SLR Consulting (Canada) Ltd.
200-1620 West 8th Avenue, Vancouver, BC V6J 1V4

July 8, 2021

Mr. Jason Shupe
Western Cleanwood Preservers LP
9815 Robson Road
Surrey, BC V3V 2R9

SLR Project No.: 201.88819.00004

Dear Mr. Shupe,

RE: Stormwater Pollution Prevention Plan Update for Infrastructure Demolition at Western Cleanwood Preservers LP, 9815 Robson Road, Surrey, BC

The purpose of this Stormwater Pollution Prevention Plan (SPPP) Update is to address potential stormwater quality-related issues and stormwater management practices during upcoming demolition and removal work at Western Cleanwood Preserves LP (Western Cleanwood), 9815 Robson Road, Surrey, BC (the site). Demolition and removal of existing, aboveground site infrastructure (buildings and equipment) is expected to be completed in August and September 2021.

A site-specific plan detailing stormwater management needs and strategies is summarized in the *Western Cleanwood Preservers LP Stormwater Pollution Prevention Plan* (enclosed at the end of this letter). The following sections outline additional site activities, associated materials, potential pollutants and stormwater management strategies to be considered and followed in conjunction with the existing site SPPP during the planned demolition and building removal activities.

OVERVIEW

The site is an industrial property, located on land leased from the Vancouver Fraser Port Authority (VFPA), which operated as a wood-preserving plant for over 40 years. In 2020, operations (including select primary and secondary activities, as described in the site SPPP) were deactivated and facility decommissioning was initiated.

The site currently includes a two-story office building and several single-story enclosed or partially enclosed covered operations structures, as well as an on-site water treatment facility. The area around the buildings was formerly used for surface car parking, raw materials storage and the processing, storage and shipping of treated wood products. The site is largely paved (operational areas and associated downgradient areas are completely paved), with limited vegetation along the south, east and west property boundaries. The site is self-contained and during operations precipitation and associated runoff was captured for re-use.

SITE INVENTORY

ACTIVITIES AND MATERIALS

The site SPPP outlines primary and secondary activities, as well as associated materials and/ or substances, that took place, continue to take place or may take place at the site. Primary activities refer to tasks

undertaken on a daily or near-daily basis and secondary activities refer to regularly conducted, although less frequent, tasks.

Additional primary and secondary activities that may be undertaken during demolition and building removal activities are outlined in Table A below, and additional materials and/ or substances associated with these activities that could be recognized as potential pollutants are outlined in Table B.

Table A: Primary and Secondary Activities

Activity Type	Activity	Frequency of Occurrence
Primary	Demolition of site buildings	High
Primary	Loading and transport of equipment and demolition waste materials off-site	High

Table B: Primary and Secondary Activity Materials (Potential Pollutants)

Material Type	Materials	Quantities	Months Consumed
Primary	Demolition waste (including concrete, wood, metal, insulation, paint, soil/dust, hazardous materials, etc.)	>10,0000 kgs	Summer and Fall

STORMWATER MANAGEMENT INFRASTRUCTURE

Existing stormwater management infrastructure at the site includes:

- Approximately 540 linear metres of concrete/asphalt berm and 205 m of earth berm, as well as site sloping, to prevent off-site flow and direct stormwater runoff to the sump in the northeast corner of the site;
- A catch basin and sump in the northeast corner of the property, where stormwater runoff is collected and pumped to stored on the west side of the property;
- Three stormwater storage tanks located on the west side of property, where water is stored for processing, treatment and discharge. Depending on the water volume collected, the water may be transported offsite for appropriate disposal.

The existing stormwater management infrastructure will be maintained throughout the demolition and removal of site buildings and equipment. Throughout the work, electrical power will be supplied to the sump and filtration system pump via a generator, as needed. Collected stormwater will continue to be stored in the on-site storage tanks and will be discharged to the Metro Vancouver sanitary sewer system following laboratory analysis (as per the site's Metro Vancouver permit, included in the site SPPP) during site demolition or depending on the volume may be transported offsite for appropriate disposal.

Water collected on the rooves of the four main operations buildings was previously reported to drain directly to the municipal storm sewer. Following the removal of these buildings, stormwater will be directed overland via site sloping and the containment berms to the northeast corner. Following the methodology outlined in

the site SPPP, the revised minimum berm height requirements for the "Remaining Site Area" catchment area for a common water quality event, common storm drainage event and extreme storm drainage event are shown in Table C below.

Table C: Estimated Peak Flow Rates, Total Runoff Volumes and Minimum Required Berm Heights

Sub-catchment Area	Total Area (m^2)	Storm Event	Peak Flow Rate* (L/s)	Total Runoff Volume (L)	Minimum Berm Height Required (m)
Remaining Site Area	35,450	Common Water Quality Event (24-hour event)	21	1,649,061	0.13
		Common Storm Drainage Event (5-minute duration, 10-year return period)	717	189,018	0.03
		Extreme Storm Drainage Event (2-hour duration, 100-year return period)	195	1,149,719	0.17

** Updated rainfall intensity and climate change projections (assuming moderate climate change for the 2050-time horizon) were applied to these calculations, as per the 2018 Study of the Impacts of Climate Change on Precipitation and Stormwater Management, prepared by GHD for the Great Vancouver Sewerage and Drainage District (Metro Vancouver).*

The height of the berm along the east site boundary currently ranges from 0.17 m to 0.82 m in the northeast corner, therefore leaving considerable freeboard. In conclusion, the berm along the east property boundary, the sump and the storage system will still be sufficient for handling the common and extreme storm drainage events expected for the site.

ISSUES IDENTIFICATION AND RISK ANALYSIS

During the demolition and removal process, an additional potential pollutant source and issue is presented by the demolition waste. Demolition waste and dust could settle around and within the demolition area, and ultimately impact stormwater runoff.

The potential issue will be mitigated by removing waste for disposal from the site immediately and through, placement of material into trucks and bins for offsite disposal and general housekeeping (sweeping) practices. Existing site stormwater infrastructure will otherwise prevent off-site travel of impacted runoff.

MANAGEMENT STRATEGY

Strategies outlined in the site SPPP for the prevention of pollution related to stormwater runoff will be maintained throughout the demolition and removal work. In particular:

- Outdoor work and storage areas will be inspected by the SPPP Manager, and maintained and cleaned of debris, garbage and pollutant sources, as needed;
- Stormwater collection infrastructure will be monitored and inspected routinely by the SPPP Manager, and cleared of debris and build-up as needed;

- Equipment, vehicles and other on-site systems used during the demolition process, as well as any fuel or hazardous waste containers, will be regularly inspected, maintained and, if needed, repaired in a timely manner;
- Fuels and hazardous wastes will be handled with extreme care. Staff will be trained in spill response and equipped with spill kits for prompt clean-up in the event of a spill or other emergency; and,
- Paved site surfaces will be inspected by the SPPP Manager and maintained (as needed) to verify site surface is intact.

Similarly, steps for containment/ reduction discussed in the site SPPP will also be maintained. In particular:

- Wastes will be disposed of regularly; and,
- Fueling should occur in the same general area, and that area should be contained (has secondary containment) and equipped with spill kits.

Where measures to prevent contract between pollutants and rainwater runoff are not feasible or do not provide complete protection, treatment will be used as a final attempt at mitigation. Stormwater runoff will be collected and filtered prior to discharge to the Metro Vancouver municipal sanitary sewer or transported offsite for appropriate disposal.

IMPLEMENTATION AND MONITORING

During the demolition and removal work, stormwater management, containment, reduction and treatment strategies will be implemented by:

SPPP Manager: Jason Shupe, Property Manager

Cell Number: 604-864-7724

Storm events will continue to be documented and tracked, and regular inspections of the stormwater infrastructure will be completed to evaluate performance.

Site staff will be trained on the contents of this SPPP Update and to recognize signs of stormwater pollution and stormwater infrastructure failure. In the event that stormwater pollution or off-site travel are identified, staff will report the issues to the SPPP Manager for further investigation.

STATEMENT OF LIMITATIONS

This report has been prepared and the work referred to in this report has been undertaken by SLR Consulting (Canada) Ltd. (SLR) for Western Cleanwood Preservers LP, hereafter referred to as the “Client”. It is intended for the sole and exclusive use of Western Cleanwood Preservers LP. This report has been prepared in accordance with the Scope of Work and agreement between SLR and the Client. Other than by the Client 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 unless payment for the work has been made in full and express written permission has been obtained from SLR.

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Yours sincerely,
SLR Consulting (Canada) Ltd.

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Enc Western Cleanwood Preservers LP Stormwater Pollution Prevention Plan

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global environmental solutions

9815 Robson Road
Surrey, BC

Stormwater Pollution Prevention Plan

Western Cleanwood Preservers LP

September 2018
SLR Project No.: 201.88819.00000

WESTERN CLEANWOOD PRESERVERS LP

STORMWATER POLLUTION PREVENTION PLAN

9815 ROBSON ROAD

SURREY, BRITISH COLUMBIA

SLR Project No.: 201.88819.00000

Prepared by
SLR Consulting (Canada) Ltd.
200 – 1620 West 8th Avenue
Vancouver, BC V6J 1V4

for

WESTERN CLEANWOOD PRESERVERS LP
9815 ROBSON ROAD
SURREY, BC V3V 2R9

September 13, 2018

Prepared by:

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CONFIDENTIAL

Distribution: 1 electronic copy – Western Cleanwood Preservers LP
1 electronic copy – Vancouver Fraser Port Authority
1 copy – SLR Consulting (Canada) Ltd.

ACRONYMS

ACQ	Alkaline Copper Quaternary
AST	Aboveground Storage Tank
CCA	Chromate Copper Arsenate
CEPA	Canada Environmental Protection Plan
HWR	Hazardous Waste Regulation
IBC	Intermediate Bulk Container
IDF	Intensity-Duration-Frequency
m	Metre
MCA	Micronized Copper Azole
MOE	BC Ministry of Environment
SLR	SLR Consulting (Canada) Ltd.
SPPP	Stormwater Pollution Prevention Plan
VFPA	Vancouver Fraser Port Authority

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1.0 PURPOSE

The purpose of this Stormwater Pollution Prevention Plan (SPPP) is to address stormwater quality-related issues at Western Cleanwood Preservers LP (Western Cleanwood), located at 9815 Robson Road, Surrey, BC (the site). As per the SPPP guidelines provided by the Vancouver Fraser Port Authority (VFPA), this plan includes an assessment of on-site activities and potential pollutants, an analysis of associated issues and risks, a detailed management strategy and a review of implementation and monitoring requirements.

Stormwater is water resulting from precipitation events, including rain, snow and ice melt. Water collected from these events ultimately either ponds on the ground surface, evaporates, infiltrates through pervious surfaces or travels over impervious surfaces as runoff until it reaches a nearby body of water. Stormwater runoff has the potential to accumulate debris, soils and sediment, and other contaminants as it flows over ground surfaces, which could negatively impact water quality.

2.0 OVERVIEW

2.1 Background

The site is an industrial property which has been operating as a wood-preserving plant for over 40 years. It is located on land leased from the VFPA and situated in a predominantly industrial land use area. The site is located west of Robson Road and north of Elevator Road, and is bounded to the north and west by the Fraser Surrey Docks property, also owned and operated by the VFPA.

The site includes a two-story office building and several single-story enclosed or partially enclosed covered operations structures, as well as an on-site water treatment facility and three active wood-treatment chambers (pressure vessels). Since the site began operations, chromate copper arsenate (CCA) has been used in the treatment chambers as a preserving agent. Since 2005, however, the volumes of CCA used on site have decreased as other preserving compounds have been introduced. Currently, the treatment chambers are operating processes which include the use of chromated copper arsenate (CCA), alkaline copper quaternary (ACQ), borate solution and micronized copper azole (MCA).

The area around the buildings is used for surface car parking, raw materials storage and the processing, storage and shipping of treated wood products. The site is largely paved, with limited vegetation along the south, east and west property boundaries. The site has an area of approximately 4.23 hectares (10.45 acres).

The location of the site, including surrounding properties, features and land use, are shown on Drawings 1 and 2. Existing stormwater infrastructure on-site and servicing the site are shown on Drawing 3.

3.0 SITE INVENTORY

3.1 Activities

The principal function of the site is to treat and preserve wood products. The activities associated with this work have been broken into primary and secondary activities and are detailed in the following sections.

Primary activities refer to tasks that are undertaken on a daily or near-daily basis and serve the principal function of the site. Secondary activities refer to tasks that are still conducted regularly, but occur less frequently than primary activities and are conducted in support of site operations.

3.1.1 Primary Activities

Primary activities undertaken at the site, including frequency of occurrence, are detailed in Table 1 below.

Table 1: Primary Activities

Primary Activity	Frequency of Occurrence
Chemical preservation and treatment of wood	High
Covering/ wrapping finished products for protection during storage/ transport	High
Handling and storage of raw materials and finished products	High
Receiving and shipping (via transport truck) of raw materials and finished products	High

3.1.2 Secondary Activities

Secondary activities undertaken at the site, including frequency of occurrence, are detailed in Table 2 below.

Table 2: Secondary Activities

Secondary Activity	Frequency of Occurrence
Fuelling of equipment and vehicles	Medium
Routine servicing of equipment and on-site facilities	Low/Medium
Collection, re-use, filtration and/or discharge of stormwater runoff and process water used in site operations	Low/Medium (seasonal)
Occasional repair and maintenance activities (ie. cleaning, painting, etc.)	Low
Storage of process chemicals and waste from site operations (hazardous and non-hazardous wastes)	Low

3.2 Materials

Materials and/or substances associated with primary and secondary site activities that are recognized as potential pollutants are summarized in the following sections.

3.2.1 Primary Activities

Materials and/or substances associated with primary activities conducted on-site have been detailed in Table 3 below.

Table 3: Primary Activity Materials (Potential Pollutants)

Materials	Quantities	Months Consumed
Wood preservation and treatment chemicals used in operations, including: • CCA • ACQ • Borate Solution • MCA	>10,000 Litres (L)	All year
Chemically-treated wood products (see wood preservation and treatment chemicals listed above)	>10,000 kgs	All year
Hydrocarbons, hydraulic oil and coolants from motor vehicles and motorized equipment	<10,000 L	All year

Chemicals used in the treatment process are stored indoors in ASTs.

Once dry, the treated wood products are packaged, wrapped and stored in various covered and uncovered storage areas across the site, pending transport offsite. The products are elevated above-ground to prevent surface contact and stacked.

3.2.2 Secondary Activities

Materials and/ or substances associated with secondary activities conducted on-site have been detailed in Table 4 below.

Table 4: Secondary Activity Materials (Potential Pollutants)

Materials	Quantities	Months Consumed
Bulk fuels (gasoline and diesel) stored in and accessed from two on-site above-ground storage tanks (ASTs)	>10,000 L	All year
Collected stormwater	>10,000 L	Varies*
Solid waste including garbage, refuse and operations by-products	>10,000 kgs	All year
Waste stored on-site prior to disposal including used treatment chemicals and hydraulic oil	1,000 L	All year

**While process water is collected and reused year round, stormwater is seasonal with higher volumes collected, stored, used and/or discharged in the winter months.*

Gasoline and diesel bulk fuels are stored on-site in two elevated, steel ASTs, located along the west property boundary. The ASTs are housed within a covered, concrete-walled secondary containment area. Both tanks have been registered with Environment and Climate Change Canada (ECCC). Operations and maintenance of, and all other works relating to, the ASTs shall meet the *Canadian Environmental Protection Act* (CEPA) Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations and Canadian Council of Ministers of the Environment (CCME) Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products.

