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Memorandum

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To:	Sandra Treccani and Katie Larimer; Washington State Department of Ecology
From:	Bruce Williams and JR Sugalski, PE JS.
Date:	February 7, 2017
File:	0110-148-06
Subject:	Riverfront Park Soil Management – Soil Placement on North Bank Property

INTRODUCTION AND OBJECTIVE

Riverfront Park (Park) is currently undergoing redevelopment as part of a municipal bond approved in 2014. This memo summarizes anticipated soil reuse activities at Riverfront Park as part of the park redevelopment. Multiple construction projects are planned for the next few years throughout the park property and the City of Spokane Parks and Recreation Department (Spokane Parks) desires to consolidate and beneficially reuse soil at the Park. The Park is shown in the Vicinity Map, Figure 1.

The objective of this memo is to identify an approach to manage excavated soil from multiple projects within the Park for reuse in the North Bank area in a manner that protects human health and the environment, complies with applicable regulations and is cost-effective. We request Ecology's opinion of the proposed approach described in this memo through the Voluntary Cleanup Program (VCP), Site CSID 13026, VCP project number EA0318.

SOIL CHARACTERIZATION

Before the Park was established as part of the World's Fair of 1974 (Expo 74), it was occupied by many industrial facilities and as a result, areas of the park contain contaminants associated with the historical industrial use of the site. Soil sampling conducted in preparation of redevelopment activities has indicated the presence of polycyclic aromatic hydrocarbons (PAHs), lead, cadmium, arsenic and diesel- and oil-range petroleum hydrocarbons at concentrations greater than Model Toxics Control Act (MTCA) Method A Cleanup Levels for Unrestricted Land Use (GeoEngineers 2016b, c and e). Soil sampling primarily was focused on areas where earthwork activities were anticipated as part of the redevelopment. During geotechnical and environmental assessments conducted at and near the Ice Ribbon and Skyride Facility projects (GeoEngineers 2016b) and the Looff Carousel project (GeoEngineers 2016c) encountered soil consisted of granular material (fine to medium sand and loose to medium dense sand and gravel with variable silt and cobble content).

Table 1 summarizes chemical analytical results greater than MTCA Method A Cleanup Levels for samples collected from the Ice Ribbon and Looff Carousel geotechnical and environmental assessments, and a park-wide soil assessment.

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TABLE 1: SUMMARY OF CHEMICAL ANALYTICAL RESULTS GREATER THAN MTCA METHOD A

Parameter	MTCA Method A Cleanup Level	Ice Ribbon	Looff Carousel	Park Wide Soil Assessment
Arsenic (mg/kg)	20	47	None	None
Cadmium (mg/kg)	2	6.8	None	2.2 – 15
Lead (mg/kg)	250	340 – 3,600	730	300 – 1,800
Calculated cPAHs TEQ (µg/kg)	100	109 – 1,296	111 – 28,210	106 – 4,690
Lube Oil Range Hydrocarbons (mg/kg)	2,000	2,800	5,600	2,200 – 10,000
Diesel Range Hydrocarbons (mg/kg)	2,000	None	None	3,000 – 7,400

Notes:
mg/kg = milligrams per kilogram, µg/kg = micrograms per kilogram

To reduce project costs and beneficially reuse suitable soil (from a geotechnical standpoint), a Soil Management Plan (GeoEngineers 2016a) was developed in consultation with the Washington State Department of Ecology (Ecology) through the VCP, Site CSID 13026, VCP (project number EA0318), to provide guidelines on testing, handling and reusing clean, impacted and contaminated soil at the site. In general accordance with the Soil Management Plan (SMP), Spokane Parks proposes to utilize impacted and contaminated soil from various redevelopment projects within the park for embankment fill at the North Bank project area (North Bank). The embankment fill is intended to connect the upper and lower portions of the North Bank area currently separated by a basalt outcrop. The primary source of soil will be from the Ice Ribbon and Looff Carrousel projects, although impacted and contaminated soil from other areas of the park where earthwork activities occur could also be used for embankment fill.

