



General Purposes Committee

Anderson Room, City Hall
6911 No. 3 Road

Monday, March 20, 2017
4:00 p.m.

Pg. # ITEM

MINUTES

GP-4 *Motion to adopt the **minutes** of the meeting of the General Purposes Committee held on March 6, 2017.*



LAW AND COMMUNITY SAFETY DIVISION

1. **NON-FARM USE FILL APPLICATION FOR THE PROPERTY LOCATED AT THE EASTERN TERMINUS OF FRANCIS ROAD (PID: 023-860-481) – CRANBERRY MEADOWS FARMS LTD.**
(File Ref. No. 12-8060-02) (REDMS No. 5304965)

GP-11

See Page GP-11 for full report

Designated Speaker: Ron Graham

STAFF RECOMMENDATION

- (1) *That the application and corresponding staff report titled “Non-Farm Use Fill Application for the Property Located at the Eastern Terminus of Francis Road” (PID 023-860-481) – Cranberry Meadows Farms Ltd.”, dated March 1, 2017, by the Acting General Manager; Law and Community Safety be referred to the Agricultural Land Commission (ALC); and*

- (2) *That should the ALC grant approval, the applicant must satisfy all City and ALC requirements and obtain a soil deposit permit with conditions from the City prior to any soil being deposited on the property.*



PLANNING AND DEVELOPMENT DIVISION &
ENGINEERING AND PUBLIC WORKS DIVISION

2. **GEORGE MASSEY TUNNEL REPLACEMENT PROJECT –
ANALYSIS OF APPROVED ENVIRONMENTAL ASSESSMENT
CERTIFICATE**

(File Ref. No. 10-6350-05-08) (REDMS No. 5315720 v. 4)

GP-115

[See Page GP-115 for full report](#)

Designated Speakers: John Irving & Victor Wei

STAFF RECOMMENDATION

- (1) *That the City continue to reiterate its significant outstanding concerns to the Province regarding the George Massey Tunnel Replacement Project by sending a letter to the Ministry of Transportation and Infrastructure requesting that the Ministry address the concerns that were not resolved through the Environmental Assessment Application process for the Project; and*
- (2) *That staff be directed to continue seeking mitigation of any potential negative impacts of the Project on Richmond and the region through participation in Working Groups and input into management plans required by the Environmental Assessment Certificate as well as on-going involvement in the design and construction phases and related permit processes.*



LULU ISLAND ENERGY COMPANY

3. **SPECIAL GENERAL MEETING OF THE LULU ISLAND ENERGY
COMPANY DISTRICT ENERGY ASSETS TRANSFER
CONSIDERATION VALUE RATIFICATION**

(File Ref. No. 01-0060-20-LIEC1) (REDMS No. 5309451 v. 7)

GP-134

[See Page GP-134 for full report](#)

Pg. #

ITEM

Designated Speaker: Robert Gonzalez

STAFF RECOMMENDATION

That the ordinary resolution of the shareholder in Attachment 1 of the Lulu Island Energy Company report dated February 15, 2017 that ratifies the value of the district energy assets transferred to Lulu Island Energy Company (LIEC) be approved and adopted.

☐

ADJOURNMENT

☐



General Purposes Committee

Date: Monday, March 6, 2017

Place: Anderson Room
Richmond City Hall

Present: Mayor Malcolm D. Brodie, Chair
Councillor Chak Au
Councillor Derek Dang
Councillor Carol Day
Councillor Ken Johnston
Councillor Alexa Loo
Councillor Bill McNulty
Councillor Linda McPhail
Councillor Harold Steves

Call to Order: The Chair called the meeting to order at 4:00 p.m.

MINUTES

It was moved and seconded

That the minutes of the meeting of the General Purposes Committee held on February 20, 2017, be adopted as circulated.

CARRIED

DELEGATION

1. New Acute Care Tower at Richmond Hospital

Natalie Meixner, President and CEO, Richmond Hospital Foundation, joined by Kyle Shury, Chair of the Board of Directors and Dr. Ken Poon, Head of Surgery, Richmond Hospital, spoke of the Richmond Hospital's need for a new Acute Care Tower (the "Project.")

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With the aid of a PowerPoint presentation (copy on file, City Clerk's Office), Ms. Meixner provided background information with regard to the proposed Project's timing, highlighting that Vancouver Coastal Health's Board approved its concept plan in 2016 and submitted it to the Province of BC. Ms. Meixner then advised that the Project rests with the Province to approve the concept plan and advance to the business planning stage.

She provided statistical information regarding the proposed Project, emphasizing that Richmond residents ranked a new acute care tower at Richmond Hospital as the single most important upcoming capital project. Ms. Meixner then highlighted that with the aid of generous donors and organizations, \$25 million in funding has been committed toward the Foundation's campaign goal of \$40 million for the proposed Project. She remarked that a commitment from the Province is imperative to ensure the Project proceeds in a timely manner.

Dr. Poon spoke of the Hospital's current tower, noting that it was built over 50 years ago and is well past its infrastructure lifespan. He commented on several ways in which the current tower no longer meets today's standards for care, such as operating rooms that are built below the flood plain and are too small to accommodate today's medical technology.

Ms. Meixner then requested that Richmond City Council pass a resolution requesting the Province's approval of the concept plan so that Vancouver Coastal Health may move forward on the proposed Project's business plan.

As a result of the presentation, the following **motion** was introduced:

It was moved and seconded

That a letter be written to the Premier, the Minister of Health, the Minister of Finance, Richmond MLAs, the Leader of the Opposition and Vancouver Coastal Health calling on the provincial government to commit to a new hospital tower to replace the north tower in Richmond.

CARRIED

In accordance with Section 100 of the *Community Charter*, Councillor Carol Day declared herself to be in a conflict of interest with respect to Item No. 2 as she and her spouse are owners of a bed and breakfast and left the meeting at 4:31 p.m.

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FINANCE AND CORPORATE SERVICES DIVISION

2. SHORT-TERM RENTALS - PROPOSED BYLAWS AND OPTIONS

(File Ref. No. 03-0900-01) (REDMS No. 5324334 v. 8)

With the aid of a PowerPoint presentation (copy on file, City Clerk's Office), Cecilia Achiam, Director, Administration and Compliance, provided background information and highlighted the following regarding the proposed changes to short-term rental regulations:

- existing regulations will be enhanced and enforcement will be intensified along with increased fines and penalties;
- "short-term rental" will be defined;
- "agri-tourism accommodation" will require rezoning;
- Bed and Breakfast (B&B) operations will not be permitted in homes with secondary suites, granny flats, or coach houses;
- primary residence of B&B operator will be verified annually;
- B&B operations will be limited to maximum of three bedrooms with a maximum of two people per room;
- a 500 metre buffer between all new B&B operations will be implemented;
- B&B operators must notify their neighbours of their business and provide operator contact information; and
- B&B operators will be encouraged to carry adequate liability and property damage insurance.

Discussion took place and concern was expressed regarding how the City would address regulatory and enforcement gaps, particularly how short-term rental operations would be dealt with in multi-family dwellings.

In reply to queries from Committee, Ms. Achiam and Carli Edwards, Manager, Customer Services and Licencing, advised that the proposed regulatory changes address short-term rental operations in single-family dwellings only and a B&B business licence is issued to an applicant not the property.

Discussion further ensued regarding the City's ability to require that a B&B operator be the owner of the property and it was noted that such discussion take place in closed session due to its nature. Also, concern was expressed regarding the safety of dwellings with B&B operations.

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Ms. Edwards spoke of the business licence bylaw, noting that a B&B business licence is not issued unless it complies with building, fire, and health regulations. Also, she remarked that since B&Bs are a residential use, they are not required to have separate water and heating systems.

In reply to further queries from Committee, Ms. Achiam and Ms. Edwards advised that (i) B&B operations will be limited to maximum of three bedrooms with a maximum of two people per room, (ii) site specific zoning remains an option for Council to consider implementing, (iii) a combination of fees and increased fines will support increased enforcement activity of short-term rentals, (iv) staff have engaged with the Richmond Chamber of Commerce for information sharing purposes only, and (v) B&B operations will not be permitted in homes with secondary suites, granny flats, or coach houses, thus those affordable housing options remain on the rental market.

The Chair recessed the meeting at 5:21 p.m. to resolve into closed session to hear legal advice on short-term rentals.

The meeting reconvened at 5:33 p.m. with all members of Council present, except Councillor Day.

It was moved and seconded

In respect to bed and breakfast ("B&B") uses in single-family and agricultural zones, implementing a distance buffer between B&B establishments and to the enhanced enforcement of such short-term rental regulation:

- (1) That Official Community Plan Bylaw 9000, Amendment Bylaw 9691, which amends Official Community Plan Bylaw 9000 by adding a provision for a 500 meter buffer between B&B establishments be introduced and given first reading;***
- (2) That Bylaw 9691, having been considered in conjunction with:***
 - (a) the City's financial plan and capital program; and***
 - (b) the Greater Vancouver Regional District Solid Waste and Liquid Waste Management Plans;******is hereby found to be consistent with said program and plans in accordance with section 477(3)(a) of the Local Government Act;***
- (3) That Bylaw 9691 be sent to the Agricultural Land Commission for comment;***
- (4) That Bylaw 9691, having been considered in accordance with section 475 of the Local Government Act and the City's Official Community Plan Bylaw Preparation Consultation Policy 5043, is found not to require further consultation;***

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- (5) *That Richmond Zoning Bylaw 8500, Amendment Bylaw 9647 to amend definitions, be introduced and given first reading;*
- (6) *That Richmond Zoning Bylaw 8500, Amendment Bylaw 9692 to require a distance buffer between B&Bs, be introduced and given first reading;*
- (7) *To incorporate enhanced business licencing requirements and increase fees and penalties, that:*
 - (a) *Business Regulation Bylaw No. 7538, Amendment Bylaw No. 9649;*
 - (b) *Business Licence Bylaw No. 7360, Amendment Bylaw No. 9650;*
 - (c) *Municipal Ticket Information Authorization Bylaw No. 7321, Amendment Bylaw No. 9651; and*
 - (d) *Consolidation Fees Bylaw No. 8636, Amendment Bylaw No. 9652;**each be introduced and given first, second and third readings;*
- (8) *That the proposed communication plan described in Attachment 12 of this report explaining the proposed changes (identified in the above recommendation) to the short-term rental regulations be endorsed; and*
- (9) *That:*
 - (a) *the information regarding tax requirements including whether a hotel tax should apply to short-term rentals provided in this report be received for information; and*
 - (b) *staff be directed to engage the Province of British Columbia to discuss regulatory changes to the Provincial Sales Tax in regards to the Municipal and Regional District Tax, including the definition of accommodation providers;*
- (10) *That staff conduct a one-year review of the City's proposed short-term rental regulation, and include issues surrounding a requirement for the operator of the short-term rental to be the owner of the property and report back to Council;*
- (11) *That staff consider options and report back on the issue of short-term rentals for multi-family dwellings; and*
- (12) *That staff formulate a robust public engagement process to address additional options and regulatory and enforcement gaps for future consideration.*

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The question on the motion was not called as discussion ensued and staff was directed to provide periodic updates to Council on short-term rentals.

Also, there was agreement to postpone calling the question on the motion in order to hear delegations from members of the audience.

Lynda ter Borg, Sandpiper Court resident, was of the opinion that the staff report presented to Committee did not address Council's previous direction to staff on short-term rentals. She cited concern regarding not implementing a proof of insurance requirement and the definition of owner/operator, among other concerns.

Katherine McCreary, 7560 Glacier Crescent, expressed concern that the staff report presented to Committee does not indicate concurrence from departments like Fire-Rescue, Affordable Housing, Building Approvals, and Transportation. Also, she queried the proposed regulation amendments in relation to inspections of bed and breakfast operations and the proposed Official Community Plan amendment and its compliance with Metro Vancouver's regional growth strategy.

Anne Lerner, No. 2 Road resident, was of the opinion that Council should implement strict rules with regards to short-term rentals and define in detail the term "owner/operator." Also, she expressed concern regarding the rental of homes for less than 30-days.

In reply to queries from the Chair, Ms. Edwards advised that following receipt of a bed and breakfast business licence application, staff conduct an inspection of the home to verify that the plans submitted match those submitted to the City when the home was originally built. Terry Crowe, Manager, Policy Planning, stated that only major amendments to the Official Community Plan require Metro Vancouver's approval.

The question on the motion was then called and it was **CARRIED**.

ADJOURNMENT

It was moved and seconded

That the meeting adjourn (5:57 p.m.).

CARRIED

General Purposes Committee
Monday, March 6, 2017

Certified a true and correct copy of the Minutes of the meeting of the General Purposes Committee of the Council of the City of Richmond held on Monday, March 6, 2017.

Mayor Malcolm D. Brodie
Chair

Hanieh Berg
Legislative Services Coordinator



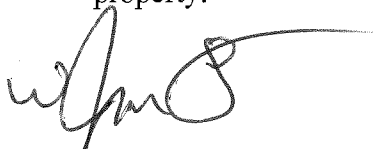
City of Richmond



Report to Committee

To: General Purposes Committee **Date:** March 1, 2017
From: John McGowan **File:** 12-8060-02/01-Vol01
Acting General Manager, Law and Community
Safety
Re: **Non-Farm Use Fill Application for the Property Located at the Eastern
Terminus of Francis Road (PID: 023-860-481) – Cranberry Meadows Farms
Ltd.**

Staff Recommendation

1. That the application and corresponding report titled “Non-Farm Use Fill Application for the Property Located at the Eastern Terminus of Francis Road” (PID 023-860-481) – Cranberry Meadows Farms Ltd.”, dated March 1, 2017, by the Acting General Manager; Law and Community Safety be referred to the Agricultural Land Commission (ALC); and
2. Should the ALC grant approval, the applicant must satisfy all City and ALC requirements and obtain a soil deposit permit from the City prior to any soil being deposited on the property.


John McGowan
Acting General Manager, Law and Community Safety
(604-276-4104)
Att. 4

REPORT CONCURRENCE			
ROUTED TO:	CONCURRENCE	REVIEWED BY STAFF REPORT / AGENDA REVIEW SUBCOMMITTEE	INITIALS:
Finance Department	<input checked="" type="checkbox"/>	APPROVED BY CAO 	
Engineering	<input checked="" type="checkbox"/>		
Roads & Construction	<input checked="" type="checkbox"/>		
Sustainability	<input checked="" type="checkbox"/>		
Law	<input checked="" type="checkbox"/>		
Policy Planning	<input checked="" type="checkbox"/>		
Transportation	<input checked="" type="checkbox"/>		

Staff Report

Origin

The City of Richmond is in receipt of a soil deposit application, deemed to be non-farm use (the "Application") by the ALC, submitted by Cranberry Meadows Farms Ltd. for PID 023-860-481 (the "Property"). The intent of the application is to place fill on the property located at the Eastern Terminus of Francis Road to improve the property's agricultural capability for the purpose of grape and raspberry farming.

The property is situated within the Agricultural Land Reserve (ALR) and is subject to provisions of the *ALC Act*, *Agricultural Land Reserve Use, Subdivision, and Procedure Regulation*, and the City's current Soil Removal and Fill Deposit Regulation Bylaw 8094 (the "Bylaw").

Pursuant to applicable provincial regulations, non-farm use applications for land that is zoned by bylaw to permit agricultural or farm use require Council authorization to be referred to the ALC. Should the application receive Council resolution to be referred to the ALC and should it subsequently be approved by the ALC, the applicant would be required to satisfy the requirements of the Bylaw before a soil deposit permit would be issued.

Analysis

The property is located at the Eastern Terminus of Francis Road and is zoned AG1 (Agriculture). The current zoning permits a wide range of farming and compatible uses consistent with the provisions of the *ALC Act* and *Regulation* and the City's Official Community Plan (OCP) and Zoning Bylaw.

The applicant has been operating a cranberry farm for the past eleven years. The *Fill Deposition Plan* (the "Plan") prepared by Pottinger Gaherty Environmental Consultants Ltd. (the "Consultant") indicates that the location of the property, near the mouth of the Fraser River, experiences high saline levels in the sourced water used for frost protection in the fall (Attachment 1). The plan notes that the increased salinity levels have negatively impacted the property's agricultural capability for cranberry production resulting in decreased harvest volume.

City staff notes that the drainage/irrigation network that serves the subject property is protected from high levels of salt in irrigation water by an automated valve at the system intake at the No. 6 Road South pump station. The automated valve closes when Fraser River salinity levels are above the levels appropriate for farming. City staff have not been provided evidence indicating that high levels of salt are present in the irrigation water at the subject property or the surrounding area.

Uses on Adjacent Lots

- To the North: Golf Course
- To the East: Industrial
- To the South: ALR – Land is not in production
- To the West: ALR – Land is not in production

Item	Existing	Proposed
Owner (PID 023-860-481)	Cranberry Meadows Farms Ltd. No. BC0729542	No change
Applicant	Cranberry Meadows Farms Ltd. No. BC0729542	No change
Authorized Agent	PGL Environmental Consultants	No change
Lot Size	8.05 hectares (19.89 acres)	No change
Land Uses	Cranberry production	Raspberry and grape production
OCP Designation	Agriculture	No change
ALR Designation	Property is within the ALR	No change
Zoning	AG1	No change
Riparian Management Area (RMA)	5.0 meters RMA	No change

Project Overview

The applicant proposes to raise the property and improve the agricultural capability in order to produce grapes and raspberries.

The total project area of the property is approximately 8.05 hectares (19 acres). The property is presently in agricultural production of cranberries and is comprised of Richmond and Lulu series soils. Lulu soils are suitable for the production of annual legumes, blueberries, cereals, cole crops, corn, perennial forage crops, root crops, and shallow-rooted annual vegetables.

As noted in the consultant's report, grape vines are deep-rooted plants that require an adequate soil depth. The applicant is proposing to import and deposit 362,000 cubic metres of fill (approximately 51,700 truckloads), to improve the property's drainage, slope, aspect, and rooting depth for the production of grapes and raspberries. The property will be raised by approximately 6m to 8m deep at the north section and approximately 2m deep at the south side of the property.

Lulu and Richmond soils have very poor drainage due to a high water table that is present for most of the year. The applicant intends to improve the drainage through the deposition of suitable fill and the establishment of a shallow slope. It is proposed that the site grading will maintain well-drained conditions and restrict surface ponding.

Existing drainage on the perimeter of the property will be retained to manage seasons of high rainfall; however, ditches separating the existing cranberry fields will be filled as part of the fill deposit activities. The conversion to grape and raspberry production will negate the need to induce a harvest flood as the new crops will utilize drip irrigation.

The proposed fill will be sourced from multiple locations within the Lower Mainland. The material will be coarse-textured (sandy) soil with a small percentage of fines, which will improve

site drainage and crop selection. While the target fill material is sandy soil, any stony material which may make up the fill, will be segregated onsite, screened and placed at depth to ensure that it does not hinder cultivation of site soils. Soil screening to remove material over 2.5cm in diameter will be conducted onsite.

The proposal includes blending salvaged organic soil from the property with loamy material to provide a highly suitable growth medium. The plan states that the Lulu and Richmond soils range from 0.4m to 1.6m in depth. The applicant intends to salvage the top 0.25m of organic soil material and utilize the organic soil for mixing with mineral soil to prepare a suitable growing medium for grapes and raspberries, as per the Fill Deposition Plan.

The applicant has advised that the proposed duration of the project will be three years. This includes topsoil preparation and crop transitioning from cranberries to grape and raspberry production. Fourteen acres of the property will be dedicated to grape vines that favor the cooler Metro Vancouver temperatures; while the remaining four acres will be used to produce raspberries to support the Richmond Country Farm market.

The Consultant concludes:

“The Fill Deposition Plan is expected to improve the Site’s historically mapped agricultural improved capability from O3LW (with limitations of degree of decomposition-permeability and excess water) to an agricultural capability of Class 1 or 2A, with significantly improved agricultural productivity and increased crop selection.”

Richmond Agricultural Advisory Committee Consultation

The Agricultural Advisory Committee (AAC) discussed the proposal on April 26, 2016. It should be noted the committee did not have quorum; however, the members did provide the following comment:

“The Committee noted that it understands the issue related to the quality of water and rationale behind the proposed soil fill. Committee agreed that raising the profile of the site will enhance the agricultural viability of the site and enable the owners to pursue a positive venture.”

The AAC introduced the following motion:

“That the ALR soil fill application for the site (PID: 023-860-481) be supported as presented.”

Please refer to Attachment 2 for a copy of the AAC meeting discussion notes.

Staff Comments

City staff have prepared a comprehensive soil deposit permit (the “Permit”) that addresses a number of key issues, including but not limited to, protection of the surrounding Riparian

Management Areas (RMA), public safety, drainage, eliminating impacts to neighbouring properties and City infrastructure, security deposits, and the permitted hours/days of operation (Attachment 3).

The open watercourse adjacent to the Francis Road right-of-way is a protected RMA. As this work is farm activity it is not subject to Riparian Area Regulation requirements. While it is an accepted best practice to maintain riparian setbacks to support effective agricultural drainage, the City has no authority to require protection and management of the 5m RMA setback in this application.

The applicant will be required to take all necessary precautions to prevent sedimentation of any stream, creek, waterway, watercourse, ditch, drain, catch basin, culvert, or manhole either on or adjacent to the property. Sediment control and erosion measures will be installed/constructed and inspected by the consultant. City staff will inspect to ensure compliance prior to the importation of any soil onto the property. This will be a separate condition within the permit that requires that the applicant meet the City's current Watercourse Protection and Crossing Bylaw and the current Pollution Prevention and Clean-Up Bylaw.

The City will require a comfort letter from a professional engineer confirming that, should the proposal receive approval, the soil will have no impact to surrounding properties including, but not limited to, impacts on the neighbouring properties' groundwater table, open or closed drainage infrastructure connecting to the City's storm drainage infrastructure.

Should the project receive approval, the applicant may be required to install a wheel wash prior to the importation of any soil onto the property.

The permit holder will be required to maintain an accurate daily log of trucks depositing soil on the property. This log will be made available for inspection by City staff when requested. At the sole discretion of the City, alternate measures may be used (i.e. survey, etc.) in order to establish the volume of soil deposited on the property.

Staff are recommending to the ALC as a condition of approval, that the applicant be required to post a substantial performance bond in a form and amount deemed acceptable by the ALC. The performance bond should be of a sufficient amount to ensure that all required mitigation and monitoring measures are completed as proposed and to ensure the rehabilitation of the property in the event the project is not completed. The performance bond will be held by the ALC.

Staff are also recommending to the ALC that the project be monitored by a professional agrologist. Furthermore, that the agrologist provides quarterly inspection reports to the City and ALC. This will be a separate condition within the permit that may include the provision that a report may be required upon request by the City.

Prior to permit issuance, the City will require that the applicant provide a security deposit. The deposit will not be returned until all of the conditions as stated in the permit and the ALC approval, should one be granted, are satisfied in their entirety to the satisfaction of the City. City staff will also require confirmation in writing from the applicant's consultant and the ALC, that

the project is completed as per the initial approval. City staff will conduct a final inspection prior to closing the file.

City staff will monitor the property to regularly ensure compliance with the conditions of the permit and ALC approval, should approval be granted.

Geotechnical & Drainage Considerations

The applicant has contracted Geo Pacific Consultants Ltd. to conduct a geotechnical investigation to determine impacts to surrounding properties and drainage should the project be approved. Please refer to Attachment 4 for a copy of the Geotechnical Investigation Report. It is the opinion of the report's author(s):

"The proposed fill program is feasible without adversely impacting drainage or groundwater levels beyond the site."

As per the investigation and assessment, the report indicates the probability of considerable settlement of up to 6m to 8m beyond the fill area. The report further indicates the likelihood that maintenance may be required to "ensure [...] level access roads and positively flowing ditches." Staff are recommending that the approved fill area be setback a minimum of 8m from property lines in order to mitigate any future impact to neighbouring properties due to potential settlement related issues.

In addition, the planned Vancouver Airport fuel delivery pipeline is projected to be placed within the Francis Road corridor next to the proposed soil deposit project. Geo Pacific has provided an additional geotechnical investigation report assessing potential impacts on the proposed pipeline should the soil deposit project be approved. The report concludes that the pipeline will be setback 12 to 14m from the soil deposit project. Furthermore, the report states:

"While measurable movements of the pipeline are likely, they are expected to be low differentially at less than 1mm/metre and should not impact the jet fuel line."

Geo Pacific has identified and City staff are recommending that a pipeline monitoring plan be implemented for the duration of the fill project. Any cost for monitoring would be assumed by the applicant.

Staff will require a topographic survey identifying pre and proposed post-fill elevations prior to the project commencing.

Environmental Considerations

The applicant will be required to ensure that there is no damage to adjacent watercourses. Conditions of the permit will require that the applicant install adequate erosion/sediment control measures prior to the importation of soil.

The proposed fill site borders Freshwater Wetland Environmentally Sensitive Area (ESA) on its western property boundary and also on the south across the road. Erosion and sediment control will be required to prevent impacts to the ESA.

Any trees of 20cm caliper located on the property and trees located on neighbouring properties within 2m of any property line are to be protected as per the City's information bulletin Tree-03 "Protection of Existing Trees during Demolition and Construction".

As per Fisheries & Oceans Canada, it is recommended that residents self-assess any proposed works to ensure that a project avoids causing serious harm to fish. This applies to work being conducted in or near water bodies that support fish that are part of or that support a commercial, recreational, or Aboriginal fishery.

Agricultural Considerations

The applicant retained the consultant in order to provide the agricultural land capability assessment and any site mitigation recommendations for the proposed soil deposit project.

The owner has identified a number of agricultural considerations with respect to the property. They include, but are not limited to, the following:

- High salt levels recorded in the farm's water source (south arm of the Fraser River) has been detrimental to crop yields and farming operations.
- During the past seven years the crop has averaged a yield of 180,800lbs, while the previous seven years averaged 277,900lbs. This represents a 35% reduction of production per year on average;
- Reductions in cranberry production over the last two years have resulted in Cranberry Meadows being ranked in the bottom 27% of all Ocean Spray growers;
- Farm harvest occurs in the fall and was often delayed due to the quality and quantity of the water from the Fraser River;
- The farm was required in 2010 to use a 3 inch-metered water main from the adjacent golf course to help dilute excess salt water from the Fraser River during harvest flood.

As per the City's report (re: Salinity Intrusion in the Fraser River) identified within the consultant's assessment, City staff identified the potential for the salt wedge to advance beyond the No. 6 Road irrigation water intake during tidal cycles. As noted in the report:

"[T]he City installed a salinity meter at the [No. 6 Rd. South] pump station that shuts off flow from the Fraser River when salt content becomes too high."

The salinity meter and automated valve protect the irrigation system from high levels of salinity. The salinity meter and automated valve are in working order and there are no instances where fault or failure have allowed water with high salt content into the system. While the Fraser River source water does experience high salt concentrations on a regular basis, the irrigation system is maintained at a salinity level appropriate for Richmond farming. There are many farms in the

vicinity of the subject farm that utilize provided irrigation water and maintain successful farming operations.

As indicated, Lulu soils are typically suited for production of annual legumes, blueberries, cereals, cole crops, corn, perennial forage crops, root crops and shallow-rooted vegetables. Production of other crops including grapes and raspberries, which are proposed for the site, are limited by inadequate drainage of these soils causing winter injury due to a high water table.

Consideration should be given to the desirability of man-made transformation of Lulu soils that have traditionally been successfully used for a wide range of agriculture crops throughout Richmond to the specific use of grapes and raspberries.

Should the proposal achieve final approval, the City will require that the consultant be retained to monitor the project and provide regular reporting. Should the consultant not be retained or cease providing regular oversight and reporting, the City would reserve the right as per the permit, to suspend and/or void the permit until such time as a new qualified agrologist, agreeable to the City and ALC, is retained to monitor the project and provide regular reporting.

Road & Traffic Considerations

A traffic management plan has been provided to ensure public safety. Truck contractors accessing the site will be required to adhere to speed and weight limit conditions and must only access No. 6 Road from Steveston Highway. Due to truck weight limit and speed limit considerations, no access will be permitted on No. 6 Road from Williams Road to Westminster Highway. The City will reserve the right, as per the permit conditions, to request modifications to the traffic management plan should it be deemed necessary by staff.

The proponent must ensure that measures for dust and noise control are in place to ensure there is no damage from dust to the cranberry crop on the adjacent cranberry farm or noise disturbance to poultry for the adjacent turkey operation.

Should the soil deposit proposal receive approval, it will be the responsibility of the applicant and his contractor(s) to contact officials with the Vancouver Airport Fuel Facilities Corporation to ensure soil deposit operations (i.e. truck traffic) and pipeline construction do not conflict.

Security Bonds

Should the soil deposit project receive approval, the City will require that the applicant provide the following security bonds:

- \$5,000 pursuant to section 8(d) of the current Boulevard and Roadway Protection Regulation Bylaw 6366 to ensure that roadways and drainage systems are kept free and clear of materials, debris, dirt, or mud resulting from the soil deposit activity; and

- \$10,000 pursuant to section 4.2.1 of the current Soil Removal and Fill Deposit Regulation Bylaw 8094 to ensure the full and proper compliance with the provisions of this Bylaw and all other terms and conditions of the permit.

The security bonds are required prior to issuance of the permit.

Financial Impact

While there is no incremental financial impact to the City, there are costs associated with City staff monitoring the fill site throughout the duration of the project, as ALC staff do not actively monitor fill projects. In addition, an external consultant's review may be requested should staff deem such a review necessary. Funding is set aside within the existing budget to pay for costs associated with a review.

As per the bylaw, the applicant has provided the City's non-refundable application fee in the amount of \$600. In addition, the applicant has submitted the ALC application fee in the amount of \$600.

Conclusion

Staff recommends that Council refer the non-farm use fill application for the property located at the Eastern Terminus of Francis Road (PID 023-860-481) to the ALC for their review and consideration.



Ron Graham
Acting Manager, Community Bylaws
(604-247-4601)

RG:mm

- Att. 1: Copy of the Fill Deposition Plan (PGL Environmental Consultants) dated October 2016
2: Copy of the AAC meeting discussion notes dated April 26, 2016.
3: Draft copy of the proposed City of Richmond Soil Deposit Permit
4: Copy of the Geotechnical Investigation Report (Geo Pacific Consultants Ltd.) dated January 11, 2017

Eastern Terminus of Francis Road
Richmond, BC

Fill Deposition Plan



PREPARED FOR:

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PGL File: 4402-01.01

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solve and simplify

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1.0 INTRODUCTION

PGL Environmental Consultants (PGL) has been retained by Cranberry Meadows Farm Ltd. (Cranberry Meadows) to develop a fill deposition plan to improve agricultural capability for grape and raspberry production at the eastern terminus of Francis Road (C Sec 21 BLK4N RG5W PL LMP 3438 [BL299792]), in Richmond, BC (the Site; Figure 1). The property owner would like to use appropriate fill materials to raise the majority of the 8.05ha property so that it is at the same elevation as the surrounding properties in the southern portion, and suitably high enough in the northern portion to permit grape production.

2.0 BACKGROUND

The site of an old mined-out peat farm, Cranberry Meadows has been operating a pre-existing cranberry farm for the past eleven years. During that time, crop production has been impacted by the agricultural capability of the property given its current limitations. These limitations are largely due to the quantity and quality of water that is sourced from the South Arm of the Fraser River.

Water required by Cranberry Meadows in the fall for frost protection and harvest flooding is sourced from the Fraser River through the No. 6 South Road Pump Station. Agricultural activities at the site have been increasingly impacted over the years due to high salinity which adversely impacts agricultural production. The location of this property is unique as it requires Cranberry Meadows to source its water closer to the mouth of the Fraser River than other cranberry operations. Most farms in Richmond source their water from further upstream on the North Arm of the Fraser River, which is less saline. In his staff report on salt intrusion into the Fraser River dated July 5, 2010, Richmond's engineering director, John Irving, noted that evidence suggests that the No. 6 Road South Pump Station is impacted by higher saline conditions owing to saltwater intrusion during periods of low flow and high tides. These conditions are associated with periods of the year in which Cranberry Meadows requires water for frost protection and harvest. John Irving further indicated that water quality at the No. 7 North and No. 8 North Pump Stations, which provide water for most agricultural operators in Richmond, are not impacted by saltwater intrusion and associated saline conditions. Consequently, high salinity concentrations have not been a significant impediment for these operations. The property owner has indicated that these concerns have been previously documented by the City of Richmond (the City) staff resulting in a meeting with the City's engineering department. While the City has attempted to address the high salinity issues, a suitable solution has not been identified.

Cranberry Meadows would like to continue using the property for agricultural production but would like to change the crop production from cranberries to grapes and raspberries. This will eliminate the need for spring/fall frost protection and harvest flood, which will provide a significant advantage as it will eliminate the farm's reliance on the Fraser River. The owners of Cranberry Meadows already have a portion of their Richmond Country Farms in grape production. The proposed grape production for the Site will supplement their current grape and wine production. Grape production however, will require improvements to the Site soils and the addition of slopes to facilitate drainage, both of which can be achieved through the proposed fill deposition plan.