Collected stormwater is stored in two vertical ASTs prior to treatment and/or discharge.

3.3 Hydrologic Assessment

The stormwater containment system installed, maintained and monitored at the site is in line with the risk management plan for the property as agreed by the VFPA and Western Cleanwood.

3.3.1 Stormwater Management Infrastructure

3.3.1.1 *SLR Consulting (Canada) Ltd. Berm Condition Assessment, September 2018*

In May 2018, SLR Consulting (Canada) Ltd. completed a condition assessment of the stormwater containment berms at Western Cleanwood. The purpose of this assessment was to evaluate the status and performance of the stormwater containment berms at the site, and to identify locations in need of repair or maintenance or areas requiring containment installation.

Two berm types were identified at the site: concrete berms/ walls and earth berms. The full perimeter of the site is approximately 900 m. The total approximate lengths of the berms around the site perimeter, based on berm type, are detailed in Table 5 below.

Table 5: Total Length of Berms

Containment Type	Total Length of Perimeter
Concrete Berm/ Wall	540 m
Earth Berm	205 m
None	155 m

The concrete berms were consistently measured to be a height of at least 0.17 m. The concrete walls in the northeast corner of the site (the sump area) ranged in height from 0.53 m to 0.82 m (Concrete Wall 1) and from 0.43 m to 0.49 m (Concrete Wall 2). The earth berms along the site's west and south perimeters ranged in height from 0.15 m to greater than 2 m (approximately).

In response to the field observations made during the condition assessment, SLR returned to site in June 2018 to remove debris and vegetation from along the concrete berms to improve berm performance. Works to install containment infrastructure, as either concrete berms or concrete speed bumps, were scheduled by Western Cleanwood for the areas in need of increased containment or repair.

Final recommendations included:

- Conduct regular future cleaning/ maintenance activities of the concrete berms to prevent build-up and overgrowth;
- Perform maintenance on sections of the earth berm area along the western site perimeter where the berm has been washed out and extend the earth berm along the western perimeter where the berm tapers out (between the AST containment area and the southwest corner, minimum berm height of 0.17 m); and
- Repair significant berm and asphalt cracking as needed.

A copy of the assessment has been included in Appendix E.

3.3.1.2 *Stormwater Collection, Storage and Filtration System*

Stormwater collected in the north corner of the site is pumped, via sump, to the on-site stormwater storage tanks. The capacity of the sump corresponding to its best efficiency point is approximately 1.04 m^3/min (1,040 L/min). A copy of the sump performance curve has been provided in Appendix C.

The three stormwater storage tanks near the filtration system housing have a combined capacity of approximately 503.9 m^3 (503,884 L). The stored water is either recycled into on-site processes or treated via filtration (two 10 micron filters in parallel) and discharged directly into the Metro Vancouver municipal storm sewer system under an existing permit.

Based on the current, Metro Vancouver Waste Discharge Permit for the site, the maximum daily discharge flow rate allowed is 308 m^3/day (308,000 L/day). Under the permit, monthly monitoring and sampling events are required during discharge events. Standards governing the discharge water quality are specified in the Permit, as well as procedures to follow in the event standards are exceeded. Records of discharge events, volumes and sampling results are logged and managed by Western Cleanwood.

A copy of the current Metro Vancouver Waste Discharge Permit is included in Appendix B.

3.3.2 Sub-Catchment Areas

Based on current site drainage patterns, the site can be divided into two sub-catchment areas: the raw materials storage area and the remaining site area.

The raw material storage area in the south west corner of the site is a largely flat area. An earthen berm is present along the south and west boundaries, preventing off-site flow. This area is not used for active industrial processes and therefore potential surface water contaminants are limited. Stormwater from areas of the site that are considered outside the active wood treatment areas or treated wood storage areas does not require collection or treatment.

The remaining site area is a contained facility. Stormwater runoff is prevented from travelling off-site by a number of containment measures. Concrete berms along the north and east property boundaries and earth berms along the south and west property boundaries prevent stormwater from travelling off-site. Slight site grading directs surface water to the east. At the east boundary and berm, stormwater is directed north. Collected water passes through a culvert under the raised (bermed) driveway and travels to the far northeast corner of the site.

A sump located in the lowered, contained northeast corner then pumps the collected water to the on-site water storage tanks and filtration system.

Typical percent impervious values for asphalt are approximately 90% to 95%. While the site is paved with asphalt, the percent impervious values for the sub-catchment areas are assumed to be 90% to account for general wear and cracking. Asphalt repair and patching takes place at the site annually.

Stormwater from the rooves of the four main operations buildings appear to drain directly into the municipal storm sewer system, based on visual observation of the roof drains. The surface area of the rooves account for approximately 8,500 square meters (m^2).

The sub-catchment areas and site features are shown on Drawing 2 and detailed below in Table 6.

Table 6: Sub-Catchment Area Details

Sub-Catchment	Area (m^2)	Percent Impervious	Average Slope*
Southwest Storage Area	6,850	90%	0.1%
Remaining Site Area	26,950	90%	1%

**Average slope value based on Google Earth topography*

3.3.3 Water Quality Event

A water quality event is defined as the time period over which water with anomalous characteristics is detected. Common water quality events are applied as design events in designing water quality and stormwater infrastructure and evaluating performance.

For the purpose of this SPPP, as specified by Metro Vancouver's 2012 Stormwater Source Control Design Guidelines, a common water quality event is considered to be a 6-month, 24 hour rainfall event. Using the rainfall data collected from Metro Vancouver climate stations, the 6-month, 24-hour rainfall can be correlated to 72% (on average) of the 2-year, 24-hour event volume.

As per the Metro Vancouver Regional Intensity-Duration-Frequency (IDF) data chart for the Zone 4 area (which encompasses the Western Cleanwood property), the assumed rainfall intensity for a 2-year, 24-hour rainfall event is 2.6 mm/h. A copy of the Metro Vancouver IDF data chart for the Zone 4 area has been included in Appendix A.

When considering a 17% buffer to account for climate change projections and the event correlations, the rainfall flow rate for the Southwest Storage Area is approximately 250 L/min (4.2 L/s) and for the Remaining Site Storage Area is approximately 984 L/min (16.4 L/s).

Based on the sub-catchment areas, design storm drainage events and the appropriate IDF data, the peak flow rates and corresponding total runoff volumes and minimum required berm heights have been estimated for the site sub-catchments using the Rational Method. A runoff coefficient of 0.9 (heavy industrial) has been assumed. Results are shown in Table 7 below and example calculations are included in Appendix D.

Table 7: Estimated Peak Flow Rates, Total Runoff Volumes and Minimum Required Berm Heights for Water Quality Events

Sub-Catchment	Total Area (m^2)	Storm Event	Peak Flow Rate (L/s)	Total Runoff Volume (L)	Minimum Required Berm Height (m)
Southwest Storage Area	6,850	Common Water Quality Event (24 hour event)	4.2	326,592	0.05
Remaining Site Area	26,950	Common Water Quality Event (24 hour event)	16.5	1,283,040	0.07

For the “Remaining Site Area” sub-catchment, the sump at the northeast corner is capable of pumping collected water at a rate that exceeds the estimated peak flow (1,040 L/min pump rate vs. 988 L/min flow rate). As such, it can be assumed that stormwater will build-up along the berm only when the system has reached capacity and pump is no longer in use.

The system has a combined storage and discharge capacity of 811,884 L (503,884 L tanks and up to 308,000 L discharge to sewer per 24 hour period) therefore a standing runoff volume of 471,156 L would need to be contained by the berm. The area along the berm and in the northeast corner of the site with the capacity to hold standing water during storm events is estimated at approximately 6,600 m^2. Based on these assumptions, the berm height required to contain the standing runoff volume is 0.07 m. The height of the berm along the east site boundary currently ranges from 0.17 m to 0.82 m, therefore leaving considerable freeboard.

In conclusion, the berms along the east property boundary, the sump and the storage system are sufficient for handling a common water quality event expected for the site.

3.3.4 Storm Drainage Event

A storm drainage event is defined as the time period used to evaluate stormwater flow and infrastructure requirements to prevent flooding and ensure safe drainage. Common storm drainage events are applied as design events in evaluating general stormwater infrastructure performance, and extreme storm drainage events are applied as design events in evaluating prevention of property damage and protection of site personnel.

For the purpose of this SPPP, as specified by the City of Vancouver’s storm sewer design guidelines, a common storm drainage event is considered to be a 5 minute duration, 10 year return period storm event. An extreme storm drainage event is considered to be a 2 hour duration, 100 year return period storm event. Rainfall intensity for common and extreme storm drainage events, based on the Metro Vancouver Regional Intensity-Duration-Frequency (IDF) data chart for the Zone 4 area, is 64.8 mm/h and 18.7 mm/h, respectively.

When considering a 17% buffer to account for climate change projections, the peak flow rate for the Southwest Storage Area is approximately 8,650 L/min (144 L/s) and for the Remaining Site Storage Area is approximately 34,050 L/min (568 L/s) for a common storm drainage event. The rainfall intensity for the Southwest Storage Area is approximately 2,500 L/min (41.6 L/s) and for the Remaining Site Storage Area is approximately 9,830 L/min (163 L/s) for an extreme storm drainage event.

Based on the sub-catchment areas, design storm drainage events and the appropriate IDF data, the peak flow rates and corresponding total runoff volumes and minimum required berm heights have been estimated for the site sub-catchments using the Rational Method. A runoff coefficient of 0.9 (heavy industrial) has been assumed. A runoff coefficient of 0.9 (heavy industrial) has been assumed. Results are shown in Table 8 below and example calculations are included in Appendix D.

Table 8: Estimated Peak Flow Rates, Total Runoff Volumes and Minimum Required Berm Heights for Storm Drainage Events

Sub-catchment	Total Area (m^2)	Storm Event	Peak Flow Rate (L/s)	Total Runoff Volume (L)	Minimum Required Berm Height (m)
Southwest Storage Area	6,850	Common Storm Drainage Event (5 minute duration, 10 year return period)	144	38,950	0.01
		Extreme Storm Drainage Event (2 hour duration, 100 year return period)	41.6	11,240	0.002
Remaining Site Area	26,950	Common Storm Drainage Event (5 minute duration, 10 year return period)	568	153,243	0.02
		Extreme Storm Drainage Event (2 hour duration, 100 year return period)	163	44,223	0.14

Given the pump rate of the sump in the “Remaining Site Area” sub-catchment, for storm events where the peak flow rate is greater than or equal to the pump rate (1,040 L/min), the operational time of the pump before the system capacity is reached in approximately 13 hours. Therefore, the pump can remain operational for storms with durations of 13 hours or less, including both the common and extreme storm drainage events considered for the site.

Considering the common storm drainage event, the peak flow rate is modified by the pump rate to be 33,010 L/min (550 L/s). Assuming the runoff storage volume is contained in an area of 6,600 m^2, the minimum berm height required is 0.02 m. Similarly, for an extreme storm drainage event, the peak flow rate is modified by the pump rate to be 8,790 L/min (146.5 L/s) and the minimum berm height required is 0.14 m. The height of the berm along the east site boundary currently ranges from 0.17 m to 0.82 m, therefore leaving considerable freeboard.

In conclusion, the berm along the east property boundary, the sump and the storage system are sufficient for handling the common and extreme storm drainage events expected for the site.

4.0 ISSUES IDENTIFICATION AND RISK ANALYSIS

4.1 Applicable Standards, Acts and Regulations

4.1.1 Activities

Based on current and potential future activities, as well as current and potential future materials use and/ or storage, the following regulations are considered to apply to activities conducted at the site:

- *BC Environmental Management Act* (EMA), Hazardous Waste Regulations (HWR)
- CEPA, Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations

- CCME Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products
- *Canada Marine Act* (CMA), Port Authorities Operations Regulations
- *Canada Fisheries Act*
- Fisheries and Oceans Canada (DFO) Urban Stormwater Guidelines and Best Management Practices (BMPs) for Protection of Fish and Fish Habitat
- BC EMA, Spill Reporting Regulation
- City of Surrey Stormwater Drainage Regulation and Charges
- Metro Vancouver Stormwater Source Control Design Guidelines 2012

Hazardous materials stored on-site, such as the chemicals used in the treatment process and hazardous operational by-products, are subject to the HWR under the EMA, issued by the BC ECCC. The HWR address the proper handling and disposal of hazardous wastes.

Both the on-site gasoline AST and diesel AST are subject to the Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations under the CEPA, issued by Environment and Climate Change Canada, as well as the CCME Environmental Code of Practice for Aboveground and Underground Storage Tank Systems Containing Petroleum and Allied Petroleum Products. The objective of these Regulations is to prevent soil and groundwater contamination from storage tank systems on federal and aboriginal lands while enhancing environmental protection and reducing uncertainties regarding federal and provincial responsibilities.

Given that the site is leased from the Vancouver Fraser Port Authority, activities and operations at the site are subject to the Port Authorities Operations Regulations. These regulations outline safety requirements, as well as activities under lease agreements and authorizations from the port authority.

Given the site's proximity to the Fraser River and Gunderson Slough, both of which are fish bearing waterways, The Fisheries Act applies to potential discharges from the site to the environment. The Act governs management and control of fisheries, conservation and protection or fish and the protection of fish habitat and prevention of pollution.

On-site stormwater management infrastructure, and its performance evaluation as part of this SPPP, is based on the criteria outlined in the Fisheries and Oceans Canada (DFO) Urban Stormwater Guidelines and BMPs for Protection of Fish and Fish Habitat. This guidance document proposes stormwater design guidelines to aid in achieving volume reduction, water quality and rate control BMPs.

The BC EMA Spill Reporting Regulation is applicable to the site in the event that a spill of a listed substance enters, or is likely to enter, a body of water or if the quantity of the substance spilled exceeds the listed quantity (specified in the guidelines). Listed substances include flammable (gasoline, diesel), waste oil, and substances that are toxic or can cause pollution (wood treatment chemicals and stains). These regulations outline procedures to follow during and after spill events.

The discharge of stormwater from the site to city storm sewer infrastructure is governed by both the Metro Vancouver Waste Discharge Permit (issued specifically to Western Cleanwood by Metro Vancouver), as well as by The City of Surrey Stormwater Drainage Regulation and Charges. This by-law regulates the use of city stormwater drainage utility systems and impacts to natural watercourses, including spill reporting.

On-site stormwater management infrastructure, and its performance evaluation as part of this SPPP, is based on the criteria outlined in the Metro Vancouver Stormwater Source Control Design Guidelines 2012. These guidelines are used to assist in the fulfillment of the commitments and requirements stated in the Integrated Liquid Waste and Resource Management: A Liquid Waste Management Plan for the Greater Vancouver Sewage and Drainage District and its Member Municipalities (ILWRM), particularly by providing guidance for design of source controls.

4.1.2 Water Quality

- CCME Water Quality Guidelines for the Protection of Aquatic Life
- BC EMA, Contaminated Sites Regulations (CSR)
- Metro Vancouver Waste Discharge Permit
- BC Ministry of Environment Water Quality Guidelines (WQGs)

Groundwater on-site is comparable to the Freshwater Aquatic Life (AWF) and Marine Aquatic Life (AWM) standards outlined in the BC CSR.

