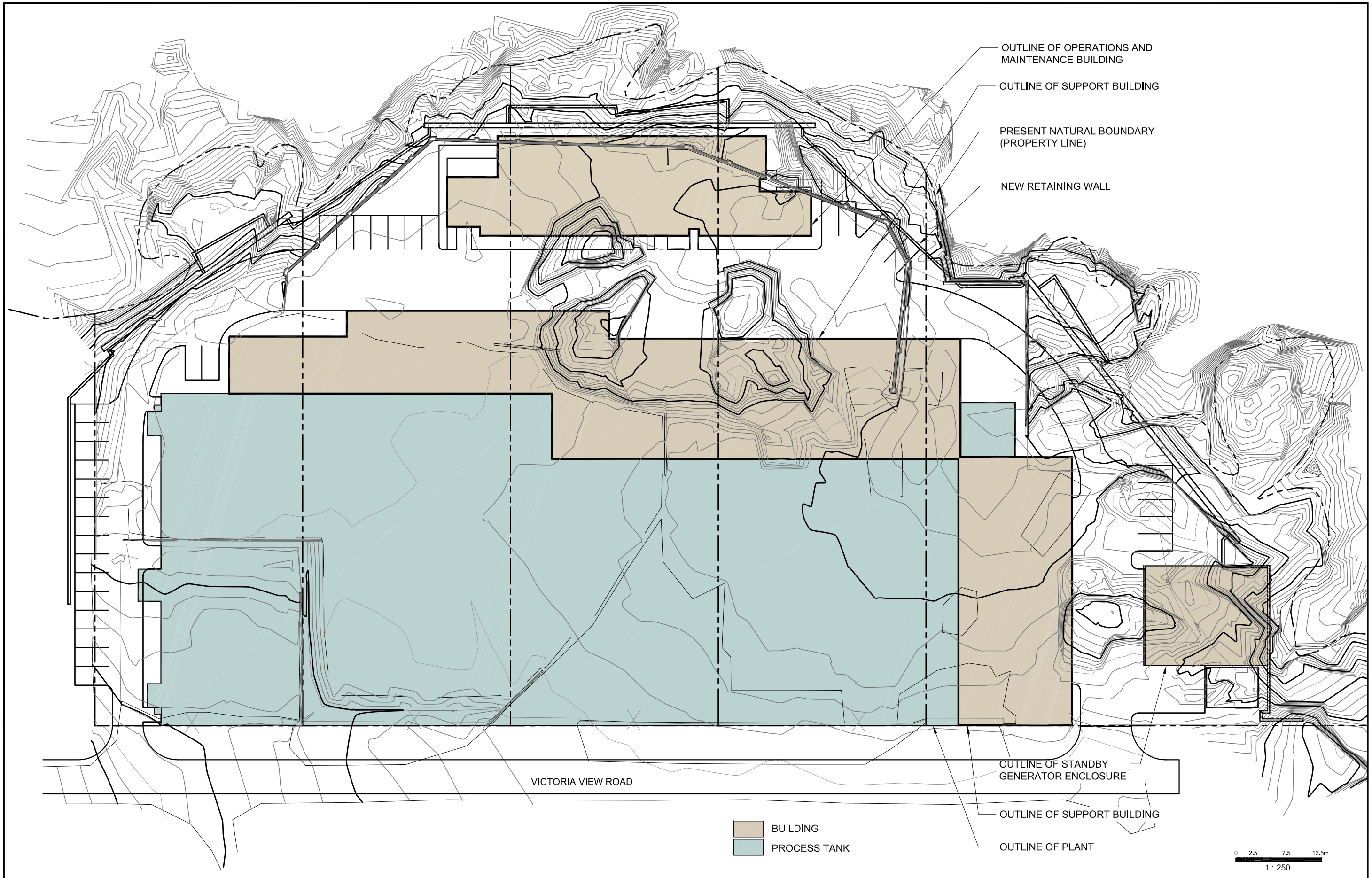
APPENDIX C:
Site & Floor Plans



CAD FILE : \\vdt122-fs01\shared_projects\111700431\Architecture\06_dwg\5-02_ast\01_Current\5-B-XXX-202.dwg
PRINTED BY : JMO - JANUARY/25/2013 - 11:46AM

Stantec

SEAL

BY	DATE	No.	REVISION	ENG.

No.	DATE	ISSUE
1	25.01.2013	ISSUED FOR REZONING APPLICATION

Making a difference...together

Capital Regional District |	Core Area Wastewater Treatment Program		
DESIGNED		SURVEYED –	
DRAWN –		DATE 25/01/13	
SCALE HORIZONTAL 1: 250		CHECKED	
SCALE VERTICAL –		APPROVED	

CORE AREA WASTEWATER TREATMENT PROGRAM

McLOUGHLIN POINT WWTP
EXISTING SITE CONTOUR DIAGRAM

CONTRACT NUMBER	DRAWING NUMBER	ISSUE	SHT. No. OF
–	5-B-XXX-202	–	– –

VICTORIA HARBOUR

HIGH WATER LINE (1.8024m)

PROPOSED RETAINING WALL

PRESENT NATURAL BOUNDARY

OPERATIONS AND MAINTENANCE BUILDING

EXISTING RETAINING WALL

GREEN

PARKING

ACCESS ROAD

CHEMICAL BUILDING

WORKSHOP

ELECTRICAL WORKSHOP

ODOUR CONTROL ROOM

HEAT RECOVERY ROOM (ABOVE)

DIRTY WASH WATER STORAGE TANK (BELOW GROUND)

BIOLOGICAL AERATED FILTERS

HIGHRATE PRIMARY CLARIFIERS

BLOWER AND EFFLUENT PUMP STATION (ABOVE)

UV ROOM (ABOVE)

CLEAN WASH WATER STORAGE TANK (BELOW GROUND)

ELECTRICAL ROOM (ABOVE)

STANDBY GENERATOR

TRANSFORMER

SECURITY FENCE

4.5m WIDE ACCESS ROAD

PROPERTY LINE (GREEN WALL)

ENTRANCE

EXIT

0 2.5 7.5 12.5m

1 : 250

Stantec

SEAL

BY	DATE	No.	REVISION	ENG.

No.	DATE	ISSUE

Making a difference...together

Capital Regional District | Core Area Wastewater Treatment Program	
DESIGNED MN/KC	SURVEYED –
DRAWN PRC	DATE 08/01/13
SCALE HORIZONTAL 1:250	CHECKED PP
SCALE VERTICAL –	APPROVED RAF

CORE AREA WASTEWATER TREATMENT PROGRAM

Mc LOUGHLIN PT. SITE

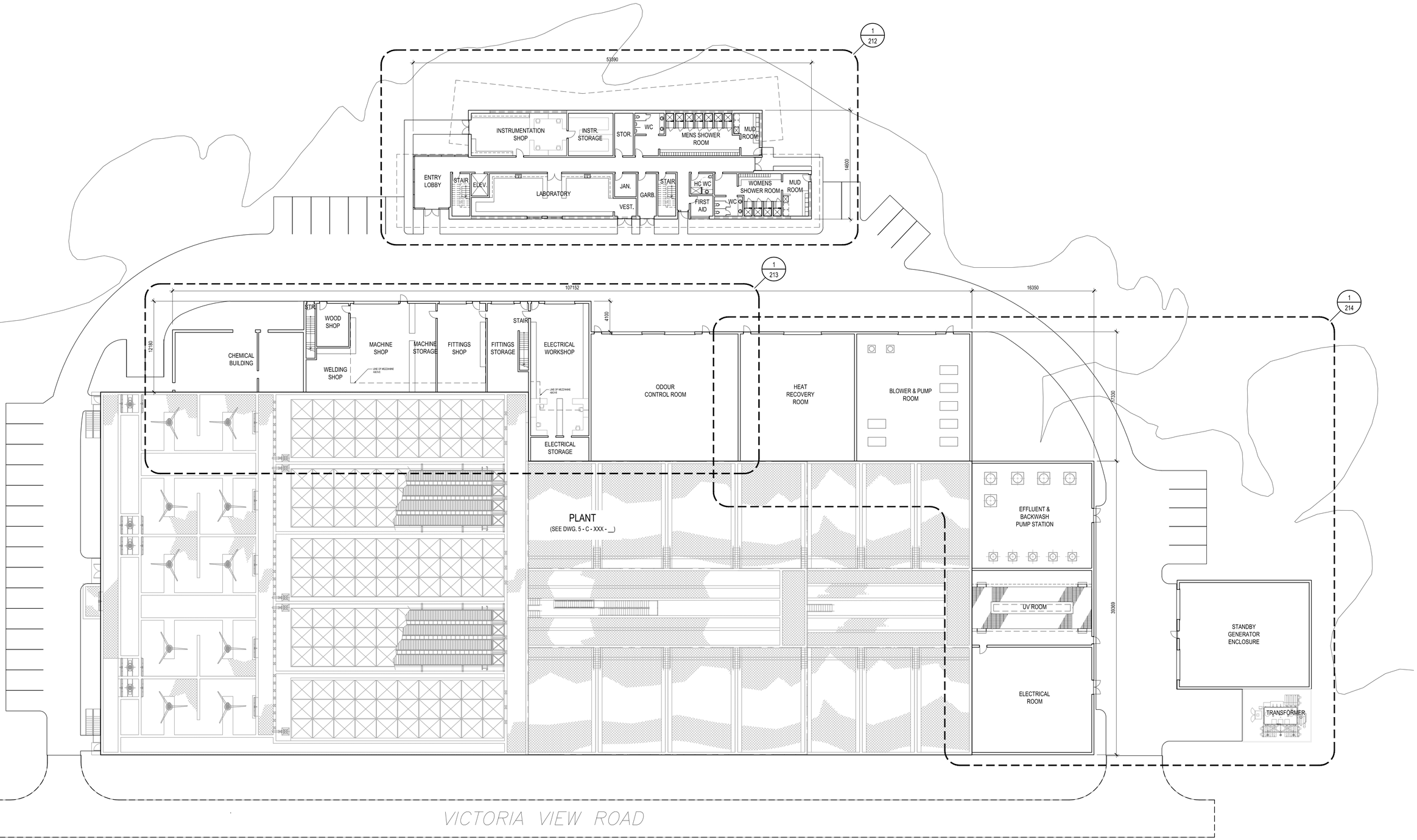
–

–

SITE PLAN

CONTRACT NUMBER	DRAWING NUMBER	ISSUE	SHT. No. OF
–	5-B-XXX-201	–	– –

CAD FILE : \\cd1222-f01\shared_projects\111700431\Architecture\06_dwg\5-02_ad\01_Current\5-B-XXX-201.dwg
PLOTTED BY : FJOSE - JANUARY/23/2013 - 5:35PM



LEVEL 1 OVERALL PLAN

0 2.5 7.5 12.5m

1 : 250

Xrefs: A1-CRD-TITLE.DWG
Drawing: V:\0961\456002\DRAWINGS_PAGE SETUP.DWG
August 01, 2009 9:19:07

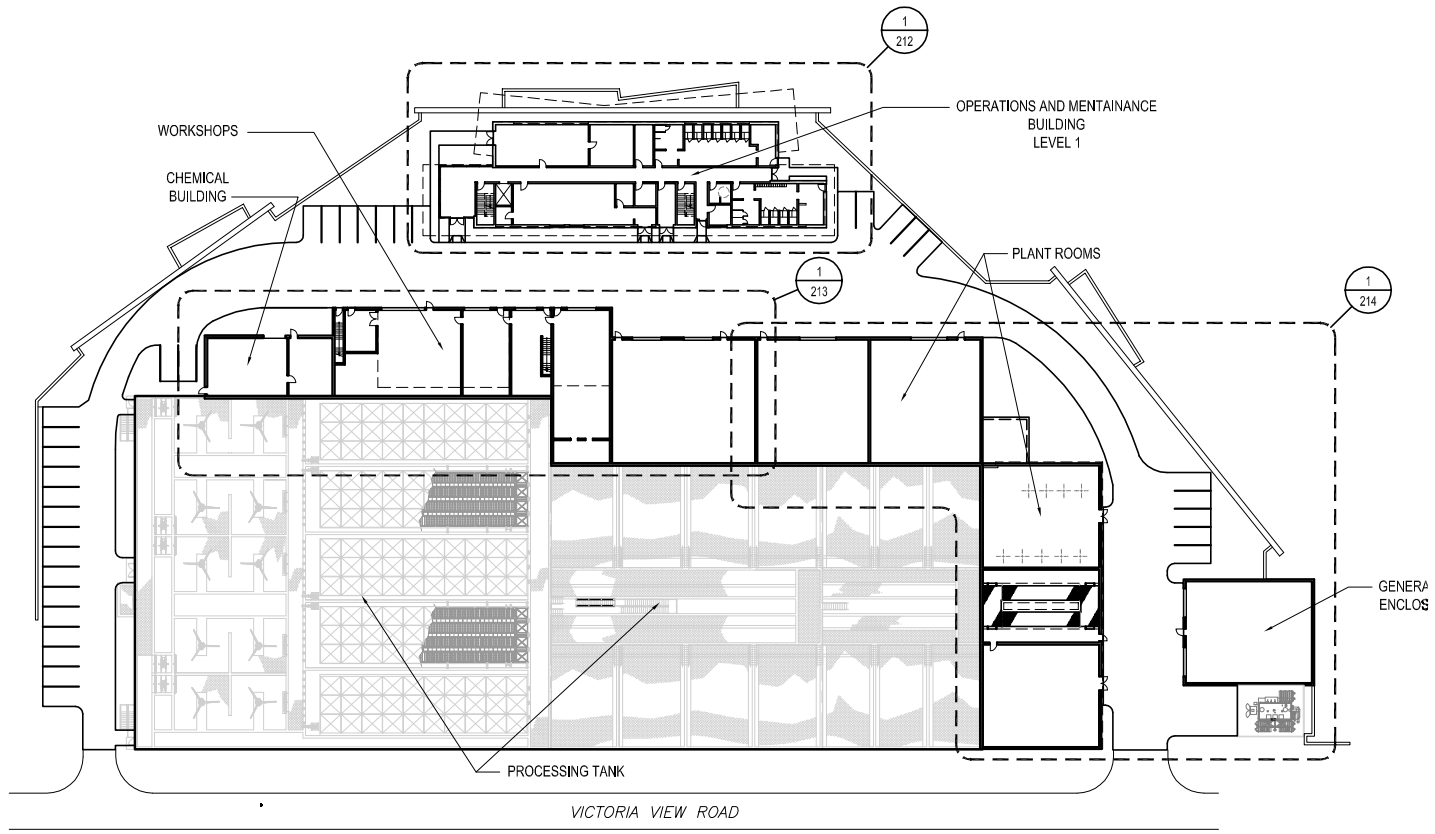
Stantec

SEAL	BY	DATE	No.	REVISION	ENG.	No.	DATE	ISSUE

Making a difference...together

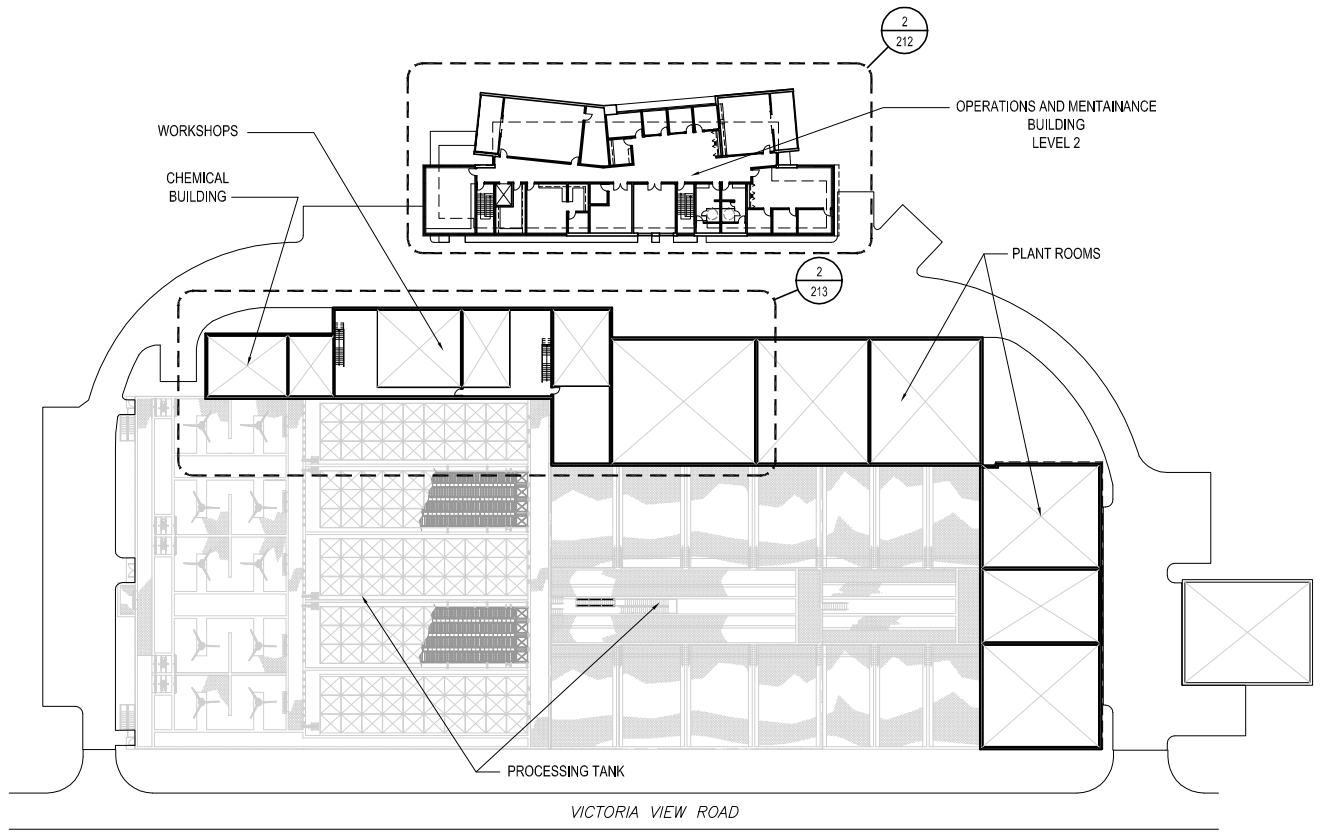
Capital Regional District | Core Area Wastewater Treatment Program		
DESIGNED –	SURVEYED –	CORE AREA WASTEWATER TREATMENT PROGRAM
DRAWN –	DATE 05/12/12	Mc LOUGHLIN PT. SITE – OPERATIONS AND MAINTENANCE BUILDING LEVEL 1 OVERALL PLAN
SCALE HORIZONTAL 1:250	CHECKED –	
SCALE VERTICAL –	APPROVED –	

CONTRACT NUMBER	DRAWING NUMBER	ISSUE	SHT. No.
–	5-B-XXX-210	–	– OF –



1 LEVEL 1 KEY PLAN
SCALE: 1:500

0 5 15 25m
1 : 500



2 LEVEL 2 KEY PLAN
SCALE: 1:500

0 5 15 25m
1 : 500

Stantec

SEAL

BY	DATE	No.	REVISION	ENG.

No.	DATE	ISSUE
1	25.01.2013	ISSUED FOR REZONING APPLICATION

Making a difference...together

Capital Regional District | Core Area Wastewater Treatment Program

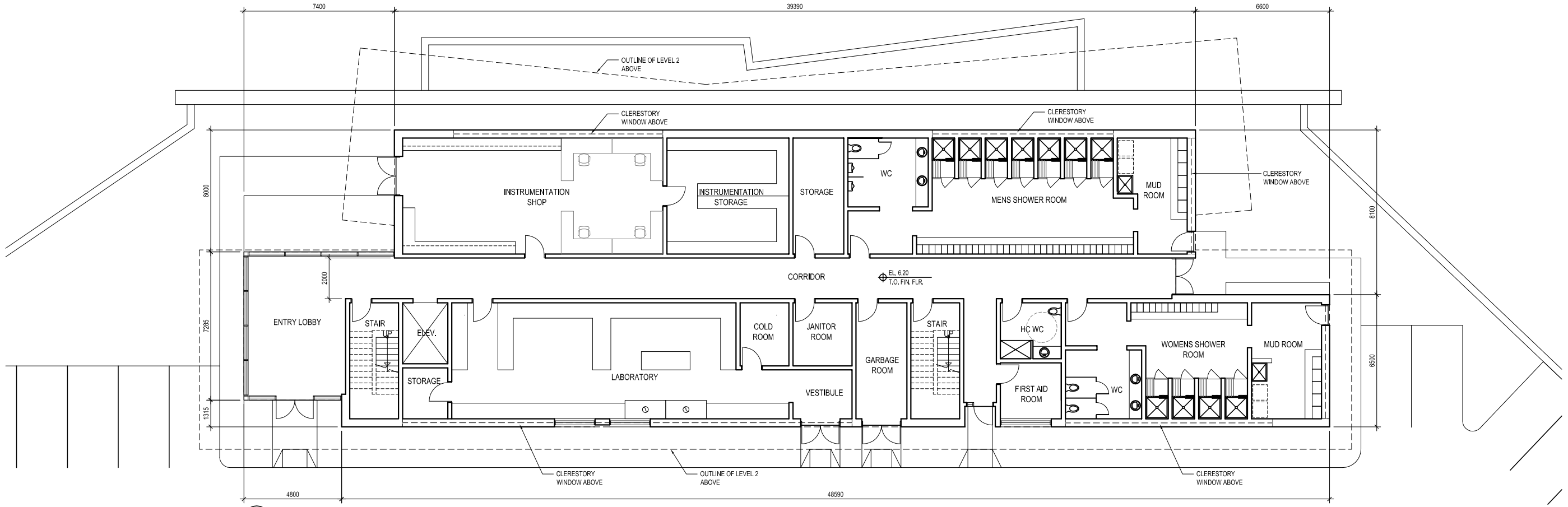
DESIGNED	DH/AH	SURVEYED	–
DRAWN	FJ	DATE	05/12/12
SCALE HORIZONTAL	1:500	CHECKED	DH
SCALE VERTICAL	–	APPROVED	AH

CORE AREA WASTEWATER TREATMENT PROGRAM

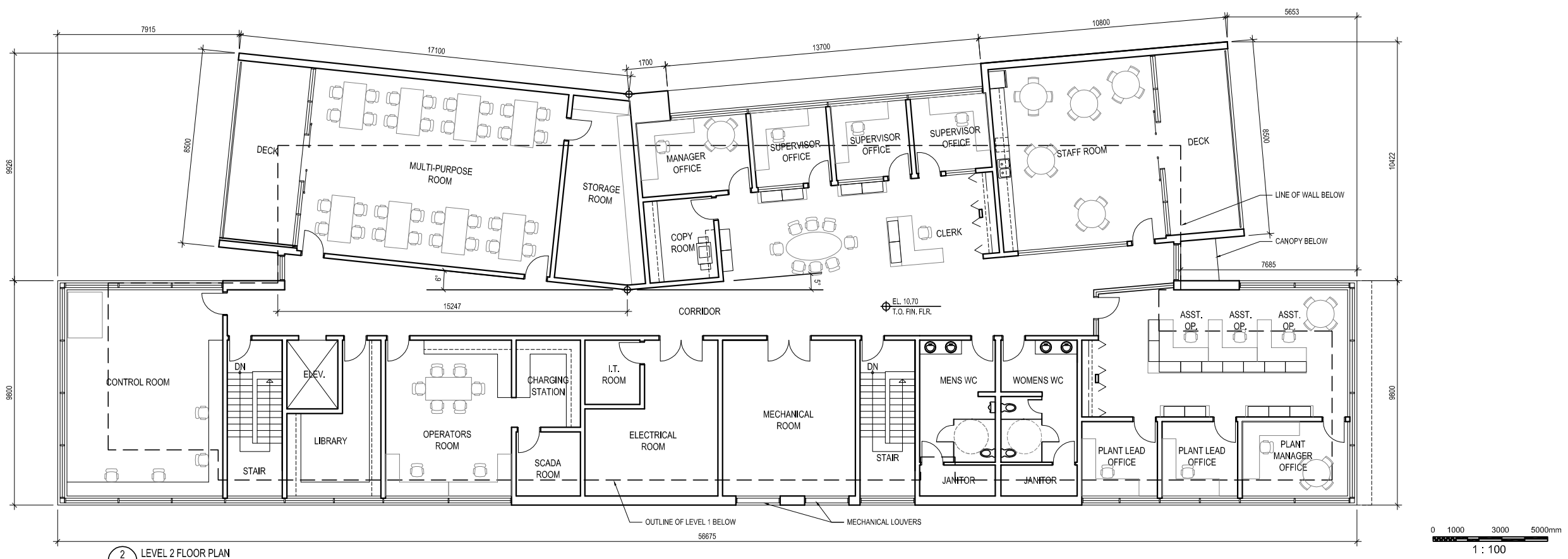
McLOUGHLIN POINT WWTP
LEVEL 1 & LEVEL 2 KEY PLANS

CONTRACT NUMBER	DRAWING NUMBER	ISSUE	SHT. No. OF
–	5–B–XXX–211	–	– –

CAD FILE : \\vi1222-f01\shared_projects\111700431\Architecture\06_dwg\6-02_sd\01_Current\5-B-XXX-211.dwg
PRINTED BY : JGOSE -Jan/Mon/25/2013 - 1:37PM



1 - LEVEL 1 FLOOR PLAN
SCALE: 1:100



2 - LEVEL 2 FLOOR PLAN
SCALE: 1:100

0 1000 3000 5000mm
1 : 100

CAD FILE : \\cd2222-f01\shared_projects\1117004431\Architecture\06_dwg\6-02_arch\01_Current\5-B-XXX-212.dwg
PRINTED BY : JSOSE - Jeudi, 25 juillet 2013 - 1:41PM

Stantec

SEAL

BY	DATE	No.	REVISION	ENG.

No.	DATE	ISSUE
1	25.01.2013	ISSUED FOR REZONING APPLICATION

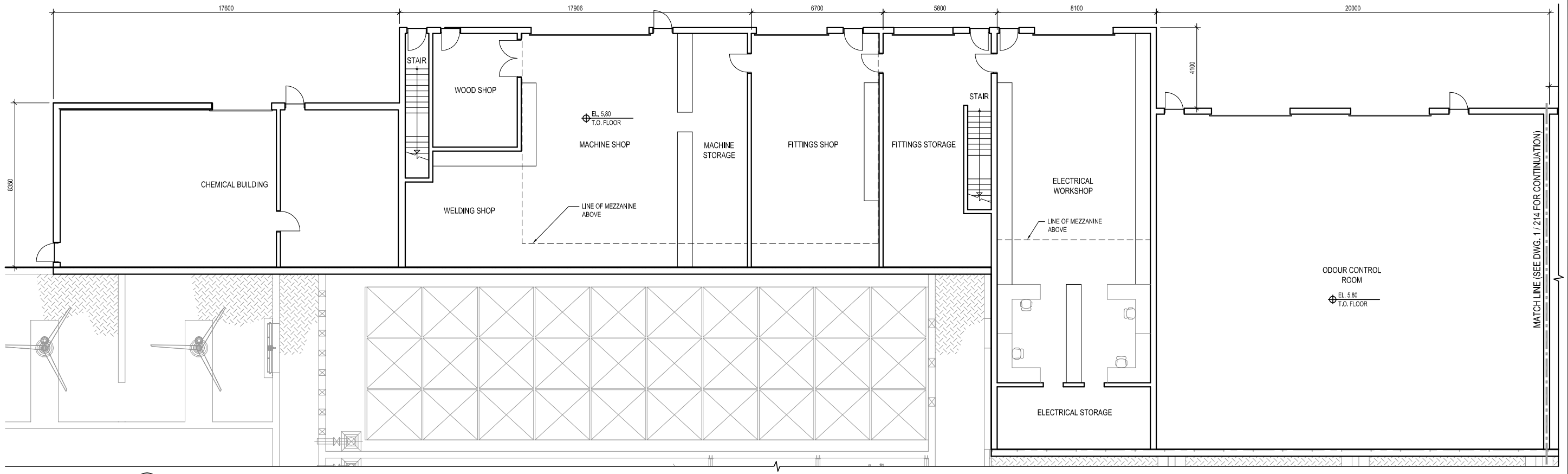
Making a difference...together

Capital Regional District |	Core Area Wastewater Treatment Program		
DESIGNED	DH/AH	SURVEYED	–
DRAWN	FJ	DATE	05/12/12
SCALE HORIZONTAL	1:100	CHECKED	DH
SCALE VERTICAL	–	APPROVED	AH

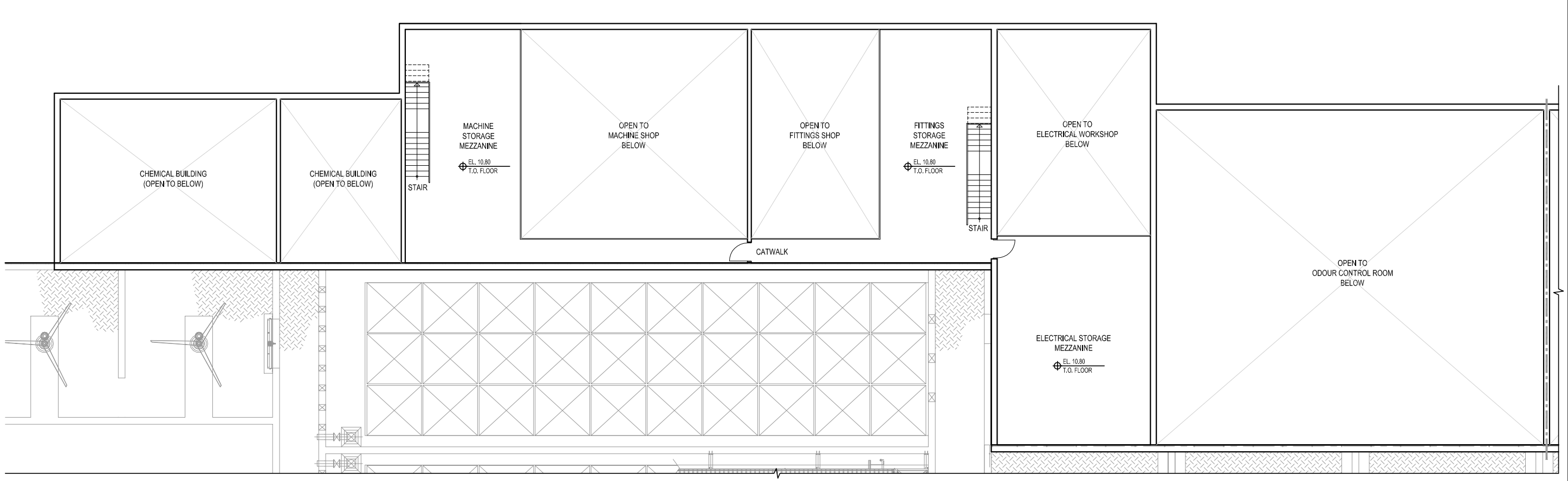
CORE AREA WASTEWATER TREATMENT PROGRAM

McLOUGHLIN POINT WWTP
OPERATIONS AND MAINTENANCE BUILDING
LEVEL 1 & LEVEL 2 FLOOR PLANS

CONTRACT NUMBER	DRAWING NUMBER	ISSUE	SHT. No. OF
–	5-B-XXX-212	–	–



1 LEVEL 1 FLOOR PLAN
SCALE: 1:100



2 MEZZANINE FLOOR PLAN
SCALE: 1:100

CAD FILE : \\stt222-f01\shared_projects\117904\1\Architecture\06_dwg\5-02_a1\01_Current\5-B-XXX-213.dwg
PRINTED BY : SJOZ -JANUARY/25/2013 - 1:50PM

Stantec

SEAL

BY	DATE	No.	REVISION	ENG.

No.	DATE	ISSUE
1	25.01.2013	ISSUED FOR REZONING APPLICATION

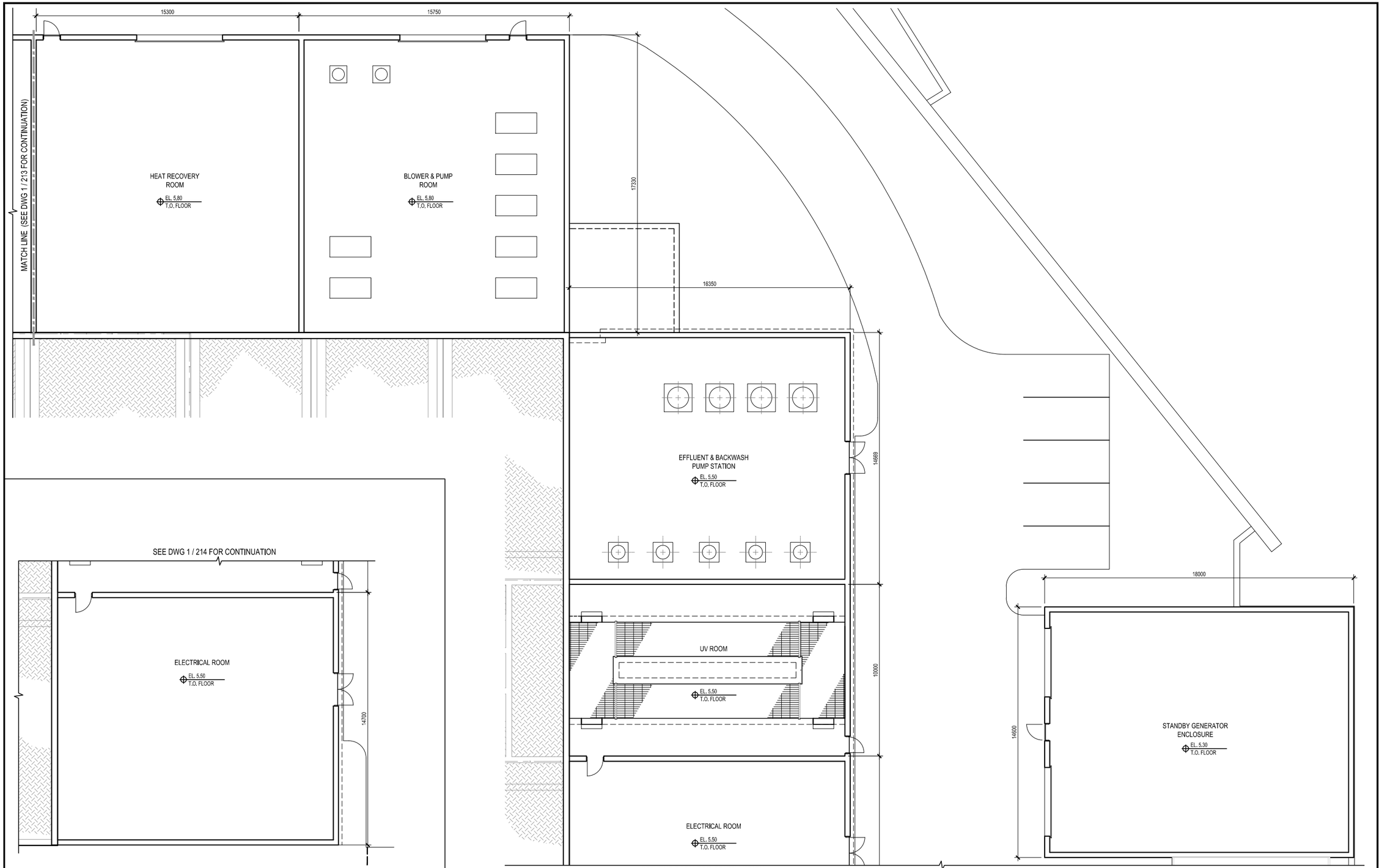
Making a difference...together

Capital Regional District |	Core Area Wastewater Treatment Program		
DESIGNED	DH/AH	SURVEYED	–
DRAWN	FJ	DATE	09/01/13
SCALE HORIZONTAL	1:100	CHECKED	DH
SCALE VERTICAL	–	APPROVED	AH

CORE AREA WASTEWATER TREATMENT PROGRAM

McLOUGHLIN POINT WWTP
SHOP & PLANT ROOMS
LEVEL 1 & MEZZANINE FLOOR PLANS

CONTRACT NUMBER	DRAWING NUMBER	ISSUE	SHT. No. OF
–	5-B-XXX-213	–	– –



2 - LEVEL 1 FLOOR PLAN
SCALE: 1:100

1 - LEVEL 1 FLOOR PLAN
SCALE: 1:100

CAD FILE : \\vic1222-f01\shared_projects\111700431\Architecture\06_dwg\A-02_a4\01_Current\5-B-XXX-214.dwg
PRINTED BY : SJOSE - JANUARY/25/2013 - 2:31PM

Stantec

SEAL

BY	DATE	No.	REVISION	ENG.

No.	DATE	ISSUE
1	25.01.2013	ISSUED FOR REZONING APPLICATION

Making a difference...together

Capital Regional District | Core Area Wastewater Treatment Program

DESIGNED	DH/AH	SURVEYED	–
DRAWN	FJ	DATE	09/01/13
SCALE HORIZONTAL	1:100	CHECKED	DH
SCALE VERTICAL	–	APPROVED	AH

CORE AREA WASTEWATER TREATMENT PROGRAM

McLOUGHLIN POINT WWTP
SHOP & PLANT ROOMS
LEVEL 1 FLOOR PLANS (CONT'D.)

CONTRACT NUMBER	DRAWING NUMBER	ISSUE	SHT. No.
–	5-B-XXX-214	–	– OF –

APPENDIX D:
McLoughlin Point WWTP Site Service Report

Prepared by Stantec Consulting Ltd.

Memo

Stantec

To:	Deane Strongitharm, MCIP City Spaces 5th Floor 844 Courtenay Street Victoria BC, Canada V8W 1C4	From:	Mitchell Hahn, P.Eng. Victoria, BC
File:	111700431	Date:	January 5, 2013

Reference: McLoughlin Point WWTP – Site Service Report

1.0 SUMMARY

In support of the rezoning application for the McLoughlin Point Wastewater Treatment Plant (WWTP) site, the following site servicing report provides information with respect to the utilities required to support the proposed development.

The site is located at 337 and 343 Victoria View Road, in the Township of Esquimalt, BC. The McLoughlin Point site is approximately 700 m northeast of the Macaulay Point pump station. The McLoughlin Point site is a decommissioned Imperial Oil tank farm on 1.4 ha (3.5 acres) of freehold property bounded on the north and west by federal Department of National Defence (DND) land. The facility formerly accommodated seventeen (17) oil tanks and is zoned "Industrial" by the Township of Esquimalt. Victoria View Road runs north-south, immediately west of the McLoughlin Point site. The federal DND property extends north and west from Victoria View Road towards Macaulay Point. Victoria Harbour bounds the site to the east and south.

