

Restoring Ground: Remediation and Empowerment in Tremé, New Orleans

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In the efforts to redevelop New Orleans, the impact of Hurricane Katrina on the city's landscape has been overlooked in the public discourse, planning proposals, and numerous studies conducted by governmental and independent organizations alike. Action in the billions of dollars is being discussed for coastal ecologies and the reconstruction of grounds to protect the city (most notably, the levee system), yet far less attention has been given to the ground within the city itself. While providing security along the perimeter is essential to reconstruction, equally important are the internalized conditions of soil contamination, which may present the city's residents with lifelong adverse health effects.

In post-Katrina New Orleans, many reasons have led to a muting of public concern for the city's landscape. The political and planning leadership of New Orleans has failed to develop any overarching approach to the city's redevelopment, particularly as it relates to infrastructure, neighborhood planning, and the re-establishment of services. For residents returning to the city, shelter is often the area of first concern, with over 200,000 units of housing substantially damaged according to FEMA estimates.¹ And for those

with housing, the job market is equally dire. In the twelve months leading up to June 2006, the metropolitan area lost 184,000 jobs, about 30 percent of its pre-storm levels. At the one-year anniversary of Katrina, a study conducted by Louisiana State University found that 60 percent of businesses had likely not reopened.²

Remediation of the landscape in New Orleans is likewise a Herculean task that dwarfs even the city's current waste removal crisis. There is already little or no capacity at area landfills for the safe and efficient removal of 300,000 refrigerators, 250,000 abandoned cars,³ or tens of millions of cubic yards of housing and other debris,⁴ let alone initiating a wholesale cleansing of contaminated topsoil in New Orleans.

Studies by various agencies and institutions demonstrate that Katrina may have brought additional levels of contamination to the city's landscape, particularly in terms of petroleum hydrocarbons. With eighty percent of New Orleans submerged under water for as long as three weeks, the flooding literally marked the neighborhoods by leaving a brown "bathtub ring" on homes and buildings. Once the levees were breeched, the waters from

Lake Pontchartrain and the network of manmade canals that connect the city to the Gulf of Mexico may have transported contaminants from industrial areas across neighborhood after neighborhood. The floods deposited sediment on lawns and in homes and offices, sediment that still sits thickly in many areas of the city and may contain toxins.

At present, insufficient evidence exists to discern the origins of the contamination. The inattention to landscape and its health risks following Katrina may be, in part, related to the fact that the problem is not entirely Katrina's. Much like the exposure the storm gave to existing poverty in New Orleans, Hurricane Katrina also brought a history of existing environmental problems into stark relief, problems that predate the storm itself. The *invisible* soil contaminants were made visible after the flooding disaster and consequent testing that has begun to occur. Yet there is little drive to correct problems unrelated to Katrina.

Debating the origins of contamination is irrelevant to the public health problem. The soil and urban fill of New Orleans have recorded the city's industrial history and its long cultural dependency on persistent, hazardous chemicals. For example, both the Louisiana Department of Environmental Quality (LDEQ) and the Natural Resources Defense Council (NRDC) attribute petroleum hydrocarbons identified in soil samples throughout the city as originating from vehicles submerged by floodwaters.^{5 6} In contrast, a quarter of the city's inner-city children were estimated to have elevated blood lead levels before the storm.⁷ Dr. Howard Mielke of Xavier University, one of the nation's foremost childhood lead poisoning experts, argues that the main exposure source for many children is soil, not the more-heavily regulated interior lead paint often assumed to be the culprit.⁸ Yet despite decades of research indicating the negative public health outcomes of contaminated soil, the post-Katrina environmental quality debate has been framed around the misguided concept of historical contamination levels. On August 24, 2006, LDEQ issued a statement assuring residents that "the majority of New Orleans' environment is back to pre-Katrina levels."⁹ Historical contamination should not be confused with innocuous soil.

The inattention to landscape as an area of public concern in post-Katrina New Orleans is further related to the fact that these environmental problems are by no means exclusive to New Orleans. They reflect a social health risk and environmental injustice that characterizes most American post-industrial urban centers, and therefore carry a far higher price tag to correct than our national interests will bear at present.

