

April 17, 2013

10-1177.100

Manitoba Conservation and Water Stewardship
Ste. 160-123 Main Street
Winnipeg, Manitoba
R3C 1A5

Attention: Mr. Warren Rospad
District Supervisor / Environment Officer
Environmental Compliance and Enforcement

Dear Mr. Rospad:

Re: Remedial Action Plan
Former Petro-Canada Service Station and Certigard Car Repair Facility
208 St. Anne's Road
Winnipeg, Manitoba
Outlet No. 63955

Under the authorization of Suncor Energy Inc. (Suncor), O'Connor Associates Environmental Inc., a Parsons Company (Parsons), has prepared the following remedial action plan (RAP). The proposed plan includes the excavation of impacted soil and entrained groundwater, the disposal of the excavated impacted soil and the backfilling of the excavation with imported fill material at the above referenced Site.

Specifically, this RAP concerns the removal of petroleum hydrocarbon impacted soil and entrained groundwater in the vicinity of the former tank nest and pump island areas located on the north and east portions of the Site.

The location of the Site is presented on Drawing No. 1. The former Site facilities are presented on Drawing No. 2. The borehole and monitoring well locations are presented on Drawing No. 3.



BACKGROUND INFORMATION

Site Location/ Description

The Site is located at 208 St. Anne's Road in Winnipeg, Manitoba. The Site is legally described as Lot 33-36, Block 3, Plan 2785 WLTO (Winnipeg Land Titles Office) and occupies an area of approximately 2394 m².

The Site formerly operated as a Petro-Canada Service Station and Certigard Car Repair Facility and currently operates as Penner Certified Auto Service Station. Former Site facilities included several petroleum USTs and associated product piping and dispensing equipment. Current Site facilities include a service building (with an inactive car wash) and one waste oil underground storage tank (UST).

The Site is zoned for commercial land use. Surrounding land is commercial to the north, east and south; and, residential to the west.

Regional Description

Previous assessments on-Site indicated the underlying native soil profile generally consisted of interlayered silt and clay which extended to the maximum depth of investigation, approximately 6.1 mbgs. Gravel fill material was encountered in the vicinity of the former tank nests to a depth of approximately 4.0 mbgs.

The nearest permanent natural surface water body is the Red River, located approximately 850 m west of the Site.

Groundwater in the area is typically not used as a source of drinking water or for industrial purposes. Potable water for the City of Winnipeg is obtained from Shoal Lake, Ontario, located approximately 125 km east of the city.

Previous Assessments and Contaminants of Concern

The soil and groundwater analytical results for benzene, toluene, ethylbenzene, xylenes (BTEX), petroleum hydrocarbon fractions (PHC) fractions F1 to F4, lead, 1, 2-dibromoethane (DBA) and 1,2-dichloroethane (DCA) obtained during the most recent Site assessment work are summarized on Drawing Nos. 4 and 5.

During the assessment work, 1,2-DBA and 1,2-DCA were not detected in soil and groundwater above the assessment criteria ((Alberta Soil and Groundwater Remediation Guidelines (2010)) and therefore, are not considered contaminants of concern for remediation at the Site.

Arsenic was detected in soil at one location at depth (3.5 mbgs to 3.8 mbgs) at a concentration slightly higher than the assessment criterion (13 mg/kg vs. 12 mg/kg) ((Canadian Council of Ministers of the Environment (CCME) (2012)). This finding appears to be related to naturally occurring arsenic typically seen in clay soils within the region and therefore, is not considered a contaminant of concern for remediation at the Site.

Selection of Remediation Criteria

For the remediation work, Manitoba Conservation's direction to adopt the CCME *Canadian Environmental Quality Guidelines* (2012) and *Canada Wide Standards (CWS) for Petroleum Hydrocarbons in Soil* (2008) will be followed.

The applicable exposure pathways were selected based on the following information.

- Fine-grained soils, as determined during previous Site investigation activities;
- According to the City of Winnipeg, the Site is currently zoned for commercial land use;
- The City of Winnipeg is supplied with potable water from Shoal Lake, located approximately 125 km east of the City; and,
- The nearest permanent natural surface water body is the Red River, located approximately 850 m west of the Site.

Based on the above discussion, criteria concerning fine-grained soils in a commercial land use setting, with the potable and freshwater aquatic life pathways excluded, were selected.

The selected applicable remediation soil criteria are those presented under the CCME CEQG *Canadian Soil Quality Guidelines for the Protection of Environment and Human Health* (2012) Tables 2 and 3 Soil quality guidelines and check values for BTEX and lead; and the CCME CWS (2008) Table 2 Tier 1 levels for PHCs for fine-grained surface soils and Table 4 Tier 1 levels for PHCs for fine-grained subsoils for PHC fractions F1 to F4.

A detailed summary of the selected soil remediation criteria is presented in Table 1.

TABLE 1
REMEDIATION CRITERIA
PETROLEUM HYDROCARBON PARAMETERS AND LEAD

	B	T	E	X	F1	F2	F3	F4	Pb
Surface Soil	2.8 ^{a,b}	330 ^a	430 ^a	230 ^a	320 ^{c,d}	260 ^{c,e}	2500 ^{c,f}	6600 ^c	260 ^g
Subsoil	2.9 ^{a,b}	660 ^a	860 ^a	460 ^a	800 ^{c,d}	1000 ^{c,e}	5000 ^{c,f}	10000 ^c	260 ^g

- a - Canadian Council of Ministers of the Environment (CCME); Canadian Environmental Quality Guidelines (2012); Soil quality guidelines and check values in surface soil – fine-grained soils, commercial land use
 - b - human health guidelines/check values – 10⁻⁵ incremental risk
 - c - CCME; Canadian Wide Standards for Petroleum Hydrocarbons in Soil (2008); Tier 1 levels for PHCs for fine-grained surface soils – commercial land use
 - d - BTEX to be not included in fraction
 - e - Naphthalene to be included in the fraction
 - f - PAHs to be included in the fraction
 - g - CCME; Canadian Environmental Quality Guidelines (2012); Soil quality guidelines and check values – commercial land use
- Soil criteria listed in milligrams per kilogram (mg/kg) on a dry weight basis.