This report summarizes the site servicing concept and provides background information with respect to adjacent utilities including water (City of Victoria), sanitary sewer, storm drainage, electrical (BC Hydro), communications (Telus), natural gas (Fortis BC) and the transmission of sludge from the WWTP to the biosolids facility assumed to be at the Hartland Landfill. This site servicing report has been based on the CRD conceptual WWTP Option 1A Prime 2. Please refer to Figure 1 that illustrates the McLoughlin site in connect with the overall Core Area Wastewater Treatment Program. Figure 2 illustrates available services to the site and identifies upgrades required.

2.0 SANITARY SEWER

The proposed development is a wastewater treatment plant and as such requires no connection to an external sewage collection system for the purpose of discharge. All wastewater generated internal to the site will be discharge to the plant for treatment. Effluent will be discharged from

the plant through a new 2.3 km, 55-60m deep, 2000 mm diameter outfall which will terminate near the existing 1.7 km , 60m deep 1050 mm diameter Macaulay outfall.

Sewer will be conveyed to the McLoughlin WWTP from both the Macaulay Point and Clover Point lift stations. Flows from Clover Point will be conveyed to the McLoughlin WWTP via a 1200 mm diameter forcemain routed down Dallas road and then crossing 800m of the Victoria Harbour (via tunnel or directional drilling) and entering the East side of the WWTP. Flows from Macaulay Point via a 1500mm diameter forcemain routed mainly down Anson Street, Bewdley Avenue and Victoria View Road.

3.0 SLUDGE TRANSMISSION

It is expected that sludge from the McLoughlin WWTP will be pumped approximately 18 km, via a 200mm diameter forcemain, through the Township of Esquimalt to the proposed biosolids facility at Hartland Landfill – the Hartland Energy Centre. Sludge will be received at the Hartland Energy Centre where it will be processed using anaerobic thermophilic digestion. A second 200mm forcemain will be installed in the same trench as the sludge forcemain to convey centrate from the dewatering process and return it to the sanitary sewer system. Minor changes in the above pipe sizes may be incurred based on the final engineering plans approved by the CRD.

The design and installation of the sludge forcemains will be undertaken in manner consistent with the installation of any underground utility in the Township of Esquimalt. The design will be coordinated with the Township of Esquimalt in accordance with standard design review procedures, and submitted to the Township of Esquimalt for Final Approval. The sludge forcemains will be designed and installed in accordance with the Township of Esquimalt Bylaws and the Master Municipal Construction Documents (MMCD) which, in addition to detailing standards of design, material and construction, provides provisions for traffic management, reinstatement of disturbed property, and hours of work.

4.0 WATER

The total water demand for the new Mc Loughlin Point development is a combination of onsite water demand and the fire flow as prescribed by the “Water Supply for Public Fire Protection – A guide to Recommended Practice”, published by the Fire Underwriters Survey (FUS). In the case of industrial developments, it is generally the case that onsite water consumption is much less than the fire flow requirement. This is particularly true for this development given the nature of the facility, with fire flows governing.

Esquimalt’s water system is operated and maintained by the City of Victoria. The City of Victoria has confirmed that a 200mm ductile iron water main dead-ends at the southern tip of Victoria View Road, on DND lands, adjacent the plant site. It is likely that this existing line will have to be upgraded to 250mm to 300mm depending on water modeling and fire flow calculations based on detailed facility design. The extent of upgrades will be confirmed in future design development; however, the current assessment indicates that the 200mm ductile iron pipe will need to be replaced from Lyall Street, through DND lands, to McLoughlin Point.

The City of Victoria uses the Master Municipal Construction Documents (MMCD) as the design standard for water works.

Design Criteria per MMCD (2005):

- Maximum velocity of 3.5 m/s under fire flow conditions.
- Minimum Fire Flow: 150 L/s for institutional sites (non-sprinklered)

Demands:

- Average daily demand (ADD) for the WWTP process is estimated at 15 L/s. Since there are no irrigation demands anticipated at Mc Loughlin Point it is not anticipated there will be a significant peaking factor at the site.
- The peaking factor for MDD to ADD is anticipated to be small because there are no irrigation demands. For estimating purposes a factor of 1.5 is used which results in a MDD of 23 L/s.
- The fire flow requirements for the site is estimated at 153 L/s if the plant is unsprinklered and 90 L/s if the plant is automatic sprinklered based on the FUS. The area of the building assessed was 2400m2 (mechanical, electrical and UV rooms, standby generator room, odour control room, and sludge thickening room) and does not include the covered tanks.

Pipe Diameter (mm)	Fire Protection	Fire Flow (L/s)	MDD (L/s)	Total Flow (L/s)	Velocity (m/s)
250	Sprinkler	89	23	112	**2.3**
300	Non -Sprinkler	150	23	173	**2.4**

Note - The water main sizing will be confirmed through further design development work.

Onsite hydrants will be installed to meet municipal and FUS standards.

5.0 STORM DRAINAGE

The site is approximately 1.4 hectares and has been leveled by blasting and stripped of plant cover. The proposed footprint will be constructed in the disturbed area. Existing drainage patterns include infiltration (minimal due to bedrock), and overland flows to the ocean to the East and South (although ponding is observed on site at present due to the level cleared area and some areas of excavation due to the decommissioning of the previous buildings). No streams are present on this site.

Once developed that all drainage will continue to be directed to the ocean via an outfall. The type of treatment prior to discharge will be reviewed with the Township of Esquimalt and the Department of Fisheries and Oceans, but it is expected that a typical storm water pollutant removal system will be used to maintain positive treatment of total suspended solids (TSS) year round regardless of flow rate. A duckbill type valve will be used on any storm water outfall which is below high water level to prevent backflow of seawater into the system.

A storm water model will be developed during future design development which will recommend sizes for stormwater infrastructure. The design of stormwater infiltration and green treatment features will be encouraged where practical.

6.0 ELECTRICAL AND COMMUNICATIONS

BC Hydro service, outside the DND land area, is located at the intersection of Lyall and Peters Streets. DND owns the poles on their land. McLoughlin Point shares the same 12.5 kV primary service as the Macaulay Point lift station.

BC Hydro indicated that the existing supply feeder (even with upgrades to cable sizes) would only allow for the upgrades to Macaulay and could not service the McLoughlin WWTP as well. Therefore it is expected that a new primary supply service for 5 MVA will be required to be routed from the plant to the existing substation near the intersection of Hereward and Devonshire (2.5-3.0 km from WWTP). This would include new poles and 25 kV line to replace the existing poles and 12 kV line. Two new transformers will be installed on the McLoughlin Point site. Installation of the poles and service would be carried out by BC Hydro, with short term hazard limited to the replacement of the existing power line and will introduce no new long term health hazards. Future design development by BC Hydro will confirm route and indicate additional upgrades BC Hydro may make on to their system at that time.

Telus has confirmed that service for phone and communication services exist on Victoria View Road adjacent to the site on DND lands. If fibre optics is required, it is available in the general area and could be delivered to the site. No underground services exist.

7.0 NATURAL GAS

Natural gas is not required for any processes; however, it will be required for supplemental heating of the buildings. Although heat recovery will be explored as a method to provide building heat, gas may still be required to either supplement or provide full load for heating as a backup. Demand capacity will be confirmed in future design development work.

Fortis BC has confirmed that a 26mm diameter PE/DP gas line exists on Victoria View Road on DND lands (Work Point) terminating approximately 250m north of the plant site. Gas will be required to be extended to the site, and the routing will be required to be confirmed as either coming from the DND property or from another nearby location depending on demand required by the WWTP.

Stantec Consulting Ltd.

Mitchell Hahn, P.Eng.
Civil Engineer
mitchell.hahn@stantec.com

c. Reno Fiorante, Dave Walker

APPENDIX E:

Core Area Wastewater Treatment Program – McLoughlin Point Zoning Application, Township Of Esquimalt – McLoughlin Point Risk Assessment

Prepared by Stantec Consulting Ltd.

Stantec Consulting Ltd.
400 – 655 Tyee Road, Victoria BC, V9A 6X5

December 18, 2012
File: 111700431

Attention: Mr. Deane Strongitharm, MCIP
City Spaces
5th Floor
844 Courtenay Street
Victoria BC V8W 1C4

Reference: Core Area Wastewater Treatment Program – McLoughlin Point Zoning Application, Township of Esquimalt
McLoughlin Point Risk Assessment

This technical memorandum has been developed to identify risks associated with tsunami, earthquakes, fire protection, and chemical storage at the proposed McLoughlin Point Wastewater Treatment Plant Site.

1. Tsunami

In summary, a top of wave height of 6.024 m geodetic will be used for the design of Waste Water Treatment Plant and ancillary site structures and equipment. To mitigate the risk associated with a Tsunami, all post disaster structures and equipment will to be constructed above this elevation or protected by a wall reaching this elevation or higher.

AECOM has been retained by the CRD to model the Maximum Tsunami Water level at McLoughlin Point. All of the analyses have been performed for the Magnitude 9.0 seismic event as the most likely of the 500-year Cascadia Subduction Zone earthquake scenarios. The results include both Maximum Water Level (relative to Mean Sea Level) with an assumed mean high tide (Higher High Water Mean Tide), as well as maximum flow speed resulting from the waves. Initial analysis indicates that typically the Maximum Water Levels range between 2 and 3 m within the Capital Regional District boundaries, and maximum flow speeds are in the order of 2 – 3 m/s (with higher velocities in localized narrows areas).

In addition to the Maximum Water level developed by a Tsunami the effects of storm surge, wave run up, and the rise in sea level have also been considered. The following table summarizes the factors that make up the top of wave height and where the information was obtained.

Item	Height	Information Source
Maximum Water Level	4.0m	"Modeling of Potential CRD Tsunami Inundation Limits and Run-Up Elevation for the Coastline of the Capital Region" AECOM Status Update Report, October 19, 2012. This value is the maximum water level with an assumed mean high tide (Higher High Water Mean Tide), including subsidence of 0.45m and a 50% factor of safety.
Storm Surge	1.0m	Institute of Ocean Sciences
Rise In Sea Level	1.0m	"BC Ministry of Environment / Climate Change Adaptation Guideline for Sea Dikes and Coastal Flood Hazard Land use" Ausenco Sandwell, January 27, 2012
Difference Between Mean Sea Level and Geodtic Datum	0.024m (assume 0.1)	City of Victoria
Total	6.1m	

2. Earthquake

The proposed wastewater treatment facility structures will be designed to post-disaster standards as prescribed in National Building Code NBC 2010. The seismic design criteria will be based on ground motions with 2% probability of exceedance in 50 years (1/2475 year). All concrete tankage will be designed in accordance with American Concrete Institute ACI 350 "Code requirements for Environmental Engineering Concrete Structures and Seismic Design for Liquid-Containing Concrete structures".

Structural and geotechnical teams will be working closely together to determine the seismic response of the native soil, backfill materials and ground improvement requirement for each proposed structure.

For non-structural elements such as electrical cabinets, light fixtures, piping, cable trays, equipment etc., seismic restraints will be designed to CAN CSA S832-01"Guideline for Seismic Risk Reduction of Operation and Functional Components of Buildings".

Although Victoria area is considered as a high earthquake zone with designed peak ground acceleration g = 0.61, the combination of McLoughlin Point site solid rock base and post-disaster higher safety factor design should mitigate the seismic risk by more than 53% and have a resistant safety factor of at least 3.0 against the expected seismic loads.

Reference: Core Area Wastewater Treatment Program – McLoughlin Point Zoning Application, Township of Esquimalt
McLoughlin Point Risk Assessment

3. Fire Protection

The proposed WWTP and ancillary buildings will be a combination of Fire Resistive and Non-combustible Construction and will have a Low Hazard Occupancy as defined the Water Supply for Public Fire Protection – A guide to Recommended Practice" published by the Fire Underwriters Survey (FUS). The building is isolated from other structures; as such, risk to adjacent properties can be considered minimal.

The current design layout provides for non-restrictive access for emergency vehicles and includes an internal roadway for improved access and egress. Hydrants will be provided in the municipal road right of way.

The existing water network will be modeled during preliminary design to confirm adequate flow is available. The existing system will be upgraded (if required).

4. Chemical Storage:

Chemicals will consist of water treatment coagulants and storage will be provided within the chemical building. Chemical storage tanks will situated in a containment sump to enable full secondary containment of the chemicals in the event of a leak. Drainage sumps will also be provided at chemical off-loading locations to capture accidental spillages.

Regards,

Stantec Consulting Ltd.

Ian Sander, P. Eng.
Senior Project Manager
Tel: (250) 388-9161
Fax: (250) 382-0514
Ian.sander@stantec.com

c. Reno Fiorante, Dave Walker

is \\cd1222-f01\shared_projects\111700431\design criteria\let_mcloughlin point servicing study and risk assement assurance_01_20121211_igs.docx

APPENDIX F:

Archaeological Review Of The Proposed Capital Regional District McLoughlin Point Wastewater Treatment Facility

Prepared by Tera Environmental Consultants

ARCHAEOLOGICAL REVIEW OF THE PROPOSED CAPITAL REGIONAL DISTRICT McLOUGHLIN POINT WASTEWATER TREATMENT FACILITY

Final Report
January 2013
W7732

Prepared for:

Making a difference...together

Capital Regional District
625 Fisgard Street Victoria, British Columbia V8W 2S6

Prepared by:

ENVIRONMENTAL CONSULTANTS

TERA Environmental Consultants
Suite 201, 655 Tyee Road Victoria, British Columbia V9A 6X5
Phone: 250-592-8500

SUMMARY

This report summarizes the results of archaeological and heritage investigations of the McLoughlin Point area undertaken as part of the Capital Regional District's (CRD's) Core Area Wastewater Treatment Program. McLoughlin Point is the planned location of a wastewater treatment facility to be built in compliance with provincial directives to institute secondary treatment of wastewater from Core Area municipalities.

The McLoughlin Point facility will treat wastewater and discharge the liquid effluent, and pump wastewater solids to the Hartland North facility for further treatment and energy extraction. The system configuration forms the basis of amendment #8 to the CRD's Core Area Liquid Waste Management Plan (LWMP), submitted to the provincial government in June 2010 and approved by the Minister of Environment in August 2010.

This summary report identifies potential impacts of the treatment facilities and recommends mitigation measures as appropriate. The report is based on field inspections of the site and surrounding areas, review of available reports and maps, and involvement of local First Nations. The work program complies with provincial guidelines for the conduct of archaeology and heritage investigations.

Construction impacts are examined separately from impacts of facility operation. Construction activities includes site clearing, grading, excavation, foundation work, building construction, equipment installation and testing, commissioning of the facility, and landscaping or site restoration. Operations include day-to-day functioning of the treatment facility and including routine maintenance.

Project-related impacts are described according to their:

- spatial extent (area affected);
- temporal extent (duration);
- reversibility;
- magnitude; and
- significance.

The McLoughlin Point site has been heavily disturbed by past industrial activities. This report recommends actions to be taken by the CRD to ensure the protection of archaeological and heritage resources that might be found during construction. Based on research conducted as part of this report and by other in previous studies, all potential project effects on archaeological or heritage resources are considered less than significant.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1.0 INTRODUCTION

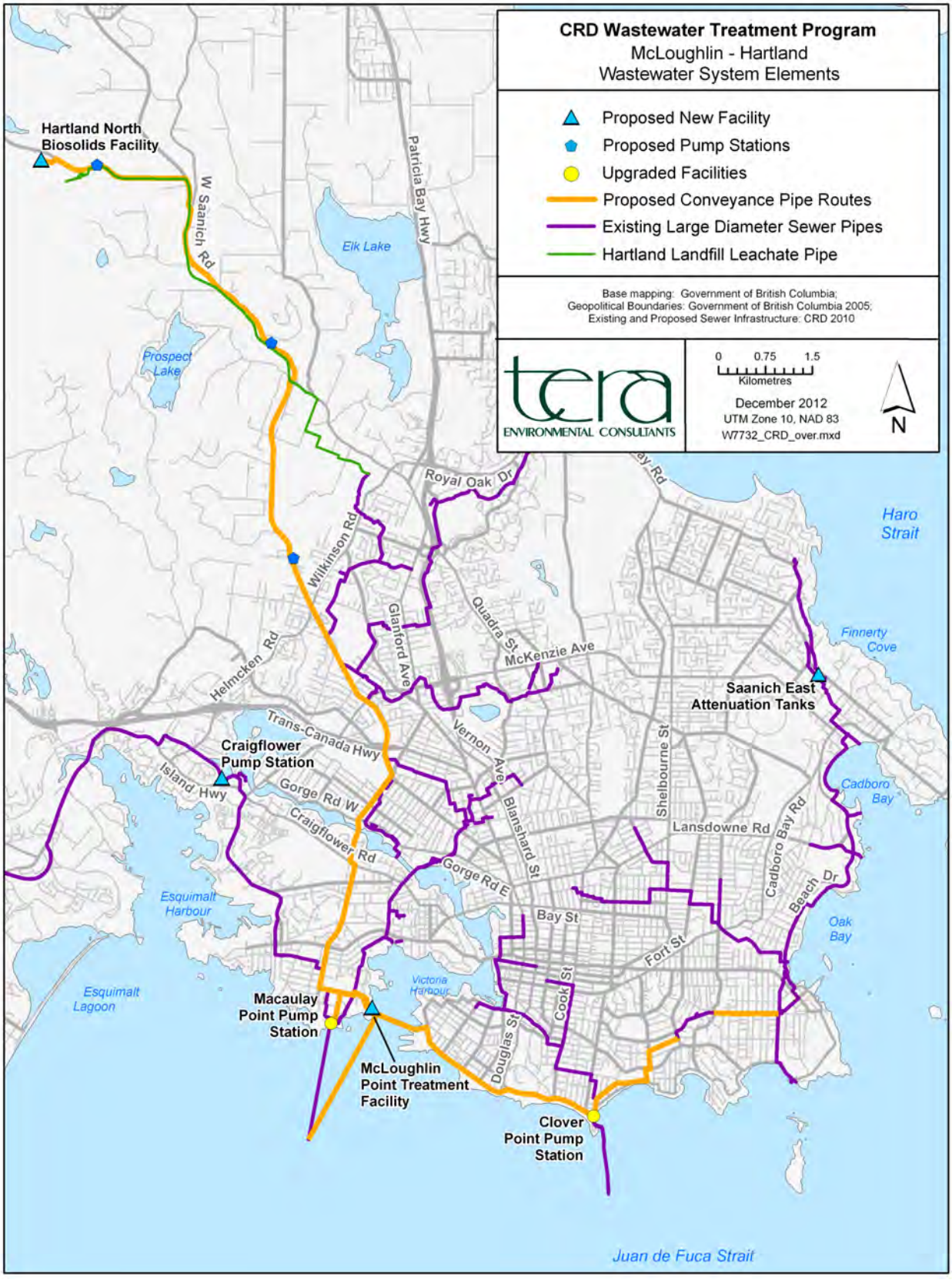
This report summarizes the results of an archaeological and heritage investigation conducted as part of the CRD's Core Area Wastewater Treatment Program. The study focused on the site planned for the McLoughlin Point wastewater treatment facility. Additional details about the McLoughlin Point facility can be found in Terrestrial Environmental Effects of the McLoughlin Point Wastewater Treatment Program (TERA 2013).

In June 2010, the Core Area Liquid Waste Management Committee approved amendment #8 to the LWMP. The main facilities to be built as part of the LWMP Amendment #8 are:

- Arbutus Road attenuation tanks;
- Macaulay Point pump station upgrade and grit removal facility;
- Clover Point pump station upgrade and grit removal facility;
- McLoughlin Point liquids wastewater treatment facility;
- Hartland biosolids management facility; and
- Conveyance pipes.

The locations of these facilities are shown in Figure 1-1. These facilities are key components of the regional system and necessary to meet the objectives of the Capital Regional District Core Area Liquid Waste Management Plan.

Figure 1-1 Overview map of Core Area wastewater treatment facilities



1.1 McLoughlin Point Liquids Wastewater Treatment Facility

1.1.1 Facility Location and Elements

The McLoughlin Point facility site is located at the southern end of Victoria View Road in Esquimalt, British Columbia (Figure 1-2). The lands adjacent to the site are federally owned, and controlled by the Department of National Defence (DND). The McLoughlin Point site is currently a decommissioned Imperial Oil tank farm on 1.37 ha (3.46 acres) of freehold property. The facility formerly accommodated 17 fuel tanks that had a maximum storage capacity of 2.5 million litres.

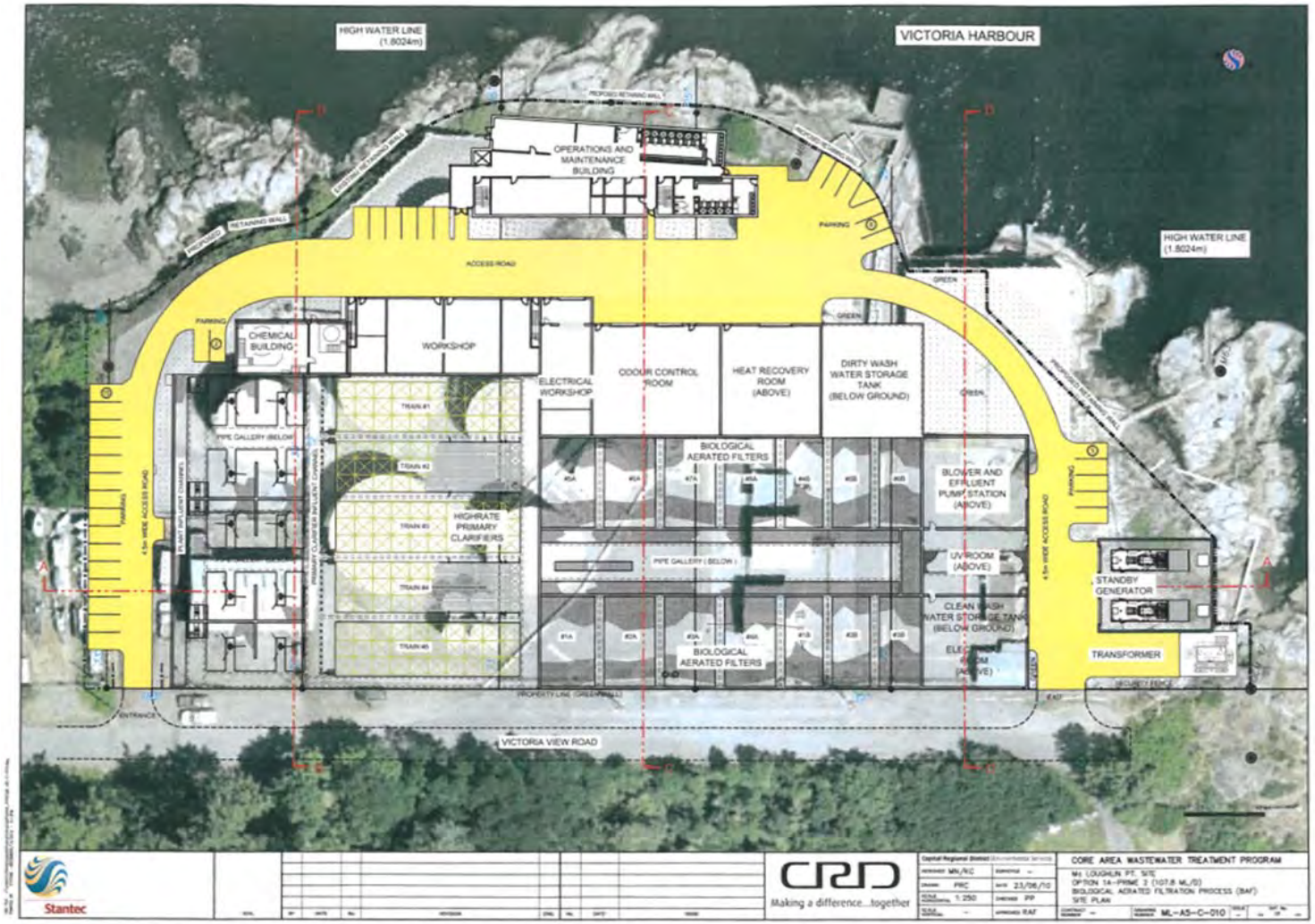
Wastewater received from the Macaulay Point and Clover Point pump stations will undergo primary and secondary treatment at the McLoughlin Point facility. Several buildings will be constructed at the McLoughlin Point site, and some will be located partially below ground. Some structures will extend 5 to 10 m above grade. The facility will be designed to be attractive, and not to detract from the appearance of the area. The following treatment facilities will be constructed at McLoughlin Point:

- primary clarifiers;
- biological aerated filters (BAF);
- a blower building;
- odour control;
- heat recovery works;
- sludge thickening and pumping;
- an administration building;
- standby generators; and
- vehicle access and parking.

The equipment and treatment units that will be installed in the McLoughlin Point facility must comply with the process reliability standards set out in the British Columbia *Municipal Sewage Regulation* BC Regulation 129/99.

The sludge that is produced during the primary and secondary treatment process will be pumped to a biosolids management facility located at the Hartland North site, adjacent to the CRD-operated Hartland Landfill in the District of Saanich. The secondary treated water will be discharged through a new outfall constructed at McLoughlin Point.

Figure 1-2 McLoughlin Point facility site plan



Source: Stantec

1.2 Construction of the McLoughlin Point Facility

1.2.1 Construction Activities

McLoughlin Point Facility

The McLoughlin Point facility site requires remediation of contamination caused by past use as a fuel storage facility. Remediation required to satisfy Provincial and Federal regulations is currently being conducted. Sale of the site by Imperial Oil to the CRD is contingent on the parties reaching agreement on the extent of remediation remaining.

The McLoughlin Point site is comprised of clay and bedrock. Blasting will be necessary to construct a wastewater treatment facility. The CRD is seeking permission from DND to use temporary construction laydown areas on federal lands to the north of the planned treatment facility site.

The McLoughlin Point facility requires the construction of deep concrete tanks, which will be founded at various elevations on the facility site. These tanks will be constructed partially above grade to reduce rock excavation quantities and reduce risk from predicted tsunami wave height combined with storm surge and mean high tide. The depth of building foundations and concrete tanks varies from 0.3 m to 6 m. Other structures on the site include covered buildings to house major process equipment, an operations building, roadways, parking facilities, and fencing. A site plan showing the current planned site development is shown in Figure 1-2.

2.0 METHODS

This section of the report outlines the data collection and assessment methods used by the study team.

2.1 Effects Assessment Criteria

The criteria applied in this study are based on industry standards for impact assessment, adapted for use in the assessment of the CRD's wastewater program. The rating of impacts under these headings focuses on mitigated impacts. The ratings assume that standard construction and operating procedures will be implemented. Significance is assessed for these mitigated project effects. If additional mitigation is recommended by the consulting team (over and above that described in the project description), those "enhanced mitigation" measures are described in the text of the report. These additional measures are intended to further reduce identified project impacts.

Table 2-1 presents and explains the assessment criteria applied in the report. The criteria cover such topics as the spatial context of project impacts, temporal context, reversibility, magnitude, and significance of potential effects of project construction and operation.

TABLE 2-1

CRITERIA USED IN ASSESSING PROJECT EFFECTS

Assessment Criteria		Definition
SPATIAL CONTEXT location of effect		
Treatment Facility Footprint		Land area permanently occupied by the treatment facility including buildings, parking, and access.
Workspace		Areas temporarily used during construction, including equipment and material storage or vehicle access.
Local Area		Lands within 250 m of the candidate site.
Regional Area		The Regional Study Area (RSA) is the area in the Core Area municipalities.
TEMPORAL CONTEXT of effect		
Duration (length of time a residual effect will last)	Short-term	Event duration is less than or equal to one year.
	Medium-term	Event duration is longer than one year but less than or equal to five years.
	Long-term	Event duration extends longer than five years.
Frequency (how often event causing the residual effect will occur)	Occasional	Event occurs intermittently.
	Periodic	Event occurs intermittently but repeatedly over the construction and operations period.
	Continuous	Event occurs continually over the assessment period.

TABLE 2-1 Cont'd

Assessment Criteria		Definition
Reversibility (Will identified effects cease to be a concern?)	Yes	The potential effect can be reversed.
	No	The potential effect cannot be reversed, despite efforts to mitigate.
MAGNITUDE of the effect		
Negligible		Potential effect is barely detectable.
Low		Potential effect is below established or derived environmental standards or thresholds.
Moderate		Potential effect is detectable but meets established or derived environmental or regulatory standards or thresholds.
High		Potential effect exceeds established or derived environmental standards or thresholds.
BENEFICIAL or ADVERSE effect		
Beneficial		The resource or topic under study would be improved as a result of project effects.
Adverse		The resource or topic under study would be worsened as a result of project effects.
SIGNIFICANCE of the effect		
Significant		The identified effect would have a combination of characteristics that render it unacceptable to the public, regulators, other interests, or that exceed standards or contravenes legal requirements.
Less than significant		All other effects that are not considered significant.

2.2 Data Collection and Analysis

In 2008 and 2009, Archaeological Overview Assessment (AOA) studies were conducted for the Victoria Harbour, South Esquimalt, and James Bay areas by Bastion Group Heritage Consultants. The results of the studies were published in James Bay-South Esquimalt Siting Investigations for Wastewater Treatment Facilities (Westland 2009a) and Land Suitability for Anaerobic Digesters in Victoria Harbour (Westland 2009b). The James Bay-South Esquimalt study reviewed archaeological and heritage reports and databases, maps and aerial photographs, and archaeological potential mapping produced by the BC Archaeology Branch. The Victoria Harbour study was conducted using the same methods as the James Bay-South Esquimalt study. Results of these studies were used to assess potential archaeological and heritage impact of construction near McLoughlin Point as well as impacts of construction of the ancillary facilities from Macaulay Point to McLoughlin Point.

Under permit from the Heritage Conservation Branch, Millennia Research Ltd. (Millennia), a Victoria based professional archaeology company, conducted an Archaeological Impact Assessment (AIA) of the McLoughlin Point facility site. The study reviewed archaeological and heritage reports and databases, maps and aerial photographs, and archaeological potential mapping produced by the BC Archaeology Branch. Field inspections were completed as part of the AIA to verify the location of known or potential sites or features and to conduct an impact assessment of their condition. Members of the Songhees and Esquimalt First Nations assisted in some field reconnaissance components of the study.

3.0 SITE CONDITIONS AND IMPACT ASSESSMENT

This section presents the results of an assessment of the relevant archaeology and heritage effects associated with the construction and operation of the McLoughlin Point wastewater treatment facility.

3.1 Treatment Facility Site Conditions

The McLoughlin Point property contains no previously recorded archaeological sites, although the archaeological potential model maintained by the BC Archaeology Branch indicates a small area of archaeological potential along a rocky outcrop at the southern end of McLoughlin Point (Figure 3-1). The closest recorded archaeological sites, shell midden recorded as DcRu-662 and a shipwreck on Harrison Island recorded as DcRu-1152, are more than 350 m from the property. A site visit on December 9, 2009 confirmed the limited potential of the area. Most of the property is undergoing environmental remediation. Buildings and facilities associated with previous use of the property have been removed. The central portion of the property remains capped by an asphalt pad and a concrete slab (Figure 3-2). The area beneath these structures was not examined for archaeological potential, although sediment exposures and two cleared bedrock outcrops in the remediation area were examined. A fringe of what appears to be original shoreline outside the remediation area was not examined because access was restricted to this area at the time of the site visit.

Figure 3-1 McLoughlin Point areas of archaeological potential and noted historic debris

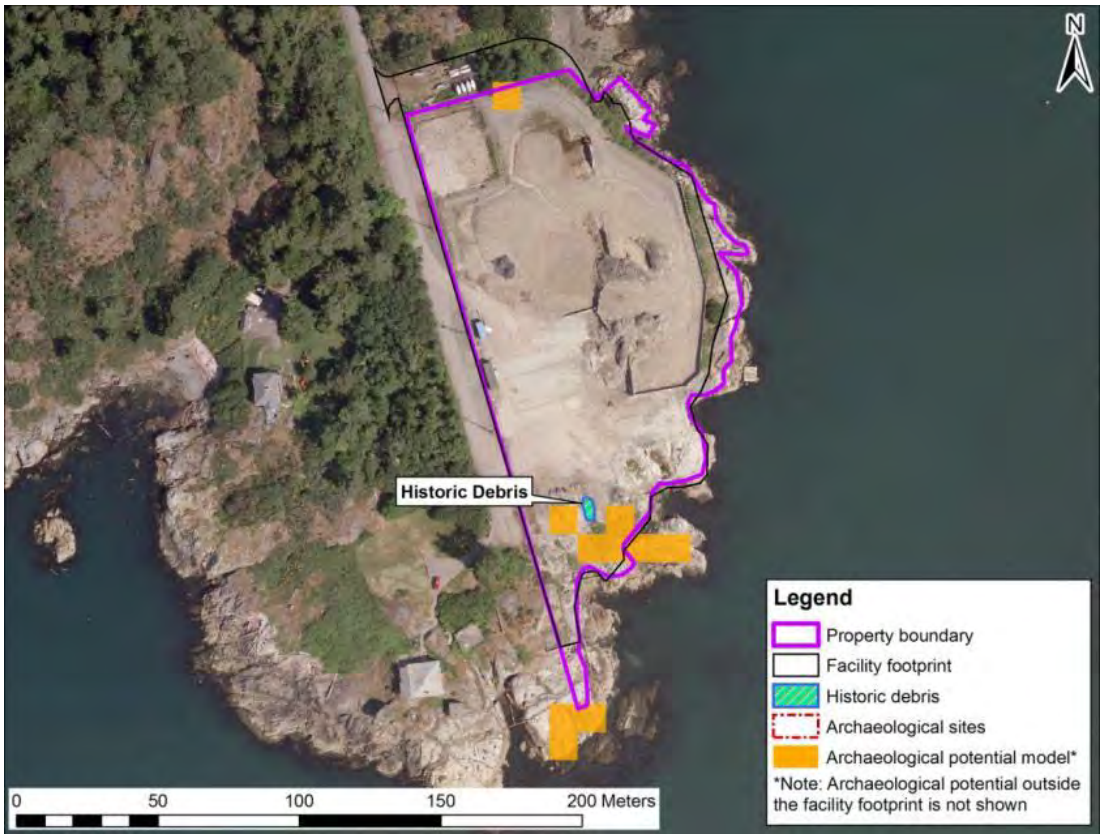


Figure 3-2 McLoughlin Point property, looking north. Asphalt pad and concrete slab capping in foreground.

No precontact archaeological deposits were identified. A small concentration of historic debris – leaded glass, bottle fragments, ceramic dishware shards, and machine cut bone – were identified in sediment in a bedrock crevice at the southern end of the remediation area (Figure 3-3). The material is of limited cultural significance and is not protected by the Heritage Conservation Act (HCA). Examination of the surrounding surficial exposures, including recently disturbed areas, and of excavation profiles on the western side of the property near the fence line suggests there is very limited archaeological potential in the unexamined portions of the remediation area.

The bedrock exposure south of the remediation area at the south end of McLoughlin Point was examined for cultural deposits and burial cairns. This is the area of potential as indicated by the BC Archaeology Branch's archaeological potential model. The area is a highly exposed, largely barren, and has been modified to some degree as evident from a rock wall constructed of apparent local materials, and a bunker located on adjacent Department of National Defence property (Figure 3-4). No cultural features or sediments were located.

The McLoughlin Point site is approximately 700 m northeast of the Macaulay Point pump station in Esquimalt, British Columbia (Figure 3-5). The McLoughlin Point site is a decommissioned Imperial Oil tank farm on 1.4 ha (3.46 acres) of freehold property bounded on the north and west by federal Department of National Defence (DND) land. The facility formerly accommodated 17 oil tanks with maximum storage capacity of 2.5 million litres. The land is zoned "Industrial" by the Township of Esquimalt.

Figure 3-3 McLoughlin Point study area from central bedrock outcrop looking south. Historic debris was located on bedrock outcrops in background.

Figure 3-4 Bedrock outcrop at southern end of McLoughlin Point study area

Figure 3-5 McLoughlin Point site from south

Victoria View Road runs north-south, immediately west of the McLoughlin Point site. The federal DND property extends north and west from Victoria View Road towards Macaulay Point. Victoria Harbour bounds the site to the east and south.

The ground surface at the McLoughlin Point site is presently uniform and near level at an elevation of about 6 m above sea level at the north and 4 m above sea level at the south end. The site is asphalt or gravel surfaced, except for occasional rock outcrops. Available information indicates that the site was once irregular and rocky at a similar average grade to the adjoining sites, and was levelled to its present configuration by excavation (likely by blasting) and fill placement.

The subsurface conditions at this site are expected to comprise varying amounts of unknown fill materials atop bedrock and intermittent deposits of marine silts and clays. Perched water table conditions may be experienced from place to place resulting in locally high groundwater conditions and surface water ponding, particularly during periods of heavy or prolonged precipitation.

3.1.1 Impact Assessment and Mitigation Measures

Figure 3-6 shows previously identified archaeological and heritage features near the McLoughlin Point site.

3.2 Ancillary Facility Site Conditions

Macaulay Point to McLoughlin Point

The shoreline between McLoughlin Point and Macaulay Point, identified as Shore Unit No. 1615.00 in the Harbours Ecological Inventory and Rating (HEIR) mapping project (VEHEAP 2000), contains no registered archaeological sites (Figure 3-7). However, field reconnaissance identified physiographic features associated with the potential for burial cairns, both onshore on rocky bluffs and on offshore inlets. Several off-shore islets and rocky headlands (Harrison Island and McLoughlin Point, for example) may have been used by First Nations as burial sites before contact with Europeans, as was done on Coffin Island and Laurel Point in the Inner Harbour. Small bays have extensive build-up of shell deposits. Inshore level areas could contain intact shell midden that has been buried by fill in the course of building detached military housing and yards, thus covering evidence of archaeological sites. No known intensive archaeological surveys have been conducted on subsurface materials in this shoreline area, which remains relatively undisturbed by residential and industrial development. The ancillary route from Macaulay Point to McLoughlin Point pipe route will follow existing road rights-of-way and is not expected to affect cultural resources along the shoreline, but there are small areas of archaeological potential along the route.

Traditional use records show that reef net fishing occurred off the south shoreline of Macaulay Point, a site that is under water and associated with shallow offshore reefs (Easton 1985, Duff 1969). Songhees First Nation traditional use information describes the harvesting of salmon, sea urchins, and “rockstickers” (limpets) at Macaulay Point. No information is available about harvesting of plant resources on land (English 1996, Te’mexw Treaty Association 2003).

