GUIDE FOR SOIL TESTING IN URBAN GARDENS

TORONTO PUBLIC HEALTH

2013

Toronto Public Health

SUMMARY

GUIDE FOR SOIL TESTING IN URBAN GARDENS

Cities are great places to grow food, but they can also have issues with soil contamination. This guide is for people who want to start an urban garden and want to get more information about the safety of their soil.

Follow these three steps to check your soil quality and to take actions to reduce your risks:

Step 1

Establish the level of concern

Step 2

Test the soil

Step 3

Take actions to reduce risks

Resources: To develop this guide, Toronto Public Health used information from literature reviews, experiences in other jurisdictions, consultations with gardeners and experts, information on soils in the City of Toronto, and a pilot study of five proposed gardens. The full report, titled Assessing Urban Impacted Soil for Urban Gardening: Decision Support Tool Technical Report and Rationale, is available at: http://www.toronto.ca/health/lead/soil_gardening.htm.

STEP 1

ESTABLISH A LEVEL OF CONCERN

The initial step is to assess whether the soil may be contaminated by past activities on the land. This is done by inspecting the site and researching the history of the garden site.

- A **site visit** involves walking through the area and inspecting the site thoroughly. Appendix A, *Site Visits for Gardens*, provides more information on conducting a site visit.
- A **site history** involves searching the City archives, available City records[1], and asking neighbours for information about the past and current use of the site and surrounding properties. Appendix B, *Site History Searches for Gardens*, provides more information on site history searches.

[1] Toronto Public Health has access to City records that might be relevant for your site.

STEP 1

ESTABLISH A LEVEL OF CONCERN

There are three Levels of Concern for garden sites: **Low**, **Medium** and **High**. The Level of Concern gives you the next steps for your site: soil testing and/or actions to reduce risks from exposure to soil contaminants.

The Levels of Concern are defined as:

Low Concern Site

- Garden site has always been residential, parkland, farmland, child care centre or school.
- If your site is a Low Concern site then soil testing is not required. Action Level 1 is recommended for these sites (*see Step 3*).

Medium Concern Site

- Garden site is or has once been a risk managed park, orchard, hydro corridor, infill area, commercial land (excluding gas station, dry cleaner, printing and auto body shop).
- Garden site is located within: a former landfill; former lead reduction zone; or 30 metres from a rail line or a major arterial road.

High Concern Site

- Garden site is or has once been a gas station, dry cleaner, print shop, auto body shop, rail line or rail yard.
- Is or has once been industrial land.[2]
- Garden site reveals indications of dumping or burning, smells or staining in the soil.

TPH recommends the gardeners use raised bed gardens or container gardens or grow fruit and nut trees on High Concern sites. Action Level 3 is recommended for growing gardens on these sites (*see Step 3*).

NOTE FOR ALL SITES

If you are planting a garden on public land (e.g., park or hydro corridor) or you are a developer using part of your commercial or industrial land for a garden, there may be additional regulatory requirements for soil sampling. Contact Toronto Public Health or refer to the full report for more information at: http://www.toronto.ca/health/lead/soil_gardening.

[2] The site should be considered a Medium Concern site if the industrial land has been remediated and is currently residential or commercial land.

STEP 2

TEST THE SOIL

Soil testing is only recommended for *Medium Concern* sites. TPH does not recommend testing small gardens.

- TPH recommends testing the soil if the planned garden is on a Medium Concern site **and** if the garden is **larger** than 16 m^2 (170 ft^2) or 4 X 4 M (13 X 13 ft). It is not cost-effective to conduct soil testing for small gardens. If you have a small garden in the Medium Concern category go to Action Level 3 (*see Step 3*).
- The approach to soil sampling should be based on how gardeners will come into contact with the soil. The soil sample should be taken from the area that the gardeners use. A typical community garden will need only one or two soil samples. We recommend that a soil sample is taken every 10 x 10 to 15 x 15 metre area. For farms larger than half an acre, TPH is available to work with you to develop a sampling plan.

Appendix C, Soil Sampling, provides more information on soil sampling.

Send the Soil to the Laboratory to be Analyzed

TPH has identified a list of the most likely contaminants present in Medium Concern sites (*see Table 1, page 8*). There may be other contaminants present in urban soil. The contaminants in Table 2 are used as indicators to guide gardeners to take appropriate actions.

