UNIVERSITY OF LOUISVILLE
SUPERFUND RESEARCH CENTER

Superfund Site Reuse Playbook

A Step-by-Step Guide

Contents

Executive Summary

The US Environmental Protection Agency has identified thousands of active and inactive Superfund and brownfield sites. Many of these sites have not been properly remediated or contained. As such, these sites may be leaching chemicals into our air, water, and soil, posing a large threat to human health and the environment.

How can we restore these sites for reuse and ensure their safety for surrounding communities

Many Superfund sites have been redeveloped into recreational facilities, such as sports fields, hiking trails, parks, playgrounds, picnic areas, industrial complexes, golf courses, and solar fields. Safe revitalization of these properties is typically a local effort involving many stakeholders.

This guide is intended for informational purposes only and should not be considered agency policy or guidance. It describes the processes and players involved in bringing a formerly contaminated site into safe reuse and presents potential hurdles to redevelopment.

This document offers context for embarking on a project to improve human health in our communities while utilizing barren or contaminated land for the greater good. Its contents are intended to raise awareness of the issues involved with such a project and offer guidance for the successful revitalization of former superfund sites.

The playbook is organized into four parts.

Part 1 provides the context of the playbook and provides a guide for understanding the impact Superfund sites can have on community health.

Part 2 details the playbook framework and how it can be applied to other sites for reuse assessments.

Part 3 utilizes the framework to evaluate a case study: the Lee's Lane Landfill in Louisville, KY.

Part 4 outlines the obstacles and the considerations involved in the process of redevelopment of a brownfield or Superfund site.

Introduction

This simple guide was developed to assist individuals or communities interested in leading the effort toward the beneficial reuse of a former Superfund or brownfield site. No matter what end use is deemed most appropriate for a site, the community benefits from restoring it to productivity, adding to its healthy economic, social, and ecological value.

This playbook provides a framework for redeveloping sites, including government and environmental oversight, community input, and the positive health impacts of reuse. Layering in scientific health research is essential to evaluating a site for reuse and a redevelopment project.

This playbook outlines how to examine a Superfund site for reuse, identifying the crucial elements of the analysis.

Liability or Opportunity?
Hazardous contamination often renders Superfund sites unusable and abandoned. These sites pose health risks for many reasons, including contaminants left on site, the decomposing landfill materials, and illegal and dangerous use by community members. However, with proper planning, these sites can become assets to their communities.

What is Superfund?

EPA Superfund was established in 1980 by an act of Congress that gave EPA the funds and the authority to clean up polluted sites. The goal of Superfund is to:

- Protect human health and the environment
- Involve communities in the process
- Hold the responsible parties accountable for the cleanup work.

What is the role of the NIEHS regarding superfund sites?

The NIEHS Hazardous Substance Basic Research and Training Program (Superfund Research Program [SRP]) provides scientific solutions that protect human health, the environment, and communities. As part of NIEHS, SRP strives to understand ways to protect the public from exposure to hazardous substances, such as industrial solvents, arsenic, lead, and mercury. These and other toxic substances can be present in water, soil, and air at hazardous waste sites throughout the U.S. and are often found in and around active and inactive superfund sites. Their research is conducted through university programs funded by NIH and complements the work of the U.S. Environmental Protection Agency (EPA), the Agency for Toxic Substances (ATSDR) and Disease Registry, and other federal and state agencies.

Aligned with the NIEHS mission, SRP researchers investigate the impact of environmental contaminants on human health. This research boosts confidence in the safety and viability of site remediation for community reuse.

Part 1: Context

As of 2024, 1,340 active Superfund sites in the US were on the EPA National Priorities List (NPL). 457 sites have been deleted from the NPL because they have been remediated or are no longer leaching contaminants into the surrounding areas. Superfund sites are found in nearly every state, often near residential areas. The EPA estimates that 78 million people, nearly 1 in 4 Americans, live within three miles of a Superfund site.
https://www.sciencefriday.com/segments/superfund-sites-flooding-climate-change/.