The property owner/operator of Cranberry Meadows Farms is a four-generation farming family in Richmond, and they have identified the following specific agricultural considerations:

- High salt levels recorded in the farm's water source (south arm of Fraser River) has been detrimental to crop yields and farming operations;

- During the past seven years the crop has averaged a yield of 180,800lbs, while the previous seven years averaged 277,900lbs. This represents a 35% reduction of production per year on average;
- Reductions in cranberry production over the last two years have resulted in Cranberry Meadows being ranked in the bottom 27% of all Ocean Spray growers;
- Farm harvest occurs in the fall and was often delayed due to the quality and quantity of the water from the Fraser River;
- In 2013, a pre-harvest screening showed unacceptable levels of malathion residue. Malathion is known to be used extensively on blueberry farms in the area but not in Cranberry Meadows operations. Harvest was delayed for two weeks while the residue dissipated;
- Farm operations are impacting area residents as the farm requires water levels in ditches to be raised resulting in localized flooding;
- By introducing new crops, the farm will convert to drip irrigation and drastically reduce the need for large volumes of water from the Fraser River. Irrigation will only be required for the first two years following grape planting, after which irrigation will not be required;
- The farm was required in 2010 to use a 3"-metered water main from the adjacent golf course to help dilute excess salt water from the Fraser River during harvest flood;
- By raising the profile of the property and introducing new crops the farm will convert to drip irrigation, which will be the most efficient form of irrigation and reduce the need for spring/fall frost protection and harvest flood; and
- A temperature difference exists between the surface of the recessed cranberry bog and the elevated properties surrounding the farm, resulting in a temperature differential of approximately 6°C (as observed by the land owner) due to radiative frost conditions (frost pockets) where cold air collects, which reduces the growing season in some years.

2.1 Fill Requirement to Support Existing Wine Production

Richmond Country Farms Ltd. which has a winery division under the name Country Vines will be using the proposed grape production primarily for their white wine production. However, they would like to grow some red varieties under hay grove tunnels as well. Currently Country Vines has approximately 4 acres of white varieties under cultivation, which produces roughly 10 tonnes of grapes. The Agriculture Land Commission (ALC) permits land-based wineries on Agricultural Land Reserve (ALR) land to buy a certain amount of grapes or grape juice from other farms/vineyards in BC, but not all of it.

They state:

"The ALC regulation permits licensed wineries on a parcel in the ALR, provided at least 50% of the farm products (fruit) used to make the wine is produced on the farm on which the winery is located. The farm may be comprised of one or several parcels of land owned or operated by a farmer of farm business. Alternatively, the use is permitted if the farm that grows the fruit to make the wine is 2 ha or larger and at least 50% of the fruit used to make the wine comes from a BC farm under a minimum 3 year contract to provide fruit to the winery. The 50% threshold is measured by the quantity of farm product processed on an annual basis."

The Liquor Distribution Branch (LDB) also put a restriction on the amount a land-based winery can buy from other farms.

They state:

“at least 25% of the grapes that a winery uses must come from land owned or leased by the winery.”

In recent discussions, the LDB has indicated that they may increase this percentage in the coming years to prevent land-based wineries from turning into satellite liquor stores.

Successful wineries such as Chaberton Estate winery in the Fraser Valley grow over 50 acres of their own grapes and produce over 50 thousand cases a year. Their most popular seller is a white varietal named Bacchus from Germany. It is a cool-season, early white that is grown primarily in the Fraser Valley where it thrives on a lower temperature and growing degree-days. In order to be successful making wine, a winery needs control of its own grapes. Grapes for wine are grown for quality not quantity. When a Fraser Valley winery is buying from vineyards in the interior, it is hard for them to crop thin to the tonnage per acre that makes the best quality grape that a winemaker wants. Country Vines would like to grow into a 5000+ case winery, as well as produce high-quality estate wines. More local acreage will be required to legally operate under a land-based winery license.

2.2 Soil Requirements for Grape Production

Vine health and productivity depends on a healthy root system. Roots operate most effectively in neutral, deep, well-drained, and well-aerated soil with good organic matter and an adequate supply of nutrients. Grape vines are deep-rooted plants requiring adequate soil depth, and they are not suited to shallow soils.

Grapes are grown on a variety of soil types, such as course-textured sands, fine gravels, and imperfectly drained clay soils, but they grow best on well-drained soils in Canada¹. Most expert sources suggest sandy loam as the best soil type for growing grapes. This type of soil offers the best blend of characteristics. It drains well but contains a moderate amount of organic matter to retain nutrients and generally lies within the preferred pH range. Silt loam and clay loam soils will also support the healthy growth of grapes as long as they drain well. In most cases, the latter types will benefit from moisture balancing amendments. Grapes will tolerate heavier clay-type soils but this will delay the maturity of crops and vines.

Soils most suitable for commercial grape production have the following characteristics²:

- Well drained;
- Water table > 2m of the surface;
- No restriction to root development;
- pH of 6 to 7.5 in the top 40cm;
- Nil to slightly calcareous in the top 40cm, and slight to moderately calcareous beyond 40cm;
- Non saline;
- Preferably medium to high cation exchange capacity;
- Medium to warm soil temperature;
- A gradual slope (3 to 4%) to the south or southwest; and
- Mineral soils with a minimum of 1% organic matter or more for BC interior soils, and 4% or more organic matter in BC coastal soils.

¹ Crop Profile for Grape in Canada. Agriculture and Agri-Food Canada. 2006

² BC Ministry of Agriculture and Lands. (2010). Best Practices Guide for Grapes for BC Growers, 2010. pp:200.

Few native soils have these characteristics. Most soils need to be modified before planting, and need to be managed to maintain these characteristics. Cranberry Meadows has the opportunity to produce these conditions through their screening and fill plan.

3.0 MUNICIPAL FILL DEPOSITION REQUIREMENTS

Deposition of fill requires a Fill Deposit Permit under the City of Richmond's Soil Removal and Fill Deposit Regulation (Bylaw No. 8094) and approval for a Non-farm Use to Place Fill or Remove Soil under the *Agricultural Land Commission Act*.

Application to the City for fill deposit as detailed in Bylaw No. 8094 requires completion of a fill deposition plan. The scope of the plan meets the City's requirements and includes:

- Description of the composition and volume of fill to be deposited;
- Completion of a plan diagram showing the location of proposed fill deposit and all pertinent topographic features, including existing buildings, structures, watercourses, and tree cover;
- Depths and proposed slopes, which will be maintained upon completion;
- Proposed methods to control the erosion of the banks of deposited fill;
- Proposed methods to control drainage for the Site during and after deposition of fill;
- Proposed methods to access the deposit area during operation, including a scale map of proposed routing, and scheduling of truck and vehicular traffic;
- The location and size of any buffer zones necessary to provide a visual and sound barrier between the permit area and adjacent lands; and
- Proposed methods to control noise and dust during fill deposition.

4.0 SITE DESCRIPTION

The Site is located on the eastern Terminus of Francis Road, east of No. 6 Road in Richmond, BC (Figure 1). The surrounding area is illustrated in Figure 3 and is characterized by:

- North: A golf course (Country Meadows Golf Course);
- West: Holding property (agricultural-zoned land);
- South: Holding property (agricultural-zoned land owned by Richmond Landfill); and
- East: Industrial land (Richmond Landfill)

4.1 Legal Description

The Site is comprised of one parcel. The legal description of the parcel is:

- C Sec 21 BLK4N RG5W PL LMP 3438 [BL299792]
The Parcel Identification Number is 023-860-481.

4.2 Zoning and Current Land Use

The Site is zoned by the City as AG1 (traditional sites zoned for agriculture), and lies within the Agricultural Land Reserve. The Site is also designated as an Environmentally Sensitive Area within the City of Richmond Official Community Plan. The Environmentally Sensitive Area designation is Freshwater Wetlands. The Official Community Plan has also identified the property as Agriculture.

The City considers Freshwater Wetlands to be areas with vegetation and soils influenced by the presence of freshwater in the rooting zone for plants. This includes open, forested, and shrub bogs, swamps, marshes, wet meadows, seasonally flooded fields, and shallow (<2m or 6.56ft. depth) ponds and ditches.

The 8.05ha subject property is currently used for cranberry production. The Site is entirely cleared and has been improved with four cranberry fields, a ditch and access road network surrounding the cranberry fields, as well as several outbuildings located on the southwestern portion of the Site.

4.3 Soils

4.3.1 BC Ministry of Environment Mapping

The 1:25,000 scale published soils mapping in the RAB Bulletin 18: Soils of the Langley-Vancouver Map Area indicate the Site has Richmond and Lulu soil series. Richmond soil series consist of 0.4m to 1.6m of well-decomposed organic matter overlying fine-textured deltaic deposits. Lulu soil series consist of 0.4m to 1.6 m of partially-decomposed organic matter over lying moderately fine-textured deltaic deposits. Richmond and Lulu soil series are very poorly drained and acidic in nature.

Historical surveys indicate the main agricultural limitation of the soils in the area is excess water and the degree of decomposition – permeability. The existing, less-detailed historical survey had mapped the Site with an improved agricultural capability classification of 100% Ø3LW (Agricultural Capability Map 92G.3h) throughout the property.

4.3.2 Current Onsite Inspection

The subject property indicated evidence of surficial disturbance to enable trafficability and access to the Site. The western portion had areas of gravel fill, including a driveway along the north property line and a footprint of a former structure near the south property line. A raised portion of the north side of the property has been covered in sawdust or hog fuel.

Peat mining appears to have previously occurred onsite. Test holes advanced on the access roads as part of the geotechnical investigation found that peat occurred in all investigation locations and varied in thickness between 0.4 and 1m³. Peat within the farmed portion of the Site may be thicker as it has not been compressed with fill associated with road construction.

Beneath the peat, an overbank sequence between 2m and 4m thick of clayey silt to silty clay deposits overlays a fine sandy silt to silty sand transitional sequence. River channel deposited sands occur beneath the transitional sequence, which extend to a depth of about 25–27m.

The static groundwater level is expected to be in close proximity to the existing elevation of the farm field, and is expected to vary seasonally with generally higher levels during the wetter winter and spring months.

³ Geotechnical Investigation Report – Proposed Fill Site Terminus of Francis Road – East of No. 6 Road, Richmond, BC. GeoPacific. 2016

5.0 PROPOSED FILL PLAN

The Site's agricultural capability is primarily limited by poorly-drained, naturally infertile and acidic soil. The salinity of water extracted from the irrigation ditch also limits the Site's agricultural production potential. Improvement of the agricultural capability requires improved drainage for the predominantly organic soils to increase crop selection, lengthen the growing season, and increase trafficability.

Lulu soils are typically suited for production of annual legumes, blueberries, cereals, cole crops, corn, perennial forage crops, root crops, and shallow-rooted annual vegetables. Production of other crops including grapes and raspberries, which are proposed for the Site, are limited by inadequate drainage of these soils causing winter injury due to a high water table. This results from their low-lying position and resulting high organic composition which impedes drainage. Filling will improve drainage, which is required for grape production.

Material which will be used for fill will be coarse-textured (sandy loam) soil with a small percentage of fines, which will improve Site drainage and crop selection. While the target fill material is sandy soil, any stoney material which may make up the fill will be segregated onsite, screened, and placed at depth to ensure that it does not hinder cultivation of Site soils. Soil screening to remove material over 2.5cm in diameter will be conducted onsite with an instrument identical to the screen used by the City of Richmond at the Sidaway Road soil depot. The Fill Deposition Plan also involves blending salvaged organic soil from the Site with loamy material to provide a highly suitable growth medium.

The Fill Deposition Plan is expected to improve the Site's historically mapped agricultural improved capability from O3LW (with limitations of degree of decomposition-permeability and excess water) to an agricultural capability of Class 1 or 2A, with significantly improved agricultural productivity and increased crop selection.

5.1 Soil Conservation and Management

5.1.1 Fill Plan

The fill plan has been developed to minimize the impacts to agriculture and surrounding land use, and produce a significant improvement to the Site's agricultural capability. Improvements to agricultural capability will result from reducing the excess water conditions currently experienced onsite, thereby permitting production of a greater variety of agricultural products.

In addition, the fill plan has been developed to allow agriculture to continue on portions of the Site during fill deposition and transition from a cranberry crop to grape/raspberry production.

As the existing soils are organic and not mineral, soil-salvage measures will be completed to salvage portion of the organic soil which will be mixed in with the top soil. Fill will be deposited onto the existing soil surface with coarse material at depth to ensure adequate drainage is maintained.

The fill deposition has been designed to occur over a three-year period. The filling procedures are summarized below. Additional details pertaining to soil composition, slopes and erosion, drainage, buffer, and noise and dust mitigation are provided in the following sections.

Soil will be segregated prior to final placement at the Site to ensure that the maximum improvement to agricultural capability is realized. This will include ensuring that any texture or stoniness limitations associated with the material is managed appropriately.

Fill will be sourced from multiple locations within the Lower Mainland. To maximize improvements to agriculture, fill material will be segregated onsite. The proposed fill placement plan includes:

- Stripping and salvaging the top 0.25m of surface organic soils and stockpiling until final elevations are almost achieved. Organics will be blended with topsoil to achieve the final elevation;
- Screening all soils brought to the Site with an onsite screen plant to produce a sandy loam fill, and placing fill to reach required elevation, while providing adequate drainage for crop production. Screening will be completed using the property owner's Terex Finaly 883 Soil Reclaimer, which has the ability to process up to 600 tons of material per hour;
- Top-dressing the filled area with the previously stripped organic material, sand, and other suitable loam material to achieve an appropriate growth medium required for grapes and raspberries; and
- Should any stony or high-clay-content soil make up a portion of the fill, placing it at depth to ensure that those soil types do not adversely affect drainage of the upper soils and any stony material will not hinder cultivation.

Staging will progress from the eastern portion of the Site towards the western portion of the Site, enabling the farm to phase out the cranberry operations gradually over the course of the fill operation. This staging process will aid the drainage and silt erosion control measures being implemented at the Site prior to releasing the treated water back into the City of Richmond's ditch network at the southwest corner of the Site.

5.1.2 Fill Monitoring Plan

In addition to retaining a geotechnical engineer to oversee fill placement, all material brought to the Site will be monitored by accompanying documentation from its place of origin to ensure that no potential environmental risks are associated with the material. This typically requires completion of a Phase 1 Environmental Site Investigation which assesses current and historic land uses on the site and surrounding properties and identified any potential activities of environmental concern.

To ensure that the soil meets the intended purpose of improving the Site's agricultural capability, a Professional Agrologist will conduct regular Site visits following the start of the project to confirm that fill has been placed as described in the information submitted with the application.

A final report will be submitted to the City of Richmond upon completion of the project. The final report will include, but is not limited to:

- A written description of the project;
- Evidence that the fill placement project has been completed as described in the application;
- Final cross-section profiles of the fill project area showing final contours;
- Clear and accurate measurements of the fill project area, depths, and volumes of imported fill;
- Photographs of the project area accompanied by a scale drawing; and
- A hydrological overview with respect to drainage of the project area.

5.1.3 Soil Composition

Soils are currently mapped as a mixture of Lulu and Richmond soils. Richmond soil series consist of 0.4m to 1.6m of well-decomposed organic matter overlying fine-textured deltaic deposits. Lulu soil series consist of 0.4m to 1.6 m of partially-decomposed organic matter overlying moderately fine-textured deltaic deposits. Richmond and Lulu soil series are very poorly drained and acidic in nature.

The fill deposition plan includes leaving the existing soils in place to prevent an adverse impact to drainage in an area which currently is subject to a shallow groundwater table.

Fill will be sourced from non-contaminated residential development sites in the western portion of Vancouver. Soils in this part of Vancouver have not been historically mapped for agricultural purposes but surficial geology maps have characterized the soils as developing from Vashon Drift and Capilano Sediments⁴.

Based on historic mapping and the property owner's previous experience, excavated soil will primarily be characterized by glaciomarine and marine deposits. Additional excavated materials may include the underlying glacial drift which includes lodgment and minor flow till, lenses and interbeds of stratified glacial river sand, to gravel and lenses and interbeds of glacial lake laminated stony silt.

Suitable fill material will be free of any large, woody organic material or construction waste.

5.1.4 Fill Volume and Slopes

To create suitable growing conditions, Cranberry Meadows proposes to fill the Site to 1m above surrounding grade (Francis Road) to improve rooting conditions. Class 1 agricultural capability soils include slopes between 0–5%. Additional fill will be placed onsite to create a 3% grade, increasing from the southern edge of the Site towards the north. A 3% grade will create the required aspect to maximize heat accumulation and will provide good cold-air drainage to reduce potential of frost pockets and produce suitable grape producing conditions, as well as permitting production for the full range of climatically suitable soil-based crops in the future. Sites with a slight slope (3 to 4%) to the south or southwest are required to produce the most suitable conditions for commercial grape production.

In order to maximize the area of land that would be available for agricultural production, all side slopes will be established at a slope of 1:2. The north-facing slope will be planted with suitable tree or shrub species to create additional buffering to reduce any potential visual impact to the adjacent property.

To achieve the proposed slopes, deposition of 362,000m³ of soil will be required. The top elevation of the fill will vary on the western side of the Site as Cranberry Farms intends to maintain the infrastructure located in the southwest corner of the property. Land north of the developed Site (northwest corner) will be filled to the same slope angle as the remainder of Site, but due to the shallower width of the developed southwest corner, the resulting top elevation will be lower than the remainder of the Site. Expected elevations along the north end of the fill are summarized in Table A.

⁴ Surficial Geology of Vancouver, Map 1486A, Geological Survey of Canada, 1974 Geological Survey of Canada, 1976 and 1977

Table A: Fill Deposition Summary

Slope	Soil Volume (m3)	Top elevation (above grade*)	Top elevation northwest corner (above grade)
3%	362,000m ³	6.1m	4.4m

Note: *For planning purposes, grade is the current grade of Francis Road.

5.1.5 Erosion Control

Erosion control measures will be required during fill deposition, as well as during agricultural operation. Erosion control measures are summarized below.

The main objective of the erosion and sediment control (ESC) measures during fill deposition will be to prevent sediment discharges to all Site watercourses/drainage ditches, thereby ensuring that runoff does not exceed applicable suspended solid levels. The ESC measures will be in place before commencement of work at the Site.

The basic ESC measures for the Site may include:

- A wheel wash for trucks leaving the Site;
- Silt sacks on catch basins on and off the Site (if required);
- Meeting regulatory requirements for total suspended solids of discharge water;
- Street sweeping (if required);
- Installing silt fencing along the edges of all watercourses/ditches;
- Installing silt fencing along the bases of all fill slopes;
- Covering fill slopes with polyethylene sheeting or mulch, or having them hydroseeded if they are present for the long term; and
- Having the ESC measures inspected on a regular basis and before/after significant rainfall events.

A truck wheel wash facility will be installed at the exit from the Site on the west side of the property. The location of the truck wheel wash and schematic is provided in the attached Erosion Control Plan figure. Cranberry Meadow confirms their obligation to keep City of Richmond roads/highways clean by sweeping and/or flushing soil that may originate from their filling activities on a regular basis as stated in the attached letter.

During fill deposition, Cranberry Meadows will modify and/or halt activity during periods of excessively heavy precipitation when the potential for erosion is unacceptably high.

Once the fill deposition has been completed and slopes have been established, the following general soil management strategies will be implemented to control water erosion:

- Runoff water will be controlled to prevent erosion of surface soils. This will include retention of existing perimeter ditches;
- Vegetation cover will be maintained to prevent mobilization of surface soil and to allow better infiltration of water; and
- Soil structure with good internal drainage will be maintained to permit infiltration.

5.1.6 Drainage Control

Site soils have been historically mapped as Lulu and Richmond soils which have very poor drainage due to the high water table which is present for most of the year. The high water table restricts the agricultural capability of the land by limiting the range of crops that can be grown and the trafficability of the soils. Cranberry Meadows intends to improve the drainage through the deposition of suitable sandy loam fill. A shallow slope (3%) will be established to provide ideal growing conditions.

Some of the proposed fills, including the marine, glaciomarine, glaciolacustrine and glacial till deposits, would have a relatively low permeability once placed and compacted if placed as-is. However, Cranberry Meadows intends to screen all imported fill with a screening unit and blend soil to produce a sandy loam which will not have the same permeability issues and will not adversely impact drainage.

No subsurface drainage is required. Soils will be coarse-grained with some fines, which will provide good infiltration and internal drainage during high-rainfall periods. Water will flow due to Site grading via both overland and internal flow to the existing ditches. Existing drainage works, including the perimeter drainage ditch, will be retained to manage high rainfall inputs during the fall, winter and spring. Ditches separating the existing cranberry fields will be filled as part of the deposition activities, but the Site grading will maintain well-drained conditions.

The proposed fill plan does not include any additional open or closed drainage infrastructure which may connect to the City of Richmond infrastructure. Drainage will be through infiltration and overland flow to the existing ditch network. As detailed in the attached GeoPacific Geotechnical Investigation Report, it is their opinion that the proposed fill plan is feasible without impacting drainage beyond the Site. GeoPacific's report also assesses whether geotechnical information on the potential impact on surrounding properties or drainage based on the weight of fill and its long-term compacting effects on the subsoil and on local and regional drainage characteristics.

Surface ponding will be further restricted by establishing a 3% grade following the completion of fill deposition. This will also result in a low erosion hazard (Bertrand et al. 1991).

5.1.7 Site Access

Cranberry Meadows intends to undertake fill deposition on the Site over a three-year period. To complete the required filling, approximately 630 truck trips will be completed per month over the proposed three-year period.

Truck traffic will be routed to the Site from Steveston Highway to the south to No. 6 Road prior to accessing Francis Road. The Site is located at the terminus of Francis Road which only services one other agricultural property.

Robert Gilchrist, Supervisor of Traffic Operations at City of Richmond, has stated that the City of Richmond does not require an assessment of associated traffic impacts, but instead requires a Traffic Control/Management Plan for the period that fill will be delivered to the site. The Traffic Control/Management Plan (attached) identifies correct signage and placement as per the Traffic Control Manual for Work on Roadways as published by the Highways Engineering Branch, Ministry of Transportation and Highways and Richmond Traffic Bylaw Pt.V. Sect 18.4.

5.1.8 Buffer

The Site is located at the terminus of Francis Road within an agricultural zoned area of Richmond. Site fill deposition activities have the potential to impact adjacent properties through changes in visual quality, as well as noise and dust generation during fill and re-contouring activities. However, existing natural buffering, as well as management programs detailed in the following sections, are expected to minimize or offset any residual impacts. Existing buffers include:

- North: Treed buffer separating the Country Meadows Golf Course from the Site. Furthermore, both the golf course and Cranberry Meadows are operated by the same individuals;
- West: Recently logged and cleared parcel which separates the Site from the nearest residence located 400m to the west;
- South: Forested parcel with the nearest residence located over 750m south of the Site; and
- East: Constructed earthen berm separating the Site from the Richmond Landfill.

5.1.9 Noise Control

Heavy equipment, including earth moving equipment and trucks, will be required to accomplish the proposed fill deposition activities. While activities will produce noise, the expected impact of noise is considered to be minimal given the location of the Site and surrounding land use. The Site is located at the terminus of Francis Road within a larger area of agricultural land use with no significant residential use. The closest residence is located approximately 400m to the west of the Site.

While a golf course is located immediately north of the Site, a treed barrier currently exists between the properties which will assist with buffering the noise associated with the fill deposition program. The golf course is currently owned by individuals related to those who operate Cranberry Meadows. The remaining surrounding properties are either treed or used for landfill purposes.

Although no sensitive receptors exist adjacent to or immediately near the Site, Cranberry Meadows intends to incorporate mitigation options and a noise management program to minimize noise effects:

- Operating hours will be in accordance with the City's requirements;
- There will be regular maintenance of acoustic seals, mufflers, anti-vibration mounts and other noise-reducing features on vehicles and equipment; and
- Equipment will be turned off when not in use and unnecessary idling will be avoided when practical.

5.1.10 Dust Control

Fill deposition activities have the potential to generate fugitive dust emissions that could impact adjacent blueberry operations. To minimize impacts, additional precautions will be taken to minimize dust generation, including dust suppression and soil/stockpile management. Measures to minimize fugitive dust from exposed or un-vegetated cover soils will also be implemented.

Identification of Potential Sources of Fugitive Dust Emissions

The potential sources of fugitive dust at the Site are summarized in Table B. For each potential source of fugitive dust emissions, the potential causes of dust emission and parameters that may

impact dust emissions are identified in the table. A key step in controlling fugitive dust emissions is to evaluate each of these parameters and determine how they can be controlled.

Table B: Summary of Potential Sources of Fugitive Dust Emissions

Potential Sources of Fugitive Dust Emissions		Potential Causes of Dust Emissions	Parameters that May Impact Fugitive Dust Emissions
A	Unpaved Roads/Areas: <ul style="list-style-type: none"> Unpaved roads Haul trucks Excavators 	<ul style="list-style-type: none"> Suspension (by traffic movement or wind) of fines generated from heavy traffic/equipment movement Traffic movement onsite 	<ul style="list-style-type: none"> Moisture content Surface silt loading Vehicle speed Distance travelled
B	Material Stockpiles	<ul style="list-style-type: none"> Low moisture content Disturbing the storage pile Wind erosion of the storage piles 	<ul style="list-style-type: none"> Moisture content Fines content Wind erosion Stockpile height

Fugitive Dust Control Methodology

Control measures and inspection observation criteria for fugitive dust emissions from Unpaved Roads/Areas and Material Stockpiles is summarized in Tables C and D.

Table C: Source of Fugitive Dust Emissions: Unpaved Roads/Areas

Potential Cause(s) of Fugitive Dust	Control Methodology and Frequency	Inspection Observation Criteria
Suspension by traffic	<ul style="list-style-type: none"> Apply water as a dust suppressant (e.g., access roads) 	<ul style="list-style-type: none"> Check that mobile equipment when driving the speed limit has no observable dust being kicked up by the tires Check that road surfaces have no observable tracking of dust and dirt Check that road surfaces have a visible crust or hard surface
Traffic movement onsite	<ul style="list-style-type: none"> Speed limit maximum of 20km/hr. Clean trucks prior to leaving the Site during inclement weather to reduce mud tracking 	<ul style="list-style-type: none"> Check if drivers are travelling the speed limit Check trucks are clean when they leave the Site and are not tracking dirt offsite

Table D: Source of Fugitive Dust Emissions: Material Stockpiles

Potential Cause(s) of Fugitive Dust	Control Methodology and Frequency	Inspection Observation Criteria
Low moisture content	<ul style="list-style-type: none"> Moisture level of material must be high enough to prevent silt/dust from leaving the pile 	<ul style="list-style-type: none"> Check that no observable plume or dust leaves the stockpile.
Disturbing the stockpile	<ul style="list-style-type: none"> Excavation operators must limit the disturbed area of the stockpile during shipping 	
High stockpile height	<ul style="list-style-type: none"> Minimize the height of stockpiles 	
Wind erosion	<ul style="list-style-type: none"> Cover piles or ensure pile surface has a hard surface (i.e., dust suppressant) on the windward side Work from one side of the pile if possible to minimize the disturbance of material 	

Stockpiled materials will be placed within the designated, temporary stockpile storage areas, and graded by the contractor to shed water. If dust suppression becomes necessary during the soil stockpiling, at the discretion of the environmental consultant, exposed soils will be wetted by the contractor.

5.1.11 Riparian Area Management

The Riparian Management Area (RMA) associated with the ditch running along the north side of Francis Road has been set at 15m by the City of Richmond. However, this overlaps with non-valuable habitat features associated with the existing land use (Francis Road) as well as agricultural land use. As such, the current available riparian habitat is less than the 15m RMA. Nevertheless, the proposed filling will encroach on the vegetated portion of the RMA currently used for agricultural production.

To facilitate the erosion control plan while maximizing available land for agricultural production, a 1m-wide horizontal strip between the toe of the proposed fill slopes and the top-of-bank of the perimeter ditches will be provided to further reduce the encroachment into the RMA.

Encroachment into the already disturbed RMA is unavoidable if agricultural productivity on the Site is to be maximized. If encroachment can be permitted, a detailed Riparian Areas Regulation (RAR) assessment may be completed to a) determine the RAR applicable streamside protection and enhancement area (SPEA), b) quantify the proposed encroachment area within the SPEA, and c) initiate a variance approval process under the RAR system. If a variance cannot be provided, the toe of the slope may need to be adjusted to prevent encroachment, resulting in a loss of farmable area.

Cranberry Meadows confirms that no fill activities will impact the City of Richmond-owned RMA without an RMA protection plan from a Qualified Environmental Professional and the written review

and approval of the City of Richmond. Cranberry Meadows also confirms that no new watercourse crossing within the RMA, or improvement of the existing watercourse crossings that includes an increased width of the crossing, are permitted without an RMA protection plan completed by a Qualified Environmental Professional and the written review and approval of the City of Richmond.

5.2 Potential Impacts on Nearby Agricultural Operations

Onsite activities, including trucking, are not expected to affect the existing cranberry and turkey farm located southwest of the Site. Management of potential impacts including noise, dust, and traffic controls are detailed in Sections 5.1.6, 5.1.8, and 5.1.9 of the 2014 Fill Deposition Plan. Proposed controls have been developed to address the City of Richmond's requirements for all land uses located along the trucking route or adjacent to the Site, including agricultural uses. Filling to improve agricultural capability and its associated activities, including trucking and earth moving is a permitted activity within the City of Richmond and the ALR when approved. Cranberry Meadows intends to follow best management practices as detailed in the Fill Deposition Plan to minimize any impacts during the filling period. Following completion of the filling, no potential noise, dust, or vibration sources will be associated with the farm once in operation.

In addition to the proposed controls, Cranberry Meadows does not expect any significant impacts to the turkey operation, as the turkey operation activities occur within enclosed structures located 250m east of the Site. While trucks will pass by the turkey farm, their impacts will be minimized by the controls detailed in the Fill Deposition Plan. Furthermore, the Site is located in an area with surrounding agricultural and industrial use where use of heavy machinery is typical and permitted.

Vibration impacts are typically associated with significant sources, including rail traffic and blasting activities. No potential project-related sources of vibration were identified for the proposed filling program. Using information provided by the Cranberry Meadows operators and a review of conventional trucking and filling methods information, PGL has ascertained that no vibration impacts will occur.

6.0 PROPOSED PLANTING PLAN

Due to the Site's limitations to adequately produce cranberries, Cranberry Meadows proposes to shift its crop production from cranberries to grapes to supply its winery business. The owners currently have seven acres of wine grapes under cultivation on their Richmond Country Farms property on the Steveston Highway. Six tonnes of grapes were produced at the Steveston Highway property in 2013, the second year of production. It is estimated that the four-acre crop of white wine grapes will eventually produce upwards of four to five tons per acre. The required increase in grape production needed for the winery can be accomplished by converting 14 acres of the Francis Road site to grape production. The remaining four acres will be dedicated to raspberry production to support their Richmond Country Farm market.

The planting plan developed for the Francis Road site will favour the cool season white wine varieties including Reisling and Gewurztraminer. White wine grapes will be grown over 10 acres while popular red wine varieties such as Cabernet Sauvignon, Cabernet Franc and Merlot will be grown across four acres. To meet the higher temperature requirements needed for red wine grapes, Cranberry Meadows will use Haygrove Tunnels, a greenhouse growing system that will support red wine grape production and harvest.

All grape vines will be from grafted root stock suited for the Lower Mainland climate. Rows will be spaced 8' apart with plantings spaced at 4' intervals, resulting in approximately 1360 plants per acre (Figure 6). Drip tape will be used to provide adequate irrigation.

Raspberries will be planted over four acres and will include a combination of early variety Malahat raspberries and late season Tulameen raspberries. As with the grapes, raspberry rows will be spaced 8' apart, while individual plants will be spaced at 3' intervals. Drip irrigation will also be used for raspberry production.

7.0 SUMMARY AND CONCLUSIONS

PGL has been retained by Cranberry Meadows to develop a fill deposition plan to improve agricultural capability for grape and raspberry production at the Site. Deposition of fill requires a Fill Deposit Permit under the City of Richmond's Soil Removal and Fill Deposit Regulation (Bylaw No. 8094) and approval for a Non-farm Use to Place Fill or Remove Soil under the *Agricultural Land Commission Act*. This fill deposition plan was developed to meet the requirements set out in the City of Richmond's Bylaw No. 8094.

The Site's agricultural capability is primarily limited by poorly-drained, naturally infertile and acidic soil, and it has previously experienced peat removal resulting in a farming surface below surrounding grade. The salinity of water extracted from the irrigation ditch also limits the Site's agricultural production potential.

Improvement of the agricultural capability requires improved drainage for the predominantly organic soils to increase crop selection, lengthen the growing season, and increase trafficability. Cranberry Meadows proposed filling the Site with suitable soil to establish a 3% grade across the Site, which will create the required aspect to produce suitable grape-producing conditions while maintaining a desirable slope that will provide surface drainage and not restrict any potential for the full range of climatically suitable crops in the future.

Filling would be completed through deposition of fill sourced from the western portion of Vancouver over a three-year period. All fill will be sorted and blended to produce a sandy loam soil ideal for grape and raspberry production, as well as a wide range of suited and well-suited crops. The fill deposition plan has been developed to permit the operation of agricultural activities during the filling period as the Site transitions from cranberry production to grape and raspberry production. The proposed grape production for the Site will supplement the property owners current grape and wine production.