Figure 3-6 Archaeological and heritage features in Esquimalt and Vic West

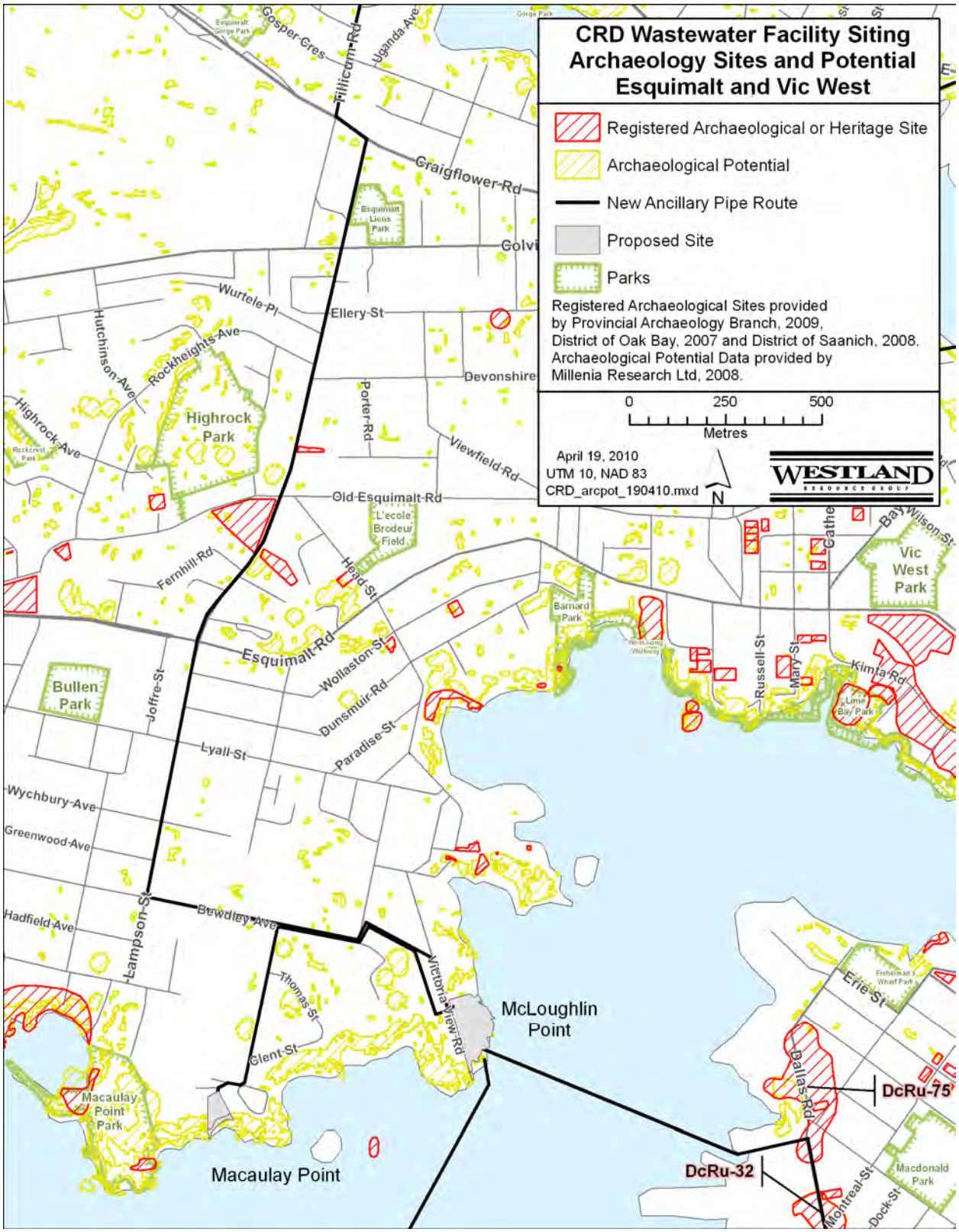


Figure 3-7 Rocky bluffs west of McLoughlin Point

First Nations Lands

The CRD has entered into an information sharing process with Songhees, Esquimalt, Tsawout, and Beecher Bay Nations on project site selection and design. The Nations' interests are being recorded and submitted to MOE officials. None of the treatment facility sites or ancillary facility routes is located on Indian Reserves. The CRD will continue to engage the First Nations communities during the project design phase.

3.2.1 Impact Assessment and Mitigation Measures

Treatment Facility Construction

Potential Impact: Construction activities may affect archaeological features on the McLoughlin Point site.

The field reconnaissance at the McLoughlin Point site indicates that ground disturbance associated with construction activities is unlikely to affect archaeological features in the project footprint. Areas of archaeological potential outside this footprint were not assessed.

- **Mitigation measures.** Recognizing that no archaeological features have been identified on the McLoughlin Point site, the CRD will take measures to identify and avoid archaeological sites and features during facility construction, and to comply with requirements of the Archaeology Branch.

Based on currently available information, it is unlikely that the construction of a treatment facility at McLoughlin Point would affect archaeological or heritage features. If archaeological or heritage features are disturbed during facility construction, such impacts would be long-term and irreversible. However, mitigation to avoid or reduce effects or to provide compensation for the removal, loss, disruption, modification, or alteration of archaeological or heritage resources at McLoughlin Point would reduce project effects to low magnitude and **less than significant** levels.

Treatment Facility Operation

Potential Impact: Operational activities of the proposed McLoughlin Point facility may affect archaeological features.

No archaeological features or deposits are anticipated in the project footprint. In the unlikely event that unanticipated archaeological features are present, the activities that may affect the features are limited to the construction phase of the project. Operation of the proposed McLoughlin Point facility is not expected to affect archaeological features and, therefore, operation impacts are assessed to be **less than significant**.

3.3 Ancillary Facilities

Ancillary Facility Construction

Potential Impact: Construction activities may affect archaeological features near the ancillary facility pipelines serving the McLoughlin Point treatment facility.

The pipeline connection to the Macaulay Point pump station is approximately 75 to 100 m east of several registered archaeological sites. The archaeological potential model maintained by the Archaeology Branch indicates that unrecorded buried shell midden or cultural features may be uncovered in the course of construction of the forcemain.

- **Mitigation measures.** An archaeological field reconnaissance should be conducted to determine the need for additional work. The reconnaissance report may recommend no further work or an Archaeological Impact Assessment (AIA) to determine whether the route would actually affect cultural resources, and to specify the significance and extent of these effects and recommendations to avoid or mitigate any effects.

A review of available data suggests that with the application of the proposed impact avoidance and mitigation measures, impacts will be limited to the facility footprint, long-term, and of low magnitude. These impacts are expected to be **less than significant**.

Ancillary Facility Operation

Potential Impact: Operational activities of the ancillary facilities may affect archaeological features.

The activities that affect archaeological and heritage resources are likely to be limited to the construction phase of the project. No impacts on archaeological or heritage resources are expected from pipeline operation, except in the unlikely event of pipeline rupture.

- **Mitigation measures.** No mitigation measures are proposed for routine operation of the pipeline. In the event of repair of the pipeline, the provisions of the *Heritage Conservation Act* and protection of archaeological sites and materials will govern the work.

No impacts on archaeological or heritage resources are expected, and impacts from pipeline operation are considered **less than significant**.

3.4 Cumulative Effects Assessment

For the purposes of this report, cumulative effects refer to the regional or local effects of constructing and operating wastewater treatment facilities in combination with the effects of other existing or planned developments in the core area of the CRD.

Based on the results of this investigation, the following statements can be made about the potential contribution of the proposed wastewater treatment facilities to cumulative effects on archaeology and heritage.

The cumulative effects of existing development on archaeological and heritage resources in the Core Area of the CRD can be considered adverse and significant. Because it will be built on a previously disturbed site, it is unlikely that the wastewater facility will contribute to further damage or loss of

archaeological or heritage resources. . Hence, the contribution of the wastewater facilities to adverse cumulative effects on archaeology and heritage is considered to be of low magnitude and less than significant.

4.0 RECOMMENDATIONS

This section summarizes the mitigation measures identified in this report and confirms the CRD's commitment to implement these recommendations.

4.1 Mitigation Measures

The CRD commits to the following mitigation measures for the construction and operation of the McLoughlin Point facility and associated ancillary facilities:

- The CRD will take measures to identify and avoid archaeological sites and features, and to comply with requirements of the Archaeology Branch.
- In order to minimize risk with respect to the proposed development, tail-gate archaeological awareness training sessions will be held before the start of construction related activities.
- In the event that unanticipated archaeological features are identified, construction related activities in the area will be halted and the Archaeology Branch will be contacted for further direction.
- The CRD and its contractors will prepare an Environmental Protection Plan (EPP) for construction at McLoughlin Point that will include measures to respond to the identification of archaeological resources that may be unearthed during project construction.

The EPP will be incorporated into building contracts, and compliance will be a legal obligation for contractors. The EPP will be written in construction specification format so that it can be easily interpreted and followed in the field by contractors, trade and environmental inspectors, regulatory inspectors, and other government representatives. The use of the construction specification format also allows the instructions contained in the EPP to be directly included in the construction contract bid documents and specifications.

4.2 CRD Commitment

The CRD commits that it will make best efforts to implement the recommended actions identified in Section 4.1. The CRD will develop and implement the aforementioned EPP.

The timing and sequence of the implementation actions will be linked to the schedules for planning, design, construction, and restoration stages of the wastewater project.

5.0 PREPARERS OF THE REPORT

The information to support this report was prepared by TERA Environmental Consultants and affiliated consultants, with the involvement of CRD personnel. The study team was headed by TERA's senior planners and environmental scientists, with support for the engineering and facility construction elements provided by staff from the CRD and Stantec. Senior personnel of Millennia Research and The Bastion Group Heritage Consultants conducted the archaeology and heritage assessment work summarized in this document.

6.0 REFERENCES

6.1 Personal Communications

TERA wishes to acknowledge those people identified in the Personal Communications for their assistance in supplying information and comments incorporated into this report.

Keddie, Grant. Curator of Archaeology, Royal British Columbia Museum, Victoria, BC.

6.2 Literature Cited

British Columbia Archaeology Branch. 1989. British Columbia Archaeological Impact Assessment Guidelines. Ministry of Small Business, Tourism, and Culture, Archaeology Branch, Victoria, BC.

British Columbia Archaeology Branch. 2009. Archaeology Branch Site Files, Victoria, BC.

British Columbia Archaeology Branch. Undated. Remote Access to Archaeological Data (RAAD). Accessed online, April 13, 2010: https://apps.gov.bc.ca/ext/raad/.

Capital Regional District website. Wastewater Made Clear. Accessed online, December 2009: http://www.wastewatermadeclear.com.

Duff, W. 1969. The Fort Victoria Treaties. BC Studies 3:3-57.

Easton, N. 1985. The Underwater Archaeology of Straits Salish Reef-netting. Master of Arts Dissertation, University of Victoria. Victoria, B.C.

English, C. and Millennia Research Ltd. 1996. Traditional Use Study, Victoria Approaches, Vancouver Island Highway Project. Harmony Human and Environmental Studies and Millennia Research Ltd. Victoria, B.C.

Keddie, G. 1997. Aboriginal Defensive Sites. Part 2: Amateur Archaeology Begins. Discovery Magazine.

Lindberg, J. 1995. Dallas Road Cliff Stabilization Project, City of Victoria, Archaeological Inventory, and Impact Assessment. Prepared by Millennia Research. Report on file at the Archaeology and Registry Services Branch.

Millennia Research Ltd. 2008. Database of Archaeological Potential Mapping for the Capital Regional District. Prepared for the Capital Regional District and BC Archaeology Branch. Victoria, BC.

Owens, D. 2001. DcRu-011 Archaeological Mitigation Path Relocation, Phase 1, Clover Point to Cook Street. Report on file with the Heritage Resource Centre of the Ministry of Community, Aboriginal, and Women's Services.

Province of British Columbia. 2008. Point Ellice House. Last updated July 21, 2008, Ministry of Tourism, Sport and the Arts. Accessed online, August 21, 2009: http://www.tca.gov.bc.ca/heritage/historic_sites/point_ellice_house.htm.

Segger, Martin and Franklin, Douglas. 1996. Exploring Victoria's Architecture. Sono Nis Press. Victoria, B.C.

Te'mexw Treaty Association. 2003. Te'mexw Mapping Project. Te'mexw Treaty Association and LGL Limited. Sidney, B.C.

Victoria and Esquimalt Harbours Environmental Action Program (VEHEAP). 2000. Victoria and Esquimalt Harbours Ecological Inventory and Rating - Phase I Intertidal and Backshore – Final Report. Westland Resource Group. Victoria, B.C.

APPENDIX G:

Core Area Wastewater Treatment Program

McLoughlin Point Wastewater Treatment Facility

– Traffic Considerations

Prepared by Bunt & Associates

TRANSPORTATION PLANNERS AND ENGINEERS

bunt & associates

Capital Regional District
Core Area Wastewater Treatment Program
McLoughlin Point Wastewater Treatment Facility
Traffic Considerations

Final Draft Report

Prepared for

Capital Regional District

Date

January 23, 2013

Prepared by

Bunt & Associates

Project No.

5855.04

TABLE OF CONTENTS

EXECUTIVE SUMMARY

1. INTRODUCTION

1.1 Background

As part of the Capital Regional District's proposed wastewater treatment program, McLoughlin Point has been selected as the site for a "liquid only" wastewater treatment facility. The selection of this site allows the CRD to adopt a centralized wastewater system, which will not only support future growth of the region while maintaining system flexibility, but will also provide continued resource recovery opportunities.

This Transportation Assessment is intended to provide sufficient information regarding the impact of the construction and subsequent operation of the facility on the local road network to accompany a rezoning application for the site. Mitigation strategies are identified to minimize the traffic and safety impacts of the project. This traffic impact assessment examines:

- the volumes and types of vehicular traffic,
- road classification,
- proximity to designated truck routes,
- alternative modes of transportation,
- transit service, and
- impact on existing traffic from construction and installation of pipes underneath existing road surfaces.

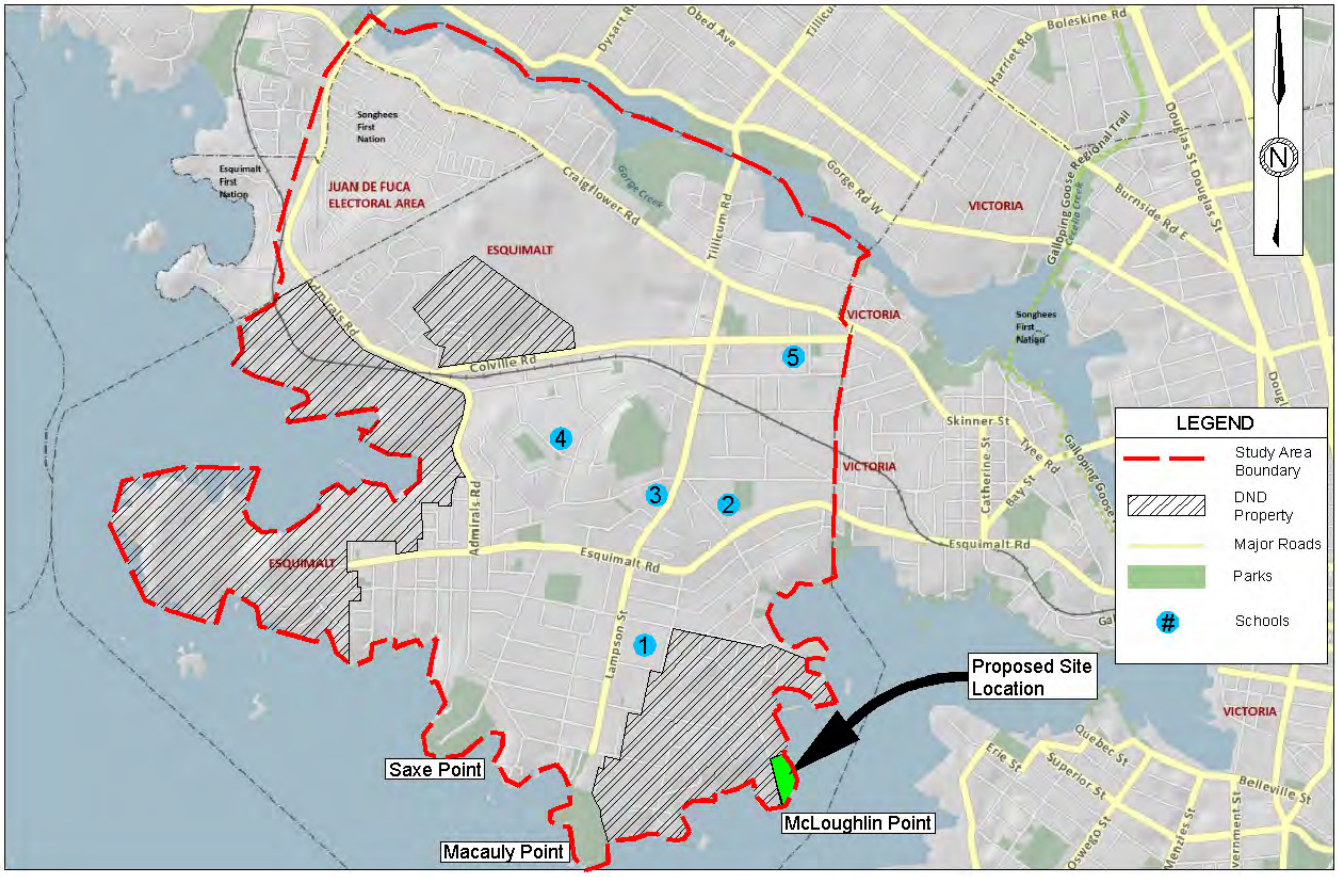
It should be noted that the CRD is considering barging construction materials and equipment to the site, but this has not been confirmed at this time and therefore, for the purpose of this study it has been assumed that this activity is not available.

1.2 Site Location and Study Area

The McLoughlin Point facility is situated on private land, within an area currently owned by the Department of National Defense on the south-eastern tip of the Township of Esquimalt. The site is a decommissioned Imperial Oil tank farm on 1.37 ha (3.46 acres) of freehold property. The facility formerly accommodated 17 fuel tanks that had a maximum storage capacity of 2.5 million litres. Victoria View Road serves as the only road connection to the surrounding street network. The local roads surrounding the site mainly service residential and DND properties, with Esquimalt Road and Lampson Street being the nearest major roads, as shown in **Exhibit 1 – Study Area**.

The key focus of this study is on the road network south of Esquimalt Road, with routing beyond this area identified to assess and comment on the critical access point locations and route characteristics.

Exhibit 1: Study Area



1.3 Scope of Study

Bunt's work program tasks for the TIA are summarized below:

1.3.1 Task 1: Information from Project Team

Bunt staff gathered the most current information on the types and amount of traffic anticipated to be generated during both the construction period and subsequent operation of the proposed McLoughlin Point facility. The construction project schedule information was also reviewed to establish the potential impact of this traffic on the adjacent neighbourhood road system.

1.3.2 Task 2: Pipeline Construction Routing Analysis

It is our understanding that the site would act as a Liquid Only treatment plant and that the biosolids would be piped to Hartland Landfill, or another suitable site yet to be determined. Although a specific route for the sludge pipe installation cannot be identified by CRD staff for this study, it was understood that Bunt would be asked to provide comment on general traffic management considerations within the

municipal boundary of Esquimalt for the future pipeline construction. This assessment is not a detailed construction Traffic Management Plan, but would identify potential mitigation measures to reduce the impact of traffic disruption through construction period.

1.3.3 Task 3: Prepare Traffic Study Report

A report outlining the amount of site generated traffic anticipated during the construction and subsequent operation of the treatment plant facility is to be provided for inclusion in the rezoning application. This report will identify any significant impact on the adjacent road network and offer mitigation strategies to minimize any adverse conditions related to this traffic.

2. EXISTING CONDITIONS

2.1 Existing Road Network

The study road network classification is shown in the following **Exhibit 2** and roadway characteristics of the affected roads are listed in **Table 1**. Roads not highlighted are classified as "Local" roads.

Exhibit 2: Road Network Classification

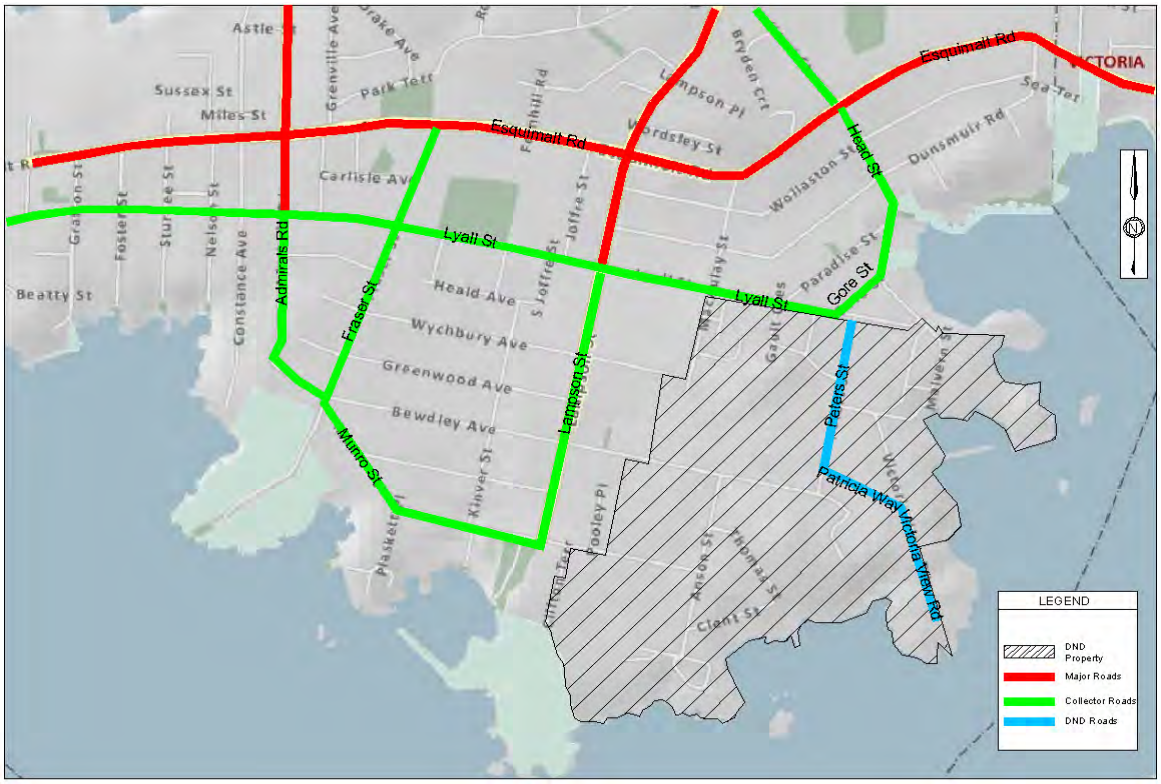


Table 1: Study Area Road Characteristics

Road Name	Classification	Speed	Width	Lanes	Walking	Cycling	Parking	Other
Victoria View Road	Local (DND)	-not posted	5.5	2	-no sidewalk	-	-	-no shoulder -no painted lanes
Patricia Way	Local (DND)	30	7.0	2	-no sidewalk	-	-	-no shoulder -solid yellow line
Peters Street	Local (DND)	30	7.5	2	-sidewalk on both sides	-	-west side: 30m parking bay for CFHA (6 marked stalls) -east side: 50m parking bay	-solid yellow line -1 speed hump
Lyall Street (Peters - Lampson)	Collector	-35m 30 zone (school)	10.0	2	-sidewalk on both sides	-marked on sidewalk (south side)	-parking on both sides	-solid yellow line -bus stops
Lyall Street (Lampson - Admirals)	Collector	-30	10.0	2	-sidewalk on both sides	-marked on sidewalk (south side)	-parking on both sides	-solid yellow line -bus stops -1 marked crosswalk
Gore Street	Collector	-not posted	8.0	2	-sidewalk on both sides	-marked on sidewalk (south side)	-no parking	-solid yellow line -bus stops
Head Street (Gore – Paradise)	Collector	-not posted	7.2	2	-sidewalk on both sides	-marked on sidewalk (east side)	-west side: on-street parking -east side: no parking	-no painted lanes -marked crosswalk
Head Street (Paradise to Dunsmuir)	Collector	-not posted		2	-sidewalk on both sides	-marked on sidewalk (east side)	-no parking	-solid yellow line -slight vertical grade
Head Street (Dunsmuir to Esquimalt)	Collector	-not posted	7.6	2	-sidewalk on both sides	-shared on sidewalk	-west side: 20m parking bay	-no painted lanes -significant vertical slope
Esquimalt Road	Major	30 / 40	12.0 (variable)	2 + 1 shared turn lane	-sidewalk on both sides	-dedicated bike lanes	-south side: 30m parking bay	-painted lanes -bus stops
Lampson Street (Lyall – Esquimalt)	Major	-not posted	10.0	4	-sidewalk on both sides	-unsigned, shared roadway	-west side: on street parking	-painted lines -bus stops

Road Name	Classification	Speed	Width	Lanes	Walking	Cycling	Parking	Other
Lampson Street (Esquimalt – Tillicum)	Major	-40	10.0	2	-sidewalk on both sides	-unsigned, shared roadway	-west side: various on street parking locations	-painted lines -bus stops
Tillicum Road	Major	-not posted	12.5 (variable)	4	-sidewalk on both sides	-unsigned, shared roadway	-no parking	-painted lines -bus stops
Admirals Road (Lyall – Esquimalt)	Major	-not posted	11.0	4	-sidewalk on both sides	-marked on sidewalk (east side)	-west side: on street parking	-painted lines -bus stops
Admirals Road (Esquimalt - Colville	Major	-not posted	12.0	4	-sidewalk on both sides	-unsigned, shared roadway	-no parking	-painted lines -bus stops

Generally, the local municipal road network in the vicinity of the site, south of Esquimalt Road carries low traffic volumes and is designed to standard which is appropriate for the adjacent land uses and users. There are concrete sidewalks along both sides of the roads under Township of Esquimalt jurisdiction. On-street parking occurs along many of the roadways, as indicated in the previous Table 1.

2.2 Designated Truck Routes

The Township of Esquimalt OCP describes the functional classification of roads. In the Township of Esquimalt, Major roads are considered to be truck routes. As seen in Exhibit 1, within the study area, Admirals Road, Esquimalt Road, Tillicum Road, Lyall Street, Craigflower Road, Colville Road and Lampson Street are Major roads and therefore legal truck routes.

In July 2007, in a letter from the Township of Esquimalt notified the Capital Regional District of its intent to amend the Street and Traffic Regulation Bylaw[1] to regulate traffic on municipal roads in the portion of the municipality south of Lyall Street (See **Appendix A**).

The amendment was intended to restrict truck traffic having a gross vehicle weight in excess of 10,000 kg (GVW) from municipal roads in the area south of Lyall Street. This bylaw amendment was subsequently adopted and Schedule A of the current bylaw depicts the roads that are restricted to these trucks (See **Appendix B**). The purpose of the proposed amendment was to restrict the types and amount of traffic that would be generated by the wastewater treatment plant construction and subsequent operation and was focussed on the Macaulay Point site. Provision for the existing operational truck traffic has been made within the bylaw.

[1] http://www.esquimalt.ca/files/PDF/Bylaws/Streets_and_Traffic_Consolidation_Bylaw_No_2607_April_5_2011.pdf

The letter also indicates the "Extraordinary Traffic" on Lyall Street, between Head Street and Admirals Road will also be prohibited unless an agreement has been entered that provides for the payment of compensation to the municipality for damage that may be caused by the extraordinary traffic.

2.3 Existing and Projected Traffic Volumes

Traffic volumes were gathered from the CRD's Regional Transportation Planning Management System website, which provided tube count volumes from 2009. Traffic volumes for 2016 (assumed Opening Day) were estimated based on an average annual compounded growth rate of 1.0%. The following **Table 2** highlights the available existing and future post-development forecast traffic volumes

Table 2: Existing and Projected Traffic Volumes

Road Name	Classification (typical volume range)	Units	Traffic Volumes (2009)	Traffic Volumes (2018)
Victoria View Road	Local (<1,000 vpd)	-	n/a	n/a
Patricia Way	Local (<1,000 vpd)	-	n/a	n/a
Peters Street	Local (<1,000 vpd)	-	n/a	n/a
Lyall Street	Collector (3,000 – 8,000 vpd)	VPD	3,410	3,730
		VPH	350	385
Gore Street	Collector (3,000 – 8,000 vpd)	-	n/a	n/a
		-	n/a	n/a
Head Street	Collector (3,000 – 8,000 vpd)	VPD	3,100	3,390
		VPH	325	355
Esquimalt Road	Major (5,000 – 20,000 vpd)	VPD	16,350	17,880
		VPH	1,720	1,880
Lampson Street	Arterial (10,000 – 30,000 vpd)	VPD	11,300	12,360
		VPH	1,190	1,300
Tillicum Road	Major (10,000 – 30,000 vpd)	VPD	24,200	26,470
		VPH	2,540	2,780
Admirals Road	Major (10,000 – 30,000 vpd)	VPD	14,300	15,640
		VPH	1,500	1,640

*vpd = vehicles per day

*vph = vehicles per hour (PM Peak Hour)

As seen in the table, all road segments continue to operate within the prescribed capacities upon "Horizon Year 2018" build-out of the McLoughlin Point facility.

2.4 Transit

There is good transit service within Esquimalt with one route servicing the area south of Esquimalt Road. BC Transit operates Bus Route 25 — MAPLEWOOD / ADMIRALS WALK / WESTERN EXCHANGE connecting the Westshore area and Saanich along both Lyall Street and Head Street, with the closest stop to the McLouphlin Point site at the intersection of Gore Street and Lyall Street (approx. 750m). The route and current schedules are shown in the following Exhibits.

Exhibit 3 – BC Transit Route #25 Map

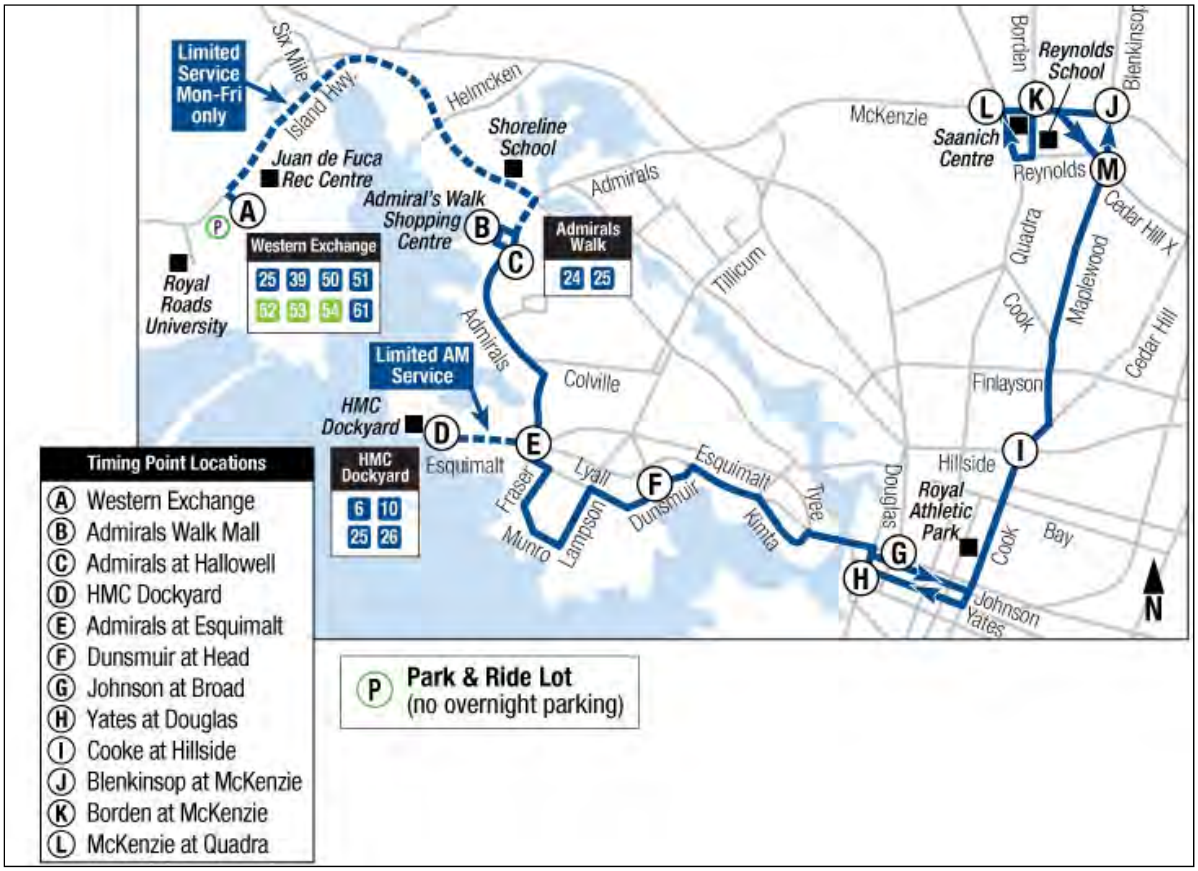


Exhibit 4 – BC Transit Route #25 Schedule

Choose Direction: NORTHEAST | SOUTHWEST
Choose Day: Monday through Friday | Saturday | Sunday

Monday through Friday - Morning

Bus Type	Borden at McKenzie	McKenzie at Quadra	Blenkinsop at Cedar Hill X	Cook at Hillside	Yates at Broad	Dunsmuir at Head	Admiral's at Esquimalt North	Admirals at Hallowell	Western Exchange	Admirals Walk Mall
Access	6:34	6:36	6:39	6:48	6:57	7:07	7:14	7:19	7:29	-
Access	7:29	7:31	7:34	7:43	7:52	8:02	8:09	-	-	8:14
Access	7:53	7:55	7:58	8:07	8:16	8:26	8:33	8:38	8:48	-
Access	8:49	8:51	8:54	9:03	9:12	9:22	9:29	-	-	9:34
Access	9:23	9:25	9:28	9:37	9:46	9:56	10:03	10:08	10:18	-
Access	9:55	9:57	10:00	10:09	10:18	10:28	10:35	-	-	10:40
Access	10:42	10:44	10:47	10:56	11:05	11:15	11:22	-	-	11:27
Access	11:26	11:28	11:31	11:40	11:50	12:00	12:08	-	-	12:14

Monday through Friday - Afternoon

Bus Type	Borden at McKenzie	McKenzie at Quadra	Blenkinsop at Cedar Hill X	Cook at Hillside	Yates at Broad	Dunsmuir at Head	Admiral's at Esquimalt North	Admirals at Hallowell	Western Exchange	Admirals Walk Mall
Access	12:00	12:02	12:05	12:14	12:24	12:34	12:42	-	-	12:48
Access	12:50	12:52	12:55	1:04	1:14	1:24	1:32	-	-	1:38
Access	1:43	1:45	1:48	1:57	2:07	2:17	2:25	-	-	2:31
Access	-	-	-	-	-	-	-	2:50	3:04	-
Access	2:25	2:27	2:30	2:39	2:49	2:59	3:07	3:13	3:27	-
Access	3:02	3:04	3:07	3:16	3:26	3:36	3:44	3:50	4:04	-
Access	3:33	3:35	3:38	3:47	3:57	4:07	4:15	-	-	4:21
Access	4:16	4:18	4:21	4:30	4:40	4:50	4:58	5:04	5:14	-
Access	4:49	4:51	4:54	5:03	5:13	5:23	5:31	5:37	5:47	-
Access	5:24	5:26	5:29	5:38	5:46	5:55	6:02	-	-	6:08

Monday through Friday - Evening

Bus Type	Borden at McKenzie	McKenzie at Quadra	Blenkinsop at Cedar Hill X	Cook at Hillside	Yates at Broad	Dunsmuir at Head	Admiral's at Esquimalt North	Admirals at Hallowell	Western Exchange	Admirals Walk Mall
Access	6:11	6:13	6:16	6:25	6:33	6:42	6:49	-	-	6:55
Access	7:53	7:55	7:58	8:07	8:15	8:24	8:31	-	-	8:37
Access	8:49	8:51	8:54	9:03	9:11	9:20	9:27	-	-	9:33
Access	10:23	10:25	10:28	10:37	10:45	10:54	11:01	-	-	11:07

Choose Direction: NORTHEAST | SOUTHWEST
Choose Day: Monday through Friday | Saturday | Sunday

Monday through Friday - Morning

Bus Type	Western Exchange	Admirals Walk Mall	Admiral's at Esquimalt South	HMC Dockyard	Dunsmuir at Head	Johnson at Broad	Cook at Hillside	McKenzie at Blenkinsop	Borden at McKenzie
Access	6:24	6:36	6:41	6:46	6:55	7:04	7:12	7:22	7:24
Access	-	6:57	7:02	7:07	7:16	7:25	7:33	7:43	7:45
Access	6:48	7:00	7:05	7:10	-	-	-	-	-
Access	7:03	7:15	-	-	-	-	-	-	-
Access	7:34	7:46	7:51	7:56	8:05	8:14	8:22	8:32	8:34
Access	-	8:34	8:39	-	8:45	8:54	9:02	9:12	9:14
Access	8:53	9:05	9:10	-	9:16	9:25	9:33	9:43	9:45
Access	-	9:57	10:02	-	10:08	10:17	10:25	10:35	10:37
Access	10:23	10:35	10:40	-	10:46	10:55	11:03	11:14	11:16
Access	-	11:14	11:19	-	11:26	11:35	11:44	11:55	11:57

Monday through Friday - Afternoon

Bus Type	Western Exchange	Admirals Walk Mall	Admiral's at Esquimalt South	HMC Dockyard	Dunsmuir at Head	Johnson at Broad	Cook at Hillside	McKenzie at Blenkinsop	Borden at McKenzie
Access	-	12:01	12:06	-	12:13	12:22	12:31	12:42	12:44
Access	-	12:54	12:59	-	1:06	1:15	1:24	1:35	1:37
Access	-	2:07	2:12	-	2:19	2:29	2:39	2:51	2:53
Access	-	2:37	2:42	-	2:49	2:59	3:09	3:21	3:23
Access	3:14	3:24	3:29	-	3:36	3:46	3:56	4:08	4:10
Access	3:40	3:50	3:55	-	4:02	4:12	4:22	4:34	4:36
Access	4:14	4:24	4:29	-	4:36	4:46	4:56	5:08	5:10
Access	-	4:58	5:03	-	5:10	5:20	5:30	5:42	5:44

Monday through Friday - Evening

Bus Type	Western Exchange	Admirals Walk Mall	Admiral's at Esquimalt South	HMC Dockyard	Dunsmuir at Head	Johnson at Broad	Cook at Hillside	McKenzie at Blenkinsop	Borden at McKenzie
Access	-	6:13	6:18	-	6:25	6:33	6:41	6:51	6:53
Access	-	7:07	7:12	-	7:19	7:27	7:35	7:45	7:47
Access	-	8:04	8:09	-	8:16	8:24	8:32	8:42	8:44
Access	-	9:38	9:43	-	9:50	9:58	10:06	10:16	10:18

This service point could be an important element in the reduction of construction staff vehicle traffic to the McLoughlin Point site. While it is likely that some vehicles will be required to deliver tools and equipment to the work site, general labour staff could find transit service as a viable commuter alternative. The frequency of this service could be reviewed with BC Transit to establish whether increased service levels would be considered during peak construction activity periods. Additionally, it could also be

feasible to develop a temporary stop closer to the construction site to better service construction staff. Alternatively, a shuttle service could operate between the existing stop and the construction site.

