12.2

District of West Vancouver

Zoning Bylaw No. 4662, 2010, Amendment Bylaw No. 5044, 2019

(Rodgers Creek, Areas 5 and 6)

Effective Date:

District of West Vancouver

Zoning Bylaw No. 4662, 2010, Amendment Bylaw No. 5044, 2019

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District of West Vancouver

Zoning Bylaw No. 4662, 2010, Amendment Bylaw No. 5044, 2019

A bylaw to amend the Zoning Bylaw for Rodgers Creek to allow for an increase in the number of residential units which would enable smaller residential units and additional secured rental units.

Previous amendments: Amendment bylaws 4672; 4677; 4678; 4679; 4689; 4701; 4680; 4710; 4697; 4716; 4712; 4737; 4726; 4736; 4757; 4752; 4767; 4787; 4788; 4784; 4772; 4791; 4805; 4809; 4828; 4854; 4873; 4866; 4895; 4839; 4898; 4927; 4944; 4905; 4974; 4967; 4982; 4962; 4928; 4992; 5001, 5021 and 5024.

WHEREAS the Council of The Corporation of the District of West Vancouver deems it expedient to provide for an amendment to the Zoning Bylaw;

NOW THEREFORE, the Council of The Corporation of the District of West Vancouver enacts as follows:

Part 1 Citation

1.1 This bylaw may be cited as Zoning Bylaw No. 4662, 2010, Amendment Bylaw No. 5044, 2019.

Part 2 Severability

2.1 If a portion of this bylaw is held invalid by a Court of competent jurisdiction, then the invalid portion must be severed and the remainder of this bylaw is deemed to have been adopted without the severed section, subsection, paragraph, subparagraph, clause or phrase.

Part 3 Amends the CD3 (Rodgers Creek) Zone

3.1 Zoning Bylaw No. 4662, 2010, Schedule A, Section 600 (Comprehensive Development or site specific zones), Section CD3 (Rodgers Creek) is amended as follows:

3.1.1 Section 603.04 "Density" is amended as follows:

3.1.1.1 Section (1) (a) is amended to add a new Section (viii) as follows:

"The area of roof overhangs and trellis extending 1.2 m or less over second story decks;"

3.1.1.2 Section (1) (b) is deleted in its entirety and replaced with the following:

"For apartments, 'floor area' shall have the meaning ascribed to it in Section 120.21 except that solariums and enclosed balconies shall be included in floor area; "

3.1.1.3 After Section (1) (b) a new Section (1) (c) is added as follows:

"For cluster housing, 'floor area' shall mean the total projected area of all storeys and attics of the principal building and all accessory buildings measured to the exterior walls of the building, excluding:

(i) Boiler room, mechanical room, electrical room, transformer vault, garbage room and building maintenance room, all intended to service the entire building, when located in a basement and/or sub-basement.

(ii) Open balconies, open terraces or exterior steps.

(iii) Hallways, elevator shafts and stairwells at basement and at sub-basement floor levels.

(iv) Laundry and workshop areas when located in a basement.

(v) Locker and storage space when located in a basement.

(vi) One residential use only entrance lobby.

(vii) Parking and loading areas.

3.1.1.4 After Section (1) (c) renumber all subsequent sections accordingly.

3.1.1.5 The bottom rows for Area 5, Area 6 and Totals, in the table that appears in Section (2), are amended as shown below:

AREA	MAXIMUM TOTAL FLOOR AREA	MAXIMUM TOTAL DWELLING UNITS
Area 5	44,426 square metres (no change)	~~224~~ 354
Area 6	~~50,409 square metres~~ 69,361 square metres	~~269~~ 620
Totals	~~174,249 square metres~~ 193,201 square metres	~~736~~ 1,217

3.1.1.6 Section (4) is deleted and subsequent sections are renumbered accordingly.

3.1.2 The rows for Area 5 and Area 6 in table that appears in Section 603.06 "Height" is amended as shown below:

AREA	HOUSING TYPE	MAXIMUM HEIGHT
Area 5	Apartment Building	~~37.19 and 12 storeys~~ 50.29 m and 16 storeys
Area 6	Single and Two Family Dwellings	7.62 m (no change)
	Cluster Housing	10.76 m (no change)
	Apartment Building	~~37.19 and 12 storeys~~ 50.29 m and 16 storeys

3.1.3 Section 603.03 is amended to add a new subsection (6) as follows:

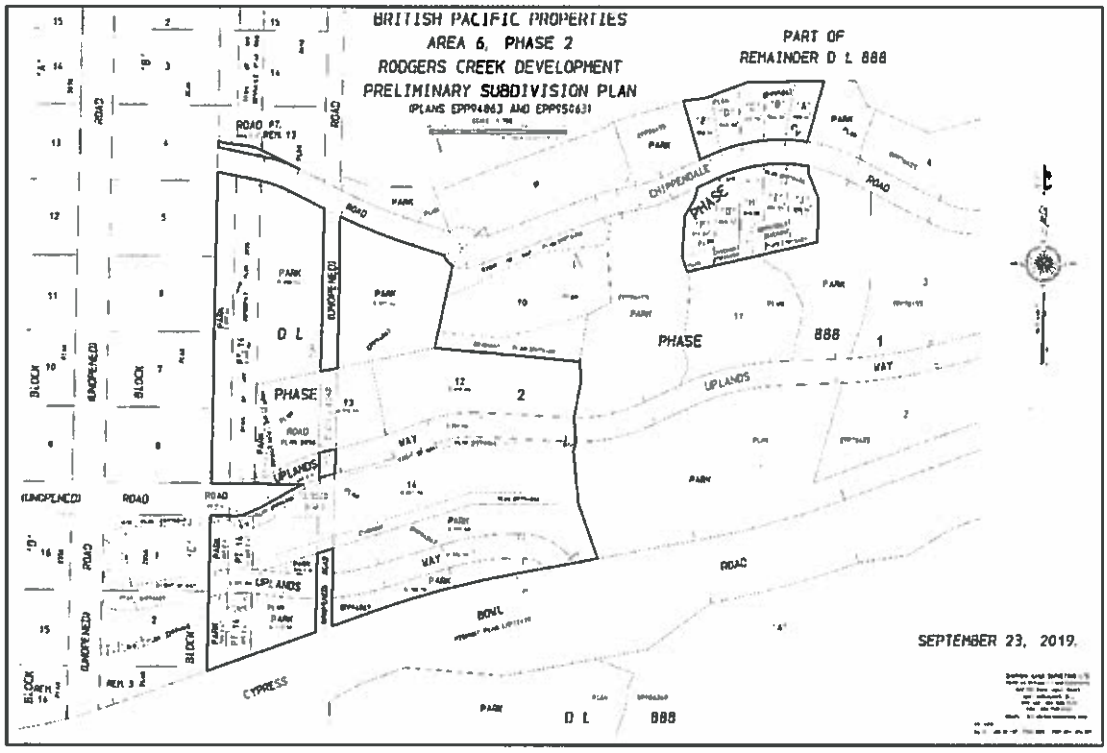
(6) On Lot 11 and Lot 12, the tenure of every dwelling unit, shall be residential rental tenure, and for the purpose of this subsection:

(a) "Lot 11" means the land legally described as Lot 11, District Lot 888, Group 1, New Westminster District, Plan EPP76455, and having the parcel identifier 030-674-107;

(b) "Lot 12" means the area of land labelled "12, *0.494 ha*" on the Rodgers Creek Development Preliminary Subdivision Plan prepared by Chapman Land Surveyors and dated September 23, 2019, a reduced copy of which appears below as section 3.1.3 (6) (d) of this CD3 zone.; and,

(c) "residential rental tenure" means occupied by one or more tenants pursuant to a tenancy agreement, and not occupied by an owner of the dwelling unit.

(d) Preliminary Subdivision Plan



3.1.4 The table in Section 603.09 (1) is amended to add new rows as shown below:

USE	PARKING RATIO
Secured Rental Housing	A minimum of 1 parking space per dwelling unit
	Parking designed and designated as visitor parking that is equal to at least 10% of the total number of dwelling units
	Secure bicycle storage space shall be provided equivalent to a minimum of 2 storage spaces per dwelling unit

READ A FIRST TIME on October 7, 2019

PUBLICATION OF NOTICE OF PUBLIC HEARING on November 22 and 27, 2019

PUBLIC HEARING HELD on December 3, 2019

READ A SECOND TIME on December 3, 2019

READ A THIRD TIME on December 3, 2019

APPROVED by the Ministry of Transportation and Infrastructure on February 5, 2020

ADOPTED by the Council on

_____
Mayor

_____
Corporate Officer

District of West Vancouver

Official Community Plan,
Bylaw No. 4985, 2018,
Amendment Bylaw No. 5045, 2019
(Rodgers Creek, Areas 5 and 6)

Effective Date:

District of West Vancouver

Official Community Plan Bylaw No. 4985, 2019, Amendment Bylaw No. 5045, 2019

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District of West Vancouver

Official Community Plan Bylaw No. 4985, 2018, Amendment Bylaw No. 5045, 2019

A bylaw to amend the Official Community Plan for Rodgers Creek to allow for an increase in the number of residential units which would enable smaller residential units and additional secured rental units.

WHEREAS the Council of The Corporation of the District of West Vancouver deems it expedient to provide for an amendment to the Official Community Plan to allow for the appropriate redevelopment of Areas 5 and 6 of Rodgers Creek;

NOW THEREFORE, the Council of The Corporation of the District of West Vancouver enacts as follows:

Part 1 Citation

1.1 This bylaw may be cited as Official Community Plan Bylaw No. 4985, 2018, Amendment Bylaw No. 5045, 2019.

Part 2 Severability

2.1 If a portion of this bylaw is held invalid by a Court of competent jurisdiction, then the invalid portion must be severed and the remainder of this bylaw is deemed to have been adopted without the severed section, subsection, paragraph, subparagraph, clause or phrase.

Part 3 Amends Area-Specific Policies and Guidelines

3.1 Schedule A to Official Community Plan Bylaw No. 4985, 2018 is amended as follows:

3.1.1 By amending Policy UL 8.1 by deleting the existing maximum floor area of 1,875,600 sq. ft. and inserting a new maximum floor area of 2,079,600 sq. ft.

3.1.2 By amending Policy UL 8.1 by deleting the existing maximum number of units from 736 and inserting a new maximum number of units of 1,217.

3.1.3 By amending Policy UL 8.1 by deleting the existing maximum number of single family and two family dwelling units of 120 and inserting a new maximum number of single family and two family dwelling units of 126.

3.1.4 By amending Policy UL 8.1 Section 2.05 by deleting the section in its entirety and inserting:

"Buildings in Area 6 should have a west coast modern character with buildings set amongst existing and replacement trees."

READ A FIRST TIME on October 7, 2019

PUBLICATION OF NOTICE OF PUBLIC HEARING on November 22 and 27, 2019

PUBLIC HEARING HELD on December 3, 2019

READ A SECOND TIME on December 3, 2019

READ A THIRD TIME on December 3, 2019

ADOPTED by the Council on .

_____

Mayor

_____

Corporate Officer

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District of West Vancouver

Phased Development Agreement Authorization

Bylaw No. 5041, 2019

(Areas 5 and 6 of Rodgers Creek)

Effective Date:

District of West Vancouver

Phased Development Agreement Authorization Bylaw No. 5041, 2019

(Areas 5 and 6 of Rodgers Creek)

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District of West Vancouver

Phased Development Agreement Authorization Bylaw No. 5041, 2019

(Areas 5 and 6 of Rodgers Creek)

A bylaw to enter into a Phased Development Agreement between the District of West Vancouver and British Pacific Properties Limited.

WHEREAS under the Local Government Act Council may by bylaw enter into a phased development agreement with a developer; and

WHEREAS Council published notices of its intention to enter into a phased development agreement with British Pacific Properties Limited, and held a public hearing in respect of this bylaw in accordance with the Local Government Act;

NOW THEREFORE, the Council of the District of West Vancouver enacts as follows:

Part 1 Citation

1.1 This bylaw may be cited as Phased Development Agreement Authorization Bylaw No. 5041, 2019.

Part 2 Severability

2.1 If a portion of this bylaw is held invalid by a Court of competent jurisdiction, then the invalid portion must be severed and the remainder of this bylaw is deemed to have been adopted without the severed section, subsection, paragraph, subparagraph, clause or phrase.

Part 3 Authorizes a Phased Development Agreement

3.1 Attached to this bylaw as Schedule "A" and forming part of this bylaw is a copy of a Phased Development Agreement between the District of West Vancouver and British Pacific Properties Limited (the "PDA").

3.2 The District is hereby authorized to enter into the PDA, and the Mayor and Clerk are authorized to execute the PDA on behalf of the District.

Schedules

Schedule A – Phased Development Agreement with British Pacific Properties Limited

READ A FIRST TIME on October 28, 2019

PUBLICATION OF NOTICE OF PUBLIC HEARING on November 22 and 27, 2019

PUBLIC HEARING HELD on December 3, 2019

READ A SECOND TIME on December 3, 2019

READ A THIRD TIME on December 3, 2019

ADOPTED by the Council on

_____
Mayor

_____
Corporate Officer

Schedule A – Phased Development Agreement with British Pacific Properties Limited

PHASED DEVELOPMENT AGREEMENT –Schedule A

This Agreement dated for reference the _____ day of_____, _____ is

AMONG:

THE DISTRICT OF WEST VANCOUVER

(the "District")

AND:

BRITISH PACIFIC PROPERTIES LIMITED

("BPP")

(BPP is referred to in this Agreement as "**the Owners**")

WHEREAS:

A. BPP is the registered owner of land legally described in Schedule A;
B. The Owners have applied to the District for an amendment to the District's land use bylaw by way of Zoning Bylaw No. 4662, 2010, Amendment Bylaw No. 5044, 2019 (the "**Zoning Amendment Bylaw**") to permit the development on the Owners' land of a range of residential uses and associated civic and community uses;
C. The Owners wish to provide certain amenities and features in the development of the Land, and the parties wish to ensure that the provisions of the District' zoning bylaw as amended by the Zoning Amendment Bylaw continue to apply to the Land for the period more particularly set out in this Agreement; and
D. The Council of the District has given notice and held a public hearing and has, by bylaw, authorized the execution of this Agreement;

NOW THEREFORE in consideration of the mutual promises set out in this Agreement, the parties agree pursuant to section 516 of the *Local Government Act* as follows:

INTERPRETATION OF AGREEMENT

1. In this Agreement, the term "Land" refers to all of the land referred to in Schedule A.

APPLICATION OF AGREEMENT

2. This Agreement applies to the Land, including any parcels of land into which the Land may be subdivided. This Agreement applies to the Land, and any subdivided portions thereof, and to no other land.

BYLAW AMENDMENTS NOT TO APPLY

3. For the term of this Agreement, any amendment or repeal of section 603 of Zoning Bylaw No. 4662, 2010 shall not apply to the Land, except:

(a) as provided in section 516(6) of the *Local Government Act*; or

(b) to the extent that the Owners of any parcel comprising the Land agrees in writing that the amendment or repeal shall apply to that Land, provided that the Owners agree that any amendment of that section or any other section of the Zoning Bylaw that permits accessory housing generally within the District, being the use of land or buildings for a second dwelling unit additional to the principal dwelling unit on land or in a building, shall apply to the Land.

4. For certainty, and without limiting section 3, the District agrees that any development permit or building permit that would be issuable in respect of the Land on the date of adoption of the Zoning Amendment Bylaw will be issued throughout the term of this Agreement in accordance with the District's Official Community Plan and Building Bylaw No. 4985, 2018 respectively, despite any amendment or repeal of the bylaw provisions specified in section 3 that would otherwise prevent the issuance of the permit.

TERM OF AGREEMENT

5. The term of this Agreement is 10 years commencing on _____, the date of adoption of the Phased Development Agreement Authorization Bylaw No. 5041, 2019, and terminating on_____.

6. The parties may terminate this Agreement at any time by written agreement of all parties.

7. If the amenities and features of the development are not provided to the standards and at the times set out in sections 8 through 10, on which questions the opinion of the District shall be determinative provided that the District may not act unreasonably, the District may at its option terminate this Agreement by providing notice in writing to the Owners, provided that the District has at least two (2) months prior to giving such notice, advised each of the Owners in writing of any alleged failure (the "Default Notice") to provide such amenities and features in accordance with this Agreement and the Owners have not corrected the deficiency to the reasonable satisfaction of the District, or if such default reasonably requires longer than two (2) months to remedy, the Owners have failed to substantially commence remedying such default within two (2) months after receipt of the Default Notice to the reasonable satisfaction of the District, or has failed to substantially complete remedying the default within six (6) months after receipt of the Default Notice to the reasonable satisfaction of the District.

AMENITIES AND FEATURES OF THE DEVELOPMENT

8. The Owners shall provide the amenities listed in Schedule B at the times specified in Schedule B, and references to areas of the Land in Schedule B are references to the areas identified in Schedule B1. The standards for any amenities to be constructed must be no lower than those described in the Rodgers Creek Area Development Plan Overview Report dated March 7, 2008, and must be approved in writing by the District prior to construction.

9. To the extent that such building features may be incorporated in the development of the Land without contravening the B.C. Building Code, buildings and structures on the Land including service infrastructure provided by any of the Owners must comply with the green building and building adaptability standards sets out in Schedule C.

10. Section 9 does not exempt any Owner from complying with any provincial or District law of general application that may impose a more onerous standard, and for that purpose a standard is more onerous if it provides a greater level of protection to the environment or greater accessibility to persons with disabilities.

SUBDIVISION OF THE LAND

11. The parties acknowledge that, at the request of the Owners, the Zoning Amendment Bylaw establishes development density limits and requirements on an area basis so as to provide maximum flexibility to the Owners in planning the subdivision and development of the Land. No Owner may subdivide any parcel comprising the Land unless, concurrently with the subdivision, the Owner grants to the District a covenant under section 219 of the *Land Title Act* restricting the use of the Land and the construction of buildings and structures on the Land such that the regulations contained in the Zoning Amendment Bylaw in respect of the Land are made applicable to the individual parcels created by the subdivision in a manner satisfactory to the District, acting reasonably.

ASSIGNMENT OF AGREEMENT

12. The Owners may assign this Agreement in whole or in relation to any parcel into which the Land may be subdivided, if;

    (a) the District, acting reasonably, consents in writing to the assignment and the assignee has executed and delivered to the District a notice of assumption and has entered into an assignment agreement with the Owners; or

    (b) the assignment is to a developer licensed to do business in the District that has executed and delivered to the District a notice of assumption and has entered into an assignment agreement with the Owners assigning the Agreement.

AMENDMENT OF AGREEMENT

13. The parties may in writing agree to minor amendments to this Agreement, and for that purpose a "minor amendment" is an amendment to section 5 of Schedule B or to Schedule C.

SPECIFIC PERFORMANCE

14. The Owners agree that the open space, Mountain Path, activity nodes, wetlands, trails and trail connections and highway rights of way described in Schedule B are uniquely located properties and if BPP fails to dedicate such lands to the District or grant to the District statutory rights of

way in respect of such lands, as described in Schedule B, the Owners agree that the District shall be entitled to an order of specific performance for the dedication or grant, but the District is not precluded from claiming an award of damage for the Owners' breach.

GENERAL TERMS AND CONDITIONS

15. Any notice permitted or required by this Agreement to be given to either party must be given to that party at the address set out above, or to any other address of which the party has given the other party notice in writing expressly for the purposes of this Agreement.

16. Except as expressly set out in this Agreement, nothing in this Agreement shall prejudice or affect the rights and powers of the District in the exercise of its functions under the *Community Charter* or the *Local Government Act* or any of its bylaws, or those of the District's approving officer under the *Land Title Act*, *Strata Property Act* or Bare Land Strata Regulations.

17. Any opinion, decision, act or expression of satisfaction or acceptance provided for in this Agreement may be taken or made by the District's Director of Planning and Development Services, unless expressly provided to be taken or made by another official of the District.

18. No provision of this Agreement is to be considered to have been waived by the District unless the waiver is expressed in writing by the District. The waiver by the District of any breach by any of the other parties of any provision is not to be construed as or constitute a waiver of any further or other breach.

19. Whenever in this Agreement the District is required or entitled to exercise any discretion in the granting of consent or approval, or is entitled to make any determination, take any action or exercise any contractual right or remedy, the District may do so in accordance with the contractual provisions of this Agreement and no public law duty, whether arising from the principles of procedural fairness or the rules of natural justice or otherwise, shall have any application in the interpretation or implementation of this Agreement except to the extent that such duty arises as a matter of public law.

20. The Owners shall indemnify and save harmless the District, its officers, employees, Council members, agents and others (the "District Representatives") from and against any and all actions, causes of action, liabilities, demands, losses (but not loss of profits), damages, costs, expenses (including actual fees of professional advisors), remediation of contamination costs, fines, penalties and other harm of any kind whatsoever, whether related to death, bodily injury, property loss, property damage, property contamination or consequential loss or damage, suffered or incurred by the District or any of the District Representatives, directly or indirectly, arising from, resulting from, connected with or related to:

    (a) death, bodily injury, damage to or loss of any property or other incident or occurrence during the construction or provision of the amenities and other development

contemplated by this Agreement;

(b) any default or breach of this Agreement by the Owners; and

(c) any wrongful act, omission or negligence of the Owners or their directors, officers, employees, agents, contractors, subcontractors, licenses, or others for whom they are responsible in law with respect to the covenants and obligations of the Owners pursuant to this Agreement.

21. This indemnity shall survive any conclusion or other termination of this Agreement, in relation to any matter arising prior to it.

22. If any Owner is delayed or prevented from the performance of any covenant or agreement required hereunder to reason of any unavoidable cause, then performance of such covenant or agreement shall be excused for the period during which such performance is delayed or prevented and the time for the performance thereof shall be extended accordingly. For the purposes of this section, "unavoidable cause" means any event or contingency beyond the reasonable control of the Owner, including without limitation a delay caused by weather conditions, power failure, fire or other casualty, governmental laws, regulations or controls, civil commotion, insurrection, sabotage, invasion, rebellion, military or usurped power, war or war-like operations and acts of God but excluding a delay caused by lack of funds.

23. Time is of the essence of this Agreement and will remain of the essence notwithstanding the extension of any dates.

24. The obligations and covenants of the parties comprising the Owners shall be several only, and not joint and several.

25. The Owners acknowledge and agree that the District, acting reasonably, may, despite any public law limitations on the withholding of building permits and occupancy permits, withhold building permits and occupancy permits for the purpose of ensuring compliance with and administrating the terms of this Agreement.

26. The District may, during the construction of any amenity required by this Agreement, appoint from time to time an employee or official to represent the interests of the District under this Agreement and advise the Owners in writing of such appointment, and the Owners shall for that purpose provide to the District's representative reasonable access to all documents related to the construction including but not limited to plans, permits, specifications, Building Code analyses, receipts, waybills, shipping documents and contracts, and reasonable access to the site of construction and all construction facilities. The Owners agree that the viewing of this documentation by the District's representative does not create any legal obligation, in tort or otherwise, on the part of the District or its representative whether or not comments are given

to the Owners and whether or not the Owners choose to act on comments that are given.

27. This Agreement may be executed in counterparts.

THE DISTRICT OF WEST VANCOUVER
By its authorized signatories:

_____

_____

BRITISH PACIFIC PROPERTIES LIMITED
By its authorized signatories:

_____

_____

SCHEDULE A – BPP LAND

PID	LEGAL DESCRIPTION
010-060-456	LOT 14, BLOCK C, DISTRICT LOT 888, PLAN 2056; EXCEPT: PART PLAN LMP 12499
010-060-472	LOT 15, BLOCK C, DISTRICT LOT 888, PLAN 2056; EXCEPT: LMP 12499
010-060-529	LOT 16, BLOCK C, DISTRICT LOT 888, PLAN 2056
010-059-903	LOT 9, BLOCK B, DISTRICT LOT 888, PLAN 2056
010-059-946	LOT 10, BLOCK B, DISTRICT LOT 888, PLAN 2056
010-059-989	LOT 11, BLOCK B, DISTRICT LOT 888, PLAN 2056
010-060-014	LOT 12, BLOCK B, DISTRICT LOT 888, PLAN 2056
010-060-049	Part of LOT 13, BLOCK B, DISTRICT LOT 888, PLAN 2056; EXCEPT: EPP76455
005-179-815	Part of THAT PART OF DISTRICT LOT 888 LYING TO THE EAST OF BLOCKS B AND C PLAN 2056; EXCEPT: PLANS 21009, 21528, LMP12499, BCP386, EPP25625, AND EPP76455
030-674-042	LOT 5 DISTRICT LOT 888 PLAN EPP76455
030-674-051	LOT 6 DISTRICT LOT 888 PLAN EPP76455
030-674-069	LOT 7 DISTRICT LOT 888 PLAN EPP76455
030-674-077	LOT 8 DISTRICT LOT 888 PLAN EPP76455
030-674-085	LOT 9 DISTRICT LOT 888 PLAN EPP76455
030-674-093	LOT 10 DISTRICT LOT 888 PLAN EPP76455

SCHEDULE B

AMENITIES AND FEATURES OF THE DEVELOPMENT

(References to Areas are references to areas set out on Schedule B1.)

1. 1. Dedication or grant of a statutory right of way, as determined by the District and the Owners, acting reasonably, to the District of open space as described in the Rodgers Creek Area Development Plan Overview Report dated March 7, 2008 (the "Report"), upon each internal subdivision within Area 5 or Area 6 containing such open space.

2. $7.64 million to be paid to the District for deposit to a District reserve, to be paid as follows:

    (a) $2.5 million prior to the issuance of a building permit authorizing the construction of the 245th dwelling unit on the Land that encompass all of the CD-3 zoning bylaw (Areas 1 through 6) to be paid to the District for deposit to a District reserve fund to be used for amenity projects determined by Council which may include but are not limited to McGavin Field, community arts and culture facilities elsewhere in the District, a fire hall and associated equipment, a childcare facility, transportation improvements within Rodgers Creek or the future Cypress Village, or over-sizing of storm water division works in the District;
    (b) $3,068,600 prior to the final approval of zoning bylaw adoption to be paid to the District for deposit to a District reserve fund;
    (c) $71,400 prior to the final approval of zoning bylaw adoption to paid to the District for deposit to the Public Art Reserve Fund;
    (d) $1 million prior to the issuance of the Phase 2 Subdivision of Area 6 and no later than December 16, 2021 to be paid to the District for deposit to a District reserve fund;
    (e) $1 million prior to the issuance of the Subdivision of Area 5 and no later than July 20, 2020 to be paid to the District for deposit to a District reserve fund.

3. $500,000 for the restoration and enhancement of environmentally sensitive areas within the Land or in the vicinity of the Land, other than the mitigation of development impacts associated with the building of bridges and the installation of culverts as described in the Report. The selection of areas to be restored and enhanced and the timing if the work shall, subject to the limitation set out in this section 3, be in the sole discretion of the District. Alternatively, with the approval of the District, allocate the $500,000 to initiate a West Vancouver Environmental Endowment Fund to be administered by the West Vancouver Foundation, to provide annuities for District-wide Environmental enhancement and improvement projects, through a granting process.

4. $2 million in-kind contribution for the installation of lights along the Mountain Paths in Areas 5 and 6 from Chippendale Road to the future Cypress Village site as well as the widening of the Upper Mountain Path to a 3.0m paved surface and construction of a trestle structure spanning Cave Creek and Cave Creek Far East, prior to the issuance of building permits in respect of Area 5 for more than

25% of the dwelling units permitted in that area or prior to the issuance of building permits in respect of Area 6 for more than 22% of the dwelling units permitted in that area.

5. Dedication to the District as highway or park land, or if so determined by the District and the Owners, acting reasonably, granting to the District of a statutory right of way for, and in either case the construction of, the Mountain Path as described in the Rodgers Creek Area Development Plan Overview Report dated March 7, 2008, at the time of development of each portion of the Land through which the Mountain Path passes, except that:

    (a) the portion of the Mountain Path connecting Area 5 to McGavin Field must be provided, subject to securing approvals from the Ministry of Transportation, prior to the issuance of building permits in respect of Area 5 for more than 25% of the dwelling units permitted in that area, and

    (b) the portion of upper Mountain Path west of Area 6 must be provided prior to the issuance of building permits in respect of Area 6 for more than 22% of the dwelling units permitted in that area.

6. The Owners agree to participate in District-led ongoing discussions, in collaboration with trails users, to identify locations for permanent recreational trails on private property (including mountain bike trails), to be secured by a statutory right of way in favour of the District or other possible mechanisms.

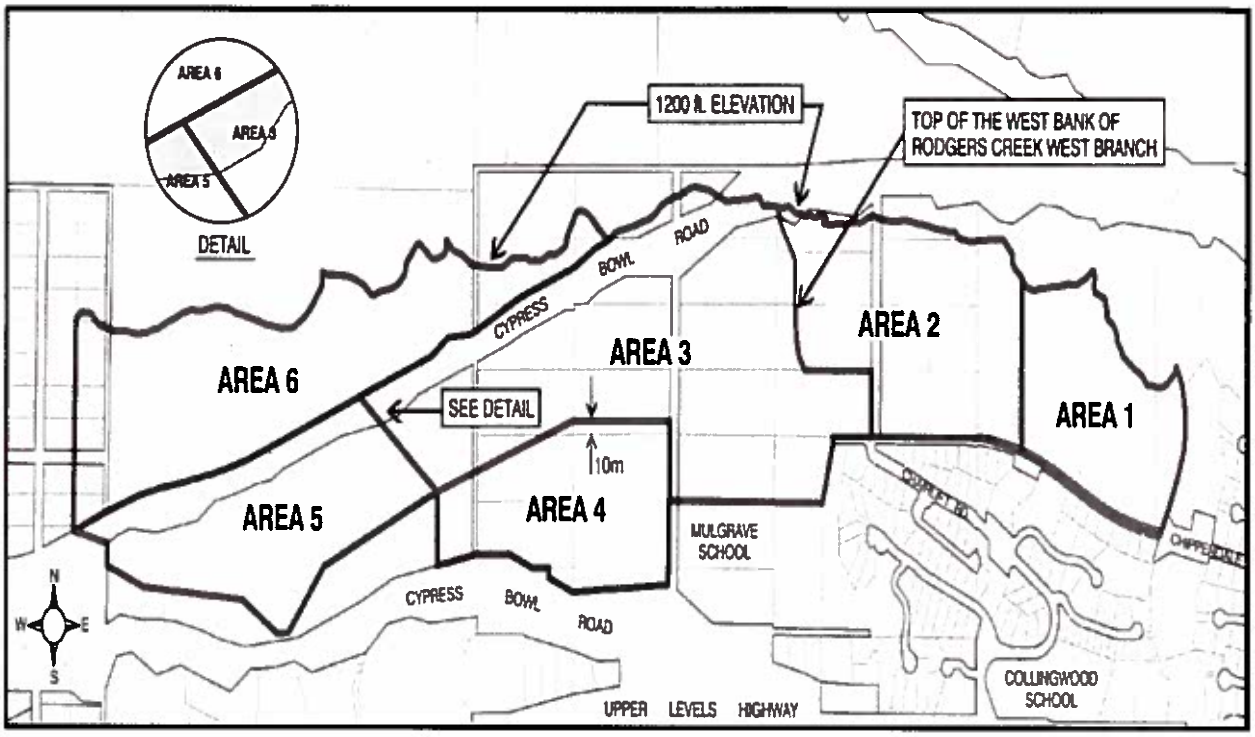
7. Road works in excess of ordinary District standards:

    (a) Enhancement of the design and construction of all roads and lanes constructed on the Land to the standard described in the Rodgers Creek Area Development Plan Overview Report dated March 7, 2008, including traffic calming measures on the portion of Chippendale Road between Marr Creek and the forested section of the Mountain Path, as each portion of the road and lane network is constructed to serve portions of the Land being developed.