The appropriate remediation plan for a site depends on its waste or contaminant characteristics and what gases and other contaminants it releases into the environment. At many Superfund sites, on-site containment is deemed the most appropriate remedial action, which leaves remaining waste or contaminants in engineered containment systems. These sites are typically safer and ready for reuse.

Know the History of Your Site. Industrial sites closed in the 1980s or earlier may not have been properly capped or contained because modern containment practices were not yet required by law. Contaminants leaking into the air, water, and soil surrounding the location can impact the health of the citizens living or working there.

At most Superfund containment sites, the primary objectives of the cover or containment system are to:

(1) protect the public from coming into contact with hazardous waste;
(2) prevent the release of hazardous waste to the environment; and,
(3) minimize surface water infiltration into the waste.

Currently, general design requirements are based on federal or state criteria (e.g., Resource Conservation and Recovery Act (RCRA) Subtitle C or Subtitle D closure requirements).

Whether a proper containment system is in place or not, or whether or not it is effective, it is in the community's best interest to engage an environmental engineer to test the chemicals in the area around the site to ensure that public human health is being protected.

Know the Community Around Your Site. The NIEHS Environmental Health Sciences Core Center Program includes Community Engagement Cores (CECs) to foster community-university partnerships. CECs communicate environmental health research findings and concepts to community partners and convey the voice of these communities to researchers within the center. In so doing, CECs increase awareness of environmental health and help researchers understand which environmental health issues are important to their identified audiences. CECs are leading the way in developing communication approaches between researchers, community groups, policymakers, and healthcare professionals. They are an important part of Superfund site reuse planning.

Part 2: Framework

This part of the report provides context for reviewing the feasibility of reusing a Superfund site.

These topics are:

- History
- Current Status
- Possible Uses
- Community Involvement
- Obstacles to Redevelopment

Key Inputs

Obtaining key or relevant inputs into your decision-making model is an important process. Once your site is identified, contact the following organizations to collect past or current information about the location.

- EPA
- Local government
- Neighborhood-led advisory council or task force
- Developers of nearby properties
- Environmental justice groups in your city or state
- State environmental commission, Department of Environmental Protection, or brownfields office
- State Divison of Water
- Metropolitan sewer management
- Air pollution control district
- Local electrical energy provider
- Waterways alliance, if a waterway is adjacent or impacted

- University environmental science departments
- Planning and zoning
- USACE - US Army Corps of Engineers
- Environmental policy groups
- A local historian in the area
- University and/or newspaper archives
- Local environmental attorney
- Environmental consultants. Note: The EPA FYR may identify an environmental consultant who has researched and reported on your site.

History

1. Identify the site's history of use. Research into the history of a site should include the full use of the land as far back as possible. This helps understand the history of dumping and any Potentially Responsible Parties (PRPs). These sites are often converted from one use to another before they are closed down. For example, a site may have been used as a rock quarry and later turned into a municipal dump site.

2. Determine ownership, past and current. Current and past owners are potentially responsible parties for cleanup costs. This will help identify who is responsible for the site's current condition, including past uses and contaminants.

3. Research past cleanup efforts (EPA). EPA Five Year Review reports (FYRs) will have information about past efforts with local government, state environmental protection, water and sewer, etc. Finding documentation of past remediation, capping, or other protection efforts is important to moving forward with a site.

(PRP) Potentially Responsible Party

A PRP is an individual or company (including generators, transporters, operators and owners) that may be responsible for causing or contributing to contamination at a Superfund site. Whenever possible, PRPs must clean, or pay for the cleanup of, the hazardous sites they contaminate.

FIND YOUR SUPERFUND SITE
https://www.epa.gov/superfund/search-superfund-sites-where-you-live
The EPA site lets you locate hazardous waste cleanup locations and identify details about those cleanups, relevant grants, and related information.

