reading;

AND THAT “Housing Agreement Bylaw 8221, 2017 (1946 – 1998 Glenaire Drive) be given FIRST reading;

AND THAT pursuant to Section 475 and Section 476 of the Local Government Act, additional consultation is not required beyond that already undertaken with respect to Bylaw 8219;

AND THAT in accordance with Section 477 of the Local Government Act, Council has considered Bylaw 8219 in conjunction with its Financial Plan and applicable Waste Management Plans;

AND THAT Bylaw 8219 and Bylaw 8220 be referred to a Public Hearing.

REASON FOR REPORT:

The proposed twenty-three unit townhouse project requires Council’s consideration of Bylaw 8219 to amend the Official Community Plan (OCP), Bylaw 8220 to rezone the subject properties, and Bylaw 8221 to implement the District’s Strata Rental Protection Policy.
SUMMARY:

The applicant, PC Urban Properties, proposes to redevelop five residential lots located at 1946-1998 Glenaire Drive to allow a twenty-three unit, three-storey townhouse project with onsite public pathway adjacent to the Capilano River.

Implementation of the project requires an OCP amendment, a rezoning, and a housing agreement. The OCP amendment would change the designation of the site from "Residential Level 2: Detached Residential" (RES2) to "Residential Level 4: Transition Multifamily" (RES4) in accordance with the "Lower Capilano Village Centre: Peripheral Area Housing Policy & Design Guidelines" endorsed by Council in July of 2014. Bylaw 8220 rezones the site to a new "Comprehensive Development Zone 100" (CD100) and the housing agreement bylaw would prevent future rental restrictions.

The proposal is consistent with the approved "Lower Capilano Village Centre: Peripheral Area Housing Policy and Design Guidelines" and the bylaws are recommended for introduction, with the OCP amendment and rezoning bylaw being referred to Public Hearing. The housing agreement bylaw does not require a Public Hearing.

ANALYSIS:

Site and Surrounding Area:

The development site is located on the northwest corner of Fullerton Avenue and Glenaire Drive and consists of five single family lots currently zoned "Single-Family Residential 7200 Zone" (RS3) (see adjacent aerial map). The site is bounded by Capilano River to the north (within Capilano River Regional Park) and single family lots to the west, south and east, all eligible for future redevelopment. Woodcroft apartments are located across the Capilano River and Klahanie Park is located due west of the property. The property is located within the peripheral area of Lions Gate Village Centre (see map on next page). Neighbouring properties to the west, south and east are envisioned to redevelop in a similar townhouse or other ground oriented multi-family housing format.
BACKGROUND AND EXISTING POLICY:

District of North Vancouver Council endorsed the “Lower Capilano Village Centre: Peripheral Area Housing Policy & Design Guidelines” in July of 2014. The “peripheral policy” identifies housing forms, density and design guidelines that should be followed within the peripheral area of “Lions Gate Village Centre”. The subject development site is within “Area 1” which contemplates a variety of ground-oriented multi-family housing to a maximum density of 1.2 FSR for larger sites, such as the subject site.

The site, and surrounding single family properties, are designated “Residential Level 2: Detached Residential” (RES2) in the OCP. In order to have the OCP designations coordinate with the peripheral policy, OCP amendment Bylaw 8219 (Attachment A) designates the development site “Residential Level 4: Transition Multifamily” (RES4) to allow townhouse development at a density of up to 1.2 FSR.

All redevelopment within the peripheral area of Lions Gate Village Centre requires an OCP amendment as outlined when the peripheral policy was endorsed.

The peripheral policy allows for a variety of ground-oriented housing types (such as duplex, triplex or townhouses) based on the nature of individual assemblies. This townhouse proposal, with an approximate FSR of 1.07, is consistent with the peripheral policy, and the application is one of four townhouse proposals being processed in the peripheral area.
The proposal achieves the following policy objectives:

- The three-storey townhouse development, with an FSR of 1.07, is compliant with the height and maximum density provisions of the "Lower Capilano Village Centre: Peripheral Area Housing Policy & Design Guidelines";

- The development is located within a village centre which is envisioned for redevelopment;

- The development provides more housing options for families as all units are 3 bedroom townhouse units, which are more affordable when compared to detached single-family residential; and

- The development will form part of a more compact community which will reduce the reliance on cars and promote walking, biking and transit. As well, the site is within a short walking distance to a frequent transit corridor.

Although the above is not an exhaustive list of how this development fulfils objectives of the OCP, the overarching goal of the OCP is to concentrate 75% - 90% of future development within key centres and growth within centres will allow for protection of the natural environment, decrease car dependency, and generally promote more compact communities.

PROJECT DESCRIPTION:

The development proposal is comprised of twenty-three townhouse units in three separate buildings with an approximate floor space ratio of 1.07. Units will face towards and have entrances onto Fullerton Avenue and Glenaire Drive.

The site plan on the next page shows the general siting of the proposed buildings. Each unit is provided a rear patio space which can be accessed through the unit or by the use of the onsite public pathway at the north side of the development.
All units have three bedrooms and range in size from approximately 160 sq. m. (1,726 sq. ft.) to 216 sq. m. (2,322 sq. ft.) in floor area. A total of 46 parking stalls (which includes two visitor stalls) are proposed within a gated underground parkade accessed at the western side of the development. Forty-seven secure bicycle storage spaces are proposed within the underground parkade – a bicycle storage ratio of approximately two spaces per townhouse unit. Of the 47 bicycle storage spaces, 24 will be in the form of a shared and secured room and 23 will be within individually-secured bicycle storage lockers.

As seen in the rendered images, the development includes a traditional row house architectural expression with uniform frontages and heights to create a logical consistency to the individual units. Each of the three buildings incorporates differentiated colours, mixtures of brick and varieties of cedar shingle siding.
Each individual townhouse unit has a prominent street entrance with landscaping and weather-protected stoop.

Advisory Design Panel

The development proposal was considered by the Advisory Design Panel on September 8, 2016 and the Panel recommended approval of the project subject to resolution of the Panel’s comments.

Minor design revisions, responding to the Panel comments will be identified when Council considers the required Development Permit, should the OCP amendment and rezoning proceed.

DEVELOPMENT PERMIT AREAS:

The site is currently within the Streamside Protection Development Permit Area. Bylaw 8219 designates the site as Development Permit Areas for the following purposes:

- Form and Character of Commercial, Industrial and Multi-Family Development; and

The following sections outline the objectives and compliance with the applicable Development Permit Area (DPA) guidelines:

a) Streamside Protection

As the site is adjacent to the Capilano River, a 15 m (49.2 ft) setback from top of bank is required. The development’s underground parkade encroaches marginally into the 15 m (49.2 ft) setback but overall siting allows for an increased riparian setback in select locations to offset this encroachment. According to the streamside protection assessment report submitted by the applicant’s environmental consultant, the development presents no net loss of the required riparian area protection area. As part of the development, the applicant will be required to remove invasive plant species and provide enhancements and plantings to the riparian area.
The development includes dedication of a significant portion of the site as parkland (888 sq. m. or approximately 9500 sq. ft.) as shown within the red outline below. This parkland will be incorporated into the Capilano Regional Park allowing future work by Metro Vancouver Parks and the District to implement an environmentally-sensitive riverfront trail along the Capilano River. In order to comply with riparian setbacks outlined within the streamside protection provisions of the OCP, the development site is located outside the streamside protected area and maintains an average setback of 15 metres (49 ft) from the Top of Bank.

The onsite public pathway location is denoted in green above. In the interim, the trail will link to Fullerton Avenue at the east side of the development and Glenaire Drive at the west. Upon redevelopment of the two lots to the west, the trail could be continued west into Klahanie Park. The creation of this new trail connection was identified in the peripheral policy and will create a key neighbourhood connection that will benefit the entire area (see adjacent map). Details outlining the project's compliance with the Streamside Protection Guidelines will be provided for Council's
consideration at the Development Permit stage should the OCP amendment and rezoning proceed.

b) Form and Character – Ground-Oriented Housing

The proposal is in keeping with the OCP’s “Design Guidelines for Ground-Oriented Housing” as well as the “Lower Capilano Village Centre: Peripheral Area Housing Policy & Design Guidelines”. Further details outlining the project’s compliance with the Form and Character Design Guidelines will be provided for Council’s consideration at the Development Permit stage should the OCP amendment and rezoning proceed.

c) Energy and Water Conservation and Greenhouse Gas Emission Reduction

Compliance with the District’s Green Building Strategy is mandatory given the proposed rezoning. The development must meet the equivalent of a “Gold” standard of any certified sustainability program available in British Columbia.

Further details outlining the project’s compliance with the Energy and Water Conservation and Greenhouse Gas Emission Reduction DPA will be provided for Council’s consideration at the Development Permit stage should the OCP amendment and rezoning proceed.

Vehicle Parking and Bicycle Storage

Vehicle parking is provided in a single-level underground garage with access from Glenaire Drive at the west end of the development. A total of 46 vehicle parking stalls are proposed which provides 2 stalls per unit, inclusive of two visitor stalls.

The required boulevard and sidewalk improvements will allow for two ‘parking pockets’ which will allow for on-street parking for approximately seven vehicles on the north side of Glenaire Drive.

Forty-Seven secure bicycle storage spaces within the underground parkade are proposed: 24 within a shared and secured room and 23 as individually-secured bicycle storage lockers.

On-site Landscaping

Landscaping on-site is designed to be low-maintenance and to feature native plantings. Street trees are proposed along Glenaire Drive and Fullerton Avenue in addition to the on-site trees and landscaping provided. Rear patios for each unit will utilize large paving stones, cedar privacy fencing and large landscape planters. Each rear patio will allow access to and from the onsite public pathway within the townhouse project.

Off-site improvements

The application includes upgrades to sidewalks, street trees, curb, gutter, and lighting along the Fullerton Avenue and Glenaire Drive frontages of the development site. The riparian area will have invasive species removed and planting enhancement provided. The developer will
be responsible for building the on-site public trail and the District will secure rights for the public pathway through a statutory right-of-way.

**Accessibility**

As part of the development permit process, the applicant will submit a checklist which identifies how the development attains the requirements of the District's "Accessible Design Policy for Multi-Family Housing". In accordance with the policy, all units will provide “basic accessible design elements” and one unit will have “enhanced accessible design elements”, such as stair lifts, to provide a higher level of accessibility.

**Zoning**

The site is currently zoned “Single-Family Residential 7,200 Zone” (RS3). Bylaw 8220 (Attachment B) proposes to rezone the site and create a new “Comprehensive Development Zone 100” (CD100) to accommodate the proposed twenty-three unit townhouse development.

This new zone:

- establishes ground-oriented multiple family residential use as a permitted use;
- limits the number of units to 23;
- limits the FSR to a maximum of 1.07;
- establishes a maximum building height of 13.2 m (43.5 ft);
- sets building coverage at a maximum of 49%;
- sets site coverage at a maximum of 51%;
- establishes acoustic performance requirements;
- requires the provision of 46 parking stalls;
- establishes a minimum drive aisle width; and
- establishes the following building setbacks
  - Front Setback (Glenaire Drive): 3.05 metres (10 ft);
  - West Side Yard Setback: 1.83 metres (6 ft);
  - East Side Yard Setback (Fullerton Avenue): 3.05 metres (10 ft); and
  - Rear Yard Setback: 7.31 m (24 ft) except for proposed Building 3 which would have a setback of 2.44 m (8 ft).

**Acoustic Regulations**

The proposed CD100 zone includes the District’s residential acoustic regulations for maximum noise levels in bedrooms, living areas and other areas of the residential units where units front a roadway.

**Strata Rental Protection Policy**

Corporate Policy 8-3300-2 “Strata Rental Protection Policy” applies to this project as the rezoning application would permit development of more than five residential units. The policy requires a Housing Agreement to ensure that future strata bylaws do not prevent owners
from renting their units. Bylaw 8221 (Attachment C) authorizes a Housing Agreement to implement this policy.

**Construction Traffic Management Plan (CTMP)**

The adjacent map indicates the development site in relation to other approved construction projects and potential development projects in the area.

In order to reduce the development's impact on pedestrian and vehicular movements in the area, the applicant in conjunction with the other developers in the area, has submitted a comprehensive and coordinated Construction Traffic Management Plan (CTMP).

The following outlines the primary components of the Construction Traffic Management Plan (CTMP) for the Lions Gate peripheral area:

**Construction Traffic Management Coordinator:**

From demolition to completion, one coordinator will be appointed by the four area developers (PC Urban, Cressey, Citimark and Woodbridge Properties) to coordinate all construction traffic for the Lions Gate Village Centre area. If multiple developments are approved in the area, this coordinator would be expected to treat the Lions Gate peripheral area as a single construction project, rather than separate projects.

The construction traffic management coordinator will be required to meet with District staff bi-weekly in order to provide updates to the District and to discuss and resolve any improvements/complications that arise.

The benefits of a single coordinator are outlined below:

- **Communication**
  
  The District of North Vancouver (and developers) will receive single-source, regular, professional and transparent communication about site-wide activities, rather than
multiple separate reports that may not be as inclusive as necessary for the Lions Gate Village Centre area. Community notices, signs and website are some of the tools anticipated to be used to ensure good neighbourhood communication.

- **Coordination**
  All construction activities (phases of construction, deliveries, major on-site activities, etc.) will be coordinated centrally, rather than having individual contractors needing to coordinate or compete with one another.

- **Accountability**
  There will be a single point of accountability for the entire area if there are any logistical or scheduling issues.

**Miscellaneous:**

In addition to a coordinated approach to construction management, the following elements will form part of the construction management approach for the Lions Gate peripheral area:

A. Three traffic cameras will be provided at key intersections in the area to assist with real time monitoring and enforcement of traffic movements in the area. After completion of all construction, these traffic cameras would be owned and operated by the District; and

B. Each development site is required to provide a $100,000 “Construction Traffic Management” deposit with the deposit used to cover any enforcement ticketing from the District. The deposit creates a financial incentive for the developer (and CTMP coordinator) to ensure efficient traffic flows, enforcement of parking and construction vehicle routing in the area; and

C. Any use of District road (typically for concrete pumping trucks during foundation construction) requires a Highway Use Permit issued by the District to offer further District control over the sequencing of construction.

In summary, the construction traffic management plan will:

1. Provide safe passage for pedestrians, cyclists, and vehicle traffic;
2. Outline roadway efficiencies (i.e. location of traffic management signs and flaggers);
3. Make provisions for trade vehicle parking which is acceptable to the District and minimizes impacts to neighbourhoods;
4. Provide a point of contact for all calls and concerns;
5. Provide a sequence and schedule of construction activities;
6. Identify methods of sharing construction schedule with other developments in the area;
7. Ascertain a location for truck marshalling;
8. Address silt/dust control and cleaning up from adjacent streets;
9. Provide a plan for litter clean-up and street sweeping adjacent to site; and,
10. Include a communication plan to notify surrounding businesses and residents.
**Vehicle Traffic Generation & Follow-up Report:**

The developer's transportation consultant has submitted a traffic analysis report which identifies the potential traffic generated from the development and in the area. Utilizing background traffic data, the report forecasts surrounding traffic in the area for the years 2019 and 2030. The report provides a comprehensive review of the Lions Gate Village Centre Area and provides estimations of traffic generation with assumed densities as outlined in the OCP and peripheral area policy.

The subject townhouse development is forecast to generate approximately 11 vehicle trips in the "AM Peak Hour" and 13 vehicle trips in the "PM Peak Hour". By contrast, the five existing single-family lots would generate approximately 5 vehicle trips in the "PM Peak Hour", for a net increase of 8 vehicle trips in the PM Peak Hour.

The developer will be required to provide a post-development traffic and parking analysis (after 6 months of the development being fully-occupied) in order to review the traffic movements in the area and to analyse the use of on-site parking. The post-development traffic and parking analysis report will afford the District improved information on vehicle movements in the area, on-site and on-street parking demand, as well as use of on-site bicycle parking facilities.

The District's Transportation Department has reviewed the submitted traffic analysis report and finds that the development will not unduly affect traffic within the Lions Gate Village Centre area and supports the requirement for a post-development traffic and parking analysis report.

**Public Input:**

The applicant held a facilitated Public Information Meeting (PIM) on October 18, 2016 and the meeting was attended by approximately 51 members of the public. A copy of the PIM "summary report" from the meeting's facilitator is attached as Attachment D. Comments submitted included the following primary topics:

- increased traffic on the North Shore generally;
- construction traffic management and timing concerns;
- support for a riverfront trail;
- cost of housing within the development; and
- accessibility of the units.

**COMMUNITY AMENITY CONTRIBUTIONS:**

As the subject property requires rezoning, a community amenity contribution (CAC) has been calculated in the amount of $121,581.00 in accordance with District CAC policy at the date of application. The CD100 zone specifies this amount in order to achieve the maximum density of 1.07 FSR and outlines projects to which the CAC may be applied, including park, trail, environmental, public art or other public realm improvements municipal or recreation service or facility improvements (in the Lions Gate Village Centre area) and/or affordable housing.
AFFORDABLE HOUSING:

In accordance with the District’s Rental and Affordable Housing Strategy, the development will expand the supply and diversity of housing in the Lions Gate Village Centre. As stated within the strategy, “Increased supply of housing in centres will add diverse multi-family housing choices (type, tenure, unit sizes etc.) for District residents, and encourage competitive pricing for homes”.

The developer will be providing a CAC which could be used toward affordable housing objectives in accordance with the Rental and Affordable Housing Strategy.

CONCURRENCE:

Staff:

The project has been reviewed by Building, Parks, Engineering and Transportation, Urban Design Planning, Real Estate and Properties, Public Art and Fire Prevention staff and staff’s recommendations, throughout the development process have been incorporated, to improve the development.

Metro Vancouver Parks:

Metro Vancouver Parks staff has been working with District staff to coordinate the intergovernmental requirements to implement an environmentally-sensitive trail adjacent to the Capilano River. Generally, Metro Vancouver Parks is supportive of the development proposal as the land dedicated to the Capilano River Regional Park is a unique opportunity to gain the extension of the riverfront trail along the Capilano River. Metro Vancouver Parks will ultimately own the parkland and potential future trail, and would be responsible for the ongoing maintenance of the trail.

School District 44 (SD44):

SD44 is currently reviewing the District’s OCP and the projected densities throughout the District. School and District staff recently identified that this family-oriented townhouse proposal does not adversely affect their interests.

Norgate Community Elementary School and Capilano Elementary School are each within approximately 1.2 kilometres of the Lions Gate Village peripheral area and the development site, and can accommodate the students anticipated from the development.

CONCLUSION:

The OCP amendment and rezoning proposal for a twenty-three unit townhouse development is in conformity with the “Lower Capilano Village Centre: Peripheral Area Housing Policy & Design Guidelines”, applicable development permit guidelines, and the general housing objectives for the Lions Gate Village Centre area. The proposal creates a choice of housing suitable for families within a compact community which encourages walking, biking, and use of transit. Bylaws 8219, 8220, and 8221 are ready for Council consideration.
OPTIONS:

The following options are available for Council's consideration:

1. Introduce Bylaws 8219, 8220, and 8221 and refer Bylaw 8219 and 8220 to a Public Hearing (staff recommendation); or

2. Defeat the bylaws at First Reading.

Erik Wilhelm
Development Planner

Attachments:

A. Bylaw 8219 – OCP Amendment Bylaw
B. Bylaw 8220 – Rezoning Bylaw
C. Bylaw 8186 – Housing Agreement Bylaw
D. Public Information Meeting – Facilitator Summary Report
The Corporation of the District of North Vancouver

Bylaw 8219

A bylaw to amend The District of North Vancouver Official Community Plan Bylaw 7900, 2011

The Council for The Corporation of the District of North Vancouver enacts as follows:

1. Citation

This bylaw may be cited as “District of North Vancouver Official Community Plan Bylaw 7900, 2011, Amendment Bylaw 8219, 2017 (Amendment 23)”.

2. Amendments

2.1 District of North Vancouver Official Community Plan Bylaw 7900, 2011, is amended as follows:

   a) Map 2 Land Use: as illustrated on Schedule A, by changing the land use designation of the properties on Map 2 from “Residential Level 2: Detached Residential” (RES2) to “Residential Level 4: Transition Multifamily” (RES4);

   b) Map 3.1 Form and Character Development Permit Area: as illustrated on Schedule B, by adding the properties to Map 3.1, designating them as a Development Permit Area for Form and Character of Commercial, Industrial and Multifamily Development; and,

   c) Map 4.1 Energy and Water Conservation and GHG Emission Reduction Development Permit Area: as illustrated on Schedule B, by adding the properties to Map 4.1, designating them as a Development Permit Area for Energy and Water Conservation and Greenhouse Gas Reduction.

READ a first time by a majority of all Council members.

PUBLIC HEARING held

READ a second time by a majority of all Council members.

READ a third time by a majority of all Council members.

ADOPTED by a majority of all Council members.
Mayor

Certified a true copy

Municipal Clerk
Schedule A to Bylaw 8219

BYLAW 8219
The District of North Vancouver Official Community Plan Bylaw 7900, 2011, Amendment Bylaw 8219, 2017 (Amendment 23)

Map 2 Land Use: as illustrated on Schedule A, by changing the land use designation of the properties on Map 2 from Residential Level 2: Detached Residential to Residential Level 4: Transition Multifamily
Schedule B to Bylaw 8219

BYLAW 8219
The District of North Vancouver Official Community Plan Bylaw 7900, 2011,
Amendment Bylaw 8219, 2017 (Amendment 23)

Map 3.1 Form and Character Development Permit Area: as illustrated on Schedule B, by adding the properties to Map 3.1, designating them as a Form and Character of Commercial, Industrial and Multifamily Development Permit Area.

Map 4.1 Energy and Water Conservation and GHG Emission Reduction Development Permit Area: as illustrated on Schedule B, by adding the properties to Map 4.1, designating them as an Energy and Water Conservation and Greenhouse Gas Reduction Development Permit Area.
The Corporation of the District of North Vancouver

Bylaw 8220

A bylaw to amend District of North Vancouver Zoning Bylaw 3210, 1965

The Council for The Corporation of the District of North Vancouver enacts as follows:

1. Citation

This bylaw may be cited as "The District of North Vancouver Rezoning Bylaw 1350 (Bylaw 8220)".

2. Amendments

2.1 District of North Vancouver Zoning Bylaw 3210, 1965 is amended as follows:

Section 301(2) by inserting the following zoning designation in numeric sequence:

"Comprehensive Development Zone CD100"

2.2 Part 4B by inserting the following:

"4B100 Comprehensive Development Zone 100 (CD100)"

4B100-1 Intent:

The purpose of the CD100 zone is to establish specific land use and development regulations for a 23 unit townhouse development.

4B100-2 Uses:

The following principal uses are permitted in the Comprehensive Development 100 Zone:

(a) Uses Permitted without Conditions:

(i) Residential building, multifamily townhouse

For the purposes of this CD100 Zone, "Residential building, multifamily townhouse" means a building having not more than three residential storeys and consisting of two or more dwelling units with individual, exterior access to grade above an underground parkade.
(b) Conditional Uses

Not applicable

4B100-3 Conditions of Use:

Not applicable

4B100-4 Accessory Use:

(a) Accessory uses are permitted and are limited to:

(i) Home occupations in accordance with the regulations in Section 405 of this Bylaw

4B100-5 Density:

(a) The maximum permitted density in the CD100 Zone is limited to a floor space ratio (FSR) of 0.45 and a maximum number of 5 units, inclusive of any density bonus for energy performance; and

(b) For the purposes of calculating floor space ratio, the area of underground parking garages, which includes: drive aisles, electrical/mechanical rooms, garbage and recycling collection areas, bicycle storage areas, and general storage areas is exempted.

4B100-6 Amenities:

Despite subsection 4B100-5, density in the CD100 Zone is increased to a maximum floor space of 3,926 m² (42,257 sq. ft.) and a maximum number of 23 units, inclusive of any density bonus for energy performance, if the owner:

1. Contributes $121,581 to the municipality to be used for any or all of the following amenities (with allocation to be determined by the municipality in its sole discretion): public art, park, trail, environmental or other public realm improvements; municipal or recreation service or facility improvements within the Lions Gate Village Centre area, and/or affordable housing; and

2. Enters into a Housing Agreement requiring a rental disclosure statement to be filed and prohibiting any strata bylaw or regulation establishing rental restrictions.

4B100-7 Maximum Principal Building Size:

Not applicable.
4B100-8 Setbacks:

(a) Buildings must be set back from property lines to the closest building face, excluding any partially exposed underground parking structure and upper floor encroachments not to exceed 0.6 m (2.0 ft) in depth, in accordance with the following regulations:

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<th>Location</th>
<th>Minimum Required Setback</th>
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<tr>
<td>Front Yard (from Glenaire Drive)</td>
<td>3.05 m (10 ft)</td>
</tr>
<tr>
<td>Rear Yard</td>
<td>7.31 m (24 ft) except in the easterly 19.5 m (64 feet) of the property where the required setback may be reduced to 2.44 m (8 ft)</td>
</tr>
<tr>
<td>West Side Yard</td>
<td>1.83 m (6 ft)</td>
</tr>
<tr>
<td>East Side Yard (from Fullerton Avenue)</td>
<td>3.05 m (10 ft)</td>
</tr>
</tbody>
</table>

4B100-9 Building Orientation:

Not applicable.

4B100-10 Building Depth and Width:

Not applicable.

4B100-11 Coverage:

a) Maximum permitted Building Coverage is 49%

b) Maximum permitted Site Coverage is 51%.

4B100-12 Height:

a) Maximum permitted Height is 13.2 meters (43.3 ft).

4B100-13 Acoustic Requirements:

In the case of residential purposes, a development permit application shall require evidence in the form of a report and recommendations prepared by persons trained in acoustics and current techniques of noise measurements, demonstrating that the noise levels in those portions of the dwelling listed below shall not exceed the noise levels expressed in decibels set opposite such portions of the dwelling units:
<table>
<thead>
<tr>
<th>Portion of Dwelling Unit</th>
<th>Noise Level (Decibels)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bedrooms</td>
<td>35</td>
</tr>
<tr>
<td>Living and Dining rooms</td>
<td>40</td>
</tr>
<tr>
<td>Kitchen, Bathrooms and Hallways</td>
<td>45</td>
</tr>
</tbody>
</table>

4B100-14 Landscaping:

a) All land areas not occupied by buildings, structures, parking spaces, loading spaces, driveways, manoeuvring aisles and sidewalks shall be landscaped or finished in accordance with an approved landscape plan; and

b) All electrical kiosks and garbage and recycling container pads not located underground or within a building shall be screened with landscaping or fencing in accordance with an approved landscape plan.

4B100-15 Subdivision Requirements

Within the CD100 zone, the Minimum Lot Area must be at least 2,601 sq. m. (27,997 sq. ft.).

4B100-16 Additional Accessory Structure Regulations

Not applicable.

4B100-17 Parking and Loading Regulations:

(a) Parking shall be provided at a ratio of 2 parking spaces per unit inclusive of designated parking spaces for visitors and parking spaces for persons with disabilities;

(b) Vehicular drive aisles shall be no less than 6.88 m (22.6 ft) wide;

(c) A minimum of 47 Class 1 bicycle parking spaces (secured within a shared bike storage area or individual bicycle storage areas) shall be provided;

2.2 The Zoning Map is amended in the case of the lands in Schedule A, by rezoning the land outlined and noted as “site” from Residential Single Family Residential 7200 Zone (RS3) to Comprehensive Development 100 Zone (CD100)."

READ a first time

PUBLIC HEARING held

READ a second time

READ a third time
Certified a true copy of "Rezoning Bylaw 1350 (Bylaw 8220)" as at Third Reading

__________________________
Municipal Clerk

APPROVED by the Ministry of Transportation and Infrastructure on

ADOPTED

__________________________  __________________________
Mayor                                Municipal Clerk

Certified a true copy

__________________________
Municipal Clerk
Schedule A to Bylaw 8220

Site to be rezoned from RS3 to CD100

Klahanie Park
The Corporation of the District of North Vancouver

Bylaw 8221

A bylaw to enter into a Housing Agreement (1946 – 1998 Glenaire Drive)

The Council for The Corporation of the District of North Vancouver enacts as follows:

1. Citation

This bylaw may be cited as “Housing Agreement Bylaw 8221, 2017 (1946 – 1998 Glenaire Drive)”.

2. Authorization to Enter into Agreement

2.1 The Council hereby authorizes a housing agreement between The Corporation of the District of North Vancouver and 1998 Glenaire Holdings Ltd., Inc. No. BC1054719 substantially in the form attached to this Bylaw as Schedule “A” with respect to the following lands:

a) 009-870-253 Lot 2 Block 16 District Lot 764 Plan 8967
b) 009-870-261 Lot 3 Block 16 District Lot 764 Plan 8967
c) 009-870-270 Lot 4 Block 16 District Lot 764 Plan 8967
d) 009-870-296 Lot 5 Block 16 District Lot 764 Plan 8967
e) 009-870-300 Lot 6 Block 16 District Lot 764 Plan 8967

3. Execution of Documents

The Mayor and Municipal Clerk are authorized to execute any documents required to give effect to the Housing Agreement.

READ a first time

READ a second time

READ a third time

ADOPTED

Mayor

Municipal Clerk
Certified a true copy

Municipal Clerk
Schedule A to Bylaw 8221

SECTION 219 COVENANT – HOUSING AGREEMENT

This agreement is dated for reference the ___ day of __________, 20___

BETWEEN:

1998 GLENAIRE HOLDINGS LTD. (Inc. No. BC1054719), 880 – 1090 West Georgia Street, Vancouver, BC V6E 3V7

(the “Developer”)

AND:

THE CORPORATION OF THE DISTRICT OF NORTH VANCOUVER, a municipality incorporated under the Local Government Act, RSBC 2015, c.1 and having its office at 355 West Queens Road, North Vancouver, BC V7N 4N5

(the “District”)

WHEREAS:

1. The Developer is the registered owner of the Lands (as hereinafter defined);

2. The Developer wishes to obtain development permissions with respect to the Lands and wishes to create a condominium development which will contain residential strata units on the Lands;

3. Section 483 of the Local Government Act authorises the District, by bylaw, to enter into a housing agreement to provide for the prevention of rental restrictions on housing, and provides for the contents of the agreement; and

4. Section 219 of the Land Title Act (British Columbia) permits the registration in favour of the District of a covenant of a negative or positive nature relating to the use of land or a building thereon, or providing that land is to be built on in accordance with the covenant, or providing that land is not to be built on except in accordance with the covenant, or providing that land is not to be subdivided except in accordance with the covenant;

NOW THEREFORE in consideration of the mutual promises contained in it, and in consideration of the payment of $1.00 by the District to the Developer (the receipt and sufficiency of which are hereby acknowledged by the Developer), the parties covenant and agree with each other as follows, as a housing agreement under Section 483 of the Local Government Act, as a contract and a deed under seal between the parties, and as a covenant under Section 219 of the Land Title Act, and the Developer hereby further covenants and agrees that neither the Lands nor any building constructed thereon shall be used or built on except in accordance with this Agreement:
1. **DEFINITIONS**

1.01 Definitions

In this agreement:

(a) "Development Permit" means development permit No. ______ issued by the District;

(b) "Lands" means land described in Item 2 of the Land Title Act Form C to which this agreement is attached;

(c) "Owner" means the Developer and any other person or persons registered in the Lower Mainland Land Title Office as owner of the Lands from time to time, or of any parcel into which the Lands are consolidated or subdivided, whether in that person's own right or in a representative capacity or otherwise;

(d) "Proposed Development" means the proposed development containing not more than 23 units to be constructed on the Lands in accordance with the Development Permit;

(e) "Short Term Rentals" means any rental of a Unit for any period less than 30 days;

(f) "Strata Corporation" means the strata corporation formed upon the deposit of a plan to strata subdivide the Proposed Development pursuant to the Strata Property Act;

(g) "Unit" means a residential dwelling strata unit in the Proposed Development; and

(h) "Unit Owner" means the registered owner of a Dwelling Unit in the Proposed Development.

2. **TERM**

This Agreement will commence upon adoption by District Council of Bylaw 8221 and remain in effect until terminated by the District as set out in this Agreement.

3. **RENTAL ACCOMODATION**

3.01 Rental Disclosure Statement

No Unit in the Proposed Development may be occupied unless the Owner has:

(a) before the first Unit is offered for sale, or conveyed to a purchaser without being offered for sale, filed with the Superintendent of Real Estate a rental disclosure statement in the prescribed form (the “Rental Disclosure Statement”) designating all of the Units as rental strata lots and imposing at least a 99 year rental period in relation to all of the Units pursuant to the Strata Property Act (or any successor or replacement legislation), except in relation to Short Term Rentals and, for greater certainty, stipulating specifically that the 99 year rental restriction does not apply to a Strata Corporation bylaw prohibiting or restricting Short Term Rentals; and
(b) given a copy of the Rental Disclosure Statement to each prospective purchaser of any Unit before the prospective purchaser enters into an agreement to purchase in respect of the Unit. For the purposes of this paragraph 3.01(b), the Owner is deemed to have given a copy of the Rental Disclosure Statement to each prospective purchaser of any Unit in the building if the Owner has included the Rental Disclosure Statement as an exhibit to the disclosure statement for the Proposed Development prepared by the Owner pursuant to the Real Estate Development Marketing Act.

3.02 Rental Accommodation

The Units constructed on the Lands from time to time may always be used to provide rental accommodation as the Owner or a Unit Owner may choose from time to time, except that this section 3.02 does not apply to Short Term Rentals which may be restricted by the Strata Corporation to the full extent permitted by law.

3.03 Binding on Strata Corporation

This agreement shall be binding upon all Strata Corporations created by the subdivision of the Lands or any part thereof (including the Units) pursuant to the Strata Property Act, and upon all Unit Owners.

3.04 Strata Bylaw Invalid

Any Strata Corporation bylaw which prevents, restricts or abridges the right to use any of the Units as rental accommodations (other than Short Term Rentals) shall have no force or effect.

3.05 No Bylaw

The Strata Corporation shall not pass any bylaws preventing, restricting or abridging the use of the Lands, the Proposed Development or the Units contained therein from time to time as rental accommodation (other than Short Term Rentals).

3.06 Vote

No Unit Owner, nor any tenant or mortgagee thereof, shall vote for any Strata Corporation bylaw purporting to prevent, restrict or abridge the use of the Lands, the Proposed Development or the Units contained therein from time to time as rental accommodation (other than Short Term Rentals).

3.07 Notice

The Owner will provide notice of this Agreement to any person or persons intending to purchase a Unit prior to any such person entering into an agreement of purchase and sale, agreement for sale, or option or similar right to purchase as part of the disclosure statement for any part of the Proposed Development prepared by the Owner pursuant to the Real Estate Development Marketing Act.
3.08 Release of Covenant

The District agrees that if the District of North Vancouver Rezoning Bylaw 1350 (Bylaw 8220), is not adopted by the District's Council before September 30th, 2017, the Owner is entitled to require the District to execute and deliver to the Owner a discharge, in registrable form, of this Agreement from title to the Land. The Owner is responsible for the preparation of the discharge under this section and for the cost of registration at the Land Title Office.

4. DEFAULT AND REMEDIES

4.01 Notice of Default

The District may, acting reasonably, give to the Owner written notice to cure a default under this Agreement within 30 days of delivery of the notice. The notice must specify the nature of the default. The Owner must act with diligence to correct the default within the time specified.

4.02 Costs

The Owner will pay to the District upon demand all the District's costs of exercising its rights or remedies under this Agreement, on a full indemnity basis.

4.03 Damages an Inadequate Remedy

The Owner acknowledges and agrees that in the case of a breach of this Agreement which is not fully remediable by the mere payment of money and promptly so remedied, the harm sustained by the District and to the public interest will be irreparable and not susceptible of adequate monetary compensation.

4.04 Equitable Remedies

Each party to this Agreement, in addition to its rights under this Agreement or at law, will be entitled to all equitable remedies including specific performance, injunction and declaratory relief, or any of them, to enforce its rights under this Agreement.

4.05 No Penalty or Forfeiture

The Owner acknowledges and agrees that it is entering into this Agreement to benefit the public interest in providing rental accommodation, and that the District's rights and remedies under this Agreement are necessary to ensure that this purpose is carried out, and the District's rights and remedies under this Agreement are fair and reasonable and ought not to be construed as a penalty or forfeiture.

4.06 Cumulative Remedies

No reference to nor exercise of any specific right or remedy under this Agreement or at law or at equity by any party will prejudice, limit or preclude that party from exercising any other right or remedy. No right or remedy will be exclusive or dependent upon any other right to remedy, but any party, from time to time, may exercise any one or more of such rights or remedies independently, successively, or in combination. The Owner acknowledges that specific
performance, injunctive relief (mandatory or otherwise) or other equitable relief may be the only adequate remedy for a default by the Owner under this Agreement.

5. LIABILITY

5.01 Indemnity

Except if arising directly from the negligence of the District or its employees, agents or contractors, the Owner will indemnify and save harmless each of the District and its board members, officers, directors, employees, agents, and elected or appointed officials, and their heirs, executors, administrators, personal representatives, successors and assigns, from and against all claims, demands, actions, loss, damage, costs and liabilities that all or any of them will or may be liable for or suffer or incur or be put to any act or omission by the Owner or its officers, directors, employees, agents, contractors, or other persons for whom the Owner is at law responsible, or by reason of or arising out of the Owner's ownership, operation, management or financing of the Proposed Development or any part thereof.

5.02 Release

The Owner hereby releases and forever discharges the District, its elected officials, board members, officers, directors, employees and agents, and its and their heirs, executors, administrators, personal representatives, successors and assigns from and against all claims, demands, damages, actions or causes of action by reason of or arising out of advice or direction respecting the ownership, operation or management of the Proposed Development or any part thereof which has been or hereafter may be given to the Owner by all or any of them.

5.03 Survival

The covenants of the Owner set out in Sections 5.01 and 5.02 will survive termination of this Agreement and continue to apply to any breach of the Agreement or claim arising under this Agreement during the ownership by the Owner of the Lands or any Unit therein, as applicable.

6. GENERAL PROVISIONS

6.01 District's Power Unaffected

Nothing in this Agreement:

(a) affects or limits any discretion, rights, powers, duties or obligations of the District under any enactment or at common law, including in relation to the use or subdivision of land;

(b) affects or limits any enactment relating to the use of the Lands or any condition contained in any approval including any development permit concerning the development of the Lands; or

(c) relieves the Owner from complying with any enactment, including the District's bylaws in relation to the use of the Lands.
6.02 Agreement for Benefit of District Only

The Owner and District agree that:

(a) this Agreement is entered into only for the benefit of the District:

(b) this Agreement is not intended to protect the interests of the Owner, any Unit Owner, any occupant of any Unit or any future owner, occupier or user of any part of the Proposed Development, including any Unit, or the interests of any third party, and the District has no obligation to anyone to enforce the terms of this Agreement; and

(c) The District may at any time terminate this Agreement, in whole or in part, and execute a release and discharge of this Agreement in respect of the Proposed Development or any Unit therein, without liability to anyone for doing so.

6.03 Agreement Runs With the Lands

This Agreement burdens and runs with the Lands and any part into which any of them may be subdivided or consolidated, by strata plan or otherwise. All of the covenants and agreements contained in this Agreement are made by the Owner for itself, its successors and assigns, and all persons who acquire an interest in the Lands or in any Unit after the date of this Agreement.

6.04 Release

The covenants and agreements on the part of the Owner and any Unit Owner and herein set forth in this Agreement have been made by the Owner and any Unit Owner as contractual obligations as well as being made pursuant to Section 483 of the Local Government Act (British Columbia) and as such will be binding on the Owner and any Unit Owner, except that neither the Owner nor any Unit Owner shall be liable for any default in the performance or observance of this Agreement occurring after such party ceases to own the Lands or a Unit as the case may be.

6.05 Priority of This Agreement

The Owner will, at its expense, do or cause to be done all acts reasonably necessary to ensure this Agreement is registered against the title to each Unit in the Proposed Development, including any amendments to this Agreement as may be required by the Land Title Office or the District to effect such registration.

6.06 Agreement to Have Effect as Deed

The District and the Owner each intend by execution and delivery of this Agreement to create both a contract and a deed under seal.

6.07 Waiver

An alleged waiver by a party of any breach by another party of its obligations under this Agreement will be effective only if it is an express waiver of the breach in writing. No waiver of a
breach of this Agreement is deemed or construed to be a consent or waiver of any other breach of this Agreement.

6.08 Time

Time is of the essence in this Agreement. If any party waives this requirement, that party may reinstate it by delivering notice to another party.

6.09 Validity of Provisions

If a Court of competent jurisdiction finds that any part of this Agreement is invalid, illegal, or unenforceable, that part is to be considered to have been severed from the rest of this Agreement and the rest of this Agreement remains in force unaffected by that holding or by the severance of that part.

6.10 Extent of Obligations and Costs

Every obligation of a party which is set out in this Agreement will extend throughout the Term and, to the extent that any obligation ought to have been observed or performed prior to or upon the expiry or earlier termination of the Term, such obligation will survive the expiry or earlier termination of the Term until it has been observed or performed.

6.11 Notices

All notices, demands, or requests of any kind, which a party may be required or permitted to serve on another in connection with this Agreement, must be in writing and may be served on the other parties by registered mail or by personal service, to the following address for each party:

If to the District:

District Municipal Hall
355 West Queens Road
North Vancouver, BC V7N 4N5

Attention: Planning Department

If to the Owner:

If to the Unit Owner:

The address of the registered owner which appears on title to the Unit at the time of notice.

Service of any such notice, demand, or request will be deemed complete, if made by registered mail, 72 hours after the date and hour of mailing, except where there is a postal service disruption during such period, in which case service will be deemed to be complete only upon
actual delivery of the notice, demand or request and if made by personal service, upon personal
service being effected. Any party, from time to time, by notice in writing served upon the other
parties, may designate a different address or different or additional persons to which all notices,
demands, or requests are to be addressed.

6.12 Further Assurances

Upon request by the District, the Owner will promptly do such acts and execute such documents
as may be reasonably necessary, in the opinion of the District, to give effect to this Agreement.

6.13 Enuring Effect

This Agreement will enure to the benefit of and be binding upon each of the parties and their
successors and permitted assigns.

7. INTERPRETATION

7.01 References

Gender specific terms include both genders and include corporations. Words in the singular
include the plural, and words in the plural include the singular.

7.02 Construction

The division of this Agreement into sections and the use of headings are for convenience of
reference only and are not intended to govern, limit or aid in the construction of any provision.
In all cases, the language in this Agreement is to be construed simply according to its fair
meaning, and not strictly for or against either party.

7.03 No Limitation

The word “including” when following any general statement or term is not to be construed to
limit the general statement or term to the specific items which immediately follow the general
statement or term similar items whether or not words such as “without limitation” or “but not
limited to” are used, but rather the general statement or term is to be construed to refer to all
other items that could reasonably fall within the broadest possible scope of the general
statement or term.

7.04 Terms Mandatory

The words “must” and “will” and “shall” are to be construed as imperative.

7.05 Statutes

Any reference in this Agreement to any statute or bylaw includes any subsequent amendment,
re-enactment, or replacement of that statute or bylaw.
7.06 **Entire Agreement**

(d) This is the entire agreement between the District and the Owner concerning its subject, and there are no warranties, representations, conditions or collateral agreements relating to this Agreement, except as included in this Agreement.

(e) This Agreement may be amended only by a document executed by the parties to this Agreement and by bylaw, such amendment to be effective only upon adoption by District Council of a bylaw to amend Bylaw 8221.

7.07 **Governing Law**

This Agreement is to be governed by and construed and enforced in accordance with the laws of British Columbia.

As evidence of their agreement to be bound by the terms of this instrument, the parties hereto have executed the *Land Title Act Form C* that is attached hereto and forms part of this Agreement.
GRANT OF PRIORITY

WHEREAS __________________ (the "Chargeholder") is the holder of the following charge which is registered in the Land Title Office:

(a) __________________ (the "Charge");

AND WHEREAS the Chargeholder agrees to allow the Section 219 Covenant herein to have priority over the Charge;

THIS PRIORITY AGREEMENT is evidence that in consideration of the sum of $1.00 paid by THE CORPORATION OF THE DISTRICT OF NORTH VANCOUVER (the "District") to the Chargeholder, the receipt and sufficiency of which are hereby acknowledged, the Chargeholder covenants and agrees to subordinate and postpone all its rights, title and interest in and to the lands described in the Form C to which this Agreement is attached (the "Lands") with the intent and with the effect that the interests of the District rank ahead of the Charge as though the Section 219 Covenant herein had been executed, delivered and registered against title to the Lands before registration of the Charge.

As evidence of its Agreement to be bound by the above terms, as a contract and as a deed executed and delivered under seal, the Chargeholder has executed the Form C to which this Agreement is attached and which forms part of this Agreement.
PUBLIC INFORMATION MEETING REPORT

To: Robert Cadez, PC Urban Properties Corp. E: rcadez@pcurban.ca
Erik Wilhelm, Planner, District of North Vancouver. E: ewilhelm@dnv.org

From: Catherine Rockandel, IAF Certified Professional Facilitator, Rockandel & Associates
Tel: 1-604-898-4614 E: cat@growpartnerships.com

Re: Public Information Meeting Summary for PC Urban 1900 Block Glenaire Drive Project

Date: October 25, 2016

Event Date: Tuesday, October 18, 2016
Time: 6:00 PM – 8:30 PM
Location: Grouse Inn, 1633 Capilano Road, North Vancouver
Attendees: Fifty-one (51) members of the public

Notification
Flyer Invitation
Invitation packages were distributed to residents within a 75-metre radius of the site.

Site Signs
There was one standard PIM signs erected on the site during the week of October 3rd, 2016
notifying the community of the meeting as per District of North Vancouver requirements.

Newspaper Advertisement
Two (2) advertisements were placed in the North Shore News, on October 10th & 12, 2016

Attendees: (51) people signed in for the Public Information Meeting. In addition, the following
project team members, and District of North Vancouver staff were in attendance.

District of North Vancouver
Erik Wilhelm, Planner, District of North Vancouver

Project Team
Developer: Robert Cadez, PC Urban

Project Consultants
Architecture: Tom Grimwood, Grimwood Architecture
Landscape Architecture: Daryl Tyackle, ETA Landscape Architecture
Transportation Engineers: Daniel Fung, Bunt & Associates

Facilitator
Catherine Rockandel, Rockandel & Associates
PC Urban 1900 Block Glenaire Drive Project Public Information Meeting Summary
October 18, 2016

PRESENTATION SUMMARY
Robert Cadez, PC Urban Properties Corp. provided an overview of the development proposal to construct three 3-storey townhouse buildings on the north side of the 1900 block of Glenaire Drive, near the corner of Glenaire Drive and Fullerton Avenue. The proposal is for 23 residential units, which will include 21 three bedroom and den units and 2 three bedroom units, each with private front and rear yards and immediate access to the Capilano River walking path. The site will be accessed from a driveway ramp off of Glenaire Drive. Parking will be located in an underground parking garage. There will be 44 parking spaces provided for the residents along with 2 visitor parking spaces. The proposal includes restoration of the natural riparian bank and public walking path along the Capilano River.

PUBLIC COMMENT: Q & A (Index: Q: Questions C: Comment A: Answers)

Q1 Is there any more information about the timetable, construction duration, etc.?
A1 That is a good questions and I wish I could answer with more clarity but we are kind of at the mercy of our approval process. We would like to be in the ground sometime this summer 2017 and construction on this type of product would be about 13 months on the safe side.

Q2 Will the units have a view of the river?
A2 There will be some views but the vegetation is quit heavy right now so there is some blocking of the view. Some of the trees will be thinned, as some of them are quite dangerous. A lot of the new planting will be much lower so there will be views from the back of the unit. We are providing views of the river to the single-family homes that didn't previously have one.

Q3 What kind of facility do you plan to have inside the unit to take care of physically challenged people since there are four levels for a person to negotiate on a daily basis? Do you have any ideas on square foot cost?
A3 Right now it is very premature to actually answer that question in terms of cost. Right now we are looking at homes over a million dollars given the square footage we have. It is hard to say how much the cost is per square foot but possibly $700-$750 in that area would be a good estimate. There is some opportunity in some of these units to possibly put in a residential lift. The stairs are wide enough to have a chair lift and meet accessibility requirement in terms of width. Traditionally speaking townhouses are not a great product for accessibility. We have 23 units that are in a style that is not conducive to that but there are solutions for it. There are other developments in the area that are ground level.

Q4 Do you have charging stations in your garage or do you have solar power?
A4 Right now there isn't anything on the table as far as charging stations but that is actually a very easy thing to install. A lot of developments in Vancouver are installing the wiring
PC Urban 1900 Block Glenaire Drive Project Public Information Meeting Summary  
October 18, 2016

for it. It does require 220 voltage in certain cases and that is something to be determined down the road as we start to look at the Hydro supply for the area. Solar power hasn’t been contemplated but the roof itself is orientated in a north south orientation so there may be possibilities for that. The District is looking into a district energy system for the area but it is in its infancy stages. There is discussion on whether this would be implemented here or not.

Q5 In regards to views of the river, is there opportunity to have upper floor balconies to provide a view to the river

A5 We thought of that in terms of our design but what we ended up with a design that provides a very deep back yard, which we believe provides a more direct connection to the river.

Q6 This looks very reasonable compared to some of the other development proposals we have seen so far. We are concerned about mitigating flow through traffic from Fullerton over to Curling if we open up Glenaire. Ideally we would like to keep it closed, is that feasible? Certainly for construction it makes sense to open it up. We are very concerned about it staying open.

A6 That will definitely be opened up for construction. It is going to be opened up according to planning for future connectivity. There is also a road that is going to be put in the new development below it. That is going to be opened to try to deal with some of the density in the neighbourhood instead of one way to get in and out of the neighbourhood.

(Erik Wilhelm) I am not a traffic engineer but from the plans I have seen from the consultants and the traffic department, there are plans to open up that connection to Glenaire onto Curling

Q7 In regards to our sewage system, has there been any assessment of the capacity to accommodate all of these developments because from time to time it backs up?

A7 There is plans to upgrade all the water, sewer, sanitary, roads, everything in the neighbourhood and that negotiation is going on between the developers throughout the entire area and the district as well. There will be an upgrade to the system, the questions is just how much the upgrade is.

Q8 Can you please indicate on the presentation slide where the additional parking is going to be?

A8 From the 15-meter set back almost to the property line is where the parkade is situated and all the parking is there.

Q9 I am concerned about the traffic on Capilano Road. It already goes all the way to upper levels highway in the morning. And there are other developments that will add traffic.

A9 (Daniel Fung) This development will add about ten vehicles per hour, that equates to about one every six minutes. This individual development is not going to change a lot. However, you are correct that there will be change with all the developments planned in the area. The current south bound traffic and left turn movement is currently one lane,
that is going to be changed to a separate through lane and separate left turn which will add a bit of capacity. The Fullerton, Curling and Marine Drive intersections are now coordinated. All these things are happening at the same time.

Q10 I see there is a three storey street wall. Is there any opportunity to step that back and not make it overwhelm the street so much?

A10 In terms of the street wall, the project has been designed already to the minimums, with having to dedicate a path as well it doesn’t leave much room. We are developing well under what we are able to. What we have tried to do is to keep the roof forms as low as they can. We are not at full height at the walls on the third floor and we are trying to sloop the roof so that the light at certain angles of the day will get past the building much easier.

Q11 My questions are about traffic during the construction phase and may not apply to this particular development. We were told at another development meeting by both the District and the developer that all construction access would be by Curling Road, and now a lot of it is going through Fullerton. I contacted the District to point this out and the response I got was “Oh we changed our mind”. In other words they didn’t care at all about that. There is definitely congestion happening, you can’t get through Fullerton at various times of the day from rush hour in the morning to right through at night. You have to plan on delays because you can’t be sure you are going to get through. So where is the construction traffic going to happen for this development? How can we trust anything that is said in these public forums if what can happen is that the District says “Oh we changed our minds”?

A11 I can’t speak about the other developments and what issues they have, all I can speak to is our development and maybe a little to the other developers that are in the room with us tonight. One of the things that we have done is banded together to do a construction management plan. The plan has been put together by looking at all of our schedules; when concrete pours might be, construction loading, trucks coming for concrete and also for excavation and looking at the timing of the projects. At this point it is a best guess. I said I would like to start in June but it might be September or it might be March, so all those things change. The only thing I can say standing here right now is that the effort has been put in and that we have been working with the District, but things can change. The plan right now is to open up the Glenaire to Curling so that we can have a one directional flow of traffic and have the trucks staged off site so we don’t have trucks waiting off Fullerton. We are also considering, on our site specifically, not doing a concrete pour for the top of our parkade but actually doing the whole thing in precast panels, which would allow us to do the suspended slab in a week as opposed to two months. That would bring down our schedule as well as alleviate some of the traffic.

Q12 Downtown prices range from about $1,200 to $1,900, you are talking about $750. Are you compromising anything?

A12 No, it is a different type of building. There are things that we consider when we do a development and one of them is price point. If we were to charge $2,000 a square foot
for 2,000 square feet, they would be $4 million dollar units and I don’t think that is reasonable to ask. In terms of looking at apartment development, there is much more efficiencies in terms of what you get out of your unit as well. You don’t have stairs to deal with, you have a different type of construction and price per square foot is determined per area. I can’t compare what we are doing here to what is going on downtown or West Vancouver that is over $2,000 a square foot. There are views at play. There are neighbourhood considerations. If you are building on the Cambie corridor, there are amenities that we don’t have here. Pricing is based on what area you are in and what amenities you have.

Q13 How will the price be reflected in the finishing of the interior?
A13 We are looking at a higher end finishing for our units. We are working with interior designers to provide an elegant finish. With this type of product and price point, we are not an investor product we are more of an end user product. We are hoping to see some downsizers and maybe some young families in here so we want to cater to that market. That is where the decisions come from.

Q14 Have you ever considered elevators in the units given accessibility?
A14 We did consider that, as I mentioned before, it compromises the plan a little bit. So you would be giving up a washroom and some space probably for closets. If done early on in the process, it is something that can be incorporated. There are only specific units that you could do that in. There is the intent that if we had someone come in early on that maybe we could re configure a unit or two.

Q15 This is more a question for the District. How many units do we now have in the whole area that are slated to be built? There are six new construction sites so, what are we looking at now and what is the proposal? How many units will there be?
A15 (Erik Wilhelm) Currently there are a number of preliminary development applications and detailed applications that are moving forward. There are approximately 300 town house units being proposed, again none of those have been approved by Council, but that is what I am aware of at this time.

Q16 I presume that all the home owners in the area where you are going to locate in have sold their properties, is that correct? Are you coordinating with all the other developers?
A16 I can’t speak for any of the other developers but we own all the houses where our development will be. I can tell you that all the developers are in the room tonight and we are working together on a variety of things. I can tell you that as a group, the entire area is working together to solve those issues and work on construction and servicing of the area.

C17 I live at Woodcroft and my big concern is that we are going to get so trapped in by construction because there is no other access on Fullerton.
PC Urban 1900 Block Glenaire Drive Project Public Information Meeting Summary  
October 18, 2016

A17 Construction is just that and there is going to be a lot of activity and I can't say that we aren't going to block traffic at certain times of the day. We are working on a plan that during peak hours we are mitigating the amount of traffic coming through but there are certain times you can't do anything about. For instance pouring concrete, it needs to happen in the morning so it is done by the end of the day. If we stop during certain hours it increases the schedule by 4-6 months and you end up with a longer construction period. A plan has been submitted to the district and they have looked at it and will hold us accountable to it.

Q18 In regards to the public footpath between your property and the river, from where to where does it go? It looks like it comes from our Woodcroft bridge, which is private property, and I don't think that you should just assume you can use private property, unless you are going to go under the bridge in which case we have no problem.

A18 The intent of the path is to enjoy the view of the river not a connection to go across Fullerton that I know of.

Q19 You said it would take about 13 months for the completion of the project, is that working Monday to Friday or do you plan on doing construction on Saturday, Sundays and holidays as well?

A19 All of our construction is in bylaw hours and at this point we are expecting to do Monday to Fridays with a few Saturday with exceptions for bad weather or pours that need to be done at a certain time. There should be no work generally on Saturdays and probably not at all on Sundays.

Q20 You mentioned 300 town house units. I am wondering how many high-rise units?

A20 Within the peripheral area there are no high rises. The maximum densities for the largest of lots is 1.2 FSR and 3 storey townhouses

Q21 Don't you think with such concentration and building in a really small area that this will make more pollution and more traffic? Are all of these three stories or are some of them more than three stories?

A21 All of the units are three stories. In terms of scale, these are five single-family lots right now, we are putting in 23 units. If you look at the construction of the old houses, their energy systems in terms of how they are heated, the new technology just in heat alone using high efficiency boilers is quite a lot less energy in terms of what is being used by the homes in the area right now. The footprint, by using more of the land mass you actually are greener so to speak because you are concentrating housing on the land mass there.

Q22 A question for the District, why has this whole area not been bought as a park?

A22 (Erik Wilhelm) I don't have the answer as it would be Council, but I do think it would probably come down to money.

Q23 My question is to the District. I am afraid that with the 300 units, all of the population density and congestion with these new builds is going to reduce the value of the rest of
PC Urban 1900 Block Glenaire Drive Project Public Information Meeting Summary
October 18, 2016

the properties. I see on the Internet that you only have two visitors parking so I am concerned about the people living in the area. Is the District going to change the zoning of the other properties or only for the developers here?

A23 (Erik Wilhelm) For every application that is coming forward, I alluded to 300 units I am aware of, every single development will require their own individualized official community plan amendment, rezoning and development permits. It is not a foregone conclusion. Everything needs to be approved by Council.

Q24 It looks like a good plan as they are preserving a lot of the greenway along the river. It is a concern though because Capilano River is a watershed river and I don't know how many trees will actually be removed. We have a lot of beautiful trees in that area that we would like to be preserved. It is a beautiful design though and I quite like it.

A24 I can speak to the trees, we are at retention of close to 50% of the trees and most of them are the large trees. The ones that are designated to come down are ill or in danger of coming down with construction or erosion of the bank. It is in our best interest to save as many trees as possible because of the stabilization of the bank and we will make every effort to do that.

Q25 You mentioned the full development was three stories. I thought the District requirement was adjacent to single-family homes you had to do two storey?

A25 (Erik Wilhelm) The peripheral housing policy does have design guidelines and there is a guideline that talks about stepping down, it would be applicable to the development to the west.

Q26 The setback is almost like sanctified holy ground. What is going to prevent the public from entering onto the setback and possibly creating a noise hazard for those people that are going to be living there?

A26 The simple answer is nothing. The area actually has a fence that is protecting it along the edge and the planting is supposed to be fairly dense so it is not an area that you are going to be setting up blankets and having picnics or anything like that. It is designed to be a protected area in its natural habitat. That being said, you can't stop anybody from climbing fences or running through things that they are not supposed to. What we can do is design to the best way we can to discourage that.

Q27 I think this is really for the District. I have been to several of these meetings and every single one I come to, the gentleman in charge of traffic says we have done the study and this will only put six cars per hour onto Capilano Road. Capilano Road is going to be extended on the corner but the problem is the Lions Gate Bridge and there is no way that is going to be expanded. We have a huge development going in at Edgemont Village and I just don't understand. All of the other developments will be putting another eight cars per hour onto the road. I want to know Mr. District, what will be the total number of cars going onto Capilano Road from all of the new developments when they are built?
A27 (Erik Wilhelm) I am not a traffic engineer but this development has submitted a traffic impact study and it hasn't just taken into account this development it takes in all future development and densities in there.

(Daniel Fung) For traffic analysis actually what we did was look at the peripheral area, the 300 units that have been talked about including the Larco development as well as the Grouse Inn development that is planned. Basically the access points would be Fullerton, Curling and Marine Drive. Looking at the change in traffic in total, basically there will be marginal change. With the improvements and Curling having a signal, this is going to help vehicles coming out of Curling have better access to Capilano Road. The planning that has been done by the District for the south-bound movement on Marine Drive and Capilano Road will not decrease traffic on the Lions Gate Bridge. There will be a marginal increase.

Q28 We are skirting around the car capacity in this development as we are in the other developments. Why two cars per unit in an age where we are promoting public transportation?

A28 That is a very good question. In terms of my development, given the size of the units and the demographic that we are looking at with young families we thought two cars were needed. Any units that don't take the second parking spot would be contributing to the visitor parking.
APPENDIX
Applicants Flyer: Page One

Meeting Agenda:
Doors Open: 6:00 pm
Open House Discussion: 7:00 - 8:30 pm
Presentation: 7:30 pm - 7:45 pm

For Further Information please contact:
Robert Cadez  PC Urban Properties Corp.
604-282-6030
Erik Wilhelm  District of North Vancouver, Planning Department
604-950-2360

Applicants Flyer: Page Two

The Proposal:
PC Urban Properties Corp. proposes to construct three 3-storey townhouse buildings on the north side of the 1900 block of Glenaire Drive, at the corner of Glenaire Drive and Fullerton Avenue.

The proposal is for 23 rowhomes, which will include 21 three-bedroom and den homes and two three-bedroom homes. Each will have private front and rear yards and immediate access to a Capilano River walking path.

Access to the development will be from a driveway ramp off of Glenaire Drive. Parking will be located in an underground parking garage. There will be 44 parking spaces provided for the residents along with 2 visitor parking spaces.

The proposal includes restoring the natural riparian bank along the Capilano River and providing a public walking path adjacent to the Riparian Area.
PUBLIC INFORMATION MEETING

A redevelopment is being proposed for 1946-1998 Glenaire Drive, to construct 23 residential townhouses. You are invited to a meeting to discuss the project.

