ENVIRONMENTAL PROCESSES FOR POTENTIAL COMMUNITY GARDENS OR URBAN FARMS

This guide provides general recommendations and establishes a standard process for evaluating and addressing environmental concerns at City-owned properties being considered for community garden and urban farms. When growing food in urban spaces, soil contamination is the primary environmental and public health concern. Soil contaminants are elements or chemicals that are present in the soil at a level that could pose health risks. Exposure to soil contaminants can lead to long-term chronic health problems, as well as trigger symptoms of acute health problems. Some contaminants that are commonly found in urban soils include lead, cadmium, arsenic, zinc, and polycyclic aromatic hydrocarbons (PAHs). Soil contamination in urban areas can come from a wide range of sources, but most of it is related to human activity. Some examples of common causes of contamination include land development, waste disposal and dumping, manufacturing, chemical fertilizer, and pesticide use. Growing food in contaminated soil poses several risks for those involved. If soil is contaminated, there is a risk of exposure to the chemicals through accidental ingestion or inhalation of soil dust and potentially through consumption of vegetables affected by plant uptake of contaminants.

This guideline outlines the steps to conduct a preliminary environmental survey, baseline sampling requirements for native, fill, and imported soils, and best management practices to reduce exposure to contaminated soils. Follow the recommendations detailed here to evaluate a City-owned property that is being considered for a community garden or urban farm to ensure that a community garden is safe for growing food and to the health of the community.

INTENDED USERS AND STAFF CONTACTS

This guideline is intended to be used by City staff, community garden organizers, and environmental consultants for developing community garden and urban farms on City-owned property. The Sustainability Department must review and approve any assessments and sampling associated with community garden and/or urban farm projects. If you have any questions or concerns, please reach out to the Department of Sustainability point of contacts:

- Catherine Wyffels – Catherine.wyffels@slcgov.com
- Maria Schwarz - maria.schwarz@slcgov.com
- Debbie Lyons – Debbie.lyons@slcgov.com

GENERAL ENVIRONMENTAL REQUIREMENTS

This guideline consists of a flow chart (Figure 1) and Standard Operating Procedures (SOPs). The flow chart in Figure 1 can be used to determine the environmental processes needed for the property in consideration. The SOPs referenced in the flow chart provide step-by-step procedures for each applicable environmental process. These SOPs can be used for both new and existing gardens.

The Sustainability Department should be involved early in the planning process for any community garden or urban farm project. Any historical Phase I or Phase II environmental site assessments (ESAs) and other historical environmental documentation can be obtained from Sustainability or Real Estate Services.

Other applicable City requirements are as follows:

1. City Policy 56-5-7 requires that Environmental Site Assessments (ESA) (Phase I and/or Phase II) be conducted at any property prior to acquisition or sale. The assessments should be conducted in accordance with ASTM standards.

2. City Policy 56-5-4 requires integrated pest management, reduction of chemicals.
    a. At least 2 years prior to converting turf or other maintained landscape to a community garden, pesticides and herbicide use shall be stopped.

PLANNING FOR COSTS AND SCHEDULE

When considering a property for urban farm or garden, the time and costs for baseline sampling and Phase I and Phase II environmental assessments should be considered. Below are some approximate timelines and costs, based on 2022 costs. Prices and timelines will vary depending on parcel size, number of samples required, and extent of potential environmental impacts.

Task	Timeframe	Average Cost	Assumptions
Baseline soils sampling (metals and PAHs)	3 – 6 weeks	$5,000 - $10,000	Price includes analytical costs for metals and PAHs; and consultant costs for preparation of sample and analysis plan, conducting field work, and reporting.
Phase I ESA	2-4 weeks	$5,000	
Phase II ESA	4 – 8 weeks	$30,000	Price includes consultant costs for preparation of sample and analysis plan, conducting field work, and preparing the Phase II report.

