



**August 25, 2017**

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District of West Vancouver  
750 – 17<sup>th</sup> St.  
West Vancouver, B.C. V7V 3T3

## **Re: Daffodil Drive Development – Habitat Offsetting and Restoration Plan**

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James,

Eagle Harbour Ventures Ltd. (EHV) is proposing a 10-lot subdivision in the lower Eagle Harbour area of West Vancouver, bounded on the southwest by Daffodil Drive and on the northeast by the Rail tracks. The lower Eagle Harbour area of West Vancouver is situated between Marine Drive and Highway 1, approximately 3 km southeast of Horseshoe Bay. The site is mostly vegetated and contains two access roads, a half gravel/paved road from Daffodil Drive and a second paved road off of Westport Road that accesses a home off of the subject property to the north. The site is moderately sloped upward to the northeast towards the rail right-of-way.

Two main environmental features were identified on site: a 320m<sup>2</sup> vegetated wetland located on the east side of the private drive approximately 30 m north of its intersection with Daffodil Drive, and an unnamed seasonal tributary to Eagle Creek that extends north and then east, following the private drive and originates at the toe of the rail ballast.

A species at risk assessment was conducted as part of the initial environmental assessment, and no species were identified utilizing the habitats on the project site.

### **Habitat Offsetting Plan**

A habitat offsetting and restoration plan is presented to offset riparian and wetland impacts associated with the construction of lots 1, 2, 3 and 10, as well as the access road.

Presently the unnamed watercourse is non-fish bearing and has a functional riparian directly below the rail tracks and sparse riparian area on the right bank along the gravel access road. The remainder of the stream flows within a grassed riparian or is squeezed between roads and property lines/fences, and is heavily impacted by invasive species.

The objective of the offsetting plan is to provide a greater overall wetted area and overwintering habitat when flows are greater, an enhanced riparian zone with the planting of the old gravel access road, and to achieve fish accessibility into the tributary by improving culvert crossings under Daffodil Drive from Eagle Creek (Figures 1 & 2).

The proposed development has the following habitat balance associated with it:

Table 1. Habitat Balance - Daffodil Development

Habitat Losses (Riparian & Instream Losses of Wetland and Riparian Losses of Unnamed Tributary )	Area (m <sup>2</sup> )	Habitat Gains	Area (m <sup>2</sup> )
Access road	523	Restoration of existing lower access road	638
Driveways (Lots 1 & 10)	173	Instream complexing & riparian improvements (invasive removal)	763
Homes (Lots 1, 2, 3 & 10)	184	Wetland expansion	115
		Fish accessible channel & culvert size upgrades	100
<b>Losses</b>	<b>880</b>	<b>Gains</b>	<b>1,616</b>
		<b>Net Habitat Gain</b>	<b>736</b>

The above habitat balance plan shows a net habitat gain of 736 m<sup>2</sup>, achieving a no net loss of fish habitat with the proposed 10-lot development and offsetting plan.

### Construction Mitigation Plan

Due to the proximity of development to the Unnamed Tributary and Eagle Creek, an Erosion and Sediment Control (ESC) Plan has been developed for maintenance of ambient water quality during development activities. Information pertaining to location and details of silt fencing, site drainage management and treatment, access/egress route armouring, catch basin protection, and dewatering are included on the ESC Plan.

The ESC Plan includes the following items:

- Stockpiles of excavated material must be consolidated, bucket-packed, and covered with polyethylene sheeting (“poly”) to minimize erosion;
- All concrete pours of foundation walls or slabs must be covered over with poly to prevent creation of alkaline drainage and unintentional input to the watercourse;
- Machinery access and truck loading should be limited to prepared rock/gravel access and/or existing paved driveway areas only;
- If significant trucking is expected, sweeping should be conducted on affected areas of Daffodil Road to recover any fines tracked onto the road;
- Catch basin protection (silt sacks) should be installed on adjacent catch basins and maintained regularly to ensure proper functioning; and,
- All import material is to be clean, inert, and free of contamination.