Current State

Create a simple overview of the current state of the Superfund site. The current state will be outlined in EPA's Five Year Review. There is much important information in past reports about individual Superfund sites. Still, a physical visit to the location will give you current information that may not be found in the report.

Identify any impacted residents or communities and outline how they are being affected by the site. Census tract data will tell you more about your community:
Source: U.S. Census Bureau American Community Survey 2014-2018 5-year estimates. Retrieved from https://www.socialexplorer.com/tables/ACS2018_5yr/R12611127 .

Site details to include:

- What is the physical condition of the site?
- Is it currently being used by the public?
- What is the size of the population living or working within a 1-mile radius?
- Is there a presence of trash?
- Are institutional controls in place, such as required signage, fences, locked gates, etc.
- Is contamination obvious?
- Are there other nearby environmental hazards such as railroads, industrial sites releasing contaminants into the groundwater, or other RCRA sites that can be identified through the EPA?
- Has a proper cap been installed on the site?

What is Capping?

Capping a former Superfund site involves constructing an engineered containment system and covering over, around or under contaminated materials to control the contamination and prevent future leaching into the surrounding soil and water table.

Ecological revitalization can restore a Superfund site into a natural area. These rewilding projects support diverse plants and wildlife for a sustainable habitat. However, the site must be capped before the general public is allowed on the property.

Possible Uses

Identify What The Site Can Be

Some of the most common uses of former Superfund and brownfield sites are as follows:

- Solar
- Parkland
- Recreation/Sports
- Reforestation/Rewilding
- Industrial
- Other

It is important to note that these are not simple solutions. First, who will be responsible for the reuse project must be determined. Even an excellent idea for a project will not go anywhere without a leader and someone to take financial responsibility.

What Are the Next Steps?

Once a use for the site has been identified:

- Understand environmental conditions
- Determine ownership of the property
- Secure commitment by an entity/government to steward the reuse project

- Be aware of differing priorities for government and community groups
- Identify the community near the site that past and future uses of the property may impact.
- Develop a plan to manage future changes in the site, such as settling, environmental changes, and impacts.
- Address the habitat and ecosystem needs
- Assess the impact on nearby waterways - what are the future risks
- Is the site adequately capped and contained?

Community Involvement

Community engagement is critical to a Superfund site's remediation and reuse process. Any public or private entity working toward the reuse of a formerly contaminated site should consider these steps to foster meaningful community involvement:

1. Identify Stakeholders

- **Who**: Identify key community leaders, organizations, businesses, local governments, affected groups, and impacted residents.
- **Diverse Representation**: Ensure inclusivity by considering cultural, socioeconomic, and language barriers for all involved parties.

2. Understand Community Concerns and Needs

- **Baseline**: Assess the community's existing knowledge about the site and their preferred modes of communication.
- **Assessments**: Use surveys, focus groups, and interviews to understand community concerns, such as health risks, impact on property values, or environmental justice issues.

3. Establish Clear Goals and Objectives

- **Engagement Goals**: Clarify what the community should expect from the remediation or reuse process (e.g., health and safety updates, job opportunities, or creating a park or public space).
- **Objectives**: Ensure the goals align with any formerly contaminated site regulating body.

4. Create a Community Engagement Plan

- **Plan**: Develop a structured plan outlining how and when the community will be engaged throughout the remediation process.

- **Communication Channels**: Use multiple communication channels such as public meetings, social media, newsletters, and a dedicated website to provide updates.

5. Provide Transparent and Accessible Information

- **Technical Translation**: Simplify complex scientific and technical information into layman's terms.
- **Bilingual Resources**: Offer materials in multiple languages for the impacted community if appropriate for that group.
- **Data Sharing**: Share findings from environmental assessments, health risk analyses, and progress reports regularly.

6. Host Interactive Meetings and Workshops

- **Community Advisory Groups (CAGs)**: Form a CAG to involve community leaders and representatives in decision-making.
- **Open Forums**: Allow community members to voice concerns, ask questions, and provide feedback.
- **Special Events**: Organize workshops or events where the community can learn about remediation technologies, timelines, and safety measures.
- **Site Visits**: Arrange supervised site tours to build transparency and trust.