2.5 Schools

2.5.1 Ecole Macaulay Elementary School – School #1

Identified as School #1 on Exhibit 1, Macaulay Elementary School is a French Immersion school located at 1010 Wychbury Avenue, within close proximity of the McLoughlin Point site. The school enrollment is approx. 450 students and regular school operating hours are 8:50am – 2:48pm with significant student pick-up / drop-off activity and pedestrian activity occurring on the streets directly adjacent the school.

2.5.2 Ecole Victor Brouder - Schools #2 and #3

Victor Brodeur School, identified as School #2 on Exhibit 1, is a Francophone school located at 637 Head Street, north of Esquimalt Road. The school services the entire region and current enrollment is well over 600 students. Lampson Street School (School #3 on Exhibit 1), serves the student population overflow for the main school. Besides the significant pedestrian activity associated with neighbourhood student activity, there are also a significant number of students that are bussed to Victor Brodeur School from outlying areas. A number of these students then walk to the adjacent Lampson Street campus.

2.5.3 Rockheights Middle School - School #4

Rockheights Middle School, identified as School #4 on Exhibit 1 has an enrollment of approx. 200 students. This school may generate some pedestrian traffic along short sections of Admirals Road and Lampson Street, but will otherwise not be influenced by the McLoughlin Point construction activity.

2.5.4 Esquimalt High School - School #5

Esquimalt High School, located at 847 Colville Road and identified as School #5 on Exhibit 1, has an enrollment of approx. 750 students. Regular class hours are between 8:28am and 3:11pm, with early dismissal at 1:57pm on Fridays. This school generates pedestrian activity along Lampson Street in the vicinity of the school.

School crossing guards

There are some intersections where crossing guards are present during peak arrival / departure periods. Beacon Community Services provides this service; however, at the time of this study, we were unable to speak to the appropriate contact person to gather more information on the details of this service. A representative should be contacted for more specific information on which intersections which have guards and how this service might be expanded during the McLoughlin Point facility construction period.

2.6 Other Considerations

2.6.1 DND and Work Point Barracks

The McLoughlin Point site is located within a residential neighbourhood on DND lands. Along with single family military housing units, Work Point houses the Naval Officer Training Centre Venture (recently relocated from Naden) as well as housing and recreation facilities for military personnel. In 1997, a new 2,000-square-metre building was constructed overlooking Victoria Harbour, including space for administration offices, instructional & training, sports facilities and a student lounge. On 30 September 2005, the new Kingsmill building was officially dedicated. The six-story accommodation building provides 172 rooms for naval officer trainees.

The old military prison closed long ago and is now used for storage.

A CFB Esquimalt marina is located just north of the site and includes 100 mooring berths for power boats less than 30 feet in length, a boat launch ramp, a storage compound, servicing bays, and a clubhouse for the CFB Esquimalt Power Boat Club. The CFB Esquimalt Power Boat Club is open to all members of the Regular and Reserve Force, to DND civilian employees, and to other employees of federal services. All facilities are secured by fences and protected by lockboxes, allowing exclusive access to members of the Boat Club.

2.6.2 Craigflower Bridge Replacement

Recently, the Town of View Royal and District of Saanich have announced that the Craigflower Bridge, located on Admirals Road, north of Craigflower Road will be replaced with work beginning in approximately May 2013. It is expected that Admirals Road could be closed for a period of approximately 7 months. During this period, traffic will be redirected to Tillicum Road. As the McLoughlin Point facility construction is scheduled to commence in the 2nd quarter of 2014, it is expected that the new bridge will be in operation by this time and no traffic diversions will be in place.

2.6.3 Parks and Recreation Facilities

Bullen Field, Esquimalt Recreation Centre, Esquimalt Teen Centre, Archie Browning Sports Centre and a Lacrosse Box can be accessed from Lyall Street / Fraser Street, west of Lampson Street. The Sports Centre is a multi-use facility, which includes an ice arena, a six-sheet curling rink, and lounge areas. The Esquimalt Recreation Centre is a multi-purpose wellness and community recreation facility with a gymnasium, strength training facilities, aquatic centre and Out of School Care and child minding services. Bullen Field hosts a number of organized field sports such as softball, soccer and rugby. The entire field is also used for single special events that draw the community and neighbours from other parts of the Capital Region. As such, the sites generate considerable pedestrian activity on the adjacent street network and should be avoided by construction related traffic.

3. PROPOSED DEVELOPMENT

As mentioned earlier, part of the Capital Regional District's proposed wastewater treatment program, McLoughlin Point has been selected as the site for a liquid only wastewater treatment facility. The project also includes the construction of conveyance pipes between the proposed McLoughlin Point Wastewater Facility, Clover Point Pump Station, Macaulay Point Pump Station, and Hartland Landfill Biosolids Facility or other suitable site.

3.1 Site Trip Generation during Construction

Construction will start in the 2nd quarter of 2014 and is expected to take approximately 3.5 years to complete. Through the construction period, different activities will require special equipment and labour resources. The site-generated trips indicated in this study have been provided to the Capital Regional District based on information contained in a previous Environmental Impact Assessment (EIS) prepared by Westland Resource Group[2] and confirmed by Stantec Consulting Ltd. for this study and are discussed in the following sections.

Throughout the construction of the McLoughlin Point wastewater treatment plant, materials and equipment needs will generate truck traffic. Construction traffic will include delivery of equipment and supplies and transport of rock and soil. Material and equipment deliveries will include concrete trucks, trucks delivering reinforcing steel, excavation and other equipment, haul trucks, and vehicles transporting other materials. Vehicle types will include flatbed trucks, tandems, small to large delivery vehicles, cranes, excavators, and related equipment. Materials and equipment may be transported by barge which would reduce many of the construction related traffic concerns in the area; however, this study is based on assessment of truck traffic.

The estimated one-way truck traffic for concrete, steel, excavated material, soil and fill transport during construction of the wastewater treatment facility are shown in **Table 3**.

---

http://www.wastewatermadeclear.ca/media/reference-library/2010amendment8tocore_/apxfeismcloughlin/apxfeismcloughlin.pdf

Table 3: Construction Truck Traffic Estimates

Activity	Total Trucks	Average Trucks per Week	Duration (weeks)
Excavation (including clearing and grubbing)	2884	58	50
Concrete	1106	11	100
Reinforcing steel	50	0.5	100
Backfill	110	2	50

Overall, the weekly truck traffic generated by the site is expected to be quite minimal when compared to the operational traffic volume thresholds found in Table 2, but will have a noticeable impact on the local community, particularly south of Esquimalt Road due to the low existing volumes and the types of traffic. The majority of truck traffic will come from the excavation activities, which will occur in the first phases of the construction. Once this activity is complete, the construction of concrete formwork and reinforcing steel would begin, with concrete pours occurring throughout this phase. Some backfilling activity will also likely occur during this phase, but the majority of this activity would occur in the subsequent stages of construction.

A staging area on or directly adjacent the site will need to be established to ensure that trucks do not park on roadways while waiting to deliver materials or equipment. Additionally, more complex scheduling could minimize the number of trucks in the area at one time.

In addition to the material and equipment trucks, labour force during construction is expected to account for a significant amount of the site's trips, summarized in the following **Table 4**.

Table 4: Labour Force Projections

Facility	Estimated time to completion	Construction labour force
McLoughlin Point facility wastewater treatment	3.5 years	Approximately 38,800 worker-days per year of site labour or an average of 155 workers per day. Assume a peak of 308 workers per day during the concrete work.
Conveyance pipeline between McLoughlin Point and Hartland North (18km)	1.15 years	Conveyance construction crew could be composed of 15 total workers, average 10 workers per day, and peak 15 workers per day.
Macaulay Point and McLoughlin Point (1km)	4 months	Forcemain construction crew could be composed of 15 total workers per day, average 10 workers per day, and peak 15 workers per day.

3.1.1 Labour Force Site Traffic and Parking Generation

In order to calculate the anticipated number of vehicle trips associated with the labour force during the construction period, the average number of workers during the different activity periods has been estimated based on a 95 percent mode split for passenger cars and a vehicle occupancy rate of 1.1 passengers per vehicle. Based on this method, the anticipated number of vehicle trips by construction staff is estimated as seen in the following **Table 5**:

Table 5: Labour Force Traffic Projections

Facility	Estimated time to completion	Construction labour force
McLoughlin Point facility wastewater treatment	3.5 years	Approximate average of 134 vehicles per day. Assume a peak of 266 vehicles per day during the concrete work.
Conveyance pipeline between McLoughlin Point and Hartland North (18km)	1.15 years	Approximate average of 9 vehicles per day. Assume a peak of 13 vehicles per day.
Macaulay Point and McLoughlin Point (1km)	4 months	Approximate average of 9 vehicles per day. Assume a peak of 13 vehicles per day.

In order to accommodate the anticipated parking needs for the peak construction activity periods, a dedicated parking area sufficient for the 266 vehicles likely to be generated by the labour force will be required. These vehicles should be accommodated off-street at a suitable convenient location to ensure

no on-street parking occurs in associated with the project. It may be feasible to work with DND officials to secure temporary space in close proximity to the construction site for parking area.

3.1.2 Site Traffic Distribution and Assignment

Given the information above, site related traffic is expected to generally follow the major roads in the network before entering Victoria View Road via the surrounding residential neighbourhoods. The logical routing south of Esquimalt Road would be Lampson Street to Lyall Street before entering onto the DND road network. An alternative route between Esquimalt Road and Lyall Street would be Head Street / Gore Street, but this route has a steeper approach grade to Esquimalt Road, making it more difficult for large trucks to accelerate from a stop condition and should be avoided by large trucks departing the site. Trucks are restricted on Dunsmuir Road, between Esquimalt Road and Head Street. Based on adjacent land uses and roadway characteristics discussed earlier in this report, a preferred Truck Route for site generated traffic is shown in **Exhibit 5**. Additional mitigation measures are discussed in following sections.

Construction traffic's start and destination points are summarized in **Table 6**.

Table 6: Construction truck traffic starting points and destinations

Construction	Starting Points	Destinations
Concrete, structural steel, reinforcing steel, and aggregates	Upper Victoria Harbour industrial area	McLoughlin Point
Pipes and equipment	Swartz Bay ferry terminal	McLoughlin Point
Labour Force	Various	McLoughlin Point

Exhibit 5 – Preferred Site Related Truck Routes

As this is a new facility with extensive excavation and concrete truck traffic, construction traffic volumes can be considered high. The roads near the site are either local or collector roads. Lyall Street and Lampson Street are expected to have substantial traffic increases, especially during peak hours, so the impact would be noticeable. However, both are classified as Collector routes and have the capacity to accommodate the forecast increase in traffic. During construction, and without any mitigation measures in place, traffic would be disrupted on site access roads and additional parking would be required for construction workers driving to and from the site.

3.1.3 Mitigation Measures to Support Construction Period Site Traffic

Because of the large labour force associated with the construction of the McLoughlin Point facility, alternative construction staff parking locations with van pooling should be investigated to ensure that this component of the construction traffic does not have an adverse effect on the adjacent neighbourhood. BC Transit services the area and opportunities to maximize this service should be explored for construction workers. Transit Passes could be offered to construction workers that do not need to drive to the site. The

Capital Regional District and construction contractors should work closely with BC Transit staff to explore potential service enhancements during periods of intense construction activity. Construction traffic (particularly labour staff) could also alternate routes to help minimize traffic volumes on local roads.

Standard traffic control measures for projects of this nature will be required. With the use of flaggers and signage, the risk to the public from vehicle movement is greatly reduced. The construction site will be fenced to prevent access by walkers, mountain bikers, or other members of the public. Flaggers will be present during school hours to ensure that students, particularly those walking to or from school, do not gain access to construction activity areas. Nearby residents (and schools) should be notified in advance of disruptive construction activities.

- continue to investigate the use of barges for delivery of materials and equipment to / from the Upper Harbour to reduce site generated truck traffic
- prior to construction, the CRD, Township of Esquimalt, construction contractors and local stakeholders should establish a project liaison committee and communication plan. This committee should have regular meetings and would be a valuable source for communication of activities, impacts and any complaints to ensure timely delivery of information between affected parties.
- avoid schools, particularly during peak pick-up / drop-off periods
- work with representatives of Macaulay School to develop a program which provides student safety education and promotes the use of alternative roadways for pedestrian traffic accessing the school.
- maintain / implement crossing guards as deemed appropriate
- transit passes could be offered to construction workers that do not need to drive to the site.
- vanpooling for construction staff should be offered to construction workers that do not need to drive to the site. Park & Ride facilities should be identified for this service.
- restrict engine compression brake usage on municipal roads
- conduct regular vehicle safety inspections
- ensure truck turning paths have adequate clearance, particularly on local roads –restrict on-street parking where necessary
- provide sufficient parking space for construction crews
- prohibit construction staff from parking on the adjacent roads. Temporary permits for residents could be provided and enforced.
- an inventory of existing road surface condition along construction traffic routes should be undertaken to ensure roadways are restored to original condition following project completion.

3.2 Pipeline Construction Traffic Considerations

Installation of conveyance pipes between the various sites is expected to generate some construction traffic as well as cause capacity constraints along the pipeline routes throughout construction due to partial lane closures.

Conveyance pipes would be buried in the road corridor, probably underneath the travel lanes, using cut and cover methods. Public safety issues associated with installing pipes in roadways and along rights-of-way are primarily associated with operation of heavy equipment and the presence of open trenches. Flaggers will be available during the day to manage vehicles and pedestrians near the worksite. Barriers or flagging is typically erected to alert people to the presence of open trenches.

Construction would disrupt vehicular traffic on affected routes. The extent and severity of disruption would be a function of the traffic volumes and available opportunities to keep some lanes open or to reroute traffic. All the roads potentially affected by the construction of ancillary facilities are minimum two-lane, so it is assumed that one lane could remain open and alternating directions of traffic utilize the remaining lane.

3.2.1 Clover Point to McLoughlin Point

Wastewater from the Clover Point pump station will be pumped to the McLoughlin Point facility intake. The 1,200 mm diameter forcemain from Clover Point to the McLoughlin Point facility will be approximately 5 km long. The pipe will be installed in a trench along Dallas Road from Clover Point to Ogden Point, and will then be installed in a 3 m to 4 m diameter tunnel beneath the entrance to the Victoria Harbour from Ogden Point to McLoughlin Point.

3.2.2 Macaulay Point to McLoughlin Point

Wastewater from the Macaulay Point pump station will be pumped to the McLoughlin Point facility via a 1,800 mm diameter forcemain beneath the following roads and shown in **Exhibit 6**:

- Vaughan Street,
- Anson Street,
- Bewdley Avenue,
- Peters Street,
- Victoria View Road

Exhibit 6 – Macaulay Point – McLoughlin Point Conveyance Pipe Route

3.2.3 McLoughlin Point to Hartland Landfill

This conveyance pipeline route between the McLoughlin Point wastewater treatment facility and Hartland Landfill biosolids facility has not been finalized. A detailed description of site conditions along the conveyance pipeline route will be provided when the route has been finalized and an assessment for the route can be conducted.

3.2.4 Mitigation Measures to Support Pipeline Construction

The Ministry of Transportation and Infrastructure Traffic Control Manual for Work on Roadways procedures for managing vehicular traffic in a construction zone will be implemented, which would result in one lane remaining open to alternating directions of traffic. Construction will be restricted to single blocks at a time and scheduled outside of peak periods of vehicular activity.

- ensure all affected stakeholders receive adequate notice of construction activities
- during periods of major activity or pipeline construction, some areas of on-street parking could be restricted to provide additional space for vehicle traffic operation.
- road surfaces and all disturbed areas will be restored to original condition.

3.3 Trip Generation during Site Operation

Maintenance of facility equipment

Once operational, maintaining and servicing the facility and equipment at the McLoughlin Point facility will include daily site visits and annual cleaning. **Table 7** summarizes the estimated operational traffic for the McLoughlin Point facility.

Table 7 – Operational Traffic

Activity	Average number of vehicles
	McLoughlin Point
Screenings and grit transferred to the Hartland Landfill	0
Alum delivery	2 per month
Bioxide delivery	0
Polymer delivery	1 per month
Staff and maintenance vehicles	12- 14 per day

Chemical Delivery

An estimated 3 delivery trucks per month will be needed for chemically assisted treatment. Chemicals will be stored in bulk storage tanks with suitable containment sumps.

The frequency of chemical delivery is based on one-month storage capacity being provided on site. Smaller storage capacity will result in more truck traffic.

3.3.1 Mitigation Measures to Support Operation and Maintenance Site Traffic

The operational traffic associated with the McLoughlin Point facility shown in Table 2 will be dispersed throughout the day and have a minor impact on the adjacent road network. To minimize the noise and safety impacts of supply delivery trucks on neighbouring residents and schools, recommendations are listed below.

- avoid school zones during peak student pick-up / drop-off periods
- discuss routing with Esquimalt staff; it may be beneficial to permit delivery trucks on alternate routes to avoid Macaulay School.
- restrict engine/air brake usage

4. CONCLUSIONS & RECOMMENDATIONS

4.1 Traffic Generation & Impact

4.1.1 McLouphlin Point Facility Site Construction Impact

The construction of the facility will have a noticeable impact on the road network and associated land uses. The construction period is medium-term (estimated to be over a 3.5 year duration) and the amounts and types of site generated traffic will vary depending on the specific activities. The majority of truck traffic will come from the excavation activities. Overall, the average weekly truck traffic generated by the site is expected to be quite low; however, during periods of concrete work, the estimated trucking could occur on a single day and the amount of labour staff required during this activity is significant and will cause some localized delay and queuing at adjacent intersections. Opportunities to barge equipment and materials to/from the construction site would significantly reduce the transportation impact of this construction activity on the local neighbourhood. Several additional mitigation measures have been identified to reduce the amount of construction related traffic and its influence on adjacent land uses.

4.1.2 Conveyance Pipeline Construction Impact

This conveyance pipeline route between the McLoughlin Point wastewater treatment facility and Hartland Landfill biosolids facility has not been finalized. A detailed description of site conditions along the conveyance pipeline route will be provided when the route has been finalized and an assessment for the route can be conducted.

Wastewater from the Clover Point pump station will be pumped to the McLoughlin Point facility intake. The 1,200 mm diameter forcemain from Clover Point to the McLoughlin Point facility will be approximately 5 km long. The pipe will be installed in a trench along Dallas Road from Clover Point to Ogden Point, and will then be installed in a 3 m to 4 m diameter tunnel beneath the entrance to the Victoria Harbour from Ogden Point to McLoughlin Point. This pipeline construction will not require any trenching on Township of Esquimalt roads.

Wastewater from the Macaulay Point pump station will be pumped to the McLoughlin Point facility via a 1,800 mm diameter forcemain beneath the following roads:

- Vaughan Street,
- Anson Street,
- Bewdley Avenue,
- Peters Street,
- Victoria View Road

The impact would be local, short-term, and continuous during the construction period. Considering volumes of traffic affected, the impact is considered low in magnitude on the local road routes. In almost all cases, one-way alternating traffic would be permitted and there would be no residual impact. Standard

construction safety procedures would be applied and no significant traffic impacts would be created as a result of this activity.

4.1.3 Operational Traffic Impact

The traffic generated by the McLoughlin Point site operation generally has a minimal increase from existing volumes in the study area. The only roads that may face noticeable differences are the local DND roads at the site entrance; Victoria View Road, Patricia Way, and Peters Street, where existing volumes are currently extremely low. However, these roads are operating well within their intended capacity even with the additional site-generated traffic and no mitigation measures will be required to handle the anticipated traffic volumes and types.

4.2 Recommended Mitigation Measures

4.2.1 Construction Traffic Mitigation Measures

With the large number of workers required on site at various times, there will not be sufficient parking either on site or adjacent to the site. Parking areas would need to be identified for the various stages of the project to ensure that sufficient parking was available and then buses used to shuttle workers to and from the work site and the parking areas.

With truck trips estimated to total more than 4,100 for McLoughlin Point facility construction, measures to reduce this traffic on the local road network include the use of barges to transport excavated materials from the site and to deliver construction materials and equipment to the site.

Additional recommended mitigation measures are as follows:

- continue to investigate the use of barges for delivery of materials and equipment to / from the Upper Harbour to reduce site generated truck traffic
- prior to construction, the CRD, Township of Esquimalt, construction contractors and local stakeholders should establish a project liaison committee and communication plan. This committee should have regular meetings and would be a valuable source for communication of activities, impacts and any complaints to ensure timely delivery of information between affected parties.
- avoid schools, particularly during peak pick-up / drop-off periods
- work with representatives of Macaulay School to develop a program which provides student safety education and promotes the use of alternative roadways for pedestrian traffic accessing the school.
- maintain / implement crossing guards as deemed appropriate
- where feasible, schedule trucking activity to occur outside the typical commuter peak periods (7:30am – 9:00am & 4:00pm – 6:00pm).
- transit passes could be offered to construction workers that do not need to drive to the site.
- vanpooling for construction staff should be offered to construction workers that do not need to drive to the site. Park & Ride facilities should be identified for this service.

- restrict engine compression brake usage on municipal roads
- conduct regular vehicle safety inspections
- ensure truck turning paths have adequate clearance, particularly on local roads –restrict on-street parking where necessary
- provide sufficient parking space for construction crews
- prohibit construction staff from parking on the adjacent roads. Temporary permits for residents could be provided and enforced.
- an inventory of existing road surface condition along construction traffic routes should be undertaken to ensure roadways are restored to original condition following project completion.

4.2.2 Conveyance Pipeline Construction Mitigation Measures

Standard procedures for managing vehicular traffic in a construction zone will be implemented, which would result in one lane remaining open to alternating directions of traffic. Construction will be restricted to single blocks at a time and scheduled outside of peak periods of vehicular activity. A detailed Traffic Management Plan should be provided to the Township of Esquimalt by the construction contractor for approval prior to off-site construction activities.

During periods of major activity or pipeline construction, the following additional mitigation measures will reduce the traffic delays associated with the trenching activities:

- ensure all affected stakeholders receive adequate notice of construction activities
- during periods of major activity or pipeline construction, some areas of on-street parking could be restricted to provide additional space for vehicle traffic operation.
- road surfaces and all disturbed areas will be restored to original condition.

4.2.3 Operational Mitigation Measures

- avoid school zones during peak student pick-up / drop-off periods
- discuss routing with Esquimalt staff; it may be beneficial to permit delivery trucks on alternate routes to avoid Macaulay School.
- restrict engine/air brake usage

APPENDIX A

Letter from Township of Esquimalt to the CRD

APPENDIX B

Schedule A Map from Streets and Traffic Bylaw

APPENDIX H:
Community Impact And Mitigation Report

Prepared by CitySpaces Consulting Ltd.

McLoughlin Point:
Community Impact & Mitigation Report

Prepared for the
Capital Regional District

January 2013

CITY SPACES

Table of Contents

A. Introduction

The following report provides a summary of potential community impacts on the Township of Esquimalt, and recommended mitigations for construction and operation of the Core Area Liquid Wastewater Treatment Program, with a focus on facilities at McLoughlin Point. Potential impacts are measured as negligible, low, moderate or high, and are based on a combination of assessments done by others and the professional judgment of CitySpaces Consulting Ltd. Impacts have been separated between construction, that is, of one-time duration, and operations that will occur over the operational life of the project.

This summary draws on reports included in the appendix of the rezoning report including reports prepared by Stantec Consulting Ltd, Tera Environmental Consultants, Bunt & Associates, and DR Coell and Associates, as well as other reports previously prepared for the Capital Regional District related to the Core Area Wastewater Treatment Program.

B. Quality of Life Impacts

The following factors have been identified as having potential impact on the quality of life for residents of the Township of Esquimalt. The information in the following section is based on the report prepared by Tera Environmental Consultants, *Terrestrial Environmental Effects of the Proposed Capital Regional District McLoughlin Point Wastewater Treatment Facility (WWTF)*. The Traffic section is based on a report prepared by Bunt and Associates, Transportation Planners and Engineers, entitled *Core Area Wastewater Treatment Program - McLoughlin Point Wastewater Treatment Facility - Traffic Considerations.*

Noise

Sources of noise during construction will range from running excavation vehicles, using concrete pouring pumps, rockbreakers and blasting, and blasting signals. Potential noise sources will be controlled to meet all noise standards at the site property lines. Information posted on temporary safety fencing and warning signs around the construction site to inform the public of noise levels will be posted if needed. No Township of Esquimalt residents live close enough to the McLoughlin Point site to be disturbed by the expected levels of construction noise.

Noise from operation of the McLoughlin Point WWTF will be generated by such equipment as pumps, compressors, standby diesel power generators, mixers, process blowers, and fans and blowers associated with ventilation systems. All systems will be covered by roof assemblies to contain noise. Noise at the property line will not exceed the levels permitted under the Township of Esquimalt's Noise Control Bylaw No. 2677. The distance between the McLoughlin Point site and the closest Esquimalt residents will further mitigate the noise effects.

Buildings that house noise-generating equipment and exhausts of diesel engines will include sound attenuation at decibel levels below the required levels to meet criteria of the Worker's Compensation Board (WCB) and Occupational Safety and Health Administration (OSHA). With the above mitigations, **impact is expected to be low** for construction and **low to negligible** for operation.

Vibration

Potential sources of vibration during construction include heavy equipment movement, excavator operation, blasting, and use of compactors and paving equipment.

Nearby occupants of Department of National Defense lands may be affected by vibration from construction activity, such as blasting, even when vibration is only slightly in excess of perception levels. Activities causing vibration will be restricted to conditions outlined in the relevant Township of Esquimalt bylaws.

Equipment that can potentially cause vibration during operations will be installed on pads and other vibration isolation devices to minimize vibration transmission, and will be kept within acceptable operating limits for protection of the equipment and operational staff.

The isolation of the site mitigates vibration impacts.

With these mitigation measures in place, **impact is expected to be low to negligible.**

Lighting

The exterior lighting plan for the WWTF will include post-top sodium vapour lighting standards typical to residential streets. Higher intensity spot lighting may be needed for any night work, if required. To prevent lighting of the night sky, lighting will be directed downward, with shields installed.

In keeping with the CRD's corporate activities for environmental sustainability, facility planning and design will incorporate sustainable building practices for green buildings, such as LEED® standards and be consistent with the project's Design Guidelines . **Impacts are expected to be low to negligible.**

Odour

Sources of odour at the McLoughlin Point WWTF can come from various components of either the untreated wastewater recovery area or the treated effluent area. The potential odour impact without mitigation, as reported in the Tera report, is high. The ambient odour guideline for the McLoughlin Point WWTF is 5 OU (Odour Units). A measurement of 5 OU or less equates to little or no detectible odour.

Ventilation air scrubbing of the enclosed facilities will be applied in ways that ensure that the 5 OU guideline is not exceeded at any time. The odour emission from all sources within enclosed buildings will be reduced by odour control systems before discharge to the atmosphere through exhaust stacks. Odour control systems will include a combination of biofilters, wet chemical scrubbing systems, and dry scrubbing systems, such as activated carbon. The heights of air exhaust stacks for the treatment of liquids will be 6m above ground level.

The operation of the facility will incorporate best practices for minimizing the potential for inadvertent release of odour, especially from untreated wastewater and sludge. Proper attention to design details and adherence to operating procedures will minimize release of odours from the treatment processes.

With these mitigation measures in place, the detection of odour units at the facility fence line is 5 OU or less, resulting in a **low to negligible expected impact**.

Visual Aesthetics

Given the location and topography of the site and its immediate surroundings, there is no point within the Township where the McLoughlin Point wastewater treatment facility will be visible. Inspections were undertaken taken by CitySpaces Consulting to determine if the site was visible from the following locations: West Bay RV site, Cairn Park and Macaulay Point Park. There is a potential that the site may be visible from higher floors of buildings located along Dunsmuir Road. The **visual impacts within the Township of Esquimalt are negligible**.

The facility will be visible from certain locations within the City of Victoria, namely the waterfront from Shoal Point to Ogden Point, and an area of waterfront along the north side of the middle harbour, from approximately Maitland Street to Paul Kane Place. The nearest point visible from land is 650 metres away, across the outer harbour. McLoughlin Point is also visible from arriving or departing Victoria Harbour vessels or aircraft.

Long-view vistas across the harbour from the east and south are the most significant design considerations.

Traffic

Bunt and Associates, Transportation Planners and Engineers, have prepared a report entitled *Core Area Wastewater Treatment Program - McLoughlin Point Wastewater Treatment Facility - Traffic Considerations.* The report examined traffic impacts on and mitigation measures for Esquimalt road systems during construction and operation of the McLoughlin Point Wastewater Treatment Facility.

The report assumes that construction materials and equipment will be delivered by vehicles. However, the contractor may consider barging some of the construction materials and equipment to the site, which would reduce the impact on traffic volumes.

CONSTRUCTION OF MCLOUGHLIN POINT WASTEWATER TREATMENT FACILITY

The analysis indicates that trips generated from construction activities on major roads (i.e. Esquimalt Road) are expected to be negligible relative to existing traffic volumes, but will have noticeable impact on local roads, particularly south of Esquimalt Road, due to lower existing volumes and the types of vehicles. Localized traffic impacts during construction may be **moderate to high without mitigation.**

The report also indicates that an average of 134 vehicles per day will be generated by the construction labour force, with a peak of 266 vehicles per day during the concrete work.

The report identifies impacts on schools, particularly Macaulay Elementary School, which is located closest to the site, and provides mitigation measures.

Recommended mitigation measures, including for Macaulay Elementary School, include:

- Continue to investigate the use of barges for delivery of materials and equipment to / from the site to reduce site generated truck traffic.

- Prior to construction, the CRD, Township of Esquimalt, construction contractors and local stakeholders should establish a project liaison committee and communication plan. This committee should have regular meetings and would be a valuable source for communication of activities, impacts and any complaints to ensure timely delivery of information between affected parties.
- A staging area on, or directly adjacent, the site will need to be established to ensure that trucks do not park on roadways while waiting to deliver materials or equipment. Additionally, more complex scheduling could minimize the number of trucks in the area at one time.
- Avoid schools, particularly during peak pick-up / drop-off periods.
- Work with representatives of Macaulay School to develop a program which provides student safety education and promotes the use of alternative roadways for pedestrian traffic accessing the school.
- Maintain / implement crossing guards as deemed appropriate.
- Where feasible, schedule trucking activity to occur outside the typical commuter peak periods (7:30am – 9:00am & 4:00pm – 6:00pm).
- Transit passes could be offered to construction workers that do not need to drive to the site.
- Vanpooling for construction staff should be offered to construction workers that do not need to drive to the site. Park & Ride facilities should be identified for this service.
- Restrict engine compression brake usage on municipal roads.
- Conduct regular vehicle safety inspections.
- Ensure truck turning paths have adequate clearance, particularly on local roads. Restrict on-street parking where necessary.
- Provide sufficient parking space for construction crews.
- Prohibit construction staff from parking on the adjacent roads. Temporary permits for residents could be provided and enforced.
- An inventory of existing road surface condition along construction traffic routes should be undertaken to ensure roadways are restored to original condition following project completion.

With these mitigation measures in place, impacts are expected to be **low to moderate.**

CONVEYANCE PIPELINE CONSTRUCTION

The conveyance pipeline route between the McLoughlin Point Wastewater Treatment Facility and the Hartland Facility has not been finalized, and will be determined after a consultation process with neighbours. Pipeline construction mitigation measures will include:

- Implement standard procedures for managing vehicular traffic in a construction zone, which would result in one lane remaining open to alternating directions of traffic.
- Schedule construction activities outside of peak periods of vehicular activity.
- Construction contractor to provide a Traffic Management Plan to the Township of Esquimalt for approval prior to construction activities.

- Final routing will be determined after consultation with neighbours subsequent to the rezoning application.
- Ensure all affected stakeholders receive adequate notice of construction activities. During periods of major activity or pipeline construction, some areas of on-street parking could be restricted to provide additional space for vehicle traffic operation.
- During periods of major activity or pipeline construction, some area of on-street parking could be restricted to provide additional space for vehicle traffic operations.
- Restore road surfaces and all disturbed areas to original condition.

With mitigation measures in place, localized impacts are expected to be **low to moderate.**

OPERATIONS

Traffic impacts during operation of the facilities will be **negligible**.

Recommended mitigation measures include:

- Avoid school zones during peak student pick-up / drop-off periods.
- Discuss routing with Esquimalt staff; it may be beneficial to permit delivery trucks on alternate routes to avoid Macaulay School.
- Restrict engine/air brake usage.

ACCESS TO DND LANDS

Access to the McLoughlin Point Wastewater Treatment Facility from the closest public road is a distance of more than 500 m through DND lands. The CRD has received approval in principle from DND for construction and long term operational access. Part of the consultation process for this application will include a community meeting with the Work Point DND staff and residents.

C. Social Impacts

Social impacts consist primarily of effects on local housing, schools or other social institutions or activities.

Housing

A major new project introduced into a community generally raises concerns in two areas:

- impact on housing availability and resulting impacts on affordability; and
- impact on residential property values.

HOUSING AVAILABILITY AND AFFORDABILITY

It is unlikely that there will be a noticeable demand for additional rental or owned housing for construction workers as they may already be living in the Township of Esquimalt or elsewhere in the region. There will be few new permanent employees for the operation of the facility and they may already be living in the Township of Esquimalt or elsewhere in the region or, if new to the region, may choose housing in another municipality.

Construction and operation of the wastewater treatment facility will have a **negligible impact** on availability and affordability of housing in the Township of Esquimalt.

RESIDENTIAL PROPERTY VALUES

DR Coell and Associates Inc. were asked to provide a professional opinion on the likely impact of a new wastewater treatment facility at McLoughlin Point on residential property values in the Township of Esquimalt (see attached report).

In their view, the two factors most likely to have a potential impact on residential use in the general area of McLoughlin Point are noise and odour. Another, more intangible category of impact is stigma. The level of market risk, usually associated with reduced sale prices or extended days on the market, is the stigma associated with the project.

The investigation was undertaken by comparing paired sales and resales before and after the installation of wastewater treatment or pumping facilities in other areas of the CRD, to determine if the infrastructure resulted in measurable market related detrimental effects.

There appeared to be no market discount associated with any of the comparable properties identified in the report.

The report concluded that “It is likely that the McLoughlin Point plant, if designed and operated according to the specifications in the CRD-Westland Report, will have **negligible to no impact** on real estate values.” (see opinion letter, Appendix J)

Schools

Macaulay Elementarty School is located at 1010 Wychbury Avenue. Approximately 450 students are enrolled in this public elementary school that offers both English and French Immersion programs to students from kindergarten through grade 5. It is a neighbourhood school and the only French Immersion elementary school in the Township of Esquimalt. This means that students travel to school by foot, by public transit, and are driven in private vehicles.

A major new development in the community can have impacts in two areas:

- student enrollment; and
- safety, particularly during construction.

STUDENT ENROLLMENT

No large influx of workers and their families is expected. It is also not expected that families will leave the area because of the facility. Construction and operation of a wastewater treatment plant at McLoughlin Point will likely have a **negligible impact** on student enrollment.

SAFETY

The traffic study prepared by Bunt and Associates identifies potential traffic impacts and recommended mitigations for both construction and operation of the wastewater treatment facility with particular reference to Macaulay School. These are outlined in the previous section “Traffic”.

D. Functional Impacts

Functional impacts identified consist of those related to construction of conveyance pipes to the biosolids treatment facility, delivery and storage of chemicals, and location and size of utility requirements. Potential impacts are described below. Background material for this section are in the appended report entitled "*McLoughlin Point Risk Assessment Report*" prepared by Stantec Consulting Ltd., and the *Terrestrial Environmental Effects of the Proposed Capital Regional District McLoughlin Point Wastewater Treatment Facility prepared by Tera Environmental Consultants.*

Disposal of Sludge

Sludge from the McLoughlin Point Wastewater Treatment Plant (WWTP) is anticipated to be pumped, via a 200mm diameter forcemain approximately 18km in length, through the Township of Esquimalt to the proposed biosolids treatment facility at Hartland Landfill (the Hartland Energy Centre). A second forcemain would be installed in the same trench, which would convey centrate from the dewatering process at the biosolids facility and return it to the sanitary sewer system. It is noted that the CRD continues to look for other location options. The Hartland site remains the "chosen" site.

The impact on the Township based on the Hartland site will occur once, during the installation of the forcemain, affecting traffic and potentially parking. The design and installation of the forcemains will be in accordance with the Township of Esquimalt Bylaws. As this primarily involves the installation of two relatively small diameter pipes in the same trench, impacts on each street will be of short duration.

In addition to the mitigation measures described above, the CRD commits to a separate neighbourhood consultation process to review the pipe route options and choose the most efficacious route.

With the proposed mitigation measures and the length of time each section of road is affected, the impact is expected to be **low to negligible**.

Delivery and Storage of Chemicals

Chemicals used in the water treatment process will be largely inorganic materials, such as polymers, caustics, coagulant chemical agents, or compounds for cleaning treatment media. Chemicals will be delivered once to a maximum of two times a month in small to medium sized shipments (10 to 20 m^3) and stored at the McLoughlin Point facility in secured tanks with containment features.

An estimated 70 to 80 mg/L of alum (aluminum sulfate) will be needed for chemically assisted primary treatment, requiring approximately 10 trucks per year (22,000L per truck). Alum will be stored in bulk storage tanks with suitable containment sumps that will enable full secondary treatment in the event of a leak. Drainage sumps will also be provided at chemical off-loading locations to capture accidental spillages. Alum will only be used during wet weather flow conditions (anticipated to occur during five months of the year).

The delivery and storage of chemicals is expected to have a **negligible impact** on the community, with no mitigation proposed.

Location and Size of New Utilities

The utility information in this section is based on the *McLoughlin Point WWTP Site Service Report* prepared by Stantec Consulting Ltd.