Prior to issuance of a building permit by the DWV, the owner and/or developer will be required to engage an appropriately qualified ESC supervisor to monitor compliance with the approved ESC Plan as well as

requirements of the DWV Watercourse Protection Bylaw 4364, 2005. As a requirement, ESC inspections are set based on the following schedule:

- Biweekly inspections **1 June – 30 September** (dry season),
- Weekly inspections **1 October – 31 May** (wet season), and
- As required during or immediately following precipitation events exceeding **20 mm within 24 hours**.

It is the responsibility of the owner and/or developer to contact their ESC supervisor prior to commencing earthworks, construction, or any other activities of ground disturbance. It is recommended that a preconstruction meeting be held to ensure that the contractors are aware of the ESC requirements.

As per DWV Interim Tree Bylaw No. 4892, 2016, tree protection fencing and signage must be installed and maintained to prevent damage to trees or their root systems during construction activities. This fencing should be installed around each tree to be retained post development, and may be constructed in conjunction with silt fencing where appropriate. Tree protection fencing must be inspected and approved prior to the commencement of development works.

## Conclusions

Upon review of habitat impacts associated with proposed Daffodil Road Development, West Vancouver, BC, it is the opinion of SEI that planned works pose no significant risk of Serious Harm to Commercial, Recreational, or Aboriginal (CRA) fisheries as defined by Sec. 35(1) of the Canada *Fisheries Act* provided that construction mitigation measures and best management practices are implemented as recommended. With construction mitigation implemented as recommended, the proposed development meets municipal bylaw requirements under the District of West Vancouver environmental development bylaws. Please contact the undersigned if you require any additional information or clarification of the above.

Sincerely,

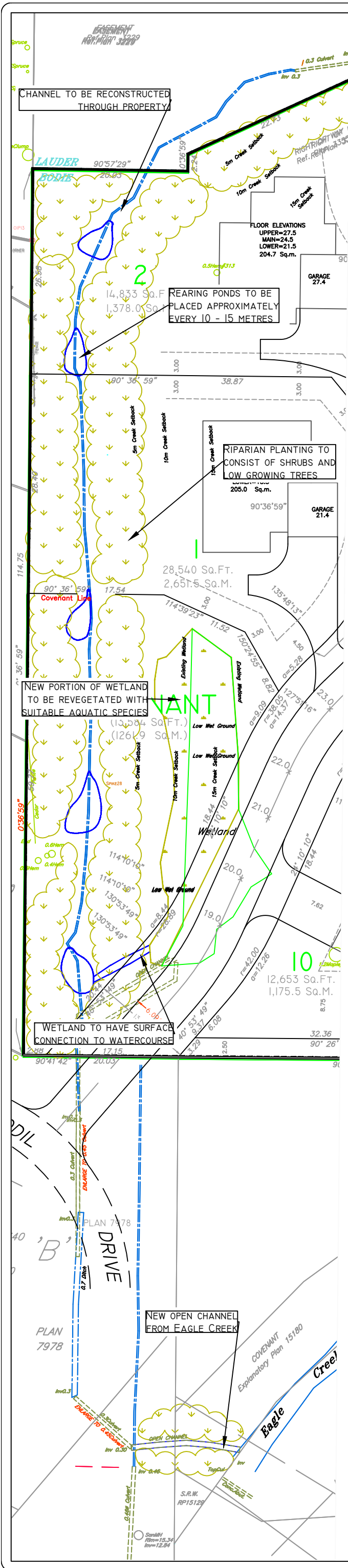
**Sartori Environmental Inc.**



Alex Sartori, R.P.Bio.