As the full extent of contamination in New Orleans has become more apparent over the past months, many scientists, environmentalists, architects, landscape architects, and citizens groups now believe that to properly heal the city, the land it sits on must be remediated. These issues lurking in the soil should not simply be addressed with landscape understood as an aesthetic device, but more pointedly as an agent¹⁰ to help cure the environmental injustice that closely parallels poverty in the region, and to revitalize the ground and make neighborhoods healthy once again. The goal is to teach easy methods to clean soil and protect citizens against environmental hazards — empowering the community to reclaim their ground. Failure to act otherwise endangers the long-term health of the citizens of New Orleans as well as the city's viability and economic welfare. Redevelopment in New Orleans, should begin literally from the ground up.

A Demonstration Garden in Tremé, New Orleans

These conditions and factors are the backdrop to an evolving design-build project led by faculty and students of the architecture department at the Wentworth Institute of Technology. The project aims to help restore environmental health to the Tremé community of New Orleans, one of the city's oldest districts and its first neighborhood for free people of color. In light of the past year's failures on the part of the local, state, and national government, communities will need to act on their own behalf. Through the creation of an environmental demonstration garden, this project proposes to empower the Tremé community by revitalizing the ground and teaching residents techniques of remediation. The effort has also created an ongoing learning laboratory that engages design students with complex and real problems, both within and outside the studio. In order to achieve the

project's larger goals of helping residents to help themselves, the team has established a series of collaborative partnerships that include environmental engineers, artists, landscape architects, community development corporations, grassroots organizations, and design schools.

Wentworth students are traveling to New Orleans for weeklong sessions in January and March of 2007. The first trip will involve a workshop in which students mock up design ideas for the demonstration garden in coordination with the client. At the same time, they will repair the adjacent building and prepare the site and decking systems. During the second trip, students will complete construction and begin planting the garden. As the first constructed stage of a larger initiative, the garden will apply architectural, landscape, and scientific solutions to correct soil contamination in New Orleans. Located on a block known as Ujamaa Square in Tremé and immediately adjacent to a new environmental center, this exhibit will enable residents to learn about the health risks they face. The soil of Tremé, like much of New Orleans, contains multiple contaminants, including heavy metals, petroleum byproducts and other persistent organic chemicals.¹¹ Soil with many contaminants may require more than one method of remediation, yet few local resources are readily available to guide residents through the complexity of multi-contaminant remediation. Heavily influenced by the input of soil scientists and public health advocates, the garden will illustrate strategies with which residents can mitigate these risks and remediate their own yards and neighborhoods. Walkways, garden beds, and signage will introduce visitors to various techniques of remediation. The garden's function will be two-fold: aesthetically, it should create a public gathering space, drawing residents to learn in part because it is beautiful; and practically, it should be a learning environment and healthy site.

Remediation gardens do exist in New Orleans. However, they are scattered and often only illustrate one method of remediation. Few have proper learning components. None is associated with an independent testing facility. The garden located on Ujamaa Square will be set up to demonstrate the following strategies:

1. Bioremediation — the use of soil-dwelling bacteria to degrade organic soil contaminants,

such as diesel-range organics (which have been traced to submerged cars) and polycyclic aromatic hydrocarbons (PAH's are often from soot and burned garbage).

2. Mycoremediation — the use of mushrooms or other fungi to degrade organic soil contaminants, especially fuels, such as diesel-range organics.

3. Non-soil barriers — the use of such devices as paving stones or crushed gravel placed over inexpensive geotextile barriers in areas with exceptionally high levels of contaminants to protect humans from coming into direct contact with contaminants. Elevated planting beds filled with clean soil will also demonstrate how residents can mitigate risk in home gardening.