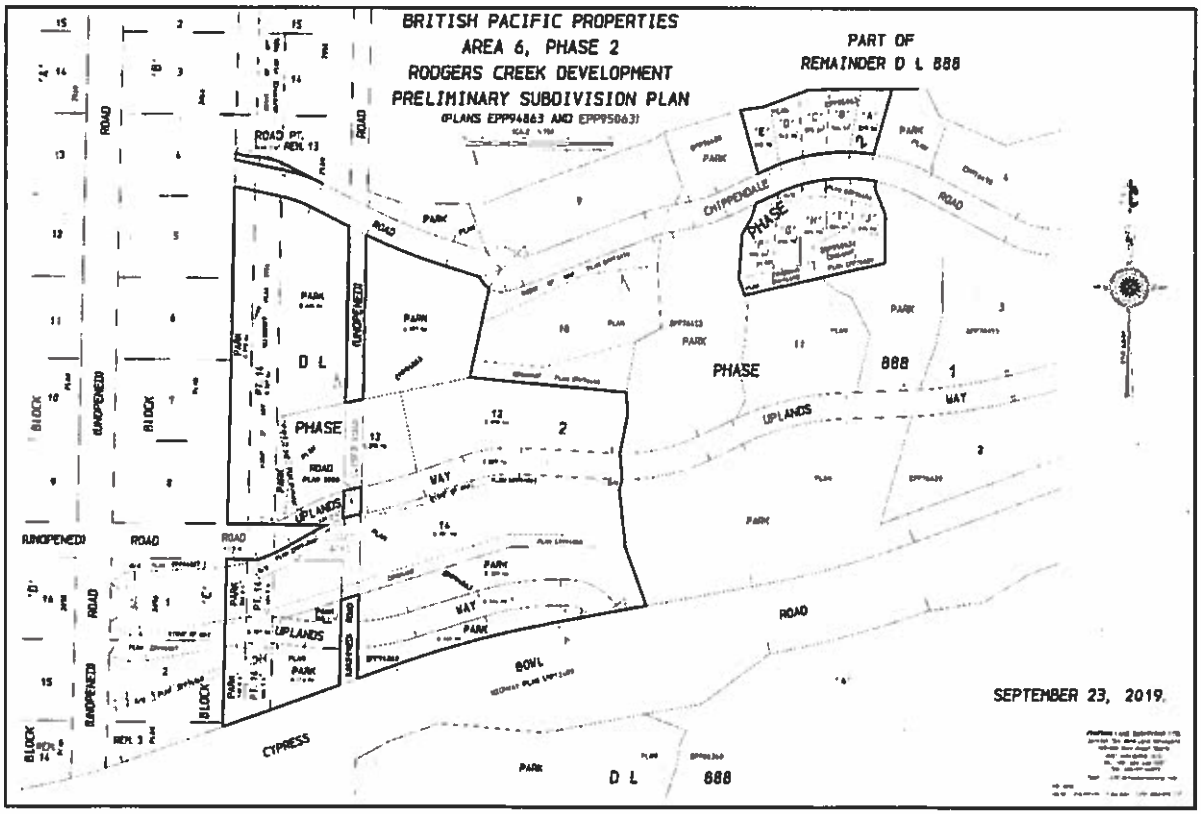
8. Construction of a purpose built rental apartment building on Proposed Lot 12 of Area 6 as shown in Schedule B2.

9. Securing Lot 11, District Lot 888, Group 1, New Westminster District, Plan EPP76455, PID 030-674-107, for the use of a purpose built rental apartment building to a maximum of 12 storeys.

SCHEDULE B1



SCHEDULE B2



SCHEDULE C

GREEN BUILDING, SUSTAINABLE TRANSPORTATION AND ADAPTABLE HOUSING STRATEGY

The landowners have committed to a Strategy that reduces GHGs, provides alternate transportation options and delivers adaptable housing. This strategy includes the following.

Green House Gas Reduction

- Use on-site carbon-free (e.g. electric) thermal energy and domestic hot water systems in all Part 3 strata title buildings.
- Use on-site carbon-free (e.g. electric) or lower-carbon (e.g. air source heat pump) thermal energy systems in all Part 9 buildings.

Electric Vehicles and Bicycle Storage

- Include a labeled and energized outlet capable of providing a minimum of Level 2 electric vehicle (EV) charging as defined by SAE International's J1772 standard for all residential parking spaces in Part 3 buildings, excluding visitor parking spaces, and for all residential units in Part 9 buildings Any energy management system that controls the rate and timing of EV charging shall be certified to be sufficient for this purpose.
- Provide a minimum of one secure bicycle parking space per bedroom. Bicycle parking spaces should be not less than 0.6 metre width and 1.8 metre length with appropriate surface, clearance, labeling and security. They should be conveniently located in a common area at the level of grade or at the first level of vehicle parking above or beneath grade.

Adaptable Housing

20 percent of all units in Part 3 Apartment Buildings shall comply with the following Adaptable Design Guidelines:

A. Drawings:

Architectural drawings must include the following:

- Project Summary Sheet with list of adaptable design elements indicated in these Design Guidelines
- Notations on drawings to label each adaptable unit
- Unit plans prepared at scale per DWV requirement

B. Design Elements:

1. Building Access:
   a) Outside stairs – maximum degree of colour contrast on nosing of each stair
   b) Curb cuts have tactile and visual cues
   c) Unobstructed access to main building entrances from street/sidewalks (excluding Cluster Homes and Townhouses)

d) Unobstructed internal access:
e) From parking levels containing accessible parking (5' or 1520mm corridors; 2' or 610mm clear wall space adjacent to door latch)
f) Garbage and recycling receptacles and storage lockers
g) No stairs within building circulation including corridors on residential levels
h) Accessible storage lockers for each accessible unit
i) Canopy over main building entrances (3' or 915mm) and enterphone
j) Provide automatic door opener for at least one building entry door at ground level as well as doors leading into the building on each underground parkade level where disability parking is provided
k) 3' or 915mm building and suite entry doors
l) Flush thresholds throughout the building (maximum 1/2" or 13mm height) - see item 6 b) for patios and balconies
m) Accessible building enterphone, call buttons and, where provided, suite door bells

2. Common Areas:
   a) Accessible mailboxes for all AD Level 2 units, and 5' or 1520mm turning radius in front

3. Circulation:
   a) Corridors minimum 4' or 1220mm wide (except for service access areas)
   b) Provide 5' or 1520mm turning radius inside and outside the entry corridor of each dwelling unit

4. Suite Circulation:
   a) Provide wiring for an automatic door opener for the suite entry door

5. Doors:
   a) Minimum one bathroom, minimum one bedroom and storage room doors 2'-10" or 860mm clear opening"

6. Patios and Balconies:
   a) Minimum one door 2' - 10" or 860mm clear door opening
   b) Minimum one patio or balcony doorsill with maximum 1/2" or 13mm vertical step at threshold or approve alternative accessibility measure.

7. Windows:
   a) Opening mechanism maximum 46" or 1168mm above floor (provide notation on window schedule)
   b) Provide minimum 6' or 1800mm horizontal windows in living room, dining room and minimum one bedroom where sills are not more than 2'- 6" or 750mm above the floor

8. Kitchen:
   a) Continuous counter between sink and stove, except where sink is in a kitchen island.

9. Min. One Bathroom:
   a) Toilet located adjacent to wall (min 3' or 915mm length)
   b) Provide turning radius within bathroom (may result from removal of vanity cabinet)
   c) 3' or 915mm clearance along full length of tub
   d) Tub control valve placed at outer edge of tub, with tub spout remaining in central position

e) Accessible storage

10. Parking:

Total Required Parking Spaces	Required number of Disability Parking Spaces to be provided for Adaptable Design Dwelling Units
1 – 25	1
26- 50	2
51 – 100	3
101 – 150	4
151 – 200	5
201 - 250	6
251 – 300	7
301 - 350	8
351 – 400	9
401 - 450	10

C. <u>Fixtures and Finishes:</u>

1. Basic:
   a) Easy to read building address numbers (min. 4" or 100mm high in contrasting colours)
   b) Good lighting levels outside and inside main building entries and suite entries
   c) No polished finish on building entry flooring
   d) Except for pocket doors, sliding doors, or doors equipped with openers, lever door handles are required on all doors (provide notation on door schedule)
   e) Signage throughout common areas has well contrasted colours
   f) Elevators have well contrasted control buttons

2. Circulation:
   a) Slip resistant flooring

3. Building Meeting & Amenity Rooms:
   a) Provide finishes and materials to absorb sound and decrease echoes

4. Unit Entries:
   a) Door handle at 40" or 1000mm above the floor, with deadbolts placed immediately above or below except where fixture incorporates the deadbolt

5. Unit Flooring:
   a) Non-slip flooring in kitchen and minimum one bathroom
   b) High density, low level loop carpet and underlay maximum 1/2" or 13mm height

6. Patios and Balconies:
   a) Outdoor light fixture provided
   b) Electrical outlet provided

7. Electrical:

a) Switches, controls, thermostats and the highest breaker in the suite panel, to be installed no higher than 46" or 1170mm above finished floor
b) Electrical outlets, cable outlets, telephone jacks not lower than 18" or 450mm above floor
c) Within suites a duplex outlet is required within 8" or 200mm of a telephone jack
d) Wiring for visual alarm system in living room and minimum one bedroom, connected to fire alarm system
e) Switches with good accessibility and tactile qualities

8. Windows:
   a) Easily grasped and operated mechanism for opening and locking windows

9. Kitchen:
   a) Task lighting at sink, stove and work areas in addition to general overhead lighting
   b) Adjustable shelves in all cabinets

10. Min One Bathroom:
    a) Solid blocking provided in walls of tub / shower and toilet areas, and behind towel bars
    b) Pressure balanced tub / shower valves
    c) Provision in water supply and drain to allow for a 4" (100mm) drop in vanity height (offset plumbing)
    d) Provision for vanity sink removal
    e) Adjustable height shower head or hand-held shower head on adjustable bracket

11. Bedrooms:
    a) Three-way switched light at bed area and doorway
    b) Provide light fixture in or adjacent to closet
    c) Telephone jack

12. In Suite Storage (if applicable):
    a) Provide light and electrical outlet

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District of West Vancouver
Proposed

Development Permit No. 19-061
Amendment to Development Permit No. 16-079

Registered Owner: British Pacific Properties Ltd (the "Owner")

This Development Permit applies to: approximately 8 ha of land located north of Cypress Bowl Road, as shown on Schedule C ("the Lands")

Legal Descriptions: See Schedule B attached

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1. This Development Permit:
   - 1.1 Imposes requirements and conditions for the development of the Lands: which are designated by the Official Community Plan as the Rodgers Creek Area of the Upper Lands Development Permit Area to provide for the protection of the natural environment, its ecosystems and biological diversity, and to provide for the protection of development from hazardous conditions; and
   - 1.2 Varies and supplements the District's Zoning Bylaw No. 4662, 2010 as follows and on the conditions set out below; and
   - 1.3 Is issued subject to the Owner's compliance with all of the Bylaws of the District applicable to the Lands, except as varied or supplemented by this Permit.
2. For clarity, Development Permit No. 16-079 still applies except where altered by this permit.
3. The following terms and conditions shall apply to the Lands:
   - 3.1 The Lands may only be subdivided in accordance with the plans attached as Schedule 'C' and 'D'. Notwithstanding, the Director of Planning and Development Services may determine:
     - a) that the subdivision plan conforms to the Development Permit plan if there is a minor difference between the Development Permit plan and Subdivision Plan that does not materially affect the intent of the plans attached to this Development Permit or is a technical requirement of the subdivision.
     - b) that minor changes to the proposal still comply with the Development Permit plans where proposed changes do not materially affect the intent of the plans attached to this Development Permit.

3.2 Prior to issuance of building permits for 22% of the principal dwelling units permitted for Area 6, the Owner shall construct the Upper Mountain Path and secondary trails identified on Schedule D of DP 16-079 to the written approval of the Director of Planning and Development Services.

3.3 Zoning Bylaw No. 4662, 2010, as amended, is varied:

a) Section 603.06 (Height) to allow houses on proposed Lots F to J to be a maximum geodetic height of 355.6 metres measured as per Section 120.19 of the Zoning Bylaw.

b) Section 603.06 (Height) to allow houses on proposed Lot A to E to be a maximum geodetic height of 363.9 metres measured as per Section 120.19 of the Zoning Bylaw.

c) Section 603.07 (Highest Building Face) to eliminate this restriction for houses on proposed Lots A to J.

d) Section 603.08 (Yards) to allow a front yard on proposed Lots A to J of 5 metres to a garage with its vehicle door facing a front site line or 3 metres to a garage with its vehicle door facing a side site line.

e) Section 603.08 (Yards) to allow side yards on proposed Lots A to J of 1.0 metres.

3.4 Zoning Bylaw No. 4662, 2010, as amended, Section 120.22 shall be varied to allow the retaining walls in proposed Lot 14 (formerly known as Lot 12) on the north side of the Upper Mountain Path as shown on Schedule 'D' to DP 16-079 to be constructed with a maximum exposed height of 6 metres and:

a) The design of which must be submitted to, and approved by, the Director of Planning and Development Services prior to construction; and

b) be in substantial conformance with the proposed grades and retaining wall detail shown on Schedule 'D' to DP 16-079 and be located a minimum of 7 metres from the rear property line of each lot; and

c) be constructed under building permit and in accordance with the recommendations of a professional geotechnical engineer and/or structural engineer; and

d) following completion of construction, be the subject of a final report from a professional geotechnical engineer that notes any measures, as required, to be employed during building, road and service construction, and that confirms and certifies that:

i. construction practices, methods, procedures, etc. were followed; and

ii. any fills or cuts within proposed building envelope areas are suitable and stable for building construction; and

iii. all retaining walls have been constructed in accordance with the approved design.

3.5 Landscaping of proposed Lots A to J must take place and include the following, all to the satisfaction of the Director of Planning and Development Services, prior to issuance of a certificate of building occupancy:

a) informal in character and with the limited use of retaining walls;

b) providing low water consumption landscapes and use of permeable paving products

c) primarily native plant materials, and specifically excluding invasive plants identified in the District's Invasive Plant Strategy; and

d) a minimum of one tree per 100 m^2 of lot area with consideration for planting coniferous trees; and

e) all trees having a minimum height of 3 metres at time of planting.

3.6 Prior to commencing tree removal, earthworks, rock removal or rock blasting in accordance with Schedule D, written approval from the Director of Planning and Development Services shall be obtained.

3.7 A Forest Management Zone, based on a Tree Management Plan approved by the Director of Planning and Development Services, must be established at the south end of Lots 2 and 10 as shown in DP 16-079 and proposed Lots 14 and F to J to ensure tree retention over the long term while allowing for drainage facilities, servicing, view corridors and wildland fire management best practices.

3.8 The proposed 'Park' areas must not be disturbed, except:

a) prior to transfer of the proposed 'Park' areas to the District, hazard trees must be removed by the Owner as approved by the Director of Planning and Development Services; or

b) secondary trails and the upper mountain path may be constructed; or

c) municipal infrastructure may be installed; or

d) the wetland shown in the proposed 'Park' area west of Lot 2 (referred to in DP 16-079) may be constructed.

3.9 Prior to commencing the permitted work on the Lands, including site clearing, grubbing, stripping and tree removal, the Owner shall:

a) implement the Wildland Fire Management Plan approved under 4.6 below as it relates to activities authorized by this Development Permit, to the written acceptance of the District's Fire Chief;

b) have fire and risk management aids onsite in areas of active work, and

c) shall cease all work onsite at the request of the District's Fire Chief.

3.10 Prior to commencing the permitted work including site clearing, grubbing, stripping and tree removal, the Owner must:

a) install measures to control sediment and erosion and to protect all watercourses including their riparian areas (the 'Environmental Protection Measures') consistent with the Environmental Management Plan attached as Schedule 'E' to the written acceptance of the Director of Planning and Development Services; and

b) maintain the Environmental Protection Measures, with modification as necessary to ensure effective sediment and erosion control and creek protection, throughout construction of the works permitted herein, and

only remove the Environmental Protection Measures upon written approval by the Director of Planning and Development Services; and

c) give a minimum of 10 business days notice to the Director of Planning and Development Services prior to commencing tree removal and earthworks.

CONDITIONS PRECEDENT TO SUBDIVISION

4. Prior to final approval of the subdivision, the Owner shall, all at the cost of the Owner:

4.1 Prepare an updated Tree Management Plan for Area 6 of Rodgers Creek that includes all changes as proposed in Schedule D to the satisfaction of the Environmental Protection Officer.

4.2 Prepare an updated functional servicing report for Areas 5 and 6 of Rodgers Creek to the satisfaction of the Director of Planning and Development Services.

4.3 Design, construct and install to the approval of the Director of Planning and Development Services, new roads including parking, trail crossings boulevards, water, storm, culvert crossings, sanitary and related infrastructure that are consistent with Schedule D of this permit and Schedule D of DP 16-079 and the concepts set out in the Rodgers Creek Area Development Plan, Overview Report dated March 7, 2008.

4.4 The Road "G" (Uplands Way) extension for the Rodgers Creek Area 6 lands, including the culverts within Cave Creek West, shall be partially constructed ("roughed-in") as illustrated in the drawings attached as Schedule 'D'. For clarification, the permitted work allows rough-in and tree removal for the roads, but does not include the installation of underground and above ground infrastructure. Prior to installation of culverts within watercourses, the Registered Owner must submit, and receive acceptance for a final culvert design for each of the watercourses on the Lands from the Director of Planning and Development Services.

4.5 Prepare an updated statutory building scheme acceptable to the Approving Officer and that reflects the Rodgers Creek Area Development Plan, Overview Report dated March 7, 2008.

4.6 Prepare an updated Wildfire Management Plan coordinated with an updated emergency access strategy acceptable to the Approving Officer.

4.7 Provide to, and receive written approval from, the Director of Planning and Development Services, design of:

a) the Upper Mountain Path within Area 6 and the portion connecting west to Cypress Bowl Road, and

b) pedestrian trails within Area 6 and a trail connecting north to the Trans-Canada Trail,

consistent with Schedule D of this permit and Schedule D of DP 16-079 and the concepts set out in the Rodgers Creek Area Development Plan, Overview Report dated March 7, 2008.

4.8 Landscape a minimum of the rear 7 metres of proposed Lot 14 (formerly referred to as Lot 12) consistent with Schedule D to DP 16-079, in

accordance with plans prepared by the Owner, accepted by the Director or Planning and Development Services and installed by the Owner. The purpose of this landscape strip is to: ensure appropriate separation between a public trail and the rear yard of the adjacent proposed lot; maintain privacy of the lot; and maintain the forest character of the adjacent public trail.

5. Prior to final approval of the subdivision of the Lands, the Owner shall register a Section 219 covenant against the proposed Lots to require compliance with the accepted wildland fire management plan required under section 4.6

6. Prior to final approval of the subdivision of the Lands, the Owner shall register a Section 219 covenant:

   6.1 Against proposed Lots A to J, to require the landscaping referred to in Section 3.5 of this Development Permit to be detailed on a landscape plan submitted and accepted prior to building permit issuance, and supported by a security equal to 100% of the cost of landscaping works for the due and proper installation of the accepted landscape plan prior to the issuance of a certificate of building occupancy.

   6.2 Against proposed Lots H and J requiring maintenance of the constructed wetlands located within the lots and, in the absence of an Owner maintaining a wetland on their property, allowing for the District to maintain the wetlands at the Owners expense.

   6.3 Against proposed Lot 14 (formerly Lot 12) preventing retaining walls being constructed within 7 metres of the rear lot line and requiring this area to be landscaped in accordance with the accepted plans under condition 4.7 above and maintained in perpetuity by Owner of the lot.

   6.4 Allowing minor changes and variations to the requirements in 6.1 to 6.3 above to be approved by the Director of Planning and Development Services, where the proposed changes do not materially affect the intent of the plans attached to this Development Permit.

SECURITY

7. As security for the due and proper completion of the measures to preserve, protect, restore or enhance the environment set forth in Section 2 of this Development Permit (the "Environmental Protection Measures"), the Owner shall:

   7.1 provide, prior to issuance of this Development Permit, security in the amount of $30,000 to the District in the form of cash or an unconditional, irrevocable auto-renewing letter of credit issued by a Canadian chartered bank or credit union; and

   7.2 be entitled to a reduction in the security as follows:

   a) $30,000 once a certificate of building occupancy is issued for proposed Lot 12; and

   7.3 maintain the Environmental Protection Measures until the permitted work is completed and written approval to remove the Environmental Protection Measures is provided as set forth in Section 3.9 of this permit and Section 2 of DP 16-079; and

   7.4 in the event that the Environmental Protection Measures are not completed as provided for in this Development Permit and if the Environmental Protection Measures fail to satisfy the objectives of the Upper Lands Development Permit Area of the Official Community Plan, the District may, at its option, enter upon, carry out and complete the Environmental Protection Measures in such a manner as to satisfy the objectives and recover the costs of doing so from the security deposited, including the costs of administration and supervision.

8. With respect to the previous security for the due and proper completion of the measures to preserve, protect, restore or enhance the environment set forth in Section 2 of DP 16-079 ("DP 16-079 Environmental Protection Measures") in the amount of $300,000 previously provided to the District, release of the security is updated as follows:

   8.1 entitlement to a reduction in the security as follows:

   a) $30,000 for each proposed lot once a certificate of building occupancy is issued for Lots 1 to 4 and Lots 9, 10, 13 and 14; and

   b) $10,000 for each proposed lot once a certificate of building occupancy is issued for Lots A, E, F and J; and

   c) $20,000 once the ownership of Lot 11 (formerly referred to as Lot 13) "amenity lot" is transferred to the District of West Vancouver; and

   8.2 maintain the DP 16-079 Environmental Protection Measures until the permitted work is completed and written approval to remove the Environmental Protection Measures is provided as set forth in Section 2; and

   8.3 in the event that the DP 16-079 Environmental Protection Measures are not completed as provided for in this Development Permit and if the Environmental Protection Measures fail to satisfy the objectives of the Upper Lands Development Permit Area of the Official Community Plan, the District may, at its option, enter upon, carry out and complete the Environmental Protection Measures in such a manner as to satisfy the objectives and recover the costs of doing so from the security deposited, including the costs of administration and supervision.

EXPIRY

9. This Development Permit lapses if the subdivision authorized herein, or any portion thereof, is not approved within 24 months of the date this permit is issued.

THE COUNCIL OF WEST VANCOUVER APPROVED THIS PERMIT BY RESOLUTION PASSED ON.

_____
MAYOR

_____
MUNICIPAL CLERK

THE REQUIREMENTS AND CONDITIONS UPON WHICH THIS PERMIT IS ISSUED ARE ACKNOWLEDGED AND AGREED TO. IT IS UNDERSTOOD THAT OTHER PERMITS / APPROVALS MAY BE REQUIRED INCLUDING PERMITS / APPROVALS FOR BUILDING CONSTRUCTION, SOIL AND ROCK REMOVAL OR DEPOSIT, BOULEVARD WORKS, AND SUBDIVISION.

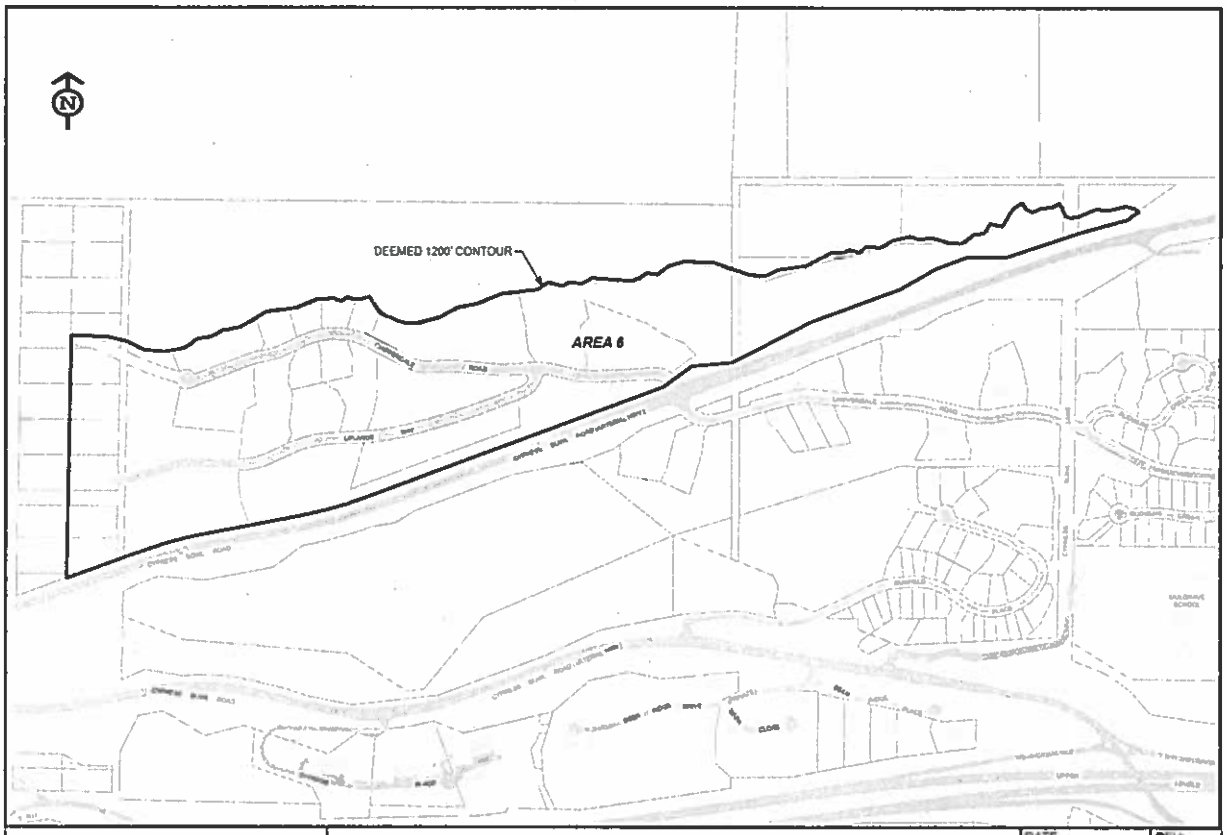
Owner: Signature	Owner: Print Name above	Date
Owner: Signature	Owner: Print Name above	Date

FOR THE PURPOSES OF SECTION 9, THIS PERMIT IS ISSUED ON

Schedules:

A – Rodgers Creek Area 6 Context Plan
B – Legal Descriptions of Subject Lands
C – Rodgers Creek Area 6 Proposed Subdivision dated September 23, 2019
D – Rodgers Creek Area 6 DP set dated September 24, 2019
E – Environmental Management Plan dated June 2019
F - Wildfire Management Plan dated June 2019

Schedule A

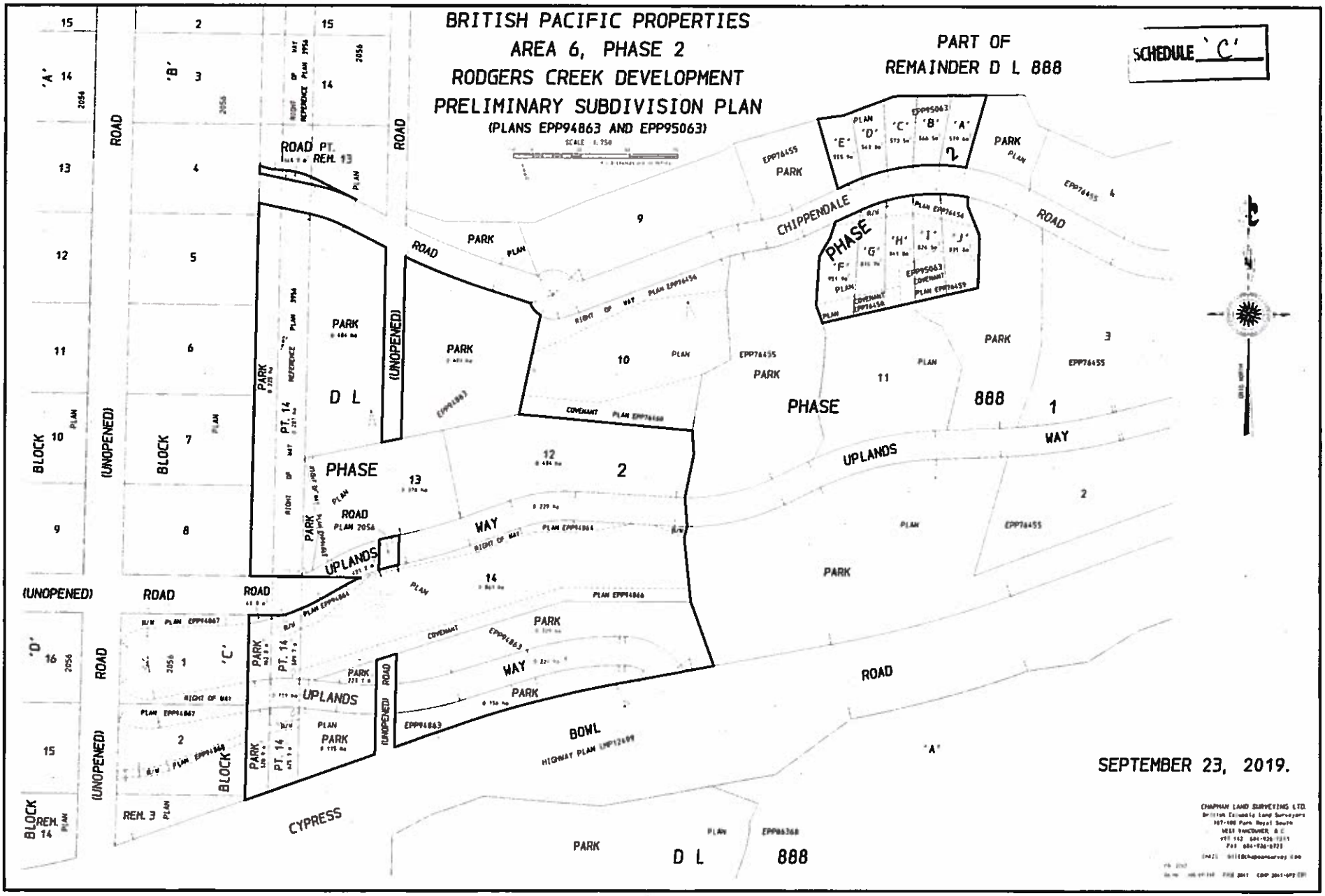


west vancouver	CONTEXT PLAN	DATE Sep.05/19	REV. 0
	TITLE Rodgers Creek Area 6	FILE 19-061	

