COPY

WASTE CHARACTERIZATION ASSESSMENT (AREA A)
PRE-CONSTRUCTION SOIL TESTING
RISK MANAGEMENT PLAN IMPLEMENTATION
LAKESHORE BOULEVARD EAST AT LESLIE STREET
TORONTO, ONTARIO

Prepared For:

CITY OF TORONTO
C/O URS COLE SHERMAN

Prepared by:

SHAHEEN & PEAKER LIMITED

Project: SP3977B
August 12, 2002

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Project: SP3977B **August 12, 2002**

City of Toronto
c/o URS Cole Sherman
75 Commerce Valley Drive East
Thornhill, Ontario
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Attention: Mr. Keith Hutchinson, P.Eng.
Senior Project Manager

Dear Mr. Hutchinson:

Waste Characterization Assessment (Area A)
Pre-Construction Soil Testing
Risk Management Plan Implementation
Lakeshore Boulevard East At Leslie Street
Toronto, Ontario

1. INTRODUCTION

Shaheen & Peaker Limited (S&P) was retained by URS Cole Sherman (URS) on behalf of the City of Toronto to collect soil samples from the locations within an area identified as Area A in the Site Specific Risk Assessment (SSRA) for the subject site prepared by S&P (draft for submission to the Ontario Ministry of Environment and Energy, dated May 14, 2002). Area A is located within the north boulevard of Lakeshore Boulevard East and extends from the north curb of the westbound lanes of Lakeshore Boulevard to the northern limit of the road allowance. The eastern limit of Area A is the west curb of Leslie Street and the western limit of Area A is at station 16+496 and is coincident with the eastern boundary of the property currently occupied by the Toronto Film Studio. In general, Area A is approximately 25 to 30 m wide and about 500 m in length.

The purpose of the pre-construction soil testing program was to obtain additional information regarding the environmental quality of the soil scheduled for excavation for the construction of proposed bicycle and pedestrian paths and landscaping features (trees, shrubs, decorative lighting) within Area A of the subject site in order to finalize the specifications to be included in the Change Order to Grascan Construction Ltd. (Grascan) for the implementation of the Risk Management Plan (RMP) developed as part of the SSRA.

To permit the installation of walkways, bicycle paths and landscaping features within Area A of

the SSRA study area, soil will be excavated in selected areas to a depth of approximately 1.0 m below the existing grade to permit the construction of these features. Proposed excavations will be required to construct the features documented on draft drawings prepared by du Toit Allsopp Hillier, landscape architects for the project, dated July 2002 for submission to the City of Toronto Works and Emergency Services. The features include the following:

- a drainage swale approximately 0.5 m deep and 1.5 m wide located adjacent to the northern limit of the road allowance;
- excavations within a berm located near the northern margin of the site and in areas adjacent to the north curb of Lakeshore Boulevard East to permit the planting of trees and shrubs. These excavations may be up to approximately 1 m deep.
- shallow excavations to a depth of approximately 0.5 m to permit the construction of a pedestrian walkway and a bicycle path. The pedestrian walkway and bicycle path will consist of granular base pavement materials supporting an asphalt pavement surface.
- localized excavations to a depth of approximately 0.5 m to permit the installation of decorative subgrade lighting to illuminate restored columns of the former Gardiner Expressway
- shallow excavations to a depth of approximately 0.5 m to permit the installation of decorative pavers or other materials in areas adjacent to the restored columns of the former Gardiner Expressway
- excavations to permit the installation of an irrigation system
- shallow excavations, if necessary to prepare areas such as adjacent to the north curb of Lakeshore Boulevard for the addition of a minimum of 0.3 m clean fill cover and the installation of topsoil and sod at an elevation approximately flush with the top of the north curb of Lakeshore Boulevard East
- excavations of up to approximately 1 m deep to permit the construction of a vehicle washing station covering an area approximately 7 m wide and 30 m long (details of the vehicle washing station are presented in the Vehicle Washing Station design drawing included with this Change Order).

The site is covered by fill soils and previous environmental soil investigations at the site conducted as part of the SSRA identified that the fill is impacted by lead and other metals. Due to the elevated concentration of lead in the leachate of some soil samples, hazardous waste was identified at the site. Any soil excavated from within the SSRA will be classified as waste and therefore will require off-site transportation and disposal. This environmental soil investigation was conducted to confirm the waste characteristics of the fill soil within the vicinity of the proposed excavations within Area A.

2. FIELDWORK

On July 22 and 26, 2002, S&P attended the site to obtain surficial soil samples for chemical analysis. Soil samples were collected from locations as shown in **Drawing 2-1**. This included:

- four soil samples collected from within the proposed swale at a depth of between 0.0 and 0.5 m below grade (designated as samples SW1 SA-1, SW2 SA-1, SW3 SA-1 and SW4 SA-1)
- five soil samples collected from adjacent to the north curb of Lakeshore Boulevard East at a depth of between 0.0 and 0.3 m below grade (designated as samples NC1, NC2, NC3, NC4, NC5)
- two soil samples from the vicinity of the restored columns from the former Gardiner Expressway at a depth of between 0.0 and 0.5 m below grade (designated as samples C1 and C2)
- four soil samples from within the proposed boulevard tree planting area at a depth of between 0.0 and 1.0 m below grade (designated as samples BT1 SA-1, BT2 SA-1, BT3 SA-1 and BT4 SA-1).

Soil samples from the swale and boulevard tree planting areas were composed of soil collected by using a 50 mm diameter split spoon sampler advanced using a hand held gasoline powered percussion drill. The drill was operated by Strata Soil Sampling Inc. of Richmond Hill, Ontario under the direct supervision of experience S&P personnel. The area of the proposed swale adjacent to the northern margin of the site was divided into four approximately equal lengths and soil samples were collected from five randomly but approximately equally spaced locations within each of the four sections. These five randomly selected samples were combined to form one composite sample which would be representative of the soil from each of the four swale areas and the composite sample was submitted to an analytical laboratory for waste classification analysis.

There are four boulevard tree planting areas within Area A. Soil samples were obtained from five randomly selected locations within each of the four tree planting areas and the five sub-samples were combined to form one composite sample from each of the four planting areas for waste classification analysis.

Between each of the four swale sub-areas and the four boulevard planting bed areas, the split spoon sampler was brushed clean of soil or other materials adhering to the inside and outer surfaces and then washed in municipal water containing phosphate free detergent and then rinsed with distilled water. Soil samples from areas adjacent to the north curb and from the column lighting areas were collected from hand excavated shallow soil sampling locations. All soil samples submitted were representative of the fill soil encountered from the surface to the depth explored (i.e. to depths of either 0.5 or 1.0 m below the existing grade at the time of the soil sampling).

Soil samples were placed in airtight zip lock plastic bags and reserved for headspace combustible vapour measurements, chemical analysis and storage. Soil samples for organic analyses were placed in glass jars and packed with minimal headspace to reduce the risk of volatilization of organic compounds.

