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**PERFORMANCE VERIFICATION PLAN  
ON-PROPERTY RESIDUAL CONTAMINATION ASSOCIATED WITH  
FORMER SERVICE STATION (SITE IDENTIFICATION NO.: 1228)  
2002 MARINE DRIVE**

**NORTH VANCOUVER, BC**

**February, 2014  
SLR Project No.: 201.88489.00001**



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Prepared by  
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28 February 2014

Prepared by:

A handwritten signature in black ink, appearing to read "Barbara Glijer". The signature is written in a cursive, flowing style.

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**CONFIDENTIAL**

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1 copy – BC MOE  
1 copy – SLR Consulting (Canada) Ltd.

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## 1.0 INTRODUCTION

SLR Consulting (Canada) Ltd. (SLR) on behalf of Pacific Gate Investments Ltd. (Pacific Gate) prepared this Performance Verification Plan (PVP) for a former Esso service station located at 2002 Marine Drive, North Vancouver, BC (the “site”).

This PVP was prepared to address residual contamination at the site in excess of Contaminated Sites Regulation (CSR) numerical standards associated with the former service station in support of an application for a risk-based Certificate of Compliance (CoC) for the site. It presents risk management measures to be implemented for the site to ensure that the CoC remains valid. This report was prepared in accordance with the BC Ministry of Environment (MOE) Procedure 12: *Procedures for Preparing and Issuing Contaminated Sites Legal Instruments* (MOE, 2012).

## 2.0 BACKGROUND

The Updated Risk Assessment for the site was completed by SLR in January 2014 to estimate potential risk to human and ecological health from the residual contamination associated with the former service station. Receptors of concern and exposure scenarios quantified at the site included:

- Residents (includes on-site residents, visitors, trespassers) – adult, teenager, child, toddler, infant; and
- Construction Workers (e.g. construction workers, utility workers, consultants) – adult.

Adjoining properties to the north, east, south and west of the site may contain commercial workers. As such, commercial workers (e.g., store clerks, hotel workers, and potential future landscape workers) were considered as potential receptors of concern in the risk assessment.

The results of the Updated Risk Assessment indicated unacceptable risk to future residential receptors from exposure to benzo(a)pyrene, which was identified as a COPC in groundwater, as a result of dermal contact while bathing.

Results of the Updated Risk Assessment indicated no need for quantification of exposure of terrestrial or aquatic receptors on the basis that no complete/operable soil or groundwater-to-surface water exposure pathways for ecological receptors to come into contact with COPCs were identified.

## 3.0 REQUIRED RISK CONTROLS

The required risk controls to manage risk identified in the risk assessment included the following

- A minimum of 1 m soil barrier above contaminated soil or a two-level parking garage of a high density residential unit that will cover the entire site to a depth of approximately 6 m below grade.
- No trench work will be conducted at depths greater than 3.0 m below grade.
- The groundwater must not be used as a source of potable water.

#### 4.0 REQUIRED ACTIONS TO IMPLEMENT THE REQUIRED RISK CONTROLS

Consideration of future land use at the site and the results of the Updated Risk Assessment (SLR, 2014), the following actions to implement risk controls are required and will be the responsibility of the site owner:

1. Inclusion of an advisory (as item (a) in clause 2 of Schedule B of any Certificate of Compliance issued for the site) that “ a minimum of 1 m soil barrier above contaminated soil or a two level parking garage of a high-density residential unit that will cover the entire site to a depth of approximately 6 m below grade.

The current site owner to notify the purchaser (and purchaser, if the site is sold, will agree to take such contractual steps as are necessary to ensure any subsequent purchaser is notified) of this PVP requirement as per the terms of the Sale Agreement. No associated inspection, monitoring/maintenance or other performance verification actions are required.

Notification to the Director is required if the subject of this advisory is breached. That obligation to notify the Director will be the responsibility of the current site owner. This requirement will be incorporated into the terms and conditions of the Sale Agreement. Pursuant to the Sale Agreement, current site owner will require the purchaser to ensure these requirements are contractually conveyed to future owners. The listing of the risk management measure in Schedule B of the CoC meets this requirement.

