City of Richmond

Agenda

Development Permit Panel

Council Chambers, City Hall
6911 No. 3 Road

Wednesday, February 28, 2018
3:30 p.m.

MINUTES

Motion to adopt the minutes of the Development Permit Panel meeting held on January 31, 2018.

1. DEVELOPMENT PERMIT 16-721500
(REDMS No. 5724405)

APPLICANT: Western-Citimark River Front Townhouse Project Ltd.

PROPERTY LOCATION: 10311 River Drive

Director's Recommendations

That a Development Permit be issued which would:

1. ***permit the construction of 86 townhouse units and a two-storey mixed-use building with amenity space and a child care facility at 10311 River Drive on a site zoned "Residential Mixed Use Commercial (ZMU17) – River Drive/No. 4 Road (Bridgeport)"; and***
2. ***vary the provisions of Richmond Zoning Bylaw 8500 to reduce the required West Side Yard from 6.0 m to 4.5 m.***

2. DEVELOPMENT PERMIT 16-741741
(REDMS No. 5677991 v. 2)

APPLICANT: Vancouver Airport Fuel Facilities Corporation (VAFFC)

ITEM

PROPERTY LOCATION: 15040 Williams Road

Director's Recommendations

That a Development Permit be issued which would permit the construction of a Marine Terminal Facility for aviation/jet fuel delivery at 15040 Williams Road on a site zoned "Industrial (I)" and partially designated as an Environmentally Sensitive Area (ESA).

3. New Business

4. Date of Next Meeting: March 14, 2018

ADJOURNMENT

City of Richmond

Minutes

Development Permit Panel
Wednesday, January 31, 2018

Time:	3:30 p.m.
Place:	Council Chambers Richmond City Hall
Present:	Joe Erceg, Chair Robert Gonzalez, General Manager, Engineering and Public Works Cecilia Achiam, General Manager, Community Safety

The meeting was called to order at 3:30 p.m.

Minutes

It was moved and seconded
That the minutes of the meeting of the Development Permit Panel held on January 17, 2018 be adopted.

CARRIED

1. Development Permit 16-735007
(REDMS No. 5611727)

APPLICANT: Alex Sartori

PROPERTY LOCATION: 6020 No. 4 Road

INTENT OF PERMIT:

Permit the construction of a Single-Family Residential Dwelling at 6020 No. 4 Road on a site zoned "Agriculture (AG1)" and designated as an Environmentally Sensitive Area (ESA).

Applicant's Comments

Richard Zhang, Bouthouse Design Group, Inc., briefed the Panel on the changes to the proposed development's site and landscape plans in response to the Panel's referrals at the April 12, 2017 and September 27, 2017 meetings of the Panel and highlighted the following:

- the proposed house size and farm home plate area have been reduced and now fully comply with the "Agriculture (AG1)" zone;
- the house and septic field have been shifted westward to reduce the impacts on the Environmentally Sensitive Area (ESA);
- previously proposed structures and landscaping atop the septic field have been removed and will be covered with grass;
- the driveway has been moved slightly northward but is still south of the mid-point of the lot; and
- the grading plan has been adjusted.

Alex Sartori, Sartori Environmental Inc., noted that (i) the vegetated portion of the ESA has been increased from 27 per cent, (ii) birch trees have been removed from the plant list in response to public comments, (iii) native species are proposed to be planted in the ESA, (iv) fencing will be installed along the outside edge of delineated ESA to protect the ESA, (v) an invasive plant species management plan is proposed for the management and removal of invasive plants within the ESA, and (vi) an irrigation system is proposed for watering of landscaped areas and to increase the survivability of newly planted trees and shrubs.

In response to a query from the Panel, Mr. Sartori acknowledged that the three-year annual monitoring and reporting to the City by a Qualified Environmental Professional is intended to enusre survivability of new plantings and control the growth of invasive plant species in the ESA.

In response to a further query from the Panel, Mr. Sartori confirmed that in lieu of birch trees, a dense mix of native riparian trees, shrubs and ground cover species are proposed to be planted in the ESA.

Staff Comments

Wayne Craig, Director, Development, noted that (i) the applicant has worked hard with staff to address the Panel's concerns, (ii) the revised proposal has significantly increased the extent of planting on the subject site, and (iii) the City will hold the landscape security for the duration of the three-year monitoring period for the ESA landscaping area.

Gallery Comments

None.

Correspondence

None.

Panel Decision

It was moved and seconded
That a Development Permit be issued which would permit the construction of a Single-Family Residential Dwelling at 6020 No. 4 Road on a site zoned "Agriculture (AG1)" and designated as an Environmentally Sensitive Area (ESA).

CARRIED

2. Development Permit 17-774155
(REDMS No. 5660408)

APPLICANT: Suncor Energy Inc.

PROPERTY LOCATION: 11991 Steveston Highway

INTENT OF PERMIT:

Permit the modification of an existing commercial building and drive-through to accommodate a drive-through restaurant establishment as a secondary use to the gas station at 11991 Steveston Highway on a site zoned "Gas Station Commercial (ZC15) – Broadmoor and Ironwood Area".

Applicant's Comments

Anna Stilwell, Suncor Energy, noted the following revisions to the design of the rooftop mechanical screening and other proposed measures to address the Panel's referral at the January 17, 2018 meeting of the Panel:

- the previously proposed height of the rooftop mechanical equipment screen has been reduced by 0.7 meters (2.3 feet), which is now consistent with the existing height of the existing rooftop mechanical equipment screening;
- the rooftop mechanical screening has been redesigned and horizontal slats with reveals are proposed to provide additional detailing and articulation to the structure;
- the colour of the proposed rooftop screening will match the existing colour of the building; and
- a silencer will be installed on one rooftop mechanical equipment and a new mechanical equipment with lower sound level generation has been selected to comply with the City's Noise Regulation Bylaw.

In response to a query from the Panel, Ms. Stilwell acknowledged that the applicant worked with staff in developing the proposed measures to address Panel's concerns regarding the design and height of the previously proposed rooftop screening for mechanical equipment.

Gallery Comments

None.

Correspondence

None.

Panel Discussion

The Chair noted that the applicant has satisfactorily addressed Panel's concern regarding the height of the previously proposed rooftop mechanical equipment screening in view of the proximity of the project's location to residential developments.

Panel Decision

It was moved and seconded
That a Development Permit be issued which would permit the modification of an existing commercial building and drive-through to accommodate a drive-through restaurant establishment as a secondary use to the gas station at 11991 Steveston Highway on a site zoned "Gas Station Commercial (ZC15)- Broadmoor and Ironwood Area".

CARRIED

3. New Business

Mr. Craig advised that there are no agenda items for the next scheduled meeting of the Panel on Wednesday, February 14, 2018.

It was moved and seconded
That the meeting of the Development Permit Panel scheduled on Wednesday, February 14, 2018 be cancelled.

CARRIED

4. Date of Next Meeting: February 28, 2018

5. Adjournment

It was moved and seconded
That the meeting be adjourned at 3:50 p.m.

CARRIED

Certified a true and correct copy of the Minutes of the meeting of the Development Permit Panel of the Council of the City of Richmond held on Wednesday, January 31, 2018.

Joe Erceg
Chair

Rustico Agawin
Auxiliary Committee Clerk

City of Richmond

Report to Development Permit Panel

To:	Development Permit Panel	**Date:**	January 26, 2018
From:	Wayne Craig Director, Development	**File:**	DP 16-721500
Re:	**Application by Western-Citimark River Front Townhouse Project Ltd. for a Development Permit at 10311 River Drive**		

Staff Recommendation

That a Development Permit be issued which would:

1. Permit the construction of 86 townhouse units and a two-storey mixed-use building with amenity space and a child care facility at 10311 River Drive on a site zoned "Residential Mixed Use Commercial (ZMU17) – River Drive/No. 4 Road (Bridgeport)"; and
2. Vary the provisions of Richmond Zoning Bylaw 8500 to reduce the required West Side Yard from 6.0 m to 4.5 m.

Wayne Craig
Director, Development
(604-247-4625)

SB:blg
Att. 4

Staff Report

Origin

Western-Citimark River Front Townhouse Project Ltd. has applied to the City of Richmond for permission to develop 86 townhouse units and a two-storey mixed-use building with amenity space and a City-owned child care facility at 10311 River Drive on a site zoned "Residential Mixed Use Commercial (ZMU17) – River Drive/No. 4 Road (Bridgeport)". The site is currently vacant.

Development Information

Please refer to the attached Development Application Data Sheet (Attachment 1) for a comparison of the proposed development data with the relevant bylaw requirements.

Background

In October, 2011, Council approved the rezoning application (RZ 07-380169) for a multi-phase Parc Riviera development (Attachment 2) on the properties at 10011, 10111, 10197, 10199, 10311 and 10333 River Drive. The rezoning also included park land dedication and park development on the current City-owned properties at 9991 and 10211 River Drive. Subsequent to the rezoning, Council approved two Zoning Text Amendment applications regarding the overall Parc Riviera development. In November, 2013, Council approved the Zoning Text Amendment application (ZT 12-611282) to provide funding towards the City's capital Affordable Housing Reserve in lieu of building affordable housing units on-site. In September, 2015, Council approved the Zoning Text Amendment application (ZT 15-691748) to clarify the density allocation and allow for the subdivision of the subject site at 10311 River Drive and adjacent 10333 River Drive.

Community amenities secured through the rezoning are being implemented in phases. Further details are provided in the "Analysis" section below.

Improvements to dikes, trails, roads, public transit and servicing infrastructure secured through the rezoning are also being implemented through Servicing Agreements in phases. The City park, frontage improvements and Dike upgrades between No. 4 Road and McLennan Avenue were constructed through Servicing Agreements as part of Phase 1. As a condition of the subject Phase 3 and Phase 4 to the east, the developer is required to enter into a Servicing Agreement for the design and construction of the adjacent park, frontage improvements, infrastructure improvements and Dike upgrades between McLennan Avenue and Shell Road, as well as traffic signal improvements at the Bridgeport Road and McLennan Road and Shell Road intersections and two bus shelters along Bridgeport Road. The required Servicing Agreement includes a public pedestrian walkway from the dike walkway to River Drive along the east edge of the site, complete with a pedestrian crossing. A 3 m wide utilities SRW registered on Title (CA4664641 & CA4664642) as part of the Zoning Text amendment application ZT 15-691748 is no longer required and will be discharged from Title.

Individual Development Permits for the overall project are being considered in phases:

- In July, 2012, a Development Permit for the first phase of the project was approved for 10011, 10111, 10197 River Drive and a portion of 10199 River Drive (DP 11-564405). This first phase includes townhouse buildings, apartment buildings, a mixed-use building, and an amenity building for the use of residents in the second phase as well.
- The application for the second phase including townhouses buildings at 10199 River Drive (DP 15-694616), was endorsed by Development Permit Panel on May 24, 2017, and the developer is in the process of completing the associated Development Permit considerations.
- The subject application is for the third phase of the overall development (DP 16-721500).
- A Development Permit application has been submitted and is in the process of being reviewed for the remaining phase of the overall development, located at 10333 River Drive (DP 16-747620).

Development surrounding the subject site is as follows:

To the North and West: City park and City dike along the North Arm of the Fraser River, which are being developed as part of the overall Parc Riviera development.

To the East: The fourth phase of the overall Parc Riviera development, also zoned "Residential Mixed Use Commercial (ZMU17) – River Drive/No. 4 Road (Bridgeport)".

To the South: Across River Drive, are single detached homes on lots zoned "Single Detached (RS1/B, RS1/C and RS1/D)".

Advisory Design Panel Comments

The Advisory Design Panel (ADP) was supportive of the proposal, subject to the applicant giving consideration to comments provided by the Panel. An annotated excerpt of the Advisory Design Panel Minutes from December 22, 2016 is attached for reference (Attachment 2). The design response from the applicant has been included immediately following the specific Design Panel comments and is identified in '***bold italics***'.

Staff Comments

The proposed scheme attached to this report has satisfactorily addressed the significant urban design issues and other staff comments identified as part of the review of the subject Development Permit application. In addition, it complies with the intent of the applicable sections of the Official Community Plan (OCP) and is generally in compliance with the "Residential Mixed Use Commercial (ZMU17) – River Drive/No. 4 Road (Bridgeport)" zone except for the zoning variance noted below.

Zoning Compliance/Variances (staff comments in **bold**)

The applicant requests to vary the provisions of Richmond Zoning Bylaw 8500 to:

1) Reduce the required West Side Yard from 6.0 m to 4.5 m.

(Staff supports the proposed variance, as the site is adjacent to a City Park and the design accommodates passive overlook into the neighbouring City park. The reduced west side yard does not present a privacy adjacency issue as it abuts a City park and does not abut a

residential property. The proposed interface with the neighbouring City park includes outdoor semi-private yard area with areas of pavers and lawn, tree planting and low 1 m height fencing. The variance request is limited to the west side yard only as the design proposal provides the required east side yard setback, including a public pedestrian walkway connection from River Drive to the Dike walkway. As a similar variance is included in the Phase 2 development on the west side of the park, the proposal would result in a consistent park interface.)

Analysis

Conditions of Adjacency

- The development site is adjacent to River Drive to the South, the City's Tait neighbourhood waterfront park to the West, the City's dike to the North, and the Parc Riviera future phase 4 site to the East.
- The development site includes an Environmentally Sensitive Area (ESA) designation along the north edge of the site, abutting the City's dike. The proposal for an ESA modified enhancement area is further detailed later in this report.
- Two to four-storey building massing is proposed, although the three four-storey buildings located along the north edge of the site will have a lower apparent three-storey height when viewed from the City dike walkway as a result of the dike's raised grade.
- Fronting River Drive, three-storey townhouse units and a two-storey mixed use building with amenity space over a child care facility at grade are proposed. The townhouse buildings are designed with more contemporary character with large windows and uplifted bay roof elements. The mixed use building is designed with a more traditional form and character to provide a transition between the subject proposal and the single-family homes on the south side of River Drive.
- Adjacent to the City park to the west, three-storey townhouse units and the two-storey mixed use building are proposed. One townhouse building, along with back yards with paver and lawn areas, tree planting and low 1 m height fencing are proposed. Although it is a three-storey building, it will appear to have a lower two-storey building height as seen from the park and dike walkway due to the raised rear yard interface with the higher proposed City park grades. The mixed use building, child care outdoor play area and required fencing are also proposed.
- Along the east edge of the site a 3 m wide Statutory Right-of-Way (SRW) with interim public walkway is proposed and in the future is to be widened out to ultimate 6 m SRW width with the future Phase 4 development to the east. Individual front yards and entries of a three-storey townhouse building interface with the walkway, as well as planted ESA modified enhancement area extending from the dike walkway and the landscaped side yard of a three-storey townhouse building that fronts onto River Drive.
- Along the north edge of the site a proposed ESA modified enhancement area, townhouse decks and pedestrian connections provide the interface to the adjacent City dike and walkway to the north and also interface with the proposed public walkway to the east. The three four-storey buildings will appear to have lower three-storey building height as seen from the dike walkway due to the raised grade interface with the higher dike.

Urban Design and Site Planning

- The proposal consists of one two-storey mixed use building, eleven three-storey buildings with four to eight units each, and three four-storey buildings with five to eight units each. Eight units will have direct access to a public walkway, 13 units will have direct access from the street, 26 units will have access from the two pedestrian mews, and 39 units will have access from the internal drive aisles.
- An attractive pedestrian-oriented streetscape is provided along River Drive with four and five-unit buildings, as well as a two-storey mixed use building, a pedestrian path into the site, and a wider public walkway connection at the east edge of the site from River Drive to the dike walkway which will be widened with future development. The pedestrian path is proposed to include bollard lighting and wayfinding signage.
- The proposed public pedestrian walkway is one of the many public accesses that will be provided in the overall Parc Riviera development between No. 4 Road and Shell Road. These public pedestrian accesses provide site permeability and waterfront access for the larger Tait residential neighbourhood. In order to secure the public pedestrian walkway, the Development Permit considerations include granting of a 3 m wide Public Right-of-Passage (PROP) Statutory Right-of-Way (SRW) over the pedestrian walkway along the east edge of the site and entering into a Servicing Agreement for the design and construction of a 3 m wide paved path, wayfinding signage, and River Drive pedestrian crossing.
- The subject site is adjacent to the City's dike and in order to address the potential dike raising in the future, the Development Permit considerations include registration of a 7.3 m wide Dike Statutory Right-of-Way (SRW) along the entire north property line of the site.
- One vehicle access is proposed from River Drive, in accordance with the master plan approved through the rezoning for the overall Parc Riviera development.
- All units have two vehicle parking spaces. 58 units have side-by-side double car garages and 28 units have tandem garages (33% of the townhouse units). A legal agreement prohibiting the conversion of the tandem parking area into habitable area is a Development Permit consideration.
- A total of seven dedicated child care facility parking spaces and 18 shared visitor/child care facility parking spaces are proposed, including an accessible visitor parking space, which meets the zoning bylaw requirement. One shared truck loading space is proposed. To ensure these are provided and prohibiting assignment of shared spaces, a legal agreement is a Development Permit consideration.
- Bicycle parking is provided, which meets the bylaw requirement.
- All units will have semi-private outdoor spaces consisting of front yards, rear yards, balconies and decks at the dike and top floor levels.
- Outdoor amenity space is proposed throughout the site. The main area is provided adjacent to the second floor indoor amenity area and a children's play area is proposed adjacent to a mews; benefitting from sun exposure and adjacent unit casual surveillance.
- A mailbox room is provided in the mixed-use building, and short-term bicycle parking racks are provided throughout the site.
- Garbage, recycling and organic waste will be collected door to door, with storage space provided in individual unit garages and a storage room in the child care facility.
- If the development is constructed in phases, the child care facility, amenity area, and frontage improvements would be required to be constructed as part of the first phase.

Architectural Form and Character

- Buildings are designed to highlight individual unit identity, provide a common contemporary development identity along River Drive, and provide a transition to the single-family character across River Drive.
- A pedestrian scale is generally achieved along the public streets and internal drive aisles through the inclusion of variation in building projections, recesses, covered entries or porches, varying material/colour combinations, landscape features and panelled garage doors with transom windows.
- The proposed building materials (asphalt roof shingles, hardi-plank, hardi board and batten, wood siding, metal and glass railings, and vinyl windows) are generally consistent with the OCP guidelines and compatible with the existing character of the neighbourhood.
- There are four proposed colour/material schemes. A base colour of beige is accented with areas of grey, dark brown, black and red stained wood. The use of colour and variations in materials accentuate building articulation and provide visual interest.

Landscape Design and Open Space Design

- A Certified Arborist's Report was submitted the applicant, which identifies tree species, assesses tree structure and condition, and provides recommendations on tree removal relative to the proposed development. The report assesses six bylaw-sized trees on the subject site and five trees in the City's dike. Six Alder trees are dead, one Weeping Willow tree (45 cm DBH) conflicts with required River Drive upgrades and four Cottonwood trees (38 cm, 50 cm and multiple stem DBH) conflict with required dike upgrades. Tree Preservation and Parks Arborist staff have reviewed the Arborist's Report, conducted an on-site visual tree assessment, and concur with the proposed removal of all 11 trees.
- The developer has agreed to contribute $5,200 to the City's Tree Compensation Fund for tree planting elsewhere in the City in compensation for the removal of four existing Cottonwood trees as a condition of Development Permit.
- The applicant is proposing to plant 72 trees on-site, including five conifers and 67 deciduous trees.
- A pedestrian-oriented streetscape is proposed along River Drive with a landscaped edge treatment, low retaining walls, and stairs to individual raised yards and townhouse entries.
- Each unit will have semi-private outdoor space at grade. The units along the east edge of the site front onto the public walkway and the units along the south edge of the site front onto River Drive. These units will have a semi-private raised yard with paver area, low landscaping, and three steps down to the River Drive sidewalk. The units along the west edge of the site back onto the City park. These units will have a semi-private back yard with paver area, small lawn and tree planting. The units along the north edge of the site back onto the ESA and City dike. These units will have a semi-private fenced deck surrounded by protected ESA planting. Some internal units will have semi-private fenced back yards with paver area, low landscaping and tree planting. Some internal units will have semi-private front yards with paver area, low landscaping, tree planting and low fencing with gates to the two pedestrian mews.
- The main outdoor amenity area is provided adjacent to the indoor amenity area on the second floor of the mixed use building, including artificial turf and deck areas, covered and open areas, seating and tables, ping pong table and barbeques. The adjacent indoor amenity area includes a kitchen, washrooms and open area.

- A smaller outdoor amenity area includes a play structure and two smaller items of children's play equipment, natural fibre safety surface and seating for supervision.
- A variety of materials, patterns and colours are proposed to provide wayfinding and visual interest to the driveway, the two pedestrian mews, informal pedestrian routes, individual unit entries, internal drive aisles, and garage accesses. The materials include asphalt, concrete and pavers in three sizes/patterns/colours.
- In order to ensure that the proposed landscaping works are completed, the applicant is required to provide a landscape security of $365,477.18 in association with the Development Permit.

Crime Prevention Through Environmental Design

- Site lighting and clear site lines provide unobstructed views of surrounding area.
- Windows in individual units provide passive surveillance of common areas.
- Proposed planting near residential entries are low to maximize views and casual surveillance opportunities of and from common areas.
- All entrances are visible and overlooked by pedestrians or by neighbour's windows.

Sustainability

- In accordance with the City's energy efficiency in townhouse developments policy, registration of a legal agreement is a condition of the Development Permit, securing the owner's commitment to design and build each proposed townhouse unit so that it scores 82 or higher on the EnerGuide rating 0-100 scale as assessed by a HOT2000 building energy model and pre-duct each unit for solar hot water.

Environmentally Sensitive Area (ESA)

- There is an ESA designation over a 1,419 m^2 area along the north edge of the site, adjacent to the City dike. This area is highly disturbed and is low functioning for vegetation and wildlife, but provides an ecological buffer to the Fraser River and a movement corridor for wildlife species. Existing vegetation is sparse, weedy and non-native species such as grasses, Himalayan Blackberry and Alder.
- The proposal includes an ESA modified enhancement area with a different configuration and overall area of 1,426 m^2 as shown in the Development Permit. Proposed townhouse decks along the north edge of the site will be contained with 0.6 m high rail fencing to discourage access to the ESA.
- The proposed landscape plan was prepared in consultation with the project environmental consultant and staff. It is suitable for its shoreline location and providing a transition between upland and shoreline habitats. The proposed plant list is comprised entirely of native species and contains a mix of trees, shrubs and herbaceous species including several flowering and fruiting species suitable for supporting pollinators and hummingbirds. Invasive species, including Himalayan Blackberry, Scotch Broom, and Reed Canary Grass will be removed and managed to prevent re-growth.
- Granting of a SRW and entering into an ESA legal agreement are Development Permit considerations to ensure that the ESA modified enhancement area and landscape plan are specified, protected, maintained, and ensure no future construction or alteration of the ESA.

- In order to ensure that the proposed ESA enhancement landscaping works are completed, monitored and maintained for five years, the applicant is required to provide a security of $64,956.65 as a consideration of the Development Permit. If the works are satisfactorily completed, monitored and maintained, the security will be released in stages, with 50% release after substantial completion and 10% releases each year for the five years after substantial completion.

Accessible Housing

- The proposed development includes five convertible townhouse units located in the centre of the site with uninterrupted access to River Drive and the dike. These units are designed with the potential to be easily renovated to accommodate a future resident in a wheelchair. The potential conversion of these units will require the installation of a stair lift in each of the two staircases to provide access to all three levels of the three-storey townhouse units.
- All of the proposed units incorporate aging in place features to accommodate mobility constraints associated with aging. These features include:
  - Stairwell hand rails.
  - Lever-type handles for plumbing fixtures and door handles.
  - Solid blocking in washroom walls to facilitate future grab bar installation beside toilets, bathtubs and showers.

Noise Mitigation

- The subject site is subject to overhead aircraft noise. Registration of a legal agreement on Title was secured through the rezoning approval to ensure that the development is designed and constructed in a manner that mitigates potential aircraft noise and ensures the thermal comfort of residents. An acoustic report was received and is on file. Detailed information is required to be included in the Building Permit application.
- The required indoor noise and thermal comfort levels are proposed to be achieved through the building envelope design, with no upgrades identified in the acoustic report and District Energy Utility air conditioning to ensure the comfort of residents during the summer months.

City-Owned Child Care Facility

As secured through the rezoning application (RZ 07-380169), the developer is required to provide a City-owned child care facility on the subject site.

- The proposed child care facility is located on the ground floor of the two-storey mixed use building fronting River Drive. Child care entry and service doors are located on the north side of the building facing an internal drive aisle and nearby parking and loading facilities.
- The proposed design accommodates up to 61 children in three separate program areas as well as an administrative office, staff room and service areas. An infant and toddler program area has been designed for 12 children, a 3-5 year-old program area has been designed for 25 children, and a school age program area has been designed for 24 children. The school age program area could also be used for a preschool program for 20 children during school hours. Each program area has been designed with separate indoor program areas and separate outdoor play areas on the south and west sides of the building. The design meets the minimum requirements of the BC Child Care Regulation and the City of Richmond Child Care Design Guidelines.

- The proposed parking provision exceeds the Zoning Bylaw child care parking requirement of 13 parking spaces. The proposal includes seven parking spaces for the exclusive use of the child care facility provided in close proximity to the child care entry doors and an additional eighteen shared visitor/child care parking spaces provided throughout the site.
- Provision of a City-owned child care facility was secured with a 'no development' covenant registered on Title. The covenant generally requires that prior to Building Permit issuance, the owner enter into a legal agreement providing for the construction, ownership transfer to the City and occupancy to be granted prior to any other building on the site. As the owner will be providing the facility to the City as a strata lot, the Development Permit considerations includes registration of a legal agreement requiring the strata plan include separate sections for the child care facility, residential units and residential amenity space as well as general guidelines for maintenance cost responsibilities.
- When details are available regarding a potential child care operator for this facility, they will be brought forward to Council in a separate report from the Manager, Community Social Development.

Conclusions

As the proposed development would meet applicable policies and Development Permit Guidelines, staff recommend that the Development Permit be endorsed, and issuance by Council be recommended.

Sara Badyal.

Sara Badyal
Planner 2
(604-276-4282)

SB:blg

Attachment 1: Development Application Data Sheet
Attachment 2: Development Application History Context Map
Attachment 3: Annotated Excerpt from December 22, 2006 Advisory Design Panel Meeting Minutes
Attachment 4: DP Considerations (Including Appendix A & B)

City of Richmond

Development Application Data Sheet

Development Applications Department

DP 16-721500 **Attachment 1**

Address: 10311 River Drive

Applicant: Western-Citimark River Front Townhouse Project Ltd.

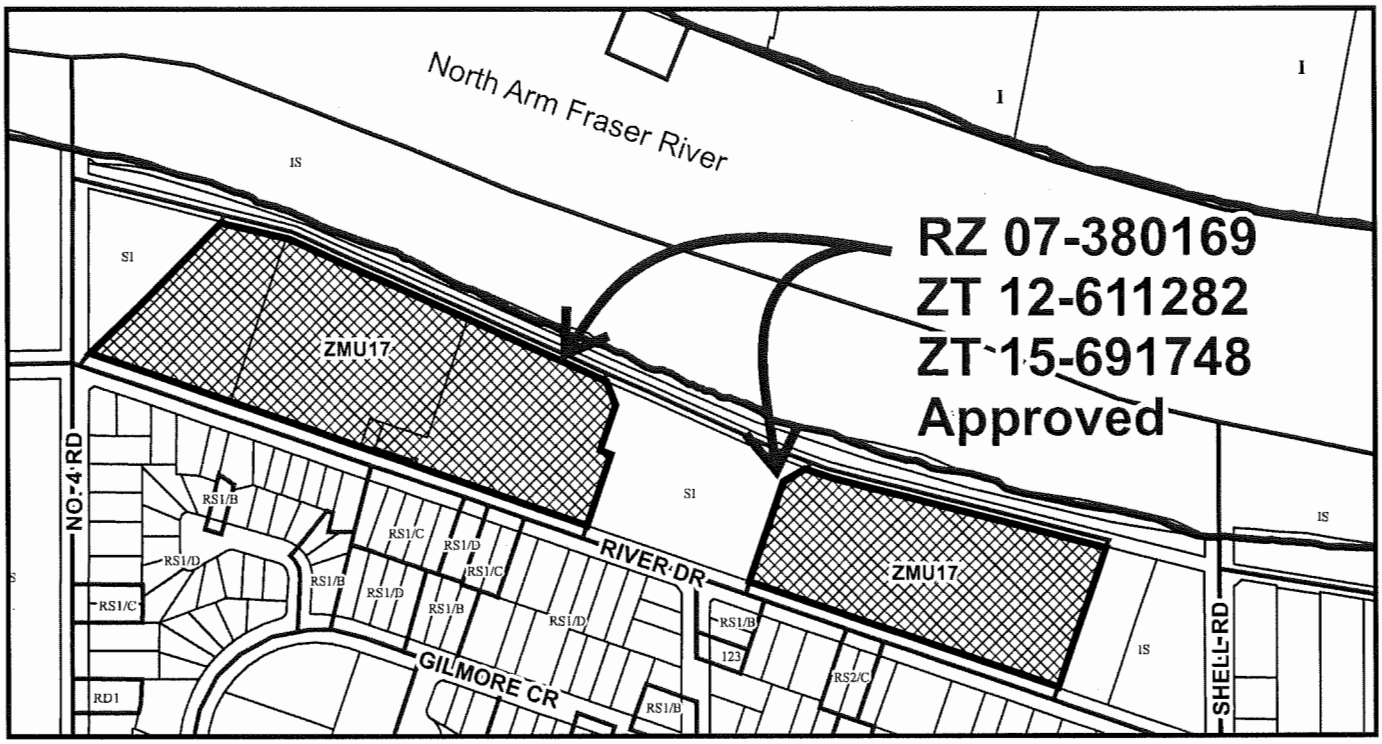
Planning Area(s): Bridgeport

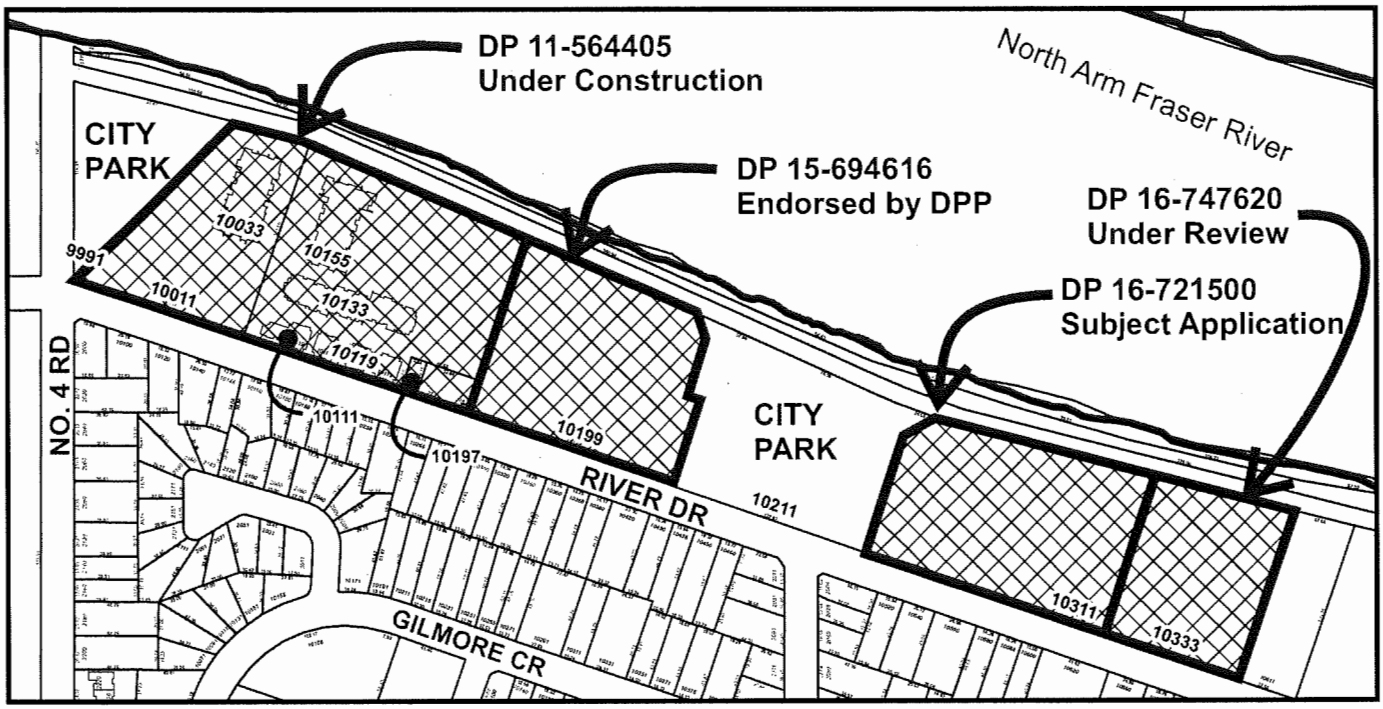
	Existing	Proposed
Owner:	Western-Citimark River Front Townhouse Project Ltd., Inc. No. BC1042830	
Site Size (m^2):	14,031.53 m^2	Remains the same
Land Uses:	Vacant	Mixed-Use
OCP Designation:	Residential Mixed-Use and Environmentally Sensitive Area (ESA)	Complies with ESA Modified Enhancement Area
Area Plan Designation:	Residential Mixed-Use (Max. 6 storey; 1.45)	Complies
Zoning:	Residential Mixed use Commercial (ZMU17) – River Drive/No. 4 Road (Bridgeport)	Variance noted below
Number of Units:	N/A	86 Townhouse units 1 Indoor amenity facility 1 City child care facility

	Bylaw Requirement	Proposed	Variance
Floor Area Ratio:	Max. 1.38	0.81	None permitted
Buildable Floor Area*:	19,363.5 m^2 (208,427 ft^2)	11,303 m^2 (121,677 ft^2)	None
Lot Coverage (% of lot area):	Max. 40%	38%	None
Lot Size:	None	3.47 ac	None
Lot Dimensions:	None	Irregular	None
Setbacks:	River Dr: Min. 3 m Dike right-of-way: Min. 7.5 m **Side Yard (West): Min. 6 m** Side Yard (East): Min. 6 m	3.7 m 7.5 m **4.5 m** 6 m	**1.5 m reduction**
Height:	Within 20 m of River Dr: Max. 10 m Within 20-36 m of River Dr: Max. 15 m Beyond 36 m of River Dr: Max. 26 m	9.6 m 9.6 m 13 m	None
Off-street Parking Spaces:	Residents: 172 Shared Visitors/Child Care: 18 Child Care: 7 Total: 197	172 18 7 197	None
Accessible Parking Spaces:	Visitor: 1	2	None
Small Car Parking Spaces:	Max. 50%	30% (58 spaces)	None
Tandem Parking Spaces	Townhouse units: 50%	33% (28 townhouse units)	None
Amenity Space – Indoor:	Min. 100 m^2	180 m^2 (1,938 ft^2)	None
Amenity Space – Outdoor:	Min. 516 m^2	516 m^2	None

*Preliminary estimate; not inclusive of garage; exact building size to be determined through zoning bylaw compliance review at Building Permit stage.

City of Richmond





Parc Riviera Context Map
Development Application History
DP 16-721500

Original Date: 04/27/17

Revision Date: 01/30/18

Note: Dimensions are in METRES

Annotated Excerpt from the Minutes from

Advisory Design Panel Meeting

Wednesday, December 22, 2016

2.	DP 16-721500	Townhouse development with a Child Care centre
	ARCHITECT	Fougere Architecture Inc.
	LOCATION	10311 River Drive

Panel Discussion

Comments from the Panel were as follows:

- appreciate the sustainability features of the project including the proposed geo-exchange system for heating and cooling the residential units; applicant should have included other proposed sustainability features in the documents submitted to the Panel, e.g. use of low-flow fixtures, LED lighting and energy star appliances – ***Noted***
- appreciate the detailed drawings of the convertible units and provision of aging-in-place features – ***Noted***
- consider eliminating the proposed stairs and provide a more accessible access to the dike from the subject development – ***An accessible walkway is provided along the east side of the development***
- support the proposed mix of the scale and heights of the buildings – ***Noted***
- consider design development to visually break up the long rows of garage doors – ***Improved. Visual interest provided with vertical elements on upper floors or shifting a portion of the upper massing.***
- reconsider the proposed location of the children's play area at the south end of Building 6 (Block V) as it is sited at an internal drive aisle intersection; consider relocating the children's play area closer to the north edge for safety reasons – ***Considered. Safety is provided at the children's play area with surrounding fencing and separated from the drive aisle by landscaping and pedestrian walkway***
- does not support the proposal for not providing a pedestrian mews between Buildings 11 and 13 as it is not consistent with the pattern of providing pedestrian mews/access in the middle of the site and the edge buildings being different; provision of pedestrian mews will enhance the "community" feel to the subject site and provide a more natural access from the daycare/indoor amenity building to the dike – ***Considered. The applicant advises that both conditions have benefits and including both conditions provides a diversity of opportunity.***
- support either a pedestrian mews or a green space between Buildings 11 and 13 – ***Noted***
- support the proposed location and character of the daycare/indoor amenity building; visually breaks up the elevation along River Drive – ***Noted***
- agree with comment regarding the "relentless" row of garage doors along some of the internal drive aisles – ***See comment above***
- the side elevations are not as successful as the elevations fronting River Road and River Drive – ***Improved. Further detail added to side elevations***
- consider design development to the canopies on some units at the north side of the subject development which appear out of place alongside the hip roofs; consider a more robust detailing of the canopies – ***Considered. Current design preferred over options.***
- investigate opportunities for introducing planting, e.g. pyramidal cedars, along the internal drive aisles to break up the long row of garage doors – ***Improved. Eddie's Yew is proposed***
- consider relocating the children's play area from the south end of Building 6 (Block V) to the north end of the middle building blocks (i.e., Buildings 9 and 10) where there would be less vehicular traffic – ***See comment above***
- support the post and rail treatment around the north patios; will provide owners of residential units with a clue not to introduce planting beyond the patios – ***Noted***

- planting on the Environmentally Sensitive Area (ESA) along the north edge of the site needs to be continuous and should follow a design standard; concerned that the proposed planting would be small and the spacing would be wide; consider tighter spacing, planting larger pot sizes or a combination of both in the first few rows of planting along the ESA – ***ESA planting was revised and will be provided as per QEP report.***
- appreciate the proposed walkway to the park to the west of the subject site; however, consider introducing a special surface paving treatment to the walkway at top and bottom to define the site's access to the park – ***A concrete path with saw cuts is proposed for the east walkway and concrete paver for the central path***
- appreciate the package materials provided to the Panel by the applicant; materials are nice and readable – ***Noted***
- appreciate the project's design rationale submitted by the applicant; however, it would have been more helpful if diagrams were included to explain the design rationale – ***Noted***
- the model helps to visualize the massing; however, the applicant could have incorporated colours to help the Panel understand the use of proposed materials and arrangement of colours – ***Noted***
- appreciate the assistance of a day care consultant in the design of the proposed child care facility; integration of the daycare facility with indoor/outdoor amenity spaces is well thought out – ***Noted***
- investigate opportunities for a direct connection from the child care facility to the future park to the west; consider introducing a gated connection to the park; design of the future park should tie-in with the relationship of the child care facility to the park – ***The child care outdoor space is required to be secure and have controlled access.***
- the proposed western connection from the subject site to the park needs to be emphasized; consider introducing vertical structures, e.g. trellises, to celebrate the connection to the park – ***Considered. The path is routed through an ESA, additional structures are not permitted.***
- appreciate the generous pervious surface paving treatment being proposed on the internal drive aisles – ***Noted***
- appreciate the big windows being proposed for the townhouse units; however, ensure that they are operable in terms of access to fresh air – ***Confirmed***
- support the proposed materials palette; however, consider replacing hardie plank with hardie panel in some sections of the building facade fronting River Drive to create larger-sized panels and a more modern finish – ***Considered. The proposed arrangement is preferred to provide emphasis to the building massing and elements.***
- appreciate the project's public realm and pedestrian connections within the subject site; also appreciate the introduction of decorative permeable pavers on-site to facilitate pedestrian circulation – ***Noted***
- support the proposed location of the daycare/indoor amenity building adjacent to the site's entrance; consider further articulation to the entrance of the building to differentiate it from the entrances of townhouse buildings – ***Considered. The child care entry will have a generous canopy and open space.***

Panel Decision

It was moved and seconded
That DP 16-721500 be supported to move forward to the Development Permit Panel subject to the applicant giving consideration to the comments of the Advisory Design Panel.

CARRIED

Attachment 4

City of Richmond

Development Permit Considerations

Development Applications Department

Address: 10311 River Drive **File No.:** DP 16-721500

Prior to forwarding this application to Council for Development Permit approval, the developer may be required to complete the following requirements:

1. Receipt of a Letter of Credit for landscaping in the amount of $365,477.18.
2. The City's acceptance of the applicant's voluntary contribution of $5,200 to the City's Tree Compensation Fund for tree planting elsewhere in the City in compensation for the removal of 4 Cottonwood trees.
3. Granting of 3m wide public-rights-of-passage statutory right-of-way (PROP SRW) along the entire east property line of the site for the purposes of providing wayfinding signage and pedestrian access to/from the Dike walkway and River Drive sidewalk (to be widened to 6m wide through future development of 10333 River Drive). The works are to be built by the developer. The works are to be maintained by the owner. Any works essential for public access within the required statutory right-of-way (SRW) are to be included in the Servicing Agreement (SA) and the owner's maintenance & liability responsibility is to be clearly noted. The design must be prepared in accordance with good engineering practice with the objective to optimize public safety and after completion of the works, the Owner is required to provide a certificate of inspection for the works, prepared and sealed by the Owner's Engineer in a form and content acceptable to the City, certifying that the works have been constructed and completed in accordance with the accepted design.
4. Granting of 7.3m wide Dike statutory right-of-way (SRW) along the entire north property line of the site.
5. Discharge existing 3 m wide utilities SRW across the River Drive frontage of the site (CA4664641 & CA4664642).
6. Discharge 'no development' legal agreement (BB4018179) requiring voluntary contribution of $1,000,000 or provision of 464.5 m^2 of community use space, which funds were received via DP 15-694616.
7. Registration of a legal agreement on Title which grants a blanket utilities statutory right-of-way (SRW) to the City in connection with the installation, use, maintenance, repair and removal of a fibre optic cable and related equipment. The SRW shall be allowed to be discharged from townhouse residential strata lots. The conduit for the fibre optic cable service is to be built by the developer as part of the construction of the child care facility (via separate child care construction legal agreement). The City utility works are to be maintained by the City.
8. Registration of a legal agreement on Title prohibiting the conversion of tandem parking into habitable area.
9. Registration of a legal agreement on Title which requires:
   a. designation of one loading space as common property;
   b. designation of seven parking spaces as limited common property for the exclusive use of the owner of the child care facility strata lot, tenant, employees, volunteers and the users of the child care facility; and
   c. designation of eighteen parking spaces (and access to those spaces) as common property for the shared use of visitors to the residential units, the owner of the child care facility strata lot, tenant, employees, volunteers and the users of the child care facility. These parking spaces will be provided in phases to the satisfaction of the Director of Development.
10. Registration of a legal agreement on Title prohibiting the transfer or sale of the indoor amenity area strata lot without the City's prior written consent in order to ensure it is provided for the benefit of all residential strata lots.

11. Strata Section consideration: Registration of a legal agreement on Title which provides there shall be no subdivision (by strata plan or otherwise) and no occupancy unless a strata plan and related documentation is filed that:
    a. creates three sections: one for the townhouse strata lots (known as a residential section), one for the child care facility strata lot (known as a non-residential section) and one for the indoor amenity strata lot (known as a non-residential section, separate from the section comprised of the child care facility strata lot);
    b. designates outdoor amenity space(s) as limited common property for the exclusive use of the child care facility strata lot in locations approved by the City (substantially in accordance with Appendix B attached hereto);
    c. contains cost sharing arrangements between the three sections which are based substantially on the attached Cost Schedule (Appendices A & B), subject to the requirements of the Strata Property Act;
    d. the residential section owns the indoor amenity area strata lot (located substantially in accordance with Appendix B attached hereto);
    e. designates indoor and outdoor amenity areas as limited common property for the benefit of the indoor amenity area strata lot to provide all residents with shared use of and access to the indoor and outdoor amenity areas; and
    f. designates adequate access as common property (or pursuant to a registered legal agreement, if otherwise required) to provide users of the child care facility pedestrian and vehicular access and egress from the abutting streets to the child care facility.
12. Registration of a restrictive covenant and/or alternative legal agreement(s), to the satisfaction of the City, securing the owner's commitment to design and build each proposed townhouse unit so that it scores 82 or higher on the EnerGuide rating 0-100 scale as assessed by a HOT2000 building energy model and pre-duct each unit for solar hot water.

    This covenant and/or legal agreement(s) will include, at minimum, that no Building Permit will be issued for a building on the subject site unless the building is designed to achieve Energuide 82 requirements, all units are pre-ducted and structurally designed for solar hot water, and the owner has provided a professional report by a Certified Energy Advisor (CEA), to the satisfaction of the Director of Development.
13. Environmentally Sensitive Area considerations, including:
    a) Receipt of a Letter of Credit for ESA landscaping and monitoring in the amount of $64,956.65.
    b) Registration of an ESA protective covenant on title to identify the modified ESA enhancement area, ESA landscape plan, protect vegetation and to ensure no future construction or alteration of the ESA, with terms to be based on recommendations of the QEP report.
    c) Registration of an ESA SRW on title to allow City access to the protected area in case conditions of the covenant are not maintained (i.e. in case the City needs to enter the lands to restore disturbed vegetation and charge the costs to the owner).
14. Enter into a Servicing Agreement prior to Development Permit issuance for dike and waterfront trail works to extend improvements from approximately the west edge of the central park to Shell Road as secured with 'no development' covenant (BB4018177) and modified through ZT 15-691748. Upgrade to the existing dike shall tie-in to the dike upgrade built via SA11- 587071 and shall extend to Shell Road. A servicing agreement design (i.e., SA15-707864) that shall cover the scope of the required dike upgrade is currently being reviewed by the City. The dike scope of work under SA15-707864 shall include design and construction of dike maintenance access that shall be coordinated by the developer with the required dike access through the proposed Central Park. Dike Maintenance Act approval is required for SA15-707864 from the Provincial Dike Inspector's office, developer to coordinate.
15. Enter into a Servicing Agreement prior to Development Permit issuance for the design and construction of the following remaining road and infrastructure works secured with 'no development' covenant

(CA4664647) as well as providing a geotechnical assessment and works related to the subject site to accommodate a pedestrian connection from the Dike walkway to River Drive along the east edge of the site, complete with pedestrian crossing:

a) Transportation Works:

i) Contribution of $60,000 for provision of two (2) bus shelters along Bridgeport Road.

ii) Provide a pedestrian crossing on River Drive to connect through the proposed pedestrian walkway SRW PROP to the water front trail, without any conflicts with existing driveways on the south side of River Drive. Coloured textured pavement at a marked crosswalk to match other crosswalks along River Drive. As well, special pavement marking and signage will be required at the interface of the sidewalk and internal walkway to advise and appear as a public facility. Speed deterrent measures such as bollards may be required at the River Drive side of the walkway. Additional road works may include curb extension modifications on the north side of River Drive and a raised crossing with decorative treatment.

iii) Provide a pedestrian internal walkway located in a required 3m wide PROP SRW and connecting to the water front trail and the River Drive sidewalk. Provide an accessible pedestrian path in the along the entire east edge of the site with an interim cross-section from west to east of 1.5 m wide landscaping and minimum 1.5 m wide concrete paving, and safety fencing/barriers/retaining walls as needed. Compaction test results for the trail sub-base to be submitted to the City for review prior to placement of concrete. Provide 6 m wide ultimate cross-section design which is to be constructed as part of future phase 4, from west to east consisting of 1.5 m landscaping, 3 m wide concrete paving, and 1.5 m landscaping.

iv) Provide functional roadway plan depicting traffic calming measures at River Drive and Shell Road intersection and the traffic calming measures shall be implemented to the satisfaction of the City. Options to be developed include, but are not limited to, a raised intersection, roundabout, curb extensions, etc.

v) Upgrade River Drive to full ultimate cross-section as set by SA 10-542184 and DP 11-564405, extending from works constructed via SA 10-542184 to Shell Road, complete with street lighting system, parking pockets for on street parking, curb extensions along River Drive as traffic calming devices, and coordination with neighbours to the south.

vi) Any road dedications and/or SRW PROP required to implement the cross sections will be secured along the south property line of 10311 River Drive in addition to the existing 1.3m wide SRW.

vii) Traffic Signals at the Bridgeport Road and McLennan Road intersection - upgrade of the existing pedestrian signal to a full traffic signal. Works shall include, but not limited to:
- Type "P" controller cabinet
- UPS (Uninterrupted Power Supply)
- Video detection
- Illuminated street name signs
- Service base
- Type "S" and/or type "L" poles/bases to suit site conditions
- APS (Accessible Pedestrian Signals)
- Fibre optic communications cable and associated equipment
- In-ground vehicle detection
- Removal of existing signal poles, bases, etc. to be returned to City Works Yard
- All associated costs to upgrade this system to be borne by the developer

viii) Traffic Signals at the Bridgeport Road and Shell Road intersection - upgrade of controller equipment for a new left turn phase and intersection improvement measures. Works shall include, but are not limited to:
- Traffic pole/base relocations along the frontage of the development

Initial:_____

- Junction box/conduit relocations
- Associated traffic signal cables/conductors and vehicle detector loops
- Traffic signal modification design drawings (if required, modifications are to be identified during Servicing Agreement and are the sole responsibility of the developer).

b) Engineering Works to the satisfaction of the Director of Engineering:

i) Watermain upgrade required (approximately 360 m) from the west edge of 10311 River Drive to the existing watermain in Shell Road, complete with 300mm diameter PVC piping and fire hydrants (spaced as per City standard). The required watermain shall tie-in to the watermain built via SA10-542184 at the west end, tie-in to the existing watermain along Shell Road at the east end, and tie-in to all existing water service connections south of River Drive.

ii) Storm sewer upgrade required (approximately 640 m) from west edge of 10197 River Drive to Shell Road:

- Provide 600 mm diameter storm sewer, complete with manholes (spaced as per City standard) from west property line of 10197 River Drive to the east property line of 10311 River Drive (approximately 510 m). The required storm sewer shall tie-in to the storm sewer built via SA10-542184 along the entire River Drive frontage of 10197 River Drive, 10199 River Drive, the central park (meandering behind the roundabout) and 10311 River Drive.
- Storm sewer alignment change required (via manholes as per City standard) from the east end of 10333 River Drive to the future boulevard area in the roadway. Change in alignment pipe size shall be 600 mm diameter and its approximate length is 6 m.
- Provide a 1050 mm diameter storm sewer from the east property line of 10333 River Drive to Shell Road (approximately 130 m). The 1050 mm diameter storm sewer shall tie-in to the required manhole in the future boulevard and to the existing box culvert in Shell Road.
- Remove all existing storm sewer service connections to 10311 and 10333 River Drive.

iii) Sanitary sewer upgrade required (approximately 270 m) from approximately McLennan Avenue to east edge of 10333 River Drive:

- Provide 300 mm diameter sanitary sewer from the sanitary main built via SA10-542184 at the intersection of River Drive and McLennan Road to the east property line of 10333 River Drive.
- Tie-in all existing sanitary service connections to the single family properties at the south side of River Drive to the upgraded sanitary main.

iv) Private utility works:

- Pole relocations may be required at the south-west corner of River Drive and Shell Road junction due to the required road improvements and traffic calming works. The developer is responsible for coordination with private utility companies. Any required pole relocation shall be at the developer's cost.
- Pre-duct for future hydro, telephone and cable utilities along all road frontages.
- Locate all above ground utility cabinets and kiosks required to service the development within the developments site (see list below for examples). A functional plan showing conceptual locations for such infrastructure shall be submitted and shall be included in the development process design review. Please coordinate with the respective private utility companies and the project's lighting and traffic signal consultants to confirm the right of way requirements and the locations for the aboveground structures. If a private utility company does not require an aboveground structure, that company shall confirm this via a letter to be submitted to the City. The following are examples of SRWs that shall be shown in the functional plan and registered prior to SA design approval:

BC Hydro Vista	Confirm SRW size with BC Hydro
BC Hydro PMT	Confirm SRW size with BC Hydro (approx. 4m x 5m)
BC Hydro LPT	Confirm SRW size with BC Hydro (approx. 3.5m x 3.5m)
Street light kiosk	Approx. 2m x 1.5m
Traffic signal controller cabinet	Approx. 3.2m x 1.8m

Initial:_____

Traffic signal UPS cabinet	Approx. 1.8m x 2.2m
Show possible locations in functional plan of:	
Shaw cable kiosk	Confirm SRW size with Shaw (approx. 1m x 1m)
Telus FDH cabinet	Confirm SRW size with Telus (approx. 1.1m x 1m)

v) General:

- Any retaining walls exceeding 1 m in height requires a Building Permit. For walls retaining preload material, this permit must be obtained prior to construction of the retaining wall or installation of the preload material. Please see the new bulletin at the following link: http://www.richmond.ca/__shared/assets/permits5239047.pdf .
- It is the developer's responsibility to address the impact of the required road raising to the existing single family properties along the south side of River Drive from McLennan Avenue to Shell Road. The developer shall coordinate with the owner(s) of the affected properties the extent of works required in private properties. The developer shall get written consent or permission to work in private property from the owner(s) of the affected lots.
- Coordination works shall be at the developer's cost and may include but not be limited to the following:
  - Arborist assessment of the existing trees (e.g., City and privately owned) along the south side of River Drive from McLennan Road to Shell Road that may be impacted by the required road raising.
  - Community meetings and written notices to the individual owners of the affected lots.
  - Design/drawings showing the required works inside each property affected by the road raising. The required works inside private property may include but not limited to the following: (i) removal and reinstatement of existing driveways that may require construction of a retaining wall on each side of the reinstated driveways on private property; and (ii) landscaping repairs and / or replacement as may be required.
  - Individual sign-off sheet that shall indicate the extent of the required works in private properties. The owner(s) of the affected lots shall sign the sign off sheet to permit the required works to be completed in their properties.
  - Community notices and individual sign off sheets shall be reviewed and approved by staff prior to sending to the affected properties.
- Provide, prior to first SA design submission, a geotechnical assessment of preload and soil preparation impacts on the existing utilities fronting or within the development site, proposed utility installations and provide mitigation recommendations. The mitigation recommendations (if required) shall be incorporated into the first SA design submission.
- Additional legal agreements, as determined via the subject development's Servicing Agreement(s) and/or Development Permit(s), and/or Building Permit(s) to the satisfaction of the Director of Engineering may be required, including, but not limited to, site investigation, testing, monitoring, site preparation, de watering, drilling, underpinning, anchoring, shoring, piling, pre-loading, ground densification or other activities that may result in settlement, displacement, subsidence, damage or nuisance to City and private utility infrastructure.

Prior to Building Permit Issuance, the developer is required to complete the following requirements:

- Registration of a restrictive covenant and/or alternative legal agreement(s), to the satisfaction of the City, securing the construction of the child care facility and transfer of ownership to the City as secured with 'no development' covenant (BB4018182).
- Incorporation of items identified through the DP process.
- Mixed-Use Amenity/child care building BP issuance prior to BP issuance for any other building.
- Submission required of fire flow calculations signed and sealed by a professional engineer based on the Fire Underwriter Survey or ISO to confirm that there is adequate available flow for fire fighting.

- Submission of a Construction Parking and Traffic Management Plan to the Transportation Department. Management Plan shall include location for parking for services, deliveries, workers, loading, application for any lane closures, and proper construction traffic controls as per Traffic Control Manual for works on Roadways (by Ministry of Transportation) and MMCD Traffic Regulation Section 01570.
- If applicable, payment of latecomer agreement charges associated with eligible latecomer works.
- Obtain a Building Permit (BP) for any construction hoarding. If construction hoarding is required to temporarily occupy a public street, the air space above a public street, or any part thereof, additional City approvals and associated fees may be required as part of the Building Permit. For additional information, contact the Building Approvals Department at 604-276-4285.

Prior to Occupancy of any building on the lands, the developer is required to complete the following:

- Complete construction of Servicing Agreement works for the central park, dike and waterfront trail works as secured with 'no development' covenant (BB4018175).
- Complete construction of child care facility and transfer ownership to the City as secured with 'no development' covenant (BB4018182).

Note:

* This requires a separate application.

- Where the Director of Development deems appropriate, the preceding agreements are to be drawn not only as personal covenants of the property owner but also as covenants pursuant to Section 219 of the Land Title Act.
- All agreements to be registered in the Land Title Office shall have priority over all such liens, charges and encumbrances as is considered advisable by the Director of Development. All agreements to be registered in the Land Title Office shall, unless the Director of Development determines otherwise, be fully registered in the Land Title Office prior to enactment of the appropriate bylaw.
- The preceding agreements shall provide security to the City including indemnities, warranties, equitable/rent charges, letters of credit and withholding permits, as deemed necessary or advisable by the Director of Development. All agreements shall be in a form and content satisfactory to the Director of Development.
- Additional legal agreements, as determined via the subject development's Servicing Agreement(s) and/or Development Permit(s), and/or Building Permit(s) to the satisfaction of the Director of Engineering may be required including, but not limited to, site investigation, testing, monitoring, site preparation, de-watering, drilling, underpinning, anchoring, shoring, piling, pre-loading, ground densification or other activities that may result in settlement, displacement, subsidence, damage or nuisance to City and private utility infrastructure.
- Applicants for all City Permits are required to comply at all times with the conditions of the Provincial Wildlife Act and Federal Migratory Birds Convention Act, which contain prohibitions on the removal or disturbance of both birds and their nests. Issuance of Municipal permits does not give an individual authority to contravene these legislations. The City of Richmond recommends that where significant trees or vegetation exists on site, the services of a Qualified Environmental Professional (QEP) be secured to perform a survey and ensure that development activities are in compliance with all relevant legislation.

[Signed copy onfile]

_____ _____

Signed Date

Cost Schedule

General Guidelines for Division of Responsibilities (subject to the requirements of the Strata Property Act and the Land Title Act and as may be modified subject to the agreement of both the Owner and the City)

1. The residential section and the non-residential sections shall have separate responsibility for limited common property designated for the exclusive use of strata lots within their respective sections (including dedicated parking spaces, dedicated outdoor areas, fencing).
2. The residential section and the non-residential sections shall have shared responsibility for common expenses of the Strata Corporation and common property (including building envelopes, building foundations, shared outdoor areas shown on Appendix B for loading bay, non-exclusive use parking spaces, drive aisle access, non-exclusive use walkways, and non-exclusive use landscaping, but excluding fencing), with cost sharing based on unit entitlement calculated in accordance with the Strata Property Act.

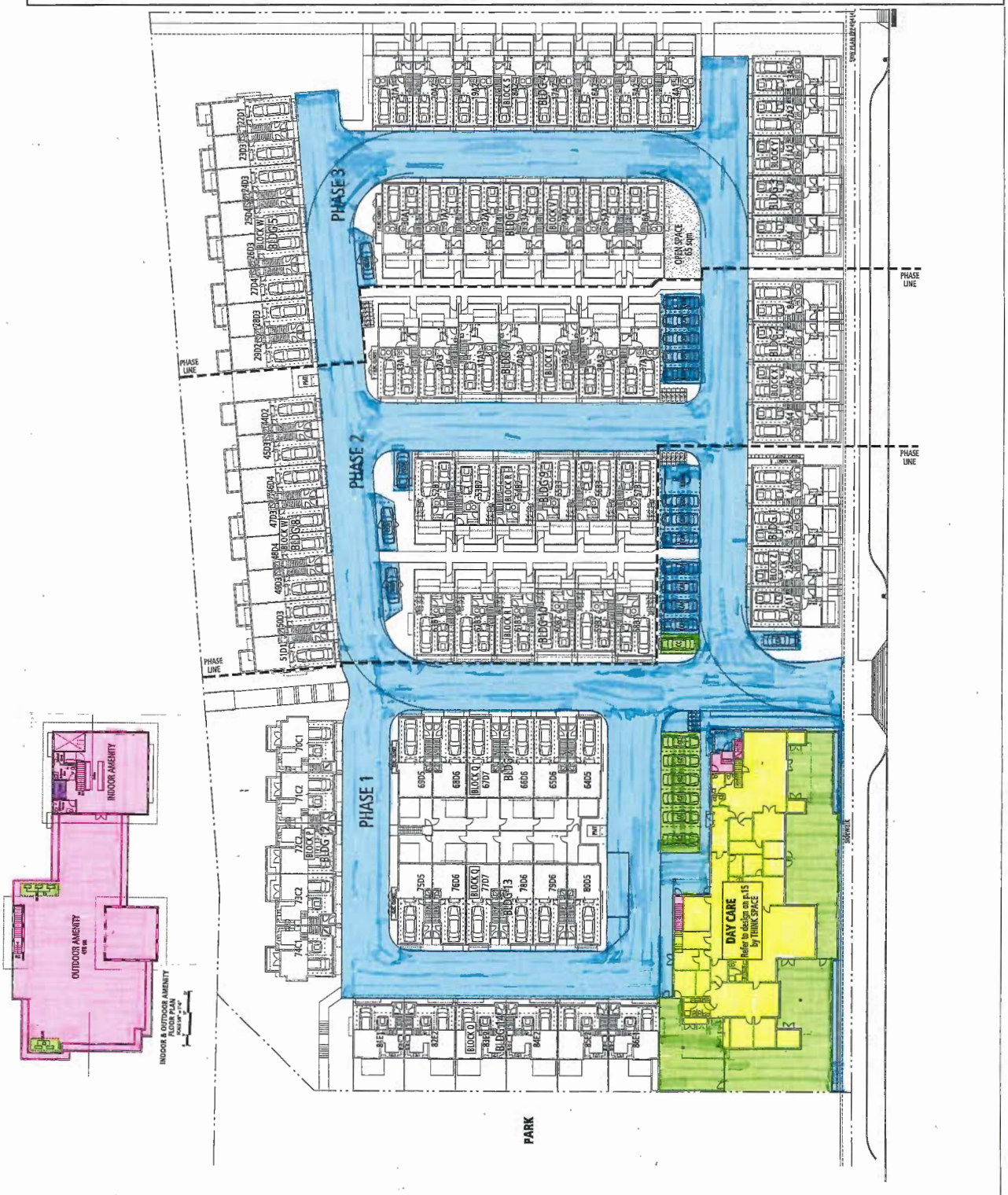
   The unit entitlement is based on the proportional floor area of all strata lots [approximately 95.22% residential section/indoor amenity room non-residential section (approximately 122,052 ft^2) and 4.78% child care facility non-residential section (approximately 6,125 ft^2) as identified in preliminary information from the project surveyor, to be confirmed by surveyor] and based on the assumption that all three Phases will be built. Until they are, the numbers will be as determined based on what is built at the time.
3. The child care non-residential section will not be serviced by or responsible for any costs related to geo-exchange systems and/or district energy utility systems.
4. For the shared mixed-use building, each non-residential section shall have separate responsibility for:
   a. Their own separate buildings systems (including electrical, HVAC, plumbing).
   b. Their own separate utilities after the point at which they are tied into the utilities systems that service the residential section (for the child care facility non-residential section this also includes City fiber optic/communications, which is to be conveyed by conduit from the property line to the child care facility electrical room).
   c. Their own separate water and electrical meters.
5. For the shared mixed-use building, the non-residential sections shall have shared responsibility for the following, notwithstanding the items above:
   a. The mixed-use building fire suppression system.
   b. The interior shared mailroom area (excluding stairway, elevator and mechanical room servicing the second floor residential amenity area).

Appendix B

Cost Schedule

General Guidelines for Division of Responsibilities (to be finalized as part of required Construction Agreement)

- Child Care facility section strata lot
- Child Care section limited common property outdoor area (including fencing)
- Common property shared indoor mailbox area (excluding elevator) and shared outdoor area (landscaping, pedestrian walkway, driveway, loading space, shared parking spaces and access drive aisles, excluding fencing)
- Indoor amenity section strata lot
- Indoor amenity section limited common property indoor and outdoor areas
- Residential section strata lots and limited common property (including fencing)



City of Richmond

Development Permit

No. DP 16-721500

To the Holder:	WESTERN-CITIMARK RIVER FRONT TOWNHOUSE PROJECT LTD.
Property Address:	10311 RIVER DRIVE
Address:	C/O WAYNE FOUGERE FOUGERE ARCHITECTURE INC. 202 - 2425 QUEBEC STREET VANCOUVER, BC V5T 4L6

1. This Development Permit is issued subject to compliance with all of the Bylaws of the City applicable thereto, except as specifically varied or supplemented by this Permit.
2. This Development Permit applies to and only to those lands shown cross-hatched on the attached Schedule "A" and any and all buildings, structures and other development thereon.
3. The "Richmond Zoning Bylaw 8500" is hereby varied to:
    a) Reduce the required West Side Yard from 6.0 m to 4.5 m.
4. Subject to Section 692 of the Local Government Act, R.S.B.C.: buildings and structures; off-street parking and loading facilities; roads and parking areas; and landscaping and screening shall be constructed generally in accordance with Plans #1 to #37 attached hereto.
5. Sanitary sewers, water, drainage, highways, street lighting, underground wiring, and sidewalks, shall be provided as required.
6. As a condition of the issuance of this Permit, the City is holding the security in the amount of $365,477.18 to ensure that development is carried out in accordance with the terms and conditions of this Permit. Should any interest be earned upon the security, it shall accrue to the Holder if the security is returned. The condition of the posting of the security is that should the Holder fail to carry out the development hereby authorized, according to the terms and conditions of this Permit within the time provided, the City may use the security to carry out the work by its servants, agents or contractors, and any surplus shall be paid over to the Holder. Should the Holder carry out the development permitted by this permit within the time set out herein, the security shall be returned to the Holder. The City may retain the security for up to one year after inspection of the completed landscaping in order to ensure that plant material has survived.
7. If the Holder does not commence the construction permitted by this Permit within 24 months of the date of this Permit, this Permit shall lapse and the security shall be returned in full.

Development Permit
No. DP 16-721500

To the Holder:	WESTERN-CITIMARK RIVER FRONT TOWNHOUSE PROJECT LTD.
Property Address:	10311 RIVER DRIVE
Address:	C/O WAYNE FOUGERE FOUGERE ARCHITECTURE INC. 202 - 2425 QUEBEC STREET VANCOUVER, BC V5T 4L6

8. The land described herein shall be developed generally in accordance with the terms and conditions and provisions of this Permit and any plans and specifications attached to this Permit which shall form a part hereof.

   This Permit is not a Building Permit.

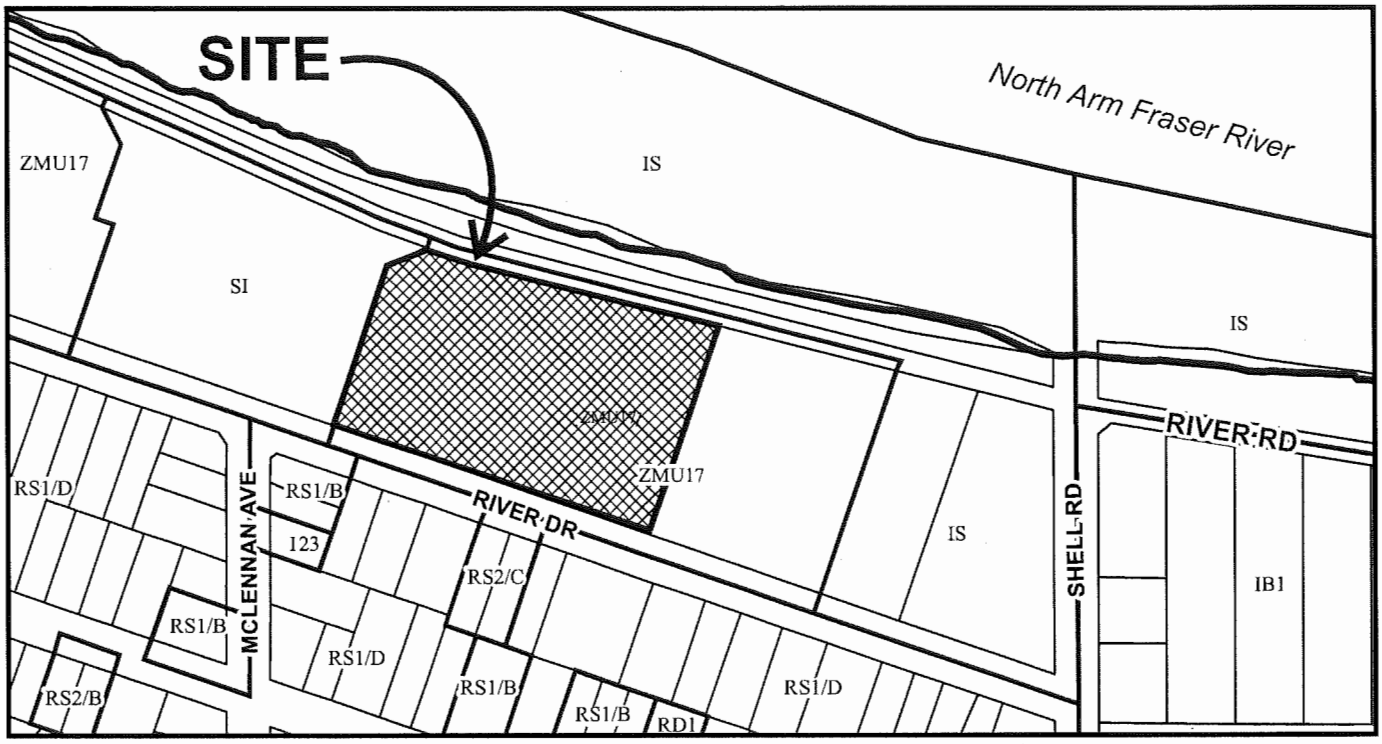
AUTHORIZING RESOLUTION NO. ISSUED BY THE COUNCIL THE DAY OF , .

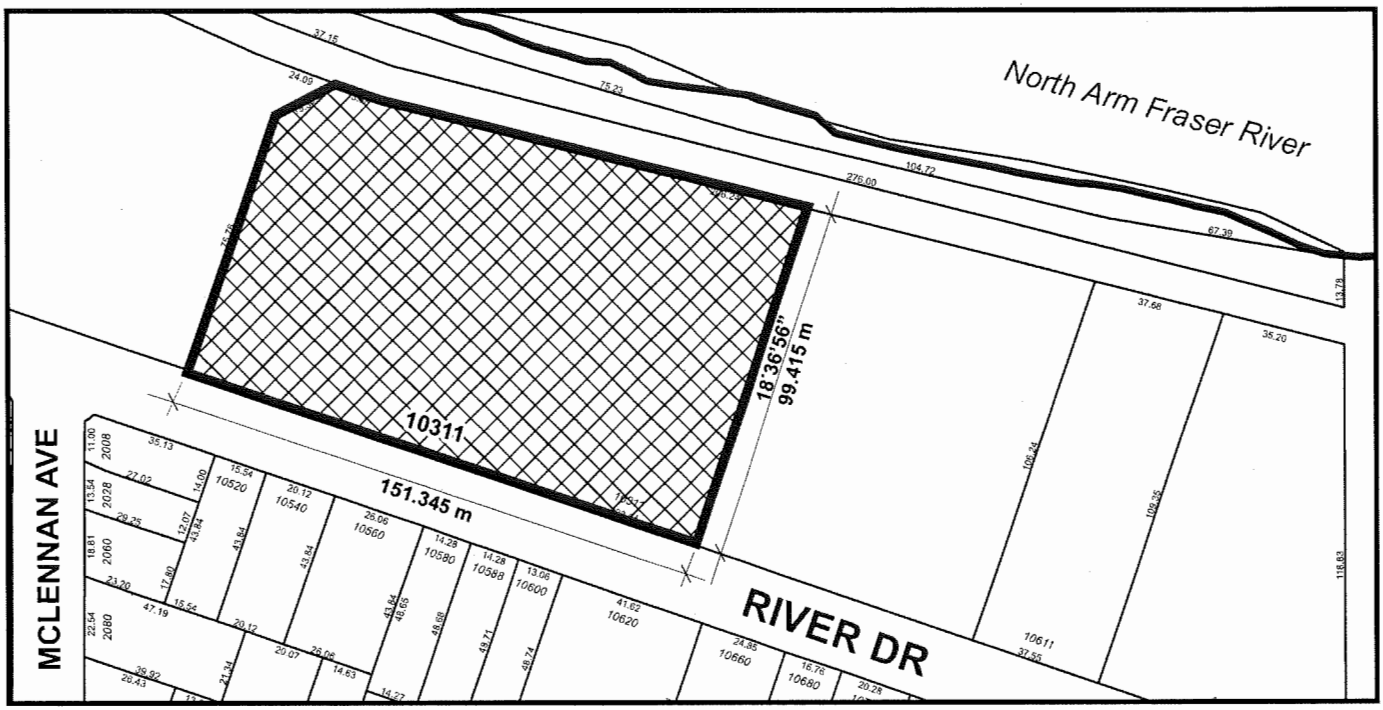
DELIVERED THIS DAY OF , .

_____

MAYOR

City of
Richmond



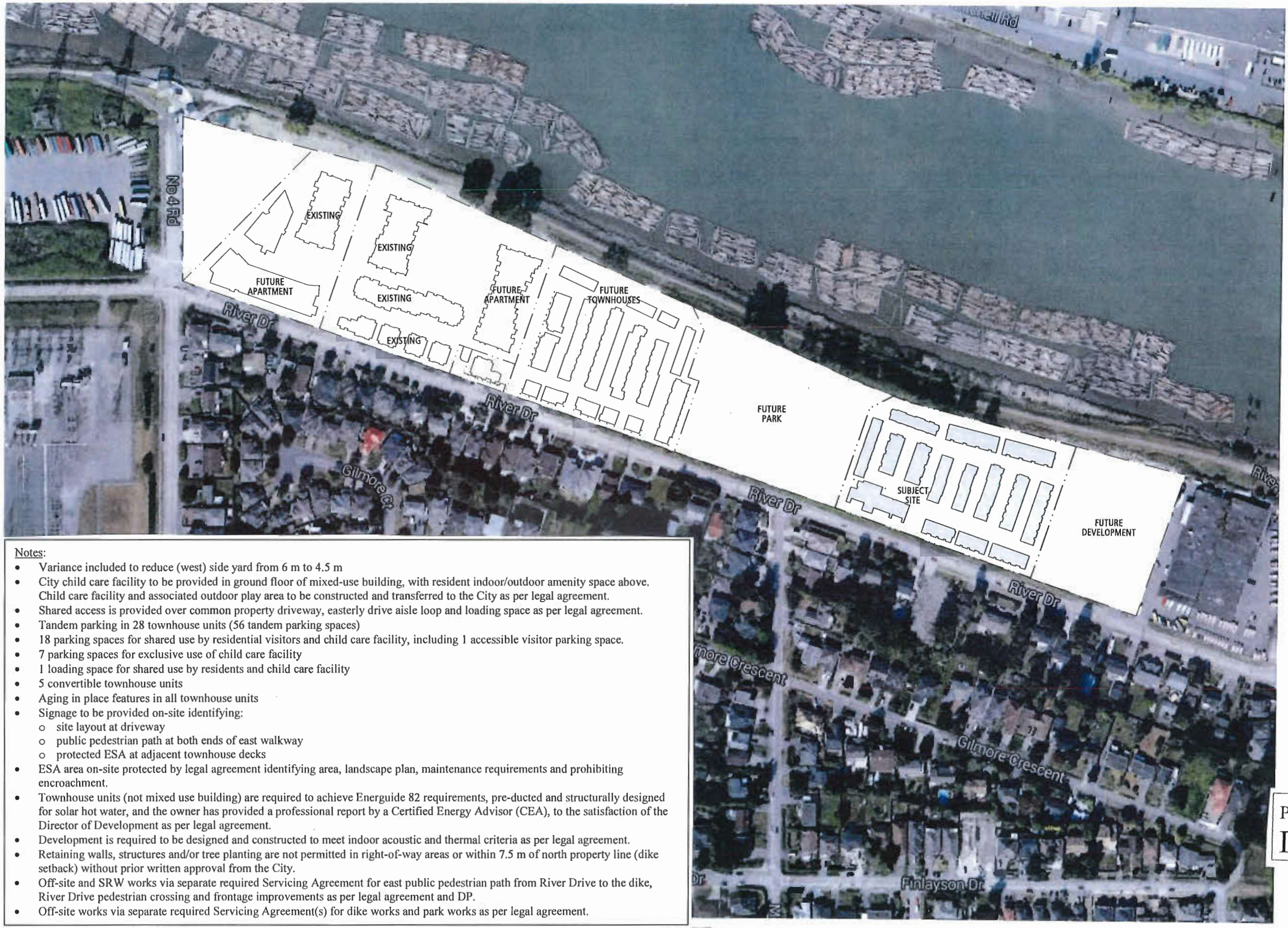


DP 16-721500
SCHEDULE "A"

Original Date: 01/22/16

Revision Date: 01/19/18

Note: Dimensions are in METRES



Notes:

- Variance included to reduce (west) side yard from 6 m to 4.5 m
- City child care facility to be provided in ground floor of mixed-use building, with resident indoor/outdoor amenity space above. Child care facility and associated outdoor play area to be constructed and transferred to the City as per legal agreement.
- Shared access is provided over common property driveway, easterly drive aisle loop and loading space as per legal agreement.
- Tandem parking in 28 townhouse units (56 tandem parking spaces)
- 18 parking spaces for shared use by residential visitors and child care facility, including 1 accessible visitor parking space.
- 7 parking spaces for exclusive use of child care facility
- 1 loading space for shared use by residents and child care facility
- 5 convertible townhouse units
- Aging in place features in all townhouse units
- Signage to be provided on-site identifying:
  - site layout at driveway
  - public pedestrian path at both ends of east walkway
  - protected ESA at adjacent townhouse decks
- ESA area on-site protected by legal agreement identifying area, landscape plan, maintenance requirements and prohibiting encroachment.
- Townhouse units (not mixed use building) are required to achieve Energuide 82 requirements, pre-ducted and structurally designed for solar hot water, and the owner has provided a professional report by a Certified Energy Advisor (CEA), to the satisfaction of the Director of Development as per legal agreement.
- Development is required to be designed and constructed to meet indoor acoustic and thermal criteria as per legal agreement.
- Retaining walls, structures and/or tree planting are not permitted in right-of-way areas or within 7.5 m of north property line (dike setback) without prior written approval from the City.
- Off-site and SRW works via separate required Servicing Agreement for east public pedestrian path from River Drive to the dike, River Drive pedestrian crossing and frontage improvements as per legal agreement and DP.
- Off-site works via separate required Servicing Agreement(s) for dike works and park works as per legal agreement.

CONTEXT PLAN

SCALE 1" = 100'-0"

0 25m 50m 100m

NORTHVIEW ESTATE

Plan 1 Jan 26, 2018

DP 16-721500

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fougerearchitecture.ca

PLAN#001

FLOOR AREA CALCULATION

Proposed Zoning ZMU17 | Gross Site Area 151,047 sf (3.47 acres)

Unit Count	Unit Type	Ground Total Floor Area	Main Total Floor Area	Upper Total Floor Area	Top Total Floor Area	Unit Total		Total		Ground Floor Stair Exemption	Main Floor Staircase Exemption	Upper Floor Staircase Exemption	Top Floor Staircase Exemption	Garage Area Exemption	Covered / Amenity Area Exemption	Unit Net Floor Area		Total Net Area		Unit GFA (Saleable)		Total GFA (Saleable)	
8	A1 (4 BR+Family)	601	663	687	0	1,951	sf	15,608	sf	65	43	37	0	360	0	1,446	sf	11,568	sf	1,591	sf	12,728	sf
18	A2 (4 BR+Family)	596	636	659	0	1,891	sf	34,038	sf	65	43	38	0	356	0	1,389	sf	25,002	sf	1,535	sf	27,630	sf
5	A3 (4 BR+Family)	611	636	673	0	1,920	sf	9,600	sf	91	17	43	0	353	0	1,416	sf	7,080	sf	1,567	sf	7,835	sf
4	A4 (4 BR+Family)	601	652	676	0	1,929	sf	7,716	sf	65	43	38	0	360	0	1,423	sf	5,692	sf	1,569	sf	6,276	sf
4	B1 (3 BR+Family)	541	614	665	0	1,820	sf	7,280	sf	72	36	35	0	403	0	1,274	sf	5,096	sf	1,417	sf	5,668	sf
4	B2 (3 BR+Family)	537	584	629	0	1,750	sf	7,000	sf	72	36	35	0	398	0	1,209	sf	4,836	sf	1,352	sf	5,408	sf
4	B3 (3 BR+Family)	537	584	634	0	1,755	sf	7,020	sf	72	36	35	0	398	0	1,214	sf	4,856	sf	1,357	sf	5,428	sf
2	C1 (3 BR)	611	638	713	0	1,962	sf	3,924	sf	48	60	52	0	501	0	1,301	sf	2,602	sf	1,461	sf	2,922	sf
3	C2 (3 BR+Family)	617	634	708	259	2,218	sf	6,654	sf	48	60	7	50	500	0	1,553	sf	4,659	sf	1,718	sf	5,154	sf
2	D1 (3 BR)	576	615	686	0	1,877	sf	3,754	sf	63	45	38	0	478	0	1,253	sf	2,506	sf	1,399	sf	2,798	sf
2	D2 (3 BR)	576	599	612	0	1,787	sf	3,574	sf	63	43	37	0	478	0	1,166	sf	2,332	sf	1,309	sf	2,618	sf
8	D3 (3 BR+Family)	569	581	605	320	2,075	sf	16,600	sf	63	43	0	37	471	0	1,461	sf	11,688	sf	1,604	sf	12,832	sf
4	D4 (3 BR+Family)	569	593	607	320	2,089	sf	8,356	sf	63	43	0	37	471	0	1,475	sf	5,900	sf	1,618	sf	6,472	sf
4	D5 (3 BR)	576	601	610	0	1,787	sf	7,148	sf	63	43	37	0	478	0	1,166	sf	4,664	sf	1,309	sf	5,236	sf
6	D6 (3 BR)	569	581	592	0	1,742	sf	10,452	sf	63	43	38	0	471	0	1,127	sf	6,762	sf	1,271	sf	7,626	sf
2	D7 (3 BR)	569	581	590	0	1,740	sf	3,480	sf	63	43	37	0	471	0	1,126	sf	2,252	sf	1,269	sf	2,538	sf
2	E1 (3 BR+Den)	603	655	708	0	1,966	sf	3,932	sf	62	33	40	0	473	0	1,358	sf	2,716	sf	1,493	sf	2,986	sf
4	E2 (3 BR+Den)	600	635	688	0	1,923	sf	7,692	sf	63	33	40	0	471	0	1,316	sf	5,264	sf	1,452	sf	5,808	sf
86	Homes							163,828	sf									115,475	sf			127,963	sf
								15,220.12	sm									10,727.98	sm			11,888.15	sm

															Amenity Exemption								
1	Day Care	6,202	0	0	0	6,202	sf	6,202	sf	0	0	0	0	0	0	6,202	sf	6,202	sf				
1	Indoor Amenity Area	252	1,686	0	0	1,938	sf	1,938	sf	0	0	0	0	0	1,938	0	sf	0	sf				
88								171,968	sf									121,677	sf				
								15,976.35	sm									11,304.16	sm				

Residential Net FAR	0.764
Average Unit Size	1,343 sf

Maximum FAR	1.380
Proposed FAR	0.806

Drawing List

PAGE NO.	Drawing Title	Scale
D001	Context Plan	1" = 100'-0"
D002	Site Data	NTS
D01	Site Plan	1" = 20'-0"
D01a, 01b, 01c, 01d	Phase Plans and Phase Data	1" = 20'-0"
D01e	ESA Plan	1" = 20'-0"
D02	Parking Plan	1" = 20'-0"
D04	Elevations, Block O	1/8" = 1'-0"
D04a	Block Plans, Block O	1/8" = 1'-0"
D05	Elevations, Block P	1/8" = 1'-0"
D05a	Block Plans, Block P	1/8" = 1'-0"
D06	Elevations, Block Plan, Block Q	1/8" = 1'-0"
D07	Elevations, Block Plan, Block R	1/8" = 1'-0"
D08	Elevations, Block S	1/8" = 1'-0"
D08a	Block Plans, Block S	1/8" = 1'-0"
D09	Elevations, Block T	1/8" = 1'-0"
D09a	Block Plans, Block T	1/8" = 1'-0"
D10	Elevations, Block V	1/8" = 1'-0"
D10a	Block Plans, Block V	1/8" = 1'-0"
D11	Elevations, Block W	1/8" = 1'-0"
D11a	Block Plans, Block W	1/8" = 1'-0"
D12	Elevations, Block Plan, Block X	1/8" = 1'-0"
D13	Elevations, Block Plan, Block Y	1/8" = 1'-0"
D14	Elevations, Block Plan, Block Z	1/8" = 1'-0"
D15	Daycare Floor Plan	1/8" = 1'-0"
D15a	Coloured Daycare Floor Plan	3/16" = 1'-0"
D16	Indoor & Outdoor Amenity Floor Plan	1/8" = 1'-0"
D17	Daycare and Amenity Elevations	1/8" = 1'-0"
D17a	Daycare Shadow Analysis	NTS
D18	Site_Sections	1/8" = 1'-0"
D19	Area_Calculation	1/8" = 1'-0"
D20	Area_Calculation	1/8" = 1'-0"
D21	Area_Calculation	1/8" = 1'-0"
D22	Convertible unit	1/4" = 1'-0"
D23	Streetscapes	1" = 20'-0"

UNIT DENSITY / SITE COVERAGE CALC. / ACCESSORY CALC. / COVERED AREA CALC.

Unit Count	Unit Type	Foot Print	Total Area		Accessory Area	Total Accessory Area		Covered Area	Total Covered Area	
8	A1 (4 BR+Family)	601	4,808	sf	360	2880	sf	0	0	sf
18	A2 (4 BR+Family)	596	10,728	sf	356	6408	sf	0	0	sf
5	A3 (4 BR+Family)	611	3,055	sf	353	1765	sf	0	0	sf
4	A4 (4 BR+Family)	601	2,404	sf	360	1440	sf	0	0	sf
4	B1 (3 BR+Family)	541	2,164	sf	403	1612	sf	0	0	sf
4	B2 (3 BR+Family)	537	2,148	sf	398	1592	sf	0	0	sf
4	B3 (3 BR+Family)	537	2,148	sf	398	1592	sf	0	0	sf
2	C1 (3 BR)	638	1,276	sf	501	1002	sf	0	0	sf
3	C2 (3 BR+Family)	634	1,902	sf	499	1497	sf	0	0	sf
2	D1 (3 BR)	576	1,152	sf	478	956	sf	0	0	sf
2	D2 (3 BR)	576	1,152	sf	478	956	sf	0	0	sf
8	D3 (3 BR+Family)	569	4,552	sf	471	3768	sf	0	0	sf
4	D4 (3 BR+Family)	569	2,276	sf	471	1884	sf	0	0	sf
4	D5 (3 BR)	576	2,304	sf	478	1912	sf	0	0	sf
6	D6 (3 BR)	569	3,414	sf	471	2826	sf	0	0	sf
2	D7 (3 BR)	569	1,138	sf	471	942	sf	0	0	sf
2	E1 (3 BR+Den)	620	1,240	sf	473	946	sf	0	0	sf
4	E2 (3 BR+Den)	617	2,468	sf	471	1884	sf	0	0	sf
6	Electrical Closet	50	250	sf	48	240	sf	0	0	sf
1	Daycare + Amenity	7,268	7,268	sf	0	0	sf	1,071	1,071	sf
86	Homes		57,847	sf		36,102	sf		1,071	sf

Site Area	151,047 sf (3.47 acres)	Maximum Lot Coverage	40.0%	Maximum Accessory Area per unit	538 sf	Maximum Covered Area	10.0% of Net
Proposed Density	24.78 upa	Proposed Lot Coverage	38.3%	Proposed Average Accessory Area	420 sf	Proposed Covered Area	0.88%

SITE DATA

NORTHVIEW ESTATE

Plan 2 Jan 26, 2018

DP 16-721500

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PLAN#002

PROVISION OF ACCESSIBILITY FEATURES
"AGING-IN-PLACE" REQUIREMENTS
ON ALL UNITS:

- Entry doors minimum 855 mm clear opening (3'-0" swinging door spec.)
- Hallways minimum 900 mm width
- Door from garage to living area minimum 2'-10" (swinging door spec.)
- Blocking to bathrooms for installation of grab-bars (toilet, tub and shower)
- Provision of lever door handles
- One window that can be opened with a single hand in the living room
- One window that can be opened with a single hand in one bedroom

LEGEND:

- POROUS PAVER
- LIVE PLANT
- DAYCARE OUTDOOR PLAYING AREA
- DAYCARE COVERED OUTDOOR PLAYING AREA
- PATIO
- OPEN SPACE
- 0.00 m PROPOSED SITE GRADE
- 0.00 m EXISTING SITE GRADE
- REMOVED TREES
- FLOOD PLAIN LEVEL: 2.90 m
- DOOR TO DOOR GARBAGE AND RECYCLING PICKUP

SITE PLAN

SCALE 1" = 20'-0"

0 5m 10m 20m

thinkspace
architecture planning interior design
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t (604) 581 8128 f (604) 581 8148 www.think-space.ca
Architect for Daycare Design

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Plan 3 Jan 26, 2018

DP 16-721500

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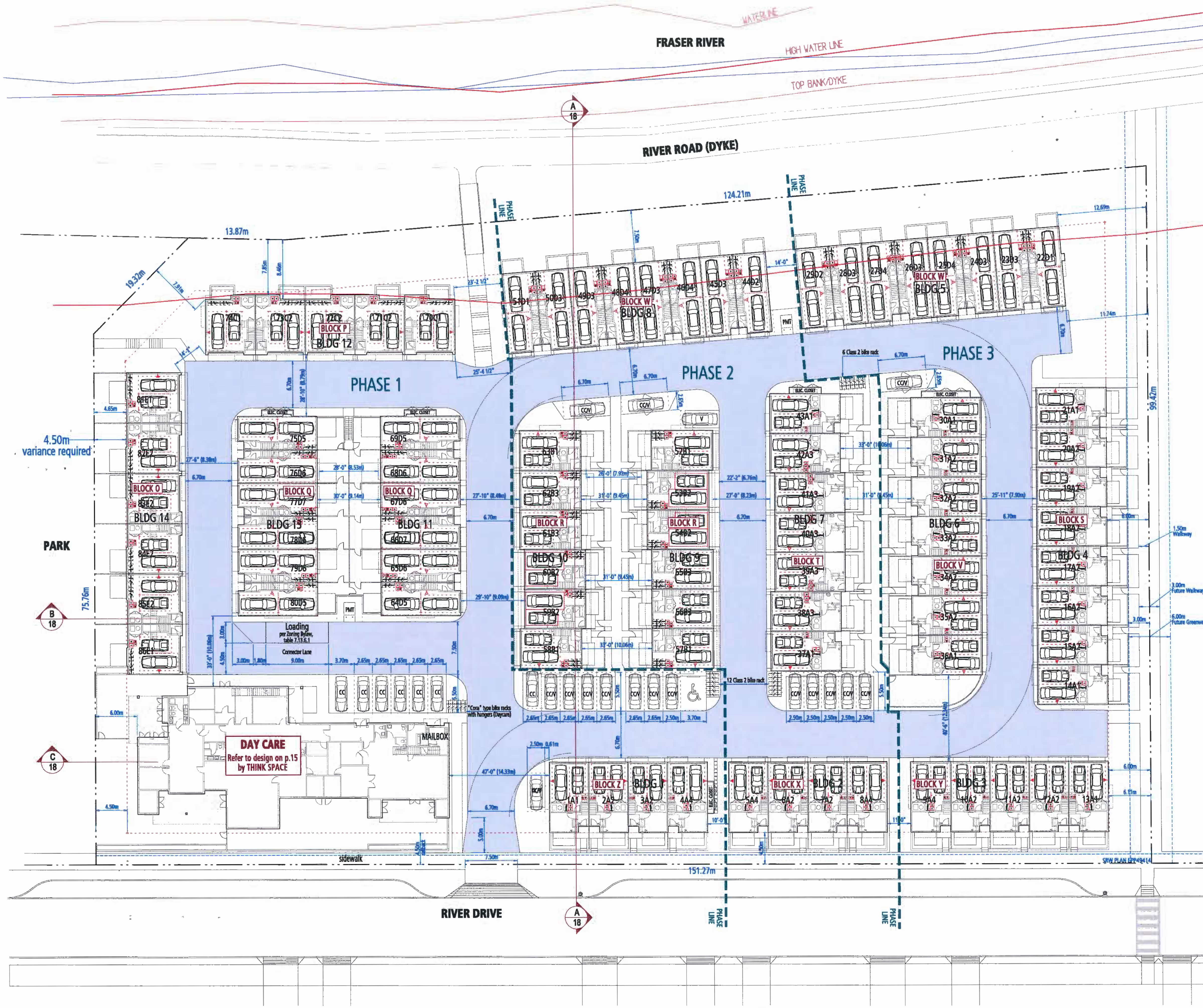
PLAN#01



PARKING & BICYCLE DATA

Unit Count	86
Residential 2 cars/unit	172
18 shared DC/Visitors stalls (requires one to be H/C stall)	+ 18
13 dedicated DC stalls (includes 1 dedicated H/C stall)	+ 13
Shared with Visitors	- 6
Total Required	197
Parking Provided	172
Visitor Provided	+ 18
Daycare Provided (6 shared with Visitor)	+ 13 - 6
Standard Stall (required min 50% of stalls)=139 (70%)	
Small Stall=58	
Tandem Stall (required max 50% of stalls)=56 (29%)	
Total Provided	197
HC car stalls provided (shared with daycare)	1
Medium-Size Loading Stall	1
On-site Bicycle Parking Requirements	
Class 1: 1.25 stalls/unit	108
Class 2: 0.2 stall/unit	18
Total Class 1 Stalls Provided	109
max. 33% Vertical Stalls=35 (32.4%)	
Residential Class 2 Stalls Provided	18
Daycare Class 1 Stalls Provided	5

LEGEND

- STANDARD CAR STALL FOR RESIDENTIAL SIZE: 2.5m x 5.5m
- STANDARD CAR STALL SIZE: 3.4m x 5.5m (one of the tandem)
- SMALL CAR STALL SIZE: 2.3m x 4.6m
- STANDARD CAR STALL FOR DAYCARE SIZE: 2.65m x 5.5m
- HANDICAPPED CAR STALL SIZE: 3.7m x 5.5m
- CLASS 1 BIKE STALL SIZE: 1.8m x 0.6m
- CLASS 1 BIKE STALL (Vertical) SIZE: 1.0m x 0.6m
- Electric Vehicle Plug-Ins
- Pre-Ducting for Future Wiring

PARKING PLAN

SCALE 1" = 20'-0"

0 5m 10m 20m

thinkspace

architecture planning interior design
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architect for daycare design

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REGISTERED ARCHITECT · WAYNE A. FOUGERE · BRITISH COLUMBIA

NORTHVIEW ESTATE

Plan 4 Jan 26, 2018

DP 16-721500

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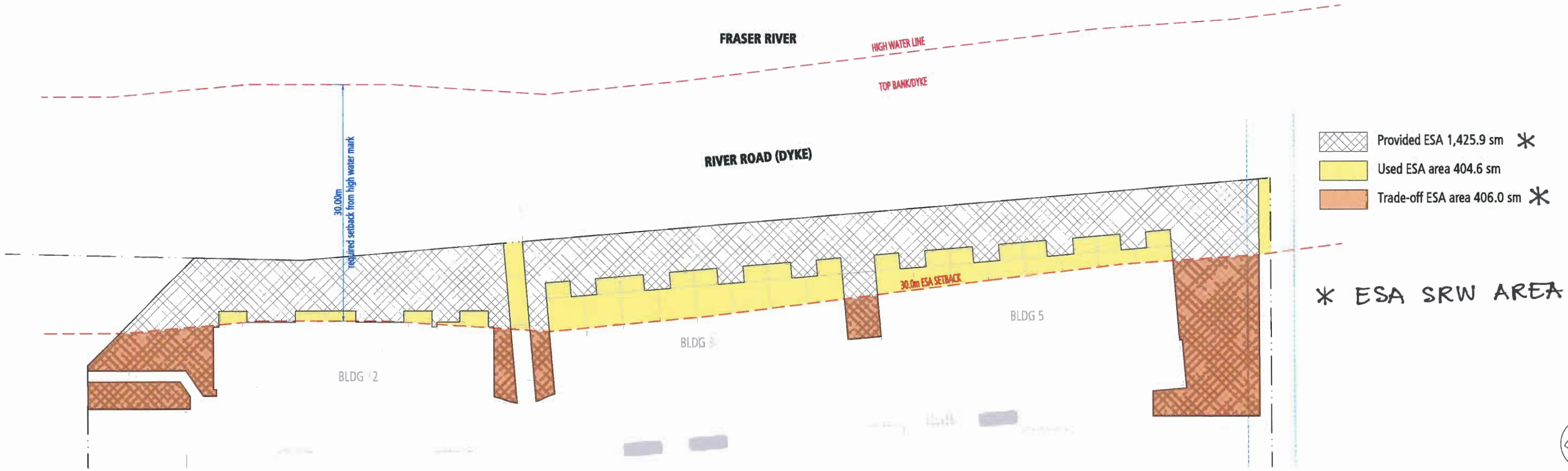
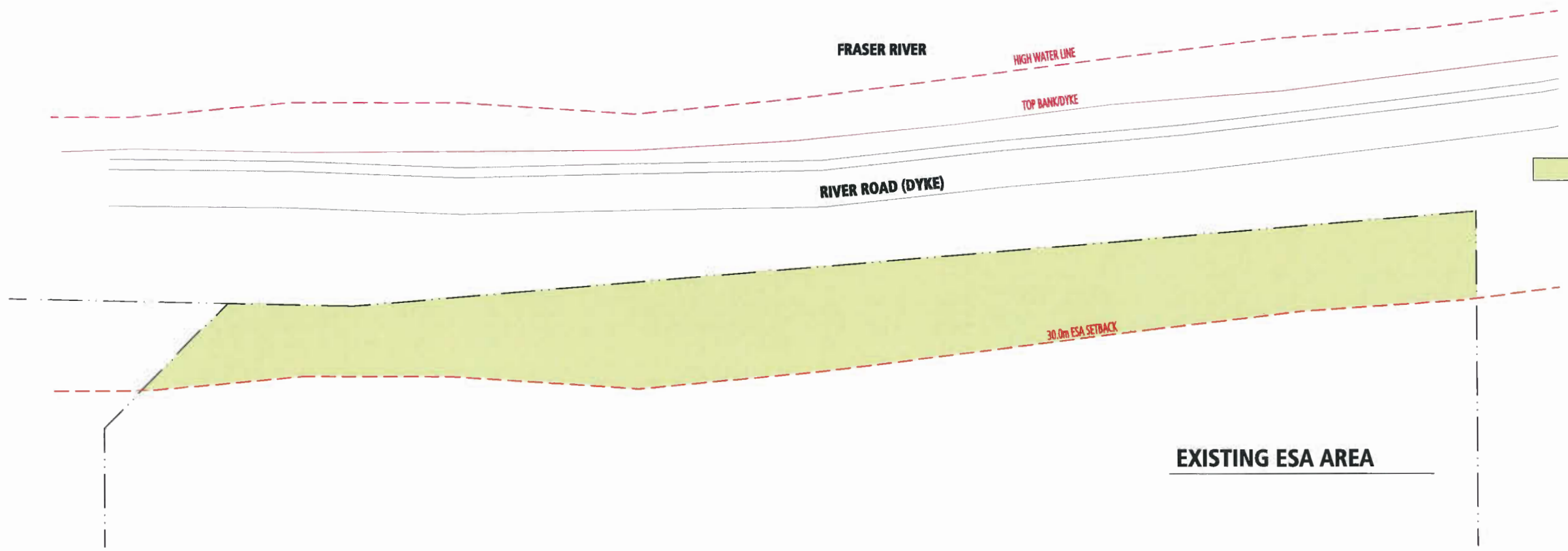
PLAN#02



PROPOSED ESA AREA



EXISTING ESA AREA

ESA PLAN
SCALE 1" = 20'-0"
0 5m 10m 20m

NORTHVIEW ESTATE

Plan 5 Jan 26, 2018
DP 16-721500

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PLAN#01e

* MIXED USE BUILDING CITY CHILD CARE FACILITY & PLAY AREA AT GROUND FLOOR, RESIDENT INDOOR/OUTDOOR AMENITY SPACE AT SECOND FLOOR

SOUTH ELEVATION

NORTH ELEVATION

EAST ELEVATION

WEST ELEVATION

ALL ENTRY DOORS AND GARAGE DOORS TO HAVE GLAZED PANELS (TYP.)

EXTERIOR FINISHES SCHEDULE (DARK BLUE and GREEN)

1	ASPHALT SHINGLES		GAF- WEATHERED WOOD
2	WOOD FASCIA		BENJAMIN MOORE - 2143-30 IRON MOUNTAIN
3	HARDIE PLANK LAP SIDING		HARDIE COLOURPLUS SIDING - COBBLE STONE
4	WOOD SIDING		CEDAR: SIKKENS CETOL PRO LUXE #086 Teak On Cedar
5a	HARDIE BOARD AND BATTEN		BENJAMIN MOORE - 2129-20 SOOT
5b	HARDIE BOARD AND BATTEN		BENJAMIN MOORE - 2140-40 STORM CLOUD GREY
6	WOOD TRIM		HARDIE COLOURPLUS SIDING - COBBLE STONE
7	WOOD TRIM HORIZONTAL		BENJAMIN MOORE - 2143-30 IRON MOUNTAIN
8	WINDOW & DOOR TRIM @ BOARD AND BATTEN		BENJAMIN MOORE - HC-170 STONINGTON GREY
9	WINDOW TRIM @ HARDIE SIDING		BENJAMIN MOORE - 2143-30 IRON MOUNTAIN
10	VINYL WINDOWS		White
11	METAL GUTTERS		GENTEK - IRON ORE
12	SOLID-CORE EXTERIOR DOOR	(townhouse)	SHERWIN WILLIAMS - SW6349 PENNYWISE
13	GARAGE DOOR	(townhouse)	TERRA BRONZE OR SANDSTONE
14	HARDIE SOFFIT FOR REVERSE SHED ROOF	(townhouse)	HARDIE SOFFIT NON VENTED SMOOTH, COBBLE STONE
15	HARDIE SOFFIT		COBBLE STONE
16	DOWNSPOUTS		MATCH TO SOFFIT COLOUR

* **ELEVATION DAYCARE/ AMENITY**

SCALE 1/8" = 1'-0"

0 5' 10' 20'

NORTHVIEW ESTATE

Plan 6 Jan 26, 2018

DP 16-721500

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PLAN#17

BLOCK O - EAST ELEVATION

BLOCK O - WEST ELEVATION

BLOCK O - NORTH ELEVATION

BLOCK O - SOUTH ELEVATION

EXTERIOR FINISHES SCHEDULE (BROWN)		
1	ASPHALT SHINGLES	GAF- WEATHERED WOOD
2	WOOD FASCIA	BENJAMIN MOORE - 2143-30 IRON MOUNTAIN
3	HARDIE PLANK LAP SIDING	HARDIE COLOURPLUS SIDING - COBBLE STONE
4	WOOD SIDING	CEDAR: SIKKENS CETOL PRO LUXE #065 Teak On Cedar
5	HARDIE BOARD AND BATTEN	SHERWIN WILLIAMS - SW 7020 BLACK FOX
6	WOOD TRIM	HARDIE COLOURPLUS SIDING - COBBLE STONE
7	WOOD TRIM HORIZONTAL	BENJAMIN MOORE - 2143-30 IRON MOUNTAIN
8	WINDOW & DOOR TRIM @ BOARD AND BATTEN	BENJAMIN MOORE - HC-170 STONINGTON GREY
9	WINDOW TRIM @ HARDIE SIDING	BENJAMIN MOORE - 2143-30 IRON MOUNTAIN
10	VINYL WINDOWS	White
11	METAL GUTTERS	GENTEK - IRON ORE
12	SOLID-CORE EXTERIOR DOOR	SHERWIN WILLIAMS - SW6349 PENNYWISE
13	GARAGE DOOR (OVERHEAD DOOR)	SANDSTONE
14	HARDIE SOFFIT FOR REVERSE SHED ROOF	HARDIE SOFFIT NON VENTED SMOOTH, COBBLE STONE
15	HARDIE SOFFIT	COBBLE STONE
16	DOWNSPOUTS	MATCH TO SOFFIT COLOUR

ELEVATIONS BLOCK O

SCALE 1/8" = 1'-0"

0 5' 10' 20'

NORTHVIEW ESTATE

Plan 7 Jan 26, 2018

DP 16-721500

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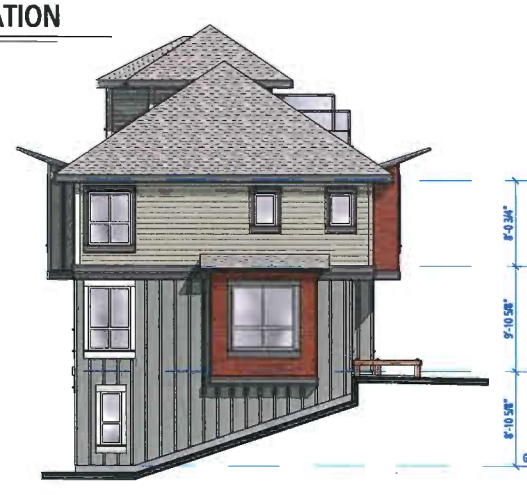
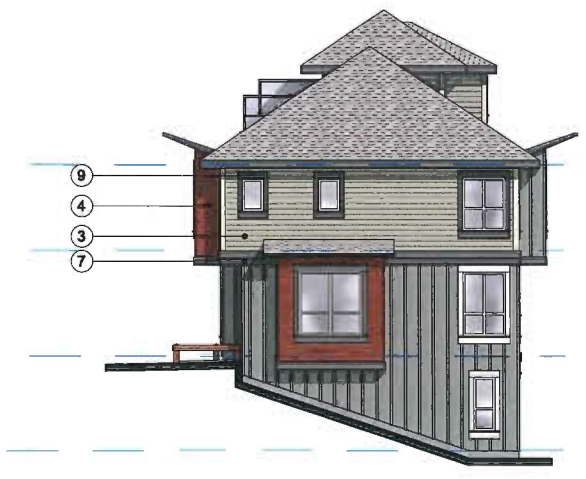
PLAN#04

BLOCK P - SOUTH ELEVATION

BLOCK P - NORTH ELEVATION



BLOCK P - EAST ELEVATION



BLOCK P - WEST ELEVATION

EXTERIOR FINISHES SCHEDULE (GREEN)		
1	ASPHALT SHINGLES	GAF- WEATHERED WOOD
2	WOOD FASCIA	BENJAMIN MOORE - 2143-30 IRON MOUNTAIN
3	HARDIE PLANK LAP SIDING	HARDIE COLOURPLUS SIDING - COBBLE STONE
4	WOOD SIDING	CEDAR: SIKKENS CETOL PRO LUXE #085 Teak On Cedar
5	HARDIE BOARD AND BATTEN	BENJAMIN MOORE - 2140-40 STORM CLOUD GREY
6	WOOD TRIM	HARDIE COLOURPLUS SIDING - COBBLE STONE
7	WOOD TRIM HORIZONTAL	BENJAMIN MOORE - 2143-30 IRON MOUNTAIN
8	WINDOW & DOOR TRIM @ BOARD AND BATTEN	BENJAMIN MOORE - HC-170 STONINGTON GREY
9	WINDOW TRIM @ HARDIE SIDING	BENJAMIN MOORE - 2143-30 IRON MOUNTAIN
10	VINYL WINDOWS	White
11	METAL GUTTERS	GENTEK - IRON ORE
12	SOLID-CORE EXTERIOR DOOR	SHERWIN WILLIAMS - SW6349 PENNYWISE
13	GARAGE DOOR (OVERHEAD DOOR)	TERRA BRONZE
14	HARDIE SOFFIT FOR REVERSE SHED ROOF	HARDIE SOFFIT NON VENTED SMOOTH, COBBLE STONE
15	HARDIE SOFFIT	COBBLE STONE
16	DOWNSPOUTS	MATCH TO SOFFIT COLOUR

ELEVATIONS BLOCK P

SCALE 1/8" = 1'-0"

0 5' 10' 20'

REGISTERED ARCHITECT WAYNE A. FOUGERE January 26 2018 BRITISH COLUMBIA

NORTHVIEW ESTATE

Plan 8 Jan 26, 2018

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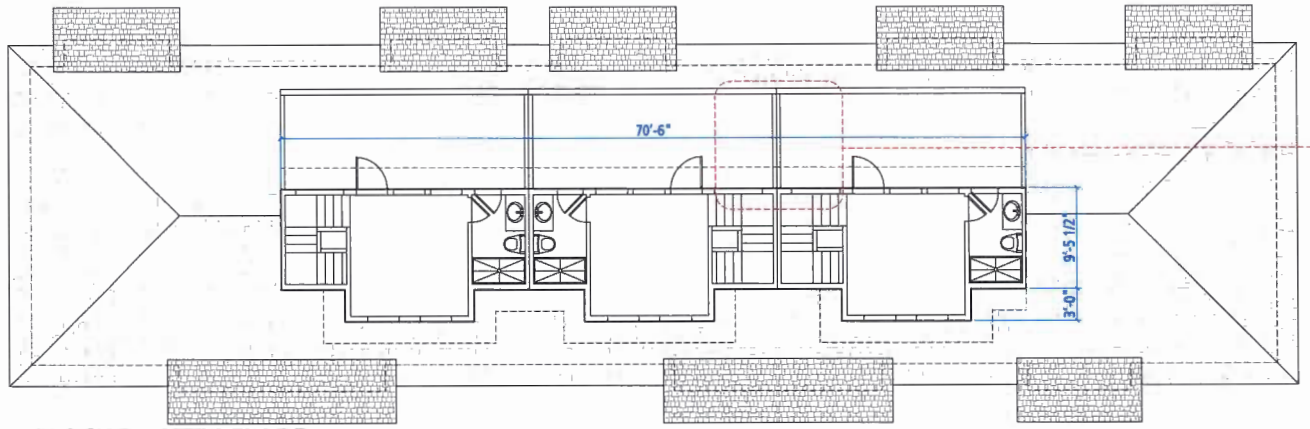
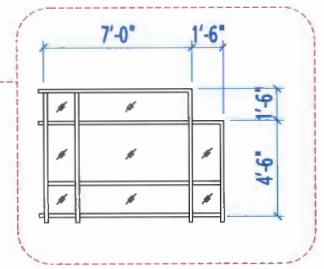
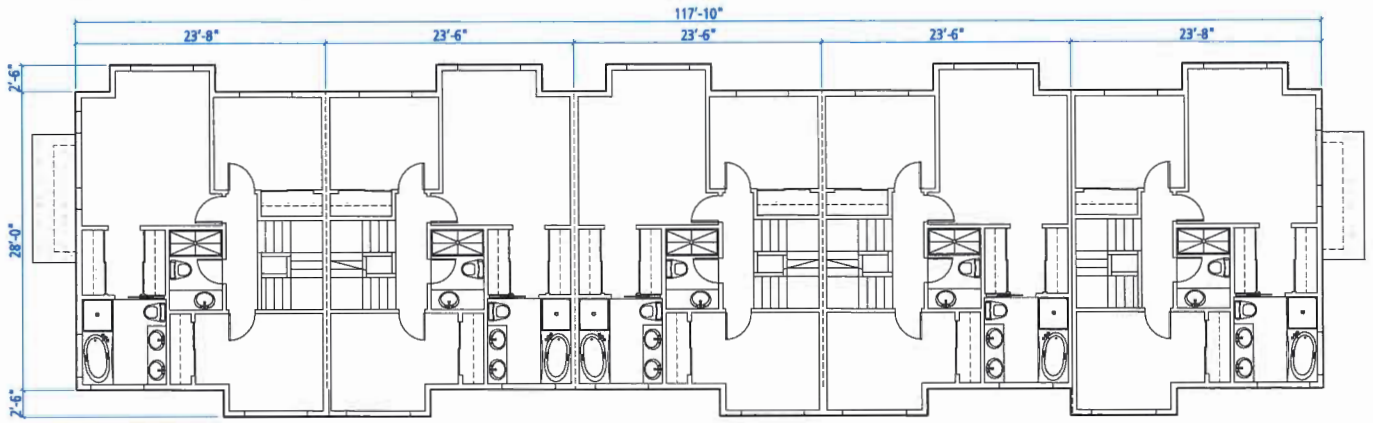
PLAN#05



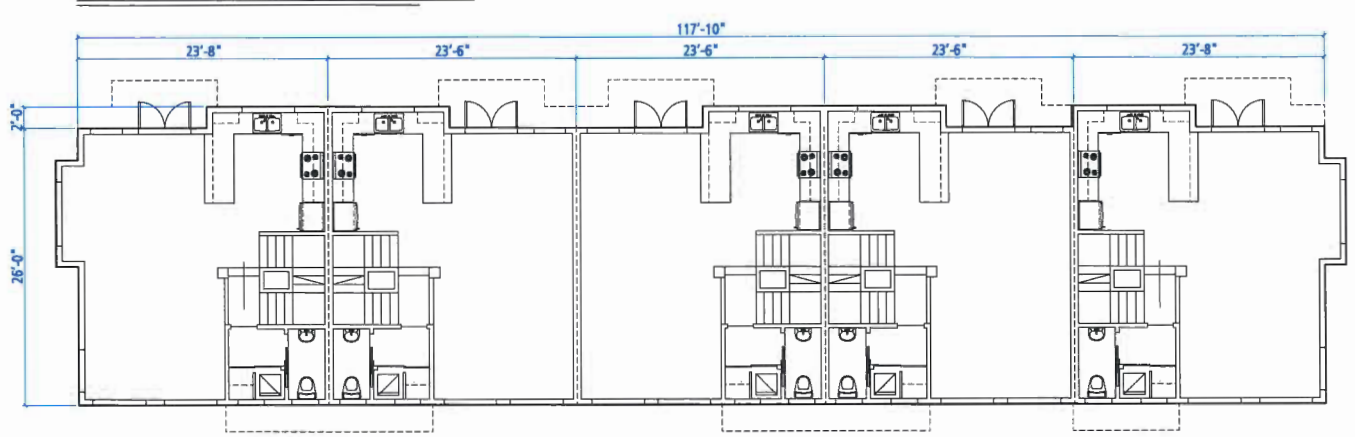
BLOCK P - ATTIC FLOOR



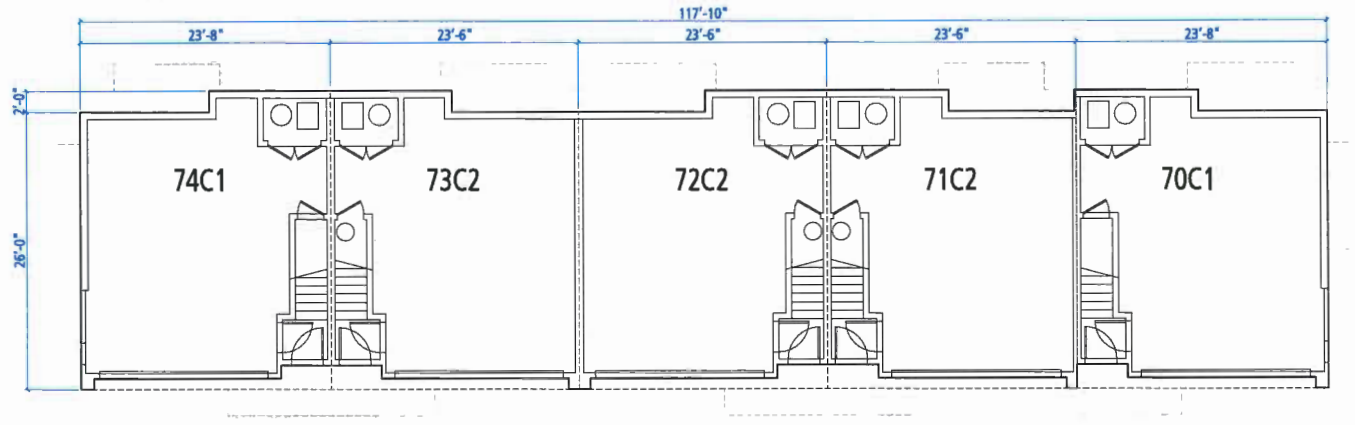
Metal & Glass Privecy Screen (TYP.)



BLOCK P - UPPER FLOOR



BLOCK P - MAIN FLOOR



BLOCK P - GROUND FLOOR

PROVISION OF ACCESSIBILITY FEATURES

"AGING-IN-PLACE" REQUIREMENTS ON ALL UNITS:

- Entry doors minimum 855 mm clear opening (3'-0" swinging door spec.)
- Hallways minimum 900 mm width
- Door from garage to living area minimum 2'-10" (swinging door spec.)
- Blocking to bathrooms for installation of grab-bars (toilet, tub and shower)
- Provision of lever door handles
- One window that can be opened with a single hand in the living room
- One window that can be opened with a single hand in one bedroom

BLOCK PLANS
BLOCK P

SCALE 1/8" = 1'-0"

0 5' 10' 20'

NORTHVIEW ESTATE

Plan 9 Jan 26, 2018

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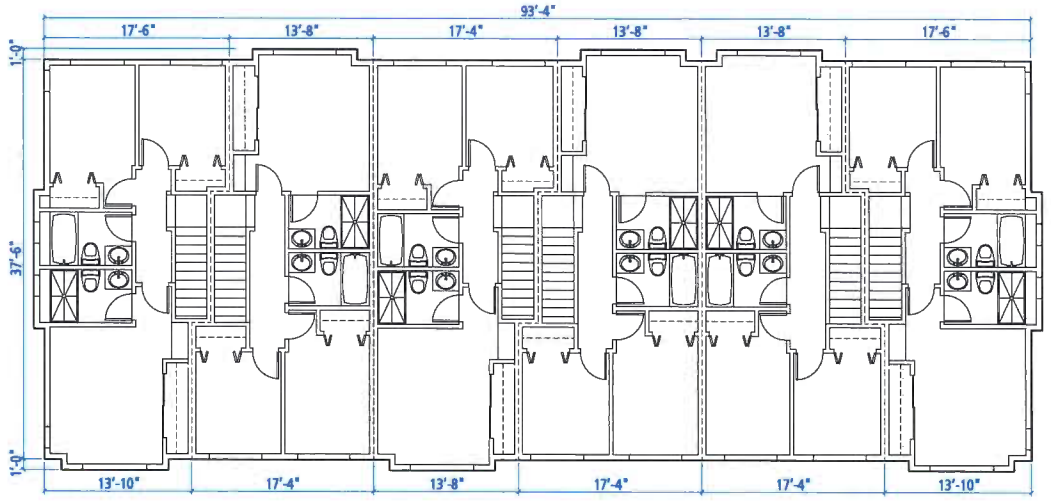
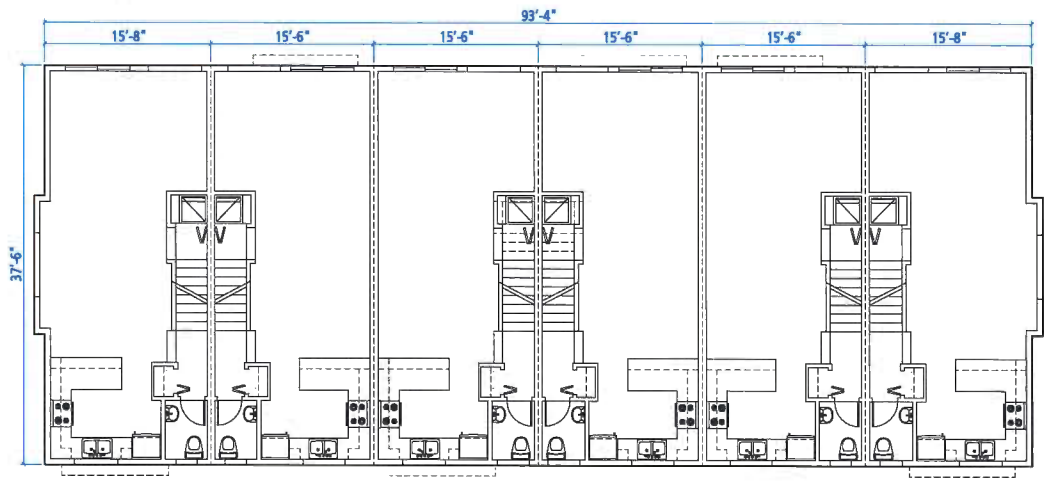
PLAN#05a



BLOCK Q - UPPER FLOOR



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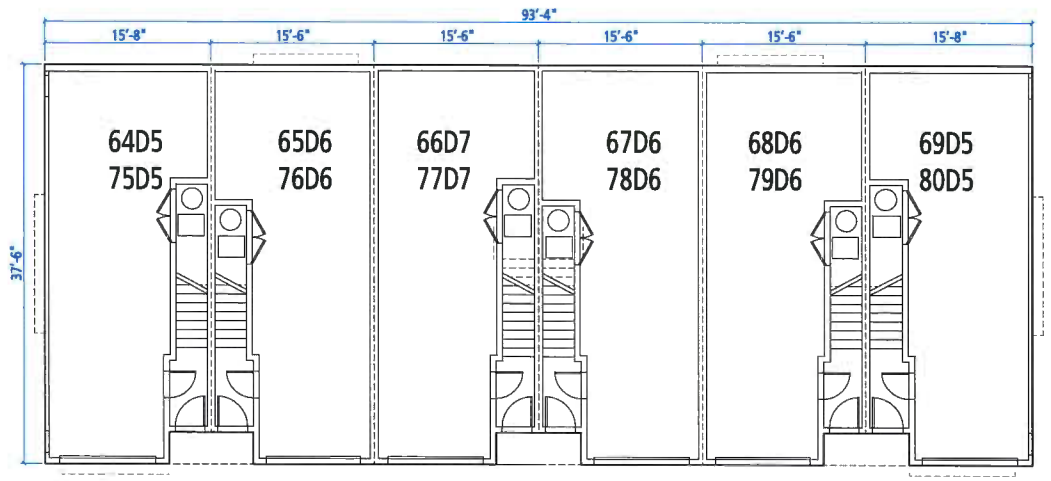

BLOCK Q - GROUND FLOOR

PROVISION OF ACCESSIBILITY FEATURES

"AGING-IN-PLACE" REQUIREMENTS ON ALL UNITS:

- Entry doors minimum 855 mm clear opening (3'-0" swinging door spec.)
- Hallways minimum 900 mm width
- Door from garage to living area minimum 2'-10" (swinging door spec.)
- Blocking to bathrooms for installation of grab-bars (toilet, tub and shower)
- Provision of lever door handles
- One window that can be opened with a single hand in the living room
- One window that can be opened with a single hand in one bedroom

EXTERIOR FINISHES SCHEDULE (DARK BLUE)

1	ASPHALT SHINGLES	GAF- WEATHERED WOOD
2	WOOD FASCIA	BENJAMIN MOORE - 2143-30 IRON MOUNTAIN
3	HARDIE PLANK LAP SIDING	HARDIE COLOURPLUS SIDING - COBBLE STONE
4	WOOD SIDING	CEDAR: SIKKENS CETOL PRO LUXE #085 Teak On Cedar
5	HARDIE BOARD AND BATTEN	BENJAMIN MOORE - 2129-20 SOOT
6	WOOD TRIM	HARDIE COLOURPLUS SIDING - COBBLE STONE
7	WOOD TRIM HORIZONTAL	BENJAMIN MOORE - 2143-30 IRON MOUNTAIN
8	WINDOW & DOOR TRIM @ BOARD AND BATTEN	BENJAMIN MOORE - HC-170 STONINGTON GREY
9	WINDOW TRIM @ HARDIE SIDING	BENJAMIN MOORE - 2143-30 IRON MOUNTAIN
10	VINYL WINDOWS	White
11	METAL GUTTERS	GENTEK - IRON ORE
12	SOLID-CORE EXTERIOR DOOR	SHERWIN WILLIAMS - SW6349 PENNYWISE
13	GARAGE DOOR (OVERHEAD DOOR)	SANDSTONE
14	HARDIE SOFFIT FOR REVERSE SHED ROOF	HARDIE SOFFIT NON VENTED SMOOTH, COBBLE STONE
15	HARDIE SOFFIT	COBBLE STONE
16	DOWNSPOUTS	MATCH TO SOFFIT COLOUR

BLOCK Q- EAST ELEVATION

BLOCK Q - WEST ELEVATION

BLOCK Q - NORTH ELEVATION

BLOCK Q - SOUTH ELEVATION

ELEVATIONS & BLOCK PLANS BLOCK Q

SCALE 1/8" = 1'-0"

0 5' 10' 20'

NORTHVIEW ESTATE

Plan 10 Jan 26, 2018

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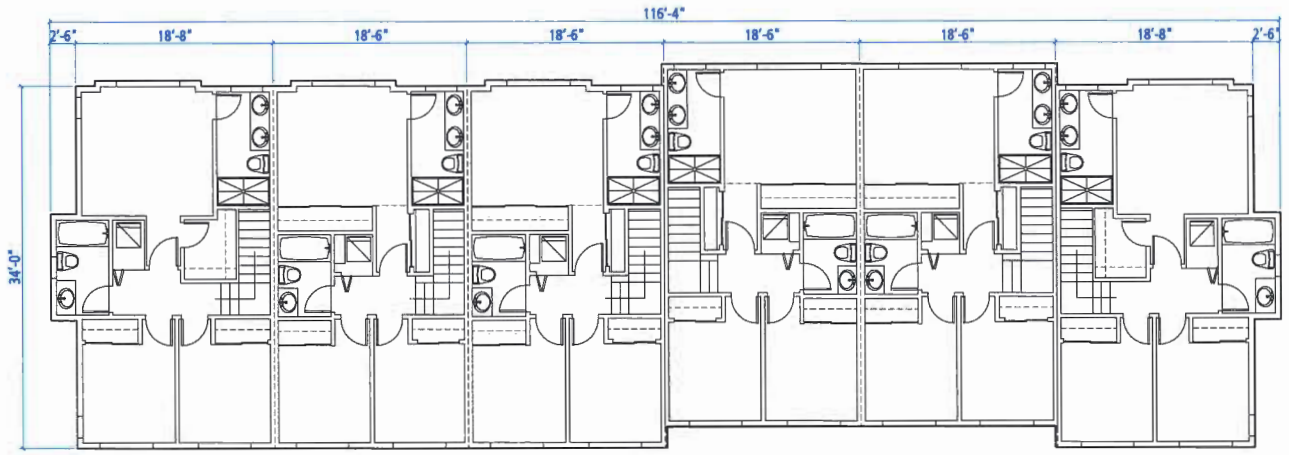
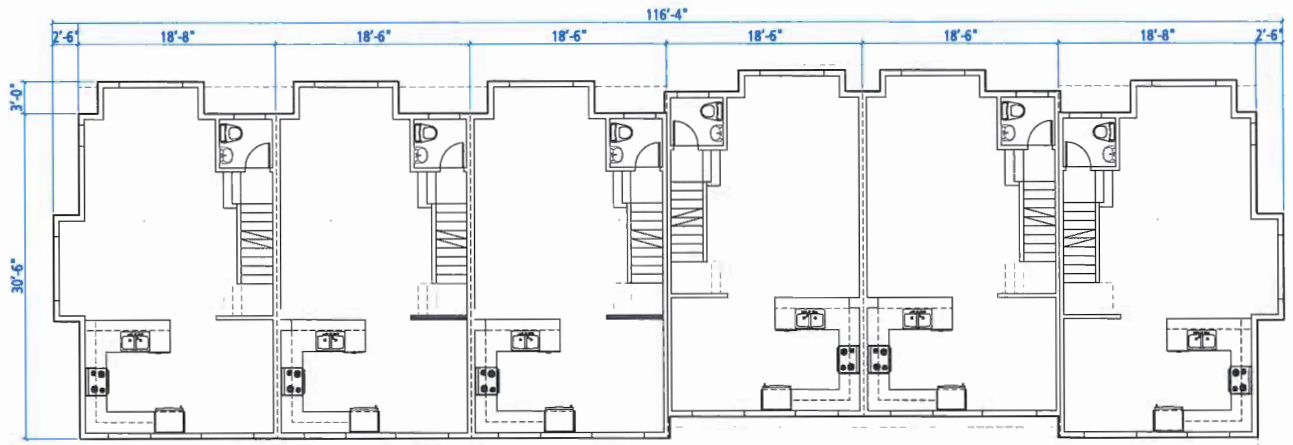
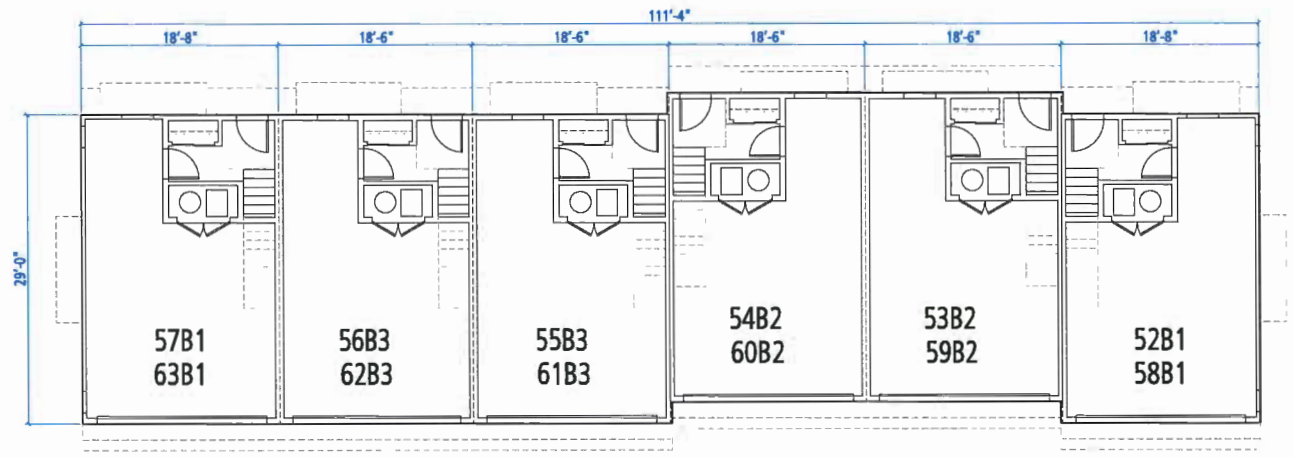
PLAN#06



BLOCK R - UPPER FLOOR



BLOCK R - MAIN FLOOR



BLOCK R - GROUND FLOOR

PROVISION OF ACCESSIBILITY FEATURES

"AGING-IN-PLACE" REQUIREMENTS ON ALL UNITS:

- Entry doors minimum 855 mm clear opening (3'-0" swinging door spec.)
- Hallways minimum 900 mm width
- Door from garage to living area minimum 2'-10" (swinging door spec.)
- Blocking to bathrooms for installation of grab-bars (toilet, tub and shower)
- Provision of lever door handles
- One window that can be opened with a single hand in the living room
- One window that can be opened with a single hand in one bedroom

EXTERIOR FINISHES SCHEDULE (GREEN)

1	ASPHALT SHINGLES	GAF- WEATHERED WOOD
2	WOOD FASCIA	BENJAMIN MOORE - 2143-30 IRON MOUNTAIN
3	HARDIE PLANK LAP SIDING	HARDIE COLOURPLUS SIDING - COBBLE STONE
4	WOOD SIDING	CEDAR: SIKKENS CETOL PRO LUXE #085 Teak On Cedar
5	HARDIE BOARD AND BATTEN	BENJAMIN MOORE - 2140-40 STORM CLOUD GREY
6	WOOD TRIM	HARDIE COLOURPLUS SIDING - COBBLE STONE
7	WOOD TRIM HORIZONTAL	BENJAMIN MOORE - 2143-30 IRON MOUNTAIN
8	WINDOW & DOOR TRIM @ BOARD AND BATTEN	BENJAMIN MOORE - HC-170 STONINGTON GREY
9	WINDOW TRIM @ HARDIE SIDING	BENJAMIN MOORE - 2143-30 IRON MOUNTAIN
10	VINYL WINDOWS	White
11	METAL GUTTERS	GENTEK - IRON ORE
12	SOLID-CORE EXTERIOR DOOR	SHERWIN WILLIAMS - SW6349 PENNYWISE
13	GARAGE DOOR (OVERHEAD DOOR)	TERRA BRONZE
14	HARDIE SOFFIT FOR REVERSE SHED ROOF	HARDIE SOFFIT NON VENTED SMOOTH, COBBLE STONE
15	HARDIE SOFFIT	COBBLE STONE
16	DOWNSPOUTS	MATCH TO SOFFIT COLOUR

BLOCK R - EAST ELEVATION

BLOCK R - WEST ELEVATION

BLOCK R - NORTH ELEVATION

BLOCK R - SOUTH ELEVATION

ELEVATIONS & BLOCK PLANS BLOCK R

SCALE 1/8" = 1'-0"

0 5' 10' 20'

NORTHVIEW ESTATE

Plan 11 Jan 26, 2018

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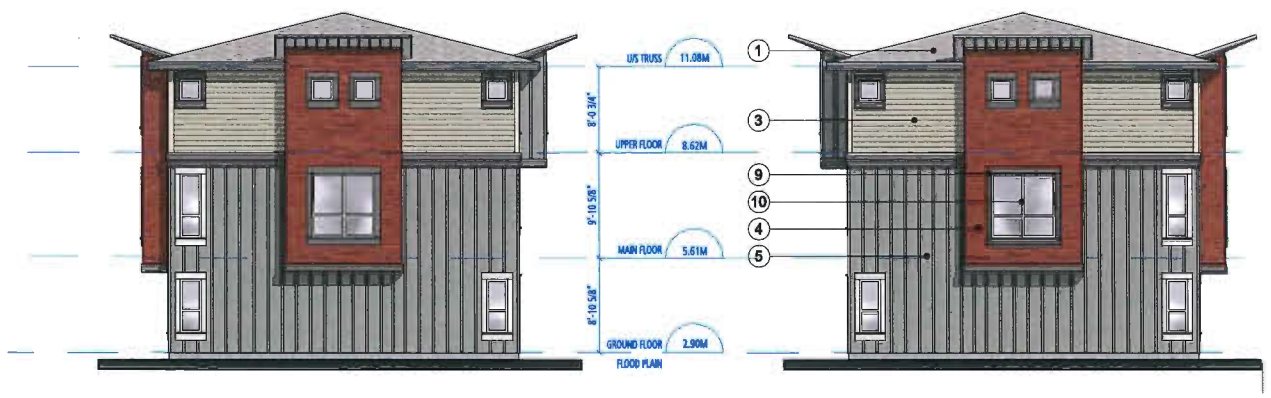
PLAN#07

BLOCK S - EAST ELEVATION

BLOCK S - WEST ELEVATION



BLOCK S - NORTH ELEVATION

BLOCK S - SOUTH ELEVATION

EXTERIOR FINISHES SCHEDULE (GREEN)		
1	ASPHALT SHINGLES	GAF- WEATHERED WOOD
2	WOOD FASCIA	BENJAMIN MOORE - 2143-30 IRON MOUNTAIN
3	HARDIE PLANK LAP SIDING	HARDIE COLOURPLUS SIDING - COBBLE STONE
4	WOOD SIDING	CEDAR: SIKKENS CETOL PRO LUXE #066 Teak On Cedar
5	HARDIE BOARD AND BATTEN	BENJAMIN MOORE - 2140-40 STORM CLOUD GREY
6	WOOD TRIM	HARDIE COLOURPLUS SIDING - COBBLE STONE
7	WOOD TRIM HORIZONTAL	BENJAMIN MOORE - 2143-30 IRON MOUNTAIN
8	WINDOW & DOOR TRIM @ BOARD AND BATTEN	BENJAMIN MOORE - HC-170 STONINGTON GREY
9	WINDOW TRIM @ HARDIE SIDING	BENJAMIN MOORE - 2143-30 IRON MOUNTAIN
10	VINYL WINDOWS	White
11	METAL GUTTERS	GENTEK - IRON ORE
12	SOLID-CORE EXTERIOR DOOR	SHERWIN WILLIAMS - SW6349 PENNYWISE
13	GARAGE DOOR (OVERHEAD DOOR)	TERRA BRONZE
14	HARDIE SOFFIT FOR REVERSE SHED ROOF	HARDIE SOFFIT NON VENTED SMOOTH, COBBLE STONE
15	HARDIE SOFFIT	COBBLE STONE
16	DOWNSPOUTS	MATCH TO SOFFIT COLOUR

ELEVATIONS BLOCK S

SCALE 1/8" = 1'-0"

0 5' 10' 20'

NORTHVIEW ESTATE

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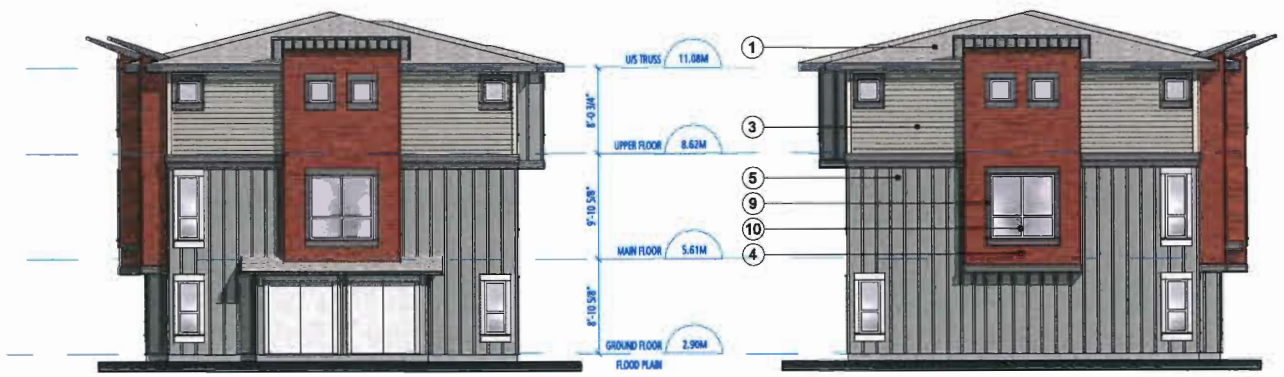
PLAN#8

BLOCK T - EAST ELEVATION

BLOCK T - WEST ELEVATION



BLOCK T - NORTH ELEVATION

BLOCK T - SOUTH ELEVATION

EXTERIOR FINISHES SCHEDULE (GREEN)		
1	ASPHALT SHINGLES	GAF- WEATHERED WOOD
2	WOOD FASCIA	BENJAMIN MOORE - 2143-30 IRON MOUNTAIN
3	HARDIE PLANK LAP SIDING	HARDIE COLOURPLUS SIDING - COBBLE STONE
4	WOOD SIDING	CEDAR: SIKKENS CETOL PRO LUXE #085 Teak On Cedar
5	HARDIE BOARD AND BATTEN	BENJAMIN MOORE - 2140-40 STORM CLOUD GREY
6	WOOD TRIM	HARDIE COLOURPLUS SIDING - COBBLE STONE
7	WOOD TRIM HORIZONTAL	BENJAMIN MOORE - 2143-30 IRON MOUNTAIN
8	WINDOW & DOOR TRIM @ BOARD AND BATTEN	BENJAMIN MOORE - HC-170 STONINGTON GREY
9	WINDOW TRIM @ HARDIE SIDING	BENJAMIN MOORE - 2143-30 IRON MOUNTAIN
10	VINYL WINDOWS	White
11	METAL GUTTERS	GENTEK - IRON ORE
12	SOLID-CORE EXTERIOR DOOR	SHERWIN WILLIAMS - SW6349 PENNYWISE
13	GARAGE DOOR (OVERHEAD DOOR)	TERRA BRONZE
14	HARDIE SOFFIT FOR REVERSE SHED ROOF	HARDIE SOFFIT NON VENTED SMOOTH, COBBLE STONE
15	HARDIE SOFFIT	COBBLE STONE
16	DOWNSPOUTS	MATCH TO SOFFIT COLOUR

ELEVATIONS & BLOCK PLANS BLOCK T

SCALE 1/8" = 1'-0"

0 5' 10' 20'

NORTHVIEW ESTATE

Plan 13 Jan 26, 2018

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PLAN#09

BLOCK V - EAST ELEVATION

BLOCK V - WEST ELEVATION

BLOCK V - NORTH ELEVATION

BLOCK V - SOUTH ELEVATION

EXTERIOR FINISHES SCHEDULE (BROWN)		
1	ASPHALT SHINGLES	GAF- WEATHERED WOOD
2	WOOD FASCIA	BENJAMIN MOORE - 2143-30 IRON MOUNTAIN
3	HARDIE PLANK LAP SIDING	HARDIE COLOURPLUS SIDING - COBBLE STONE
4	WOOD SIDING	CEDAR: SIKKENS CETOL PRO LUXE #085 Teak On Cedar
5	HARDIE BOARD AND BATTEN	SHERWIN WILLIAMS - SW 7020 BLACK FOX
6	WOOD TRIM	HARDIE COLOURPLUS SIDING - COBBLE STONE
7	WOOD TRIM HORIZONTAL	BENJAMIN MOORE - 2143-30 IRON MOUNTAIN
8	WINDOW & DOOR TRIM @ BOARD AND BATTEN	BENJAMIN MOORE - HC-170 STONINGTON GREY
9	WINDOW TRIM @ HARDIE SIDING	BENJAMIN MOORE - 2143-30 IRON MOUNTAIN
10	VINYL WINDOWS	White
11	METAL GUTTERS	GENTEX - IRON ORE
12	SOLID-CORE EXTERIOR DOOR	SHERWIN WILLIAMS - SW6349 PENNYWISE
13	GARAGE DOOR (OVERHEAD DOOR)	SANDSTONE
14	HARDIE SOFFIT FOR REVERSE SHED ROOF	HARDIE SOFFIT NON VENTED SMOOTH, COBBLE STONE
15	HARDIE SOFFIT	COBBLE STONE
16	DOWNSPOUTS	MATCH TO SOFFIT COLOUR

ELEVATIONS & BLOCK PLANS BLOCK V

SCALE 1/8" = 1'-0"

0 5' 10' 20'

NORTHVIEW ESTATE

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PLAN#10

BLOCK W - SOUTH ELEVATION

BLOCK W - NORTH ELEVATION

BLOCK W - EAST ELEVATION

BLOCK W - WEST ELEVATION

EXTERIOR FINISHES SCHEDULE (DARK BLUE)

1	ASPHALT SHINGLES	GAF- WEATHERED WOOD
2	WOOD FASCIA	BENJAMIN MOORE - 2143-30 IRON MOUNTAIN
3	HARDIE PLANK LAP SIDING	HARDIE COLOURPLUS SIDING - COBBLE STONE
4	WOOD SIDING	CEDAR: SIKKENS CETOL PRO LLDE #085 Teak On Cedar
5	HARDIE BOARD AND BATTEN	BENJAMIN MOORE - 2129-20 SOOT
6	WOOD TRIM	HARDIE COLOURPLUS SIDING - COBBLE STONE
7	WOOD TRIM HORIZONTAL	BENJAMIN MOORE - 2143-30 IRON MOUNTAIN
8	WINDOW & DOOR TRIM @ BOARD AND BATTEN	BENJAMIN MOORE - HC-170 STONINGTON GREY
9	WINDOW TRIM @ HARDIE SIDING	BENJAMIN MOORE - 2143-30 IRON MOUNTAIN
10	VINYL WINDOWS	White
11	METAL GUTTERS	GENTEK - IRON ORE
12	SOLID-CORE EXTERIOR DOOR	SHERWIN WILLIAMS - SW6348 PENNYWISE
13	GARAGE DOOR (OVERHEAD DOOR)	SANDSTONE
14	HARDIE SOFFIT FOR REVERSE SHED ROOF	HARDIE SOFFIT NON VENTED SMOOTH, COBBLE STONE
15	HARDIE SOFFIT	COBBLE STONE
16	DOWNSPOUTS	MATCH TO SOFFIT COLOUR

ELEVATIONS BLOCK W

SCALE 1/8" = 1'-0"

0 5' 10' 20'

