CONTAMINATED SOIL

Contaminants are a common issue in urban gardens, especially in industrial areas like Pilsen. Vacant lots in these areas are sometimes called "brownfields": land where contaminants or the possible presence of contaminants complicate the site's reuse. When a brownfield is being revitalized for future use as a community space, contaminants must be addressed early in planning phases. Here's how the Pilsen toolkit partners arrived at a strategy to protect visitors from high levels of lead and mercury at the site that would become the Mary Zepeda Native Garden.

PLANNING CONCERNS:

The Pilsen project leaders had three main priorities when deciding on their strategy:

COMMUNITY

- Create a safe place for children to play
- Provide health education for families
- Complete project on schedule
- Use remediation as demonstration

LANDSCAPE

- Ensure safe construction
- Mitigate soil contaminants (lead and mercury) properly
- Design for proper rain water drainage

CLIMATE+ENVIRONMENT

- Use brownfield best practices
- Plant native species
- Limit airborne lead from disturbing the soil

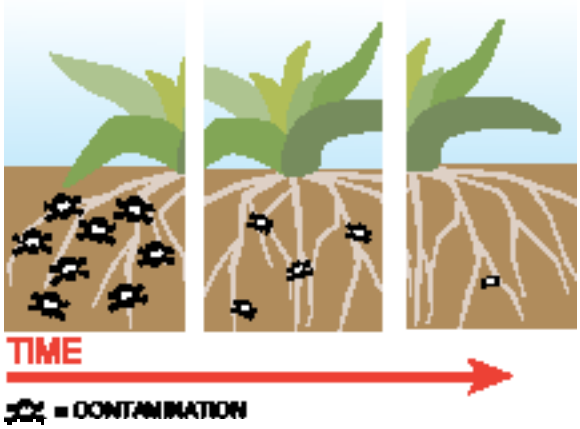
STRATEGIES CONSIDERED:

Conversations with the City of Chicago Department of Environment, the Region 5 Environmental Protection Agency (EPA), and The Field Museum's technical partners brought about a number of different options for protecting plants and people from this type of contamination.

OPTION 1:

Cleaning the soil with plants

There are many species of plants that are metal hyperaccumulators, meaning their roots attract and break down heavy metal contaminants in the soil. Cleansing the soil this way takes at least a couple years.



OPTION 2:

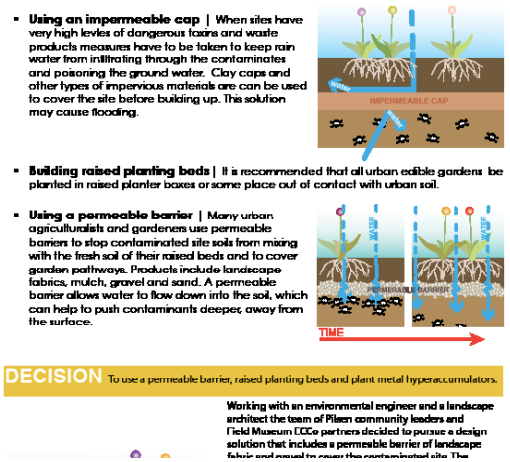
Replacing contaminated soil

Another route was to remove six to twelve inches of contaminated soil and then add a layer of new, clean soil. However, this involves contaminating an additional site, because the removed toxic soil has to be dumped somewhere else.

OPTION 3:

Using an impermeable cap

If a site has very high levels of dangerous toxins, it's important to keep rain water from drawing the toxins up to the surface. A layer, or "cap," of clay can be used to cover a site before building it out, but in some cases this solution can cause flooding.



OPTION 4:

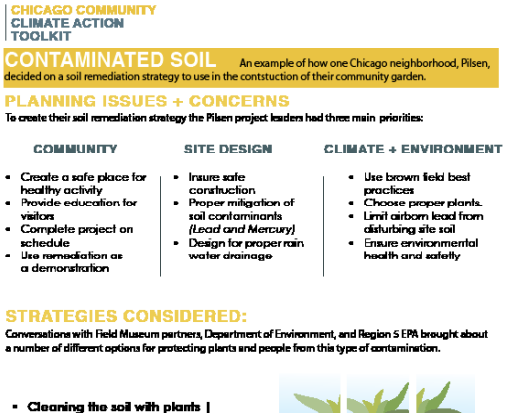
Building raised planting beds

It is recommended that all urban edible gardens be planted in raised planter boxes or some place out of contact with urban soil. But this project did not involve growing food.

OPTION 5:

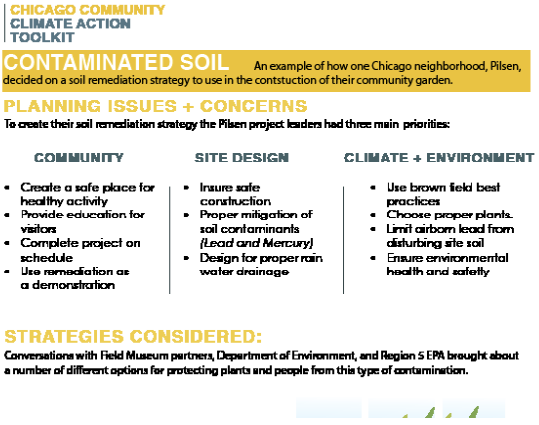
Using a permeable barrier

Many urban gardeners use permeable barriers to stop contaminated soils from mixing with the fresh soil of their raised beds and to cover garden pathways. Permeable products include landscape fabrics, mulch, gravel and sand. A permeable barrier allows water to flow down into the soil, which can help to push contaminates deeper underground, away from the surface.



DECISION:

Use a permeable barrier, raised planting beds, and plant metal hyperaccumulators.



Working with an environmental engineer and a landscape architect the team of Pilsen community leaders decided on a design solution that includes a permeable barrier of landscape fabric and gravel to cover the contaminated site. The planting beds are designed to be raised hill forms, and the rain garden on the site includes metal hyperaccumulators that help mediate the continuous flow of pollution from nearby industry.

The team believed it was important that the garden serve as a demonstration site for others who might want to build native gardens in urban settings. With this in mind they decided not to replace the contaminated soil because this process would not necessarily be easy for others to replicate. In addition, removing soil would have released additional airborne lead into the neighborhood. Consideration for the garden's neighbors was also an important factor in the team's decision. For this reason they opted not to use a impermeable cap and instead used a permeable barrier that would allow for better water drainage. Most importantly, the site is intended for use by the local neighborhood residents and their children, so extra measures were create a safe environment in the garden.

CHICAGO COMMUNITY CLIMATE ACTION TOOLKIT

Find this and other climate action tools at climatechicago.fieldmuseum.org

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