The applicable regulations for surface water and filtration system discharge water at the site are specified in the Metro Vancouver Waste Discharge Permit. As both the surface water samples and the filtration system samples are indicative of water being discharged/ transferred from the site to the City of Surrey storm sewer system, discharge permit guidelines apply. In accordance with the permit, sampling and analysis of discharge water must take place, at minimum, once per month while actively discharging. Guidelines regarding discharge activity tracking, reporting, and additional testing are also outlined in the permit.

Surface water (runoff) is comparable to the Freshwater Aquatic Life (AWF) and Marine Aquatic Life (AWM) BC CSR, BC WQG and CCME Water Quality Guidelines.

4.2 Potential Pollutant Sources

Based on planned activities and/ or materials on-site that could result in potential risks in terms of stormwater pollution, the following potential pollutant sources have been identified for the “Remaining Site Area” sub-catchment:

- Wood treatment processes – Chemicals being supplied to the treatment chambers, used in the treatment chambers or having a residual presence in the treatment chamber could potentially leak or drip onto the ground in the event of an equipment failure or malfunction. This is extremely unlikely as the chemicals are stored in above grade tanks inside buildings. Additionally, the area in and around the production area is paved or otherwise sealed allowing spilled material to be collected prior to impact the environment.
- Finished product storage – Treated wood products are left to dry prior to offsite transport. Treated wood is stored under cover and/or capped to reduce the likelihood of impacting surface water.
- Material transport and handling via transport truck, forklift and other motorized equipment – Hydrocarbons/ oil/ coolant/ during general transport and handling activities could drip or leak onto the ground and impact stormwater runoff in the roadway and storage areas. This machinery is maintained to reduce the likelihood of incidents. The working area is paved or otherwise sealed. Staff have been trained in spill response and

spill kits are present at key locations throughout the site reducing the likelihood of incident affecting the environment.

- Diesel and gasoline ASTs – Diesel and/ or gasoline being transferred or stored in the AST could potentially be spilled outside of the secondary containment area due to failure or other forms of disaster (fire, explosion, etc.) and impact stormwater runoff near the AST storage area. Staff have been trained in spill response and spill kits are present at key locations throughout the site reducing the likelihood of incident affecting the environment.
- Vehicle/ equipment refuelling and maintenance – Diesel and/ or gasoline during refuelling at the ASTs, or oil/coolant during maintenance activities, could leak onto the ground from vehicles/ equipment. Fueling and maintenance working areas are paved or otherwise sealed. The ASTs are stored under cover to prevent the spread of spilled/ leaked potential contaminants during precipitation events. Similarly, vehicle maintenance activities are performed under cover. Staff have been trained in spill response and spill kits are present at key locations throughout the site reducing the likelihood of incident affecting the environment.
- Hazardous and non-hazardous chemical collection, storage and removal – Hazardous and non-hazardous chemicals collected, stored and removed. This material is stored in specific location away from the site boundary and operational areas. Staff have been trained in spill response and spill kits are present at key locations throughout the site reducing the likelihood of incident affecting the environment.
- Surface water collection, storage and filtration system – Stormwater runoff collected from the site surfaces is stored, filtered, recycled and/or discharged to the municipal storm sewer system under permit. The site is paved or otherwise sealed and has a berm along the property line where operations have the potential to impact surface water quality.

The following potential pollutant sources have been identified for both site sub-catchments:

- Vehicle/ equipment use – Hydrocarbons, oils, coolants and other chemicals could be leaked from vehicles or machinery during general use around the site. This machinery is maintained to reduce the likelihood of incidents. The working area is paved or otherwise sealed. Staffs have been trained in spill response and spill kits are present at key locations throughout the site reducing the likelihood of incident affecting the environment.

Potential pollutant source locations are shown on Drawing 2.

4.3 Potential Sensitive Receptors

Potentially sensitive watercourse receptors that could potentially be impacted by stormwater runoff from the site are detailed in Table 9 and shown on the attached City of Surrey Drainage Infrastructure and Waterways (by Fish Classification) drawing, downloaded from the City of Surrey (CoS) GIS system (COSMOS).

Fish classifications for the watercourses are taken from the Fraser River Estuary Management Program or City of Surrey databases.

Table 9: Potential Sensitive Watercourse Receptors

Watercourse Name	Watercourse Classification (Fraser River Estuary Management Program or City of Surrey)	Location
Ditch (South of Site)	C (CoS) (non-fish bearing)	South-adjacent to the site, running in parallel with the southern site boundary and earthen berm. Collected water is transferred to the Elevator Road Ditch via a CoS drainage main.
Elevator Road Ditch	C (CoS) (non-fish bearing)	South of the site, running adjacent to Elevator Road. Water is transferred from the Robson Road Ditch and the ditch south-adjacent to the site via a CoS drainage main.
Robson Road Ditch	C (CoS) (non-fish bearing)	Parallel to the east side of Robson Road. Collected water is transferred to the Elevator Road Ditch via a CoS drainage main.
Shadow Brook	A (CoS) (year-round fish habitat)	Runs under Robson Road and Elevator Road via a series of culverts. Ultimately drains into Gunderson Slough, south the site.
Gunderson Slough	High productivity habitat (FREMP)	Approximately 240 m south of the site, south of Elevator Road.

Other non-watercourse environmental receptors that could potentially be impacted by stormwater runoff from the site include:

- The vegetated area south-adjacent to the site, which also serves as potential habitat to select urban birds and mammals. It is noted that this area contains habitat for a federally protected species at risk: streambank lupine. This area is upgradient of the general operating areas.

Potential sensitive public receptors that could be impacted by stormwater runoff from the site include:

- The public frontage road (Robson Road) adjacent to the eastern site property boundary, including the three catchbasins along the west side of the road which flow to a City of Surrey drainage main, before discharging into the Elevator Road Ditch. Surface water at the property is prevented from entering the catch basins through a number of mechanisms including the concrete berm along the property line in the production areas, the redirection of surface water to a collection sump and active recovery and treatment/re-use of the stormwater.

4.4 Potential Issues

4.4.1 Wood Preservation and Treatment Chemicals

Wood preservation and treatment chemicals, including CCA, ACQ, Borate Solution and MCA, are stored and used in the three on-site wood treatment chambers, ultimately being applied to the raw timber materials. Once the treatment chemicals are applied, the preserved timbers are left to dry before being prepped for short term storage and transport.

The potential for pollution is mitigated by allowing the treated timbers to fully dry in a covered area before prepping the materials for storage, keeping treated product under cover or wrapped and elevated off the ground during storage at all times. Surface water is collected from

production areas. The water is then either reused in on-site processes, or is treated in the on-site water filtration system prior to discharge to the municipal sewer system (testing occurs monthly during active discharging).

4.4.2 Hydrocarbons, Hydraulic Oil, Coolant, Etc.

Hydrocarbons, hydraulic oil, coolant and other potential pollutants are present in motorized vehicles and/ or equipment and present a potential risk.

The potential for pollution is mitigated by having staff trained in spill response, having spill kits available at key locations at the property, collecting stormwater from production area that may entrain contaminants whenever possible and ensuring any potentially impacted stormwater is adequately treated in the on-site water filtration system prior to discharge (testing occurs monthly during active discharging). Existing site stormwater infrastructure will otherwise prevent off-site travel of impacted runoff. Consequences of release of this potential pollutant as it is described above would be medium.

4.4.3 Bulk Fuels

Bulk fuels, including gasoline and diesel, are stored on site in two elevated ASTs within appropriate secondary containment. The fuels are used to refuel equipment operating on site.

The potential for pollution is mitigated as the ASTs are located within an area of secondary containment and by ensuring applicable tank system regulations are met at all times. The tanks have been registered with Environment and Climate Change Canada (ECCC) and the guidelines for petroleum product tank systems, including maintenance, refilling, containment and emergency response, are outlined in the ECCC Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations followed.

4.4.4 Surface Water

Collected site surface water is stored for future use in site operations or for treatment and discharge in large, above-ground storage tanks. When greater storage capacity is required, the stored water is filtered through the on-site water treatment system, analysed to ensure treatment is effective and meeting permitted quality requirements, and discharged to the Metro Vancouver municipal storm sewer.

The potential for pollution is mitigated through the operation and maintenance of an effective closed loop system. This is supplemented by ensuring the all tanks and lines are assessed on a regular (monthly) basis and maintained as needed. Release of storm water from the tanks or piping would flow back to the sump allowing the water to be recovered.

4.4.5 Hazardous Waste

Hazardous waste, including used/ residual wood treatment chemicals, finishing stain and hydraulic oil, is stored on-site in IBCs.

The potential for pollution is mitigated by ensuring that stored hazardous waste meets the requirements for storage outlined by the Hazardous Waste Regulations. The IBCs are stored centrally at the south end of site, away from sensitive environmental receptors that could potentially be impacted in the event of a worst case scenario. Existing site stormwater

infrastructure will otherwise prevent off-site travel of impacted runoff. Staff have been trained in spill response and spill kits have been placed at key locations at the site. The wastes are disposed offsite on a regular basis to appropriate facilities.

4.4.6 Risk Analysis

A total risk value can be assigned to each major pollutant of concern to evaluate its overall level of risk. Total risk value is based on the probability of pollution and the potential consequences of pollution. The Risk Ranking Matrix used in assessing the total risk value is provided in Table 10.

Table 10: Risk Ranking Matrix

		Pollution Consequences				
		Low (1)	**Medium/ Low (2)**	**Medium (3)**	**Medium/ High (4)**	**High (5)**
Pollution Probability	**Low (1)**	1	2	3	4	5
	Medium Low (2)	2	4	6	8	10
	Medium (3)	3	6	9	12	15
	Medium High (4)	4	8	12	16	20
	High (5)	5	10	15	20	25

Using the assessment of pollution probability and consequence, and the above Risk Ranking Matrix, total risk values have been determined for each major pollutant of concern on-site (Table 11).

Table 11: Risk Analysis of Potential Stormwater Pollutants

Sub-catchment	Major Pollutants of Concern	Pollution Probability	Pollution Consequences	Total Risk Value
Southwest Storage Area	Hydrocarbons/ hydraulic oil/ coolant/ etc.	Medium	Medium	9
Remaining Site Area	Wood preservation and treatment chemicals (CCA, ACQ, Borate Solution and MCA)	Medium	Medium	9
	Hydrocarbons/ hydraulic oil/ coolant/ etc.	Medium	High	15
	Bulk fuels (gasoline/ diesel)	Medium	Medium/ High	12
	Surface Water	Low	Medium	3
	Hazardous waste (used wood preservation and treatment chemicals/ hydraulic oil)	Medium	High	15

4.5 Potential Pollutant Pathways

Potential pollutant pathways on-site have been controlled through management, preventative or containment/collection measures. In extreme cases, however, off-site travel of stormwater may be possible through:

- Overland flow due to failure of existing stormwater collection and/ or treatment infrastructure.

Identified pollutant pathways and prevention measures (stormwater infrastructure), are shown on Drawing 3.

5.0 STORMWATER POLLUTION PREVENTION PLAN

5.1 Management Strategy

The management strategy outlined below includes preventative, containment/ reduction and treatment approaches to preventing stormwater pollution.

5.1.1 Prevention

A primary goal of the management strategy is to prevent the release of potentially polluting materials within the site. Strategies for the prevention of pollution related to stormwater, based on current and/or potential future site activities, are outlined in Table 12.

Table 12: Stormwater Pollution Prevention Management Strategies

Prevention Strategy	Minimum Frequency of Performance	Performed By
All outdoor work and storage areas shall be maintained and cleaned of debris, garbage, and pollutant sources	Bi-annually, or as needed	SPPP Manager/ Plant Manager
Stormwater collection infrastructure will be monitored and inspected routinely, and cleared of debris and build-up	Bi-annually, or as needed	SPPP Manager/ Plant Manager
Regular maintenance and timely repairs will be completed on equipment, vehicles and other on-site systems	As needed (equipment/ vehicle/ system dependent)	All employees
Regular inspection and maintenance will be completed on fuels and hazardous waste containers	Bi-annually, or as needed	SPPP Manager/ Plant Manager
Fuels and hazardous wastes will be handled with extreme care, employees are trained in spill response and spill kits will be kept on hand for prompt clean-up in the event of a spill or other emergency	Whenever fuel or hazardous wastes are being handled or used	All employees
Regular inspections and maintenance (as needed) of paved site surfaces will be conducted to verify the site surface is intact	Annually	SPPP Manager/ Plant Manager

5.1.2 Containment/ Reduction

In minimizing and containing the area where potential polluting activities occur, the amount of subsequent treatment efforts required will be reduced. Strategies for containment and reduction of potential polluting areas include:

- Keeping hazardous waste storage in the same general area, and ensuring that the area is contained (has secondary containment);
- Disposing hazardous waste at offsite permitted facilities on a regular basis;
- Treated material will be capped and/or maintained under cover; and
- Keeping all bulk fuel ASTs in the same general area, and ensuring that the area is contained (has secondary containment) and is equipped with emergency spill kits.

5.1.3 Treatment

Where measures to prevent contact between pollutants and rainwater runoff are not feasible or do not provide complete protection, treatment options offer a final attempt at mitigation. The site's industrial process area is fully contained, and stormwater runoff is collected and filtered through a treatment system prior to discharge to the Metro Vancouver municipal sanitary sewer or is re-used on-site.

6.0 IMPLEMENTATION AND MONITORING

6.1 Implementation and Monitoring

To oversee and guide the implementation of this SPPP, Western Cleanwood management will identify an SPPP Manager. The SPPP Manager will be a qualified individual with the knowledge and skills to assess conditions and activities that could impact stormwater quality on-site. The SPPP Manager will be responsible for ensuring that all best management practices are followed and the SPPP is being implemented effectively.

SPPP Manager: *Harvey Khun Khun, Plant Manager*
Office Number: *604-585-2511*
Cell Number: *604-355-0486*

Major storm events will be documented and tracked, and regular inspections of site infrastructure will be completed to evaluate performance during heavy rain or precipitation periods. Inspection results will be documented, including necessary repairs, upgrades and alterations required to ensure all off-site stormwater travel is prevented. Noted issues will be dealt with as soon as possible.

Regular inspections of the hazardous and non-hazardous waste storage areas, the on-site bulk fuel tanks, roadways, and areas around identified potential sources will be performed to assess for stormwater pollution and implement further preventative measures as needed. Evidence of pollution can include odours, oily sheen, or discolouration. In the event that evidence of pollution is discovered, sources of the pollution will be investigated and mitigating action will be undertaken. Regulatory requirements regarding potential contamination will be followed as needed.

As per the lease agreement between Western Cleanwood and VFPA, quarterly sampling and analysis of water collected in the three off-site catch basins along Robson Road will be

conducted. Additionally, monthly sampling and analysis of water in the on-site filtration system will be completed to ensure that system discharge is meeting the standards outlined in the Metro Vancouver Waste Discharge Permit.

Site staff will be trained on the contents of this SPPP and to recognize signs of stormwater pollution and stormwater infrastructure failure. In the event that stormwater pollution or off-site travel are identified, staff will report the issues to the SPPP Manager for further investigation.

6.2 Adaptive Management Measures

Applying adaptive management, a planned and systematic process for continually improving management practices, to the SPPP allows for the flexibility to identify and implement new mitigation measures or modify existing ones. Following the principles of adaptive management will ensure the protection of stormwater quality on and off site.

As such, regular reviews of the SPPP will be undertaken by the SPPP Manager to ensure that the contents, including activities and potential pollutant sources, are up-to-date and that all inspection, analysis and maintenance requirements are being met. Any necessary changes will be made within pre-determined timelines for completion.