NORTHVIEW ESTATE

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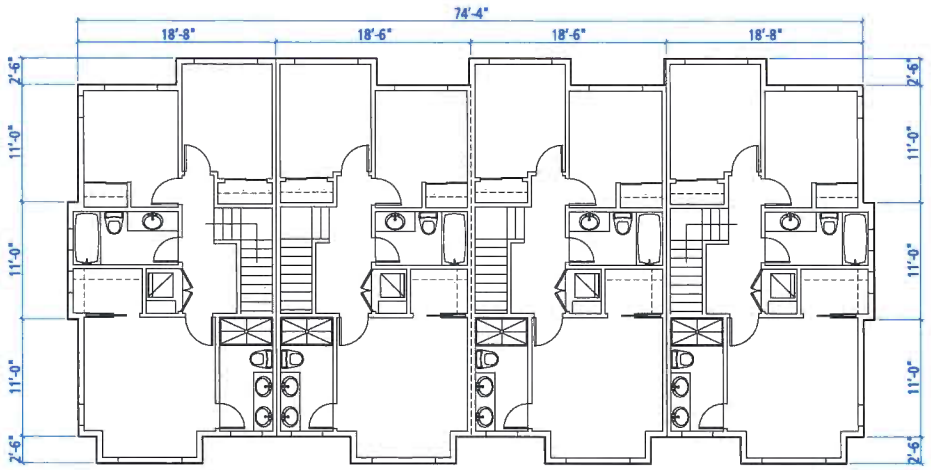
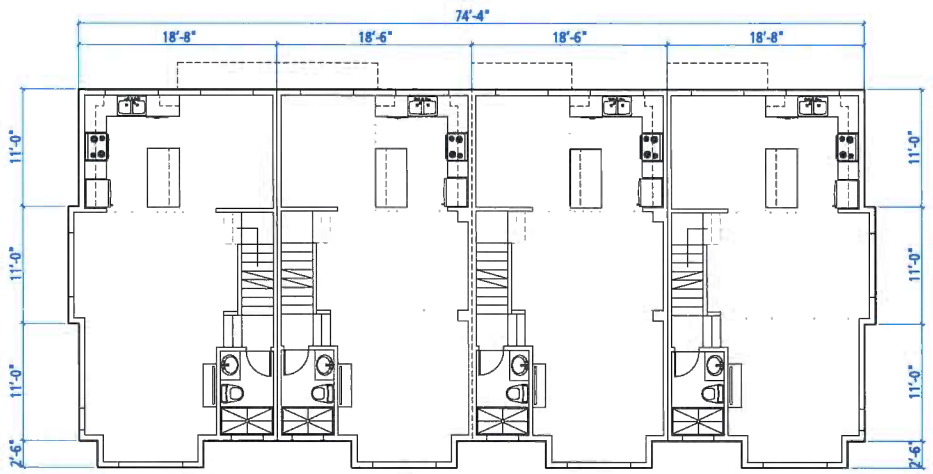
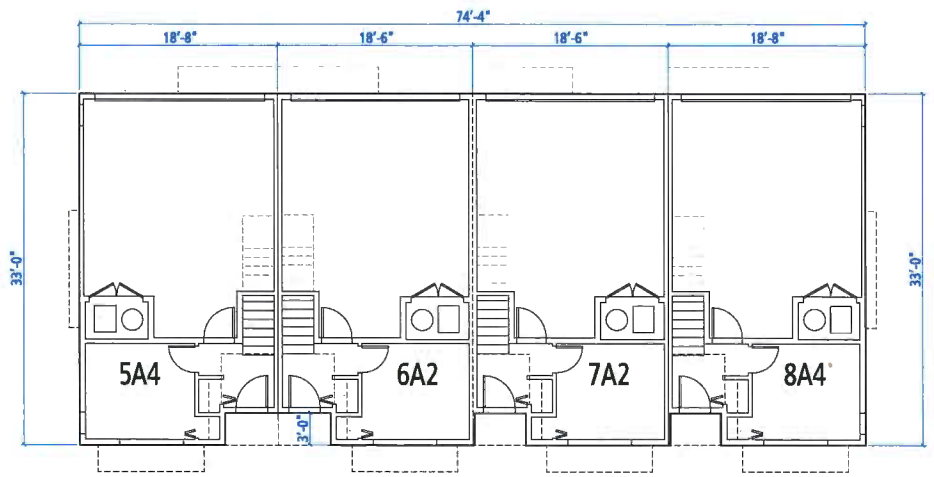
PLAN#11



BLOCK X - UPPER FLOOR



BLOCK X - MAIN FLOOR



BLOCK X - GROUND FLOOR

PROVISION OF ACCESSIBILITY FEATURES

"AGING-IN-PLACE" REQUIREMENTS ON ALL UNITS:

- Entry doors minimum 855 mm clear opening (3'-0" swinging door spec.)
- Hallways minimum 900 mm width
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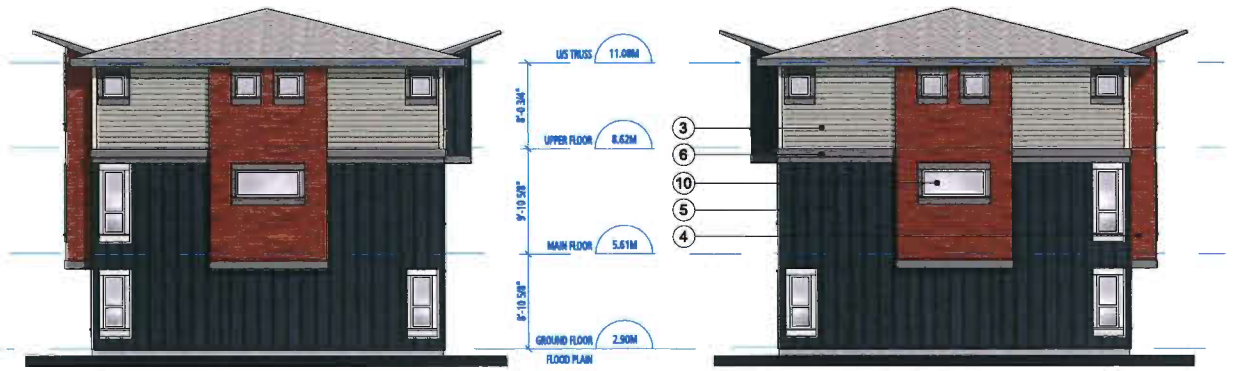
- Blocking to bathrooms for installation of grab-bars (toilet, tub and shower)
- Provision of lever door handles
- One window that can be opened with a single hand in the living room
- One window that can be opened with a single hand in one bedroom

EXTERIOR FINISHES SCHEDULE (DARK BLUE)

1	ASPHALT SHINGLES	GAF- WEATHERED WOOD
2	WOOD FASCIA	BENJAMIN MOORE - 2143-30 IRON MOUNTAIN
3	HARDIE PLANK LAP SIDING	HARDIE COLOURPLUS SIDING - COBBLE STONE
4	WOOD SIDING	CEDAR: SIKKENS CETOL PRO LUXE #085 Teak On Cedar
5	HARDIE BOARD AND BATTEN	BENJAMIN MOORE - 2129-20 SOOT
6	WOOD TRIM	HARDIE COLOURPLUS SIDING - COBBLE STONE
7	WOOD TRIM HORIZONTAL	BENJAMIN MOORE - 2143-30 IRON MOUNTAIN
8	WINDOW & DOOR TRIM @ BOARD AND BATTEN	BENJAMIN MOORE - HC-170 STONINGTON GREY
9	WINDOW TRIM @ HARDIE SIDING	BENJAMIN MOORE - 2143-30 IRON MOUNTAIN
10	VINYL WINDOWS	White
11	METAL GUTTERS	GENTEK - IRON ORE
12	SOLID-CORE EXTERIOR DOOR	SHERWIN WILLIAMS - SW6349 PENNYWISE
13	GARAGE DOOR (OVERHEAD DOOR)	SANDSTONE
14	HARDIE SOFFIT FOR REVERSE SHED ROOF	HARDIE SOFFIT NON VENTED SMOOTH, COBBLE STONE
15	HARDIE SOFFIT	COBBLE STONE
16	DOWNSPOUTS	MATCH TO SOFFIT COLOUR

BLOCK X - SOUTH ELEVATION

BLOCK X - NORTH ELEVATION



BLOCK X - EAST ELEVATION

BLOCK X - WEST ELEVATION

ELEVATIONS & BLOCK PLANS BLOCK X

SCALE 1/8" = 1'-0"

0 5' 10' 20'

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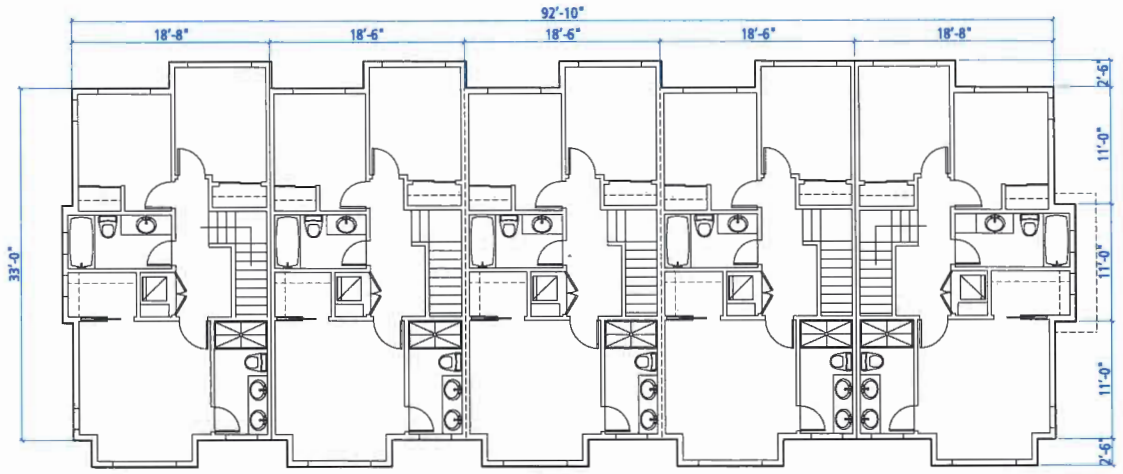
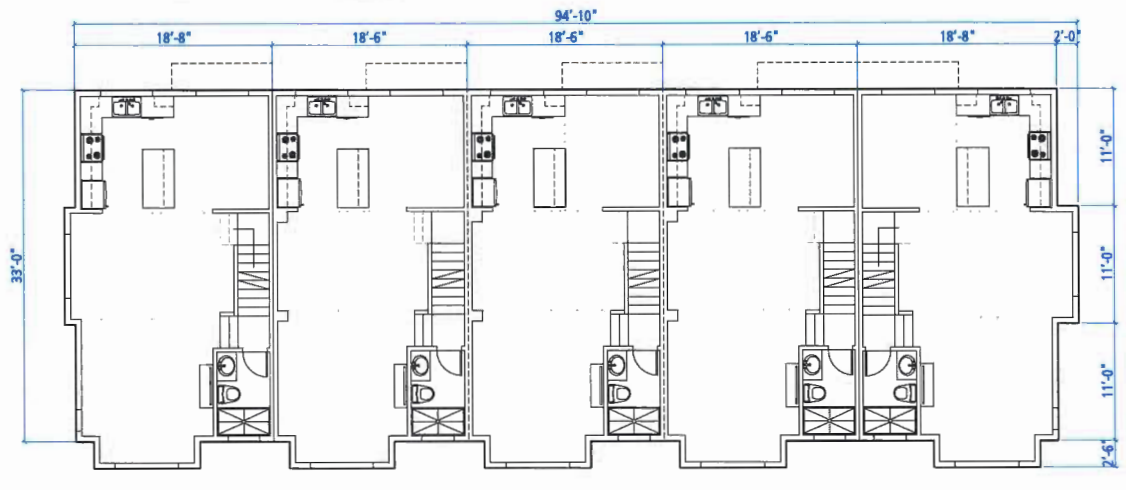
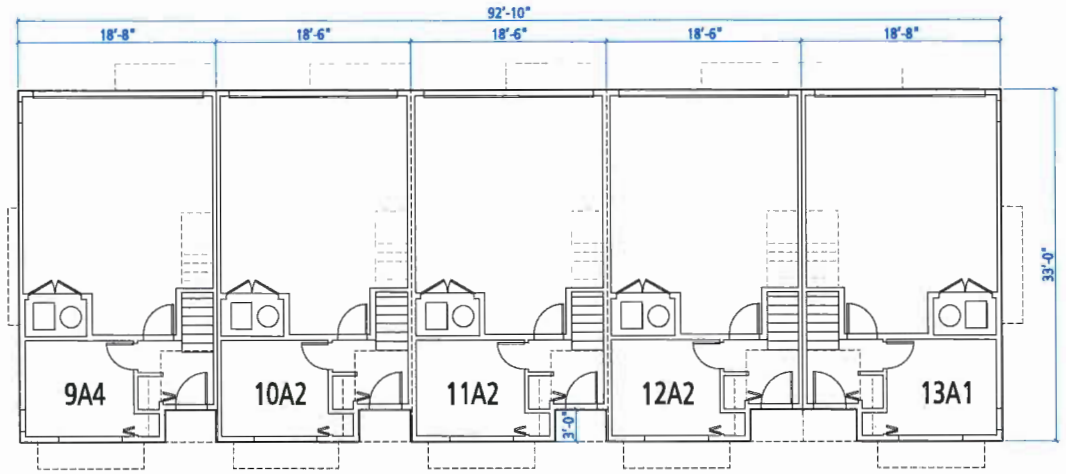
PLAN#12



BLOCK Y - UPPER FLOOR



BLOCK Y - MAIN FLOOR



BLOCK Y - GROUND FLOOR

PROVISION OF ACCESSIBILITY FEATURES

"AGING-IN-PLACE" REQUIREMENTS ON ALL UNITS:

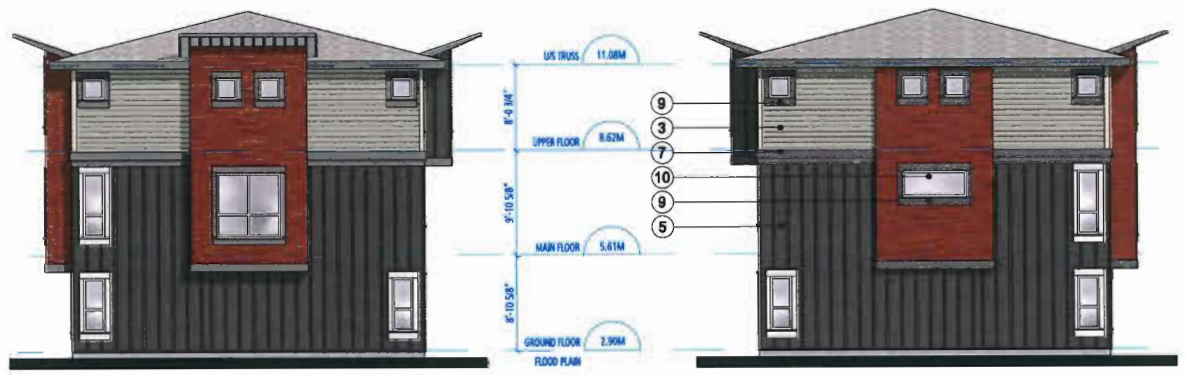
- Entry doors minimum 855 mm clear opening (3'-0" swinging door spec.)
- Hallways minimum 900 mm width
- Door from garage to living area minimum 2'-10" (swinging door spec.)
- Blocking to bathrooms for installation of grab-bars (toilet, tub and shower)
- Provision of lever door handles
- One window that can be opened with a single hand in the living room
- One window that can be opened with a single hand in one bedroom

EXTERIOR FINISHES SCHEDULE (BROWN)

1	ASPHALT SHINGLES	GAF- WEATHERED WOOD
2	WOOD FASCIA	BENJAMIN MOORE - 2143-30 IRON MOUNTAIN
3	HARDIE PLANK LAP SIDING	HARDIE COLOURPLUS SIDING - COBBLE STONE
4	WOOD SIDING	CEDAR: SIKKENS CETOL PRO LUXE #085 Teak On Cedar
5	HARDIE BOARD AND BATTEN	SHERWIN WILLIAMS - SW 7020 BLACK FOX
6	WOOD TRIM	HARDIE COLOURPLUS SIDING - COBBLE STONE
7	WOOD TRIM HORIZONTAL	BENJAMIN MOORE - 2143-30 IRON MOUNTAIN
8	WINDOW & DOOR TRIM @ BOARD AND BATTEN	BENJAMIN MOORE - HC-170 STONINGTON GREY
9	WINDOW TRIM @ HARDIE SIDING	BENJAMIN MOORE - 2143-30 IRON MOUNTAIN
10	VINYL WINDOWS	White
11	METAL GUTTERS	GENTEK - IRON ORE
12	SOLID-CORE EXTERIOR DOOR	SHERWIN WILLIAMS - SW6348 PENNYWISE
13	GARAGE DOOR (OVERHEAD DOOR)	SANDSTONE
14	HARDIE SOFFIT FOR REVERSE SHED ROOF	HARDIE SOFFIT NON VENTED SMOOTH, COBBLE STONE
15	HARDIE SOFFIT	COBBLE STONE
16	DOWNSPOUTS	MATCH TO SOFFIT COLOUR

BLOCK Y - SOUTH ELEVATION

BLOCK Y - NORTH ELEVATION



BLOCK Y - EAST ELEVATION

BLOCK Y - NORTH ELEVATION

ELEVATIONS & BLOCK PLANS BLOCK Y

SCALE 1/8" = 1'-0"

0 5' 10' 20'

NORTHVIEW ESTATE

Plan 17 Jan 26, 2018

DP 16-721500

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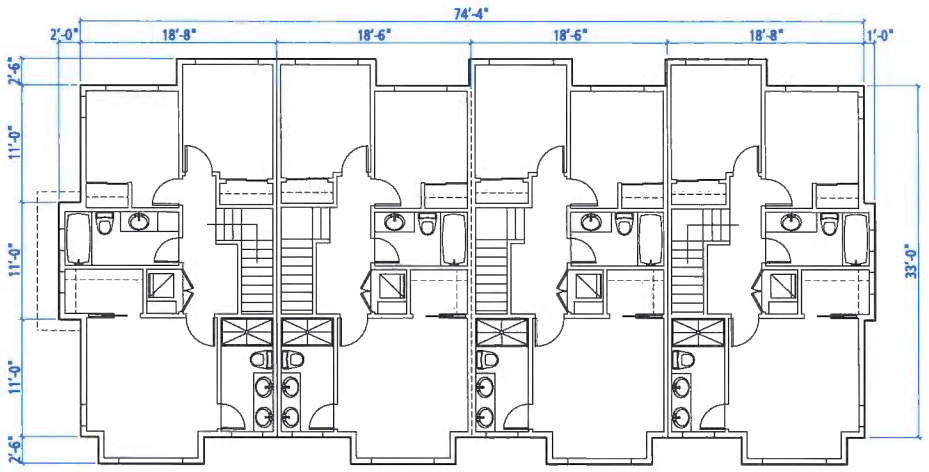
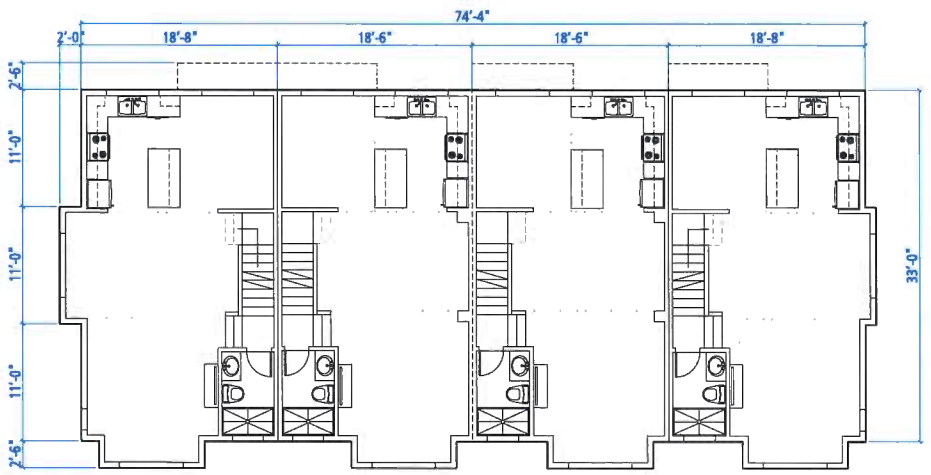
604.873.2907
fougerearchitecture.ca

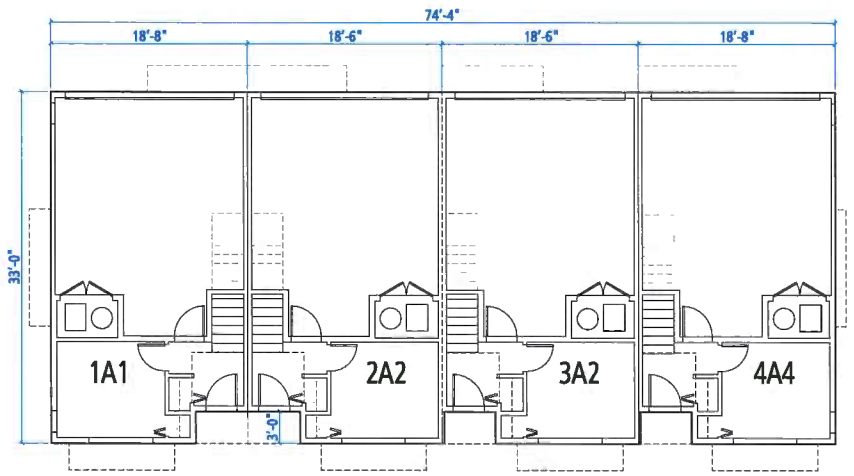
PLAN#13



BLOCK Z - UPPER FLOOR



BLOCK Z - MAIN FLOOR



BLOCK Z - GROUND FLOOR

PROVISION OF ACCESSIBILITY FEATURES

"AGING-IN-PLACE" REQUIREMENTS ON ALL UNITS:

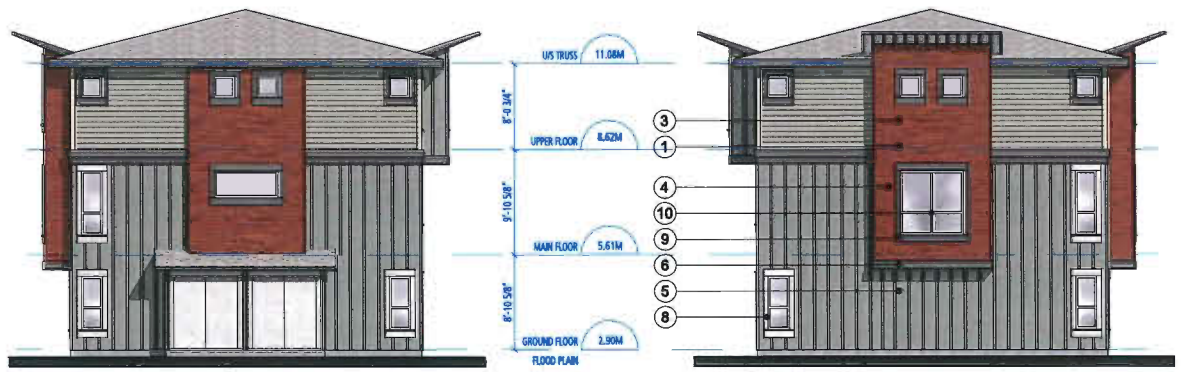
- Entry doors minimum 855 mm clear opening (3'-0" swinging door spec.)
- Hallways minimum 900 mm width
- Door from garage to living area minimum 2'-10" (swinging door spec.)
- Blocking to bathrooms for installation of grab-bars (toilet, tub and shower)
- Provision of lever door handles
- One window that can be opened with a single hand in the living room
- One window that can be opened with a single hand in one bedroom

EXTERIOR FINISHES SCHEDULE (GREEN)

1	ASPHALT SHINGLES	GAF- WEATHERED WOOD
2	WOOD FASCIA	BENJAMIN MOORE - 2143-30 IRON MOUNTAIN
3	HARDIE PLANK LAP SIDING	HARDIE COLOURPLUS SIDING - COBBLE STONE
4	WOOD SIDING	CEDAR: SIKKENS CETOL PRO LUXE #085 Teak On Cedar
5	HARDIE BOARD AND BATTEN	BENJAMIN MOORE - 2140-40 STORM CLOUD GREY
6	WOOD TRIM	HARDIE COLOURPLUS SIDING - COBBLE STONE
7	WOOD TRIM HORIZONTAL	BENJAMIN MOORE - 2143-30 IRON MOUNTAIN
8	WINDOW & DOOR TRIM @ BOARD AND BATTEN	BENJAMIN MOORE - HC-170 STONINGTON GREY
9	WINDOW TRIM @ HARDIE SIDING	BENJAMIN MOORE - 2143-30 IRON MOUNTAIN
10	VINYL WINDOWS	White
11	METAL GUTTERS	GENTEK - IRON ORE
12	SOLID-CORE EXTERIOR DOOR	SHERWIN WILLIAMS - SW6349 PENNYWISE
13	GARAGE DOOR (OVERHEAD DOOR)	TERRA BRONZE
14	HARDIE SOFFIT FOR REVERSE SHED ROOF	HARDIE SOFFIT NON VENTED SMOOTH, COBBLE STONE
15	HARDIE SOFFIT	COBBLE STONE
16	DOWNSPOUTS	MATCH TO SOFFIT COLOUR

BLOCK Z - SOUTH ELEVATION

BLOCK Z - NORTH ELEVATION



BLOCK Z - EAST ELEVATION

BLOCK Z - WEST ELEVATION

ELEVATIONS & BLOCK PLANS BLOCK Z

SCALE 1/8" = 1'-0"

0 5' 10' 20'

NORTHVIEW ESTATE

Plan 18 Jan 26, 2018

DP 16-721500

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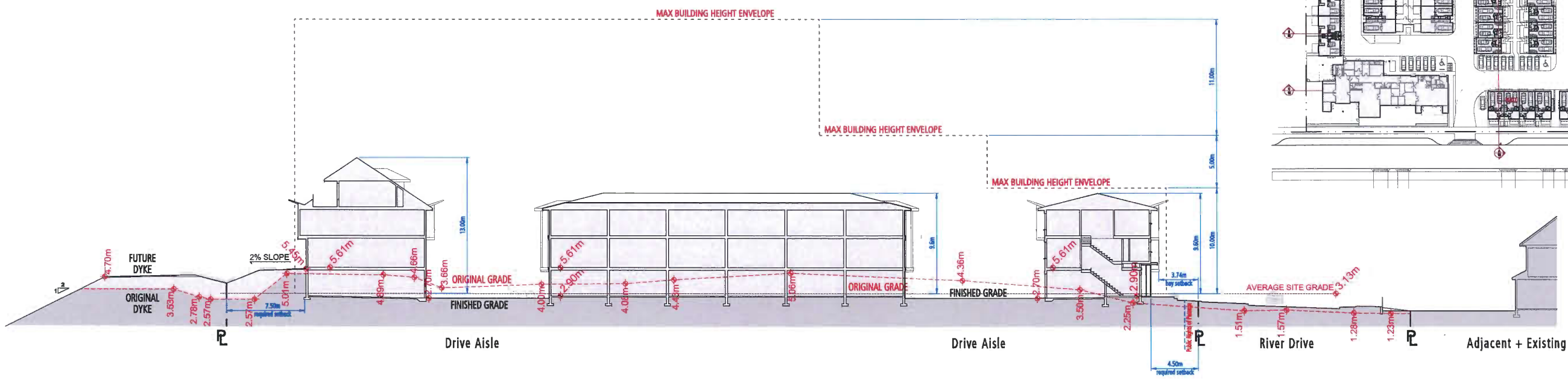
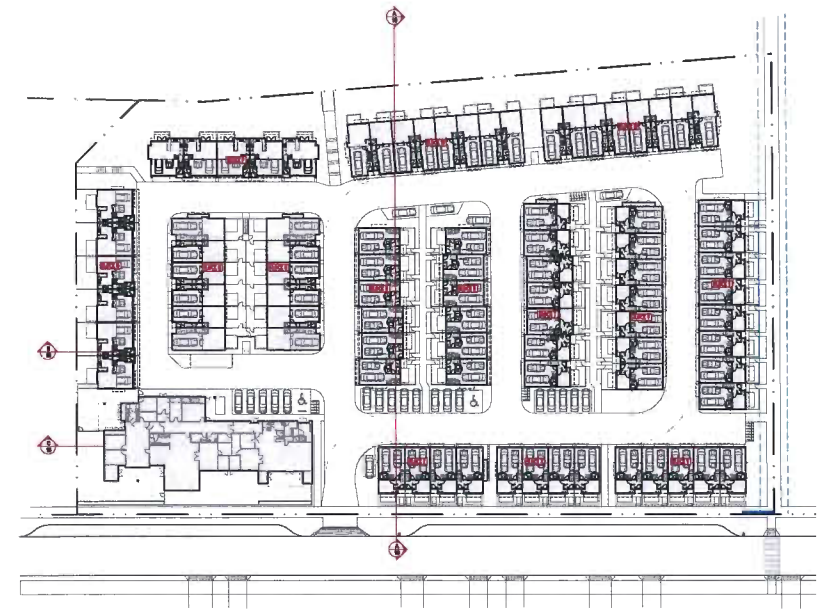
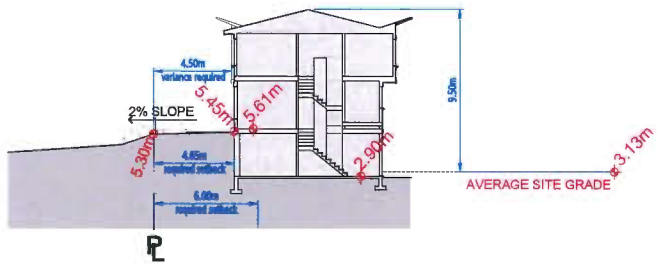
PLAN#14



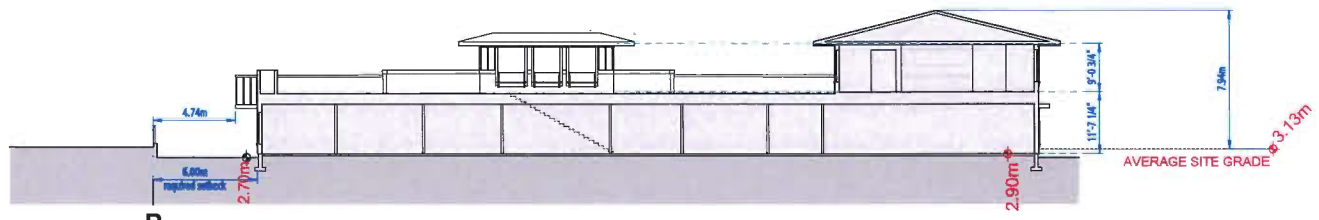
Schematic Site Section A-A





Schematic Section B

Park Interface



Schematic Section C

Park Interface
(at Daycare - varies)

SITE SECTIONS

SCALE 1/16": 1'-0"

0 10' 20' 40'

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Plan 19 Jan 26, 2018

DP 16-721500

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604.873.2907
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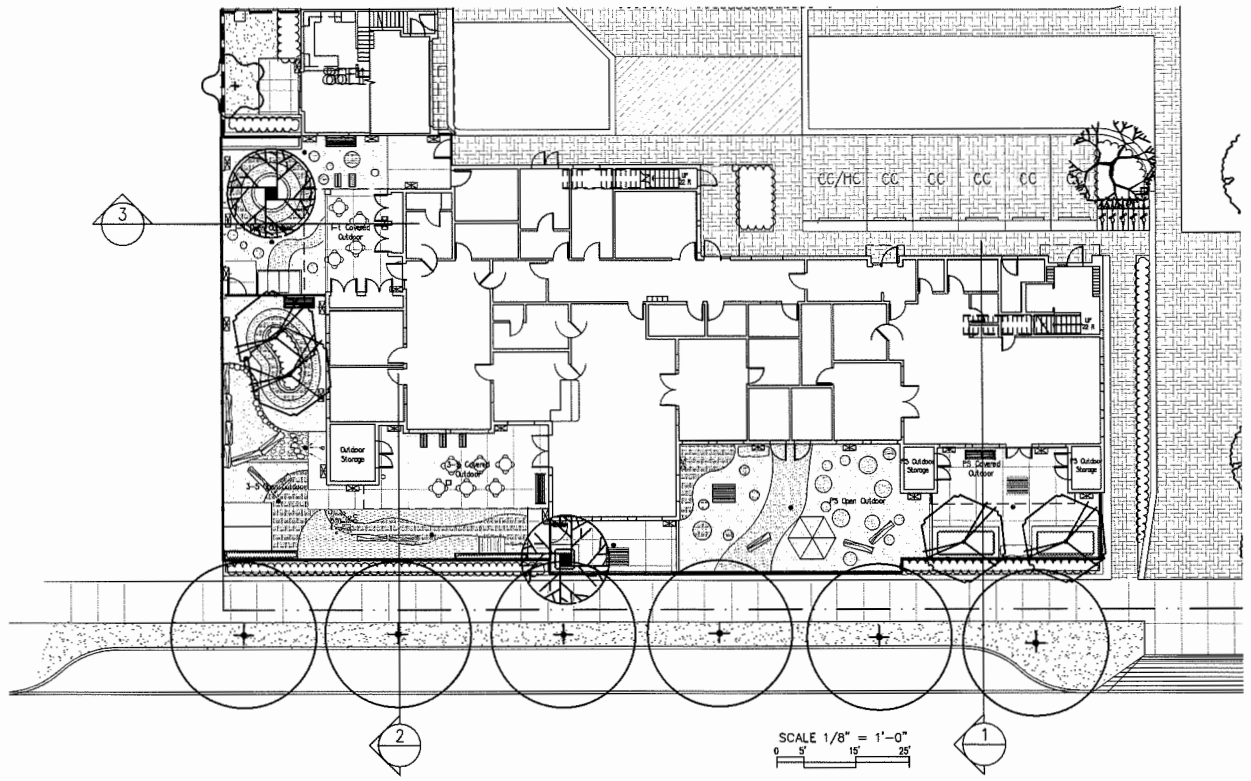
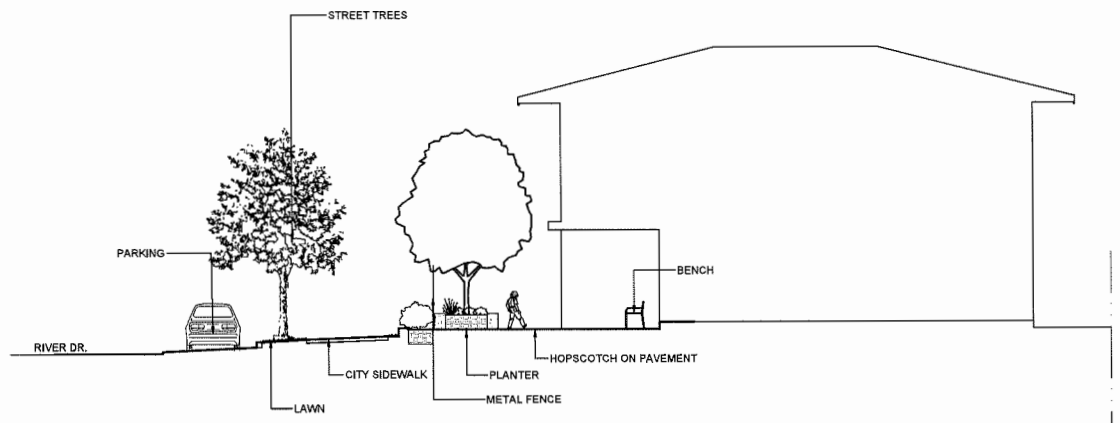
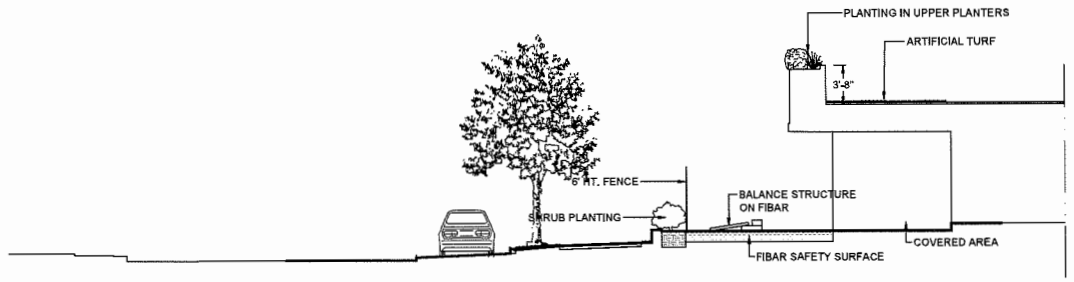
PLAN#18

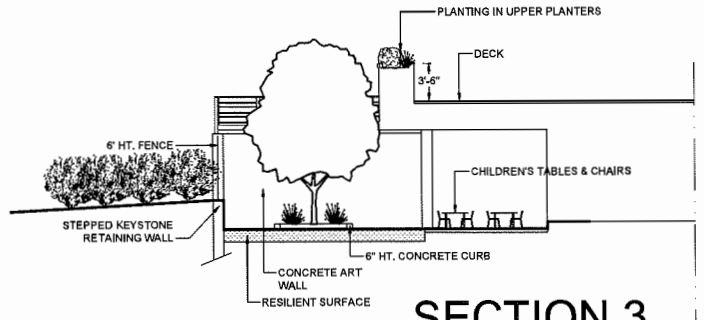




SECTION 1



SECTION 2



SECTION 3

pmg LANDSCAPE ARCHITECTS
Suite C100 - 4185 Still Creek Drive
Burnaby, British Columbia, V5C 6G9
p: 604 294-0011 ; f: 604 294-0022

SEAL:

NO.	DATE	REVISION DESCRIPTION	DR.
14	18.JAN.26	ISSUED FOR BP	MM
13	18.JAN.08	REVISE DAYCARE BUILDING	DO
12	17.DEC.21	UPDATED DAYCARE	MM
11	17.NOV.30	REV. DAYCARE BLDG OUTLINE	MM
10	17.NOV.22	REV. AS PER MUN. COMMENTS	MM
9	17.OCT.05	REV. AS PER MUN. COMMENTS	MM
8	17.JULY.19	REV.AS PER MUN. COMMENTS	MM
7	17.APR.26	COMMENTS	DO
6	17.MAR.27	NEW SITE PLAN, MUN. COMMENTS	MM
5	16.NOV.25	NEW SITE PLAN, COMMENTS	YR
4	16.NOV.15	NEW SITE PLAN, MUN. COMMENTS	MM
3	16.JAN.08	LANDSCAPE GRADING PLAN	CLG
2	15.DEC.22	DP SUBMISSION	MM
	15.NOV.17	NEW SITE PLAN	MM

CLIENT:

Plan 20 Jan 26, 2018

DP 16-721500

PROJECT:

NORTHVIEW ESTATE

10311 RIVER DR.
RICHMOND, B.C.

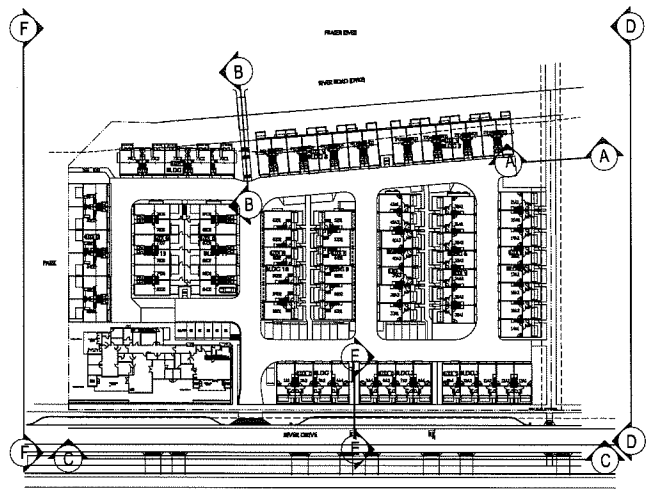
DRAWING TITLE:

LANDSCAPE SECTIONS

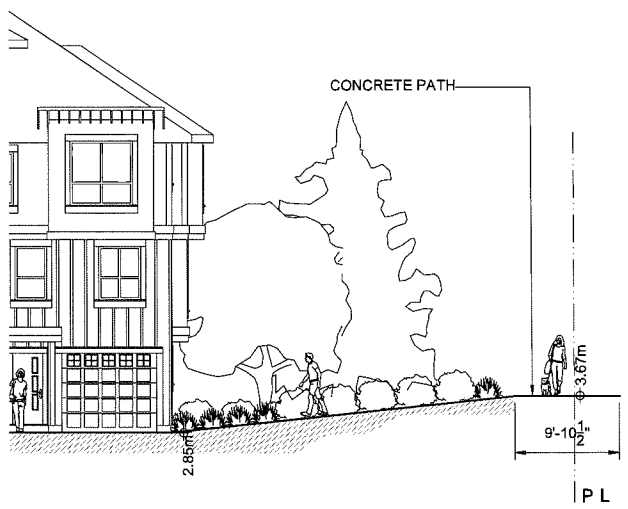
DATE:	15.AUG.31	DRAWING NUMBER:
SCALE:	1/8"=1'-0"	**L12**
DRAWN:	MM	
DESIGN:	MM	
CHK'D:		**OF 17**

15116-17.ZIP

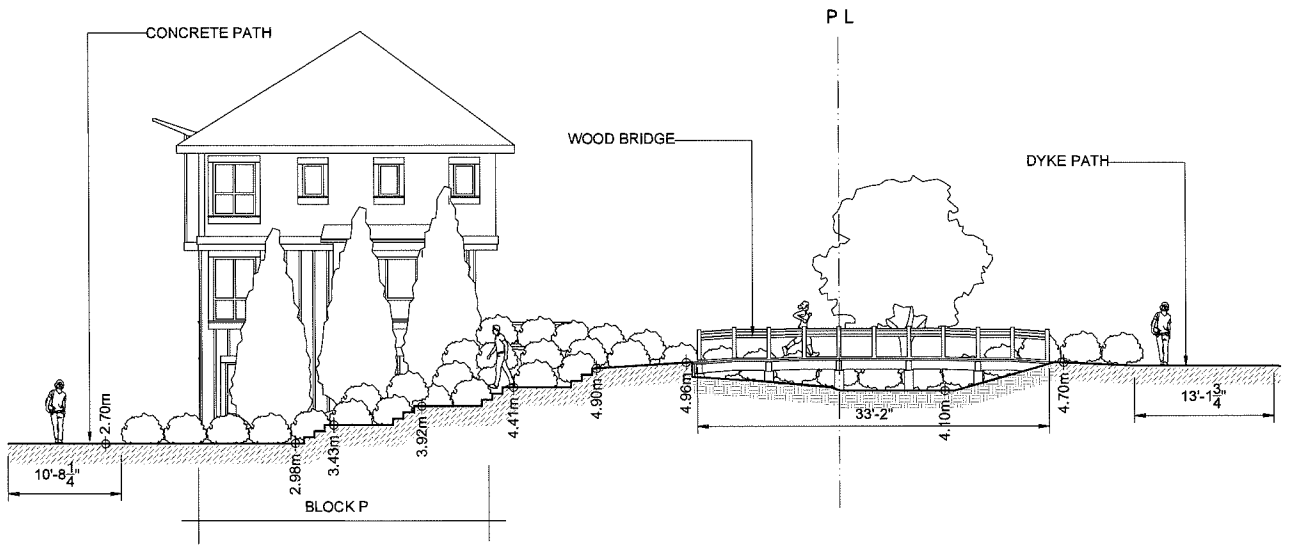
PMG PROJECT NUMBER: **15-116**



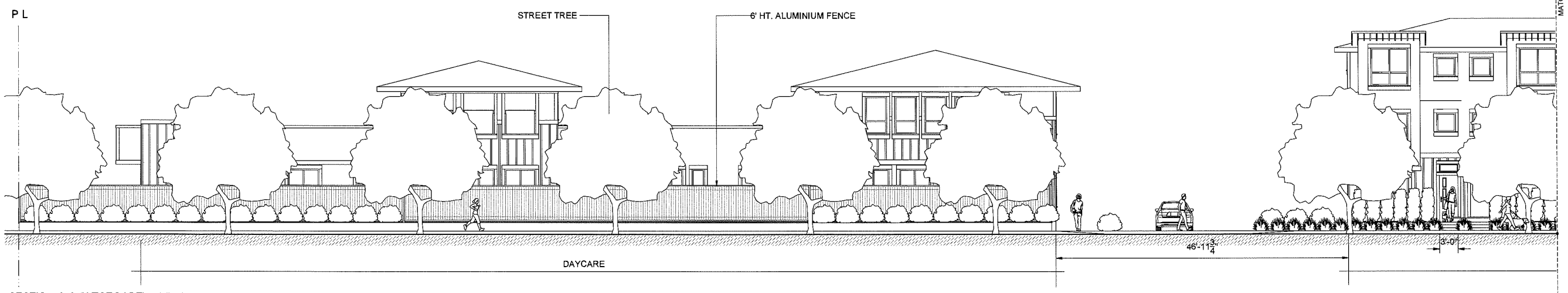
KEYPLAN



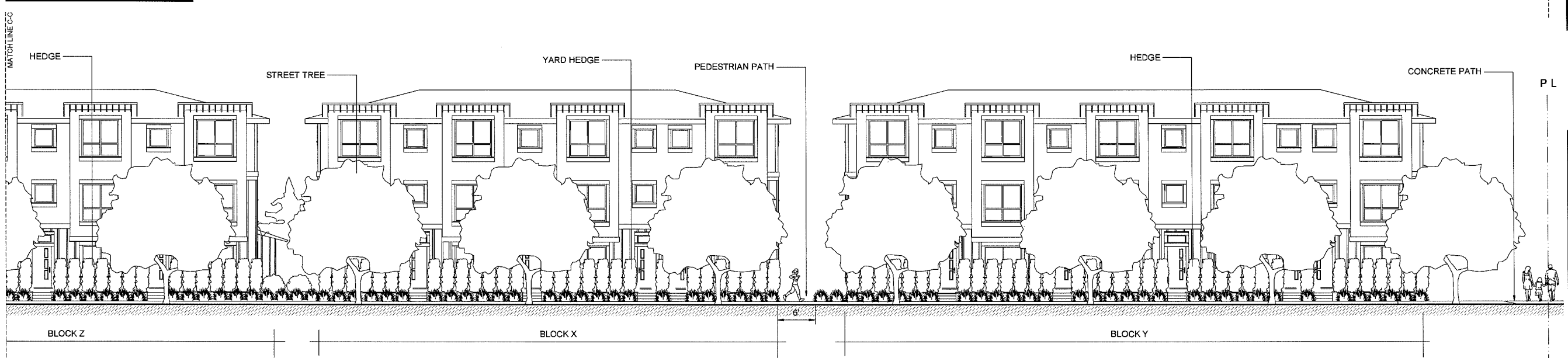
SECTION A-A 1/8"=1'-0"



SECTION B-B 1/8"=1'-0"



SECTION C-C (WEST PART) 1/8"=1'-0"



SECTION C-C (EAST PART) 1/8"=1'-0"

pmg LANDSCAPE ARCHITECTS
Suite C100 - 4185 Still Creek Drive
Burnaby, British Columbia, V5C 6G9
p: 604 294-0011 ; f: 604 294-0022

SEAL:

NO.	DATE	REVISION DESCRIPTION	DR.
14	18.JAN.26	ISSUED FOR BP	MM
13	18.JAN.08	REVISE DAYCARE BUILDING	DO
12	17.DEC.21	UPDATED DAYCARE	MM
11	17.NOV.30	REV. DAYCARE BLDG OUTLINE	MM
10	17.NOV.22	REV. AS PER MUN. COMMENTS	MM
9	17.OCT.05	REV. AS PER MUN. COMMENTS	MM
8	17.JULY.19	REV.AS PER MUN. COMMENTS	MM
7	17.APR.26	COMMENTS	DO
6	17.MAR.27	NEW SITE PLAN, MUN. COMMENTS	MM
5	16.NOV.25	NEW SITE PLAN, COMMENTS	YS
4	16.NOV.15	NEW SITE PLAN, MUN. COMMENTS	MM
3	16.JAN.06	LANDSCAPE GRADING PLAN	CLG
2	15.DEC.22	DP SUBMISSION	MM
	15.NOV.17	NEW SITE PLAN	MM

CLIENT:

Plan 21 Jan 26, 2018

DP 16-721500

PROJECT:

NORTHVIEW ESTATE

10311 RIVER DR.
RICHMOND, B.C.

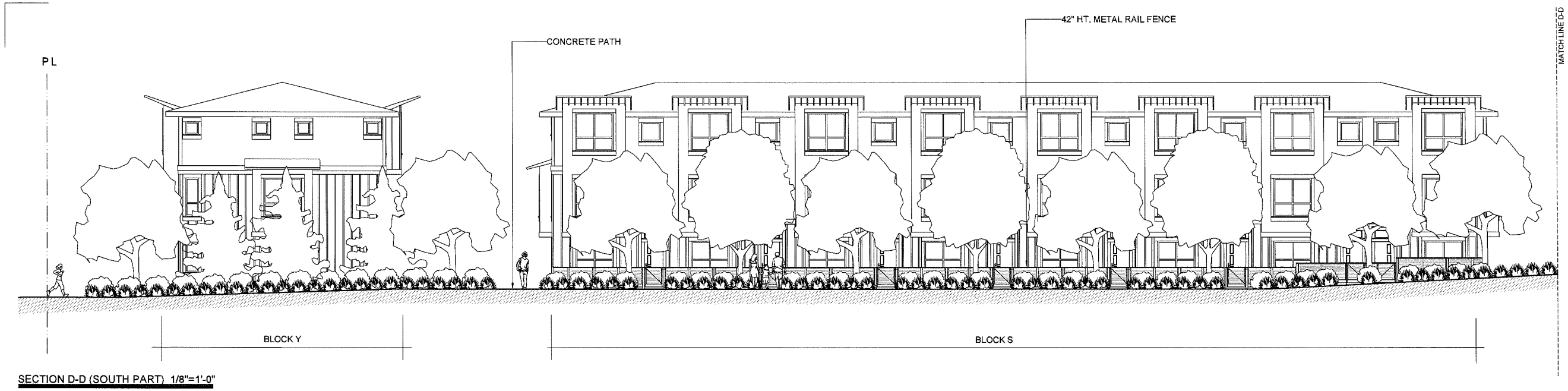
DRAWING TITLE:

LANDSCAPE SECTIONS

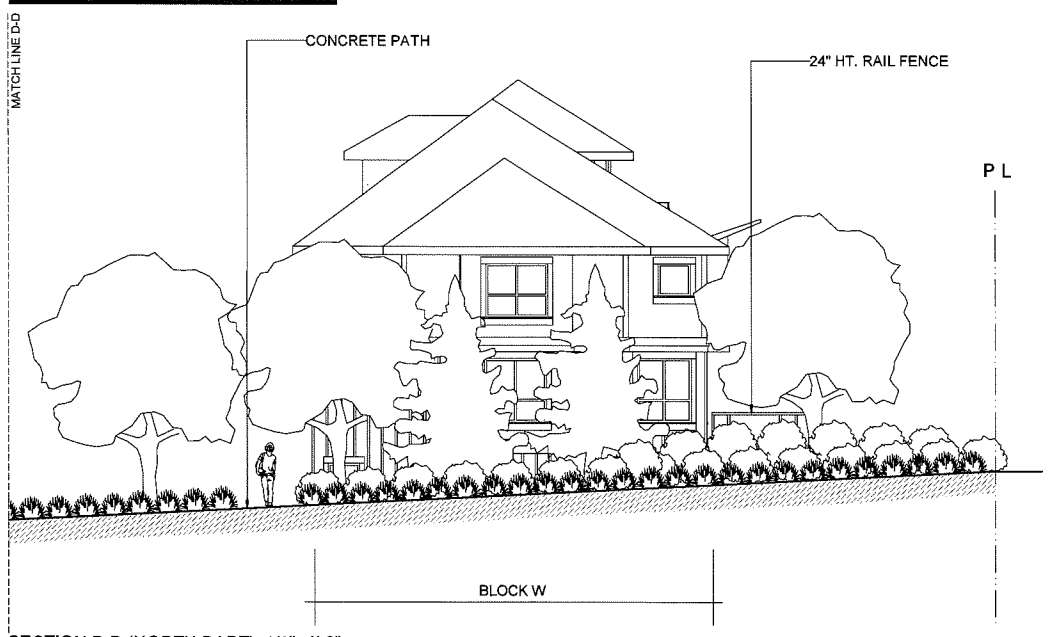
DATE:	15.NOV.23	DRAWING NUMBER:
SCALE:	1/8"=1'-0"	**L13**
DRAWN:	MM	
DESIGN:	MM	
CHK'D:		**OF 17**

15116-17.ZIP

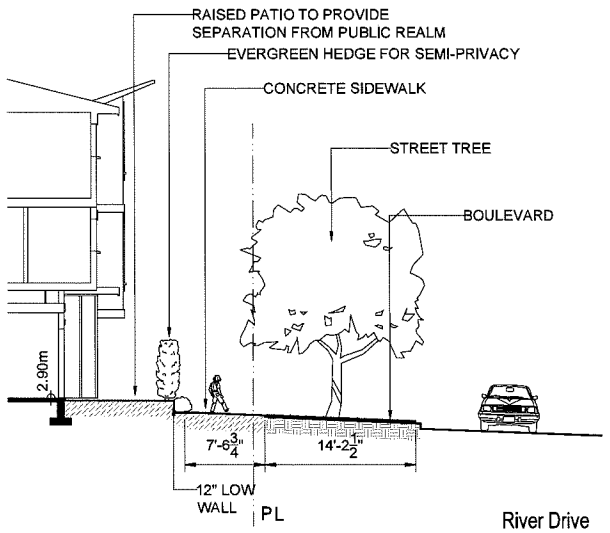
PMG PROJECT NUMBER: **15-116**



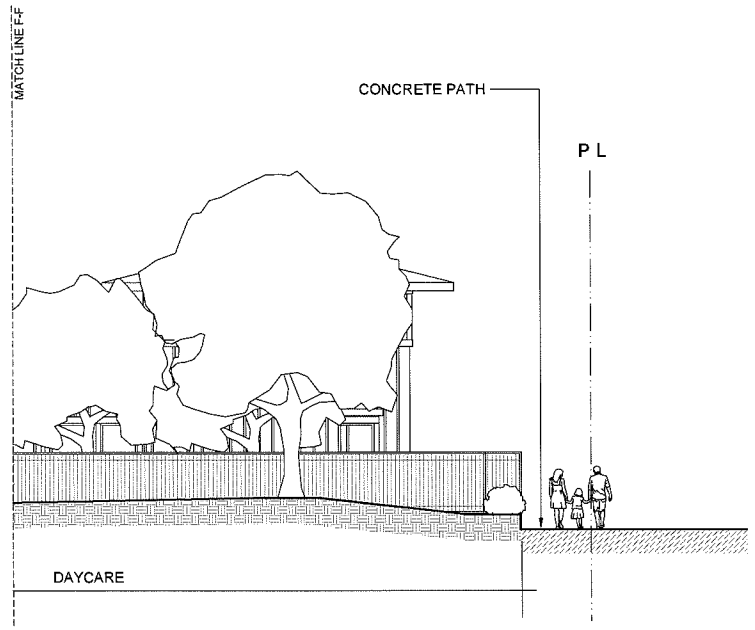
SECTION D-D (SOUTH PART) 1/8"=1'-0"



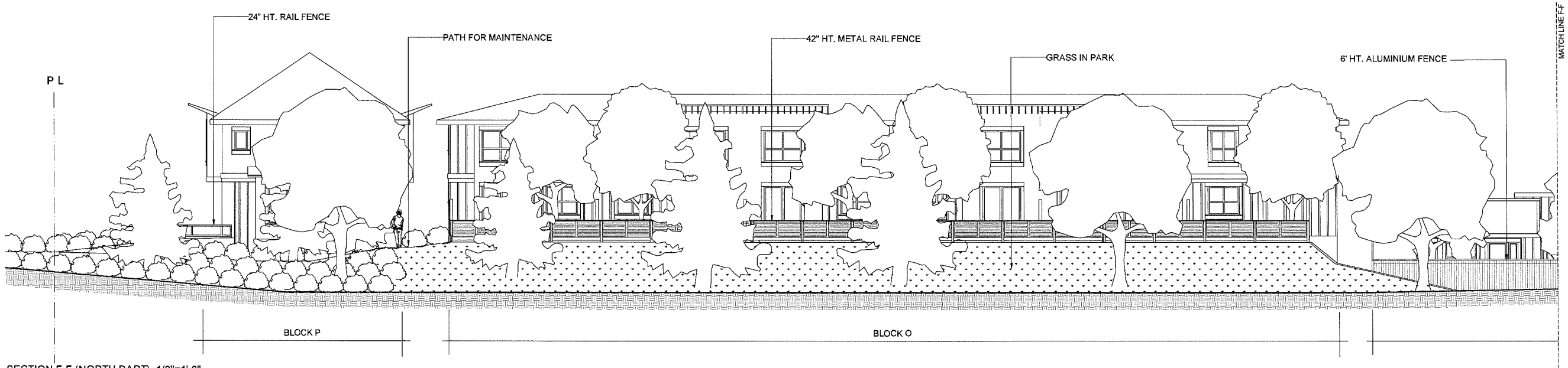
SECTION D-D (NORTH PART) 1/8"=1'-0"



SECTION E-E 1/8"=1'-0"



SECTION F-F (SOUTH PART) 1/8"=1'-0"



SECTION F-F (NORTH PART) 1/8"=1'-0"

pmg LANDSCAPE ARCHITECTS
Suite C100 - 4185 Still Creek Drive
Burnaby, British Columbia, V5C 6G9
p: 604 294-0011 ; f: 604 294-0022

SEAL:

NO.	DATE	REVISION DESCRIPTION	DR.
14	18.JAN.26	ISSUED FOR BP	MM
13	18.JAN.08	REVISE DAYCARE BUILDING	DD
12	17.DEC.21	UPDATED DAYCARE	MM
11	17.NOV.30	REV. DAYCARE BLDG OUTLINE	MM
10	17.NOV.22	REV. AS PER MUN. COMMENTS	MM
9	17.OCT.05	REV. AS PER MUN. COMMENTS	MM
8	17.JULY.19	REV.AS PER MUN. COMMENTS	MM
7	17.APR.26	COMMENTS	DD
6	17.MAR.27	NEW SITE PLAN, MUN. COMMENTS	MM
5	16.NOV.25	NEW SITE PLAN. COMMENTS	YR
4	16.NOV.15	NEW SITE PLAN, MUN. COMMENTS	MM
3	16.JAN.08	LANDSCAPE GRADING PLAN	CLG
2	15.DEC.22	DP SUBMISSION	MM
	15.NOV.17	NEW SITE PLAN	MM

CLIENT:

Plan 22 Jan 26, 2018

DP 16-721500

PROJECT:

NORTHVIEW ESTATE

10311 RIVER DR.
RICHMOND, B.C.

DRAWING TITLE:

LANDSCAPE SECTIONS

DATE:	15.NOV.23	DRAWING NUMBER:
SCALE:	1/8"=1'-0"	**L14**
DRAWN:	MM	
DESIGN:	MM	
CHK'D:		**OF 17**

PMG PROJECT NUMBER: **15-116**

15116-17.ZIP

* OFF SITE WORKS,
RIVER DR SIDEWALK SRW
& EAST PUBLIC PATH SRW
WORKS VIA SEPERATE SA

FRASER RIVER

* DYKE PLANTING REFER TO OFFSITE PLANTING PLAN PMG JOB 15-141

* DYKE PLANTING REFER TO OFFSITE PLANTING PLAN PMG JOB 15-141

WOOD BRIDGE

RIVER ROAD (DYKE)

3 18" HT. RAIL FENCE

CONCRETE PATH
CONCRETE STAIRS

ACER CIRCINATUM

6 24" SQ. CONCRETE PADS

STYRAX JAPONICUS

ACER GRISEUM

MAINTENANCE GATE

1 42" HT. RAIL FENCE

2 42" HT. RAIL FENCE

PARK

LAWN

ACER GRISEUM

PHASE 1

7 DRAIN ROCK UNDER OVERHANG

PYRUS CALLERYANA 'CHANTICLEER'

CONCRETE STAIRS

CONCRETE PAVERS

42" HT. RAIL FENCE (TYP.)

CARPINUS BETULUS FRANS FONTAINE

PHASE 2

ASPHALT

BIKE RACKS

CONCRETE PAVERS

DECORATIVE PAVERS 5

42" HT. RAIL FENCE (TYP.)

PHASE 3

ASPHALT

42" HT. RAIL FENCE 1

CHILDREN'S PLAY: KOMPAN M87401,M620,M191 ON FIBAR 9

WISHBONE IND. - NEW YORK CHAIRS

ACER X FREEMANII 'AUTUMN BLAZE'

PICEA OMORIKA

CONCRETE PAVING

BLDG 17

BLDG 8

BLDG 5

BLDG 14

BLDG 13

BLDG 11

BLDG 10

BLDG 9

BLDG 7

BLDG 6

BLDG 4

BLDG 1

BLDG 2

BLDG 3

KEYSTONE CENT. RET. WALL

18" HT. RAIL FENCE 3

ESA TREES

CONCRETE PAVER PATHWAY

SAWCUT CONCRETE @ 1.5M SPACING NATURAL COLOR *

42" HT. RAIL FENCE 1

GATE

PATIO

42" HT. RAIL FENCE 1

CONCRETE PATH NATURAL COLOR WITH SAWCUT @ 5' O/C

ACER JAPONICUM

SAWCUT CONCRETE @ 2.5 x 2.5 *

6' HT DECORATIVE METAL FENCE 12 L12

RAISED PLANTER 15 L12

CITY SIDEWALK

SOD LAWN

LIQUIDAMBAR STYRACIFLUA *

RIVER DRIVE

PHASE LINE

CONCRETE WALL NATURAL COLOR

CONCRETE STAIRS NATURAL COLOR

PHASE LINE

15116-17.ZIP

pmg LANDSCAPE ARCHITECTS
Suite C100 - 4185 Still Creek Drive
Burnaby, British Columbia, V5C 6G9
p: 604 294-0011 ; f: 604 294-0022

SEAL:

NO.	DATE	REVISION DESCRIPTION	DR.
14	18.JAN.26	ISSUED FOR BP	MM
13	18.JAN.08	REVISE DAYCARE BUILDING	DG
12	17.DEC.21	UPDATED DAYCARE	MM
11	17.NOV.30	REV. DAYCARE BLDG OUTLINE	MM
10	17.NOV.22	REV. AS PER MUN. COMMENTS	MM
9	17.OCT.05	REV. AS PER MUN. COMMENTS	MM
8	17.JULY.19	REV.AS PER MUN. COMMENTS	MM
7	17.APR.26	COMMENTS	DG
6	17.MAR.27	NEW SITE PLAN, MUN. COMMENTS	MM
5	16.NOV.25	NEW SITE PLAN, COMMENTS	YR
4	16.NOV.15	NEW SITE PLAN, MUN. COMMENTS	MM
3	16.JAN.08	LANDSCAPE GRADING PLAN	CLG
2	15.DEC.22	DP SUBMISSION	MM
	15.NOV.17	NEW SITE PLAN	MM

CLIENT:

Plan 23 Jan 26, 2018

DP 16-721500

PROJECT:

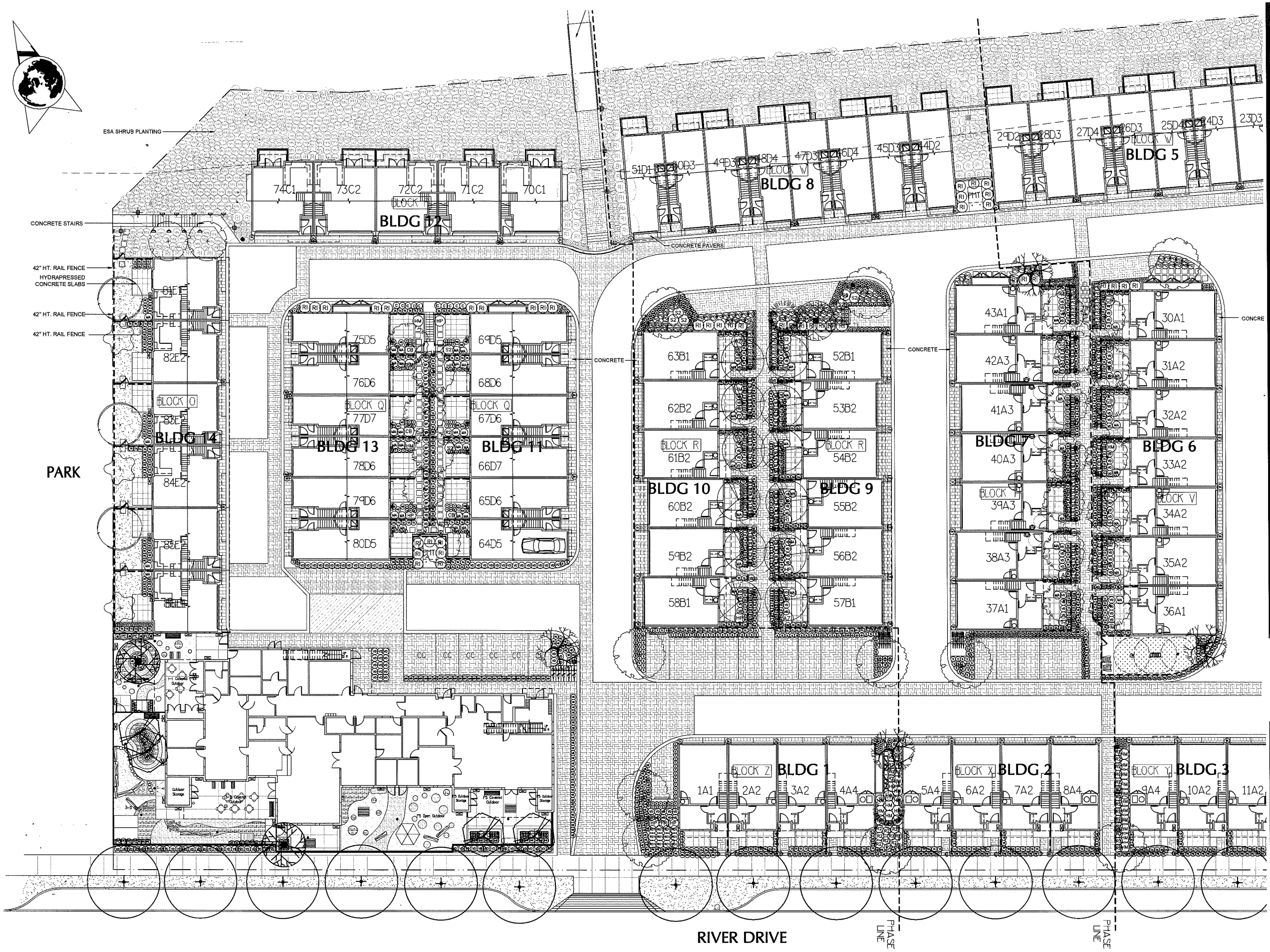
NORTHVIEW ESTATE

10311 RIVER DR.
RICHMOND, B.C.

DRAWING TITLE:

LANDSCAPE PLAN

DATE:	15.SEP.01	DRAWING NUMBER:
SCALE:	1"=20'-0"	**L1**
DRAWN:	MM	
DESIGN:	MM	
CHK'D:	MCY	OF 17
PMG PROJECT NUMBER:		15-116



pmg LANDSCAPE ARCHITECTS
Suite C100 - 4185 Still Creek Drive
Burnaby, British Columbia, V5C 6G9
p: 604 294-0011 ; f: 604 294-0022

SEAL:

NO.	DATE	REVISION DESCRIPTION	DR.
14	18.JAN.26	ISSUED FOR BP	MM
13	18.JAN.08	REVISE DAYCARE BUILDING	DO
12	17.DEC.21	UPDATED DAYCARE	MM
11	17.NOV.30	REV. DAYCARE BLDG OUTLINE	MM
10	17.NOV.22	REV. AS PER MUN. COMMENTS	MM
9	17.OCT.05	REV. AS PER MUN. COMMENTS	MM
8	17.JULY.19	REV.AS PER MUN. COMMENTS	MM
7	17.APR.26	COMMENTS	DO
6	17.MAR.27	NEW SITE PLAN, MUN. COMMENTS	MM
5	16.NOV.25	NEW SITE PLAN, COMMENTS	YR
4	16.NOV.15	NEW SITE PLAN, MUN. COMMENTS	MM
3	16.JAN.08	LANDSCAPE GRADING PLAN	CJG
2	15.DEC.22	DP SUBMISSION	MM
1	15.NOV.17	NEW SITE PLAN	MM

CLIENT:

Plan 24 Jan 26, 2018

DP 16-721500

PROJECT:

NORTHVIEW ESTATE

10311 RIVER DR.
RICHMOND, B.C.

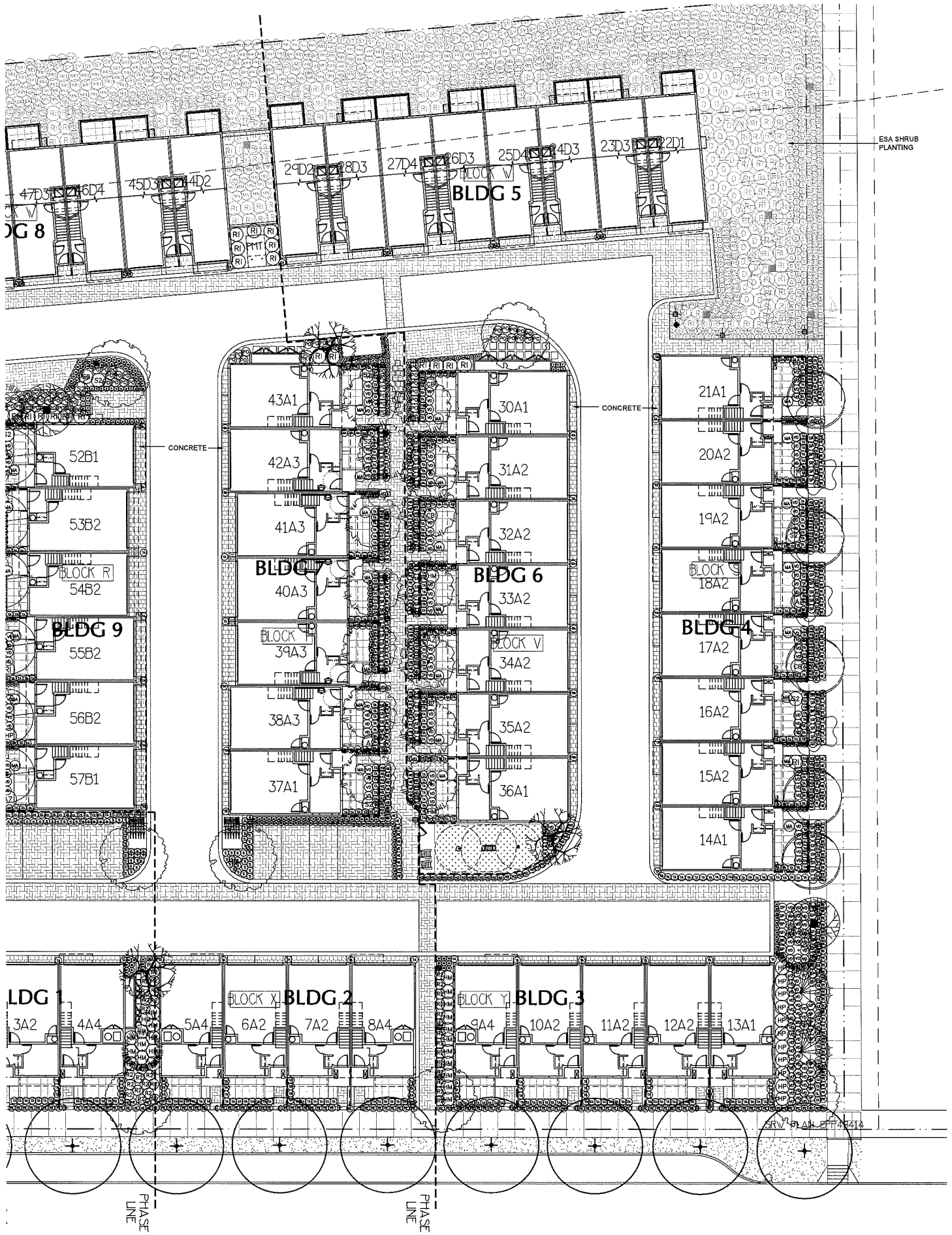
DRAWING TITLE:

LANDSCAPE SHRUB PLAN

DATE:	15.SEP.01	DRAWING NUMBER:
SCALE:	1/16"=1'-0"	**L2**
DRAWN:	MM	
DESIGN:	MM	
CHK'D:	MCY	OF 17

15116-17.ZIP

PMG PROJECT NUMBER: **15-116**



PLANT SCHEDULE — ON-SITE

PMG PROJECT NUMBER: 15116

KEY	QTY	BOTANICAL NAME	COMMON NAME	PLANTED SIZE / REMARKS
TREE				
	11	ACER CIRCINATUM	VINE MAPLE	2.5M HT; B&B; 3 STEM CLUMP
	6	ACER GRISEUM	PAPERBARK MAPLE	6CM CAL; 1.8M STD; B&B
	11	ACER X FREEMANII 'AUTUMN BLAZE'	AUTUMN BLAZE MAPLE	10CM CAL; 2.0M STD; B&B
	12	CARPINUS BETULUS FRANS FONTAINE	EUROPEAN HORNBEAM	6CM CAL; 1.8M STD; B&B
	10	CORNUS NUTTALLII	PACIFIC DOGWOOD	2.5M HT; B&B
	4	CORNUS x 'CELESTIAL'	CELESTIAL DOGWOOD	5CM CAL; B&B
	4	FAGUS SYLVATICA 'DAWYCK'	FASTIGIATE OR DAWYCK BEECH	7CM CAL; B&B
	16	LIQUIDAMBAR STYRACIFLUA 'WORPLESDON'	WORPLESDON SWEET GUM	6CM CAL; 2M STD; B&B
	5	MALUS FUSCA	PACIFIC CRABAPPLE	5CM CAL; 1.5M STD; B&B
	3	PICEA OMORIKA	SERBIAN SPRUCE	2.5M HT; B&B; SINGLE LEADER;SPECIMEN
	8	PSEUDOTSUGA MENZIESII	DOUGLAS FIR	2.5M HT; B&B
	20	PYRUS CALLERYANA 'CHANTICLEER'	CHANTICLEER PEAR	6CM CAL; 1.5M STD; B&B
	8	STYRAX JAPONICUS	JAPANESE SNOWBELL	2.5M HT.; B&B
SHRUB				
A2	5	AZALEA 'ORCHID LIGHTS'	DECIDUOUS AZALEA; LILAC	#3 POT; 40CM
B2	7	CARYOPTERIS x CLANDONENSIS 'DARK KNIGHT'	BLUEBEARD	#3 POT; 60CM
D	44	CORNUS SERICEA	REDTWIG DOGWOOD	#2 POT; 50CM
E	29	HYDRANGEA MACROPHYLLA 'NIKKO BLUE'	BIGLEAF HYDRANGEA (BLUE)	#3 POT; 80CM
E2	20	HYDRANGEA PAN. 'BIG BEN'	PEEGEE HYDRANGEA	#3 POT; 80CM
R	180	MAHONIA AQUIFOLIUM	OREGON GRAPE	#2 POT; 40CM
R2	169	NANDINA DOMESTICA 'FIRE POWER'	DWARF HEAVENLY BAMBOO	#2 POT; 20CM
S	499	PACHYSTIMA MYRSINITES	OREGON BOX	#2 POT; 40CM
S2	37	RHODODENDRON 'ANAH KRUSCHKE'	RHODODENDRON; BLUE	#3 POT; 50CM
T	57	RIBES SANGUINEUM	RED FLOWERING CURRANT	#2 POT; 60CM
T2	12	ROSA MEIDILAND 'RED'	MEIDILAND ROSE; RED; 0.9M MATURE HT	#2 POT; 40CM
U	141	ROSA NUTKANA	BALDHIP ROSE	#2 POT; 40CM
U2	167	SPIRAEA JAPONICA 'LITTLE PRINCESS'	LITTLE PRINCESS SPIRAEA; PINK	#2 POT; 40CM
V	160	SYMPHORICARPOS ALBUS	SNOWBERRY	#2 POT; 30CM
V2	16	SYRINGA PATULA 'MISS KIM'	MISS KIM COMPACT LILAC	#3 POT; 60CM
W	784	TAXUS X MEDIA 'H.M. EDDIE'	EDDIE'S YEW	1M HT.; B&B
W2	293	VIBURNUM DAVIDII	DAVID'S VIBURNUM	#2 POT; 30CM
GRASS				
C	10	CALAMAGROSTIS ACUTIFLORA 'KARL FOERSTER'	FEATHER REED GRASS	#1 POT
H	218	HELICTOTRICHON SEMPERVIRENS	BLUE OAT GRASS	#2 POT
I	7	IMPERATA CYLINDRICA 'RED BARON'	BLOOD GRASS	#1 POT
M	62	MISCANTHUS SINENSIS 'ADAGIO'	MAIDEN GRASS	#1 POT
M2	343	PENNISETUM ALOPECUROIDES 'LITTLE BUNNY'	LITTLE BUNNY FOUNTAIN GRASS	#1 POT
X	304	SESLERIA HEUFLERIANA	BLUE-GREEN MOOR GRASS	#1 POT
X2	175	STIPA TENUISSIMA	MEXICAN FEATHER GRASS	#1 POT
VINE				
O	13	LONICERA JAPONICA	HONEYSUCKLE	#2 POT; 60CM; STAKED
O2	3	PASSIFLORA INCENSE	BLUE PASSION FLOWER	#3 POT; 75CM; STAKED
PERENNIAL				
Q	105	CROCOSMIA X C. 'LUCIFER'	LUCIFER CROCOSMIA	#1 POT
R	32	RUDBECKIA FULGIDA VAR SULLIVANTII 'GOLDSTURM	RUDBECKIA; YELLOW	#1 POT
GC				
U	11	ARCTOSTAPHYLOS UVA-URSI 'MASSACHESETTS'	KINNIKINNICK	#1 POT; 20CM
C2	60	FRAGARIA x ANANASSA	GARDEN STRAWBERRY	9CM POT
G	147	GAULTHERIA SHALLON	SALAL	#1 POT; 20CM;
M2	473	MAHONIA NERVOSA	LONGLEAF MAHONIA	#1 POT; 25CM
P2	663	POLYSTICHUM MUNITUM	WESTERN SWORD FERN	#1 POT; 25CM
V	176	VACCINIUM VITIS-IDAEA	LINGONBERRY	#1 POT

NOTES: * PLANT SIZES IN THIS LIST ARE SPECIFIED ACCORDING TO THE CANADIAN LANDSCAPE STANDARD, LATEST EDITION. CONTAINER SIZES SPECIFIED AS PER CNLA STANDARDS. BOTH PLANT SIZE AND CONTAINER SIZE ARE THE MINIMUM ACCEPTABLE SIZES. * REFER TO SPECIFICATIONS FOR DEFINED CONTAINER MEASUREMENTS AND OTHER PLANT MATERIAL REQUIREMENTS. * SEARCH AND REVIEW: MAKE PLANT MATERIAL AVAILABLE FOR OPTIONAL REVIEW BY LANDSCAPE ARCHITECT AT SOURCE OF SUPPLY. AREA OF SEARCH TO INCLUDE LOWER MAINLAND AND FRASER VALLEY. * SUBSTITUTIONS: OBTAIN WRITTEN APPROVAL FROM THE LANDSCAPE ARCHITECT PRIOR TO MAKING ANY SUBSTITUTIONS TO THE SPECIFIED MATERIAL. UNAPPROVED SUBSTITUTIONS WILL BE REJECTED. ALLOW A MINIMUM OF FIVE DAYS PRIOR TO DELIVERY FOR REQUEST TO SUBSTITUTE. SUBSTITUTIONS ARE SUBJECT TO CANADIAN LANDSCAPE STANDARD - DEFINITION OF CONDITIONS OF AVAILABILITY. ALL LANDSCAPE MATERIAL AND WORKMANSHIP MUST MEET OR EXCEED CANADIAN LANDSCAPE STANDARD'S LATEST EDITION. ALL PLANT MATERIAL MUST BE PROVIDED FROM CERTIFIED DISEASE FREE NURSERY

ALL LANDSCAPED AREAS TO BE IRRIGATED WITH DESIGN BUILD AUTOMATIC IRRIGATION SYSTEM WHICH MEETS IIABC STANDARDS.

MINIMUM GROWING MEDIUM DEPTH:

- TREES:DEPTH TO BE MINIMUM 24" OR DEPTH OF ROOT BALL; WIDTH TO BE TWICE THE WIDTH OF ROOT BALL
- SHRUBS: MINIMUM DEPTH TO BE 18"
- PERENNIALS, FERNS, ORNAMENTAL GRASS & GROUNDCOVER: MINIMUM DEPTH TO BE 9"
- SOD LAWN: MINIMUM DEPTH TO BE 6"
- ALL SOFT LANDSCAPE AREAS WILL BE IRRIGATED WITH AUTOMATIC IRRIGATION SYSTEM PER IIABC STANDARDS

PLANT SCHEDULE — STREET TREES

PMG PROJECT NUMBER: 15-116

KEY	QTY	BOTANICAL NAME	COMMON NAME	PLANTED SIZE / REMARKS
TREE	16	ACER RUBRUM MORGAN	MORGAN MAPLE	7CM CAL; 2M STD; WB

NOTES: * PLANT SIZES IN THIS LIST ARE SPECIFIED ACCORDING TO THE BC LANDSCAPE STANDARD, LATEST EDITION. CONTAINER SIZES SPECIFIED AS PER CNTA STANDARDS. BOTH PLANT SIZE AND CONTAINER SIZE ARE THE MINIMUM ACCEPTABLE SIZES. * REFER TO SPECIFICATIONS FOR DEFINED CONTAINER MEASUREMENTS AND OTHER PLANT MATERIAL REQUIREMENTS. * SEARCH AND REVIEW: MAKE PLANT MATERIAL AVAILABLE FOR OPTIONAL REVIEW BY LANDSCAPE ARCHITECT AT SOURCE OF SUPPLY. AREA OF SEARCH TO INCLUDE LOWER MAINLAND AND FRASER VALLEY. * SUBSTITUTIONS: OBTAIN WRITTEN APPROVAL FROM THE LANDSCAPE ARCHITECT PRIOR TO MAKING ANY SUBSTITUTIONS TO THE SPECIFIED MATERIAL. UNAPPROVED SUBSTITUTIONS WILL BE REJECTED. ALLOW A MINIMUM OF FIVE DAYS PRIOR TO DELIVERY FOR REQUEST TO SUBSTITUTE. SUBSTITUTIONS ARE SUBJECT TO BC LANDSCAPE STANDARD - DEFINITION OF CONDITIONS OF AVAILABILITY. ALL LANDSCAPE MATERIAL AND WORKMANSHIP MUST MEET OR EXCEED BC LANDSCAPE STANDARD'S LATEST EDITION. ALL PLANT MATERIAL MUST BE PROVIDED FROM CERTIFIED DISEASE FREE NURSERY

OFF-SITE STREET TREE INSTALLATION AS PER SERVICING AGREEMENT AND NOT PART OF ONSITE APPLICATION
INFORMATION ONLY SHOWN FOR CONTEXT

pmg LANDSCAPE ARCHITECTS
Suite C100 - 4185 Still Creek Drive
Burnaby, British Columbia, V5C 6G9
p: 604 294-0011 ; f: 604 294-0022

SEAL:

NO.	DATE	REVISION DESCRIPTION	DR.
14	18.JAN.26	ISSUED FOR BP	MM
13	18.JAN.08	REVISE DAYCARE BUILDING	DO
12	17.DEC.21	UPDATED DAYCARE	MM
11	17.NOV.10	REV. DAYCARE BLDG OUTLINE	MM
10	17.NOV.22	REV. AS PER MUN. COMMENTS	MM
9	17.OCT.05	REV. AS PER MUN. COMMENTS	MM
8	17.JULY.19	REV.AS PER MUN. COMMENTS	MM
7	17.APR.26	COMMENTS	DO
6	17.MAR.27	NEW SITE PLAN, MUN. COMMENTS	MM
5	16.NOV.25	NEW SITE PLAN. COMMENTS	YR
4	16.NOV.15	NEW SITE PLAN, MUN. COMMENTS	MM
3	16 JAN.06	LANDSCAPE GRADING PLAN	CLG
2	15.DEC.22	DP SUBMISSION	MM
1	15.NOV.17	NEW SITE PLAN	MM

CLIENT:

Plan 25 Jan 26, 2018
DP 16-721500

PROJECT:

NORTHVIEW ESTATE

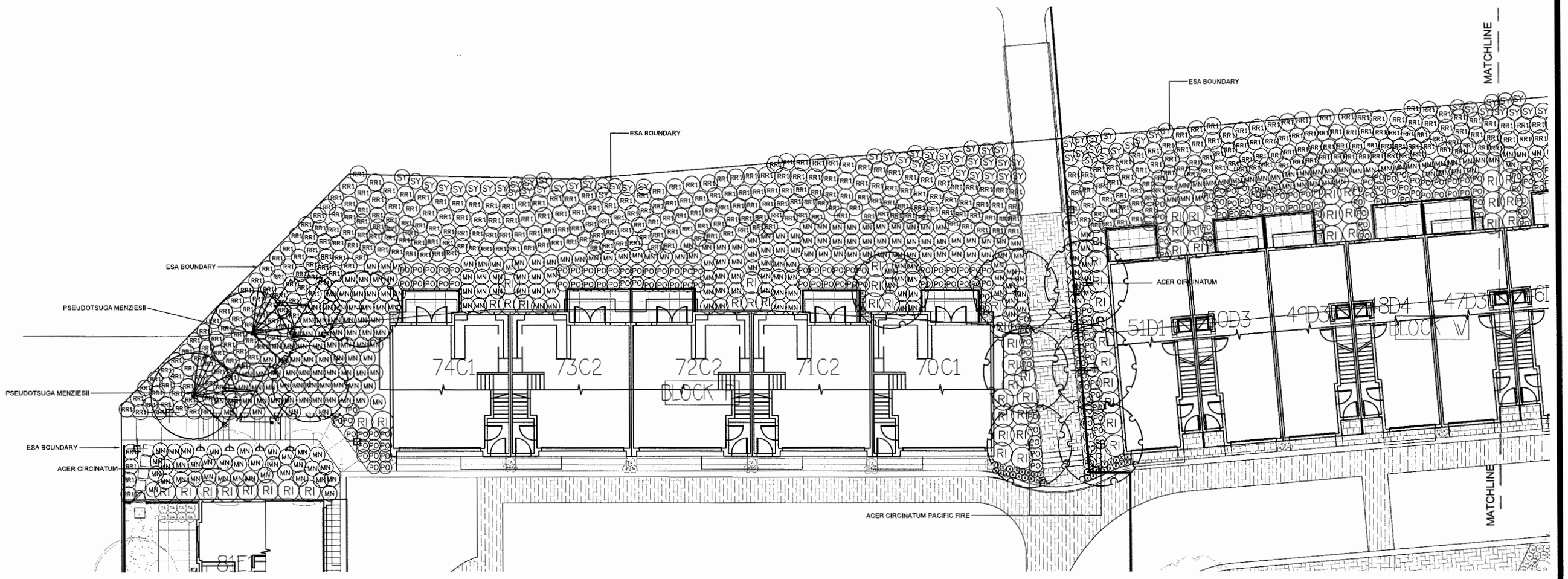
10311 RIVER DR.
RICHMOND, B.C.

DRAWING TITLE:

LANDSCAPE SHRUB PLAN

DATE:	15.SEP.01	DRAWING NUMBER:
SCALE:	1/16"=1'-0"	**L3**
DRAWN:	MM	
DESIGN:	MM	
CHK'D:	MCY	**OF 17**
PMG PROJECT NUMBER:		**15-116**

15116-17.ZIP



PLANT SCHEDULE FOR L16 & L17

PLANT SCHEDULE-TOTALS ON-SITE ESA — PMG PROJECT NUMBER: 15116

KEY	QTY	BOTANICAL NAME	COMMON NAME	PLANTED SIZE / REMARKS
TREE				
C	9	ACER CIRCINATUM	VINE MAPLE	2.5M HT; B&B; 3 STEM CLUMP
N	6	CORNUS NUTTALLII	PACIFIC DOGWOOD	2.5M HT; B&B
F	5	MALUS FUSCA	PACIFIC CRABAPPLE	5CM CAL; 1.5M STD; B&B
S	6	PSEUDOTSUGA MENZIESII	DOUGLAS FIR	2.5M HT; B&B
SHRUB				
D	44	CORNUS SERICEA	REDTWIG DOGWDOD	#2 POT; 50CM
RR1	640	ROSA NUTKANA	BALDHIP ROSE	#2 POT; 40CM
RI	192	RUBUS SPECTABILIS	SALMONBERRY	#2 POT; 40CM
SY	160	SYMPHORICARPOS ALBUS	SNOWBERRY	#2 POT; 30CM
GRASS				
X	37	LEYMUS MOLLIS (ESA)	DUNEGRASS	#1 POT
GS				
G	147	GAULTHERIA SHALLON	SALAL	#1 POT; 20CM;
MN	443	MAHONIA NERVOSA	LONGLEAF MAHONIA	#1 POT; 25CM
PO	530	POLYSTICHUM MUNITUM	WESTERN SWORD FERN	#1 POT; 25CM
V	28	VACCINIUM VITIS-IDAEA	LINGONBERRY	#1 POT

NOTES: * PLANT SIZES IN THIS LIST ARE SPECIFIED ACCORDING TO THE CANADIAN LANDSCAPE STANDARD, LATEST EDITION. CONTAINER SIZES SPECIFIED AS PER CNLA STANDARDS. BOTH PLANT SIZE AND CONTAINER SIZE ARE THE MINIMUM ACCEPTABLE SIZES. * REFER TO SPECIFICATIONS FOR DEFINED CONTAINER MEASUREMENTS AND OTHER PLANT MATERIAL REQUIREMENTS. * SEARCH AND REVIEW: MAKE PLANT MATERIAL AVAILABLE FOR OPTIONAL REVIEW BY LANDSCAPE ARCHITECT AT SOURCE OF SUPPLY. AREA OF SEARCH TO INCLUDE LOWER MAINLAND AND FRASER VALLEY. * SUBSTITUTIONS: OBTAIN WRITTEN APPROVAL FROM THE LANDSCAPE ARCHITECT PRIOR TO MAKING ANY SUBSTITUTIONS TO THE SPECIFIED MATERIAL. UNAPPROVED SUBSTITUTIONS WILL BE REJECTED. ALLOW A MINIMUM OF FIVE DAYS PRIOR TO DELIVERY FOR REQUEST TO SUBSTITUTE. SUBSTITUTIONS ARE SUBJECT TO CANADIAN LANDSCAPE STANDARD - DEFINITION OF CONDITIONS OF AVAILABILITY. ALL LANDSCAPE MATERIAL AND WORKMANSHIP MUST MEET OR EXCEED CANADIAN LANDSCAPE STANDARD'S LATEST EDITION. ALL PLANT MATERIAL MUST BE PROVIDED FROM CERTIFIED DISEASE FREE NURSERY

pmg LANDSCAPE ARCHITECTS
Suite C100 - 4185 Still Creek Drive
Burnaby, British Columbia, V5C 6G9
p: 604 294-0011 ; f: 604 294-0022

SEAL:

NO.	DATE	REVISION DESCRIPTION	DR.
14	18.JAN.26	ISSUED FOR BP	MM
13	18.JAN.06	REVISE DAYCARE BUILDING	DD
12	17.DEC.21	UPDATED DAYCARE	MM
11	17.NOV.30	REV. DAYCARE BLDG OUTLINE	MM
10	17.NOV.22	REV. AS PER MUN. COMMENTS	MM
9	17.OCT.05	REV. AS PER MUN. COMMENTS	MM
8	17.JULY.19	REV.AS PER MUN. COMMENTS	MM
7	17.APR.26	COMMENTS	DD
6	17.MAR.27	NEW SITE PLAN, MUN. COMMENTS	MM
5	16.NOV.25	NEW SITE PLAN. COMMENTS	YR
4	16.NOV.15	NEW SITE PLAN, MUN. COMMENTS	MM
3	16.JAN.08	LANDSCAPE GRADING PLAN	CLG
2	15.DEC.22	DP SUBMISSION	MM
	15.NOV.17	NEW SITE PLAN	MM

Plan 26 Jan 26, 2018
DP 16-721500

PROJECT:

NORTHVIEW ESTATE

10311 RIVER DR.
RICHMOND, B.C.

DRAWING TITLE:

ESA LANDSCAPE PLAN

DATE: 15.AUG.31
SCALE: 1"=10'-0"
DRAWN: MM
DESIGN: MM
CHK'D:

DRAWING NUMBER: **L15** OF 17

15116-17.ZIP

PMG PROJECT NUMBER: **15-116**

PLANT SCHEDULE FOR L16 & L17

PLANT SCHEDULE

ON-SITE ESA

PMG PROJECT NUMBER: 15116

KEY	QTY	BOTANICAL NAME	COMMON NAME	PLANTED SIZE / REMARKS
TREE				
		ACER CIRCINATUM	VINE MAPLE	2.5M HT; B&B; 3 STEM CLUMP
		CORNUS NUTTALLII	PACIFIC DOGWOOD	2.5M HT; B&B
		MALUS FUSCA	PACIFIC CRABAPPLE	5CM CAL; 1.5M STD; B&B
		PSEUDOTSUGA MENZIESII	DOUGLAS FIR	2.5M HT; B&B
SHRUB				
D		CORNUS SERICEA	REDTWIG DOGWOOD	#2 POT; 50CM
RR1		ROSA NUTKANA	BALDHIP ROSE	#2 POT; 40CM
RI		RUBUS SPECTABILIS	SALMONBERRY	#2 POT; 40CM
SY		SYMPHORICARPOS ALBUS	SNOWBERRY	#2 POT; 30CM
GRASS				
X		LEYMUS MOLLIS (ESA)	DUNEGRASS	#1 POT
GC				
G		GAULTHERIA SHALLON	SALAL	#1 POT; 20CM;
MN		MAHONIA NERVOSA	LONGLEAF MAHONIA	#1 POT; 25CM
PO		POLYSTICHUM MUNITUM	WESTERN SWORD FERN	#1 POT; 25CM
V		VACCINIUM VITIS-IDAEA	LINGONBERRY	#1 POT

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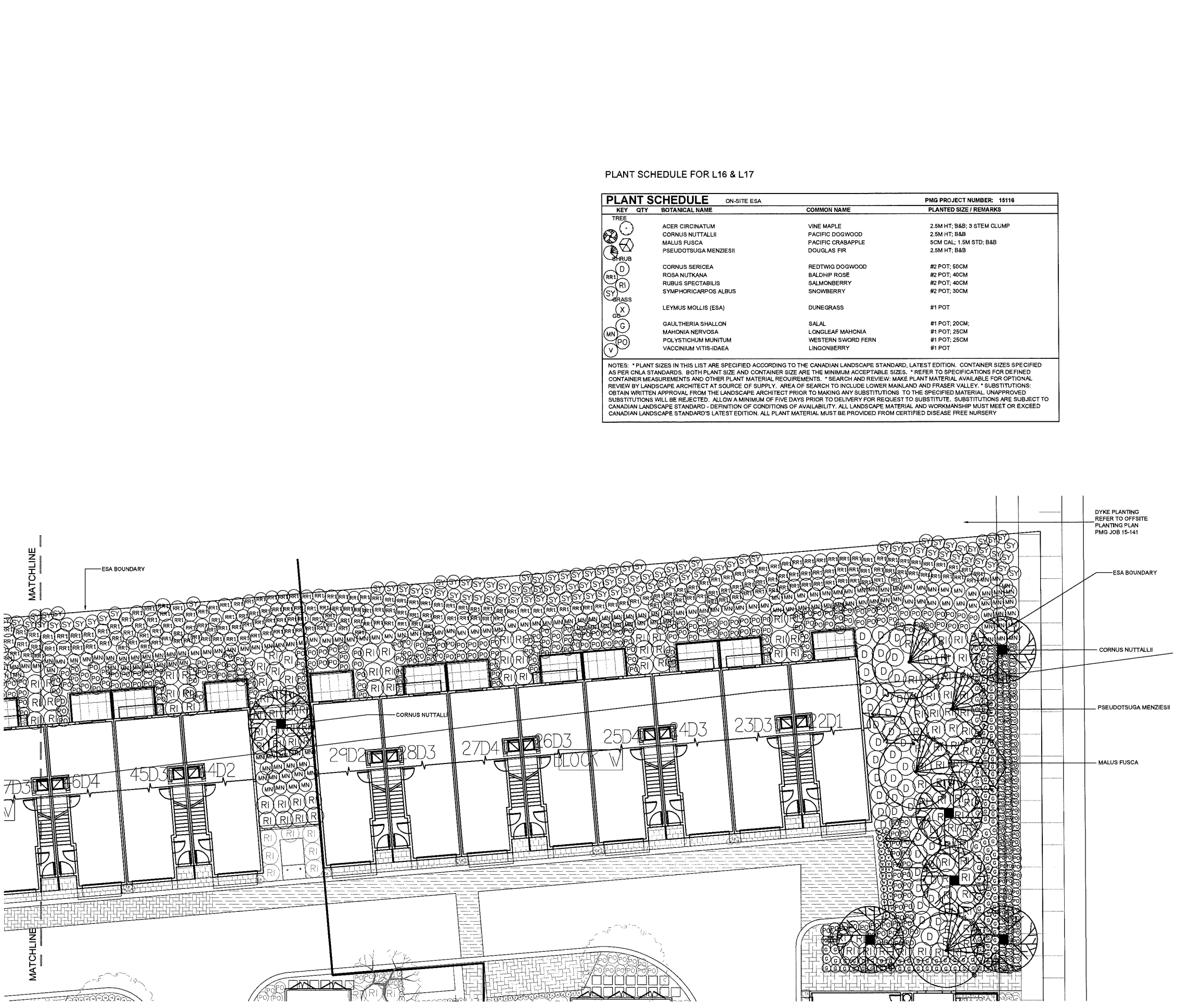


pmg LANDSCAPE ARCHITECTS
Suite C100 - 4185 Still Creek Drive
Burnaby, British Columbia, V5C 6G9
p: 604 294-0011 ; f: 604 294-0022

SEAL:

NO.	DATE	REVISION DESCRIPTION	DR.
14	18.JAN.26	ISSUED FOR BP	MM
13	18.JAN.08	REVISE DAYCARE BUILDING	DD
12	17.DEC.21	UPDATED DAYCARE	MM
11	17.NOV.30	REV. DAYCARE BLDG OUTLINE	MM
10	17.NOV.22	REV. AS PER MUN. COMMENTS	MM
9	17.OCT.05	REV. AS PER MUN. COMMENTS	MM
8	17.JULY.19	REV.AS PER MUN. COMMENTS	MM
7	17.APR.26	COMMENTS	DD
6	17.MAR.27	NEW SITE PLAN, MUN. COMMENTS	MM
5	16.NOV.25	NEW SITE PLAN. COMMENTS	YK
4	16.NOV.15	NEW SITE PLAN, MUN. COMMENTS	MM
3	16.JAN.06	LANDSCAPE GRADING PLAN	CLG
2	15.DEC.22	DP SUBMISSION	MM
	15.NOV.17	NEW SITE PLAN	MM

Plan 27 Jan 26, 2018
DP 16-721500

PROJECT:

NORTHVIEW ESTATE

10311 RIVER DR.
RICHMOND, B.C.

DRAWING TITLE:

ESA LANDSCAPE PLAN

DATE:	15.AUG.31	DRAWING NUMBER:
SCALE:	1"=10'-0"	**L16**
DRAWN:	MM	
DESIGN:	MM	
CHK'D:		OF 17

15116-17.ZIP

PMG PROJECT NUMBER: **15-116**

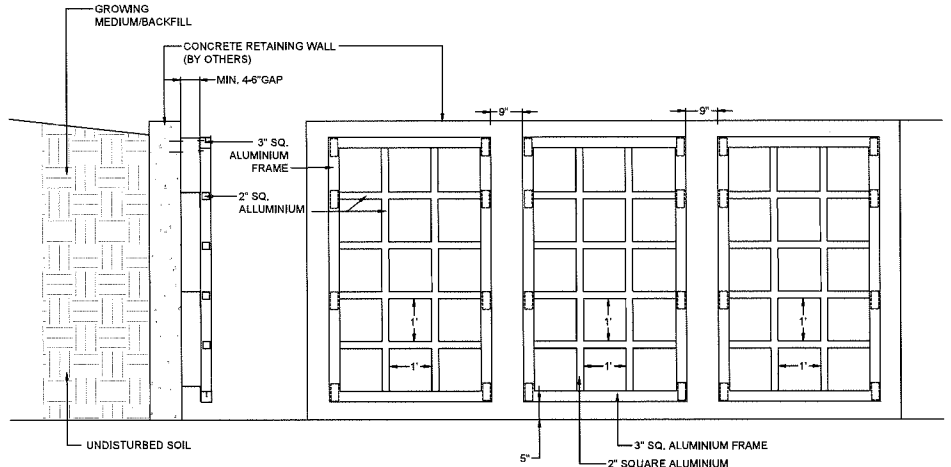
PLANT SCHEDULE

PMG PROJECT NUMBER: 15-116

KEY	QTY	BOTANICAL NAME	COMMON NAME	PLANTED SIZE / REMARKS
TREE	2	CORNUS NUTTALLII X STARLIGHT	PACIFIC DOGWOOD VAR	2.5M HT; B&B
	4	CORNUS x 'CELESTIAL'	CELESTIAL DOGWOOD	5CM CAL; B&B
GRASS				
HE	19	HELICTOTRICHON SEMPERVIRENS	BLUE OAT GRASS	#2 POT
IB	4	IMPERATA CYLINDRICA 'RED BARON'	BLOOD GRASS	#1 POT
PE	7	PENNISETUM ALOPECUROIDES 'LITTLE BUNNY'	LITTLE BUNNY FOUNTAIN GRASS	#1 POT
S	28	STIPA TENUISSIMA	MEXICAN FEATHER GRASS	#1 POT
VINE				
PC	3	PASSIFLORA INCENSE	BLUE PASSION FLOWER	#3 POT; 75CM; STAKED
GS				
F	64	FRAGARIA x ANANASSA	GARDEN STRAWBERRY	9CM POT
PO	15	POLYSTICHUM MUNITUM	WESTERN SWORD FERN	#1 POT; 25CM

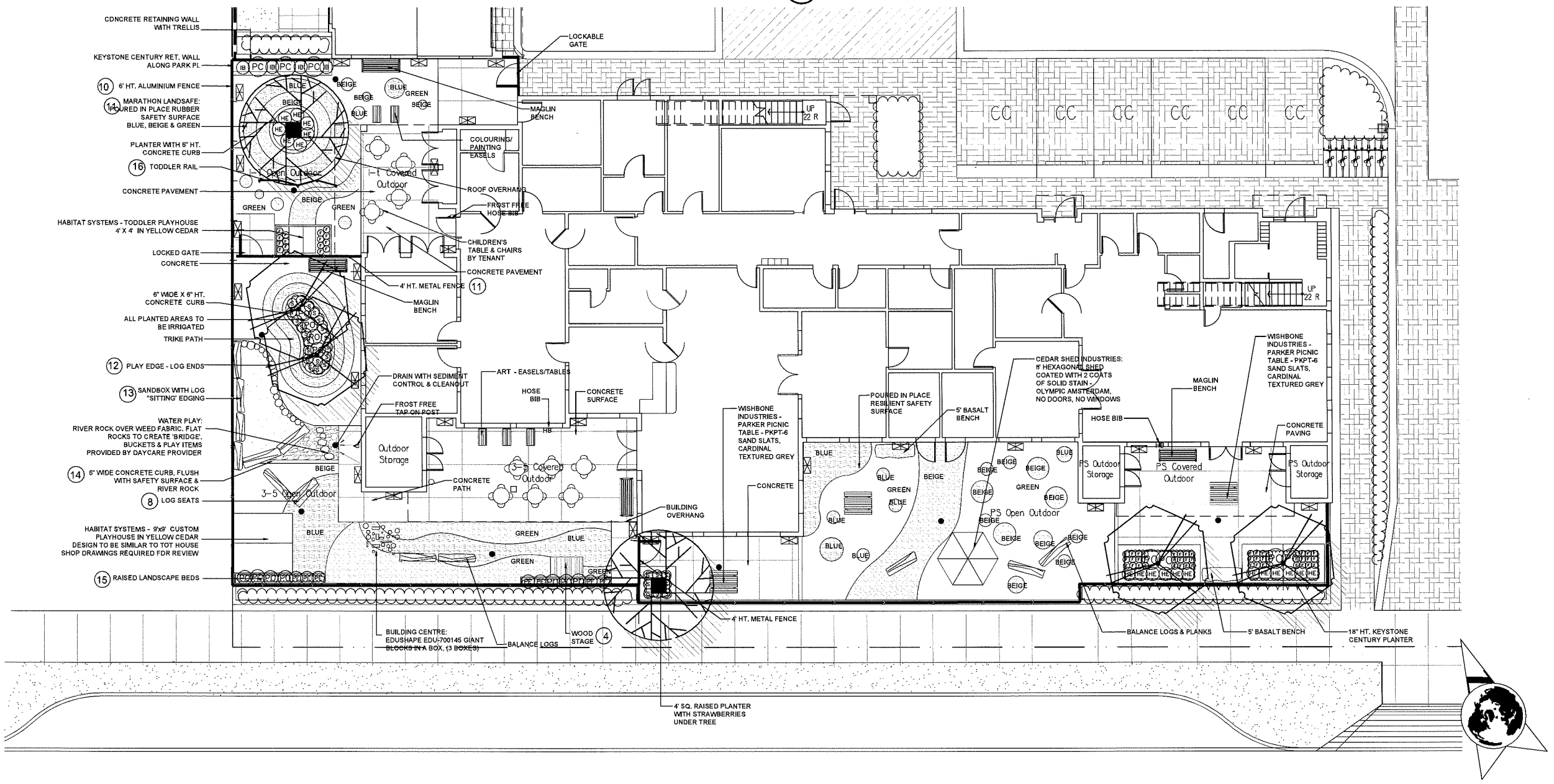
NOTES: * PLANT SIZES IN THIS LIST ARE SPECIFIED ACCORDING TO THE CANADIAN LANDSCAPE STANDARD, LATEST EDITION. CONTAINER SIZES SPECIFIED AS PER CNLA STANDARDS. BOTH PLANT SIZE AND CONTAINER SIZE ARE THE MINIMUM ACCEPTABLE SIZES. * REFER TO SPECIFICATIONS FOR DEFINED CONTAINER MEASUREMENTS AND OTHER PLANT MATERIAL REQUIREMENTS. * SEARCH AND REVIEW: MAKE PLANT MATERIAL AVAILABLE FOR OPTIONAL REVIEW BY LANDSCAPE ARCHITECT AT SOURCE OF SUPPLY. AREA OF SEARCH TO INCLUDE LOWER MAINLAND AND FRASER VALLEY. * SUBSTITUTIONS: OBTAIN WRITTEN APPROVAL FROM THE LANDSCAPE ARCHITECT PRIOR TO MAKING ANY SUBSTITUTIONS TO THE SPECIFIED MATERIAL. UNAPPROVED SUBSTITUTIONS WILL BE REJECTED. ALLOW A MINIMUM OF FIVE DAYS PRIOR TO DELIVERY FOR REQUEST TO SUBSTITUTE. SUBSTITUTIONS ARE SUBJECT TO CANADIAN LANDSCAPE STANDARD - DEFINITION OF CONDITIONS OF AVAILABILITY. ALL LANDSCAPE MATERIAL AND WORKMANSHIP MUST MEET OR EXCEED CANADIAN LANDSCAPE STANDARD'S LATEST EDITION. ALL PLANT MATERIAL MUST BE PROVIDED FROM CERTIFIED DISEASE FREE NURSERY

** NO DOORS OR GLASS WINDOWS IN PLAYHOUSES OR GAZEBO
** ALL AREAS TO BE IRRIGATED WITH A DESIGN/BUILD IRRIGATION SYSTEM
- CONTRACTOR TO PROVIDE SHOP DRAWINGS FOR REVIEW BY LA.



NOTE:S
1. ALL ALUMINIUM TO BE WELDED AT JOINS
2. TRELLIS TO HAVE 2 COATS SEMI-GLOSS BLACK POWDER COATING
3. TRELLIS TO BE SECURED TO CONCRETE WALL WITH HEAVY DUTY METAL BRACKETS (BLACK)
4. CONTRACTOR TO PROVIDE SHOP DRAWINGS TO LANDSCAPE ARCH. FOR REVIEW

1 TRELLIS ON CONCRETE WALL
1/2"=1'-0"



pmg LANDSCAPE ARCHITECTS
Suite C100 - 4185 Still Creek Drive
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p: 604 294-0011 ; f: 604 294-0022

SEAL:

NO.	DATE	REVISION DESCRIPTION	DR.
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12	17.DEC.21	UPDATED DAYCARE	MM
11	17.NOV.30	REV. DAYCARE BLDG OUTLINE	MM
10	17.NOV.22	REV. AS PER MUN. COMMENTS	MM
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7	17.APR.26	COMMENTS	DO
6	17.MAR.27	NEW SITE PLAN, MUN. COMMENTS	MM
5	16.NOV.25	NEW SITE PLAN. COMMENTS	YR
4	16.NOV.15	NEW SITE PLAN, MUN. COMMENTS	MM
3	16.JAN.08	LANDSCAPE GRADING PLAN	CJG
2	15.DEC.22	DP SUBMISSION	MM
1	15.NOV.17	NEW SITE PLAN	MM

Plan 28 Jan 26, 2018
DP 16-721500

PROJECT:

NORTHVIEW ESTATE

10311 RIVER DR.
RICHMOND, B.C.

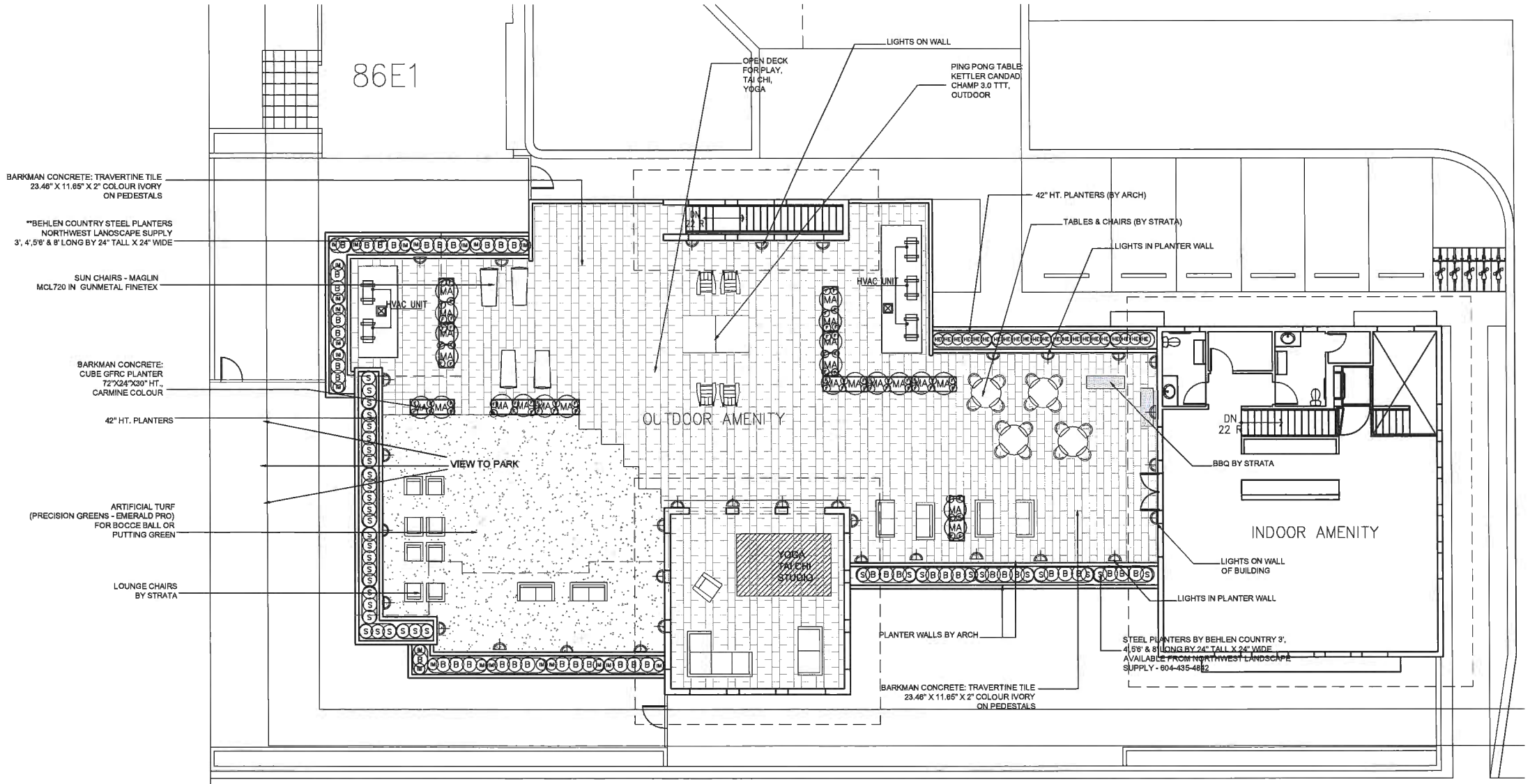
DRAWING TITLE:

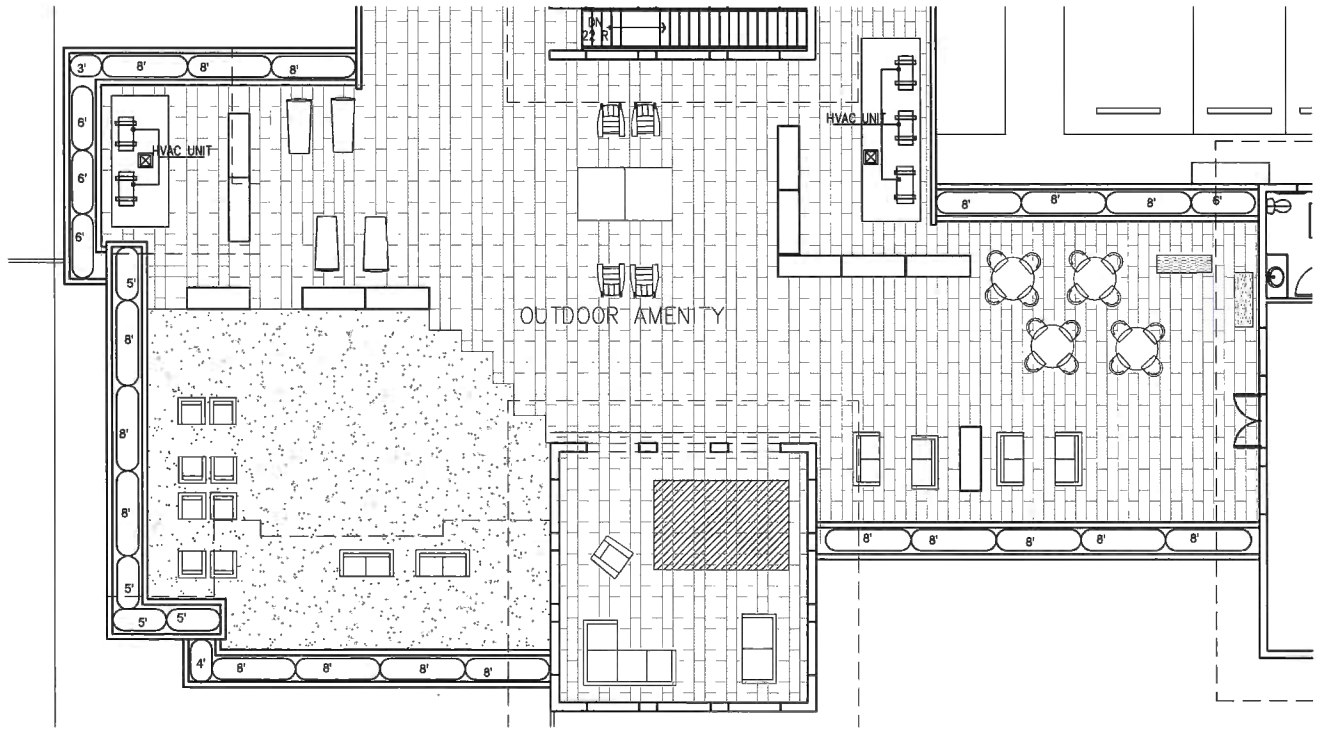
DAYCARE PLAN

DATE:	15.SEP.01	DRAWING NUMBER:
SCALE:	AS SHOWN	**L5**
DRAWN:	MM	
DESIGN:	MM	
CHK'D:	MCY	OF 17

PMG PROJECT NUMBER: **15-116**

15116-17.ZIP





PLANT SCHEDULE

AMENITY PLANTING — PMG PROJECT NUMBER: 15-116

KEY	QTY	BOTANICAL NAME	COMMON NAME	PLANTED SIZE / REMARKS
SHRUB				
B	44	BUXUS MICROPHYLLA 'WINTER GEM'	LITTLE-LEAF BOX	#2 POT; 25CM
GRASS				
HE	22	HELICTOTRICHON SEMPERVIRENS	BLUE OAT GRASS	#2 POT
IM	23	IMPERATA CYLINDRICA 'RED BARON'	BLOOD GRASS	#1 POT
MA	22	MISCANTHUS SINENSIS 'ADAGIO'	MAIDEN GRASS	#1 POT
S	37	STIPA TENUISSIMA	MEXICAN FEATHER GRASS	#1 POT
GC				
F	66	FRAGARIA x ANANASSA	GARDEN STRAWBERRY	9CM POT

NOTES: * PLANT SIZES IN THIS LIST ARE SPECIFIED ACCORDING TO THE BC LANDSCAPE STANDARD, LATEST EDITION. CONTAINER SIZES SPECIFIED AS PER CNTA STANDARDS. BOTH PLANT SIZE AND CONTAINER SIZE ARE THE MINIMUM ACCEPTABLE SIZES. * REFER TO SPECIFICATIONS FOR DEFINED CONTAINER MEASUREMENTS AND OTHER PLANT MATERIAL REQUIREMENTS. * SEARCH AND REVIEW: MAKE PLANT MATERIAL AVAILABLE FOR OPTIONAL REVIEW BY LANDSCAPE ARCHITECT AT SOURCE OF SUPPLY. AREA OF SEARCH TO INCLUDE LOWER MAINLAND AND FRASER VALLEY. * SUBSTITUTIONS: OBTAIN WRITTEN APPROVAL FROM THE LANDSCAPE ARCHITECT PRIOR TO MAKING ANY SUBSTITUTIONS TO THE SPECIFIED MATERIAL. UNAPPROVED SUBSTITUTIONS WILL BE REJECTED. ALLOW A MINIMUM OF FIVE DAYS PRIOR TO DELIVERY FOR REQUEST TO SUBSTITUTE. SUBSTITUTIONS ARE SUBJECT TO BC LANDSCAPE STANDARD - DEFINITION OF CONDITIONS OF AVAILABILITY. ALL LANDSCAPE MATERIAL AND WORKMANSHIP MUST MEET OR EXCEED BC LANDSCAPE STANDARD'S LATEST EDITION. ALL PLANT MATERIAL MUST BE PROVIDED FROM CERTIFIED DISEASE FREE NURSERY

STEEL PLANTERS BY BEHLEN COUNTRY 3', 4',5'6' & 8' LONG BY 24" TALL X 24" WIDE AVAILABLE FROM NORTHWEST LANDSCAPE SUPPLY - 604-435-4842

3'	BEHLEN COUNTRY 3' STEEL PLANTER FV-RE223
4'	BEHLEN COUNTRY 4' STEEL PLANTER FV-RE224
5'	BEHLEN COUNTRY 5' STEEL PLANTER FV-RE225
6'	BEHLEN COUNTRY 6' STEEL PLANTER FV-RE226
8'	BEHLEN COUNTRY 8' STEEL PLANTER FV-RE228

pmg LANDSCAPE ARCHITECTS
Suite C100 - 4185 Still Creek Drive
Burnaby, British Columbia, V5C 6G9
p: 604 294-0011 ; f: 604 294-0022

SEAL:

NO.	DATE	REVISION DESCRIPTION	DR.
14	18.JAN.26	ISSUED FOR BP	MM
13	18.JAN.08	REVISE DAYCARE BUILDING	DO
12	17.DEC.21	UPDATED DAYCARE	MM
11	17.NOV.30	REV. DAYCARE BLDG OUTLINE	MM
10	17.NOV.22	REV. AS PER MUN. COMMENTS	MM
9	17.OCT.05	REV. AS PER MUN. COMMENTS	MM
8	17.JULY.19	REV. AS PER MUN. COMMENTS	MM
7	17.APR.26	COMMENTS	DO
6	17.MAR.27	NEW SITE PLAN, MUN. COMMENTS	MM
5	16.NOV.25	NEW SITE PLAN, COMMENTS	YR
4	16.NOV.15	NEW SITE PLAN, MUN. COMMENTS	MM
3	16.JAN.08	LANDSCAPE GRADING PLAN	CLG
2	15.DEC.22	DP SUBMISSION	MM
	15.NOV.17	NEW SITE PLAN	MM

Plan 29 Jan 26, 2018
DP 16-721500

PROJECT:

NORTHVIEW ESTATE

10311 RIVER DR.
RICHMOND, B.C.

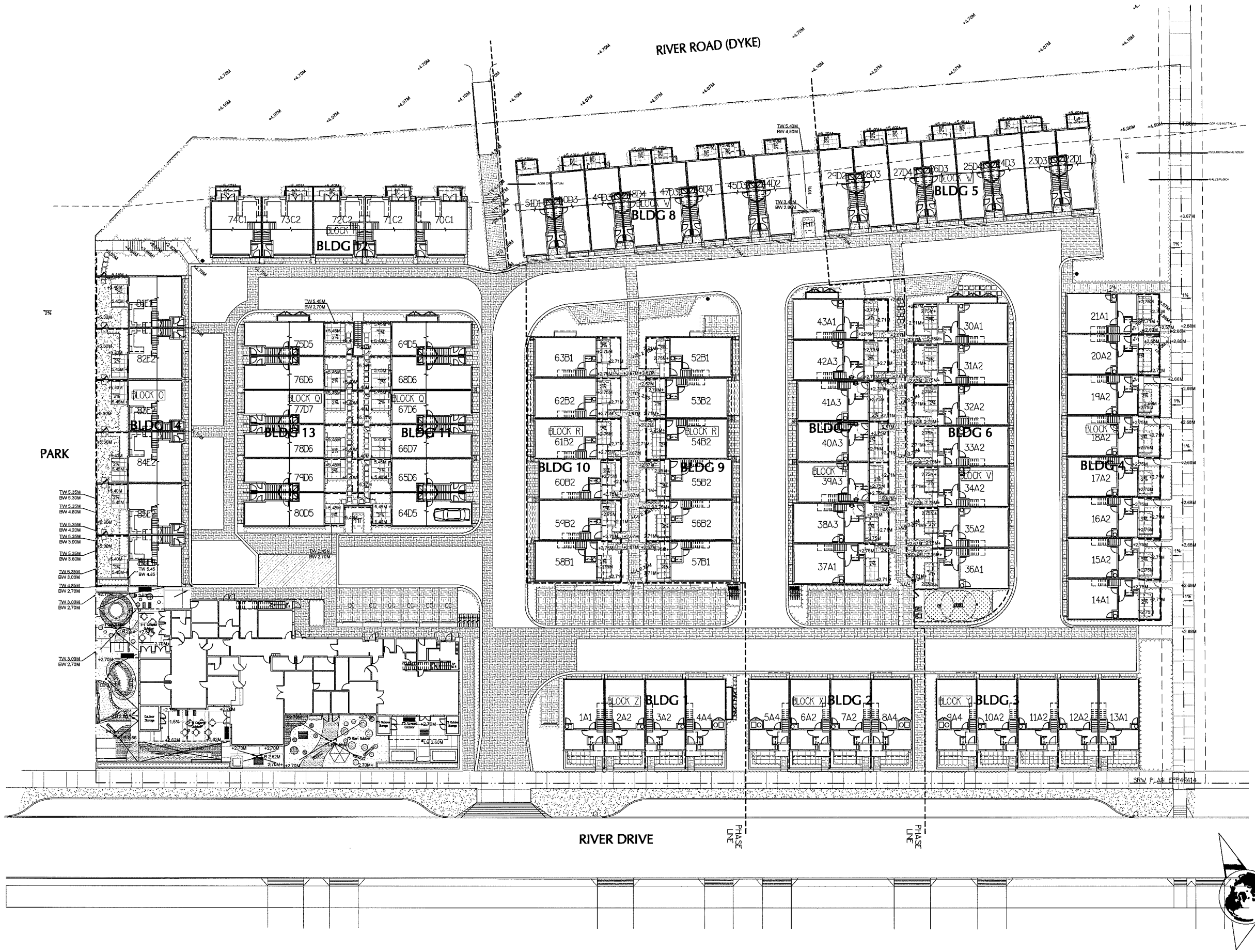
DRAWING TITLE:

OUTDOOR ROOF DECK AMENITY PLAN

DATE:	15.SEP.01	DRAWING NUMBER:
SCALE:	1/8"-1'-0"	L4
DRAWN:	MM	
DESIGN:	MM	
CHK'D:	MCY	OF 17

15116-17.ZIP

PMG PROJECT NUMBER: 15-116



pmg LANDSCAPE ARCHITECTS
Suite C100 - 4185 Still Creek Drive
Burnaby, British Columbia, V5C 6G9
p: 604 294-0011 ; f: 604 294-0022

SEAL:

NO.	DATE	REVISION DESCRIPTION	DR.
14	18.JAN.26	ISSUED FOR BP	MM
13	18.JAN.08	REVISE DAYCARE BUILDING	DD
12	17.DEC.21	UPDATED DAYCARE	MM
11	17.NOV.30	REV. DAYCARE BLDG OUTLINE	MM
10	17.NOV.22	REV. AS PER MUN. COMMENTS	MM
9	17.OCT.05	REV. AS PER MUN. COMMENTS	MM
8	17.JULY.19	REV.AS PER MUN. COMMENTS	MM
7	17.APR.26	COMMENTS	DD
6	17.MAR.27	NEW SITE PLAN, MUN. COMMENTS	MM
5	16.NOV.25	NEW SITE PLAN. COMMENTS	YR
4	16.NOV.15	NEW SITE PLAN, MUN. COMMENTS	MM
3	16.JAN.08	LANDSCAPE GRADING PLAN	CLG
2	15.DEC.22	DP SUBMISSION	MM
	15.NOV.17	NEW SITE PLAN	MM

Plan 30 Jan 26, 2018

DP 16-721500

PROJECT:

NORTHVIEW ESTATE

10311 RIVER DR.
RICHMOND, B.C.

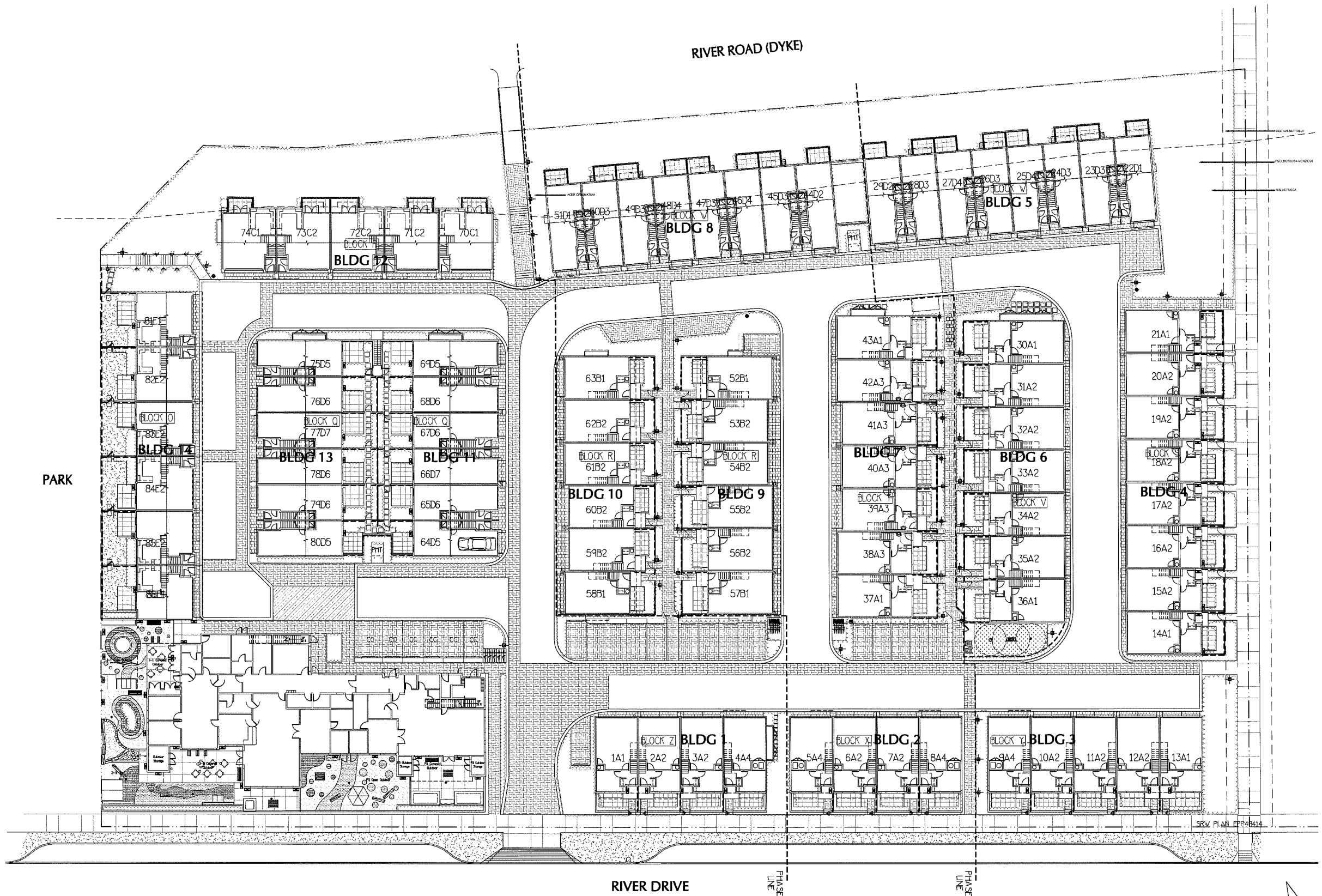
DRAWING TITLE:

LANDSCAPE GRADING PLAN

DATE:	15.SEP.01	DRAWING NUMBER:
SCALE:	1"=20'-0"	**L6**
DRAWN:	MM	
DESIGN:	MM	
CHK'D:	MCY	**OF 17**

15116-17.ZIP

PMG PROJECT NUMBER: **15-116**



Lighting Legend

Symbol	LIGHT TYPE
	RECESSED WALL LIGHT FOR STAIRS
	BOLLARD 36" HT
	WALL MOUNTED LIGHT

15116-17.ZIP

pmg LANDSCAPE ARCHITECTS
Suite C100 - 4185 Still Creek Drive
Burnaby, British Columbia, V5C 6G9
p: 604 294-0011 ; f: 604 294-0022

SEAL:

NO.	DATE	REVISION DESCRIPTION	DR.
14	18.JAN.26	ISSUED FOR BP	MM
13	18.JAN.08	REVISE DAYCARE BUILDING	DO
12	17.DEC.21	UPDATED DAYCARE	MM
11	17.NOV.30	REV. DAYCARE BLDG OUTLINE	MM
10	17.NOV.22	REV. AS PER MUN. COMMENTS	MM
9	17.OCT.05	REV. AS PER MUN. COMMENTS	MM
8	17.JULY.19	REV.AS PER MUN. COMMENTS	MM
7	17.APR.26	COMMENTS	DO
6	17.MAR.27	NEW SITE PLAN, MUN. COMMENTS	MM
5	16.NOV.25	NEW SITE PLAN, COMMENTS	YR
4	16.NOV.15	NEW SITE PLAN, MUN. COMMENTS	MM
3	16.JAN.08	LANDSCAPE GRADING PLAN	CLG
2	15.DEC.22	DP SUBMISSION	MM
	15.NOV.17	NEW SITE PLAN	MM

Plan 31 Jan 26, 2018

DP 16-721500

PROJECT:

NORTHVIEW ESTATE

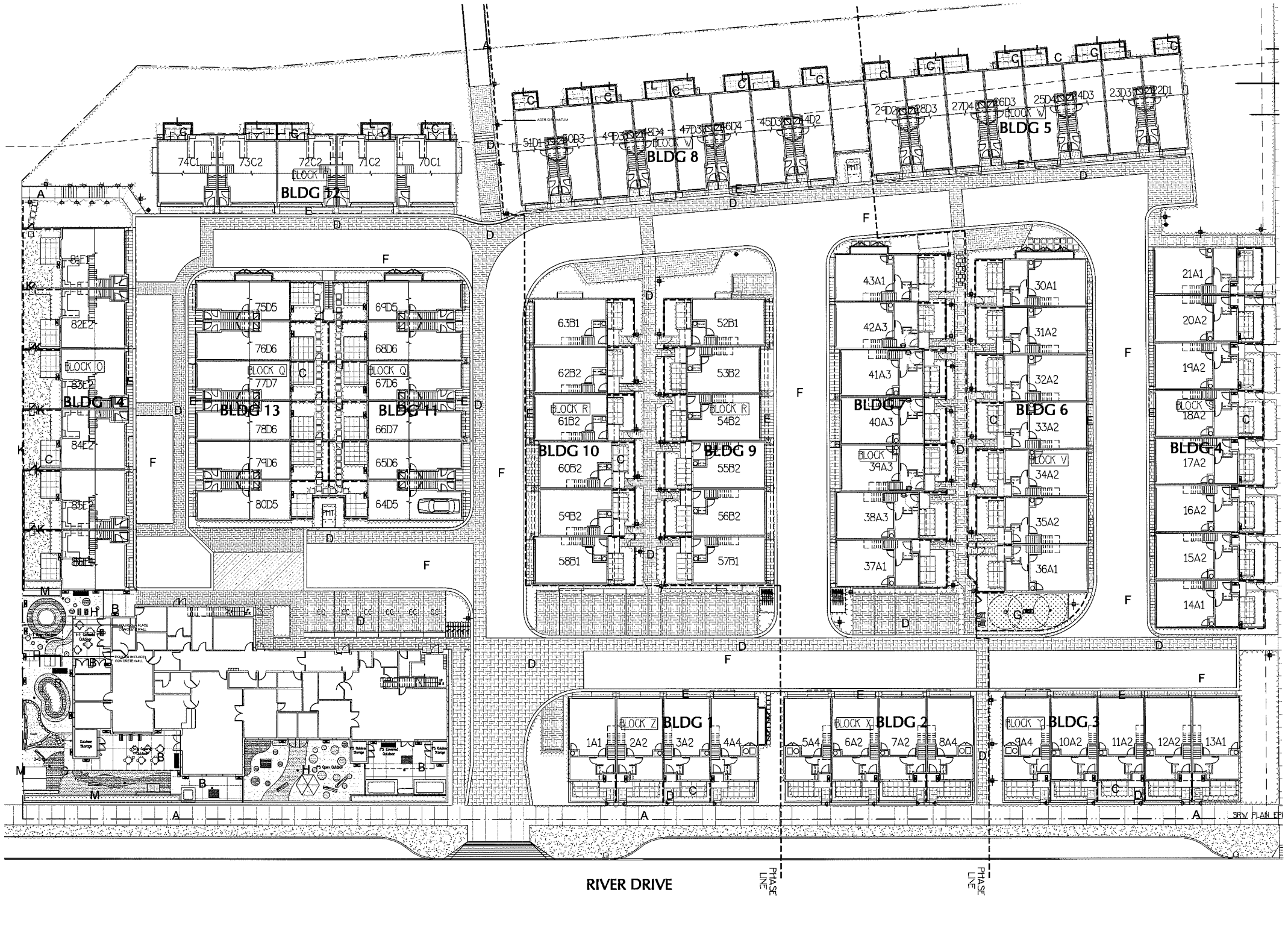
10311 RIVER DR.
RICHMOND, B.C.

DRAWING TITLE:

LANDSCAPE LIGHTING PLAN

DATE:	15.SEP.01	DRAWING NUMBER:
SCALE:	1"=20'-0"	**L7**
DRAWN:	MM	
DESIGN:	MM	
CHK'D:	MCY	**OF 17**

PMG PROJECT NUMBER: **15-116**



SYMBOL	
A	CONCRETE PATH: NATURAL COLOR WITH SAWCUT @ 5' O/C - TO MMCD STANDARDS
B	SAWCUT CONCRETE - NATURAL COLOUR 2.5' x 2.5'
C	PATIO: ABBOTSFORD CONCRETE PRODUCTS OLD COUNTRY STONE, WALNUT BLEND COLOR
D	ABBOTSFORD CONCRETE PRODUCTS VENETIAN COBBLE SERIES GRANITE BLEND
E	ABBOTSFORD CONCRETE PRODUCTS CLASSIC STANDARD SERIES DESERT SAND BLEND
F	ASPHALT
G	FIBAR
H	RESILIENT TILE
I	VEGETATION
J	ABBOTSFORD CONCRETE PRODUCTS 80MM THICK STANDARD PAVER - HERRINGBONE NATURAL COLOUR
K	42" HT. RAIL FENCE
L	24" HT. RAIL FENCE
M	6' HT. DECORATIVE ALUMINIUM FENCE

15116-17.ZIP

pmg LANDSCAPE ARCHITECTS
Suite C100 - 4185 Still Creek Drive
Burnaby, British Columbia, V5C 6G9
p: 604 294-0011 ; f: 604 294-0022

SEAL:

NO.	DATE	REVISION DESCRIPTION	DR.
14	18.JAN.26	ISSUED FOR SP	MM
13	18.JAN.08	REVISE DAYCARE BUILDING	DD
12	17.DEC.21	UPDATED DAYCARE	MM
11	17.NOV.30	REV. DAYCARE BLDG OUTLINE	MM
10	17.NOV.22	REV. AS PER MUN. COMMENTS	MM
9	17.OCT.05	REV. AS PER MUN. COMMENTS	MM
8	17.JULY.19	REV.AS PER MUN. COMMENTS	MM
7	17.APR.26	COMMENTS	DD
6	17.MAR.27	NEW SITE PLAN, MUN. COMMENTS	MM
5	16.NOV.25	NEW SITE PLAN, COMMENTS	YR
4	16.NOV.15	NEW SITE PLAN, MUN. COMMENTS	MM
3	16.JAN.08	LANDSCAPE GRADING PLAN	CLG
2	15.DEC.22	DP SUBMISSION	MM
	15.NOV.17	NEW SITE PLAN	MM

Plan 32 Jan 26, 2018

DP 16-721500

PROJECT:

NORTHVIEW ESTATE

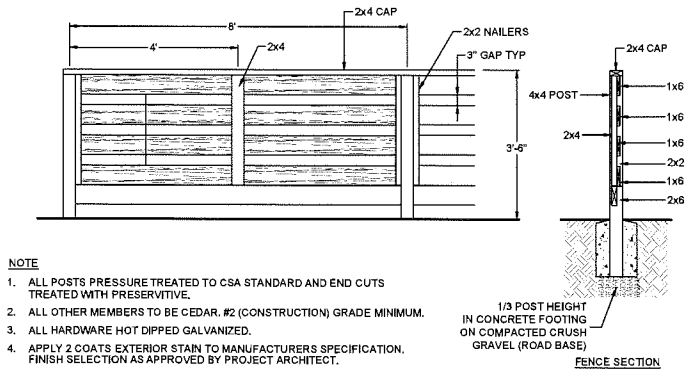
10311 RIVER DR.
RICHMOND, B.C.

DRAWING TITLE:

MATERIALS PLAN

DATE:	15.SEP.01	DRAWING NUMBER:
SCALE:	1"=20'-0"	**L8**
DRAWN:	MM	
DESIGN:	MM	
CHK'D:	MCY	OF 17

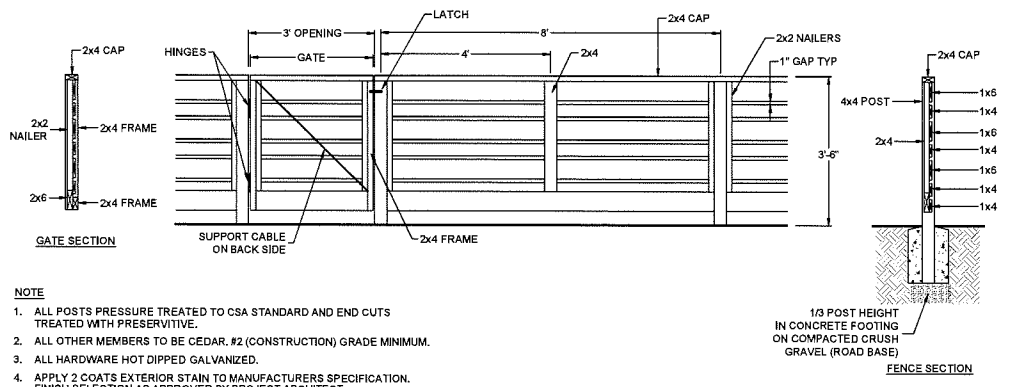
PMG PROJECT NUMBER: **15-116**



NOTE

1. ALL POSTS PRESSURE TREATED TO CSA STANDARD AND END CUTS TREATED WITH PRESERVITIVE.
2. ALL OTHER MEMBERS TO BE CEDAR. #2 (CONSTRUCTION) GRADE MINIMUM.
3. ALL HARDWARE HOT DIPPED GALVANIZED.
4. APPLY 2 COATS EXTERIOR STAIN TO MANUFACTURERS SPECIFICATION. FINISH SELECTION AS APPROVED BY PROJECT ARCHITECT.
5. ALL FENCES TO BE LEVEL. CHANGES IN GRADE TO BE IN 12"-18" STEPS (MAX.). GAPS TO GRADE TO FOLLOW FINISH GRADE. GAP TO BE 3-6".

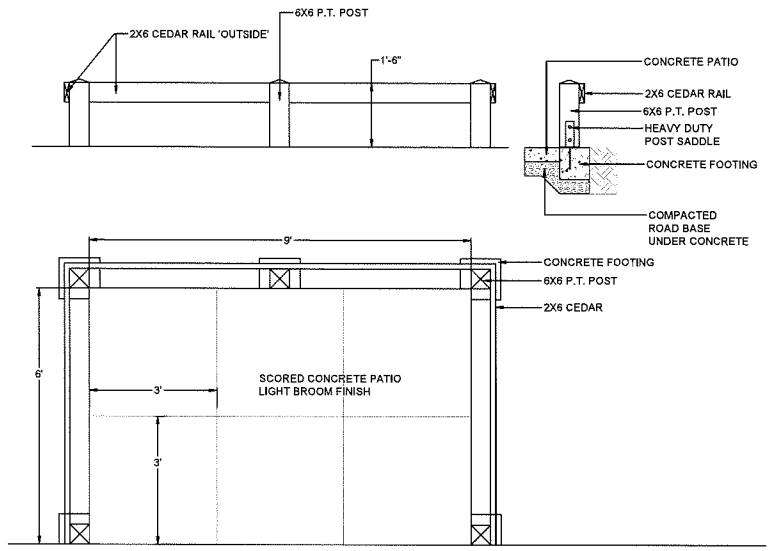
1 42" HT. WOOD FENCE (ALONG PARK EDGE)
1/2"=1'-0"



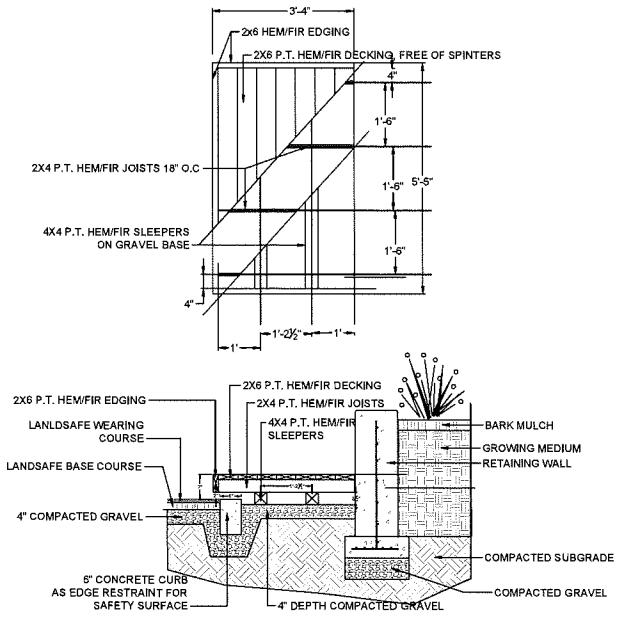
NOTE

1. ALL POSTS PRESSURE TREATED TO CSA STANDARD AND END CUTS TREATED WITH PRESERVITIVE.
2. ALL OTHER MEMBERS TO BE CEDAR. #2 (CONSTRUCTION) GRADE MINIMUM.
3. ALL HARDWARE HOT DIPPED GALVANIZED.
4. APPLY 2 COATS EXTERIOR STAIN TO MANUFACTURERS SPECIFICATION. FINISH SELECTION AS APPROVED BY PROJECT ARCHITECT.
5. ALL FENCES TO BE LEVEL. CHANGES IN GRADE TO BE IN 12"-18" STEPS (MAX.). GAPS TO GRADE TO FOLLOW FINISH GRADE. GAP TO BE 3-6".