ACRONYMS

ASTM – American Society for Testing and Materials

bgs – below ground surface

CY – Cubic Yards

ESA – Environmental Site Assessment

g – gram

mg/kg – milligrams per kilograms

oz – Ounces

PAHs – Polycyclic aromatic hydrocarbons

RCRA - Resource Conservation and Recovery Act

SOP - Standard Operating Procedures

sq m – Square Meter

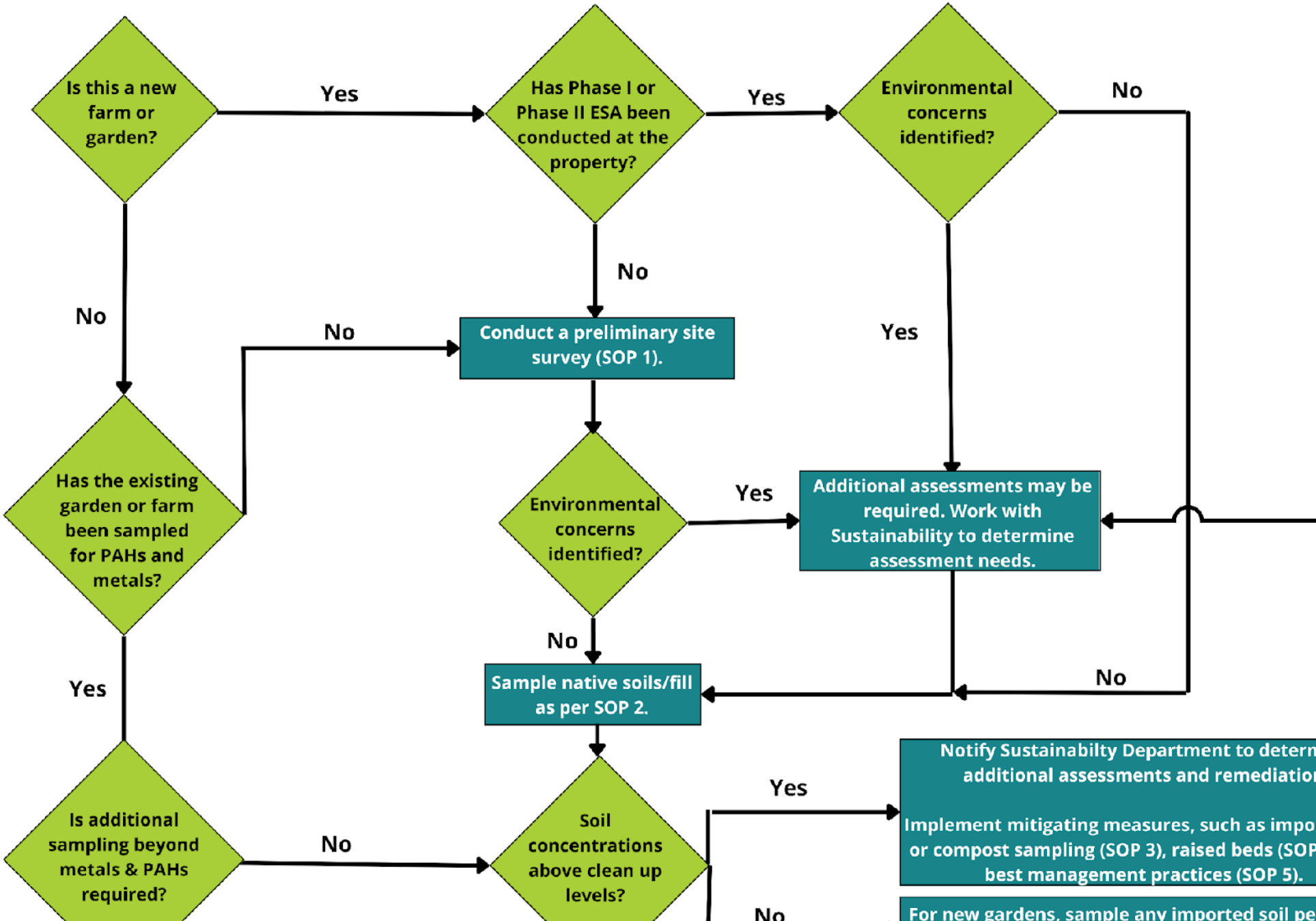
sq yd – Square Yard

USU – Utah State University

UDEQ – Utah Department of Environmental Quality

USEPA – United States Environmental Protection Agency

Figure 1 –Environmental Process Flow Chart for Community



Gardens and Urban Farms

`

SOP 1 – PRELIMINARY PROPERTY SURVEY

1.1 BACKGROUND

The purpose of the preliminary property survey is to determine if there are any environmental concerns at the property. The survey form can be found in Section 1.2 of this SOP. This survey is for screening purposes only and is not intended to replace a survey conducted as part of an ESA.