There is a higher likelihood that other contaminants are present in the soil of High Concern sites. It is not economically feasible to test for all the possible soil contaminants. Therefore, we recommend that raised bed or container gardens or fruit and nut trees are used at these sites. *See Appendix D, Soil Analysis* for more information on analyzing soil.

Interpret the Soil Tests, Confirm the Level of Concern and Take Appropriate Action

Compare the concentration of each contaminant identified in the soil test with the Urban Gardening Soil Screening Values (SSVs) shown in Table 2. Note the two levels of SSVs.

The SSVs are used to determine the intensity of recommended actions to reduce risks.

Use the SSVs to interpret the soil test results, confirm the Level of Concern, and take the appropriate action:

If the concentrations of *all of the contaminants* are below the SSV 1, then the site is **Low Concern:**	If the concentration of *any contaminant* is over the SSV 1 level, but lower than the SSV 2, then the site is **Medium Concern:**	If the concentration of *any contaminant* is above the SSV 2, then the site is **High Concern:**
ACTION LEVEL 1 RECOMMENDED	**ACTION LEVEL 2** RECOMMENDED	**ACTION LEVEL 3** RECOMMENDED

Note: These SSVs are different than the soil standards that the laboratory typically uses to interpret soil contaminants. Toronto Public Health developed Urban Gardening Soil Screening Values specifically for gardening.

Table 1: Urban Gardening Soil Screening Values (SSVs) (mg/kg)
(also can be expressed as µg/g, ppm or parts per million)

METALS	URBAN GARDENING SOIL SCREENING VALUE	
	SSV 1	SSV 2
Arsenic (As)	11	110
Cadmium (Cd)	1.0	10
Cobalt (Co)	23	170
Chromium, total (Cr)	390	630
Chromium, VI (CrVI)	5.0	5.0
Copper (Cu)	180	660
Mercury (Hg)	2.7	2.7
Molybdenum (Mo)	13	13
Nickel (Ni)	34	340
Lead (Pb)	34	340
Selenium (Se)	10	11
Zinc (Zn)	500	1800
PAHS	**URBAN GARDENING SOIL SCREENING VALUE**	
	SSV 1	SSV 2
Acenaphthene	0.050	0.32
Acenaphthylene	0.093	0.47
Anthracene	0.58	0.58
Benz(a)anthracene	0.23	2.3
Benzo(a)pyrene	2.3	3
Benzo(b)fluoranthene	0.23	2.3
Benzo(g,h,i)perylene	0.10	1.0
Benzo(k)fluoranthene	0.23	2.3
Chrysene	0.099	0.99
Dibenz(a,h)anthracene	0.77	0.77
Fluoranthene	0.14	1.4
Fluorene	0.39	0.39
Indeno(1,2,3-c,d)pyrene	0.23	2.3
Phenanthrene	3.1	3.1
Pyrene	0.11	1.1

NOTE: Some of the SSV1 and SSV2 values are the same. This is not an error. This is because for this particular contaminant, a value above the SSV1 indicates a potential pollution source, therefore this site should be considered High Concern.

STEP 3

TAKE ACTION TO REDUCE RISKS

Gardeners can take many simple and inexpensive actions to reduce their exposure to urban soil contaminants.

Depending on the Level of Concern for your site and the results of the soil sampling, there are different levels of intensity of recommended actions to reduce your exposure to soil contaminants. *Table 3* summarizes the three Action Levels.

STEP 3

TAKE ACTION TO REDUCE RISKS

Table 3: Levels of Concern and Recommended Actions to Reduce Gardeners' Exposures to Soil Contaminants

LOW CONCERN ACTION LEVEL 1	Use good gardening practices: • Wash your hands after gardening and always before eating. • Wash produce with soap and water.
MEDIUM CONCERN ACTION LEVEL 2	Use good gardening practices and further reduce your exposure to contaminants in the following ways: • Lower the concentrations of contaminants by adding clean soil and organic matter (compost and manure) to the existing soil. Adding organic matter will also improve the pH level of the soil. • Reduce dust by covering bare soil with ground cover or mulch. • Peel root vegetables before you eat or cook them. • Avoid growing the types of produce that accumulate soil contaminants (See list below).
HIGH CONCERN ACTION LEVEL 3	Use good gardening practices, reduce dust by covering bare soil surrounding the garden with ground cover or mulch, and eliminate your exposure to contaminants in the following ways: • Build raised bed gardens (minimum of 40 cm/16 in. depth over a geotextile barrier on the soil), or grow food in containers. • Add clean soil and organic matter annually (compost and manure) to the raised bed or containers. OR • Grow only nut and fruit trees (not any other types of produce).