7.0 STATEMENT OF LIMITATIONS

This report has been prepared and the work referred to in this report has been undertaken by SLR Consulting (Canada) Ltd. (SLR) for Western Cleanwood Preservers LP, hereafter referred to as the “Client”. It is intended for the sole and exclusive use of Western Cleanwood Preservers LP. This report has been prepared in accordance with the Scope of Work and agreement between SLR and the Client. Other than by the Client 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 unless payment for the work has been made in full and express written permission has been obtained from SLR.

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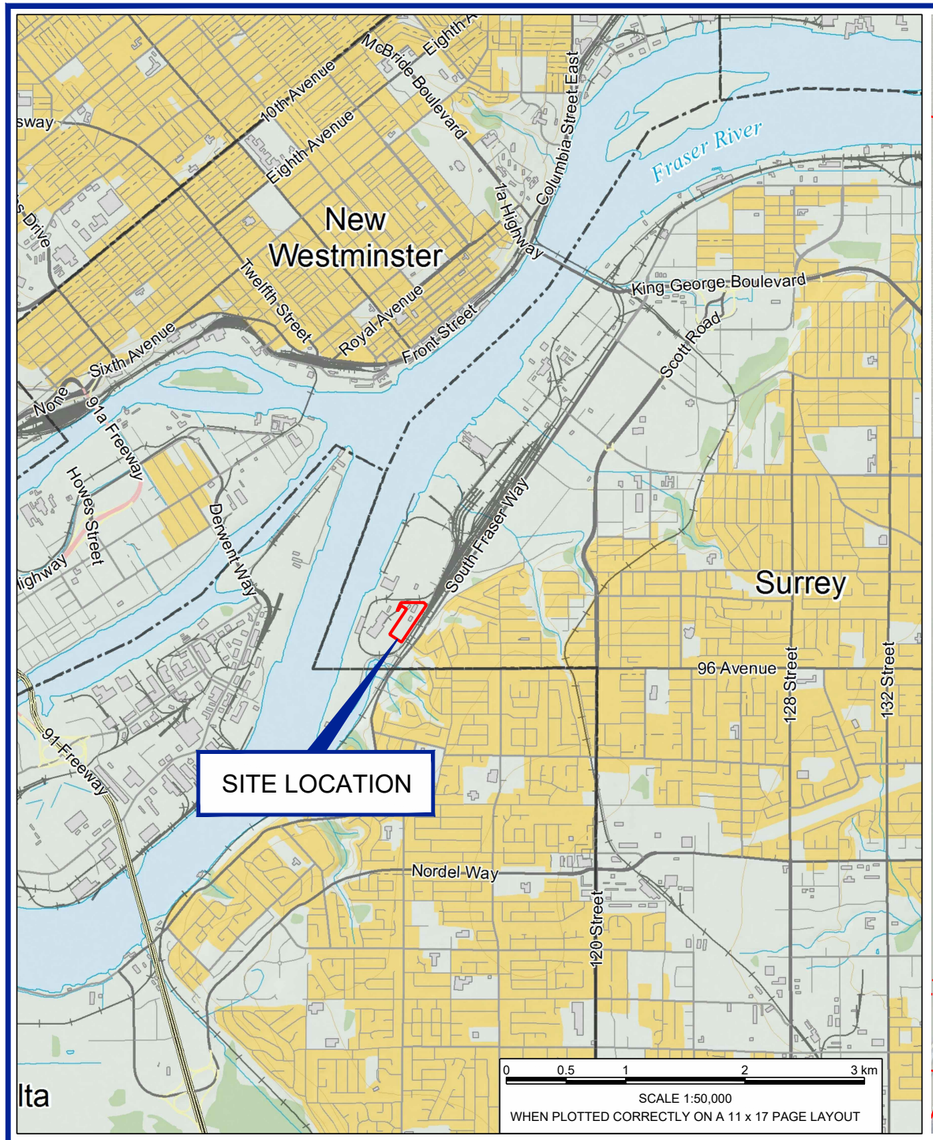
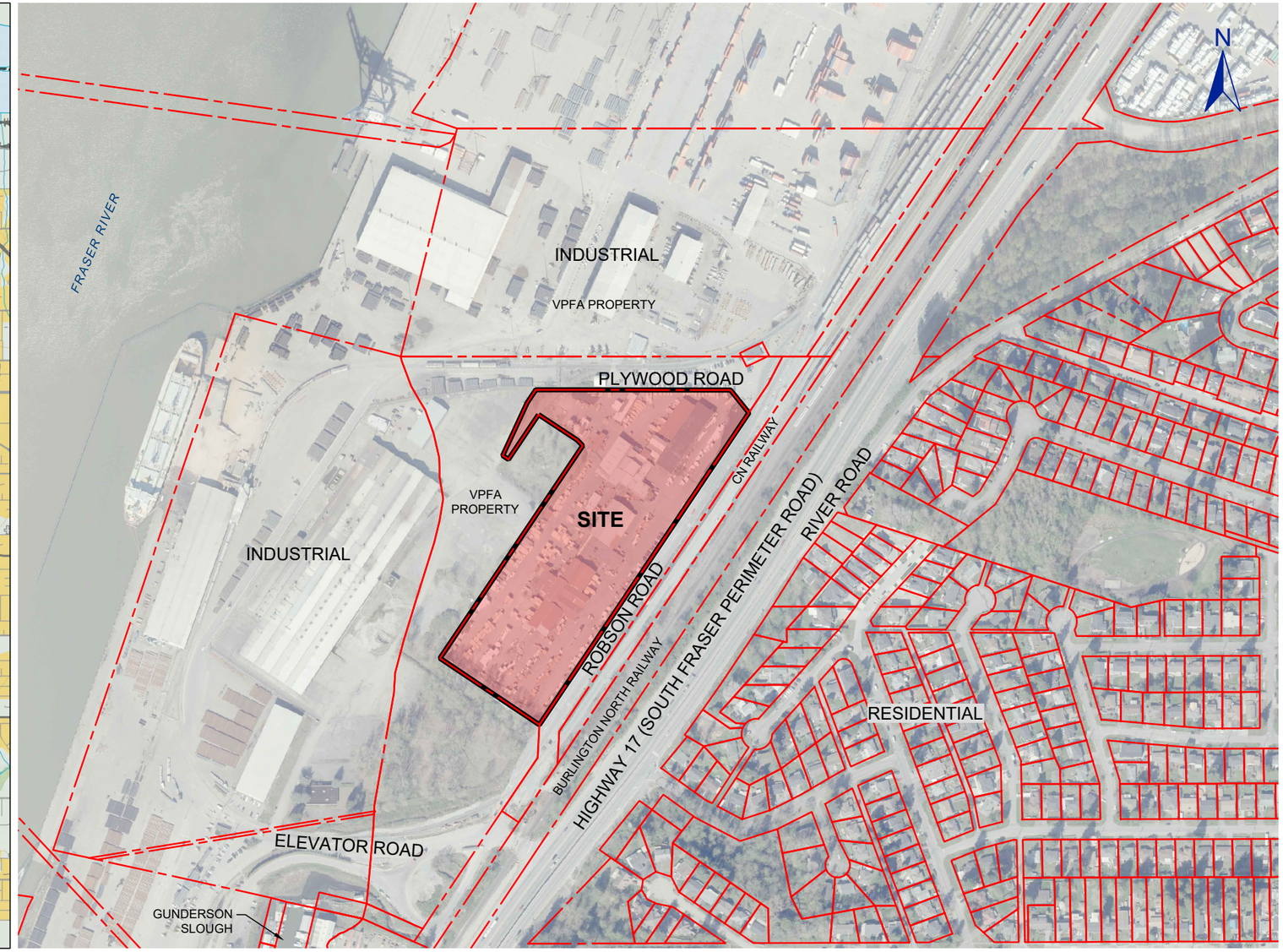
CN/ijk

N:\Vancouver\Projects\CanWel\201.88819.00 Western Cleanwood SW & Risk Mgmt\Deliverables\
2_Stormwater Pollution Prevention Plan\1. Western Cleanwood SPPP_September 13, 2018.docx

DRAWINGS

Western Cleanwood Preservers LP
Stormwater Pollution Prevention Plan
9815 Robson Road, Surrey, British Columbia
SLR Project No.: 201.88819.00000





NOTES:
REFERENCED FROM CITY OF SURREY GIS DATA. IMAGERY: © 2017 CITY OF SURREY (IMAGE DATE: 2016).

LEGAL DESCRIPTION:
LEASE - 4.62 HA. (11.42 AC.) PORTION OF LOT 4, PLAN LMP 29318, AND A PORTION OF PARCEL "L", R.P. 6744, BOTH OF SEC. 34 AND 35, B5N, R3W, N.W.D.

BASEDATA:
© Department of Natural Resources Canada, All rights reserved;National Road Network, National Railway Network Geobase®, Downloaded March 2014; BC regional Districts and Municipalities, GeoBC,Downloaded March 2014;Fresh Water Atlas, GeoBC®, Downloaded December 2014

- Rail Line
- Contour (20m)
- Municipality Boundary
- Watercourse
- Buildings
- Wooded Area
- Developed Area
- Arterial
- Local / Street
- Alleyway / Lane
- Resource / Recreation

LEGEND:
- PROPERTY BOUNDARY
- SITE LOCATION

0 50 100 200 300 m
SCALE 1:5,000
WHEN PLOTTED CORRECTLY ON A 11 x 17 PAGE LAYOUT
NAD 1983 UTM Zone 10 U

THIS DRAWING IS FOR CONCEPTUAL PURPOSES ONLY. ACTUAL LOCATIONS MAY VARY AND NOT ALL STRUCTURES ARE SHOWN.

WESTERN CLEANWOOD PRESERVERS LP
9815 ROBSON ROAD
SURREY, BC

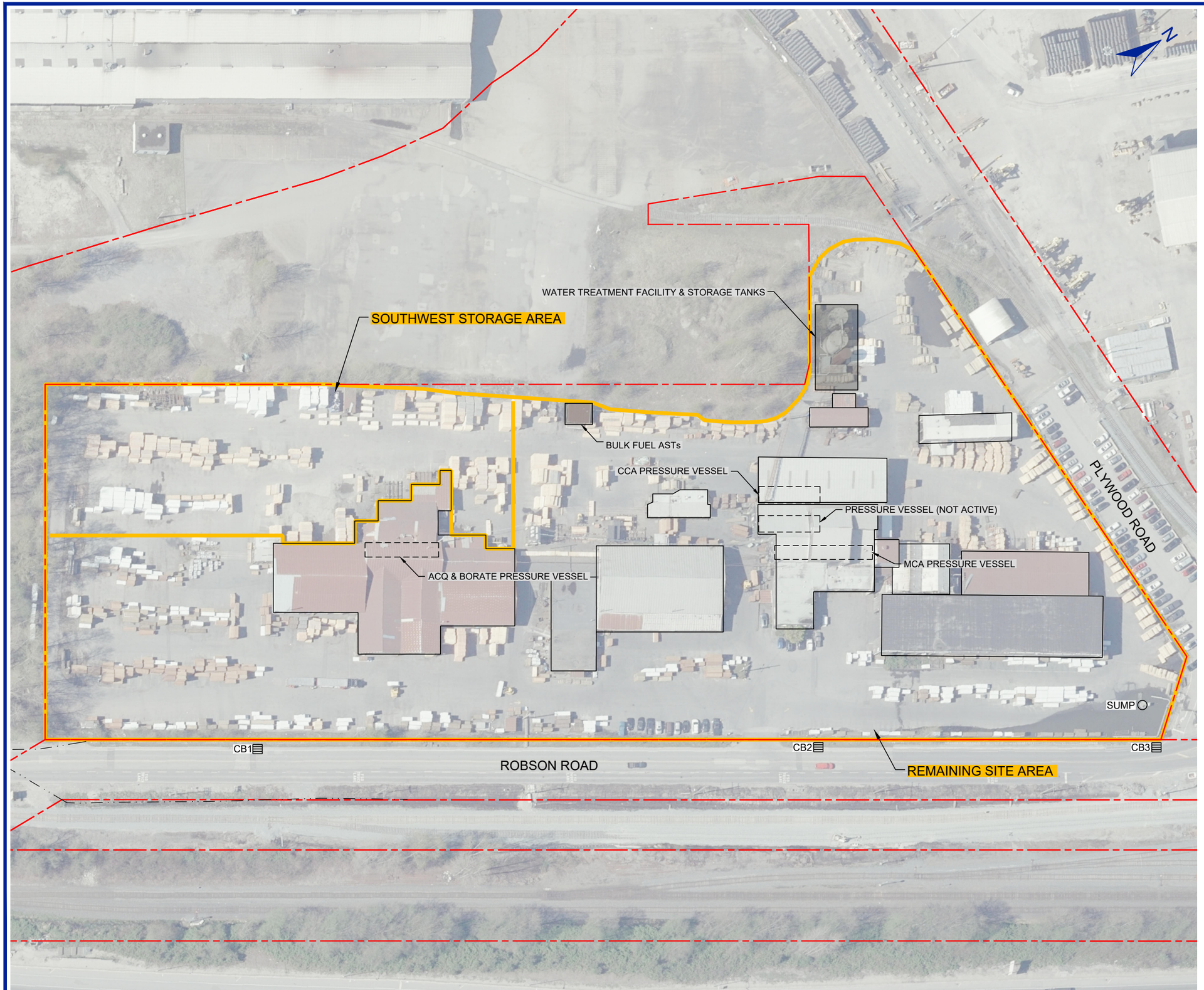
STORMWATER POLLUTION PREVENTION PLAN

SITE LOCATION & SURROUNDING LAND USE

Date: June 14, 2018
Project No. 201.88819.00000
Drawing No. 1

SLR global environmental solutions

Cadfile name: S_201-88819-00000-A1.dwg



NOTES:
NOT A LEGAL SURVEY. DO NOT USE FOR CONSTRUCTION. REFERENCED FROM CITY OF SURREY GIS DATA, POTTINGER GAHERTY ENVIRONMENTAL CONSULTANTS DRAWING *SITE PLAN AND INVESTIGATION LOCATIONS* (JUNE, 2013). IMAGERY: © 2017 CITY OF SURREY (IMAGE DATE: 2016).

LEGAL DESCRIPTION:
LEASE - 4.62 HA. (11.42 AC.) PORTION OF LOT 4, PLAN LMP 29318, AND A PORTION OF PARCEL "L", R.P. 6744, BOTH OF SEC. 34 AND 35, B5N, R3W, N.W.D.

LEGEND:

- PROPERTY BOUNDARY
- SUB-CATCHMENT AREA BOUNDARY
- SITE FEATURE
- SITE BUILDING
- SUMP — SUMP
- CB — CATCH BASIN

0 10 20 40 60 80 m

SCALE 1:1,250
WHEN PLOTTED CORRECTLY ON A 11 x 17 PAGE LAYOUT
NAD 1983 UTM Zone 10 U

THIS DRAWING IS FOR CONCEPTUAL PURPOSES ONLY. ACTUAL LOCATIONS MAY VARY AND NOT ALL STRUCTURES ARE SHOWN.