2 42" HT. WOOD FENCE & GATE (BETWEEN YARDS)
1/2"=1'-0"



3 18" HT. WOOD RAIL FENCE @ PATIO
1/2"=1'-0"



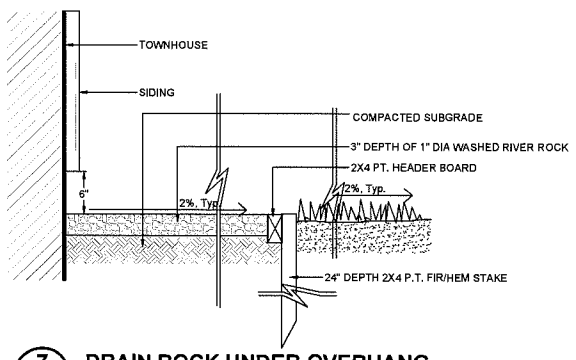
4 WOOD STAGE
1/2"=1'-0" (DAYCARE)

NOTE:
PAVERS- ABBOTSFORD CONCRETE PRODUCTS, CLASSIC STANDARD PAVERS
PAVERS TO BE INSTALLED TO MANUFACTURERS SPECIFICATIONS
PAVERS FOR PEDESTRIAN AREAS TO BE 60MM THICK, SHADOW COLOUR, RUNNING BOND
PAVERS FOR VEHICULAR AREAS TO BE 80MM THICK, SHADOW COLOUR, HERRINGBONE

5 PAVERS ON GRADE
1"=1'-0"

NOTE:
PAVERS- ABBOTSFORD CONCRETE PRODUCTS, HYDRAPRESSED SLABS, CHARCOAL 18" SQUARE
PAVERS TO BE INSTALLED TO MANUFACTURERS SPECIFICATIONS

6 HYDRAPRESSED PAVERS ON GRADE
1"=1'-0"



7 DRAIN ROCK UNDER OVERHANG
1"=1'-0"

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Burnaby, British Columbia, V5C 6G9
p: 604 294-0011 ; f: 604 294-0022

SEAL:

NO.	DATE	REVISION DESCRIPTION	DR.
14	18.JAN.24	REVISE DAYCARE/DETAILS/AMENITY	MM
13	18.JAN.08	REVISE DAYCARE BUILDING	DD
12	17.DEC.21	UPDATED DAYCARE	MM
11	17.NOV.30	REV. DAYCARE BLDG OUTLINE	MM
10	17.NOV.22	REV. AS PER MUN. COMMENTS	MM
9	17.OCT.05	REV. AS PER MUN. COMMENTS	MM
8	17.JULY.19	REV.AS PER MUN. COMMENTS	MM
7	17.APR.26	COMMENTS	DD
6	17.MAR.27	NEW SITE PLAN, MUN. COMMENTS	MM
5	16.NOV.25	NEW SITE PLAN. COMMENTS	YR
4	16.NOV.15	NEW SITE PLAN, MUN. COMMENTS	MM
3	16.JAN.08	LANDSCAPE GRADING PLAN	CLG
2	15.DEC.22	DP SUBMISSION	MM
1	15.NOV.17	NEW SITE PLAN	MM

Plan 33 Jan 26, 2018
DP 16-721500

PROJECT:

NORTHVIEW ESTATE

10311 RIVER DR.
RICHMOND, B.C.

DRAWING TITLE:

LANDSCAPE DETAILS

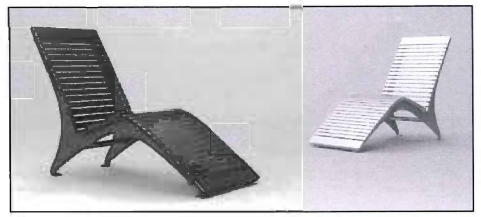
DATE:	15.AUG.31	DRAWING NUMBER:
SCALE:	AS NOTED	**L9**
DRAWN:	MM	
DESIGN:	MM	
CHK'D:		**OF 17**

15116-17.ZIP

PMG PROJECT NUMBER: **15-116**

BENCH MAGLIN SCB1600-PCC
SLATE WITH SANDSTONE SLATS

MAGLIN BIKE RACK:
MBR400-7-S SLATE



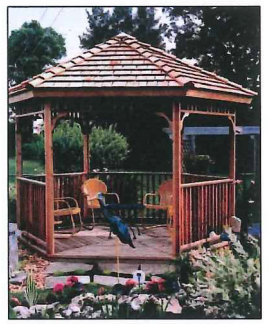
CHAISE - MAGLIN MCL720
GUNMETAL FINETEX

WISHBONE - PARKER PICNIC TABLE
PKPT-6, BOLT DOWN, SAND SLATS &
TEXTURED GREY FRAME

BARKMAN CONCRETE - 113526
GFRC CUBE PLANTER IN CARMINE

HABITAT SYSTEMS:
TOT PLAYHOUSE

HABITAT SYSTEMS:
CUSTOM PLAYHOUSE
PROVIDE SHOP DWG.
FOR REVIEW



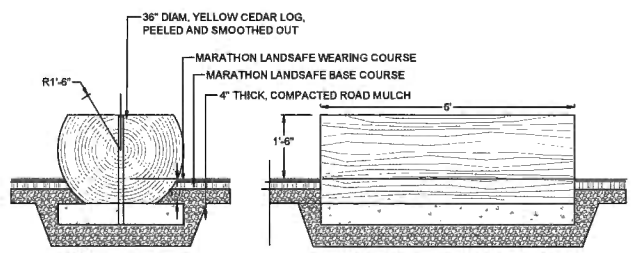
CEDAR SHED INDUSTRIES:
8' HEXAGONAL GAZEBO

NOTE

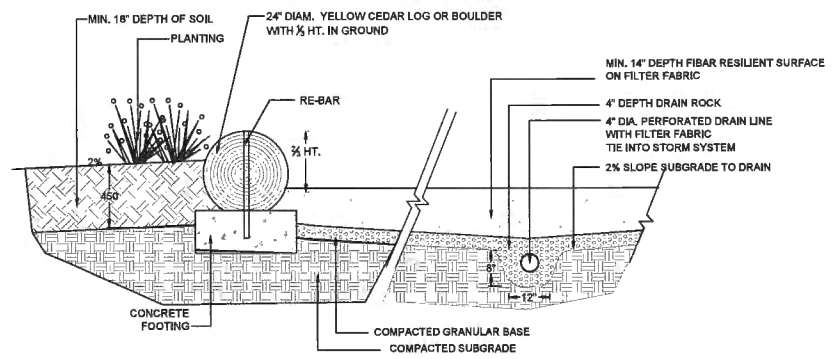
1. ALL POSTS PRESSURE TREATED TO CSA STANDARD AND END CUTS TREATED WITH PRESERVATIVE.
2. ALL OTHER MEMBERS TO BE CEDAR. #2 (CONSTRUCTION) GRADE MINIMUM UNLESS SPECIFIED OTHERWISE.
3. ALL HARDWARE HOT DIPPED GALVANIZED.
4. APPLY 2 COATS EXTERIOR STAIN TO MANUFACTURERS SPECIFICATION. FINISH SELECTION AS APPROVED BY PROJECT ARCHITECT.
5. ALL FENCES TO BE LEVEL. CHANGES IN GRADE TO BE IN 12"-18" STEPS (MAX.). GAPS TO GRADE TO FOLLOW FINISH GRADE. GAP TO BE 3-6".

SAFETY SURFACE:
LANDSAFE BY MARATHON SURFACES
INSTALL AS PER MANUFACTURERS SPECIFICATIONS
(604-575-0625)
SEE PLAN FOR COLOURS * LOCATIONS

ALL LOGS TO BE YELLOW CEDAR,
BARK REMOVED AND SMOOTHED TO REMOVE ALL SPLINTERS,
SECURE TO CONCRETE FOOTINGS
UNDER LOGS WITH REBAR
NO SHARP EDGES ON LOGS -
ALL EDGES TO BE ROUNDED



8 CUSTOM BENCH
SCALE: 1/2"=1'-0" (DAYCARE)



9 PLAY AREA: HARD EDGE
1/2"=1'-0" (TOWNHOUSES)

pmg LANDSCAPE ARCHITECTS
Suite C100 - 4185 Still Creek Drive
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p: 604 294-0011 ; f: 604 294-0022

SEAL:

NO.	DATE	REVISION DESCRIPTION	DR.
14	18.JAN.24	REVISE DAYCARE/DETAILS/AMENITY	MM
13	18.JAN.08	REVISE DAYCARE BUILDING	DO
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11	17.NOV.30	REV. DAYCARE BLDG OUTLINE	MM
10	17.NOV.22	REV. AS PER MUN. COMMENTS	MM
9	17.OCT.05	REV. AS PER MUN. COMMENTS	MM
8	17.JULY.19	REV.AS PER MUN. COMMENTS	MM
7	17.APR.26	COMMENTS	DO
6	17.MAR.17	NEW SITE PLAN, MUN. COMMENTS	MM
5	16.NOV.25	NEW SITE PLAN, COMMENTS	YR
4	16.NOV.15	NEW SITE PLAN, MUN. COMMENTS	MM
3	16.JAN.08	LANDSCAPE GRADING PLAN	CLG
2	15.DEC.22	DP SUBMISSION	MM
-	15.NOV.17	NEW SITE PLAN	MM

Plan 34 Jan 26, 2018
DP 16-721500

PROJECT:

NORTHVIEW ESTATE

10311 RIVER DR.
RICHMOND, B.C.

DRAWING TITLE:

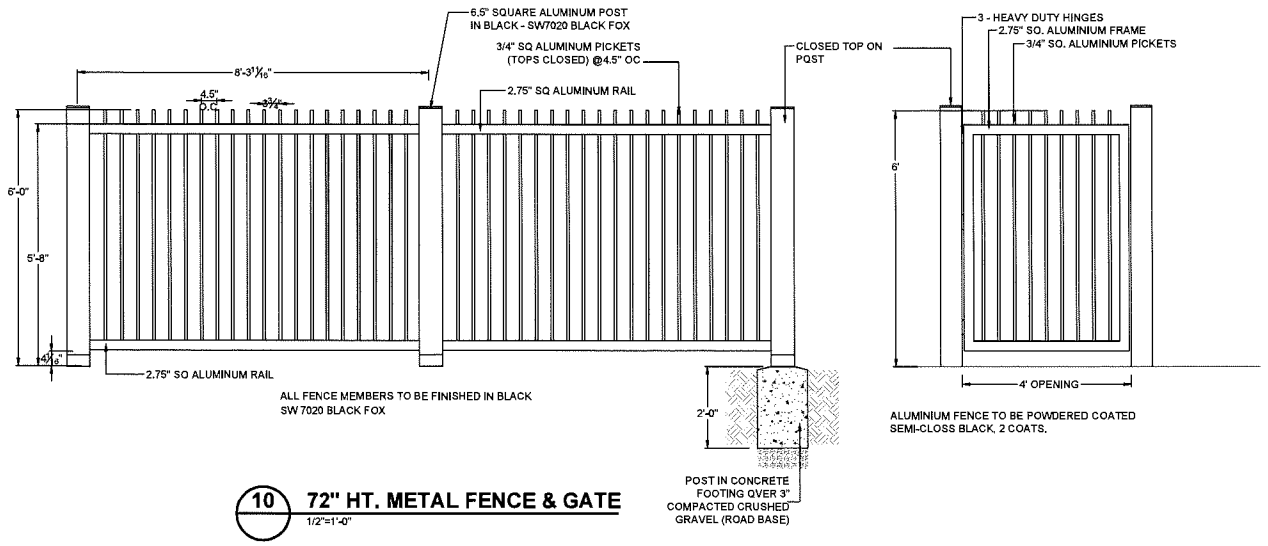
LANDSCAPE DETAILS

DATE: 15.AUG.31
SCALE: AS NOTED
DRAWN: MM
DESIGN: MM
CHK'D:

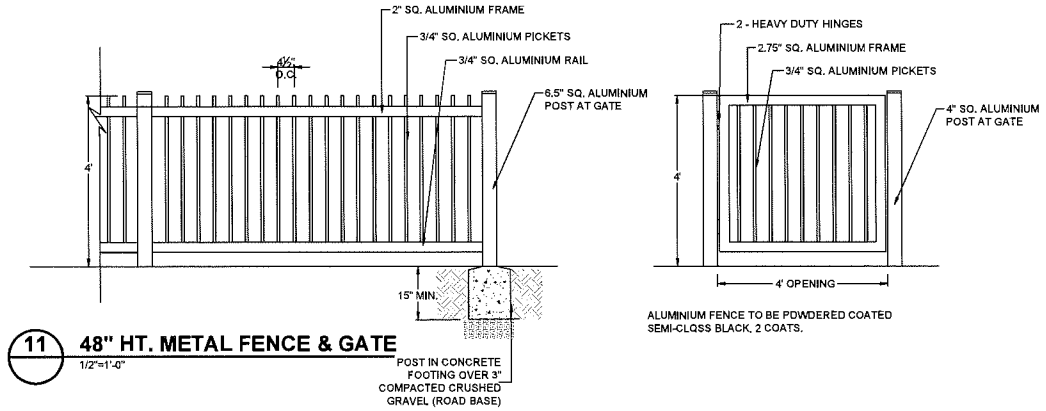
DRAWING NUMBER:
L10
OF 17

15116-17.ZIP

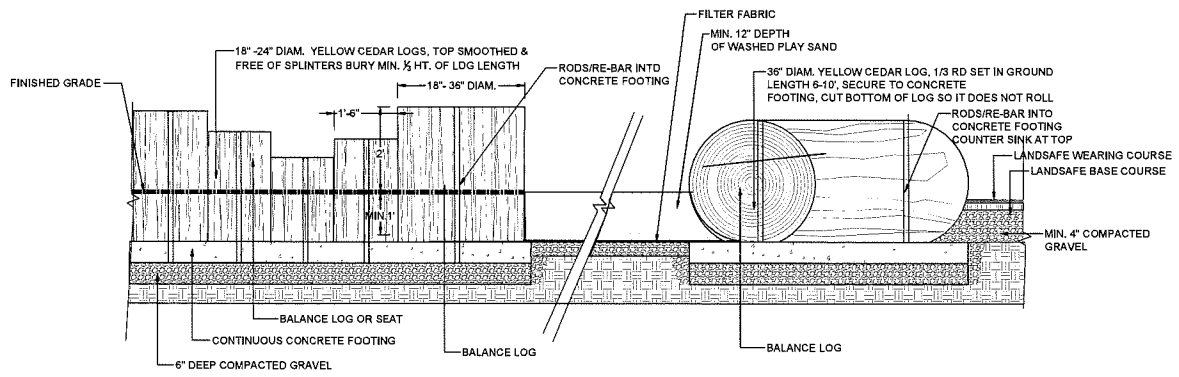
PMG PROJECT NUMBER: **15-116**



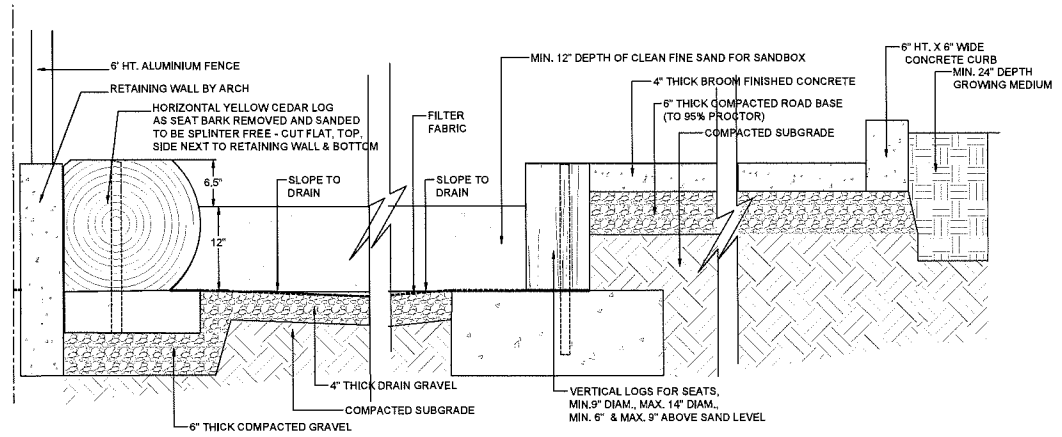
10 72" HT. METAL FENCE & GATE
1/2"=1'-0"



11 48" HT. METAL FENCE & GATE
1/2"=1'-0"



12 PLAY AREA: LOG EDGING/ENDS
1/2"=1'-0" (DAYCARE)

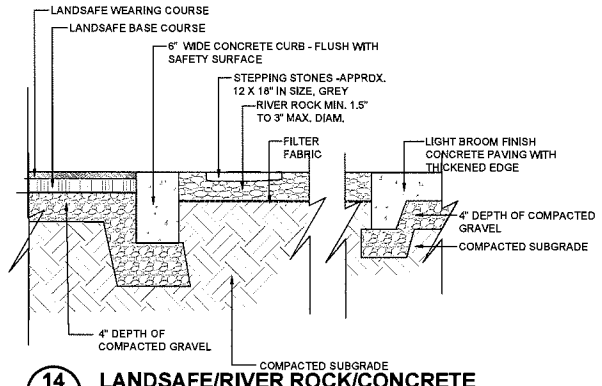


13 PLAY AREA: SAND BOX
1"=1'-0" (DAYCARE)

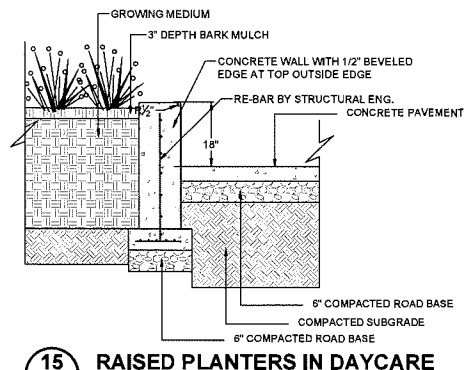
SAFETY SURFACE:
LANDSAFE BY MARATHON SURFACES
INSTALL AS PER MANUFACTURERS SPECIFICATIONS
(604-878-0625)
SEE PLAN FOR COLOURS * LOCATIONS

ALL LOGS TO BE YELLOW CEDAR, BARK REMOVED AND SMOOTHED TO REMOVE ALL SPLINTERS, SECURE TO CONCRETE FOOTINGS UNDER LOGS WITH REBAR
NO SHARP EDGES ON LOGS - ALL EDGES TO BE ROUNDED

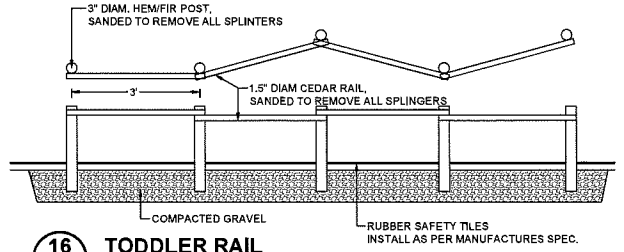
NOTE
1. ALL POSTS PRESSURE TREATED TO CSA STANDARD AND END CUTS TREATED WITH PRESERVATIVE.
2. ALL OTHER MEMBERS TO BE CEDAR. #2 (CONSTRUCTION) GRADE MINIMUM UNLESS SPECIFIED OTHERWISE.
3. ALL HARDWARE HOT DIPPED GALVANIZED.
4. APPLY 2 COATS EXTERIOR STAIN TO MANUFACTURERS SPECIFICATION. FINISH SELECTION AS APPROVED BY PROJECT ARCHITECT.
5. ALL FENCES TO BE LEVEL. CHANGES IN GRADE TO BE IN 12"-18" STEPS (MAX.). GAPS TO GRADE TO FOLLOW FINISH GRADE. GAP TO BE 3-6".



14 LANDSAFE/RIVER ROCK/CONCRETE
1"=1'-0"



15 RAISED PLANTERS IN DAYCARE
1/2"=1'-0"



16 TODDLER RAIL
1/2"=1'-0"

pmg LANDSCAPE ARCHITECTS
Suite C100 - 4185 Still Creek Drive
Burnaby, British Columbia, V5C 6G9
p: 604 294-0011 ; f: 604 294-0022

SEAL:

NO.	DATE	REVISION DESCRIPTION	DR.
14	18.JAN.24	REVISE DAYCARE/DETAILS/AMENITY	MM
13	18.JAN.08	REVISE DAYCARE BUILDING	DO
12	17.DEC.21	UPDATED DAYCARE	MM
11	17.NOV.30	REV. DAYCARE BLDG OUTLINE	MM
10	17.NOV.22	REV. AS PER MUN. COMMENTS	MM
9	17.OCT.05	REV. AS PER MUN. COMMENTS	MM
8	17.JULY.19	REV.AS PER MUN. COMMENTS	MM
7	17.APR.26	COMMENTS	DO
6	17.MAR.27	NEW SITE PLAN, MUN. COMMENTS	MM
5	16.NOV.25	NEW SITE PLAN. COMMENTS	YR
4	16.NOV.15	NEW SITE PLAN, MUN. COMMENTS	MM
3	16.JAN.08	LANDSCAPE GRADING PLAN	CLG
2	15.DEC.22	DP SUBMISSION	MM
-	15.NOV.17	NEW SITE PLAN	MM

Plan 35 Jan 26, 2018

DP 16-721500

PROJECT:

NORTHVIEW ESTATE

10311 RIVER DR.
RICHMOND, B.C.

DRAWING TITLE:

LANDSCAPE DETAILS

DATE: 15.AUG.31
SCALE: AS NOTED
DRAWN: MM
DESIGN: MM
CHK'D:

DRAWING NUMBER: **L11** OF 17

15116-17.ZIP

PMG PROJECT NUMBER: **15-116**

PART ONE GENERAL REQUIREMENTS

1.1 REFERENCES

.1 CCDC Doc 2 2008
Comply with all articles in the General Conditions of Contract in conjunction with this section unless superseded by other Contract Documents.

.2 Canadian Landscape Standard, latest edition, prepared by the Canadian Society of Landscape Architects and the Canadian Landscape & Nursery Association, jointly. All work and materials shall meet standards as set out in the Canadian Landscape Standard unless superseded by this specification or as directed by Landscape Architect with written instruction.

.3 MASTER MUNICIPAL SPECIFICATIONS & STANDARD DETAILS, 2000 edition, prepared by the Consulting Engineers of British Columbia, Roadbuilders and Heavy Construction Association, and the Municipal Engineers Division

.4 STANDARD FOR LANDSCAPE IRRIGATION SYSTEM, 2008- Prepared by the Irrigation Industry Association of British Columbia.

.5 MUNICIPAL BYLAWS AND ENGINEERING SPECIFICATIONS WHERE NOTED.

1.2 TESTING

.1 A current (not more than one month) test for all growing medium to be used on this site is required. Provide and pay for testing by an independent testing facility pre-approved by the Landscape Architect. Deliver growing medium test results to Landscape Architect for review and approval prior to placement. Refer to Section 3.4 Growing Medium Testing for procedure.

.2 Owner reserves the right to test or re-test materials. Contractor responsible to pay for testing if materials do not meet specification.

1.3 SUBMITTALS

.1 Any alternate products differing from that contained in the contract documents must be pre-approved by the Landscape Architect.

.2 Submittals to consist of product sample or manufacturer's product description.

1.4 SITE REVIEW

.1 Under the terms of the Landscape Architect's Contract with the Owner and where the Landscape Architect is the designated reviewer, the Landscape Architect will observe construction as is necessary in their opinion to confirm conformance to the plans and specifications. Contact Owners Representative to arrange for site observation at the appropriate times. Allow two days notice. Observation schedule may include but will not be limited to the following:
.11 Start Up Site Meeting, General Contract: Prior to any site disturbance, a meeting with the general contractor to review tree preservation issues, general landscape issues and municipal requirements.
.12 Start Up Site Meeting, Landscape Contract (if separate): At the start of work with Owner's Representative, Site Superintendent and Landscape Contractor; a meeting is to be held to review expected work and to verify the acceptability of the subgrade and general site conditions to the Landscape Contractor. Provide growing medium test results for this meeting.
.13 Progress Site Visits: To observe materials and workmanship as necessary through the course of the work. Review of different aspects of the work may be dealt with on any single visit. Such elements may include: Site Layout, Rough Grading, Growing Medium - quality, depths, finish grading; Drainage and Drainage Materials; Lawns or Grass areas; Planting -plant material including negotiations with suppliers, nursery inspections, plant sizes, quality, quantity, planting practice and layout, tree support; Mulch; Irrigation Systems; Play Equipment; Site Furniture; and other elements of the site development where the Landscape Architect is the designated reviewer such as: Pedestrian Paving, Fencing, Non-structural walls and slabs, Unit Paving.
.14 Substantial Performance: Review of all work, accounting of all substitutions, deletions; plant counts, preparations of deficiency list, and recommendations for completion.
.15 Certificate of Completion: Upon the declaration of Substantial Performance, a recommendation for the issuance of the Certificate of Completion will be made to the Payment Certifier as defined in the contract.
.16 Deficiency Review: Prior to the completion of the holdback period, check for completion of deficiencies. Once completed, a Schedule 'C' will be issued where required.
.17 Warranty Review: Prior to the completion of the warranty period (+/- 11 months after issuance of the Certificate of Completion), review all warranty material and report recommendations for warranty replacement.

1.5 WORKMANSHIP

.1 Unless otherwise instructed in the Contract Documents, the preparation of the subgrade shall be the responsibility of the General Contractor. Placement of growing medium constitutes acceptance of the subgrade by the Landscape Contractor. Any subsequent corrections to the subgrade required are the responsibility of the Landscape Contractor.

.2 All work and superintendence shall be performed by personnel skilled in landscape contracting. In addition, all personnel applying herbicides and/or pesticides shall hold a current license issued by the appropriate authorities.

.3 A site visit is required to become familiar with site conditions before bidding and before start of work.

.4 Confirm location of all services before proceeding with any work.

.5 Notify Landscape Architect of any discrepancies. Obtain approval from Landscape Architect prior to deviating from the plans.

.6 Take appropriate measures to avoid environmental damage. Do not dump any waste materials into water bodies. Conform with all federal, provincial and local statutes and guidelines.

.7 Collect and dispose of all debris and/or excess material from landscape operations. Keep paved surfaces clean and repair damage resulting from landscape work. Repairs are to be completed prior to final acceptance.

.8 Where new work connects with existing, and where existing work is altered, make good to match existing undisturbed condition.

1.6 WARRANTIES

.1 Guarantee all materials and workmanship for a minimum period of one full year from the date of Certificate of Completion.

.2 Refer to individual sections for specific warranties.

PART TWO SCOPE OF WORK

2.1 SCOPE OF WORK

.1 Other conditions of Contract may apply. Confirm Scope of Work at time of tender.

.2 Work includes supply of all related items and performing all operations necessary to complete the work in accordance with the drawings and specifications and generally consists of the following:

.2.1 Retention of Existing Trees where shown on drawings.
.2.2 Finish Grading and Landscape Drainage.
.2.3 Supply and placement of growing medium.
.2.4 Testing of imported growing medium and/or site topsoil.
.2.5 Supply and incorporation of additives to meet requirements of soil test and Table One.
.2.6 Preparation of planting beds, supply of plant material and planting.
~~.2.7 Preparation of rough grass areas, supply of materials and seeding.~~
.2.8 Preparation of lawn areas, supply of materials and sodding.
.2.9 Supply and placement of bark mulch.
.2.10 Maintenance of planted and seeded/sodded areas until accepted by Owner.
.2.11 SEPARATE PRICE: Establishment Maintenance, Section 3.11.
.2.12 Other work: Work other than this list, not specified by Landscape Architect.

2.2 MATERIALS

.1 Growing Medium: Conform to Canadian Landscape Standard for definitions of imported and on-site topsoil. Refer to Table One below.

TABLE ONE: PROPERTIES OF GROWING MEDIUM FOR LEVEL 2 GROOMED AND LEVEL 3 MODERATE AREAS
Canadian System of Soil Classification Textural Class: "Loamy Sand" to "Sandy Loam".

Applications	Low Traffic Areas. Trees and Large Shrubs	High Traffic Lawn Areas	Planting Areas and Planters
Growing Medium Types	2L	2H	2P
Texture	Percent Of Dry Weight of Total Growing Medium		
Coarse Gravel: larger than 25mm	0 - 1%	0 - 1%	0 - 1%
All Gravel: larger than 2mm	0 - 5%	0 - 5%	0 - 5%
	Percent Of Dry Weight of Growing Medium Excluding Gravel		
Sand: larger than 0.05mm smaller than 2.0mm	50 - 80%	70 - 90%	40 - 80%
Silt: larger than 0.002mm smaller than 0.05mm	10 - 25%	0 - 15%	10 - 25%
Clay: smaller than 0.002mm	0 - 25%	0 - 15%	0 - 25%
Clay and Silt Combined	maximum 35%	maximum 15%	maximum 35%
Organic Content (coastal)	3 - 10%	3 - 5%	10 - 20%
Organic Content (interior)	3 - 5%	3 - 5%	15 - 20%
Acidity (pH)	6.0 - 7.0	6.0 - 7.0	4.5 - 6.5
Drainage	Percolation shall be such that no standing water is visible 60 minutes after at least 10 minutes of moderate to heavy rain or irrigation.		

.2 Fertilizer: An organic and/or inorganic compound containing Nitrogen (N), Phosphate (25), and Potash (soluble 2) in proportions required by soil test.

.3 Lime: Ground agricultural limestone. Meet requirements of the Canadian Landscape Standard.

.4 Organic Additive: Commercial compost product to the requirements of the Canadian Landscape Standard, latest edition and pre-approved by the Landscape Architect. Recommended suppliers: The Answer Garden Products, Fraser Richmond Soils & Fibre, Stream Organics Management.

.5 Sand: Clean, washed pump sand to meet requirements of the Canadian Landscape Standard.

.6 Composted Bark Mulch: 10mm (3/8") minus Fir/Hemlock bark chips and fines, free of chunks and sticks, dark brown in colour and free of all soil, stones, roots or other extraneous matter. Fresh orange in colour bark will be rejected.

.7 Herbicides and Pesticides: If used, must conform to all federal, provincial and local statutes. Appliers must hold current licenses issued by the appropriate authorities in the area.

.8 Filter Fabric: A non biodegradable blanket or other filtering membrane that will allow the passage of water but not fine soil particles. (Such as MIRAFI 140 NL, GEOLON N40 OR AMOCO 4545 or alternate product pre-approved by the Landscape Architect.)

.9 Drainage Piping if required: Schedule 40 PVC nominal sizes.

.10 Drain Rock: Clean, round, inert, durable, and have a maximum size of 19mm and containing no material smaller than 10mm.

.11 Plant Material: To the requirements of the Canadian Landscape Standard. Refer to 3.9, Plants and Planting. All plant material must be provided from a certified disease free nursery. Provide proof of certification.

.12 Sod: Refer to individual sections in this specification.

.13 Supplier and installers of segmental block walls to provide engineered drawings for all walls: signed and sealed drawings for all walls, individually, in excess of 1.2m, or combinations of walls collectively in excess of 1.2m. Installations must be reviewed and signed off by Certified Professional Engineer; inlcude cost of engineering services in Tender price.

.14 Miscellaneous: Any other material necessary to complete the project as shown on the drawings and described herein.

PART THREE SOFT LANDSCAPE DEVELOPMENT

3.1 RETENTION OF EXISTING TREES

.1 Prior to any work on site - protect individual trees or plant groupings indicated as retained on landscape plans as vegetation retention areas.
.1.1 In some instances the Landscape Architect will tag trees or areas to remain. Discuss tree retention areas at a start-up meeting with the Landscape Architect.

.2 A physical barrier must be installed to delineate clearing boundaries. Refer to physical barrier detail. If detail not provided, comply with local municipal requirements.

.3 No machine travel through or within vegetation retention areas or under crowns of trees to be retained is allowed.

.4 Do not stockpile soil, construction materials, or excavated materials within vegetation retention areas.

.5 Do not park, fuel or service vehicles within vegetation retention areas.

.6 No debris fires, clearing fires or trash burning shall be permitted within vegetation retention areas.

.7 No excavations, drain or service trenches nor any other disruption shall be permitted within vegetation retention areas without a review of the proposed encroachment by the Landscape Architect.

.8 Do not cut branches or roots of retained trees without the approval of the Landscape Architect.

.9 Any damage to existing vegetation intended for preservation will be subject to evaluation by an I.S.A. Certified Arborist using the "Guide for Plant Appraisal", Eighth Edition, 1992.
.9.1 Replacement planting of equivalent value to the disturbance will be required. The cost of the evaluation and of the replacement planting will be the responsibility of the General Contractor and or the person(s) responsible for the disturbance.

.10 In municipalities with specific tree retention/replacement bylaws ensure compliance to bylaws.

.11 In situations where required construction may disturb existing vegetation intended for preservation, contact Landscape Architect for review prior to commencing construction.

3.2 GRADES

.1 Ensure subgrade is prepared to conform to depths specified in Section 3.5, Growing Medium Supply, below. Where planting is indicated close to existing trees, prepare suitable planting pockets for material indicated on the planting plan. Shape subgrade to eliminate free standing water and conform to the site grading and drainage plan.

.2 On slopes in excess of 3:1 trench subgrade across slope to 150mm (6") minimum at 1.5m (5 ft.) intervals minimum.

.3 Scarify the entire subgrade immediately prior to placing growing medium. Re-cultivate where vehicular traffic results in compaction during the construction procedures. Ensure that all planting areas are smoothly contoured after light compaction to finished grades.

.4 Eliminate standing water from all finished grades. Provide a smooth, firm and even surface and conform to grades shown on the Landscape Drawings. Do not exceed maximum and minimum gradients defined by the Canadian Landscape Standard.

.5 Construct swales true to line and grade, smooth and free of sags or high points. Minimum slope 2%, maximum side slopes 10%. Assure positive drainage to collection points.

.6 Slope not to exceed the following maximums: Rough Grass 3:1, Lawn 4:1, Landscape plantings 2:1.

.7 Finished soil/mulch elevation at building to comply with municipal requirements.

.8 Inform Landscape Architect of completion of finish grade prior to placement of seed, sod, plants or mulch.

3.3 LANDSCAPE DRAINAGE

.1 Related Work: Growing medium and Finish Grading, Grass areas, Trees Shrubs and Groundcovers, Planters, Crib Walls.

.2 Work Included: Site finish grading and surface drainage. Installation of any drainage systems detailed on landscape plans. Note: Catch basins shown on landscape plans for coordination only, confirm scope of work prior to bid.
.2.1 Coordinate all landscape drainage work with rest of site drainage, Refer to engineering drawings and specifications for connections and other drainege work.
.2.2 Determine exact location of all existing utilities and structures and underground utilities prior to commencing work, which may not be located on drawings and conduct work so as to prevent interruption of service or damage to them. Protect existing structures and utility services and be responsible for damage caused.
.2.3 Planter drains on slab: Refer to Section 3.10, Installing Landscapes on Structures.

.3 Execution
.3.1 Do trenching and backfilling in accordance with engineering details and specifications.
.3.2 Lay drains on prepared bed, true to line and grade with inverts smooth and free of sags or high points. Ensure barrel of each pipe is in contact with bed throughout full length.
.3.3 Commence laying pipe at outlet and proceed in upstream direction.
.3.4 Lay perforated pipes with perforations at 8pm and 4pm positions.
.3.5 Make joints tight in accordance with manufacturer's directions.
.3.6 Do not allow water to flow through the pipes during construction except as approved by Engineer.
.3.7 Make watertight connections to existing drains, new or existing manholes or catchbasins where indicated or as directed by Landscape Architect.
.3.8 Plug upstream ends of pipe with watertight clean out caps.
.3.9 Surround and cover pipe with drain rock in uniform 150mm layers to various depths as shown in details, minimum 100mm.
.3.10 Cover drain rock with non-woven filter cloth lap all edges and seams minimum 150mm.
.3.11 Assure positive drainage.
.3.12 Back fill remainder of trench as indicated.
.3.13 Protect subdrains from floatation during installation.

3.4 GROWING MEDIUM TESTING

.1 Submit representative sample of growing medium proposed for use on this project to an independent laboratory. Provide test results to Landscape Architect prior to placing. Test results to include:
.1.1 Physical properties, % content of gravel, sand, silt, clay and organics.
.1.2 Acidity PH and quantities of lime or sulphur required to bring within specified range.
.1.3 Nutrient levels of principle and trace elements and recommendations for required soil amendments.
.1.4 Carbon/Nitrogen level.

3.5 GROWING MEDIUM SUPPLY AND PLACEMENT

.1 Supply all growing medium required for the performance of the Contract. Do not load, transport or spread growing medium when it is so wet that its structure is likely to be damaged.

.2 Supply all growing medium admixtures as required by the soil test. Amended growing medium must meet the specification for growing medium as defined in Table One for the various areas.
.2.1 Thoroughly mix required amendments into the full depth of the growing medium.
.2.2 Special mixes may be required for various situations. Refer to drawing notes for instructions.

.3 Place the amended growing medium in all grass and planting areas. Spread growing medium in uniform layers not exceeding 6" (150mm), over unfrozen subgrade free of standing water.

.4 Minimum depths of growing medium placed and compacted to 80%:
.4.1 On-grade:
.4.1.1 Seeded end sodded lawn..........6" (150mm)
.4.1.2 Mass planted shrubs & groundcovers..........15" (400mm)
.4.1.3 Groundcover only areas, if defined on plan..........9" (225mm)
.4.1.4 Tree & large shrub pits..........depth to conform to depth of rootball - width shall be at least twice the width of the root ball with saucer shaped sides.
.4.2 On-Slab:
.4.2.1 Irrigated lawn..........9" (210mm)
.4.2.2 Groundcover areas..........12" (300mm)
.4.2.3 Lawn without automatic irrigation..........12" (300mm)
.4.2.4 Shrub & groundcover areas..........15" (380mm)
.4.2.5 Trees and specimen shrubs..........30" (760mm) over columns and/or edge of slab (verify column locations on-site for tree locations)
.4.2.6 Depth noted includes 1" to 2" (25-50mm) sand over filter fabric
.4.2.7 Maximum 18" depth growing medium except where mounded for trees over column points.

.5 Manually spread growing medium/planting soil around existing trees, shrubs and obstacles.

.6 In perimeter seeded grass areas, feather growing medium out to nothing at edges and blend into existing grades.

.7 Finished grades shall conform to the elevations shown on landscape and site plans.

3.6 ROUGH GRASS AREA - SEEDING

.1 General: Rough grass areas are noted on the drawings as "Rough Grass". Treat all areas defined as rough grass between all property lines of the project including all boulevards to edge of roads and lanes.

.2 Preparation of Surfaces: To Canadian Landscape Standard Class 3 Areas (Rough grass) Section 7.1.1.3
.2.1 Clean existing soil by mechanical means of debris over 50mm in any dimension.
.2.2 Roughly grade surfaces to allow for maintenance specified and for positive drainage.

.3 Time of Seeding: Seed from early spring (generally April 1st) to late fall (September 15th) of each year. Further extensions may be obtained on concurrence of the Landscape Architect.

.4 Seed Supply & Testing: All seed must be obtained from a recognized seed supplier and shall be No. 1 grass mixture delivered in containers bearing the following information:
.4.1 Analysis of the seed mixture
.4.2 Percentage of each seed type

.5 Seed Mixture: All varieties shall be rated as strong performers in the Pacific Northwest and are subject to client approval.
70% Creeping Red Fescue
20% Annual Rye
5% Saturn Perennial Rye
5% Kentucky Bluegrass
For Wildflower Areas use a mixture of Wildflowers with Hard Fescues (Terralink Coastal Wildflowers) with Hard Fescue or pre-approved alternate.

.6 Fertilizer: Mechanical seeding: Apply a complete synthetic slow-release fertilizer with maximum 35% water soluble nitrogen and a formulation ratio of 18-18-18 - 50% sulphur urea coated , 112 kg/ha(100lbs/acre) using a mechanical spreader.

.7 Seeding: Apply seed at a rate of 112k/H (100lbs /acre) with a mechanical spreader. incorporate seed into the top 1/4" (6mm) of soil and lightly compact.

.8 Acceptance: Provide adequete protection of the seeded areas until conditions of acceptance have been met. Comply with Section 3.7 Hydroseeding.

3.7 HYDROSEEDING

.1 May be used as an alternate to mechanical seeding in rough grass areas.

.2 May not be used in areas of lawn unless pre-approved by the Landscape Architect prior to bidding.

.3 Preparation and Growing Medium:
.3.1 In areas of Rough Grass: Comply with Section 3.6 Rough Grass.
.3.2 Where approved for use in areas of lawn, comply with Section 3.8 Lawn Areas: Sodding.

.4 Protection: Ensure that fertilizer in solution does not come in contact with the foliage of any trees, shrubs, or other susceptible vegetation. Do not spray seed or mulch on objects not expected to grow grass. Protect existing site equipment, roadways, landscaping, reference points, monuments, markers and structures from damage. Where contamination occurs, remove seeding slurry to satisfaction of and by means approved by the Landscape Architect

.5 Mulch shall consist of virgin wood fibre or recycled paper fibre designed for hydraulic seeding and dyed for ease of monitoring application. If using recycled paper material for wood fibre substitute use 135% (by weight). Conform to Canadian Landscape Standard for mulch requirements.

.6 Water: Shall be free of any impurities that may have an injurious effect on the success of seeding or may be harmful to the environment.

.7 Equipment: Use industry standard hydraulic seeder/mulcher equipment with the tank volume certified by an identification plate or sticker affixed in plain view on the equipment. The hydraulic seeder/mulcher shall be capable of sufficient agitation to mix the material into a homogenous slurry and to maintain the slurry in a homogenous state until it is applied. The discharge pumps and gun nozzles shall be capable of applying the materials uniformly over the designated area.

PART THREE SOFT LANDSCAPE DEVELOPMENT - CONT

.8 Application Rate:
.8.1 Seed Mixture: 136 kg/ha (125 lbs/acre)
.8.2 Fertilizer: 112 kg/ha (100 lbs/acre)
.8.3 Coastal Wildflower Mix: Where specified, apply (31 lbs/acre) (1/4 lb.: 1 lb. of grass seed)
.8.4 Notes:
.8.4.1 At the time of Tender provide a complete chart of all components of the mix proposed including mulch, tackifier, water etc. Sloped sites require tackifier.
.8.4.2 Fertilizer:
.8.4.2.1 Rough Grass: If a soil analysis is available, comply with results.
.8.4.2.2 Lawn: Where hydroseeding is approved, comply with soil analysis recommendations.

.9 Accurately measure the quantities of each of the materials to be charged into the tank either by mass or by a commonly accepted system of mass-calibrated volume measurements. The materials shall be added to the tank while it is being filled with water, in the following sequence; seed, fertilizer. Thoroughly mix into a homogenous slurry. After charging, add no water or other material to the mixture. Do not leave slurry in the tank for more than four (4) hours.

.10 Distribute slurry uniformly over the surface of the area to be hydroseeded. Blend application into previous applications and existing grass areas to form uniform surfaces.

.11 Clean up: Remove all materials and other debris resulting from seeding operations from the job site.

.12 Maintenance: Begin maintenance immediately after seeding and continue for 60 days after Substantial Completion and until accepted by the Owner. Re-seed at three week intervals where germination has failed. Protect seeded areas from damage with temporary wire or twine fences complete with signage until grass area is taken over by the Owner. Water in sufficient quantities to ensure deep penetration and at frequent intervals to maintain vigorous growth until grass is taken over by the Owner. It is the Owner's responsibility to supply water at no extra cost to the Contract.

.13 Acceptance of the Rough Grass Areas: Proper germination of all specified grass species is the responsibility of the Landscape Contractor. The grass shall be reasonably well established, with no apparent dead or bare spots and shall be reasonably free of weeds (to Canadian Landscape Standard, Section 13 Maintenance Level 4 (Open space). Sixty days after substantial completion, areas meeting the conditions above will be taken over by the Owner. Areas seeded in Fall will be accepted in Spring one month after start of growing season, provided that the above conditions for acceptance are fulfilled.

3.8 LAWN AREAS - SODDING

.1 General: Treat all areas defined as lawn areas on the landscape plan between all property lines of the project including all boulevards to edge of roads and lanes.

.2 Growing Medium: Comply with Section 2.2.1, Growing Medium. Prior to sodding, request an inspection of the finished grade, and depth and condition of growing medium by the Landscape Architect.

.3 Time of Sodding: Sod from April 1st to October 1st. Further extensions may be obtained on concurrence of the Landscape Architect.

.4 Sod Supply: Conform to all conditions of Canadian Landscape Standard, Section 8, B.C. Standard for Turfgrass Sod.

.5 Specified Turfgrass by area: Refer to Table 2 below.

TABLE 2 SPECIFIED TURFGRASS BY AREA

Area	Description	Quality Grade	Major Species
CLASS 1	Lawn, all areas noted on drawings as lawn in urban development sites including boulevard grass	No. 1 Premium	Kentucky Blue for sun, Fescues for shade
CLASS 2	Grass - public parks, industrial and institutional sites	No. 2 Standard	same
CLASS 3	Rough Grass	see hydroseeding	
SPECIAL			

.6 Lime: The lime shall be as defined in Section 2.2.3, Materials. Apply at rates recommended in required soil test. Refer to Section 3.4 for method.

.7 Fertilizer: Refer to Section 2.2.2 Materials. Apply specified fertilizer at rates shown in the required soil test. Apply with a mechanical spreader. Cultivate into growing medium 48 hours prior to sodding. Apply separately from lime.

.8 Sodding: Prepare a smooth, firm, even surface for laying sod. Lay sod staggered with sections closely butted, without overlapping or gaps, smooth and even with adjoining areas and roll lightly. Water to obtain moisture penetration of 3" to 4" (7 - 10cm). Comply with requirements of Canadian Landscape Standard Section 8, BC Standard for Turfgrass Sod.

.9 Maintenance: Begin maintenance immediately after sodding and continue for 60 days after Substantial Completion and until accepted by the Owner. Protect sodded areas from damage with temporary wire or twine fences complete with signage until lawn is taken over by the Owner. Water to obtain moisture penetration of 3" to 4" (7-10cm) at intervals necessary to maintain sufficient growth. Keep grass cut at height of between 1-1/2" (4cm) and 2" (5cm). Provide adequate protection of sodded areas against damage until the turf has been taken over by Owner. Repair any damaged areas, re-grade as necessary. Aeration may be required if in the Landscape Architect's opinion, drainage through the sod base medium is impaired.

.10 Acceptance of Lawn Areas: The turf shall be reasonably well established, with no apparent dead spots or bare spots and shall be reasonably free of weeds (to Canadian Landscape Standard, Section 13 Maintenance Level 2 (Appearance). Use herbicides if necessary for weed removal unless other conditions of contract forbid their use. After the lawn has been cut at least twice, areas meeting the conditions above will be taken over by the Owner.

3.9 PLANTS AND PLANTING

.1 Conform to planting layout as shown on Landscape Plans.

.2 Obtain approval of Landscape Architect for layout and preparation of planting prior to commencement of planting operations.

.3 Make edge of beds with smooth clean defined lines.

.4 Time of Planting:
.4.1 Plant trees, shrubs and groundcovers only during periods that are normal for such work as determined by local weather conditions when seasonal conditions are likely to ensure successful adaptation of plants to their new location.

.5 Standards:
.5.1 All plant material shall conform to the requirements of the Canadian Landscape Standard, latest edition, unless exceeded by drawing Plant Schedule or this specification.
.5.1.1 Refer to Canadian Landscape Standard, Section 9, Plants and Planting and in Section 12, BCLNA Standard for Container Grown Plants for minimum standards.
.5.1.2 Refer to Plant Schedule for specific plant and container sizes and comply with requirements.
.5.2 Plant material obtained from areas with less severe climatic conditions shall be grown to withstand the site climate.

.6 Review:
.6.1 Review at the source of supply and/or collection point does not prevent subsequent rejection of any or all planting stock at the site.

.7 Availability:
.7.1 Area of search includes the Lower Mainland and Fraser Valley. Refer to Plant Schedule for any extension of area.
.7.2 Supply proof of the availability of the specified plant material within 30 days of the award of the Contract.

.8 Substitution:
.8.1 Obtain written approval of the Landscape Architect prior to making any substitutions to the specified material. Non-approved substitutions will be rejected.
.8.2 Allow a minimum of 5 days prior to delivery for request to substitute.
.8.3 Substitutions are subject to Canadian Landscape Standard - definition of Conditions of Availability.

.9 Plant Species & Location:
.9.1 Plants shall be true to name and of the height, caliper and size of root ball as shown on the landscape/site plan plant schedule. Caliper of trees is to be taken 6" (15cm) above grade.
.9.2 Plant all specified species in the location as shown on the landscape drawings. Notify Landscape Architect if conflicting rock or underground/overhead services are encountered.
.9.3 Deviation of given planting location will only be allowed after review of the proposed deviation by the Landscape Architect.

.10 Excavation:
.10.1 Trees and large shrubs: Excavate a saucer shaped tree pit to the depth of the rootball and to at least twice the width of the rootball. Assure that finished grade is at the original grade the tree was grown at.

.11 Drainage of Planting Holes:
.11.1 Provide drainage of planting pits where required. ie. on sloped conditions, break out the side of the planting pit to allow drainage down slope; and in flat conditions, mound to raise the rootball above impervious layer. Notify the Landscape Architect where the drainage of planting holes is limited.

.12 Planting and Fertilizing Procedures:
.12.1 Plant all trees and shrubs with the roots placed in their natural growing position. If burlapped, loosen around the top of the ball and cut away or fold under. Do not pull burlap from under the ball. Carefully remove containers without injuring the rootballs. After settled in place, cut twine. For wire baskets, clip and remove top three rows of wire.
.12.2 Fill the planting holes by gently firming the growing medium around the root system in 6" (15cm) layers. Settle the soil with water. Add soil as required to meet finish grade. Leave no air voids. When 2/3 of the topsoil has been placed, apply fertilizer as recommended by the required soil test at the specified rates.
.12.3 Where planting is indicated adjacent to existing trees, use special care to avoid disturbance of the root system or natural grades of such trees.
.12.4 Where trees are in lawn areas, provide a clean cut mulched 900mm (3 ft.) diameter circle centered on the tree.

.13 Staking of Trees:
.13.1 Use two 2"x2"x5' stakes, unless superseded by municipal requirements. Set stakes minimum 2 ft. in soil. Do not drive stake through rootball.
.13.2 Leave the tree carefully vertical.
.13.3 Tie with pre-approved commercial, flat woven polypropylene fabric belt, minimum width 19mm (3/4"). Approved product: ArborTie - available from DeepRoot.
.13.4 Coniferous Trees over 6 ft. height: Guy with three 2-strand wires (11 gauge). Drive three stakes equidistant around the tree completely below grade.
.13.5 Trees 6 ft.+ on Wood or Concrete Decks: Guy as above using three deadmen (min. 2"x2"x4") buried to the maximum possible depth instead of stakes.
.13.6 Mark all guy wires with visible flagging material.

.14 Pruning:
.14.1 Limit pruning to the minimum necessary to remove dead or injured branches. Preserve the natural character of the plants, do not cut the leader. Use only clean, sharp tools. Make all cuts clean and cut to the branch collar leaving no stubs. Shape affected areas so as not to retain water. Remove damaged material.

.15 Mulching:
.15.1 Mulch all planting areas with an even layer of mulch to 2-1/2 - 3" (65 - 75mm) depth. Confirm placement of mulch in areas labeled "Groundcover Area" on drawings. Mulch a 3 ft. (900mm) diameter circle around trees in lawn areas, leave a clean edge.

.16 Acceptance:
.16.1 The establishment of all plant material is the responsibility of the Landscape Contractor.

.17 Plant Material Maintenance:
.17.1 Maintain all plant material for 60 days after landscape work has received a Certificate of Completion.
.17.2 Watering: Conform to Canadian Landscape Standard, Section 13.3.2 - Watering and generally as follows:
.17.2.1 Water to supplement natural rainfall such that the soil moisture content is kept to 50% to 100% of field capacity. Water to the full depth of the root zone each time. The Owner is responsible to supply water at no extra cost to the Contract. Confirm source of water prior to beginning work.
.17.3 Use appropriate measures to combat pests or diseases damaging plant material. Comply with all local governing statutes and guidelines for chemical control.
.17.4 Plant material which fails to survive shall be replaced in the next appropriate season as determined by the Landscape Architect.
.17.5 Repair tree guards, stakes, and guy wires, when necessary.
.17.6 Maintain areas relatively weed free. (Appearance level 2, Canadian Landscape Standard, Chapter 13).
.17.7 Maintain mulch to specified depths.

.18 Plant Warranty:
.18.1 Replace all unsatisfactory plant material except those designated "Specimen" for a period of one (1) year after the Certificate of Completion. Replace all unsatisfactory plant material designated "Specimen" for a period of two (2) years after the Certificate of Completion. Replace all unsatisfactory trees and shrubs and continue to replace these until the specified number is complete and satisfactory to the Landscape Architect. Such replacement shall be subject to the notification, inspection and approval as specified for the original planting, and shall not constitute an extra to the Contract.
.18.2 Those Plants, identified as hardy within one zone of the Canada Department of Agriculture zonal class for the area, specified by the Landscape Architect and installed by the Landscape Contractor which are killed through below normal temperatures (below the average of the extreme minimum temperatures officially recorded in the area concerned, in the last 10 years), will not be replaced without cost of replacement borne by the Owner.
.18.3 A review may be requested during the latter part of the warranty growing season. All plant material showing well developed foliage, healthy growth and bud forming, will then be taken over.

PART THREE SOFT LANDSCAPE DEVELOPMENT - CONT

.18.4 For all plant material, the Landscape Architect reserves the right to extend the Contractor's responsibility for another growing season if, in his opinion, leaf development and growth is not sufficient to ensure future satisfactory growth.
.18.5 Where the Owner is responsible for plant maintenance and has not provided adequate maintenance, the plant replacement section of the contract may be declared void. The Landscape Architect shall determine whether maintenance has been satisfactory using the Canadian Landscape Standard, Section 13, Maintenance as the guide. The required maintenance standard is a minimum of Level Three - Medium. Refer to Section 3.11, Establishment Maintenance.
.18.6 The Landscape Contractor is responsible to replace any plant material or repair any construction included in the Contract that is damaged or stolen until the issuance of the Certificate of Completion.
.18.7 Deviation from the specifications may require extension of the Warranty Period as determined by the Landscape Architect.

3.10 INSTALLING LANDSCAPE ON STRUCTURES

.1 Verify that drainage and protection material is completely installed and acceptable before beginning work. Contact Landscape Architect for instructions if not in place.

.2 Coordinate work with construction of planters and planter drainage.
.2.1 Verify that planter drains are in place and positive drainage to roof drains is present prior to placing any drain rock or soil.

.3 Provide clean out at all through-slab drain locations. Use 300mm min. dia. PVC Pipe filled with drain rock unless specific drawing detail shown.

.4 Install drain rock evenly to a minimum depth of 4" (100mm)or alternate sheet drain if specified. Install sheet drain as per manufacturer's recommendations.

.5 Cover drain rock (or alternate sheet drain if specified on drawing details) with filter fabric lapping 6" (150mm) at all edges. Obtain approval of drainage system prior to placing growing medium.

.6 Place an even layer of 25 - 50mm clean washed pump sand over filter fabric.

.7 Place growing medium to depths specified in Section 3.5 above for various surface treatments. Refer to Drawing details for any light weight filler required to alter grade. Use Styrofoam block over drain rock shaped to provide smooth surface transition at edges. Butt each piece tightly together and cover with filter fabric to prevent soil from migrating downward.

3.11 ESTABLISHMENT MAINTENANCE (Provide a separate price for this section)

.1 Intent: The intent of "establishment" maintenance is to provide sufficient care to newly installed plant material for a relatively short period of time to ensure or increase the long term success of the planting. The objective is the adaptation of plants to a new site.in order to obtain the desired effect from the planting while reducing the rate of failure and unnecessary work associated with improper establishment. Establishment of maintenance procedures apply to all new and retained vegetation including cultivated turfgrass areas and new trees and shrubs.

.2 Maintenance Period: Provide maintenance of installed landscaping for 12 months following substantial completion.

.3 Related Standards and Legislation: Canadian Landscape Standard, latest edition; Fertilizer Code, B.C. Pesticide Control Act.

.4 Site Review: In addition to the inspections at substantial completion, at final progress draw application, and at the end of the guarantee period, there should be three other reviews during the 12 months attended by the Contractor and a designated representative of the Owner. Maintain a logbook and reporting procedures and submit to the designated representative.

.5 Scheduling: Prepare a schedule of anticipated visits and submit to designated representative at start-up. Maintenance operations shall be carried out predominately during the growing season between March 1st and November 30th, however visits at other times of the year may be required.

.6 Maintenance Level: Comply with B. C Landscape Standard, Section 14, Table 14.2, Maintenance Level 2 "Groomed".

.7 Materials: Comply with Part Two of this specification.
.7.1 Fertilizers: To the requirements of the Canadian Landscape Standard. Formulations and rates as required by soil testing.

.8 Plant Material Establishment:
.8.1 Watering: During the first growing season, water new plants at least every ten (10) days between April 1st and July 31st, and every twenty (20) days between August 1st and September 15th. Minimum 25 gallons per tree per application. During the second growing season, water new plants at least every twenty days between April 1 and July 31 and once between August 1st and September 31st. Apply water at a rate and duration such that the water content reaches field capacity to the full depth of the growing medium. Apply water again when the water content reaches 25% of field capacity. Provide and irrigate with water in the event that any automatic irrigation system malfunctions or has not been completely installed. Scheduled applications of water shall be missed only when rainfall has penetrated the soil fully as required.
.8.2 Mulch: Maintain mulches in the original areas and to the original depths.
.8.3 Weed Control: Remove all weeds from all areas at least once per month during the growing season by hoeing or cultivation to a maximum depth of 80mm, hand-pulling, or, if necessary, by the use of herbicides.
.8.4 Pest and Disease Control: Inspect all planted areas for pests and diseases periodically and at least every two months during the growing season by an experienced person. Carry out treatment for pests or diseases promptly and consistently for maximum effectiveness. Comply with all B.C. Pesticide Control Act and municipal requirements.
.8.5 Tree Support: Maintain stakes, guy wires and ties one full growing season. Check ties at least every two months to ensure that they are not causing a depression in the bark. Loosen, repair or replace ties as necessary. Remove all stakes guy wires and ties after the first growing season except where large trees require continuing support in the opinion of the Landscape Architect. All flagging of guy wires shall be visible and in good repair.
.8.6 Pruning: Inspect all trees and shrubs at least every two months during the growing season; prune to remove all dead, weak or diseased wood. Maintain the natural shape of the plant. Carry out clipping or shaping only if required in the maintenance contract for specific varieties or conditions.
.8.7 Fertilizing: Once during the twelve month period of establishment maintenance fertilize shrubs, trees and groundcovers according to soil analysis requirements.

.9 Grass Areas Establishment:
.9.1 Watering: Use hoses and sprinklers, irrigation systems or other methods to apply water to Class 1 and Class 2 grassed areas (Canadian Landscape Standard, Section 7, Lawns and Grasses) such that the grass is maintained in a turgid condition. Supply and irrigate with water in the event of any irrigation system malfunction, or incomplete installation at no expense to the owner. Apply water to prevent packing or erosion of the soil. Apply water at a rate and duration so that the water content in the growing medium reaches field capacity to the full depth of the growing medium. Apply water again when the water content reaches 25% of field capacity.
.9.2 Weed, Insect and Disease Control: Inspect grass areas each time they are mowed for weeds, insect pests, and diseases and treat promptly when necessary by appropriate manual methods, or by the use of chemicals in compliance with the B.C.S.L.A./B.C.L.N.A. Landscape Standards latest edition. Kill broadleafed weeds in grassed areas by a general application of a suitable herbicide if the weed population exceeds 10 Broadleaf weeds or 50 annual weeds or weedy grasses per 40 square meters. This application shall reduce the weed population to zero.
.9.3 Fertilizing: According to soil analysis.
.9.4 Liming According to soil analysis
.9.5 Mowing and Trimming - All areas: The first four cuts shall be a sharp rotary type mower. Excess grass clipping shall be removed after each cut. Mow all grassed areas with a sharp reel or rotary mower when the grass reaches a height of 60mm. Mow to a height of 40mm. Edge with a mechanical vertical cutting edger once per year in March. Remove all grass clippings after each cut.
.9.6 Aeration: Aeration not required in the first growing season. If necessary, in the second growing season, aerate in early May with a suitable mechanical corer. Core to a depth of 100mm. (4"), and remove cores.
.9.7 Repairs: Re-grade, re-seed or re-sod when necessary to restore damaged or failing grass areas. Match the grass varieties in the surrounding area. Re-sod, if required, throughout the growing season. Re-seed between April 1st and April 15th or between September 1st and September 15th. Protect re-seeded areas and keep moist until the first mowing.

pmg LANDSCAPE ARCHITECTS
Suite C100 - 4185 Still Creek Drive
Burnaby, British Columbia, V5C 6G9
p: 604 294-0011 ; f: 604 294-0022

SEAL:

NO.	DATE	REVISION DESCRIPTION	DR.
14	18.JAN.26	ISSUED FOR BP	MM
13	18.JAN.08	REVISE DAYCARE BUILDING	DO
12	17.DEC.21	UPDATED DAYCARE	MM
11	17.NOV.30	REV. DAYCARE BLDG OUTLINE	MM
10	17.NOV.22	REV. AS PER MUN. COMMENTS	MM
9	17.OCT.05	REV. AS PER MUN. COMMENTS	MM
8	17.JULY.19	REV.AS PER MUN. COMMENTS	MM
7	17.APR.26	COMMENTS	DO
6	17.MAR.27	NEW SITE PLAN, MUN. COMMENTS	MM
5	16.NOV.25	NEW SITE PLAN. COMMENTS	YR
4	16.NOV.15	NEW SITE PLAN, MUN. COMMENTS	MM
3	16.JAN.08	LANDSCAPE GRADING PLAN	CLG
2	15.DEC.22	DP SUBMISSION	MM
	15.NOV.17	NEW SITE PLAN	MM

Plan 36 Jan 26, 2018
DP 16-721500

PROJECT:

NORTHVIEW ESTATE

10311 RIVER DR.
RICHMOND, B.C.

DRAWING TITLE:

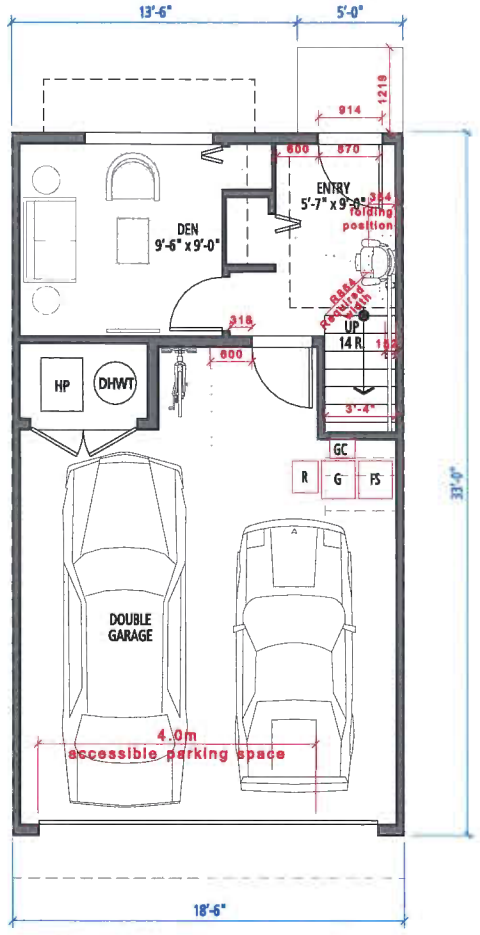
LANDSCAPE SPECIFICATIONS

DATE: 15.SEP.01
SCALE:
DRAWN: MM
DESIGN: MM
CHK'D: MCY

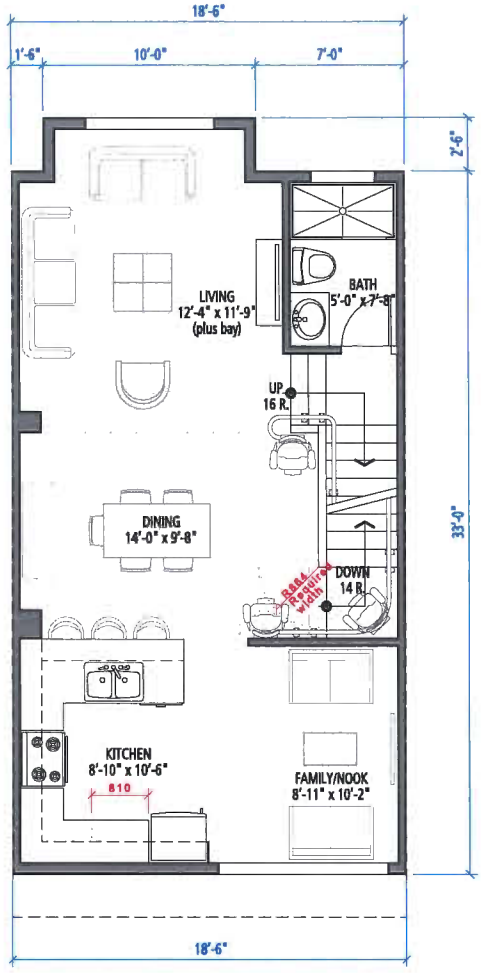
DRAWING NUMBER: **L17** OF 17

PMG PROJECT NUMBER: 15-116

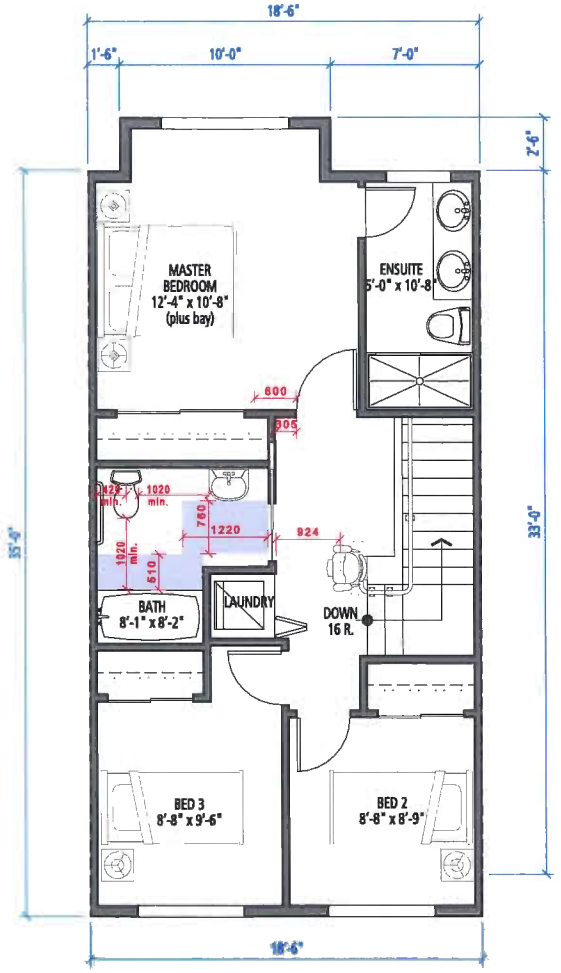
15116-17.ZIP



GROUND FLOOR



MAIN FLOOR



UPPER FLOOR

Summary of the Convertible Unit Features Checklist as Submited

- Entry doors 914 mm opening.
- Entry door clear exterior floor space min. 1220 mm depth by door width plus 600 mm on latch side.
- Interior doors to entry & main living areas, min. 800 mm clear opening. (2'8"sliding or 2'10"swinging door spec.) with flush thresholds max.13mm height.
- Stair lift as per manufacturer spec (Bruno,SRE-2010-Electra-Ride)
- Hallways minimum 900 mm width
- Door from garage to living area minimum 800 mm clear opening.
- Min. clear opening 860 mm clear opening to Patios and Balconies.
- Toilet clear floor space min. 1020 mm at side and in front
- Interior Doors to main living areas, 1 bedroom and 1 bedroom min 800 mm clear opening with flush thresholds max. 13 mm height.
- Wall blocking for future installation of grab-bars (toilet, tub and shower)
- Clear area needed under future work space. Plumbing and gas pipes (in-wall and in-floor) located clear of under counter area of future work space (stove, sink & min. 810 mm wide counter)
- 1500 mm turning diameter or turning path diagram
- One window that can be opened with a single hand in the living room
- One window that can be opened with a single hand in one bedroom

CONVERTIBLE UNIT FLOOR PLANS (A3)

SCALE 1/4" = 1'-0"

0 3' 6' 12'

NORTHVIEW ESTATE

Plan 37 Jan 26, 2018

DP 16-721500

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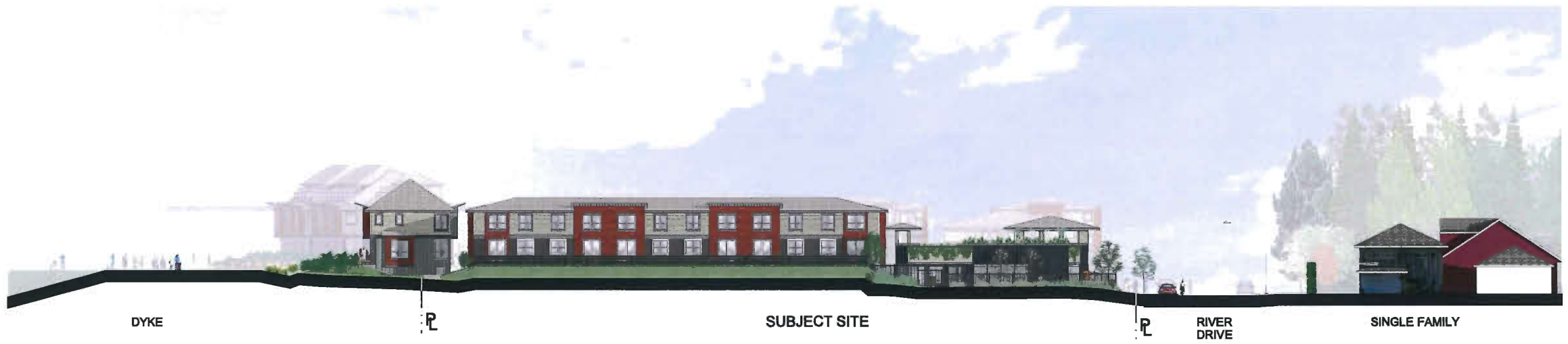
PLAN#22

RIVER DRIVE STREETSCAPE



PARK YARDSCAPE

RIVERSCAPE

STREETSCAPE YARDSCAPE

SCALE 1" = 20'-0"

0 5m 10m 20m

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architecture planning interior design
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t (604) 581 8128 f (604) 581 8148 www.think-space.ca
Architect for Daycare Design

REGISTERED ARCHITECT WAYNE A. FOUGERE January 26 2018 PROVINCE OF BRITISH COLUMBIA

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Reference Plan Jan 26, 2018

DP 16-721500

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PLAN#23

DAYCARE
FLOOR PLAN
SCALE 1/8" = 1'-0"
0 5' 15' 25'

thinkspace
architecture planning interior design
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Architect for Daycare Design

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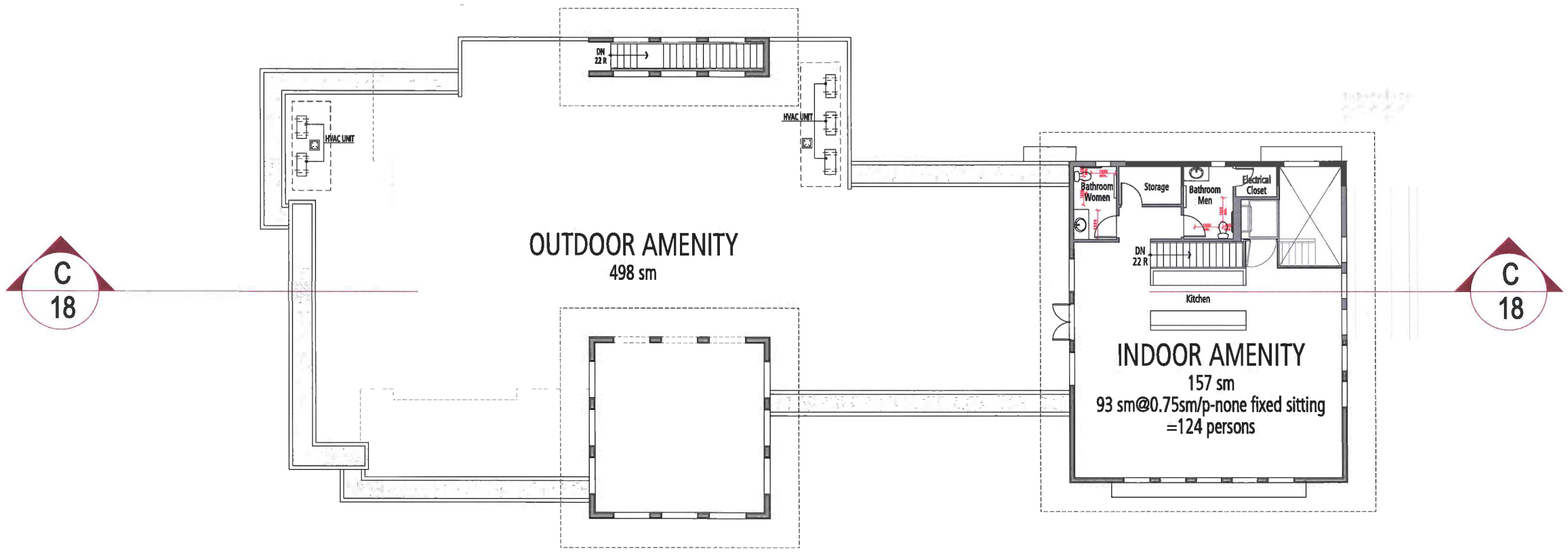
PLAN#15



INDOOR & OUTDOOR AMENITY
FLOOR PLAN
SCALE 1/8" = 1'-0"

0 5' 15' 25'

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DP 16-721500

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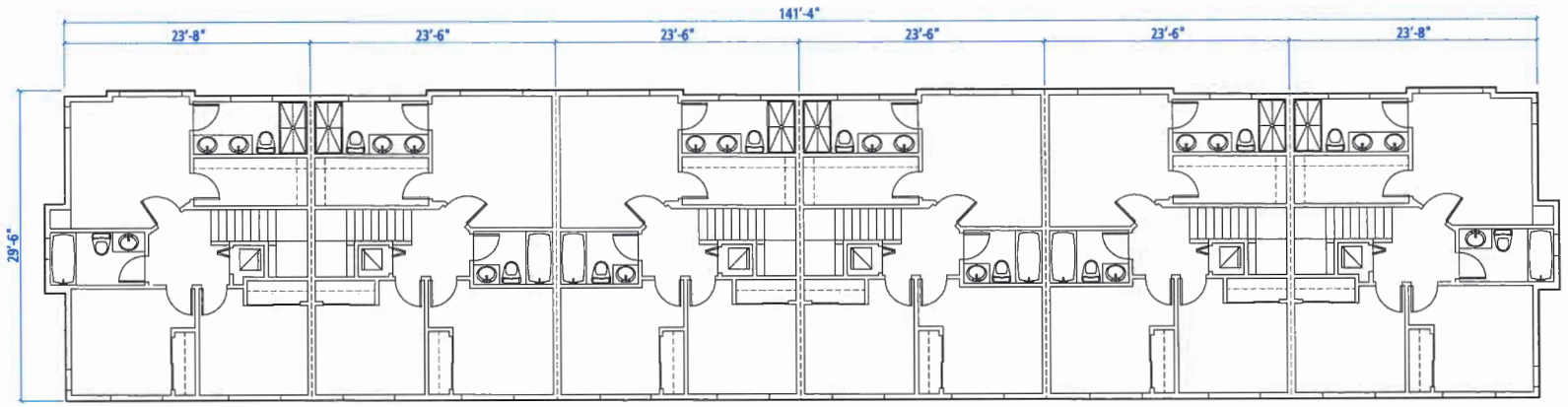
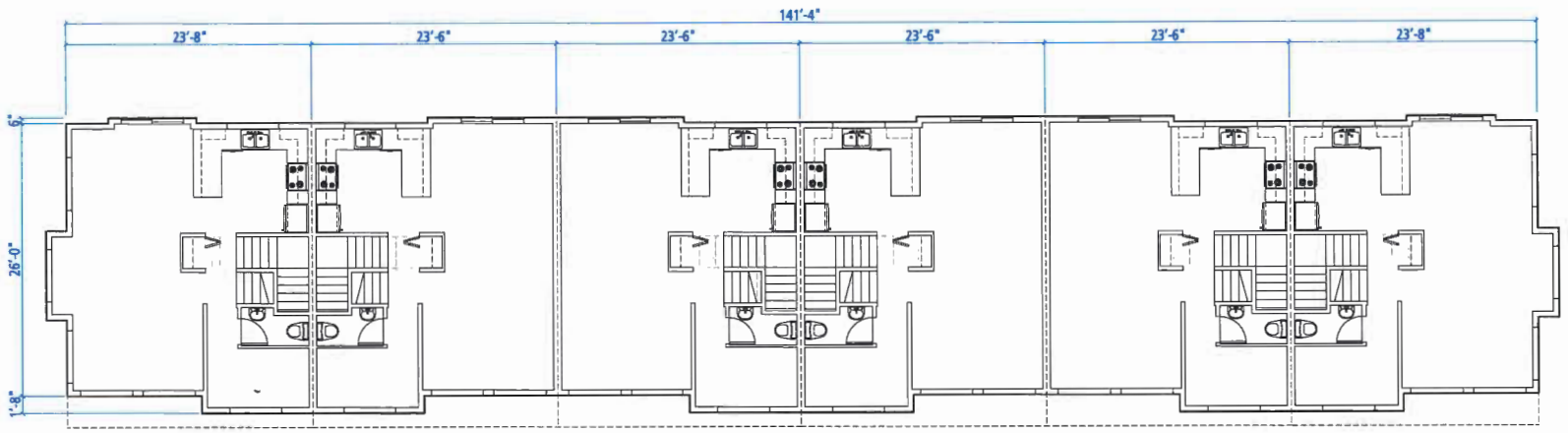
PLAN#16



BLOCK O - UPPER FLOOR



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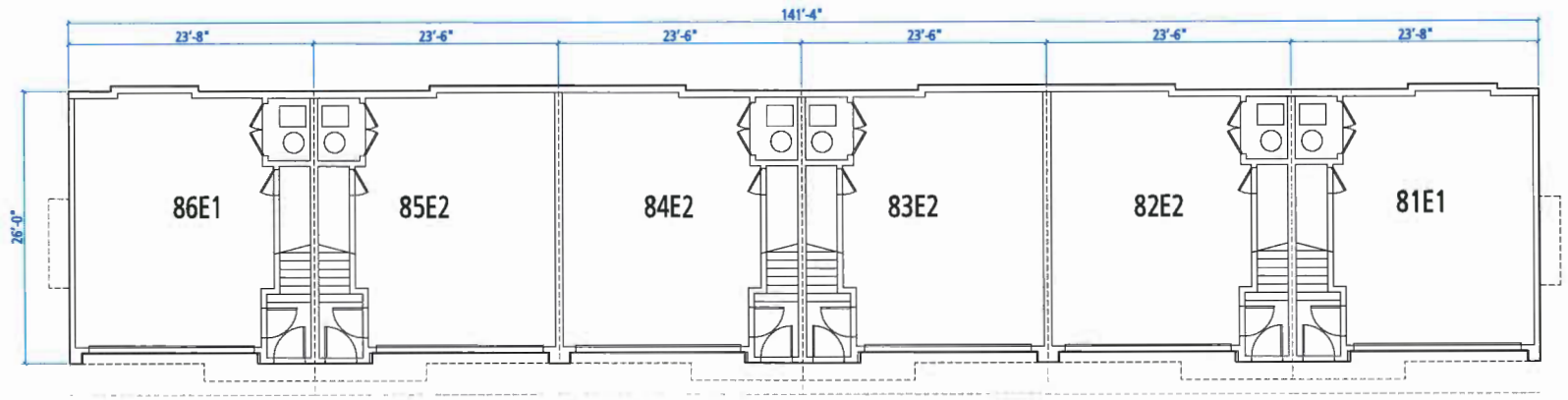

BLOCK O - GROUND FLOOR

PROVISION OF ACCESSIBILITY FEATURES

"AGING-IN-PLACE" REQUIREMENTS ON ALL UNITS:

- Entry doors minimum 855 mm clear opening (3'-0" swinging door spec.)
- Hallways minimum 900 mm width
- Door from garage to living area minimum 2'-10" (swinging door spec.)
- Blocking to bathrooms for installation of grab-bars (toilet, tub and shower)
- Provision of lever door handles
- One window that can be opened with a single hand in the living room
- One window that can be opened with a single hand in one bedroom

BLOCK PLANS BLOCK O

SCALE 1/8" = 1'-0"

0 5' 10' 20'

NORTHVIEW ESTATE

Reference Plan Jan 26, 2018

DP 16-721500

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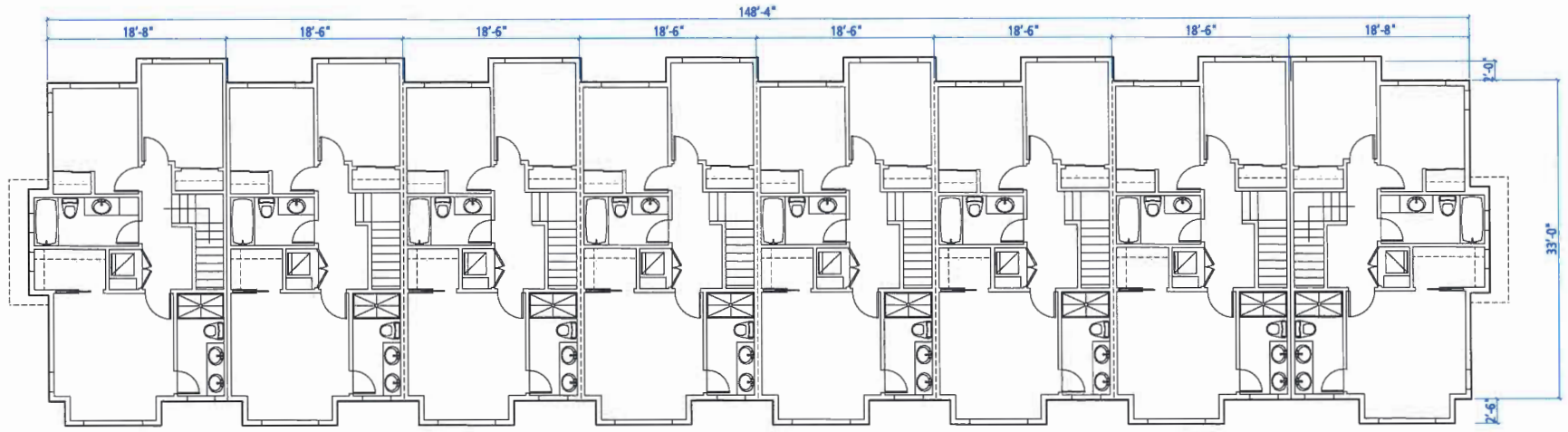
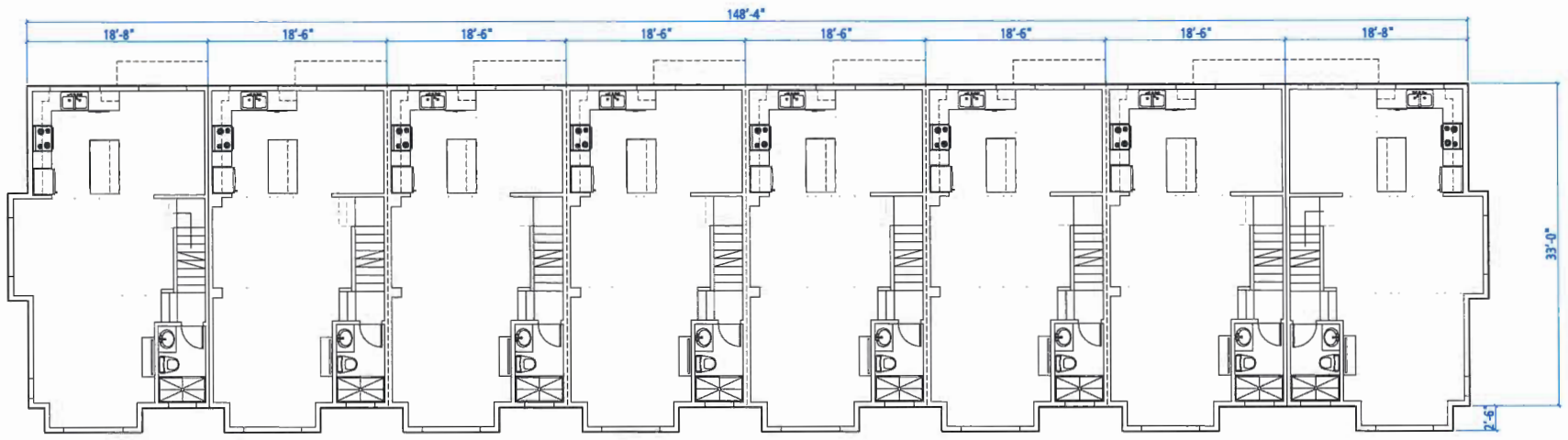
PLAN#04a



BLOCK S - UPPER FLOOR



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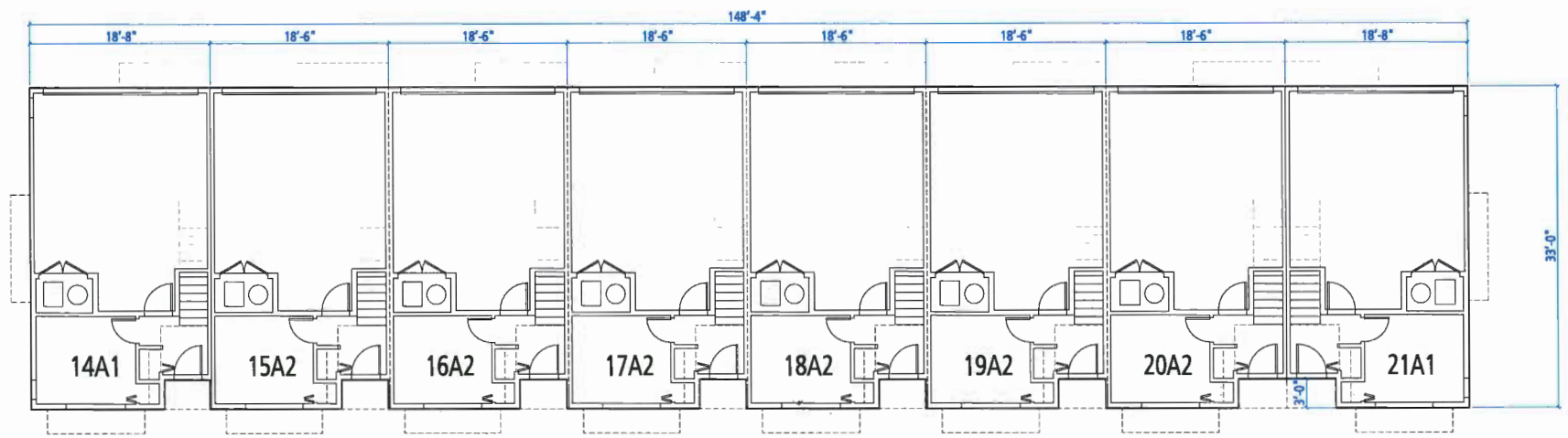

BLOCK S - GROUND FLOOR

PROVISION OF ACCESSIBILITY FEATURES

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- One window that can be opened with a single hand in one bedroom

BLOCK PLANS
BLOCK S

SCALE 1/8" = 1'-0"

0 5' 10' 20'

REGISTERED ARCHITECT WAYNE A. FOUGERE January 26 2018 PROVINCE OF BRITISH COLUMBIA

NORTHVIEW ESTATE

Reference Plan Jan 26, 2018

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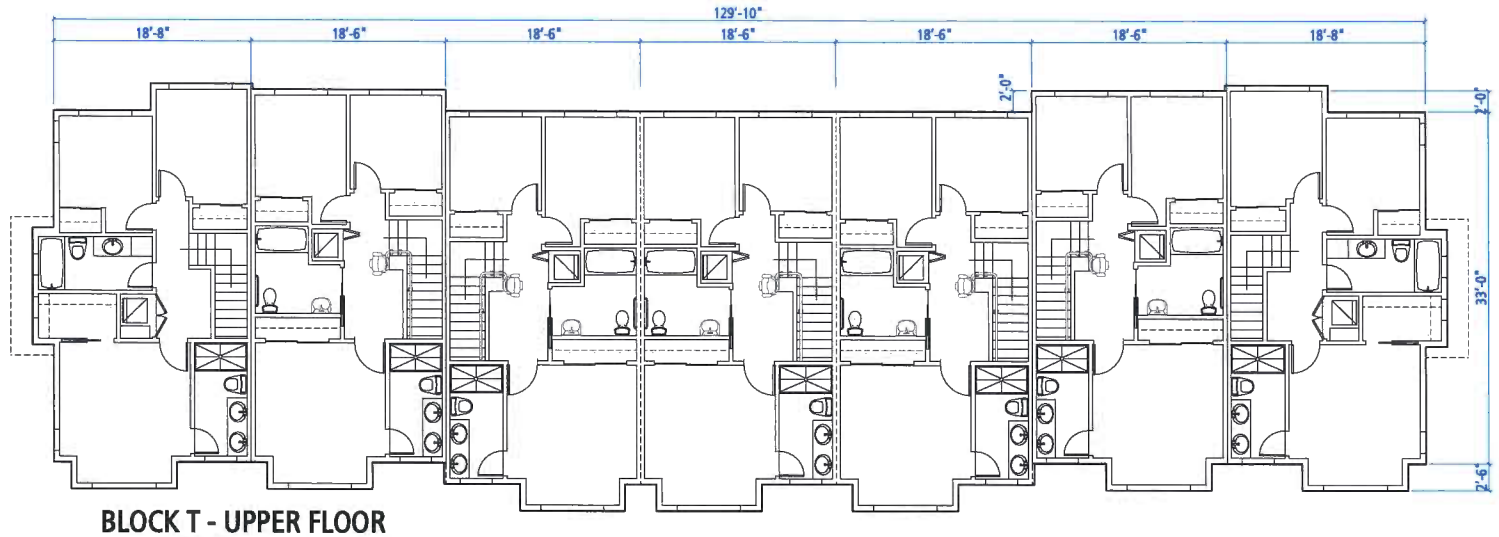
PLAN#8a



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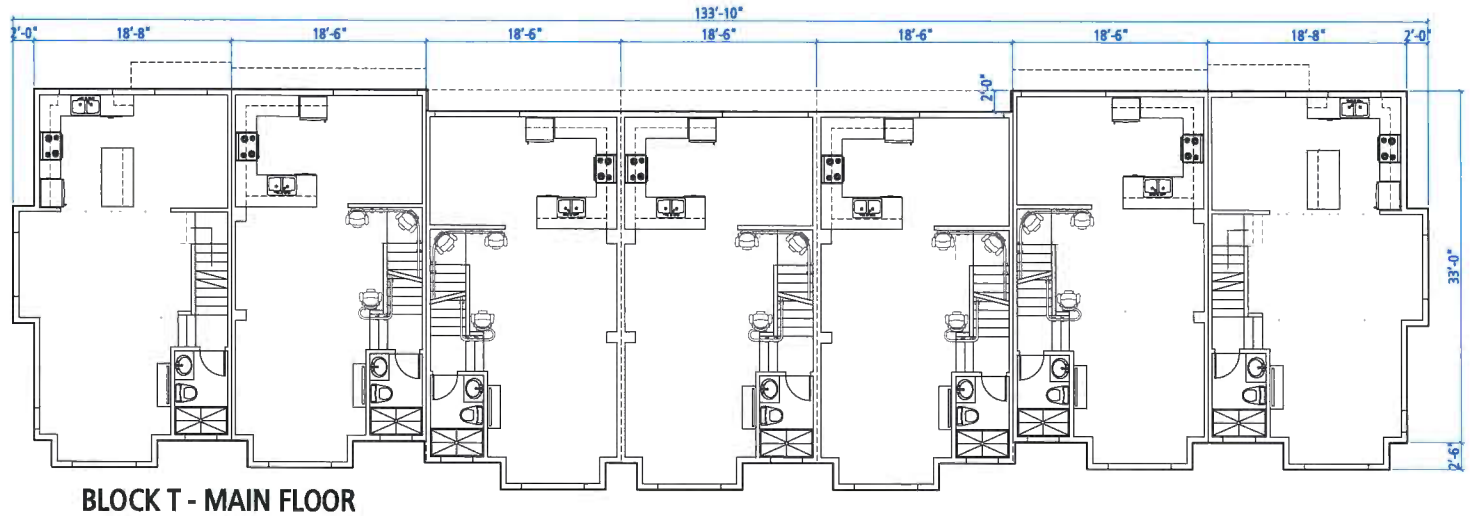

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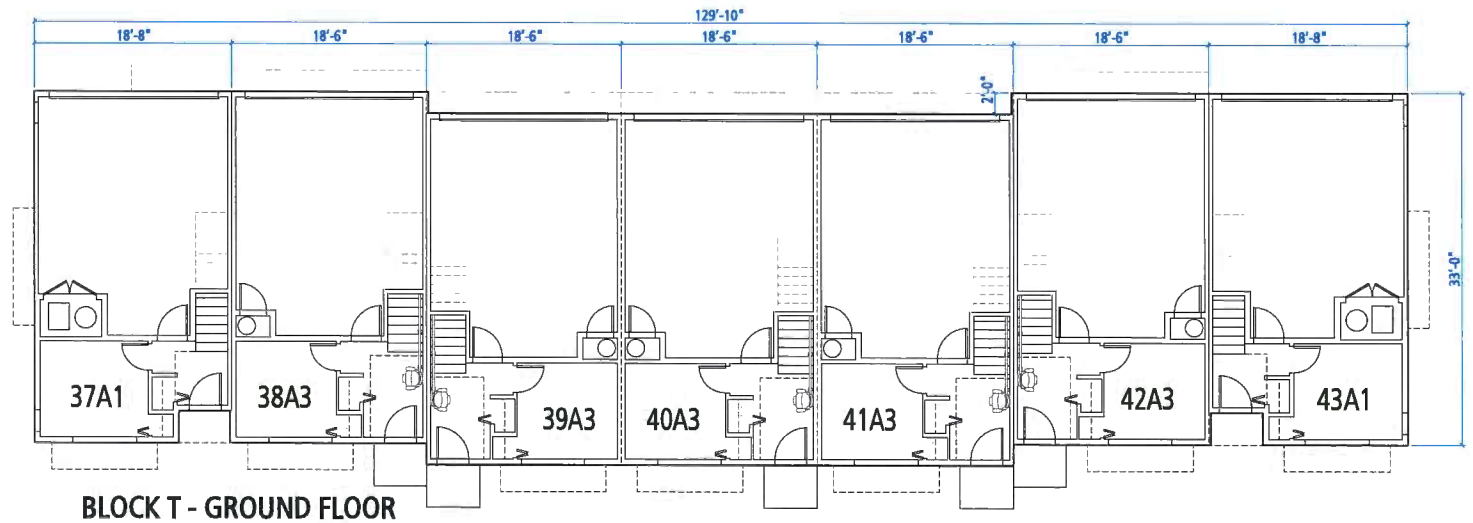

BLOCK T - GROUND FLOOR

PROVISION OF ACCESSIBILITY FEATURES

"AGING-IN-PLACE" REQUIREMENTS ON ALL UNITS:

- Entry doors minimum 855 mm clear opening (3'-0" swinging door spec.)
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- One window that can be opened with a single hand in one bedroom

ELEVATIONS & BLOCK PLANS BLOCK T

SCALE 1/8" = 1'-0"

0 5' 10' 20'

REGISTERED ARCHITECT WAYNE A. FOUGERE January 26, 2018 PROVINCE OF BRITISH COLUMBIA

NORTHVIEW ESTATE

Reference Plan Jan 26, 2018

DP 16-721500

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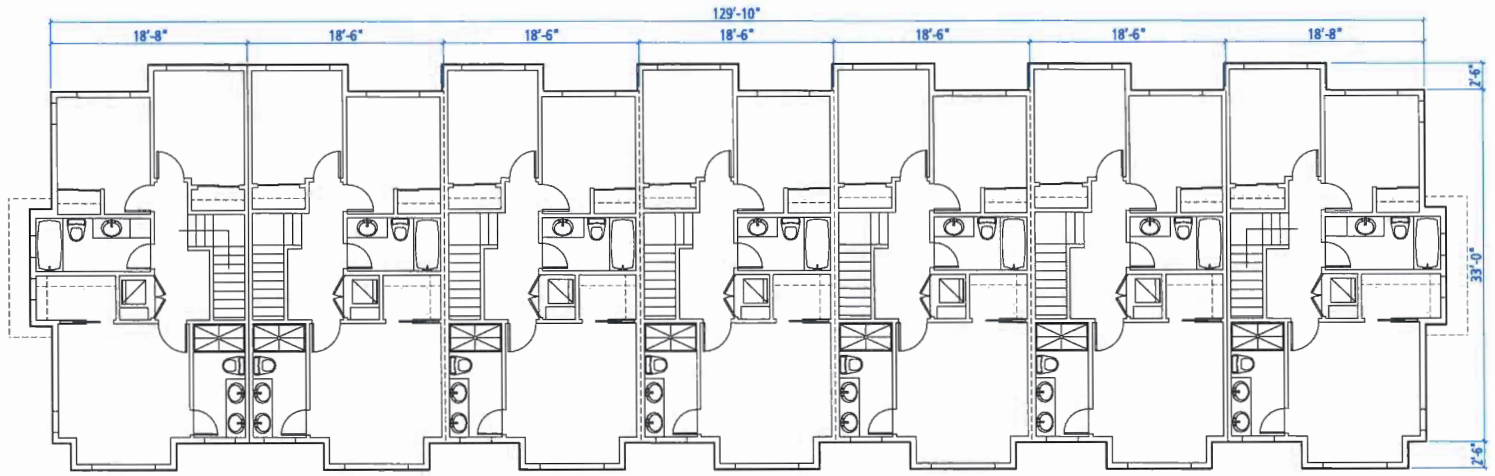
PLAN#09a



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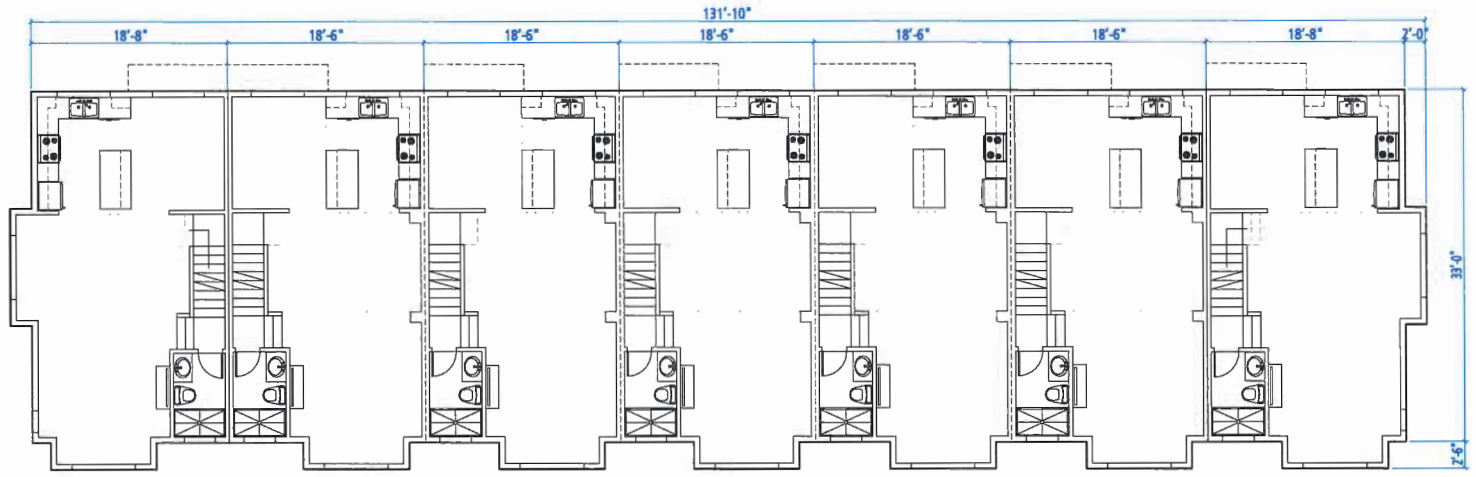
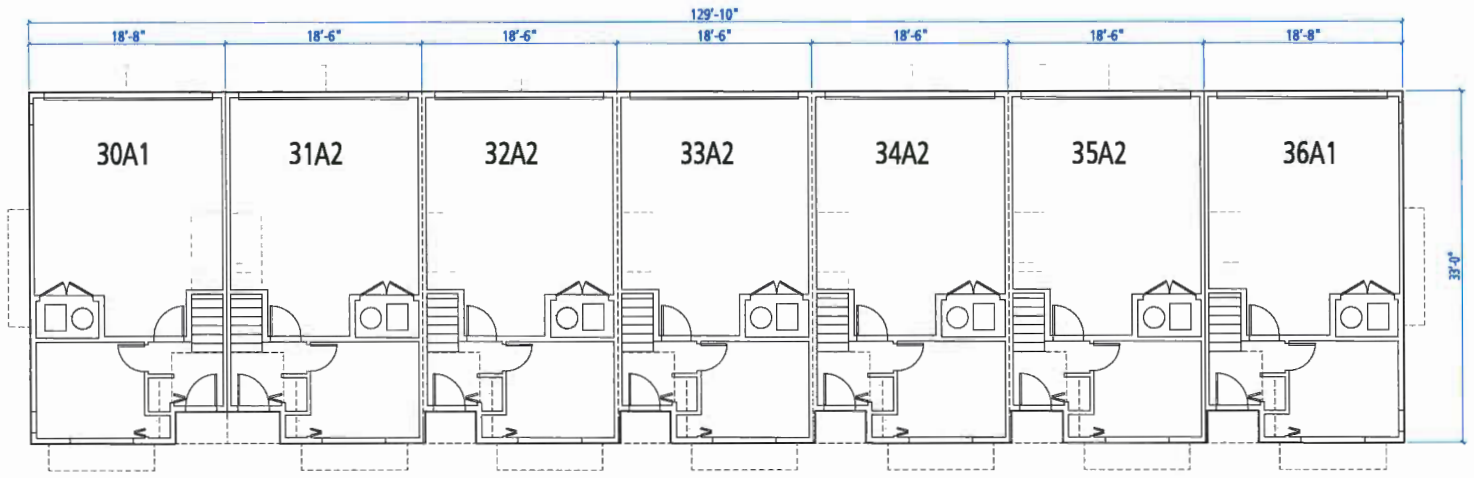


BLOCK V - MAIN FLOOR



BLOCK V - GROUND FLOOR

PROVISION OF ACCESSIBILITY FEATURES

"AGING-IN-PLACE" REQUIREMENTS ON ALL UNITS:

- Entry doors minimum 855 mm clear opening (3'-0" swinging door spec.)
- Hallways minimum 900 mm width
- Door from garage to living area minimum 2'-10" (swinging door spec.)
- Blocking to bathrooms for installation of grab-bars (toilet, tub and shower)
- Provision of lever door handles
- One window that can be opened with a single hand in the living room
- One window that can be opened with a single hand in one bedroom

BLOCK PLANS BLOCK V

SCALE 1/8" = 1'-0"

0 5' 10' 20'

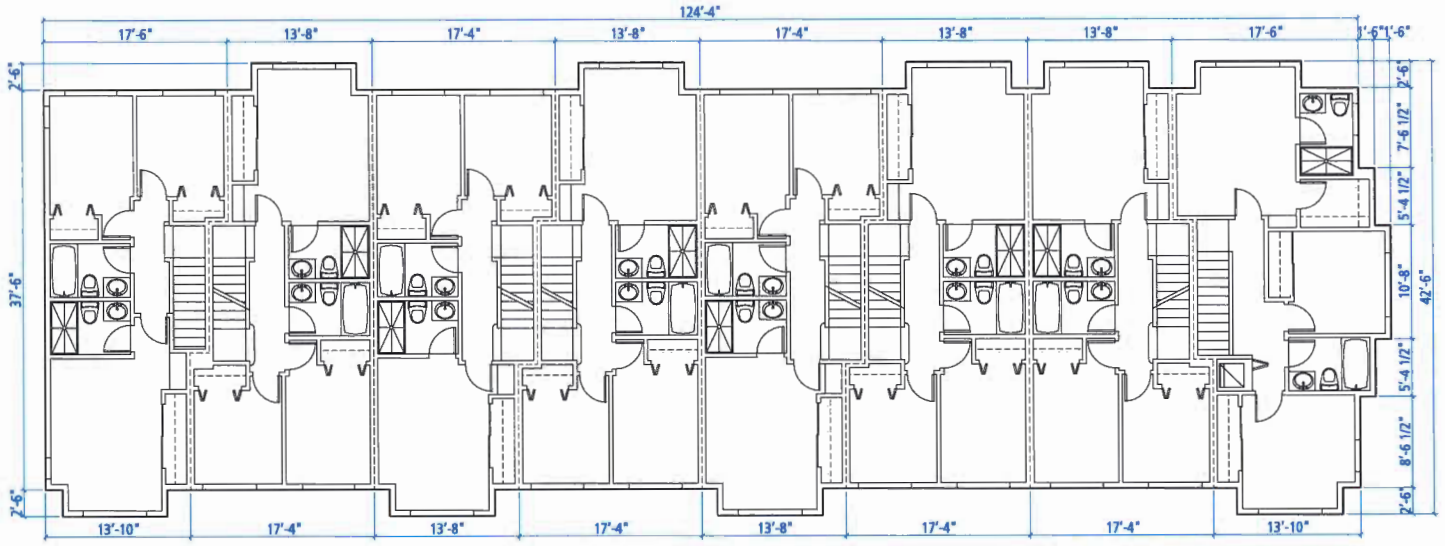
NORTHVIEW ESTATE

Reference Plan Jan 26, 2018

DP 16-721500

FOUGERE architecture inc.
BRITISH COLUMBIA - ALBERTA - WASHINGTON
202 – 2425 Quebec Street Vancouver, BC V5T 4L6
604.873.2907 fougerearchitecture.ca

PLAN#10a



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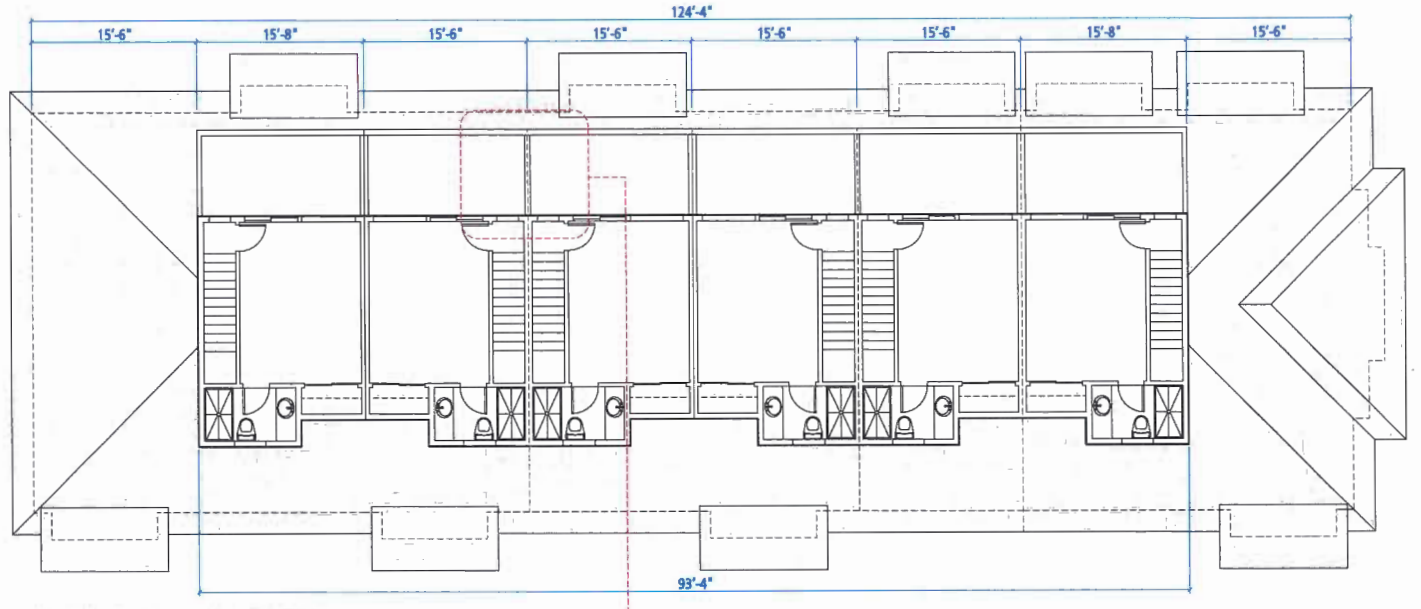
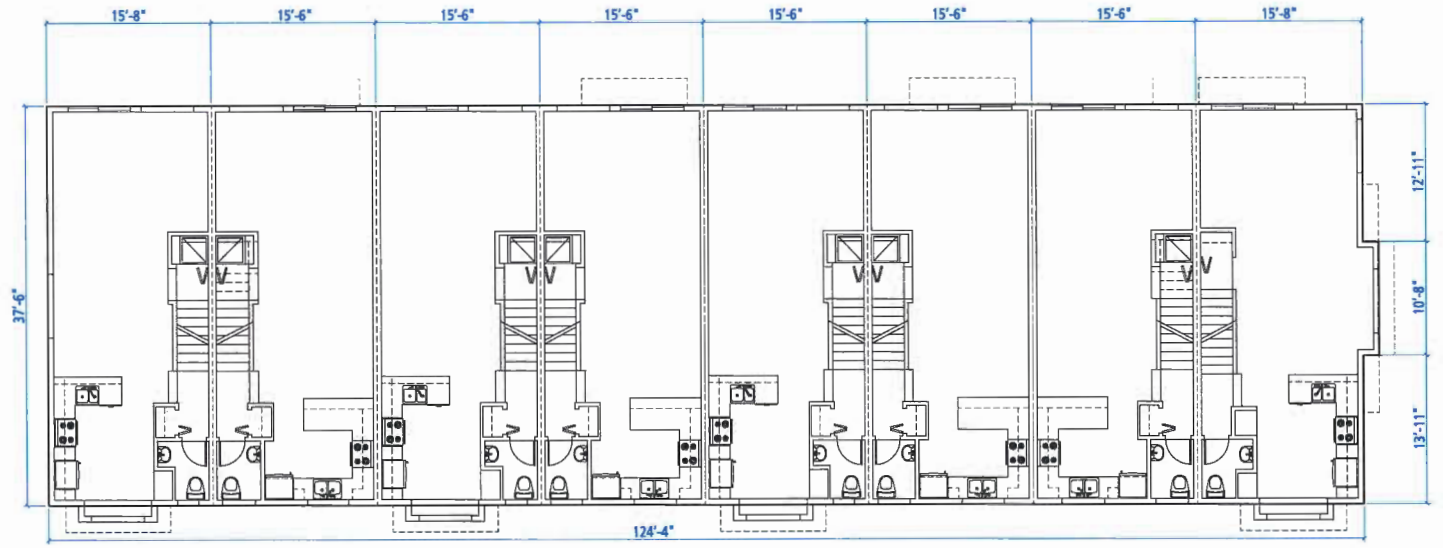


BLOCK W - ATTIC FLOOR



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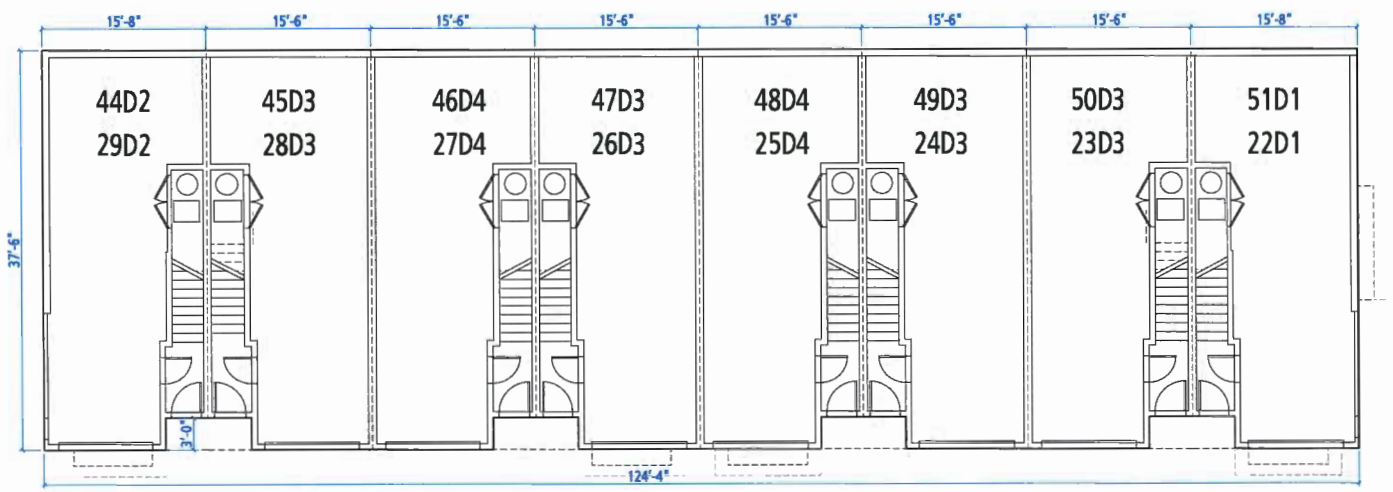
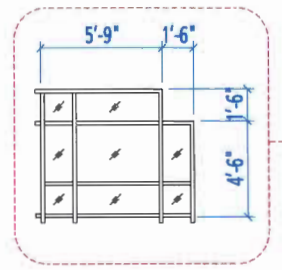


BLOCK W - GROUND FLOOR



Metal & Glass Privecy Screen

PROVISION OF ACCESSIBILITY FEATURES

"AGING-IN-PLACE" REQUIREMENTS ON ALL UNITS:

- Entry doors minimum 855 mm clear opening (3'-0" swinging door spec.)
- Hallways minimum 900 mm width
- Door from garage to living area minimum 2'-10" (swinging door spec.)
- Blocking to bathrooms for installation of grab-bars (toilet, tub and shower)
- Provision of lever door handles
- One window that can be opened with a single hand in the living room
- One window that can be opened with a single hand in one bedroom

BLOCK PLANS BLOCK W

SCALE 1/8" = 1'-0"

0 5' 10' 20'

REGISTERED ARCHITECT WAYNE A. FOUGERE BRITISH COLUMBIA January 26 2018

NORTHVIEW ESTATE

Reference Plan Jan 26, 2018

DP 16-721500

FOUGERE architecture inc.
BRITISH COLUMBIA - ALBERTA - WASHINGTON
202 – 2425 Quebec Street 604.873.2907
Vancouver, BC V5T 4L6 fougerearchitecture.ca

PLAN#11a

City of Richmond

Report to Development Permit Panel

To:	Development Permit Panel	**Date:**	February 13, 2018
From:	Wayne Craig Director, Development	**File:**	DP 16-741741
Re:	**Application by Vancouver Airport Fuel Facilities Corporation (VAFFC) for a Development Permit at 15040 Williams Road**		

Staff Recommendation

That a Development Permit be issued which would permit the construction of a Marine Terminal Facility for aviation/jet fuel delivery at 15040 Williams Road on a site zoned "Industrial (I)" and partially designated as an Environmentally Sensitive Area (ESA).

Wayne Craig
Director, Development
(604-247-4625)

WC:DB
Att. 5

Staff Report

Origin

The Vancouver Airport Fuel Facilities Corporation (VAFFC) has applied to the City of Richmond for permission to develop a Marine Terminal Facility for aviation/jet fuel delivery at 15040 Williams Road on a site zoned "Industrial (I)" and that is partially designated as an Environmentally Sensitive Area (ESA). The site is currently vacant.

The proposed use conforms to the existing "Industrial (I)" zoning and the subject site does not require rezoning.

Background

This application was initially reviewed by the Development Permit Panel at the meeting on October 11, 2017, but was referred back to staff. The application was subsequently reviewed by the Development Permit Panel at the meeting on November 29, 2017 (see Attachment AA for both reports), but was referred back to staff a second time under the following referral motion:

That Development Permit DP 16-741741 be referred back to staff to:

1. ***Investigate opportunities to expand the area of on-site planting particularly at the northwest portion of the site in addition to the proposed three-meter wide planting strip adjacent to the Williams Road RMA;***

2. ***Explore further opportunities to increase the total area of proposed on-site planting considering the extent of foreshore area that will not be planted to accommodate the loading facility;***

3. ***Review the advice given by the applicant regarding the viability of planting in the site's intertidal ESA in relation to similar projects which City staff have had direct experience in, including:***

   (a) soliciting additional opinion from third party experts in the field regarding opportunities as well as constraints for enhancement in the site's intertidal ESA;

   (b) considering a financial compensation package for habitat enhancement in other areas if intertidal ESA planting is not feasible in the subject site; and

4. ***Review the design and scope of the proposed viewing platform with the Parks Department to determine whether the type and size of the viewing platform should be revised.***

This supplemental report is being brought forward to:

- Provide a response to the referral.
- Provide a summary of the revisions made to the development proposal.
- Provide the revised Development Permit considerations.
- Present the revised Development Permit for Development Permit Panel consideration.

The applicant worked with staff to revise the proposal to address the Panel's referral comments regarding expanded planting in the northwest triangle portion of the site, increasing the area and size of planting in other portions of the site, adding an intertidal bench marsh enhancement and offering a revised cash in lieu contribution for future off-site trail enhancements and the future development of a recreational staging area at the foot of Williams Road.

Attachments to this report include the following:

- Attachment AA: Original Staff Reports to Development Permit Panel (Reports dated September 20, 2017 and November 9, 2017).
- Attachment BB: Revised Offsite Staging Area and Trail Enhancement Cost Estimate
- Attachment CC: Revised Landscape Cost Estimates
- Attachment DD: Peer Review Summary Letter (Pottinger Gaherty and Northwest Hydraulics)
- Attachment EE: Revised Development Permit Considerations

The revised plan submission and the updated Development Permit are provided after the above attachments.

Development Information

Please refer to this Staff Report and the revised Development Permit plans that accompany this report for:

- Responses to the Development Permit Panel referral motion of November 29, 2017 and a summary of the revisions made to the proposal to address the Panel's concerns.
- The revised description and cost estimate for the proposed off-site staging area and trail enhancements.
- The revised plan sets and updated landscaping costs.
- The revised Development Permit Considerations.

Please refer to the original Staff Report dated September 20, 2017 (Attachment AA) for information pertaining to:

- Background information on the project objectives, external agency approvals, and surrounding development.
- The Marine Terminal Project Description.
- Biologist's Environmental Assessments for ESA and RMA.
- The Arborist's Report and Assessment.
- The Proposed Public Trail and Dike Alignments and Covenant Requirements.
- Transportation Requirements.
- CN Rail Reviews.
- Flood-Plain Covenant Requirements.
- Servicing and Frontage Improvement Requirements.
- Financial Impacts.
- The Development Application Data Sheet.

Responses to Panel Comments

1. ***Development Permit Panel Comments: Investigate opportunities to expand the area of on-site planting, particularly at the northwest portion of the site, in addition to the proposed three-meter wide planting strip adjacent to the Williams Road RMA.***

   Response:

   - The VAFFC have increased the planting to the area of the property north of the CN Right-of-Way (ROW) bisecting the property so that virtually all of the non-operational space in this area will be planted.
   - Planting has been substantially increased in the north triangle area.
     - An additional 1,210 m^2 of planting has been added to now encompass an additional 25% of the total area of the north triangle. Note: Triangle site area is approximately 4,900 m^2. Areas in the triangle previously committed to RMA and landscape planting total approximately 1,040 m^2. Approximately 46% of the entire triangle area will be planted in total.
   - Based on their operational review, they indicate that the proposed area of planting will now occupy the maximum available space for planting; after allowing for the minimum space required for facility operational and maintenance activities at the north triangle area of the site, including:
     - Safe accessible roadway access parallel to the Savage Road ROW is required to access the backflow preventer building and to provide inspection access to the pipeline routing.
     - Minimum operational land to the southeast of the new proposed planting area for operational and maintenance requirements including marine response equipment. The VAFFC indicates this area will be used for equipment storage.

2. ***Development Permit Panel Comments: Explore further opportunities to increase the total area of proposed on-site planting, considering the extent of foreshore area that will not be planted to accommodate the loading facility.***

   Response:

   - The revised proposal substantially increases the planting in the triangle area north of the CN ROW.

     The VAFFC indicate that they have reviewed plant sizes and density and increased both in the north triangle area and elsewhere on the site in accordance with best practices with the objective of maximizing the survivability of the plants.

     Pot sizes of shrubs are now a minimum of #2 pot, up from #1 pot, groundcovers all now #1 pot, up from a 10 com pot, and tree sizes have been increased to the largest reasonably available sizes. Conifers are all specified as 3.0 m. height which will be a balled and burlaped condition, rather than container grown. Plant size changes are noted on the attached drawing L0.05

3. ***Development Permit Panel Comments: Review the advice given by the applicant regarding the viability of planting in the site's intertidal ESA in relation to similar projects which City staff have had direct experience in, including:***

Response:

- The VAFFC team has reviewed all aspects of planting within the foreshore intertidal area within the operational area of the facility and has determined that an intertidal bench planting area may be accommodated. They state that the proposed approach balances several important objectives:
    - Maintaining facility operations and site geotechnical requirements.
    - Avoiding impacts to future dyke improvements.
    - Improving the vegetation's chance of survival.
- The City of Richmond Engineering Department has reviewed the proposed bench design in relation to the dike and not believe the bench will affect the operation of the dike. The bench will be reviewed further as part of the detailed design via the Servicing Agreement for the dike and the foreshore riprap.
- The VAFFC indicates that the effect of river current velocities and passing vessel waves has also been considered in the design of the bench planting area in this location on the Fraser River.
- They state that by cutting back the top of the riprap banking by a maximum of 4 m, a bench 2 m in width by approximately 100 m in length can be engineered and constructed within the restructured riprap slope where the existing dock is to be removed.
    - Because the riprap slope to the north and south of this area steepens as it transitions into the existing riprap grades, the bench planting cannot be extended without impairing the facility infrastructure and destabilizing the steeper riprap slopes.
    - The bench cannot be expanded to the south because of the water lot allowance and unacceptable encroachment on the navigation channel safety setbacks
    - The bench cannot be expanding to the north because it would push the slope back into the existing upland area of the site which would impair the design of the marine structures and other shore side facilities, as well as encroach on the dike.
    - The bench cannot be expanded to the east or west because these areas must be kept clear of the mooring line zones. Mooring lines are dragged across the slope when vessels are arriving and departing and so any plantings there would be damaged.
- The planting area can be constructed within a redesigned riprap slope by creating a bench lined with geotextile and filled with a cobble/ gravel substrate to a thickness of 0.5 m.
- Based on the location of the salt wedge in this particular location of the river, the following species would be suitable for planting. This zone of the river is characterized as a brackish marsh (salt water/freshwater mix).
    - Baltic Rush (Juncus Balticus) (Preferred)
    - Lyngbye's Sedge (Carex Lyngbyei)

- Common Cattail (Typha Latifolia)
- Common Rush (Juncus Effuses)

- The VAFFC team of Fisheries Biologists have reviewed the proposed bench and believe the bench, combined with the increased habitat area from the removal of the existing wharf, will be a substantial gain.
- As noted in previous Development Permit Application material, the Department of Fisheries and Oceans Canada has reviewed the project design and is of the opinion that the construction of the facility will cause no serious harm to fish or fish habitat, and that no authorization or offsetting is required.

a. Soliciting additional opinion from third party experts in the field regarding opportunities, as well as constraints for enhancement in the site's intertidal ESA.

Response:

Per the Development Permit Panel's referral, third party expert's review was sought by City staff to provide an assessment of the proposed intertidal enhancement. A Project Manager and a Restoration Ecologist with Pottinger Gaherty Environmental Consultants Ltd. (PGL) and a Geomorphologist with Northwest Hydraulics Consultants (NHC) undertook a review of relevant background documents and the intertidal enhancement plan in the context of the site's specific hydraulic conditions. An on-site meeting was held on February 2, 2018, involving relevant members of the proponent's consulting team, PGL, NHC and City staff providing an opportunity to examine the conditions at the site and query specific assumptions with regard to the proposed intertidal bench marsh design, installation and function. A summary comment letter has been submitted by the peer review consultants (Attachment DD) providing their assessment and recommendations on the proposed enhancement project.

The expert's peer review key findings and recommendations are as follows:

1. They conclude that the bench marsh will improve the overall foreshore habitat and should be looked at favourably.
2. They recommend moving the intertidal bench to a higher position on the riprap slope so that it is located closer to or just below the mean annual high tide level (for technical reasons related to the amount of inundation depths).
3. They note that this site has inherent challenges, but indicate that careful engineering designs and implementation of an adaptive management approach should provide the best possible means to reduce/address these challenges.
4. The three plant species indicated each have individual characteristics, but are acceptable if an adaptive management strategy is in place and the monitoring period is extended to five years from three years. Planting densities proposed are within the acceptable standards.
5. The marsh bench should be lined with a geotextile material to help retain the substrate.
6. To prevent damage to the new planting by geese, they have recommended the installation of a temporary (two to three growing seasons) fence around the bench marsh planting.

7. The review provides an outline of an adaptive management strategy process and recommends the proponent submit a detailed success monitoring plan for the monitoring period.
8. PGL has also provided their opinion (via follow-up email) that additional approvals from Fisheries and Oceans should not be necessary, as the project will not cause serious harm to fish as defined under the Fisheries Act, provided that construction occurs during the least risk windows (July 16th through February 28th of each year).

PGL's summary report has been reviewed and agreed to by the proponent. Modifications to the design and placement of the bench marsh will be addressed via the Servicing Agreement. Securities for the five-year monitoring and the requirement for submission of an adaptive management/detailed success monitoring plan have been added to the Development Permit Considerations.

b. Considering a financial compensation package for habitat enhancement in other areas if intertidal ESA planting is not feasible in the subject site.

Response:

- As the VAFFC has proposed a feasible intertidal planting bench within the new rip rap structure an additional financial compensation package is not required.

4. ***Development Permit Panel Comments: Review the design and scope of the proposed viewing platform with the Parks Department to determine whether the type and size of the viewing platform should be revised.***

Response:

As requested by the Development Permit Panel, the previously proposed observation platform was revisited by Park staff and subsequently with the proponent. Parks staff have indicated that:

a. The Williams Road end is considered secondary to the south end of the No. 7 Road Canal, just 1 km. to the northeast. That is a priority location for a significant waterfront staging area and pier because:
   i. It is at the junction of the future north/south No. 7 Road Canal Trail (planned to span the island as well as provide a connection around Fraser Port) and the Waterfront Trail.
   ii. Near the junction with the No. 7 Road Canal, there is a generous foreshore area of City-owned Lot K, plus the dike row, which allows for a large area to develop a waterfront amenity.
   iii. City ownership of the water lot means that it would not be encumbered by a water lot lease from the Province.
   iv. The City-owned Lot E, the lot immediately northeast of Lot K, will now be developed for a major shipping terminal; which means that the south end of the No. 7 Road Canal will be the east terminus of the riverfront trail system. We understand that that adjacent development is providing a cash contribution to a pier/staging area that is planned to be located in the vicinity.

b. The east end of Williams Road is considered to be a secondary staging area that is intended to:
   i. Provide a resting and viewing area similar to the amenity at the east end of Steveston Highway.
   ii. Since Williams Road is not a connector to other parts of the trail system, it does not require any significant wayfinding signage, but could be an opportunity for interpretive signage.

Based on Development Permit Panel's feedback and the considerations noted above, Parks recommends that the staging area/lookout at the end of Williams Road provide views to the river, and include:

- A timber deck that is approximately 75 m^2 in area with a kick rail along the river-facing edge.
- Be located approximately 2 m back from the top of the rip rap bank in order to allow for riparian planting along the top of the dike that will act as a buffer between the deck and rip rap bank.
- Four benches with backs and arm rests.
- Planter cut-outs in the deck that equal a total of approximately 20 m^2 in order to break up the size of the deck and create outdoor "rooms".
- A 2 m width strip of foreshore/native planting along the top of the bank that equals approximately 45 m^2.

In addition, Parks staff have recommended widening a portion of the public trail to the west of the subject site from 2 m to 3 m with habitat enhancement/native planting along the river-facing side of the trail. The widened trail would be more in keeping with trail standards elsewhere in the community and would facility improved multiuse of the pathway.

A conceptual layout of the Williams Road staging area, a diagram showing the approximate location of the trail enhancement area, and the detailed cost estimate for both works are provided in Attachment BB.

Including a 20% contingency the staging area and trail enhancements will total $204,210. These modifications and the associated cost estimate have been reviewed and agreed to by the proponent as a voluntary cash-in-lieu payment. The contribution has been included in the Development Permit Considerations.

Analysis

Summary of the Revisions Made to the Development Proposal

The following is a brief summary of the changes incorporated into the applicant's revised plan submission from the previous submission reviewed by the Development Permit Panel on November 29, 2017:

1. Added 1210 m^2 of new upland planting in the triangle area north of the CN Rail. This planting will be secured for $169,090 including monitoring and 10% contingency through the Development Permit Considerations. The additional planting are has been added to the habitat balance sheet.

2. Re-designed the foreshore riprap to accommodate a new 200 m^2 intertidal bench marsh.
3. Increased the sizes of previously proposed groundcover, shrub and tree selections throughout the site – typically by one standard size increase.
4. Increased landscape cost estimates incorporating the upsizing of plant selections and the new planting areas mentioned above (see Attachment CC). On-site planting/contingency estimates have increased from the November, 2017 estimate by $67,004.85. Off-site planting/contingency estimates have increased from the November, 2017 estimate by $5,151.30. ** The combined increase is approximately $72,156.15.
5. Provision of a cash-in-lieu contribution of $204,210 toward a future staging area at the end of Williams Road and off-site trail upgrades.
6. The proponent's habitat balance sheet now indicates a total gain of 3,491 m^2 of terrestrial habitat and 3,800 m^3 of aquatic habitat.

** Note that off-site security amounts may be adjusted via the terms of the standard Servicing Agreement.

Staff Assessment of the Modified Submission

This revised submission significantly increases the amount of upland planting north of the CN Rail, makes possible an intertidal bench marsh, increases the overall plant/tree selection sizes across the site, and more than triples the contribution to off-site recreational upgrades. All of this is in addition to the vegetation monitoring, trail and dike Statutory Right-of-Ways (SRWs), dike construction and off-site Servicing Agreement works previously committed. The progression of modifications to the landscape plans are cloud outlined and dated on the revised plan submission.

Staff believe this submission to be a substantive and sincere attempt to address both the Panel's concerns and their operational needs at the site. Engineering staff reviewed the proposed modifications to the foreshore rip rap and have indicated that it is acceptable and will not affect the function or performance of the foreshore armourment or the integrity of the proposed dike structure.

Revised Development Permit Considerations

As a result of the changes incorporated into the revised submission, the Development Permit Considerations were adjusted as follows:

1. On-site landscape securities have been increased by 65% from $361,248.80 to $597,344.55.
2. Security for the five-year adaptive management/detailed success monitoring plan implementation for a total of $38,224.00 has been added to the Considerations.
3. The triangle planting area has been added to the areas required to be monitored.
4. The cash-in-lieu contribution of $204,210 for the future staging area and off-site trail upgrades has been added to the Considerations.
5. The intertidal bench marsh and the triangle planting area have been added to the required legal agreement; prohibiting their abandonment or removal without City approval.
6. Off-site ESA/RMA securities (estimated at $23,861.00 plus a 10% contingency of $2,386.10**) have been added to the Servicing Agreement requirements to be addressed prior to Building Permit Issuance.

   ** Note that off-site security amounts may be adjusted via the terms of the standard Servicing Agreement.

The revised Development Permit Considerations are provided in Attachment EE.

Conclusions

In response to the Development Permit Panel's referral motion of November 29, 2017, the applicant has undertaken a fresh review of their site in order to respond to the Panel's comments. Staff believe that the modified submission now merits consideration by the Development Permit Panel.

David Brownlee
Planner 2
(604-276-4200)

DB:blg

Attachments:
Attachment AA: Prior Staff Reports to Development Permit Panel
(Reports dated September 20, 2017 and November 9, 2017)
Attachment BB: Revised Offsite Staging Area and Trail Enhancement Cost Estimate
Attachment CC: Revised Landscape Cost Estimates
Attachment DD: Peer Review Summary Letter (Potter Gaherty and Northwest Hydraulics)
Attachment EE: Revised Development Permit Considerations

Attachment AA

Prior Staff Reports to Development Permit Panel

- Report Dated Sept. 20, 2017: Reviewed By DPP Oct. 11, 2017
- Report Dated Nov. 9, 2017: Reviewed By DPP Nov. 29, 2017

City of Richmond

Report to Development Permit Panel

To:	Development Permit Panel	**Date:**	November 9, 2017
From:	Wayne Craig Director, Development	**File:**	DP 16-741741
Re:	**Application by Vancouver Airport Fuel Facilities Corporation (VAFFC) for a Development Permit at 15040 Williams Road**		

Staff Recommendation

That a Development Permit be issued which would permit the construction of a Marine Terminal Facility for aviation/jet fuel delivery at 15040 Williams Road on a site zoned "Industrial (I)" and partially designated as an Environmentally Sensitive Area (ESA).

Wayne Craig
Director, Development
(604-247-4625)

DCB:blg
Att. 5

Staff Report

Origin

The Vancouver Airport Fuel Facilities Corporation (VAFFC) has applied to the City of Richmond for permission to develop a Marine Terminal Facility for aviation/jet fuel delivery at 15040 Williams Road on a site zoned "Industrial (I)" and that is partially designated as an Environmentally Sensitive Area (ESA). The site is currently vacant.

The proposed use conforms to the existing "Industrial (I)" zoning and the subject site does not require rezoning.

Background

This application was initially reviewed by the Development Permit Panel at the meeting on October 11, 2017 (Attachment A), but was referred back to staff under the following referral motion:

1. *That DP-16-741741 be referred back to staff for the applicant to work with staff to:*
   - *(a) review the proposed mitigation, compensation and enhancement scheme for shoreline ESA based primarily on existing ESA condition in the subject site and investigate opportunities for additional on-site ESA planting;*
   - *(b) review the proposed compensation/enhancement planting scheme for the shoreline ESA and consider introducing more mature and substantive planting;*
   - *(c) consider introducing some planting in the intertidal ESA in addition to the proposed removal of existing and development/construction of new structures and shoreline within the shoreline and intertidal ESA;*
   - *(d) investigate opportunities for further on-site ESA compensation and enhancements especially within the shoreline ESA and other areas along the proposed public trail and in the northern portion of the site in addition to the proposed off-site ESA enhancements; and*
   - *(e) consider installing on-site signage to inform and provide interpretation to the public regarding the works and enhancements done on the subject site to protect and preserve the natural environment; and*
2. *That staff review the adequacy of the pedestrian viewing platform cash-in-lieu contribution and report back.*

This supplemental report is being brought forward to:

- Provide a response to the referral.
- Provide a summary of the revisions made to the development proposal.
- Provide the revised Development Permit considerations.

- Present the revised Development Permit for Development Permit Panel consideration.

The applicant worked with staff to revise the proposal to address the Panel's referral comments regarding the compensation/enhancement planting plans for the site and the addition of an interpretive signage package for the public trail. Staff have also reviewed the observation platform cost estimate and a detailed breakdown is included in this report.

Attachments to this report include the following:
Attachment A: Original Staff Report to Development Permit Panel (dated September 20, 2017).
Attachment B: Professional Opinion Memo from Hatfield Consultants.
Attachment C: Revised Landscape Cost Estimates With Breakdowns.
Attachment D: Sketch plans and Cost Estimates for the Proposed Public Observation Platform.
Attachment E: Revised Development Permit Considerations.

Development Information

Please refer to this report and the revised Development Permit plans (Attachment A) that accompany this report for:

- Responses to the Development Permit Panel referral motion and the revisions made to the proposal to address the specific concerns identified.
- Sketch plans and cost estimates for the proposed public observation platform.
- Revised Landscaping Installation Costs.
- Revised Development Permit Considerations.

Please refer to the original staff report dated September 20, 2017 (Attachment B) for information pertaining to:

- Background information on the project objectives, external agency approvals, and surrounding development.
- The Marine Terminal Project Description.
- Biologist's Environmental Assessments for ESA and RMA.
- The Arborist's Report and Assessment.
- The Proposed Public Trail and Dike Alignments and Covenant Requirements.
- Transportation Requirements.
- CN Rail Reviews.
- Flood-Plain Covenant Requirements.
- Servicing and Frontage Improvement Requirements.
- Financial Impacts.
- The Development Application Data Sheet.

Staff Comments

Staff's opinion is that the revised scheme attached to this report has satisfactorily addressed the Development Permit Panel's referral of October 11, 2017. Based on the applicant's responses the application may now be reconsidered.

Responses to Panel Comments

Panel Comment: ***Review the proposed mitigation, compensation and enhancement scheme for shoreline ESA based primarily on existing ESA condition in the subject site and investigate opportunities for additional on-site ESA planting.***

VAFFC Response: "Additional ESA compensation areas totaling 702 m^2 (7,556 ft^2) have been added in the northeast and southwest extents of the site."

The VAFFC response provides two new shoreline ESA planting areas to the site plan (refer to Plan #15). The first is a new 352 m^2 shoreline ESA planting area with additional trees, shrubs and herbs at the southwest corner of the site. The second is a new 350 m^2 shoreline ESA planting area with short shrubs and herbs at the northeast corner of the site.

Additional rationale comments are provided in the professional opinion memo provided by Hatfield Consultants (Attachment B). The plan modifications are highlighted in the revised plan set.

Panel Comment: ***Review the proposed compensation/enhancement planting scheme for the shoreline ESA and consider introducing more mature and substantive planting.***

VAFFC Response: "New ESA compensation areas include some larger plants, as well as new landscaping areas outside of the ESA."

The VAFFC's revised planting plan increases the pot sizes primarily for the coniferous trees in the Shoreline ESA. They've advised that the deciduous trees are better planting in smaller sizes but higher concentrations to out compete invasive species. Larger trees (both coniferous and deciduous) have also been incorporated within the non-ESA/non-RMA planting areas.

Additional rationale comments are provided in the professional opinion memo provided by Hatfield Consultants (Attachment B). The plan modifications are highlighted in the revised plan set.

Panel Comment: ***Consider introducing some planting in the intertidal ESA in addition to the proposed removal of existing and development/construction of new structures and shoreline within the shoreline and intertidal ESA.***

VAFFC Response: "VAFFC has explored intertidal planting with its engineering and environment experts and concludes that this option is not viable. VAFFC contends that the significant effort to offer further compensation areas and landscaped areas (cumulatively representing approximately 15% of the total property area) should satisfy the overall need for enhancement of the site."

The VAFFC's biologist's analysis indicates that the likelihood of a successful planting and survival within the Intertidal ESA along the site's waterfront is low given, for example, the site's hydraulic conditions, high velocity river flows and other factors that would affect the viability of the vegetation planting. In addition, they point out that the integrity of the proposed rip-rap

revetment would be impacted by substantive vegetation growth as it would compromise the long-term erosional protection intended by the engineering design of the bank structures.

Additional rationale comments are provided in the professional opinion memo provided by Hatfield Consultants (Attachment B). The plan modifications are highlighted in the revised plan set.

Panel Comment: ***Investigate opportunities for further on-site ESA compensation and enhancements especially within the shoreline ESA and other areas along the proposed public trail and in the northern portion of the site in addition to the proposed off-site ESA enhancements.***

VAFFC Response: "VAFFC has offered further enhancement of upland areas adjacent to the public trail and along the Williams Road Riperian Management Area (RMA). Additional areas totaling 645 m^2 (6,943 ft^2) have been added which brings the total landscaping commitment to approximately 2,053 m^2 (22,098 ft^2)".

Three additional non-ESA/non-RMA planting areas are proposed by the VAFFC. The first is a new trailside area in the northeast corner of the site. The second planting area involves a new 3 metre wide strip adjacent to the Williams Road RMA. The third area is a 1.5 m widening of one side of the proposed vegetation planting strip adjacent to the public trail.

Additional rationale comments are provided in the professional opinion memo provided by Hatfield Consultants (Attachment B). The plan modifications are highlighted in the revised plan set.

Panel Comment: ***Consider installing on-site signage to inform and provide interpretation to the public regarding the works and enhancements done on the subject site to protect and preserve the natural environment.***

VAFFC Response: "As part of the trail enhancements, VAFFC will include interpretive signage along the trail corridor and at strategic viewing locations. VAFFC will design the signage to City standards and commit a total of $5,400 plus 20% contingency to complete these installations."

In consultation with Parks staff the estimate is based on cost estimates for three large information signs. The final package makeup could vary in terms of the number of signs and the agreed upon context for each sign as will be determined through the Servicing Agreement.

Panel Comment: ***That staff review the adequacy of the pedestrian viewing platform cash-in-lieu contribution and report back.***

Staff Response: A detailed cost breakdown for the proposed observation platform (refer to Attachment D), as provided by the applicant's contractor, has been reviewed by Parks Department staff.

The design is essentially a short treated wood frame construction platform with a protective wooden handrail at its perimeter. The platform will sit atop wood footings to provide an overlook to the Fraser River and would be similar to observation platforms used in various locations in Richmond. The platform would not be intended to project out significantly from the dike and would not extend past the high water mark. The basic design is shown in Attachment D.

The detailed estimate, shown in Attachment D, includes an allowance for benches and signage and a 20% contingency allowance. Parks Department staff reassessed the proposed conceptual design and the associated cost breakdown and have determined it to be acceptable for the general location.

Analysis

Summary of the Revisions Made to the Development Proposal

Modifications made to the development proposal submission reviewed by the Development Permit Panel on October 11, 2017 are summarized as follows:

1. Two additional ESA compensation areas totalling 702 m^2 (7,552.27 ft^2) have been added along the site's shoreline (See Plan #15). Overall, the on-site ESA compensation proposed in the revised submission has increased from 344 m^2 to 1,046 m^2 (3,702.8 ft^2 to 11,259 ft^2). No changes were made to the off-site ESA landscaping area which remains at 144.6 m^2 (1,556.5 ft^2).

2. 59 additional trees and 2,458 additional shrubs have been added on-site. Tree pot sizes for approximately 10% of the ESA/RMA trees and have been increased from a 5 or 10 pot size to a 15 pot size. The trees increased in size were primarily conifers within the ESA and RMA areas. The quantity and size changes are reflected in the landscaping plans species listings provided in Plan #24.

3. The request to consider planting in the intertidal rip-rap area was undertaken, but the professional opinion given is "that planting within the intertidal ESA is not supported based on the proposed engineering design criteria." The revised submission makes no changes to the previous submission on this issue.

4. An additional 645 m^2 (6,942.7 ft^2) of non-ESA/RMA landscaping has been added via a new 400 m^2 (4,305.6 ft^2) trailside planting area in the northeast corner of the site and a new 3 m wide planting strip adjacent to the Williams Road RMA north of the CN Rail (refer to Plan #15).

   The east side of the pedestrian trail landscaped area has been widened by 1.5 m; increasing the east side planting strip to 3.0 m in width. When combined with the landscaping on the adjacent terraced slope, this adds 660 m^2 (7,104.2 ft^2) of landscaping to this area (refer to Plans #15 – #20).

   Collectively the non-ESA/RMA planting additions total approximately 1,305 m^2 of new material over and above that shown in the October 11, 2017 submission.

5. Based on estimates provided by Parks Department staff, the proponent has agreed to a signage package that will cover the placement of several interpretive signs along the proposed pedestrian trail. The commitment is for $5,400 plus a 20% contingency (total = $6,480). This figure includes graphics design and installation of the signs and has been reviewed and accepted by Parks staff. The contribution has been added to the Development Permit considerations. The detailed design and installation of the interpretive signage is included in the Servicing Agreement requirements included in the Development Permit considerations.

