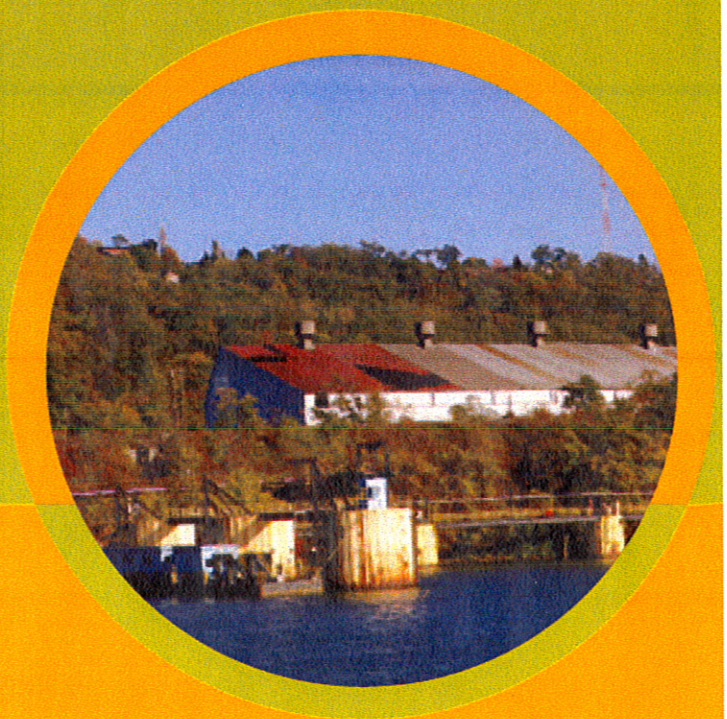
Remaking HAZELWOOD

Remaking Pittsburgh

Urban design recommendations for Pittsburgh's next big urban project



Remaking Cities Institute

Carnegie Mellon
School of Architecture

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Remaking Hazelwood, Remaking Pittsburgh

Remaking Hazelwood, Remaking Pittsburgh was the pilot project of the RCI. In 2006, the RCI was funded by the Heinz Endowments to convene, host and facilitate the interaction of a select group of technology visionaries to think about the future of the Pittsburgh region, and to put at their service our expertise in urban design and community development. Our work begins in Hazelwood, a once thriving but still promising neighborhood located along the Monongahela River in Pittsburgh's southeast end and home to one of Pittsburgh's largest remaining riverfront brownfield sites, the 178-acre ALMONO site.

Released in August 2007, *Remaking Hazelwood, Remaking Pittsburgh: A Background Study* looks at the history and heritage of Hazelwood, its existing conditions, sustainable urban design strategies, and regional institutions with the goal of discovering the development potential of the ALMONO site.

In September 2009, *Remaking Hazelwood, Remaking Pittsburgh: Urban Design Recommendation for Pittsburgh's Next Big Urban Project* (or Executive Summary) was published. The book is a guiding document whose aim is to promote a comprehensive and sustainable urban design-based approach to the revitalization of Hazelwood through the redevelopment of the ALMONO site. The recommendations are the result of a two-year investigation by Carnegie Mellon University's Remaking Cities Institute (RCI) into the history, conditions and future of Hazelwood. The urban design recommendations incorporate ideas produced by students enrolled in the Urban Laboratory: Community and Urban Design Studio (2007 Hazelwood Studio and the 2008 Hazelwood Studio).

background study	recommendations

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Remaking Hazelwood, Remaking Pittsburgh: Urban Design Recommendations for Pittsburgh's Next Big Urban Project

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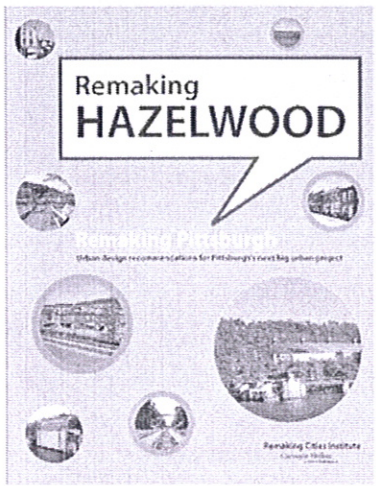

Preview

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Remaking Hazelwood, Remaking Pittsburgh: Urban Design Recommendations for Pittsburgh's Next Big Urban Project is a guiding document whose aim is to promote a comprehensive and sustainable urban design-based approach to the revitalization of Hazelwood through the redevelopment of the 178-acre ALMONO site. The recommendations are the result of a two-year investigation by Carnegie Mellon University's Remaking Cities Institute (RCI) into the history, conditions and future of Hazelwood, a once thriving but still promising neighborhood located along the Monongahela River in Pittsburgh's southeast end. The urban design recommendations incorporate ideas produced by students from Carnegie Mellon University's School of Architecture, particularly those in the fifth-year Urban Laboratory: Community and Urban Design Studio.

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Praise for *The Metropolitan Revolution*

"*The Metropolitan Revolution* upends conventional wisdom and makes the case for how our cities and metros are leading American change and progress: they are transforming our national economy, political conversation, and collective destiny from the bottom up like never before. A must-read for anyone working toward a brighter future for our cities and our nation."

—MAYOR CORY BOOKER

"*The Metropolitan Revolution* builds on twenty years of studying metropolitan areas and hundreds of thousands of miles traveling to them around the globe, and the result is an exciting guide to the new world economy—urban, networked, innovative, collaborative, and driven by human potential."

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"Being mayor of Chicago is the best job I've ever had in public life. Katz and Bradley totally get it: the real power to change America lies in our cities and metros."

—MAYOR RAHM EMANUEL

"With paralysis in Washington, public policy solutions will come from successful metropolitan regions, the clinical trials of our future. We are well into this journey, but never has it been explained with such insight and analysis until *The Metropolitan Revolution.*"

—GOVERNOR JON HUNTSMAN

"Just when 'by the people, for the people' seems like an anachronism, cities are giving it new meaning, fueled by twenty-first-century technology. Every citizen needs to understand the metropolitan revolution. If we change cities, we change the country."

—JENNIFER PAHLKA, FOUNDER AND EXECUTIVE DIRECTOR, CODE FOR AMERICA

"This book captures the energy and excitement bubbling up in cities across America. This is 'do it yourself' urbanism of the highest order, and it is altering our landscape and our country."

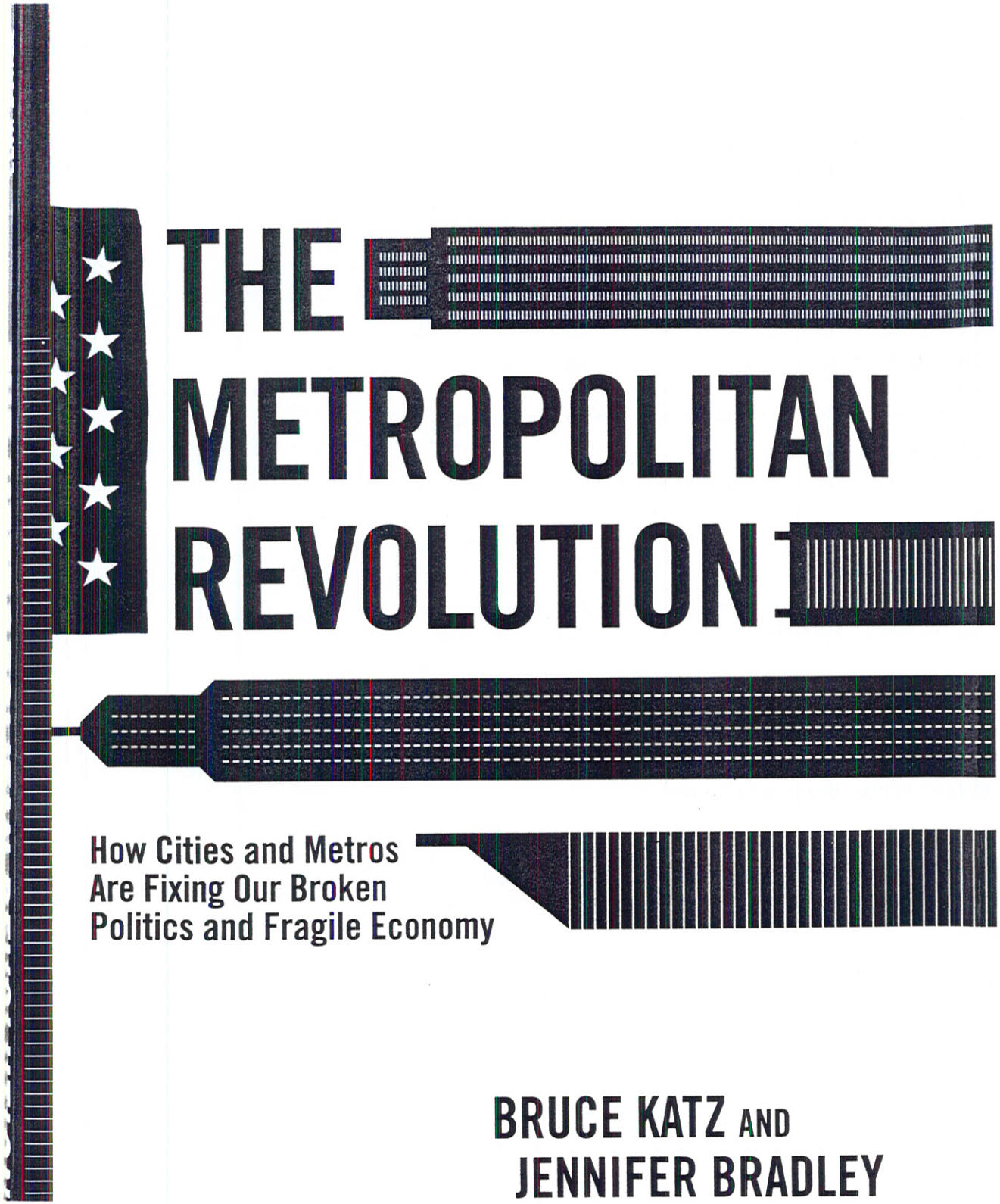
—JANETTE SADIK-KHAN, COMMISSIONER, NEW YORK CITY DEPARTMENT OF TRANSPORTATION

"Through real-world examples, *The Metropolitan Revolution* brings to life how America's cities and suburbs drive innovation to solve problems and seize opportunities. This book is a call to action beyond Washington, where metro leaders join together and simply get stuff done."

—MAYOR SCOTT SMITH

"*The Metropolitan Revolution* is compelling reading on how our federal system is a powerful advantage in global competitiveness. This book is indispensable for business and elected leaders on realizing the economic potential of metropolitan areas for their citizens and the country."

—TREASURY SECRETARY ROBERT E. RUBIN



A revolution is stirring in America. Across the nation cities and metropolitan areas, and the networks of pragmatic leaders who govern them, are taking on the big issues that Washington won't, or can't, solve. They are reshaping our economy and fixing our broken political system.

The Metropolitan Revolution is a national movement, and the book describes how it is taking root in New York City, where efforts are under way to diversify the city's vast economy; in Portland, Oregon, which is selling the "sustainability" solutions it has perfected to other cities around the world; in Northeast Ohio, where groups are using industrial-age skills to invent new twenty-first-century materials, tools, and processes; in Houston, where a modern settlement house helps immigrants climb the employment ladder; in Miami, where innovators are forging strong ties with Brazil and other nations; in Denver and Los Angeles, where leaders are breaking political barriers and building world-class metropolises; and in Boston and Detroit, where innovation districts are hatching ideas to power these economies for the next century.

Bruce Katz and Jennifer Bradley highlight these success stories and the people behind them in order to share lessons and catalyze action. This revolution is happening, and every community in the country can benefit.

Remaking HAZELWOOD

Remaking Pittsburgh

Urban design recommendations for Pittsburgh's next big urban project

Elise Gatti

With contributions from
Jonathan Kline
Renee Roy
Murtuza Bhopalwala
Karen Mesko
Luis Rico-Gutierrez

Remaking Cities Institute
Carnegie Mellon University
Pittsburgh, PA

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Preface

How can the urban design-driven redevelopment of a large riverfront brownfield in the City of Pittsburgh have a local and regional transformational impact, and what is the role of Carnegie Mellon University in the process? These questions drive the content of this document.

We understand urban design as a multi-disciplinary activity of designing and arranging all the physical elements that make up cities to create harmonious, vibrant and successful places for people. It is not simply about making places look good. Equally important is ensuring that places work and function better for the people who use and inhabit them. Fundamentally, good urban design is the glue that holds a successful city environment together. Most importantly, high-quality urban design is a key to creating sustainable cities and is proven to lead to economic, social, cultural and environmental well-being.

The well-being of the Pittsburgh region motivated a group of four philanthropic organizations (The Heinz Endowments, Mellon Foundation, Claude Worthington Benedum Foundation and the McCune Foundation) to partner with the Regional Industrial Development Corporation (RIDC) to form the ALMONO, LP and purchase the former LTV coke works site in Hazelwood. These organizations envision the redevelopment of this site not as a commercial venture but as a way to create a context for a transformational intervention in the social, cultural, economic and ecologic fabric of the greater Pittsburgh region.

It was also the desire of contributing to the advancement of a regional agenda that motivated the creation of the Urban Laboratory and the Remaking Cities Institute. Since 1963, the Urban Laboratory: Community and Urban Design Studio at Carnegie Mellon's School of Architecture has pursued the core principles of participatory urban design through its studio course offerings. With the Pittsburgh region as its focus of study, the Urban Laboratory enriches the training of architects and creates a new generation of urban designers and policymakers positioned to become leaders in the planned growth and sustainable development of our cities. In 2006, the Remaking Cities Institute was established to expand the regional and global impact of the Urban Laboratory by creating new processes that foster collaboration between faculty, researchers, and professionals in the public and private sectors. By enhancing the work created through the Urban Laboratory, the Remaking Cities Institute enables Carnegie Mellon to contribute more effectively and efficiently to efforts that strive to enhance the quality of life in our region.

The recommendations in this report live in between the generalities of academic research and the specificity of a development blueprint. They also live in between the unbounded creativity of our talented students and the preconceptions that sometimes go unchallenged in a standard real estate venture. Our work is not intended to replace but rather to augment the work of professionals in the field. Grounded in reality yet ambitious, our recommendations aim to challenge notions of what is possible and ultimately foster positive interaction between different stakeholders in the public and private sectors that we hope will result in a high quality contribution to the future of our region.

Luis Rico-Gutierrez
David Lewis Director of Urban Design and Regional Engagement
Remaking Cities Institute
Carnegie Mellon University

Acknowledgements

Remaking Hazelwood, Remaking Pittsburgh: Urban Design Recommendations for Pittsburgh's Next Big Urban Project was researched, written and produced by Elise Gatti, RCI Research Associate, with contributions from Jonathan Kline, RCI Research Fellow; Renee Roy, RCI Research Associate; Murtuza Bhopalwala, RCI Intern and Masters Candidate, Architectural Engineering Construction Management, School of Architecture; and Karen Mesko, RCI Intern and Masters Candidate, Public Policy and Management, Heinz College. The Principal Investigator was Luis Rico-Gutierrez, RCI David Lewis Director of Urban Design and Regional Engagement.

Remaking Hazelwood, Remaking Pittsburgh: Urban Design Recommendations for Pittsburgh's Next Big Urban Project was funded by the Heinz Endowments. The Remaking Cities Institute would particularly like to thank Christina Gabriel, Program Director, Innovation Economy, and Caren Glotfelty, Program Director, Environment.

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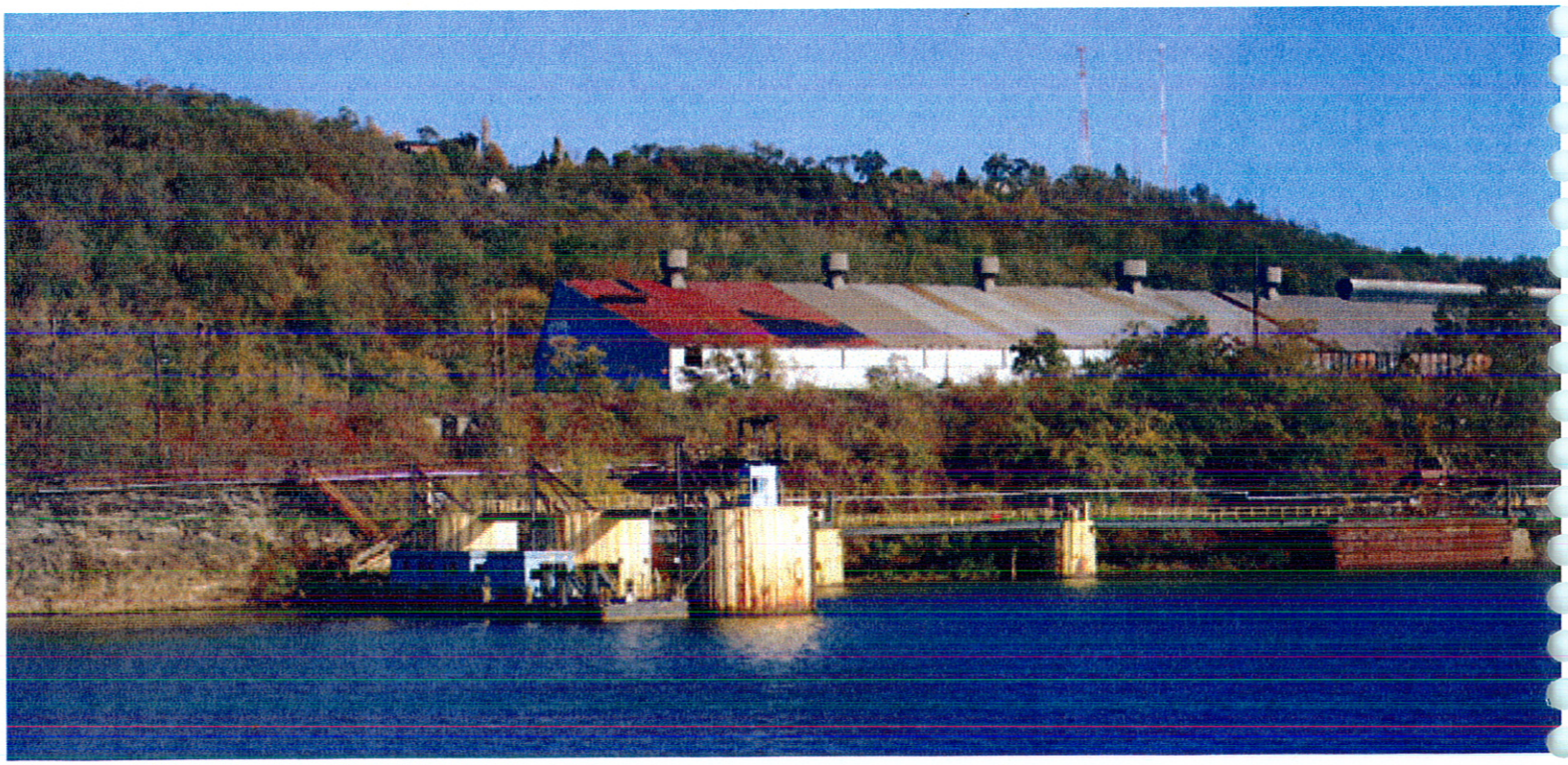
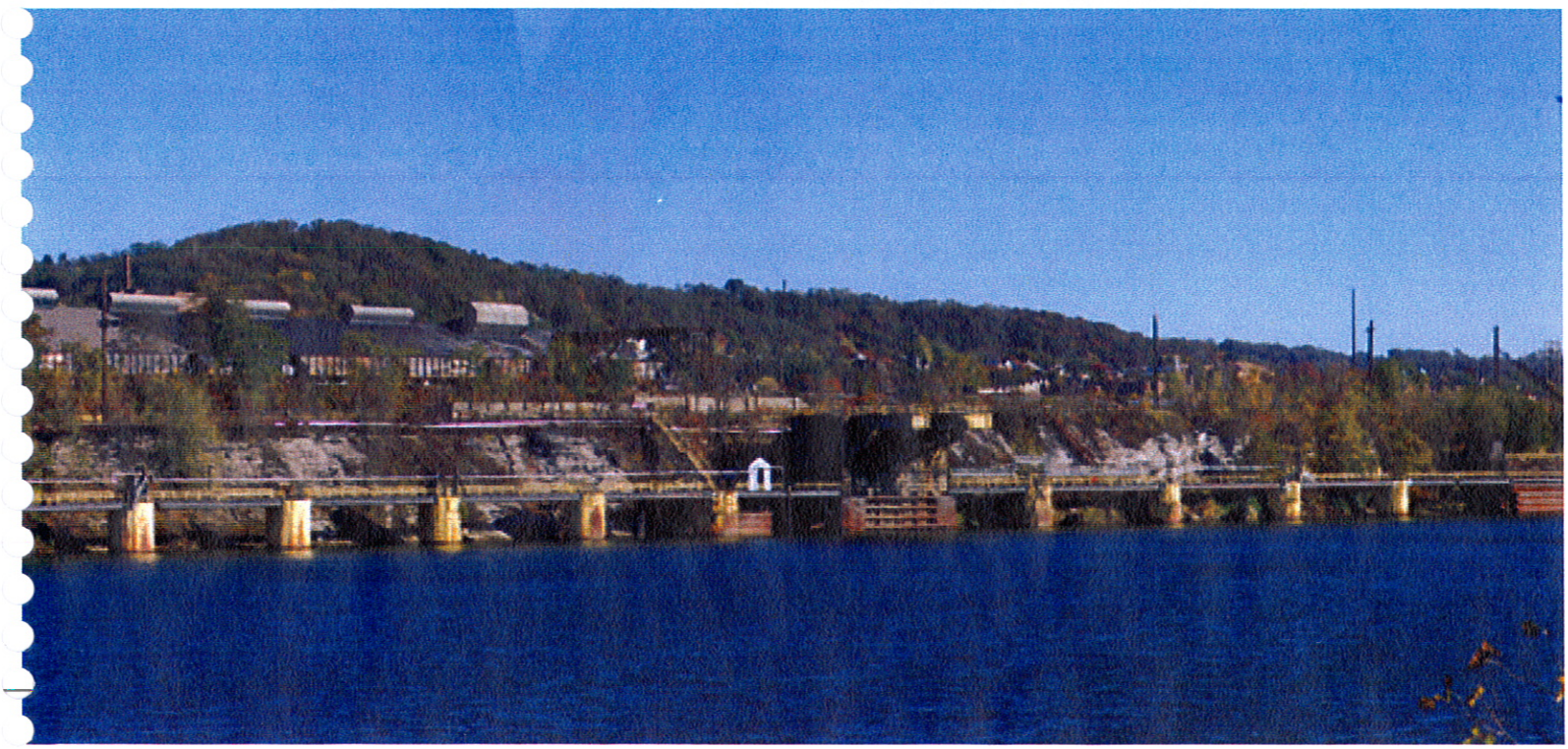
And finally, we would like to thank the students and faculty from Carnegie Mellon University School of Architecture's Urban Laboratory who, year after year, have creatively engaged the multitude of urban questions challenging both Hazelwood and the Pittsburgh region.

BACKGROUND



"THE RUINS OF THE UNSUSTAINABLE ARE THE 21ST CENTURY'S FRONTIER."

Bruce Sterling



Introduction
- Scope
- Purpose, Objectives & Benefits
- An Urban Design Approach

Carnegie Mellon

Hazelwood

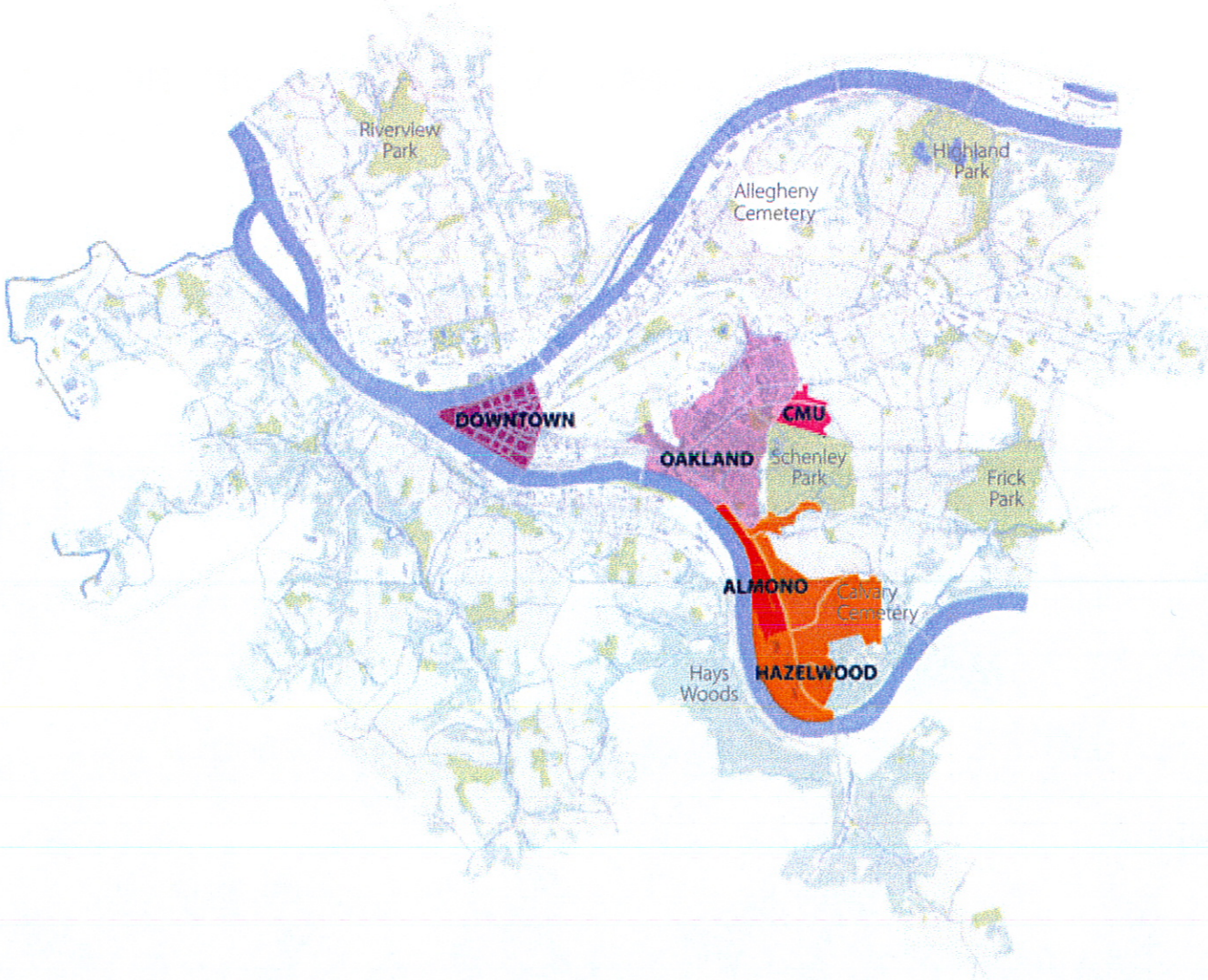
Introduction

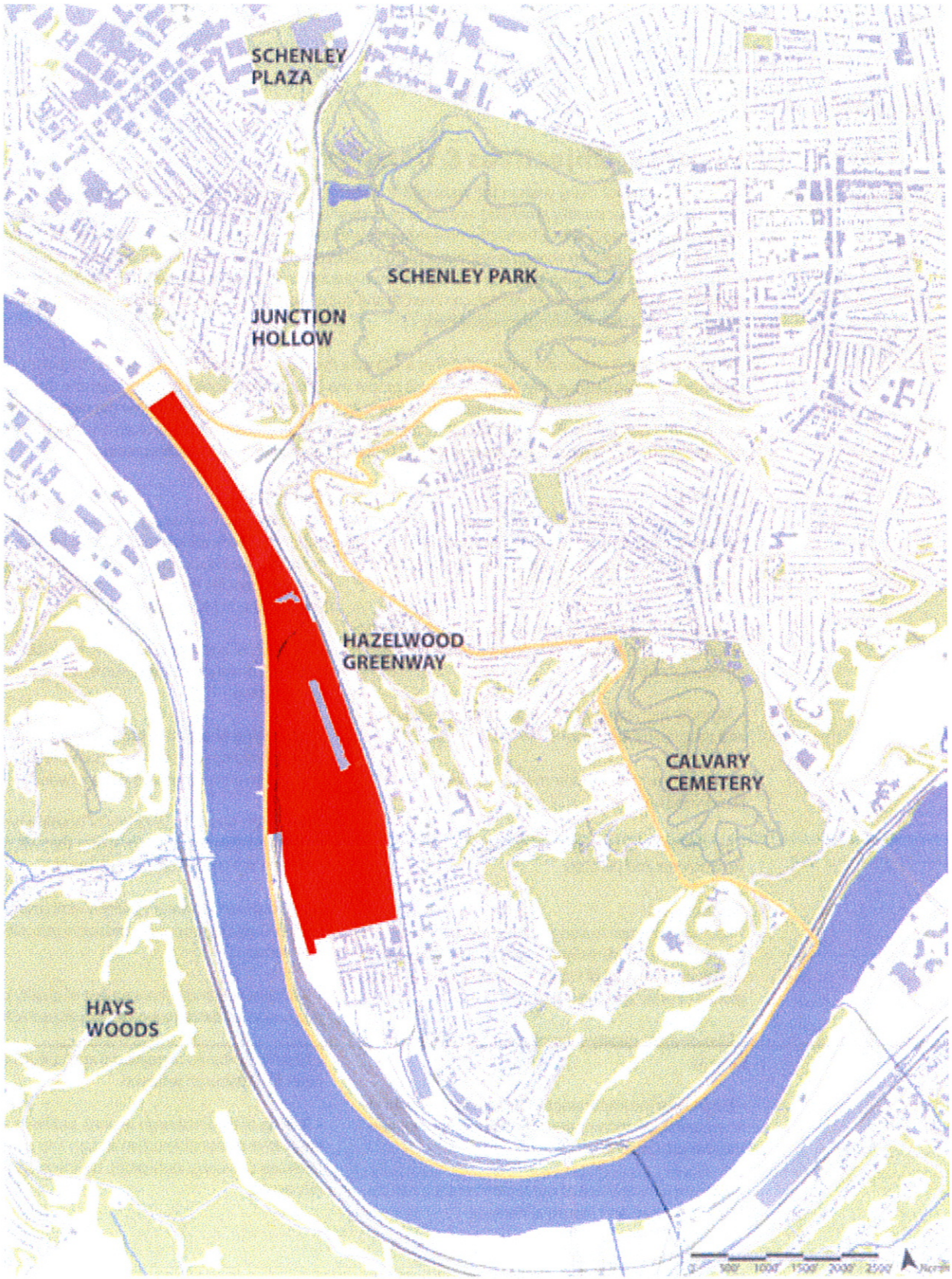
Scope

Remaking Hazelwood, Remaking Pittsburgh: Urban Design Recommendations for Pittsburgh's Next Big Urban Project is a guiding document whose aim is to promote a comprehensive, innovative and sustainable urban design-based approach to the redevelopment of the ALMONO site, a 178-acre former steel mill property located along the Monongahela River in Hazelwood, Pittsburgh.

The urban design recommendations are the product of deliberation and consultation with stakeholders as well as familiarity with existing plans and initiatives. They build on the work of students in Carnegie Mellon's Urban Laboratory: Community and Urban Design Studio and the Remaking Cities Institute's past and current research on Hazelwood.

The recommendations capitalize on the development potential of Hazelwood's central waterfront location and proximity to Oakland, its extraordinary landscape and rich heritage, the unique motivations of the site owners and the interest of regional institutions like Carnegie Mellon University in expanding onto the ALMONO site. Although the ALMONO site redevelopment is the impetus for this document, the geographic scope of the recommendations extend beyond it to Greater Hazelwood and Junction Hollow. The foreseeable economic and cultural impacts extend to the region and beyond.





Key: Greater Hazelwood

- ALMONO Site
- Greater Hazelwood
- Green Spaces

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Carnegie Mellon

Hazelwood

Purpose, Objectives & Benefits

After languishing for many years in the wake of the devastating restructuring of the steel industry, the Pittsburgh region is slowly but steadily emerging as a place of innovation and promise for a prosperous and sustainable future. The tenacity and vigor with which long-time residents and an ever-growing number of newcomers are tackling the issues and proposing change is inspirational. Foundations, universities, community organizations and neighborhood groups are forging links and finding common ground amid their respective interests. As a result of the mobilization of region's human capital, commercial and cultural districts, neighborhoods and riverfronts are being redesigned, and their meanings renegotiated.

The premise of this document is the belief that a 178-acre riverfront brownfield site could be Pittsburgh's "next big urban project", the decisive intervention that will propel the Pittsburgh region's economy over the threshold on which it has been sitting precariously for the past decade. In particularly, we wonder how the redevelopment of a riverfront brownfield in Pittsburgh's south end can contribute concretely to the transformation of the region's economy and what is the role of Carnegie Mellon University and urban design in this process.

Purpose

- Offer a singular vision for the redevelopment of Hazelwood and Junction Hollow that integrates the interests of the community, site owners and institutional investors

- Assist the site owners in the development process by offering a clear physical and programmatic direction for development

- Promote high standards of sustainable urban design and process in Pittsburgh

- Increase investor and community confidence in Hazelwood's future

- Set the basis for constructive dialogue between stakeholders and partners

Objectives

- Reinforce positive existing cultural and economic development trends, as well as compatible planning initiatives of the City of Pittsburgh and the many civic groups operating in the region

- Demonstrate quality sustainable urban design and process

- Emphasize the importance of providing rapid and efficient transportation options for movement between Hazelwood, Oakland and downtown

- Promote conservation of our region's unique natural and visual assets and industrial heritage

- Endorse the reuse of existing urban fabric as a strategy for regional fiscal recovery and long-term sustainability

Benefits

We believe that "remaking Hazelwood" through the thoughtful redevelopment of the ALMONO site can help "remake Pittsburgh". We anticipate many local and regional benefits following the successful redevelopment of the ALMONO site, including:

- Creation of both short and long term local employment in construction, development, retail and institutional sectors

- Leveraging of private sector investment in the form of new buildings and businesses on the ALMONO site and in the existing sections of Hazelwood

- New high-tech jobs, a variety of housing types, rapid transit and quality public amenities that will draw new residents to Hazelwood and Pittsburgh

- Improvement of water quality and riparian wildlife habitat through proposed landscape restoration interventions

- Revitalization and enhancement of quality of life for Hazelwood residents through a redeveloped ALMONO site

- New water-based recreational and cultural opportunities for Pittsburgh residents

- Raising of the Pittsburgh region's profile as a result of innovative sustainable urban design and partnerships between university, non-profit, business, and community actors

Negotiating new meaning:

From Time Magazine, photo by Walter Sanders of a smokeless Jones & Laughlin steel works on the present-day ALMONO site during the 1959 labor strike.

Students' vision for the ALMONO site: Kozar + Couch, Urban Laboratory - Hazelwood Studio, 2007.

An Urban Design Approach

Urban design is increasingly being called upon in efforts to renew ailing post-industrial cities of North America and Europe. As a comprehensive and creative practice, urban design combines the social, cultural, ecological and economic dimensions of the built environment with issues of form, connectivity and aesthetics to create functional, equitable and attractive public spaces, landscapes, streets, neighborhoods, districts and cities.

Urban design is highly contextual and inherently multi-disciplinary, engaging professionals from various fields, most typically urban planning, civil engineering, architecture, landscape architecture and real estate development, and drawing knowledge from domains as varied as economics, engineering, ecology, history, policy, sociology and aesthetics.

Contemporary strategies for urban redevelopment include:
- focusing on a theme, such as culture, art, architecture and design
- hosting large one-time public events and attractions to leverage large sums of investment
- encouraging heritage preservation
- building large sports or cultural institutions, typically on high profile waterfront locations
- enticing new technology businesses through digital infrastructure and cultural amenities

Urban design can be used as a framework for these strategies, organizing a physical context that is both functional and aesthetic. Urban design is particularly useful for addressing those uses and infrastructures, such as industrial uses and transportation structures, that have traditionally acted as barriers to both people and markets or become urban "voids", by finding creative and appealing design solutions.