Medium Concern Sites—it is recommended that you avoid certain plants that can accumulate soil contaminants

Various plants types are different from each other, and so is their uptake of contaminants. Some plants will uptake some soil contaminants, while others do not at all. Some plants will uptake contaminants only in the parts of the plant that we don't eat. We recommend for Medium Concern sites:

- For All Garden Produce: Use good gardening practices. Wash all produce with soap and water. Peel root vegetables before you eat or cook them.
- Eat only the fruit, seed or grain (not the leaves, root, or shoot) for the following plants: tomato, corn, barley, oat, rice, rye, wheat, soybean, and sunflower.
- Grow these plants in raised bed or container gardens: alfalfa, amaranth, brassicas (broccoli, brussel sprouts, cabbage, cauliflower, kale, kohlrabi, mustard greens, canola, turnip), beets, carrots, chicory, dandelion, endive, garden pea, lettuce, radish, rice (wild), sorghum, sorrel, spinach and mushrooms.

Action Level 2 measures will reduce the concentration of soil contaminants over time. Thus, after two years of implementing Action Level 2 measures, consider retesting the soil of Medium Concern sites. If the tests show that the site is now a Low Concern site, you can start growing these plants in the garden soil.

LET'S WORK THROUGH AN EXAMPLE TOGETHER

Suzanne is a community youth worker in downtown Toronto. Her centre backs onto a hydro corridor. She wants to start a vegetable garden for the youth in the hydro corridor.

Step 1

Once she got permission to build a garden, she researched the hydro corridor site and discovered that before it was a hydro corridor it was agricultural land. Suzanne does a thorough walk through of the proposed garden site, paying attention to any garbage, dead and dying plants. She uses a shovel to turn over the soil in various locations and doesn't notice any indication of **garbage dumping**, **soil staining**, or **strange odours** coming from the soil. Suzanne classifies her site as *Medium Concern* (hydro corridors are Medium Concern sites).

Note: Some of the details included in this example are found in the Appendices

Step 2

Suzanne is planning a garden that is 15 by 15 metres. This classifies her garden as a **large garden** so she notes that soil sampling is recommended for her site.

She does an internet search and after a few phone calls, finds a laboratory that will analyze her soil samples for metals and PAHs, for the best price.

For the size of her garden, Suzanne notes that she only needs one sample to send to the laboratory. The laboratory she is working with sends her a container for her sample with instructions on how much soil is needed.

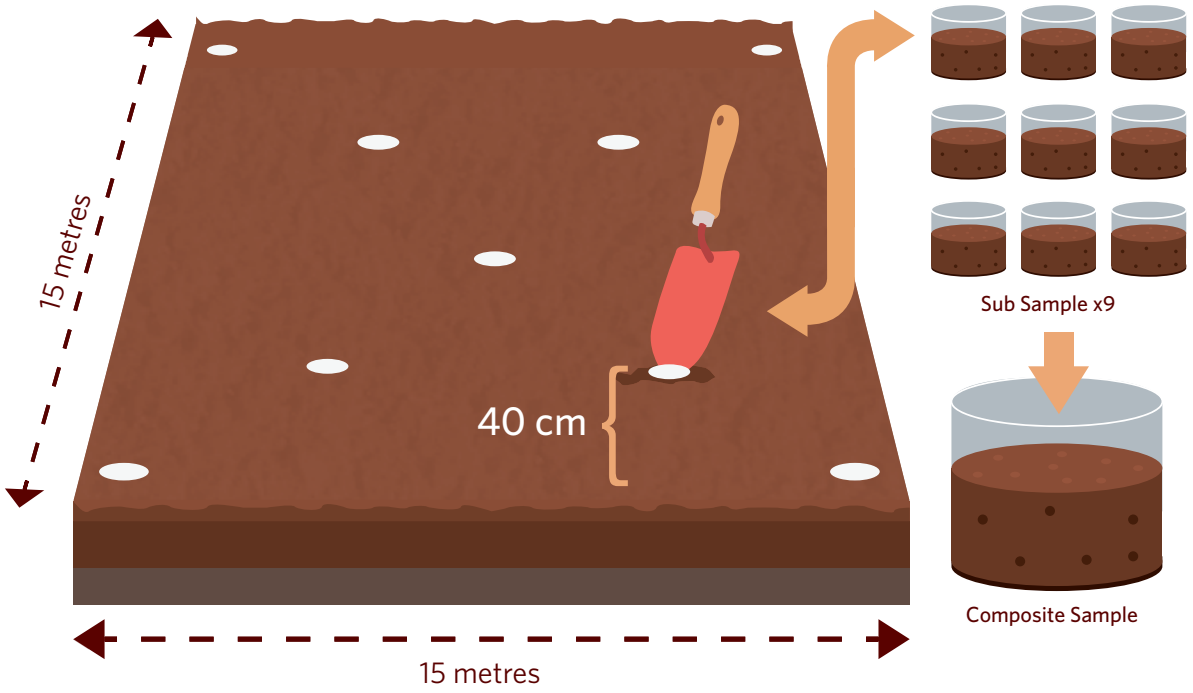
Suzanne starts her soil sampling by making a detailed map of her garden site. She then draws a line around her garden (she does this with pylons, but you can do it with tape, rope, etc.). She walks in a line starting from one corner of her garden and walks diagonally to the far corner and repeats, making an "X" pattern across her garden.