6. A revised cost estimate for the on-site landscape areas adjacent to the trail buffer and expanded on-site non ESA/RMA landscaping shows an increase from the original submission of $29,903.50 to $99,177.10 – inclusive of a 10% contingency and three years of monitoring. The revised cost estimate with details is provided in Attachment C. Staff's opinion is that the revised planting addresses the Panel's concerns regarding addition planting considerations.

7. A revised cost estimate for the on-site and off-site ESA and RMA habitat landscaping plus the on-site trail and buffer strip landscaping increases from $241,168.70 to $283,167.50 – inclusive of a 10% contingency, three years of maintenance and three years of monitoring. The revised cost estimate with details is provided in Attachment C.

Overall Summary of Landscaping Area Changes

The table below shows the overall changes to the proposed landscaping areas between the Development Permit submission of October 11, 2017 and the revised Development Permit submission.

Landscaping Area	Oct. 11, 2017 Submission (m^2)	Revised Submission (m^2)	Change (m^2)
Marine Terminal ESA/RMA	1,144.8	1,846.8	+702
Trail Buffers	748	748	0
Terraces + Expanded Trail Buffer		660	+660
On-site Non ESA/RMA	0	645	+645
Off-site ESA/RMA	434.4	434.4	0
Combined Totals	2,327.2	4,334.2	+2,007

Revised Development Permit Considerations

Based on the revised submission, the Development Permit Considerations were adjusted as follows:

- The landscape security for the on-site landscaping has been increased from $250,078.40 to $361,248.80 (inclusive of 10% contingency and monitoring costs) based on the revised cost estimate submissions from the Landscape Architect (dated October 31, 2017). Additional landscape securities (estimated at $19,178.00 plus 1,917.80 contingency) for the off-site ESA/RMA landscaping will be addressed through a Servicing Agreement.

- The additional non-ESA/nonRMA landscaping areas (on-site trailside landscaping [400 m^2], the expanded trail buffer and slope planting [660 m^2] and the planting strip adjacent to the Williams Road RMA [245 m^2] have been included in the areas to be monitored by a Qualified Environmental Professional (QEP) for 3 years.

- An additional voluntary contribution of $6,480.00 for interpretive signage has been added to the Development Permit Considerations.

The revised Development Permit Considerations are provided in Attachment E.

Conclusions

The VAFFC has responded to all of the issued identified in the Development Permit Panel's referral motion of October 11, 2017. The VAFFC's revised proposal incorporates a number of significant modifications to the Marina Terminal proposal to address the issues identified by the Panel and staff. Staff believe the proponent's modified proposal to be generally in compliance with the City's Environmentally Sensitive Area Development Permit Guidelines as applicable to the subject site.

On this basis, staff recommend that the Development Permit be endorsed and issuance by Council be recommended.

David Brownlee
Planner 2
(604-276-4200)

DCB:blg

List of Attachments:
Attachment A: Original Staff Report to Development Permit Panel (report dated September 20, 2017).
Attachment B: Professional Opinion Memo from Hatfield Consultants.
Attachment C: Revised Landscape Cost Estimates With Breakdowns.
Attachment D: Sketch plans and Cost Estimates for the Proposed Public Observation Platform.
Attachment E: Revised Development Permit Considerations.

ATTACHMENT A

City of Richmond

Report to Development Permit Panel

To:	Development Permit Panel	**Date:**	September 20, 2017
From:	Wayne Craig Director, Development	**File:**	DP 16-741741
Re:	**Application by Vancouver Airport Fuel Facilities Corporation (VAFFC) for a Development Permit at 15040 Williams Road**		

Staff Recommendation

That a Development Permit be issued which would permit the construction of a Marine Terminal Facility for aviation/jet fuel delivery at 15040 Williams Road on a site zoned "Industrial (I)" and partially designated as an Environmentally Sensitive Area (ESA).

Wayne Craig
Director, Development

DCB:blg
Att. 5

Staff Report

Origin

The Vancouver Airport Fuel Facilities Corporation (VAFFC) has applied to the City of Richmond for permission to develop a Marine Terminal Facility for aviation/jet fuel delivery at 15040 Williams Road on a site zoned "Industrial (I)" and that is partially designated as an Environmentally Sensitive Area (ESA). The site is currently vacant.

The proposed use conforms to the existing "Industrial (I)" zoning and the subject site does not require rezoning.

To accommodate the proposed Marine Terminal Facility one or more Servicing Agreements will be required at Building Permit stage. The Servicing Agreement(s) will include the design and construction of approximately 350 m of new dikes across the subject site, design and construction of a new publically accessible trail and associated landscaping through the site, design and construction of utility and frontage works and off-site ESA and Riparian Management Area (RMA) landscaping as outlined in this DP plan submission.

Development Information

The VAFFC is currently working on a Vancouver Airport Fuel Delivery project involving three main components:

- A "Fuel Receiving Facility" for fuel storage on Port of Vancouver owned lands on the north side of Williams Road (Richmond Key 42267) (currently under construction).
- A 13 km (8 mile) long underground pipeline running from the Fuel Receiving Facility to the aviation tanks at the Vancouver Airport on Sea Island.
- A "Marine Terminal" for off-loading aviation/jet fuel from vessels at 15040 Williams Road.

The applicant's stated intent for the Fuel Delivery project is to "secure and enhance the present and future aviation fuel delivery to the Vancouver International Airport".

The overall project has been reviewed under a five year harmonized Federal and Provincial environmental review led by the BC Environmental Assessment Office (BCEAO) and was awarded an Environmental Assessment Certificate (EAC) in December, 2013. The Environmental Assessment Office attached 64 conditions to the EAC which it felt are in the public interest and "will prevent or reduce potential adverse environmental, social, economic, heritage or health impacts of the project, such that no significant residual adverse effects are expected". Key issues addressed in the 64 EAC conditions include:

- Development and implementation of a Construction Environmental Management Plan (CEMP);
- Implementing a Traffic Management Plan;
- Retaining the Services of an Environmental Monitor;
- Developing and implementing an Operations Environmental Management Plan (OEMP);
- Fisheries, Aquatic and Surface Water Quality;

- Fuels, Chemical and Materials Storage and Handling;
- Vegetation and Wildlife;
- Air Quality;
- Noise;
- Social and Economic issues;
- Spill Prevention, Preparedness and Emergency Response;
- Accidents or Malfunctions; and
- Fire Prevention, Preparedness and Emergency Response.

The VAFFC obtained a construction permit from the Port of Vancouver in February 2016, allowing them to begin construction of the Fuel Receiving Facility on Port of Vancouver property on the north side of Williams Road.

A permit has also been issued to the VAFFC (April 3, 2017) by the BC Oil and Gas Commission, authorizing it to construct and operate a pipeline to transmit jet fuel as described in their application to the Commission and allowing it to utilize a waterlot lease under Provincial jurisdiction adjacent to the subject site. Note that the fuel storage facility on Port Metro Vancouver lands and the pipeline are not part of this Development Permit application.

With regard to the subject Development Permit application the City's jurisdiction is limited primarily to the subject site and the immediate surroundings with the specific focus on the project's implications to the protection of the natural environment, its ecosystems and biological diversity as authorized under the Local Government Act (2015). The City's Official Community Plan outlines the Development Permit Guidelines for Environmentally Sensitive Areas and form the framework for assessing the development proposal.

A separate report, prepared by City Engineering staff, will be presented for Council's review and consideration of a Municipal Access Agreement (MAA) which is required for those portions of the proposed pipeline to be located on City land.

Development Permit Application Requirement

A portion of the Marine Terminal site has a designated 'intertidal' and 'shoreline' Environmentally Sensitive Area (ESA) that will be impacted by the proposed Marine Terminal development and a Development Permit (DP) is therefore required.

Impacts to Riparian Management Area features arising from the Marine Terminal development will also be addressed through the proposed DP. The primary focus of this Development Permit is to ensure that the environmental impacts to the ESA and RMA features are identified and acceptable mitigation, compensation and enhancement actions are incorporated into the proposed development plan in accordance with the Official Community Plan's Development Permit guidelines for Environmentally Sensitive Areas.

Marine Terminal Project Description

The subject site, located at 15040 Williams Road, covers an area of approximately 40,468.56 m^2 (10 ac.), including 31,241.73 m^2 (7.72 ac.) of land and a 9,226.83 m^2 (2.28 ac.) area in the Fraser

River covered by a Provincial water lot lease. The site is bisected by a 30 m (98.4 ft.) wide CN Rail right-of-way (ROW).

The portion of the site north of the CN Rail ROW is currently proposed to contain only limited infrastructure including, an underground fuel delivery pipe to carry fuel from the subject property to YVR, an underground potable water pipe line and a small shed structure to house a water meter and a backflow preventer.

The portion of the site south of the CN Rail ROW abuts approximately 300 linear metres (984 ft.) of the Main Arm of the Fraser River and is proposed to contain the primary infrastructure of the Marine Terminal facility – some of which will extend out over the water and into the Provincial water lot lease area. Any structures within the Provincial water lot are outside City jurisdiction. The water lot falls under the jurisdiction of the BC Oil and Gas Commission (OGC) under a Provincial interdepartmental working agreement for projects regulated by the OGC.

The purpose of the Marine Terminal facility is to allow marine vessels to dock and safely transfer aviation/jet fuel from the vessels to the fuel receiving facility being built on Port of Vancouver property on the north side of Williams Road (Richmond Key 42267). The fuel is proposed to be transferred from the Marine Terminal facility to the fuel receiving facility by pipelines that will cross under Williams Road. According to the VAFFC's submission to the BC Environmental Assessment Office, the Marine Terminal facility will receive approximately one fuel barge each week. The standard barge will have an average capacity of between 30 to 40 million litres of fuel. When in operation, the Marine Terminal facility will have up to approximately 10 employees on site.

The proposed Marine Terminal site was previously used as a scrap metal storage and transfer facility. The previous owner partially filled the property and constructed a wharf, allowing vessels to moor and transfer scrap metal to and from the site. The VAFFC intends to undertake the following actions to repurpose the site:

- Removal of an existing 30 m x 120 m wharf and concrete filled piles at the waterfront.
- Re-grading of the foreshore and intertidal zone.
- Upland seismic stabilization in the form of ground densification within the ESA.
- Construction of new berthing and mooring structures for a range of marine vessels.
- Install pile-supported containment structures upstream and downstream of the proposed vessel moorage area.
- Construct fuel uploading arms, piping and manifold to transfer fuel from vessel to pipeline to the fuel receiving facility on Port Metro Vancouver's property on the north side of Williams Road.
- Install both Municipal and river water fire pump systems for redundant supply of fire protection water to both the Marine Terminal and fuel receiving facility.
- Install six buildings or enclosures, totalling approximately 205.94 m^2 (2,216.7 ft^2) in area to provide a control room/washroom, a fuel lab, an electrical house, fire pumps and hydro foam storage for fire suppression.
- Install a utility dock for dedicated full time spill response vessels.

- Install a containment and treatment system for storm run-off and contained transfer areas.
- Install perimeter landscaping and fencing.

The development proposal includes:

- The provision of a pedestrian trail accommodated within a 6 m wide right-of-way (ROW) through the site;
- The design and construction of a 4.7 m high dike and an associated 7.5 m wide ROW that will connect to existing City dikes on the adjacent properties to the east and west of the subject site;
- A$62,000 cash donation is also proposed for the construction of a pedestrian observation platform to be located on "Lot K" east of Williams Road and overlooking the Fraser River; and
- Environmental enhancements and compensation planting are proposed to address the anticipated impacts to environmental features within the designated ESA and RMA areas.

The Development Permit considerations include the requirements for registration of the various right-of-way agreements and the proposed cash donation for the pedestrian observation platform.

One or more Servicing Agreements will be required for various works, including utility connections (water services with backflow prevention device, storm sewer outfall with an oil and grit separator), dike design and construction, off-site riparian area improvements and ESA compensation, trail design and construction. These Servicing Agreements will be addressed under separate applications and will need to be entered into prior to Building Permit issuance. The requirements for the Servicing Agreements are included in the Development Permit considerations.

Please refer to the attached Development Application Data Sheet (Attachment 1) for a comparison of the proposed development data with the relevant bylaw requirements.

Background

Development surrounding the subject site is as follows:

To the north is:

- A 30.45 ha (75.24 ac.) "Industrial (I)" zoned parcel owned by the Fraser River Port Authority (aka Port Metro Vancouver). Most of that site is vacant except for the south western corner, which is currently under construction to accommodate the VAFFC "fuel receiving facility".
- An 11.77 ha (29.08 ac.) "Industrial (I)" zoned parcel owned by Ecowaste Industries. That site is part of a 15 to 20 year redevelopment project approved under Development Permit (DP 11-566011 - issued January 23, 2017).

To the east is:

- A City-owned waterfront parcel known as "Lot K". The lot is zoned "Industrial (I)" and is approximately 7.05 ha (17.41 ac.) in size. It includes a segment of the City's dikes.

To the west is:

- The continuation of the 30 m (98 ft.) wide CN Rail right-of-way. There are currently no rail lines within the right-of-way.

- A vacant 2.65 ha (6.56 ac.) City-owned lot zoned "Light Industrial (IL)".
- A vacant 3.64 ha (9 ac.) City-owned waterfront lot zoned "Entertainment & Athletics (CEA)". This property contains both a segment of the City's dike system and a recreational trail.

To the south is:

- The Main Arm of the Fraser River.

Rezoning and Public Hearing Results

A rezoning is not required to accommodate the proposed uses on the subject property, as they conform to the site's existing "Industrial (I)" zoning.

Staff Comments

The proposed scheme attached to this report has satisfactorily addressed the environmental and site planning issues and other staff comments identified as part of the review of the subject Development Permit application. In addition, it complies with the intent of the applicable sections of the Official Community Plan (OCP) and is in compliance with the "Industrial (I)" zone. No variances are requested for this application.

Analysis

Environmentally Sensitive Area Designations (ESA)

The City's Official Community Plan (OCP) identifies the subject site as having both an 'Intertidal' ESA and a 'Shoreline' ESA. The 'Intertidal' ESA runs along the site's interface with the Fraser River extending from the average high water mark outward 30 m into the river. The 'Shoreline' ESA runs along the site's interface with the Fraser River but extends landward 30 m into the site. These two ESA types are described by the City as follows:

'Intertidal': Applicable to coastal areas within 30 m (98.43 ft.) (seaward) of the high water mark which are influenced by waves, tides, and other processes along the Fraser River of Strait of Georgia. This area can include mudflats, vegetated estuarine or salt marsh communities and developed shorelines with riprap, docks and pilings. The intertidal is important for fish and wildlife and particularly for fish such as juvenile salmon. They are also important for dike protection.

'Shoreline': Applicable to coastal areas within 30 m (98.43 ft.) landward of the high water mark with environmental values related to their association to the Fraser River and Straight of Georgia. This is a marine riparian zone that typically includes the crest and back slope of the perimeter dike, as well as developed or natural areas landward of the dike. Shoreline areas are important for fish and wildlife within forests and other ecosystems within the shoreline area. They also serve to filter contaminants and sediments and help protect Richmond's dikes.

Biologist's ESA Assessment

The biologist's ESA assessment indicates that the Marine Terminal property has undergone significant alterations by the previous owners. They note that the 'intertidal' ESA area was "green coded" (i.e. low productivity habitat) under the Fraser River Estuary Management Program (FREMP). The biologist assessed the intertidal ESA as having a low diversity of

habitats (no mudflat, marsh or sandflat) and only small patches of poor quality habitat and a high level of invasive plant cover.

With regard to the 'shoreline' ESA area, the biologist's assessment is that this area is largely devoid of vegetation with the majority of the existing vegetation consisting almost entirely invasive plant species. The sole exception to this assessment is a 208 m^2 patch of native Red Alder and Black Cottonwood saplings near the south-western area of the site which the report indicates "constitutes marginal wildlife habitat". As confirmed by the arborist, none of these trees are bylaw-sized trees (i.e. 20 cm or greater diameter) and will be removed.

No Provincially designated plant or animal 'species at risk' were identified in the biologist's assessment of the Marine Terminal site.

City staff concur with the biologist's assessment of the RMA and ESA conditions at the subject site.

Riparian Management Areas (RMA)

As part of the City's 2006 Riparian Response Strategy, and in consultation with the Department of Fisheries and Oceans, a 5 m (16.4 ft.) wide Riparian Management Area (RMA) setback was established along a minor watercourse fronting the subject site within the Williams Road ROW to the north of the site. A similar designation was not assigned to the minor watercourse along the Savage Road ROW south of Williams Road, however, discussions between staff and the applicant's biologist have resulted in an agreement to note the area along the Savage Road ROW between the CN Rail ROW and Williams Road as an "inferred RMA" effectively treating this area as a minor RMA also requiring a minimum 5 m (16.4 ft.) wide setback. The RMA areas are shown on Plan #12 in the applicant's submission package.

Biologist's RMA Assessment

A registered professional Biologist was hired by the proponent to assess the baseline bio-inventory environmental conditions at the Marine Terminal site and provide recommendations on habitat impact mitigation, compensation and enhancement in accordance with the City's Official Community Plan.

Assessment reports (Hatfield Consultants, July 2016, November 2016, December 2017, February 2017, June 2017) were submitted for the subject property assessing both the Riparian Management Areas (RMA) and the Environmentally Sensitive Areas (ESA).
With regard to the RMA, the biologist indicates that the watercourse adjacent to Williams Road is a non-fish-bearing, ephemeral and highly disturbed drainage ditch with opportunity for improvement. Their environmental inventory shows that Red Alder trees encompassed an area of approximately 276 m2, approximately 29.3% of the Williams Road RMA. Himalayan Blackberry and non-native herbs cover approximately 332 m^2 and remnant infrastructure materials over an area of approximately 198 m^2 within the RMA. The reports note that an existing solid barrier fence installed overtop of lock blocks by the previous owner approximately 2.5 m from the high water mark (HWM) limits the amount of vegetation that could otherwise occur within the 5 m RMA setback.

The Savage Road "inferred RMA" was also identified as an ephemeral drainage ditch, lacking fish and having no connectivity to fish-bearing habitat. The reports indicate that this narrow RMA area is highly disturbed, comprised primarily of Himalayan Blackberry and bordered by reed canary grass and non-native herbs. Red Alder trees cover approximately 107 m^2 primarily on the east side of the ditch within the Savage Road RMA. Similar to the situation along Williams Road, the existing fence along the Savage Road RMA is also located about 2.5 m from HWM and again reduces the effective RMA setback area by half.

Impacts to the Site's RMAs and ESAs from the Proposed Development

As proposed, the Marine Terminal development is anticipated to result in the following impacts to the RMA and ESA features:

a) RMA (riparian areas along Savage Road and Williams Road)
   - Removal of the existing property fence and the underlying concrete blocks.
   - Re-grading of the two RMA areas (with retention of the existing trees).
   - Installation of a new property fence outside the RMA 5 m buffer.

b) Intertidal ESA (area extending 30 m below the high water mark (HWM))
   - Removal of the existing bulkhead wharf.
   - Re-grading of the riverbed below the HWM to a 2:1 slope.
   - Recovering the bank with clean, coarse armour (rip rap).
   - Re-grading most of the banks north and south of the existing wharf and replacement of the concrete rubble with clean, coarse armour (approximately 75% of the river frontage will be improved (cleaned and stabilized).
   - Installation of infrastructure into the water area to provide for the moorage of vessels, offloading of fuel, and various safety and containment measures. The biologist indicates that the in-water infrastructure (an unloading platform with spill containment, berthing and mooring dolphins and a utility boat dock) will total approximately 0.29 ha of the project footprint – much of this occurring in the same location as the existing wharf which is proposed to be removed. In-river structures will be supported by steel pipe piles and will have concrete and steel decks.

c) Shoreline ESA (upland area within 30 m of the HWM)
   - Excavation of top soil and replacement with clean, imported fill landward of the top of bank.
   - Compaction and stabilization using stone columns.
   - Removal of the 208 m^2 (2,239 ft^2) of native tree saplings as a result of the need to undertake seismic compaction and stabilize the site.
   - Portions of the site will be raised to approximately 4.7 m GSC for dike installation and flood protection.

Proposed Compensation and Enhancements for RMA and ESA Impacts

a) RMA
   - Establishing a new property fence at a minimum of 5 m setback from the RMA.
   - Re-grading the RMA to remove invasive vegetation and create better growing areas for re-vegetation.
   - Re-vegetation of the new 5 m wide RMA with native vegetation.

- The net compensation will be an approximate 2 for 1 replacement/enhancement for both RMA areas (Williams Road and Savage Road) for a total of 1,090.6 m^2 enhanced RMA.

b) Intertidal ESA
- Restoration of approximately 36,000 m^3 of the Fraser River flowing water environment as a result of the removal of the existing wharf.
- Re-grading of the water interface in place of the existing wharf will create a narrow intertidal band along the shoreline providing new microhabitats for small aquatic plants, fish and invertebrates.
- The biologist indicates that upgrading the bank armour will benefit for small aquatic life forms.
- A total of 283 linear metres of the intertidal ESA foreshore will be improved.
- Staff asked the VAFFC to consider additional foreshore habitat enhancements (e.g. bench marshes) at the subject site or on nearby intertidal areas. After a more detailed review was undertaken by a professional Biologist it was determined that the developer's proposed modifications to the foreshore/intertidal area will, of themselves, provide intertidal and sub-tidal habitat gains and improvement to habitat conditions at the site in comparison to the baseline situation. On this basis, no further foreshore enhancement works were sought. The Biologist's assessment is provided in Attachment 4.

c) Shoreline ESA
- Compensation for the anticipated loss of 208 m^2 of tree saplings from the shoreline ESA is proposed to be undertaken both on-site, with the installation of:
  - Approximately 344.0 m^2 of native riparian shrubs and ground cover vegetation in the north-eastern corner of the site adjacent to the Fraser River.
  - An additional 144.6 m^2 of native trees, riparian shrubs and ground cover vegetation to be installed in two off site locations on adjacent City-owned lands to the south west of the subject property.
  - The combined 488.5 m^2 of compensation will result in a 2.34 for 1 enhancement/replacement by area with more than 70% of the compensation occurring on-site.
- Registration of legal agreements on Title for the on-site portions of the RMA and ESA enhancement/compensation areas is included in the Development Permit (DP) considerations to ensure these areas are retained. The DP considerations also include a requirement for submission of securities in the amount of $82,049 to ensure that the required ESA and RMA landscaping is installed to the satisfaction of the Director of Development.
- Submission of securities in the amount of $54,252.00 for three years of maintenance and $8,712.00 for monitoring with annual reporting by a Qualified Environmental Professional (QEP) for both the on-site and off-site ESA, RMA and trail enhancement areas is included in the Development Permit considerations.
- As proposed, landscaping plans for the ESA, RMA, the public trail buffer planting and the additional planting adjacent to the proposed pedestrian trail includes approximately 340 trees, 2016 shrubs and 4,760 ground cover plants. All selections will be species native to the area.

A balance sheet summary of the anticipated impacts and compensation/enhancements is provided on Plan #25 of the applicant's submission plans.

Arborist Report

As part of the required base-line assessment of the Marine Terminal site, the proponent contracted with uTree Environmental Consultants to undertake an assessment of the trees on and around the property that may be affected by the project. The submitted arborist's report has the following findings:

a. On-site Trees

The arborist's report indicates that there are no bylaw-sized (i.e. > 20 cm) trees present on the Marine Terminal site. The report indicates that a small stand of non-bylaw sized Alder sapling trees will be impacted by the development. Compensation for these trees is addressed in the Environmentally Sensitive Area (ESA) section earlier in this report as the stand is located within a designated ESA.

b. Off-site Trees

The arborist's report identifies 37 off-site Alder, Cottonwood and Birch trees located along Williams Road and within the Savage Road ROW. Most of these trees are within the City's designated Riparian Management Areas (RMA). The report indicates that these trees are "all young and show good vigour despite historical damage by ditch cleaning, wind and other factors". All these trees are recommended to be retained.

The report also comments on a mature stand of trees treed area on City owned land outside the south-western corner of the Marine Terminal property. Many of these mature trees are up to 24 m (80 ft.) tall and their condition ranges from good to dead. The report recommends mitigation measures in this stand for safety reasons before any work can begin on-site on the dike/trail in the vicinity of this stand.

c. Arborist Recommendations

The arborist recommends the installation of tree protection fencing for the off-site trees being retained, pruning and limb removal in the vicinity of the off-site dike/trail areas to be under supervision of a certified arborist, invasive vegetation removal within the tree protection area by hand only and activity within the drip line of retained trees to be done under the supervision of a Qualified Environmental Professional (QEP) or a certified arborist. The report also recommended the removal of four dead / hazardous trees from the City's tree stand at the south-western corner of the Marine Terminal site.

d. Staff Review

Parks staff reviewed the arborist's findings and are in agreement with them. Parks staff have authorized the removal of four hazardous dead and leaning cottonwoods from the City owned tree stand at the south-western corner of the Marine Terminal site due to concerns of crew safety.

The arborist's recommendations regarding protective fencing and the supervision by a QEP or certified arborist have been incorporated into the Development Permit considerations.

ESA Guideline Checklist

The applicant was asked to respond to an Environmentally Sensitive Areas DP Guideline checklist. The intent of the checklist is to provide an overview of the anticipated ESA impacts and the proposed compensation/enhancement, as well as to ensure that the overall objectives of the City's ESA Strategy are being achieved. The guidelines address both the intertidal and shoreline areas and include aspects such as maintaining ecological processes, minimizing shade coverage from structures, requiring environmental assessments and implementing mitigation measures, providing safe access to the public, restoration of degraded habitat, etc.

A copy of the applicant's responses is provided in Attachment 2. Staff's assessment is that the applicant's proposed compensation and enhancement plan adequately addresses the City's ESA DP guidelines.

Construction Environmental Management Plan

One of the 64 conditions of the Environmental Assessment Offices' (EAO) Environmental Assessment Certificate (EAC) requires the proponent to prepare and implement a Construction Environmental Management Plan (CEMP). The CEMP is a requirement of the EAO and has been approved by them for this project. There is no requirement for Municipal approval of the 200 plus page document however the CEMP has been provided to, and has reviewed by, the City's Environmental Sustainability Department and the Engineering Department. City staff do not have any specific concerns with the CEMP as it relates to the Development Permit.

The CEMP is required to include the following:

- Accidents or Malfunctions Management Plan;
- Air Quality and Dust Control Management Plan;
- Archaeological Management Plan;
- Contaminated Sites Management Plan;
- Fuels, Chemicals and Materials Storage and Handling Plan;
- Noise Management Plan;
- Spill Prevention and Emergency Response Plan;
- Surface Water Quality/Fisheries Protection and Sediment Control Plan;
- Vegetation and Wildlife Management Plan; and
- Waste Management Plan.

The intent of the CEMP is to ensure that construction activities will comply with the EAC.

Proposed Public Trail

The VAFFC had originally proposed a public trail alignment around the perimeter of the subject site. Because of the concerns raised by City staff with regard to the trail crossing over the CN Rail ROW, an alternative alignment a-top the proposed dike alignment near the waterfront was suggested to the applicant. The VAFFC reviewed this proposal in terms of the implications to the anticipated future operations of the site and the attendant safety concerns to the public and the facility. The VAFFC also reviewed the proposed waterfront trail location with Transport Canada; the agency responsible for reviewing and approving safety and security measures for port related activities and were advised by Transport Canada that a trail located at the waterfront would be a significant concern for both pedestrian safety and site security.

The VAFFC subsequently submitted a detailed rationale statement examining and assessing each of the alignment options for the trail location (see Attachment 3). The VAFFC ultimately concluded that a trail alignment in proximity to the shoreline would not be viable and instead, proposed an alternative alignment for the trail running parallel to the CN Rail right-of-way, as a compromise between the options of going across the CN Rail line and around the subject site or locating the trail across the subject site's waterfront. The proposed alternative alignment paralleling the CN Rail right-of-way has been reviewed and accepted by City Park's staff.

The revised pedestrian trail alignment is proposed to be accommodated within a 6 m wide right-of-way with public right-of-passage. The right-of-way would be designed to accommodate a 3 m wide limestone pathway with 1.5 m wide vegetated strips along both sides. The proponent will be responsible for the trail construction to the City's standards. After the usual maintenance period, on-going maintenance and liability of the trail will transfer to the City. Conceptual planting plans and cross sections for the trail are include in the Development Permit plans (see Plans #18 – 20), but minor modifications may occur through the required Servicing Agreement for the trail's design and construction.

Both the trail right-of-way registration and the requirement to enter into a Servicing Agreement for the construction of the trail are included in the Development Permit considerations. Requirements for submission of trail landscape securities in the amount of $105,065.40 are also included in the DP considerations.

In recognition of the City's desire for direct access to the waterfront for viewing, the proponent has also agreed provide a voluntary cash contribution of $62,000 toward the future construction of a pedestrian observation platform to be located on "Lot K" east of Williams Road and overlooking the Fraser River. The proponent has submitted a conceptual design for the viewing platform which was reviewed and approved by Parks staff. Actual construction of the viewing platform will occur in conjunction with future dike improvement works along the Lot K area. The cash contribution for the viewing platform is also included in the Development Permit considerations.

Dike Provision and Foreshore Covenant Requirements

The current Marine Terminal proposal will result in the subject site being raised, seismically stabilized and a new 4.7 m high dike being constructed within a 7.5 m wide right-of-way (see Plan # 3 for the proposed dike alignment). The dike will be designed to accommodate the future raising of the dike to 5.5 m elevation, the height recommended by the Province. Buildings will be required to be setback a minimum of 7.0 m from the dike right-of-way. Registration of a legal agreement establishing the right-of-way and obligating the applicant to enter into a Servicing Agreement for the design and construction of the dike are included in the Development Permit considerations. The Development Permit considerations also include a requirement for discharge of the existing foreshore maintenance covenant (BG 285960) and registration of a new legal agreement to ensure that the newly reshaped river bank and armament is maintained and will not be altered without City approval. Maintenance of the foreshore armament will be the proponent's responsibility. Both the dike construction and the foreshore armament will be subject to the City's and the Provincial Diking Authority's satisfaction.

Transportation Issues

A traffic impact study was undertaken by Tetra Tech (final version dated Jun 29, 2017). The Marine Terminal portion of the study includes information on: the type and number of vehicles expected to access the facility, the time of day vehicles access the site, anticipated travel routes and the number of vehicles generated by employees at any given time. As a result of study, modifications were made to the development plans to ensure that all parking and loading needs will be appropriate for the site and that vehicle accesses and fronting roadways are able to accommodate the anticipated vehicle movements. The study indicates that the proposed Marine Terminal will only generate a minimal amount of traffic with less than 20 cars per day and a maximum of one truck (less than 5 tonnes in size) per day.

Based on the traffic impact study the proposed development will provide:

- A single vehicle access to Williams Road.
- Four regular parking spaces.
- One handicapped parking space.
- One Class 1 bicycle space and three Class 2 bicycle spaces.

The City's Transportation staff reviewed and concurred with the submitted traffic impact study's recommendations for the Marine Terminal.

As proposed, the development will comply with the relevant parking and loading provisions of Zoning Bylaw No. 8500.

In addition to addressing the parking and loading provisions, an on-site location has been designated for garbage and recycling containers and has been reviewed and accepted by staff.

CN Rail Review

As the CN's rail corridor runs through the site, the applicant was requested to seek comment on the proposed development from CN Rail.

CN Rail is still undertaking their detailed review of the proposed development plan to "ensure that it is compliant with all Transport Canada Rules and Regulations related to crossings and construction adjacent to a rail corridor", but has provided a letter (dated August 28, 2017) confirming "at this point, that we are not opposed to VAFFC's development, and that a technical solution in compliance with all applicable regulations and standards can be developed."

Based on CN Rail's response, a requirement has been included in the Development Permit considerations that, prior to Building Permit issuance, the proponent is to submit a final sign-off letter of from CN Railway, to the satisfaction of the City's Director of Transportation and the Director of Engineering, for the VAFFC Marine Terminal project at 15040 Williams Road. If CN Railway's approval includes conditions or requirements, the proponent must provide means to meet those conditions/requirements to the satisfaction of the City's Director of Transportation.

Note that should any future mitigation measures be triggered when / if CN Rail constructs and activates the railway the requirement for the proponent to implement such measures, at its sole cost, has been included in the proposed Municipal Access Agreement (MAA).

Frontage Improvements

As a result of the proposed development, the City will take ownership of developer-contributed assets, such as dike maintenance, roadworks, waterworks, storm sewers, sanitary sewers, street lights, street trees. The anticipated operating budget impact for the ongoing maintenance of these assets is $125,000.00 per annum. The majority of this figure is associated with the maintenance of the proposed addition of approximately 350 m of new dike infrastructure across the subject site. Dike maintenance costs for the City typically average approximately $350.00 per linear metre.

The operating budget impacts will be considered as part of the 2019 Operating Budget.

Conclusions

Staff worked with the applicant to ensure that all the Environmentally Sensitive Area (ESA) and Riparian Management Area (RMA) impacts arising from the proposed development have been identified and appropriate mitigation, compensation and enhancement measures are incorporated into the development plans. Compensation/enhancement for the impacts to the ESA and RMA features will result in a better than 2 for 1 net habitat gain and will incorporate native vegetation species enhancements and secure appropriate monitoring measures for three years.

Changes to the intertidal area will result in an improved, more stable and properly armoured bank for the 283 m length of the property's foreshore. The project will also result in the installation of a full 4.7 m high dike and a separate public trail connection through the subject site - both of which will be designed and constructed to City standards and secured with registered right-of-way agreements. A voluntary cash contribution for the future construction of a pedestrian observation platform overlooking the Fraser River near the subject site is also provided.

As the proposed development will meet applicable policies and the Development Permit Guidelines for Environmentally Sensitive Areas, staff recommend that the Development Permit be endorsed, and issuance by Council be recommended.

David Brownlee
Planner 2
(604-276-4200)
DCB:blg

List of Attachments

Attachment 1: Development Application Data Sheet
Attachment 2: Response to ESA DP Guidelines
Attachment 3: Proponent's Trail Location Rationale Statement
Attachment 4: Biologist Professional Opinion on Potential for Post Development Foreshore Habitat Improvement
Attachment 5: Development Permit Considerations

City of Richmond

Development Application Data Sheet

Development Applications Department

DP 16-741741 **Attachment 1**

Address: 15040 Williams Road

Applicant: Vancouver Airport Fuel Facilities Corporation (VAFFC) Owner: Same

Planning Area(s): Fraser Lands

Floor Area Gross: 205.94 m^2 (2,216.7 ft^2)

	Existing	Proposed
Site Area:	40,468.56 m^2 (10 ac.) including 31,241.73 m^2 (7.72 ac.) of land and 9,226.83 m^2 (2.28 ac.) of land covered by water	Same total area however the area of land and land covered by water will change.
Land Uses:	Vacant	'Industrial' - Marine Terminal Facility
OCP Designation:	Industrial	Same
Zoning:	Industrial (I)	Same

	Bylaw Requirement	Proposed	Variance
Floor Area Ratio:	1.0	0.006	none permitted
Lot Coverage:	Max. 60%	0.52%	None
Setback – Front Yard:	Min. 3.0 m	More than 3.0 m	None
Setback – Exterior Side Yard:	Min. 3.0 m	More than 3.0 m	None
Setback – Interior Side Yard:	No Minimum	More than 3.0 m	None
Setback – Rear Yard:	No Minimum	More than 3.0 m for buildings. Structures extend out into the Provincial water lot lease area.	None
Height (m): Buildings	Max. 12 m	Less than 6.0 m	None
Height (m): Structures	Max. 20 m	19.7 m (gangway tower)	None
Lot Size:	No Minimum	40,468.56 m^2	None
Off-street Parking Spaces –	1 space per 100.0 m^2 of gross leasable floor area of building (3 spaces required)	5 including 1 handicapped space	None

Bicycle Spaces:	Class 1: 0.27 spaces per each 100.0 m^2 of gross leasable floor area greater than 100.0 m^2 (1 space required). Class 2: 0.27 spaces per each 100.0 m^2 of gross leasable floor area greater than 100.0 m^2 (1 space required)..	Class 1: 1 space Class 2: 1 space	None

2012 OCP DEVELOPMENT PERMIT GUIDELINES FOR ESA
AS APPLICABLE TO 15040 WILLIAMS ROAD

Intertidal Guidelines

DP GUIDELINE	PERFORMANCE CRITERIA	RESPONSE
a) Preserve all intertidal zones, except in accordance with the conditions of the Development Permit and other necessary permits or approvals (e.g., FREMP, Port Metro Vancouver, and Navigable Waters).	• Linear metres of intertidal retained, removed, enhanced/created. • Overall net gain/loss of intertidal habitat.	**Summary** Approximately 75% (283 m) of the property river frontage will be modified/ enhanced to achieve a more stable (2:1) intertidal slope. Clean, competent materials will be added to a depth of approximately 16 m below the river bed. Bank stabilization works will involve: (1) removing the existing 127 m long wharf resulting in restoration of approximately 36,000 m^3 of the water column and 400 m^2 of new shoreline; and (2) replacing 156 m of overly steep (1.5:1 slope) and poor quality concrete rubble currently armouring the bank on either side of the wharf. Overall, approximately 8,000 m^3 of bank armour will be upgraded below the high water mark. The intertidal zone associated with the property will be significantly more stable, and will have clean, rounded materials which are more conducive to providing interstitial refugia for small aquatic organisms than densely-packed angular rubble or vertical steep pipes. **Linear metres of intertidal:** • **retained -** 94 m • **removed -** 0 m • **enhanced/created -** 283 m

		Overall net gain/loss - 283 m

b) Maintain ecological processes important to the long-term health of the intertidal zone including drainage and hydrology and natural sediment or detritus movement (accretion and erosion).	• Assess proposed net change to intertidal ecological processes.	Replacing the closely spaced vertical steel pipes that form a sealed 'box' in the river with stable, coarse bank armour, will lead to the creation of a continuous, linear, sloped, interstitial habitat below the high water mark. Although the post-development intertidal zone of the property will be enhanced when compared with existing conditions, this positive ecological net change is not expected to contribute significantly to the ecological processes of the already green-coded (low productivity) intertidal habitat along the property (i.e., the newly created interstitial habitat associated with the property's intertidal zone will likely remain green-coded low productivity habitat).
c) Development must not increase shade or disrupt the movement of detritus or other materials. Where water access is necessary for transportation or recreation facilities, filling of the intertidal zone shall be avoided. The preferred method of development over the intertidal zone is on pilings or floating structures.	• Area of shading coverage • Measures employed to avoid, mitigate, compensate impacts.	In-river infrastructure will be minimal and installed on low density piles to minimize shading and flow interference. With this design, the effects are expected to be negligible through the low productivity intertidal zone fronting the marine terminal, and considering the typically high turbidity of the river and consequent absence of a perceptible photic zone. Construction mitigation measures will be described in detail in the construction environmental management plan (CEMP).
d) Consider contiguous or nearby ESA areas such as shoreline zone which have the potential to influence the intertidal zone.	• Assess impact of removal/relocation of adjacent shoreline habitat. • Measures employed to avoid, mitigate, compensate impacts.	There is no natural vegetation in the shoreline ESA area of the property beyond a small 208 m^2 patch of native saplings, set 7 m from the high water mark. The saplings have no notable influence on the intertidal zone. However, compensation is proposed for the loss of this small patch, in the form of habitat enhancement in the northeast corner of the marine terminal property and along the more productive

		shoreline areas adjacent to the property (refer to Shoreline Guidelines section). Construction mitigation measures will be described in detail in the construction environmental management plan (CEMP).
e) No alterations should be made to the intertidal area without an appropriate environmental assessment and implementation of mitigation measures. The City may require preparation of an Environmental Protection Plan (EPP) prepared by a qualified professional to guide environmental management on sensitive, complex, or large sites.	• Submission of an acceptable Environmental Report inclusive of protection, mitigation and compensation measures. • Habitat Balance • Vegetation assessment, habitat utilization, sediment transfer modeling. • Construction and post construction monitoring plans.	A harmonized federal and provincial environmental assessment of the potential effects of the marine terminal development, including mitigation measures, potential residual effects and cumulative effects was conducted over a 5-year period. That review process was comprehensive and robust, with both levels of government concluding that significant effects were unlikely. Conditional environmental assessment approvals were granted in December 2013. Notwithstanding the aforementioned environmental assessment, the potential effects of the marine terminal development to the intertidal and shoreline ESAs associated with the property were further assessed as described in the Environmental Report that was prepared for the City of Richmond, and submitted to the City as part of the Development Permit (DP) application. The Environmental Report describes the site features and characteristics in detail, and presents recommended protection, mitigation and compensation measures. A habitat compensation plan was prepared as part of the DP application to the City, which includes a habitat balance sheet. However, the development of the marine terminal will result in

		zero loss of intertidal habitat (there will be an increase in interstitial refugia availability through wharf removal and bank stabilization works, but this is considered a negligible-to-marginal gain in intertidal habitat). Foreshore works will involve a mix of floating and land-based equipment. Details on construction mitigation measures are provided in the project's environmental assessment certificate application document, and will be described in detail in the construction environmental management plan (CEMP). The City will be provided a copy of the draft CEMP at least 60 days before the start of construction.
f) No recreational trails or other facilities shall be constructed in the intertidal zone.	• Linear metres of trail encroachment into intertidal zone.	No trail will be constructed in the intertidal zone.
g) Permitted works shall use careful site design to avoid the most sensitive portions of the intertidal zone (see FREMP habitat coding).	• FREMP habitat coding. • Measures employed to avoid, mitigate, compensate impacts.	Foreshore works along the green-coded (low productivity habitat) shoreline will be conducted in accordance with federal (DFO) and provincial (OGC) regulatory permits for works in or next to water. Construction mitigation measures will be described in detail in the construction environmental management plan (CEMP).
h) All works within or adjacent to the intertidal zone shall be constructed, where required, to preserve and enhance the shoreline by: o providing safe, durable access such that people are afforded an unobstructed view of the waterfront wherever possible;	• Accommodation of safe, access and unobstructed views of the waterfront. • Area of mature intertidal vegetation retained. • Area of replanted native intertidal vegetation. • Invasive species control plan.	There will be no safe access to the waterfront on the marine terminal property itself. A trail will be safely set back from the shoreline, which will connect the existing City trail (115 m to the southwest of the property) to an unobstructed view point immediately northeast of the marine terminal. There is currently no intertidal vegetation in the marine terminal ESA area

o retaining mature vegetation, including existing large trees, shrubs, and aquatic vegetation; o replanting disturbed areas with native vegetation.	• Monitoring Plan.	(except algae on rip-rap rubble); nor will there be once the marine terminal is constructed.
i) Where possible, restore degraded intertidal zones by removing historical fill, structures, or contaminated sediment, and recreating natural habitats such as mudflats and marsh.	• Linear metres of intertidal fill removed. • Area and type of mudflat / marsh created.	Mudflat and marsh creation is not possible along this green-coded section of the intertidal zone, nor is it warranted. Bank stabilization is a priority at this location (approximately 283 m; refer to Intertidal Guidelines section row a).
j) Conformance with these guidelines does not exempt applicants from meeting requirements of other agencies, such as participating in the Fraser River Estuary Management Program (FREMP), and Port Metro Vancouver. It is the responsibility of proponents to ensure they meet all external requirements.	• External agency approvals achieved.	Noted.

Shoreline Guidelines

DP GUIDELINE	PERFORMANCE CRITERIA	RESPONSE
a) Preserve all natural vegetation and all trees in the shoreline zone, except in accordance with the conditions of the Development Permit and other necessary permits or approvals (e.g., FREMP, Port Metro Vancouver, and Navigable Waters).	• Linear metres of shoreline zone retained, removed, enhanced/created. • Overall net gain/loss.	**Summary** A 52-m long by 4-m wide patch of native pole sapling trees represents the only natural vegetation to be removed during the development of the marine terminal (the remainder of the site is comprised of compacted fill with scattered weeds and herbs; there are invasive shrubs at the top of bank on either side of the current wharf). A compensation plan was prepared as part of the DP application, which proposes to compensate for its loss by mechanically removing Himalayan blackberry and other non-native plants in portions of the shoreline ESA that are on site, and on either side of the marine terminal (along a red-coded intertidal zone to the southwest, and a yellow-coded intertidal zone to the northeast) and planting native trees, shrubs and herbs. This compensation work will be done at a 2:1 ratio, resulting in a habitat net gain of 416 m^2. **Linear metres of shoreline zone:** • **retained** – N/A • **removed -** 52 m (alder patch) • **enhanced/created:** 104 m **Overall net gain/loss:** 52 m

b) Maintain ecological processes important to the long-term health of the shoreline zone including drainage and hydrology.	• Assess proposed net change to shoreline ecological processes.	The shoreline ESA at the marine terminal property has no sensitive habitats, no wildlife habitat features, and borders a green-coded (low productivity habitat) intertidal zone. Wildlife is limited to transient, foraging birds. The ESA provides minimal contributions to the ecological processes typical of a river riparian zone (i.e., shade and nutrient inputs to river, water filtration, flood management, or the provision of wildlife habitat).
c) Consider contiguous or nearby ESA areas such as the intertidal zone which have the potential to influence the shoreline zone.	• Assess impact of changes to the intertidal zone to the adjacent shoreline habitat. • Measures employed to avoid, mitigate, compensate impacts.	Loss of some native saplings on the marine terminal property can be readily compensated for by planting native species along the property's northeast edge and enhancing adjacent, more functional ESA areas (refer to Shoreline Guidelines section row a). Construction mitigation measures will be described in detail in the construction environmental management plan (CEMP).
d) No alterations should be made to the shoreline zone without an appropriate environmental assessment and implementation of mitigation measures. The City may require preparation of an Environmental Protection Plan (EPP) prepared by a qualified professional to guide environmental management on sensitive, complex, or large sites.	• Submission of an acceptable Environmental Report inclusive of protection, mitigation and compensation measures. • Habitat Balance	A harmonized federal and provincial environmental assessment of the potential effects of the marine terminal development, including mitigation measures, potential residual effects and cumulative effects was conducted over a 5-year period. That review process was comprehensive and robust, with both levels of government concluding that significant effects were unlikely. Conditional environmental assessment approvals were granted in December 2013. Notwithstanding the aforementioned environmental assessment, the potential

		effects of the marine terminal development to the intertidal and shoreline ESAs associated with the property were further assessed as described in the Environmental Report that was prepared for the City of Richmond, and submitted to the City as part of the Development Permit (DP) application. The Environmental Report describes the site features and characteristics in detail, and presents recommended protection, mitigation and compensation measures. Construction mitigation measures will be described in detail in the construction environmental management plan (CEMP). There will be a minor loss of marginal habitat in the shoreline ESA (refer to Shoreline Guidelines section rows a and b), which will be compensated for through habitat improvements on site and in adjacent ESA areas bordering more productive shoreline zones: refer to Shoreline Guidelines section, rows a and c). A habitat compensation plan (including a habitat balance sheet) and planting prescription guidelines were prepared. The latter is in addition to the landscape design for the marine terminal and the trail sections being established on either side of the property for the City of Richmond. This planting prescription plan provides guidance on: (1) invasive plant removal and handling; (2) revegetation (native species to plant, pot size, spacing); and (3) the monitoring of native plant survival/invasive plant

		colonization rates during the subsequent three years, so that additional plant management actions can be outlined. The cost of the planting and monitoring, including a 10% contingency for supplemental planting, will be provided by the landscape architect once the project and trail designs are approved.
e) No recreational trails or other facilities shall be constructed in the shorelines zone without written approvals from FREMP or other regulatory bodies.	• Approvals from external agencies for works within the shoreline zone (e.g. DFO, Provincial Diking Authority, FLNRO, EC)	Noted.
f) Permitted works shall use careful site design to avoid the most sensitive portions of the shoreline zone.	• FREMP habitat coding. • Measures employed to avoid, mitigate, compensate impacts.	There are no sensitive areas in the shoreline zone of the marine terminal, which borders low productivity habitat (green-coded intertidal zone).
g) Water quality and natural systems shall be protected by leaving stream banks intact and by not altering natural slopes and existing vegetation.	• Water quality measures employed. • Area of natural slopes/existing vegetation impacted / enhanced.	Works below the high water mark will be conducted in compliance with regulatory permit conditions. Refer to Intertidal Guidelines section rows e and g. Water quality measures will be described in the Project CEMP. Habitat enhancement works in the ESA areas will occur above the dike crest (avoid the high water mark and dike slope). Sediment and erosion control measures will be used to isolate the high water mark from revegetation areas upslope
h) All works within or adjacent to the shoreline zone shall be constructed, where required, to preserve and enhance shoreline values by: o providing safe, durable access such	• Accommodation of safe, access and unobstructed views of the waterfront. • Area of mature shoreline vegetation retained.	Refer to Intertidal Guidelines section row h re. water front access. There is no mature shoreline vegetation to retain. Areas of replanted native shoreline

that people are afforded an unobstructed view of the waterfront wherever possible; o retaining mature vegetation, including existing large trees, shrubs, and aquatic vegetation; o replanting disturbed areas with native vegetation.	• Area of replanted native shoreline vegetation. • Submission of an acceptable, detailed planting and monitoring plans.	vegetation are addressed in the Shoreline Guidelines section (rows a to c). A planting prescription, including monitoring, was prepared (refer to Shore Guidelines section row d).
i) Development proposals that include measures to restore degraded shoreline zones by removing historical fill, structures, or contaminated sediment, and recreating natural habitats such as riparian forest may increase the level of support by the agencies provided that the works comply with DFO and FREMP guidelines. In many areas, the shoreline zone has been developed or landscaped and improvements including tree planting will enhance its ecological value over the long-term.	• Linear metres of shoreline fill removed. • Area of natural habitat created. • Number of trees removed and replanted.	Old fill material from the marine terminal property will be removed and replaced with cleaner and more suitable materials. Works will occur along approximately 75% (283 m) of the property's shoreline zone, which is approximately 377 m long. No natural habitat will be created in the Shoreline ESA on the marine terminal property. The removal of 208 m^2 of native saplings in the shoreline ESA will be compensated for as outlined in Shoreline Guidelines section row a to c). There is currently no other 'natural habitat' on site.
j) Conformance with these guidelines does not exempt applicants from meeting requirements of other agencies, such as those participating in FREMP and Port Metro Vancouver. It is the responsibility of proponents to ensure they meet all external requirements.	• External agency approvals achieved.	Noted.

FSM MANAGEMENT GROUP

SOLVE • BUILD • MANAGE

VAFFC / Vancouver Airport
Fuel Facilities Corporation
AN FSM GROUP MANAGED CORPORATION

March 13, 2017

David Brownlee, Planner 2 – Urban Design
Planning & Development Division
City of Richmond
6911 No. 3 Road
Richmond, BC, V6Y 2C1

RE: Rationale for Dyke Trail location at 15040 Williams Road
Vancouver Airport Fuel Delivery Project

Dear Mr. Brownlee:

This letter is provided to the City of Richmond in support of the Vancouver Airport Fuel Facilities Corporation (VAFFC) application for Development Permit (ESA) in connection with the development of its property at 15040 Williams Road, Richmond, BC.

VAFFC is constructing a Marine Terminal and fuel offloading system at this property as part of the Vancouver Airport Fuel Delivery Project. The industrial waterfront property is located at the east end of Williams Road and is bisected by a CN Rail corridor and a dyke structure that forms part of the perimeter dyke system protecting Lulu Island from flood and sea level rise conditions associated with the Fraser River estuary. The property is currently fenced and does not provide for any trail connectivity through or around the property to connect to existing trail systems northeast or southwest of the property boundaries.

In establishing the conditions for approval of the project under the harmonized Environmental Assessment process between 2009 and 2013, VAFFC agreed to construct a connecting trail on the property to contribute to the City's overall Trail Strategy as described in the Official Community Plan. In its Environmental Assessment application, VAFFC proposed that the trail follow the suggested trail network identified in the 2010 Richmond Trail Strategy (Option 1 in Figure 1 below). However, in its comments to the subsequent Development Permit application made by VAFFC, the City identified a preference for the trail to connect across the property as close to the shoreline as possible, estimated as Option 2 in Figure 1.

VAFFC has reconsidered its design to accommodate the City's request, and has determined that the position of the trail immediately next to the shoreline is not viable from an operational standpoint. VAFFC is offering to construct the trail in the location identified as Option 3 in Figure 1. The rationale for the route is discussed in the next section.

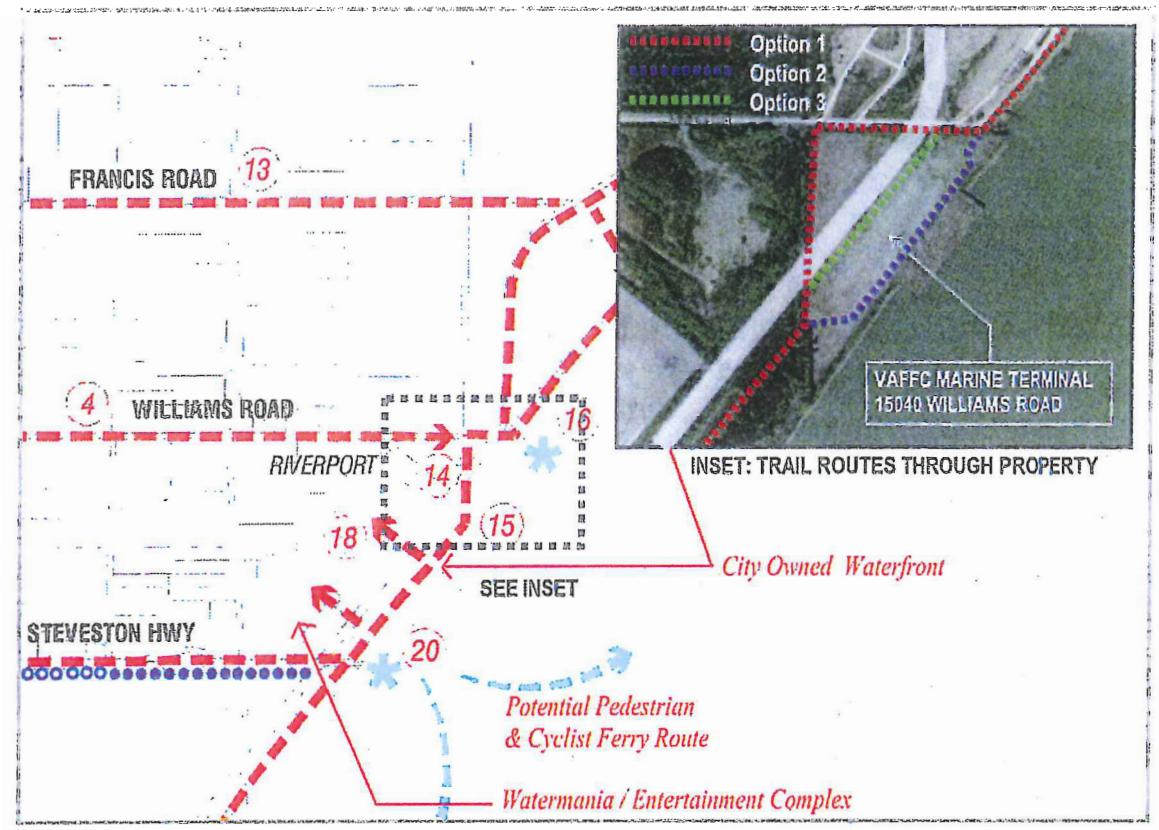


Figure 1. Excerpt from Richmond Trail Strategy with VAFFC property inset.

Rationale

VAFFC proposed route Option 1 in its initial Development Permit application to achieve consistency with the OCP. VAFFC identified further merits of this option as follows:

- Maximizes separation from operational areas of the Marine Terminal
- Aligns with properties boundaries with limited development value
- Overlaps with roads or road right-of-ways minimizing property dedication to this use.

As indicated earlier, the City has identified the desire to place the trail adjacent to the shoreline if possible (Option 2), consistent with public trail development in other areas of the city, and to avoid crossing of the CN Rail corridor in two locations as would be required under Option 1. VAFFC accommodated this request and has prepared a revised design aligning the trail across the front portion of the site, identified as Option 3, away from the shoreline but on the river side of the CN corridor. VAFFC recognizes the value of having the trail avoid rail crossings and align with the waterfront, however, due primarily to strict operational requirements, asserts that the trail must be set back from the waterfront area to provide security to the terminal and safety to the travelling public.

The following details are provided for additional clarity:

- Option 3 maximizes separation from operational areas of the Marine Terminal without pushing the trail across the CN rail corridor;
- Option 3 would have greater success in meeting the International Ship and Port Facility Security Code "ISPS Code" requirements which identifies restricted areas that must be considered in the Port Facility Security Plan "PFSP", including:
    - shore and waterside areas immediately adjacent to the ship;
    - embarkation and disembarkation areas, passenger and ship's personnel holding and processing areas including search points;
    - areas where loading, unloading or storage of cargo and stores is undertaken;
    - locations where security sensitive information, including cargo documentation, is held;
    - areas where dangerous goods and hazardous substances are held;
    - vessel traffic management system control rooms, aids to navigation and port control buildings, including security and surveillance control rooms;
    - areas where security and surveillance equipment are stored or located;
    - essential electrical, radio and telecommunication, water and other utility installations; and
    - other locations in the port facility where access by vessels, vehicles and individuals should be restricted.

  The placement of any public space or public right-of-way in areas identified as restricted would require operational constraints such as closure during operations, confinement by fencing on both sides, significant physical barriers to protect against ship mooring ropes and cables, and highly restrictive signage warning the public of the danger and prohibited activities.
- Due to the safety and security constraints in the operational area, Option 3 will provide a more enjoyable public experience than Option 2 for the following reasons:
    - Fencing will be required on only one side of the trail;
    - Mild grade changes will provide for some landscaping and visual variability;
    - Users will experience less operational noise and visual distraction of the facility operations;
    - Trail closures will be minimized or eliminated during the securing of vessels upon arrival;
    - There will be less restrictive signage identifying safety requirements for public passage (ie smoking, loitering, etc).

VAFFC is currently undertaking a Security Vulnerability Assessment (SVA) which must be reviewed and approved by Transport Canada. The assessment considers the facility operations and layout and recommends security features (ie fencing, surveillance, access control, barrier protection, etc) to be incorporated into the facility to maximize safety and security of the facility. The assessment and findings are confidential, however the draft assessment contains the following excerpt specific to this facility and would not be compromised by the trail if positioned in accordance with Option 3:

Restricted Areas

The Marine Transportation Security Regulations (MTSR) of Canada and the IMO's International Ship and Port Facility Security (ISPS) Code require that certain areas be restricted to avoid any possibility of sabotage and limit accidents. Such areas include those that require deterrence of unauthorized access; places where security and surveillance systems are located; land areas adjacent to where vessels interface with the facility; places where security sensitive information is kept, inclusive of cargo documentation; location of central controls for security and surveillance systems; location of central lighting controls; location of critical infrastructure including water, electric, telecommunications and process control rooms; areas designated for the unloading of cargo, and areas containing dangerous cargoes. (MTSR – 329.) Such restricted areas must be alarmed, have access control, lighting and be monitored in some way to ensure any tampering or breach is detected and responded to. Further, the level of surveillance of the restricted areas must increase in response to any raised marine security level (MARSEC) above level 1. The restricted areas for this facility should include:

1. *The marine terminal area which contains:*
   - *a. The dock and off-loading equipment*
   - *b. The spill containment areas*
   - *c. The building housing utilities controls (electric, water, telecommunications) and security equipment (alarm panels, security lighting, video recording.)*
   - *d. The building housing operations controls.*
2. *The tank farm which contains*
   - *a. An operations building*
   - *b. A power transformer*
   - *c. An emergency generator*
   - *d. An electrical building (E-house) for all electrical cabling and controls*
   - *e. A foam monitor enclosure and a foam distribution enclosure*
   - *f. Six storage tanks for Jet A-1*
3. *Piping and pumps for the product which are exposed and/or accessible and which are thereby vulnerable to tampering or attack.*

For organizational purposes each of these designated areas will be addressed separately.

1. Marine Terminal -General

The terminal includes many of the key assets including operational controls for the terminal, utility controls, backup power, fire suppression buildings and equipment and the spill containment areas. This area is to be surrounded by a fence line which will extent from the water on the southwest boundary to the location of the easement that runs through the property, and back to the waterline in the northeast of the property. It is noted that local pedestrians have in the past walked along the river bank onto what is now part of the facility. It is therefore imperative that the fence line extend to and into the river to preclude passage along the bank. This needs to be done on both the northeast and southwest ends of the fence line.

Closure

VAFFC requests that the City consider the alternative presented by VAFFC in its updated submissions related to the Development Permit application supporting the Option 3 location. Updated design drawings, landscape drawings, and Environmental Reports have all been recently submitted with this option in mind.

VAFFC recognizes the need for public access and wishes to do its part in connecting neighbourhoods with this initiative. VAFFC's recommendation for the trail location maximizes safety and security for both the public users and the operational staff at the marine terminal facility. The VAFFC development team would be happy to meet to discuss these items in more detail if required.

Sincerely,
Vancouver Airport Fuel Facilities Corporation

Adrian Pollard, P.Eng.
Project Director

Hatfield
CONSULTANTS

MEMO

Date:	May 23, 2017 HCP Ref No.: VAFFC6773-NV
From:	Cory Bettles, MSc, RPBio, FP-C, Senior Fisheries Manager
To:	Adrian Pollard, PEng, Director of Engineering, FSM Management Group Inc.
Subject:	Vancouver Airport Fuel Delivery Project, Marine Terminal Development: Professional opinion on potential for post-development foreshore habitat improvement

1.0 Context

Vancouver Airport Fuel Facilities Corporation (VAFFC) has received Environmental Assessment (EA) approvals from the provincial and federal governments to construct and operate a new aviation fuel delivery system (the Project) to serve Vancouver International Airport (YVR). The Project was subject to a robust 5-year coordinated provincial and federal environmental assessment review that involved agencies and departments from all levels of government, which was concluded in December 2013 with the issuance of conditional approvals from British Columbia (BC) Ministers and Vancouver Fraser Port Authority (VFPA). Fisheries and Oceans Canada (DFO) was an active participant throughout the Project review process and all issues of concern with respect to potential residual effects to fish and fish habitat were addressed in the EA to the satisfaction of the federal regulator.

The Project includes construction and operation of a marine terminal located at 15040 Williams Road on the north shore of the South Arm of the Fraser River located in Richmond, BC; a fuel receiving facility located on nearby industrial zoned property that VAFFC has leased from VFPA; and underground pipelines to transfer fuel from the marine terminal to the fuel receiving facility (fuel transfer pipeline) and then to YVR (fuel delivery pipeline).

As part of VAFFC's permitting requirements post-EA certification, submission of a Development Permit (DP) application to the City of Richmond (CoR) was executed for the marine terminal component. Since DP application filing, follow-up information requests (IRs) and position statements have been issued by the CoR. Most recently, the CoR issued their position with respect to the anticipated habitat improvement to be gained with the removal and replacement of the current infrastructure at the site. Their position stated that,

"[t]he foreshore restructuring will not be considered as habitat improvement along the water edge of the property. As the CoR feels that the water flows are too high to provide any benefit increases. The CoR requests that VAFFC submit a proposal for improving habitat upland of the MT. (Bench marsh)."

VAFFC has requested an unbiased professional opinion as to whether the planned marine terminal development will result in "improved habitat" compared to existing conditions and whether additional habitat enhancement is justified. Professional opinion has been formulated based on a review of pertinent information including the EA information record, the DP application submitted to the CoR, DP Guidelines

for Environmentally Sensitive Areas (ESAs) applicable to 15040 Williams Road, site-specific engineering designs, and scientific literature.

2.0 Summary of Intertidal (Foreshore) Baseline Conditions

Characterization of the current intertidal (foreshore) habitat conditions at the marine terminal site is described in detail in the DP application submitted to the CoR. Below, I highlight key features.

Intertidal areas are influenced by waves, tides, and other processes along the Fraser River or Strait of Georgia. Typical conditions of an intertidal zone include mudflats, tidal channels and pools, salt marsh communities, as well as developed shorelines (wharves, pilings, bank armouring). Natural intertidal zone features represent important fish and wildlife habitat. The majority of habitat and aquatic resource information available for the Lower Fraser River has been synthesized by the Fraser River Estuary Management Program (FREMP). The intertidal (foreshore) of the property has been classified as low productivity habitat ("green coded"; FREMP, 2006).

There is a CoR designated ESA along the property shoreline, which encompasses an intertidal (foreshore) zone 30 m seaward of the high water mark (HWM), and a shoreline zone 30 m landward of the HWM. The entire portion of the ESA on the property represents the south-eastern portion of the Project's DP Area.

The shoreline of the industrial-zoned property includes a backfilled protruding steel pipe pile bulkhead wharf and steep intertidal areas on either side comprising poor quality concrete rubble with embedded rebar.

3.0 Net Result of Bulkhead Wharf Removal and Regrading of the Existing Foreshore

Based on a review of the current footprint conditions and proposed engineering design for the site, there will be additional intertidal and subtidal area gained below the HWM with the removal of existing and development/construction of new structures and shoreline. Removal of the bulkhead wharf and re-grading of the shoreline is aimed to create a new intertidal area of approximately 730 square meters (m^2), and additional subtidal area of approximately 3,000m^2. The proposed re-grading of the existing shoreline on either side of the removed dock to a shallower slope will result in approximately 625 m^2 of new intertidal area. The resulting net gain of intertidal area post-development will be approximately 1,355 m^2 while the net gain of subtidal area is to be approximately 3,000 m^2. The shoreline to be exposed by the dock removal and large volume of existing rubble on either side of the dock, will be replaced by appropriate and fit-for-purpose angular rip-rap material.

4.0 Positive Effects of Replaced Rip-Rap on Fish and Fish Habitat

Positive effects of rip-rap on fish and aquatic resources in lotic environments has been described in scientific literature. Positive effects have been reported in large and small riverine systems and were usually attributed to degraded conditions prior to rip-rap installation in combination with the use of other mitigative measures (Craig and Zale 2001). Below I provide a couple of those examples where rip-rap resulted in positive outcomes and supports the position that the proposed use of rip-rap at the marine terminal will provide an improvement of habitat conditions.

Schmetterling et al. (2001) found that rip-rap provided habitat for juvenile salmonids in watercourses that have been severely degraded. Whether juvenile salmonids would utilize the proposed rip-rap at this site

along the Fraser River is unknown. However, the presence of the rip-rap would provide additional refuge habitat (albeit a small amount) for juvenile salmonids in the lower Fraser River.

Hinch and Rand (1998) observed that rip-rap placed to control erosion along the Nechako River, BC, generated small reverse flow fields (i.e., eddy vortices) along the foreshore that were used by adult sockeye salmon to facilitate their migration upstream. Migration through reaches with constrictions (e.g., large islands, gravel bars or large rock outcroppings) was found to require higher energy expenditure than that through reaches with parallel, straight banks. The additional placement of rip-rap at the site, including replacement of existing rubble, may provide improved conditions (reduced velocities) during upstream migration of all adult salmon species.

Craig and Zale (2001) observed that aquatic invertebrates flourish in rip-rap because it provides many interstices and high surface area suggesting that it may provide a superior food source for fish. Regardless of whether fish utilize the increased abundance of invertebrates as a food source, the expected increase in productivity is of overall benefit to the aquatic environment.

5.0 Opinion

Based on my review of the existing information that characterizes current baseline intertidal and shoreline conditions of the site, available scientific literature that highlights where the use of rip-rap can offer improvements to habitat conditions in degraded areas, and the 2012 CoR OCP DP Guidelines for ESAs (specific to Intertidal Guidelines), I am of the opinion that the dock removal, shoreline regrading and proposed use of angular rip-rap in the intertidal (foreshore) area will provide intertidal and subtidal habitat gains and some level of improvement to habitat conditions at the site in comparison to what baseline conditions currently offer. The scientific literature provides evidence that rip-rap can provide some enhancement opportunities in areas that have been tarnished, as is the case here including the potential to reduce flow velocities in the area. Additionally, the area will likely benefit from the protruding steel sheet pipe pile spill containment walls that are proposed at the upriver and downriver extents of the property providing further (secondary opportunity to reduce flow velocity in the terminal area.

The level of 'improvement' is not expected to be substantial – I agree with the response provided in (b) of the 2012 OCP DP Guidelines for ESA that states, "...[any] positive ecological net change is not expected to contribute significantly to the ecological processes of the already green-coded (low productivity) intertidal [foreshore] habitat along the property". However, no additional degradation of habitat conditions at the site through the use of rip-rap are to be expected (given the site is already low productivity habitat), hence no additional enhancement (e.g., upland habitat as requested by the CoR) is warranted.

6.0 Closing

My professional opinion is based solely on the information reviewed as described herein. I reserve the right to expand, modify or otherwise amend my opinion as additional information becomes available.

Regards,

Cory Bettles, MSc, RPBio, FP-C
Senior Fisheries Manager
Certified Fisheries Professional
Hatfield Consultants

Literature Cited

Craig, A.J., and A.V. Zale. 2001. Effects of bank stabilization structures on fish and their habitat. US Geological Survey, Washington Department of Ecology, and Montana State University. Bozeman, MT, 29 pp.

Schmetterling, D.A., C.G. Clancy, and T.M. Brandt. 2001. Effects of rip-rap bank reinforcement on stream salmonids in the western United States. Fisheries 26(7):6-13.

Hinch, S.G., and P.S. Rand. 1998. Swim speeds and energy use of upriver-migrating Oncorhynchus nerka: Role of local environment and fish characteristics. Can. J. Fish. Aquat. Sci. 55:1821-1831.

City of Richmond

Development Permit Considerations

Development Applications Department
6911 No. 3 Road, Richmond, BC V6Y 2C1

Address: 15040 Williams Road **File No.:** DP 16-741741

Prior to approval of the Development Permit, the developer is required to complete the following:

1. Receipt of a Letter of Credit/security for $250,078.40 inclusive of the following:
   - On-site ESA and RMA landscaping in the amount of $67,589.50,
   - On-site non ESA/RMA landscaping (slope adjacent to trail) in the amount of $14,459.50,
   - On-site Trail landscaping in the amount of $105,065.40
   - Three years of maintenance (ESA/RMA/Trail/non ESA/RMA) in the amount of, $54,252.00.
   - Three years of monitoring (ESA/RMA/Trail) in the amount of $8,712.00.

   (The above amounts being based on the costs estimate provided by a BCSLA Registered Landscape Architect including 10% contingency).

   Off-site ESA/RMA securities will be addressed through a Servicing Agreement.
2. Submission of a contract entered into between the applicant and a Qualified Environmental Professional (QEP) to monitor all planting ESA, RMA and trail vegetation installations and to provide three years of post-installation monitoring with annual reporting for the on-site and the off-site ESA and RMA enhancement areas and the pedestrian trail vegetation installation. The Contract should include the scope of work to be undertaken, including: the proposed number of site monitoring inspections, and a provision any remedial works during the monitoring period. Planting within RMA areas is to comply with Provincial RAR re-vegetation guidelines.
3. Submission of a contract to ensure that pruning and limb removal of retained trees is under supervision of a certified arborist, invasive vegetation removal within the tree protection area by hand only and activity within the drip line of retained trees to be done under the supervision of a Qualified Environmental Professional (QEP) or a certified arborist as outlined in the arborist's report.
4. Installation of appropriate tree protection fencing around all trees identified for retention by the Arborist (uTree Environmental Consultants report). Fencing is to be installed to the City's standards as part of the development prior to any construction activities occurring on-site.
5. Submission of payment in the amount of $62,000 to the City of Richmond, as a voluntary contribution for the design and future construction of a pedestrian observation platform overlooking the Fraser River and located to the east of Williams Road at the City's discretion. Timing of the platform construction may be affected by future dike improvements.
6. Registration of a 6 metre wide statutory right-of-way with public right of passage through 15040 Williams Road to accommodate a public trail in an alignment generally along the southern side of the CN Rail right-of-way as indicated in the Development Permit application and to the satisfaction of the Senior Manager of Parks. After completion of the Servicing Agreement maintenance period, the City will be responsible for maintenance and liability associated with the SRW.
7. Registration of a 7.5 metre wide statutory right-of-way for dike through 15040 Williams Road in an alignment generally near the property's foreshore with the Fraser River as indicated in the Development Permit application and to the satisfaction of the General Manager of Engineering. After completion of the Servicing Agreement maintenance period, the City will be responsible for maintenance and liability associated with the SRW. The SRW will provide the City with rights for access and the ability to maintain the works. The agreement should include a minimum building setback from the SRW of 7.0 metres.
8. Registration of a flood plain covenant on title identifying a minimum habitable elevation of 3.0 / 4.35 m GSC split approximately at the alignment of the southern edge of the CN Rail right-of-way.

Initial: _____

9. Registration of a legal agreement on title to ensure that landscaping planted as part of the on-site ESA and the on-site RMA is maintained and will not be abandoned or removed. Registration of a statutory right-of-way, and/or other legal agreements or measures, as determined to the satisfaction of the Director of Development.
10. Discharge of the existing foreshore covenant (BG 285960).
11. Registration of a legal agreement on title to require the owner to design and construct bank protection along the river to the satisfaction of the General Manager, Engineering and the Inspector of Dikes and to provide the City with access to the land to inspect and maintain the works should the owner fail to do so. The owner will be responsible for the ongoing maintenance and liability of the works. The intent of the covenant is to ensure that the area outside of the 7.5 m right-of-way will be constructed and maintained in a manner that protects the dike and cannot be modified without consent of the City of Richmond and the Provincial Inspector of Dikes.

Prior to Building Permit Issuance, the developer must complete the following requirements:

1. Enter into a Servicing Agreement* for the design and construction of a dike across 15040 Williams Road within the 7.5 m wide right-of-way and integration with existing dikes on adjacent properties acceptable to the General Manager, Engineering.
2. Enter into a Servicing Agreement* for the design and construction of a 6 m wide park trail across 15040 Williams Road and integration with existing trails on adjacent properties acceptable to the Senior Manager of Parks. Works include, but may not be limited to, a 3 m wide aggregate trail surface with vegetation strips on both sides to the satisfaction of the Senior Manager of Parks.
3. Enter into a Servicing Agreement* for the design and construction of utility and frontage works and the off-site ESA/RMA landscaping enhancement areas identified as per the landscaping plans submitted under DP 16-741741. Works include, but may not be limited to the following:

Water Works:

a. Using the OCP Model, there is 583 L/s of water available at a 20 psi residual at the Williams Road frontage. Based on your proposed development, your site requires a minimum fire flow of 250 L/s.
b. The Developer is required to:
   - Submit Fire Underwriter Survey (FUS) or International Organization for Standardization (ISO) fire flow calculations to confirm development has adequate fire flow for onsite fire protection. Calculations must be signed and sealed by a Professional Engineer and be based on Building Permit Stage Building designs.
   - Install a single water service connection to serve the development site. The service connection can be split at the property line, and two meters installed (one for fire, one for domestic use) inside meter chamber(s).
   - Install backflow prevention device at property line.
   - Provide statutory right-of-way for meter and meter chamber.
c. At Developer's cost, the City is to:
   - Complete all tie-ins for the proposed works to existing City infrastructure.

Storm Sewer Works:

a. The Developer is required to:
   - Design and construct a storm sewer outfall into the RMA ditch utilizing appropriate sediment and erosion control methods, such as deltalok bags, and provide a functional plan within the first servicing agreement submission for review and approval by the City.
   - Install an oil & grit separator upstream of the proposed outfall, and provide the City with a separator maintenance plan within the first servicing agreement submission for review and approval.

Sanitary Sewer Works:

a. The Developer is required to:
   - N/A

Frontage Improvements:

a. The Developer is required to:

- Coordinate with BC Hydro, Telus and other private communication service providers:
- When relocating/modifying any of the existing power poles and/or guy wires within the property frontages.
- To locate all above ground utility cabinets and kiosks required to service the proposed development within the developments site (see list below for examples). A functional plan showing conceptual locations for such infrastructure shall be included in the development process design review. Please coordinate with the respective private utility companies and the project's lighting and traffic signal consultants to confirm the requirements (e.g., statutory right-of-way dimensions) and the locations for the aboveground structures. If a private utility company does not require an aboveground structure, that company shall confirm this via a letter to be submitted to the City. The following are examples of statutory right-of-ways that shall be shown in the functional plan and registered prior to SA design approval:
  - BC Hydro PMT – 4mW X 5m (deep)
  - BC Hydro LPT – 3.5mW X 3.5m (deep)
  - Street light kiosk – 1.5mW X 1.5m (deep)
  - Traffic signal kiosk – 2mW X 1.5m (deep)
  - Traffic signal UPS – 1mW X 1m (deep)
  - Shaw cable kiosk – 1mW X 1m (deep) – show possible location in functional plan
  - Telus FDH cabinet-1.1 m W X 1 m (deep – show possible location in functional plan
- Implement a riparian enhancement planting plan in the 5.0 m RMA watercourse along the Williams Road frontage.

Dike Improvements:

a. The Developer is required to satisfy the following for the dike:
   - The dike shall be designed by a Professional Geotechnical Engineer.
   - The elevation of the dike crest shall be raised to minimum 4.7 m geodetic, and designed to accommodate a future elevation of 5.5 m. On the waterside of the dike, the slope shall be maximum 2:1. On the landside of the dike, the slope shall be maximum 3:1.
   - The crest of the dike shall be minimum 4.0 m wide.
   - Provide a 7.5 m statutory right-of-way for the dike.
   - There shall be a minimum building setback of 7.0 m from the dike right-of-way.
   - The drip line of any trees shall be set back at least 8.0 m from the future toe of the dike.
   - Above ground pipes crossing the dike right-of-way shall be removable to allow for dike inspection and maintenance.
   - Design the dike and operations in a manner that allows for vehicular and man access along the dike upon the City's request.
   - The dike along the frontage of the development site shall be tied in to the adjacent dikes to the north and south at a maximum slope of 3:1. Developer to be responsible to locate the dike to the north and south for a smooth transition. No retaining walls within the dike crest or slope area are allowed.
   - All dike construction, including materials, shall be in conformance with City standard drawing MB-98 or MB-99, Dike Design and Construction Guide – Best Management Practices for British Columbia (2003), and Environmental Guidelines for Vegetation Management on Flood Protection Works to Protect Public Safety and the Environment (1999).
   - The design and construction of the dike shall be done to the satisfaction of the General Manager, Engineering and Public Works, and any other relevant dike approving authorities.
   - Discharge existing foreshore covenant and register a new foreshore covenant to ensure that the area outside of the 7.5 m right-of-way will be constructed and maintained in a manner that protects the dike and cannot be modified without consent of the City of Richmond and Inspector of Dikes.

General Items:

a. The Developer is required to:

- Develop a sediment and erosion control and protection fencing plan for the proposed works to minimize impact to the 5.0m RMA along Williams Road during construction, to the satisfaction of the City. A functional plan must be reviewed and approved by the City prior to development permit issuance.
- Provide, within the first servicing agreement submission, a geotechnical assessment of preload and soil preparation impacts on the existing utilities fronting the development site and provide mitigation recommendations.
- Enter into, if required, additional legal agreements, as determined via the subject development's Servicing Agreement(s) and/or Development Permit(s), and/or Building Permit(s) to the satisfaction of the Director of Engineering, including, but not limited to, site investigation, testing, monitoring, site preparation, de-watering, drilling, underpinning, anchoring, shoring, piling, pre-loading, ground densification or other activities that may result in settlement, displacement, subsidence, damage or nuisance to City and private utility infrastructure.
- Prepare and submit a design and sealed cost estimate (inclusive of a 10% contingency) as prepared by a qualified professional for the construction of a foreshore observation deck to the satisfaction of the Senior Manager, Parks and the Director, Engineering.
- Submit a voluntary cash contribution for the construction of the foreshore observation deck to the satisfaction of the Senior Manager, Parks and the Director, Engineering.

b. Plan and undertake the off-site ESA and RMA landscaping as per the landscaping plans submitted under DP 16-741741. A Qualified Environmental Professional (QEP) to monitor all planting ESA, RMA and trail vegetation installations and to provide three years of post-installation monitoring with annual reporting for the on-site and the off-site ESA, the RMA enhancement areas and the pedestrian trail vegetation installation. Planting within RMA areas is to comply with Provincial RAR re-vegetation guidelines.

c. Ensure that all pruning and limb removal of retained trees is to be under supervision of a certified arborist, invasive vegetation removal within the tree protection area is by hand only and activity within the drip line of retained trees to be done under the supervision of a Qualified Environmental Professional (QEP) or a certified arborist as outlined in the arborist's report.

4. City arborist (Conor Sheridan: 604-244-1208, CSheridan@richmond.ca) to be notified prior to commencement of works within the drip line of existing retained offsite trees. Provide 3 business days minimum notice.
5. City Parks to review all offsite planting after it is in place (contact Steve Priest, Supervisor of Horticulture: 604-244-1208, and Miriam Plishka, Park Planner: 604-233-3310). Once plant material and placement have been accepted by the City, the maintenance period will commence.
6. Submission of a final sign-off letter of from CN Railway, to the satisfaction of the City's Director of Transportation and the Director of Engineering, for the VAFFC Marine Terminal project at 15040 Williams Road. If CN Railway's approval includes conditions or requirements, the proponent must provide means to meet those conditions / requirements to the satisfaction of the City's Director of Transportation.
7. Submission of a Construction Parking and Traffic Management Plan to the Transportation Department. Management Plan shall include location for parking for services, deliveries, workers, loading, application for any lane closures, and proper construction traffic controls as per Traffic Control Manual for works on Roadways (by Ministry of Transportation) and MMCD Traffic Regulation Section 01570.
8. Obtain a Building Permit (BP) for any construction hoarding. If construction hoarding is required to temporarily occupy a public street, the air space above a public street, or any part thereof, additional City approvals and associated fees may be required as part of the Building Permit. For additional information, contact the Building Approvals Department at 604-276-4285.

Note:

* This requires a separate application.

- Where the Director of Development deems appropriate, the preceding agreements are to be drawn not only as personal covenants of the property owner but also as covenants pursuant to Section 219 of the Land Title Act.

  All agreements to be registered in the Land Title Office shall have priority over all such liens, charges and encumbrances as is considered advisable by the Director of Development. All agreements to be registered in the Land Title Office shall, unless the

Director of Development determines otherwise, be fully registered in the Land Title Office prior to enactment of the appropriate bylaw.

The preceding agreements shall provide security to the City including indemnities, warranties, equitable/rent charges, letters of credit and withholding permits, as deemed necessary or advisable by the Director of Development. All agreements shall be in a form and content satisfactory to the Director of Development.

- Additional legal agreements, as determined via the subject development's Servicing Agreement(s) and/or Development Permit(s), and/or Building Permit(s) to the satisfaction of the Director of Engineering may be required including, but not limited to, site investigation, testing, monitoring, site preparation, de-watering, drilling, underpinning, anchoring, shoring, piling, pre-loading, ground densification or other activities that may result in settlement, displacement, subsidence, damage or nuisance to City and private utility infrastructure.
- Applicants for all City Permits are required to comply at all times with the conditions of the Provincial *Wildlife Act* and Federal *Migratory Birds Convention Act*, which contains prohibitions on the removal or disturbance of both birds and their nests. Issuance of Municipal permits does not give an individual authority to contravene these legislations. The City of Richmond recommends that where significant trees or vegetation exists on site, the services of a Qualified Environmental Professional (QEP) be secured to perform a survey and ensure that development activities are in compliance with all relevant legislation.

Signed _____ Date _____

City of Richmond

Development Permit

No. DP 16-741741

To the Holder:	VANCOUVER AIRPORT FUEL FACILITIES CORPORATION
Property Address:	15040 WILLIAMS ROAD
Address:	C/O FSM MANAGEMENT GROUP INC. 108 – 12300 HORSESHOE WAY RICHMOND, BC V7A 4Z1

1. This Development Permit is issued subject to compliance with all of the Bylaws of the City applicable thereto, except as specifically varied or supplemented by this Permit.
2. This Development Permit applies to and only to those lands shown cross-hatched on the attached Schedule "A" and any and all buildings, structures and other development thereon.
3. Subject to Section 692 of the Local Government Act, R.S.B.C.: buildings and structures; off-street parking and loading facilities; roads and parking areas; and landscaping and screening shall be constructed generally in accordance with Plans #1 to #25 attached hereto.
4. Sanitary sewers, water, drainage, highways, street lighting, underground wiring, and sidewalks, shall be provided as required.
5. As a condition of the issuance of this Permit, the City is holding the security in the amount of $250,078.40 (including, on-site ESA/RMA $67,589.50, on-site non-ESA $14,459.50, on-site trail planting $105,065.40, 3 years of maintenance $54,252.00 and 3 years of monitoring $8,712.00) to ensure that development is carried out in accordance with the terms and conditions of this Permit. Should any interest be earned upon the security, it shall accrue to the Holder if the security is returned. The condition of the posting of the security is that should the Holder fail to carry out the development hereby authorized, according to the terms and conditions of this Permit within the time provided, the City may use the security to carry out the work by its servants, agents or contractors, and any surplus shall be paid over to the Holder. Should the Holder carry out the development permitted by this permit within the time set out herein, the security shall be returned to the Holder. The City may retain the security for up to three years after inspection of the completed landscaping in order to ensure that plant material has survived.
6. If the Holder does not commence the construction permitted by this Permit within 24 months of the date of this Permit, this Permit shall lapse and the security shall be returned in full.

Development Permit
No. DP 16-741741

To the Holder:	VANCOUVER AIRPORT FUEL FACILITIES CORPORATION
Property Address:	15040 WILLIAMS ROAD
Address:	C/O FSM MANAGEMENT GROUP INC. 108 - 12300 HORSESHOE WAY RICHMOND, BC V7A 4Z1

7. The land described herein shall be developed generally in accordance with the terms and conditions and provisions of this Permit and any plans and specifications attached to this Permit which shall form a part hereof.

   This Permit is not a Building Permit.

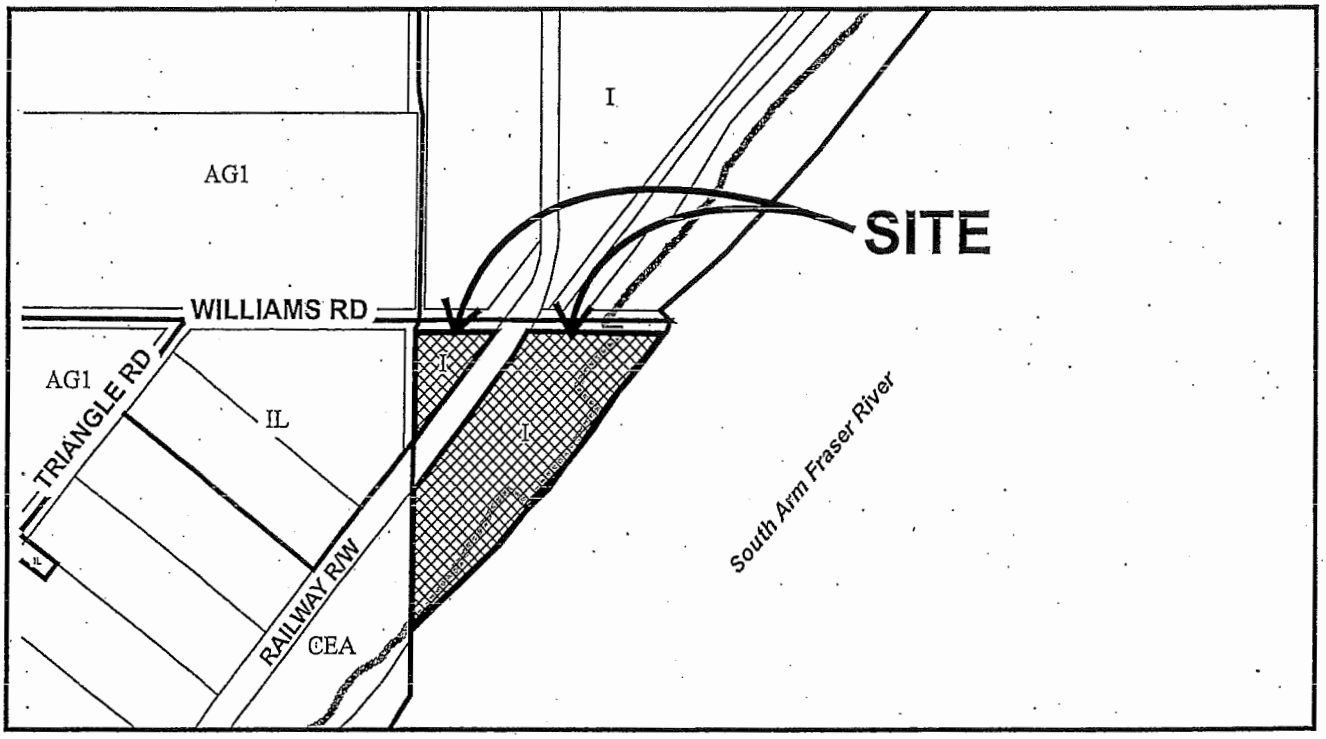
AUTHORIZING RESOLUTION NO. ISSUED BY THE COUNCIL THE DAY OF , .

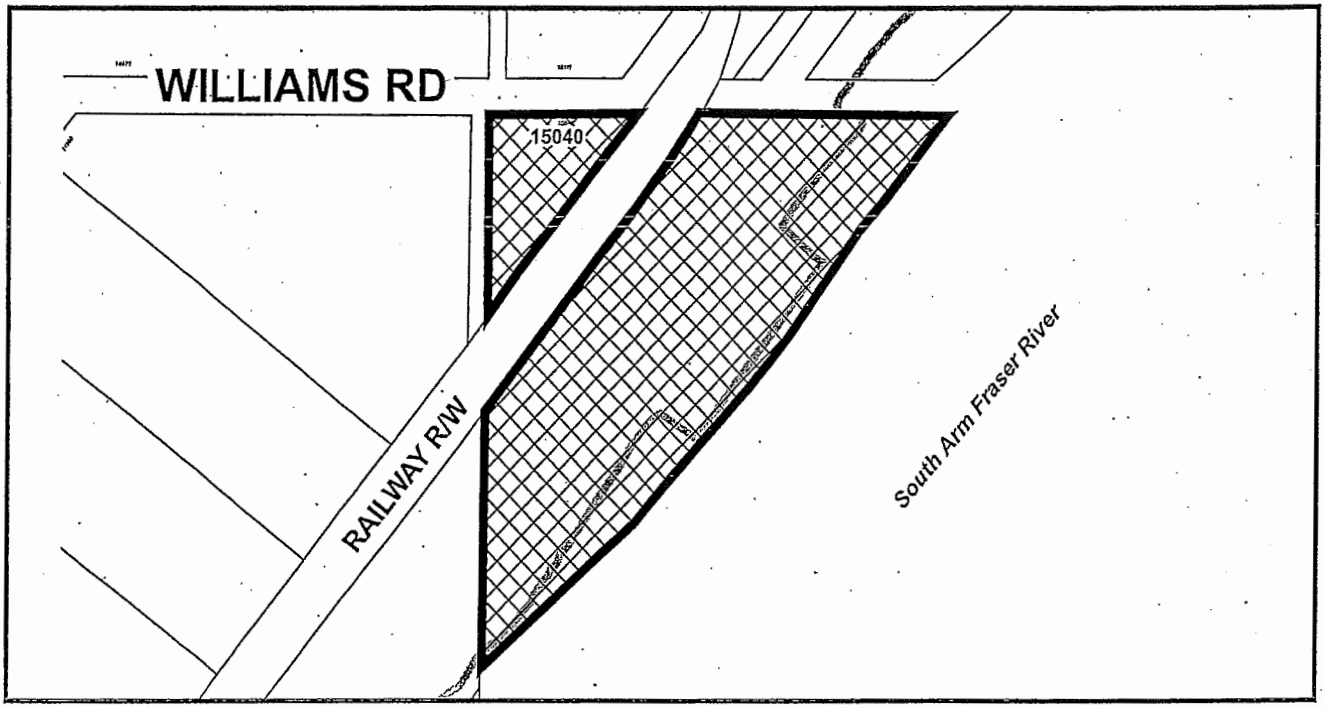
DELIVERED THIS DAY OF , .

_____

MAYOR

City of
Richmond





DP 16-741741
SCHEDULE "A"

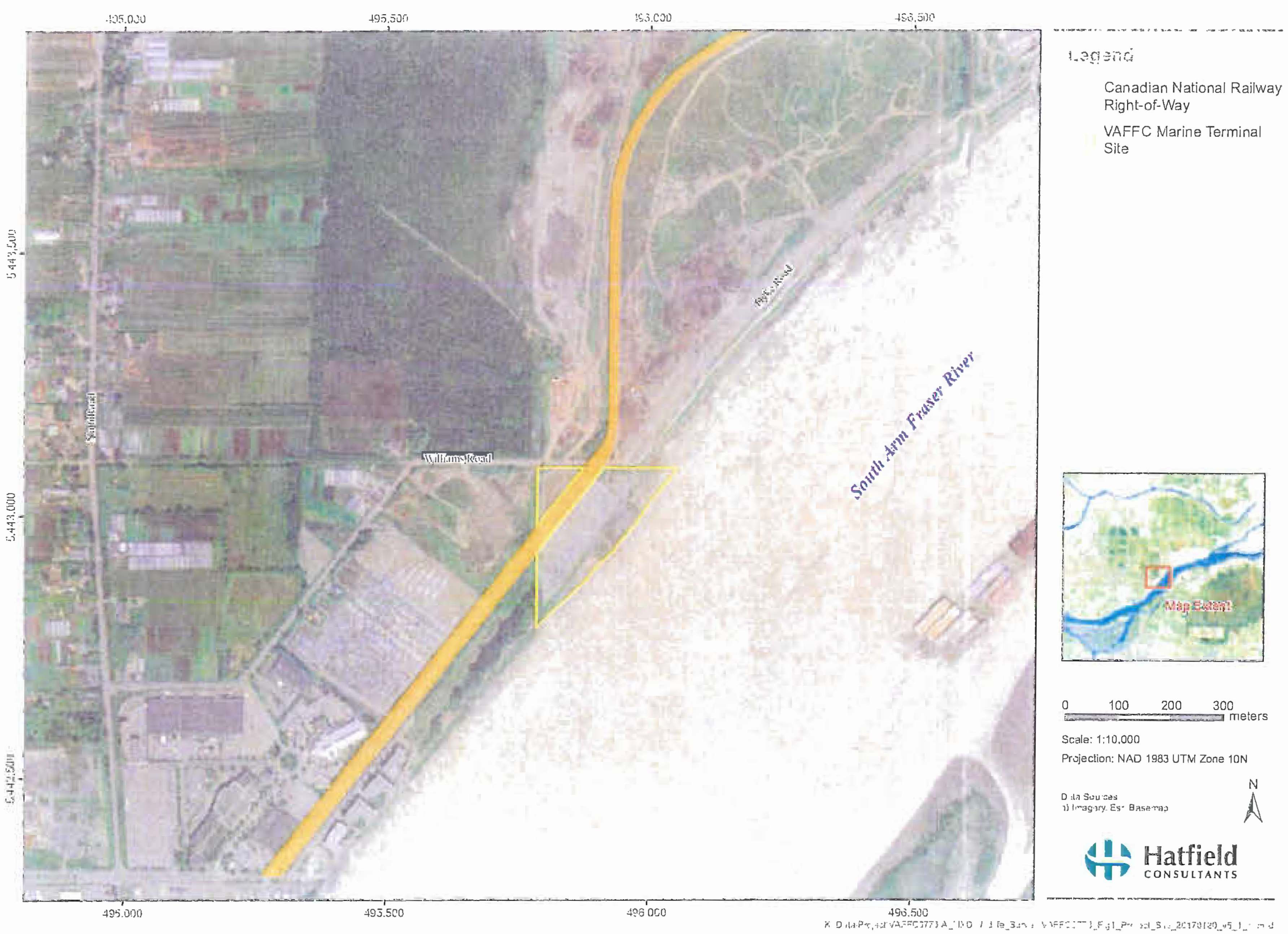
Original Date: 08/22/16

Revision Date:

Note: Dimensions are in METRES

ATTACHMENT A

Figure 1 Vancouver Airport Fuel Delivery Project – Marine Terminal site location.



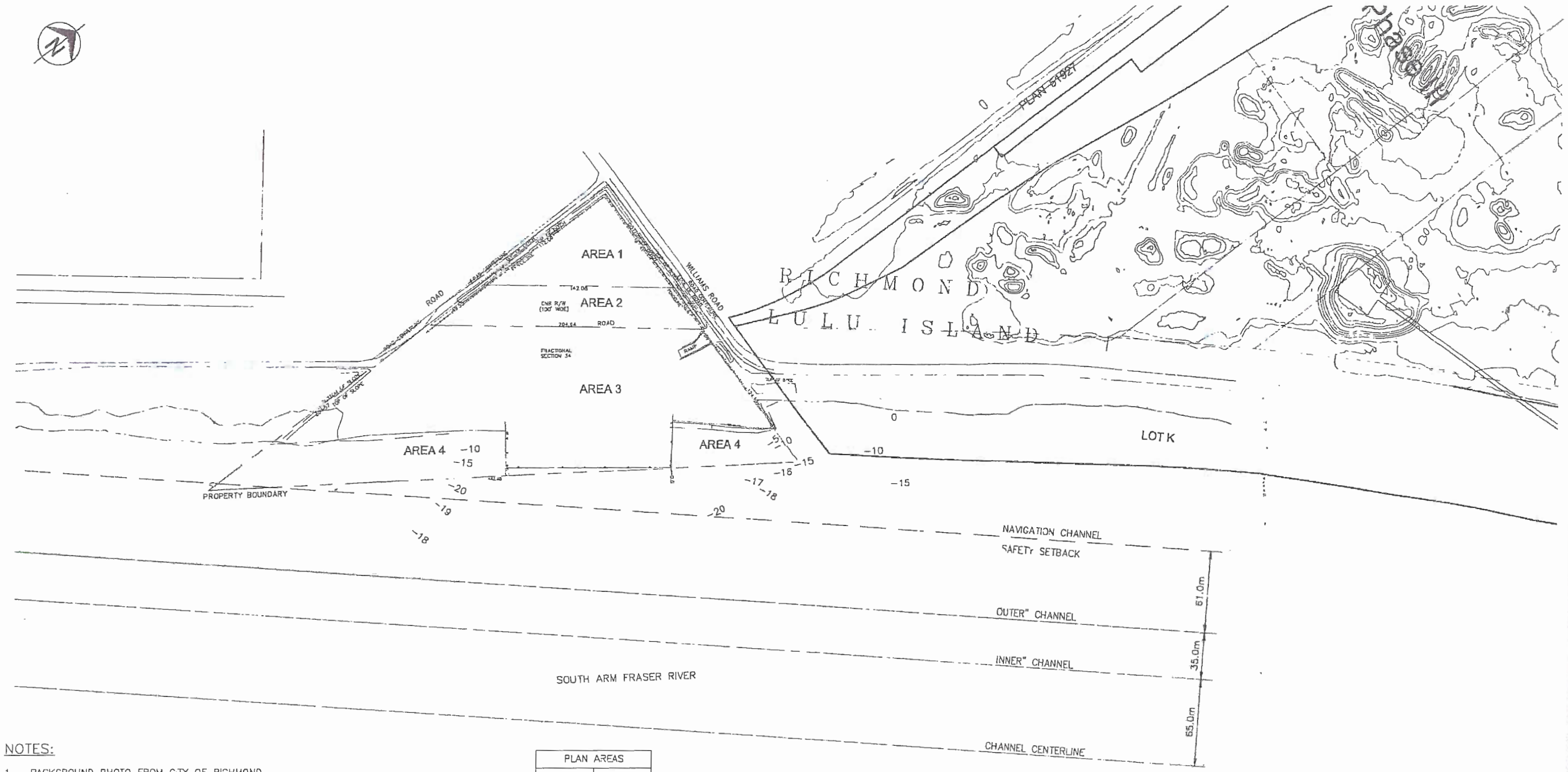
This plan is reprinted from the
ESA and FMA Environmental Report
by
Hatfield Environmental Consultants

SEP 2 7 2017

DP 16-741

DAMON ORIENTE LTD.	Project: VAFFC MARINE TERMINAL FACILITY	Drawing: MARINE TERMINAL SITE LOCATION	Issue:	Scale: nts
	15040 Williams Road, Richmond BC			Date:
				Project Number: 2014-280
				Dwg L0.02

Reference



NOTES:

1. BACKGROUND PHOTO FROM CITY OF RICHMOND.
2. TOPOGRAPHIC SURVEY PREPARED BY MATSON, PEAK AND TOPLISS. DRAWING REFERENCE V-06-15234-TPG. SURVEY DONE BY SEPTEMBER 12-14, 2006
3. ALL ELEVATIONS ARE REFERENCED TO GEODETIC DATUM.

PLAN AREAS	
LOCATION	AREA (m^2)
AREA 1	4985
AREA 2	5298
AREA 3	26388
AREA 4	9229
TOTAL	45810

1 EXISTING SITE PLAN
1:1500

0 30 60 90 150m
1:1500

ISSUE NO.	DRAWING REVISIONS	ISSUE DATE
0	ISSUED FOR CONSTRUCTION	09/14/2017

Fuel Facilities Corporation

VANCOUVER AIRPORT FUEL DELIVERY PROJECT
MARINE RECEIVING AREA
MARINE DESIGN PACKAGE
VANCOUVER AIRPORT FUEL FACILITIES CORPORATION
RICHMOND, BRITISH COLUMBIA

SEAL: PROFESSIONAL ENGINEER

COORD: moffatt & nichol

Argus ENGINEERING PLANNING | MANAGEMENT
ARGUS CONSULTING, INC
6183 College Boulevard, Suite 800
Overland Park, Kansas 66211
816 228 7500 FAX 816 228.7535
www.argusconsulting.com

PROJECT NO:	15004 22C
DATE:	12/21/15
DESIGNED BY:	PS
DRAWN BY:	WM
CHECKED BY:	RB
CAD FILE NAME:	15004 22C-2009

EXISTING SITE PLAN

DRAWING NO: G-009

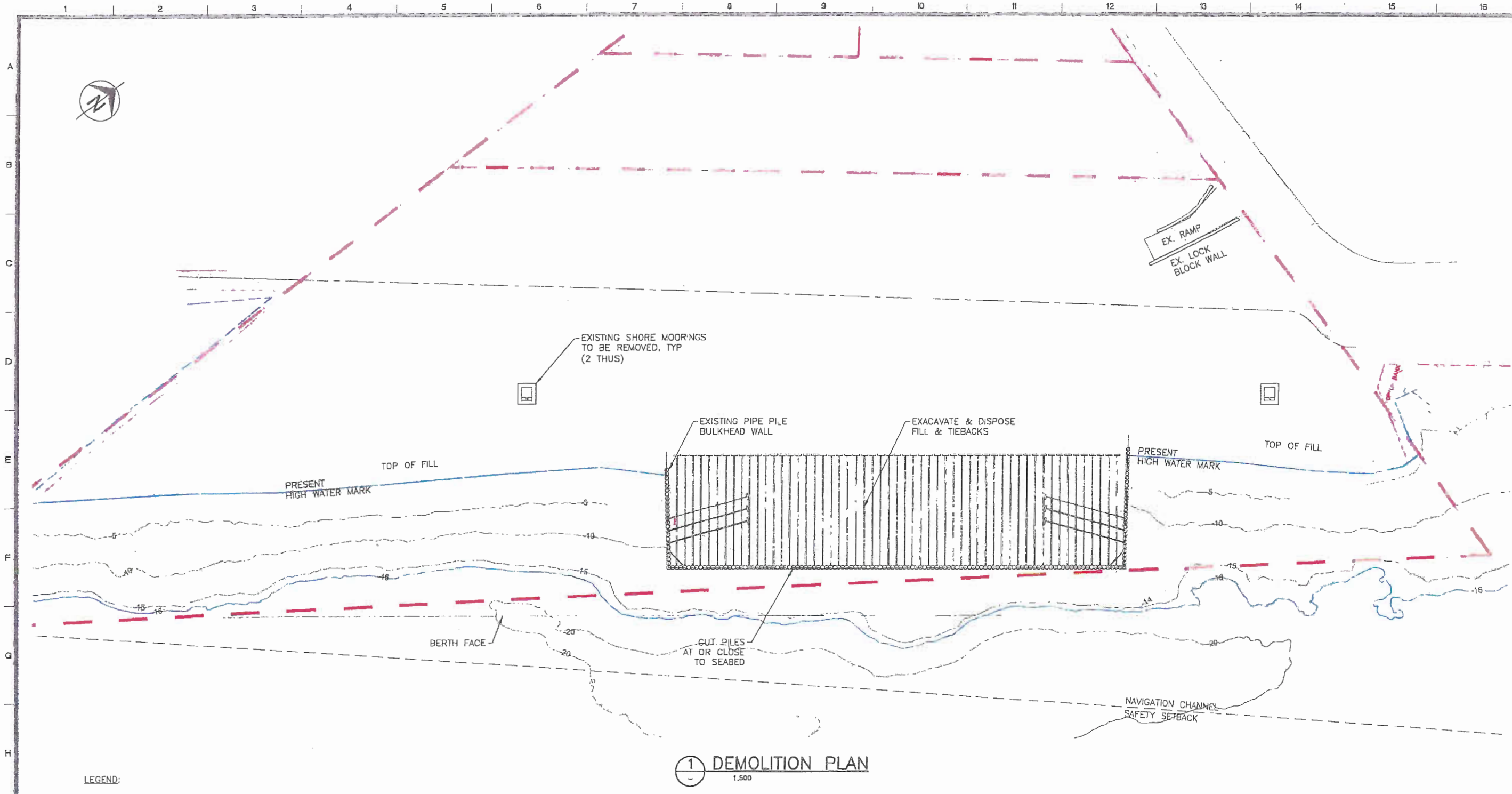
Plotted: P:\8338 VC Vancouver Airport Fue Delivery Project\CADD_Active\15004 22C-G009.dwg on 03/7/17 at 1:17 PM by AMANUZON using Argus 2013.stb

PLEASE RECYCLE

ISSUED FOR CONSTRUCTION

SEP 27 2017

Plan #1



1 DEMOLITION PLAN
1:500

LEGEND:

PROPERTY BOUNDARY

NOTES:

1. CONTOURS ARE BASED ON GEODETIC DATUM.

0 10 20 30 50m
1:500

NO	ISSUE NO	DRAWING REVISIONS	ISSUE DATE
0	ISSUED FOR CONSTRUCTION		02/14/2017

Fuel Facilities Corporation

VANCOUVER AIRPORT FUEL DELIVERY PROJECT
MARINE RECEIVING AREA
MARINE DESIGN PACKAGE
VANCOUVER AIRPORT FUEL FACILITIES CORPORATION
RICHMOND, BRITISH COLUMBIA

SEAL

moffatt & nichol
727 WEST BROADWAY, STE 301
VANCOUVER, BC CANADA V5Z 4L7
604-707-3034

Argus
ENGINEERING PLANNING | MANAGEMENT
ARGUS CONSULTING INC
6361 College Boulevard, Suite 600
Overland Park, Kansas 66211
816.228.7500 FAX 816.228.7535
www.argusconsulting.com

PROJECT NO	15004 22C
DATE	12/16/15
DESIGNED BY	RB
DRAWN BY	AYM
CHECKED BY	RB
CAD FILE NAME	15004 22C -G020

MARINE TERMINAL DEMOLITION PLAN

DRAWING NO
G-020

ISSUED FOR CONSTRUCTION

SEP 27 2017

PLEASE RECYCLE

Plotted: P:\8338 VC Vancouver Airport Fuel Delivery Project\CADD_Active\15004 22C-G020.dwg on 03/7/17 at 1:18 PM by AMANZON using Argus 2013.stb

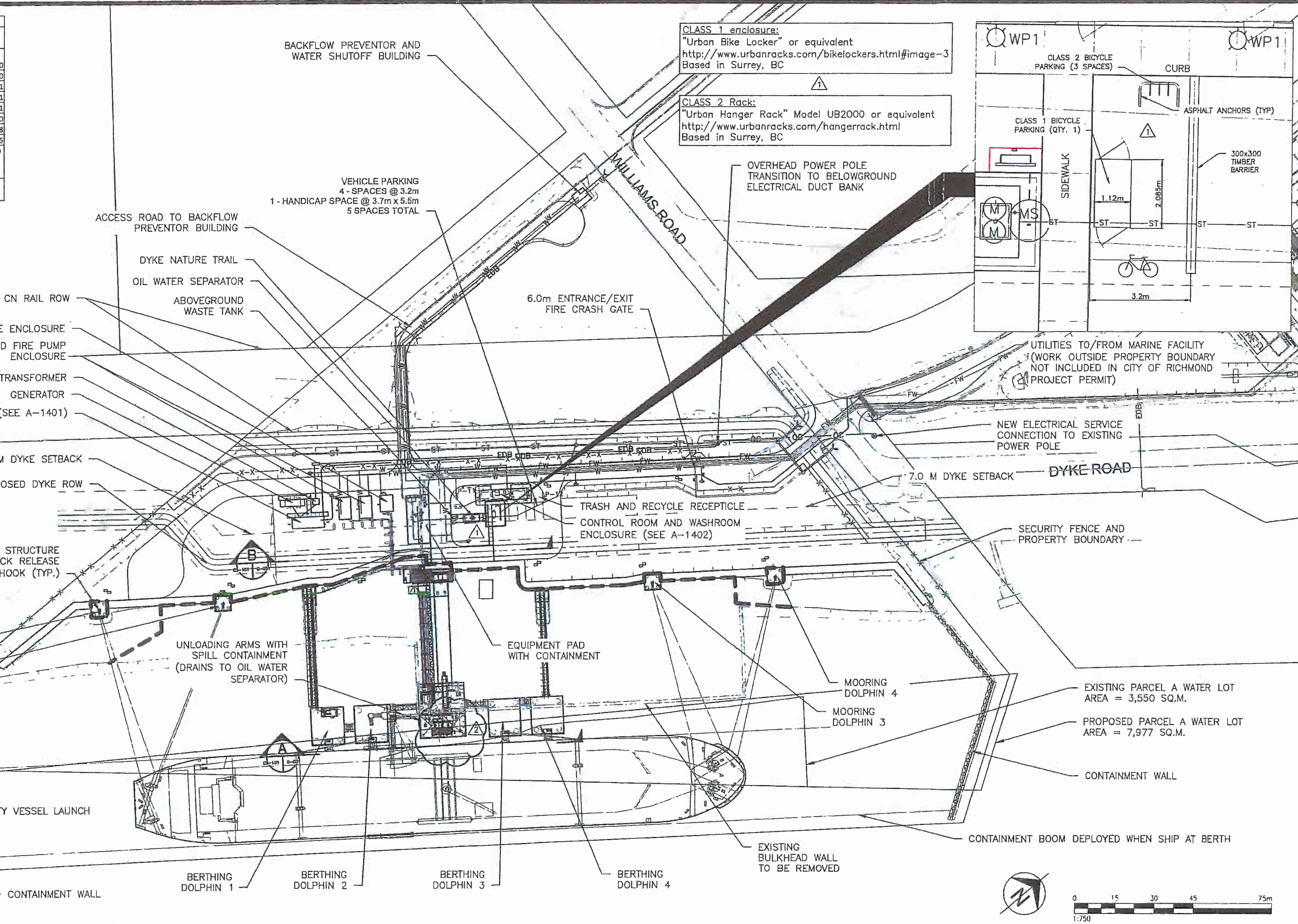
Plan #2

ISSUED FOR DEVELOPMENT PERMIT REVIEW

SEP 2 7 2017

BUILDING AREA AND STRUCTURE ELEVATIONS			
BUILDING NAME	FLOOR AREA (M 2)	STRUCTURE HEIGHT (M)	STRUCTURE ELEVATION (M)
CONTROL ROOM AND WASHROOM ENCLOSURE	43.29	3.5	9.0
FUEL LAB ENCLOSURE	21.65	3.5	9.0
FIRE PUMP ENCLOSURE 1	33.51	2.6	8.1
FIRE PUMP ENCLOSURE 2	33.51	2.6	8.1
FOAM STORAGE ENCLOSURE	28.01	2.6	8.1
ELECTRICAL ENCLOSURE	45.97	5.5	11.0
DOCK UNLOADING ARMS	N/A	33.0	37.8
DOCK GANGWAY TOWER	N/A	19.7	24.5

NOTE: THE MARINE UNLOADING ARMS ELEVATION ARE TO BE DETERMINED BY THE MANUFACTURER. APPROXIMATE ELEVATIONS OF THE STRUCTURE ARE LISTED ABOVE.
SITE AREA: 40,468 M^2
LOT COVERAGE AREA: 0.52%



CLASS 1 enclosure:
"Urban Bike Locker" or equivalent
http://www.urbanracks.com/bikelockers.html#image-3
Based in Surrey, BC
CLASS 2 Rack:
"Urban Hanger Rack" Model UB2000 or equivalent
http://www.urbanracks.com/hangerrack.html
Based in Surrey, BC
WP1
CLASS 2 BICYCLE PARKING (3 SPACES)
CURB
ASPHALT ANCHORS (TYP)
CLASS 1 BICYCLE PARKING (QTY. 1)
300x300 TIMBER BARRIER
SIDEWALK
1.12m
2.085m
3.2m
BACKFLOW PREVENTOR AND WATER SHUTOFF BUILDING
VEHICLE PARKING
4 - SPACES @ 3.2m
1 - HANDICAP SPACE @ 3.7m x 5.5m
5 SPACES TOTAL
ACCESS ROAD TO BACKFLOW PREVENTOR BUILDING
DYKE NATURE TRAIL
OIL WATER SEPARATOR
ABOVEGROUND WASTE TANK
CN RAIL ROW
FOAM STORAGE ENCLOSURE
DIESEL POWERED FIRE PUMP ENCLOSURE
TRANSFORMER
GENERATOR
ELECTRICAL ENCLOSURE (SEE A-1401)
7.0 M DYKE SETBACK
PROPOSED DYKE ROW
NEW MOORING STRUCTURE WITH QUICK RELEASE MOORING HOOK (TYP.)
MOORING DOLPHIN 1
MOORING DOLPHIN 2
UTILITY VESSEL LAUNCH
CONTAINMENT WALL
BERTHING DOLPHIN 1
BERTHING DOLPHIN 2
BERTHING DOLPHIN 3
BERTHING DOLPHIN 4
UNLOADING ARMS WITH SPILL CONTAINMENT (DRAINS TO OIL WATER SEPARATOR)
EQUIPMENT PAD WITH CONTAINMENT
WILLIAMS ROAD
6.0m ENTRANCE/EXIT FIRE CRASH GATE
OVERHEAD POWER POLE TRANSITION TO BELOWGROUND ELECTRICAL DUCT BANK
TRASH AND RECYCLE RECEPTICLE
CONTROL ROOM AND WASHROOM ENCLOSURE (SEE A-1402)
UTILITIES TO/FROM MARINE FACILITY (WORK OUTSIDE PROPERTY BOUNDARY NOT INCLUDED IN CITY OF RICHMOND PROJECT PERMIT)
NEW ELECTRICAL SERVICE CONNECTION TO EXISTING POWER POLE
7.0 M DYKE SETBACK
DYKE ROAD
SECURITY FENCE AND PROPERTY BOUNDARY
MOORING DOLPHIN 4
MOORING DOLPHIN 3
EXISTING PARCEL A WATER LOT AREA = 3,550 SQ.M.
PROPOSED PARCEL A WATER LOT AREA = 7,977 SQ.M.
CONTAINMENT WALL
CONTAINMENT BOOM DEPLOYED WHEN SHIP AT BERTH
EXISTING BULKHEAD WALL TO BE REMOVED
0 15 30 45 75m
1:750

ISSUE NO.	DRAWING REVISIONS	ISSUE DATE
2	REVISED LOCATION OF UNLOADING ARMS INTO WATER LOT	08/18/2017
1	ADDED BICYCLE PARKING DETAIL	07/24/2017
0	ISSUED FOR DEVELOPMENT PERMIT REVIEW	12/02/2016

Fuel Facilities Corporation
109 - 12300 Horseshoe Way, Richmond, BC V7A 4Z1, 604-271-7113, www.fsmgroup.ca, www.vancouverairportfuel.ca

VANCOUVER AIRPORT FUEL DELIVERY PROJECT
MARINE RECEIVING AREA
PERMIT PACKAGE
VANCOUVER AIRPORT FUEL FACILITIES CORPORATION
RICHMOND, BRITISH COLUMBIA

SEAL

LOGO

Argus
ENGINEERING | PLANNING | MANAGEMENT
ARGUS CONSULTING, INC.
6363 College Boulevard, Suite 600
Overland Park, Kansas 66211
815.228.7500 FAX 816.228.7535
www.argusconsulting.com

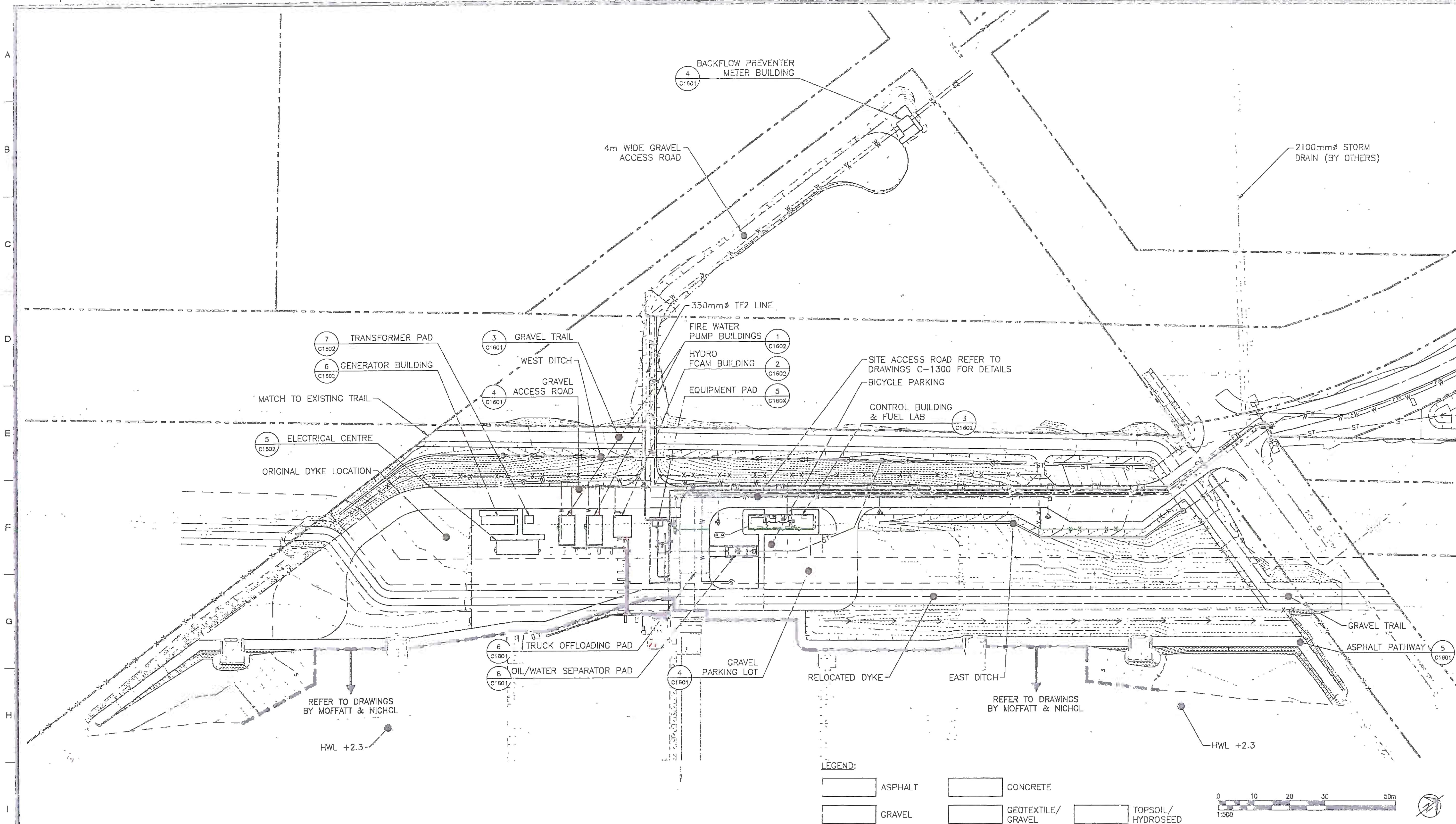
PROJECT NO: 15004.22
DATE: 05/22/2015
DESIGNED BY: DWF
DRAWN BY: DWF
CHECKED BY: DWF
CAD FILE NAME: CS1.01

OVERALL SITE PLAN

DRAWING NO.: CS-101

Plotted: Y:\Comm\YVR - Vancouver\15004 VAFDP\Dwgs\22-Marine\22A - Permit\Civil\CS1.01.dwg on 08/18/17 at 5:51 PM by SNEWBOLD using acad.stb

Plan #3



ISSUE NO.	DRAWING REVISIONS	ISSUE DATE
	ISSUED FOR DEVELOPMENT PERMIT REVIEW	05/05/2017

Fuel Facilities Corporation

VANCOUVER AIRPORT FUEL DELIVERY PROJECT
MARINE RECEIVING AREA
MARINE DESIGN PACKAGE

VANCOUVER AIRPORT FUEL FACILITIES CORPORATION
RICHMOND, BRITISH COLUMBIA

SEAL

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1000-885 DUNSMUIR ST. VANCOUVER BC CANADA V6C 1N5
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8363 College Boulevard, Suite 200
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PROJECT NO: 15004.22C
DATE: 10/10/16
DESIGNED BY:
DRAWN BY:
CHECKED BY:
CAD FILE NAME: 15004.22C-C1112

SURFACING PLAN (COLOUR)

DRAWING NO.: C-1112

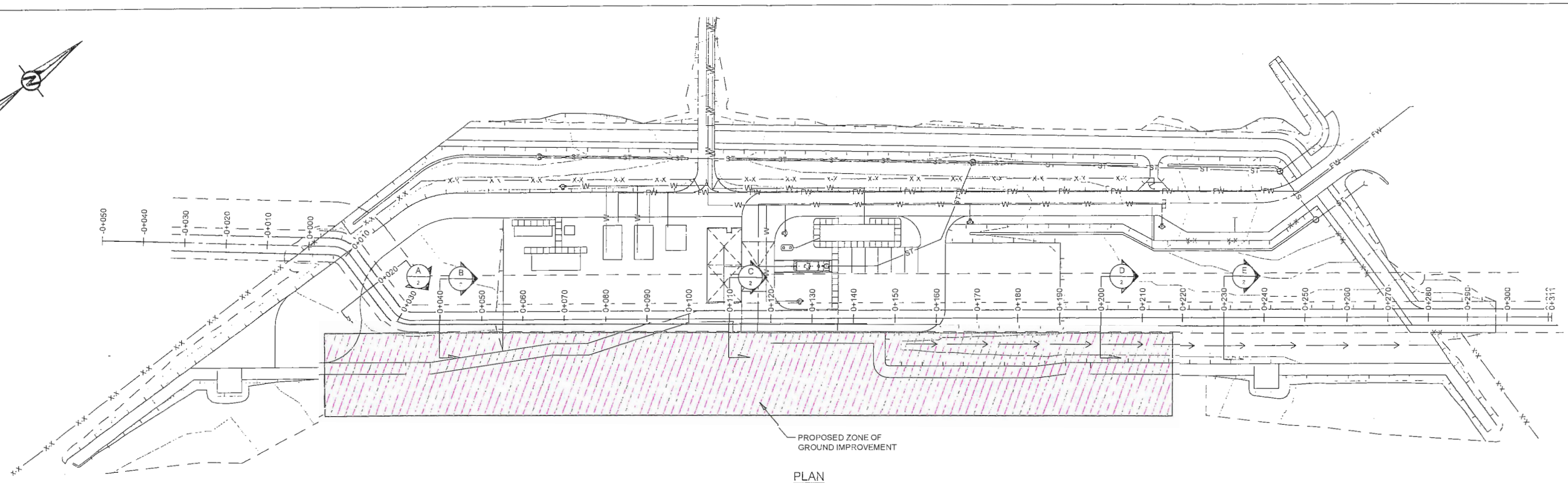
Plan #4

ISSUED FOR DEVELOPMENT PERMIT REVIEW

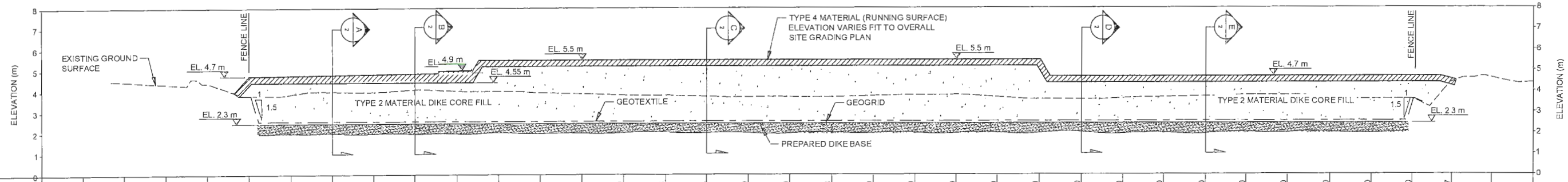
SEP 2 7 2017

PLEASE RECYCLE

Plotted: G:\C31\C3103509-01\15004.22C\CADD\DWGS\SHTS\15004.22C-C1112.dwg on 05/4/17 at 9:03 AM by TANNER.JOHNSON using Argus.stb



PLAN



CHAINAGE	0+050	0+040	0+030	0+020	0+010	0+000	0+010	0+020	0+030	0+040	0+050	0+060	0+070	0+080	0+090	0+100	0+110	0+120	0+130	0+140	0+150	0+160	0+170	0+180	0+190	0+200	0+210	0+220	0+230	0+240	0+250	0+260	0+270	0+280	0+290	0+300	0+310
FINISHED GROUND						4.73	4.74	4.76	4.81	4.85	4.89	5.50	5.50	5.50	5.50	5.46	5.42	5.50	5.49	5.48	5.49	5.50	5.50	5.50	5.50	5.50	4.70	4.70	4.70	4.70	4.70	4.70	4.70	4.70	4.70	4.57	
EXISTING GROUND			4.48	4.35	4.40	3.80	3.85	3.98	3.97	4.09	4.02	4.00	3.94	3.88	3.82	3.80	3.74	3.71	3.72	3.72	3.76	3.80	3.82	3.71	3.60	3.60	3.65	3.70	3.73	3.80	3.78	3.67	3.60	3.59	4.49	4.62	4.40

ELEVATION PROFILE

NOTE(S)

1. BASE DRAWING PROVIDED BY ARGUS CONSULTING CAD FILE: L2.01.DWG, DATED RECEIVED MAY 10, 2017.
2. ELEVATION SHOWN ARE IN GEODETIC DATUM
3. DATUM NAD 83, PROJECTION ZONE 10
4. ALL MATERIALS AND CONSTRUCTION SHALL CONFORM TO THE FOLLOWING:
5. A) CURRENT EDITION OF THE CITY OF RICHMOND SUPPLEMENTARY SPECIFICATIONS AND DETAIL DRAWINGS AND ASSOCIATED EDITION OF THE MASTER MUNICIPAL CONSTRUCTION DOCUMENTS.
   B) PROVINCE OF BRITISH COLUMBIA MINISTRY OF ENVIRONMENT, LANDS AND PARKS "ENVIRONMENTAL GUIDELINES FOR VEGETATION MANAGEMENT ON FLOOD PROTECTION WORKS TO PROTECT PUBLIC SAFETY AND THE ENVIRONMENT" AND "RIPRAP DESIGN AND CONSTRUCTION GUIDE" AND "DIKE DESIGN AND CONSTRUCTION GUIDE: BEST MANAGEMENT PRACTICES FOR BRITISH COLUMBIA".
6. COMPATIBILITY OF THE MATERIAL SHOULD BE CHECKED BEFORE AND DURING CONSTRUCTION TO CONFIRM WHETHER A GEOTEXTILE FABRIC IS NEEDED.

DRAFT

0 20 40
1:500 METRES
HORIZONTAL SCALE

0 5 10
1:100 METRES
VERTICAL SCALE

CLIENT
FSM MANAGEMENT GROUP

CONSULTANT
Golder Associates

DESIGNED	M. MIAO / J. JI
PREPARED	GB
REVIEWED	M. MIAO
APPROVED	J. JI

PROJECT
VANCOUVER AIRPORT FUEL DELIVERY PROJECT
NEW FLOOD PROTECTION DIKE
15040 WILLIAMS ROAD, RICHMOND, B.C.

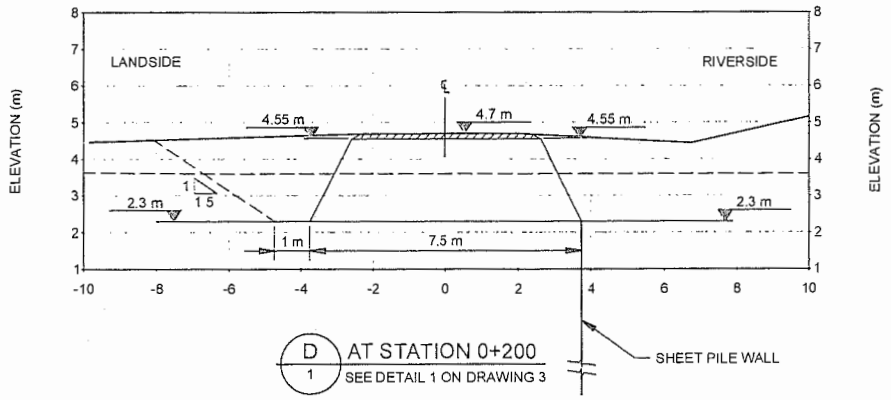
TITLE
PLAN AND ELEVATION PROFILE

PROJECT NO	PHASE	REV	FIGURE
1406834	9442	B	1

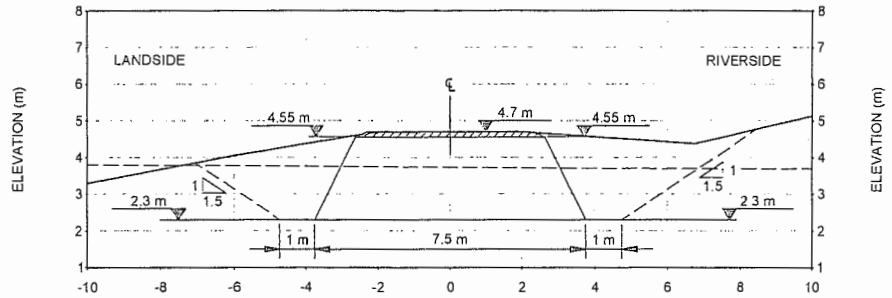
25 mm

SEP 27 2017

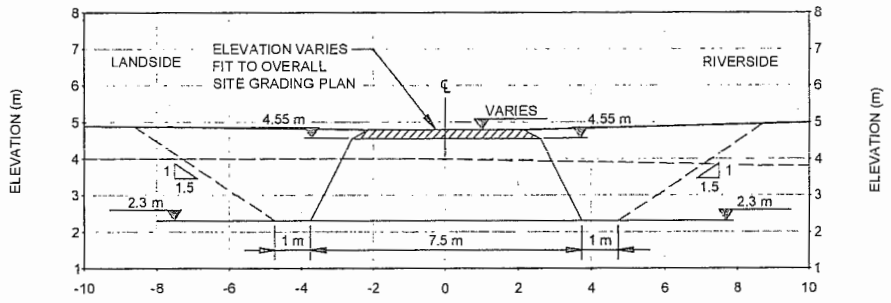
Plan #5



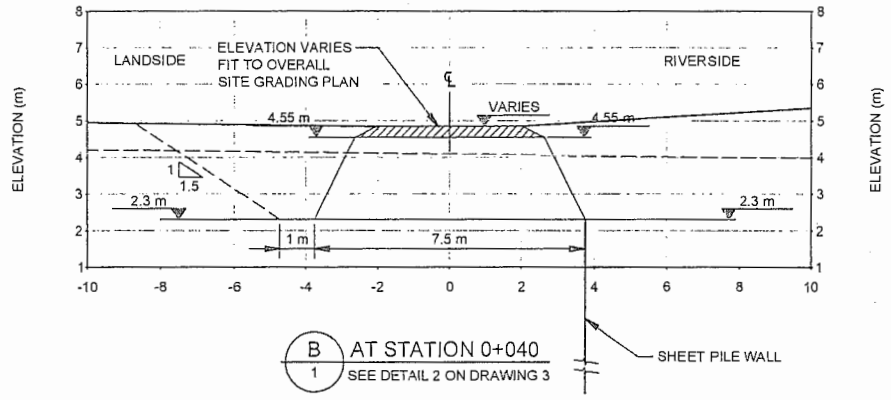
D / 1 AT STATION 0+200
SEE DETAIL 1 ON DRAWING 3



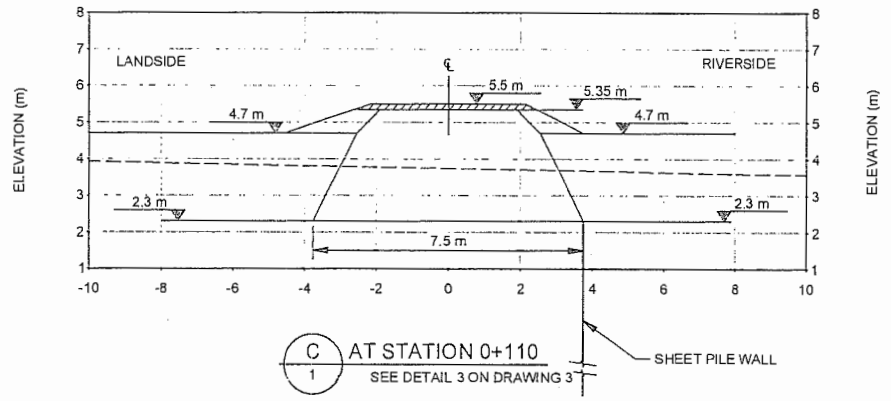
E / 1 AT STATION 0+230
SEE DETAIL 1 ON DRAWING 3



A / 1 AT STATION 0+020
SEE DETAIL 1 ON DRAWING 3



B / 1 AT STATION 0+040
SEE DETAIL 2 ON DRAWING 3



C / 1 AT STATION 0+110
SEE DETAIL 3 ON DRAWING 3

NOTE(S)
1. BASE DRAWING PROVIDED BY ARGUS CONSULTING
   CAD FILE: L2.01.DWG. DATED RECEIVED MAY 10, 2017.
2. ELEVATION SHOWN ARE IN GEODETIC DATUM
3. DATUM NAD 83, PROJECTION ZONE 10

DRAFT

0 5 10
1:100 METRES

CLIENT
FSM MANAGEMENT GROUP

CONSULTANT
Golder Associates

DESIGNED	M. MIAO / J. JI
PREPARED	GB
REVIEWED	M. MIAO
APPROVED	J. JI

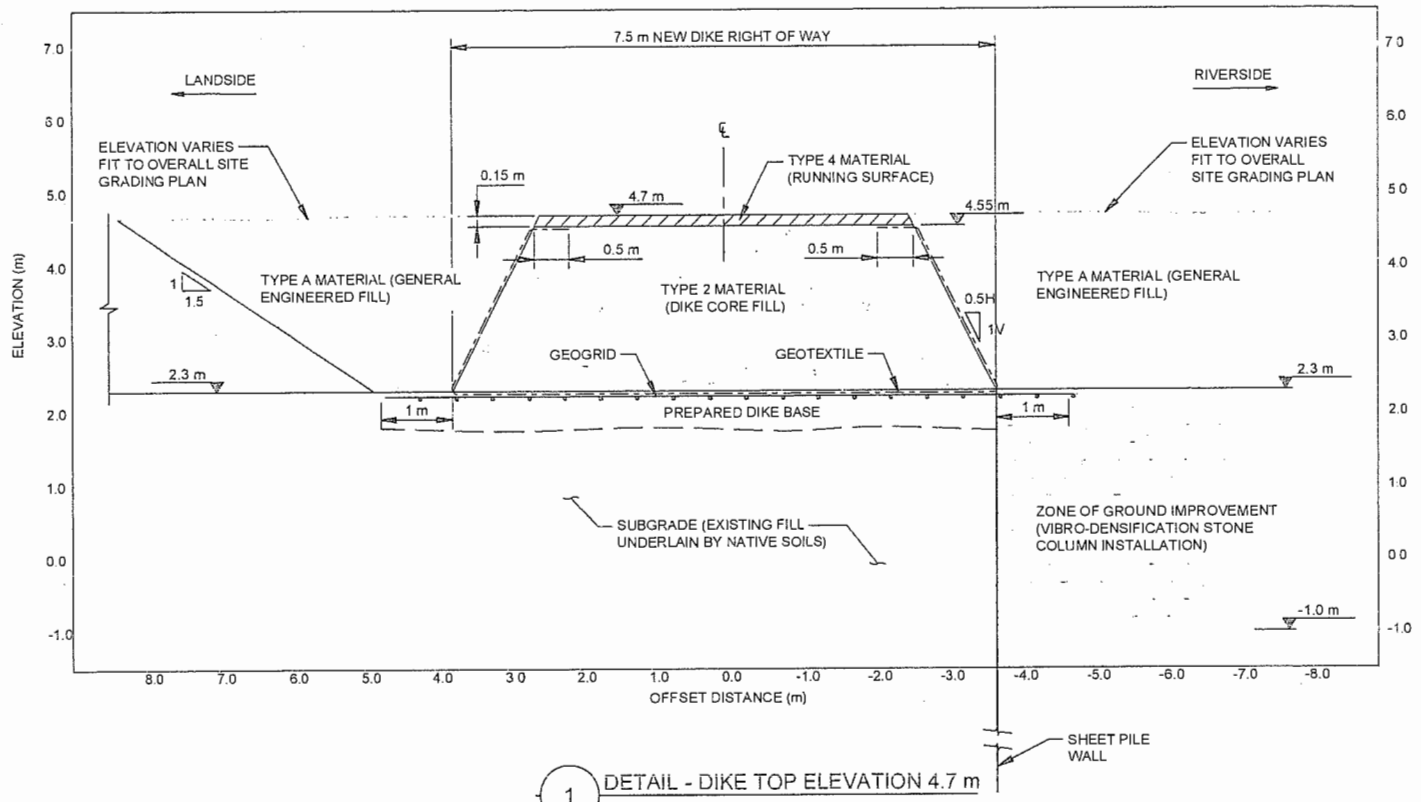
PROJECT
VANCOUVER AIRPORT FUEL DELIVERY PROJECT
NEW FLOOD PROTECTION DIKE
15040 WILLIAMS ROAD, RICHMOND, B.C.

TITLE
CROSS SECTIONS

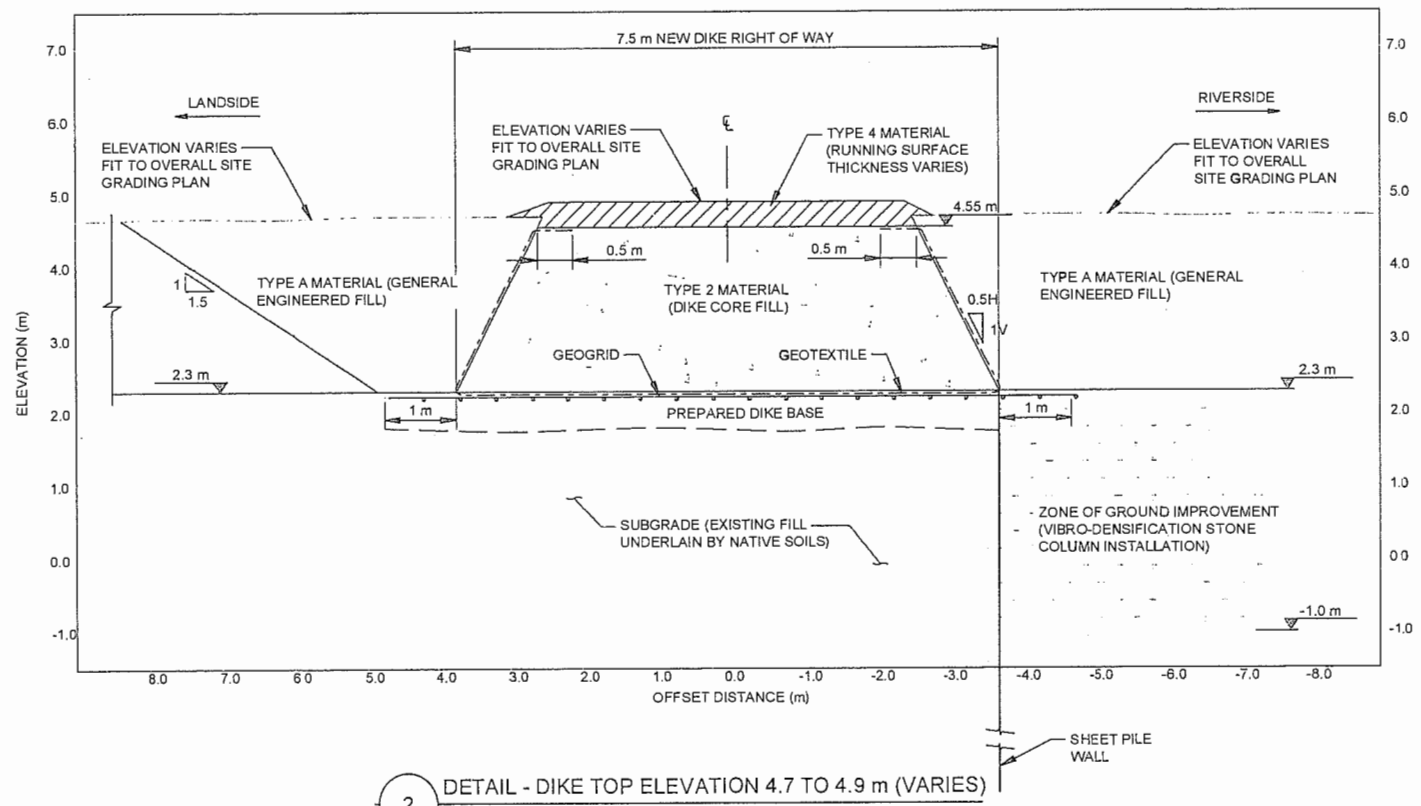
PROJECT NO	PHASE	REV.	FIGURE
1406834	9442	B	2

SEP 27 2017

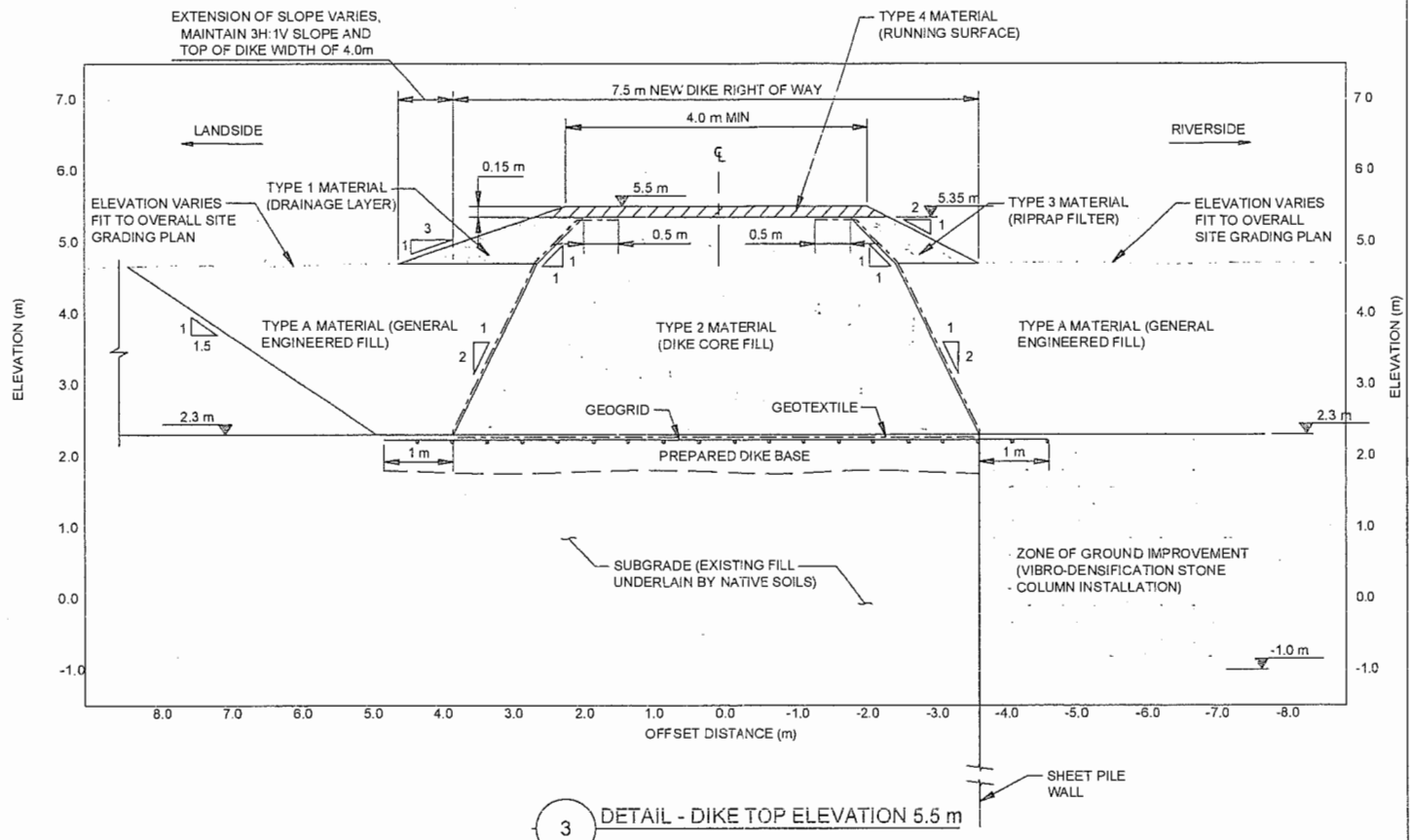
Plan #6



1 DETAIL - DIKE TOP ELEVATION 4.7 m



2 DETAIL - DIKE TOP ELEVATION 4.7 TO 4.9 m (VARIES)



3 DETAIL - DIKE TOP ELEVATION 5.5 m

TYPE 1 MATERIAL (DRAINAGE LAYER)
Type 1 material shall consist of clean well-graded 75 mm minus sand and gravel meeting the following gradation limits

PARTICLE SIZE (mm)	PERCENTAGE BY WEIGHT PASSING
75	100
37.5	60 - 100
19	35 - 80
9.5	26 - 60
4.75	20 - 40
2.36	15 - 30
1.18	10 - 20
0.6	5 - 15
0.3	3 - 10
0.075	0 - 5

TYPE 2 MATERIAL (BULK FILL OR DIKE CORE FILL)
Type 2 material shall consist of well-graded sand with 15 to 30 percent fines passing 0.075 mm sieve meeting the following gradation limits

PARTICLE SIZE (mm)	PERCENTAGE BY WEIGHT PASSING
19	100
4.75	80 - 100
0.425	25 - 90
0.15	18 - 50
0.075	15 - 30

TYPE 3 MATERIAL (RIPRAP FILTER)
Type 3 material shall consist of clean well-graded pit-run or processed sand, gravel and cobbles, or quarried stone meeting the following gradation limits

PARTICLE SIZE (mm)	PERCENTAGE BY WEIGHT PASSING
200	100
75	60 - 90
9.5	30 - 65
0.85	5 - 30
0.15	0 - 5

TYPE 4 MATERIAL (RUNNING SURFACE)
Type 4 material shall consist of clean well-graded 19mm minus sand and gravel or road mulch meeting the following gradation limits

PARTICLE SIZE (mm)	PERCENTAGE BY WEIGHT PASSING
19	100
12.5	75 - 100
9.5	60 - 90
4.75	40 - 70
2.36	27 - 55
1.18	16 - 42
0.6	8 - 30
0.3	5 - 20
0.075	2 - 8

TYPE A MATERIAL (GENERAL ENGINEERED FILL)
Type A material shall consist of clean well-graded 75 mm minus sand and gravel meeting the following gradation limits

PARTICLE SIZE (mm)	PERCENTAGE BY WEIGHT PASSING
75	100
37.5	30 - 100
19	20 - 100
4.75	10 - 60
1.18	6 - 32
0.3	4 - 15
0.075	0 - 5

NOTE(S)
1. BASE DRAWING PROVIDED BY ARGUS CONSULTING CAD FILE: L2.01.DWG. DATED RECEIVED MAY 10, 2017.
2. ELEVATION SHOWN ARE IN GEODETIC DATUM
3. DATUM NAD 83, PROJECTION ZONE 10

DRAFT

0 2 4
1:50 METRES

CLIENT
FSM MANAGEMENT GROUP

CONSULTANT
Golder Associates

DESIGNED	M. MIAO / J. JI
PREPARED	GB
REVIEWED	M. MIAO
APPROVED	J. JI

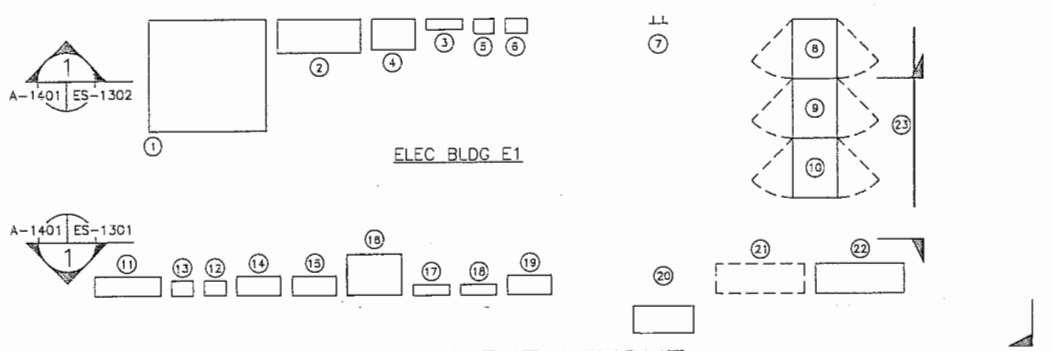
PROJECT
VANCOUVER AIRPORT FUEL DELIVERY PROJECT
NEW FLOOD PROTECTION DIKE
15040 WILLIAMS ROAD, RICHMOND, B.C.