Date: Tuesday, October 18, 2016
Time: 6:00 – 8:30 p.m.
Location: Grouse Inn Meeting Room,
1633 Capilano Road, North Vancouver

The applicant proposes to rezone the site from single-family zoning to a comprehensive development zone, to permit a 23-unit, three storey, ground oriented townhouse project. Each home is between 1,700 and 2,300 square feet in size and includes two underground parking stalls per home.

Notification flyers are being distributed to residents throughout the Lions Gate towncentre and peripheral areas. If you would like more information, contact Erik Wilhelm of the Planning Department at 604-990-2360 or Robert Cadez, PC Urban Properties Corp. at 604-282-6085. Please bring your questions and comments to the meeting.

* This is not a Public Hearing. DNV Council will receive a report from staff on issues raised at the meeting and will formally consider the proposal at a later date.
The Corporation of the District of North Vancouver

Bylaw 8219

A bylaw to amend The District of North Vancouver Official Community Plan Bylaw 7900, 2011

The Council for The Corporation of the District of North Vancouver enacts as follows:

1. Citation

This bylaw may be cited as “District of North Vancouver Official Community Plan Bylaw 7900, 2011, Amendment Bylaw 8219, 2017 (Amendment 23)”.

2. Amendments

2.1 District of North Vancouver Official Community Plan Bylaw 7900, 2011, is amended as follows:

a) Map 2 Land Use: as illustrated on Schedule A, by changing the land use designation of the properties on Map 2 from “Residential Level 2: Detached Residential” (RES2) to “Residential Level 4: Transition Multifamily” (RES4);

b) Map 3.1 Form and Character Development Permit Area: as illustrated on Schedule B, by adding the properties to Map 3.1, designating them as a Development Permit Area for Form and Character of Commercial, Industrial and Multifamily Development; and,

c) Map 4.1 Energy and Water Conservation and GHG Emission Reduction Development Permit Area: as illustrated on Schedule B, by adding the properties to Map 4.1, designating them as a Development Permit Area for Energy and Water Conservation and Greenhouse Gas Reduction.

READ a first time March 27th, 2017 by a majority of all Council members.

PUBLIC HEARING held

READ a second time by a majority of all Council members.

READ a third time by a majority of all Council members.
ADOPTED by a majority of all Council members.

Mayor

Municipal Clerk

Certified a true copy

Municipal Clerk
Schedule A to Bylaw 8219

BYLAW 8219
The District of North Vancouver Official Community Plan Bylaw 7900, 2011, Amendment Bylaw 8219, 2017 (Amendment 23)

Land Use: as illustrated on Schedule A, by changing the land use designation of the properties on Map 2 from Residential Level 2: Detached Residential to Residential Level 4: Transition Multifamily.
Schedule B to Bylaw 8219

BYLAW 8219
The District of North Vancouver Official Community Plan Bylaw 7900, 2011, Amendment Bylaw 8219, 2017 (Amendment 23)

Map 3.1 Form and Character Development Permit Area: as illustrated on Schedule B, by adding the properties to Map 3.1, designating them as a Form and Character of Commercial, Industrial and Multi-family Development Development Permit Area

Map 4.1 Energy and Water Conservation and GHG Emission Reduction Development Permit Area: as illustrated on Schedule B, by adding the properties to Map 4.1, designating them as an Energy and Water Conservation and Greenhouse Gas Reduction Development Permit Area
The Corporation of the District of North Vancouver

Bylaw 8220

A bylaw to amend District of North Vancouver Zoning Bylaw 3210, 1965

The Council for The Corporation of the District of North Vancouver enacts as follows:

1. Citation

This bylaw may be cited as “The District of North Vancouver Rezoning Bylaw 1350 (Bylaw 8220)”.

2. Amendments

2.1 District of North Vancouver Zoning Bylaw 3210, 1965 is amended as follows:

Section 301(2) by inserting the following zoning designation in numeric sequence:

“Comprehensive Development Zone CD100”

2.2 Part 4B by inserting the following:

“4B100 Comprehensive Development Zone 100 (CD100)"

4B100-1 Intent:

The purpose of the CD100 zone is to establish specific land use and development regulations for a 23 unit townhouse development.

4B100-2 Uses:

The following principal uses are permitted in the Comprehensive Development 100 Zone:

(a) Uses Permitted without Conditions:

(i) Residential building, multifamily townhouse

For the purposes of this CD100 Zone, “Residential building, multifamily townhouse” means a building having not more than three residential storeys and consisting of two or more dwelling units with individual, exterior access to grade above an underground parkade.
(b) Conditional Uses

Not applicable

4B100-3 Conditions of Use:

Not applicable

4B100-4 Accessory Use:

(a) Accessory uses are permitted and are limited to:

(i) Home occupations in accordance with the regulations in Section 405 of this Bylaw

4B100-5 Density:

(a) The maximum permitted density in the CD100 Zone is limited to a floor space ratio (FSR) of 0.45 and a maximum number of 5 units, inclusive of any density bonus for energy performance; and

(b) For the purposes of calculating floor space ratio, the area of underground parking garages, which includes: drive aisles, electrical/mechanical rooms, garbage and recycling collection areas, bicycle storage areas, and general storage areas is exempted.

4B100-6 Amenities:

Despite subsection 4B100-5, density in the CD100 Zone is increased to a maximum floor space of 3,926 m² (42,257 sq. ft.) and a maximum number of 23 units, inclusive of any density bonus for energy performance, if the owner:

1. Contributes $121,581 to the municipality to be used for any or all of the following amenities (with allocation to be determined by the municipality in its sole discretion): public art, park, trail, environmental or other public realm improvements; municipal or recreation service or facility improvements within the Lions Gate Village Centre area, and/or affordable housing; and

2. Enters into a Housing Agreement requiring a rental disclosure statement to be filed and prohibiting any strata bylaw or regulation establishing rental restrictions.

4B100-7 Maximum Principal Building Size:

Not applicable.
4B100-8 Setbacks:

(a) Buildings must be set back from property lines to the closest building face, excluding any partially exposed underground parking structure and upper floor encroachments not to exceed 0.6 m (2.0 ft) in depth, in accordance with the following regulations:

<table>
<thead>
<tr>
<th>Location</th>
<th>Minimum Required Setback</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front Yard (from Glenaire Drive)</td>
<td>3.05 m (10 ft)</td>
</tr>
<tr>
<td>Rear Yard</td>
<td>7.31 m (24 ft) except in the easterly 19.5 m</td>
</tr>
<tr>
<td></td>
<td>(64 feet) of the property where the required</td>
</tr>
<tr>
<td></td>
<td>setback may be reduced to 2.44 m (8 ft)</td>
</tr>
<tr>
<td>West Side Yard</td>
<td>1.83 m (6 ft)</td>
</tr>
<tr>
<td>East Side Yard (from Fullerton Avenue)</td>
<td>3.05 m (10 ft)</td>
</tr>
</tbody>
</table>

4B100-9 Building Orientation:

Not applicable.

4B100-10 Building Depth and Width:

Not applicable.

4B100-11 Coverage:

a) Maximum permitted Building Coverage is 49%

b) Maximum permitted Site Coverage is 51%.

4B100-12 Height:

a) Maximum permitted Height is 13.2 meters (43.3 ft).

4B100-13 Acoustic Requirements:

In the case of residential purposes, a development permit application shall require evidence in the form of a report and recommendations prepared by persons trained in acoustics and current techniques of noise measurements, demonstrating that the noise levels in those portions of the dwelling listed below shall not exceed the noise levels expressed in decibels set opposite such portions of the dwelling units:
### Portion of Dwelling Unit Noise Level (Decibels)

<table>
<thead>
<tr>
<th>Portion of Dwelling Unit</th>
<th>Noise Level (Decibels)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bedrooms</td>
<td>35</td>
</tr>
<tr>
<td>Living and Dining rooms</td>
<td>40</td>
</tr>
<tr>
<td>Kitchen, Bathrooms and Hallways</td>
<td>45</td>
</tr>
</tbody>
</table>

**4B100-14 Landscaping:**

- a) All land areas not occupied by buildings, structures, parking spaces, loading spaces, driveways, manoeuvring aisles and sidewalks shall be landscaped or finished in accordance with an approved landscape plan; and

- b) All electrical kiosks and garbage and recycling container pads not located underground or within a building shall be screened with landscaping or fencing in accordance with an approved landscape plan.

**4B100-15 Subdivision Requirements**

Within the CD100 zone, the Minimum Lot Area must be at least 2,601 sq. m. (27,997 sq. ft.).

**4B100-16 Additional Accessory Structure Regulations**

Not applicable.

**4B100-17 Parking and Loading Regulations:**

- (a) Parking shall be provided at a ratio of 2 parking spaces per unit inclusive of designated parking spaces for visitors and parking spaces for persons with disabilities;

- (b) Vehicular drive aisles shall be no less than 6.88 m (22.6 ft) wide;

- (c) A minimum of 47 Class 1 bicycle parking spaces (secured within a shared bike storage area or individual bicycle storage areas) shall be provided;

2.2 The Zoning Map is amended in the case of the lands in Schedule A, by rezoning the land outlined and noted as “site” from Residential Single Family Residential 7200 Zone (RS3) to Comprehensive Development 100 Zone (CD100).”

**READ a first time March 27th, 2017**

**PUBLIC HEARING held**

**READ a second time**

**READ a third time**
Certified a true copy of “Rezoning Bylaw 1350 (Bylaw 8220)” as at Third Reading

Municipal Clerk

APPROVED by the Ministry of Transportation and Infrastructure on

ADOPTED

Mayor ___________________________ Municipal Clerk ___________________________

Certified a true copy

Municipal Clerk
Schedule A to Bylaw 8220

Site to be rezoned from RS3 to CD100

Klahanie Park
The Corporation of the District of North Vancouver

Bylaw 8221

A bylaw to enter into a Housing Agreement (1946 – 1998 Glenaire Drive)

The Council for The Corporation of the District of North Vancouver enacts as follows:

1. Citation

This bylaw may be cited as “Housing Agreement Bylaw 8221, 2017 (1946 – 1998 Glenaire Drive)”.

2. Authorization to Enter into Agreement

2.1 The Council hereby authorizes a housing agreement between The Corporation of the District of North Vancouver and 1998 Glenaire Holdings Ltd., Inc. No. BC1054719 substantially in the form attached to this Bylaw as Schedule “A” with respect to the following lands:

   a) 009-870-253 Lot 2 Block 16 District Lot 764 Plan 8967
   b) 009-870-261 Lot 3 Block 16 District Lot 764 Plan 8967
   c) 009-870-270 Lot 4 Block 16 District Lot 764 Plan 8967
   d) 009-870-296 Lot 5 Block 16 District Lot 764 Plan 8967
   e) 009-870-300 Lot 6 Block 16 District Lot 764 Plan 8967

3. Execution of Documents

The Mayor and Municipal Clerk are authorized to execute any documents required to give effect to the Housing Agreement.

READ a first time March 27th, 2017

READ a second time

READ a third time

ADOPTED

Mayor       Municipal Clerk
Certified a true copy

____________________________________
Municipal Clerk
Schedule A to Bylaw 8221

SECT 219 COVENANT — HOUSING AGREEMENT

This agreement is dated for reference the ____ day of ______________, 20____

BETWEEN:

1998 GLENAIRE HOLDINGS LTD. (Inc. No. BC1054719), 880 – 1090 West Georgia Street, Vancouver, BC  V6E 3V7

(the “Developer”)

AND:

THE CORPORATION OF THE DISTRICT OF NORTH VANCOUVER, a municipality incorporated under the Local Government Act, RSBC 2015, c.1 and having its office at 355 West Queens Road, North Vancouver, BC  V7N 4N5

(the “District”)

WHEREAS:

1. The Developer is the registered owner of the Lands (as hereinafter defined);

2. The Developer wishes to obtain development permissions with respect to the Lands and wishes to create a condominium development which will contain residential strata units on the Lands;

3. Section 483 of the Local Government Act authorises the District, by bylaw, to enter into a housing agreement to provide for the prevention of rental restrictions on housing, and provides for the contents of the agreement; and

4. Section 219 of the Land Title Act (British Columbia) permits the registration in favour of the District of a covenant of a negative or positive nature relating to the use of land or a building thereon, or providing that land is to be built on in accordance with the covenant, or providing that land is not to be built on except in accordance with the covenant, or providing that land is not to be subdivided except in accordance with the covenant;

NOW THEREFORE in consideration of the mutual promises contained in it, and in consideration of the payment of $1.00 by the District to the Developer (the receipt and sufficiency of which are hereby acknowledged by the Developer), the parties covenant and agree with each other as follows, as a housing agreement under Section 483 of the Local Government Act, as a contract and a deed under seal between the parties, and as a covenant under Section 219 of the Land Title Act, and the Developer hereby further covenants and agrees that neither the Lands nor any building constructed thereon shall be used or built on except in accordance with this Agreement:
1. **DEFINITIONS**

1.01 Definitions

In this agreement:

(a) “Development Permit” means development permit No. _____ issued by the District;

(b) “Lands” means land described in Item 2 of the Land Title Act Form C to which this agreement is attached;

(c) “Owner” means the Developer and any other person or persons registered in the Lower Mainland Land Title Office as owner of the Lands from time to time, or of any parcel into which the Lands are consolidated or subdivided, whether in that person’s own right or in a representative capacity or otherwise;

(d) “Proposed Development” means the proposed development containing not more than 23 units to be constructed on the Lands in accordance with the Development Permit;

(e) “Short Term Rentals” means any rental of a Unit for any period less than 30 days;

(f) “Strata Corporation” means the strata corporation formed upon the deposit of a plan to strata subdivide the Proposed Development pursuant to the Strata Property Act;

(g) “Unit” means a residential dwelling strata unit in the Proposed Development; and

(h) “Unit Owner” means the registered owner of a Dwelling Unit in the Proposed Development.

2. **TERM**

This Agreement will commence upon adoption by District Council of Bylaw 8221 and remain in effect until terminated by the District as set out in this Agreement.

3. **RENTAL ACCOMODATION**

3.01 Rental Disclosure Statement

No Unit in the Proposed Development may be occupied unless the Owner has:

(a) before the first Unit is offered for sale, or conveyed to a purchaser without being offered for sale, filed with the Superintendent of Real Estate a rental disclosure statement in the prescribed form (the “Rental Disclosure Statement”) designating all of the Units as rental strata lots and imposing at least a 99 year rental period in relation to all of the Units pursuant to the Strata Property Act (or any successor or replacement legislation), except in relation to Short Term Rentals and, for greater certainty, stipulating specifically that the 99 year rental restriction does not apply to a Strata Corporation bylaw prohibiting or restricting Short Term Rentals; and
(b) given a copy of the Rental Disclosure Statement to each prospective purchaser of any Unit before the prospective purchaser enters into an agreement to purchase in respect of the Unit. For the purposes of this paragraph 3.01(b), the Owner is deemed to have given a copy of the Rental Disclosure Statement to each prospective purchaser of any Unit in the building if the Owner has included the Rental Disclosure Statement as an exhibit to the disclosure statement for the Proposed Development prepared by the Owner pursuant to the Real Estate Development Marketing Act.

3.02 Rental Accommodation

The Units constructed on the Lands from time to time may always be used to provide rental accommodation as the Owner or a Unit Owner may choose from time to time, except that this section 3.02 does not apply to Short Term Rentals which may be restricted by the Strata Corporation to the full extent permitted by law.

3.03 Binding on Strata Corporation

This agreement shall be binding upon all Strata Corporations created by the subdivision of the Lands or any part thereof (including the Units) pursuant to the Strata Property Act, and upon all Unit Owners.

3.04 Strata Bylaw Invalid

Any Strata Corporation bylaw which prevents, restricts or abridges the right to use any of the Units as rental accommodations (other than Short Term Rentals) shall have no force or effect.

3.05 No Bylaw

The Strata Corporation shall not pass any bylaws preventing, restricting or abridging the use of the Lands, the Proposed Development or the Units contained therein from time to time as rental accommodation (other than Short Term Rentals).

3.06 Vote

No Unit Owner, nor any tenant or mortgagee thereof, shall vote for any Strata Corporation bylaw purporting to prevent, restrict or abridge the use of the Lands, the Proposed Development or the Units contained therein from time to time as rental accommodation (other than Short Term Rentals).

3.07 Notice

The Owner will provide notice of this Agreement to any person or persons intending to purchase a Unit prior to any such person entering into an agreement of purchase and sale, agreement for sale, or option or similar right to purchase as part of the disclosure statement for any part of the Proposed Development prepared by the Owner pursuant to the Real Estate Development Marketing Act.
3.08 **Release of Covenant**

The District agrees that if the District of North Vancouver Rezoning Bylaw 1350 (Bylaw 8220), is not adopted by the District’s Council before September 30th, 2017, the Owner is entitled to require the District to execute and deliver to the Owner a discharge, in registrable form, of this Agreement from title to the Land. The Owner is responsible for the preparation of the discharge under this section and for the cost of registration at the Land Title Office.

4. **DEFAULT AND REMEDIES**

4.01 **Notice of Default**

The District may, acting reasonably, give to the Owner written notice to cure a default under this Agreement within 30 days of delivery of the notice. The notice must specify the nature of the default. The Owner must act with diligence to correct the default within the time specified.

4.02 **Costs**

The Owner will pay to the District upon demand all the District’s costs of exercising its rights or remedies under this Agreement, on a full indemnity basis.

4.03 **Damages An Inadequate Remedy**

The Owner acknowledges and agrees that in the case of a breach of this Agreement which is not fully remediable by the mere payment of money and promptly so remedied, the harm sustained by the District and to the public interest will be irreparable and not susceptible of adequate monetary compensation.

4.04 **Equitable Remedies**

Each party to this Agreement, in addition to its rights under this Agreement or at law, will be entitled to all equitable remedies including specific performance, injunction and declaratory relief, or any of them, to enforce its rights under this Agreement.

4.05 **No Penalty or Forfeiture**

The Owner acknowledges and agrees that it is entering into this Agreement to benefit the public interest in providing rental accommodation, and that the District’s rights and remedies under this Agreement are necessary to ensure that this purpose is carried out, and the District’s rights and remedies under this Agreement are fair and reasonable and ought not to be construed as a penalty or forfeiture.

4.06 **Cumulative Remedies**

No reference to nor exercise of any specific right or remedy under this Agreement or at law or at equity by any party will prejudice, limit or preclude that party from exercising any other right or remedy. No right or remedy will be exclusive or dependent upon any other right to remedy, but any party, from time to time, may exercise any one or more of such rights or remedies independently, successively, or in combination. The Owner acknowledges that specific
performance, injunctive relief (mandatory or otherwise) or other equitable relief may be the only adequate remedy for a default by the Owner under this Agreement.

5. **LIABILITY**

5.01 **Indemnity**

Except if arising directly from the negligence of the District or its employees, agents or contractors, the Owner will indemnify and save harmless each of the District and its board members, officers, directors, employees, agents, and elected or appointed officials, and their heirs, executors, administrators, personal representatives, successors and assigns, from and against all claims, demands, actions, loss, damage, costs and liabilities that all or any of them will or may be liable for or suffer or incur or be put to any act or omission by the Owner or its officers, directors, employees, agents, contractors, or other persons for whom the Owner is at law responsible, or by reason of or arising out of the Owner’s ownership, operation, management or financing of the Proposed Development or any part thereof.

5.02 **Release**

The Owner hereby releases and forever discharges the District, its elected officials, board members, officers, directors, employees and agents, and its and their heirs, executors, administrators, personal representatives, successors and assigns from and against all claims, demands, damages, actions or causes of action by reason of or arising out of advice or direction respecting the ownership, operation or management of the Proposed Development or any part thereof which has been or hereafter may be given to the Owner by all or any of them.

5.03 **Survival**

The covenants of the Owner set out in Sections 5.01 and 5.02 will survive termination of this Agreement and continue to apply to any breach of the Agreement or claim arising under this Agreement during the ownership by the Owner of the Lands or any Unit therein, as applicable.

6. **GENERAL PROVISIONS**

6.01 **District’s Power Unaffected**

Nothing in this Agreement:

(a) affects or limits any discretion, rights, powers, duties or obligations of the District under any enactment or at common law, including in relation to the use or subdivision of land;

(b) affects or limits any enactment relating to the use of the Lands or any condition contained in any approval including any development permit concerning the development of the Lands; or

(c) relieves the Owner from complying with any enactment, including the District’s bylaws in relation to the use of the Lands.
6.02 Agreement for Benefit of District Only

The Owner and District agree that:

(a) this Agreement is entered into only for the benefit of the District:

(b) this Agreement is not intended to protect the interests of the Owner, any Unit Owner, any occupant of any Unit or any future owner, occupier or user of any part of the Proposed Development, including any Unit, or the interests of any third party, and the District has no obligation to anyone to enforce the terms of this Agreement; and

(c) The District may at any time terminate this Agreement, in whole or in part, and execute a release and discharge of this Agreement in respect of the Proposed Development or any Unit therein, without liability to anyone for doing so.

6.03 Agreement Runs With the Lands

This Agreement burdens and runs with the Lands and any part into which any of them may be subdivided or consolidated, by strata plan or otherwise. All of the covenants and agreements contained in this Agreement are made by the Owner for itself, its successors and assigns, and all persons who acquire an interest in the Lands or in any Unit after the date of this Agreement.

6.04 Release

The covenants and agreements on the part of the Owner and any Unit Owner and herein set forth in this Agreement have been made by the Owner and any Unit Owner as contractual obligations as well as being made pursuant to Section 483 of the Local Government Act (British Columbia) and as such will be binding on the Owner and any Unit Owner, except that neither the Owner nor any Unit Owner shall be liable for any default in the performance or observance of this Agreement occurring after such party ceases to own the Lands or a Unit as the case may be.

6.05 Priority of This Agreement

The Owner will, at its expense, do or cause to be done all acts reasonably necessary to ensure this Agreement is registered against the title to each Unit in the Proposed Development, including any amendments to this Agreement as may be required by the Land Title Office or the District to effect such registration.

6.06 Agreement to Have Effect as Deed

The District and the Owner each intend by execution and delivery of this Agreement to create both a contract and a deed under seal.

6.07 Waiver

An alleged waiver by a party of any breach by another party of its obligations under this Agreement will be effective only if it is an express waiver of the breach in writing. No waiver of a
breach of this Agreement is deemed or construed to be a consent or waiver of any other breach of this Agreement.

6.08  **Time**

Time is of the essence in this Agreement. If any party waives this requirement, that party may reinstate it by delivering notice to another party.

6.09  **Validity of Provisions**

If a Court of competent jurisdiction finds that any part of this Agreement is invalid, illegal, or unenforceable, that part is to be considered to have been severed from the rest of this Agreement and the rest of this Agreement remains in force unaffected by that holding or by the severance of that part.

6.10  **Extent of Obligations and Costs**

Every obligation of a party which is set out in this Agreement will extend throughout the Term and, to the extent that any obligation ought to have been observed or performed prior to or upon the expiry or earlier termination of the Term, such obligation will survive the expiry or earlier termination of the Term until it has been observed or performed.

6.11  **Notices**

All notices, demands, or requests of any kind, which a party may be required or permitted to serve on another in connection with this Agreement, must be in writing and may be served on the other parties by registered mail or by personal service, to the following address for each party:

If to the District:

    District Municipal Hall  
    355 West Queens Road  
    North Vancouver, BC V7N 4N5  
    Attention: Planning Department

If to the Owner:

If to the Unit Owner:

    The address of the registered owner which appears on title to the Unit at the time of notice.

Service of any such notice, demand, or request will be deemed complete, if made by registered mail, 72 hours after the date and hour of mailing, except where there is a postal service disruption during such period, in which case service will be deemed to be complete only upon
actual delivery of the notice, demand or request and if made by personal service, upon personal service being effected. Any party, from time to time, by notice in writing served upon the other parties, may designate a different address or different or additional persons to which all notices, demands, or requests are to be addressed.

6.12 Further Assurances

Upon request by the District, the Owner will promptly do such acts and execute such documents as may be reasonably necessary, in the opinion of the District, to give effect to this Agreement.

6.13 Enuring Effect

This Agreement will enure to the benefit of and be binding upon each of the parties and their successors and permitted assigns.

7. INTERPRETATION

7.01 References

Gender specific terms include both genders and include corporations. Words in the singular include the plural, and words in the plural include the singular.

7.02 Construction

The division of this Agreement into sections and the use of headings are for convenience of reference only and are not intended to govern, limit or aid in the construction of any provision. In all cases, the language in this Agreement is to be construed simply according to its fair meaning, and not strictly for or against either party.

7.03 No Limitation

The word “including” when following any general statement or term is not to be construed to limit the general statement or term to the specific items which immediately follow the general statement or term similar items whether or not words such as “without limitation” or “but not limited to” are used, but rather the general statement or term is to be construed to refer to all other items that could reasonably fall within the broadest possible scope of the general statement or term.

7.04 Terms Mandatory

The words “must” and “will” and “shall” are to be construed as imperative.

7.05 Statutes

Any reference in this Agreement to any statute or bylaw includes any subsequent amendment, re-enactment, or replacement of that statute or bylaw.
7.06 **Entire Agreement**

(d) This is the entire agreement between the District and the Owner concerning its subject, and there are no warranties, representations, conditions or collateral agreements relating to this Agreement, except as included in this Agreement.

(e) This Agreement may be amended only by a document executed by the parties to this Agreement and by bylaw, such amendment to be effective only upon adoption by District Council of a bylaw to amend Bylaw 8221.

7.07 **Governing Law**

This Agreement is to be governed by and construed and enforced in accordance with the laws of British Columbia.

As evidence of their agreement to be bound by the terms of this instrument, the parties hereto have executed the *Land Title Act Form C* that is attached hereto and forms part of this Agreement.
GRANT OF PRIORITY

WHEREAS ________________ (the “Chargeholder”) is the holder of the following charge which is registered in the Land Title Office:

(a) _________________ (the “Charge”);

AND WHEREAS the Chargeholder agrees to allow the Section 219 Covenant herein to have priority over the Charge;

THIS PRIORITY AGREEMENT is evidence that in consideration of the sum of $1.00 paid by THE CORPORATION OF THE DISTRICT OF NORTH VANCOUVER (the “District”) to the Chargeholder, the receipt and sufficiency of which are hereby acknowledged, the Chargeholder covenants and agrees to subordinate and postpone all its rights, title and interest in and to the lands described in the Form C to which this Agreement is attached (the “Lands”) with the intent and with the effect that the interests of the District rank ahead of the Charge as though the Section 219 Covenant herein had been executed, delivered and registered against title to the Lands before registration of the Charge.

As evidence of its Agreement to be bound by the above terms, as a contract and as a deed executed and delivered under seal, the Chargeholder has executed the Form C to which this Agreement is attached and which forms part of this Agreement.
PUBLIC HEARING
1946-1998 Glenaire Drive
Twenty-Three Unit Townhouse

What: A Public Hearing for Bylaws 8219 and 8220, proposed amendments to the Official Community Plan and Zoning Bylaw, to permit the development of a twenty-three unit townhouse.

When: 7 pm, Tuesday, April 18, 2017

Where: Council Chambers, District of North Vancouver Municipal Hall, 355 West Queens Road, North Vancouver, BC

What changes?
Bylaw 8219 proposes to amend the OCP land use designation for 1946-1998 Glenaire Drive from Residential Level 2: Detached Residential to Residential Level 4: Transition Multifamily and to designate this property as Development Permit Areas for Form and Character, Energy and Water Conservation and GHG Emission Reduction. Bylaw 8220 proposes to amend the District’s Zoning Bylaw by creating a new Comprehensive Development Zone 100 (CD100) and rezone the subject site from Single Family Residential 7200 Zone (RS3) to CD100 to allow the development of a twenty-three unit townhouse. The CD100 Zone addresses use, density, amenities, setbacks, site coverage, building height, landscaping and parking.

When can I speak?
We welcome your input Tuesday, April 18, 2017, at 7 pm. You can speak in person by signing up at the hearing, or you can provide a written submission to the Municipal Clerk at input@dnv.org or by mail to Municipal Clerk, District of North Vancouver, 355 West Queens Road, North Vancouver, BC, V7N 4N5, before the conclusion of the hearing.

Please note that Council may not receive further submissions from the public concerning this application after the conclusion of the public hearing.

Need more info?
Relevant background material and copies of the bylaws are available for review at the Municipal Clerk’s Office or online at dnv.org/public_hearing from March 28 to April 18. Office hours are Monday to Friday 8 am to 4:30 pm, except statutory holidays.

Who can I speak to?
Erik Wilhelm, Development Planner, at 604-990-2360 or wilhelme@dnv.org

--

*Provided by applicant for illustrative purposes only. The actual development, if approved, may differ.
Lower Capilano Village Centre: Peripheral Area Housing Policy & Design Guidelines

Figure 1. Range of possible housing types

Housing Objectives:

- Provide for a variety of primarily ground-oriented multi-family housing with some low density apartments that enhance the character of the neighbourhood.
- Provide a transition to neighbouring homes and improve green space and connectivity.

Housing Policy

1. Support new housing types that are compatible with the Lower Capilano Marine Drive Village Centre Implementation Plan objectives and add to the District’s much needed supply of ground oriented and low density multi-family housing as illustrated on Map 1 and specified in Table A.

2. Support existing individual single family lots located in Areas 1, 2 and 4 on Map 1 as suitable for new single family with detached coach house, or duplex, triplex or fourplex development ranging in density from 0.5 to 0.75 floor space ratio (FSR) depending on the size of the lot and according to the guidelines set out in Table A.

3. Support consolidations of existing lots in Areas 1, 2, and 4 on Map 1 as suitable for townhouse or rowhouse ranging in density from 0.8 to 1.2 FSR according to the guidelines set out in Table A.

4. Support consolidations of existing lots in Area 3 on Map 1 as suitable for low-rise apartment development of up to approximately 1.75 FSR according to the guidelines set out in Table A.

5. Recognize the single family properties on McLallen Court and the northern extent of Sandown Place within the Peripheral Area as suitable for continued single family use in the short and medium term subject to future planning review.
Good Neighbour Strategies

Redevelopment in the Peripheral Area surrounding the Lower Capilano Village Centre core is expected to take place over many years and provide opportunities for a mixture of built forms on a single block. This mixture of mostly duplex, triplex and multiplex buildings on single lots and townhouse, rowhouse or low rise apartment on assembled sites requires careful design and siting so as not to negatively impact neighbouring development which may remain in its current form for some time.

All new projects need to consider their neighbours and design in a manner that fits with the scale and character of the area. Project designers or architects are encouraged to meet the neighbours early in the development process so that new designs can balance long term community objectives with existing neighbours’ interests about such aspects as privacy, views and sunlight. Specific design and setback measures as outlined below should be taken in Buffer Areas indicated on Map 1 where adjacent single family development is expected to remain in the longer term, or where there is a need for additional setback requirements from the Capilano River.

For new ground-oriented development, provision of three or more bedroom units and inclusion of on-site play areas are encouraged in order to accommodate families with children. Projects should also, where possible, include some accessible one floor ground-oriented units for people with mobility issues.

New development is expected to provide opportunities to improve existing and provide for new pathway and trail connections as indicated on Map 1.

Design Guidelines for Ground-Oriented Housing and Guidelines for Multi-family Housing (OCP Schedule B) apply to the Peripheral Area. In addition, the following design measures apply to development proposed in this area.

General Provisions

Building mass and height should:

» Be considered up to 3 storeys in general except where adjacent or flanking longer term single family dwellings where 2 storey maximums apply;

» Be considered up to 4 storeys at locations identified as Area 3 on Map 1;

» Not allow any single building to exceed 150 feet in length;

» Limit site coverage to a maximum of 50%;

» Carefully site and enclose garbage and recycling containers to reduce the impact of noise and smell on adjacent properties; and

» Allow reduced side yard setbacks in order to facilitate more neighbourly design or tree retention but in no case may this setback be less than 4 feet (ft).

Local utilities are expected to:

» Be able to meet the demands of new townhouse and apartment development; and

» Remain in their current locations or be moved at the developers expense should this be of benefit to the project under consideration and the broader public realm.

Undeveloped or surplus road allowances and public rights-of-ways may:

» Be provided for development where the District of North Vancouver is willing to sell this land and where pedestrian circulation and project design can be improved and or neighbourhood compatibility can be demonstrated.
Specific Provisions

Siting requirements should:

- Provide wide yard setbacks (up to 15 ft.) in the Neighbourhood Buffer zone indicated on Map 1 where new development is adjacent or abutting longer term single family zoned lands;
- Allow for reduced front yard setbacks on the Glenaire Drive frontages to accommodate required riparian setbacks and to provide for a public trail at the rear for assembled development sites, but in no case may this front setback be less than 10 ft. from the property line;
- Provide a minimum 15 ft. front yard setback and 20 ft. rear yard setback for new development occurring elsewhere in areas 1 and 2;
- Provide a 10 to 15 ft. front yard setback to the building face of the ground floor level and a further setback to the building face of any third storey of development on Garden Avenue frontages in Area 4; and
- Provide a 15 to 20 ft. front yard setback and a 20 ft. rear yard setback for apartment development on McGuire Avenue in Area 3, with possible relaxation to 10 ft. for “L” or “U” shaped buildings.

Environmental Considerations

The Capilano River is a major environmental feature in the area requiring special design and development considerations. Protection of streamside habitat and environmental features will be required for lots along the Capilano River in keeping with the District’s Development Permit Areas. The District’s Green Building Strategy and development permit area guidelines apply to new multifamily construction. Extension of a public pathway to enhance the local trail system along the river south of Fullerton will be accommodated outside of the environmentally sensitive area. In addition, new development will be encouraged to provide for future connection to a potential District energy system. Retention or salvage of significant vegetation is encouraged in redevelopment in order to retain neighbourhood character.

Community Amenity Contributions (CAC’s)

Community amenity contributions to address increased demands on community facilities may be provided by developers when rezoning applications for increased density are approved. The Lower Capilano Village Centre Implementation Plan identifies amenities such as a new community centre, daycare, parks and plazas that are planned in the area to create a highly livable community. Any new multifamily housing in the peripheral area is anticipated to contribute to community amenities.

For the Peripheral Area, CAC rates consistent with District-wide (outside of mixed-use OCP growth centres) policy will be applied. The current District-wide rate is $5 per sq. ft. for additional residential density for townhouse and $15 per sq. ft. for additional residential density for apartments. The District is reviewing the CAC policy in late 2014/early 2015, and as such, may adjust these CAC target rates in the future.
Implementation and Monitoring

Redevelopment in the Peripheral Area will require individual rezoning applications and OCP amendments along with the requisite community consultations and public hearing processes. While development in this area is expected to take many years, construction will need to be carefully managed to minimize impacts to the community.

Strategies

» Require each development project to provide a Construction Management Plan to the approval of the District and coordinate these plans to minimize resident inconvenience. As part of Construction Management Plans:
  » Ensure all works and materials are kept on-site and do not utilize public road allowances.
  » Require a parking plan for construction workers that minimizes use of local streets.
  » Enforce permitted hours of work and noise bylaw provisions.
  » Require development applications to provide a transportation analysis and a robust transportation demand management strategy.
  » Post traffic and construction advisories on the DNV website and in other media as needed to inform local residents and other road users of construction activities and possible traffic delays.
  » Monitor implementation of the Peripheral Area and manage the pace of redevelopment by coordinating concurrent development applications to facilitate effective use of transportation infrastructure and to minimize local disturbance.
  » Update and consult with the community on an ongoing basis to ensure implementation is consistent with the Lower Capilano Village Centre Implementation Plan, including the Peripheral Area Housing Policy and to minimize potential impacts to residents.
Ground Oriented Multifamily: Duplex, Triplex, or Townhouse at up to 3 Storeys and 1.2 FSR.

Low Density Apartment: Lowrise Apartment at up to 4 Storeys and 1.75 FSR.

Approximate Environmental Setback

Existing Pathways

New Pathways

Approximate Neighbourhood Buffer - design measure to step down to 2 storeys and setback to single family homes.

Map 1: Proposed Land Use for Peripheral Areas

Peripheral Area Housing Policy & Design Guidelines

Lower Capilano Marine Drive Implementation Plan
Table A: Lower Capilano Marine Drive Peripheral Residential Area Density and Development Guide Sheet

<table>
<thead>
<tr>
<th>Area</th>
<th>Single Family Dwelling</th>
<th>Duplex</th>
<th>Triplex</th>
<th>Fourplex</th>
<th>Rowhouse/Townhouse</th>
<th>Apartment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.35 FSR + 350 ft²</td>
<td>0.5 FSR</td>
<td>0.6 FSR</td>
<td>0.75 FSR</td>
<td>0.8 – 1.2 FSR</td>
<td>1.2 – 1.75 FSR</td>
</tr>
</tbody>
</table>

**Area 1 & 2**

- **Single lot**
  - Less than 5000 ft²
  - Between 5000 ft² and 8000 ft²
  - More than 8000 ft²

**Assembly of 2 or more lots (minimum 12,000 ft²)**

**Area 3**

- **Single lot**
  - Any Size

**Assembly of 4 lots (minimum 15,000 ft²) + no locked out lots**

**Area 4**

- **Single lot**
  - Any Size

**Assembly of 4 lots (minimum 15,000 ft²)**

FSR – Floor Space Ratio
Lions Gate Peripheral Area
Townhouse Developments
Transportation Impact Assessment
Draft Report

Prepared for
Citimark, the Airey Group, PC Urban, Woodbridge Homes

Date
June 14, 2016

Project No.
4749.08
June 14, 2016
4749.08

Rebecca Nguyen, Development Manager
Citimark
Unit 2248 – 13353 Commerce Parkway
Richmond, BC
V6V 3A1

Dear Rebecca:

Re: Lions Gate Peripheral Townhouse Developments
DRAFT Transportation Impact Assessment

The enclosed report addresses the requested transportation impact assessment for the proposed townhouse developments planned for the Lower Capilano Marine Village area by Citimark, the Airey Group, PCUrban, and Woodbridge Homes. In addition to the impact analysis, this report provides a summary and rationale for the site’s proposed parking provision, and proposed Transportation Demand Management (TDM) strategies.

At the point of writing of this report, there are still elements, from a roadway infrastructure standpoint, and from an internal site standpoint that is being progressed. These are highlighted in the report for further discussion. Should you have any questions / comments, please do not hesitate to contact the undersigned.

Yours truly,
Bunt & Associates

Senior Transportation Engineer

cc: Taylor Johnson, the Airey Group; Robert Cadez, PCUrban; Kevin Chan, Woodbridge
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APPENDIX A Signal Timing Output

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1. INTRODUCTION

Bunt and Associates was retained by a client group comprised of Citimark, the Airey Group, PC Urban, and Woodbridge Homes collectively to prepare a Transportation Impact Assessment (TIA) for four planned townhouse developments in the District of North Vancouver, BC located within the Lower Capilano Marine Village area. The purpose of this TIA is to determine the off-site transportation impacts of the proposed developments, in relation to vehicular traffic and other travel modes as well as to confirm the adequacy of the proposed parking supply provision and the site design layout from a transportation perspective.

Exhibit 1.1 shows the location of the proposed development sites. This report summarizes the work undertaken to fulfill the scope requirements for the sites’ development permit submissions, as well as our findings and recommendations for the surrounding traffic network. Note as of the writing of this report, some of the site plans are currently being progressed, this includes inclusion of the updated network infrastructure functional designs.

1.1 Background

The combined developments include 87 townhouse units for the Citimark development, 43 townhouse units for the Airey Group development, 23 townhouse units for PCUrban, and 153 townhouse units for Citimark / Woodbridge Homes development proposed for the area north of Curling Road, south of Fullerton Avenue and west of Larco’s CapWest site. Collectively, there are 306 townhouse units planned, replacing 35 current single family homes on the four sites.

The scope of this TIA was developed in partnership with District of North Vancouver (DNV) staff. The TIA study takes into account the Lower Capilano Marine Village Implementation Plan (District of North Vancouver, September 2013) and Lower Capilano Marine Village Centre Transport Plan (Creative Transportation Solutions, March 2013), as background information. Also, this study accounts for background vehicle trips in the study area associated with the future redevelopment of the Larco CapWest development site (Bunt & Associates Draft Transportation Impact Assessment for Full Build Out, April 2016), and the Pacific Gate Grouse Inn development located northwest of the Marine Drive / Capilano Road intersection.

For the purposes of the traffic impact analysis conducted in this study, the subject development(s) opening day is expected to be year 2019 while the long term planning horizon for the project is 2030 as agreed with DNV staff.
Exhibit 1.1
Site Location
1.2 Site Location & Study Area

Exhibit 1.2 shows the general study area. The following intersections were included in the transportation impact assessment in the study:

- Marine Drive / Capilano Road;
- Curling Road / Capilano Road;
- Fullerton Avenue / Capilano Road;
- Sandown Place / Fullerton Avenue;
- Belle Isle Place / Fullerton Avenue;
- Glenaire Drive / Curling Road; and
- McGuire Avenue / Capilano Road (planning horizon analysis only).
Exhibit 1.2
General Study Area

Lions Gate Peripheral Area Townhouse Developments TIA
4749-08
May 2016
2. TRAFFIC FORECASTING

2.1 Data Collection

To be consistent with other transportation impact assessment studies previously completed or underway in the study area, the base “existing” traffic volumes were assumed to be the same as the Larco CapWest development traffic study and the Pacific Gate Grouse Inn development traffic study.

For the Capilano corridor intersections, traffic and queue surveys were conducted on October 28, 2015 which was typical of a peak fall commuter season scenario. In the study area, peak hour traffic demands were observed to occur from 8:00 to 9:00 AM during the morning peak period and from 5:00 to 6:00 PM during the afternoon peak period. In addition to the Capilano corridor counts, supplemental traffic counts for this study were conducted at Sandown Place, Belle Isle Place, and Glenaire Drive at Fullerton Avenue on Wednesday, February 24, 2016.

Exhibit 2.1 illustrates the peak hour traffic volumes in the study area.

2.2 Background Traffic

There will be two components associated with “background” or non-site traffic growth in the future: general background growth associated with vehicles driving through the study area, and site-specific background growth associated with known development sites in the study area (that have trip origins and destinations located in the study area).

2.2.1 General Background Growth

To be consistent with previous neighbourhood planning work and other TIAs in the study area, Bunt assumed a 1% blanket (compound) growth rate for both AM and PM peak hour background traffic growth, to forecast the 2019 Background and 2030 Background traffic volumes.

The exceptions to this blanket growth rate application were the movements to/from the Lions Gate Bridge which in our view are at saturation levels in the morning peak period. Consequently, no growth in background traffic was assumed for the AM Peak Hour only at the Marine Drive & Capilano intersection, for the southbound right turn and the westbound through movements and for the PM Peak only at the Marine Drive & Capilano intersection, for the eastbound left turn movement. For these movements, on-site observations during our count program indicated they are saturated and therefore additional traffic volumes could not be processed through the intersection. As side note, growth was applied only to the through volumes for the Capilano Road corridor so not to double count growth from the side streets.

2.2.2 Site Specific Background Growth

In addition to the application of blanket background growth, Bunt superimposed forecasted background traffic from the known Larco CapWest development for the Opening Day Background conditions and additionally, the Pacific Gate Grouse Inn development for the 2030 Planning Horizon Background
Exhibit 2.1
Existing Peak Hour Traffic Volumes

Lions Gate Peripheral Area Townhouse Developments TIA
4749-08
May 2016
conditions. The Larco CapWest development is anticipated to be completed in 2018 (before opening day of the subject Lions Gate Peripheral Area Townhouse developments) and the Pacific Gate Grouse Inn development is anticipated to be completed in 2020 (after opening day of the subject townhouse units).

For this TIA, the site land uses, density and unit mixes for these other developments was assumed to be consistent with the latest available information from these other developers; as the site plans for these other projects are still being developed and refined, the final site statistics may be somewhat different than assumed in this study but is not anticipated to drastically affect traffic operations.

Trip rates for the future off-site developments on Exhibits 2.2/2.4 and 2.3/2.5 were based on Institute of Transportation Engineer’s Trip Generation Manual rates, consistent with trip rates agreed with District staff. Tables 2.1 to 2.4 summarize the off-site development trips.

### Table 2.1: Off-Site Larco CapWest Site Trips AM Peak Hour

<table>
<thead>
<tr>
<th>USE</th>
<th>SIZE</th>
<th>TRIP RATE SOURCE</th>
<th>AM PEAK HOUR</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>TRIP RATES (trips/unit)</td>
<td>Traffic Volumes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>In</td>
<td>Out</td>
</tr>
<tr>
<td>Residential</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Townhouses</td>
<td>29 units</td>
<td>CTS</td>
<td>0.04</td>
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<tr>
<td>Apartments</td>
<td>311 units</td>
<td>CTS</td>
<td>0.04</td>
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<td>Rental Apartments</td>
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<td>CTS</td>
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<td>ITE 252</td>
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<tr>
<td>Sub-Total</td>
<td>460 units</td>
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</tr>
<tr>
<td>Commercial</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Retail</td>
<td>4,870 x 1,000 sqft</td>
<td>CTS</td>
<td>0.61</td>
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<tr>
<td>Self Storage</td>
<td>(assumes self storage office trips included in trip rate)</td>
<td>CTS</td>
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<tr>
<td>Community Centre</td>
<td>26.86 x 1,000 sqft</td>
<td>ITE 495</td>
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</tr>
<tr>
<td>Red Cross Lending</td>
<td>2.5 x 1,000 sqft</td>
<td>ITE 720</td>
<td>1.89</td>
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<td>Sub-Total</td>
<td>156.1 x 1,000 sqft</td>
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<tr>
<td>TOTAL TRAFFIC</td>
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### Table 2.2: Off-Site Larco CapWest Site Trips PM Peak Hour

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<tr>
<td>Residential</td>
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<tr>
<td>Townhouses</td>
<td>29 units</td>
<td>CTS</td>
<td>0.14</td>
<td>0.08</td>
<td>0.22</td>
</tr>
<tr>
<td>Apartments</td>
<td>311 units</td>
<td>CTS</td>
<td>0.14</td>
<td>0.08</td>
<td>0.22</td>
</tr>
<tr>
<td>Rental Apartments</td>
<td>75 units</td>
<td>CTS</td>
<td>0.14</td>
<td>0.08</td>
<td>0.22</td>
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<tr>
<td>Senior Housing</td>
<td>45 units</td>
<td>ITE 252</td>
<td>0.14</td>
<td>0.12</td>
<td>0.25</td>
</tr>
<tr>
<td>Sub-Total</td>
<td>460 units</td>
<td>--</td>
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<tr>
<td>Commercial</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Retail</td>
<td>4,870 x 1,000 sqft</td>
<td>CTS</td>
<td>2.94</td>
<td>3.06</td>
<td>6.00</td>
</tr>
<tr>
<td>Self Storage</td>
<td>121.9 x 1,000 sqft</td>
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<td>0.06</td>
<td>0.03</td>
<td>0.09</td>
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<td>1.34</td>
<td>1.40</td>
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<tr>
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<td>2.5 x 1,000 sqft</td>
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<td>2.57</td>
<td>3.57</td>
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<td>Sub-Total</td>
<td>156.1 x 1,000 sqft</td>
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<tr>
<td>TOTAL TRAFFIC</td>
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Table 2.3: Off-Site Pacific Gate Grouse Inn Site Trips AM Peak Hour

<table>
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<th>AM PEAK HOUR</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Trip Rates (trips/unit)</td>
<td>Traffic Volumes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>In</td>
<td>Out</td>
</tr>
<tr>
<td>Residential</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strata Apartments</td>
<td>254 units</td>
<td>CTS</td>
<td>0.04</td>
</tr>
<tr>
<td>Townhouses</td>
<td>5 units</td>
<td>Bunt / ITE 826</td>
<td>0.09</td>
</tr>
<tr>
<td>Sub-Total</td>
<td>259 units</td>
<td>--</td>
<td></td>
</tr>
<tr>
<td>Commercial</td>
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</tr>
<tr>
<td>Supermarket (Urban)</td>
<td>12.59 x 1,000 sqft</td>
<td>ITE &amp; Bunt</td>
<td>1.43</td>
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<tr>
<td>Specialty Retail</td>
<td>10.94 x 1,000 sqft</td>
<td>ITE 826</td>
<td>1.77</td>
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<tr>
<td>Restaurant</td>
<td>3.50 x 1,000 sqft</td>
<td>ITE 932</td>
<td>5.95</td>
</tr>
<tr>
<td>Sub-Total</td>
<td>27.03 x 1,000 sqft</td>
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</tr>
<tr>
<td>With Internal Capture</td>
<td>15%</td>
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</tr>
<tr>
<td>TOTAL TRAFFIC</td>
<td></td>
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</tr>
</tbody>
</table>

The supermarket (urban) trip rate was based on previous Bunt studies on urban supermarket. The rates were agreed with District staff before application for the Grouse Inn development site. Internal capture rate assumed are conservative considering the walkability nature of the proposed village. Actual trip generation could be lower as a result.
Table 2.4: Off-Site Pacific Gate Grouse Inn Site Trips PM Peak Hour

<table>
<thead>
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<th>USE</th>
<th>SIZE</th>
<th>TRIP RATE SOURCE</th>
<th>PM PEAK HOUR</th>
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<th>Traffic Volumes</th>
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<tbody>
<tr>
<td></td>
<td></td>
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<td>Trip Rates (trips/unit)</td>
<td>Traffic Volumes</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>In</td>
<td>Out</td>
<td>Total</td>
<td>In</td>
<td>Out</td>
</tr>
<tr>
<td>Residential</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Strata Apartments</td>
<td>258 units</td>
<td>CTS</td>
<td>0.14</td>
<td>0.08</td>
<td>0.22</td>
<td>36</td>
<td>21</td>
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<tr>
<td>Townhouses</td>
<td>5 units</td>
<td>Bunt / ITE 826</td>
<td>0.33</td>
<td>0.19</td>
<td>0.52</td>
<td>2</td>
<td>1</td>
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<tr>
<td>Sub-Total</td>
<td>263 units</td>
<td>--</td>
<td>38</td>
<td>22</td>
<td>59</td>
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<tr>
<td>Commercial</td>
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<td></td>
</tr>
<tr>
<td>Supermarket (Urban)</td>
<td>12.59 x 1,000 sqft</td>
<td>ITE &amp; Bunt</td>
<td>3.19</td>
<td>3.22</td>
<td>6.41</td>
<td>40</td>
<td>41</td>
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<tr>
<td>Specialty Retail</td>
<td>10.94 x 1,000 sqft</td>
<td>ITE 826</td>
<td>1.19</td>
<td>1.52</td>
<td>2.71</td>
<td>13</td>
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<tr>
<td>Restaurant</td>
<td>3.50 x 1,000 sqft</td>
<td>ITE 932</td>
<td>5.91</td>
<td>3.94</td>
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<td>14</td>
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<td>Sub-Total</td>
<td>27.03 x 1,000 sqft</td>
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<td>74</td>
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<tr>
<td>Internal Capture</td>
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<td></td>
<td>63</td>
<td>60</td>
<td>123</td>
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<tr>
<td>TOTAL TRAFFIC</td>
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<td>101</td>
<td>82</td>
<td>182</td>
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The supermarket (urban) trip rate was based on previous Bunt studies on urban supermarket. The rates were agreed with District staff before application for the Grouse Inn development site. Internal capture rate assumed are conservative considering the walkability nature of the proposed village. Actual trip generation could be lower as a result.
Exhibits 2.2 and 2.3 summarize the site traffic volumes for each of the developments assuming the existing road network. However, the McGuire Road connection between Capilano Road and the “Woonerf Road” on the east side of the CapWest site is expected to be developed with a new signal at Capilano Road sometime between the Opening Day (2019) and the long term planning horizon year (2030). Also, by 2030, McGuire Road is expected to be developed and connected between Capilano Road and Marine Drive with a new traffic signal at the intersection of McGuire Road & Marine Drive. Therefore for both the Opening Day and the long term planning horizon year of 2030, the background traffic associated with the Larco and Pacific Gate sites was redistributed to reflect these future networks as shown on Exhibit 2.4 and 2.5. Further information on the future road and traffic control assumptions is provided in Sections 2.4 and 2.5 below.

2.2.3 Combined Background Traffic

Exhibit 2.6 summarizes the 2019 Background traffic assuming just the 1% blanket growth rate while Exhibit 2.7 summarizes the 2030 background traffic assuming just the 1% blanket growth rate. The site-specific background growth component was then superimposed on these volumes to yield the combined background traffic forecasts as illustrated on Exhibits 2.8 and 2.9.
Exhibit 2.2
Larco CapWest Site Volumes (Prior to McGuire Avenue Connection East of Capilano Road)

Lions Gate Peripheral Area Townhouse Developments TIA
4749-08
May 2016
Exhibit 2.3
Pacific Gate Grouse Inn Site Volumes (Prior to McGuire Avenue Connection East of Capilano Road)

Lions Gate Peripheral Area Townhouse Developments TIA 4749-08
May 2016
Pacific Gate Grouse Inn Site Volumes (After McGuire Avenue Connection East of Capilano Road)

Exhibit 2.5

Traffic Signal
Unsignalised Intersection
XX (XX) AM Peak Hour (PM Peak Hour)

May 2016
Exhibit 2.6
2019 Background Traffic Volumes (1% Growth Only)
Exhibit 2.7

2030 Background Traffic Volumes (1% Growth Only)
Exhibit 2.8

2019 Background Traffic Volumes (1% Growth with Off-Site Traffic)

Lions Gate Peripheral Area Townhouse Developments TIA
4749-08
May 2016

*Note: Existing and single-family home trips associated with the Belle Isles Development are removed.
Exhibit 2.9

2030 Background Traffic Volumes (1% Growth with Off-Site Traffic)

Lions Gate Peripheral Area Townhouse Developments TIA
4749-08
May 2016

*Note: Existing and single-family home trips associated with the Belle Isles Development are removed.
2.3 Opening Day Road Network Assumptions

For the purposes of analysis, road and traffic control assumptions for Opening Day 2019 were:

- A new signal will be installed at Capilano Road & Curling Road, as recommended in Bunt’s Draft Transportation Impact (part of the Larco CapWest development off-site improvements);
- The future McGuire Road Connection will not yet be completed;
- Curling Road would not yet be connected to McGuire Road past the Capilano Road corridor;
- The future new separate southbound to eastbound left turn lane on Capilano Road to Marine Drive will not yet be installed (part of the Pacific Gate Grouse Inn development off-site improvements);
- The current T-intersection at Belle Isle Place / Fullerton Road will have a traffic circle constructed at this location as per the DNV’s traffic calming plans for the Fullerton corridor;
- Glenaire Drive will be connected to Curling Road (part of the Lions Gate Peripheral Area townhouse developments off-site improvements), and
- The Larco CapWest development will be completed (by 2018).

Note, we acknowledge that at the point of the writing of the report, Curling Road and Glenaire Drive functional designs are not yet completed. With the completion of the final functional designs issued from DNV, this analysis may need to be updated.

2.4 Planning Horizon Road Network Assumptions

For the purposes of analysis, road and traffic control assumptions for the 2030 Planning Horizon were:

- McGuire Avenue will be extended and completed between Marine Drive and the Woonerf;
- New traffic signals at Capilano Road / McGuire Avenue and at Marine Drive / McGuire Avenue intersections will be installed;
- Curling Road will be extended to the east and connected to McGuire Avenue;
- With the development of the Pacific Gate Grouse Inn, separate through and left turn lanes will be provided southbound on Capilano Road at Marine Drive; and,
- Both the Larco CapWest and the Grouse Inn developments were assumed to be completed.

2.5 Site Statistics and Site Generated-Trips

The site statistics provided by the client group used in this TIA for traffic impact assessment analysis are listed in Table 2.5 and Table 2.6 below. We note that since provision of these site statistics, the Citimark site is now proposed to have 87 units and the PC Urban development is proposed to have 23 units. As these minor changes would not substantively alter the findings of Bunt’s TIA analysis, the previously provided and slightly higher values were not updated.

Note, all of the below sites are currently assumed to be completed by 2019.
Table 2.5: Site Statistics and AM Trip Generation

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<tr>
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<th>AM PEAK HOUR</th>
<th>Trip Rates (trips/unit)</th>
<th>Traffic Volumes</th>
</tr>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>In</td>
<td>Out</td>
<td>Total</td>
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<tr>
<td>Citimark</td>
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<td>Bunt / ITE</td>
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<tr>
<td>The Airey Group</td>
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Table 2.6: Site Statistics and PM Trip Generation

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<td></td>
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<td>In</td>
<td>Out</td>
</tr>
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<td>Citimark</td>
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<td>Bunt / ITE</td>
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<td>Airey Group</td>
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<td></td>
</tr>
<tr>
<td>PCUrban</td>
<td></td>
<td></td>
<td>0.33</td>
<td>0.19</td>
</tr>
<tr>
<td>Townhouses</td>
<td>24 units</td>
<td>Bunt / ITE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Woodbridge Homes</td>
<td></td>
<td></td>
<td>0.33</td>
<td>0.19</td>
</tr>
<tr>
<td>Townhouses</td>
<td>153 units</td>
<td>Bunt / ITE</td>
<td>0.33</td>
<td>0.19</td>
</tr>
<tr>
<td>TOTAL TRAFFIC</td>
<td></td>
<td></td>
<td>102</td>
<td>58</td>
</tr>
</tbody>
</table>

Note: Townhouse trip generation rates were derived from a recent Bunt study of two townhouse developments near to the site: specifically, Cedar Crescent located at 2871-2935 Capilano Road and 3401-3599 Capilano Road. Driveway counts at these two existing townhouse sites were undertaken in late February 2016 and the resulting trip generation rates were found to be very close to the Residential Condominium / Townhouse category (ITE 230) within the ITE Trip Generation Manual (9th Edition). Therefore, the ITE 230 was used for analysis purposes in this TIA.
Based on Tables 2.5 and 2.6 above, the combined trip generation for the AM peak hour is 136 trips (27 inbound and 109 outbound) while the combined trip generation for the PM peak hour is 161 trips (102 inbound and 58 outbound).

### 2.6 Directional Distribution of Site Traffic Volumes

The assumed directional distribution of site traffic to the “external gates” at the study area boundaries was assumed to be the same the directional distribution used in the Lower Capilano Marine Village Centre Transportation Study (March 2013) as summarized in **Table 2.7**. This distribution was applied to both site trips associated with the subject four townhouse properties as well as the site-specific background trips associated with the Larco CapWest and Pacific Gate Grouse Inn sites.

**Table 2.7: Directional Distribution of Site**

<table>
<thead>
<tr>
<th>SITE TRAFFIC</th>
<th>AM PEAK HOUR</th>
<th>PM PEAK HOUR</th>
</tr>
</thead>
<tbody>
<tr>
<td>To/From</td>
<td>In</td>
<td>Out</td>
</tr>
<tr>
<td>Capilano North</td>
<td>41%</td>
<td>20%</td>
</tr>
<tr>
<td>Hope East</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Marine East</td>
<td>23%</td>
<td>23%</td>
</tr>
<tr>
<td>Garden South</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>McGuire South</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Capilano South</td>
<td>6%</td>
<td>6%</td>
</tr>
<tr>
<td>Marine West</td>
<td>30%</td>
<td>50%</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>100%</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

As the Lower Capilano Marine Village Centre Transport Plan was based on full build out of the neighbourhood with new roadway links, some adjustments to the assumed distribution was made to reflect the traffic analysis conditions without the McGuire and Curling Road extensions for the Opening Day conditions (only). **Exhibit 2.10** illustrates the assumed site directional distribution. The origin-destination traffic breakdown will still be the same.

For the 2030 planning horizon, as it is assumed that the McGuire connection will be completed, the directional distribution will be extended to include Garden Avenue South and McGuire South origin-destination points.

In addition to the distributions to the external gates of the study area noted above, traffic patterns are expected to change somewhat west of Capilano Road due to the new connection of Glenaire Drive to Curling Road. This new connection will change distribution of mainly the site traffic between Curling Road and Fullerton Road (for Lions Gate Peripheral Townhouse developments trips only). The diversion of traffic per the Glenaire Drive connection is shown in **Exhibit 2.11**.
Exhibit 2.10
Directional Distribution

Lions Gate Peripheral Area Townhouse Developments TIA
4749-08
May 2016
Exhibit 2.11
Glenaire Drive Connection Diversion Percentages
Based on the above information, **Exhibit 2.12** summarizes the Lions Gate Peripheral Area Townhouse Developments Traffic Volumes for the 2019 Opening Day conditions while **Exhibit 2.13** summaries the Lions Gate Peripheral Townhouse Developments Traffic Volumes for the 2030 Planning Horizon (when the McGuire Avenue connections east of Capilano Road are in place).
Exhibit 2.12
Lions Gate Peripheral Area Townhouse Developments Site Trips (2019 Opening Day)
Lions Gate Peripheral Area Townhouse Developments TIA 4749-08
May 2016
Exhibit 2.13
Lions Gate Peripheral Area Townhouse Developments
Site Trips (2030)

Lions Gate Peripheral Area Townhouse Developments TIA
4749-08
May 2016
2.7 Opening Day and Planning Horizon Total Traffic Forecast

To create Opening Day total traffic forecasts, site trips were superimposed on combined background trips (2019 off-site trips, 2019 background growth trips of 1% per annum, and 2019 Lions Gate Peripheral Area Townhouse Developments site trips). The Build-out scenario total Opening Day traffic volumes are summarized on Exhibit 2.14.