2. Inclusion of an advisory (as item (b) in clause 2 of Schedule B of any Certificate of Compliance issued for the site) that “No trench work will be conducted at depths greater than 3.0 m below grade”.

Pursuant to the Sale Agreement, the current site owner to notify the purchaser (and purchaser, if the property is sold, will agree to take such contractual steps as are necessary to ensure any subsequent purchaser are notified) of this PVP requirement. No associated inspection, monitoring/maintenance or other performance verification actions are required.

Notification to the Director is required if the subject of this advisory is breached. That obligation to notify the Director will be the responsibility of the current site owner. The Agreement will provide that this requirement will be incorporated into the terms and conditions of the Sale Agreement of this site. The listing of the risk management measure in Schedule B of the CoC meets this requirement.

3. Inclusion of an advisory (as item (c) in clause 2 of Schedule B of any Certificate of Compliance issued for the site) that “The groundwater must not be used as a source of potable water.

Pursuant to the Sale Agreement, the current site owner to notify the purchaser (and purchaser, if the property is sold, will agree to take such contractual steps as are necessary to ensure any subsequent purchaser are notified) of this PVP requirement. No associated inspection, monitoring/maintenance or other performance verification actions are required.

Notification to the Director is required if the subject of this advisory is breached. That obligation to notify the Director is the responsibility of the current site owner. The agreement will provide that this requirement will be incorporated into the terms and conditions of any sale agreement

for this site. The listing of the risk management measure in Schedule B of the CoC meets this requirement.

In summary, it is our opinion that the advisories listed in Schedule B of the CoC are sufficient to ensure performance verification of the risk management measures required for this site.

## **5.0 SUMMARY RATIONALE FOR SELECTING REQUIRED PVP ELEMENTS**

The site is classified as a Risk-Based Remediation Type 2 Site on the basis that risk management measures are required for the site, but failure of risk management measures will not result in the imminent exposure of site contaminants to humans, or discharge of contaminant to the aquatic receiving environment at concentrations above BC water quality guidelines, or imminent exposure of contaminants to terrestrial ecological receptors at levels above site-specific risk-based concentrations, or contaminant spreading at concentrations above upper cap concentrations.

The risk assessment was performed assuming that a high-density residential structure with two-levels of underground parking to a depth of approximately 6 m below grade will be constructed over the entire site or 1 m soil barrier will be maintained at the site. To assure that the assumptions of risk assessment will remain valid, these conditions were included as a risk management measures in Schedule B of the CoC.

As part of the risk assessment conducted at the site it has been assumed that utility workers will not conduct intrusive activities at depths greater than 3 mbg. To assure that this assumption of risk assessment will remain valid, this condition was included as a risk management measure in Schedule B of the CoC.

As discussed previously, the incremental life cancer risk (ILCR) derived for future residential receptor from potential dermal contact of benzo(a)pyrene measured at 0.05 µg/L in groundwater (i.e., used as a potable water source) exceeded the CSR risk-based standard of 1E-05. Based on the benzo(a)pyrene risk estimate in excess of the CSR risk-based standard for the residential receptor exposure via dermal contact, protection of a the residential receptor by restricting the installation of a potable water well on the site was included as a risk management measure in Schedule B of the CoC.

## **6.0 RECORD KEEPING**

Up-to-date records of the above performance verification monitoring actions and results should be maintained by the site owner and must be provided to the BC MoE if requested by a Director designated under the Environmental Management Act.

Examples of the records to be kept on file include:

- Record/report documenting an event subject to PVP requirement such as conducting intrusive activity at the site that involves excavation of soil greater than 8 m. At a minimum, the start and end dates of the event and the type of activities performed should be recorded, and health and safety procedures, if any, implemented during subsurface work should be specified.
- Notification on file when a condition of the PVP has been breached.
- Notification on file when and records related to when a breached condition has been rectified.