7. Collaborate with Local Institutions

- **Schools and Universities**: Partner with local educational institutions to promote awareness and provide research opportunities.
- **NGOs**: Collaborate with nonprofit organizations **t**o gather resources and strengthen outreach efforts.

8. Monitor and Evaluate Engagement

- **Feedback Mechanisms**: Create tools for the community to provide ongoing input, such as comment forms or online surveys.
- **Participation**: Record attendance and participation levels at meetings or events.
- **Strategies**: Adjust engagement methods based on community feedback and effectiveness assessments. Let them know you "hear" them.

10. Celebrate Successes

- **Community Contributions**: Recognize the role of the community in the remediation and reuse process.

- **Milestones**: Publicize key achievements, such as remediation milestones or the opening of a reuse project.

By following these steps, you can ensure that affected communities are informed, involved, and empowered throughout a Superfund or brownfield site's remediation or reuse process.

Consider reviewing the following resources that may help determine the affected communities:

- EPA EJ Screen: https://ejscreen.epa.gov/mapper/
- FEMA Flood Map Service Center: https://msc.fema.gov/portal/home
- Lojic Online: https://www.lojic.org/lojic-online
- Census Maps: https://www.census.gov/programs-surveys/geography/data/interactive-maps.html

Part 3: Case Study: Lee's Lane Landfill

The Lee's Lane Landfill serves as a prototype for the process outlined in this document. It highlights the importance of investigating and summarizing the status of Superfund sites to understand their potential uses, climate impacts, and benefits to the surrounding community.

History

The Hofgesang dump on Lees Lane was a beehive of activity when this picture was taken. The white truck belongs to the City of Shively, which uses the site for refuse disposal. Photo by Al Allen, THE COURIER-JOURNAL Jul 12, 1967 (Al Allen, The C-J)

The Lee's Lane Landfill is located in western Louisville, KY, along the Ohio River. Owned by Joseph Hofgesang, the site was used as a quarry in the 1940s and repurposed as a landfill from 1948 to 1975. Over 200,000 tons of municipal, industrial, and residential waste were disposed of in the landfill during this period.

Following a flood in 1980, the Kentucky Department of Hazardous Materials and Waste Management discovered approximately 400 drums of hazardous waste at the landfill. The landfill owners removed these drums in the fall of 1981, but the remaining drums of non-hazardous material, as well as any empty drums, were buried in place on the landfill.

EPA placed the site on the Superfund program's National Priorities List (NPL) in 1983 because of contaminated groundwater, surface water, sediment, soil, and air from landfill operations. A soil cap was placed on exposed waste, and a riverbank erosion protection system was installed in 1986. The site was removed from the NPL in 1996.

The EPA's 1986 Enforcement Decision Document and Record of Decision (ROD) selected the following remedy:

1. Provision for a properly operating gas collection system.
2. Consideration of a possible future alternate water supply.
3. Cleanup of surface waste area.
4. Bank protection controls. Riprap, a layer of large stones that protects soil from erosion in areas of high or concentrated flows, was installed along the Ohio River shoreline.
5. Establishment of an alternate cleanup limit for the groundwater at the Site.
6. Institutional controls will be implemented and fully identified during remedial design. These controls may include, but will not be limited to:
    a. Cautionary signs.
    b. Installation of a gate at the Putnam Street access point.
7. Operation and maintenance activities, which will include:
    a. Groundwater, gas, and air monitoring.
    b. Inspection of the gas monitoring wells, gas collection system, capped waste areas, and the rip-rap along the Ohio River bank.

Note: No groundwater remedy was selected in the 1986 Enforcement Decision Document.

