Brownfields Briefs

HOMES, SCHOOLS, AND PARKS
Where, When, and How Is it Appropriate to Build on Contaminated Properties?

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In October, 1999 the National Brownfields Environmental Justice/Community Caucus prepared the ten "Recommendations for Responsive Brownfields Revitalization."[1] In that document Caucus members emphasized the need to provide resources to community residents so they could shape, not simply react to, cleanup and redevelopment proposals at brownfields sites. The Caucus argued that the rush to regenerate brownfields should not be used to justify projects that "sweep contamination under the rug" or which limit a community's flexibility for future land use changes. Nor should brownfields projects, in improving the attractiveness of neighborhoods, make current residents more vulnerable to displacement or erode the informal community institutions and networks that provide support and security to local residents. Though federal and state brownfields programs have incorporated some of the ideas raised in these principles, they remain relevant today.

In this paper we hope to adapt some of the key ideas raised in the 1999 recommendations to an evolving brownfields context. When the Caucus was initiated a decade ago, the majority of brownfield projects focused on commercial redevelopment, were driven by the private sector, and paid little attention to the question of how site reuse fits into the revitalization goals of a community. While these practices are still prevalent in the brownfields industry, an alternative and increasingly sophisticated community-based approach to brownfields has emerged.

Compared to for-profit developers, the community-based approach does not simply focus on private market land values or on the highest and best uses of a single site, but on projects that can bring desirable end uses to residents living in under-served and disinvested neighborhoods. In a number of urban neighborhoods, for example, local community development corporations or community land trusts have developed the

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[1]See http://www.cpeo.org/brownfields/reccom.html.

expertise to acquire brownfield properties and successfully build much needed affordable housing for local residents; in other cases, non-profits have managed to transform brownfield parcels into playgrounds and parks, linking neighborhoods with rivers and other amenities that have been more or less “off the map” for a generation; and in urban neighborhoods across the country, community groups have participated in discussions with school district officials about the suitability of building schools on brownfields.

Planned affordable housing site on Communipaw Avenue, Jersey City, New Jersey

And yet, despite the growing significance of affordable housing, schools, and park projects in the brownfields context, there is little consensus on where, when, and how it is appropriate to build these community sanctioned uses on contaminated properties. The question is not simply a technical matter of how clean is clean. The larger issue is how should community-based redevelopment efforts balance the relationship between the need for streamlined, less costly remediation and environmental protection in the long term. What are the justifications for these tradeoffs and how should these decisions be made? And if bargaining in brownfields revitalization becomes more pervasive as communities attempt to transform contaminated properties into desirable public uses—schools, parks, and affordable housing—how should community members advocate for the public interest in preserving more stringent environmental standards and maintaining adequate controls over residual contamination?

To ground the discussion in more concrete examples, we have identified four contamination scenarios that are illustrative of cases emerging in the field:

- Closed landfills containing a fraction of hazardous wastes

- Properties where vapor intrusion is likely—that is, with volatile organic compounds, in shallow soil or groundwater, that are likely to migrate into overlying structures
- Sites where only the soil is contaminated with persistent contaminants such heavy metals or PCBs
- Former manufactured gas plants that contain carcinogenic coal tars

CLEANUP APPROACHES

1) Landfills and Old Dumps

There are some 3,000 operating landfills and over 10,000 old municipal dumps across the country. They range in size from a few acres to hundreds of acres, and over the last decade many have been redeveloped for a variety of uses. Landfills are generally unsuitable locations for the construction of homes and schools. Not only is there a risk of eventual exposure to buried toxic substances, but landfills release methane—a fire hazard—and are subject to subsidence. The possible burial of containerized wastes means that potential hazards may remain for exceptionally long times.

Keith Middle School, built on an old dump in New Bedford, Massachusetts

On the other land, it may be appropriate to develop parks on former landfills, as long as the nature and extent of contamination has been fully characterized to the satisfaction of the community. Local residents and other parties involved in developing a park on an old landfill need to know what's in the landfill or dump and whether or not the disposed wastes are hazardous. In some urban neighborhoods, the lack of open space and playgrounds is itself an environmental injustice and has consequences for the community's health and quality of life; so the question community groups need to ask is not do we build or not build a park on a landfill, but given the contamination, what mitigation measures can be used to help build parks that pose minimal risks.