NORTH BANK SITE CHARACTERIZATION

The North Bank area of Riverfront Park proposed for redevelopment is generally bounded by Cataldo Avenue to the north, Mallon Avenue/Howard Street to the west, Washington Street to the east and the Spokane River to the south. This area of the Park currently contains two parking lots, green space and a central maintenance facility. A basalt outcrop between the two parking lots provides approximately 20 feet of vertical relief. The upper parking lot was the former site of the Broadview Dairy. Historical use of the lower parking lot is unknown.

The area is generally unpaved and surface soil generally consists of sand and gravel. A patch of asphalt comprising approximately 10,000 square feet (ft^2) is located on the upper parking lot. A historical concrete feature comprising approximately 3,500 ft^2 is located in the northeastern portion of the parking lot. Green space and park pavilions are located between the lower parking lot and Spokane River.

In-place soil in the North Bank area was characterized by CH2MHill in 2000 (CH2M 2000) and GeoEngineers in 2016 (GeoEngineers 2016e). Shallow bedrock is present at depths of approximately ½ to 3 feet below ground surface (bgs) near the outcrop. Soil thickness generally increases to the south and east away from the outcrop to depths in excess of 15 feet. Groundwater was encountered in one boring (DP-1) at about 3 feet bgs near the bedrock outcrop. Both assessments identified metals and PAHs in soil at the North Bank area greater than MTCA Method A Cleanup Levels. Diesel- and oil-range petroleum hydrocarbons greater than MTCA Method A Cleanup Levels were also identified in the North Bank area as part of the 2016 assessment activities.

SUMMARY OF PROPOSED ACTION

Spokane Parks proposes to temporarily stockpile soil at the eastern end of the lower parking lot as shown in Proposed Soil Stockpile Location, Figure 2. The location is approximately 300 feet from the Spokane River and will abut to the existing basalt outcrop. Spokane Parks intends to reuse the stockpiled soil at the proposed stockpile location as embankment fill as part of the final North Bank design.

Site Preparation

During soil assessment activities in 2016, petroleum contamination was observed within the proposed footprint of the soil stockpile. Before the soil stockpile is constructed, Spokane Parks will remove petroleum contaminated soil (PCS) from the footprint of the proposed stockpile. Existing soil will be excavated to bedrock and if petroleum contamination is observed on bedrock, the area will be rinsed with a pressure washer and the water will be collected by a vactor truck, where possible. PCS will be disposed off-site at Waste Management's Graham Road Facility.

After PCS removal, approximately four soil samples will be collected from the excavation below the proposed stockpile footprint to characterize the area and the effectiveness of the cleanup action. Samples will be collected from the excavation sidewalls if the excavation terminates on top of bedrock. The upper parking lot will also be regraded (if needed) to divert stormwater away from the planned location of the soil stockpile. Construction of the temporary stockpile will commence after the PCS is removed, confirmation samples are collected and grading is done to direct stormwater away from the stockpile area.

Temporary Stockpile Construction

A Soil Stockpile Management Plan (SSMP) (GeoEngineers 2016d), was developed to assist with construction and maintenance of the temporary soil stockpile. The soil stockpile will be constructed in general accordance with the SSMP. Management features within the plan include:

- Installing and maintaining silt fence around the stockpile;
- Tracking the quantities and sources of soil placed into the stockpile;
- Removing large pieces of concrete from the soil, which could result in voids within the embankment;
- Covering the stockpile with scrim reinforced plastic sheet to minimize stormwater infiltration and water/wind erosion during stockpile construction;
- Controlling stormwater runoff from the covered stockpile and allowing stormwater to infiltrate into native soil at grade without treatment;
- Managing equipment used to construct the pile to prevent "track out" of soils;
- Limiting access to the stockpile using temporary fences and posted signs: and
- Regular inspections.

Since the stockpile will be constructed near the proposed permanent location, a bottom plastic sheet will not be used. The height of the stockpile will most likely be greater than 10 feet because the stockpile will be constructed against the existing basalt outcrop. During inactive periods of stockpile construction (greater than three months) hydro-seeding or tackifiers will be used to stabilize the stockpile and reduce the chances of wind

and water erosion. Before the pile is hydroseeded or tackifiers are applied, the pile will be graded to encourager stormwater to runoff from the pile and infiltrate into the existing site soils.