Other industrial sites are located near the Lee's Lane Landfill. The LG&E coal-fired Cane Run Generating Station was in operation for over 60 years until it was closed in 2019. Coal ash from the station is still detected in the area. Rubbertown is an area of Louisville located next to the Lee's Lane Landfill. Oil refineries were built in this area in the early 1900s, but rubber plants and tire companies took over during World War II. Today, there are 11 large chemical plants in Rubbertown that account for 42% of air emissions in Louisville. "An air quality study from 1956 found extremely high levels of cancer-causing chemicals in the ambient air around Rubbertown." (WFPL. (2019). Unequal: How West Louisville residents cleaned up the air. Retrieved from https://www.lpm.org/news/2019-04-17/unequal-how-west-louisville-residents-cleaned-up-the-air).

What does the history of Lee's Lane tell us?

1. There were multiple uses of the land in the last 100 years.
2. More than one historical use most likely produced contaminants still existent in the landfill.
3. The history of the site includes improper handling of hazardous materials.
4. The landfill was closed before current-day EPA regulations were in place, and the site of the former dump has not been capped and contained properly.
5. The EPA has continuously tested the site since the early 1980s. Levels of contaminants leaching from the site appear to be reducing.

6. Testing of contaminant pathways from adjacent industrial sites does not appear in environmental testing reports. These adjacent entities may contaminate the water table and air adjacent to Lee's Lane.
7. The site is in the Ohio River floodplain, and flooding has affected a portion of it in recent decades.

Current State

What is the site's current state, and what is the impact on human health?

- The Lee's Lane Landfill sits in the 100-year flood plain of the Ohio River.
- Metro Louisville and the Hofgesang Foundation, a disinterested party, own the site today. As of the date of this report, potential developers' conversations with the Foundation have led nowhere.
- At Lee's Lane, site signage is largely damaged or missing.
  Result: People are trespassing on the site daily and are potentially exposed to leachates.
  - There is evidence of off-road driving.
  - Community members and visitors walk the property, walk their dogs, and build campfires.
  - The Louisville Loop recreational trail runs through the property, encouraging recreational activity near the Lee's Lane property.
  - People are actively dumping trash and construction materials on the site.
  - There have been reports of unhoused persons on the property.
- Trees and other vegetation growing on the riprap, the protective barrier constructed along the Ohio River shoreline.
  Invasive vegetation compromises the barrier's stability. Deterioration of the barrier may allow erosion on the shoreline, impacting the landfill material along the river.
- There are swales and depressions on the cap, indicating site settling.
  Uneven and settling soil illustrates the cap's instability and the changing nature of the landfill material below.
- Remnants of materials, such as tires, dumped in past years are still visible.
- Invasive plant growth dominates the property.
  Risks:
  - Invasive plants with shallow roots can cause erosion by allowing soil to wash into creeks, harming water quality and making it difficult for fish and other animals to thrive.
  - They also reduce biodiversity by displacing native plants, which disrupts the balance of the ecosystem and endangers animals that rely on various plants.

- Invasive species can reduce habitat by preventing the growth of trees that provide necessary shade for streams, leading to warmer waters that are inhospitable to fish.
- Invasive plants may damage or topple trees by adding weight or killing soil fungus essential for tree growth.

Upon physical examination, it is obvious that *differential settlement* is taking place. This is where the cap settles more in some places than in others. This can result in an uneven surface area and make parks, athletic fields and solar fields a poor option. This uneven settlement can result in unpredictable gas release and can pose health and safety concerns to site users.

Contaminants at Lee's Lane

Toxins found in Lee's Lane: Arsenic, Barium, Lead, Selenium, Mercury, Copper, Beryllium, Manganese, Iron, Zinc, Chromium, Cadmium, and VOCs such as Benzene. Research on these chemicals is available from the University of Louisville Superfund Research Center at https://louisville.edu/enviromeinstitute/superfund/Publications.

What to do next?