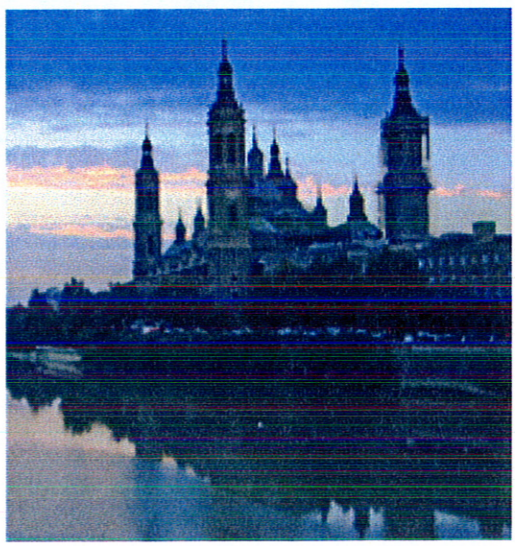
Pittsburgh was once described by a visiting journalist as "Hell with the lid off", a comparison that spoke directly to the city's thriving heavy industrial economy as well as its less desirable impact on the city's environment and public health. While this image of Pittsburgh is no longer real nor reflective of the economy, the physical and cultural legacy of the industrial era present city builders with both challenges and opportunity for its continued evolution.

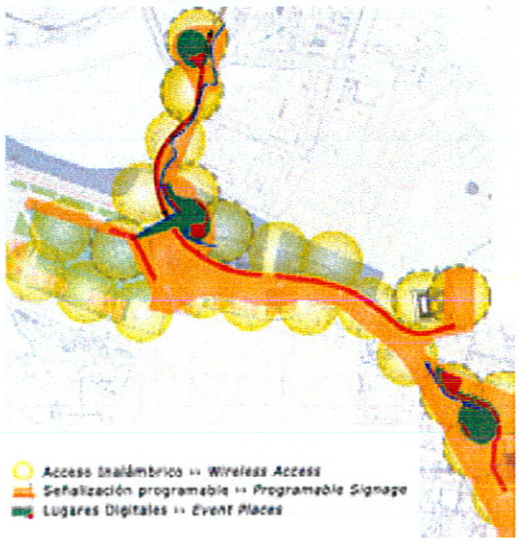
Urban design takes these into account by applying creativity and innovation to the region's problems. Our recommendations use urban design strategies and methods in Hazelwood to encourage connectivity, diversity, resiliency and sustainability.

Specifically, an urban design approach to the redevelopment of the ALMONO site can do the following:

Support innovative, high-value added economic initiatives

Hazelwood can play a pivotal role as a catalyst for the City of Pittsburgh and the region's economic growth by providing a desirable physical environment and urban amenities within which companies and their employees in robotics engineering, media arts and digital technology and other high value-added industries can thrive.





Facilitate stronger economic and cultural ties between Hazelwood and Oakland

Ties to Oakland's institutions can be supported by new physical linkages via Light Rail Transit and an enhanced multi-use trail through Junction Hollow, by promoting complete streets that effectively accommodate car, bike and pedestrian movement, and by embedding ubiquitous digital infrastructure into Hazelwood.

Renew and re-imagine connections within Hazelwood

Connections between the former LTV site, the Monongahela River and Hazelwood's established commercial and residential districts can be renewed through a network of public open green spaces, and by creating a cohesive urban neighborhood made of distinct districts, nodes and pathways.

Create a new identity and sense of place for Hazelwood

Visually tying form to function, designing legible districts, activity nodes, gateways and landmarks, and focusing on unique physical and cultural assets can help create a new identity for Hazelwood.

Support inclusiveness and participation

New and diverse outdoor public spaces, recreational amenities, and cultural and civic institutions both within Hazelwood and along the Monongahela River can be merged with existing local and regional initiatives to create opportunities for various types of engagement.

Restore and sustain local ecological processes

Ecological processes, particularly the hydrological cycle, can be restored and sustained through large and small landscape interventions, and overall sustainable development can be promoted through the adoption of green building and design practices, and sustainable energy and transportation infrastructure.

Celebrate and link Hazelwood and Pittsburgh's natural, cultural and built heritage

Hazelwood's "three heritages" can be embraced and connected by retaining and adaptively reusing the remaining vestiges of industrial use on the ALMONO site and referencing past landscape forms through landscape design and public art.

A case study in modern urbanism: Known for its bridges and historic towers, Zaragoza, Spain added a new layer of culture with the Digital Mile redevelopment. The urban-design driven project attracted businesses and residents working in the information technology and media sectors. The project was spurred by Zaragoza's role as host of Expo 2008, whose theme was "Water and Sustainable Development". Images courtesy of MIT.

Carnegie Mellon

Urban Laboratory

Founded in 1963 by distinguished urban designer and scholar, David Lewis, FAIA, the Urban Laboratory: Community and Urban Design Studio began as a graduate course in the Master in Urban Design program and later became the capstone course for fifth-year architecture students. Over the past two decades, Urban Laboratory studios have taken place in over twenty neighborhoods in the Pittsburgh region and have engaged hundreds of students, government officials, design professionals, community groups and concerned citizens in collective visioning processes.

The Urban Laboratory studio approaches the city as an integrated design problem that is best solved using participatory design methods. Studios are designed to host a shared conception of a design problem, where urban design and place-making become a collaborative task between students and a wide range of community stakeholders and other participants.

Typically, the fifteen-week studio course is administered in three phases structured around three major community design workshops:

Phase 1: Analysis

Students begin by completing a study of the economic, social and physical attributes of the community through diagrams, photographs, maps and models. The analysis is presented at an initial community workshop to both verify facts with participants and initiate dialogue on key issues through hands-on collaborative exercises using neighborhood maps and models.

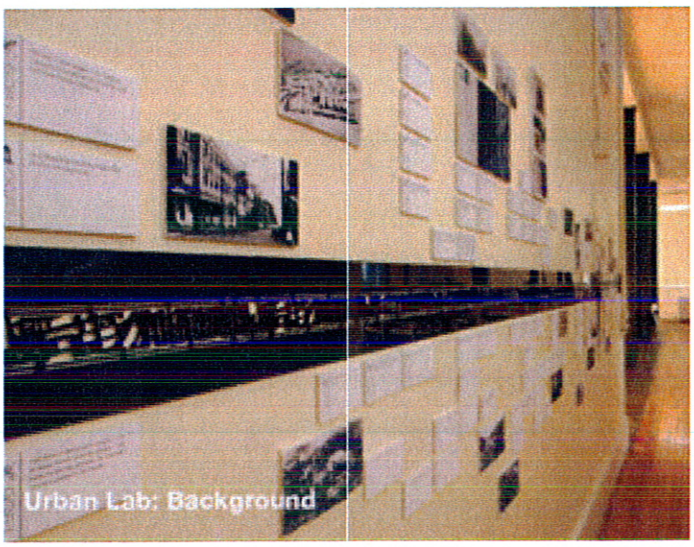
Phase 2: Urban Design Frameworks

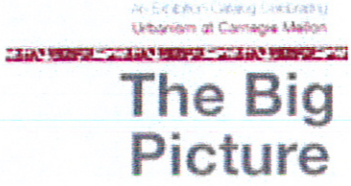
This phase involves students extrapolating key insights from community members and integrating them into several urban design master plans. Scenarios are presented at a second community meeting and may be refined collectively using methods such as design charrettes.

Phase 3: Place Making/Visionary Projects

The final phase centers on the students' detailed development of a single area of focus, essentially through three-dimensional place-making. Projects are presented at a final community meeting or reception. Despite being the final products within the pedagogical framework, these results are intended to serve as a base for future discussions that may help to orient actual practices.

Cover and pages from The Big Picture: Urbanism at Carnegie Mellon exhibition catalogue, curated by Rami el Samahy with assistant curators Kelly Hutzell and Emily Rice.





Since its inception in 1990, the Urban Laboratory: Community and Urban Design Studio has visited more than 20 communities in the Pittsburgh region.

A community presentation in Braddock, PA. Photo courtesy Jonathan Kline and Christine Brill.

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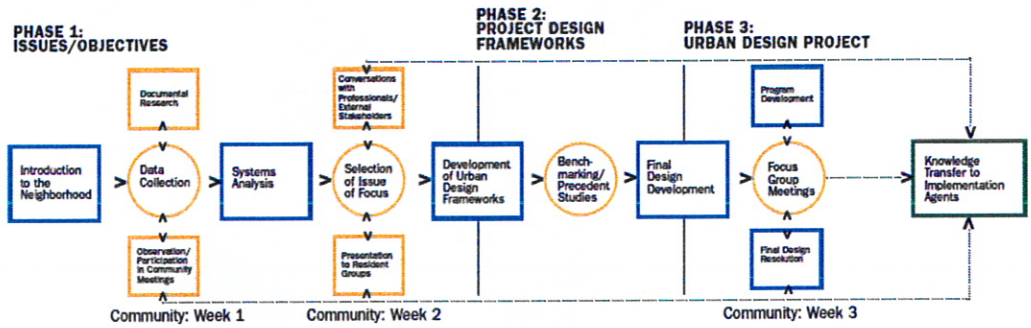
Hazelwood

Remaking Cities Institute

Despite the influence of the Urban Laboratory, faculty and partner communities alike have recognized that the potential of such outreach urban design studios to influence ongoing initiatives can be significantly expanded if properly aligned with urban design practice. In 2006, the Remaking Cities Institute was formed in recognition of this need and in response to the demand for a greater link between academic student work and ongoing neighborhood initiatives undertaken by firms, government agencies and community groups.

The Urban Laboratory process helps to create a space where students and participants explore ideas. The Remaking Cities Institute takes the results of that process, identifies key ideas and refines them through more focused research, analysis and dialogues with key community stakeholders. Ultimately, the products of this process are reports containing design frameworks and recommendations for implementation aimed at enriching urban design practices with academic research. The outcome of this process is a shared creative space for the exploration of urban design strategies with the goal of improving the built environment in the Pittsburgh region.

THE URBAN LABORATORY PROCESS



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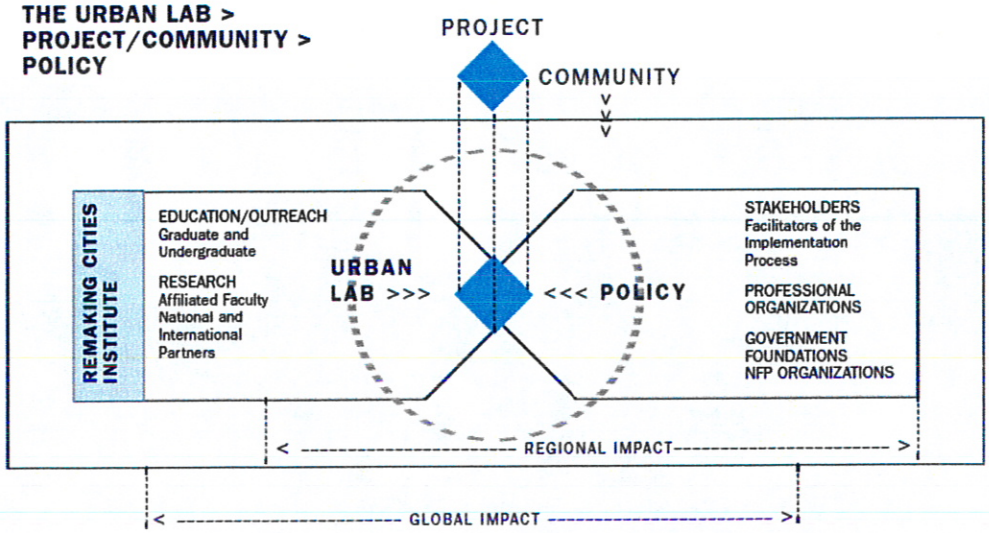

Urban Laboratory - Hazelwood Studio presentation, 2007. Photo courtesy Carnegie Mellon's School of Architecture.

Students building models, Urban Laboratory, 2008. Photo courtesy Carnegie Mellon's School of Architecture.

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Hazelwood

Carnegie Mellon Contributions

It has been nearly a decade since students from Carnegie Mellon's School of Architecture began to set their sights on Hazelwood. Overall, more than seventy students from three Urban Laboratory studios, one Master in Urban Design Studio, a fourth-year Systems Integration Studio and a Summer Internship for Diversity Studio have explored the issues and proposed urban design solutions for Hazelwood. In addition to these contributions, the Remaking Cities Institute prepared a 127-page background study of Hazelwood in 2007. Following is a summary of Carnegie Mellon's involvement in Hazelwood since 2001.

Urban Laboratory, 2001

In 2001, the Urban Laboratory was invited to Hazelwood by the Hazelwood Initiative, Inc., a local community development corporation created by local citizens with an alternative vision to the proposed Mon Fayette Express toll road. Nine student teams spent a semester exploring urban design proposals for Hazelwood's future according to two scenarios: one that included the Mon Fayette Express and one that did not.

Although the students showed that through design there was indeed potential for the community under both schemes, it was evident that the construction of the expressway seriously compromised the redevelopment of Hazelwood according to the community's vision of a vibrant, mixed-use neighborhood that takes advantage of its strategic location in the region. The studio was led by Professor Luis Rico-Gutierrez.

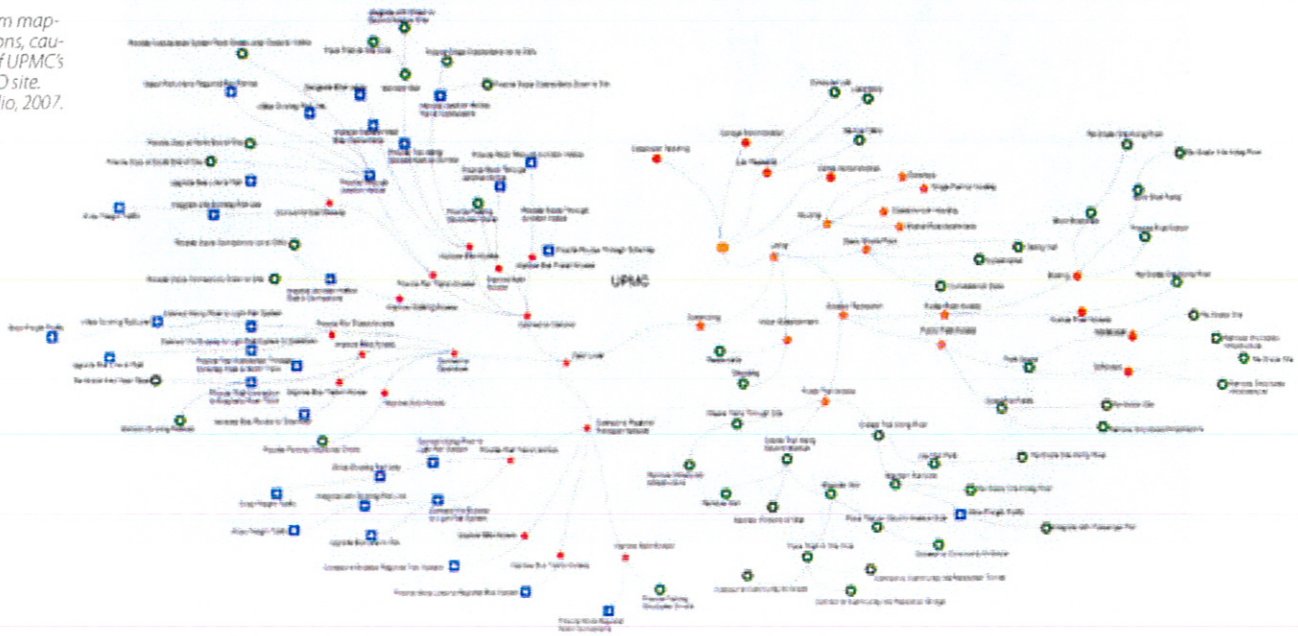
Master in Urban Design Studio, 2007

The large size and riverfront position of the former LTV steel mill site presents its owners, ALMONO, LP, with numerous possibilities for redevelopment. Under the supervision of Assistant Professor Rami el Samahy, two students from the Master in Urban Design (MUD) program chose to model the complexity of the process to evaluate and ultimately pursue any space-related action on the ALMONO site. The decision-making process for such a site is rendered complex by the large number of groups with direct or indirect stakes in the future of the site, including the property owners, potential large-scale occupants, such as universities and health-related organizations in nearby Oakland that require additional space in order to maintain success in the region, and the diverse surrounding communities, who are characterized by various degrees of attachments and interests.

Rather than provide a single master plan, MUD students created a system that maps the hundreds of various potential decisions, both to understand their causality and to identify the various spatial implications of each decision. Using the logic of operational systems research, they affixed surface area values to each possible outcome, allowing decision-makers to arrive at more informed choices with regards to site capacity.

Remaking Hazelwood, Remaking Pittsburgh, 2007

At the request of the Heinz Endowments, a partner in the ALMONO, LP, the Remaking Cities Institute crafted an extensive background study examining the potential role of the ALMONO site and Hazelwood in the future of the Pittsburgh region's economy. After reviewing the



Decision-making diagram mapping the potential decisions, causality and implications of UPMC's presence on the ALMONO site. Huang + Day, MUD Studio, 2007.

existing conditions in Hazelwood and the economic forecast of the regional economy, the study looked at ways in which potential institutional investors, such as Carnegie Mellon University and University of Pittsburgh, could sustainably alter and enhance the physical, cultural and economic landscape of Hazelwood. Using local and international case studies, the report suggested possible avenues for sustainable energy and development on the riverfront brownfield site.

The result is a document that brings stakeholders and Urban Laboratory students closer to understanding the complex dynamics at play in the redevelopment of Hazelwood. The report was researched and written by Research Associates Elise Gatti and Kim Kinder under the supervision of Director Luis Rico-Gutierrez.

Urban Laboratory, 2007

Focusing on the ALMONO site, three studios totalling forty students explored the challenges and opportunities embedded in the reclaiming and reprogramming of this post-industrial urban terrain by reconnecting it to surrounding human and natural ecologies, exploring programmatic scenarios, and designing a piece of sustainable contemporary urbanism. Each studio approached the site with a different programmatic focus in relation to the public realm:

The *Robot City Studio* explored how the spatial and economic context of the site, in particular its proximity to Carnegie Mellon and the University of Pittsburgh, offered unique opportunities for a cluster of robotics and related research and development facilities with local, national and global economic implications. The studio, run by Adjunct Assistant Professor Jonathan Kline, sought to reinterpret the default scenario of the 'R & D office park', already in place in the nearby Pittsburgh Technology Center, by integrating and layering these building and landscape programs into a mixed-use district with an urban public realm.

Assistant Professor and Lucian and Rita Caste Chair Kelly Hutzell's *Urban Housing Studio* focused on a range of housing types and densities looking for connections to both the Hazelwood neighborhood and the universities. Solutions were meant to be both innovative and realistic in terms of regulatory codes and the logic of the local real estate market, while emphasizing mixed-use development, Smart Growth strategies and Transit Oriented Development.

In the *Possible Publics Studio*, Assistant Professor Rami el Samahy instructed students to consider the public design of buildings, space and infrastructure for its central role in creating character of place and function for the new neighborhood, as well as its capacity to establish links to the larger Hazelwood community.

Summer Internship for Diversity, 2008

During the Summer of 2008, three students from Howard University participated in the School of Architecture's summer urban design program. Students spent six weeks immersed in Hazelwood learning about the people, the heritage, and the architecture and urban design issues that are of concern to the community, including the liabilities and opportunities. After interviewing residents and community leaders and making visual observations, students formulated

Models of proposals by Cozzolongo + Eskenazi, and Debolski + Lynch, Urban Laboratory - Hazelwood Studio, 2007. Photographs courtesy Carnegie Mellon's School of Architecture.

Carnegie Mellon

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- Remaking Cities Institute
- Carnegie Mellon Contributions

design proposals that potentially could help reinvigorate the community.

The interventions were organized into four themes, which formed the title of their analysis: "To Create, Enhance, Provide and Encounter". The interventions included the creation of a green park and mixed use development on the LTV site; the enhancement of quality of life by providing markets and other necessary amenities; the provision of a major community space by reestablishing the historic Carnegie Library as a major public amenity; and encouraging encounters through the creation of two major axes linking important nodes within the site. Adjunct Assistant Professor Brock Onque', PhD, led the studio.

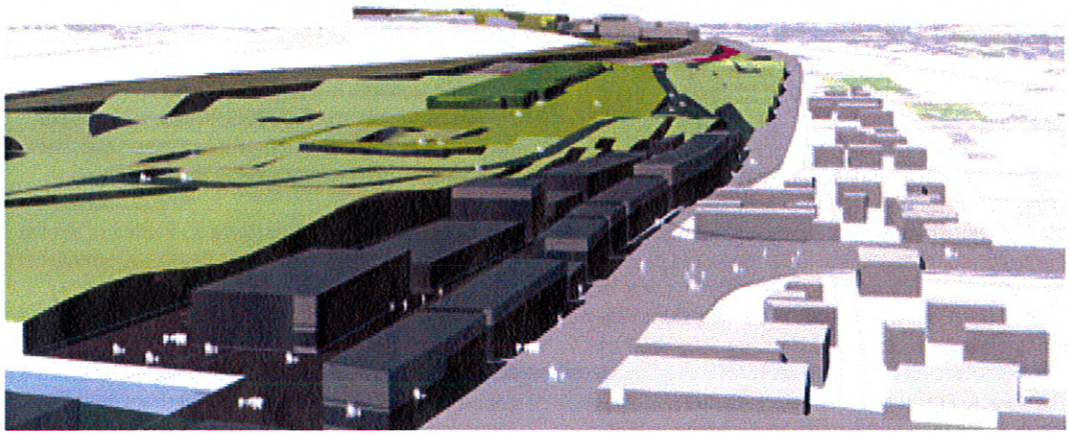
Urban Laboratory, 2008

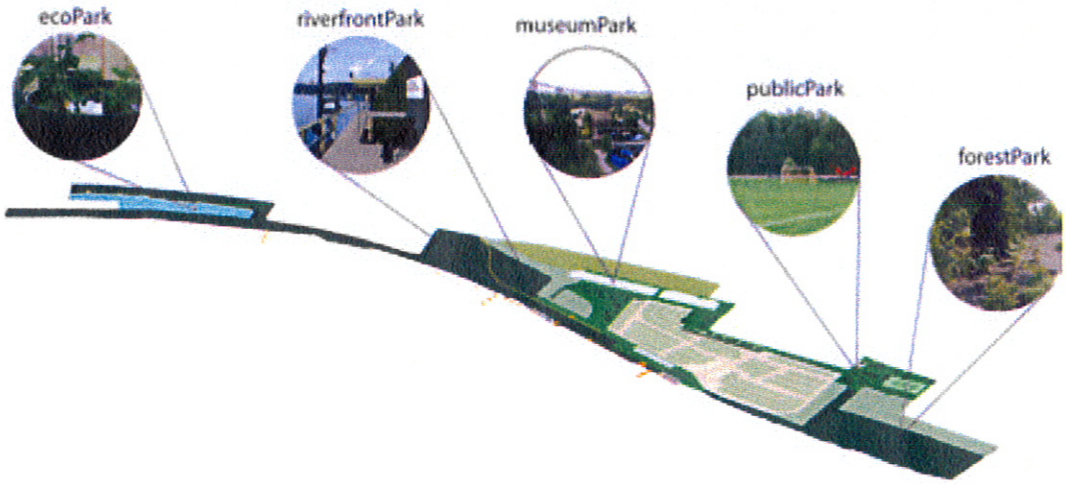
Thirteen students returned to Hazelwood to propose interventions that were inspired by the neighborhood's residential and commercial fabric. The studio, led by Adjunct Associate Professors Ken Doyno and Dan Rothschild, created a common framework for the entire neighborhood into which projects were slotted. Interventions included a dense, mixed-use waterfront district at the foot of Junction Hollow; an expanded greenway with recreational amenities; a new residential island along the ALMONO site, the adaptive reuse of Gladstone Middle School, and the reuse of the Gladstone Elementary School into a mixed-use building.

Fourth Year Systems Integration Studio, 2009

The built environment is central to addressing climate change, and is a major career opportunity for both blue and white collar workers in the U.S. The School of Architecture's fourth-year Systems Integration Studio focused on the portion of Second Avenue lying at the foot of Junction Hollow. The studio asked students to design the first 100,000 square feet of a state-of-the-art campus to serve as an epicenter for education and training for careers in sustainability. Students were challenged to apply the highest level sustainability principles and incorporate innovative environmental technologies, leveraging the intellectual, financial, labor and community resources of the region with goals to develop a trained green collar workforce, educate and engage the community, create K-12 learning experiences, promote and showcase new technologies, and incubate new environmental businesses. Students worked collaboratively with diverse client groups, including the International Union of Operating Engineers. The studio was taught by University Professor Vivian Loftness, FAIA.

Project by Azoulai + Gardner, Systems Integration Studio, 2009.





Proposals for Hazelwood by Connell + Werner, Hartle + Lopez, and McKinney + Knapp, Urban Laboratory - Hazelwood Studio, 2007.

Introduction

Carnegie Mellon

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- Existing Conditions & History
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Hazelwood

Focus Area

Although the redevelopment of the ALMONO lands is at the heart of the urban design recommendations, the site owners are motivated by the potential catalytic power of its redevelopment to revitalize Hazelwood and the promising dynamic between the revamped site and institutions in Oakland. For this reason, the urban design recommendations focus not only on the ALMONO site but on Greater Hazelwood and Junction Hollow.

Greater Hazelwood

Greater Hazelwood, usually referred to simply as Hazelwood, is situated along a deep and hilly bend on the northern shore of the Monongahela River, approximately four miles from downtown Pittsburgh. It encompasses two of Pittsburgh's ninety-three officially recognized neighborhoods, Hazelwood proper and Glenwood, as well as three small distinct communities, The Run, Riverside and Glen Hazel. Up the steep slope is Greenfield and Squirrel Hill.

Hazelwood also includes the sizeable 178-acre riverfront ALMONO property, formerly the LTV Corporation steel mill site. The site is now named after its current owners, ALMONO, LP, a partnership between four local philanthropic foundations and a regional non-profit developer.

Hazelwood is located one mile to the southwest of Oakland, Pittsburgh's second-busiest commercial district, a major employment center and home to many of the region's largest medical institutions and places of higher learning. It is easily accessible by bike and foot via Junction Hollow, the buried Four Mile Run's valley running between South Oakland and Schenley Park.

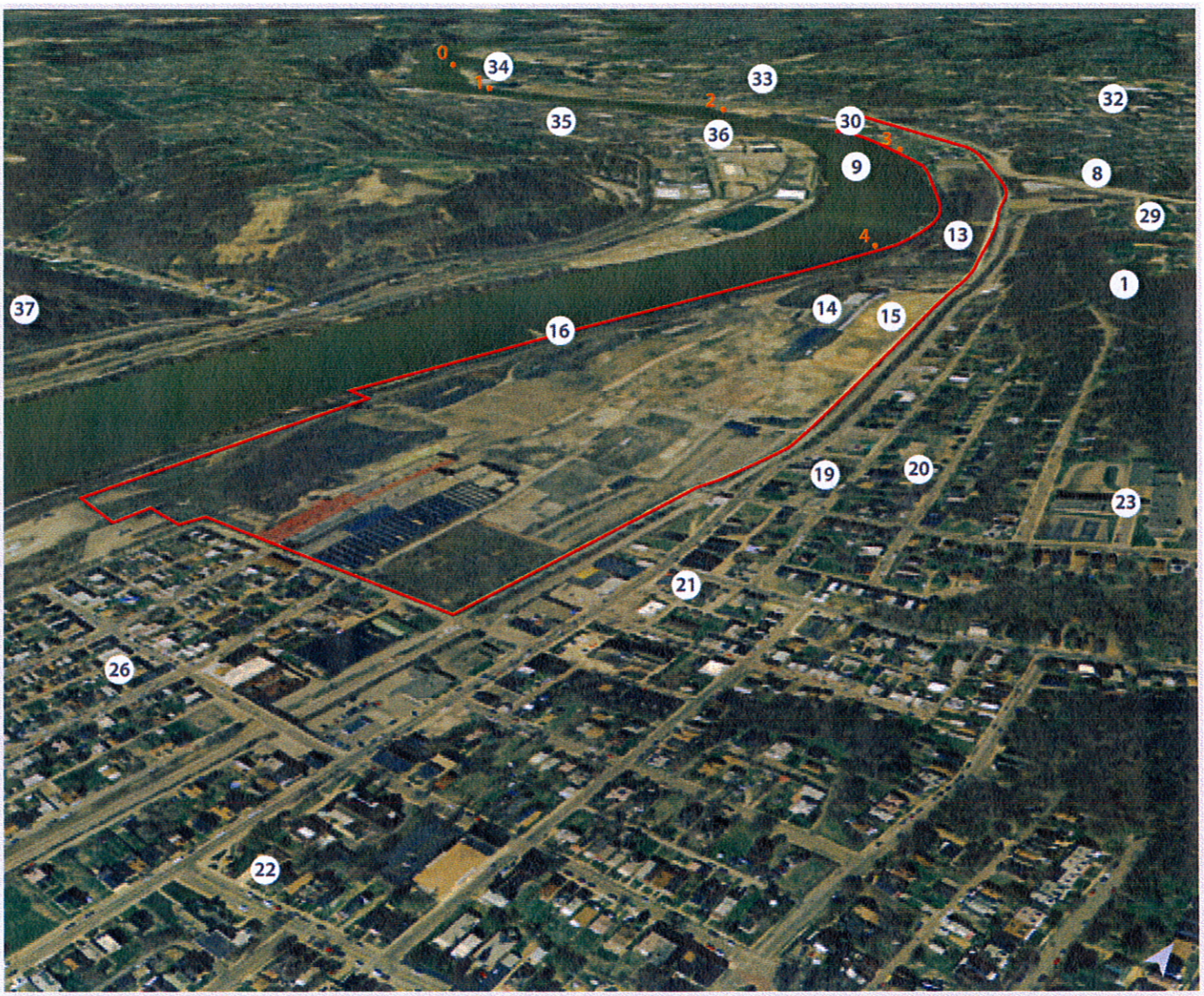
The 49-acre Pittsburgh Technology Center (PTC) abuts the ALMONO site to the north and is home to high-tech industrial and research facilities, including satellite facilities operated by Carnegie Mellon and the University of Pittsburgh. Across the Monongahela is Hays Woods, the South Side neighborhood, and SouthSide Works, an urban, mixed-use brownfield redevelopment. To the south of the site is the Glenwood Rail Yard and a recycling facility.

ALMONO Site

The former LTV steel mill site, now owned by the ALMONO, LP partnership sits mostly empty with the exception of Building 19, the B&O Roundhouse, a historic stone wall along Second Avenue and a brick riverfront pumphouse of unknown vintage. Two rail lines owned by the CSX Corporation run through the site, one along the riverfront and the other along Second Avenue. Although the inland line is still actively used, the riverfront spur is used infrequently. Three loading docks, a floating wharf and some ice breakers are located along the Monongahela's banks and, unlike the rest of the remaining infrastructure, appear to be in decent condition.

Carnegie Mellon's Field Robotics Center is the site's only current occupant. The Field Robotics Center have partially renovated the B&O roundhouse to suit their needs and, along with a recent Carnegie Mellon spin-off company, GTECH Strategies Inc., is using portions of the heavily contaminated lands ("Area B") in front of the Bar Mill building as a testing site for robotic soil remediation research and automated vehicular navigation.

At 178 acres, the ALMONO site is one of Pittsburgh's last large remaining riverfront parcels. The largely flat property includes 1.5 miles of riverfront land. The Monongahela River, which means "falling banks" in a Native American language (probably from the Delaware Tribe), was made entirely navigable in the 1840s through the installation of locks and dams to counter variable water levels. The 128-mile Monongahela River is one of the few navigable rivers in the world that flows north. From its origins in West Virginia, it winds through Pittsburgh, where it converges with the Allegheny River to create the 981-mile long Ohio River, itself the Mississippi River's largest tributary by volume.



Parks & Greenspaces

1 Hazelwood Greenway
2 Junction Hollow
3 Schenley Park
4 Schenley Plaza

Institutions

5 Carnegie Mellon University
6 University of Pittsburgh
7 UPMC

Access

8 I-379 Penn-Lincoln Parkway
9 Hot Metal Bridge
10 Glenwood Bridge
11 Birmingham Bridge
12 Homestead Bridge

Focus Area

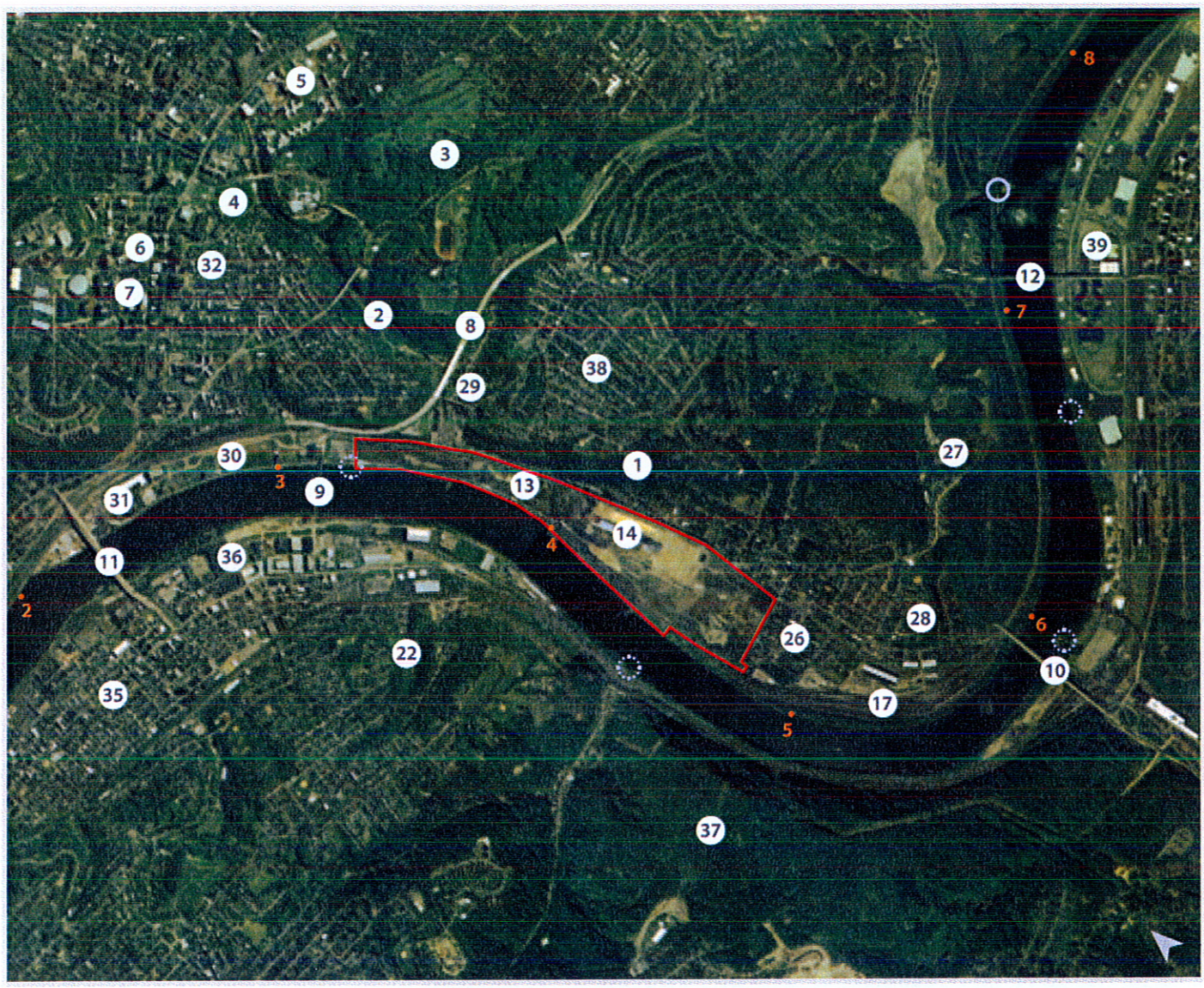
13 B&O Roundhouse
14 Building 19
15 Area B
16 Pumphouse
17 Glenwood Rail Yard

Local Amenities & Services

18 Car Barn Seniors Center
19 Hazelwood YMCA
20 Historic Carnegie Library
21 Current Carnegie Library
22 Public Garden & Hazelwood Initiative
23 Gladstone Middle School (closed)
24 Burgwin Elementary School (closed)
25 Bellefield Plant

Neighborhood and Districts

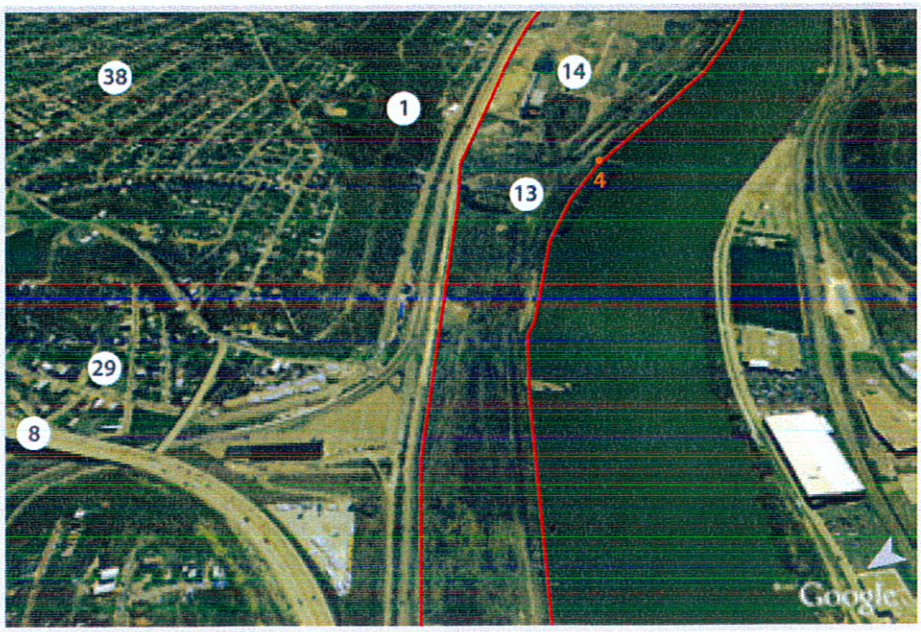
26 Riverside
27 Glen Hazel
28 Glenwood
29 The Run
30 Pittsburgh Technology Center (PTC)
31 Metal Tech, Inc.
32 Oakland
33 Uptown
34 Downtown
35 South Side
36 SouthSide Works
37 Hays Woods
38 Greenfield
39 The Waterfront
5. *Miles From Downtown*



Base satellite image of Oakland, Greenfield, South Side and Hazelwood.