Suzanne takes a soil sample approximately every 2.5 metres by digging into the soil down to 40 cm and putting that soil sample into a standard sized bucket. She makes sure she includes soils from just below the grass line down through to 40 cm. She removes the grass and other vegetation from the soil sample. Suzanne mixes the soil around and then takes a sub-sample from Bucket #1 and transfers a scoop of the soil to Bucket #2. She empties the soil from Bucket #1 back into the hole that she just dug. Suzanne then goes on to dig her next subsample.

LET'S WORK THROUGH AN EXAMPLE TOGETHER

When Suzanne has collected all of her subsamples (9 will do) in Bucket #2, she uses the trowel and mixes all the soil in the bucket, turning over the soil multiple times making sure to mix the soil completely. Suzanne then uses the trowel and takes a scoop or two and puts it in the container (either the laboratory will provide it or you can use a sealable plastic bag). Suzanne labels the bag providing all the information that the laboratory needs (e.g., date, contact person, contact information, site name). She stores the soil sample in a cooler with ice packs for shipping or until the laboratory picks up the sample.

In about a week Suzanne receives the laboratory results. She compares her soil sample to the Urban Gardening Soil Screening Values (SSVs) provided by Toronto Public Health. In particular, she is concerned about lead and arsenic levels. The lead level for her soil is 2.4 µg/g, while the arsenic level is 1.3 µg/g.



Example of Soil Contaminant Testing Results provided by a Laboratory (highlighted column indicates the results you are looking for).

	Units	SOIL SAMPLE #1	SOIL SAMPLE #1 Lab-Dup	RDL	QC Batch
Metals					
Acid Extractable Arsenic (As)	µg/g	1.3	1.4	1.0	2979771
Acid Extractable Cadmium (Cd)	µg/g	ND	ND	0.10	2979771
Acid Extractable Chromium (Cr)	µg/g	5.2	5.5	1.0	2979771
Acid Extractable Cobalt (Co)	µg/g	2.2	2.2	0.10	2979771
Acid Extractable Copper (Cu)	µg/g	4.9	5.0	0.50	2979771
Acid Extractable Lead (Pb)	µg/g	2.4	2.3	1.0	2979771
Acid Extractable Molybdenum (Mo)	µg/g	ND	ND	0.50	2979771
Acid Extractable Nickel (Ni)	µg/g	3.9	3.7	0.50	2979771
Acid Extractable Selenium (Se)	µg/g	ND	ND	0.50	2979771
Acid Extractable Zinc	µg/g	12	12	5.0	2979771
Acid Extractable Mercury (Hg)	µg/g	ND	ND	0.050	2979771

Suzanne compares all of the soil contaminants and determines that they are all below the SSV1. She classifies her garden as a Low Concern site.

Step 3

Suzanne proceeds with her garden plan, makes sure to let all her gardeners know that they need to take Action Level 1 measures to reduce their exposure to urban soil contaminants: wash their hands after gardening and wash all the produce with soap and water before eating.

WE WANT TO HEAR FROM YOU

These guidelines will be updated periodically, as we receive feedback from gardeners and other stakeholders and as new research becomes available.

To provide feedback on these guidelines, please contact:

Toronto Public Health
Josephine Archbold
416-338-8095
jarchbo@toronto.ca

For City of Toronto information about your site and for assistance with this soil guide, please contact:

Toronto Public Health
Barbara Lachapelle
416-392-7691 or 416-392-7685
blachap@toronto.ca

TORONTO Public Health

Designed with ♥ in TO by:
HYPENOTIC

APPENDIX A

SITE VISIT CHECK LIST

Purpose: Inspect the site for risk indicators that will help you determine the *Level of Concern*.