Similar to the Opening Day total traffic forecasts, trips from Exhibits 2.4, 2.5, 2.7, and 2.13 were combined (2030 off-site trips, 2030 background growth trips of 1% per annum, and 2030 Lions Gate Peripheral Area Townhouse Developments site trips). The Build-out scenario total Planning Horizon (2030) traffic volumes are summarized on Exhibit 2.15.

For both build-out scenarios, it must be noted that the single family home trips to which the developments are built on have been removed for the purposes of analysis but as the volumes are low, they have not been explicit provided in an exhibit.
Exhibit 2.14

2019 Opening Day Combined Total Traffic Volumes
Exhibit 2.15

2030 Combined Total Traffic Volumes
3. TRAFFIC IMPACT ASSESSMENT

3.1 Traffic Analysis Scenarios

3.1.1 Existing Conditions
Existing conditions models were prepared as part of several TIAs associated with the Larco site as reported in Bunt’s Draft Transportation Impact Assessment at Full Build Out (April 2016) and therefore analysis of this scenario is not repeated herein.

3.1.2 2019 Background Conditions
Bunt assumed that for the 2019 Background scenario the Larco CapWest site would be completed. As such, site traffic from the CapWest development was included in the traffic models in addition to the 1% per annum growth on Capilano Road.

3.1.3 2019 Opening Day Total Conditions
Bunt assumed that for the 2019 Opening Day scenario both the Larco CapWest site and the Lions Gate Peripheral Area townhouse developments site trips would be completed. All road and traffic control improvements assumed for 2019 Background scenario were also assumed for the 2019 Total Scenario; in addition, the Glenaire Drive connection is expected to be in place for this scenario.

As the Lions Gate Peripheral Area townhouse sites will replace existing single family homes, the original single family home trips were subtracted from the road network. The single family home trips removed were calculated using the ITE Trip Generation Manual (9th Edition) for Single Family Detached Housing (ITE 210). Aside from the subtraction, the 1% per annum growth was applied to the arterial roads.

Also, by opening day, it is assumed that the Jr. Woonerf connecting Belle Isle Place and Fullerton Avenue and Glenaire Drive (north of the Belle Isle Park) will be in place. As this connection was being designed as of the writing of the report and the traffic volumes are expected to be low due to the pedestrian-oriented nature of the Jr. Woonerf, no traffic was assigned to the Jr. Woonerf for the purposes of analysis.

3.1.4 2030 Background Conditions
Bunt assumed that for the 2030 Background scenario both the Larco CapWest site and the Pacific Gate Grouse Inn development site would be completed. Aside from the site-specific background trips, the 1% growth was applied on through traffic on just the arterial roads.

The McGuire Avenue intersection connection east of Capilano Road and to Marine Drive was also assumed to be in place along with the Marine Drive / Capilano Road separate southbound through and left turn lanes.
3.1.5 2030 Total Conditions

In this scenario, Bunt assumed that the Lions Gate Peripheral Area townhouse site trips would be superimposed on the background traffic after removal of single family homes. All road and traffic control improvements assumed for 2030 Background scenario were also assumed for the 2030 Total Scenario.

3.2 Performance Thresholds

The following desired traffic operations performance thresholds were assumed, which if exceeded would trigger consideration of potential mitigation measures:

- \( v/c = 0.90 \) or less for the overall intersection operations; and,
- \( v/c = 0.95 \) or less for individual movements and Levels of Service at E or F.

3.3 Signal Timing Assumptions

3.3.1 2019 Scenarios

Today, the Marine Drive / Capilano Road intersection is not coordinated with the Fullerton Avenue / Capilano Road intersection. As part of the Larco CapWest project, when the new traffic signal at Capilano Road & Curling is installed the three resulting signals will be coordinated as reported in Bunt’s CapWest Transportation Impact Assessment Study at Full Build Out.

In consequence, for this TIA Bunt assumed that the 2019 scenario assumed that Curling Road was signalized and the intersection signal timings at Marine Drive, Curling Road, and Fullerton Avenue were coordinated and phasing/green splits optimized. As part of this study, for the 2019 scenarios, signal phase split optimization was updated to accommodate the forecasted traffic which is anticipated to be higher than in the CapWest study.

A summary of the assumed signal timings is shown in Table 3.1 and Appendix A provides further details of recommended green, yellow and all red times. Note, for this analysis, the yellow and all red clearance times for the new Capilano Road & Curling Road intersection were not the Synchro-calculated defaults but were calculated based on District of North Vancouver guidelines. For the purposes of this TIA, the yellow and all red clearance times at the existing Marine Drive and Fullerton signals were assumed to be the same as today, since stop bars and curb locations at these existing signalized intersections are not expected to change.

---

1 District of North Vancouver Signal Timing Practices Review, CTS, 2002
Table 3.1: Signal Timing Assumptions – 2019 Background / Total Conditions

<table>
<thead>
<tr>
<th>INTERSECTION</th>
<th>2019 BACKGROUND / TOTAL</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM Peak Hour</td>
<td>PM Peak Hour</td>
<td></td>
</tr>
<tr>
<td>Fullerton Avenue / Capilano Road</td>
<td>Optimized Timing, Coordinated (65s Cycle)</td>
<td>Optimized Timing, Coordinated (65s Cycle)</td>
<td></td>
</tr>
<tr>
<td>Curling Road / Capilano Road</td>
<td>Optimized Timing Coordinated (130s Cycle)</td>
<td>Optimized Timing, Coordinated (65s Cycle)</td>
<td></td>
</tr>
<tr>
<td>Marine Drive / Capilano Road</td>
<td>Optimized Timing, Coordinated (130s Cycle)</td>
<td>Optimized Timing, Coordinated (130s Cycle)</td>
<td></td>
</tr>
</tbody>
</table>

For the 2019 Total conditions, it was assumed that the Capilano Corridor signal cycle lengths and coordination offsets would not change from the 2019 Background conditions. As such, only signal phase optimization of green splits was assumed to accommodate additional site trip volumes anticipated in the study area.

“Half cycling” at the Fullerton Avenue intersection as noted in the table above was assumed during both the AM and PM peak hours, and similarly at the Curling Road intersection during the PM peak hour. The longer cycle time at Curling Road of 130 seconds during the AM Peak Hour was assumed in order to provide better coordination with the critical southbound right turn onto Marine Drive. In Bunt’s view, this is considered the best approach to provide opportunities for side street vehicles to enter the Capilano Road corridor without excessive queues blocking the future “Woonerf” road and ensuring northbound to westbound left turn bays do not overflow on Capilano Road. The efficiency of intersection operations may be somewhat worsened as compared to a providing a longer cycle as there is more lost time with double cycling. Also, operations for major arterial movements may not be optimized; however, it is Bunt’s opinion that double cycling is necessary to support the densities proposed for the Lower Capilano Marine Village plan and that it balances the need to manage queues as well as provide good traffic operations for through traffic.

It is noted that the northbound left turn movement at Fullerton Avenue was assumed to be permitted only during the AM Peak Hour. This assumption is necessary to accomplish the half cycle timing of 65 seconds while still maintaining enough green time for the critical southbound through movement. Utilizing a 130s cycle at this intersection resulted in significant delay and queuing along Fullerton Avenue in the eastbound direction and consistent blocking of the “Woonerf” road.

3.3.2  2030 Scenarios

By 2030, improvements to the Capilano Corridor anticipated are outlined in Section 2.4. Based on the above improvements and to optimize operations while managing queues, Table 3.2 summarizes the proposed cycle lengths for each intersection. As McGuire Avenue will be signalized and is located between

For the 2030 Scenarios, the proposed cycle lengths for each intersection are as follows:
Fullerton and Curling Road, the cycle length is recommended to be 65 seconds for the best coordination with other signals in the corridor.

Table 3.2: Signal Timing Assumptions – 2030 Background / Total Conditions

<table>
<thead>
<tr>
<th>INTERSECTION</th>
<th>2030 BACKGROUND / TOTAL</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AM Peak Hour</td>
<td>PM Peak Hour</td>
</tr>
<tr>
<td>Fullerton Avenue / Capilano Road</td>
<td>Optimized Timing, Coordinated (65s Cycle)</td>
<td>Optimized Timing, Coordinated (65s Cycle)</td>
</tr>
<tr>
<td>McGuire Avenue / Capilano Road</td>
<td>Optimized Timing, Coordinated (65s Cycle)</td>
<td>Optimized Timing, Coordinated (65s Cycle)</td>
</tr>
<tr>
<td>Curling Road / Capilano Road</td>
<td>Optimized Timing Coordinated (130s Cycle)</td>
<td>Optimized Timing, Coordinated (65s Cycle)</td>
</tr>
<tr>
<td>Marine Drive / Capilano Road</td>
<td>Optimized Timing, Coordinated (130s Cycle)</td>
<td>Optimized Timing, Coordinated (130s Cycle)</td>
</tr>
</tbody>
</table>

3.4 Traffic Assessment Results

Traffic operations were analyzed using the Synchro/SimTraffic software; the results are summarized in a series of tables provided in the sections below as well as Appendix B.

The summary tables report the calculated Volume-to-Capacity (v/c) ratio and a corresponding delay-based traffic Level of Service (LOS) indicator ranging from LOS A conditions with minimal delay through to LOS E ‘near capacity’ conditions and LOS F ‘over-saturated’ conditions when drivers may have to wait through several signal cycles to perform their desired movements through the intersection. The 50th and 95th percentile queues, which are predicted queue lengths for each lane group, are also summarized measured in metres.

Section 3.3.1 below focuses on the Level of Service and Volume-to-Capacity ratio performance metrics; and Section 3.3.2 following focuses on anticipated queuing conditions.

3.4.1 Levels of Service and Volume-to-Capacity Analysis

Fullerton Avenue / Capilano Road

Tables 3.3 to 3.6 summarize the reported HCM 2000 performance of Fullerton Avenue / Capilano Road with the Synchro and SimTraffic (ST) queues in the AM and PM Peak hours, respectively. It can be seen that the reported overall operations of this intersection were acceptable in all scenarios. It must be noted...
that the southbound through movement exhibits near or at-capacity v/c for all of the AM scenarios. This is consistent with the existing roadway conditions.
### Table 3.3: Fullerton Avenue / Capilano Road – AM Peak Hour – 2019 Background / Total Conditions

<table>
<thead>
<tr>
<th></th>
<th>EASTBOUND</th>
<th>NORTHBOUND</th>
<th>SOUTHBOUND</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MOVEMENT</strong></td>
<td>L</td>
<td>R</td>
<td>L</td>
</tr>
<tr>
<td><strong>Background 2019</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>Geometry</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>v/c</td>
<td>0.55</td>
<td>0.13</td>
<td>0.35</td>
</tr>
<tr>
<td>Delay (s)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LOS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>50th Queue (m)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ST Average Queue (m)</td>
<td>26</td>
<td>22</td>
<td>40</td>
</tr>
<tr>
<td>95th Queue (m)</td>
<td>34</td>
<td>13</td>
<td>13</td>
</tr>
<tr>
<td>ST 95th Queue (m)</td>
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<td>36</td>
<td>28</td>
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<td>Intersection V/C:</td>
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<tr>
<td>Intersection LOS (Delay):</td>
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<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total 2019</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Geometry</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>v/c</td>
<td>0.56</td>
<td>0.28</td>
<td>0.37</td>
</tr>
<tr>
<td>Delay (s)</td>
<td></td>
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</tr>
<tr>
<td>LOS</td>
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<td></td>
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</tr>
<tr>
<td>50th Queue (m)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>ST Average Queue (m)</td>
<td>28</td>
<td>26</td>
<td>22</td>
</tr>
<tr>
<td>95th Queue (m)</td>
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<td>20</td>
<td>11</td>
</tr>
<tr>
<td>ST 95th Queue (m)</td>
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<td>40</td>
<td>38</td>
</tr>
<tr>
<td>Intersection V/C:</td>
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<tr>
<td>Intersection LOS (Delay):</td>
<td>C (33)</td>
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### Table 3.4: Fullerton Avenue / Capilano Road – PM Peak Hour – 2019 Background / Total Conditions

<table>
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<th>SOUTHBOUND</th>
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<tbody>
<tr>
<td>L</td>
<td>R</td>
<td>L</td>
<td>T</td>
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</table>

#### Background 2019

<table>
<thead>
<tr>
<th>Geometry</th>
<th>L-R</th>
<th>L-T-T</th>
<th>T-T/R</th>
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</thead>
<tbody>
<tr>
<td>v/c</td>
<td>0.43</td>
<td>0.47</td>
<td>0.47</td>
</tr>
<tr>
<td>Delay (s) LOS</td>
<td>28</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>50th Queue (m)</td>
<td>C</td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>ST Average Queue (m)</td>
<td>16</td>
<td>28</td>
<td>24</td>
</tr>
<tr>
<td>95th Queue (m)</td>
<td>21</td>
<td>39</td>
<td>57</td>
</tr>
<tr>
<td>ST 95th Queue (m)</td>
<td>30</td>
<td>55</td>
<td>47</td>
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</table>

Intersection V/C: 0.51
Intersection LOS (Delay): B (11)

#### Total 2019

<table>
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<th>T-T/R</th>
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<tbody>
<tr>
<td>v/c</td>
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<td>0.54</td>
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<tr>
<td>Delay (s) LOS</td>
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<td>B</td>
<td>B</td>
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<tr>
<td>ST 95th Queue (m)</td>
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<td>72</td>
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Intersection V/C: 0.56
Intersection LOS (Delay): B (13)
Table 3.5: Fullerton Avenue / Capilano Road – AM Peak Hour – 2030 Background / Total Conditions

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<td>R</td>
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<tr>
<td><strong>Background 2030</strong></td>
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<tr>
<td><strong>Geometry</strong></td>
<td>L-R</td>
<td>L-T-T</td>
<td>T-T/R</td>
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<tr>
<td>v/c</td>
<td>0.55</td>
<td>0.12</td>
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</tr>
<tr>
<td>Delay (s)</td>
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<td>23</td>
<td>45</td>
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<tr>
<td>LOS</td>
<td>C</td>
<td>C</td>
<td>D</td>
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<td>50th Queue (m)</td>
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<td>0</td>
<td>8</td>
</tr>
<tr>
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<td>20</td>
</tr>
<tr>
<td>95th Queue (m)</td>
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<td>13</td>
<td>21</td>
</tr>
<tr>
<td>ST 95th Queue (m)</td>
<td>40</td>
<td>34</td>
<td>33</td>
</tr>
<tr>
<td>Intersection V/C:</td>
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<td></td>
</tr>
<tr>
<td>Intersection LOS (Delay):</td>
<td>C (31)</td>
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<th>EASTBOUND</th>
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<td>L-T-T</td>
<td>T-T/R</td>
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<td>D</td>
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</tr>
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<td>21</td>
</tr>
<tr>
<td>ST 95th Queue (m)</td>
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<td>34</td>
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<tr>
<td>Intersection V/C:</td>
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<td>Intersection LOS (Delay):</td>
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Table 3.6: Fullerton Avenue / Capilano Road – PM Peak Hour – 2030 Background / Total Conditions

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<th></th>
<th>EASTBOUND</th>
<th>NORTHBOUND</th>
<th>SOUTHBOUND</th>
</tr>
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<td>MOVEMENT</td>
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<td>R</td>
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<tr>
<td><strong>Background 2030</strong></td>
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<td></td>
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<tr>
<td>Geometry</td>
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</table>
Curling Road / Capilano Road

Tables 3.7 and 3.10 summarize the reported HCM 2000 performance of Curling Road / Capilano Road intersection with the Synchro and SimTraffic (ST) queue in the AM and PM Peak hours, respectively. For the purposes of analysis under 2019 traffic demands, Curling Road was assumed to have separate right and left turn exit lanes.

By 2030, with Curling extended eastward to McGuire, the eastbound approach on Curling was assumed to be changed to an eastbound right turn plus a shared eastbound through + left configuration; the westbound approach was assumed to have the same configuration. It can be seen that both the eastbound and westbound approaches to the intersection are expected to operate with relatively high delays at LOS E during the AM peak hour, primarily due to the 130 second long signal cycle required for coordination with the Marine Drive traffic signal. However, westbound and eastbound queues are expected to be modest and not block adjacent intersections.
### Table 3.7: Curling Road / Capilano Road – AM Peak Hour – 2019

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</thead>
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#### Background 2019

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<th>T-T/R</th>
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<td>0.18</td>
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<td>LOS</td>
<td>E</td>
<td>E</td>
<td>A</td>
</tr>
<tr>
<td>50&lt;sup&gt;th&lt;/sup&gt; Queue (m)</td>
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<td>1</td>
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<tr>
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<td>9</td>
<td>7</td>
</tr>
<tr>
<td>95&lt;sup&gt;th&lt;/sup&gt; Queue (m)</td>
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<tr>
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<td>20</td>
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<td>Intersection V/C:</td>
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#### Total 2019

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<th>T-T/R</th>
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</thead>
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<td>0.37</td>
<td>0.23</td>
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<td>60</td>
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<tr>
<td>LOS</td>
<td>E</td>
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<td>A</td>
</tr>
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Value not reported
### Table 3.8: Curling Road / Capilano Road – PM Peak Hour – 2019

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<td>L</td>
<td>T</td>
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<tr>
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<td>T</td>
<td>T</td>
<td>R</td>
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#### Background 2019

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<th>L-T-T</th>
<th>T-T/R</th>
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<tbody>
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<td>0.23</td>
<td>0.19</td>
<td>0.58</td>
</tr>
</tbody>
</table>

| Delay (s) | 27 | 26 | 1 | 3 | 2 |
| LOS       | C  | C  | A | A | A |
| 50th Queue (m) | 5 | 0 | 1 | 11 | 3 |

| ST Average Q (m) | 10 | 9 | 12 | 24 | 39 |
| 95th Queue (m)   | 13 | 9 | m2 | 25 | 8 |
| ST 95th Queue (m) | 21 | 17 | 26 | 46 | 101 |

Intersection V/C: 0.57
Intersection LOS (Delay): A (4)

#### Total 2019

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<th>L-T-T</th>
<th>T-T/R</th>
</tr>
</thead>
<tbody>
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<td>0.27</td>
<td>0.60</td>
</tr>
</tbody>
</table>

| Delay (s) | 27 | 26 | 1 | 3 | 2 |
| LOS       | C  | C  | A | A | A |
| 50th Queue (m) | 6 | 0 | 1 | 11 | 4 |

| ST Average Q (m) | 10 | 14 | 18 | 29 | 103 |
| 95th Queue (m)   | 15 | 10 | m1 | m21 | 9 |
| ST 95th Queue (m) | 23 | 28 | 29 | 47 | 118 |

Intersection V/C: 0.59
Intersection LOS (Delay): A (4)
### Table 3.9: Curling Road / Capilano Road – AM Peak Hour – 2030

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<th>SOUTHBOUND</th>
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#### Background 2030

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<td>E</td>
<td>E</td>
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**INTERSECTION V/C: 0.60**

**INTERSECTION LOS (DELAY): A (7)**

#### Total 2030

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<td>D</td>
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<td>ST Average Q (m)</td>
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<td>3</td>
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<tr>
<td>95th Queue (m)</td>
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**INTERSECTION V/C: 0.65**

**INTERSECTION LOS: A (9)**
Table 3.10: Curling Road Avenue / Capilano Road – PM Peak Hour – 2030

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Background 2030

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<td>7</td>
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<td>16</td>
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INTERSECTION V/C: 0.61
INTERSECTION LOS (DELAY): A (5)

Total 2030

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INTERSECTION V/C: 0.63
INTERSECTION LOS: A (6)
Marine Drive / Capilano Road

Tables 3.11 through 3.14 summarize the reported HCM 2000 performance of Marine Drive / Capilano Road with the Synchro and SimTraffic (ST) queues in the AM and PM Peak hours for the two horizon years under both Background and Total traffic conditions.

This intersection is expected to be close to capacity during both the 2019 AM and PM peak hour all scenarios. The peak demand movements in the AM will continue to be the southbound right turn and the westbound through movement. In the PM Peak hour, the peak demand movements will continue to be the eastbound left turn and through movements. Long queues are expected to be present for the southbound right turn movement, as they are today during the AM peak hour. Also in the 2019 AM peak hour scenarios, the westbound left turn is expected to operate with long delays but this is primarily a result of the long 130 second cycle; as this left turn movement is also expected to have low demand volumes (less than 20 vph) the high delays are not considered a significant operational issues for this intersection. The eastbound left turn during the PM peak hour is anticipated to have a v/c of 0.88 for the 2019 Background scenario and 0.93 for the 2019 Total scenario.

For the 2030 Scenarios, it was assumed that geometric improvements will be made to the southbound approach of the intersection which will have a significant operational benefit during the PM Peak period in particular. Specifically, the current southbound through-left lane will be separated into one southbound left lane and one southbound through lane. With the improvement, the southbound approach to this intersection is expected to improve operations considerably compared to 2019 conditions.
Table 3.11: Marine Drive / Capilano Road – AM Peak Hour – 2019

<table>
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**Background 2019**

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**Total 2019**

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**Intersection V/C:** 0.91                  **Intersection LOS (Delay):** C (32)

**Intersection V/C:** 0.93                  **Intersection LOS:** D (39)
### Table 3.12: Marine Drive / Capilano Road – PM Peak Hour – 2019

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<td>25</td>
<td>18</td>
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<td>D</td>
<td>C</td>
<td>B</td>
<td>E</td>
</tr>
<tr>
<td><strong>50&lt;sup&gt;th&lt;/sup&gt; Queue (m)</strong></td>
<td>146</td>
<td>115</td>
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<td>12</td>
</tr>
<tr>
<td><strong>ST Average Q (m)</strong></td>
<td>101</td>
<td>65</td>
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<tr>
<td><strong>95&lt;sup&gt;th&lt;/sup&gt; Queue (m)</strong></td>
<td>174</td>
<td>141</td>
<td>24</td>
<td>25</td>
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<tr>
<td><strong>ST 95&lt;sup&gt;th&lt;/sup&gt; Queue (m)</strong></td>
<td>149</td>
<td>99</td>
<td>71</td>
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</tr>
<tr>
<td><strong>Intersection V/C</strong></td>
<td>0.88</td>
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<td></td>
<td></td>
</tr>
<tr>
<td><strong>Intersection LOS (Delay)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total 2019</strong></td>
<td></td>
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<td>L-T-R</td>
<td>L/T-R-R</td>
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<td>0.53</td>
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<td><strong>Delay (s)</strong></td>
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<td>27</td>
<td>20</td>
<td>65</td>
</tr>
<tr>
<td><strong>LOS</strong></td>
<td>E</td>
<td>C</td>
<td>B</td>
<td>E</td>
</tr>
<tr>
<td><strong>50&lt;sup&gt;th&lt;/sup&gt; Queue (m)</strong></td>
<td>157</td>
<td>88</td>
<td>21</td>
<td>12</td>
</tr>
<tr>
<td><strong>ST Average Q (m)</strong></td>
<td>160</td>
<td>75</td>
<td>35</td>
<td>10</td>
</tr>
<tr>
<td><strong>95&lt;sup&gt;th&lt;/sup&gt; Queue (m)</strong></td>
<td>200</td>
<td>144</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td><strong>ST 95&lt;sup&gt;th&lt;/sup&gt; Queue (m)</strong></td>
<td>245</td>
<td>175</td>
<td>56</td>
<td>28</td>
</tr>
<tr>
<td><strong>Intersection V/C</strong></td>
<td>0.93</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Intersection LOS (Delay)</strong></td>
<td></td>
<td></td>
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### Table 3.13: Marine Drive / Capilano Road – AM Peak Hour – 2030

<table>
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<tr>
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<th>NORTHBOUND</th>
<th>SOUTHBOUND</th>
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<tr>
<td></td>
<td>L</td>
<td>T</td>
<td>R</td>
<td>L</td>
</tr>
<tr>
<td><strong>Background 2030</strong></td>
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<td></td>
<td></td>
<td></td>
</tr>
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<td>Geometry</td>
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<td>L-T-T-T-R</td>
<td>L-T-R</td>
<td>L-T-R-R</td>
</tr>
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<td>v/c</td>
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<td>0.59</td>
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<td>0.63</td>
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<tr>
<td>Delay (s)</td>
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<td>96</td>
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<tr>
<td>LOS</td>
<td>E</td>
<td>C</td>
<td>C</td>
<td>F</td>
</tr>
<tr>
<td>50th Queue (m)</td>
<td>58</td>
<td>73</td>
<td>1</td>
<td>5</td>
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<tr>
<td>ST Average Q (m)</td>
<td>59</td>
<td>52</td>
<td>18</td>
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<tr>
<td>95th Queue (m)</td>
<td>75</td>
<td>107</td>
<td>15</td>
<td>13</td>
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<td>ST 95th Queue (m)</td>
<td>84</td>
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<td>57</td>
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**INTERSECTION V/C:** 0.93

### Total 2030

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<th>SOUTHBOUND</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>L</td>
<td>T</td>
<td>R</td>
<td>L</td>
</tr>
<tr>
<td><strong>Total 2030</strong></td>
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<tr>
<td>Geometry</td>
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<td>L-T-T-R</td>
<td>L-T-R</td>
<td>L-T-R-R</td>
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<td>v/c</td>
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<td>0.10</td>
<td>0.63</td>
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<tr>
<td>Delay (s)</td>
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<td>28</td>
<td>96</td>
</tr>
<tr>
<td>LOS</td>
<td>E</td>
<td>D</td>
<td>C</td>
<td>F</td>
</tr>
<tr>
<td>50th Queue (m)</td>
<td>59</td>
<td>74</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>ST Average Q (m)</td>
<td>56</td>
<td>57</td>
<td>11</td>
<td>8</td>
</tr>
<tr>
<td>95th Queue (m)</td>
<td>77</td>
<td>108</td>
<td>16</td>
<td>13</td>
</tr>
<tr>
<td>ST 95th Queue (m)</td>
<td>79</td>
<td>85</td>
<td>37</td>
<td>17</td>
</tr>
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</table>

**INTERSECTION V/C:** 0.95

**INTERSECTION LOS:** C (35)
Table 3.14: Marine Drive / Capilano Road – PM Peak Hour – 2030

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<th>WESTBOUND</th>
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<th>NORTHBOUND</th>
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<td>T</td>
<td>R</td>
<td>L</td>
<td>T</td>
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**Background 2030**

<table>
<thead>
<tr>
<th>Geometry</th>
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<th>L-T-R</th>
<th>L-T-R-R</th>
</tr>
</thead>
<tbody>
<tr>
<td>v/c</td>
<td>0.90</td>
<td>0.71</td>
<td>0.23</td>
<td>0.57</td>
</tr>
<tr>
<td>Delay (s)</td>
<td>50</td>
<td>27</td>
<td>19</td>
<td>66</td>
</tr>
<tr>
<td>LOS</td>
<td>D</td>
<td>C</td>
<td>B</td>
<td>E</td>
</tr>
<tr>
<td>50th Queue (m)</td>
<td>147</td>
<td>128</td>
<td>10</td>
<td>14</td>
</tr>
<tr>
<td>ST Average Q (m)</td>
<td>138</td>
<td>73</td>
<td>35</td>
<td>13</td>
</tr>
<tr>
<td>95th Queue (m)</td>
<td>174</td>
<td>156</td>
<td>26</td>
<td>27</td>
</tr>
<tr>
<td>ST 95th Queue (m)</td>
<td>191</td>
<td>116</td>
<td>80</td>
<td>33</td>
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</table>

**Total 2030**

<table>
<thead>
<tr>
<th>Geometry</th>
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<th>L-T-R</th>
<th>L-T-R-R</th>
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</thead>
<tbody>
<tr>
<td>v/c</td>
<td>0.93</td>
<td>0.70</td>
<td>0.23</td>
<td>0.57</td>
</tr>
<tr>
<td>Delay (s)</td>
<td>52</td>
<td>26</td>
<td>18</td>
<td>66</td>
</tr>
<tr>
<td>LOS</td>
<td>D</td>
<td>C</td>
<td>B</td>
<td>E</td>
</tr>
<tr>
<td>50th Queue (m)</td>
<td>155</td>
<td>128</td>
<td>10</td>
<td>14</td>
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<tr>
<td>ST Average Q (m)</td>
<td>109</td>
<td>79</td>
<td>35</td>
<td>15</td>
</tr>
<tr>
<td>95th Queue (m)</td>
<td>184</td>
<td>156</td>
<td>26</td>
<td>27</td>
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<tr>
<td>ST 95th Queue (m)</td>
<td>150</td>
<td>118</td>
<td>82</td>
<td>38</td>
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</table>

**Intersection V/C:** 0.82  
**Intersection LOS (Delay): D (36)**
Capilano Road / McGuire Road
By 2030, the McGuire Avenue extension northwards across Capilano Road to the “Woonerf” road is expected to be in place. **Table 3.15 and 3.16** summarize the 2030 intersection operations expected at this location for both time periods and traffic scenarios. Overall, it can be seen that the intersection is expected to operate well under the assumed signal coordination and timing plans.

**Table 3.15: McGuire Avenue / Capilano Road – AM Peak Hour – 2030**

<table>
<thead>
<tr>
<th>MOVEMENT</th>
<th>EASTBOUND</th>
<th>WESTBOUND</th>
<th>NORTHBOUND</th>
<th>SOUTHBOUND</th>
</tr>
</thead>
<tbody>
<tr>
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<td>L T R</td>
<td>L T R</td>
<td>L T R</td>
<td>L T R</td>
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**Background 2030**

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<tr>
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<th>L-T-T/R</th>
<th>L-T-T/R</th>
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<tr>
<td>v/c</td>
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<td>0.03</td>
<td>0.12</td>
<td>0.04</td>
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<tr>
<td>Delay (s)</td>
<td>33</td>
<td>32</td>
<td>33</td>
<td>32</td>
</tr>
<tr>
<td>LOS</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>50th Queue (m)</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>ST Average Q (m)</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>95th Queue (m)</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>ST 95th Queue (m)</td>
<td>4</td>
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<td>8</td>
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INTERSECTION V/C: 0.63

**Total 2030**

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<th>L-T-R-R</th>
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<tbody>
<tr>
<td>v/c</td>
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<td>0.02</td>
<td>0.06</td>
<td>0.02</td>
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<td>Delay (s)</td>
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<td>30</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>LOS</td>
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<td>0</td>
</tr>
<tr>
<td>ST Average Q (m)</td>
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<td>3</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>95th Queue (m)</td>
<td>3</td>
<td>3</td>
<td>3</td>
<td>5</td>
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<tr>
<td>ST 95th Queue (m)</td>
<td>4</td>
<td>10</td>
<td>7</td>
<td>12</td>
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INTERSECTION V/C: 0.65

INTERSECTION LOS (DELAY): A (4)
### Table 3.16: McGuire Avenue Drive / Capilano Road – PM Peak Hour – 2030

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<th>EASTBOUND</th>
<th>WESTBOUND</th>
<th>NORTHBOUND</th>
<th>SOUTHBOUND</th>
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</thead>
<tbody>
<tr>
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<td>L T R</td>
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<td>L T R</td>
<td>L T R</td>
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#### Background 2030

<table>
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<th>NORTHBOUND</th>
<th>SOUTHBOUND</th>
</tr>
</thead>
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<td>v/c</td>
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<td>0.07</td>
<td>0.01</td>
<td>0.57</td>
</tr>
<tr>
<td>Delay (s)</td>
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<td>30</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>LOS</td>
<td>C</td>
<td>C</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>50th Queue (m)</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>ST Average Q (m)</td>
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<td>2</td>
<td>4</td>
<td>11</td>
</tr>
<tr>
<td>95th Queue (m)</td>
<td>3</td>
<td>6</td>
<td>0</td>
<td>8</td>
</tr>
<tr>
<td>ST 95th Queue (m)</td>
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<td>7</td>
<td>12</td>
<td>37</td>
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**INTERSECTION V/C:** 0.54  **INTERSECTION LOS (DELAY):** A (1)

#### Total 2030

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<th>L-T-R</th>
<th>L/T-R-R</th>
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</thead>
<tbody>
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<td>0.04</td>
<td>0.04</td>
<td>0.19</td>
</tr>
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<td>Delay (s)</td>
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<td>28</td>
<td>28</td>
<td>29</td>
</tr>
<tr>
<td>LOS</td>
<td>C</td>
<td>C</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>50th Queue (m)</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>ST Average Q (m)</td>
<td>2</td>
<td>6</td>
<td>2</td>
<td>9</td>
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<tr>
<td>95th Queue (m)</td>
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<td>4</td>
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</tr>
<tr>
<td>ST 95th Queue (m)</td>
<td>7</td>
<td>10</td>
<td>10</td>
<td>20</td>
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**INTERSECTION V/C:** 0.57  **INTERSECTION LOS (DELAY):** A (2)
Site Accesses

The proposed site accesses were found to operate acceptably for both the AM and PM peak hours. **Table 3.17** summarizes the results. At the site access points, traffic volumes are expected to be the same in 2019 and 2030 as background traffic growth of 1%/year was only applied to arterial road through traffic volumes in the study area.

**Table 3.17: Site Accesses**

<table>
<thead>
<tr>
<th>INTERSECTION</th>
<th>AM PEAK HOUR</th>
<th>PM PEAK HOUR</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Minor Leg V/C &amp; LOS Intersection Delay</td>
<td>Minor Leg V/C &amp; LOS Intersection Delay</td>
<td></td>
</tr>
<tr>
<td>Curling Road (Citimark and Airey Group)</td>
<td>0.05</td>
<td>0.03</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>9 sec</td>
<td>10 sec</td>
<td></td>
</tr>
<tr>
<td>Fullerton Avenue (PCUrban)</td>
<td>0.01</td>
<td>0.00</td>
<td>A</td>
</tr>
<tr>
<td></td>
<td>9 sec</td>
<td>9 sec</td>
<td></td>
</tr>
<tr>
<td>Woodbridge (not applicable as it exits onto Fullerton Avenue / Glenaire Drive intersection)</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Other Unsignalized Intersections

The unsignalized intersections west of the Capilano Corridor included as part of this traffic study are forecasted to operate well for all horizon years under both Background and Total traffic conditions as summarized in **Tables 3.18 through 3.21**. At these intersections, traffic volumes are expected to be the same in 2019 and 2030 as background traffic growth of 1%/year was only applied to Arterial road through traffic volumes in the study area.

Note that the analysis accounts for the following:
- the Belle Isle Place intersection will be a traffic circle when the townhouse developments are completed and,
- the Glenaire Drive / Curling Road intersection will be connected as part of the townhouse development projects.
### Table 3.18: Sandown Place / Fullerton Avenue

<table>
<thead>
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<th>AM PEAK HOUR</th>
<th>PM PEAK HOUR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Minor Leg V/C &amp; LOS Intersection Delay</td>
<td>Minor Leg V/C &amp; LOS Intersection Delay</td>
</tr>
<tr>
<td>Sandown Place / Fullerton Avenue</td>
<td>0.05 B</td>
<td>0.02 B</td>
</tr>
<tr>
<td></td>
<td>13 sec</td>
<td>13 sec</td>
</tr>
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</table>

### Table 3.19: Belle Isle Place / Fullerton Avenue

<table>
<thead>
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<th>INTERSECTION</th>
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<th>PM PEAK HOUR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Minor Leg V/C &amp; LOS Intersection Delay</td>
<td>Minor Leg V/C &amp; LOS Intersection Delay</td>
</tr>
<tr>
<td>Belle Isle Place / Fullerton Avenue</td>
<td>0.3 A</td>
<td>0.3 A</td>
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</tbody>
</table>

### Table 3.20: Fullerton Avenue / Glenaire Drive

<table>
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<th>PM PEAK HOUR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Minor Leg V/C &amp; LOS Intersection Delay</td>
<td>Minor Leg V/C &amp; LOS Intersection Delay</td>
</tr>
<tr>
<td>Fullerton Avenue / Glenaire Drive</td>
<td>0.01 B</td>
<td>0.02 A</td>
</tr>
<tr>
<td></td>
<td>11 sec</td>
<td>10 sec</td>
</tr>
</tbody>
</table>

### Table 3.21: Glenaire Drive / Curling Road

<table>
<thead>
<tr>
<th>INTERSECTION</th>
<th>AM PEAK HOUR</th>
<th>PM PEAK HOUR</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Minor Leg V/C &amp; LOS Intersection Delay</td>
<td>Minor Leg V/C &amp; LOS Intersection Delay</td>
</tr>
<tr>
<td>Curling Road / Glenaire Drive</td>
<td>0.00 A</td>
<td>0.01 A</td>
</tr>
<tr>
<td></td>
<td>9 sec</td>
<td>10 sec</td>
</tr>
</tbody>
</table>
3.4.2 Queue Analysis

Because of the significant operational influence of overflowing turn bays and closely spaced intersections on congested corridors, the SimTraffic micro-simulation model was utilized to provide insight to anticipated queues, in addition to Synchro. Bunt averaged results for five separate SimTraffic model runs to provide 50th and 95th percentile queuing information for each scenario which are reported in the series of tables in the previous report section.

We note that several of the queues reported by SimTraffic are consistent with those reported by Synchro, while others are significantly different; it is our view the SimTraffic results are likely more realistic, but that neither software is capable of taking into account the effects of the spreading congestion “footprint” of the downstream Lions Gate Bridge. Particularly during the PM Peak Hour, the bridge congestion results in a significant decline in the quality of operations at the Marine Drive / Capilano Road traffic signal and illegal blocking behaviours by drivers which cannot be captured by the software.

During the peak hour, 95th percentile queue conditions may only be experienced once or twice during the busiest peak period of the day, and therefore do not provide insight to typical conditions. Also, in our experience SimTraffic over-estimates 95th percentile queues under congested urban conditions because SimTraffic does not accurately portray particular driver behaviours under such conditions: for example, where drivers in the main traffic stream may yield to side street entering drivers as a courtesy, or where drivers may choose to illegally block intersections. As such, in our experience the 95th percentile queues reported are often found to unrealistically conservative in representing actual queuing “culture” in a congested network.

AM Peak Hour

The main queuing issue for the AM peak hour was found to be the southbound right turn from Capilano Road to Marine Drive. In the 2019 Background scenario, the reported queue was found to typically extend between Curling Road and Hope Road, which is consistent with existing observed conditions when the congestion from Lions Gate Bridge does not reach back to the Marine Drive & Capilano Road intersection.

In the 2019 Total scenario, the southbound queue along Capilano Road was reported by the software to be similar to the 2019 Background queue. However, the signalization of the intersection with Curling Road and the shorter cycle time at the Fullerton Avenue / Capilano Road intersection reduced the side street queues significantly compared to current conditions. This benefit is balanced by the anticipated increase the length of the southbound queue on Capilano Road.

For the 2030 Background and Total scenarios, separate southbound left turn and southbound through lanes at the Capilano Road / Marine Drive intersection results in forecasted queues being similar to if not slightly shorter than 2019 projected conditions. The separated lanes decrease the likelihood of southbound through vehicles being blocked by left turners at intersection.
PM Peak Hour
Two significant queue issues are anticipated at the Marine Drive / Capilano Road intersection for the 2019 Background and 2019 Total scenario: similar to existing conditions, these will be the eastbound left turn and the southbound through/left movements.

The queue issue for the eastbound left turn movement was expected, given the high demand volume and the presence of significant queues for this movement under existing conditions. Operationally, it is Bunt’s view that the southbound through/left queue issue in the 2019 scenarios has a more significant impact on the study area network; at times, this queue was observed to extend northwards to Fullerton Avenue. The extent of the future queue in 2019 is, in our opinion, likely overstated due to the limitations of the software in representing driver’s routing decisions in a complex urban network.

If the southbound queue on Capilano Road does extend northwards to the extent predicted by the software and results in blockage of the Curling intersection in practise it is likely eastbound drivers on Curling Road destined to northbound Capilano Road would choose to reroute via the new Woonerf Road or the Glenaire Drive connection and instead use Fullerton Avenue to proceed northbound on Capilano Road. This is one of the advantages of the Woonerf / Glenaire Drive/Curling Road connection: they will allow for such rerouting and support a more robust road network with multiple route options that do not exist today.

With the 2030 Scenarios, the Marine Drive / Capilano Road intersection will have separated southbound through and southbound left turn lanes which will reduce queue lengths when installed, but by 2030 growth in background traffic as well as site traffic volumes will result in southbound approach queues similar to that predicted for 2019. If southbound queues on Capilano Road result in significant delays, the southbound drivers on Capilano Road destined for Marine Drive eastbound would likely reroute to the new McGuire connection to Marine Drive or even via Garden Avenue.

For the northbound left turn movement at the Capilano Road & Curling Road intersection, although the predicted 95th percentile queue indicates that available storage will be exceeded for the some 2019 and 2030 Scenarios, based on observations of the traffic model it was found that the queues extended the storage only for short periods of time and did not materially affect the operations of the northbound movements on Capilano Road. The recommended half cycling of the traffic signal at Capilano Road & Curling Road was important in managing this critical queue which must be managed carefully to ensure impacts on the busy Marine Drive & Capilano Road intersection are minimized.

3.4.3 Glenaire Drive Connection Benefits
The Glenaire Drive connection to Curling Road as proposed by DNV offers some road network and operational benefits as summarized in Table 3.22 below.
Table 3.22: Glenaire Drive Connection with Curling Road Advantages vs. Disadvantages

<table>
<thead>
<tr>
<th>ADVANTAGES</th>
<th>DISADVANTAGES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provides alternative routing for vehicles in the neighbourhood (from Curling Road / Fullerton Avenue).</td>
<td>Residents in the area may be prone to additional (however low volumes) traffic from vehicles “rat-running” the neighbourhood. As a result of the “rat-running”, there may be additional traffic noise / emissions associated with the additional traffic movements.</td>
</tr>
<tr>
<td>Allows better access for emergency vehicles through the neighbourhood.</td>
<td></td>
</tr>
<tr>
<td>Vehicles utilize both intersections may be more evenly spread out and improve overall operations for the corridor.</td>
<td></td>
</tr>
<tr>
<td>Potentially decreases overall delay at a congested Fullerton Avenue or Curling Road intersection.</td>
<td></td>
</tr>
</tbody>
</table>
4. PARKING SUPPLY

4.1 Required Supply Parking Rates

Table 4.1 below summarizes the required parking supply rates based on the District of North Vancouver Zoning Bylaw 3210 which assumes no Transportation Demand Management (TDM) Plan would be approved by the DNV to support the lower parking rates, and also the minimum parking supply rates permitted with an approved TDM plan as per the Lower Capilano Marine Village Plan (LCMVP).

**Table 4.1: Bylaw Parking Rates**

<table>
<thead>
<tr>
<th>DEVELOPMENT</th>
<th>NUMBER OF UNITS</th>
<th>GROSS FLOOR AREA (SQM)</th>
<th>SUPPLY RATE IF TDM IS NOT APPROVED (PER UNIT OR SQM PER STALL)</th>
<th>SUPPLY RATE PER LCMVP (PER UNIT)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Citimark Townhouse Development fronting Curling Road</td>
<td>87</td>
<td>9,620</td>
<td>2.00</td>
<td>1.5 for residents 0.1 for visitors</td>
</tr>
<tr>
<td>Airey Group Townhouse Development fronting Curling Road</td>
<td>43</td>
<td>5,812</td>
<td>2.00</td>
<td>1.5 for residents 0.1 for visitors</td>
</tr>
<tr>
<td>PCUrban Townhouse Development fronting Fullerton Road</td>
<td>23</td>
<td>3,728</td>
<td>2.00</td>
<td>1.5 for residents 0.1 for visitors</td>
</tr>
<tr>
<td>Woodbridge Townhouse Development fronting Fullerton Road</td>
<td>153</td>
<td>16,230</td>
<td>2.00</td>
<td>1.5 for residents 0.1 for visitors</td>
</tr>
</tbody>
</table>

1 space per unit plus 1 space per 100m² of gross residential floor area (to a maximum of 2 spaces per unit inclusive of 0.25 per dwelling unit designated for visitor parking.)

4.2 Proposed Site Plan Provision

Table 4.2 below summarizes the sites’ planned parking supply provision at build out. All parking is proposed to be provided underground for both residents and visitors. Although the proposed parking supply is lower than that required by Part 10 of the District’s Zoning Bylaw for two of the four sites, the parking supply for all sites is considerably higher than the minimum requirement permitted in the Lower Capilano Marine Village Implementation Plan with an approved TDM plan.
Table 4.2: Lions Gate Peripheral Area Site Proposed Parking Supply Provision

<table>
<thead>
<tr>
<th></th>
<th>PARKING SUPPLY AT BUILD-OUT</th>
<th>CAPILANO MARINE VILLAGE IMPLEMENTATION PLAN</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. of Units</td>
<td>Stalls</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Citimark Development</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Townhouses</td>
<td>87</td>
<td>166</td>
</tr>
<tr>
<td>Total</td>
<td>166</td>
<td>1.91</td>
</tr>
<tr>
<td>Airey Group Development</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Townhouses</td>
<td>43</td>
<td>83</td>
</tr>
<tr>
<td>Total</td>
<td>83</td>
<td>1.93</td>
</tr>
<tr>
<td>PCURBAN Group Development</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Townhouses</td>
<td>23</td>
<td>46</td>
</tr>
<tr>
<td>Total</td>
<td>46</td>
<td>2.00</td>
</tr>
<tr>
<td>WOODBRIDGE Homes Development</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Townhouses</td>
<td>153</td>
<td>321</td>
</tr>
<tr>
<td>Total</td>
<td>321</td>
<td>2.10</td>
</tr>
</tbody>
</table>

It can be seen from the information in Table 4.2 that all sites are proposed to considerably exceed the Lower Capilano Marine Village Plan minimum allowable provision assuming an approved TDM program is in place.

Based on the most current site plan, and the supply rates above, Table 4.3 summarizes the differences between the required parking provision under Part 10 of the DNV Zoning Bylaw and the proposed supply provision. It can be seen that:

- The Citimark development at build-out is proposed to have 166 stalls and requires 174 stalls, a deficiency of approximately 5%;
- The Airey Group development at build-out is proposed to have 83 stalls and requires 86 stalls, a deficiency to approximately 3%;
- The PCUrban development at build-out is proposed to have 46 stalls and requires 46 stalls (and therefore has no deficiency); and,
- The Woodbridge development at build-out is proposed to have 321 stalls and requires 306 stalls, a surplus of approximately 5%.
Table 4.3: Proposed Parking Supply vs. Supply as per DNV Requirement

<table>
<thead>
<tr>
<th></th>
<th>PER LATEST DESIGN (STALLS)</th>
<th>PER ZONING BYLAW REQUIREMENTS (STALLS)</th>
<th>DEFICIENCY IN STALLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Citimark Townhouse Dev.</td>
<td>166</td>
<td>174</td>
<td>8</td>
</tr>
<tr>
<td>Airey Group Townhouse Dev.</td>
<td>83</td>
<td>86</td>
<td>3</td>
</tr>
<tr>
<td>PCUrban Townhouse Dev.</td>
<td>46</td>
<td>46</td>
<td>0</td>
</tr>
<tr>
<td>Woodbridge Townhouse Dev.</td>
<td>321</td>
<td>306</td>
<td>-15</td>
</tr>
</tbody>
</table>

Note: A negative deficiency in stalls indicate a surplus in parking above the general zoning bylaw.

Based on the above, for those sites providing lower parking supply than DNV Zoning Bylaw requirements, either:

- A parking variance is required to support the reductions proposed in parking supply below the DNV Zoning Bylaw rates; and/or,
- A Transportation Demand Management (TDM) plan is required with measures to be committed by the developer which would reduce parking demand to the proposed supply levels.

4.3 Rationale for Reduced Parking Supply Rates

4.3.1 Residential Parking

Vehicle ownership per household, and therefore the need for vehicle storage (parking) depends on a number of factors. Those listed below are the key influences:

- Number of working adults in the household;
- Income level;
- Size of the household unit (number of bedrooms);
- Tenure of unit (rental or strata);
- Proximity to the frequent transit network (FTN); and,
- Any Transportation Demand Management (TDM) measures in place at the site.

The first factor cannot be directly influenced by the site developer, while the second factor can only be indirectly influenced by the price point of the units. The other factors and their influence on parking demand are discussed below or (in the case of TDM) measures, in the following section of this report.

Metro Vancouver Apartment Parking Study

Metro Vancouver released the Metro Vancouver Apartment Parking Study (MVAPS) in September of 2012, the most extensive study of its kind in Canada. The study included research and a comprehensive survey program of over 1,000 multifamily household units in the Greater Vancouver area. The MVAPS reviewed
emerging trends, past studies, discussions with municipal staff and data from two regional surveys to develop parking guideline recommendations to improve current practices in the region. The study covered both resident and visitor parking supply/demand and noted the proximity (within 800m) of surveyed sites to a TransLink Frequent Transit Network (FTN)\(^2\) to determine its influence, among other factors. Key findings regarding resident and visitor parking rates are highlighted below. The study can be found at the following link:


Generally, the findings of the Metro Vancouver Study support a broad reduction in current municipal minimum parking requirements for multi-family residential apartments in the region even if they are not in proximity to the FTN. The study found that strata apartments across the region are consistently “over parked” in the range of 18% – 35%. Further, the study found that apartments within 800m of the region’s FTN have auto ownership levels considerably lower than those outside convenient walking distance to transit services.

The Lower Capilano/Marine Village Centre is located within 400m of bus routes on the FTN on Marine Drive and Capilano Road. The relevant Metro Vancouver parking demand rates to this site, based on the findings of the household survey, are summarized in Table 4.4.

\(^2\) Frequent Transit Network” or “FTN” is defined by the network of corridors in Metro Vancouver that have high frequency transit service (every 15 min), bus and/or SkyTrain.
Table 4.4: Metro Vancouver Survey Strata Vehicle Ownership Rates (vehicles per household)

<table>
<thead>
<tr>
<th>SOURCE</th>
<th>1 BEDROOM</th>
<th>2 BEDROOM</th>
<th>3+ BEDROOM</th>
<th>ALL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strata Apartments, North Shore (all locations)</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1.33</td>
</tr>
<tr>
<td>Strata Apartments, within 800m of FTN (Bus Only), entire Metro Region excluding Downtown Vancouver &amp; UBC</td>
<td>1.09</td>
<td>1.35</td>
<td>1.40</td>
<td>1.34</td>
</tr>
</tbody>
</table>

It can be seen that on the North Shore, the average household car ownership rate for strata apartments as found in the Metro study was 1.33 (for all unit sizes, unit types, tenures and location in relation to the FTN). For the Metro Region as a whole, excluding Downtown Vancouver and UBC, the overall auto ownership rate of 1.34 was very similar to the overall North Shore average rates. Therefore, it is reasonable to conclude that the Metro Region rates by unit size (outside of Downtown and UBC) could be applicable to the North Shore. It can be seen that size of unit does affect auto ownership and therefore the mix of unit sizes in a development will impact its parking demand.

The MVAPS material discussed above for apartments and not townhouses which are proposed for the four subject sites. However, the findings for three bedroom apartments noted above are likely similar to townhouse land use forms; that is, it is likely that North Shore strata townhouse households have about 1.34 vehicles per household if located within 800m of the FTN.

City of Surrey Townhouse Tandem Parking Study
Bunt & Associates recently completed a tandem parking study for the City of Surrey, which included City-led electronic surveys of 220 townhouse households throughout the City. As noted below in Table 4.5, the average auto ownership based on the survey responses was 1.85 vehicles per household. However, when location analysis was undertaken by Bunt, there were considerable differences as noted in Figure 4.1. Townhouses located in neighbourhood within convenient walking distance to the Frequent Transit Network (like Fleetwood) had on average 1.3 vehicles per household while those without FTN service (like those in South Surrey and Cloverdale had 1.8-2.0 vehicles per household).

---

1 Surrey Residential Tandem Parking Study, Bunt & Associates, September 23, 2014
Table 4.5: City of Surrey Townhouse Vehicle Ownership

<table>
<thead>
<tr>
<th>VEHICLE TYPES</th>
<th>AVERAGE VEHICLES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cars</td>
<td>1.17</td>
</tr>
<tr>
<td>Pick-up trucks, SUVs or minivans</td>
<td>0.54</td>
</tr>
<tr>
<td>Other vehicles (motorcycles, etc.)</td>
<td>0.13</td>
</tr>
<tr>
<td>TOTAL</td>
<td>1.85</td>
</tr>
</tbody>
</table>

Figure 4.1: Vehicle Ownership by Neighbourhood

Residential Visitor Parking

The Metro Vancouver Study previously referenced also looked at residential visitor parking demands at apartment buildings across Metro Vancouver compared to visitor parking supply rates for different municipalities. In particular, the Metro Vancouver study stated that visitor parking bylaw requirements may be too high and that, “observed parking demand rates were below 0.1 stall per apartment unit, compared to the typical municipal requirement of 0.2 visitor stalls per apartment unit.

Combined Resident and Visitor Parking Demand at Lions Gate Peripheral Area Sites

Based on the above information, it is Bunt’s view that average auto ownership rates of townhouses near the FTN on the North Shore will likely be in the order of 1.3 to 1.4 vehicles per unit, and residential visitor demand in the order of 0.1 stalls per unit, resulting in a total demand of 1.4 to 1.5 stalls per unit. Consequently, the proposed 1.91 to 2.10 per unit proposed by the site developers is expected to exceed the required supply even in the absence of a TDM program.
4.3.2 Small Car Spaces

The District’s bylaw allows for up to 35% of all stalls to be designated as small car stalls, if the District’s parking supply rates are met. The following is the maximum small car stall to be provided for each of the development sites:

- Citimark development: 58 small car stalls;
- The Airey Group development: 29 small car stalls;
- PCUrban development: 16 small car stalls; and
- Woodbridge development: 112 small car stalls.

All four sites provide less than the maximum small car requirement. The following list provides the number of small car stalls provided in each of the parking lot designs.

- Citimark development: 36 small car stalls.
- The Airey Group development: 24 small car stalls:
- PCUrban development: 0 small car stalls; and
- Woodbridge development: 23 small car stalls.

4.3.3 Site Loading

While not required by District bylaw, it is assumed that the sites will be loaded by vehicles parked in the available parking areas fronting the development sites on street. Civil engineering / functional design plans are being progressed as of writing of this report to confirm this assumption.

4.3.4 Garbage & Recycling

Garbage and recycling for each of the developments sites are anticipated to be collected via small pickup (F-550 type) trucks from the underground parking garage. Thereafter, refuse (boxes) will be pulled onto the top of the parkade ramp access and will be picked up near the top of the underground ramp access for each of the developments. For each of the developments, the garbage truck loading, from the top of the parking ramp, will be via Curling Road (Citimark and Airey Group developments) or Fullerton Avenue (PCUrban). These roadways were assumed to be able to accommodate the standard District garbage truck. The Woodbridge Homes development will have garbage trucks access their top of parkade ramp just east of the Fullerton Avenue / Glenaire Drive intersection. Swept path analysis is shown in Exhibit 4.1 below. Note as of writing of this report, the design for the Woodbridge Homes site is being progressed. As such, Exhibit 4.1 is an in-progress drawing.

4.3.5 Disabled Parking

Residential

Based on the latest designs, the following are the provided disabled stalls for each development:
Exhibit 4.1
Garbage/Loading Swept Path - Woodbridge Homes Development (In Progress)
• Citimark development: 1 disabled stalls;
• The Airey Group development: 0 disabled stalls;
• PCUrban development: 0 disabled stalls; and
• Woodbridge development: 7 disabled stalls.

Where applicable, the above disabled stalls may be updated for the revised site plans.

4.3.6 Parking Lot Design
Each underground parkade was tested using the AutoTurn software to ensure that vehicles can efficiently maneuver within the proposed designs. The designs are currently in progress and Bunt is continually providing updates to parking designs. The swept path analyses have also been provided to the developers for their revisions of the site as necessary.

4.3.7 Firetruck Routing
The Firetruck routing will be via the network roadways adjacent to the site. Since the network roadways should be up to District standards, the routes taken should be able to accommodate the firetrucks. Specifically:

• Citimark / Airey Group developments were assumed to have firetruck routes via Curling Road or via Fullerton Road with access to the future Jr. Woonerf. The firetruck is then expected to circulate back to Capilano Road via the Glenaire Drive connection to Curling Road. At this point in the process, as the Glenaire Drive connection and the Jr. Woonerf design is not finalized, firetruck swept paths have not yet been completed.
• For the PCUrban development, the ingress firetruck route is expected to be accessed from the Fullerton Avenue while the egress route is expected to be via Glenaire Drive then Curling Road. As the Glenaire Drive connection design is not finalized, firetruck swept paths have not yet been completed.
• Finally for the Woodbridge Homes development, the ingress routing is expected to be via Fullerton Road and via the Fullerton Avenue / Glenaire Drive access. Exhibit 4.2 illustrates the swept path analysis for this site. As noted above, the site plan for the Woodbridge Homes is currently being detailed and as such, the swept path analyses are in-progress versions only.
Exhibit 4.2

Firetruck Routing - Woodbridge Homes Development (In Progress)

Lions Gate Peripheral Area Townhouse Developments TIA

4749-08     May 2016     Scale 1:1250 on Letter     Prepared by BLD
5. TRANSPORTATION DEMAND MANAGEMENT

5.1 District Targets for TDM

A TDM Plan is required by the District since the designs for Citimark and the Airey Group developments (excluding PCUrban and Woodbridge Homes) are proposing parking supply ratios below that cited within the District’s Zoning Bylaw.

5.2 District Sustainability Policy

Sustainable developments generally incorporate a diversity of land uses and higher densities, and are within walking distance to everyday amenities and transit. Walking, cycling and transit are each promoted through provision of attractive pedestrian connections, safe and convenient bicycle routes and nearby transit access with frequent service. In conjunction with increased accessibility by sustainable travel modes, reduced parking levels, strategies to increase vehicle occupancy are also typically provided to minimize the number of automobiles and automobile use.

The District of North Vancouver (DNV) is aiming to be a leader in sustainability, and the District’s Vision Statement from the OCP this goal:

“By 2020, we will be recognized among the most sustainable communities in the world as demonstrated through our environmental stewardship, strong network of neighbourhoods, a vibrant economy and community-driven growth and change.”

The subject development sites are located within the evolving Lower Capilano Marine Village Centre area. The District’s vision for the centre is:

“The Lower Capilano – Marine Drive Village Centre serves as a gateway to the District and will function as a vibrant, walkable neighbourhood with local-serving businesses, jobs, community recreation opportunities and a range of housing options.”

The following includes several of the key policies and objectives included in the Lower Capilano Marine Village Centre Implementation Plan (April 2013) relative to land use and transportation:

- **General** – Locate higher density land uses in the core area of the Village Centre to support the commercial uses and community facilities located in the “heart”;

- **Housing** – Provide for a range of housing options to meet the anticipated needs of existing and future District residents over the next 20 years including: seniors, young adults and families;

- **Community Facilities, Services and Amenities** – Create a community heart that includes: a community centre, small-scale retail that serves local residents’ needs, community open / plaza space, playground space, community green space and connection to parks through enhanced trails, pedestrian and cycling linkages to nearby destinations and networks;
• **Parks, Trails & Open Spaces** – Establish new park spaces and enhance access to and connectivity between parks and trails in the area;

• **Mobility Network** – Provide an integrated transportation network that supports all modes of transportation with an emphasis on walkability and strong pedestrian/cycling connections;

• **Mobility Network** – Create a welcoming and inviting pedestrian experience by: using appropriate traffic control and traffic calming measures on roadways; providing pedestrian infrastructure along Fullerton Avenue, Curling Road, and Capilano Road; and providing sidewalk amenities to encourage pedestrian connections between Woodcroft, the Village Heart and transit stops; and,

• **Mobility Network** – provide new bike route facilities, including signage for way-finding/route-marking and road safety infrastructure, as appropriate.

• In time, as the neighbourhood is redeveloped and more mixed-use and higher density residential projects are developed, it is anticipated that the area will become more walkable, bicycle-friendly and transit-oriented with shops/restaurants/services all within walking distance.

• As such, the proposed site is considered to be well located from a sustainability perspective and the development plans to integrate with the local community plan objectives. The sustainable transportation features associated with the site will increase the potential to generate lower than typical site traffic generation and parking demands. The development plan and the strategies outlined in the following TDM Plan both include components that will address many of the goals outlined above, and will be further explored in the remaining sections.

5.3 **Site Accessibility Review**

This section examines aspects of accessibility related to the proposed developments with a focus on existing and future walking, cycling and transit infrastructure. The potential for participation in each of these forms of travel will be considered along with influences such as travel distances, street design, and transportation infrastructure.

5.3.1 **Site Location and Context**

The development site is located within the Lower Capilano Marine Village Centre and is shown in Exhibit 1.1 above, which highlights the site’s location within a regional context. The site is north of Marine Drive and west of Capilano Road, and there are a number of services and amenities located near the site which include restaurants, hotels, a fitness centre and Klahanie Park.
The current travel mode share for the North Shore, which is likely similar to the existing site is shown in Table 5.1 below. The majority of trips on the North Shore are currently made by automobile; however the transit share has increased by 37% from 8% to 11% between 1999 and 2011.

Table 5.1: North Shore Mode Share

<table>
<thead>
<tr>
<th>Mode</th>
<th>Share</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walking</td>
<td>12%</td>
</tr>
<tr>
<td>Cycling</td>
<td>1%</td>
</tr>
<tr>
<td>Transit</td>
<td>8%</td>
</tr>
<tr>
<td>Auto Driver/Passenger</td>
<td>79%</td>
</tr>
</tbody>
</table>

Source: TransLink’s – 2011 Metro Vancouver Regional Trip Diary Analysis Report

5.3.2 Walking

Walking is a realistic form of travel for most people, especially over short distances with many people willing to walk at least 5-minutes or 400m for short trips. Guidelines on the distances that people are willing to walk to for various trip purposes are set out in Table 5.2. This table focuses on land uses that can reasonably be accessed by walking from the site today.