- Records, including copies of, communication with the site owner/operator related to performance verification actions undertaken for the site.
- Records of any notification provided to the Director and any subsequent communication received from the Director related to a breach of a performance verification action.

## 7.0 REFERENCES

MOE. 2013. British Columbia Ministry of the Environment. Procedure 12: Procedures for Preparing and Issuing Contaminated Sites Legal Instruments. April, 2013. Version 1.0.

SLR, 2014. Updated Risk Assessment for 2002 Marine Drive, North Vancouver, BC (Site Identification No.: 1228). SLR Consulting (Canada) Ltd. January 2014.

## 8.0 STATEMENT OF LIMITATIONS

This report has been prepared and the work referred to in this report has been undertaken by SLR for Pacific Gate Investments Ltd. (Pacific Gate). It is intended for the sole and exclusive use of Pacific Gate and its authorized agents for the purpose(s) set out in this report. Any use of, reliance on or decision made based on this report by any person other than Pacific Gate for any purpose, or by Pacific Gate for a purpose other than the purpose(s) set out in this report, is the sole responsibility of such other person or Pacific Gate. Pacific Gate and SLR make no representation or warranty to any other person with regard to this report and the work referred to in this report and they accept no duty of care to any other person or any liability or responsibility whatsoever for any losses, expenses, damages, fines, penalties or other harm that may be suffered or incurred by any other person as a result of the use of, reliance on, any decision made or any action taken based on this report or the work referred to in this report.

The investigation undertaken by SLR on which this report was based and any conclusions or recommendations made in this report reflect SLR's judgment based on the site conditions observed at the time of the site inspection on the date(s) set out in this report, on information available at the time of preparation of this report, on the interpretation of data collected from the field investigation, and on the results of laboratory analyses, which were limited to the quantification in select samples of those substances specifically identified in this report.

This report has been prepared for specific application to this site and it is based, in part upon visual observation of the site, subsurface investigation at discrete locations and depths, and specific analysis of specific chemical parameters and materials during a specific time interval, all as described in this report.

Unless otherwise stated, the findings cannot be extended to previous or future site conditions, portions of the site which were unavailable for direct investigation, subsurface locations which were not investigated directly, or chemical parameters, materials or analysis which were not addressed. Substances other than those addressed by the investigation described in this report may exist within the site; substances addressed by the investigation may exist in areas of the site not investigated; and concentrations of substances addressed which are different than those reported may exist in areas other than the locations from which samples were taken. SLR expresses no warranty with respect to the accuracy of the laboratory analyses, methodologies used, or presentation of analytical results by the laboratory. Actual concentrations of the substances identified in the samples submitted may vary according to the extraction and testing procedures used.

As the evaluation and conclusions reported herein do not preclude the existence of other chemical compounds or that variations of conditions within the site may be possible, this report should be used for informational purposes only and should absolutely not be construed as a comprehensive hydrogeological or chemical characterization of the site. If site conditions change or if any additional information becomes available at a future date, modifications to the findings, conclusions and recommendations in this report may be necessary.

Nothing in this report is intended to constitute or provide a legal opinion. SLR makes no representation as to the requirements of or compliance with environmental laws, rules, regulations or policies established by federal, provincial or local government bodies. Revisions to the regulatory standards referred to in this report may be expected over time. As a result, modifications to the findings, conclusions and recommendations in this report may be necessary.

Other than by Pacific Gate and as set out herein, copying or distribution of this report or use of or reliance on the information contained herein, in whole or in part, is not permitted without the express written permission of SLR. Copying of this report is not permitted without the written permission of Pacific Gate and SLR.

Pacific Gate may submit this report to the British Columbia Ministry of Environment and/or related British Columbia environmental regulatory authorities or persons for review and comment purposes. The BC MOE may rely on the information contained in this report in the decision making process regarding the Pacific Gate site, as described in this report.

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Waste Management



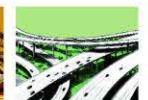
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