Materials Needed

☐ WORK BOOTS

☐ WORK GLOVES

☐ SHOVEL

☐ NOTEBOOK & PENCILS

APPENDIX A

SITE VISIT CHECK LIST

Make a Site Diagram

- ☐ Sketch a quick diagram of the site, showing its size, location and surroundings.
- ☐ Look around, and note on your diagram:
  - ○ Land use of site
    (residential, commercial, industrial, school, park, etc.)
  - ○ Neighbouring land uses
    (immediately next to the garden site)
  - ○ Estimated distances to main roads or railway lines.

Walk the Site

- ☐ Walk each section and note on your diagram any signs of:
  - ○ Stained soil
  - ○ Unusual odours
  - ○ Trash or debris
  - ○ Burned patches
  - ○ Old equipment, pipes or tanks
  - ○ Dead or dying plants
- ☐ Pick a few random spots and dig into the soil. Look out for all of the risk factors identified in the list above.

APPENDIX A

SITE VISIT CHECK LIST

Talk to the Neighbours

- ☐ Ask what the site was used for in the past
- ☐ Ask about any dumping or burning on the site that they have noticed
- ☐ Make notes of your conversations, marking the activities and locations on your diagram

APPENDIX A

FREQUENTLY ASKED QUESTIONS:

Q: How long should the visit last?

A: A site visit can take 0.5 to 1 hours to complete, depending on the size of the site.

Q: What types of trash or debris am I looking for?

A: Make note of the following if you find them:

- ☐ Household garbage
- ☐ Litter (in unusual quantities)
- ☐ Old tanks and pipes
- ☐ Construction/demolition debris, including:
  - ○ Potentially Asbestos-containing Materials
    (e.g., drywall joint compound, mechanical insulation, roofing materials, floor and ceiling tiles, fire doors)
  - ○ Potentially Lead-Containing Material
    (paint chips, plumbing solder, old pipes)
  - ○ Potentially PCB-Containing Material
    (old electrical equipment such as transformers, fluorescent lamp ballasts, capacitors)

APPENDIX B

SITE HISTORY SEARCH CHECK LIST

Purpose: Determine the *Level of Concern* for your garden site by learning about its past use.

Visit the City of Toronto Archives:

255 Spadina Road (a short walk from Dupont Subway Station)
416-397-5000 | www.toronto.ca/archives | 9:00 a.m. to 4:30 p.m., Mon to Fri

The Archives are also open some Saturdays, but certain materials may not be available on the weekend. Toronto Public Health also has access to resources that may be relevant for your site. Call Toronto Public Health to have your site searched in:

- ☐ Historical Land Use database
- ☐ Lead reduction zones
- ☐ Infill zones
- ☐ Landfill database
- ☐ Toronto Public Health records of environmental site assessments

APPENDIX B

SITE HISTORY SEARCH CHECK LIST

What to do at the Archives

☐ Register and sign in

☐ Check the Street Names Binder

Check the Street Names binder for your municipality. Look up the street name for your site to determine if and when the street name has changed. You will need this information when you check the City Directories and Fire Insurance Plans.

☐ Use the maps

Use the Building Construction Dates map to look up the date the neighbourhood around your site was developed.

☐ Check the databases

Use the following resources to look up the historical uses of your site and of immediately surrounding sites. Start with the editions produced soon after the neighbourhood was developed, and proceed forward in time.

- ○ City Directories
  (this resource will tell you the types of businesses that were around the site in question)
- ○ Fire Insurance Plans
  (these will show the lot sizes and the type of structures that were present on or around the site)

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APPENDIX B

SITE HISTORY SEARCH CHECK LIST

What to do at the Archives

☐ If needed, check additional databases

If the resources above do not provide enough information, use the following resources to look up the historical land uses of your site and immediately surrounding sites:

- ○ Assessment rolls
- ○ Aerial photographs
  (these will help you see if it was a residential area or industrial area, etc.)

☐ Make notes

Make notes of the resources consulted and your findings.

Q: How do I get into the Archives?

A: Admission to the Archives is free. You will need to register as a researcher to get access to the Archives materials. This is a simple step that requires you to provide identification that includes your address and agree to comply with Archives rules.

Q: How long will the search take?