Prior to preparing composite soil samples, headspace combustible measurements (excluding methane) were made inside the plastic bags using a Trace-techtor™ combustible vapour meter calibrated to hexane, with the methane elimination setting enabled. The maximum headspace reading recorded in the samples from this investigation was 84 ppm.

As documented in the SSRA, the soils on the site to the depths explored during the current investigation consisted of heterogeneous fill materials, generally ranging in gradation from sandy silt to gravelly sand with organic matter. Debris such as ash, cinders, glass, metal, wood and fragments of brick and concrete are commonly present within the fill.

2.2 SOIL ANALYSES

Fifteen (15) soil samples were analyzed in accordance with the leachate procedures in Regulation 347 (as amended by O.Reg. 558/00). All samples were analyzed for the inorganic parameters contained in Schedule 4 of Regulation 347. In addition, leachate analysis for volatile organic compounds, benzo(a)pyrene and for polychlorinated biphenyls (PCB) were conducted on two samples. The selection of samples was based on visual and olfactory observations, headspace readings and to provide site coverage. The results were compared to the criteria contained in Schedule 4 of Regulation 347 to classify the waste soil materials for transportation off-site and disposal.

3. RESULTS

3.1 SOIL SAMPLES

The chemical analyses of the soil samples were conducted by Entech Laboratory of Mississauga, Ontario. The results of the chemical testing are presented in **Table 1** and the findings are discussed in the following sections. The Certificates of Analysis are attached.

3.2 CRITERIA FOR EVALUATING SOIL QUALITY

The Risk Management Plan (RMP) developed as part of the SSRA for the subject site requires that the upper 0.3 m of surficial soil within Area B meets the residential/parkland land use criteria for coarse textured soil as contained in Table B of the previously referenced MOEE Guideline. This is intended to provide a clean fill cover above any environmentally impacted soil that will remain on-site after implementation of the RMP. As a result, soil scheduled for excavation for the construction of the proposed walkway, bicycle path and landscaping features which exceeds the Table B residential/parkland land use criteria will require off-site disposal. The results of previous and current soil sampling indicates that the majority of the soil samples of the fill material analyzed to date on the site exceed the Table B residential/parkland land use criteria. Given the heterogeneous nature of the fill and the proposed construction schedule, the City of Toronto has agreed that soil excavated from within Area A of the SSRA will be disposed

off-site as a waste. To assess if soil from the site is classified as a non-hazardous or hazardous solid waste, a leachate analyses in accordance with Regulation 347 (as amended by O.Reg. 558/00) are required.

3.3 LEACHATE ANALYSIS OF SOIL

The results indicate that the leachate concentrations in 14 of the 15 samples analyzed during the current investigation were less than the Schedule 4 criteria. The concentration of lead in the leachate from one sample obtained from the swale area (sample SW2 SA-1) was 21.2 mg/L which exceeded the Schedule 4 limit of 5 mg/L. No other exceedances of the leachate parameters contained in Schedule 4 were recorded for the parameters analyzed during this assessment.

4. DISCUSSION

4.1 HAZARDOUS WASTE

Soil removed from the site as a waste requires to be analyzed in accordance with Regulation 347 (as amended by O.Reg. 558/00) to assess whether the soil is classified as a hazardous or non-hazardous waste. Soil with leachate concentrations that exceed the criteria contained in Schedule 4 of Regulation 347 is classified as a hazardous waste. All hazardous waste must be transported by carriers licensed by MOEE to transport such material and the material must be received by a receiver licensed to accept such waste. Manifests are used to track the movement of hazardous wastes. Soil with concentrations less than the Schedule 4 criteria are classified as non-hazardous and are not subject to the same manifest procedures. Most non-hazardous waste soils can be disposed at municipal landfill sites.

Previous investigations at the site, including those documented in the SSRA, identified hazardous soil in the vicinity of borehole BH603. The concentration of lead in the leachate of a surficial soil sample from this borehole (sample GSA BH603/1) was 135 mg/L which exceeded the Schedule 4 limits of 5 mg/L. This borehole was located within the general vicinity of the composite sample from the current investigation that was classified as hazardous soil due to the concentration of lead in the leachate of 21.2 mg/L.

Concurrent with the present Waste Characterization Assessment, S&P also collected samples of soil that had recently been imported to the subject site. The sampling included composite soil samples from within 17 sampling grids with each grid being approximately 30 m wide and about 25 to 30 m deep depending on the distance of the road allowance between the north curb of Lakeshore Boulevard and the northern limit of the road allowance. The concentration of lead in one of the composite samples (sample AR A-8 SA-1) was 10,219 µg/g (ppm). As discussed in the S&P report detailing fill quality within Area A ("Imported Fill Quality Testing Report", report SP3977B, dated August 12, 2002) soil with concentrations of lead greater than 5000 µg/g is

assumed by S&P on the basis of other chemical results from the SSRA to be a hazardous waste if the material was transported off-site.

Hazardous soil was also previously identified in a sample obtained from borehole BH604. As reported in the SSRA, the concentration of lead in the leachate was 5.0 µg/L which equalled the Schedule 4 limit of 5. In accordance with the definition of a hazardous waste contained in Regulation 347 (as amended by O.Reg. 558/00) material that equals or exceeds the Schedule 4 limits are considered to be hazardous if transported off-site. As the leachate result equalled but did not exceed the Schedule 4 criteria and additional testing in the vicinity of borehole BH604 indicated that the soil in from this area meets the Table B residential/parkland land use criteria, S&P conclude that the hazardous soil is identified in borehole BH604 is likely limited to the vicinity of borehole BH604. For estimation purposes S&P assumes that the hazardous soil is limited to an area within 10 m of borehole BH604.

5. CONCLUSIONS AND RECOMMENDATIONS

Based on the results of this waste characterization assessment for the proposed construction within Area A, S&P makes the following conclusions and recommendations:

(i) Fifteen surficial soil samples were collected from within areas of proposed excavations within Area A of the SSRA. The results of chemical analyses indicated that the concentrations of lead in one sample exceeded the Schedule 4 limits and therefore on the basis of the chemical analyses, one of the 15 samples analyzed was classified as a hazardous waste.

(ii) The approximate extent of hazardous waste is shown on **Drawing 2-2**. Soil excavated within this area should be removed from the site as a hazardous waste. Soil excavated from areas of the site as shown on **Drawing 2-2** to be outside the area of hazardous soil should be removed from the site as a non-hazardous waste and disposed at a municipal landfill site.

(iii) All soil removed from the site as a hazardous waste requires a manifest in accordance with provincial regulations and the timely submission of the completed manifests to the MOEE.

Based on the results of this investigation, S&P presents the following recommended soil management options for soil excavated within Area A:

(i) Full-time environmental monitoring should be implemented during all excavation and fill placement activities during the proposed construction period within Area A. This will ensure that all excavated soil is sent off-site to appropriate receivers and it will provide the level of quality control necessary to ensure that the requirements of the SSRA's Risk Management Plan are met.