1. Review the EPA's most recent Five-Year Report: According to the EPA, further site monitoring is unnecessary. However, the most recent EPA FYR recommends that only passive recreation be allowed on this property.
   - Is more monitoring needed?
2. Identify current site ownership. The Hofgesang Foundation and Metro Louisville currently own the 112-acre site. Future ownership of the parcels must be determined before progress can be made.
3. Does the EPA or Kentucky Dept of Environmental Protection offer immunity from liability for interested parties?
4. What are the physical characteristics of the site need to be addressed before reuse can be initiated?
5. What is the cost of adequately capping the 112 acres before reuse?
6. Consider the impact of a new reuse solution on the residential properties adjacent to the site. Talk to the community.
7. Conduct an infrastructure evaluation before determining future use: water, sewer, electric, gas, broadband, and roads.
8. The site must be properly characterized through extensive environmental and geotechnical testing. This will determine what is underneath, how deep, and how stable the site is for future reuse.
9. The Kentucky Department of Environmental Protection oversees the property's operations and maintenance (O&M). Is this feasible moving forward?

Possible Uses for Lee's Lane

Reuse options for Lee's Lane and their impacts/issues to consider.
The following options have been discussed as possible options for reusing Lee's Lane Landfill. However, as of 2024, no option has been selected or implemented.

Solar
: Issues: Noise, visual pollution, utility support, eliminating public access to the site, security, unstable cap, signage, installation, and mitigating flood risk

Sports Fields
: Issues: The site needs a proper cap, parking, traffic in adjacent neighborhoods, lights and power, security, flood risk, noise, signage, replanting, watering, and drainage.

Rewilding
: Issues: The site needs a proper cap, invasive plant removal, replanting native plants, security, signage, and security.

Industrial
: Issues: The site needs a proper cap, disturbance during construction, parking, traffic, and a geotechnical study to ensure building stability, floodplain, potential settlement, and elimination of public access.

Regardless of the reuse option selected, responsibility for the upkeep and ongoing O&M must be determined.

Why should we care about flooding?
The EPA has determined that more than **300 Superfund sites** are at risk of flooding. However, according to a 2021 Government Accountability Office report, the number of flood-prone sites may exceed that amount. Floodwaters can transport toxic waste into neighboring communities, threatening drinking water, agriculture, and broader ecosystem health.
https://www.sciencefriday.com/segments/superfund-sites-flooding-climate-change/#:~:text=They're found in nearly, nearly 1 in 4 Americans.

Further testing at Lee's Lane?
Researchers at the **University of Louisville Superfund Research Center (ULSRC)** focus on accurately measuring and monitoring the health impacts connected to exposure to volatile organic compounds (VOCs), such as benzene, methane, and 1,3-butadiene, all of which have been identified at Lee's Lane. The research team is concerned about understanding persistent VOCs at the Lee's Lane Landfill and any possible human exposure pathways that could have adverse health impacts for individuals who live near or come onto the site regularly.

VOCs are organic chemical compounds that can volatilize under normal atmospheric temperature and pressure conditions. In the past, the Lee's Lane Landfill site was a documented emission source of VOCs; these gases were proven to have migrated to the nearby Riverside Gardens neighborhood. The ULSRC researchers intend to offer summaries and assessments of ongoing site monitoring and related decisions by KDEP and the EPA to help community members and stakeholders better understand potential health risks and more fully participate in determining the future of Lee's Lane Landfill.

Community Engagement

Where does community engagement begin? Awareness of a brownfield or superfund site often starts when an environmental issue affecting the community is identified and a complaint is filed. For Lee's Lane, heavy community engagement began when complaints started in 1975.

"*In 1975, nearby residents reported flash fires in their basements; methane, apparently from the landfill, was being ignited by the pilot lights of their hot water heaters. The Commonwealth of Kentucky closed the landfill, and local authorities evacuated and purchased seven nearby homes because of the presence of explosive levels of methane." (*Harr, J. 1995. *A Civil Action.* Vintage Books*)*

The EPA held several community meetings in the 1980s to solicit input and inform the community about the next steps regarding these environmental issues.