#### (4) Attachments

- Figure 1. Habitat Impacts Plan
- Figure 2. Habitat Offsetting Plan
- Figure 3. Channel Detail & Planting Plan
- Figure 4. Preliminary ESC Plan



### Revegetation Plan

Approximately 1,500 sq. metres of planting area is proposed within the watercourse alignment and restoration area. Plants are to be placed at an average of 1.0m<sup>2</sup> density. The following planting list is recommended:

#### Trees

- 40 vine maple (*Acer circinatum*)
- 30 pacific willow (*Salix lucida ssp lasiandra*)
- 20 pacific crabapple (*Malus fusca*)
- 20 beaked hazelnut (*Corylus cornuta*)
- 10 Western redcedar (*Thuja plicata*)

**TOTAL - 120 trees**

#### Wetland

- 75 Bulrush (*Typha spp.*)
- 30 Lyngbyei Sedge (*Carex lyngbyei*)

#### Shrubs

- 200 sword fern (*Polystichum munitum*)
- 200 salal (*Gaultheria shallon*)
- 200 sitka willow (*Salix sitchensis*)
- 100 red elderberry (*Sambucus racemosa*)
- 200 red-osier dogwood (*Cornus sericea*)
- 100 nootka rose (*Rosa nutkana*)
- 200 Oregon grape (*Mahonia nervosa*)
- 150 red huckleberry (*Vaccinium parvifolium*)

**TOTAL - 1350 shrubs**

Trees should be a minimum of 1.2 m high at time of purchase and planted 1.5 to 3.0m apart dependent on the mature height and drip line of the species. Shrubs should be planted 1.0 to 2.0m apart.

All plant materials shall be healthy, with well developed root systems and top growth. All plant materials shall be free of disease and insect infestation and the following defects at all times:

- broken tops, torn roots and abrasions of bark on trunk and branches;
- dried out root systems;
- prematurely opened or damaged buds;
- dry, loose or broken ball of earth;
- evidence of heating, moulding, or freezing damage;
- thin, poor root or top systems; and,
- abnormal leaf colour.

Invasive plant species and their root structures should be removed to the extent possible from the riparian area prior to implementing the revegetation plan.

#### Channel Restoration and Rearing Pond Notes:

- Channel to be reconstructed following removal of existing gravel road;
- Instream works to be completed in dry conditions, using bypass pumps or pipe if watercourse is flowing;
- All instream activities to be conducted during the period of August 1st to September 30th;
- All import material to be clean inert and free of contamination;
- Machine access areas to be stabilized with grass seed following works, prior to implementing the revegetation plan;
- Rearing ponds to be excavated to a depth of 1.0 metre and be approximately 3m x 3m in size. Field adjustments may be necessary to work around existing trees and utilities; and,
- Woody debris or large boulders should be added to ponds to add complexity to the channel.