The proposed fill deposition plan will dramatically improve the agricultural capability from Class 3 soils with significant limitations (salinity, excess water) and will result in an improved agricultural capability to Class 1 or 2, while minimizing any potential impacts to agriculture, the environment, or adjacent property and land uses.

Respectfully submitted,

PGL ENVIRONMENTAL CONSULTANTS

Per:



Stewart Brown, M.Sc. P.Ag., R.P.Bio.
Lead Consultant



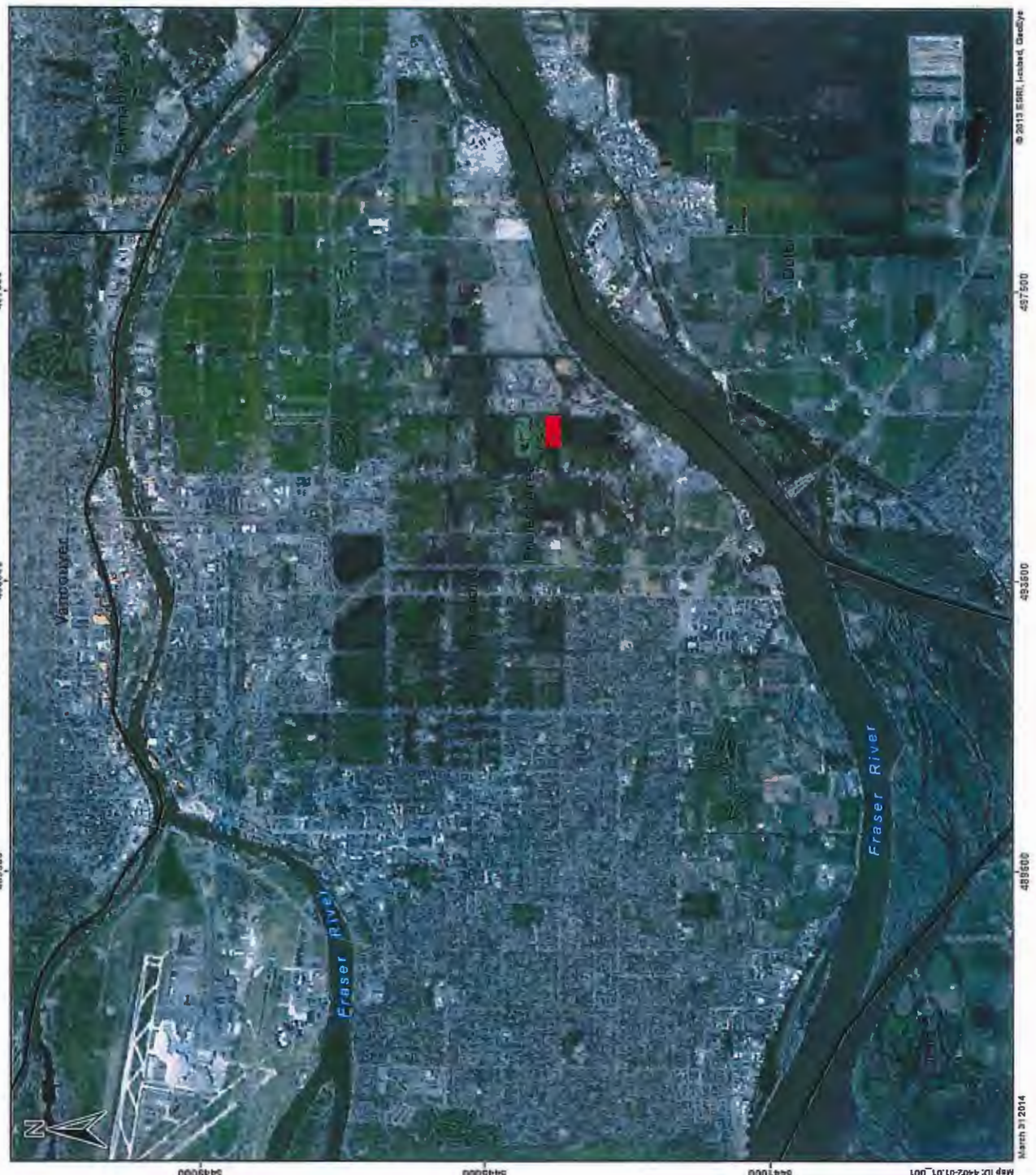
E.L. (Ned) Pottinger, M.Sc., P.Geo., P.Ag.
Chairman

CSB/ELP/mtl/slr/mtl

\\pgl-van-file1\Project Files\4400-4499\4402 - Cranberry Meadows Farms Ltd\01-01\Client Docs\Fill Plan-Oct16\4402-01-01-Fill Plan-Oct16.docx



Figures



Site Location

Project Location

1:75,000
0 1,000 2,000
Metres
Coordinate System: NAD 1983 UTM Zone 10N




Figure 1



Site Plan

 Project Location

 Cross Section ID
Figure No.

Surrounding Land Use

- Project Location
- Zoning Boundary
- Agriculture Land Reserve (ALR)
- AG1 Agriculture
- I Industrial
- GC Golf Course



Figure 3





Truck Routing

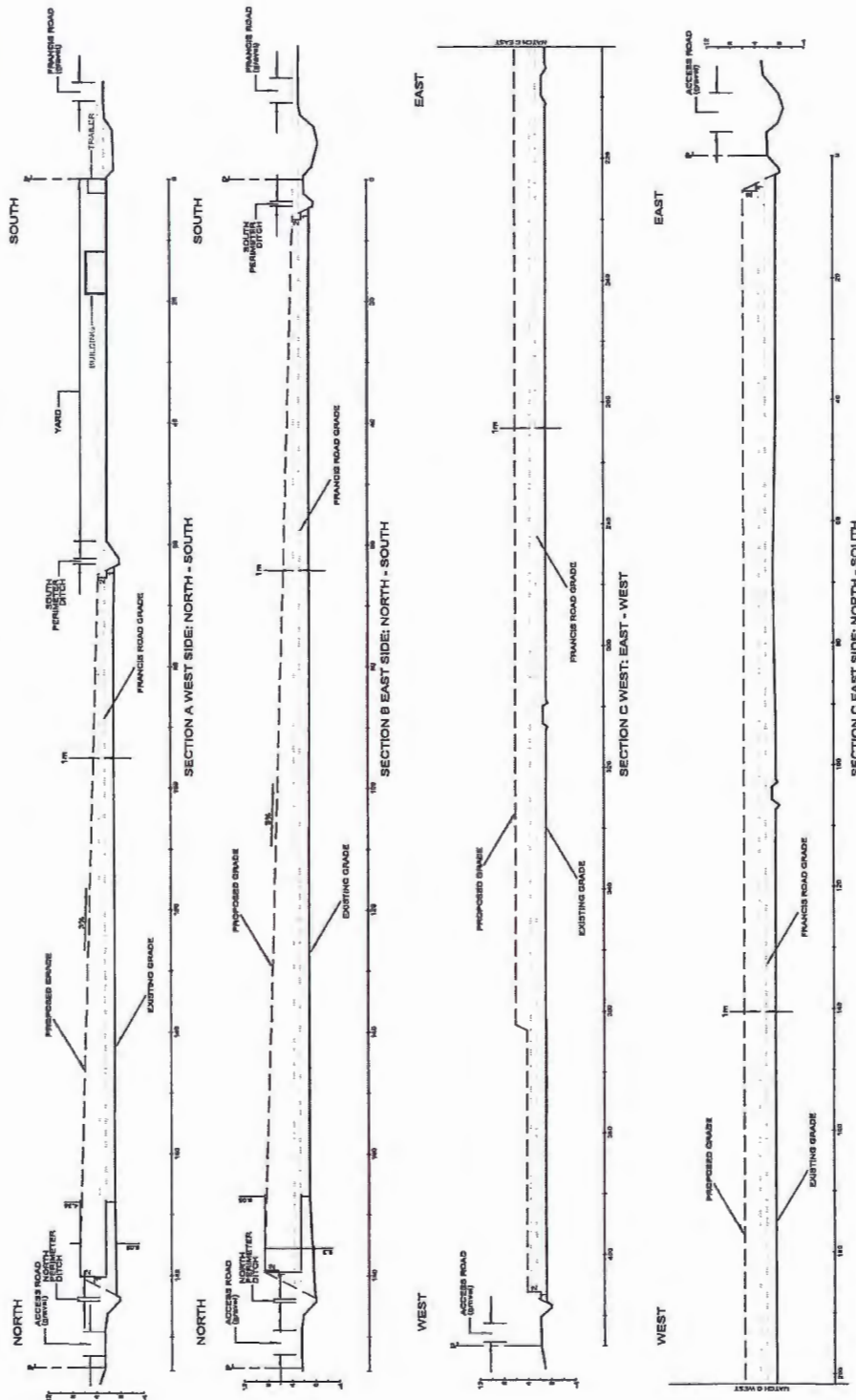


- Proposed Route
- Project Location

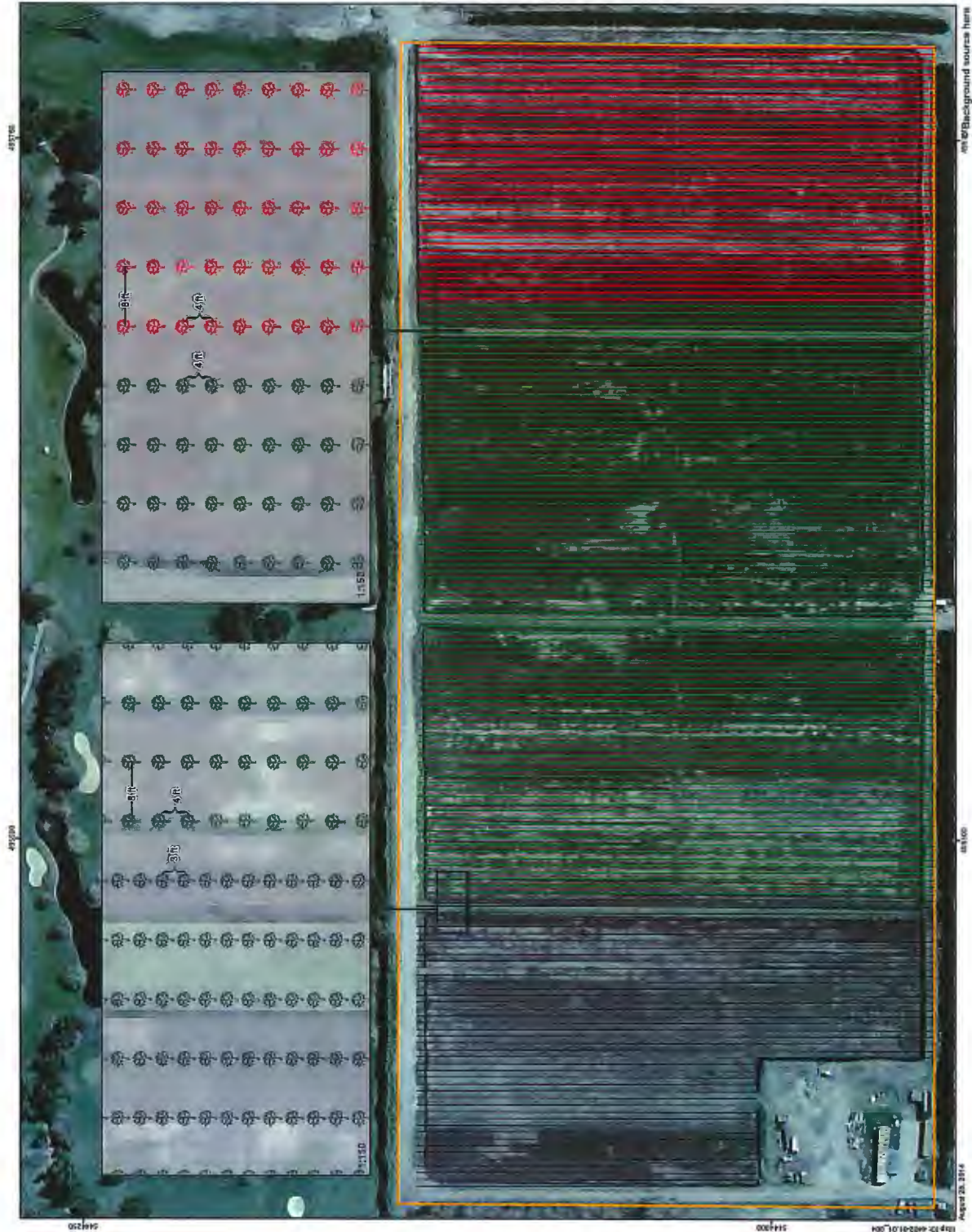


Coordinates System: NAD 1983 UTM Zone 18N

Figure 4



Fill Plan



GP - 44



Planting Plan

- Raspberry Plant
- Green Grape Plant
- Red Grape Plant
- Raspberries
- White Grapes
- Red Grapes
- Project Location

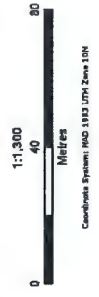


Figure 6

Appendix 1
Site Photographs





Photograph 1:

**Looking north from the centre
of the Site towards Country
Meadows Golf Course**



Photograph 2:

**Looking west from the centre
of the Site**



Photograph 3:

Looking east from the centre of the Site towards Richmond Landfill. Note the steep raised slope of the adjacent property.



Photograph 4:

Looking south from the centre of the Site towards lands owned by the Richmond Landfill



Photograph 5:

**Access path between the
centre two cranberry bogs,
looking north**



Photograph 6:

**Ditch along north perimeter
access road and cranberry
bog, looking east**



Photograph 7:

**Canal along the east perimeter
access road and east access
path, looking north**



Photograph 8:

**Pump station on the south
canal located at the centre of
the Site, looking west**



Photograph 9:

**Organic soils overlying
fine-textured mineral soil in
Test Pit 01 on the northeast
side of the Site**



Photograph 10:

**Organic soils overlying
fine-textured mineral soil in
Test Pit 02 on the southeast
side of the Site**



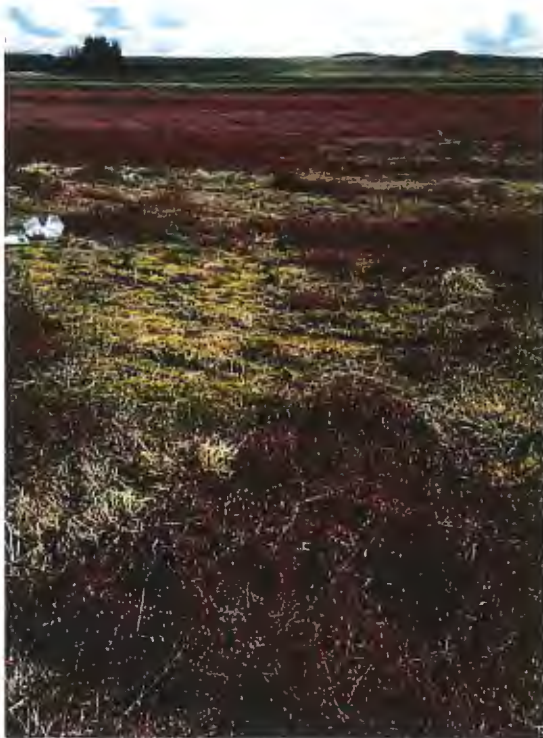
Photograph 11:

**Organic soils overlying
fine-textured mineral soil in
Test Pit 05 on the west side of
the Site**



Photograph 12:

**Sand lense between 0.2m and
0.6m in TP06 on the northwest
side of the Site**



Photograph 13:

Signs of crop damage on the south side of the Site



Photograph 14:

East side of Site, with raised Ecowaste Landfill adjacent to Site



Photograph 15:

Site, looking south with crop damage



Photograph 16:

Soil reclaimer intended for use to screen soil and produce sand loam for filling purposes



Photograph 17:

**Soil reclaimer and associated
screened material**

Appendix 2
Erosion Control Plan Figure



Appendix 3
GeoPacific Geotechnical Investigation Report





GEOPACIFIC
VANCOUVER KAMLOOPS CALGARY

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Cranberry Meadows Farms Ltd.
11450 92A Avenue
Delta, BC
V4C 3M5

January 20, 2016
File: 13570

Attention: Gord Maichin

**Re: Geotechnical Investigation Report - Proposed Fill Site
Terminus of Francis Road - East of No. 6 Road, Richmond, B.C.**

1.0 INTRODUCTION

We understand that you propose to fill the above referenced 8.05 hectare parcel of farm land to elevations varying between 4.4 and 6 m geodetic to permit the farming of grapes and raspberries. We further understand that the City of Richmond requires a geotechnical assessment of the site to determine impacts to surrounding properties and drainage due to the contemplated filling program.

This report presents the results of a geotechnical investigation of the soil and groundwater conditions at the site and presents our assessment of the potential drainage and off-site impacts of the development.

This report has been prepared exclusively for Cranberry Meadows Farms Ltd, for their use, the use of others on their design team, and the City of Richmond for use in the development and permitting process.

2.0 SITE DESCRIPTION

The fill site is located in east Richmond, east of No. 6 Road, and directly north of Francis Road. The site is rectangular with east-west dimension of approximately 410 m and north-south dimension of about 194 m. The site is presently employed as a cranberry farm with equipment lay down and storage area located at the southwest corner of the property. Existing elevations vary from 0 to 1 m geodetic in the farm field with surrounding ditches at lower elevations. Francis Road and gravel access roads surrounding the site are at elevations of about 1 to 2 m geodetic. The site is essentially flat.

The location of the site relative to surrounding properties and roads is shown on our site plan, Drawing 13570-01, attached to this report.

3.0 FIELD INVESTIGATION

GeoPacific completed an investigation of the site on January 6, 2016. The investigation included a total of 4 auger test holes, to depths of 6 m below current site grade and 4 Cone Penetration Test (CPT) soundings, advanced to depths of 22.6 to 30 m below grade. The test holes and CPT soundings were completed using a subcontracted, track mounted auger drill rig operated by On Track Drilling Inc. of Coquitlam, B.C. All test holes were logged in the field by a technician from our office and backfilled immediately upon completion of testing and logging.

As the cone penetrometer is advanced into the ground, it records cone tip resistance, sleeve friction, pore water pressure, temperature and inclination every 50 mm to a purpose built data acquisition system. Analysis of the CPT sounding data allows an estimation of geotechnical design parameters and inference of the sub-surface stratigraphy from soil-type behaviour characteristics. The stratigraphic interpretation was verified with the augured test holes as described above. The CPT sounding results are presented in Appendix B of this report. Geotechnical parameters interpreted from the CPT soundings, such as undrained shear strength and standard penetration $N_{1(60)}$ values, are presented in Appendix C of this report while Liquefaction Analyses are presented in Appendix D.

Test holes were completed on the access roads surrounding the farm land and equipment storage area as the farm land itself is not capable of supporting a heavy drill rig.

The approximate location of the auger test holes and CPT soundings with respect to the property are shown on our Drawing No. 13750-01.

4.0 SUBSURFACE CONDITIONS

4.1 Soil Conditions

The existing soil profile at the site, from the surface downwards, generally consists of 0.6 and 1.4 m of fill around the site perimeter, and then natural soils of PEAT followed by low plastic clayey SILT to silty CLAY over interbedded silty fine SAND to fine sandy SILT over silty to clean SAND. The sand is underlain by a thick sequence of marine clay silt interbedded with fine sands below depths of 25 to 27 m. Based on our general knowledge of the area, and published geology, we anticipate the marine clay silt extends to a depth of about 60 metres where it is underlain by dense glacially consolidated deposits.

A detailed description of the soils encountered is given below.

Fill

Fill was encountered at each test hole and varied from pavement structure related sand and gravel to wood chips to organic rich silty sand (topsoil). These materials were also encountered on the access roads and lay down area surrounding the farm field. We do not expect much, if any, mineral based fill in the farm field itself.

Peat

Peat was present at all test hole locations and varied in thickness between 0.4 and 1 m with moisture contents between 167% and 274%. These moisture content values are relatively low for peat and are expected to be a function of the consolidation induced by the presence of the above referenced fills. We anticipate that the peat will likely be thicker with higher moisture content within the farm land, and therefore more susceptible to larger settlements induced by filling.

Peat is highly compressible when loaded in excess of its current insitu stress. Conventional site preparation measures to limit post construction settlements also have a limited benefit on peat. Long term settlements of peat are caused by the gradual decay of the organic constituent that makes up the majority of the peat. These settlements are unavoidable.

Clayey Silt to silty Clay (Overbank Sequence)

The peat is underlain by between 2 and 4 m of silt to clay. The silt is typically firm with some organic content and brown in the upper 200 to 500 mm, below this becoming firm to soft and grey in colour. Laboratory testing yielded moisture contents ranging from 50 to 123%. Shear strength in the soft portion of the clayey silt profile is interpreted at between 15 and 50 kPa below the upper desiccated zone as shown in Appendix C. The desiccated zone is typically about 300 mm thick and has a shear strength of between 75 and 120 kPa. The soft portion of the clayey silt zone is significantly compressible under the contemplated fill loads.

Fine Sandy Silt to Silty Sand (Transitional Sequence)

Underlying the clay silt is about 2 m of a transitional sequence comprised of loose to compact silty fine SAND to fine sandy SILT. The sequence is non plastic and therefore somewhat compressible under moderate to heavy loading only.

Clean Sand to Silty Sand (Channel Sequence)

The silt and interbedded sand and silt described above is underlain by a sequence of river channel deposited sands. The slight variations in the in-situ density, compressibility, mineralogy and grain size are reflected in the shape of the tip resistance curves shown on the CPT plots in Appendix B. In general the Fraser River channel sands are well graded, medium grained, predominantly quartz, highly stratified and loose to medium dense. These deposits extend to about 25 to 27 m depth at our CPT soundings,.

Occasional zones of clayey silts are interbedded in the predominantly sand, channel sequence, as shown on the soil behaviour type plots given in Appendices B and C.

Deep Marine Clay Silt

The sand is underlain by a thick sequence of deep marine clay silt below 25 to 27 m. This zone is expected to extend down to the glacial deposits, inferred to extend to about 60 m below local site grades. This zone is considered compressible given the height and extent of the contemplated filling. Due to the thickness of this zone and it's low permeability, post filling settlements will continue for many years after the completion of the site preparation work. This long term settlement behaviour is not uncommon in Richmond with long term post construction settlements occurring as a result of mid-rise tower development, for example.

For a more detailed description of the subsurface soil conditions refer to the Test Hole Logs and CPT Sounding Logs in Appendices A and B, following the text of this report.

4.2 Groundwater Conditions

The static groundwater level is expected to be in close proximity to the existing elevation of the farm field. Groundwater levels are expected to vary seasonally with generally higher levels during the wetter winter and spring months. It has been our experience that near surface groundwater levels are often controlled by surface water levels in local ditches and thus levels can rise to near ambient ground level during periods of

heavy and prolonged rainfall.

5.0 DISCUSSION

5.1 Fill Program

We understand that the filling program is proposed to occur over a period of 3 years with a total of 362,000 m³ of material imported to the site. The site will be sloped at approximately 3% with finished site elevations varying from 4.4 to 6 m geodetic. The margins of the fill site will be sloped at 2H:1V. The existing soils will be left in place with new fill derived from sites in western Vancouver varying from Vashon Drift to Capilano sediments. These soils vary in composition and may include glacial till (well graded sand, silt, and gravel), glaciofluvial sand to gravel, glaciolacustrine silts, marine and glaciomarine silts, and beach deposited sands.

5.2 Drainage

The natural soil profile consists of relatively low permeability peat and overbank deposited silts which grade into channel deposited sands at depth. The proposed fill operation will result in significant consolidation of the peat and silt. While the permeability of these upper will reduce, the main aquifer of sand below 6 m depth will not be affected. We would expect normal flows in these Fraser River sands to control the surrounding property groundwater levels.

The current conditions allow for natural infiltration of rainwater into the topsoil of the farm field. Some of the proposed fills including the marine, glaciomarine, glaciolacustrine, and glacial till deposits will have a relatively low permeability once placed and compacted. Negligible infiltration into these materials will occur. We expect that some rainwater will be retained in the topsoil of the future grape and raspberry fields, but some will also flow to the perimeter of the site. We anticipate that a cleaner granular soil will be placed below the upper topsoil to facilitate drainage as required. Regardless, the surface runoff would be directed to perimeter site drainage to ensure no mounding of groundwater levels at adjacent properties. Any potential groundwater impact in this regard can be mitigated substantially with the incorporation of an efficient ditch and drainage system around the periphery of the site which conveys surface run off to the surrounding City storm system.

In summary, it is our geotechnical opinion that the proposed fill program is feasible without adversely impacting drainage or groundwater levels beyond the site. Some maintenance of the drainage system during the filling process as well as in the future due to the predicted long term settlements, described in Section 5.3, should be expected.

5.3 Settlement

Due to the large extent of the fill area, significant consolidation of the upper compressible peat and silt deposits will occur along with the deep marine deposits. Due to the thickness and low permeability of the marine deposits, consolidation of this stratum will continue to occur for several years after placement of the fill. Our analysis indicates that total settlements on the order of 1.2 to 1.8 m should be anticipated at the mid point of the fill site. Settlements are predicted to decrease to about 600 mm to 900 mm at the margin of the fill area. We anticipate that approximately 60 to 70% of this settlement will occur during fill placement with the remainder accumulating over about 20 to 25 years.

The majority of the settlement is derived from the surficial peat and silt, which accounts for approximately

60% of the total settlements. The primary consolidation of these two strata should occur relatively quickly within a few months of completion of the fill program. Significant secondary consolidation will be as a result of gradual consolidation of the marine deposits at depth. Some limited settlement will be realized from gradual decay of the peat as well, but this is anticipated to be small in relation to the predicted total.

Significant differential settlements should be anticipated within 6 to 8 m of the fill area. These settlements will likely require some maintenance of the surrounding area to ensure, for example, level access roads and positively flowing ditches.

Settlements will be measurable off-site. We estimate settlements at about 8 m beyond the fill area to range from 50 to 150 mm. These settlements are derived from the marine deposits located below about 26 m depth. Therefore, the surface projection of these deep settlements typically result in small differentials of less than 2 mm/metre and are generally not damaging to surface infrastructure. However, the long term impacts on gravity based services surrounding the site should be reviewed. Similar behaviour occurs beyond mid-rise towers in Richmond.

6.0 CLOSURE

The preceding comments and calculations are based on theoretical consolidation approaches and stress distribution procedures. Some variation between theoretical and actual settlements is likely. Any changes to the fill plan should be provided to GeoPacific for review and update our settlement estimates.

Please do not hesitate to call the undersigned if you should require any clarification or additional details.

For:

GeoPacific Consultants Ltd.

Reviewed by:



John Carter, M.Eng., P.Eng.
Principal Engineer

Keith Robinson, M.Eng., P.Eng.
Principal Consultant



SITE PLAN

*TEST LOCATIONS ARE APPROXIMATE

LEGEND:

- ◆ CPT16-01 - CONE PENETRATION TEST (CPT) LOCATION
- △ TH16-01 - TEST HOLE (TH) LOCATION

REFERENCE

GEOPACIFIC
VANCOUVER LANDSCAPE CONSULTANTS

#115-3280-0000-774-0000
VANCOUVER, BC V6P 4A5
P 604.438.0002
F 604.438.0000

DATE:	2016-Jun-1
DRAWN BY:	ED
APPROVED BY:	JC
REVIEWED BY:	JC
SCALE:	AS SHOWN

CRANBERRY MEADOWS
TERMINUS OF FRANCES ROAD (EAST OF NO. 6 ROAD), RICHMOND, BC
TEST HOLE SITE PLAN

FILE NO.:	13570
DWG. NO.:	13570-01
REVISIONS:	
A.	
B.	
C.	

APPENDIX A - TEST HOLE LOGS

Test Hole Log: TH16-01 (CPT16-01)

File: 13570

Project: CRANBERRY MEADOWS

Client: CRANBERRY MEADOWS FARMS LTD

Site Location: TERMINUS OF FRANCES ROAD (EAST OF NO. 6 ROAD), P215 - 1200 West 73rd Avenue, Vancouver, BC, V6P 6G5
Tel: 604-439-0922 Fax: 604-439-8189



GEO PACIFIC
CONSULTANTS

INFERRED PROFILE				Moisture Content (%)	DCPT (blows per foot) 10 20 30 40	Groundwater / Well	Remarks
Depth	Symbol	SOIL DESCRIPTION	Depth (m)/Elev (m)				
0		Ground Surface	0.0				
1		Sand and gravel compact SAND and GRAVEL fill, brown, slightly moist					
2							
3		moist after 1.1m					
4							
5		Peat firm to soft PEAT, red-brown, moist to wet	1.4	186.1			
6							
7		Silt soft SILT, trace organics, grey, wet	1.8				
8							
9							
10				123.3			
11		sand lens at 3.2m					
12							
13				49.6			
14							
15		Silt firm sandy SILT, grey, wet	4.3				
16							
17		sandy SILT to silty SAND after 5.3m		36.9			
18							
19							
20							
21		End of Borehole	6.1				
22							
23							
24							
25							
26							

Logged: ED

Method: Solid stem auger/CPT

Date: 2016-Jan-6

Datum: Ground elevation

Figure Number: A.01

Page: 1 of 1

Test Hole Log: TH16-02 (CPT16-02)

File: 13570

Project: CRANBERRY MEADOWS

Client: CRANBERRY MEADOWS FARMS LTD

Site Location: TERMINUS OF FRANCES ROAD (EAST OF NO. 6 ROAD), 215 - 1200 West 73rd Avenue, Vancouver, BC, V6P 6G5
Tel: 604-439-0922 Fax: 604-439-9189



GEO PACIFIC
CONSULTANTS

INFERRED PROFILE				Moisture Content (%)	DCPT (blows per foot) 10 20 30 40	Groundwater / Well	Remarks
Depth	Symbol	SOIL DESCRIPTION	Depth (m)/Elev (m)				
0		Ground Surface	0.0				
1		Sand and gravel compact SAND and fine grained GRAVEL fill, grey, slightly moist	0.3				
2							
3		Fill compact wood chip fill, brown, moist wet at 0.8m	0.8	189.2			
4							
5		Peat firm to soft PEAT, red-brown, moist wet after 1.2m		273.8			
6			1.8				
7		Silt soft organics rich SILT, brown, wet					
8			2.3				
9		Silt soft SILT, trace organics, grey, wet					
10				101.7			
11		no organics after 3.2m					
12							
13		trace to some fine grained sand after 4.0m		62.0			
14							
15			4.6				
16		Silt firm sandy SILT, grey, wet					
17							
18							
19				33.4			
20							
21		End of Borehole	6.1				
22							
23							
24							
25							
26							

3.2m estimated water table
depth based on CPT pore
pressure data

Logged: ED

Method: Solid stem auger/CPT

Date: 2016-Jan-6

Datum: Ground elevation

Figure Number: A.02

Page: 1 of 1

Test Hole Log: TH16-03 (CPT16-03)

File: 13570

Project: CRANBERRY MEADOWS

Client: CRANBERRY MEADOWS FARMS LTD

Site Location: TERMINUS OF FRANCES ROAD (EAST OF NO. 6 ROAD), 215 - 1200 West 73rd Avenue, Vancouver, BC, V6P 6G5
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GEOPACIFIC
CONSULTANTS

INFERRED PROFILE				Moisture Content (%)	DCPT (blows per foot) 10 20 30 40	Groundwater / Well	Remarks
Depth	Symbol	SOIL DESCRIPTION	Depth (m)/Elev (m)				
0		Ground Surface	0.0				
1		Sand and gravel compact silty SAND and GRAVEL fill, brown, slightly moist	0.6				
2		Fill compact to loose organics rich silty SAND fill, dark brown, moist wet after 3.5	1.5	98.5			
3		Peat soft PEAT, red-brown, wet silty after 2.0m	2.3	203.1			
4		Silt soft organics rich SILT, grey-brown, wet	2.6				
5		Silt soft SILT, trace to some organics, grey, moist to wet	4.3	66.9			
6		Silt firm sandy SILT, grey, wet	4.6				
7		Sand compact silty SAND, grey, wet	5.2	34.7			
8		Sand compact SAND, grey, wet	6.1				
9		End of Borehole					

Logged: ED

Method: Solid stem auger/CPT

Date: 2016-Jan-6

Datum: Ground elevation

Figure Number: A.03

Page: 1 of 1

Test Hole Log: TH16-04 (CPT16-04)

File: 13570

Project: CRANBERRY MEADOWS

Client: CRANBERRY MEADOWS FARMS LTD

Site Location: TERMINUS OF FRANCES ROAD (EAST OF NO. 6 ROAD), 215 - 1200 West 73rd Avenue, Vancouver, BC, V6P 6G5
Tel: 604-439-0922 Fax: 604-439-9189



GEOPACIFIC
CONSULTANTS

INFERRED PROFILE				Moisture Content (%)	DCPT (blows per foot) 10 20 30 40	Groundwater / Well	Remarks
Depth	Symbol	SOIL DESCRIPTION	Depth (m)/Elev (m)				
0		Ground Surface	0.0				
1		Sand and gravel compact to dense silty SAND and GRAVEL fill, grey, slightly moist					
2							
3							
4		Peat firm to soft PEAT, red-brown, moist	1.2	166.5			
5							
6							
7		Silt soft organics rich SILT, peat like organics, brown, wet	2.1	259.9			
8			2.4				
9		Silt soft SILT, some organics, grey-brown, wet trace organics after 2.7m		51.2			
10							
11							
12							
13				78.5			
14							
15		trace fine grained SAND after 4.6m					
16							
17							
18				46.4			
19							
20							
21		End of Borehole	6.1				
22							
23							
24							
25							
26							

Logged: ED

Method: Solid stem auger/CPT

Date: 2016-Jan-6

Datum: Ground elevation

Figure Number: A.04

Page: 1 of 1

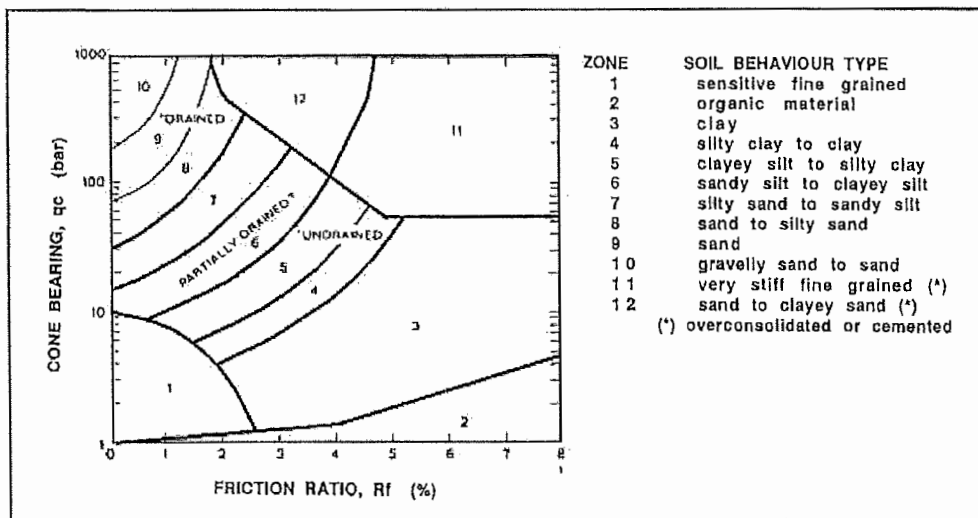
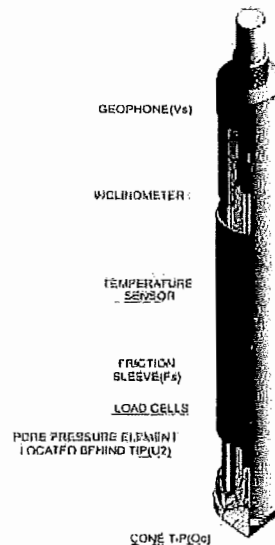
APPENDIX B - ELECTRONIC CONE PENETRATION RESULTS

The system used is owned and operated by GeoPacific and employs a 35.7 mm diameter cone that records tip resistance, sleeve friction, dynamic pore pressure, inclination and temperature at 5 cm intervals on a digital computer system. The system is a Hogentogler electronic cone system and the cone used was a 10 ton cone with pore pressure element located behind the tip and in front of the sleeve as shown on the adjacent figure.