Final Design

Final redevelopment plans in this area include a regional playground, paved pathways, open green spaces, and a parking lot. Both native materials and fill from other portions of the site, placed properly, are appropriate for reuse in this manner. The reuse of soil is sustainable because it avoids transporting and landfilling the material, and the cost of purchasing clean fill for placement. In an email dated December 21, 2016, Ecology determined that limited purpose landfill regulations (WAC 173-350-400) did not apply to re-use of the soil at the site because:

"…This rule was intended to address the appropriate handling of contaminated soils that are removed (not excavated) from a property. You (Spokane Parks) explained your intent to consolidate/reuse contaminated soils on the same property from which they will be excavated; hence, we don't consider them to be removed."

Soil identified for potential placement at the North Bank area will be placed in general accordance with the SMP (GeoEngineers 2016a). Material unsuitable from geotechnical considerations, such as large organic material, will be segregated and disposed in accordance with local, state and federal regulations. The limits and extents of the consolidated material will be surveyed by a Washington State Licensed Professional Land Surveyor (PLS). The extents of the consolidated material will be shown on projects as-builts and incorporated into the GIS-based Riverfront Park maintenance plan for the redevelopment project. The maintenance plan will show park maintenance workers where the contaminants are located and will help employees understand the contaminants, exposure pathways and potential effects.

To reduce exposure pathways and contaminant migration, efforts will be made to cover the fill material with generally impermeable materials such as concrete and asphalt concrete pavement. Where the embankment fill will not be covered by impermeable material, the contaminated and/or impacted soil will be covered with a geotextile fabric (as a marker), at least 1 foot of clean fill material, and a vegetated cap in accordance with the SMP.

Site grading and stormwater management controls will be utilized to reduce stormwater infiltration through contaminated soil. When applicable, low impact development (LID) best management practices (BMPs) will be incorporated into the North Bank project design to enhance and combine stormwater management into the aesthetics of Riverfront Park. LID BMPs may include bioretention facilities with underdrains to collect and convey water from paved surfaces or that infiltrates though vegetative layers if located near or above contaminated soil.

REFERENCES

CH2MHill, 2000. "Technical Memorandum. Central Park Maintenance Property Phase II Environmental Site Assessment". Prepared for the City of Spokane Department of Parks and Recreation by CH2M Hill Spokane. August 2, 2000.

GeoEngineers, Inc. 2016a. "Soil Management Plan, Riverfront Park Redevelopment, Spokane, Washington." GEI File No. 0110-148-04.

GeoEngineers, Inc. 2016b. "Geotechnical Engineering Evaluation and Environmental Site Assessment, Riverfront Park Ice Ribbon and Skyride Facility, Spokane, Washington." GEI File No. 0110-148-04.

GeoEngineers, Inc. 2016c. "Geotechnical Engineering Evaluation and Environmental Site Assessment, Riverfront Park Looff Carousel, Spokane, Washington." GEI File No. 0110-148-04.

GeoEngineers, Inc. 2016d. "Soil Stockpile Management Plan " GEI File No. 0110-148-06.