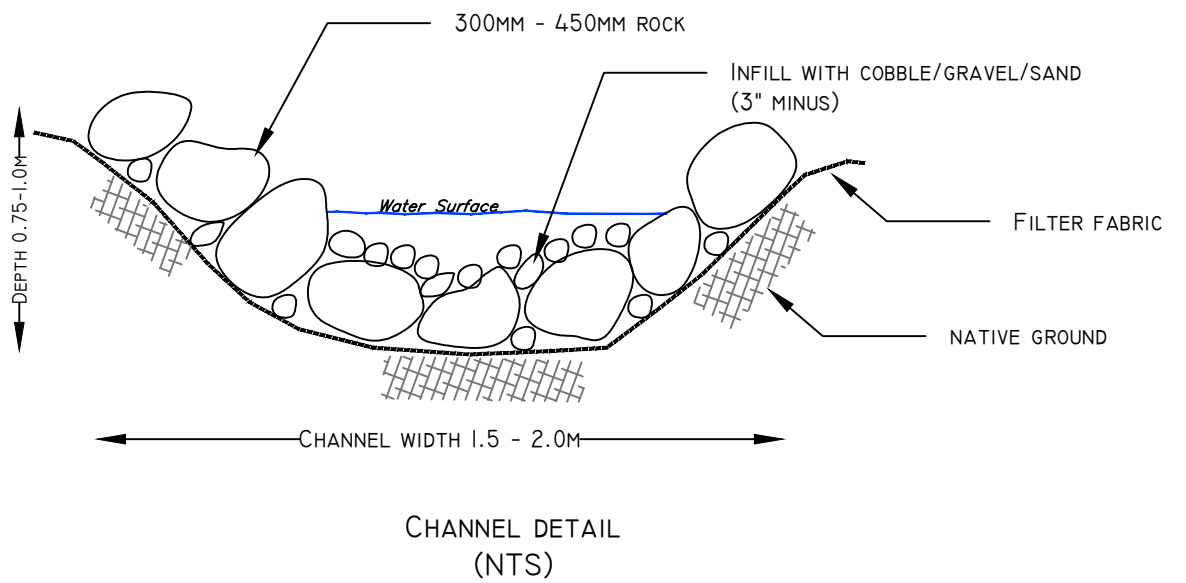


FIGURE 3. DAFFODIL DRIVE DEVELOPMENT- CHANNEL DETAIL & PLANTING PLAN

DATE AUGUST 2017

REV 0

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SCALE 1:500

DRAWING NO. DAFFODILDEV.DWG

PLAN 17281

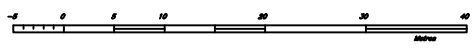
REMAINDER

1

PLAN 16133

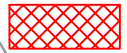
Explanatory Plan 6782

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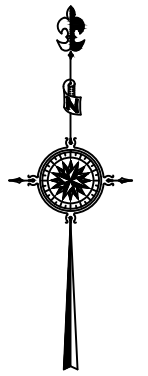