SANITARY SEWER

As the proposed development is a wastewater treatment plant, there will be no need to connect to an external sewage collection system. All internally generated wastewater will be discharged to the on-site treatment plant.

This is expected to have a **negligible impact** on the community, and therefore no mitigation is proposed.

WATER

The total water demand will be a combination of fire flow and, to a lesser extent, onsite water consumption. The watermain location was confirmed with the City of Victoria. Based on calculations contained in their report, the 200mm ductile iron watermain on DND lands that dead-ends adjacent to the site will need to be replaced with a 250mm to 300mm watermain, from Lyall Street through DND lands to McLoughlin Point. On-site fire hydrants will also need to be installed.

The watermain installation work to be done from Lyall Street through DND lands to the site is expected to have **low impact** on the community during construction. Mitigation during construction would involve constructing during permitted hours and following traffic safety requirements.

ELECTRICAL AND COMMUNICATIONS

It is expected that a new primary supply service for 5 MVA will be required to be routed from the plant to the existing substation near the intersection of Hereward and Devonshire (approx. 3 km from the WWTP). This would include new poles and 25 kV line to replace the existing poles and 12 kV line. Two new transformers would also be installed on the McLoughlin Point site. BC Hydro will install the poles and service, with short-term hazard limited to the replacement of the existing power line, and no new long-term health hazards. The actual routing of new wiring and power lines will be designed and installed by BC Hydro and can only be determined after more detailed design development has occurred.

The short-term hazard during installation of power services in the road rights-of-way is anticipated to have **low impact** on the community. Mitigation during construction would involve constructing during permitted hours and following safety requirements and regulations.

Telus has confirmed that phone and communication services exist on Victoria View Road adjacent to the site on DND lands. Fibre optics is available in the general area and could be delivered to the site, if required. Installation of these services is expected to have a **negligible impact** on the community.

NATURAL GAS

Although natural gas is not required for any treatment processes, it will be used for supplemental heating of the buildings. Gas would need to be extended to the site from where it currently terminates on Victoria View Road, approximately 250m north of the site.

The installation of a natural gas line is expected to have a **negligible impact** on the community during construction. Mitigation during construction would involve constructing during permitted hours and following safety requirements and regulations.

E. Economic Impacts

The purpose of this section is to provide a high-level overview of economic and financial impacts of the proposed Core Area Wastewater Treatment Program from a region-wide context and more specifically, for the Township of Esquimalt. It is not an assessment that will provide succinct background information for the municipality.

Capital Costs and Impacts - Overview

Gross examination of the Capital Expenditures are shown in the table below, collected from CRD sources including work prepared for the CRD by Stantec Consulting Ltd.

TABLE 1 - CAPITAL EXPENDITURES INCLUDING EMPLOYMENT

Description	Amount
Estimated total costs of the Core Area Wastewater Treatment Program implementation	$783,000,000
Estimated construction capital cost	$549,000,000
Estimated capital costs of the McLoughlin Point Treatment Plant and Outfall	$210,000,000
Biosolids Recovery - Hartland Road - including conveyance piping and pumps	$205,000,000
Macaulay Point to McLoughlin Point conveyance	$13,000,000
Capital cost estimate for provision of resource recovery	$57,000,000
Total number of direct jobs during construction - (full time job years)	10,124 job years
Estimated direct and indirect economic impact applying multiplier effect [1]	$1,323,270,000

[1] The multiplier effects represent additional expenditures made within the regional economy that are “stimulated” by the direct expenditures on the sewage treatment system. The multiplier tries to measure how much one dollar spent circulates and recirculates within the economy, thus magnifying (or multiplying) the effects of the original expenditure.

Operating Costs and Impacts – Overview

The following table provides an overview of the estimated operational costs and impacts.

TABLE 2 - OPERATIONAL EXPENDITURES INCLUDING EMPLOYMENT

Description	Costs	Revenues/Benefits
Annual operating cost	$14.5 million	
Additional full-time staffing for operations and maintenance	14 persons	
Potential future resource recovery		$3.1 million
Potential carbon offsets		18, 500 Tons

Impacts – Regional

- Construction of the Core Area Wastewater Treatment Program components is expected to create more than 10,000 job years of employment and generate some $1.3 billion in economic activity over approximately a 4-year period.
- The CRD is the last major coastal community in Western Canada and United States discharging untreated sewage into the marine environment and there have been general concerns expressed about the impacts on future investment decisions based on current practices. For example, tourism is a significant part of the regional economy. Based on a 2011 study by Grant Thornton Consulting, there were 21,756 tourism jobs, equating to $720 million in tourism-related wages and salaries and $1.9 billion in industry output in 2009. Concerns have been expressed regarding the region's image and potentially negatively impacting the region's tourism economy. It is noted that there are no definitive analyses to support the position.
- The current financial costs are being borne more or less equally among a federal contribution, a provincial contribution, and local government (core area tax payer) contributions. The breakdown is: $253.4 million from the federal government, $248 million from the provincial government, and $281.3 million estimated as the local contribution. If there was not a three-party funding formula, the costs borne by the local taxpayer would be effectively three times the planned impacts.
- Operationally, there will be an estimated 14 additional staff hired, an estimated $3.1 million in potential future resource recovery revenue and a potential of 18,500 tons of carbon offsets. Annual operating costs are estimated at $14.5 million, in today's dollars.

Impacts – Township of Esquimalt

The impacts incurred by or within the Township include the following:

- The McLoughlin Point property taxes for 2012 was $94,172. With the transfer of land to the CRD, the land will not be taxable. Approximately 40% of the property tax revenues in the Township are transferred to other taxing authorities. Based on 2012 taxation, about $56,500 will be directly lost from municipal revenues. This loss will be ongoing. If one assumes a 4% rate over a 40 year period, the future value of the $56,500 is $270,800.
- The Township property tax revenue loss based on 2012 taxation represents about about one-fifth of 1% of the Township's annual revenues and about 0.4% (less than one-half of one per cent) of municipal revenues attributable to property taxes.
- Building permit fees are expected to generate approximately $100,000 in a one-time payment.
- A Works and Services agreement is expected to be entered into consistent with Council Policy #PLAN-27 regarding the repair and upgrade of highways, sidewalks, boulevards and boulevard crossings, street lighting, electrical, drainage, pathways, or other municipal infrastructure impacted by the development of the treatment or collection system (piping). All Township roads and infrastructure impacted by the construction will be repaired and upgraded to appropriate standards.
- The Township will receive at least a proportional economic benefit that the region experiences in terms of financial impact of the capital dollars spent in the region, including secondary financial benefits to local retails stores and businesses.
- The Township will receive at least a proportional economic benefit in terms of local residents obtaining construction employment and permanent operational employment.

CITY SPACES

Suite 585, 1111 West Hastings Street, Vancouver BC V6E 2J3 | 604.687.2281
5th Floor, 844 Courtney Street, Victoria BC V8W 1C4 | 250.383.0304
Suite 300, 160 Quarry Park Boulevard SE, Calgary AB T2C 3G3 | 403.336.2468

www.cityspaces.ca

APPENDIX I:

Terrestrial Environmental Effects Of The Proposed Capital Regional District McLoughlin Point Wastewater Treatment Facility

Prepared by Tera Environmental Consultants

TERRESTRIAL ENVIRONMENTAL EFFECTS OF THE PROPOSED CAPITAL REGIONAL DISTRICT McLOUGHLIN POINT WASTEWATER TREATMENT FACILITY

Final report
January 2013
W7732

Prepared for:

Capital Regional District
625 Fisgard Street Victoria, British Columbia V8W 2S6

Prepared by:

TERA Environmental Consultants
Suite 201, 655 Tyee Road, Victoria, British Columbia V9A 6X5
Phone: 250-592-8500

SUMMARY

This report summarizes information collected on environmental impacts of facilities proposed to be constructed as part of the Capital Regional District's (CRD's) Core Area Wastewater Treatment Program. The report focuses on potential environmental effects associated with construction and operation of the McLoughlin Point treatment facility in the Township of Esquimalt. Environmental information has been collected to support siting of facilities and to comply with provincial and federal environmental reporting requirements and Esquimalt's rezoning process. In addition to this summary, the provincially-mandated Environmental Impact Study (EIS) of the McLoughlin Point facility contains information pertinent to environmental effects of the construction and operation of the facility.

In compliance with provincial directives to institute secondary treatment of wastewater, the CRD is developing plans for treatment facilities to serve the CRD's core area. The facilities will treat wastewater flows from Victoria, Esquimalt, View Royal, Oak Bay, Saanich, Colwood, and Langford. Primary and secondary wastewater treatment will be provided at the McLoughlin Point facility.

The system configuration forms the basis of amendments to the CRD's Core Area Liquid Waste Management Plan, submitted to the provincial government in December 2009 and June 2010.

This report describes the environmental effects of the construction and operation of the McLoughlin Point treatment facility, and examines the following topics, as specified in terms of reference for the EIS developed jointly by the CRD and the Ministry of Environment:

- Geotechnical conditions;
- Hydrology and water quality;
- Vegetation;
- Wildlife and wildlife habitat;
- Fish;
- Air quality;
- Land use;
- Noise, vibration, and lighting;
- Human health;
- Visual aesthetics;
- Site contamination; and
- Cumulative effects.

This document identifies potential impacts of the treatment facility and recommends mitigation measures as appropriate. The report does not examine the effects of installing pipes that connect McLoughlin Point facility to other treatment facilities, because such works are similar to the installation of any other piped utility. Pipes will be installed in trenches beneath existing roadways. Using standard construction procedures, few or no environmental effects of such installations are anticipated. Additionally, the exact routes of the pipes will be selected during the detailed design phase of the project, to occur in 2013.

The methods applied in conducting the study are described in detail in Section 4. In general terms, the results presented in this report are based on:

- a review of available literature on wastewater facility construction and operation;
- field inspections of the sites, ancillary facility routes, and surrounding areas;

- analysis of plans and reports prepared by municipalities and major institutions covering land use, environmental, and other specified topics; and

- discussions with staff of local governments and major land-owning institutions.

Construction impacts are examined separately from impacts of facility operation. Construction activities include site clearing, grading, excavation, foundation work, building construction, equipment installation and testing, commissioning of the facility, and landscaping or site restoration. Operations include day-to-day functioning of the treatment facility, including routine maintenance.

Project-related impacts identified in the report are described according to their:

- spatial extent (area affected);

- temporal extent (duration);

- reversibility;

- magnitude; and

- significance.

Table 1-1 summarizes the impact significance ratings for the various topics assessed for each facility site. Most of the project-induced effects can be reduced to less than significant levels using mitigation measures that are standard practice. In some cases, enhanced mitigation measures will be required to reduce project effects to a less than significant level.

TABLE 1-1

McLOUGHLIN POINT – SIGNIFICANCE OF IMPACTS

Impact on	Impact significance			
	Construction		Operation	
	Standard practice	Enhanced mitigation	Standard practice	Enhanced mitigation
Geotechnical hazards	L	L	L	L
Hydrology and water quality	B	B	L	L
Vegetation	L	L	L	L
Wildlife	L	L	L	L
Fish	N/A	N/A	N/A	N/A
Air quality	L	L	S	L
Land use	L	L	L	L
Noise, vibration, and lighting	L	L	L	L
Human health	L	L	L	L
Visual aesthetics	L	L	L	L

Legend

S =	Significant	The identified effect would have characteristics that render it unacceptable to the public, regulators, other interests, or that exceeds standards or contravenes legal requirements.
L =	Less than significant	Effects that are not considered significant.
B =	Beneficial	The resource or topic under study would be improved as a result of project effects.
N/A =	Not applicable	

The following points summarize the findings of this investigation.

- Construction of the facility at McLoughlin Point provides opportunities to advance remediation of this contaminated site.
- The facility construction will not adversely affect use of adjacent lands.
- Odour effects at the facilities can be mitigated to less than significant levels through implementation of advanced odour treatment technology and use of redundant systems and backup power supplies.
- High quality design and finish of the facilities can mitigate visual aesthetic impacts to less than significant levels.
- An OCP amendment and rezoning is required for a wastewater treatment facility at the McLoughlin Point site.
- Few vegetation or wildlife impacts will result from facility construction or operation at the McLoughlin Point.
- Soils, hydrology, and other geotechnical effects are less than significant in most cases, except where water quality could be improved with site redevelopment at the McLoughlin Point site, constituting beneficial effects.
- No fisheries effects will occur.
- Potential project nuisance effects (noise, vibration, and lighting) and human health effects can be mitigated to less than significant levels.
- The proposed McLoughlin Point facility is on land that has been previously developed for industrial uses. The contribution of the wastewater project facility to the cumulative environmental effects of development in the region is considered less than significant.

The CRD has agreed to implement measures to mitigate impacts identified in this report. Environmental and community impacts resulting from construction and operation of the treatment facility can be effectively mitigated. The impacts of building and operating wastewater treatment facilities need to be considered in the context of the substantial improvements in the quality of effluent released into the marine environment from Core Area municipalities.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1.0 INTRODUCTION

The purposes of this environmental summary are to:

- describe the locations of the McLoughlin Point wastewater treatment facility,
- present the results of the assessment of potential environmental effects of facility construction and operation, and
- recommend mitigation measures to avoid or reduce project effects.

2.0 SITE SELECTION

In 2009, CRD consultants conducted two siting studies for wastewater treatment facilities in the core area of the CRD. The first study investigated land in James Bay and South Esquimalt (Westland 2009a). The second study reviewed land near the Victoria Harbour (Westland 2009b). This work involved collecting and analyzing geotechnical, ecological, archaeological, heritage, and land use information. These topics were studied as they relate to the technical aspects of facility operation, cost, energy consumption, resource recovery, effluent discharge, and effect on adjacent neighbourhoods. Concurrently, the CRD and its engineering consultants conducted studies of wastewater flows, biosolids treatment options, construction and operating cost, procurement, and other topics. Through these studies, available land parcels suitable for wastewater treatment facilities were identified.

The following criteria were applied during the identification of candidate sites for wastewater treatment facilities:

- existing and planned land uses are compatible with a wastewater treatment facility,
- archaeological and heritage features are avoided,
- surficial material, seismic and liquefaction risk, and site drainage and stability are suitable for facility construction and operation,
- gravity rather than pumps can be used to transport effluent, thereby conserving energy,
- adverse effects on sensitive or important habitat are avoided,
- reclaimed water and recovered energy can be used nearby,
- parcel size is adequate for a facility to provide treatment capacity to 2035,
- housing, institutional structures, and school playgrounds are avoided, and
- sites are avoided that would entail excessive capital or operating costs.

After review by the Technical and Community Advisory Committee (TCAC), a committee of municipal engineers, representatives of major institutions, and the public, and consideration by the Core Area Liquid Waste Management Committee (CALWMC), Liquid Waste Management Plan (LWMP) Amendments #7 and #8 were prepared.

LWMP Amendment #8 calls for new facilities at McLoughlin Point, Hartland North, and Arbutus Road. The existing pump stations at Macaulay Point and Clover Point will be upgraded and expanded to include removal of grit from the waste system, and a replacement pump station will be built at Craigflower. Solids removed at the McLoughlin Point site will be pumped to digesters at Hartland North to be processed into biosolids.

2.1 Public Involvement

The CRD has been involving the public in the wastewater management program since 2006. The CRD has held open houses in Esquimalt and Victoria to provide information to the public on the proposed number and types of facilities and potential siting options in those municipalities. Other public engagement initiatives have occurred in the West Shore and Saanich East. The CRD has disseminated information throughout the region, and provided opportunities for the interested public to comment on the Liquid Waste Management Plan (LWMP).

3.0 PROJECT DESCRIPTION

3.1 Overview

In June 2010, the Core Area Liquid Waste Management Committee approved LWMP #8, which identified McLoughlin Point as the preferred location for a wastewater treatment facility for the Core Area.

The main facilities to be built as part of LWMP #8 are:

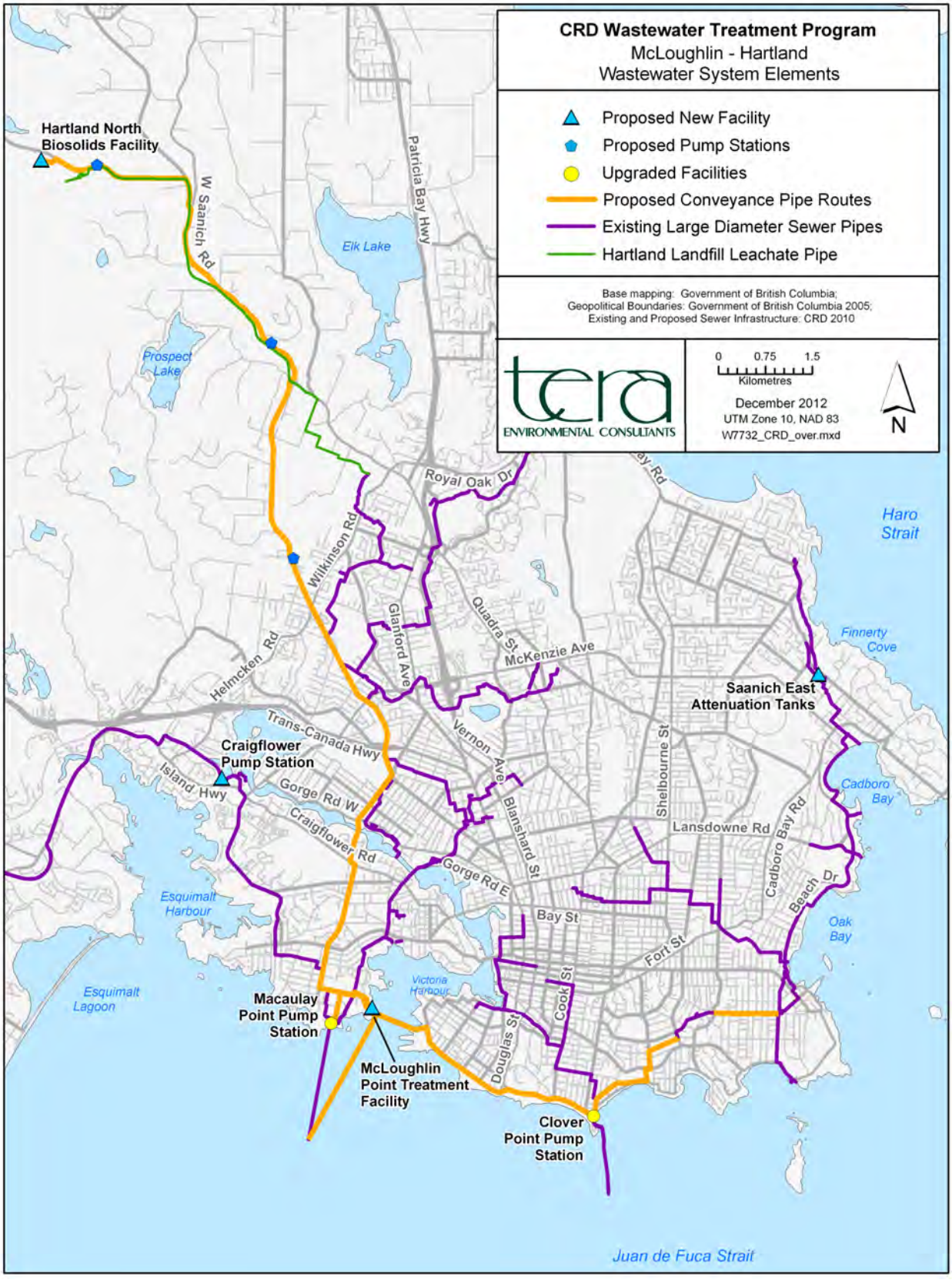
- Arbutus Road high flow attenuation tanks;
- Macaulay Point pump station upgrade and grit removal facility;
- Replacement of the Craigflower pump station;
- Clover Point pump station upgrade and grit removal facility;
- McLoughlin Point liquids wastewater treatment facility;
- Hartland biosolids management facility; and
- Conveyance facilities.

The locations of these facilities are shown in Figure 3-1. These facilities are key components of the regional system and necessary to meet the objectives of the CRD's Core Area Liquid Waste Management Plan.

Existing Macaulay Point and Clover Point pump station sites will continue to provide initial screening. Grit removal of the influent will be added to these facilities. After the wastewater is screened and the grit is removed, the wastewater is pumped to the McLoughlin Point liquids wastewater treatment facility for secondary treatment of the wastewater. At Clover Point, flows up to three times the Average Dry Weather Flow (ADWF) will be pumped to McLoughlin Point for treatment. The rare flows exceeding three times ADWF will be screened and discharged via the long outfall at Clover Point. Secondary treated effluent from McLoughlin Point will be discharged to the Strait of Juan de Fuca through a new outfall constructed from the McLoughlin Point site to a discharge location near the existing Macaulay Point outfall.

Sludge produced during the treatment process will be pumped from McLoughlin Point via a conveyance pipeline to a biosolids facility located at Hartland North (Figure 3-1). The Hartland biosolids facility will use thermophilic anaerobic digesters to produce pathogen-free biosolids, and to generate methane gas that will be captured, scrubbed, and reused as fuel. The biosolids produced by the digester process will be dewatered to achieve 25% to 30% solids concentration. The biosolids will be then dried to 95% solids content. The dried biosolids will be beneficially used as an energy source for industrial facilities.

Figure 3-1 Overview map of Core Area wastewater treatment facilities



The McLoughlin Point facility provides the following treatment services:

- Primary and secondary treatment of wastewater;
- Discharge of treated effluent to the Strait of Juan de Fuca; and
- Pumping of treated sludge to the Hartland North biosolids facility.

3.2 McLoughlin Point System Components

3.2.1 Facility Site Plan

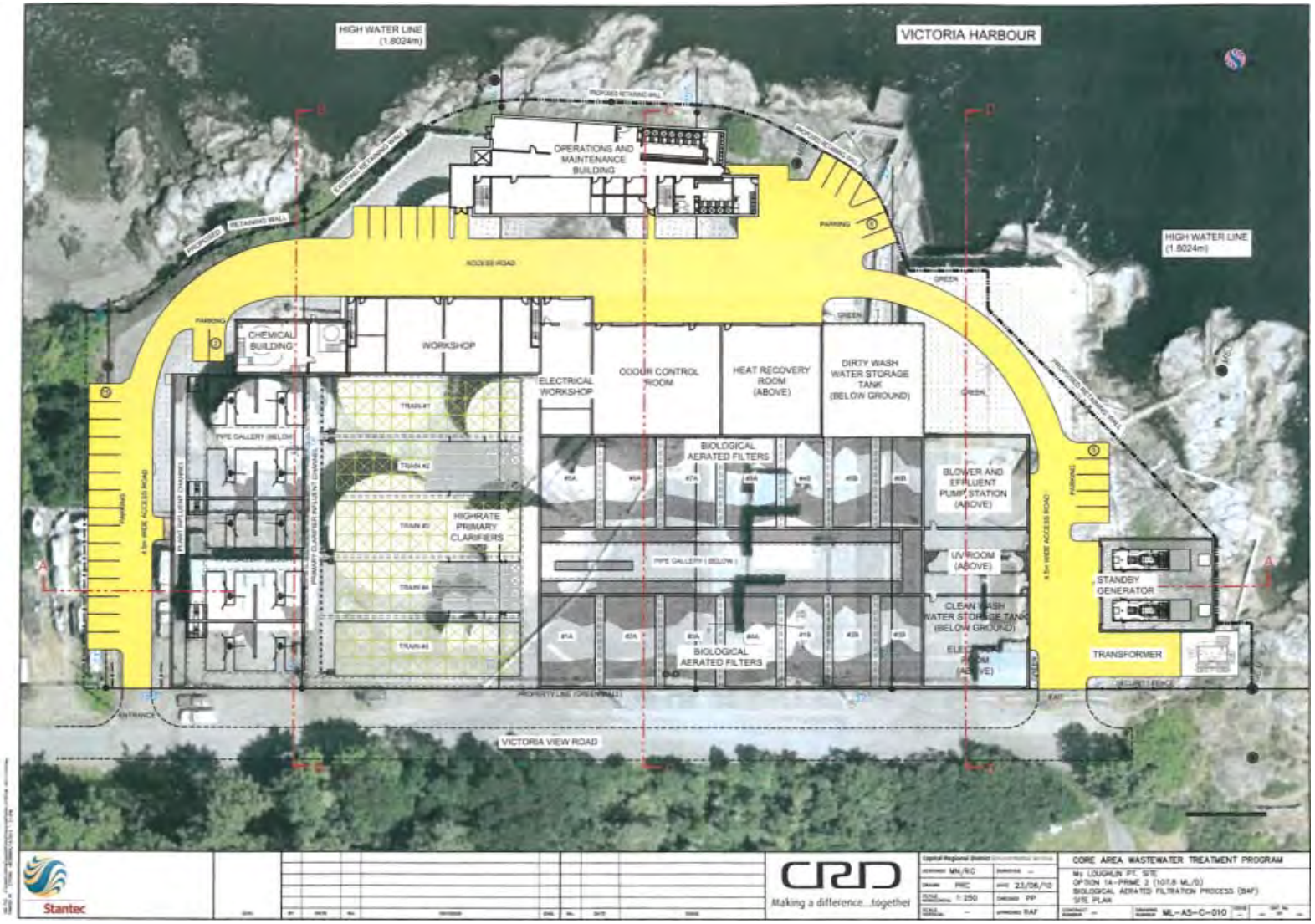
The McLoughlin Point facility site is located at the southern end of Victoria View Road in the Township of Esquimalt (Figure 3-2). The lands adjacent to the site are federally owned, and controlled by the Department of National Defence (DND). The McLoughlin Point site is currently a decommissioned Imperial Oil tank farm on 1.37 ha (3.46 acres) of freehold property. The facility formerly accommodated 17 fuel tanks that had a maximum storage capacity of 2.5 million litres.

Wastewater received from the Macaulay Point and Clover Point pump stations will undergo primary and secondary treatment at the McLoughlin Point facility. Several buildings will be constructed at the McLoughlin Point site, and some will be located partially below ground. Some buildings will extend 5 to 10 m above grade. The facility will be designed to be attractive, and not to detract from the appearance of the area. The following treatment facilities will be constructed at McLoughlin Point:

- primary clarifiers;
- biological aerated filters (BAF);
- a blower building;
- odour control;
- heat recovery works;
- sludge thickening and pumping;
- an administration building;
- standby generators; and
- vehicle access and parking.

The equipment and treatment units that will be installed in the McLoughlin Point facility must comply with the process reliability standards set out in the British Columbia Municipal Sewage Regulation BC Regulation 129/99.

Figure 3-2 McLoughlin Point facility site plan



Source: Stantec

The secondary treated water will be discharged through a new outfall constructed at McLoughlin Point. The sludge that is produced during the primary and secondary treatment process will be pumped to a biosolids management facility located at Hartland North.

3.2.2 Treatment Characteristics and Design Wastewater Flows

By convention, the McLoughlin Point facility is described by its ADWF capacity of 108 ML/d. In reality, the McLoughlin Point facility is designed to provide secondary treatment for two times ADWF of 216 ML/d and primary treatment for maximum wet weather flows of 380 ML/d. Wastewater reaching for the McLoughlin Point facility will come from residences, industry, commercial developments, and institutional sources, as well as infiltration and inflow of surface water and ground water into the sanitary sewer system. Details about hydraulic wastewater flows and the treatment standards for effluent from the McLoughlin Point facility are available in Table 4.5 of the Capital Regional District Core Area Liquid Waste Management Plan - Amendment No. 8 (June 2010).

Wastewater discharge quality must meet the British Columbia Municipal Sewage Regulation (BC MSR), and shall not exceed the following concentrations:

- 5-day Biochemical Oxygen Demand 45 mg/L
- Total Suspended Solids 45 mg/L.

For the portion of average daily flow exceeding two times ADWF, the following standards apply:

- 5-day Biochemical Oxygen Demand 130 mg/L
- Total Suspended Solids 130 mg/L.

For all flows, pH shall be in the range of 6 to 9 pH units.

The McLoughlin Point facility will be designed to produce effluent that meets the proposed Federal National standards of Carbonaceous Biochemical Oxygen Demand (cBOD) of 25 mg/L and Total Suspended Solids (TSS) of 25 mg/L based on a monthly average.

3.2.3 Ancillary Facilities

Ancillary facilities are primarily pipes that are used to convey wastewater or related liquids for treatment or to dispose of treated effluent. This section describes the major ancillary facilities associated with the McLoughlin Point facility.

Clover Point to McLoughlin Point

Wastewater from the Clover Point pump station will be pumped to the McLoughlin Point facility. The 1,200 mm diameter forcemain from Clover Point to the McLoughlin Point facility will be installed in a trench along Dallas Road from Clover Point to Ogden Point, and will then be installed via horizontal directional drilling (HDD) beneath the entrance to the Victoria Harbour from Ogden Point to McLoughlin Point.

Macaulay Point to McLoughlin Point

Wastewater from the Macaulay Point pump station will be pumped to the McLoughlin Point facility via a 1,200 mm diameter forcemain on DND land beneath Vaughan Street, Anson Street, Bewdley Avenue, Peters Street, and Victoria View Road.

McLoughlin Point to Hartland North

Conveyance pipeline routes connecting the McLoughlin Point and Hartland facilities still need to be determined. It is intended that the conveyance pipelines will be built in existing road easements.

McLoughlin Point Outfall

A new 1,800 mm diameter outfall to the Strait of Juan de Fuca will be built from the McLoughlin Point facility. The new outfall and multi-port diffuser will extend 1,700 m to a depth of 60 m below mean low water, near the end of the existing Macaulay Point outfall. Treated wastewater will be discharged uniformly through the diffuser.

3.3 Implementation of Buffer Zones

Assessment of buffer zones is required under the Municipal Sewage Regulation. The following section presents a discussion of applicable buffer zones.

3.3.1 McLoughlin Point Facility

The McLoughlin Point facility is located on private property adjacent to DND land approximately 70 m east of the nearest residence on Victoria Road. No change in adjacent land uses (military training, housing, equipment storage) is expected. Victoria Harbour borders the site to the east and south. The treatment facilities will be designed to be suitable in a waterfront urban setting. The treatment processing equipment will be enclosed in buildings and the facility will be fenced and landscaped. Controls will be installed to ensure acceptable odour and noise levels at the property line. With these measures in place, no additional buffer zones will be required.

3.3.2 Ancillary Facilities

No buffer zones are required for conveyance pipelines because they will be installed beneath roadways (except for bridge crossings of watercourses).

3.4 Provisions for Controlling Adjacent Development

The McLoughlin Point facility will be designed to minimize adverse effects on nearby properties. Adjacent land is owned by Canada and administered by DND, which enforces a variety of development controls. The development of the McLoughlin Point site is subject to zoning, subdivision, and other development controls available to the Township of Esquimalt. A rigorous technical review and public involvement process accompanies applications for rezoning and Official Community Plan amendments.

3.5 Operation of the Wastewater Processing System

Operations include day-to-day activities and routine maintenance of the wastewater processing system. This section describes operational noise, odour, and electricity consumption.

3.5.1 Chemical Use

Chemicals used in the wastewater treatment process at the McLoughlin Point facility will be largely inorganic materials such as polymers, caustics, coagulant chemical agents (alum, polymer), or compounds for cleaning treatment media (mild acids and caustics). These chemicals will be delivered once per month in small to medium sized shipments (10 to 20 m^3) and stored at the McLoughlin Point facility in secured tanks with containment features.

An estimated 70 to 80 mg/L of alum (aluminum sulfate) will be needed for chemically assisted primary treatment, requiring approximately 10 trucks per year (22,000 L per truck). Alum will be stored in bulk storage tanks with suitable containment sumps. Alum will only be used during wet weather flow conditions (anticipated to occur during five months of the year).

3.5.2 Maintenance of Facility Equipment

Maintaining and servicing the equipment at the McLoughlin Point facility will include daily site visits and annual cleaning.

3.5.3 Operational Health and Safety, and Nuisance Effects

Health and Safety

Facility operations will comply with safety criteria established by Occupational Safety and Health Administration (OSHA), Workers Compensation Board of British Columbia (WCBBC), and the National Fire Protection Association (NFPA). Operations staff will be trained to meet relevant health and safety regulations.

Noise

Operation of the McLoughlin Point facilities will generate noise from the following equipment that will be enclosed in buildings on site:

- pumps;
- compressors;
- standby diesel power generators;
- mixers;
- process blowers; and
- fans and blowers associated with ventilation systems.

Noise at the property line of the McLoughlin Point facility will not exceed the levels permitted under the Township of Esquimalt's Noise Control Bylaw No. 2677. Noise effects will be further mitigated by the distance between the McLoughlin treatment plant and other occupied buildings.

Sound attenuation will be installed in the buildings that house noise-generating equipment and on the exhausts of diesel engines to ensure that decibel levels remain below the required level to meet Worker's Compensation Board (WCB) and Occupational Safety and Health Administration (OSHA) criteria for worker safety.

Vibration

Equipment that has the potential to vibrate will be installed on pads and vibration isolation devices to minimize transmission of vibration to adjacent buildings or roadways. Vibration will be kept within acceptable operating limits for protection of the equipment and operational staff.

The CRD, as an employer for the treatment facility, will meet the requirements of the OSHA of the Workers Compensation Act.

Lighting

The lighting plan for the wastewater treatment facility will include normal post-top sodium vapour lighting standards similar to those on residential streets. If night work is required, higher intensity spot lighting lamps may be needed. Lighting will be directed downward and will have shields installed to prevent lighting of the night sky.

In accordance with corporate activities for environmental sustainability, facility planning and design will incorporate energy efficiency, BC Hydro "Power Smart" initiatives, and the applicable Leadership in Energy and Environmental Design (LEED™) standards for green buildings. Low energy fixtures will be used on fixtures and motion activation sensors will turn off or reduce lighting when rooms are unoccupied. It is anticipated the facility designs will incorporate natural lighting in buildings to reduce reliance on artificial light.

3.5.4 Sources of Odour and Odour Control

Odour Measurement

Odour discharges are expressed in terms of Odour Units (OU) per hour. An OU is a measure of odour concentration and is defined as the amount of dilution with clean air required to reduce odours to non-detectable levels. The OUs are calculated by multiplying the odour concentration in the ventilation air times the ventilation airflow rate (m^3 per hour). Airflow rates for exhaust stacks of the McLoughlin facility are estimated to be 12 m^3/s.

Table 3-2 defines the OUs and compares various odour magnitudes.

TABLE 3-2

ODOUR INTENSITY VERSUS AMBIENT ODOUR CONCENTRATION

Category Scale	Field Qualitative Odour Intensity Scale	Estimated Odour Concentration (OU) (Detection Threshold)	Typical Description of Odour
Little or no odour	If the odour activates the sense of smell, the characteristics may not be distinguishable. Usual limit of public acceptability.	≤ 5	None
Very Light	Odour activates the sense of smell but is not objectionable to most people.	> 5 to 15	Earthy, stale, musty, chemical
Light	Odour is distinctive and may be objectionable to some people.	> 15 to 50	Earthy, garbage, soil, chemical
Moderate	Odour is very distinct and clearly distinguishable and may tend to be objectionable and/or irritating.	> 50 to 150	Sewer, sour, solvent, chemical
Strong	Odour is objectionable, would cause a person to attempt to avoid it, and could produce physiological effects during prolonged exposure.	> 150 to 1,500	Offensive, sewer, garbage
Very strong	Odour is so strong it is overpowering and intolerable for any length of time and could easily produce physiological effects.	> 1,500	Offensive, chemical, putrid, rotten, sewer, urine, septic

Source: Adopted from Manual of Practise No. 25, Control of Odours and Emissions From Wastewater Treatment Plants, Wat. Env. Fed., 2004, and fit to real data from wastewater treatment facility examples.

Odour Sources

The odour sources of the McLoughlin Point facility are described in Table 3-3.

TABLE 3-3

ODOUR SOURCES AT THE MCLOUGHLIN POINT FACILITY

Source	Potential Odour Level Before Treatment
Untreated wastewater recovery area	
Chemically Enhanced Primary Treatment (CEPT)	Light to Moderate
Primary Clarifier	Light to Moderate
Treated effluent area	
Pipe Chase Gallery	Nil to Light
Biological Aerated Filter (BAF)	Moderate (musty)
Lift Station and Sludge Pumping Station	Strong
Effluent Pumping	Nil to Very Light
Odour Control	Nil to Very Light
Blowers Building	Nil to Very Light

Odour Control

The design of the facility will include best practices for minimizing release of odour, especially from untreated wastewater and sludge. With proper attention to design details and adherence to operating procedures, routine release of odours from the treatment facility processes can be minimized by:

- the use of submerged inlets and weirs;
- eliminating turbulence in influent piping and channels;
- the elimination of physical conditions leading to the formation of turbulence;
- proper process loadings;
- containment of odour sources;
- off-gas treatment;
- good housekeeping; and
- keeping access doors and buildings closed.

The McLoughlin Point facility will be specifically designed for the anticipated concentrations of odorous compounds. The odour control systems will include a combination of biofilters, wet chemical scrubbing systems, and dry scrubbing systems, such as activated carbon.

Odour Discharges

For the McLoughlin Point facility, the ambient odour guideline is 5 OU (little or no detectible odour), not to be exceeded under the worst-case meteorological conditions. Poor meteorological conditions are characterized by calm winds and inversions that limit mixing, dispersion, and dilution of exhaust air.

The odour emission from all sources will be reduced by odour control systems before discharge to the atmosphere through exhaust stacks. The odour units that can be detected at the facility fence lines are estimated to be 5 OU. Ventilation air scrubbing of the facilities will be applied in ways that ensure that the 5 OU guideline is not exceeded during normal operation and all meteorological conditions. It is expected that there will be infrequent short periods of time when odour emissions will exceed their design values during maintenance of the scrubbers. If objectionable odours attributable to the operation of the facilities occur beyond the boundary of the sites, measures or additional works will be required to reduce odour to acceptable levels.

Security

After the treatment facility is constructed, operations staff will work daily at the site. Access to the site will be controlled at all times. The building doors and main gate will be remotely alarmed by the CRD's supervisory control and data acquisition (SCADA) monitoring system. A combination of sturdy, but attractive, materials for fencing, lighting, and landscaping will be incorporated into the design to discourage vandalism at the facility sites.

3.5.5 Drainage Management

Current principles for low impact development and stormwater management will be applied to facility site planning. Storm runoff from roofs of structures will be directed to infiltration facilities where site conditions allow. Parking areas and other on-grade surfaces will be constructed using permeable pavers, or the runoff from these areas will be directed to biofiltration swales or similar facilities. If site conditions do not allow use of infiltration techniques, oil and grease separators and sediment traps will be installed to prevent contaminants from leaving the sites. There will be no changes to offsite hydrology caused by development of the facilities. Landscaping will incorporate pervious soils and vegetation to minimize increases in runoff caused by the facility. Native vegetation will be used in landscaping to reduce irrigation demand.