A: It will probably take 2 to 3 hours for you to research a single site at the Archives. If you identify any indicators of high concern, you can stop searching. Otherwise, search the resources noted above.

Please note, it could take up to several days for Toronto Public Health to look up your site in their records.

APPENDIX B

FREQUENTLY ASKED QUESTIONS:

Q: What am I looking for?

A: Urban Gardening Indicators of *Level of Concern*

LOW CONCERN	Current or historical land uses indicating **Low Concern**: • Garden site has always been residential, parkland, farmland, child care centre or school
MEDIUM CONCERN	Current or historical land uses indicating **Medium Concern**: • Garden site is or has once been a risk managed park, orchard, hydro corridor, infill area, commercial land uses (excluding gas station, dry cleaner, printing and auto body shop) • Garden site is located within: a former landfill; former lead reduction zone; or 30 metres from a rail line or a major arterial road[1]
HIGH CONCERN	Current or historical land uses indicating **High Concern**: • Garden site is or has once been a gas station, dry cleaner, print shop, auto body shop, rail line or rail yard • Is or has once been industrial land[2] • Garden site reveals indications of dumping or burning, smells or staining in the soil

[1] Roadways with traffic frequencies greater than 20,000 vehicles per day, speed limits of 50 to 60 km/h, no stop signs (traffic lights control intersections), and frequent use by city buses. Find your street on the City of Toronto Road Classification System is available at: http://www.toronto.ca/transportation/road_class/index.htm.

[2] The site should be considered a Medium Concern site if the industrial land has been remediated and is currently residential or commercial land.

APPENDIX C

SOIL SAMPLING CHECK LIST

Purpose: Collect a representative soil sample of the site. A composite soil sample is made up of two or more combined sub-samples to represent an area of the garden.

Materials Needed

☐ WORK BOOTS

☐ WORK GLOVES

☐ MEASURING TAPE (25 feet or longer)

☐ TROWEL

☐ SHOVEL

☐ 2 CLEAN PLASTIC BUCKETS (9L each)

☐ RESEALABLE BAGS (3.7L)

☐ COOLER & ICE PACKS

☐ NOTEBOOK & PENCILS

☐ LARGE BLACK PERMANENT MARKER

☐ TAPE, PYLONS OR ROPE (Something to mark boundary of proposed garden site)

APPENDIX C

SITE SAMPLING CHECK LIST

What to do

☐ Create a diagram of the site, showing:

- ○ Name and address of the property
- ○ Proposed garden site (draw a line around your garden using pylons, tape or rope). Starting at one corner of the garden, walk diagonally to the far corner and repeat, making an "X" pattern across the garden. Mark the location of a sub-sample approximately every 2.5 metres using a pylon or some other marker)
- ○ Note the location of the sub-samples on your diagram *(see instructions on where to take the sub-samples on page 4/5)*

☐ Sample the soil:

- ○ Strip off turf or other vegetation from the sub-sample spot
- ○ Take shovel and dig into soil down to 40 cm. Place soil into Bucket 1

- ○ Break up and mix the soil in Bucket 1
- ○ Remove stones and visible debris
- ○ Note the presence and type(s) of debris, smells, and staining in your field notes

- ○ Transfer a trowelful of the mixed soil from Bucket 1 to Bucket 2. This is your sub-sample.
- ○ Refill the hole with the remainder of the soil in Bucket 1, and replace the turf.
- ○ Repeat until 9 sub-samples have been collected in Bucket 2.

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APPENDIX C

SITE SAMPLING CHECK LIST

☐ Create composite soil sample

- ○ Mix the combined subsamples in Bucket 2.

- ○ Label sample bag with:
  - ○ name of site
  - ○ sample number

  - ○ sampling date
  - ○ name(s) of person(s) doing the sampling

- ○ Transfer 2 trowels full of the mixed soil from Bucket 2 to the labelled sample bag.

- ○ Seal the sample bag and place it in a cooler with ice packs.

Note: If you are taking more than one composite sample, all equipment should be washed with soap and water between the composite samples. There is no need to wash the equipment when taking sub-samples.