In addition to the capabilities described above, the cone can be stopped at specified depths and dissipation tests carried out. These dissipation tests can be used to determine the groundwater pressures at the specified depth. This is very useful for identifying artesian pressures within specific layers below the ground surface.

Interpretation of the cone penetration test results are carried out by computer using the interpretation chart presented below by Robertson¹. Raw data collected by the field computer includes tip resistance, sleeve friction and pore pressure. The tip resistance is corrected for water pressure and the friction ratio is calculated as the ratio of the sleeve friction on the side of the cone to the corrected tip resistance expressed as a percent. These two parameters are used to determine the soil behaviour type as shown in the chart below. The interpreted soil type may be different from other classification systems such as the Unified Soil Classification that is based upon grain size and plasticity.

Electronic Cone Penetrometer



¹ Robertson, P.K., 1990, "Soil Classification using the cone penetration test", 1990 Canadian Geotechnical Colloquium, Canadian Geotechnical Journal, Vol. 27, No. 1, 1990



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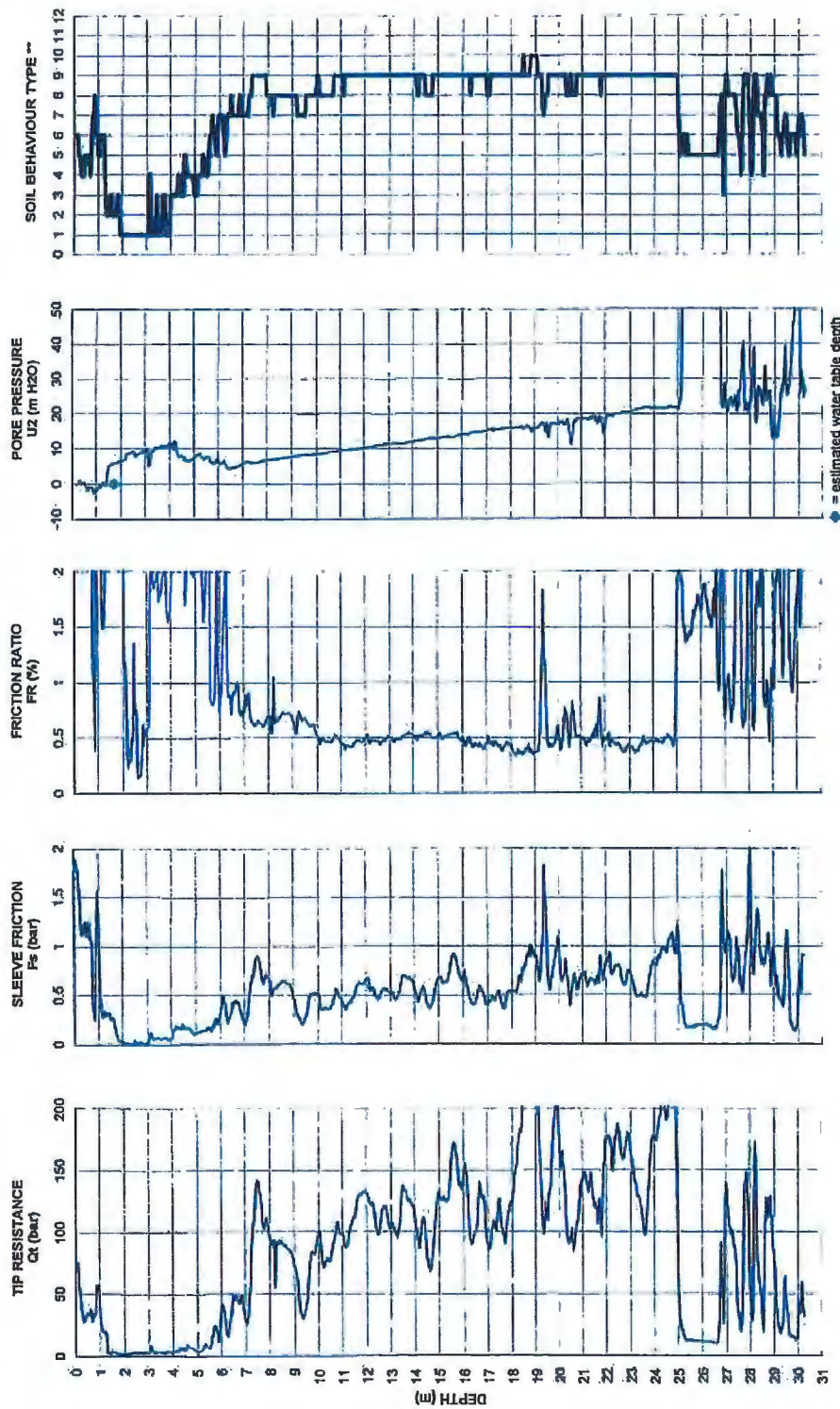
2016-Jan-6

Sounding: CPT16-01

CRANBERRY MEADOWS FARMS LTD
TERMINUS OF FRANCIS ROAD (EAST OF
NO. 6 ROAD), RICHMOND

GeoPacific Project #: 13570

Figure: B.01



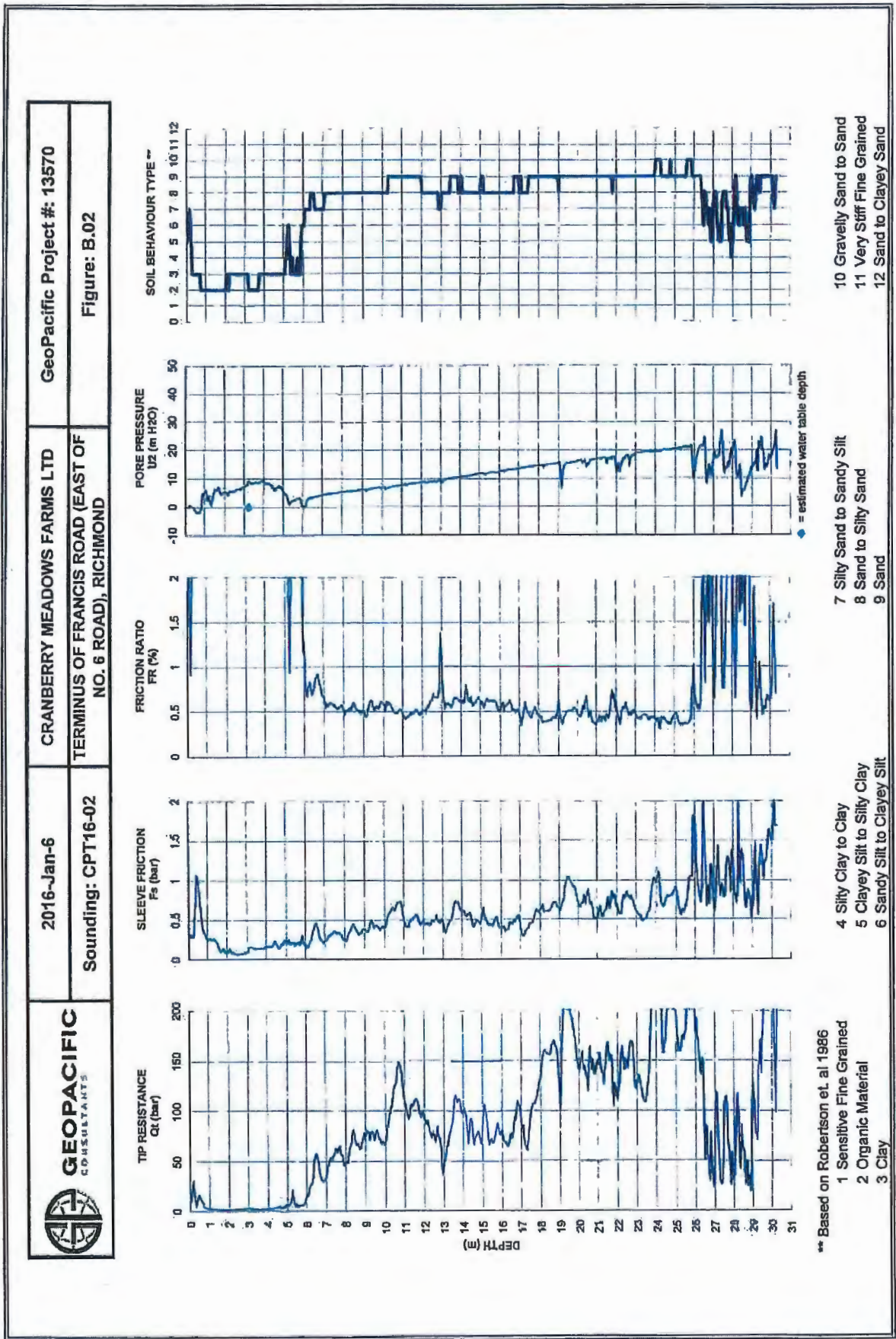
^{**} Based on Robertson et al 1986

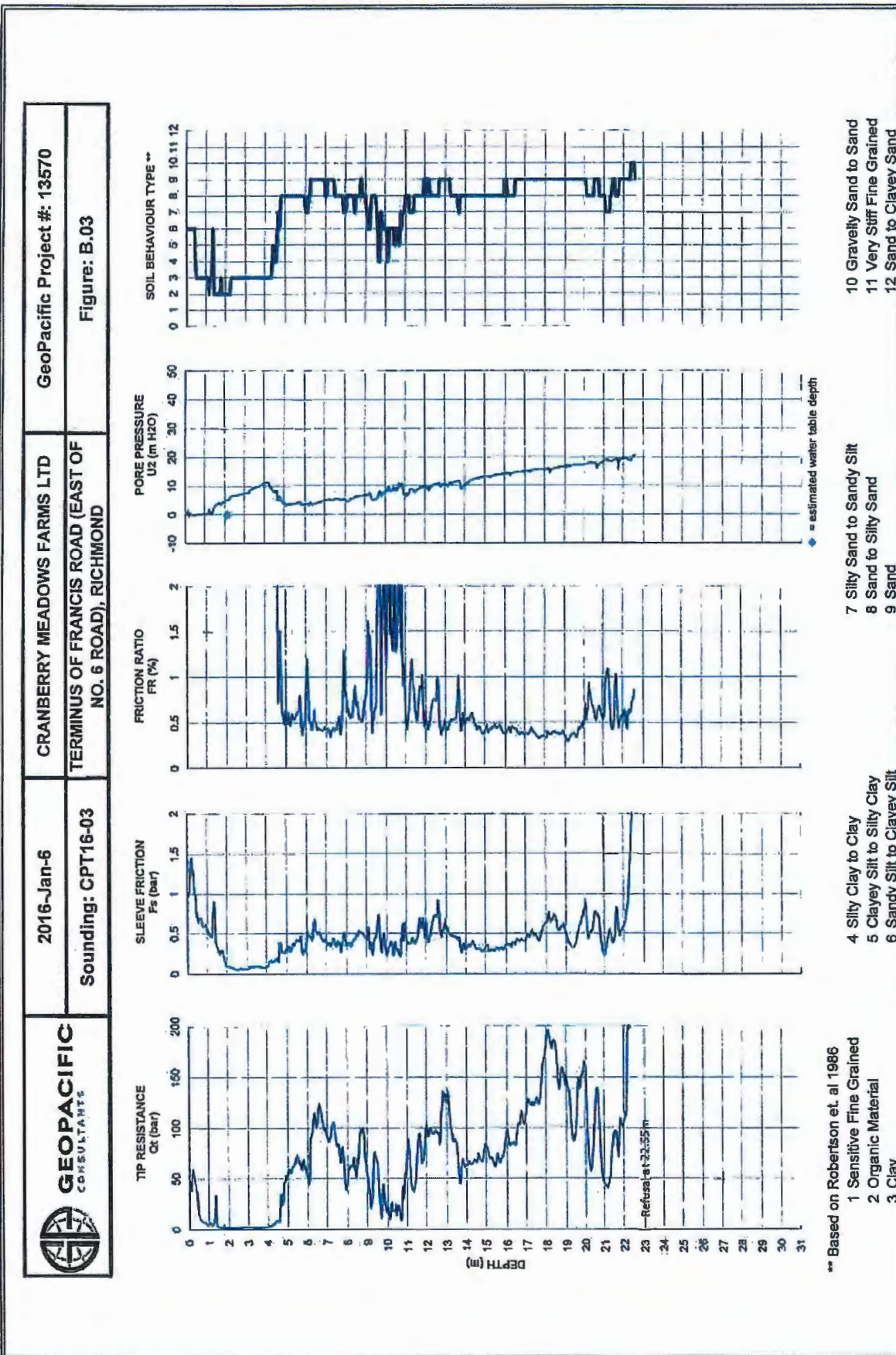
- 1 Sensitive Fine Grained
- 2 Organic Material
- 3 Clay

- 4 Silty Clay to Clay
- 5 Clayey Silt to Silty Clay
- 6 Sandy Silt to Clayey Silt

- 7 Silty Sand to Sandy Silt
- 8 Sand to Silty Sand
- 9 Sand

- 10 Gravelly Sand to Sand
- 11 Very Stiff Fine Grained
- 12 Sand to Clayey Sand







2016-Jan-6

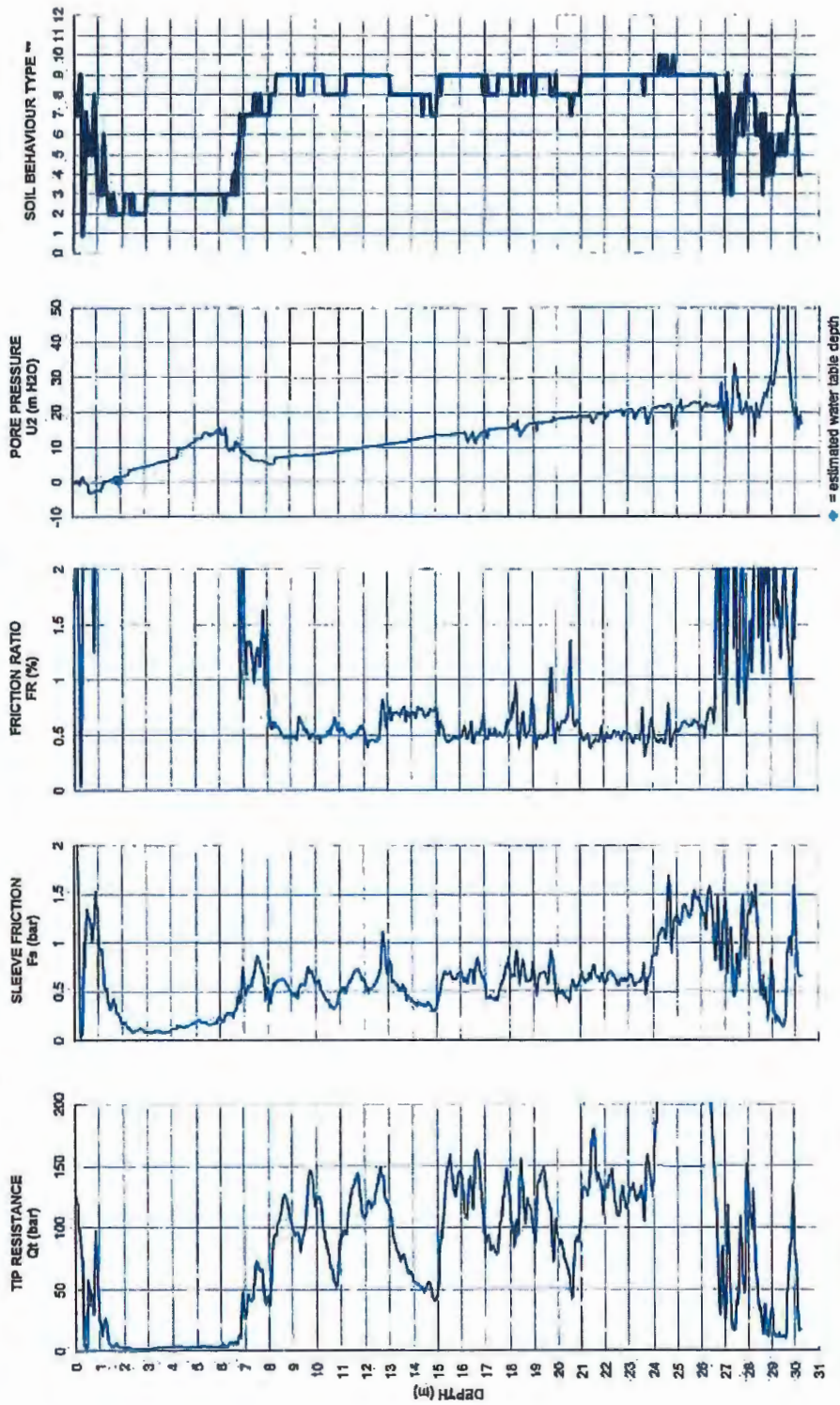
CRANBERRY MEADOWS FARMS LTD

GeoPacific Project #: 13570

Sounding: CPT16-04

TERMINUS OF FRANCIS ROAD (EAST OF
NO. 6 ROAD), RICHMOND

Figure: B.04



- Based on Robertson et. al 1986
- | | | |
|--------------------------|----------------------------|----------------------------|
| 1 Sensitive Fine Grained | 7 Silty Sand to Sandy Silt | 10 Gravelly Sand to Sand |
| 2 Organic Material | 8 Sand to Silty Sand | 11 Very Stiff Fine Grained |
| 3 Clay | 9 Sand | 12 Sand to Clayey Sand |
- 4 Silty Clay to Clay
5 Clayey Silt to Silty Clay
6 Sandy Silt to Clayey Silt

APPENDIX C - INTERPRETED PARAMETERS

The following charts plot the Standard Penetration Test (SPT) values and the undrained strength of fine grained soils based upon generally accepted correlations. The methods of correlation are presented below.

STANDARD PENETRATION TEST CORRELATION

The Standard Penetration Test $N_{(60)}$ value is related to the cone tip resistance through a Q_c/N ratio that depends upon the mean grain size of the soil particles. The soil type is determined from the interpretation described in Appendix B and the data of Table C.1 below is used to calculate the value of $N_{(60)}$.

Table C.1. Tabulated $Q_c/N_{(60)}$ Ratios for Interpreted Soil Types

Soil Type	Q_c/N Ratio
Organic soil - Peat	1.0
Sensitive Fine Grained	2.0
Clay	1.0
Silty Clay to Clay	1.5
Clayey Silt to Silty Clay	2.0
Silt	2.5
Silty Sand to Sandy Silt	3.0
Clean Sand to Silty Sand	4.0
Clean Sand	5.0
Gravelly Sand to Sand	6.0
Very Stiff Fine Grained	1.0
Sand to Clayey Sand	2.0

The $Q_c/N_{(60)}$ ratio is based upon the published work of Robertson (1985)². The values of N are corrected for overburden pressure in accordance with the correction suggested by Liao and Whitman using a factor of 0.5. Where the correction is of the form:

$$N_1 = 0.5 * N$$

All calculations are carried out by computer using the software program CPTint.exe developed by UBC Civil Engineering Department. The results of the interpretation are presented on the following Figures.

UNDRAINED SHEAR STRENGTH CORRELATION

It is generally accepted that there is a correlation between undrained shear strength of clay and the tip resistance as determined from the cone penetration testing. Generally the correlation is of the form:

$$S_u = \frac{(q_c - \sigma_v)}{N_k}$$

where q_c = cone tip resistance, σ = in situ total stress, N_k = cone constant

The undrained shear strength of the clay has been calculated using the cone tip resistance and an N_k factor of 12.5. All calculations have been carried out automatically using the program CPTint.exe. The results are presented on the Figures following.

APPENDIX C - OVER CONSOLIDATION RATIO ANALYSIS

The over consolidation ratio (OCR) is defined as the ratio between the maximum past vertical pressure on the soil versus the current in-situ vertical pressure. The maximum past vertical pressure is typically caused by the presence of excess overburden which is removed by either natural or man-made reasons. Soil ageing and other chemical precipitation affects can also cause a soil to behave as if it has a higher maximum past pressure, which is sometimes described as pseudo-overconsolidation.

Research by Schmertmann (1974) showed the following equation reasonably approximates the OCR of medium plastic to clayey soils:

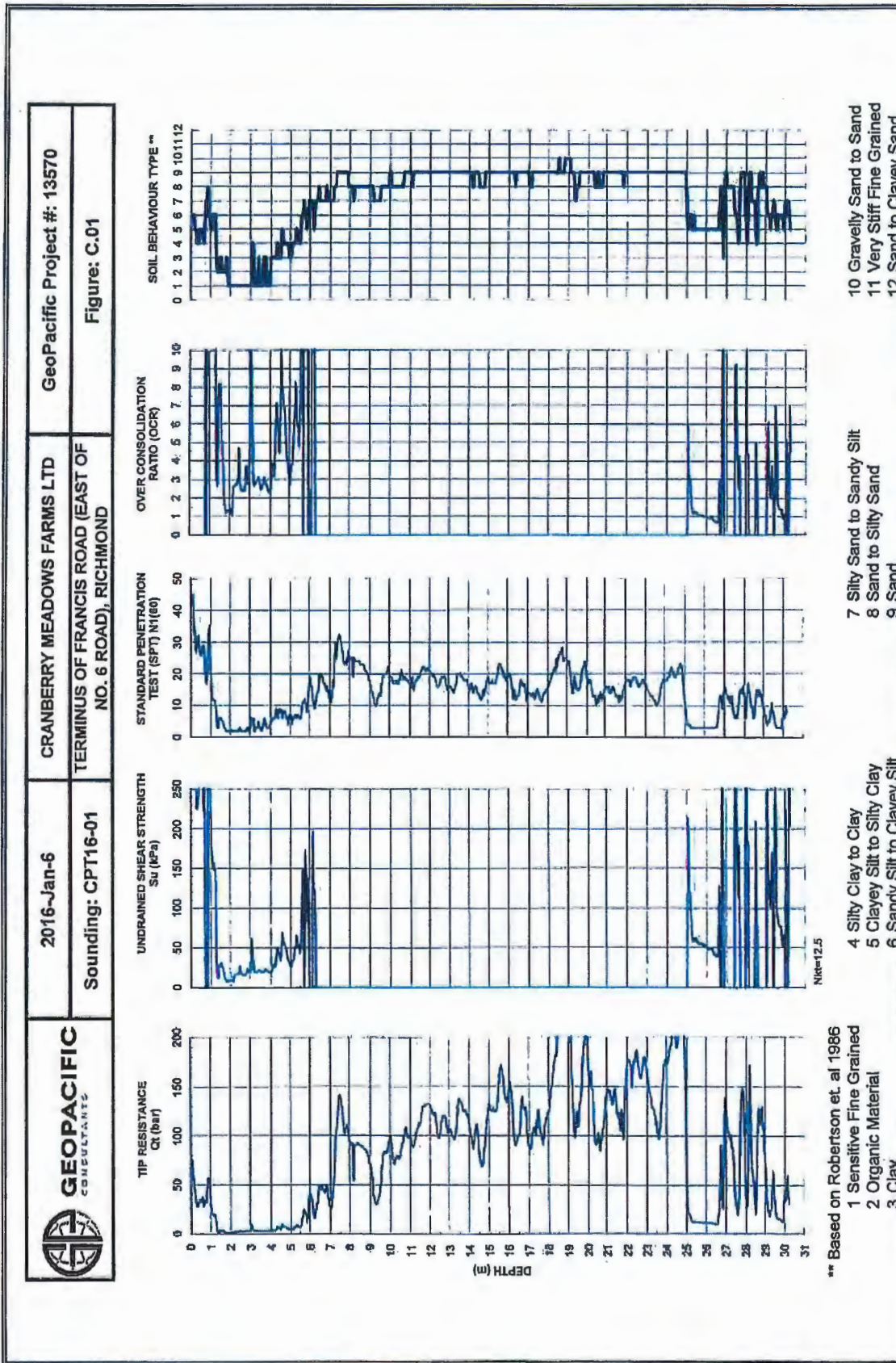
$$OCR = \left(\frac{\left(\frac{S_u / p'_{oc}}{S_u / p'_{nc}} \right)^{5/3} + 0.82}{1.82} \right)$$

S_u / p'_{oc} = The undrained shear strength to effective stress ratio of the over consolidated soil

S_u / p'_{nc} = The undrained shear strength to effective stress ratio of a normally consolidated soil
(OCR = 1). Typically = ~0.2

Soils which are subject to loads less than the maximum past pressure of the soil are typically subject to relatively small elastic settlements. Loads which exceed the maximum past pressure on the soil typically cause consolidation which is the gradual settlement of the ground as a result of expulsion of water from the pores of the soil. The rate of settlement and the time to complete consolidation is a function of the permeability of the soil.

The Schmertman equation has been employed to estimate the OCR of the soils with depth employing the CPT data provided in Appendix B and C.





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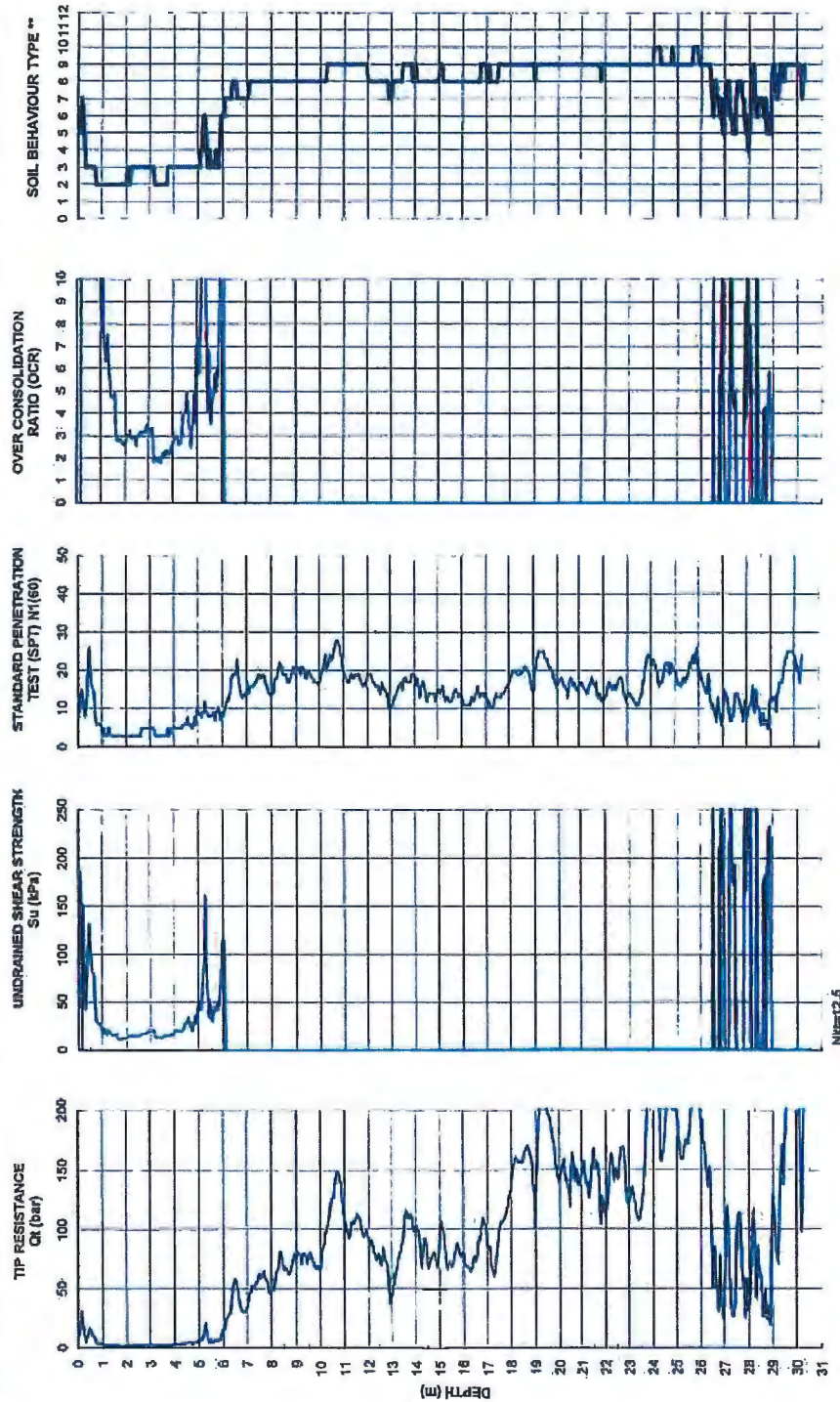
Sounding: CPT16-02