REMEDIATION EXCAVATION/MANAGEMENT PLAN

The excavation, transporting and backfilling activities will be conducted by Tervita Corporation (Tervita) under contract to Suncor. Parsons personnel will assist the contractor with the management of the petroleum impacted soils and the determination of the extent of the excavation. Remediation of the Site will tentatively commence in Summer 2013. The following presents details concerning the excavation activities.

Excavation Limits and Volumes

The most probable extent of remedial excavation limits and volume were derived based on previous Site assessment findings concerning impacted soil and entrained groundwater at the Site. It is estimated that approximately 2620 m³ of impacted soil and entrained groundwater is expected to be excavated.

The most probable extent of remedial excavation limits and volume are presented on Drawing No. 6.

Waste Disposal Site

Excavated soils will be transported and treated at the Mid Canada Soil Recycling Facility located in Ile de Chenes, Manitoba.

Soil Screening and Sampling

Soil screening samples will be collected from the final floor of the excavation on an approximate 2 m by 2 m grid. Soil screening samples will be collected from the final walls of the excavation on an approximate 1 m by 2 m grid.

Soil samples from the excavation margins will be selected for laboratory analyses based on physical observations and/or field screening results. Worst case samples (based on field screening results) from the excavation wall and floor grid will be submitted for laboratory analysis. In general, one sample from every column on the walls of the excavation and ten percent of the floor samples will be submitted for laboratory analysis.

Potential Dewatering

Groundwater which may accumulate during excavation activities will be removed by vacuum truck and transported offsite for disposal by a licensed waste hauler to a licensed facility for treatment, if required.

Excavation Backfill

Prior to remedial excavation activities, samples of the proposed imported backfill material will be submitted for a suite of laboratory analyses to ensure compliance with remediation objectives. In addition, imported backfill material will be selected to correspond with native stratigraphy.

We trust that the enclosed information is satisfactory for your present requirements. Should you have any questions or concerns, please contact the undersigned.

Respectfully submitted,

O'CONNOR ASSOCIATES ENVIRONMENTAL INC., A PARSONS COMPANY



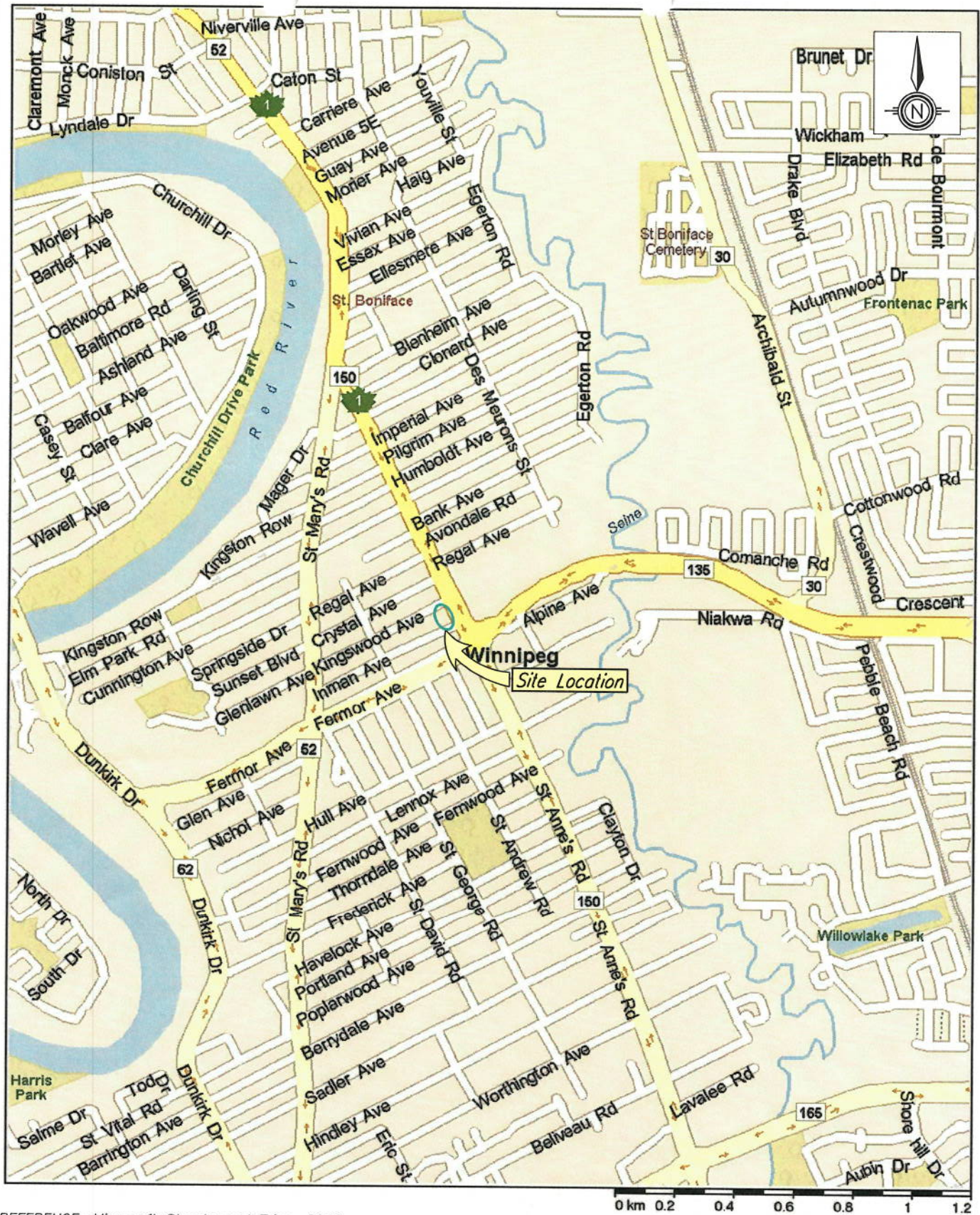
Carrie Strachan, B.Sc., C.E.T.