(ii) During periods when hazardous soil is being excavated, S&P estimates that two full time personnel will be required in order to monitor the excavation areas for changed soil conditions and to assist with the vehicle inspection and manifest

reports required in order to transport hazardous soil from the site in accordance with government regulations and/or the recommended measures contained in documents included in Grascan's Change Order. These documents include the Dust Control Plan and the Health and Safety Plan.

6. LIMITATIONS

This investigation was conducted as per the terms of reference described in S&P's proposal dated July 19, 2002 and was prepared for the account of City of Toronto and URS Cole, Sherman. The findings of the borehole/shallow soil sampling and laboratory analysis programs are believed to be representative of the area of investigation and are based on facts and information determined by Shaheen & Peaker Limited during the execution of this project. Soil and groundwater conditions at locations other than the borehole/shallow soil sampling locations may vary from conditions encountered at the borehole/shallow soil sampling locations. The findings in this report are limited to the environmental conditions on the site. This report was prepared for the exclusive use of City of Toronto and URS Cole, Sherman. Any uses which a Third Party makes of this report, or any reliance on decisions to be made based on it, are the responsibility of such Third Parties. Shaheen & Peaker Limited accepts no responsibility for damages, if any, suffered by any Third Party as a result of decisions made or actions based on this report.

SHAHEEN & PEAKER LIMITED

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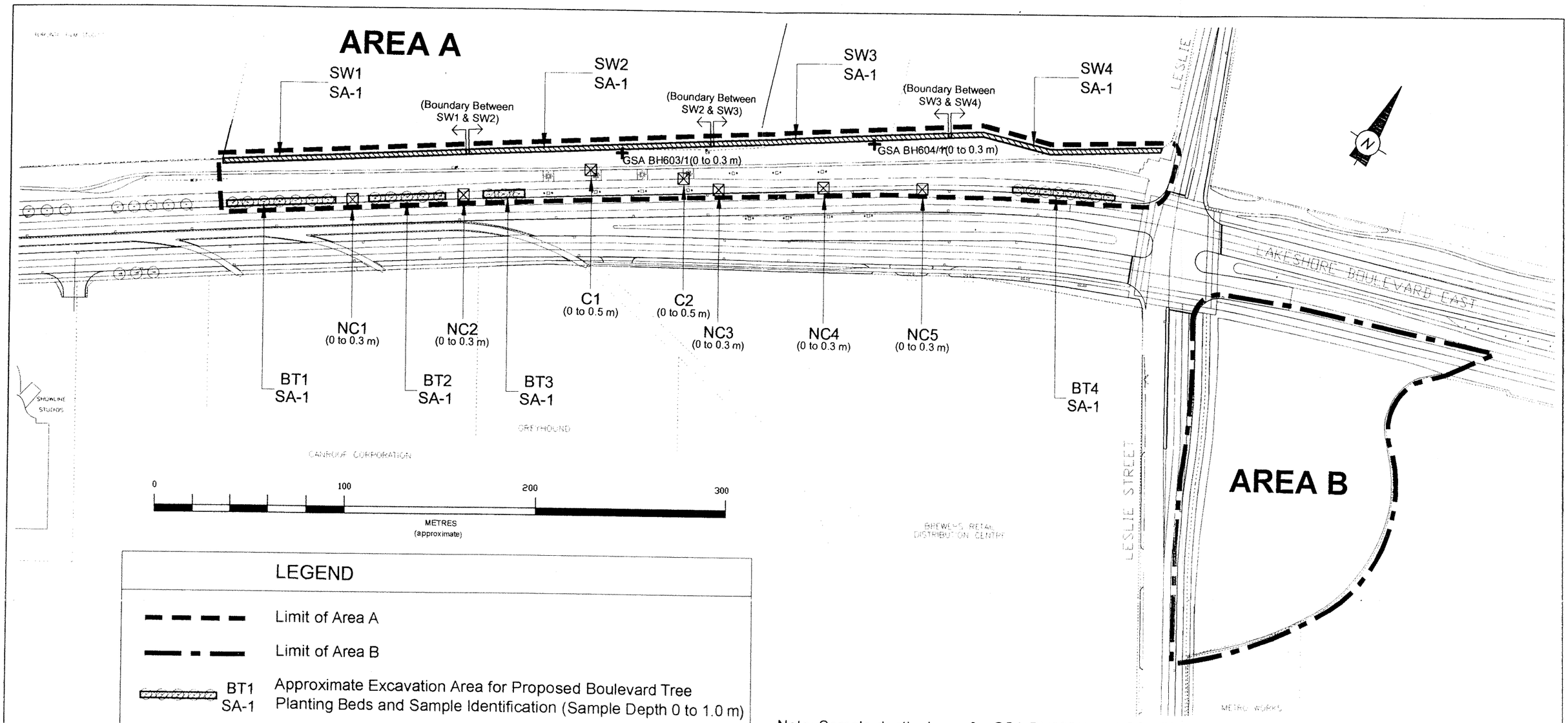
Senior Project Manager