TITLE
TYPICAL DETAILS

PROJECT NO	PHASE	REV	FIGURE
1406834	9442	B	3

SEP 27 2017

Plan #7



1 ELECTRICAL EQUIPMENT LAYOUT
ES-1201, ES-1202 | A-1401 1:50

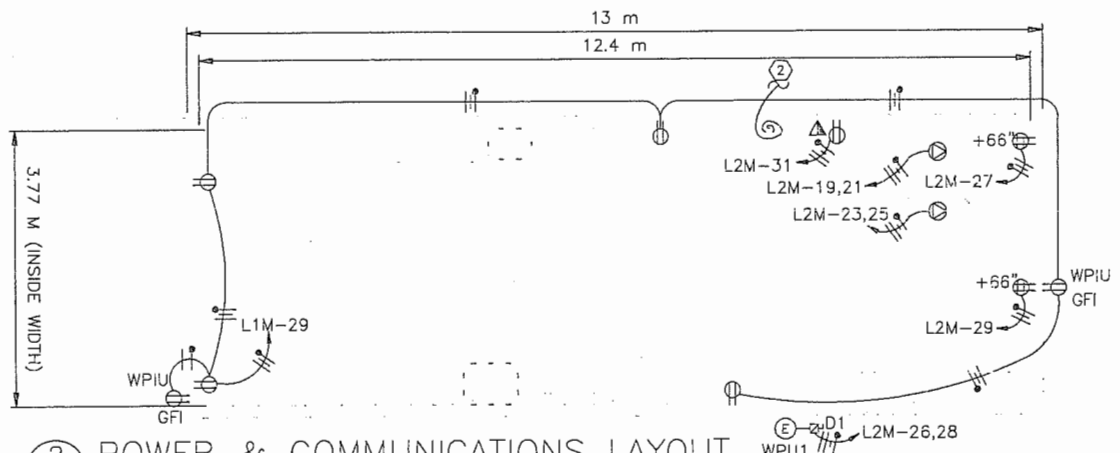
EQUIPMENT LIST			
ITEM(S)	QUANTITY	TAG(S)	DESCRIPTION
1	1	ATS1	AUTOMATIC TRANSFER SWITCH
2	1	MDP1	MAIN DISTRIBUTION PANELBOARD – NORMAL POWER
3	1	L1M	PANELBOARD L1M
4	1	T2M	TRANSFORMER
5	1	ST-SP-103	MOTOR STARTER
6	1	ST-SP-104	MOTOR STARTER
7	1	MGB1	MASTER GROUND BAR 1
8	1	CR1	COMMUNICATIONS RACK 1 (SHORE)
9	1	CR2	COMMUNICATIONS RACK 2 (PIER)
10	1	CR3	COMMUNICATIONS RACK 3 (FUTURE)
11	1	H1M	PANELBOARD H1M
12	1	ST-SP-101	MOTOR STARTER
13	1	ST-SP-102	MOTOR STARTER
14	1	H2M	PANELBOARD H2M
15	1	H2MB	PANELBOARD H2MB
16	1	T3M	TRANSFORMER
17	1	L2M	PANELBOARD L2M
18	1	L2MB	PANELBOARD L2MB
19	1	LCP1	PANELBOARD LCP1
20	1	WPU1	WALL PACKAGE UNIT 1
21	1	PLCC2	PROGRAMMABLE LOGIC CONTROLLER CAB 2 (FUTURE)
22	1	PLCC1	PROGRAMMABLE LOGIC CONTROLLER CAB 1
23	1	BKBD	PLYWOOD BACKBOARD

NOTES:

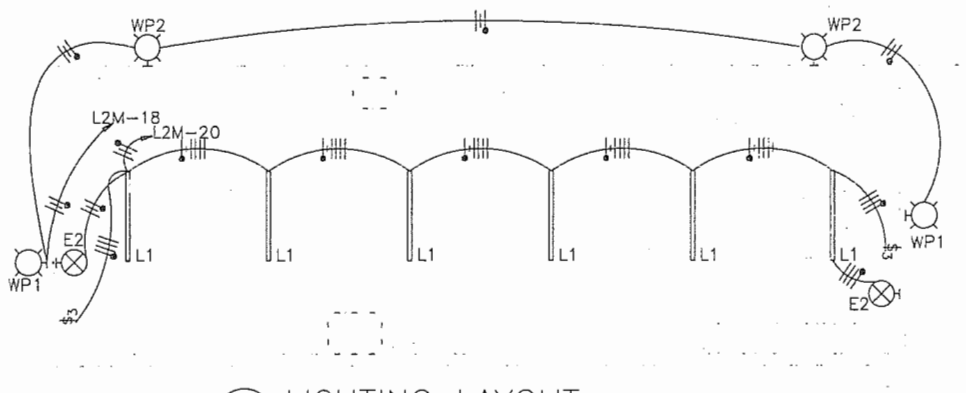
1. SEE DRAWINGS E-1001 AND E-1002 FOR LEGEND, ABBREVIATIONS AND GENERAL NOTES.
2. ELECTRICAL WORK SHOWN WITH DARK LINE WEIGHT SHALL BE PROVIDED.
3. SEE 1700 SERIES DRAWINGS FOR CABLE, DUCTBANK, LIGHTING, PANELBOARD, AND RACEWAY SCHEDULES.

⬡ KEYNOTES:

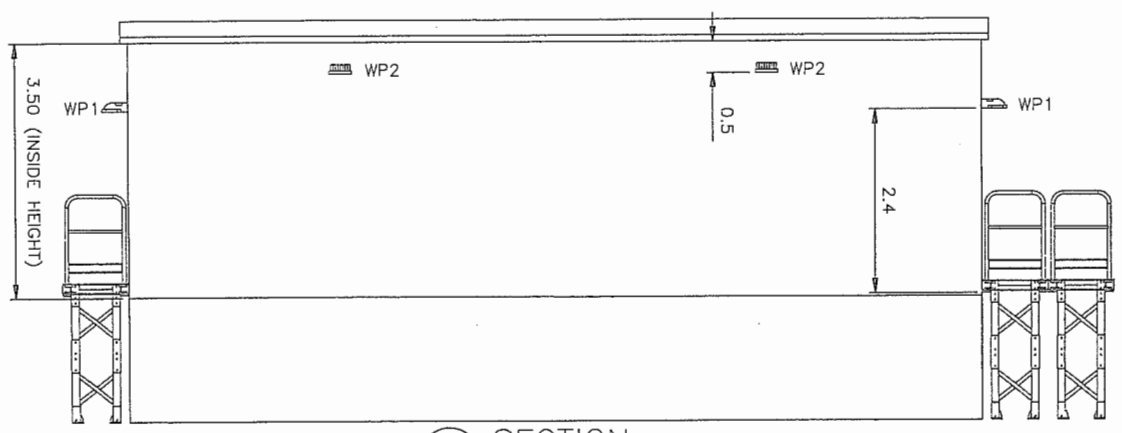
1. PROVIDE REMOVABLE RAIL WIDTH OF DOUBLE DOORS TO AID EQUIPMENT MOVEMENT. SEE STRUCTURAL DRAWINGS FOR DETAILS.
2. PROVIDE GROUND COILED. BOND TO BUILDING COUNTERPOISE FROM MASTER GROUND BAR. SEE DRAWING ES-1104 FOR CONTINUATION.



2 POWER & COMMUNICATIONS LAYOUT
ES-1201, ES-1202 | A-1401 1:50



3 LIGHTING LAYOUT
ES-1201, ES-1202 | A-1401 1:50



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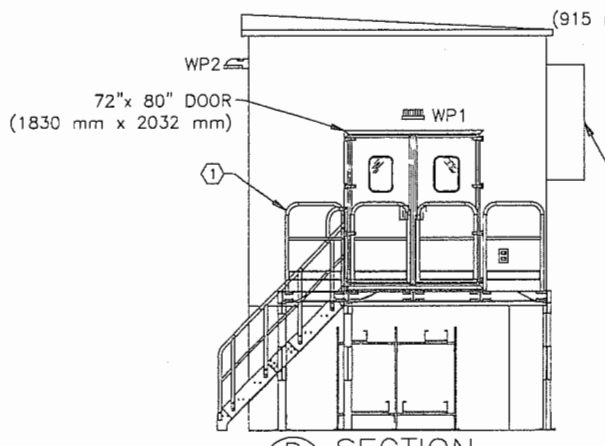
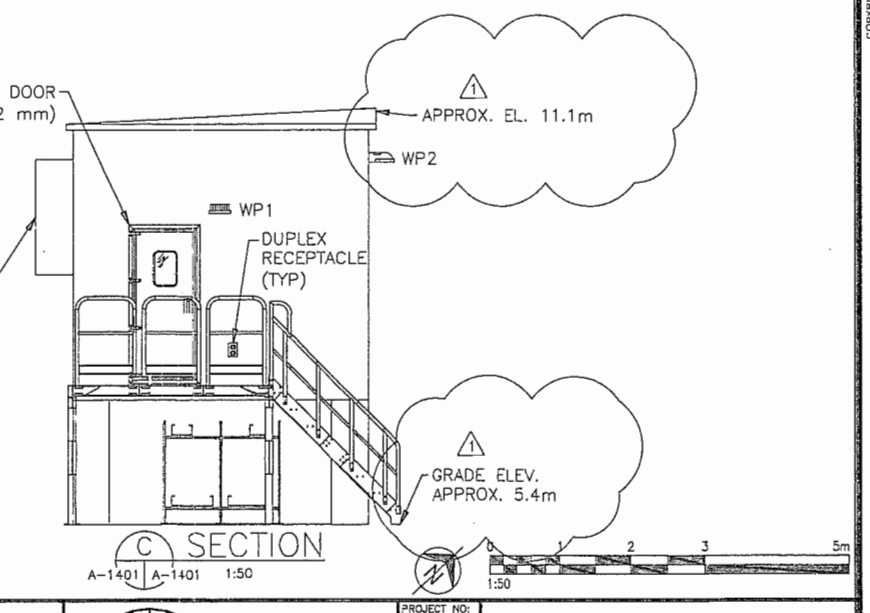
A1401 | A-1401 1:50



B SECTION
A-1401 | A-1401 1:50



C SECTION
A-1401 | A-1401 1:50

ISSUE NO.	DRAWING REVISIONS	ISSUE DATE
1	ADDED ELEVATION TEXT	08/18/2017
	ISSUED FOR CONSTRUCTION	02/14/17

Fuel Facilities Corporation

VANCOUVER AIRPORT FUEL DELIVERY PROJECT
MARINE RECEIVING AREA

VANCOUVER AIRPORT FUEL FACILITIES CORPORATION
RICHMOND, BRITISH COLUMBIA

SEAL

LOGO

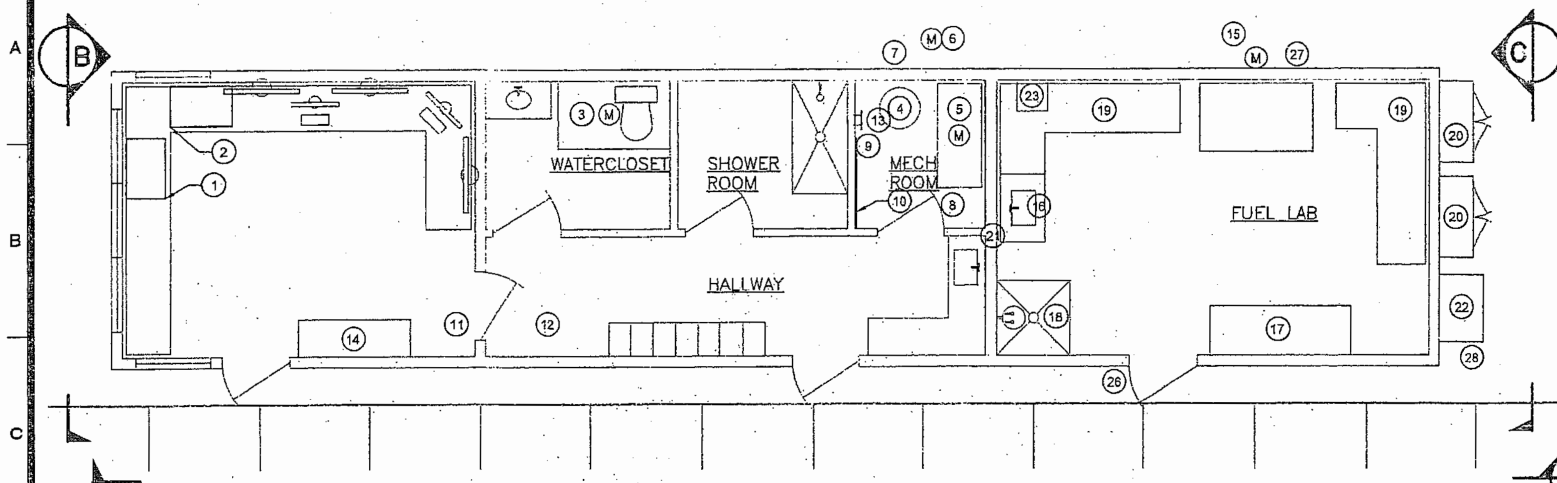
Argus
ENGINEERING | PLANNING | MANAGEMENT
ARGUS CONSULTING, INC.
6363 College Boulevard, Suite 500
Overland Park, Kansas 66211
816.228.7500 FAX 816.228.7535
www.orgusconsulting.com

PROJECT NO: 15004.22	E1 ELEC BLDG FLOOR PLAN
DATE: 03/19/16	
DESIGNED BY: WBJ	
DRAWN BY: SMF	
CHECKED BY: DWF	DRAWING NO.: A-1401
CAD FILE NAME: 15004.22C-A1401	

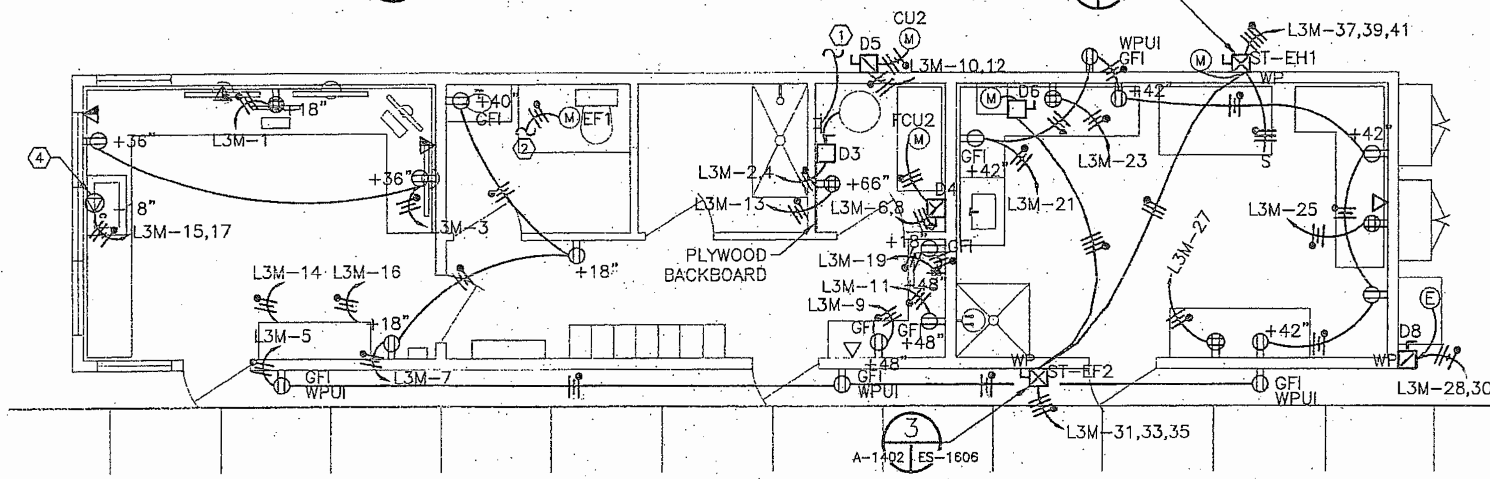
Plotted: Y:\Comm\YVR – Vancouver\15004 VAFDP\Dwgs\22-Marine\22C – Design\Arch\15004.22C-A1401.dwg on 08/18/17 at 5:53 PM by SNEWBOLD using acad.stb

ISSUED FOR CONSTRUCTION
SEP 27 2017

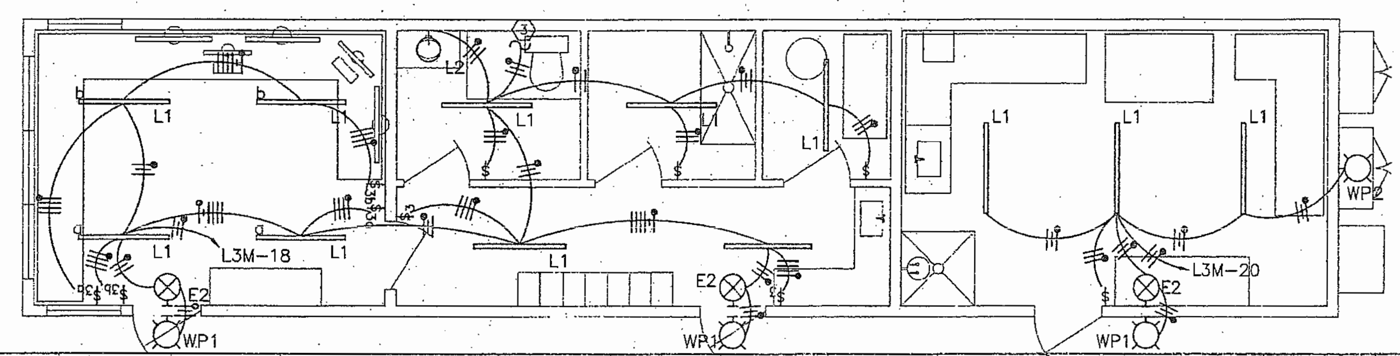
Plan #8



1 ELECTRICAL EQUIPMENT LAYOUT
ES-1203 | A-1402 1:50



2 POWER & COMMUNICATIONS LAYOUT
ES-1203 | A-1402 1:50



3 LIGHTING LAYOUT
ES-1203 | A-1402 1:50

EQUIPMENT LIST			
ITEM(S)	QUANTITY	TAG(S)	DESCRIPTION
1	1	MR-CR-4	COMMUNICATIONS RACK 4
2	1	MR-CR-5	COMMUNICATIONS RACK 5
3	1	EF1	EXHAUST FAN 1
4	1	WH1	WATER HEATER 1
5	1	FCU2	FAN COIL UNIT 2
6	1	CU2	CONDENSING UNIT 2
7	1	D5	SERVICE DISCONNECT (CU2)
8	1	D4	SERVICE DISCONNECT (FCU2)
9	1	D3	SERVICE DISCONNECT (WH1)
10	1	BKBD	PLYWOOD BACKBOARD
11	1	GAP1	GENERATOR ANUNCIATOR PANEL
12	1	L3M	PANELBOARD L3M
13	1	MGB2	MASTER GROUND BAR 2
14	1	NODE1	FIRE ALARM CONTROL PANEL
15	1	EH1	EXHAUST HOOD
16	1	CT1	WATER ONLY SINK
17	1	CB1	WORKBENCH BASE CABINETS
18	1	EWSH1	EYE WASH / SHOWER STATION
19	2	CB2	CABINET BASE AND OVERHEAD UNIT (LEFT CORNER)
20	2	CO	OUTDOOR FUEL SAMPLE CABINETS
21	1	FW1	FIRE WALL BETWEEN OPERATIONS AND FUEL LAB
22	1	WPU2	WALL PACKAGE UNIT 2
23	1	EF2	EXHAUST FAN
24	1	D6	SERVICE DISCONNECT (EF2)
25	1	D7	SERVICE DISCONNECT (WPU2)
26	1	ST-EF2	MOTOR STARTER (EF2)
27	1	ST-EH1	MOTOR STARTER (EH1)

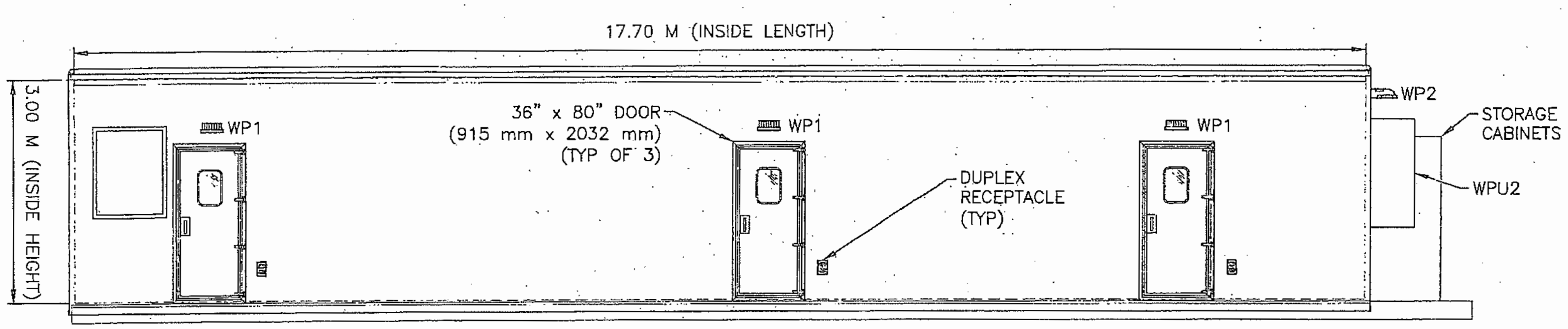
NOTES:

1. SEE DRAWINGS E-1001 AND E-1002 FOR LEGEND, ABBREVIATIONS AND GENERAL NOTES.
2. ELECTRICAL WORK SHOWN WITH DARK LINE WEIGHT SHALL BE PROVIDED.
3. SEE 1700 SERIES DRAWINGS FOR CABLE, DUCTBANK, LIGHTING, PANELBOARD, AND RACEWAY SCHEDULES.

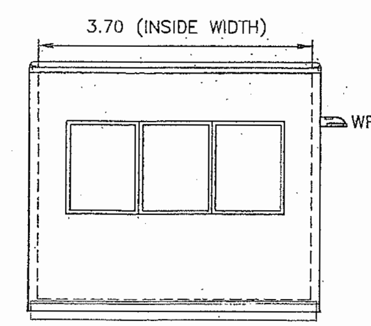
KEYNOTES:

1. PROVIDE GROUND COILED IN MECHANICAL ROOM. BOND TO BUILDING COUNTERPOISE FROM MASTER GROUND BAR. SEE DRAWING ES-1104 FOR CONTINUATION.
2. SEE CONTINUATION FOR EXHAUST FAN ON DETAIL 3 LIGHTING LAYOUT ON THIS SHEET.
3. SEE CONTINUATION FOR EXHAUST FAN ON DETAIL 2 POWER LAYOUT ON THIS SHEET.
4. PROVIDE RECEPTACLE TO MATCH UPS EQUIPMENT PLUG.

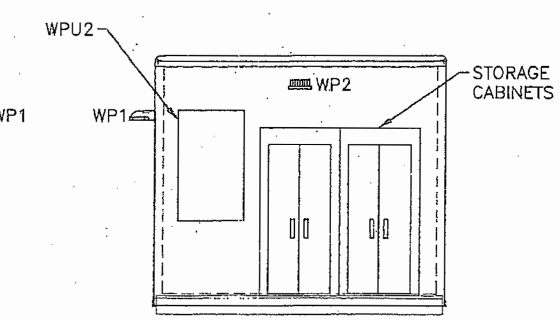
SEP 2 7 2017



A SECTION
ES-1203 | A-1402 1:50



B SECTION
ES-1203 | A-1402 1:50



C SECTION
ES-1203 | A-1402 1:50

0 0.5 1 1.5 2.5m
1:50

ISSUED FOR CONSTRUCTION

ISSUE NO.	DRAWING REVISIONS	ISSUE DATE
	ISSUED FOR CONSTRUCTION	02/14/17

VAFFC Vancouver Airport Fuel Facilities Corporation
FSM Management Group
100 - 12300 Horseshoe Way, Richmond, BC V7A 4Z1
604-271-7113
www.fsmgroup.ca
www.vancouverairportfuel.ca

VANCOUVER AIRPORT FUEL DELIVERY PROJECT
MARINE RECEIVING AREA

VANCOUVER AIRPORT FUEL FACILITIES CORPORATION
RICHMOND, BRITISH COLUMBIA

SEAL
D. W. FRANK
3/1/17

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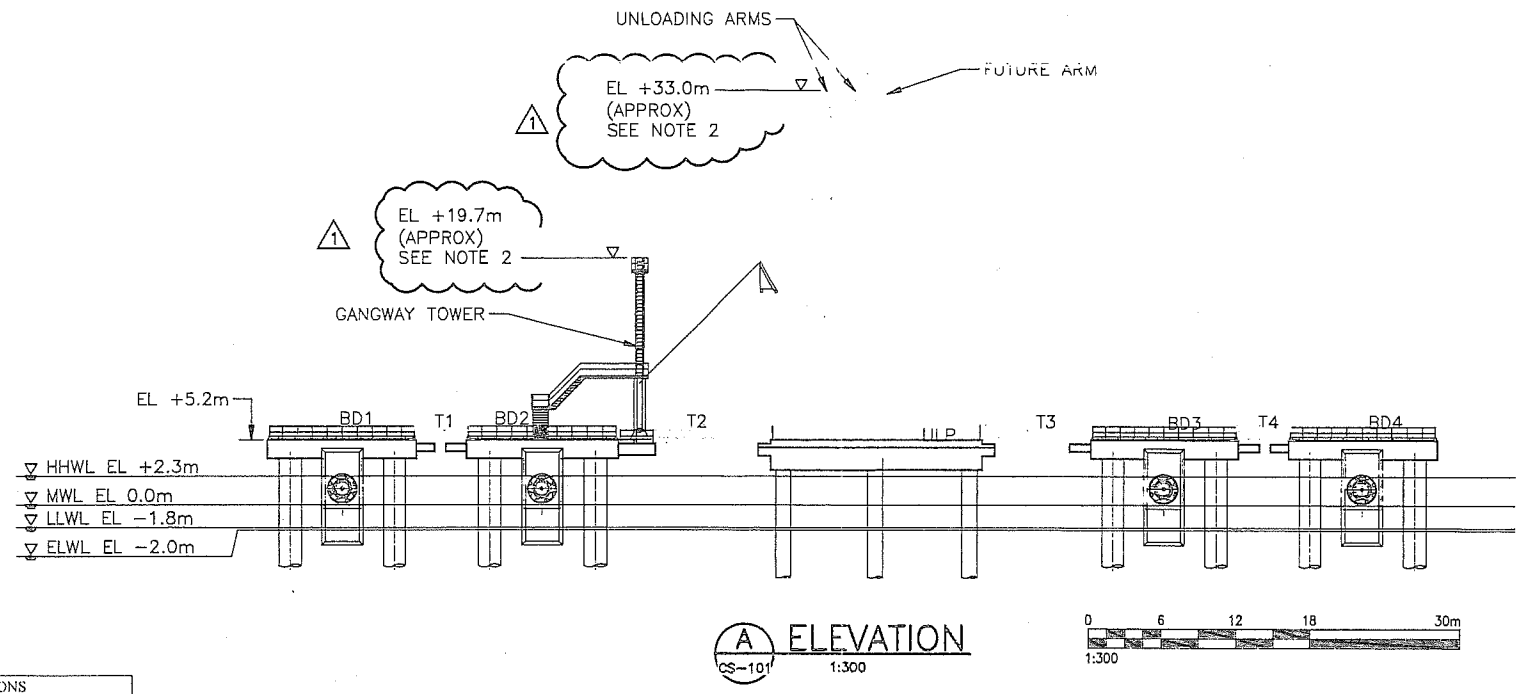
PROJECT NO.: 15004.22
DATE: 03/19/15
DESIGNED BY: WBJ
DRAWN BY: SMF
CHECKED BY: DWF
CAD FILE NAME: 15004.22CA1402

OPS1 OPERATIONS BLDG AND FL1 FUEL LAB FLOOR PLANS

DRAWING NO.: A-1402

Plotted: Y:\Comm\YVR – Vancouver\15004 VAFDP\Dwgs\22-Marine\22C – Design\Arch\15004.22CA1402.dwg on 03/6/17 at 1:58 PM by GCROWDER using acad.stb

Plan #9



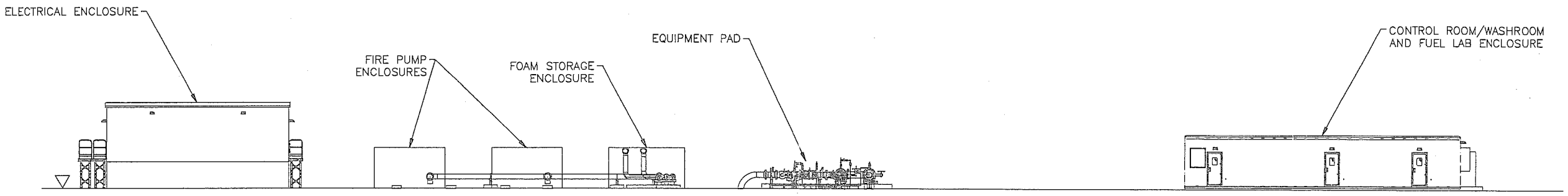
A ELEVATION
CS-101
1:300

0 6 12 18 30m
1:300

NOTES:

1. ELEVATIONS ARE TO GEODETIC DATUM.
2. ELEVATIONS OF VENDOR SUPPLIED MECHANICAL EQUIPMENT SHOWN ARE APPROXIMATE AND SUBJECT TO CHANGE ONCE EQUIPMENT IS ORDERED AND SHOP DRAWINGS PRODUCED.

BUILDING AREA AND STRUCTURE ELEVATIONS			
BUILDING NAME	FLOOR AREA (M^2)	STRUCTURE HEIGHT (M)	STRUCTURE ELEVATION (M)
CONTROL ROOM AND WASHROOM ENCLOSURE	43.29	3.5	9.0
FUEL LAB ENCLOSURE	21.65	3.5	9.0
FIRE PUMP ENCLOSURE 1	33.51	2.6	8.1
FIRE PUMP ENCLOSURE 2	33.51	2.6	8.1
FOAM STORAGE ENCLOSURE	28.01	2.6	8.1
ELECTRICAL ENCLOSURE	45.97	5.5	11.0
DOCK UNLOADING ARMS	N/A	33.0	37.8
DOCK GANGWAY TOWER	N/A	19.7	24.5
NOTE: THE MARINE UNLOADING ARMS ELEVATION ARE TO BE DETERMINED BY THE MANUFACTURER. APPROXIMATE ELEVATIONS OF THE STRUCTURE ARE LISTED ABOVE.			
SITE AREA: 40,468 M^2 LOT COVERAGE AREA: 0.52%			



B ELEVATION
CS-101
1:150

0 3 6 9 15m
1:150

ISSUE NO.	DRAWING REVISIONS	ISSUE DATE
2	ISSUED FOR DEVELOPMENT PERMIT REVIEW	05/05/2017
1	ELEVATIONS ADDED	04/27/2017
0	ISSUED FOR CONSTRUCTION	02/14/2017

Fuel Facilities Corporation

VANCOUVER AIRPORT FUEL DELIVERY PROJECT
MARINE RECEIVING AREA
MARINE DESIGN PACKAGE
VANCOUVER AIRPORT FUEL FACILITIES CORPORATION
RICHMOND, BRITISH COLUMBIA

SEAL

LOGO

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www.argusconsulting.com

PROJECT NO:	15004.22C
DATE:	12/18/15
DESIGNED BY:	FS
DRAWN BY:	AVM
CHECKED BY:	RB
CAD FILE NAME:	15004.22C-G031

ELEVATION

DRAWING NO.: G-031

Plotted: Y:\Comm\YVR – Vancouver\15004 VAFDP\Dwgs\22-Marine\22A – Permit\Gen\15004.22C-G031 ELEVATION 2017-05-01\15004.22C-G031.dwg on 05/5/17 at 8:13 AM by NPARK using acad.stb

ISSUED FOR DEVELOPMENT PERMIT REVIEW

SEP 27 2017

Plan #10

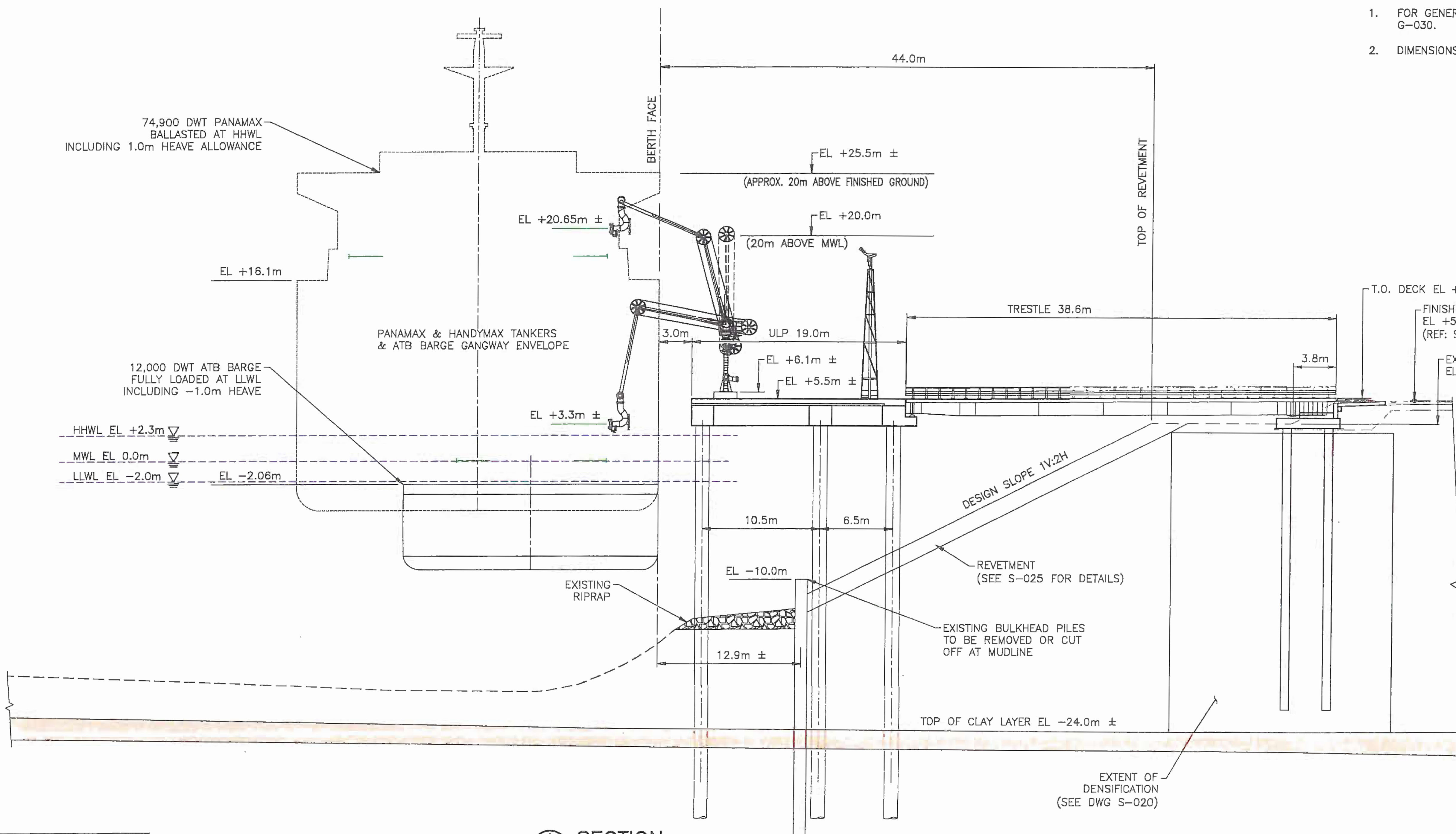
PLEASE RECYCLE

ISSUED FOR CONSTRUCTION

SEP 2 7 2017

NOTES:

1. FOR GENERAL NOTES, SEE DWGS G-003 & G-030.
2. DIMENSIONS AND ELEVATIONS IN METRES (m).



A SECTION
G-030
1:200

REVISION IN PROGRESS
NOT FOR ISSUE
DATE: 2017/06/21 – 1:34pm

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

0 4 8 12 20m
1:200

ISSUE NO.	DRAWING REVISIONS	ISSUE DATE

Fuel Facilities Corporation

VANCOUVER AIRPORT FUEL DELIVERY PROJECT
MARINE RECEIVING AREA
MARINE DESIGN PACKAGE
VANCOUVER AIRPORT FUEL FACILITIES CORPORATION
RICHMOND, BRITISH COLUMBIA

SEAL

LOGO

moffatt & nichol
777 WEST BROADWAY, STE 301
VANCOUVER, BC CANADA V5Z 4J7
604-707-9004

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6363 College Boulevard, Suite 600
Overland Park, Kansas 66211
816.228.7500 FAX 816.228.7535
www.argusconsulting.com

PROJECT NO: 15004.22C
DATE: 10/20/15
DESIGNED BY: SP
DRAWN BY: AVM
CHECKED BY: RB
CAD FILE NAME: 15004.22C-G034

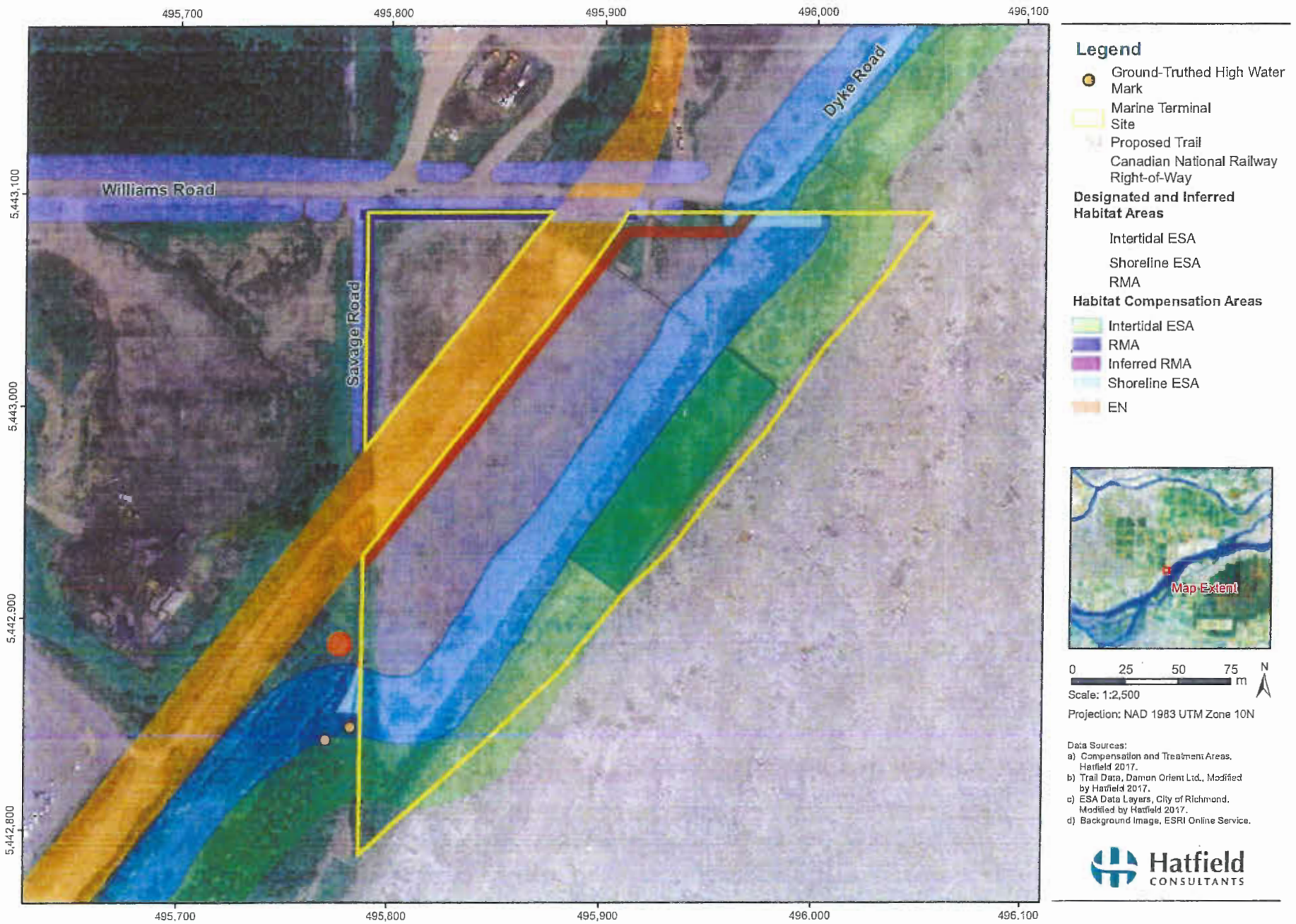
UNLOADING PLATFORM
SECTION

DRAWING NO.: G-034

Plotted: P:\8338 VC Vancouver Airport Fuel Delivery Project\CADD_Active\15004.22C-G034.dwg on 06/21/17 at 1:34 PM by AMANUZON using Argus.ctb

Plan #11

Figure 1 Vancouver Airport Fuel Delivery Project – Marine terminal proposed habitat compensation areas



This plan is reprinted from the
ESA and RMA Environmental Impacts Report
by
Hatfield Environmental Consultants

SEP 27 2017

DAMON ORIENTE LTD.
landscape architects
306 - 4464 West 10th Avenue
Vancouver, BC, Canada
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t. 604-222-9200
e. dvo@telus.net
w. damonoriente.ca

Project
VAFFC MARINE TERMINAL FACILITY
15040 Williams Road, Richmond BC

Drawing
PROPOSED COMPENSATION AREAS

Issue:

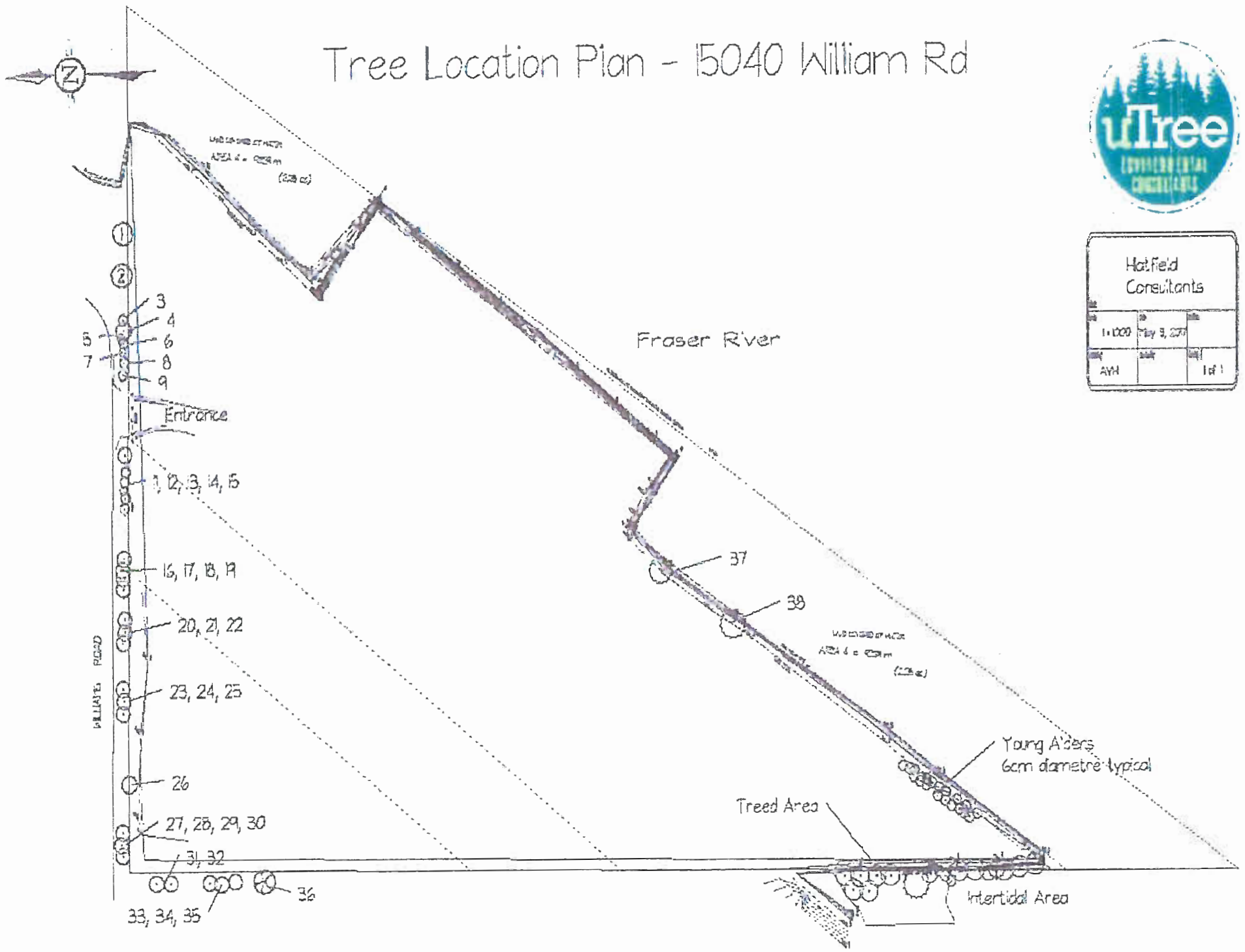
Scale: nts
Date:
Project Number: 2014-280

Dwg
L0.03

30 June 2017 Development Permit Application Resubmission

Plan #12

Tree Location Plan - 15040 William Rd



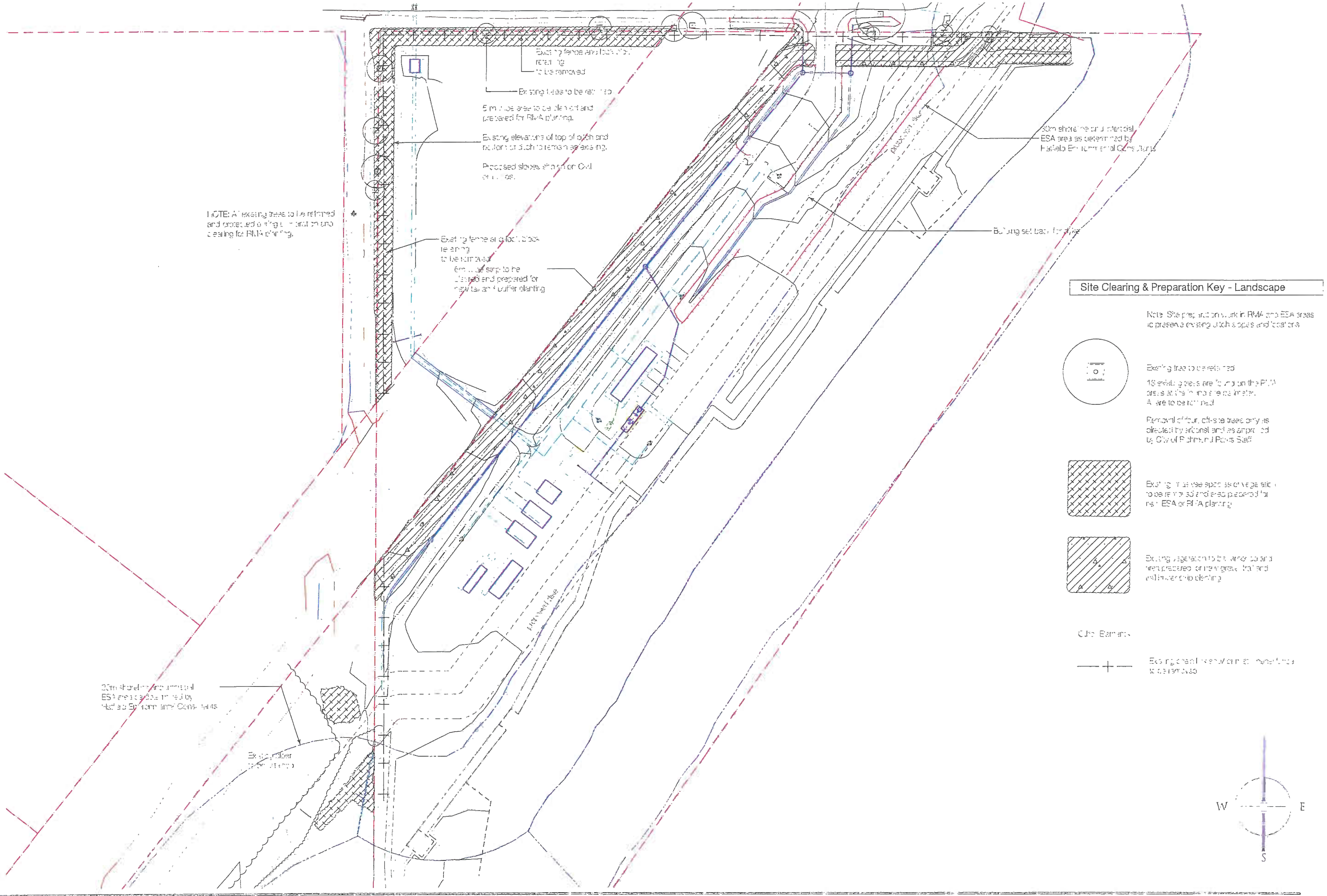
Hatfield Consultants

1:000	May 3, 2017	
AWH		1 of 1

uTree Environmental Consultants.
p 604-328-0614 e awanderlelm@gmail.com w www.utree.com

SEP 2 7 2017

Plan #13

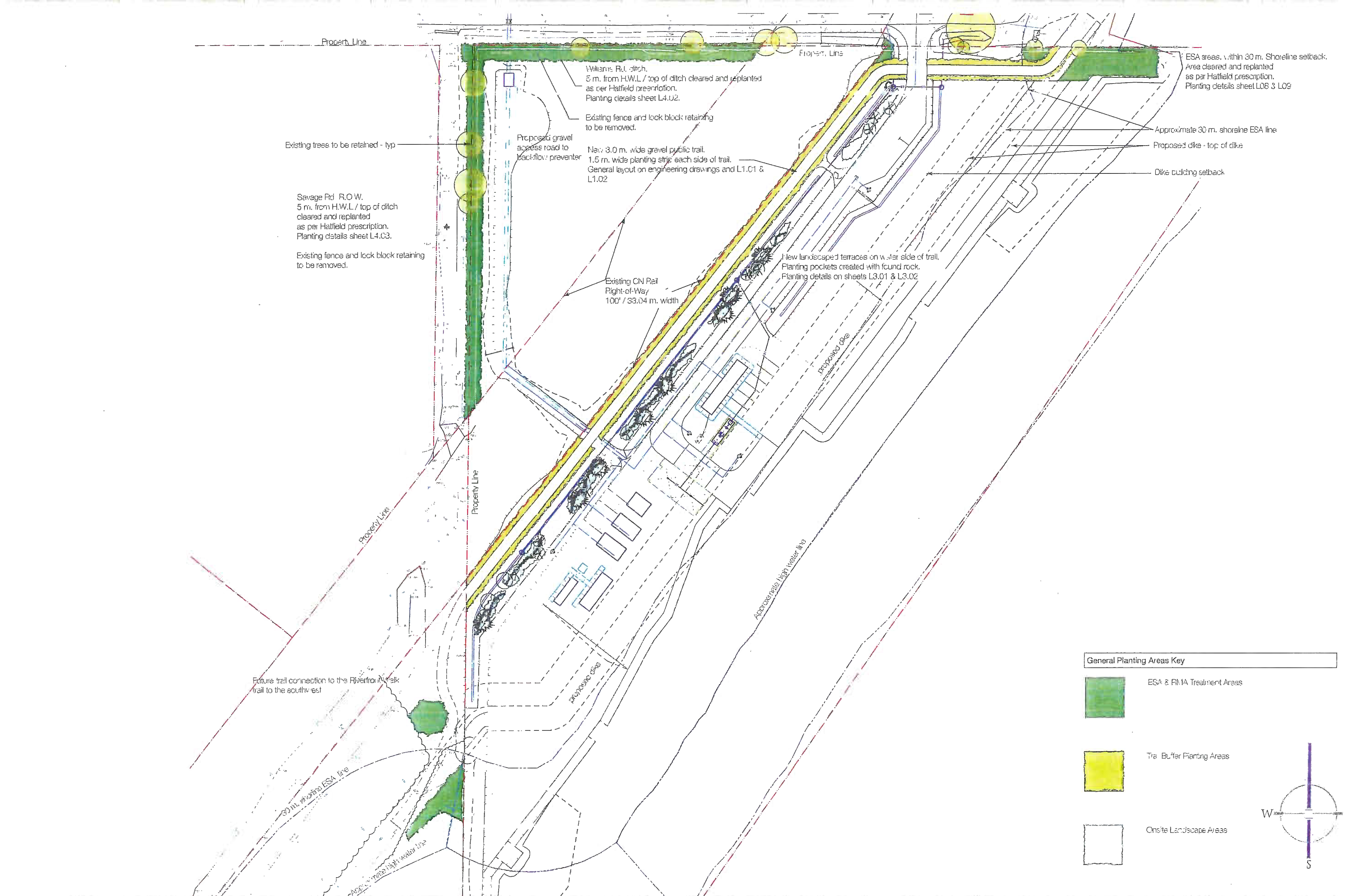


SEP 27 2017

DAMON ORIENTE LTD. | VAFFC MARINE TERMINAL FACILITY | SITE PREPARATION & CLEARING | Dwg L1.01

Plan #14

SEP 2 7 2017



...N ORIENTE LTD.

Project: VAFFC MARINE TERMINAL FACILITY

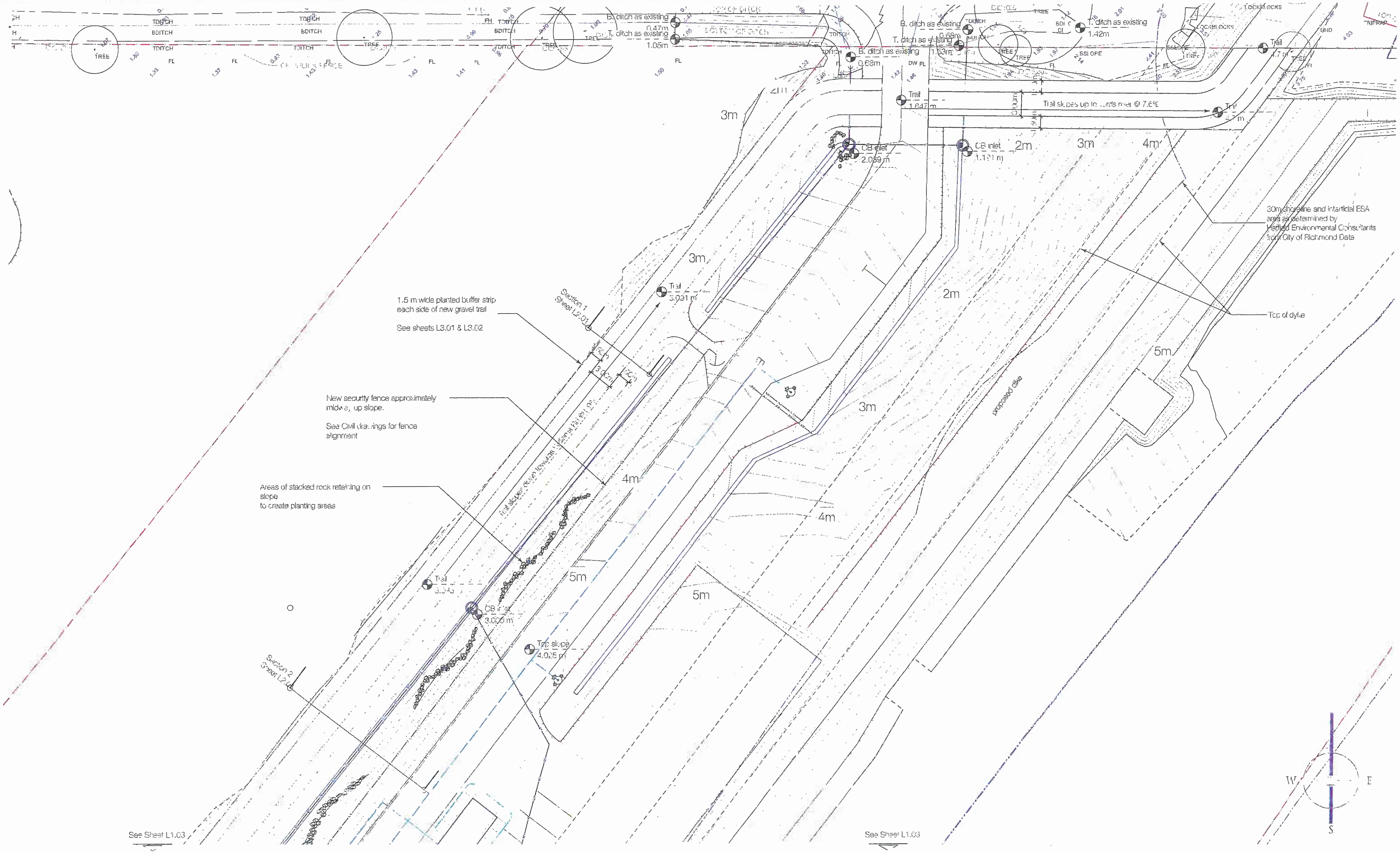
Title: OVERALL SITE LANDSCAPE WORKS

Scale: 1:500

Date: February 2017

Dwg: L0.01

Plan #15



SEP 2 7 2017

DAMON ORIENTE LTD.

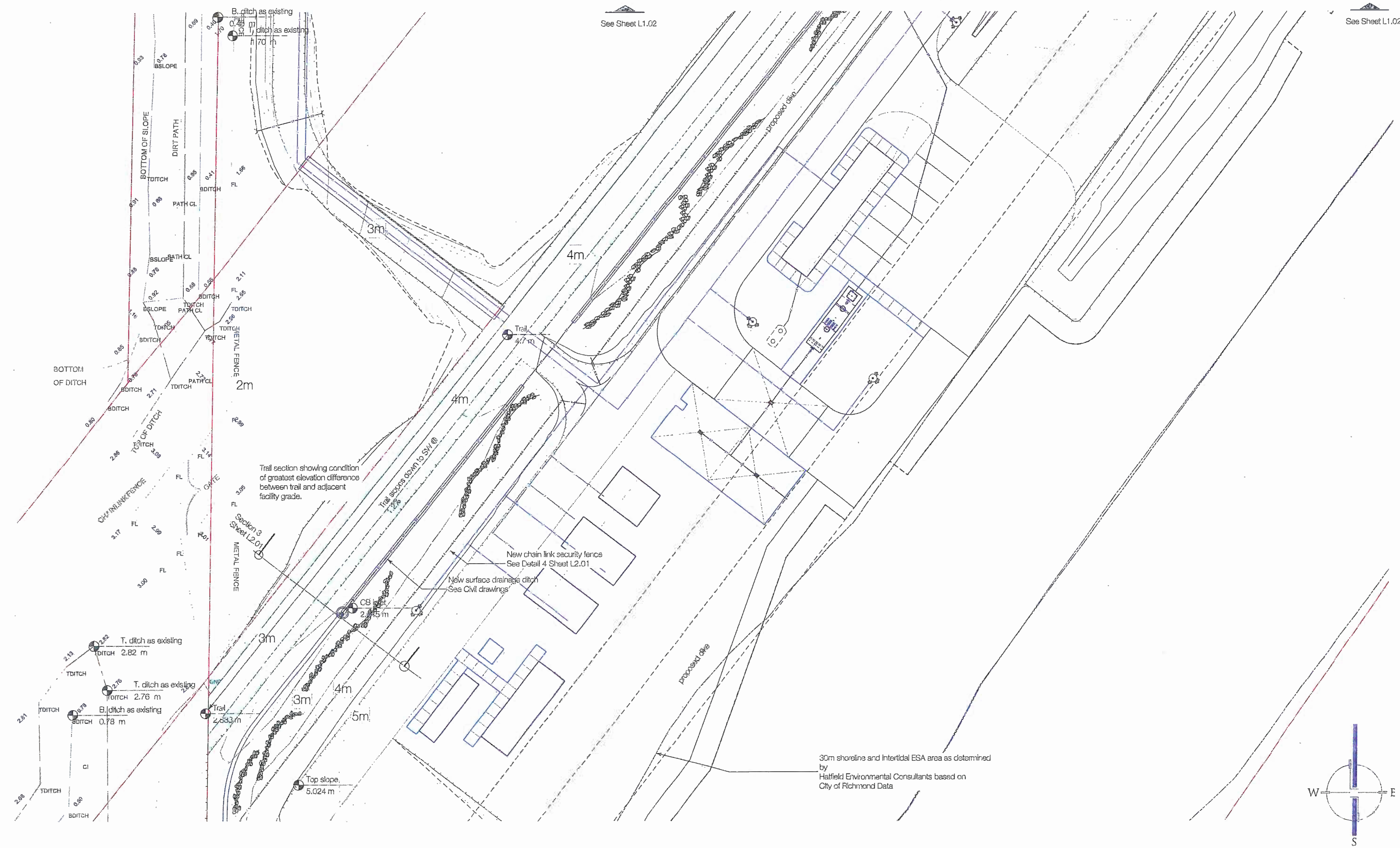
Project
VAFFC MARINE TERMINAL FACILITY

Drawing
TRAIL LAYOUT - NORTH

Scale 1:200
Date February 2017

Dwg
L1.02

Plan #16



SEP 2 7 2017

DP 15-7[illegible]

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t. 604-222-9200
f. 604-222-9212
e. [illegible]
w. damonoriente.ca

Project
VAFFC MARINE TERMINAL FACILITY
12040 Williams Road, Richmond BC

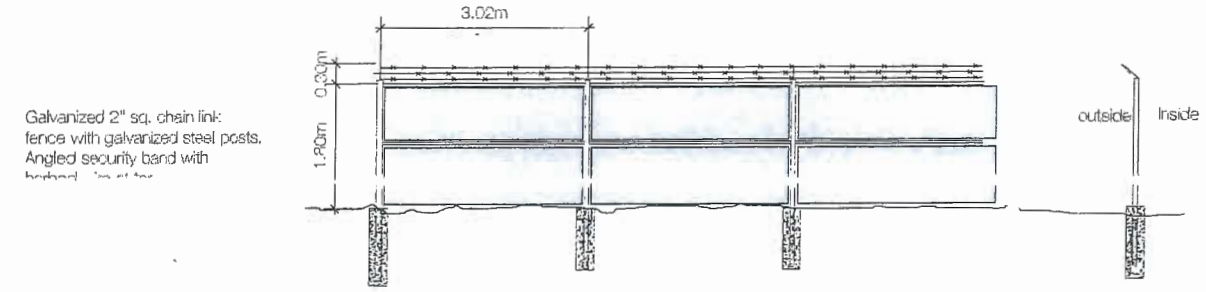
Drawing
TRAIL LAYOUT - SOUTH

Issued: 19 May 2017 Development Permit Application
30 June 2017 Development Permit Application Resubmission

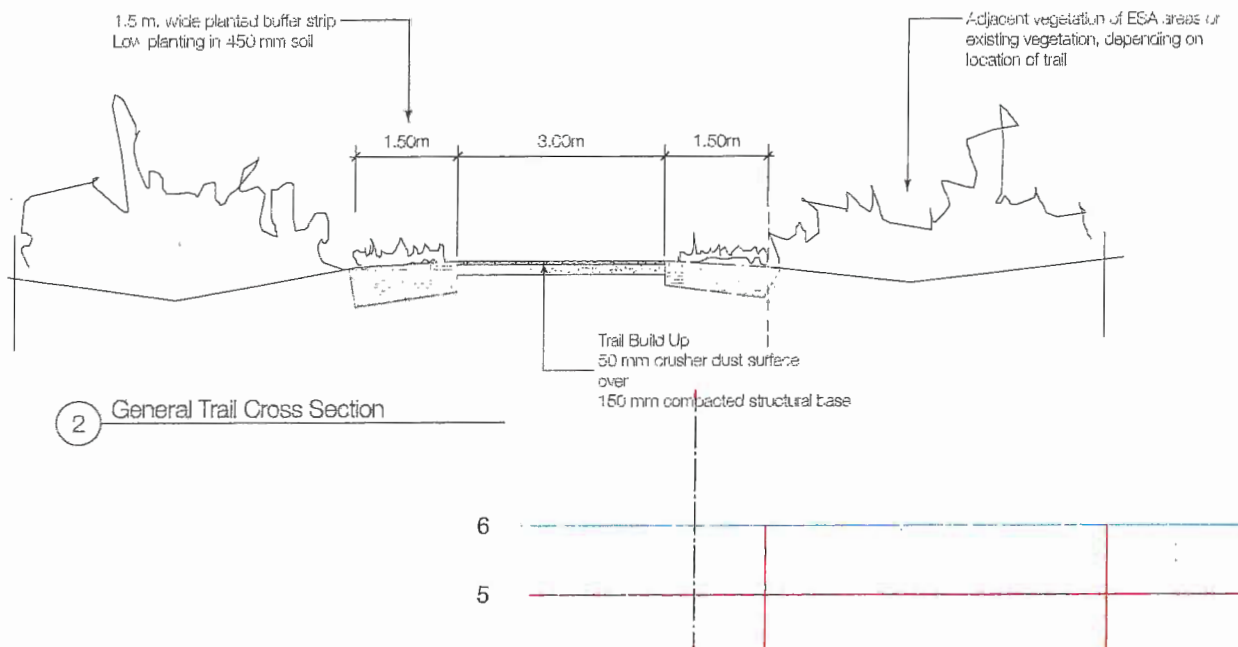
Scale: 1:200
Date: February 2017
Development Permit No: DP 15-717741
Building Permit No.
Project Number: 2014-260

Dwg
L1.03

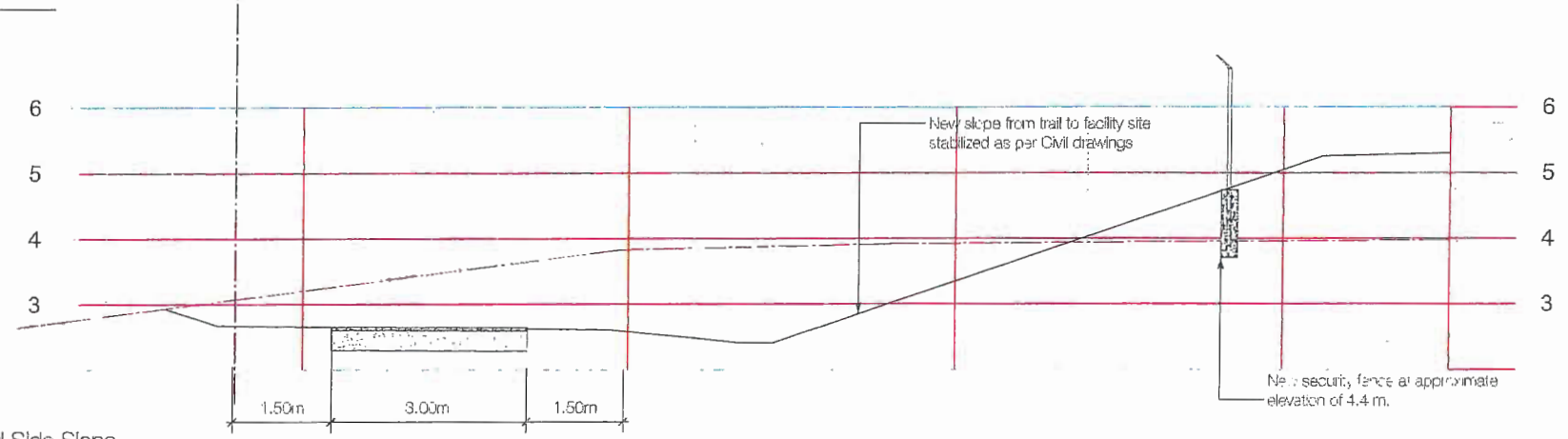
Plan #17



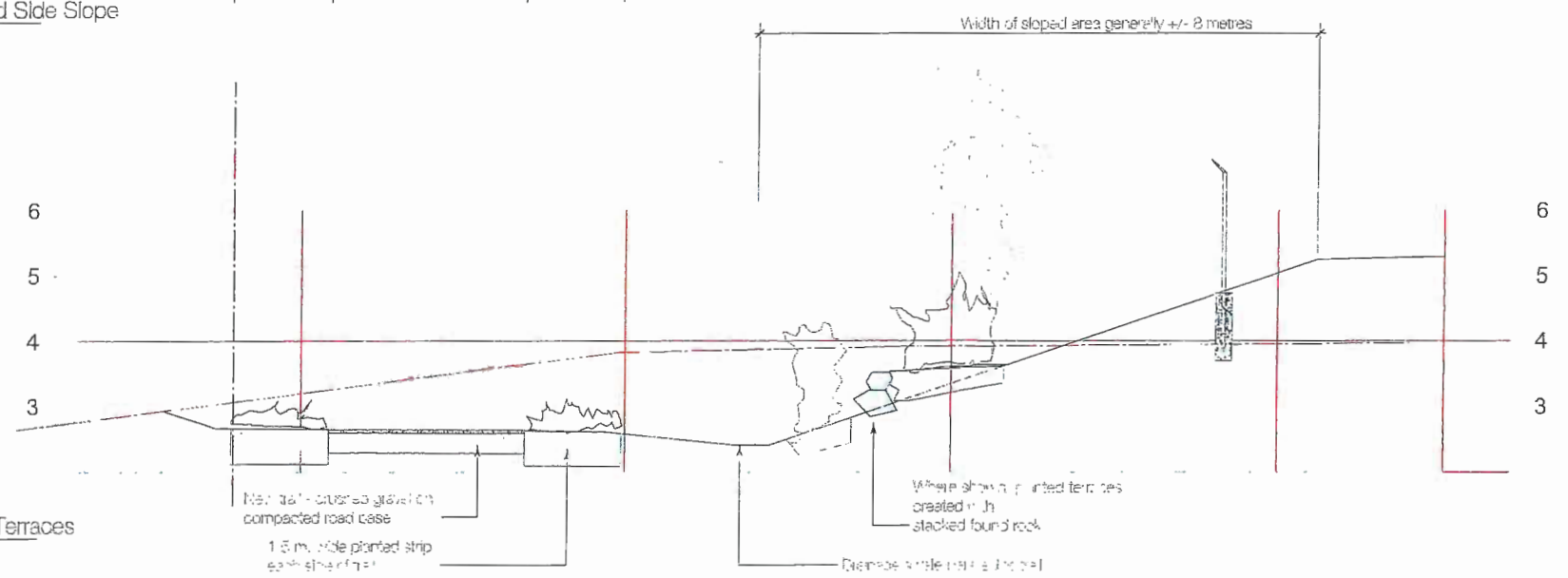
1 Security Fence - Typical



2 General Trail Cross Section



3 Trail Through Facility Site - Standard Side Slope



4 Trail Through Facility Site - Planted Terraces

SEP 27 2017

DAMON ORIENTE LTD.

Project
VAFFC MARINE TERMINAL FACILITY

Drawing
TRAIL SECTIONS

Scale 1:50
Date February, 2017
Development Permit DP 2017-1
Building Permit
Project No. 2014-060

Dwg
L2.01

Plan #18

CENTRELINE OF ROAD

EDGE OF ASPHALT

Groundcover

Groundcover and Shrubs

Groundcover and Grasses

Groundcover and Grasses

Groundcover and Shrubs

Groundcover and Shrubs

Groundcover

30 m. shoreline ESA setback line

Top of dyke

proposed dike

Building setback for dyke

See Sheet L3.02

See Sheet L3.02

Trail Buffer Planting Areas Key

Trail Planting 1 - Groundcover

Au	Arctostaphylos uva-ursi	Kinnikinnick	4 plants per sq. m.
Fc	Fragraria chiloensis	Coastal strawberry	4 plants per sq. m.

Trail Planting 2 - Groundcover & Grasses

Au	Arctostaphylos uva-ursi	Kinnikinnick	2 plants per sq. m
Pg	Elymus glaucus	Blue lyme grass	3 plants per sq. m
Lm	Leymus mollis	Dune grass	3 plants per sq. m

Trail Planting 2 - Groundcover & Shrubs

Rosa	Rosa gymnocarpa	Baldhip rose	1 plants per sq. m
Rhg	Rhus glabra	Smooth sumac	0.5 plants per sq. m.
Phl	Philadelphus lewisii	Mock orange	0.25 plants per sq. m.
Au	Arctostaphylos uva-ursi	Kinnikinnick	2 plants per sq. m

W E S

SEP 27 2017

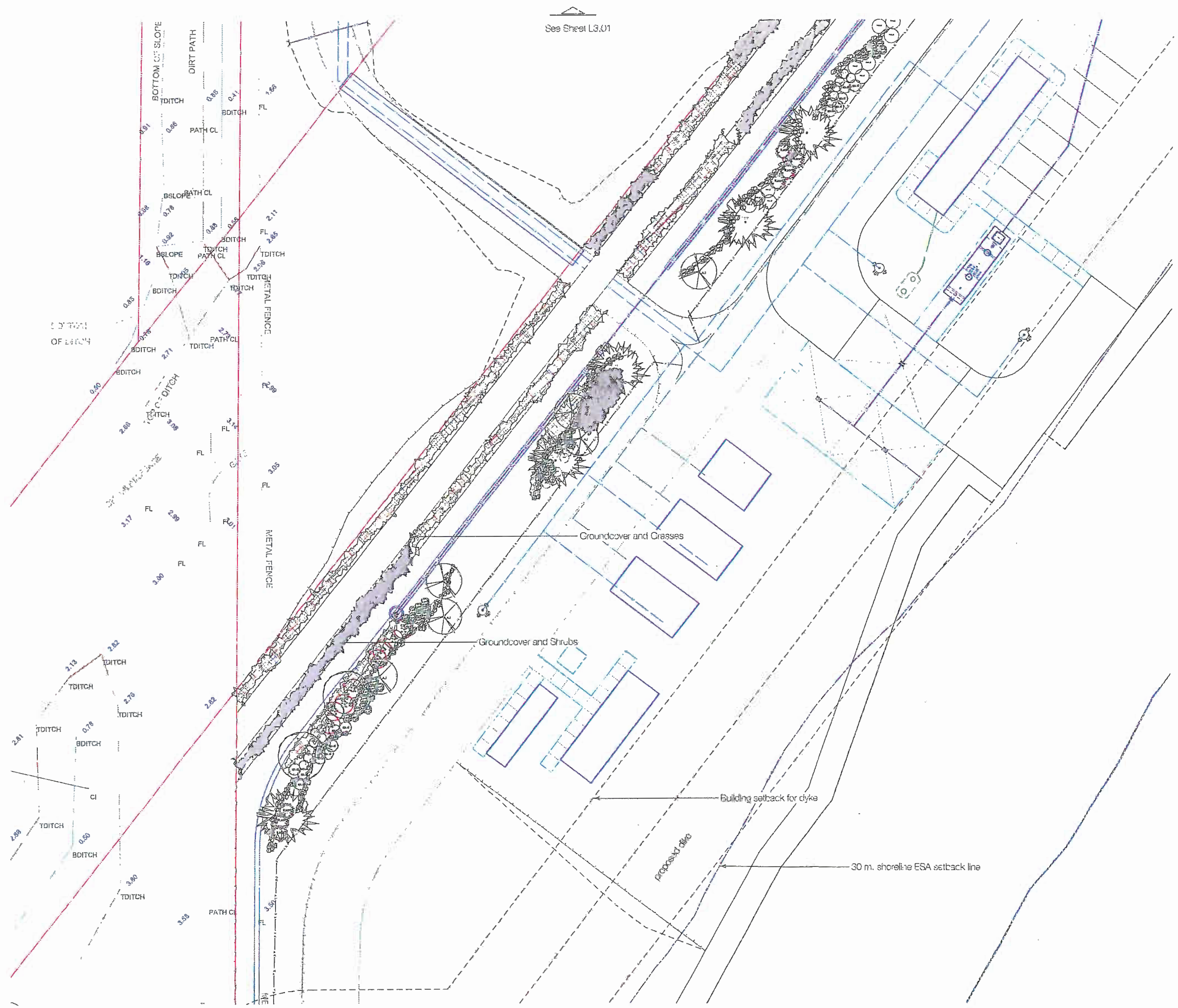
DAMON ORIENTE LTD.

Project
VAFFC MARINE TERMINAL FACILITY

Drawing
TRAIL PLANTING AREA 1

Dwg
L3.01

Plan #19



General Planting Areas Key

Trail Planting 1 - Groundcover

Code	Botanical name	Common name
au	Arctostaphylos uva-ursi	Kinnikinnick
fc	Fragaria chiloensis	Coastal strawberry

Trail Planting 2 - Groundcover & Grasses

Code	Botanical name	Common name
au	Arctostaphylos uva-ursi	Kinnikinnick
Eg	Elymus glaucus	Blue lyme grass
Lm	Leymus mollis	Dune grass

Trail Planting 3 - Groundcover & Shrubs

Code	Botanical name	Common name
Rosa	Rosa gymnocarpa	Baldhip rose
Rhg	Rhus glabra	Smooth sumac
Ph	Philadelphus lewisii	Mock orange
au	Arctostaphylos uva-ursi	Kinnikinnick

SEP 2 7 2017

DP

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landscape architects

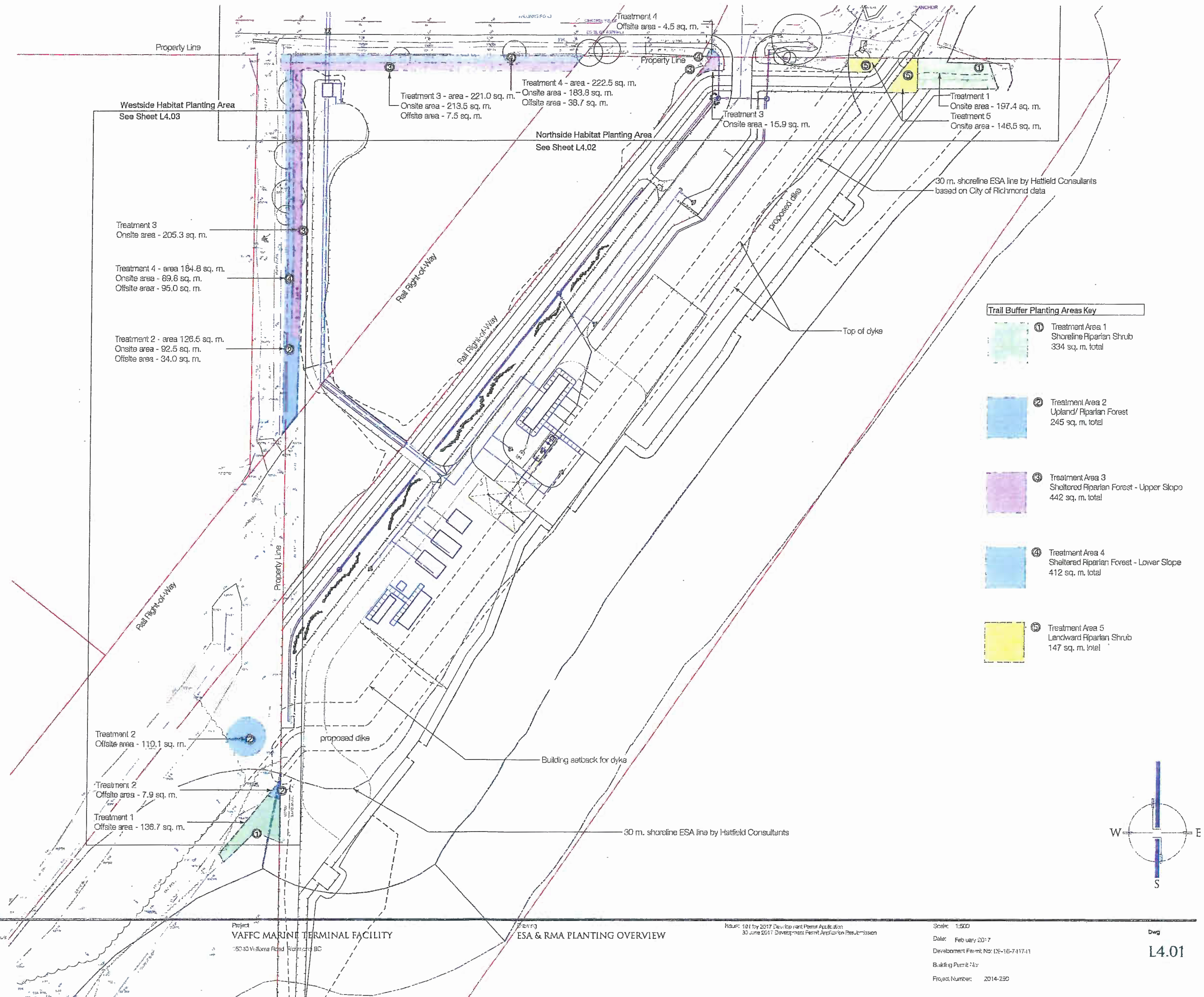
Project
VAFFC MARINE TERMINAL FACILITY

Drawing
TRAIL PLANTING AREA 2

Scale: 1:250
Date: February 2017
Project Number: 1314-290

Dwg
L3.02

Plan # 20



SEP 2 7 2017

DP 15-714741

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landscape architects

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Project
VAFFC MARINE TERMINAL FACILITY
15040 Williams Road Richmond BC

Drawing
ESA & RMA PLANTING OVERVIEW

Issue: 10 Feb 2017 Development Permit Application
30 June 2017 Development Permit Application Resubmission

Scale: 1:500
Date: February 2017
Development Permit No: DP-16-741741
Building Permit No:
Project Number: 2014-230

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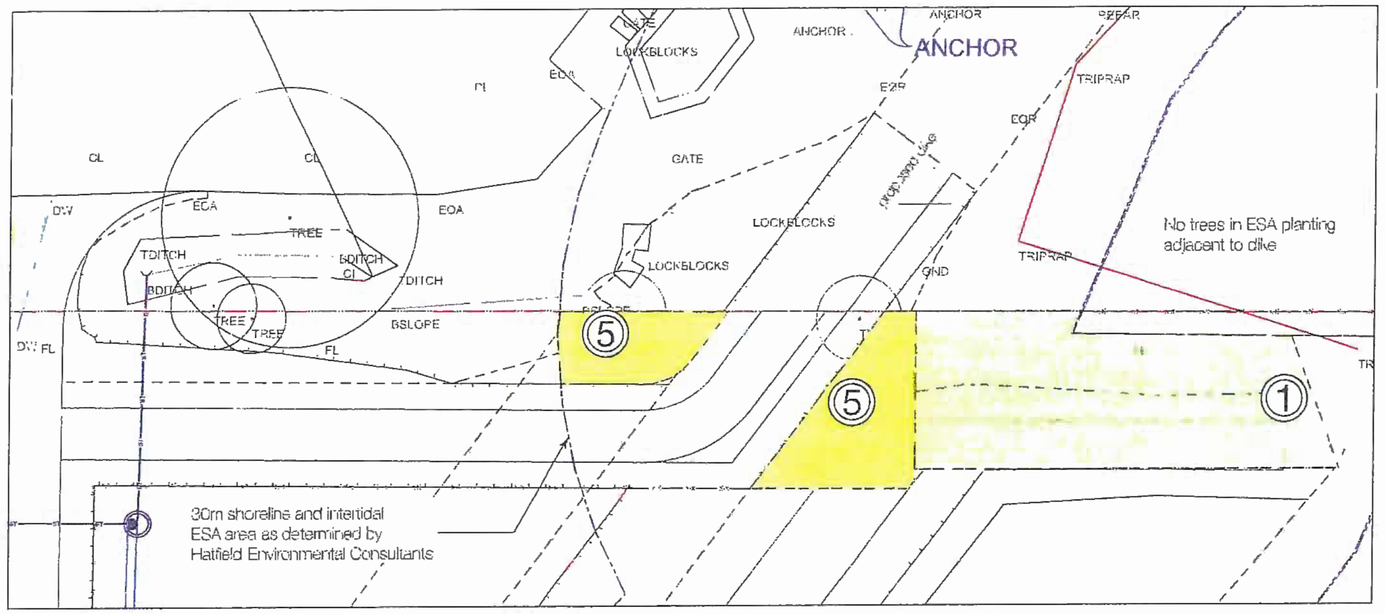
L4.01

Plan #21



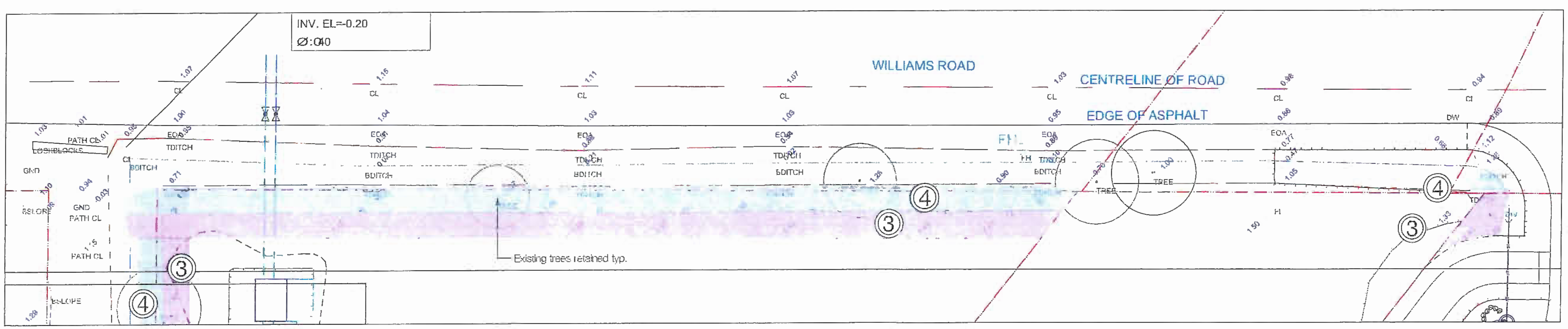
1 Northeast Shoreline ESA Areas

Treatment Area 1 - Shoreline Riparian Shrub

- Mahonia nervosa
- Rubus parviflorus
- Rubus spectabilis
- Spirea douglasii
- Symphoricarpus albus

Treatment Area 5 - Landward Riparian Shrub

- Alnus rubra
- Rubus parviflorus
- Rubus spectabilis
- Ribes sanguineum
- Sambucus racemosa



2 Willams Road RMA Areas

Treatment 3 Sheltered Riparian Forest - Upper Slope

- Alnus rubra
- Acer circinatum
- Populus trichocarpa
- Thuja plicata
- Tsuga heterophylla
- Physocarpus albus
- Polystichum munitum
- Rubus spectabilis

Treatment 4 Sheltered Riparian Forest - Lower Slope

- Cornus stolonifera
- Physocarpus albus
- Rubus spectabilis
- Salix sitchensis
- Spirea douglasii
- Symphoricarpus albus

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NORTH SIDE ESA & RMA PLANTING

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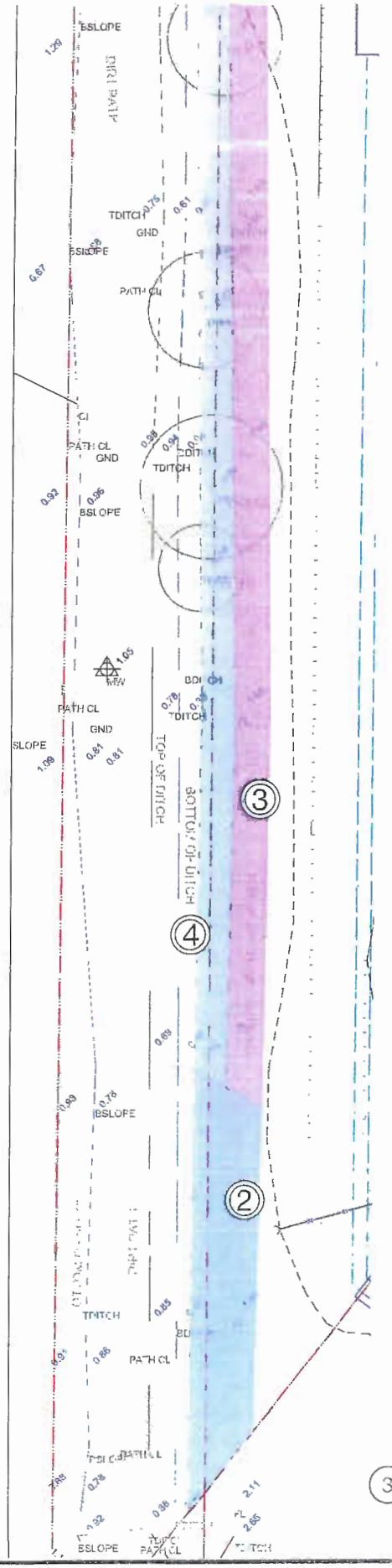
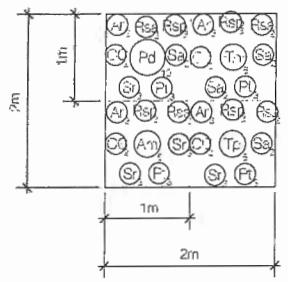
Plan #22

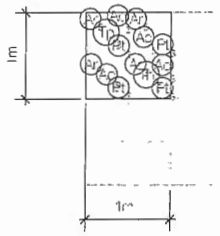


Treatment 2 - Upland/ Riparian Forest



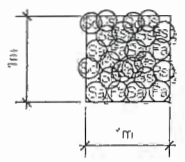
- Acer macrophyllum
- Alnus rubra
- Populus trichocarpa
- Pseudotsuga douglasii
- Thuja plicata
- Tsuga heterophyla
- Corylus cornuta v. Californica
- Rubus spectabilis
- Ribes sanguineum
- Sambucus racemosa
- Symphoricarpus albus

Treatment 3 - Sheltered Riparian Forest - Upper Slope



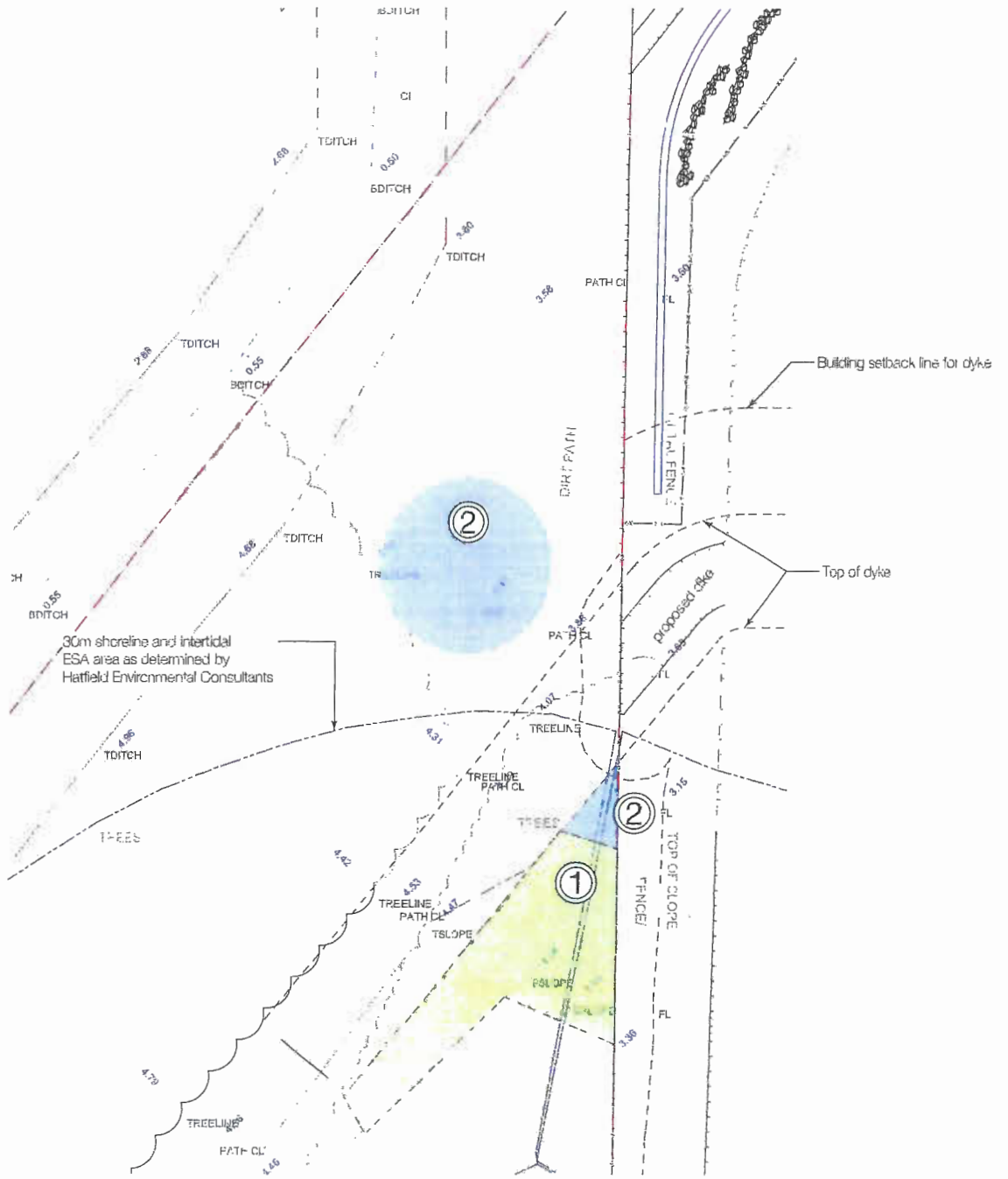
- Alnus rubra
- Acer circinatum
- Populus trichocarpa
- Thuja plicata
- Tsuga heterophyla
- Physocarpus albus
- Polystichum munitum
- Rubus spectabilis
- Symphoricarpus albus

Treatment 4 - Sheltered Riparian Forest - Lower Slope

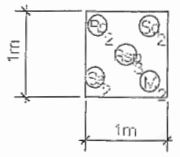


- Cornus stolonifera
- Physocarpus albus
- Rubus spectabilis
- Salix sitchensis
- Spirea douglasii
- Symphoricarpus albus

3 Savage Road R.O.W RMA Areas

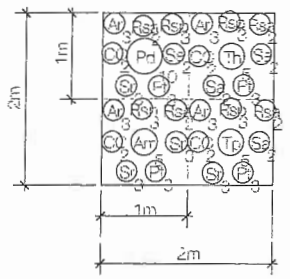


Treatment Area 1 - Shoreline Riparian Shrub

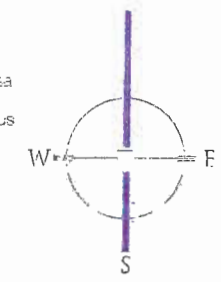


- Mahonia nervosa
- Rubus perviflorus
- Rubus spectabilis
- Spirea douglasii
- Symphoricarpus albus

Treatment Area 5 - Landward Riparian Shrub



- Acer macrophyllum
- Alnus rubra
- Populus trichocarpa
- Pseudotsuga douglasii
- Thuja plicata
- Tsuga heterophyla
- Corylus cornuta v. Californica
- Rubus spectabilis
- Ribes sanguineum
- Sambucus racemosa
- Symphoricarpus albus



4 Southwest Corner ESA Area

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Project
VAFFC MARINE TERMINAL FACILITY

Drawing
WESTSIDE ESA & RMA PLANTING

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Plan #23

Plant List for ESA, RMA Planting Areas

Trees

ID	Quantity	Latin Name	Common Name	Scheduled Size	Notes
	0				
	80	Acer circinatum	Vine maple	#3 pot	
	7	[illegible]	[illegible]	[illegible]	
	112	Alnus rubra	Red alder	#3 pot	
	17	Corylus cornuta var. 'Californica'	Beaked hazlenut	#2 pot	
	74	Populus trichocarpa	Black cottonwood	#3 pot	
	4	Pseudotsuga menziesii	Douglas fir	#10 pot	
	13	Thuja plicata	Western redcedar	#5 pot	
	12	Tsuga heterophylla	Western hemlock	#5 pot	

Shrubs & Herbs

ID	Quantity	Latin Name	Common Name	Scheduled Size	Notes
	0				
	62	Cornus stolonifera	Redosier dogwood	#2 pot	
	33	Mahonia nervosa	Dull Oregon grape	#2 pot	
	72	Physocarpus albus	Pacific ninebark	#2 pot	
	40	Polystichum munitum	Swordfern	#2 pot	
	34	Ribes sanguineum	Red flowering currant	#2 pot	
	55	Rubus parviflorus	Thimbleberry	#2 pot	
	450	Rubus spectabilis	Salmonberry	#2 pot	
	69	Sambuccus racemosa	Red elderberry	#2 pot	
	62	Salix sitchensis	Sitka willow	#2 pot	
	149	Spiraea douglasii	Steeplebush	#2 pot	
	148	Symphorocarpus albus	Snowberry	#2 pot	

Plant List for Trail Buffer Planting Areas

Shrubs & Herbs

ID	Quantity	Latin Name	Common Name	Scheduled Size	Notes
	0				
	80	Mahonia aquafolium	Oregon grape	#2 pot	
	324	Mahonia nervosa	Dull Oregon grape	#2 pot	
	325	Rosa gymnocarpa	Baldhip rose	#2 pot	

Groundcover & Grasses

ID	Quantity	Latin Name	Common Name	Scheduled Size	Notes
	0				
	1740	Arctostaphylls uva-ursi	Kinnikinnick	10 cm pot	
	1395	Elymus glacus	Blue lyme grass	10 cm pot	
	160	Fragraria chiloensis	Coastal straberry	10 cm pot	
	1365	Leymus mollis	Dune grass	10 cm pot	

Plant List for On-site Slope Areas Adjacent to the Trail

Trees

ID	Quantity	Latin Name	Common Name	Scheduled Size	Notes
A.l	11	Amelanchier laevis	Allegheny Serviceberry	#5 pot	
Be.pap	2	Betula papyrifera	Paper birch	#2 pot	
P.con	5	Pinus contorta	Shore pine	#10 pot	

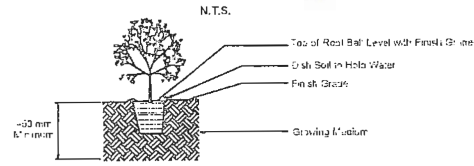
Shrubs

ID	Quantity	Latin Name	Common Name	Scheduled Size	Notes
cs	8	Cornus sericea 'stolonifera'	Redosier Dogwood	#2 pot	
gs	21	Gaultheria shallon	Salal	#1 pot	
Hol.d	10	Holodiscus discolor	oceanspray	#2 pot	
M.aq	5	Mahonia aquafolium	Oregon grape	#2 pot	
pm	43	Polystichum munitum	Western swordfern	#1 pot	
R.san	13	Ribes sanguineum 'King Edward VII'	King Edward VII Flowering Currant	#2 pot	
sp.d	13	Spiraea douglasii	Hardhack spiraea	#2 pot	
	0				

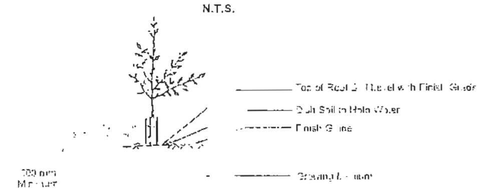
General Landscape Specifications

- Areas requiring topsoil shall be fine graded by taking out spoil material and debris such as rocks, asphalt and concrete over 50 mm in diameter, and scarified to a minimum depth of 150 mm immediately before placing topsoil.
- Topsoil and any amendments to the growing medium shall meet the criteria described in the British Columbia Landscape Standards for background (natural) areas (refer to adjacent table for particle size, acidity and drainage specifications).
- Topsoil shall be tested by an accredited soil testing laboratory, prior to delivery.
- Screened topsoil must be applied with a minimum thickness of 450 mm in shrub planting areas and 600 mm in treed areas. Topsoil must be free of subsoil, wood (including woody plant parts) toxic materials, stones over 30 mm, foreign objects, propagules of plant species designated as noxious under the BC Weed Control Act and Regulation and other invasive or undesirable plant species.
- All plant material that has not been salvaged from the construction footprint shall be of guaranteed nursery stock, densely branched, well-established (minimum leaf density of 50 %), free of invasive/noxious plant material and meet the criteria specified in City of Richmond Engineering and Public Works Department Supplementary Specifications and Detail Drawings, Version 3, 2016, Schedule G – Tree Planting on Sidewalks and Boulevards (they replace the specifications in Sec on 32 93 01 – Planting of Trees, Shrubs, and Ground Covers in the MMCD Platinum Edition).
- Plants in containers shall have a well-established root system, reaching the sides of the container but not being root bound. Soil must hold together when a plant is removed from its container.
- The City of Richmond's Engineering and Public Works department must be notified once nursery stock has arrived on site, for inspection prior to planting. Fall planting (following the last drought period in September or October), or spring planting (March or April) is recommended.
- Native trees, shrubs and herbs must be set plumb and fully immersed in growing medium, such that the top of the rootball is set at or slightly above the finished grade. Planting wells will be established to increase the capture and retention of water. The soil around each new plant will be tamped and watered in layers. Trees will be securely staked on both sides.
- The soil must be raked once the revegetation work is complete. A fall rye should be spread in the enhancement areas to prevent erosion and provide some shelter for new plants until they become fully established.
- Habitat enhancement works should be supervised by a certified landscape architect (or horticulturalist) to ensure compliance with the BC Landscape Standards and City and Richmond specifications for the planting of trees, shrubs, and ground cover.
- The contractor shall provide maintenance including watering, removal of invasive species and replacement of dead stock for a period of three (3) years following planting.

Typical Container Shrub Planting Detail
N.T.S.



Typical Container Tree Planting Detail
N.T.S.



Topsoil (growing medium) specifications.

Soil Attribute	Criteria
Gravel 2 - [illegible] mm	≤ 10% of dry weight
Sand 0.05 - 2 mm	30 - 70% of dry weight
Silt and clay combined	Max of [illegible] of dry weight
Organic content	10 - 2[illegible] of dry weight
Hydraulic conductivity	2 [illegible]
pH	4.5 – 7.0

Hatfield	Vancouver Airport Fuel Delivery Project – Habitat Enhancement On/By Marine Terminal		
DESIGN: LD	DRAWN: TK	PROFESSIONAL SEAL	DRAWING NUMBER: 6773-01
REVISION: 0	DATE: Feb 2, 2017		

Treatment 1 (Shoreline Riparian Shrub) – 197 m²

Common name	Botanical Name	% of Area	Stock Size	Planting Density
Salmonberry	*Rubus spectabilis*	50	No. 3 pot	1 plant per 1 m²
Thimbleberry	*Rubus parviflorus*	10	No. 2 pot	1 plant per 1 m²
Steeplebush	*Spirea douglasii*	20	No. 2 pot	1 plant per 1 m²
Snowberry	*Symphoricarpos albus*	10	No. 2 pot	1 plant per 1 m²
Dull Oregon Grape	*Mahonia nervosa*	10	No. 2 pot	1 plant per 1 m²

Treatment 2 (Upland/Riparian Forest) – 246 m²

Common name	Botanical Name	% of Area	Stock Size	Planting Density
Coastal Douglas-fir	*Pseudotsuga douglasii*	6	No. 10 pot	1 plant per 4 m²
Western redcedar	*Thuja plicata*	6	No. 5 pot	1 plant per 4 m²
Western hemlock	*Tsuga heterophylla*	7	No. 5 pot	1 plant per 4 m²
Bigleaf maple	*Acer macrophyllum*	6	No. 5 pot	1 plant per 2 m²
Red alder	*Alnus Rubra*	17	No. 3 pot	1 plant per 1 m²
Black cottonwood	*Populus trichocarpa*	12	No. 3 pot	1 plant per 1 m²
Salmonberry	*Rubus spectabilis*	14	No. 3 pot	1 plant per 1 m²
Beaked hazelnut	*Corylus cornuta var. Californica*	7	No. 2 pot	1 plant per 1 m²
Red elderberry	*Sambucus racemosa*	15	No. 3 pot	1 plant per 1 m²
Red-flowering currant	*Ribes sanguineum*	5	No. 2 pot	1 plant per 1 m²
Snowberry	*Symphoricarpus albus*	7	No. 2 pot	1 plant per 1 m²

Treatment 3 (Sheltered Riparian Forest – Upper Slope) – 442 m²

Common name	Botanical Name	% of Area	Stock Size	Planting Density
Western redcedar	*Thuja plicata*	8	No. 5 pot	1 plant per 4 m²
Western hemlock	*Tsuga heterophylla*	7	No. 5 pot	1 plant per 4 m²
Red alder	*Alnus Rubra Populus*	10	No. 3 pot	1 plant per 1 m²
Black cottonwood	*trichocarpa Rubus*	10	No. 3 pot	1 plant per 1 m²
Salmonberry	*spectabilis*	23	No. 3 pot	1 plant per 1 m²
Pacific ninebark	*Physocarpus albus*	7	No. 2 pot	1 plant per 1 m²
Vine maple	*Acer circinatum*	16	No. 3 pot	1 plant per 1 m²
Snowberry	*Symphoricarpos albus*	8	No. 2 pot	1 plant per 1 m²
Sword fern	*Polystichum munitum*	9	No. 2 pot	1 plant per 1 m²

Treatment 4 (Sheltered Riparian Forest – Lower Slope) – 412 m²

Common name	Botanical Name	% of Area	Stock Size	Planting Density
Redosier dogwood	*Cornus stolonifera*	15	No. 2 pot	1 plant per 1 m²
Sitka willow	*Salix sitchensis*	15	No. 2 pot	1 plant per 1 m²
Salmonberry	*Rubus spectabilis*	25	No. 2 pot	1 plant per 1 m²
Pacific ninebark	*Physocarpus albus*	10	No. 2 pot	1 plant per 1 m²
Snowberry	*Symphoricarpos albus*	15	No. 2 pot	1 plant per 1 m²
Steeplebush	*Spirea douglasii*	20	No. 2 pot	1 plant per 1 m²

Treatment 5 (Landward Riparian Shrub) – 147 m²

Common name	Botanical Name	% of Area	Stock Size	Planting Density
Red alder	*Alnus rubra*	18	No. 2 pot	1 plant per 1 m²
Red elderberry	*Sambucus racemosa*	22	No. 3 pot	1 plant per 1 m²
Salmonberry	*Rubus spectabilis*	30	No. 2 pot	1 plant per 1 m²
Thimbleberry	*Rubus parviflorus*	15	No. 2 pot	1 plant per 1 m²
Red-flowering currant	*Ribes sanguineum*	15	No. 2 pot	1 plant per 1 m²

Hatfield	Vancouver Airport Fuel Delivery Project – Habitat Enhancement On/By Marine Terminal		
DESIGN: LD	DRAWN: TK	PROFESSIONAL SEAL	DRAWING NUMBER: 6773-01
REVISION: 1	DATE: June 26, 2017		

SEP 2 7 2017

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VAFFC MARINE TERMINAL FACILITY

SPECIFICATION NOTES AND PLANT LISTS

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Plan #24

Table 1 Habitat Balance Sheet for the Marine Terminal Site Development.

Location	Existing	Post-construction	Net Change	Enhancement Area	Comments
	Habitat (m^2)				
Habitat Impact Summary					
Marine Terminal Property					
Shoreline ESA	208.0	344.0	+136.0	+344.0	Existing ESA is an area of fill and gravel, and largely barren. Two young trees and one small marginal habitat patch containing native red alder and black cottonwood saplings with an understory of invasive shrubs and herbs will be lost to development. A 2.4:1 compensation for this loss will be achieved by enhancing Shoreline ESA in northeast corner of the property (344 m^2) and adjacent to the property (see below). Overall, 70% of ESA enhancement works would be onsite.
Intertidal ESA	Refer to comments				Green-coded low productivity habitat. Replacing the 3,256 m^2 wharf structure with clean, stable bank armour will restore approximately 36,000 m^3 of open river flow environment and provide approximately 3,800 m^3 of new, stable micro-refugia for flora and fauna. Upgrading concrete rubble rip-rap on either side of the existing wharf footprint will improve stability and quality of substrate refugia over 4,400 m^3 (total of 8,000 m^3 at base of slope along marine terminal property).
Williams Road RMA	176.3	413.2	+236.9	+413.2	These RMAs are degraded by invasive species and dust generated by the high volume of Ecowaste truck traffic. Only the trees are native and these will not be eliminated by the development. Although there is no defensible ecological rationale for it, 2.2:1 habitat compensation is proposed, by removing the existing fences to restore the full 5 m width of each RMA, and by regrading the sites and replacing invasive shrubs and herbs with native vegetation. Overall, 82% of RMA enhancement works would be onsite.
Savage Road RMA (inferred)	95.0	387.6	+292.6	+387.6	
Proposed Habitat Compensation					
Adjacent to Property					
Shoreline ESA	N/A	N/A	N/A	+144.6	To further compensate for marginal habitat loss from the marine terminal property Shoreline ESA, invasive plants southwest of the property, by red-coded intertidal habitat, will be replaced with native plants.
Williams Road RMA	50.7	50.7	0	50.7	A portion of the RMAs are beyond the property boundary, which will thus involve limited offsite enhancement work (11% for Williams Road RMA; 25% for Savage Road RMA).
Savage Road RMA (inferred)	129.0	129.0	0	129.0	
Upland Habitat	N/A	N/A	N/A	+110.1	A portion of the CN ROW in the Williams Road RMA will be compensated for by replacing invasive species with native ones between the Savage Road RMA and Shoreline ESA, as a contribution to the local Ecological Network (the remaining 72 m^2 of the ROW compensation was shifted to the onsite Shoreline ESA).
Gains and Losses					
Terrestrial Habitat				+1,579.2 m^2	2:1 habitat enhancement in Shoreline ESAs for a 208 m^2 onsite shoreline disturbance and a portion of the Williams RMA overlapping with the CN ROW (53% on site). Approximately 2:1 habitat compensation and enhancement to RMAs (54% on site).
Aquatic Habitat				+3,800.0 m^3	Improvements to Intertidal ESA by replacing vertical steel-pile wharf with clean, stable bank armour.

This schedule is reprinted from the
ESA and RMA Environmental Impacts Report
by
Hatfield Environmental Consultants

ATTACHMENT B

Hatfield
CONSULTANTS

MEMO

Date:	October 31, 2017	HCP Ref No.: VAFFC6773
From:	Hatfield Consultants	
To:	Mark McCaskill, FSM Management Group Inc.	
Subject:	Vancouver Airport Fuel Delivery Project: City of Richmond Development Permit Panel Session – Memorandum Addressing Outstanding Staff Comments on VAFFC DP-16-741741	

This memorandum is in response to City of Richmond's Development Permit (DP) Panel comments at the October 11, 2017, panel session.

The Panel moved and seconded that the DP application (DP-16-741741) be referred back to staff:

1. for the applicant to work with staff to:

   a) review the proposed mitigation, compensation and enhancement scheme for the Shoreline Environmentally Sensitive Area (ESA) based primarily on existing ESA condition in the subject site, and investigate opportunities for additional on-site ESA planting;

   b) review the proposed compensation/enhancement planting scheme for the Shoreline ESA and consider introducing more mature and substantive planting;

   c) consider introducing some planting in the Intertidal ESA in addition to the proposed removal of existing and development/construction of new structures and shoreline within the shoreline and intertidal ESA;

   d) investigate opportunities for further on-site ESA compensation and enhancements especially within the Shoreline ESA and other areas along the proposed public trail and in the northern portion of the site in addition to the proposed off-site ESA enhancements; and

2. for staff to review the adequacy of the pedestrian viewing platform cash-in-lieu contribution and report back (note, this is not included in the scope of this memorandum).

The Project Team has since worked with City staff to ensure the Panel's comments have been adequately addressed, as follows:

1. ***Review the proposed mitigation, compensation and enhancement scheme for shoreline ESA based primarily on existing ESA condition in the subject site and investigate opportunities for additional on-site ESA planting***

The mitigation, compensation and enhancement scheme for the Shoreline ESA has been reviewed and additional on-site ESA planting is proposed. Because the entire coastline of the City constitutes a City-

designated ESA regardless of land cover, the Panel requested that the portion of the existing, barren land that overlaps with this Shoreline ESA designation be subject to additional planting as much as possible. With safety, dike integrity, and operational constraints in mind, the following additional on-site planting is proposed in this ESA:

- The southwest corner of the Shoreline ESA on the site will be planted with additional trees at the core, and additional shrubs and herbs around the periphery for a total of **352 m²**. A mix of tall- and short-growing shrubs will be interspersed among the trees, and along the edge of the tree patch to the north and southeast. Dwarf shrubs and herbs will be most suitable along the fence line to not interfere with site security monitoring measures. The additional planting in this corner of the ESA will also enhance the value of the proposed adjacent offsite compensation area bordering the high-productivity shoreline zone downstream.
- An additional **350 m²** strip of short shrubs and herbs will be planted in the northeast corner of the Shoreline ESA behind the mooring structure, to further contribute to the local Ecological Network of the neighbouring onsite and offsite compensation areas, which border a moderately-productive shoreline zone.

This additional **702 m²** of on-site Shoreline ESA planting is illustrated in the attached schematic drawing. It will result in three times as much onsite planting in the Shoreline ESA (**1,046 m²** instead of 344 m²) compared with the initial proposal, which represents a **5.1:1** onsite plant replacement ratio for the 208 m² patch of native vegetation currently on the property (and a **5.7:1** ratio overall with offsite habitat enhancement works, compared to the previous 2.4:1 ratio).

2. ***Review the proposed compensation/enhancement planting scheme for the shoreline ESA and consider introducing more mature and substantive planting***

The new treed planting area in the onsite Shoreline ESA will include one Douglas-fir and two hemlocks of a Class 15 pot size. In the previous treed compensation areas, 6 Douglas-firs will be increased in size from Class 10 to Class 15 pots; 14 western hemlocks (*Tsuga heterophylla*) and 14 western redcedars (*Thuja plicata*) will be increased in size from Class 5 to Class 15 pots accordingly. Conifers can be increased slightly to a Class 15 pot size but deciduous trees are best kept small. Densely planted, small trees can better outcompete Himalayan blackberry (*Rubus armeniacus*) in particular, which is a major threat to natural areas in Richmond.

To further accommodate the City's request for more substantive trees, the landscaped portions of the site (in non-ESA/RMA areas) will have larger trees consistent with ~~of~~ a decorative landscape approach, using the following balled and burlapped trees: 17 shore pines (*Pinus contorta*) and 10 Douglas-firs (*Pseudotsuga menziesii*) 3 m tall; 2 paper birch (*Betula papyrifera*) 2.5 m tall; and 15 Allegheny serviceberry trees (*Amelanchier laevis*) with a caliper of 5 cm.

3. ***Consider introducing some planting in the intertidal ESA in addition to the proposed removal of existing and development/construction of new structures and shoreline within the shoreline and intertidal ESA***

Hatfield's fisheries subject matter expert has further evaluated the scientific validity for introducing suitable planting to the newly designed Intertidal ESA verses natural re-colonization.

The likelihood of successful planting and survivorship within the Intertidal ESA is low. Direct evidence is demonstrated by the scarcity of vegetation within the existing intertidal zone at the site. Scientific literature highlights the important role environmental conditions play in long-term and sustainable establishment. The realization of including such ecological features is driven by a number factors, most notably by the defined project requirements, geomorphic processes, prevailing energy regime (i.e., hydraulic conditions), and scour conditions[1,2]. High-energy (velocity) river flows can severely impede any planting (thus ecological succession) of the intertidal area, which are conditions regularly experienced at the site. Bank stabilization systems using vegetation have not been standardized for general application under particular flow conditions. There is a lack of knowledge about the properties of the materials being used in relation to force and stress generated by flowing water and there are known impediments in obtaining consistent performance from countermeasures that rely on living materials[2].

Considering the intertidal area's limited (low) ecological productivity ("green coded"), the engineering requirements for the site development, and existing physical river conditions (e.g., river hydraulics, geomorphology, scour), this intertidal area would not benefit from introducing plants. Further, Fisheries and Oceans Canada (DFO), who are the responsible authority for the protection of fish and fish habitat in the foreshore (intertidal) and nearshore (subtidal) boundaries of the Fraser River, has reviewed the proposed site development and determined that adverse effects to fish and fish habitat (i.e., serious harm) will not result. No authorization under the *Fisheries Act* or approval under the *Species at Risk Act* are required to proceed with the site development, thus no habitat enhancement or creation (i.e., habitat offsetting) is required.

An important context for this Intertidal ESA is also provided through the City's guidance material for DP applications within City-designated ESA's highlighting that new construction within designated ESAs that will not result in damage to sensitive features within the ESA (e.g., trees, shrubs, wetlands, marshes or fish habitat) are exempt from the DP ESA process[3]. The Intertidal ESA on the site will not result in damage to any sensitive features (i.e., fish habitat as determined by DFO); rather, it will restore a large section of the intertidal area to a free-flowing environment and will create a contiguous and shallower sloped profile with improved stability, condition and ecological function.

The removal of the existing bulkhead wharf as well as the addition and re-grading of a new rip rap revetment (36,000 m^3 open river flow environment restored; 3,800 m^3 of new artificial 'reef' habitat created; and 4,000 m^3 of substrate improved) is intended to strike a balance between providing critical long-term erosional protection to the banks of the Fraser River supporting the integrity of the marine terminal infrastructure while including lower grade (i.e., shallower slope) and coarser (rougher) rock material that will afford equal or improved habitat function compared to current conditions and functionality. Rip rap revetments have their greatest benefits within brackish and salt water habitats; fill structures constructed of

---

[1] Adams, M.A. 2002. Shoreline Structures Environmental Design: A Guide for Structures Along Estuaries and Large Rivers. Fisheries and Oceans Canada, Vancouver, BC and Environment Canada, Delta< BC. 68p. + appendices.

[2] Baird, D.C., L. Fotherby, C.C. Klumpp, and S.M. Sculock. 2015. Bank Stabilization Design Guidelines. Bureau of Reclamation. Technical Services Center, Denver, Colorado. Sedimentation and River Hydraulics Group, 86-68240. Report # SRH-2015-25 277p. + appendices.

[3] https://www.richmond.ca/plandev/devzoning/permit.htm

rip rap are, in essence, an artificial reef[1] and the size of voids between rocks offers advantageous refugia for key species of fish and lower trophic organisms[1,4].

Given the rationale provided above, it is our fisheries expert's qualified professional opinion that planting within the Intertidal ESA is not supported based on the proposed engineering design criteria.

4. ***Investigate opportunities for further on-site ESA compensation and enhancements especially within the shoreline ESA and other areas along the proposed public trail and in the northern portion of the site in addition to the proposed off-site ESA enhancements***

Opportunities for further onsite compensation and enhancements in the Shoreline ESA, along the public trail, and in the northern area of the site have been identified. Additional onsite Shoreline ESA compensation and enhancement areas are previously discussed in bullet #1.

Although the loss of a 208 m^2 patch of native vegetation in the Shoreline ESA has more than adequately been compensated for through the habitat enhancement proposed in the DP and in this memorandum, the amount of on-site landscaping will also be increased by **645 m^2** as follows: **400 m^2** in the northeast corner, next to the Shoreline ESA and the public trail leading to it, and **245 m^2** along the Williams Road RMA. This brings the total onsite landscaping to **2,053 m^2** from the existing 1,408 m^2 (**748 m^2** in the trail right-of ways, and **660 m^2** along the terraces bordering the south side of the trail). Landscape vegetation will benefit wildlife using the proposed, local compensation habitat areas, and will increase the aesthetics of the site to trail users.

In conclusion, we are of the qualified professional opinion that these additional compensation and enhancement measures on the site adequately respond to the Panel's comments, and, in combination with the offsite measures, are more than adequate from an ecological network and functionality perspective.

Sincerely,

Angus Johnston, MSc, RPBio, EP
Senior Manager and Associate Partner
Hatfield Consultants

Linda Dupuis, MSc, RPBio
Senior Manager and Biologist, Wildlife Group
Hatfield Consultants

Cory Bettles, MSc, RPBio
Senior Fisheries Manager
Hatfield Consultants

[4] Schmetterling D.A., C.G. Clancy, and T.M. Brandt. 2001. Effects of rip-rap bank reinforcement on stream salmonids in the western United States. Fisheries 26(7):6-13.

ATTACHMENT C

DAMON ORIENTE LTD.
LANDSCAPE ARCHITECTS

#306 – 4464 West 10th Avenue
Vancouver, BC, V6R 2H9
Canada

Tel: 604-222-9200
Fax: 604-222-9212
E: dvo@telus.net
W: http://www.damonoriente.ca

31 October 2017

RE: Marine Terminal Fuel Facility Site
REVISED Estimate of Landscape Construction Costs for On-Site Landscape Areas Adjacent to Trail Buffer and Expanded Landscape Areas On-Site.

This letter provides a summary of our estimate of probable landscape construction costs for the above named area. It has been prepared to cover the onsite planting areas on the slope adjacent to the on-site area of the trail. This estimate is based on the revised landscape drawings dated 31 October 2017.

We have divided the work into general categories typical for landscape construction. Each category cost is developed using material costs which have integrated allocations for delivery, installation and machine time factored in to the total item cost.

This estimate assumes that grading and necessary excavation will be performed as part of the overall site construction work, undertaken by the facility and civil works contractors. Site access is direct, with gentle slopes and direct delivery to the installation locations anticipated.

The estimated total increases from $29,903.50 to $99,177.10.

On Site Trail Slope Planting			
	Planting soil	652 cu. m.	$35,887.50
	Plants, installed	5330	$20,793.50
	Estimated Construction Cost		$56,681.00
	Maintenance for three years		$33,480.00
Subtotal			$90,161.00
Contingency at 10%			$9,016.10
Estimated Total Cost			$99,177.10

Maintenance includes watering once per week, three months per year, for three years, and weeding once per month, eight months per year, for three years.

end

DAMON ORIENTE LTD.
LANDSCAPE ARCHITECTS

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31 October 2017

RE: Marine Terminal Fuel Facility Site
REVISED Estimate of Landscape Construction Costs for Development Permit Areas

This letter provides a revised summary of our estimate of probable landscape construction costs for the above named project. It includes the onsite and offsite RMA and ESA habitat planting areas as well as the onsite trail and landscape buffer planting.

This estimate is based on the landscape drawings submitted as part of the development permit application, revised 31 October 2017. Tree sizes have been increased and additional on-site ESA areas added. The estimate total increases from $241,168.70 to $283,167.50.

We have divided the work into general categories typical for landscape construction. Each category cost is developed using material costs which have integrated allocations for delivery, installation and machine time factored in to the total item cost.

These estimates assume that the site grading and necessary excavation will be performed as part of the overall site construction work, undertaken by the facility and civil works contractors. Site access appears to be direct, with gentle slopes and direct delivery to the installation locations anticipated.

Summary Table of Area Cost Estimates		
	On Site ESA & RMA Planting	$86,673.00
	Off Site ESA & RMA Planting	$19,178.00
	On Site Trail and Buffer Strip Planting	$95,414.00
Subtotal		**$201,265.00**
	Maintenance for Three Years	$48,240.00
	Monitoring for Three Years	$7,920.00
Subtotal		**$257,425.00**
Contingency at 10%		$25,742.50
Estimated Total Cost		**$283,167.50**

The area breakdowns are on the following page.

Maintenance includes watering once per week, three months per year, for three years, and weeding once per month, eight months per year, for three years. Monitoring will be once per year by a QEP and includes an annual report.

Damon Oriente Ltd.

On Site ESA & RMA planting area		2,282 sq. m.	UPDATED
	Planting soil	925 cu. m.	$50,831.00
	Plants, installed	1876 asst'd sizes	$35,842.00
	Estimated Item Total		**$86,673.00**

Off Site ESA & RMA Planting			UNCHANGED
	Planting soil	142 cu. m.	$7,837.00
	Plants, installed	537 asst'd sizes	$11,341.00
	Estimated Item Total		**$19,178.00**

On Site Trail and Buffer Strip Planting			UNCHANGED
	Planting soil	390 cu. m.	$21,450.00
	Plants, installed	5389 asst'd sizes	$34,964.00
	Trail, gravel on compacted base	780 sq. m. (260 lin. m. x 3 m width)	$39,000.00
	Estimated Item Total		**$95,414.00**

. end

ATTACHMENT D

FSM MANAGEMENT GROUP

SOLVE • BUILD • MANAGE

VAFFC / Vancouver Airport
Fuel Facilities Corporation
AN FSM GROUP MANAGED CORPORATION

Date: July 4, 2017

David Brownlee, M.A.
Planner, Special Projects
Policy Planning Division

City of Richmond
6911 No. 3 Road,
Richmond BC V6Y 2C1

MEMORANDUM

RE: OBSERVATION PLATFORM - VANCOUVER AIRPORT FUEL DELIVERY PROJECT – CITY OF RICHMOND DEVELOPMENT PERMIT COMMENT RESPONSES

Dear David,

To follow up on our response, June 26, 2017, in regards to the comment made by the City of Richmond in regards to the requested observation platform.

As the City of Richmond has yet to provide detail in regards to the requirements of the requested observation platform FSM has enlisted a general contractor to provide a generic example of a platform design and cost.

The attached sketch and costs are based on a basic wood frame construction using standard construction practices.

Please review the attached proposal and provide detailed feedback.

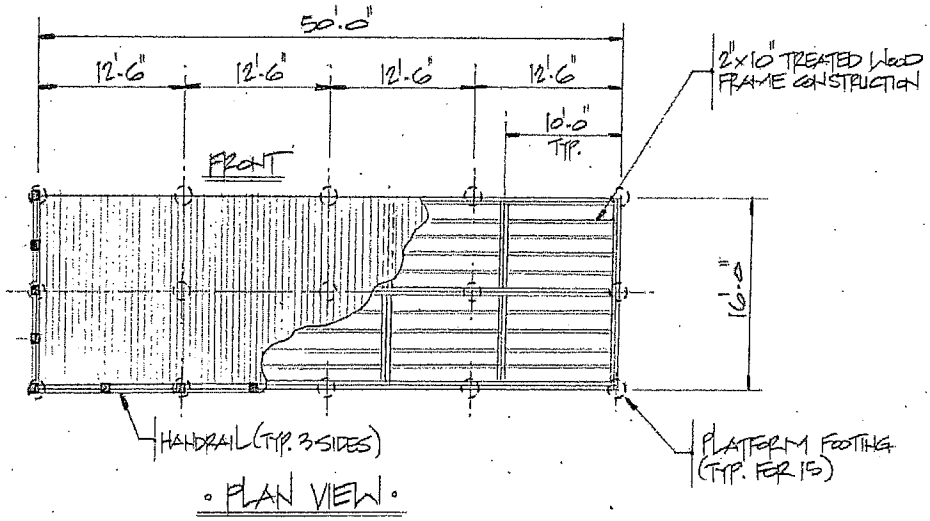
Regards,

Mark McCaskill
Sr. Project Manager

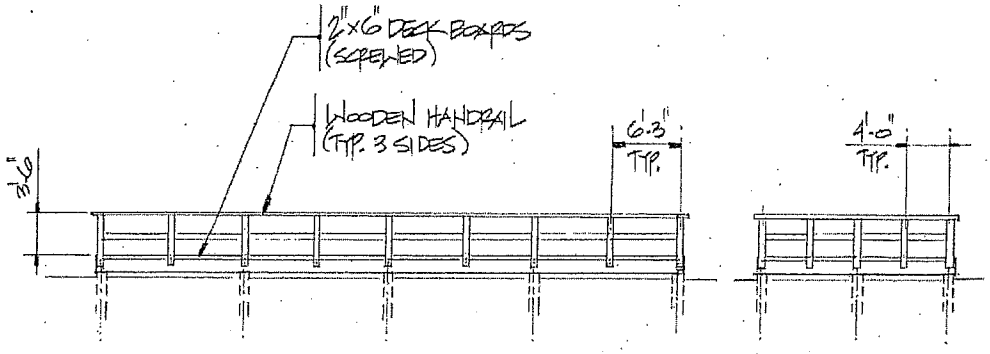
604.271.7113 PHONE | 604.271.7115 FAX | FSMGROUP.CA ONLINE | 108-12800 Horseshoe Way Richmond, BC V7A 4Z1

Reference: **Vancouver Airport Fuel Delivery Project (VAFDP)**
City of Richmond Comments on VAFFC Development Permit Application
Marine Facility - Proposed Dyke Trail Observation Platform

Budget Price for Design, Construction of 5m x 15m observation platform:	$45,910
Allowance for Appurtenances (benches, signage)	$5,500
Contingency (@ approx. 20%)	$10,210
TOTAL (rounded up)	**$62,000**



• PLAN VIEW •



• REAR ELEVATION VIEW •

• SIDE VIEW •

* NOTE: ALL LUMBER TO BE TREATED

Observation Platform - Detailed Cost Estimate

The detailed estimate, shown below, includes an allowance for benches and signage and a 20% contingency allowance. Parks Department staff have reassessed the proposed conceptual design and the associated cost estimate as acceptable for the general location.

Observation Platform - Detailed Cost Estimate

ITEM	COST ESTIMATE
Formal design and drawing	$3,500.00
Platform frame materials	$2,692.00
Finished decking materials	$2,385.00
Handrail materials	$848.00
Miscellaneous materials (joist hangers, screws, hardware and fasteners)	$1,760.00
Platform installation labour	$20,595.00
Footings supply and installation	$11,925.00
Survey (as-built)	$1,595.00
Local freight	$610.00
Allowance for Appurtenances (benches, signage)	$5,500.00
Contingency allowance (20%)	$10,210.00
Total Budget Estimate (rounded up)	$62,000.00

ATTACHMENT E

City of Richmond

Development Permit Considerations
Development Applications Department
6911 No. 3 Road, Richmond, BC V6Y 2C1

Address: 15040 Williams Road **File No.:** DP 16-741741

Prior to approval of the Development Permit, the developer is required to complete the following:

1. Receipt of a Letter of Credit/security for $361,248.80 inclusive of the following:
   - On-site ESA and RMA landscaping in the amount of $86,673.00.
   - On-site Trail and Buffer Strip in the amount of $95,414.00.
   - On-site Trail landscaping in the amount of $56,681.00.
   - Three years of maintenance (ESA/RMA/Trail/Trail Slope) in the amount of, $81,720.00.
   - Three years of monitoring (ESA/RMA/Trail) in the amount of $7,920.00.
   - 10% contingency in the amount of $32,840.80.

   (The above amounts being based on the costs estimate provided by Damon Oriente Ltd. Landscape Architects – letters dated October 31, 2017. The figures include a 10% contingency).

   Off-site ESA/RMA securities (estimated at $19,178.00 plus 1,917.80 contingency) will be addressed through a Servicing Agreement.
2. Submission of a contract entered into between the applicant and a Qualified Environmental Professional (QEP) to monitor all ESA, RMA and trail vegetation installations (on and off-site) plus the on-site trailside landscaping (400 m^2), the expanded trail buffer and slope planting (660 m^2) and the planting strip adjacent to the Williams Road RMA (245 m^2). The contract will also include provision for three years of post-installation monitoring with annual reporting for these landscape installations. The Contract should include the scope of work to be undertaken, including: the proposed number of site monitoring inspections, and a provision any remedial works during the monitoring period. Planting within RMA areas is to comply with Provincial RAR re-vegetation guidelines.
3. Submission of a contract to ensure that pruning and limb removal of retained trees is under supervision of a certified arborist, invasive vegetation removal within the tree protection area by hand only and activity within the drip line of retained trees to be done under the supervision of a Qualified Environmental Professional (QEP) or a certified arborist as outlined in the arborist's report.
4. Installation of appropriate tree protection fencing around all trees identified for retention by the Arborist (uTree Environmental Consultants Report). Fencing is to be installed to the City's standards as part of the development prior to any construction activities occurring on-site.
5. Submission of payment in the amount of $62,000 to the City of Richmond, as a voluntary contribution for the design and future construction of a pedestrian observation platform overlooking the Fraser River and located to the east of Williams Road at the City's discretion. Timing of the platform construction may be affected by future dike improvements.
6. Submission of payment in the amount of $6,480.00 to the City of Richmond, as a voluntary contribution for the design and future installation of an interpretive signage package for the pedestrian trail system through the subject site. The detailed design and installation has been included in the

Servicing Agreement requirements for the pedestrian trail and will be to the satisfaction of the Senior Manager of Parks Department.

7. Registration of a 6 m wide statutory right-of-way (ROW) with public right-of-passage (PROP) through 15040 Williams Road to accommodate a public trail in an alignment generally along the southern side of the CN Rail right-of-way as indicated in the Development Permit application and to the satisfaction of the Senior Manager of Parks Department. After completion of the Servicing Agreement maintenance period, the City will be responsible for maintenance and liability associated with the SRW.
8. Registration of a 7.5 m wide statutory right-of-way (ROW) for dike through 15040 Williams Road in an alignment generally near the property's foreshore with the Fraser River as indicated in the Development Permit application and to the satisfaction of the General Manager of Engineering Department. After completion of the Servicing Agreement maintenance period, the City will be responsible for maintenance and liability associated with the SRW. The SRW will provide the City with rights for access and the ability to maintain the works. The agreement should include a minimum building setback from the SRW of 7.0 m.
9. Registration of a flood plain covenant on Title identifying a minimum habitable elevation of 3.0 / 4.35 m GSC split approximately at the alignment of the southern edge of the CN Rail right-of-way.
10. Registration of a legal agreement on Title to ensure that landscaping planted as part of the on-site ESA and the on-site RMA is maintained and will not be abandoned or removed. Registration of a statutory right-of-way, and/or other legal agreements or measures, as determined to the satisfaction of the Director of Development.
11. Discharge of the existing foreshore covenant (BG 285960).
12. Registration of a legal agreement on Title to require the owner to design and construct bank protection along the river to the satisfaction of the General Manager, Engineering and the Inspector of Dikes and to provide the City with access to the land to inspect and maintain the works should the owner fail to do so. The owner will be responsible for the ongoing maintenance and liability of the works. The intent of the covenant is to ensure that the area outside of the 7.5 m right-of-way (ROW) will be constructed and maintained in a manner that protects the dike and cannot be modified without consent of the City of Richmond and the Provincial Inspector of Dikes.

Prior to Building Permit Issuance, the developer must complete the following requirements:

1. Enter into a Servicing Agreement* for the design and construction of a dike across 15040 Williams Road within the 7.5 m wide right-of-way (ROW) and integration with existing dikes on adjacent properties acceptable to the General Manager, Engineering.
2. Enter into a Servicing Agreement* for the design and construction of a 6 m wide park trail across 15040 Williams Road and integration with existing trails on adjacent properties acceptable to the Senior Manager of Parks Department. Works include, but may not be limited to, a 3 m wide aggregate trail surface with vegetation strips on both sides, design and installation of an interpretive signage package for the pedestrian trail, to the satisfaction of the Senior Manager of Parks Department.
3. Enter into a Servicing Agreement* for the design and construction of utility and frontage works and the off-site ESA/RMA landscaping enhancement areas identified as per the landscaping plans submitted under DP 16-741741. Works include, but may not be limited to the following:

Water Works:

a. Using the OCP Model, there is 583 L/s of water available at a 20 psi residual at the Williams Road frontage. Based on your proposed development, your site requires a minimum fire flow of 250 L/s.
b. The Developer is required to:
    - Submit Fire Underwriter Survey (FUS) or International Organization for Standardization (ISO) fire flow calculations to confirm development has adequate fire flow for onsite fire protection. Calculations must be signed and sealed by a Professional Engineer and be based on Building Permit Stage Building designs.
    - Install a single water service connection to serve the development site. The service connection can be split at the property line, and two meters installed (one for fire, one for domestic use) inside meter chamber(s).
    - Install backflow prevention device at property line.
    - Provide statutory right-of-way (ROW) for meter and meter chamber.
c. At Developer's cost, the City is to:
    - Complete all tie-ins for the proposed works to existing City infrastructure.

Storm Sewer Works:

a. The Developer is required to:
    - Design and construct a storm sewer outfall into the RMA ditch utilizing appropriate sediment and erosion control methods, such as deltalok bags, and provide a functional plan within the first Servicing Agreement submission for review and approval by the City.
    - Install an oil and grit separator upstream of the proposed outfall, and provide the City with a separator maintenance plan within the first Servicing Agreement submission for review and approval.

Sanitary Sewer Works:

a. The Developer is required to:
    - N/A.

Frontage Improvements:

a. The Developer is required to:
    - Coordinate with BC Hydro, Telus and other private communication service providers:
    - When relocating/modifying any of the existing power poles and/or guy wires within the property frontages.

- To locate all above ground utility cabinets and kiosks required to service the proposed development within the developments site (see list below for examples). A functional plan showing conceptual locations for such infrastructure shall be included in the development process design review. Please coordinate with the respective private utility companies and the project's lighting and traffic signal consultants to confirm the requirements (e.g., statutory right-of-way dimensions) and the locations for the aboveground structures. If a private utility company does not require an aboveground structure, that company shall confirm this via a letter to be submitted to the City. The following are examples of statutory right-of-ways that shall be shown in the functional plan and registered prior to Servicing Agreement design approval:
- BC Hydro PMT – 4 mW X 5 m (deep).
- BC Hydro LPT – 3.5 mW X 3.5 m (deep).
- Street light kiosk – 1.5 mW X 1.5 m (deep).
- Traffic signal kiosk – 2 mW X 1.5 m (deep).
- Traffic signal UPS – 1 mW X 1 m (deep).
- Shaw cable kiosk – 1 mW X 1 m (deep) – show possible location in functional plan.
- Telus FDH cabinet-1.1 m W X 1 m (deep – show possible location in functional plan.
- Implement a riparian enhancement planting plan in the 5.0 m RMA watercourse along the Williams Road frontage.

Dike Improvements:

a. The developer is required to satisfy the following for the dike:
   - The dike shall be designed by a Professional Geotechnical Engineer.
   - The elevation of the dike crest shall be raised to minimum 4.7 m geodetic, and designed to accommodate a future elevation of 5.5 m. On the waterside of the dike, the slope shall be maximum 2:1. On the landside of the dike, the slope shall be maximum 3:1.
   - The crest of the dike shall be minimum 4.0 m wide.
   - Provide a 7.5 m statutory right-of-way for the dike.
   - There shall be a minimum building setback of 7.0 m from the dike right-of-way.
   - The drip line of any trees shall be set back at least 8.0 m from the future toe of the dike.
   - Above ground pipes crossing the dike right-of-way shall be removable to allow for dike inspection and maintenance.
   - Design the dike and operations in a manner that allows for vehicular and man access along the dike upon the City's request.
   - The dike along the frontage of the development site shall be tied in to the adjacent dikes to the north and south at a maximum slope of 3:1. Developer to be responsible to locate the dike to the north and south for a smooth transition. No retaining walls within the dike crest or slope area are allowed.

- All dike construction, including materials, shall be in conformance with City standard drawing MB-98 or MB-99, Dike Design and Construction Guide – Best Management Practices for British Columbia (2003), and Environmental Guidelines for Vegetation Management on Flood Protection Works to Protect Public Safety and the Environment (1999).
- The design and construction of the dike shall be done to the satisfaction of the General Manager, Engineering and Public Works, and any other relevant dike approving authorities.
- Discharge existing foreshore covenant and register a new foreshore covenant to ensure that the area outside of the 7.5 m right-of-way will be constructed and maintained in a manner that protects the dike and cannot be modified without consent of the City of Richmond and Inspector of Dikes.