Gary S. Karp, P. Geo.



Distribution: Addressee (1)
Suncor Project Manager (1)



REFERENCE: Microsoft Streets and Trips, 2012.

Site Location Map

Suncor Energy
208 St. Anne's Road, Winnipeg, Manitoba

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Ref. No.: 10-1177.100

Reviewed: MSH

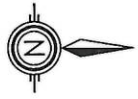
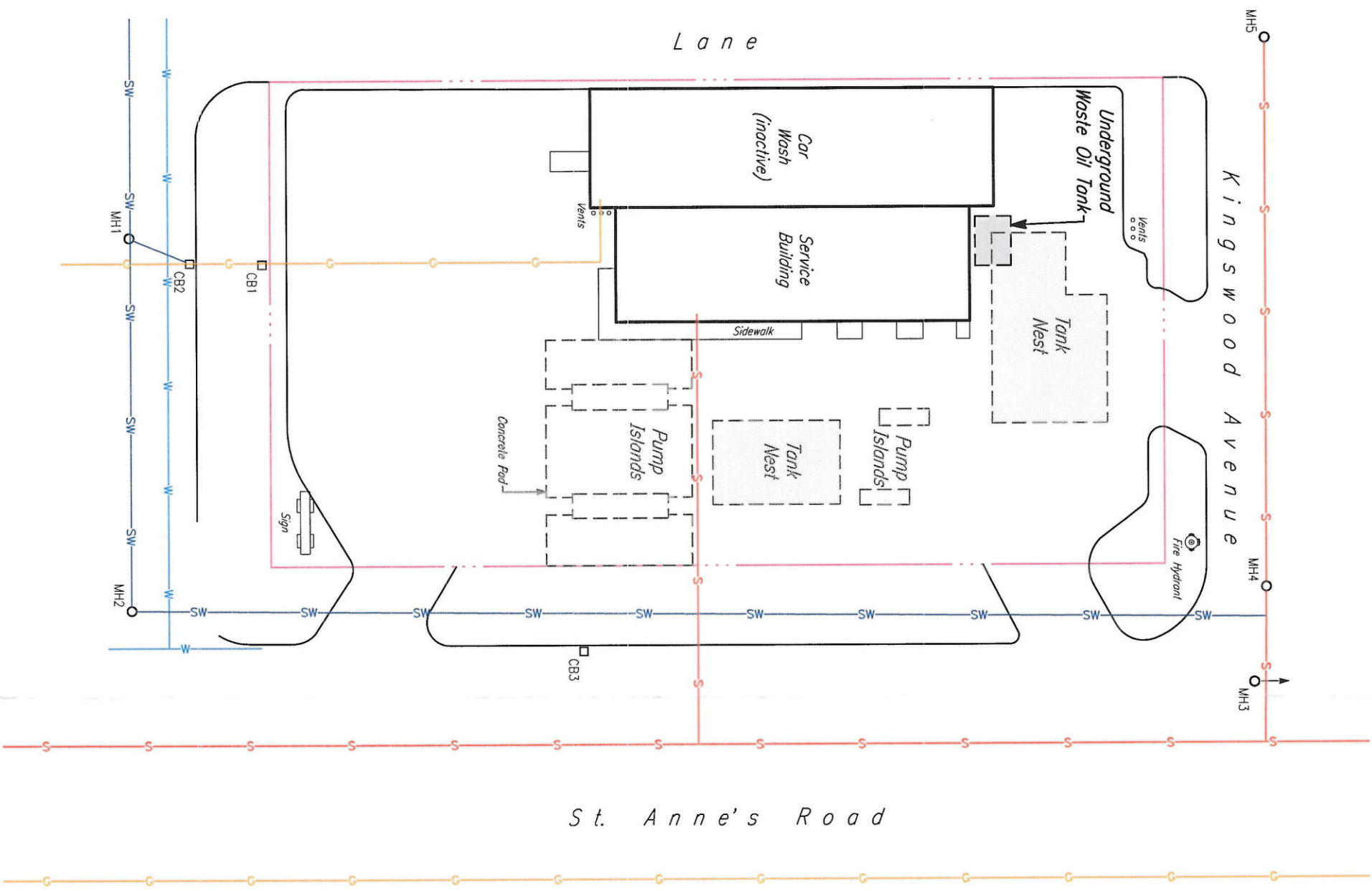
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Date: 2013/03/22

PARSONS

Drawing
No.:

1



LEGEND

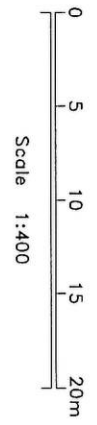
- Former Feature
- Assumed Property Line
- 201012251 Date Format: yyyy/mm/dd

Utilities

All utility lines are underground unless noted as O/H - overhead.