Schedule B

PID'S & LEGAL DESCRIPTIONS OF LANDS RODGERS CREEK AREA 6

PID	Legal Description
010-060-456	LOT 14, BLOCK C, DISTRICT LOT 888, PLAN 2056; EXCEPT: PART PLAN LMP 12499
010-060-472	LOT 15, BLOCK C, DISTRICT LOT 888, PLAN 2056; EXCEPT: LMP 12499
010-060-529	LOT 16, BLOCK C, DISTRICT LOT 888, PLAN 2056
010-059-903	LOT 9, BLOCK B, DISTRICT LOT 888, PLAN 2056
010-059-946	LOT 10, BLOCK B, DISTRICT LOT 888, PLAN 2056
010-059-989	LOT 11, BLOCK B, DISTRICT LOT 888, PLAN 2056
010-060-014	LOT 12, BLOCK B, DISTRICT LOT 888, PLAN 2056
010-060-049	Part of LOT 13, BLOCK B, DISTRICT LOT 888, PLAN 2056; EXCEPT: EPP76455
005-179-815	Part of THAT PART OF DISTRICT LOT 888 LYING TO THE EAST OF BLOCKS B AND C PLAN 2056; EXCEPT: PLANS 21009, 21528, LMP12499, BCP386, EPP25625, AND EPP76455
030-674-042	LOT 5 DISTRICT LOT 888 PLAN EPP76455
030-674-051	LOT 6 DISTRICT LOT 888 PLAN EPP76455
030-674-069	LOT 7 DISTRICT LOT 888 PLAN EPP76455
030-674-077	LOT 8 DISTRICT LOT 888 PLAN EPP76455
030-674-085	LOT 9 DISTRICT LOT 888 PLAN EPP76455
030-674-093	LOT 10 DISTRICT LOT 888 PLAN EPP76455


BRITISH PACIFIC PROPERTIES
AREA 6, PHASE 2
RODGERS CREEK DEVELOPMENT
PRELIMINARY SUBDIVISION PLAN
(PLANS EPP94863 AND EPP95063)
PART OF
REMAINDER D L 888
SCHEDULE 'C'
SEPTEMBER 23, 2019.
CHAPMAN LAND SURVEYING LTD.
British Columbia Land Surveyors
ROAD
(UNOPENED)
BLOCK
PHASE
PARK
UPLANDS
WAY
CHIPPENDALE
CYPRESS
BOWL
D L
888

SCHEDULE "D"

RODGERS CREEK AREA 6: ROAD G EXTENSION

DP FOR SUBDIVISION, ROAD CLEARING & EARTHWORKS

BRITISH PACIFIC PROPERTIES LTD.
WEST VANCOUVER

SEPTEMBER 24, 2019

OWNER:
BRITISH PACIFIC PROPERTIES
#1001 - 100 Park Royal
West Vancouver, BC, V7T 1A2
tel 604.925 9000
CONTACT: BRYCE TUPPER

CIVIL ENGINEER
INTERCAD SERVICES, LTD.
1111 West 8th Avenue
Vancouver , Bc, V6H 1C5
Tel 604.739.7707
CONTACT: IAIN LOWE

LANDSCAPE ARCHITECT:
PWL PARTNERSHIP LANDSCAPE ARCHITECTS INC.
5th Floor, East Asiatic House
1201 West Pender Street
Vancouver , BC, V6E 2V2
Tel 604.688.6111
CONTACT: JASON WEGMAN

LAND SURVEYOR
CHAPMAN LAND SURVEYING LTD.
#107 - 180 Park Royal South
West Vancouver
BC, V7T 1A2
Tel 604.926 7311
CONTACT: BILL CHAPMAN

DRAWING LIST:

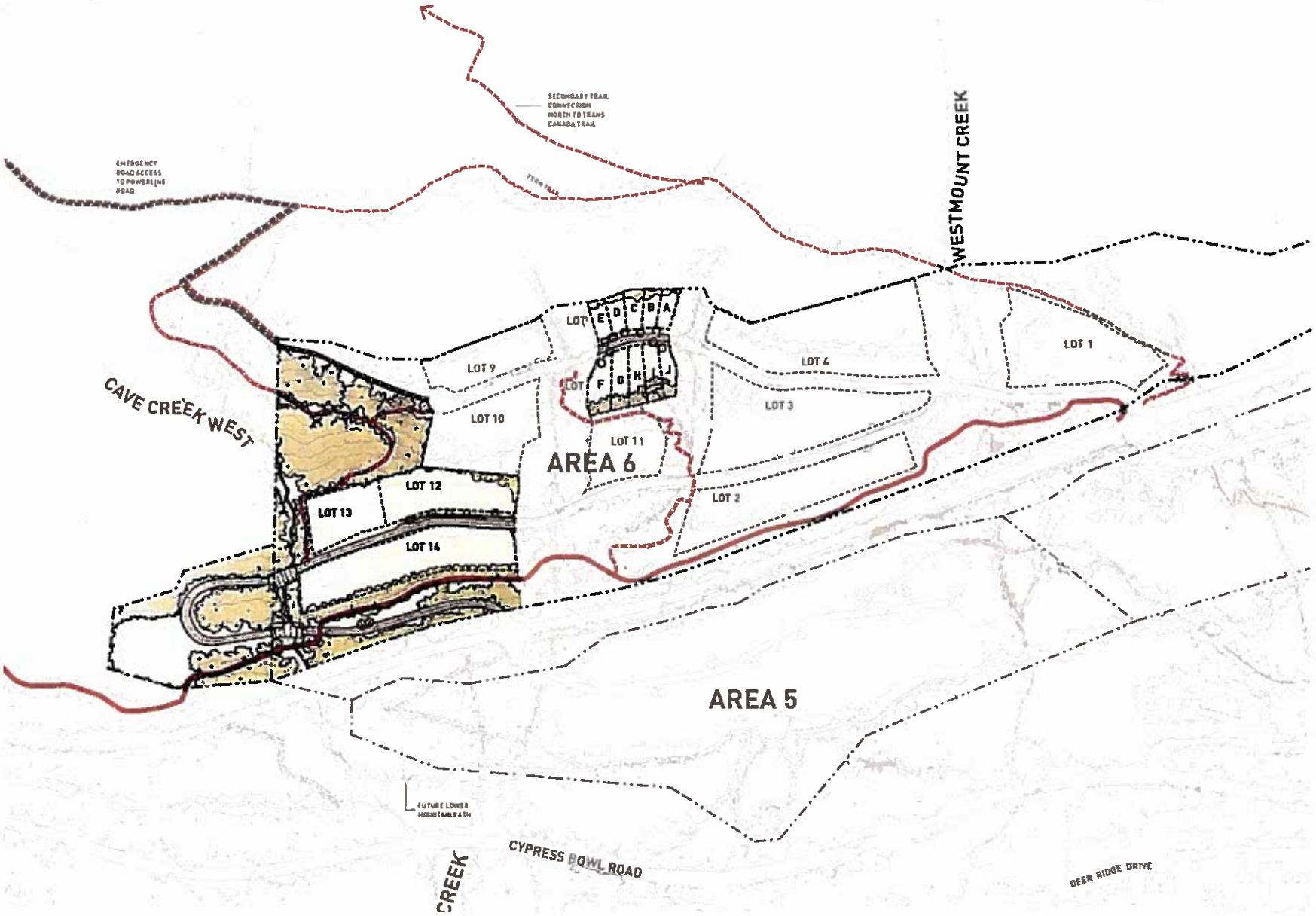
LANDSCAPE DRAWINGS:

CIVIL DRAWINGS:

SURVEY:
SUBDIVISION PLAN

InterCAD

PWL



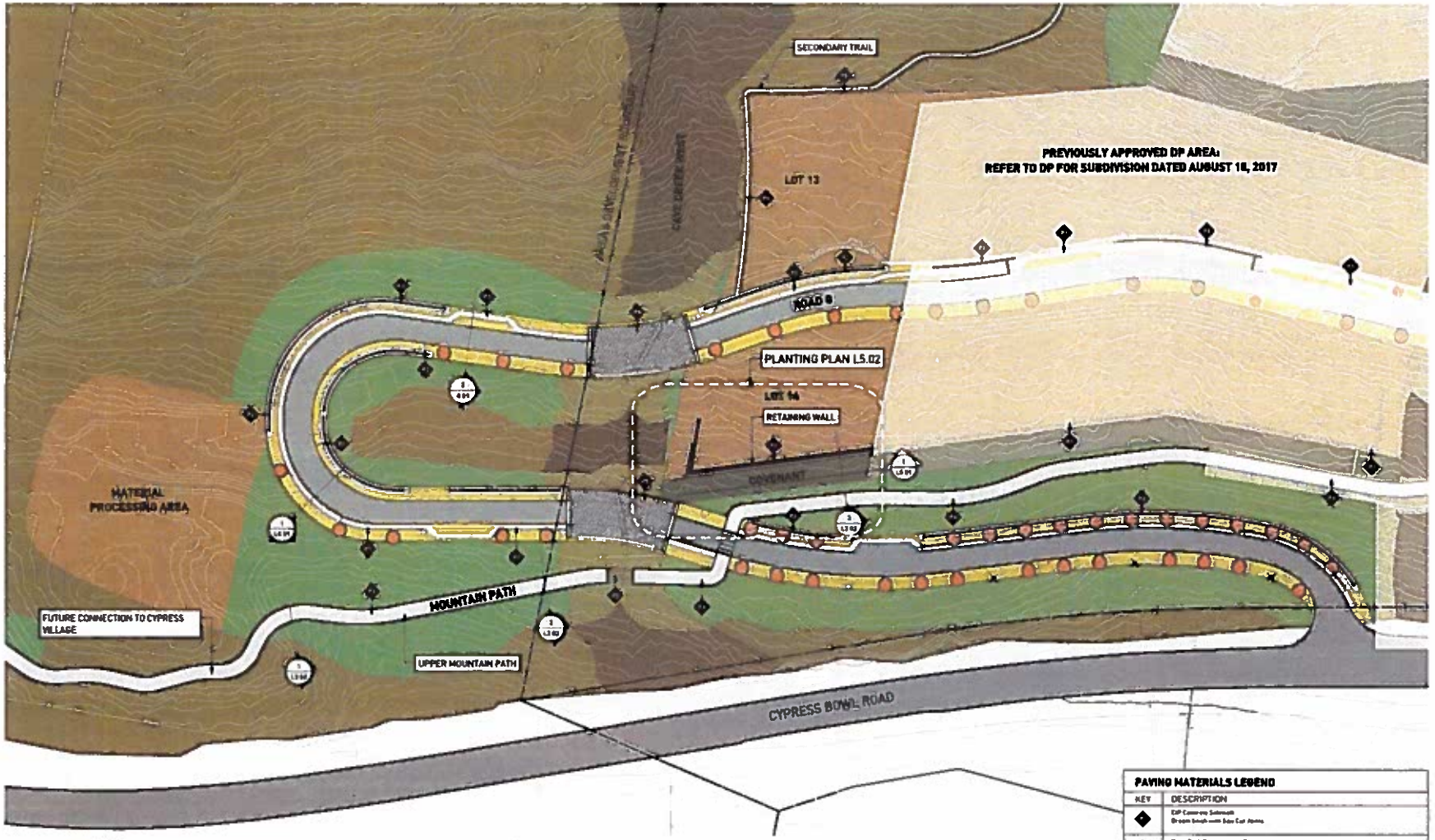
PWL partnership

ROGERS CREEK AREA 6

ILLUSTRATIVE CONCEPT PLAN

1:150

L0.01



LEGEND

- STREETSCAPE
- LOT AREA AND MATERIAL PROCESSING AREA
- FOREST PROTECTED AREA
- FOREST ENHANCEMENT AREA
- RIPARIAN PROTECTED AREA
- RIPARIAN ENHANCEMENT AREA
- FOREST MANAGEMENT COVENANT
- PREVIOUSLY APPROVED DP AREA
- MOUNTAIN PATH
- DEVELOPMENT BOUNDARY

PAVING MATERIALS LEGEND

KEY	DESCRIPTION
◆	CIP Concrete Sidewalk Broom finish with Saw Cut Joints
◆	River Rock Broom-swept Boulders
◆	Trench Drain with Cast Iron Grate
◆	Upper Mountain Path per Rodgers Creek Standard Asphalt
◆	Mountain Path On-slope Timber
◆	Secondary Trail per Rodgers Creek Standard Granular with Timber Border
◆	Retaining Wall Stacked Rock Wall/Pre-Cast Segmental Block System
◆	Broom-swept and Trowel-cut Asphalt

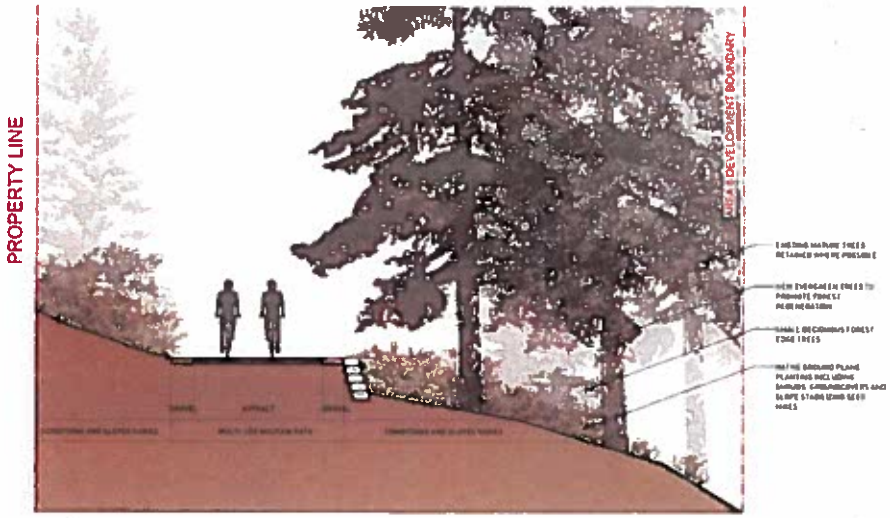
PWL partnership

RODGERS CREEK AREA 6

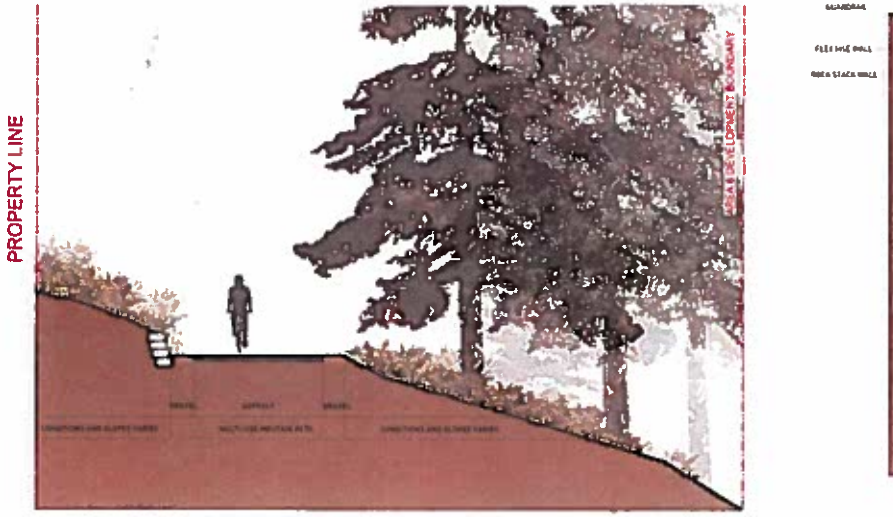
MATERIALS PLAN

1:150

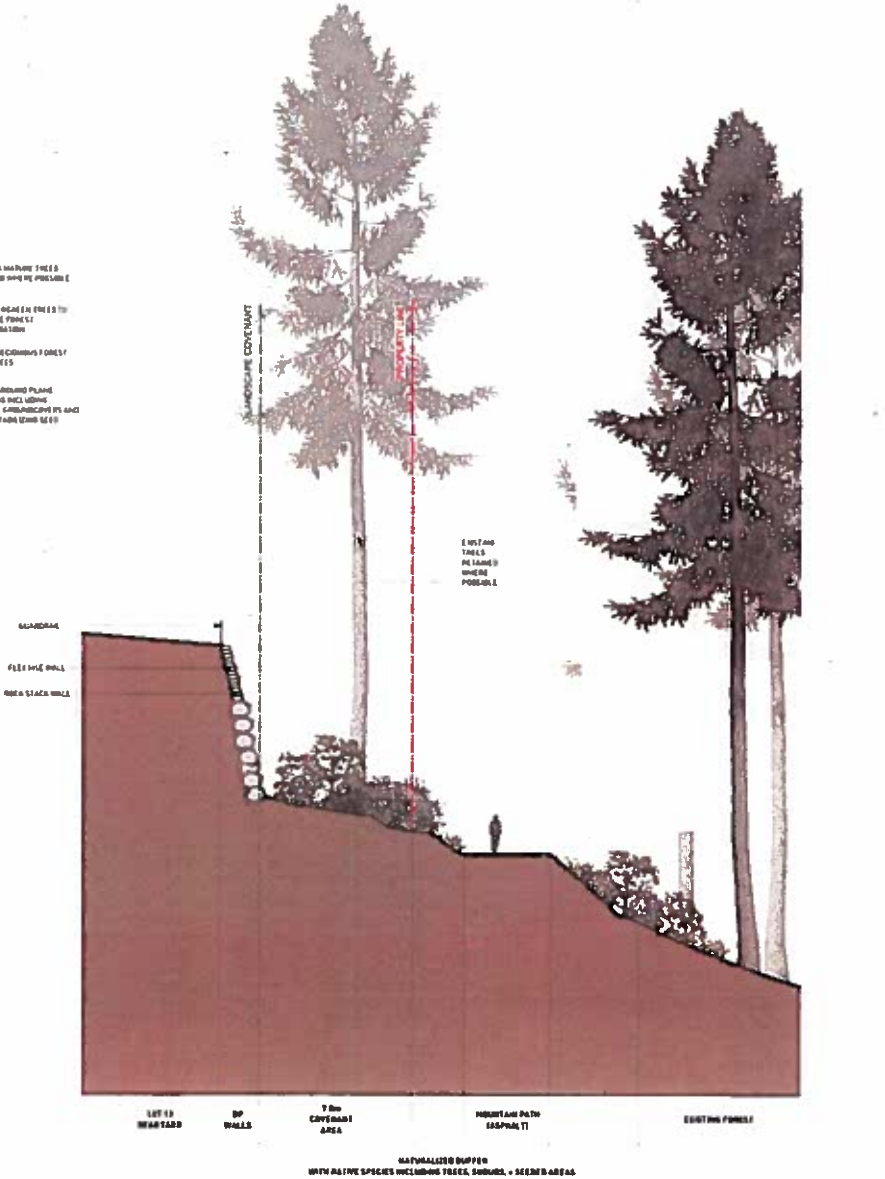
L1.01



1 MOUNTAIN PATH - FLEX MSE WALL - TYPICAL SECTION - RAISED CONDITION
Scale 1:50



2 MOUNTAIN PATH - FLEX MSE WALL - TYPICAL SECTION - CUT CONDITION ADJACENT TO EXISTING TREE TO BE RETAINED
Scale 1:50



3 MOUNTAIN PATH WITH DP WALL
Scale 1:100

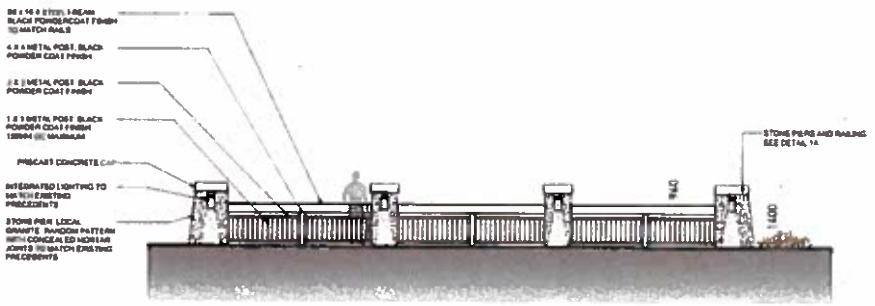
PWL partnership

RODGERS CREEK - AREA II

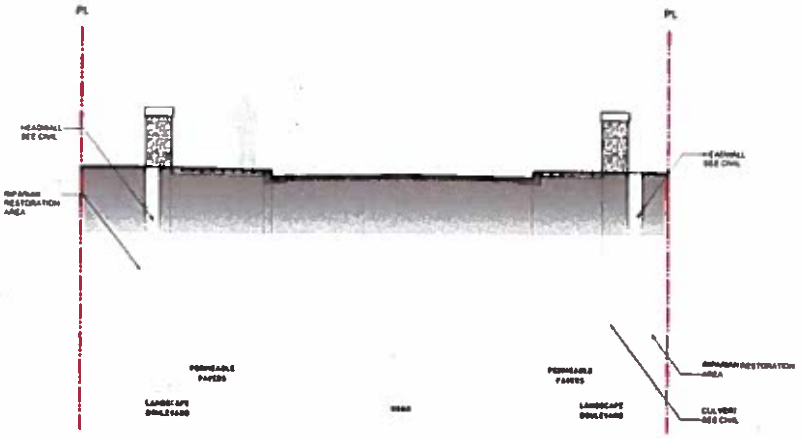
DETAILS
UPPER MOUNTAIN PATH

AS SHOWN

L 3.01

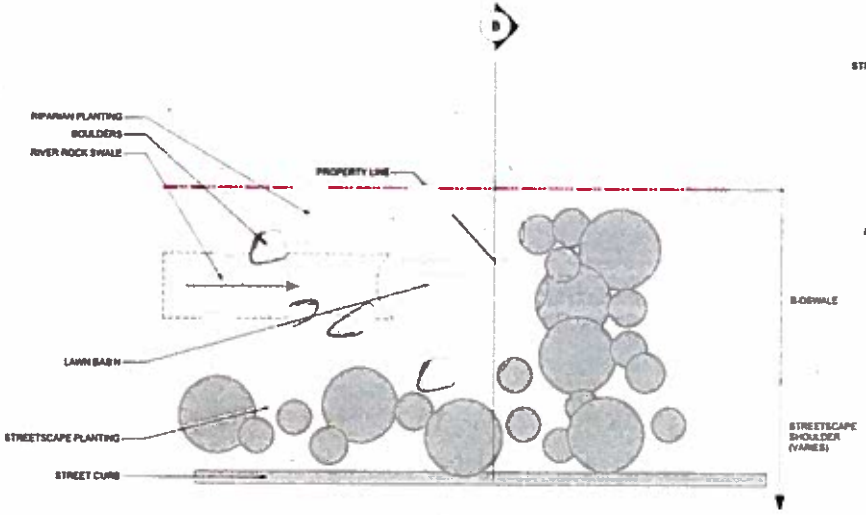


A TYPICAL ELEVATION

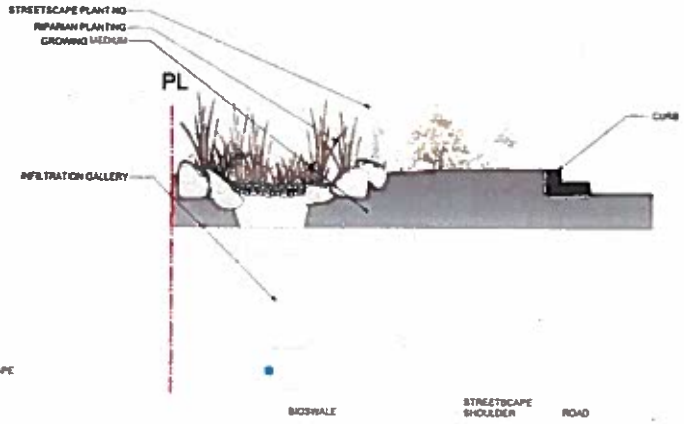


B TYPICAL SECTION

1 DECORATIVE AND METAL RAILING



A TYPICAL PLAN



B TYPICAL SECTION

2 BIO RETENTION SWALE TYPE A

ATTENTION
REFER TO PROJECT SPECIFICATIONS FOR ADDITIONAL INFORMATION REGARDING MATERIAL REFERENCES, INSTALLATION METHODS AND APPROVALS

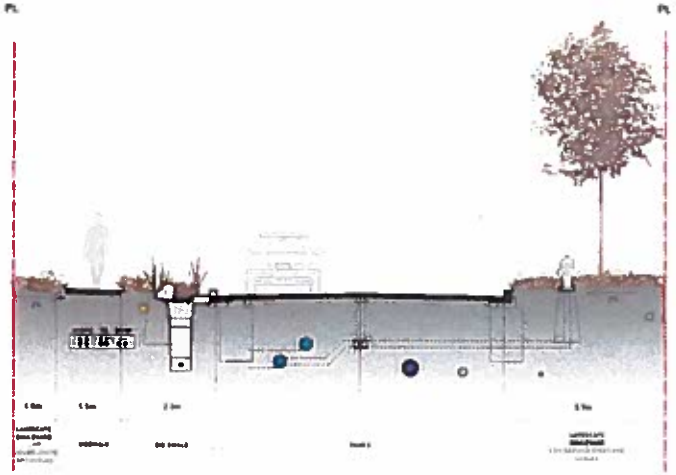
PWL partnership

RODGERS CREEK - AREA B

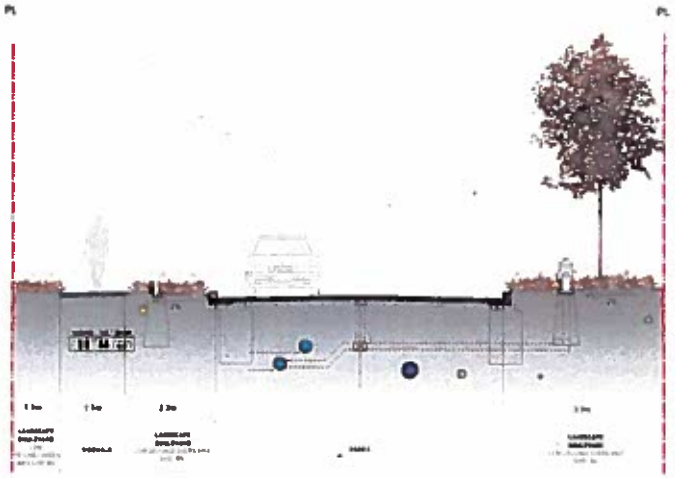
DETAILS
CREEK CROSSING
RAILING AND PIER
BIOSWALE

AS SHOWN

L 3.02



1 ROAD G - TYPICAL SECTION
Scale 1:50



2 ROAD G - TYPICAL SECTION WITH PARKING BAY
Scale 1:50

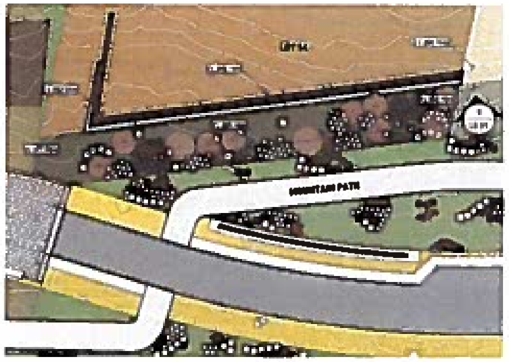
PWL partnership

ROGERS CREEK AREA 6

ROAD SECTIONS

1:50

L4.01



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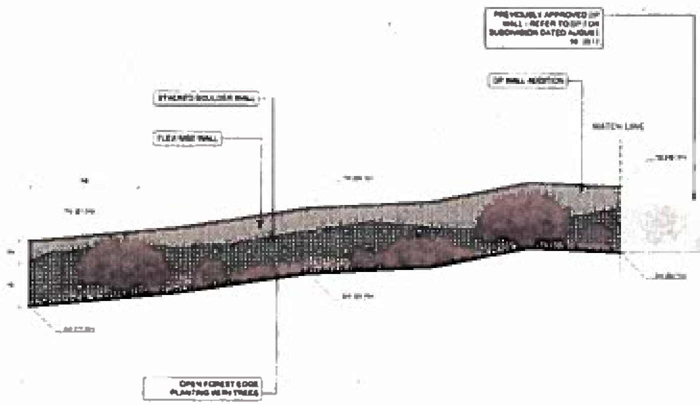


ELEVATION AT MOUNTAIN PATH - DP WALL

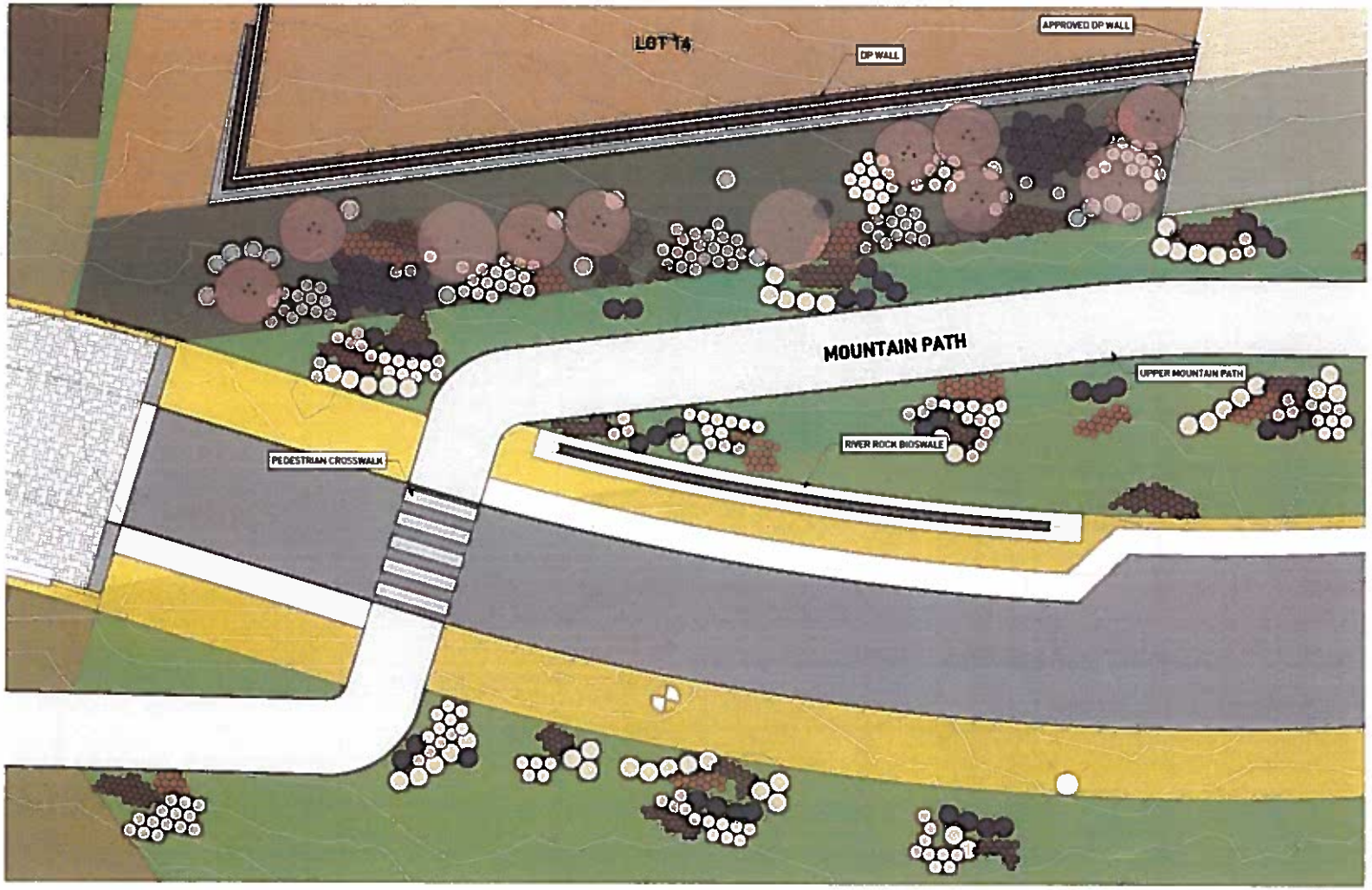
PWL partnership

RODGERS CREEK AREA 6

DP WALL ELEVATION

1:200

L5.01



UNDERSTORY AND TREES

- Acer glabrum (Rock Maple)
- Acer circinatum (Vine Maple)
- Amelanchier alnifolia (Pacific serviceberry)
- Oemleria cerasiformis (Indian Plum)