General Items:

a. The Developer is required to:
   - Develop a sediment and erosion control and protection fencing plan for the proposed works to minimize impact to the 5.0m RMA along Williams Road during construction, to the satisfaction of the City. A functional plan must be reviewed and approved by the City prior to Development Permit issuance.
   - Provide, within the first Servicing Agreement submission, a geotechnical assessment of preload and soil preparation impacts on the existing utilities fronting the development site and provide mitigation recommendations.
   - Enter into, if required, additional legal agreements, as determined via the subject development's Servicing Agreement(s) and/or Development Permit(s), and/or Building Permit(s) to the satisfaction of the Director of Engineering, including, but not limited to, site investigation, testing, monitoring, site preparation, de-watering, drilling, underpinning, anchoring, shoring, piling, pre-loading, ground densification or other activities that may result in settlement, displacement, subsidence, damage or nuisance to City and private utility infrastructure.
   - Prepare and submit a design and sealed cost estimate (inclusive of a 10% contingency) as prepared by a qualified professional for the construction of a foreshore observation deck to the satisfaction of the Senior Manager, Parks Department and the Director, Engineering Department.
   - Submit a voluntary cash contribution for the construction of the foreshore observation deck to the satisfaction of the Senior Manager, Parks Department and the Director, Engineering Department.
b. Plan and undertake the off-site ESA and RMA landscaping as per the landscaping plans submitted under DP 16-741741. A Qualified Environmental Professional (QEP) to monitor all planting ESA, RMA and trail vegetation installations and to provide three years of post-installation monitoring with annual reporting for the on-site and the off-site ESA, the RMA enhancement areas and the pedestrian trail vegetation installation. Planting within RMA areas is to comply with Provincial RAR re-vegetation guidelines.
c. Ensure that all pruning and limb removal of retained trees is to be under supervision of a certified arborist, invasive vegetation removal within the tree protection area is by hand only and activity within the drip line of retained trees to be done under the supervision of a Qualified Environmental Professional (QEP) or a certified arborist as outlined in the arborist's report.

4. City arborist (Conor Sheridan: 604-244-1208, CSheridan@richmond.ca) to be notified prior to commencement of works within the drip line of existing retained off-site trees. Provide three business days minimum notice.
5. City Parks to review all off-site planting after it is in place (contact Steve Priest, Supervisor of Horticulture: 604-244-1208, and Miriam Plishka, Park Planner: 604-233-3310). Once plant material and placement have been accepted by the City, the maintenance period will commence.
6. Submission of a final sign-off letter of from CN Railway, to the satisfaction of the City's Director of Transportation and the Director of Engineering, for the VAFFC Marine Terminal project at 15040 Williams Road. If CN Railway's approval includes conditions or requirements, the proponent must provide means to meet those conditions/requirements to the satisfaction of the City's Director of Transportation.
7. Submission of a Construction Parking and Traffic Management Plan to the Transportation Department. Management Plan shall include location for parking for services, deliveries, workers, loading, application for any lane closures, and proper construction traffic controls as per Traffic Control Manual for works on Roadways (by Ministry of Transportation) and MMCD Traffic Regulation Section 01570.
8. Obtain a Building Permit for any construction hoarding. If construction hoarding is required to temporarily occupy a public street, the air space above a public street, or any part thereof, additional City approvals and associated fees may be required as part of the Building Permit. For additional information, contact the Building Approvals Department at 604-276-4285.

Notes:

* This requires a separate application and approval.

- Where the Director of Development deems appropriate, the preceding agreements are to be drawn not only as personal covenants of the property owner but also as covenants pursuant to Section 219 of the Land Title Act.

  All agreements to be registered in the Land Title Office shall have priority over all such liens, charges and encumbrances as is considered advisable by the Director of Development. All agreements to be registered in the Land Title Office shall, unless the Director of Development determines otherwise, be fully registered in the Land Title Office prior to enactment of the appropriate bylaw.

  The preceding agreements shall provide security to the City including indemnities, warranties, equitable/rent charges, letters of credit and withholding permits, as deemed necessary or advisable by the Director of Development . All agreements shall be in a form and content satisfactory to the Director of Development.

- Additional legal agreements, as determined via the subject development's Servicing Agreement(s) and/or Development Permit(s), and/or Building Permit(s) to the satisfaction of the Director of Engineering may be required including, but not limited to, site investigation, testing, monitoring, site preparation, de-watering, drilling, underpinning, anchoring, shoring, piling, pre-loading, ground densification or other activities that may result in settlement, displacement, subsidence, damage or nuisance to City and private utility infrastructure.

- Applicants for all City Permits are required to comply at all times with the conditions of the Provincial *Wildlife Act* and Federal *Migratory Birds Convention Act*, which contains prohibitions on the removal or disturbance of both birds and their nests. Issuance of Municipal permits does not give an individual authority to contravene these legislations. The City of Richmond recommends that where significant trees or vegetation exists on site, the services of a Qualified Environmental Professional (QEP) be secured to perform a survey and ensure that development activities are in compliance with all relevant legislation.

Signed Date

REVISED PLAN SUBMISSION

Figure 1 Vancouver Airport Fuel Delivery Project – Marine Terminal site location.

Legend

- Canadian National Railway Right-of-Way
- VAFFC Marine Terminal Site

0 100 200 300 meters

Scale: 1:10,000

Projection: NAD 1983 UTM Zone 10N

Data Sources:
a) Imagery, Esri Basemap

N

Hatfield CONSULTANTS

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This plan is reprinted from the
ESA and RMA Environmental Report
by
Hatfield Environmental Consultants

NOV 29 2017

DP 16-741741

DAMON ORIENTE LTD.
landscape architects

#306 - 4464 West 10th Avenue
Vancouver, BC, Canada
V6R 2H9

t. 604-222-9200
e. dvo@telus.net
w. damonoriente.ca

Project
VAFFC MARINE TERMINAL FACILITY

15040 Williams Road, Richmond BC

Drawing
MARINE TERMINAL SITE LOCATION

Issue:

Scale: nts

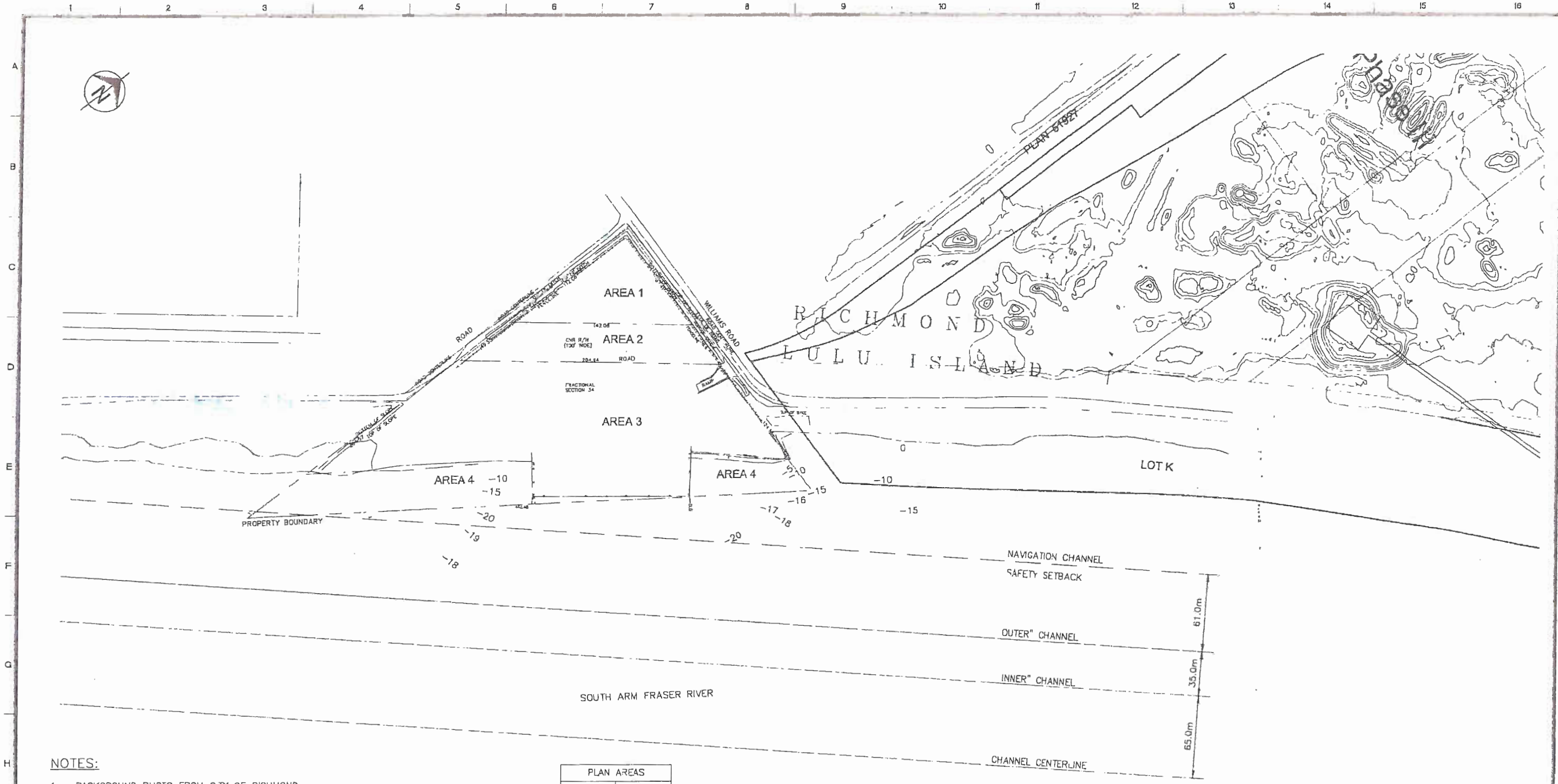
Date:

Project Number: 2014-280

31 Oct. 2017 Development Permit Application Resubmission - ADP Comments

Dwg
L0.02

Reference



NOTES:

1. BACKGROUND PHOTO FROM CITY OF RICHMOND.
2. TOPOGRAPHIC SURVEY PREPARED BY MATSON, PEAK AND TOPLISS. DRAWING REFERENCE V-06-15234-TPG. SURVEY DONE BY SEPTEMBER 12-14, 2006
3. ALL ELEVATIONS ARE REFERENCED TO GEODETIC DATUM.

PLAN AREAS	
LOCATION	AREA (m^2)
AREA 1	4985
AREA 2	5298
AREA 3	26388
AREA 4	9229
TOTAL	45810

1 EXISTING SITE PLAN
1:1500

0 30 60 90 150m
1:1500

ISSUE NO	DRAWING REVISIONS	ISSUE DATE
0	ISSUED FOR CONSTRUCTION	12/14/2017

Fuel Facilities Corporation

VANCOUVER AIRPORT FUEL DELIVERY PROJECT
MARINE RECEIVING AREA
MARINE DESIGN PACKAGE
VANCOUVER AIRPORT FUEL FACILITIES CORPORATION
RICHMOND, BRITISH COLUMBIA

SEAL

ECO moffatt & nichol

Argus ENGINEERING | PLANNING | MANAGEMENT
ARGUS CONSULTING INC

PROJECT NO	15004 22C
DATE	12/21/15
DESIGNED BY	FS
DRAWN BY	AVM
CHECKED BY	RB
CAD FILE NAME	15004 22C 0009

EXISTING SITE PLAN

G-009

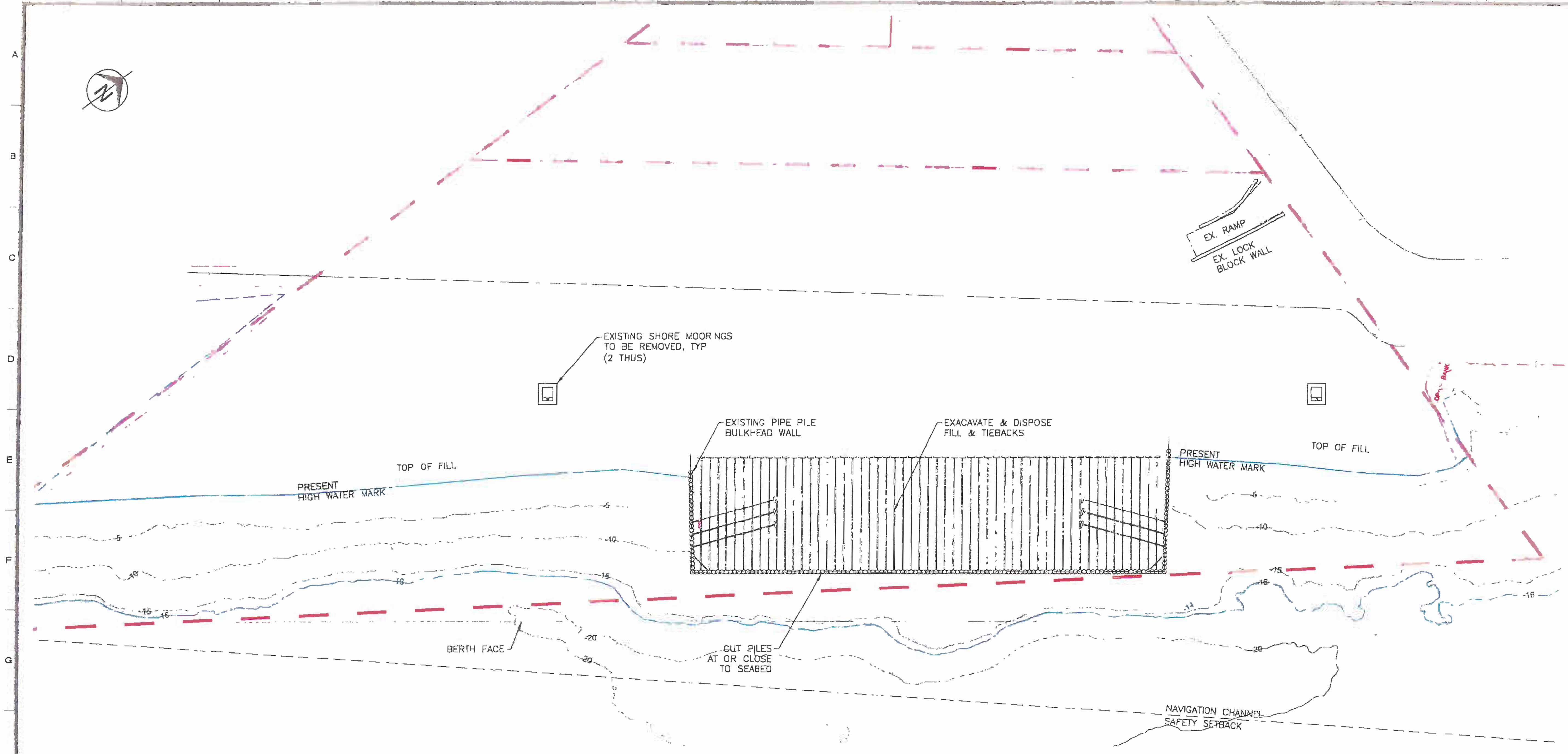
ISSUED FOR CONSTRUCTION

NOV 29 2017

PLEASE RECYCLE

P:\ollec. P:\6338 VC Vancouver Airport Fue Delivery Project\CADD_Active\15004 22C-G009.dwg on 03/7/17 at 1:17 PM by AMANUZON using Argus 2013.stb

Plan #1



1 DEMOLITION PLAN

1:500

LEGEND:

— — PROPERTY BOUNDARY

NOTES:

1. CONTOURS ARE BASED ON GEODETIC DATUM

ISSUE NO.	DRAWING REVISIONS	ISSUE DATE
0	ISSUED FOR CONSTRUCTION	02/14/2017

Fuel Facilities Corporation

VANCOUVER AIRPORT FUEL DELIVERY PROJECT
MARINE RECEIVING AREA
MARINE DESIGN PACKAGE
VANCOUVER AIRPORT FUEL FACILITIES CORPORATION
RICHMOND, BRITISH COLUMBIA

moffatt & nichol

Argus
ENGINEERING PLANNING MANAGEMENT
ARGUS CONSULTING INC

PROJECT NO 15004 22C
DATE 12/16/15

MARINE TERMINAL
DEMOLITION PLAN

G-020

ISSUED FOR CONSTRUCTION

NOV 2 9 2017

Plotted: P:\8338 VC Vancouver Airport Fuel Delivery Project\CADD_Active\15004 22C-G020.dwg on 03/7/17 at 1:18 PM by AMANZON using Argus 2013.stb

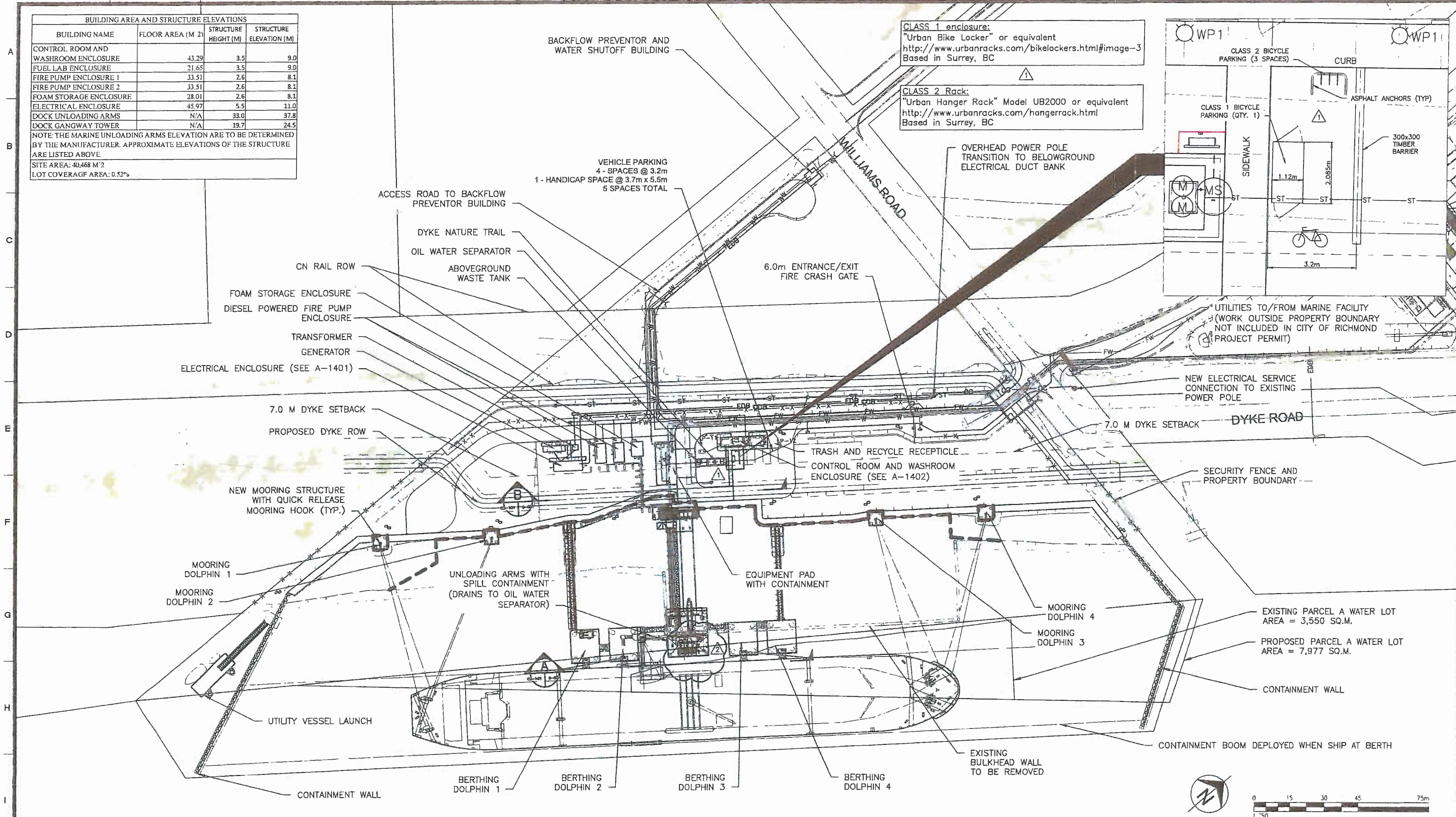
Plan #2

BUILDING AREA AND STRUCTURE ELEVATIONS			
BUILDING NAME	FLOOR AREA (M 2)	STRUCTURE HEIGHT (M)	STRUCTURE ELEVATION (M)
CONTROL ROOM AND WASHROOM ENCLOSURE	43.29	3.5	9.0
FUEL LAB ENCLOSURE	21.65	3.5	9.0
FIRE PUMP ENCLOSURE 1	33.51	2.6	8.1
FIRE PUMP ENCLOSURE 2	33.51	2.6	8.1
FOAM STORAGE ENCLOSURE	28.01	2.6	8.1
ELECTRICAL ENCLOSURE	45.97	5.5	11.0
DOCK UNLOADING ARMS	N/A	33.0	37.8
DOCK GANGWAY TOWER	N/A	19.7	24.5

NOTE: THE MARINE UNLOADING ARMS ELEVATION ARE TO BE DETERMINED BY THE MANUFACTURER. APPROXIMATE ELEVATIONS OF THE STRUCTURE ARE LISTED ABOVE.

SITE AREA: 40,468 M^2

LOT COVERAGE AREA: 0.53%



BACKFLOW PREVENTOR AND WATER SHUTOFF BUILDING
VEHICLE PARKING
4 - SPACES @ 3.2m
1 - HANDICAP SPACE @ 3.7m x 5.5m
5 SPACES TOTAL
ACCESS ROAD TO BACKFLOW PREVENTOR BUILDING
DYKE NATURE TRAIL
OIL WATER SEPARATOR
ABOVEGROUND WASTE TANK
CN RAIL ROW
FOAM STORAGE ENCLOSURE
DIESEL POWERED FIRE PUMP ENCLOSURE
TRANSFORMER
GENERATOR
ELECTRICAL ENCLOSURE (SEE A-1401)
7.0 M DYKE SETBACK
PROPOSED DYKE ROW
NEW MOORING STRUCTURE WITH QUICK RELEASE MOORING HOOK (TYP.)
MOORING DOLPHIN 1
MOORING DOLPHIN 2
UNLOADING ARMS WITH SPILL CONTAINMENT (DRAINS TO OIL WATER SEPARATOR)
UTILITY VESSEL LAUNCH
CONTAINMENT WALL
BERTHING DOLPHIN 1
BERTHING DOLPHIN 2
BERTHING DOLPHIN 3
BERTHING DOLPHIN 4
EXISTING BULKHEAD WALL TO BE REMOVED
CONTAINMENT BOOM DEPLOYED WHEN SHIP AT BERTH
CONTAINMENT WALL
PROPOSED PARCEL A WATER LOT AREA = 7,977 SQ.M.
EXISTING PARCEL A WATER LOT AREA = 3,550 SQ.M.
MOORING DOLPHIN 4
MOORING DOLPHIN 3
EQUIPMENT PAD WITH CONTAINMENT
SECURITY FENCE AND PROPERTY BOUNDARY
TRASH AND RECYCLE RECEPTICLE
CONTROL ROOM AND WASHROOM ENCLOSURE (SEE A-1402)
7.0 M DYKE SETBACK
DYKE ROAD
NEW ELECTRICAL SERVICE CONNECTION TO EXISTING POWER POLE
UTILITIES TO/FROM MARINE FACILITY (WORK OUTSIDE PROPERTY BOUNDARY NOT INCLUDED IN CITY OF RICHMOND PROJECT PERMIT)
6.0m ENTRANCE/EXIT FIRE CRASH GATE
WILLIAMS ROAD
OVERHEAD POWER POLE TRANSITION TO BELOWGROUND ELECTRICAL DUCT BANK
CLASS 1 enclosure:
"Urban Bike Locker" or equivalent
http://www.urbanracks.com/bikelockers.html#image-3
Based in Surrey, BC
CLASS 2 Rack:
"Urban Hanger Rack" Model UB2000 or equivalent
http://www.urbanracks.com/hangerrack.html
Based in Surrey, BC
WP1
WP1
CLASS 2 BICYCLE PARKING (3 SPACES)
CURB
ASPHALT ANCHORS (TYP)
CLASS 1 BICYCLE PARKING (QTY. 1)
SIDEWALK
300x300 TIMBER BARRIER
1.12m
2.085m
3.2m
0 15 30 45 75m
1:750

ISSUE NO.	DRAWING REVISIONS	ISSUE DATE
2	REVISED LOCATION OF UNLOADING ARMS INTO WATER LOT	08/18/2017
1	ADDED BICYCLE PARKING DETAIL	07/24/2017
0	ISSUED FOR DEVELOPMENT PERMIT REVIEW	12/02/2016

Fuel Facilities Corporation

108 - 12300 Horseshoe Way
Richmond, BC, V7A 4Z1
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www.vancouverairportfuel.ca

VANCOUVER AIRPORT FUEL DELIVERY PROJECT
MARINE RECEIVING AREA
PERMIT PACKAGE
VANCOUVER AIRPORT FUEL FACILITIES CORPORATION
RICHMOND, BRITISH COLUMBIA

SEAL

8/18/2017

LOGO

Argus
ENGINEERING | PLANNING | MANAGEMENT
ARGUS CONSULTING, INC.
6363 College Boulevard, Suite 600
Overland Park, Kansas 66211
816.228.7500 FAX 816.228.7535
www.argusconsulting.com

PROJECT NO: 15C04.22
DATE: 05/22/2015
DESIGNED BY: DWF
DRAWN BY: DWF
CHECKED BY: DWF
CAD FILE NAME: CS101
DRAWING NO.

OVERALL SITE PLAN

CS-101

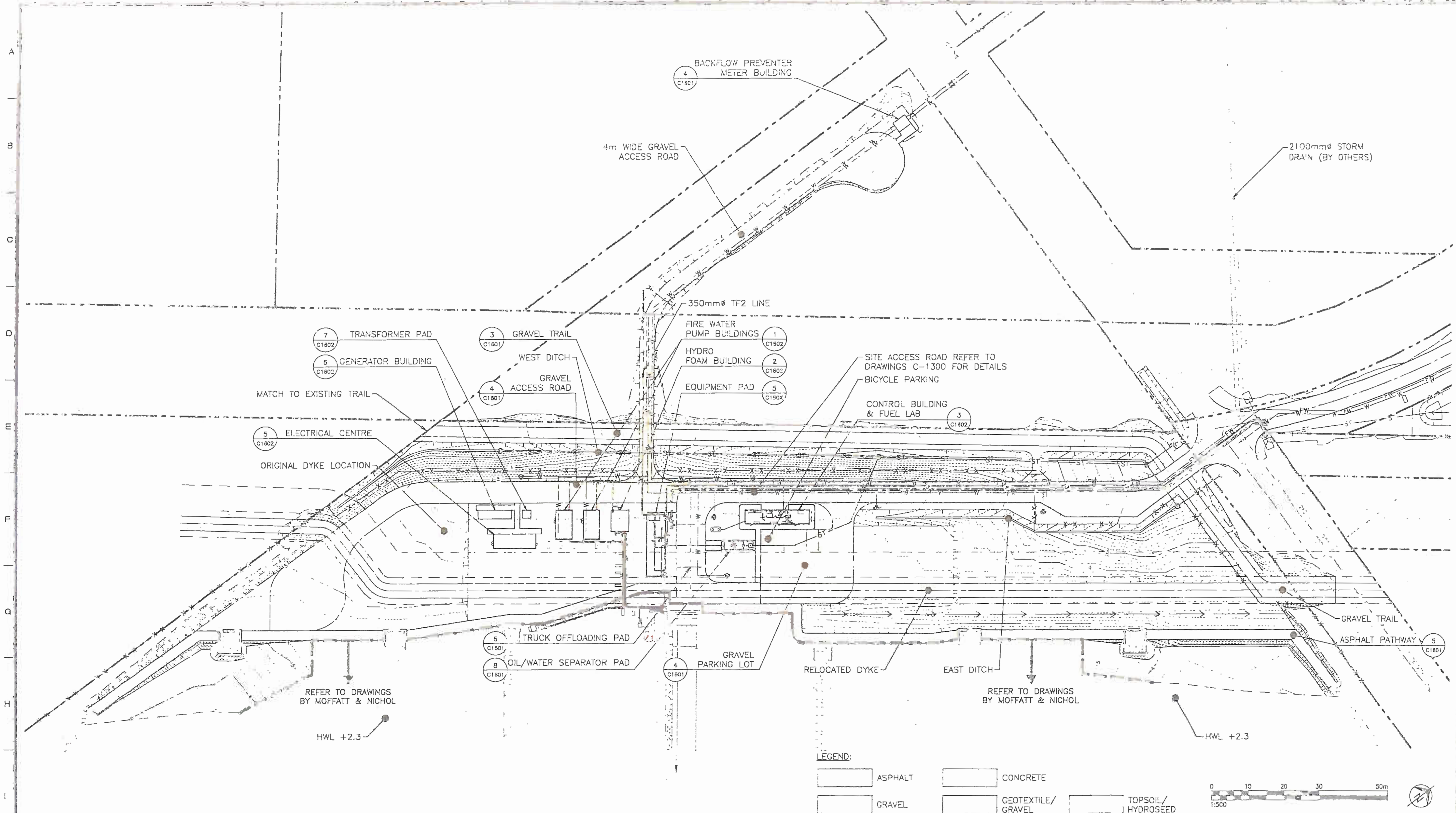
Plotted: Y:\Comm\YVR - Vancouver\15004 VAFDP\Dwgs\22-Marine\22A - Permit\Civil\CS1.01.dwg on 08/18/17 at 5:51 PM by SNEWBOLD using acad.stb

Plan #3

NOV 29 2017

ISSUED FOR DEVELOPMENT PERMIT REVIEW

DP 16-747



ISSUED FOR DEVELOPMENT PERMIT REVIEW

NOV 29 2017

ISSUE NO.	DRAWING REVISIONS	ISSUE DATE
	ISSUED FOR DEVELOPMENT PERMIT REVIEW	05/05/2017

Fuel Facilities Corporation

VANCOUVER AIRPORT FUEL DELIVERY PROJECT
MARINE RECEIVING AREA
MARINE DESIGN PACKAGE

VANCOUVER AIRPORT FUEL FACILITIES CORPORATION
RICHMOND, BRITISH COLUMBIA

TETRA TECH

Argus

ARGUS CONSULTING, INC.

PROJECT NO: 15004.220
DATE: 10/10/16

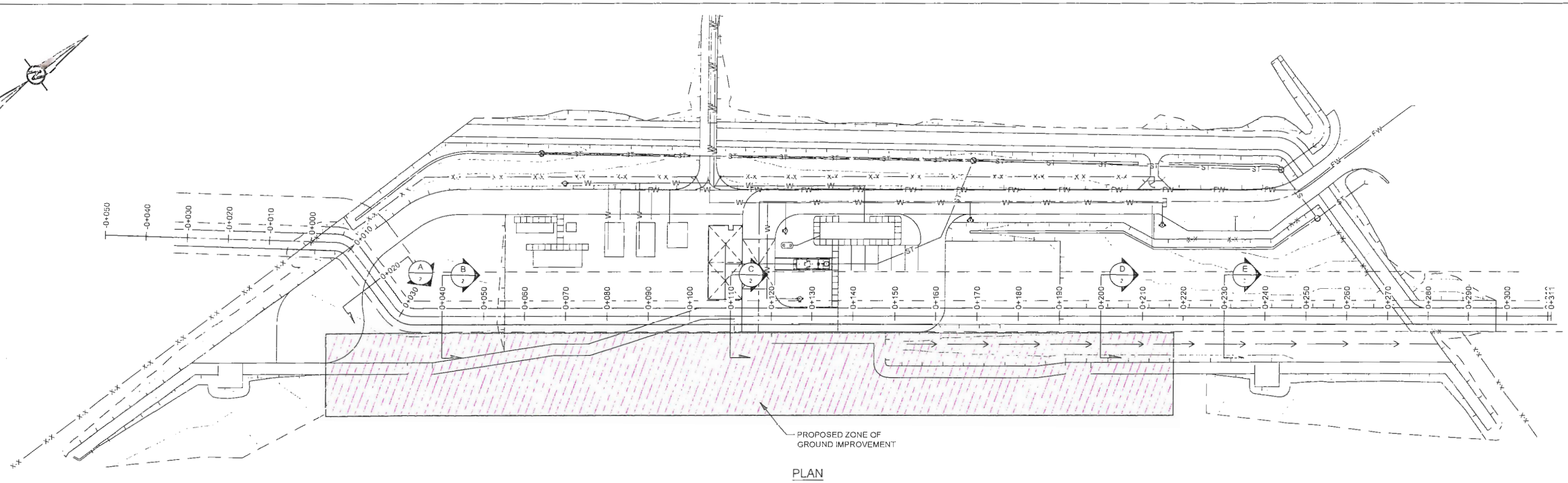
SURFACING PLAN (COLOUR)

DRAWING NO: C-1112

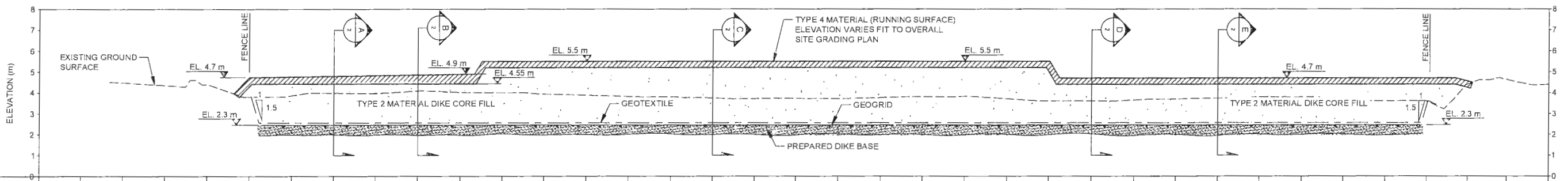
PLEASE RECYCLE

Plotted: G:\C3\...\15004.220-C1112.dwg on 05/4/17 at 9:33 AM by TANNER.JOHNSON using Argus.stb

Plan #4



PLAN



CHAINAGE	FINISHED GROUND	EXISTING GROUND
0+050		
0+040		4.48
0+030		4.35
0+020		4.40
0+010		3.80
0+000	4.73	3.86
0+010	4.74	3.98
0+020	4.78	3.97
0+030	4.81	4.09
0+040	4.65	4.02
0+050	4.89	4.00
0+060	5.50	3.94
0+070	5.50	3.88
0+080	5.50	3.82
0+090	5.50	3.80
0+100	5.46	3.74
0+110	5.42	3.71
0+120	5.50	3.72
0+130	5.49	3.72
0+140	5.48	3.76
0+150	5.49	3.80
0+160	5.50	3.82
0+170	5.50	3.71
0+180	5.50	3.60
0+190	5.50	3.60
0+200	4.70	3.65
0+210	4.70	3.70
0+220	4.70	3.73
0+230	4.70	3.80
0+240	4.70	3.78
0+250	4.70	3.67
0+260	4.70	3.60
0+270	4.70	3.59
0+280	4.70	4.40
0+290	4.57	4.62
0+300		4.40
0+310		

ELEVATION PROFILE

NOTE(S)

1 BASE DRAWING PROVIDED BY ARGUS CONSULTING
CAD FILE: L2.01.DWG DATED RECEIVED MAY 10 2017.
2 ELEVATION SHOWN ARE IN GEODETIC DATUM
3 DATUM NAD 83, PROJECTION ZONE 10
4 ALL MATERIALS AND CONSTRUCTION SHALL CONFORM TO THE FOLLOWING:
5 A) CURRENT EDITION OF THE CITY OF RICHMOND SUPPLEMENTARY SPECIFICATIONS AND DETAIL DRAWINGS AND ASSOCIATED EDITION OF THE MASTER MUNICIPAL CONSTRUCTION DOCUMENTS
5 B) PROVINCE OF BRITISH COLUMBIA MINISTRY OF ENVIRONMENT GUIDELINES: 'ENVIRONMENTAL GUIDELINES FOR VEGETATION MANAGEMENT ON FLOOD PROTECTION WORKS TO PROTECT PUBLIC SAFETY AND THE ENVIRONMENT' AND 'RIPRAP DESIGN AND CONSTRUCTION GUIDE' AND 'DIKE DESIGN AND CONSTRUCTION GUIDE. BEST MANAGEMENT PRACTICES FOR BRITISH COLUMBIA'.
6 COMPATIBILITY OF THE MATERIAL SHOULD BE CHECKED BEFORE AND DURING CONSTRUCTION TO CONFIRM WHETHER GEOTEXTILE FABRIC IS NEEDED

DRAFT

0 20 40
1:500 METRES
HORIZONTAL SCALE

0 5 10
1:100 METRES
VERTICAL SCALE

CLIENT
FSM MANAGEMENT GROUP

DATE	2017-08-18
DESIGNED	M. MIAO / J. JI
PREPARED	GB
REVIEWED	M. MIAO
APPROVED	J. JI

Golder Associates

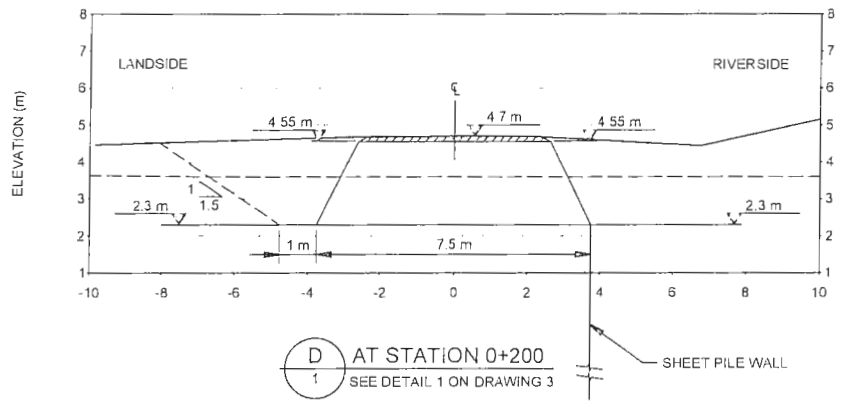
PROJECT
VANCOUVER AIRPORT FUEL DELIVERY PROJECT
NEW FLOOD PROTECTION DIKE
15040 WILLIAMS ROAD, RICHMOND, B.C.

TITLE
PLAN AND ELEVATION PROFILE

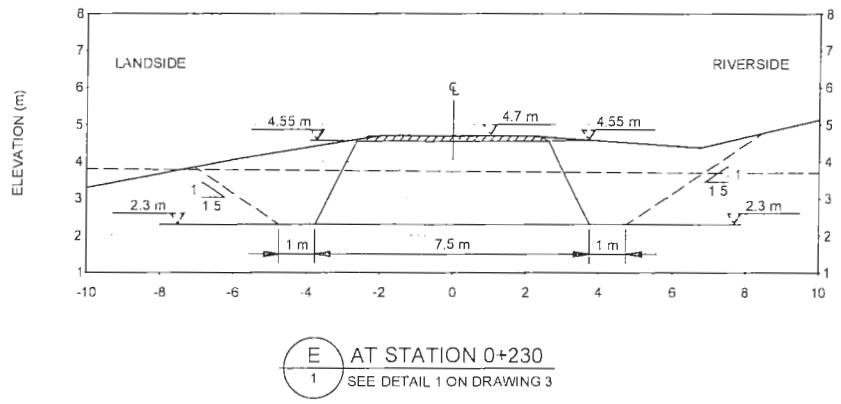
PROJECT NO.	PHASE	REV.	FIGURE
1406834	9442	B	1

NOV 29 2017

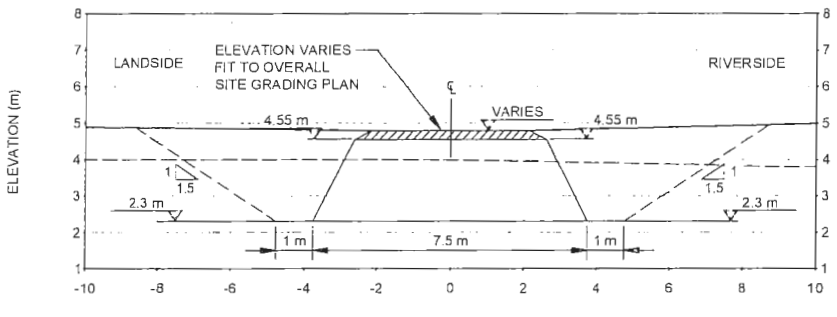
Plan #5



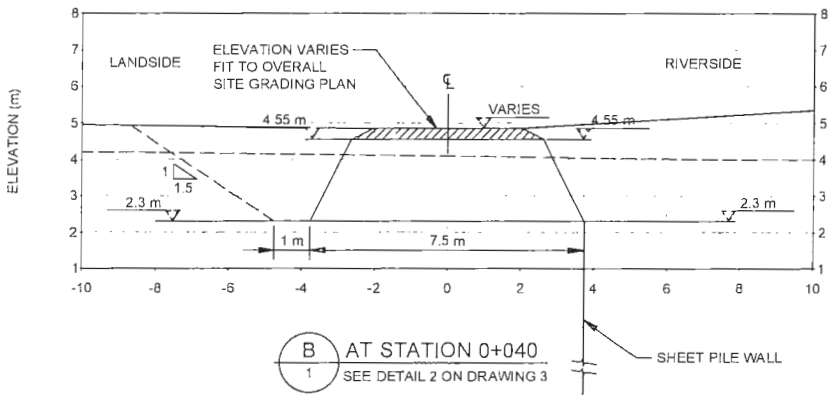
D / 1 AT STATION 0+200
SEE DETAIL 1 ON DRAWING 3



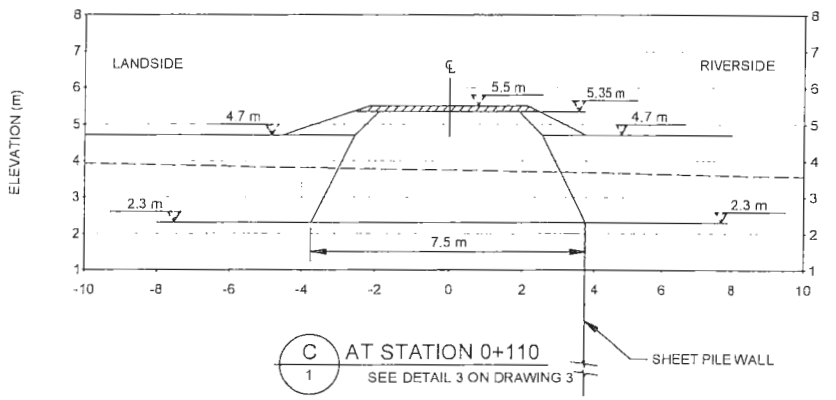
E / 1 AT STATION 0+230
SEE DETAIL 1 ON DRAWING 3



A / 1 AT STATION 0+020
SEE DETAIL 1 ON DRAWING 3



B / 1 AT STATION 0+040
SEE DETAIL 2 ON DRAWING 3



C / 1 AT STATION 0+110
SEE DETAIL 3 ON DRAWING 3

NOTE(S)
1. BASE DRAWING PROVIDED BY ARGUS CONSULTING
   CAD FILE: L2.01.DWG, DATED RECEIVED MAY 10, 2017.
2. ELEVATION SHOWN ARE IN GEODETIC DATUM
3. DATUM NAD 83, PROJECTION ZONE 10

DRAFT

0 5 10
1:100 METRES

CLIENT
FSM MANAGEMENT GROUP

Golder Associates

DESIGNED	2017-06-19
DRAWN	M. MIAO / J. JI
PREPARED	GB
REVIEWED	M. MIAO
APPROVED	J. JI

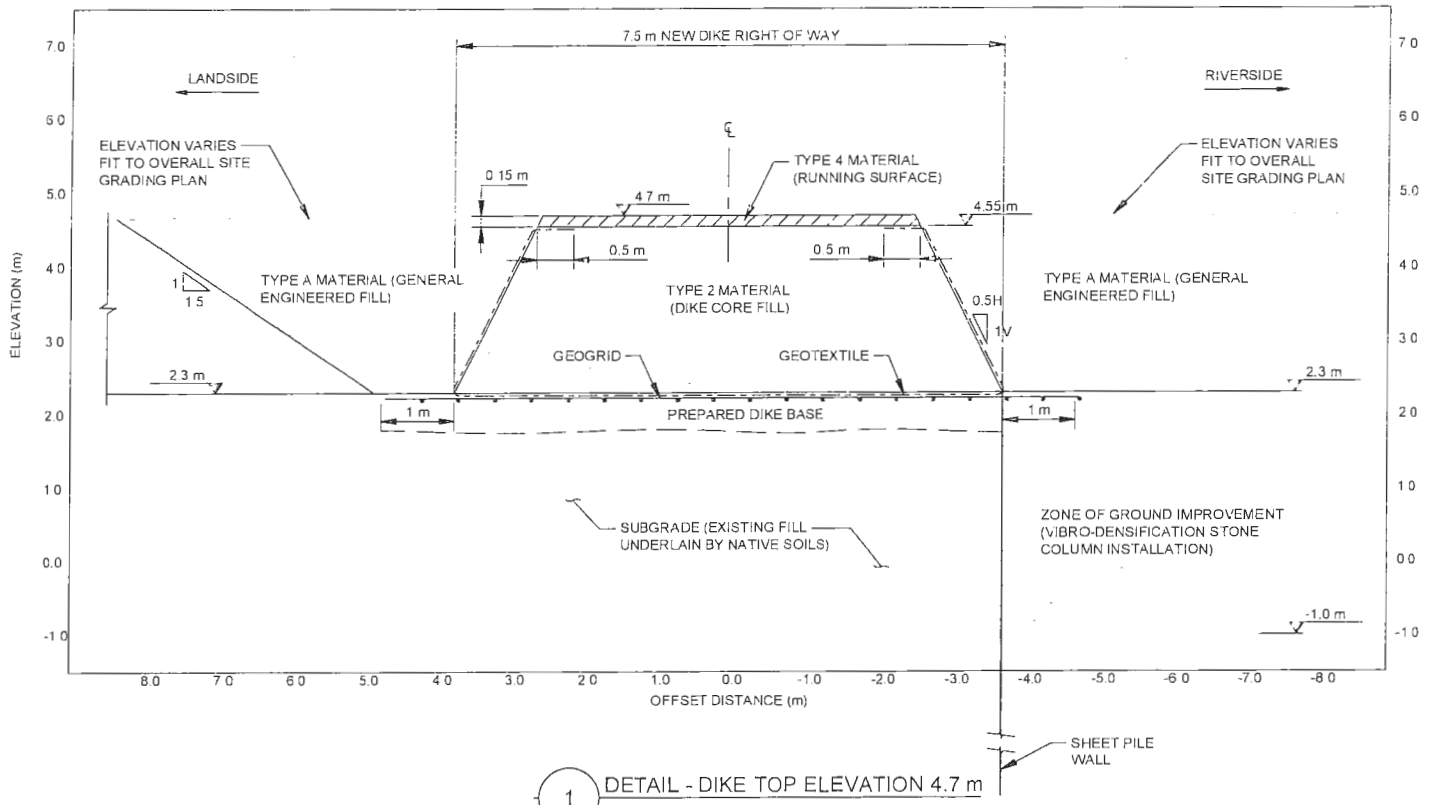
PROJECT
VANCOUVER AIRPORT FUEL DELIVERY PROJECT
NEW FLOOD PROTECTION DIKE
15040 WILLIAMS ROAD, RICHMOND, B.C.

TITLE
CROSS SECTIONS

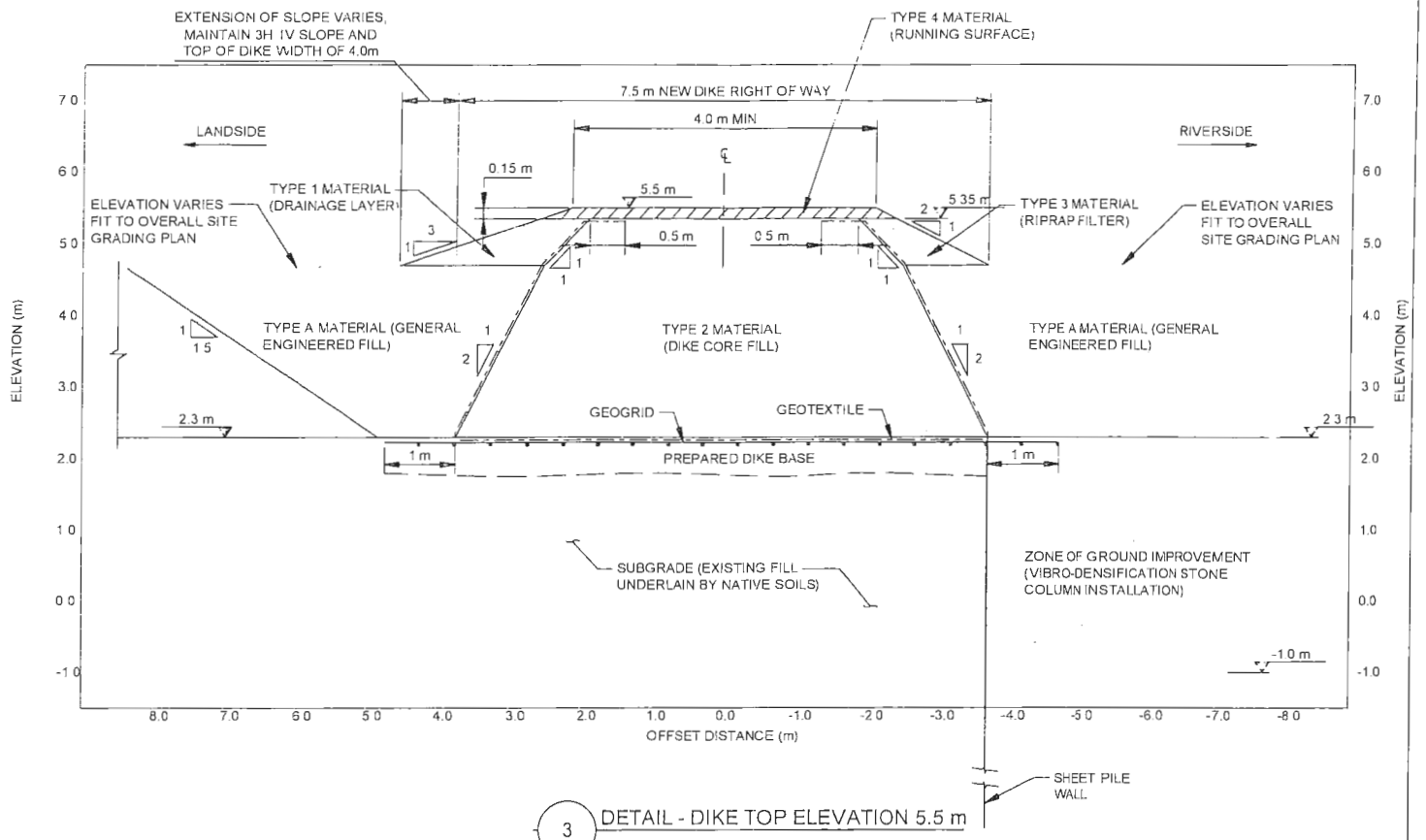
PROJECT NO.	PHASE	REV.	FIGURE
1406834	9442	B	2

NOV 29 2017

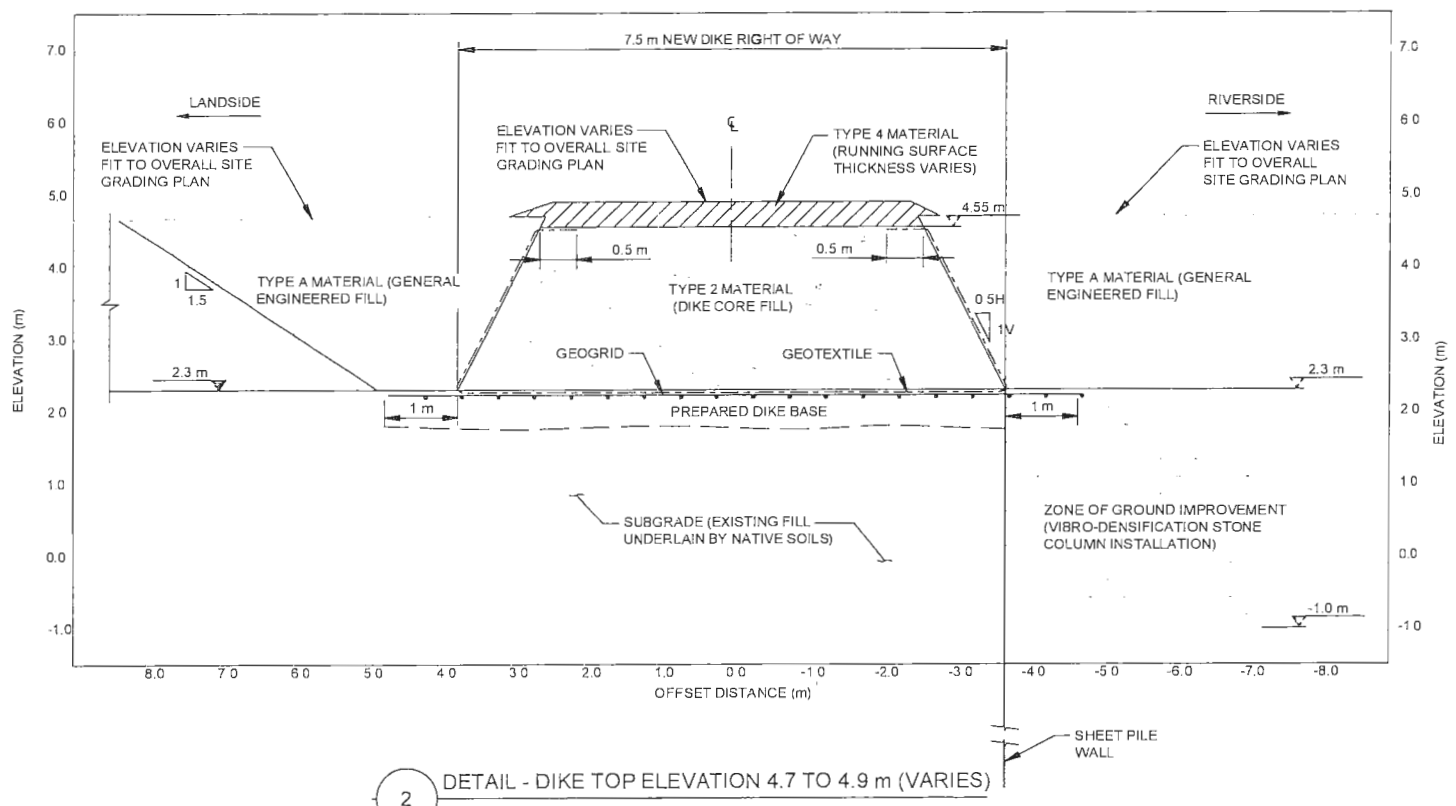
Plan #6



1 DETAIL - DIKE TOP ELEVATION 4.7 m



3 DETAIL - DIKE TOP ELEVATION 5.5 m



2 DETAIL - DIKE TOP ELEVATION 4.7 TO 4.9 m (VARIES)

TYPE 1 MATERIAL (DRAINAGE LAYER)
Type 1 material shall consist of clean well-graded 75 mm minus sand and gravel meeting the following gradation limits

PARTICLE SIZE (mm)	PERCENTAGE BY WEIGHT PASSING
75	100
37.5	60 - 100
19	35 - 80
9.5	26 - 60
4.75	20 - 40
2.36	15 - 30
1.18	10 - 20
0.6	5 - 15
0.3	3 - 10
0.075	0 - 5

TYPE 2 MATERIAL (BULK FILL OR DIKE CORE FILL)
Type 2 material shall consist of well-graded sand with 15 to 30 percent fines passing 0.075 mm sieve meeting the following gradation limits

PARTICLE SIZE (mm)	PERCENTAGE BY WEIGHT PASSING
19	100
4.75	80 - 100
0.425	25 - 90
0.15	18 - 50
0.075	15 - 30

TYPE 3 MATERIAL (RIPRAP FILTER)
Type 3 material shall consist of clean well-graded pit-run or processed sand, gravel and cobbles, or quarried stone meeting the following gradation limits

PARTICLE SIZE (mm)	PERCENTAGE BY WEIGHT PASSING
200	100
75	60 - 90
9.5	30 - 65
0.85	5 - 30
0.15	0 - 5

TYPE 4 MATERIAL (RUNNING SURFACE)
Type 4 material shall consist of clean well-graded 19mm minus sand and gravel or road mulch meeting the following gradation limits

PARTICLE SIZE (mm)	PERCENTAGE BY WEIGHT PASSING
19	100
12.5	75 - 100
9.5	60 - 90
4.75	40 - 70
2.36	27 - 55
1.18	16 - 42
0.6	8 - 30
0.3	5 - 20
0.075	2 - 8

TYPE A MATERIAL (GENERAL ENGINEERED FILL)
Type A material shall consist of clean well-graded 75 mm minus sand and gravel meeting the following gradation limits

PARTICLE SIZE (mm)	PERCENTAGE BY WEIGHT PASSING
75	100
37.5	30 - 100
19	20 - 100
4.75	10 - 60
1.18	6 - 32
0.3	4 - 15
0.075	0 - 5

NOTE(S)
1 BASE DRAWING PROVIDED BY ARGUS CONSULTING CAD FILE: L2.01.DWG DATED RECEIVED MAY 10 2017.
2 ELEVATION SHOWN ARE IN GEODETIC DATUM
3 DATUM NAD 83 PROJECTION ZONE 10

DRAFT

0 2 4
1:50 METRES

CLIENT
FSM MANAGEMENT GROUP

ISSUED	2017-08-18
DESIGNED	M. MIAO / J. JI
PREPARED	GB
REVIEWED	M. MIAO
APPROVED	J. JI

Golder Associates

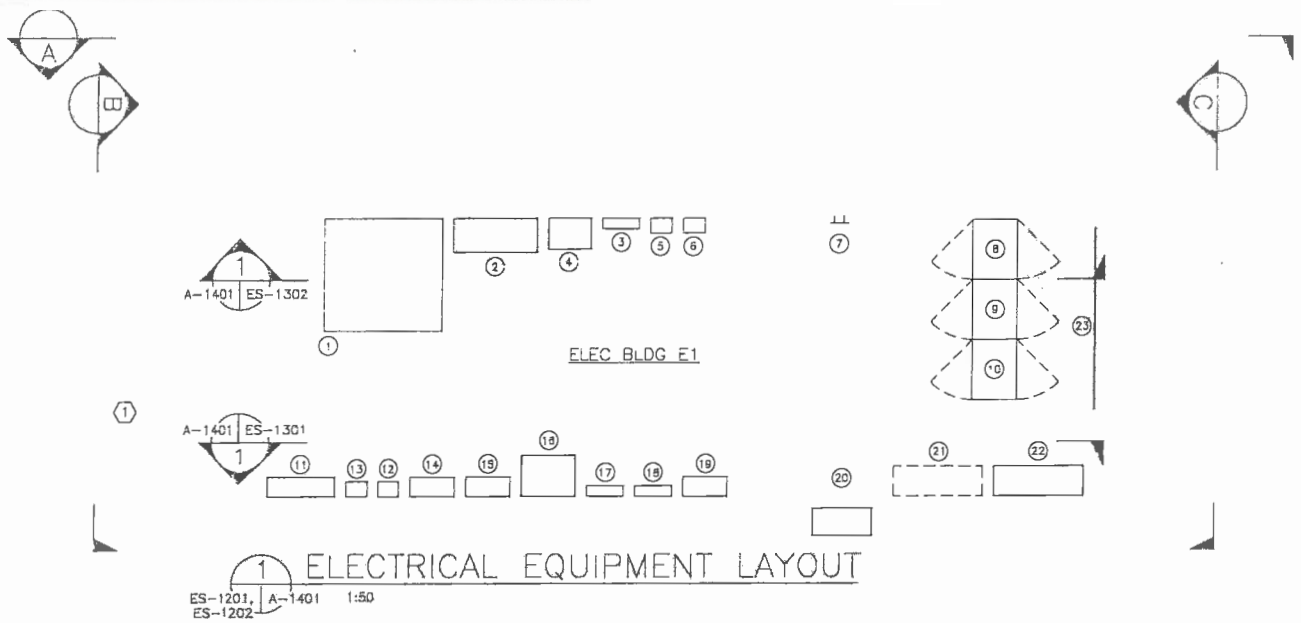
PROJECT
VANCOUVER AIRPORT FUEL DELIVERY PROJECT
NEW FLOOD PROTECTION DIKE
15040 WILLIAMS ROAD, RICHMOND, B.C.

TITLE
TYPICAL DETAILS

PROJECT NO.	PHASE	REV.	FIGURE
1406834	9442	B	3

NOV 29 2017

Plan #7



1 ELECTRICAL EQUIPMENT LAYOUT
ES-1201, ES-1202 A-1401 1:50

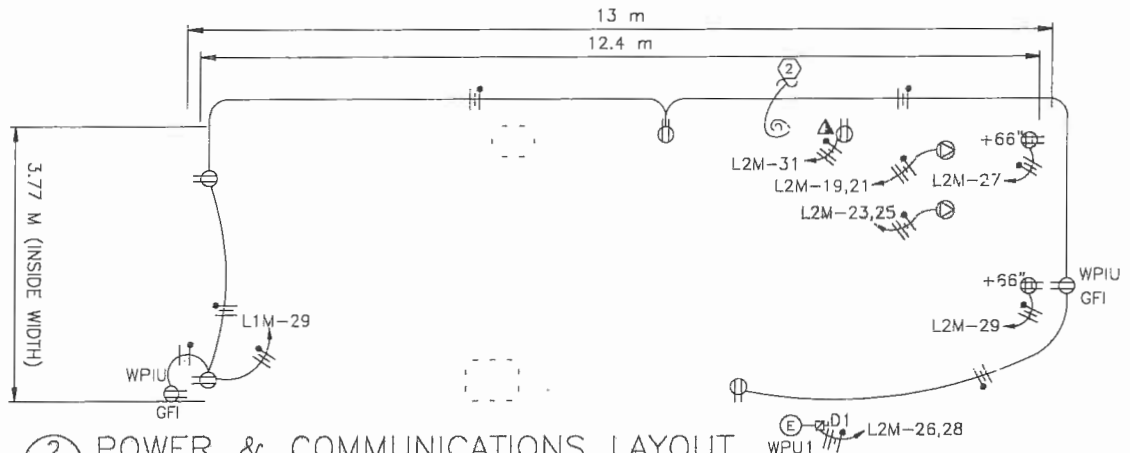
EQUIPMENT LIST			
ITEM(S)	QUANTITY	TAG(S)	DESCRIPTION
1	1	ATS1	AUTOMATIC TRANSFER SWITCH
2	1	MDP1	MAIN DISTRIBUTION PANELBOARD – NORMAL POWER
3	1	L1M	PANELBOARD L1M
4	1	T2M	TRANSFORMER
5	1	ST-SP-103	MOTOR STARTER
6	1	ST-SP-104	MOTOR STARTER
7	1	MGB1	MASTER GROUND BAR 1
8	1	CR1	COMMUNICATIONS RACK 1 (SHORE)
9	1	CR2	COMMUNICATIONS RACK 2 (PIER)
10	1	CR3	COMMUNICATIONS RACK 3 (FUTURE)
11	1	H1M	PANELBOARD H1M
12	1	ST-SP-101	MOTOR STARTER
13	1	ST-SP-102	MOTOR STARTER
14	1	H2M	PANELBOARD H2M
15	1	H2MB	PANELBOARD H2MB
16	1	T3M	TRANSFORMER
17	1	L2M	PANELBOARD L2M
18	1	L2MB	PANELBOARD L2MB
19	1	LCP1	PANELBOARD LCP1
20	1	WPU1	WALL PACKAGE UNIT 1
21	1	PLCC2	PROGRAMMABLE LOGIC CONTROLLER CAB 2 (FUTURE)
22	1	PLCC1	PROGRAMMABLE LOGIC CONTROLLER CAB 1
23	1	BKBD	PLYWOOD BACKBOARD

NOTES:

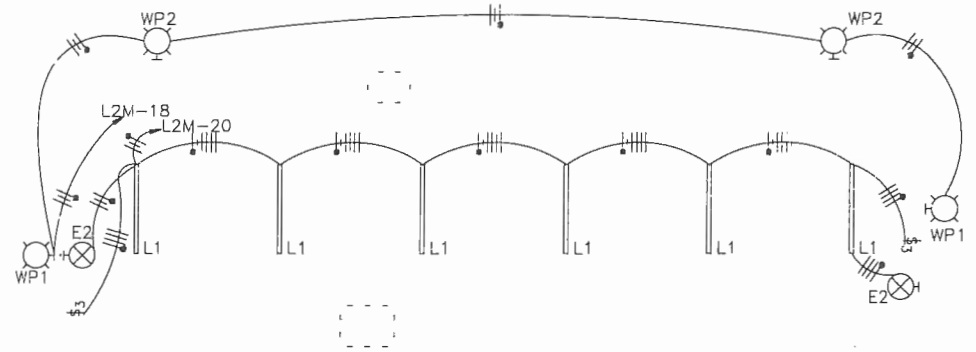
1. SEE DRAWINGS E-1001 AND E-1002 FOR LEGEND, ABBREVIATIONS AND GENERAL NOTES.
2. ELECTRICAL WORK SHOWN WITH DARK LINE WEIGHT SHALL BE PROVIDED.
3. SEE 1700 SERIES DRAWINGS FOR CABLE, DUCTBANK, LIGHTING, PANELBOARD, AND RACEWAY SCHEDULES.

KEYNOTES:

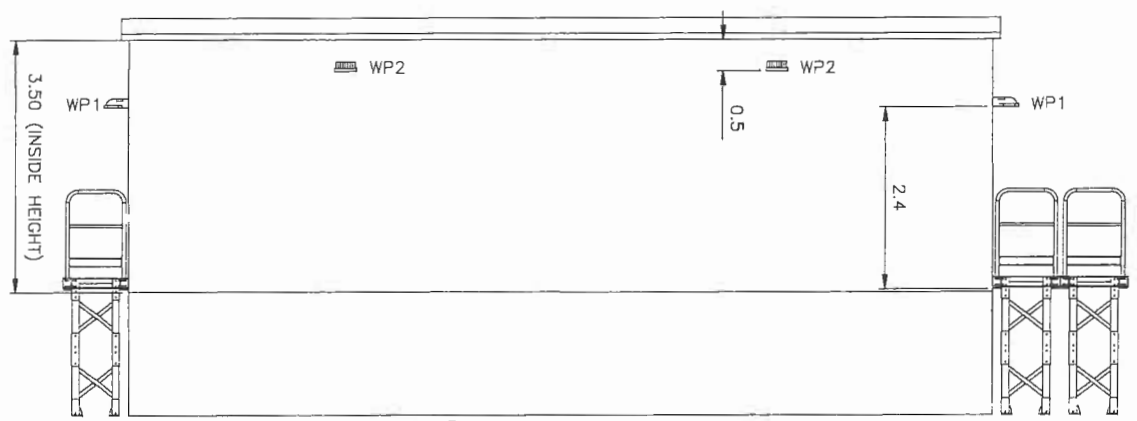
1. PROVIDE REMOVABLE RAIL WIDTH OF DOUBLE DOORS TO AID EQUIPMENT MOVEMENT. SEE STRUCTURAL DRAWINGS FOR DETAILS.
2. PROVIDE GROUND COILED. BOND TO BUILDING COUNTERPOISE FROM MASTER GROUND BAR. SEE DRAWING ES-1104 FOR CONTINUATION.



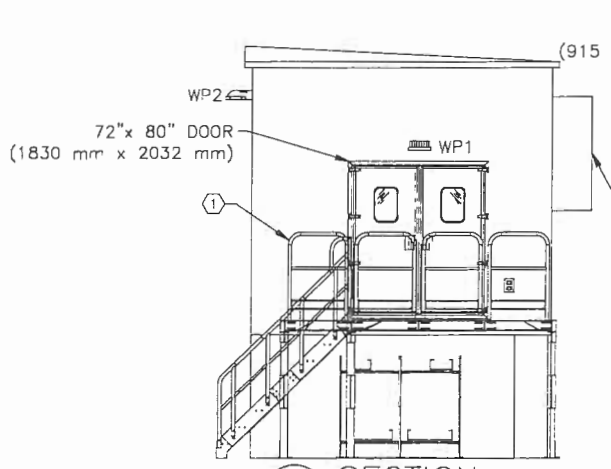
2 POWER & COMMUNICATIONS LAYOUT
ES-1201, ES-1202 A-1401 1:50



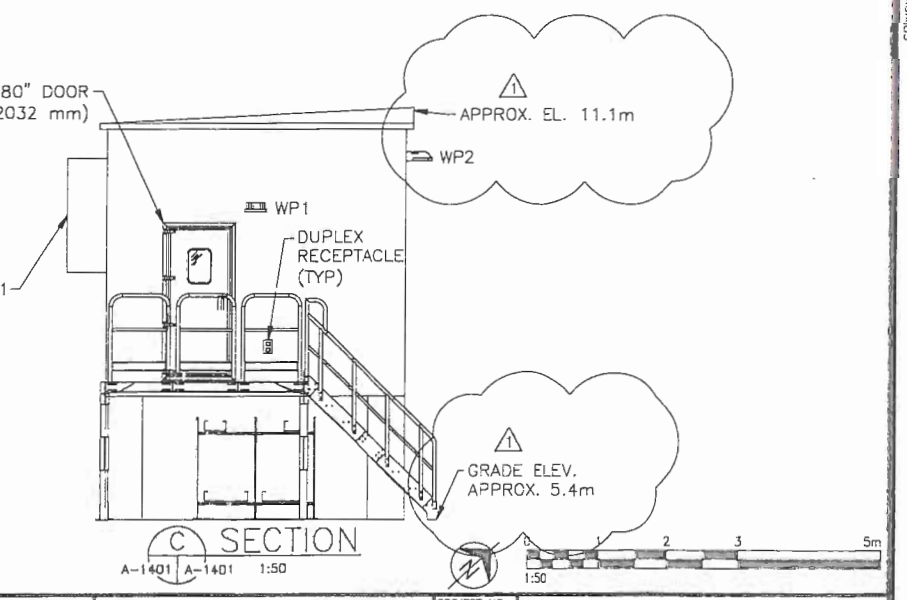
3 LIGHTING LAYOUT
ES-1201, ES-1202 A-1401 1:50



A SECTION
A-1401 A-1401 1:50



B SECTION
A-1401 A-1401 1:50



C SECTION
A-1401 A-1401 1:50

1	ADDED ELEVATION TEXT	08/18/2017
	ISSUED FOR CONSTRUCTION	02/14/17
ISSUE NO.	DRAWING REVISIONS	ISSUE DATE

Fuel Facilities Corporation

VANCOUVER AIRPORT FUEL DELIVERY PROJECT
MARINE RECEIVING AREA

VANCOUVER AIRPORT FUEL FACILITIES CORPORATION
RICHMOND, BRITISH COLUMBIA

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Overland Park, Kansas 66211
816.228.7500 FAX 816.228.7535
www.argusconsulting.com

PROJECT NO:	15004.22
DATE:	03/19/16
DESIGNED BY:	WBJ
DRAWN BY:	SWF
CHECKED BY:	DWF
CAD FILE NAME:	15004-22C-A1401

E1 ELEC BLDG FLOOR PLAN

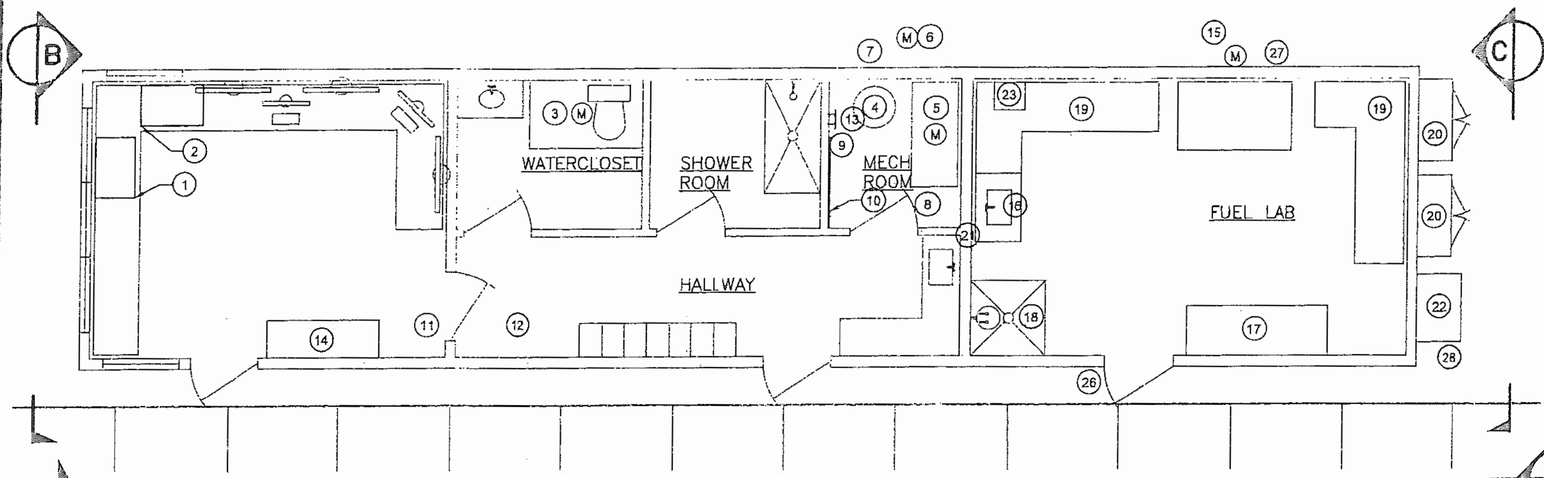
DRAWING NO.: A-1401

NOV 27 2017

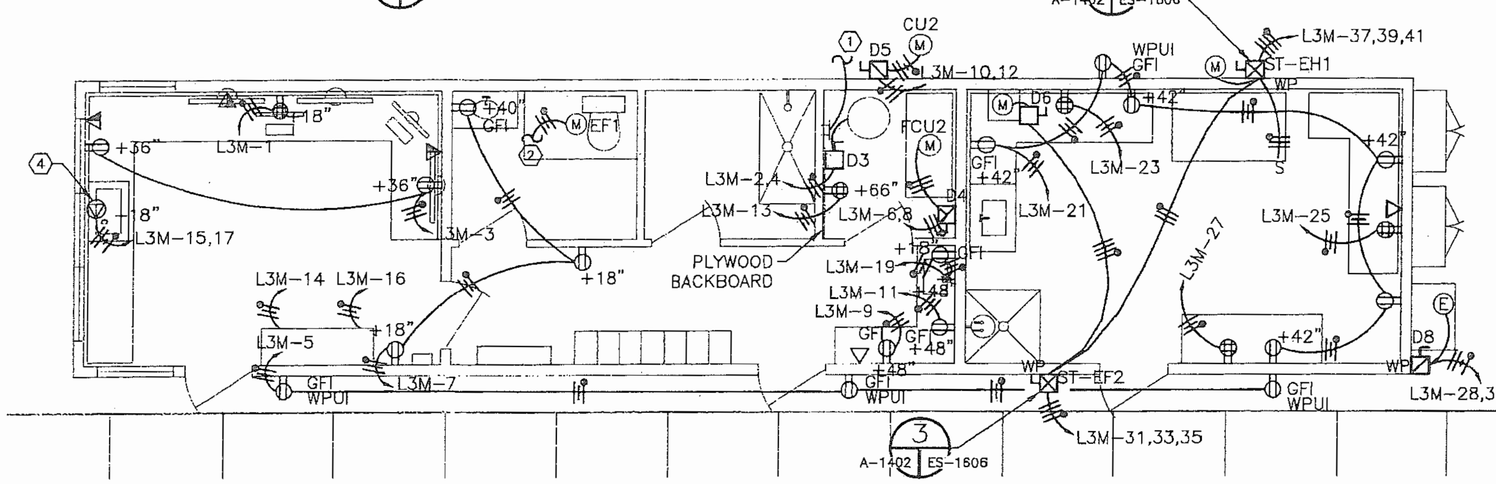
ISSUED FOR CONSTRUCTION

Plotted: Y:\Comm\YVR – Vancouver\15004 VAFDP\Dwgs\22-Marine\22C – Design\Arch\15004.22C-A1401.dwg on 08/18/17 at 5:53 PM by SNEWBOLD using acad.stb

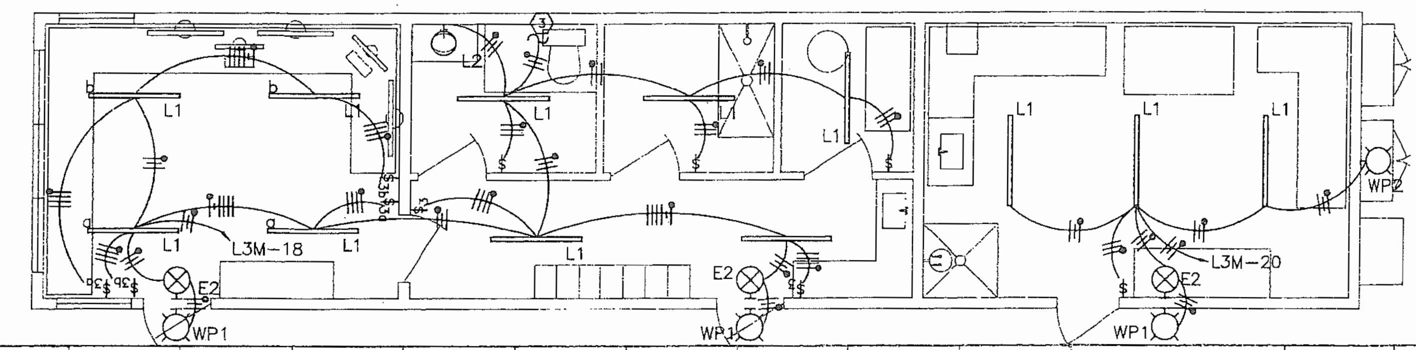
Plan #8



1 ELECTRICAL EQUIPMENT LAYOUT
ES-1203 | A-1402 1:50



2 POWER & COMMUNICATIONS LAYOUT
ES-1203 | A-1402 1:50



3 LIGHTING LAYOUT
ES-1203 | A-1402 1:50

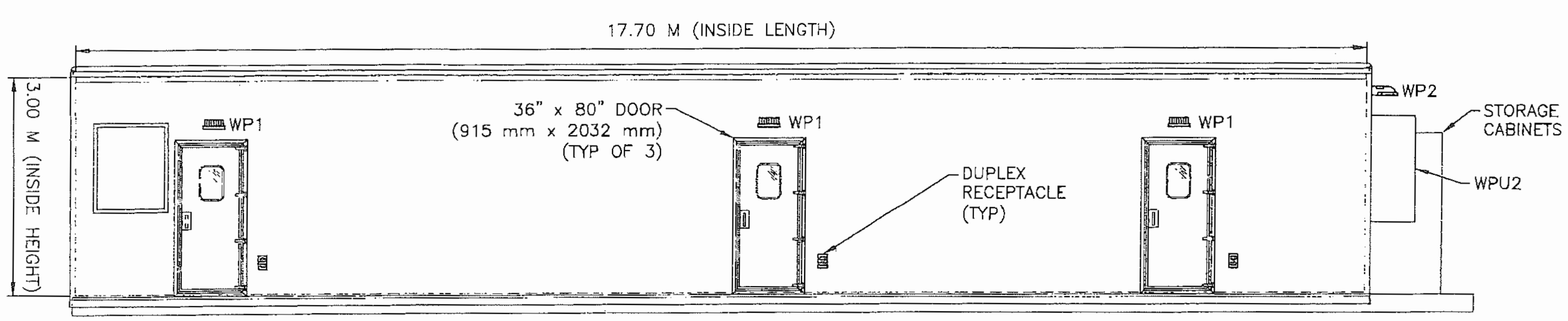
EQUIPMENT LIST			
ITEM(S)	QUANTITY	TAG(S)	DESCRIPTION
1	1	MR-CR-4	COMMUNICATIONS RACK 4
2	1	MR-CR-5	COMMUNICATIONS RACK 5
3	1	EF1	EXHAUST FAN 1
4	1	WH1	WATER HEATER 1
5	1	FCU2	FAN COIL UNIT 2
6	1	CU2	CONDENSING UNIT 2
7	1	D5	SERVICE DISCONNECT (CU2)
8	1	D4	SERVICE DISCONNECT (FCU2)
9	1	D3	SERVICE DISCONNECT (WH1)
10	1	BKBD	PLYWOOD BACKBOARD
11	1	GAP1	GENERATOR ANUNCIATOR PANEL
12	1	L3M	PANELBOARD L3M
13	1	MGB2	MASTER GROUND BAR 2
14	1	NODE1	FIRE ALARM CONTROL PANEL
15	1	EH1	EXHAUST HOOD
16	1	CT1	WATER ONLY SINK
17	1	CB1	WORKBENCH BASE CABINETS
18	1	EWSH1	EYE WASH / SHOWER STATION
19	2	CB2	CABINET BASE AND OVERHEAD UNIT (LEFT CORNER)
20	2	CO	OUTDOOR FUEL SAMPLE CABINETS
21	1	FW1	FIRE WALL BETWEEN OPERATIONS AND FUEL LAB
22	1	WPU2	WALL PACKAGE UNIT 2
23	1	EF2	EXHAUST FAN
24	1	D6	SERVICE DISCONNECT (EF2)
25	1	D7	SERVICE DISCONNECT (WPU2)
26	1	ST-EF2	MOTOR STARTER (EF2)
27	1	ST-EH1	MOTOR STARTER (EH1)

NOTES:

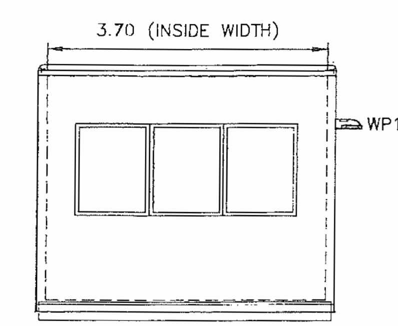
1. SEE DRAWINGS E-1001 AND E-1002 FOR LEGEND, ABBREVIATIONS AND GENERAL NOTES.
2. ELECTRICAL WORK SHOWN WITH DARK LINE WEIGHT SHALL BE PROVIDED.
3. SEE 1700 SERIES DRAWINGS FOR CABLE, DUCTBANK, LIGHTING, PANELBOARD, AND RACEWAY SCHEDULES.

KEYNOTES:

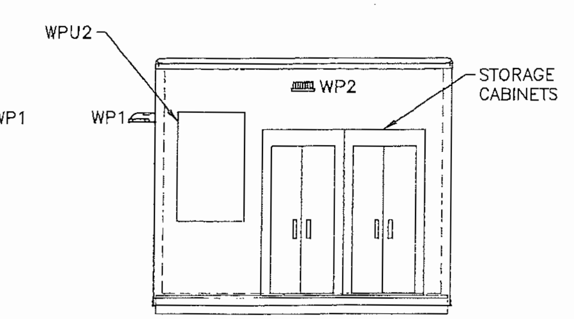
1. PROVIDE GROUND COILED IN MECHANICAL ROOM. BOND TO BUILDING COUNTERPOISE FROM MASTER GROUND BAR. SEE DRAWING ES-1104 FOR CONTINUATION.
2. SEE CONTINUATION FOR EXHAUST FAN ON DETAIL 3 LIGHTING LAYOUT ON THIS SHEET.
3. SEE CONTINUATION FOR EXHAUST FAN ON DETAIL 2 POWER LAYOUT ON THIS SHEET.
4. PROVIDE RECEPTACLE TO MATCH UPS EQUIPMENT PLUG.



A SECTION
ES-1203 | A-1402 1:50



B SECTION
ES-1203 | A-1402 1:50



C SECTION
ES-1203 | A-1402 1:50

	ISSUED FOR CONSTRUCTION	02/14/17
ISSUE NO.	DRAWING REVISIONS	ISSUE DATE

VAFFC Fuel Facilities Corporation

VANCOUVER AIRPORT FUEL DELIVERY PROJECT
MARINE RECEIVING AREA

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RICHMOND, BRITISH COLUMBIA

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PROJECT NO: 15004.22
DATE: 03/19/15
DESIGNED BY: WBJ
DRAWN BY: SMF
CHECKED BY: DWF
CAD FILE NAME: 15004.22CA1402

OPS1 OPERATIONS BLDG AND FL1 FUEL LAB FLOOR PLANS

DRAWING NO.: A-1402

NOV 29 2017

Plotted: Y:\Comm\YVR – Vancouver\15004 VAFDP\Dwgs\22-Marine\22C – Design\Arch\15004.22CA1402.dwg on 03/6/17 at 1:58 PM by GCROWDER using acad.stb

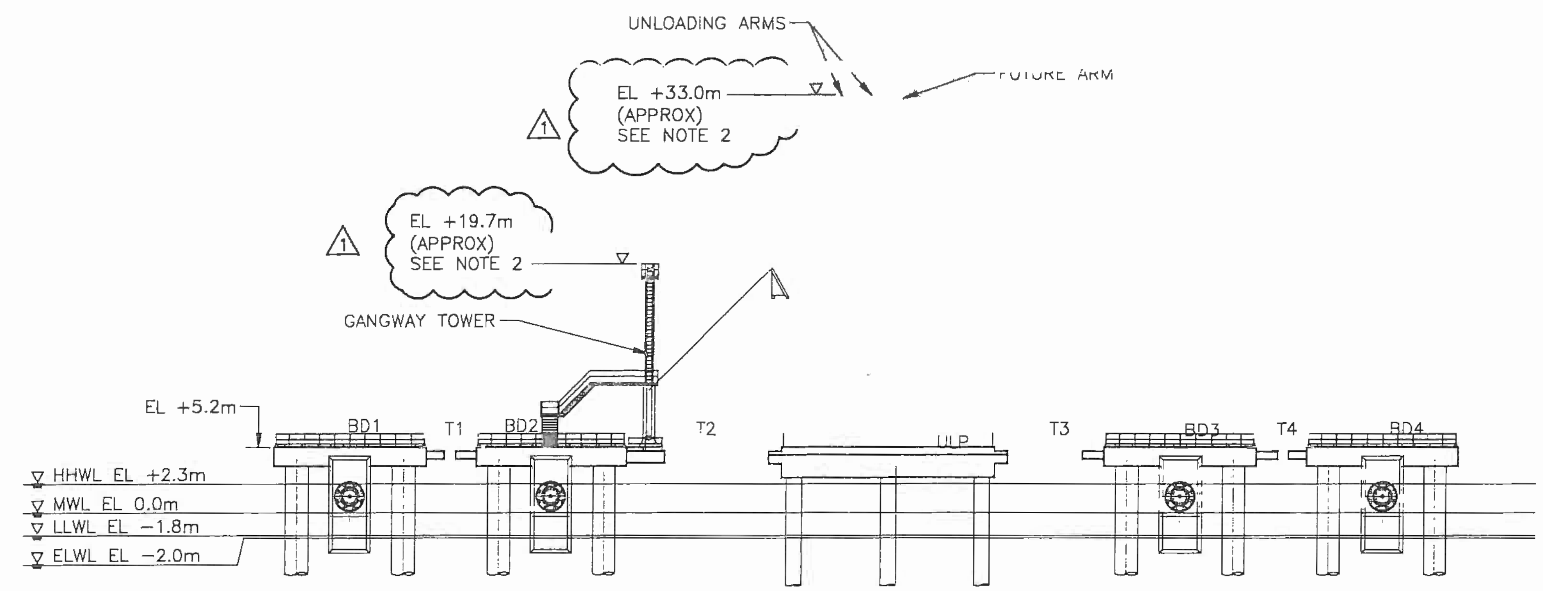
Plan #9

ISSUED FOR DEVELOPMENT PERMIT REVIEW

NOV 2 9 2017

NOTES:

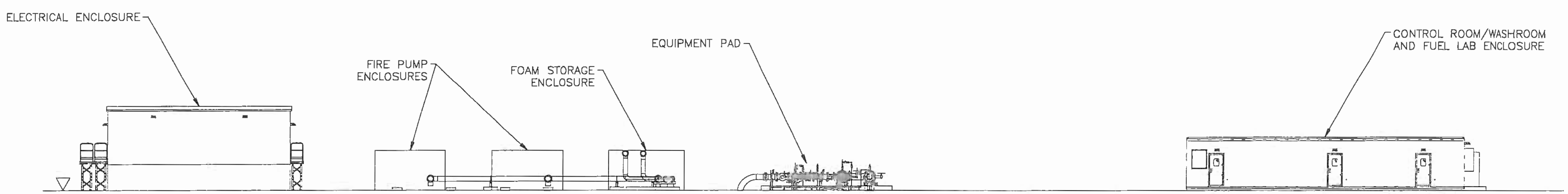
1. ELEVATIONS ARE TO GEODETIC DATUM.
2. ELEVATIONS OF VENDOR SUPPLIED MECHANICAL EQUIPMENT SHOWN ARE APPROXIMATE AND SUBJECT TO CHANGE ONCE EQUIPMENT IS ORDERED AND SHOP DRAWINGS PRODUCED.



A ELEVATION (CS-101) 1:300

0 6 12 18 30m 1:300

BUILDING AREA AND STRUCTURE ELEVATIONS			
BUILDING NAME	FLOOR AREA (M^2)	STRUCTURE HEIGHT (M)	STRUCTURE ELEVATION (M)
CONTROL ROOM AND WASHROOM ENCLOSURE	43.29	3.5	9.0
FUEL LAB ENCLOSURE	21.65	3.5	9.0
FIRE PUMP ENCLOSURE 1	33.51	2.6	8.1
FIRE PUMP ENCLOSURE 2	33.51	2.6	8.1
FOAM STORAGE ENCLOSURE	28.01	2.6	8.1
ELECTRICAL ENCLOSURE	45.97	5.5	11.0
DOCK UNLOADING ARMS	N/A	33.0	37.8
DOCK GANGWAY TOWER	N/A	19.7	24.5
NOTE: THE MARINE UNLOADING ARMS ELEVATION ARE TO BE DETERMINED BY THE MANUFACTURER. APPROXIMATE ELEVATIONS OF THE STRUCTURE ARE LISTED ABOVE			
SITE AREA: 40,468 M^2 LOT COVERAGE AREA: 0.52%			



B ELEVATION (CS-101) 1:150

0 3 6 9 15m 1:150

ISSUE NO.	DRAWING REVISIONS	ISSUE DATE
2	ISSUED FOR DEVELOPMENT PERMIT REVIEW	05/05/2017
1	ELEVATIONS ADDED	04/27/2017
0	ISSUED FOR CONSTRUCTION	02/14/2017

Fuel Facilities Corporation

VANCOUVER AIRPORT FUEL DELIVERY PROJECT
MARINE RECEIVING AREA
MARINE DESIGN PACKAGE
VANCOUVER AIRPORT FUEL FACILITIES CORPORATION
RICHMOND, BRITISH COLUMBIA

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PROJECT NO: 15004.22C
DATE: 12/18/15
DESIGNED BY: FS
DRAWN BY: AVV
CHECKED BY: RB
CAD FILE NAME: 15004.22C-G031

ELEVATION

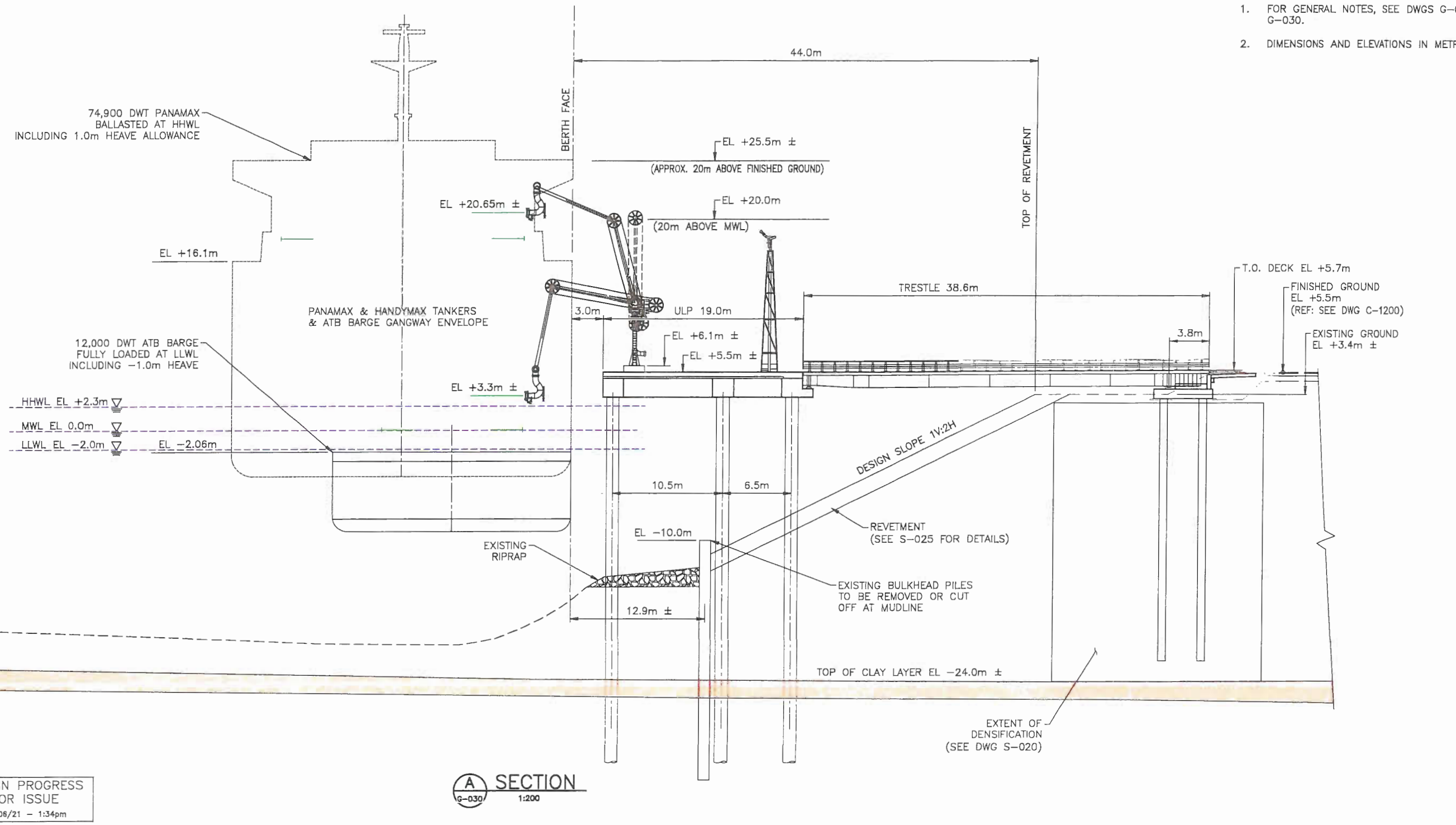
DRAWING NO.: G-031

Plotted: Y:\Comm\YVR - Vancouver\15004 VAFDP\Dwgs\22-Marine\22A - Permit\Gen\15004.22C-G031 ELEVATION 2017-05-01\15004.22C-G031.dwg on 05/5/17 at 9:13 AM by NPARK using acad.stb

Plan # 10

NOTES:

1. FOR GENERAL NOTES, SEE DWGS G–003 & G–030.
2. DIMENSIONS AND ELEVATIONS IN METRES (m).



A G–030 SECTION 1:200

REVISION IN PROGRESS
NOT FOR ISSUE
DATE: 2017/06/21 – 1:34pm

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

0 4 8 12 20m
1:200

NOV 29 2017

ISSUED FOR CONSTRUCTION

PLEASE RECYCLE

ISSUE NO.	DRAWING REVISIONS	ISSUE DATE

Fuel Facilities Corporation

PSM GROUP 106 12300 Horseshoe Way Richmond BC V7A 4Z1 604-271-7113 www.psmgroup.ca www.vancouverairportfuel.ca

VANCOUVER AIRPORT FUEL DELIVERY PROJECT
MARINE RECEIVING AREA
MARINE DESIGN PACKAGE
VANCOUVER AIRPORT FUEL FACILITIES CORPORATION
RICHMOND, BRITISH COLUMBIA

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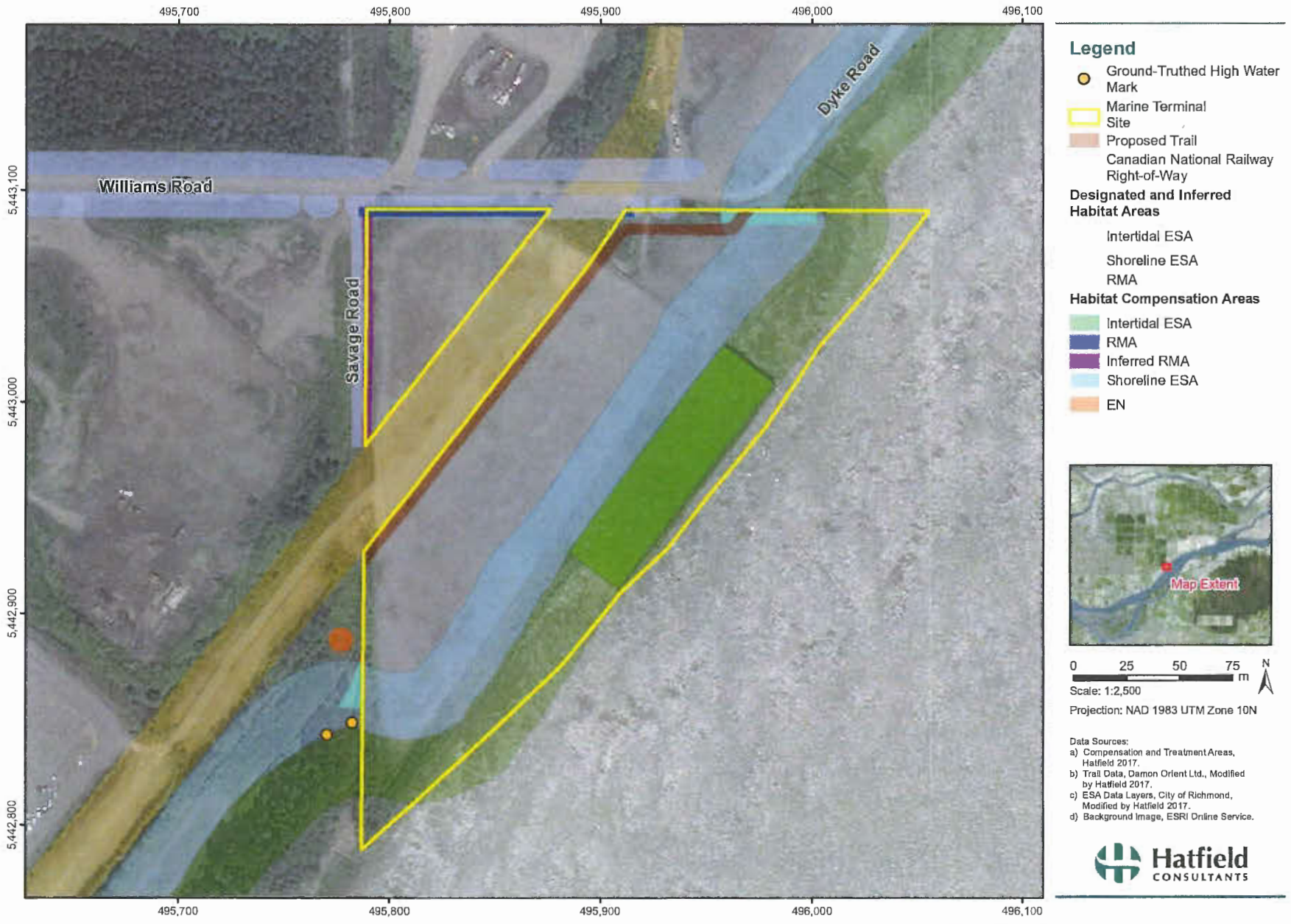
PROJECT NO: 15004.22C	UNLOADING PLATFORM SECTION
DATE: 10/20/15	
DESIGNED BY: SP	
DRAWN BY: AVM	
CHECKED BY: RB	DRAWING NO.: G-034
CAD FILE NAME: 15004.22C-G034	

Plotted: P:\8338 VC Vancouver Airport Fuel Delivery Project\CADD_Active\15004.22C-G034.dwg on 06/21/17 at 1:34 PM by AMANUZON using Argus.stb

Plan #11

Figure 1 Vancouver Airport Fuel Delivery Project – Marine terminal proposed habitat compensation areas



Legend

- Ground-Truthed High Water Mark
- Marine Terminal Site
- Proposed Trail
- Canadian National Railway Right-of-Way

Designated and Inferred Habitat Areas

- Intertidal ESA
- Shoreline ESA
- RMA

Habitat Compensation Areas

- Intertidal ESA
- RMA
- Inferred RMA
- Shoreline ESA
- EN

0 25 50 75 m N

Scale: 1:2,500

Projection: NAD 1983 UTM Zone 10N

Data Sources:
a) Compensation and Treatment Areas, Hatfield 2017.
b) Trail Data, Damon Orient Ltd., Modified by Hatfield 2017.
c) ESA Data Layers, City of Richmond, Modified by Hatfield 2017.
d) Background Image, ESRI Online Service.

Hatfield CONSULTANTS

K:\Data\Project\VAFFC6773\A_MXD\HabitatComp\MarineTerminal\VAFFC6773_Fig1_MT_HabitatComp_20170629_v1_13_SJ.mxd

This plan is reprinted from the
ESA and RMA Environmental Impacts Report
by
Hatfield Environmental Consultants

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Project
VAFFC MARINE TERMINAL FACILITY

15040 Williams Road, Richmond BC

Drawing
PROPOSED COMPENSATION AREAS

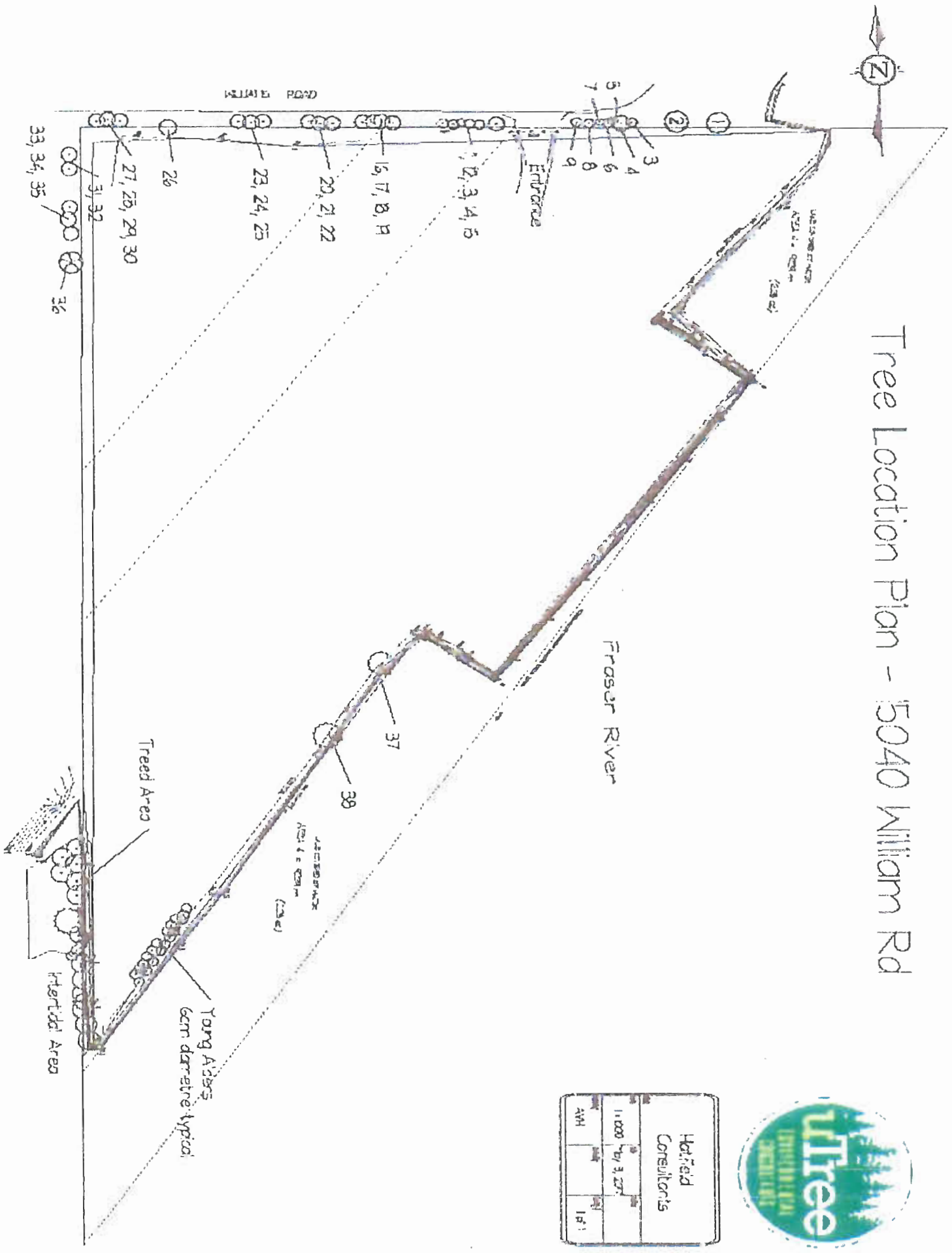
Issue:
31 Oct. 2017 Development Permit Application Resubmission - ADP Comments

Scale: nts
Date:
Project Number: 2014-280

Dwg
L0.03

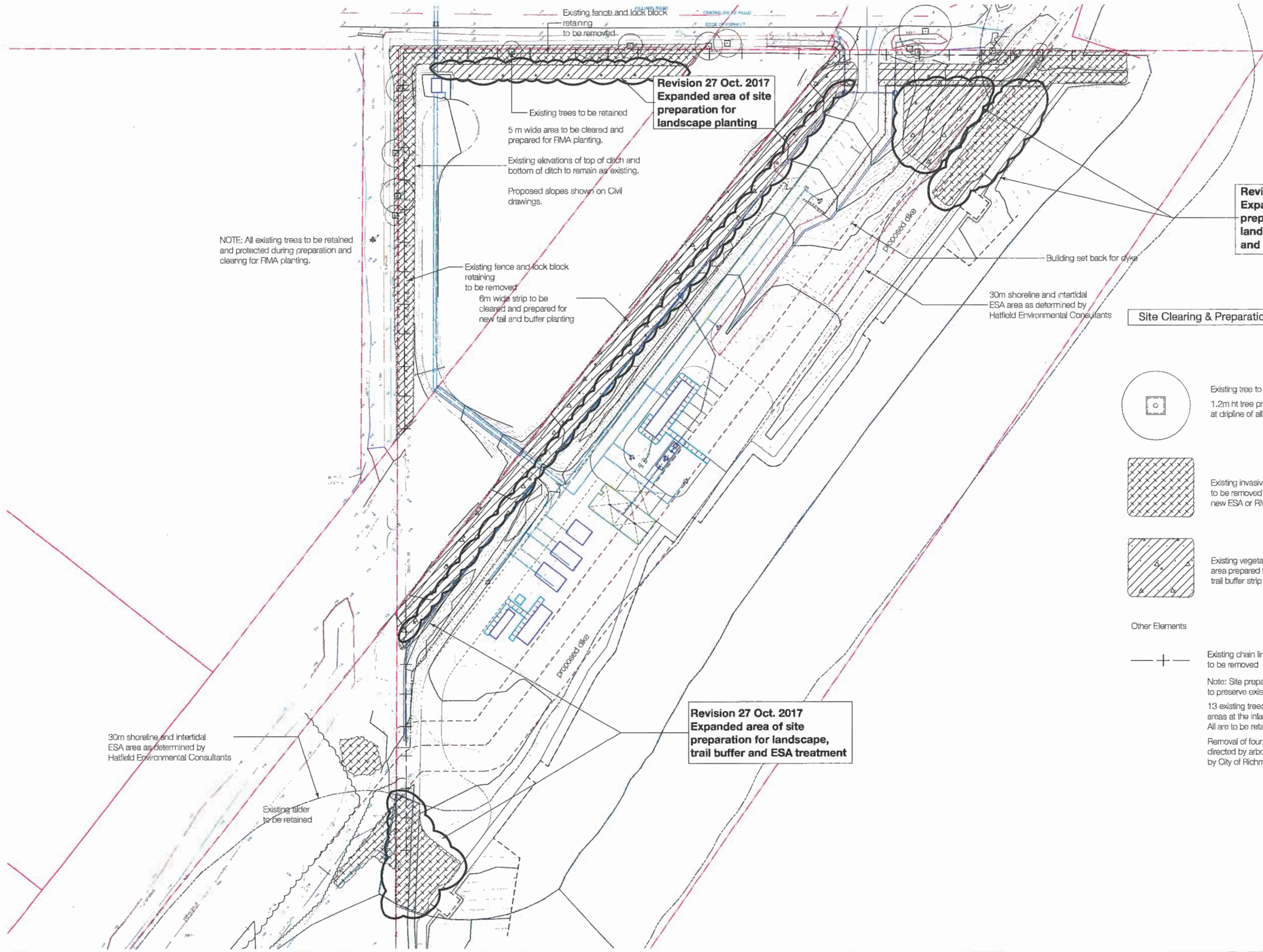
Plan # 12

Tree Location Plan - 5040 William Rd



uTree Environmental Consultants.
p 604-328-0614 e avanderhelm1@gmail.com w www.utree.com

Plan #13



Site Clearing & Preparation Key - Landscape

Existing tree to be retained

1.2m ht tree protection fencing to be erected at dripline of all existing trees to be retained

Existing invasivse species of vegetation to be removed and area prepared for new ESA or RMA planting

Existing vegetation to be removed and area prepared for new gravel trail and trail buffer strip planting

Other Elements

Existing chain link and/ or metal panel fence to be removed

Note: Site preparation work in RMA and ESA areas to preserve existing ditch slopes and locations.

13 existing trees are found on the RMA areas at the inland site perimeter. All are to be retained

Removal of four, off-site trees only as directed by arborist and as approved by City of Richmond Parks Staff

W E S

NOV 29 2017

DP 16-741741

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Project
VAFFC MARINE TERMINAL FACILITY
16040 Williams Road, Richmond BC

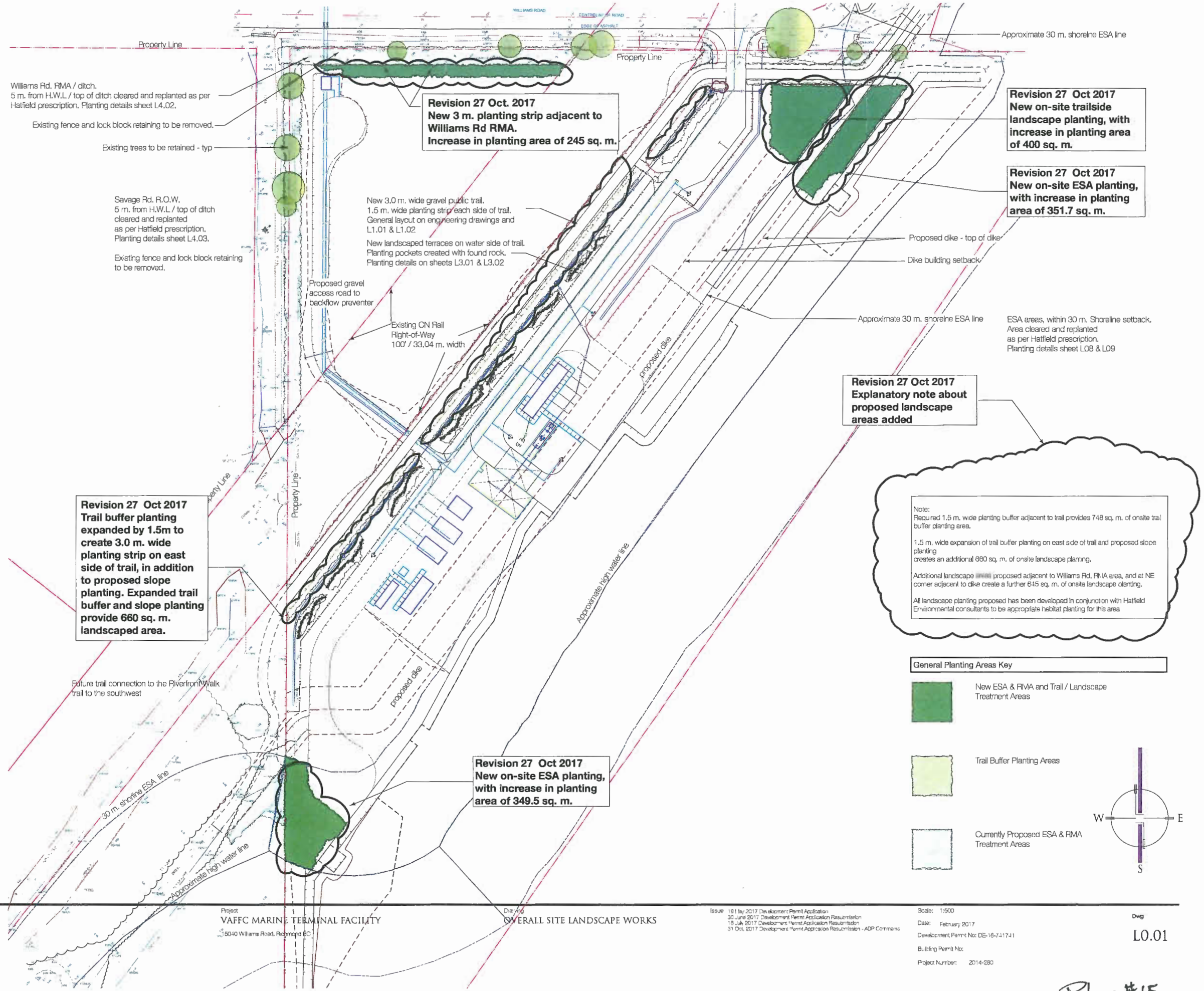
Drawing
SITE PREPARATION & CLEARING

Issue 19 May 2017 Development Permit Application
30 June 2017 Development Permit Application Resubmission
18 July 2017 Development Permit Application Resubmission
31 Oct. 2017 Development Permit Application Resubmission - ADP Comments

Scale 1:500
Date: February 2017
Development Permit No: DP-16-741741
Building Permit No:
Project Number: 2014-280

Dwg
L1.01

Plan #14



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Project
VAFFC MARINE TERMINAL FACILITY
5040 Williams Road, Richmond BC

Drawing
OVERALL SITE LANDSCAPE WORKS

Issue 18 May 2017 Development Permit Application
30 June 2017 Development Permit Application Resubmission
18 July 2017 Development Permit Application Resubmission
31 Oct. 2017 Development Permit Application Resubmission - ADP Comments

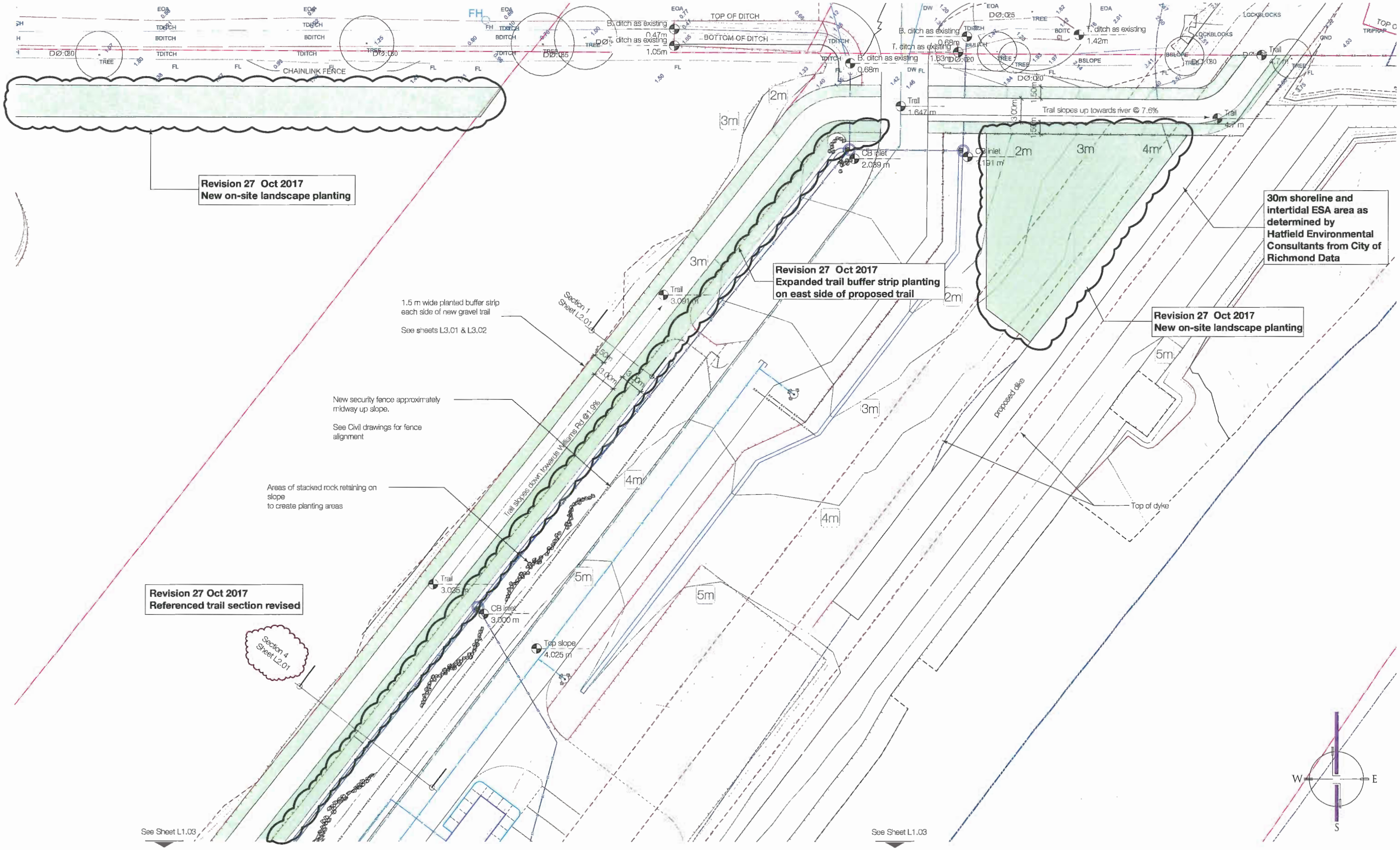
Scale: 1:500
Date: February 2017
Development Permit No: DP-16-741741
Building Permit No:
Project Number: 2014-280

Dwg
L0.01

Plan #15

NOV 29 2017

DP 16-741741



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Project
VAFFC MARINE TERMINAL FACILITY
15040 Williams Road, Richmond BC

Drawing
TRAIL LAYOUT - NORTH

Issue: 9 May 2017 Development Permit Application
30 June 2017 Development Permit Application Resubmission
18 July 2017 Development Permit Application Resubmission
31 Oct. 2017 Development Permit Application Resubmission - ADP Comments

Scale: 1:200
Date: February 2017
Development Permit No: DP-16-741741
Building Permit No:
Project Number: 2014-280

Dwg
L1.02

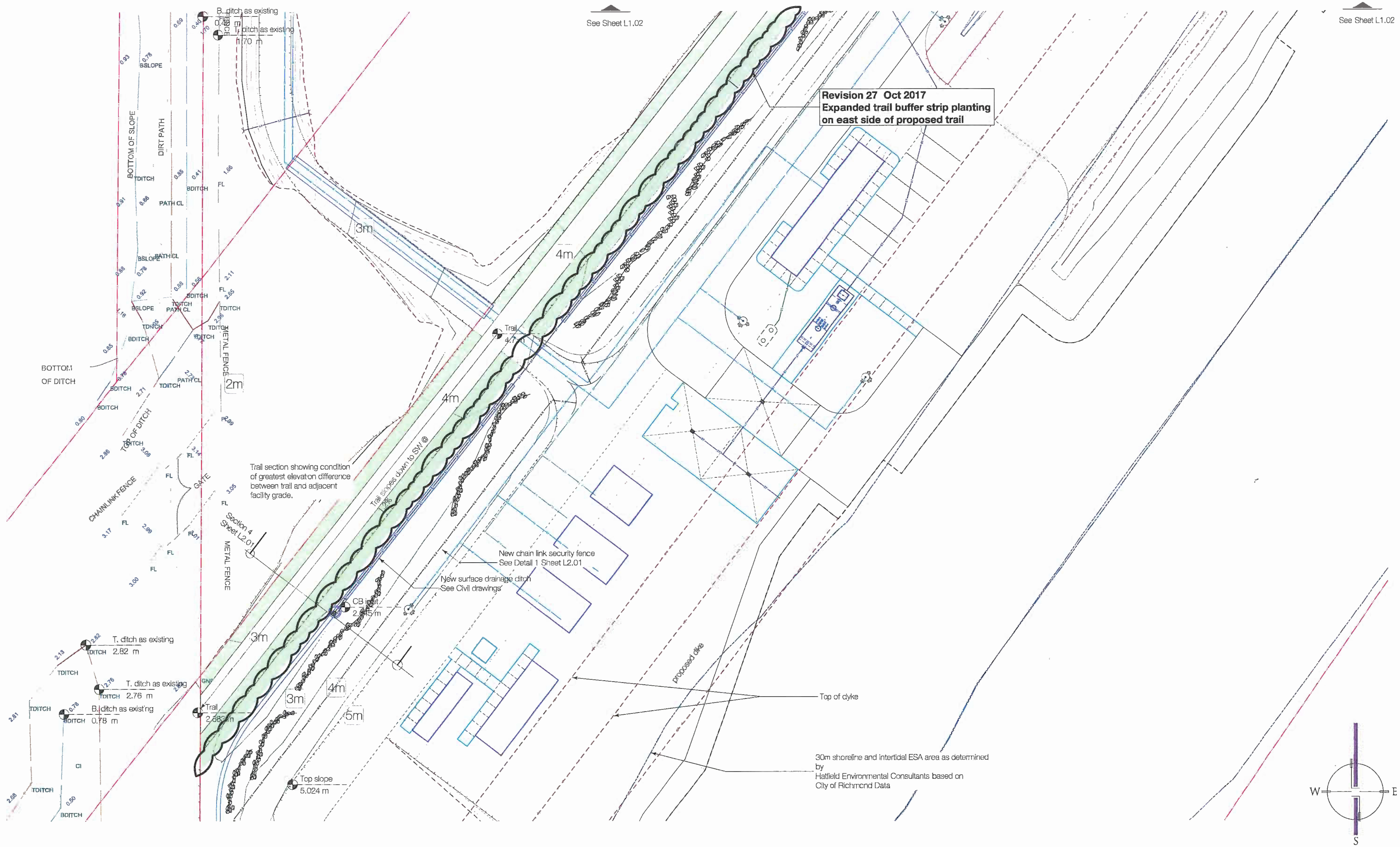
NOV 29 2017

DP 16-741741

Plan #16

DP 16-741741

NOV 2 9 2017



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Project
VAFFC MARINE TERMINAL FACILITY
15040 Williams Road, Richmond BC

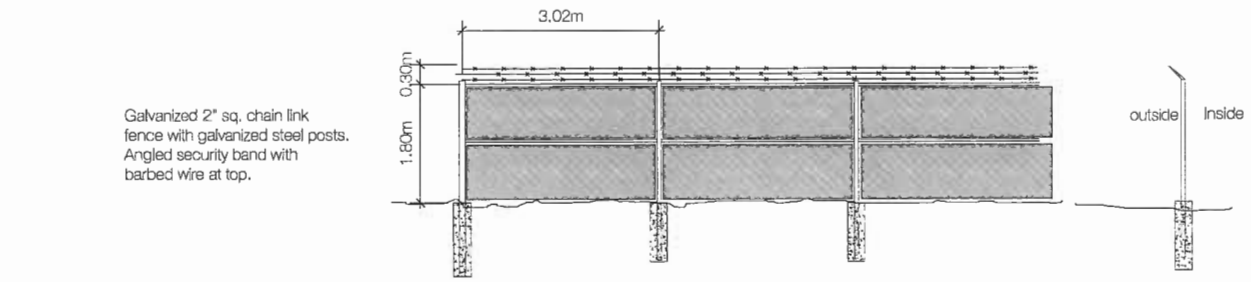
Drawing
TRAIL LAYOUT - SOUTH

Issue
19 May 2017 Development Permit Application
30 June 2017 Development Permit Application Resubmission
18 July 2017 Development Permit Application Resubmission
31 Oct. 2017 Development Permit Application Resubmission - ADP Comments

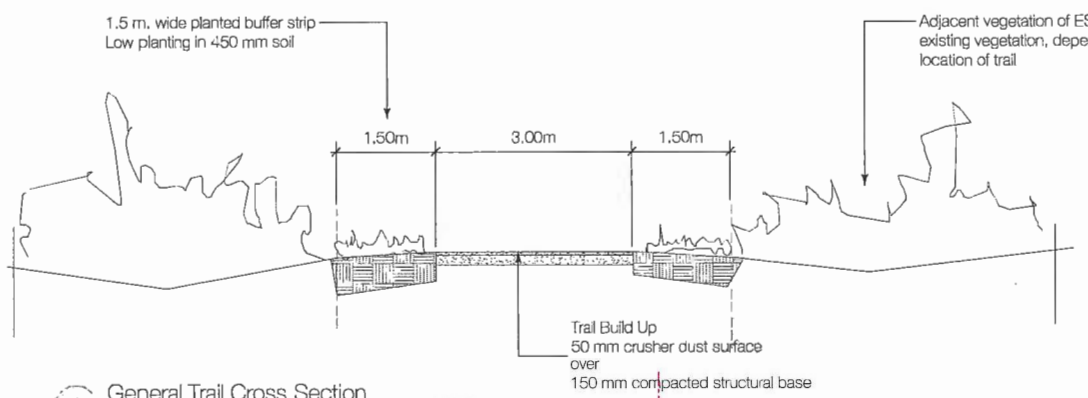
Scale: 1:200
Date: February 2017
Development Permit No: DP-16-741741
Building Permit No:
Project Number: 2014-280

Dwg
L1.03

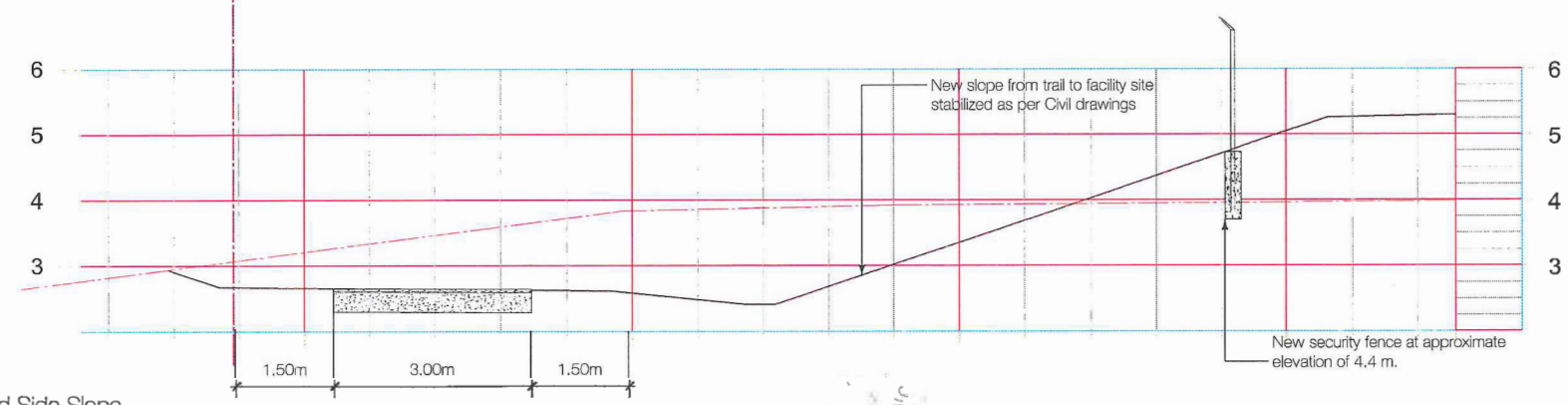
Plan #17



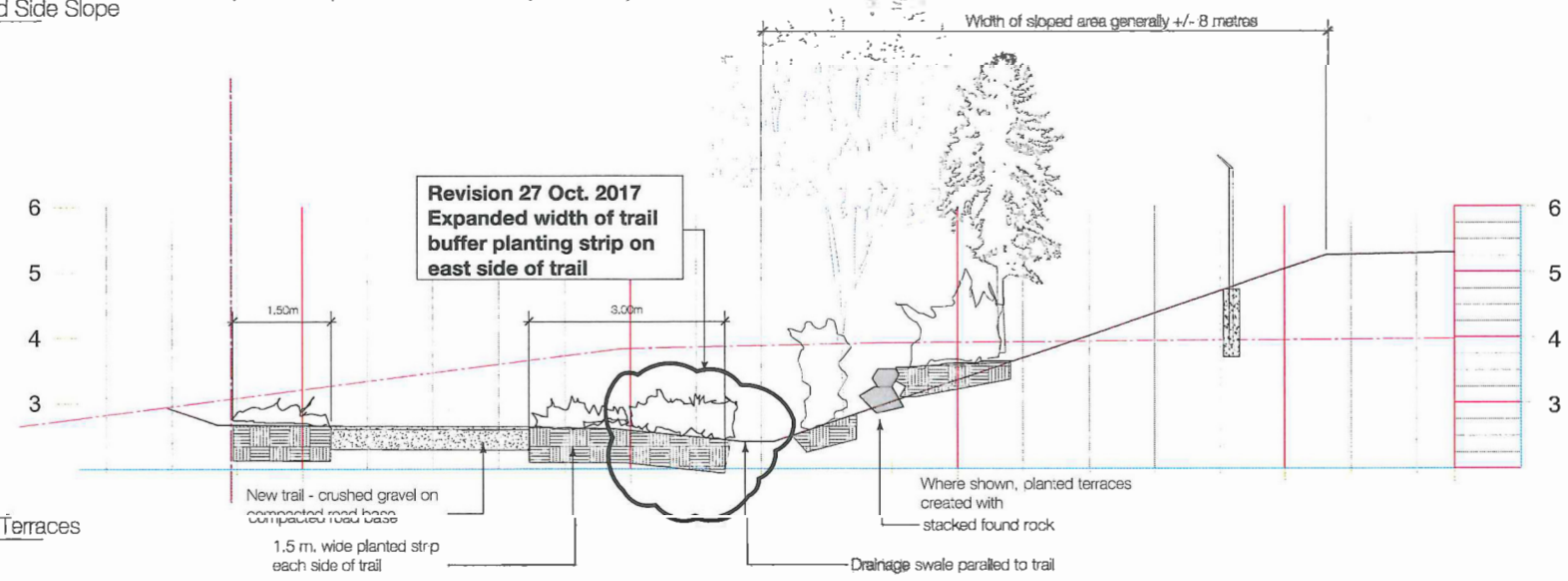
1 Security Fence - Typical



2 General Trail Cross Section



3 Trail Through Facility Site - Standard Side Slope



4 Trail Through Facility Site - Planted Terraces

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Project
VAFFC MARINE TERMINAL FACILITY
15040 Williams Road, Richmond BC

Drawing
TRAIL SECTIONS

Issue
19 May 2017 Development Permit Application
30 June 2017 Development Permit Application Resubmission
18 July 2017 Development Permit Application Resubmission
31 Oct. 2017 Development Permit Application Resubmission - ADP Comments

Scale 1:50
Date: February 2017
Development Permit No: DP-16-741741
Building Permit No:
Project Number: 2014-260

Dwg
L2.01

NOV 29 2017

DP 16-741741

Plan #18

CENTRELINE OF ROAD

EDGE OF ASPHALT

TOP OF DITCH

BOTTOM OF DITCH

CHAIN LINK FENCE

Revision 27 Oct 2017
New on-site landscape planting adjacent to RMA planting

Revision 27 Oct 2017
Expanded trail buffer strip planting on east side of proposed trail

Revision 27 Oct 2017
New on-site landscape planting

Groundcover and Shrubs

Groundcover

30 m. shoreline ESA setback line

Groundcover and Grasses

Groundcover

Groundcover and Grasses

Groundcover and Shrubs

proposed dike

Top of dyke

Building setback for dyke

See Sheet L3.02

See Sheet L3.02

Trail Buffer Planting Areas Key

Trail Planting 1 - Groundcover

ac	Arctostaphyllos uva-ursi	Kinnikinnick	4 plants per sq. m.
fc	Fragraria chiloensis	Coastal strawberry	4 plants per sq. m.

Trail Planting 2 - Groundcover & Grasses

ac	Arctostaphyllos uva-ursi	Kinnikinnick	2 plants per sq. m.
Eg	ELymus glaucus	Blue lyme grass	3 plants per sq. m.
Lm	Leymus mollis	Dune grass	3 plants per sq. m.

Trail Planting 3 - Groundcover & Shrubs

Rosa	Rosa gymnocarpa	Baldhip rose	1 plant per sq. m.
Mn	Mahonia nervosa	Dull Oregon grape	1 plant per sq. m.
Ma	Mahonia aquafolium	Oregon grape	0.25 plants per sq. m.
ac	Arctostaphyllos uva-ursi	Kinnikinnick	2 plants per sq. m.

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Project
VAFFC MARINE TERMINAL FACILITY
15040 Williams Road, Richmond BC

Drawing
TRAIL PLANTING AREA 1

Issue
19 May 2017 Development Permit Application
30 June 2017 Development Permit Application Resubmission
18 July 2017 Development Permit Application Resubmission
31 Oct. 2017 Development Permit Application Resubmission - ADP Comments

Scale: 1:200
Date: February 2017
Development Permit No: DP-16-741741
Building Permit No:
Project Number: 2014-280

Dwg
L3.01

Plan #19

See Sheet L3.01

See Sheet L3.01

BOTTOM OF SLOPE
DIRT PATH
TDITCH
BDITCH
PATH CL
BSLOPE
BOTTOM OF DITCH
TOP OF DITCH
METAL FENCE
CHAINLINK FENCE
GATE
FL
CI

Revision 27 Oct 2017
Expanded trail buffer strip planting on east side of proposed trail

Groundcover and Grasses

Groundcover and Shrubs

Tops of dyke

Building setback for dyke

proposed dike

30 m. shoreline ESA setback line

General Planting Areas Key

Trail Planting 1 - Groundcover

ac	Arctostaphyllos uva-ursi	Kinnikinnick
fc	Fragraria chiloensis	Coastal strawberry

Trail Planting 2 - Groundcover & Grasses

ac	Arctostaphyllos uva-ursi	Kinnikinnick
Eg	ELymus glaucus	Blue lyme grass
Lm	Leymus mollis	Dune grass

Trail Planting 3 - Groundcover & Shrubs

Rosa	Rosa gymnocarpa	Baldhip rose	1 plant per sq. m.
Mn	Mahonia nervosa	Dull Oregon grape	1 plant per sq. m.
Ma	Mahonia aquafolium	Oregon grape	0.25 plants per sq. m.
ac	Arctostaphyllos uva-ursi	Kinnikinnick	2 plants per so. m.

W E S

NOV 29 2017

DP 16-741741

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Project
VAFFC MARINE TERMINAL FACILITY
15040 Williams Road, Richmond BC

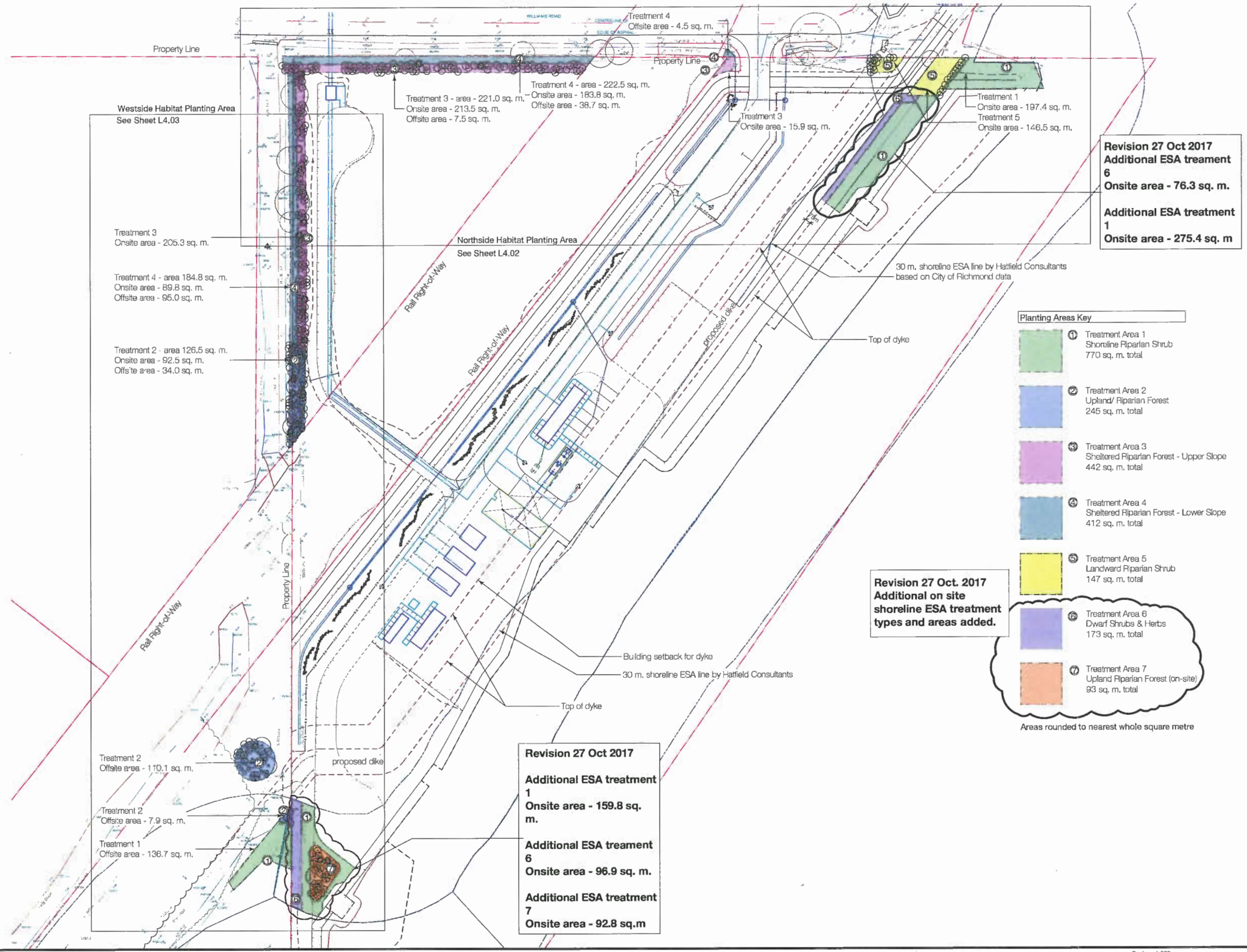
Drawing
TRAIL PLANTING AREA 2

Issue 19 May 2017 Development Permit Application
30 June 2017 Development Permit Application Resubmission
19 July 2017 Development Permit Application Resubmission
31 Oct. 2017 Development Permit Application Resubmission - ADP Comments

Scale: 1:200
Date: February 2017
Development Permit No: DE-16-741741
Building Permit No:
Project Number: 2014-280

Dwg
L3.02

Plan #20



Revision 27 Oct 2017
Additional ESA treament 6
Onsite area - 76.3 sq. m.

Additional ESA treatment 1
Onsite area - 275.4 sq. m

Revision 27 Oct. 2017
Additional on site shoreline ESA treatment types and areas added.

Revision 27 Oct 2017

Additional ESA treatment 1
Onsite area - 159.8 sq. m.

Additional ESA treament 6
Onsite area - 96.9 sq. m.

Additional ESA treatment 7
Onsite area - 92.8 sq.m

Planting Areas Key

1. Treatment Area 1
   Shoreline Riparian Shrub
   770 sq. m. total
2. Treatment Area 2
   Upland/ Riparian Forest
   245 sq. m. total
3. Treatment Area 3
   Sheltered Riparian Forest - Upper Slope
   442 sq. m. total
4. Treatment Area 4
   Sheltered Riparian Forest - Lower Slope
   412 sq. m. total
5. Treatment Area 5
   Landward Riparian Shrub
   147 sq. m. total
6. Treatment Area 6
   Dwarf Shrubs & Herbs
   173 sq. m. total
7. Treatment Area 7
   Upland Riparian Forest (on-site)
   93 sq. m. total

Areas rounded to nearest whole square metre

W E S

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Project
VAFFC MARINE TERMINAL FACILITY
16040 Williams Road, Richmond BC

Drawing
ESA & RMA PLANTING OVERVIEW

Issue: 12 May 2017 Development Permit Application
30 June 2017 Development Permit Application Resubmission
18 July 2017 Development Permit Application Resubmission
31 Oct. 2017 Development Permit Application Resubmission - ADP Comments

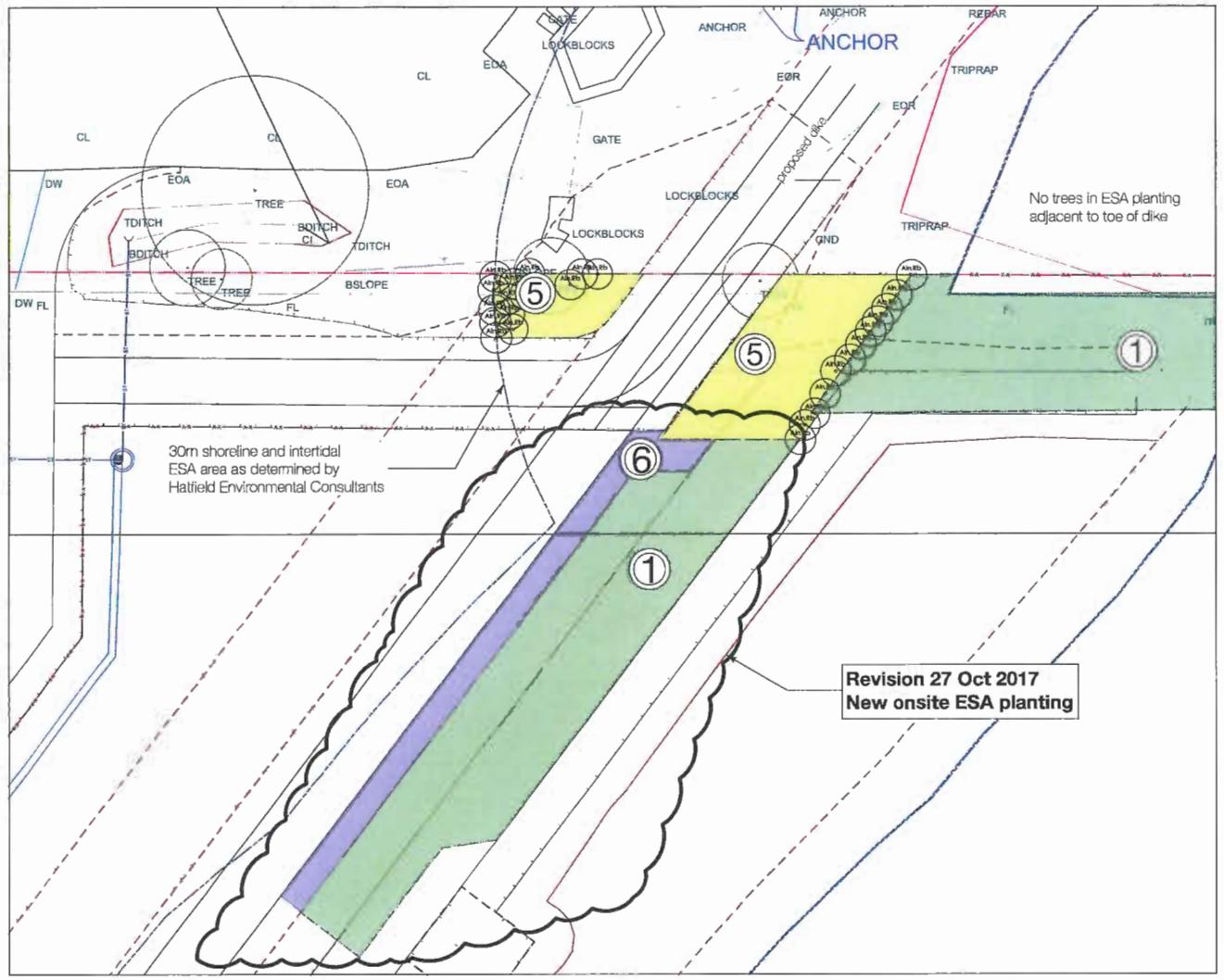
Scale: 1:500
Date: February 2017
Development Permit No: DP-16-741741
Building Permit No:
Project Number: 2014-280

Dwg
L4.01

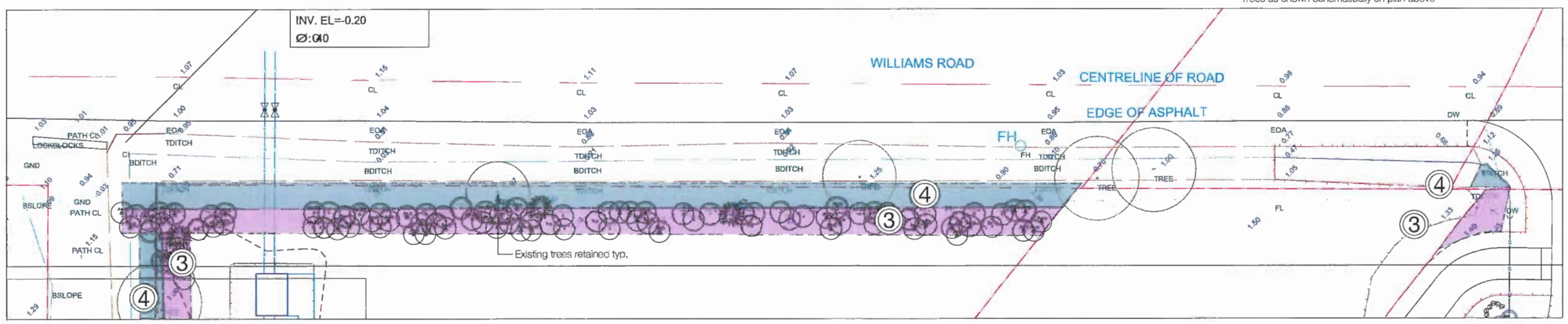
NOV 29 2017

DP 16 741741

Plan #21

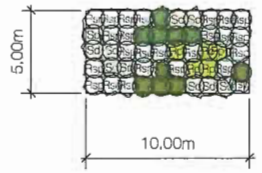


1 Northeast Shoreline ESA Areas



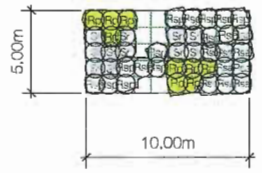
2 Williams Road RMA Areas

Treatment Area 1 - Shoreline Riparian Shrub



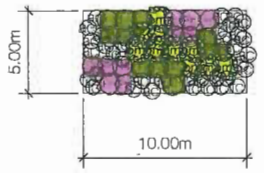
M	Mahonia nervosa	10% of area
Rp	Rubus parviflorus	10% of area
Rs	Rubus spectabilis	50% of area
Sd	Spirea douglasii	20% of area
Sa	Symphoricarpos albus	10% of area

Treatment Area 5 - Landward Riparian Shrub



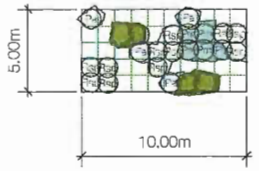
	Alnus rubra as shown on plan In blank areas on sample plan to left	18% of area
Rp	Rubus parviflorus	15% of area
Rs	Rubus spectabilis	30% of area
Rs	Ribes sanguineum	15% of area
Sr	Sambucus racemosa	22% of area

Treatment 6 - Dwarf Shrubs & Herbs



M	Mahonia nervosa	25% of area
Rn	Rosa nootkensis	20% of area
Pm	Polystichum munitum	20% of area
Ac	Arctostaphyllos uva-ursi	20% of area
fc	Fragraria chiloensis	15% of area

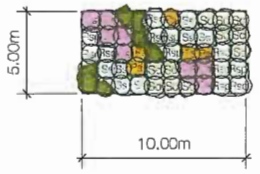
Treatment 3 Sheltered Riparian Forest - Upper Slope



Pa	Physocarpus albus	7% of area
Pm	Polystichum munitum	9% of area
Rs	Rubus spectabilis	23% of area
Sa	Symphoricarpos albus	8% of area
	Alnus rubra	10% of area
	Acer circinatum	18% of area
	Populus trichocarpa	10% of area
	Thuja plicata	8% of area
	Tsuga heterophyla	7% of area

Trees as shown schematically on plan above

Treatment 4 Sheltered Riparian Forest - Lower Slope



Cs	Cornus stolonifera	15% of area
Pa	Physocarpus albus	10% of area
Rs	Rubus spectabilis	25% of area
Sx	Salix sitchensis	15% of area
Sd	Soirea douglasii	20% of area
Sa	Symphoricarpos albus	15% of area

Note on Planting Layout

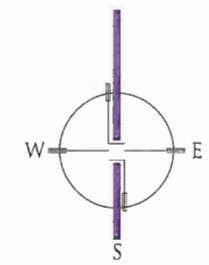
Planting detail area plans show the exent the applicable habitat planting treatment. The trees for each treatment area prescription are shown in a probable layout.