- Catch Basin
- Manhole
- Electricity
- Natural Gas
- Sanitary Sewer
- Storm Sewer
- Water

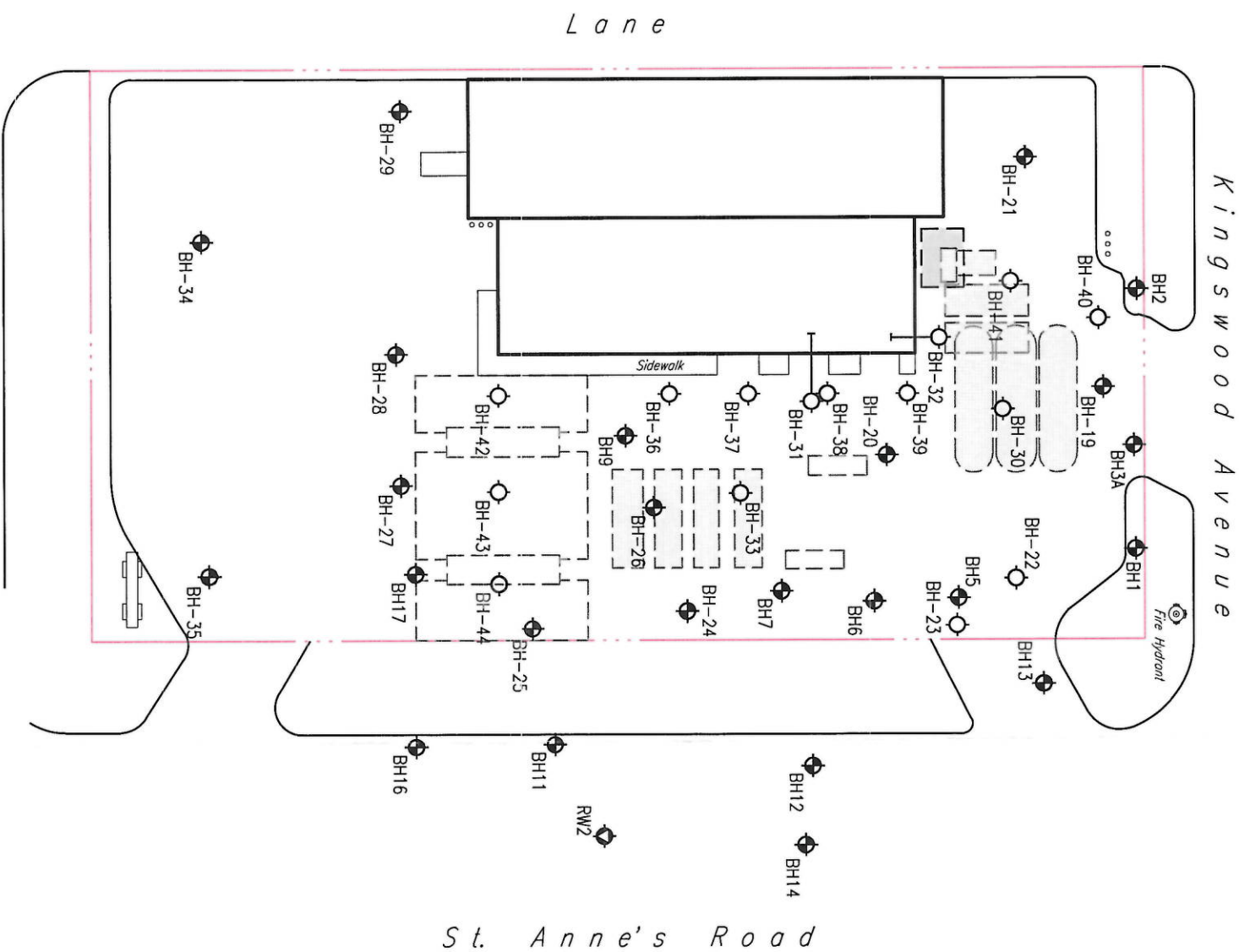
NOTE: All features are approximate.



Site Plan

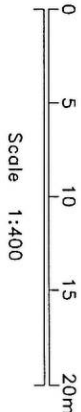
Suncor Energy
208 St. Anne's Road, Winnipeg, Manitoba

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LEGEND

- Former Feature
 - .-.- Assumed Property Line
 - Borehole
BH-22 and BH-23 by Parsons, 2012
BH-30 and BH-33 by Parsons, 2012
BH-36 to BH-44 by Parsons, 2013
 - Angled Borehole
BH-31 and BH-32 by Parsons, 2012
 - Monitoring Well
BH1, BH2, BH5 to BH7, BH9, BH11
to BH14, BH16 and BH17, Unknown
BH34, BH-19 to BH-21 and BH-24 to BH-29
by Parsons, 2012
BH-34 and BH-35 by Parsons, 2013
 - Recovery Well
- 2010/12/31 Date Format: yyyy/mm/dd



NOTE: All features are approximate.