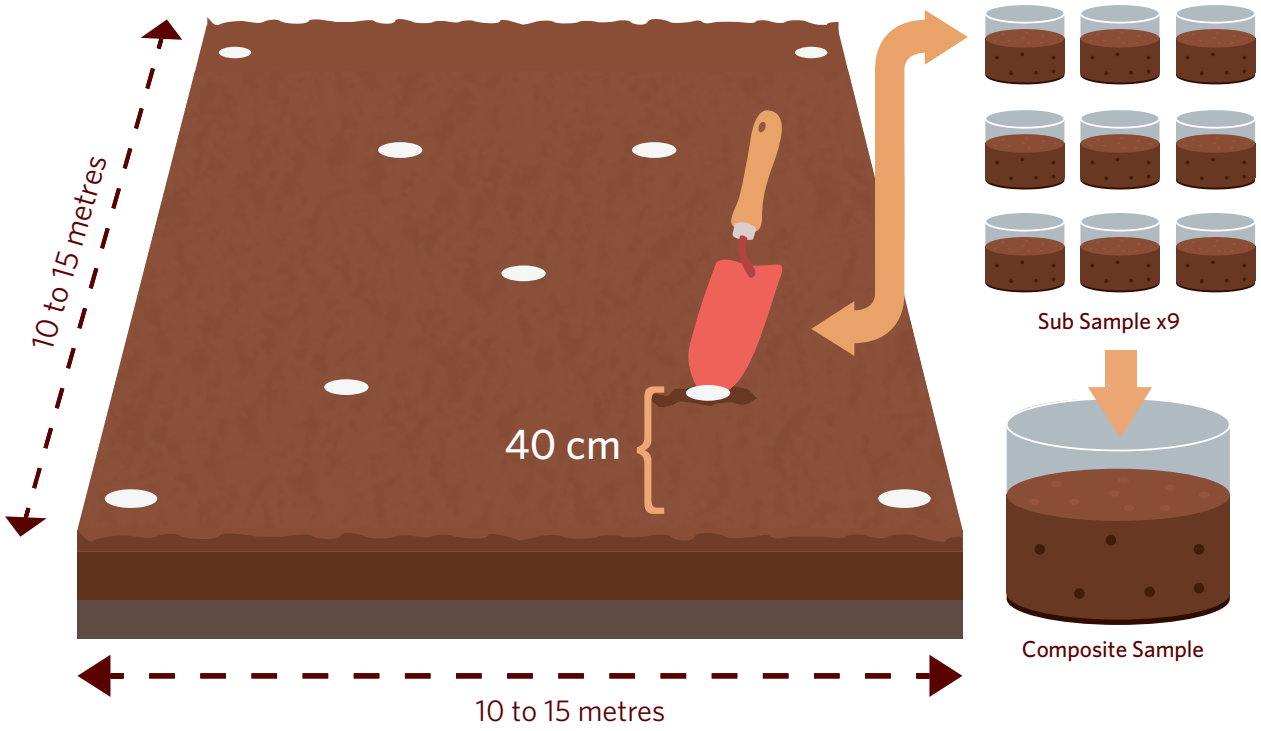
APPENDIX C

FREQUENTLY ASKED QUESTIONS:

Q: Where should I take the samples?

A: Divide the site into 10 to 15 by 10 to 15 metres sections. Each section is one composite sample area.

Plot an "X" over the sample area. Take 9 sub-samples evenly spaced along this "X."



APPENDIX C

FREQUENTLY ASKED QUESTIONS:

Q: How much soil do I need In each sample?

A: The laboratory will tell you how much soil you need. Typically, each soil sample is approximately 2 cups (2 small trowels of soil).

Q: How much will it cost?

A: Each laboratory is different and prices change over time. You should expect to pay between $150 to $300 for each soil sample.

APPENDIX D

SOIL ANALYSIS CHECK LIST

Purpose: Select a laboratory for the soil analysis and tell the lab staff what analyses you would like them to do.

Select a Laboratory Able to do the Analysis

- ☐ Find qualified labs in your area through
  - ○ Standards Council of Canada (SCC) or the Canadian Association for Laboratory Accreditation (CALA)[1]
  - ○ Yellow Pages (heading: Laboratories–Analytical & Testing)
  - ○ Internet search (keywords: environmental analytical laboratory Toronto)
- ☐ Laboratories should be accredited by the SCC or CALA. Ask the lab if they meet the MOE Reg. 153 method detection limit for the metals and PAHs.

[1] You can find the contact information for these organizations through an internet search.

APPENDIX D

SOIL ANALYSIS CHECK LIST

Contact the Laboratory

- ☐ Get in contact with your chosen lab several days before you take the samples to:
  - ○ Confirm price and turnaround time
  - ○ Obtain a chain of custody form
  - ○ Tell the lab when you expect to deliver the samples
  - ○ Obtain instructions for handling the samples and delivering them to the lab

Fill out a Chain of Custody Form

- ☐ Fill out the chain of custody form and keep the required copies with the samples.