WESTERN CLEANWOOD PRESERVERS LP
9815 ROBSON ROAD
SURREY, BC

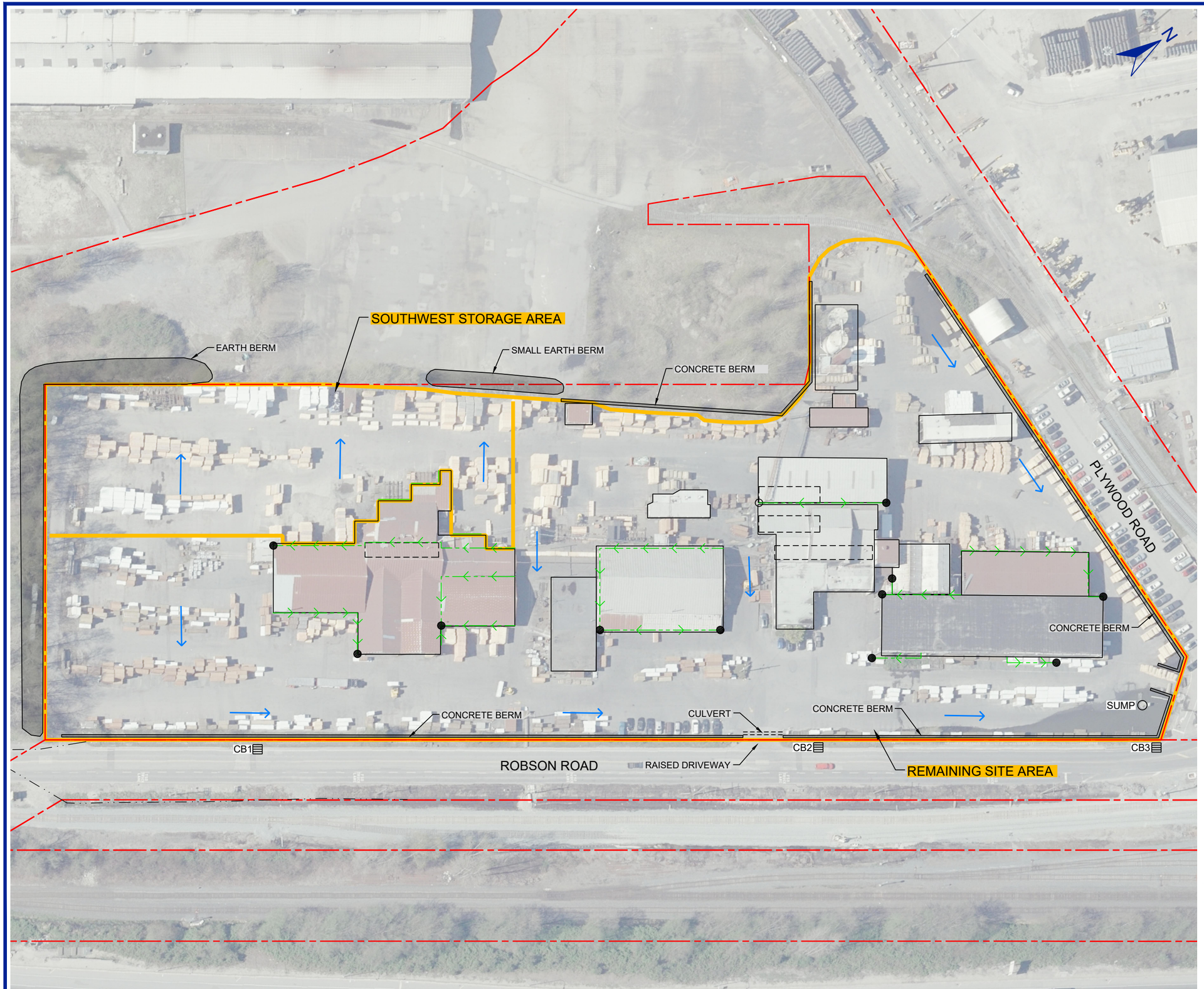
STORMWATER POLLUTION PREVENTION PLAN

SITE FEATURES & SUB-CATCHMENT AREAS

Date: June 14, 2018	Drawing No. 2
Project No. 201.88819.00000	

SLR global environmental solutions

Cadfile name: S_201-88819-00000-A1.dwg



NOTES:
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LEASE - 4.62 HA. (11.42 AC.) PORTION OF LOT 4, PLAN LMP 29318, AND A PORTION OF PARCEL "L", R.P. 6744, BOTH OF SEC. 34 AND 35, B5N, R3W, N.W.D.

LEGEND:

- PROPERTY BOUNDARY
- SUB-CATCHMENT AREA BOUNDARY
- SURFACE WATER FLOW DIRECTION
- SUMP — SUMP
- CB — CATCH BASIN
- ROOF DRAINS/FLOW DIRECTION
- CITY OF SURREY DRAINAGE
- DOWNSPOUT CONNECTIONS TO SEWER (ASSUMED)
- SITE WATER COLLECTION/STORAGE/PROCESS RE-USE

0 10 20 40 60 80 m

SCALE 1:1,250
WHEN PLOTTED CORRECTLY ON A 11 x 17 PAGE LAYOUT
NAD 1983 UTM Zone 10 U

THIS DRAWING IS FOR CONCEPTUAL PURPOSES ONLY. ACTUAL LOCATIONS MAY VARY AND NOT ALL STRUCTURES ARE SHOWN.

WESTERN CLEANWOOD PRESERVERS LP
9815 ROBSON ROAD
SURREY, BC

STORMWATER POLLUTION PREVENTION PLAN

STORMWATER INFRASTRUCTURE AND POLLUTANT PATHWAYS

Date: June 14, 2018	Drawing No. 3
Project No. 201.88819.00000	

SLR global environmental solutions

Cadfile name: S_201-88819-00000-A1.dwg

City of Surrey Online Mapping System

Legend

Road Names1000_4000

Buildings (labels)

Dog-Off-Leash Area (labels)

Park (labels)

Plaza/Square (labels)

Drainage Manholes

- Box
- Catch Basin Manhole
- Inside Drop
- Inside Outside Drop
- Inside Ramp
- Manhole Chamber
- Outside Drop
- Outside Ramp
- Overflow
- Pressurized
- Regular
- Riser
- Sump
- Abandoned
- Drainage Flow Arrows

Drainage Mains (labels)

Drainage Mains

- Proposed
- In Service/For Construction
- Abandoned
- Trails and Paths

Fish Class (Open Channels)

- A
- AO
- B
- C
- Unknown

Fish Class (Water Bodies)

- A
- AO
- B
- C
- Unknown

Water Courses

- River
- Creek
- Ditch

Park Sports Fields

- Sports Fields

Drainage Infrastructure and Waterways (by Fish Classification)

Scale: 1:3,025

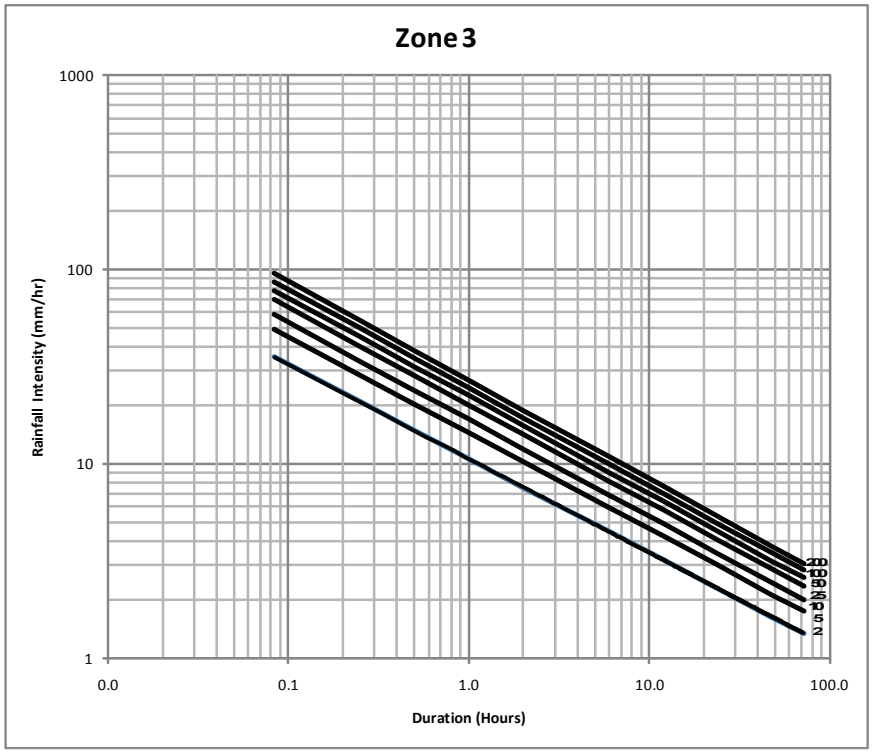
0 0.03 0.06 0.12 0.18

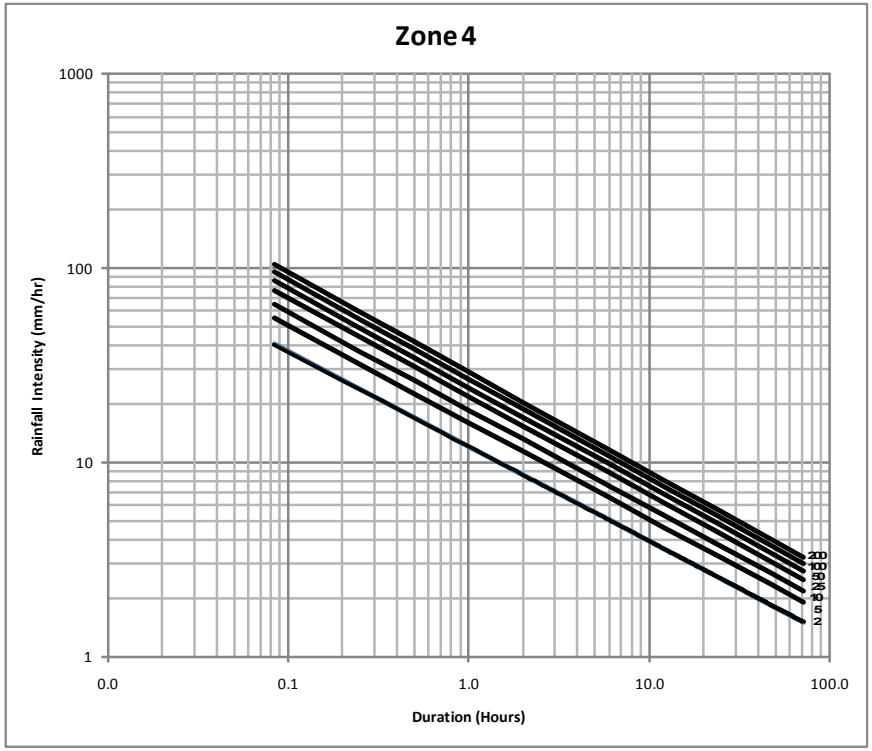
km

Map created on: 2018-06-11

APPENDIX A
Metro Vancouver IDF Curve

Western Cleanwood Preservers LP
Stormwater Pollution Prevention Plan
9815 Robson Road, Surrey, British Columbia
SLR Project No.: 201.88819.00000





Duration	2 year	5 year	10 year	25 year	50 year	100 year	200 year
5 min	35.3	49.2	58.3	69.7	78.2	86.6	95.0
15 min	20.7	28.6	33.7	40.2	44.9	49.7	54.4
30 min	14.8	20.3	23.9	28.4	31.7	35.0	38.3
1 h	10.6	14.4	16.9	20.0	22.3	24.6	26.9
2 h	7.6	10.2	12.0	14.1	15.7	17.3	18.9
6 h	4.5	5.9	6.9	8.1	9.0	9.9	10.8
12 h	3.2	4.2	4.9	5.7	6.4	7.0	7.6
24 h	2.3	3.0	3.5	4.1	4.5	4.9	5.4
48 h	1.6	2.1	2.5	2.9	3.2	3.5	3.8
72 h	1.3	1.7	2.0	2.3	2.6	2.8	3.1

Duration	2 year	5 year	10 year	25 year	50 year	100 year	200 year
5 min	40.4	55.1	64.8	77.0	86.1	95.1	104.0
15 min	23.7	31.9	37.3	44.1	49.2	54.2	59.2
30 min	16.9	22.6	26.3	31.1	34.6	38.0	41.5
1 h	12.1	16.0	18.6	21.9	24.3	26.7	29.1
2 h	8.6	11.3	13.1	15.4	17.1	18.7	20.4
6 h	5.0	6.6	7.6	8.8	9.8	10.7	11.6
12 h	3.6	4.6	5.3	6.2	6.9	7.5	8.1
24 h	2.6	3.3	3.8	4.4	4.8	5.3	5.7
48 h	1.8	2.3	2.7	3.1	3.4	3.7	4.0
72 h	1.5	1.9	2.2	2.5	2.8	3.0	3.2

REV.	DATE	REVISION NOTES	DRAWN	CHECK	APPR.

SCALE: NTS
DATE: DEC 2009
DRAWN: KH
DESIGNED: KH
CHECKED: KH
APPROVED: MJ

PROFESSIONAL SEAL:

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

CLIENT: Metro Vancouver

PROJECT: Metro Vancouver Regional IDF Curves

TITLE: Rainfall Zone IDF Curves

PROJECT No.: 0431-007

DWG No.: 4

REV.:

X:\Projects\0431 GVRD\007\Designwork\2009\222_report_drawings_final\Dwg4_IDF Graphs_Zone3&4.mxd

APPENDIX B
Metro Vancouver Waste Discharge Permit

Western Cleanwood Preservers LP
Stormwater Pollution Prevention Plan
9815 Robson Road, Surrey, British Columbia
SLR Project No.: 201.88819.00000

metrovancouver Greater Vancouver Regional District • Greater Vancouver Water District
Greater Vancouver Sewerage and Drainage District • Metro Vancouver Housing Corporation
4330 Kingsway, Burnaby, BC, Canada V5H 4G8 604-432-6200 www.metrovancouver.org

Policy & Planning Department
Tel. 604-432-6200, Fax 604-436-6707

WASTE DISCHARGE PERMIT
No. SC-100170-FSA

(the "Permit")

Under the provisions of the

Greater Vancouver Sewerage & Drainage District Sewer Use Bylaw No. 299, 2007 (as amended)
(the "Bylaw")

Western Cleanwood Preservers Ltd.

(the "Permittee")

is authorized to discharge Wastewater to Sewer from

a lumber treating, drying, and remanufacturing facility located at

9815 Robson Road, Surrey, BC

This Permit has been issued under the terms and conditions prescribed in the attached

Schedules A, B, C, D and E for discharge services and works existing or planned on

July 01, 2011

Issued: September 20, 1994
Amended: June 30, 2011

Grant McGillivray
Deputy Sewage Control Manager

SCHEDULE A

This Schedule sets out requirements for the quantity and quality of the discharge to Sewer.

1. AUTHORIZED RATE OF DISCHARGE

The Permittee shall not exceed the following:

Sample Point: 1

- Maximum daily discharge flow rate: **308.00 m^3/day**
- Maximum instantaneous peak flow rate: **10.70 L/second**

2. AUTHORIZED DISCHARGE CRITERIA

a) The Permittee shall not discharge Restricted Waste or other Waste, as defined in the Bylaw, including but not limited to the following (regardless of sample type):

Parameter	Authorized Limit	Notes
pH	5.5 - 10.5 pH Units	
Total Suspended Solids	600 mg/L	
Mercury - total	0.05 mg/L	
Aluminum - total	50 mg/L	
Arsenic - total	1 mg/L	
Boron - total	50 mg/L	
Cadmium - total	0.2 mg/L	
Chromium - total	4 mg/L	
Cobalt - total	5 mg/L	
Copper - total	2 mg/L	
Iron - total	10 mg/L	
Lead - total	1 mg/L	
Manganese - total	5 mg/L	
Molybdenum - total	1 mg/L	
Nickel - total	2 mg/L	
Selenium - total	1 mg/L	
Silver - total	1 mg/L	
Zinc - total	3 mg/L	

b) The Permittee shall not discharge Prohibited Waste, Storm Water or Uncontaminated Water, as defined in the bylaw, with the exception of precipitation that falls directly on the bermed areas.

c) The Permittee shall not discharge Hazardous Waste, or effluent from the treatment of Hazardous Waste which exceeds the Effluent Standards for Hazardous Waste Facilities, as stipulated in Schedule 1.2, Column 3, of the BC Environmental Management Act Hazardous Waste Regulation.