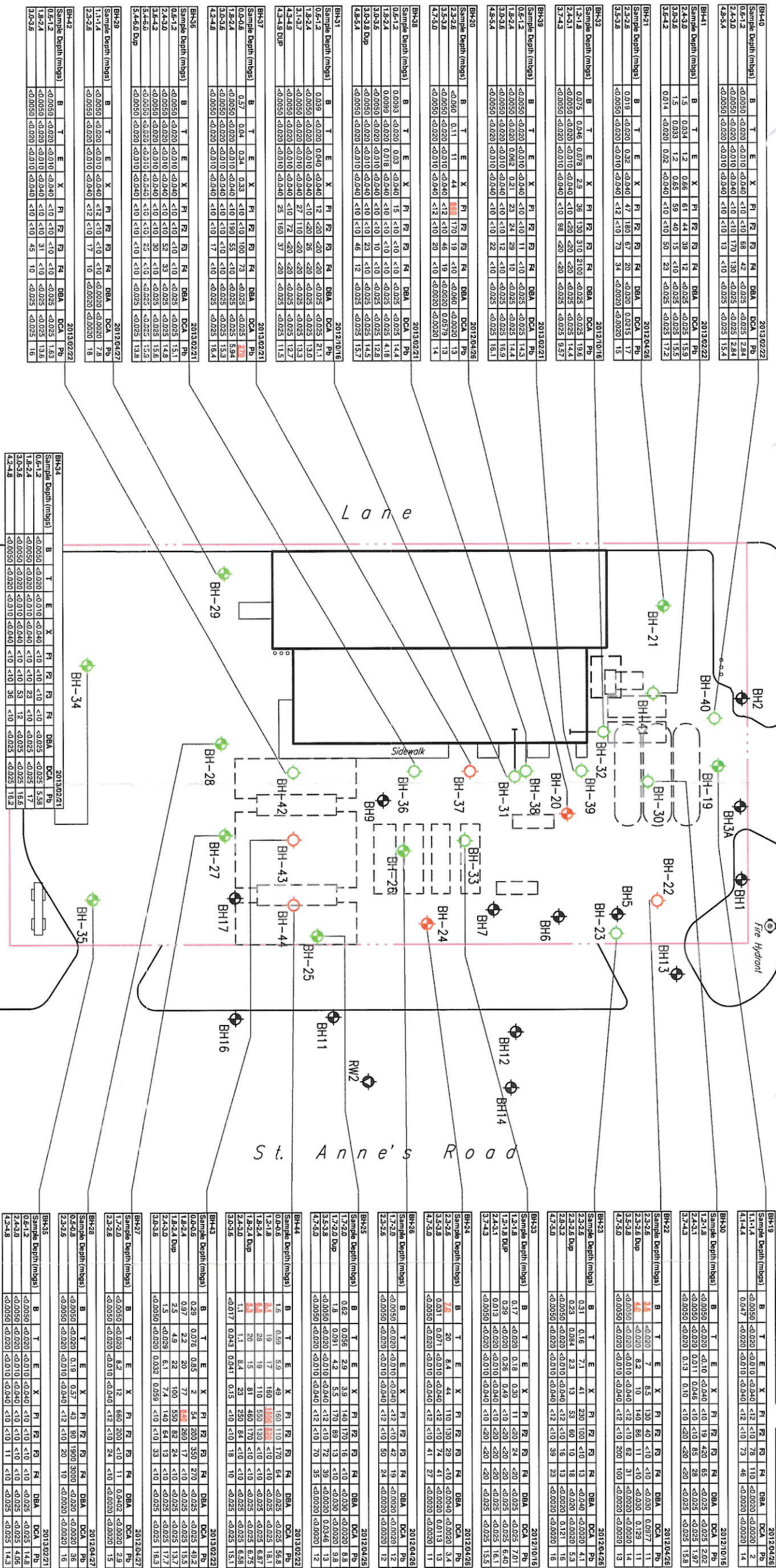
Borehole and Monitoring Well Location Plan

Suncor Energy
208 St. Anne's Road, Winnipeg, Manitoba

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Reviewed: MSH	File No.: 1177S025	Date: 2013/03/22

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Drawing
No.: 3



LEGEND

Analytical Results

Criteria

- Former Feature
 - Assumed Property Line
 - Borehole
 - Angled Borehole
 - Monitoring Well
 - Recovery Well
 - 2010/12/31 Date Format: yyyy/mm/dd
 - mg/kg Metres Below Ground Surface
 - mg/kg Milligrams Per Kilogram, dry weight basis
- All Results Reported in mg/kg
- Location Where All Soil Samples Met Applicable Criteria for All Parameters that Were Analyzed, Shown in Green
- Location Where at Least One Soil Sample Exceeded Applicable Criteria for At Least One Parameter that Was Analyzed, Shown in Red
- Exceedances of Applicable Criteria, Shown in Red and Bold
- DUP Field Duplicate Sample
- Not Analyzed
- Result Less Than Reportable Detection Limit

Parameter	B ^a	T	E	X	FI	F2	R3	R4	DBA	DCA	Pb
Surface Soil ≤1.5 m	2.8	330	430	230	320	280	2500	6600			260
Other ^a mg/kg	Subsoil >1.5 m	2.9	660	860	460	800	1000	5000	10 000		0.37
Benzene	Triphenylamine	Ethylphenylamine	Xylenes	FI-H	CCl ₄	CWS	Perpetuum	Hydrocarbon	Fraction		
DBA-1,2-Dichloroethane	DCA-1,2-Dichloroethane	Pb-Lead									

^a - Canadian Council of Ministers of the Environment (CCME), Canadian Environmental Quality Guidelines (2012)

^b - Soil quality guidelines and check values in surface soils - fine grained soils, commercial land use