3.5.6 Accidents and Malfunctions

Design of the new treatment facilities will include redundant features to comply with the Municipal Sewage Regulation, and to reduce the chance of accidents and malfunctions. During the design phase, a Hazard and Operability (HAZOP) study will be completed to identify hazardous and malfunction conditions and appropriate design consideration will be given to these conditions. The redundancy anticipated in the design includes:

- building multiple treatment trains to enable maintenance and repairs,
- installing redundant critical equipment, including pumps, blowers, and other identified critical process equipment,
- supervision of the treatment plant processes by an automated SCADA system that will include monitoring of the critical treatment process parameters, such as dissolved oxygen and effluent turbidity (alarm conditions will be indicated so that operators may take immediate corrective actions),
- development of regular maintenance programs to minimize equipment downtime, and
- provision of standby generators to maintain the treatment processes during power outages.

The CRD will develop Standard Operating Procedures for the facility. The procedures will have emergency contingency plans for abnormal operating circumstances caused by malfunctions.

The CRD will consider preparing a Conditional Management Plan (CMP) to minimize the risk of releases of effluent that could affect marine resources, particularly shellfish. A CMP would need to be approved by the CRD, Canadian Food Inspection Agency, Fisheries and Oceans Canada, Environment Canada, and the British Columbia Ministry of Environment.

Details regarding offshore impacts of accidents and malfunctions will be provided in the marine Environmental Impact Statement (EIS) for the wastewater program.

3.6 Construction of the McLoughlin Point Facility

3.6.1 Construction Activities

The McLoughlin Point facility site requires remediation of contamination caused by past use as a fuel storage facility. Remediation required to satisfy Provincial and Federal regulations is currently being conducted. Sale of the site by Imperial Oil to the CRD is contingent on the parties reaching agreement on the level of remediation remaining to be completed.

The McLoughlin Point site is comprised primarily of clay and bedrock. Blasting will be necessary to construct a wastewater treatment facility. The CRD is seeking permission from DND to use temporary construction laydown areas on the federal lands along Victoria View Road to the north.

The McLoughlin Point facility requires the construction of deep concrete tanks, which will be founded at various elevations on the facility site. These tanks will be constructed partially above grade to reduce rock excavation quantities and reduce the risk from Tsunami. The depth of building foundations and concrete tanks varies from 0.3 m to 6 m. Other structures on the site include covered buildings to house major process equipment, an operations building, roadways, parking facilities, and fencing. A site plan showing the current planned site development is shown in Figure 3-2.

Ancillary Facilities

Most of the pipes required to convey wastewater and sludge (Figure 3-1) will be installed using conventional trench excavation. Excavation is usually 2 to 3 m deep for forcemains. The maximum area of disturbance anticipated for conveyance pipelines is 3 to 4 m^2 per metre of pipe.

3.6.2 Labour Force during Construction

Construction of the McLoughlin Point facility is anticipated to occur over a period of 3.5 years. The estimated average labour force during construction is 155 workers per day, though during peak periods (such as concrete pours), more than 300 workers could be required. A total of 38,800 worker-days per year of labour can be expected. Some construction activities will occur simultaneously to reduce the overall construction timeline and increase efficiency. At certain times during facility construction, several work crews may be on site concurrently.

3.6.3 Construction Health, Safety, and Nuisance Effects

Health and Safety

The construction activities will comply with safety criteria established by OSHA, Worksafe BC, and NFPA, and the relevant safety manuals and instructions will be followed. Workers will be trained in health and safety requirements. Temporary safety fencing and warning signs will be installed around the construction site.

Noise

Proper safety procedures will be observed to ensure the noise exposure by construction workers during construction is within permitted levels. If necessary, the contractor and the CRD will install temporary safety fencing and warning signs around the construction site to inform the public of noise levels at the construction sites.

Construction activities in the Township of Esquimalt must comply with the relevant municipal noise bylaws for hours of work and noise levels. Work is allowed to occur Monday to Saturday from 7 am to 5 pm, with no work on Sundays or holidays (except in an emergency).

Construction activities such as running excavation vehicles, truck deliveries, and using chainsaws, compressors, water pumps, concrete pouring pumps, rock breakers, and blasting and blasting signals will be sources of noise. Potential noise sources can be controlled to meet noise standards at the site property lines. No Esquimalt residents live close enough to the McLoughlin site to be disturbed by expected levels of construction noise.

Vibration

Potential sources of vibration during construction include heavy equipment movement, excavator operation, blasting, and use of compactors and paving equipment.

People nearby (on DND land) may be affected by vibration from construction activity such as blasting, even when vibration is only slightly in excess of perception levels. Activities causing vibration will occur only between 7 am and 5 pm Monday to Saturday. Although no Esquimalt residents are likely to be affected, the CRD or its contractors will be prepared to inform residents and businesses about work that may cause abnormal vibration.

The Contractor must ensure that workers are not exposed to vibration in excess of the limits specified in the Occupational Health and Safety Regulation.

Dust and Mud

Construction may generate short-term localized dust with associated air quality impacts. Air emissions generated by construction include fugitive dust and equipment exhaust. Trucks will have box covers when hauling soil or other granular materials that could create dust nuisances.

During wet weather, trucks may deposit mud from excavated areas on roads off site. Onsite wheel washing facilities will be provided and street cleaning will be done if mud tracking becomes a problem.

The CRD Code of Practice for “Construction and Development Activities” will be used to minimize dust and mud impacts. Erosion and sediment control plans will be prepared and implemented during construction.

4.0 METHODS

This section of the report outlines the data collection and assessment methods in conduct of the study team.

4.1 Effects Assessment Criteria

The criteria applied in this study are based on industry standards for impact assessment, adapted for use in the assessment of the CRD's wastewater program. The rating of impacts focuses on mitigated impacts. The ratings assume that standard construction and operating procedures will be implemented. Significance is assessed for these mitigated project effects. If additional mitigation is recommended by the consulting team (over and above standard procedures), those "enhanced mitigation" measures are described. These additional measures are intended to further reduce identified project impacts.

Table 4-1 presents and explains the assessment criteria applied in this report. The criteria cover such topics as the spatial context of project impacts, temporal context, reversibility, magnitude, and significance of potential effects of project construction and operation.

TABLE 4-1

CRITERIA USED IN ASSESSING PROJECT EFFECTS

Assessment Criteria		Definition
SPATIAL CONTEXT location of effect		
Treatment Facility Footprint		Land area permanently occupied by the treatment facility including buildings, parking, and access.
Workspace		Areas temporarily used during construction, including equipment and material storage or vehicle access.
Local Area		Lands within 250 m of the candidate site.
Regional Area		The Regional Study Area (RSA) is the area in the Core Area municipalities.
TEMPORAL CONTEXT of effect		
Duration (length of time a residual effect will last)	Short-term	Event duration is less than or equal to one year.
	Medium-term	Event duration is longer than one year but less than or equal to five years.
	Long-term	Event duration extends longer than five years.
Frequency (how often event causing the residual effect will occur)	Occasional	Event occurs intermittently.
	Periodic	Event occurs intermittently but repeatedly over the construction and operations period.
	Continuous	Event occurs continually over the assessment period.
Reversibility (Will identified effects cease to be a concern?)	Yes	The potential effect can be reversed.
	No	The potential effect cannot be reversed, despite efforts to mitigate.
MAGNITUDE of the effect		
Negligible		Potential effect is barely detectable.
Low		Potential effect is below established or derived environmental standards or thresholds.
Moderate		Potential effect is detectable but meets established or derived environmental or regulatory standards or thresholds.
High		Potential effect exceeds established or derived environmental standards or thresholds.
BENEFICIAL or ADVERSE effect		
Beneficial		The resource or topic under study would be improved as a result of project effects.
Adverse		The resource or topic under study would be worsened as a result of project effects.
SIGNIFICANCE of the effect		
Significant		The identified effect would have a combination of characteristics that render it unacceptable to the public, regulators, other interests, or that exceed standards or contravenes legal requirements.
Less than significant		All other effects that are not considered significant.

4.2 Data Collection and Analysis

This section describes the methods used to collect and analyze data for each topic examined in this report.

4.2.1 Geotechnical Hazards

The remediation work for the site has generated a substantial new geotechnical data for the site. Investigation of the geotechnical conditions at the sites also consisted of collection and review of available information for the study area, including the BC Ministry of Energy and Mines Quaternary Geology mapping of Greater Victoria (Monahan & Levson 2000), as well as seismic hazard maps (Monahan et al. 2000a, Monahan et al. 2000b, McQuarrie & Bean 2000). Maps detailing regional terrain and bedrock geology (Muller 1980) were also reviewed. Published information was supplemented by interpretation of current and historical Provincial and Federal Government aerial photographs based on knowledge of local conditions, their engineering properties, and construction implications provided by C.N. Ryzuk & Associates.

4.2.2 Hydrology and Water Quality

The assessment of hydrologic and water quality conditions in the study area was based on:

- review of topographic maps and orthophotos,
- review of relevant reports, and
- on-site field inspections.

Field inspections included observation of slopes and drainage on the site. There was no evidence of slope instability.

4.2.3 Vegetation

A review of existing information, literature, and other data was completed before initiating fieldwork. This office-based review included the examination of aerial photographs, existing reports about the vegetation of the study area, and sensitive ecosystem inventory mapping of the site. The work determined the extent of natural vegetation and the variability in vegetation composition.

Information about rare and endangered plant species and plant communities was obtained from the Conservation Data Centre (CDC) online database (BC CDC, 2008). This information and any Element Occurrence Reports (EOR) for the site were reviewed to determine whether rare plants or rare plant communities have been recorded. Information provided through interviews with knowledgeable people from the Capital Regional District (CRD) and the Department of National Defence (DND) was incorporated into the baseline data.

Field visits were conducted to determine vegetation composition and distribution of the existing vegetation features.

The following information was collected at the site:

- canopy cover (dominant tree species),
- shrub cover (dominant tall and low shrubs), and
- groundcover (dominant herbaceous species).

A “Site Inventory and Conservation Evaluation” was completed using standard "Develop With Care" checklists (MOE 2006). During site visits, all categories outlined in the protocol were assessed, but only topics relevant to the wastewater program are presented in this report.

4.2.4 Wildlife and Wildlife Habitat

Information was compiled about wildlife use and habitats at the site and associated ancillary facilities. Information sources consulted include CDC element occurrences, Sensitive Ecosystem Inventory (SEI), Victoria Natural History Society database of important wildlife habitats, and other literature. The site was characterized using aerial photography, topographic data, and SEI mapping before fieldwork was conducted.

Field visits were conducted to document wildlife use, evaluate habitat conditions, and record wildlife habitat features. A "Site Inventory and Conservation Evaluation" was completed using standard "Develop with Care" checklists (MOE 2006).

4.2.5 Air Quality

For the McLoughlin Point site, University of Victoria climatologist Dr. Stan Tuller combined hourly wind and temperature data for the Esquimalt Harbour with cloud cover and cloud ceiling height from the Victoria International Airport for the five years 2004 and 2008, to provide an input file for the U.S. Environmental Protection Agency's (EPA's) RAMMET atmospheric dispersion model.

Atmospheric stability was estimated indirectly from the time of day and local measurements of wind speed, cloud cover and cloud ceiling height using meteorological pre-processors (special software that processes meteorological data and converts it into a form used in atmospheric dispersion models) such as the RAMMET package.

Odour modeling was conducted using the EPA ISC-PRIME atmospheric dispersion model to estimate the maximum off-site odour concentrations that may result from adverse meteorological conditions. The five years of meteorological data (discussed above) and the ISC-PRIME complex terrain option were used to estimate plume elevated-terrain interactions. The output from the ISC-PRIME model was processed in a graphical post-processor to create an overlay of odour isopleths onto a Google Earth map of the site and the surrounding communities. The odour isopleths show the maximum 10-minute odour concentrations that may occur during the 5-year period represented by the meteorological data file.

4.2.6 Land Use

The land use section of this report builds on information collected for the wastewater treatment facility siting analyses, which included a review of existing planning documents, site visits, and discussions with representatives of the Township of Esquimalt, Capital Regional District, and the Department of National Defence to understand existing and planned land uses and potential impacts of the wastewater treatment facility.

The preparation of this report involved a review of the latest versions of relevant land use plans, including:

- Township of Esquimalt Official Community Plan and Zoning Bylaw;
- Macaulay Point Natural Areas Management Plan;
- Victoria Harbour Plan; and
- CRD Solid Waste Management Plan.

News articles, media releases, letters to the editor, and information on other community initiatives were also reviewed to understand the regional and local context.

Discussions were held with Esquimalt's municipal planner and representatives from CFB Esquimalt, Department of National Defence, to understand development plans, concerns, potential impacts, and appropriate mitigation measures.

Colour ortho-photography was reviewed and site visits were conducted by the report authors to confirm the use of the site and adjacent land. These visits were undertaken numerous times and during various seasons between 2008 and 2012.

4.2.7 Visual Aesthetics

This report's visual assessment provides a subjective comparison of changes in the attractiveness of locations resulting from development or other changes to the landscape. The assessment considers the degree of landscape modification and the compatibility of new structures with surrounding landscape features. Modifications may include the removal of existing trees and shrubs, changes to slopes, and the addition of roads, buildings, lighting, and other utility structures. These visual elements are considered in the assessment in comparison with present conditions.

Visual assessment is a subjective exercise. People's aesthetic sensibilities and tastes are unique, though there are several common aesthetic preferences:

- natural landscapes tend to be favoured over built landscapes;
- complex natural landscapes are generally preferred over simple landscapes, for example, trees and mountains versus a prairie; and
- residential and similar urban landscapes are generally preferred over industrial landscapes.

These general aesthetic preferences have been used in this study to support the assessment of beneficial and adverse visual impacts of development.

The McLoughlin Point site was visited in person and was viewed using online map tools, specifically Google Streetview and Bing Maps "Birds Eye View". These tools and field visits were used to identify key viewpoints. Photographs of the site were used as a base to refine and better identify key viewing areas. Photographs were also taken of the site from key viewpoints for detailed visual analysis.

Three-dimensional digital perspective models were developed of the proposed McLoughlin Point facility to help to assess visual impact and the potential effectiveness of mitigation. The models were superimposed on digital photographs taken from key viewpoints by the study team. The rendered images are a graphic representation of how the proposed facilities might look from different viewpoints.

5.0 SITE CONDITIONS AND IMPACT ASSESSMENT

This section presents the results of an assessment of the relevant environmental and social effects associated with the construction and operation of the proposed McLoughlin Point wastewater treatment facility. The following topics are assessed:

- geotechnical conditions;
- hydrology and water quality;
- vegetation;
- wildlife and wildlife habitat;
- fish;
- air quality;
- land use;
- noise, vibration, and lighting;
- human health;
- visual aesthetics; and
- site contamination.

Each topic is assessed for potential effects associated with the construction and operation of the treatment facility. Mitigation measures are recommended to reduce or avoid adverse effects, and the magnitude, temporal extent, spatial extent, reversibility, and significance are evaluated. Table 4-1 in the Methods section provides definitions of the assessment criteria.

5.1 General Site Description

The McLoughlin Point site is approximately 700 m northeast of the Macaulay Point pump station in Esquimalt, British Columbia (Figure 5-1). The McLoughlin Point site is a decommissioned Imperial Oil tank farm on 1.4 ha (3.46 acres) of freehold property bounded on the north and west by federal Department of National Defence (DND) land. The facility formerly accommodated 17 oil tanks with maximum storage capacity of 2.5 million litres. The land is zoned “Industrial” by the Township of Esquimalt.

Victoria View Road runs north-south, immediately west of the McLoughlin Point site. The federal DND property extends north and west from Victoria View Road towards Macaulay Point. Victoria Harbour bounds the site to the east and south.

Figure 5-1 McLoughlin Point site from south

5.2 Geotechnical Conditions

5.2.1 Earthquake and Tsunami Risk in Greater Victoria

Vancouver Island is in the Cascadia Subduction Zone and is susceptible to major earthquakes of magnitude 9.0 or greater. In response, current building codes require that facilities be designed to withstand at least 1 in 2,000 year earthquake events.

Earthquakes in the Cascadia Subduction Zone are the main tsunami threat to Greater Victoria. This type of tsunami would most likely affect coastal areas up to 4 m above the highest tide. Because of the underwater topography of the Strait of Juan de Fuca, tsunamis created elsewhere in the Pacific Basin

would be likely to affect low-lying coastal areas in ways similar to severe winter storms (City of Victoria website).

A Greater Victoria Tsunami Planning Map produced by the CRD delineates areas of tsunami risk (CRD 2006). According to this mapping, the McLoughlin Point site could be potentially be affected by a tsunami, though the risk is low. Facility designs will consider a 4 m tsunami plus storm surge and high tide. The design will allow 1 m for sea level rise due to climate change.

5.2.2 Treatment Facility Site Conditions

The ground surface at the McLoughlin Point site is presently uniform and nearly level at an elevation of about 6 m above sea level at the north end of the site and 4 m at the south end of the site. The site is asphalt or gravel surfaced, except for occasional rock outcrops. Available information indicates that the site was once irregular and rocky at a similar average grade to the adjoining sites, and was levelled to its present configuration by excavation (likely by blasting) and fill placement.

The subsurface conditions at this site are expected to comprise varying amounts of unknown fill materials atop bedrock, as well as deposits of marine silts and clays. The general groundwater table is likely within 2 to 3 m of the present ground surface, and may be influenced by tidal fluctuations. Perched water table conditions may be experienced from place to place resulting in locally high groundwater conditions and surface water ponding, particularly during periods of heavy or prolonged precipitation.

It is anticipated that soil conditions in the proposed development area will be favourable concerning the seismic design parameters, as bedrock is anticipated to be at relatively shallow depths.

5.2.3 Impact Assessment and Mitigation Measures

Treatment Facility Construction

Potential Impact: Geotechnical hazards during construction.

The native bedrock anticipated at a relatively shallow depth at McLoughlin Point and depths below the clay will provide competent long-term support for the proposed new facilities. The suitability of possible existing fill materials for stable foundation support for the new facilities is uncertain. Excavation will be required during construction. Unusual concerns relating to excavation stability are not expected aside from stability considerations associated with localized zones of existing fill materials. There is a possibility of substantial seepage into deeper excavations via discontinuities or possible shattered zones in the bedrock, particularly for excavations that might extend below adjacent tide levels. Moderate seepage from pockets of water trapped in existing fill material (resulting from long-term accumulation of surface water) may be experienced.

Seismically, the conditions at this site are typical of those in the Greater Victoria area where shallow bedrock exists. Such conditions are usually desired from a design perspective.

- **Mitigation measures.** A geotechnical investigation and review of the treatment facility designs will be conducted. Careful consideration will be given to ground water levels in excavations deeper than 3 to 4 m below existing grades and any excavations below sea level.

Appropriate measures will be implemented to avoid or control seepage from fill or rock cuts, to ensure use of suitable fill materials, and to respond to potential buoyancy concerns where structures are below the water table.

Earthquake and tsunami risks will be factored into facility designs.

Potential impacts associated with geotechnical hazards during construction at McLoughlin Point are expected to be local, medium-term, irreversible, low magnitude, and **less than significant**.

Treatment Facility Operation

Potential Impact: Treatment facility operation could be affected by geotechnical conditions.

After construction is completed and operation of the treatment facility begins at McLoughlin Point, no additional geotechnical impacts are anticipated, so impacts of the treatment facility operation are considered less than significant.

5.3 Hydrology and Water Quality

5.3.1 Treatment Facility Site Conditions

The McLoughlin Point site is generally flat, at an average elevation of 5 m above sea level. The seaward margins of the site (east and south) feature exposed rock outcrops. The natural drainage on the site has been substantially altered by the removal of rock outcrops, site re-grading, asphalt and concrete paving, and the addition of fill.

No visible drainage courses are present on the site. Just to the north of the property boundary, on DND land, a small drainage course flows from west to east through a stand of black cottonwood (Populus balsmaifera).

The quality of water on the site is currently being tested as part of a Detailed Site Investigation (DSI) being prepared by Imperial Oil. The site was an oil tank farm for several decades until it was decommissioned in 2008. Water draining from the site passes through an oil and grease separator before it is discharged into the ocean.

5.3.2 Impact Assessment and Mitigation Measures

Treatment Facility Construction

Potential Impact: Subsurface flows of groundwater or tidal water may be intercepted by excavation.

Seepage may occur during excavation depending on the water table conditions and whether excavation occurs below adjacent tide levels. Small subsurface flows of groundwater or tidal water may be intercepted by excavation. This water would need to be conveyed to the ocean.

During the construction period, excavations will need to be dewatered to maintain safe working conditions. This pumped water is likely to be discharged to the ocean because other alternatives are limited. Appropriate treatment of these discharges will be provided.

The potential effect of intercepting groundwater or tidal water during excavation is local, short-term, reversible, of low magnitude, and **less than significant**.

Potential Impact: Sedimentation and erosion may affect water quality.

Because McLoughlin Point is nearly flat and mostly rock, excavation associated with construction of the facility is unlikely to measurably increase erosion and sediment risk on the site. Uncovered soil stockpiles may be at risk of erosion during precipitation events. Site runoff and water pumped from excavated areas may contain sediment that could affect water quality in Victoria Harbour. Without proper drainage management, sediment-laden water could affect the water quality in the harbour directly adjacent to the site.

- **Mitigation measures.** Prepare and implement a sediment and erosion control plan for site construction. The plan would include measures such as covering stockpiles of excavated soil to prevent erosion, and to install filtration to settle, or filtering site run-off and water from excavations.

Effects of sediment and erosion on water quality are local, short-term, reversible, of low magnitude, and **less than significant**.

Potential Impact: Rinse water from concrete pouring activities may affect water quality.

Rinse water from concrete trucks and from freshly-poured concrete has the potential to affect water quality. Rinse water from concrete pouring activities will not be discharged on the site, and no measurable effect on surface or ground water quality is expected.

- **Mitigation measures.** Concrete truck rinse water will be removed from site for treatment. Other water used in concrete pouring will be managed to prevent entry into the ocean. The CRD will prepare an Environmental Protection Plan that will include a contingency plan that outlines procedures in case of accidental spills.

Effects of concrete rinse water on water quality are considered local, short-term, reversible, of low magnitude, and **less than significant**.

Potential Impact: Quality of runoff water could improve after site remediation.

For decades, Imperial Oil operated an oil tank farm at McLoughlin Point. The site is currently undergoing remediation. Runoff water quality can be expected to improve after the site is remediated and the treatment facility has been constructed.

- **Mitigation measures.** No mitigation is necessary.

Increased quality of runoff water is local, long-term, **less than significant** and **beneficial**.

Treatment Facility Operation

Potential Impact: Volumes of runoff may increase during facility operation.

The McLoughlin Point site has very low infiltration potential, as it is a paved and rocky site. A treatment facility will increase the rate of runoff compared to existing conditions.

Mitigation measures. Opportunities exist to provide modest infiltration on the site in landscaped areas. Runoff water will pass through oil, grease, and sediment traps before being released to the ocean or storm drains. Project design will include measures to reduce offsite runoff and to improve its quality.

Effects on runoff volumes during facility operation are local, long-term, irreversible, of low magnitude, and **less than significant**.

5.4 Vegetation

5.4.1 Treatment Facility Site Conditions

The McLoughlin Point site is a previous industrial site in Esquimalt. The site is located on the eastern half of McLoughlin Point, facing the outer Victoria Harbour. The area is susceptible to strong winds and high energy waves. Topographic features include bedrock covered by a thin soil layer (Capital Regional District, Harbour Area Atlas 2009).

The footprint of the proposed wastewater treatment facility occurs in the former Imperial Oil tank farm, which is currently being remediated. The topography has been altered by blasting and the site has been stripped of plant cover. The few plants remaining on the site are mostly invasive and include Himalayan blackberry (Rubus armeniacus) and English ivy (Hedera helix). There are no sensitive ecosystems on the property but some native vegetation does occur west and north of the site. Plant species found in adjacent areas include Douglas-fir, Himalayan blackberry, English ivy, scotch broom (Cytisis scorpa), willow (Salix spp.), domestic apple (Malus domestica), black cottonwood (Populus balsamifera), and Garry oak (Quercus garryana).

Coastal bluff ecosystems line the shore of McLoughlin Point. Populations of red-listed purple sanicle (Sanicula bipinnatifida) and blue-listed Spanish clover (Lotus unifoliolatus var. unifoliolatus) have been documented on the west side of the point by the Conservation Data Centre (CDC). These populations are outside the treatment facility footprint, and are located approximately 25 m west of the property boundary. There is a stand of mature Douglas fir forest across Victoria View Road to the west of the McLoughlin Point site, and a small Garry oak dominated rock-outcrop ecosystem is north of the project footprint.

5.4.2 Impact Assessment and Mitigation Measures

Treatment Facility Construction

Potential Impact: Native plants or rare plant species may be affected by facility construction.

Construction at the McLoughlin Point site will occur mostly on the footprint of the former Imperial Oil tank farm, including the edge of a coastal bluff ecosystem on the south end of McLoughlin Point. The proposed parking spaces at the north end of the project footprint will abut native vegetation, including Garry oak (Quercus garryana) and black cottonwood (Populus balsamifera) on the adjacent DND property. However, no removal of native plant communities is anticipated.

- **Mitigation measures.** Native vegetation and plant communities located outside of the currently disturbed areas on McLoughlin Point will be avoided. Temporary workspace and lay-down areas will be located in areas that will not affect native or rare plant communities.

Effects of McLoughlin Point facility construction on native and rare plant species are local, medium-term, reversible, low magnitude, and **less than significant**.

Treatment Facility Operation

Potential Impact: Native plants or rare plant species may be affected by facility operation.

No additional plant removal or disturbance of vegetated ground is expected during facility operation.

Effects of facility operation are short-term, reversible, negligible, and **less than significant**.

5.5 Wildlife and Wildlife Habitat

5.5.1 Treatment Facility Site Conditions

The McLoughlin Point site is located on what was previously an oil tank farm owned by Imperial Oil. No wildlife use or wildlife habitat features were recorded for the site.

Adjacent areas include Garry oak rock-outcrop, coastal bluff habitat, and mature Douglas-fir forest. These areas contain wildlife habitat features such as decomposing logs and wildlife trees. Garry oak habitat to the north of the property contains known river otter latrine sites as described by the Natural Areas Atlas (CRD website).

Provincially listed species such as blue-listed Purple Martin and red-listed Western Meadowlark (Georgia Depression population) have been sighted in the area but are unlikely to use the treatment facility site because of a lack of suitable habitat. River otters are the only wildlife known to use the rocky coastline surrounding the property.

Eastern grey squirrel and eastern cotton tail, both non-native wildlife species, occupy the adjacent vegetated areas and are occasional visitors to the property.

5.5.2 Impact Assessment and Mitigation Measures

Treatment Facility Construction

Potential Impact: Construction activities may affect wildlife or wildlife habitat.

Based on current facility designs, the proposed road at the north end of the project footprint will abut native trees and shrubs on the adjacent DND property but no removal of wildlife habitat or habitat features is anticipated. Native songbirds use this vegetation for feeding, security habitat and potentially for nesting.

Existing sources of regular wildlife sensory disturbances at McLoughlin Point include sea and air traffic, site remediation activities, and urban use. River otter using the adjacent shorelines could be disturbed by the increase in construction activities.

- **Mitigation measures.** Wildlife habitat and native vegetation located outside of the currently fenced areas of the Imperial Oil property will be avoided in the design of the facility footprint.

Temporary construction lay-down areas will also avoid areas of wildlife habitat and native vegetation.

Applying standard construction practices during the construction of the McLoughlin Point facility will result in impacts to wildlife and wildlife habitat that are local, medium-term, low magnitude, and **less than significant**.

Treatment Facility Operation

Potential Impact: Operational activities may interfere with wildlife or wildlife habitat.

There are no expected adverse effects to wildlife or wildlife habitat in the area as a result of operating the proposed McLoughlin Point facility, and the impacts will be less than significant.

5.6 Fish

There are no streams or other freshwater aquatic systems in or adjacent to the treatment facility sites. A drilled forcemain will cross the outer Victoria Harbour and a new outfall will be constructed. The CRD is conducting a marine Environmental Impact Study that will assess potential impacts to fish habitat in the marine environment.

Because no fresh water fish habitat will be affected by the facilities under study, impacts are considered less than significant.

5.7 Air Quality

5.7.1 Treatment Facility Site Conditions

High wind speeds create direct dilution and mechanical air turbulence, resulting in good odour dispersion. These beneficial conditions do not occur if wind speeds are low. Periods of calm conditions, if combined with an odour release from a treatment facility, would increase the risk of adverse odour impacts.

McLoughlin Point

Figures 5-2, 5-3, 5-4 show 2004 - 2008 annual wind speed, wind direction, and atmospheric stability in the harbour. Air temperature, air pressure, and wind data from 2004 to 2008 were obtained from the Esquimalt Harbour weather station. Cloud opacity and ceiling height were obtained from Victoria International Airport. The Esquimalt Harbour station is located at the end of a short jetty extending out into the water between Duntze Head and Fisgard Island. The station is well exposed to winds coming off the Strait of Juan de Fuca from the south through southwest and from over Esquimalt Harbour and Constance Cove from the north-northwest through northeast. The only major high-friction surface is the land and buildings adjacent to the station to the east.

Figure 5-2 Wind rose for Esquimalt (2004 to 2008)

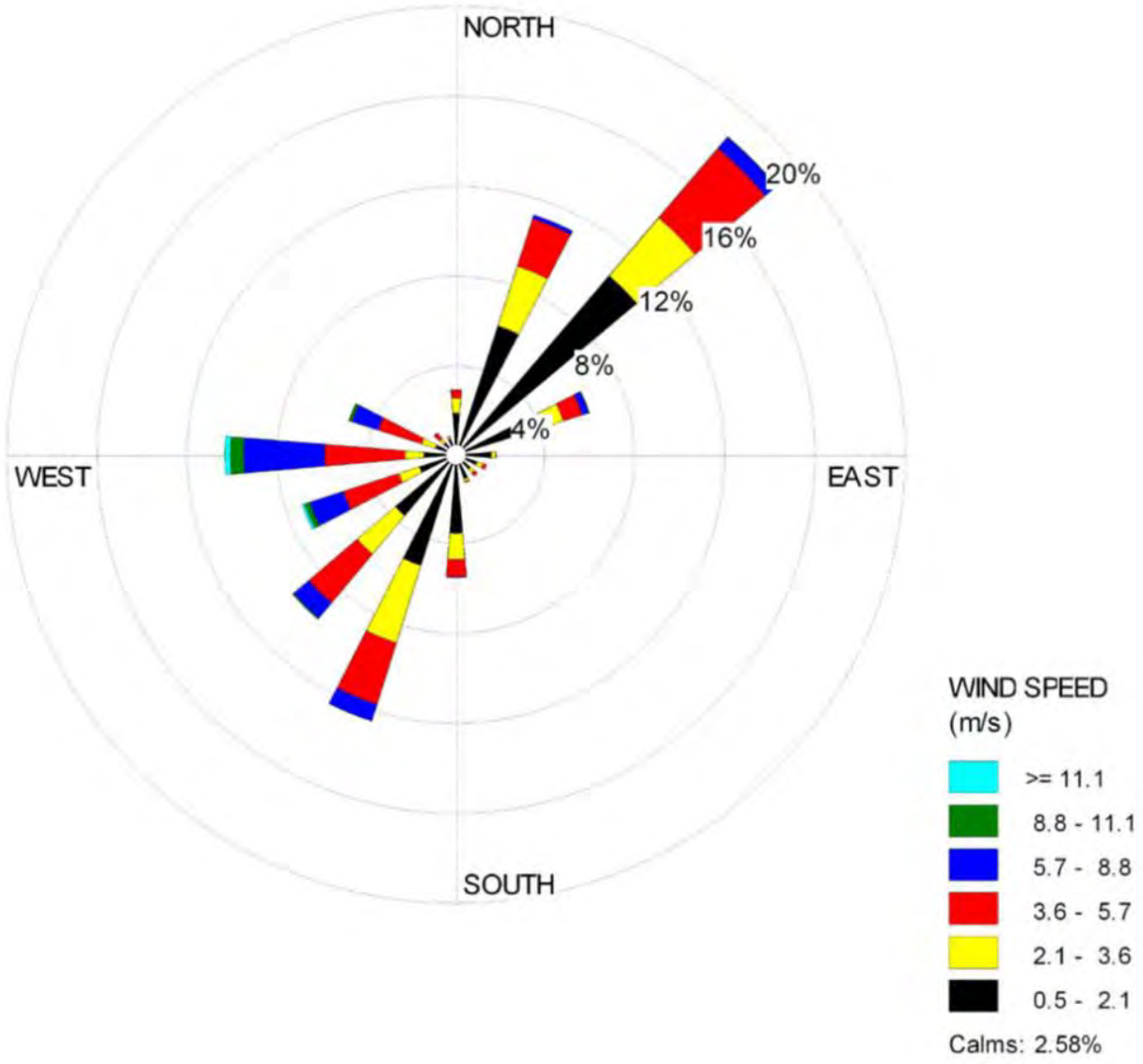


Figure 5-3 Atmospheric stability rose for Esquimalt (2004 to 2008)

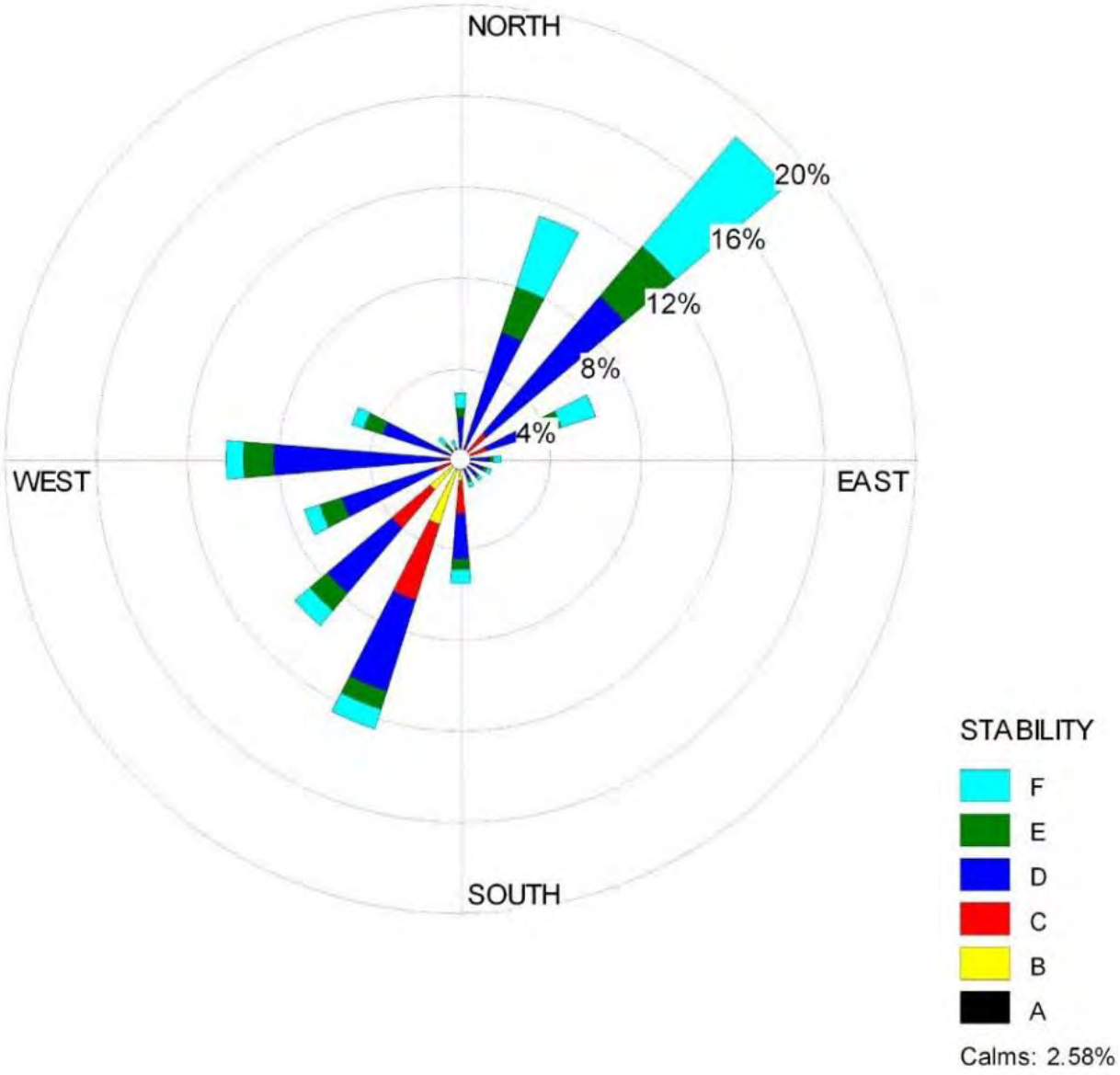
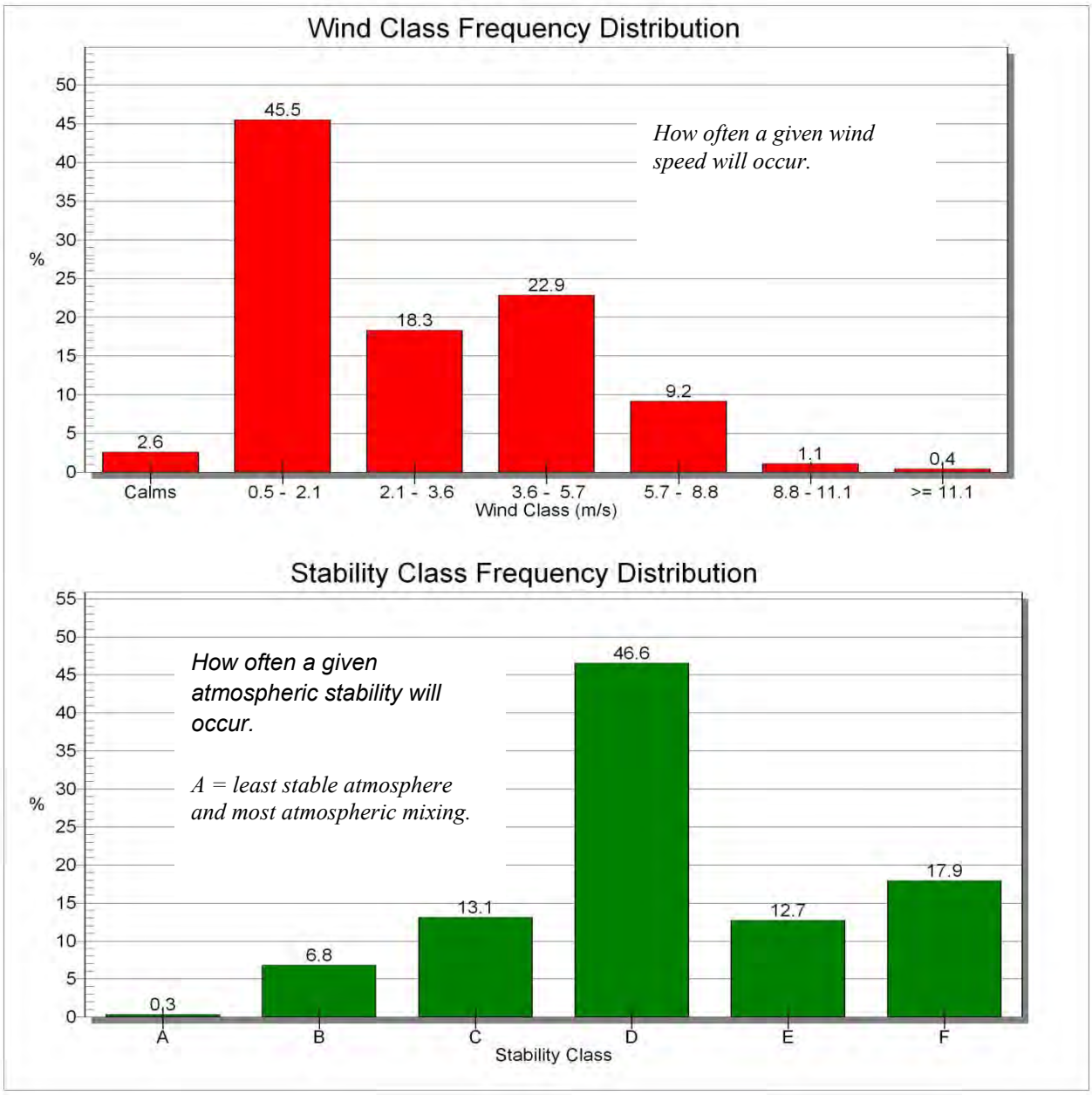


Figure 5-4 Frequency and distribution of wind and atmospheric stability Esquimalt (2004 – 2008)



The Esquimalt Harbour weather station was used to model the meteorological conditions at the McLoughlin Point site. Data from this station were used because data from the Victoria Harbour station are not available for the important evening hours. The Esquimalt Harbour weather station data should be representative as it is nearby and is subjected to similar wind patterns. This station is located 3.4 km west-northwest of the McLoughlin Point site. McLoughlin Point has more water exposure to the southeast than does Esquimalt Harbour.