DRAWINGS



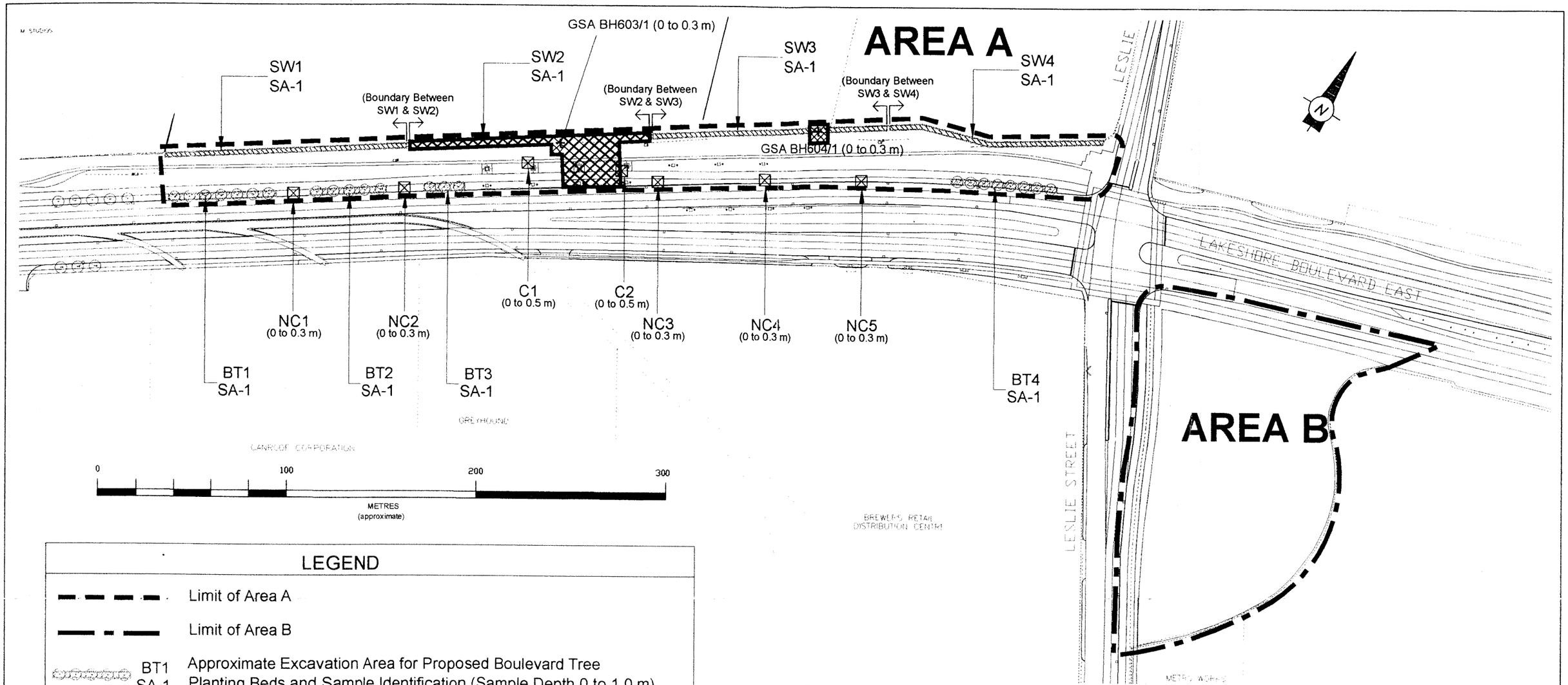
LEGEND

Limit of Area A	
Limit of Area B	
BT1 SA-1	Approximate Excavation Area for Proposed Boulevard Tree Planting Beds and Sample Identification (Sample Depth 0 to 1.0 m)
SW1 SA-1	Approximate Excavation Area for Proposed Swale and Sample Identification (Sample Depth 0 to 0.5 m)
☒ NC1 (0 to 0.3 m)	Sample Location and Sample Identification (Sample Depth)
+ GSA BH604/1 (0 to 0.3 m)	Sample Location and Sample Identification (Sample Depth)

Note: Sample depth shown for GSA BH603/1 and GSA BH604/1 are refrenced from site grades September 2001, all remaining sample depths are referenced to site grades from July 2002

WASTE CHARACTERIZATION SAMPLE LOCATIONS

Scale: ~1: 2000	IMPORTED FILL QUALITY TESTING PRE-CONSTRUCTION SOIL TESTING RISK MANAGEMENT PLAN IMPLEMENTATION LAKESHORE BOULEVARD EAST AT LESLIE STREET TORONTO, ONTARIO	Drawn By: RBW
Date: AUG. 12, 2002		Approved By: DJB
Project No.: SP3977B	SHAHEEN AND PEAKER LIMITED	Drawing No.: 2–1



LEGEND

- Limit of Area A
- Limit of Area B
- BT1 / SA-1 — Approximate Excavation Area for Proposed Boulevard Tree Planting Beds and Sample Identification (Sample Depth 0 to 1.0 m)
- SW1 / SA-1 — Approximate Excavation Area for Proposed Swale and Sample Identification (Sample Depth 0 to 0.5 m)
- NC1 (0 to 0.3 m) — Sample Location and Sample Identification (Sample Depth)
- GSA BH603/1 (0 to 0.3 m) — Sample Location and Sample Identification (Sample Depth)
- Approximate Extent of Hazardous Solid Waste

Note: 1- All Soil Excavated Within Area A and Area B is Classified as Non-hazardous Waste as per Ontario Regulation 347 as amended by Regulation 558 / 00 Except Soil Excavated from Areas of Hazardous Solid Waste as Indicated on this Drawing.

2- Sample depth shown for GSA BH603/1 and GSA BH604/1 are refrenced from site grades September 2001, all remaining sample depths are referenced to site grades from July 2002

APPROXIMATE EXTENT OF HAZARDOUS SOLID WASTE

Scale: ~1: 2000	WASTE CHARACTERIZATION ASSESSMENT PRE-CONSTRUCTION SOIL TESTING RISK MANAGEMENT PLAN IMPLEMENTATION LAKESHORE BOULEVARD EAST AT LESLIE STREET TORONTO, ONTARIO	Drawn By: RBW
Date: AUG. 12, 2002		Approved By: DJB
Project No.: SP 3977B	SHAHEEN AND PEAKER LIMITED	Drawing No.: 2–2

TABLES

Table 1: Summary of Regulation 347/558 Analysis of Soil (Page 1 of 4)

Parameter	**Reg. 347 Schedule 4 Limits**	**SW1 SA1** (0-0.5 m)	**SW2 SA1** (0-0.5 m)	**SW3 SA1** (0-0.5 m)	**SW4 SA1** (0-0.5 m)
Arsenic	2.5	0.003	0.013	0.002	0.002
Barium	100	0.41	0.61	0.80	0.52
Boron	500	<0.01	<0.01	<0.01	<0.01
Cadmium	0.5	<0.005	0.062	0.025	0.009
Chromium	5	<0.01	<0.01	<0.01	<0.01
Cyanide free	20	<0.005	<0.005	<0.005	<0.005
Fluoride	150	0.19	0.22	0.32	0.24
Lead	5	0.06	**21.2**	1.58	1.24
Mercury	0.1	<0.0001	<0.0001	<0.0001	<0.0001
Nitrate+Nitrite-N	1000	0.10	0.07	0.05	0.12
Selenium	1	<0.002	<0.002	<0.002	<0.002
Silver	5	<0.005	<0.005	<0.005	<0.005
Benzene	0.5	<0.004	-	-	-
Benzo(a)pyrene	0.001	<0.001	-	-	-
Carbon tetrachloride	0.5	<0.005	-	-	-
Chlorobenzene	8	<0.008	-	-	-
Chloroform	10	<0.004	-	-	-
1,2-dichlorobenzene	20	<0.008	-	-	-
1,4-dichlorobenzene	0.5	<0.005	-	-	-
1,2-dichloroethane	0.5	<0.008	-	-	-
1,1-dichloroethylene	1.4	<0.01	-	-	-
Methyl ethyl ketone	200	<0.1	-	-	-
Methylene chloride	5	<0.004	-	-	-
PCBs	0.3	<0.001	-	-	-
Tetrachloroethylene	3	<0.008	-	-	-
Trichloroethylene	5	<0.008	-	-	-
Vinyl chloride	0.2	<0.002	-	-	-

Notes:

1. Regulation 347 Schedule 4 (as amended by Reg. 558/00) leachate quality analyses for inorganics, PCBs, Benzo(a)pyrene and VOCs
2. Units are mg/L (ppm) in soil leachate
3. Approximate sample depth in metres shown in parentheses following sample identification
4. - = parameter not analyzed
5. If all values are less than the Schedule 4 Limits, the material can be classified as non-hazardous waste
6. Bold and underlined value (e.g. **21.2**) indicates equal to or greater than the Schedule 4 Limits, which requires classification as **hazardous waste**