Base satellite image of Junction Hollow, Greenfield, Riverside and northern portion of the ALMONO site. Images courtesy of Google Earth. (Full legend on previous page.)

Panoramic photographs of Hazelwood's 1.5 miles of riverfront edge. Photographs by Elise Gatti.



5 *Miles From Downtown*

Open Tributary

Piped Tributary

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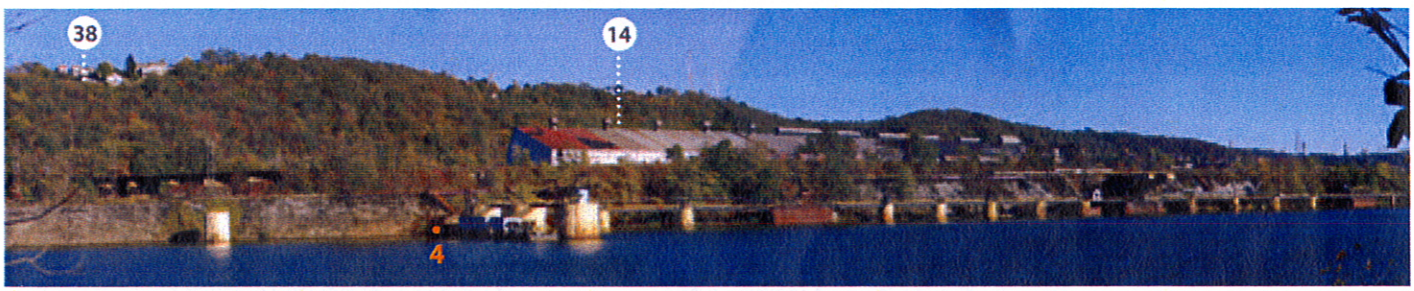
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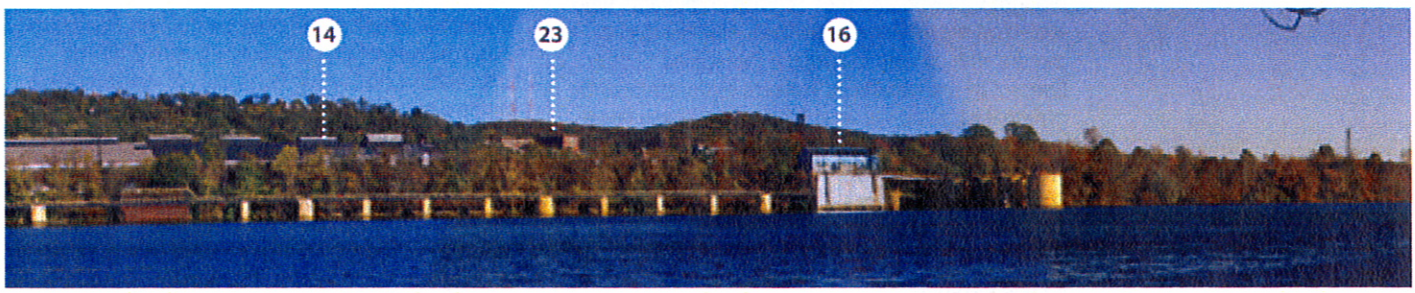
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Hazelwood

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Existing Conditions & History

As a part of the extensive Appalachian Range and the Allegheny Plateau, Pittsburgh's iconic undulating topography is the sculptural product of the action of wind and rain over millennia on the plateau's sedimentary rock. Hazelwood covers roughly 1,300 acres from the Monongahela River's edge to the Greenfield hilltop neighborhood above. Nearly half of Hazelwood is draped across the northern flatlands of the Monongahela River. The rest climbs up the adjacent hillside; the impressive 300 foot rise is one of Pittsburgh's steepest. One hundred and fifteen acres, roughly 10 percent of Hazelwood, has a slope greater than 25 percent. From the Hot Metal Bridge to the Glenwood Bridge, Hazelwood is hemmed by roughly 2.5 miles of riverfront land, much of which is bermed and covered in slag, or buttressed by high concrete walls and infrastructure.

Hazelwood's landscape has been altered in the past two centuries at a rate that far exceeds previous natural morphological transformations. The changes to the neighborhood's physique have been driven by the complex interplay between site, economy, technology and culture. The most notable change has been the burial of the Four Mile Run.

Hazelwood's development can be characterized by four distinct periods:

Pre-Colonial Times (<1758)

The region's original native inhabitants did little to change Hazelwood's landscape. Early nomadic Paleo-Indians regularly passed through the area, as did their descendents, the Seneca, Delaware, Shawnee and Mingo. There are no records of Native American structures in Hazelwood with the exception of burial mounds where Mansion Street now stands. Early settlers demolished them, using the stones to pave the old "Indian" trail that would later become Second Avenue. The most lasting vestige of pre-colonial people and culture are etymological: Monongahela, Ohio and Allegheny are all Native American words.

Bucolic Estate Period (1758 - 1820)

It was the signing of the *1758 Treaty of Fort Stanwix* that brought surveyors and then Scottish immigrants, who settled on the rich alluvial lowlands near the river in the late 18th century to farm the then called "Scotch Bottom". By the mid-1800s, bankers, businessmen and riverboat captains had established large leisure home estates on the lower hillsides, surrounded by orchards and views of the Monongahela River and the south hills, and both the river and Second Avenue were well-established transportation corridors between Pittsburgh and sites along the Monongahela river valley and beyond.

Industrial Era (1820 - 1960)

The combination of the coal and timber-rich hillsides of the Allegheny Plateau, long navigable rivers and strategic location between the Northeast and Midwest fuelled the Pittsburgh region's industrial economy during the latter half of the 19th century and much of the following century. By the late 1800s, industrialists had cleared the riverfront land and buried the streams and rivers in order to erect massive steel and coke refining mills. The surrounding areas, including the large estates, were carved up into smaller parcels and workers' row homes were built on the lower flatlands with larger single-detached homes on the lower hillside. Immigrants came largely from Ireland, Italy, Hungary, Poland and the Slovakian countries.

As a major route, Second Avenue flourished as a commercial district. During this time, the Four Mile Run in Junction Hollow and all but two of its streams, Panther Hollow Run and Phipps Run, were piped into the combined sewer system to both hide the sewage-filled waterways and make available for development the alluvial flatlands. Although sewer improvements improved Pittsburgh's high typhoid fever rates, the combined sewer overflow system, along with the dumping of slag and other industrial products put great stress onto the Monongahela River ecosystem.

During the height of industrial production, Hazelwood was a microcosm of the region, a bustling, diverse "city within a city", where two-thirds of residents lived within a two-mile radius of their workplace. As many as 40 percent of workers were employed locally by the Jones and Laughlin Steel Company (later the LTV Corporation) and the B&O Railroad Company. Within one hundred years, Hazelwood had been transformed from a tree-covered terrain with small creeks and rivers pouring into the Monongahela River into a bustling urban and industrial landscape made of steel, brick and wood.

Post-Industrial/Economic Decline (>1960)

Since the decline and then termination of major industrial activity in the late 1990s, few physical changes have taken place. Hazelwood's existing conditions are the result of cumulative years of disinvestment that has affected every sector. Many commercial and residential buildings have been left vacant or demolished, leaving gaping holes in the urban fabric. As of 2003, only 52 percent of the buildings located in the core commer-

cial area along Second Avenue were occupied. Nearly 20 percent of houses are vacant and in 2008, the Pittsburgh administration ordered the demolition of 57 abandoned housing units in an effort to remove blight.

As a testament to the regenerative tendency of the natural environment, Hazelwood's hillsides have recovered and are today resplendent in their lush green vegetal covering, providing a colorful changing visual backdrop and recreational environment. The Monongahela River has also made a comeback, although urban runoff from the city's aged combined sewer overflow infrastructure continues to be a persistent source of contamination preventing the full recreational use of Pittsburgh's three rivers. To this effect, the Pittsburgh Parks Conservancy is studying the possibility of daylighting the Four Mile Run in an attempt to divert rain water from the city's overcharged CSO system.

Although Hazelwood possesses one of Pittsburgh's oldest standing houses, the John Woods House (built in 1792), there are no built vestiges from the area's suburban estate period, which lasted from 1750 to 1820, and relatively few standing examples of the area's industrial heritage. Those structures that persist have for the most part been abandoned and neglected, with the exception of the B&O Roundhouse (built circa 1885) that, although not fully renovated, is occupied by Carnegie Mellon's Field Robotics Center. Many fine religious buildings and public school buildings remain in Hazelwood, most notably St. Stephen's Roman Catholic Church, the Episcopal Church of the Good Shepherd (1891), and Burgwin Elementary School (1937), as well as a century old Carnegie Library of Pittsburgh branch library. Second Avenue maintains its main street character in spite of the loss of many older buildings.

With the larger Pittsburgh economy growing and diversifying, and the continued strength of the nearby Oakland institutional district, Hazelwood now stands on the threshold of yet another prosperous period.

Pittsburgh is not the only post-industrial city to have experienced dramatic population losses: The epic Shrinking Cities project, funded by the German Federal Cultural Foundation, investigated the "shrinking" processes of Detroit, Ivanovo, Manchester/Liverpool and Halle/Leipzig through the lens of culture. The project then proposed innovative interventions.

Pittsburgh as interpreted by painter Otto Krebs in 1874.

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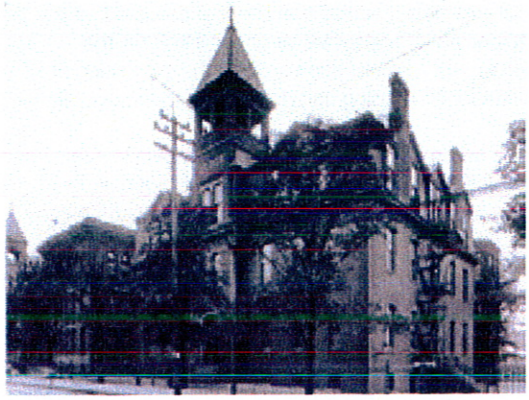
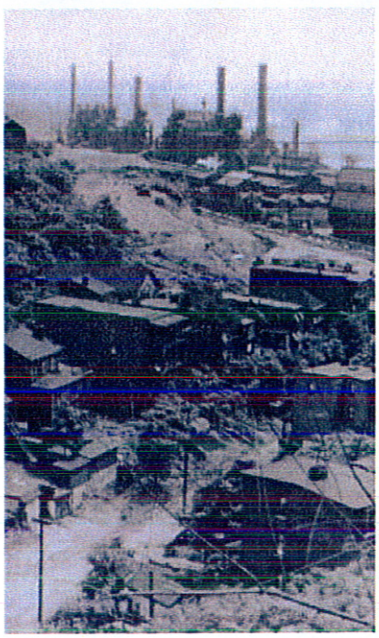
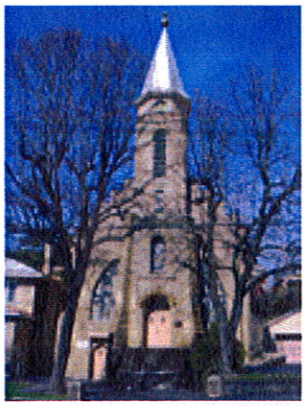




Clockwise: Hazelwood Avenue, 1933; Hazelwood School (torn down), 1915; Gould transfer station near Minden Street, 1928; Jones & Laughlin works from Greenfield Avenue, 1959; mill and houses from Greenfield Avenue, circa 1910; baby clinic, 1920. Courtesy University of Pittsburgh, Pitt Digital Library and Life Magazine.

Opposite: Photos of present-day Hazelwood by Elise Gatti. Woods House photo courtesy University of Pittsburgh, Pitt Digital Library. Photo of Schenley Park courtesy Life Magazine.



- Pittsburgh Historic and Landmarks Foundation Plaque
- National Register Eligible
- National Register Listed
- National Historic Landmark
- City of Pittsburgh Designated Landmark

Hazelwood Historic District
Burgwin Elementary School
Carnegie Library of Pittsburgh, Hazelwood
D.L. Thomas Dry Goods
E. Elizabeth St. Apartments
Episcopal Church of the Good Shepherd
First Hungarian Reformed Church
Gladstone Middle School
Hazelwood Brewing and Derby Brewing Co.
Pittsburgh Railways Building (Car Barn)
St. Stephen's Church

Jones and Laughlin Steel Works
B&O Roundhouse
Building 19
Pumphouse
Brick rail supporting wall

Barker Property
Greenfield Elementary School
John Woods House
Monongahela Connecting Railroad Company
Schenley Park

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Access

Hazelwood's location and topography lends it a naturally isolated character. As a result, there are few access points into the neighborhood. The lack of access is exacerbated by limited transportation options and dangerous conditions for cyclists along Second Avenue.

Vehicular Access

As a result of its hilly backdrop and riverside location, Hazelwood has only five primary vehicular access points: the Glenwood Bridge from the south, the refurbished Hot Metal Bridge from the west, Second Avenue from the north, Greenfield Avenue from the east and Hazelwood Avenue from the east.

The elevated I-376 Penn Lincoln Parkway runs along the northern edge of Hazelwood and Greenfield. It is easy to access the Penn Lincoln Parkway in the eastbound direction from Hazelwood via Bates Street but not possible for the westbound direction.

Second Avenue/Irvine Street is the only north-south thoroughfare running the entire length of Hazelwood and, as a major commuting artery, serves 40,000 daily commuters traveling between downtown, Oakland, and suburban communities in the Monongahela River Valley. The smaller Johnston Avenue/Browns Hill Road sub-artery also connects Hazelwood to the southeastern suburbs via Pittsburgh's Blue Belt.

Public Transit Service

Hazelwood is served by two Port Authority of Allegheny County bus lines. The principal lines along Second Avenue are the 56B, running between downtown and East Pittsburgh via Homestead, and the 56C to McKeesport, and the 56U to Oakland and Greenfield via Hazelwood Avenue. These buses run on 20 to 70 minute intervals during weekdays, depending on the time of day. Paratransit also operates door-to-door, shared-ride service for disabled residents in accordance with the *Americans with Disabilities Act* (ADA).

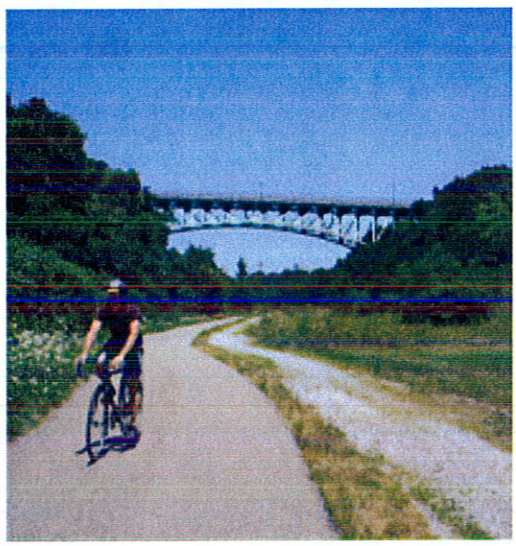
Cycling and Pedestrian Access

Cyclists can reach Oakland via the Panther Hollow bike trail, which connects to the Eliza Furnace Trail ("Jail Trail" in local parlance) and leads to downtown Pittsburgh. Additionally, as part of the Three Rivers Heritage Trail, the steel truss Hot Metal Bridge's second span was recently redesigned for pedestrian/cyclist use, allowing users easy access to the busy South Side neighborhood, the SouthSide Works mixed-use development, and suburban communities in the South Hills.

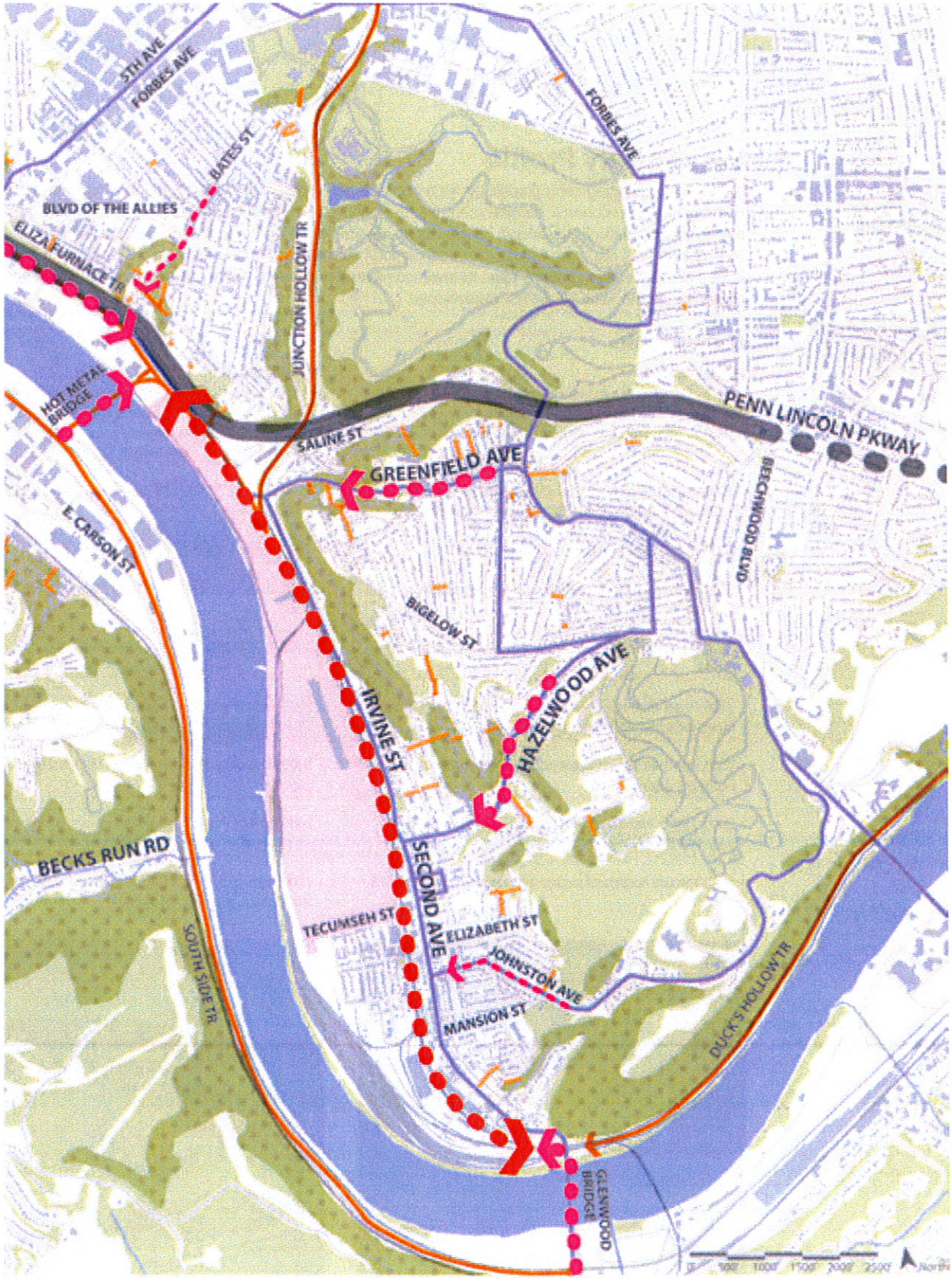
Within Hazelwood, the grid street and alleyway system allows for easy pedestrian circulation in the flat portions of the neighborhood. There are two overpass footbridges over Second Avenue and a number of public steps scattered throughout the hillside. However, these are not regularly maintained by the City.

River Access

There are three barge docking stations for goods movement. There are currently no official recreational or commercial (taxi) water access points.



Alternatives to streets: Cycling through Junction Hollow; public stairs in The Run section of Hazelwood provide additional connectivity to pedestrians. Photos by Elise Gatti.



Key: Access and Connections

- Streets
- Bus
- Highway
- Bike Trails
- Stairs
- Rail
- Main Thoroughfare
- Main Access Points
- Green Spaces
- Slope > 25%
- ALMONO Site

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Community Profile

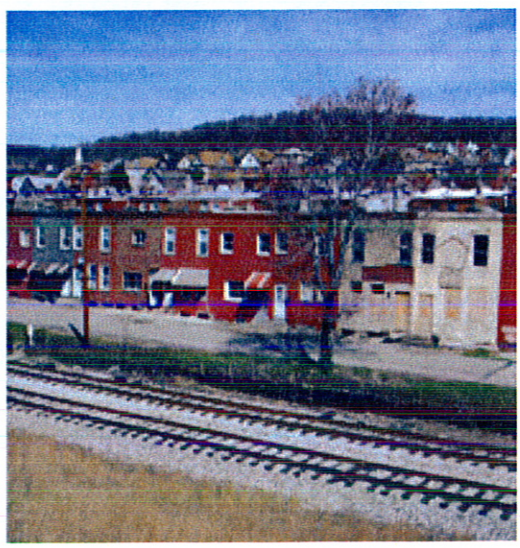
Hazelwood's changing demographic profile reflects the general pattern of out-migration of residents to suburban communities and economic disinvestment that led to Pittsburgh's population shrinking by more than half since the mid-twentieth century. Hazelwood, once a vibrant, dense "city within the city" is today a community characterized by disinvestment, disproportionately large senior and youth cohorts, female earnings that are slightly higher than male earnings and high poverty rates. Its low-income residents will be vulnerable to increases in rent and property values should the ALMONO site be redeveloped.

Demographics

HAZELWOOD	PITTSBURGH
• 1960s, Hazelwood experienced its *peak population* of 13,000	• 1950s, Pittsburgh experienced its *peak population* of 677,000
• 1960 to 2000, Hazelwood's *population shrank* nearly 60%	• 1960 to 2000, Pittsburgh's *population shrank* by more than 45%
• 1990 to 2000, Hazelwood's *population decreased* 17.4% to 5,334 individuals living in 2,289 occupied housing units	• 1990 to 2000, Pittsburgh's *population decreased* by 10.6% to 334,563
• 2000, *median age* in Hazelwood was 43 years	• 2000, *median age* in Pittsburgh was 35.5
• 2000, more than 20% of Hazelwood residents were *aged 65 and over*	• 2000, 16% of Pittsburgh residents were *aged 65 and over*
• 2000, more than 20% of Hazelwood residents were *aged 5 to 19*	• 2000, 19% of Pittsburgh residents were *aged 5 to 19*
• 2000, fewer than half of Hazelwood residents aged 25 and older had obtained a *high school diploma*	• 2000, more than three-quarters of Pittsburgh residents aged 25 and older had obtained a *high school diploma*
• 2000, less than 1% of Hazelwood residents had obtained a *bachelor's degree*	• 2000, 25% of Pittsburgh residents had obtained a *bachelor's degree*
• 2000, 25% of Hazelwood's 1,475 households were living *under the poverty level*	• 2000, 20% of Pittsburgh's households were living *under the poverty level*
• 2000, *median household income* in Hazelwood was $19,513	• 2000, *median household income* in Pittsburgh was $28,588 (state median of $43,714 in 2004)

U.S. Census data

A building at the corner of Elizabeth and Second Avenue bears a striking mosaic mural.



Rowhouses on Langhorn Street in Riverside present a solid front to the adjacent industrial lands. Photos by Elise Gatti.

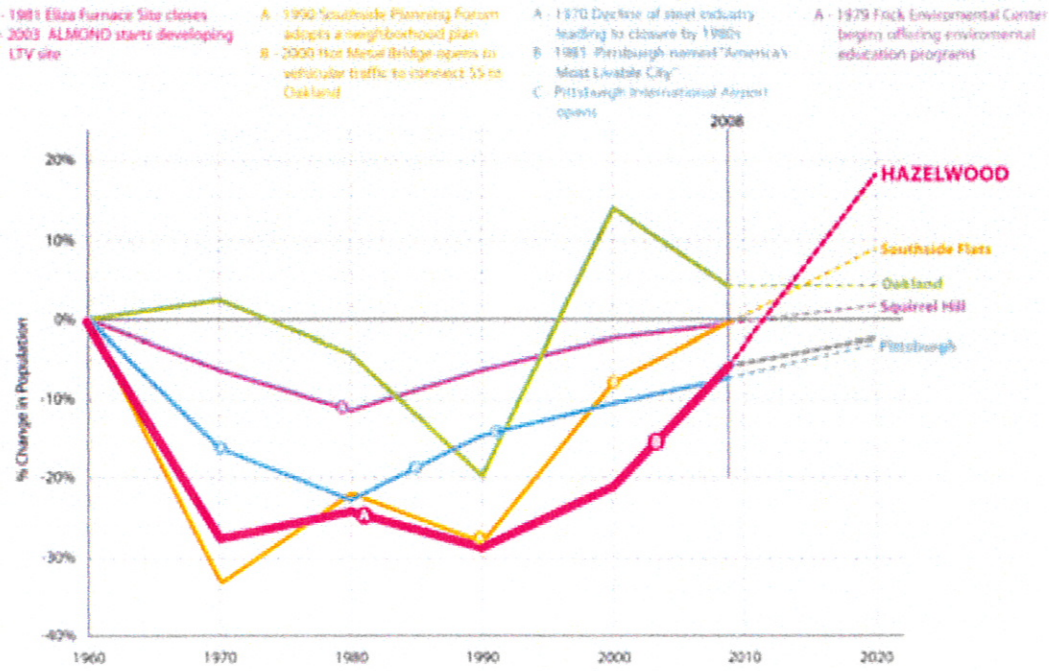
While Hazelwood was an ethnically diverse neighborhood during the industrial era, with immigrants from all of over Europe, particularly Eastern Europe, today there are very few immigrants in Hazelwood -- or Pittsburgh. In the latter half of the twentieth century, however, there has been significant internal migration of African Americans. The first significant migration of African Americans to Hazelwood occurred when Hill District residents were displaced by the Pittsburgh Civic Arena urban renewal project in the 1960s. Hazelwood's minority proportion of the population, the majority self-identifying as African American, grew from 28 percent in 1990 to 37 percent in 2000 (28 percent and 32 percent respectively in Pittsburgh).

Given these numbers, ALMONO site developers should consider that according to the 2007 *Pittsburgh's Racial Demographics: Differences and Disparities*, a study by the University of Pittsburgh's Center on Race and Social Problems, African Americans in the Pittsburgh region remain at the bottom of every measure of the quality of life, including indicators of economic status, educational achievement, family stability and violence. Even the most recent immigrants to Pittsburgh were found to be faring better. Hazelwood's poor residents will be at risk of displacement yet again should inclusionary housing and support services not be included in the redevelopment plan.

Services

In addition to having a high poverty rate, Hazelwood's remaining resident base must contend with few surviving amenities and services, particularly in the areas of education, recreation and neighborhood-based retail. Residents are served by fourteen community service organizations, and sixteen religious organizations maintain churches and educational facilities in Hazelwood and nearby Greenfield, providing or sponsoring community services. There are also several health service providers located along Second Avenue. The City maintains a firehouse and social services office in Hazelwood. The neighborhood's only supermarket recently closed.

The last public school to close was Burgwin Elementary School in 2006, five years after Gladstone Middle School shut its doors. Two small, private religious schools remain open and enroll young and disabled children. Most of Hazelwood's children are currently bused to schools in other neighborhoods, including two of the city's highest performing schools, Minadeo Elementary School and Allderdice High School. While there is a Carnegie Library branch on Second Avenue and a small YMCA near Hazelwood Avenue, local leaders point out that there are no community centers or large indoor recreational spaces, forcing residents to travel outside of Hazelwood to participate in indoor sports like basketball. The neighborhood's outdoor community pool is no longer in operation.



Population projection of four city neighborhoods and the City of Pittsburgh mapped with major development events. Analysis by Han, Lukacsy and West, Urban Laboratory - Hazelwood, 2007.

Planning & Community Development

In spite of a lack of financial resources and in the face of formidable challenges, including the specter of the Mon Fayette toll expressway, Hazelwood residents have proven themselves to be engaged citizens. In addition to Hazelwood-specific planning, there are several city and regional initiatives that bear on Hazelwood's future directly.

Hazelwood Planning

Hazelwood has undergone a number of community participatory planning processes, beginning in 2001 with the process that led to the document *Master Development Planning in Hazelwood and Junction Hollow*, commissioned by the City of Pittsburgh and led by Saratoga Associates. Residents called for a mixed-use redevelopment of the former LTV site and stronger connections to Oakland, Junction Hollow and Hazelwood. In 2003, the Urban Design Associates completed *Conceptual Master Plan for LTV Site*, followed by *Hazelwood Redevelopment: Reconnecting to the River*, by Calthorpe Associates and Burt, Hill in 2007. Both plans focused on the ALMONO site and created plans based on the community's vision. Two additional noteworthy studies are the *Hazelwood Second Avenue Design Strategy* (2005) by Loysen + Kreuthmeier, and *Connecting the Assets of the Greater Hazelwood Community* (2003) by Rothschild Doyno Architects and Pashek Associates.

Other community revitalization efforts have centered on crime reduction and prevention, economic development, employment initiatives, youth programs and modest beautification projects. Hazelwood has been the recipient of several major community development grants, including the U.S. Department of Justice's Weed and Seed Program, a Main Street economic development grant, and HUD's Community Development Block Grant. The area's community development corporation, Hazelwood Initiative, Inc., formed in 1994 by local activists, has been the main vehicle for revitalization efforts.

Adjacent Planning

While there has been no significant development within Greater Hazelwood in the past four decades, a 48-acre former mill site to the north of the Hot Metal Bridge was redeveloped into an office park. The Pittsburgh Technology Center (PTC) site was developed by the Urban Redevelopment Authority of Pittsburgh (URA), the city's economic development agency, beginning in the early 1990s until 2002. More than 1,000 employees work on the PTC's grounds, whose tenants include the Carnegie Mellon Research Institute, the University of Pittsburgh Center for Biotechnology and Bioengineering, and a number of private high-tech companies. The PTC also has space across the river on the South Side Works site. A new master plan was approved in 2006 which will add up to 1 million square feet of new high-tech office space and supporting retail services.

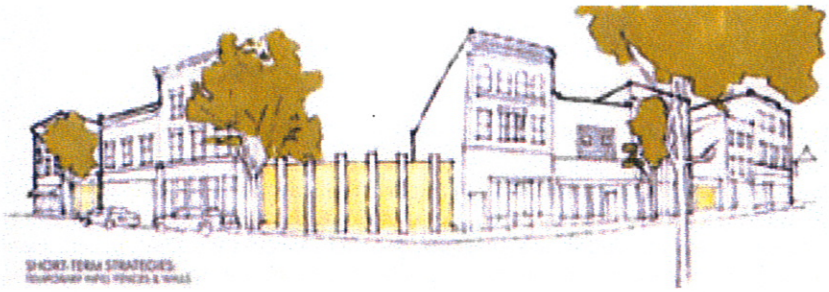
The Pittsburgh Parks Conservancy (PPC) manages the City's four large urban parks, and in line with its *Pittsburgh's Regional Parks Master Plan* (2001) is performing ecological restoration work in Panther Hollow and plans to upgrade recreational amenities in Junction Hollow. The PPC is currently studying the possibility of daylighting a portion of Four Mile Run in order to reduce the stormwater burden on the Monongahela River and is considering building a pedestrian bridge between Panther Hollow Lake and South Oakland. Carnegie Mellon University and local partners Oakland Catholic High School, Central Catholic High School, and Winchester Thurston School have proposed building three artificial surfaced athletic fields in Junction Hollow which, outside of their programming, would be open to the public.

Transportation Planning

On the transportation front, the Pennsylvania Turnpike Commission has a long-standing proposal to develop the four-lane Mon Fayette Expressway toll road through Hazelwood. The project has been stalled numerous times and does not enjoy full support within the Pittsburgh community. The Port Authority of Allegheny County released its *Vision 20/20* regional plan for public transportation in Southwestern Pennsylvania in which it recommends developing a light-rail or busway rapid transit connection through Hazelwood to Oakland and the Monongahela Valley. Pittsburgh City Council recently hired a consultant to study a cross-town LRT line from Hazelwood to Lawrenceville.

Recreational Planning

The Friends of the Riverfront, Bike-PGH, Riverlife Taskforce and Allegheny Trail Alliance are all working to complete and maintain 37 miles of commuter and recreational bike and hiking trails along all edges of Pittsburgh's rivers. The Three Rivers Heritage Trail connects to the regional Great Allegheny Passage, a 150-mile biking and hiking trail system that links Pittsburgh to Washington, D.C. The portion of the Passage that runs from McKeesport to Pittsburgh along the Monongahela River is stewarded by the Steel Valley Trail Council as the Steel Valley Trail, a celebration of the region's industrial heritage. Friends of the Riverfront are additionally working to promote boating facilities, such as ramps, tie-ups and marinas, along the three rivers.



A short-term strategy for temporary filling in vacant commercial lots along Second Avenue. Proposal by Loysen + Kreuthmeier in the Hazelwood Second Avenue Design Strategy (2005).

The 150-mile Great Allegheny Passage from Pittsburgh to Cumberland, MD, with missing link in Hazelwood. Map by Bill Metzger.

Expansion plan for the Pittsburgh Technology Center, 2008. Graphic courtesy of the URA.

Hazelwood

- Focus Area
- Existing Conditions & History
- Access
- Community Profile
- Planning & Community Development
- Real Estate Market

Real Estate Market

Until the 1970s, Hazelwood maintained a stable residential base and successful business district. However Hazelwood's changing economic fortunes and subsequent loss of population, increase in poverty and aging population have left a visible mark on the community's buildings and landscape. Recent market studies show that new housing is a viable option under certain redevelopment scenarios and would increase demand for retail services. Pittsburgh's real estate values are appreciating quickly. With better connections to Oakland and downtown Pittsburgh, and the thoughtful redevelopment of the ALMONO site into a mixed-use urban waterfront district, Hazelwood is poised to partake in Pittsburgh's resurgence.

Housing

Hazelwood's current status as a weak property market is best exemplified by the growing number of vacant housing units and vacant lots, particularly along Second Avenue, decreasing single-family home prices and increasing number of parcels with tax liens. Of the nearly 4,000 property parcels in Hazelwood, roughly 60 percent are residential, and owner-occupied housing vacancy rates range from 14 to 24 percent. Vacancy rates have been on an upward trend, particularly in the southern end of the neighborhood. Overall, rates increased by 7 percent from 1990 to 2000, compared to 2 percent for the City of Pittsburgh.