The shrub keys show a general arrangment for layout of shrubs and herbs. Where the sample area has white or open space, this space indicates the approximate area, based on percent coverage, that will be occupied by the trees proposed for that treatment area.

Colours shown in shrub key areas are intended to illustrate the general grouping of shrubs in each area.x

Note that habitat planing plans are guides. It is standard practice that final layout of trees and shrubs be done in the field at the time of planting.

IN-PROGRESS REVIEW
31 OCT. 2017
1:30 PM



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Project
VAFFC MARINE TERMINAL FACILITY
15040 Williams Road, Richmond BC

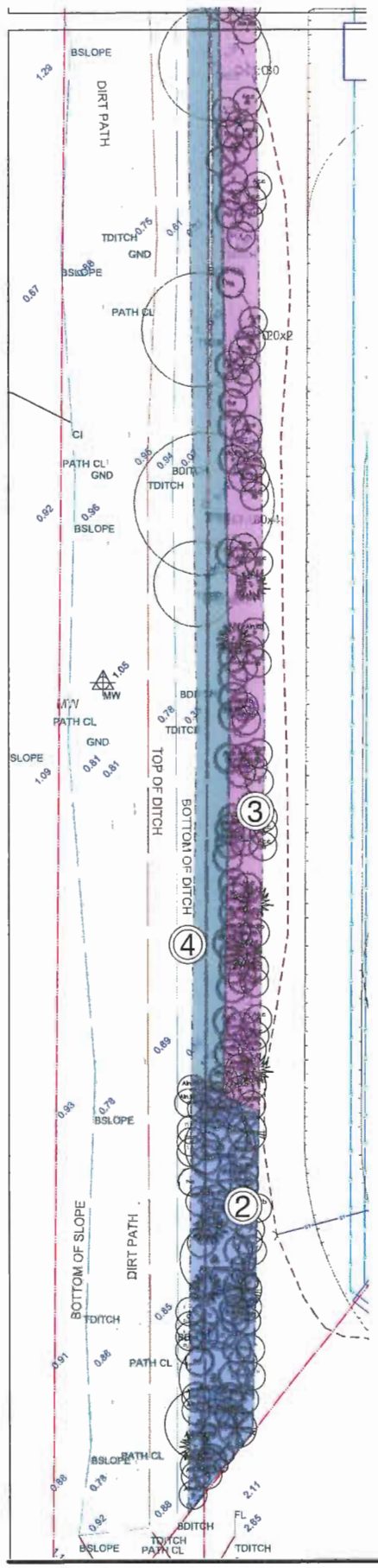
Drawing
NORTH SIDE ESA & RMA PLANTING

Issue 19 May 2017 Development Permit Application
30 June 2017 Development Permit Application Resubmission
19 July 2017 Development Permit Application Resubmission
31 Oct. 2017 Development Permit Application Resubmission - ADP Comments

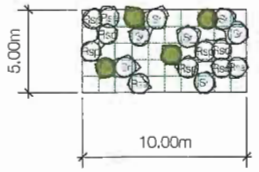
Scale: 1:200
Date: February 2017
Development Permit No: DP-16-741741
Building Permit No:
Project Number: 2014-230

Dwg
L4.02

Plan # 22

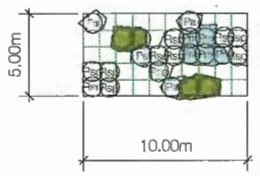


Treatment 2 - Upland/ Riparian Forest



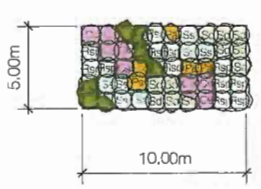
Rsp	Rubus spectabilis	14% of area	Acer macrophyllum 6% of area
Rse	Ribes sanguineum	5% of area	Alnus rubra 17% of area
Sr	Sambucus racemosa	15% of area	Corylus comuta var. Californica 7% of area
Ss	Symphoricarpos albus	7% of area	Populus trichocarpa 12% of area
			Pseudotsuga douglasii 6% of area
			Thuja plicata 6% of area
			Tsuga heterophyla 7% of area

Treatment 3 - Sheltered Riparian Forest - Upper Slope



Ps	Physocarpus albus	7% of area	Alnus rubra 10% of area
Pm	Polystichum munitum	9% of area	Acer circinatum 18% of area
Rsp	Rubus spectabilis	23% of area	Populus trichocarpa 10% of area
Ss	Symphoricarpos albus	8% of area	Thuja plicata 8% of area
			Tsuga heterophyla 7% of area

Treatment 4 - Sheltered Riparian Forest - Lower Slope



Cs	Cornus stolonifera	15% of area
Pa	Physocarpus albus	10% of area
Rsp	Rubus spectabilis	25% of area
Sx	Salix sitchensis	15% of area
Sd	Spirea douglasii	20% of area
Ss	Symphoricarpos albus	15% of area

Note on Planting Layout

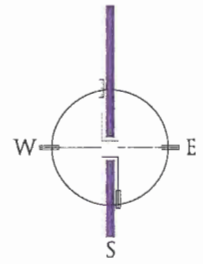
Planting detail area plans show the extent the applicable habitat planting treatment. The trees for each treatment area prescription are shown in a probable layout.

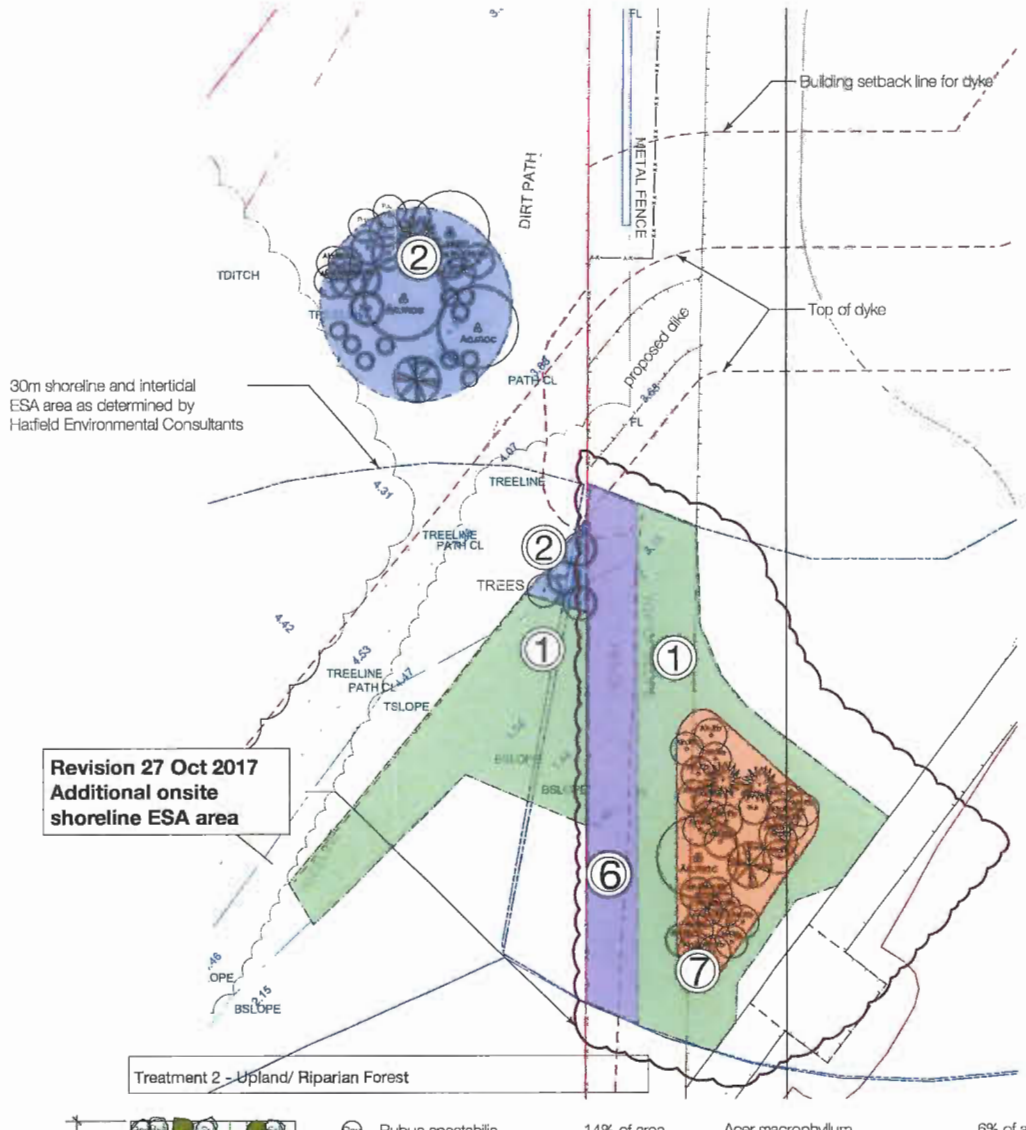
The shrub keys show a general arrangment for layout of shrubs and herbs. Where the sample area has white or open space, this space indicates the approximate area, based on percent coverage, that will be occupied by the trees proposed for that treatment area.

Colours shown in shrub key areas are intended to illustrate the general grouping of shrubs in each area.x

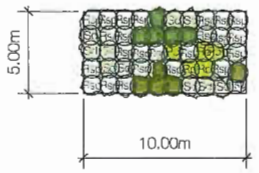
Note that habitat planing plans are guides. It is standard practice that final layout of trees and shrubs be done in the field at the time of planting.

Revision 27 Oct 2017
Additional ESA plant prescriptions



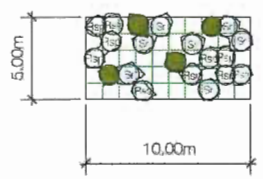


Treatment Area 1 - Shoreline Riparian Shrub



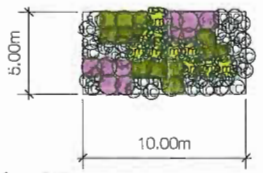
M	Mahonia nervosa	10% of area
Rp	Rubus parviflorus	10% of area
Rsp	Rubus spectabilis	50% of area
Sd	Spirea douglasii	20% of area
Ss	Symphoricarpos albus	10% of area

Treatment 2 - Upland/ Riparian Forest



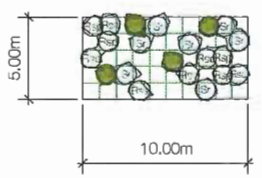
Rsp	Rubus spectabilis	14% of area	Acer macrophyllum 6% of area
Rse	Ribes sanguineum	5% of area	Alnus rubra 17% of area
Sr	Sambucus racemosa	15% of area	Corylus comuta var. Californica 7% of area
Ss	Symphoricarpos albus	7% of area	Populus trichocarpa 12% of area
			Pseudotsuga douglasii 6% of area
			Thuja plicata 6% of area
			Tsuga heterophyla 7% of area

Treatment 6 - Dwarf Shrubs & Herbs



M	Mahonia nervosa	25% of area
Rn	Rosa nootkensis	20% of area
Pm	Polystichum munitum	20% of area
Au	Arctostaphyllos uva-ursi	20% of area
Fc	Fragraria chiloensis	15% of area

Treatment 7 - Upland/ Riparian Forest (Onsite)



Rsp	Rubus spectabilis	20% of area	Pseudotsuga douglasii 5% of area
Sr	Sambucus racemosa	15% of area	Tsuga heterophyla 10% of area
Ss	Spirea douglasii	15% of area	Acer macrophyllum 5% of area
			Alnus rubra 3% of area

3 Savage Road R.O.W RMA Areas

4 Southwest Corner ESA Area

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Project
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*5040 Williams Road, Richmond BC

Drawing
WESTSIDE ESA & RMA PLANTING

Issue 19 May 2017 Development Permit Application
30 June 2017 Development Permit Application Resubmission
18 July 2017 Development Permit Application Resubmission
31 Oct, 2017 Development Permit Application Resubmission - ADP Comments

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Date: February 2017
Development Permit No: DP-16-747741
Building Permit No:
Project Number: 20*4-280

Dwg
L4.03

Plan #23

Plant List for ESA, RMA Planting Areas

Revision 27 Oct 2017
Plant list updates to reflect additional ESA areas

Trees

ID	Quantity	Latin Name	Common Name	Scheduled Size	Notes
	0				
	80	Acer circinatum	Vine maple	#3 pot	
	8	Acer macrophyllum	Bigleaf maple	#5 pot	
	144	Alnus rubra	Red alder	#3 pot	
	17	Corylus cornuta var. 'Californica"	Beaked hazlenut	#2 pot	
	74	Populus trichocarpa	Black cottonwood	#3 pot	
	5	Pseudotsuga menziesii	Douglas fir	#15 pot	
	13	Thuja plicata	Western redcedar	#15 pot	
	14	Tsuga heterophylla	Western hemlock	#15 pot	

Shrubs & Herbs

ID	Quantity	Latin Name	Common Name	Scheduled Size	Notes
	0				
	62	Cornus stolonifera	Redosier dogwood	#2 pot	
	180	Mahonia nervosa	Dull Oregon grape	#2 pot	
	72	Physocarpus albus	Pacific ninebark	#2 pot	
	74	Polystichum munitum	Swordfern	#2 pot	
	69	Ribes sanguineum	Red flowering currant	#2 pot	
	96	Rubus parviflorus	Thimbleberry	#2 pot	
	696	Rubus spectabilis	Salmonberry	#2 pot	
	76	Sambuccus racemosa	Red elderberry	#2 pot	
	62	Salix sitchensis	Sitka willow	#2 pot	
	248	Spiraea douglasii	Steeplebush	#2 pot	
	179	Symphorocarpus albus	Snowberry	#2 pot	
	140	Arctostaphyllos uva-ursi	Kinnikinnick	#2 pot	
	104	Fragraria virginiana	Wild strawberry	#1 pot	

Plant List for Trail Buffer Planting Areas

Shrubs & Herbs

ID	Quantity	Latin Name	Common Name	Scheduled Size	Notes
	0				
	80	Mahonia aquafolium	Oregon grape	#2 pot	
	324	Mahonia nervosa	Dull Oregon grape	#2 pot	
	325	Rosa gymnocarpa	Baldhip rose	#2 pot	

Groundcover & Grasses

ID	Quantity	Latin Name	Common Name	Scheduled Size	Notes
	0				
	1252	Arctostaphylls uva-ursi	Kinnikinnick	10 cm pot	
	1252	Elymus glacus	Blue lyme grass	10 cm pot	
	115	Fragraria chiloensis	Coastal straberry	10 cm pot	
	980	Leymus mollis	Dune grass	10 cm pot	

Plant List for On-site Slope Areas and Additional Landscape Planting

Revision 27 Oct 2017
Plant list updates to reflect additional landscape planting areas

Trees

ID	Quantity	Latin Name	Common Name	Scheduled Size	Notes
A.l	15	Amelanchier laevis	Allegheny Serviceberry	5 cm. cal	
Be.pap	2	Betula papyrifera	Paper birch	2.5 m. ht.	
P.con	17	Pinus contorta	Shore pine	3 m. ht.	
P.doug	10	Pseudotsuga menziesii	Douglas fir	3 m. ht.	

Shrubs

ID	Quantity	Latin Name	Common Name	Scheduled Size	Notes
au	1411	Arctostaphylos uva-ursi 'Vancouver Jade'	Vancouver Jade Kinnikinick	#1 pot	
cs	37	Cornus sericea 'stolonifera'	Redosier Dogwood	#2 pot	
gs	109	Gaultheria shallon	Salal	#1 pot	
Hol.d	35	Holodiscus discolor	Oceanspray	#2 pot	
M.aq	38	Mahonia aquafolium	Oregon grape	#3 pot	
R.san	25	Ribes sanguineum 'King Edward VII'	King Edward Vii Flowering Currant	#2 pot	
sp.d	32	Spiraea douglasii	Hardhack spiraea	#2 pot	

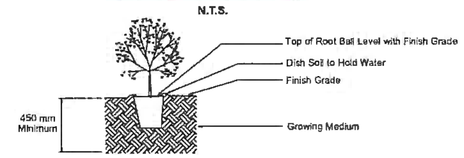
Groundcover & Grasses

ID	Quantity	Latin Name	Common Name	Scheduled Size	Notes
	0				
	1252	Arctostaphylls uva-ursi	Kinnikinnick	10 cm pot	
	1252	Elymus glacus	Blue lyme grass	10 cm pot	
	115	Fragraria chiloensis	Coastal straberry	10 cm pot	
	980	Leymus mollis	Dune grass	10 cm pot	

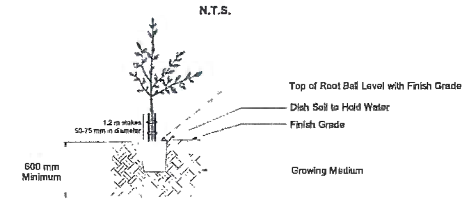
General Landscape Specifications

- Areas requiring topsoil shall be fine graded by raking out spoil material and debris such as rocks, asphalt and concrete over 50 mm in diameter, and scarified to a minimum depth of 150 mm immediately before placing topsoil.
- Topsoil and any amendments to the growing medium shall meet the criteria described in the British Columbia Landscape Standards for background (natural) areas (refer to adjacent table for particle size, acidity and drainage specifications).
- Topsoil shall be tested by an accredited soil testing laboratory, prior to delivery.
- Screened topsoil must be applied with a minimum thickness of 450 mm in shrub planting areas and 600 mm in treed areas. Topsoil must be free of subsoil, wood (including woody plant parts), toxic materials, stones over 30 mm, foreign objects, propagules of plant species designated as noxious under the BC Weed Control Act and Regulation, and other invasive or undesirable plant species.
- All plant material that has not been salvaged from the construction footprint shall be of guaranteed nursery stock, densely branched, well-established (minimum leaf density of 50%), free of invasive/noxious plant material and meet the criteria specified in City of Richmond Engineering and Public Works Department Supplementary Specifications and Detail Drawings, Version 3, 2016, Schedule G – Tree Planting on Sidewalks and Boulevards (they replace the specifications in Section 32 93 01 – Planting of Trees, Shrubs, and Ground Covers in the MMCD Platinum Edition).
- Plants in containers shall have a well-established root system, reaching the sides of the container but not being root bound. Soil must hold together when a plant is removed from its container.
- The City of Richmond's Engineering and Public Works department must be notified once nursery stock has arrived on site, for inspection prior to planting. Fall planting (following the last drought period in September or October), or spring planting (March or April) is recommended.
- Native trees, shrubs and herbs must be set plumb and fully immersed in growing medium, such that the top of the rootball is set at or slightly above the finished grade. Planting wells will be established to increase the capture and retention of water. The soil around each new plant will be tamped and watered in layers. Trees will be securely staked on both sides.
- The soil must be raked once the revegetation work is complete. A fall rye should be spread in the enhancement areas to prevent erosion and provide some shelter for new plants until they become fully established.
- Habitat enhancement works should be supervised by a certified landscape architect (or horticulturalist) to ensure compliance with the BC Landscape Standards and City and Richmond specifications for the planting of trees, shrubs, and ground cover.
- The contractor shall provide maintenance including, watering, removal of invasive species and replacement of dead stock for a period of three (3) years following planting.

Typical Container Shrub Planting Detail
N.T.S.



Typical Container Tree Planting Detail
N.T.S.



Topsoil (growing medium) specifications.

Soil Attribute	Criteria
Gravel 2 - 30 mm	≤ 10% of dry weight
Sand 0.05 – 2 mm	30 – 70% of dry weight
Silt and clay combined	Max of 60% of dry weight
Organic content	10 – 20% of dry weight
Hydraulic conductivity	2 cm/hour
pH	4.5 – 7.0

Hatfield		Vancouver Airport Fuel Delivery Project – Habitat Enhancement On/By Marine Terminal	
DESIGN	DRAWN	PROFESSIONAL SEAL	DRAWING NUMBER
LD	TK		6773-01
REVISION	DATE		
0	Feb 2, 2017		

Treatment 1 (Shoreline Riparian Shrub)

Common name	Botanical Name	% of Area	Stock Size	Planting Density
Salmonberry	Rubus spectabilis	50	No. 3 pot	1 plant per 1 m2
Thimbleberry	Rubus parviflorus	10	No. 2 pot	1 plant per 1 m2
Steeplebush	Spirea douglasii	20	No. 2 pot	1 plant per 1 m2
Snowberry	Symphoricarpos albus	10	No. 2 pot	1 plant per 1 m2
Dull Oregon Grape	Mahonia nervosa	10	No. 2 pot	1 plant per 1 m2

Treatment 2 (Upland/Riparian Forest)

Common name	Botanical Name	% of Area	Stock Size	Planting Density
Coastal Douglas-fir	Pseudotsuga douglasii	6	No. 15 pot	1 plant per 4 m2
Western redcedar	Thuja plicata	6	No. 15 pot	1 plant per 4 m2
Western hemlock	Tsuga heterophylla	7	No. 15 pot	1 plant per 4 m2
Bigleaf maple	Acer macrophyllum	6	No. 5 pot	1 plant per 2 m2
Red alder	Alnus Rubra	17	No. 3 pot	1 plant per 1 m2
Black cottonwood	Populus trichocarpa	12	No. 3 pot	1 plant per 1 m2
Salmonberry	Rubus spectabilis	14	No. 3 pot	1 plant per 1 m2
Beaked hazelnut	Corylus cornuta var. Californica	7	No. 2 pot	1 plant per 1 m2
Red elderberry	Sambucus racemosa	15	No. 3 pot	1 plant per 1 m2
Red-flowering currant	Ribes sanguineum	5	No. 2 pot	1 plant per 1 m2
Snowberry	Symphoricarpos albus	7	No. 2 pot	1 plant per 1 m2

Treatment 3 (Sheltered Riparian Forest – Upper Slope)

Common name	Botanical Name	% of Area	Stock Size	Planting Density
Western redcedar	Thuja plicata	8	No. 15 pot	1 plant per 4 m2
Western hemlock	Tsuga heterophylla	7	No. 15 pot	1 plant per 4 m2
Red alder	Alnus Rubra Populus	10	No. 3 pot	1 plant per 1 m2
Black cottonwood	trichocarpa Rubus	10	No. 3 pot	1 plant per 1 m2
Salmonberry	spectabilis	23	No. 3 pot	1 plant per 1 m2
Pacific ninebark	Physocarpus albus	7	No. 2 pot	1 plant per 1 m2
Vine maple	Acer circinatum	18	No. 3 pot	1 plant per 1 m2
Snowberry	Symphoricarpos albus	8	No. 2 pot	1 plant per 1 m2
Sword fern	Polystichum munitum	9	No. 2 pot	1 plant per 1 m2

Treatment 4 (Sheltered Riparian Forest – Lower Slope)

Common name	Botanical Name	% of Area	Stock Size	Planting Density
Redosier dogwood	Cornus stolonifera	15	No. 2 pot	1 plant per 1 m2
Sitka willow	Salix sitchensis	15	No. 2 pot	1 plant per 1 m2
Salmonberry	Rubus spectabilis	25	No. 2 pot	1 plant per 1 m2
Pacific ninebark	Physocarpus albus	10	No. 2 pot	1 plant per 1 m2
Snowberry	Symphoricarpos albus	15	No. 2 pot	1 plant per 1 m2
Steeplebush	Spirea douglasii	20	No. 2 pot	1 plant per 1 m2

Treatment 5 (Landward Riparian Shrub)

Common name	Botanical Name	% of Area	Stock Size	Planting Density
Red alder	Alnus rubra	18	No. 2 pot	1 plant per 1 m2
Red elderberry	Sambucus racemosa	22	No. 3 pot	1 plant per 1 m2
Salmonberry	Rubus spectabilis	30	No. 2 pot	1 plant per 1 m2
Thimbleberry	Rubus parviflorus	15	No. 2 pot	1 plant per 1 m2
Red-flowering currant	Ribes sanguineum	15	No. 2 pot	1 plant per 1 m2

Treatment 6 (Dwarf Shrubs and Herbs)

Common name	Botanical Name	% of Area	Stock Size	Planting Density
Nootka rose	*Rosa nootkana*	0.2	No. 2 pot	1 plant per 1 m2
Dwarf oregon-grape	*Mahonia nervosa*	0.25	No. 2 pot	1 plant per 1 m2
Kinnikinnick	*Arctostaphylos uva-ursi*	0.2	No. 2 pot	1 plant per 0.25 m2
Wild strawberry	*Fragaria virginiana*	0.15	No. 1 pot	1 plant per 0.25 m2
Sword fern	*Polystichum munitum*	0.2	No. 1 pot	1 plant per 1 m2

Treatment 7 (On-Site Upland/Riparian Forest)

Common name	Botanical Name	% of Area	Stock Size	Planting Density
Douglas-fir	*Pseudotsugo douglasii*	0.05	No. 15 pot	1 plant per 4 m2
Western hemlock	*Tsuga heterophylla*	0.1	No. 15 pot	1 plant per 4 m2
Bigleaf maple	*Acer macrophyllum*	0.05	No. 10 pot	1 plant per 4 m2
Red alder	*Alnus rubra*	0.3	No. 3 pot	1 plant per 1 m2
Salmonberry	*Rubus spectabilitis*	0.2	No. 2 pot	1 plant per 1 m2
Red elderberry	*Sambucus racemosa*	0.15	No. 2 pot	1 plant per 1 m2
Steeplebush	*Spirea douglasii*	0.15	No. 2 pot	1 plant per 1 m2

Hatfield		Vancouver Airport Fuel Delivery Project – Habitat Enhancement On/By Marine Terminal	
DESIGN	DRAWN	PROFESSIONAL SEAL	DRAWING NUMBER
LD	TK		6773-01
REVISION	DATE		
	Oct. 30, 2017		

Revision 27 Oct 2017
Plant list updates to reflect additional ESA areas

NOV 2 9 2017

DP 16-741741

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Project
VAFFC MARINE TERMINAL FACILITY
15040 Williams Road, Richmond BC

Drawing
SPECIFICATION NOTES AND PLANT LISTS

Issue
19 May 2017 Development Permit Application
30 June 2017 Development Permit Application Resubmission
19 July 2017 Development Permit Application Resubmission
31 Oct. 2017 Development Permit Application Resubmission - ADP Comments

Scale: 1:500
Date: February 2017
Development Permit No: DE-16-741741
Building Permit No.
Project Number: 2014-280

Dwg
L0.05

Plan #24

Habitat Balance Sheet for the Marine Terminal Site Development.

Location	Habitat (m^2)				Comments
Habitat Impact Summary					
Marine Terminal Property	**Existing**	**Post-construction**	**Net Change**	**Enhancement Area**	
Shoreline ESA	208.0	1046	+837	+1046	Existing ESA is an area of fill and gravel, and largely barren. Two young trees and one small marginal habitat patch containing native red alder and black cottonwood saplings with an understory of invasive shrubs and herbs will be lost to development. A 5.1:1 compensation for this loss will be achieved by enhancing Shoreline ESA in the SW (350 m^2) and NE corner (696 m^2) of the property and adjacent to the property (see below). Overall, 88% of ESA enhancement works would be onsite.
Intertidal ESA	Refer to comments				Green-coded low productivity habitat. Replacing the existing 3,256 m^2 wharf structure with clean, stable erosion bank protection (armour) that will restore approximately 36,000 m^3 of open river flow environment and provide approximately 3,800 m^3 of new, artificial 'reef' habitat aimed to provide micro-refugia for aquatic flora and fauna. Upgrading concrete rubble rip-rap on either side of the existing wharf footprint will improve stability and quality of substrate refugia over 4,400 m^3 (total of 8,000 m^3 at base of slope along marine terminal property). Refer to Hatfield memo dated October 31, 2017 for additional information.
Williams Road RMA	176.3	413.2	+236.9	+413.2	These RMAs are degraded by invasive species and dust generated by the high volume of Ecowaste truck traffic. Only the trees are native and these will not be eliminated by the development. Although there is no defensible ecological rationale for it, 2.2:1 habitat compensation is proposed, by removing the existing fences to restore the full 5 m width of each RMA, and by regrading the sites and replacing invasive shrubs and herbs with native vegetation. Overall, 82% of RMA enhancement works would be onsite.
Savage Road RMA (inferred)	95.0	387.6	+292.6	+387.6	
Proposed Habitat Compensation					
Adjacent to Property					
Shoreline ESA	N/A	N/A	N/A	+144.6	To further compensate for marginal habitat loss from the marine terminal property Shoreline ESA, invasive plants southwest of the property, by some red-coded intertidal habitat, would be replaced with native plants.
Williams Road RMA	50.7	50.7	0	50.7	A portion of the RMAs are beyond the property boundary, which would thus involve limited offsite enhancement work (11% for Williams Road RMA; 25% for Savage Road RMA).
Savage Road RMA (inferred)	129.0	129.0	0	129.0	
Upland Habitat	N/A	N/A	N/A	+110.1	A portion of the CN ROW in the Williams Road RMA would be compensated for by replacing invasive species with native ones between the Savage Road RMA and Shoreline ESA, as a contribution to the local Ecological Network (the remaining 72 m^2 of the ROW compensation area was shifted to the onsite Shoreline ESA).
Gains and Losses					
Terrestrial Habitat				+2,281 m^2	5.7:1 habitat enhancement in Shoreline ESAs for a 208 m^2 onsite shoreline disturbance and a portion of the Williams RMA overlapping with the CN ROW (53% on site). Approximately 2:1 habitat compensation and enhancement to RMAs (54% on site).
Aquatic Habitat				+3,800.0 m^3	Improvements to Intertidal ESA by replacing vertical steel-pile wharf with clean, stable erosion protection of Fraser River shoreline and secondary artificial reef for brackish environments.

Revision 27 Oct 2017
Table updated with latest Hatfield information

This schedule is reprinted from the
ESA and RMA Environmental Impacts Report
by
Hatfield Environmental Consultants

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Project
VAFFC MARINE TERMINAL FACILITY
15040 Williams Road, Richmond BC

Drawing
HABITAT BALANCE

Issue:
31 Oct. 2017 Development Permit Application Resubmission - ADP Comments

Scale: nts
Date:
Project Number: 2014-280

Dwg
L0.04

Plan # 25

City of Richmond

Development Permit

No. DP 16-741741

To the Holder:	VANCOUVER AIRPORT FUEL FACILITIES CORPORATION
Property Address:	15040 WILLIAMS ROAD
Address:	C/O FSM MANAGEMENT GROUP INC. 108 – 12300 HORSESHOE WAY RICHMOND, BC V7A 4Z1

1. This Development Permit is issued subject to compliance with all of the Bylaws of the City applicable thereto, except as specifically varied or supplemented by this Permit.
2. This Development Permit applies to and only to those lands shown cross-hatched on the attached Schedule "A" and any and all buildings, structures and other development thereon.
3. Subject to Section 692 of the Local Government Act, R.S.B.C.: buildings and structures; off-street parking and loading facilities; roads and parking areas; and landscaping and screening shall be constructed generally in accordance with Plans #1 to #25 attached hereto.
4. Sanitary sewers, water, drainage, highways, street lighting, underground wiring, and sidewalks, shall be provided as required.
5. As a condition of the issuance of this Permit, the City is holding the security in the amount of $361,248.80 (including, on-site ESA/RMA $86,673.00, on-site Trail and Buffer Strip $95,414.00, On-site Trail Slope landscaping $56,681.00, 3 years of maintenance $81,720.00, 3 years of monitoring $7,920.00 and a 10% contingency $32,840.80) to ensure that development is carried out in accordance with the terms and conditions of this Permit. Should any interest be earned upon the security, it shall accrue to the Holder if the security is returned. The condition of the posting of the security is that should the Holder fail to carry out the development hereby authorized, according to the terms and conditions of this Permit within the time provided, the City may use the security to carry out the work by its servants, agents or contractors, and any surplus shall be paid over to the Holder. Should the Holder carry out the development permitted by this permit within the time set out herein, the security shall be returned to the Holder. The City may retain the security for up to three years after inspection of the completed landscaping in order to ensure that plant material has survived.
6. If the Holder does not commence the construction permitted by this Permit within 24 months of the date of this Permit, this Permit shall lapse and the security shall be returned in full.

NOV 29 2017

Development Permit
No. DP 16-741741

To the Holder:	VANCOUVER AIRPORT FUEL FACILITIES CORPORATION
Property Address:	15040 WILLIAMS ROAD
Address:	C/O FSM MANAGEMENT GROUP INC. 108 - 12300 HORSESHOE WAY RICHMOND, BC V7A 4Z1

7. The land described herein shall be developed generally in accordance with the terms and conditions and provisions of this Permit and any plans and specifications attached to this Permit which shall form a part hereof.

   This Permit is not a Building Permit.

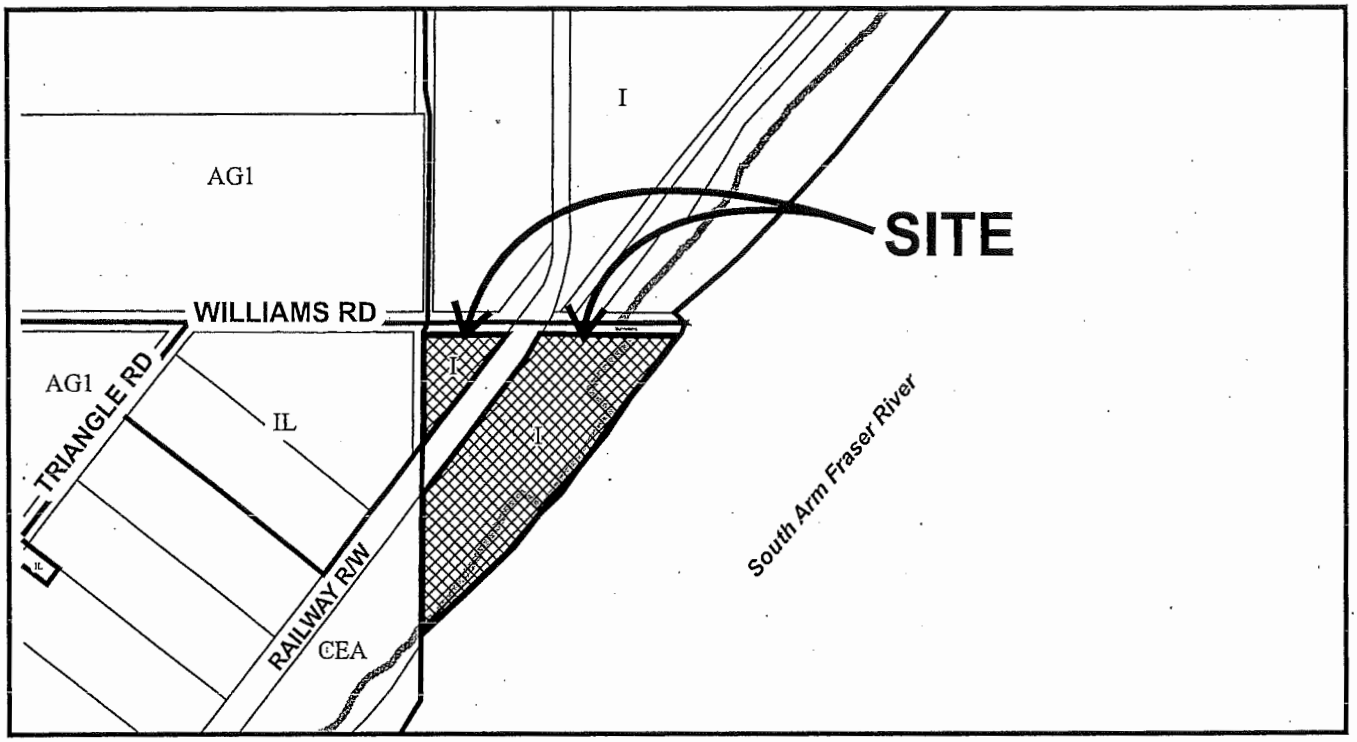
AUTHORIZING RESOLUTION NO. ISSUED BY THE COUNCIL THE DAY OF , .

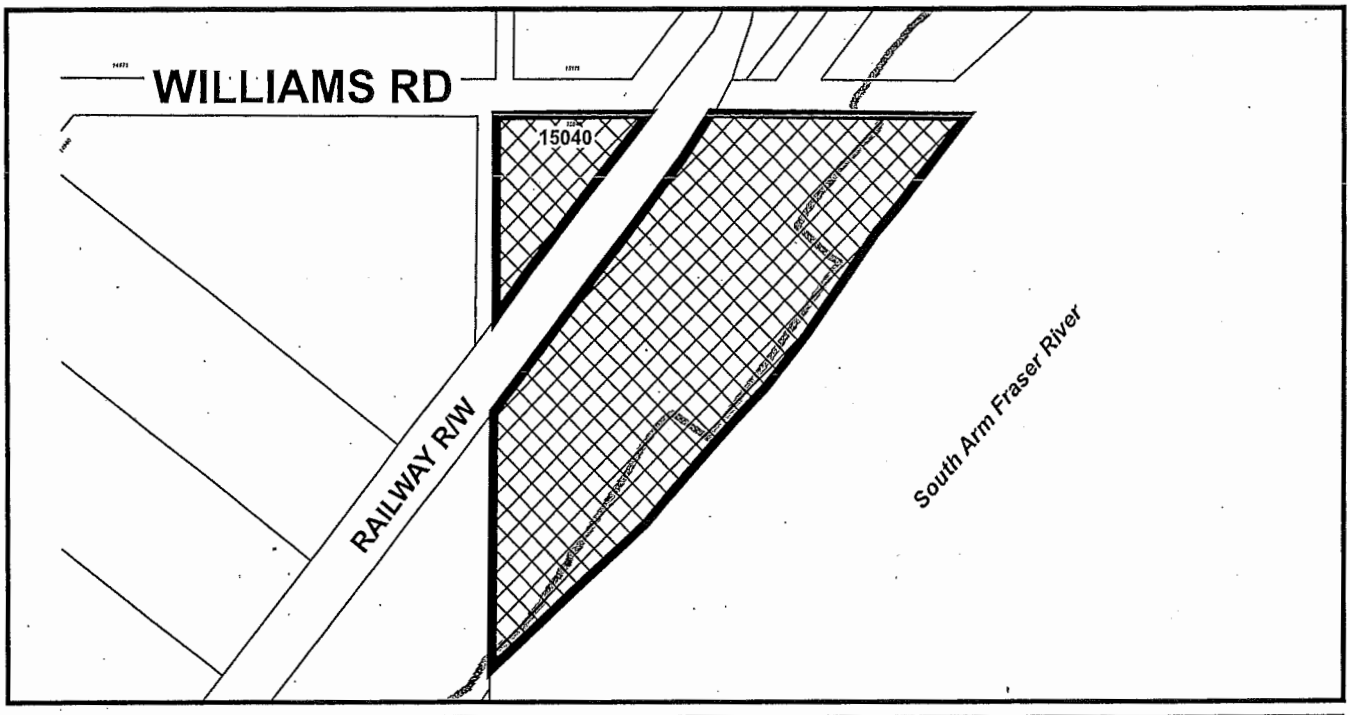
DELIVERED THIS DAY OF , .

_____

MAYOR

City of
Richmond





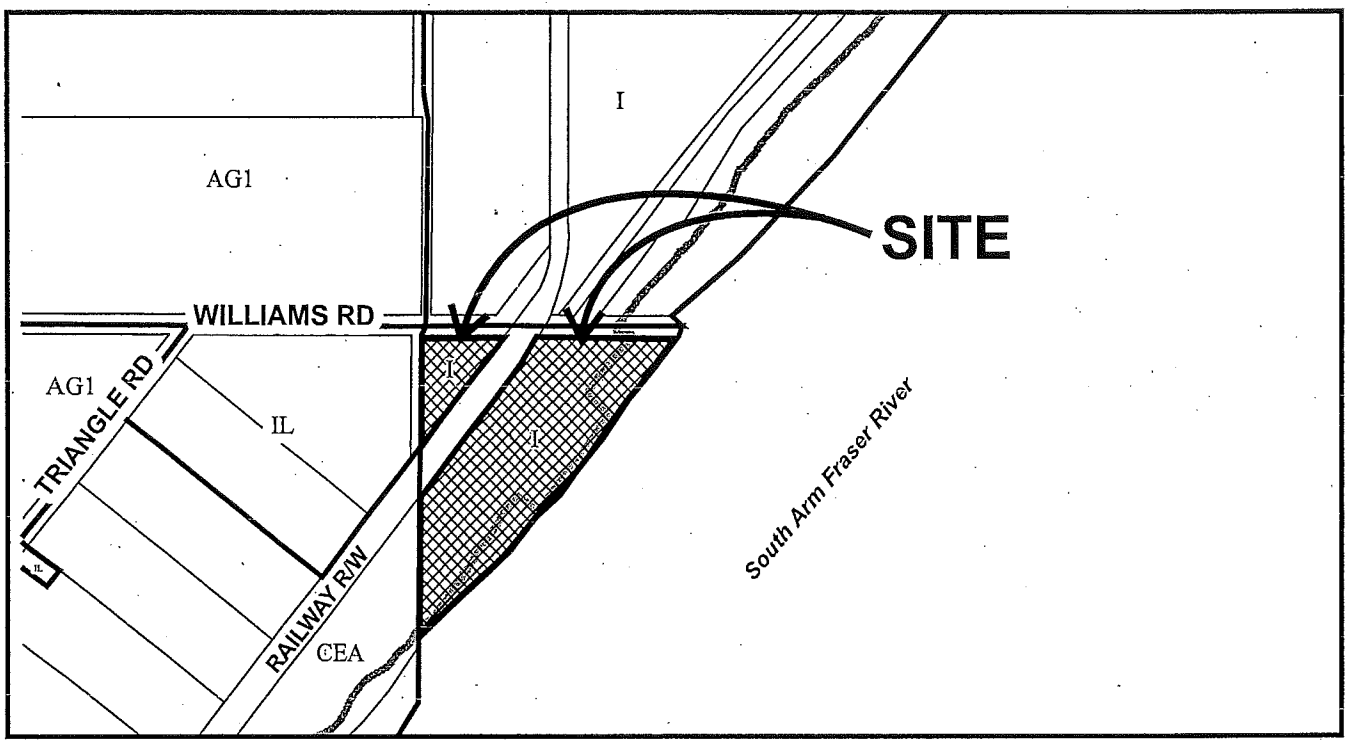
DP 16-741741
SCHEDULE "A"

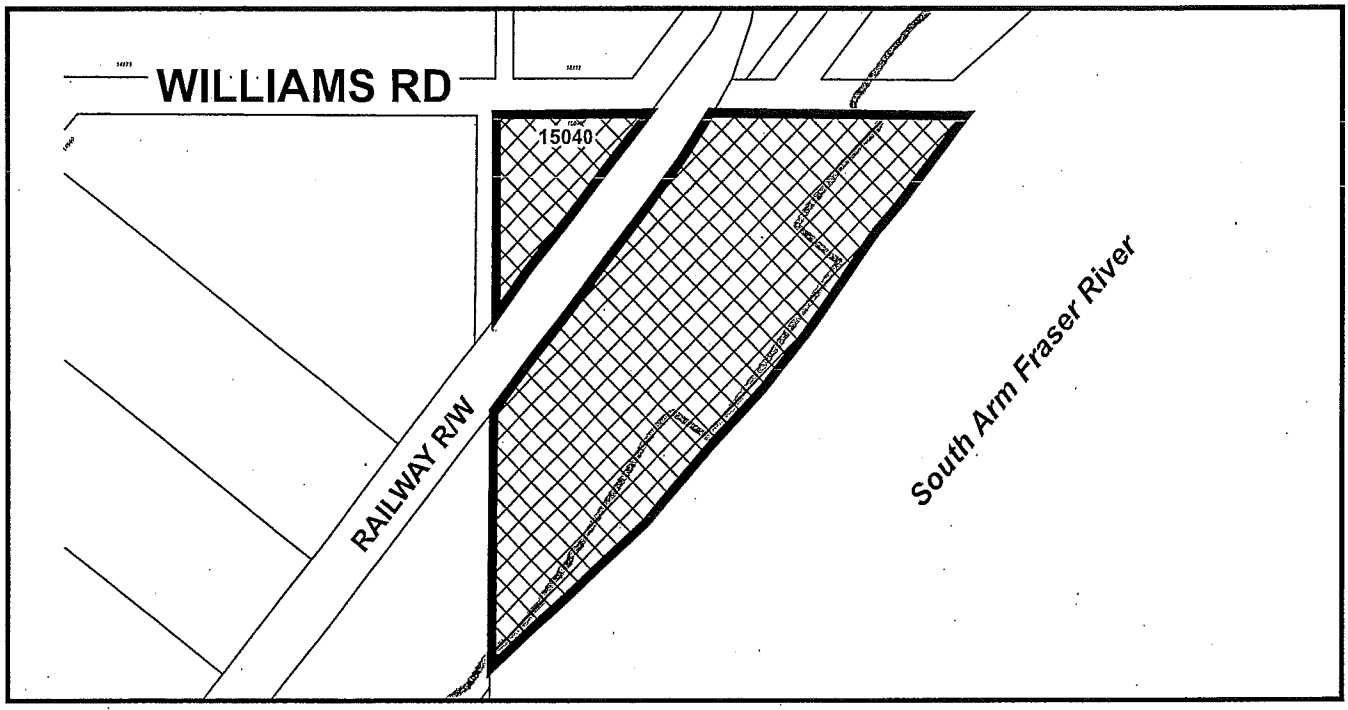
Original Date: 08/22/16

Revision Date:

Note: Dimensions are in METRES

City of
Richmond





DP 16-741741

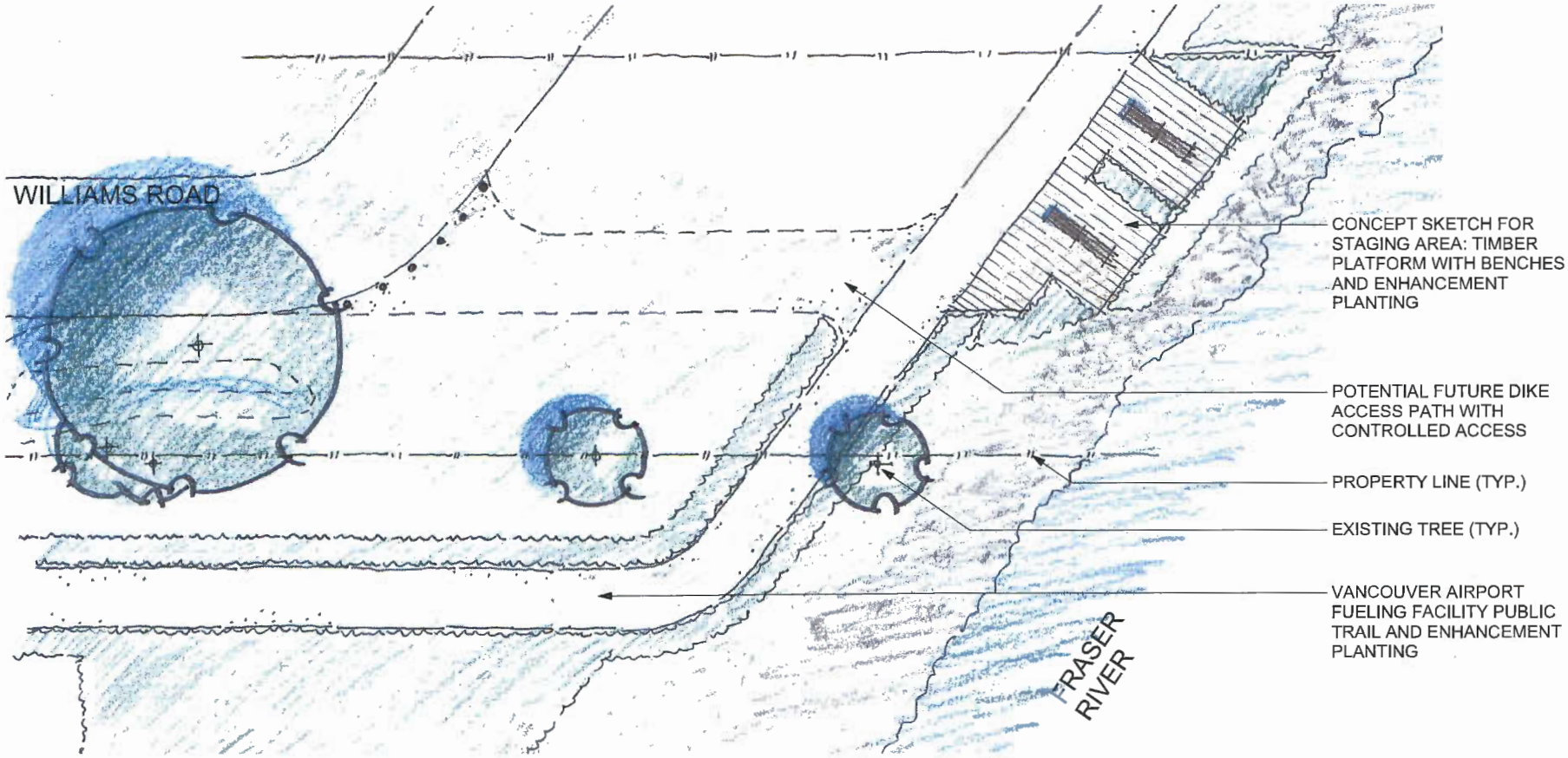
Original Date: 08/22/16

Revision Date:

Note: Dimensions are in METRES

Attachment BB

Revised Offsite Staging Area and
Trail Enhancement Cost Estimate



VANCOUVER AIRPORT FUELING FACILITY: WILLIAMS ROAD STAGING AREA CONCEPT SKETCH | DATE: JAN 23, 2018 | SCALE 1:200 | N

City of Richmond Interactive Map

Legend

- Parks Names
- Major Street Names
- Minor Street Names
- Parks
- Strata
- Property
- Aerial Photo 2013

169.0 0 84.52 169.0 Meters

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

THIS MAP IS NOT TO BE USED FOR NAVIGATION

VAFFC

Estimate of Probable Costs

Last updated: January 8, 2018

Williams Road Staging Area

#	Item	Units	Unit Cost	Quantity	Total
	Site Preparation				
1	Excavation and Earth Works	cu m	$50.00	50	$2,500.00
	Paving and Hardscape				
2	Timber Decking	sq m	$300.00	75	$22,500.00
	Furnishings				
3	Benches	ea	$1,500.00	4	$6,000.00
	Planting				
4	Mixed Shrubs and Perennials	sq m	$75.00	55	$4,125.00
5	Growing Medium	cu m	$60.00	25	$1,500.00
	Miscellaneous				
6	Site Survey	lump	$7,500.00	1	$7,500.00
7	Engineering + Design	lump	$15,000.00	1	$15,000.00
				Subtotal	**$59,125.00**

Trail and Planting Upgrades to South

#	Item	Units	Unit Cost	Quantity	Total
	Site Preparation				
1	Excavation and Earth Works	cu m	$50.00	325	$16,250.00
	Paving and Hardscape				
2	Increase existing width of crushed granular trail along the river by 1m (from 2m to 3m)	sq m	$40.00	420	$16,800.00
	Planting				
3	Mixed Shrubs and Perennials	sq m	$75.00	840	$63,000.00
4	Growing Medium	cu m	$60.00	250	$15,000.00
				Subtotal	**$111,050.00**

Combined Subtotal	**$170,175.00**
20%Contingency	**$34,035.00**
TOTAL	**$204,210.00**

Legend: cu m = cubic meter // lump = lump sum // sq m = square meter // ea = each

Attachment CC
Revised Landscape Cost Estimates

DAMON ORIENTE LTD.
LANDSCAPE ARCHITECTS

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18 December 2017

RE: Marine Terminal Fuel Facility Site
REVISED Estimate of Landscape Construction Costs for On-Site Landscape Areas Adjacent to Trail Buffer and Expanded Landscape Areas On-Site.

This letter provides a summary of our estimate of probable landscape construction costs for the above named area. It has been prepared to cover the onsite planting areas on the slope adjacent to the on-site area of the trail. This estimate is based on the revised landscape drawings dated 18 December 2017.

We have divided the work into general categories typical for landscape construction. Each category cost is developed using material costs which have integrated allocations for delivery, installation and machine time factored in to the total item cost.

This estimate assumes that grading and necessary excavation will be performed as part of the overall site construction work, undertaken by the facility and civil works contractors. Site access is direct, with gentle slopes and direct delivery to the installation locations anticipated.

The estimated total increases from $99,177.10 to $109,074.35

On Site Trail Slope Planting			
	Planting soil	652 cu. m.	$35,887.50
	Plants, installed	5330	$29,791.00
	Estimated Construction Cost		$65,678.50
	Maintenance for three years		$33,480.00
Subtotal			$99,158.50
Contingency at 10%			$9,915.85
Estimated Total Cost			$109,074.35

Maintenance includes watering once per week, three months per year, for three years, and weeding once per month, eight months per year, for three years.

end

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18 December 2017

RE: Marine Terminal Fuel Facility Site
REVISED Estimate of Landscape Construction Costs for Development Permit Areas

This letter provides a revised summary of our estimate of probable landscape construction costs for the above named project. It includes the onsite and offsite RMA and ESA habitat planting areas as well as the onsite trail and landscape buffer planting.

This estimate is based on the landscape drawings submitted as part of the development permit application, revised 18 December 2017. Tree sizes have been increased as have pot sizes for some specified shrubs and ground covers. The estimate total increases from $283,167.50 to $345,426.40.

We have divided the work into general categories typical for landscape construction. Each category cost is developed using material costs which have integrated allocations for delivery, installation and machine time factored in to the total item cost.

These estimates assume that the site grading and necessary excavation will be performed as part of the overall site construction work, undertaken by the facility and civil works contractors. Site access appears to be direct, with gentle slopes and direct delivery to the installation locations anticipated.

Summary Table of Area Cost Estimates		
	On Site ESA & RMA Planting	$87,329.00
	Off Site ESA & RMA Planting	$23,861.00
	On Site Trail and Buffer Strip Planting	$146,674.00
Subtotal		**$257,864.00**
	Maintenance for Three Years	$48,240.00
	Monitoring for Three Years	$7,920.00
Subtotal		**$314,024.00**
Contingency at 10%		$31,402.40
Estimated Total Cost		**$345,426.40**

The area breakdowns are on the following page.

Maintenance includes watering once per week, three months per year, for three years, and weeding once per month, eight months per year, for three years. Monitoring will be once per year by a QEP and includes an annual report.

Damon Oriente Ltd.

On Site ESA & RMA planting area		2,282 sq. m.	UPDATED
	Planting soil	925 cu. m.	$50,831.00
	Plants, installed	1876 asst'd sizes	$36,498.00
	Estimated Item Total		**$87,329.00**

Off Site ESA & RMA Planting			UPDATED
	Planting soil	142 cu. m.	$7,837.00
	Plants, installed	537 asst'd sizes	$16,024.00
	Estimated Item Total		**$23,861.00**

On Site Trail and Buffer Strip Planting			UPDATED
	Planting soil	390 cu. m.	$21,450.00
	Plants, installed	5389 asst'd sizes	$86,224.00
	Trail, gravel on compacted base	780 sq. m. (260 lin. m. x 3 m width)	$39,000.00
	Estimated Item Total		**$146,674.00**

end

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25 January 2018

RE: Marine Terminal Fuel Facility Site
Estimate of Landscape Construction Costs for Inland/ Triangle Portion of the Development Permit Areas

This letter provides a preliminary estimate of probable landscape construction costs for the inland triangle area of the proposed Marine Terminal project. It includes the onsite area west of the rail R.O.W, excluding RMA and ESA habitat planting areas which are costed in previous estimates.

This estimate is based on the landscape drawing dated 18 December 2017 prepared for City review. The treatment area on this portion of the site is calculated at 1210 sq. metres.

We have divided the work into general categories typical for landscape construction. Each category cost is developed using material costs which have integrated allocations for delivery, installation and machine time factored in to the total item cost. The plant list for this area is on the following page.

Maintenance includes watering once per week, three months per year, for three years, and weeding once per month, eight months per year, for three years.

Summary Table of Inland Triangle Area Cost Estimate			
	Planting soil	605 cu. m.	$33,275.00
	Plants installed	3193 asst'd sizes	$86,964.00
Subtotal			**$120,239.00**
	Maintenance for Three Years		$33,480.00
Subtotal			**$153,719.00**
Contingency at 10%			$15,371.90
Estimated Total Cost			**$169,090.90**

.../2

Triangle Site Plant List

ID	Quantity	Latin Name	Common Name	Scheduled Size	Notes
TREES					
Ac.c	61	Acer circinatum	Vine maple	3.0 m ht.	
Ac.mac	38	Acer macrophyllum	Big leaf maple	#5 pot	
Aln.Rb	152	Alnus rubra	Red alder	#3 pot	
P.doug	38	Pseudotsuga menziesii	Douglas fir	3.0 m. ht.	
Tsu.ht	61	Tsuga heterphylla	Western hemlock	3.0 m. ht.	
SHRUBS					
Cyc	61	Corylus cornuta	Beaked hazelnut	1.5m. ht.	
Pa	23	Physocarpus albus	Pacific ninebark	#2 pot	
Rp	114	Rubus parviflorus	Thimbleberry	#2 pot	
Rsp	190	Rubus spectabilis	Salmonberry	#2 pot	
Sa	36	Symphorocarpus albus	Snowberry	#2 pot	
GROUNDCOVERS AND GRASSES					
	888	Arctostaphylls uva-ursi	Kinnikinnick	10 cm pot	
	608	Elymus glacus	Blue lyme grass	10 cm pot	
	608	Leymus mollis	Dune grass	10 cm pot	
	35	Mahonia aquafolium	Oregon grape	#2 pot	
	140	Mahonia nervosa	Dull Oregon grape	#2 pot	
	140	Rosa gynmocarpa	Baldhip rose	#2 pot	
	3193	Plant total for triangle site			

Damon Oriente Ltd.

end

Hatfield
CONSULTANTS

MEMO

Date: February 8, 2018

From: Tim Poulton

To: Mark McCaskill

Subject: Vancouver Airport Fuel Facilities Corporation – Cost Proposal to Monitor Intertidal Habitat Bench

The following memorandum provides a scope of work and fee estimate to monitor the proposed intertidal marsh bench located at the Vancouver Airport Fuel Facilities Corporation's Marine Terminal in the City of Richmond.

The monitoring will occur over a 5-year post-construction period. The intention of the monitoring program is to evaluate the success of the intertidal marsh bench by assessing plant species survivorship, and physical stability of the bench. It is estimated that two site inspections will occur each year of the monitoring program and include liaison with stakeholders to review adaptive management as required.

A brief report summarizing results of the site inspections and recommendations will be provided annually. It should be noted that a formal monitoring plan has not been developed or approved at this time. Estimated costs to complete the monitoring activities are summarized in Table 1.

Table 1 Estimated cost to complete monitoring of the Marine Terminal Facility Intertidal Marsh Bench.

Year 1 Task Description	Professional Fees
Field Inspections	$2,880
Adaptive Management and Liaison	$1,440
Annual Report	$2,880
Year 1 Total	***$7,200***
[1]Year 2 Total	$7,416
[1]Year 3 Total	$7,638
[1]Year 4 Total	$7,867
[1]Year 5 Total	$8,103
5 Year Monitoring Plan Total	***$38,224***

Note: All costs are exclusive of GST.

[1]Includes a 3% annual increase in Fees

Please contact me should you have any questions regarding this memorandum.

Sincerely

Tim Poulton

Tim Poulton, RPBio, PBiol
Manager, Environmental Monitoring and Assessment
HATFIELD CONSULTANTS

Attachment DD

Peer Review Summary Letter
(Pottinger Gaherty and Northwest Hydraulics)

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604 682 3707
pggroup.com

February 8, 2018
PGL File: 0831-11.01

Via E-mail: **dbrownlee@richmond.ca**

City of Richmond
6911 No. 3 Road
Richmond, BC
V6Y 2C1

Attention: **David Brownlee**
Planner 2

RE: PEER REVIEW ASSESSMENT – VANCOUVER AIPORT FUEL FACILITIES CORPORATION, INTERTIDAL ENHANCEMENT – 15040 WILLIAMS ROAD, RICHMOND, BC

PGL Environmental Consultants (PGL) is pleased to provide the City of Richmond (City) with the following letter summarizing our peer review assessment of the proposed intertidal habitat enhancement works associated with Vancouver Airport Fuel Facilities Corporation's (VAFFC's) Marine Terminal Facility at 10540 Williams Road in Richmond, BC.

BACKGROUND

The VAFFC has applied to the City for a Development Permit (DP) to construct a Marine Terminal Facility for aviation/jet fuel delivery at 15040 Williams Road (the Site). The Site is situated along the north shoreline of the South Arm of the Fraser River and a portion of this Site has been designated by the City as an Environmentally Sensitive Area (ESA).

Given the location and nature of the proposed project, the ESA will be impacted. As such, the City has requested that the VAFFC explore opportunities to enhance habitat conditions within the ESA and along the Fraser River intertidal waterfront to offset the proposed impacts. In addition to backshore terrestrial restoration, the proponent's offset plan includes a 200m x 2m wide marsh bench within the intertidal zone of the Fraser River.

The City has requested that PGL review the intertidal habitat bench to ensure that the proposed offset is viable from both a technical and a functional habitat perspective. To provide this review, PGL collaborated with Northwest Hydraulic Consultants (NHC) to provide a review from both a biological and geomorphological/engineering perspective.

The objective of the review will be to provide the City with our opinion and recommendations related to the design and monitoring of the intertidal bench feature, as well as indicate whether any additional approvals might be required (e.g., referral to Fisheries and Oceans Canada).

Methodology

PGL and NHC reviewed background documents, as provided by the City. These included a series of memos and reports prepared by Hatfield Consultants (Hatfield) and various design plans prepared by VAFFC's consulting team. City-prepared guidance documents including the Official Community Plan sections related to the Ecological Network Approach and the intertidal ESA DP Guidelines were also reviewed.

In addition to reviewing background documents, PGL and NHC participated in a site meeting and reconnaissance on February 2, 2018. Representatives from both the City and VAFFC's consulting team were present to provide additional background, and answer questions.

FINDINGS

The proposed intertidal bench is positioned within a fast-flowing portion of the Fraser River and is located on the scour-side. As such, there are inherent challenges in creation of intertidal habitat features without careful consideration of geomorphologic processes. It is our opinion that the projects ability to design and engineer around the geomorphic process will have the greatest influence on the success of the intertidal bench feature. This is in line with notions expressed in Hatfield's memo dated October 31, 2017. NHC provides further assessment, comments, and recommendations regarding this aspect of the design will be provided under separate cover.

From a biological perspective, we provide the following comments regarding general approach, species selection, substrate, geese grazing, and adaptive management/success monitoring.

General Approach

We agree with VAFFC's consultants in that the proposed project will ultimately provide an improvement to overall foreshore habitat in this area. Demolition of the existing bulkhead wall, removal of fill, and stabilization of the shoreline with a new riprap slope will improve connectivity between moderately productive habitat upstream of the Site, to highly productive habitat downstream.

As noted, creation of a planted intertidal feature with the shoreline improvements will be met with inherent challenges. Careful engineering designs and implementation of an adaptive management approach (discussed below) should provide the best possible means to reduce/address these challenges. With even limited vegetation success, the additional complexity and new intertidal area at this location will represent a significant improvement in foreshore habitat.

The current placement of the intertidal bench is situated at mean sea level (i.e., 0.0m geodetic). This position could potentially subject the intertidal bench to maximum inundation depths of up to 2.3m under higher high water large tide events. Other than salinity, environmental factors such as soil texture and elevation can influence composition and richness in brackish intertidal marshes. Studies have shown notable decreases in these plant community characteristics, as time and depth of inundation increase.[i] For this reason, we would recommend adjusting the position of the intertidal bench so that it is closer to, or just below the mean annual high tide level.

Plant Species Selection

The proponent is proposing the use of three plant species to be installed at a density of 3 plants per square meter in the intertidal bench. The density proposed falls within the typical approach of 3-4 plants per square meter density observed/experienced in similar restoration initiatives.

Baltic rush (*Juncus balticus*) is the dominant species proposed for planting. This species seems suitable for the expected conditions (brackish water, frequent inundation) and proposed planting substrate (coarse). Under ideal conditions, a new stand could be established within one growing season planted at the proposed density. The Baltic rush plant guide provided by the United States Department of Agriculture's (USDAs) Natural Resources Conservation Service (NRCS) suggests that new plants can tolerate between 2.5 and 8cm of inundation.[ii] This would further support our recommendation to move the proposed intertidal bench to a higher position on the riprap slope.

The other two plant species proposed, Lyngbye's sedge (*Carex lyngbyei*) and hard-stemmed bulrush (*Schoenoplectus acutus*), are proposed at lesser amounts (i.e., 20% total composition each). According to growth requirements listed by the USDA's NRCS, Lyngbye's sedge has a

moderate tolerance to salinity, but is intolerant to shade.[iii] The latter may have a greater influence on the success of this species given the north-east exposure of the intertidal bench. In addition to this, studies have shown that Lyngbye's sedge grows most often in clay soils.[i] The coarser substrate proposed in the intertidal bench may also be a hindrance to the success of this species.

Hard-stemmed bulrush is noted to be less tolerant of saline conditions relative to Baltic rush and Lyngbye's sedge; however, it can tolerate greater depths of inundation.[iv] Although hard-stemmed bulrush is believed to be intolerant of shade, it can grow in a range of soils including coarser substrate.[v]

Although the two lesser plant species are not as suitable for the expected growing environment relative to Baltic rush, there is a reasonable chance that they might succeed. As such, it is our opinion that including these species as a "trial" attempt to diversify the plant community within the proposed intertidal bench is worth the effort, providing an adaptive management strategy is in place.

Substrate

As noted above, the coarse substrate proposed may not present ideal growing conditions for some of the plant species (e.g., Lyngbye's sedge). However, given the position on the Fraser River and expected geomorphic influences, it is our opinion that the substrate proposed is needed in order to reduce loss. Finer sediment accumulation may occur with time, as deposition occurs, which may, over time, create a more favourable habitat for other plant species.

Based on the cross-section reviewed, it appears that the proposed substrate depth of 0.5m will only be achieved in the middle of the bench. Substrate depth will lessen towards the edges of the bench. Presumably, the substrate depth will reach a point where it is too shallow to support plants (i.e., <0.3-0.2m). As such, it is reasonable to expect that vegetation will occur in a somewhat narrower band closer to the centre of the bench.

We note that the January 5, 2018 memo indicates that the bench will be "lined with geotextile;" this is not included on the cross-section detail. Lining the bench with geotextile material will help to retain the substrate within the bench and reduce the amount of material that could potentially wash into the spaces of the large riprap below. Therefore, it is our recommendation that the proponent ensure the intertidal bench includes a geotextile liner.

Geese Grazing

Based on past experience and expectations discussed during the site reconnaissance, we strongly recommend that some level of goose deterrent be implemented to restrict access to the planted intertidal bench. Canada geese (*Branta canadensis*) are known to be a nuisance species when trying to establish wetland or intertidal plant species because they are known to devour any and all newly-planted nursery stock.

To avoid these losses, one possible option might be to install a temporary fence around the perimeter of the intertidal planting area. The fencing should be securely anchored (i.e., wooden posts firmly pounded into substrate), and rope should be strung across the opening to prevent geese from flying into the enclosure. The fencing must also be inspected and maintained on a regular basis to repair damage caused by floating debris or river flows, and ropes must be restrung across the opening, as needed.

Although the fencing may not be aesthetically pleasing and require some level of effort to maintain, it will only be required as a temporary measure (i.e., two-three growing seasons). This will allow for the plants to establish and develop sufficient biomass to withstand future grazing.

Adaptive Management and Success Monitoring

As noted, it should be anticipated that challenges will be experienced during the establishment of plant communities on the proposed intertidal bench. The proponent and City should recognize that the proposed intertidal bench is an attempt to create an unique habitat feature relative to adjacent and/or nearby shorelines, which are characterized by little to no intertidal plant growth.

Successful plant establishment will be influenced by ambient site conditions, species selection, invasive species occurrences, and potentially other unanticipated factors (e.g., storm events, human or animal disturbances, etc.). It is recommended that the proposed success monitoring program be implemented as part of an adaptive management strategy. Monitoring data should be used to modify and adapt the planting plan, if required, and improve plant establishment success.

Adaptive management is not simply an "on-the-fly" management strategy but is based on incorporating appropriate science and experience, along with monitoring data to reach a successful outcome. A simple adaptive management framework includes six primary steps, including assessment, design/planning, implementation, monitoring, evaluation, and adjustment (Figure 1).

Figure 1: Adaptive Management 6-Step Process Cycle[1]

We understand that the proponent has proposed a three-year success monitoring program. Given the expected challenges and uncertainty around intertidal plant success, we recommend that the success monitoring program for the intertidal habitat bench be extended to a minimum of five years. At the very least, there should be established thresholds or triggers in the proposed three-year success monitoring plan that would require the program to be extended (i.e., if any adaptation is required). It is our opinion that a three-year program would not provide for sufficient time to assess the success of adaptive measures, should they be required.

We recommend that the proponent propose a detailed success monitoring plan for the City to review and agree to. The plan should outline monitoring methodology, reporting expectations, and success criteria. It is also recommended that the proponent consider implementing a success criterion that assesses coverage versus survival. An agreed upon threshold should be established

[1] BC Ministry of Forests and Range, accessed March 24, 2015. https://www.for.gov.bc.ca/hfp/amhome/Admin/index.htm

where efforts are to be abandoned if it becomes apparent that plant success cannot be reasonably achieved.

Previous restoration projects requiring assessment of success of similar intertidal habitats have established five coverage classes. The coverage classes are defined as follows:

- Class 5 = 76-100% coverage;
- Class 4 = 51-75% coverage;
- Class 3 = 26-50% coverage;
- Class 2 = 5-25% coverage; and
- Class 1 = <5% coverage.

Standards outlined in the BC Ministry of Forests and Range/Ministry of Environment's Field Manual for Describing Terrestrial Ecosystems (2nd edition, 2010) could be adapted to estimate of percent vegetation cover on the intertidal bench. Achievement of Class 4 or 5 after five years of monitoring should be considered good success, Class 3 should be considered moderate success, and Classes 1 and 2 should be considered poor.

CONCLUSIONS

PGL was tasked with determining if the habitat enhancement project proposed by VAFFC was viable. We recommend that the bench elevation be altered to improve likelihood of success and note that conditions may not be ideal for long-term survival of marsh grasses in high densities. Nevertheless, even low vegetative coverage on a periodically exposed bench characterized by coarse substrate has ecological benefit and represents a meaningful improvement in riparian habitat quality in the lower reaches of the Fraser River. We are therefore of the opinion that the project is viable from an ecological and technical perspective.

LIMITATIONS

PGL prepared this report for our client and its agents exclusively. PGL accepts no responsibility for any damages that may be suffered by third parties as a result of decisions or actions based on this report.

PGL relied on the documents provided by the City for site information to prepare this opinion and as such, the limitations of our review are at least as great as those documents. The documents reviewed were last uploaded to the City's ownCloud application on February 2, 2018.

The findings and conclusions are site-specific and were developed in a manner consistent with that level of care and skill normally exercised by environmental professionals currently practising under similar conditions in the area. Changing assessment techniques, regulations, and site conditions means that environmental investigations and their conclusions can quickly become dated. The recommendations contained within this report are considered valid for one year. The report should not be used after that without PGL review/approval.

The project has been conducted according to our instructions and work program. Additional conditions, and limitations on our liability are set forth in our work program/contract. No warranty, expressed or implied, is made.

CLOSING

We trust that this meets your needs. If you have any questions or require clarification, please contact Keven Goodearle or Leslie Beckmann at 604-895-7646 and 604-895-7629, respectively.

PGL ENVIRONMENTAL CONSULTANTS

Per:

Original signed by

Keven Goodearle, B.Sc., R.P.Bio.
Senior Environmental Consultant

Original signed by

Leslie M. Beckmann, M.A.
Senior Environmental Consultant

[i] Erwing, K. 1982. *Environmental controls in Pacific Northwest intertidal marsh plant communities.* Canadian Journal of Botany, Volume 61: 1105-1116.

[ii] Stevens, M. and C. Hoag. Plant guide for Baltic rush (*Juncus balticus*). USDA-Natural Resources Conservation Service, Idaho Plant Materials Centre. Aberdeen, ID. https://plants.usda.gov/plantguide/pdf/cs_juba.pdf . Accessed 7 February 2018.

[iii]PLANTS Database. Characteristics: *Carex lyngbyei.* USDA-Natural Resources Conservation Service. https://plants.usda.gov/java/charProfile?symbol=CALY3 . Accessed 7 February 2018.

[iv] Tiley, D. 2012. Plant guide for hardstem bulrush (*Schoenoplectus acutus*). USDA-Natural Resources Conservation Service, Idaho Plant Materials Centre. Aberdeen, ID. 83210. https://plants.usda.gov/plantguide/pdf/pg_scac3.pdf . Accessed 7 February 2018.

[v] PLANTS Database. Characteristics: *Schoenoplectus acutus.* USDA-Natural Resources Conservation Service. https://plants.usda.gov/java/charProfile?symbol=SCACA . Accessed 7 February 2018.

Attachment EE
Revised Development Permit Considerations

City of Richmond

Development Permit Considerations
Development Applications Department
6911 No. 3 Road, Richmond, BC V6Y 2C1

Address: 15040 Williams Road **File No.:** DP 16-741741

Prior to approval of the Development Permit, the developer is required to complete the following:

1. Receipt of a Letter of Credit/security for $597,344.55 inclusive of the following:
   - On-site ESA and RMA landscaping in the amount of $87,329.00.
   - On-site Trail and Buffer Strip in the amount of $146,674.00.
   - On-site Trail landscaping in the amount of $65,678.50.
   - On-site landscaping for the Triangle Area north of CN Rail in the amount of $120,239.00.
   - Three years of maintenance (ESA/RMA/Trail/Trail Slope/Triangle area) in the amount of, $115,200.00.
   - Three years of monitoring (ESA/RMA/Trail/Triangle area) in the amount of $7,920.00.
   - 10% contingency in the amount of $54,304.05.

   (The above amounts being based on the costs estimate provided by Damon Oriente Ltd. Landscape Architects – letters dated December 18, 2017. The figures include a 10% contingency).

   Off-site ESA/RMA securities (estimated at $23,861.00 plus $2,386.10 contingency**) will be addressed through a Servicing Agreement. ** Note that off-site security amounts may be adjusted via the terms of the standard Servicing Agreement.
2. Receipt of a Letter of Credit/security in the amount of $38,224.00 for five years of adaptive management/detailed success monitoring plan implementation with annual reporting by a Qualified Environmental Professional (QEP).
3. Submission of a five-year adaptive management strategy/detailed success monitoring plan to the satisfaction of the Director of Development prior to the Development Permit application being forwarded to Council.

4. Submission of a contract entered into between the applicant and a Qualified Environmental Professional (QEP) to monitor all ESA, RMA and trail vegetation installations (on and off-site) plus the on-site trailside landscaping (400 m^2), the expanded trail buffer and slope planting (660 m^2) the planting strip adjacent to the Williams Road RMA (245 m^2), the new intertidal bench marsh (200 m^2) and the new triangle area planting (1,210 m^2). The contract will also include provision for three years of post-installation monitoring for all areas, with the exception of the intertidal bench marsh which will be monitored for five years. Annual reporting is to be provided for these installations. The Contract should include the scope of work to be undertaken, including: the proposed number of site monitoring inspections, and a provision any remedial works during the monitoring period. Planting within RMA areas is to comply with Provincial RAR re-vegetation guidelines.
5. Submission of a contract to ensure that pruning and limb removal of retained trees is under supervision of a certified arborist, invasive vegetation removal within the tree protection area by hand only and activity within the drip line of retained trees to be done under the supervision of a Qualified Environmental Professional (QEP) or a certified arborist as outlined in the Arborist's Report.
6. Installation of appropriate tree protection fencing around all trees identified for retention by the Arborist (uTree Environmental Consultants Report, June, 2017). Fencing is to be installed to the City's standards as part of the development prior to any construction activities occurring on-site.
7. Submission of payment in the amount of $204,210 to the City of Richmond, as a voluntary cash-in-lieu contribution for the design and future construction of a recreational staging area located to the east of Williams Road and off-site trail enhancements to the east of the subject property at the City's discretion. Timing of the staging area construction may be affected by future dike improvements.
8. Submission of payment in the amount of $6,480.00 to the City of Richmond, as a voluntary contribution for the design and future installation of an interpretive signage package for the pedestrian trail system through the subject site. The detailed design and installation has been included in the Servicing Agreement requirements for the pedestrian trail and will be to the satisfaction of the Senior Manager of Parks Department.
9. Registration of a 6 m wide statutory right-of-way (ROW) with public right-of-passage (PROP) through 15040 Williams Road to accommodate a public trail in an alignment generally along the southern side of the CN Rail right-of-way as indicated in the Development Permit application and to the satisfaction of the Senior Manager of Parks Department. After completion of the Servicing Agreement maintenance period, the City will be responsible for maintenance and liability associated with the SRW.

10. Registration of a 7.5 m wide statutory right-of-way (ROW) for dike through 15040 Williams Road in an alignment generally near the property's foreshore with the Fraser River as indicated in the Development Permit application and to the satisfaction of the General Manager of Engineering Department. After completion of the Servicing Agreement maintenance period, the City will be responsible for maintenance and liability associated with the SRW. The SRW will provide the City with rights for access and the ability to maintain the works. The agreement should include a minimum building setback from the SRW of 7.0 m.
11. Registration of a flood plain covenant on Title, identifying a minimum habitable elevation of 3.0 / 4.35 m GSC split approximately at the alignment of the southern edge of the CN Rail right-of-way.
12. Registration of a legal agreement on Title to ensure that landscaping planted as part of the on-site ESA, the on-site RMA, the intertidal bench marsh and the triangle site are maintained and will not be abandoned or removed without City approval. Registration of a statutory right-of-way, and/or other legal agreements or measures, as determined to the satisfaction of the Director of Development.
13. Discharge of the existing foreshore covenant (BG 285960).
14. Registration of a legal agreement on Title to require the owner to design and construct bank protection along the river to the satisfaction of the General Manager, Engineering and the Inspector of Dikes and to provide the City with access to the land to inspect and maintain the works should the owner fail to do so. The owner will be responsible for the ongoing maintenance and liability of the works. The intent of the covenant is to ensure that the area outside of the 7.5 m right-of-way (ROW) will be constructed and maintained in a manner that protects the dike and cannot be modified without consent of the City of Richmond and the Provincial Inspector of Dikes.

Prior to Building Permit Issuance, the developer must complete the following requirements:

1. Enter into a Servicing Agreement* for the design and construction of a dike across 15040 Williams Road within the 7.5 m wide right-of-way (ROW) and integration with existing dikes on adjacent properties acceptable to the General Manager, Engineering. The foreshore riprap armourment is to include a bench marsh of approximately 100 m length by 2 m width, lined with an appropriate geotextile fabric and suitable growing substrate materials as outlined in the Development Permit application (DP 16-741741) and to the satisfaction of the General Manager, Engineering and the Director of Development. The intertidal bench marsh is to be located on the riprap slope generally as described in the report by PGL Environmental Consultants dated February 8, 2019 and is to include a temporary protective fence or similar alternative acceptable to the City.
2. Enter into a Servicing Agreement* for the design and construction of a 6 m wide park trail across 15040 Williams Road and integration with existing trails on adjacent properties acceptable to the Senior Manager of Parks Department. Works include, but may not be limited to, a 3 m wide aggregate trail surface with vegetation strips on both sides, design and installation of an interpretive signage package for the pedestrian trail, to the satisfaction of the Senior Manager of Parks Department.

3. Enter into a Servicing Agreement* for the design and construction of utility and frontage works and the off-site ESA/RMA landscaping enhancement areas identified as per the landscaping plans submitted under DP 16-741741. Off-site ESA/RMA securities (estimated at $23,861.00 plus $2,386.10 contingency**) will be addressed through the Servicing Agreement. ** Note that off-site security amounts may be adjusted via the terms of the standard Servicing Agreement.
4. Servicing Agreement works include, but may not be limited to the following:

Water Works:

a. Using the OCP Model, there is 583 L/s of water available at a 20 psi residual at the Williams Road frontage. Based on your proposed development, your site requires a minimum fire flow of 250 L/s.
b. The Developer is required to:
   - Submit Fire Underwriter Survey (FUS) or International Organization for Standardization (ISO) fire flow calculations to confirm development has adequate fire flow for on-site fire protection. Calculations must be signed and sealed by a Professional Engineer and be based on Building Permit Stage Building designs.
   - Install a single water service connection to serve the development site. The service connection can be split at the property line, and 2 m installed (one for fire, one for domestic use) inside meter chamber(s).
   - Install backflow prevention device at property line.
   - Provide statutory right-of-way (ROW) for meter and meter chamber.
c. At Developer's cost, the City is to:
   - Complete all tie-ins for the proposed works to existing City infrastructure.

Storm Sewer Works:

a. The Developer is required to:
   - Design and construct a storm sewer outfall into the RMA ditch utilizing appropriate sediment and erosion control methods, such as deltalok bags, and provide a functional plan within the first Servicing Agreement submission for review and approval by the City.
   - Install an oil and grit separator upstream of the proposed outfall, and provide the City with a separator maintenance plan within the first Servicing Agreement submission for review and approval.

Sanitary Sewer Works:

a. The Developer is required to:
   - N/A.

Frontage Improvements:

a. The Developer is required to:

- Coordinate with BC Hydro, Telus and other private communication service providers:
- When relocating/modifying any of the existing power poles and/or guy wires within the property frontages.
- To locate all above ground utility cabinets and kiosks required to service the proposed development within the developments site (see list below for examples). A functional plan showing conceptual locations for such infrastructure shall be included in the development process design review. Please coordinate with the respective private utility companies and the project's lighting and traffic signal consultants to confirm the requirements (e.g., statutory right-of-way dimensions) and the locations for the aboveground structures. If a private utility company does not require an aboveground structure, that company shall confirm this via a letter to be submitted to the City. The following are examples of statutory right-of-ways that shall be shown in the functional plan and registered prior to Servicing Agreement design approval:
- BC Hydro PMT – 4 mW x 5 m (deep).
- BC Hydro LPT – 3.5 mW x 3.5 m (deep).
- Street light kiosk – 1.5 mW x 1.5 m (deep).
- Traffic signal kiosk – 2 mW x 1.5 m (deep).
- Traffic signal UPS – 1 mW x 1 m (deep).
- Shaw cable kiosk – 1 mW x 1 m (deep) – show possible location in functional plan.
- Telus FDH cabinet-1.1 m W x 1 m (deep – show possible location in functional plan.
- Implement a riparian enhancement planting plan in the 5.0 m RMA watercourse along the Williams Road frontage.

Dike Improvements:

a. The developer is required to satisfy the following for the dike:
   - The dike shall be designed by a Professional Geotechnical Engineer.
   - The elevation of the dike crest shall be raised to minimum 4.7 m geodetic, and designed to accommodate a future elevation of 5.5 m. On the waterside of the dike, the slope shall be maximum 2:1. On the landside of the dike, the slope shall be maximum 3:1.
   - The crest of the dike shall be minimum 4.0 m wide.
   - Provide a 7.5 m statutory right-of-way for the dike.
   - There shall be a minimum building setback of 7.0 m from the dike right-of-way.
   - The drip line of any trees shall be set back at least 8.0 m from the future toe of the dike.
   - Above ground pipes crossing the dike right-of-way shall be removable to allow for dike inspection and maintenance.

- Design the dike and operations in a manner that allows for vehicular and man access along the dike upon the City's request.
- The dike along the frontage of the development site shall be tied in to the adjacent dikes to the north and south at a maximum slope of 3:1. Developer to be responsible to locate the dike to the north and south for a smooth transition. No retaining walls within the dike crest or slope area are allowed.
- All dike construction, including materials, shall be in conformance with City standard drawing MB-98 or MB-99, Dike Design and Construction Guide – Best Management Practices for British Columbia (2003), and Environmental Guidelines for Vegetation Management on Flood Protection Works to Protect Public Safety and the Environment (1999).
- The design and construction of the dike shall be done to the satisfaction of the General Manager, Engineering and Public Works, and any other relevant dike approving authorities.
- Discharge existing foreshore covenant and register a new foreshore covenant to ensure that the area outside of the 7.5 m right-of-way will be constructed and maintained in a manner that protects the dike and cannot be modified without consent of the City of Richmond and Inspector of Dikes.

General Items:

a. The Developer is required to:
   - Develop a sediment and erosion control and protection fencing plan for the proposed works to minimize impact to the 5.0 m RMA along Williams Road during construction, to the satisfaction of the City. A functional plan must be reviewed and approved by the City prior to Development Permit issuance.
   - Provide, within the first Servicing Agreement submission, a geotechnical assessment of preload and soil preparation impacts on the existing utilities fronting the development site and provide mitigation recommendations.
   - Enter into, if required, additional legal agreements, as determined via the subject development's Servicing Agreement(s) and/or Development Permit(s), and/or Building Permit(s) to the satisfaction of the Director of Engineering, including, but not limited to, site investigation, testing, monitoring, site preparation, de-watering, drilling, underpinning, anchoring, shoring, piling, pre-loading, ground densification or other activities that may result in settlement, displacement, subsidence, damage or nuisance to City and private utility infrastructure.

b. Plan and undertake the off-site ESA and RMA landscaping as per the landscaping plans submitted under DP 16-741741. A Qualified Environmental Professional (QEP) to monitor all planting ESA, RMA and trail vegetation installations and to provide three years of post-installation monitoring with annual reporting for the on-site and the off-site ESA, the RMA enhancement areas and the pedestrian trail vegetation installation. Planting within RMA areas is to comply with Provincial RAR re-vegetation guidelines.

c. Ensure that all pruning and limb removal of retained trees is to be under supervision of a certified arborist, invasive vegetation removal within the tree protection area is by hand only and activity within the drip line of retained trees to be done under the supervision of a Qualified Environmental Professional (QEP) or a certified arborist as outlined in the Arborist's Report.

5. City Arborist (Conor Sheridan: 604-244-1208, CSheridan@richmond.ca) to be notified prior to commencement of works within the drip line of existing retained off-site trees. Provide three business days minimum notice.
6. City Parks to review all off-site planting after it is in place (contact Steve Priest, Supervisor of Horticulture: 604-244-1208, and Miriam Plishka, Park Planner: 604-233-3310). Once plant material and placement have been accepted by the City, the maintenance period will commence.
7. Submission of a final sign-off letter of from CN Railway, to the satisfaction of the City's Director of Transportation and the Director of Engineering, for the VAFFC Marine Terminal project at 15040 Williams Road. If CN Railway's approval includes conditions or requirements, the proponent must provide means to meet those conditions/requirements to the satisfaction of the City's Director of Transportation.
8. Submission of a Construction Parking and Traffic Management Plan to the Transportation Department. Management Plan shall include location for parking for services, deliveries, workers, loading, application for any lane closures, and proper construction traffic controls as per Traffic Control Manual for works on Roadways (by Ministry of Transportation) and MMCD Traffic Regulation Section 01570.
9. Obtain a Building Permit for any construction hoarding. If construction hoarding is required to temporarily occupy a public street, the air space above a public street, or any part thereof, additional City approvals and associated fees may be required as part of the Building Permit. For additional information, contact the Building Approvals Department at 604-276-4285.

Notes:

* This requires a separate application and approval.

- Where the Director of Development deems appropriate, the preceding agreements are to be drawn not only as personal covenants of the property owner but also as covenants pursuant to Section 219 of the Land Title Act.

  All agreements to be registered in the Land Title Office shall have priority over all such liens, charges and encumbrances as is considered advisable by the Director of Development. All agreements to be registered in the Land Title Office shall, unless the Director of Development determines otherwise, be fully registered in the Land Title Office prior to enactment of the appropriate bylaw.

  The preceding agreements shall provide security to the City including indemnities, warranties, equitable/rent charges, letters of credit and withholding permits, as deemed necessary or advisable by the Director of Development. All agreements shall be in a form and content satisfactory to the Director of Development.

- Additional legal agreements, as determined via the subject development's Servicing Agreement(s) and/or Development Permit(s), and/or Building Permit(s) to the satisfaction of the Director of Engineering may be required including, but not limited to, site investigation, testing, monitoring, site preparation, de-watering, drilling, underpinning, anchoring, shoring, piling, pre-loading, ground densification or other activities that may result in settlement, displacement, subsidence, damage or nuisance to City and private utility infrastructure.
- Applicants for all City Permits are required to comply at all times with the conditions of the Provincial *Wildlife Act* and Federal *Migratory Birds Convention Act*, which contains prohibitions on the removal or disturbance of both birds and their nests. Issuance of Municipal permits does not give an individual authority to contravene these legislations. The City of Richmond recommends that where significant trees or vegetation exists on site, the services of a Qualified Environmental Professional (QEP) be secured to perform a survey and ensure that development activities are in compliance with all relevant legislation.

_____ _____

Signed Date

Revised Plan Submission

(For Development Permit Panel Review Feb. 28, 2018)

Figure 1 Vancouver Airport Fuel Delivery Project – Marine Terminal site location.

This plan is reprinted from the
ESA and RMA Environmental Report
by
Hatfield Environmental Consultants

18 Dec. 2017 Development Permit Application Resubmission - DPP Comments
31 Oct. 2017 Development Permit Application Resubmission - ADP Comments

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landscape architects

#306 - 4464 West 10th Avenue
Vancouver, BC, Canada
V6R 2H9

t. 604-222-9200
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Project
VAFFC MARINE TERMINAL FACILITY
15040 Williams Road, Richmond BC

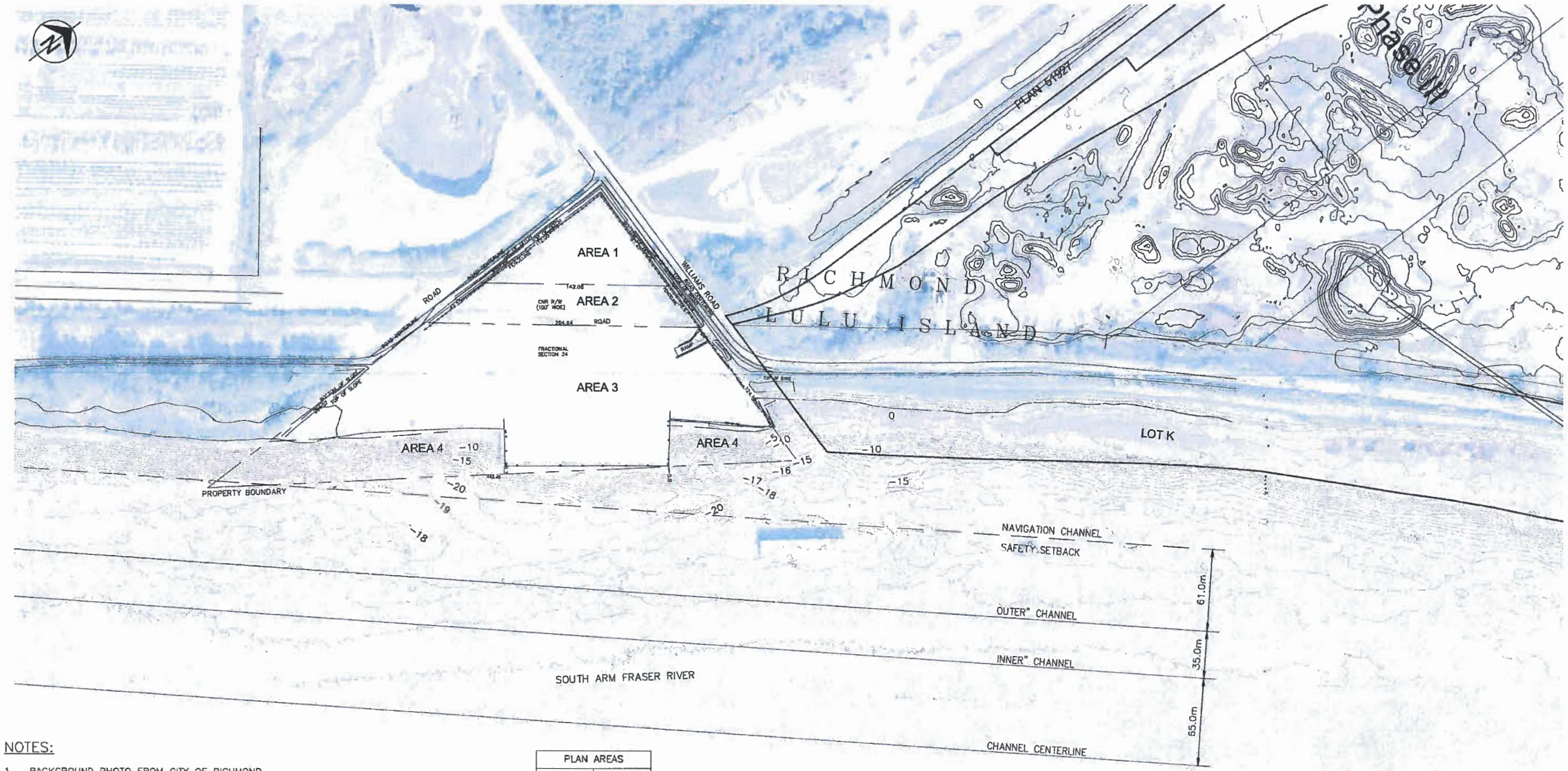
Drawing
MARINE TERMINAL SITE LOCATION

Issue:

Scale: nts
Date:
Project Number: 2014-280

Dwg
L0.02

Refrence



NOTES:

1. BACKGROUND PHOTO FROM CITY OF RICHMOND.
2. TOPOGRAPHIC SURVEY PREPARED BY MATSON, PEAK AND TOPLISS. DRAWING REFERENCE V-06-15234-TPG. SURVEY DONE BY SEPTEMBER 12-14, 2006.
3. ALL ELEVATIONS ARE REFERENCED TO GEODETIC DATUM.

PLAN AREAS	
LOCATION	AREA (m^2)
AREA 1	4985
AREA 2	5298
AREA 3	26388
AREA 4	9229
TOTAL	45810

1 EXISTING SITE PLAN
1:1500

0 30 50 90 150m
1:1500

ISSUE NO.	DRAWING REVISIONS	ISSUE DATE
0	ISSUED FOR CONSTRUCTION	02/14/2017

YVR Fuel Facilities Corporation
106-12300 Horseshoe Way
Richmond BC V7A 4Z1
604-271-7113
www.fmgroup.ca
www.vancouverairportfuel.ca

VANCOUVER AIRPORT FUEL DELIVERY PROJECT
MARINE RECEIVING AREA
MARINE DESIGN PACKAGE
VANCOUVER AIRPORT FUEL FACILITIES CORPORATION
RICHMOND, BRITISH COLUMBIA

SEAL: F.H. SHUSHTARIAN, PROFESSIONAL ENGINEER, PROVINCE OF BRITISH COLUMBIA

LOGO: moffatt & nichol
777 WEST BROADWAY, STE 301
VANCOUVER, BC CANADA V5Z 4J7
604-707-9004

Argus
ENGINEERING | PLANNING | MANAGEMENT
ARGUS CONSULTING, INC.
6363 College Boulevard, Suite 600
Overland Park, Kansas 66211
816.228.7500 FAX 816.228.7535
www.argusconsulting.com

PROJECT NO:	15004.22C
DATE:	12/21/15
DESIGNED BY:	FS
DRAWN BY:	AVM
CHECKED BY:	RB
CAD FILE NAME:	15004.22C-G009

EXISTING SITE PLAN

DRAWING NO.: G-009

Plotted: P:\8338 VC Vancouver Airport Fuel Delivery Project\CADD_Active\15004.22C-G009.dwg on 03/7/17 at 1:17 PM by AMANUZON using Argus 2013.stb

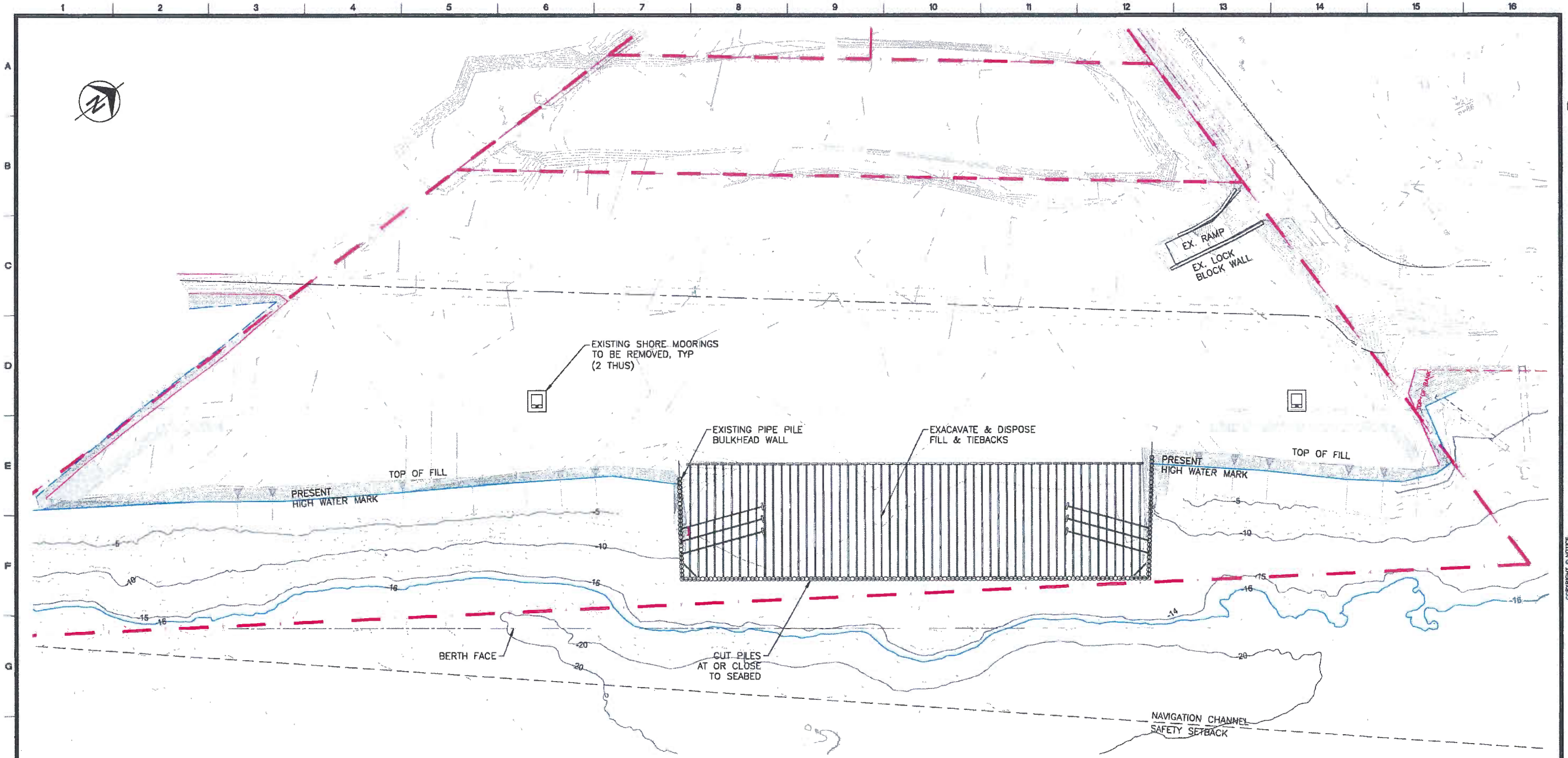
PLEASE RECYCLE

FEB 28 2018

ISSUED FOR CONSTRUCTION

DP 16-741741

Plan #1



1 DEMOLITION PLAN
1:500

LEGEND:

PROPERTY BOUNDARY

NOTES:

1. CONTOURS ARE BASED ON GEODETIC DATUM.

ISSUE NO.	DRAWING REVISIONS	ISSUE DATE
0	ISSUED FOR CONSTRUCTION	02/14/2017

VAFFC / Fuel Facilities Corporation
1GB - 12300 Horseshoe Way
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www.vancouverairportfuel.ca

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PROJECT NO:	15004.22C
DATE:	12/16/16
DESIGNED BY:	RB
DRAWN BY:	AVM
CHECKED BY:	RB
CAD FILE NAME:	15004.22C-G020

MARINE TERMINAL DEMOLITION PLAN

DRAWING NO.: G-020

Plotted: P:\8338 VC Vancouver Airport Fuel Delivery Project\CADD_Active\15004.22C-G020.dwg on 03/7/17 at 1:18 PM by AMANUZON using Argus 2013.stb

PLEASE RECYCLE

FEB 28 2018

ISSUED FOR CONSTRUCTION

DP 16-741741

Plan #2

BUILDING AREA AND STRUCTURE ELEVATIONS			
BUILDING NAME	FLOOR AREA (M^2)	STRUCTURE HEIGHT (M)	STRUCTURE ELEVATION (M)
CONTROL ROOM AND WASHROOM ENCLOSURE	43.29	3.5	9.0
FUEL LAB ENCLOSURE	21.65	3.5	9.0
FIRE PUMP ENCLOSURE 1	33.51	2.6	8.1
FIRE PUMP ENCLOSURE 2	33.51	2.6	8.1
FOAM STORAGE ENCLOSURE	28.01	2.6	8.1
ELECTRICAL ENCLOSURE	45.97	5.5	11.0
DOCK UNLOADING ARMS	N/A	33.0	37.8
DOCK GANGWAY TOWER	N/A	19.7	24.5
NOTE: THE MARINE UNLOADING ARMS ELEVATION ARE TO BE DETERMINED BY THE MANUFACTURER. APPROXIMATE ELEVATIONS OF THE STRUCTURE ARE LISTED ABOVE.			
SITE AREA: 40,468 M^2			
LOT COVERAGE AREA: 0.52%			

BACKFLOW PREVENTOR AND WATER SHUTOFF BUILDING

VEHICLE PARKING
4– SPACES @ 3.2m
1–HANDICAP SPACE @ 3.2m
5 SPACES TOTAL

ACCESS ROAD TO BACKFLOW PREVENTOR BUILDING

DYKE NATURE TRAIL

OIL WATER SEPARATOR

ABOVEGROUND WASTE TANK

CN RAIL ROW

FOAM STORAGE ENCLOSURE

DIESEL POWERED FIRE PUMP ENCLOSURE

TRANSFORMER

GENERATOR

ELECTRICAL ENCLOSURE (SEE A–1401)

7.0 M DYKE SETBACK

PROPOSED DYKE ROW

NEW MOORING STRUCTURE WITH QUICK RELEASE MOORING HOOK (TYP.)

MOORING DOLPHIN 1

MOORING DOLPHIN 2

UNLOADING ARMS WITH SPILL CONTAINMENT (DRAINS TO OIL WATER SEPARATOR)

UTILITY VESSEL LAUNCH

CONTAINMENT WALL

BERTHING DOLPHIN 1

BERTHING DOLPHIN 2

BERTHING DOLPHIN 3

BERTHING DOLPHIN 4

EQUIPMENT PAD WITH CONTAINMENT

EXISTING BULKHEAD WALL TO BE REMOVED

LAND COVERED BY WATER

MOORING DOLPHIN 4

MOORING DOLPHIN 3

EXISTING PARCEL A WATER LOT AREA = 3,550 SQ.M.

PROPOSED PARCEL A WATER LOT AREA = 7,977 SQ.M.

CONTAINMENT WALL

CONTAINMENT BOOM DEPLOYED WHEN SHIP AT BERTH

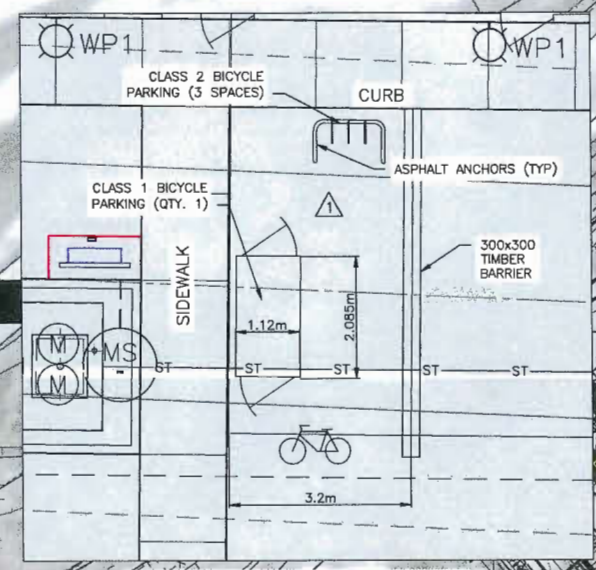
WILLIAMS ROAD

6.0m ENTRANCE/EXIT FIRE CRASH GATE

OVERHEAD POWER POLE TRANSITION TO BELOWGROUND ELECTRICAL DUCT BANK

CLASS 1 enclosure:
"Urban Bike Locker" or equivalent
http://www.urbanracks.com/bikelockers.html#image-3
Based in Surrey, BC

CLASS 2 Rack:
"Urban Hanger Rack" Model UB2000 or equivalent
http://www.urbanracks.com/hangerrack.html
Based in Surrey, BC



UTILITIES TO/FROM MARINE FACILITY (WORK OUTSIDE PROPERTY BOUNDARY NOT INCLUDED IN CITY OF RICHMOND PROJECT PERMIT)

NEW ELECTRICAL SERVICE CONNECTION TO EXISTING POWER POLE

7.0 M DYKE SETBACK

DYKE ROAD

TRASH AND RECYCLE RECEPTICLE

CONTROL ROOM AND WASHROOM ENCLOSURE (SEE A–1402)

SECURITY FENCE AND PROPERTY BOUNDARY

0 15 30 45 75m
1:750

PLEASE RECYCLE

FEB 28 2018

ISSUED FOR DEVELOPMENT PERMIT REVIEW

DP 16-741741

ISSUE NO.	DRAWING REVISIONS	ISSUE DATE
2	REVISED LOCATION OF UNLOADING ARMS INTO WATER LOT	08/18/2017
1	ADDED BICYCLE PARKING DETAIL	07/24/2017
0	ISSUED FOR DEVELOPMENT PERMIT REVIEW	12/02/2016

VAFFC / Vancouver Airport
Fuel Facilities Corporation
A FIRM GROUP MANAGED CORPORATION
FIRM MANAGEMENT GROUP
108-12300 Horseshoe Way
Richmond, BC, V7A 4Z1
604-271-7113
www.firmgroup.ca
www.vancouverairportfuel.ca

VANCOUVER AIRPORT FUEL DELIVERY PROJECT
MARINE RECEIVING AREA
PERMIT PACKAGE
VANCOUVER AIRPORT FUEL FACILITIES CORPORATION
RICHMOND, BRITISH COLUMBIA

SEAL

LOGO

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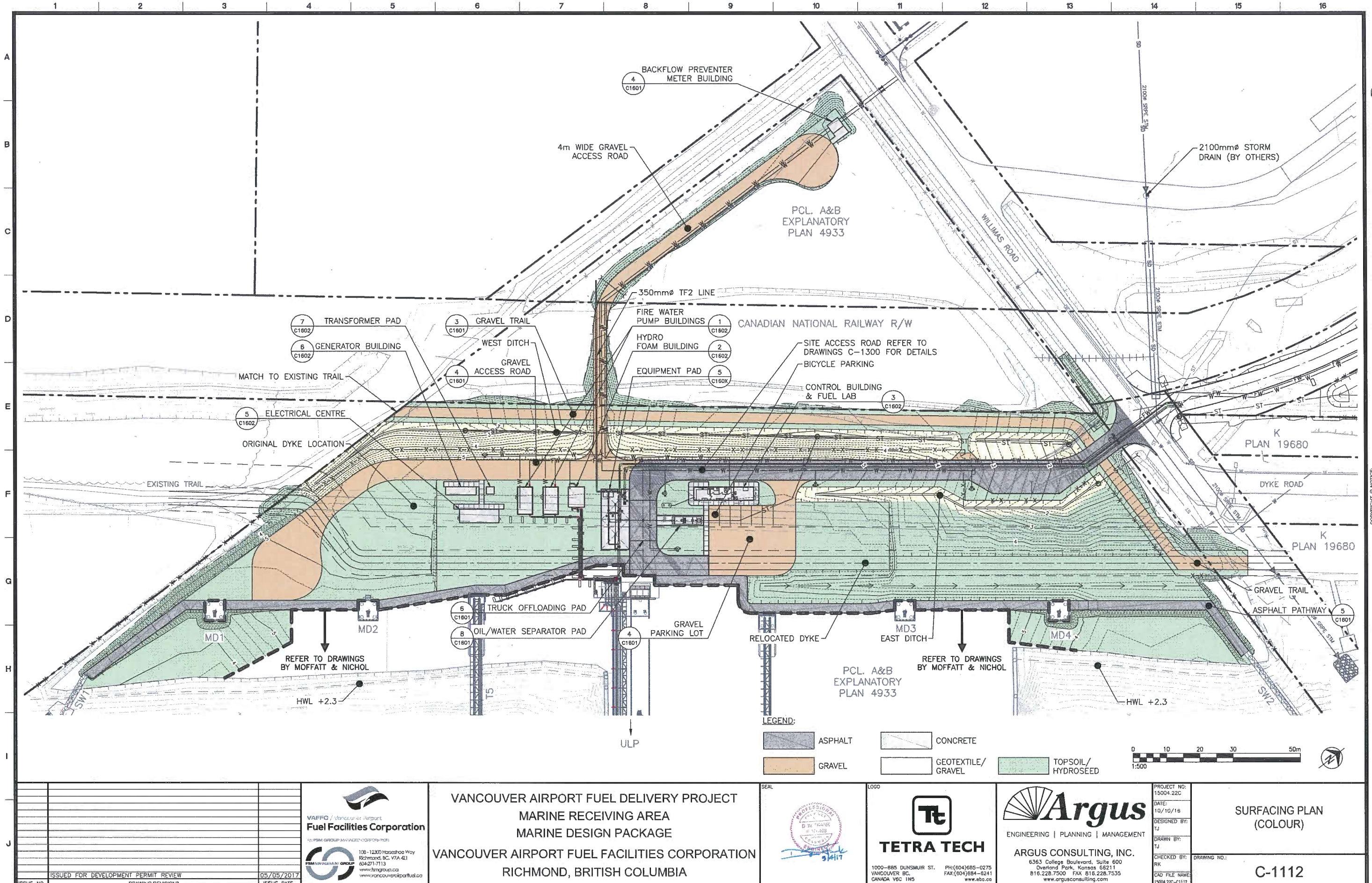
PROJECT NO:	15004.22
DATE:	05/22/2015
DESIGNED BY:	DWF
DRAWN BY:	DWF
CHECKED BY:	DWF
CAD FILE NAME:	C01.01

OVERALL SITE PLAN

DRAWING NO.: CS-101

Plotted: Y:\Comm\YVR – Vancouver\15004 VAFDP\Dwgs\22–Marine\22A – Permit\Civil\CS1.01.dwg on 08/18/17 at 5:51 PM by SNEWBOLD using acad.stb

Plan #3



ISSUE NO.	DRAWING REVISIONS	ISSUE DATE
	ISSUED FOR DEVELOPMENT PERMIT REVIEW	05/05/2017

VAFFC / Vancouver Airport Fuel Facilities Corporation
An FSM Group Managed Corporation
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www.vancouverairportfuel.co

VANCOUVER AIRPORT FUEL DELIVERY PROJECT
MARINE RECEIVING AREA
MARINE DESIGN PACKAGE
VANCOUVER AIRPORT FUEL FACILITIES CORPORATION
RICHMOND, BRITISH COLUMBIA

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6363 College Boulevard, Suite 600 Overland Park, Kansas 66211
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PROJECT NO:	15004.22C
DATE:	10/10/16
DESIGNED BY:	TJ
DRAWN BY:	TJ
CHECKED BY:	RK
CAD FILE NAME:	15004.22C-C1112

SURFACING PLAN (COLOUR)

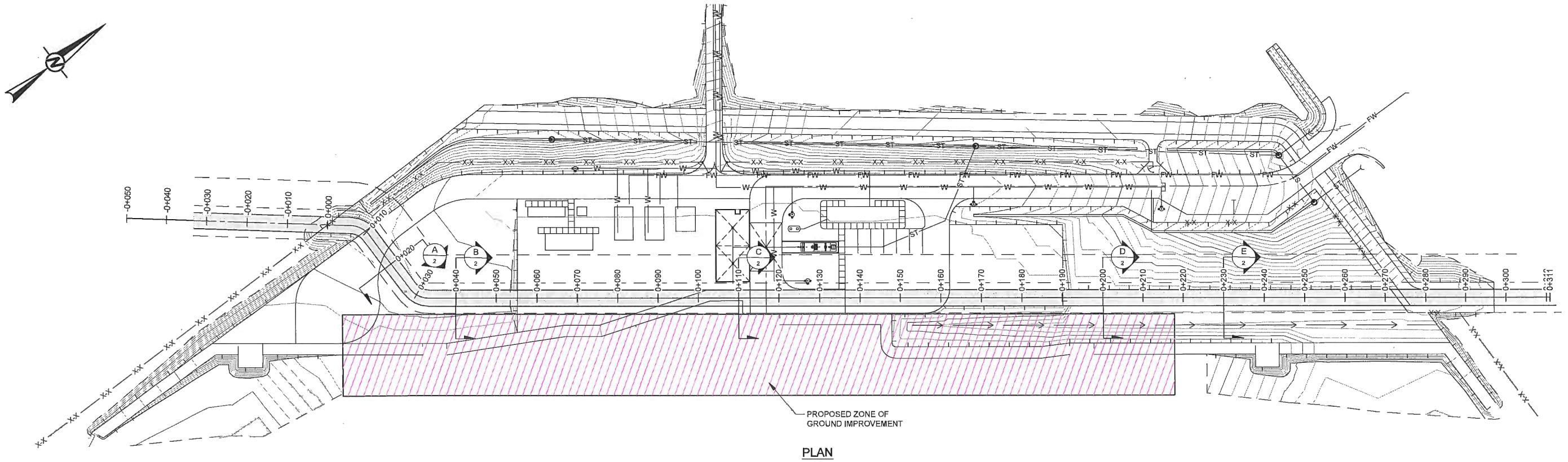
DRAWING NO.: C-1112

PLEASE RECYCLE

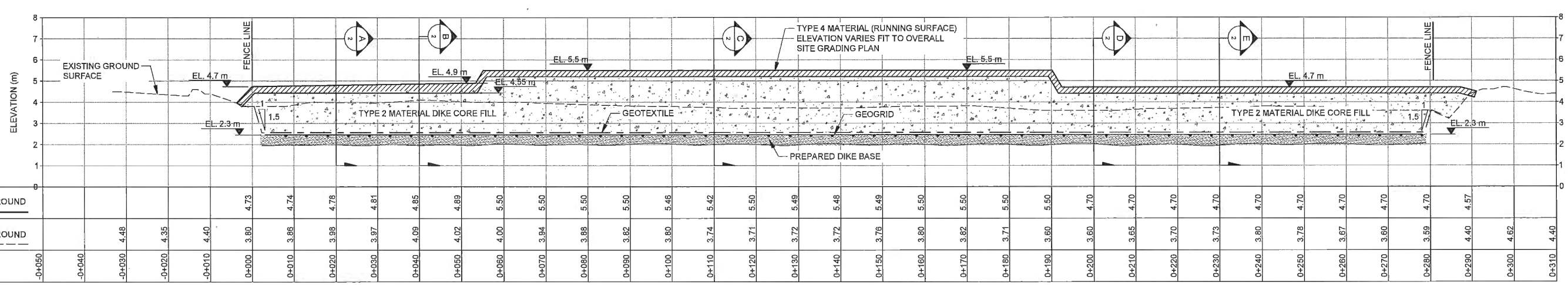
ISSUED FOR DEVELOPMENT PERMIT REVIEW
FEB 28 2018
DP 16-741741

Plotted: G:\C311\C31103509-01\15004.22C\CADD\DWGS\SHTS\15004.22C-C1112.dwg on 05/4/17 at 9:03 AM by TANNER.JOHNSON using Argus.stb

Plan #4



PLAN



CHAINAGE	0+050	0+040	0+030	0+020	0+010	0+000	0+010	0+020	0+030	0+040	0+050	0+060	0+070	0+080	0+090	0+100	0+110	0+120	0+130	0+140	0+150	0+160	0+170	0+180	0+190	0+200	0+210	0+220	0+230	0+240	0+250	0+260	0+270	0+280	0+290	0+300	0+310
FINISHED GROUND						4.73	4.74	4.78	4.81	4.85	4.89	5.50	5.50	5.50	5.50	5.46	5.42	5.50	5.49	5.48	5.49	5.50	5.50	5.50	5.50	4.70	4.70	4.70	4.70	4.70	4.70	4.70	4.70	4.70	4.57	
EXISTING GROUND			4.48	4.35	4.40	3.80	3.86	3.98	3.97	4.09	4.02	4.00	3.94	3.88	3.82	3.80	3.74	3.71	3.72	3.72	3.78	3.80	3.80	3.82	3.71	3.60	3.60	3.65	3.70	3.73	3.80	3.78	3.67	3.60	3.59	4.40	4.62	4.40

ELEVATION PROFILE

NOTE(S)

1. BASE DRAWING PROVIDED BY ARGUS CONSULTING
   CAD FILE: L2.01.DWG. DATED RECEIVED MAY 10, 2017.
2. ELEVATION SHOWN ARE IN GEODETIC DATUM
3. DATUM NAD 83, PROJECTION ZONE 10
4. ALL MATERIALS AND CONSTRUCTION SHALL CONFORM TO THE FOLLOWING:

5 A) CURRENT EDITION OF THE CITY OF RICHMOND SUPPLEMENTARY SPECIFICATIONS AND DETAIL DRAWINGS AND ASSOCIATED EDITION OF THE MASTER MUNICIPAL CONSTRUCTION DOCUMENTS.

5 B) PROVINCE OF BRITISH COLUMBIA MINISTRY OF ENVIRONMENT, LANDS AND PARKS "ENVIRONMENTAL GUIDELINES FOR VEGETATION MANAGEMENT ON FLOOD PROTECTION WORKS TO PROTECT PUBLIC SAFETY AND THE ENVIRONMENT" AND "RIPRAP DESIGN AND CONSTRUCTION GUIDE" AND "DIKE DESIGN AND CONSTRUCTION GUIDE: BEST MANAGEMENT PRACTICES FOR BRITISH COLUMBIA".

6. COMPATIBILITY OF THE MATERIAL SHOULD BE CHECKED BEFORE AND DURING CONSTRUCTION TO CONFIRM WHETHER GEOTEXTILE FABRIC IS NEEDED.

DRAFT

0 20 40
1:500 METRES
HORIZONTAL SCALE

0 5 10
1:100 METRES
VERTICAL SCALE

CLIENT
FSM MANAGEMENT GROUP

CONSULTANT
Golder Associates

YYYY-MM-DD	2017-06-19
DESIGNED	M. MIAO / J. JI
PREPARED	GB
REVIEWED	M. MIAO
APPROVED	J. JI

PROJECT
VANCOUVER AIRPORT FUEL DELIVERY PROJECT
NEW FLOOD PROTECTION DIKE
15040 WILLIAMS ROAD, RICHMOND, B.C.

TITLE
PLAN AND ELEVATION PROFILE

PROJECT NO.	PHASE	REV.	FIGURE
1406834	9442	B	1

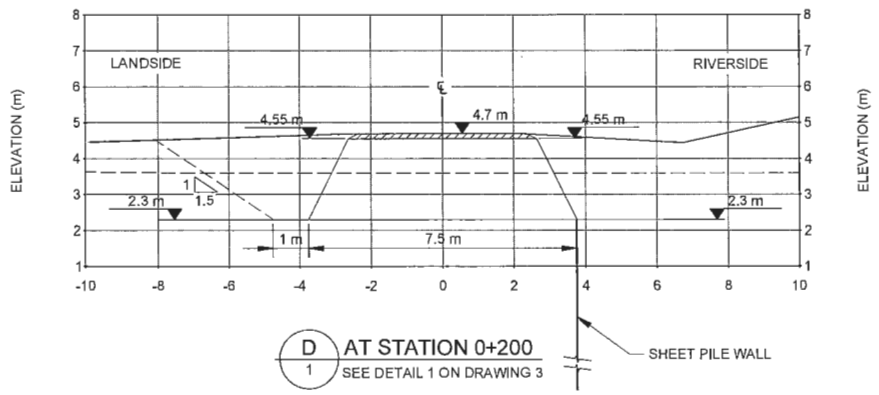
IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI D
25 mm
0

FEB 28 2018

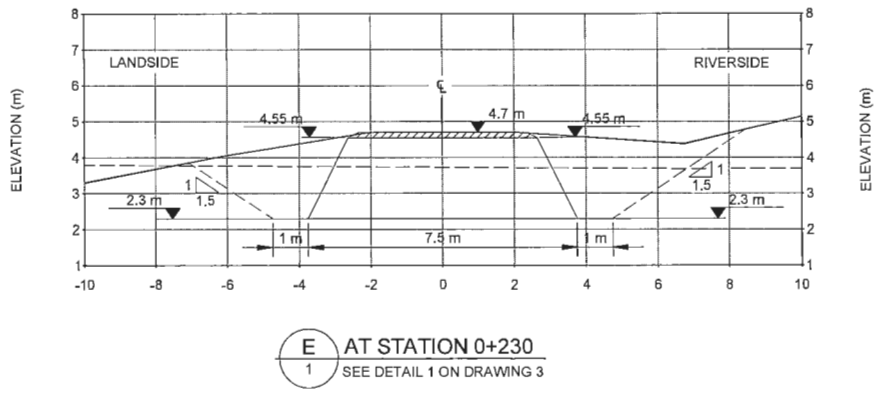
DP 16-741741

Plan #5

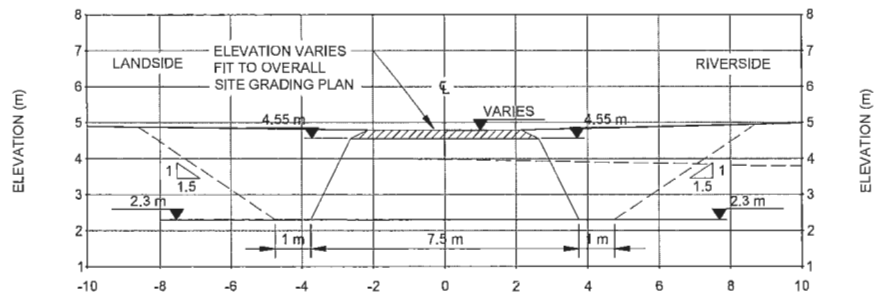
Path: \\golder.gds.golder.com\burnaby\CAD-GIS\Client\FSM\Richmond\99_PROJECT\911406834_VAFPD\02_PRODUCTION\9442\ | File Name: 1406834-9442-001.dwg



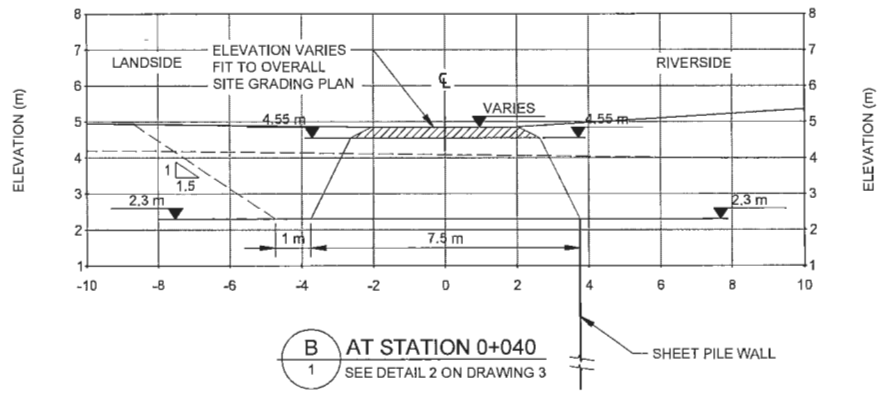
D / 1 AT STATION 0+200
SEE DETAIL 1 ON DRAWING 3



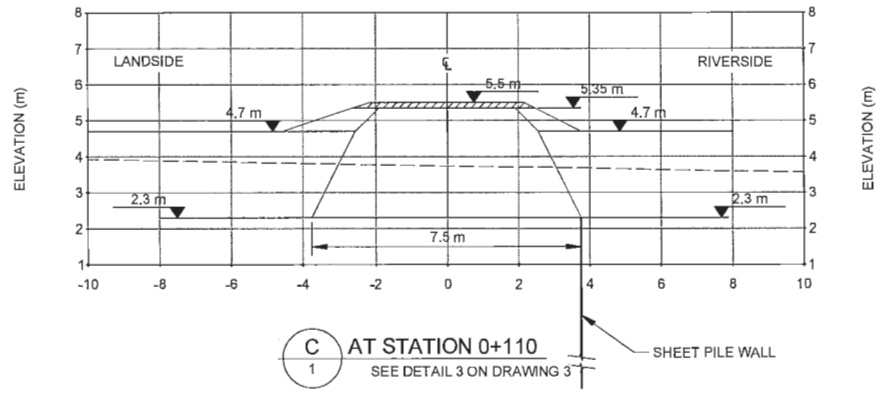
E / 1 AT STATION 0+230
SEE DETAIL 1 ON DRAWING 3



A / 1 AT STATION 0+020
SEE DETAIL 1 ON DRAWING 3



B / 1 AT STATION 0+040
SEE DETAIL 2 ON DRAWING 3



C / 1 AT STATION 0+110
SEE DETAIL 3 ON DRAWING 3

NOTE(S)

1. BASE DRAWING PROVIDED BY ARGUS CONSULTING CAD FILE: L2.01.DWG. DATED RECEIVED MAY 10, 2017.
2. ELEVATION SHOWN ARE IN GEODETIC DATUM
3. DATUM NAD 83, PROJECTION ZONE 10

DRAFT

0 5 10
1:100 METRES

CLIENT
FSM MANAGEMENT GROUP

CONSULTANT
Golder Associates

YYYY-MM-DD	2017-06-19
DESIGNED	M. MIAO / J. JI
PREPARED	GB
REVIEWED	M. MIAO
APPROVED	J. JI

PROJECT
VANCOUVER AIRPORT FUEL DELIVERY PROJECT
NEW FLOOD PROTECTION DIKE
15040 WILLIAMS ROAD, RICHMOND, B.C.

TITLE
CROSS SECTIONS

PROJECT NO.	PHASE	REV.	FIGURE
1406834	9442	B	2

IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI D

0 25 mm

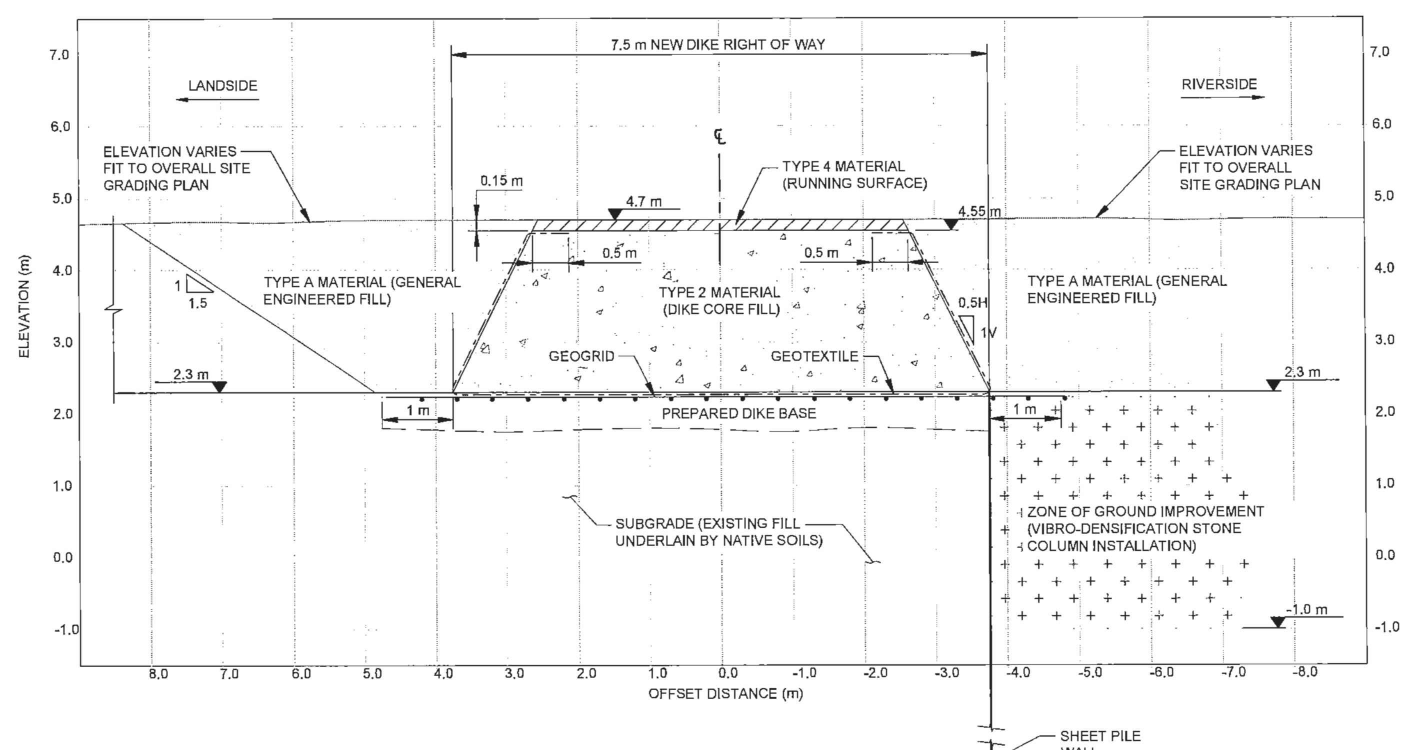
FEB 2 8 2018

DP 16-771771

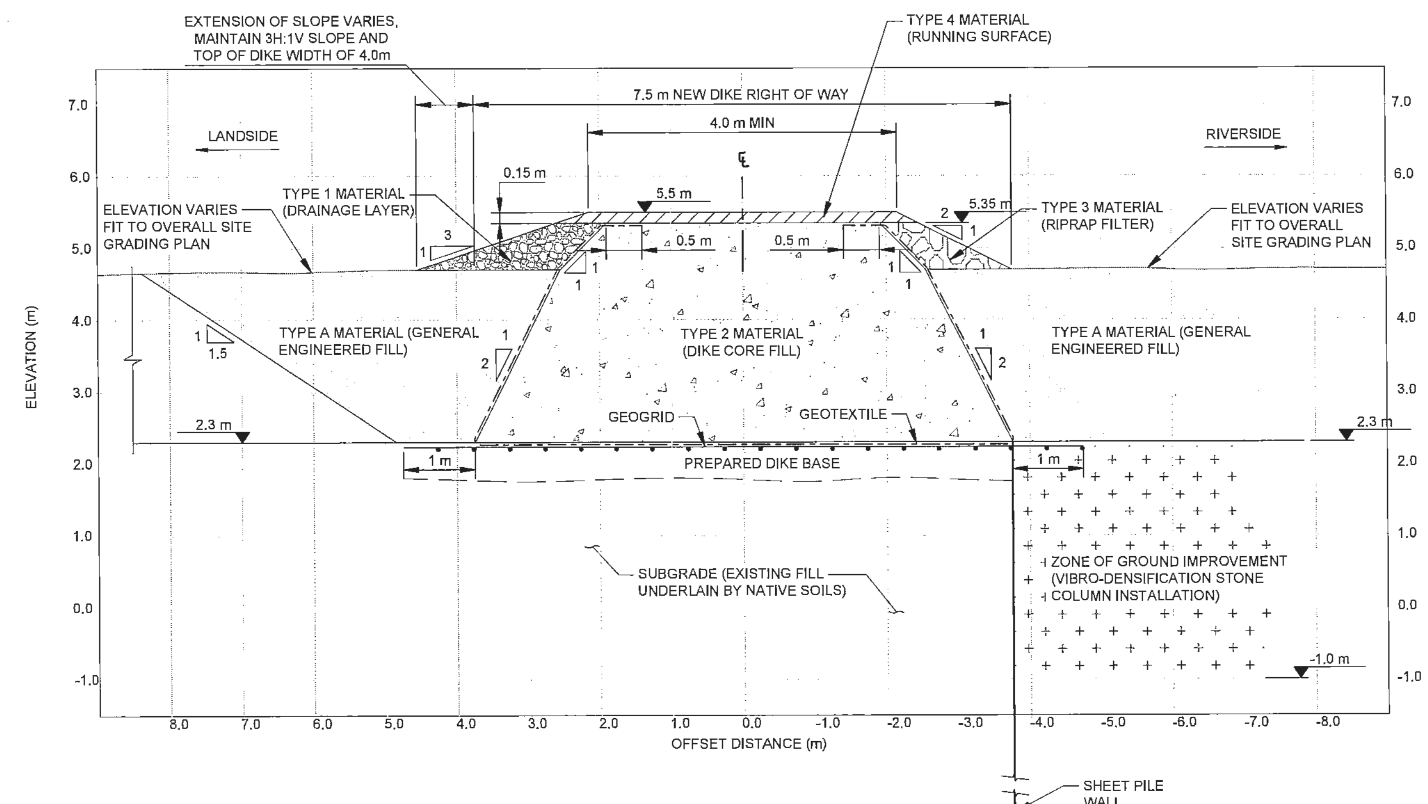
Plan #6

DP 16-741741

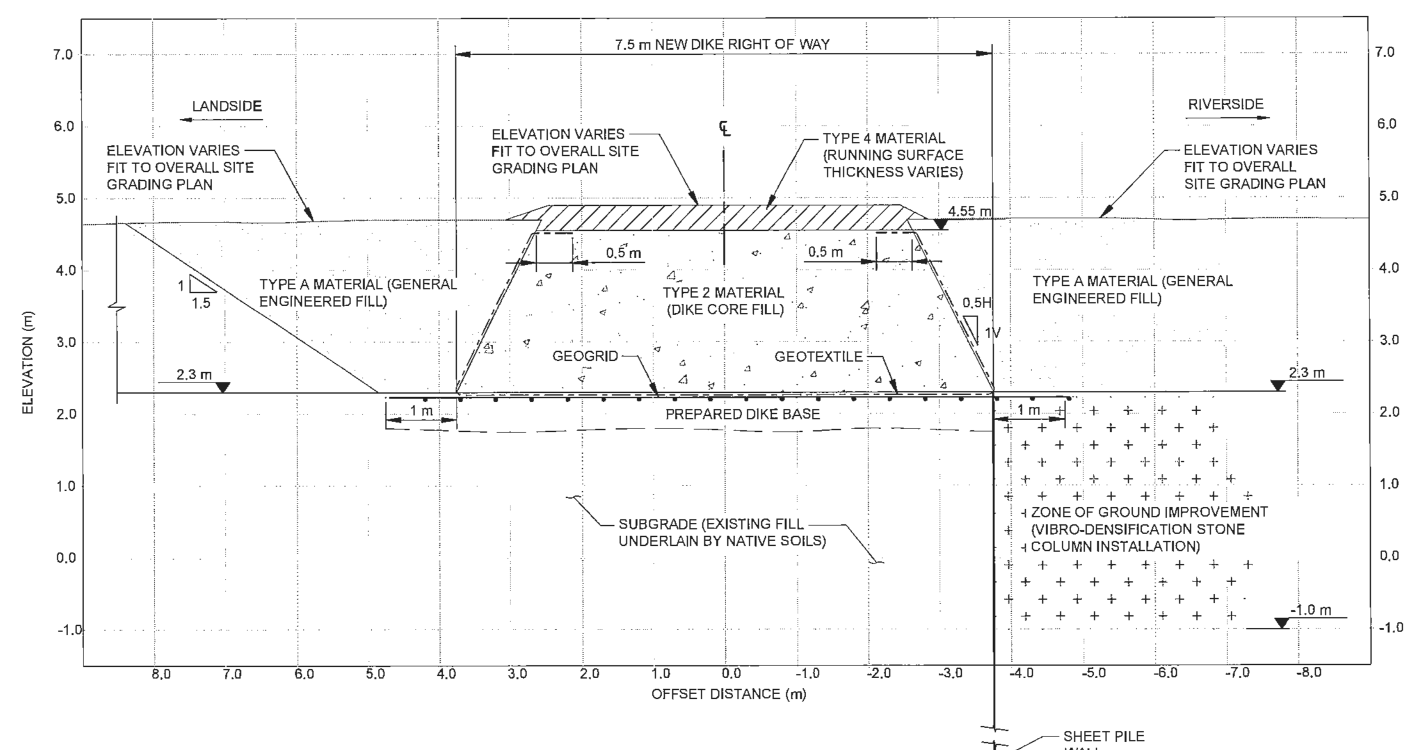
FEB 2 8 2018



1 DETAIL - DIKE TOP ELEVATION 4.7 m



3 DETAIL - DIKE TOP ELEVATION 5.5 m



2 DETAIL - DIKE TOP ELEVATION 4.7 TO 4.9 m (VARIES)

TYPE 1 MATERIAL (DRAINAGE LAYER)
Type 1 material shall consist of clean well-graded 75 mm minus sand and gravel meeting the following gradation limits

PARTICLE SIZE (mm)	PERCENTAGE BY WEIGHT PASSING
75	100
37.5	60 - 100
19	35 - 80
9.5	26 - 60
4.75	20 - 40
2.36	15 - 30
1.18	10 - 20
0.6	5 - 15
0.3	3 - 10
0.075	0 - 5

TYPE 2 MATERIAL (BULK FILL OR DIKE CORE FILL)
Type 2 material shall consist of well-graded sand with 15 to 30 percent fines passing 0.075 mm sieve meeting the following gradation limits

PARTICLE SIZE (mm)	PERCENTAGE BY WEIGHT PASSING
19	100
4.75	80 - 100
0.425	25 - 90
0.15	18 - 50
0.075	15 - 30

TYPE 3 MATERIAL (RIPRAP FILTER)
Type 3 material shall consist of clean well-graded pit-run or processed sand, gravel and cobbles, or quarried stone meeting the following gradation limits

PARTICLE SIZE (mm)	PERCENTAGE BY WEIGHT PASSING
200	100
75	60 - 90
9.5	30 - 65
0.85	5 - 30
0.15	0 - 5

TYPE 4 MATERIAL (RUNNING SURFACE)
Type 4 material shall consist of clean well-graded 19mm minus sand and gravel or road mulch meeting the following gradation limits

PARTICLE SIZE (mm)	PERCENTAGE BY WEIGHT PASSING
19	100
12.5	75 - 100
9.5	60 - 90
4.75	40 - 70
2.36	27 - 55
1.18	16 - 42
0.6	8 - 30
0.3	5 - 20
0.075	2 - 8

TYPE A MATERIAL (GENERAL ENGINEERED FILL)
Type A material shall consist of clean well-graded 75 mm minus sand and gravel meeting the following gradation limits

PARTICLE SIZE (mm)	PERCENTAGE BY WEIGHT PASSING
75	100
37.5	30 - 100
19	20 - 100
4.75	10 - 60
1.18	6 - 32
0.3	4 - 15
0.075	0 - 5

DRAFT

0 2 4
1:50 METRES

NOTE(S)
1. BASE DRAWING PROVIDED BY ARGUS CONSULTING CAD FILE: L2.01.DWG. DATED RECEIVED MAY 10, 2017.
2. ELEVATION SHOWN ARE IN GEODETIC DATUM
3. DATUM NAD 83, PROJECTION ZONE 10

CLIENT
FSM MANAGEMENT GROUP

CONSULTANT
Golder Associates

YYYY-MM-DD	2017-06-19
DESIGNED	M. MIAO / J. JI
PREPARED	GB
REVIEWED	M. MIAO
APPROVED	J. JI

PROJECT
VANCOUVER AIRPORT FUEL DELIVERY PROJECT
NEW FLOOD PROTECTION DIKE
15040 WILLIAMS ROAD, RICHMOND, B.C.