Table 5.2: Walking Thresholds

<table>
<thead>
<tr>
<th>FACILITY</th>
<th>THRESHOLD DISTANCES</th>
<th>FACILITIES WITHIN THRESHOLD DISTANCES OF THE DEVELOPMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bus/Transit</td>
<td>400m</td>
<td>4 bus stops on Marine Drive; 2 bus stops on Capilano Road; and, 1 bus stop on Garden Avenue (dependent on specific development)</td>
</tr>
<tr>
<td>Schools</td>
<td>600-1200m</td>
<td>Capilano Elementary School</td>
</tr>
<tr>
<td>Leisure Facilities</td>
<td>600-1200m</td>
<td>Klahanie Park, Evergreen Squash Club, Steve Nash Fitness World, Future Community Centre at the Larco Development site</td>
</tr>
<tr>
<td>Shops, restaurants, commercial</td>
<td>800-1200m</td>
<td>Marine Drive -Earls, Denny’s, Pho Japolo &amp; east to Bridgeman Avenue Capilano Road - Panago, Capilano Café, Capilano Market</td>
</tr>
<tr>
<td>Employment</td>
<td>2000m</td>
<td>Businesses at the proposed site, businesses along Capilano Road &amp; on Marine Drive to Hamilton Ave</td>
</tr>
</tbody>
</table>

Sources: (a) TransLink (b) Institute of Highways and Transportation (UK)
From this information, it is clear the site has the potential to have a reasonable walking mode split which would continue to grow as the rest of the Lower Capilano Marine Village redevelops, resulting in more destinations within convenient walking distance.

The distance that a person is willing to walk is often related to the purpose of the journey, but is also influenced by factors such as urban form, traffic, safety, personal fitness, car ownership, and parking availability.

Existing and proposed connections near the site are illustrated on Exhibit 5.1, along with other planned improvements in the area. The site is located close to Marine Drive and Capilano Road, both of which have sidewalks provided along both sides of the road and traffic signals with pedestrian actuated push buttons at all signalized intersections. In the near vicinity of the site, sidewalks are provided on just one side (except on Capilano Road where they are located on both sides), or not at all.

Currently, there will be a traffic calmed section, which will be Jr. Woonerf just north of the Belle Isle Park. In addition, there will be a traffic circle located at the Belle Isle Place/Fullerton Avenue intersection. Both these designs are currently being progressed.

5.3.3 Cycling

A person’s willingness to cycle is based on a number of lifestyle factors, including health benefits, cost savings (compared to automobile use and parking) and convenience. Infrastructure also plays an important role through the safety of routes, presence or absence of steep gradients, availability of cycle storage facilities, etc. Cycling is a realistic transportation option for most people over short to medium distances, i.e. up to 8 kilometres, or a 30-35 minute cycle. Based on this distance criterion, downtown Vancouver, West Vancouver and many areas of North Vancouver are readily accessible by bicycle from the proposed development. The District and the development site are also uniquely situated below world-class mountain biking in the North Shore Mountains. This location helps to promote a culture of cycling in the community, with over a doubling of the cycling mode share on the north shore between 1999 and 2011.4

4 TransLink – Backgrounder # 5: How and Why People Travel
http://www.translink.ca/~/media/Documents/plans_and_projects/regional_transportation_strategy/Backgrounders/How_and_Why_People_Travel_Backgrounder.ashx
Nearby Pedestrian Infrastructure

Exhibit 5.1

Lions Gate Peripheral Area Townhouse Developments TIA
4749-08
May 2016
Existing cycling routes near to the site are illustrated in Exhibit 5.2. As shown, there are a number of cycling routes directly accessible adjacent to the site providing connections to downtown Vancouver, West Vancouver and other cycling routes and neighbourhoods across North Vancouver. This exhibit also illustrates proposed bicycle routes according to both the District’s Master Bicycle Plan and the Lower Capilano/Marine Village Centre plan, for completeness.

### 5.3.4 Transit

When people are considering taking transit their decision is typically based on a number of factors including their eligibility to drive, cost, convenience, relative journey times with other modes, personal choice, income level, etc. Generally transit is a practical proposition for journeys of 4 kilometres and more, however if high frequency service is available, it is also practical for shorter distance trips for convenience. Other than the shops/businesses in the immediate area of the development, which are for the most part within walking distance, other destinations that residents would likely be travelling to (Downtown Vancouver, Park Royal and Lonsdale) generally fall within the over 4 kilometre threshold, suggesting that transit is a viable travel mode for residents of this development for many trips. The site is serviced by a number of Frequent Transit Network (FTN) routes within 400m walking distance to the site. An FTN route is a bus service that runs at least every 15-minutes throughout most of the day seven days a week.

The proposed development is served by transit routes on both Marine Drive and Capilano Road with 5 bus stops within a 400m walk of the site. These bus stops and routes are shown in Exhibit 5.2, with the nearest bus stops located at the intersection of Capilano Road and Marine Drive, on the Capilano Road corridor. Appendix C summarizes the bus routes that service these stops.

The transit routes provide connections to Downtown Vancouver, West Vancouver, Capilano University, Lonsdale Quay, Upper Lonsdale and Upper Capilano. Service headways average between 10 to 15min in the peak periods, with the highest 24 hour frequency service for route 239 between the Park Royal Shopping Centre and Capilano University.

TransLink has recently constructed a transit priority lane on Marine Drive from Tatlow Avenue to the Lions Gate bridge westbound on-ramp. This dedicated bus lane is on the north side of Marine Drive and services approximately 25 buses each hour.
Exhibit 5.2

Nearby Bicycle Connections

Legend

- Bike Lanes
- Wide Curb Lanes + Sharrows
- Shared Route
- Off-Street Pathway
- Signal Crossings

Existing  Improvements  Planned

Bike Lanes
Wide Curb Lanes + Sharrows
Shared Route
Off-Street Pathway
Signal Crossings
5.4 Transportation Demand Management

5.4.1 Background

Transportation Demand Management is the use of policies and procedures to influence travel behaviour and encourage people to use modes of transportation other than the single occupant automobile. For the Lions Gate Peripheral Area Townhouse Developments, the primary goal of the TDM Plan is to reduce the on-site parking demand (for some of the developments) to ensure that the provided parking is adequate to suit the needs of the residents, site visitors and the neighbourhood.

The Lower Capilano Marine Village Centre Implementation Plan allows for reduced parking requirements, and these are to be accompanied by trip reduction programs in order to manage the provided parking supply effectively. The plan also encourages developers to consider other TDM initiatives such as un-bundled parking, shared parking, electric vehicle infrastructure and more.

Transportation Demand Management (TDM) is defined as the “application of strategies and policies to reduce travel demand (specifically that of single-occupancy private vehicles), or to redistribute this demand in space or in time”. A successful TDM program can influence travel behaviour away from Single Occupant Vehicle (SOV) travel during peak periods towards more sustainable modes such as High Occupancy Vehicle (HOV) travel, transit, cycling or walking. The responsibility for implementation of TDM measures can range across many groups, including regional and municipal governments, transit agencies, private developers, residents/resident associations or employers.

5.4.2 Possible TDM Measures for Lions Gate Peripheral Area Townhouse Sites

Table 5.3 below summarizes a possible suite of measures based on our research that may be appropriate for this site and the objectives of the TDM Plan. The strategy is identified in the left column, and the measure in the centre column. The right column on the table shows which parties would be responsible for administering and managing the each initiative. While this is a comprehensive listing of measures, the noted developers potential role in TDM for the CapWest site would be limited to those items identified as site developers on the far right of this table.

Note that we have identified in *italics* text those measures that the specific developer would be responsible for, which are a) already part of the current site plan; b) would be relatively cost effective to provide; or c) we feel would be the most effective for this site/expected by the District. These measures are discussed further in section below.
Table 5.3: TDM Strategies Summary Table

<table>
<thead>
<tr>
<th>STRATEGY</th>
<th>MEASURE</th>
<th>RESPONSIBILITY FOR IMPLEMENTATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marketing &amp; Promotion</td>
<td>Prepare marketing materials to attract residents who want a car-free lifestyle</td>
<td>Citimark and Airey Group</td>
</tr>
<tr>
<td></td>
<td>Provide a Welcome Brochure, with an information package on transportation alternatives, that is issued to all new residents and posted in common areas</td>
<td>Citimark and Airey Group</td>
</tr>
<tr>
<td></td>
<td>Participation in Bike to Work Week and other community and regional promotions/events for sustainable transportation</td>
<td>Community Centre (DNV); Citimark and Airey Group</td>
</tr>
<tr>
<td>Cycling Infrastructure Improvements</td>
<td>Provide cycling facilities leading to, adjacent to and on the site</td>
<td>Citimark and Airey Group</td>
</tr>
<tr>
<td></td>
<td>Provide safe, marked cycling crossings at intersections, with push button activation at signals</td>
<td>DNV</td>
</tr>
<tr>
<td>Cycling Amenities</td>
<td>Provide bicycle maps and way finding signage through site</td>
<td>Citimark and Airey Group</td>
</tr>
<tr>
<td>End of Trip Cycling Facilities</td>
<td>Provide a bicycle repair station</td>
<td>Citimark and Airey Group</td>
</tr>
<tr>
<td></td>
<td>Provide long term secure and convenient bicycle storage facilities for residents, at DNV bylaw rates</td>
<td>Citimark and Airey Group</td>
</tr>
<tr>
<td>Transit</td>
<td>Provide subsidized transit passes to new residents upon move-in</td>
<td>Citimark and Airey Group</td>
</tr>
</tbody>
</table>

5.5 Recommended TDM Measures for Lions Gate Peripheral Area Townhouse Developments

Bunt has developed a TDM Plan in collaboration with the site developer that is focused on reducing parking demand on the site and specifically residential parking demand. The TDM Plan addresses measures that are recommended to be in place at build out of the developments.

The measures identified in italics in Table 5.3 above, for implementation by the site developers, are described in more detail below. The proposed implementation time for each initiative is provided at the end of the section.

5.5.1 Marketing & Promotion

Marketing Materials & Transportation Information Package for Residents

Travel patterns are most pliable when residents move from one location to another. Therefore, site developers/rental companies can play a significant role in changing people’s travel behaviours, through marketing materials to potential buyers/renters and through provision of information packages to new residents which stress the attractiveness and ease of alternative travel modes.

In marketing materials to potential residents, clear and simple messages such as cost savings and health benefits (within the context of life style choice and urban living), along with practical information about local transit services, walking and cycle routes to key locations, carpooling and car-sharing services, would
help attract residents who want to live a car-free lifestyle. Citimark, and the Airey Group, will commit to including this information in its marketing and promotional materials for the site.

For residents who are moving in, a Transportation Information Package should be provided on move-in day. The package should include:

- A map showing amenities and shopping opportunities within a typical walking catchment of 800m;
- A map showing local cycling and transit routes with key destinations and travel times by different modes;
- Information about bicycle safety and local bicycle shops and repair facilities;
- Information pertaining to on-site car share provisions, car share membership sign up and procedures;
- Information pertaining to available bicycle and vehicle parking;
- Information on regional ride-share organizations, such as Jack Bell; and
- A list of websites and apps that can aid in the use of alternative transportation such as transit apps.

5.5.2 Cycling Improvements

Bicycle Parking

Well managed, secure, accessible and covered bicycle parking will be provided as part of the development plan. Table 5.4 shows parking bylaw rates and the proposed parking supply for the development. Class 1 parking spaces are defined as secured spaces with gated entry which are typically located inside a building and reserved for specific users. Class 2 parking spaces are spaces that are provided in a publically accessible area and may be used by anyone. Class 2 spaces are typically provided via a traditional outdoor bicycle rack.
Table 5.4: Bicycle Parking Bylaw Requirements

<table>
<thead>
<tr>
<th>SITE</th>
<th>BYLAW REQUIREMENTS</th>
<th>PROPOSED</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Class 1 – Long Term</td>
<td>Class 2 – Short Term</td>
</tr>
<tr>
<td>Citimark Townhouse Development</td>
<td>-</td>
<td>18 (1)</td>
</tr>
<tr>
<td>The Airey Group Townhouse Development</td>
<td>-</td>
<td>9 (1)</td>
</tr>
<tr>
<td>PCUrban Townhouse Development</td>
<td>-</td>
<td>5 (1)</td>
</tr>
<tr>
<td>Woodbridge Homes Townhouse Development</td>
<td>-</td>
<td>31 (1)</td>
</tr>
</tbody>
</table>

Notes:
1. As per Zoning Bylaw

5.5.3 Transit

Transit Pass Subsidies
Citimark and Airey Group will commit to fund and administer transit pass subsidies to new strata residents and will subsidize residents for 100% of the cost of a two-zone transit passes for a minimum of six months.

Transit pass subsidies would begin to be implemented at a strata unit and is sold, and would cover up to 11 reduced stalls (8 passes for Citimark and 3 passes for Airey Group on a first come first served basis. This proposed level of subsidy meets the District’s reduced parking rate guideline of one transit subsidy for each parking space reduced; the calculation for the number of parking spaces reduced was presented previously in Table 4.2. Providing transit pass subsidies is one of the most effective ways to encourage transit use for new residents and such subsidies will be part of the marketing campaign if and when the development converts from rental to strata.

5.5.4 Parking

Reduced Parking Supply
The development is proposing to supply residential parking at a rate that is higher than the minimum allowable in the LCMVCIP but lower than the District of North Vancouver Zoning Bylaw 3210 (for Citimark, and the Airey Group). Supplying a reduced amount of parking will act as a TDM strategy in itself, as it will discourage new residents from owning more vehicles than stalls. A limited supply of parking will also help to manage the amount of visitor parking demand on the site, and may help guide visitors to using other modes of transportation to access the site.
5.6 Additional TDM Measures – Citimark Development

In addition to the above recommended TDM measures, Citimark has indicated if no suitable car share program can be found, that they will be operating their own car share vehicle and providing their own car share stalls. The vehicle will be located behind the gates of the Citimark development and is slated for their resident use only.

5.7 TDM Effectiveness

The proposed TDM measures are intended to reduce the parking demand for the development and are expected to make a measureable impact on the parking operations on site. As travel behaviors are often difficult to influence and predict, the amount that the measures will impact the transportation patterns of the residents and visitors is highly variable. However, there are some references that can be used in predicting the effectiveness of TDM procedures to reduce parking demand.

TDM effectiveness is highly dependent on the application setting, complementary strategies, nature of the travel market segment being targeted and even the “vigour” with which TDM is implemented and promoted. The effectiveness of TDM measures in terms of reducing vehicle trip-making is difficult to forecast as these measures are typically applied at different levels, in different mixes, on different sites. While several models existing to estimate the effects of TDM (EPA Commuter Model, TDM Effectiveness Evaluation Model, Worksite Trip Reduction Model, Trip Reduction Impacts of Mobility Management Strategies), these models have all been developed to address USA conditions and require extensive and detailed knowledge about the base conditions as well as individual TDM measures which are not known at the Master Planning level.

Nevertheless, research has shown that TDM programs which are very focused and site-specific, with aggressive financial incentives, disincentives and parking management have been proven to reduce trip making by over 15%. Some communities identify/allow vehicle trip reductions for TDM measures based on transit service levels combined with the level of TDM applied. For example, Table 5.5 below provides anticipated ranges of “net mode shift” from auto trips for various levels of TDM programs and various levels of transit provision from Fairfax County, VA, USA planning guidelines.

The reductions noted in the table below have been corroborated for work trips by other studies such as the recent TCRP report on “Employer and Institutional TDM Strategies” which shows that at work sites with “high performing” and aggressive TDM programs, employee vehicle trip reductions of up to 25% are possible with “High” transit services and pay parking.

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6 Integrating Demand Management into the Transportation Planning Process: A Desk Reference, U.S. Department of Transportation, Federal Highway Administration, August 2012
Table 5.5: TDM Effectiveness

<table>
<thead>
<tr>
<th>TDM PROGRAM OR STRATEGY</th>
<th>HIGH TRANSIT</th>
<th>MODERATE TRANSIT</th>
<th>LOW TRANSIT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support, Promotion, Information</td>
<td>3-5%</td>
<td>1-3%</td>
<td>&lt;1%</td>
</tr>
<tr>
<td>Alternative Commute Services</td>
<td>5-10%</td>
<td>5-10%</td>
<td>1-3%</td>
</tr>
<tr>
<td>Financial Incentives</td>
<td>10-20%</td>
<td>5-15%</td>
<td>1-5%</td>
</tr>
</tbody>
</table>

**Combined Strategies**

<table>
<thead>
<tr>
<th>With Free Parking</th>
<th>15-20%</th>
<th>10-15%</th>
<th>3-7%</th>
</tr>
</thead>
<tbody>
<tr>
<td>With Pay Parking</td>
<td>15-30%</td>
<td>15-20%</td>
<td>n/a</td>
</tr>
</tbody>
</table>


Research has shown that TDM measures tend to have the greatest influence on frequent and regular work-based trips and has lesser impacts on shopping and personal business trips which are less frequent and discretionary. Therefore, most TDM programs, and therefore monitoring of TDM program effectiveness is typically focussed on “Commuter Trip Reduction” or CTR programs.

According to the Victoria Transport Policy Institute, a comprehensive CTR program typically reduces peak-period (work-based) automobile trips by 4-20% at a worksite (Winters and Rudge 1995; Rye 2002; Boarnet, Hsu and Handy 2010), and impacts vary depending on program design, geography and employee demographics. Programs that lack financial incentives (e.g. transit subsidies, parking cash out) generally achieve reductions under 10% (Boarnet, Hsu and Handy 2010).⁷

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⁷ VTPI website http://www.vtpi.org/tdm/tdm9.htm
6. CONCLUSIONS & RECOMMENDATIONS

6.1 Conclusions

6.1.1 Traffic Operations
- At build-out the Lions Gate Peripheral Area Townhouse Developments are anticipated to generate collectively in the order of 136 trips during the AM peak hour (27 inbound and 109 outbound) and 161 trips during the PM peak period (102 inbound and 58 outbound);
- The nearby Larco CapWest development which was included as Background traffic in all scenarios of Bunt’s analysis, is expected to generate in the order of 165 site trips during the AM peak period (66 trips inbound and 99 trips outbound) and 225 trips during the PM peak period (124 trips inbound and 101 trips outbound);
- The nearby Pacific Gate Grouse Inn development which was included in the Background traffic for the 2030 scenarios of Bunt’s analysis, is expected to generate in the order of 145 site trips during the AM peak period (60 trips inbound and 85 trips outbound) and 182 trips during the PM peak period (101 trips inbound and 182 trips outbound);
- The overall impact of the proposed Lions Gate Peripheral Area Townhouse developments is expected to be a minimal 0.01 to 0.05 increase in Volume to Capacity (v/c) ratios at study area intersections for the 2019 planning horizon and a minimal 0.01 to 0.05 for the 2030 planning horizon;
- In general, most intersection and individual movement Levels of Service after the Build-out of the development are expected to be within acceptable parameters, while some individual movements will continue to exhibit operations exceeding desired performance thresholds;
- For the Marine Drive / Capilano Road intersection, the southbound right turn (during the AM peak hour), the eastbound left turn and the southbound left turn (during the PM peak period) are expected to experience long queues. These long queues are expected to be present regardless of the subject townhouse developments. The planned separate southbound through and left turn lanes, to be installed in conjunction with the Pacific Gate development, will improve southbound approach operations at this intersection;
- The northbound left turn from Capilano Road at Curling currently has only 20m of storage; it is expected that this left turn bay may occasionally overflow during peak demand periods, but not cause undue operational problems on Capilano Road. Signal timing (half cycling) at the new Capilano Road & Curling Road intersection can reduce the probability of queue overflow issues during the critical PM Peak Hour and also ensure eastbound queues on Curling Road and Fullerton do not block the new Woonerf Road. When the new southbound left turn lane is constructed at the Marine Drive / Capilano Road intersection, there will be opportunity to increase the northbound left turn lane storage at the Curling Road intersection.

6.1.2 Parking
- Both PCUrban and Woodbridge developments provide at or higher than general zoning bylaw parking requirements. The Airey Group and Citimark are proposing parking supply ratios which while are
higher than the Lower Capilano Marine Drive Village Plan’s allowable minimums is lower than the general bylaw requirements. A TDM program is planned for these developments.

- The site developers are proposing to meet the District’s requirements for small car stall allocation.

### 6.1.3 TDM

The Lions Gate Peripheral Area townhouse developments are well located near the centre of the increasingly urban Lower Capilano Marine Village Centre. The site is in close proximity to the frequent transit network and pedestrian and cyclist networks around the site will be improved with the proposed development. These sustainable transportation options and features of the site will provide residents with modal choices and will help reduce the number of SOV trips and parking demands at the site.

A number of TDM measures are proposed to improve the ability of the future residents to take advantage of the nearby sustainable transportation infrastructure and to reduce their reliance on the automobile. The proposed TDM measures are as follows:

- Promotion of the sustainable transportation features of the site during marketing phases;
- Provision of a one page sustainable transportation summary in the owner’s manual for the residents;
- Provision of car share vehicle and stall (Citimark development only);
- Provision of sufficient Class 1 and Class 2 bicycle parking spaces and supporting infrastructure for electric vehicles and bicycles; and,
- Provision of up to 11 six month two-zone transit passes.

The committed TDM plan is expected to reduce vehicle ownership and parking demand to meet the minimum supply rates specified in the Lower Capilano and Marine Drive Centre Village Plan.

### 6.2 Recommendations

- With the proposed traffic signal coordination, Bunt’s traffic analysis and modelling indicates that optimized timing during peak demand periods would of the 2019 conditions be:
  
  - AM: 130 seconds for the Marine Drive / Capilano Road intersection; 130 seconds for the Curling Road / Capilano Road intersection; 65 seconds for the Fullerton Avenue / Capilano Road intersection; and,
  
  - PM: 130 seconds for the Marine Drive / Capilano Road intersection; 65 seconds for the Curling Road / Capilano Road intersection; 130 seconds for the Fullerton Avenue / Capilano Road intersection.

- With the coordination, Bunt’s traffic analysis and modelling indicates that optimized timing during peak demand periods would of the 2019 conditions be:
LIONS GATE VILLAGE PERIPHERAL AREA
CONSTRUCTION IMPACT MITIGATION STRATEGY (CIMS)
VERSION 10 – JANUARY 24, 2017

RESIDENTIAL DEVELOPMENT PROJECTS FROM:
CRESSEY DEVELOPMENTS
CITIMARK
PC URBAN REAL ESTATE CORP.
WOODBRIDGE PROPERTIES
PROJECT APPROACH
Ventana Construction Corp. has proposed to the Lions Gate developers (Citimark, PC Urban, Woodbridge and Cressey) that they select a sole CIMS manager for the entire development.

This manager would then treat the Lions Gate development as a single construction project, rather than separate projects.

This approach will generate several tangible benefits for both the developers, as well as the District of North Vancouver (DNV).

This manager will arrange coordinated meetings between the DNV, Larco and future overlapping developments so that deliveries, parking and general construction programs will be aligned. This manager will assess and modify the CIMS should the need arise.

BENEFITS FOR THE DEVELOPERS

Communication
- the developers will receive single-source, regular, professional and transparent communication about site-wide activities, rather than multiple separate reports that may not be as inclusive as necessary

Coordination
- all construction activities (phases of construction, deliveries, major on-site activities, etc.) will be coordinated, rather than individual contractors needing to coordinate or compete with one another

Accountability
- there will be a single point of accountability for the entire development if there are any logistical or scheduling issues

BENEFITS FOR DNV

Communication
- area residents will receive consistent, timely and professional communication about construction activities for the entire project
- businesses and groups in the area will receive consistent, timely and professional communication about construction activities for the entire project
- the District will receive consistent, timely and professional communication about construction activities for the entire project

Coordination
- the District will have a single point of contact for the duration of the project
- the CIMS manager will coordinate meetings between the DNV, Larco and future projects that come online

Accountability
- the District will have a single point of accountability in the event that there are questions or concerns about the project

CONSTRUCTION PARKING AT LIONS GATE VILLAGE
Parking for major construction projects is always a challenge. This is even more of an issue in areas surrounding residential neighbourhoods. This development group is well aware of parking issues in the area.

We have looked into trade parking at various sites in the area. None of them were feasible, for a variety of reasons. As a result, these locations are not viable for the Lions Gate Village Peripheral Area project. The sites included:
- Park Royal Shopping Centre
- St David’s United Church
- West Vancouver Baptist Church
- North Shore Jewish Community Centre
- Squamish First Nation lands south of Marine
- Travelodge parking lot

We have a number of strategies in place that we believe will mitigate parking issues for the Lions Gate project. First, we believe that there will be a natural sequence to the projects based on permitting, design timelines, sales targets and tender results. Site B is also large enough that it will be phased internally into two phases to help facilitate sales and improve trade efficiency. Sequencing and staging will allow for some self-contained parking on sites that are not yet under construction and will reduce the peak load.

This strategy includes parking on Site E during the first year of the project and on the Belle Isle park land until Fall 2018. The former would be dependent on release of demolition permits prior to various stages of rezoning, development permits and building permits. The latter would be dependent on the District’s work schedule for the revised park. Both of these options would be contingent on permission from the District.

Our second parking strategy would be the parkades that are part of the respective developments. Once individual parkades are safe for vehicles to occupy during the works hours, trades will be allowed to park under the buildings. There are 355 stalls within the project parkades. This greatly exceeds our expected car count.

A back-up option for parking would be both the parking lot and gravel field at the Capilano Rugby Football Club. We have engaged in preliminary discussions with the club. They are reluctant to agree to the provision given the current infrastructure and single lane access road going north from the Evergreen Squash Club.

There is, however, another access point that would allow trades to bypass this road: the pass-through that connects the old Capilano Rugby Football clubhouse and the parking lot to the north of the main playing field.

This access point is currently blocked by no-post barriers, but removing these barriers would allow direct access for construction-only traffic to the parking lot and field. Trades would enter the project via Fullerton Ave., turn west onto Glenaire Dr. and then west again at the pass-through to access parking.

“No Construction Traffic” signage would be erected on the north-south road on the east side of the fields, and trades would be told they had to exit the project via Glenaire Dr. and use a newly created connection to Curling Rd. Opening this access does not guarantee approval of this parking plan.

We respect that street parking for trades is not allowed. We will advise trades during tender and in their contract of the parking strategies above, and suggest they carpool or take transit to further reduce not only parking loads, but also traffic volumes.
**PART A – PROJECT DETAILS**

**PROJECT DESCRIPTION (DEMOLITION TO COMPLETION)**

The proposed Lions Gate Village Peripheral Area residential development is comprised of four newly consolidated building sites bordered by the Capilano River to the north, Capilano Rd. to the east, Curling Rd. to the south and Glenaire Dr. to the west. The 314-unit project is a joint initiative from four developers: PC Urban, Woodbridge, Citimark and Cressey.

The typical design for each site is a collection of three-storey wood-frame townhouses built over a common underground parkade.

The building sites are distinguished on Appendix A1 into Site A, Site B1 and Site B2, Site C, Site D and Site E.

**CONTACT INFO**

- Single point of contact
  - one party will act as the primary point contact for the project and will assign one person to manage notifications, communications, address traffic issues, coordinate deliveries between sites and liaise with surrounding construction sites. This individual will be designated during the pre-construction phase.
  - This information will be included in project notifications posted on the fence, as well as on the project website. It will be confirmed and circulated closer to project start-up.

**SCHEMATIC SITE PLAN**

- See Appendix A1 – Site plan for an overview of the project
- other appendices have bus routes, parking plans, pedestrian routing, bicycle routes and transit routes

**WORK TO BE PERFORMED**

The work to be performed on this project includes (at a high level):

- existing building demolition
- site excavation
- below grade structure (concrete foundations, parkade)
- above grade structure (wood frame townhomes and stacked townhomes)
- envelope and finishes
- landscaping and civil works
- off-site improvements

**WORK PLAN**

The work will follow the general schedule attached as Appendix A2. Construction dates are anticipated to be as follows:

- Site A – June 2017 to December 2018
- Site B1 – August 2017 to May 2019
- Site B2 – August 2017 to September 2019
- Site C – July 2017 to April 2019
- Site D – October 2017 to September 2019
- Site E – construction TBD; cleared for parking June 2017
- Off-sites – April 2018 to January 2019
- Belle Isle Park – opening September 2018

This schedule is contingent on permitting, design, sales, tender results, financing and trade availability.

**CIVIL WORKS**

The single family homes currently on site are served by a front driveway connecting the homes to the street. The scope of the proposed civil works involves removing the individual driveways and installing new sidewalks, letdowns and road extensions as follows:

- Belle Isle townhouses – new sidewalks along Curling Rd., road extension of Belle Isle Place along the north and a new driveway letdown to access the parkade
- Cressey townhouses – new sidewalks along Glenaire Dr. and Curling Rd., new driveway let down connecting the underground parkade entrance to Curling Rd, new road extension / connection between Curling Rd. and Glenaire Dr.
- PC Urban – new sidewalks along Glenaire Dr. and Fullerton Ave., new driveway letdown to access the parkade off Glenaire Dr. at the west end of the site
- Glenaire – new sidewalks along Glenaire Dr. and Fullerton Ave., and new driveway letdowns

With the exception of the two new road extensions (Belle Isle and Glenaire), the assumption is that the existing roadways will be maintained and any future alterations are not part of the civil scope of this application.

The expected duration for the civil works is approximately 20 weeks, and will be completed in sections to coincide with each completed development during the off-site period noted.

New off-site improvements will be discussed and finalized in conjunction with the District. They will, in general, likely include upgraded service infrastructure such as sewer and water, new curbs and gutters, new sidewalks, new street lighting, new asphalt paving and soft scape between curb and edge of building.

The full scope of this work will evolve and be finalized as each development within the larger project moves through the permit process and are under review by the project team and DNV.

**ON- STREET BUILDING ZONE**

The intent of this project is that all construction activities will be confined to the sites on which they occur, with the exception of trucking for earthworks removals, concrete trucks and pumps and major material deliveries.

No on-street building zones are anticipated to be required. The activities noted above will make use of the curb lanes and will be scheduled in such a way as to avoid multiple sites having major deliveries on the same day.

One contact person is proposed to liaise between sites to pre-book the activities that may affect trade parking, so that a minimum number of parking stalls can be maintained.

With the above in mind, the phases of construction that will see the highest volume of trucking will typically see lower trade parking requirements, i.e. trucking for earthworks removals will happen at an early project stage where few trades are on site.

The longest parking spaces required would be for a concrete pump truck and concrete truck during a pour. This may involve a second concrete truck waiting in queue. Total length required for this scenario would be approx. 18m for the pump set-up and 11m for each truck and 9m of manoeuvring space, for a total of 40m.

Streets will be rented at the posted rate when they are used for staging materials, deliveries or storage. They will not be rented or used for trade parking.
PART B — SCHEDULE
A preliminary construction schedule is attached for reference and is based on the major activities outlined in the sequence of operations:
1. existing building demolition
2. site excavation
3. below grade structure (concrete foundations, parkade)
4. above grade structure (wood frame)
5. envelope and finishes
6. landscaping and civil works
This sequence will be similar on each project.

TIMING OF PHASES
Based on the current schedules, the overall development is sequenced as follows:
- Site A
- Site B, Phase 1
- Site B, Phase 2
- Site C
- Site D
- Site E
- Off-sites
See Appendix A2 for further details.

HOURS OF WORK
- Hours of work for the sites are expected to conform to the District of North Vancouver’s Noise Bylaw (07:00 to 20:00 on each week day or Saturday, and from 09:00 to 17:00 on a Sunday or holiday).
- Where work is expected to take place outside of these hours, application for a bylaw variance will be made. This would likely be limited to concrete pours and concrete finishing work, or possibly crane erection (depending on the final nature of the projects).

PART C — MOBILITY IMPACT
The overwhelming majority of the work being done will be in a self-contained environment, bordered by the site as outlined above.

Groups that will be impacted by the construction traffic and works would include:
1. individuals still living within the borders of the larger development
2. pedestrian, bicycle and vehicle traffic accessing Fullerton Dr. north of the Capilano River
3. pedestrian, bicycle and vehicle traffic accessing Sandown Pl.
4. pedestrians using the west sidewalk along Capilano Rd. between Curling Dr. and Garden Dr.
5. pedestrian, bicycle and vehicle traffic accessing Curling Dr.

In order to mitigate the impact, we will:
- not park or stage construction vehicles on Fullerton
- not allow construction traffic to access Marine Drive at peak traffic hours (left turn only north onto Capilano out of Lions Gate Village Peripheral Area)
- open up site access through Curling Dr. to Glaenere Dr.
- open up local traffic access for right turns only between Sandown Pl. and Capilano Rd.
- create temporary pedestrian and bike access along Glaenere
See Appendix D for proposed traffic routing, and Appendix D1 for pedestrian and bike routing.

IMPACT ON USER GROUPS & MITIGATION MEASURES
- pedestrians, disabled persons, cyclists
  - pedestrians, disabled persons and cyclists will be able to travel along paved and lit paths in the DNV on the right-of-way throughout the Lions Gate Village. These routes are illustrated in Appendix D1.
  - cyclists will be able to travel along Fullerton and Sandown avenues in the same manner as normal traffic. Caution signage will be put up identifying construction traffic, disturbed pavement and other potential hazards.
- transit service
  - BC Transit does not enter this neighbourhood; therefore, there will be no impact on transit services.
- emergency vehicles
  - Emergency vehicles will have unimpeded access throughout the entire Lions Gate development.
- trucks
  - There may be minor construction delays to trucks accessing Fullerton Dr. north of the Capilano River, as well as Sandown Pl. We will endeavour to minimize these delays and use flaggers where appropriate.
  - It is expected that the Larco site directly to the south will be finished excavation prior to the anticipated start of excavation at Lions Gate Village Peripheral Area start date, thereby ensuring that there is no double truck impact to the neighbourhood.
- general purpose traffic
  - There may be minor construction delays to general purpose traffic travelling along Capilano Rd., accessing Fullerton Dr. north of the Capilano River, as well as Sandown Pl. and the remaining residential occupants on Glaenere Dr. and Belle Isle Pl. We will endeavour to minimize these delays and use flaggers where appropriate. All traffic delays will meet the DNV’s guidelines for traffic stoppage during construction.

TRUCK TRIPS
During the eight-month excavation phase of the project, it is anticipated that an average of 75 trucks will be entering and leaving the site per day to remove excavated material.

The highest volume will be during non-peak hours between 9 am and 3 pm, where up to 15 trucks per hour will enter and leave the site.

Per the traffic plan, we will not be turning right to Marine, and will instead limit them to turning north on Capilano during heavy traffic hours. (7-9 am, 3-5 pm)

STAGING TRUCKS
- At the start of the day, excavation trucks will be staged on Highway 1 with overflow areas as identified on Appendix A1, in front of or on each site.
- The highest volume of truck traffic will be during excavation and concrete pour phase of the projects, when the actual requirement for trade parking is minimal and surface streets will not be required for trade / personal vehicles.
- Concrete trucks will be staged outside the plant, rather than staged. This is both a quality control measure and means of reducing traffic impact.

TRUCK ARRIVAL AND DEPARTURE TIMES
- Trucks will start arriving at the time permitted by DNV noise bylaws.
- The highest volume will be during non-peak hours between 9 am and 3 pm, where up to 15 trucks per hour will enter and leave the site.
- We expect that trucks will have left site well before the latest time allowed by DNV noise bylaws, except on days when special circumstances dictate their presence. For these days, a variance permit will be obtained.

TRUCK ROUTING & COMMUNICATION PLAN
- Please see Appendix C.
- The CIMS plan will be provided to all trades, and clauses will be put into trade contracts that enforce the CIMS requirements.

OVERSIZED EQUIPMENT
The largest oversized equipment anticipated would be for the delivery of self-erecting cranes and concrete pump trucks.

Typical flatbed truck for delivery of a 36m (120’) self-erect crane is approximately 14m. Typical concrete pump truck is approximately 12m.

Since we are using one-way traffic through Lions Gate Village Peripheral Area, no turnaround is required.
PART D — COMMUNITY IMPACT

The demolition and excavation phases will require approximately 75 parking spaces, while the above-grade structure and envelope and finishing phases will require up to 220 spaces. This is inclusive of Site B, which will be self-contained.

NOISE / DUST / LITTER CONTROL

- noise
  - We expect that construction noise will occur during the hours outlined by the DNV Noise Bylaw. If we need to work outside of these hours, we will apply for a variance.
  - Any other concerns about noise occurring during construction that brought to our attention will be addressed in a timely manner that is acceptable to all parties.

- dust
  - Dust will be controlled through the set-up and maintenance of a proper erosion and sediment control (ESC) program.
  - ESC controls will be set up on all sites per the recommendations of the civil and/or geotechnical consultants.
  - This may involve silt fencing, sediment traps, storm drain inlet protection, wheel wash stations, etc.
  - An additional measure proposed is regular street sweeping as required, particularly during the excavation and removals phase.

- litter
  - Clearly labelled disposal bins will be provided on site for general construction debris, metals and cardboard. Trash cans will be provided near the site office for personal garbage / food waste.
  - Site safety rules posted at the entrance of each site require regular clean-up of work areas; this will also be put into trade contracts.
  - Site cleanliness and neighbour impact will be addressed at each new worker’s safety orientation and during mandatory trade meetings throughout the project.

- other nuisances
  - We will address other nuisances that present themselves or are brought to our attention in a timely manner.

HOURS OF WORK

- Hours of work for the sites are expected to conform to the District of North Vancouver’s Noise Bylaw (07:00 to 20:00 on each week day or Saturday, and from 09:00 to 17:00 on a Sunday or holiday).
- We do not expect to be working on Sundays or statutory holidays during this project.
- Where work is expected to take place outside of these hours, application for a bylaw variance will be made. This would likely be limited to concrete pours and concrete finishing work, or possibly crane erection (depending on the final nature of the projects).
- It is not expected that any work will be so disruptive to local traffic that it will need to be scheduled outside standard hours of work.

PART E — COMMUNICATION

COMMUNICATION PLAN

- community notices
  - Ventana develops a community notice on every project that will impact residents and businesses in the areas surrounding work. This notice provides pertinent details about the project, the ways in which it might impact residents and businesses and gives readily accessible points of contact in the event that they may have questions or concerns.
  - Our goal is to provide peace of mind, get in front of any potential issues and proactively address concerns rather than having them directed towards City Hall.
  - We hand-distribute notices to the adjacent area, and post large notices on the site fencing. This approach has been highly successful in the past, and we are able to provide updates to area residents and businesses if warranted.
  - A sample community notice is included below.
  - These notices will be posted on the project website.

- neighbourhood signage
  - at key locations, as outlined below in Appendix A1
  - The development group could create a single website for the entire Lions Gate Village Peripheral Area project.

- email notifications
  - the website will have opt-in email notification program for community notices and construction updates

- visible presence
  - clear signage on trailers and fences, indicating site offices, contact info on fences, etc.

AFFECTED BUSINESSES AND RESIDENCES

- see Appendix B1 for a map of the area containing affected agencies, businesses, residents and property owners that will be contacted

SAMPLE LETTER / NOTICE

- See Appendix B2 – Community Notice for a sample notice for area residents and businesses
- these notices will be updated and redistributed as required for major construction events, as well as posted on the project website and emailed to people who have registered to receive notifications

PROJECT WEBSITE

- The development group could create a project website that would provide up-to-date information to neighbours about construction and related traffic impacts.
- This website would go live prior to the start of construction, would be updated regularly and would stay live for the duration of the project.
- It could be referenced on all site signage, as well as the community notices.
- People would be able to opt in on the website to receive emailed construction updates.
- add two Axis Q6055 PTZ dome camera feeds to website

TRAVELLER INFORMATION SIGNAGE

- The developers will create a plan for traveller information signage sufficiently in advance of the construction.
- This signage will explain broad impacts of construction, thus enabling travellers to choose alternative routes, and direct them to the project website for more information.

ON-SITE CONTACT INFORMATION

- Contact information for the key developer contact, as well as key contacts for the general contractors, will be readily available and apparent on site, as illustrated in Appendix B2.

LIST OF GROUPS TO BE NOTIFIED

- we will distribute information for affected agencies, as well as be responsible for addressing questions and managing concerns about the project in a timely fashion.
- groups to be notified:
  - District of North Vancouver (Planning / Permitting, Transportation, other dept as required)
  - City of North Vancouver (departments TBC)
  - District of West Vancouver (departments TBC)
  - Coast Mountain Bus Company
  - TransLink
  - Police
  - Fire
  - Ambulance
  - Ministry of Transportation and Infrastructure,
  - Tsleil-Waututh Nation
  - Squamish Nation
  - the project
  - Evergreen Squash Club
  - Capilano Rugby Football Club
  - others as indicated on notification map

- relevant neighbouring properties for air and shoring rights
- Nav Can, to receive approval for crane masts where required
There will be a single point of contact that will be responsible for monitoring traffic plan effectiveness and ensuring that traffic impacts are minimized. That contact is likely to provide all flagging services, coordinate deliveries and update community notices.

Upgrades
- the initial construction impact mitigation plan will be reviewed as the project transitions through phases (site prep, excavation, foundation work, major construction, finishing construction, landscaping, final clean-up)
- plans will be reviewed quarterly at a minimum, then monthly during the lead-up to each subsequent construction phase and weekly if problems are being discovered
- revisions will be made to the plan as required, and distributed to all stakeholders as well as posted on the project website and distributed via email
- site-specific ESC plans will be created for work inside each site

Dotworkz enclosure to monitor construction and traffic activity for this project
- views of these cameras will be available on the project website

PTZ Cameras
- Ventana will commit to using Axis model 6055 PTZ cameras mounted in Dotworkz enclosure to monitor construction and traffic activity for this project

As indicated, there will be the single point of contact for the CMIS
- this individual will coordinate traffic plans, communication and strategies and then be responsible for overseeing implementation
- this role would be in place from the pre-construction stages all the way through to project completion for the final phases of development
- contact information for the coordinator will be provided on all notifications, site signage, email contacts and website
- this CMIS coordinator will work directly with Larco Investments and Pacific Gate Investments (Lower Capilano towers / Grouse Inn property developer) to coordinate major construction activities to minimize the impact on the neighbourhood
- this will include, but not be limited to, sharing two-week look-ahead schedules for major deliveries

Project Map
- see Appendix A1

Coordinating Works with Other Developments
- A new project by Larco Investments will be starting on a site adjacent to the Lions Gate Village Peripheral Area site approximately six months prior to the demo and excavation phase of Lions Gate Village Peripheral Area.
- It is anticipated that the excavation of the Larco site will be complete by summer 2017, prior to the start of the excavation of the Lions Gate sites.
- As mentioned previously, the excavation stages of each project will generate the highest volume of trucking traffic, so the current schedule seeks to minimize the construction traffic by not having overlapping excavation works with other nearby projects.
- Coordination between the sites will still be required, however, as the Larco project progresses through its major concrete pours and material deliveries. It is proposed that the person designated to liaise between the multiple Lions Gate sites would also be the point of contact for the Larco site for coordinating major concrete pours and deliveries.

Appendices Included in This Submission
- Appendix A1 – Preliminary Site Plan
- Appendix A2 – Preliminary Schedule
- Appendix B1 – Construction Notification Area
- Appendix B2 – Sample Community Notice
- Appendix C – Staging and Routing
- Appendix D – Construction Traffic Routing
- Appendix D1 – Pedestrian & Bike Traffic Routing
- Appendix E – Construction Parking Zones
- Appendix F – Transit Map

The project coordinator will produce detailed TMPs for each phase of the project and for each activity for which traffic will have to be disrupted to accommodate construction and civil works will be submitted for acceptance by the District
- these plans will be submitted for acceptance by the District 10 working days prior to the proposed commencement date
- TMPs must be completed in accordance with the Workers Compensation Board Act – Section 18, the Traffic Control Manual for Work on Roadways – BC Ministry of Highways, and the Canadian Manual of Uniform Traffic Control Devices
- each TMP will provide address, phone number and 24-hour contact information; describe the works being undertaken; state the proposed dates for which it will be in effect and the total number of days the work is expected to take, and the hours of work for each day; describe the manner in which the neighbourhood and other stakeholders will be notified of the works
- the project coordinator will provide written approval from the appropriate agencies on the proposed plan and mitigation measures in the event that full road closures are required
- the project coordinator will provide a schedule of works that are expected to affect the public realm two weeks before commencement of the project and update it every two weeks or as required by the District
The same work will be done on each of the four sites. This work will be sequenced as follows:

- existing building demolition
- site excavation
- below grade structure (concrete foundations, parkade)
- above grade structure (wood frame)
- envelope and finishes
- landscaping and civil works

Phases of work will overlap, with the next phase of work likely to begin before the previous phase is completed at a different site.

This approach is further detailed in our project schedule (Appendix A2).

Developers will commit to renting City property for temporary use, in compliance with bylaws for both storage and delivery needs.

Rental will not be for trade parking.

Off-site work to be done 04/18 - 01/19
<table>
<thead>
<tr>
<th>ID</th>
<th>Task Name</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Lions Gate Village Construction</td>
<td>566 days</td>
</tr>
<tr>
<td>2</td>
<td>Demolition/Clearing</td>
<td>102 days</td>
</tr>
<tr>
<td>3</td>
<td>Site A</td>
<td>1 emon</td>
</tr>
<tr>
<td>4</td>
<td>Site C</td>
<td>1.5 emons</td>
</tr>
<tr>
<td>5</td>
<td>Site B (phase 1)</td>
<td>2 emons</td>
</tr>
<tr>
<td>6</td>
<td>Site B (phase 2)</td>
<td>2 emons</td>
</tr>
<tr>
<td>7</td>
<td>Site D</td>
<td>1 emon</td>
</tr>
<tr>
<td>8</td>
<td>Excavation</td>
<td>206 days</td>
</tr>
<tr>
<td>9</td>
<td>Site A</td>
<td>2 emons</td>
</tr>
<tr>
<td>10</td>
<td>Site C</td>
<td>2 emons</td>
</tr>
<tr>
<td>11</td>
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<td>4.3 emons</td>
</tr>
<tr>
<td>12</td>
<td>Site B (phase 2)</td>
<td>2.01 emons</td>
</tr>
<tr>
<td>13</td>
<td>Site D</td>
<td>2 emons</td>
</tr>
<tr>
<td>14</td>
<td>Below Grade Structure</td>
<td>229 days</td>
</tr>
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</tr>
<tr>
<td>16</td>
<td>Site C</td>
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</tr>
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<tr>
<td>18</td>
<td>Site B (phase 2)</td>
<td>4 emons</td>
</tr>
<tr>
<td>19</td>
<td>Site D</td>
<td>4 emons</td>
</tr>
<tr>
<td>20</td>
<td>Above Grade Structure</td>
<td>291 days</td>
</tr>
<tr>
<td>21</td>
<td>Site A</td>
<td>5 emons</td>
</tr>
<tr>
<td>22</td>
<td>Site C</td>
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<tr>
<td>24</td>
<td>Site B (phase 2)</td>
<td>8 emons</td>
</tr>
<tr>
<td>25</td>
<td>Site D</td>
<td>5 emons</td>
</tr>
<tr>
<td>26</td>
<td>Envelope and Finishes</td>
<td>358 days</td>
</tr>
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<td>27</td>
<td>Site A</td>
<td>9 emons</td>
</tr>
<tr>
<td>28</td>
<td>Site C</td>
<td>10 emons</td>
</tr>
<tr>
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<tr>
<td>30</td>
<td>Site B (phase 2)</td>
<td>12 emons</td>
</tr>
<tr>
<td>31</td>
<td>Site D</td>
<td>9 emons</td>
</tr>
<tr>
<td>32</td>
<td>Landscape and Civil Work</td>
<td>213 days</td>
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<td>33</td>
<td>Site A</td>
<td>2 emons</td>
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<tr>
<td>34</td>
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<td>Site D</td>
<td>3 emons</td>
</tr>
<tr>
<td>38</td>
<td>Offsites</td>
<td>181 days</td>
</tr>
</tbody>
</table>

**Lions Gate Village Preliminary Construction Schedule**

Project: Lions Gate Village  
Date: Tue 1/24/17
ARTICLE B2 – SAMPLE COMMUNITY NOTICE

This notice is intended to provide the public with general information about construction taking place at 333 East 11th Ave. in Vancouver, BC.

Edgar Development Corporation is building The Duke, a 14-storey mixed-use residential tower with market rental housing, ground-oriented non-market housing and ground-floor CRUs; this project is targeting LEED Gold. The current construction site is bordered by a Kindred Construction project called Vya to the north, a laneway to the east, 11th Ave. to the south and Kingsway to the west.

Construction work on the project will be carried out by Ventana Construction Corporation, a Burnaby, BC-based company with more than 29 years of construction experience in the Lower Mainland.

PROJECT DETAILS

PROJECT DURATION
Excavation on site has now been completed. We have begun pouring the concrete foundation and parkade; once this is complete, we will move to the above-ground concrete structure. Concrete pours will take place periodically for approximately 10 months.

Construction on the interior of the building will start part-way through that process. The project is scheduled to be completed by spring 2017.

CONSTRUCTION HOURS
Site operations will generally run from 7:30 am to 8 pm, Monday to Friday and 10 am to 8 pm on Saturday. We will not be working on Sundays or statutory holidays.

If we need to work outside of these hours, Ventana will apply for bylaw variances from the City and endeavour to minimize any inconvenience for area residents.

CONSTRUCTION TRAFFIC AND PARKING
Construction traffic will travel to the site via Kingsway and will turn east onto 11th Ave., and then turn north into the laneway.

It is anticipated that most construction and sub-trade vehicles will be accessing the site from the laneway located on the east side of the site, but we will also be using 11th Ave. for major deliveries, staging and concrete truck access.

Possible lane closures may occur, but will be approved by the City of Vancouver. Traffic control personnel will be used as necessary on both Kingsway and 11th Ave. to ensure public safety. Please obey all posted signage and traffic control personnel, and watch for construction vehicle traffic.

The approximate boundary for construction at The Duke is indicated in red. The approximate boundary for construction at the Kindred Construction site is indicated in blue.

A spotters used when cranes are in operation to ensure the safety of the general public and workers on the site.

CONSTRUCTION HOURS
Site operations will generally run from 7:30 am to 8 pm, Monday to Friday and 10 am to 8 pm on Saturday. We will not be working on Sundays or statutory holidays.

If we need to work outside of these hours, Ventana will apply for bylaw variances from the City and endeavour to minimize any inconvenience for area residents.

CONSTRUCTION TRAFFIC AND PARKING
Construction traffic will travel to the site via Kingsway and will turn east onto 11th Ave., and then turn north into the laneway.

It is anticipated that most construction and sub-trade vehicles will be accessing the site from the laneway located on the east side of the site, but we will also be using 11th Ave. for major deliveries, staging and concrete truck access.

Possible lane closures may occur, but will be approved by the City of Vancouver. Traffic control personnel will be used as necessary on both Kingsway and 11th Ave. to ensure public safety. Please obey all posted signage and traffic control personnel, and watch for construction vehicle traffic turning into and out of the site.

CONNOSIÈRE COMMUNITY NOTICE
THE DUKE
333 EAST 11TH AVE., VANCOUVER BC
MARCH 2016

There will be no public parking on the north side of 11th Ave. for the duration of the project. Possible closures of the parking lane on the south side of 11th Ave. may occur at certain stages of construction.

Parking for Ventana staff and sub-contractors is subject to Vancouver parking bylaws. Site workers will be encouraged to carpool or take public transit whenever possible.

FENCING, SECURITY
Ventana will be erecting modular fencing around the construction site for the public’s safety, as well as security and site management. There will also be site security in place for the duration of the project.

PEDESTRIAN TRAFFIC
Structural wood hoarding has been erected along the full length of Kingsway in front of the project, and wraps around onto 11th Ave. to ensure the safety of pedestrians. Please obey all posted signage and traffic control personnel, and watch for construction vehicle traffic.

CRANE ON SITE
We will be using a crane on The Duke project. We choose highly-qualified formwork (concrete) and crane companies for our projects to ensure that they provide the best and safest service possible.

All crane companies are required to meet or exceed strict WorkSafeBC guidelines for operating cranes, and individual crane operators are licensed and certified. Additionally, the cranes themselves are regularly inspected and certified to ensure they are structurally sound.

The safety of the general public and workers on the site are paramount concerns when cranes are in operation at a Ventana site.

Loads are lifted from construction vehicles that are parked immediately adjacent to the site; they are never lifted or carried over private property.

Spotters are always used when cranes are in operation to ensure the public’s safety, as well as the safety of on-site workers.

Cranes are not locked in position when the site is shut down, which means that the wind can cause them to rotate. That rotation does not pose any risk to the public or neighbouring properties.

ENVIRONMENTAL IMPACT
Ventana is committed to minimizing the environmental impact of construction for all of its projects. We will implement site erosion sediment and control guidelines, waste recycling guidelines, low volatile organic compound guidelines and indoor air quality guidelines on the Duke construction site.

BEING GOOD NEIGHBOURS
Construction is an inherently noisy and potentially disruptive process, but we understand and are sensitive to the concerns of residents living adjacent to The Duke site as well as businesses in the area. We will endeavour to minimize the inconvenience for residents, as well as the impact of construction on the neighbourhood.

In order to achieve that objective, as well as to address potential issues in a timely manner, we would ask that you contact Ventana first in the event that you do have concerns about this project. We will do our best to resolve the issue in a manner that is satisfactory to everyone involved.

HAVE QUESTIONS?
If you have any questions or concerns about this project, please feel free to contact us.

Ventana Project Manager
604.291.9000
@ventanaconstruction.com

Ventana Project Superintendent
@ventanaconstruction.com

Ventana Construction Corporation
Burnaby, BC
604.291.9000
VentanaConstruction.com
LEGEND

- **truck routing**
- **morning truck staging area**
- **possible pass-through from Fullerton to Keith Rd. for local traffic, pending permission from DWV**
APPENDIX D – CONSTRUCTION
TRAFFIC ROUTING

construction vehicle traffic routing

No Right Turn 7-9 am, 3-5 pm

No Entry for construction vehicles

flagger (work zone)

connect Curling Dr. to Glenaire Dr.

open for local traffic

connect Glenaire Dr. to Klahanie Park (remove barriers), pending permission from DWV

parking at Klahanie Park, pending permission from rugby club

open to parking traffic, pending permission from DWV

PTZ camera

open access to Keith Rd. from Fullerton for local traffic, pending approval from DNV
potential construction parking in lot at Klahanie Park, pending permission from rugby club (~40 cars)
potential parking on field, pending permission from club (~200 cars)
parking on Site B2 / E prior to excavation on these sites (~150 cars)
potential parking on Belle Isle (~30 cars)

NOTES
Parking lots on B2 and E are contingent on an early demolition permit release prior to rezoning being approved.

Trades will be encouraged to carpool and take public transit to site

No trade parking will be allowed on the streets.

Once individual parkades are safe for vehicles to occupy during the works hours, trades will be allowed to park under the buildings.
NOTE
Transit vehicles do not enter the neighbourhood where the Lions Gate Village Peripheral Area development is located. As a result, there will be no direct impact on transit.

Buses may encounter construction traffic when coming south down Capilano Rd., and may be delayed slightly by flaggers located at Fullerton Dr. and Curling Dr.

These delays would be minimal, and in accordance with DNV guidelines for stopping traffic for construction work.
REFERENCE PLAN OF LOTS 2, 3, 4, 5 AND 6
ALL OF BLOCK 16 DISTRICT LOT 764
GROUP 1 NEW WESTMINSTER DISTRICT PLAN 8967
PURSUANT TO SECTION (100) (3) (b) OF THE LAND TITLE ACT.
BCGS 925.035

SCALE 1 : 200

INTEGRATED SURVEY AREA No. 44
(CITY OF NORTH VANCOUVER) BOUNDARIES (CESRS)

Scale drawings are subject to interpretation between:
- Astronomical observations
- Field observations
- Interpretation of survey data

INTEGRATED SURVEY AREA No. 44
(CITY OF NORTH VANCOUVER) BOUNDARIES (CESRS)

TL PLAN 764

GL£NAIRE

PLAN EP63286

RECEIVED
JUL 04 2013
Planning Department
District of North Vancouver

RECEIVED
JUL 04 2013
Planning Department
District of North Vancouver

NOTE: THIS PLAN SHOWS ONE OR MORE POSTS WHICH ARE
ACKNOWLEDGED AND ATTACHED BY THE PHILIPS.

RECEIVED
JUL 04 2013
Planning Department
District of North Vancouver

PIVS PLAN LIES WITHIN THE GREATER VANCOUVER REGIONAL DISTRICT
NOTES / COPYRIGHT RELATED TO THE USE OF THIS DRAWING:
The use of this drawing shall be governed by standard copyright law as generally accepted in architectural practice.

ARCHITECT'S REQUIREMENTS AND APPROVALS:
It is the Builder's responsibility to notify Grimwood Architecture and to seek prior written approval for materials and workmanship which deviates from instructions provided by the Architect.

ENGINEER'S REQUIREMENTS AND APPROVALS:
It is the Builder's responsibility to notify Grimwood Architecture and to seek prior written approval for materials and workmanship which deviates from instructions provided by the Engineer.

AUTHORITIES' REQUIREMENTS AND APPROVALS:
All materials and workmanship must comply with the requirements of all authorities having jurisdiction over the work. It is the Builder's responsibility to gain necessary approval from all relevant Authorities.

DIMENSIONS:
All dimensions must be verified on site. Do not scale off drawings. Plans take precedents over elevations. In the absence of dimensions, or if discrepancies exist, consult Architect. All minimum dimensions are to comply with the National Building Code of Canada.

SHOP DRAWINGS:
Submit shop drawings to the Architect and Engineer for approval prior to manufacturing prefabricated elements of the building.
### Site Plan Overall

#### Glennaire Drive

**NOTES /**

**COMMENTS**

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1/8" = 1'-0"
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Submit shop drawings to the Architect and Engineer for approval prior to manufacturing prefabricated elements of the building.

1/8" = 1'-0"
UNIT C1 UNIT AREA SUMMARY

GRID FLOOR AREA:
- 3RD FLOOR: 607.2 SF
- 2ND FLOOR: 611.2 SF
- 1ST FLOOR: 57.3 SF
- BASEMENT: 293.5 SF
- EAST ELEVATION: 20' - 1 1/4"
- 1ST FLOOR: 615.3 SF
- BASEMENT: 293.5 SF

GROSS FLOOR AREA:
- 3RD FLOOR: 607.2 SF
- 2ND FLOOR: 611.2 SF
- BASEMENT: 450.3 SF
- TOTAL GROSS AREA: 2284.0 SF

ABOVE GRADE AREA:
- 2ND FLOOR: 1833.7 SF
- BASEMENT: 293.0 SF

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GLENNAIRE
1946 - 1980 GLENNAIRE DRIVE
NORTH VANCOUVER, BC
V7R 3S5
+1 604 565 - 3142
Civic Address: 1986-1998 Glenaire Drive
Legal Address:

CONSULTANT TEAM
OWNER: ***
ARCHITECT: Grimwood Architecture
STRUCTURAL: ***
MECHANICAL: ***
ELECTRICAL: ***
LANDSCAPE: ETA Landscape Architecture

ISSUED FOR REZONING 06/24/2016

DRAWING LIST
L1.0 Tree Management Plan
L2.0 Landscape Materials Plan
L3.0 Landscape Planting Plan
L4.0 Grading Plan
L5.0 Offsite Landscape Plan
L7.1 Landscape Details
L7.2 Landscape Details
**SITE FURNISHINGS**

<table>
<thead>
<tr>
<th>ID</th>
<th>DESCRIPTION</th>
<th>SIZE</th>
<th>MODEL</th>
<th>MANUFACTURER</th>
<th>COMMENT</th>
<th>COLOUR</th>
<th>QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>CENTRAL WALKWAY WALL</td>
<td>Height Varies</td>
<td>Custom</td>
<td>CIP Concrete</td>
<td>True</td>
<td>Charcoal</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>4' FENCE &amp; GATE</td>
<td>4' high</td>
<td>Cedar, Aluminium</td>
<td>Custom Horizontal Slat</td>
<td>Clear Stain</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>6' PRIVACY SCREEN</td>
<td>6' high</td>
<td>Cedar, Aluminium</td>
<td>Custom Horizontal Slat</td>
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<td>3</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>6' WOOD BOUNDARY FENCE</td>
<td>6' high</td>
<td>Cedar</td>
<td>Custom</td>
<td>Clear Stain</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>DRIP STRIP</td>
<td>360mm wide</td>
<td>Custom</td>
<td>Light sandblast finish</td>
<td></td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>CIP CONCRETE STEPS</td>
<td>Custom</td>
<td>as shown</td>
<td></td>
<td></td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>GUARDRAIL</td>
<td>42&quot; (1.07m)</td>
<td>Custom</td>
<td></td>
<td></td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>BENCH</td>
<td>To be Spec'd</td>
<td>To be Spec'd</td>
<td></td>
<td></td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>METAL PLANTER</td>
<td>Cedar, Aluminium</td>
<td>Custom</td>
<td>size varies</td>
<td></td>
<td>9</td>
<td></td>
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<tr>
<td>10</td>
<td>METAL PLANTER BENCH</td>
<td>Cedar, Aluminium</td>
<td>Custom</td>
<td></td>
<td></td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>BI-FOLD DOOR</td>
<td>Cedar, Aluminium</td>
<td></td>
<td></td>
<td></td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>WALL LIGHT</td>
<td>Cedar, Aluminium</td>
<td>To be Spec'd</td>
<td></td>
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<td></td>
<td></td>
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**SITE MATERIALS**

<table>
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<th>ID</th>
<th>DESCRIPTION</th>
<th>SIZE</th>
<th>MODEL</th>
<th>MANUFACTURER</th>
<th>COMENT</th>
<th>COLOUR</th>
<th>QTY</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>PAVER - Front Entry</td>
<td>600x100x100mm</td>
<td>Piazza</td>
<td>Abbotsford Concrete</td>
<td></td>
<td>Charcoal</td>
<td>1</td>
</tr>
<tr>
<td>14</td>
<td>CIP CONCRETE - Surface 1</td>
<td>Custom</td>
<td>Natural</td>
<td></td>
<td></td>
<td></td>
<td>14</td>
</tr>
<tr>
<td>15</td>
<td>CIP CONCRETE - Surface 2</td>
<td>Custom</td>
<td>Light Sandblast</td>
<td></td>
<td></td>
<td></td>
<td>15</td>
</tr>
<tr>
<td>16</td>
<td>CIP CONCRETE - Surface 3</td>
<td>Custom</td>
<td>Medium Sandblast</td>
<td></td>
<td></td>
<td></td>
<td>16</td>
</tr>
</tbody>
</table>

**NOTE:** IN THE EVENT OF A DISCREPANCY BETWEEN THE SITE FURNISHINGS, MATERIALS, AND LIGHTING SCHEDULE QUANTITIES AND THE LANDSCAPE PLANS, THE LANDSCAPE PLANS TAKE PRECEDENCE.
Glenaire
1946 - 1998 Glenaire Drive
North Vancouver, BC

Drawing Title
Grading Plan
Project: Glenaire

1946 - 1998 Glenaire Drive
North Vancouver, BC

Drawing Title: Landscape Off-site Plan

1. All landscape to conform to the current edition of the BC Landscape Standards for Level 2 'Groomed' Landscape Treatment.