OPEN FOREST EDGE

- Amelanchier alnifolia (Pacific serviceberry)
- Blechnum spicant (Deer Fern)
- Gaultheria shallon (Salal)
- Oemleria cerasiformis (Indian Plum)
- Polystichum munitum (Western Swordfern)
- Rubus spectabilis (Salmonberry)
- Vaccinium ovatum 'Thunderbird' (Huckleberry)

LEGEND

- STREETSCAPE
- LOT AREA AND MATERIAL PROCESSING AREA
- FOREST PROTECTED AREA
- FOREST ENHANCEMENT AREA
- RIPARIAN PROTECTED AREA
- RIPARIAN ENHANCEMENT AREA
- FOREST MANAGEMENT COVENANT
- PREVIOUSLY APPROVED DP AREA
- MOUNTAIN PATH
- DEVELOPMENT BOUNDARY

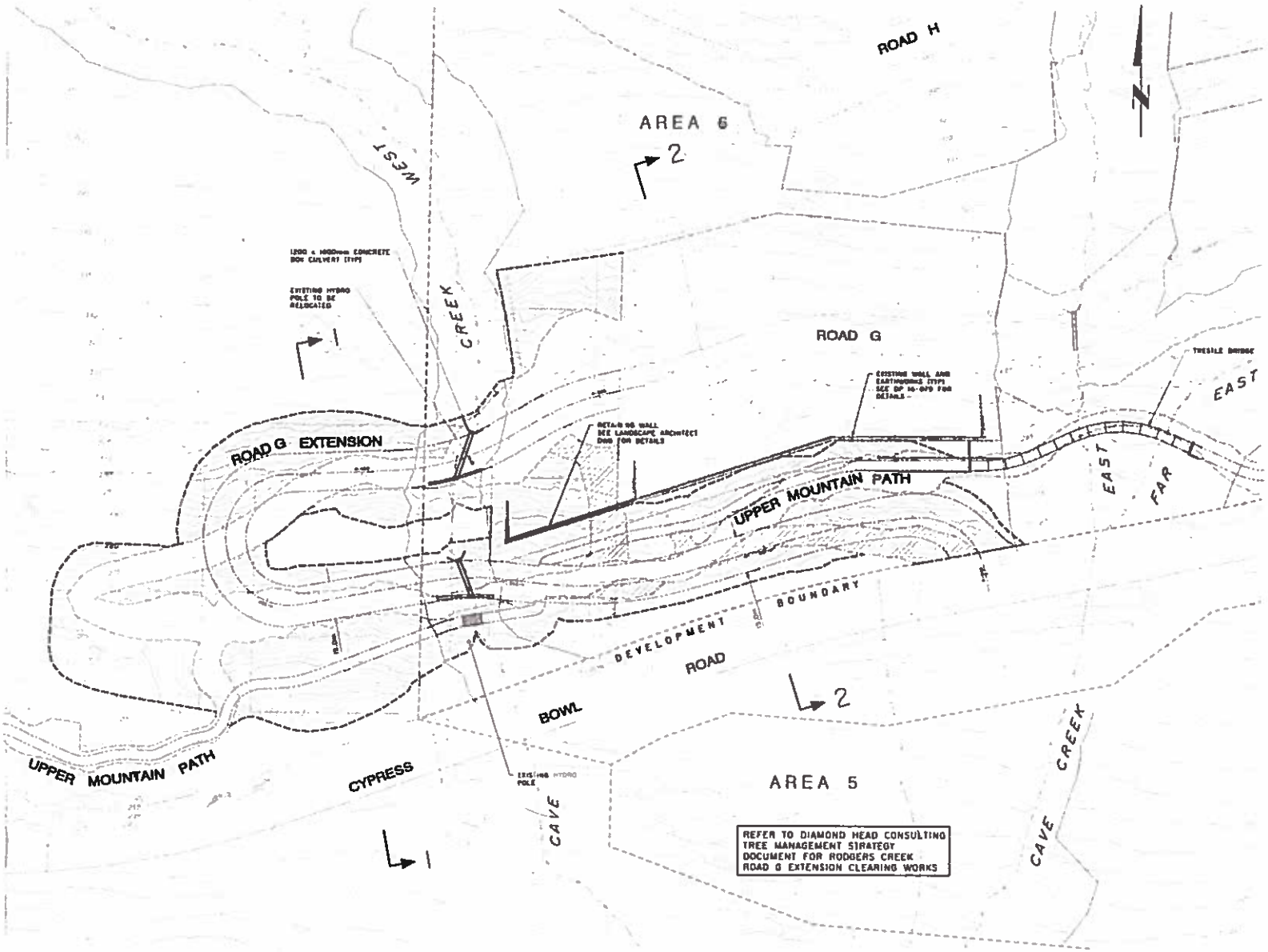
PWL partnership

ROGERS CREEK AREA 6

COVENANT AREA PLANTING

1:150

L5.02



InterCAD
CONSULTING ENGINEERS

LEGEND

EXISTING UTILITY CLEARING LIMIT

APPROVED CLEARING AND GRUBBING LIMIT

PROPOSED CLEARING AND GRUBBING LIMIT

EXISTING UTILITY CLEARING

APPROVED CLEARING AND GRUBBING

PROPOSED CLEARING AND GRUBBING

2	REISSUED FOR DP FOR SUBJ + S.DR. ROAD CLEARING AND EARTHWORKS	9-09-14	JP
1	ROAD CLEARANCE DP SUBMISSION	9-08-15	JP

BRITISH PACIFIC PROPERTIES LTD

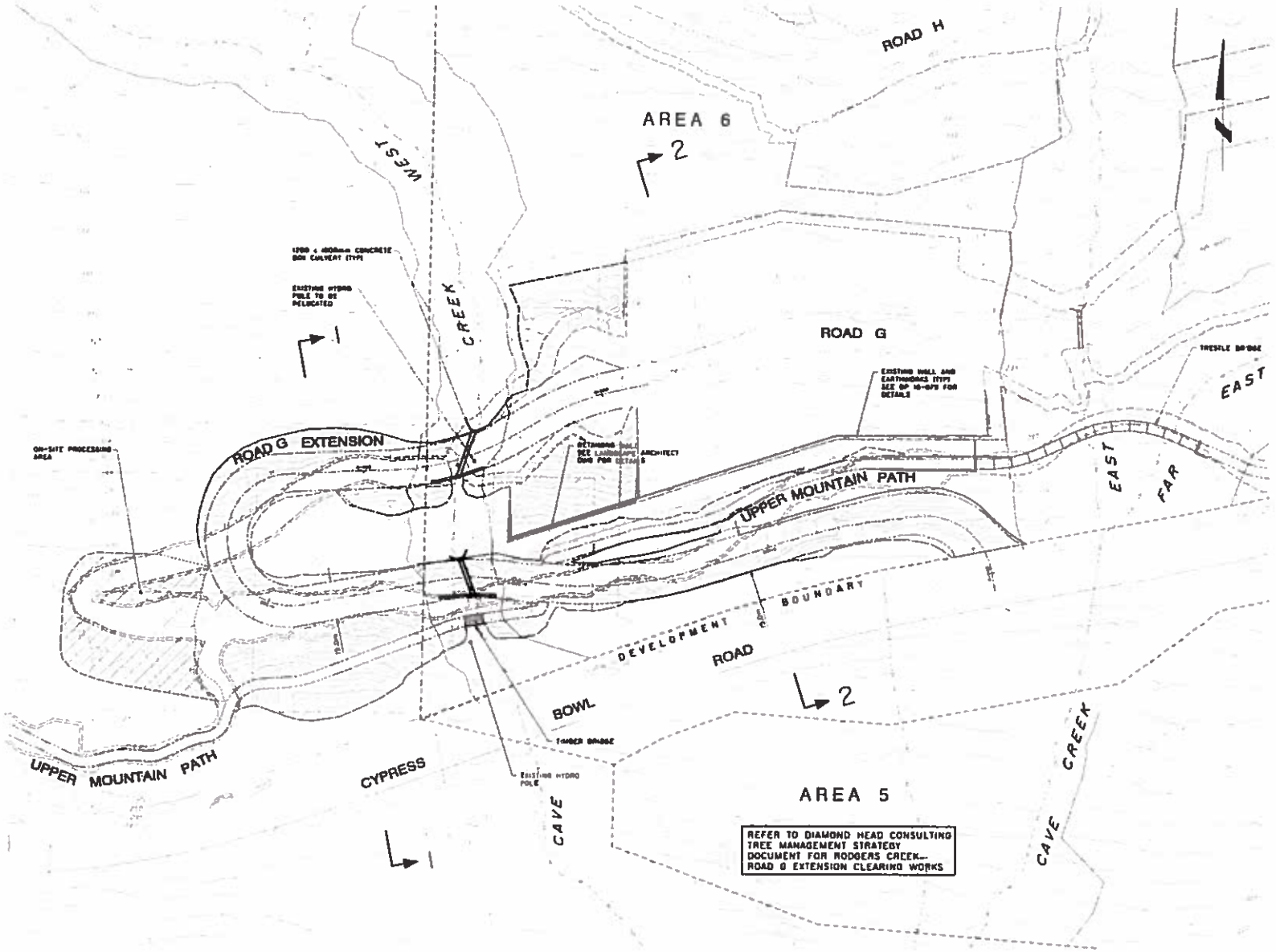
RODGERS CREEK DEVELOPMENT

AREA 6

CLEARING PLAN

ROAD G-EXTENSION

C-1 | 2



InterCAD
CONSULTING ENGINEERS

LEGEND

APPROVED EARTHWORKS BY DP 16-070

PROPOSED EARTHWORKS

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1	ROAD CLEARING DP SUBMISSION	8-08-28	JH

1:750 MAY 2008

BRITISH PACIFIC PROPERTIES LTD

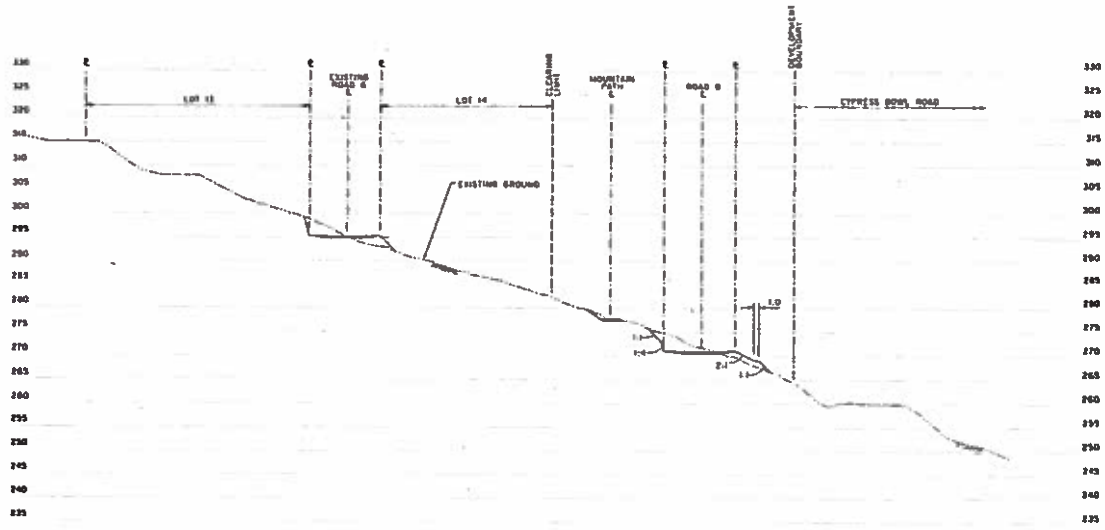
RODGERS CREEK DEVELOPMENT

AREA 6

ROAD EARTHWORKS PLAN

ROAD G EXTENSION

C-2 | 2



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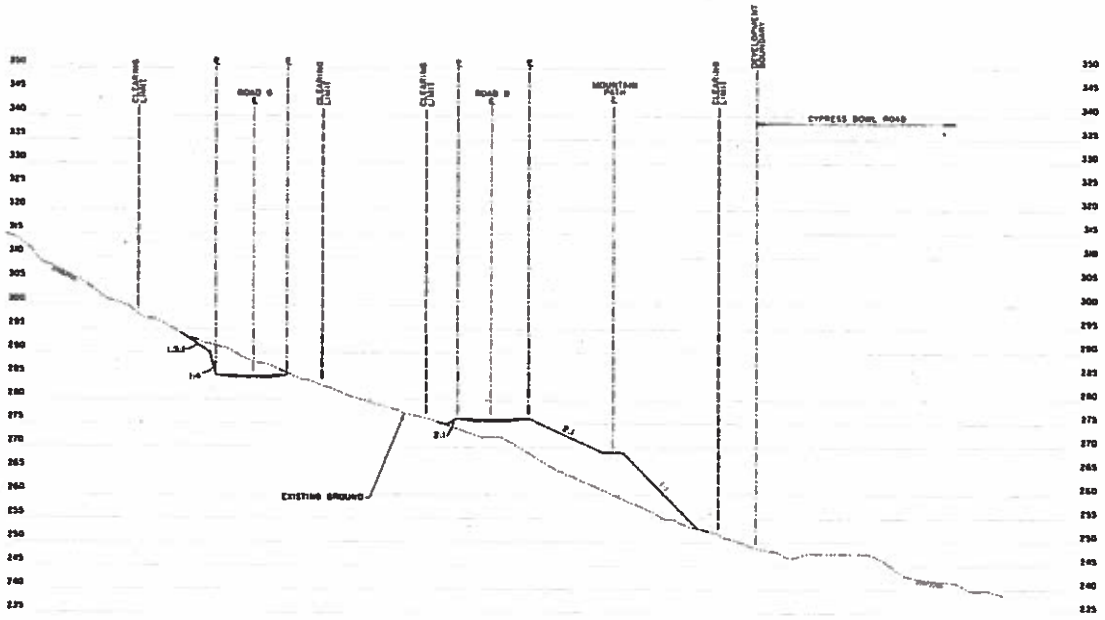

SECTION 1

InterCAD
CONSULTING ENGINEERS

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no	revision	init	by

DRAWN JH SHEET JH
SCALE 1:500 DATE MAY 2019

BRITISH PACIFIC PROPERTIES LTD

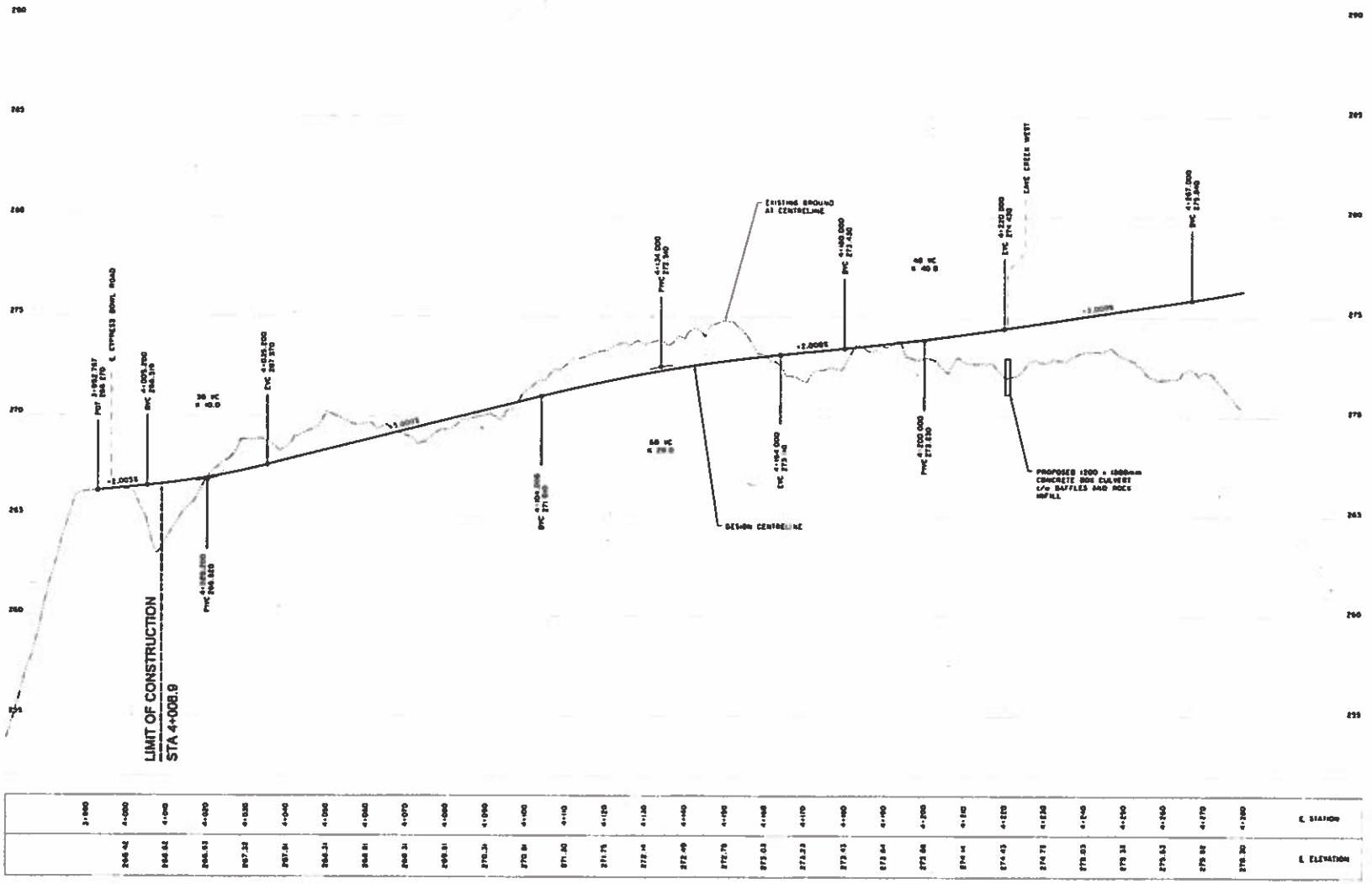
RODGERS CREEK DEVELOPMENT

AREA 6

SECTIONS

ROAD G EXTENSION

DRAWING NO. C-3 REV. 2



InterCAD
CONSULTING ENGINEERS

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1	ROAD CLEARING DP SUBMISSION	18-06-28	JK

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RODGERS CREEK DEVELOPMENT

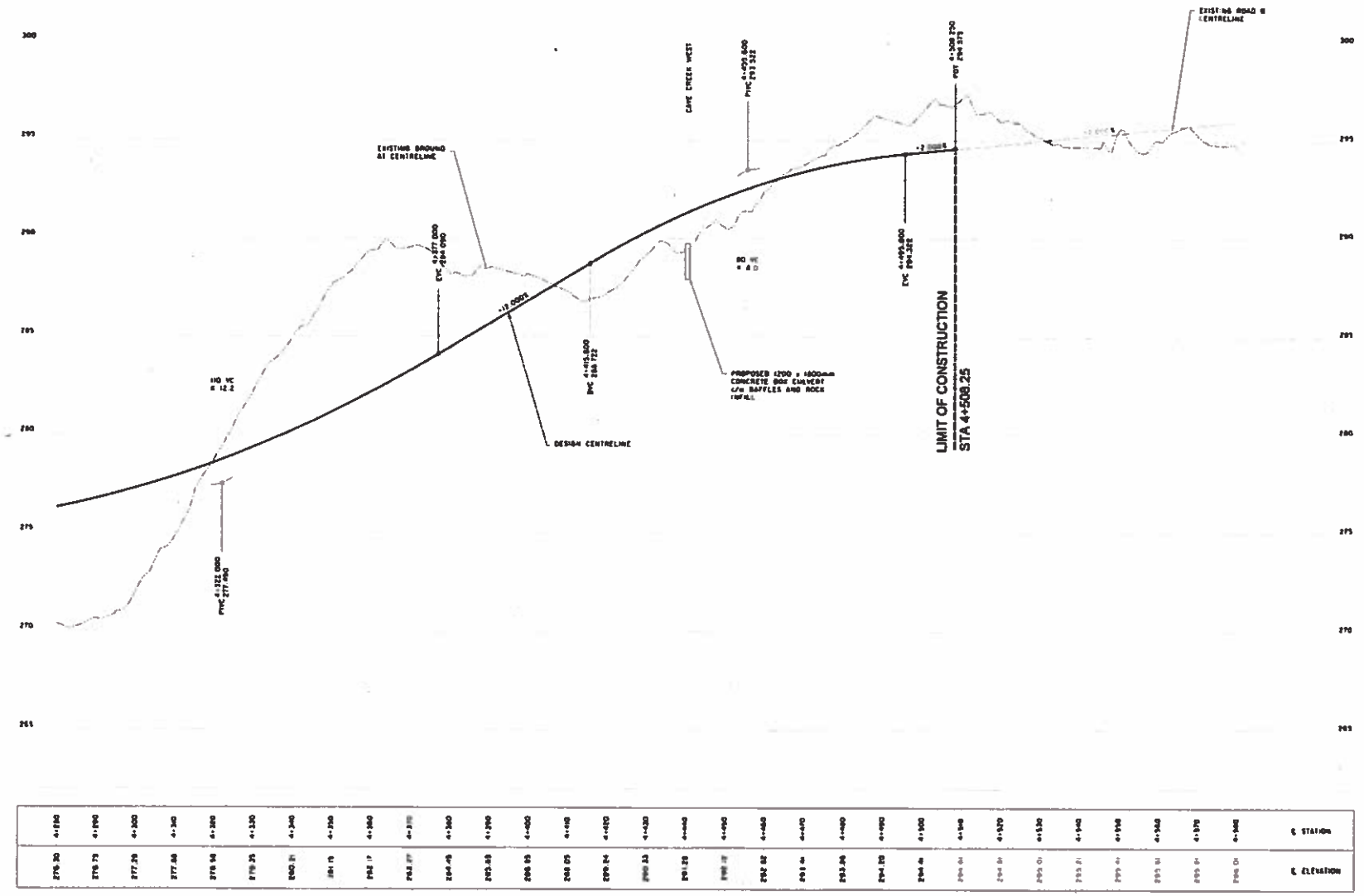
AREA 6

PROFILE 1 OF 2

ROAD G EXTENSION

C-4

2



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CONSULTING ENGINEERS

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BRITISH PACIFIC PROPERTIES LTD

RODGERS CREEK DEVELOPMENT

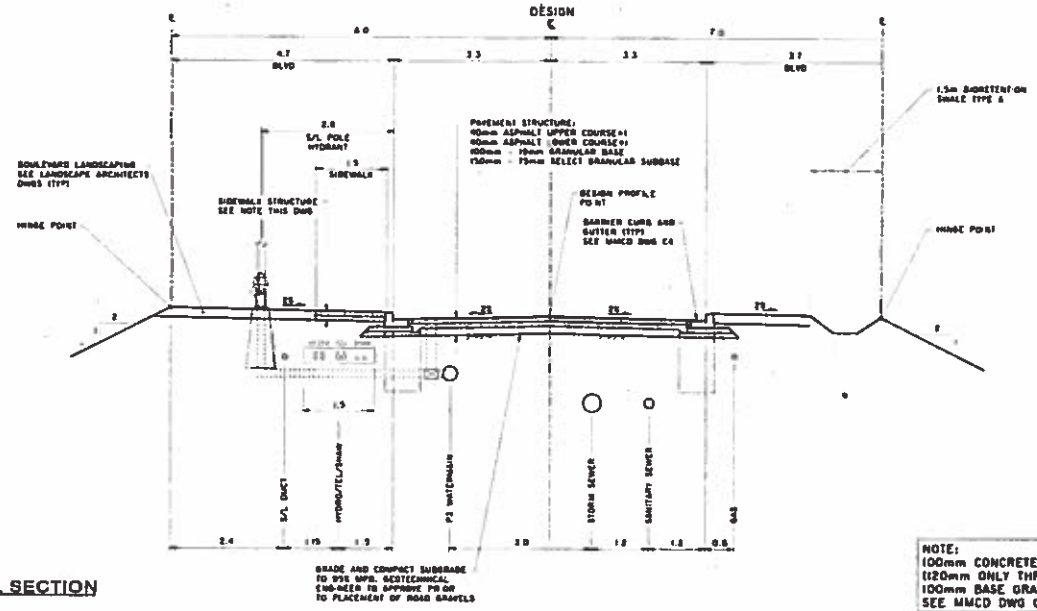
AREA 6

PROFILE 2 OF 2

ROAD G EXTENSION

C-5

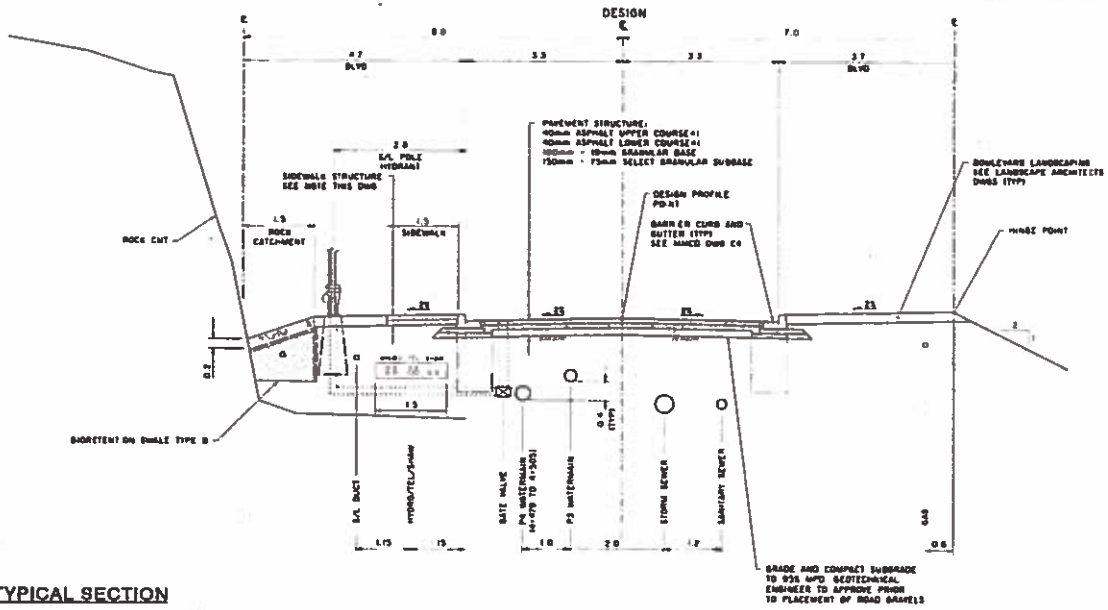
2



ROAD G TYPICAL SECTION

SCALE 1:50

NOTE:
100mm CONCRETE SIDEWALK
(120mm ONLY THROUGH DRIVEWAY)
100mm BASE GRAVEL
SEE MMCD DWG C2



ROAD G TYPICAL SECTION

SCALE 1:50

InterCAD
CONSULTING ENGINEERS

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1	ROAD CLEARING DP SUBMISSION	19-06-25	JK
NO.	REVISION	DATE	BY

DRAWN JK CHECKED JK
SCALE AS SHOWN DATE MAY 2019

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RODGERS CREEK DEVELOPMENT

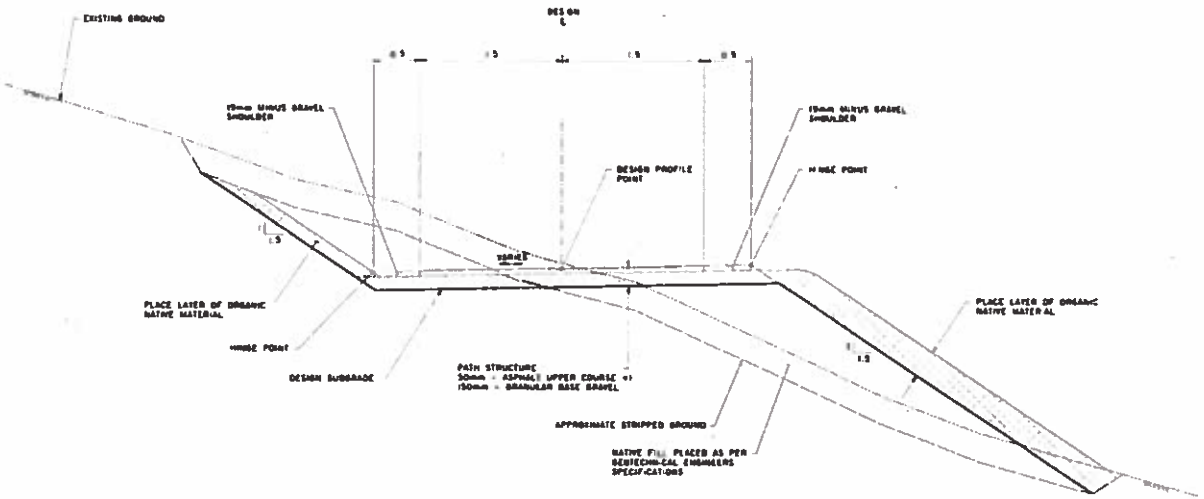
AREA 6

ROAD G TYPICAL SECTIONS

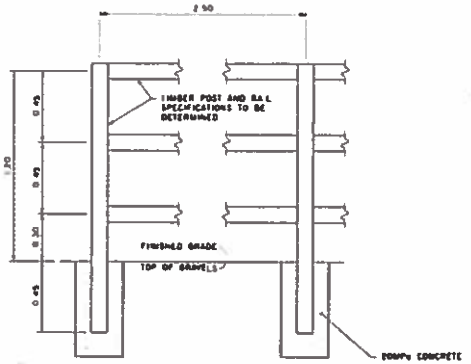
ROAD G EXTENSION

DRAWING NO. C-6 | NO. 2

InterCAD
CONSULTING ENGINEERS



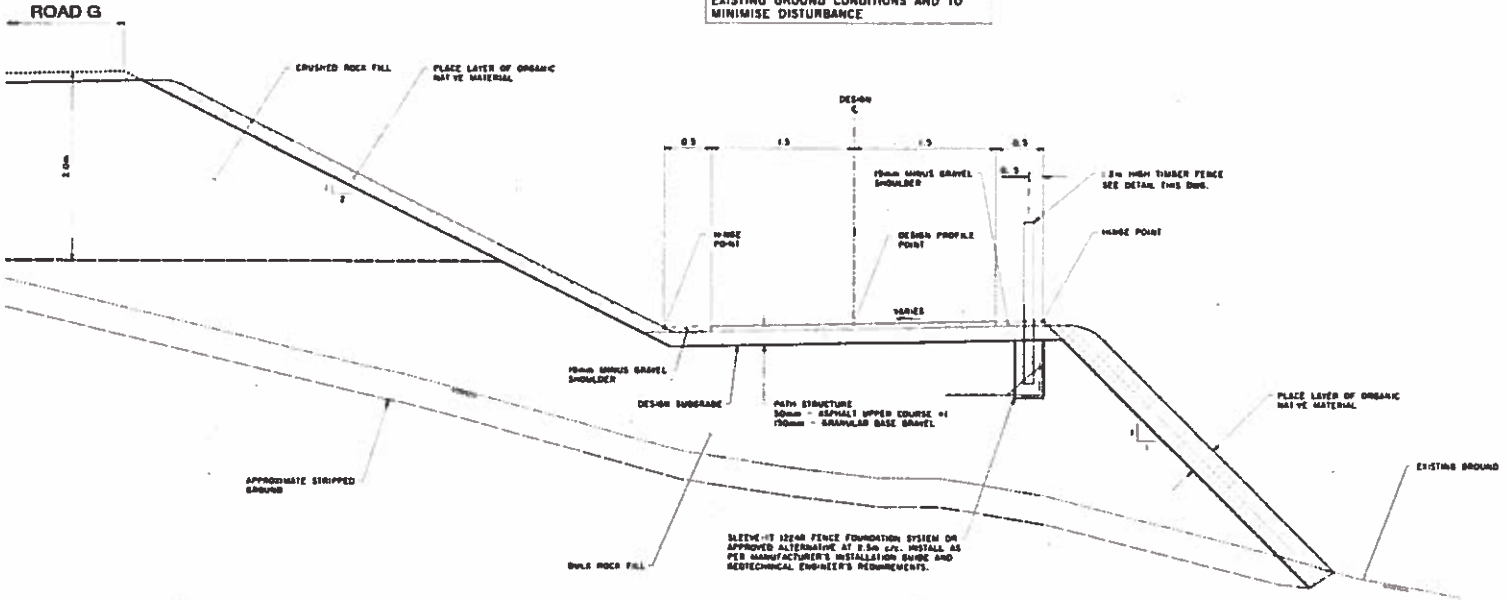
TYPICAL SECTION 2: CUT AND FILL SLOPES (6+090 TO 6+260)
SCALE 1:25