4. Phytoremediation — the use of plants to degrade or absorb soil contaminants, especially heavy metals. In some cases, plants used in phytoremediation need to be disposed of in hazardous waste facilities, while other plants and microbes introduced by roots remediate without the need for extraction and disposal; where possible, the latter technique is preferred, since currently much of the hazardous waste in New Orleans is not being disposed properly.¹²

5. Soil emplacement — the use of imported clean soil from other sites to cover surface-contaminated soil.

In this garden, strategies and plant types will be selected that are appropriate for treating contaminants prevalent in areas surrounding the site. Rather than waiting for Federal cleanup, the project enlists the community in a decentralized strategy for remediation, one based on grassroots action. Remediation is still an emerging science and much testing needs to be done. Niall Kirkwood writes that "...these projects should become design laboratories, where process and results are evaluated with data created for further refinement and integration in subsequent projects."¹³ This demonstration garden aims to test a variety of remediation methods while exhibiting cost-effective and easily implemented techniques to a public that is already facing great demands in the recovery process.

This effort is supported by the Boston Society of Architects and Wentworth Institute of Technology, including its Center for

Community & Learning Partnerships.¹⁴ Moreover, the project is being completed in collaboration with several New Orleans-based organizations: the recently created People's Environmental Center, which will oversee and test the garden from its adjacent facility as well as provide testing services to local residents; Ujamaa CDC, a community development corporation which owns the property; and the newly established CITYbuild consortium of schools initiated by Tulane University's architecture department.¹⁵

PROGRESS SINCE JANUARY 2006

The project began in January 2006 when Wentworth faculty and staff made links with Ujamaa CDC through CITYbuild. A fact-finding trip in February 2006 was followed by the arrival of a team of seventeen Wentworth students, three faculty, three staff volunteers, and one parent of a student in March, during the institute's spring break. This team worked in conjunction with Ujamaa CDC to begin examining the Ujamaa Square block adjacent to Ursulines Avenue. Formerly the site of St. Ann Church and St. Ann Shrine, the block had in recent years become a neighborhood resource containing 45 units of housing for low-income seniors, a community center, and the first Head Start facility in New Orleans. The flood following Hurricane Katrina brought approximately two feet of water to the site and surrounding residential areas. The floodwaters heavily damaged Ujamaa Square's elderly housing and forced the already dilapidated childcare facility to close permanently. The community center remained relatively unharmed, although services were interrupted and widespread site flooding spread debris.

Students spent their spring break engaged in several tasks: gutting one of Ujamaa Square's structures (which is being converted to temporary housing for emergency relief workers following a \$125,000 grant from the Jewish Federation); cleaning debris from the 87,000 square-foot block; documenting as-built conditions for structures on the site and the surrounding residential blocks; meeting with environmental activists; witnessing the devastation of the city during sessions with and a tour led by local advocacy group directors; and conducting a community design charrette focused on reinventing Ujamaa Square.

With 38 community members and leaders of various organizations present, the charrette

elicited requests for neighborhood services to occupy the Ujamaa block: mental health counseling; legal clinics focused on post-Katrina homeowner assistance and insurance rights; replacement childcare facilities and safe spaces for children; more appealing landscaping; how-to workshops on rebuilding; educational assistance related to job searches; environmental health information; arts facilities; and specific programs such as a farmer's market or an internet café. Several of these services, to be sponsored by Ujamaa and other organizations, can be housed in the existing Ujamaa Activities Center.

The questions of safe places for children and especially environmental health, as outlined in the previous section of this paper, became important components of the site's development. Ujamaa CDC hopes to work with an organization to provide childcare facilities again in the future. Prior to this, the Wentworth team established a connection between Ujamaa and the People's Environmental Center (PEC) to introduce an environmental health facility on the site. The PEC will provide residents with information on environmental hazards and a neighborhood drop-off location for soil, water, and bacteria samples. This center will also teach residents how to safely test levels of toxicity in their yards while illustrating hands-on methods of remediation through workshops and information panels in the proposed demonstration garden.

Once the major elements of the block's program were established, Wentworth's involvement included a complex pedagogical commitment, drawing on the resources of the architecture department's curriculum to provide a response that is not possible from within a single studio's structure or timeframe. Over its lifespan, the project is expected to involve approximately 300 students from architecture and other departments. Work has been developed within several concurrent classes and across several semesters, much of which was based on environmental, political, and economic research prepared during two elective undergraduate seminars.