Table 1: Summary of Regulation 347/558 Analysis of Soil (Page 2 of 4)

Parameter	**Reg. 347 Schedule 4 Limits**	**BT1 SA1** (0-1.0 m)	**BT2 SA1** (0-1.0 m)	**BT3 SA1** (0-1.0 m)	**BT4 SA1** (0-1.0 m)
Arsenic	2.5	<0.001	0.002	0.002	<0.001
Barium	100	0.16	0.18	0.24	0.08
Boron	500	<0.01	<0.01	<0.01	<0.01
Cadmium	0.5	<0.005	<0.005	0.011	0.081
Chromium	5	<0.01	<0.01	<0.01	<0.01
Cyanide free	20	<0.005	<0.005	<0.005	<0.005
Fluoride	150	0.36	0.27	0.25	0.21
Lead	5	0.05	0.24	0.78	0.10
Mercury	0.1	<0.0001	<0.0001	<0.0001	<0.0001
Nitrate+Nitrite-N	1000	0.17	0.15	0.16	0.19
Selenium	1	<0.002	<0.002	<0.002	<0.002
Silver	5	<0.005	<0.005	<0.005	<0.005
Benzene	0.5	-	<0.004	-	-
Benzo(a)pyrene	0.001	-	<0.001	-	-
Carbon tetrachloride	0.5	-	<0.005	-	-
Chlorobenzene	8	-	<0.008	-	-
Chloroform	10	-	<0.004	-	-
1,2-dichlorobenzene	20	-	<0.008	-	-
1,4-dichlorobenzene	0.5	-	<0.005	-	-
1,2-dichloroethane	0.5	-	<0.008	-	-
1,1-dichloroethylene	1.4	-	<0.01	-	-
Methyl ethyl ketone	200	-	<0.1	-	-
Methylene chloride	5	-	<0.004	-	-
PCBs	0.3	-	<0.001	-	-
Tetrachloroethylene	3	-	<0.008	-	-
Trichloroethylene	5	-	<0.008	-	-
Vinyl chloride	0.2	-	<0.002	-	-

Notes:

1. Regulation 347 Schedule 4 (as amended by Reg. 558/00) leachate quality analyses for inorganics, PCBs, Benzo(a)pyrene and VOCs
2. Units are mg/L (ppm) in soil leachate
3. Approximate sample depth in metres shown in parentheses following sample identification
4. - = parameter not analyzed
5. If all values are less than the Schedule 4 Limits, the material can be classified as non-hazardous waste
6. Bold and underlined value (e.g. **21.2**) indicates equal to or greater than the Schedule 4 Limits, which requires classification as **hazardous waste**

Table 1: Summary of Regulation 347/558 Analysis of Soil (Page 3 of 4)

Notes:

Parameter	Reg. 347 Schedule 4 Limits	NC1 (0-0.3 m)	NC2 (0-0.3 m)	NC3 (0-0.3 m)	NC4 (0-0.3 m)
Arsenic	2.5	<0.001	<0.001	0.002	<0.001
Barium	100	0.07	0.23	0.17	0.24
Boron	500	<0.01	<0.01	<0.01	<0.01
Cadmium	0.5	<0.005	0.006	<0.005	0.005
Chromium	5	<0.01	<0.01	<0.01	<0.01
Cyanide free	20	<0.005	<0.005	<0.005	<0.005
Fluoride	150	0.12	0.22	0.25	0.44
Lead	5	0.04	0.22	0.13	0.11
Mercury	0.1	<0.0001	<0.0001	<0.0001	<0.0001
Nitrate+Nitrite-N	1000	0.05	0.04	0.03	0.07
Selenium	1	<0.002	<0.002	<0.002	<0.002
Silver	5	<0.005	<0.005	<0.005	<0.005
Benzene	0.5	-	-	-	-
Benzo(a)pyrene	0.001	-	-	-	-
Carbon tetrachloride	0.5	-	-	-	-
Chlorobenzene	8	-	-	-	-
Chloroform	10	-	-	-	-
1,2-dichlorobenzene	20	-	-	-	-
1,4-dichlorobenzene	0.5	-	-	-	-
1,2-dichloroethane	0.5	-	-	-	-
1,1-dichloroethylene	1.4	-	-	-	-
Methyl ethyl ketone	200	-	-	-	-
Methylene chloride	5	-	-	-	-
PCBs	0.3	-	-	-	-
Tetrachloroethylene	3	-	-	-	-
Trichloroethylene	5	-	-	-	-
Vinyl chloride	0.2	-	-	-	-

1. Regulation 347 Schedule 4 (as amended by Reg. 558/00) leachate quality analyses for inorganics, PCBs, Benzo(a)pyrene and VOCs
2. Units are mg/L (ppm) in soil leachate
3. Approximate sample depth in metres shown in parentheses following sample identification
4. - = parameter not analyzed
5. If all values are less than the Schedule 4 Limits, the material can be classified as non-hazardous waste
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Table 1: Summary of Regulation 347/558 Analysis of Soil (Page 4 of 4)

Parameter	**Reg. 347 Schedule 4 Limits**	**NC5** (0-0.3 m)	**C1** (0-0.5 m)	**C2** (0-0.5 m)	**GSA BH603/1** (0-0.3m)	**GSA BH604/1** (0-0.3m)
Arsenic	2.5	0.002	<0.001	0.005	<0.2	<0.2
Barium	100	0.26	0.39	0.13	0.5	0.7
Boron	500	<0.01	<0.01	<0.01	<0.1	0.1
Cadmium	0.5	0.011	<0.005	0.023	0.27	0.09
Chromium	5	<0.01	<0.01	<0.01	<0.1	<0.1
Cyanide free	20	<0.005	<0.005	<0.005	<0.01	<0.01
Fluoride	150	0.24	0.28	0.24	<0.1	<0.2
Lead	5	0.57	0.13	1.10	**135**	**5.0**
Mercury	0.1	<0.0001	<0.0001	<0.0001	<0.01	<0.01
Nitrate+Nitrite-N	1000	0.05	0.09	0.40	<0.2	1.4
Selenium	1	<0.002	<0.002	<0.002	<0.1	<0.1
Silver	5	<0.005	<0.005	<0.005	<0.1	<0.1
Benzene	0.5	-	-	-	-	-
Benzo(a)pyrene	0.001	-	-	-	-	-
Carbon tetrachloride	0.5	-	-	-	-	-
Chlorobenzene	8	-	-	-	-	-
Chloroform	10	-	-	-	-	-
1,2-dichlorobenzene	20	-	-	-	-	-
1,4-dichlorobenzene	0.5	-	-	-	-	-
1,2-dichloroethane	0.5	-	-	-	-	-
1,1-dichloroethylene	1.4	-	-	-	-	-
Methyl ethyl ketone	200	-	-	-	-	-
Methylene chloride	5	-	-	-	-	-
PCBs	0.3	-	-	-	-	-
Tetrachloroethylene	3	-	-	-	-	-
Trichloroethylene	5	-	-	-	-	-
Vinyl chloride	0.2	-	-	-	-	-