SCHEDULE B

This Schedule sets out requirements and locations for the approved sample points, waste sources, and works and procedures to treat and/or control the discharges to Sewer.

1. SAMPLE POINTS, WASTE SOURCES, WORKS & PROCEDURES

SAMPLE POINT: 1

This sample point is considered to be a point of discharge to Sewer. The approved sample point location is described and is illustrated in the photo(s) below.

Description: The sampling valve located on the "Recovery Collection" tank.

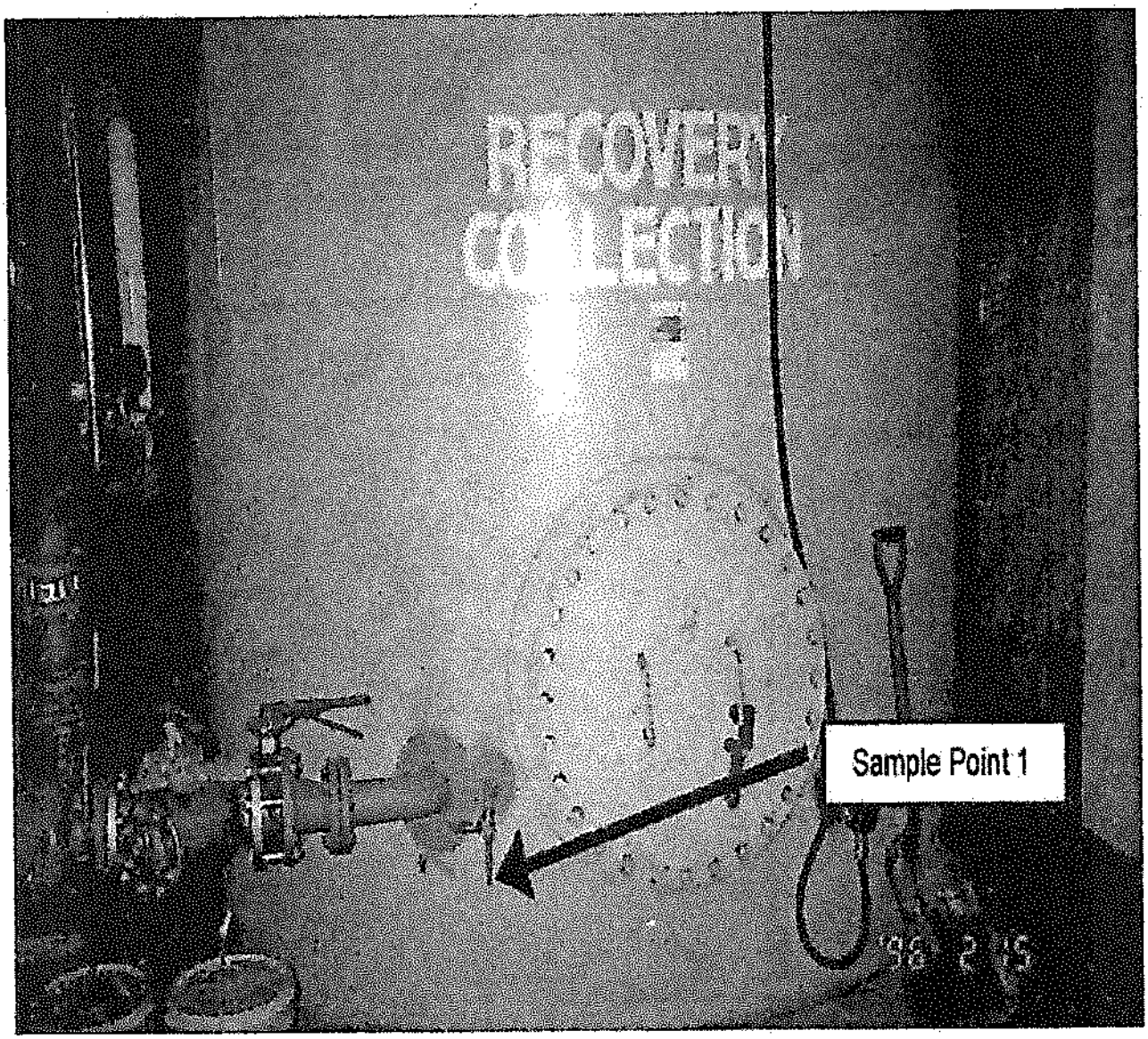
Source: **Surface Run-Off within the Bermed Area**

Type: Continuous

Works and Procedures	Completion Date
Approved flow monitoring device	Completed
Berm containment	Completed
Catch basins	Completed
Cartridge filter	Completed
Multi-media filters	Completed
Good operating practices	Completed

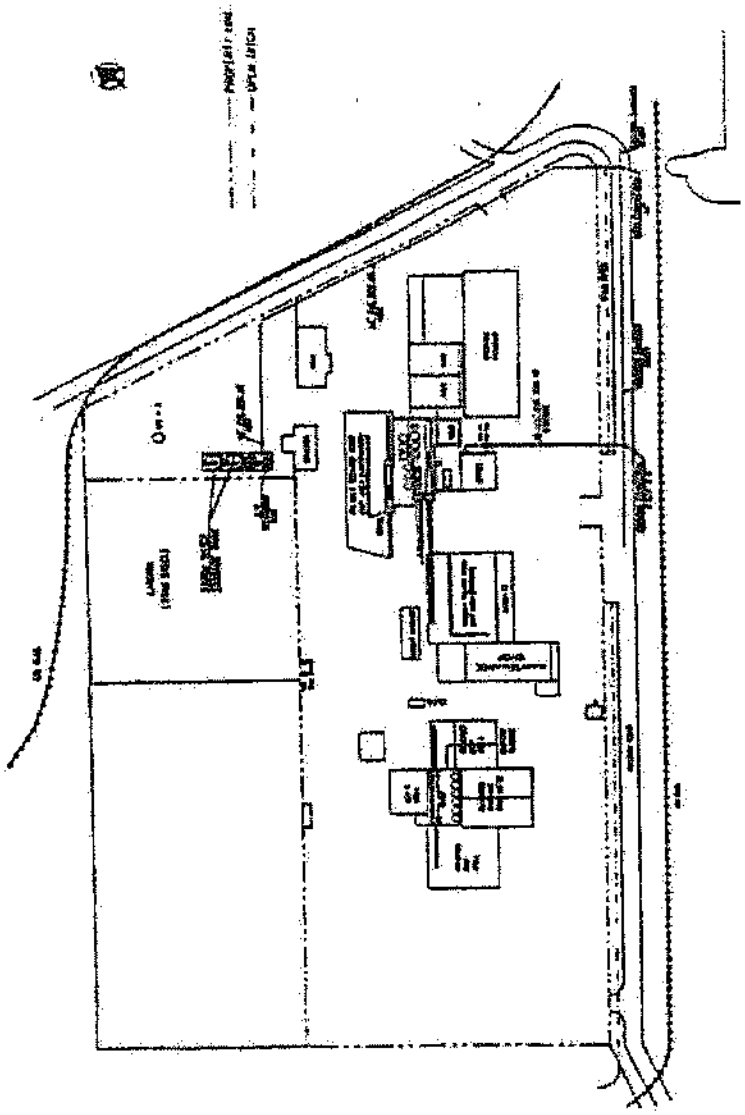
SCHEDULE B

Photograph of Sample Point 1:

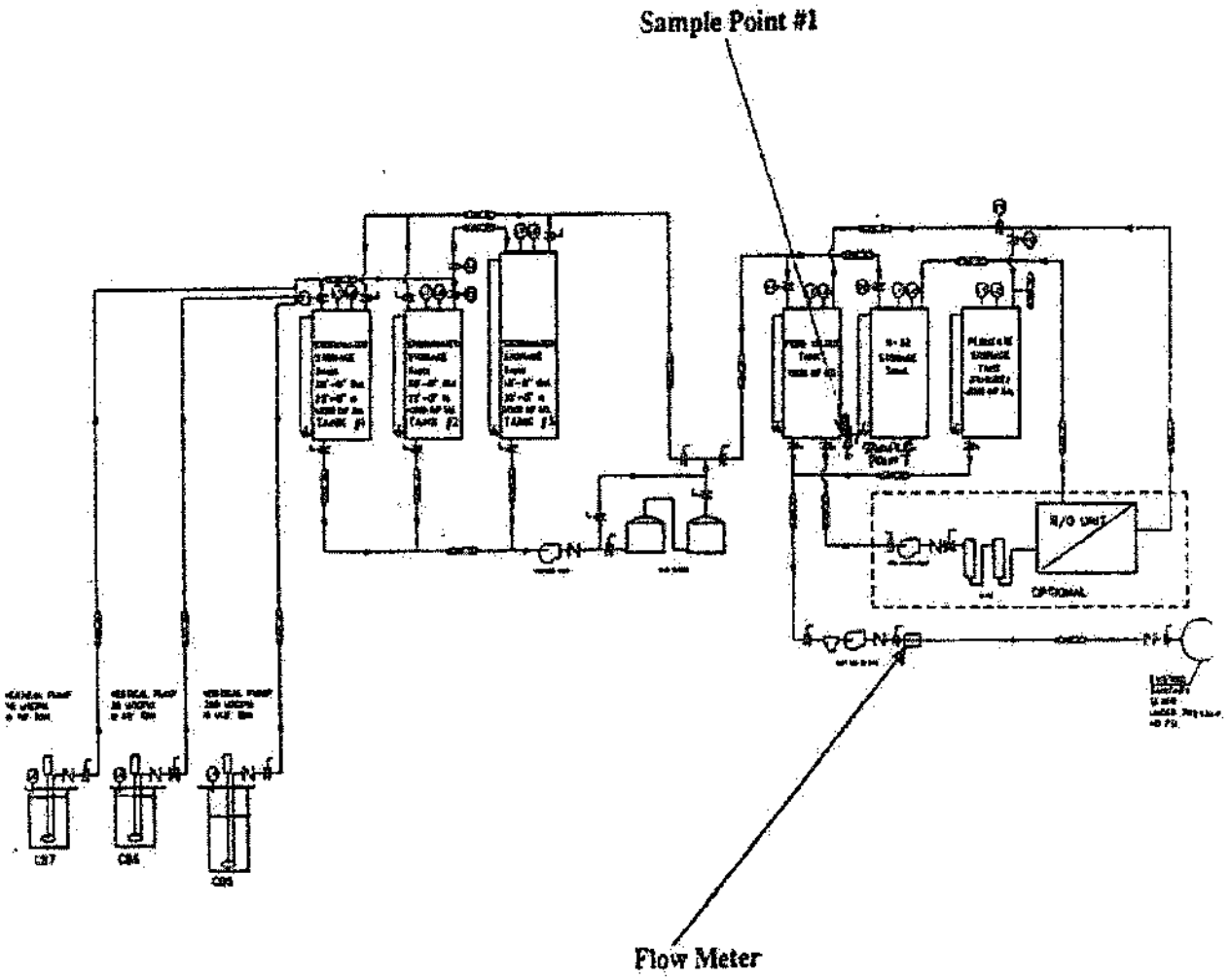


SCHEDULE B

2. SITE PLAN(S)



SCHEDULE B



SCHEDULE C

This Schedule sets out standard conditions and requirements for emergency procedures.

1. STANDARD CONDITIONS

a) Except as otherwise provided in this Permit, all terms, conditions and definitions stipulated in the Bylaw shall apply to this Permit.
b) Pursuant to the Bylaw, the Sewage Control Manager (the Manager) may amend the terms and conditions of this Permit.
c) All records required by this permit shall be kept available for a minimum period of one year.

2. WORKS AND PROCEDURES

a) All authorized works, procedures and requirements shall be employed at all times during any discharge to sewer. As applicable, all such works shall be inspected and calibrated regularly and maintained in good working condition.
b) The Manager may require that additional works be installed if the existing works do not provide an acceptable level of treatment. The Manager must authorize new works or alterations to existing works. The Manager must authorize new waste sources.

3. NOTIFICATION PROCEDURES

The Permittee shall immediately report to Metro Vancouver at 604-643-8488 (24 hours):

a) Spills with the potential to be discharged to the Sanitary Sewer.
b) Failure of authorized works or conditions and/or failure to carry out authorized procedures that will or have the potential to result in a Permit limit being exceeded.
c) Discharge pH less than 2 or greater than 12.5.

4. BY-PASSES

The discharge of Wastes that by-pass any authorized works or is not in accordance with procedures designated by the Permit is prohibited, unless prior authorization of the Manager is obtained.

5. DISCHARGE MONITORING

a) All sampling, measurements, tests and analyses of waste discharges shall be carried out in accordance with the latest edition of "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, or an alternate method authorized by the Manager. With the exception of pH measurements, all samples shall be analyzed by an independent laboratory unless otherwise authorized by the Manager.
b) Laboratories used by the Permittee must be accredited by the Canadian Association for Laboratory Accreditation.
c) Any changes in method or location of monitoring must be authorized by the Manager.
d) Additional monitoring and/or reporting shall be undertaken by the Permittee when required by the Manager.

SCHEDULE D

This Schedule sets out the requirements for the monitoring of the discharge to Sewer.

DISCHARGE SAMPLING AND ANALYSES: Effective July 01, 2011

1. FLOW MEASUREMENTS

The Permittee shall measure or estimate the discharge flow to sanitary sewer during each month of operation using the approved method(s) and record for reporting purposes the following:

- Total discharge volume (m^3) for the month for sample point(s) 1
- Number of days of discharge to sewer during the month for sample point(s) 1
- Maximum daily discharge flow rate (m^3/day) during the month for sample point(s) 1

2. SAMPLING PROGRAM

Continuous Discharge Sampling:

The Permittee shall record for reporting purposes for each sample the following:

- Sample date
- Sample collection time or sample collection start and stop time(s) if applicable
- Total daily discharge volume (m^3) on the date of sampling

SAMPLE POINT: 1

Continuous Discharges:

On one normal operating day once per month collect 1 set of composite samples and analyze for:

- Total Suspended Solids
- Mercury - total
- Total Metals by ICP Scan including:
  Aluminum, Arsenic, Boron, Cadmium, Chromium, Cobalt, Copper, Iron, Lead, Manganese, Molybdenum, Nickel, Selenium, Silver, Zinc

On one normal operating day once per month collect 1 set of grab samples and analyze for:

- pH

Grab sample pH analysis must be conducted immediately upon sampling.

Unless otherwise specified, composite samples shall consist of equal portions of grab samples, collected at a frequency of at least one per hour during discharge to sewer.

SCHEDULE D

If composite sampling is specified, grab samples shall be taken during the period of composite sampling unless noted otherwise in this Schedule.

Unless otherwise specified, all samples should be taken during normal operations.

SCHEDULE E

This Schedule sets out reporting requirements for this Permit.