2. In the event of a discrepancy between the plant list and the planting plan, the planting plan takes precedence.

3. Search area to include British Columbia, Washington, and Oregon.

OFF-SITE PLANT LIST

<table>
<thead>
<tr>
<th>ID</th>
<th>QTY</th>
<th>LATIN NAME</th>
<th>COMMON NAME</th>
<th>SPACING</th>
<th>SCHEDULED SIZE</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ac</td>
<td>10</td>
<td>Acer circinatum</td>
<td>vine maple</td>
<td>as shown</td>
<td>15' full height</td>
<td>full, bushy plants</td>
</tr>
<tr>
<td>Pot</td>
<td>8</td>
<td>Populus tremuloides</td>
<td>quaking aspen</td>
<td>as shown</td>
<td>6m - 8m ht/ B&amp;B</td>
<td>low branching/ multistemmed</td>
</tr>
<tr>
<td>Ae</td>
<td>8</td>
<td>Asarum europaeum</td>
<td>European wild ginger</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ca</td>
<td>3814</td>
<td>Carex albula</td>
<td>frosty curls sedge</td>
<td>7.500</td>
<td>#2 cont.</td>
<td></td>
</tr>
<tr>
<td>Cos</td>
<td>3814</td>
<td>Cornus sericea</td>
<td>red osier dogwood</td>
<td>15.000</td>
<td>#3 cont.</td>
<td></td>
</tr>
<tr>
<td>Is</td>
<td>3814</td>
<td>Iris sibirica 'Caesar's Brother'</td>
<td>Caesar's Brother Siberian Iris</td>
<td>7.500</td>
<td>#2 cont.</td>
<td></td>
</tr>
</tbody>
</table>

Curb breaks collect stormwater runoff in boulevard rain garden.

Asymmetrical tree groupings evoke the 'River Village' Design theme as suggested by the Lions Gate Centre Design Guidelines.

Native rain garden planting.

Decorative boulders as suggested in LGC Design Guidelines.
Slopes at front entry

Bi-fold doors at building face, per Arch

Bi-fold doors open panel up to the greater landscape

Raised metal planter

Steps at front entry

Back patio swing gate

Multi-use path guardrail

6' privacy screen

Riparian area

Multi-use path

Step separates the multi-use path from the rear patio

6' privacy screen

Simple swing gate for everyday use

Cedar top bench

Step down from patio to multi-use path, demarcates property

Step from patio to multi-use path, demarcates property

TC 49.46

BS 49.58

EXTENT OF PARKADE

BUILDING 1

PROPERTY BOUNDARY

SECTION: North - South at Building 1

Scale: 3/16" = 1'-0"

ELEVATION: Rear Patio, View from riparian area

Scale: 1/4" = 1'-0"
Landscape Details

**Concrete Unit Pavers**

- 2% slope paving away from building
- See architectural for exact wall/slab details
- 3-15/16" (100mm) concrete pavers with sand swept joints
- 2" of 9mm clear crush min. prepared subgrade
- 6" of crush-compacted sub-base
- Decorative saw-cut pattern, installed per landscape drawings
- Concrete joints as per MMCG Standards:
  - Expansion joints c/w expansion joint material to be provided at 9m o.c. and where structures such as wall, stairs and curbs meet concrete paving.
  - Control joints to be 1/4 thickness of slab provided at 3m MAX o.c.
  - Decorative saw-cut pattern to be installed per layout plan.
  - Saw-cuts to be completed within 24hrs of pouring the slab.

**CIP Concrete Surface**

- 2% slope
- 100mm (4") CIP concrete pad, reinforced with 9 gauge welded wire mesh, 2% slope to drain
- Decorative saw-cut pattern, installed per landscape drawings

**CIP Concrete Stair with Metal Handrail**

- 2 x 5/8" hot dipped galvanized steel handrail
- 25mm x 25mm (1"x1") relief cast into concrete stairs
- Stair treads slope a min. 2%

**Perimeter Fence**

- 6'-0" o.c.
- 1x4" horizontal cedar slats
- 1x3 cedar separated by neoprene spacers

**Multi-Use Path Handrail**

- 3mm steel cable
- Steel stantions
- Cedar board
Prepare soil in the entire bed and place plants as per planting plan.

2" mulch (do not put mulch against the base of the plants).

Growing medium - refer to BCLNA Standards (2008 ED).

Filter fabric - 30" min. at trees.

2" drain rock, clear of fines.

CIP concrete entry planters.

Paint on damp proofing along inside face of planter.

Planter modules - refer to L10 for planter components and modules.

Metal Planter

Scale: 1:25

All steel to be galvanized, 3/16" steel reinforcing brace.

Fold 4" tabs down 90 degrees to make lip at the top and bottom.

Continuous welded EPDM, waterproof liner inside planter.
Explanatory Memo to the Advisory Design Panel

Date: Sept. 1, 2016
File: 08.3060.20/044.16

FROM: Erik Wilhelm, Community Planner

SUBJECT: DETAILED PLANNING APPLICATION – 23 UNIT TOWNHOUSE PROJECT AT 1946-1998 GLENAIRE DRIVE

PROJECT INFORMATION:

Application Type: Detailed
Applicant: PCUrban
Architecture Firm: Grimwood Architecture Inc.
Project Architect: Thomas Grimwood
Landscape Architect: Eckford Tyacke + Associates
Official Community Plan Designation: Residential Level 2: Detached Residential
Existing Zoning: RS3 (Single-Family Residential 7,200 Zone)
Green Building: Required
Public Art: To be determined through a Community Amenity Contribution analysis.

Context: The development site is located on the northwest corner of Fullerton Avenue and Glenaire Drive and currently consists of 5 single family dwellings. Capilano River flows north of the site (within Capilano River Regional Park). Single family dwellings remain west and south of the site (see map above).

Applicable Development Permit Area Guidelines:
1. Guidelines for Ground Oriented Housing;
2. Guidelines for Multi-Family Housing;
3. Lower Capilano Village Centre: Peripheral Area Housing Policy & Design Guidelines;
4. Streamside Protection; and

BACKGROUND:

District of North Vancouver Council endorsed the “Lower Capilano Village Centre: Peripheral Area Housing Policy & Design Guidelines” in July of 2014 (Attachment 2). This ‘peripheral policy’ outlined the envisioned housing forms, density and design guidelines that should be followed within the newly named “Lions Gate” area. As outlined in the peripheral policy, the development site is identified to be within “Area 1” which contemplates townhouses to a maximum FSR of 1.2 for larger sites.
The site is currently designated Residential Level 2: Detached Residential within the Official Community Plan (OCP). Accordingly, the application requires an OCP amendment to the Residential Level 4: Transitional Multi-Family designation in order to comply with ‘peripheral policy’ densities. The development will also require Rezoning and Development Permit approval from District Council.

A considerable amount of development activity is expected in the general area and it is anticipated that the majority of developments will propose three storey townhouse developments as envisioned within the peripheral policy.

THE PROPOSAL:

The development site is approximately 1353 sq. m. (14,571 sq. ft.) in area. The overall development proposes 23 townhouse units (conventional walk-up) with an FSR of approximately 1.06.

There are 3 buildings, all 3 storeys, and all units provide for 3 bedrooms. A total of 46 parking stalls and storage for 47 bicycles are provided within the underground parkade which is accessed from Glenaire Drive on the western portion of the site.

Given the location of the Capilano River just north of the site, the development must provide an average of 15 m. (49.2 ft.) riparian area setback from the ‘top of bank’. The trail proposed at the rear of the development is located outside the riparian area setback (District policy dictates that no trail may be located within the riparian area setback). The riparian area is slated to be rehabilitated and revegetated as part of this development and demarcated by a protective fence.

URBAN DESIGN COMMENTS:

The Urban Design Planner’s comments will be provided at the ADP meeting.

APPLICABLE DESIGN GUIDELINES:

In accordance with the Official Community Plan, the form and character of the development may be reviewed alongside the following Development Permit Area Guidelines:

1. Ground Oriented Housing;
2. Multi-Family Housing;
3. Lower Capilano Village Centre: Peripheral Area Housing Policy & Design Guidelines;
4. Streamside Protection; and

CONCLUSION:

Staff look forward to the Panel’s comments and would be interested in any direction the Panel may provide for this detailed application.

Erik Wilhelm, Community Planner

Attachments:

1 - ADP package (Grimwood Architecture Inc.)
2 - “Lower Capilano Village Centre: Peripheral Area Housing Policy & Design Guidelines”
may not reflect neighbourhood character and the costs of manufacture and maintenance may be a problem
- The adjacent project has a lovely walkway and water feature which could be celebrated in the site layout for this project
- Plant choices could use more variety and there would be merit for inclusion of some taller plant species in the landscape plan to assist in increasing privacy and definition of the outdoor areas

The Chair invited the project team to respond and Mr. Yadigari thanked the Panel and noted the team’s willingness to explore refinements to the project design.

The Chair invited the Panel to compose a motion:

MOVED by Stefen Elmitt and SECONDED by Amy Tsang:

THAT the ADP has reviewed the proposal, and SUPPORTS the general concept but recommends revisions to the proposal and a further presentation to address staff the items noted by the Panel in its review of the project.

CARRIED

c.) 1946 – 1998 Glenaire Dr. – Detailed Planning Application for OCP Amendment, Rezoning and Development Permit for 23 Unit Townhouse Project.

Mr. Erik Wilhelm, District Community Planner, introduced the project and provided background on the site and planning policy context for the project. The proposal is for 23 townhouse units in three separate three-storey buildings at an overall FSR of approximately 1.1 FSR. A trail feature on the river side of the property adjacent to the riparian area, will enhance the connection to the natural surroundings and allow for improved public access along the river. The development will require an OCP amendment, Rezoning, and Development Permit.

The Chair welcomed the applicant team, and Mr. Thomas Grimwood of Grimwood Architecture introduced the project. The following points were reviewed:

- There is a 15 metre riparian setback at the north side of the property and a public pathway will be created at the edge of this setback area
- The project addresses the protection and restoration of the riparian area
- All parking is underground in a mix of private garages and open spaces. The parking garage entrance is from Glenaire Drive
- A total FSR less than the maximum permitted 1.2 FSR is proposed to allow for larger dwelling units that will offer more of a single family character
- A European row home approach has informed the design which is reflected in the elegant and consistent approach to the frontages of the buildings
- Variation in material and colour palettes is proposed for each of the three buildings
Larger windows have been included for the portions of the units facing the Capilano River to take advantage of the attractive outlook.

- A large rear patio has been included for each unit.
- The housing type is intended to be comfortable for families.
- "Built Green Gold" certification is proposed along with a range of energy and resource-efficient features.

Mr. Daryl Tyacke of ETA Landscape Architects reviewed the following points in the landscape plan presentation:

- The Glenaire Drive frontage of the property includes a series of vehicle pull-outs with rain garden elements between them to provide on-street parking while creating a soft edge to the street.
- Paving patterns are intended to draw the eye toward the river.
- The proposed planting palette includes a columnar tree at each front entrance to help identify the entrances and establish a rhythm in the landscape.
- The mews area between Buildings 1 and 2 includes native plant selections and a planting plan to create an attractive landscape between the buildings and a comfortable pedestrian connection.

The Chair thanked the applicant team for their presentation and asked if there were any questions of clarification from the Panel. Questions were asked and answered on the following topics:

- What is the landscape edge of the riparian area? There is a grade change with the parkade wall adjacent and the path is on top of the parkade. Options are being reviewed for the location of the trail, and for disguising the parkade wall.
- Is the trail outside of the riparian area? Yes, a portion of garage encroaches into the riparian setback area, but the average protected area is larger than required.
- Is underground parking secured? Yes, there is an overhead gate at the driveway entrance and individual garages are separately secured.
- Has the Department of Fisheries and Oceans been consulted? Yes.
- Are planters proposed on the exterior of the buildings at the upper level? No.
- Is there a flood plain concern? No.
- Is access from units to public path proposed? No.
- Were roof decks considered? Yes, but larger grade level patios were preferred.
- How was accessibility considered? Some units allow for a retrofit elevator, and straight stairs which allows for future installation of stair glide equipment. The provision of a main level accessible washroom is being considered.

Mr. Alfonso Tejada, District Urban Designer Planner, provided comments on the project with reference to the following principles:

- The proposed railing along the pedestrian pathway is problematic and it would be preferred to see some re-examination of this important public asset to provide "stopping points" along the pathway.
- The proposal for eight risers to the front entrances from street level as well as the railing designs seem challenging in terms of creating a successful street character.
The mews relationship between Building 1 and Building 2 should be reviewed to ensure the design of this area is successful as the current design for the elevations of the buildings along the mews seems flat and uninteresting.

- A more natural material than poured concrete for the base of the buildings would be preferred.
- The parking garage entrance needs to be more interesting and the project would benefit from the provision of a balancing element at the other end of this building.

The Chair invited comments from the Panel members, and the following comments and items for consideration were offered:

- In general, it was suggested that the proposal provides a positive site plan and building form with a refreshing approach to townhouse expression.
- The public path along the river seems overly structured and could be more successful with a more organic approach – the design should celebrate a pathway experience along a natural edge.
- Intersecting gable roof elements at the north-east corner of the site are somewhat challenging and could use some re-consideration.
- The proposed plant palette appears sophisticated and successful but some approach to a grade change or a planting strip between the private patios and the public walkway should be explored.
- It was suggested that the proposed outdoor areas lack privacy and landscaping could be used to address that issue.
- Roof drainage will be a challenge in the project and should be examined carefully to avoid obtrusive rainwater leaders on the elevations.
- In general, the colour selections are positive, but the proposed westerly building seems a bit dull and might benefit from additional contrast.
- The walkway through the mews areas seems a bit tight and could benefit from better sight lines.
- Given the number of storeys, exiting via the main floor should be reviewed for code compliance.
- Wood soffits would be a better choice than vinyl.
- It was suggested that the handrails for the front entrances need some additional work, and that the roof features over the rear patio doors appear somewhat tacked-on and could benefit from improved detailing.

The Chair invited the project team to respond.

The applicant team noted an appreciation for the comments made by the Panel and thanked them for their time.

The Chair invited the Panel to compose a motion:

**MOVED** by Craig Taylor and **SECONDED** by Samir Eidnani:

**THAT** the ADP has reviewed the proposal, commends the applicant for the quality of the proposal, and recommends **APPROVAL** of the project **SUBJECT** to addressing to the satisfaction of staff the items noted by the Panel in its review of the project.

**CARRIED**
Diamond Head Consulting Ltd.
Arborist Report

For:
1946-1998 Glenaire Dr
North Vancouver, BC

June 21, 2016

To be submitted with Tree Protection Plan
Dated: Oct 22, 2015

Departed to:
PC Urban
Suite 880, 1090 West Georgia Street
Vancouver, BC V6E 3V7

Submitted by:
DIAMOND HEAD
CONSULTING LTD.

3551 Commercial Street
Vancouver, BC
V5N 4E8
The following Diamond Head Consulting staff performed the site visit and prepared the report. All general and professional liability insurance and individual accreditations have been provided below for reference.

Mike Coulthard  
RPF (#3772) RPBio (#1338)

This report summarizes the planned management of trees on the site. If there are any questions or concerns as to the contents of this report, please contact us at any time.

Contact Information

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Fax: 604-733-4879  
Email: mike@diamondheadconsulting.com  
Website: www.diamondheadconsulting.com

Insurance Information

WCB: # 657906 AQ (003)  
General Liability: Northbridge General Insurance Corporation - Policy #CBC1935506, $5,000,000 (Mar 2015 to Mar 2016)  
Errors & Omissions: Lloyds Underwriters – Policy #1010615D, $1,000,000 (June 2015 to June 2017)
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1.0 Introduction

Diamond Head Consulting Ltd. (DHC) was asked to complete an assessment of the trees on and adjacent to the following proposed development:

<table>
<thead>
<tr>
<th>Civic address:</th>
<th>1946-1998 Glenaire Dr North Vancouver, BC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Client name:</td>
<td>Robert Spencer PC Urban</td>
</tr>
<tr>
<td>Date of site visit:</td>
<td>Oct 19, 2015</td>
</tr>
</tbody>
</table>

The objective of this report is to ensure the proposed development is in compliance with District of North Vancouver Bylaws that applies to tree retention. These requirements are covered in the Tree Protection Bylaw (H7671). Protected trees as defined by this bylaw include:

a. Any tree on land owned by or in the possession of the District, including, without limitation, a tree in a park or on a boulevard, road or lane allowance;
b. Any tree within a protected area;
c. Any tree on sloping terrain;
d. Any replacement tree;
e. Any retained tree;
f. Any heritage tree;
g. Any wildlife tree;
h. Any tree located on wetland or waterfront;
i. Any tree of the following species:
   i. Arbutus (Arbutus menziesii);
   ii. Garry Oak (Quercus garryana);
   iii. Oregon Ash (Fraxinus spp);
   iv. Pacific Yew (Taxus brevifolia);
   v. Western White Pine (Pinus monticola); or
   vi. Yellow-cedar (Chamaecyparis nootkatensis).

Replacement trees for the removal of large diameter trees (over 75cm) are required if the subject lot will have less than 20% canopy cover remaining after the removal of the large diameter tree. If the canopy cover is over 20% after the removal, no replacement tree is required.

- If the subject lot is less than 420 square meters in area, one replacement tree for every large-diameter tree must be planted.
- If the subject lot is over 420 square meters in area, three replacement trees for every large-diameter tree must be planted.

All trees (>20cm in diameter) on and immediately adjacent to the site were assessed, including: species, diameter at breast height (dbh) measured to the nearest 1 cm at 1.4 m above tree base, estimated height and general health and defects. Critical root zones were calculated for each of the trees with the potential for development impacts. Tree hazards were assessed according to International Society of Arboriculture and WCB standards. Suitability for tree retention was evaluated based on the health of the trees and their location in relation to the proposed building envelopes and infrastructure.
1.1 Limits of Assignment

- Our investigation is based solely on our visual inspection of the trees on Oct 19 and Aug 27, 2015. Our inspection was conducted from ground level. We did not conduct soil tests or root examination to assess the condition of the root system of the trees.
- Only the trees specified in the scope of work were assessed and assessments were performed within the limitations specified.
- This report does not provide any estimates to implement the proposed recommendations provided in this report.
- This report is valid for six months from the date of submission. Additional site visits and report revisions are required after this point to ensure accuracy of the report for the District's development permit application process.

1.2 Purpose and Use of Report

- Provide documentation pertaining to on and off site trees to supplement the proposed development permit application.

Figure 1. Location of site – 1946-1998 Glenaire Dr.
2.0 Observations

2.1 Site Overview

The site consists of five residential lots. The proposed development includes a row of townhouses to be built. Capilano River runs along the north edge of the development site. The majority of trees have been cleared from the existing developed lots. There is an open band of mature trees that is currently growing from the north property lines down to the high water mark of the River. Tree species found in this area include a mix of native and non-native species. The largest trees include native black cottonwood (*Populus trichocarpa*). Other native species found in this area include western redcedar (*Thuja plicata*), bigleaf maple (*Acer macrophyllum*), red alder (*Alnus rubra*) and Douglas-fir (*Pseudotsuga menziesii*). There are a number of non-native trees species within the assessment area including Horse chestnut (*Aesculus hippocastanum*).

There are two large mature conifers growing in the front yards including a an open grown Douglas-fir and a Western redcedar that has been previously topped. Smaller non-native trees are found in the landscaped back yards of 1946 and 1958. There is also a dense row of native cedar, hemlock as well as non-native hornbeam growing along the eastern boundary of 1998.

A windfirm boundary assessment was completed for the trees growing along the Capilano River. This identified edge trees that must be retained and protected in order to comply with the Provincial Riparian Areas Regulation. The windfirm boundary that has been identified includes those mature trees that are growing along the backs of these lots.

2.2 Tree Inventory

The following is an inventory of assessed trees, each of which was marked with a numbered tag. The trees that are protected under the District Tree Bylaw have been highlighted in red. Tree species, characteristics, comments, recommendations and required root protection zones have been suggested (Table 1). Their locations are illustrated on the accompanying map.
Overall Health and Structure Rating

- **Excellent** = Tree of possible specimen quality, unique species or size with no discernible defects. Or a heritage tree.
- **Normal** = These trees are in fair to good condition, considering its growing environment and species.
- **Poor** = These trees have low vigour, with noted health and/or structural defects. This tree is starting to decline from its typical species growth habits.
- **Very poor** = These trees are in serious decline from its typical growth habits, with multiple very definable health and/or structural defects.
- **Dead/Dying** = These trees were found to be dead, and/or have severe defects and are in severe decline.
- **High Risk** = These trees have been deemed hazardous by a Certified Tree Risk Assessor utilizing CTRA methods. They have a probability of failure of 3 or higher with a total overall risk rating of 8 (Moderate 3) or above.

Tree Retention Suitability Ratings

- **Unsuitable** = Not suitable for retention in context of the proposed project design and land use changes. These trees have pre-existing health and structural defects. There is a significant chance that these trees will not survive or may become a hazard given the proposed future land use.
- **Moderate** = These trees have moderate structural defects or health issues. The retention of this class of trees is not always successful or viable due to their pre-existing structural defects or health issues; however these trees may be viable for retention with the use of special measures.
- **Suitable** = These trees have no obvious structural defects or health issues, and are worthy of consideration for retention in the proposed development.
- **Suitable as group** = These trees have grown up in groups (groves) of other trees, and have not developed the type of trunk and root structure that will allow them to be safely retained on their own. These trees should only be retained in groups.

Tree Risk Assessment

Using the *Tree Risk Assessment in Urban Areas and the Urban/Rural Interface Release 1.4* manual, published by the International Society of Arboriculture, a Risk Rating out of 12 maximum points was given to the tree as shown in Table 2. The formula used was: **Probability of Failure + Size of Part + Target Area = Tree Risk Assessment (Rating).**

In the Tree Risk Assessment, the tree was rated as follows:

**Probability of Failure** = (1 low to 5 Extreme). This is the likelihood of branch or whole tree failure. One is the lowest possible score; five is the highest likelihood of tree part failure.

**Size of Defective Part** = (1 small to 3 large). This section identifies the largest part, which could fail. A part greater than 50 cm is given a rating of 3, a part between 10 and 50 cm is given a rating of 2 and all parts less than 10 cm are given a rating of 1.
Target Area = (1 low to 4 high). The target that the tree could strike is designated a value from 1 to 4 based on the potential to cause personal injury or damage structures and infrastructure.

A value for each of the three categories is assessed and added together in the Risk Rating calculation shown in Table 2. A score of 3-5 indicates a low risk, 6-8 is a moderate risk, 9-11 is a high risk and 12 indicates an extreme risk; this level warrants immediate tree removal. A risk category assigning ranges to the three levels of risk is also provided. Please refer to the table in Appendix 1 for detailed information on interpretation and implications of risk ratings and categories.

2.3 Photographs

Photo 1. View north over existing residences at mature trees growing adjacent to the backs of the lots.

Photo 2. View of riparian buffer from the river.
Photo 3. View of tree 3947

Photo 4. View of tree 3982

Photo 5. View of trees 3948-3952

Photo 6. View of tree 472 with tree house
Table 1. Tree Inventory.

<table>
<thead>
<tr>
<th>Tag #</th>
<th>Common Name</th>
<th>Botanical Name</th>
<th>DBH (cm)</th>
<th>Ht (m)</th>
<th>Live Crown Ratio (%)</th>
<th>Overall Condition</th>
<th>Suitability</th>
<th>Comments</th>
<th>Retain/Remove</th>
<th>Tree Protection Zone (m) from center of tree</th>
<th>Tree Protection Zone (m) from outer edge of tree</th>
</tr>
</thead>
<tbody>
<tr>
<td>466</td>
<td>Western Hemlock</td>
<td>Tsuga heterophylla</td>
<td>51</td>
<td>20</td>
<td>80-89%</td>
<td>Good</td>
<td>Suitable</td>
<td>Full crown. Open grown. This is a natural edge tree. No other mature trees exist to the south. Windfirm riparian edge tree.</td>
<td>Retain</td>
<td>5.1</td>
<td>5.3</td>
</tr>
<tr>
<td>471</td>
<td>Western White Pine</td>
<td>Pinus monticola</td>
<td>34</td>
<td>22</td>
<td>70-79%</td>
<td>Good</td>
<td>Suitable</td>
<td>Inside active yard space. The only other mature trees north of this include two cottonwoods along the high water mark of the river. Windfirm riparian edge tree.</td>
<td>Retain</td>
<td>3.4</td>
<td>3.6</td>
</tr>
<tr>
<td>472</td>
<td>Western Redcedar</td>
<td>Thuja plicata</td>
<td>69</td>
<td>21</td>
<td>70-79%</td>
<td>Good</td>
<td>Suitable</td>
<td>Inside active yard space. A tree house has been built around the base of this tree. However it has caused no major damage and can be removed. There are no other mature trees to the south. Windfirm riparian edge tree.</td>
<td>Retain</td>
<td>6</td>
<td>6.4</td>
</tr>
<tr>
<td>3947</td>
<td>Douglas-fir</td>
<td>Pseudotsuga menziesii</td>
<td>104</td>
<td>41</td>
<td>70-79%</td>
<td>Excellent</td>
<td>Suitable</td>
<td>Open grown full crown. Between two driveways with roots cracking asphalt to the west. Large size tree. Roots conflict with building envelope.</td>
<td>Remove</td>
<td>8</td>
<td>8.5</td>
</tr>
<tr>
<td>3954</td>
<td>Western Hemlock</td>
<td>Tsuga heterophylla</td>
<td>33</td>
<td>15</td>
<td>50-59%</td>
<td>Poor</td>
<td>Unsuitable</td>
<td>Previously topped at 8m. Decay at crotch of old topping. 1m from shed. Roots conflict with building envelope.</td>
<td>Remove</td>
<td>3.3</td>
<td>3.5</td>
</tr>
<tr>
<td>3955</td>
<td>Western Hemlock</td>
<td>Tsuga heterophylla</td>
<td>31</td>
<td>14</td>
<td>60-69%</td>
<td>Poor</td>
<td>Unsuitable</td>
<td>Previously topped at 8m. Decay at crotch of old topping. 1m from shed. Roots conflict with building envelope.</td>
<td>Remove</td>
<td>3.1</td>
<td>3.3</td>
</tr>
<tr>
<td>3956</td>
<td>Western Redcedar</td>
<td>Thuja plicata</td>
<td>39</td>
<td>16</td>
<td>70-79%</td>
<td>Poor</td>
<td>Unsuitable</td>
<td>Co-dominant stems from 1m (17cm, 22cm). One stem topped at 8m but not hazardous. Growing 1m from shed. Roots conflict with building envelope.</td>
<td>Remove</td>
<td>3.9</td>
<td>4.1</td>
</tr>
<tr>
<td>Tag #</td>
<td>Common Name</td>
<td>Botanical Name</td>
<td>DBH (cm)</td>
<td>Ht (m)</td>
<td>Live Crown Ratio (%)</td>
<td>Overall Condition</td>
<td>Suitability</td>
<td>Comments</td>
<td>Retain/Remove</td>
<td>Tree Protection Zone (m) from center of tree</td>
<td>Tree Protection Zone (m) from outer edge of tree</td>
</tr>
<tr>
<td>-------</td>
<td>----------------</td>
<td>----------------</td>
<td>----------</td>
<td>--------</td>
<td>----------------------</td>
<td>-------------------</td>
<td>-------------</td>
<td>--------------------------------------------------------------------------</td>
<td>---------------</td>
<td>---------------------------------------------</td>
<td>-------------------------------------------------</td>
</tr>
<tr>
<td>3957</td>
<td>Western Redcedar</td>
<td>Thuja plicata</td>
<td>50</td>
<td>17</td>
<td>70-79%</td>
<td>Poor</td>
<td>Suitable</td>
<td>Co-dominant stems from base (24cm, 26cm). Growing 1m from shed. Ropes tied around stem starting to girdle it. Roots conflict with building envelope.</td>
<td>Remove</td>
<td>5</td>
<td>5.3</td>
</tr>
<tr>
<td>3958</td>
<td>Western Redcedar</td>
<td>Thuja plicata</td>
<td>57</td>
<td>15</td>
<td>60-69%</td>
<td>Normal</td>
<td>Suitable</td>
<td>Co-dominant stems from base but no included bark (28cm, 29cm). Growing 1m from shed. Roots conflict with building envelope. In riparian zone.</td>
<td>Remove</td>
<td>5.7</td>
<td>6</td>
</tr>
<tr>
<td>3959</td>
<td>Western Redcedar</td>
<td>Thuja plicata</td>
<td>23</td>
<td>15</td>
<td>60-69%</td>
<td>Normal</td>
<td>Suitable</td>
<td>Growing 1m from shed. Roots conflict with building envelope. In riparian zone.</td>
<td>Remove</td>
<td>2.3</td>
<td>2.4</td>
</tr>
<tr>
<td>3960</td>
<td>Western Redcedar</td>
<td>Thuja plicata</td>
<td>28</td>
<td>15</td>
<td>80-89%</td>
<td>Normal</td>
<td>Suitable</td>
<td>Growing 2m from shed. Roots conflict with building envelope. In riparian zone.</td>
<td>Remove</td>
<td>2.8</td>
<td>2.9</td>
</tr>
<tr>
<td>3961</td>
<td>Western Redcedar</td>
<td>Thuja plicata</td>
<td>19</td>
<td>13</td>
<td>70-79%</td>
<td>Normal</td>
<td>Suitable</td>
<td>Suppressed by adjacent cedars. Growing 1m from shed. Roots conflict with building envelope. Not within the riparian zone.</td>
<td>Remove</td>
<td>1.9</td>
<td>2</td>
</tr>
<tr>
<td>3962</td>
<td>Western Redcedar</td>
<td>Thuja plicata</td>
<td>44</td>
<td>17</td>
<td>70-79%</td>
<td>Normal</td>
<td>Suitable</td>
<td>Growing 0.5m from shed. Ropes tied around stem. Roots conflict with building envelope. Not within the riparian zone.</td>
<td>Remove</td>
<td>4.4</td>
<td>4.6</td>
</tr>
<tr>
<td>3966</td>
<td>Cypress</td>
<td>Cupressaceae</td>
<td>26</td>
<td>8</td>
<td>&lt;20%</td>
<td>Dead/dying</td>
<td>Unsuitable</td>
<td>Almost dead. 10% live crown. Roots conflict with building envelope. Not within the riparian zone.</td>
<td>Remove</td>
<td>2.6</td>
<td>2.7</td>
</tr>
<tr>
<td>3968</td>
<td>Western Redcedar</td>
<td>Thuja plicata</td>
<td>61</td>
<td>9</td>
<td>30-39%</td>
<td>Poor</td>
<td>Unsuitable</td>
<td>5 stems growing from the base (16cm, 6cm, 12cm, 13cm, 14cm). Low live crown. Growing on top of 1m retaining wall. Poor structure but not hazardous. Roots conflict with building envelope. Not within the riparian zone.</td>
<td>Remove</td>
<td>2</td>
<td>2.1</td>
</tr>
<tr>
<td>Tag #</td>
<td>Common Name</td>
<td>Botanical Name</td>
<td>DBH (cm)</td>
<td>Ht (m)</td>
<td>Live Crown Ratio (%)</td>
<td>Overall Condition</td>
<td>Suitability</td>
<td>Comments</td>
<td>Retain/Remove</td>
<td>Tree Protection Zone (m) from center of tree</td>
<td>Tree Protection Zone (m) from outer edge of tree</td>
</tr>
<tr>
<td>-------</td>
<td>-------------</td>
<td>----------------</td>
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<td>--------------</td>
<td>-------------------------------------------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>3969</td>
<td>Western Redcedar</td>
<td>Thuja plicata</td>
<td>49</td>
<td>8</td>
<td>60-69%</td>
<td>Poor</td>
<td>Suitable</td>
<td>3 stems growing from base (19cm, 17cm, 13cm). Growing on top of 1m retaining wall. Poor structure but not hazardous. Roots conflict with building envelope. Not within the riparian zone</td>
<td>Remove</td>
<td>2</td>
<td>2.1</td>
</tr>
<tr>
<td>3970</td>
<td>Western Redcedar</td>
<td>Thuja plicata</td>
<td>35</td>
<td>9</td>
<td>80-89%</td>
<td>Normal</td>
<td>Suitable</td>
<td>Growing on top of 1m retaining wall. Conflict with building envelope. Not within the riparian zone</td>
<td>Remove</td>
<td>3.5</td>
<td>3.7</td>
</tr>
<tr>
<td>3971</td>
<td>Cypress</td>
<td>Cupressaceae</td>
<td>18</td>
<td>14</td>
<td>70-79%</td>
<td>Normal</td>
<td>Suitable</td>
<td>Growing in a row. Not within the riparian zone</td>
<td>Remove</td>
<td>1.8</td>
<td>1.9</td>
</tr>
<tr>
<td>3972</td>
<td>Cypress</td>
<td>Cupressaceae</td>
<td>14</td>
<td>13</td>
<td>70-79%</td>
<td>Normal</td>
<td>Suitable</td>
<td>Growing in a row. In riparian zone.</td>
<td>Retain</td>
<td>1.4</td>
<td>1.5</td>
</tr>
<tr>
<td>3973</td>
<td>Cypress</td>
<td>Cupressaceae</td>
<td>13</td>
<td>13</td>
<td>50-59%</td>
<td>Normal</td>
<td>Suitable</td>
<td>Growing in a row. In riparian zone.</td>
<td>Retain</td>
<td>1.3</td>
<td>1.4</td>
</tr>
<tr>
<td>3974</td>
<td>Cypress</td>
<td>Cupressaceae</td>
<td>15</td>
<td>13</td>
<td>50-59%</td>
<td>Normal</td>
<td>Suitable</td>
<td>Growing in a row. In riparian zone.</td>
<td>Retain</td>
<td>1.5</td>
<td>1.6</td>
</tr>
<tr>
<td>3975</td>
<td>Cypress</td>
<td>Cupressaceae</td>
<td>13</td>
<td>12</td>
<td>50-59%</td>
<td>Normal</td>
<td>Suitable</td>
<td>Growing in a row. In riparian zone.</td>
<td>Retain</td>
<td>1.3</td>
<td>1.4</td>
</tr>
<tr>
<td>3976</td>
<td>Cypress</td>
<td>Cupressaceae</td>
<td>13</td>
<td>12</td>
<td>50-59%</td>
<td>Normal</td>
<td>Suitable</td>
<td>Growing in a row. In riparian zone.</td>
<td>Retain</td>
<td>1.3</td>
<td>1.4</td>
</tr>
<tr>
<td>3977</td>
<td>Shorepine</td>
<td>Pinus contorta</td>
<td>16</td>
<td>12</td>
<td>30-39%</td>
<td>Poor</td>
<td>Unsuitable</td>
<td>Leaning 5 degrees. Thin crown. In riparian zone. Cannot reach target.</td>
<td>Retain</td>
<td>1.6</td>
<td>1.7</td>
</tr>
<tr>
<td>3979</td>
<td>Western Redcedar</td>
<td>Thuja plicata</td>
<td>31</td>
<td>15</td>
<td>80-89%</td>
<td>Poor</td>
<td>Suitable</td>
<td>Wire grown into stem at 1.5m but no sign of health effects. In riparian zone.</td>
<td>Retain</td>
<td>3.1</td>
<td>3.3</td>
</tr>
<tr>
<td>3980</td>
<td>Sitka Spruce</td>
<td>Picea sitchensis</td>
<td>18</td>
<td>6</td>
<td>50-59%</td>
<td>Poor</td>
<td>Unsuitable</td>
<td>Girdled at 2m. Leaning 5 degrees. Crown mostly on south side. Conflict with building envelope. Not within the riparian zone</td>
<td>Remove</td>
<td>1.8</td>
<td>1.9</td>
</tr>
<tr>
<td>3981</td>
<td>Western Redcedar</td>
<td>Thuja plicata</td>
<td>22</td>
<td>8</td>
<td>30-39%</td>
<td>Normal</td>
<td>Suitable</td>
<td>Lift pruned. Conflict with building envelope. In riparian zone.</td>
<td>Retain</td>
<td>2.2</td>
<td>2.3</td>
</tr>
<tr>
<td>3982</td>
<td>Western Redcedar</td>
<td>Thuja plicata</td>
<td>95</td>
<td>19</td>
<td>80-89%</td>
<td>Poor</td>
<td>Suitable</td>
<td>Tree was topped at 19m. Growing in a 0.3m tall wall around base. Conflict with building envelope. Large diameter tree.</td>
<td>Remove</td>
<td>7</td>
<td>7.5</td>
</tr>
<tr>
<td>Tag #</td>
<td>Common Name</td>
<td>Botanical Name</td>
<td>DBH (cm)</td>
<td>Ht (m)</td>
<td>Live Crown Ratio (%)</td>
<td>Overall Condition</td>
<td>Suitability</td>
<td>Comments</td>
<td>Retain/ Remove</td>
<td>Tree Protection Zone (m) from center of tree</td>
<td>Tree Protection Zone (m) from outer edge of tree</td>
</tr>
<tr>
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<td>--------------------------------------------------------------------------</td>
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<td>---------------------------------------------</td>
</tr>
<tr>
<td>3983</td>
<td>Amabilis Fir</td>
<td>Abies amabilis</td>
<td>27</td>
<td>9</td>
<td>80-89%</td>
<td>Normal</td>
<td>Suitable</td>
<td>Growing in landscaped area. Rocks and retaining wall over root zone. In riparian zone.</td>
<td>Retain</td>
<td>2.7</td>
<td>2.8</td>
</tr>
<tr>
<td>3985</td>
<td>Shorepine</td>
<td>Pinus contorta</td>
<td>33</td>
<td>9</td>
<td>70-79%</td>
<td>Normal</td>
<td>Suitable</td>
<td>Growing in landscaped area. Rocks, gravel and retaining wall over root zone. In riparian zone.</td>
<td>Retain</td>
<td>3.3</td>
<td>3.5</td>
</tr>
<tr>
<td>3986</td>
<td>Western Hemlock</td>
<td>Tsuga heterophylla</td>
<td>17</td>
<td>9</td>
<td>80-89%</td>
<td>Normal</td>
<td>Suitable</td>
<td>In landscape area 0.5m to pavers. Conflict with building envelope. Not within the riparian zone</td>
<td>Remove</td>
<td>1.7</td>
<td>1.8</td>
</tr>
<tr>
<td>3987</td>
<td>Bigtooth Aspen</td>
<td>Populus grandidentata</td>
<td>13</td>
<td>12</td>
<td>80-89%</td>
<td>Normal</td>
<td>Suitable</td>
<td>Variety uncertain. Growing in landscaped area, 0.5m to pavers. Conflict with building envelope. Not within the riparian zone</td>
<td>Remove</td>
<td>1.3</td>
<td>1.4</td>
</tr>
<tr>
<td>3988</td>
<td>Bigtooth Aspen</td>
<td>Populus grandidentata</td>
<td>12</td>
<td>1</td>
<td>80-89%</td>
<td>Normal</td>
<td>Suitable</td>
<td>Variety uncertain. Growing in landscaped area, 0.5m to pavers. Conflict with building envelope. Not within the riparian zone</td>
<td>Remove</td>
<td>1.2</td>
<td>1.3</td>
</tr>
<tr>
<td>3989</td>
<td>Western Redcedar</td>
<td>Thuja plicata</td>
<td>96</td>
<td>28</td>
<td>60-69%</td>
<td>Poor</td>
<td>Suitable</td>
<td>Was topped at 18m with multiple stems. Has poor structure. Aerial assess for risk if retained. Large diameter tree.</td>
<td>Retain</td>
<td>7</td>
<td>7.5</td>
</tr>
<tr>
<td>Off Site 465</td>
<td>Douglas-fir</td>
<td>Pseudotsuga menziesii</td>
<td>50</td>
<td>25</td>
<td>70-79%</td>
<td>Good</td>
<td>Suitable</td>
<td>Minor deadwood in lower 1/3 of crown. This is a natural edge tree. No other mature trees exist to the south. Windfirm riparian edge tree.</td>
<td>Retain</td>
<td>5</td>
<td>5.3</td>
</tr>
<tr>
<td>Off Site 467</td>
<td>Black Cottonwood</td>
<td>Populus balsamifera ssp. trichocarpa</td>
<td>68</td>
<td>24</td>
<td>50-59%</td>
<td>Good</td>
<td>Suitable as group</td>
<td>This is a mature dominant tree with full crown. It is open grown. All trees to the south include 8-15m tall cedars. Windfirm riparian edge tree.</td>
<td>Retain</td>
<td>6</td>
<td>6.3</td>
</tr>
<tr>
<td>Off Site 468</td>
<td>Horsechestnut</td>
<td>Aesculus hippocastanum</td>
<td>20</td>
<td>11</td>
<td>80-89%</td>
<td>Fair</td>
<td>Suitable as group</td>
<td>Minor signs of drought stress. There are no other mature trees in this area.</td>
<td>Retain</td>
<td>3</td>
<td>3.1</td>
</tr>
<tr>
<td>Tag #</td>
<td>Common Name</td>
<td>Botanical Name</td>
<td>DBH (cm)</td>
<td>Ht (m)</td>
<td>Live Crown Ratio (%)</td>
<td>Overall Condition</td>
<td>Suitability</td>
<td>Comments</td>
<td>Retain/Remove</td>
<td>Tree Protection Zone (m) from center of tree</td>
<td>Tree Protection Zone (m) from outer edge of tree</td>
</tr>
<tr>
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<td>---------------------------------------------------------------------------</td>
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<td>---------------------------------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>Off Site 469</td>
<td>Horsechestnut</td>
<td>Aesculus hippocastanum</td>
<td>32</td>
<td>13</td>
<td>80-89%</td>
<td>Fair</td>
<td>Suitable as group</td>
<td>Two similar size bigleaf maples exist to the west. Windfirm riparian edge tree.</td>
<td>Retain</td>
<td>3.2</td>
<td>3.4</td>
</tr>
<tr>
<td>Off Site 470</td>
<td>Black Cottonwood</td>
<td>Populus balsamifera ssp. trichocarpa</td>
<td>66</td>
<td>33</td>
<td>80-89%</td>
<td>Good</td>
<td>Suitable</td>
<td>Minor signs of drought stress. There are no other mature trees in this area. This is the only tree between the river and edge of property. Windfirm riparian edge tree.</td>
<td>Retain</td>
<td>6</td>
<td>6.3</td>
</tr>
<tr>
<td>Off Site 473</td>
<td>Black Cottonwood</td>
<td>Populus balsamifera ssp. trichocarpa</td>
<td>140</td>
<td>28</td>
<td>70-79%</td>
<td>Fair</td>
<td>Suitable</td>
<td>Large trees with 2 co-dominant stems from base the base. The north most stem has decay in the base and has a broken top. It is however leaning towards the river and not a risk to the development site. This is the only mature tree between the river and the property. Windfirm riparian edge tree.</td>
<td>Retain</td>
<td>8</td>
<td>8.7</td>
</tr>
<tr>
<td>Off Site 8358</td>
<td>Black Cottonwood</td>
<td>Populus balsamifera ssp. trichocarpa</td>
<td>80</td>
<td>33</td>
<td>80-89%</td>
<td>Good</td>
<td>Suitable</td>
<td>Growing at the top of a steep bank. Leaning towards the river. Location not surveyed. Windfirm riparian edge tree.</td>
<td>Retain</td>
<td>7</td>
<td>7.4</td>
</tr>
<tr>
<td>Off Site 3948</td>
<td>Hornbeam</td>
<td>Carpinus Sp</td>
<td>14</td>
<td>8</td>
<td>70-79%</td>
<td>Normal</td>
<td>Suitable</td>
<td>Growing up against driveway. Minor decay in stem at base. District owned tree. Roots conflict with building envelope.</td>
<td>Remove</td>
<td>1.4</td>
<td>1.5</td>
</tr>
<tr>
<td>Off Site 3949</td>
<td>Hornbeam</td>
<td>Carpinus Sp</td>
<td>17</td>
<td>9</td>
<td>70-79%</td>
<td>Normal</td>
<td>Suitable</td>
<td>Growing up against driveway. Minor decay in stem at base. District owned tree. Roots conflict with building envelope.</td>
<td>Remove</td>
<td>1.7</td>
<td>1.8</td>
</tr>
<tr>
<td>Off Site 3950</td>
<td>Hornbeam</td>
<td>Carpinus Sp</td>
<td>17</td>
<td>9</td>
<td>70-79%</td>
<td>Normal</td>
<td>Suitable</td>
<td>Growing up against driveway. District owned tree. Roots conflict with building envelope.</td>
<td>Remove</td>
<td>1.7</td>
<td>1.8</td>
</tr>
<tr>
<td>Tag #</td>
<td>Common Name</td>
<td>Botanical Name</td>
<td>DBH (cm)</td>
<td>Ht (m)</td>
<td>Live Crown Ratio (%)</td>
<td>Overall Condition</td>
<td>Suitability</td>
<td>Comments</td>
<td>Retain/Remove</td>
<td>Tree Protection Zone (m) from center of tree</td>
<td>Tree Protection Zone (m) from outer edge of tree</td>
</tr>
<tr>
<td>---------</td>
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<td>--------------------------------------------------------------------------</td>
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<td>-------------------------------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>Off Site 3951</td>
<td>Hornbeam</td>
<td>Carpinus Sp</td>
<td>19</td>
<td>9</td>
<td>70-79%</td>
<td>Normal</td>
<td>Suitable</td>
<td>Growing up against driveway. District owned tree. Roots conflict with building envelope.</td>
<td>Remove</td>
<td>1.9</td>
<td>2</td>
</tr>
<tr>
<td>Off Site 3952</td>
<td>Hornbeam</td>
<td>Carpinus Sp</td>
<td>24</td>
<td>9</td>
<td>80-89%</td>
<td>Normal</td>
<td>Suitable</td>
<td>Growing up against driveway. District owned tree. Roots conflict with building envelope.</td>
<td>Remove</td>
<td>2.4</td>
<td>2.5</td>
</tr>
<tr>
<td>Off Site 3953</td>
<td>Western Redcedar</td>
<td>Thuja plicata</td>
<td>15</td>
<td>8</td>
<td>70-79%</td>
<td>Normal</td>
<td>Suitable</td>
<td>0.5m from shed and walkway. Suppressed by adjacent trees. District owned tree. Roots conflict with building envelope.</td>
<td>Remove</td>
<td>1.5</td>
<td>1.6</td>
</tr>
<tr>
<td>Off Site 3963</td>
<td>Liquid Amber</td>
<td>Liquidambar styraciflua</td>
<td>16</td>
<td>8</td>
<td>80-89%</td>
<td>Normal</td>
<td>Suitable</td>
<td>Growing 1m from sidewalk. District owned tree.</td>
<td>Retain</td>
<td>1.6</td>
<td>1.7</td>
</tr>
<tr>
<td>Off Site 3964</td>
<td>Liquid Amber</td>
<td>Liquidambar styraciflua</td>
<td>13</td>
<td>8</td>
<td>80-89%</td>
<td>Normal</td>
<td>Suitable</td>
<td>Growing 1m from sidewalk. District owned tree.</td>
<td>Retain</td>
<td>1.3</td>
<td>1.4</td>
</tr>
<tr>
<td>Off Site 3965</td>
<td>Red Alder</td>
<td>Alinus rubra</td>
<td>21</td>
<td>10</td>
<td>50-59%</td>
<td>Poor</td>
<td>Unsuitable</td>
<td>Leaning 25 degrees over road. Minor decay in stem. Poses a hazard to the road. District owned tree.</td>
<td>Remove</td>
<td>2.1</td>
<td>2.2</td>
</tr>
<tr>
<td>Off Site 3967</td>
<td>Western Hemlock</td>
<td>Tsuga heterophylla</td>
<td>37</td>
<td>20</td>
<td>40-49%</td>
<td>Normal</td>
<td>Suitable as group</td>
<td>Suppressed by adjacent cottonwood. In riparian zone.</td>
<td>Retain</td>
<td>3.7</td>
<td>3.9</td>
</tr>
<tr>
<td>Off Site 3984</td>
<td>Black Spruce</td>
<td>Picea mariana</td>
<td>28</td>
<td>14</td>
<td>80-89%</td>
<td>Normal</td>
<td>Suitable</td>
<td>Growing in landscaped area. In riparian zone.</td>
<td>Retain</td>
<td>2.8</td>
<td>2.9</td>
</tr>
<tr>
<td>Off Site 1</td>
<td>Western Hemlock</td>
<td>Tsuga heterophylla</td>
<td>70</td>
<td>21</td>
<td>80-89%</td>
<td>Poor</td>
<td>Suitable</td>
<td>4 co-dominant stems from 4m. Off-site riparian tree. Not assessed for risk. Requires protection during construction. In riparian zone.</td>
<td>Retain</td>
<td>7</td>
<td>7.4</td>
</tr>
<tr>
<td>Tag #</td>
<td>Common Name</td>
<td>Botanical Name</td>
<td>DBH (cm)</td>
<td>Ht (m)</td>
<td>Live Crown Ratio (%)</td>
<td>Overall Condition</td>
<td>Suitability</td>
<td>Comments</td>
<td>Retain/Remove</td>
<td>Tree Protection Zone (m) from center of tree</td>
<td>Tree Protection Zone (m) from outer edge of tree</td>
</tr>
<tr>
<td>--------</td>
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<td>----------------------------------------------------------------</td>
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<td>---------------------------------------------</td>
<td>---------------------------------------------</td>
</tr>
<tr>
<td>Off Site 2</td>
<td>Douglas-fir</td>
<td>Pseudotsuga menziesii</td>
<td>80</td>
<td>25</td>
<td>80-89%</td>
<td>Poor</td>
<td>Suitable</td>
<td>3 co-dominant stems from 4m. Off-site riparian tree. Not assessed for risk. Requires protection during construction. In riparian zone.</td>
<td>Retain</td>
<td>7</td>
<td>7.4</td>
</tr>
</tbody>
</table>
LEGEND

- Trees to Remove
- Trees to Retain

Map Produced: Oct 22 2015
Aerial Photograph Year: 2009

Tree locations are approximate

DIAMOND HEAD
CONSULTING LTD.
342 West 8th Avenue
Vancouver, BC 604.733.4886
3.0 Summary

The site inventory identified 34 trees on the subject site that are greater than 10cm in diameter. 23 of these trees are protected under the Districts Bylaw. Most of these are within the riparian setback area of Capilano River. 19 of the on-site trees are proposed to be removed for the development. 9 of these trees to be removed are protected under the Districts Bylaw.

There are 20 trees identified on adjacent properties that have rooting zones that extend into the development site. 7 of these trees are on District owned land to the east of the development and requested to be removed.

3.1 Tree Retention and Removal by Species

Table 2. Tree species on site summary

<table>
<thead>
<tr>
<th>Tree Species</th>
<th>Total Number of Trees</th>
<th>Total Retained</th>
<th>Total Removed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Western white pine</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Western Redcedar</td>
<td>15</td>
<td>4</td>
<td>11</td>
</tr>
<tr>
<td>Western Hemlock</td>
<td>4</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Sitka Spruce</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Shorepine</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Douglas-fir</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Cypress</td>
<td>7</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Bigtooth aspen</td>
<td>2</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Amabilis fir</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>34</strong></td>
<td><strong>15</strong></td>
<td><strong>20</strong></td>
</tr>
</tbody>
</table>

Table 3. Tree species off site summary

<table>
<thead>
<tr>
<th>Tree Species</th>
<th>Total Number of Trees</th>
<th>Total Retained</th>
<th>Total Removed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red alder</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Western Redcedar</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Western Hemlock</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Liquid Amber</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Horsechestnut</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Hornbeam</td>
<td>5</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Douglas-fir</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Black spruce</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Black cottonwood</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>20</strong></td>
<td><strong>13</strong></td>
<td><strong>7</strong></td>
</tr>
</tbody>
</table>
4.0 Trees on Adjacent Properties

20 trees found growing on the adjacent properties are included in the inventory and retention plan. Most are on District owned land to the east and north of the development. 5 trees along the eastern boundary are requested to be removed as they conflict with the proposed building envelope. The remaining trees require root protection where the root protection zone (RPZ) extends onto the development site. Root protection zones for the trees have provided within Table 1 Tree Inventory.

4.0 Trees on Adjacent Properties

Total number of replacement trees will be determined by the District. Typically replacement trees for the removal of large diameter trees (over 75cm) are required if the subject lot will have less than 20% canopy cover remaining after the removal of the large diameter trees. It is expected that replacement trees will be required for this site.

5.0 Construction Guidelines

The following are recommendations for risk mitigation and proper tree protection during the construction phase of the project.

Tree Retention Zones

Six times the diameter was used to determine the optimal root protection zone (RPZ). The optimal root protection zone is to be measured in the field from the outer edge of the stem of the tree. The RPZ is the area around the tree in which no grading or construction activity may occur without project arborist approval, and is required for the tree to retain good health and vigor.

The following are tree preservation guidelines and standards for the RPZs:

- No soil disturbance or stripping;
- The natural grade shall be maintained within the protection zone;
- No storage, dumping of materials, parking, underground utilities or fires;
- Any plan affecting trees should be reviewed by a consultant including demolition, erosion control, improvement, utility, drainage, grading, landscape, and irrigation;
- Special foundations, footings and paving designs are required if within the tree protection zone;
- Utilities should be routed around the RPZ;
- Excavation within the tree protection zone should be supervised by a consulting arborist;
- Surface drainage should not be altered so as to direct water into or out of the RPZ; and
- Site drainage improvements should be designed to maintain the natural water table levels within the RPZ.
Respecting these guidelines will prevent changes to the soil and rooting conditions, wounding of the trees and contamination due to spills and waste. Any plans for work or activities within the RPZ that are contrary to these guidelines should be discussed with the project arborist so that mitigation measures can be implemented.

Tree Protection Fences

Prior to any construction activity on site, tree protection fences must be constructed at the specified distance from the tree trunks. The protection barrier or temporary fencing must be at least 1.2 m in height and constructed of 2 by 4 lumber with orange plastic mesh screening. This must be constructed prior to tree removal, excavation or construction and remain intact throughout the entire period of construction. Further standards for fencing construction can be found at:

http://www.dnv.org/upload/pcdocsdocuments/16kw011.pdf

Unsurveyed Trees

Trees that are identified by DHC on the Tree Retention Plan, and within this report as unsurveyed trees have been hand plotted for approximate location only. Their location and ownership cannot be confirmed without being surveyed. The property owner or project developer must ensure that all relevant on and off site trees are surveyed by a legally registered surveyor, whether they are identified by DHC or not.

Removal of logs from sites

Private timber marks are required for the transporting logs from private-owned land in the province of BC. It is the owner of the properties responsibility to apply for a timber mark prior to the removal of any merchantable timber from the site. Additional information can be found at:

http://www.for.gov.bc.ca/hth/private-timber-marks.htm

Regulation of Soil Moisture and Drainage

The excavation and construction activities adjacent to the RPZs can influence the moisture availability to the subject trees. This is due to a reduction in the total rooting mass, changes in drainage conditions and changes in exposure including reflected heat from adjacent hard surfaces. To mitigate these concerns the following guidelines should be followed:

- Soil moisture conditions within the tree protection zones should be monitored during hot and dry weather. When soil moisture conditions are dry, supplemental irrigation should be provided. Irrigation should wet the soil to the depth of the root system (approximately 30 cm deep).
- Any planned changes to the surface grades within the RPZ, including the placement of mulch, should be designed so that the water will flow away from the tree trunks.
- Excavation adjacent to trees can alter the soils hydrological processes by draining the water faster than it had naturally. It is recommended that when excavating within 6 m of any tree, the site be irrigated more frequently to account for this.
Tree Pruning

All heavy machinery (excavators, cranes, dump trucks, etc.) working within five meters of tree crowns should be made aware of their proximity to the tree. If there is to be a sustained period of machinery working within five meters of the tree crowns, a line with colored flags should be suspended at the height of the crowns along the length of the protected tree area. If there are concerns regarding the clearance required for machinery and workers within the tree protection zone, or just outside of it, the project arborist should be consulted so that a pruning prescription can be developed or a zone surrounding the crowns can be established. Any wounds incurred to the subject trees during construction should be reported to the project arborist immediately.

Fertilization

Fertilization and root zone enhancements may be recommended by the project arborist in any phase of the project if they deem it necessary to provide the best chance of tree survival.

Paving Within and Adjacent to Tree Protection Zones

If the development plans propose the construction of paved areas and/or retaining walls close to the proposed tree protection zones measures should be taken to minimize impacts. Construction of these features would raise concerns regarding proper aeration, drainage, irrigation and opportunities for adequate root growth. The following design and construction guidelines are recommended be followed to minimize the long-term impacts to trees if any paving or retaining walls are necessary:

- Any excavation activities near the TPZ (tree protection zone) should be monitored by a Certified Arborist. Excavation should remove and disturb as little of the rooting zone as possible and all roots greater than 2 cm in diameter should be hand pruned.
- The natural grade of the rooting zone should be maintained. Any retaining walls should be designed at heights that will maintain the existing grade to within 20 cm of its current level. If the grade is altered, it should be raised not reduced in height.
- The long-term health of the tree is directly dependent on the volume of available, below ground growing space. If the RPZ must be compromised, the planned distance of structures from the trunks of the subject trees should not be closer than 50% of the RPZ on more than two sides of the tree.
- Compaction of sub grade materials can cause the trees to develop shallow rooting systems. This can contribute to long-term damage to pavement surfaces as the roots grow. Minimizing the compaction of sub grade materials using structural soils and increasing the strength of the pavement reduces the reliance on sub grade for strength.
- If it is not possible to minimize the compaction of sub grade materials, subsurface barriers should be considered to help direct roots downward into the soil and prevent them from growing directly under the paved surfaces.
Plantings Within the TPZs

If there are plans to landscape the ground within the TPZ, measures should be taken to minimize impacts. It is not recommended that the existing grass layer be stripped, as this will damage the surface roots. The grass layer should be covered with mulch at the start of the project, which will gradually kill the grass while moderating soil moisture and temperatures. Topsoil should be mixed with the mulch prior to planting of shrubs; however the depth of this new topsoil layer should not exceed 20 cm. Planting should take place within the newly placed topsoil mixture and should not disturb the original rooting zone of the trees. Two meters around the base of each tree should be left unplanted and covered in mulch.

Monitoring During Construction

Ongoing monitoring should be provided for the duration of the project. Site visits should be more frequent during activities that are higher risk, including the first stages of construction when excavation occurs adjacent to the trees. Site visits will ensure contractors are respecting the recommended tree protection measures and will allow the arborist to identify any new concerns that may arise.

During each site visit the following measures will be assessed and reported on:

- The integrity of the Tree Protection Zone and fencing;
- Changes to TPZ limits including: overall maintenance, parking on roots, and storing or dumping of materials within TPZ. If failure to maintain and respect TPZ is observed, suggestions will be made to ensure tree protection measures are upheld;
- Review and confirmation of recommended tree maintenance including root pruning, irrigation, mulching and branch pruning;
- Health and condition of each tree;
- Damage to trees that may have resulted from construction activities will be noted, as will the health of branches, trunks and roots of protected trees. Recommendations for remediation will follow;
- Changes to soil moisture levels and drainage patterns; and
- Factors that may be detrimentally impact the trees.

All findings and recommendations will be documented in a summary report. All concerns will be highlighted along with recommended mitigation measures.
6.0 Limitations

1. Except as expressly set out in this report and in these Assumptions and Limiting Conditions, Diamond Head Consulting Ltd. ("Diamond Head") makes no guarantee, representation or warranty (express or implied) with regard to: this report; the findings, conclusions and recommendations contained herein; or the work referred to herein.