Notes:

1. Regulation 347 Schedule 4 (as amended by Reg. 558/00) leachate quality analyses for inorganics, PCBs, Benzo(a)pyrene and VOCs
2. Units are mg/L (ppm) in soil leachate
3. Approximate sample depth in metres shown in parentheses following sample identification
4. - = parameter not analyzed
5. If all values are less than the Schedule 4 Limits, the material can be classified as non-hazardous waste
6. Bold and underlined value (e.g. **21.2**) indicates equal to or greater than the Schedule 4 Limits, which requires classification as **hazardous waste**

APPENDIX A

CERTIFICATES OF ANALYSES

Client:	Shaheen & Peaker Ltd.
Attention:	David Baigent/Sergiy Tchernikov
Project:	SP3977B
P.O.:	
Sample Type:	Soil
Date Received:	Jul 23/02
Date Analysed:	Jul 24 to Jul 26/02
Date Reported:	Jul 29/02

Sam Sanyal, M.Sc. C. Chem.
Manager, Inorganic Analysis.

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CERTIFICATE OF ANALYSIS FOR ONTARIO REGULATION 558/00

TCLP - LEACHATE QUALITY CRITERIA (INORGANICS)

Data Pertains To Specific Sample(s) Mentioned

CONTAMINANT	SCHEDULE 4 Concentration (mg/L)	Method Detection Limit (mg/L)	CONTROL SAMPLE Expected Conc. (mg/L)	Found Conc. (mg/L)	Recovery %	SAMPLE DATA (mg/L) Blank	5882 SW1 SA1		
Arsenic	2.5	0.001	0.258	0.238	92	<0.001	0.003		
Barium	100	0.01	1.30	1.21	93	<0.01	0.41		
Boron	500	0.01	1.20	1.18	98	<0.01	<0.01		
Cadmium	0.5	0.005	0.140	0.140	100	<0.005	<0.005		
Chromium	5.0	0.01	0.260	0.252	97	<0.01	<0.01		
Cyanide Free	20.0	0.005	0.20	0.194	97	<0.005	<0.005		
Fluoride	150	0.05	3.8	3.86	102	<0.05	0.19		
Lead	5.0	0.02	0.630	0.641	102	<0.02	0.06		
Mercury	0.1	0.0001	0.00524	0.00568	108	<0.0001	<0.0001		
(Nitrate+Nitrite)-N	1000	0.01	5.39	5.84	108	<0.01	0.10		
Selenium	1.0	0.002	0.019	0.0178	94	<0.002	<0.002		
Silver	5.0	0.005	0.210	0.202	96	<0.005	<0.005		
Initial pH (units)	-	-	-	-	-	5.0	9.0		
Fluid No.	-	-	-	-	-	1	1		
Fluid pH (units)	-	-	-	-	-	5.0	5.0		
Final pH (units)	-	-	-	-	-	4.9	6.3		

Sample Disposal: 30 Days from the Reporting Date.

Analyst(s): MD, SS, JW, AI, AV, NL

All Results except pH are expressed in mg/L (parts per million).

Note: "+" means the result exceeds the Schedule 4 concentration.

Method:

As, Se: HG-FAAS (EPA 3005/7062/7742)

Hg: CV-AAS (EPA 245.1)

Metals: ICP-AES (EPA 3005/200.7)

pH: Electrometric/pH-Meter (EPA 150.1)

Cyanide Free: Auto-Color (EPA 365.1)

Fluoride: ISE (EPA 340.2)

(NO3 + NO2)-N: Auto-Color (EPA 353.2)

Client:	**Shaneen & Peaker Ltd.**
Attention:	**David Balgent/Sergiy Tchernikov**
Project:	**SP3977B**
P.O.:	
Sample Type:	**Soil**
Date Received:	**Jul 23/02**
Date Analysed:	**Jul 24 to Jul 26/02**
Date Reported:	**Jul 29/02**

Sam Sanyal, M.Sc. C. Chem.
Manager, Inorganic Analysis.

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CERTIFICATE OF ANALYSIS FOR ONTARIO REGULATION 558/00
TCLP - LEACHATE QUALITY CRITERIA (INORGANICS)

Data Pertains To Specific Sample(s) Mentioned

CONTAMINANT	SCHEDULE 4 Concentration (mg/L)	Method Detection Limit (mg/L)	CONTROL SAMPLE Expected Conc. (mg/L)	Found Conc. (mg/L)	Recovery %	SAMPLE DATA (mg/L) Blank	5883 SW2 SA1	5884 SW3 SA1	5885 SW4 SA1
Arsenic	2.5	0.001	0.258	0.238	92	<0.001	0.013	0.002	0.002
Barium	100	0.01	1.30	1.21	93	<0.01	0.61	0.80	0.52
Boron	500	0.01	1.20	1.18	98	<0.01	<0.01	<0.01	<0.01
Cadmium	0.5	0.005	0.140	0.140	100	<0.005	0.062	0.025	0.009
Chromium	5.0	0.01	0.260	0.252	97	<0.01	<0.01	<0.01	<0.01
Cyanide Free	20.0	0.005	0.20	0.194	97	<0.005	<0.005	<0.005	<0.005
Fluoride	150	0.05	3.8	3.86	102	<0.05	0.22	0.32	0.24
Lead	5.0	0.02	0.630	0.641	102	<0.02	21.2+	1.58	1.24
Mercury	0.1	0.0001	0.00524	0.00568	108	<0.0001	<0.0001	<0.0001	<0.0001
(Nitrate+Nitrite)-N	1000	0.01	5.39	5.84	108	<0.01	0.07	0.05	0.12
Selenium	1.0	0.002	0.019	0.0178	94	<0.002	<0.002	<0.002	<0.002
Silver	5.0	0.005	0.210	0.202	96	<0.005	<0.005	<0.005	<0.005
Initial pH (units)	-	-	-	-	-	2.9	8.9	9.3	9.5
Fluid No.	-	-	-	-	-	2	2	2	2
Fluid pH (units)	-	-	-	-	-	2.9	2.9	2.9	2.9
Final pH (units)	-	-	-	-	-	2.9	5.5	5.8	5.8

Sample Disposal: 30 Days from the Reporting Date.
All Results except pH are expressed in mg/L (parts per million).
Note: "+" means the result exceeds the Schedule 4 concentration.