In April, nearly 170 second-year architecture students developed site concepts for Ujamaa Square. They experimented with strategies to remediate the landscape and prepared schemes for environmental and childcare centers as well as gardens that would

demonstrate remediation techniques. Fourteen master planning approaches were selected in consultation with Ujamaa and the People's Environmental Center during a meeting in Boston in May. These were each developed further in a fourth-year architectural studio over the summer, which focused on the placement of the PEC in the two existing shotgun houses that had previously been occupied by Head Start. Schemes from the summer studio will be presented in the fall to various constituents in New Orleans, including the PEC and Ujamaa CDC. A graduate student from MIT's Department of Urban Studies and Planning joined the team and spent five weeks in New Orleans, where she conducted research into the scientific literature on urban soil remediation, public health literature on the historical and current environmental quality of New Orleans, and field research on residential soil remediation, pre- and post-Katrina. Input she received from soil scientists and public health advocates has shaped the design of the demonstration garden, resulting in the inclusion of a broader range of remediation techniques.

The complexity of the project has necessitated a multidisciplinary approach, with efforts among scientists, planners and designers working towards the same goal. Many other individuals and groups not yet mentioned have added greatly to the progress of this project, including the environmental engineer Dr. Howard Mielke of Xavier University, the environmental artist Mel Chin (who created "Revival Field" in 1990), Advocates for Environmental Human Rights, the environmental action group Common Ground, and Luisa Oliveira, a landscape designer who specializes in lead remediation. This expanded group has been instrumental in the core design team's education process.

STEPS TOWARDS THE FUTURE

Moving towards implementation, the demonstration garden presents many challenges because of the uncertainties of the city's infrastructure, the prospect of additional flooding, difficulties in obtaining material supplies, and limited local human resources. Success over time is dependent upon the PEC and the community's involvement. Where design and construction end, the project is open-ended and requires continuous implementation by the community as well as

continued testing, advising and caretaking by the People's Environmental Center. These factors mean that buy-in is important from the beginning.

The PEC has committed a staff member to be a caretaker and remediation instructor. But the project cannot achieve its goals without extensive local participation. While people are in fact returning to Tremé, the city's overall population is less than half of its pre-Katrina level.¹⁶ These limited human resources are already strained. As part of the two trips in 2007, the construction team and PEC will need to recruit residents to expand the scope of the project, because the community will ultimately be responsible for fulfilling the mission. This strategy is necessitated by the paradoxical scales of the task. On the one hand, contamination is spread over a vast area. On the other hand — and unlike with large brownfields — contamination exists on many fragmented sites that cannot be treated consistently or all at once. They can only be treated, literally, yard by yard.

This demonstration garden illustrates how landscape remediation requires both scientists and designers to find solutions in collaboration with one another and the community they are serving. Here, landscape is an active surface, a Petri dish that can teach the risks of contaminated soil as well as the costs and methods to either remediate or provide safe measures to avoid the contaminants. The lessons of the project are not isolated to Tremé or New Orleans. Cities throughout the United States face similar problems, and this approach could be viable in many other contexts. Following construction, the team plans to create a publication that will enable communities beyond Tremé to learn about urban health risks from soil and strategies for mitigation and remediation.

At its core, this project attempts to value landscape as an educational, social, and political agent, one that empowers individuals with tools to overcome an instance of environmental injustice. It holds the promise of different disciplines finding solutions together. It holds the promise of academic institutions and their students working with struggling communities in a grassroots effort to correct historically ingrained problems, at times when the public sector appears unwilling to do so.



Figure 1. Site photo of the west side of Ujamaa Square in March 2006. To the right is the house gutted by students, to the left is the future site of the People's Environmental Center and proposed gardens.



Figure 2. In March 2006, Wentworth students gutted a building on Ujamaa Square as part of their Alternative Spring Break.



Figure 3. Community leaders and neighbors were invited to envision a remade Ujamaa Square during a design charrette conducted by Wentworth students and faculty in March 2006.