CRANBERRY MEADOWS FARMS LTD

TERMINUS OF FRANCIS ROAD (EAST OF
NO. 6 ROAD), RICHMOND

GeoPacific Project #: 13570

Figure: C.02

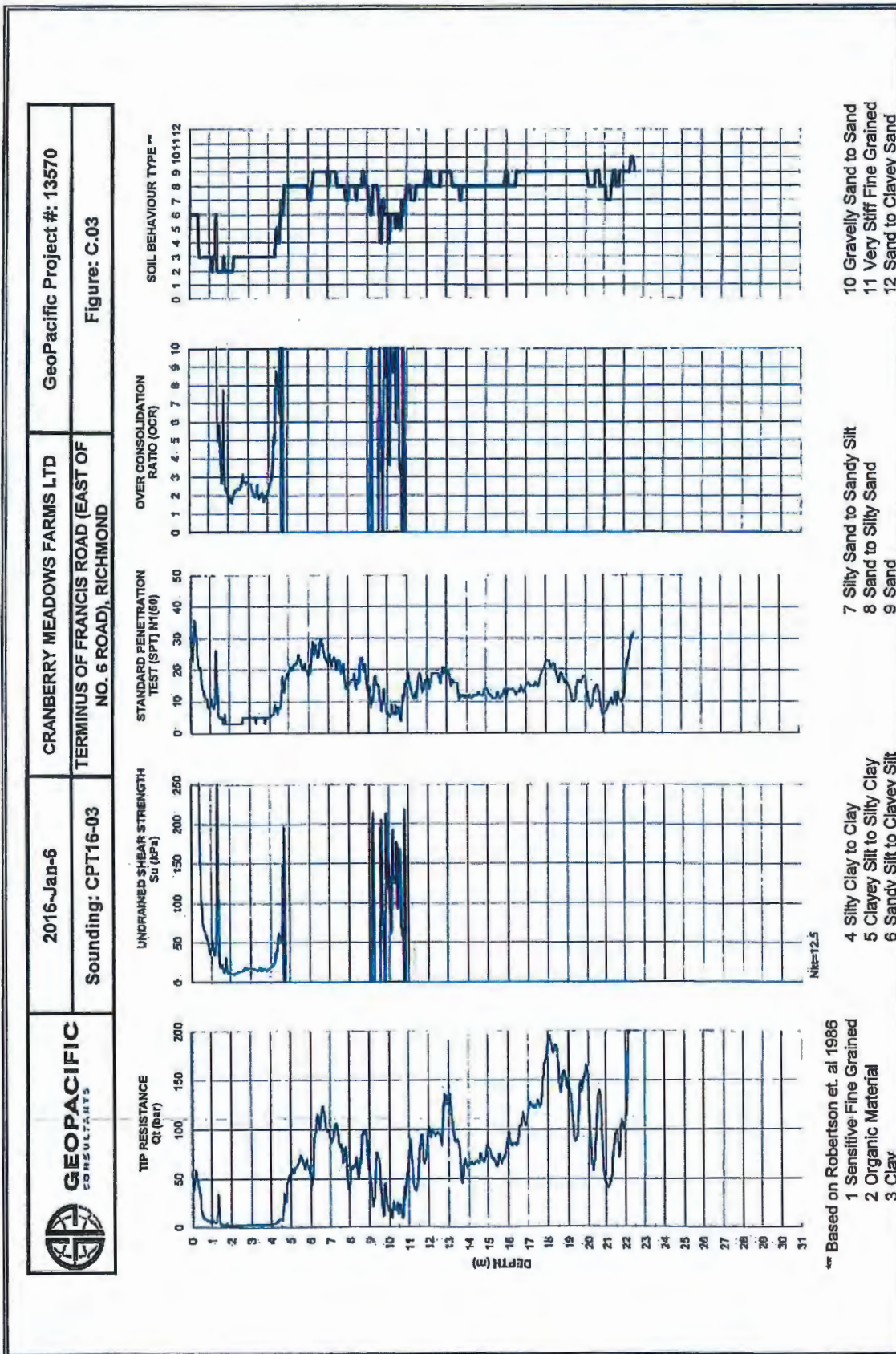


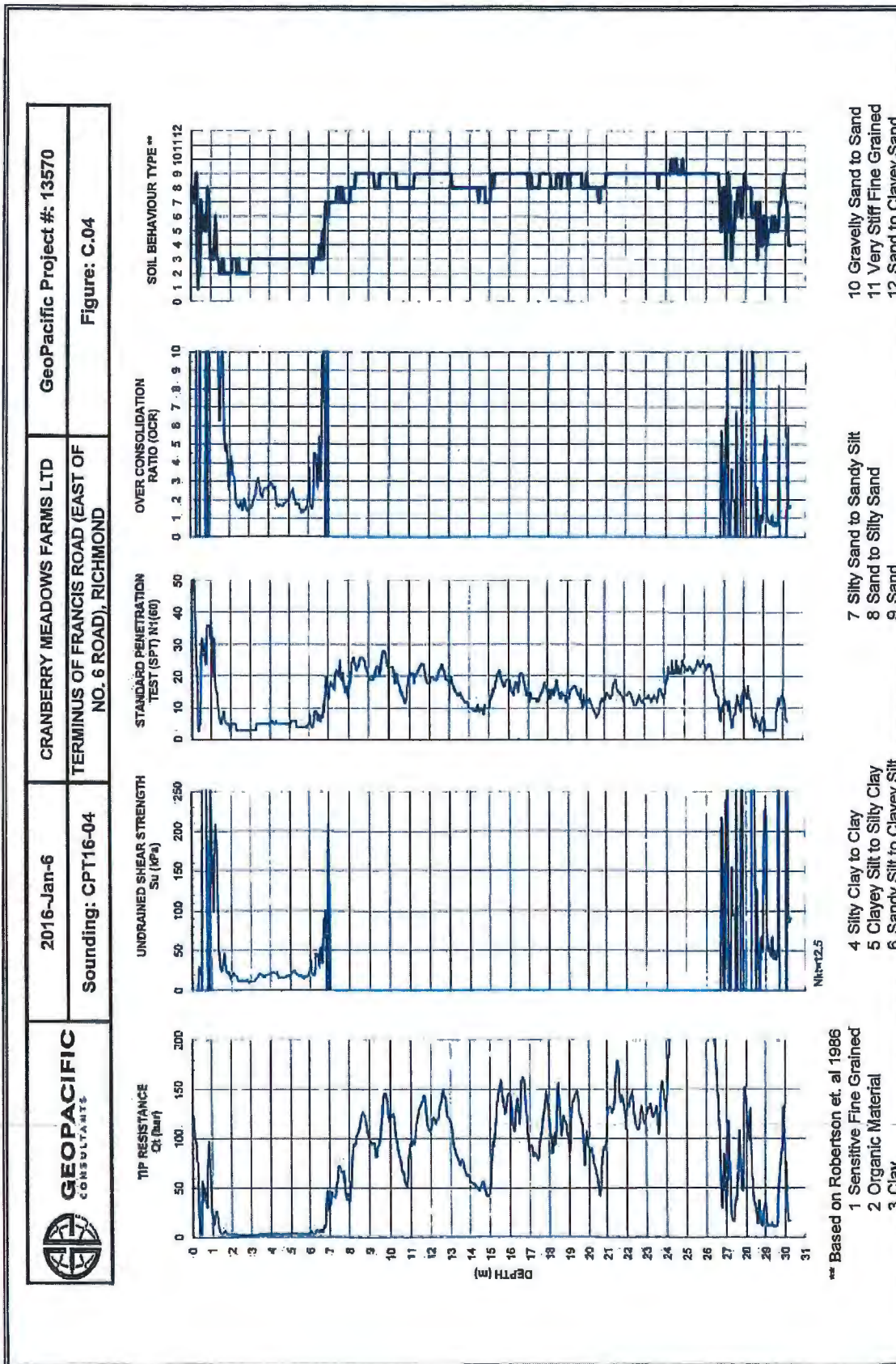
*** Based on Robertson et. al 1986
1 Sensitive Fine Grained
2 Organic Material
3 Clay

4 Silty Clay to Clay
5 Clayey Silt to Silty Clay
6 Sandy Silt to Clayey Silt

7 Silty Sand to Sandy Silt
8 Sand to Silty Sand
9 Sand

10 Gravely Sand to Sand
11 Very Stiff Fine Grained
12 Sand to Clayey Sand





Appendix 4
Traffic Control/Management Plan





City of Richmond

Discussion Notes (no quorum meeting)

AGRICULTURAL ADVISORY COMMITTEE (AAC)

Held Thursday, April 26, 2016 (7:00 pm)

M.2.002

Richmond City Hall

In Attendance:

Steve Easterbrook (Co-Chair); Krishna Sharma; Doug Wright; Scott May; Robert Savage; Minhee Park (Policy Planning); Terry Crowe (Policy Planning); John Hopkins (Policy Planning); Michelle Orsetti (Community Bylaw); Kevin Connery (Parks); Dieter Geesing (Ministry of Agriculture); Tony Pellett (Agricultural Land Commission)

Regrets:

Councillor Harold Steves; Todd May (Co-Chair); Janet Langelaan; Kyle May; Teresa Murphy; Colin Dring

Guests:

Theresa Duynstee (Metro Vancouver)

1. Adoption of the Agenda

Since there was no quorum, the Committee could not formally adopt the agenda.

2. AAC Communication Process

Terry Crowe clarified the role of the AAC and draft communication process to be used when the AAC comments on development applications related to agriculture. He noted that the AAC comments are advisory only, and the applicants are not automatically required to address the comments. After the AAC meeting, staff will discuss the AAC's recommendation and comments with the applicant who may choose either to act on the AAC's recommendation or not act on it. If the applicant chooses not to act on it, staff may either request that the applicant do so to provide a complete report to Council or recommend that the applicant not do so and let the Planning Committee decide. The final decision will be made by the Planning Committee and Council.

Mr. Crowe requested feedback from the Committee. The Committee did not have specific comments or concerns.

3. Development Proposal – Non-farm Use Application (Soil fill) 14791 Westminster Highway

Community Bylaw Staff (Michelle Orsetti) provided an overview of the Agricultural Land Reserve (ALR) soil fill application to establish a tree nursery at 14791 Westminster

Highway. The application was initially considered by the Committee on September 24, 2015. Staff noted that the applicant had provided all the information previously requested by the Committee. The Chair invited the applicant and the project agrologist to the table.

The Committee had the following questions and comments:

- Committee asked about the source of subsoil. The applicant noted that it will be sourced from a single local provider.
- Committee asked whether the owner plans to grow only local trees. The applicant noted that, unless there is a request for exotic trees, they will grow mostly local trees.
- Discussion ensued regarding suitability of the site for the proposed use and proposed improvement. The agrologist noted that the site can be used for a tree nursery with some improvement.
- Committee noted that it wants to see a long term business plan when reviewing a development application in the ALR to ensure that the proposed proposal makes sense. Committee also would like to see a long term commitment from the applicant and ensure the site will still be agriculturally productive after fill activities are completed in case the nursery operation ceases in the future.
- The soil contractor from Hexcel Construction Ltd. was invited to the table and provided details of the operation and soil quality. He noted that soil will be tested and certified, and it will mostly be from Richmond.
- A Committee member noted that the site has been fallow for 40-50 years, and there must be a reason for it. Another member also noted that the plan makes sense, and Committee's role is to provide comments on the plan, not to enforce it.
- The chair introduced the following motion:

That the ALR non-farm use application for soil fill at 14791 Westminster Highway be supported subject to the following conditions:

- 1. The applicant ensures that there is no drainage impact on neighbouring properties.*
- 2. The applicant commits to using only non-contaminated soil supported by a Phase 1 Environmental Site Assessment report and not to bring in construction materials and/or non-excavated soil.*
- 3. No soil sub-contractor, other than the designated soil provider, to be used to ensure the soil quality.*
- 4. A performance bond to be provided*
- 5. The property must be left to a condition that it can still be viable for agriculture once the tree nursery operation ceases.*

Due to the absence of quorum, the motion could not be considered.

4. Development Proposal – Non-farm Use Application (Soil Fill) PID: 023-860-481 (no civic address)

Staff provided a brief overview of the non-farm use application. The Chair invited the applicants to the table. The applicant explained the current limitations of the site due to the high salinity of water that is sourced from the South Arm of the Fraser River. The proponent would like to change the crop production from cranberries to grapes and raspberries. The grape production on the site will supplement their current grape and wine production on another site in Richmond.

The Committee had the following questions and comments:

- In response to Committee's query, the proponent provided further information about the current winery operation. The proponent noted that more than 50% of the products used to manufacture wine will be produced on the farm but they will also continue to purchase grapes from Okanagan.
- The Committee asked how much raspberry production is planned on the site. The proposed raspberry production will be roughly around 5 acres and will use drip irrigation.
- The Committee noted that it understands the issue related to the quality of water and rationale behind the proposed soil fill. Committee agreed that raising the profile of the site will enhance the agricultural viability of the site and enable the owners to pursue a positive venture.

As a result of discussion, the Committee introduced the following motion:

That the ALR soil fill application for the site (PID: 023-860-481) be supported as presented.

Carried Unanimously

5. Verbal Update – Soil Fill at 12871 Steveston Highway

Ms. Orsetti provided an update on the soil fill activity at 12871 Steveston Highway. She noted the conditions of the ALC approval.

The ALC, Community Bylaw, and the City's Agrologist have been monitoring the site to ensure these conditions are met. The City conducted a joint inspection with the ALC staff on October 23, 2015. They noted that the surface of the site was clean and there was large asphalt for access road base. The departing trucks were also clean.

In January 2016, the City and the ALC conducted another joint inspection. Since it was not clear adequate amount of soil and top soil had been placed, a survey was requested to verify the volume of fill. The survey was provided and it was confirmed that the amount of soil brought to the site was in accordance with the approved plans. However, the amount of top soil is inadequate so the applicant is working to correct the issue.

Another inspection is scheduled for early May, 2016. The ALC will take further action if the top soil issue does not get corrected.

The Committee requested staff to send the conditions of the ALC approval to the members by email.

6. Agriculture Impact Assessment Guidelines

Theresa Duynstee, Regional Planner from Metro Vancouver, provided highlights of the Agricultural Impact Assessment Guidelines. The AIA process can be used to better understand the effects of non-farm use developments. She noted the table "Screening Significance Indicator" on page 7 of the guidelines can be used in reviewing development applications. Committee noted that the guidelines would be useful and the City should consider using the guidelines in reviewing development applications. Staff noted that staff will review how the AIA guidelines could be integrated into the 2041 Official Community Plan and Agricultural Viability Strategy.

7. Garden City Lands Update

Parks staff (Kevin Connery) noted that, since the Garden City Lands Legacy Landscape Plan was adopted by Council in 2014, staff had continued with developing a more detailed design. The presentation was to share the findings of the hydrogeological assessments with the AAC and discuss the implications on the Legacy Landscape Plan.

The Committee had the following questions and comments:

- In response to the Committee's query regarding the source of water, Mr. Connery answered that it is precipitation only, and there is no other source on the site. He also noted that there is a concern regarding the long-term viability of the bog and ideas to keep the bog viable are being discussed.
- In response to the Committee's query about the current status, Mr. Connery noted that 5.2 million has been approved by Council to develop the perimeter trail, mid dyke, farm road and water management system and implement the farm plan.
- Committee requested further information about the proposed land uses and farming. Mr. Connery noted that ultimately approximately 20 acres will be used for farming with partnership with Kwantlen Polytechnic University. Mr. Connery said that farm plan is currently being developed and would likely be ready in June.
- Farming will be based on sustainable agriculture practices; it will focus more on research and investigation, not production.
- Committee asked if there is any water feature.
- It was suggested that GCL should showcase ethnic diversity through farming (ethnic crops and practices.)
- In response to the Committee's query regarding the next steps, Mr. Connery noted that an open house is planned for early June, and the City will prepare an application to the ALC for non-farm use.

8. Meeting Minutes and Business Arising from February 4, 2016 Meeting.

Since there was no quorum, the said minutes will be formally approved by the Panel in its next meeting.

9. Action Item Table – Review and Update

No update.

10. Updates

No update.

11. New Business/Information and Update Items

None.

12. Next Meeting date – May 26, 2016 (Tentative)

13. Adjournment



SOIL DEPOSIT PERMIT 42047

Property Location:	PID: 023-860-481 (the "Lands")	
Name of Owner(s):	Cranberry Meadow Farms Ltd.	Phone: 604.802.4775
Name of Agent:	NA	Phone: NA
A.L.C. Approval Date:	Date?	
A.L.C. Expiration Date:	Date?	
Permit Issuance Date:	Date?	
Permit Expiry Date:	Date?	
Permitted Volume of Soil or Fill:	volume of soil or fill m3	

This permit is issued pursuant to section 4.3 of the City of Richmond's current *Soil Removal & Fill Deposit Regulation Bylaw No. 8094*, as may be amended, updated, or replaced.

Deposition and removal of soil or fill must be done in compliance with all requirements of the City of Richmond's *Soil Removal & Fill Deposit Regulation Bylaw No. 8094*, as may be amended, updated, or replaced. This permit is also issued subject to compliance with all of the following conditions:

GENERAL CONDITIONS OF THE PERMIT

- 1) This permit is issued subject to full and continual compliance with all conditions for the deposition and/or removal of soil or fill as contained in the City of Richmond's *Soil Removal & Fill Deposit Regulation Bylaw No. 8094* (the "Bylaw") and the current *Agricultural Land Commission (ALC) Act*, as may be amended, updated, or replaced.
- 2) The permit holder will comply with all other applicable Acts, regulations, and decisions and orders of any person or body having jurisdiction over the Lands.
- 3) The owner of the Lands, as well as the permit holder, will both indemnify and save harmless the City of Richmond (the "City") from any and all claims, proceedings, liabilities, obligations, damages, costs and expenses whatsoever arising from, or in connection with the soil or fill project (the "Project") which is authorized by this permit, including but not limited to, claims in relation to the subject Lands or neighbouring properties.
- 4) Prior to commencement of the project; the permit holder may be required, at the Manager of Community Bylaw's (the "Manager") sole discretion, to arrange for the perimeter of the approved project area(s) to be staked out so as to make the area(s) clearly visible. The project may not be permitted to commence until the staked area has been inspected and approved by City staff.

- 5) Prior to the depositing of any soil or fill, all existing trees that measure 20cm calliper or greater located on the site require tree protection fencing to be installed around the drip line (and inspected by City staff) as per Tree Protection Bulletin Tree-03, as may be amended, updated, or replaced.
- 6) The deposition of soil or fill will not be permitted on weekends or statutory holidays or between the hours of **7:00 p.m. and 8:00 a.m.**, unless identified within the *Special Conditions* or unless exempted by the Manager.
- 7) The City must be advised **forty-eight (48) hours** prior to the project proceeding unless exempted by the Manager.
- 8) No soil or fill will be placed within **three (3) metres** of any property line unless exempted by the Manager.
- 9) The permit placard issued by the City for this permit will be placed in a visible location at the front of the Lands for the duration of the project authorized by this permit.
- 10) The placement of cedar hog fuel and any other forms of wood waste within the area designated for soil or fill is strictly prohibited. In addition, no concrete, asphalt, construction debris, petroleum products, toxic wastes, contaminated materials, or any other non-soil material (the "Other Material") will be deposited on the Lands.
- 11) The deposition of concrete and asphalt waste material is not permitted for driveway and road base on the Lands, unless exempted by the Manager, ALC staff, or the *ALC Act or Regulations*.
- 12) The Lands are to be secured at all times to prevent unauthorized deposition of soil, fill, or other material. The owner of the Lands, as well as the permit holder, will both remain responsible for the removal of, or placement of unauthorized soil, fill, or other material on the Lands.
- 13) Caution will be exercised with the storage and handling of fuels and lubricants on-site. Soil or fill contaminated by spills will be removed immediately and disposed of at a permitted facility in accordance with the requirements of the current *BC Environmental Management Act*, as may be amended, updated, or replaced.
- 14) The deposition of soil or fill will not, in any way, interfere with the above or below ground drainage pattern of any adjoining properties to the Lands, and will not cause the groundwater table to rise on adjoining properties to the Lands, so as to cause flooding or malfunctioning of any sewage disposal system.
- 15) Groundwater and surface run off is not to drain into or onto adjoining properties to the Lands at greater rates after commencement than prior to the commencement of the project authorized by this permit.
- 16) The owner of the Lands, as well as the permit holder, will both remain responsible for any adverse effects, including drainage, caused by the placement of the soil or fill and will ensure any adverse effects are corrected upon written request by the City.
- 17) All necessary precautions must be taken to prevent sedimentation of any stream, creek, waterway, watercourse, ditch, drain, catch basin, culvert, or manhole either on or adjacent to the Lands. Sediment control and erosion measures will be installed/constructed and inspected by the Manager, if required by the Manager, at his/her sole discretion.

- 18) The permit holder is responsible for any contamination of ground/surface water which is attributable to the project authorized by this permit.
- 19) The permit holder will ensure that all dirt, mud, and debris resulting from the project authorized by this permit is removed from all public roads, as many times per day that is required to keep the road safe for both pedestrian and vehicular traffic, or as directed by the Manager, at his/her sole discretion. Should the permit holder fail to perform the necessary cleaning work, the City may undertake the cleaning work and recover the costs of such work by drawing on the security deposit, as well as pursue the owner and permit holder for repayment for any such costs incurred by the City.
- 20) Dust control measures are to be implemented, if required by the Manager, at his/her sole discretion.
- 21) The soil or fill to be deposited pursuant to this permit will consist of good quality soil or fill, substantially free of stones and other material, and which is suitable for the intended development use.
- 22) Any soil or other material deposited under this permit must be free and clear of any invasive species, including plant fragments or seeds, as identified in the provincial *Weed Control Act*, as may be amended, updated, or replaced, and any related regulations. If invasive species, including any plant fragments or seeds, are identified in the subject soil or other material, the Manager, at his/her sole discretion, may suspend the permit. In addition, a report must be prepared by a Qualified Environmental Professional (QEP), including proposed remediation steps and an implementation plan. This report must include best management practices for either chemical or mechanical treatment, and must be submitted within thirty (30) days and approved by the City's Environmental Coordinator. The QEP must supervise the agreed upon remediation efforts contained in the report, including monitoring the site for three (3) years for any emerging invasive plants post-treatment, unless determined otherwise by the QEP, and agreed to by the City. The QEP must also supervise any required follow-up treatments. The QEP must deliver a final report to the City confirming that the deposited soil or other material is free and clear of any invasive species, including plant fragments or seeds, as identified in the provincial *Weed Control Act*, as may be amended, updated, or replaced, and any related regulations, prior to the City returning the security deposit and closing its soil deposit file for this property.
- 23) The approved project area(s) will be seeded as soon as possible following completion of the project authorized by this permit, as required by the Manager, at his/her sole discretion.
- 24) The permit holder will, upon request of the City, provide a detailed traffic management plan, in form and substance acceptable to the Manager. The Manager may request modification of the plan prior to or at any time throughout the soil deposit project.
- 25) Trucks will access the approved project site from designated truck routes in accordance with the City's current *Traffic Control & Regulation Bylaw*, as may be amended, updated, or replaced. Where soil or fill is transported to the Lands over any road which is a non-designated truck route, the permit holder will be responsible for any damage occurring to that road as a result of the transportation of the soil or fill.
- 26) No truck traffic is permitted to be parked or staged on any Municipal roadway/allowance.
- 27) The permit holder will maintain an accurate daily log of trucks depositing soil or fill on the site. This log will be made available for inspection by the Manager when requested. At the sole discretion of the Manager, alternate measures may be used (i.e. survey, etc) in order to determine the volume of soil or fill deposited on or removed from the Lands.

- 28) Subject to any requirements of a Provincial enactment, the Manager is hereby authorized at all reasonable times to enter upon and inspect the Lands to determine whether the requirements, restrictions, regulations, terms, conditions, and directions of this this permit, the Bylaw, and *ALC Act* are being followed.
- 29) Non-compliance with any of the terms and conditions contained in this permit may render this permit suspended or void. If suspended, the Manager may order that the deposition of soil or fill cease until such a time as the permit holder has rectified the issue of non-compliance within the timeframe required by the Manager, to the Manager's satisfaction.
- 30) This permit may be voided by the Manager, at his/her sole discretion, if non-compliant issues are not rectified to the Manager's satisfaction. The Manager, at his/her sole discretion, may void the permit without suspension.
- 31) Should the applicant be non-compliant with any conditions of this permit, the Manager, at his/her sole discretion, may draw a partial or full amount of the security deposit and cancel or suspend the permit until a new amount for the security deposit is provided to the City, to the Manager's satisfaction.
- 32) Prior to the security deposit being returned, the permit holder will provide the Manager with any reports or information that may be required by the Manager in order to confirm that the deposit or removal which is the subject matter of this permit is in compliance with the permit conditions, bylaws, Acts, enactments, applicable legislation, or other requirements of any person or body having any jurisdiction over the Lands.
- 33) Prior to the security deposit being returned, all conditions as stated in this permit and ALC approval, will be satisfied in their entirety, to the satisfaction of the Manager, and only after the City has carried out a final site inspection and confirmed, in writing, that the site is in a condition satisfactory to the Manager.
- 34) The security deposit may be used by the City to pay for or recover costs incurred by the City or to pay outstanding fees to the City.
- 35) Should a permit extension be required, the permit holder will provide reasonable advance notice to the City, and if applicable, to the ALC, prior to the expiration of this permit.

SPECIAL CONDITIONS OF THE PERMIT

- 36) The permit holder will arrange for a site meeting with City staff prior to work commencing to ensure all pre-fill requirements have been satisfied.
- 37) All soil or fill shall be deposited as per the *Fill Deposition Plan* prepared by Pottinger Gaherty Environmental Consultants Ltd. dated October 2016.
- 38) All soil or fill shall be deposited in full compliance with the conditions as stipulated in the decision from the *Agricultural Land Commission (ALC)* dated «adddate». The project may not commence until such time as all ALC approval conditions have been satisfied.
- 39) Upon completion of the soil deposit project, a final topographic survey will be provided that identifies the finished elevations and the total volume of soil deposited on the Lands.
- 40) If additional soil or fill is required beyond the permitted volume, the permit holder may be required to complete a new *Soil Removal / Fill Deposit* form as per the City's current *Soil Removal & Fill Deposit Regulation Bylaw*, at the Manager's sole discretion.

42047

If the permit holder fails to satisfy or comply with any condition of this permit, the owner of the Lands agrees to immediately satisfy or comply with the applicable condition, upon request by the City. Further, the issuance of this permit does not, in any way, relieve the owner of the Lands, any occupier of the Lands, or the permit holder, from having to comply with any and all applicable legislation; including but not limited to, all applicable zoning, subdivision, and other land use bylaws of the City, as well as all other applicable Acts or regulations, and any and all decisions of responsible authorities which may apply to the Lands.

Enter Your Name
SOIL BYLAW OFFICER

Date

Enter Name
Owner/Agent

Date

**GEOPACIFIC**
VANCOUVER KAMLOOPS CALGARYP 604.439.0922
F 604.429.9189
geopacific.ca
1779 W 75th Ave.
Vancouver, B.C. Canada V6P 6P2Cranberry Meadows Farms Ltd.
11450 92A Avenue
Delta, BC
V4C 3M5January 11, 2017
File: 13570

Attention: Gord Maichin

**Re: Geotechnical Investigation Report - Proposed Fill Site
Terminus of Francis Road - East of No. 6 Road, Richmond, B.C.****1.0 INTRODUCTION**

We understand that you propose to fill the above referenced 8.05 hectare parcel of farm land to elevations varying between 4.4 and 6 m geodetic to permit the farming of grapes and raspberries. We further understand that the City of Richmond requires a geotechnical assessment of the site to determine impacts to surrounding properties and drainage due to the contemplated filling program. We also note that it is intended to install a new jet fuel pipeline to service Vancouver International Airport, which will be installed within the Francis Road right-of-way adjacent to the proposed fill site.

This report presents the results of a geotechnical investigation of the soil and groundwater conditions at the site and presents our assessment of the potential drainage and off-site impacts of the development.

This report has been prepared exclusively for Cranberry Meadows Farms Ltd, for their use, the use of others on their design team, and the City of Richmond for use in the development and permitting process.

2.0 SITE DESCRIPTION

The fill site is located in east Richmond, east of No. 6 Road, and directly north of Francis Road. The site is rectangular with east-west dimension of approximately 410 m and north-south dimension of about 194 m. The site is presently employed as a cranberry farm with equipment lay down and storage area located at the southwest corner of the property. Existing elevations vary from 0 to 1 m geodetic in the farm field with surrounding ditches at lower elevations. Francis Road and gravel access roads surrounding the site are at elevations of about 1 to 2 m geodetic. The site is essentially flat.

The location of the site relative to surrounding properties and roads is shown on our site plan, Drawing 13570-01, attached to this report.

3.0 FIELD INVESTIGATION

GeoPacific completed an investigation of the site on January 6, 2016. The investigation included a total of 4 auger test holes, to depths of 6 m below current site grade and 4 Cone Penetration Test (CPT) soundings, advanced to depths of 22.6 to 30 m below grade. The test holes and CPT soundings were completed using

a subcontracted, track mounted auger drill rig operated by On Track Drilling Inc. of Coquitlam, B.C. All test holes were logged in the field by a technician from our office and backfilled immediately upon completion of testing and logging.

As the cone penetrometer is advanced into the ground, it records cone tip resistance, sleeve friction, pore water pressure, temperature and inclination every 50 mm to a purpose built data acquisition system. Analysis of the CPT sounding data allows an estimation of geotechnical design parameters and inference of the sub-surface stratigraphy from soil-type behaviour characteristics. The stratigraphic interpretation was verified with the augured test holes as described above. The CPT sounding results are presented in Appendix B of this report. Geotechnical parameters interpreted from the CPT soundings, such as undrained shear strength and standard penetration $N_{1(60)}$ values, are presented in Appendix C of this report while Liquefaction Analyses are presented in Appendix D.

Test holes were completed on the access roads surrounding the farm land and equipment storage area as the farm land itself is not capable of supporting a heavy drill rig.

The approximate location of the auger test holes and CPT soundings with respect to the property are shown on our Drawing No. 13750-01.

4.0 SUBSURFACE CONDITIONS

4.1 Soil Conditions

The existing soil profile at the site, from the surface downwards, generally consists of 0.6 and 1.4 m of fill around the site perimeter, and then natural soils of PEAT followed by low plastic clayey SILT to silty CLAY over interbedded silty fine SAND to fine sandy SILT over silty to clean SAND. The sand is underlain by a thick sequence of marine clay silt interbedded with fine sands below depths of 25 to 27 m. Based on our general knowledge of the area, and published geology, we anticipate the marine clay silt extends to a depth of about 60 metres where it is underlain by dense glacially consolidated deposits.

A detailed description of the soils encountered is given below.

Fill

Fill was encountered at each test hole and varied from pavement structure related sand and gravel to wood chips to organic rich silty sand (topsoil). These materials were also encountered on the access roads and lay down area surrounding the farm field. We do not expect much, if any, mineral based fill in the farm field itself.

Peat

Peat was present at all test hole locations and varied in thickness between 0.4 and 1 m with moisture contents between 167% and 274%. These moisture content values are relatively low for peat and are expected to be a function of the consolidation induced by the presence of the above referenced fills. We anticipate that the peat will likely be thicker with higher moisture content within the farm land, and therefore more susceptible to larger settlements induced by filling.

Peat is highly compressible when loaded in excess of it's current insitu stress. Conventional site

preparation measures to limit post construction settlements also have a limited benefit on peat. Long term settlements of peat are caused by the gradual decay of the organic constituent that makes up the majority of the peat. These settlements are unavoidable.

Clayey Silt to silty Clay (Overbank Sequence)

The peat is underlain by between 2 and 4 m of silt to clay. The silt is typically firm with some organic content and brown in the upper 200 to 500 mm, below this becoming firm to soft and grey in colour. Laboratory testing yielded moisture contents ranging from 50 to 123%. Shear strength in the soft portion of the clayey silt profile is interpreted at between 15 and 50 kPa below the upper desiccated zone as shown in Appendix C. The desiccated zone is typically about 300 mm thick and has a shear strength of between 75 and 120 kPa. The soft portion of the clayey silt zone is significantly compressible under the contemplated fill loads.

Fine Sandy Silt to Silty Sand (Transitional Sequence)

Underlying the clay silt is about 2 m of a transitional sequence comprised of loose to compact silty fine SAND to fine sandy SILT. The sequence is non plastic and therefore somewhat compressible under moderate to heavy loading only.

Clean Sand to Silty Sand (Channel Sequence)

The silt and interbedded sand and silt described above is underlain by a sequence of river channel deposited sands. The slight variations in the in-situ density, compressibility, mineralogy and grain size are reflected in the shape of the tip resistance curves shown on the CPT plots in Appendix B. In general the Fraser River channel sands are well graded, medium grained, predominantly quartz, highly stratified and loose to medium dense. These deposits extend to about 25 to 27 m depth at our CPT soundings.

Occasional zones of clayey silts are interbedded in the predominantly sand, channel sequence, as shown on the soil behaviour type plots given in Appendices B and C.

Deep Marine Clay Silt

The sand is underlain by a thick sequence of deep marine clay silt below 25 to 27 m. This zone is expected to extend down to the glacial deposits, inferred to extend to about 60 m below local site grades. This zone is considered compressible given the height and extent of the contemplated filling. Due to the thickness of this zone and its low permeability, post filling settlements will continue for many years after the completion of the site preparation work. This long term settlement behaviour is not uncommon in Richmond with long term post construction settlements occurring as a result of mid-rise tower development, for example.

For a more detailed description of the subsurface soil conditions refer to the Test Hole Logs and CPT Sounding Logs in Appendices A and B, following the text of this report.

4.2 Groundwater Conditions

The static groundwater level is expected to be in close proximity to the existing elevation of the farm field.

Groundwater levels are expected to vary seasonally with generally higher levels during the wetter winter and spring months. It has been our experience that near surface groundwater levels are often controlled by surface water levels in local ditches and thus levels can rise to near ambient ground level during periods of heavy and prolonged rainfall.

5.0 DISCUSSION

5.1 Fill Program

We understand that the filling program is proposed to occur over a period of 3 years with a total of 362,000 m³ of material imported to the site. The site will be sloped at approximately 3% with finished site elevations varying from 4.4 to 6 m geodetic. The margins of the fill site will be sloped at 2H:1V. The existing soils will be left in place with new fill derived from sites in western Vancouver varying from Vashon Drift to Capilano sediments. These soils vary in composition and may include glacial till (well graded sand, silt, and gravel), glaciofluvial sand to gravel, glaciolacustrine silts, marine and glaciomarine silts, and beach deposited sands.