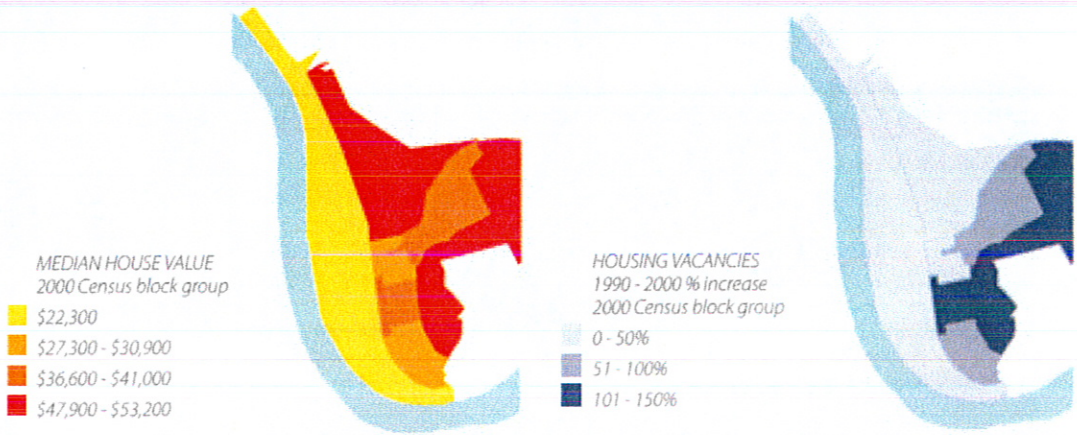
The median single-family home price ranges from $22,000 west of Second Avenue to $53,000 in the upper hillsides. The average owner-occupied home price in 2000 was $39,492; Pittsburgh's mean price was $59,700. After comparatively slow growth for decades, the Pittsburgh Metropolitan Statistical Area's (MSA) housing values appreciated at a higher rate (4.6 percent) than the national average (0.2 percent) in the third quarter of 2007. In the City of Pittsburgh, average house values rose 31 percent from 1990 to 2000.

Hazelwood has traditionally had high rates of owner-occupied housing and still does in the areas north of Hazelwood Avenue from Bigelow Boulevard to Irvine Street, where in 2000, 84 percent of homes were owner-occupied, and east of Glenwood and south of Kilbourne, where 77 percent were owner-occupied. Recently, however, more than half of sales have been to non-occupying owners and one-third of homeowners are over the age of 65, suggesting that Hazelwood's home ownership rate has likely changed since the last Census.

Some of the challenges to reviving Hazelwood's property market include the decreasing and aging resident population, an older housing stock, the trend to non-owner occupancy, particularly in the central core of the neighborhood, and the concentration of ownership of residential properties by a few large property owners. Connectivity is also a major drawback now that residents rarely work within walking distance to their employment. Hazelwood's topographical isolation is exacerbated by the lack of reliably rapid transportation options despite its relative proximity to Oakland and downtown, and the spectre of the Mon Fayette tollway has likely also had a negative effect on investment.

A Zimmerman/Volk Associates (ZVA) report in 2003 indicated that Hazelwood's market has the potential to absorb 1,150 new units of housing on 50 acres of the former LTV site over a seven-year period. The

The block group closest to Oakland has the highest median house values and lowest vacancies.



The most common housing types in Hazelwood are brick rowhouses and single-family homes. Less common are apartment buildings and apartments above commercial storefronts on Second Avenue. Photos by Elise Gatti.

Hazelwood

- Focus Area
- Existing Conditions & History
- Access
- Community Profile
- Planning & Community Development
- Real Estate Market

major assets of the site include its riverfront location, potential of downtown views, size of the parcel, and dearth of new housing products available in the City of Pittsburgh. Challenges of the site noted in the report include the presence of the CSX rail line separating the site from the surrounding area and river, lack of adequate transportation options to Oakland and downtown, and Hazelwood's higher than average poverty and crime rates.

According to the ZVA study, the market for new construction in Hazelwood includes empty nest and retiree households (40 percent), traditional and non-traditional families (31 percent), and younger singles and couples (29 percent). The mix of housing that could be supported on the site includes 504 rental units (44 percent of total units) and 646 for-sale units (56 percent of total units). The size of the units varies, and includes six different housing types.

In addition to the private market, Carnegie Mellon is interested in developing new housing for 500 undergraduate and 500 graduate students. The university currently leases undergraduate space in a number of hotels and apartment buildings off-campus to accommodate excess demand and does not provide housing to graduate students or students with families. If transportation can be provided to the main campus, the ALMONO site could prove a viable site for university-affiliated housing.

Commercial

A 2007 market study conducted for Point Park University by an Urban Land Institute (ULI) advisory panel suggests that students living in downtown Pittsburgh buy approximately 10 percent of their retail goods from downtown establishments. This spending translates to 3.1 square feet of Gross Leasable Area (GLA) per student resident. Applying this figure and the 10 percent local spending assumption to Hazelwood, this would translate to a total of 3,089 square feet of retail space for the 1,000 students that could reside on the ALMONO site.

The retail demand calculator developed by the Center for Community and Economic Development at the University of Wisconsin Extension can be used to determine the retail impacts of the new residents of Hazelwood's market-rate housing. This tool uses data from the Economic Census and Urban Land Institute to calculate the amount of retail space that new residents can be expected to support. Assuming competition from nearby retail clusters in the South Side, Squirrel Hill, and The Waterfront (but not the PTC) limits the neighborhood's capture of new residents' spending to 10 percent, leaving 5,642 square feet of retail space that can be supported by the addition of new market-rate residents to the neighborhood.

If the ALMONO site is developed to include the 1,150 private sector units the ZVA study suggests are supportable, as well as the 1,000-units of student housing, the impact on Hazelwood's retail climate will be beneficial. Even if Hazelwood-based businesses captured only a small proportion of the total spending by these new residents, the total retail space supported by these new residents could translate to nearly 10,000 square feet of leasable commercial space.

Second Avenue: Traditional commercial building on the left. On the right, Plaza Sophia, built in 2002 and location of the new Hazelwood Carnegie Library of Pittsburgh branch. Photos by Elise Gatti.

Summary of Planning Documents

Remaking Hazelwood, Remaking Pittsburgh: A Background Study
Year: 2007
Consultant: Remaking Cities Institute, Carnegie Mellon University
Client: The Heinz Endowments

Hazelwood Redevelopment: Reconnecting to the River
Year: 2007
Consultant: Calthorpe Associates; Burt Hill
Client: ALMONO, LP

Hazelwood Second Avenue Design Strategy
Year: 2005
Consultant: Loysen + Kreuthmeier Architects
Client: Department of City Planning

Hazelwood Community Asset Map: Assessing the Services, Needs and Strengths of Hazelwood's Community Service Providers
Year: 2005
Author: Corrie Ulrich, Tracy M. Soska and James Richter
Publisher: University of Pittsburgh Community Outreach Partnership Center

Connecting the Assets of the Greater Hazelwood Community
Year: 2003
Consultants: Rothschild Doyno Architects and Pashek Associates
Client: Hazelwood Initiative, Inc.

Hazelwood Housing Study Supplement
Year: 2003
Author: Andrew Aurand
Client: Hazelwood Initiative, Inc. and Community Outreach Partnership Center, University of Pittsburgh

Conceptual Master Plan for LTV Site
Year: 2003
Consultant: Urban Design Associates (UDA)
Client: ALMONO

Master Development Planning in Hazelwood and Junction Hollow
Year: 2001
Consultant: Saratoga Associates
Client: Department of City Planning

Summary of Investment Programs

Main Street Program, Hazelwood Mainstreet Taskforce

BluePrint Communities, specific to the LTV site

Keystone Opportunity Zone (KOZ), specific to Second Avenue business district (until 2010)

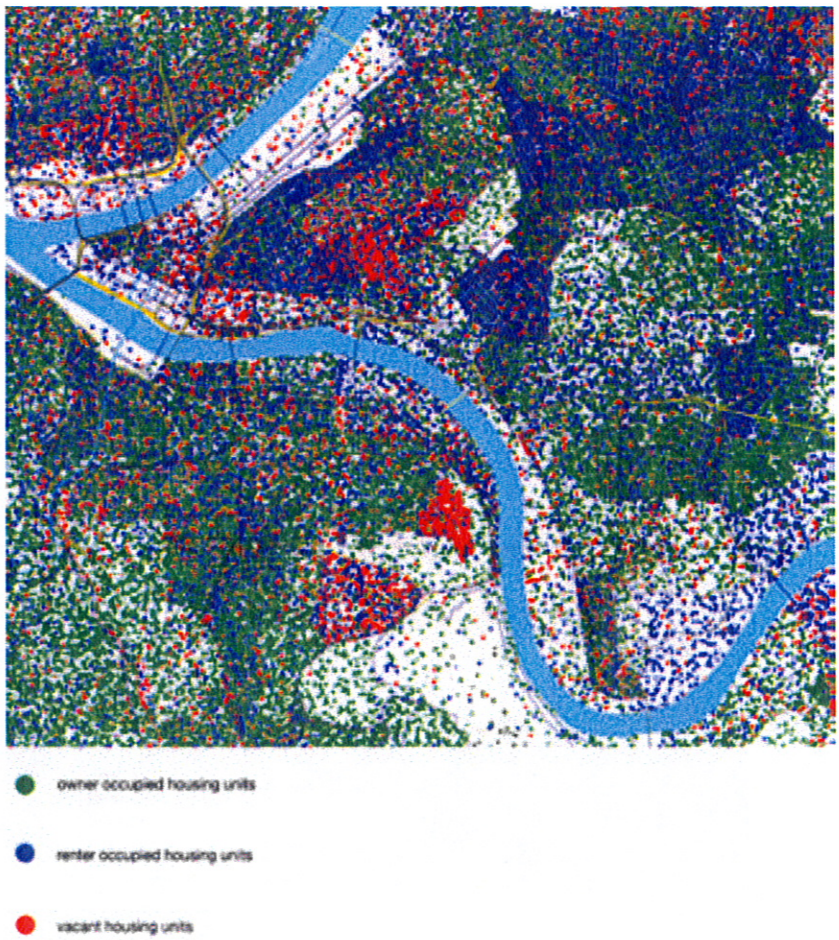
Community Development Block Grant (CDBG)

Greater Hazelwood Weed and Seed program (1996 – 2002)

Home Improvement Loan Program (HILP), Pittsburgh Home Rehabilitation Program (PHRP), Urban Redevelopment Authority of Pittsburgh

Governor's Economic Development Grant, specific to the LTV site (2004)

City of Pittsburgh occupancy map. Analysis by students in the Urban Laboratory - Hazelwood Studio, 2007.



RECOMMENDATIONS

"THE CITY OF THE FUTURE IS A PLACE WHERE THE FRAGMENTS OF SOMETHING ONCE BROKEN ARE RECOMPOSED."

Aldo Rossi

Vision

Remaking Hazelwood, Remaking Pittsburgh: Urban Design Recommendations for Pittsburgh's Next Big Urban Project is a guiding document whose aim is to promote a comprehensive and sustainable urban design-based approach to the revitalization of the ALMONO site and Hazelwood.

The recommendations capitalize on the development potential of Hazelwood's central waterfront location and proximity to Oakland, its extraordinary landscape and rich heritage, the unique motivations of the ALMONO site owners and the interest from institutions like Carnegie Mellon University. They build on the premise that the academic, research and redevelopment activities performed by these institutions are critical to the success of our region, and that Hazelwood possesses the array of urban conditions necessary to nurture their growth.

Remaking Cities Institute

The Remaking Cities Institute's vision for the ALMONO site and Hazelwood is one that combines a diversity of housing types, places of employment and commerce, outstanding public spaces and both land- and river-based recreational amenities to create a vibrant, contemporary urban riverfront district that can accommodate a variety of lifestyles. The vision is of a neighborhood that is easily accessible from Oakland and downtown via public transit, car and bicycle, one that features exemplary sustainable design and takes full advantage of its central riverfront location and spectacular views.

Hazelwood Community

Our vision builds on previously elaborated visions for Hazelwood's future in order to propose a sustainable physical framework within which the activities and characteristics envisioned by the community and the site owners take place successfully and sustainably. Past visioning processes have been organized by design firms such as Saratoga Associates (2000), Urban Design Associates (2003) and Calthorpe Associates (2007), as well as the Carnegie Mellon School of Architecture's Urban Laboratory: Community and Urban Design Studio (2001, 2007 and 2008).

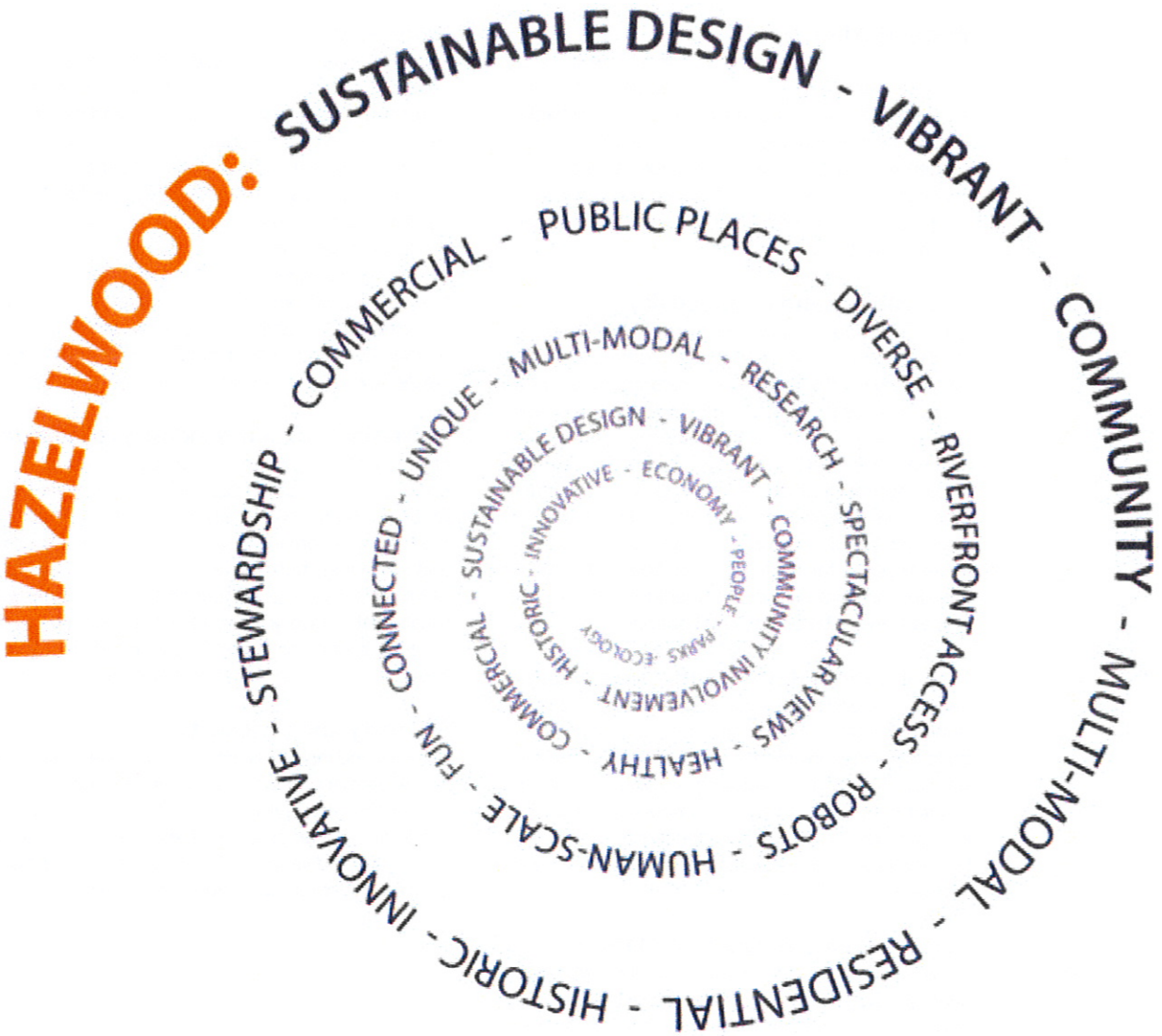
The community vision is for the full integration of Hazelwood, Oakland and Junction Hollow into the mixed-used redevelopment of the ALMONO site. The community has stated repeatedly that it wishes to see a diversity of uses that would expand existing training and employment opportunities for residents and create stronger physical and economic connections to surrounding communities. New and diverse housing options are desired as are new recreational and educational opportunities that support a better quality of life for residents.

The community has also voiced an urgent need for greater connectivity between Hazelwood, downtown Pittsburgh, Oakland and the Monongahela River, as well as expanded choices for mobility, such as light rail public transit, cycling and walking. While the physical scale of the redevelopment should be human, the economic scale can and should extend beyond Hazelwood. Conservation and restoration of the environment, so thoroughly altered by urbanization and industrialization, is also part of the community vision.

ALMONO, LP

The ALMONO, LP vision for the redevelopment of its property, as recorded by the Urban Design Associates (UDA) during their design process in 2003, compliments that of the community. The ALMONO partners propose that new development be woven into existing residential and commercial districts in Hazelwood. They wish to celebrate the cultural and industrial heritage of Hazelwood and Pittsburgh while nurturing a new identity for the region as a thriving, economically-viable and sustainable place. ALMONO's vision is also centered on connectivity, creating links between Hazelwood and the region physically through public transportation, economically and institutionally via institutions and businesses that are located in Oakland and the region, and culturally, with a particular focus on public access and interaction with the Monongahela River.

The Remaking Cities Institute's urban design recommendations for Hazelwood respect and fully embrace these visions. It proposes a development framework and a programmatic insert that will promote and facilitate the goals of both the community and the site owners, while meeting high standards of sustainable urban design.


HAZELWOOD:
SUSTAINABLE DESIGN - VIBRANT - COMMUNITY - MULTI-MODAL - RESIDENTIAL - HISTORIC - INNOVATIVE - STEWARDSHIP - COMMERCIAL - PUBLIC PLACES - DIVERSE - RIVERFRONT ACCESS - ROBOTS - HUMAN-SCALE - FUN - CONNECTED - UNIQUE - MULTI-MODAL - RESEARCH - SPECTACULAR VIEWS - HEALTHY - COMMUNITY INVOLVEMENT - HISTORIC - INNOVATIVE - ECONOMY - PEOPLE - PARKS - ECOLOGY - COMMERCIAL - SUSTAINABLE DESIGN - VIBRANT

Themes

A series of themes have been pulled from the vision for Hazelwood. These broad themes underlie the urban design recommendations.

Place-Making

Our vision for Hazelwood rests upon a set of space-defining sustainable infrastructure networks within which are embedded a series of distinctive and identifiable places. These environments -- a business district, residential neighborhoods, park spaces, a robotics research zone -- are designed to be memorable and unique places that are also integrated into the larger urban context.

Accessibility and Connectivity

One of Hazelwood's most significant development challenges is its poor connectivity to other districts, particularly nearby Oakland. The recommendations address this issue through a multi-modal transportation framework, by extending the existing grid street pattern onto the ALMONO site, by following the Complete Streets approach which designs streets to accommodate pedestrians, cyclists, motorists and public transit users, and by using universal design principles to increase access for all. Digital technology is also recommended to augment access and enjoyment of public spaces, transportation and retail options.

Conservation, Restoration, Sustainability

The recommendations suggest measures to conserve resources, restore physical and cultural assets, and build long-term environmental, social and economic stability. These include restoring landscapes, managing rainwater, adding biodiversity corridors, conserving energy, reusing materials and creating locational efficiency through strategically-placed urban density and transit-oriented development.

Culture, Built Environment, Nature

Together, these themes represent Hazelwood's three heritages: Its economy and social life, its built form and its natural environment. These elements have evolved in tandem over the past 150 years, and the ALMONO redevelopment is an opportunity to embrace Hazelwood's rich heritages through adaptive reuse while creating new, exemplary forms that represent contemporary cultural values and building practices.

Water and Land

The Monongahela River was critical to the development of Hazelwood, first in the 18th century as a visual backdrop to residential estates, and later as a transportation corridor, source of drinking water and pollution sink during the region's industrial phase. The recommendations once again reimagine the Monongahela River, this time through a lens of sustainability. We strive to balance its various uses, including source of drinking water, recreational amenity, transportation corridor, wildlife habitat and visual asset. Natural hydrological processes, such as seasonal flooding, are embraced and integrated into the landscape design to create new water-based environments.

University-Community-Industry Collaboration

One of the Pittsburgh region's biggest assets is undoubtedly its human capital. The area's universities, foundations and civic groups have been very active in the transition from industrial center to research, arts and technology hub. The recommendations for the ALMONO site redevelopment embrace this multi-sectorial collaborative approach to city building by incorporating existing proposals for expanded greenspace, ecological restoration and the Robot City concept.

Diversity and Inclusivity

Diversity and inclusivity are present in every aspect of the recommendations. This theme informs the variety of activities and services, options for housing, multi-modal transportation, accessible public spaces, universal design, biodiversity and emphasis on connections between different stakeholder groups' initiatives.

Human and institutional capital: Oakland (middle ground) is home to many of the region's top educational institutions. Downtown Pittsburgh's skyline looms in the distance while Carnegie Mellon University's campus is shown in the foreground.

Artistic interventions in urban spaces: A writer and an artist helped save a defunct elevated railway in New York City that once carried cattle and convert it into the High Line, an urban parkway similar to Paris' Coulée Verte. Photo by Iwan Baan, courtesy of Friends of the High Line.

Opportunities & Challenges

There are many leading factors that are converging to suggest that Hazelwood may be Pittsburgh's "next big urban project". Hazelwood's redevelopment can potentially set a new standard in sustainable, urban design-driven economic and community development with regional impacts and global implications. Understanding the contextual opportunities and challenges is critical to delivering a successful redevelopment vision.

From an urban design perspective, the most significant challenges to Hazelwood's redevelopment are the lingering issues of connectivity and linkages, and the effects of longterm landscape degradation of the ALMONO site and Monongahela River riparian environment, including the impacts on the public's perceptions. The biggest opportunities are the location, commitment and vision of the site owners, the community capacity, regional institutions and industry, and Hazelwood's assets.

ALMONO, LP

First and foremost, the unique ownership structure of the 178-acre ALMONO site offers unprecedented flexibility and possibility for innovation. As philanthropic foundations, the ALMONO, LP partners operate within a different accountability paradigm than municipal governments, for-profit and non-profit developers. They come with what has been called "patient money", allowing for a long-term development vision, and compatible program missions in the areas of economic and community development, sustainability and public education.

Institutional Interest

The redevelopment of Hazelwood is also supported by the enthusiasm and interest of potentially important research and pedagogic, industry and cultural investors, such as Carnegie Mellon's Robotics Institute. These institutions are actively interested in becoming a permanent installation in Hazelwood, providing the critical programmatic axis on which the ALMONO site urban design recommendations rest.

Strategic Location

Hazelwood is located four miles from downtown Pittsburgh and one mile from Oakland, Pennsylvania's second and third largest commercial districts respectively. It is also in proximity to the research-focused Pittsburgh Technology Center (PTC) and the successful Southside Works retail district.

Site Assets

Hazelwood is in many ways a microcosm of the best of what Pittsburgh has to offer, with more than two miles of winding river frontage, a steep forested hillside backdrop, established walkable neighborhoods and proximity to a major urban park. Its location on a dramatic bend of the Monongahela River offers impressive views of Hays Woods, landmark buildings in Oakland and downtown Pittsburgh's skyline. These assets should be emphasized in any redevelopment scheme.

Committed Community

De-industrialization has had a destabilizing impact on Hazelwood's resident and economic base. Confronting these challenges are a collection of committed and active community organizations, including the Community Development Corporation (CDC) Hazelwood Initiative, Inc., the faith-based, community empowerment organization Center for Life, and the urban farming-focused Hazelwood Harvest. Local residents and business owners have participated in several community visioning and planning processes, including the Carnegie Mellon School of Architecture's Urban Laboratory: Community and Urban Design Studio.

Lack of Connectivity & Transportation Choices

With one of Pittsburgh's steepest hillsides and a long, winding shoreline, Hazelwood's site conditions are unusually dramatic and full of potential. Currently, however, the fragmented path and street network, and limited variety of transportation options creates isolation and negates the advantages of the area's proximity to major employment and service districts. The redevelopment of the ALMONO site will require early investment in public transportation infrastructure in order to create speedy access and stoke the synergies between Hazelwood, Oakland and downtown.

The importance of providing a permanent, rapid link between Hazelwood, Oakland and downtown cannot be overstated. It is the singular most important gesture that will ensure the success of the ALMONO site's redevelopment. In the long term, a second major proposed transportation intervention is a bridge connecting Hazelwood to the south side of the Monongahela River. This will improve traffic flow and increase regional connectivity.

Degraded Landscape Functions

Pittsburgh's hydrological system has been seriously altered due to the transformation of the landscape's surface over the past two hundred years. There are few surviving open streams. Most have been piped underground and covered, some with earth, others with slag, in order to create flat surface areas for development.

The Monongahela River riparian corridor has been severely degraded. In many places, its edges are raised with railway berms, covered in slag or draped in high concrete walls. In Hazelwood, there are several opportunities to atone for past grievances against important natural functions through landscape restoration work, particularly in Junction Hollow, where the buried Four Mile Run meets the Monongahela River, and along the river's edge. Resolving these ecological dilemmas will yield benefits that extend beyond the site. Addressing the hydrological system will not only help ecological functions and create aesthetic and recreational landscapes but also return what has become a serious and costly liability, as well as image problem, into an asset by alleviating combined sewage and stormwater overflow contamination.

Privately-Held Land

The urban design recommendations proposed in this document extend beyond the boundary of the ALMONO site. The end of the Four Mile Run valley, the hillside and Second Avenue are all critical to the overall framework. Some of these areas are publicly-held; others are privately-owned. A map is in the section Development Constraints. The support of the City of Pittsburgh and the Urban Redevelopment Authority (URA) will be critical to the success of our vision. The ALMONO, LP could try to purchase these sites. Failing that, the URA can support the project by purchasing those properties that are within the scope of the recommendations and making them available for redevelopment in accordance with the proposed strategy.

Harnessing the opportunities and finding solutions to the challenges will require the participation of important stakeholders and regional actors, including the City of Pittsburgh, its development arm, the URA, and its public transit agency, the Port Authority of Allegheny County. The Commonwealth of Pennsylvania may also be called upon as a funding and leveraging partner. A discussion on additional stakeholders and partners is included at the end of the recommendations.

Assumptions

Incorporated into the urban design recommendations are several important assumptions about existing and proposed uses and infrastructure. These assumptions concern major infrastructure affecting the site's redevelopment potential.

End of Mon-Fayette Toll Expressway

It is assumed that the final leg of the Mon-Fayette toll expressway, proposed to be routed through Braddock and Hazelwood, is abandonned. It is the RCI's position that a regional highway of the magnitude proposed by the Pennsylvania Turnpike Commission is not consistent with a community-based, sustainable redevelopment vision of Hazelwood.

We support the cause of regional connectivity and as such propose a multi-faceted and integrated approach to transportation along the lines of what is proposed in the *Citizens' Plan: An Alternative to the Pennsylvania Turnpike Commission's Plan to Complete the Mon-Fayette Toll Road (2002)*, a study published by Penn Future and informed by a broad coalition of regional and local organizations. In this optic, transportation infrastructure is viewed as both an opportunistic design feature, defining and delineating space and acting as a landmark, while maintaining a positive and interactive relationship with other uses, such as commercial, office, industrial, residential and recreational uses. This approach to urban transportation infrastructure creates value beyond the actual transportation intervention.

Relocation of Metaltech, Inc.

Metaltech, Inc. is a manufacturer of coated steel coils currently located at the northern end of the Pittsburgh Technology Center (PTC), south of the Birmingham Bridge. We propose that the facility be relocated or serviced by river barge instead of rail. This will allow for the removal of the riverfront CSX rail spur and its raised berm that is used infrequently by Metaltech. This move is critical to the successful implementation of a vibrant new urban riverfront district that fully embraces the Monongahela River.

Light Rail Transit

We propose that the current CSX rail line running parallel to Second Ave and through Junction Hollow into Oakland be paired with a commuter rail line and a commuter bikeway, creating an effective and aesthetically pleasing multi-modal people and goods movement corridor between Oakland and Hazelwood.

Bellefield Steam Plant

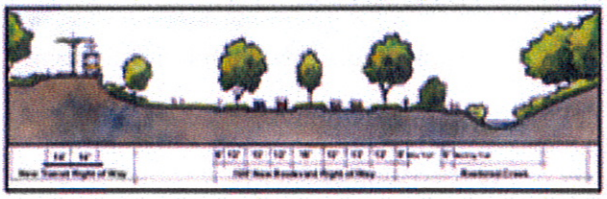
Under our recommendations, the Bellefield coal-fired steam generating plant, scenically located on the slope of Junction Hollow adjacent to the Carnegie Library of Pittsburgh and Carnegie Mellon University, would be closed and replaced with a district co-generation energy plant on the ALMONO site. The Bellefield building would be adaptively reused by area institutions, such as the Carnegie Library of Pittsburgh or the Carnegie Museums.

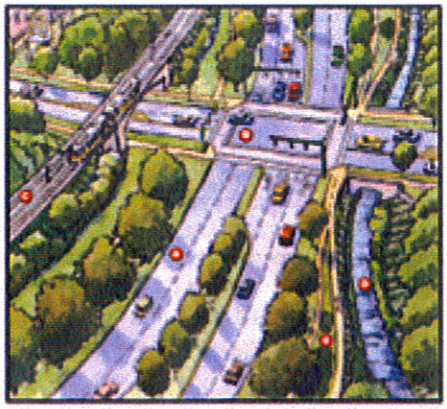
Land Assembly

The complexity of the urban design recommendations require a geographic scope that extends beyond the ALMONO site. The interventions in the larger project area maximize the potential of the dynamic between the ALMONO site, Oakland institutions and Hazelwood. There are two zones of privately-held and publicy-held land that are critical to the overal vision of the ALMONO site redevelopment: The area between Junction Hollow and the ALMONO site includes land that is critical to the implementation of the LRT line and Transit Oriented Development proposal. The completion of the Riverside neighborhood at the southern end of the ALMONO parcel requires the acquisition of part of the lands currently used for the Glenwood Rail Yard.

New Urban Boulevards with Transit

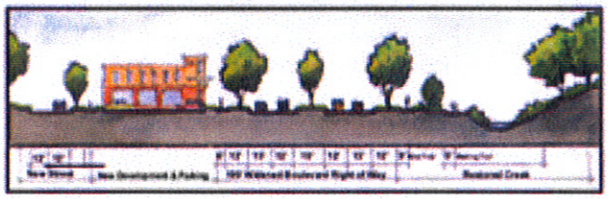
- Two twelve foot travel directions in either direction (PennDOT Standards.)
- Efficient signalized intersections with dedicated left hand turn lanes.
- New dedicated light rail right of way and with extension of existing service.
- Ecologically restored creek with conservation easement.
- New walking and bicycling trails.

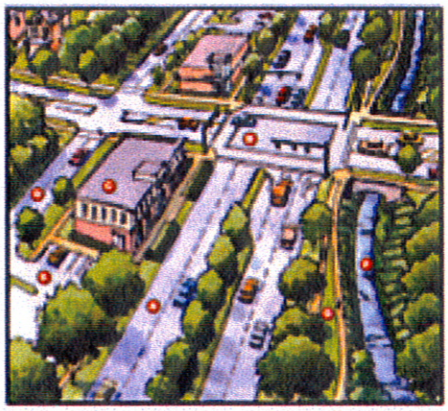




Upgraded Commercial Urban Boulevard

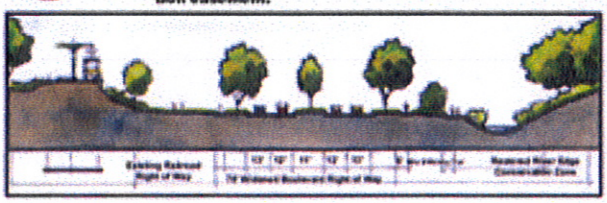
- Two twelve foot travel directions in either direction without frequent driveways (PennDOT Standards.)
- Efficient signalized intersections with dedicated left hand turn lanes.
- New development parcels.
- New service road network connecting to development and parking.
- New shared parking facilities.
- Ecologically restored creek with conservation easement.
- New walking and bicycling trails.

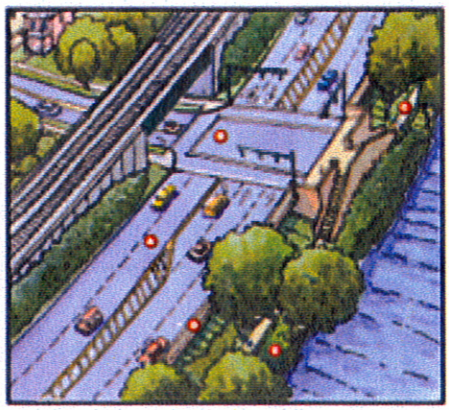




Upgraded River Edge Urban Boulevard

- Two twelve foot travel directions in either direction (PennDOT Standards.)
- Efficient signalized intersections with dedicated left hand turn lanes.
- New walking and bicycling trails along the Monogahela River.
- Cantilevered extension of existing roadway where needed to accommodate widened road.
- Ecologically restored riparian river edge with conservation easement.





A value-added approach to transportation infrastructure: Page 9 from The Citizens Plan, produced in 2002 by Citizens for Pennsylvania's Future (PennFuture). The Plan, completed by a team of multidisciplinary national and local experts, proposes an alternative to the Mon-Fayette toll road that focuses on sound urban design and place-making.

Green Urbanism

Values of environmental stewardship and public health are at the base of our urban design recommendations. This approach to the design of the ALMONO site differs from conventional decision-making approaches to urban development focused largely on the "highest-best use" principle of maximizing the economic value of land. The approach advocated here is best described as Green Urbanism.

Green Urbanism uses sustainable planning and design to retrofit existing urbanized areas and create new developments that are more compact, healthy, low energy and less wasteful. It considers ecosystems and ecological processes, proposes design that is based on full lifecycle analysis and measures performance according to social, ecological and economic indicators.

Our recommendations link key traditional urban design and planning elements, such as buildings, site layout, transportation infrastructure, public spaces and materials, with the contemporary environmental concerns of energy production, rainwater management and food production, while also considering changing cultural practices. Ranking seventh nationally in the number of buildings with Leadership in Energy and Environmental Design (LEED) certification, and with growing world-renowned institutional expertise in the area of sustainable architecture and building systems, Pittsburgh is striving to be a center of the green building industry. Green Urbanism is consistent with these motivations.

Our approach to Green Urbansim integrates four mutually supportive planning frameworks and concepts, several of which can be applied to Hazelwood and Pittsburgh retroactively:

I Leadership in Energy and Environmental Design (LEED)

II Sustainable Urban Drainage Systems

III Active Living

IV Sustainable Energy

I Leadership in Energy and Environmental Design (LEED)

The redevelopment of the ALMONO site represents the last large-scale, riverside opportunity for Pittsburgh to implement sustainable development and present a new image for Pittsburgh. We propose that the site developer pursue certification in Leadership in Energy and Environmental Design for Buildings (LEED) and for Neighborhood Development (LEED ND).

The U.S. Green Building Council's (USGBC) LEED is a third party certification program and currently the nationally accepted benchmark for the design, construction and operation of high performance green buildings. In addition to certifying homes, commercial interiors, new construction, schools, healthcare and retail buildings, the USGBC has developed criteria for sustainable neighborhood development.

The David L. Lawrence Convention Center is the first and largest Gold LEED certified convention center in the world and was the site of the 2009 G-20 Summit. Its distinctive roof, covered with a large solar array, slopes toward the Allegheny River. Photo courtesy of the David L. Lawrence Convention Center.

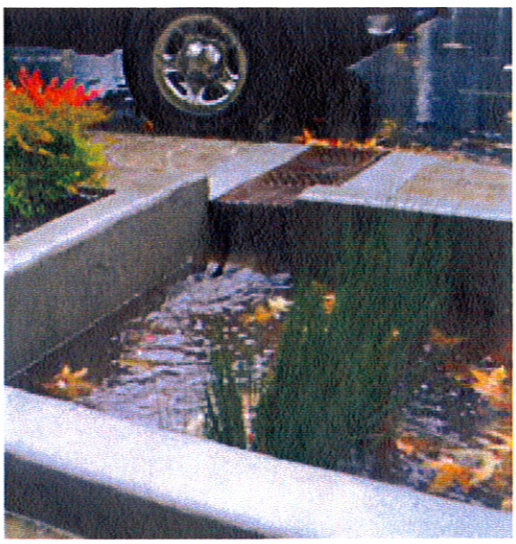
The LEED for Neighborhood Development (LEED ND) rating system was approved in October 2009 a consensus body. LEED ND was developed by the USGBC, the Congress for the New Urbanism (CNU) and the Natural Resources Defense Council (NRDC). It incorporates the Smart Growth Network's ten principles of smart growth and the charter of the CNU.