This preliminary survey should be conducted by City staff.

1. Fill out the Preliminary Survey Form for the property in consideration.
    a. Coordinate with the Sustainability or Real Estate Services to obtain past environmental documentation for the property.
    b. Information on historical uses and environmental indicators can be found using the following tools and resources:
        i. Google Earth
        ii. UDEQ Interactive Map: https://enviro.deq.utah.gov/
        iii. USEPA Envirofacts: https://enviro.epa.gov/
        iv. Sat Lake County Recorder: https://slco.org/recorder
        v. Sanborn Maps: https://www.loc.gov/collections/sanborn-maps/
        vi. Previous Phase I and Phase II reports
    c. Coordinate with the Sustainability Department as needed when reviewing historical documents.
2. Return the completed Preliminary Survey Form to the Sustainability Department for further consideration of potential environmental concerns.
3. If any of the answers on the Preliminary Site Survey Form indicate that there are environmental concerns at the site, then additional environmental assessment must be conducted by a qualified consultant (beyond baseline sampling for PAHs and metals)
4. If no environmental concerns are indicated, an environmental assessment may not be necessary (beyond baseline sampling for PAHs and metals). Follow the flow chart in Figure 1 and coordinate with Sustainability.

1.2 PRELIMINARY SITE SURVEY FORM

Name (person completing form)	Date	Site Name	Site Address

Environmental Assessment History	
1. When did the City acquire the property? 2. Are the historical uses of the site known? If yes, list the historical uses for the site.	
3. Was an environmental assessment conducted when the property was acquired (Phase I/Phase II ESAs)? a) If yes, were any environmental concerns identified? List the recognized environmental concerns here.	
4. Were there any other environmental investigations conducted at this site?	
a) If yes, list the investigations and findings.	

Environmental Indicators	**Yes**	**No**	**Suggested Data Sources**
5. Was or is the property or adjoining properties used for industrial use such as: ○ Dry cleaner, gas stations, auto repair, painting or printing operations, chrome plating, manufacturing, refining			Google Earth Sanborn Maps USEPA Envirofacts
6. Was or is the property used for agricultural purposes such as: ○ Crop production, livestock farming			Google Earth Sanborn Maps

7. Were hazardous materials used or stored at the site? Hazardous materials include: ○ Paints, solvents, gasoline, diesel, oils, pesticides, herbicides			Google Earth Sanborn Maps UDEQ Interactive Map USEPA Envirofacts
8. Are there any other indications environmental contamination, such as: ○ Storage piles, debris on site (railroad ties, piping, construction debris), tanks (aboveground or underground), drums, oily sheen on puddles, soil staining, undocumented fill materials, distressed vegetation.			Site visit UDEQ Interactive Map
9. Are there or were there transformers on site?			Site visit Google Earth
10. Are there any monitoring wells on site? If yes, has the groundwater been sampled and is analytical data available?			Site visit UDEQ Interactive Map
11. Is there the potential for contamination from surface water, such as drainage ditches carrying water from potential sources of contamination?			Site visit
12. Are there any utility corridors on the site, such as: ○ oil and gas pipelines, right-of-way, easements, etc?			Public Utilities
13. Are there any land use limitations such as: ○ Environmental liens, institutional controls, environmental covenants, etc			Sustainability and Recorder's office
Conclusion			
14. Based on the Environmental Indicators above, were environmental concerns identified for the site?			

1.3 RESOURCES

https://www.gardeningonbrownfields.org/docs/MF3096%20Historical%20Property%20Usage%20and%20Implications%202017%20update.pdf

https://www.gardeningonbrownfields.org/docs/MF3078%20Obtaining%20Property%20Information%20and%20Site%20History%20updated%202017.pdf

SOP 2 – NATIVE SOIL/FILL SAMPLING PROTOCOL

2.1 BACKGROUND

This protocol is intended to help establish a consistent approach and minimum sampling requirements. Sampling of fill/native soils should be conducted by a qualified environmental consultant. The environmental consultant must develop a sampling plan for City approval. The sample plan should be based on the guidelines below and should take site-specific conditions into consideration. The Sustainability Department should review and approve the sample plan prior to sampling activities.

2.2 SAMPLING RECOMMENDATIONS

General sampling recommendations are provided below. These recommendations are intended to be general guidelines and a site-specific sample plan should be developed by the environmental consultant.