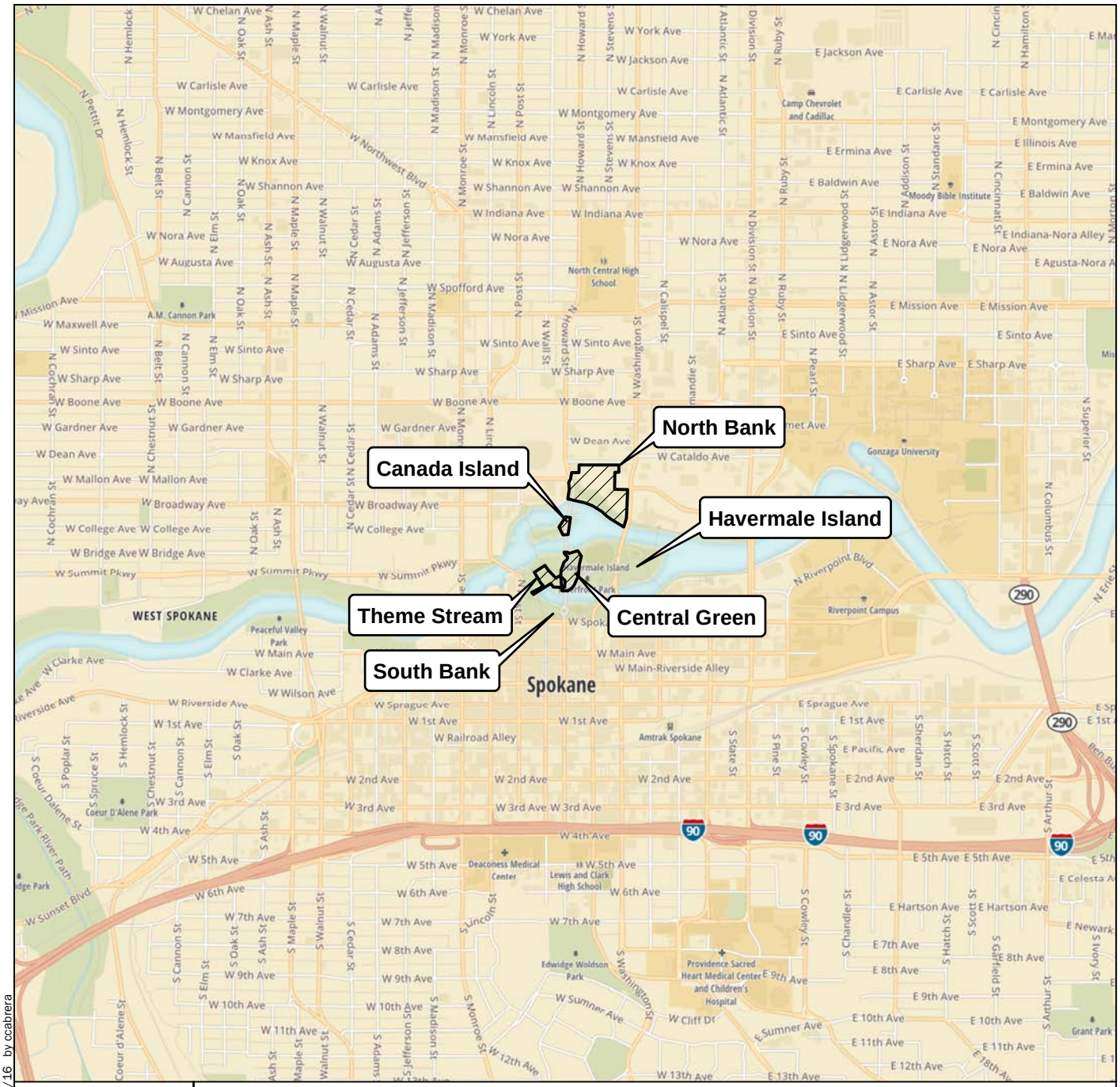
GeoEngineers, Inc. 2016e. "Phase II Assessment Report, Riverfront Park, Spokane, Washington." GEI File No. 0110-148-06.

Washington State Department of Ecology. 2007. Model Toxics Control Act Cleanup Regulations, Washington Administrative Code, Chapter 173-340.

Attachments:

Figure 1. Vicinity Map

Figure 2. Proposed Soil Stockpile Location



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Feet

Vicinity Map

Riverfront Park Redevelopment
Spokane, Washington

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Figure 1

Notes:

1. The locations of all features shown are approximate.
2. This drawing is for information purposes. It is intended to assist in showing features discussed in an attached document. GeoEngineers, Inc. cannot guarantee the accuracy and content of electronic files. The master file is stored by GeoEngineers, Inc. and will serve as the official record of this communication.