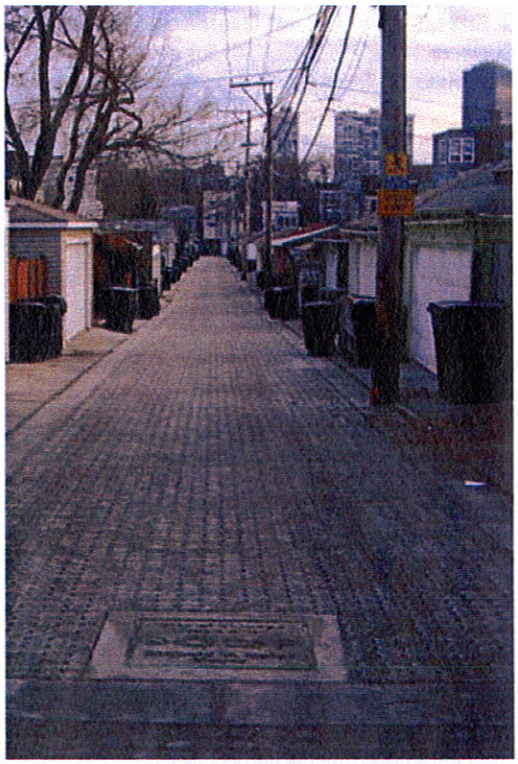
LEED ND provides the most comprehensive and integrated system of criteria for sustainable urban design available. The highest number of points possible under the pilot rating system is 110. The minimum required points for basic LEED ND certification is 40. The rating system is currently divided into three categories, each having prerequisite conditions that must be met in order to qualify for additional credits:

- Smart Location and Linkage
- Neighborhood Pattern and Design
- Green Infrastructure and Building

Due to its urban location and brownfield status, the ALMONO site redevelopment easily meets the locational prerequisites. Our recommendations for urban design are in line with the LEED ND criteria, so should the redevelopment of the ALMONO follow our strategies, it could easily obtain Gold and likely Platinum certification. The critical challenge will be improving inter-urban connections via a fixed public transportation line.

Achieving LEED ND certification for the ALMONO site redevelopment would help bolster Pittsburgh and Pennsylvania's emerging status as a national leader in LEED certified construction, and increase the marketability of the project.





Offering new aesthetic, recreational and wildlife habitat opportunities: With the goal of making Chicago the greenest city in America, Mayor Richard Daly is instituting a number of Green Urbanism measures, including replacing asphalt in alleyways with a permeable surface. Photo courtesy of the City of Chicago.

Swales integrated into public gardens in Portland's South Waterfront. Photo courtesy of Nevue Ngan Associates.

Unused right-of way space is converted into a retention strip in the SW 12th Avenue Green Street Project in Seattle. Photo courtesy of the SW 12th Avenue Green Street Project.

II Sustainable Urban Drainage Systems

Our recommendations explicitly link development patterns to the future health and recreational potential of Pittsburgh's three rivers, whose main source of pollution is urban runoff and bacterial contamination due to combined sewer overflow (CSO). As little as one-tenth of an inch of rain or melting snow can cause sewage to overflow into Pittsburgh's rivers and streams.

Currently, when stormwater pipes fill, extra stormwater flows into the nearly 4,000 miles of pipes that make up the sewage collection system through direct connections and cracked pipes, causing rainwater and sewage to mix. Untreated sewage ends up in waterways, manhole overflows and basements, while stormwater is directed to be treated at the County's ALCOSAN water treatment plant. During dry weather, about 40 percent of all flow that reaches the ALCOSAN treatment plant is due to inflow and infiltration of stormwater and groundwater into underground pipes.

Combined sewer overflows violate the federal *Clean Water Act* and as a result, the majority of municipalities in Allegheny County have been issued a consent order by the U.S. Environmental Protection Agency (EPA) to make critical repairs and develop a long-term control program, among other actions, or face fines. Estimates of the cost of rehabilitating the sewage collection and treatment system in Allegheny County total up to $3 billion. Limiting the source of overflow is generally regarded as the cheapest way to ensure quality of drinking water with the added benefit of enhancing the rivers' potential as recreational amenities.

Sustainable Urban Drainage Systems (SUDS) are an economically viable alternative to conventional underground rainwater piping systems. SUDS employ a variety of techniques to trap and hold rainwater, releasing it slowly back into the ground through a pervious surface and often cleansing it through a filtration process. The traditional approach diverts rainwater directly into area streams and rivers, leading to floods and contamination from surface pollutants.

In addition to reducing runoff, keeping pollution at its source, and aiding in the replenishment of local aquifers, SUDS offer new aesthetic, recreational and wildlife habitat opportunities. Common SUDS techniques include minimizing impervious surfaces and installing infiltration devices and landscapes, such as filter strips, swales and raingardens, or detaining and retaining water using floodplains and retention ponds. These landscape features often double as wildlife habitat and movement corridors, add visual interest along recreational trails and can be designed creatively to produce visually striking vegetal features. In the case of brownfields, the use of SUDS should take into consideration contaminated soil.

III Active Living

The Centers for Disease Control and Prevention (CDC) reports that there has been a dramatic increase in obesity in the past twenty years with serious implications for health, quality of life and the economy. Nearly 20 percent of youths aged 6 to 19 years are obese and nearly another 20 percent are overweight. It is no surprise that policy makers and individual Americans are increasingly interested in healthy living.

Planners and designers can encourage Active Living by incorporating recreational spaces, such as this dog park in Manhattan, and encouraging utilitarian cycling with a network of safe urban bike lanes and advocacy institutions like the Maison du Vélo in Montreal. Photos by Elise Gatti.

Active Living is promoted as a way of life that integrates at least 30 minutes of physical activity into a daily routine, mainly through transportation and recreation choices. Designing for an active lifestyle means creating environments that offer people the option to easily engage in physical exercise on a daily basis, whether taking public transit or riding a bicycle to school, work or other engagements, walking a dog to a dog park or visiting a neighborhood playground.

Promoting Active Living requires a multidisciplinary partnership between designers and planners, transportation engineers, public health officials, educators, recreational advocates and public safety officials. Urban planners and designers have a particular impact on people's abilities to live an active lifestyle. Current barriers to an active lifestyle that are directly linked to planning and design include dispersed land use patterns, large urban blocks, infrastructure that cannot be traversed, poor connections between streets, streets that are unfriendly to cyclists and pedestrians, and car-oriented development, such as strip malls and cul-de-sac residential neighborhoods. Other factors include real and perceived crime, and social norms.

Urban designers and planners can facilitate the active lifestyle by using zoning, road design protocols and other policy tools to ensure compact development and mixity of uses. Encouraging walking, cycling and public transportation is key to Active Living design. Convenient access to public transportation, Complete Streets that accommodate pedestrians, cyclists and transit users, as well as drivers, networks of bike lanes and paths, traffic calming measures, and universal design for accessibility are all design decisions that give people choices. Architects can furthermore incorporate bike-friendly facilities in residences and work buildings, such as safe and sheltered bike storage and showers.

Connecting residents to recreational amenities, such as parks, trails and greenways, is also important, as is maintaining a perception of safety and security in public spaces. Visual stimulation, pleasant scenery, engaging streetscapes and a culture that respects non-motorists are additional variables that encourage Active Living.

IV Sustainable Energy

The ALMONO redevelopment offers a unique opportunity to design a contemporary urban district that is powered using sustainable energy strategies at the outset. This can be achieved through energy efficient building and site design as prescribed by LEED ND standards, Connected Urban Development methods, and renewable energy generation through a district co-generation system.

Integrating multi-scalar sustainable energy strategies could help reduce the energy load of the ALMONO redevelopment by a factor of at least two compared to conventional development, provide energy security to Hazelwood and reduce carbon dioxide emissions. This would help the City of Pittsburgh meet its commitments to its Climate Action Plan, the Pittsburgh Solar Initiative and the U.S. Conference of Mayors Climate Protection agreement.

The building codes laid out in the LEED program reduce energy use by incorporating passive solar de-

Amenities for active people: Quebec City's new Promenade Samuel-De-Champlain, a redesign of a former expressway, includes bike parking, a smooth multi-purpose pathway, a pedestrian pathway and drinking fountains. Photo by Elise Gatti.

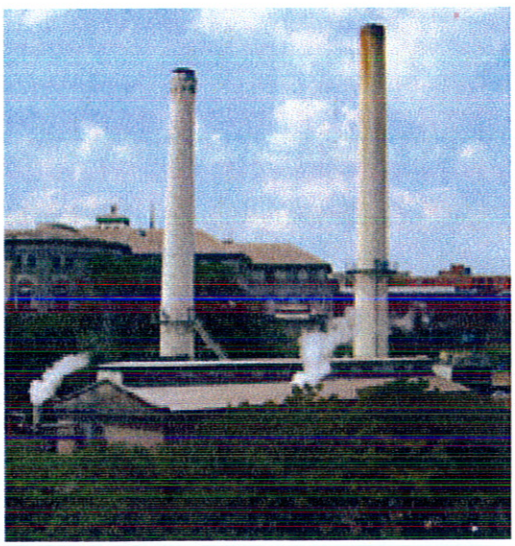
Ottawa's 5-mile long Rideau Canal becomes a "skateway" during the winter, allowing residents to commute or skate recreationally between Canada's Parliament building and Carlton University. Photo from Ottawa Tourism.

Green Urbanism

sign, thermal mass construction to moderate internal temperatures, super insulation to reduce heat loss and heat gain, natural ventilation, high performance glazing on windows, green rooftops, solar water heaters, active solar power, and by selecting efficient appliances and fixtures.

Cities produce 80 percent of the world's greenhouse gas (GHG) emissions. Connected Urban Development (CUD) employs Information and Communication Technology (ICT) to improve the efficiency of urban infrastructure and encourage telecommuting, thereby reducing GHG emissions. A growing number of cities, including San Francisco, Amsterdam, Seoul and Madrid, are implementing CUD strategies. These should be explored in the context of both Hazelwood and Pittsburgh.

The centerpiece of the ALMONO site sustainable energy plan is a district co-generation energy plant, located near the proposed renaturalized mouth of the Four Mile Run. A district energy plant captures the waste heat from the energy generation process, either to heat air, steam or water, or alternately, through the use of absorption chillers, to produce chilled water or cool air, all of which is distributed within a 2-mile radius. In doing so, a Combined Cooling, Heating and Power (CCHP) system can reach efficiency rates of up to 85 percent compared to 60 percent for the best conventional gas-fired power plants, and 33 percent for coal-fired and nuclear plants that typically transmit energy over long distances through electrical wires. Since less fuel is consumed, pollution and emissions are proportionately reduced.



"Cloud Factory": The historic Bellefield Steam Plant, located on the slope of Junction Hollow, behind the Carnegie Library of Pittsburgh, is a landmark building with rich potential for reuse as an arts facility. Photo courtesy of TheZachMorrisExperience.

A study by David Archer, Hongxi Yin and Yang Hu at Carnegie Mellon's Center for Building Performance and Diagnostics (2008) looked at alternative systems for the ALMONO redevelopment, including CCHP, a closed-loop geothermal ground source and dispersed renewable energy sources, and concluded that a CCHP co-generation plant using regionally-available natural gas, waste or renewable fuel would be the best option. They estimate that a CCHP plant would reduce the energy consumed on the ALMONO site by a factor of two as compared to conventional electrical energy production.

The authors suggest that a new Hazelwood district co-generation plant would further gain efficiency by being located beside a data center. The data center would benefit from the cooling provided by the CCHP plant's absorption chillers and, given the weaknesses inherent in large-scale electric grid systems, the data center would also benefit from a decentralized, reliable source of energy. The co-generation plant could use the waste heat delivered by the data center's servers. Such arrangements are already in practice in California, where energy production is more volatile.

Investment in data centers is an emerging niche sector of the information technology industry and is increasingly being targeted by community economic development specialists. Data centers are buildings specially designed to house computer equipment. Their specific functions vary from data storage and server farms to hosting networking equipment and software applications for large companies. Data centers have become necessary infrastructure for any community wishing to attract high-tech sector companies, offering the potential for the clustering of information technology services. Nearly all Fortune 1000 companies use data centers as well as health care providers, financial services companies, banks, telecommunications firms and Internet-based companies.

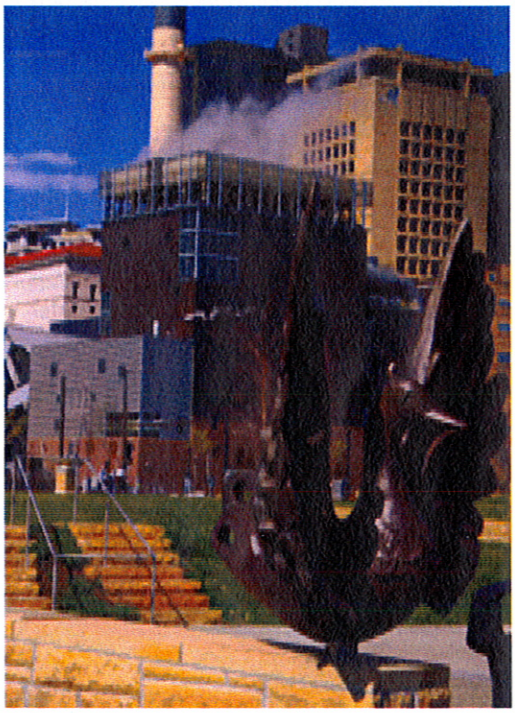
Data centers provide many benefits to a community. At the outset, they require large capital expenditures, stimulating construction jobs. In the long-term, they provide high-paying service jobs for information technologists, software developers and electrical and mechanical engineers. Data centers have very specific site requirements, which include electricity, labor availability and costs, land, utility availability and taxes, disaster risk, and site constraints.

Based on these requirements, the ALMONO site in particular is very well suited to the inclusion of a data center. It has been reported that the construction of data centers has been limited in some parts of the U.S.

because power companies could not guarantee supply. Typical electrical energy loads for data centers vary from 0.5 MW to as high as 10 MW, with the biggest energy draws being used to power and cool equipment. A constant load of about 2 MW is the equivalent of about 2,000 homes. As electricity costs and power consumption from data centers continue to rise, many data center owners and operators are looking to provide more environmentally friendly options for their customers. Recently developed "green" data centers use green-building standards and are often partially powered by renewable electricity.

A new co-generation plant in Hazelwood would free up the existing coal-fired Bellefield Boiler Plant, located behind the Carnegie Library at the top of Junction Hollow. Built in 1907, the system comprises 2.5 miles of underground steel pipes that deliver steam heat to nine different institutions, including Carnegie Mellon University, Carnegie Library of Pittsburgh, University of Pittsburgh, Phipps Conservatory and University of Pittsburgh Medical Center. The plant is run on low-sulphur Kentucky coal and natural gas, relying on rail delivery almost every day during the winter to produce steam heat. The plant is not longer used in the summer. The largest users, University of Pittsburgh and UPMC, recently pulled out of the Bellefield Boiler Plant partnership and have built a modern district energy plant in North Oakland.

At 150 feet and 200 plus feet tall, the twin smokestacks are landmarks viewable from the bike trail in Junction Hollow and Schenley Park. The Bellefield Boiler Plant was referred to by Pulitzer Prize-winning novelist Michael Chabon as "the Cloud Factory" in his 1998 book *The Mysteries of Pittsburgh*. The Bellefield Boiler Plant's central location, Romanesque Revival architectural style and interesting site context, in combination with its non-compliance with EPA emissions standards, lack of use during the summer and possible co-generation plant at the northern end of the ALMONO site, beg an inquiry into alternative, university or culture related uses for the building that take advantage of its iconic image and central location in Oakland.



The new riverfront district co-generation plant in Saint Paul, Minnesota, creates electricity and district heating hot water from urban waste wood. The building's design was improved by community input. Photo courtesy of the Saint Paul Riverfront Corporation.

Designers of the sustainable Vauban Quartier development in Freiburg-im-Breisgau took advantage of a parking garage's rooftop to install solar-panels as part of a sustainable energy plan. Photo courtesy of Forum Vauban.

Overview
Urban Form
Frameworks
Places
Legibility
Possible Development Scenario

Overview

The following section sets out the main elements of our urban design recommendations. They are organized around the basic components of urban design: Form, infrastructure, places, uses and legibility. We also provide an example of a possible development scenario based on the recommendations.

Urban Form

The urban design recommendations begin with a strategy regarding open space and built space (or voids and solids) in Hazelwood. The strategy targets intensity of use, concentrating residential development near service clusters and transportation infrastructure, opening up new recreational spaces in the process. Suggestions for block massing and building heights are also included.

Frameworks

Within this overall spatial organization strategy, a set of permeable land and water landscapes and transportation infrastructure frameworks are proposed to delineate space and provide services, extending from the river's edge and the ALMONO site to beyond the parameters of Hazelwood.

Places

These frameworks are interconnected, structural layers within which are embedded seven distinct but interconnected places:

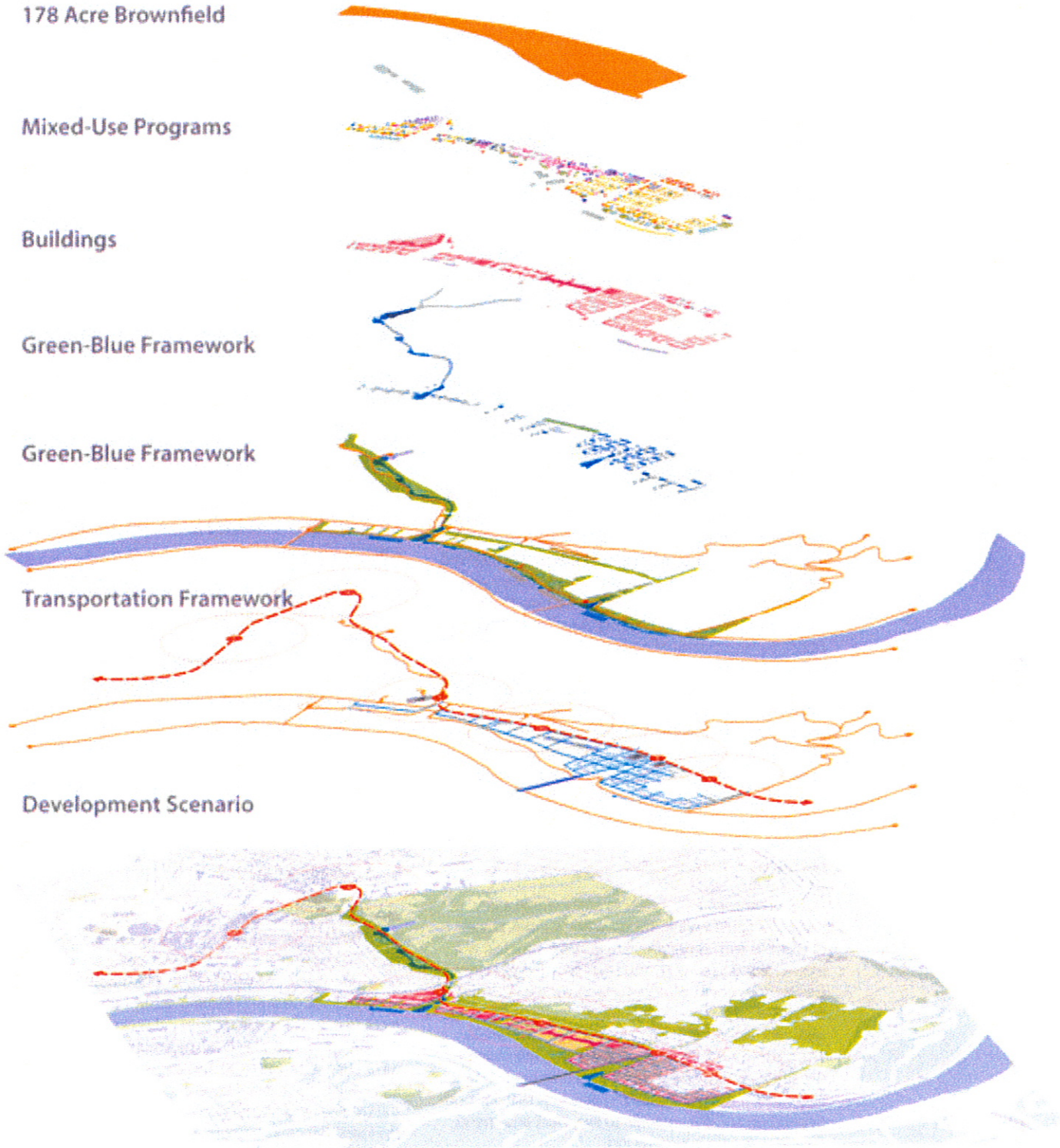
- Junction Hollow
- Four Mile Run Neighborhood
- Robot City
- Hazelwood Riverfront Park
- Hazelwood Town Center
- Hazelwood Greenway
- Riverside Neighborhood

Legibility

A final layer addresses urban legibility. Related to wayfinding, legibility asks how people perceive their environment, and particularly how they decipher meaning, such as cultural and use information, from patterns and forms in the built environment. The recommendations focus on the role of gateways, landmarks and views in creating legible places and wayfinding.

Possible Development Scenario

A possible development scenario illustrates how our recommendations might look as a final master plan. The plans are suggestive rather than prescriptive, and are not meant to replace the work of the final site designers.


178 Acre Brownfield
Mixed-Use Programs
Buildings
Green-Blue Framework
Green-Blue Framework
Transportation Framework
Development Scenario

Overview

Urban Form
- Density and Intensity
- Massing and Height

Frameworks

Places

Legibility

Possible Development Scenario

Urban Form

Density and Intensity

Underlying the urban design recommendations is a critical proposal to strategically consolidate activities and buildings by intensifying and de-densifying parts of Hazelwood over time. Pittsburgh's dramatic decrease in population in the last 50 years has left many neighborhoods, including Hazelwood, with vacant homes and empty lots, creating derelict streetscapes which further hinder investment by decreasing property values. Hazelwood in particular has some of Pittsburgh's lowest housing values in spite of a sturdy stock of brick homes and a central, riverfront location. The overall strategy to redistribute density and open space will reinforce nodes of activity, raise density to support public transit, expand the network of multi-functional green spaces and raise property values.

Spatial Redistribution

Intensification of buildings occurs along a gradient, with higher concentrations of buildings at suggested activity and transportation nodes, such as Second Avenue and Hazelwood Avenue, and where the Four Mile Run meets the Monongahela River. The hilliest and more remote sections of Hazelwood are subjected to degrees of de-densification to the benefit of an expanded greenway park system that spans the entire neighborhood and connects to adjacent Schenley Park and Frick Park.

The strategic intensification and de-densification of Hazelwood should be a primary focus of the next twenty years. Hillside streets located at the periphery of Hazelwood's urban fabric should be decommissioned over time through the acquisition of vacant properties. This will allow for the greenway to be expanded, turning what is currently a liability -- nearly vacant streets that are expensive to service -- into an asset. Development should be encouraged to happen near services and public transit, concentrating people and activities.

Landscape is a determining feature of Pittsburgh and Hazelwood. The steep hillsides and rivers provide a multitude of development opportunities. Sometimes, however, not building is the best "development" choice. In some cases, landscape restoration and naturalization is recommended to take full advantage of the topographic potential, including the mouth of the Four Mile Run, Hazelwood's hillsides and the Monongahela River riparian edge.

Hazelwood once functioned as a "city within a city". Residents could walk to shops, schools, work, places of worship and community buildings. A streetcar line existed along Second Avenue, transporting passengers to downtown. Although Hazelwood has lost the density of population and services it once had, its well-connected street grid and main streets remain. The recommendations for the ALMONO site build on the street pattern and scale of the existing urban fabric and infuse it with new uses and activities that will both depend on and draw people to live, work and spend their leisure time in Hazelwood.

In a Brookings Institute study, Pittsburgh was rated one of the nation's top walkable cities, after such notable cities as Boston, San Francisco, Denver and Portland. The study looked at three urban neighborhoods: Oakland, downtown Pittsburgh and Southside. It notes the presence of Light Rail Transit in walkable areas in each case study and suggests there is a strong potential for fixed-rail public transit to play a role in catalyzing walkable urban development in other parts of Pittsburgh. In addition to a reliable and modern transit system, recreational amenities should also be part of the strategy to attract new residents to Pittsburgh and Hazelwood. The trend toward active urban living is being led by young professionals, retirees and near-retirees enticed by the convenience of proximity, public transit, and the social interactions provided by dynamic, lively streets and mix of uses in cities.

We recommend varying density profiles according to desired levels of activity, building up mass around the business district, LRT stops and public amenities. A minimum density of units is required in order to economically justify greater investment in public transit. In order to meet the current LEED ND prerequisites, any residential development must be built at an average density of 7 or more dwelling units per acre of buildable land available for residential uses. In addition, if the project is serviced by a transit agency which has specified minimum service densities that are greater than the densities required by this prerequisite, the project must meet the transit agency's minimum service densities instead.

At gross population density levels of between 2,000 and 8,000 persons per square mile, the average person makes about a quarter of their trips daily on foot and bicycle. At gross population densities of over 50,000, non-motorized travel increases sharply, reaching about 1 trips a day, more than by car. A minimum of 7 dwelling units per net acre (the current LEED ND minimum) are needed to run a bus line and 15 to 20 dwelling units per net acre for trolley and streetcar. However higher densities near the LRT line would be preferable in order to maximize the investment and support the local business district. We recommend a minimum of 30 dwelling units per net acre within 400 feet of a LRT station in Hazelwood.

Key:
Figure-Ground
Existing Buildings
New Buildings
Green Framework

Overview

Urban Form
- Density and Intensity
- Massing and Height

Frameworks

Places

Legibility

Possible Development Scenario

Height and Massing

The recommendations for height and massing at the block level are the result of complex urban design and real estate market considerations, including:
- the relationship between buildings and the surrounding landscape features, including the Four Mile Run, hillside and Monongahela River
- reinforcement of the existing and desired character of each district
- respect for the modestly-scaled historic building, block and street patterns of the existing Hazelwood community, including setbacks
- transitioning heights between districts
- consideration of views of the sky, landmarks and landscape features
- sunlight penetration to the street and building
- comfort of the pedestrian experience at street level

The recommendations propose general categories of development envelopes at the scale of the block for which more specific urban design guidelines may be developed. These development envelopes incorporate massing, heights and setbacks at the block level.

Low-Rise Development Envelope (up to 40')

These are suggested for the residential development adjacent to the existing Riverside community. New townhouses and semi-detached houses of up to 3.5 stories should follow existing setbacks of between 5 and 15 feet. The height-to-width enclosure ratios for streets with low-rise development should be between 1:1 and 1:3, ensuring that there is adequate daylight.

Mid-Rise Development Envelope (60' to 80')

Mid-rise development is suggested for the Hazelwood Town Center perimeter of the Hazelwood Riverfront Park and around the reconstructed estuary basin of the Four Mile Run. Here, buildings stand 5 to 8 storeys high and the height-to-width ratio is 1:1.5 to 1:3. The fourth to eighth storeys could be stepped back from the street so as to avoid a "looming effect" while allowing for apartment terraces.

High-Rise Development Envelope (80' +)

We recommend that high-rise buildings of 8 stories or more be incorporated into the Four Mile Run Transit Oriented Development (TOD). As with mid-rise buildings, emphasizing the first four floors from the ground up and keeping the ground floor animated with public uses will help anchor the building to the street and create more ground-level appeal.

Additional considerations when designing blocks include shaping blocks so that they frame public spaces in interesting and legible ways, keeping blocks smaller allowing for better pedestrian mobility, orienting building entrances to face the public realm, placing buildings along the perimeter of the block, and keeping parking and garages located behind buildings and in alleyways.

The award-winning 3-storey Archer Courts townhouses were built surrounding a rehabilitated public housing complex in Chicago's Chinatown neighborhood. All 43 units are fully accessible and one quarter were designated for low-income and public housing. Photo by Payton Chung.

Low-rise development proposal by Levine + Russell, Urban Laboratory - Hazelwood Studio, 2007.

The 14-storey Terrazzo mixed-use condominium tower in Nashville, TN makes a strong corner statement and is LEED-certified (silver). Photo courtesy Crosland LLC.

The 6-storey Greenbelt infill home in Brooklyn, NY uses 40 percent less energy and 30 percent less water than a comparable building. This type can easily be converted into a multi-unit building. Photo courtesy of Brownstoner.com.

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Green-Blue Framework

The Green-Blue Framework is a multi-purpose network of open, permeable ground and water features that includes water management landscapes, transportation infrastructure, food and other natural product generating landscapes, cultural and recreational spaces, and wildlife habitat and biodiversity corridors. It takes into account Pittsburgh's unique natural assets, particularly its outstanding topography, and through specific interventions turns these into cultural and economic activators for Hazelwood's redevelopment.

The framework is made up of three "meta" landscapes, each which in turn contains a wide variety of smaller landscapes, some of which overlap and can be expanded to city and region wide networks. These landscapes are interconnected, allowing water, wildlife and people to circulate throughout the neighborhood and potentially into surrounding neighborhoods.

The four landscapes are:

I Green Infrastructure

II Parks and Recreational Spaces

III Productive Landscapes

Overlooking Hazelwood, the Hazelwood Greenway provides a continuous swath of open space and, ultimately, a hiking, mountain biking and biodiversity corridor between Schenley Park and Frick park.

Four open green wedges connect the Hazelwood Greenway to the Hazelwood Riverfront Park and the Monongahela River riparian corridor:
- Junction Hollow and Four Mile Run linear park
- Robot City B&O Roundhouse park
- Hazelwood Avenue green promenade
- Melancthon Street edge and community gardens

The Ethel M. Botanical Cactus Garden in Las Vegas recycles 100 percent of the its wastewater without the use of any chemicals using Living Machines. The water is recycled for use in providing water for the gardens. Photo by Stan Shebs.

I Green Infrastructure

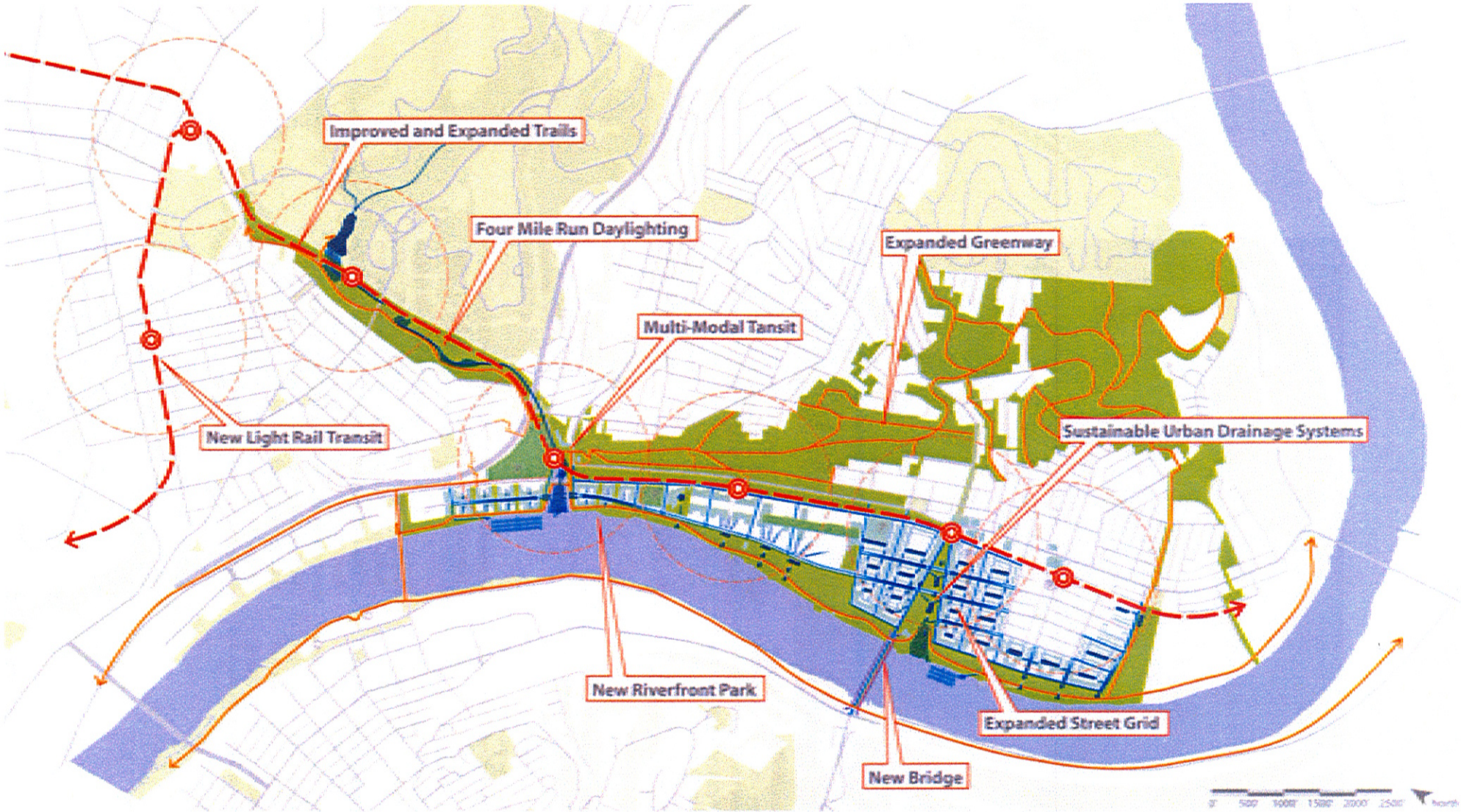
Green infrastructure is the interconnected network of landscapes and systems that sustain human life by supporting natural ecosystem values and functions that have traditionally been disrupted and displaced by urban development, with negative results for human health and sustainability.

Green infrastructure landscapes vary in size and form, from waterways, forests, wilderness areas, fringe green spaces and recreational fields, to highly engineered forms, such as streets with biofiltration systems, pervious parking lots and green rooftops. Together, they form overlapping networks or systems that span all spectra of development, hydrological scales and ecosystems.

Green infrastructure integrates a number of design strategies and techniques to manage water and flooding, and to accommodate biodiversity and energy flows, including power supply, food supply, and waste disposal. It also provides corridors for movement, can be integrated into public space and offers an opportunity to create unique aesthetic markers.

Green infrastructure complements "grey" infrastructure -- the modern pipes, pavement and mechanical systems that help move water, sewage and energy, and serve as a surface for transportation. It does so primarily by diverting rain water that would otherwise flow into already overloaded municipal combined overflow sewer systems (CSOs), helping to alleviate costly flooding and improve water quality. However green infrastructure can also be used to treat sewage safely using beneficial microorganisms through the recreation of wetland ecologies as demonstrated by Living Machines.

Several urban design approaches to natural stormwater management have been developed and are in practice, including Low Impact Development (LID), Best Management Practices (BMPs) and Sustainable Urban Drainage Systems (SUDS). These include techniques for the collection, retention, dispersal, filtering and reuse of rainwater across different scales, from the parcel to the neighborhood.


Improved and Expanded Trails
Four Mile Run Daylighting
Expanded Greenway
Multi-Modal Tansit
New Light Rail Transit
Sustainable Urban Drainage Systems
New Riverfront Park
Expanded Street Grid
New Bridge
0' 500' 1000' 1500' 2000' 2500'
North
Key:
Green-Blue Framework
Stormwater Collection
Stormwater Conveyance
Boulevard Swales
Treatment Wetlands
Major Green Roof Collection
Daylit Four Mile Run
Permeable Ground
Transportation Framework
New Roads
New Boulevards
New Alleys
Multi-Use Trails
Stairs
Structured Public Parking
Existing Buildings
New Buildings
Marine & Water Taxi
Boat Launch
New Light Rail Line
Transit Station
5 Minute walk from station
(1/4 mile radius)

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It typically costs less to install and maintain landscape-based stormwater management systems than hard infrastructure, and the benefits extend beyond costs savings. Green infrastructure provides "free" services, such as flood control, filtration of air- and water-borne pollutants, and support of biodiversity, while having the additional benefits of being available for other uses, such as recreation and transportation. In some cases, green infrastructure can be used to partially or entirely replace grey infrastructure.

Types of urban green infrastructure landscapes and elements that can be incorporated into Hazelwood include:
- greenways
- raingardens
- wetlands (restored)
- forests and woodlands
- trees
- green roofs and walls
- swales
- porous pavement
- native landscapes

These can be integrated to varying degrees into any type of land use or development type, including parks, commercial streets, industrial zones, infrastructure, campuses, parking lots and individual building sites. Buildings can accommodate green infrastructure landscapes on their rooftops, in their courtyards and gardens, and even on their walls, or within their buildings depending on the climate. Marginal type spaces such as vacant lots, alleys, roadside and rail right-of-ways can also become part of the green infrastructure network.