Capping should be sufficiently complete and robust to prevent human or ecological exposure to contamination. Capping should also be designed to prevent the leaching of liquids, and vapor collection systems should minimize the release of methane and toxic vapors. Long-term management, reinforced by funding and continuing regulatory enforcement, including institutional controls, may be necessary to ensure that burrowing animals, vegetation, and human activity do not damage the integrity of the cap. Gas collection systems not only control emissions, but they create the option of converting methane gas into heat or electricity, in turn establishing a funding stream to support long-term site management.

Melissa Street park site, Providence, Rhode Island

2) Potential Vapor Intrusion Sites

It is much easier and less expensive to investigate and remediate vapor intrusion before buildings are constructed, and it's much easier and less expensive to build mitigation, such as vapor membranes or ventilation/depressurization systems, into the original design of structures, rather than to retrofit.

The current extent of contamination, as well as its anticipated fate and transport, should be understood before structures are sited and designed. In addition, shallow contamination should be removed, or systems should be in place to reduce contamination quickly to remedial action objectives. Mitigation designed to reduce indoor exposures below health-based standards should be incorporated into each new building.

Regular monitoring should prove those levels are being achieved once the buildings are completed, beginning with sampling prior to occupancy. Long-term management, reinforced by funding and continuing regulatory enforcement, including institutional controls, should be used to maximize the extent of effectiveness.

Homes and schools should only be built on likely vapor intrusion sites where there are no safer alternatives. Furthermore, current trends in toxicology suggest that standards for common volatile compounds are likely to be tightened. Therefore, mitigation should err on the side of caution. That is, it should drive projected exposures down to at least an order of magnitude below current regulatory standards.

Vapor intrusion—the migration of toxic vapors into buildings—is by definition **not** an issue for open space, but the absence of regularly occupied structures is not a reason to avoid the cleanup of subsurface contamination.

3) Contaminated Soil

In some cases, it may be acceptable to build schools, homes, and parks on property where unacceptable concentrations of heavy metals and other persistent contaminants remain in soil even after excavation and treatment. Such sites must first be fully characterized, and residual contamination should be consolidated in areas where there is no opportunity for human contact, such as under parking structures. The potential for leaching—the migration of soil contamination into groundwater or surface water—as well as the potential exposure of ecological receptors, should also be addressed.

Wherever contamination is left in place at levels that should not allow unrestricted use and unlimited access, institutional controls should be built into decision documents, be subject to public comment, and supported with both funding and enforcement authority. The decision document should specify what set of factors should trigger action to revisit institutional controls and which entities are responsible for monitoring and reporting on the effectiveness of institutional controls. But institutional controls—that is, paper restrictions—should not be relied upon as the sole measure in preventing people from gardening or farming on land with unsafe levels of persistent or other bioavailable contaminants.

4) Manufactured Gas Plants

Manufactured gas plants (MGPs) were introduced in the US in the mid-1850s and were used to produce gas for lights, heating, and cooking. They produced thousands of tons of waste, which were normally buried on-site. These wastes contained carcinogenic coal tars and a host of polycyclic aromatic hydrocarbons (PAHs), including benzo(a)pyrene and naphthalene, and volatile organic compounds such as benzene, toluene, and xylene. Many of the tars found at MGP sites are quite fluid and are likely to migrate through soils, dissolve in groundwater, and appear at different locations from where they were originally disposed.

At the time when natural gas pipelines were introduced in the 1950s, an estimated 3,000 to 5,000 MGP sites had been constructed across the country. A hundred years ago, MGPs were often built on the outskirts of cities, but a vast quantity of these sites are now located in densely populated neighborhoods. Many of these MGPs were owned by companies which were predecessors of large, modern gas and electric utilities. As these utilities evolved, many gave away or sold their MGP sites to local governments. A large number of these sites, with little cleanup—and often no knowledge of the prior use—have been used for parks, public housing. and schools. In some cases, community groups involved in restoring greenways or urban rivers or rehabilitating dilapidated parks have, unexpectedly, uncovered extensive contamination from former MGP sites.

Typically remediation at MGP sites requires excavation and off-site disposal of soils containing unacceptable levels of semi-volatile organic compounds (SVOCs) and volatile organic compounds (VOCs), as well as visible tar. The current extent of contamination, as well as the anticipated fate and transport, should be understood before the development footprint is determined. At some MGP sites, to reduce remedial costs and to keep projects viable, material from the site is used to backfill excavations. If this is proposed, backfill material should be tested for contamination and meet cleanup criteria for VOCs and SVOCs and other contaminants. Clean fill should be used to complete remedial construction. Though such cleanups may be expensive, if the ownership in the MGP sites can be traced to an existing utility, that utility should share some responsibility for remediation.