Figure 4. In April 2006, nearly 170 second-year architecture students presented designs for Ujamaa Square to over 40 professionals at Wentworth's final reviews in Boston.



Figure 5. The proposed demonstration gardens will replace a storm fence along the side of the People's Environmental Center.



Figure 6. Additional demonstration gardens and an outdoor workshop will be situated between the two buildings containing the People's Environmental Center.

Endnotes

¹A Review of and Plan for Progress One Year after Hurricane Katrina," prepared by the Brookings Institution (August 2006), 4. Original source: U.S. Department of Homeland Security, "Current Housing Unit Damage Estimates: Hurricanes Katrina, Rita, and Wilma," (February 2006).

² Leslie Eaton, "New Orleans Shops Struggle to Survive," *New York Times* (August 25, 2006). ² As reported in Amy Liu, "Building a Better New Orleans:

³ Charles C. Mann, "The Long Strange Resurrection of New Orleans," *Fortune* (August 10, 2006).

⁴ As reported in Liu. Original source: "Situation Report for New Orleans: July 17, 2006" (New Orleans: Mayor's Office of Communications, 2006).

⁵ Louisiana Department of Environmental Quality, Office of Environmental Assessment, "Overview of Post-Katrina Data for Zip Code 70116." Available at: <http://www.deq.louisiana.gov/portal/portals/0/zipdata/data/70116.pdf>.

⁶ Solomon, Gina M. and Miriam Rotkin-Elman, "Contaminants in New Orleans Sediment: An Analysis of EPA Data," NRDC (February 2006), 7. Available at: www.nrdc.org/health/effects/katrinadata/contents.asp

⁷ Mielke, H. W.; Powell, E. T.; Gonzales, C. R.; Mielke, P. W., Jr.; Ottesen, R. T.; Langedal, M. "New Orleans Soil Lead (Pb) Cleanup Using Mississippi River Alluvium: Need, Feasibility, and Cost," *Environmental Science & Technology*; (Article); 2006; 40(8); 2784-2789.

⁸ Mielke et al., 2006.

⁹ Press release, "State, federal agencies summarize Hurricane Katrina sampling, recycling, clean-up efforts", LDEQ (August 24, 2006). Available at: <http://www.deq.louisiana.gov/portal/portals/0/news/pdf/HurricaneKatrinaUpdate-24Aug06.pdf>.

¹⁰ James Corner, "Introduction," *Recovering Landscape* (New York: Princeton Architectural Press, 1999).

¹¹ Solomon, et. al., 2006.

¹² Concern for environmental hazards in the disposal of debris following Katrina has been widespread. See for example Wayne Curtis, "A Heap of Sorrows," *Grist Magazine* (August 10, 2006).

¹³ Niall Kirkwood, ed., *Manufactured Sites* (London: Spon Press, 2001), 51.

¹⁴ The team is currently seeking additional funding through other foundations and sources.

¹⁵ "The CITYbuild Consortium of Schools is a formal collaborative framework for architecture, design and planning programs from across the country to work collectively on design and building needs in a single city or area. This framework provides the opportunity for multiple programs and disciplines to share resources and information to address situations in areas of the United States where the scale of necessary intervention exceeds that of any singular response. The CITYbuild Consortium acts as a centralizing organizational entity to connect academic programs to local projects and agencies, to collect and disseminate data, to coordinate the logistics of visiting institutions and to provide a forum for the exchange of knowledge. The type of participation is envisioned to include numerous disciplines and talents ranging from larger scale planning and policy strategies, actual programming and building of projects at various scales to the documentation of the process, and ultimately to publications related to all of the facets of the endeavor." From an unpublished document outlining CITYbuild's composition (August 14, 2006).

¹⁶ Population estimates have varied widely because of the difficulty posed in polling. The Postal Service's June 2006 estimate of 171,000 out of an original 460,000 residents was based upon change-of-address data, but did not include new residents or temporary workers in the region. More recent City Hall projections of greater than 250,000 have been judged overly optimistic. Estimates reported in: Adam Nossiter, "Outlines Emerge for a Shaken New Orleans," *New York Times* (August 26, 2006).