At the neighborhood level, gardens, plazas, rooftops, and even parking lots can become amenities and provide visual interest while performing stormwater quality functions and reinforcing urban design goals for the neighborhood and community. There are many examples of multi-use projects that are designed around stormwater management landform features. These water cleansing projects render the hydrological process visible to the public and serve an educational purpose as well as meeting ecological and fiscal goals.

There have been no deliberate attempts to create green infrastructure in Hazelwood. There are, however, several existing landscapes that perform green infrastructure functions, particularly in Junction Hollow and the hillside. The ALMONO site, mostly vacant, provides a blank canvass onto which green infrastructure can be drawn in conjunction with the transportation framework and other programmatic goals.

Wetlands and river estuaries provide many "free" services, such as water cleansing, flood protection and wildlife habitat. This image from Michael Van Valkenburgh Associates' (MVVA) winning renaturalization proposal for Toronto's Don River estuary.

Unique aesthetic markers: Elevated Wetlands, by artist Noel Harding, is a functional ecological art installation along the Don River in Toronto. Water polluted from urban runoff is pumped through the large sculptures using solar energy and cleansed naturally by bacteria in a mini-wetland environment before being returned back to the Don River. Photo courtesy of City of Toronto Archives.

The grass-covered T3 tram line in Paris acts as "connective tissue", structuring space and connecting points while allowing rainwater to permeate into the soil. Photo by Michael Stavy.

A central courtyard stormwater garden with sinewy swale in Russellville Commons, a multi-family assisted living facility for Alzheimer patients in Portland, OR. Photo courtesy GreenWorks design firm.

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Green infrastructure has a dual role to play in the urban design process, first as a space-structuring agent and, second, as connective tissue. Rather than work in opposition to development, green infrastructure is an opportunity to incorporate open land conservation and other ecological values into a development concept. In Hazelwood, green infrastructure can be used to drive the overall design and character of the development. As the main space-structuring element of the urban design recommendations, this network of open green landscapes fundamentally shapes the redevelopment and frames the different districts, acting as a both a buffer and a connector between areas while providing additional venues for public spaces.

Traditional grey infrastructure must be considered at the different scales of urban development: Region, district, neighborhood, street and building site. Green infrastructure relies mostly on landscape forms to handle rainwater and provide wildlife habitat, so it must additionally be conceived of at different hydrological scales -- region, river basin, watershed and drainage area -- as well as units of ecology.

All of the green infrastructure interventions proposed for the ALMONO site and Hazelwood contribute to the stabilization of local hydrology while providing wildlife habitat, biodiversity corridors, recreational environments and passages for walking and cycling.

The main green infrastructure interventions are:

- **Four Mile Run Daylighting and Renaturalization**

The Four Mile Run daylighting and estuary naturalization project is the most ambitious and visually striking landscape gesture in the recommendations. If achieved, it will be the first stream reclamation project within the city limits that extends all the way to one of Pittsburgh's three rivers and includes significant public access.

- **Expanded Greenway**

The existing hillside greenway could be expanded and enriched with new programmatic features, including additional trails, recreational amenities, viewing platforms, as well as measures to support wildlife biodiversity through habitat creation and protection, and planting of appropriate non-invasive, indigenous edible plants.

- **Urban Stormwater Capture & Cleansing System**

The proposed urban stormwater capture and cleansing system directs surface rainwater from Hazelwood's streets and hard surfaces into collection areas, boulevard swales, perched wetlands and treatment wetlands.

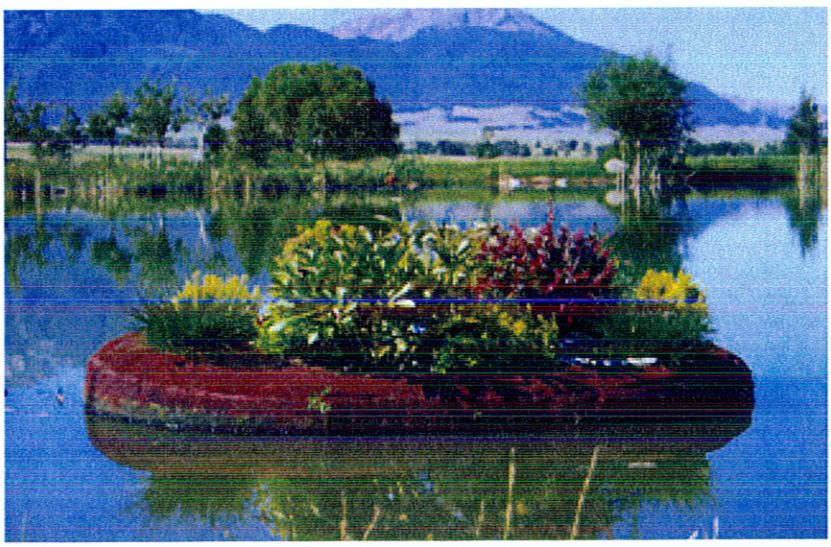
- **Site-Specific Gestures**

Green infrastructure includes highly engineered and designed site-specific gestures, such as green rooftops and walls, rain barrels and rain gardens, permeable asphalt and urban street trees. These can be integrated into the ALMONO site development and adapted into the existing Hazelwood community.

- **Functional Urban Ecological Art**

Pittsburgh artists and arts programs should be invited to participate in creating art that serves an ecological

BioHaven Floating Islands can be planted ornamentally or to simulate natural wildlife habitat for waterfowl. The root system creates fish habitat while filtering the water. Photos courtesy Floating Island International.



function, such as filtering water, remediating soil or providing wildlife habitat, even if only in a token way.

In order to successfully design green infrastructure into the ALMONO site redevelopment, it is important to include a civil engineer, landscape architect, ecologist and urban designer with experience in LID, BMPs and SUDS and issues of biodiversity in the design team at the outset of the site design process. These professionals will be able to discern between ecologically significant and developable lands, and best determine the green infrastructure strategies and techniques most effective in each context.

II Parks and Recreational Spaces

Parks and recreational spaces are the most diverse landscape in the Green Framework. These public spaces provide a multitude of recreational opportunities to residents while providing a contrast from Hazelwood's built environment.

Green recreational spaces not only contribute the environmental values of green infrastructure but have also been shown to increase property values. Many studies have concluded that urban parks, greenways and even street trees have a positive effect on property values, particularly residential values.

Embracing the seasons: Images from Michael Van Valkenburgh Associates' (MVVA) winning renaturalization proposal for Toronto's Don River.

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A 2004 survey of studies measuring the economic impact of green space by Michigan State University found that proximity, typically a half mile or less, to an urban park or greenway can increase housing values by up to 20 percent. The International Society of Arboriculture estimates that curb appeal due to street trees increases real estate values by 5 to 20 percent. City-wide, the neighborhoods located between Pittsburgh's largest urban forests, Schenley Park and Frick Park (Squirrel Hill, Point Breeze, Shadyside, Regent Square) have the highest property values as well as an abundance of mature trees. Hazelwood's property values are among the lowest in Pittsburgh. However the highest values within the neighborhood are found near the forested hillside.

Types of parks and recreational spaces that can be integrated into Hazelwood include:
- community parks
- conservancy lands
- playfields
- neighborhood park or playgrounds
- school grounds
- parklet or pocket parks
- linear parks
- dog parks
- themed parks (meditative, commemorative, etc.)

Possible active and passive recreational amenities and infrastructure can include:
- year-round items like play structures and a dog park
- seasonal areas like sports fields and courts (soccer, basketball, tennis, etc.), rock climbing wall, fishing docks, gardens and kayak/canoe launch
- multi-use infrastructure, like a wading pool that becomes an ice rink
- linear paths that can be used for walking, cycling or cross-country skiing, depending on the season

Hazelwood residents have access to ten nearby parks and recreational facilities. These are mainly small playgrounds, in various states of repair, and are distributed throughout Hazelwood. There is also a community sitting garden and gazebo on Second Avenue, baseball fields in Riverside and the Carnegie Library of Pittsburgh and YMCA. The latter both have small indoor meeting spaces but since the closure of Gladstone Middle School in 2001 and Burgwin Elementary School in 2005, Hazelwood residents have not had access to a large indoor recreational facility. Schenley Park and several soccer fields in Junction Hollow are within a mile of Hazelwood, as are a park with outdoor basketball courts and a playground in The Run but these cannot be safely accessed by children on foot or bike.

The proposed parks and recreational interventions will create two new major greenspaces, the Hazelwood Greenway and Hazelwood Riverfront Park, and improve connections to Schenley Park via a direct transportation link through Junction Hollow.

The recommendations for parks and recreational spaces focus on five major types of greenspaces:

- **Hazelwood Greenway**

The expanded, forested Hazelwood Greenway will provide a four-season recreational zone for residents and visitors. Once fully expanded, it will provide ample space for hiking and mountain biking trails, legible access points, viewing platforms and opportunities for observing wildlife in a forest environment.

- **Hazelwood Riverfront Park**

The 90-acre linear Hazelwood Riverfront Park extends from one end of Hazelwood to the other, creating a public space that allows direct contact between residents and the Monongahela River. It is programmed for a variety of recreational activities, from sports to nature appreciation, cycling, walking, boating and swimming.

- **Junction Hollow**

The recommendations support existing plans to add recreational amenities to Junction Hollow by the Pittsburgh Parks Conservancy (PPC) and Carnegie Mellon University. The PPC plans to return Panther Hollow Lake to public use with the addition of a boat house while Carnegie Mellon hopes to add new soccer fields, available to the public when not in use by the university and its local partners. Night-lighting the bike trail will make it safer for use during the shorter winter days by both winter cyclists, pedestrians and cross-country skiers while the proposed LRT line will create more access to these amenities and to Schenley Park.

- **Green Wedges**

The Green Framework's wedges are open, structured and semi-structured park spaces that connect the Hazelwood Riverfront Park to Junction Hollow and the Hazelwood Greenway at four deliberate intervals. These green spaces contain recreational amenities as well as important elements of the site's urban stormwater capture and cleansing system.

- **Urban Parks and Gardens**

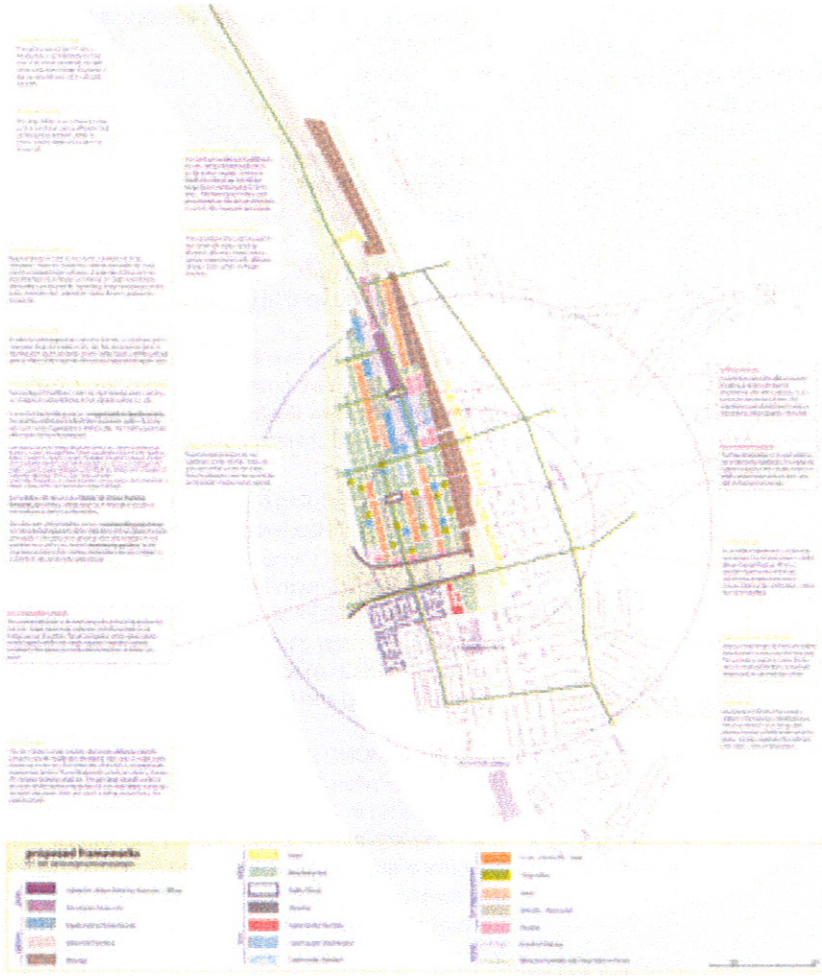
Edible and ornamental gardens, playgrounds and pocket parks should be distributed throughout the ALMONO site and in Hazelwood on a block by block basis.

III Productive Landscapes

Productive landscapes are green spaces that produce goods and services associated with a set of social, economic and ecological functions. These environments support the practice of urban agriculture, market and non-market based production of food, fuel and timber products in urban areas. Productive landscapes include private gardens, community gardens, energy gardens, small farms, orchards/agro-forests, forests/tree farms, greenhouses, roof gardens and green roofs.

In cities around the world, productive landscapes are prevalent as recreational or entrepreneurial pursuits. They are often ad hoc, taking place on marginalized land in cities. Efforts to integrate productive landscapes into neighborhoods have begun to be explored by landscape architects, architects, planners and urban designers. The ALMONO site provides a prime opportunity to use productive landscapes to enhance the social, economic and environmental sustainability of Hazelwood and the Pittsburgh region.

Gardens, farms and ecological landscapes have always existed in some form in cities. Recently, scholars have focused on how these spaces address critical issues affecting society today -- namely the broad impacts of the global food system, the global energy market and the conditions of cities. Shifting consumption patterns and localizing production of food, fuel and timber are ways to address these issues while creating new opportunities for community engagement, economic development and ecological restoration.



Framework proposal for productive landscapes on the ALMONO site by Horton + Wu, Urban Laboratory - Hazelwood Studio, 2007.

Evergreen Brickworks Greenhouse Complex in Toronto is an adaptive re-use of the old Don Valley Brick Works. Courtesy Evergreen Brickworks.

A wide range of possible productive landscape typologies exist, including:
- private gardens
- community gardens
- small farms
- energy gardens/energy crops
- orchards/agro-forests
- forests/tree farms
- greenhouses
- green roofs and walls
- roof gardens and vertical gardens

These spaces and the overall practices of food, fuel and forest production have grown widely in cities. Designers are exploring how these productive landscapes inform the use and character of the public realm.

While there is no existing comprehensive productive landscape plan for Hazelwood, several initiatives are currently underway. Carnegie Mellon's Field Robotics Center (FRC) and Growth Through Energy and Community Health (GTECH) Strategies, a social enterprise, have planted energy gardens on construction fill near Building 19. GTECH mobilizes vacant lands for biofuel crops while hiring and training local youth.

Using the ALMONO site for research and development, GTECH piloted a strategy in 2007 and planted an energy field in 2008. These plots, containing six acres of switch grass and two acres of sunflowers, performed soil remediation, drawing contaminants up into the plant bodies through their roots. The biofuel feedstock was subsequently cultivated and tested for biofuel yield. The sunflower seeds were packaged and sold at local markets. Over 500 hundred poplars have also been planted on the ALMONO site, as a tool for both soil remediation and a source of biofuel. The FRC has additionally been using the ALMONO site to test agricultural robots.

Hazelwood Harvest is a community-based organization pursuing urban agriculture and promoting composting in Hazelwood. It is cross-generational, linking youth to the land. After settlers arrived to Hazelwood in the late 1750s, fruit orchards were planted. Today, Hazelwood Harvest has planted vegetable gardens and recently added honeybee hives. They are also taking advantage of a city ordinance that permits a small number of chickens to be kept on private residential property.

Given the space needs of the programmatic recommendations, large-scale land-based productive landscapes will not be feasible on this site. Smaller productive landscapes can, however, be integrated into the Green Framework and Robot City. Productive landscapes that are not land-based, such as green rooftops and vertical gardens, can be included throughout the ALMONO site and in the existing parts of Hazelwood, through retrofitting projects.

Students in the Fall 2007 Urban Laboratory's Hazelwood Studio explored ways that selected productive landscapes can be paired with building and public space programming for the ALMONO site. Proposals included:
- research facilities with tree farming spaces
- aquaculture production facilities with new housing

Productive landscapes for ALMONO site are a possible interim use. Rendering by Horton + Wu, Urban Laboratory - Hazelwood Studio, 2007.

developments and public space
- expansive areas of container gardens with designated public plazas
- continuous farm landscapes with community businesses and a research center
- phytoremediation strategies and their associated social and economic functions (namely the planting of energy gardens) were proposed as productive interim uses of the site

We recommend the following classes of productive landscapes for Hazelwood:

- **Energy Gardens**

As a pre-development site remediation and economic development strategy, energy gardens provide productive use of property prior to development. They can be used as opportunities for community development through planting of energy gardens and can create additional sources for local bio-fuel production.

In the interim, GTECH feels that there is a good time horizon for research and development as a placeholder for future development on the ALMONO site. However the uncertainty over the future of the site is hindering research at the moment. Hazelwood's community-based agriculture group, Hazelwood Harvest, as well as experts in local agriculture from the region, such as Grow Pittsburgh, should be included in these efforts.

Portions of the site remain heavily contaminated with VOC, sulfur dioxide, oils, ammonium sulfide, naphthalene, oils, and ammonium sulfide. Productive landscape typologies such as energy gardens and willow tree plantings alone may not be sufficient in remediating these areas. Site analysis should be conducted prior to development to determine feasible areas for planting, particularly for food crops. If food production is a goal, greenhouses and container planting can be used on sites that are too contaminated.

- **Green Roofs, Roof Gardens and Green Walls**

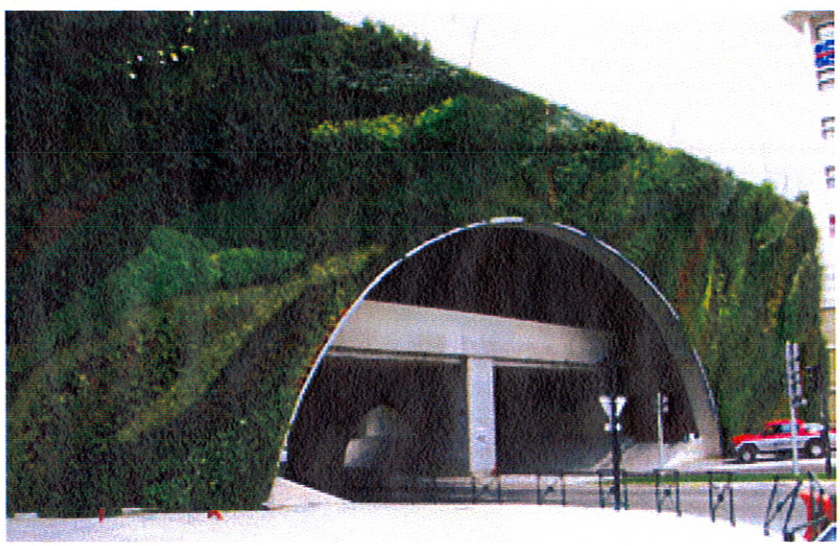
As an integral building design component, green roofs and green walls have many benefits, including providing a landscape solution adaptable to any building type or infrastructure, creating opportunities to earn up to fifteen LEED New Construction Credits, saving energy costs, lessening the need for thermal insulation, reducing stormwater/wastewater charges, providing wildlife habitat and minimizing the heat island effect.

Roof gardens and vertical gardens can additionally be a source of local produce, offer an accessible means of gardening for any building type, provide an extra

Container gardening: A resident tends to his garden at Curran House in San Francisco. Photo by Marion Brenner.

Rooftop garden at the University of North Carolina. Photo courtesy the UNC Gazette.

Vertical gardens have many applications, from building to infrastructure. Max Juvénal Bridge in Aix-en-Provence, France. Photo courtesy the designer, Patrick Blanc.



function to fencing and infrastructure, and provide opportunities to integrate food-producing gardens with green roofs or as container gardens and planters.

Key considerations for green roofs and walls include limitations on public access for some types of green roofs (intensive) and increased maintenance requirements for intensive green roofs (extensive green roofs are fairly self-maintaining). Key considerations for roof gardens and vertical gardens include identifying stewards to manage and maintain gardens, locating gardens to be accessible to stewards, once they are identified.

- **Private Gardens, Community Gardens, Small Farms and Orchards**

Private gardens, community gardens, small farms and orchards can be key components of residential development. The benefits of these types of productive landscapes include the creation of diverse fresh food outlets in Hazelwood, the enhancement of social and economic value of residential areas through new spaces for individual and communal food production, the reinforcement of sustainable lifestyles and creation of opportunities for self-subsistence and community engagement, and the generation of revenue for entrepreneurs or community organizations (in the case of farms).

Planning small farms, community gardens and orchards requires determining whether sites may be subject to future development pressure prior to implementation. Gardens can, however, be designed and planned as permanent landscapes by locating them within residential complexes and among areas with orchards or woody trees. Successful projects require stewards to maintain gardens on a seasonal basis and these should be identified during the planning phase. Certain projects, such as orchards, may require increased maintenance and start-up costs. Local resources for technical assistance, such as the aforementioned non-profit urban agricultural organization Grow Pittsburgh should be included in the planning process.

- **Orchards and Forests**

Pittsburgh has several urban forest parks. We recommend that orchards and forests be integrated into new park developments, such as in the Hazelwood Greenway. Orchards and forests are valuable on several levels. They can be sustainable sources of fruits, nuts, and timber, permanent productive landscapes on marginalized urban lands, and can create opportunities for social programming that engages residents and visitors.

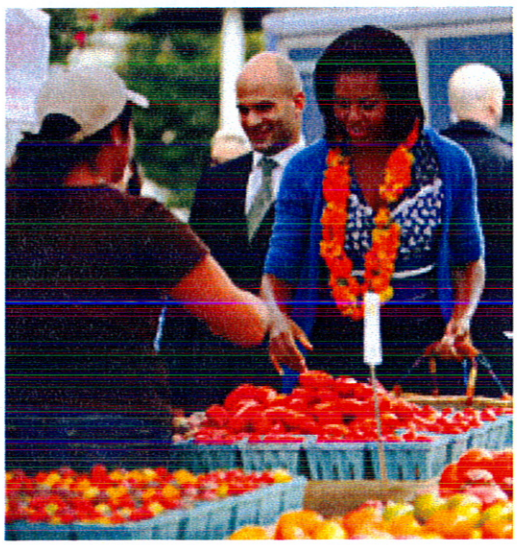
Key considerations in the planning of orchards and forests include finding spaces that are less prone to development pressures, and the consideration of greater costs, maintenance requirements and externalities, for example bees, associated with some types of fruit trees and woody plants.

- **Research-Driven Productive Landscapes**

The presence of Robot City signifies an opportunity to incorporate a research orchard and other agricultural landscapes. This unique situation creates opportunities to enhance the social and physical connections between the Robotics Institute and Hazelwood residents

New cultural practices: Urban farming is booming in the Pittsburgh region. Young Hazelwood residents learn the art of urban beekeeping courtesy of Burgh Bees.

First Lady Michelle Obama shops at a new FRESHFARM Market by the White House in Washington, DC. The U.S. Food and Nutrition Service recently changed its rules to allow Food Stamp (SNAP) and Special Supplemental Nutrition Program for Women, Infants, and Children (WIC Program) users to spend their subsidy at farmers' markets. Photo by AP photographer Manuel Balce Ceneta.



while providing potential for university-community-industry partnerships and the local distribution and sale of fruits. Research-driven productive landscapes in Hazelwood can help further innovation in robotics as well as public space design.

It will be important to determine testing methods and post-research uses of orchard products prior to implementation. Orchards should be located so as to maximize accessibility and exposure to surrounding areas while considering the privacy and security needs of Robot City.

- **Fruit Trees and Shrubs**

Streets and public plazas can be enhanced with fruit trees and shrubs. The benefits of this include providing a means for smaller interventions of productive landscapes throughout Hazelwood, enhancing social and economic value of the public realm by planting fruit and nut bearing plants and shrubs along streets, public plazas and greenway, and opportunities for social programming through managing and distributing the products of fruit trees and shrubs.

Key considerations in integrating fruit trees and shrubs into Hazelwood include locating appropriate sites through site analysis and determining the management structure and participating organizations for associated programs.

- **Urban Farming as a Business and Community Institution**

With its abundance of abandoned land, Pittsburgh and nearby Braddock have become a locus of urban agricultural activity, linking entrepreneurship with community rebuilding.

Farming as a business has several additional benefits, including the provision of a consistent source of fresh local food while creating new business opportunities for residents and community organizations. This aspect is important since many dis-invested communities do not have a grocery store or a reliable source of fresh and healthy food choices. Farming also reclaims underutilized property while creating green job development.

Urban farming for profit requires extensive business planning, market analysis and site analysis, as well as effective business and crop management in order to generate consistent revenue. The design of farms should consider methods to minimize vandalism and theft.

The urban farm as part of a new community institution can provide opportunities to reuse buildings and land for comprehensive farm business development in Hazelwood. It can become a community center that may support farming, gardening and educational needs of local residents and community organizations through on-site commercial farms, classrooms, and meeting spaces.

The Gladstone Middle School building, with its adjacent land, could possibly be converted into a community urban farm complex. Key considerations are determining the appropriate properties to develop as a food-based community complex and identifying tenants and managing organizations.

A Remaking Cities Institute white paper detailing these aspects of productive landscapes along with case studies is available (Renee Roy, 2008).

Fallen Fruit, an activist art project, maps public fruit -- fruit that is on or overhanging public spaces like parks, sidewalks, streets or parking lots -- found in cities around the world. Graphic courtesy of Fallen Fruit.

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Transportation Framework

Transportation is a basic enabler of economic and cultural activities. Hazelwood's redevelopment presents the City of Pittsburgh with an opportunity to add value to the significant investments being made by foundations and the private sector by skillfully investing public dollars in strategic transportation infrastructure early on in the process.

The goal of the Transportation Framework is to move people and goods, not simply to move cars. We recommend adopting a comprehensive transportation planning approach, also called multi-modal transportation planning, which considers various modes of transportation, including walking, wheelchairs, cycling, automobiles and trucks, and public transit. Importantly, this approach emphasizes the connections between these modes so that each can reach its potential in the overall mobility system.

The post-war American transportation paradigm that has privileged the car above other modes of transportation and likely contributed to the nation's obesity epidemic and dependence on foreign oil is gradually being replaced by a more balanced approach that prioritizes mass transportation, cycling and walking. A comprehensive transportation framework will encourage multi-modality and emphasize the links between transportation, land use and development.

The infrastructure associated with transportation has repercussions on the health of the environment, public funds, public health and social justice, not to mention impacts on the landscape. In a given urbanized region, not only do people get around in cars, trains, buses and on bikes and foot, but goods are moved in and out via networks of rail, highways, rivers and roads. In between these networks are the places where people live, work, consume and play.

Our recommendations consider the question of mobility at all scales, from regional connections to the residential street. The main recommendations center on a fixed-rail transit line, from Hazelwood to Oakland via Junction Hollow, and on Complete Streets, defined as streets which are safe and inclusive for all users. However these proposals are part of a series of nested networks of mobility and connection points to larger systems, for both people and goods movement, that are tied to the neighborhood's districts and land uses.

The proposed Transportation Framework for Hazelwood enhances access to and circulation within Hazelwood, and along with the Green-Blue Framework, helps to structure the entire redevelopment's program.

The framework's main elements are:

I Light Rail Transit

II Multi-Modal Infrastructure

III Hazelwood Street Grid Expansion and Complete Streets

IV Parking Management Strategy and Car-Sharing

V Bicycling Infrastructure

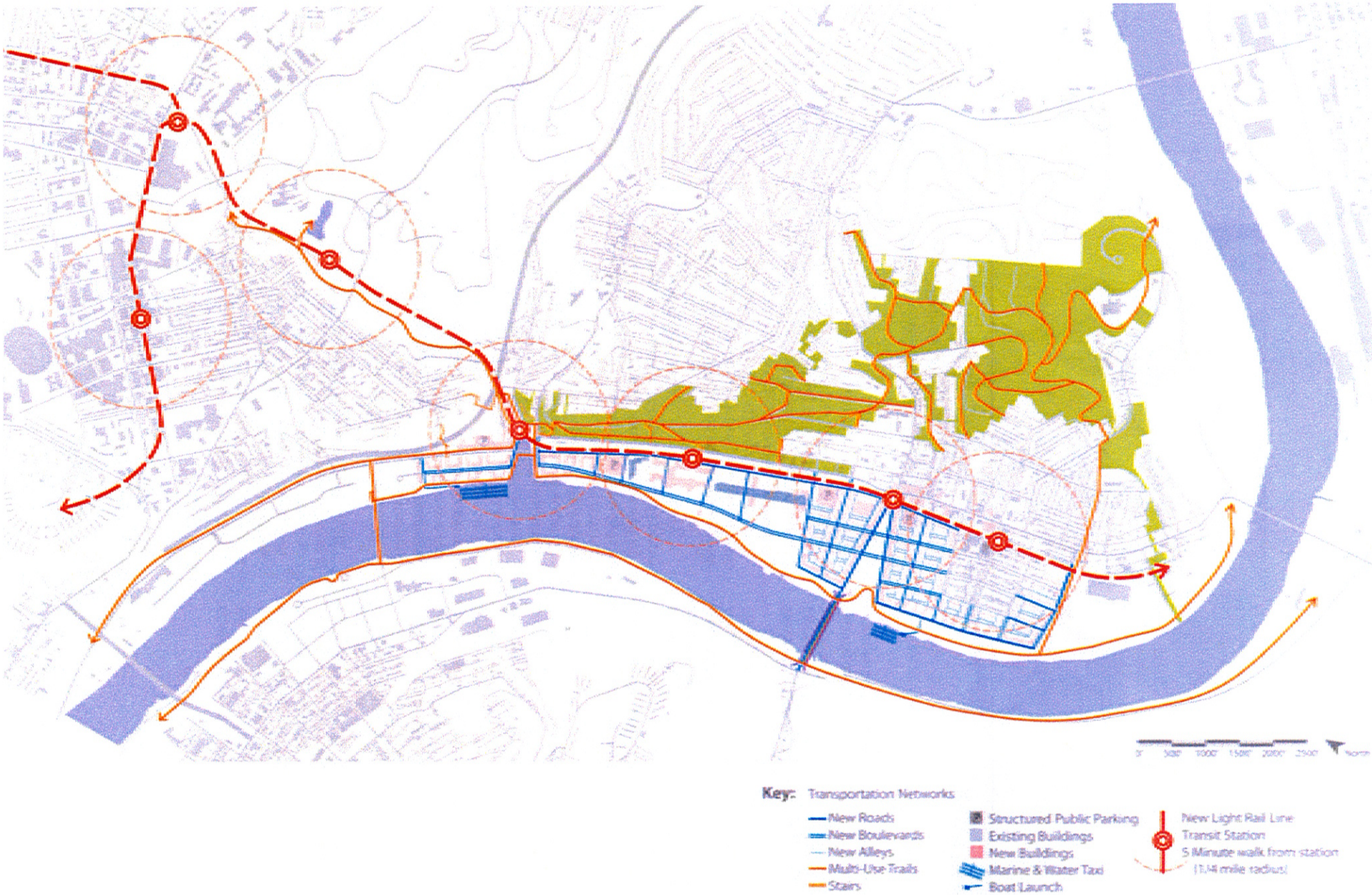
VI Water-based Transportation for People and Goods

I Light Rail Transit

Transportation choice is intrinsically linked to urban design, and Americans are rediscovering the benefits of living in compact cities and towns. The advantages include shorter commuting times, lower transportation costs, easy access to services and amenities, a more active lifestyle, connection to history through older buildings, institutions and public spaces, and increased sociability.

Studies show that middle and upper-middle class empty nesters, young adults and immigrants prefer urban housing, and all three groups are growing rapidly and are the key demographic cohorts that Pittsburgh currently has difficulty attracting and retaining. Businesses are also looking for opportunities in cities, choosing their location based on connectivity, access to mass transit and proximity to clients. Downtowns are being reinvested in while inner-ring suburbs are being rediscovered and retrofitted.

Public transit is a basic service that has been neglected in most American cities, including Pittsburgh, since the diffusion of the private automobile and the large-scale dismantling of urban streetcar systems. Municipalities and regions are coming to terms with the critical place that mass transit -- subways, buses, streetcars and light rail -- plays in urban redevelopment, management of public funds, environmental health and quality of life.


Key: Transportation Networks
New Roads
New Boulevards
New Alleys
Multi-Use Trails
Stairs
Structured Public Parking
Existing Buildings
New Buildings
Marine & Water Taxi
Boat Launch
New Light Rail Line
Transit Station
5 Minute walk from station
(1/4 mile radius)

Overview

Urban Form

Frameworks
- Green-Blue
- Transportation

Places

Legibility

Possible Development Scenario

A bus can transport as many people as 20 to 50 automobiles yet only takes up as much space as 2.3 cars. A five-car LRT train can displace 600 cars. Each of these mass transit options also consumes less energy than the number of cars needed to transport its capacity. And with sufficient passenger loads, the overall cost of public transit is less than new investments in roads.

There is growing demand for housing that is close to public transit. An Urban Land Institute (ULI) study estimated that up to one quarter of all new households in the U.S. will be looking for housing within one-half mile of public transportation. One reason for this might be the rising cost of owning and operating a car. The average American household spends $7,800 annually on transportation, second only to housing and roughly the cost of a child. The Center for Neighborhood Technology in Chicago found that the cost of transportation can vary from 14 percent of the average household's budget in compact transit-rich communities, to 28 percent or more in less dense areas far from employment and other amenities. For some working families, transportation costs may approach 50 percent of their household income.

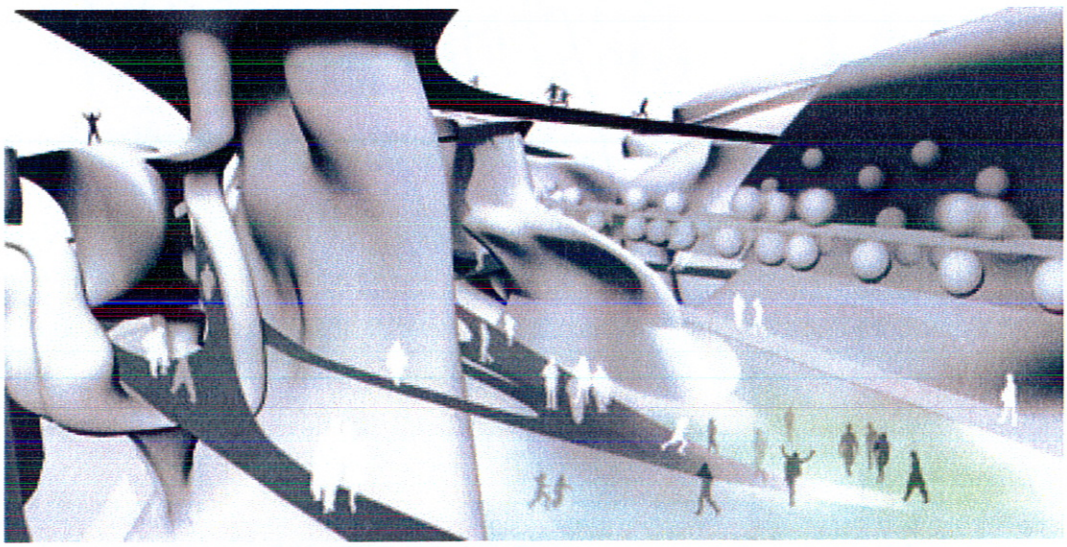
Another reason for the increased interest in living near public transit is the growing interest in personal health through Active Living. Active Living suggests that at least 30 minutes of physical activity be integrated into one's daily routine, typically through transportation and recreation. A recent poll showed that more than half of Americans want to bike more and 55 percent want to drive less and walk more.

Given that more than half of all trips are three miles or less and 28 percent are one mile or less, walking, taking public transit or biking seems within reach. The typical cyclist can cover one mile in less than 10 minutes and a pedestrian can walk a mile in roughly 20 minutes. Yet 65 percent of trips under one mile are taken by automobile. In addition to cultural factors, the missing ingredient in creating a more active population is pedestrian and cyclist-friendly urban design.