Analyst(s): MD, SS, JW, AI, AV, NL

Method:

As, Se: HG-FAAS (EPA 3005/7062/7742)
Hg: CV-AAS (EPA 245.1)
Metals: ICP-AES (EPA 3005/200.7)
pH: Electrometric/pH-Meter (EPA 150.1)
Cyanide Free: Auto-Color (EPA 365.1)
Fluoride: ISE (EPA 340.2)
(NO3 + NO2)-N: Auto-Color (EPA 353.2)

Client:	Shaheen & Peaker Ltd.
Attention:	David Baigent/Sergiy Tchernikov
Project:	SP3977B
P.O.:	
Sample Type:	Soil
Date Received:	Jul 23/02
Date Analysed:	Jul 24 to Jul 26/02
Date Reported:	Jul 29/02

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CERTIFICATE OF ANALYSIS FOR ONTARIO REGULATION 558/00

TCLP - LEACHATE QUALITY CRITERIA (INORGANICS)

Data Pertains To Specific Sample(s) Mentioned

CONTAMINANT	SCHEDULE 4 Concentration (mg/L)	Method Detection Limit (mg/L)	CONTROL SAMPLE Expected Conc. (mg/L)	Found Conc. (mg/L)	Recovery %	SAMPLE DATA (mg/L) 5886 BT1 SA1	5887 BT2 SA1	5888 BT3 SA1	5889 BT4 SA1
Arsenic	2.5	0.001	0.258	0.238	92	<0.001	0.002	0.002	<0.001
Barium	100	0.01	1.30	1.21	93	0.16	0.18	0.24	0.08
Boron	500	0.01	1.20	1.18	98	<0.01	<0.01	<0.01	<0.01
Cadmium	0.5	0.005	0.140	0.140	100	<0.005	<0.005	0.011	0.081
Chromium	5.0	0.01	0.260	0.252	97	<0.01	<0.01	<0.01	<0.01
Cyanide Free	20.0	0.005	0.20	0.194	97	<0.005	<0.005	<0.005	<0.005
Fluoride	150	0.05	3.8	3.86	102	0.36	0.27	0.25	0.21
Lead	5.0	0.02	0.630	0.641	102	0.05	0.24	0.78	0.10
Mercury	0.1	0.0001	0.00524	0.00568	108	<0.0001	<0.0001	<0.0001	<0.0001
(Nitrate+Nitrite)-N	1000	0.01	5.39	5.84	108	0.17	0.15	0.16	0.19
Selenium	1.0	0.002	0.019	0.0178	94	<0.002	<0.002	<0.002	<0.002
Silver	5.0	0.005	0.210	0.202	96	<0.005	<0.005	<0.005	<0.005
Initial pH (units)	-	-	-	-	-	9.6	9.6	9.7	9.3
Fluid No.	-	-	-	-	-	2	2	2	2
Fluid pH (units)	-	-	-	-	-	2.9	2.9	2.9	2.9
Final pH (units)	-	-	-	-	-	5.9	5.9	5.8	5.9

Sample Disposal: 30 Days from the Reporting Date.
All Results except pH are expressed in mg/L (parts per million).
Note: "+" means the result exceeds the Schedule 4 concentration.

Analyst(s): MD, SS, JW, AI, AV, NL

Method:

As, Se: HG-FAAS (EPA 3005/7062/7742)
Hg: CV-AAS (EPA 245.1)
Metals: ICP-AES (EPA 3005/200.7)
pH: Electrometric/pH-Meter (EPA 150.1)
Cyanide Free: Auto-Color (EPA 365.1)
Fluoride: ISE (EPA 340.2)
(NO3 + NO2)-N: Auto-Color (EPA 353.2)

Client:	Shaheen & Peaker Ltd.
Attention:	David Baigent
Project:	SP3977B
P.O.:	
Sample Type:	Soil
Date Received:	Jul 26/02
Date Analysed:	Jul 26, 29 to Jul 31/02
Date Reported:	Jul 31/02

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CERTIFICATE OF ANALYSIS FOR ONTARIO REGULATION 558/00

TCLP - LEACHATE QUALITY CRITERIA (INORGANICS)

Data Pertains To Specific Sample(s) Reported

CONTAMINANT	SCHEDULE 4 Concentration (mg/L)	Method Detection Limit (mg/L)	CONTROL SAMPLE Expected Conc. (mg/L)	Found Conc. (mg/L)	Recovery %	SAMPLE DATA (mg/L) Blank	6124 NC1	6126 NC3	6130 C2
Arsenic	2.5	0.001	0.258	0.233	90	<0.001	<0.001	0.002	0.005
Barium	100	0.01	1.30	1.27	98	<0.01	0.07	0.17	0.13
Boron	500	0.01	1.20	1.21	101	<0.01	<0.01	<0.01	<0.01
Cadmium	0.5	0.005	0.140	0.139	99	<0.005	<0.005	<0.005	0.023
Chromium	5.0	0.01	0.260	0.257	99	<0.01	<0.01	<0.01	<0.01
Cyanide Free	20.0	0.005	0.10	0.098	98	<0.005	<0.005	<0.005	<0.005
Fluoride	150	0.05	3.8	3.86	102	<0.05	0.12	0.25	0.24
Lead	5.0	0.02	0.080	0.083	104	<0.02	0.04	0.13	1.10
Mercury	0.1	0.0001	0.00524	0.00576	110	<0.0001	<0.0001	<0.0001	<0.0001
(Nitrate+Nitrite)-N	1000	0.01	5.39	5.67	105	<0.01	0.05	0.03	0.40
Selenium	1.0	0.002	0.019	0.017	89	<0.002	<0.002	<0.002	<0.002
Silver	5.0	0.005	0.210	0.200	95	<0.005	<0.005	<0.005	<0.005
Initial pH (units)	-	-	-	-	-	4.9	9.2	9.2	9.2
Fluid No.	-	-	-	-	-	1	1	1	1
Fluid pH (units)	-	-	-	-	-	4.9	4.9	4.9	4.9
Final pH (units)	-	-	-	-	-	5.1	6.4	6.5	6.4

Sample Disposal: 30 Days from the Reporting Date.

Analyst(s): MD, SS, JW, AI, AV, NL

All Results except pH are expressed in mg/L (parts per million).

Note: "+" means the result exceeds the Schedule 4 concentration.