5.2 Drainage

The natural soil profile consists of relatively low permeability peat and overbank deposited silts which grade into channel deposited sands at depth. The proposed fill operation will result in significant consolidation of the peat and silt. While the permeability of these upper soils will reduce, the main aquifer of sand below 6 m depth will not be affected. We would expect normal flows in these Fraser River sands to control the surrounding property groundwater levels.

The current conditions allow for natural infiltration of rainwater into the topsoil of the farm field. Some of the proposed fills including the marine, glaciomarine, glaciolacustrine, and glacial till deposits will have a relatively low permeability once placed and compacted. Negligible infiltration into these materials will occur. We expect that some rainwater will be retained in the topsoil of the future grape and raspberry fields, but some will also flow to the perimeter of the site. We anticipate that a cleaner granular soil will be placed below the upper topsoil to facilitate drainage, as required. Regardless, the surface runoff would be directed to perimeter site drainage to ensure no mounding of groundwater levels at adjacent properties. Any potential groundwater impact can be mitigated substantially with the incorporation of an efficient ditch and drainage system around the periphery of the site which conveys surface run off to the surrounding City storm system.

In summary, it is our geotechnical opinion that the proposed fill program is feasible without adversely impacting drainage or groundwater levels beyond the site. Some maintenance of the drainage system during the filling process as well as in the future, due to the predicted long term settlements described in Section 5.3, should be expected.

5.3 Settlement

Due to the large extent of the fill area, significant consolidation of the upper compressible peat and silt deposits will occur along with the deep marine deposits. Due to the thickness and low permeability of the marine deposits, consolidation of this stratum will continue to occur for several years after placement of the fill. Our analysis indicates that total settlements on the order of 1.2 to 1.8 m should be anticipated at the mid point of the fill site. Settlements are predicted to decrease to about 600 mm to 900 mm at the margin of the fill area. We anticipate that approximately 60 to 70% of this settlement will occur during fill placement with the remainder accumulating over about 20 to 25 years.

The majority of the settlement is derived from the surficial peat and silt, which accounts for approximately 60% of the total settlements. The primary consolidation of these two strata should occur relatively quickly within a few months of completion of the fill program. Significant secondary consolidation will be as a result of gradual consolidation of the marine deposits at depth. Some limited settlement will be realized from gradual decay of the peat as well, but this is anticipated to be small in relation to the predicted total.

Significant differential settlements should be anticipated within 6 to 8 m of the fill area. These settlements will likely require some maintenance of the surrounding area to ensure, for example, level access roads and positively flowing ditches.

Settlements will be measurable off-site. We estimate settlements at about 8 m beyond the fill area to range from 50 to 150 mm. These settlements are derived from the marine deposits located below about 26 m depth. Therefore, the surface projection of these deep settlements typically result in small differentials of less than 2 mm/metre and are generally not damaging to surface infrastructure. However, the long term impacts on gravity based services surrounding the site should be reviewed. Similar behaviour occurs beyond mid-rise towers elsewhere in Richmond.

5.4 Francis Road - Jet Fuel Pipe Line

We understand that it is proposed to install a new pipe line within the Francis Road right-of-way fronting the site which will supply jet fuel to Vancouver International Airport. Details of the pipeline are shown on the Construction Plan (DWG 1452-AL-A04, dated November 30, 2016) prepared by CCI.

The contemplated fill plan includes a fill setback from Francis Road of 10 to 12 m. The above referenced jet fuel plan indicates that the pipe line will be installed at about the mid point of the existing road, which would result in a pipeline to fill setback of approximately 12 to 14 m. The jet fuel line is to be installed by horizontal directional drilling with entry and exit pits located within Francis Road at the approximate easterly and westerly ends of the development property. At the pit locations the pipe depth will be 1.5 to 4 m. The pipe will be deepest at the midpoint of the property at a depth of approximately 15 m.

While measurable movements of the pipeline are likely, they are expected to be low differentially at less than 1 mm/metre and should not impact the jet fuel line. We also assume that the pipeline designers have considered that properties along the alignment are likely to develop over time and considerations for settlements have been incorporated into their pipe design.

Filling much closer to, and at greater heights than this project has been completed successfully by GeoPacific adjacent to the existing jet fuel pipeline on Bridgeport Road, directly east of Sea Island. This work included placement of a preload up to 12 m in height within 2 m of the jet fuel pipe line. That pipe was monitored by Kinder Morgan's geotechnical engineer during the site preparation work with no damage reported, and no remedial repairs required. We expect that a similar monitoring program will have to be developed with the geotechnical engineer for the new pipeline prior to filling.

6.0 CLOSURE

The preceding comments and calculations are based on theoretical consolidation approaches and stress distribution procedures. Some variation between theoretical and actual settlements is likely. Any changes to the fill plan should be provided to GeoPacific for review and update our settlement estimates.

Please do not hesitate to call the undersigned if you should require any clarification or additional details.

For:

GeoPacific Consultants Ltd.

Reviewed by:



JAN 11 2017

John Carter, M.Eng., P.Eng.
Principal Engineer

Keith Robinson, M.Eng., P.Eng.
Principal Consultant



SITE PLAN

*TEST LOCATIONS ARE APPROXIMATE

LEGEND:

- CPT##-# - CONE PENETRATION TEST (CPT) LOCATION
- △ TH##-# - TEST HOLE (TH) LOCATION

REFERENCE:

REVISIONS:

A.
B.
C.

FILE NO: 13570

DWG. NO.: 13570-01

CRANBERRY MEADOWS
TERMINUS OF FRANCES ROAD (EAST OF NO. 6 ROAD), RICHMOND, BC
TEST HOLE SITE PLAN

DATE: 2016-Jan-1

DRAWN BY: ED
APPROVED BY: JC
REVIEWED BY: JC

SCALE: AS SHOWN

10215-1200 West 73rd Ave.
Vancouver, B.C. V6P 6G5
P 604.439.0922
F 604.439.0909

GEO PACIFIC
VANCOUVER LANDSCAPE CONSULTANTS



APPENDIX A - TEST HOLE LOGS

Test Hole Log: TH16-01 (CPT16-01)

File: 13570

Project: CRANBERRY MEADOWS

Client: CRANBERRY MEADOWS FARMS LTD

Site Location: TERMINUS OF FRANCES ROAD (EAST OF NO. 6 ROAD), 215 - 1200 West 73rd Avenue, Vancouver, BC, V6P 6G5
Tel: 604-439-0922 Fax: 604-439-9189



GEOPACIFIC
CONSULTANTS

INFERRED PROFILE				Moisture Content (%)	DCPT (blows per foot) 10 20 30 40	Groundwater / Well	Remarks
Depth	Symbol	SOIL DESCRIPTION	Depth (m)/Elev (m)				
0		Ground Surface	0.0				
1		Sand and gravel compact SAND and GRAVEL fill, brown, slightly moist					
2							
3		moist after 1.1m					
4							
5		Peat firm to soft PEAT, red-brown, moist to wet	1.4	186.1			
6							
7		Silt soft SILT, trace organics, grey, wet	1.8				
8							
9							
10				123.3			
11		sand lens at 3.2m					
12							
13				49.6			
14							
15		Silt firm sandy SILT, grey, wet	4.3				
16							
17		sandy SILT to silty SAND after 5.3m		36.9			
18							
19							
20							
21		End of Borehole	6.1				
22							
23							
24							
25							
26							

Logged: ED

Method: Solid stem auger/CPT

Date: 2016-Jan-6

Datum: Ground elevation

Figure Number: A.01

Page: 1 of 1

Test Hole Log: TH16-02 (CPT16-02)

File: 13570

Project: CRANBERRY MEADOWS

Client: CRANBERRY MEADOWS FARMS LTD

Site Location: TERMINUS OF FRANCES ROAD (EAST OF NO. 6 ROAD), F215 - 1200 West 73rd Avenue, Vancouver, BC, V6P 6G5
Tel: 604-439-0922 Fax: 604-439-9189



GEO PACIFIC
CONSULTANTS

INFERRED PROFILE				Moisture Content (%)	DCPT (blows per foot) 10 20 30 40	Groundwater / Well	Remarks
Depth	Symbol	SOIL DESCRIPTION	Depth (m)/Elev (m)				
0		Ground Surface	0.0				
1		Sand and gravel compact SAND and fine grained GRAVEL fill, grey, slightly moist	0.3				
2		Fill compact wood chip fill, brown, moist wet at 0.8m	0.8	189.2			
3		Peat firm to soft PEAT, red-brown, moist wet after 1.2m		273.8			
4		Silt soft organics rich SILT, brown, wet	1.8				
5		Silt soft SILT, trace organics, grey, wet	2.3				
6		no organics after 3.2m		101.7			
7		trace to some fine grained sand after 4.0m		62.0			
8		Silt firm sandy SILT, grey, wet	4.6				
9				33.4			
10		End of Borehole	6.1				
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
21							
22							
23							
24							
25							
26							

Logged: ED

Method: Solid stem auger/CPT

Date: 2016-Jan-6

Datum: Ground elevation

Figure Number: A.02

Page: 1 of 1

Test Hole Log: TH16-03 (CPT16-03)

File: 13570

Project: CRANBERRY MEADOWS

Client: CRANBERRY MEADOWS FARMS LTD

Site Location: TERMINUS OF FRANCES ROAD (EAST OF NO. 6 ROAD), F215 - 1200 West 73rd Avenue, Vancouver, BC, V6P 6G5
Tel: 604-439-0922 Fax: 604-439-9189



GEO PACIFIC
CONSULTANTS

INFERRED PROFILE				Moisture Content (%)	DCPT (blows per foot) 10 20 30 40	Groundwater / Well	Remarks
Depth	Symbol	SOIL DESCRIPTION	Depth (m)/Elev (m)				
0 m		Ground Surface	0.0				
1		Sand and gravel compact silty SAND and GRAVEL fill, brown, slightly moist	0.0				
2		Fill compact to loose organics rich silty SAND fill, dark brown, moist wet after 3.5	0.6	98.5			
3							
4							
5		Peat soft PEAT, red-brown, wet silty after 2.0m	1.5	203.1			
6							
7							
8		Silt soft organics rich SILT, grey-brown, wet	2.3				
9			2.6				
10		Silt soft SILT, trace to some organics, grey, moist to wet		66.9			
11							
12							
13				77.1			
14							
15		Silt firm sandy SILT, grey, wet	4.3				
16			4.6	34.7			
17		Sand compact silty SAND, grey, wet					
18			5.2				
19		Sand compact SAND, grey, wet					
20							
21		End of Borehole	6.1				
22							
23							
24							
25							
26							

Logged: ED

Method: Solid stem auger/CPT

Date: 2016-Jan-6

Datum: Ground elevation

Figure Number: A.03

Page: 1 of 1

Test Hole Log: TH16-04 (CPT16-04)

File: 13570

Project: CRANBERRY MEADOWS

Client: CRANBERRY MEADOWS FARMS LTD

Site Location: TERMINUS OF FRANCES ROAD (EAST OF NO. 6 ROAD), F215 - 1200 West 73rd Avenue, Vancouver, BC, V6P 6G5
Tel: 604-439-0922 Fax: 604-439-9189



GEOPACIFIC
CONSULTANTS

INFERRED PROFILE				Moisture Content (%)	DCPT (blows per foot) 10 20 30 40	Groundwater / Well	Remarks
Depth	Symbol	SOIL DESCRIPTION	Depth (m)/Elev (m)				
0 ft 0 m		Ground Surface					
1		Sand and gravel compact to dense silty SAND and GRAVEL fill, grey, slightly moist	0.0				
2							
3							
4		Peat firm to soft PEAT, red-brown, moist	1.2	166.5			
5							
6							
7		Silt soft organics rich SILT, peat like organics, brown, wet	2.1	259.9			
8			2.4				
9		Silt soft SILT, some organics, grey-brown, wet trace organics after 2.7m		51.2			
10							
11							
12							
13				78.5			
14							
15		trace fine grained SAND after 4.6m					
16							
17				46.4			
18							
19							
20							
21		End of Borehole	6.1				
22							
23							
24							
25							
26							

Logged: ED
Method: Solid stem auger/CPT
Date: 2016-Jan-6

Datum: Ground elevation
Figure Number: A.04
Page: 1 of 1

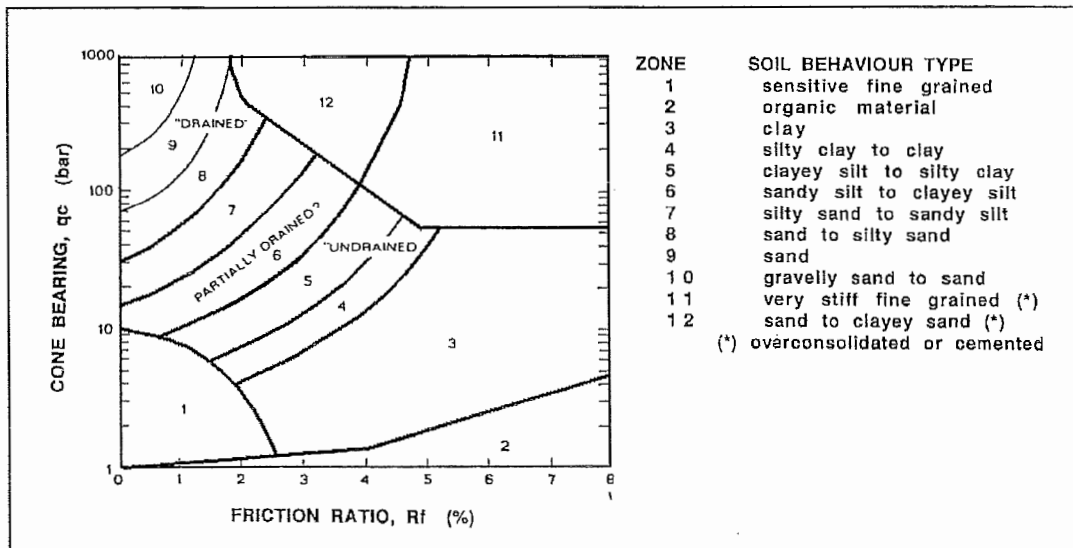
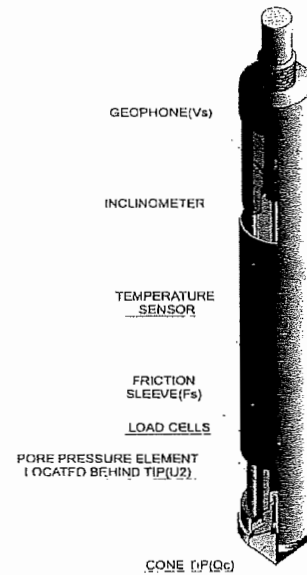
APPENDIX B - ELECTRONIC CONE PENETRATION RESULTS

The system used is owned and operated by GeoPacific and employs a 35.7 mm diameter cone that records tip resistance, sleeve friction, dynamic pore pressure, inclination and temperature at 5 cm intervals on a digital computer system. The system is a Hogentogler electronic cone system and the cone used was a 10 ton cone with pore pressure element located behind the tip and in front of the sleeve as shown on the adjacent figure.

In addition to the capabilities described above, the cone can be stopped at specified depths and dissipation tests carried out. These dissipation tests can be used to determine the groundwater pressures at the specified depth. This is very useful for identifying artesian pressures within specific layers below the ground surface.


Interpretation of the cone penetration test results are carried out by computer using the interpretation chart presented below by Robertson¹. Raw data collected by the field computer includes tip resistance, sleeve friction and pore pressure. The tip resistance is corrected for water pressure and the friction ratio is calculated as the ratio of the sleeve friction on the side of the cone to the corrected tip resistance expressed as a percent. These two parameters are used to determine the soil behaviour type as shown in the chart below. The interpreted soil type may be different from other classification systems such as the Unified Soil Classification that is based upon grain size and plasticity.

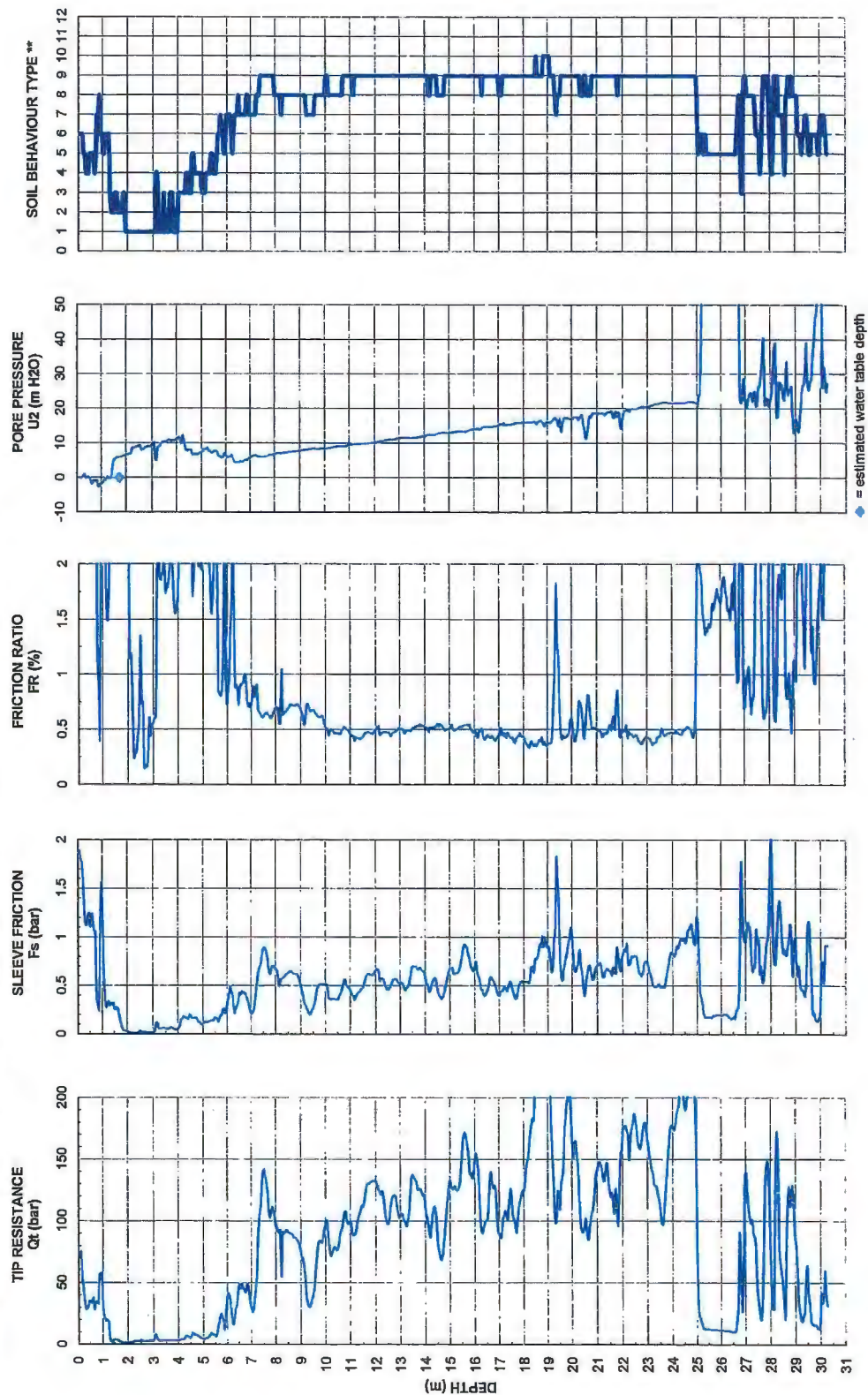
Electronic Cone Penetrometer



¹

Robertson, P.K., 1990, "Soil Classification using the cone penetration test", 1990 Canadian Geotechnical Colloquium, Canadian Geotechnical Journal, Vol. 27, No. 1, 1990

 GEO PACIFIC CONSULTANTS	2016-Jan-6 Sounding: CPT16-01	CRANBERRY MEADOWS FARMS LTD TERMINUS OF FRANCIS ROAD (EAST OF NO. 6 ROAD), RICHMOND	GeoPacific Project #: 13570 Figure: B.01
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** Based on Robertson et. al 1986

1 Sensitive Fine Grained
2 Organic Material
3 Clay

4 Silty Clay to Clay
5 Clayey Silt to Silty Clay
6 Sandy Silt to Clayey Silt

7 Silty Sand to Sandy Silt
8 Sand to Silty Sand
9 Sand

10 Gravelly Sand to Sand
11 Very Stiff Fine Grained
12 Sand to Clayey Sand



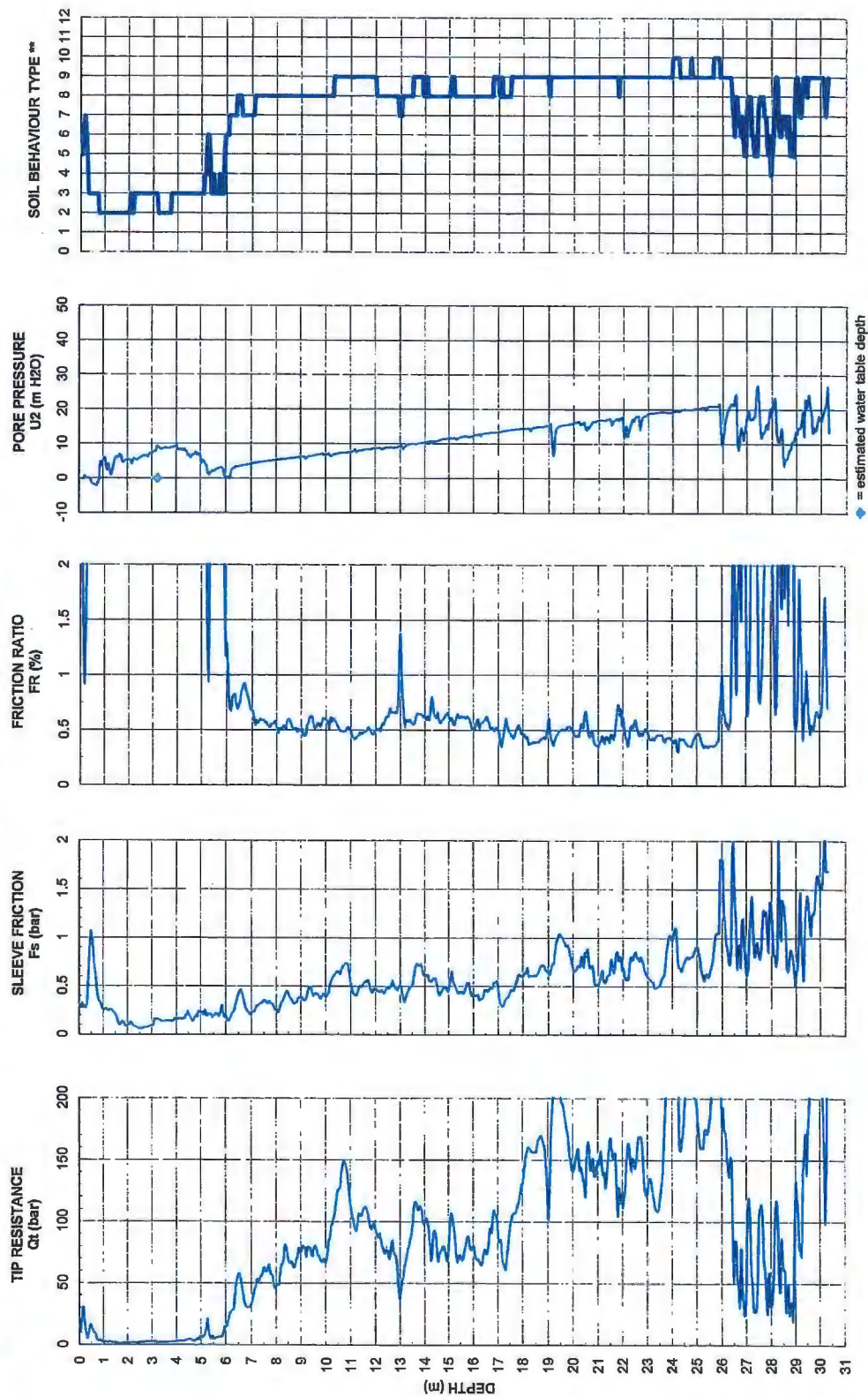
2016-Jan-6

Sounding: CPT16-02

CRANBERRY MEADOWS FARMS LTD
TERMINUS OF FRANCIS ROAD (EAST OF
NO. 6 ROAD), RICHMOND

GeoPacific Project #: 13570

Figure: B.02




** Based on Robertson et. al 1986

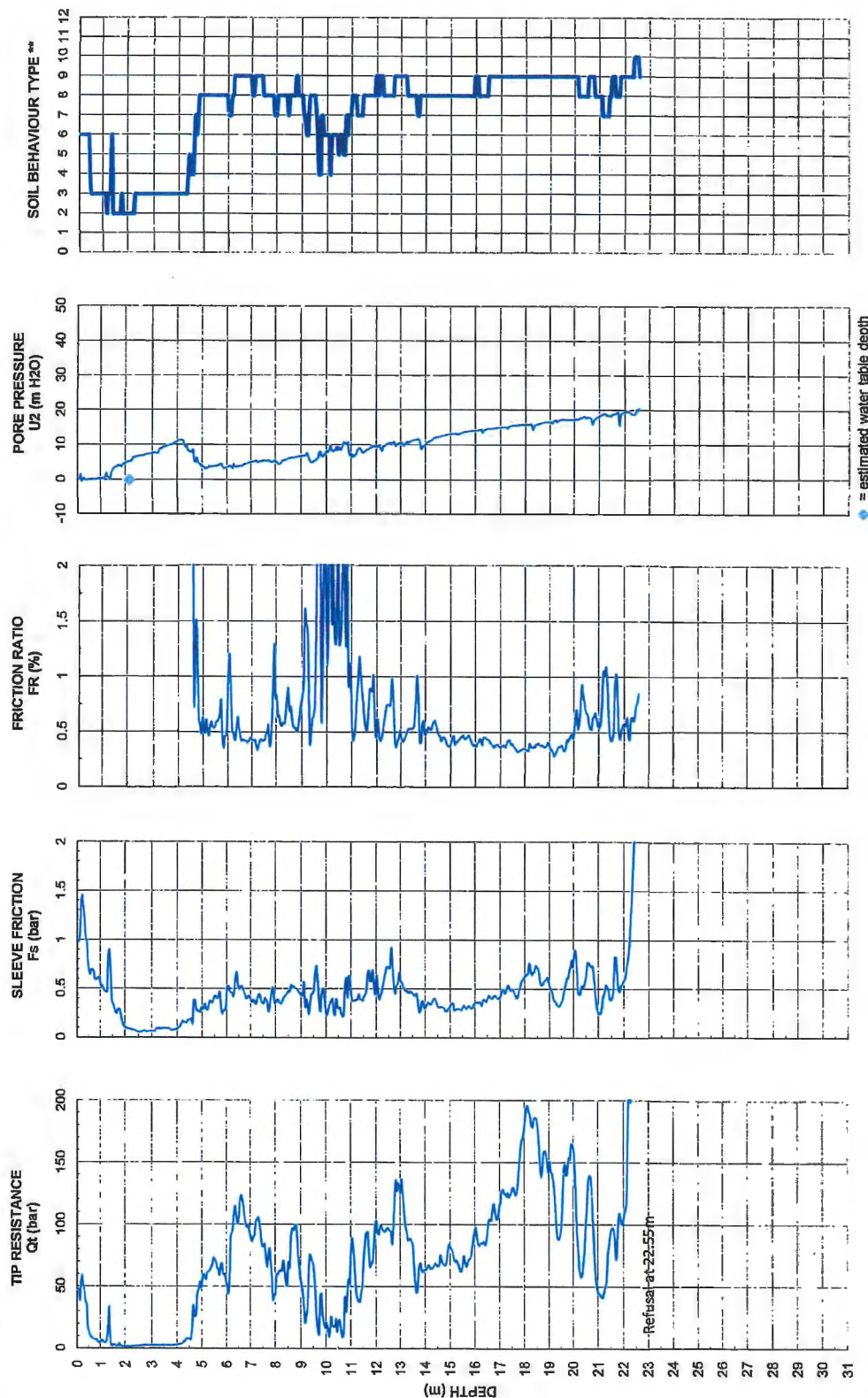
- 1 Sensitive Fine Grained
- 2 Organic Material
- 3 Clay

- 4 Silty Clay to Clay
- 5 Clayey Silt to Silty Clay
- 6 Sandy Silt to Clayey Silt


- 7 Silty Sand to Sandy Silt
- 8 Sand to Silty Sand
- 9 Sand

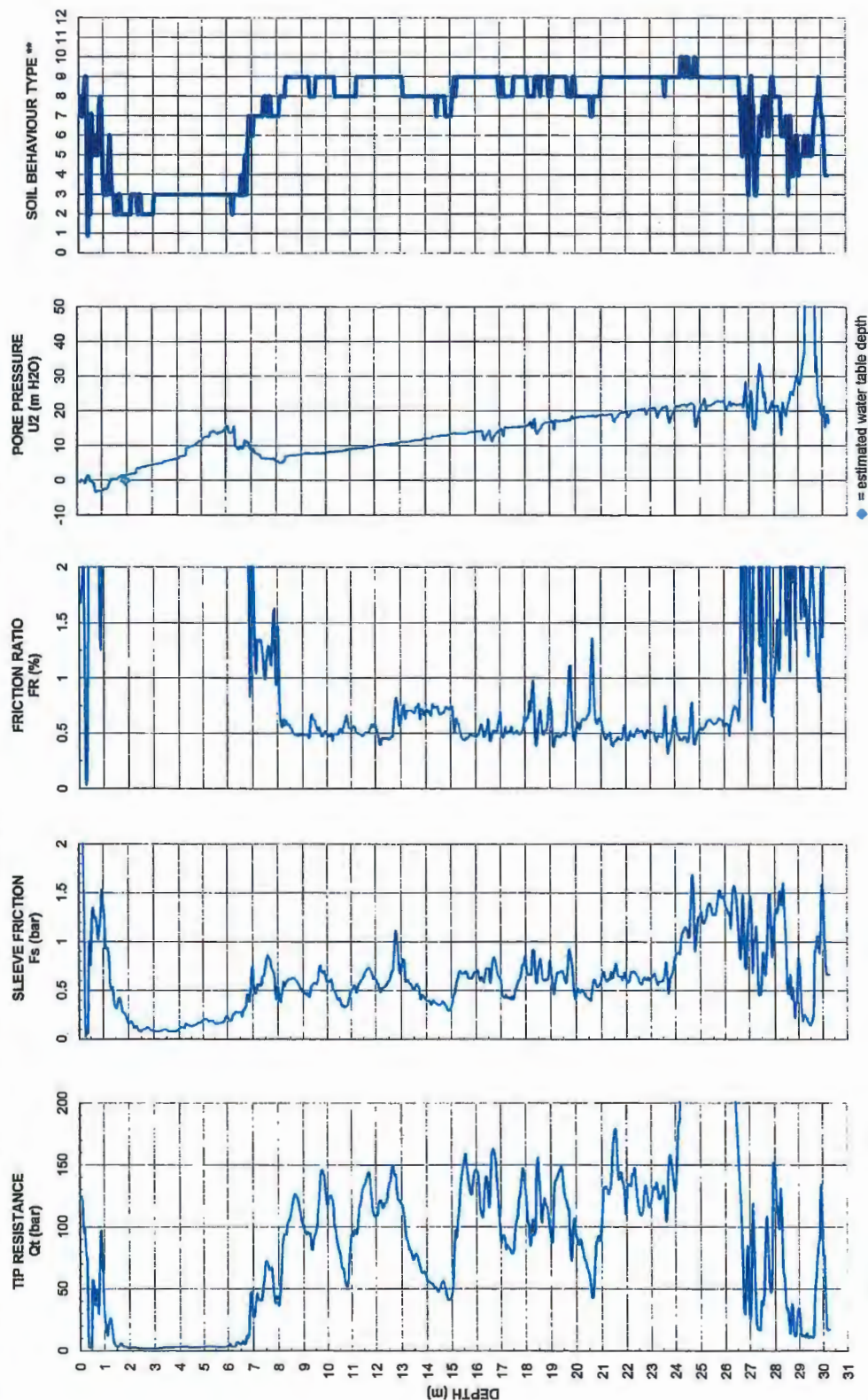
- 10 Gravely Sand to Sand
- 11 Very Stiff Fine Grained
- 12 Sand to Clayey Sand

 GEO PACIFIC CONSULTANTS	2016-Jan-6 Sounding: CPT16-03	CRANBERRY MEADOWS FARMS LTD TERMINUS OF FRANCIS ROAD (EAST OF NO. 6 ROAD), RICHMOND	GeoPacific Project #: 13570 Figure: B.03
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- ** Based on Robertson et. al 1986
- | | | |
|-----------------------------|----------------------------|----------------------------|
| 1 Sensitive Fine Grained | 7 Silty Sand to Sandy Silt | 10 Gravelly Sand to Sand |
| 2 Organic Material | 8 Sand to Silty Sand | 11 Very Stiff Fine Grained |
| 3 Clay | 9 Sand | 12 Sand to Clayey Sand |
| 4 Silty Clay to Clay | | |
| 5 Clayey Silt to Silty Clay | | |
| 6 Sandy Silt to Clayey Silt | | |
- = estimated water table depth

 GEO PACIFIC CONSULTANTS	2016-Jan-6 Sounding: CPT16-04	CRANBERRY MEADOWS FARMS LTD TERMINUS OF FRANCIS ROAD (EAST OF NO. 6 ROAD), RICHMOND	GeoPacific Project #: 13570 Figure: B.04
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- ** Based on Robertson et. al 1986
- 1 Sensitive Fine Grained
 - 2 Organic Material
 - 3 Clay
 - 4 Silty Clay to Clay
 - 5 Clayey Silt to Silty Clay
 - 6 Sandy Silt to Clayey Silt
 - 7 Silty Sand to Sandy Silt
 - 8 Sand to Silty Sand
 - 9 Sand
 - 10 Gravelly Sand to Sand
 - 11 Very Stiff Fine Grained
 - 12 Sand to Clayey Sand

APPENDIX C - INTERPRETED PARAMETERS

The following charts plot the Standard Penetration Test (SPT) values and the undrained strength of fine grained soils based upon generally accepted correlations. The methods of correlation are presented below.