It is also important to consider that one third of Americans do not drive and are *de facto* pedestrians and public transit users, including children, many seniors, people with disabilities and low-income Americans. Providing options for transportation allows non-drivers access to work, services and a social life that is taken for granted by those who drive. In this sense, urban design can be an act of social justice (or injustice).

Improving connections between Hazelwood and Oakland is critical to the success of the ALMONO site redevelopment vision as proposed in this report. This stance is backed by the results of the numerous community and professional planning processes that have focused on Hazelwood and surrounding area in the past decade. It is also consistent with recent proposals for a circulating system connecting downtown to Oakland, the South Side and the rest of the East End.

Pittsburgh's single biggest deficit is its lack of a comprehensive and updated mass transit system. Although it is home to several national sports teams, world-class learning and cultural institutions, it has only two subway lines, both servicing the South Hills, and is build-

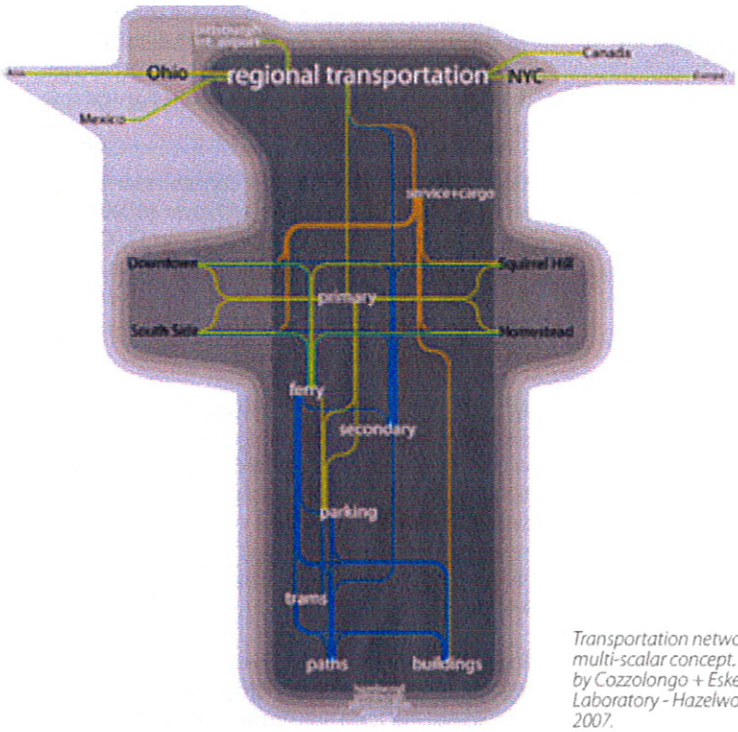


Student conceptualization of a multi-modal network. Cozzolongo + Eskenazi, Urban Laboratory - Hazelwood Studio, 2007.

ing another to serve a new casino on the North Side. There is no fixed link to the Pittsburgh International Airport, although there is a bus line.

Regional and city leaders are cognizant of this deficit and several transportation studies looking at potential routes for a transit system for the region's densest employment corridor, between Oakland and downtown, have been completed, including the 1993 *Spine Line Study* by the Port Authority of Allegheny Country (PAAC), the *Oakland Transit Whitepaper* (2004), the PAAC & Allegheny County's *Eastern Corridor Transit Study* (2005) and Allegheny County Chief Executive Dan Onorato's *Transportation Action Team Recommendations* (2007). Furthermore, a 54-mile, 35-minute high-speed MagLev route from the airport to downtown Pittsburgh and the Eastern suburbs of Monroeville and Greensburg has been proposed by the PAAC, the Pennsylvania Department of Transportation (PennDOT) and MAGLEV, Inc., in cooperation with the Federal Railroad Administration. Pittsburgh City Council also recently commissioned a study to investigate a cross-town Light Rail Transit (LRT) line between Hazelwood and Lawrenceville.

To put matters into perspective, downtown Pittsburgh is the region's center of business, employment and



Transportation network as a multi-scalar concept. Diagram by Cozzolongo + Eskenazi, Urban Laboratory - Hazelwood Studio, 2007.

Some cities have never stopped using streetcars: The red, white and black TTC streetcar has become a beloved and iconic fixture of urban living in Toronto. Rendering by Michael Van Valkenburgh Associates (MVVA).

governmental services, as well as home to most of the region's professional sports and cultural venues. The weekday population in downtown Pittsburgh exceeds 150,000 commuters, visitors, and students. More than 3,000 people live downtown and new residential towers and loft retrofits are planned.

Oakland has the second largest concentration of daytime population in the region, with over 38,000 workers, 40,000 students, 24,000 residents and 12,000 daily visitors. Currently, over 50 percent of all trips between downtown and Oakland are taken by bus. Over 60,000 bus riders pass through Oakland on a given weekday with 23,000 stopping off in Oakland.

At least forty U.S. cities are investigating reinstalling or expanding streetcar systems as a means of spurring economic development and reducing traffic congestion. Portland began building a modern streetcar system in 2001 and since then, more than 10,000 residential units have been built and $3.5 billion of private funds have been invested in property within two blocks of the line.

Following a lenghthy public process, the *Eastern Corridor Transit Study* (2003) identified two options for an LRT "Spine Line" from downtown to Homestead via Oakland and Hazelwood. Both options begin downtown at the Steel Plaza Subway Station.

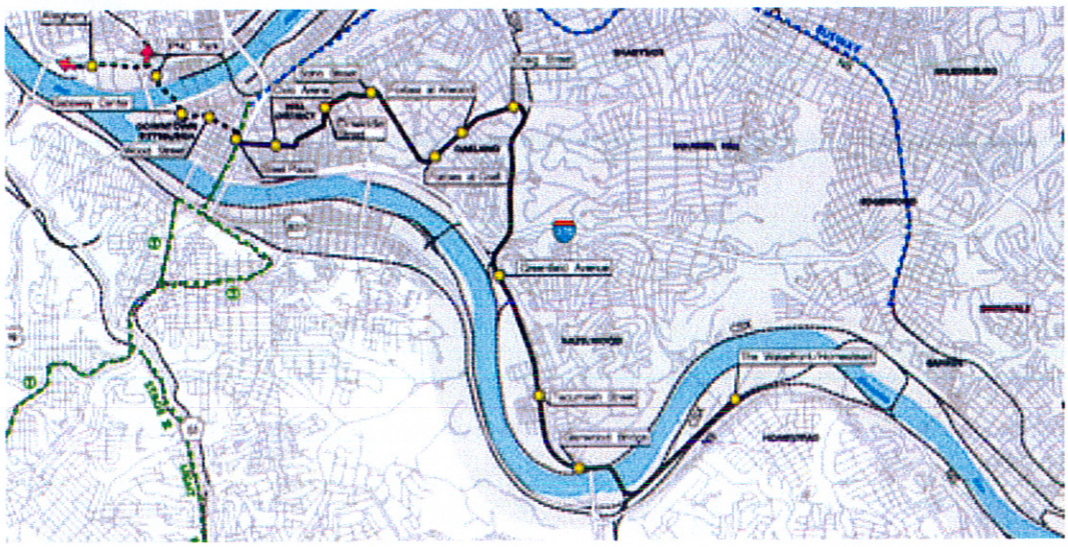
- **Preferred Option**

The 10-mile Spine Line option proposes a subway alignment between Steel Plaza and Craig Street, running through the Hill District and then under Forbes Avenue to Craig Street. From that point, it would access the CSX railroad right-of-way and operate at-grade through Junction Hollow, the valley between the dense South Oakland neighborhood and one of Pittsburgh's large urban forests, Schenley Park. It would continue along the existing rail lines beside Second Avenue in Hazelwood, cross the Monongahela River and terminate in Homestead.

- **Alternate Option**

The alternate option is a surface LRT line travelling along Centre Avenue via Fifth Avenue reaching to the CSX Railroad right-of-way near Neville Street. Similar to the preferred option, it would then dip south on the CSX Railroad right-of-way through Oakland and Hazelwood to Homestead. The alignment running from downtown to Craig Street would have a spur that extends to Wilkinsburg, while the Mon Valley and Etna Line would run from the Convention Center through the Strip to the Martin Luther King East busway in Skunk Hollow and over to Oakland and the Junction Hollow alignment, passing through Hazelwood on its way to McKeesport.

In keeping with the momentum of the Transportation Action Partnership's proposals, we recommend that an LRT line connect Hazelwood to Oakland and downtown at a minimum. A new Transit Oriented Development (TOD) with high-rise apartments atop a multi-modal station at the base of Junction Hollow near Greenfield Avenue and the Pittsburgh Technolgy Center would provide an additional source of riders, revenue for developers and add a new building typology to Pittsburgh's portfolio.



Proposed LRT "Spine Line" from downtown to Homestead via Oakland and Hazelwood. From the Eastern Corridor Transit Study Transitional Analysis to Locally Preferred Alternatives (2003).

The placement of the LRT stops proposed in our recommendations ensures that the great majority of residents in Hazelwood are within a quarter-mile or five-minute walking radius. The LRT line is conceived of as beginning in downtown and arriving in Oakland along Forbes Avenue, with the following stops between Oakland and Hazelwood:

- **Forbes and Atwood Station**
A stop at Forbes Avenue and Atwood Street would service the University of Pittsburgh and hospitals.

- **Forbes and Craig Station**
A station at Forbes Avenue and Craig Street, perhaps as part of the redevelopment of the existing parking lot on the southeast corner of the intersection, would serve Carnegie Mellon University, the Carnegie Museums and the Carnegie Library of Pittsburgh. The line would then descend through Junction Hollow along the existing CSX rail line toward Hazelwood.

- **Panther Lake Stop (contingent)**
A stop in Junction Hollow would be contingent on the Pittsburgh Parks Conservancy's (PPC) plans to build a boathouse beside Panther Lake and improve connections between Schenley and South Oakland with a pedestrian bridge, as well as Carnegie Mellon's proposal to add three new soccer fields to Junction Hollow.

- **Four Mile Run Multi-Modal Station**
The Four Mile Run multi-modal station at Second Avenue and Greenfield Avenue would act as a transfer point for car and bicycle commuters. Part of a TOD, the multi-modal station would serve a new high-density community arranged around the recreated estuary of the Four Mile Run, as well as the nearby Pittsburgh Technology Center (PTC) and The Run neighborhood.

- **Second and Robot City Stop**
A second Hazelwood stop would serve the redevelopment's flagship economic development project, the Robot City research campus.

- **Second and Hazelwood Station**
Hazelwood Avenue and Second Avenue, the epicenter of Hazelwood's reinvigorated Town Center, would be the site of the third stop, outfitted to be a multi-modal station with a multi-level parking facility nearby.

- **Second and Elizabeth Stop**
A fourth stop at Elizabeth Street would serve as a bookend to the Second Avenue commercial corridor, situated at the heart of the residential sector. The line could then continue past Hazelwood and onto Homestead and the Waterworks big box retail, office and residential complex.

II Multi-Modal Infrastructure

Designing the interface between different modes of transportation is important if they are each to achieve their optimal function within the overall transportation system. We recommend that LRT trains and buses be equipped to accommodate bicycles, wheelchairs, carts and push strollers. Allowing cyclists to mix modes helps them negotiate topographical barriers such as bridges, tunnels and hills, as well as inclement weather. Creating a flush threshold onto the train and designat-

Freiburg-im-Breisgau's Mobile houses bicycle storage for commuters, bike rental and repair shop, café, offices for car-sharing and bike touring organizations, and a mobility center, where travellers can get maps and buy tickets for various modes of transportation. The Mobile is located beside the city's main train station, bike and LRT systems. Photos courtesy Mobil Ggmbh.

ing space will ease access and comfort for wheelchair users, strollers and grocery carts.

A multi-modal station is incorporated into the TOD at the base of the Four Mile Run. This multi-storey, multi-modal complex would integrate the LRT stop, several storeys of parking, including parking spaces designated for car sharing and hybrid vehicles, and offer services for cyclists, such as safe storage and a repair shop. Pittsburgh's own outdoor recreation organization, Venture Outdoors, might be a tenant, as well as other bike-centered organizations, like Bike-PGH. In-line skates, ice skates, bikes and cross-country skis might also be considered for rent for use in Junction Hollow, the Hazelwood Riverfront Park and the Hazelwood Greenway.

III Hazelwood Street Grid Expansion and Complete Streets

Hazelwood's traditional street grid is hierarchical and permeable, allowing for good pedestrian access and legible streetscapes. Arterial or main streets accommodate city-scale traffic while secondary residential streets are used by local traffic. Back alleys allow cars to be parked in garages and for businesses to be serviced from the rear. They also serve as alternative paths for cyclists and pedestrians.

This traditional arrangement remains functional today and should be pursued in the ALMONO site redevelopment. We recommend that Second Avenue remain the main arterial but we reimagine it as a multi-modal urban boulevard. In twenty years or so, we propose that the portion of Second Avenue between Greenfield Avenue and Mobile Street (currently named Irvine Street) be closed and the space incorporated into the Hazelwood Greenway, perhaps to be used for productive landscapes, sustainable water capturing landscapes or recreational fields. A new extension running closer to Robot City becomes the main artery for that section. Also in the long term view, the street grid is extended across the Monongahela River with a bridge extending from Hazelwood Avenue to Beck's Run Road and connecting to Carson Street.

In addition to a hierarchical street grid, we recommend that the spirit of connectivity and permeability be augmented with the Complete Streets approach. Complete Streets are designed and operated to allow safe access along and across streets for all users, from cyclists, pedestrians and wheelchair users, to motorists and public transit users.

Cities and states across the U.S. are instituting Complete Streets policies. Effective Complete Streets policies should include restructured procedures and standards, re-written design manuals, re-trained planners and engineers, and re-tooled measures to track outcomes. The City of Pittsburgh recently created a Bicyclist and Pedestrian Coordinator position in its administration, the first in the Commonwealth of Pennsylvania.

The Complete Streets approach is further complimented by Context Sensitive Solutions (CSS), a roadway design philosophy that resists the tendency to apply uniform traffic solutions regardless of the needs of non-drivers and the aesthetic, historic and environmental setting.

Under the Complete Streets approach, existing streets can be retroffitted to be more inclusive but the main goal is to change design standards so that all users' needs are considered when building new streets. There are a number of design techniques that are used to "complete a street", depending on the nature of the road.

As an example, the following techniques can be used to render urban arterials, such as Second Avenue, safer for all users:

- reduce speeds
- reduce lane width (from 12 feet to 11 or even 10 feet)
- reduce number of lanes from four to three, improving safety for left turns (sometimes called a "road diet")
- install sidewalks if missing
- consolidate curb cuts and access/egress points to minimize vehicles crossing sidewalks
- install raised medians for pedestrians
- add Universal Design features, including audible signals, curb ramps, and a four-foot wide clear path of travel on the sidewalk, in accordance with the *Americans with Disabilities Act*
- enhance pedestrian crossings with ladder-stye or zebra-style crosswalk markings, signal modifications such as a leading pedestrian interval or countdown timer, and other measures
- maintain or install street parking to slow down speed
- modify highway interchanges to eliminate high-speed, free right turns by "squaring up" the interchange to resemble a 90-degree, signal-controlled intersection
- install corner treatments, such as curb extensions, right-turn slip lanes, Advanced Stop Lines (ASL) or tighter turning radii, all of which slow right turns and provide greater visibility for pedestrians and cyclists
- improve transit accommodations, such as bus shelters and bus stops by adding benches, lighting and other amenities

These techniques and others can also be applied to residential streets.

In addition to ensuring streets that are safer for pedestrians, we recommend upgrading the area's staircases and two footbridges, one crossing Second Avenue near Robot City and the other extending down from South Oakland to the northern end of the ALMONO site.

IV Parking Management Strategy and Car-Sharing

Parking is one of the chief complaints to local officials and businesses, yet experts in parking management point out that conventional approaches to parking typically provide an oversupply of parking spaces. The real problem is the management of parking rather than supply.

Establishing an integrated parking management strategy will be important from the start in order to reduce the overall amount of space, particularly surface area, that is devoted to parking while still meeting demands. In order to attain the LEED ND rating for parking, no more than 20 percent of the total development footprint area can be used for surface parking and no individual parking lot can be larger than 2 acres. Many of the parking management strategies below, such as providing bicycle facilities and carpooling spaces, are

Complete Streets: Rendering depicting the difference between an "incomplete" and "complete" street in Portsmouth, VA, by Steve Price. Courtesy of GOOD Magazine.

also indicated by LEED ND. Shared parking between businesses that operate at different times -- such as an office and a bar -- can especially reduce the need for dedicated parking.

The factors affecting parking demand and requirements include:
- parking facility location, type, and design
- geography
- demographics
- pricing and regulation
- parking and mobility management programs
- time period
- evaluation of multiple factors

In addition to adopting Smart Growth urban planning policies and improving walking and cycling conditions, there are many parking management strategies that can be employed around the site to reduce the overall space dedicated to parking cars, including:
- regulate parking
- establish more accurate and flexible standards
- establish parking maximums
- provide remote parking with shuttle services
- increase capacity of existing parking facilities
- implement mobility management
- price parking
- improve pricing methods
- provide financial incentives
- unbundle parking from new developments
- reform parking taxes
- improve user information and marketing
- improve enforcement and control
- establish transportation management associations and parking brokerages
- establish overflow-parking plans
- address spillover problems
- improve parking facility design and operation

The typical car sits idle for 22 hours a day. igo car sharing parking spaces in Bucktown, Chicago. Photo courtesy of PlannersWeb.

Another approach to freeing up parking spaces is to encourage car-sharing services. Zipcar, a car-sharing service with 180,000 members and a fleet of 5,000 cars in the U.S., Canada and U.K., has been operating 34 vehicles in downtown and East End neighborhoods since 2007. By Zipcar's own estimates, each shared car takes the place of fifteen to twenty privately owned cars.

Zipcar parking spaces should be integrated throughout Hazelwood but especially in the multi-modal station, the Transit Oriented Development at the foot of Four Mile Run, Second Avenue commercial corridor and the Robot City research district. Giving the most convenient parking spaces to car-sharing services will make them more attractive and raise their profile.

V Bicycling Infrastructure

Bicycling as a mode of transportation has been on the rise in Pittsburgh in the past few years, no doubt in part due to the work of the bike advocacy group, Bike-PGH. They have worked closely with Pittsburgh's administration to plan and add bike lanes and bike racks to city streets. Additionally, as previously mentioned, the City of Pittsburgh recently hired a Bicycle and Pedestrian Coordinator.

The political and cultural climate in Pittsburgh is ripe for a project that heavily promotes cycling. As the region's second largest employment center, Oakland has many cyclists commuting from across the city and even outlying suburbs. Many students use bicycles as a cheap, healthy and convenient everyday form of transportation. We recommend that cycling infrastructure be included from the very beginning in the redesign of the ALMONO site and Hazelwood.

In order to accommodate regional commuters, utility cyclists, recreational cyclists and mountain bikers, we envision several interconnected networks of bike trails and paths, both on street and off, as well as optimum connections with public transit, and end of trip amenities. A system of easy-to-understand wayfinding should also be incorporated.

The following are specific suggested interventions:

- **Second Avenue Bikeway**

Commuters -- drivers and cyclists alike -- appreciate a safe and quick direct route with few stops. The rail

right-of-way along Second Avenue could be shared to accommodate a bikeway from the Glenwood Bridge to Junction Hollow, connecting to the Junction Hollow Trail to Oakland or the Eliza Furnace Trail to downtown.

- **Riverfront Trail**

A riverfront trail through Hazelwood would complete the connection between two existing cycling and hiking trails: The Eliza Furnace Trail, popular with both leisure riders and commuters cycling between the South Hills and downtown and Oakland, and Duck Hollow Trail, which begins past the Glenwood Bridge. These are part of two larger trail systems: Eliza Furnace Trail is part of the Three Rivers Park system while the Duck Hollow Trail marks the beginning of the Steel Valley Trail. Both are also part of the larger Great Allegheny Passage (also called the Montour Trail), a 150-mile trail system that connects Pittsburgh to Washington, DC, mostly via converted defunct rail roads.

- **On-street Bike Lanes and Sharrows**

It is important to distinguish between the needs of leisure or sport cyclists, and commuter or utility cyclists. Utility cyclists use their bicycles, often equipped with baskets, paniers and child carriers, as many do a car or public transit: To go to work, drop children off at school, run errands and make social stops. In order to reach their destinations in a timely manner, they ride on the most direct routes possible, typically busy streets.

Bike lanes, sharrows and other space-sharing measures should be used on all streets where traffic flows reach 20 mph (30 km/hr) or more. Additional design measures can be used to increase the safety and visibility of cyclists. For example, Advanced Stop Lines (ASL) and bike boxes allow drivers to easily see cyclists who are stopped ahead of them at an intersection. Traffic light preemption can also be used at busy intersections where segregated bike lanes are treated as a separate roadway with their own traffic light. Colored pavement or "sharrows" may be used to remind motorists to cede space to cyclists.

- **Hazelwood Greenway Mountain Bike Trails**

The Pittsburgh region, with its hilly topography, is known nationally for its superb mountain biking opportunities. *Dirt Rag*, the preeminent mountain biking magazine, is based in Pittsburgh. The Pittsburgh Trails Advocacy Group (PTAG) has been working with regional land managers to design, maintain and build sustainable mountain biking trails in fifteen area parks since 2001. In 2008, PTAG volunteers contributed over 2,500 hours of labor to trail maintenance.

PTAG has partnered with the Pittsburgh Parks Conservancy (PPC) to maintain a network of mountain biking trails in Frick Park. In 2006, PTAG worked with the Student Conservation Association (SCA) to develop a section of multi-use trails in Hazelwood's current greenway. These trails currently do not form a loop but the PTAG trail crew reports that there is potential to increase the trail length and complexity, and to either connect it with an endpoint or develop a loop. Furthermore, this expanded trail network within the improved Hazelwood Greenway could be connected to Frick Park's system via a trail through the Glenwood/Glen Hazel hillside and Nine Mile Run to provide recreational and commuter options.

In spite of experiencing long winters, Montreal, QC has installed extensive cycling infrastructure and changed traffic rules in the past decade to encourage cycling. Here, on-road bike parking in lieu of car parking, and permission for counter-directional cycling. Photos by Elise Gatti.

- **End of Trip Amenities**

In addition to safe and practical paths, cyclists need a place to safely park their bikes. This is especially true for commuters who may have made heavy investments in their bikes and accessories. Workplaces and larger businesses can provide indoor, restricted access bike parking for their staff and customers. Similarly, parking garages could provide covered and supervised bike parking.

Employers can additionally provide shower and locker facilities to their employees. Free bicycle tire pumps, water fountains and other amenities also improve the cycling commuter's experience.

VI Water-Based Transportation for People and Goods

The Transportation Framework includes several water-based transportation infrastructures for both goods and people movement. Currently, there are three barge docks situated along the ALMONO site's edge, however it is not clear how often they are used. We recommend investigating the needs for barge docking facilities and if necessary, keeping one in place for water-based goods movement.

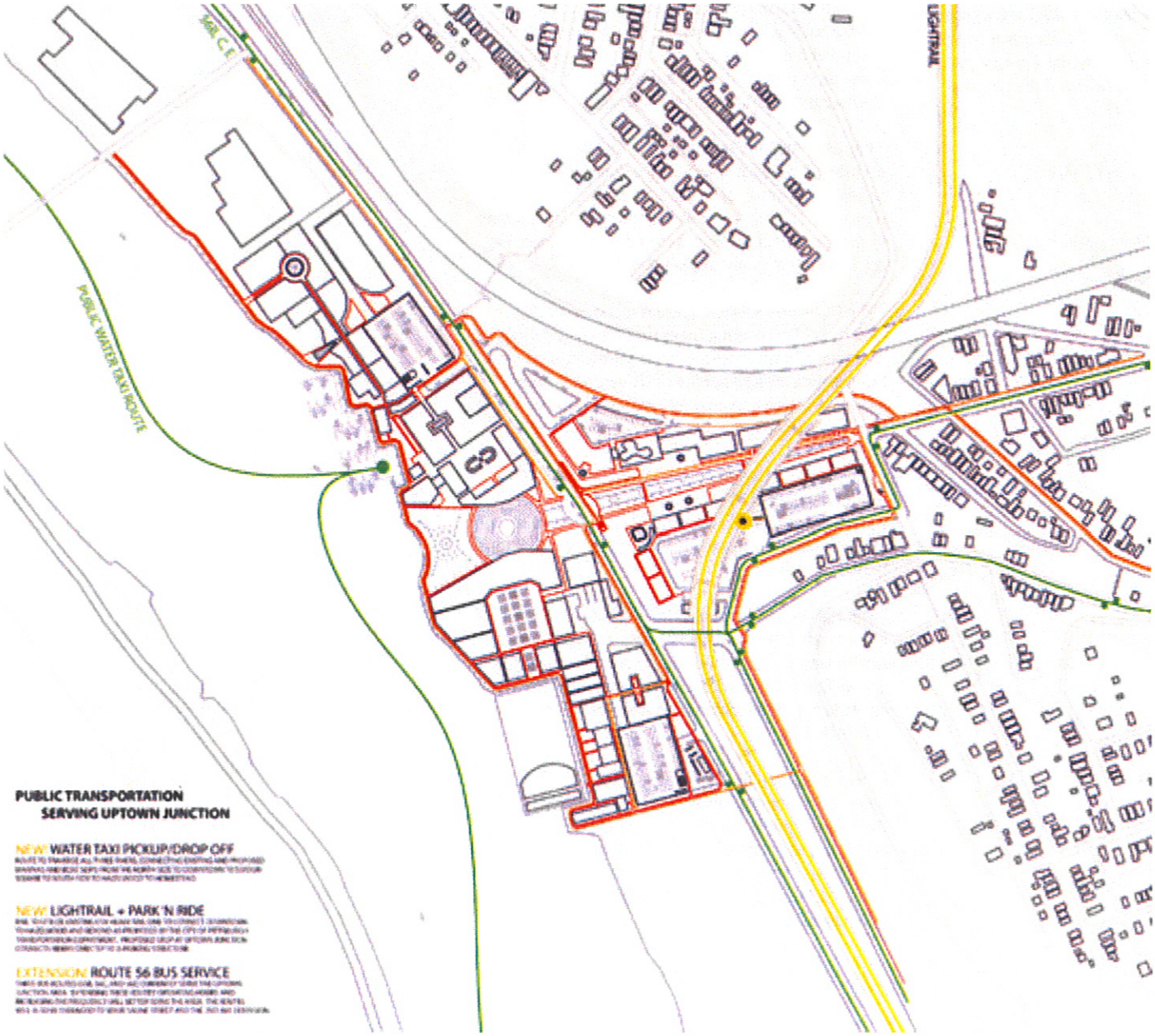
Public marinas near the mouth of the Four Mile Run and near the Hazelwood Bridge would provide access points for boaters and water taxis. Small, non-motorized watercraft lauching docks are also suggested for these locations. Groups like the Three Rivers Rowing Association (TRRA) would like to see more boating infrastructure in order to facilitate commuting by boat.

Kayaking in Pittsburgh is a growing recreational trend with potential to become a mode of transportation for commuting. Photo courtesy Kayak Pittsburgh.

Bike trail overpass by Eastridge + Waldron, Urban Laboratory - Hazelwood Studio, 2007.

Adopting a comprehensive, multi-modal transportation planning approach to Hazelwood will further establish it as a leading project in sustainability and quality of living. The recycling of the existing railroad tracks and their right-of-ways is a monumental task worth fighting for. This is key to the development of the ALMONO site and the region. It will require passionate leadership and commitment from all stakeholders.

Transportation options, including light rail, bus and water taxi, in Caranante + Lukacsy's proposal for the mouth of the Four Mile Run. Urban Laboratory - Hazelwood Studio, 2008.



Overview

Urban Form

Frameworks

Places
- Junction Hollow
- Four Mile Run Neighborhood
- Robot City
- Hazelwood Town Center
- Riverside Neighborhood
- Hazelwood Greenway
- Hazelwood Riverfront Park

Legibility

Possible Development Scenario

Places

Within the structuring transportation and open space frameworks are seven special environments, each with a unique program of uses and urban design character. The Places were inspired by the existing context and uses, as well as the vision for the ALMONO site. While they each stand alone, they are also interdependent and connected to each other by the frameworks. Taken together, they form a revitalized, multi-dimentional Hazelwood.

• Junction Hollow, between Carnegie Mellon University and The Run, is enhanced with new recreational amenities and ecological restoration work. The major move is the daylighting of the buried Four Mile Run.

• Junction Hollow flows into the new Four Mile Run Neighborhood, a mixed-use transit-oriented development that is centered around a high-rise residential tower atop a multi-modal transportation station and the Four Mile Run's renaturalized estuary.

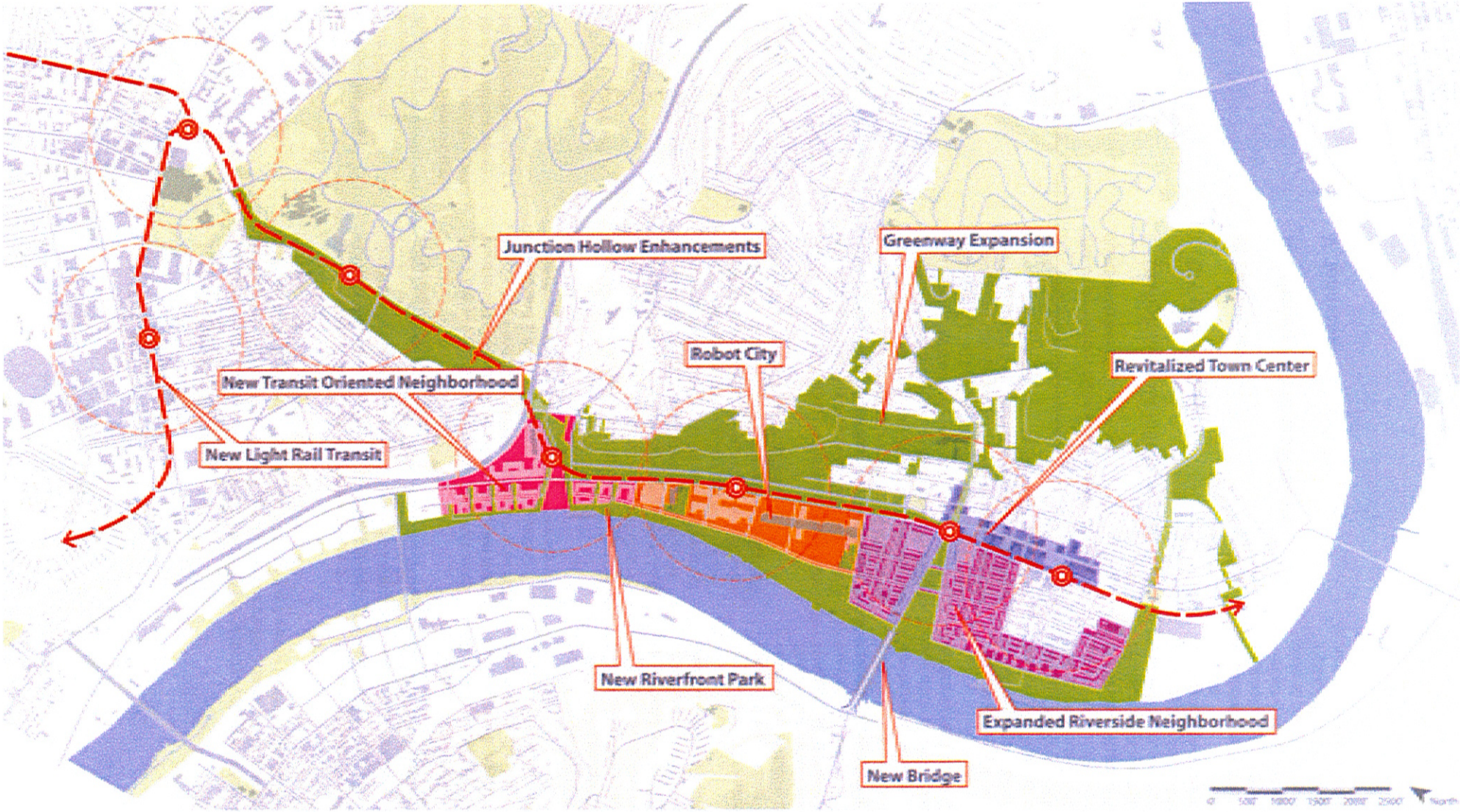
• Carnegie Mellon's Field Robotics Center (FRC) finds a permanent home at Robot City, a university-industry collaborative environment where research is commercialized. A 40-acre flexible open space with access to the Monongahela River allows for field research to continue in proximity to the university.

• The Hazelwood Town Center is made up of the historic Second Avenue main street and the proposed Hazelwood Avenue extension to the Monongahela River. It features a wide new boulevard with green promenade and a main public square at the nexus of Second Avenue and Hazelwood Avenue.

• The Riverside Neighborhood doubles the existing residential base of Hazelwood and brings the neighborhood close to the Monongahela River. New housing types are introduced, including the Riverside house boat community.

• The Hazelwood Greenway is a four-season hillside recreational space and wildlife habitat offering spectacular views, established with a vision of creating an arcing forested urban park system that includes Schenley Park, Junction Hollow, the Hazelwood Greenway and Frick Park.

• The Hazelwood Riverfront Park is a 94-acre regional park amenity where users can interact with the Monongahela River in unprecedented ways. The park is infused with recreational amenities, productive landscapes and sustainable urban drainage features, and is connected to the Hazelwood Greenway via four green wedges.


Junction Hollow Enhancements
Greenway Expansion
Robot City
Revitalized Town Center
New Transit Oriented Neighborhood
New Light Rail Transit
New Riverfront Park
Expanded Riverside Neighborhood
New Bridge
Key:
Places
Riverside Expansion
Hazelwood
Four Mile Run TOD
The Run
Hazelwood Town Center
Robot City
Green Framework
Existing Parks
New Light Rail Line
Transit Station
5 Minute walk from station
(1/4 mile radius)

Overview

Urban Form

Frameworks

Places
- Junction Hollow
- Four Mile Run Neighborhood
- Robot City
- Hazelwood Town Center
- Riverside Neighborhood
- Hazelwood Greenway
- Hazelwood Riverfront Park

Legibility

Possible Development Scenario

Junction Hollow

The recommendations for Junction Hollow focus on connectivity, ecological restoration and recreation. It builds on existing plans, such as the Pittsburgh Parks Conservancy's (PPC) renaturalization work around Panther Hollow Lake, and makes links between Junction Hollow and adjacent uses in Schenley Park, South Oakland and the proposed new transit-oriented Four Mile Run Neighborhood.

Junction Hollow is a one-mile long valley that begins at Fifth Avenue, runs along the edge of Carnegie Mellon University's campus, between Schenley Park and South Oakland, and ends at The Run neighborhood under the Penn Lincoln Parkway.

The valley has several distinct sequences, with conditions ranging from paved and urbanized under North Neville Street and then Boundary Street between Fifth Avenue and S. Bouquet Street, to partially wooded, open grass and playing fields from then onward to The Run.

The Four Mile Run stream, now buried in a trunk sewer pipe under the valley's floor, once collected waters from the hillsides, is the hydrological equivalent to an arterial road, collecting and carrying water into the Monongahela River. A CSX rail line runs the length of Junction Hollow, entering a tunnel just north of the Forbes Avenue Bridge. In the section of Junction Hollow that is managed by the Pittsburgh Parks Conservancy (PPC), there is one playing field.

We recommend that Junction Hollow retain its park status but improve its ecological profile by incorporating the daylighting of the Four Mile Run wherever possible, expanding recreational amenities, improving connections to Schenley Park and South Oakland, and accommodating an LRT line running between Oakland and Hazelwood. Much of the infrastructure in the Hollow is in fair to poor condition and will need to be replaced in coming decades. There will be an opportunity to rebuild bridges, roads and underground utilities in ways that accommodate daylighting sections of the Four Mile Run.

The recommended urban design interventions for Junction Hollow are:

I Daylighting Four Mile Run

II LRT and Bikeway

III Sports Fields

IV Schenley Park Improvements

V Innovative Research Grounds

I Daylighting Four Mile Run

The most dramatic measure proposed for Junction Hollow is the partial daylighting of the Four Mile Run. While the LRT and multi-use trail would connect disparate areas physically, including South Oakland, Carnegie Mellon University, Schenley Park, The Run and the new Four Mile Run Neighborhood development, the Four Mile Run would connect these places visually and thematically while creating a unique recreational and ecological environment for Pittsburghers to enjoy.