TITLE
TYPICAL DETAILS

PROJECT NO.	PHASE	REV.	FIGURE
1406834	9442	B	3

25 mm IF THIS MEASUREMENT DOES NOT MATCH WHAT IS SHOWN, THE SHEET SIZE HAS BEEN MODIFIED FROM: ANSI D

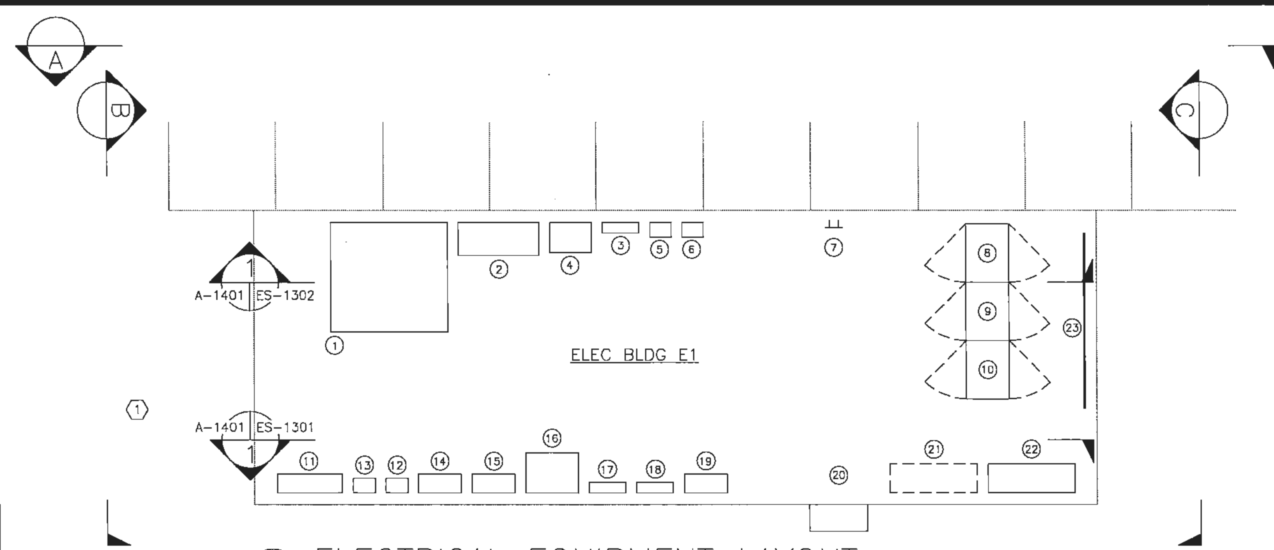
Path: \\golder.gds\gal\burnaby\CAD-GIS\Client\FSM\Richmond\99_PROJECTS\1406834_VAFFD\02_PRODUCTION\9442\ | File Name: 1406834-9442-001.dwg

Plan #7

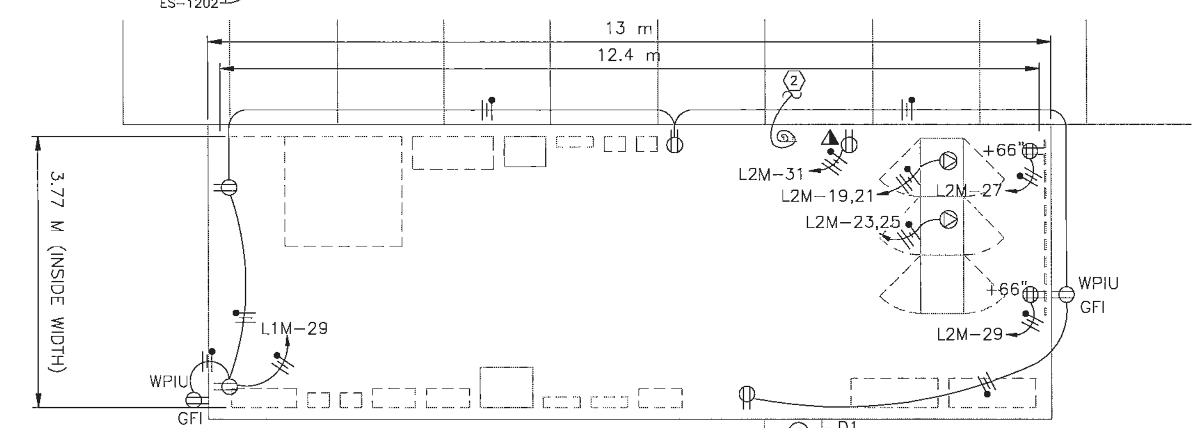
ISSUED FOR CONSTRUCTION

DP 16-741741

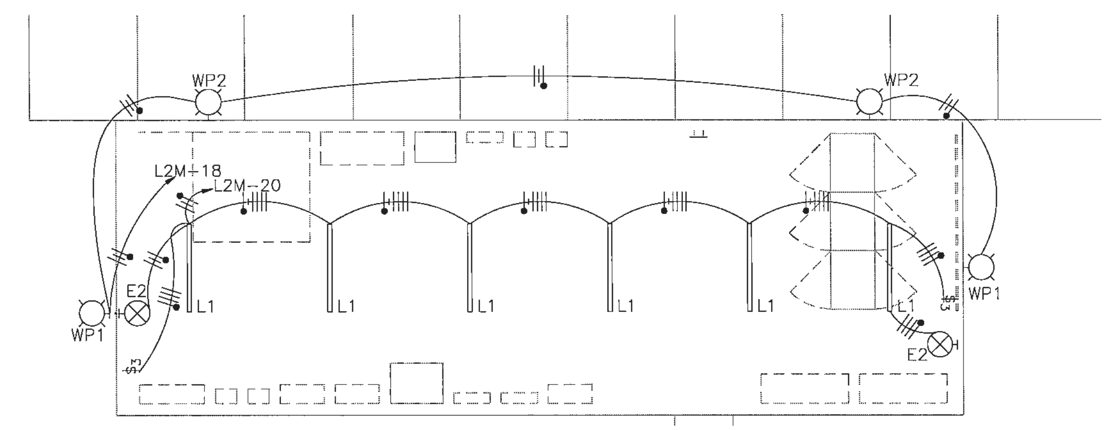
FEB 2 8 2018



1 ELECTRICAL EQUIPMENT LAYOUT ES-1201, ES-1202, A-1401 1:50



2 POWER & COMMUNICATIONS LAYOUT ES-1201, ES-1202, A-1401 1:50



3 LIGHTING LAYOUT ES-1201, ES-1202, A-1401 1:50

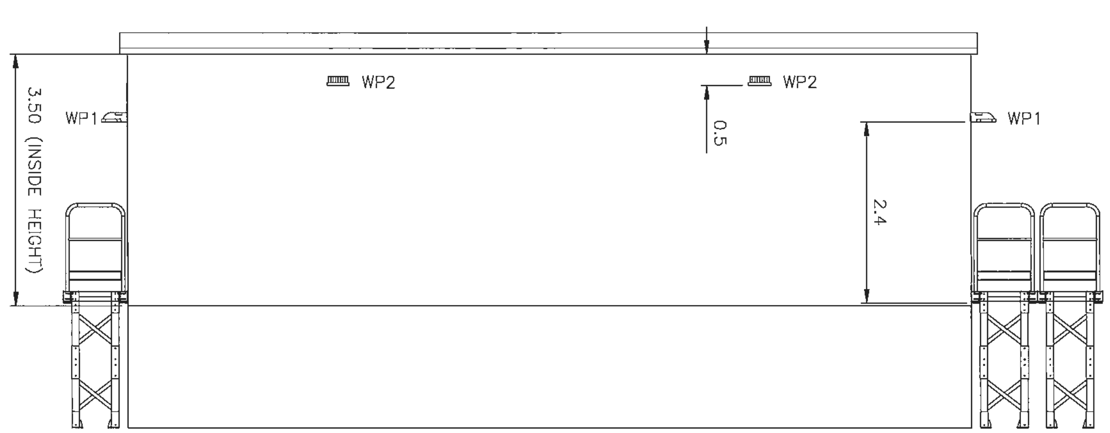
EQUIPMENT LIST			
ITEM(S)	QUANTITY	TAG(S)	DESCRIPTION
1	1	ATS1	AUTOMATIC TRANSFER SWITCH
2	1	MDP1	MAIN DISTRIBUTION PANELBOARD – NORMAL POWER
3	1	L1M	PANELBOARD L1M
4	1	T2M	TRANSFORMER
5	1	ST-SP-103	MOTOR STARTER
6	1	ST-SP-104	MOTOR STARTER
7	1	MGB1	MASTER GROUND BAR 1
8	1	CR1	COMMUNICATIONS RACK 1 (SHORE)
9	1	CR2	COMMUNICATIONS RACK 2 (PIER)
10	1	CR3	COMMUNICATIONS RACK 3 (FUTURE)
11	1	H1M	PANELBOARD H1M
12	1	ST-SP-101	MOTOR STARTER
13	1	ST-SP-102	MOTOR STARTER
14	1	H2M	PANELBOARD H2M
15	1	H2MB	PANELBOARD H2MB
16	1	T3M	TRANSFORMER
17	1	L2M	PANELBOARD L2M
18	1	L2MB	PANELBOARD L2MB
19	1	LCP1	PANELBOARD LCP1
20	1	WPU1	WALL PACKAGE UNIT 1
21	1	PLCC2	PROGRAMMABLE LOGIC CONTROLLER CAB 2 (FUTURE)
22	1	PLCC1	PROGRAMMABLE LOGIC CONTROLLER CAB 1
23	1	BKBD	PLYWOOD BACKBOARD

NOTES:

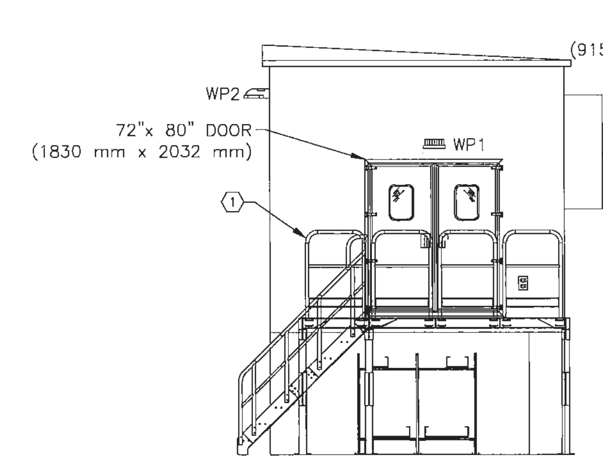
1. SEE DRAWINGS E-1001 AND E-1002 FOR LEGEND, ABBREVIATIONS AND GENERAL NOTES.
2. ELECTRICAL WORK SHOWN WITH DARK LINE WEIGHT SHALL BE PROVIDED.
3. SEE 1700 SERIES DRAWINGS FOR CABLE, DUCTBANK, LIGHTING, PANELBOARD, AND RACEWAY SCHEDULES.

KEYNOTES:

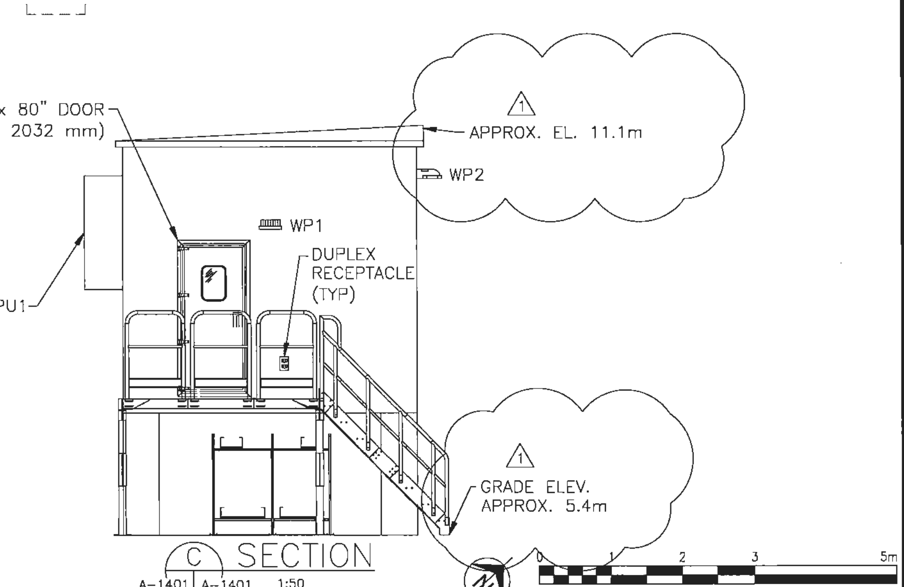
1. PROVIDE REMOVABLE RAIL WIDTH OF DOUBLE DOORS TO AID EQUIPMENT MOVEMENT. SEE STRUCTURAL DRAWINGS FOR DETAILS.
2. PROVIDE GROUND COILED. BOND TO BUILDING COUNTERPOISE FROM MASTER GROUND BAR. SEE DRAWING ES-1104 FOR CONTINUATION.



A SECTION A1401 A-1401 1:50



B SECTION A-1401 A-1401 1:50



C SECTION A-1401 A-1401 1:50

ISSUE NO.	DRAWING REVISIONS	ISSUE DATE
1	ADDED ELEVATION TEXT	08/18/2017
	ISSUED FOR CONSTRUCTION	02/14/17

Fuel Facilities Corporation

FSM GROUP 158-12300 Horseshoe Way Richmond, BC V7A 4Z1 604-271-7113 www.fsmgroup.ca www.vancouverairportfuel.ca

VANCOUVER AIRPORT FUEL DELIVERY PROJECT
MARINE RECEIVING AREA

VANCOUVER AIRPORT FUEL FACILITIES CORPORATION
RICHMOND, BRITISH COLUMBIA

SEAL: D. W. FRANK # 106103 ENGINEER

Argus
ENGINEERING | PLANNING | MANAGEMENT
ARGUS CONSULTING, INC.
6363 College Boulevard, Suite 600 Overland Park, Kansas 66211 816.228.7500 FAX 816.228.7535 www.argusconsulting.com

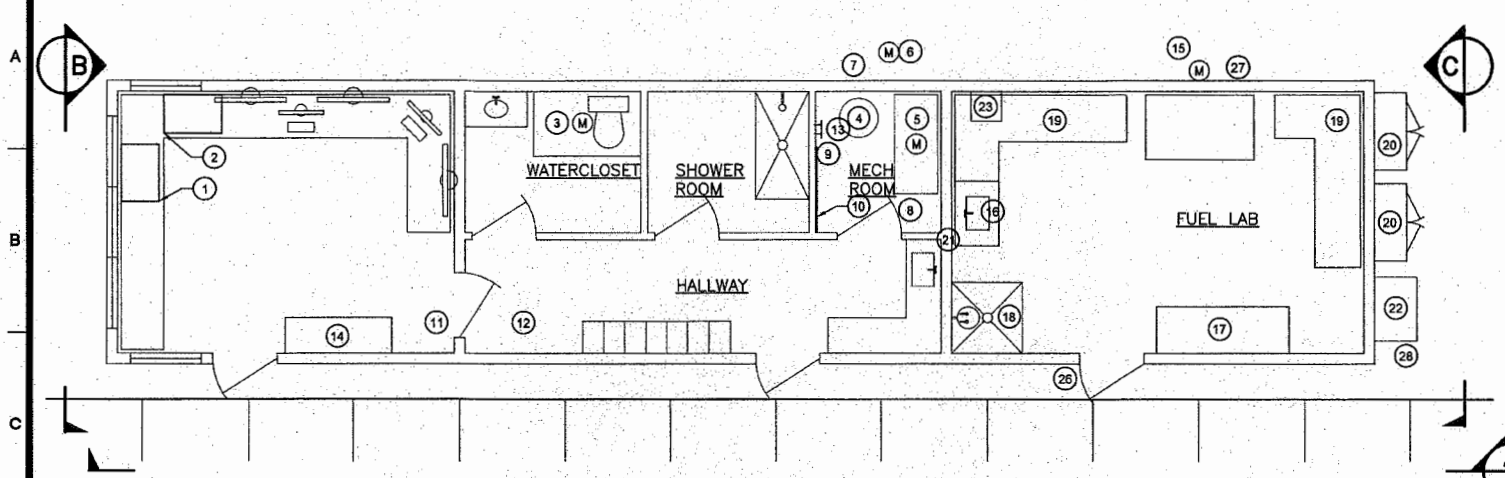
PROJECT NO: 15004.22
DATE: 03/19/16
DESIGNED BY: WBJ
DRAWN BY: SMF
CHECKED BY: DWF
CAD FILE NAME: 15004.22C-A1401

E1 ELEC BLDG FLOOR PLAN

DRAWING NO.: A-1401

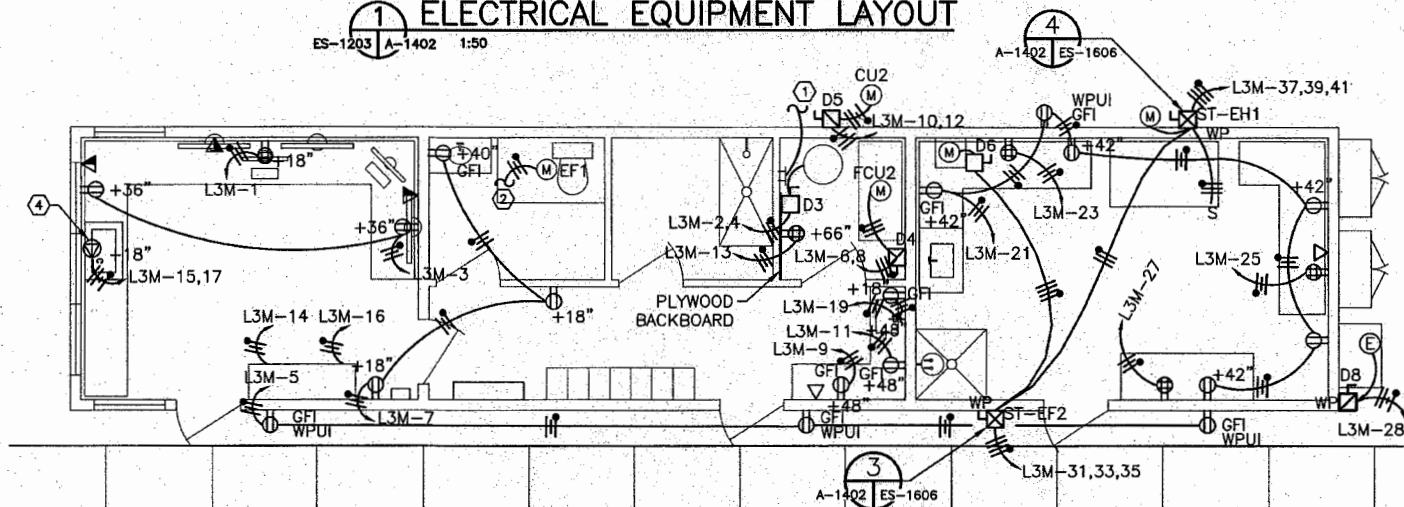
Plotted: Y:\Comm\YVR – Vancouver\15004 VAFDP\Dwgs\22–Marine\22C – Design\Arch\15004.22C–A1401.dwg on 08/18/17 at 5:53 PM by SNEWBOLD using acad.stb

Plan #8



1 ELECTRICAL EQUIPMENT LAYOUT

ES-1203 | A-1402 1:50



EQUIPMENT LIST			
ITEM(S)	QUANTITY	TAG(S)	DESCRIPTION
1	1	MR-CR-4	COMMUNICATIONS RACK 4
2	1	MR-CR-5	COMMUNICATIONS RACK 5
3	1	EF1	EXHAUST FAN 1
4	1	WH1	WATER HEATER 1
5	1	FCU2	FAN COIL UNIT 2
6	1	CU2	CONDENSING UNIT 2
7	1	D5	SERVICE DISCONNECT (CU2)
8	1	D4	SERVICE DISCONNECT (FCU2)
9	1	D3	SERVICE DISCONNECT (WH1)
10	1	BKBD	PLYWOOD BACKBOARD
11	1	GAP1	GENERATOR ANUNCIATOR PANEL
12	1	L3M	PANELBOARD L3M
13	1	MGB2	MASTER GROUND BAR 2
14	1	NODE1	FIRE ALARM CONTROL PANEL
15	1	EH1	EXHAUST HOOD
16	1	CT1	WATER ONLY SINK
17	1	CB1	WORKBENCH BASE CABINETS
18	1	EWSH1	EYE WASH / SHOWER STATION
19	2	CB2	CABINET BASE AND OVERHEAD UNIT (LEFT CORNER)
20	2	CO	OUTDOOR FUEL SAMPLE CABINETS
21	1	FW1	FIRE WALL BETWEEN OPERATIONS AND FUEL LAB
22	1	WPU2	WALL PACKAGE UNIT 2
23	1	EF2	EXHAUST FAN
24	1	D6	SERVICE DISCONNECT (EF2)
25	1	D7	SERVICE DISCONNECT (WPU2)
26	1	ST-EF2	MOTOR STARTER (EF2)
27	1	ST-EH1	MOTOR STARTER (EH1)

NOTES:

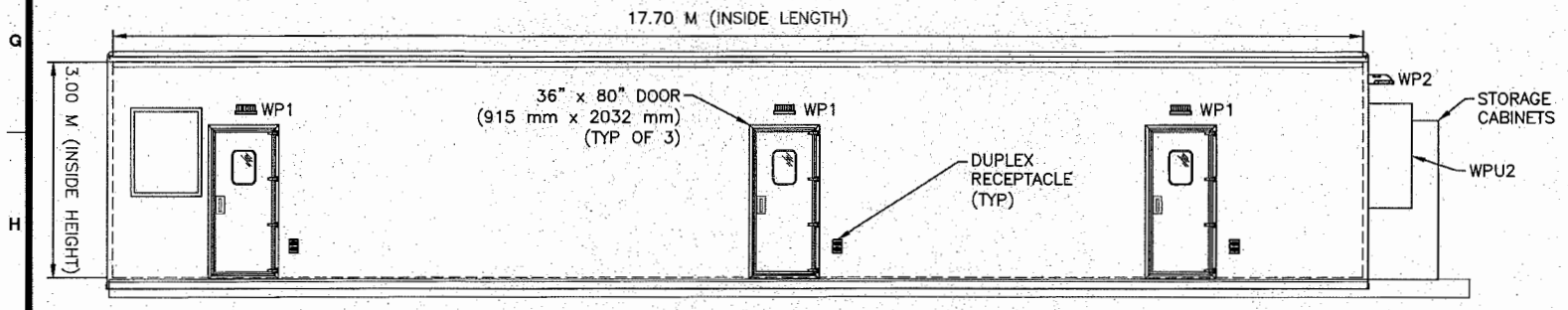
1. SEE DRAWINGS E-1001 AND E-1002 FOR LEGEND, ABBREVIATIONS AND GENERAL NOTES.
2. ELECTRICAL WORK SHOWN WITH DARK LINE WEIGHT SHALL BE PROVIDED.
3. SEE 1700 SERIES DRAWINGS FOR CABLE, DUCTBANK, LIGHTING, PANELBOARD, AND RACEWAY SCHEDULES.

KEYNOTES:

1. PROVIDE GROUND COILED IN MECHANICAL ROOM. BOND TO BUILDING COUNTERPOISE FROM MASTER GROUND BAR. SEE DRAWING ES-1104 FOR CONTINUATION.
2. SEE CONTINUATION FOR EXHAUST FAN ON DETAIL 3 LIGHTING LAYOUT ON THIS SHEET.
3. SEE CONTINUATION FOR EXHAUST FAN ON DETAIL 2 POWER LAYOUT ON THIS SHEET.
4. PROVIDE RECEPTACLE TO MATCH UPS EQUIPMENT PLUG.

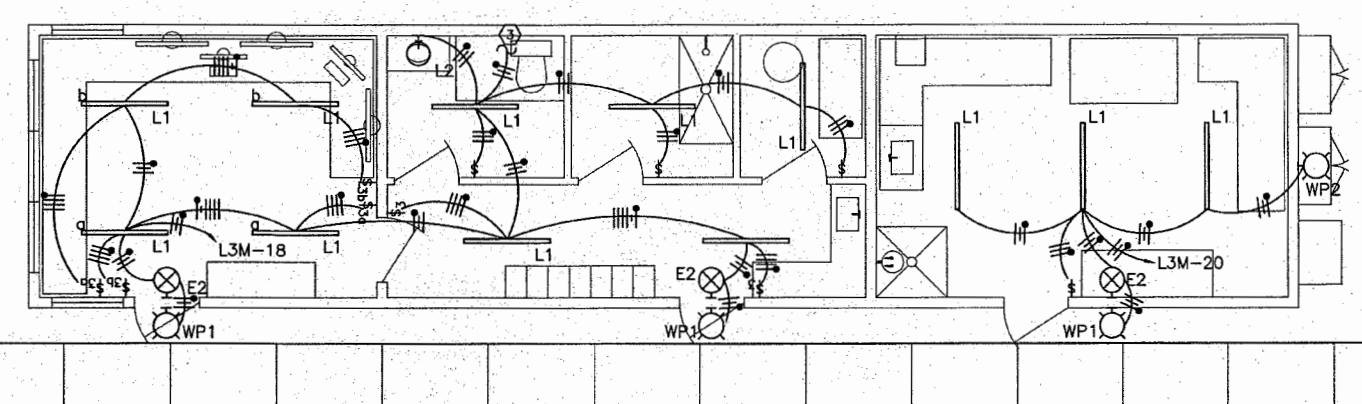
2 POWER & COMMUNICATIONS LAYOUT

ES-1203 | A-1402 1:50



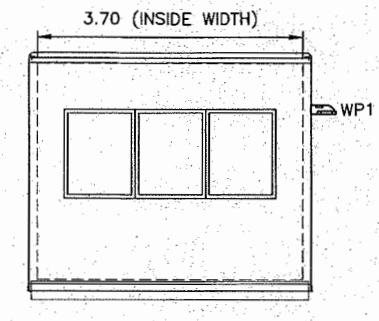
3 LIGHTING LAYOUT

ES-1203 | A-1402 1:50



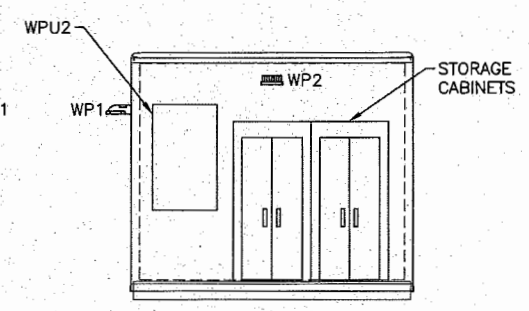
A SECTION

ES-1203 | A-1402 1:50



B SECTION

ES-1203 | A-1402 1:50



C SECTION

ES-1203 | A-1402 1:50

0 0.5 1 1.5 2 2.5m
1:38

ISSUE NO.	DRAWING REVISIONS	ISSUE DATE
	ISSUED FOR CONSTRUCTION	02/14/17

VAFFC / Vancouver Airport Fuel Facilities Corporation
AN FBM GROUP MANAGED CORPORATION
FBM MANAGEMENT GROUP
108 - 12300 Horseshoe Way
Richmond, BC, V7A 4Z1
604.271.7113
www.fbmgroup.ca
www.vancouverairportfuel.ca

VANCOUVER AIRPORT FUEL DELIVERY PROJECT
MARINE RECEIVING AREA

VANCOUVER AIRPORT FUEL FACILITIES CORPORATION
RICHMOND, BRITISH COLUMBIA

SEAL: PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA D. W. FRANK # 108408 — 3/7/17

LOGO

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816.228.7500 FAX 816.228.7535
www.argusconsulting.com

PROJECT NO: 15004.22	OPS1 OPERATIONS BLDG AND FL1 FUEL LAB FLOOR PLANS
DATE: 03/19/16	
DESIGNED BY: WBJ	
DRAWN BY: SMF	
CHECKED BY: DWF	DRAWING NO.: A-1402
CAD FILE NAME: 15004.22CA1402	

PLEASE RECYCLE

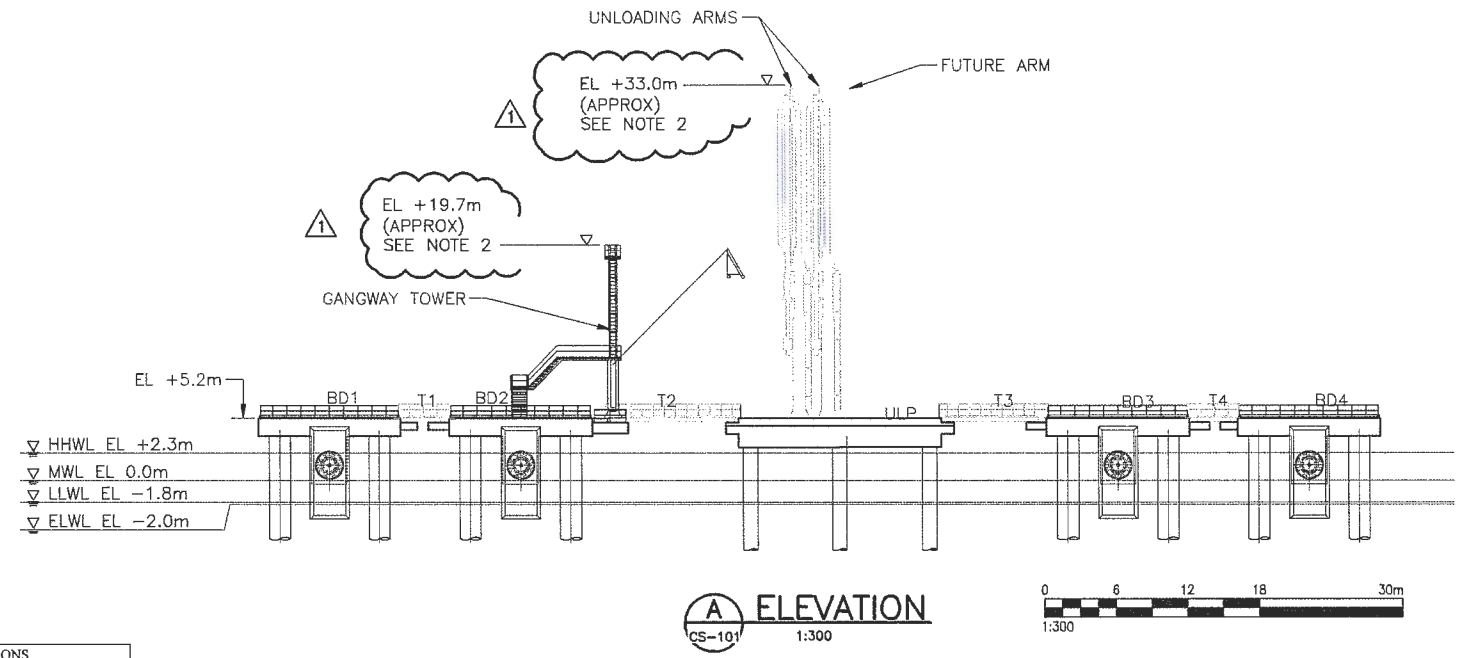
FEB 28 2018

ISSUED FOR CONSTRUCTION

DP 16-741741

Plan #9

Plotted: Y:\Comm\YVR - Vancouver\15004 VAFDP\Dwgs\22-Marine\22C - Design\Arch\15004.22CA1402.dwg on 03/6/17 at 1:58 PM by GCROWDER using acad.stb



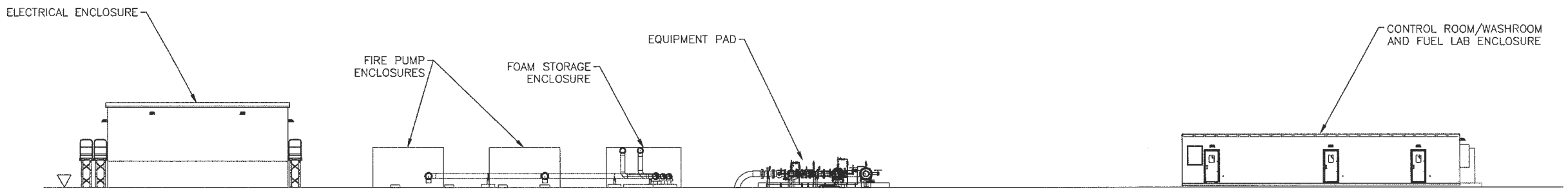
A ELEVATION
CS-101
1:300

0 6 12 18 30m
1:300

NOTES:

1. ELEVATIONS ARE TO GEODETIC DATUM.
1. 2. ELEVATIONS OF VENDOR SUPPLIED MECHANICAL EQUIPMENT SHOWN ARE APPROXIMATE AND SUBJECT TO CHANGE ONCE EQUIPMENT IS ORDERED AND SHOP DRAWINGS PRODUCED.

BUILDING AREA AND STRUCTURE ELEVATIONS			
BUILDING NAME	FLOOR AREA (M^2)	STRUCTURE HEIGHT (M)	STRUCTURE ELEVATION (M)
CONTROL ROOM AND WASHROOM ENCLOSURE	43.29	3.5	9.0
FUEL LAB ENCLOSURE	21.65	3.5	9.0
FIRE PUMP ENCLOSURE 1	33.51	2.6	8.1
FIRE PUMP ENCLOSURE 2	33.51	2.6	8.1
FOAM STORAGE ENCLOSURE	28.01	2.6	8.1
ELECTRICAL ENCLOSURE	45.97	5.5	11.0
DOCK UNLOADING ARMS	N/A	33.0	37.8
DOCK GANGWAY TOWER	N/A	19.7	24.5
NOTE: THE MARINE UNLOADING ARMS ELEVATION ARE TO BE DETERMINED BY THE MANUFACTURER. APPROXIMATE ELEVATIONS OF THE STRUCTURE ARE LISTED ABOVE.			
SITE AREA: 40,468 M^2 LOT COVERAGE AREA: 0.52%			



B ELEVATION
CS-101
1:150

0 3 6 9 15m
1:150

ISSUE NO.	DRAWING REVISIONS	ISSUE DATE
2	ISSUED FOR DEVELOPMENT PERMIT REVIEW	05/05/2017
1	ELEVATIONS ADDED	04/27/2017
0	ISSUED FOR CONSTRUCTION	02/14/2017

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PGM MANAGEMENT GROUP
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www.fpmgroup.ca
www.vancouverairportfuel.ca

VANCOUVER AIRPORT FUEL DELIVERY PROJECT
MARINE RECEIVING AREA
MARINE DESIGN PACKAGE
VANCOUVER AIRPORT FUEL FACILITIES CORPORATION
RICHMOND, BRITISH COLUMBIA

SEAL

LOGO

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Overland Park, Kansas 66211
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PROJECT NO:	15004.22C
DATE:	12/18/15
DESIGNED BY:	FS
DRAWN BY:	AVM
CHECKED BY:	RB
CAD FILE NAME:	15004.22C-G031

ELEVATION

DRAWING NO.: G-031

PLEASE RECYCLE

FEB 28 2018

ISSUED FOR DEVELOPMENT PERMIT REVIEW

DP 16-751414

Plotted: Y:\Comm\YVR – Vancouver\15004 VAFDP\Dwgs\22-Marine\22A – Permit\Gen\15004.22C-G031 ELEVATION 2017-05-01\15004.22C-G031.dwg on 05/5/17 at 8:13 AM by NPARK using acad.stb

Plan #10

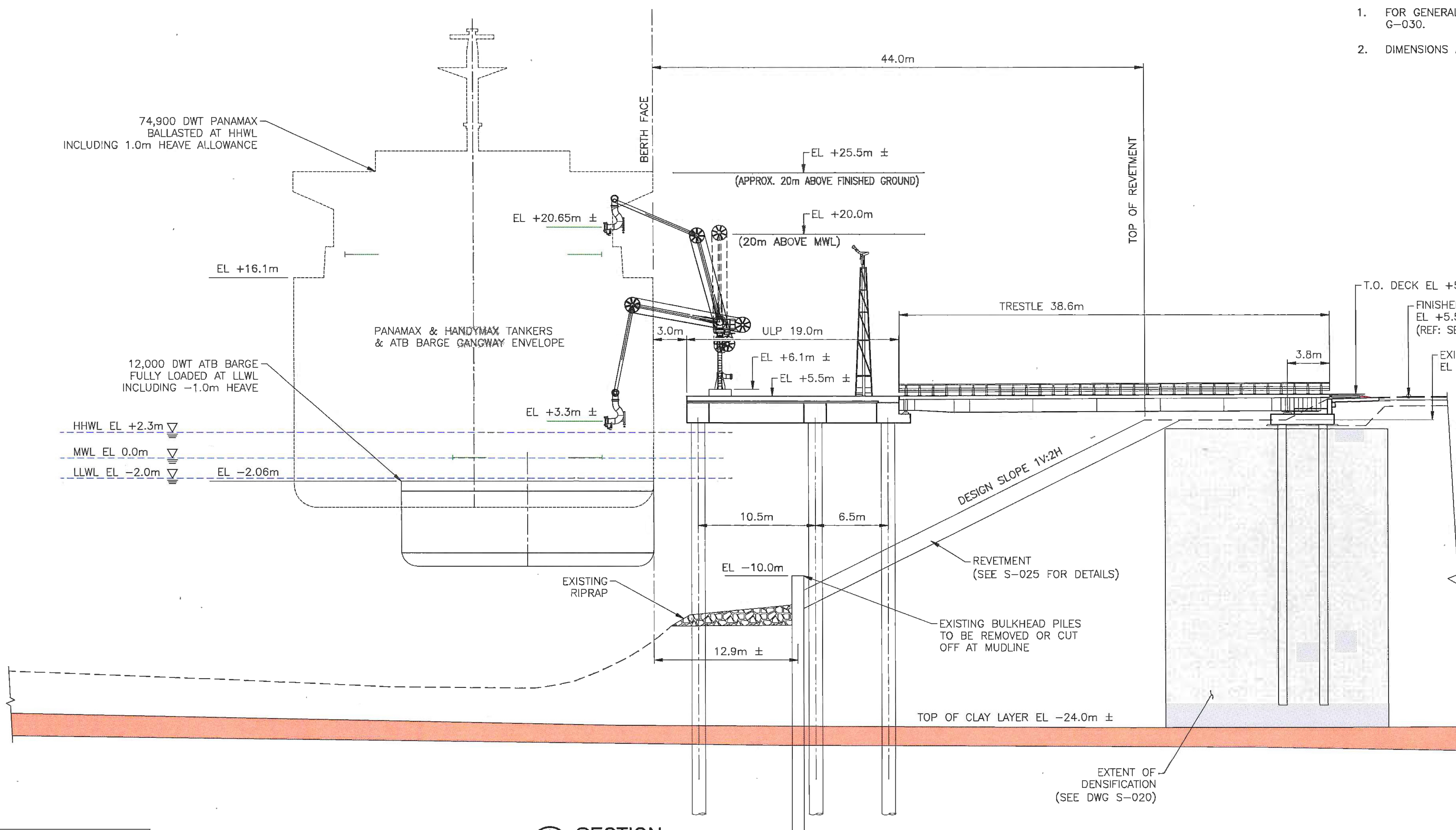
DP 16-741741

FEB 2 8 2018

ISSUED FOR CONSTRUCTION

NOTES:

1. FOR GENERAL NOTES, SEE DWGS G-003 & G-030.
2. DIMENSIONS AND ELEVATIONS IN METRES (m).



A SECTION
G-030 1:200

0 4 8 12 20m
1:200

REVISION IN PROGRESS
NOT FOR ISSUE
DATE: 2017/06/21 - 1:34pm

PRELIMINARY
NOT TO BE USED FOR CONSTRUCTION

ISSUE NO.	DRAWING REVISIONS	ISSUE DATE

VAFFC / Vancouver Airport
Fuel Facilities Corporation

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Richmond, BC, V7A 4Z1
604-271-7113
www.fsmgroup.ca
www.vancouverairportfuel.ca

VANCOUVER AIRPORT FUEL DELIVERY PROJECT
MARINE RECEIVING AREA
MARINE DESIGN PACKAGE
VANCOUVER AIRPORT FUEL FACILITIES CORPORATION
RICHMOND, BRITISH COLUMBIA

SEAL

LOGO

moffatt & nichol
777 WEST BROADWAY, STE 301
VANCOUVER, BC CANADA V5Z 4J7
604-707-9004

Argus
ENGINEERING | PLANNING | MANAGEMENT
ARGUS CONSULTING, INC.
6363 College Boulevard, Suite 600
Overland Park, Kansas 66211
816.228.7500 FAX 816.228.7535
www.argusconsulting.com

PROJECT NO: 15004.22C
DATE: 10/20/15
DESIGNED BY: SP
DRAWN BY: AVM
CHECKED BY: RB
CAD FILE NAME: 15004.22C-G034

UNLOADING PLATFORM SECTION

DRAWING NO.: G-034

Plotted: P:\8338 VC Vancouver Airport Fuel Delivery Project\CADD_Active\15004.22C-G034.dwg on 06/21/17 at 1:34 PM by AMANUZON using Argus.stb

Plan # 11

Figure 1 Vancouver Airport Fuel Delivery Project – Marine terminal proposed habitat compensation areas

Legend

- Ground-Truthed High Water Mark
- Marine Terminal Site
- Proposed Trail
- Canadian National Railway Right-of-Way

Designated and Inferred Habitat Areas

- Intertidal ESA
- Shoreline ESA
- RMA

Habitat Compensation Areas

- Intertidal ESA
- RMA
- Inferred RMA
- Shoreline ESA
- EN

0 25 50 75 m N

Scale: 1:2,500

Projection: NAD 1983 UTM Zone 10N

Data Sources:
a) Compensation and Treatment Areas, Hatfield 2017.
b) Trail Data, Damon Orient Ltd., Modified by Hatfield 2017.
c) ESA Data Layers, City of Richmond, Modified by Hatfield 2017.
d) Background Image, ESRI Online Service.

Hatfield CONSULTANTS

K:\Data\Project\VAFFC6773\A_MXD\HabitatComp\MarineTerminal\VAFFC6773_Fig1_MT_HabitatComp_20170629_v1_13_SJ.mxd

This plan is reprinted from the
ESA and RMA Environmental Impacts Report
by
Hatfield Environmental Consultants

18 Dec. 2017 Development Permit Application Resubmission - DPP Comments
31 Oct. 2017 Development Permit Application Resubmission - ADP Comments

DAMON ORIENTE LTD.
landscape architects

#306 - 4464 West 10th Avenue
Vancouver, BC, Canada
V6R 2H9

t. 604-222-9200
e. dvo@telus.net
w. damonoriente.ca

Project
VAFFC MARINE TERMINAL FACILITY

15040 Williams Road, Richmond BC

Drawing
PROPOSED COMPENSATION AREAS

Issue:

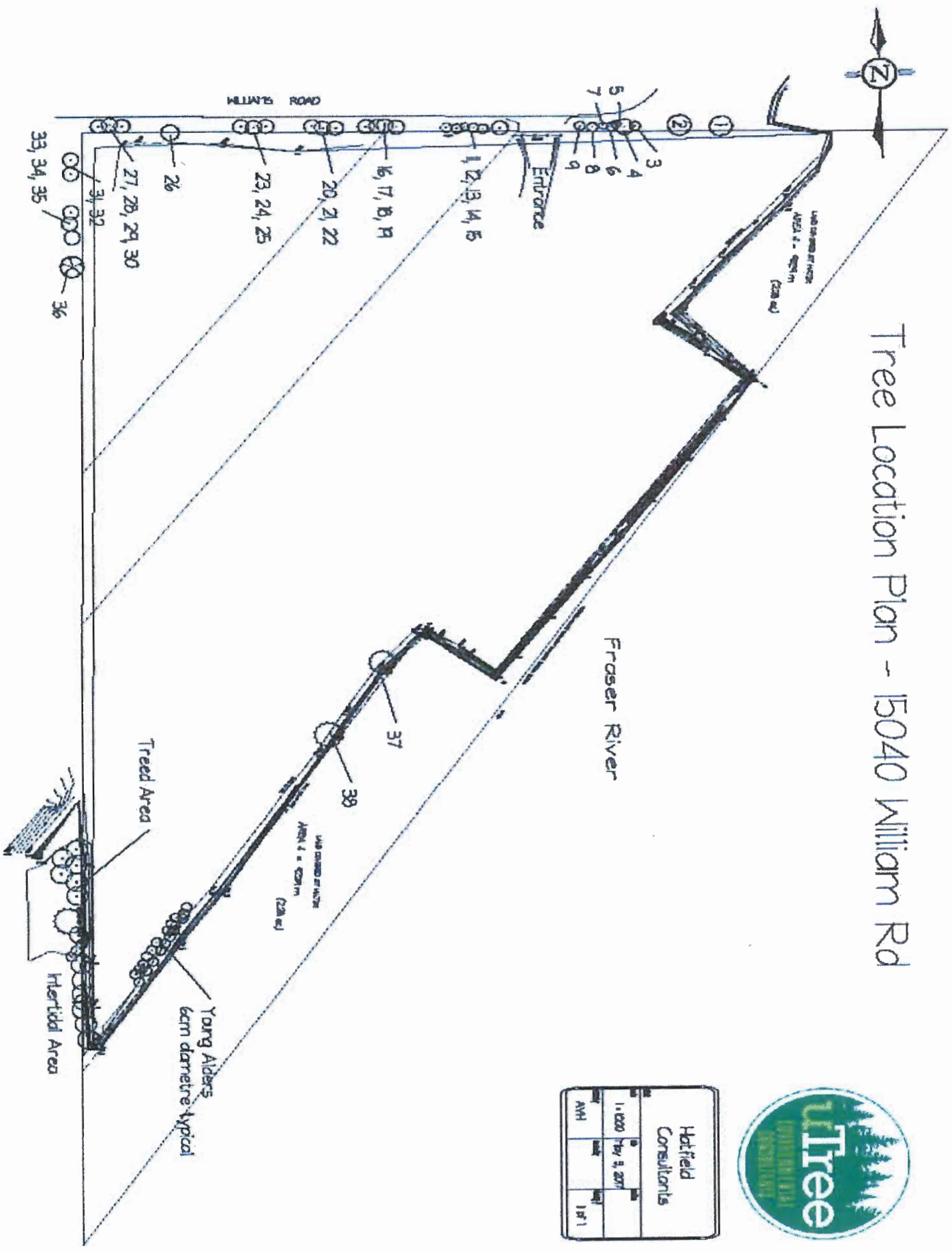
Scale: nts

Date:

Project Number: 2014-280

Dwg
L0.03

Tree Location Plan - 15040 William Rd

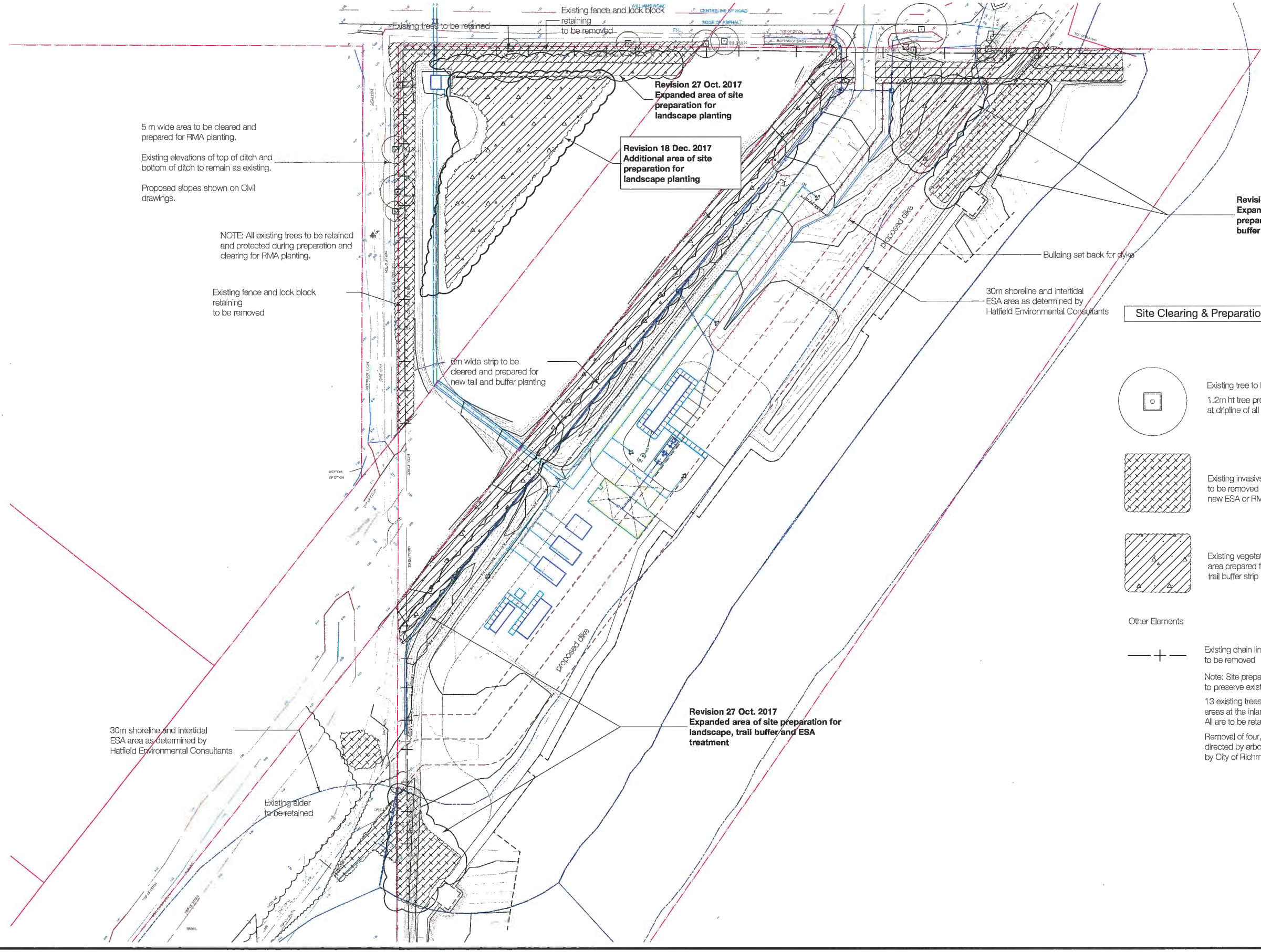


uTree Environmental Consultants.
p 604-328-0614 e avanderhelm1@gmail.com w www.utree.com

Plan # 13

DP 16-741741

FEB 28 2018



Site Clearing & Preparation Key - Landscape

Existing tree to be retained

1.2m ht tree protection fencing to be erected at dripline of all existing trees to be retained

Existing invasivse species of vegetation to be removed and area prepared for new ESA or RMA planting

Existing vegetation to be removed and area prepared for new gravel trail and trail buffer strip planting

Other Elements

Existing chain link and/ or metal panel fence to be removed

Note: Site preparation work in RMA and ESA areas to preserve existing ditch slopes and locations.

13 existing trees are found on the RMA areas at the inland site perimeter. All are to be retained

Removal of four, off-site trees only as directed by arborist and as approved by City of Richmond Parks Staff

W E S

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e. rhn@telus.net
w. damonoriente.ca

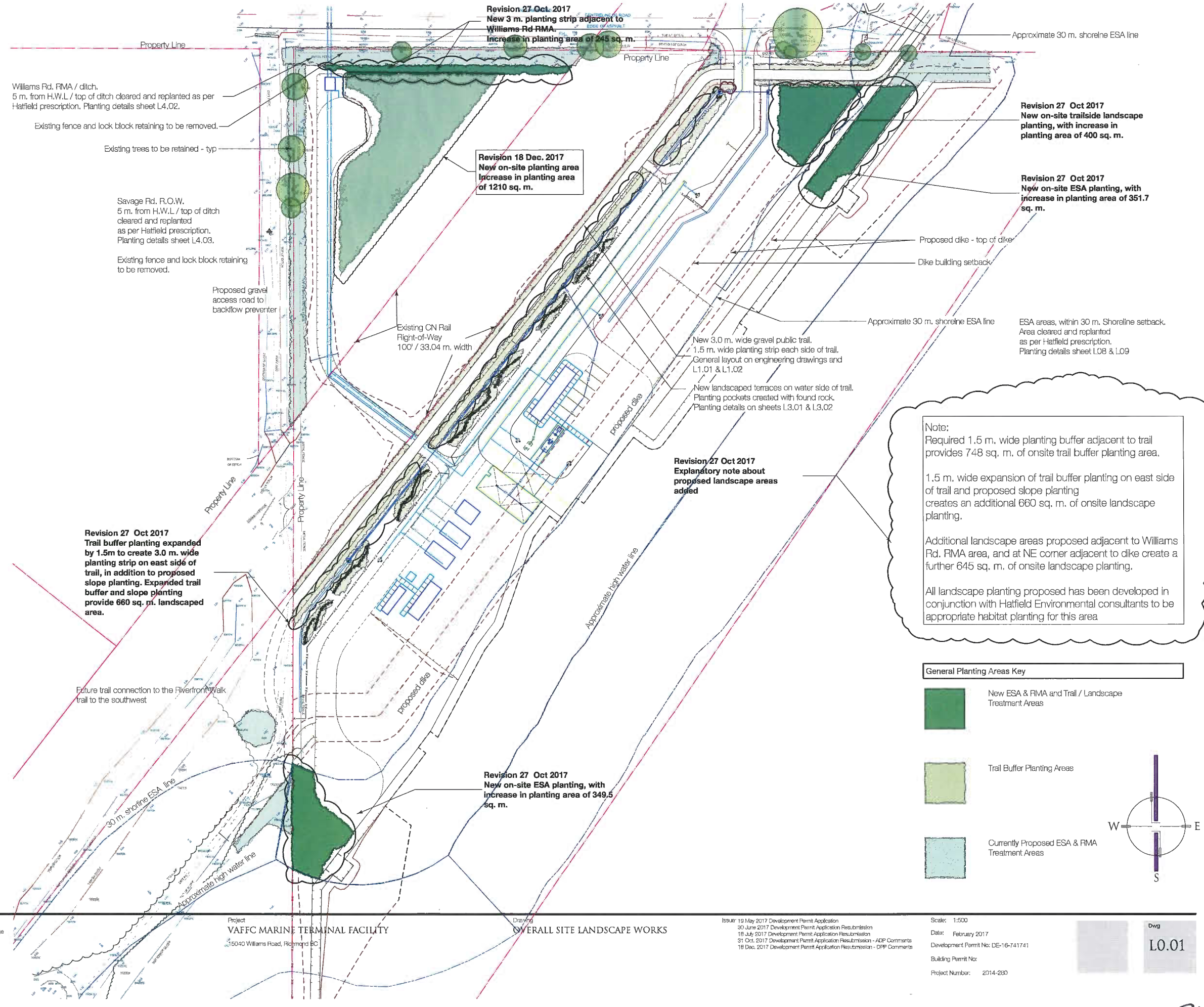
Project
VAFFC MARINE TERMINAL FACILITY
15040 Williams Road, Richmond BC

Drawing
SITE PREPARATION & CLEARING

Issue: 19 May 2017 Development Permit Application
30 June 2017 Development Permit Application Resubmission
18 July 2017 Development Permit Application Resubmission
31 Oct. 2017 Development Permit Application Resubmission - ADP Comments
18 Dec. 2017 Development Permit Application Resubmission - DPP Comments

Scale: 1:500
Date: February 2017
Development Permit No: DE-16-741741
Building Permit No:
Project Number: 2014-280

Dwg
L1.01



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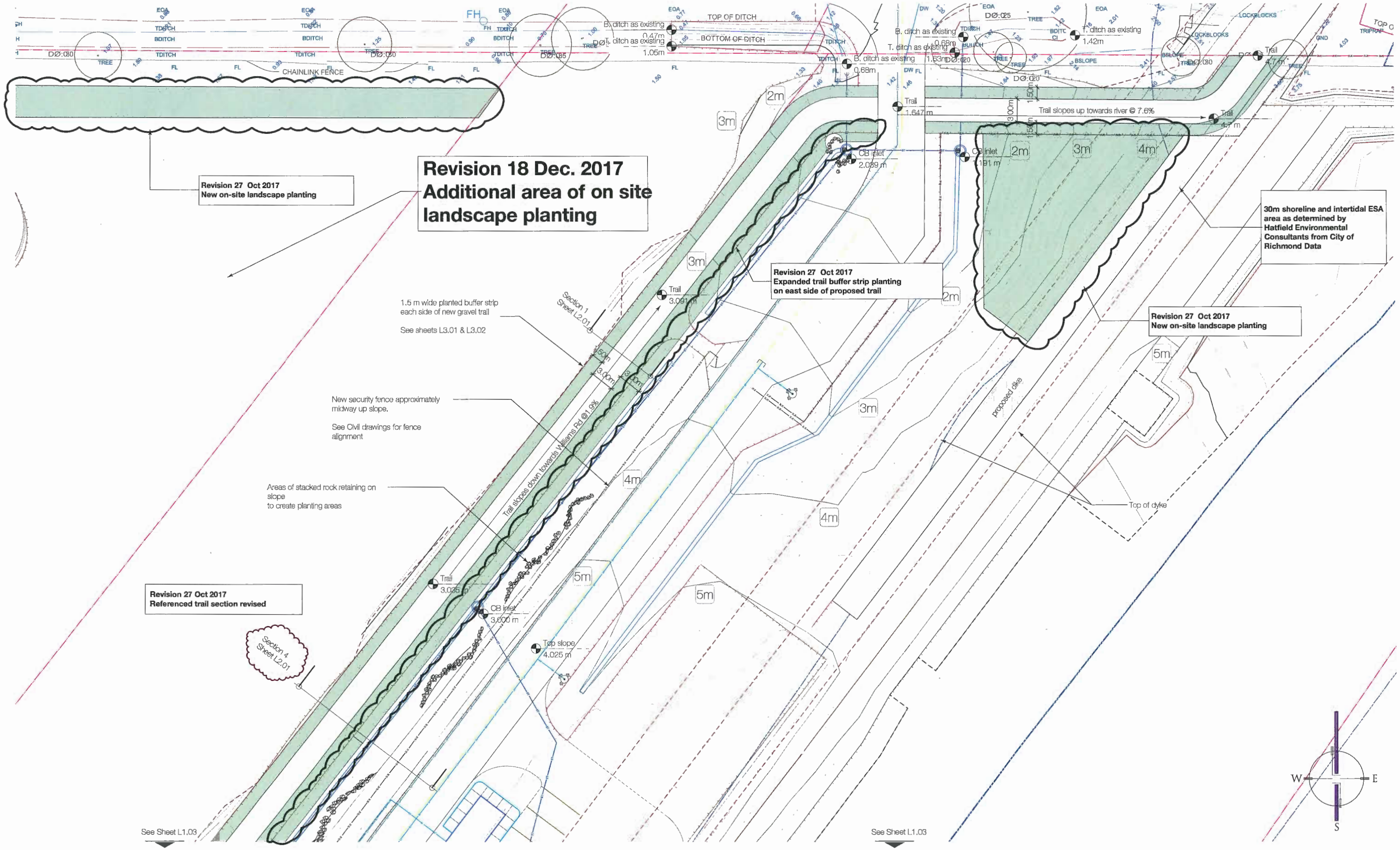
Project
VAFFC MARINE TERMINAL FACILITY
15040 Williams Road, Richmond BC

Drawing
OVERALL SITE LANDSCAPE WORKS

Issue: 19 May 2017 Development Permit Application
30 June 2017 Development Permit Application Resubmission
18 July 2017 Development Permit Application Resubmission
31 Oct. 2017 Development Permit Application Resubmission - ADP Comments
18 Dec. 2017 Development Permit Application Resubmission - DPP Comments

Scale: 1:500
Date: February 2017
Development Permit No: DE-16-741741
Building Permit No:
Project Number: 2014-280

Dwg
L0.01



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f. 604-222-9212
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w. damonoriente.ca

Project
VAFFC MARINE TERMINAL FACILITY
15040 Williams Road, Richmond BC

Drawing
TRAIL LAYOUT - NORTH

Issue: 19 May 2017 Development Permit Application
30 June 2017 Development Permit Application Resubmission
18 July 2017 Development Permit Application Resubmission
31 Oct. 2017 Development Permit Application Resubmission - ADP Comments
18 Dec. 2017 Development Permit Application Resubmission - DPP Comments

Scale: 1:200
Date: February 2017
Development Permit No: DE-16-741741
Building Permit No:
Project Number: 2014-280

Dwg
L1.02

Plan #16

See Sheet L1.02

See Sheet L1.02

Revision 27 Oct 2017
Expanded trail buffer strip planting on east side of proposed trail

B. ditch as existing
0.45 m

T. ditch as existing
1.70 m

BOTTOM OF SLOPE
DIRT PATH
TOP OF DITCH
BOTTOM OF DITCH
CHAINLINK FENCE
METAL FENCE
GATE
TDITCH
BDITCH
BSLOPE
PATH CL
FL

3m
4m
2m
5m

Trail
4.7

Trail section showing condition of greatest elevation difference between trail and adjacent facility grade.

Trail slopes down to SW @ 1.72%

Section 4
Sheet L2.01

New chain link security fence
See Detail 1 Sheet L2.01

New surface drainage ditch
See Civil drawings

CB Inlet
2.415 m

T. ditch as existing
2.82 m

T. ditch as existing
2.76 m

B. ditch as existing
0.78 m

Trail
2.883 m

Top slope
5.024 m

proposed dike

Top of dyke

30m shoreline and intertidal ESA area as determined by
Hatfield Environmental Consultants based on
City of Richmond Data

W E S

FEB 28 2018

DP 16-741741

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landscape architects
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w. damonoriente.ca

Project
VAFFC MARINE TERMINAL FACILITY
15040 Williams Road, Richmond BC

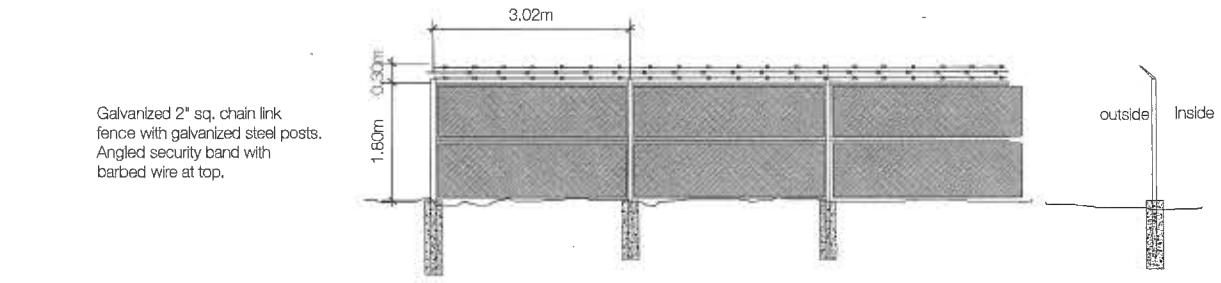
Drawing
TRAIL LAYOUT - SOUTH

Issue: 19 May 2017 Development Permit Application
30 June 2017 Development Permit Application Resubmission
18 July 2017 Development Permit Application Resubmission
31 Oct. 2017 Development Permit Application Resubmission - ADP Comments
18 Dec. 2017 Development Permit Application Resubmission - DPP Comments

Scale: 1:200
Date: February 2017
Development Permit No: DE-16-741741
Building Permit No:
Project Number: 2014-280

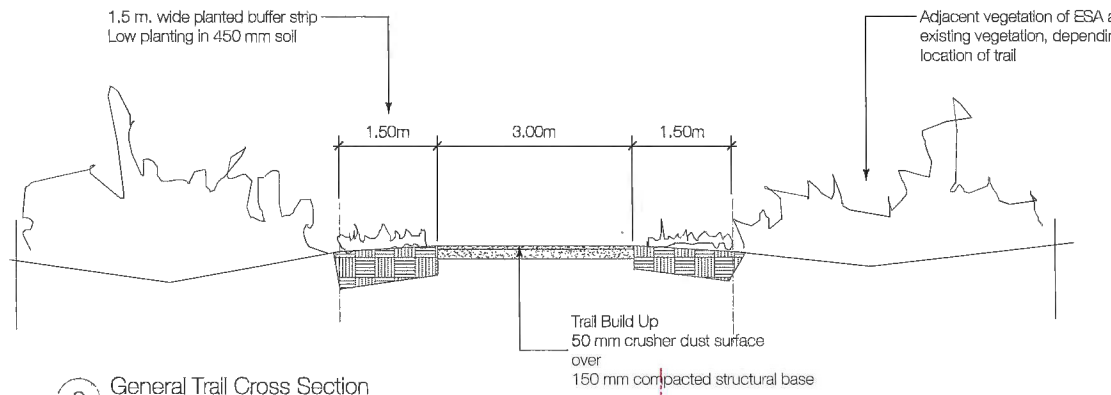
Dwg
L1.03

Plan #17

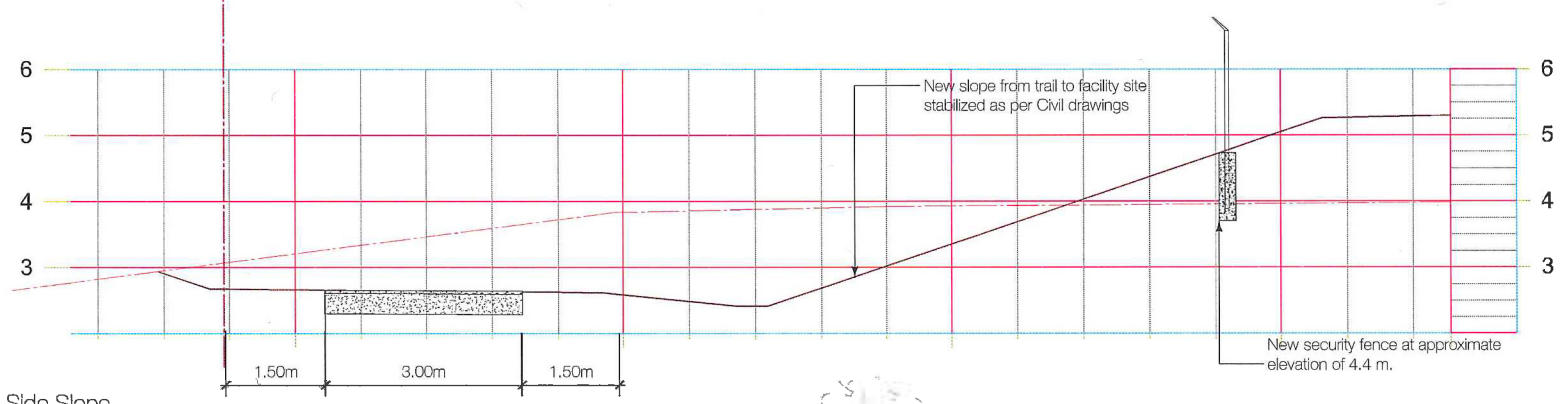


Galvanized 2" sq. chain link fence with galvanized steel posts. Angled security band with barbed wire at top.

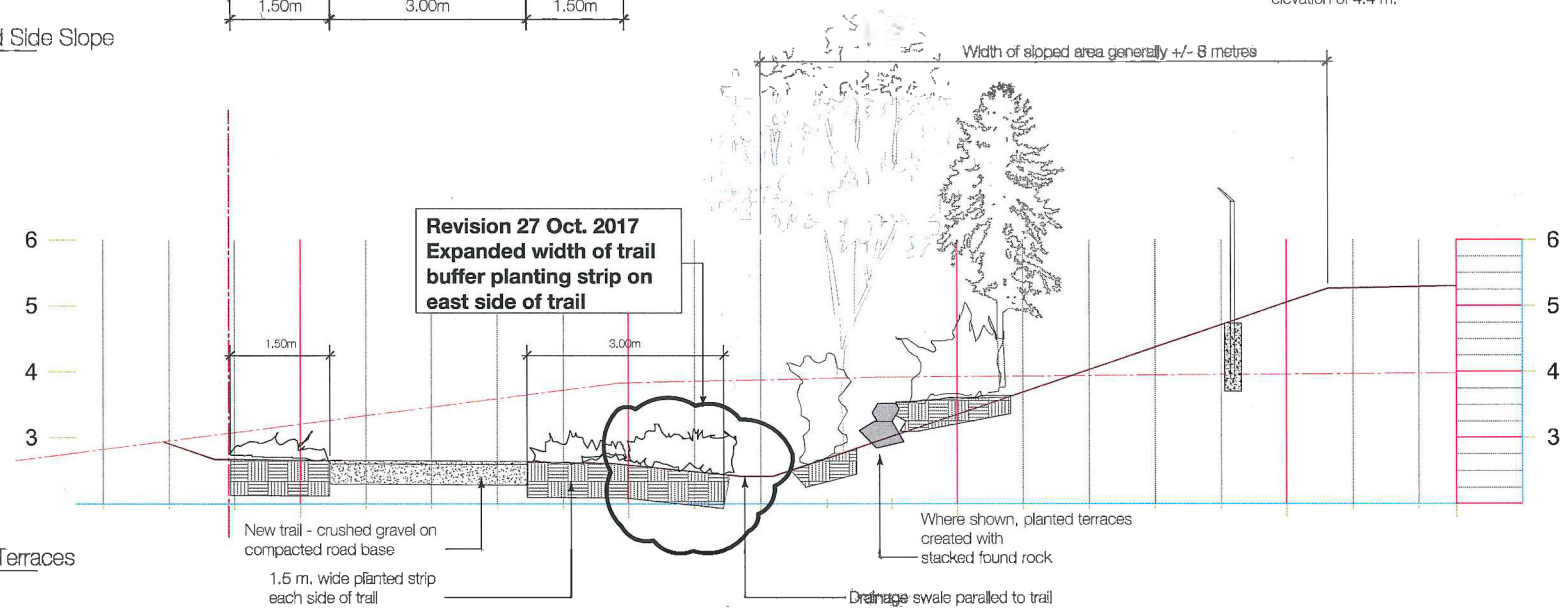
1 Security Fence - Typical



2 General Trail Cross Section



3 Trail Through Facility Site - Standard Side Slope



4 Trail Through Facility Site - Planted Terraces

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Drawing
TRAIL SECTIONS

Issue: 10 May 2017 Development Permit Application
30 June 2017 Development Permit Application Resubmission
18 July 2017 Development Permit Application Resubmission
31 Oct. 2017 Development Permit Application Resubmission - ADP Comments

Scale: 1:50
Date: February 2017
Development Permit No: DP-16-741741
Building Permit No:
Project Number: 2014-280

Dwg
L2.01

FEB 28 2018

DP 16-741741

Plan #18

CENTRELINE OF ROAD

EDGE OF ASPHALT

TOP OF DITCH

BOTTOM OF DITCH

CHAIN LINK FENCE

Revision 27 Oct 2017
New on-site landscape planting adjacent to RMA planting

See sheet L3.03 for details of additional landscape planting this area

Groundcover and Grasses

Groundcover

Revision 27 Oct 2017
Expanded trail buffer strip planting on east side of proposed trail

Groundcover and Shrubs

Groundcover

30 m. shoreline ESA setback line

Revision 27 Oct 2017
New on-site landscape planting

proposed dike

Top of dyke

Building setback for dyke

GATE

LOCKBLOCKS

Trail Buffer Planting Areas Key

Trail Planting 1 - Groundcover

ac	Arctostaphyllos uva-ursi	Kinnikinnick	4 plants per sq. m.
fc	Fragraria chiloensis	Coastal strawberry	4 plants per sq. m.

Trail Planting 2 - Groundcover & Grasses

ac	Arctostaphyllos uva-ursi	Kinnikinnick	2 plants per sq. m.
Eg	ELymus glaucus	Blue lyme grass	3 plants per sq. m.
Lm	Leymus mollis	Dune grass	3 plants per sq. m.

Trail Planting 3 - Groundcover & Shrubs

Rosa	Rosa gymnocarpa	Baldhip rose	1 plant per sq. m.
Mn	Mahonia nervosa	Dull Oregon grape	1 plant per sq. m.
Ma	Mahonia aquafolium	Oregon grape	0.25 plants per sq. m.
ac	Arctostaphyllos uva-ursi	Kinnikinnick	2 plants per sq. m.

See Sheet L3.02

See Sheet L3.02

W E S

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DP 16-741741

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16040 Williams Road, Richmond BC

Drawing
TRAIL PLANTING AREA 1

Issue: 19 May 2017 Development Permit Application
30 June 2017 Development Permit Application Resubmission
18 July 2017 Development Permit Application Resubmission
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18 Dec. 2017 Development Permit Application Resubmission - DPP Comments

Scale: 1:200
Date: February 2017
Development Permit No: DE-16-741741
Building Permit No:
Project Number: 2014-280

Dwg
L3.01

Plan #19

See Sheet L3.01

See Sheet L3.01

Revision 27 Oct 2017
Expanded trail buffer strip planting on east side of proposed trail

Groundcover and Grasses

Groundcover and Shrubs

Tops of dyke

Building setback for dyke

30 m. shoreline ESA setback line

proposed dike

BOTTOM OF SLOPE
DIRT PATH
BOTTOM OF DITCH
TOP OF DITCH
METAL FENCE
CHAINLINK FENCE
GATE
TDITCH
BDITCH
PATH CL
BSLOPE
CI

General Planting Areas Key

Trail Planting 1 - Groundcover

ac	Arctostaphyllos uva-ursi	Kinnikinnick
fc	Fragraria chiloensis	Coastal strawberry

Trail Planting 2 - Groundcover & Grasses

ac	Arctostaphyllos uva-ursi	Kinnikinnick
Eg	ELymus glaucus	Blue lyme grass
Lm	Leymus mollis	Dune grass

Trail Planting 3 - Groundcover & Shrubs

Rosa	Rosa gymnocarpa	Baldhip rose	1 plant per sq. m.
Mn	Mahonia nervosa	Dull Oregon grape	1 plant per sq. m.
Ma	Mahonia aquafolium	Oregon grape	0.25 plants per sq. m.
ac	Arctostaphyllos uva-ursi	Kinnikinnick	2 plants per sq. m.

W E S

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DP 16-741741

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Drawing
TRAIL PLANTING AREA 2

Issue: 19 May 2017 Development Permit Application
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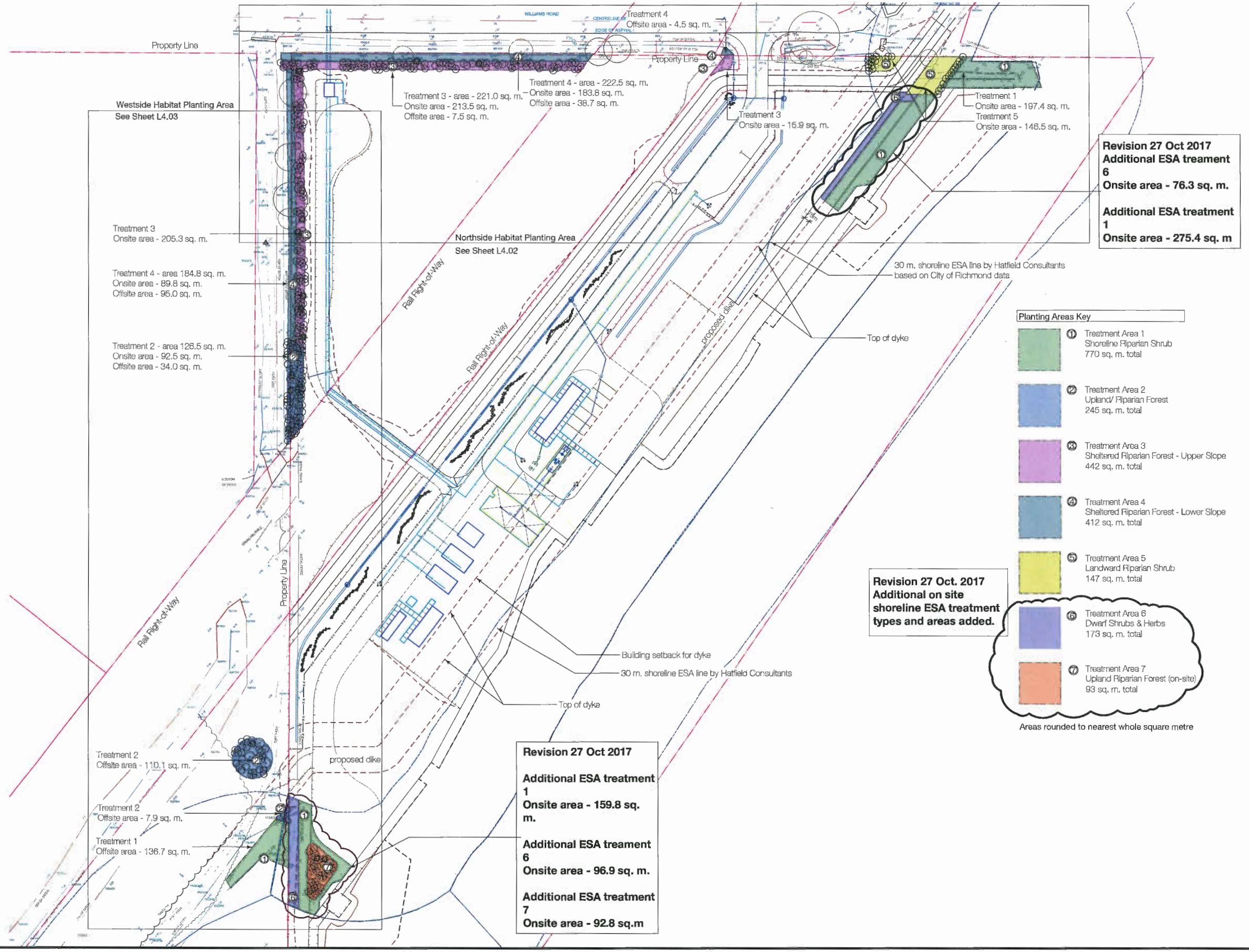
31 Oct. 2017 Development Permit Application Resubmission - ADP Comments
18 Dec. 2017 Development Permit Application Resubmission - DPP Comments

Scale: 1:200
Date: February 2017
Development Permit No: DE-16-741741
Building Permit No:
Project Number: 2014-280

Dwg
L3.02

Plan #20



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DP 16-741741

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Project
VAFFC MARINE TERMINAL FACILITY
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Drawing
ESA & RMA PLANTING OVERVIEW

Issue: 18 May 2017 Development Permit Application
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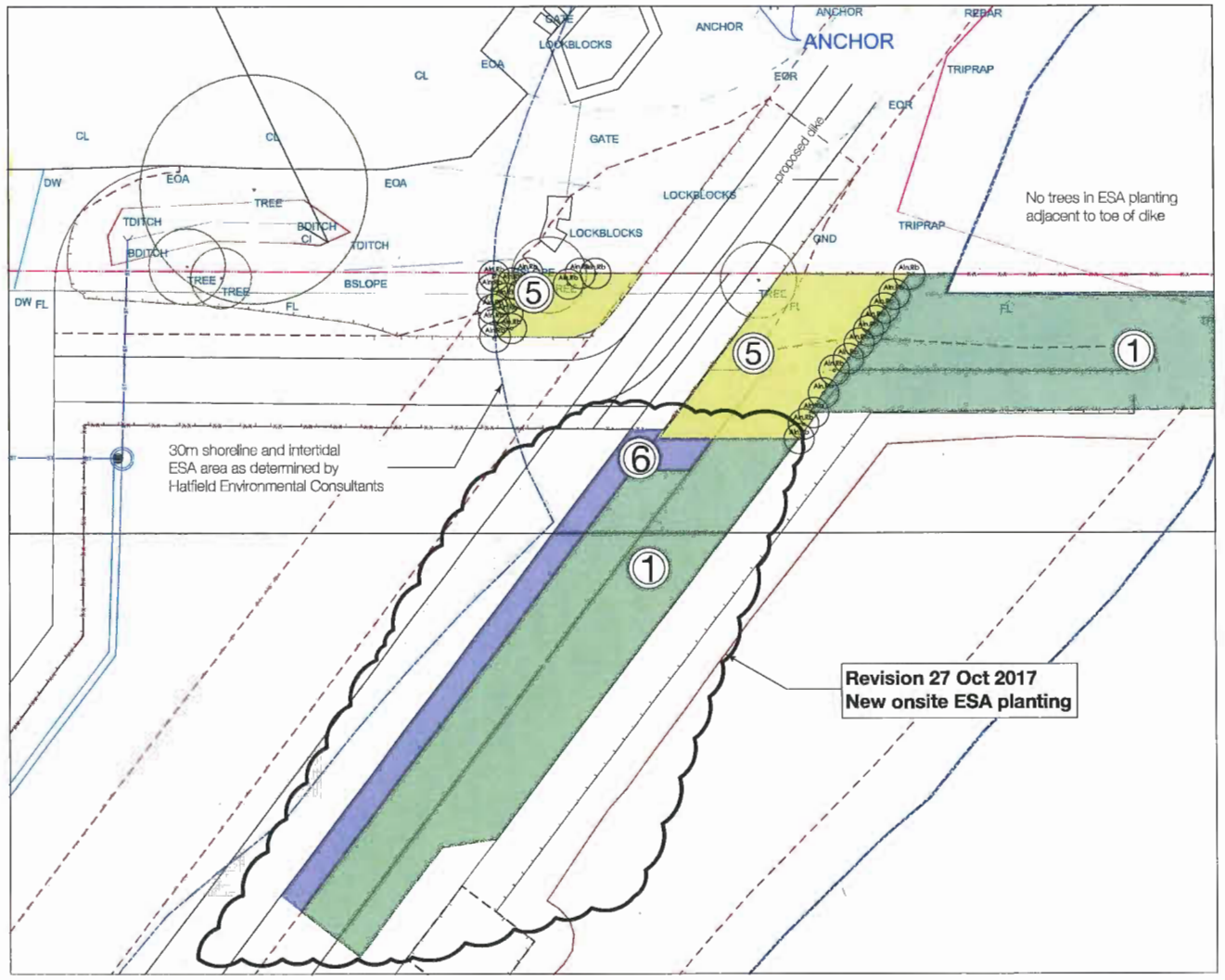
18 Dec. 2017 Development Permit Application Resubmission - DPP Comments

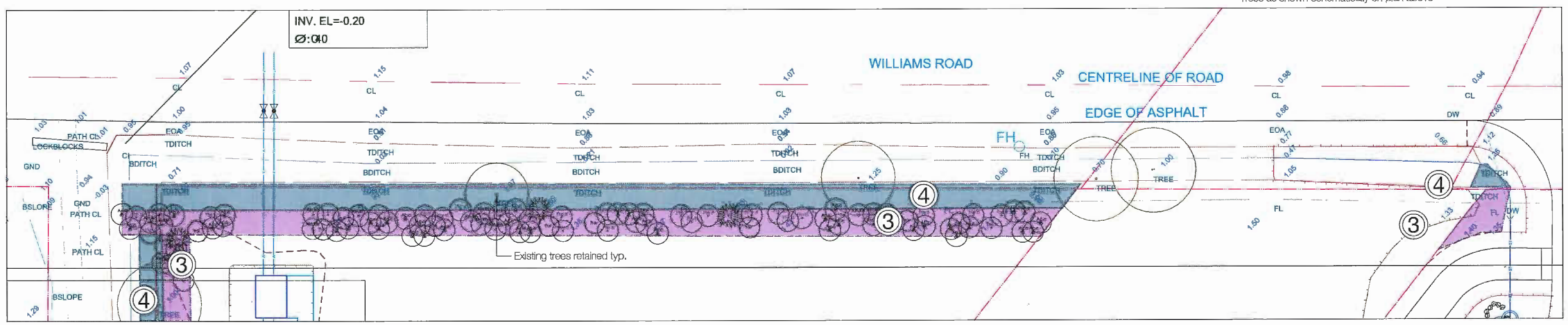
Scale: 1:500
Date: February 2017
Development Permit No: DE-16-741741
Building Permit No:
Project Number: 2014-280

Dwg
L4.01

Plan #21



1 Northeast Shoreline ESA Areas

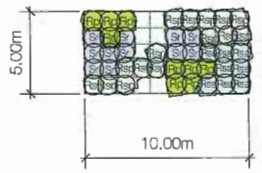


2 Williams Road RMA Areas

Treatment Area 1 - Shoreline Riparian Shrub

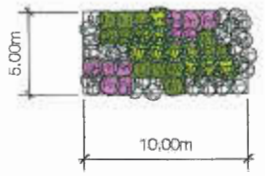
M	Mahonia nervosa	10% of area
Rp	Rubus parviflorus	10% of area
Rsp	Rubus spectabilis	50% of area
Sd	Spirea douglasii	20% of area
Sa	Symphoricarpos albus	10% of area

Treatment Area 5 - Landward Riparian Shrub



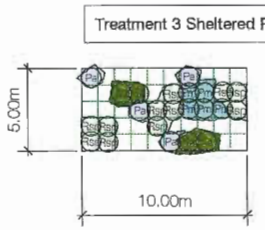
	Alnus rubra as shown on plan in blank areas on sample plan to left	18% of area
Rp	Rubus parviflorus	15% of area
Rsp	Rubus spectabilis	30% of area
Ras	Ribes sanguineum	15% of area
Sr	Sambucus racemosa	22% of area

Treatment 6 - Dwarf Shrubs & Herbs



M	Mahonia nervosa	25% of area
Rn	Rosa nootkensis	20% of area
Pm	Polystichum munitum	20% of area
Au	Arctostaphyllos uva-ursi	20% of area
Fc	Fragraria chiloensis	15% of area

Treatment 3 Sheltered Riparian Forest - Upper Slope



Ps	Physocarpus albus	7% of area
Pm	Polystichum munitum	9% of area
Rsp	Rubus spectabilis	23% of area
Sa	Symphoricarpos albus	8% of area
	Alnus rubra	10% of area
	Acer circinatum	18% of area
	Populus trichocarpa	10% of area
	Thuja plicata	8% of area
	Tsuga heterophyla	7% of area

Trees as shown schematically on plan above

Treatment 4 Sheltered Riparian Forest - Lower Slope

Cs	Cornus stolonifera	15% of area
Ps	Physocarpus albus	10% of area
Rsp	Rubus spectabilis	25% of area
Sx	Salix sitchensis	15% of area
Sd	Spirea douglasii	20% of area
Sa	Symphoricarpos albus	15% of area

Note on Planting Layout

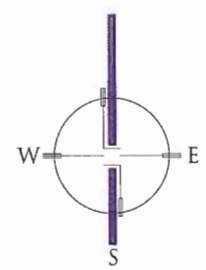
Planting detail area plans show the extent the applicable habitat planting treatment. The trees for each treatment area prescription are shown in a probable layout.

The shrub keys show a general arrangment for layout of shrubs and herbs. Where the sample area has white or open space, this space indicates the approximate area, based on percent coverage, that will be occupied by the trees proposed for that treatment area.

Colours shown in shrub key areas are intended to illustrate the general grouping of shrubs in each area.x

Note that habitat planing plans are guides. It is standard practice that final layout of trees and shrubs be done in the field at the time of planting.

REVIEW
17 DEC. 2017



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Drawing
NORTH SIDE ESA & RMA PLANTING

Issue: 19 May 2017 Development Permit Application
30 June 2017 Development Permit Application Resubmission
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31 Oct. 2017 Development Permit Application Resubmission - ADP Comments
18 Dec. 2017 Development Permit Application Resubmission - DPP Comments

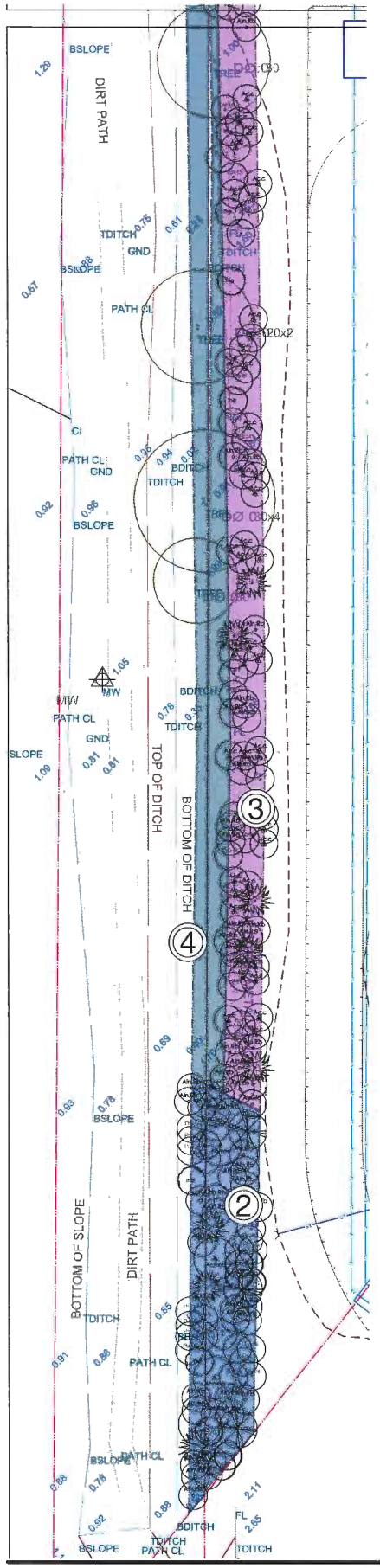
Scale: 1:200
Date: February 2017
Development Permit No: DP-16-741741
Building Permit No:
Project Number: 2014-280

Dwg
L4.02

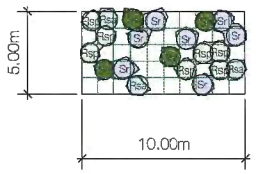
FEB 28 2018

DP 16-741741

Plan #22



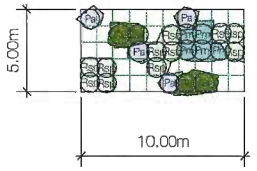
Treatment 2 - Upland/ Riparian Forest



Rsp	Rubus spectabilis	14% of area
Rpa	Ribes sanguineum	5% of area
Sr	Sambucus racemosa	15% of area
Sa	Symphoricarpos albus	7% of area

Acer macrophyllum	6% of area
Alnus rubra	17% of area
Corylus comuta var. Californica	7% of area
Populus trichocarpa	12% of area
Pseudotsuga douglasii	6% of area
Thuja plicata	6% of area
Tsuga heterophyla	7% of area

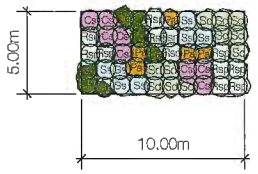
Treatment 3 - Sheltered Riparian Forest - Upper Slope



Pa	Physocarpus albus	7% of area
Pm	Polystichum munitum	9% of area
Rsp	Rubus spectabilis	23% of area
Sa	Symphoricarpos albus	8% of area

Alnus rubra	10% of area
Acer circinatum	18% of area
Populus trichocarpa	10% of area
Thuja plicata	8% of area
Tsuga heterophyla	7% of area

Treatment 4 - Sheltered Riparian Forest - Lower Slope



Cs	Cornus stolonifera	15% of area
Pa	Physocarpus albus	10% of area
Rsp	Rubus spectabilis	25% of area
Ss	Salix sitchensis	15% of area
Sd	Spirea douglasii	20% of area
Sa	Symphoricarpos albus	15% of area

Note on Planting Layout

Planting detail area plans show the extent the applicable habitat planting treatment. The trees for each treatment area prescription are shown in a probable layout.

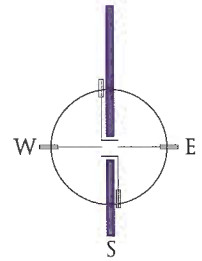
The shrub keys show a general arrangment for layout of shrubs and herbs. Where the sample area has white or open space, this space indicates the approximate area, based on percent coverage, that will be occupied by the trees proposed for that treatment area.

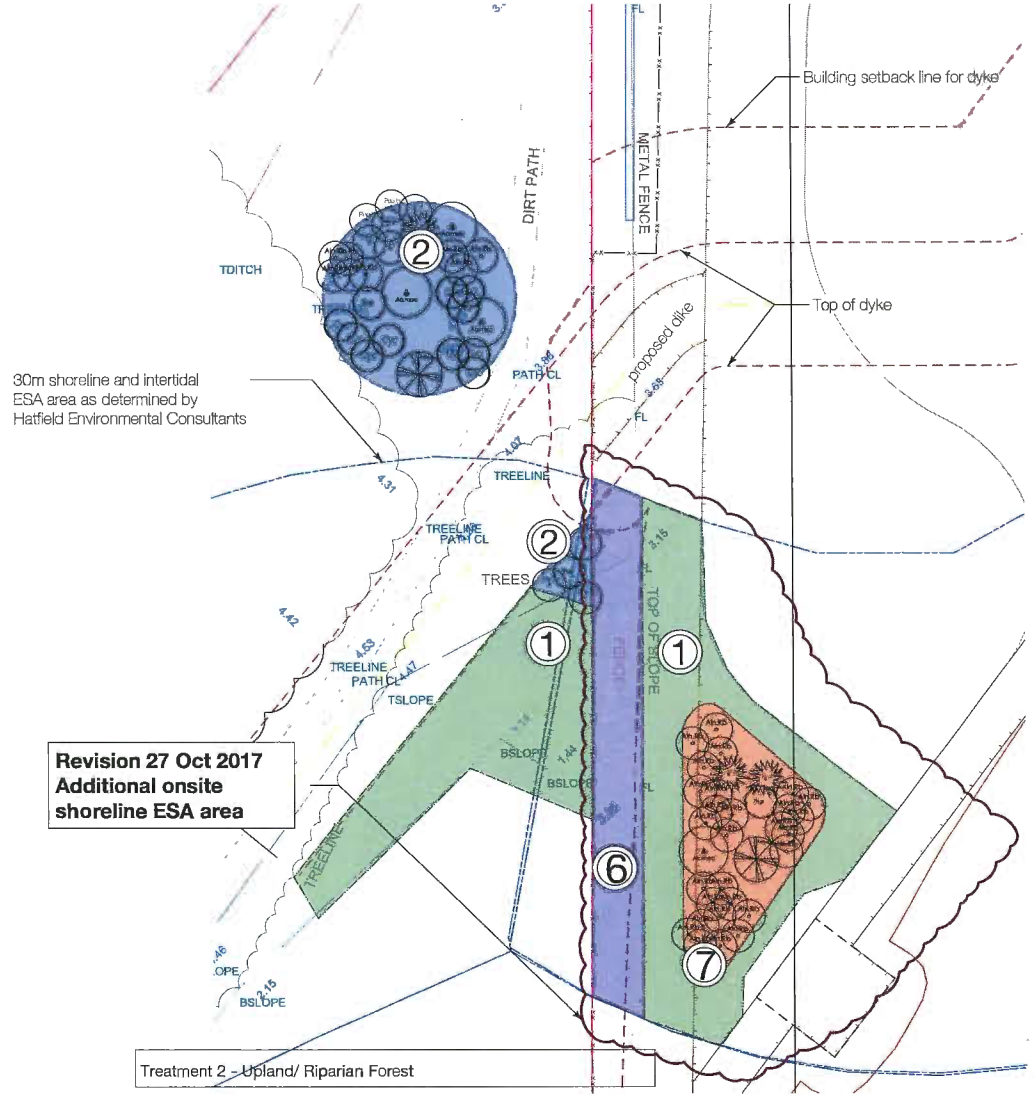
Colours shown in shrub key areas are intended to illustrate the general grouping of shrubs in each area.x

Note that habitat planing plans are guides. It is standard practice that final layout of trees and shrubs be done in the field at the time of planting.

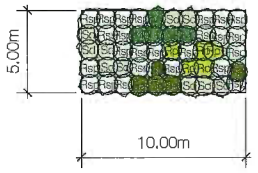
Revision 27 Oct 2017
Additional ESA plant prescriptions

3 Savage Road R.O.W RMA Areas



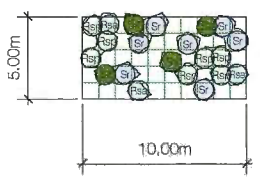


Treatment Area 1 - Shoreline Riparian Shrub



M	Mahonia nervosa	10% of area
Rp	Rubus parviflorus	10% of area
Rsp	Rubus spectabilis	50% of area
Sd	Spirea douglasii	20% of area
Sa	Symphoricarpos albus	10% of area

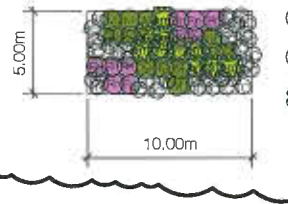
Treatment 2 - Upland/ Riparian Forest



Rsp	Rubus spectabilis	14% of area
Rpa	Ribes sanguineum	5% of area
Sr	Sambucus racemosa	15% of area
Sa	Symphoricarpos albus	7% of area

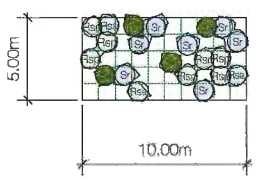
Acer macrophyllum	6% of area
Alnus rubra	17% of area
Corylus comuta var. Californica	7% of area
Populus trichocarpa	12% of area
Pseudotsuga douglasii	6% of area
Thuja plicata	6% of area
Tsuga heterophyla	7% of area

Treatment 6 - Dwarf Shrubs & Herbs



M	Mahonia nervosa	25% of area
Rn	Rosa nootkensis	20% of area
Pm	Polystichum munitum	20% of area
AC	Arctostaphyllos uva-ursi	20% of area
Fc	Fragraria chiloensis	15% of area

Treatment 7 - Upland/ Riparian Forest (Onsite)



Rsp	Rubus spectabilis	20% of area
Sr	Sambucus racemosa	15% of area
Sd	Spirea douglasii	15% of area

Pseudotsuga douglasii	5% of area
Tsuga heterophyla	10% of area
Acer macrophyllum	5% of area
Alnus rubra	3% of area

4 Southwest Corner ESA Area

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15040 Williams Road, Richmond BC

Drawing
WESTSIDE ESA & RMA PLANTING

Issue: 19 May 2017 Development Permit Application
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Date: February 2017
Development Permit No: DP-16-741741
Building Permit No:
Project Number: 2014-280

Dwg
L4.03

Plan #23

FEB 2 8 2018

DP 16-741741

Plant List for ESA, RMA Planting Areas

Revision 27 Oct 2017
Plant list updates to reflect additional ESA areas

Trees

ID	Quantity	Latin Name	Common Name	Scheduled Size	Notes
	0				
	80	Acer circinatum	Vine maple	#5 pot	
	8	Acer macrophyllum	Bigleaf maple	~~#5 pot~~	
	144	Alnus rubra	Red alder	#3 pot	
	17	Corylus cornuta var. 'Californica''	Beaked hazlenut	#2 pot	
	74	Populus trichocarpa	Black cottonwood	~~#3 pot~~	
	5	Pseudotsuga menziesii	Douglas fir	3.0 m. ht.	
	13	Thuja plicata	Western redcedar	3.0 m. ht.	
	14	Tsuga heterophylla	Western hemlock	3.0 m. ht.	

Revision 18 Dec. 2017
Plant list updates to reflect increased plant sizes

Shrubs & Herbs

ID	Quantity	Latin Name	Common Name	Scheduled Size	Notes
	0				
	62	Cornus stolonifera	Redosier dogwood	#2 pot	
	180	Mahonia nervosa	Dull Oregon grape	#2 pot	
	72	Physocarpus albus	Pacific ninebark	#2 pot	
	74	Polystichum munitum	Swordfern	#2 pot	
	69	Ribes sanguineum	Red flowering currant	#2 pot	
	96	Rubus parviflorus	Thimbleberry	#2 pot	
	696	Rubus spectabilis	Salmonberry	#2 pot	
	76	Sambuccus racemosa	Red elderberry	#2 pot	
	62	Salix sitchensis	Sitka willow	#2 pot	
	248	Spiraea douglasii	Steeplebush	#2 pot	
	179	Symphorocarpus albus	Snowberry	#2 pot	
	140	Arctostaphyllos uva-ursi	Kinnikinnick	#2 pot	
	104	Fragraria virginiana	Wild strawberry	#1 pot	

Plant List for Trail Buffer Planting Areas

Shrubs & Herbs

ID	Quantity	Latin Name	Common Name	Scheduled Size	Notes
	0				
	80	Mahonia aquafolium	Oregon grape	#2 pot	
	324	Mahonia nervosa	Dull Oregon grape	#2 pot	
	325	Rosa gymnocarpa	Baldhip rose	#2 pot	

Groundcover & Grasses

ID	Quantity	Latin Name	Common Name	Scheduled Size	Notes
	0				
	1252	Arctostaphylls uva-ursi	Kinnikinnick	#1 pot	
	1252	Elymus glacus	Blue lyme grass	#1 pot	
	115	Fragraria chiloensis	Coastal straberry	#1 pot	
	980	Leymus mollis	Dune grass	#1 pot	

Revision 18 Dec. 2017
Plant list updates to reflect increased plant sizes

Plant List for On-site Slope Areas and Additional Landscape Planting

Revision 27 Oct 2017
Plant list updates to reflect additional landscape planting areas

Trees

ID	Quantity	Latin Name	Common Name	Scheduled Size	Notes
A.l	15	Amelanchier laevis	Allegheny Serviceberry	5 cm. cal	
Be.pap	2	Betula papyrifera	Paper birch	2.5 m. ht.	
P.con	17	Pinus contorta	Shore pine	3 m. ht.	
P.doug	10	Pseudotsuga menziesii	Douglas fir	3 m. ht.	

Shrubs

ID	Quantity	Latin Name	Common Name	Scheduled Size	Notes
au	852	Arctostaphylos uva-ursi 'Vancouver Jade'	Vancouver Jade Kinnikinick	#1 pot	
cs	23	Cornus sericea 'stolonifera'	Redosier Dogwood	#2 pot	
gs	71	Gaultheria shallon	Salal	#1 pot	
Hol.d	24	Holodiscus discolor	Oceanspray	#2 pot	
M.aq	19	Mahonia aquafolium	Oregon grape	#3 pot	
R.san	14	Ribes sanguineum 'King Edward VII'	King Edward Vii Flowering Currant	#2 pot	
sp.d	21	Spiraea douglasii	Hardhack spiraea	#2 pot	

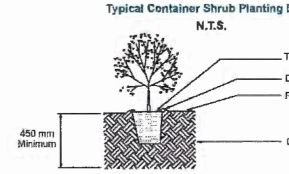
Groundcover & Grasses

ID	Quantity	Latin Name	Common Name	Scheduled Size	Notes
	0				
	1252	Arctostaphylls uva-ursi	Kinnikinnick	#1 pot	
	1252	Elymus glacus	Blue lyme grass	#1 pot	
	115	Fragraria chiloensis	Coastal straberry	#1 pot	
	980	Leymus mollis	Dune grass	#1 pot	

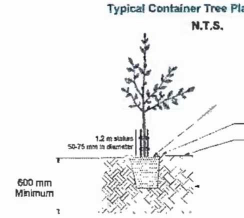
General Landscape Specifications

- Areas requiring topsoil shall be fine graded by raking out spoil material and debris such as rocks, asphalt and concrete over 50 mm in diameter, and scarified to a minimum depth of 150 mm immediately before placing topsoil.
- Topsoil and any amendments to the growing medium shall meet the criteria described in the British Columbia Landscape Standards for background (natural) areas (refer to adjacent table for particle size, acidity and drainage specifications).
- Topsoil shall be tested by an accredited soil testing laboratory, prior to delivery.
- Screened topsoil must be applied with a minimum thickness of 450 mm in shrub planting areas and 600 mm in treed areas. Topsoil must be free of subsoil, wood (including woody plant parts), toxic materials, stones over 30 mm, foreign objects, propagules of plant species designated as noxious under the BC Weed Control Act and Regulation, and other invasive or undesirable plant species.
- All plant material that has not been salvaged from the construction footprint shall be of guaranteed nursery stock, densely branched, well-established (minimum leaf density of 50%), free of invasive/noxious plant material and meet the criteria specified in City of Richmond Engineering and Public Works Department Supplementary Specifications and Detail Drawings, Version 3, 2016, Schedule G – Tree Planting on Sidewalks and Boulevards (they replace the specifications in Section 32 93 01 – Planting of Trees, Shrubs, and Ground Covers in the MMCD Platinum Edition).
- Plants in containers shall have a well-established root system, reaching the sides of the container but not being root bound. Soil must hold together when a plant is removed from its container.
- The City of Richmond's Engineering and Public Works department must be notified once nursery stock has arrived on site, for inspection prior to planting. Fall planting (following the last drought period in September or October), or spring planting (March or April) is recommended.
- Native trees, shrubs and herbs must be set plumb and fully immersed in growing medium, such that the top of the rootball is set at or slightly above the finished grade. Planting wells will be established to increase the capture and retention of water. The soil around each new plant will be tamped and watered in layers. Trees will be securely staked on both sides.
- The soil must be raked once the revegetation work is complete. A fall rye should be spread in the enhancement areas to prevent erosion and provide some shelter for new plants until they become fully established.
- Habitat enhancement works should be supervised by a certified landscape architect (or horticulturalist) to ensure compliance with the BC Landscape Standards and City and Richmond specifications for the planting of trees, shrubs, and ground cover.
- The contractor shall provide maintenance including, watering, removal of invasive species and replacement of dead stock for a period of three (3) years following planting.

Typical Container Shrub Planting Detail
N.T.S.



Typical Container Tree Planting Detail
N.T.S.



Topsoil (growing medium) specifications.

Soil Attribute	Criteria
Gravel 2 - 30 mm	≤ 10% of dry weight
Sand 0.05 – 2 mm	30 – 70% of dry weight
Silt and clay combined	Max of 60% of dry weight
Organic content	10 – 20% of dry weight
Hydraulic conductivity	2 cm/hour
pH	4.5 – 7.0

Hatfield	Vancouver Airport Fuel Delivery Project – Habitat Enhancement On/By Marine Terminal		
DESIGN: LD	DRAWN: TK	PROFESSIONAL SEAL	DRAWING NUMBER: 6773-01
REVISION: 0	DATE: Feb 2, 2017		

Treatment 1 (Shoreline Riparian Shrub)

Common name	Botanical Name	% of Area	Stock Size	Planting Density
Salmonberry	Rubus spectabilis	50	No. 3 pot	1 plant per 1 m2
Thimbleberry	Rubus parviflorus	10	No. 2 pot	1 plant per 1 m2
Steeplebush	Spirea douglasii	20	No. 2 pot	1 plant per 1 m2
Snowberry	Symphoricarpos albus	10	No. 2 pot	1 plant per 1 m2
Dull Oregon Grape	Mahonia nervosa	10	No. 2 pot	1 plant per 1 m2

Treatment 2 (Upland/Riparian Forest)

Common name	Botanical Name	% of Area	Stock Size	Planting Density
Coastal Douglas-fir	Pseudotsuga douglasii	6	No. 15 pot	1 plant per 4 m2
Western redcedar	Thuja plicata	6	No. 15 pot	1 plant per 4 m2
Western hemlock	Tsuga heterophylla	7	No. 15 pot	1 plant per 4 m2
Bigleaf maple	Acer macrophyllum	6	No. 5 pot	1 plant per 2 m2
Red alder	Alnus Rubra	17	No. 3 pot	1 plant per 1 m2
Black cottonwood	Populus trichocarpa	12	No. 3 pot	1 plant per 1 m2
Salmonberry	Rubus spectabilis	14	No. 3 pot	1 plant per 1 m2
Beaked hazelnut	Corylus cornuta var. Californica	7	No. 2 pot	1 plant per 1 m2
Red elderberry	Sambucus racemosa	15	No. 3 pot	1 plant per 1 m2
Red-flowering currant	Ribes sanguineum	5	No. 2 pot	1 plant per 1 m2
Snowberry	Symphoricarpos albus	7	No. 2 pot	1 plant per 1 m2

Treatment 3 (Sheltered Riparian Forest – Upper Slope)

Common name		% of Area	Stock Size	Planting Density
Western redcedar	Thuja plicata	8	No. 15 pot	1 plant per 4 m2
Western hemlock	Tsuga heterophylla	7	No. 15 pot	1 plant per 4 m2
Red alder	Alnus Rubra Populus	10	No. 3 pot	1 plant per 1 m2
Black cottonwood	trichocarpa Rubus	10	No. 3 pot	1 plant per 1 m2
Salmonberry	spectabilis	23	No. 3 pot	1 plant per 1 m2
Pacific ninebark	Physocarpus albus	7	No. 2 pot	1 plant per 1 m2
Vine maple	Acer circinetum	18	No. 3 pot	1 plant per 1 m2
Snowberry	Symphoricarpos albus	8	No. 2 pot	1 plant per 1 m2
Sword fern	Polystichum munitum	9	No. 2 pot	1 plant per 1 m2

Treatment 4 (Sheltered Riparian Forest – Lower Slope)

Common name	Botanical Name	% of Area	Stock Size	Planting Density
Redosier dogwood	Cornus stolonifera	15	No. 2 pot	1 plant per 1 m2
Sitka willow	Salix sitchensis	15	No. 2 pot	1 plant per 1 m2
Salmonberry	Rubus spectabilis	25	No. 2 pot	1 plant per 1 m2
Pacific ninebark	Physocarpus albus	10	No. 2 pot	1 plant per 1 m2
Snowberry	Symphoricarpos albus	15	No. 2 pot	1 plant per 1 m2
Steeplebush	Spirea douglasii	20	No. 2 pot	1 plant per 1 m2

Treatment 5 (Landward Riparian Shrub)

Common name	Botanical Name	% of Area	Stock Size	Planting Density
Red alder	Alnus rubra	18	No. 2 pot	1 plant per 1 m2
Red elderberry	Sambucus racemosa	22	No. 3 pot	1 plant per 1 m2
Salmonberry	Rubus spectabilis	30	No. 2 pot	1 plant per 1 m2
Thimbleberry	Rubus parviflorus	15	No. 2 pot	1 plant per 1 m2
Red-flowering currant	Ribes sanguineum	15	No. 2 pot	1 plant per 1 m2

Treatment 6 (Dwarf Shrubs and Herbs)

Common name	Botanical Name	% of Area	Stock Size	Planting Density
Nootka rose	*Rosa nootkana*	0.2	No. 2 pot	1 plant per 1 m2
Dwarf oregon-grape	*Mahonia nervosa*	0.25	No. 2 pot	1 plant per 1 m2
Kinnikinnick	*Arctostaphylos uva-ursi*	0.2	No. 2 pot	1 plant per 0.25 m2
Wild strawberry	*Fragaria virginiana*	0.15	No. 1 pot	1 plant per 0.25 m2
Sword fern	*Polystichum munitum*	0.2	No. 1 pot	1 plant per 1 m2

Treatment 7 (On-Site Upland/Riparian Forest)

Common name	Botanical Name	% of Area	Stock Size	Planting Density
Douglas-fir	*Pseudotsuga douglasii*	0.05	No. 15 pot	1 plant per 4 m2
Western hemlock	*Tsuga heterophylla*	0.1	No. 15 pot	1 plant per 4 m2
Bigleaf maple	*Acer macrophyllum*	0.05	No. 10 pot	1 plant per 4 m2
Red alder	*Alnus rubra*	0.3	No. 3 pot	1 plant per 1 m2
Salmonberry	*Rubus spectabilitis*	0.2	No. 2 pot	1 plant per 1 m2
Red elderberry	*Sambucus racemosa*	0.15	No. 2 pot	1 plant per 1 m2
Steeplebush	*Spirea douglasii*	0.15	No. 2 pot	1 plant per 1 m2

Revision 18 Dec. 2017
Increased plant sizes shown in plant list upper left superceed sizes shown here

Revision 27 Oct 2017
Plant list updates to reflect additional ESA areas

Hatfield	Vancouver Airport Fuel Delivery Project – Habitat Enhancement On/By Marine Terminal		
DESIGN: LD	DRAWN: TK	PROFESSIONAL SEAL	DRAWING NUMBER: 6773-01
REVISION	DATE: Oct. 30, 2017		

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Project
VAFFC MARINE TERMINAL FACILITY
15040 Williams Road, Richmond BC

Drawing
SPECIFICATION NOTES AND PLANT LISTS

Issue: 19 May 2017 Development Permit Application
30 June 2017 Development Permit Application Resubmission
18 July 2017 Development Permit Application Resubmission
31 Oct. 2017 Development Permit Application Resubmission - ADP Comments
18 Dec. 2017 Development Permit Application Resubmission - DPP Comments

Scale: 1:500
Date: February 2017
Development Permit No: DE-16-741741
Building Permit No:
Project Number: 2014-280

Dwg L0.05

Plan #24

Inland triangle site additional planting area: 1210 sq m.

Proposed planting is a combination of ESA planting treatment 2 & treatment 3, with modifications to suit the environment of the triangle site.

Internal planting area of 760 sq. m.
Preliminary plant list and area coverages:

61	Tsuga heterophyla	Western hemlock
38	Pseudotsuga douglasii	Douglas fir
152	Alnus rubra	Red alder
38	Acer macrophyllum	Bigleaf maple
61	Acer circinatum	Vine maple
61	Corylus cornuta var. Calif.	Beaked hazelnut
190	Rubus spectabilis	Salmonberry
114	Rubus parviflorus	Thimbleberry
38	Symphoricarpos albus	Snowberry
23	Physocarpus albus	Pacific ninebark

Perimeter planting area of 450 sq. m.
Preliminary plant list and area coverages:

Perimeter Planting - Shrubs, Groundcovers & Grasses

450	Rosa gymnocarpa	Baldhip rose
450	Mahonia nervosa	Dull Oregon grape
1350	ELymus glaucus	Blue lyme grass
1350	Leymus mollis	Dune grass
1800	Arctostaphyllos uva-ursi	Kinnikinnick
1800	Fragraria chiloensis	Coastal strawberry

NOTE: tree graphics indicate general areas of probable tree groupings, but do not represent quantities in plant lists above

REVIEW
17 DEC. 2017

FEB 28 2018

DP 16-741741

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Project
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15040 Williams Road, Richmond BC

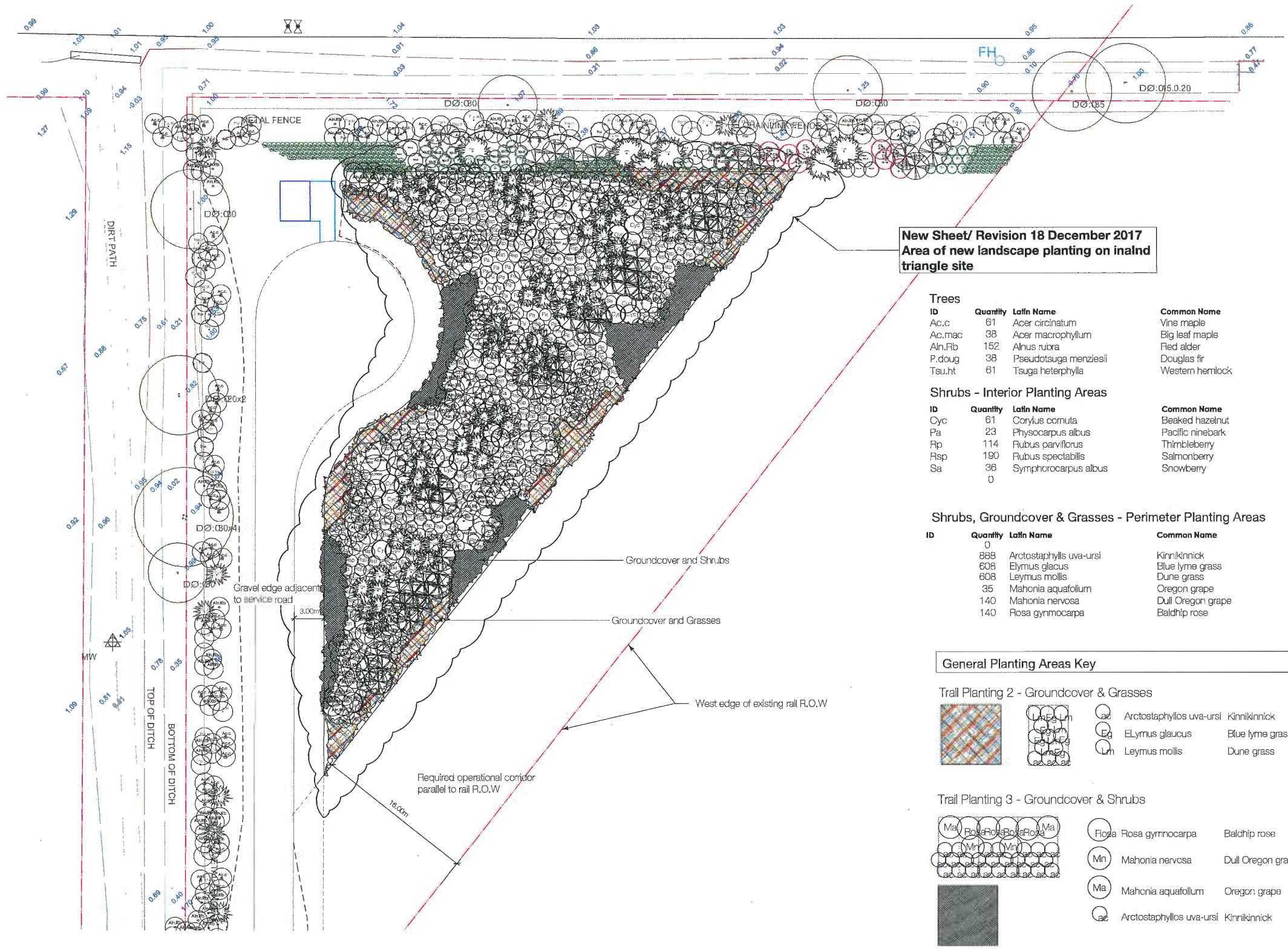
Drawing
TRIANGLE SITE PLANTING SKETCH

Issue:
31 Oct. 2017 Development Permit Application Resubmission - ADP Comments

Scale: 1:300
Date:
Project Number: 2014-280

Dwg
L0.00

Plan #25



New Sheet/ Revision 18 December 2017
Area of new landscape planting on inalnd triangle site

Trees

ID	Quantity	Latin Name	Common Name	Scheduled Size	Notes
Ac.c	61	Acer circinatum	Vine maple	3.0 m ht.	
Ac.mac	38	Acer macrophyllum	Big leaf maple	#5 pot	
Aln.Rb	152	Alnus rubra	Red alder	#3 pot	
P.doug	38	Pseudotsuga menziesii	Douglas fir	3.0 m. ht.	
Tsu.ht	61	Tsuga heterphylla	Western hemlock	3.0 m. ht.	

Shrubs - Interior Planting Areas

ID	Quantity	Latin Name	Common Name	Scheduled Size	Notes
Cyc	61	Corylus cornuta	Beaked hazelnut	1.5m. ht.	
Pa	23	Physocarpus albus	Pacific ninebark	#2 pot	
Rp	114	Rubus parviflorus	Thimbleberry	#2 pot	
Rsp	190	Rubus spectabilis	Salmonberry	#2 pot	
Sa	36	Symphorocarpus albus	Snowberry	#2 pot	
	0				

Shrubs, Groundcover & Grasses - Perimeter Planting Areas

ID	Quantity	Latin Name	Common Name	Scheduled Size	Notes
	0				
	888	Arctostaphylls uva-ursi	Kinnikinnick	10 cm pot	
	608	Elymus glacus	Blue lyme grass	10 cm pot	
	608	Leymus mollis	Dune grass	10 cm pot	
	35	Mahonia aquafolium	Oregon grape	#2 pot	
	140	Mahonia nervosa	Dull Oregon grape	#2 pot	
	140	Rosa gymnocarpa	Baldhip rose	#2 pot	

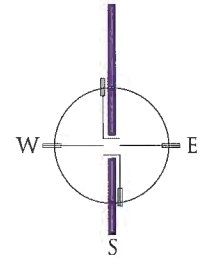
General Planting Areas Key

Trail Planting 2 - Groundcover & Grasses

ac Arctostaphyllos uva-ursi Kinnikinnick
Eg ELymus glaucus Blue lyme grass
Lm Leymus mollis Dune grass

Trail Planting 3 - Groundcover & Shrubs

Rosa Rosa gymnocarpa Baldhip rose
Mn Mahonia nervosa Dull Oregon grape
Ma Mahonia aquafolium Oregon grape
ac Arctostaphyllos uva-ursi Kinnikinnick



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Project
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15040 Williams Road, Richmond BC

Drawing
TRIANGLE SITE PLANTING AREA

Issue: 18 Dec. 2017 Development Permit Application Resubmission - DPP Comments

Scale: 1:200
Date: December 2017
Development Permit No: DE-16-741741
Building Permit No:
Project Number: 2014-280

Dwg
L3.03

FEB 28 2018

DP 16-741741

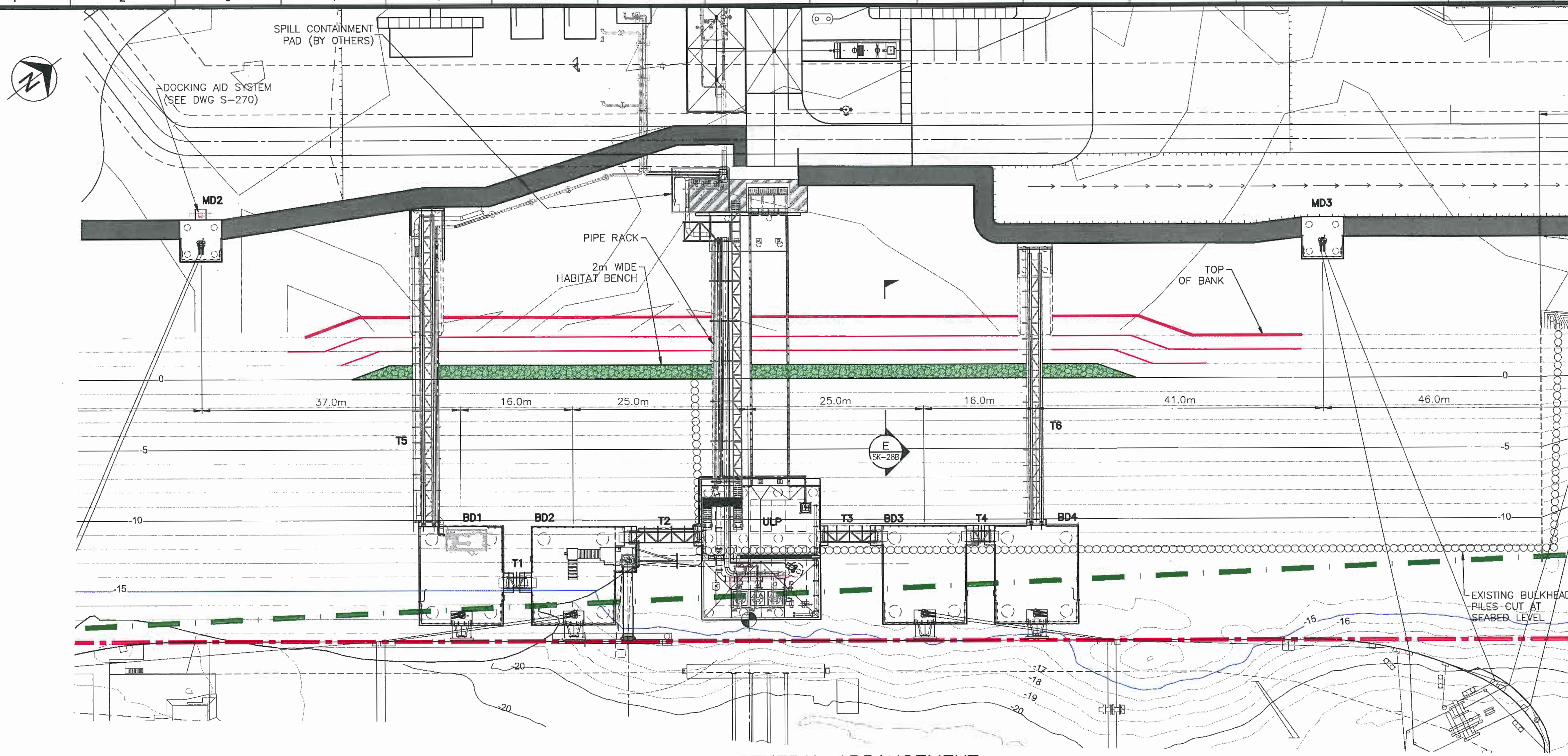
Plan #26

ISSUED FOR CONSTRUCTION

DP 16-741741

FEB 2 8 2018

Plan #27



GENERAL ARRANGEMENT

1:300

NOTES:

1. CONTOURS ARE BASED ON GEODETIC DATUM.
2. SURVEY DATA BASED ON MATSON PECK & TOPLISS CAD FILE 17647-001-TPG-000.dwg. ANY COORDINATES SHOWN IN PLAN ARE LOCAL GROUND COORDINATES. TO COMPUTE UTM NAD83 (CSRS) GRID 4.0.0.BC.1 COORDINATES, ADD 5,440,000 TO NORTHINGS AND 490,000 TO EASTINGS, THEN MULTIPLY BY COMBINED SCALE FACTOR OF 0.99960272.

LEGEND:

(green dash line)	PROPERTY BOUNDARY
(red dash line)	BERTHING LINE
MD	MOORING DOLPHIN
BD	BREASTING DOLPHIN
T	CATWALK
ULP	UNLOADING PLATFORM

0 6 12 18 30m
1:300

ISSUE NO.	DRAWING REVISIONS	ISSUE DATE
B	ISSUED FOR DISCUSSION	JAN.03/2018
A	ISSUED FOR DISCUSSION	DEC.11/2017

VAFFC / Vancouver Airport Fuel Facilities Corporation
108-12300 Horseshoe Way, Richmond, BC V7A 4Z1, 604-271-7113, www.fsmgroup.ca, www.vancouverairportfuel.ca

VANCOUVER AIRPORT FUEL DELIVERY PROJECT
MARINE RECEIVING AREA
MARINE DESIGN PACKAGE
VANCOUVER AIRPORT FUEL FACILITIES CORPORATION
RICHMOND, BRITISH COLUMBIA

SEAL

LOGO

moffatt & nichol
777 WEST BROADWAY, STE 301, VANCOUVER, BC CANADA V5Z 4J7, 604-707-9004

Argus
ENGINEERING | PLANNING | MANAGEMENT
ARGUS CONSULTING, INC.
6363 College Boulevard, Suite 600, Overland Park, Kansas 66211, 816.228.7500 FAX 816.228.7535, www.argusconsulting.com

PROJECT NO: 15004.22C
DATE: 12/08/17
DESIGNED BY: RB
DRAWN BY: LL
CHECKED BY: RB
CAD FILE NAME: 15004.22C-SK-28A

GENERAL ARRANGEMENT

DRAWING NO.: SK-28A

Plotted: P:\8338 VC Vancouver Airport Fuel Delivery Project\CADD_Active\15004.22C-SK-28A.dwg on 01/3/18 at 4:53 PM by LLU using Argus.stb

ISSUED FOR CONSTRUCTION

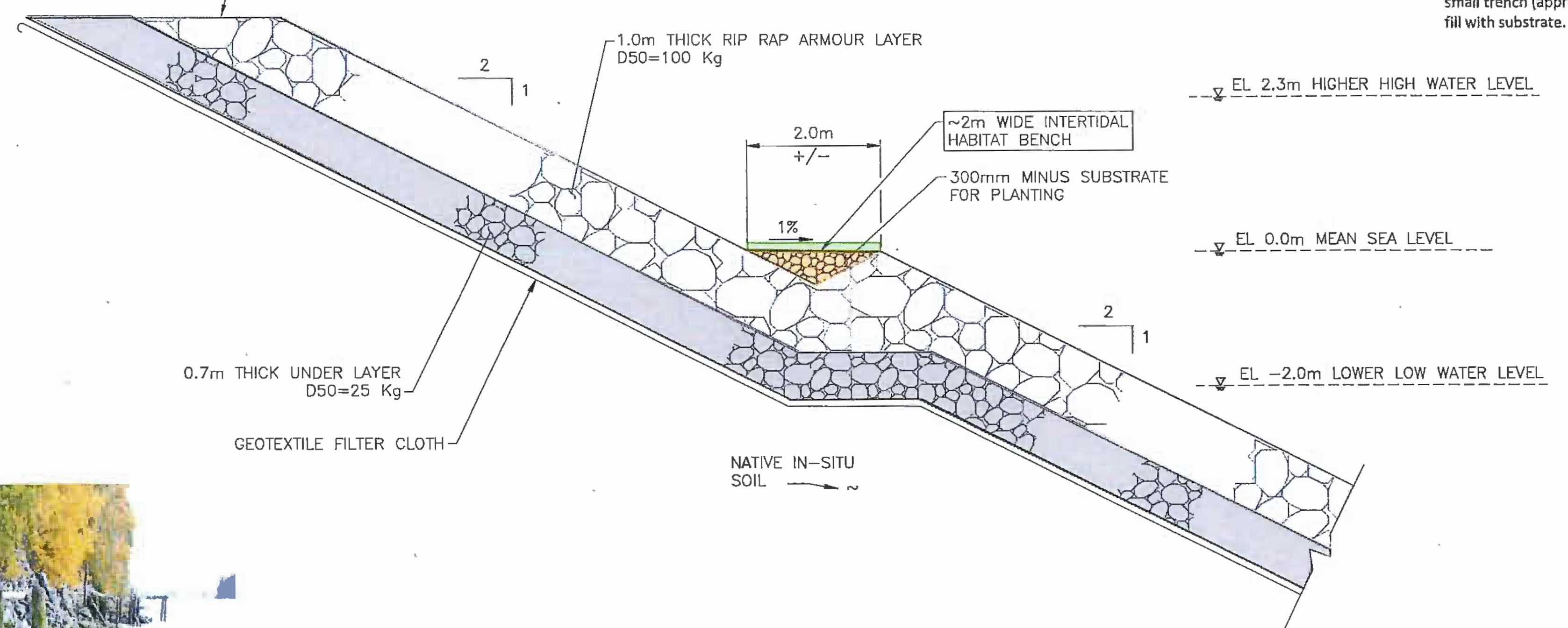
FEB 2 8 2018

Intertidal Habitat Bench					
Common Name	Botanical Name	% of Area	Number	Stock Size	Planting Density
Baltic rush	*Juncus balticus*	60	360	Bare Root	3 plants per m^2
Lyngby's sedge	*Carex lyngbyei*	20	120	Bare Root	3 plants per m^2
Hard-stemmed bulrush	*Schoenoplectus acutus*	20	120	Bare Root	3 plants per m^2

Given the location of the salt wedge in this region it is recommended to go with species more typical of a brackish environment. Bare root, if available, will have the best chance to survive in this substrate over plugs (rhizomes will spread quicker). Baltic rush has proven success in this substrate; however, substitutions for the Lyngby's sedge and hard-stemmed bulrush, would be acceptable, if the nurseries are having difficulty sourcing them.

Planting is recommend in late fall or early winter when the bare root stock will be dormant, this will give them the best chance of survival and allow roots to become established in early spring prior to freshet. It is recommend focusing the Baltic rush on the waterward side of the bench and the Lyngby's sedge and hard-stemmed bulrush on the landward side of the bench.

With regards to planting procedures these will need to be installed by hand. Essentially you would dig a small trench (approximately 10 to 15 cm deep) and install the rhizome of each bare root stock and back fill with substrate.



Note: The placement of the intertidal bench marsh to be positioned closer to, or just below the mean annual high tide level (as outlined in the report by PGL Environmental Consultants dated February 8, 2018. DP Requirement.

E SK-28A SECTION 1:50

THE FOLLOWING SPECIES WOULD BE SUITABLE FOR PLANING IN THIS AREA:
i. BALTIC RUSH (JUNCUS BALTICUS)
ii. LYNGBYE'S SEDGE (CAREX LYNGBYEI)
iii. HARD STEMMED BULLRUSH (SCHOENOPLECTUS ACUTUS)

0 1 2 3 5m
1:50

ISSUE NO.	DRAWING REVISIONS	ISSUE DATE
A	ISSUED FOR DISCUSSION	DEC.11/2017

VAFFC / Vancouver Airport Fuel Facilities Corporation
108-12300 Horseshoe Way Richmond, BC V7A 4Z1 604-271-7113 www.fsmgroup.ca www.vancouverairportfuel.ca

VANCOUVER AIRPORT FUEL DELIVERY PROJECT
MARINE RECEIVING AREA
MARINE DESIGN PACKAGE
VANCOUVER AIRPORT FUEL FACILITIES CORPORATION
RICHMOND, BRITISH COLUMBIA

SEAL

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6363 College Boulevard, Suite 600 Overland Park, Kansas 66211 816.228.7500 FAX 816.228.7535 www.argusconsulting.com

PROJECT NO: 15004.22C
DATE: 12/08/17
DESIGNED BY: RB
DRAWN BY: LL
CHECKED BY: RB
CAD FILE NAME: 15004.22C-SK-28B

SECTION THROUGH INTERTIDAL HABITAT BENCH

DRAWING NO.: SK-28B

Plotted: P:\8338 VC Vancouver Airport Fuel Delivery Project\CADD_Active\15004.22C-SK-28B.dwg on 12/11/17 at 10:24 AM by LLU using Argus.stb

Plan #28

Habitat Balance Sheet for the Marine Terminal Site Development.

Location	Habitat (m^2)				Comments
Habitat Impact Summary					
Marine Terminal Property	**Existing**	**Post-construction**	**Net Change**	**Enhancement Area**	
Shoreline ESA	208.0	1046	+837	+1046	Existing ESA is an area of fill and gravel, and largely barren. Two young trees and one small marginal habitat patch containing native red alder and black cottonwood saplings with an understory of invasive shrubs and herbs will be lost to development. A 5.1:1 compensation for this loss will be achieved by enhancing Shoreline ESA in the SW (350 m^2) and NE corner (696 m^2) of the property and adjacent to the property (see below). Overall, 88% of ESA enhancement works would be onsite.
Intertidal ESA	Refer to comments				Green-coded low productivity habitat. Replacing the existing 3,256 m^2 wharf structure with clean, stable erosion bank protection (armour) that will restore approximately 36,000 m^3 of open river flow environment and provide approximately 3,800 m^3 of new, artificial 'reef' habitat aimed to provide micro-refugia for aquatic flora and fauna. Upgrading concrete rubble rip-rap on either side of the existing wharf footprint will improve stability and quality of substrate refugia over 4,400 m^3 (total of 8,000 m^3 at base of slope along marine terminal property). Refer to Hatfield memo dated October 31, 2017 for additional information. In response to the DP Panel comments of November 29th, 2017, 200m2 of intertidal planting has been added.
Williams Road RMA	176.3	413.2	+236.9	+413.2	These RMAs are degraded by invasive species and dust generated by the high volume of Ecowaste truck traffic. Only the trees are native and these will not be eliminated by the development. Although there is no defensible ecological rationale for it, 2.2:1 habitat compensation is proposed, by removing the existing fences to restore the full 5 m width of each RMA, and by regrading the sites and replacing invasive shrubs and herbs with native vegetation. Overall, 82% of RMA enhancement works would be onsite.
Savage Road RMA (inferred)	95.0	387.6	+292.6	+387.6	
Upland Habitat	0.0	1210.0	+1210.0	+1210.0	Upland habitat is being added to the triangle area north of the CN ROW, to address comments of the November 29, 2017, DP Panel. This habitat is contiguous with the Williams Road RMA and will help improve the functionality of the RMA and the effectiveness of the local Ecological Network.
Proposed Habitat Compensation					
Adjacent to Property					
Shoreline ESA	N/A	N/A	N/A	+144.6	To further compensate for marginal habitat loss from the marine terminal property Shoreline ESA, invasive plants southwest of the property, by some red-coded intertidal habitat, would be replaced with native plants.
Williams Road RMA	50.7	50.7	0	50.7	A portion of the RMAs are beyond the property boundary, which would thus involve limited offsite enhancement work (11% for Williams Road RMA; 25% for Savage Road RMA).
Savage Road RMA (inferred)	129.0	129.0	0	129.0	
Upland Habitat	N/A	N/A	N/A	+110.1	A portion of the CN ROW in the Williams Road RMA would be compensated for by replacing invasive species with native ones between the Savage Road RMA and Shoreline ESA, as a contribution to the local Ecological Network (the remaining 72 m^2 of the ROW compensation area was shifted to the onsite Shoreline ESA).
Gains and Losses					
Terrestrial Habitat				+3,491 m^2	5.7:1 habitat enhancement in Shoreline ESAs for a 208 m^2 onsite shoreline disturbance and a portion of the Williams RMA overlapping with the CN ROW (53% on site). Approximately 2:1 habitat compensation and enhancement to RMAs (54% on site). A total of 1,320 m^2 of upland vegetation was added alongside these local ESAs.
Aquatic Habitat				+3,800.0 m^3	Improvements to Intertidal ESA by replacing vertical steel-pile wharf with clean, stable erosion protection of Fraser River shoreline and secondary artificial reef for brackish environments.

Revision 02 Feb. 2018
Table updated with latest Hatfield information

This schedule is reprinted from the
ESA and RMA Environmental Impacts Report
by
Hatfield Environmental Consultants

02 Feb. 2018 Development Permit Application Resubmission - DPP Comments
18 Dec. 2017 Development Permit Application Resubmission - DPP Comments
31 Oct. 2017 Development Permit Application Resubmission - ADP Comments

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Project
VAFFC MARINE TERMINAL FACILITY
15040 Williams Road, Richmond BC

Drawing
HABITAT BALANCE

Issue:

Scale: nts
Date:
Project Number: 2014-280

Dwg
L0.04

Plan #29

City of Richmond

Development Permit

No. DP 16-741741

To the Holder:	VANCOUVER AIRPORT FUEL FACILITIES CORPORATION (VAFFC)
Property Address:	15040 WILLIAMS ROAD
Address:	C/O FSM MANAGEMENT GROUP INC. 108-12300 HORSESHOE WAY RICHMOND, BC V7A 4Z1

1. This Development Permit is issued subject to compliance with all of the Bylaws of the City applicable thereto, except as specifically varied or supplemented by this Permit.
2. This Development Permit applies to and only to those lands shown cross-hatched on the attached Schedule "A" and any and all buildings, structures and other development thereon.
3. Subject to Section 692 of the Local Government Act, R.S.B.C.: buildings and structures; off-street parking and loading facilities; roads and parking areas; and landscaping and screening shall be constructed generally in accordance with Plans #1 to #29 attached hereto.
4. Sanitary sewers, water, drainage, highways, street lighting, underground wiring, and sidewalks, shall be provided as required.
5. As a condition of the issuance of this Permit, the City is holding the security in the amount of $428,253.65 (including, on-site ESA/RMA $87,329.00, on-site Trail and Buffer Strip $146,674.00, On-site Trail Slope landscaping $65,678.50, three years of maintenance $81,720.00, three years of monitoring $7,920.00 and a 10% contingency $38,932.15) to ensure that development is carried out in accordance with the terms and conditions of this Permit. An additional security in the amount of $38,224.00 covering five years of adaptive management / detailed success monitoring plan implementation with annual reporting by a Qualified Environmental Professional (QEP) is held by the City to ensure monitoring of the intertidal bench marsh. Should any interest be earned upon the security, it shall accrue to the Holder if the security is returned. The condition of the posting of the security is that should the Holder fail to carry out the development hereby authorized, according to the terms and conditions of this Permit within the time provided, the City may use the security to carry out the work by its servants, agents or contractors, and any surplus shall be paid over to the Holder. Should the Holder carry out the development permitted by this permit within the time set out herein, the security shall be returned to the Holder. The City may retain the security for up to three years after inspection of the completed landscaping in order to ensure that plant material has survived.
6. If the Holder does not commence the construction permitted by this Permit within 24 months of the date of this Permit, this Permit shall lapse and the security shall be returned in full.

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7. The land described herein shall be developed generally in accordance with the terms and conditions and provisions of this Permit and any plans and specifications attached to this Permit which shall form a part hereof.

   This Permit is not a Building Permit.

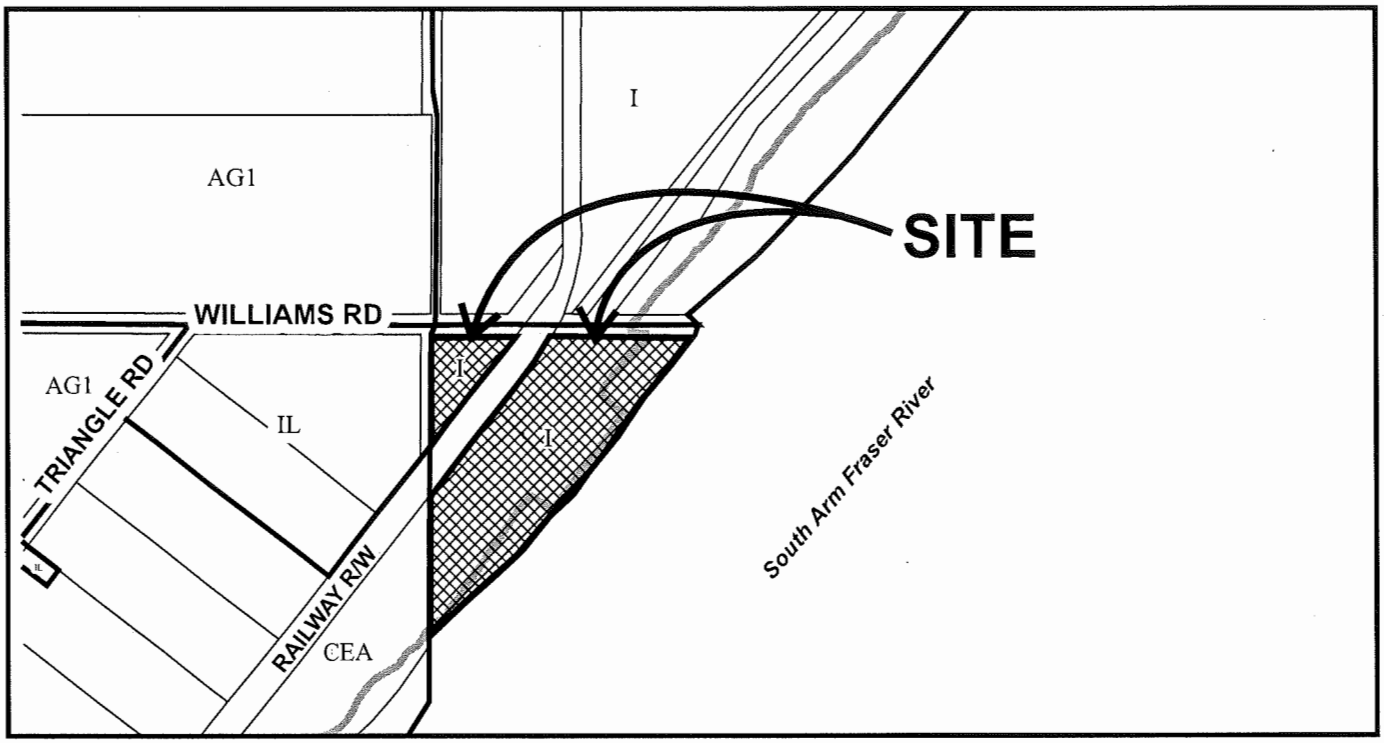
AUTHORIZING RESOLUTION NO. ISSUED BY THE COUNCIL THE DAY OF , .

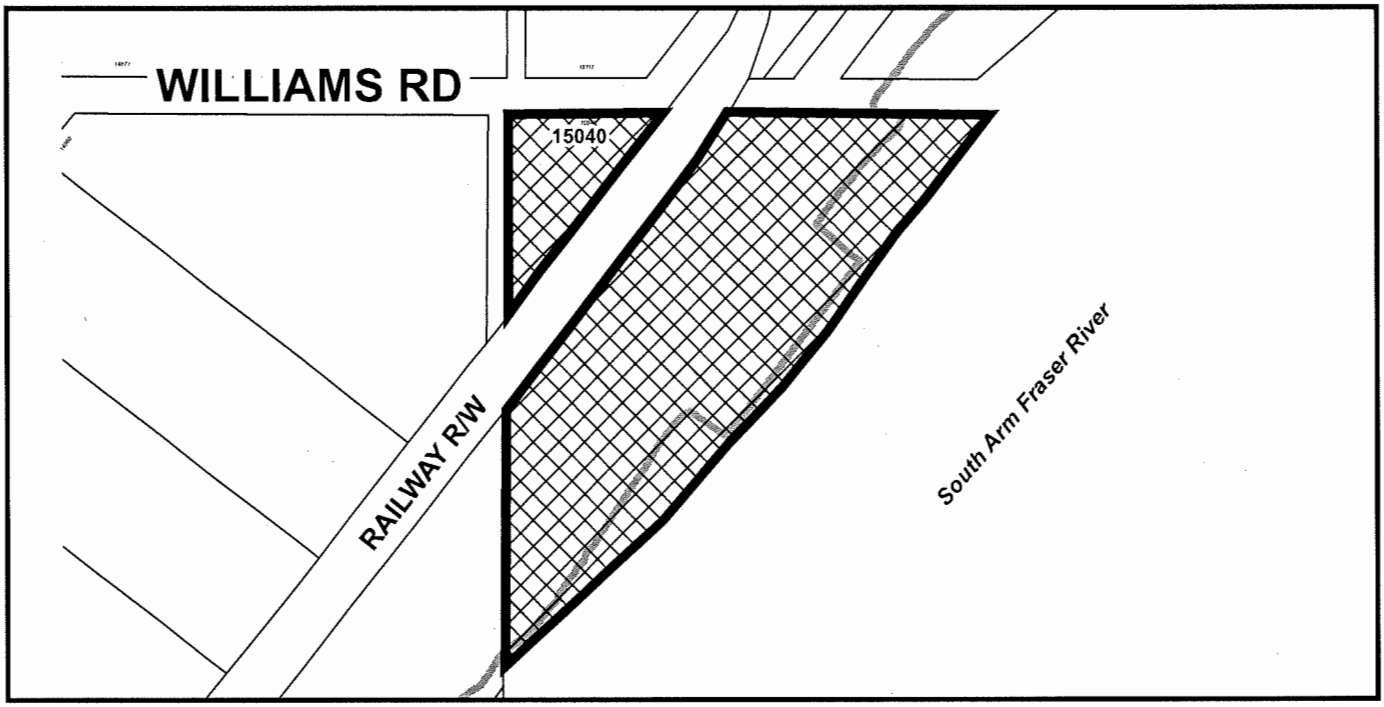
DELIVERED THIS DAY OF , .

_____

MAYOR

City of
Richmond





DP 16-741741
SCHEDULE "A"

Original Date: 08/22/16

Revision Date:

Note: Dimensions are in METRES