ADDRESSING RESIDUAL CONTAMINATION

Many brownfield projects leave some level of contamination in place rather than treat or entirely remove it. During the last decade, institutional controls (ICs) such as easements, zoning restrictions, and permits have been used increasingly at redevelopment sites. Institutional controls, as an alternative to full remediation, often appeal to parties responsible for cleanups because they appear to cost less yet promise to block exposure pathways. But, as many of the people who are at risk of exposure point out, the technical adequacy of a remedy becomes dependent upon a number of non-technical factors such as the efficacy of local government administration, the ability of a land registry office to maintain its deed records in good order, the adequacy of funding and shared resources to monitor IC compliance, and the ability and willingness to enforce ICs and, if need be, to revise remedies.

Given this complexity and the stakes involved, community activists have criticized the use of institutional controls on three fronts. First, ICs constitute extremely blunt instruments when they are applied to the task of preventing exposure to contaminated soil or water, particularly when the authority to enforce them (through zoning restrictions and proprietary controls such as easements) are delegated to local agencies or private parties with little interest or power to enforce them. Second, systems to track and monitor ICs are anything but robust. Few state and local governments have conducted IC audits to determine the rate of non-compliance or to examine the conditions that lead to IC failures. And third, the long term costs of monitoring ICs is uncertain and typically there is no dedicated funding to monitor, inspect, enforce, and inform the public about the viability of ICs over the long term. Indeed, if the long-term costs of complying with ICs were better understood, there might be more emphasis placed on cleanup rather than containment remedies.

From the perspective of community-based organizations, what is an effective system for monitoring and enforcing ICs? Clearly, the long range goal of such a system is not simply to create an inventory of what types of ICs are in use and which parties are responsible for implementing them, but to help target resources at those sites that for various reasons are likely to shift out of compliance and where the consequences of IC failure to public health and the environment are most acute. For example, a community-based organization could push for a neighborhood IC overlay district, funded from a cleanup settlement, to educate local residents within the overlay district about the need to comply with ICs and to set up a public health protocol to assess how well the ICs are preventing human exposure to residual contamination.

A model IC compliance program would thus help both regulators and the public clarify conditions under which existing ICs are likely to work, and under which conditions they are ineffective and should not be used as a substitute for treatment. Clearly, IC data needs to be systematically collected and analyzed to help answer questions about compliance rates, the harm caused by inadvertent or intentional IC failures, the thresholds for enforcement employed by state and local programs, and the costs to maintain ICs.

FUNDING CLEANUP FOR PUBLIC USES

Some have argued that if community-based organizations push for more extensive cleanups at brownfields sites or for putting teeth in IC monitoring systems, then cleanups and maintenance will cost more, making marginal brownfields projects that much harder to pull off. And for those sites that don't generate tax revenues and require some level of public subsidy, such as schools and recreational facilities, municipalities and community development corporations may simply walk away.

This line of thinking, however, fails to consider how transforming a contaminated eyesore into a school or park usually increases property taxes revenues from surrounding parcels. The question for community-based organizations is how to use these anticipated off-site revenues—stemming from public sector reuse—to fund the cleanup that makes such reuse possible.

For example, Tax Increment Financing (TIF)—a tool used for decades to support "urban renewal"—could channel off-site revenues to support cleanup of land destined for public use.[2] Today cities use TIF districts to finance virtually every aspect of brownfields redevelopment, from property acquisition to site investigation, cleanup, and post-remedial monitoring of ICs. They could create districts that contain these planned public uses as well as private property expected to rise in value as a result of the public project. Such districts would not only help fund cleanup, but they would reinforce area-wide perspectives on brownfields revitalization.

However, formal tax-increment financing is not the only option. Once local officials recognize the value of remediating brownfields well enough to use them as value-enhancing schools or recreational facilities, they can simply appropriate funds for that purpose. Anticipated increases in local government revenues, resulting from Brownfields development, should never be a requirement before cleanup—necessary to protect public health and the environment—is undertaken, but it is likely to make additional environmental expenditures more palatable.

[2] Under tax-increment financing, the public agencies that normally receive property taxes from property within the TIF district receive a constant level of revenue over the life of the district, typically thirty years. Any additional revenues resulting from enhanced property values go to the redevelopment agency, to pay, sometimes after the fact, for the investments that help generate increased assessments.