1. REPORTING REQUIREMENTS

By October 31, 2011 and quarterly thereafter for the term of this permit:

The Permittee shall submit a report detailing the results of the discharge sampling and analyses program, as specified, for the previous calendar quarter including lab reports.

Should a violation of any term or condition of the Permit be noted, the report shall include a summary of the investigation into the cause of the violation and the corrective actions taken or proposed to prevent future violations. This does not preclude the immediate notification requirements specified in Schedule C.

APPENDIX C
Sump Performance Curve

Western Cleanwood Preservers LP
Stormwater Pollution Prevention Plan
9815 Robson Road, Surrey, British Columbia
SLR Project No.: 201.88819.00000

TSURUMI PUMP

B-SERIES
SEWAGE & WASTEWATER PUMPS

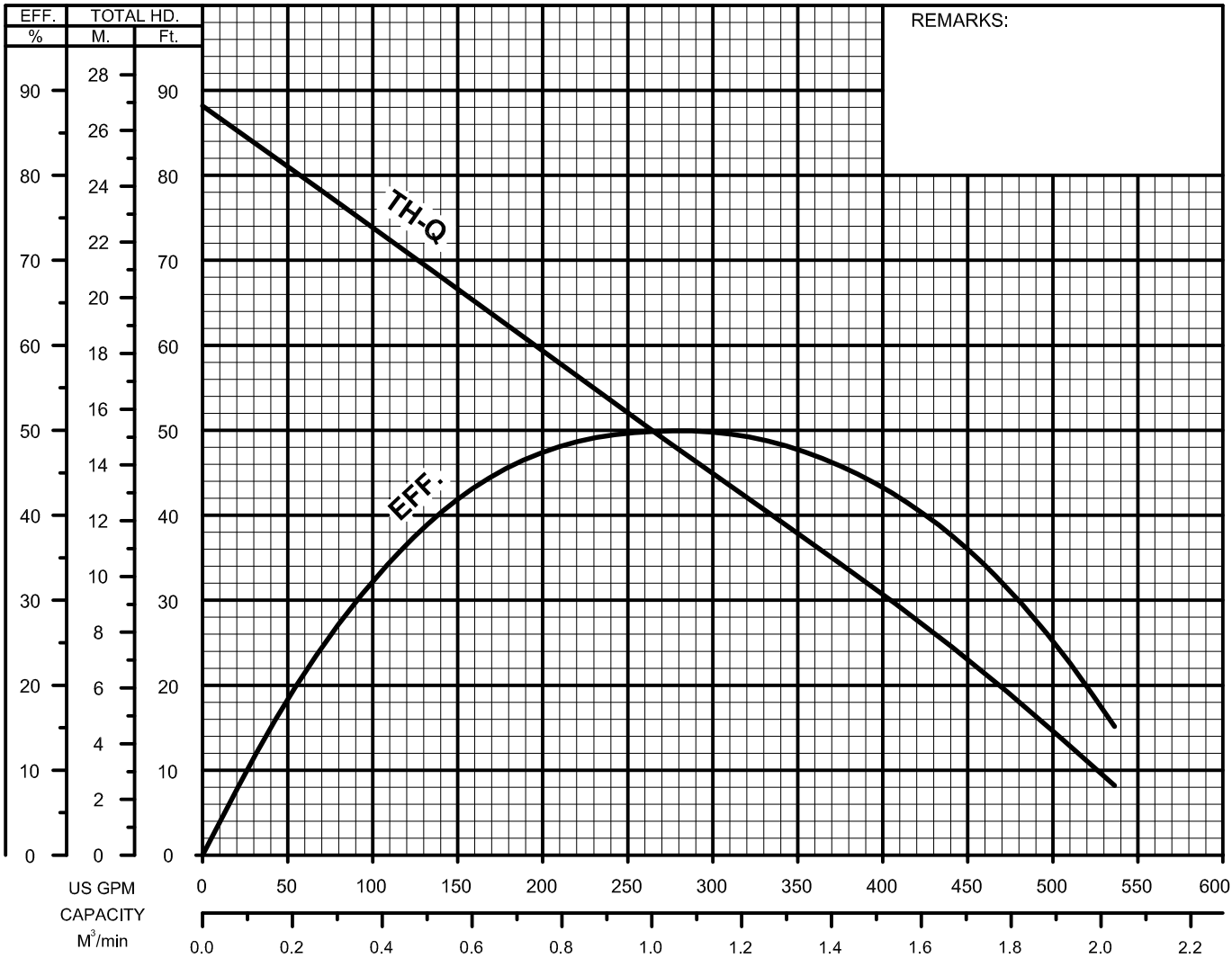
PERFORMANCE CURVE

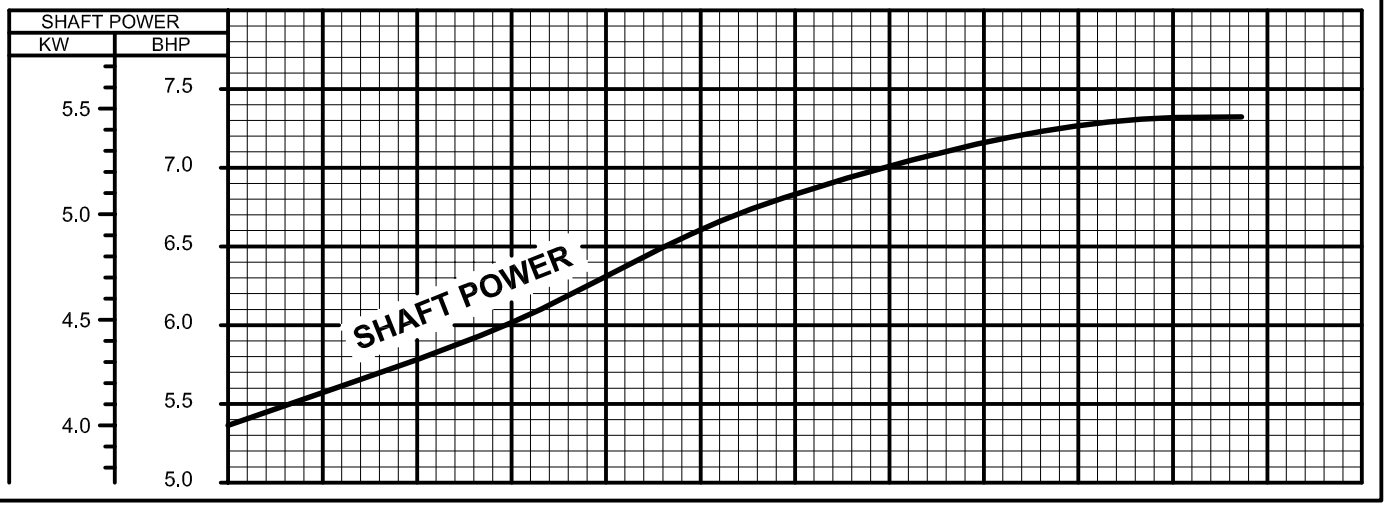
MODEL	BORE	HP	KW	RPM	SOLIDS DIA.	LIQUID	SG.	VISCOSITY	TEMP.
(TOS)100B45.5 -64	4"/100mm	7.5	5.5	1731	1.57"/40mm	Water	1.0	1.123cSt.	60°F

PUMP TYPE	PHASE	VOLTAGE	AMPERAGE	HZ	STARTING METHOD	INS.CLASS
Sewage&Wastewater	3	208-230/460/575	22.6-20.5 / 10.3 / 8.1	60	Direct On Line	F

CURVE No.	DATE	PHASE	VOLTAGE	AMPERAGE	HZ	STARTING METHOD	INS.CLASS
-	-	-	-	-	-	-	-

REMARKS:





APPENDIX D
Calculations

Western Cleanwood Preservers LP
Stormwater Pollution Prevention Plan
9815 Robson Road, Surrey, British Columbia
SLR Project No.: 201.88819.00000

APPENDIX D – CALCULATIONS

1.0 RAINFALL INTENSITY

Assumptions:

- Rainfall Intensity for a 2-year, 24-hour rainfall event at the site: 2.6 mm/h
- Based on the rainfall data collected from Metro Vancouver climate stations, the 6-month, 24-hour rainfall can be correlated to 72% (on average) of the 2-year, 24-hour event volume.
- Climate change projections for Metro Vancouver can be accounted for with a 17% increase in intensity.

Example:

$$i = 2.6\frac{mm}{h} = 0.0026\frac{m}{h}$$

$$i = 0.0026\frac{m}{h}x\ 0.72 = 0.0019\frac{m}{h}$$

$$i = 0.0019\frac{m}{h}x\ 1.17 = 0.0022\frac{m}{h}$$

where i = Rainfall Intensity (m/h)

2.0 PEAK FLOW RATE

$$\boxed{Q = iA}$$

where Q = Flow Rate (m^3/h)
i = Rainfall Intensity (m/h)
A = Area (m^2)

Example:

$$Q = 0.0022\frac{m}{h}x\ 6{,}850\ m^2 = 15\ \frac{m^3}{h}$$

$$Q = 15\ \frac{m^3}{h} = 250\ \frac{L}{min} = 4.2\ \frac{L}{s}$$

3.0 TOTAL RUNOFF VOLUME

$$V = cQt = ciAt$$

where V = Runoff Volume (L)
Q = Flow Rate (L/s)
c = Runoff Coefficient (unitless)
i = Rainfall Intensity (m/s)
A = Area (m^2)
t = Time (s)

Assumptions:

- The runoff coefficient applicable at the site is 0.9 (heavy industrial).
- A common storm event for the site is a 24-hour (86,400 s) event.

Example:

$$V = 0.9\ x\ 4.2\ \frac{L}{s}\ x\ 86{,}400\ s = 326{,}592\ L = 326.592\ m^3$$

4.0 STANDING WATER CAPACITY OF EXISTING BERMS

Assumptions:

- The slope of the area along the east boundary berm, prior to the increase in slope at the northeast corner and collection area, is the assumed site slope of 1% (0.01, measured via Google Earth).
- The smaller concrete berm has a consistent height of 0.17 m (measured) and a linear length 375 m.
- Runoff in the “Remaining Site Area” sub-catchment travels along the slope to containment areas along the berms until it can be pumped to the on-site stormwater storage tanks and treatment system.
- The slope in the northeast corner is greater than throughout the rest of the site area to encourage flow towards the sump. This area is defined by both the increased slope and the increased berm height (0.53 m to 0.82 m). Based on observations to date, the containment area in the northeast corner of the site is approximately 220 m^2 (measured via Google Earth).

Calculations:

$$s = \frac{h_b}{w_b}$$

where s = Slope (unitless)
h_b = Height of the berm (m)
w_b = Width of the berm area (m)

$$0.01 = \frac{0.17}{w_b}$$
$$w_b = 17.0\ m$$

$$A_T = A_b + A_c = (l_b\ x\ w_b) + A_c$$

where A_T = Total Runoff Containment Area (m^2)
A_b = Runoff Containment Area Along Berm (m^2)
l_b = Linear Length of Berm Area (m)
w_b = Width of Berm Area (m)
A_c = Runoff Containment Area in Northeast Corner (m^2)

$$A_T = (375\ m\ x\ 0.17\ m) + 220\ m = 6{,}600\ m^2$$

5.0 BERM HEIGHT

5.1 Southwest Storage Area

$$h = \frac{V}{A}$$

where h = Berm Height (m)
V = Runoff Volume (m^3)
A = Containment Area (m^2)

Example:

$$h = \frac{326.592\ m^3}{6{,}850\ m^2} = 0.048\ m$$

5.2 Remaining Site Area

$$Q_T = Q - Q_P$$

where Q_T = Total Flow Rate (L/min)
Q = Flow Rate (L/min)
Q_P = Pump Rate (L/min)

Assumptions:

- The Total Flow Rate calculation is only applicable when the peak flow rate is greater than the pump rate (1,040 L/min).
- The duration of a common storm drainage event at the site is 5 minutes (300 seconds).
- The runoff coefficient applicable at the site is 0.9 (heavy industrial)

Example:

$$Q_T = 2{,}500\frac{L}{min} - 1{,}040\frac{L}{min} = 1{,}460\frac{L}{min} = 24.3\ \frac{L}{s}$$

$$V = 0.9\ x\ 24.3\ \frac{L}{s}\ x\ 300\ s = 6{,}570\ L = 6.570\ m^3$$

$$h = \frac{V}{A_T}$$

where h = Berm Height (m)
V = Runoff Volume (m^3)
A_T = Total Runoff Containment Area (m^2)

Example:

$$h = \frac{6.570\ m^3}{6{,}600\ m^2} = 0.0001\ m$$

APPENDIX E
Stormwater Containment Berm Condition Assessment

Western Cleanwood Preservers LP
Stormwater Pollution Prevention Plan
9815 Robson Road, Surrey, British Columbia
SLR Project No.: 201.88819.00000

13 September 2018

Mr. Jason Shupe
Regional Manager
Western Cleanwood Preservers Ltd.
9815 Robson Road
Surrey, BC V3V 2R9

Project No.: 201.88819.00001

Dear Mr. Shupe,

RE: STORMWATER CONTAINMENT BERM CONDITION ASSESSMENT RESULTS FOR WESTERN CLEANWOOD PRESERVERS LP, 9815 ROBSON ROAD, SURREY, BC

On May 10, 2018, SLR conducted a condition assessment of the stormwater containment berms at Western Cleanwood Preservers LP (Western Cleanwood), located at 9815 Robson Road, Surrey, BC. The purpose of this assessment was to evaluate the current status and performance of the stormwater containment infrastructure at the site, and to identify any areas in need of repair, maintenance or improvement.

1.0 BACKGROUND

The site is an industrial property operating as active wood preservation facility. The site includes a two-story office building and several single-story enclosed or partially enclosed covered operations structures, as well as an on-site water treatment facility and three active wood-treatment chambers (pressure vessels). Preserving agents used in the on-site pressure vessels include chromate copper arsenate (CCA), alkaline copper quaternary (ACQ), borate solution and micronized copper azole (MCA).

Based on current site operations and regulations specified in the property lease agreement with VFPA, Western Cleanwood is required to fully contain, collect and treat any stormwater runoff from areas of the site where potential surface water contamination could occur.

1.1 Sub-Catchment Areas

Given current site drainage patterns, the site can be divided into two sub-catchment areas: the Southwest Storage Area and the Remaining Site Area.

The raw material storage area in the south west corner of the site, or Southwest Storage Area, is not used for active industrial processes and therefore potential surface water contaminants are limited. Stormwater from areas of the site that are considered outside the active wood treatment areas or treated wood storage areas, such as this area, do not require collection or treatment.

The remaining site area, where the site's active industrial processes take place, is a contained facility where stormwater runoff is prevented from travelling off-site by a number of containment measures. Concrete berms along the north and east property boundaries, and an earth berm along the south property boundary, prevent stormwater from travelling off-site. Slight site grading directs surface water to the east, where a sump located in the lowered, contained northeast corner of the site then pumps the collected water to the on-site water storage tanks and filtration system.

The concrete and earth berms around the perimeter of the site are critical in ensuring all on-site stormwater runoff is completely contained.

2.0 FIELD OBSERVATIONS

2.1 Berm Condition Assessment

Field observations made during the May 10, 2018 condition assessment of the stormwater containment berms at the site are detailed in Table 1 below. Photographs have been included following the text.