FENCE DETAIL
NTS

FINAL DESIGN OF UPPER MOUNTAIN PATH TO BE AGREED WITH DWV TO BEST MATCH EXISTING GROUND CONDITIONS AND TO MINIMISE DISTURBANCE

ROAD G



TYPICAL SECTION 1: FILL SLOPES (5+940 TO 6+070)
SCALE 1:25

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1	ROAD CLEARING DP SUBDIVISION	19-05-26	JR

AS SHOWN MAY 2019

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RODGERS CREEK DEVELOPMENT

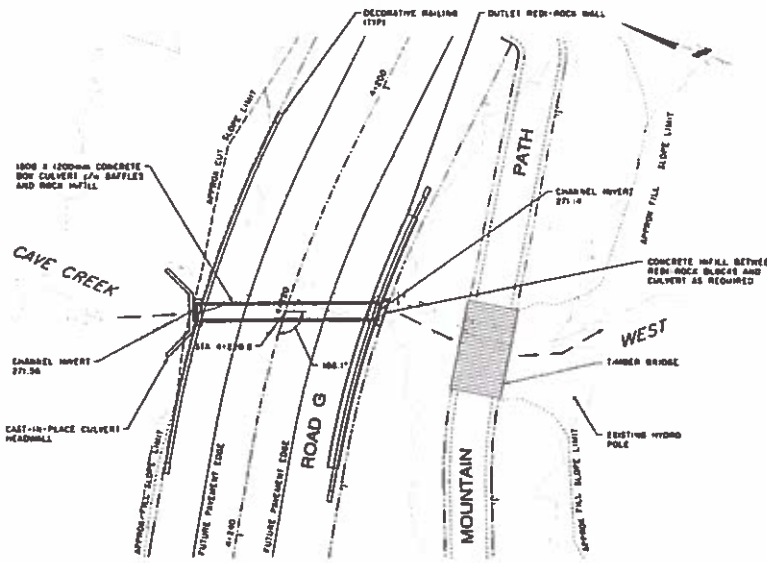
AREA 6

MOUNTAIN PATH TYPICAL SECTIONS AND DETAILS

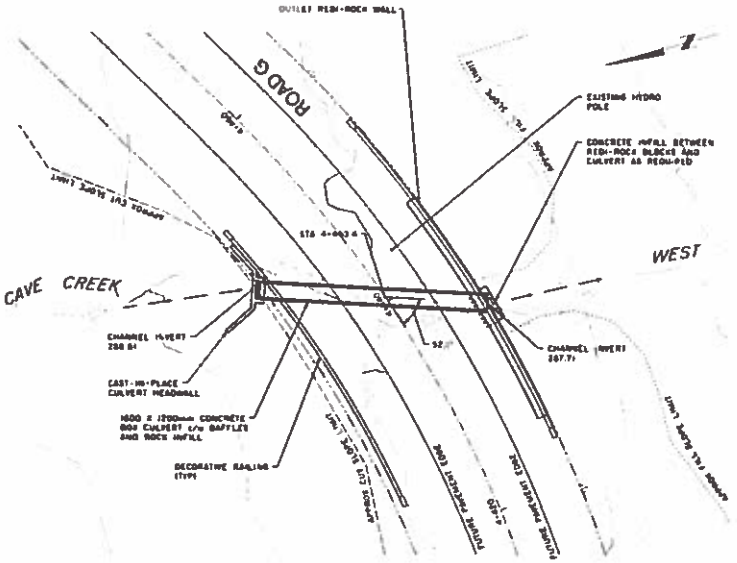
MOUNTAIN PATH

C-7

2



PLAN - CAVE CREEK WEST
SCALE 1:200



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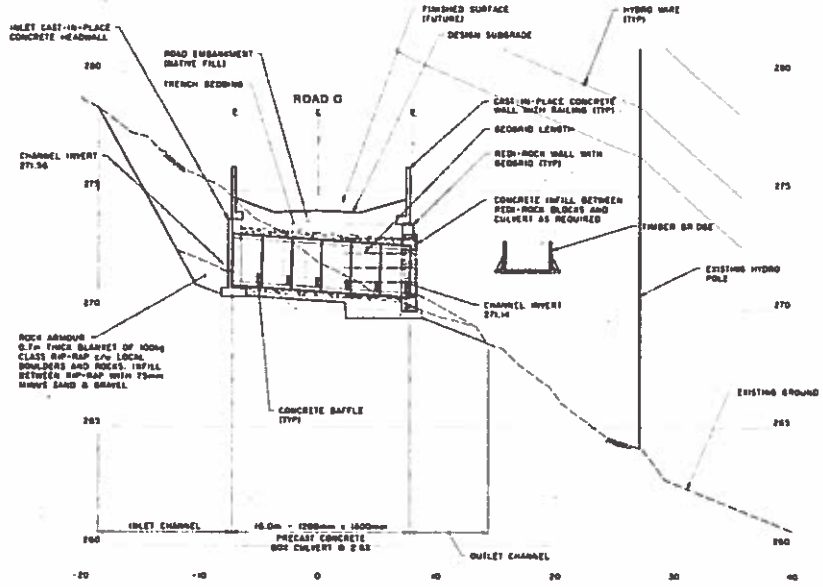
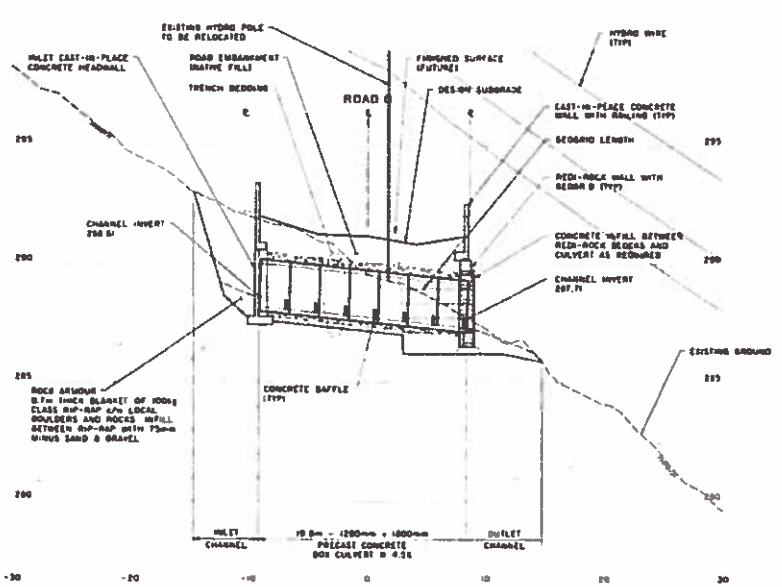
SCALE 1:200



PROFILE - CAVE CREEK WEST
SCALE 1:200H/1:100V



PROFILE - CAVE CREEK WEST
SCALE 1:200H/1:100V

InterCAD
CONSULTING ENGINEERS

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1	ROAD CLEARING DP SUBMISSION	19-08-26	JM
NO	REVISION	DATE	BY

DESIGNED JM | DRAWN JM
SCALE 1:500 | DATE MAY 2019

BRITISH PACIFIC PROPERTIES LTD

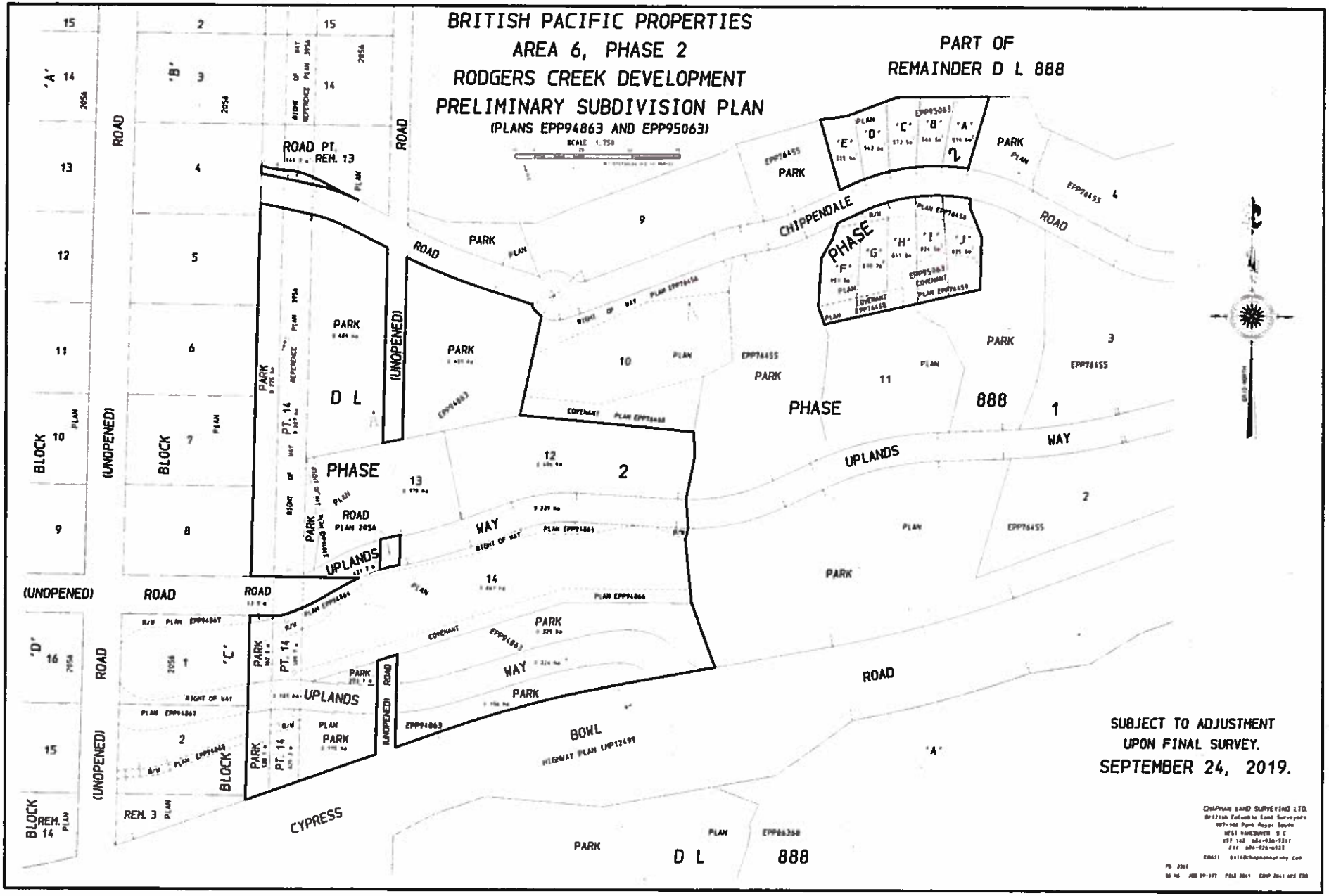
RODGERS CREEK DEVELOPMENT

AREA 6

CULVERT CROSSING

CAVE CREEK WEST
ROAD G

C-8 | 2


BRITISH PACIFIC PROPERTIES
AREA 6, PHASE 2
RODGERS CREEK DEVELOPMENT
PRELIMINARY SUBDIVISION PLAN
(PLANS EPP94863 AND EPP95063)
PART OF
REMAINDER D L 888
SCALE 1:750
ROAD PT.
REM. 13
ROAD
(UNOPENED)
PARK
PHASE
D L
888
UPLANDS
WAY
CHIPPENDALE
ROAD
BOWL
HIGHWAY PLAN LMP12499
CYPRESS
BLOCK
REM. 3
REM. 14
SUBJECT TO ADJUSTMENT
UPON FINAL SURVEY.
SEPTEMBER 24, 2019.

sartori environmental

SCHEDULE 'E'

AMENDED JUNE 2019

Rodgers Creek Development – Area 6 Environmental Management Plan

Prepared for: British Pacific Properties Ltd.

Suite 1001 – 100 Park Royal

West Vancouver, BC, V7T 1A2

Sartori Environmental Inc.

#106 – 185 Forester Street

North Vancouver, BC, V7H 0A6

Table of Contents

Figures

Appendix

1.0 Introduction

British Pacific Properties Limited (BPP) is continuing with development in the Rodgers Creek Development Area, located in the District of West Vancouver, B.C. The Rodgers Creek development is comprised of six distinct areas totalling 87 ha (215.1 acres), and this Environmental Management Plan (EMP) has been prepared for the Area 6 development.

1.1 Purpose of the Environmental Management Plan

BPP has commissioned Sartori Environmental Services (SES) to develop the following EMP for the proposed Area 6 development, as well as to act as an Environmental Monitor (EM) for the proposed development works. This EMP describes environmental protection measures and environmental guidance to be used to prevent and/or mitigate environmental impacts resulting from construction activities, and identifies project-specific considerations to be implemented.

1.2 Project Description and Location

Area 6 is situated north of Cypress Bowl Road and in between Cave Creek Main Branch (most westerly) and Tributary W (most easterly). Four (4) watercourses exist within the Area 6 boundaries (Cave Creek Main Branch, Cave Creek East, Cave Creek Far East, and Westmount Creek).

Development within the Area 6 site will consist of single family and multi-family housing, associated roads, services, parks, trails, and 7 culvert crossings. All municipal servicing will be provided including water, sanitary and storm sewers, electrical and telecommunications and natural gas.

Key objectives of the EMP are to:

- Identify streams and their ravines, with respect to fisheries and amphibian values;
- Provide guidance for working within environmentally sensitive areas; and,
- Ensure BPP's commitment to protecting the environment is communicated to construction contractors.

1.3 Environmental Setbacks

During the Rodgers Creek Development planning process, a series of tables and maps were developed following extensive review and a 'sieve analysis' with District staff. Each watercourse was evaluated as a collaborative process at technical meetings, including detailed field review, and categorized with respect to its environmental values as H (high), M (moderate), or L (low). The top of bank, RAR setback and District Development Permit setback lines were overlaid onto these maps and all creek setbacks were individually assessed and justified. At minimum, no setback is closer than the RAR designated line. Detailed environmental setback summary tables and maps are available in Appendix B.

Figure 1. Map of Area 6 Development

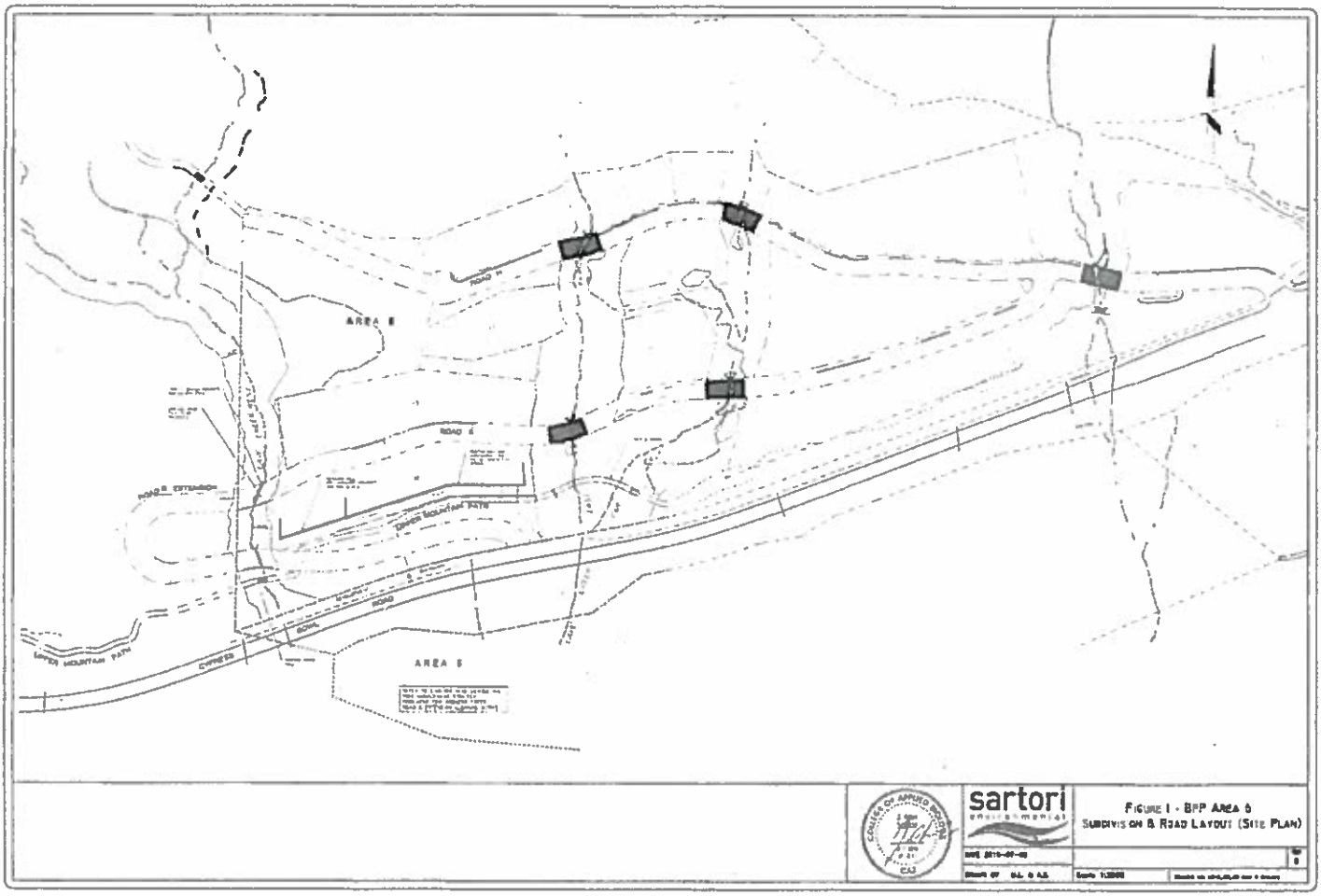


FIGURE 1 - BPP AREA 6
SUBDIVISION & ROAD LAYOUT (SITE PLAN)

2.0 Environmental Management Measures

The following works-specific environmental protection measures were developed by SES in conjunction with BPP in attempt to have proposed works meet recommendations made in DFO's *Land Development Guidelines for the Protection of Aquatic Life* (DFO, 1993); and MOE's *Develop with Care: Environmental Guidelines for Urban and Rural Land Development in British Columbia* (MOE, 2006).

2.1 Preliminary Construction Schedule

Construction works commenced in summer 2016, beginning with clearing and grubbing activities of road alignments. Road construction and Lot preparation is in the later stages of construction and pioneering has been completed through to the west end of site. Detailed construction scheduling of the various components of the project will vary to some extent as determined by municipal approvals, weather conditions, and songbird nesting season.

2.2 Site Preparation

Prior to delineating the clearing boundaries, a pre-construction meeting will be held with the project manager, construction supervisor, project engineer, the District's Environmental Protection Officer and the owners' environmental consultant, to ensure that site safety and environmental procedures are adhered to.

2.2.1 *Temporary Protective Fencing*

Prior to any site work, tree protective fencing shall be installed along the boundaries of riparian areas. No work shall take place within riparian areas without the approval of the EM and the District's Environmental Protection Officer unless noted otherwise on the approved development permit and servicing drawings.

2.2.2 *Access, Delineation & Clearing*

Access into the Area 6 development site will utilize the existing intersection with Cypress Bowl Road, to the west of Tributary W. Clearing and grubbing activities has the potential to result in the greatest initial effects to the environment. The following are methods that will be used to minimize the potential for negative environmental effects to the extent possible:

- The boundaries of the construction/clearing area will be clearly marked. Only the area within these boundaries may be disturbed;
- All contractor employees and sub-contractors will be briefed on the limits of construction and the locations of the marked Environmentally Sensitive Areas (ESAs) during orientation prior to their first day on site;
- Machinery will operate within these boundaries only. Cleared debris will be properly disposed of, and will not be relocated outside of the delimited areas;
- Sediment control structures will be installed downslope of all ground disturbing activities as required, to reduce the input of sediment to all watercourses prior to grubbing or stripping activities;

- All reasonable efforts will be made to ensure that trees are felled away from riparian areas and proposed Covenant and Park areas unless it poses a risk to human safety. If it is determined that a tree cannot be felled safely without going into a riparian area or proposed Covenant or Park area, the District's Environmental Protection Officer shall be notified and the EM shall be consulted on the methodology to minimize any damage to other trees or vegetation within the riparian areas and proposed Covenant and Park areas;
- Grub operations will carried out during favourable weather conditions. Should inclement weather be encountered, the site will be stabilized prior to work postponement as directed in the ESC plan to minimise the potential for sediment from being mobilized and entering the adjacent watercourses. Machinery will not enter below the High Water Mark (HWM) of watercourses, and clearing will not occur within adjacent environmentally-sensitive areas; and,
- Organic topsoil will be stockpiled separately from other materials for use in progressive reclamation activities. Shrubs will be salvaged and stored separately where possible to aid in revegetation. Coarse Woody Debris (CWD) will also be salvaged and stockpiled for future placement in revegetation areas.

Although existing vegetation is composed mostly of native species, invasive species such as Himalayan blackberry (*Rubus armeniacus*) and Holly (*Ilex aquifolium*) are also present in the area. Cleared invasive vegetation will be trucked off site for proper disposal. Care will be taken when grubbing soils infected with invasive vegetation with rhizomes capable of fragmentation and regrowth (i.e. Himalayan blackberry) to grub to sufficient depth to remove all subsurface plant material. Grubbed soils known to contain invasive plant material will be trucked off site for proper disposal at an approved disposal facility.

2.2.3 *Pre-Clearing Bird Nesting Surveys*

Under the BC *Wildlife Act*, it is illegal to molest or destroy active bird nests not on current provincial exclusion lists. Concurrently, North American migratory birds are managed by the Canadian Wildlife Service (CWS) branch of Environment Canada (EC) under the *Migratory Birds Convention Act*. The CWS-recommended songbird nesting survey window for the proposed works area falls between March 15 and July 31.

If clearing of the Area 6 site coincides with the March 15 to July 31 window, SEI will conduct pre-clearing surveys to identify active nests, and species, if present. If nesting activity is detected prior to or following the March 15 to July 31 window, surveys should be initiated in consultation with the EM. In the event that an active songbird nest is discovered, a 20m buffer radius from the nest will be flagged in field, and no clearing works or machinery operations will be conducted within the radius until SEI confirms that the nest is no longer active. The nest buffer diameter may be adjusted by the QP based on species, site specific conditions and anticipated construction activities within the area. In the event that a raptor nest is observed, a species specific nest buffer will be established in the field in consultation with the EM. Identified active nests of bird species listed on provincial *Wildlife Act* exclusion lists including Rock Dove (*Columba livia*) and North-western Crow (*Corvus caurinus*) will be managed in consultation with SEI.

2.2.4 *Fish/Amphibian Salvage*

Fish presence in the proposed work area is not anticipated due to significant gradient barriers to fish passage that occur downstream through the Highway 1 culverts (25% gradient through a perched culvert); however, amphibian salvages will be performed prior to the commencement of instream work activities as required. Wildlife exclusion fencing will be installed to preclude amphibian entrance to the immediate area. The salvage crew will comprise qualified environmental professionals (QEPs), and will be responsible for obtaining necessary permits required by the BC *Wildlife Act* prior to conducting salvage activities.

2.2.5 *Rare Elements Update*

A full rare elements assessment was conducted during the Rodgers Creek development assessment and published in the Rodgers Creek Area – Environmental Effects Report (March 2008). The *BC Conservation Data Centre* (BCCDC) website was searched for all vegetation species listed under the Federal *Species at Risk Act* (SARA), the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and Provincial Identified Wildlife that are suspected to occur within habitats identified within the study area. In addition, species listed as Red and Blue-listed by the BCCDC but not specifically covered under legislation were also included. Data was also requested from the BCCDC for all records within 2 km of the study area.

No ecological communities or rare plants, and species of concern were identified during the search and are expected to reside in Area 6.

2.2.6 *Temporary Channel Diversion*

Works will be completed in accordance with the Provincial *Water Sustainability Act* (WSA) through the *Ministry of Forests, Lands, Resources and Rural Development* (MFLNRORD) Section 11 Notification process. In all, 5 clear span timber bridges and 7 precast concrete culvert crossings will be constructed for road and pathway construction for the Project. Works will necessitate the installation of a channel diversion to ensure that the works take place in isolation of flows. The following mitigation measures are recommended to ensure water quality is maintained during the temporary flow diversion:

- Works will be prioritized during low flow (Spring/Summer) conditions.
- Stage dewatering pumps and hoses in preparation for bypassing flows around the work area. The outlet of the dewatering hose should be placed in the channel downstream of the work area and be protected with an energy dissipation structure to prevent bank and channel scouring;
- Install a temporary sand bag and poly sheeting berm upstream of the work area and downstream of the staged diversion pump intakes. The berm should prevent water from seeping into the work area; and,
- Install a sump and berm at the downstream extent of the work area as required to collect all potentially turbid water seepage that may have entered the work area. All seepage water entering the active work area should be dewatered to a suitable vegetated area for bio-infiltration. If no suitable natural infiltration area exists, appropriately sized settlements areas should be constructed in consultation with the EM.

Periodic in-situ water quality monitoring (*e.g.* pH and turbidity) will be performed during the excavation activities. Water meeting the BC Water Quality Guidelines for the Protection of Freshwater Aquatic Life (BCWQG) will be pumped back to the Creek. Water of insufficient quality under BCWQG will be pumped to nearby vegetated receiving areas pending SES approval or will require treatment prior to discharge.

2.3 Erosion and Sediment Control

Once clearing and grubbing activities have been completed and earthworks, including construction of the roads and homes begins, it is anticipated that sediment control ponds or tanks and drainage ditching will be utilized in controlling runoff and treating it prior to discharge into large vegetated buffer areas and not directly into watercourses.

All erodible stockpiled materials will be tarped or covered with poly to minimize erosion and the development of turbid runoff. Once the road has been excavated to sub-grade, large 6" angular rock will be placed at the site entrances to minimize the potential for sediment tracking.

Working during inclement weather conditions will be reviewed by the project manager in consultation with the EM and the contractor(s). Activities such as excavation and grubbing will not be undertaken if significant rainfall events are forecasted and the risk of creating unmanageable turbid runoff is possible.

A Draft Area 6 Erosion and Sediment Control Plan (ESCP) is presented in Appendix 1 for the clearing and road earthworks. This plan should be viewed as the start point for construction and site-specific field adjustments will be implemented as construction progresses in consultation with the EM. In order for erosion and sediment controls to be effective they need to be appropriately designed, implemented, inspected and maintained. The following four principles will be used for erosion and sediment control within Area 6:

1. Expose the smallest practical area of land for the shortest possible time;
2. Apply "soil erosion" control practices as a first line of defence against silt laden runoff;
3. Apply "sediment control" practices as a perimeter protection to prevent the off-site conveyance of turbid runoff; and,
4. Implement thorough maintenance and follow-up practices.

2.3.1 *Upland Construction Activities*

Construction of individual homes and site preparation of lots has the potential to have negative effects on water quality. Individual site erosion and sediment control procedures and prescriptions will be developed prior to excavation works on the lots, to ensure that water quality can be maintained during construction.

Site specific prescriptions and BMP's will be reviewed in the field by the EM during the pre-construction meeting and site inspections (see environmental monitoring below).

2.4 Waste Management Plan

Contractors working at the Project site shall adhere to applicable legislation with respect to the handling, transportation, and/or disposal of all materials related to Area 6 construction (waste or otherwise). These regulations may include (but not limited to):

- *Hazardous Waste Regulation;*
- *Contaminated Sites Regulation;*
- *Spill Reporting Regulation;*
- WorkSafeBC *Occupational Health and Safety Regulation*; and,
- *Transportation of Dangerous Goods Regulation.*

2.4.1 *Recyclable Waste*

Recyclable waste such as cardboard, wood and approved plastic will be separated from other materials and stored in appropriate, clearly identified containers. Contractor(s) are responsible for the appropriate disposal of recyclable waste coming from the construction site.

2.4.2 *Non-Recyclable Waste*

Non-recyclable waste generated during the project including general refuse, replacement air filters, construction debris, concrete, etc. and surplus oil requiring disposal off-site shall require approval from the local landfill operator prior to disposal. Only landfills authorized to accept the specific products requiring disposal shall be used.

2.4.3 *Hazardous Waste*

Absorbent materials or soils contaminated with oil (greater than 3% by weight) or any quantity of gasoline must be handled and transported as hazardous waste. Any contaminated soils will be excavated and hauled off-site to an authorized treatment/disposal area in accordance to the BC Hazardous Waste Regulations.