The most frequent annual wind directions at the weather station are toward the southwest and south-southwest (Figure 5-2). These directions have a relatively high frequency of low wind speeds in the 0.5 to 2.1 m/s range. Winds blowing in the opposite direction are also common but are accompanied by generally higher wind speed, resulting in more atmospheric dispersion.

The pattern of the annual wind rose is a combination of warm and cold season prevailing winds.

Winter winds primarily blow toward the southwest sector. From November through February, 54% of winds are headed between 200 and 250 degrees. This pattern would also hold at the McLoughlin Point site. However, the frequency of winter northwest trending winds that precede the passage of mid-latitude cyclonic storms would be greater and their wind speeds much higher at McLoughlin Point with is open exposure and long open-water fetch to the southeast.

Summer winds primarily blow toward the north-northeast. June through September, 44% of winds are headed between 10 and 50 degrees. These winds come off the Strait of Juan de Fuca during the daytime and bring maritime fresh air. Summer wind speeds reach a peak during the afternoon and early evening. Lighter winds blowing toward the southwest sector account for 14% of summer observations, mainly occurring during night and early morning. This wind pattern would hold at McLoughlin Point.

Overall wind speeds in the area are moderate. The annual mean is 3.1 m/s and only 2.6% of the hourly observations are calm (Figures 5-2 and 5-3). However, the median is only 2.0 m/s. Less than 11% of the measured wind speeds are 5.7 m/s or greater.

Wind speeds along the shoreline are great enough to produce mechanical turbulence (Figure 5-3).This characteristic combined with the water surfaces that limit surface heating during the day and surface cooling at night create a neutral stability class D (neither stable nor unstable) 46% of the time. Unstable air (classes A, B, and C) occurs with daytime, summer solar heating of the ground. Prevailing winds during summer days blow toward the northeast and north-northeast. Most unstable conditions are found with these wind directions.

Stable air that inhibits vertical mixing and odour dilution (classes E and F) occurs most commonly with winds blowing toward the southwest and south-southwest. Light winds from this direction are most frequently associated with high pressure systems in winter and night time conditions in summer. Of most concern is class F, very stable, which occurs 18% of the time at Esquimalt Harbour. The frequency and direction of effect would be similar at McLoughlin Point.

Although infrequent in occurrence, McLoughlin Point winds blowing toward the west through north-northwest carry odour directly over land without any fetch (distance wind can travel over water) and dilution over water. Maximum odour effects would occur in the McLoughlin Point area in these directions during the infrequent times of light winds and stable air (Figures 5-2 and 5-4).

5.7.2 Impact Assessment and Mitigation Measures

McLoughlin Point

Atmospheric Dispersion Modeling

Maximum off-site odour concentrations were estimated around the McLoughlin Point site using five years (2004–2008) of wind and temperature data from the nearby Esquimalt Harbour meteorological station (described in the previous section) and cloud-cover and ceiling height data from the Victoria airport. The output from the atmospheric dispersion modeling contains estimates of the maximum 10-minute-averaged odour concentration over the 5-year modeling period at each of the receptor locations. The model results are then post-processed to create odour isopleths (contours of equal odour concentration) over the affected area.

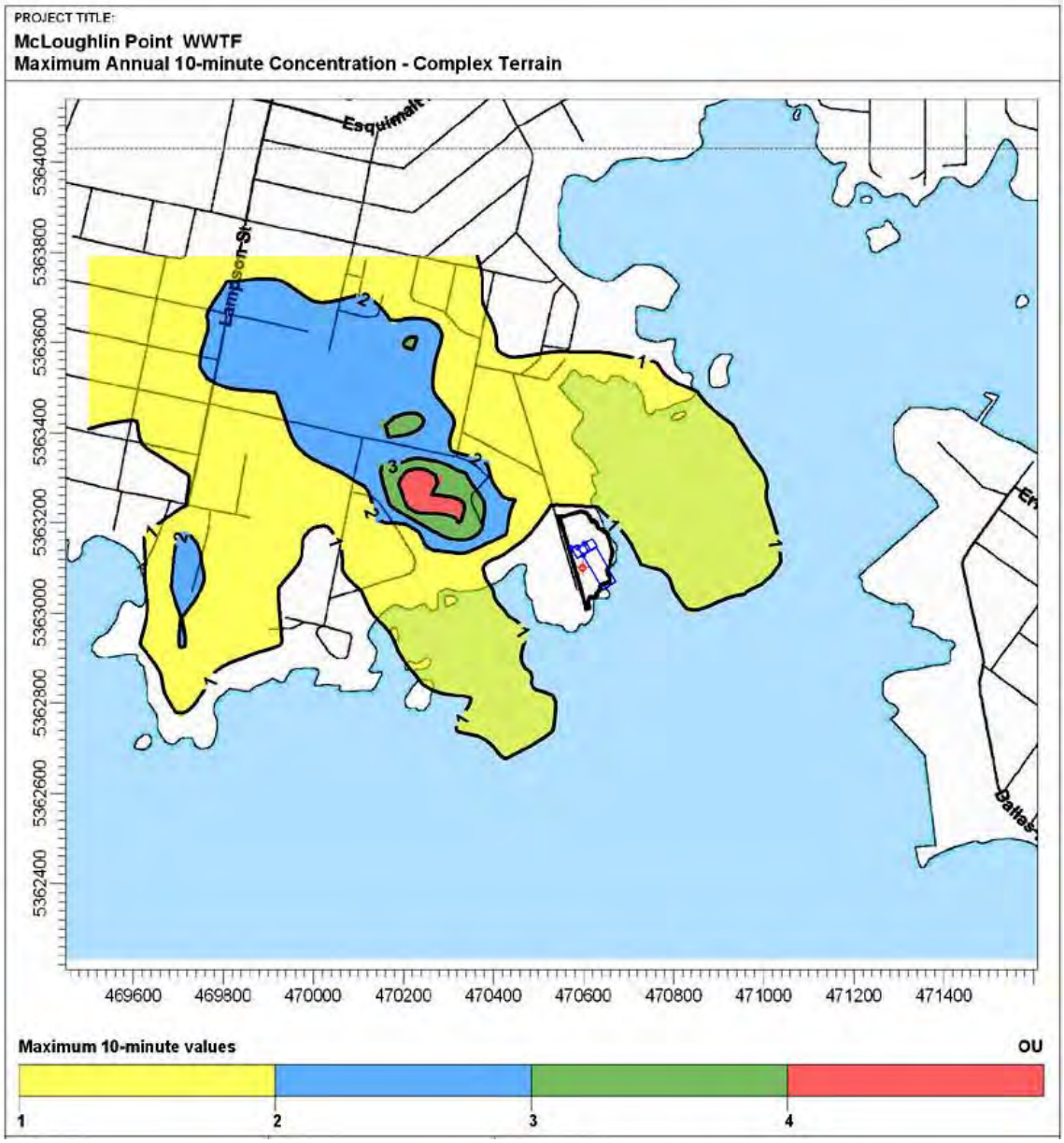
The McLoughlin Point site is located near the entrance to the Victoria Harbour, where terrain elevations are modest. Clear evening skies and low winds will result in a temperature inversions and stable atmospheres with low turbulence and hence poor odour dispersion characteristics. Under inversion conditions, the odour plume from a wastewater treatment facility at the McLoughlin Point site will tend to quickly flatten out and brush against nearby elevated surfaces, such as ridges or knolls, resulting in maximum predicted ground-level odour concentration at these locations.

For the McLoughlin Point site, the ambient odour guideline is 5 OU, not to be exceeded under the worst-case meteorological conditions. The effectiveness of the treatment facility ventilation air scrubbing would be chosen so that this guideline is not exceeded during normal operation and all meteorological

conditions. Figure 5-5 is a representation of the maximum odour concentrations with sufficient odour control to reduce odour units to approximately 5 OU. Under the worst-case meteorological conditions, the model estimates odour of less than 1 OU for the property line. Outside the property line, the model estimates odour between 0 and 5 odour units under worst-case conditions for the five years of meteorological data collected from the years 2004–2008.

The modeling predicts that the maximum ground level concentration would occur when a gentle late night breeze of 1 m/s would cause an odour plume to impinge onto a 32 m above sea level knoll approximately 425 m west-northwest of the McLoughlin Point site. The predicted maximum concentration of approximately 5 OU would be expected to occur perhaps once during a 5-year period of normal operation. Figures 5-2 and 5-3 show, however, that the wind rarely blows towards the west-northwest. A more usual evening wind would be an outflow over the open water, and not over land.

Figure 5-5 Maximum 10-minute duration odour isopleths for McLoughlin Point site



Note: Odour concentrations less than 5 OUs are considered non-detectible.

Treatment Facility Construction

Potential Impact: Air quality may be reduced by dust and exhaust emissions during construction.

People may observe reduced air quality from construction dust and exhaust emissions when outdoors for extended periods. Dust can be a nuisance when it adheres to windows and vehicles, and seeps into houses. No adverse health effects are anticipated. The dust and exhaust emissions would be most noticeable to those close to the facility site. At the McLoughlin Point site, there is a substantial buffer between most of the military housing and the treatment facility site. However, two military residences are located 45 m and 70 m west of the facility site. The trees between the facility site and the residences would reduce the air quality effects of facility construction.

- **Mitigation measures.** Dust control measures, including the use of box covers on trucks, the application of the CRD codes of practice, and a dust management plan will be used to reduce effects on residents and land users. Vehicles and equipment will be shut off when not in use to reduce exhaust emissions.

The potential effect of reduced air quality from dust and exhaust emissions during McLoughlin Point facility construction is local, medium-term, reversible, low in magnitude, and **less than significant**.

Treatment Facility Operation

Potential Impact: Air quality may be reduced by odour emissions during facility operation.

Typical operation of the facility will result in no detectable odour at the property boundary. Annual maintenance will be conducted, when possible, during breezy weather, minimizing risk of adverse odour effects. However, if a redundant odour control system is not installed and running in parallel with the main system, adverse odours could be detectable during maintenance.

In rare cases of equipment malfunction, if a redundant odour control system is not installed, adverse odour effects of unknown magnitude and duration could affect the local area. The season and prevailing wind direction at the time of the malfunction would determine the location and intensity of any adverse air quality effects.

- **Mitigation measures.** Redundant odour control systems and backup generators will be installed to reduce the risk of untreated air discharge from the facility. This mitigation will ensure that odour impacts during maintenance, breakdowns, or power failure are reduced to low magnitude.

The CRD will respond to neighbourhood concerns about odour.

Based on the existing treatment facility design, which does not provide a redundant odour control system, the potential impact on air quality from odour emissions during routine maintenance or mechanical failure is considered local, short-term, occasional, reversible, high magnitude, and **significant**.

If a redundant odour control system is installed to operate during routine maintenance or mechanical failure, the potential impact on air quality will be reduced to low magnitude and **less than significant**.

5.7.3 Ancillary Facilities

Ancillary Facility Construction

Potential Impact: Air quality from dust and exhaust emissions could be affected during ancillary facility construction.

People may observe reduced air quality from construction dust and exhaust emissions when working or exercising outdoors. Dust can be a nuisance when it adheres to windows and vehicles, and seeps into houses. No adverse health effects are anticipated. The dust and exhaust emissions would be most noticeable during the summer months and to those close to the construction site. The construction of the conveyance pipelines will introduce dust impacts for residents, institutional users, industrial users, and commercial users near the construction area. Most of the conveyances pipes will be installed under roads or in tunnels, so the construction effects will be similar to those of other public road projects.

Construction of the Macaulay Point to McLoughlin Point and McLoughlin to Hartland North pipes may affect military residences, users of Department of National Defence (DND) military training grounds, and DND administration buildings.

- **Mitigation measures.** The CRD will work with the Township of Esquimalt and the Department of National Defence representatives to minimize impacts of constructing the ancillary facilities. Dust control measures, including the use of box covers on trucks, the application of the CRD codes of practice, and a dust management plan will be used to reduce effects on residents and land users. Vehicles and equipment will be shut off when not in use to reduce exhaust emissions.

The potential effect of reduced air quality from dust and exhaust emissions during ancillary facility construction is local, short-term, reversible, low in magnitude, and **less than significant**.

Ancillary Facility Operation

No air quality effects are anticipated during ancillary facility operation, so impacts to air quality are considered less than significant.

5.8 Land Use

5.8.1 Treatment Facility Site Conditions

McLoughlin Point

Current Site Uses

The McLoughlin Point site in the Township of Esquimalt is currently a decommissioned Imperial Oil tank farm on 1.4 ha (3.46 acres) of freehold property, owned by Imperial Oil Ltd. and bounded by federal Department of National Defence (DND) land and Victoria Harbour. The oil tanks, parking, buildings, and ancillary structures have been demolished and removed from the site, preceding the present remediation program. The land is currently zoned "I3 – Industrial" by the Township of Esquimalt, which is intended to "accommodate bulk petroleum storage facilities and related uses" (Township of Esquimalt 2008, p. 5-72). A wastewater treatment facility is not a permitted use under current zoning.

Adjacent Land Uses

The McLoughlin Point site is approximately 700 m northeast of the existing Macaulay Point pump station. Victoria View Road runs north-south, immediately west of the McLoughlin Point site. The federal DND property extends west from Victoria View Road towards Macaulay Point.

Two DND-operated storage areas are located north of the proposed treatment facility site. These areas are used for storage of boats, vehicles, soil, equipment, and garden debris.

A CFB Esquimalt marina is located north of the storage areas (Figure 5-6) and includes 100 mooring berths for power boats less than 30 feet in length, a boat launch ramp, a storage compound, servicing bays, and a clubhouse for the CFB Esquimalt Power Boat Club. The CFB Esquimalt Power Boat Club is open to all members of the Regular and Reserve Force, to DND civilian employees, and to other employees of federal services. All facilities are secured by fences and protected by lockboxes, allowing exclusive access to members of the Boat Club.

Figure 5-6 CFB Esquimalt marina, north of the McLoughlin Point site

Image source: Bing Maps

The mouth of Victoria Harbour bounds the McLoughlin Point site to the east and south. Marine and air traffic use the gateway of the Harbour, including ferries from Washington, cruise ships, seaplanes, helicopters, Canada Coast Guard, and private and commercial marine vessels.

DND staff refers to the DND property near the McLoughlin Point site as the Work Point area (Beach, pers. comm.). Uses of the Work Point area include military training, residences (detached and attached structures) for DND staff and military personnel, a canteen, a maintenance supplies yard, CFB Esquimalt administration buildings, and heritage fortification structures (Gingras, pers. comm.). The two nearest residences to the McLoughlin Point site are 45 m and 70 m west of the site.

Planned Land Uses

In discussing the McLoughlin Point site, the Town of Esquimalt OCP states:

The storage facilities are anticipated to remain on the waterfront for the near future. At the time any redevelopment plan is prepared for the surrounding DND lands, consideration should be given to alternate uses for this site that complement and support the redevelopment plan (Town of Esquimalt 2007, p. 22).

Most of the DND property near the McLoughlin Point site is planned for outdoor military personnel training (Gingras, pers. comm.). The current draft of the Master Asset Development Plan (MADP) for future DND activities anticipates that a wastewater treatment facility will be built on the McLoughlin Point site (Gingras, pers. comm.). Land uses in the MADP are intended to minimize conflict with a future wastewater treatment facility.

5.8.2 Impact Assessment and Mitigation Measures

Treatment Facility Construction

Potential Impact: Compliance of facility design with adopted DND plans and uses.

DND staff have not expressed concern that the construction of the McLoughlin Point wastewater treatment facility will adversely affect the adjacent DND land uses and activities (Gingras, pers. comm.). The draft MADP anticipates construction of a CRD wastewater treatment facility on the McLoughlin Point site. A portion of the parking spaces at the north end of the proposed facility design (Figure 3-2) is to be constructed on DND property, requiring a permit from the federal government.

- **Mitigation measures.** The CRD will seek to conclude its negotiation with DND to obtain permission for permanent vehicle access and easements for the various utilities required for the facility.

If permission from DND is granted for permanent vehicle access and easements for utilities on DND property, the impact of the wastewater facility design on adopted DND plans is considered to be negligible and **less than significant**.

Potential Impact: Public access to McLoughlin Point may be disturbed during construction.

As private land, McLoughlin Point is not readily accessible by the public. Public access is also restricted on the surrounding DND land, and use of Victoria View Road is under DND control. Because public access to McLoughlin Point is already limited, restrictions on public access during construction of the wastewater treatment facility at this site is considered to have a local, short-term, reversible, low magnitude, and less than significant impact on public access to McLoughlin Point.

Potential Impact: Construction activities could conflict with Victoria Harbour air traffic land use regulations.

Considering the nearby aerodrome for seaplanes and helicopters, it is necessary to ensure the construction of the facilities on the McLoughlin Point site complies with federal air traffic safety policies and regulations of Transport Canada, or with Nav Canada air navigation safety guidelines. The Transport Canada document, TP 1247 - Aviation - Land Use in the Vicinity of Airports, describes the operational characteristics of airports and aerodromes that may influence land uses outside the aerodrome boundary and recommends, where applicable, guidelines for nearby land uses. However, Transport Canada does not have regulations in place associated with structural height limitations on land adjacent to the Victoria Harbour aerodrome (Youngson, pers. comm.).

- **Mitigation measures.** Design of the facilities and construction methods at the McLoughlin Point site will follow applicable Transport Canada guidelines. It is recommended that a Land Use Submission Proposal be submitted to Nav Canada, so that the agency can assess potential obstructions and impacts of a proposed physical structure on air navigation in Victoria Harbour.

Compared to other buildings near Victoria Harbour and the previous 16 m-high petroleum tanks on the McLoughlin Point site, the wastewater treatment facilities will be relatively low (three storeys or less). Cranes needed to build the treatment facility are unlikely to create a hazard to aircraft. Although this conclusion will be revisited following Nav Canada review of CRD plans, currently available information about the wastewater facilities and federal regulations indicate that construction will not affect air navigation in Victoria Harbour, and impacts will be local, medium-term, reversible, of low magnitude, and **less than significant**.

Treatment Facility Operation

Potential Impact: Compliance of facility operation with adopted plans and zoning bylaws.

DND staff have not identified adverse effects of the operation of the McLoughlin Point wastewater treatment facility on adjacent land uses (Gingras, pers. comm.). The draft MADP anticipates operation of a CRD wastewater treatment facility on the McLoughlin Point site.

The McLoughlin Point site is zoned “I3 – Industrial” by the Township of Esquimalt, a designation is intended to “accommodate bulk petroleum storage facilities and related uses” (Township of Esquimalt 2008, p. 5-72). A wastewater treatment facility will require rezoning to permit wastewater treatment facility at McLoughlin Point site.

The Esquimalt OCP anticipated that the fuel storage facility would remain on the McLoughlin Point site (Town of Esquimalt 2007, p. 22), and the OCP provides no specific guidance regarding other use of the McLoughlin Point site. However, the OCP does state that the Township will not approve a bylaw that will have the effect of authorizing the use of lands in and around Macaulay Point for the purposes of a Regional Sewage Treatment Facility (Town of Esquimalt 2007, p. 40).

If an OCP amendment is required to accommodate the development of a wastewater treatment facility on the McLoughlin Point site, the CRD will comply with Esquimalt's amendment procedures. The Town of Esquimalt has a clear process for OCP amendment, rezoning, and building permit applications, completion of which will bring the McLoughlin Point site into full compliance with these municipal bylaws. The impacts of the wastewater facility on compliance with local plans and bylaws are considered to local, long-term, reversible, of low magnitude, and **less than significant**.

Potential Impact: Facility operation may affect existing and planned adjacent land uses.

Two houses are located 45 m and 70 m west of the site. The houses are owned by DND and leased to DND personnel (Gingras, pers. comm.). Approximately 20 m north of the site is a federal maintenance yard for storing building and landscaping materials. Heritage fortifications are located southwest of the site. Aside from these uses, the DND land surrounding the McLoughlin Point site is mostly used as a training area for military personnel (Beach, pers. comm.).

Based on the draft MADP, most land near the McLoughlin Point site will be used for outdoor training for military personnel (Gingras, pers. comm.). The operation of the McLoughlin Point wastewater treatment facility will not conflict with the existing and planned uses of the surrounding DND property.

The operation of the McLoughlin Point facility is deemed compatible with adjacent uses, and the impact on current and planned DND activities is assessed to be local, long-term, irreversible, of low magnitude, and **less than significant**.

5.9 Noise, Vibration, and Lighting

5.9.1 Treatment Facility Site Conditions

Section 5.7: Land use in this report provides a description of treatment facility site conditions as they relate to noise, vibration, and lighting effects of the project.

5.9.2 Impact Assessment and Mitigation Measures

Treatment Facility Construction

Potential Impact: Nuisance effects of noise and vibration may occur during facility construction.

Construction of the treatment facilities will involve the use of heavy machinery, compressors, pumps, concrete pouring equipment, and other equipment to prepare the site and build the treatment facility. During the construction period, noise and vibration impacts will affect neighbouring residents and institutional uses, in particular, the military housing to the west of the McLoughlin Point facility, but the residences near the McLoughlin Point site are more than 45 m away, so noise and vibration effects during construction are expected to be minor.

Peak construction activity and potential noise and vibration will occur in the first 9 months during the excavation and concrete pouring phase. Construction of the McLoughlin Point facility is expected to take 3.5 years to complete. After the 9-month peak construction activity has occurred, the construction activities will be similar to the construction of other utility or industrial buildings.

- **Mitigation measures.** Construction activities will comply with the applicable Township of Esquimalt bylaws for hours of work and noise levels. Work will usually occur on weekdays from 7 am to 5 pm with no work on Sundays or holidays (except in an emergency or where a critical piece of work must be completed in a specified work window). If required, construction lighting will be oriented downward to reduce effects on neighbours and institutional users. Discussions will be undertaken with DND and neighbouring residents during project planning and before construction to confirm noise mitigation measures.

Nuisance effects of noise and vibration during facility construction at McLoughlin Point are local, medium-term, of low magnitude, reversible, and **less than significant**.

Treatment Facility Operation

Potential Impact: Nuisance effects of noise, lighting, and vibration may occur during facility operation.

During facility operation, noise, lighting, and vibration effects are unlikely to affect neighbouring residents and institutional uses.

Noise generating equipment will include:

- air-driven pumps;
- compressors;
- fans and blowers;
- diesel-driven pumps; and
- standby diesel power generators.

Project noise is unlikely to disrupt residents or DND training and administrative activities near McLoughlin Point. Victoria Harbour traffic generates substantial noise, especially during the daytime. This area is accustomed to intermittent periods of noise.

- **Mitigation measures.** Noise at the edge of the treatment facility property will not exceed 45 dB at night and 55 dB during the day. Sound attenuation will be installed in the buildings housing noise-generating equipment and on diesel engine exhaust to ensure that decibel levels remained below 45 dB at the property lines. Noise levels will meet the Township of Esquimalt noise bylaw requirements and WCB-OSHA criteria for worker safety. Noise-generating equipment will be installed in soundproofed rooms to meet these requirements.

All installed vibrating equipment will be contained in isolated structures that meet vibration limits acceptable in residential areas. The facility equipment does not include excessive vibrating equipment and is typical of current operating systems found elsewhere. Vibration issues are not anticipated and, if present, can be mitigated.

The lighting plan for the facility is expected to include normal post top sodium vapour lighting standards similar to those on residential streets. Lighting will be directed downward and will have shields installed to minimize scatter lighting of the night sky. Low energy LED lighting with low ultra violet emissions will be specified.

Effects of noise, vibration, and lighting during facility operation at McLoughlin Point will be local, irreversible, long-term, of low magnitude, and **less than significant**.

5.10 Human Health

Recent health research reports have found no conclusive evidence of health risks to residents living near to wastewater treatment facilities, but they note that some health risks may be present for treatment facility workers.

The McLoughlin Point facility will be entirely enclosed, and air will be filtered with advanced odour control and air filtration systems before it is released. This enclosed design will reduce exposure to microbial aerosol releases outside the treatment facilities. The ventilation systems will not be connected to the odour control system in the facility. These ventilation systems will filter air vented from the interior of the facility to the outside.

The odour control system will employ proven and reliable technology. One such system that could be used, a three stage chemical scrubber, includes absorption, adsorption, filtration, entrapment, and chemical conversion systems designed to remove disease-causing organisms. Chemical scrubbers typically use an acid followed by hypochlorite and water to remove amine and reduced sulphur compounds; sometimes a caustic is also used. This system provides a barrier to most viruses and

bacteria. Next, the activated carbon filter absorbs residual molecular organic compounds not completely oxidized by the scrubber. It is unlikely that disease organisms will pass through the odour treatment system and pose a risk to nearby residents.

Birds, rodents, and insects have been known to serve as vectors for transmitting bacteria and viruses from traditional wastewater facilities. Because the McLoughlin Point facility will be enclosed, the risk of disease transfer by birds, rodents, or insects is negligible.

5.10.1 Impact Assessment and Mitigation Measures

Treatment Facility Construction

Potential Impact: Human health risks could result from exposure to dust and noise.

Dust control measures will be implemented if dust is generated during construction. Noise levels will be typical of a major construction project.

- **Mitigation measures.** Nearby residents, businesses, industry, and institutions will be notified in advance of potentially disruptive construction activities. Dust control measures, such as spraying water, box covers on trucks, will be used as needed.

Human health risks associated with exposure to dust and noise during treatment facility construction are local, medium-term at McLoughlin Point, reversible, of low magnitude, and **less than significant**.

Treatment Facility Operation

Potential Impact: Safety risks may be associated with the public accessing the facilities.

It is unlikely that the public would gain entry into the treatment facility. As discussed in the project description, the facilities will be fenced to minimize public entry, and the equipment at the facilities is enclosed.

- **Mitigation measures.** No additional mitigation measures are necessary.

Safety risks associated with the public accessing the facilities are local, long-term, reversible, of low magnitude, and **less than significant**.

Potential Impact: Human contact with disease organisms could constitute a health risk.

Human health risks will be limited to treatment facility workers who may come into contact with untreated wastewater or microbial aerosols. The enclosed facilities will prevent direct transmission of disease organisms to residents. Advanced odour control systems reduce the risk of viruses, bacteria, or other contaminants being discharged by air from the facilities. The distance between the treatment facilities and residences or institutions further reduces human health risks.

- **Mitigation measures.** No additional mitigation measures are necessary.

Human health effects of human contact with untreated wastewater are local, long-term, irreversible, of low magnitude, and **less than significant**.

5.11 Visual aesthetics

This section contains information on the visual aesthetic character of McLoughlin Point and an assessment of the significance of visual impacts of the construction and operation of wastewater facilities on the site.

5.11.1 Treatment Facility Site Conditions

McLoughlin Point is a rocky peninsula at the western side of the entrance to Victoria Harbour. Victoria View Road bisects the peninsula in a north south direction. The western half of the peninsula is partially treed and contains two detached dwellings and several heritage fortification structures. The eastern half is the proposed location of the CRD wastewater treatment facility. The site was formerly an Imperial Oil tank farm (Figure 5-7), was decommissioned in 2008, and fuel storage structures removed (Figure 5-1).

Figure 5-7 McLoughlin Point site before fuel tank decommissioning in 2008

Image source: Bing Maps

The McLoughlin Point site is flat or gently sloping, with rocky outcrops, gravel and concrete base material, 3 m high concrete retaining walls, and several spoil heaps. A chain link fence surrounds the north, east, and south boundaries of the property. The vacant, partially remediated site has few features that would be considered visually appealing. The site's relatively low profile reduces its visibility when viewed from the south or east, near sea level.

Trees and rock outcrops to the west and north shield the site from view, except from Victoria View Road and a neighbouring small-boat storage yard to the north (Figure 5-8). The two dwellings on the western side of Victoria View Road have partial views of the site when the intervening deciduous trees are not in leaf.

Figure 5-8 McLoughlin Point site looking southeast from Victoria View Road, December 2009

From the east and south, close views of the site are available only from the water (for example, from cruise ships and ferries), or the air (the site is close to floatplane and helicopter landing and take off areas). Distant views (greater than 500 m) of the site are available from the east side of Victoria Harbour.

5.11.2 Impact Assessment and Mitigation Measures

McLoughlin Point

The following figures provide a photographic record of current site conditions at McLoughlin Point and a graphic representation of the site after construction of a wastewater treatment facility. The building shapes are based on representative designs and technology, and are intended to represent the height and extent of buildings on the site. Viewpoints have been selected based on areas of high traffic and high site visibility.

Figure 5-9 View of McLoughlin Point site looking west from floatplane leaving Victoria Harbour, November 2009

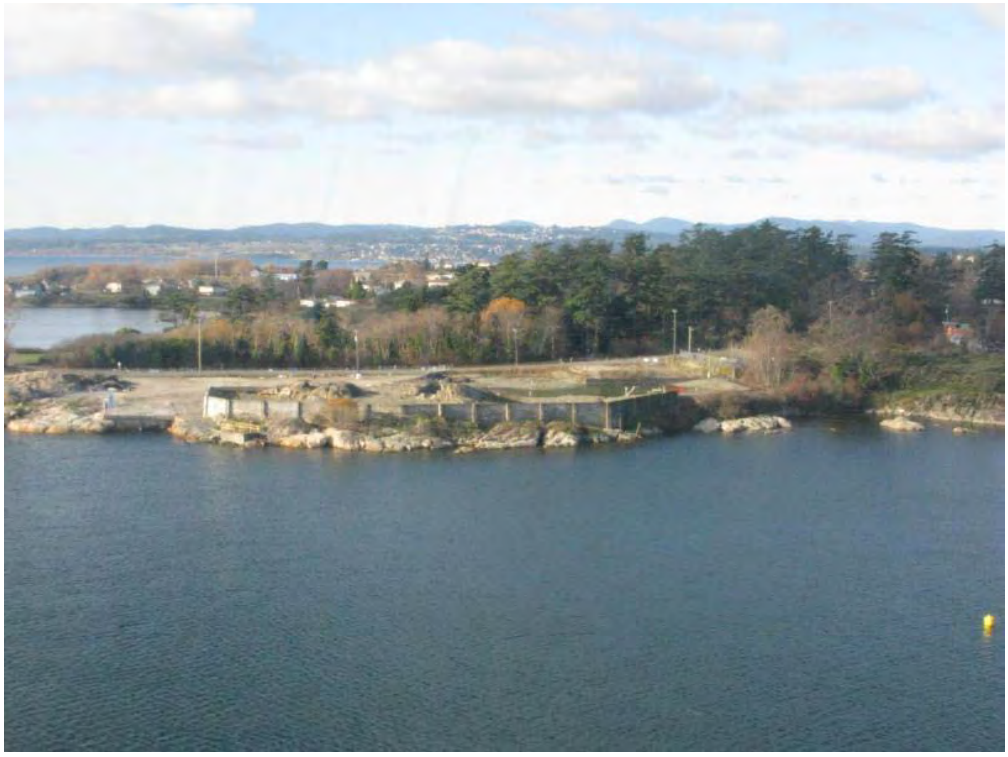


Figure 5-10 Rendered view of the McLoughlin Point site with the proposed wastewater treatment facility superimposed

Figure 5-11 View of McLoughlin Point looking northeast from the end of Ogden Point breakwater, November 2009

Figure 5-12 Rendered view of the McLoughlin Point site from Ogden Point breakwater with the proposed wastewater treatment facility superimposed

Figure 5-13 View of McLoughlin Point site from Victoria Cruise Ship Terminal, Pier B, November 2009

Figure 5-14 Rendered view of the McLoughlin Point site from Victoria Cruise Ship Terminal Pier B with wastewater treatment facility superimposed

Treatment Facility Construction

Potential Impact: Remediation and construction activities at McLoughlin Point will affect viewscapes that include rocky shoreline, mature trees, and vacant industrial land.

As a former fuel storage facility ("tank farm") the McLoughlin Point site requires remediation before construction activities take place. Remediation introduces the following visual elements into the local viewscapes:

- excavators;
- soil stockpiles;
- security and work lighting;
- large trucks moving material off-site; and
- potentially on-site soil processing equipment.

Facility construction will introduce the following visual elements into the local landscape:

- earth moving equipment, cranes and other construction related large equipment;
- soil and aggregate stockpiles;
- stockpiled construction materials;
- security and work lighting;
- truck and other construction related traffic; and
- partially completed treatment facility structures.

Because of the site's location in an area that is a mix of natural rocky coastline with vegetated waterfront and urban waterfront, the introduction of the identified visual elements during remediation and construction may be considered an adverse visual impact.

The principle viewers of construction activities will be users of Victoria Harbour. Air and marine traffic will have unobstructed views of the site from the northeast, east, and southeast as they enter and exit the harbour. Because of established harbour traffic routes and the presence of a rocky shoreline, most ground and water-based views will be distant (greater than 200 m).

- **Mitigation measures.** Most viewers will see the site from several hundred metres distant, and obliquely from ferry decks, cruise ship decks, or float planes. Because of the long period of remediation and construction, consideration will be given to selecting security fence materials that also screen the site, for example green or black chain link fence slats. Selecting colours for such screens that are analogous to background colours would lessen the visual impact of construction to viewers from Victoria View Road (not a public road) and from distant viewpoints on the east side of the Harbour.

The temporary nature of the construction activities associated with the McLoughlin Point facility, and the lack of intrusion into, or development of, visually sensitive areas, such as forested areas, creates visual impacts of development of the site that are local, long-term, reversible, of low magnitude, and **less than significant**.

Treatment Facility Operation

Potential Impact: Siting a wastewater treatment facility at McLoughlin Point will affect views from the east side of Victoria Harbour.

Viewed from the east side of Victoria Harbour, including Ogden Point, the McLoughlin Point site appears as a distant low concrete retaining wall against a treed backdrop. The wastewater treatment facility will add industrial buildings, parking, administration offices, and landscaping (Figure 5-46 to Figure 5-51). Viewers near sea level looking at the site from the east side of the harbour will see partially screened industrial and office buildings in the middle distance against a treed background. The distances between land based viewers and the facility (greater than 500 m) ensures that this will be a minimal adverse visual impact.

- **Mitigation measures.** Vegetation screens and landscaping are recommended along the east and south shorelines of the site to partially screen the facility and to blend the site with the surrounding landscape.

An industrial facility seen from the east side of the harbour may be considered unattractive by some viewers, but its appearance is largely mitigated by the distance between most viewers and the proposed facility and by vegetation screens. In consequence, the mitigated visual impact of the McLoughlin Point wastewater treatment facility, as viewed from east side of Victoria Harbour, is considered local, long-term, irreversible, of low magnitude, and **less than significant**.

Potential Impact: Siting a wastewater treatment facility at McLoughlin Point will affect marine and harbour views obtained when entering or leaving Victoria by cruise ship, ferry, floatplane, or helicopter.

The McLoughlin Point site is in a prominent location at the entrance to Victoria Harbour. Potentially some 400,000 viewers per year enter or exit the harbour by large vessel, helicopter, or floatplane (Dykes 2009). High vantages provide a more oblique view of the site, so these viewers presently have unscreened views of a vacant 1.5 ha area of broken concrete and spoil heaps. After construction, these viewers will have unobstructed or partially screened views of facility buildings and associated infrastructure and landscaping (Figure 5-10).

For most viewers entering or exiting the harbour, a wastewater treatment plant at McLoughlin Point may be considered a neutral or positive visual effect, because it replaces an unattractive vacant industrial lot with modern, well-designed industrial building, infrastructure, and landscaping.

- **Mitigation measures.** It is recommended that buildings be designed to a high architectural standard. Where feasible, facades on east and south faces will be designed and finished to reduce the industrial appearance of the facility. Vegetated screens and landscaping are recommended along the east and south shorelines of the site to partially screen the facility and to blend the site with the surrounding landscape.

The site's development will replace an unattractive vacant lot and the previous tank farm with a well-designed industrial facility that is highly visible to harbour marine and air traffic, so the visual impacts are considered **beneficial**. In consequence, the mitigated visual impact of development of this site as a wastewater treatment facility, on most viewers entering or leaving the harbour, is considered to be **less than significant**, and **beneficial**.