  The chain of custody form provides information on you (the client), the samples, and the analyses you want.

- ☐ Every lab's form differs, but you will have to indicate that you want the soil tested for pH values, metals and PAHs (please include the full list of metals and PAHs that you want analyzed. Write out the name of each one. See page 8 of the Guide for the list).

APPENDIX D

SOIL ANALYSIS CHECK LIST

- ☐ If you have any difficulty with the form, contact the lab for advice.
- ☐ Soil interpretation

  Do not ask the laboratory to interpret the soil sample for you. They use provincial soil standards that were not developed for gardening (use SSVs on page 4/6).

Deliver Samples to the Lab

- ☐ The laboratory will provide instructions.
- ☐ Deliver or ship samples to lab within 1 day of sampling. Some laboratories will pick up the soil sample.
- ☐ Keep samples refrigerated or in a cooler between the time you take them and the time you deliver or send them to the lab.

APPENDIX D

FREQUENTLY ASKED QUESTIONS:

Q: How do I interpret the test results?

A: Compare the results of the analysis to the two sets of Urban Gardening Soil Screening Values (SSVs) shown below to determine which *Level of Concern* and Action Level applies to the garden site.

Urban Gardening Soil Screening Values (SSVs) (mg/kg) (also can be expressed as µg/g, ppm or parts per million)

PAHS	URBAN GARDENING SOIL SCREENING VALUE	
	SSV 1	SSV 2
Acenaphthene	0.050	0.32
Acenaphthylene	0.093	0.47
Anthracene	0.58	0.58
Benz(a)anthracene	0.23	2.3
Benzo(a)pyrene	2.3	3
Benzo(b)fluoranthene	0.23	2.3
Benzo(g,h,i)perylene	0.10	1.0
Benzo(k)fluoranthene	0.23	2.3
Chrysene	0.099	0.99
Dibenz(a,h)anthracene	0.77	0.77
Fluoranthene	0.14	1.4
Fluorene	0.39	0.39
Indeno(1,2,3-c,d)pyrene	0.23	2.3
Phenanthrene	3.1	3.1
Pyrene	0.11	1.1

APPENDIX D

FREQUENTLY ASKED QUESTIONS:

Urban Gardening Soil Screening Values (SSVs) (mg/kg) (also can be expressed as µg/g, ppm or parts per million)

METALS	URBAN GARDENING SOIL SCREENING VALUE	
	SSV 1	SSV 2
Arsenic (As)	11	110
Cadmium (Cd)	1.0	10
Cobalt (Co)	23	170
Chromium, total (Cr)	390	630
Chromium, VI (CrVI)	5.0	5.0
Copper (Cu)	180	660
Mercury (Hg)	2.7	2.7
Molybdenum (Mo)	13	13
Nickel (Ni)	34	340
Lead (Pb)	34	340
Selenium (Se)	10	11
Zinc (Zn)	500	1800

NOTE: Some of the SSV1 and SSV2 values are the same. This is not an error. This is because for this particular contaminant, a value above the SSV1 indicates a potential pollution source, therefore this site should be considered High Concern.

Toronto Public Health (TPH) developed these Urban Gardening Soil Screening Values (SSVs) to ensure that users can garden in urban settings without being exposed to unsafe levels of soil contaminants through contact with garden soil and consumption of garden produce.

In deriving the SSVs, TPH considered public health, children's exposure, other sources of exposure to soil contaminants, and all forms of exposure associated with urban gardening when deriving the SSVs.

APPENDIX D

FREQUENTLY ASKED QUESTIONS:

Q: How do I determine the right Action Level for my garden?

A: Use the SSVs to interpret the soil test results, confirm the *Level of Concern*, and take the appropriate action:

- If the concentrations of all of the contaminants are below the SSV 1, then the site is LOW CONCERN, and Action Level 1 is recommended.
- If the concentration of any contaminant is over the SSV 1 level, but lower than the SSV 2, then the site is MEDIUM CONCERN, and Action Level 2 is recommended.
- If the concentration of any contaminant is above the SSV 2, then the site is HIGH CONCERN, and Action Level 3 is recommended.

Note: Please refer back to page 10 of the Guide for instructions on the Action Levels.

Q: If I have difficulty interpreting the results, where can I get more help?

A: You can contact Toronto Public Health for assistance.