5 METRE SETBACK

15 METRE SETBACK



HABITAT IMPACTS WITHIN 15M TOP OF BANK



HABITAT IMPACTS

ROAD - 523M<sup>2</sup>

DRIVEWAY - 173M<sup>2</sup>

HOMES - 184M<sup>2</sup>  
880M<sup>2</sup>

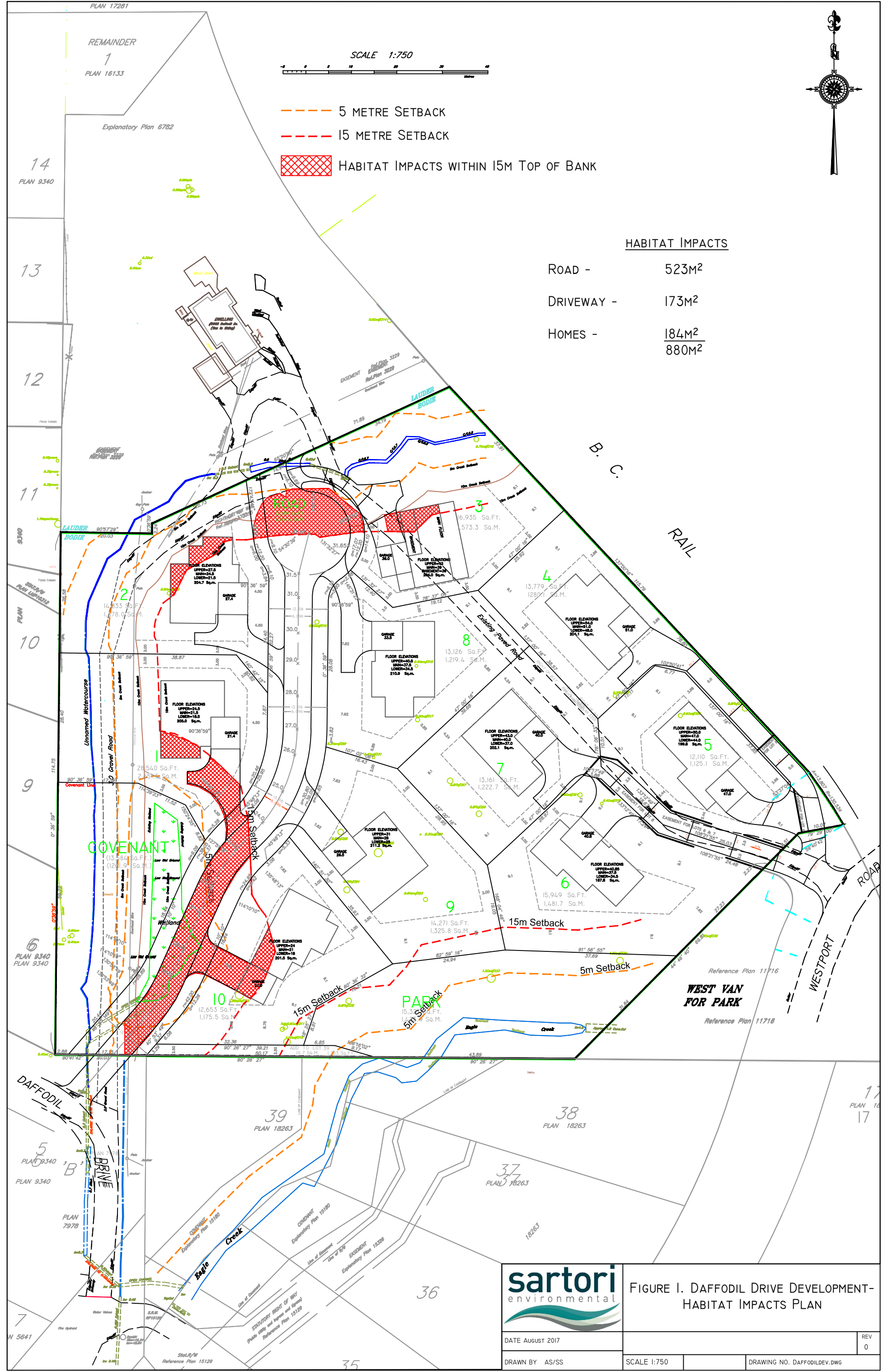


FIGURE I. DAFFODIL DRIVE DEVELOPMENT- HABITAT IMPACTS PLAN

DATE AUGUST 2017

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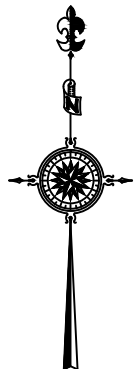
PLAN 17281

REMAINDER

PLAN 16133

Explanatory Plan 6782

SCALE 1:750



--- 5 METRE SETBACK

--- 15 METRE SETBACK

HABITAT IMPROVEMENTS WITHIN 15M TOP OF BANK

**HABITAT GAINS**

RESTORATION OF EXISTING ROAD -	638M <sup>2</sup>
INSTREAM COMPLEXING & RIPARIAN IMPROVEMENTS (INVASIVE REMOVAL) -	763M <sup>2</sup>
WETLAND EXPANSION -	115M <sup>2</sup>
FISH ACCESSIBLE CHANNEL & CULVERT SIZE UPGRADES -	100M <sup>2</sup>
	<u>1,616M<sup>2</sup></u>

RIPIARIAN REPLANTING AND INVASIVE SPECIES REMOVAL

ROAD REMOVAL AND REPLANTING

INSTREAM HABITAT COMPLEXING AND CHANNEL CAPACITY INCREASES

WETLAND WIDTH INCREASE

NEW CHANNEL CONNECTION FROM WETLAND TO WATERCOURSE

CULVERT SIZE INCREASE (FROM 300MM TO 450MM)

CULVERT SIZE INCREASE (FROM 300MM TO 450MM)