2. This report has been prepared, and the work undertaken in connection herewith has been conducted, by Diamond Head for the "Client" as stated in the report above. It is intended for the sole and exclusive use by the Client for the purpose(s) set out in this report. Any use of, reliance on or decisions made based on this report by any person other than the Client, or by the Client for any purpose other than the purpose(s) set out in this report, is the sole responsibility of, and at the sole risk of, such other person or the Client, as the case may be. Diamond Head accepts no liability or responsibility whatsoever for any losses, expenses, damages, fines, penalties or other harm (including without limitation financial or consequential effects on transactions or property values, and economic loss) that may be suffered or incurred by any person as a result of the use of or reliance on this report or the work referred to herein. The copying, distribution or publication of this report (except for the internal use of the Client) without the express written permission of Diamond Head (which consent may be withheld in Diamond Head's sole discretion) is prohibited. Diamond Head retains ownership of this report and all documents related thereto both generally and as instruments of professional service.

3. The findings, conclusions and recommendations made in this report reflect Diamond Head's best professional judgment in light of the information available at the time of preparation. This report has been prepared in a manner consistent with the level of care and skill normally exercised by arborists currently practicing under similar conditions in a similar geographic area and for specific application to the trees subject to this report as at the date of this report. Except as expressly stated in this report, the findings, conclusions and recommendations set out in this report are valid for the day on which the assessment leading to such findings, conclusions and recommendations was conducted. If generally accepted assessment techniques or prevailing professional standards and best practices change at a future date, modifications to the findings, conclusions, and recommendations in this report may be necessary. Diamond Head expressly excludes any duty to provide any such modification if generally accepted assessment techniques and prevailing professional standards and best practices change.

4. Conditions affecting the trees subject to this report (the "Conditions", including without limitation structural defects, scars, decay, fungal fruiting bodies, evidence of insect attack, discoloured foliage, condition of root structures, the degree and direction of lean, the general condition of the tree(s) and the surrounding site, and the proximity of property and people) other than those expressly addressed in this report may exist. Unless otherwise stated: information contained in this report
covers only those Conditions and trees at the time of inspection; and the inspection is limited to visual examination of such Conditions and trees without dissection, excavation, probing or coring. While every effort has been made to ensure that the trees recommended for retention are both healthy and safe, no guarantees, representations or warranties are made (express or implied) that those trees will remain standing or will not fail. The Client acknowledges that it is both professionally and practically impossible to predict with absolute certainty the behaviour of any single tree, or groups of trees, in all given circumstances. Inevitably, a standing tree will always pose some risk. Most trees have the potential for failure and this risk can only be eliminated if the risk is removed. If Conditions change or if additional information becomes available at a future date, modifications to the findings, conclusions, and recommendations in this report may be necessary. Diamond Head expressly excludes any duty to provide any such modification of Conditions change or additional information becomes available.

5. Nothing in this report is intended to constitute or provide a legal opinion, and Diamond Head expressly disclaims any responsibility for matters legal in nature (including, without limitation, matters relating to title and ownership of real or personal property and matters relating to cultural and heritage values). Diamond Head makes no guarantee, representation or warranty (express or implied) as to the requirements of or compliance with applicable laws, rules, regulations, or policies established by federal, provincial, local government or First Nations bodies (collectively, “Government Bodies”) or as to the availability of licenses, permits or authorizations of any Government Body. Revisions to any regulatory standards (including by-laws, policies, guidelines and any similar directions of a Government Bodies in effect from time to time) referred to in this report may be expected over time. As a result, modifications to the findings, conclusions and recommendations in this report may be necessary. Diamond Head expressly excludes any duty to provide any such modification if any such regulatory standard is revised.

6. Diamond Head shall not be required to give testimony or to attend court by reason of this report unless subsequent contractual arrangements are made, including payment of an additional fee for such services as described in the fee schedule and contract of engagement.

7. In preparing this report, Diamond Head has relied in good faith on information provided by certain persons, Government Bodies, government registries and agents and representatives of each of the foregoing, and Diamond Head assumes that such information is true, correct and accurate in all material respects. Diamond Head accepts no responsibility for any deficiency, misinterpretations or fraudulent acts of or information provided by such persons, bodies, registries, agents and representatives.

8. Sketches, diagrams, graphs, and photographs in this report, being intended as visual aids, are not necessarily to scale and should not be construed as engineering or architectural reports or surveys.

9. Loss or alteration of any part of this report invalidates the entire report.
7.0 Appendix 1 – Overall risk rating and action thresholds

The Overall Risk Rating and Action Thresholds

<table>
<thead>
<tr>
<th>Risk Rating</th>
<th>Risk Category</th>
<th>Interpretation and Implications</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Low 1</td>
<td>Insignificant - no concern at all.</td>
</tr>
<tr>
<td>4</td>
<td>Low 2</td>
<td>Insignificant - very minor issues.</td>
</tr>
<tr>
<td>5</td>
<td>Low 3</td>
<td>Insignificant - minor issues not of concern for many years yet.</td>
</tr>
<tr>
<td>6</td>
<td>Moderate 1</td>
<td>Some issues but nothing that is likely to cause any problems for another 10 years or more.</td>
</tr>
<tr>
<td>7</td>
<td>Moderate 2</td>
<td>Well defined issues - retain and monitor. Not expected to be a problem for at least another 5 - 10 years.</td>
</tr>
<tr>
<td>8</td>
<td>Moderate 3</td>
<td>Well defined issues - retain and monitor. Not expected to be a problem for at least another 1 - 5 years.</td>
</tr>
<tr>
<td>9</td>
<td>High 1</td>
<td>The assessed issues have now become very clear. The tree can still reasonably be retained as it is not likely to fall apart right away, but it must now be monitored annually. At this stage it may be reasonable for the risk manager/owner to hold public education sessions to inform people of the issues and prepare them for the reality that part or the entire tree has to be removed.</td>
</tr>
<tr>
<td>10</td>
<td>High 2</td>
<td>The assessed issues have now become very clear. The probability of failure is now getting serious, or the target rating and/or site context have changed such that mitigation measures should now be on a schedule with a clearly defined timeline for action. There may still be time to inform the public of the work being planned, but there is not enough time to protracted discussion about whether or not there are alternative options available.</td>
</tr>
<tr>
<td>11</td>
<td>High 3</td>
<td>The tree, or a part of it, has reached a stage where it could fail at any time. Action to mitigate the risk is required within weeks rather than months. By this stage there is not time to hold public meetings to discuss the issue. Risk reduction is a clearly defined issue and although the owner may wish to inform the public of the planned work, he/she should get on with it to avoid clearly foreseeable liabilities.</td>
</tr>
<tr>
<td>12</td>
<td>Extreme</td>
<td>This tree, or a part of it, is in the process of failing. Immediate action is required. All other, less significant tree work should be suspended, and roads or work areas should be cleared of, until the risk issues have been mitigated. This might be as simple as removing the critical part, drastically reducing overall tree height, or taking the tree down and cordon off the area until final clean up, or complete removal can be accomplished. The immediate action required is to ensure that the clearly identified risk of harm is eliminated. For areas hit by severe storms, where many extreme risk trees can occur, drastic pruning and/or partial tree removals, followed by barriers to contain traffic, would be an acceptable first stage of risk reduction. There is no time to inform people or worry about public concerns. Clearly defined safety issues preclude further discussion.</td>
</tr>
</tbody>
</table>

The Table shown above outlines the interpretation and implications of the risk ratings and associated risk categories. This table is provided to inform the reader about these risk categories so that they can better understand any risk abatement recommendations made in the risk assessment report.
8.0 Appendix A - Requirement for Tree Protection Barrier as per Tree-Protection Bylaw 7671

8. A person performing work on lands containing one or more retained trees shall:

a) install a tree protection barrier around any retained tree or group of retained trees at the drip line of the outermost tree, the outside boundary of the critical root zone of the outermost tree, or 5 metres from the stem of the outermost tree, whichever is greatest;

b) ensure that such tree protection barrier is constructed of chain link or plywood fastened to solid wood or equivalent framing with railings along the tops, sides and bottom, or is constructed of materials otherwise satisfactory to the Environmental Protection Officer;

c) display signage indicating that the area within the tree protection barrier is a "protection zone," and stating that no encroachment, storage of materials or damage to trees is permitted within the "protection zone;"

d) arrange for inspection by the Environmental Protection Officer before any work commences, and refrain from commencing work until the Environmental Protection Officer has approved the tree protection barrier; and

e) ensure that the tree protection barrier remains in place until written approval of its removal is received from the Environmental Protection Officer.

9. No work is permitted within the "protection zone" referred to in section 11(c) except in accordance with plans and procedures authorized by a tree permit.
Windfirm Boundary Assessment for Riparian Areas Setback

1946-1998 Glenaire Dr
North Vancouver, BC

June 21, 2016

RECEIVED

JUL 04 2016

Planning Department
District of North Vancouver

Submitted to:

Envirowest Consultants Inc.
Suite 101 – 1515 Broadway Street
Port Coquitlam BC
V3C 6M2

Submitted by:

DIAMOND HEAD
CONSULTING LTD.

342 West 8th Avenue
Vancouver, BC
V5Y 3X2
Introduction

Diamond Head Consulting Ltd. (DHC) was retained by Envirowest Consultants Inc. to provide a windfirm boundary assessment of the riparian corridor adjacent to 1946-1998 Glenaire Dr. North Vancouver, BC. This riparian corridor encompasses the proposed Streamside Protection and Enhancement Areas (SPEA) for Capilano River.

A site visit was completed on Aug 27, 2015 to assess the condition of trees on site. The objective of establishing a windfirm boundary is to protect existing trees within the designated SPEA. This responds to Department of Fisheries and Oceans (DFO) concerns and helps ensure that the ecological integrity (water quality, fish habitat and associated riparian values) of the SPEA will be maintained over the long-term.

The proposed SPEA setback 15m from the top of bank of Capilano River. The most stable treed boundary has been recommended. The objective of identifying this windfirm line was to ensure that the trees growing within the proposed SPEA are protected and will not blow down. Individual trees that make up this boundary were inventoried. Trees were tagged and characteristics recorded. All identified trees have been surveyed.

Figure 1 – Project location illustrated in red
1 Establishing a Windfirm Boundary

The site consists of five residential lots. The proposed development includes townhouses. Capilano River runs along the north edge of the development site. The majority of trees have been cleared from the existing lots. There is an open band of mature trees that is currently growing from the north property lines down to the high water mark of the River. Tree species found in this area include a mix of native and non-native species. The largest trees include native black cottonwood (*Populus trichocarpa*). Other native species found in this area include western redcedar (*Thuja plicata*), bigleaf maple (*Acer macrophyllum*), red alder (*Alnus rubra*) and Douglas-fir (*Pseudotsuga menziesii*). There are a number of non-native trees species within the assessment area including Horse chestnut (*Aesculus hippocastanum*).

Along the assessment area, most mature trees have been cleared from the existing lots. The windfirm boundary that has been identified includes those mature trees that are growing along the backs of these lots. In general this treed riparian zone is narrow, sometimes being only one mature tree wide. These trees have adapted to growing in their current condition. However due to the narrow nature of this stand and the predominance of black cottonwood (not inherently a structural stable species) this edge is expected to be *Moderately* windfirm. A description of this risk rating is provided as follows:

**Moderate**: The trees to be exposed are generally expected to be windfirm, however there is a risk of windthrow during unusually high wind events. The failure potential of some of the exposed trees is possible during wind events that reach speeds of greater than 40 km/hr.

The following table is an inventory of trees that will form the new stand edge. No hazard trees were identified during the assessment that must be removed. In addition to the windfirm trees identified in this report, it was noted that there are two mature trees growing close to the property line at the north west corner of the site. These were not assessed as they are on private property but should be considered and protected during planning and construction.
# Table 1 Tree inventory of windfirm trees

<table>
<thead>
<tr>
<th>Tag #</th>
<th>Common Name</th>
<th>Botanical Name</th>
<th>DBH (cm)</th>
<th>Ht (m)</th>
<th>Live Crown Ratio (%)</th>
<th>Overall Condition</th>
<th>Comments</th>
<th>Retain/Remove</th>
<th>Tree Protection Zone (m) from center of tree</th>
<th>Tree Protection Zone (m) from outer edge of tree</th>
</tr>
</thead>
<tbody>
<tr>
<td>465</td>
<td>Douglas-fir</td>
<td>Pseudotsuga menziesii</td>
<td>50</td>
<td>25</td>
<td>70-79%</td>
<td>Good</td>
<td>Minor deadwood in lower 1/3 of crown. This is a natural edge tree. No other mature trees exist to the south.</td>
<td>Retain</td>
<td>5</td>
<td>5.3</td>
</tr>
<tr>
<td>466</td>
<td>Western Hemlock</td>
<td>Tsuga heterophylla</td>
<td>51</td>
<td>20</td>
<td>80-89%</td>
<td>Good</td>
<td>Full crown. Open grown. This is a natural edge tree. No other mature trees exist to the south.</td>
<td>Retain</td>
<td>5.1</td>
<td>5.3</td>
</tr>
<tr>
<td>467</td>
<td>Black Cottonwood</td>
<td>Populus balsamifera ssp. trichocarpa</td>
<td>68</td>
<td>24</td>
<td>50-59%</td>
<td>Good</td>
<td>This is a mature dominant tree with full crown. It is open grown. All trees to the south include 8-15m tall cedars.</td>
<td>Retain</td>
<td>6</td>
<td>6.3</td>
</tr>
<tr>
<td>468</td>
<td>Horsechestnut</td>
<td>Aesculus hippocastanum</td>
<td>20</td>
<td>11</td>
<td>80-89%</td>
<td>Fair</td>
<td>Minor signs of drought stress. There are no other mature trees in this area. Two similar size bigleaf maples exist to the west.</td>
<td>Retain</td>
<td>3</td>
<td>3.1</td>
</tr>
<tr>
<td>469</td>
<td>Horsechestnut</td>
<td>Aesculus hippocastanum</td>
<td>32</td>
<td>13</td>
<td>80-89%</td>
<td>Fair</td>
<td>Minor signs of drought stress. There are no other mature trees in this area. This is the only tree between the river and edge of property.</td>
<td>Retain</td>
<td>3.2</td>
<td>3.4</td>
</tr>
<tr>
<td>470</td>
<td>Black Cottonwood</td>
<td>Populus balsamifera ssp. trichocarpa</td>
<td>66</td>
<td>33</td>
<td>80-89%</td>
<td>Good</td>
<td>This is the only mature tree between the river and edge of property.</td>
<td>Retain</td>
<td>6</td>
<td>6.3</td>
</tr>
<tr>
<td>471</td>
<td>Western White Pine</td>
<td>Pinus monticola</td>
<td>34</td>
<td>22</td>
<td>70-79%</td>
<td>Good</td>
<td>Inside active yard space. The only other mature trees north of this include two cottonwoods along the high water mark of the river.</td>
<td>Retain</td>
<td>3.4</td>
<td>3.6</td>
</tr>
<tr>
<td>472</td>
<td>Western Redcedar</td>
<td>Thuja plicata</td>
<td>69</td>
<td>21</td>
<td>70-79%</td>
<td>Good</td>
<td>Inside active yard space. A tree house has been built around the base of this tree. However it has caused no major damage and can be removed. There are no other mature trees to the south.</td>
<td>Retain</td>
<td>6</td>
<td>6.4</td>
</tr>
<tr>
<td>473</td>
<td>Black Cottonwood</td>
<td>Populus balsamifera ssp. trichocarpa</td>
<td>140</td>
<td>28</td>
<td>70-79%</td>
<td>Fair</td>
<td>Large trees with 2 co-dominant stems from base the base. The north most stem has decay in the base and has a broken top. It is hwoever leaning towards the river and not a risk to the development site. This is the only mature tree between the river and the property.</td>
<td>Retain</td>
<td>8</td>
<td>8.7</td>
</tr>
<tr>
<td>Tag #</td>
<td>Common Name</td>
<td>Botanical Name</td>
<td>DBH (cm)</td>
<td>Ht (m)</td>
<td>Live Crown Ratio (%)</td>
<td>Overall Condition</td>
<td>Comments</td>
<td>Retain/Remove</td>
<td>Tree Protection Zone (m) from center of tree</td>
<td>Tree Protection Zone (m) from outer edge of tree</td>
</tr>
<tr>
<td>--------</td>
<td>---------------</td>
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<td>----------------------</td>
<td>-------------------</td>
<td>--------------------------------------------------------------------------</td>
<td>---------------</td>
<td>---------------------------------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>8358</td>
<td>Black Cottonwood</td>
<td>Populus balsamifera ssp. trichocarpa</td>
<td>80</td>
<td>33</td>
<td>80-89%</td>
<td>Good</td>
<td>Growing at the top of a steep bank. Leaning towards the river. Location not surveyed.</td>
<td>Retain</td>
<td>7</td>
<td>7.4</td>
</tr>
<tr>
<td>3985</td>
<td>Lodgepole Pine</td>
<td>Pinus contorta</td>
<td>33</td>
<td>9</td>
<td>70-79%</td>
<td>Good</td>
<td>Growing in landscaped bed in back yard. Was not tagged as assessor had no permission to enter yard. Visually assessed from property line. Location not surveyed.</td>
<td>Retain</td>
<td>3.3</td>
<td>3.5</td>
</tr>
<tr>
<td>3983</td>
<td>Balsam</td>
<td>Abies sp</td>
<td>27</td>
<td>9</td>
<td>80-89%</td>
<td>Good</td>
<td>Growing in landscaped bed in back yard. Was not tagged as assessor had no permission to enter yard. Visually assessed from property line. Location not surveyed.</td>
<td>Retain</td>
<td>2.7</td>
<td>2.8</td>
</tr>
<tr>
<td>3984</td>
<td>Spruce</td>
<td>Picea sp</td>
<td>28</td>
<td>14</td>
<td>80-89%</td>
<td>Good</td>
<td>Growing in landscaped bed in back yard. Was not tagged as assessor had no permission to enter yard. Visually assessed from property line. Location not surveyed.</td>
<td>Retain</td>
<td>2.8</td>
<td>2.9</td>
</tr>
</tbody>
</table>
Photo 1. View north over existing residences at mature trees growing adjacent to the backs of the lots.

Photo 2. View north from 1998 at trees 466 and 465.

Photo 3. View of mature cottonwood trees that are dominant along the river edge.
Photo 4. View of tree 470 which is the only dominant trees between the river and the property.

Photo 5. View of tree 468 showing signs of drought stress.

Photo 6. View of riparian buffer from the river.
Prior to construction all trees to be protected in Table 1 and their required root protection zones should be marked on the ground. The following tree protection measures should be considered during the construction process:

- All trees that have root protection zones that extend beyond the SPEA should be protected. A permanent tree protection zone should be established at or greater to the distances specified in Table 1. This should be installed as soon as tree cutting is completed. Within this tree protection zone, no work activities or disturbance is permitted;
- It is recommended that a tree protection covenant be placed on the root protection zones to ensure that they are protected after the lot ownership has been transferred; Any future works within these zones should be done in a way that does not impact the trees roots;
- Excavation that takes place within 6 meters of the base of any trees to be protected should be done carefully to ensure that roots are not ripped back toward the trees. A certified arborist should be on site to monitor the excavation if work is to be taken place within this zone. As soon as roots that are greater than 5cm in diameter are encountered, the remaining areas around the roots should be excavated with hand tools and the roots pruned off clean;
- Excavation and construction activities adjacent to SPEAs and trail corridors can influence the moisture availability to subject trees. Soil moisture conditions within the tree protection zones should be monitored during hot and dry weather. When soil moisture conditions are dry, supplemental irrigation should be provided; and
- If there are concerns regarding the clearance required for machinery and workers within the tree protection zone or just outside it, the project arborist should be consulted so that a pruning prescription can be developed or a zone surrounding the crowns can be established. All heavy machinery working adjacent to the trees (excavators, cranes, dump trucks, etc.) operating machinery within five meters of the crowns of these trees should be made aware of the proximity of these trees to their activities. If there is to be a sustained period of machinery working within five meters of the crowns of these trees a line with coloured flags should be suspended at the height of the crowns along the length of the protected trees.

If there are any questions or concerns as to the contents of this report, please contact us at any time.

Sincerely,

Mike Coulthard RPF (#3772) RPBio (#1338)
604-733-4886
6 Limitations:

The assessments of the trees discussed in this correspondence have been made using acceptable arboricultural techniques. These include a visual tree assessment of the trees discussed for structural defects, scars, external indications of decay such as fungal fruiting bodies, evidence of insect attack, discoloured foliage, the condition of any visible root structures, the degree and direction of lean (if any), the general condition of the tree(s), the surrounding site and the proximity of property and people. Except where specifically noted in this correspondence, none of the trees examined were dissected, cored, probed, or climbed, and detailed root crown examinations were not undertaken.

Notwithstanding the recommendations and conclusions made in this correspondence, it must be realized that trees are living organisms, and their health and vigour constantly changes over time. They are not immune to changes in site conditions, or seasonal variations in the weather.

While reasonable efforts have been made to ensure that the trees recommended for retention are healthy, no guarantees are offered, or implied, that the trees recommended for retention are healthy, no guarantees are offered or implied, that these trees, or all parts of them, will remain standing. It is both professionally and practically impossible to predict with absolute certainty the behaviour of any single tree - or group of trees, or all their component parts, in all given circumstances. Inevitably, a standing tree will always pose some risk. Most trees have the potential for failure in the event of adverse weather conditions, and this risk can only be eliminated if the tree is removed.

Although every effort has been made to ensure that this assessment is reasonably accurate, the trees should be re-assessed periodically. In accordance with standard practice, the assessment presented in this correspondence is valid at the time it was undertaken.

Approval and implementation of any recommendations made within this correspondence is the responsibility of the owner of the trees, and in no way implies any inspection or supervisory role on the part of Diamond Head Consulting Ltd. unless we have specifically been requested to examine said implementation activities, and have been able to do so. In the event that inspection or supervision of all or part of the implementation plan is requested, said request shall be in writing and the details agreed to in writing by both parties. Any on site inspection or supervisory work undertaken by Diamond Head Consulting Ltd. shall be restricted to the items requested, and shall be recorded in written form and submitted to the client as a matter of record.

Sketches, diagrams and photographs contained in this report, being intended as visual aids, should not be construed as engineering reports or legal surveys. If a tree prescribed for removal is not situated wholly on the owners' property, then permission from the additional owner(s) must be obtained before treatment is undertaken.
June 24, 2016

District of North Vancouver
355 West Queens Rd.
North Vancouver, BC
V7N 4N5

Attention: Mr. Richard Boase
Environmental Protection Officer

Dear Mr. Boase,

RE: PROPOSED MULTI-FAMILY RESIDENTIAL DEVELOPMENT AT 1946-1998 GLENAIRE DRIVE
PIDs: 009-870-253, 009-870-261, 009-870-270, 009-870-296, 009-870-300
Environmental Assessment in Support of a Streamside Development Permit

Envirowest Consultants Inc. (Envirowest) respectfully submits the following environmental assessment for the construction of a multi-family residential development at 1946 - 1998 Glenaire Drive (Property) in the District of North Vancouver (District) on behalf of PC Urban Properties Corp. (Proponent). The Property is located within the District’s Streamside Protection Development Permit Area (DPA) and adjacent to the Capilano River and thus will require delineation of a Streamside Protection Area (SPA). Envirowest has been retained to provide environmental consulting services associated with the Proponent’s application for a Streamside Development Permit, pursuant to the District’s Official Community Plan. This correspondence represents an environmental assessment of the proposed development.

PROPERTY OVERVIEW

Please refer to the location map included as Attachment A, site photographs included as Attachment B, and site survey, included as attachment C.

The property is located on the north side of Glenaire Drive, west of Fullerton Avenue in the District of North Vancouver. It comprises five adjacent lots, each with an existing single family residence. The property has a total area of 3638.2 square metres (m$^2$) and occurs between 14 and 16 metres (m) geodetic. Each existing residence has a cleared back yard extending to the north property line with no riparian setback from the Capilano River, which is located immediately north of the property on a lot owned by Metro Vancouver.
WATERCOURSES

The Capilano River is located immediately north of the property and its Streamside Protection DPA of 15 m from top-of-bank (TOB) engages all five of the subject lots. The Capilano River (watershed code 900-071100) conveys flows to its terminus at Burrard Inlet approximately 1700 m downstream of the property. Documented fish species occurring within the Capilano River include chinook salmon (*Oncochynus tshawytscha*), chum salmon (*O. keta*), coho salmon (*O. kisutch*), pink salmon (*O. gorbuscha*), coastal cutthroat trout (*O. clarki clarki*), and rainbow/steelhead trout (*O. mykiss*) (BC Ministry of Environment 2015). The river has an approximate bankfull width of 53 m, with substrates composed primarily of boulders and cobble. The Fullerton Avenue bridge is located adjacent to the eastern edge of the property.

RIPARIAN VEGETATION

Riparian vegetation is dominated by a canopy of mature trees extending from the northern property line to the high water mark of the Capilano River. Native trees occurring in the riparian area include black cottonwood (*Populus trichocarpa*), western redcedar (*Thuja plicata*), Douglas-fir (*Pseudotsuga menziesii*), bigleaf maple (*Acer macrophyllum*), and red alder (*Alnus rubra*). Non-native trees in the riparian area include horse chestnut (*Aesculus hippocastanum*) and mountain ash (*Sorbus aucuparia*). The understorey is predominated by ornamental shrubs and invasive plant species including Himalayan blackberry (*Rubus armeniacus*), ivy (*Hedera helix*), and holly (*Ilex aquifolium*). Much of the area within 15 m of the top of bank is currently located within the rear yards of the existing houses, and includes lawn grasses, hard landscaping and ancillary buildings, in addition to ornamental plantings.

WILDLIFE AND SPECIES AT RISK

Definitions

Species at risk are identified in the context of the provincial and national ranking systems. The provincial ranking system applies to species that have been assessed by the British Columbia Conservation Data Centre (CDC). The national ranking system applies to species that have been assessed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). The CDC and COSEWIC publish lists of species at risk in order to prioritize species for conservation.

Conservation Data Centre

In British Columbia, the BC Ministry of Environment supports the CDC. The CDC maintains dynamic tracking lists of rare plant and animal species and rare ecological communities that occur within British Columbia. The CDC utilizes three ranked criteria for species and

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communities at risk and presents them as lists, specifically the Red, Blue, and Yellow lists. The definitions of these designations are as follows (BC Ministry of Environment 2011\(^2\)):

**Red List:** List of ecological communities, and indigenous species and subspecies that are extirpated, endangered or threatened in BC; threatened species are likely to become endangered if limiting factors are not reversed; endangered species face imminent extirpation or extinction.

**Blue List:** List of ecological communities, and indigenous species and subspecies of special concern in BC; species of special concern are those species that are particularly sensitive to human activities or natural events but not endangered or threatened.

**Yellow List:** List of ecological communities and indigenous species that are not at risk in BC.

The listings serve two purposes; first, they provide a list of species for consideration for formal designation as Endangered or Threatened, either provincially under the British Columbia *Wildlife Act*, or nationally by COSEWIC. Second, the listings assist in the setting of conservation priorities for species and ecological communities considered at risk in British Columbia.

**Committee on the Status of Endangered Wildlife in Canada**

The Canada *Species at Risk Act* (SARA) was proclaimed with the specific intent of protecting wildlife species at risk in Canada. Within SARA, COSEWIC was established as an independent body of experts responsible for identifying and assessing species considered to be at risk. COSEWIC currently addresses all indigenous mammals, birds, reptiles, amphibians, fish, arthropods, molluscs, vascular plants, mosses and lichens (COSEWIC 2009\(^3\)).

The identification and assessment of species considered to be at risk is the first step towards protecting species at risk. Species that have been designated by COSEWIC may qualify for legal protection and recovery under SARA. It is the responsibility of the Canadian Minister of Environment (the Minister responsible for SARA) to assign legal protection of species designated by COSEWIC. This involves listing the species in Schedule 1 of SARA. SARA only applies to species listed on Schedule 1.

A wildlife species is considered by COSEWIC to be:

| a species, subspecies, variety or geographically or genetically distinct population of animal, plant or other organism, other than a bacterium or virus, that is wild by nature |

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and is either native to Canada or has extended its range into Canada without human intervention and has been present in Canada for at least 50 years (COSEWIC 2014).

Wildlife status categories utilized by COSEWIC consist of:

- **Extinct:** A species that no longer exists.
- **Extirpated:** A species that no longer exists in the wild in Canada, but occurs elsewhere (for example, in captivity or in the wild in the United States).
- **Endangered:** A species facing imminent extirpation or extinction.
- **Threatened:** A species likely to become endangered if limiting factors are not reversed.
- **Special Concern:** A wildlife species that may become threatened or endangered because of a combination of biological characteristics and identified threats.
- **Not at Risk:** A wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances.
- **Data Deficient:** A category that applies when the available information is insufficient (a) to resolve a wildlife species’ eligibility for assessment or (b) to permit an assessment of the wildlife species’ risk of extinction.

Schedule 1 of SARA classifies listed species as being Extirpated, Endangered, Threatened, or of Special Concern. Schedule 2 and Schedule 3 include species that have been tracked by COSEWIC prior to the proclamation of SARA, yet require reassessment using the latest assessment criteria before being listed on Schedule 1.

**Methods**

An assessment was made of which wildlife species at risk may be found on and within 50 metres (m) of the property by reviewing species at risk documented to occur within the Chilliwack Forest District and Metro Vancouver Regional District (BC Conservation Data Centre 2015a). Species at risk are defined here as species found on the provincial Blue or Red lists, or federally listed as Endangered, Threatened or Special Concern by COSEWIC or Schedule 1 of SARA.

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The list was refined to include only species found within the Coastal Western Hemlock biogeoclimatic zone and utilizing the Riparian Forest habitat subtype.

The initial list of species was further refined to include only those species whose habitat requirements for critical life stages (e.g. breeding, nesting/denning, or hibernating, for animals; or germination, flowering, and seed dispersal for plants) matched site conditions on the property.

Results

*Species at Risk Act* (SARA) Recovery Strategies have been developed for a number of species listed under SARA (Government of Canada 2015a). Recovery Strategies for each species identify areas of critical habitat. Based on the published Recovery Strategies, the property is not located within Critical Habitat of any species with a Recovery Strategy.

The list of species at risk with potential to occur on the property is included below.

**Invertebrates**

*Grappletail* (*Octogomphus specularis*).

The grappletail (BC Red-listed; not listed by COSEWIC or SARA) is a dragonfly known to inhabit wooded streams draining lakes (BC Conservation Centre 2015b). Its range within British Columbia is limited to the lower Fraser Valley (E-Fauna BC 2015). Adults are known to perch on rocks along the stream or on trees and bushes near the water (E-Fauna BC 2015). Probability of grappletail occurring on or adjacent to the property is considered low – no records from the north shore are recorded by CDC. If present in the Capilano River near the property, grappletail are likely to be restricted to vegetation immediately adjacent to the river and are not expected to occur on the property itself.

**Amphibians**

*Western toad* (*Anaxyrus boreas*).

The western toad (provincially Blue-listed; designated Special Concern by COSEWIC, 2012; designated Special Concern under SARA Schedule 1, 2005) breeds in natural and artificial waterbodies with shallow sandy bottoms. Western toads utilize riparian and lacustrine environments for breeding, migrating annually between breeding sites and upland terrestrial habitats including forests and suburban areas. They are present throughout much of British Columbia and at elevations from sea-level to 3500 m. The toads hibernate over winter in

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burrows, preferring damp conditions and areas with loose soils (BC Conservation Centre 2015c).  

The riparian area of the Capilano River may support habitat features associated with the western toad. However, the rapid flows and rocky substrates in the river reach adjacent to the property are unlikely to be conducive to toad breeding habitat.

**Coastal tailed frog (*Ascaphus truei*)**

The coastal tailed frog (provincially Blue-listed; designated Special Concern by COSEWIC, 2011; designated Special Concern under SARA Schedule 1, 2003) occurs widely in coastal mountain ranges in British Columbia, from sea level to timberline. Breeding is restricted to cool, fast flowing creeks with permanent flow (BC Conservation Centre 2015d). Tailed frogs are typically associated with mature forests with an established understorey.

If present, coastal tailed frogs are likely to be restricted to the Capilano River and immediately adjacent riparian areas, and are not expected to occur on the property.

**Northern red-legged frog (*Rana aurora*)**

Northern red-legged frog (provincially Blue-listed; designated Special Concern by COSEWIC, 2015; designated Special Concern under SARA Schedule 1, 2005) (BC Conservation Data Centre 2015e) is associated with streams, ponds, or marshes in close proximity to forest (BC Conservation Data Centre 2015e) and may be present in the Capilano River north of the property. Wooded areas along the river provide suitable cover for foraging and dispersal of this species, which is known to occur in North Vancouver, as indicated by a record from the Upper Lynn River (BC Conservation Centre 2015f).

Suitable habitat for breeding does not occur on or adjacent to the property.

Habitat suitable to support critical life history functions of the red-legged frog do not occur on the property. Suitable habitat may occur immediately adjacent to the property along the forested riparian corridor; probability of occurrence on the property is considered to be moderate, but would likely be restricted to foraging under areas of canopy cover within the SPA and is not likely to be affected by the proposed development.

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Birds

Great blue heron, *fannini* subspecies (*Ardea herodias fannini*)

The great blue heron (provincially Blue-listed; designated Special Concern by COSEWIC, 2008; designated Special Concern under SARA Schedule 1, 2010) is a resident waterbird along the west coast and utilizes seashore, riparian, and lacustrine environments for foraging (BC Conservation Data Centre 2015g). Great blue herons nest colonially in tall conifers, red alders, and black cottonwoods. Nesting sites require isolation from disturbance (COSEWIC 2008a). Loss of nesting and foraging habitat is a great threat to this species in addition to decreasing food sources.

Probability of great blue heron occurring on the property is considered moderate. Great blue heron may temporarily utilize the property; however, at the time of the assessment there were no great blue heron nests observed and is not thought to be affected by the proposed development.

Olive-sided Flycatcher (*Contopus cooperi*)

The olive-sided flycatcher (provincially Blue-listed; designated Threatened by COSEWIC, 2007; designated Threatened under SARA Schedule 1, 2010) (BC Conservation Data Centre 2015h) is often found in coniferous or mixed coniferous forests with open areas including forest edges near rivers or swamps, logged areas and burned areas, with places such as tall trees or snags for perching (COSEWIC 2007). This species breeds throughout most of North America and on the west coast ranges from Alaska and the Yukon south to Baja California. Overwintering occurs in South and Central America (BC conservation Data Centre 2015h). Habitat loss in both breeding and wintering areas is a large threat to olive-sided flycatchers. Additionally, nesting success may be lower in manmade areas than in natural clearings (BC Conservation Data Centre 2015h).

Habitat suitable to support critical life history functions of the olive-sided flycatcher on the property does not exist, although the canopy adjacent to the north property line may provide suitable habitat, thus probability of occurrence on the property is thought to be moderate. The olive-sided flycatcher would not be affected by the proposed development as suitable habitat is limited to the SPA.

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Barn Swallow (*Hirundo rustica*)

Barn swallows (provincially Blue-listed; designated Threatened by COSEWIC, 2011; not listed under SARA) (BC Conservation Data Centre 2015i17) are found on every continent excluding Antarctica. Within Canada barn swallows have been found in every province and territory. Areas near open habitats and water are preferred.

In North America barn swallows nest in caves, crevices and ledges of rocky cliffs as well as in manmade structures such as buildings, bridges and culverts (BC Conservation Data Centre 2015i17). Barn swallows commonly return to old nests and yearlings often return to nest near their natal site. Habitat loss and degradation, human nest removal and interspecific competition for nest sites are threats to barn swallows. Declines and changes in food sources (i.e., insect populations) and high rates of ectoparasitism are additional threats to this species (BC Conservation Data Centre 2015i17).

Probability of barn swallow occurring on the property is considered moderate as there are existing sheds and other buildings on the property. Should this species nest on the property it would most likely be within these manmade structures. A nest survey shall be conducted prior to commencement of construction, should construction occur during the active bird nesting window (generally March 1 through August 31 of any given year). Should active nests be located on the property, construction is to be delayed until young have fledged, and a nest management plan shall be developed by the environmental monitor.

Western Screech-Owl kennicottii subspecies (*Megascops kennicottii kennicottii*)

The western screech-owl (provincially Blue-listed; designated Threatened by COSEWIC, 2012; designated Special Concern by SARA Schedule 1, 2005) (BC Conservation Data Centre 2015j18) is widely distributed throughout its range along the coast, although declines in the Lower Mainland have occurred (Robertson et al. 200019). Western screech-owls prefer lower elevations in Pacific coastal forests and southern interior region of BC (COSEWIC 201220). The range extends from BC to mountain valleys in Mexico.

The western screech-owl is associated with a wide variety of habitats including deciduous, coniferous and mixed forests on the edges of clearings, wooded canyons, riparian thickets,

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deserts and orchards but is often associated with bigleaf maple and/or black cottonwood. Large natural cavities of coniferous and deciduous trees are preferred for roosting and nesting (BC Conservation Data Centre 2015). The greatest threats to this species are removal of nesting sites such as dead trees and snags, and predation from barred owls.

Probability of western screech-owl occurring on the property is considered low. The trees in the riparian area adjacent to the property include species favoured by western screech-owl (black cottonwood, western redcedar). There are however no known occurrences of western screech-owl in the area surrounding the property. This species was not detected on the property during the current assessment. Should western screech-owl occur on the property, it is most likely to be found in the riparian forest, which supports a number of large trees suitable for nesting. The streamside protected area will maintain existing large trees in addition to new riparian plantings.

Band-Tailed Pigeon (*Patagioenas fasciata*)

The band-tailed pigeon (provincially Blue-listed, designated Special Concern by COSEWIC, designated Special Concern under Schedule 1 of SARA (BC Conservation Data Centre 2015k)) breeds in western regions of the Americas from coastal British Columbia to northern Argentina. In Canada, the breeding range of the Band-tailed Pigeon is restricted to British Columbia, mainly on the south coast (COSEWIC 2008b). It is an uncommon to locally abundant resident breeder on the south coast and southern Vancouver Island (BC Conservation Data Centre 2015k). Pairs nest solitarily, dispersed across breeding areas to which they return annually (Government of Canada 2015b).

Preferred breeding habitat includes natural and man-made habitats, including the edges of mature forests, at elevations below 300 m (COSEWIC 2008b). A small population winters in Canada, making use of urban bird feeders (COSEWIC 2008b). Band-tailed pigeons rely on soft mast and berries, including red elderberry, hawthorn, and particularly cascara, as food sources during the nesting season (Bottorff 2007).

Probability of band-tailed pigeon occurring on the property or adjacent riparian area is considered Moderate. Band-tailed pigeons were not observed during the current assessment, but if present would likely be found in the riparian canopy. The proposed streamside protected area enhancement includes plantings of red elderberry and cascara, both favoured food species.

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Spotted owl (*Strix occidentalis*)

The spotted owl (provincially Red-listed; designated Endangered by COSEWIC, 2008; designated Endangered by SARA Schedule 3, 2003) occurs in a restricted range in the southwest of British Columbia, east of the Capilano River (BC Conservation Data Centre 2015\textsuperscript{25}). The current population size in British Columbia is estimated at between 16 and 60 adults. The spotted owl is highly dependent on old growth coniferous forests and the small mammal species associated with this forest structure, including the flying squirrel. Threats include the lack of available habitat and continued timber harvesting and habitat fragmentation.

The riparian forest on and adjacent to the property is not late successional or old growth. No suitable nesting habitat for the spotted owl occurs within the proposed development, and the probability of the spotted owl occurring on the property is considered Low.

Mammals

Keen’s Myotis (*Myotis keenii*)

Keen’s Myotis long eared bat (provincially Blue-listed; designated Data Deficient by COSEWIC, 2004; designated SARA Schedule 3, 2005) is insectivorous; known prey items include spiders, moths, and flies (BC Conservation Data Centre 2015\textsuperscript{m}\textsuperscript{26}). This bat is associated with mature forests but not restricted to old growth (COSEWIC 2003\textsuperscript{27}). Across its range it has been found roosting in southwest facing crevices, among geothermally heated rocks, tree cavities, bark crevices and in buildings (Firmam \textit{et. al} 1993\textsuperscript{28}, Nagorsen and Brigham 1993 \textsuperscript{29}). The range of Keen’s Myotis extends from western Washington to southeastern Alaska. Within BC its range includes Haida Gwaii, Vancouver Island and the coastal mainland (BC Conservation Data Centre 2015m\textsuperscript{26}).

Tree cavities and loose bark are important natural roost sites and may be limiting in some parts of the range (BC Conservation Data Centre 2015m\textsuperscript{26}). Human disturbance is another threat to these bats as is predation by small mammals such as cats and raccoons (COSEWIC 2003\textsuperscript{27}).

Probability of Keen’s Myotis occurring on the property is considered low. This species was not observed during the current assessment. Should this species occur on the property it


would likely occur within the sheds or riparian trees. If present, it would likely persist in the retained streamside protected area on and adjacent to the property.

Pacific Water Shrew (*Sorex bendirii*)

The Pacific water shrew (provincially Red-listed; designated Endangered by COSEWIC, 2006; designated Endangered under SARA Schedule 1, 2003) occurs in the coastal region of the Pacific Northwest from California to southwestern British Columbia (BC Conservation Data Centre 2015n). Within BC, habitat is limited to the Lower Fraser Valley (COSEWIC 2006).

The Pacific water shrew is typically associated with low elevation riparian habitats, forests with extensive canopy and understory of abundant shrubs and woody debris that borders streams, swamps, or marshes. Habitat loss and population fragmentation and isolation from development are the main threats to Pacific water shrew (COSEWIC 2006).

Probability of Pacific water shrew occurring on the property is considered Low based on habitat values. No impacts to critical life stages of the Pacific water shrew are anticipated as works will not occur in the Capilano River or immediately adjacent riparian area.

Trowbridge’s Shrew (*Sorex trowbridgii*)

Trowbridge’s shrew (provincially Blue-listed; not listed by COSEWIC or under SARA) is a primarily insectivorous mammal found in mature forests with abundant leaf litter, riparian forests with red alder, black cottonwood, bigleaf maple and western redcedar, forested canyons and ravines, deep grass and cleared areas if there is adequate ground cover BC Conservation Data Centre 2015o). The range of Trowbridge’s Shrew is from southwestern BC in the Fraser River valley to California (Nagorsen 2013). The eastern limit of the range in BC is Hope (BC Conservation Data Centre 2015o).

Development within its range, urban and agricultural, is likely causing decrease in habitat quality and increased fragmentation (BC Conservation Data Centre 2015o).

Probability of Trowbridge’s shrew occurring on the property is considered low based on habitat requirements. This species was not detected during the current assessment. Should this species occur on or adjacent to the property, it is most likely to be found in the proposed

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streamside protected area on the northern edge of the property, the area with the greatest
ground cover and separation from existing residences.

A summary of species that potentially occur on the property is included as Table 1, below.
Species that for whom the property contains habitat suitable to support critical life history
functions and that have a moderate or high probability of occurrence are shown in bold, and are
limited to the great blue heron and the barn swallow.

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<tr>
<th>Common Name</th>
<th>Scientific Name</th>
<th>Status</th>
<th>BC List</th>
<th>SARA</th>
<th>Habitat to Support Critical Life History Functions?</th>
<th>Probability of Occurrence</th>
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PROPOSED WORKS

Please refer to the site plan included as Attachment D.

The proponent intends to demolish the existing residences on the property and construct 3 multi-family residential buildings.

Also included in the proposal is a public footpath requested by the District, located to the north of the proposed residences and yards and running parallel with the bank of the Capilano River. The footpath will have a width of 2 m. The proponent has configured the proposed development area to provide for a streamside protected area with an average width of 15 m, although the proposed public footpath is within 15 m of the top of bank of the Capilano River in places.

The proposed streamside protected area and habitat balance is shown in Attachment E.

REGULATORY FRAMEWORK

Municipal

Schedule B to the District’s Official Community Plan (OCP), as amended by Amendment Bylaw 7934 adopted in 2012, designates a Streamside Protection DPA, including all land parcels located within 15 m of the top of bank of a stream. It states that all development and subdivisions within a DPA require a development permit. The property, located within 15 m of the top of bank of the Capilano River, is within the Streamside Protection DPA and requires a development permit for the proposed redevelopment.

Schedule B of the OCP designates a ‘streamside protected area’ (SPA) as the area ‘from the centreline of the stream to a distance of 15 metres measured perpendicularly from the top of bank of a stream’. The Guidelines in Schedule B provide that all development should be located outside the SPA, and that any development within the SPA should be located as far away from the stream as feasible so as to minimize intrusion, should avoid damaging impacts to the area, and should protect and enhance the natural features thereof.

The Guidelines further stipulate that proponents may be required to submit an environmental impact study prepared by a qualified environmental professional (QEP), to identify potential
issues and impacts relating to the proposed development. This correspondence constitutes such an impact study and includes the following aspects stipulated in the Guidelines:

- Delineation of the streamside protected area, including details on the features and extent thereof;
- A description of the proposed development and an assessment of its impacts on vegetation, wildlife and habitat; and
- A description of proposed habitat compensation, including a planting plan and cost estimate.

Provincial

Parts 2 and 3 of the Water Sustainability Regulation within the provincial *Water Sustainability Act* require either a Change Approval or Notification for works in or about a stream. Works will not be conducted below top-of-bank, however riparian enhancement works will occur within setback areas as prescribed by the provincial *Riparian Areas Protection Act* (formerly the Riparian Areas Regulation of the *Fish Protection Act*). Thus, a Notification to FrontCounter BC will be sent to the Ministry of Forests, Lands, and Natural Resource Operations (MFLRNO) to address provincial permitting requirements of the *Water Sustainability Act*. A copy of the Notification will be forwarded to the District.

Federal

Section 35(1) of the *Fisheries Act* states that ‘No person shall carry on work, undertaking or activity that results in serious harm to fish’. The *Act* defines ‘serious harm to fish’ as ‘the death of fish or any permanent alteration to, or destruction of, fish habitat’. To address the requirements of the *Act*, a ‘self-assessment’ has been carried out by the QEP, and is included as Attachment F.

DELINEATION OF THE STREAMSIDE PROTECTED AREA

Please refer to Envirowest Drawing Nos. 1611-04-01 and 1611-04-02 for a proposed habitat balance, included as Attachment E.

As required by Schedule B of the District’s OCP, a streamside protected area with an average width of 15.0 m is proposed. The proposed public pathway will result in the development of an area of approximately 83 m² within 15 m of the top of bank, which is generally high disturbed and is characterized by non-native vegetation, hardscaping and backyard lawn. The encroachment area will be offset by 65 m² of additional SPA area, and enhancement of the entire SPA, with a total area of 1,608 m².
ASSESSMENT OF IMPACTS

Riparian Habitat

Please refer to Envirowest Drawing nos. 1611-04-03 and 1611-04-04, included as Attachment E, for environmental planting plan and specifications.

Existing riparian habitat consists largely of non-native and invasive understorey plant species. The proposed habitat enhancement will have a positive impact on the productivity of the riparian area, by removing any existing structures and non-native plants from the planting area, and including native plantings. The proposed planting area will be protected by permanent fencing, to discourage future encroachment by people and domestic animals. Two years of plant monitoring and maintenance will be required. Maintenance activities may include ongoing removal of non-native plants, watering, mulching and fertilization, as required.

Wildlife

Pursuant to the federal *Migratory Bird Act* and the provincial *Wildlife Act*, an active bird nest survey shall be required prior to clearing of any vegetation, should clearing occur during the bird nesting window (generally March 1 to August 31 of any given year). The survey must be conducted by a Qualified Environmental Professional. If clearing is to occur outside of this window, a nest survey shall not be required.

Regardless of time of year, a raptor and heron nest survey will be conducted prior to clearing of vegetation.

Danger Trees and Windfirmness

The arborist and windfirm reports prepared by Diamond Head Consulting Ltd. are included as Attachment B. The reports assesses concerns related to danger trees and windfirmness associated with the proposed development. Trees within the SPA that are 10 centimetres diameter at breast height or larger are to be retained unless identified to be in a poor condition by the arborist.

Slope Stability

The property is located outside of the District’s defined Slope Hazard DPA and the proposed development is set back from the river bank.
Floodplain

The project footprint is located beyond the top of bank and outside of the floodplain. A Flood Hazard Assessment has been conducted by GeoPacific Consultants Ltd. and is included as Attachment H.

Sediment and Erosion Control

The proponent is to ensure that no sediment or sediment laden waters enter any watercourses during the construction phase. Regular site inspections will be conducted by a Qualified Environmental Professional (QEP), retained by the developer to review efficacy and effectiveness of erosion and sediment control measures and to provide additional direction as required. An Erosion and Sediment Control Plan has been prepared by Aplin & Martin Consultants Ltd. and has been submitted separately.

ENVIRONMENTAL MONITORING

The developer will retain a QEP to inspect construction activities and undertake the following duties:

- establish the streamside protection area boundary in the field, in conjunction with a professional land surveyor prior to the commencement of construction activities;
- conduct an active bird nest survey if clearing is to occur between March 1 and August 31 of any given year; conduct a raptor nest survey prior to clearing regardless of time of year; prepare a nest management plan should active nests be discovered during the survey;
- review sediment and erosion control requirements and plans with the developer, the contractor and all sub-contractors prior to and during site visits;
- provide direction during construction to the site foreman and or subcontractors to ensure deficiencies noted in sediment and erosion control are rectified immediately;
- collect samples of water discharging from the site for total suspended solid analysis as required;
- prepare environmental summary reports for submission to and review by the developer and the District of North Vancouver;
- conduct annual inspection of environmental plantings for two year maintenance and monitoring period and provide copies of annual plant inspections to the District.

With consideration of the arborist’s recommendations, and with implementation of the mitigation measures prescribed above, Envirowest has determined that the development, contained within the proposed streamside protection area boundary, will not significantly impact fish or wildlife habitat.
Please contact the undersigned at gibson@envirowest.ca or 604-944-0502 should you have comments or questions regarding this correspondence.

Sincerely,

ENVIROWEST CONSULTANTS INC.

[Signature]

Christie Gibson, R.P. Bio
Project Biologist

CWG

Reviewed by,

[Signature]

Ian Whyte, P.Ag.
Senior Project Manager

IWW

Attachments:  A  Location Map  
B  Site Photographs  
C  Site Survey  
D  Site Plan  
E  Envirowest Drawings  
F  DFO Self-Assessment  
G  Arborist’s Report  
H  Flood Hazard Assessment

Copy: Robert Cadez, PC Urban Property Corp.
REFERENCE DRAWINGS
2. 2013 Ortho Photograph From District of North Vancouver.

PROJECT LOCATION
Glenaire Drive
North Vancouver, BC

PC Urban Properties Corp.
ATTACHMENT B
Site Photographs
Photograph 1.  Typical view of slope adjacent to Capilano River (July 22, 2015).

Photograph 2.  Typical north view of heavily modified backyard areas, proposed to be enhanced with native plantings (July 22, 2015).
Photograph 3. Typical view of non-native vegetation assemblage along Capilano River top of bank (July 22, 2015).

Photograph 4. Typical view of existing houses and yards fronting Glenaire Drive, within footprint of proposed development (July 22, 2015).
ATTACHMENT C
Site Survey
Proposed Encroachment Area = 63 m²
Available Enhancement Area = 1608 m²

REFERENCE DRAWINGS
2. 2013 Ortho Photograph From District of North Vancouver.

PC URBAN PROPERTIES CORP.

GLENAIRE DRIVE
North Vancouver, BC
SPA Loss = 83m²
SPA Gain = 65m²

REFERENCE DRAWINGS
2. 2013 Ortho Photograph From District of North Vancouver.

PLAN
SCALE 1:250

LEGEND
- SPA Loss = 83m²
- SPA Gain = 65m²

STREAMSIDE PROTECTED AREA PLAN
GLENAIRE DRIVE
North Vancouver, BC

June 20, 2016

PC URBAN PROPERTIES CORP.
envirowest consultants inc.
PLANT SPECIES LIST AND SPECIFICATIONS

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>COMMON NAME</th>
<th>LATIN NAME</th>
<th>NUMBER</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>DR</td>
<td>Douglas-fir</td>
<td>Pseudotsuga macrophylla</td>
<td>10</td>
<td>1.2m - 1.5m, well established</td>
</tr>
<tr>
<td>DR</td>
<td>broadleaf maple</td>
<td>Acer macrophyllum</td>
<td>4</td>
<td>1.2m - 1.5m, well established</td>
</tr>
<tr>
<td>DR</td>
<td>black hawlhom</td>
<td>Acer macrophyllum</td>
<td>6</td>
<td>1.2m - 1.5m, well established</td>
</tr>
<tr>
<td>DR</td>
<td>douglas fir</td>
<td>Pseudotsuga macrophylla</td>
<td>5</td>
<td>1.2m - 1.5m, well established</td>
</tr>
<tr>
<td>DR</td>
<td>red alder</td>
<td>Alnus rubra</td>
<td>2</td>
<td>1.2m - 1.5m, well established</td>
</tr>
<tr>
<td>DR</td>
<td>western rector</td>
<td>Thuja plicata</td>
<td>3</td>
<td>1.2m - 1.5m, well established</td>
</tr>
<tr>
<td>DR</td>
<td>western rector</td>
<td>Thuja plicata</td>
<td>10</td>
<td>1.2m - 1.5m, well established</td>
</tr>
<tr>
<td>DR</td>
<td>westrake</td>
<td>Picea pungens</td>
<td>340</td>
<td>1.2m - 1.5m, well established</td>
</tr>
<tr>
<td>DR</td>
<td>beaked barshul</td>
<td>Corylus cornuta</td>
<td>5</td>
<td>1.2m - 1.5m, well established</td>
</tr>
<tr>
<td>DR</td>
<td>red huckleberry</td>
<td>Vaccinium parviflorum heterophyllum</td>
<td>12</td>
<td>1.2m - 1.5m, well established</td>
</tr>
<tr>
<td>DR</td>
<td>salal</td>
<td>Gaultheria shallon</td>
<td>92</td>
<td>1.2m - 1.5m, well established</td>
</tr>
<tr>
<td>DR</td>
<td>arrowberry</td>
<td>Symphoricarpos albus</td>
<td>430</td>
<td>1.2m - 1.5m, well established</td>
</tr>
<tr>
<td>DR</td>
<td>elk berry</td>
<td>Rubus parviflorus</td>
<td>220</td>
<td>1.2m - 1.5m, well established</td>
</tr>
<tr>
<td>DR</td>
<td>elf hoop</td>
<td>Acer circinatum</td>
<td>82</td>
<td>1.2m - 1.5m, well established</td>
</tr>
<tr>
<td>DR</td>
<td>western harvested</td>
<td>Tsuga heterophylla</td>
<td>8</td>
<td>2.0m - 2.5m, multi-stemmed, well established</td>
</tr>
<tr>
<td>DR</td>
<td>western harvested</td>
<td>Tsuga heterophylla</td>
<td>10</td>
<td>2.0m - 2.5m, multi-stemmed, well established</td>
</tr>
<tr>
<td>DR</td>
<td>western harvested</td>
<td>Tsuga heterophylla</td>
<td>4</td>
<td>2.0m - 2.5m, multi-stemmed, well established</td>
</tr>
<tr>
<td>DR</td>
<td>western harvested</td>
<td>Tsuga heterophylla</td>
<td>5</td>
<td>2.0m - 2.5m, multi-stemmed, well established</td>
</tr>
<tr>
<td>DR</td>
<td>western harvested</td>
<td>Tsuga heterophylla</td>
<td>1</td>
<td>2.0m - 2.5m, multi-stemmed, well established</td>
</tr>
<tr>
<td>DR</td>
<td>red huckleberry</td>
<td>Vaccinium parviflorum</td>
<td>13</td>
<td>1.2m - 1.5m, well established</td>
</tr>
<tr>
<td>DR</td>
<td>sprig</td>
<td></td>
<td>15</td>
<td>1.2m - 1.5m, well established</td>
</tr>
<tr>
<td>DR</td>
<td>shrub</td>
<td></td>
<td>15</td>
<td>1.2m - 1.5m, well established</td>
</tr>
<tr>
<td>DR</td>
<td>grass</td>
<td></td>
<td>28</td>
<td>3.0m - 3.5m, well established</td>
</tr>
</tbody>
</table>

REFERENCE DRAWINGS:
2. 2013 Orlho Photograph From District of North Vancouver.
June 22, 2016

Mr. Robert Cadez  
PC Urban Properties Corp.  
Suite 880, 1090 West Georgia Street  
Vancouver, BC  V6E 3V7

Mr. Cadez,

RE: PROPOSED RIPARIAN ENHANCEMENT AT 1946-1998 GLENAIRE DRIVE, NORTH VANCOUVER  
FISHERIES AND OCEANS CANADA SELF-ASSESSMENT

The proposed development at the referenced address occurs in proximity to the Capilano River. Riparian enhancements are proposed within the river’s riparian assemblage, but will not engage the river below top of bank. Envirowest Consultants Inc. (Envirowest) has prepared the following correspondence to address the federal *Fisheries Act* regulatory requirements facilitated by Fisheries and Oceans Canada (DFO) as a ‘self-assessment’.

The Capilano River is a fish-bearing stream. Proposed Works adjacent to the stream comprise removal of non-native vegetation and installation of native plantings and woody debris, generally within 15 metres (m) from top-of-bank. Works are not proposed below top-of-bank. Ongoing maintenance of plantings will occur for 2 years and may involve removal of invasive plant material, watering, mulching and/or fertilizing, as required.

Review by DFO is not required for the following relevant project activities (Fisheries and Oceans Canada 2015):

- Habitat Restoration
- Riparian Vegetation Removal

In the context of the *Fisheries Act*, the proposed works will not result in serious harm to fish. Section 35(1) of the *Fisheries Act* states that:

> “No person shall carry on any work, undertaking or activity that results in serious harm to fish that are part of a commercial, recreational, or Aboriginal fishery, or to fish that support such a fishery.”

---

The Act defines serious harm to fish as:

“the death of fish or any permanent alteration to, or destruction of, fish habitat”.

The proposed works will not result in the death of fish.

DFO interprets a permanent alteration to fish habitat to be:

“a spatial scale, duration or intensity that limits or diminishes the ability of fish to use such habitats as spawning grounds, or as nursery, rearing, or food supply areas, or as a migration corridor, or any other area in order to carry out one or more of their life processes”. (http://www.dfo-mpo.gc.ca/pnw-ppe/pol/index-eng.html#provisions; accessed March 30, 2016).

DFO interprets the destruction of fish habitat to be:

“the destruction of fish habitat of a spatial scale, duration or intensity that fish can no longer rely upon such habitats for use as spawning grounds, or as nursery, rearing, or food supply areas, or as a migration corridor, or any other area in order to carry out one of more of their life processes”. (http://www.dfo-mpo.gc.ca/pnw-ppe/pol/index-eng.html#provisions; accessed March 30, 2016).

The proposed works will result in enhancement of a riparian assemblage that is currently degraded and highly modified by human activities. The works do not constitute a permanent alteration to, or destruction of fish habitat.

The regulatory process facilitated by DFO as it pertains to projects being conducted in or near waterbodies that support fish and fish habitat typically commences with a request for review. The proponent of works submits proposed works to DFO to assess whether serious harm to fish would result from the works. DFO suggests that proponents, if unsure whether their project requires a DFO review retain a qualified environmental professional to render an assessment as to whether a DFO review is required (www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html; accessed June 22, 2016). This correspondence represents such an assessment: a DFO review is not required for the proposed works.
Please contact me at 604-944-0502 or gibson@envirowest.ca should you have comments or questions regarding this self assessment.

Sincerely,

ENVIROWEST CONSULTANTS INC.

[Signature]

Christie Gibson, R.P.Bio
Project Biologist

CWG

Reviewed by,

[Signature]

Ian Whyte, P.Ag.
Senior Project Manager

IWW
ATTACHMENT G
Arborist and Windfirm Assessments
Diamond Head Consulting Ltd.
Arborist Report

For:
1946-1998 Glenaire Dr
North Vancouver, BC

June 21, 2016

To be submitted with Tree Protection Plan
Dated: Oct 22, 2015

Submitted to:
PC Urban
Suite 880, 1090 West Georgia Street
Vancouver, BC V6E 3V7

Submitted by:

Diamond Head Consulting Ltd.
3551 Commercial Street
Vancouver, BC V5N 4E8
The following Diamond Head Consulting staff performed the site visit and prepared the report. All general and professional liability insurance and individual accreditations have been provided below for reference.

Mike Coulthard  
RPF (#3772) RPBio (#1338)

This report summarizes the planned management of trees on the site. If there are any questions or concerns as to the contents of this report, please contact us at any time.

Contact Information

Phone: 604-733-4886  
Fax: 604-733-4879  
Email: mike@diamondheadconsulting.com  
Website: www.diamondheadconsulting.com

Insurance Information

WCB: # 657906 AQ (003)  
General Liability: Northbridge General Insurance Corporation - Policy #CBC1935506, $5,000,000 (Mar 2015 to Mar 2016)  
Errors & Omissions: Lloyds Underwriters – Policy #1010615D, $1,000,000 (June 2015 to June 2017)
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1.0 Introduction

Diamond Head Consulting Ltd. (DHC) was asked to complete an assessment of the trees on and adjacent to the following proposed development:

<table>
<thead>
<tr>
<th>Civic address:</th>
<th>1946-1998 Glenaire Dr North Vancouver, BC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Client name:</td>
<td>Robert Spencer PC Urban</td>
</tr>
<tr>
<td>Date of site visit:</td>
<td>Oct 19, 2015</td>
</tr>
</tbody>
</table>

The objective of this report is to ensure the proposed development is in compliance with District of North Vancouver Bylaws that applies to tree retention. These requirements are covered in the Tree Protection Bylaw (#7671). Protected trees as defined by this bylaw include:

a. Any tree on land owned by or in the possession of the District, including, without limitation, a tree in a park or on a boulevard, road or lane allowance;
b. Any tree within a protected area;
c. Any tree on sloping terrain;
d. Any replacement tree;
e. Any retained tree;
f. Any heritage tree;
g. Any wildlife tree;
h. Any tree located on wetland or waterfront;
i. Any tree of the following species:
   i. Arbutus (*Arbutus menziesii*);
   ii. Garry Oak (*Quercus garryana*);
   iii. Oregon Ash (*Fraxinus* spp);
   iv. Pacific Yew (*Taxus brevifolia*);
   v. Western White Pine (*Pinus monticola*); or
   vi. Yellow-cedar (*Chamaecyparis nootkatensis*).