STANDARD PENETRATION TEST CORRELATION

The Standard Penetration Test $N_{1(60)}$ value is related to the cone tip resistance through a Q_c/N ratio that depends upon the mean grain size of the soil particles. The soil type is determined from the interpretation described in Appendix B and the data of Table C.1 below is used to calculate the value of $N_{1(60)}$.

Table C.1. Tabulated $Q_c/N_{1(60)}$ Ratios for Interpreted Soil Types

Soil Type	Q_c/N Ratio
Organic soil - Peat	1.0
Sensitive Fine Grained	2.0
Clay	1.0
Silty Clay to Clay	1.5
Clayey Silt to Silty Clay	2.0
Silt	2.5
Silty Sand to Sandy Silt	3.0
Clean Sand to Silty Sand	4.0
Clean Sand	5.0
Gravelly Sand to Sand	6.0
Very Stiff Fine Grained	1.0
Sand to Clayey Sand	2.0

The $Q_c/N_{1(60)}$ ratio is based upon the published work of Robertson (1985)². The values of N are corrected for overburden pressure in accordance with the correction suggested by Liao and Whitman using a factor of 0.5. Where the correction is of the form:

$$N_1 = \sigma^{0.5} * N$$

All calculations are carried out by computer using the software program CPTint.exe developed by UBC Civil Engineering Department. The results of the interpretation are presented on the following Figures.

UNDRAINED SHEAR STRENGTH CORRELATION

It is generally accepted that there is a correlation between undrained shear strength of clay and the tip resistance as determined from the cone penetration testing. Generally the correlation is of the form:

$$S_u = \frac{(q_c - \sigma_v)}{N_k}$$

where q_c = cone tip resistance, σ = in situ total stress, N_k = cone constant

The undrained shear strength of the clay has been calculated using the cone tip resistance and an N_k factor of 12.5. All calculations have been carried out automatically using the program CPTint.exe. The results are presented on the Figures following.

APPENDIX C - OVER CONSOLIDATION RATIO ANALYSIS

The over consolidation ratio (OCR) is defined as the ratio between the maximum past vertical pressure on the soil versus the current in-situ vertical pressure. The maximum past vertical pressure is typically caused by the presence of excess overburden which is removed by either natural or man-made reasons. Soil ageing and other chemical precipitation affects can also cause a soil to behave as if it has a higher maximum past pressure, which is sometimes described as pseudo-overconsolidation.

Research by Schmertmann (1974) showed the following equation reasonably approximates the OCR of medium plastic to clayey soils:

$$OCR = \left(\frac{\left(\frac{Su / p'_{oc}}{Su / p'_{nc}} \right)^{5/3} + 0.82}{1.82} \right)$$

Su/p'_{oc} = The undrained shear strength to effective stress ratio of the over consolidated soil

Su/p'_{nc} = The undrained shear strength to effective stress ratio of a normally consolidated soil (OCR = 1). Typically = ~0.2

Soils which are subject to loads less than the maximum past pressure of the soil are typically subject to relatively small elastic settlements. Loads which exceed the maximum past pressure on the soil typically cause consolidation which is the gradual settlement of the ground as a result of expulsion of water from the pores of the soil. The rate of settlement and the time to complete consolidation is a function of the permeability of the soil.

The Schmertman equation has been employed to estimate the OCR of the soils with depth employing the CPT data provided in Appendix B and C.



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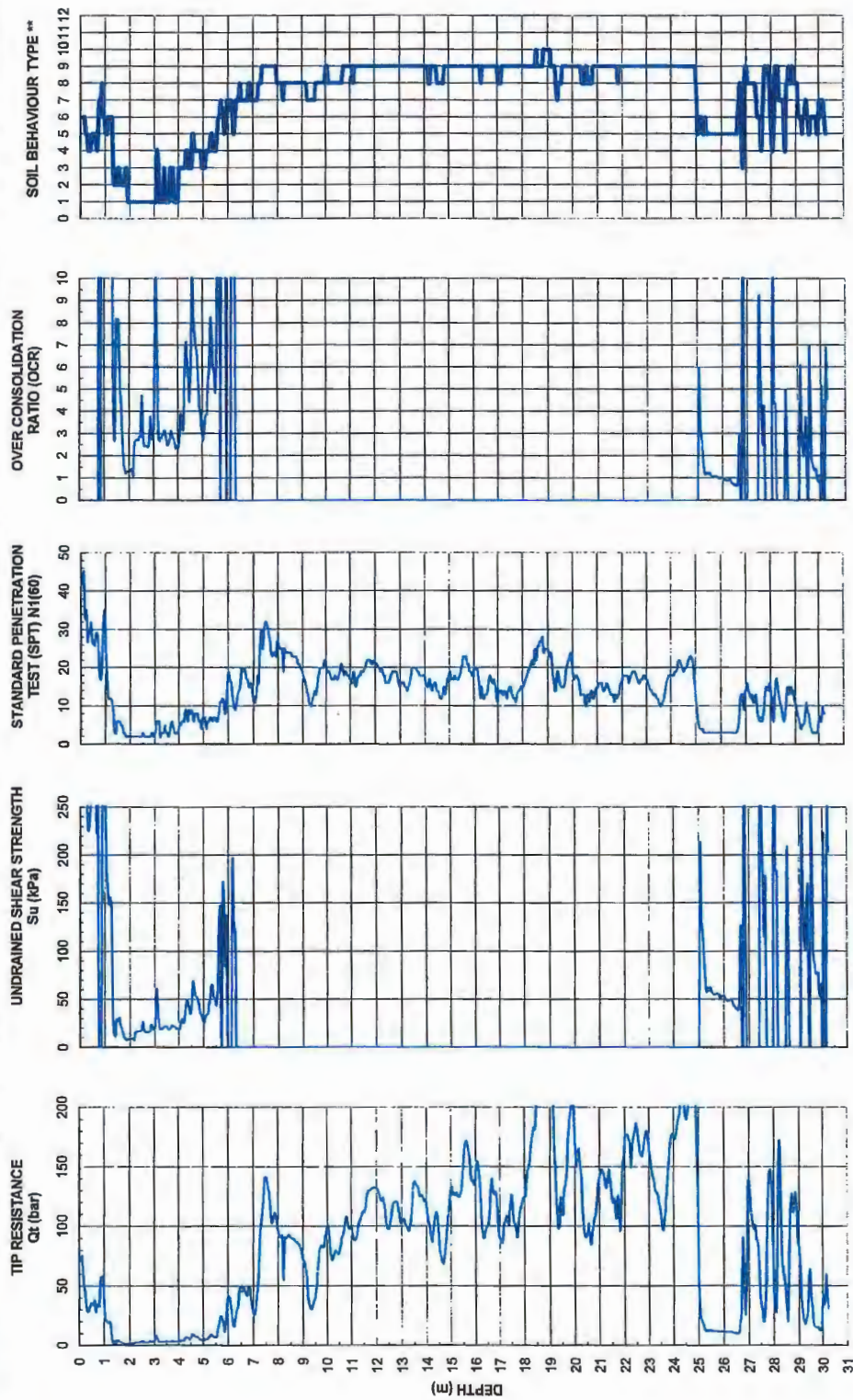
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CRANBERRY MEADOWS FARMS LTD

TERMINUS OF FRANCIS ROAD (EAST OF
NO. 6 ROAD), RICHMOND

GeoPacific Project #: 13570

Figure: C.01



** Based on Robertson et. al 1986

- 1 Sensitive Fine Grained
- 2 Organic Material
- 3 Clay

- 4 Silty Clay to Clay
- 5 Clayey Silt to Silty Clay
- 6 Sandy Silt to Clayey Silt

- 7 Silty Sand to Sandy Silt
- 8 Sand to Silty Sand
- 9 Sand

- 10 Gravelly Sand to Sand
- 11 Very Stiff Fine Grained
- 12 Sand to Clayey Sand



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2016-Jan-6

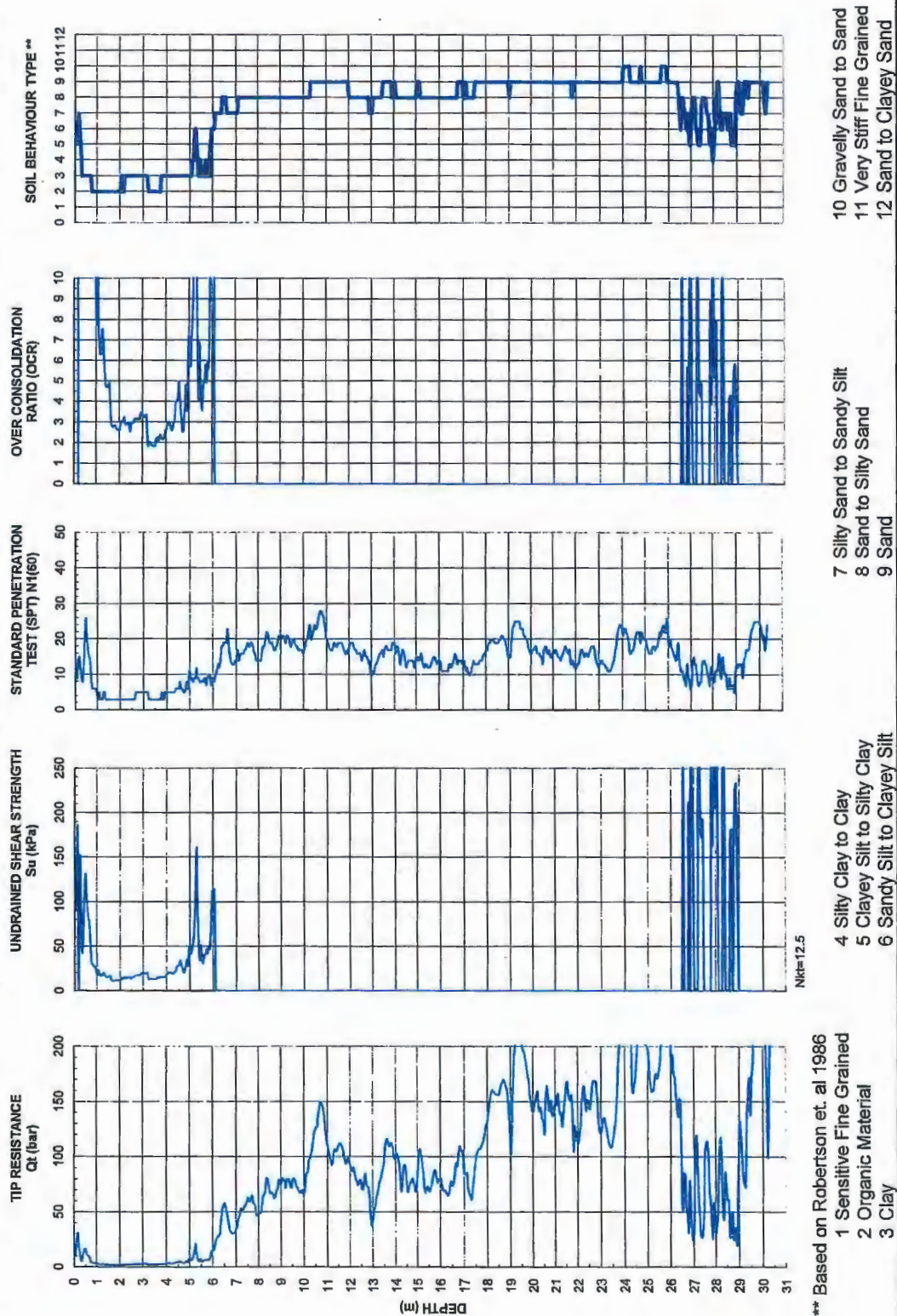
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CRANBERRY MEADOWS FARMS LTD

TERMINUS OF FRANCIS ROAD (EAST OF
NO. 6 ROAD), RICHMOND

GeoPacific Project #: 13570

Figure: C.02





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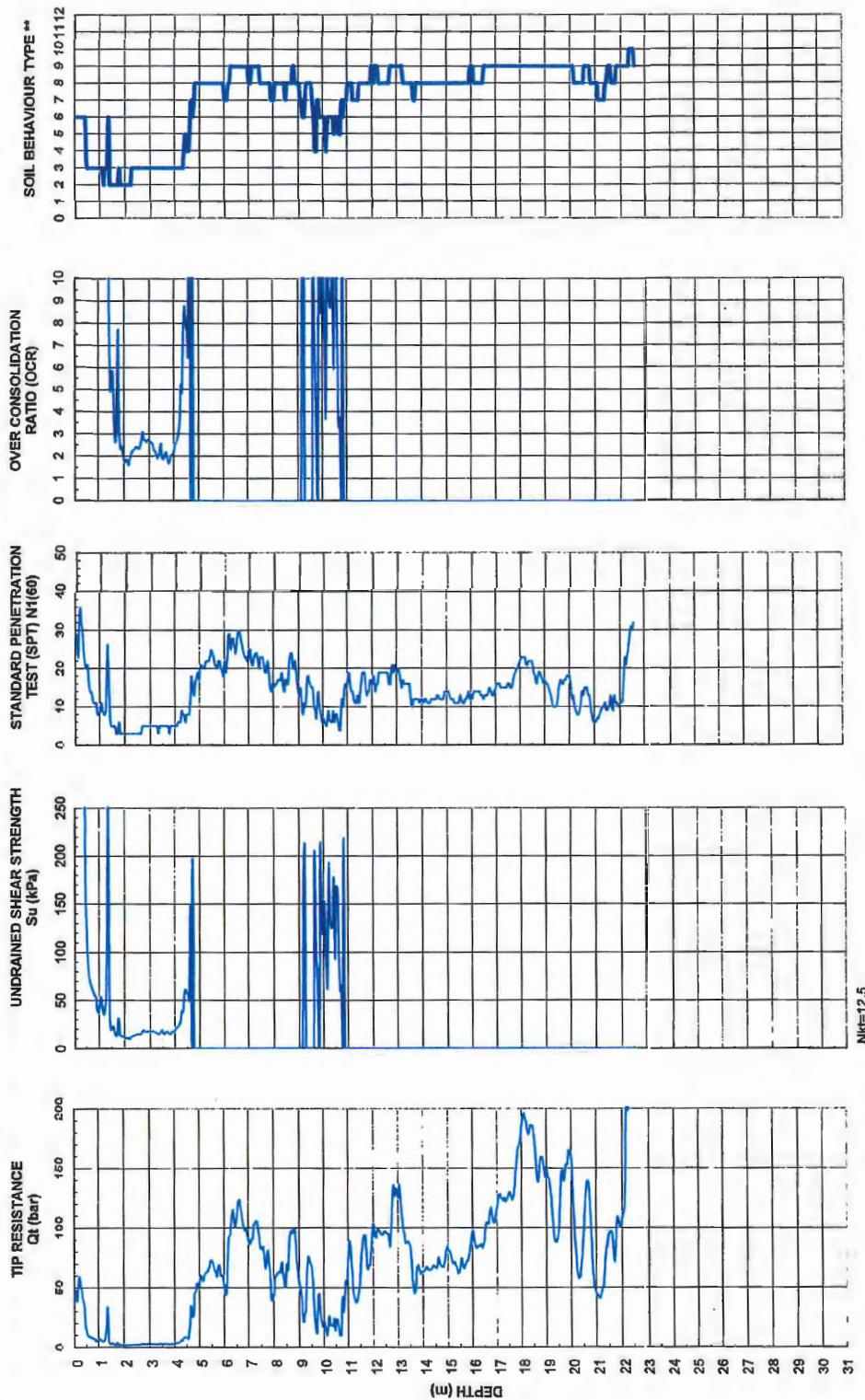
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Sounding: CPT16-03

CRANBERRY MEADOWS FARMS LTD
TERMINUS OF FRANCIS ROAD (EAST OF
NO. 6 ROAD), RICHMOND

GeoPacific Project #: 13570

Figure: C.03



Nkt=12.5

** Based on Robertson et. al 1986

- 1 Sensitive Fine Grained
- 2 Organic Material
- 3 Clay

- 4 Silty Clay to Clay
- 5 Clayey Silt to Silty Clay
- 6 Sandy Silt to Clayey Silt

- 7 Silty Sand to Sandy Silt
- 8 Sand to Silty Sand
- 9 Sand

- 10 Gravelly Sand to Sand
- 11 Very Stiff Fine Grained
- 12 Sand to Clayey Sand



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2016-Jan-6

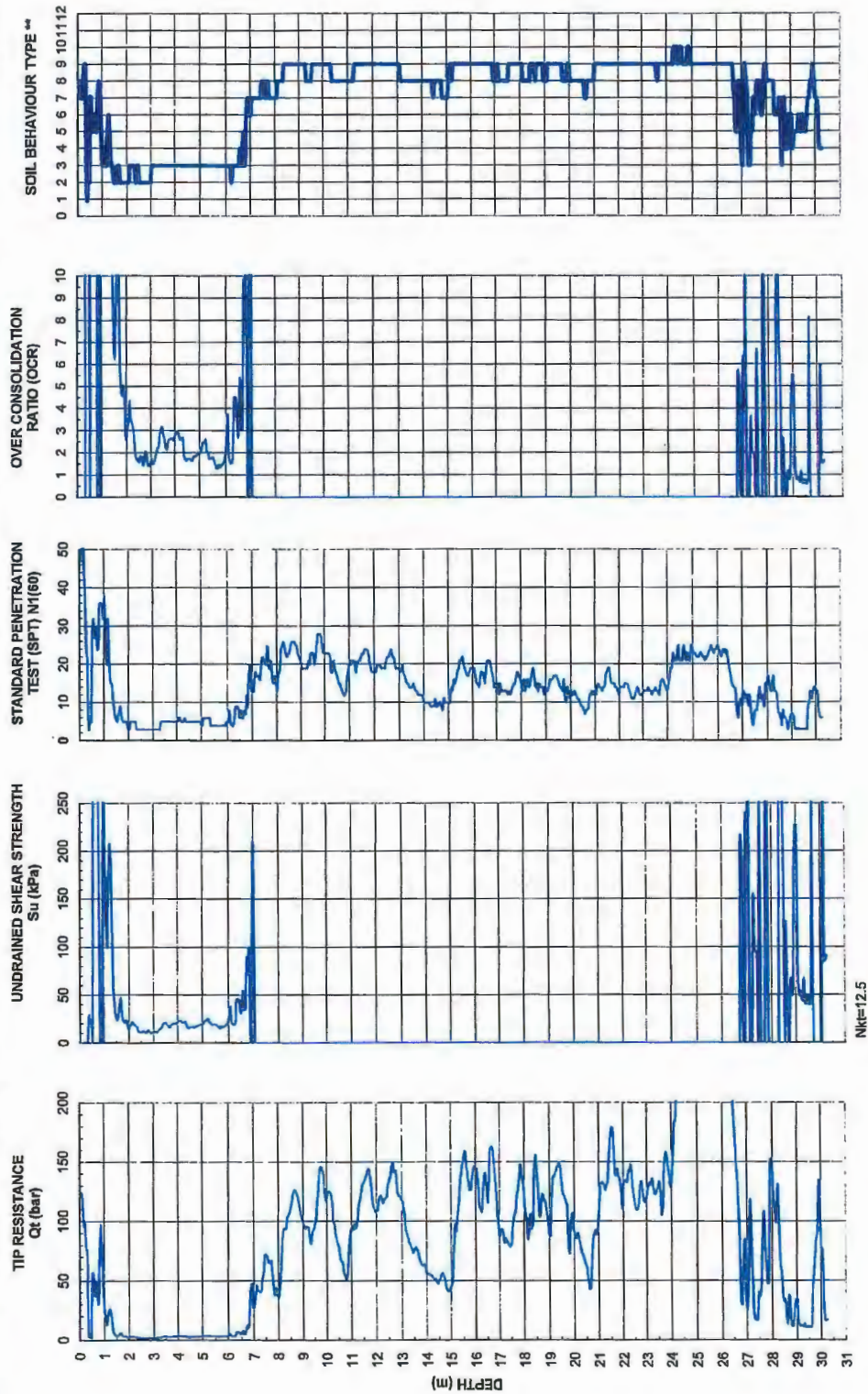
Sounding: CPT16-04

CRANBERRY MEADOWS FARMS LTD

TERMINUS OF FRANCIS ROAD (EAST OF
NO. 6 ROAD), RICHMOND

GeoPacific Project #: 13570

Figure: C.04



** Based on Robertson et. al 1986



City of Richmond

Report to Committee

To: General Purposes Committee

Date: February 21, 2017

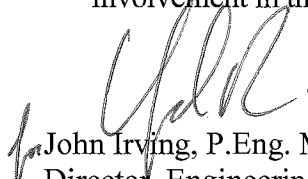
From: John Irving, P.Eng. MPA
Director, Engineering
Victor Wei, P.Eng.
Director, Transportation


File: 10-6350-05-08/2017-
Vol 01

Re: **George Massey Tunnel Replacement Project – Analysis of Approved
Environmental Assessment Certificate**

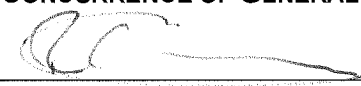

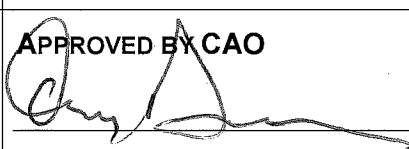
Staff Recommendation

1. That the City continue to reiterate its significant outstanding concerns to the Province regarding the George Massey Tunnel Replacement Project by sending a letter to the Ministry of Transportation and Infrastructure requesting that the Ministry address the concerns that were not resolved through the Environmental Assessment Application process for the Project; and
2. That staff be directed to continue seeking mitigation of any potential negative impacts of the Project on Richmond and the region through participation in Working Groups and input into management plans required by the Environmental Assessment Certificate as well as on-going involvement in the design and construction phases and related permit processes.


John Irving, P.Eng. MPA
Director, Engineering
(604-276-4140)


Victor Wei, P.Eng.
Director, Transportation
(604-276-4131)

Att. 3

REPORT CONCURRENCE		
ROUTED TO: Parks Policy Planning Fire-Rescue	CONCURRENCE <input checked="" type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>	CONCURRENCE OF GENERAL MANAGER 
REVIEWED BY STAFF REPORT / AGENDA REVIEW SUBCOMMITTEE	INITIALS: 	APPROVED BY CAO 

Staff Report

Origin

On July 27, 2016, the BC Environmental Assessment Office (BCEAO) advised the City that the 180-day Application Review stage for the George Massey Tunnel Replacement Project (the Project) was initiated. During this period, the BCEAO received and reviewed comments from the Working Group (includes City staff), Richmond City Council (via Council resolutions and associated staff reports) and the public. At the same time, the BCEAO compiled the Assessment Report, Certified Project Description and Table of Conditions, which were referred to the Minister of Environment and the Minister of Community, Sport and Cultural Development, along with the recommendation of the BCEAO, for decision on January 19, 2017.

On February 9, 2017, the Ministers issued an Environmental Assessment Certificate (the Certificate) to the Ministry of Transportation and Infrastructure (the Ministry) that includes 33 legally enforceable conditions (the Conditions). This report provides an assessment of the final Assessment Report, Certified Project Description and Table of Conditions and the extent to which they address the numerous concerns with the Project repeatedly identified by the City throughout the environmental assessment (EA) process.

Analysis

City Input during EA Process

During the EA process, Council expressed a preference for a new or improved tunnel (Council Resolution R16/17-6 of October 11, 2016) as opposed to the proposed 10-lane bridge and reiterated its key concerns related to land use and agricultural impacts, the scale of the infrastructure, traffic impacts on local roads and at the Oak Street Bridge, and the decommissioning of the tunnel enabling potential future dredging of the Fraser River. To ensure these concerns were considered during the EA process, the City provided input or commentary on the Project through the following means:

- Working Group: Staff participation in the EA Working Group that included meetings to develop, review and propose conditions for inclusion in the Table of Conditions.
- Letters to Senior Governments: Letters communicating Council resolutions were sent to senior government staff and elected officials.
- Meetings with Project Staff: City staff regularly met every two weeks with Project staff.
- Public Open Houses: Attendance at BCEAO open houses.

Section 3.5 (Local Government Consultation) of the Assessment Report fully itemizes the City's concerns. However, the Report either accepts the analyses and rationale presented by Project staff in the EA Application that the components of the Project would have little to no adverse residual effects or, where Conditions are imposed that are intended to address some of the City's concerns (discussed below), the City's role is typically limited to the provision of input as part of the consultation process with no guarantee that the feedback will be acted upon or result in changes to the Project that will be satisfactory to the City.

Certified Project Description

The Project has been given a Certificate based on the scope described in the EA application:

- Highway 99 Improvements: dedicated transit/HOV lanes, integrated transit stops at Steveston Highway and Highway 17A interchanges, up to four new general purpose lanes and ramp connections, replacement of Highway 99 interchanges at Westminster Highway, Steveston Highway and Highway 17A, and replacement of overpasses/underpasses at Cambie Road, Shell Road, Blundell Road, Ladner Trunk Road, and 112th Street.
- Bridge and Approaches: 10-lane bridge with a clear span over the Fraser River, southbound exit ramp to River Road South in Delta and removal of the Deas Slough Bridge.
- Tunnel Decommissioning: removal and offsite disposal of the four central in-river segments, decommissioning of the two remaining segments on either side of the four central segments, which will be left in place, and decommissioning of the approaches, ventilation shafts, and associated works.
- Temporary Activities: components that may be located anywhere within the Project corridor during construction including access roads, barging facilities, bridges at some or all Highway 99 interchanges and overpasses, laydown activities, and site office(s).

As evidenced by this unchanged Project description, there were no revisions to the Project scope (e.g., crossing scenario changed to a new tunnel, retention of the existing tunnel or a lower bridge with fewer lanes) in response to Council's conveyed concerns.

Table of Conditions

The Certificate has a total of 33 Conditions (the categories are shown in Attachment 1) that primarily ensure implementation of the mitigation measures where required and allow for on-going consultation with stakeholders (including the City) after issuance of the Certificate. Notwithstanding the approved Project scope, some of the City's concerns have been recognized as a result of the City's involvement and contributions and are reflected in selected Conditions. For each of the City concerns, the following sections summarize the Assessment Report's consideration of the concerns and, if a Condition has been identified to address the concern, compare the City's requested changes versus the final wording of the Condition. Attachment 2 provides a full comparison of the City's requested changes versus the final Certified Project Description and Table of Conditions.

Compatibility with Land Use Plans

City Concerns: The Project's expanded vehicle capacity for single occupant vehicles is not consistent with the Mayors' Council Vision, the Regional Growth Strategy or the City's Official Community Plan and may spur unplanned increased development south of the Fraser River and the conversion of farming land to non-agricultural uses.

City Requested Change: Add a new Condition that would require the Ministry to obtain written support from the Metro Vancouver Board that the Project is considered compatible with the Regional Growth Strategy.

Consideration in Assessment Report: The Report states the Ministry response that “*the Project has been designed to support a range of transportation, land use and economic development objectives identified in a number of regional and local land use and transportation plans and is generally consistent with these plans.*” The Project influence on land use is deemed to be moderate due to the lack of available developable land and the presence of restrictive land use controls. Thus, there is no new Condition associated with land use or the City’s concern.

Agricultural Impacts

City Concerns: The City identified the following concerns related to agriculture:

- Net Gain: No guarantee that highway right-of-way identified for return to agricultural use will be farmed to off-set the loss of the actively cultivated parcels required for the Project.
- Topsoil Conservation: Clarify how topsoil conservation will be undertaken.
- Soil Quality: Validate that soil quality of highway right-of-way identified for return to agricultural use will be equal to or better than that of the parcels required for the Project.
- Salt Wedge: Potential movement of the salt wedge as a result of the tunnel decommissioning.

City Requested Changes: That the draft Agricultural Management Plan be revised to include:

- how the Ministry will ensure that there will be new farming activity;
- how the highway right-of-way identified for return to agricultural use will be primed for farming including improvement of its soil capability class;
- how the topsoil reclamation program will be implemented; and
- greater monitoring of the salt wedge and the mitigation measures to be deployed should adverse changes be detected.

Consideration in Assessment Report (Condition 21): The Agricultural Management Plan must be developed in consultation with stakeholders including the City and the Richmond Farmers Institute and the final plan be provided to stakeholders no less than 60 days prior to the planned start date of construction. The implementation period of the Plan has been extended beyond construction only to two years post-construction, which will lengthen the window for the City to provide input. The Plan is to include the following key elements with respect to the City’s concerns (bold text identifies additions to the draft Condition):

- description of how the Ministry will offset the acquisition of parcels of farmland by restoring suitable lands within unused portions of the Highway 99 right-of-way and make these lands available for agricultural use;
- **the means by which topsoil salvage and reclamation will be implemented;** and
- the timing, duration and frequency of in-river salinity monitoring to be undertaken at the 80th Street Pump Station in Delta. Should the monitoring show that Project effects are not mitigated to the extent identified in the Application or are not predicted, then an adaptive management plan to address the effects is required.

However, the exact requirements of the measures are not specified. Thus, for example, there is no guarantee that the Ministry will ensure that that highway right-of-way identified for return to agricultural use will be farmed. The City will be able to provide input into the development of the Plan but the City’s endorsement is not required.

Visual and Noise Impacts

City Concerns: The proposed three-level configuration of the Steveston Highway Interchange and the widened Highway 99 are likely to have noise and visual impacts on adjacent land use, including the Gardens site, the City's Gardens Agricultural Park and the daycare within the site, area residents, and businesses. With respect to BC Hydro's relocation of its transmission line, Council expressed a preference for either an underground crossing or a transmission line attached to the new bridge.

City Requested Changes: Add a new Condition that the Ministry be required to re-examine the rationale for a 10-lane bridge and seek to minimize the extent of Highway 99 widening. Revise the draft Inter-Agency Working Group terms of reference to:

- state that the Ministry should obtain the support of the City on the design of Project infrastructure to be constructed in the city; and
- include BC Hydro as a member with the agency required to revise the scope of its transmission line relocation project to achieve the least visual impacts.

Consideration in Assessment Report (Conditions 12 & 24): The Inter-Agency Working Group (Condition 12) terms of reference must state how the Ministry will seek input from members on the following key elements related to the City's concerns (bold text identifies additions to the draft Condition) prior to the start of construction:

- design of infrastructure for the Project, including drainage, **cycling and pedestrian trails**, landscaping and visual considerations;
- **meeting Project lighting requirements that minimize light spill on adjacent areas;** and
- implementation of noise mitigation.

The Working Group must now remain active during operations as well as construction, which will extend the window for the City to provide input. However, the support of the City on the design of Project infrastructure is not required.

Implementation of the Noise Management Plan (Condition 24) is now extended beyond the construction phase to include the first 12 months following the start of operations. The Plan must include follow-up measures to be implemented if the specified minimum noise level objectives in the Ministry's Noise Policy have not been met during operations. Typically, mitigation measures will be implemented at noise-sensitive locations (e.g., residences, schools, places of worship) as warranted to avoid exceedances of specified noise thresholds in the Ministry's Noise Policy and achieve a minimum target noise reduction of 5 dBA.

With respect to the significantly expanded vehicle capacity of the crossing, the Report accepts the Ministry rationale that "*a 10-lane bridge would still be needed even with a tolled bridge and that, with an 8-lane bridge, there would still be peak hour congestion on opening day.*" The Report considers the cumulative visual effects of the BC Hydro transmission line relocation but concludes that the impact is not significant as the transmission line and towers are aligned with the bridge deck and piers. Accordingly, there are no Conditions related to BC Hydro.

Traffic Impacts

City Concerns: The City identified the following traffic-related concerns:

- Oak Street Bridge: Despite the claim of 40 percent of the traffic through the Tunnel destined to/from Vancouver, no contingency plans are identified to address the potential lengthening queues at the Oak Street Bridge during the peak periods.
- Local Road, Pedestrian and Cycling Networks: Lack of traffic analysis of the Project impacts at all intersections in Richmond adjacent to the Highway 99 corridor and no consideration of the impact of the proposed transit only lanes underneath the Oak Street Bridge that will cut across the Bridgeport Trail and the off-street multi-use pathway on Van Horne Way.