In the event that material believed to be contaminated or hazardous is discovered during excavation at the site, SES must be notified immediately. If the hazardous material is stable and does not pose an immediate threat, operations should be halted until SES determines the appropriate course of action for removal or neutralization of the hazardous material.

If the hazardous material poses an immediate threat and is unstable, then the spill response procedures outlined below (Section 2.8) should be immediately followed in order to contain the hazardous material.

2.4.4 *Burning*

Burning of any type is not permitted at the construction site.

2.4.5 *Portable Toilets*

A portable toilet will be on site during all construction. This will be kept clean and periodically cleared of waste matter (trucked off site to a designated waste facility by a waste pump truck) as required.

2.4.6 *Animal Attractants*

Contractors will place all animal attractive wastes (*i.e.* food scraps) in animal proof containers, and will ensure that these wastes are removed on a regular basis from the site. Food wastes are not to be disposed of on site.

2.5 Concrete Management Plan

Culvert installations, will comprise precast concrete box culverts. Cast-in-place concrete works associated with construction of Area 6 include foundation walls, fence posts, footings, pools, abutment walls, and bridge deck pours. During these works, extra care will be taken to prevent the release of uncured concrete into water or nearby catch basins, ditches and/or any watercourses, as it is known to be toxic to the aquatic environment. Mitigation procedures will be implemented to reduce the potential for environmental damage when pouring concrete around water or during rain events.

In addition, the following conditions will be met:

- All concrete wastewater from cleaning or mixing is considered toxic, and will be prevented from entering any catch basins, ditches and/or any watercourses for at least 48 hours to allow the water to reach neutral pH.
- Wash out of concrete trucks and equipment will be carried out in the designated concrete wash bay at the approved Gate 5 facility.
- All waste concrete will be collected and disposed of at an approved facility and/or buried at an EM approved site away from any areas where the material may contact surface or groundwater.
- Freshly poured concrete will be covered immediately if rain is forecasted.
- If water is found to be out of the desired pH range (between 6.5 and 9) it will be contained using measures outlined in the Spill Response Plan and treated or disposed of at an approved disposal facility.
- Carbon dioxide will be diffused through any plumes/spills into water via a soaker hose to help neutralize the pH effect that concrete has on potentially effected waters. The carbon dioxide cylinder with the already attached soaker hose will be used to inject the carbon dioxide into the water. A CO_2 soaker hose will be readily available at the pour site during any concrete pour.
- Surplus concrete in rolling concrete mixers will be returned to the batch plant yard and will not be wasted on site.

During all concrete pours near any watercourse, the contractor and the EM will inspect all forms for leakages. If such a situation should arise, the leakage will be immediately plugged utilizing tarps/catch nets and monitored for effectiveness by the EM.

2.6 Noise Reduction

Area 6 is not located within a residential area and therefore the potential for excessive noise levels during construction are less of a concern. However with respect to clearing, grubbing, and excavation work the following general measures will minimize the potential for construction related noise and vibration effects:

- Construction activities will be limited to the times allowed under the District of West Vancouver Bylaws. Permitted construction hours are confirmed as follows:
  - 7:30am to 5:30pm weekdays
  - 8:00am to 5:00pm Saturday
  - No work on Sundays
- All equipment will be properly maintained to limit noise generation and fitted with functioning exhaust and muffler systems.
- Diesel generator(s) required to run overnight for submersible pump diversion works will be housed in insulated housings (*e.g.* "Whisper-Watt" type) and be fitted with functioning exhaust and muffler systems. Gasoline generators will not be utilized for overnight works.

2.7 Wildlife Encounters

As the works area is located within a forested area, wildlife encounters may occur. In order to minimise the potential wildlife encounters (*e.g.* bears, coyotes, domestic dogs, etc.), animal attractants will be properly stored for disposal. If persistent or aggressive wildlife encounter(s) occur, construction staff should remove themselves from danger immediately and contact SES immediately.

Wildlife encounters deemed dangerous with a high probability of reoccurrence will be reported to the BC Conservation Service by SES.

2.7.1 *Bear Safety Essentials*

The following provides some basic safety essentials if a bear has been observed – Referenced from Safety Guide to Bears in the Wild (BC Environment, 1996)

- Respect all bears – they all can be dangerous;
- Never approach a bear;
- Never attempt to feed a bear;
- Be defensive - never surprise a bear;
- Learn about bears – anticipate and avoid encounters;
- Know what to do if you encounter a bear; and
- Each bear encounter is unique. No hard and fast rules can be applied when dealing with a potentially complex situation.

2.8 Emergency Spill Response Plan

Once a spill has occurred the primary objective will be to ensure health and safety, and to minimize environmental damage due to the spill. The order of priority when dealing with a spill will be people, environment, and property. A spill kit that will include tools and absorbent materials will be maintained near the work area and absorbent materials (including spill pads and absorbent booms) will also be available on each machine.

The response plan will be as follows:

1. Stop the Flow. Use common sense to ensure the safety of personnel in the area but act quickly.

- Shut off machinery, pumps, valves etc.
- Plug leaks.
- Right containers.

2. No smoking, and no open flames, etc. as required.
3. Implement safety measures and ensure personnel have appropriate personal protective equipment.
4. If conditions permit, clean up the spill:
   a. Immobilize the product with absorbent materials, earth, sand, booms, etc. Procedures will vary depending on the product spilled and the location of the spill. A spill kit will be maintained at each staging area.
   b. For product spills and leaks on soil, liquid will be collected using absorbent materials and the soiled absorbent materials will be transferred into a drum. The contaminated soil will then be excavated and also placed within a designated drum. Drums of waste will be labelled to identify their contents and be stored at either of the staging areas prior to being hauled off site for disposal by a certified hauler.
   c. For product spills into the watercourse, an absorbent boom will be utilized when possible to contain the spill. Absorbent materials will be used to recover floating product. This procedure will be most effective if the spill occurs in an aquatic environment that is relatively still.
5. Report spills and obtain assistance immediately. Do not attempt to contain a large spill by yourself.
6. Call for assistance as required.
7. Contact the following:
   - Environmental Consultant: 604.987.5588 (Sartori Environmental Services).
   - Government Notification for spills that reach reportable quantities, **Provincial Emergency Response Program (PEP)** *24 hour hotline*: 1-800-663-3456.

Spill reporting is mandatory as per the *Spill Reporting Regulation* under the *Waste Management Act*. The following are reporting thresholds:

Flammable Liquid, Class 3	100 litres
Corrosive Liquids, Class 5	5 kg or 5 litres
Oil	100 litres

The report shall include:

- Name and phone number of person reporting the spill
- Name and phone number of person causing the spill
- Location and time of the spill
- Type and quantity of the spill
- Cause and effect of the spill
- Details of action proposed or taken to contain and minimize impact
- Names of agencies on the scene
- Names of other persons or agencies advised
- Methods implemented to contain The Spill

As part of the EMP, the contractor(s) will ensure that all on-site personnel are aware of the environmental features associated with the project. During the pre-construction meeting, environmental sensitivities related to the project will be conveyed to the construction crew, as well as the proper use of spill kits and absorbent booms. Site-specific precautions and conditions will be conveyed to the construction foreman prior to construction and on an on-going basis.

Back-up procedures in the event that the primary protective measures fail will be initiated during the mobilization phase. These measures include:

- Storm drains in areas of high risk will be sealed with drain seals. This will prevent any oil/hydraulic spills to gain quick access to the creek.
- Absorbent boom and pads will be on site at all times.
- Any fuel or oil tanks stored on near the site will be placed on containment pads with sufficient capacity to contain the fuel.

The following is a list of protective equipment available in the development area at all times:

- A spill response kit that will include absorbent pads, three shovels, nylon rope, one (1) axe, a roll of plastic, four 5-gallon buckets, and two empty drums will be kept in a designated area and clearly marked.
- An extra absorbent boom for use around watercourses.
- Drip trays, which can be placed under leaking vehicles and/or machinery.
- A list of contact numbers, in case of a spill.

3.0 Environmental Monitoring

SES has been commissioned as the EM for the construction of Area 6. SES has conducted monitoring of numerous instream works throughout Lower Mainland, and is known to all relevant local environmental regulatory agencies (DWV, DFO, MOE).

SES will inspect and monitor conditions in the vicinity of the development to ensure compliance with environmental permits and appropriate environmental regulations and Best Management Practices (BMP's). The frequency of inspections and monitoring will correspond to the environmental sensitivity of the construction activities, proximity to environmentally-sensitive areas and weather conditions.

Full-time monitoring will be conducted during high risk construction activities to ensure compliance with the mitigation plan and municipal watercourse protection bylaws. Construction activities scheduled for full time monitoring include:

- Stripping of material within 15 metres of any watercourse;
- Direct instream works;
- Excavation related to the installation of culvert crossings;
- Concrete pours (pile filling, and superstructure pours);
- Installation of the rip rap within 15 metres of any watercourse; and
- Installation of the culvert sections and substrate placement within.

The monitor will have authority to halt or modify pre-construction, construction or restoration activities as conditions warrant. The monitor will inspect equipment, material storage, work areas and riparian areas, and monitor turbidity and pH. In addition, the monitor will have sample containers on-hand to collect water samples for laboratory analysis if needed.

3.1 Site Stabilization

Erodible material stabilization is an ongoing task to ensure that cut slopes and stockpiles do not erode and create turbid runoff. Typically BMP measures (*e.g.* polyethylene sheets, silt barriers, etc.) are used to minimize erosion or treat sediment during periods of active construction. However, to achieve further long term stabilization, the following criteria will be used to assess whether hydro-seeding exposed soils is appropriate:

- During summer months – hydro-seeding will be conducted on exposed soils if they are to be left for a period of four weeks or if drought conditions do not allow for hydro-seeding, all slopes exposed slopes will be covered prior to rain events;
- During spring/fall months – hydro-seeding will be conducted on all exposed soils if they are to be left for a period of three weeks, or otherwise be entirely covered prior to rain events; and,
- During winter months – hydro-seeding is not possible as seed will not germinate. All slopes to be covered as soon as possible after being exposed.

The use of wood mulch can also be used to cover exposed slopes up to 2H:1V.

3.2 Danger Tree Removal

After initial clearing, a certified arborist shall assess trees along the edge of riparian areas and proposed Covenant and Park areas to identify any danger trees. Danger trees may not be cut or removed without the approval of the District's:

- Environmental Protection Officer in proposed covenant areas, and,
- Manager of Parks in proposed Park areas.

3.3 Tree Replacement Criteria

All areas cleared of danger trees within the riparian zone of a watercourse will be restored at the completion of works. Restoration will include installation of clean, locally-sourced topsoil and revegetated according the approved Rodgers Creek tree replacement criteria. Key components of the vegetation restoration plan include:

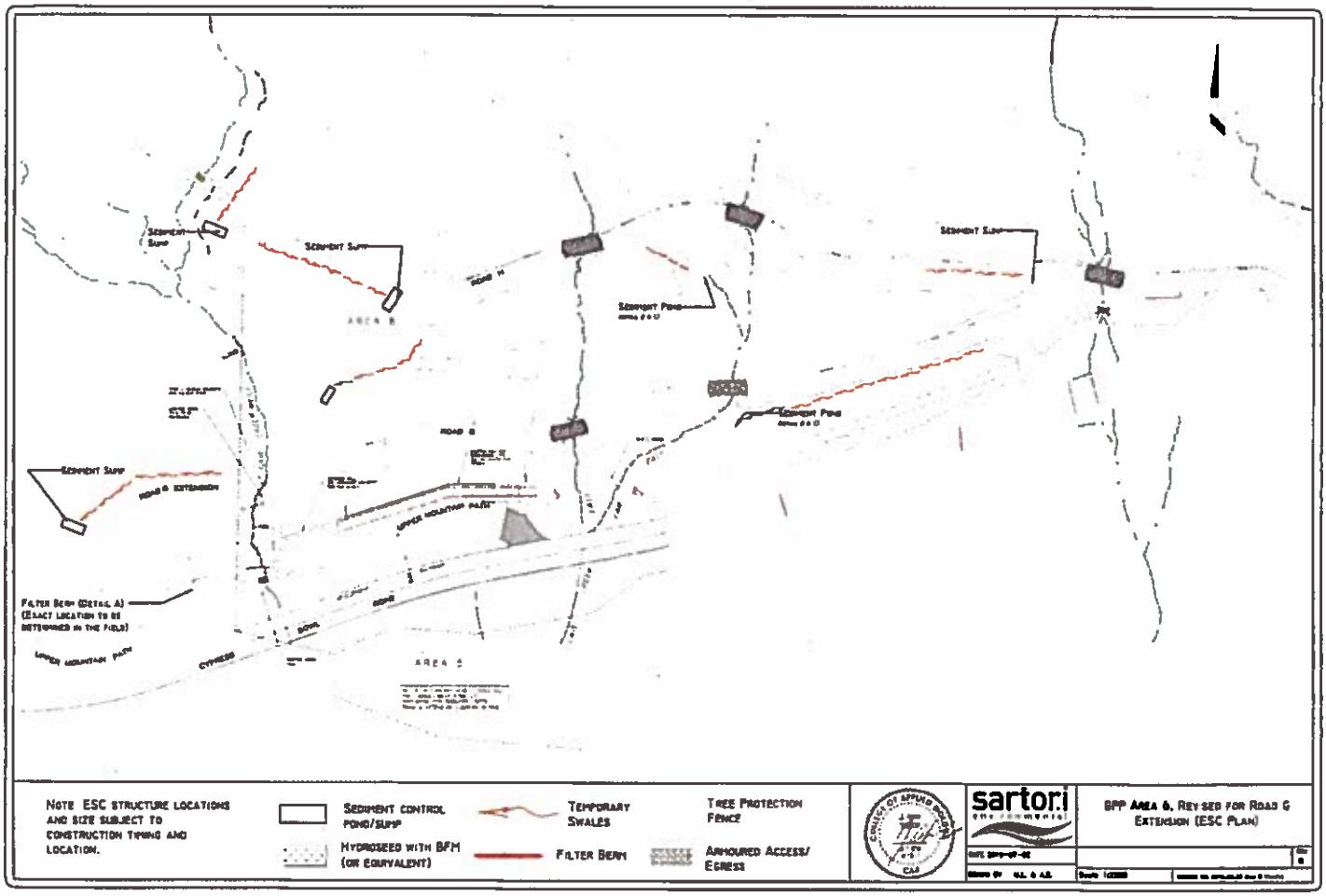
- Prior to restoration works, a planting list including species-specific quantities and planting densities will be compiled or approved by the EM, and will be submitted to the District for review;
- Following topsoil installation, exposed areas will be ground seeded with season-appropriate stock to promote immediate root growth and associated stabilization against erosion;
- Following ground seeding, biogeoclimatic appropriate nursery stock native plants or locally source transplants will be installed in an attempt to expedite succession and reduce invasive plant intrusion;

- Recommendations for plant replacement and/or general restoration items (*e.g.* invasive species removal, watering, fertilization, *etc.*) will be made to BPP to ensure appropriate timing and ecological function; and,
- If insufficient space (due to bedrock, or existing vegetation is sufficiently dense) is available for planting of trees according the Provincial Tree Replacement Criteria, the replanting plan will be reviewed with the District's Manager of Parks.

APPENDIX A

EROSION AND SEDIMENT CONTROL PLAN

sartori environmental
106-185 Forester Street, North Vancouver, BC V7H 0A6
Tel 604.987.5588 Fax 604.987.7740
Email info@sartorienv.com
www.sartorienv.com


Sediment Sump
Sediment Sump
Sediment Pond
Sediment Sump
Sediment Pond
Sediment Sump
Road G Extension
Upper Mountain Path
Filter Berm (Detail A)
(Exact location to be determined in the field)
Upper Mountain Path
Cypress
Road G
Area A
Area B
Note ESC structure locations and size subject to construction timing and location.
Sediment control pond/sump
Hydroseed with BFM (or equivalent)
Temporary Swales
Filter Berm
Tree Protection Fence
Armoured Access/ Egress
sartori
BPP Area 6, Rev-Sed for Road G Extension (ESC Plan)

EROSION AND SEDIMENT CONTROL NOTES

1. THIS EROSION AND SEDIMENT CONTROL (ESC) PLAN HAS BEEN PREPARED FOR BRITISH PACIFIC PROPERTIES, ROGERS CREEK - AREA 6, WEST VANCOUVER.

GENERAL

2. UNDER THIS ESC PLAN, IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ENSURE THAT ALL OF THE EROSION AND SEDIMENT CONTROL FACILITIES DESCRIBED UNDER THIS ESC PLAN ARE CONSTRUCTED, IMPLEMENTED, INSTALLED AND MAINTAINED FOR THE DURATION OF CONSTRUCTION, OR UNTIL REMOVAL/DECOMMISSIONING IS RECOMMENDED BY THE ESC MONITOR.
3. THE CONSTRUCTION CONTRACTOR, AND ALL OTHER SUB-CONTRACTORS OR PERSONS INVOLVED WITH CONSTRUCTION OF THE PROJECT SHALL COMPLY WITH FEDERAL, PROVINCIAL AND LOCAL GOVERNMENT LAWS AND REGULATIONS PERTAINING TO THE PROTECTION OF FISH AND AQUATIC HABITAT AND EROSION AND SEDIMENT CONTROL, INCLUDING BUT NOT LIMITED TO THE LAND DEVELOPMENT GUIDELINES FOR PROTECTION OF FISH AND AQUATIC HABITAT AND THE DISTRICT OF WEST VANCOUVER BYLAW NO 4364
4. IT IS THE RESPONSIBILITY OF THE CONTRACTOR, AND ANY SUB-CONTRACTORS OR EMPLOYEES TO ENSURE THAT WATER DISCHARGING FROM THE SITE SHALL NOT EXCEED THE WATER QUALITY STANDARD OF 75 MG/L FOR TOTAL SUSPENDED SOLIDS (TSS) FOLLOWING A SIGNIFICANT RAINFALL EVENT. A SIGNIFICANT RAINFALL EVENT IS DEFINED AS A PRECIPITATION EVENT THAT MEETS OR EXCEEDS THE INTENSITY OF 20 MM OF TOTAL RAINFALL OVER A 24 HOUR PERIOD.
5. THE ESC MONITOR OR PROJECT MANAGER, AT THEIR DISCRETION, MAY RECOMMEND THAT ESC FACILITIES AND MITIGATIONS BE ADDED TO THE SITE OR RECOMMENDED ESC FACILITIES BE MODIFIED AS REQUIRED TO COMPLY WITH BYLAW NO. 4364, AND DEPENDENT ON SITE CONDITIONS, WEATHER CONDITIONS, OR UNFORESEEN OBSTACLES DURING CONSTRUCTION. THE CONTRACTOR SHALL COMPLY WITH THE DIRECTIONS OF THE ESC MONITOR AND THE PROJECT MANAGER, AND SHALL ENSURE THAT ESC FACILITIES ARE CONSTRUCTED, IMPROVED, REPAIRED AND MAINTAINED AS A PRIORITY AHEAD OF ALL OTHER SITE CONSTRUCTION ACTIVITIES.

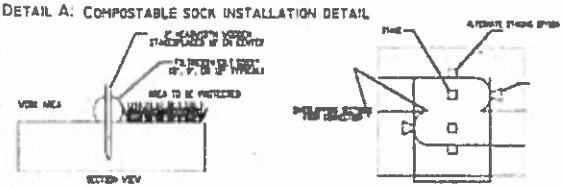
CONSTRUCTION PHASE

6. TRUCK AND VEHICLE ACCESS TO THE WORKS AREA IS TO BE CONFINED, AS MUCH AS POSSIBLE, TO DEFINED ACCESS POINTS FROM PUBLIC ROADS TO PREVENT SILT TRACKING TO PAVED SURFACES. PAVED ACCESS ROADS SHOULD BE EMPLOYED TO PREVENT UNNECESSARY SEDIMENT TRACKING TO PUBLIC ROADS FROM MACHINERY AND VEHICLES.
7. THE CONSTRUCTION CONTRACTOR WILL BE RESPONSIBLE FOR MAINTAINING CLEAN PUBLIC ROADS ADJACENT TO THE SITE THROUGH PERIODIC SWEEPING AND SCRAPING AS REQUIRED.
8. HYDROSEEDING WITH A SUITABLE SEED MIX, REVIEWED AND APPROVED BY THE ESC MONITOR, SHOULD BE USED ON CUT AND FILL SLOPES. HYDROSEEDING, CURLEX MATTING, STRAW/MULCH, AND/OR A COMBINATION THEREOF, AS REVIEWED AND APPROVED BY THE ESC SUPERVISOR, MAY BE USED ON INACTIVE SURFACES TO PREVENT SEDIMENT MOBILIZATION.
9. ALL CATCH BASINS ADJACENT TO ACTIVE WORKS AND CONSTRUCTION ACCESS ROUTES ARE TO BE PROTECTED AS REQUIRED WITH CATCH BASIN PROTECTION DEVICES IF SEDIMENT DEPOSITION IS OBSERVED.
10. NO SITE DRAINAGE IS TO FLOW DIRECTLY TO THE MUNICIPAL STORM SYSTEM, WITHOUT PRIOR TREATMENT (e.g. SEDIMENT CONTROL POND; DETAIL A & B)
11. EXPOSED CUT AND/OR FILL SLOPES ARE TO BE COVERED WITH DENSE APPLICATION STRAW, COMPOSTABLE MATTING, STAKED-IN POLYETHYLENE TARPING, OR EQUIVALENT TO PREVENT EROSION WHILE POOR WEATHER EXISTS.
12. STOCKPILES OF ERODABLE MATERIALS (e.g. EXCAVATION SPOIL, CLAYS, PIT RUN, TOPSOIL, etc.) WILL BE COVERED WITH STAKED-IN POLYETHYLENE TARPING OR EQUIVALENT WHEN NOT IN USE AND ALWAYS PRIOR TO AND DURING FORECAST PRECIPITATION. NON-ERODABLE MATERIALS WILL BE STOCKPILED ON PAVED SURFACES.

ESC MONITORING PROGRAM

13. THE OWNER/DEVELOPER IS REQUIRED TO CONTACT THE ESC MONITOR BY EMAIL AT MINIMUM 72HRS PRIOR TO THE COMMENCEMENT OF CONSTRUCTION ACTIVITIES TO SET-UP A SITE KICK-OFF MEETING. AT THIS TIME, AND THROUGHOUT CONSTRUCTION, THE ESC MONITOR WILL ADDRESS POTENTIAL CONFLICTS BETWEEN THIS ESC PLAN AND ACTUAL SITE CONDITIONS. THE ESC MONITORING WILL CONTINUE UNTIL ALL SITE SURFACES ARE AT FINAL GRADE, BUILDING IS CONSTRUCTED AND DISTURBED SURFACES ARE VEGETATED.
14. THE ESC MONITOR WILL BE CONFIRMED PRIOR TO ISSUANCE OF THE ESC PERMIT THROUGH A CONFIRMATION OF COMMITMENT BY ESC SUPERVISOR. THE ESC MONITOR WILL IMPLEMENT THE FOLLOWING MONITORING SCHEDULE:
    a. JUNE 1 TILL SEPTEMBER 30 - BIWEEKLY OR AS REQUIRED IF PRECIPITATION EXCEEDS 25MM IN 24HRS.
    b. OCTOBER 1 TILL MAY 31 - WEEKLY OR AS REQUIRED IF PRECIPITATION EXCEEDS 20MM IN 24 HRS.
19. THE ESC MONITOR WILL INSPECT AND MONITOR THE ESC FACILITIES TO ENSURE SEDIMENT AND SEDIMENT LADEN WATER DO NOT REACH THE MUNICIPAL DRAINAGE SYSTEM WITHOUT TREATMENT AND THE FACILITIES HAVE BEEN INSTALLED AS DESIGNED, ARE OPERATING EFFECTIVELY, AND TO DETERMINE IF ANY REPAIR OR MAINTENANCE OF THE FACILITIES ARE REQUIRED. THE CONTRACTOR IS RESPONSIBLE FOR THE MAINTENANCE OF ALL ESC FACILITIES OVER THE COURSE OF WORKS. THE ESC MONITOR MAY MODIFY OR ADJUST ESC FACILITIES AS REQUIRED IN ORDER TO ASSURE COMPLIANCE WITH THE MUNICIPAL BYLAW.
16. AT THE DISCRETION OF THE ENVIRONMENTAL MONITOR, SITE SAMPLING (TURBIDITY SAMPLING) MAY BE CONDUCTED DURING EACH SITE VISIT. IF HIGH TURBIDITY (> 50NTU) IS OBSERVED, A TSS WATER SAMPLE WILL BE COLLECTED AND SUBMITTED TO THE LABORATORY FOR ANALYSIS. ALL DATA WILL BE AVAILABLE TO THE DISTRICT FOR INSPECTION IF REQUESTED.
17. THE ESC MONITORING PROGRAM SHOULD CONTINUE FROM THE START OF CONSTRUCTION TO SUCH A TIME THAT THE ESC MONITOR DETERMINES THAT FURTHER MONITORING IS NO LONGER REQUIRED AS CONSTRUCTION PROGRESS HAS REACHED FINAL STAGES AND THE RISK TO THE SURROUNDING ENVIRONMENT IS NEGLIGIBLE. THE ESC MONITOR WILL PROVIDE THE DISTRICT OF WEST VANCOUVER ENVIRONMENTAL STAFF WITH CONFIRMATION VIA EMAIL THAT THE MONITORING PROGRAM HAS CEASED.

DETAIL A: COMPOSTABLE SOCK INSTALLATION DETAIL



DETAIL TAKEN FROM "FILTREXX SILT SOCK"

COMPOST SOCK CONNECTION/ATTACHMENT DETAIL

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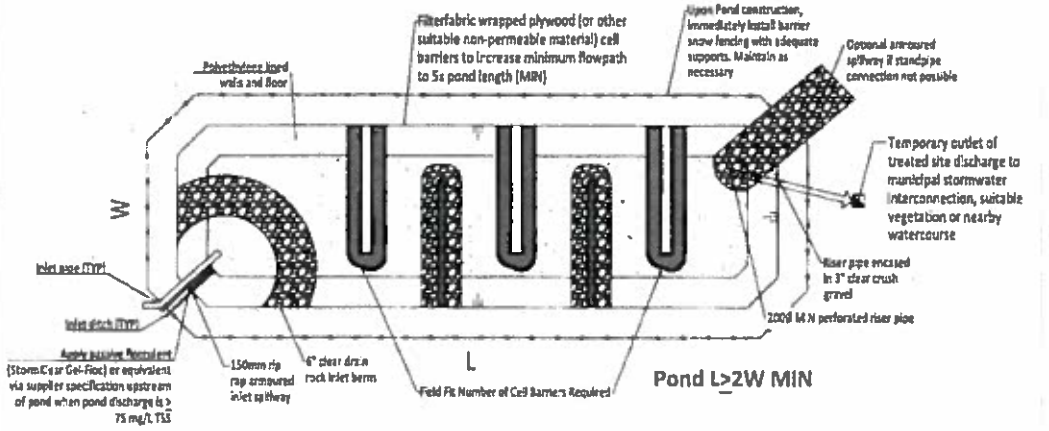
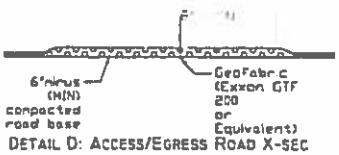
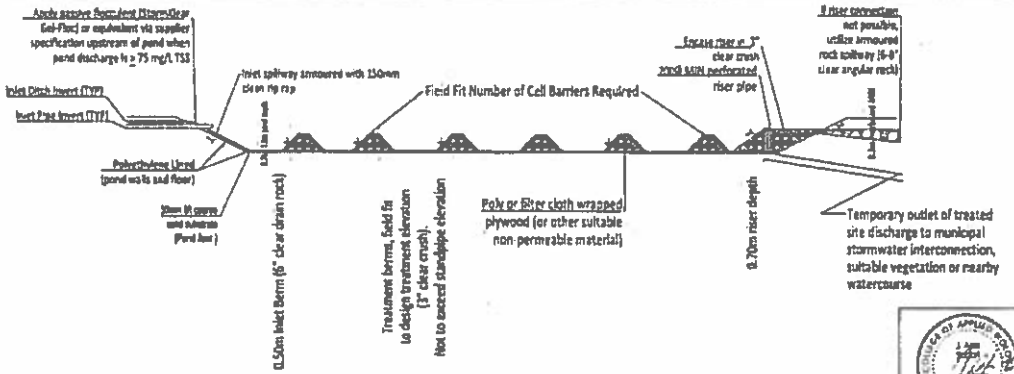
BPP AREA 6 - REVISED ESC PLAN
(ESC DETAILS)
PERMIT DRAWINGS (2 OF 3)



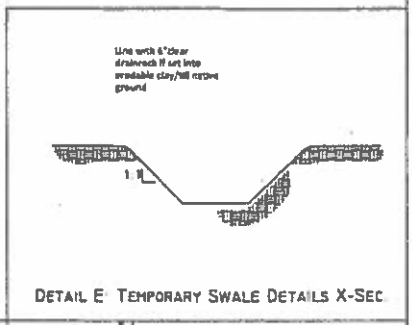
DETAIL B: TYPICAL SEDIMENT CONTROL POND DETAILS (FIELD FIT REQUIRED)



DETAIL D: ACCESS/EGRESS ROAD X-SEC



DETAIL C: TYPICAL SEDIMENT CONTROL POND DETAILS *(FIELD FIT REQUIRED)*



DETAIL E: TEMPORARY SWALE DETAILS X-SEC

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BPP AREA 6, REVISED ESC PLAN
(ESC DETAILS)
PERMIT DRAWINGS (3 OF 3)