^c - CCME, Canadian Environmental Quality Guidelines (2012), Soil quality guidelines and check values in subsoils - fine grained soils, commercial land use

^d - CCME, Canada Wide Standards for Petroleum Hydrocarbons in Soil (2008), Tier 1 levels for PHCs for fine grained surface soils - commercial land use

^e - CCME, Canada Wide Standards for Petroleum Hydrocarbons in Soil (2008), Tier 1 levels for PHCs for fine grained subsoils - commercial land use

^f - CCME, Canada Wide Standards for Petroleum Hydrocarbons in Soil (2008), Tier 1 levels for PHCs for fine grained subsoils - commercial land use

^g - CCME, Canadian Environmental Quality Guidelines (2012), Surface soil remediation guideline values for commercial land use - fine grained soils

^h - CCME, Canadian Environmental Quality Guidelines (2012), Soil quality guidelines and check values - commercial land use

ⁱ - human health guidelines/check values - 10⁻⁶ incremental risk

NV - No Value

Soil Analytical Results

Petroleum Hydrocarbon Parameters

Suncor Energy

208 St. Anne's Road, Winnipeg, Manitoba



Screen Interval: Unknown									
Sample Date	B	T	E	X	F1	F2	DBA	DCA	Pb
2012/07/19	<0.0004	<0.0004	<0.0004	<0.0008	<0.3	<0.15	<0.00020	<0.00050	<0.00050

Screen Interval: 0.6 m to 3.7 mbgs									
Sample Date	B	T	E	X	F1	F2	DBA	DCA	Pb
2012/06/13	0.00082	0.0009	<0.00040	<0.00080	<0.100	<0.10	<0.00050	<0.00050	<0.00020

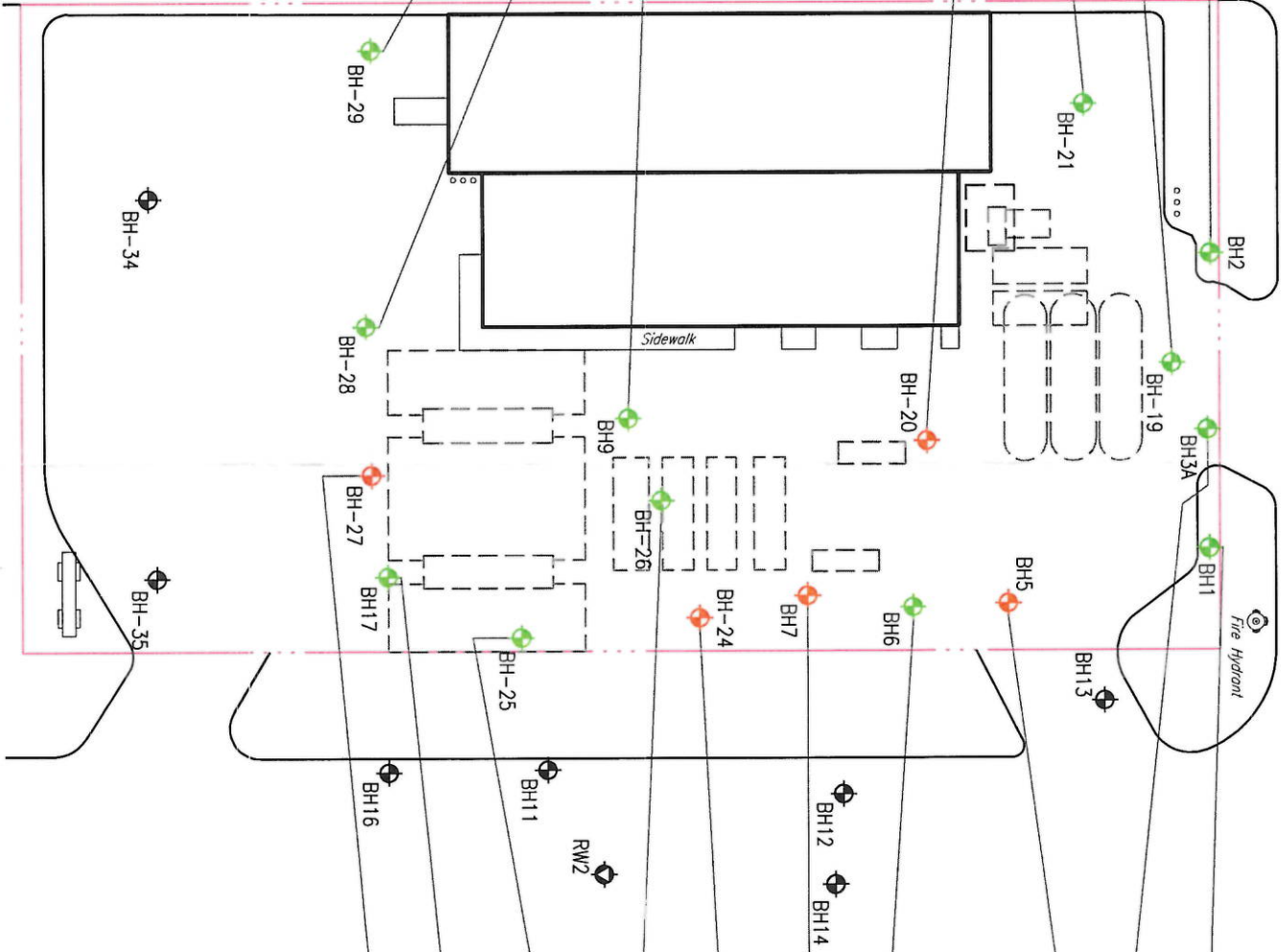
Screen Interval: 0.9 m to 4.0 mbgs									
Sample Date	B	T	E	X	F1	F2	DBA	DCA	Pb
2012/07/19	0.0006	<0.0004	0.0013	<0.0008	<0.3	0.25	<0.00020	<0.0018	<0.00020
2012/07/19 Dup	0.0015	0.0006	0.0044	<0.0008	<0.3	<0.15	<0.00020	<0.0028	<0.00020