Potential Impact: Views of vacant McLoughlin Point industrial land from Victoria View Road will be replaced by views of an industrial facility

Victoria View Road is a private DND road used to access two detached residential dwellings on the west side of the peninsula. Viewers on the road have unscreened views of a vacant, partially remediated, industrial lot in the foreground with marine and harbour views in the middle distance and background, (Figure 5-41). Viewers from the detached residences have heavily screened and occasional glimpses of the site (when deciduous foliage is absent). Development of the McLoughlin Point site will replace an unattractive vacant lot and marine views with views of a partially screened, modern, wastewater treatment plant.

- **Mitigation measures.** It is recommended that vegetation screens be planted adjacent to Victoria View Road to partially screen the facility from view and to complement the treed view on the west side of the road.

Siting a wastewater treatment plant at McLoughlin Point will replace an unattractive vacant lot with a modern facility, but will also obscure harbour and marine views. The limited use of Victoria View Road and the glimpses of the site from the residential dwellings on the west, combined with the replacement of an unattractive vacant lot with a modern wastewater treatment facility balance the loss of marine views. In consequence, the mitigated visual impact of development of McLoughlin Point as viewed from Victoria View Road is considered local, long-term, irreversible, of low magnitude, and **less than significant**.

5.12 Cumulative Effects

As noted in this report, the McLoughlin Point site has been extensively used for industrial development as an Imperial Oil tank farm. The use of the McLoughlin Point site for a wastewater treatment facility will not affect additional undeveloped "greenfield" land, so it will not contribute to adverse cumulative environmental effects of development in the region. Terrestrial cumulative effects, therefore, are considered less than significant. Indeed, the treatment of wastewater from the Core Area municipalities will have a beneficial effect on cumulative effects of discharges to the marine environment.

6.0 RECOMMENDATIONS

This section summarizes the mitigation measures identified in this report and confirms the CRD's commitment to implement these recommendations.

6.1 Mitigation Measures

The CRD commits to the following mitigation measures for the construction and operation of the McLoughlin Point facility, including associated ancillary facilities:

- A geotechnical investigation and review of the treatment facility design will be conducted.
- Careful consideration will be given to groundwater levels of excavations deeper than 3 to 4 metres below existing grades and any excavations below sea level.
- Appropriate measures will be implemented to avoid or control seepage from fill or rock cuts, to ensure use of suitable fill materials, and to respond to potential buoyancy concerns where structures are below the water table.
- Earthquake and tsunami risks, and projected sea level rise, will be factored into facility designs.
- When blasting, the CRD will limit the size of charge detonated per delay to avoid or minimize vibration effects on adjacent facilities and structures.
- The CRD will follow WorkSafe BC standards.
- Areas of native vegetation and plant communities located on or near facility footprints will be avoided, where possible.
- Temporary workspace and lay-down areas will be located in areas that will not substantially affect native plant communities,
- Redundant odour control systems and backup generators will be installed where required to reduce the risk of untreated air discharge from the treatment facilities.
- The CRD will respond to neighbourhood concerns about odour.
- Signs, newspaper advertisements, or other measures will be used to inform residents and businesses about the construction schedule and potentially disruptive construction activities.

- Users of facilities that could be affected by pipeline construction will be notified about the work schedule and potential disruptions.
- The CRD will seek to comply with the Township of Esquimalt plans and bylaws in siting, design, construction, and operation of the McLoughlin Point facility.
- Design of the facilities on the McLoughlin Point site will follow the Transport Canada guidelines and a Land Use Submission Proposal will be submitted to Transport Canada.
- A registered arborist will be retained during the conveyance pipeline route planning and design stages to determine further measures to avoid or mitigate potential damage to street trees.
- The construction site will be fenced to prevent access by the public.
- The CRD will engage in discussions with nearby institutions and neighbouring residents during project planning and before construction to confirm noise mitigation measures.
- All buildings will be designed to a high architectural standard and, where feasible, designed and finished to reduce the industrial appearance of the facility.
- Where feasible, vegetated screens, security fencing materials, and landscaping will be used to partially screen the facilities and to blend the facilities with the surrounding landscape.
- Location of staging areas will be chosen to minimize visual disturbance.
- A water management plan will be prepared to minimize on-site and off-site effects of groundwater changes associated with the project. If feasible, onsite infiltration of runoff will be included in project design.
- Water used in concrete pouring will be managed to prevent entry into storm drains or the ocean.
- Stockpiles of excavated soil will be covered to prevent erosion.
- During construction, settlement ponds or filtration basins will be provided to reduce suspended sediments in construction drainage. Silt fencing may be appropriate to control movement of sediments.
- During operation, runoff water will pass through oil, grease, and sediment traps before being released to the ocean or storm drains.
- As part of an Environmental Protection Plan (EPP) for the McLoughlin Point facility, a spill response plan will be prepared that specifies procedures to follow in case of an accidental spill of wastewater, sludge, or biosolids.

6.2 Environmental Protection Plan

The EPP for the McLoughlin Point facility will contain a set of instructions that are developed to avoid or minimize adverse clearing and construction effects of the project on the environment.

The mitigation measures described in Section 6.1 of this report and the forthcoming marine EIS will be incorporated in the EPP. The EPP will apply to each phase of the project, including clearing, grading, construction, operation, and restoration.

The EPP will incorporate the appropriate requirements of the CRD's existing procedures and manuals that are applicable to the construction and operation phases of the wastewater treatment facilities. The EPP will examine the following topics:

- environmental standards;
- adherence to applicable permits;

- use and handling of approved materials;
- construction practices;
- proper disposal of waste; and
- compliance with the Workplace Hazardous Materials Information System (WHMIS) and other pertinent regulations.

The standards will be incorporated into the project's building contracts, and compliance will be a legal obligation for contractors.

The EPP will be written in construction specification format so that it can be easily interpreted and followed in the field by contractors, trade and environmental inspectors, regulatory inspectors, and other government representatives. The use of the construction specification format also allows the instructions contained in the EPP to be directly included in the construction contract bid documents and specifications.

Before construction of the McLoughlin Point facility, workers will receive environmental orientation and training describing requirements related to safety and environment.

The EPP will include a series of contingency plans covering:

- wet soils;
- soil erosion or siltation;
- flooding or excessive drainage;
- accidental spills;
- fire;
- accidental release of drilling mud during horizontal direction drilling;
- wildlife incidents;
- discovery of plant species or wildlife species of concern during construction; and
- discovery of archeological or heritage resources during construction.

6.3 Capitol Regional District Commitment

The CRD commits that it will make best efforts to implement the recommended actions identified in Section 6.1. The CRD will develop and implement the EPP described in Section 6.2.

The timing and sequence of the implementation actions will be linked to the schedules for planning, design, construction, and restoration stages of the wastewater project.

7.0 PREPARERS OF THE REPORT

The information to support this report was prepared by TERA Environmental Consultants and affiliated consultants, with the involvement of CRD personnel. The study team was headed by TERA's senior planners and environmental scientists, with support for the engineering and facility construction elements provided by staff from the CRD and Stantec. Expertise was provided in the following areas:

- land use planning and analysis;
- biology (vegetation and wildlife);
- hydrology and water quality;
- community effects (noise, odour, light and glare);
- Geographic Information Systems-based mapping and spatial analysis;
- facility design, construction, and operation;
- meteorology;
- odour dispersion modelling; and
- geotechnical analysis.

All of the consultants involved have professional registrations in their respective fields and are experienced in conducting studies of this type.

8.0 REFERENCES

8.1 Personal Communications

TERA wishes to acknowledge those people identified in the Personal Communications for their assistance in supplying information and comments incorporated into this report.

Beach, Sharon. Real Estate Services, CFB Esquimalt, Department of National Defence. December 22, 2009.

Gingras, Marcel. Base Development Engineer, Canadian Forces Base Esquimalt, Department of National Defence, Government of Canada. Personal communication. January 4, 2010.

Parkes, Trevor. Senior Planner, Development Services, Township of Esquimalt. Personal communication. December 30, 2009, January 4, 2010.

Tabbernor, David. Manager, Real Estate Services, CFB Esquimalt, Department of National Defence. Personal communication. January 27, 2009.

Youngson, Grant. Regional Manager, Aerodrome Safety & Air Navigation Services & Airspace, Transport Canada. Personal Communication, January 22, 2010.

8.2 Literature Cited

Beauchesne, S.M., Chytyk, Paul, and Cooper, John M. 2002b. Western Meadowlark Stewardship Account for the Garry Oak Ecosystems of Southwestern British Columbia. Prepared for the Vertebrates at Risk Recovery Action Group of the Garry Oak Ecosystems Recovery Team. Sponsored by the Habitat Stewardship Program, Government Canada, and National Conservancy Canada.

British Columbia Conservation Data Centre. 2010. Ecological Community Summary: Pseudotsuga mensiesii / Mahonia nevosa. BC Ministry of Environment. Accessed online, April 14, 2010: http://a100.bc.ca/pub/eswp/.

British Columbia Conservation Data Centre. 2010. Ecological Community Summary: Pseudotsuga mensiesii / Melica subulata. BC Ministry of Environment. Accessed online, April 14, 2010: http://a100.bc.ca/pub/eswp/.

British Columbia Conservation Data Centre. 2010. Species Summary: Megascops kennicottii kennicottii. BC Ministry of Environment. Accessed online, April 15, 2010: http://a100.gov.bc.ca/pub/eswp/.

British Columbia Ministry of Environment. 2010. British Columbia Approved Water Quality Guidelines for the Protection of Aquatic Life. British Columbia Ministry of Environment. Accessed online, April 14, 2010: http://www.env.gov.bc.ca/wat/wq/wq_guidelines.html#approved.

Brown, N. J. 1997. Health hazards manual: Wastewater treatment plant and sewer workers. Ithaca, NY: Cornell University, Chemical Hazard Information Program.

Capital Regional District website. Natural Areas Atlas. Accessed November 25, 2009. Accessed online: http://www.crd.bc.ca/maps/natural/atlas.htm.

Capital Regional District website. Wastewater Made Clear. Accessed online, December 2009: http://www.wastewatermadeclear.com.

Capital Regional District. 2002. Bylaw No. 3027, Comprehensive Community Development Plan for Willis Point. Accessed online, April 9, 2010: http://www.crd.bc.ca/bylaws/juandefucaelectorala_/bl30270000/BL30270000.pdf.

Capital Regional District. 2006. Greater Victoria Tsunami Planning Map. November 22, 2006.

Capital Regional District. 1995. Solid Waste Management Plan - Revision 2. Accessed online, April 12, 2010: http://www.crd.bc.ca/waste/managementplan.htm.

Capital Regional District. 2004. Amendment No. 3 to Solid Waste Management Plan - Revision 2. Accessed online, April 12, 2010: http://www.crd.bc.ca/waste/managementplan.htm.

Capital Regional District. 2009. Saanich Peninsula Designated Truck Routes (Draft). Environmental Services, Capital Regional District, October 26, 2009.

Carducci, A., E. Tozzi, E. Rubulotta, B. Casini, Cantiani, E. Rovini, M. Muscillo, and R. Pacini. 2000. Assessing airborne biological hazard from urban wastewater treatment. Water Research 34: 1173-1178.

Center for Construction Research and Training. 2004. Biological hazards in sewage and wastewater treatment plants: Hazard alert. Accessed online, May 25, 2009: http://www.elcosh.org/docs/d0200/d000283/d000283.pdf.

City of Victoria. 2001. Victoria Harbour Plan. Accessed online, August 12, 2009: http://www.victoria.ca/common/pdfs/planning_harbourplan.pdf.

City of Victoria. no date. Learn to Protect Yourself from a Tsunami.

City of Victoria. Undated. Part 7.3- M-3 Zone, Heavy Industrial District. Accessed online, January 20, 2010: http://www.victoria.ca/common/pdfs/planning_zoning_73.pdf.

COSEWIC. 2005. COSEWIC assessment and status report on the dense-flowered lupine, Lupinus densiflorus, in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 21 pp. Accessed online: www.sararegistry.gc.ca/status/status_e.cfm.

Dykes, Ray. 2009. BC Ports May Be Heading for Smoother Waters. Harbour & Shipping, September/October:14.

Flynn, Samantha. 1999. “Coastal Douglas-fir Ecosystems.” Species and ecosystems at risk brochure. Forest Renewal British Columbia, Ministry of Environment, Lands, and Parks, Victoria, British Columbia.

MacArthur, Robert H. and Wilson, Edward O. 1967. The Theory of Island Biogeography. Princeton University Press, Princeton, N.J. 215 pp.

McQuarrie, E. and S. Bean. 2000. Seismic Slope Stability Map of Greater Victoria, British Columbia Geological Survey, Ministry of Energy and Mines, Victoria, B.C., Geoscience Map 2000-3, Sheet 3C.

Meidinger, D. and J. Pojar. 1991. Ecosystems of British Columbia. Prepared for British Columbia Ministry of Forests. Victoria, BC.

Ministry of Justice, Canada. 2009. Subsection 3(1) and (3) of the Legislation Revision and Consolidation Act. In force June 1, 2009. Accessed online, December 22, 2009: http://laws.justice.gc.ca/PDF/Regulation/C/C.R.C.,_c._1036.pdf.

Monahan, P. and V. Levson. 2000. Quaternary Geological Map of Greater Victoria, British Columbia Geological Survey, Ministry of Energy and Mines, Victoria, B.C., Geoscience Map 2000-2, Sheet 2.

Monahan, P., V. Levson, P. Henderson and A. Sy. 2000a. Relative Liquefaction Hazard Map of Greater Victoria, British Columbia Geological Survey, Ministry of Energy and Mines, Victoria, B.C., Geoscience Map 2000-3, Sheet 3A.

Monahan, P., V. Levson, P. Henderson, and A. Sy. 2000b. Relative Amplification of Ground Motion Hazard Map, British Columbia Geological Survey, Ministry of Energy and Mines, Victoria, B.C., Geoscience Map 2000-3, Sheet 3B.

Muller, J. 1980. Geology Victoria West of Sixth Meridian, British Columbia, Geological Survey of Canada, Ottawa, ON, Map 1553A.

National Audubon Society. 2002. The Christmas Bird Count Historical Results. Accessed online, December 4, 2009: http://www.audubon.org/bird/cbc.

Nuszdorfer, F.C., Klinka, K., Demarchi, D.A. 1991. Coastal Douglas-fir zone. In Meidinger, Del and Pojar, Jim (Eds). Ecosystems of British Columbia. Prepared for British Columbia Ministry of Forests. Victoria, BC.

Pojar, J., Flynn, S., and Cadrin, C. 2004. Accounts and Measures for Managing Identified Wildlife: Douglas fur/dull Oregon grape account, version 2004. Prepared for: British Columbia Ministry of Forests. Victoria, BC.

Polster Environmental Services Ltd. 2009. Macaulay Point Natural Areas Management Plan. Prepared for Township of Esquimalt, March 2009. Accessed online, December 4, 2009: http://www.esquimalt.ca/files/PDF/Parks_and_Recreation/2009_Macaulay_Point_Natual_Areas_Mgmt_Plans_Report_Mar_2009_FINAL_DRAFT.pdf.

Segger, Martin and Franklin, Douglas. 1996. Exploring Victoria's Architecture. Sono Nis Press. Victoria, BC.

Stantec Consulting Ltd. and Brown and Caldwell. 2009a. Core Area Wastewater Program – Assessment of Wastewater Treatment – Biosolids Management Plan. October 2009, Victoria, BC.

TerraWest Environmental Inc. 2008. Selkirk Recovery Inc. Limited Soil and Groundwater Investigation: Victoria, Nanaimo, and Campbell River, BC. Prepared for Selkirk Recovery Inc. January 14, 2008.

Thorn, J., L. Beijer, and R. Rylander. 2002. Work related symptoms among sewage workers: A nationwide survey in Sweden. Occupational Environmental Medicine 59: 562-566.

Town of Esquimalt. 2007. Official Community Plan. Accessed online, December 4, 2009: http://www.esquimalt.ca/files/PDF/Business_and_Development/OCP_text_2007.pdf.

Township of Esquimalt. 2008. Zoning Bylaw 1992, Bylaw No. 2050, and Parking Bylaw 1992, Bylaw No. 2011. Accessed online, January 4, 2010: http://www.esquimalt.ca/files/PDF/Bylaws/2050_2011_Zoning_ParkingBylaw2008.pdf.

Victoria and Esquimalt Harbours Environmental Action Program (VEHEAP). 2000. Victoria and Esquimalt Harbours Ecological Inventory and Rating - Phase I Intertidal and Backshore – Final Report. Westland Resource Group. Victoria, BC.

Westland Resource Group. 2009a. James Bay-South Esquimalt Investigations for Wastewater Treatment Facilities. Draft. March 2009. Prepared for the Capital Regional District.

Westland Resource Group. 2009b. Land Suitability for an Anaerobic Digester near Victoria Harbour. September 2009. Prepared for the Capital Regional District.

APPENDIX J:
Opinion Letter

Prepared by D.R. Coell and Associates

CONSULTING REPORT OF
PROPOSED MCLAUGHLIN POINT
SEWAGE TREATMENT PLAN
337 VICTORIA VIEW ROAD
VICTORIA, BC

VALUATION DATE

January 18, 2013

PREPARED FOR

City Spaces Consulting

D.R. COELL & ASSOCIATES INC.
REAL ESTATE APPRAISERS & CONSULTANTS
Est. 1974
SUITE 303-1001 CLOVERDALE AVENUE, VICTORIA, B.C. V8X 4C9 PHONE (250) 388-6242 FAX (250) 388-6290
EMAIL drc@drcoell.com WEB PAGE www.drcoell.com

Our File: 6415-VHI-EVR259C

January 18, 2013

City Spaces Consulting
5th Floor, 844 Courtney St.
Victoria, BC V8W 1C4

Attention: Mr. Deane Strongitharm

Dear Mr. Strongitharm:

Re: Proposed McLoughlin Point – Sewage Treatment Plant
337 Victoria View Road, Victoria, BC

In this letter I provide my opinion on the potential market impacts on local residential properties from a proposed sewage treatment plant at the Imperial Oil Bulk Petroleum Storage property at McLoughlin Point.

This opinion is consistent with the Consulting Standard of the Appraisal Institute of Canada 2012 Standards of Professional Appraisal Practice.

Opinion Sought

The scope of this opinion is limited to my investigation and response to the following real estate research questions.

1. *What is the likely impact of the new treatment system on property values in the municipality?*

   In responding to this question, it will be useful to examine benchmarks or local examples involving residential properties in proximity to Capital Regional District sewage pump stations, such as the McCauley Point; Clover Point and the Windsor (Carrie Road) pump stations.

…/2

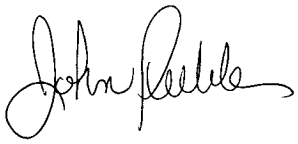
2. *Is there likely to be a significant change (increase) in the value of the land, created as a result of the land being rezoned by the municipality?*

To answer these questions I have investigated available documentary research, developed local case studies, and applied my professional opinion.

Should you wish to discuss my findings and this report please contact me directly.

Yours very truly,

D.R. COELL & ASSOCIATES INC.
Per:



John Peebles, AACI, P.App.
JP/ts

TABLE OF CONTENTS

Section **Page**

SCOPE OF WORK

The principal tasks undertaken in my scope of work are as follows.

- Review of the December 21, 2012 letter of instructions and follow-up email clarifications from the client.
- Review of the technical reports prepared for the proposed sewage treatment plant at McLoughlin Point.
- A literature review concerning valuation of property affected by similar detrimental conditions.
- Identification of case studies in the local market to determine potential property value impacts associated with residential properties in immediate proximity of existing sewage pumping and sewage treatment facilities.
- Evaluation of technical project reports and case studies outcomes to reach findings regarding the potential impacts on residential property values for properties in proximity to the proposed sewage treatment plant at McLoughlin Point.

MCLOUGHLIN POINT PLANT PROJECT CHARACTERISTICS

The proposed project development characteristics are as follows.

Legal Description:	Lots A-E, Section 11, Esquimalt District, Plan 35322
Site Area:	3.4 acres (148,104 ft^2)
Existing Improvements:	Decommissioned bulk petroleum storage site (tanks removed)
Zoning:	I-3 Bulk Petroleum Storage
Proposed Improvements:	Refer to sketch to follow, courtesy of Stantec

LOOKING NE TO PROPOSED PLANT SITE

DRIVEWAY TO RESIDENCE IMMEDIATELY ACROSS FROM PROPOSED PLANT SITE

PLANT SITE ILLUSTRATION FROM WESTLAND-CRD REPORT (STANTEC ENGINEERING)

A series of technical reports have been prepared for the Capital Regional Districts' proposed regional wastewater treatment project. A report entitled *Environmental Impact Study of Core Area Wastewater Treatment Facilities* (Westland-CRD Report) provides an overview of the proposed plant at McLoughlin Point.[1] The proposed plant will consist of a series of above grade and partially below grade buildings housing specialized process equipment and machinery including concrete tanks, clarifiers, aerators, sludge thickening and pumping, a blower building, odour control equipment, heat recovery works, and an administration building.

There are several potential types of terrestrial (land based) impacts associated with the McLoughlin Point project identified in the Westland–CRD Report, as follows.

- Short term construction traffic and noise
- Operational or ongoing traffic, noise, odour, facility lighting, and vibration

[1] Environmental Impact Study of Core Area Wastewater Treatment Facilities, Co-authored by the Westland Resource Group and Capital Regional District, June 2010.

Table 3-7 (page 31) of the Westland-CRD Report indicates a planned construction period of about 2.5 years. Since real estate value trends tend to be more measurable in response to long-term detrimental conditions rather than one-time events or short-term activity, I have focused on the impact of the forecast ongoing operations for the new plant rather than construction activities.

On pages 163 and 169 of the Westland-CRD Report, the proposed odour and vibration (noise) mitigation measures are described as follows.

> *Noise from the treatment facilities will not exceed 45 dB and 55 dB at the edge of the facility footprints at night and day, respectively. Sound attenuation will be installed in the buildings housing noise-generating equipment and on diesel engine exhaust to ensure that decibel levels remained below 45 dB at the property lines. Noise levels will meet the Township of Esquimalt noise control bylaw requirements and WCB-OSHA criteria for worker safety. Noise-generating equipment will be installed in soundproofed rooms to meet these requirements.*
>
> *The facilities will be entirely enclosed, and air will be filtered with advanced odour control and air filtration systems before it is released. This enclosed design will reduce exposure to microbial aerosol releases outside the treatment facilities. The ventilation systems will not be connected to the odour control system in the facility. These ventilation systems will filter air vented from the interior of the facility to the outside.*

On page 94 of the Westland-CRD Report, there is an analysis of ambient odour and the potential impacts of the proposed McLoughlin Plant.

> *The McLoughlin Point site is located near the entrance to the Victoria Harbour, where terrain elevations are modest. Clear evening skies and low winds will result in a temperature inversions and stable atmospheres with low turbulence and hence poor odour dispersion characteristics. Under inversion conditions, the odour plume from a wastewater treatment facility at the McLoughlin Point site will tend to quickly flatten out and brush against nearby elevated surfaces, such as ridges or knolls, resulting in maximum predicted ground-level odour concentration at these locations.*

On page 94 of the Report, the stated design goal for the McLoughlin Point plant is to ensure that the ambient odour guideline of 5 odour units (OU) is *not to be exceeded under the worst-case meteorological conditions*.

On pages 152-153 and page 158 of the Westland-CRD Report is a discussion of the potential vehicle traffic to McLoughlin Point plant site during construction and subsequent plant operations. It is apparent that the frequency of heavy truck and other vehicle traffic to the plant site will be greatest during construction. The specific impact of the anticipated construction traffic transiting through the Town and DND property to the plant site will depend on the frequency of truck traffic, vehicle weight, and principal routes. My preliminary review of the general area indicates that the logical truck will follow arterial roads within Esquimalt and DND lands, bypassing most residential areas with the exception of Lyall Street.

On page 158 of the Report modest traffic volumes are forecast during plant operations with some exceptions during peak morning and afternoon commuting periods for plant employees and periodic (two trips per month) heavy truck trips. The report states the following.

> *…an increase of 12 vph (vehicles per hour) represents a 3% increase in traffic, but it is unlikely that all 12 vehicles will use the same route to and from the facility and it would not have any substantial impact on the capacity of these roads.*

Based on the above, I conclude that the odour and vibration impacts of the proposed facility, if noticeable, are likely to be very localized, within 100 m of the plant site.

METHODOLOGY

In my opinion, the two factors most likely to have a potential impact on residential use in the general area of McLoughlin Point are noise and odour. Another, more intangible category of impact is stigma. Stigma in real estate is associated with the perceptions of buyers and sellers about the uncertainty of impact of detrimental conditions. In this case, technical report(s) may indicate little to no impact on nearby properties from sewage treatment facilities. However, market participants may still associate some element of risk with project outcomes, especially one that has not yet been completed. The level of market risk, usually associated with reduced sales prices or extended days on the market, is the stigma associated with the project.

According to documentary research, there are a number of possible ways to evaluate the impact of potential detrimental conditions on real estate values.[2] Paired sales and re-sales analysis are the most common methodologies.

I have investigated several case studies of sewage treatment and sewage pumping stations near residential properties to determine if the influence of these potentially detrimental uses can be measured in the residential market. A paired sales approach was used comparing properties near or adjacent to the sewage plant to similar properties some distance away. The outcome of these local benchmarks were subsequently compared to the McLoughlin Point project and overall findings reached in response to Question 1.

[2] Randall Bell, *The Impact of Detrimental Conditions on Property Values*, Appraisal Journal, October 1998,

Case 1 - Currie Road Sewage Pumping Station, Oak Bay

LOOKING SOUTH TO PUMP STATION BUILDING ON CURRIE ROAD

Kerr Wood Leidal Consulting Engineers identifies the Currie Road pump station as a 1,200 Litre per second facility constructed in 1992. The pump station is located in a quiet residential neighbourhood in south Oak Bay, immediately across from Windsor Park.[3] The facility architecture was designed to blend in with the surrounding single-family housing with most of the equipment housed below grade.

According to the project engineers) website there was specific measures undertaken to control noise and odour. Noise was controlled by acoustically silencing the generator, pumps and drives, scrubbers and ventilation systems. Odour was abated by a custom designed ventilation and carbon scrubbing systems, and other technical systems.

The project become known to the public in April 1988 after property acquisition had been concluded.

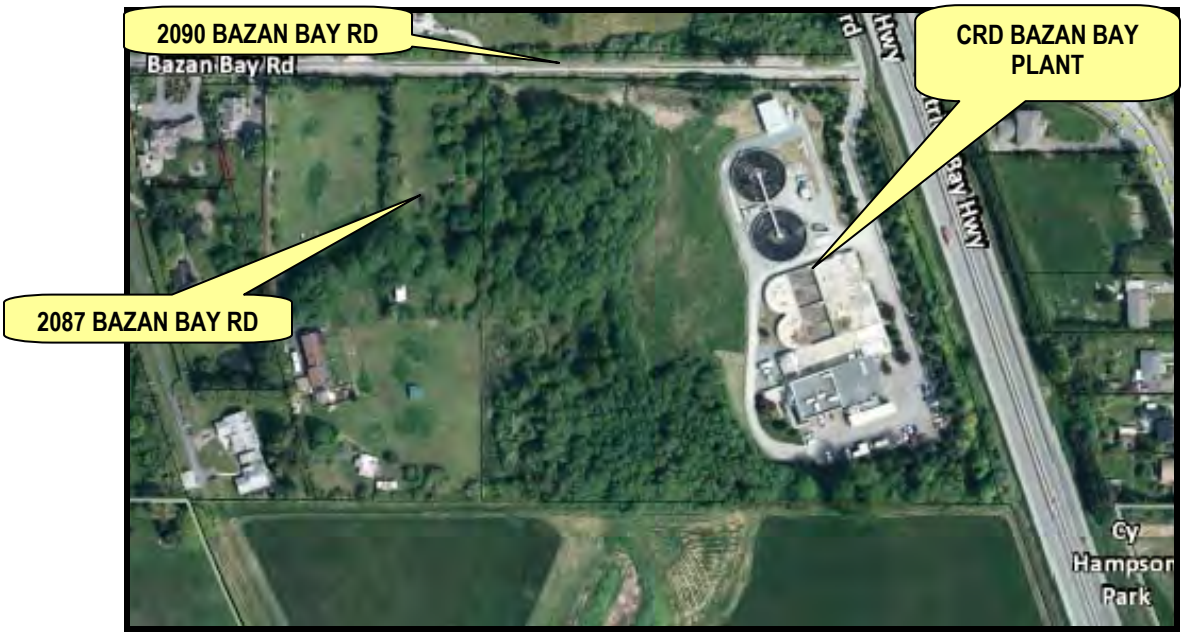
Two properties were acquired by the Capital Regional District to provide the pumping station site: 2431 Currie Road and 2425 Currie Road (pump station). The residence at 2431 Currie Road was subsequently re-sold by the CRD with a restrictive covenant. This property, located immediately east of the pumping station, re-sold in June 1995 for $335,000 and again in March 2010 for $885,000. Both sales were achieved after a very short listing period.

[3] Kerr Wood Leidal Consulting Engineers Project Webpages. http://www.kwl.ca/projects/currie-wastewater-pump-station.

The re-sales of 2431 Currie Road were compared to the re-sales of a residence a short distance to the west, in the next block, 2453 Currie Road. This residence re-sold 4 times from 1995 to 2007 with increases consistent with market trends for Oak Bay over this period. The 2431 Currie Road sales appear consistent with the price trends for 2453 Currie Road, taking into account differences in sale dates, property design, and finished floor area.,

In conclusion, there appears to be no market discount or extended market period associated with properties in the immediate vicinity of the Currie Road sewage pump station.

Case 2 – Bazan Bay Sewage Treatment Plant, North Saanich



CRD NATURAL AREAS ATLAS ORTHO-PHOTO

The Capital Regional District Bazan Bay Waste Water Treatment Plant was announced in 1997 with construction in 1998-1999 and operations commencing in 2000. The plant is located on Bazan Bay Road and serves a local population of about 30,000. Over the years some local residents have complained of odour from the settling ponds and trucks transporting evaporated sludge material (biosolids).[4]

A paired sales analysis was completed for two similar residential properties on Lochside Drive, 8930 and 8520 Lochside Drive. Both properties back onto the Pat Bay Highway. 8930 Lochside Drive is located a short distance east of the treatment plant and is physically separated from the plant by the Pat Bay Highway. It is apparent that any noticeable odour plume from plant would impact this property. The compared property, 8520 Lochside Drive, is located about 1 km further south.

Both properties sold in January 2007 with 8930 Lochside selling for $655,000 and 8930 Lochside selling for $659,000. However, 8930 Lochside required an extended marketing period to achieve a sale, 116 days, versus 8520 Lochside with a short, 8 day marketing period.

4 http://www.northsaanich.ca/Assets/NSaanich/PDF+Files/!+Minutes/Council+Minutes/October+20$!2c+2003.pdf.

Two acreage properties in immediate proximity to the plant are 2087 and 2090 Bazan Bay Road. While the properties were improved with similar size and design, residential dwellings there were some differences in lot size and outbuildings. 2087 Bazan Bay Road sold in September 2001 for $398,000 after 112 days on the market, 2090 Bazan Bay Road sold in November 2011 for $449,000 after 321 days on the market. While an extended marketing period is common for rural acreage properties, the 321 days on the market for 2090 Bazan Bay Road appears beyond the norm.

A property located about ½ km to the south near the corner of Lowe Road and Ebor Terrace, improved with a house similar in size to housing on 2087 Bazan Bay Road, sold in October 2000 for $350,000. When difference in lot size and view between the two properties is considered, there appears to be no measurable impact for 2087 Bazan Bay Road associated with detrimental conditions. This outcome may be partially attributed to two factors: the larger size of the lots relative to nearby conventional residential lots and the vegetative (forest) screen on both properties providing visual separation between the settling ponds and plant, and the residences.

In conclusion, there appears to be no measurable market discount associated with properties in the immediate vicinity of the Bazan Bay sewage treatment plant. However, it is possible that an extended marketing period was required to achieve sales of properties in the immediate vicinity of the plant. It is also likely that the impact of this operation on immediately adjacent properties would have been more significant in the absence of a vegetative screen and large acreage buffer.

Case 3 – Clover Point Sewage Pumping Station

CRD ORTHO-PHOTO OF CLOVER POINT

SOUTH ELEVATION OF CLOVER POINT PLANT

A series of sewage outfalls at Clover Point have been in continuous operation for about 115 years.[5]

In 1975 the Capital Regional District (CRD) constructed the Clover Point wastewater pumping station and related outfall in to deal with the need for increased capacity and environmental and odour issues associated with the existing legacy brick outfall. The facility serves the City of Victoria, Oak Bay, and Saanich East.

The sewage pumping station is located largely below grade of Dallas Road in a grassed over hillside with the sewage discharge outfall extending 1.1 km offshore. The only visible elements are the south elevation of the structure facing Clover Point. The facility was upgraded in 2003 with UV odour mitigation added to the carbon air filter scrubbers. The Clover Point pump station and outfall is one of two regional outfalls for Greater Victoria.

Residential properties on Dallas Road are physically separated from the Clover Point sewage treatment and pumping facility by Dallas Road. However, a number of properties are within close proximity of the plant vents, including 1350 Dallas Road. This 2,250 ft^2 Art Deco southern exposure property sold in August 2004 for $740,000 after 57 days on the market. A somewhat larger property at 1234 Dallas Road with 2,600 ft^2 of finished area sold for $640,000 in June 2003. This property is located about ½ km west of the Clover Point plant, well away from any potential odour issues.

[5] Beacon Hill Park History. http://www.beaconhillparkhistory.org/contents/appendix_C.htm

After accounting for market movement between June 2003 and August 2004, the two properties appear to have achieved similar sale prices

A similar value relationship was identified for two 2011 sales of Dallas Road residential properties, 1308 and 1244 Dallas Road. 1308 Dallas Road, located 117 m west of the Clover Point plant, sold in January 2011 for $976,000. This property was improved with a heritage era 3,276 ft^2 residence. 1244 Dallas Road, located about ½ km west of the Clover Point plant, sold in January 2011 for $970,000. This property was improved with a heritage era 3,839 ft^2 residence.

These two properties have similar market appeal and appear to have achieved very similar sale prices with similar days exposed to the market.

In conclusion, there appears to be no market discount associated with properties in the immediate vicinity of the Clover Point sewage plant and outfall.

MCLOUGHLIN POINT PLANT REAL ESTATE IMPACTS

The preceding case studies indicate that the real estate impacts, if any, associated with sewage treatment plants and pumping stations are highly localized. While the Bazan Bay treatment plant has the potential for the greatest impact on real estate values due the nature of the open pond treatment and size of the operations, it was difficult to observe a specific impact. It appears that a combination of factors such as new odour reducing technology, adjacent large acreage lots to create a buffer, and vegetative screening were factors mitigating any potential impacts.

The main issue arising in one of the case studies was an extended marketing period for property immediately adjacent to the treatment plant, possibly linked to some uncertainty about long-term impacts.

However, the local market does not appear to measurably discount properties in immediate proximity to treatment plants that are well designed with minimal odour and noise emissions.

There are DND married quarters (detached & semi-detached housing) located ± 240 m west of the proposed McLoughlin Point plant. Other DND housing is located ± 230 m to the north on Victoria View Road and ± 386 m to the west on Thomas Road.

Two isolated DND dwellings are located at McLoughlin Point, about 50 m W of the proposed plant site. There may be some stigma or negative market perceptions associated with the close proximity of two residences to the proposed plant site. However, these perceptions are likely no greater and possibly less than the market response to residential property located near a large Bulk Petroleum Storage facility, the former heavy industrial use of the property.

DND housing is located on Crown land and does not trade in the local residential market. However, assuming this housing was located on non-DND lands, it is likely that the detrimental impacts from the proposed McLoughlin Point plant, if designed and operated according to the specifications in the CRD-Westland Report, will have minimal to no impact on real estate values.

MARKET VALUE OF THE IMPERIAL OIL PROPERTY – MCLOUGHLIN POINT

The market value of this property has been estimated by our firm for the property owner and Capital Regional District on a number of occasions.

The appropriate real estate valuation techniques and related selection of market information is founded on the principle of highest and best use, or most profitable and probable use that a property can be developed and used. In this case, we have concluded that the highest and best use is a military – institutional use consistent with the adjoining DND lands.

The value of special purpose property, including land required for institutional use, such as a wastewater treatment plant, is typically associated with the value of the adjoining lands. This principle is based on the premise that a purchaser/developer of the property would need to acquire and assemble similar lands to achieve the special purpose property use, assuming land-use approval could be obtained.

Based on the preceding it is unlikely that the subject property market value would change materially upon rezoning to permit the proposed wastewater treatment plant use.

SUMMARY OF FINDINGS

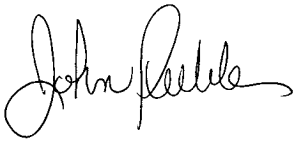
1. It is likely that the McLoughlin Point plant, if designed and operated according to the specifications in the CRD-Westland Report, will have minimal to no impact on local real estate values.

2. The market value of the McLoughlin Point lands will likely remain unchanged as a result of a change in land-use zoning to permit the proposed regional wastewater treatment use.

CONSULTANTS' CERTIFICATION

I certify that, to the best of my knowledge and belief that:

- The statements of fact contained in this report are true and correct;
- The reported analyses, opinions, and conclusions are limited only by the reported assumptions and limiting conditions, and are my personal, unbiased professional analyses, opinions and conclusions;
- I have no present or prospective interest in the property that is the subject of this report, and no personal interest with respect to the parties involved;
- I have no bias with respect to the property that is the subject of this report or to the parties involved with this assignment;
- My engagement in and compensation for this assignment was not contingent on an action or event resulting from the analysis, opinions or conclusions in, or the use of, this report;
- My analyses, opinions, and conclusions were developed, and this report has been prepared in conformity with the Canadian Uniform Standards of Professional Appraisal Practice;
- I have the knowledge and experience to complete the assignment competently;
- No one provided significant professional assistance to the persons signing this report;
- As of the date of this report, the undersigned has fulfilled the requirements of the Appraisal Institute of Canada Continuing Professional Development Program for designated members;
- I inspected the subject property at McLoughlin Point on January 15, 2013.



Dated this 18th day of January 2013

John Peebles, AACI, P.App

CITY SPACES

Suite 585, 1111 West Hastings Street, Vancouver BC V6E 2J3 | 604.687.2281
5th Floor, 844 Courtney Street, Victoria BC V8W 1C4 | 250.383.0304
Suite 300, 160 Quarry Park Boulevard SE, Calgary AB T2C 3G3 | 403.336.2468

www.cityspaces.ca