Next Step: Re-engage the community when Metro Louisville or a private entity takes responsibility for the land and commits to reusing it.
At that time, they will need to:

- Identify the community impacted
- Understand the current community challenges
- Engage the community to understand their vision for the property

Part 4: Considerations

- **Ownership and consolidation** - Consider consolidating the property under one owner for ease of future decisions regarding the site and responsibilities for maintenance.
- **Involving past PRPs in cleanup** - Past owners, companies who dumped materials, contaminant-carrying companies, and operators may be liable to share in the remediation cost.
- **CERCLA laws and long-term liability**—Determine who is liable for improvements, bringing the site to new safety standards, and who is liable if ownership changes.
- **Physical site instability** - A thorough evaluation of the stability and settling occurring on the site must be performed.
- **Impact on adjacent waterways** - Carefully examine nearby streams, creeks, rivers, and drainage so that new construction or planting does not negatively affect the waterways.
- **Public opposition and environmental justice** - The impact on the community and residents in need must be fairly evaluated. The community's concerns must be addressed, as they often bring to awareness serious issues that were not formerly known.
- **Habitat/ecosystem health** - Can native plantings be introduced as part of the reuse to rebuild the ecosystem?
- **Ongoing operations and maintenance (O&M)** - Who will conduct and pay for ongoing maintenance of the new use of the property?
- **Transportation/Access** - Are there roadways to support the new function, and are those roadways invasive to the community?
- **Infrastructure** - Are utility services available to support reuse
- **Safety** - How to keep the new functions of the site safe from vandalism. Is the new operation hazardous to the community?

For **Lee's Lane**, many obstacles are hindering the reuse of the site today.

1. **Ownership** - The site is owned by Metro Louisville and the Hofgesang Foundation.
2. **Leadership** - No one has stepped up to lead the effort to redevelop the site and take responsibility for ongoing operations and maintenance.
3. **Proper site analysis —**The depth of the landfill materials has not been properly analyzed. This is mandatory before anything can be built on the site. Proper site stability tests could stabilize a building or structure.
4. **No proper cap has been installed.** Before this land is open to the public, a protective cap on the landfill should be installed.
5. **Coalition with the community**—The community has not been involved in conversations about future use. Homeowners have turned over since Lee's Lane was put of the EPA National Priority List in the 1980s. An agreement with the community on future use of the site is recommended.
6. **Current utility infrastructure** may not support uses of interest. This will need to be considered once a future use is determined, as it may be a significant cost to a future project.

Conclusion

Although much work has been done in Superfund site reuse and brownfield rehabilitation, it is important to note that **no two Superfund sites or landfills are alike.** Cooperation and collaboration amongst all players (PRPs, government at all levels, community, and adjacent businesses) are crucial. Someone must lead the effort and take on the financial responsibility for cleanup, construction, planting, security, operations, and maintenance.

> As stated in the 2023 Five-Year Report, "A feasible reuse has not been identified, and an entity to lead this effort has not come forward."

Even with proper site testing, remediation, and taking measures for proper stability, future issues may occur. The quantity, rate, and type of gas a brownfield or Superfund site will generate depends on the waste's composition, age, volume, moisture conditions, and other factors.

Proper monitoring and O&M are required. O&M encompasses a wide range of activities, including caring for cover system vegetation, operating landfill gas or groundwater collection and treatment systems, sampling and monitoring various media (e.g., air, water, soil), performing annual and special inspections, and making necessary repairs or upgrades to remedy features.

While the reuse process for Superfund sites is extensive, the benefits for such projects far outweigh the costs. We hope this playbook can guide impacted communities, governments, and private entities in future reuse and redevelopment efforts.

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GLOSSARY OF TERMS

(ATSDR) Agency for Toxic Substances and Disease Registry - The ATSDR is based in Atlanta, Georgia, and is a federal public health agency of the U.S. Department of Health and Human Services. ATSDR protects communities from harmful health effects related to exposure to natural and artificial hazardous substances by responding to environmental health emergencies, investigating emerging environmental health threats, and researching the health impacts of hazardous waste sites. ATSDR assists in building capabilities and providing actionable guidance to state and local health partners.