1. Composite sampling approach is preferred.
2. Divide the garden area into sample areas based on site history, areas of potential contamination, former foundations or structures, stockpiles, or other environmental indicators.
    a. If there are no discerning features at the property or indications of past environmental indications (i.e structures or stockpiles), a grid patterns can be used to collect samples.
    b. At a minimum, divide site into at least 2 sample areas, with each sample area not to exceed approximately 0.1 acres in most cases. One composite sample from each target depth interval shall be collected from each sample area.
3. Samples should be collected from the following target depth intervals:
    a. Surface (0-6 inches bgs)
    b. Subsurface (6 – 18 inches bgs)
    c. Deep subsurface (18-36 inches bgs)
4. Analytes of Concern and Analytical Methods:
    a. PAHs: SW8270E, SW3500C
    b. RCRA 8 Metals: SW6020B
    c. Herbicides and Pesticides (surface soil samples only, if prior agricultural use)
    d. Asbestos if indication of demolished structures
    e. Testing for additional contaminants may be needed, depending on historical use of the site and proximity to commercial or industrial properties.
5. Testing results for PAHs and metals shall be compared to the screening levels in Table 1. For all other contaminants, results should be compared to the current EPA RSLs.
    a. If concentrations of any contaminant exceed its respective screening level, remediation is necessary prior to developing a garden/farm directly in native soil. Alternatively, raised boxes may be constructed as per SOP 4 and best management practices in SOP 5 should be followed.
        i. NOTE: Naturally occurring arsenic in soils in Salt Lake City can cause elevated concentrations that usually exceed its RSL of 0.68 mg/kg. For instance,

background concentrations of arsenic in soils throughout the western United States are observed to range up to 97 mg/kg (U.S. Geological Survey Professional Paper 1270, 1984). Typical cleanup levels for arsenic in the Salt Lake Valley area range from 35 to 50 mg/kg for residential properties.

b. If concentrations are below screening levels, the site may be developed without any further sampling or remediation. Planting may be done directly on native soil and exposed native soil does not need to be covered.

Table 1. EPA Residential Screening Levels		
Contaminant		**Screening Level* (mg/kg)**
Metals (SW6020)	Arsenic	29**
	Barium	15,008**
	Cadmium	80**
	Chromium	80**
	Lead	400
	Selenium	390
	Silver	390
	Mercury	23**
PAHs (SW8270)	Acenaphthylene	4,502**
	Acenaphthene	3600
	Anthracene	18000
	Benzo(a)anthracene	1.1
	Benzo(a)pyrene	0.80**
	Benzo(b)fluoranthene	8.0**
	Benzo(g,h,i)perylene	NE
	Benzo(k)fluoranthene	80**
	Chrysene	803**
	Dibenz(a,h)anthracene	0.80**

	Fluoranthene	2400
	Fluorene	2400
	Indeno(1,2,3-Cd)pyrene	8**
	Naphthalene	6.62**
	Phenanthrene	NE
	Pyrene	1800
	1-Methyl Naphthalene	28**
	2-Methyl Naphthalene	240
	2-Chloro Naphthalene	4800

* Screening levels are EPA's residential regional screening levels, unless otherwise noted.

**Site specific cleanup standards calculated as part of the *Human Health Risk Assessment for the Glendale Urban Fam, Cannon Green Community Garden, and Green Phoenix Farm, Kleinfelder, February 2023.*

SOP 3 – IMPORTED SOIL OR COMPOST SAMPLING

3.1 BACKGROUND

Soil or compost may need to be imported to the site for improvements or to fill raised garden beds. Imported soil or compost should always be sampled at the source before being brought on site.

Sampling of imported soils or compost should be conducted by the garden organizers as part of garden development.