Screen Interval: 0.9 m to 4.0 mbgs									
Sample Date	B	T	E	X	F1	F2	DBA	DCA	Pb
2012/06/13	0.34	0.014	0.0063	4.0	5.6	4.3	<0.00050	0.035	0.0015

Screen Interval: Unknown									
Sample Date	B	T	E	X	F1	F2	DBA	DCA	Pb
2012/06/13	<0.00040	<0.00040	<0.00040	<0.00080	<0.100	<0.10	<0.00050	<0.00050	<0.00020

Screen Interval: 0.9 m to 4.0 mbgs									
Sample Date	B	T	E	X	F1	F2	DBA	DCA	Pb
2012/06/13	<0.00040	<0.00040	<0.00040	<0.00080	<0.100	<0.10	<0.00050	<0.00050	<0.00020

Screen Interval: 0.9 m to 4.0 mbgs									
Sample Date	B	T	E	X	F1	F2	DBA	DCA	Pb
2012/06/13	<0.00040	<0.00040	<0.00040	<0.00080	<0.100	<0.10	<0.00050	<0.00050	0.00021



Screen Interval: Unknown									
Sample Date	B	T	E	X	F1	F2	DBA	DCA	Pb
2012/07/19	<0.0004	<0.0004	<0.0004	<0.0008	<0.3	<0.15	<0.00020	0.002	<0.00050

Screen Interval: 0.9 m to 4.0 mbgs									
Sample Date	B	T	E	X	F1	F2	DBA	DCA	Pb
2012/06/13	<0.00040	<0.00040	<0.00040	<0.00080	<0.100	<0.10	<0.00050	0.0025	<0.00020

Screen Interval: Unknown									
Sample Date	B	T	E	X	F1	F2	DBA	DCA	Pb
2012/06/13	0.44	0.1	2.0	11	8.8	2.1	<0.00050	0.0019	0.00059
2012/06/13 Dup	0.36	0.081	1.8	9.8	13	2.1	<0.00050	0.0015	0.00049

Screen Interval: Unknown									
Sample Date	B	T	E	X	F1	F2	DBA	DCA	Pb
2012/06/13	0.36	0.03	0.83	3.7	2.5	1.1	-	-	-

Screen Interval: Unknown									
Sample Date	B	T	E	X	F1	F2	DBA	DCA	Pb
2012/06/13	4.8	0.2	0.29	2.3	4.0	4.3	<0.00050	0.024	<0.00020
2012/06/13 Dup	4.9	0.23	0.29	2.4	6.1	3.1	<0.00050	0.027	<0.00020

Screen Interval: 0.9 m to 4.0 mbgs									
Sample Date	B	T	E	X	F1	F2	DBA	DCA	Pb
2012/06/13	22	30	2.6	14	7.5	2.9	<0.00050	0.036	0.0018

Screen Interval: 0.9 m to 4.0 mbgs									
Sample Date	B	T	E	X	F1	F2	DBA	DCA	Pb
2012/06/13	<0.00040	<0.00040	<0.00040	<0.00080	<0.100	<0.10	<0.00050	<0.00050	<0.00020

Screen Interval: 0.9 m to 3.1 mbgs									
Sample Date	B	T	E	X	F1	F2	DBA	DCA	Pb
2012/06/13	2.9	0.15	1.5	3.0	9.7	2.3	<0.00050	0.01	<0.00020
2012/07/19	3.0	0.066	1.3	2.6	<0.3	2.3	<0.00020	<0.00050	<0.00020

Screen Interval: Unknown									
Sample Date	B	T	E	X	F1	F2	DBA	DCA	Pb
2012/08/16	0.0021	0.0006	0.011	0.01	<0.300	0.52	<0.00020	<0.00050	<0.00020

Screen Interval: 0.9 m to 4.0 mbgs									
Sample Date	B	T	E	X	F1	F2	DBA	DCA	Pb
2012/06/13	0.016	0.0016	0.009	0.86	8.1	5.6	<0.00050	<0.00050	<0.00020

Analytical Results

LEGEND

- Former Feature
- Assumed Property Line
- Monitoring Well
- Recovery Well
- Date Format: yyyy/mm/dd
- mbgs
- Metres Below Ground Surface
- mg/L
- milligrams Per Litre

All Results Reported in mg/L

Location Where Most Recent Groundwater Sample Met Applicable Criteria for All Parameters that Were Analyzed, Shown in Green

Location Where Most Recent Groundwater Sample Exceeded Applicable Criteria for At Least One Parameter that Was Analyzed, Shown in Red

Location Where No Groundwater Sample Was Submitted From the Most Recent Sampling Event, Shown in Black

Location Where Measurable Free Product or Sheen Was Observed From Most Recent Sampling Event, Shown in Purple

Exceedences of Applicable Criteria, Shown in Red and Bold Free Product Apparent Thickness (in millimetres), or Sheen, Shown in Purple and Bold