Method:

As, Se: HG-FAAS (EPA 3005/7062/7742)

Hg: CV-AAS (EPA 245.1)

Metals: ICP-AES (EPA 3005/200.7)

pH: Electrometric/pH-Meter (EPA 150.1)

Cyanide Free: Auto-Color (EPA 365.1)

Fluoride: ISE (EPA 340.2)

(NO3 + NO2)-N: Auto-Color (EPA 353.2)

Client:	**Shaneen & Peaker Ltd.**
Attention:	**David Balgent**
Project:	**SP3977B**
P.O.:	
Sample Type:	**Soil**
Date Received:	**Jul 26/02**
Date Analysed:	**Jul 26, 29 to Jul 31/02**
Date Reported:	**Jul 31/02**

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CERTIFICATE OF ANALYSIS FOR ONTARIO REGULATION 558/00

TCLP - LEACHATE QUALITY CRITERIA (INORGANICS)

Data Pertains To Specific Sample(s) Reported

CONTAMINANT	SCHEDULE 4 Concentration (mg/L)	Method Detection Limit (mg/L)	CONTROL SAMPLE Expected Conc. (mg/L)	Found Conc. (mg/L)	Recovery %	SAMPLE DATA (mg/L) 6129 C1	6128 NC5 Duplicate		
Arsenic	2.5	0.001	0.258	0.233	90	<0.001	0.002		
Barium	100	0.01	1.30	1.27	98	0.39	0.26		
Boron	500	0.01	1.20	1.21	101	<0.01	<0.01		
Cadmium	0.5	0.005	0.140	0.139	99	<0.005	0.011		
Chromium	5.0	0.01	0.260	0.257	99	<0.01	<0.01		
Cyanide Free	20.0	0.005	0.10	0.098	98	<0.005	<0.005		
Fluoride	150	0.05	3.8	3.86	102	0.28	0.23		
Lead	5.0	0.02	0.080	0.083	104	0.13	0.56		
Mercury	0.1	0.0001	0.00524	0.00576	110	<0.0001	<0.0001		
(Nitrate+Nitrite)-N	1000	0.01	5.39	5.67	105	0.09	0.06		
Selenium	1.0	0.002	0.019	0.017	89	<0.002	<0.002		
Silver	5.0	0.005	0.210	0.200	95	<0.005	<0.005		
Initial pH (units)	-	-	-	-	-	9.2	9.2		
Fluid No.	-	-	-	-	-	2	2		
Fluid pH (units)	-	-	-	-	-	2.9	2.9		
Final pH (units)	-	-	-	-	-	5.9	5.8		

Sample Disposal: 30 Days from the Reporting Date.

Analyst(s): MD, SS, JW, AI, AV, NL

All Results except pH are expressed in mg/L (parts per million).

Note: "+" means the result exceeds the Schedule 4 concentration.

Method:

As, Se: HG-FAAS (EPA 3005/7062/7742)

Hg: CV-AAS (EPA 245.1)

Metals: ICP-AES (EPA 3005/200.7)

pH: Electrometric/pH-Meter (EPA 150.1)

Cyanide Free: Auto-Color (EPA 365.1)

Fluoride: ISE (EPA 340.2)

(NO3 + NO2)-N: Auto-Color (EPA 353.2)

Cl Sha & F Lt

Attention: S. Tchernikov

Client Reference: Proj: SP3977B

Date Received: Jul. 23, 2002.

Date Analyzed: Jul. 26, 2002.

Date Reported: Jul. 30, 2002.

Sample Type: Leachate.

ENTECH

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Professional Analytical Services

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CERTIFICATE OF ANALYSIS

TCLP-Volatile Organic Compounds	ENTECH # >> Sample I.D. >>	Maximum** allowable	Lab Blank	5882 SW1 SA1	5887 BT2 SA1	Lab Spike Amount	Lab Spike Recovery
Units: mg/L (ppm) -->	MDL					(ug/L)	(%)
Vinyl chloride	0.002	0.2	<	<	<	10	70
1,1-Dichloroethene	0.01	1.4	<	<	<	5	70
Methylene Chloride	0.004	5	<	<	<	5	77
MEK	0.1	200	<	<	<	15	70
Chloroform	0.004	10	<	<	<	5	70
Carbon Tetrachloride	0.005	0.5	<	<	<	5	81
Benzene	0.004	0.5	<	<	<	5	70
1,2-Dichloroethane	0.008	0.5	<	<	<	5	70
Trichloroethene	0.008	5	<	<	<	5	84
Tetrachloroethene	0.008	3	<	<	<	5	97
Chlorobenzene	0.008	8	<	<	<	5	76
1,4-Dichlorobenzene	0.005	0.5	<	<	<	5	80
1,2-Dichlorobenzene	0.005	20	<	<	<	5	80
Spike Surrogate Recovery: Toluene-d8 (%)			88	86	86	100	99
1,3-Dichlorobutane (%)			97	103	107	100	82
4-Bromofluorobenzene (%)			83	87	90	100	102

Ref. Method: Entech#OWA-15

Surrogate and spike recovery control limits = 70% to 130%; < = Not Detected (less than Method Detection Limit (MDL)).

**TCLP list according to MOEE, Ontario, 2001.

Dr. Asit Raksit, Ph.D., C. Chem.
Manager, Organics

Analysts: Saima Johri, B. Sc.
Agnes Tworek, B. Sc.

Attention: S. Tchernikov
Client Reference: Proj: SP3977B
Date Received: Jul. 23, 2002.
Date Analyzed: Jul. 25, 2002.
Date Reported: Jul. 30, 2002.
Sample Type: TCLP (Leachate)

ENTECH

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Certificate of Analysis

Benzo(a)pyrene

ENTECH #	Sample Identification	Conc. (mg/L)	Surrogate Phenanthrene-d10	Surrogate Chysene-d12	Surrogate Perylene-d12
5882	SW1 SA1	ND	80	128	114
5887	BT2 SA1	ND	84	130	118
Lab Blank		ND	78	129	120

MDL 0.001 mg/L; ND = <0.001 ppm; mg/L = ppm

Comment:

MDL = Method Detection Limit; < = Not Detected (less than the MDL).
Method: EPA 3510C/8270C - Solvent Extraction/GC/MSD
Surrogate recovery control limits = 70% - 130%
QC spike amount = 0.90 ppm; spike recovery = 1.1 ppm (122%).

Dr. Asit Raksit, Ph.D., C. Chem.
Manager, Organics

Analysts: Saima Johri, B. Sc.
Benita Cortez, B. Sc.

Client : Shaheen & Peaker Ltd.
Attention: Tchernikov
Client Reference: Proj: SP3977B
Date Received: July 23, 2002.
Date Analyzed: July 29, 2002.
Date Reported: July 30, 2002.
Sample Type: TCLP (leachate)

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Certificate of Analysis

Total PCB's

ENTECH #	Sample Identification	Conc. (ug/L)	Surrogate #1 Recovery (%)	Surrogate #2 Recovery (%)
5882	SW1 SA1	ND	100	130
5887	BT2 SA1	ND	90	130
Lab Blank		ND	89	130

MDL 1.0 ug/L; ND = <1.0 ppb; ug/L = ppb

Comments:

Ref. Method: Entech #: OWA-8, Solvent Extraction/ GC/ECD.
Total PCB quantification based on a mixture of Aroclors 1254 and 1260.
Surrogate and spike recovery control limits = 70%-130%.
Surrogates used are 2,4,5,6-Tetrachloro-m-xylene and Decachlorobiphenyl.
QC spike = 2.04ppm, QC recovery = 2.45ppm (120%)

Dr. Asit Raksit, Ph.D., C. Chem.
Manager, Organics

Analysts: Lynn Uyen Luyen, B. Sc.
Benita Cortez, B. Sc.