Data Source: Mapbox Open Street Map, 2016

Projection: NAD 1983 UTM Zone 11N

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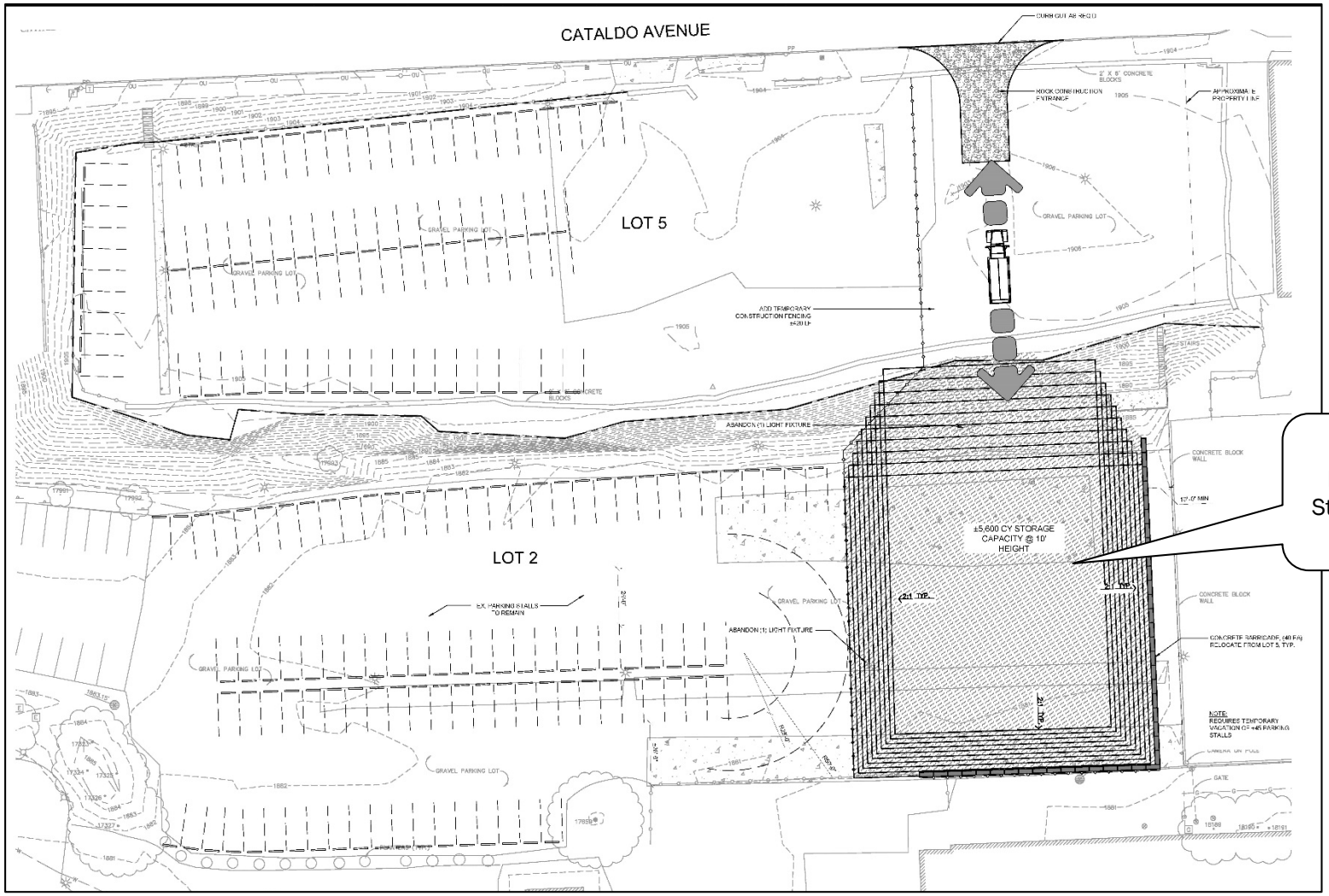

Not to Scale

Proposed Soil Stockpile Location

Riverfront Park Redevelopment
Spokane, WA

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Figure 2

Notes:

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Data Source: January 12, 2017 RFP Soil Stockpile Study, City of Spokane Parks and Recreation