APPENDIX B

ENVIRONMENTAL SETBACK SUMMARY & MAPS

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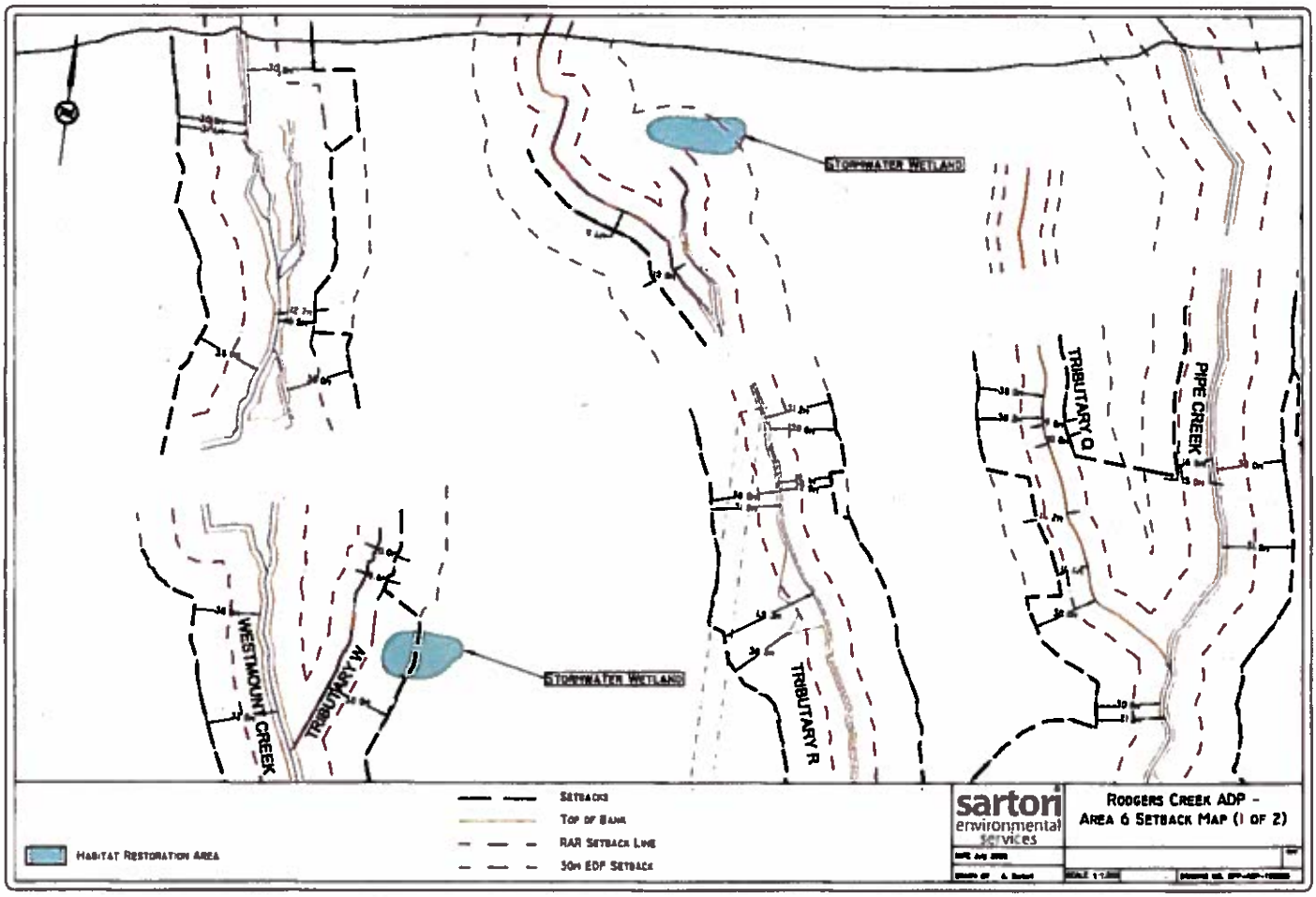
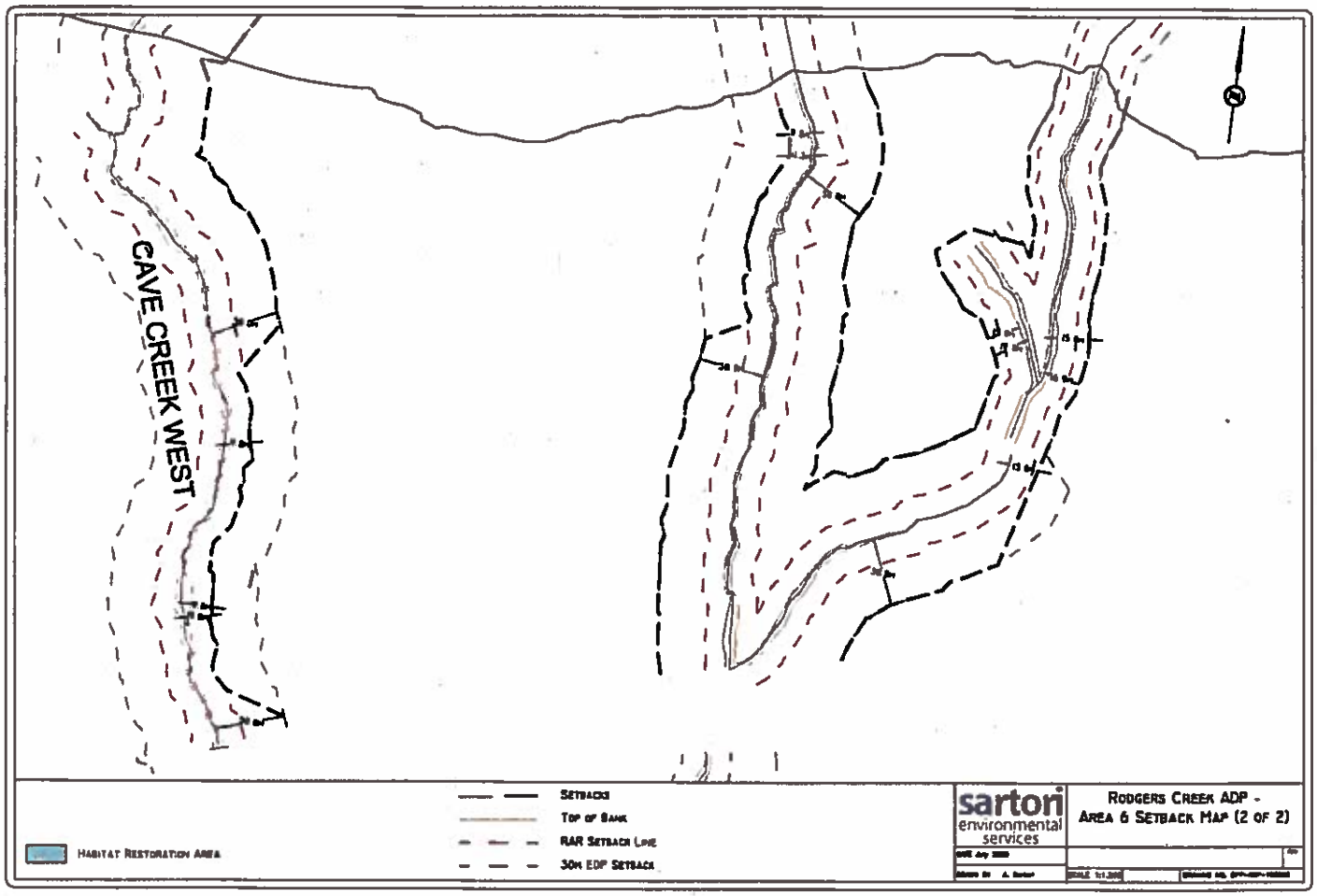
106-185 Forester Street, North Vancouver, BC V7H 0A6
Tel 604.987.5588 Fax 604.987.7740
Email info@sartorienv.com
www.sartorienv.com

Development Area No	Stream Name	Snapshot Characteristics	Proper Functioning Condition Description	Stream Ranking	Restoration Opportunities	Elapsed Point to Potential Development Area	EDP Setback Recommendation	Stream Setback Rationale
3	Trib W	* average channel width of 2.58 metres * no bankfull flags or high elevation * erosion and deposition * no connection above Cypress Bend Road	Tributary W is a short reach segment that is functioning, whose channel begins at headwater seepage from Cypress Bend Road, flows in a gully and in the upper stream reach	Low	Potential to alter culvert & large wetland pond with the old logger's road bench	13 minutes walking 9.5 minutes Tall	7 m	A 7m top-of-bank setback is proposed within the EDP between Trib W & Bellevue Drive. A 15 metre RAR setback is proposed on the east side of the stream to allow for future channel migration and floodplain of the watercourse
3	Vaughan Creek	* average channel width of 3.64 metres * no bankfull flags or high elevation * abundant flow complexity * large substrate * large tract of forest intact between Pipe Creek and Cave Creek provides connectivity to an additional adjacent and Pipe Creek provides connectivity to an additional adjacent and Cave Creek provides connectivity to a continuous	Vaughan Creek is functional throughout its length with its banks and riparian zone within CEM. The channel is on a U2/3 with good riparian that have moderated some stormwater and litter down and that has some shade and benches in the lower reaches	Moderate	Restoration opportunities exist within & adjacent reach in the Pipe & Vaughan backyards	Not applicable	7 m	For impacts to Vaughan Creek
5	Trib U	* average channel width of 1.13 metres * no bankfull flags or high elevation * no small flow complexity * predominantly small stony gravel (50 metres in length)	Tributary U is functional gravel that is less valuable as watercourse and the lower flows reflect the gradient water backflows and riparian shading from logging slopes and headwater flow contributions was gone. Tributary U connects at a gully at upper reaches approximately with a new rapid headwater wetland draining from harvest log road crossing. Natural cross sections & substrate and stream and CEM & Bridge Creek	Low	Potential to alter/infill & large wetland headwater pond which could also be used for landscape purposes for the development and access	Not Impacted	7 m	Not impacts to Trib U
1	Cave Creek	* average channel width of 3.18 metres * no bankfull flags or high elevation * abundant flow complexity * limited and undefined between Cypress Bend Roads * large tract of forest intact between Pipe Creek and Cave Creek provides connectivity to an additional adjacent and Pipe Creek provides connectivity to a continuous	Cave Creek is functional throughout its length, except at the upper most and where there are in the lower reaches. Isolated channels growing from headwater seeps. Natural cross sections have good shade and benches in the lower reaches. There is a significant lagging LWD and some litter down throughout the channel	Moderate	11 minutes walking* 2.4 minutes Tall	Yes	7 m	A minor encroachment within the EDP setback is proposed and is offset by the large contiguous riparian area to the west and south
1	Trib W	average channel width of 1.5 metres no bankfull flags or high elevation abundant flow complexity	Tributary W is functional as part of the lower reaches and the upper flows are channelized, though vegetation and riparian shading from headwater seeps and groundwater flows	Low	Not applicable	Not applicable	7 m	Not impacts to Trib W
4	Trib R	* average channel width of 3.5 metres * no bankfull flags or high elevation * abundant flow complexity * small stony flow complexity * some and deep/undercut into Pipe Creek	Upper reaches of tributary R below CEM are not functional considering it channel, though undercut characteristics, damage caused from falling logs and roads and encroachment from through the adjacent channel & restoration activities & breaking and bankfull flows are irregular reaches downstream of CEM are functional, with significant lagging LWD and some down the channel channels at 8.3m and some B3A density reduced and compromised at upper reaches. Lower reaches are relatively stable particularly with Pipe Creek at deeper and well-functional	Moderate	Restoration opportunities exist within disturbed riparian & forested backyards. Headwater wetland restoration/enhancement opportunities	13 minutes walking 5.5 minutes Tall	7 m	An encroachment within the EDP setback is proposed on the west side however the proposed setback is sufficient to maintain the floor function and floodplain of the watercourse
6	Vaughan Creek	* average channel width of 3.44 metres * no bankfull flags or high elevation * abundant flow complexity * large substrate * large tract of forest intact between Pipe Creek and Cave Creek provides connectivity to an additional adjacent and Pipe Creek provides connectivity to a continuous	Vaughan Creek is functional throughout its length with its channel & CEM. The channel is on a U2/3 with some reaches that have moderated some stormwater and litter down and that have some shade and benches in the lower reaches	Moderate	Restoration opportunities exist within & adjacent riparian & forested backyards	18.5 minutes walking (not home)* 12.7 minutes Tall (not home) 21.4 minutes walking (not home)* 16 minutes Tall (not home)	7 m	A minor encroachment within the EDP setback is proposed on the west side however the proposed setback is sufficient to maintain the floor function and floodplain of the watercourse
6	Cave Creek	* average channel width of 3.78 metres * no bankfull flags or high elevation * abundant flow complexity * isolated and undefined between Cypress Bend Roads * large tract of forest intact between Pipe Creek and Cave Creek provides connectivity to an additional adjacent and Pipe Creek provides connectivity to a continuous	Cave Creek is functional throughout its length, except at the upper most and where there are in the lower reaches. Isolated channels growing from headwater seeps. Natural cross sections have good shade and benches in the lower reaches. There is a significant lagging LWD and some litter down throughout the channel	Moderate	Restoration opportunities exist within & adjacent lagging road	21.5 minutes walking (road & ?)* 15.8 minutes Tall (road trail) 13.8 minutes walking (road trail) 11.8 minutes Tall (road trail)	7 m	A minor encroachment within the EDP setback is proposed on the west channel within proximately undefined rail / bankfull cross. Trail replaced between proposed & sufficient to maintain the floor function and floodplain of the watercourse
4	Cave Creek West	* average channel width of 1.64 metres * no bankfull flags or high elevation * abundant flow complexity * lower portion of channel when connected (DW and natural		Low	Restoration opportunities exist within Park and logger's road crossings and on area where the watercourse has crossed over a road	13 minutes walking 10.5 minutes Tall	7 m	30 metre setback provided along entire length of creek where the 30 days flows within the Hydro ROW as the riparian zone is predominantly undisturbed due to the powerlines

* Assumes either non-specific road identification (pedestrians) to the bridges trail or a road crossing


STORMWATER WETLAND
STORMWATER WETLAND
TRIBUTARY Q
PIPE CREEK
WESTMOUNT CREEK
TRIBUTARY W
TRIBUTARY R
SETBACKS
TOP OF BANK
RAR SETBACK LINE
30M EDF SETBACK
HABITAT RESTORATION AREA
sartori environmental services
RODGERS CREEK ADP -
AREA 6 SETBACK MAP (1 OF 2)


CAVE CREEK WEST
SETBACKS
TOP OF BANK
RAR SETBACK LINE
30M EDP SETBACK
HABITAT RESTORATION AREA
sartori environmental services
RODGERS CREEK ADP -
AREA 6 SETBACK MAP (2 OF 2)

SCHEDULE 'F'

Wildfire Management Plan
Rodgers Creek Area 6

Amended - June 2019

Submitted to:

British Pacific Properties Limited
#1001 - 100 Park Royal
West Vancouver, British Columbia

Submitted by:

DIAMOND HEAD

3559 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.

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Insurance Information

WCB: # 657906 AQ (003)
General Liability: Northbridge General Insurance Corporation - Policy #CBC1935506, $5,000,000
Errors & Omissions: Lloyds Underwriters – Policy #1010615D, $1,000,000

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List of Figures

1 Introduction

Diamond Head Consulting Ltd. (DHC) was retained by British Pacific Properties Limited to complete a wildfire management plan for the proposed Area 6 subdivision at Rodgers Creek in West Vancouver. This report has been updated to include the extension of Road G at the west edge of the subdivision. In accordance with the 2007 Community Wildfire Protection Plan, the District requires that such a plan be submitted for the subdivision approval. The overall objective of this report is to assess the potential wildfire threat and provide recommendations and tools to reduce this threat to the development site. Specific goals for this project are:

- To assess interface fuel hazards using an accepted fuel hazard assessment procedure and present a summary of results;
- To map the location of hazardous fuel types relative to the planned development area;
- Recommend site-specific fuel treatments for adjacent high fuel hazards that will reduce the risk to structures, human lives, and critical natural features;
- Recommend improvements to suppression capabilities in and around the proposed development; and
- Make recommendations for building materials and landscaping that will minimize wildfire hazard.

1.1. Site Planning Documents Reviewed

Diamond Head Consulting was provided with the following documentation from the client that provides the basis for all comments and recommendations:

- British Pacific Properties Rodgers Creek Development - Development Concept, updated in July 2017
- British Pacific Properties Rodgers Creek Development Area 6 – Clearing and Road Earthworks Plan for the Road G Extension.

Any changes to these site plans should be provided to Diamond Head Consulting so that this wildfire report can be updated accordingly.

2 Methodology

Diamond Head Consulting Ltd. completed a field assessment of the natural areas within 200m of the development site. In these areas, detailed descriptions of the ecology and the fuel characteristics was collected for each polygon. Data collected at each fuel plot included:

- Biogeoclimatic classification;
- Soil and humus characteristics;
- Slope, aspect and terrain classification;
- Forest stand composition by layer (species, density, age, diameter, height, etc.);
- Vertical and horizontal stand structure;
- Quantity and distribution of ladder fuels;
- Composition and coverage of understory brush, herbs and grasses, and;
- Quantity and distribution of ground fuels by size class.

Detailed fuel hazard assessments were completed within the interface of adjacent lands using the provincial assessment system, "Rating Interface Wildfire Threats in BC" (Morrow, Johnson, Davies, 2008). This ranking system was used to help determine where fuel treatments will effectively reduce wildfire threat and to prioritize these areas for treatment. This combination of landscape and site level risk assessments provides a foundation to develop treatment strategies at a broad landscape level as well as specific treatments to address structures at risk.

3 Project Description

The planned development in Area 6 consists of a mix of single family lots, duplex lots, cluster housing units, and apartment complexes. Due to the size of the development and its associated infrastructure requirements, few mature trees are planned to be retained within the development clusters. Most of these areas are bordered by creeks and associated environmental setbacks. There are also natural areas outside the environmental setbacks within the development area. These areas are passive forested parks and will be dedicated to the District of West Vancouver. Figure 1 shows the proposed plan for Area 6 including the Road G extension.

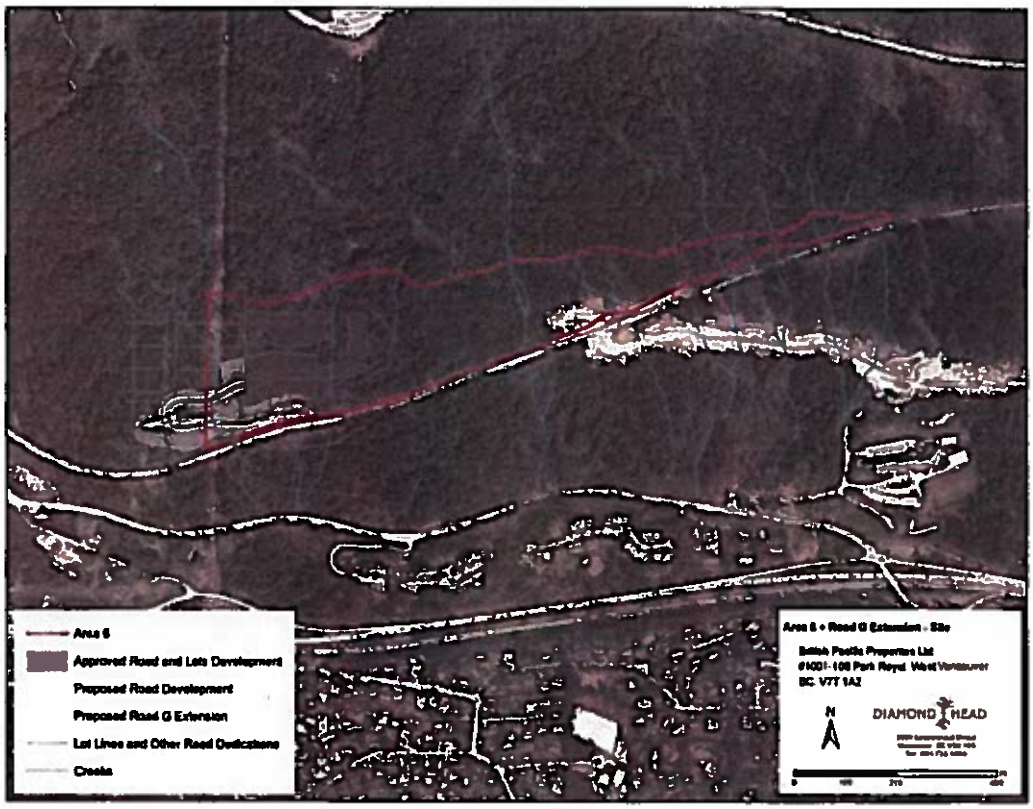
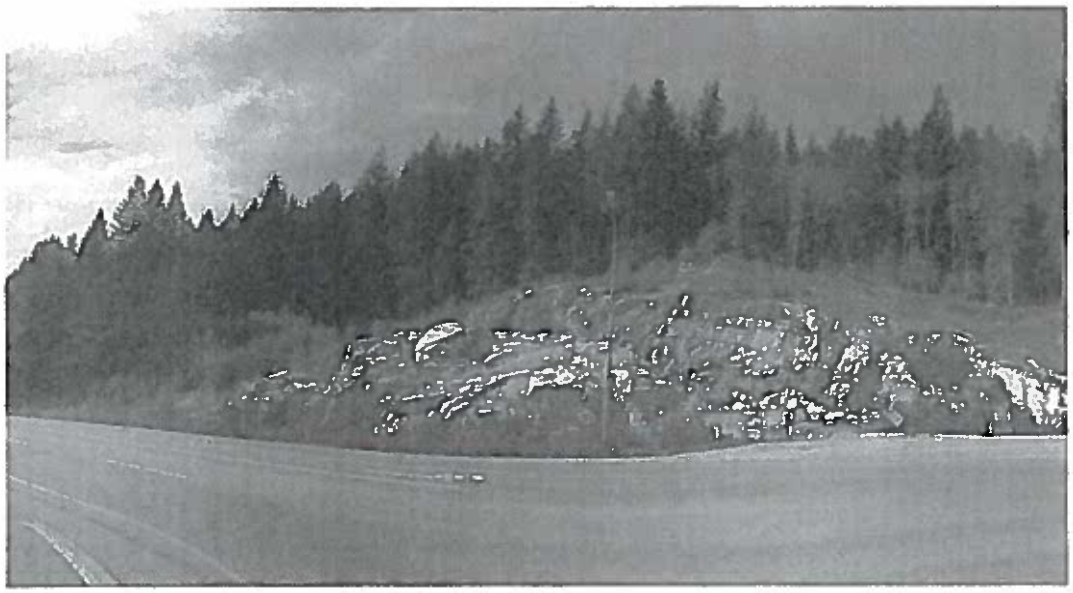


Figure 1. Area 6 subdivision plan with proposed Road G extension



View of planned access to Area 6

3.1 Terrestrial Ecology

The assessment area is located on a south facing, moderately steep slope. The parent material is a mix of morainal and colluvial consisting of deep sandy loam soils with a moderate to high coarse fragment content. This area is located within the Dry Maritime Coastal western hemlock Subzone (CWHdm) of the Biogeoclimatic Ecosystem Classification System (BEC) of BC. This subzone is characterized by warm, relatively dry summers and moist, mild winters with little snowfall. Generally, the areas assessed have a slightly dry to moist soil moisture regime and is nutrient medium to rich. These are identified as mostly Site Series 01 and 05 and minor components of 07 according to BEC.

4 Fuel Descriptions

All forested areas within 100m of the proposed development site were visited on the ground. Most areas consist of moderately dense mature stands of native species that regenerated naturally following logging operations about 80 years ago. Detailed fuel types were delineated and mapped. The fuels have been divided into classifications based on the sixteen national benchmark fuel types that are used by the Canadian Fire Behaviour Prediction System (CFBPS). There are no fuel classifications specific to the coastal region in the Canadian Fire Behaviour Prediction System; instead the site has been classified into the fuels types that represent the fire behaviour potential of the forests types most accurately. Four fuel types were identified and are illustrated in Figure 2.

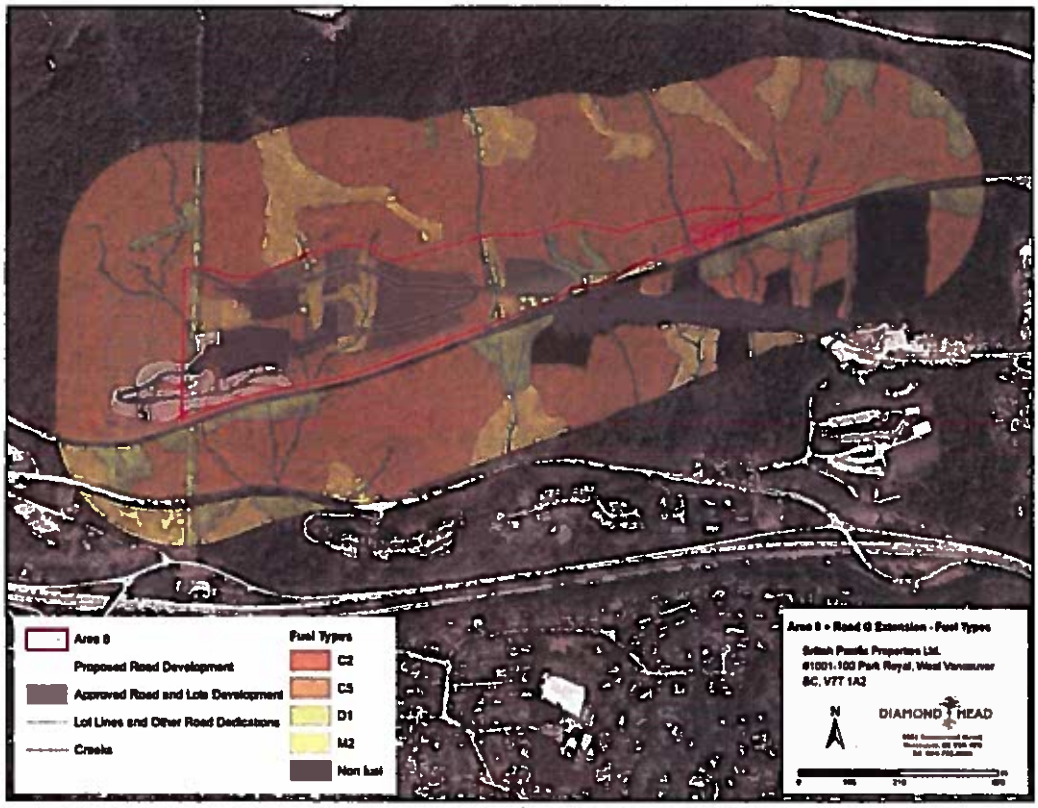


Figure 2. CFBPS Fuel Type Map

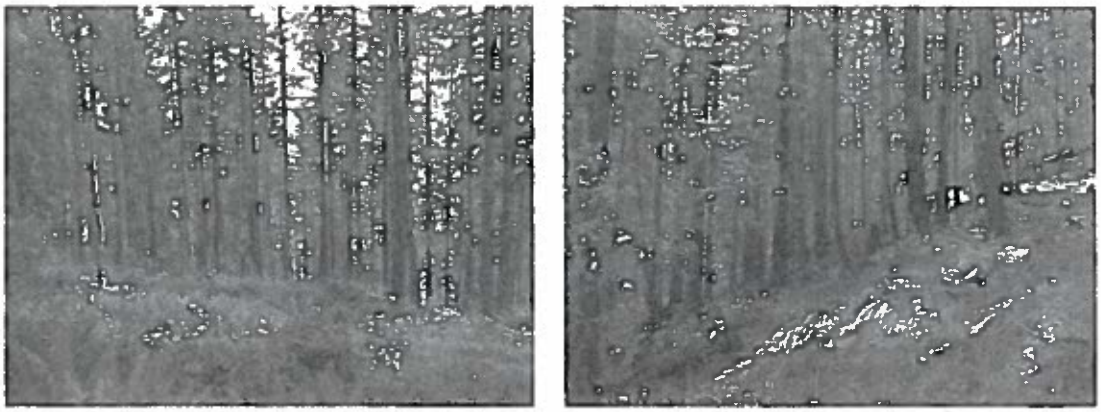
4.1 Fuel Type C5- Coniferous Dominated Stands

A large portion of the stands found within and adjacent to the development sites are classified as C5 fuel type. These stands are about 80 years old and consists of a mature second growth canopy of even aged, moderately stocked (500 – 800 stems per hectare) conifers. The stands are dominated by Douglas-fir (*Psuedutsuga menziesii*), western hemlock (*Tsuga heterphylla*), and western redcedar (*Thuja plicata*). The stand has a high crown to base height with few ladder fuels. There are scattered ladder fuels, mostly consisting of western redcedar and western hemlock. Ground fuel loading is moderate and there is a patchy distribution of flammable ground vegetation.

These areas pose a high wildfire risk. The slopes are moderately steep (30-60%) and there is relatively continuous ground and crown fuels that could support a high intensity wildfire under dry weather conditions. Although there are limited ladder fuels, a high intensity fire could create a crown fire that would move quickly and would be difficult to suppress. Table 1 outlines the general stand characteristics of a C5 stand.

Table 1 - C5 fuel characteristics

Characteristic	Risk Level	Description
Surface fuel continuity (% cover)	Moderate	24-60 % cover
Vegetation fuel composition	Low	Herbs and deciduous shrubs
Fine woody debris continuity (<=7cm) (% cover)	Moderate	10-25% coverage
Large woody debris Continuity (>=7cm) (% cover)	Moderate	10-25% coverage
Live conifer canopy closure (%)	Med	41-60% crown closure
Live deciduous canopy closure (%)	High	<20% crown closure
Live and dead conifer crown height (m)	Low	>5m
Live and dead suppressed and understory conifer (stems/ha)	Low	<500 stems/ha



Fuel type C5 photos

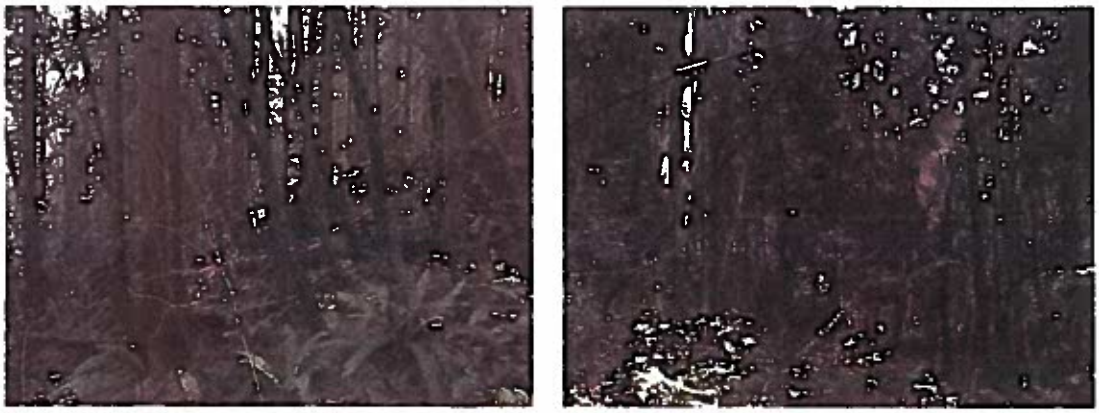
4.2 Fuel Type C2 - Coniferous Dominated Stands

There are some stands of trees that are denser with lower and more compact crowns. These are generally growing on rocky drier sites and many are directly above Cypress Bowl Road. The trees in these stands are generally young to mature and have an even aged stand structure. They are dense with 500-700 stems per hectare. Western redcedar and Douglas-fir are the dominant species with lesser components of western hemlock. There are moderate to high amounts of ladder fuels present consisting of lower branches of mature conifers and suppressed western redcedar and western hemlock. Ground fuel loading is moderate and there is a patchy distribution of flammable ground vegetation.

These areas pose a high wildfire risk. The slopes are moderately steep (30-60%) and there is continuous ground, ladder and crown fuels that could support a high intensity wildfire under dry weather conditions. The greatest risk from these conifer stands is their potential to support a crown fire, which has the potential to carry quickly, is difficult to suppress and can produce significant spotting. Table 2 outlines the general stand characteristics of a C2 stand.