(EPA) Environmental Protection Agency - Formed in 1970, the EPA is the U.S. federal agency responsible for protecting the environment. The EPA conducts environmental assessments, research, and education and is responsible for issuing and enforcing regulations that establish national standards to limit human exposure to various toxins, hazardous materials, and air, water, and soil pollutants.

(FEMA) Federal Emergency Management Agency - This agency was established to assist its partners in understanding and reducing their disaster risks. FEMA leads the coordination of federal response efforts to stabilize communities after a disaster and provides support for individuals and communities to rebuild, making them more resilient than before.

(FYR) Five-Year Review - Five-year reviews (FYRs) are mandated by CERCLA when hazardous substances remain on a site above levels that allow for unlimited use and unrestricted exposure. These reviews provide an opportunity to evaluate the implementation and effectiveness of a remedy to ensure it continues to protect human health and the environment. Typically, reviews occur five years after starting a CERCLA response action and are repeated every five years as long as future uses remain restricted. Five-year reviews can be conducted by the EPA or the lead agency for a site, with the EPA maintaining responsibility for determining the remedy's protectiveness.

(NIEHS) National Institute of Environmental Health Sciences Superfund Research Program - NIEHS is one of the 27 institutes and centers of the National Institutes of Health that conduct research into the effects of the environment on human disease.

(NPL) EPA National Priorities List - The National Priorities List (NPL) is the list of sites of national priority with known releases or threatened releases of hazardous substances, pollutants, or contaminants throughout the United States and its territories.

(O&M) Operation and Maintenance - An O&M Plan specifies key system operating parameters and limits, maintenance procedures and schedules, and documentation methods necessary to demonstrate proper operation and maintenance of an approved emission control device or system.

(PRP) Potentially Responsible Party - A PRP is an individual or company (including generators, transporters, operators and owners) that may be responsible for causing or contributing to contamination at a Superfund site. Whenever possible, PRPs must clean or pay for the cleanup of the hazardous sites they contaminate.

(RCRA) Resource Conservation and Recovery Act - Established in 1976, the Resource Conservation and Recovery Act gives EPA the authority to control hazardous waste from cradle to grave, including the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA is related to managing hazardous waste at facilities that are currently in use. The 1986 amendments to RCRA enabled the EPA to address environmental problems that could result from underground tanks storing petroleum and other hazardous substances.

Riprap Area - Riprap is a layer of large stones that protects soil from erosion in areas of high or concentrated flows. It is especially useful for armoring channels and ditch banks, among other features.

(ROD) Record of Decision Amendment – This amendment represents a significant change from the original selected remedy stated in the original Record of Decision (ROD), such as the use of

a new technology to address contamination or the discovery of a new contaminated medium (e.g., contaminated soil, groundwater, etc.).

Superfund - EPA's Superfund program is responsible for cleaning up some of the nation's most contaminated land and responding to environmental emergencies, oil spills, and natural disasters. To protect public health and the environment, the Superfund program focuses on making a visible and lasting difference in communities, ensuring people can live and work in healthy, vibrant places.

(USACE) US Army Corps of Engineers - The USACE oversees civil engineering projects, including designing and developing major highways, airfields, hospitals, laboratories, dams, levees, powerhouses, embankments, and various military installation facilities.

(VOCs) Volatile Organic Compounds - VOCs are organic chemical compounds that can volatilize under normal atmospheric conditions of temperature and pressure. There is some level of natural VOC exposure from environmental sources, but VOCs are also emitted from anthropogenic sources such as paints, cleaners, cigarette smoke, car exhaust, and industrial releases. Several VOCs, including 1,3-butadiene, benzene, and chloroform, have been linked to adverse health outcomes, while others have no known health effects.