3.2 SAMPLING

General guidelines for sampling are as follows:

1. At least one composite sample per 1,000 CY of soil slated for the community garden or urban farm should be tested.
2. The USU extension program can be used for sample analysis. Garden organizers should contact USU to for sampling analysis.
    a. Sample results may take a few days (2 – 10 days depending on turnaround time requested). Garden organizers should coordinate with the soil vendor to ensure that the soil samples are collected from storage piles that will be available after the time needed to analyze the samples.
3. Composite sampling approach is preferred. Composite sample collection instructions:
    a. Using a metal trowel, collect at least five subsamples from different areas of the soil stockpile
    b. Combine the subsamples in a large clean stainless steel mixing bowl or disposable aluminum pan or disposable zip-type plastic bag.
    c. Remove stones, sticks, vegetation.
    d. Mix the subsamples together using a clean disposable or stainless steel spoon
    e. Transfer the adequate volume of soil to the sample vial obtained from the lab.
    f. Brush any soil off the vial thread. Cover and seal the vial.
    g. Fill out lab forms, label sample, and ship to lab as per lab instructions.
4. Analytes of Concern and Analytical Methods:
    a. RCRA 8 metals - EPA Test Method 6010/6020 and 7470/7471 or equivalent
    b. PAHs - EPA Test Method 8310/8270 or equivalent
5. Testing results for contaminants shall be compared to screening levels in Table 1.
    a. If there are any exceedances of screening levels in imported soil, soil cannot be used at the garden or farm. Soil should be obtained from a different source.
    b. If testing results are below screening levels, imported soil may be used at the garden or farm.

SOP 4 - RAISED BED GARDENS

4.1 BACKGROUND

Raised beds offer the most protection against exposure risks and are recommended for the following:

- Properties where soil contamination has been found and cannot be remediated
- Properties not evaluated as per the recommendations of this document and where soil contamination is unknown.

For properties that meet these criteria, raised beds should be used in any situation where people would be coming into contact with soil, including planting and play areas.

4.2 RAISED BED CONSTRUCTION

Raised beds shall be constructed in the following manner:

1. Minimum height: 11 inches high (equivalent to two 2x6 boards stacked)
2. Material: Wood, synthetic wood, stone, concrete block, brick. Do not use treated lumber or railroad ties.
3. Place a layer of heavy-duty, water permeable geotextile fabric under the raised box to prevent roots from penetrating into native soil and exposure to native soil.
    a. Specification: Nonwoven geotextile filter fabric, polypropylene or polyester fabric, 3 oz/sq yd (101g/sq m) minimum, composed of fibers formed into a stable network so that fibers retain their relative position. Fabric shall be inert to biological degradation and resist naturally encountered chemicals, alkalis, and acids.
2. Fill raised bed with imported soil/compost that was sampled in accordance with SOP 3.

4.3 PATHS, WALKWAYS, PLAY AND WORK AREAS

Paths, walkways, play areas, and other areas not used for planting shall be developed in the following manner:

1. Place a layer of heavy-duty, water permeable geotextile fabric over the entire site to prevent exposure to native soil. The same specifications as above apply for walkways, paths, and play and work areas.
2. Place 2-3 inches of mulch over geotextile. Alternatively, these areas may be covered with grass, stones, or clean imported soils sampled as per SOP 3.
3. Install signs to warn users to stop digging if native soils are reached and avoid contact with fill/native soils.

4.4 RESOURCES

https://m.vevor.com/commercial-grade-driveway-fabric-c_10184/vevor-driveway-fabric-stabilization-geotextile-fabric-13x108-underlayment-black-p_010600913832

https://www.farmtek.com/farm/supplies/ProductDisplay?mfPartNumber=108201

SOP 5 – RECCOMENDATIONS FOR SAFE GARDEN PRACTICES

5.1 BACKGROUND

City properties used for growing food must be evaluated for suitability as recommended in this document and must be designed and developed to minimize risk of exposure to contaminants that are common in urban soils.

Visitors and users of garden /farms are advised to adhere to the following to further minimize their own risk.

1. Use only organic soil amendments in your garden plots
2. Watch over small children to stop them from consuming soil through hand-to-mouth play
3. Wash hands immediately after gardening and before eating to avoid accidental consumption of soil
4. Wear gloves as a barrier between your hands and soil
5. Throw away the outer leaves of greens, especially from the bottom of plants, before washing
6. Wash produce in running water
7. Avoid bringing contaminated soil home:
    a. Clean tools, gloves, and shoes before bringing them indoors
    b. Put highly soiled clothes in a bag before bringing them indoors and wash promptly in a separate load
    c. Wash excess dirt from crops, especially root crops and leafy vegetables
8. Peel vegetables, especially root vegetables, that have been in direct contact with soil

5.2 RESOURCES

For more information, visit:

https://www.epa.gov/sites/production/files/2014-03/documents/urban_gardening_fina_fact_sheet.pdf