Table 2 - C2 fuel characteristics

Characteristic	Risk Level	Description
Surface fuel continuity (% cover)	Moderate	24-60 % cover
Vegetation fuel composition	Low	Herbs and deciduous shrubs
Fine woody debris continuity (<=7cm) (% cover)	Moderate	10-25% coverage
Large woody debris Continuity (>=7cm) (% cover)	Moderate	10-25% coverage
Live conifer canopy closure (%)	High	61-80% crown closure
Live deciduous canopy closure (%)	High	<20% crown closure
Live and dead conifer crown height (m)	Moderate	2-3m
Live and dead suppressed and understory conifer (stems/ha)	Moderate	500-1000 stems/ha



Photos of C2 fuel type

4.3 Fuel Type D1 - Deciduous Dominated Stands

There are fragmented pockets of stands dominated by deciduous species. These grow mainly in wetter areas and adjacent to existing creeks. They are classified as a D1 fuel type which typically have less than 20% coniferous component. These stands are even aged with a density between 500 and 1000 stems per hectare. Dominant trees species include mainly red alder (*Alnus rubra*) and bigleaf maple (*Acer macrophyllum*). These areas generally have a high moisture regime. Ground fuel loadings are low and the ground vegetation is moderately dense consisting of mostly species with low flammability. Areas that are dominated by deciduous shrub species and regenerating deciduous trees are also classified as D1 fuel type. These include the hydro right of way the extends up through the west edge of Area 6 as well as the area previously cleared adjacent to the planned access road.

D1 fuel types have a low flammability and would not support a fast spreading, high intensity wildfire. If a ground fire did start it would not have a high intensity and would be very unlikely to spread into the crown of the stand. D1 stands pose a low wildfire risk and are expected to act as fuel breaks decreasing the overall wildfire threat to the site. Table 3 outlines general characteristics of D1 stands.

Table 3 - D1 fuel characteristics

Characteristic	Risk Level	Description
Surface fuel continuity (% cover):	Low	20-40 % cover
Vegetation fuel composition	Low	Herbs and deciduous shrubs
Fine woody debris continuity (<=7cm) (% cover)	Low	Scattered, <10% coverage
Large woody debris Continuity (>=7cm) (% cover)	Low-Med	10-25% coverage
Live conifer canopy closure (%)	Very low	< 20% crown closure
Live deciduous canopy closure (%)	Very low	>80% crown closure
Live and dead conifer crown height (m)	Very low	5m+ or <20% conifer crown closure
Live and dead suppressed and understory conifer (stems/ha)	Very Low	0-500 stems/ha

Photos of D1 fuel type

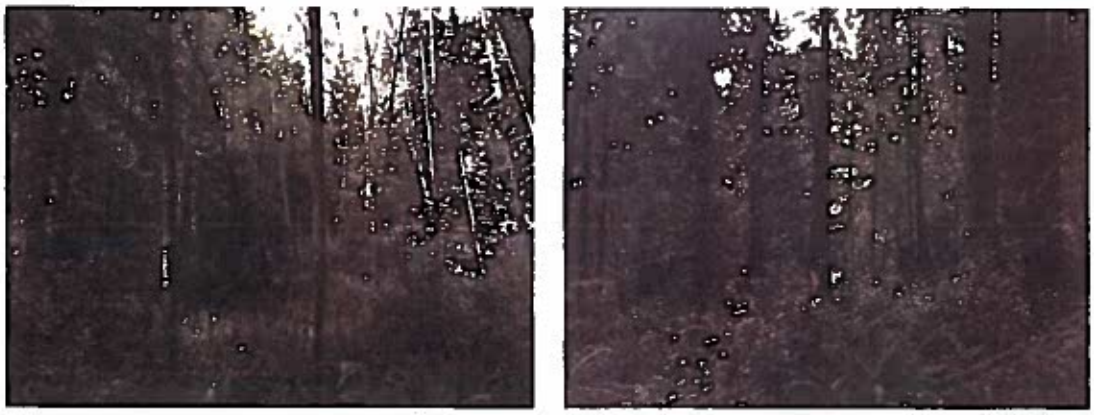
4.4 Fuel Type M2 – Mixed stand of coniferous and deciduous species

There are pockets of stands in and adjacent to Area 6 that have mixed components of deciduous and conifer species. Stand density is between 200 and 600 stems per hectare. Tree species include an inconsistent mix of bigleaf maple, red alder, western redcedar, western hemlock and Douglas-fir. The coniferous trees in these stands are generally discontinuous and there are scattered canopy gaps which breaks horizontal fuel continuity. Pockets of ladders fuel are present, and consist mainly of the lower branches of conifers. Ground fuels in these areas are generally moderate and discontinuous. Understory vegetation is moderately dense consisting of mostly species with low flammability.

The fire behavior potential in these stands is low to moderate and highly dependent on the percentage content and distribution of coniferous species. Most of these stands have a 40-60% coniferous component which is discontinuous in the stand. If a ground fire did start in these areas, it could move into the crowns of the scattered conifers. However, an M2 crown fire would be isolated and unlikely to spread quickly. Table 4 outlines general characteristics of M2.

Table 2 - M2 fuel characteristics

Characteristic	Risk Level	Description
Surface fuel continuity (% cover)	Low	20-40 % cover
Vegetation fuel composition	Low	Herbs and deciduous shrubs
Fine woody debris continuity (<=7cm) (% cover)	Low	Scattered, <10% coverage
Large woody debris Continuity (>=7cm) (% cover)	Low-Med	10-25% coverage
Live conifer canopy closure (%)	Med	40-60% crown closure
Live deciduous closure (%)	Med	20-40% crown closure
Live and dead conifer crown height (m)	Med	2-<3 m
Live and dead suppressed and understory conifer (stems/ha)	Very Low	0-500 stems/ha



Photos of M2 fuel type

5 Summary of Wildfire Threat

Areas 6 and the Road G extension are located within a densely forested area with few natural fuel breaks. Each fuel type and distinct stand was assessed for wildfire threat using the Wildfire Urban Interface worksheet (Morrow et. al 2013). Figure 3 outlines the wildfire threat in context with the subdivision plans for the subject property.

The majority of the forested areas have a high and continuous conifer component, and are moderately steep. These include areas classified as C5 and C2 fuel types. In these areas, ground fuels are moderate and there are enough ladder fuels to carry a ground fire to the crown of the trees. Under dry and hot weather conditions, there is potential to produce a relatively high intensity crown fire that would be difficult to suppress, posing an interface and spotting hazard to the development. Based on the Wildfire Urban Interface assessment methodology, these fuel types pose a high wildfire threat to the development.

There are also pockets of mixed stand conditions classified as M2. These stands include a discontinuous distribution of conifers that could support isolated crown fires. Fuels breaks that would help to slow a wildfire include pockets of deciduous dominated stands, roadways and openings created for development lots. These fuel types pose a moderate wildfire threat to the development. Deciduous dominated stands and shrub communities (D1 fuels types) exist adjacent to streams, wetter draws and along cleared right of ways. These areas provide fuel breaks however are relatively small in comparison to the surrounding continuous forested areas.

Figure 3. Wildfire threat mapping

6 FireSmart Wildfire Threat Mitigation Recommendations

This section provides recommendations to mitigate the risk of wildfire to the proposed development areas based on the current condition of hazardous fuels and wildfire threat, site planning documents, and FireSmart standards within the prioritized zones defined in the FireSmart Homeowners Manual (Partners in Protection and Province of BC, 2016).

During a wildfire homes are ignited as a result of:

- Sparks or embers landing and accumulating on vulnerable surfaces such as roofs, verandas, eaves and openings. Embers can also land on or in nearby flammable materials such as bushes, trees or woodpiles causing a fire close to a structure.
- Extreme radiant heat from flames within 30 m of a structure that melts or ignites siding, or breaks windows.
- Direct ignition from nearby flammable materials such as bushes, trees or woodpiles.

The fire resistance of homes in the interface can be improved by achieving FireSmart standards for subdivision design, building materials, ignition sources and combustible fuels. In the event that a wildfire does threaten the area, suppression capability is improved with good access, defensible space and water supply. The following recommendations address:

- Building construction and site layout;
- Suppression and Emergency Access Planning;
- Fuel hazard mitigation on any wildland/green spaces;
- FireSmart landscaping; and,
- Ongoing maintenance.

6.1 Building Construction and Site Layout

During a wildfire, homes are ignited as a result of direct radiant heat as well as embers landing and accumulating on vulnerable surfaces such as roofs, verandas, eaves and openings. Embers can also land on or in nearby flammable materials such as bushes, trees or woodpiles and, if the resulting fire is near the home, create enough radiant heat to ignite the walls of the home. Small fires in the yard can also spread towards the structures, beneath porches or under homes. The creation of a fuel free defensible space between structures and fuels as well as building material are paramount concerns for homes in the interface. The following construction guidelines are recommended for this development:

Roofs

- Use only fire retardant material (Class A or B rated) on roofs; and
- Clear and maintain roofs free of combustible material.

Siding

- Siding should be predominantly fire resistant or non-combustible material, particularly within 30 m of a mixed or coniferous forest edge; and,
- Siding should extend from the ground level to the roofline.

Wood Chimneys

- Wood burning fireplaces are not permitted as per the Development Permit and a Section 219 Covenant to be registered on the lots in the subdivision.

Balcony, Decks and Porches

- Deck surface and sheathing materials should be made of predominantly non-combustible of fire-resistant materials (Class A or B rated) such as wood composite products.
- Decks should be sheathed in and, if deck surfaces are slotted, provide access below for cleaning out litter accumulations.

Vents, openings, eaves, attics, overhanging projections, soffits

- Eaves, attics, overhanging projections and underfloor openings should be protected with non-combustible covers.
- Any intake or exhaust vents that open into insulated attic space or are attached to combustible duct systems must be non-combustible and screened using 3mm, non-combustible wire mesh.
- Soffits must be non-combustible or made of ignition resistant materials.

Guidelines during Construction

- During construction of houses, all waste construction materials including brush and land clearing debris; needs to be cleaned up on a regular basis to minimize the potential risk. No combustible materials should be left at the completion of construction.
- Prior to construction of any wood frame buildings, there must be fire hydrants within operating range.
- All construction operations should be conducted according to the Wildfire Act and the regulations.

6.2 Suppression and Emergency Access Planning

In BC, the *Wildfire Act* specifies responsibilities and obligations with respect to fire use, prevention, control, and rehabilitation. The expected outcome of the *Wildfire Act* is that fire starts are prevented through appropriate fire prevention planning and hazard mitigation. The concept of "due diligence" is central to the *Act*, meaning that all reasonable care commensurate with the fire hazard is exercised.

Under the Act, land clearing and the use of heavy machinery for construction are considered "High risk industrial activities" under the Wildfire Act and Regulation and must conform to the statutory requirements:

- Between March 1 and November 1, the Wildfire Regulation requires that the Fire Danger Class be determined for the location of the activity.
- High risk activities are required to have a functioning fire suppression system at the activity site. The system may involve the delivery of water, the addition of a surfactant, the application of a suppressant, or a combination of all three. The fire suppression system should be practicable and reasonable for the specific high risk activity being carried out. The system should be nearby, operational and capable of being deployed in a reasonable length of time to suppress a fire, taking the Fire Danger Class into consideration.
- Firefighting hand tools are required on site during the fire season (on or after March 1 and before November 1). Firefighting hand tools must be available at that site in a combination and type to properly equip each person who works at the site with a minimum of one firefighting hand tool per person.
- Operation of engines must be done safely. A person must not operate an engine at a time when there is a risk of fire starting or spreading unless precautions are taken to ensure that the engine does not cause a fire.
- Sufficient fuel breaks are required so that there is no reasonable chance of a fire spreading. A fuel break may also be created using a sprinkler system that increases the moisture content of fuel above its ignition point.

Hand Tools

Fire suppression hand tools and water back packs should be placed at each of the water tanks and on every machine that is working on site. Each worker should have access to a tool with which to carry out fire suppression work. "Fire fighting hand tools" are defined in the Regulation to include shovels, mattocks, pulaskis, fire extinguishers and hand tank pumps.

Water for Suppression

During construction, emergency water storage tanks will be placed in strategic locations accessible along Fern Fire Access Road. These tanks will be maintained from March through to November. The District of West Vancouver Fire Department and North Shore Emergency Management Office (NSEMO) have been provided with the locations and access information for these tanks. In addition, a mobile water tank will be on site with a pump delivery system. Emergency water tanks will be made ready with hose connections placed in locations accessible to the clearing site. The mobile water tanker will be used to irrigate the work site prior to clearing activities if required.

Work Restrictions and Fire Watch

Restrictions on high risk activities apply depending on the Fire Danger Class. Restrictions must be followed when the rating is moderate, high and extreme. These may include ceasing activity altogether or for periods of the day and maintaining fire watcher and communication requirements. Requirements for work restrictions are provided in Schedule 3 of the Wildfire Regulation.

Table 3. Schedule 3 of the Wildfire Regulation (restrictions on high risk activities)

Column 1 Fire Danger Class (DGR)	Column 2 Restriction	Column 3 Duration
III (moderate)	After 3 consecutive days of DGR III or greater, maintain a fire watcher after work for a minimum of one hour	Until after the fire danger class falls below DGR III
IV (high)	Maintain a fire watcher after work for a minimum of 2 hours	Until after the fire danger class falls below DGR III
	After 3 consecutive days of DGR IV, cease activity between 1 p.m. PDT (Pacific Daylight Saving Time) and sunset each day	Until after the fire danger class falls to DGR III for 2 consecutive days, or falls below DGR III
V (extreme)	Cease activity between 1 p.m. PDT (Pacific Daylight Saving Time) and sunset each day and maintain a fire watcher after work for a minimum of 2 hours	Until after the fire danger class falls below DGR IV for 2 or more consecutive days
	After 3 consecutive days of DGR V, cease activity all day	Until after the danger class falls below DGR V for 3 or more consecutive days, or falls below DGR IV

During the summer months and when operational practices allow, BPP will install and maintain a temporary pressurized fire prevention and suppression system on-site to reduce the risk of wildfire. The system will include sprinklers along the forest edges that will be used to wet the fuels around the site daily. Also charged fire hoses will be installed at intervals around the perimeter of the site. When these measures are operational working restrictions may be relaxed subject to the inspection and approval of the West Vancouver Fire Department.

Access Planning

An emergency response access strategy (May 2016) has been developed for Area 6. This document provides an explanation and discussion of the various routes planned for accessing the subdivision. It also specifies road design requirements as it relates to an Emergency Response Strategy (ERS).

As part of the ERS, BPP has committed to maintaining secondary access from the end of each of the cul-de-sac roads. The northern road will connect to the Fern Fire Access road while the south road will connect south west to the Upper Mountain path which will be constructed immediately north of Cypress Bowl Road. Fern Access road will be upgraded and maintained to provide access for suppression resources as needed and to be used for evacuation if necessary.

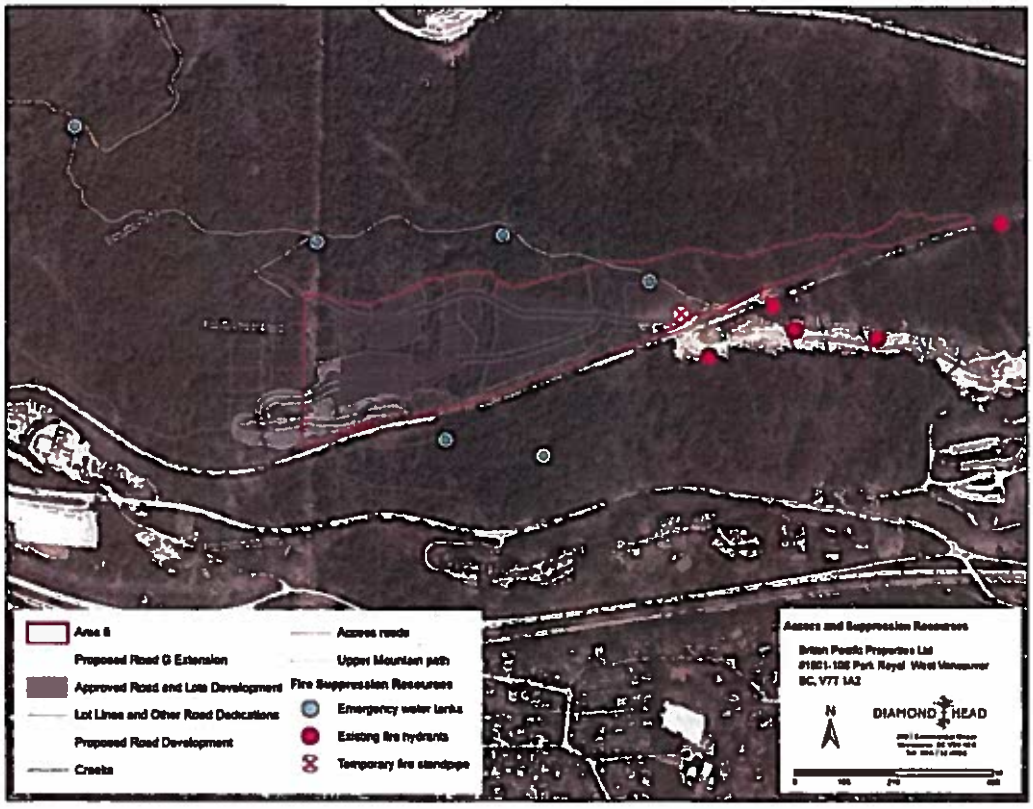


Figure 4. Access for Emergency Response and Water Availability

6.3 Fuel Hazard Mitigation in Adjacent Forested Areas

The FireSmart Program outlines three priority areas when mitigating fuels adjacent to structures. General recommendations for the creation and maintenance of FireSmart zones 1 and 2 are provided. Recommended objectives of these strategies that will reduce wildfire threat include:

- Reduce surface fuels;
- Increase the height to the base of tree crowns;
- Increase spacing between tree crowns; and,
- Promote fire-resistant deciduous trees.

Priority zone 1 is within 10m of any structures. The goal in this zone is to remove hazardous fuels and convert vegetation to fire resistance species to produce an environment that does not support combustion. Priority zone 2 is from 10 to 30m from any structures. These areas are found mostly within the proposed park areas. Most of these areas support sensitive environmental conditions and fuel treatments must be prescribed in a sensitive manner. The goal in this zone is to reduce flammable vegetation through thinning, pruning and clean-up of ground fuels to produce an environment that will only support low-intensity surface fires.

Priority zone 3 includes the natural areas between 30 and 100m from structures. Due to the environmental sensitivities of these areas and potential impacts of removing trees, treatments in this area have not generally been recommended.

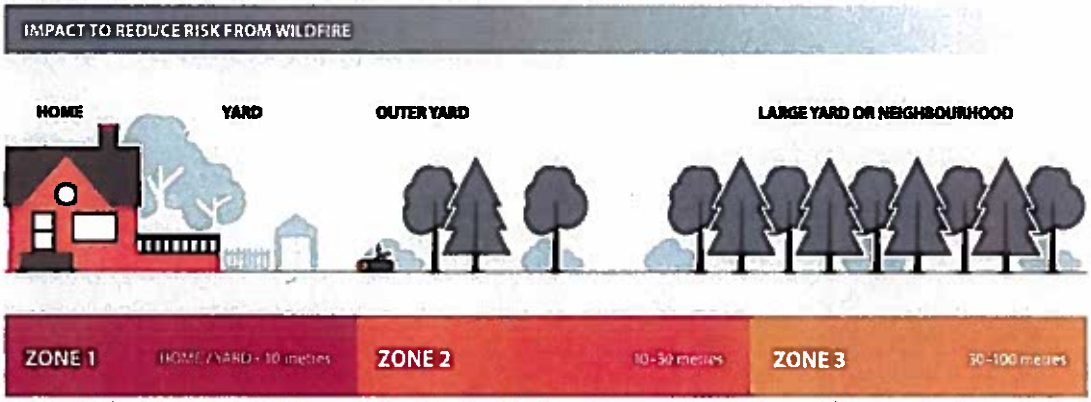


Figure 5. FireSmart Priority Zones defined in the FireSmart Homeowners Manual (Partners in Protection and Province of BC, 2016).

Recommendations for Zone 1 – Within 10m of buildings

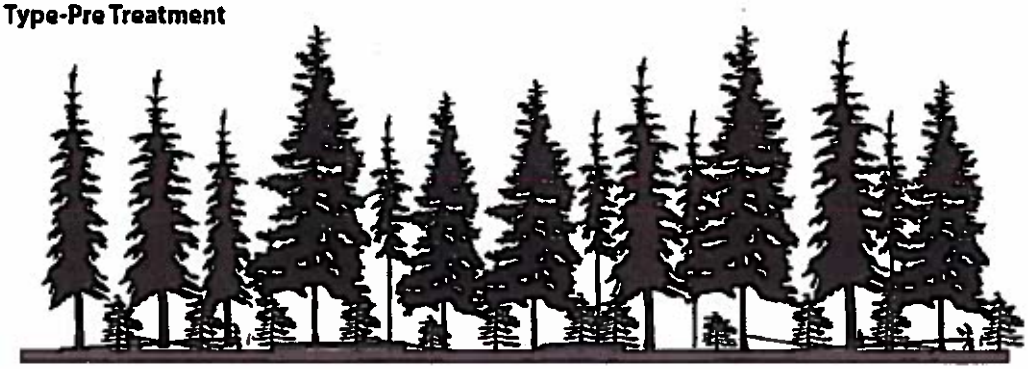
- While considering environmental sensitivities, create as large a fuel free zone as possible between the structures and adjacent fuels.
- Overmature, dead, and dying trees with the potential to ignite and carry fire should be removed.
- All conifer trees should be removed.
- Remove all ground fuel accumulations;
- Grass should be kept mowed to 10 cm or less and watered regularly during the summer months.
- Remove all highly flammable vegetation and other combustibles from around the buildings.
- No conifer trees or shrubs should be planted.
- Litter should be removed regularly and prior to the fire season
- If including trees and shrubs in landscaping, select deciduous, fire resistant species. Ensure that vegetation will not grow to touch or overhang buildings.
- Irrigation sprinklers should be installed in landscaping

Recommendations for Zone 2 – 10m to 30 of buildings

- Conifer trees within the sub-canopy layer and understory (generally shorter than ~10m) should be removed. These are conifers that have lower branches to the ground and would act as ladder fuels to overhead conifer trees.
- Overstory conifer crown separation should generally target a spacing of 3 to 6 m, however, in natural areas the target should be refined by the prescribing forester based on site ecology.
- Canopy heights of retained overstory conifers should be pruned to a minimum height of 4 m.
- Overmature, dead, and dying trees with the potential to ignite and carry fire should be removed.
- Grass should be kept mowed to 10 cm or less and watered regularly during the summer months in landscaped areas.
- Deciduous composition in the overstory should be promoted and no thinning of live deciduous trees is necessary.
- Woody debris and downed trees should be removed. Low densities of woody debris should be retained at greater than 0.5 kg/m2 and less than 3 kg/m2. Larger decayed logs do not pose a significant wildfire risk and should be retained for ecological value;
- Dispose of all slash created by treatments off-site, or chip and retain onsite, or scatter on-site. Chips should not be a left onsite at a depth of greater than 10 cm. Low densities of woody debris should be retained at greater than 0.5 kg/m2 and less than 3 kg/m2.
- Any local accumulations of woody material should be removed from the site or scattered so that they are discontinuous. Larger decayed logs do not pose a significant wildfire risk and should be retained for ecological value.
- No roots are to be disturbed and tree removal should be done in a way that minimizes ground disturbance.

- This zone should be constructed by the developer and maintained by the individual property owner.
- Fuel treatment areas should be delineated, prescribed and supervised by a Professional Forester or Biologist.

Fuel Type-Pre Treatment



Fuel Type-Post Treatment

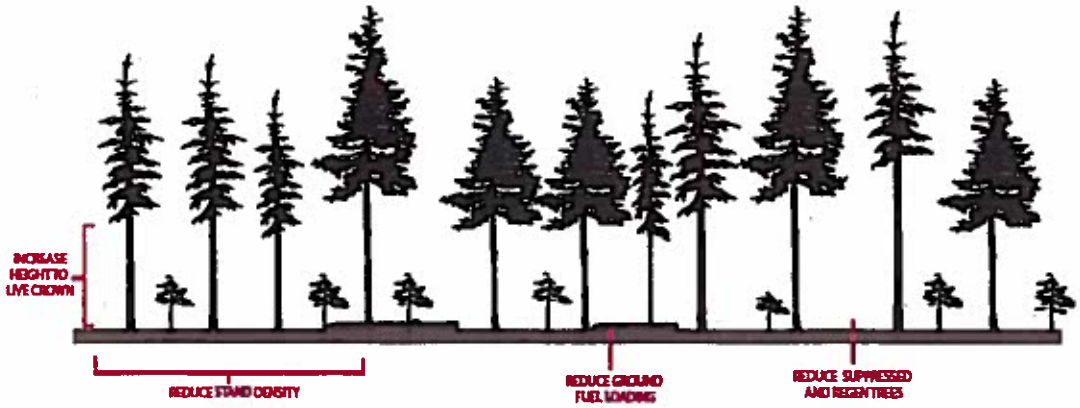


Figure 6. Illustration of fuel treatment outcomes sought to reduce horizontal and vertical fuel continuity in Priority Zones 1 and 2 with conifer fuel types.

6.4 Ongoing Maintenance

To ensure that FireSmart standards are maintained, periodic re-treatment or maintenance is recommended. These include:

- Regularly remove debris from roofs, gutters and beneath decks.
- Grass and landscaping should be kept mowed to 10 cm or less and watered regularly during the summer months.
- Landscape sprinkler systems should be installed and maintained by the homeowner.
- Remove any local accumulations of woody or combustible material (e.g., no woodpile or yard waste accumulations).
- Remove any over mature, dead or dying shrubs and trees.
- Plant only fire resistant trees and shrubs. A list of fire resistant plants and trees can be found at the fire smart canada website

7 Final Remarks

Planners, engineers, and landscape architects should refer to both this report and the BC FireSmart Manual during the design phase of this development. Once the subdivision layout has been finalized with the locations of structures to be built, fuel treatments should be identified in the field and carried out prior to any construction. It is recommended that fuel treatments be supervised by a qualified professional.

All construction operations should be conducted according to the Wildfire Act and the regulations. Following these regulations will help reduce liability and protect the development as an investment. Periodic inspections should be conducted during the fire season to ensure that the Act and associated regulations are being adhered to.

The forests in and surrounding Area 6 pose a moderate to high wildfire threat to this subdivision. If the recommendations made within this report are followed, wildfire risk to life and property will be substantially reduced to a reasonable extent within the limitations of environmentally sensitives, zoning and ownership. However, the implementation of these measures does not guarantee that the site or structures are safe from wildfire, only that fire hazards have been identified and mitigation measures taken. If there are any questions or concerns as to the contents of this report, please contact us at any time.

Sincerely,

Mike Coulthard, R.P.Bio., R.P.F.
Senior Forester, Biologist
Certified Tree Risk Assessor (46)

8 Appendix A – Fuel Descriptions

The following are stand profiles that are representative of the fuel types found around this project.

Fuel Type C5

	Dominant Trees	Co-Dominant Trees	Intermediate/Suppressed Trees
Species[1] (% by volume)	Fd100%	Fd60% Cw30%Hw10%	Cw50%Hw30% Fd20%
Density (stems/ha)	25	350	25
Tree Diameter at Breast Height (cm)	70	50	15
Tree Height (m)	45	35	8
Height to Live Crown (m)	20	15	2
Crown closure (%)	65		

[1] Species codes: Act (black cottonwood), Cw (western redcedar), Hw (western hemlock), Fd (Douglas-fir), Dr (red alder), Mb (bigleaf maple), Pr (bitter cherry), Ep (paper birch)

Fuel Type C2

	Dominant Trees	Co-Dominant Trees	Intermediate/ Suppressed Trees
Species[1] (% by volume)	Hw60% Cw40%	Cw60% Hw20%Dr20%	Cw100%
Density (stems/ha)	50	500	200
Tree Diameter at Breast Height (cm)	50	35	10
Tree Height (m)	32	25	8
Height to Live Crown (m)	7	4	2
Crown closure (%)	75		

[1] Species codes: Act (black cottonwood), Cw (western redcedar), Hw (western hemlock), Fd (Douglas-fir), Dr (red alder), Mb (bigleaf maple), Pr (bitter cherry), Ep (paper birch)

Plot 9 – Fuel Type M2

	Dominant Trees	Co-Dominant Trees	Intermediate/ Suppressed Trees
Species[1] (% by volume)	Fd100%	Dr40% Cw30%Hw10% Mb10%Fd10%	Cw50% Dr20% Hw30%
Density (stems/ha)	10	300	50
Tree Diameter at Breast Height (cm)	70	40	15
Tree Height (m)	45	25	10
Height to Live Crown (m)	20	15	5
Crown closure (%)	40		

[1] Species codes: Act (black cottonwood), Cw (western redcedar), Hw (western hemlock), Fd (Douglas-fir), Dr (red alder), Mb (bigleaf maple), Pr (bitter cherry), Ep (paper birch)

Plot 10 – Fuel Type D1

	Dominant Trees	Co-Dominant Trees	Intermediate/ Suppressed Trees
Species[1] (% by volume)	Hw40%Cw40%Fd10%	Dr90% Cw10%	Cw60% Hw40%
Density (stems/ha)	25	400	50
Tree Diameter at Breast Height (cm)	60	30	15
Tree Height (m)	35	25	5
Height to Live Crown (m)	9	15	1
Crown closure (%)	60		

[1] Species codes: Act (black cottonwood), Cw (western redcedar), Hw (western hemlock), Fd (Douglas-fir), Dr (red alder), Mb (bigleaf maple), Pr (bitter cherry), Ep (paper birch)

9 Appendix B – Description of Terminology

Co-dominant Trees
Defines trees with crowns forming the general level of the main canopy in even-aged groups of trees, receiving full light from above and partial light from the sides.

Crown Closure
An assessment of the degree to which the crowns of trees are nearing general contact with one another. The percentage of the ground surface that would be considered by a downward vertical projection of foliage in the crowns of trees.

Diameter at Breast Height
The diameter of a tree measured at 1.3m above the point of germination.

Dominant Trees
Defines trees with crowns extending above the general level of the main canopy of even-aged groups of trees, receiving full light from above and comparatively little from the sides.

Intermediate Trees
Defines trees with crowns extending into the lower portion of the main canopy of even-aged groups of trees, but shorter in height than the co-dominants. These receive little direct light from above and none from the sides, and usually have small crowns that are crowded on the sides.

Live Crown Ratio
Is the percentage of the total stem length covered with living branches. It provides a rough but convenient index of the ability of a tree's crown to nourish the remaining part of the tree. Trees with less than 30 percent live crown ratio are typically weak, lack vigor, and have low diameter growth, although this depends very much on the tree's age and species.

Open Grown
Defines trees with crowns receiving full light from all sides due to the openness of the canopy.

Stems Per Hectare
The number or size of a population (trees) in relation to some unit of space (one hectare). It is measured as the amount of tree biomass per unit area of land.

Suppressed Trees
Defines trees with entirely below the general level of the canopy of even-aged groups of trees, receiving no direct light either from above or from the sides.

Tree Species Codes
Fd – Douglas-fir (*Pseudotsuga menziesii*)
Hw – Western hemlock (*Tsuga heterophylla*)

Cw – Western redcedar (*Thuja plicata*)
Dr – Alder (*Alnus rubra*)
Ac – Black cottonwood (*Populus balsamifera* ssp. *trichocarpa*)
Ep – Paper birch (*Betula papyrifera)*
Pw – Western white pine (*Pinus monticola*)
Pr - Bitter cherry (*Prunus emarginata*)

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