NEW FISH ACCESSIBLE CHANNEL FROM EAGLE CREEK TO UNNAMED WATERCOURSE

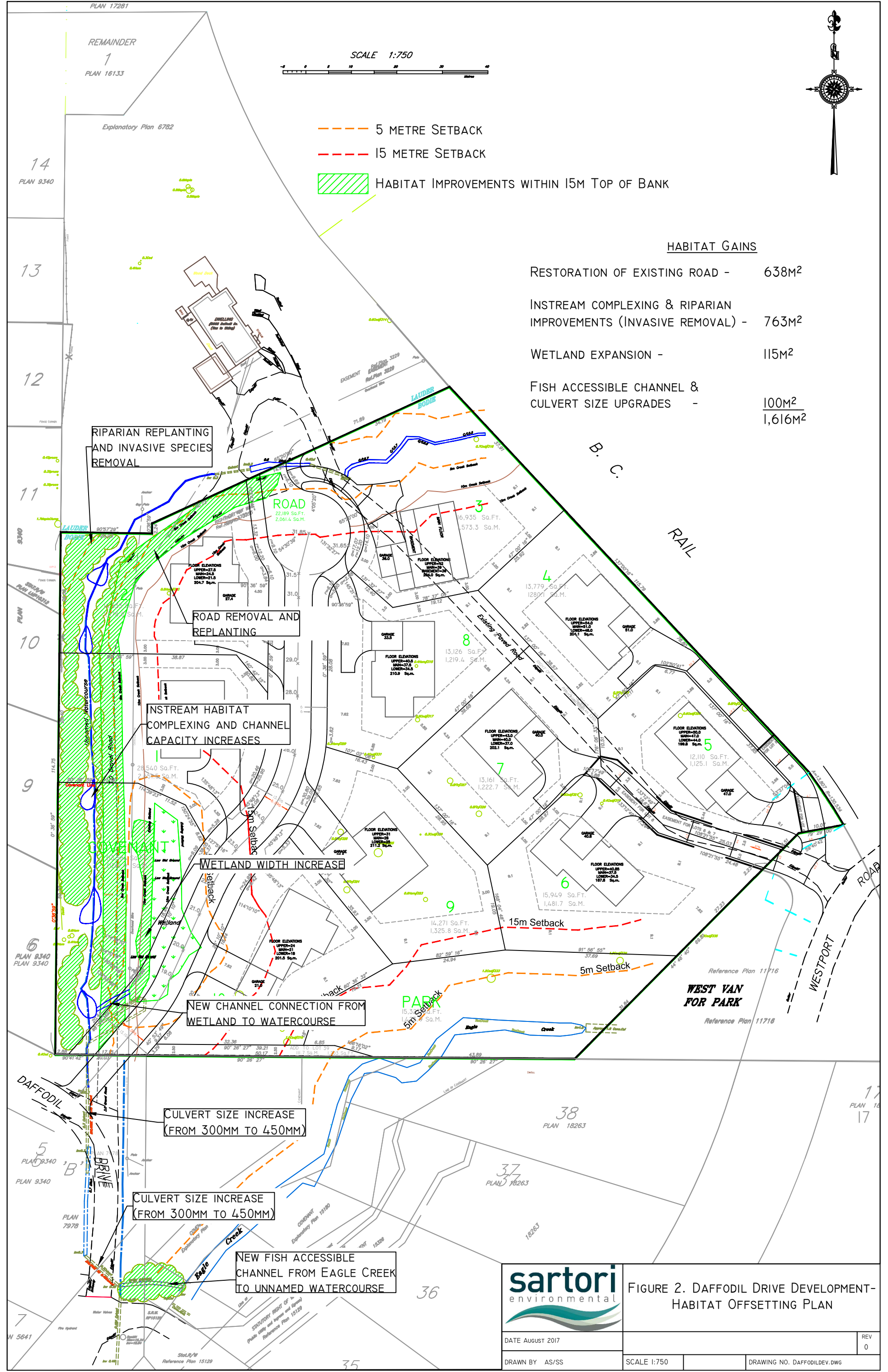


FIGURE 2. DAFFODIL DRIVE DEVELOPMENT- HABITAT OFFSETTING PLAN

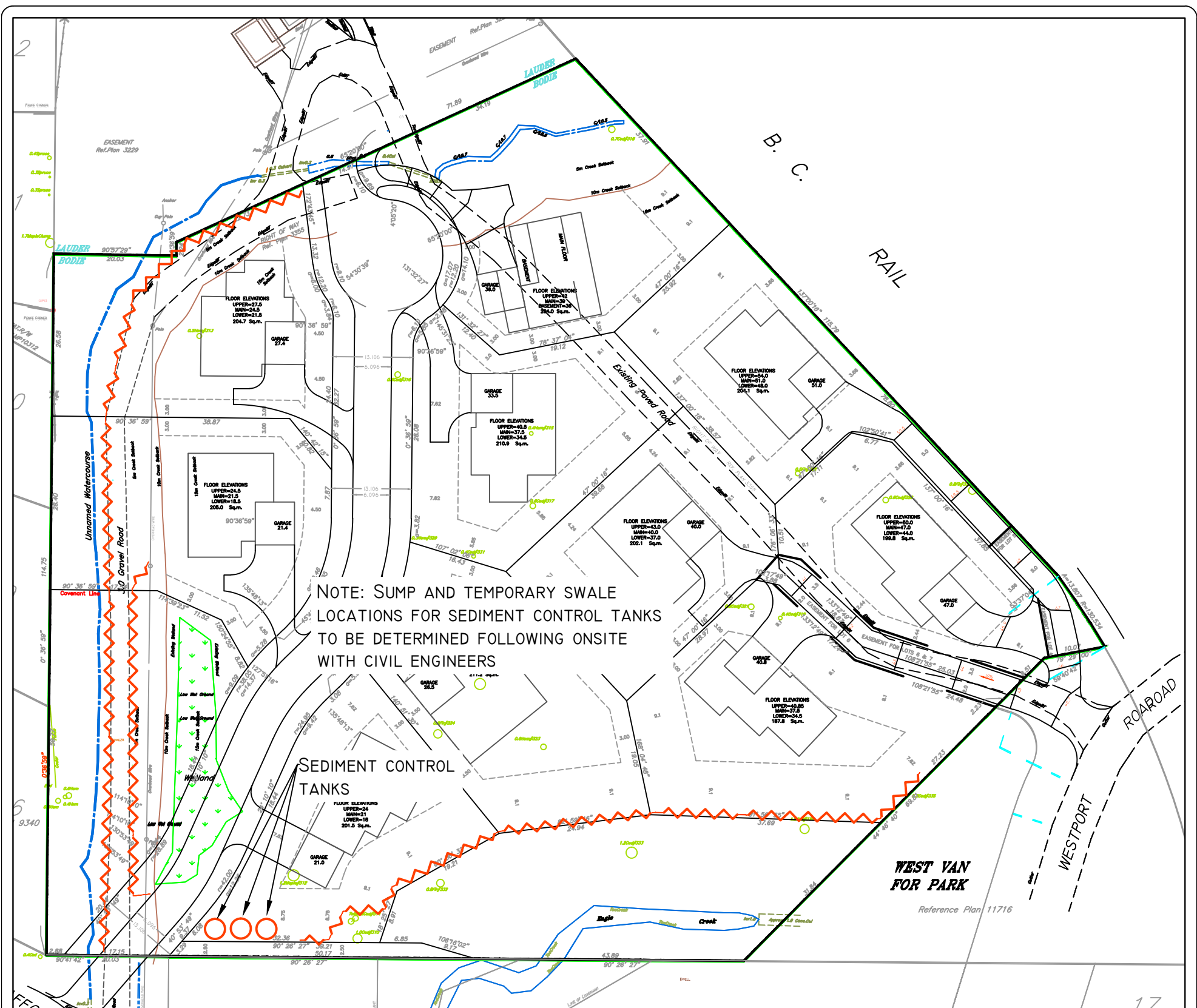
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**EROSION AND SEDIMENT CONTROL NOTES**

1. THIS EROSION AND SEDIMENT CONTROL (ESC) PLAN HAS BEEN PREPARED FOR THE DAFFODIL DEVELOPMENT, 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 WORKS, OR UNTIL REMOVAL/DECOMMISSIONING IS RECOMMENDED BY THE ESC MONITOR (SEE ESC MONITORING SECTION BELOW).
3. THE CONSTRUCTION CONTRACTOR, AND ALL OTHER SUB-CONTRACTORS OR PERSONS INVOLVED WITH DEMOLITION OF THE SUBJECT PROPERTY 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, AND IN PARTICULAR SCHEDULE A - SEDIMENT AND EROSION CONTROL GUIDELINES OF DISTRICT OF WEST VANCOUVER'S WATERCOURSE PROTECTION BYLAW NO. 4364, 2005. ADDITIONAL RESOURCES ARE AVAILABLE IN SECTION 3.7.3 EROSION AND SEDIMENT CONTROL WITHIN DEVELOP WITH CARE (2014), SECTION 3 - SITE DEVELOPMENT AND MANAGEMENT (<http://www.env.gov.bc.ca/wld/documents/bmp/devwithcare/DWC-Section-3.pdf>).
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.