Field Duplicate Sample

Not Analyzed

Result Less Than Reportable Detection Limit

Criteria

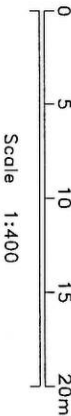
Parameter	B	T	E	X	F1	F2	DBA	DCA	Pb
Criteria* mg/L	19	240	150	74	9.9	3.1	NV	1.2	0.025
B-Benzene T-Toluene E-Ethylbenzene X-Xylenes F1-F2-CONE CWS Petroleum Hydrocarbon Fractions DBA-1,2-Dibromomethane DCA-1,2-Dichloroethane Pb-Lead									

*BTEX, F1-F2, DCA Alberta Soil and Groundwater Remediation Guidelines (2010);

Groundwater Remediation Guideline Values for Commercial/Industrial - fine grained soils (Ontario Ministry of Environment, 2011); Full Depth Generic Site Condition Standards in a Non-Portable Groundwater Condition

NV - No Value

NOTE: All features are approximate.



Groundwater Analytical Results Petroleum Hydrocarbon Parameters

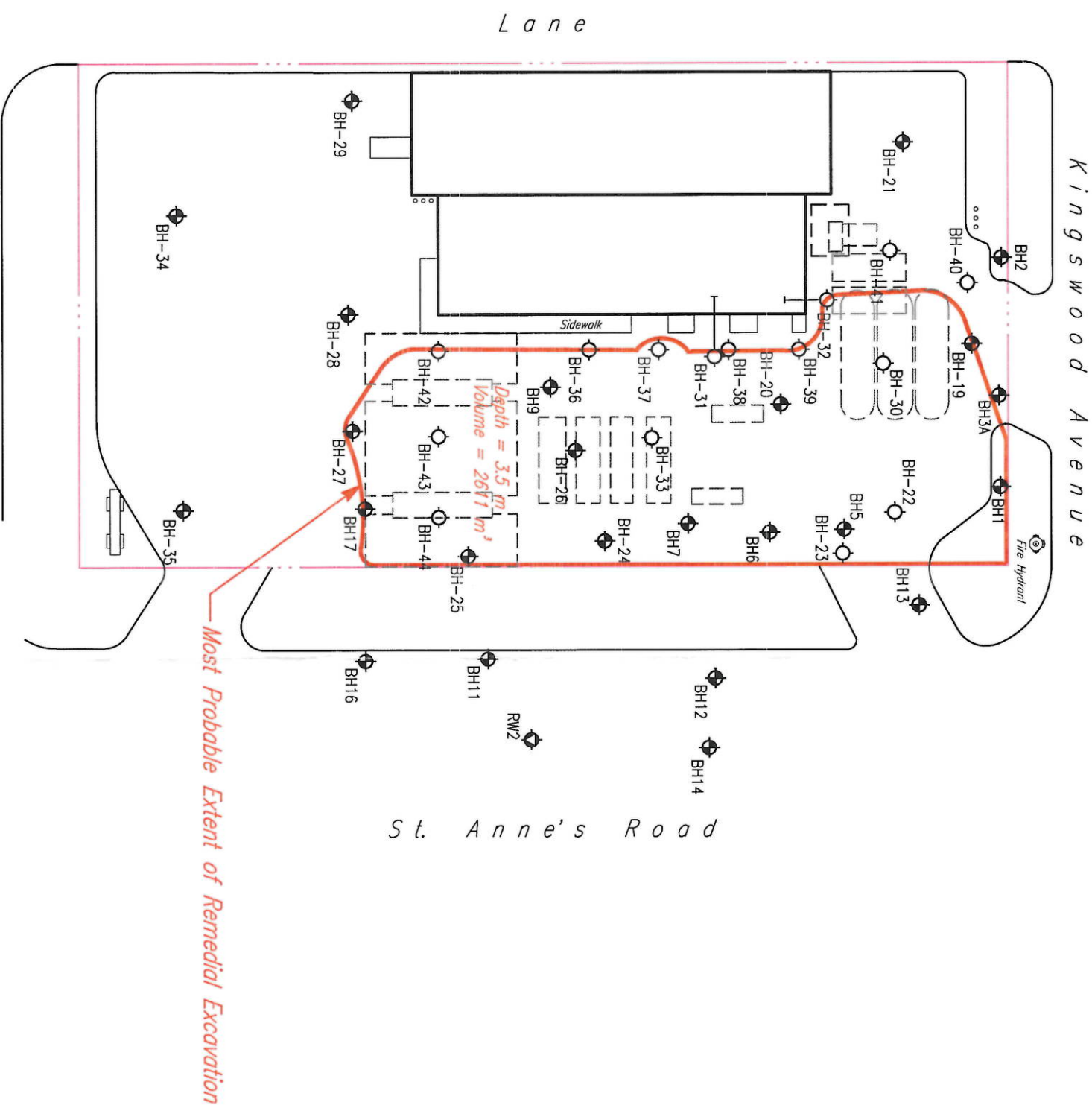
Suncor Energy

208 St. Anne's Road, Winnipeg, Manitoba

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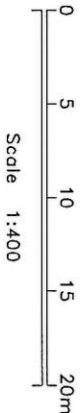
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LEGEND

- Former Feature
 - Assumed Property Line
 - Borehole
 - Angled Borehole
 - Monitoring Well
 - Recovery Well
- 2010/12/31 Date Format: yyyy/mm/dd

NOTE: All features are approximate.



Most Probable Extent of Remedial Excavation Location Plan

Suncor Energy
208 St. Anne's Road, Winnipeg, Manitoba

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Drawing No.: 6