Table 1. Field Observations

Berm Segment	Berm Type	Observation Location/ Segment	Observation	Follow-Up
Main Gate off Robson Road	Raised Concrete (Speed Bump)	0 m – 13.5 m	• Stormwater flows northeast along the eastern site perimeter, directed by the concrete berm, and under the Main Gate entrance way through a culvert	
From the northeast corner of the Main Gate off Robson Road (0 m) to the Northeast Gate (127 m)	Concrete Berm	0 m	• Start of concrete berm	
		8.1 m	• Transverse crack	
		10 m – 30 m	• Significant build-up of debris (leaves and mud) • Significant vegetation growth around/ on berm	• Maintenance activities were undertaken to remove debris and vegetation. (Photograph 1)
		44 m – 82 m	• Significant build-up of debris (leaves, mud and wood) causing pooling water • Debris is over topping the curb	• Maintenance activities were undertaken to remove debris. (Photograph 2)
		82 m – 113 m	• Curb cleared of debris • Pooling water was noted at the base of the berm	
	Concrete Wall	113 m – 127 m	• Concrete wall around sump ("Concrete Wall 1") • Height of wall varied between 0.53 m to 0.82 m • Total length of wall is 19.0 m	
		127 m	• End of concrete berm/ wall	
Northeast Gate	None	0 m – 9.2 m	• No containment present (Photograph 3)	• Containment infrastructure upgrades have been scheduled.

Table 1. Field Observations

Berm Segment	Berm Type	Observation Location/ Segment	Observation	Follow-Up
From the Northeast Gate (0 m) to the east end of the northern site perimeter (15 m)	Concrete Wall	0 m	• Start of concrete wall	
		0 m – 15.1 m	• Concrete wall around area upgradient of the Northeast Gate (“Concrete Wall 2”) • Wall height varied between 0.43 m to 0.49 m • Total length of wall is 15.1 m	• Maintenance activities were undertaken to remove debris.
		15.1 m	• End of concrete wall	
From the east end of the northern site perimeter (0 m) to the west end of the northern site perimeter (154 m)	Concrete Berm	0 m	• Start of concrete berm	
		0 m – 6 m	• Minor build-up of debris • Alligator cracking and missing asphalt sections noted along the berm (immediately south) (Photograph 4)	• Maintenance activities were undertaken to remove debris. • Asphalt repairs have been scheduled.
		6 m – 100 m	• Minor build-up of debris (wood, leaves, organics, and pipe insulation) • Height of curb is consistently 0.17 m	• Maintenance activities were undertaken to remove debris. (Photograph 5)
		14.4 m	• Transverse crack, <0.1 cm wide	
		18.2 m	• Transverse crack, >0.1 cm wide • Minor spalling along crack	
		26.8 m	• Transverse crack, >0.1 cm wide (Photograph 6) • Minor spalling along crack	
		30.6 m	• End of one concrete berm and beginning of another • Gap between berm ends <0.5 cm wide	
		36.9 m	• Transverse crack, <0.1 cm wide	
		100 m – 122 m	• Sections of minor debris build-up • No visible cracking	• Maintenance activities were undertaken to remove debris.
		122 m – 140 m	• Berm segment could not be observed due to overgrown vegetation	• Maintenance activities were undertaken to remove some of the vegetation, where possible and where needed.
		140 m – 145 m	• No visible cracking • Some parts of the berm segment could not be observed due to overgrown vegetation	• Maintenance activities were undertaken to remove some of the vegetation, where possible and where needed.
		154 m	• End of concrete berm	

Table 1. Field Observations

Berm Segment	Berm Type	Observation Location/ Segment	Observation	Follow-Up
From the west end of the northern site perimeter (0 m) to the west end of the southern site perimeter, west of the water treatment facility (56 m)	None	0 m – 56 m	• Area is approximately flat • After asphalt ends, area is unpaved • Perimeter is lined with vegetation (Photograph 7)	• Containment infrastructure upgrades have been scheduled.
From the west end of the southern site perimeter, west of the water treatment facility (0 m), to the end of the concrete berm along the eastern site perimeter, west of the AST containment area (109 m)	Concrete Berm	0 m	• Start of concrete berm	
		0 m – 6 m	• End of one concrete berm and beginning of another • Gap between berm ends <0.5 cm wide • Moderate build-up of debris (leaves)	• Maintenance activities were undertaken to remove debris.
		6 m – 25 m	• Curb intact • Moderate build-up of debris (leaves and mud) • Significant vegetation growth around/ on berm • Cracking in asphalt noted along the berm (immediately north)	• Maintenance activities were undertaken to remove debris and vegetation. (Photograph 8)
		25 m – 63 m	• Large build-up of debris (leaves and wood)	• Maintenance activities were undertaken to remove debris.
		63 m – 69 m	• Transverse cracking noted in four locations, >0.1 cm • Minor spalling noted in all four crack locations • End of one concrete berm and beginning of another • Gap between berm ends <0.5 cm wide • Moderate build-up of debris (leaves)	• Maintenance activities were undertaken to remove debris.
		69 m – 109 m	• Some vegetation growth around/ on berm	• Maintenance activities were undertaken to remove vegetation.
		109 m	• End of concrete berm	

Table 1. Field Observations

Berm Segment	Berm Type	Observation Location/ Segment	Observation	Follow-Up
From the end of the concrete berm along the eastern site perimeter, west of the AST containment area (0 m) to the southwest corner of the site (175 m)	Earth Berm	0 m - 12.5 m	• Build-up of earth and vegetation (earth berm) noted, 0.3 m tall (approximately)	
		12.5 m – 50 m	• Build-up of earth and vegetation (earth berm) noted, 0.15 m tall (approximately)	
		20 m	• A small portion of the earth berm has been washed out (Photograph 9)	
		39 m	• A small portion of the earth berm has been washed out	
		41 m	• A small portion of the earth berm has been washed out	
	None	50 m – 72 m	• No containment present	
		72 m – 125 m	• No containment present	
	Earth Berm	125 m – 175 m	• Large earth berm • Berm height varies from group to approximately >2 m tall • Stores of wood, metal, totes • Large piles of debris (wood, metal)	
South Site Perimeter	Earth Berm	0 m – 115 m	• Large earth berm • Berm height is approximately >2 m tall • Stores of wood, metal, totes • Large piles of debris (wood, metal)	
Southeast Gate	None	0 m – 15 m	• No containment present at the gate • Sediment and debris on the ground shows evidence of flow of surface water under the gate (low point in pavement) (Photograph 10)	• Containment infrastructure upgrades have been scheduled.
From the corner of the Southeast Gate (0 m) to the southeast corner of the Main Gate off Robson Road (220 m)	Concrete Berm	0 m	• Start of concrete berm	
		0 m – 10 m	• Berm segment could not be observed due to overgrown vegetation	• Maintenance activities were undertaken to remove vegetation.
		10 m – 52 m	• Minor build-up of debris • Minor surficial cracks noted along top of berm	• Maintenance activities were undertaken to remove debris.
		40 m	• Transverse crack, >0.5 cm wide	
		52 m – 67 m	• Berm segment could not be observed due to overgrown vegetation	• Maintenance activities were undertaken to remove vegetation.
		67 m – 80 m	• Broken curb, earth berm behind is intact	

Table 1. Field Observations

Berm Segment	Berm Type	Observation Location/ Segment	Observation	Follow-Up
From the corner of the Southeast Gate (0 m) to the southeast corner of the Main Gate off Robson Road (220 m) (continued)	Concrete Berm (cont'd)	82 m	• Transverse crack • Berms have shifted and are no longer in line	
		86 m	• Transverse crack • Berms have shifted and are no longer in line	
		86 m – 107 m	• Moderate build-up of debris (leaves and mud) causing pooling water	• Maintenance activities were undertaken to remove debris.
		107 m – 117 m	• Moderate build-up of debris (leaves and mud)	• Maintenance activities were undertaken to remove debris.
		117 m – 140 m	• Berm segment could not be observed due to overgrown vegetation	• Maintenance activities were undertaken to remove vegetation.
		140 m – 168 m	• Curb intact • Mostly clear of debris	
		168 m – 169 m	• A 1 m (approx.) segment of the berm appears to have been missing/ removed and has been replaced with asphalt patching • Sediment and debris on the ground shows evidence of flow of surface water over the patch (low point in berm) (Photograph 11)	• Containment infrastructure upgrades have been scheduled.
		169 m – 179 m	• Berm segment could not be observed due to overgrown vegetation	• Maintenance activities were undertaken to remove vegetation.
		179 m – 192 m	• Berm segment could not be observed due to overgrown vegetation • Pooling water was noted at the base of the berm	• Maintenance activities were undertaken to remove vegetation.
		192 m – 220 m	• Curb cleared of debris	
		220 m	• End of concrete berm • Wood debris observed blocking culvert opening under the Main Gate berm at the southeast corner of the Main Gate	• Maintenance activities were undertaken to remove debris.

The concrete berms were consistently measured to be a height of 0.17 m. The concrete walls in the northeast corner of the site (the sump area) ranged in height from 0.53 m to 0.82 m (Concrete Wall 1) and from 0.43 m to 0.49 m (Concrete Wall 2). The earth berms along the site's west and south perimeters ranged in height from 0.15 m to greater than 2 m (approximately).

The full perimeter of the site is approximately 900 m. The total approximate length of the berms around the site perimeter, based on berm type, is detailed in Table 2 below.

Table 2. Total Length of Berms

Containment Type	Total Length of Perimeter
Concrete Berm/ Wall	540 m
Earth Berm	205 m
None	155 m

2.2 Maintenance Works

On June 6 and 7, 2018, SLR revisited the site to remove debris and vegetation, and provide maintenance works, along the concrete berms. As indicted in Table 1 above, debris and vegetation was removed from areas where minor to significant build-up was noted during the condition assessment.

3.0 DISCUSSION

The following section provides a summary of the stormwater containment berm condition assessment results for the site.

Multiple areas of minor to significant debris build-up and vegetation overgrowth were identified during the May 10 site reconnaissance. On June 6 and 7, 2018, follow-up work was undertaken to clear the identified debris and vegetation along the concrete berms, wherever possible. Build-up of debris and vegetation growth along the berm has the potential to increase ponding, and ultimately lead to the off-site flow of stormwater runoff. Regular debris removal, as well as maintenance of the concrete and earth berms, is required to ensure the berms are preforming optimally and all stormwater runoff is appropriately contained.

Missing stormwater containment infrastructure was identified at the Northeast and Southeast Gates and in the northwest corner of the site. These areas fall within the Remaining Site Area sub-catchment, where stormwater runoff could potentially be impacted with contaminants from on-site processes, and therefore should be contained. Works to install concrete berms and/or speed bumps for the purpose of stormwater containment have been scheduled for these areas.

In addition, one area of asphalt patching, approximately 1 m in length, was identified along the eastern site perimeter where the concrete berm was missing or had been removed. Based on the visual observation of the debris around the patching, previous overtopping of the patched segment by stormwater flow was evident. This area is a potential weak spot in the containment infrastructure. Repair works have been scheduled.

Along the western site perimeter, between the AST containment area and the southwest site corner, the earth berm was found to have washed away in multiple locations, before tapering off to the southeast. Based on visual observations, it appears that the berm has been washed towards the neighboring site. Although this berm corresponds to the Southwest Storage Area sub-catchment, an area which is not required to be contained, repairing and extending the berm to more fully contain the western site perimeter would prevent further degradation/ washing, and improve overall aesthetics and perception.

Multiple transverse cracks, along with some minor spalling, were identified in the concrete berms and asphalt pavement around the site. In the event of significant precipitation, stormwater could potentially travel through these cracks and travel off-site.

4.0 RECOMMENDATIONS

Based on the results of SLR's May 10 assessment of the stormwater containment berms, following the completion of berm maintenance work and the scheduling of berm repair/ improvement works, the following actions are recommended:

- Conduct regular future cleaning/ maintenance activities of the concrete berms to prevent future build-up and overgrowth;
- Preform maintenance on sections of the earth berm area along the western site perimeter where the berm has been washed out and extend the earth berm along the western perimeter where the berm tapers out (between the AST containment area and the southwest corner, minimum berm height of 0.17 m); and
- Repair significant berm and asphalt cracking as needed.

5.0 STATEMENT OF LIMITATIONS

This report has been prepared and the work referred to in this report has been undertaken by SLR Consulting (Canada) Ltd. (SLR) for Western Cleanwood Preservers LP, hereafter referred to as the "Client". It is intended for the sole and exclusive use of Western Cleanwood Preservers LP. The report has been prepared in accordance with the Scope of Work and agreement between SLR and the Client. Other than by the Client 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 unless payment for the work has been made in full and express written permission has been obtained from SLR.

This report has been prepared in a manner generally accepted by professional consulting principles and practices for the same locality and under similar conditions. No other representations or warranties, expressed or implied, are made.

Opinions and recommendations contained in this report are based on conditions that existed at the time the services were performed and are intended only for the client, purposes, locations, time frames and project parameters as outlined in the Scope or Work and agreement between SLR and the Client. The data reported, findings, observations and conclusions expressed are limited by the Scope of Work. SLR is not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. SLR does not warranty the accuracy of information provided by third party sources.

Yours sincerely,
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2_Stormwater Pollution Prevention Plan\Appendix E - Berm Assessment\
1. 2018 Berm Assessment_Letter Report.2018-09-13.docx

Photograph 1: Between the northeast corner of the Main Gate off Robson Road (0 m) and the Northeast Gate (127 m) – Concrete Berm (looking south), 10 m to 30 m – Debris and vegetation removed from berm area.

Photograph 2: Between the northeast corner of the Main Gate off Robson Road (0 m) and the Northeast Gate (127 m) – Concrete Berm (looking north), 44 m to 82 m – Debris and vegetation removed from berm area.

Photograph 3: Northeast Gate (looking north) – No containment present between Concrete Wall 1 and Concrete Wall 2.

Photograph 4: Between the east end of the northern site perimeter (0 m) and the west end of the northern site perimeter (154 m) – Concrete Berm (looking east), 0 m – 6 m - Alligator cracking and missing asphalt sections noted along the berm (immediately south).

Photograph 5: Between the east end of the northern site perimeter (0 m) and the west end of the northern site perimeter (154 m) – Concrete Berm (looking east), 6 m – 100 m - Debris cleared from berm area.

Photograph 6: Between the east end of the northern site perimeter (0 m) and the west end of the northern site perimeter (154 m) – Concrete Berm, 26.8 m – Transverse Crack, >0.1 cm wide, minor spalling along crack.

Photograph 7: Between the west end of the northern site perimeter (0 m) and the west end of the southern site perimeter, west of the water treatment facility (56 m) – No containment present.

Photograph 8: Between the west end of the southern site perimeter, west of the water treatment facility (0 m), and the end of the concrete berm along the eastern site perimeter, west of the AST containment area (109 m) – Concrete Berm (looking west), 6 m – 25 m – Debris and vegetation removed from berm area.

Photograph 9: Between the end of the concrete berm along the eastern site perimeter, west of the AST containment area (0 m) and the southwest corner of the site (175 m) – Earth Berm (looking west), 20 m – A small portion of the earth berm has been washed out.

Photograph 10: Southeast Gate (looking south) – No containment present, sediment and debris on the ground shows evidence of flow of surface water under the gate (low point in pavement).

Photograph 11: Between the corner of the Southeast Gate (0 m) and the southeast corner of the Main Gate off Robson Road (220 m) – Concrete Berm, 168 m – 169 m - A 1 m (approx.) segment of the berm appears to have been missing/ removed and has been replaced with asphalt patching, sediment and debris on the ground shows evidence of flow of surface water over the patch (low point in berm).

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