City Requested Changes: Revise the draft terms of reference for the Transportation Working Group for Highway 99 to require the Ministry to commit to monitor traffic operations at Oak Street Bridge and at all local intersections adjacent to the Highway 99 for a minimum of one year, provide a reserve contingency fund that can be used exclusively to address any unforeseen deficiencies caused by the Project and maintain the contingency fund for a minimum of two years after the full opening of the Project. In addition, the period of implementation for the Traffic Access Management Plan should be extended from during construction only to operations as well.

Consideration in Assessment Report (Conditions 12 & 28): The Transportation Working Group for Highway 99 (Condition 28) terms of reference must describe the scope and mandate to be addressed or implemented by the Working Group including the requirement of the Ministry to (bold text identifies additions to the draft Condition):

- present the results of traffic monitoring following the first year of Operations **and the third year of Operations**; and
- moderate a forum for members to identify and discuss the operation of transportation infrastructure in the Project area and the improvement of the operation of Project-related infrastructure and integration with adjacent infrastructure.

However, no contingency fund is required as part of the conditions and the monitoring is within the Highway 99 corridor only. The Transportation Working Group for Highway 99 is intended to be a forum for discussion only with no compulsory consultation. The Report quotes from the EA Application that “*northbound commuters who may change their preferred travel time to take advantage of potential time savings from the new bridge may result in longer queue lengths at Oak Street, if drivers choose to commute during the busiest part of rush-hour.*” The Report also states that the Ministry provided Richmond with analysis during the EA process that predicted that the Project would provide “*relief for a number of local Richmond roads, in particular for adjacent north-south municipal roads.*” This conclusion is questionable given that the Ministry’s shared analysis was limited to a single intersection adjacent to Highway 99 (Steveston Highway and No. 5 Road).

As noted above for Condition 12, the Inter-Agency Working Group, the City’s input is now required on the infrastructure design of cycling and pedestrian trails to address the City’s concern with the impact of the proposed transit only lanes underneath the Oak Street Bridge on the Bridgeport Trail and the off-street multi-use pathway on Van Horne Way. In addition, Condition

29, Traffic and Access Management Plan, must now be implemented during construction and operations, which will extend the window for the City to provide input.

Tunnel Decommissioning, Seismic Risk and Potential Future Dredging of Fraser River

City Concerns: While the Vancouver Fraser Port Authority may not have any current expressed plans for capital dredging, the removal of the tunnel would eliminate a key obstacle to future dredging of the Fraser River in order to enable larger vessels to navigate the river. In addition, the Project will be located in a high risk area for seismic activities.

City Requested Changes: Revise the draft Construction Marine Access Management Plan to require a commitment from the Port Authority that capital dredging of the river will not be undertaken. Require the Ministry to provide further analysis to substantiate that a bridge can be safely built in the proposed location given the soil conditions and identify the potential impacts to the Project infrastructure should a seismic event occur.

Consideration in Assessment Report: The Report accepts the Ministry rationale that the removal of the four in-stream segments of the tunnel is to mitigate potential damage to the bridge if there is a seismic event, to meet best practice regarding management of obsolete infrastructure and to provide opportunities to restore Fraser River habitat. The Report also notes the Port Authority's statement that the agency "*currently has no plans to dredge the Fraser River to create a wider or deeper navigation channel.*" The Certificate does not include a Condition to prohibit the future capital dredging of the Fraser River.

Further, the Report acknowledges that the Project would be situated in a high risk area for seismic activities but concludes that despite the consequence of damage considered to be moderate to high, the occurrence of seismic event causing permanent damage to Project infrastructure is considered remote. There is no requirement for the Ministry to undertake further analysis regarding construction of the bridge in the planned location.

Air Quality Impacts

City Concern: The Application's air quality study only addresses emissions from traffic within the Highway 99 corridor but the Project could cause significant traffic changes away from the study corridor (e.g., at other bridge crossings and gateway intersections in Richmond to avoid the toll and due to induced traffic resulting from land use changes south of the Fraser River).

City Requested Changes: Revise the draft Construction Environmental Management Plan to include the monitoring of local air quality at gateway locations in Richmond and bridge crossings as well as regional air quality for a minimum of five years during the operations phase or until the monitoring results meet the forecast improved local and regional air quality levels stated in the Application (i.e., forecast concentrations of various contaminants such as carbon monoxide (CO), volatile organic compounds (VOCs), particulate matter (PM), etc).

Consideration in Assessment Report: The Report accepts the Ministry's rationale that local air quality within Highway 99 corridor would improve primarily due to reductions in congestion-related idling and that "*a reasonable assumption is that reduced local emissions would result in decreased...contaminants on a regional scale.*" The Report concludes that the Project would

result in changes in ambient air quality during construction only; there is no Condition that requires the monitoring of air quality during the operations phase.

Drainage and Stormwater

City Concerns: The Project may impact the City's drainage and irrigation system and should incorporate flood protection measures.

City Requested Changes: Revise the draft Drainage and Stormwater Management Plan to explicitly identify that a performance objective of the Plan be that the Project does not negatively impact the hydraulic grade line in the City's drainage and irrigation system and the Ministry commit to incorporating flood protection and dike improvement measures as part of the Project.

Consideration in Assessment Report (Condition 16): The Drainage and Stormwater Management Plan now explicitly states that roadside ditches must be designed and constructed in a manner that maintains or improves water quality and pre-construction flow regimes. The Plan will now be active during construction and operations and will include measures to rectify any lack of conformance with performance objectives which, however, are not explicitly identified. In addition, as noted above for Condition 12, the Inter-Agency Working Group, the City's input is required on the infrastructure design of drainage.

With respect to mid-island flood protection, the Report states the Ministry's response that "*the Project includes a higher than standard median barrier design, with specifications to be determined during final detailed design.*" The EA Application states that dike reinforcement and bank protection where required will be incorporated into the Project design to maintain the integrity of the dike and to reduce the potential for erosion at the new bridge footings and support components.

Riparian Management Areas and Environmentally Sensitive Areas

City Concerns: The City has repeatedly requested that the Project replace, compensate and establish a net gain of Riparian Management Areas (RMA) and Environmentally Sensitive Areas (ESA) habitat. The City also noted concerns regarding the management of invasive plants (e.g., knotweed).

City Requested Changes: Revise the draft Agricultural Management Plan to explicitly identify that the plan must validate how the Ministry will ensure that there will be net area gain of RMAs and ESAs in Richmond within the Project scope.

Consideration in Assessment Report: The Report states the Ministry's response that the Project would include measures to improve habitat conditions and ecological productivity associated with water courses that exist within the Highway 99 right-of-way "*in a manner that is consistent with the intent of Richmond's RMA and ESA frameworks.*" The improvements would be achieved through the establishment of riparian buffers planted with appropriate vegetation (i.e., native shrubs and trees). The Report also references that the Ministry's permit application to the Ministry of Forests, Lands and Natural Resource Operations under the *Water Sustainability Act* would include an accounting of improvements to habitat values. The permit application has been referred to the City for review and comment and through this process the City is seeking a net gain in habitat.

In addition, the Construction Environmental Management Plan (Condition 13) must now include the additional elements of invasive plant managements, re-vegetation, site restoration, and accidents and malfunctions.

New Conditions Added

The final Certificate contains the following four Conditions that were added by the BCEAO subsequent to the City's review of the draft Conditions:

- Cumulative Effects (Condition 10): During any phase of the Project, the Ministry must participate in initiatives related to the monitoring, assessment, or management of cumulative environmental effects if requested by federal, provincial or regional government agencies.
- Involvement of Aboriginal Groups in Construction Monitoring (Condition 11): The Ministry must offer opportunities for members of Aboriginal Groups to participate in monitoring activities during Construction, including activities that may affect traditional use and related environmental values.
- Site Preparation in Advance of Construction (Condition 14): The Ministry must develop, in consultation with the City, an environmental management plan for addressing environmental effects associated with site preparation (see further discussion below under Next Steps).
- Aboriginal Cultural Awareness and Recognition (Condition 31): A plan must be developed that describes the process and opportunities for Aboriginal cultural awareness and recognition during construction and operations.

Outstanding City Concerns and On-Going Opportunities for Input

Given that the City's outstanding concerns with the Project have not been substantively addressed through the EA process, staff recommend that the City continue to reiterate these concerns to the Province by sending a letter to the Ministry of Transportation and Infrastructure requesting that the Ministry address the concerns separate from the EA process.

Going forward, in addition to membership in the Working Groups and input into the preparation of management plans required by the Certificate, the City will also have opportunities to continue to address some outstanding issues as the project proceeds due to on-going involvement in the design and construction phases and related permit processes, including the continuation of regular meetings held every two weeks with the Project team and, in the future, the Preferred Proponent.

Next Steps for Project

The Project team has advised the City that the start of site preparation in advance of construction works is anticipated within the coming weeks when all required authorizations are in place. Relevant Conditions to be met before this work can proceed include Condition 14 (Site Preparation in Advance of Construction, noted above) and Condition 9, which requires the retention of an Independent Environmental Monitor (IEM). The terms of engagement for the IEM must be developed in consultation with the City and the Ministry must submit the proposed IEM and the terms of reference to the BCEAO for approval at least 30 days prior to the start of site preparation. Separate from the EA process, the Agricultural Land Commission approved the Ministry's application for Transportation, Utility and Recreational Use along the Highway 99 Corridor on February 24, 2017.

Site preparation activities include land clearing, establishment of site access, drainage works, placement of preload material to facilitate ground improvements, and management of soil or other removed material. The work in Richmond will occur from Blundell Road south to the Fraser River.

The Request for Proposals (RFP) was issued to a short-list of three proponents on October 4, 2016. Upcoming RFP milestones are the Technical Submittal (March 15, 2017 deadline), which includes the design and construction strategies and schedules; followed by the Financial Submittal (deadline to be determined) that includes the price proposal and financial model. The Project team anticipates that a Preferred Proponent will be selected by June/July 2017. The Preferred Proponent will enter into a 30-year Concession Agreement for the delivery of the Project.

Financial Impact

None.

Conclusion

Based on the recommendation of the BC Environmental Assessment Office, the Province of BC has issued a conditional Environmental Assessment Certificate that allows the George Massey Tunnel Replacement Project to proceed. While no changes to the Project scope were made to reflect the City's key concerns, some of the 33 conditions of the Certificate have been revised as a result of the City's involvement and contributions such as increased opportunities to provide input on infrastructure design.

Staff recommend that the City continue to reiterate its outstanding concerns with the Project by sending a letter to the Ministry of Transportation and Infrastructure requesting that the Ministry address the concerns that were not resolved through the Environmental Assessment Application process for the Project. In addition, staff's participation in Working Groups and input into management plans required by the Certificate and on-going involvement in the design and construction phases and related permit processes would provide further opportunities to seek to address outstanding issues and mitigate any potential negative impacts of the Project on the community and the region.



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Donna Chan, P.Eng., PTOE
Manager, Transportation Planning
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JC:jc

Att. 1: Categories of BCEAO Table of Conditions

Att. 2: Comparison of Staff Comments on Draft versus Final Certified Project Description

Att. 3: Comparison of Staff Comments on Draft versus Final Table of Conditions

Categories of BCEAO Table of Conditions

No.	Condition
1	Document Review and Implementation
2	Plan Development
3	Consultation
4	Compliance Reporting and Verification
5	Project Status Notification
6	Compliance Notification
7	Transfer of Certificate
8	Transfer of Interest in Project
9	Independent Environmental Monitor
10	Cumulative Effects
11	Involvement of Aboriginal Groups in Construction Monitoring
12	Inter-Agency Working Group (IAWG)
13	Construction Environmental Management Plan
14	Site Preparation in Advance of Construction
15	Water Quality
16	Drainage and Stormwater

No.	Condition
17	A) Fish and Fish Habitat B) B) Fish Habitat Offsetting
18	Marine Mammals
19	A) Wildlife – Construction B) B) Wildlife – Operations
20	A) Vegetation – Construction B) Vegetation – Site Habitat Assessment Surveys C) Invasive Plant Species
21	Agricultural Use
22	River Bed and Hydrology
23	Lulu Island-Delta Water Main
24	Noise
25	Marine Users Group
26	Marine Access
27	Fisheries Access
28	Transportation Working Group for Highway 99
29	Traffic and Access
30	Archaeological - Heritage Resources
31	Aboriginal Cultural Awareness and Recognition
32	Aboriginal Engagement Reports
33	Public Communications and Engagement

Comparison of Staff Comments on Draft versus Final Certified Project Description

Section	City Comment on Draft Description	Addressed in Final Description?	Final Wording of Description
1.1 Highway 99 Improvements	<p>Add new additional bullets that the Project includes:</p> <ul style="list-style-type: none"> • multi-use pathways on new overpasses; • to fulfill the Ministry's Cycling Policy, provision of alternative cycling routes on local roads in Richmond and Delta that parallel Highway 99 between Van Horne Way in Richmond and Highway 91 in Delta in lieu of cycling facilities being provided within the Highway 99 right-of-way. 	No	The requested text was not added.
1.2 Bridge and Approaches	<p>Revise the list of items to be included in the Project to include:</p> <ul style="list-style-type: none"> • Connections between the multi-use pathways on the bridge to Steveston Highway, Rice Mill Road, River Road South, and the Millennium Trail. • Southbound Highway 99 ramp exit to Rice Mill Road and northbound Highway 99 ramp access from Rice Mill Road. 	No	The requested text was not added.

Comparison of Staff Comments on Draft versus Final Table of Conditions

Condition	City Comment on Draft Condition	Addressed in Final Condition?	Final Wording of Condition
3 Consultation	Specify minimum of 60 days for parties to provide comments on any plans, programs or document.	No	No minimum time for review is specified.
5 Project Status Notification	Parties to be notified should include local governments.	Yes	The City of Richmond, Corporation of Delta and Metro Vancouver have been added as parties to be notified 30 days prior to the start of site preparation, construction, tunnel decommissioning, and operations.
9 Independent Environmental Monitor	<p>The terms of engagement for IEM should provide authority to issue stop work orders in cases of non-compliance with environmental regulations.</p> <p>IEM reports to the BCEAO should be made available to the public.</p>	Partially	<p>The terms of engagement for the IEM must now also include:</p> <p>f) The situations in which the IEM will have the authority to stop work on part or all of the Project if the IEM determined that:</p> <p>i) The Holder has not, or may have not, complied fully with the requirements of this Certificate; and</p> <p>ii) Stopping work is necessary to prevent or reduce Project-related adverse effects as determined by the IEM or any IEM support;</p> <p>There is no requirement for the IEM report to be made available to the public.</p>
12 Inter-Agency Working Group	<p>Consultation on the draft Terms of Reference should occur prior to their finalization.</p> <p>The Terms of Reference should include:</p> <ul style="list-style-type: none"> That the Ministry obtain the support (rather than only seek input) of the City on the design and visual impacts of Project infrastructure to be constructed in the city and the scope of Project-related plans and programs to be implemented in the city during construction and 	No	<p>There is no requirement for consultation on the Terms of Reference.</p> <p>The final Terms of Reference:</p> <ul style="list-style-type: none"> do not require that the Ministry obtain the support of the City (i.e., unchanged as input only); do not include BC Hydro as a member or require the agency to revise the scope of its transmission line relocation project; specify a minimum of 30 (not 60) calendar days for the provision of comments

Comparison of Staff Comments on Draft versus Final Table of Conditions

Condition	City Comment on Draft Condition	Addressed in Final Condition?	Final Wording of Condition
	<p>operations;</p> <ul style="list-style-type: none"> BC Hydro be included as a member of the Inter-Agency Working Group and be required to revise the scope of its transmission line relocation project to achieve the least visual impacts; Minimum of 60 calendar days to provide comments on materials circulated; Maximum of 30 calendar days within which meeting notes should be distributed after each meeting. 		<p>on materials circulated;</p> <ul style="list-style-type: none"> do not specify a maximum time within which meeting notes should be distributed. <p>The final Terms of Reference now also include that the Ministry must seek input on:</p> <ul style="list-style-type: none"> cycling and pedestrian trails; meeting Project lighting requirements that minimize light spill on adjacent areas; adaptive management plans. <p>The IAWG must now be implemented during construction as well as operations.</p>
13 Construction Environmental Management Plan	<p>The Plan should include the monitoring of local air quality at gateway locations in Richmond and at bridge crossings as well as regional air quality for a minimum of five years during the operations phase (not just during construction) or until the monitoring results meet the forecast improved local and regional air quality levels stated in the Application, and the identification of measures to mitigate any adverse effects due to the Project.</p> <p>Explicitly identify groundwater management as part of the waste management strategy and the erosion and sediment control strategy.</p> <p>Clarify how the BCEAO would moderate disputes regarding elements of the Plan.</p>	No	<p>The Plan does not include air quality monitoring during the operations phase.</p> <p>Groundwater management is not identified as part of the waste management strategy or the erosion and sediment control strategy.</p> <p>There is no wording regarding how the BCEAO would moderate any disputes regarding elements of the CEMP.</p> <p>Elements of the Plan must now include:</p> <ul style="list-style-type: none"> human-wildlife contact; invasive plant management re-vegetation; site restoration; accidents and malfunctions.
15 Water Quality	<p>Management of turbidity levels should be expanded include metals content, pH levels and any other applicable water quality criteria in addition to turbidity levels.</p>	No	<p>There is no change to the wording regarding the management of turbidity levels.</p> <p>The Plan must now include:</p> <ul style="list-style-type: none"> measures to mitigate soil

Comparison of Staff Comments on Draft versus Final Table of Conditions

Condition	City Comment on Draft Condition	Addressed in Final Condition?	Final Wording of Condition
			<p>erosion and prevent sediment-laden water from affecting water quality;</p> <ul style="list-style-type: none"> • means by which re-suspension of sediments will be minimized during tunnel decommissioning.
<p>16 Drainage and Stormwater Management</p>	<p>The Plan should explicitly identify that:</p> <ul style="list-style-type: none"> • a performance objective be that the Project does not negatively impact the hydraulic grade line in the City's drainage and irrigation system; • the Ministry commit to incorporating flood protection measures along Highway 99 with a City preference for raising the entire highway; • the Ministry commit to incorporating the following foreshore dike improvement measures as part of the Project: <ul style="list-style-type: none"> ○ construction of new Dike to elevation of 5.5 as shown on the Reference Concept Plan; ○ 3:1 slopes constructed down from elevation 5.5 m to tie-in to the existing dike at elevation approximately 3.4 m at the west and east ends; ○ enhanced dike to tie into the new pile caps with location and extent of new pile caps as shown on the concept plan and concept elevation of the top of pile cap at 6 m; ○ dike crest width to be a minimum of 4 m; ○ ground improvements, consisting of stone 	<p>Partially</p>	<p>The final Plan does not:</p> <ul style="list-style-type: none"> • specify the performance objectives to be included; • require the Ministry to commit to incorporate flood protection measures along Highway; • require the Ministry to commit to incorporate the City's desired foreshore dike improvements. <p>The Plan now also requires the Ministry to design and construct roadside ditches in a manner that maintains or improves water quality and pre-construction flow regimes in these watercourses.</p>

Comparison of Staff Comments on Draft versus Final Table of Conditions

Condition	City Comment on Draft Condition	Addressed in Final Condition?	Final Wording of Condition
	<p>columns, extending 10 m beyond the main bridge pile caps;</p> <ul style="list-style-type: none"> ○ in the area between the pile caps, ground improvements, consisting of stone columns, extending from the pile caps to the existing ventilation building; ○ dike cross section with water facing and land facing slopes to be 3:1 slopes; ○ dike enhancements to be in accordance with Seismic Design Guidelines for Dikes, 2nd Edition dated June 2014. 		
17 A) Fish and Fish Habitat	The condition does not identify Riparian Management Areas in Richmond.	No	There is no identification of Riparian Management Areas in Richmond.
17 B) Fish Habitat Offsetting	Expand to include reference to upland fish habitat, the City's Riparian Management Areas, and that the Plan should involve the City of Richmond.	No	There is no reference to upland fish habitat or the City's Riparian Management Areas. The City is not identified as a party involved in the development of the Plan.
21 Agricultural Use	<p>Explicitly identify that the Plan must validate:</p> <ul style="list-style-type: none"> • how the Ministry will ensure that there will be new farming activity to off-set the loss of the actively cultivated parcels that are required for the Project; • how the topsoil reclamation program will be implemented; • that the highway right-of-way identified for potential return to agricultural use will be improved to a soil capability class equal to or better than that for the parcels required for the Project to ensure a net gain in soil quality; • greater monitoring of the 	Partially	<p>Elements of the Plan are to include:</p> <ul style="list-style-type: none"> a) The means by which topsoil salvage and reclamation will be implemented; b) Description of post-construction monitoring to be conducted to ensure reconstructed roadside ditches that are used or will be used for agricultural purposes are functioning as intended; c) The timing, duration and frequency of in-river salinity monitoring to be undertaken at the 80th Street Pump Station; d) Methods to identify and inform potentially-affected farm operators of any

Comparison of Staff Comments on Draft versus Final Table of Conditions

Condition	City Comment on Draft Condition	Addressed in Final Condition?	Final Wording of Condition
	<p>salt wedge and the mitigation measures to be deployed should adverse changes be detected;</p> <ul style="list-style-type: none"> a commitment by the Ministry to consult with the City of Richmond and the Richmond Farmers Institute if there are any further impacts to agricultural land beyond those identified in the Application; how the Ministry will ensure that there will be net area gain of RMAs and ESAs in Richmond within the Project scope. <p>The Condition should identify the Richmond Farmers Institute as one of the parties to receive the plan prior to commencement of construction.</p>		<p>potential disruption to utility services during construction; and</p> <p>e) Description of how the Ministry will offset the acquisition of parcels of farmland by restoring suitable lands within unused portions of the Highway 99 right-of-way and how the Ministry will make these lands available for agricultural use.</p> <p>The elements of the Plan are not explicitly identified nor is the Ministry required to validate the measures.</p> <p>There is no requirement to ensure that there will be a net area gain of RMAs and ESAs in Richmond within the Project scope.</p> <p>The Richmond Farmers Institute is now identified as one of the parties to receive the plan prior to commencement of construction.</p>
24 Noise	<p>As the Ministry's Noise Policy does not address passive parks in a quantitative manner similar to residential uses, the Project should be required to provide mitigation measures to the satisfaction of the City to address adverse noise effects on users of the Gardens Agricultural Park (e.g., noise berms and/or walls).</p>	No	<p>The Condition does not identify mitigation measures to address adverse noise effects on users of the Gardens Agricultural Park.</p> <p>The Plan must now also include:</p> <ul style="list-style-type: none"> A noise monitoring and follow-up program developed in accordance with MOTI's Noise Policy, which includes where, when, and the road-use conditions under which, noise monitoring will be conducted during construction and the first 12 months of operations; The means by which the Ministry will mitigate noise if the noise monitoring and follow-up program indicate

Comparison of Staff Comments on Draft versus Final Table of Conditions

Condition	City Comment on Draft Condition	Addressed in Final Condition?	Final Wording of Condition
			the minimum objectives specified in MOTI's Noise Policy have not been met.
26 Marine Access	Require a commitment from the Port of Vancouver that capital dredging of the river will not be undertaken.	No	The Condition does not include a requirement that the Port of Vancouver commit to not undertake any capital dredging of the river.
28 Transportation Working Group for Highway 99	<p>The Working Group should include that the Ministry commit to:</p> <ul style="list-style-type: none"> • extend the spatial boundaries and monitoring of traffic operations within the Highway 99 corridor to include all local intersections on either side of Highway 99 in Richmond for a minimum of one year; • provide a pool of funding to address any anticipated and unforeseen adverse traffic-related effects or deficiencies caused by the Project to the local road, pedestrian and cycling networks as well as the northbound Oak Street Bridge approach; • maintain this pool of contingency funding for local road, pedestrian and cycling network improvements for a minimum of two years after the Project becomes fully operational. <p>This contingency funding should total a minimum of \$5 million to ensure sufficient resources to address traffic-related impacts to the local road, pedestrian and cycling networks within Richmond and the northbound Oak Street Bridge approach.</p> <p>The Working Group should be established prior to commencement of construction (not operations), as the</p>	No	<p>The Ministry is not required to:</p> <ul style="list-style-type: none"> • extend the spatial boundaries and monitoring of traffic operations beyond the Highway 99 corridor; • provide or maintain a pool of contingency funding. <p>The Working Group is to be established prior to commencement of operations.</p> <p>The Working Group is not involved in the development of the Traffic Access Management Plan.</p>

Comparison of Staff Comments on Draft versus Final Table of Conditions

Condition	City Comment on Draft Condition	Addressed in Final Condition?	Final Wording of Condition
	Construction Traffic and Access Management Plan is to be prepared in consultation with the Working Group.		
29 Traffic and Access	<p>Some components of the Traffic and Access Management Plan refer to both construction and operation and thus require clarification. The condition should explicitly state that the Plan is to be implemented throughout construction <u>and operations</u> to the satisfaction of EAO.</p> <p>The condition states that the plan is to be developed in consultation with the Transportation Working Group for Highway 99 and provided to the TWG a minimum of 60 days prior to planned commencement of construction. However, the draft condition for the TWG states that the terms of reference for the TWG must be developed prior to the commencement of operations. It is not clear that the TWG will be established in order to be consulted on and review the plan.</p>	Partially	<p>The Plan must now be implemented throughout construction and operation.</p> <p>The Plan must now also include:</p> <ul style="list-style-type: none"> • Description of the requirements for consultation with TransLink in regards to potential impacts to transit operations and routing during construction; • The means by which the Ministry will provide opportunities for Aboriginal Groups, that have plant gathering areas identified through Project traditional land use studies, to access these areas in order to harvest, salvage or translocate any traditional use plants that would be cleared, prior to the commencement of clearing.
New Condition: Land Use	<p>Add a new condition to require the Ministry to:</p> <ul style="list-style-type: none"> • obtain written support from the Metro Vancouver Board that the Project is considered compatible with the Regional Growth Strategy; and • re-examine the rationale for a 10-lane bridge and the design for the widening of Highway 99 north of Steveston Highway Interchange with a view to minimizing the extent of widening. 	No	No new Condition was added.



City of Richmond

Report to Committee

To: General Purposes Committee **Date:** February 28, 2017

From: George Duncan
Chief Administrative Officer and Chair of the
Board, Lulu Island Energy Company **File:** 01-0060-20-
LIEC1/2016-Vol 01

Robert Gonzalez
Deputy CAO and General Manager, Engineering
and Public Works and Chief Executive Officer,
Lulu Island Energy Company

Re: **Lulu Island Energy Company - District Energy Assets Transfer
Consideration Value Ratification**

Staff Recommendation

That the ordinary resolution of the shareholder in Attachment 1 of the Lulu Island Energy Company report dated February 15, 2017 that ratifies the value of the district energy assets transferred to Lulu Island Energy Company (LIEC) be approved and adopted.

George Duncan
Chief Administrative Officer and
Chair of the Board, Lulu Island
Energy Company Inc.
(604-276-4338)

Robert Gonzalez, P.Eng
Deputy CAO and General Manager,
Engineering and Public Works and
Chief Executive Officer,
Lulu Island Energy Company Inc.
(604-276-4150)

Att. 2

REPORT CONCURRENCE		
ROUTED TO:	CONCURRENCE	CONCURRENCE OF GENERAL MANAGER
Law	<input checked="" type="checkbox"/>	
REVIEWED BY STAFF REPORT / AGENDA REVIEW SUBCOMMITTEE	INITIALS: A	APPROVED BY CAO



Report

6911 NO. 3 ROAD
RICHMOND, BC V6Y 2C1

DATE: February 15, 2017

TO: Board of Directors

FROM: Alen Postolka, District Energy Manager

Cindy Gilfillan, Manager, Financial Reporting

Re: Special General Meeting of the Lulu Island Energy Company District Energy Assets Transfer Consideration Value Ratification

Staff Recommendation

That the Board recommends to the Council (Shareholder) to approve and adopt the ordinary resolution in Attachment 1 of the staff report dated February 15, 2017 which will approve and ratify the dollar value of the Assets transferred to Lulu Island Energy Company (LIEC).

Origin

On October 11, 2016, Council authorized staff to transfer the City's district energy assets ("the Assets") to LIEC under the material terms and conditions set out in the staff report titled, "District Energy Assets Transfer from the City to Lulu Island Energy Company" dated August 26, 2016.

On November 7, 2016, the Shareholder approved that LIEC allot and issue to the City an additional three hundred fifty (350) common shares at a deemed issue price equal to the fair market value of the transferred Assets after the transfer is completed. At the same meeting, Shareholder also resolved that the dollar value of the transferred Assets ("Transfer Consideration") be ratified and confirmed by an ordinary resolution of the sole shareholder by March 31, 2017.

The purpose of this report is to request that the Shareholder consider and adopt the ordinary resolution which will approve and ratify the dollar value of the Assets transferred to Lulu Island Energy Company (LIEC).

Analysis

As directed by Council and endorsed by the LIEC Board of Directors, the Asset Purchase Agreement (APA) dated December 16, 2016 has been executed and provides for an initial closing date of December 31, 2016 and a second and final closing date of March 31, 2017. As per the APA, a Closing Valuation Statement has been prepared determining and setting out the value of the Assets (Attachment 2).

The value of the Assets is based on the net book value of the Assets as of the date(s) of closing, calculated in accordance with generally accepted accounting principles.

The operations of the Alexandra District Energy Utility are transferred to LIEC effective December 31, 2016 at 11:59:59pm. Effectively, all operations for 2016 are recorded under the City and activity as of January 1, 2017 is recorded under LIEC. Note, there is no overall impact to the consolidated financial statements; however, the activity will be presented under the appropriate segment for the period of control.

Financial Impact

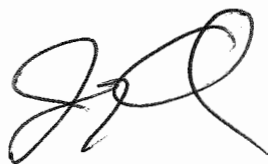
The City is to receive 350 common shares valued at \$26,997,113.50.

Conclusion

The completion of the district energy assets transfer to LIEC was the final step towards Council's goal of assigning LIEC the function of providing district energy services on behalf of the City. The ratification of the fair and correct dollar value of the transferred assets is a requirement under the Shareholder's resolution of November 7, 2016 and is important in order to support the ongoing successful establishment of LIEC, which will return additional benefits to Richmond residents in the long term.



Alen Postolka, P.Eng, CEM
Manager, District Energy
Lulu Island Energy Company
(604-276-4283)



Jerry Chong
Chief Financial Officer,
Lulu Island Energy Company
Director, Finance, City of Richmond,
(604-276-4064)

RG:ap

- Att. 1: Lulu Island Energy Company Consent Resolutions of the Shareholder
- 2: Closing Valuation Statement



CONSENT RESOLUTIONS OF THE SHAREHOLDER OF

LULU ISLAND ENERGY COMPANY LTD.
(the "Company")

The undersigned, being the sole voting shareholder of the Company, hereby consents to and adopts in writing the following resolutions:

Transfer Consideration

WHEREAS:

A. The Company entered into an asset purchase agreement dated for reference December 16, 2016, with the City of Richmond (the "**Asset Purchase Agreement**"), providing for the transfer of the Assets (as that term is defined in the Asset Purchase Agreement) in exchange for the issuance of shares by the Company at an issue price equal to the net book value of the Assets (the "**Transfer Consideration**").

B. The Asset Purchase Agreement provides that the Company and the City of Richmond shall determine the net book value of the Transfer Consideration on or before March 31, 2017.

C. Pursuant to the resolution of the Company's shareholder dated November 7, 2016, the dollar value of the Transfer Consideration is to be ratified and confirmed by ordinary resolution of the shareholder by March 31, 2017.

RESOLVED THAT:

1. the value of the Transfer Consideration is hereby ratified and confirmed to be \$26,997,113.50; and
2. the issue price for each of the 350 Common shares issued to the City of Richmond on March 31, 2017, is hereby determined to be \$77,134.61 per share.

DATED as of _____, 2017.

CITY OF RICHMOND

Per: _____

District Energy Utility Asset Closing Valuation Statement

	December 31, 2016	March 31, 2017	Total transfer value
Net Book Value of Tangible Capital Assets			
Alexandra Phase 1 and 2 assets and associated ETS	3,840,309.88	-	3,840,309.88
Alexandra Phase 3 assets and associated ETS	12,320,291.59	1,842.03	12,322,133.62
Alexandra Phase 4 assets and associated ETS	6,996,624.58	40,001.74	7,036,626.32
Total NBV of TCA	\$23,157,226.05	\$41,843.73	\$23,199,069.82
	December 31, 2016	March 31, 2017	Total transfer value
Unspent Capital Funding			
Alexandra Phase 3	-	199,256.95	199,256.95
Alexandra Phase 4	-	666,563.75	666,563.75
City Centre	-	400,025.29	400,025.29
Total Unspent Capital Funding	\$-	\$1,274,465.99	\$1,274,465.99
	December 31, 2016	March 31, 2017	Total transfer value
DEU Operations			
ADEU accumulated surplus	\$-	\$2,523,577.89	\$2,523,577.89
	December 31, 2016	March 31, 2017	Total transfer value
Total Value of Asset Transfer	\$23,157,226.05	\$3,839,887.46	\$26,997,113.50

Note: all March 31, 2017 figures are projected.