**EARTHWORKS & GRADING**

6. REFER TO THE ADJACENT SITE PLAN AND ATTACHED DETAILS FOR RECOMMENDED SITE-SPECIFIC ESC MEASURES. ALTERATIONS TO THE PLAN SHOULD BE IN CONSULTATION WITH THE APPROVED ESC MONITOR.
7. STRIPPING, PRELIMINARY EXCAVATION, AND TRENCHING WORKS ARE TO BE CONDUCTED DURING FAVORABLE WEATHER TO MINIMIZE EROSION AND GENERATION OF SEDIMENT-LADEN DRAINAGE.
8. 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.
9. THE CONSTRUCTION CONTRACTOR WILL BE RESPONSIBLE FOR MAINTAINING CLEAN PUBLIC ROADS ADJACENT TO THE SITE THROUGH PERIODIC SWEEPING AND SCRAPING AS REQUIRED.
10. ALL CATCH BASINS ADJACENT TO ACTIVE WORKS AND DEMOLITION ACCESS ROUTES ARE TO BE PROTECTED AS REQUIRED WITH CATCH BASIN PROTECTION DEVICES IF SEDIMENT DEPOSITION IS OBSERVED.
11. NO SITE DRAINAGE IS TO FLOW DIRECTLY TO THE MUNICIPAL STORM SYSTEM, WITHOUT PRIOR TREATMENT (e.g. SEDIMENT CONTROL POND)
12. 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.
13. 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**

14. AN ESC SUPERVISOR 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 20MM IN 24HRS.**
  - b. **OCTOBER 1 TILL MAY 31 - WEEKLY OR AS REQUIRED IF PRECIPITATION EXCEEDS 20MM IN 24 HRS.**
15. THE OWNER/DEVELOPER IS REQUIRED TO CONTACT THE CONFIRMED ESC MONITOR BY EMAIL AT MINIMUM 72HRS PRIOR TO THE COMMENCEMENT OF DEMOLITION ACTIVITIES TO SET-UP A SITE KICK-OFF MEETING. AT THIS TIME, AND THROUGHOUT DEMOLITION WORKS, THE ESC MONITOR WILL ADDRESS POTENTIAL CONFLICTS BETWEEN THIS ESC PLAN AND ACTUAL SITE CONDITIONS. THE ESC MONITORING WILL CONTINUE UNTIL DEMOLITION WORKS ARE COMPLETE, ALL SITE SURFACES ARE AT FINAL GRADE AND DISTURBED SURFACES ARE VEGETATED (AS REQUIRED).
16. THE ESC SUPERVISOR 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.
17. AT THE DISCRETION OF THE ESC MONITOR, SITE SAMPLING (TURBIDITY SAMPLING) MAY BE CONDUCTED DURING EACH SITE VISIT. IF HIGH TURBIDITY ( $\geq 65$ NTU) IS OBSERVED, A TSS WATER SAMPLE MAY BE COLLECTED AND SUBMITTED TO THE LABORATORY FOR ANALYSIS. LABORATORY ANALYSIS WILL BE MADE AVAILABLE UPON REQUEST
18. THE ESC MONITORING PROGRAM SHOULD CONTINUE FROM THE START OF DEMOLITION TO SUCH A TIME THAT THE ESC MONITOR DETERMINES THAT FURTHER MONITORING IS NO LONGER REQUIRED AS WORKS HAVE REACHED FINAL STAGES AND THE RISK TO THE SURROUNDING ENVIRONMENT IS NEGLIGIBLE. THE ESC MONITOR WILL PROVIDE THE DISTRICT OF WEST VANCOUVER'S ENVIRONMENTAL STAFF WITH CONFIRMATION VIA EMAIL THAT THE MONITORING PROGRAM HAS CEASED.