Replacement trees for the removal of large diameter trees (over 75cm) are required if the subject lot will have less than 20% canopy cover remaining after the removal of the large diameter tree. If the canopy cover is over 20% after the removal, no replacement tree is required.

- If the subject lot is less than 420 square meters in area, one replacement tree for every large-diameter tree must be planted.
- If the subject lot is over 420 square meters in area, three replacement trees for every large-diameter tree must be planted.

All trees (>20cm in diameter) on and immediately adjacent to the site were assessed, including: species, diameter at breast height (dbh) measured to the nearest 1 cm at 1.4 m above tree base, estimated height and general health and defects. Critical root zones were calculated for each of the trees with the potential for development impacts. Tree hazards were assessed according to International Society of Arboriculture and WCB standards. Suitability for tree retention was evaluated based on the health of the trees and their location in relation to the proposed building envelopes and infrastructure.
1.1 Limits of Assignment

- Our investigation is based solely on our visual inspection of the trees on Oct 19 and Aug 27, 2015. Our inspection was conducted from ground level. We did not conduct soil tests or root examination to assess the condition of the root system of the trees.
- Only the trees specified in the scope of work were assessed and assessments were performed within the limitations specified.
- This report does not provide any estimates to implement the proposed recommendations provided in this report.
- This report is valid for six months from the date of submission. Additional site visits and report revisions are required after this point to ensure accuracy of the report for the District’s development permit application process.

1.2 Purpose and Use of Report

- Provide documentation pertaining to on and off site trees to supplement the proposed development permit application.

---

Figure 1. Location of site – 1946-1998 Glenaire Dr.
2.0 Observations

2.1 Site Overview

The site consists of five residential lots. The proposed development includes a row of townhouses to be built. Capilano River runs along the north edge of the development site. The majority of trees have been cleared from the existing developed lots. There is an open band of mature trees that is currently growing from the north property lines down to the high water mark of the River. Tree species found in this area include a mix of native and non-native species. The largest trees include native black cottonwood (Populus trichocarpa). Other native species found in this area include western redcedar (Thuja plicata), bigleaf maple (Acer macrophyllum), red alder (Alnus rubra) and Douglas-fir (Pseudotsuga menziesii). There are a number of non-native trees species within the assessment area including Horse chestnut (Aesculus hippocastanum).

There are two large mature conifers growing in the front yards including a an open grown Douglas-fir and a Western redcedar that has been previously topped. Smaller non-native trees are found in the landscaped back yards of 1946 and 1958. There is also a dense row of native cedar, hemlock as well as non-native hornbeam growing along the eastern boundary of 1998.

A windfirm boundary assessment was completed for the trees growing along the Capilano River. This identified edge trees that must be retained and protected in order to comply with the Provincial Riparian Areas Regulation. The windfirm boundary that has been identified includes those mature trees that are growing along the backs of these lots.

2.2 Tree Inventory

The following is an inventory of assessed trees, each of which was marked with a numbered tag. The trees that are protected under the District Tree Bylaw have been highlighted in red. Tree species, characteristics, comments, recommendations and required root protection zones have been suggested (Table 1). Their locations are illustrated on the accompanying map.
Overall Health and Structure Rating

- **Excellent** = Tree of possible specimen quality, unique species or size with no discernible defects. Or a heritage tree.
- **Normal** = These trees are in fair to good condition, considering its growing environment and species.
- **Poor** = These trees have low vigour, with noted health and/or structural defects. This tree is starting to decline from its typical species growth habits.
- **Very poor** = These trees are in serious decline from its typical growth habits, with multiple very definable health and/or structural defects.
- **Dead/Dying** = These trees were found to be dead, and/or have severe defects and are in severe decline.
- **High Risk** = These trees have been deemed hazardous by a Certified Tree Risk Assessor utilizing CTRA methods. They have a probability of failure of 3 or higher with a total overall risk rating of 8 (Moderate 3) or above.

Tree Retention Suitability Ratings

- **Unsuitable** = Not suitable for retention in context of the proposed project design and land use changes. These trees have pre-existing health and structural defects. There is a significant chance that these trees will not survive or may become a hazard given the proposed future land use.
- **Moderate** = These trees have moderate structural defects or health issues. The retention of this class of trees is not always successful or viable due to their pre-existing structural defects or health issues; however these trees may be viable for retention with the use of special measures.
- **Suitable** = These trees have no obvious structural defects or health issues, and are worthy of consideration for retention in the proposed development.
- **Suitable as group** = These trees have grown up in groups (groves) of other trees, and have not developed the type of trunk and root structure that will allow them to be safely retained on their own. These trees should only be retained in groups.

Tree Risk Assessment

Using the *Tree Risk Assessment in Urban Areas and the Urban/Rural Interface Release 1.4* manual, published by the International Society of Arboriculture, a Risk Rating out of 12 maximum points was given to the tree as shown in Table 2. The formula used was: **Probability of Failure + Size of Part + Target Area = Tree Risk Assessment (Rating)**.

In the Tree Risk Assessment, the tree was rated as follows:

**Probability of Failure = (1 low to 5 Extreme).** This is the likelihood of branch or whole tree failure. One is the lowest possible score; five is the highest likelihood of tree part failure.

**Size of Defective Part = (1 small to 3 large).** This section identifies the largest part, which could fail. A part greater than 50 cm is given a rating of 3, a part between 10 and 50 cm is given a rating of 2 and all parts less than 10 cm are given a rating of 1.
**Target Area = (1 low to 4 high).** The target that the tree could strike is designated a value from 1 to 4 based on the potential to cause personal injury or damage structures and infrastructure.

A value for each of the three categories is assessed and added together in the Risk Rating calculation shown in Table 2. A score of 3-5 indicates a low risk, 6-8 is a moderate risk, 9-11 is a high risk and 12 indicates an extreme risk; this level warrants immediate tree removal. A risk category assigning ranges to the three levels of risk is also provided. Please refer to the table in Appendix 1 for detailed information on interpretation and implications of risk ratings and categories.

### 2.3 Photographs

Photo 1. View north over existing residences at mature trees growing adjacent to the backs of the lots.

Photo 2. View of riparian buffer from the river.
Photo 3. View of tree 3947

Photo 4. View of tree 3982

Photo 5. View of trees 3948-3952

Photo 6. View of tree 472 with tree house
<table>
<thead>
<tr>
<th>Tag #</th>
<th>Common Name</th>
<th>Botanical Name</th>
<th>DBH (cm)</th>
<th>Ht (m)</th>
<th>Live Crown Ratio (%)</th>
<th>Overall Condition</th>
<th>Suitability</th>
<th>Comments</th>
<th>Retain/Remove</th>
<th>Tree Protection Zone (m) from center of tree</th>
<th>Tree Protection Zone (m) from outer edge of tree</th>
</tr>
</thead>
<tbody>
<tr>
<td>466</td>
<td>Western Hemlock</td>
<td>Tsuga heterophylla</td>
<td>51</td>
<td>20</td>
<td>80-89%</td>
<td>Good</td>
<td>Suitable</td>
<td>Full crown. Open grown. This is a natural edge tree. No other mature trees exist to the south. Windfirm riparian edge tree.</td>
<td>Retain</td>
<td>5.1</td>
<td>5.3</td>
</tr>
<tr>
<td>471</td>
<td>Western White Pine</td>
<td>Pinus monticola</td>
<td>34</td>
<td>22</td>
<td>70-79%</td>
<td>Good</td>
<td>Suitable</td>
<td>Inside active yard space. The only other mature trees north of this include two cottonwoods along the high water mark of the river. Windfirm riparian edge tree.</td>
<td>Retain</td>
<td>3.4</td>
<td>3.6</td>
</tr>
<tr>
<td>472</td>
<td>Western Redcedar</td>
<td>Thuja plicata</td>
<td>69</td>
<td>21</td>
<td>70-79%</td>
<td>Good</td>
<td>Suitable</td>
<td>Inside active yard space. A tree house has been built around the base of this tree. However it has caused no major damage and can be removed. There are no other mature trees to the south. Windfirm riparian edge tree.</td>
<td>Retain</td>
<td>6</td>
<td>6.4</td>
</tr>
<tr>
<td>3947</td>
<td>Douglas-fir</td>
<td>Pseudotsuga menziesii</td>
<td>104</td>
<td>41</td>
<td>70-79%</td>
<td>Excellent</td>
<td>Suitable</td>
<td>Open grown full crown. Between two driveways with roots cracking asphalt to the west. Large size tree. Roots conflict with building envelope.</td>
<td>Remove</td>
<td>8</td>
<td>8.5</td>
</tr>
<tr>
<td>3954</td>
<td>Western Hemlock</td>
<td>Tsuga heterophylla</td>
<td>33</td>
<td>15</td>
<td>50-59%</td>
<td>Poor</td>
<td>Unsuitable</td>
<td>Previously topped at 8m. Decay at crotch of old topping. 1m from shed. Roots conflict with building envelope.</td>
<td>Remove</td>
<td>3.3</td>
<td>3.5</td>
</tr>
<tr>
<td>3955</td>
<td>Western Hemlock</td>
<td>Tsuga heterophylla</td>
<td>31</td>
<td>14</td>
<td>60-69%</td>
<td>Poor</td>
<td>Unsuitable</td>
<td>Previously topped at 8m. Decay at crotch of old topping. 1m from shed. Roots conflict with building envelope.</td>
<td>Remove</td>
<td>3.1</td>
<td>3.3</td>
</tr>
<tr>
<td>3956</td>
<td>Western Redcedar</td>
<td>Thuja plicata</td>
<td>39</td>
<td>16</td>
<td>70-79%</td>
<td>Poor</td>
<td>Unsuitable</td>
<td>Co-dominant stems from 1m (17cm, 22cm). One stem topped at 8m but not hazardous. Growing 1m from shed. Roots conflict with building envelope.</td>
<td>Remove</td>
<td>3.9</td>
<td>4.1</td>
</tr>
<tr>
<td>Tag #</td>
<td>Common Name</td>
<td>Botanical Name</td>
<td>DBH (cm)</td>
<td>Ht (m)</td>
<td>Live Crown Ratio (%)</td>
<td>Overall Condition</td>
<td>Suitability</td>
<td>Comments</td>
<td>Retain/Remove</td>
<td>Tree Protection Zone (m) from center of tree</td>
<td>Tree Protection Zone (m) from outer edge of tree</td>
</tr>
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</tr>
<tr>
<td>3957</td>
<td>Western Redcedar</td>
<td>Thuja plicata</td>
<td>50</td>
<td>17</td>
<td>70-79%</td>
<td>Poor</td>
<td>Suitable</td>
<td>Co-dominant stems from base (24cm, 26cm). Growing 1m from shed. Ropes tied around stem starting to girdle it. Roots conflict with building envelope.</td>
<td>Remove</td>
<td>5</td>
<td>5.3</td>
</tr>
<tr>
<td>3958</td>
<td>Western Redcedar</td>
<td>Thuja plicata</td>
<td>57</td>
<td>15</td>
<td>60-69%</td>
<td>Normal</td>
<td>Suitable</td>
<td>Co-dominant stems from base but no included bark (28cm, 29cm). Growing 1m from shed. Roots conflict with building envelope. In riparian zone.</td>
<td>Remove</td>
<td>5.7</td>
<td>6</td>
</tr>
<tr>
<td>3959</td>
<td>Western Redcedar</td>
<td>Thuja plicata</td>
<td>23</td>
<td>15</td>
<td>60-69%</td>
<td>Normal</td>
<td>Suitable</td>
<td>Growing 1m from shed. Roots conflict with building envelope. In riparian zone.</td>
<td>Remove</td>
<td>2.3</td>
<td>2.4</td>
</tr>
<tr>
<td>3960</td>
<td>Western Redcedar</td>
<td>Thuja plicata</td>
<td>28</td>
<td>15</td>
<td>80-89%</td>
<td>Normal</td>
<td>Suitable</td>
<td>Growing 2m from shed. Roots conflict with building envelope. In riparian zone.</td>
<td>Remove</td>
<td>2.8</td>
<td>2.9</td>
</tr>
<tr>
<td>3961</td>
<td>Western Redcedar</td>
<td>Thuja plicata</td>
<td>19</td>
<td>13</td>
<td>70-79%</td>
<td>Normal</td>
<td>Suitable</td>
<td>Suppressed by adjacent cedars. Growing 1m from shed. Roots conflict with building envelope. Not within the riparian zone</td>
<td>Remove</td>
<td>1.9</td>
<td>2</td>
</tr>
<tr>
<td>3962</td>
<td>Western Redcedar</td>
<td>Thuja plicata</td>
<td>44</td>
<td>17</td>
<td>70-79%</td>
<td>Normal</td>
<td>Suitable</td>
<td>Growing 0.5m from shed. Ropes tied around stem. Roots conflict with building envelope. Not within the riparian zone.</td>
<td>Remove</td>
<td>4.4</td>
<td>4.6</td>
</tr>
<tr>
<td>3966</td>
<td>Cypress</td>
<td>Cupressaceae</td>
<td>26</td>
<td>8</td>
<td>&lt;20%</td>
<td>Dead/dying</td>
<td>Unsuitable</td>
<td>Almost dead. 10% live crown. Roots conflict with building envelope. Not within the riparian zone.</td>
<td>Remove</td>
<td>2.6</td>
<td>2.7</td>
</tr>
<tr>
<td>3968</td>
<td>Western Redcedar</td>
<td>Thuja plicata</td>
<td>61</td>
<td>9</td>
<td>30-39%</td>
<td>Poor</td>
<td>Unsuitable</td>
<td>5 stems growing from the base (16cm, 6cm, 12cm, 13cm, 14cm). Low live crown. Growing on top of 1m retaining wall. Poor structure but not hazardous. Roots conflict with building envelope. Not within the riparian zone</td>
<td>Remove</td>
<td>2</td>
<td>2.1</td>
</tr>
<tr>
<td>Tag #</td>
<td>Common Name</td>
<td>Botanical Name</td>
<td>DBH (cm)</td>
<td>Ht (m)</td>
<td>Live Crown Ratio (%)</td>
<td>Overall Condition</td>
<td>Suitability</td>
<td>Comments</td>
<td></td>
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</tr>
<tr>
<td>3969</td>
<td>Western Redcedar</td>
<td>Thuja plicata</td>
<td>49</td>
<td>8</td>
<td>60-69%</td>
<td>Poor</td>
<td>Suitable</td>
<td>3 stems growing from base (19cm, 17cm, 13cm). Growing on top of 1m retaining wall. Poor structure but not hazardous. Roots conflict with building envelope. Not within the riparian zone</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3970</td>
<td>Western Redcedar</td>
<td>Thuja plicata</td>
<td>35</td>
<td>9</td>
<td>80-89%</td>
<td>Normal</td>
<td>Suitable</td>
<td>Growing on top of 1m retaining wall. Conflict with building envelope. Not within the riparian zone</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3971</td>
<td>Cypress</td>
<td>Cupressaceae</td>
<td>18</td>
<td>14</td>
<td>70-79%</td>
<td>Normal</td>
<td>Suitable</td>
<td>Growing in a row. Not within the riparian zone</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3972</td>
<td>Cypress</td>
<td>Cupressaceae</td>
<td>14</td>
<td>13</td>
<td>70-79%</td>
<td>Normal</td>
<td>Suitable</td>
<td>Growing in a row. In riparian zone.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3973</td>
<td>Cypress</td>
<td>Cupressaceae</td>
<td>13</td>
<td>13</td>
<td>50-59%</td>
<td>Normal</td>
<td>Suitable</td>
<td>Growing in a row. In riparian zone.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3975</td>
<td>Cypress</td>
<td>Cupressaceae</td>
<td>13</td>
<td>12</td>
<td>50-59%</td>
<td>Normal</td>
<td>Suitable</td>
<td>Growing in a row. In riparian zone.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3976</td>
<td>Cypress</td>
<td>Cupressaceae</td>
<td>13</td>
<td>12</td>
<td>50-59%</td>
<td>Normal</td>
<td>Suitable</td>
<td>Growing in a row. In riparian zone.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3979</td>
<td>Western Redcedar</td>
<td>Thuja plicata</td>
<td>31</td>
<td>15</td>
<td>80-89%</td>
<td>Poor</td>
<td>Suitable</td>
<td>Wire grown into stem at 1.5m but no sign of health effects. In riparian zone.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3980</td>
<td>Sitka Spruce</td>
<td>Picea sitchensis</td>
<td>18</td>
<td>6</td>
<td>50-59%</td>
<td>Poor</td>
<td>Unsuitable</td>
<td>Girdled at 2m. Leaning 5 degrees. Crown mostly on south side. Conflict with building envelope. Not within the riparian zone</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3981</td>
<td>Western Redcedar</td>
<td>Thuja plicata</td>
<td>22</td>
<td>8</td>
<td>30-39%</td>
<td>Normal</td>
<td>Suitable</td>
<td>Lift pruned. Conflict with building envelope. In riparian zone.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3982</td>
<td>Western Redcedar</td>
<td>Thuja plicata</td>
<td>95</td>
<td>19</td>
<td>80-89%</td>
<td>Poor</td>
<td>Suitable</td>
<td>Tree was topped at 19m. Growing in a 0.3m tall wall around base. Conflict with building envelope. Large diameter tree.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tag #</td>
<td>Common Name</td>
<td>Botanical Name</td>
<td>DBH (cm)</td>
<td>Ht (m)</td>
<td>Live Crown Ratio (%)</td>
<td>Overall Condition</td>
<td>Suitability</td>
<td>Comments</td>
<td>Retain/Remove</td>
<td>Tree Protection Zone (m) from center of tree</td>
<td>Tree Protection Zone (m) from outer edge of tree</td>
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</tr>
<tr>
<td>3983</td>
<td>Amabilis Fir</td>
<td>Abies amabilis</td>
<td>27</td>
<td>9</td>
<td>80-89%</td>
<td>Normal</td>
<td>Suitable</td>
<td>Growing in landscaped area. Rocks and retaining wall over root zone. In riparian zone.</td>
<td>Retain</td>
<td>2.7</td>
<td>2.8</td>
</tr>
<tr>
<td>3985</td>
<td>Shorepine</td>
<td>Pinus contorta</td>
<td>33</td>
<td>9</td>
<td>70-79%</td>
<td>Normal</td>
<td>Suitable</td>
<td>Growing in landscaped area. Rocks, gravel and retaining wall over root zone. In riparian zone.</td>
<td>Retain</td>
<td>3.3</td>
<td>3.5</td>
</tr>
<tr>
<td>3986</td>
<td>Western Hemlock</td>
<td>Tsuga heterophylla</td>
<td>17</td>
<td>9</td>
<td>80-89%</td>
<td>Normal</td>
<td>Suitable</td>
<td>In landscape area 0.5m to pavers. Conflict with building envelope. Not within the riparian zone</td>
<td>Remove</td>
<td>1.7</td>
<td>1.8</td>
</tr>
<tr>
<td>3987</td>
<td>Bigtooth Aspen</td>
<td>Populus grandidentata</td>
<td>13</td>
<td>12</td>
<td>80-89%</td>
<td>Normal</td>
<td>Suitable</td>
<td>Variety uncertain. Growing in landscaped area, 0.5m to pavers. Conflict with building envelope. Not within the riparian zone</td>
<td>Remove</td>
<td>1.3</td>
<td>1.4</td>
</tr>
<tr>
<td>3988</td>
<td>Bigtooth Aspen</td>
<td>Populus grandidentata</td>
<td>12</td>
<td>1</td>
<td>80-89%</td>
<td>Normal</td>
<td>Suitable</td>
<td>Variety uncertain. Growing in landscaped area, 0.5m to pavers. Conflict with building envelope. Not within the riparian zone</td>
<td>Remove</td>
<td>1.2</td>
<td>1.3</td>
</tr>
<tr>
<td>3989</td>
<td>Western Redcedar</td>
<td>Thuja plicata</td>
<td>96</td>
<td>28</td>
<td>60-69%</td>
<td>Poor</td>
<td>Suitable</td>
<td>Was topped at 18m with multiple stems. Has poor structure. Aerial assess for risk if retained. Large diameter tree.</td>
<td>Retain</td>
<td>7</td>
<td>7.5</td>
</tr>
<tr>
<td>Off Site 465</td>
<td>Douglas-fir</td>
<td>Pseudotsuga menziesii</td>
<td>50</td>
<td>25</td>
<td>70-79%</td>
<td>Good</td>
<td>Suitable</td>
<td>Minor deadwood in lower 1/3 of crown. This is a natural edge tree. No other mature trees exist to the south. Windfirm riparian edge tree.</td>
<td>Retain</td>
<td>5</td>
<td>5.3</td>
</tr>
<tr>
<td>Off Site 467</td>
<td>Black Cottonwood</td>
<td>Populus balsamifera ssp. trichocarpa</td>
<td>68</td>
<td>24</td>
<td>50-59%</td>
<td>Good</td>
<td>Suitable as group</td>
<td>This is a mature dominant tree with full crown. It is open grown. All trees to the south include 8-15m tall cedars. Windfirm riparian edge tree.</td>
<td>Retain</td>
<td>6</td>
<td>6.3</td>
</tr>
<tr>
<td>Off Site 468</td>
<td>Horsechestnut</td>
<td>Aesculus hippocastanum</td>
<td>20</td>
<td>11</td>
<td>80-89%</td>
<td>Fair</td>
<td>Suitable as group</td>
<td>Minor signs of drought stress. There are no other mature trees in this area.</td>
<td>Retain</td>
<td>3</td>
<td>3.1</td>
</tr>
<tr>
<td>Tag #</td>
<td>Common Name</td>
<td>Botanical Name</td>
<td>DBH (cm)</td>
<td>Ht (m)</td>
<td>Live Crown Ratio (%)</td>
<td>Overall Condition</td>
<td>Suitability</td>
<td>Comments</td>
<td>Retain/ Remove</td>
<td>Tree Protection Zone (m) from center of tree</td>
<td>Tree Protection Zone (m) from outer edge of tree</td>
</tr>
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</tr>
<tr>
<td>Off Site 469</td>
<td>Horsechestnut</td>
<td>Aesculus hippocastanum</td>
<td>32</td>
<td>13</td>
<td>80-89%</td>
<td>Fair</td>
<td>Suitable as group</td>
<td>Two similar size bigleaf maples exist to the west. Windfirm riparian edge tree.</td>
<td>Retain</td>
<td>3.2</td>
<td>3.4</td>
</tr>
<tr>
<td>Off Site 470</td>
<td>Black Cottonwood</td>
<td>Populus balsamifera ssp. trichocarpa</td>
<td>66</td>
<td>33</td>
<td>80-89%</td>
<td>Good</td>
<td>Suitable</td>
<td>This is the only mature tree between the river and edge of property. Windfirm riparian edge tree.</td>
<td>Retain</td>
<td>6</td>
<td>6.3</td>
</tr>
<tr>
<td>Off Site 473</td>
<td>Black Cottonwood</td>
<td>Populus balsamifera ssp. trichocarpa</td>
<td>140</td>
<td>28</td>
<td>70-79%</td>
<td>Fair</td>
<td>Suitable</td>
<td>Large trees with 2 co-dominant stems from base the base. The north most stem has decay in the base and has a broken top. It is however leaning towards the river and not a risk to the development site. This is the only mature tree between the river and the property. Windfirm riparian edge tree.</td>
<td>Retain</td>
<td>8</td>
<td>8.7</td>
</tr>
<tr>
<td>Off Site 8358</td>
<td>Black Cottonwood</td>
<td>Populus balsamifera ssp. trichocarpa</td>
<td>80</td>
<td>33</td>
<td>80-89%</td>
<td>Good</td>
<td>Suitable</td>
<td>Growing at the top of a steep bank. Leaning towards the river. Location not surveyed. Windfirm riparian edge tree.</td>
<td>Retain</td>
<td>7</td>
<td>7.4</td>
</tr>
<tr>
<td>Off Site 3948</td>
<td>Hornbeam</td>
<td>Carpinus Sp</td>
<td>14</td>
<td>8</td>
<td>70-79%</td>
<td>Normal</td>
<td>Suitable</td>
<td>Growing up against driveway. Minor decay in stem at base. District owned tree. Roots conflict with building envelope.</td>
<td>Remove</td>
<td>1.4</td>
<td>1.5</td>
</tr>
<tr>
<td>Off Site 3949</td>
<td>Hornbeam</td>
<td>Carpinus Sp</td>
<td>17</td>
<td>9</td>
<td>70-79%</td>
<td>Normal</td>
<td>Suitable</td>
<td>Growing up against driveway. Minor decay in stem at base. District owned tree. Roots conflict with building envelope.</td>
<td>Remove</td>
<td>1.7</td>
<td>1.8</td>
</tr>
<tr>
<td>Off Site 3950</td>
<td>Hornbeam</td>
<td>Carpinus Sp</td>
<td>17</td>
<td>9</td>
<td>70-79%</td>
<td>Normal</td>
<td>Suitable</td>
<td>Growing up against driveway. District owned tree. Roots conflict with building envelope.</td>
<td>Remove</td>
<td>1.7</td>
<td>1.8</td>
</tr>
<tr>
<td>Tag #</td>
<td>Common Name</td>
<td>Botanical Name</td>
<td>DBH (cm)</td>
<td>Ht (m)</td>
<td>Live Crown Ratio (%)</td>
<td>Overall Condition</td>
<td>Suitability</td>
<td>Comments</td>
<td>Retain/Remove</td>
<td>Tree Protection Zone (m) from center of tree</td>
<td>Tree Protection Zone (m) from outer edge of tree</td>
</tr>
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<td>--------------------------------------------------</td>
</tr>
<tr>
<td>Off Site 3951</td>
<td>Hornbeam</td>
<td>Carpinus Sp</td>
<td>19</td>
<td>9</td>
<td>70-79%</td>
<td>Normal</td>
<td>Suitable</td>
<td>Growing up against driveway. District owned tree. Roots conflict with building envelope.</td>
<td>Remove</td>
<td>1.9</td>
<td>2</td>
</tr>
<tr>
<td>Off Site 3952</td>
<td>Hornbeam</td>
<td>Carpinus Sp</td>
<td>24</td>
<td>9</td>
<td>80-89%</td>
<td>Normal</td>
<td>Suitable</td>
<td>Growing up against driveway. District owned tree. Roots conflict with building envelope.</td>
<td>Remove</td>
<td>2.4</td>
<td>2.5</td>
</tr>
<tr>
<td>Off Site 3953</td>
<td>Western Redcedar</td>
<td>Thuja plicata</td>
<td>15</td>
<td>8</td>
<td>70-79%</td>
<td>Normal</td>
<td>Suitable</td>
<td>0.5m from shed and walkway. Suppressed by adjacent trees. District owned tree. Roots conflict with building envelope.</td>
<td>Remove</td>
<td>1.5</td>
<td>1.6</td>
</tr>
<tr>
<td>Off Site 3963</td>
<td>Liquid Amber</td>
<td>Liquidambar styraciflua</td>
<td>16</td>
<td>8</td>
<td>80-89%</td>
<td>Normal</td>
<td>Suitable</td>
<td>Growing 1m from sidewalk. District owned tree.</td>
<td>Retain</td>
<td>1.6</td>
<td>1.7</td>
</tr>
<tr>
<td>Off Site 3964</td>
<td>Liquid Amber</td>
<td>Liquidambar styraciflua</td>
<td>13</td>
<td>8</td>
<td>80-89%</td>
<td>Normal</td>
<td>Suitable</td>
<td>Growing 1m from sidewalk. District owned tree.</td>
<td>Retain</td>
<td>1.3</td>
<td>1.4</td>
</tr>
<tr>
<td>Off Site 3965</td>
<td>Red Alder</td>
<td>Alnus rubra</td>
<td>21</td>
<td>10</td>
<td>50-59%</td>
<td>Poor</td>
<td>Unsuitable</td>
<td>Leaning 25 degrees over road. Minor decay in stem. Poses a hazard to the road. District owned tree.</td>
<td>Remove</td>
<td>2.1</td>
<td>2.2</td>
</tr>
<tr>
<td>Off Site 3967</td>
<td>Western Hemlock</td>
<td>Tsuga heterophylla</td>
<td>37</td>
<td>20</td>
<td>40-49%</td>
<td>Normal</td>
<td>Suitable as group</td>
<td>Suppressed by adjacent cottonwood. In riparian zone.</td>
<td>Retain</td>
<td>3.7</td>
<td>3.9</td>
</tr>
<tr>
<td>Off Site 3984</td>
<td>Black Spruce</td>
<td>Picea mariana</td>
<td>28</td>
<td>14</td>
<td>80-89%</td>
<td>Normal</td>
<td>Suitable</td>
<td>Growing in landscaped area. In riparian zone.</td>
<td>Retain</td>
<td>2.8</td>
<td>2.9</td>
</tr>
<tr>
<td>Off Site 1</td>
<td>Western Hemlock</td>
<td>Tsuga heterophylla</td>
<td>70</td>
<td>21</td>
<td>80-89%</td>
<td>Poor</td>
<td>Suitable</td>
<td>4 co-dominant stems from 4m. Off-site riparian tree. Not assessed for risk. Requires protection during construction. In riparian zone.</td>
<td>Retain</td>
<td>7</td>
<td>7.4</td>
</tr>
<tr>
<td>Tag #</td>
<td>Common Name</td>
<td>Botanical Name</td>
<td>DBH (cm)</td>
<td>Ht (m)</td>
<td>Live Crown Ratio (%)</td>
<td>Overall Condition</td>
<td>Suitability</td>
<td>Comments</td>
<td>Retain/Remove</td>
<td>Tree Protection Zone (m) from center of tree</td>
<td>Tree Protection Zone (m) from outer edge of tree</td>
</tr>
<tr>
<td>--------</td>
<td>---------------</td>
<td>---------------------------</td>
<td>----------</td>
<td>--------</td>
<td>----------------------</td>
<td>-------------------</td>
<td>-------------</td>
<td>--------------------------------------------------------------------------</td>
<td>---------------</td>
<td>---------------------------------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>Off Site 2</td>
<td>Douglas-fir</td>
<td>Pseudotsuga menziesii</td>
<td>80</td>
<td>25</td>
<td>80-89%</td>
<td>Poor</td>
<td>Suitable</td>
<td>3 co-dominant stems from 4m. Off-site riparian tree. Not assessed for risk. Requires protection during construction. In riparian zone.</td>
<td>Retain</td>
<td>7</td>
<td>7.4</td>
</tr>
</tbody>
</table>


3.0 Summary

The site inventory identified 34 trees on the subject site that are greater than 10cm in diameter. 23 of these trees are protected under the Districts Bylaw. Most of these are within the riparian setback area of Capilano River. 19 of the on-site trees are proposed to be removed for the development. 9 of these trees to be removed are protected under the Districts Bylaw.

There are 20 trees identified on adjacent properties that have rooting zones that extend into the development site. 7 of these trees are on District owned land to the east of the development and requested to be removed.

3.1 Tree Retention and Removal by Species

Table 2. Tree species on site summary

<table>
<thead>
<tr>
<th>Tree Species</th>
<th>Total Number of Trees</th>
<th>Total Retained</th>
<th>Total Removed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Western white pine</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Western Redcedar</td>
<td>15</td>
<td>4</td>
<td>11</td>
</tr>
<tr>
<td>Western Hemlock</td>
<td>4</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Sitka Spruce</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shorepine</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Douglas-fir</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Cypress</td>
<td>7</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Bigtooth aspen</td>
<td>2</td>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Amabilis fir</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>34</strong></td>
<td><strong>15</strong></td>
<td><strong>20</strong></td>
</tr>
</tbody>
</table>

Table 3. Tree species off site summary

<table>
<thead>
<tr>
<th>Tree Species</th>
<th>Total Number of Trees</th>
<th>Total Retained</th>
<th>Total Removed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red alder</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Western Redcedar</td>
<td>1</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Western Hemlock</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Liquid Amber</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Horsechestnut</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Hornbeam</td>
<td>5</td>
<td></td>
<td>5</td>
</tr>
<tr>
<td>Douglas-fir</td>
<td>2</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Black spuce</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Black cottonwood</td>
<td>4</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>20</strong></td>
<td><strong>13</strong></td>
<td><strong>7</strong></td>
</tr>
</tbody>
</table>
4.0 Trees on Adjacent Properties

20 trees found growing on the adjacent properties are included in the inventory and retention plan. Most are on District owned land to the east and north of the development. 5 trees along the eastern boundary are requested to be removed as they conflict with the proposed building envelope. The remaining trees require root protection where the root protection zone (RPZ) extends onto the development site. Root protection zones for the trees have provided within Table 1 Tree Inventory.

4.0 Trees on Adjacent Properties

Total number of replacement trees will be determined by the District. Typically replacement trees for the removal of large diameter trees (over 75cm) are required if the subject lot will have less than 20% canopy cover remaining after the removal of the large diameter trees. It is expected that replacement trees will be required for this site.

5.0 Construction Guidelines

The following are recommendations for risk mitigation and proper tree protection during the construction phase of the project.

Tree Retention Zones

Six times the diameter was used to determine the optimal root protection zone (RPZ). The optimal root protection zone is to be measured in the field from the outer edge of the stem of the tree. The RPZ is the area around the tree in which no grading or construction activity may occur without project arborist approval, and is required for the tree to retain good health and vigor.

The following are tree preservation guidelines and standards for the RPZs:

- No soil disturbance or stripping;
- The natural grade shall be maintained within the protection zone;
- No storage, dumping of materials, parking, underground utilities or fires;
- Any plan affecting trees should be reviewed by a consultant including demolition, erosion control, improvement, utility, drainage, grading, landscape, and irrigation;
- Special foundations, footings and paving designs are required if within the tree protection zone;
- Utilities should be routed around the RPZ;
- Excavation within the tree protection zone should be supervised by a consulting arborist;
- Surface drainage should not be altered so as to direct water into or out of the RPZ; and
- Site drainage improvements should be designed to maintain the natural water table levels within the RPZ.
Respecting these guidelines will prevent changes to the soil and rooting conditions, wounding of the trees and contamination due to spills and waste. Any plans for work or activities within the RPZ that are contrary to these guidelines should be discussed with the project arborist so that mitigation measures can be implemented.

Tree Protection Fences
Prior to any construction activity on site, tree protection fences must be constructed at the specified distance from the tree trunks. The protection barrier or temporary fencing must be at least 1.2 m in height and constructed of 2 by 4 lumber with orange plastic mesh screening. This must be constructed prior to tree removal, excavation or construction and remain intact throughout the entire period of construction. Further standards for fencing construction can be found at:

http://www.dnv.org/upload/pcdocsdocuments/16kw01l.pdf

Unsurveyed Trees
Trees that are identified by DHC on the Tree Retention Plan, and within this report as unsurveyed trees have been hand plotted for approximate location only. Their location and ownership cannot be confirmed without being surveyed. The property owner or project developer must ensure that all relevant on and off site trees are surveyed by a legally registered surveyor, whether they are identified by DHC or not.

Removal of logs from sites
Private timber marks are required for the transporting logs from private-owned land in the province of BC. It is the owner of the properties responsibility to apply for a timber mark prior to the removal of any merchantable timber from the site. Additional information can be found at:

http://www.for.gov.bc.ca/hth/private-timber-marks.htm

Regulation of Soil Moisture and Drainage
The excavation and construction activities adjacent to the RPZs can influence the moisture availability to the subject trees. This is due to a reduction in the total rooting mass, changes in drainage conditions and changes in exposure including reflected heat from adjacent hard surfaces. To mitigate these concerns the following guidelines should be followed:

- Soil moisture conditions within the tree protection zones should be monitored during hot and dry weather. When soil moisture conditions are dry, supplemental irrigation should be provided. Irrigation should wet the soil to the depth of the root system (approximately 30 cm deep).
- Any planned changes to the surface grades within the RPZ, including the placement of mulch, should be designed so that the water will flow away from the tree trunks.
- Excavation adjacent to trees can alter the soils hydrological processes by draining the water faster than it had naturally. It is recommended that when excavating within 6 m of any tree, the site be irrigated more frequently to account for this.
Tree Pruning

All heavy machinery (excavators, cranes, dump trucks, etc.) working within five meters of tree crowns should be made aware of their proximity to the tree. If there is to be a sustained period of machinery working within five meters of the tree crowns, a line with colored flags should be suspended at the height of the crowns along the length of the protected tree area. If there are concerns regarding the clearance required for machinery and workers within the tree protection zone, or just outside of it, the project arborist should be consulted so that a pruning prescription can be developed or a zone surrounding the crowns can be established. Any wounds incurred to the subject trees during construction should be reported to the project arborist immediately.

Fertilization

Fertilization and root zone enhancements may be recommended by the project arborist in any phase of the project if they deem it necessary to provide the best chance of tree survival.

Paving Within and Adjacent to Tree Protection Zones

If the development plans propose the construction of paved areas and/or retaining walls close to the proposed tree protection zones measures should be taken to minimize impacts. Construction of these features would raise concerns regarding proper aeration, drainage, irrigation and opportunities for adequate root growth. The following design and construction guidelines are recommended be followed to minimize the long-term impacts to trees if any paving or retaining walls are necessary:

- Any excavation activities near the TPZ (tree protection zone) should be monitored by a Certified Arborist. Excavation should remove and disturb as little of the rooting zone as possible and all roots greater than 2 cm in diameter should be hand pruned.
- The natural grade of the rooting zone should be maintained. Any retaining walls should be designed at heights that will maintain the existing grade to within 20 cm of its current level. If the grade is altered, it should be raised not reduced in height.
- The long-term health of the tree is directly dependent on the volume of available, below ground growing space. If the RPZ must be compromised, the planned distance of structures from the trunks of the subject trees should not be closer than 50% of the RPZ on more than two sides of the tree.
- Compaction of sub grade materials can cause the trees to develop shallow rooting systems. This can contribute to long-term damage to pavement surfaces as the roots grow. Minimizing the compaction of sub grade materials using structural soils and increasing the strength of the pavement reduces the reliance on sub grade for strength.
- If it is not possible to minimize the compaction of sub grade materials, subsurface barriers should be considered to help direct roots downward into the soil and prevent them from growing directly under the paved surfaces.
Plantings Within the TPZs

If there are plans to landscape the ground within the TPZ, measures should be taken to minimize impacts. It is not recommended that the existing grass layer be stripped, as this will damage the surface roots. The grass layer should be covered with mulch at the start of the project, which will gradually kill the grass while moderating soil moisture and temperatures. Topsoil should be mixed with the mulch prior to planting of shrubs; however the depth of this new topsoil layer should not exceed 20 cm. Planting should take place within the newly placed topsoil mixture and should not disturb the original rooting zone of the trees. Two meters around the base of each tree should be left unplanted and covered in mulch.

Monitoring During Construction

Ongoing monitoring should be provided for the duration of the project. Site visits should be more frequent during activities that are higher risk, including the first stages of construction when excavation occurs adjacent to the trees. Site visits will ensure contractors are respecting the recommended tree protection measures and will allow the arborist to identify any new concerns that may arise.

During each site visit the following measures will be assessed and reported on:

- The integrity of the Tree Protection Zone and fencing;
- Changes to TPZ limits including: overall maintenance, parking on roots, and storing or dumping of materials within TPZ. If failure to maintain and respect TPZ is observed, suggestions will be made to ensure tree protection measures are upheld;
- Review and confirmation of recommended tree maintenance including root pruning, irrigation, mulching and branch pruning;
- Health and condition of each tree;
- Damage to trees that may have resulted from construction activities will be noted, as will the health of branches, trunks and roots of protected trees. Recommendations for remediation will follow;
- Changes to soil moisture levels and drainage patterns; and
- Factors that may be detrimentally impact the trees.

All findings and recommendations will be documented in a summary report. All concerns will be highlighted along with recommended mitigation measures.
6.0 Limitations

1. Except as expressly set out in this report and in these Assumptions and Limiting Conditions, Diamond Head Consulting Ltd. ("Diamond Head") makes no guarantee, representation or warranty (express or implied) with regard to: this report; the findings, conclusions and recommendations contained herein; or the work referred to herein.

2. This report has been prepared, and the work undertaken in connection herewith has been conducted, by Diamond Head for the "Client" as stated in the report above. It is intended for the sole and exclusive use by the Client for the purpose(s) set out in this report. Any use of, reliance on or decisions made based on this report by any person other than the Client, or by the Client for any purpose other than the purpose(s) set out in this report, is the sole responsibility of, and at the sole risk of, such other person or the Client, as the case may be. Diamond Head accepts no liability or responsibility whatsoever for any losses, expenses, damages, fines, penalties or other harm (including without limitation financial or consequential effects on transactions or property values, and economic loss) that may be suffered or incurred by any person as a result of the use of or reliance on this report or the work referred to herein. The copying, distribution or publication of this report (except for the internal use of the Client) without the express written permission of Diamond Head (which consent may be withheld in Diamond Head’s sole discretion) is prohibited. Diamond Head retains ownership of this report and all documents related thereto both generally and as instruments of professional service.

3. The findings, conclusions and recommendations made in this report reflect Diamond Head’s best professional judgment in light of the information available at the time of preparation. This report has been prepared in a manner consistent with the level of care and skill normally exercised by arborists currently practicing under similar conditions in a similar geographic area and for specific application to the trees subject to this report as at the date of this report. Except as expressly stated in this report, the findings, conclusions and recommendations set out in this report are valid for the day on which the assessment leading to such findings, conclusions and recommendations was conducted. If generally accepted assessment techniques or prevailing professional standards and best practices change at a future date, modifications to the findings, conclusions, and recommendations in this report may be necessary. Diamond Head expressly excludes any duty to provide any such modification if generally accepted assessment techniques and prevailing professional standards and best practices change.

4. Conditions affecting the trees subject to this report (the “Conditions”, including without limitation structural defects, scars, decay, fungal fruiting bodies, evidence of insect attack, discoloured foliage, condition of root structures, the degree and direction of lean, the general condition of the tree(s) and the surrounding site, and the proximity of property and people) other than those expressly addressed in this report may exist. Unless otherwise stated: information contained in this report
covers only those Conditions and trees at the time of inspection; and the inspection is limited to visual examination of such Conditions and trees without dissection, excavation, probing or coring. While every effort has been made to ensure that the trees recommended for retention are both healthy and safe, no guarantees, representations or warranties are made (express or implied) that those trees will remain standing or will not fail. The Client acknowledges that it is both professionally and practically impossible to predict with absolute certainty the behaviour of any single tree, or groups of trees, in all given circumstances. Inevitably, a standing tree will always pose some risk. Most trees have the potential for failure and this risk can only be eliminated if the risk is removed. If Conditions change or if additional information becomes available at a future date, modifications to the findings, conclusions, and recommendations in this report may be necessary. Diamond Head expressly excludes any duty to provide any such modification of Conditions change or additional information becomes available.

5. Nothing in this report is intended to constitute or provide a legal opinion, and Diamond Head expressly disclaims any responsibility for matters legal in nature (including, without limitation, matters relating to title and ownership of real or personal property and matters relating to cultural and heritage values). Diamond Head makes no guarantee, representation or warranty (express or implied) as to the requirements of or compliance with applicable laws, rules, regulations, or policies established by federal, provincial, local government or First Nations bodies (collectively, “Government Bodies”) or as to the availability of licenses, permits or authorizations of any Government Body. Revisions to any regulatory standards (including by-laws, policies, guidelines an any similar directions of a Government Bodies in effect from time to time) referred to in this report may be expected over time. As a result, modifications to the findings, conclusions and recommendations in this report may be necessary. Diamond Head expressly excludes any duty to provide any such modification if any such regulatory standard is revised.

6. Diamond Head shall not be required to give testimony or to attend court by reason of this report unless subsequent contractual arrangements are made, including payment of an additional fee for such services as described in the fee schedule and contract of engagement.

7. In preparing this report, Diamond Head has relied in good faith on information provided by certain persons, Government Bodies, government registries and agents and representatives of each of the foregoing, and Diamond Head assumes that such information is true, correct and accurate in all material respects. Diamond Head accepts no responsibility for any deficiency, misinterpretations or fraudulent acts of or information provided by such persons, bodies, registries, agents and representatives.

8. Sketches, diagrams, graphs, and photographs in this report, being intended as visual aids, are not necessarily to scale and should not be construed as engineering or architectural reports or surveys.

9. Loss or alteration of any part of this report invalidates the entire report.
# Appendix 1 – Overall risk rating and action thresholds

<table>
<thead>
<tr>
<th>Risk Rating</th>
<th>Risk Category</th>
<th>Interpretation and Implications</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>Low 1</td>
<td>Insignificant - no concern at all.</td>
</tr>
<tr>
<td>4</td>
<td>Low 2</td>
<td>Insignificant - very minor issues.</td>
</tr>
<tr>
<td>5</td>
<td>Low 3</td>
<td>Insignificant - minor issues not of concern for many years yet.</td>
</tr>
<tr>
<td>6</td>
<td>Moderate 1</td>
<td>Some issues but nothing that is likely to cause any problems for another 10 years or more.</td>
</tr>
<tr>
<td>7</td>
<td>Moderate 2</td>
<td>Well defined issues - retain and monitor. Not expected to be a problem for at least another 5 - 10 years.</td>
</tr>
<tr>
<td>8</td>
<td>Moderate 3</td>
<td>Well defined issues - retain and monitor. Not expected to be a problem for at least another 1 - 5 years.</td>
</tr>
<tr>
<td>9</td>
<td>High 1</td>
<td>The assessed issues have now become very clear. The tree can still reasonably be retained as it is not likely to fall apart right away, but it must now be monitored annually. At this stage it may be reasonable for the risk manager/owner to hold public education sessions to inform people of the issues and prepare them for the reality that part or the entire tree has to be removed.</td>
</tr>
<tr>
<td>10</td>
<td>High 2</td>
<td>The assessed issues have now become very clear. The probability of failure is now getting serious, or the target rating and/or site context have changed such that mitigation measures should now be on a schedule with a clearly defined timeline for action. There may still be time to inform the public of the work being planned, but there is not enough time to protracted discussion about whether or not there are alternative options available.</td>
</tr>
<tr>
<td>11</td>
<td>High 3</td>
<td>The tree, or a part of it has reached a stage where it could fail at any time. <strong>Action to mitigate the risk is required within weeks rather than months.</strong> By this stage there is not time to hold public meetings to discuss the issue. Risk reduction is a clearly defined issue and although the owner may wish to inform the public of the planned work, he/she should get on with it to avoid clearly foreseeable liabilities.</td>
</tr>
<tr>
<td>12</td>
<td>Extreme</td>
<td>This tree, or a part of it, is in the process of failing. <strong>Immediate action is required.</strong> All other, less significant tree work should be suspended, and roads or work areas should be closed off, until the risk issues have been mitigated. This might be as simple as removing the critical part, drastically reducing overall tree height, or taking the tree down and cordonning off the area until final clean up, or complete removal can be accomplished. The immediate action required is to ensure that the clearly identified risk of harm is eliminated. For areas hit by severe storms, where many extreme risk trees can occur, drastic pruning and/or partial tree removals, followed by barriers to contain traffic, would be an acceptable first stage of risk reduction. There is no time to inform people or worry about public concern. Clearly defined safety issues preclude further discussion.</td>
</tr>
</tbody>
</table>

The Table shown above outlines the interpretation and implications of the risk ratings and associated risk categories. This table is provided to inform the reader about these risk categories so that they can better understand any risk abatement recommendations made in the risk assessment report.
8.0 Appendix A - Requirement for Tree Protection Barrier as per Tree-Protection Bylaw 7671

8. A person performing work on lands containing one or more retained trees shall:

   a) install a tree protection barrier around any retained tree or group of retained trees at the drip line of the outermost tree, the outside boundary of the critical root zone of the outermost tree, or 5 metres from the stem of the outermost tree, whichever is greatest;

   b) ensure that such tree protection barrier is constructed of chain link or plywood fastened to solid wood or equivalent framing with railings along the tops, sides and bottom, or is constructed of materials otherwise satisfactory to the Environmental Protection Officer;

   c) display signage indicating that the area within the tree protection barrier is a “protection zone,” and stating that no encroachment, storage of materials or damage to trees is permitted within the “protection zone;”

   d) arrange for inspection by the Environmental Protection Officer before any work commences, and refrain from commencing work until the Environmental Protection Officer has approved the tree protection barrier; and

   e) ensure that the tree protection barrier remains in place until written approval of its removal is received from the Environmental Protection Officer.

9. No work is permitted within the “protection zone” referred to in section 11(c) except in accordance with plans and procedures authorized by a tree permit.
Windfirm Boundary Assessment for Riparian Areas Setback

1946-1998 Glenaire Dr
North Vancouver, BC

June 21, 2016

Submitted to:

Envirowest Consultants Inc.
Suite 101 – 1515 Broadway Street
Port Coquitlam BC
V3C 6M2

Submitted by:

DIAMOND HEAD CONSULTING LTD.

342 West 8th Avenue
Vancouver, BC
V5Y 3X2
Introduction

Diamond Head Consulting Ltd. (DHC) was retained by Envirowest Consultants Inc. to provide a windfirm boundary assessment of the riparian corridor adjacent to 1946-1998 Glenaire Dr. North Vancouver, BC. This riparian corridor encompasses the proposed Streamside Protection and Enhancement Areas (SPEA) for Capilano River.

A site visit was completed on Aug 27, 2015 to assess the condition of trees on site. The objective of establishing a windfirm boundary is to protect existing trees within the designated SPEA. This responds to Department of Fisheries and Oceans (DFO) concerns and helps ensure that the ecological integrity (water quality, fish habitat and associated riparian values) of the SPEA will be maintained over the long-term.

The proposed SPEA setback 15m from the top of bank of Capilano River. The most stable treed boundary has been recommended. The objective of identifying this windfirm line was to ensure that the trees growing within the proposed SPEA are protected and will not blow down. Individual trees that make up this boundary were inventoried. Trees were tagged and characteristics recorded. All identified trees have been surveyed.

Figure 1 – Project location illustrated in red
1 Establishing a Windfirm Boundary

The site consists of five residential lots. The proposed development includes townhouses. Capliano River runs along the north edge of the development site. The majority of trees have been cleared from the existing lots. There is an open band of mature trees that is currently growing from the north property lines down to the high water mark of the River. Tree species found in this area include a mix of native and non-native species. The largest trees include native black cottonwood (*Populus trichocarpa*). Other native species found in this area include western redcedar (*Thuja plicata*), bigleaf maple (*Acer macrophyllum*), red alder (*Alnus rubra*) and Douglas-fir (*Pseudotsuga menziesii*). There are a number of non-native trees species within the assessment area including Horse chestnut (*Aesculus hippocastanum*).

Along the assessment area, most mature trees have been cleared from the existing lots. The windfirm boundary that has been identified includes those mature trees that are growing along the backs of these lots. In general this treed riparian zone is narrow, sometimes being only one mature tree wide. These trees have adapted to growing in their current condition. However due to the narrow nature of this stand and the predominance of black cottonwood (not inherently a structural stable species) this edge is expected to be *Moderately* windfirm. A description of this risk rating is provided as follows:

**Moderate**: The trees to be exposed are generally expected to be windfirm, however there is a risk of windthrow during unusually high wind events. The failure potential of some of the exposed trees is possible during wind events that reach speeds of greater than 40 km/hr.

The following table is an inventory of trees that will form the new stand edge. No hazard trees were identified during the assessment that must be removed. In addition to the windfirm trees identified in this report, it was noted that there are two mature trees growing close to the property line at the north west corner of the site. These were not assessed as they are on private property but should be considered and protect during planning and construction.
## Table 1 Tree inventory of windfirm trees

<table>
<thead>
<tr>
<th>Tag #</th>
<th>Common Name</th>
<th>Botanical Name</th>
<th>DBH (cm)</th>
<th>Ht (m)</th>
<th>Live Crown Ratio (%)</th>
<th>Overall Condition</th>
<th>Comments</th>
<th>Retain/Remove</th>
<th>Tree Protection Zone (m) from center of tree</th>
<th>Tree Protection Zone (m) from outer edge of tree</th>
</tr>
</thead>
<tbody>
<tr>
<td>465</td>
<td>Douglas-fir</td>
<td>Pseudotsuga menziesii</td>
<td>50</td>
<td>25</td>
<td>70-79%</td>
<td>Good</td>
<td>Minor deadwood in lower 1/3 of crown. This is a natural edge tree. No other mature trees exist to the south.</td>
<td>Retain</td>
<td>5</td>
<td>5.3</td>
</tr>
<tr>
<td>466</td>
<td>Western Hemlock</td>
<td>Tsuga heterophylla</td>
<td>51</td>
<td>20</td>
<td>80-89%</td>
<td>Good</td>
<td>Full crown. Open grown. This is a natural edge tree. No other mature trees exist to the south.</td>
<td>Retain</td>
<td>5.1</td>
<td>5.3</td>
</tr>
<tr>
<td>467</td>
<td>Black Cottonwood</td>
<td>Populus balsamifera ssp. trichocarpa</td>
<td>68</td>
<td>24</td>
<td>50-59%</td>
<td>Good</td>
<td>This is a mature dominant tree with full crown. It is open grown. All trees to the south include 8-15m tall cedars.</td>
<td>Retain</td>
<td>6</td>
<td>6.3</td>
</tr>
<tr>
<td>468</td>
<td>Horsechestnut</td>
<td>Aesculus hippocastanum</td>
<td>20</td>
<td>11</td>
<td>80-89%</td>
<td>Fair</td>
<td>Minor signs of drought stress. There are no other mature trees in this area. Two similar size bigleaf maples exist to the west.</td>
<td>Retain</td>
<td>3</td>
<td>3.1</td>
</tr>
<tr>
<td>469</td>
<td>Horsechestnut</td>
<td>Aesculus hippocastanum</td>
<td>32</td>
<td>13</td>
<td>80-89%</td>
<td>Fair</td>
<td>Minor signs of drought stress. There are no other mature trees in this area. This is the only tree between the river and edge of property.</td>
<td>Retain</td>
<td>3.2</td>
<td>3.4</td>
</tr>
<tr>
<td>470</td>
<td>Black Cottonwood</td>
<td>Populus balsamifera ssp. trichocarpa</td>
<td>66</td>
<td>33</td>
<td>80-89%</td>
<td>Good</td>
<td>This is the only mature tree between the river and edge of property.</td>
<td>Retain</td>
<td>6</td>
<td>6.3</td>
</tr>
<tr>
<td>471</td>
<td>Western White Pine</td>
<td>Pinus monticola</td>
<td>34</td>
<td>22</td>
<td>70-79%</td>
<td>Good</td>
<td>Inside active yard space. The only other mature trees north of this include two cottonwoods along the high water mark of the river.</td>
<td>Retain</td>
<td>3.4</td>
<td>3.6</td>
</tr>
<tr>
<td>472</td>
<td>Western Redcedar</td>
<td>Thuja plicata</td>
<td>69</td>
<td>21</td>
<td>70-79%</td>
<td>Good</td>
<td>Inside active yard space. A tree house has been built around the base of this tree. However it has caused no major damage and can be removed. There are no other mature trees to the south.</td>
<td>Retain</td>
<td>6</td>
<td>6.4</td>
</tr>
<tr>
<td>473</td>
<td>Black Cottonwood</td>
<td>Populus balsamifera ssp. trichocarpa</td>
<td>140</td>
<td>28</td>
<td>70-79%</td>
<td>Fair</td>
<td>Large trees with 2 co-dominant stems from base the base. The north most stem has decay in the base and has a broken top. It is hwoever leaning towards the river and not a risk to the development site. This is the only mature tree between the river and the property.</td>
<td>Retain</td>
<td>8</td>
<td>8.7</td>
</tr>
<tr>
<td>Tag #</td>
<td>Common Name</td>
<td>Botanical Name</td>
<td>DBH (cm)</td>
<td>Ht (m)</td>
<td>Live Crown Ratio (%)</td>
<td>Overall Condition</td>
<td>Comments</td>
<td>Retain/Remove</td>
<td>Tree Protection Zone (m) from center of tree</td>
<td>Tree Protection Zone (m) from outer edge of tree</td>
</tr>
<tr>
<td>-------</td>
<td>------------------</td>
<td>-----------------------------------</td>
<td>----------</td>
<td>--------</td>
<td>----------------------</td>
<td>-------------------</td>
<td>---------------------------------------------------------------------------</td>
<td>---------------</td>
<td>---------------------------------------------</td>
<td>-----------------------------------------------</td>
</tr>
<tr>
<td>8358</td>
<td>Black Cottonwood</td>
<td>Populus balsamifera ssp. trichocarpa</td>
<td>80</td>
<td>33</td>
<td>80-89%</td>
<td>Good</td>
<td>Growing at the top of a steep bank. Leaning towards the river. Location not surveyed.</td>
<td>Retain</td>
<td>7</td>
<td>7.4</td>
</tr>
<tr>
<td>3985</td>
<td>Lodgepole Pine</td>
<td>Pinus contorta</td>
<td>33</td>
<td>9</td>
<td>70-79%</td>
<td>Good</td>
<td>Growing in landscaped bed in back yard. Visually assessed from property line. Location not surveyed.</td>
<td>Retain</td>
<td>3.3</td>
<td>3.5</td>
</tr>
<tr>
<td>3983</td>
<td>Balsam</td>
<td>Abies sp</td>
<td>27</td>
<td>9</td>
<td>80-89%</td>
<td>Good</td>
<td>Growing in landscaped bed in back yard. Visually assessed from property line. Location not surveyed.</td>
<td>Retain</td>
<td>2.7</td>
<td>2.8</td>
</tr>
<tr>
<td>3984</td>
<td>Spruce</td>
<td>Picea sp</td>
<td>28</td>
<td>14</td>
<td>80-89%</td>
<td>Good</td>
<td>Growing in landscaped bed in back yard. Visually assessed from property line. Location not surveyed.</td>
<td>Retain</td>
<td>2.8</td>
<td>2.9</td>
</tr>
</tbody>
</table>
Photo 1. View north over existing residences at mature trees growing adjacent to the backs of the lots.

Photo 2. View north from 1998 at trees 466 and 465.

Photo 3. View of mature cottonwood trees that are dominant along the river edge.
Photo 4. View of tree 470 which is the only dominant trees between the river and the property.

Photo 5. View of tree 468 showing signs of drought stress.

Photo 6. View of riparian buffer from the river.
Prior to construction all trees to be protected in Table 1 and their required root protection zones should be marked on the ground. The following tree protection measures should be considered during the construction process:

- All trees that have root protection zones that extend beyond the SPEA should be protected. A permanent tree protection zone should be established at or greater to the distances specified in Table 1. This should be installed as soon as tree cutting is completed. Within this tree protection zone, no work activities or disturbance is permitted;
- It is recommended that a tree protection covenant be placed on the root protection zones to ensure that they are protected after the lot ownership has been transferred; Any future works within these zones should be done in a way that does not impact the trees roots;
- Excavation that takes place within 6 meters of the base of any trees to be protected should be done carefully to ensure that roots are not ripped back toward the trees. A certified arborist should be on site to monitor the excavation if work is to be taken place within this zone. As soon as roots that are greater than 5cm in diameter are encountered, the remaining areas around the roots should be excavated with hand tools and the roots pruned off clean;
- Excavation and construction activities adjacent to SPEAs and trail corridors can influence the moisture availability to subject trees. Soil moisture conditions within the tree protection zones should be monitored during hot and dry weather. When soil moisture conditions are dry, supplemental irrigation should be provided; and
- If there are concerns regarding the clearance required for machinery and workers within the tree protection zone or just outside it, the project arborist should be consulted so that a pruning prescription can be developed or a zone surrounding the crowns can be established. All heavy machinery working adjacent to the trees (excavators, cranes, dump trucks, etc.) operating machinery within five meters of the crowns of these trees should be made aware of the proximity of these trees to their activities. If there is to be a sustained period of machinery working within five meters of the crowns of these trees a line with coloured flags should be suspended at the height of the crowns along the length of the protected trees.

If there are any questions or concerns as to the contents of this report, please contact us at any time

Sincerely,

Mike Coulthard RPF (#3772) RPBio (#1338)
604-733-4886
6 Limitations:

The assessments of the trees discussed in this correspondence have been made using acceptable arboricultural techniques. These include a visual tree assessment of the trees discussed for structural defects, scars, external indications of decay such as fungal fruiting bodies, evidence of insect attack, discoloured foliage, the condition of any visible root structures, the degree and direction of lean (if any), the general condition of the tree(s), the surrounding site and the proximity of property and people. Except where specifically noted in this correspondence, none of the trees examined were dissected, cored, probed, or climbed, and detailed root crown examinations were not undertaken.

Notwithstanding the recommendations and conclusions made in this correspondence, it must be realized that trees are living organisms, and their health and vigour constantly changes over time. They are not immune to changes in site conditions, or seasonal variations in the weather.

While reasonable efforts have been made to ensure that the trees recommended for retention are healthy, no guarantees are offered, or implied, that the trees recommended for retention are healthy, no guarantees are offered or implied, that these trees, or all parts of them, will remain standing. It is both professionally and practically impossible to predict with absolute certainty the behaviour of any single tree - or group of trees-, or all their component parts, in all given circumstances. Inevitably, a standing tree will always pose some risk. Most trees have the potential for failure in the event of adverse weather conditions, and this risk can only be eliminated if the tree is removed.

Although every effort has been made to ensure that this assessment is reasonably accurate, the trees should be re-assessed periodically. In accordance with standard practice, the assessment presented in this correspondence is valid at the time it was undertaken.

Approval and implementation of any recommendations made within this correspondence is the responsibility of the owner of the trees, and in no way implies any inspection or supervisory role on the part of Diamond Head Consulting Ltd. unless we have specifically been requested to examine said implementation activities, and have been able to do so. In the event that inspection or supervision of all or part of the implementation plan is requested, said request shall be in writing and the details agreed to in writing by both parties. Any on site inspection or supervisory work undertaken by Diamond Head Consulting Ltd. shall be restricted to the items requested, and shall be recorded in written form and submitted to the client as a matter of record.

Sketches, diagrams and photographs contained in this report, being intended as visual aids, should not be construed as engineering reports or legal surveys. If a tree prescribed for removal is not situated wholly on the owners’ property, then permission from the additional owner(s) must be obtained before treatment is undertaken.
ATTACHMENT H
Floodplain Assessment
PC Urban
Suite 800-1090 West Georgia
Vancouver, B.C.
V6E 5V7

Attention: Robert Cadez

May 24th, 2016
File: 13398

Re: Flood Hazard Assessment: Proposed Residential Development
1946-1998 Glenaire Drive, North Vancouver, B.C.

As requested GeoPacific Consultants reviewed the site and available hydrological and hydraulic studies, including the Flood Assessment Study of North Vancouver provided by Northwest Hydraulic Consultants dated March 31, 2010 and Hydrological Assessment - Norgate, Lower Capilano and Lions Gate Areas provided by Piteau Associates dated July 4th, 2012. The following summarizes the review and recommendations.

The site is an irregular polygon in shape and consists of 5 contiguous single family properties. The site is bounded by Glenaire Drive to the south, Fullerton Avenue to the east, existing single story residential developments with surrounding vegetated areas to the west, and the Capilano River to the north.

Based on the hydraulic study the 200-year flood elevation is contained within the channel boundaries. The flood data grid downstream of the Woodcroft Bridge indicates that for the 200-year flood during high tide event the flood elevation estimated to be at 13.79 m (GSC) therefore the water will be 2.7 m below the north-east corner of the site. The river bank to the south is protected with rip rap. Based on our review of the flood elevation in relation to the proposed development site, we do not anticipate any deep-seated slope stability issues due to the relatively high strength and permeability of the in situ soils.

Based on our experience in this area the static groundwater is expected to be at a depth of approximately 5.7 m from the ground elevation (elevation of 10.8m). We anticipate short term increases in the groundwater level during the flood events due to high porosity of the ground. Based on the data recorded at groundwater monitoring wells in the area, located about 50 m and 215 m from the Capilano River and the approximate rainfall intensity of 4.2 mm/hr for 24 hours recorded on Nov 7th, 2015, we expect the groundwater at this site rise up to elevation of 13.1 m and 13.6 m for 10 years and 200 years flood event, respectively. The current site grades is ranging between 16.5 m and 14.9 m, therefore, expected groundwater during the flood events is manageable using a suitable waterproofing and drainage system around the expected one level of basement. This must be confirmed once the design drawings are available.
We trust that this is adequate for your present needs. Should you require additional information of clarification of the above, please feel free to contact the undersigned.

For:
GeoPacific Consultants Ltd.

Reviewed by:

Farshid Bateni, Ph.D, EIT.
Geotechnical Engineer in Training

Matt Kokan, M.A.Sc., P.Eng.
Principal

MAY 24 2016
200-year flood with 2-year tide and surge level (2.09 m GSC)

200-year flood with 200-year tide and surge level (2.88 m GSC)

Figure 4

NORTH VANCOUVER FLOOD ASSESSMENT

Capilano River Flood Depths

Scale - 1:10,000

coord. sys.: UTM Zone 10  horiz. datum: NAD 83  horiz. units: metres
northwest hydraulic consultants  project no. 3-5322  31-March-2010
29 - June - 2016

District of North Vancouver
355 West Queens Road
North Vancouver, BC
V7N 4N5

Attn: Planning Department
RE: Glenaire to meet Sustainability Guidelines

PC Urban has retained E3 Eco Group as the sustainability consultant to review the energy, resource, and environmental efficiency of its Glenaire townhome development at 1946-1998 Glenaire Drive in the District of North Vancouver. The intention is to ensure that the townhomes will achieve Energuide 80 and be equivalent to BuiltGreen™ Gold on the 2011 Checklist.

The BuiltGreen™ Gold level requires a minimum of 100 points from the Checklist as well as the completion of an Energuide Rating on each home.

In order to provide the verification, E3 Eco Group will perform the following:

1) Complete computer modeling of each of the unique plan type to be built.

2) Consult with PC Urban regarding the Checklist items to ensure that at least 100 points are achievable. Throughout construction E3 will perform site visits and review documentation to ensure all points are incorporated.

3) Provide an Energuide Rating, including air-leakage testing, on each of the townhomes built in the development. Final Energuide files will be submitted to Natural Resources Canada for Energuide Certification.

The completion of the above steps will allow all homes in the development to be equivalent to the Built Green™ Gold level and achieve an Energuide Rating of 80.

If you have any questions please contact the undersigned,

Kind Regards,

Emma Conway, B.A., CEA
Project Manager E3 Eco Group Inc
604-874-3715
emma@e3ecogroup.com
I. OPERATIONAL SYSTEMS
This section awards points for construction methods and types of products that contribute toward lower energy consumption, as well as alternative heating and electrical systems.
Minimum 10 Points Required

1-1 Install a zoned heating system. Either, from a single HVAC source utilizing two or more, programable, thermostatically controlled zones or zoning separate systems through separate programable thermostats. (2 Zones = 2 points, 3 = points, 4 = points)

Efficiency can be significantly improved by only heating or cooling when occupants are present and by only heating/cooling to the exact desired temperature. Different desired temperatures can be set in each room or space and an individual zone can be turned off when not occupied. This type of system results in a dramatic reduction of energy consumption and operating costs.

1-2 Install high efficiency, sealed combustion heating appliance, with a minimum 94% AFUE (2 points) or 95% AFUE and above (3 points).

(Not for electric heat.) High efficiency furnaces or boilers, such as condensing systems, reduce energy consumption and consequently fossil fuel reliance. Because AFUE takes into account efficiency losses during start-up and cool down it's rating is slightly lower.

1-3 Install ground or water source heat pumps (10 points) or air source heat pumps (6 points) for heating and cooling.

Heat pumps can significantly reduce primary energy use for building heating and cooling. The renewable component displaces the need for primary fuels, which, when burned, produce greenhouse gases and contribute to global warming. Please Note: Cool climate heat pump systems are often more efficient due to the costs of electricity. However, cold climate heat pump systems are often not as efficient as typical boiler/furnace natural gas systems.

1-4 Programmable thermostat with dual set back & continuous fan setting.

A set back thermostat regulates the heating/cooling system to provide optimum comfort when the house is occupied and to conserve energy when it is not.

1-5 Install HVAC appliance with variable speed fan (ECM).

A variable speed fan motor (ECM or DC powered) is designed to vary its speed based on the homes heating and air conditioning requirements. Working in conjunction with the thermostat, it keeps the appropriate air temperature circulating through the home, reducing temperature variances in the home. It also provides greater air circulation and filtration, better temperature distribution, humidity control, higher efficiency and quiet performance.

1-6 Install sealed combustion 2 pipe tank system (2 points), or condensing DHW tank system (3 points)

Hot water heater is direct vented with a closed combustion system. All air for combustion is taken directly from the outside. A direct system utilizes a co-axial vent pipe (pipe inside a pipe) draws combustion air in through the outer pipe, and exhausts the products of combustion through the inner pipe. A power vented heater exhausts air out of the building via a positive exhaust during main burner operation. Both systems eliminate the need for conventional chimneys or flue systems.

1-7 Install instantaneous “tankless” hot water heater.

A tankless water heater does not have a storage tank to keep heated all day, or a pilot light; it burns gas only when you need hot water. This eliminates standby heat loss and its higher efficiency will save on utility costs.

1-8 Install high efficiency (AFUE 90 or better) boiler domestic hot water system.

1-9 Install Ground Source Heat Pump DHW heating system to supply a minimum of 25% of the peak DHW heating load and 70% of the total DHW energy load.

A Ground Source Heat Pump system uses the earths constant temperature to heat water for the home.
1-10 Install drain water heat recovery units on the main drainage stack. 3 foot stack (1 point), 6 foot stack (2 points)

Drain water heat recovery units transfer the heat from waste water to incoming water. This reduces the amount of energy needed for the DHW system.

1-11 Sealed combustion fireplace with electronic ignition if gas fueled.

Sealed combustion fireplaces involve a double-walled special vent supplied by the manufacturer that normally vents through a sidewall in a horizontal position. The unit must be Sealed Combustion, meaning that combustion gasses can not enter the home even if the home becomes depressurized.

1-12 Install an EPA or CSA certified high-efficiency wood stove or pellet stove with a minimum efficiency of 72% (1 point) or 85% (2 points).

State-of-the-art wood and pellet stoves are among the cleanest burning heating appliances and deliver a high overall efficiency. EPA and CSA certified stoves ensure reduced emissions.

1-13 Install fireplace fan kit to circulate warm air into room (1 point per fan, maximum 2 points).

A fan kit allows the heat generated by a fireplace to be transferred into the home more effectively.

1-14 All windows in home are ENERGY STAR labeled or equivalent for the climatic zone of home.

ENERGY STAR labeled windows save energy by insulating better than standard windows, making the home more comfortable all year round, reducing outside noise and can result in less condensation forming on the window in cold weather.

1-15 Electric range is self cleaning and/or Convection based

Ranges that self clean or have convection are better insulated and sealed, performing at or less than 500 kwh (520 kwh for convection) when rated by EnerGuide.

1-16 Refrigerator is an ENERGY STAR labeled product.

An ENERGY STAR label for refrigerator indicates the product has met strict requirements to reduce energy consumption.

1-17 Dishwasher is an ENERGY STAR labeled product.

An ENERGY STAR label for a dishwasher indicates the product has met strict requirements to reduce energy consumption.

1-18 Clothes washer or combo washer dryer is an ENERGY STAR labeled product.

An ENERGY STAR label for a clothes washer indicates the product has met strict requirements to reduce energy consumption.

1-19 Clothes dryer has an energy performance "auto sense" dry setting which utilizes a humidity sensor for energy efficiency.

1-20 Home is built "Solar Ready" following Canadian Solar Industries Association (CANSIA) guidelines.

Designing a home to be solar ready will make the addition of panels in the future much easier. Contact the Canadian Solar Industries Association for more info: www.cansia.ca.

1-21 Install active solar hot water heating system. Sized for 30% of DHW load (4 points), 50% (6 points), 80% (8 Points)

System capacity must be verified by professional installer or engineer using modeling software such as RETScreen or better, data provided to Built Green Energy Advisor at time of modeling

1-22 Install photovoltaic electrical generation system. Sized for 30% of electric load (4 points), 50% (6 points), 80% (8 points).

A photovoltaic system will greatly reduce the reliance on fossil fuel energy and reduce greenhouse gas emissions. System capacity must be verified by professional installer or engineer.

1-23 50% (2 points) or 100% (4 points) of electricity used during construction of home is generated by wind power or equivalent green power certificate.

1-24 50% (2 points) or 100% (4 points) of electricity used by homeowner during first year of occupancy is generated by wind power or equivalent green power certificate. (prepaid by builder)

1-25 A properly supported and wired ceiling fan and a wall mounted switch roughed in for future installation.

Intended to allow for future temperature equalization.

1-26 Install interior motion sensor light switches. 1 point per switch to a maximum of 3 points.

Motion sensor switches prevent lights from remaining on in rooms that are unoccupied. This helps reduce electricity consumption. Switches on closet doors and pantries are also acceptable.

1-27 Install central, computerized control systems capable of unified automation control of lighting loads.

Lighting and automation control systems prevent lights from remaining on in rooms without occupants, thereby reducing electricity consumption.

1-28 Minimum 25% (1 point), 50% (2 points), 75% (3 points) or 100% (4 points) of interior and exterior light fixtures are fluorescent, compact fluorescent light bulbs or LEDs.

Fluorescent, compact fluorescent and LED lamps use 50% less energy than standard lamps and last up to ten times longer.
1-29 Minimum 50% of recessed lights use halogen bulbs. Halogen bulbs are slightly more energy efficient, last longer and provide a more effective task light than conventional bulbs.

1-30 Air tight, insulation contact-rated recessed lights are used in all insulated ceilings, or insulated ceilings have no recessed lights. Prevents heated air from exhausting through ceiling. Air tight light fixtures lead to a more airtight, energy efficient home.

**TOTAL SECTION POINTS**

### II. BUILDING MATERIALS

This section deals with building components that make up the structure of the home. Items involve alternatives to using large dimensional lumber, products with a recycled component, utilizing wood products that come from sustainably managed forests and reducing the overall amount of lumber used. Many Building Material items also improve thermal performance and EnerGuide scores. **Minimum 15 Points Required**

#### 2-1 Insulated Concrete Form (ICF) system used for foundation walls.

Insulating Concrete Forms (ICF) are hollow building elements made of plastic foam that are assembled, often like building blocks, into the shape of a building’s exterior walls. The ICFs are filled with reinforced concrete to create structural walls. Unlike traditional forms, the ICFs are left in place to provide insulation and a surface for finishes.

#### 2-2 Insulated Concrete Form (ICF) system used for 75% of above grade house walls.

See description in 2.1. Use of modest a amount of stick framing is allowable, i.e. at bay windows, pony walls and walk out walls.

#### 2-3 Non-solvent based damp proofing (seasonal application).

Water based damp proofing products use water as a thinner. Oil based damp proofing gives off a number of volatile organic compounds (VOCs) as the solvent evaporates after application. These VOCs can be a strong irritant and can add to air pollution.

#### 2-4 Exterior and interior wall stud spacing at 19.2" on-center (1 point) or 24" on-center (2 points).

Increasing stud spacing reduced the thermal performance of homes while saving materials.

#### 2-5 Use of insulated headers / lintels (either manufactured or site built insulated headers) with minimum insulation value of R10.

Headers can either be insulated on site or can be a pre-manufactured product (often insulated with a foamed plastic).

#### 2-6 Install manufactured insulated rim/band joist, or build on-site built header wrap detail for continuous air barrier.

Rim and band joists can either be insulated on site or can be pre-manufactured (often insulated with a foamed insulation).

#### 2-7 Elimination of headers at non-bearing interior and exterior walls.

It is not necessary to use the additional wood involved in header construction if the opening is less than 4’ wide and is non-load bearing. For more details on Optimum Value Engineering framing principles see www.buildingscience.com.

#### 2-8 Use of header hangers instead of jack studs.

Using metal header hangers instead of jack studs allows for savings in wood use. For more details on Optimum Value Engineering framing principles see www.buildingscience.com.

#### 2-9 Elimination of cripples on hung windows.

For hung window openings, cripples are only necessary for siding or gypsum board attachment. For more details on Optimum Value Engineering framing principles see www.buildingscience.com.

#### 2-10 Elimination of double plates, using single plates with connectors by lining up roof framing with wall and floor framing.

Stack framing will allow for reduced wood usage. For more details on Optimum Value Engineering framing principles see www.buildingscience.com.

#### 2-11 Use of two stud corner framing with drywall clips or scrap lumber for drywall backing instead of studs.

Drywall clips can be used instead of a third corner stud allowing for reduced wood usage. For more details on Optimum Value Engineering framing principles see www.buildingscience.com.

#### 2-12 Deck or veranda surfaces (1 point) and/or structure (1 point) made from a third-party certified sustainably harvested wood source.

Wood must come from a sustainably harvested source with certification from Forest Stewardship Council (FSC), Sustainable Forestry Initiative (SFI), or Canadian Standards Association’s Sustainable Forest Management Standard (CAN/CSA-Z809-02).

#### 2-13 Deck or veranda surfaces (1 point) and/or structure (1 point) made from a third-party certified sustainable concrete.

Concrete produced from aggregates derived from a pit or quarry with a valid reclamation plan approved by Materials and Resources Canada or the governing provincial body.

#### 2-14 Structural insulated panel system used for at least 75% of roof/ceiling (4 points), 75% of walls (6 points), exposed floors (2 points) and/or Foundation (2 points).

Factory built Stressed-skin Insulating Panels (SIPS) can reduce thermal migration and control air leakage – keeps heating and cooling costs to a minimum and can use less framing material compared to a conventionally framed wall.

#### 2-15 Dimensional lumber from a third-party certified sustainably harvested source used for floor framing.

See 2-12
2-16  Dimensional lumber from a third-party certified sustainably harvested source used for wall framing.
See 2-12

2-17  Dimensional lumber from a third-party certified sustainably harvested source used for roof framing.
See 2-12

2-18  Use manufactured wood products for floor systems instead of dimensional lumber (1 point), from third party certified sustainably harvested sources (2 points).
Engineered wood floor systems saves old growth forests by using components from second generation forests and the use of recycled materials. See 2-12

2-19  Reduce dimensional lumber use by using engineered product for all load bearing beams & columns (1 point), from third party certified sustainable sources (2 points).
Engineered products include wood products, concrete and recycled steel.

2-20  Reduce dimensional lumber use by using engineered products for all exterior window and door headers.
Engineered products include wood products, concrete and recycled steel.

2-21  Finger-jointed plate material and/or engineered plate material used for all framing plates.
Use of recycled materials saves old growth forests.

2-22  Reduce dimensional lumber use by using engineered stud material for 10% of structural stud wall framing.
Use of recycled lumber products saves old growth forests by using components from second generation forests and the use of recycled materials.

2-23  Finger-jointed studs for 90% of non-structural (1 point) and/or 90% of structural (1 point) wall framing.
Use of recycled materials saves old growth forests.

2-24  Recycled and/or recovered content gypsum wallboard, minimum of 15% recycled content.

2-25  Recycled content exterior wall sheathing (minimum 50% pre- or post-consumer).

2-26  Use rain screen system separating cladding from the wall sheathing with a drainage plane (2 point), 60% or more recycled content (additional 1 point).
Use of recycled content polypropylene, steel or aluminum rain screen strapping may replace the traditional use of wood strapping on rain screen systems.

2-27  Advanced sealing package, non HCFC expanding foam around window and door openings and all exterior wall penetrations.
Controls air leakage and keeps heating and cooling costs to a minimum.

2-28  All sill plates sealed with foam sill gaskets or a continuous sandwiched bead of acoustical sealant.
Controls air leakage and keeps heating and cooling costs to a minimum.

2-29  All insulation used in home is certified by a third-party to contain a minimum recycled content: 40% (1 point) or 50% (2 points).

2-30  Install site applied spray foam to insulate entire rim joist area (1 point), Exposed floors (2 points) and/or house walls (4 points) and/or entire roof (3 points).
Spray insulations provide excellent air sealing and insulation value. Spray foam must be fire protected and some types cannot come in contact with heating ducts or lines. Some foams meet requirements for vapour barriers. Consult supplier or installer for further information.

2-31  Replace exterior wood sheathing with insulating sheathing and structurally required metal bracing.
Using less materials when possible saves the forest reserves, reduces thermal migration and controls air leakage and keeps heating and cooling costs to a minimum compared to a conventional wall.

2-32  Install R5 (1 point), R8 (2 points) or R12 (3 points) above building code required under entire basement slab.
Insulation installed under the basement slab will reduce the downward heat transfer into the ground below the slab, especially when hydronic in-slab heating is installed. Insulation under the slab can reduce temperature swings in the heated space and respond quicker to new changes in thermostat settings.

2-33  Install additional rigid insulation on exterior of above grade walls, above code required framing cavity insulation.
1.5” (1 point) or 2” (3 points).
Exterior insulation can greatly reduce thermal bridging, improving thermal performance. Care must be taken to ensure the wall cavity remains permeable to the outside and foam must be fully protected from UV damage during and after construction. Refer to CHBA Builder Manual or Local Code Officials for additional information.

2-34  Install additional exterior insulations system on exterior of foundation, R Value of 7.5 (1 point), R10 (2 points), or R15 (3 points), above code required interior insulation level
Insulation on the outside of a foundation system reduced energy loss

2-35  Overhead garage door is made of 75% or greater recycled material.

2-36  Attached garage overhead door is insulated with R8 to R12 (1 point) or greater than R12 (2 points).

2-37  Attached garage is fully insulated.
A fully insulated garage serves an additional insulating capacity for any walls encapsulated by it, further slowing heat loss through those walls.
2-38 Builder uses passive solar design shading devices for home. Permanent horizontal and/or vertical exterior shading devices for glazing (2 points), computer controlled devices (additional 1 point).  
Excludes interior blinds.  

2-39 Install 100% recycled content carpet underlayment.  

2-40 Install finished concrete interior floors instead of other types of finished floors (tile, carpet, hardwood, etc). For 300-500 ft² (1 point), 501-1000 ft² (2 points), 1001-1500 ft² (3 points), 1501+ ft² (4 points).  
Not applicable in unfinished basement areas. Using the concrete itself as a finished floor where concrete is being used regardless (for in floor heat or basement slabs) provides a durable floor with less material usage.  

2-41 Install weather-stripped and insulated (R15 minimum) manufactured interior attic hatch (1 point), or no interior attic access (1 point)  

TOTAL SECTION POINTS  

<table>
<thead>
<tr>
<th>Section</th>
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<tr>
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<td><strong>TOTAL</strong></td>
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III. EXTERIOR and INTERIOR FINISHES  
This section focuses on the finish materials used both inside and outside of the home. The items listed include using longer lasting products, products with recycled content and products that are harvested from third-party certified sustainably managed forests.  
Minimum 10 Points Required

<table>
<thead>
<tr>
<th>Section</th>
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<td>1 or 2</td>
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<tr>
<td>3-15</td>
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</tbody>
</table>
3-16 Minimum 25-year manufacturer warranty roofing material (2 points plus 1 point for each additional 5 years).
A 25-year roof system saves homeowners money in replacement costs, and reduces the use of landfills due to the longevity of the product.

3-17 Minimum 25% recycled-content roofing system (1 point underlay and 2 points roofing finish).
Recycled content roofing material reduces the use of new resources and waste in landfills.

3-18 Domestic wood from reused/recovered or re-milled sources, 500 ft² minimum for flooring or all cabinets or all millwork.
Reused, recovered or re-milled sources eliminate the need for new resources, saving energy, transportation costs, and forestry from depletion.

3-19 Natural or recycled-content carpet pad made from textile, carpet cushion or tire waste (rebond still qualifies).
Natural or recycled-content carpet pad is a good use of reusable resources.

3-20 Install carpet that has a minimum of 50% recycled content.
Recycled-content carpet is a good use of renewable resources, lessens off-gassing and improves air quality.

3-21 Install a minimum of 300 ft² of laminate flooring.

3-22 Bamboo, cork or hardwood flooring used in home, minimum of 300 ft² installed. Products must be third-party certified from sustainably managed forests or certified sustainable sources.
Cork flooring comes from stripping the bark off cork oak, which regenerates itself. The cork tiles are moisture, rot and mould resistant, providing a floor that can last over 50 years. Bamboo flooring is a good use of natural resources because it is fast growing, durable and flexible. All hard floorings promote better indoor air quality by not trapping contaminates.

3-23 All ceramic tile installed in home has a minimum of 25% recycled-content.
Reduces landfill usage.

3-24 MDF and/or finger jointed casing and baseboard used throughout home (1 point), and all jambs (1 point)
Medium Density Fiberboard (MDF) casing is created from sawdust and glues, utilizing all wood waste to create usable product.

3-25 Solid hardwood trim from third-party certified sustainably harvested sources approved for millwork and/or cabinets (2 points per application – maximum of 4 points).
Uses trees from responsible sources and forests certified to an independent third party forest certification program.

3-26 Paints or finishes with minimum of 20% recycled content.
Paints or finishes made from recycled content are environmentally friendly because recycling paint reduces the hazardous waste in landfills.

3-27 Local natural stone or recycled content (30% of content) solid countertops for all kitchen counters (2 points), all other counter tops (1 point).
Solid counter top product is more durable, easy to clean and maintain, resistant to heat and scoring. By quarrying and sourcing in Canada, the environmental cost of shipping is greatly reduced. Foreign stone cut or polished in Canada is not acceptable, quarry must be located within 800km of project, see item 8-1 for additional point.

3-28 100% agricultural waste or 100% recycled wood particle board used for shelving.
Products such as wheat board are made from agricultural waste.

3-29 PVD finish on all door hardware.
Physical Vapour Disposition provides a more durable product. No toxic wastes are produced making it.

3-30 PVD finish on all faucets.
Physical Vapour Disposition provides a more durable product. No toxic wastes are produced making it.

3-31 Install only Type 1 or 2 grade door hardware with lifetime mechanical and coating warranty.
High quality, durable Type 1 and 2 hardware will not require replacing for life of home.

TOTAL SECTION POINTS

IV. INDOOR AIR QUALITY
This section focuses on the quality of the air within the finished home. Products listed here include materials that are low in VOC’s, products made from all natural materials as well as various air cleaning and ventilation systems.
Minimum 15 Points Required

4-1 Install pleated media filter on HVAC system with minimum MERV 7 rating.
MERV rating system specifies allowable amounts and practical sizes that a filter must catch. The higher the MERV rating, the smaller and greater number of particulates are caught, providing better indoor air quality.

4-2 Install electrostatic air cleaner on HVAC system.
Permanent washable air filter that traps and removes airborne particles from the air before being circulated through the furnace and into the home.

4-3 Install air filter on all fresh air inlets.
A filter installed on the fresh air inlet will reduce the particulate that can be transferred from outside into the home. All air intakes must be easily accessible for maintenance. Bug screens are not considered a “filter”. Check with furnace or HRV manufacture
4-4 Install electronic air cleaner on HVAC system.

An electronic air cleaner offers a superior level of filtration by using advanced, 3-stage filtration technology to trap and filter airborne particles like dust, cat dander and smoke. It works by placing an electric charge on airborne particles, and then collecting the charged particles like a magnet. The air cleaner cells can be washed in your dishwasher or sink.

4-5 Install HEPA filtration system in conjunction with an HVAC system.

HEPA stands for High-Efficiency Particle Arresting. HEPA filtration offers the highest particulate removal available - 99.97% of particles that pass through the system including dust, cat dander, certain bacteria, pollens and more. The system is connected to the cold air return of the forced air heating/cooling system which provides a whole house filtration system.

4-6 Install thermostat that indicates the need for the air filter to be changed or cleaned.

This feature displays filter maintenance reminders on the thermostat. Regular furnace maintenance is required to keep your mechanical equipment running efficiently and problem free as well as ensuring a healthy indoor air environment.

4-7 Power vacuum all HVAC ducting prior to occupancy by homeowner.

This process helps eliminate pollutants that drop into the HVAC ducting during the construction process from being circulated into the home.

4-8 Central vacuum system vented to exterior as recommended by the Carpet and Rug Institute.

A central vacuum system collects dust centrally, while exhausting to the exterior so that dust mites and bacteria do not have the opportunity to re-circulate. The result is cleaner, healthier air. Note: install far enough from air intake areas. See manufacturer's installation guidelines.

4-9 All insulation in the home is third-party certified or certified with low or zero formaldehyde.

Formaldehyde is colorless gasous organic compound, water soluble, with a characteristic pungent and stifling smell. Products with low formaldehyde emission levels will improve indoor air quality of homes and long term owner health.

4-10 Low formaldehyde sub floor sheathing (less than 0.18 ppm).

Formaldehyde is colorless gasous organic compound, water soluble, with a characteristic pungent and stifling smell. Products with low formaldehyde emission levels will improve indoor air quality of homes and long term owner health. Industry Standard ANSI A208.1-1999 sets a 0.20 ppm limit. Built Green™ requires a 10% better level of performance at 0.18 ppm. Products using Phenol Formaldehyde, or PMDI or MDI will meet this standard without testing.

4-11 Low formaldehyde underlayment is used in home (less than 0.18 ppm).

Low formaldehyde (phenol) and formaldehyde-free binders (PMDI) are available and becoming more common. FSC certified OSB is becoming more common, reducing environmental impacts on air, water, social quality.

4-12 Low formaldehyde particle board/MDF (less than 0.18 ppm) = 1 point, or zero formaldehyde particle board/MDF (2 points) used for cabinets.

Urea formaldehyde-free fiberboard can be used in the same way as conventional fiberboard, but with the added caution of greater potential for water damage.

4-13 Low formaldehyde particle board/MDF (less than 0.18 ppm) = 1 point, or zero formaldehyde particle board/MDF (2 points) for shelving.

Urea formaldehyde-free fiberboard can be used in the same way as conventional fiberboard, but with the added caution of greater potential for water damage.

4-14 All interior wire shelving is factory coated with low VOC / no off gassing coatings

Vinyl coating on conventional shelving units and site built MDF shelving off gas VOCs.

4-15 Water-based urethane finishes used on all site-finished wood floors.

Water-based epoxy finish (generally referred to as epoxy-modified finish) differs from its solvent-based counterpart in that the epoxy resin is itself the catalyst for an acrylic or urethane resin.

4-16 All wood or laminate flooring in home is factory finished.

Installing a pre-finished floor eliminates the time, the dust and the odours associated with the on-site sanding and finishing of an unfinished product.

4-17 Water-based lacquer or paints are used on all site built and installed millwork, including doors, casing and baseboards. (less than 200 grams/litre of VOC's)

Using water based interior finish products reduces VOC off-gassing which improves indoor air quality.

4-18 Interior paints used have low VOC content (less than 200 grams/litre of VOCs).

Volatile Organic Compounds (VOCs) are a class of chemical compounds that can cause short or long-term health problems. A high level of VOCs in paints/finishes off-gas and can have detrimental effects to a buildings indoor air quality and occupant health.

4-19 Interior paints used have no VOC’s in base paint prior to tint.

Volatile Organic Compounds (VOCs) are a class of chemical compounds that can cause short or long-term health problems. A high level of VOCs in paints/finishes off-gas and can have detrimental effects to a buildings indoor air quality and occupant health.

4-20 All ceramic tiles are installed with low VOC adhesives and plasticizer-free grout (low VOC standard is less than 150 grams per litre).

Most adhesives are still based on SB latex which releases large quantities of VOCs. The volatile solvents are used to emulsify (or liqulify) the resin that acts as the bonding agent. However, water-based adhesives emit far less VOCs than their conventional solvent based counterparts. There are three types of low-VOC formulas: water-based (latex and acrylics); reactive (silicone and polyurethane); and exempt solvent-based (VOC-compliant solvents). While all three technologies yield low- or zero-VOC caulks, sealants, and adhesives, their performance is slightly different.
4-21 All Vinyl flooring is replaced with natural linoleum installed with low VOC adhesives or other hard surface flooring (low VOC standard is less than 150 grams per litre). Hard surface flooring is generally more durable and improves the Indoor Air Quality within a building. Vinyl flooring typically releases VOC's as it ages and uses toxic glues in its application.  

4-22 Carpet and Rug Institute (CRI) IAQ label on all carpet used in home. To identify carpet products that are truly low-VOC, CRI has established a labeling program. The CRI Indoor Air Quality Carpet Testing Program green and white logo displayed on carpet samples in showrooms informs the consumer that the product type has been tested by an independent laboratory and has met the criteria for very low emissions.  

4-23 Carpet and Rug Institute (CRI) IAQ label on all underlay used in home. The adhesives used to install carpets and the latex rubber by some manufacturers to adhere face fibers to backing materials generate volatile organic compounds (VOCs). Carpets also cover large surfaces within an interior environment and can provide "sinks" for the absorption of VOCs from other sources.  

4-24 Natural material based carpet in all living areas. Natural wool carpets are durable and use less secondary backing materials and chemicals. Off-gassing is typically caused by the secondary backings and chemical additives in synthetic carpets, for controlling mildew, fungus, fire and rot.  

4-25 All carpet in home is replaced by hard surface flooring. Hard surface flooring is generally more durable and improves the Indoor Air Quality within a building. Carpets collect dust, dust mites and other allergens which when disturbed become airborne particulates- directly affecting the health of the occupants.  

V. VENTILATION  
This section covers the mechanical ventilation systems in the home, including filtrations and heat recovery. Minimum 6 Points Required  
* Platinum Level Note* Platinum level homes must use item 5-7 " Ventilation system is installed according to CSA Standard F326, as recommended by the Heating, Refrigeration and Air Conditioning Institute of Canada (HRAI)." as well as 6 additional points from this section.  

5-1 All ductwork joints and penetrations sealed with low toxic mastic or aerosolized sealant system. Duct mastic is a preferred flexible sealant that can move with the expansion, contraction, and vibration of the duct system components. A high quality duct system greatly minimizes energy loss from ductwork. The system should be airtight, sized and designed to deliver the correct airflow to each room.  

5-2 Install motorized damper on fresh air inlet (must be interlocked with furnace system). A constantly open fresh air supply (passive air) wastes energy. Positive control of this air will assure building comfort, safety and energy efficiency.  

5-3 Install all ventilation fans (bath or in-line type) to meet or exceed the Energy Star requirements Energy Star fans have to meet standards for efficiency, and sound transmission, providing quiet and effective ventilation fans. www.cee.nrcan.gc.ca/energystar/english  

5-4 Install a programmable timer or humidistat controlled ventilation fan meeting the Energy Star requirements for efficiency and sound level. A programmable timer ensures necessary, regular, automatic mechanical ventilation of the home.  

5-5 Install passive Heat Recovery Ventilator (HRV) and verify balanced installation. A Heat Recovery Ventilator (HRV) is an air exchanger that exhausts humid, stale, polluted air out of the home and draws in fresh, clean outdoor air into the home. Invisible pollutants produced by common household substances, plus dust and excess humidity that get trapped in today's houses, can increase your risk of chronic respiratory illness and your homes risk of serious structural damage. A passive HRV unit does not have its own internal fan and is 100% furnace assisted. It works by tying the exhaust side of the unit to the supply air plenum which forces air to exhaust from the home and at the same time fresh air enters from outside through the unit and into the cold air return duct work.  

5-6 Install an active Heat Recovery Ventilator or Energy Recovery Ventilator (HRV or ERV) and verify balanced installation. A Heat Recovery Ventilator (HRV) is an air exchanger that exhausts humid, stale, polluted air out of the home and draws in fresh, clean outdoor air into the home. Invisible pollutants produced by common household substances, plus dust and excess humidity that get trapped in today's houses, can increase your risk of chronic respiratory illness and your homes risk of serious structural damage. Much like the HRV, the ERV recovers heat; however, it also recuparates the energy trapped in moisture, which greatly improves the overall recovery efficiency. In dry climates and humidified homes the ERV limits the amount of moisture expelled from the home. In humid climates and air conditioned homes, when it is more humid outside than inside, the ERV limits the amount of moisture coming into the home.  

5-7 Ventilation system is installed according to CSA Standard F326, as recommended by the Heating, Refrigeration and Air Conditioning Institute of Canada (HRAI). www.hrai.ca
VI. WASTE MANAGEMENT
This section deals with the handling of waste materials on the construction site and encourages recycling. **Minimum 7 Points Required**

6-1 Comprehensive recycling program for building site including education, site signage and bins.  
A comprehensive recycling program that is strictly followed significantly reduces the amount of waste ending up in landfills. Currently it is estimated that up to 50% of landfill waste is construction related.  

6-2 Collection of waste materials from site by a waste management company that is a current member of a provincial recycling council or equivalent association and verifies that a minimum of 10% of the materials collected from the construction site have been recycled.  
Not only does this reduce overall waste of product, it ensures that as much product as possible is being utilized for the production of future resources.

6-3 Suppliers and trades recycle their own waste, including leftover material and packaging (1 point per trade - maximum 4 points).  
Trades being responsible for recycling and removal of waste not only reduces landfill waste, but also promotes a cleaner and safer working environment.

6-4 Minimum 15% (1 point) 25% (2 points) or 50% (6 points) by weight of waste materials collected from construction site is diverted from waste stream.  
Trades being responsible for recycling and removal of waste not only reduces landfill waste, but also promotes a cleaner and safer working environment.

6-5 Use of recycled materials derived from local construction sites (1 point for each different product used, to max. of 3).  
Products recycled from the construction site, such as mulched clean dimensional lumber free of metals, or mulched paperless gypsum are often useable as either clay/soil water retention additives.

6-6 Trees and natural features on site protected during construction.  
The protection of existing trees and other natural features such as streams, ponds and other vegetation reduces environmental and ecosystem impact. Many of these features can be protected simply by following good waste management procedures.

6-7 Metal or engineered durable form systems used for concrete foundation walls.  
The use of metal forming systems reduces the requirement of lumber, a limited resource.

6-8 Concrete used in home has a minimum supplementary cementing material of 25% (1 point) or 40% (2 points) within the scope of proper engineering practices.  
For every one ton of Portland cement generated, eighth tenths of a ton of carbon dioxide is produced. Supplementary cementations products include fly ash, blast furnace slag as well as metakaolin.

6-9 Install recycling center with two or more bins.  
By installing built in recycling centers, which can be as simple as labeled containers (paper, cardboard, cans, plastics, etc), homeowners are more likely to utilize the pre-existing facilities and thus contribute to the reduction in landfill waste.

6-10 Provide composter to homeowner.  
Providing a composter promotes a reduction in wastes heading to the landfill by giving homeowners an option for organic waste such as food leftovers.

6-11 Existing dwellings onsite are recycled or moved instead of demolished (recycled 2 points, moved 4 points).

**TOTAL SECTION POINTS**

16

VII. WATER CONSERVATION
This section encourages a reduction in the amount of water used in the home or in individual units within multi-story buildings. **Minimum 7 Points Required**

7-1 Install a dual flush or pressure assisted toilet in one or more bathrooms  
(3 points for first, 1 additional point for each after)  
Dual flush toilets offer a choice between two water levels for every flush; at minimum should use, 1.6 GPF (6 LPF) or 0.8 GPF (3 LPF).

7-2 Install a 1.28 GPF toilet in one or more bathrooms (2 points for first, 1 additional point for each after)  
1.28 GPF (Gallon per Flush) is generally considered the new standard in water efficiency

**TOTAL SECTION POINTS**

12
7-3 Install manufactured non-electric composting toilet (3 points each, max of 6 points).
A composting toilet uses no water and is odorless. It uses a biological processes to break down the waste into organic compost material.

7-4 Insulate the hot water lines with flexible pipe insulation, first three feet from hot water tank (1 point) or all hot water lines (2 points).
Minimizing the heat loss in the water line will decrease the initial water wasted by delivering hot water faster.

7-5 Install hot water recirculation system with all hot water lines insulated (4 points), or point-of-use instant DHW system (1 point each, max. 4)
Having the hot water re-circulated from the hot water source to the fixture points will decrease the initial water wasted by delivering the hot water faster. Pump must be on program or timer to reduce stand-by losses. Kitchen counter top "boiling water taps" are not credited.

7-6 Install low flow faucets for all kitchen faucets and lavatories (2 points), all showers & tub/showers (additional 1 point).
Reduces water consumption by lowering the flow rate. Showers must use 9.8 L/min (2.2 imp. Gal./min) or less. Faucets, both kitchen and bath, must use 8.3 L/min (1.8 imp. Gal./min) or less.

7-7 Install hands free lavatory faucets. 1 point per faucet/unit.
Battery powered electronic sensor minimizes the spread of germs and saves water.

7-8 Provide front loading clothes washer (3 points), or Condensing Combination wash/dry unit (4 points)
Front loading clothes washers conserve water by design, as they are only required to fill up the washing compartment 1/3 full to effectively wash clothing. Additionally they use up to 75% less environmentally damaging laundry detergent, AND they also conserve electrical or gas energy by significantly reducing drying time for clothes with a more thorough spin cycle.

7-9 Install water saving dishwasher that uses less than 20.0 L/water per load.
Water saving dishwasher use technology to reduce both the amount of water required as well as electrical energy requirements. The EnerGuide appliance directory put out by Natural Resources Canada has a comprehensive listing of all manufacturers and models of dishwashers and other appliances with water usage and energy efficiency ratings.

7-10 Install efficient irrigation technology that utilizes automatic soil moisture-based sensor technology at minimum
Show storm water management plan & design; water efficient irrigation systems, sensors, regulators, micro drip feed systems etc.

7-11 Install permeable paving materials for all driveways and walkways.
Permeable paving allows for storm water to flow back into the ground rather than into the storm sewers.

7-12 Provide a list of drought tolerant plants and a copy of the local municipality water usage guide to homebuyers with closing package.
Most municipalities provide a guide that gives the water requirements of various plants and grasses. When properly designed, landscaping choices can significantly contribute to water conservation.

7-13 Builder supplies a minimum of 8" of topsoil or composted yard waste, as finish grading throughout site.
Compared to subsoil materials, topsoil usually has higher aggregate stability, lower bulk density, and more favorable pore size distributions which leads to higher hydraulic conductivity, water holding capacity, and aeration porosity.

7-14 Builder incorporates water wise landscaping or xeriscaping in show home or customer home (customers 50% of lawn 2 points, 100% 4 points).
Xeriscaping (or drought resistant landscaping) plans and options can be obtained from professional landscaping contractors, and once a xeriscaping landscape is in place, it requires no manual watering. (Rain barrel usage, astro turf ineligible.)

7-15 Builder attaches water barrel with insect screen to downspout. Water barrel should also have a drain spout and overflow spout (1 point per barrel - maximum of 3 barrels).
Supplying a water barrel encourages homeowners to use rainwater for landscaping needs and therefore save on potable water.

7-16 Install grey water system collecting waste from sinks, shower and/or kitchen to capture and treat for use in toilets or irrigation (6 pts), rough-in for future grey water system (3 points)
By reusing waste water, consumption can be drastically reduced. Rough-in must include clearly identified grey water drain stack, separated from sewer line.

TOTAL SECTION POINTS 14

VIII. BUSINESS PRACTICE
This section deals more with manufacturers and builders office and business practices.
Minimum 6 Points Required

8-1 Products used for home are manufactured within 800 km (1 point for each product - maximum of 5).
Transportation of building materials is a substantial energy use, local manufacture reduces this embodied energy. Distances are calculated by road, not as the crow flies. Manufacturing or assembly must take place in a plant or factory, not on-site. Distance to raw material source is not included.
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<tr>
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<th>Description</th>
<th>Points</th>
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<tbody>
<tr>
<td>8-2</td>
<td>Builder provides Built Green™ homeowner manual, completed Built Green™ checklist and educational walkthrough with sale or possession.</td>
<td>3</td>
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<tr>
<td>8-3</td>
<td>Builders office and show homes purchase a minimum of 50% (1 point) or 100% (2 points) solar, wind or renewable energy.</td>
<td>1 or 2</td>
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<tr>
<td>8-4</td>
<td>Manufacturers and/or suppliers purchase 50% or more solar, wind or renewable electricity.</td>
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<tr>
<td>8-5</td>
<td>Builder has written an environmental policy which defines their commitment (must include an office recycling program and energy efficient lighting).</td>
<td>1</td>
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<tr>
<td>8-6</td>
<td>Manufacturer and/or supplier has written an environmental policy which defines their commitment (must include an office recycling program and energy efficient lighting). (1 point per supplier/manufacturer - maximum of 2 points).</td>
<td>1 or 2</td>
</tr>
<tr>
<td>8-7</td>
<td>Builder has written an environmental policy which prioritizes milestones for future net zero housing developments.</td>
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<tr>
<td>8-8</td>
<td>Builders’ company vehicles are hybrid or bio-diesel vehicles (1 point per vehicle - maximum of 3 points).</td>
<td>1 to 3</td>
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<tr>
<td>8-9</td>
<td>Environmental certification for builders place of business (building, office, etc).</td>
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<tr>
<td>8-10</td>
<td>Builder agrees to construct and label a minimum of 50% of all homes to the Built Green™ standard per calendar year.</td>
<td>3 or 5</td>
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<tr>
<td>8-11</td>
<td>Contracted trades and/or suppliers have successfully taken and maintained Built Green™ Builder Training status (1 point per trade organization, Max 5).</td>
<td>1 to 5</td>
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</tbody>
</table>

TOTAL SECTION POINTS: 10

TOTAL CHECKLIST POINTS: 125
Glenaire Townhomes:
Energy and Water Conservation and Greenhouse Gas Emission Reduction Development Permit Area Compliance Strategies
Prepared by Emma Conway For PC Urban
June 28, 2016
Executive Summary:

PC Urban contracted E3 Eco Group Inc. to evaluate the environmental sustainability of their proposed Glenaire development in the District of North Vancouver’s ‘Energy and Water Conservation and Greenhouse Gas Emission Reduction Development Permit Area.’ This development is planned to consist of 23 townhouses located at 1946-1998 Glenaire Drive in North Vancouver.

The primary objectives of the District’s Development Permit Area (DPA) are to promote energy conservation, water conservation and the reduction of greenhouse gas (GHG) emissions to create a more positive net impact on our environment and occupant health.

E3 Eco Group strives to offer practical, effective advice where sustainability is concerned. The recommendations provided must reduce environmental impact, but also must to be executable using available manpower and materials, must be cost-effective for the developer, and must not negatively impact housing affordability. The recommendations presented in this report were evaluated from this perspective, so that they will satisfy the District of North Vancouver’s goals without placing an undue financial or maintenance burden on the homeowners who purchase these townhomes.

Practical solutions must also respect the District’s ability to accommodate changes in construction measures and materials. If strategies are too aggressive or forward-reaching, the ability to approve and inspect the implementation of those strategies could be compromised.

The Glenaire development by PC Urban is intended to be a model of improved environmental sustainability by addressing the District’s Energy and Water Conservation and GHG Emission Reduction Objectives in an achievable, practical, and economically feasible manner. In this report these objectives, as well as other sustainability practices, are evaluated in the context of this particular development.

The purpose of this report is to create an opportunity for PC Urban and the District of North Vancouver to work together to ensure that the project raises the bar on sustainable development in the area while remaining feasible and affordable to the new buyer.
Evaluation of Potential Measures Suggested by The District of North Vancouver:

A) Energy Conservation Guidelines

1.) An integrated design process should be utilized to identify opportunities to reduce a building’s energy consumption.

An integrated design process between PC urban, design consultants, general contractor, and E3 energy advisors has identified the following strategies to help reduce energy consumption:

a) Space and domestic hot water heating equipment with “best in class” efficiency ratings

In the Glenaire development it is planned that the townhomes will use Natural Gas for radiant in floor heating and for domestic hot water. This is due to market demand as it is seen as a luxury selling point. Also, as the price of electricity increases it will remain the more affordable option for occupants to heat their homes. When it comes to natural gas space heating systems it is recommended that high efficiency products are selected. These products are more efficient at turning the fuel into usable energy, therefore produce less combustion products. For space heating boilers of 95% AFUE is proposed.

b) Heat Recovery Ventilators

Heat Recovery Ventilators (HRV) work by exhausting warm stale air through a heat exchange core past incoming cold air where a heat exchange occurs. This effectively pre-heats the incoming fresh air before it enters the living space. Raising the temperature of the supply air means the space heating system will be active less often and for shorter periods, reducing energy consumption.

c) Low energy lighting and EnergyStar appliances

The energy savings of low energy lighting (LED/CFL) can be represented in HOT2000 as ‘energy credits’ that account for the amount of kWh/year that is saved per unit. It is proposed to include 75% low energy lighting. To determine this number, the total number of light fixtures in the home including decorative, stair, and exterior lighting must be counted and then multiplied by 0.75. The nearest whole number is the number of bulbs that must be installed with low energy lighting. This would account for 295kWh/year energy credits. This path in addition to 3 EnergyStar appliances; fridge (50kWh/year), dishwasher (20kWh/year) and clothes washer (25kWhr/year) would bring the total energy credits to 390kWh/year saved per unit.
d) Programmable thermostats

Programmable thermostats allow an occupant to choose what areas can be heated/cooled at different times of the day. For example, the temperature can be programmed to be lower the hours of the day the occupants are out, while warmer just in the mornings and evenings. Different desired temperatures can be set in different spaces to reflect their occupant demand. Programmable thermostats can reduce energy consumption as well as operating costs.

2.) The effectiveness of the building envelope, including glazing, to reduce heat loss should be maximized.

E3 Eco Group considers improving the building envelope as the most direct and efficient way to achieve the objectives of reduced energy consumption and greenhouse gas emissions.

The first approach to comply with the DPA is to increase the building envelope’s thermal resistance. Measures to improve the envelope can be evaluated using energy modeling software such as HOT2000. This software, from Natural Resources Canada, allows for the comparison of numerous options for wall construction, attic insulation, floor slab insulation, window specifications, envelope air tightness, solar heat gain, and more. The software is used by Certified Energy Advisors (CEA), of which E3 Eco Group employs five, to model upgrades for single family houses, rowhouses (i.e. townhouses) and some low-rise apartment buildings.

The second approach is to use high performance windows in the development. For example, EnergyStar rated windows with reduced USI Values of 1.6 with thermally broken frames and insulated spacers would reduce the amount of heat loss and therefore reduce the heating load of the building.

3.) Overall building performance and interior thermal comfort should be maximized through a combination of passive design strategies, including, but not limited to: natural ventilation, building orientation, solar shading overhangs, and building massing.

Passive solar design is a proven concept which offers tangible benefits under the ideal circumstances. Such circumstances can exist with individual custom homes where solar orientation, local shading and thermal mass elements can be optimized. However, when they are applied to a neighbourhood of townhomes the net benefit can be substantially less or can turn into a liability rather than an asset. A worthwhile amount of passive solar energy may be attainable but the design must address excessive heat gain, homeowner knowledge/ability to take advantage of passive solar heating, and the general lack of control of the incoming heat energy relative to the mechanical space heating system.

The ability of the glazing to accept additional solar heat energy while retaining a high effective insulation value, without incurring a large upcharge in the window package, is the challenge. Typically, double pane windows with a soft-coat low-e coating need to be upgraded to triple pane
windows with hard-coat low-e coatings to provide both high solar heat gain coefficients and net reduction in energy consumption through conductive heat loss. This combination can incur high costs to the developer.

The biggest challenge of passive solar design is to not cause the house to overheat. Overheating of a home in summer is a commonly reported problem and is out of the control of a homeowner. This can lead to occupant discomfort and reliance on natural ventilation which is unreliable and does not provide whole house ventilation like an HRV does. E3 Eco Group does not consider optimizing passive solar heat gains the most effective way that PC Urban can reduce energy consumption of the Glenaire Development.

4.) Various measures should be utilized to reduce the heat island effect including: green roofs, EnergyStar rated or high-albedo roofing materials, or other appropriate measures.

Roofs with high solar reflectance help reduce heat island effect, therefore reducing the passive solar heat gain through a building’s roof thus reducing cooling loads in the summer. There are products on the market with high solar reflectance index (SRI) available which could be pursued.

5.) Opportunities for the distribution of natural daylight into interior spaces to reduce energy consumption should be considered.

As Glenaire is a townhouse development there is less opportunity for the middle units to maximize incoming daylight then compared to the end units. The plans do reflect a large window to wall ratio thus satisfying this guideline.

6.) Solar thermal or solar electric technologies should be incorporated, but where it is not possible to do so, building should be designed to be solar ready.

Solar hot water, as well as solar photovoltaic (PV) are popular subjects which are expected to play an important role in energy generation in the future. Currently, the technology remains costly relative to envelope upgrades and relative to the current cost of energy. Generally speaking, the reasonable limits of envelope upgrades and energy recovery should be exhausted before solar generation is considered.

This is not to say that no attention should be paid to the use of solar PV; the best way to incorporate solar PV at this time is to reduce the buildings energy demand, provide suitably orientated and structured roofs for panel placement and allow for the easy addition/integration of solar PV in the future (ie. “solar ready” construction). The Glenaire townhomes will be made ‘Solar Ready’ following the Canadian Solar Industries Association (CANSIA) guidelines. These guidelines include a number of criteria, such as a conduit system to connect the roof to a mechanical room and ensuring roof trusses can support the weight of a future solar hot water or solar PV system.
7.) On site renewable energy systems should be pursued where feasible.

Other renewable energy systems include on-site wind electrical generation. This is a technology that does not yield a good benefit to cost ratio. See item 6 in this section for explanation on solar renewable technologies.

8.) Mechanical systems should be designed to enable interconnection to future district energy systems in those areas identified by the District as having potential for such systems.

The effectiveness of a district energy system relies on leveraging multiple requirements for heating, or preferably, a combination of multiple heating loads, cooling loads and waste heat sources. Depending on the planned future development of the area (residential and limited commercial), there may or may not be the potential for any significant waste heat sources. The potential benefits of a district energy system must be weighed against the large up-front infrastructure cost, the inherent complexity of the system, the need for elevated levels of ongoing maintenance, and the presence (or not) of waste heat or cooling loads.

At this time Glenaire is planning on having a boiler based heating and domestic hot water system. Although the District of North Vancouver does not have the infrastructure to support a district energy system at this time, having a boiler based system is ideal as the systems installed could be converted in the future thus satisfying ‘hydronic ready.’

9.) On-site landscaping should be designed to promote opportunities for passive heating/cooling without negatively affecting the potential for solar thermal or solar electric systems on the site and on surrounding properties.

The inherent orientation of the site does satisfy this guideline. The trees on the North bank will provide some shading while the majority of the townhomes have lots of south facing glazing. Future solar panels could be easily oriented in an East-West axis along building 1 and 2 to maximize incoming solar from the South.

10.) The planting of appropriate trees within parking lots should be maximized to provide shade, store carbon, and reduce heat buildup.

The Glenaire development has a below grade parkade. However, along the North perimeter there are to be trees retained along the river bank. This is important for slope stabilization along the river and will also provide carbon storage. Once construction is complete more trees will be planted to the same effect.
11.) Daylight-responsive controls should be incorporated in all regularly occupied spaces adjacent to windows/skylights.

In all habitable rooms PC Urban could consider the incorporation of permanent blinds that occupants could use to decrease solar heat gain when undesirable. Light activated blind sensors are also available on the market, but the upfront cost to the developer and ability of future homeowners to maintain this technology should be considered.

B) Water Conservation Guidelines

1.) An integrated design process should be utilized to identify opportunities to reduce a building's water consumption and incorporate strategies for the capture and use of storm water for landscaping purposes.

An integrated design process between PC urban, design consultants, general contractor, and E3 energy advisors has identified the following strategies to help reduce water consumption. These will help reduce water consumption on a daily basis.

a) Low flow toilets and faucets
b) Water saving dishwasher and clothes washer

2.) The storm water and building water discharge should be managed on site to the extent possible. Measure could include: permeable paving materials, raingardens or bioswales, xeriscaping, topsoil.

A storm water management strategy is something that must be considered in this climate. With concentrated periods of intense rainfall, landscapes and developments must be designed to accommodate these events without flooding and avoiding erosion. Limiting the impermeability of the site, providing adequate drainage, or providing sufficient capacity for storm water detention are some of the available approaches to addressing these issues.

Xeriscaping (drought resistant landscaping) is a great way to limit the amount of outdoor irrigation required. The landscape consultant for Glenaire should consider drought tolerant plants and native species in their plans and grass areas should be kept to an absolute minimum.

3.) Site adjacent to an open watercourse should have storm water infiltration redirected to that receiving environment if appropriate.

The Glenaire development is unique as it is located adjacent to the Capilano River. This creates unique opportunities and challenges. Opportunities could include storm water redirection into the open watercourse, while challenges could include riverbank slope erosion. The Glenaire townhomes could be an ideal candidate for a raingarden, which is a detention pond that allows storm water to naturally infiltrate into the groundwater or in this case the ground flow to the river.
4.) Automated control systems should be utilized where temporary or permanent mechanical irrigation systems are required.

Irrigation technologies include moisture sensors/rain delay control, drip heads, timer controls, high efficiency nozzles, customized water spray patterns. Glenaire will utilize some of these technologies as designed by the landscape technology to increase outdoor water conservation. However, if Xeriscaping is prioritized the need for irrigation can be greatly reduced.

C) Greenhouse Gas Emission Reduction Guidelines

1.) Building materials which are durable should be selected.

Durability is important to prioritize in new construction as extended product life reduces maintenance costs and keeps more materials out of the landfill. The less products that are manufactured and shipped to site reduces GHG emissions. The durable items incorporated into Glenaire will include:

a) Decking materials that will not require any maintenance for at least 5 years
b) 30-year roof manufacturer warranty
c) Lifetime finishes on all faucets and door hardware

2.) Locally or regionally sourced building materials should be used to reduce transportation energy costs.

Construction material selection is an important consideration when trying to lower our environmental impact and make a project sustainable in a more holistic way. Strategic construction materials can make a development more sustainable by using consumer purchasing power to buy products that reduce the amount of embodied energy or carbon footprint created during the construction process. Selecting locally sourced (within 800km) resources or manufactured materials reduces the amount of GHG produced in the transportation of materials. Locally sourced resources could include lumber, aggregate, stone countertops sourced within 800km. Locally manufactured materials could include windows, roofing, cabinetry, paints, interior doors within 800km. Glenaire will commit to selecting at least 5 products manufactured within 800km.

3.) Existing building materials should be used where practical.

In the case of the Glenaire 23 unit townhome development, it is not practical to utilize materials from the 5 existing single family homes. These older materials could contain asbestos, high levels of VOCs, or could be structurally compromised.
4.) Building materials which may be used or recycled upon building demolition should be selected.

Purchasing products with recycled content diverts materials from the waste stream. A variety of materials now can have recycled content included to reduce the amount of material going into our landfills. Examples in the Glenaire development will include: manufactured wood products, drywall, interior doors, insulation, carpet padding, and MDF products.

5.) A construction waste management plan should be developed and recycling should be prioritized.

The construction waste management plan will include hiring a reputable waste hauling company that commits to having all waste hauled away sorted and then sent to recycling depots. It is not uncommon today to see waste diversion rates of 50% or higher. Having the construction waste sorted off site is preferable as on site sorting takes up too much space on site and requires continuous training and ongoing supervision of all trades on site.

6.) Building products which have low, or no-VOC off gassing potential should be selected.

Procuring materials with low volatile organic compound (VOC) concentrations can increase indoor air quality and in turn improve occupant health. The most common VOC used is formaldehyde which degrades respiratory health and has been linked to cancer. Formaldehyde is a colourless organic compound used as a binding agent in building materials. Over time it breaks down and is off-gassed into living space. Glenaire will commit to low VOC insulation, sub floor sheathing, particleboard/MDF for cabinets or shelving, wire shelving, tile adhesives, and interior paints.
As requested GeoPacific Consultants reviewed the site and available hydrological and hydraulic studies, including the Flood Assessment Study of North Vancouver provided by Northwest Hydraulic Consultants dated March 31, 2010 and Hydrological Assessment – Norgate, Lower Capilano and Lions Gate Areas provided by Piteau Associates dated July 4th, 2012. The following summarizes the review and recommendations.

The site is an irregular polygon in shape and consists of 5 contiguous single family properties. The site is bounded by Glenaire Drive to the south, Fullerton Avenue to the east, existing single story residential developments with surrounding vegetated areas to the west, and the Capilano River to the north.

Based on the hydraulic study the 200-year flood elevation is contained within the channel boundaries. The flood data grid downstream of the Woodcraft Bridge indicates that for the 200-year flood during high tide event the flood elevation estimated to be at 13.79 m (GSC) therefore the water will be 2.7 m below the north-east corner of the site. The river bank to the south is protected with rip rap. Based on our review of the flood elevation in relation to the proposed development site, we do not anticipate any deep-seated slope stability issues due to the relatively high strength and permeability of the in situ soils.

Based on our experience in this area the static groundwater is expected to be at a depth of approximately 5.7 m from the ground elevation (elevation of 10.8m). We anticipate short term increases in the groundwater level during the flood events due to high porosity of the ground. Based on the data recorded at groundwater monitoring wells in the area, located about 50 m and 215 m from the Capilano River and the approximate rainfall intensity of 4.2 mm/hr for 24 hours recorded on Nov 7th, 2015, we expect the groundwater at this site rise up to elevation of 13.1 m and 13.6 m for 10 years and 200 years flood event, respectively. The current site grades is ranging between 16.5 m and 14.9 m, therefore, expected groundwater during the flood events is manageable using a suitable waterproofing and drainage system around the expected one level of basement. This must be confirmed once the design drawings are available.
We trust that this is adequate for your present needs. Should you require additional information or clarification of the above, please feel free to contact the undersigned.

For:
GeoPacific Consultants Ltd.

Reviewed by:

Farshid Bateni, Ph.D, EIT.
Geotechnical Engineer in Training

Matt Kokan, M.A.Sc., P.Eng.
Principal

MAY 24 2016
200-year flood with 2-year tide and surge level (2.09 m GSC)

Model Boundaries
200-year Floodplain Extents
Flood Depths (m)
- 0 - 0.5
- 0.51 - 1
- 1.01 - 1.5
- 1.51 - 2
- 2.01 - 2.5
- 2.51 - 3
- 3.01 - 3.5
- 3.51 - 4

200-year flood with 200-year tide and surge level (2.88 m GSC)

NORTH VANCOUVER FLOOD ASSESSMENT
Capilano River Flood Depths

Scale - 1:10,000

coord. syst.: UTM Zone 10  horiz. datum: NAD 83  horiz. units: metres
northwest hydraulic consultants  project no. 3-5522  31-March-2010

Figure 4