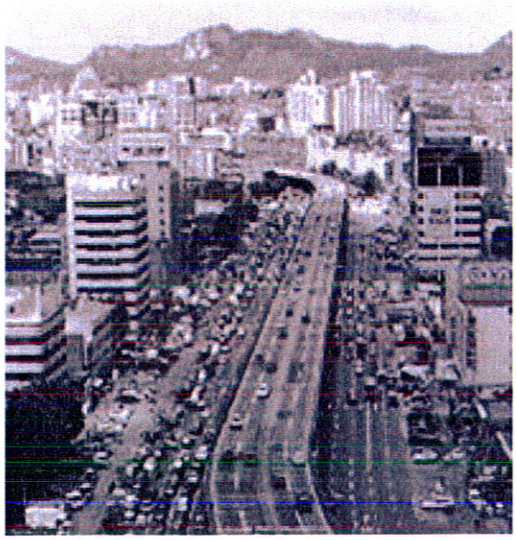
Most of Pittsburgh's streams have been covered and piped. Culverting streams was a means of covering the waste-filled water and smoothing flat land over for development, flat land being at a premium due to Pittsburgh's hilly topography. The Four Mile Run's watershed includes Schenley Park, Greenfield, South Oakland, Bellefield, Squirrel Hill and Shadyside.

The Four Mile Run's current incarnation is as a Pittsburgh Water and Sewer Authority trunk line running under Junction Hollow down to the Monongahela River. All but two of the watershed's streams, Panther Hollow Run and Phipps Run are currently piped into the combined sewer overflow (CSO) system. These two streams now flow into Panther Hollow Lake, a man-made water body where Panther Hollow meets Junction Hollow. However both the lake and a diversion ditch overflow into the Four Mile Run trunk line, eventually pouring into the Monongahela River.

The idea to daylight the Four Mile Run was explored in the report *Stream Restoration and Daylighting: Opportunities in the Pittsburgh region* (2002), commissioned by Carnegie Mellon's STUDIO for Creative Inquiry project, 3 Rivers, 2nd Nature (3R2N). The Pittsburgh Parks Conservancy (PPC), which manages Schenley Park, published the *Pittsburgh Regional Parks Master Plan*, which was prepared by LaQuatra Bonci Associates. According to the 3R2N study, several of the PPC's planned actions for Schenley Park and Junction Hollow would be mutually synergistic with daylighting the Four Mile Run. These include:
- restoring the Panther Hollow watershed
- naturalizing the edge of Panther Hollow Lake
- creating a landscape plan for Junction Hollow in order to create a destination within the park
- establishing better connections between the lake, Junction Hollow and down to the Monongahela River

Key: Junction Hollow
Green Framework
Active Recreation
Productive Landscapes
Multi-Use Trails
New Wetlands
New Woodlands
New Light Rail Line
Transit Station
5 Minute walk from station
(1/4 mile radius)
0'
500'
1000'
1500'
2000'
2500'
North

The 3R2N study concluded that stream water from Schenley Park could be kept on the surface, in a variety of possible stream channel configurations, on city-owned land through much of Junction Hollow. Given the proposed land uses (railroad, trail, sports fields, vacant land), a daylight stream could be created from Panther Hollow Lake down Junction Hollow for roughly 1,900 feet to the upper end of the existing soccer fields. The stream would replicate a natural stream landscape, with a meandering path and water vegetation. The technical challenges for daylighting increase from this point on. The study outlines the appropriate stategies, which include a combintation of daylighting using architectural channels and piping the Four Mile Run all the way to the Monongahela River.



Restoring hydrological function in a highly intense urban context: In the mid-20th century, the 6-mile Cheong Gye Cheong (River) in Seoul, Korea, was buried under concrete and raised transportation infrastructure. Its restoration began in 2003 and today it is highly appreciated by its residents, with a mix of soft and hard edges. Photos courtesy of L.A. Creek Freaks.

Such a project would add an important visual and ecological amenity to Junction Hollow while also helping to attenuate wet weather flows, delaying their delivery to the combined sewer lines and the ALCOSAN water treatment system, especially if wetlands and other stormwater management measures were incorporated.

Daylighting the Four Mile Run from Panther Hollow Lake to the Monongahela River, even if only intermittently, would increase the visual, psychological, and ecological connectivity between Oakland, Schenley Park, The Run and the new Four Mile Run Neighborhood. This linking potential is particularly important given the isolated nature of each area.

II LRT and Multi-Purpose Trail

The various community planning processes in Hazelwood have highlighted the wish of the affected communities that any transportation system developed through Junction Hollow be sensitive to the natural quiet and green character of the valley. As a mode of transit that does not produce local emissions, Light Rail Transit is compatible with this vision.

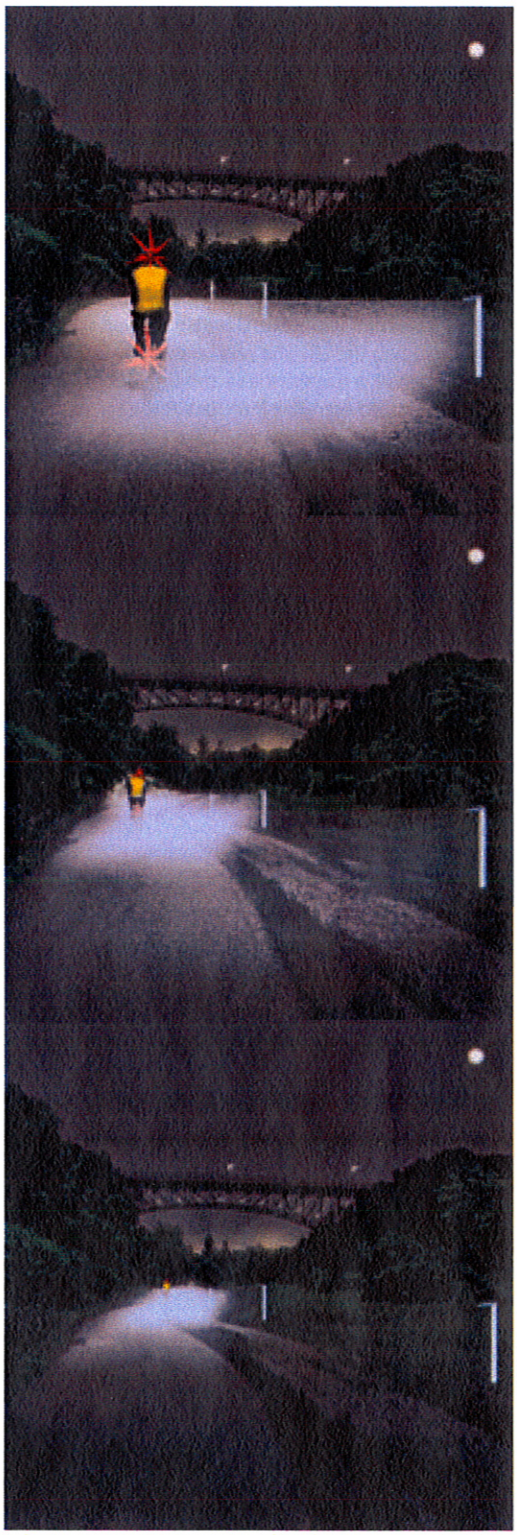
The LRT line would use existing CSX rail lines. A stop in Junction Hollow would be contingent on the renovation of Panther Hollow Lake by the PPC, the construction of a new pedestrian and bike overpass between Schenley Park and South Oakland, and the addition of the proposed semi-public sports fields by Carnegie Mellon University and its educational partners.

A multipurpose trail already exists through Junction Hollow and connects to the Eliza Furnace Trail to downtown and the Hot Metal Pedestrian and Cyclist Bridge to the South Side. We propose upgrading the existing trail by paving smooth the entire way to allow for the comfortable use of roller blades, wheelchairs and strollers. Junction Hollow and the Eliza Furnace Trail is used by bike commuters to the South Side and South Hill suburbs.

Night lighting should be added to help with evening use. In order to minimize harm to area wildlife and to reduce energy use, lighting should conform to International Dark Sky Association standards and be activated by movement.

III Sports Fields

In response to a lack of athletic facilities, Carnegie Mellon University and several local private schools have been studying possible locations in Pittsburgh's East End for new athletics fields. They are interested in finding a location that has a synergy with development



and transit initiatives. Junction Hollow has been singled out as a preferred candidate for three new sports fields. The proposed regulation soccer and general purpose sports fields would be accessible to the public when not in use by Carnegie Mellon and its partners. They would likely be made of artificial turf, reducing the need for pesticides, herbicides and watering.

IV Schenley Park Improvements

We support the Pittsburgh Parks Conservancy's (PPC) *Pittsburgh Regional Parks Master Plan*, which includes several proposals for Junction Hollow and Panther Hollow Lake that we incorporate into our recommendations. Among these are:

- renaturalizing Panther Hollow Lake
- landscaping Junction Hollow, removing invasive species
- creating a link between Panther Hollow Lake and the Junction Hollow Trail
- rebuilding the Panther Hollow Lake boat house
- building a pedestrian bridge across Junction Hollow, connecting South Oakland to Schenley Park

V Innovative Research Grounds

In addition to these added amenities, we suggest that Junction Hollow be a testing ground for innovative ecological projects by local university-affiliated researchers that can be comfortably integrated into urban park environments, such as experimental wildlife habitat structures, water and air purification systems and urban heat island dissipators. These projects would blend design and technology with a restorative intent, and could be tested in Junction Hollow for possible deployment in other cities.

Any development in Junction Hollow should minimize impacts on wildlife. Proposal for night-time motion-sensored lighting along the Junction Hollow Trail rendered by Elise Gatti, RCI.

Air Tree pavilion in Pau de Vallecas, Madrid, as proposed and under construction. Made from recycled material, filled with air-cleansing plants, and topped with photovoltaic cells, the Air Tree will produce energy to be sold to local electric companies, with the profits being used for maintenance of the structure. Image from Urban Ecosystems.

Overview

Urban Form

Frameworks

Places
- Junction Hollow
- **Four Mile Run Neighborhood**
- Robot City
- Hazelwood Town Center
- Riverside Neighborhood
- Hazelwood Greenway
- Hazelwood Riverfront Park

Legibility

Possible Development Scenario

Four Mile Run Neighborhood

Our recommendation for the northernmost portion of the ALMONO site and the intersection between Second Avenue and Greenfield Avenue is to completely transform the area from low-density transit node into a full-fledged Transit Oriented Development (TOD). We call this new mixed-use, highly connected neighborhood the Four Mile Run Neighborhood in honor of the stream that currently runs beneath it.

The area surrounding Second Avenue and Greenfield Avenue is an important nexus of several transportation corridors, including:
- Second Avenue, a busy commuter corridor (40,000 daily commuters) leading to downtown, Oakland and South Side
- Greenfield Avenue, leading to Oakland, Squirrel Hill and Greenfield
- CSX freight rail line
- Eliza Furnace Trail
- nearby Hot Metal Bridge, which connects vehicles, cyclists and pedestrians to the South Side
- nearby Bates Street and on-ramp to I-376 Penn Lincoln Parkway
- Monongahela River barge and recreational transport

The northern end of the ALMONO site constitutes what used to be the floodplain of the Four Mile Run. The river's mouth was filled in to create flatland for development and is currently roughly 25 feet above the normal shoreline level of the Monongahela River. A railroad overpass allows the CSX line to cross the intersection of Second Avenue and Greenfield Avenue to Junction Hollow. It is also the entrance to The Run neighborhood, a quiet residential district tucked beneath the raised Penn Lincoln Parkway.

The Four Mile Run Neighborhood proposal introduces a new neighborhood typology to Pittsburgh. It juxtaposes two contrasting focal points, a high-density multi-modal station platform with connected high-rise residential tower and surrounding development, and the Four Mile Run estuary, a large, open water space.

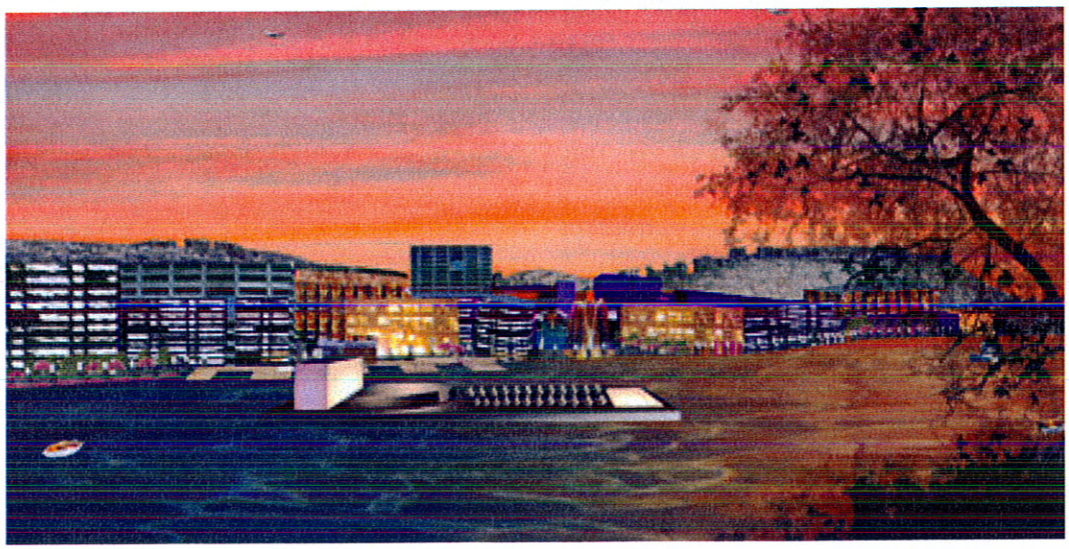
The neighborhood would continue to be a hub of mobility, threaded with several transportation corridors, including the LRT line and bikeway to Oakland, Second Avenue, a riverfront trail and the Monongahela River. Land-based corridors intersect at the Hazelwood multi-modal station while water-based networks meet at a new, ecologically-sound marina.

The major interventions in the Four Mile Run Neighborhood are:

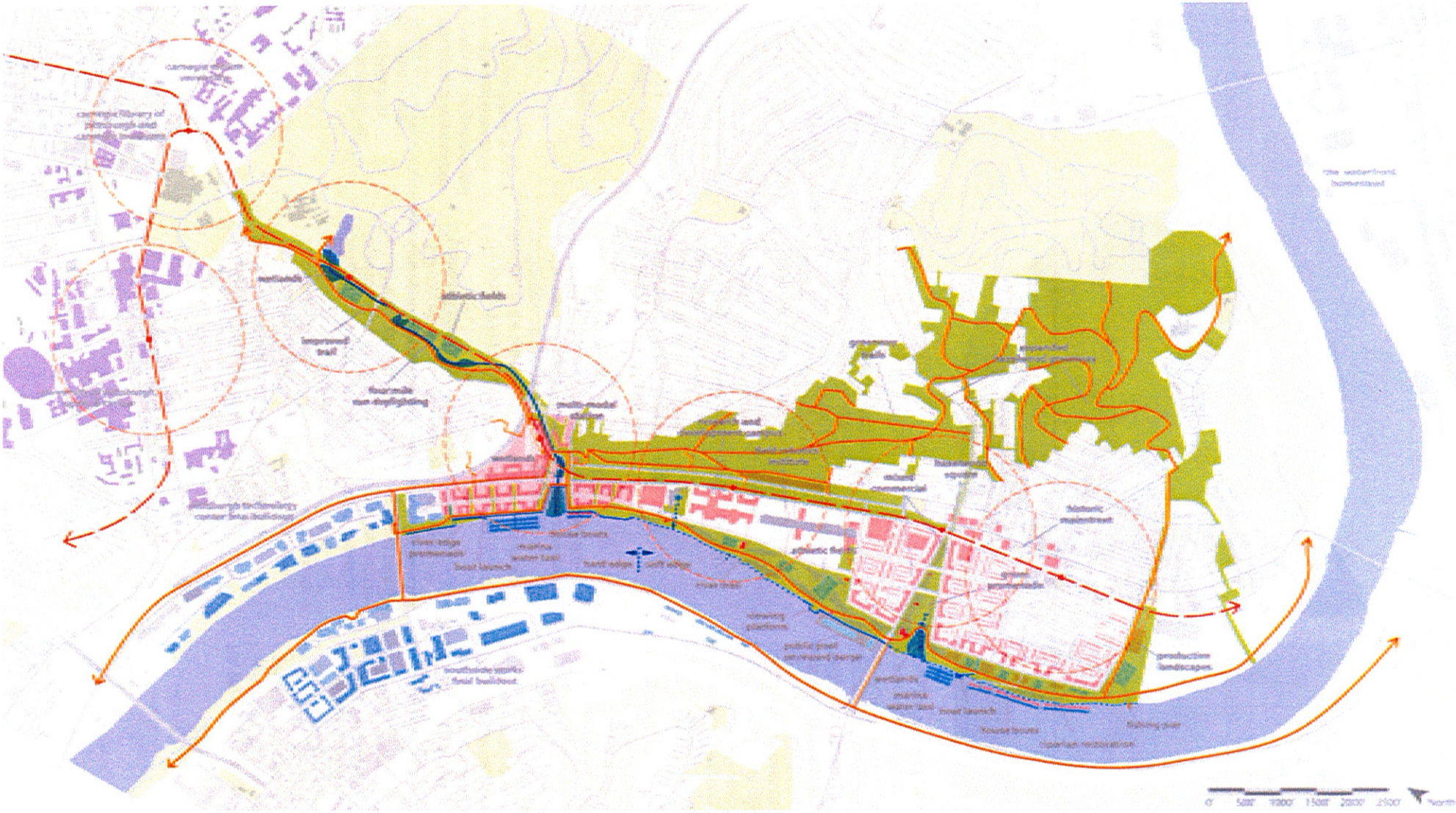
I Transit Oriented Development and Multi-Modal Transit Station

II Renaturalized Four Mile Run Estuary and Public Marina

III District Co-Generation Plant and Data Center



Caranante + Lukacsy's proposal for a high-density mixed-use development at the top of the ALMONO site includes the daylighting of the Four Mile Run and a floating, retractable outdoor performance stage. Urban Laboratory - Hazelwood Studio, 2008.



Key: Four Mile Run Neighborhood

Buildings
- Existing Buildings
- New Buildings

New Park Lands
- New Park Land
- Existing Parks
- Active Recreation
- Productive Landscapes
- Multi-Use Trails
- New Wetlands
- New Woodlands

New Light Rail Line
Transit Station
5 Minute walk from station
(1/4 mile radius)

Overview

Urban Form

Frameworks

Places
- Junction Hollow
- **Four Mile Run Neighborhood**
- Robot City
- Hazelwood Town Center
- Riverside Neighborhood
- Hazelwood Greenway
- Hazelwood Riverfront Park

Legibility

Possible Development Scenario

I Transit Oriented Development and Multi-Modal Transit Station

As a nexus for several local and regional transportation modes, Junction Hollow is the perfect candidate for a Transit Oriented Development (TOD). TODs are designed to be compact, walkable areas centered around a mass transit system and with connections to other modes of transportation, such as driving, biking, walking and even boating. While still relatively new, the TOD concept is quickly spreading and initiatives are taking hold in cities across the country.

The proximity of this area to Oakland via Junction Hollow, to the South Side from the Hot Metal Bridge, to the expanding Pittsburgh Technology Center (PTC), and a potential doubling of Hazelwood's population through the redevelopment of the ALMONO site makes it an ideal site for a TOD.

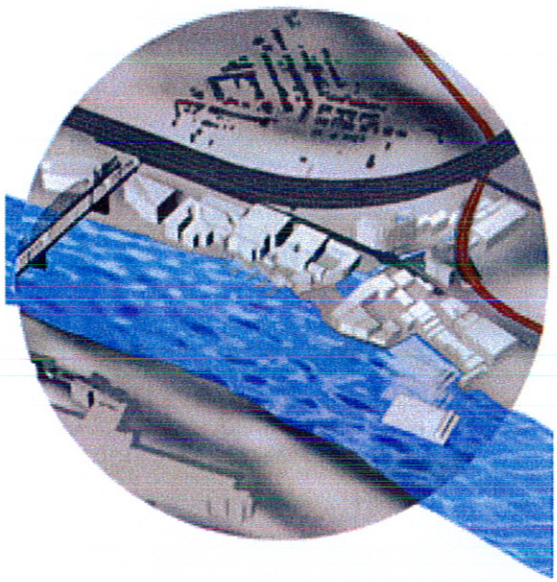
The benefits of a TOD include:
- reduction of traffic congestion and energy consumption
- preservation of open space
- capitalization on investments made in transit and public space
- improvement to air quality
- increase in the attractiveness of the region for citizens, tourists, and businesses
- revitalization of neighborhoods by making them more livable, lively and connected
- increases in property values and access to jobs

The key design components of a TOD are:
- walkable design and Complete Streets
- development centered around a transit station
- high density and high quality development within half mile of transit station (10 minute walk)
- a regional employment node or commercial destination with mixed-use clusters
- parking plan blended into neighborhood

Density is a key component of TOD. While there appears to be no national standard for TOD density as of yet, the minimum density to support basic bus service is 7 Dwelling Units per Acre (DUA). Fifteen to 20 DUA are needed to support streetcar or trolley service. By comparison, new greenfield development averages less than 2 DUA. Seven DUA -- or the equivalent commercial density -- is the minimum to meet LEED ND's prerequisites. A recent TOD conference in Pittsburgh suggested that 8 to 10 DUA is appropriate for the City of Pittsburgh given the local population and built environment.

Local governments can encourage TODs in various ways, including through zoning codes, mixed-use zoning districts, development and design standards, bonus zoning, transit overlay districts and planned residential development. Pennsylvania was one of the first states to pass legislation specifically promoting TOD with the 2004 Transit Revitalization Investment District (TRID) Act which enables public transit agencies to partner with local municipalities to create TRIDs in an area around transit stations. The legislation provides a 25 percent funding match for TRIDs, defined as zones within half a mile of transit hubs. The goals of the Act

Massing study and detail of Caranante + Lukacsy's proposal for a high-density mixed-use development at the top of the ALMONO site. Urban Laboratory - Hazelwood Studio, 2008.



are to encourage TOD and improve communities, and also establish value capture areas in which to fund transit, site improvements and maintenance.

The Pittsburgh Department of City Planning is actively working on TOD sand TRIDs. While there is currently no official TOD policy, there are plans to include them in the city's first ever Comprehensive Plan. The city now offers development bonuses in certain districts when a development is within 1,500 feet of a major transit facility, such as a platform or waiting area adjacent to a public mass transit system which has a dedicated right-of-way in the code (for example, a busway or the "T" LRT lines). The bonus provides an extra 20 percent density allowance for the developer beyond the zoning limit. Though only available in the Urban Neighborhood Commercial Districts (UNC), there are plans to expand the bonus to other districts.

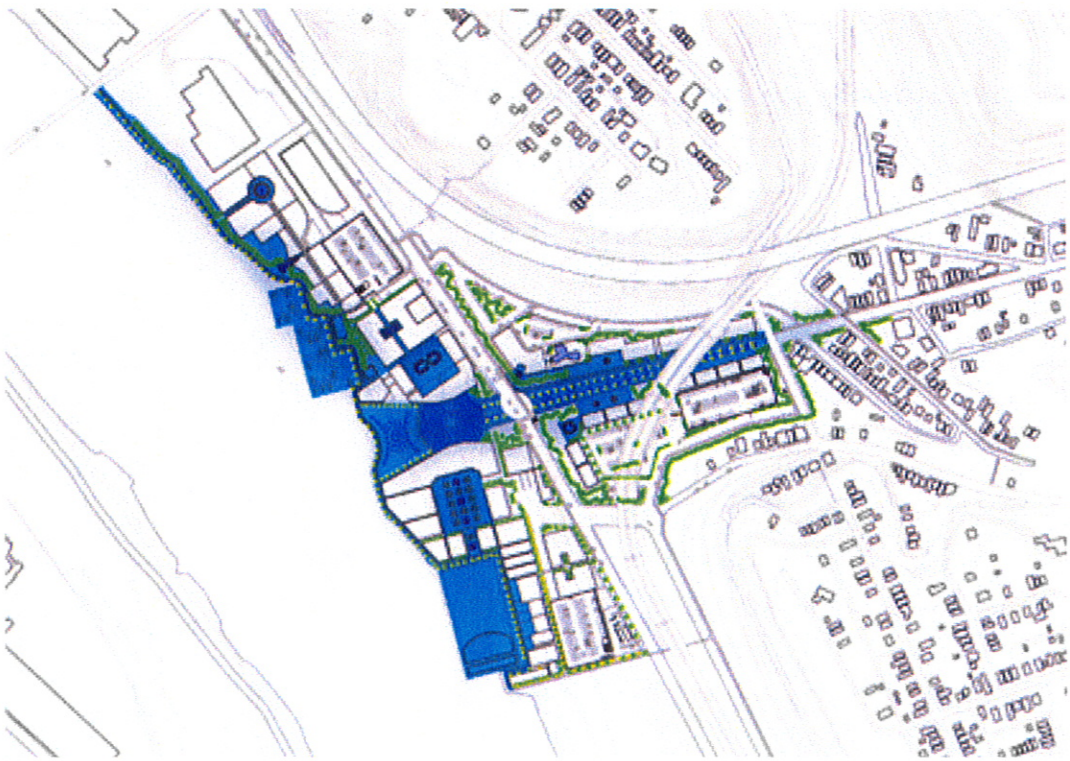
II Renaturalized Four Mile Run Estuary and Public Marina

Renaturalizing the mouth of the Four Mile Run would require substantial alterations to the topography from The Run neighborhood to the Monongahela River. According to the daylighting study commissioned by the 3R2N project, the stream could be piped through the mound of fill that blocks the end of the Four Mile Run valley from the river and brought up to the surface on the west (river) side of Second Avenue.

An estuary could be excavated down to the river level, creating an ecologically valuable environment where water from the stream would flow into slack backwater from the Monongahela River. This would be one of only a handful of embayments remaining along the Monongahela River. The Robotics Institute's terraforming robots could be used to help reshape the land.

The proposed reconstructed Four Mile Run estuary would occupy a central space in the neighborhood. It would be ringed by public space, housing, retail and entertainment venues, creating a 24-hour environment that celebrates a waterfront location. A pleasure craft marina, water taxis and kayak/canoe docking and rental facilities are also included.

While the perimeter of the main Four Mile Run basin should be kept publicly accessible, adding a small-scale system of canals or "pocket" water spaces with footbridges can allow for buildings to be placed directly on the water, introducing an exciting new type of housing and urban space to Pittsburgh, albeit one not uncommon in water-logged cities around the world.



Juxtaposing urban density and open space through the re-introduction of water spaces into a proposed TOD at the foot of Junction Hollow. Caranante + Lukacsy, Urban Laboratory - Hazelwood Studio, 2008.

Overview

Urban Form

Frameworks

Places
- Junction Hollow
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Legibility

Possible Development Scenario

III District Co-Generation Plant and Data Center

As mentioned in the section on Green Urbanism - Sustainable Energy, a co-generation plant and data center is proposed for Hazelwood. These mutually synergistic uses would be located in the Four Mile Run Neighborhood, providing locally-produced energy to Hazelwood and nearby Oakland institutions.

The district co-generation plant would potentially reach efficiency rates of up to 85 percent compared to between 33 and 60 percent for the best conventional coal-fired and nuclear plants. A co-generation plant would reduce the energy consumed on the ALMONO site by a factor of two compared to conventional electrical energy production. Placing a data center next to the co-generation plant would allow for the excess heat generated by the center's servers to be used.

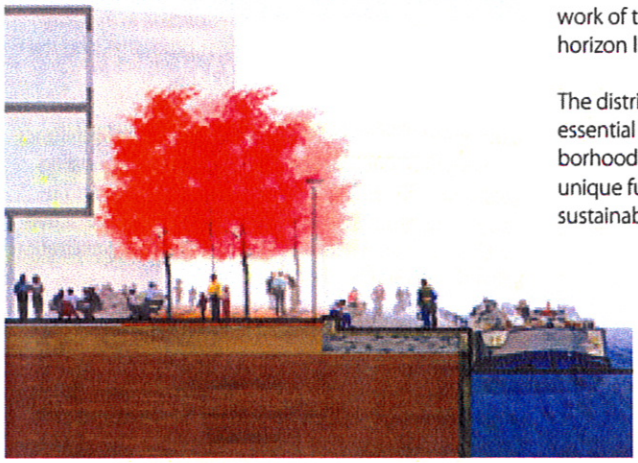
The buildings should be integrated into the development rather than be hidden. As an example, the Whitney Water Purification Facility and Park in New Haven, CT, provides water to south central Connecticut by way of water purification facilities buried beneath a public park. This integrative approach provides a diverse habitat and sanctuary for migrating species of birds. The

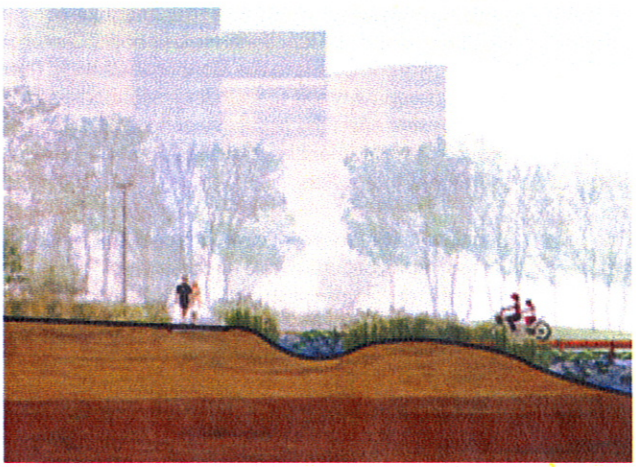
Infrastructure as defining design element: The Whitney Water Purification Facility and Park in New Haven, CT. Photo by Paul Warchol.

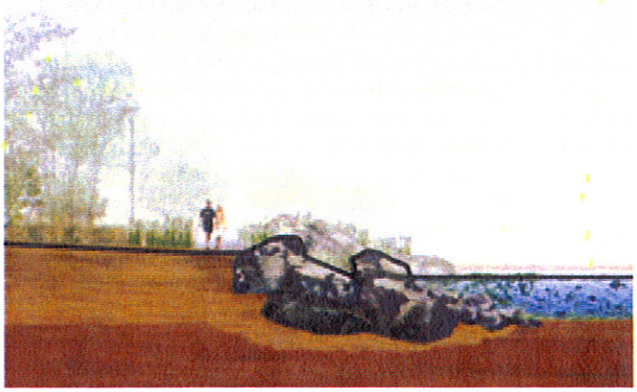
Waterfront living: Residents on Scheepstimmermanstraat (Shipwright Street) on the Borneo peninsula in Amsterdam have a watery front yard. However the project includes rear courtyards and roof garden. Photo by JayjayP.

infrascture project features a 30,000 square foot green rooftop, zero off-site storm water discharge, expanded wetlands for biodiversity and is heated and cooled by 88 geothermal wells. A 360-foot-long stainless steel tubular structure symbolizes the water purification work of the plant below surface and creates a reflective horizon line in the landscape.

The district co-generation plant and data center are an essential part of the vision of the Four Mile Run Neighborhood. Designers should take advantage of their unique functions to create a memorable landmark and sustainable building and adjacent space for Hazelwood.







Proposal for the renaturalization of the Don River estuary and redevelopment of the portlands in Toronto, with integration of the raised Gardiner Expressway. Depictions of urban and natural water edges. Courtesy of Michael Van Valkenburgh Associates.

Overview

Urban Form

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Legibility

Possible Development Scenario

Robot City

Dramatic changes have taken place in the Pittsburgh region's economy in the past 30 years. The region is repositioning itself in the national and global economies as a center for technological advancement in the areas of health care, green building technologies and robotics. These efforts are supported by an extensive pool of expertise in research and educational institutions, such as the University of Pittsburgh, Carnegie Mellon University, Duquesne University and Chatham University, as well as a growing number of small start-up technology-based enterprises. The sustainable technology and robotics industries are particularly well-served by the area's expertise in industry and manufacturing, the presence of high-ranking computer science, engineering and business programs, and the abundance of vacant buildings and brownfields.

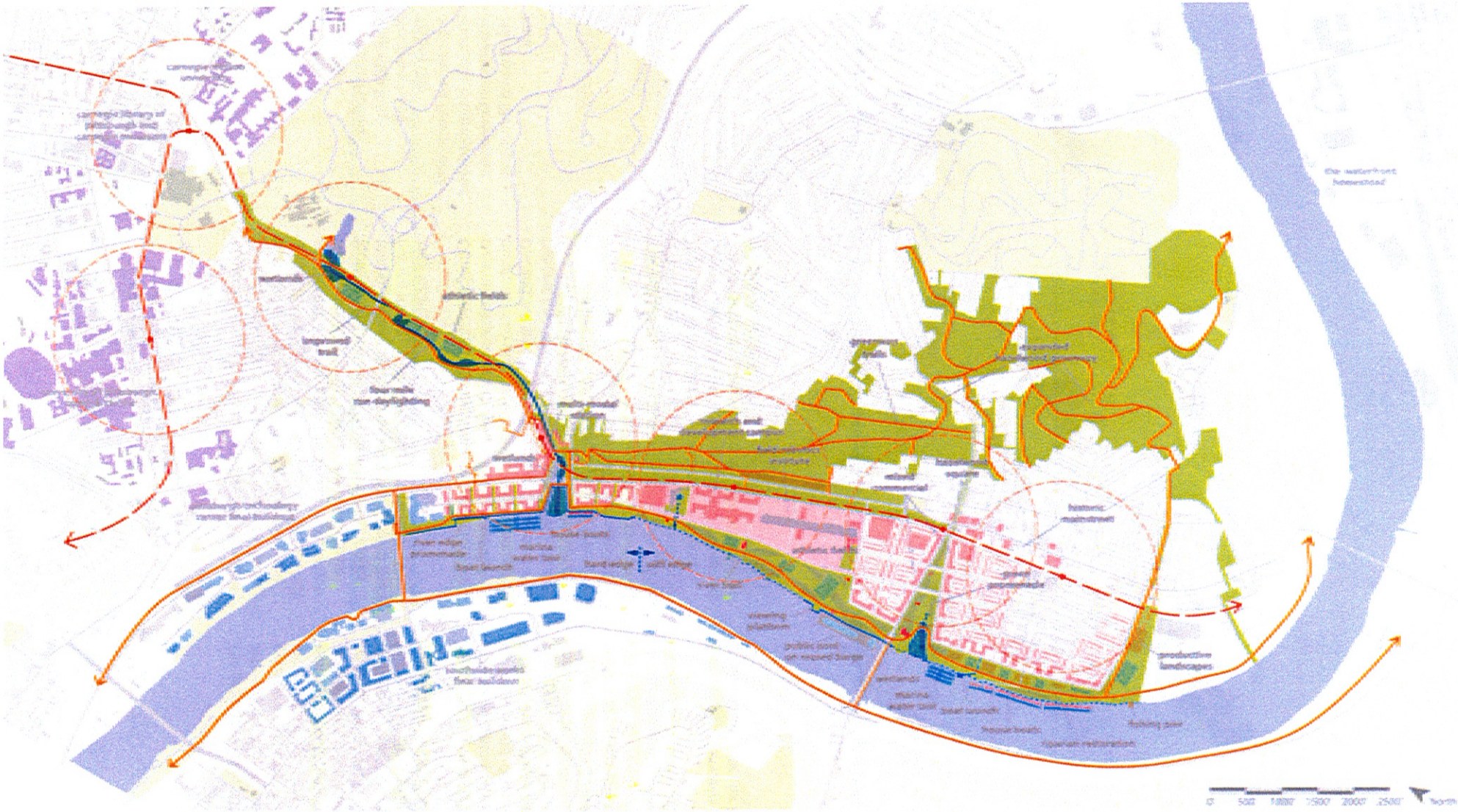
The global market for industrial robots in 2007 was $15 billion, with growth projected to reach $60 billion by 2014. Robotics already has a promising presence in Pittsburgh. Dubbed by *The Wall Street Journal* as "Roboburgh," Pittsburgh is a recognized global leader in robotics research. That position is largely bolstered by the Robotics Institute at Carnegie Mellon University, whose strengths in engineering and computer science are world-renowned. Established in 1979, the Robotics Institute conducts basic and applied research in robotics technologies relevant to industrial and societal tasks, and has developed the world's leading educational and research programs in autonomous robotics. Beyond Carnegie Mellon, there are roughly 90 organizations with 2,500 employees focusing on robotics and automation in the Pittsburgh region.

In order to fulfill its economic and cultural potential, robotics research must be amplified by entrepreneurial, technological and community initiatives. Robot City has been conceived as a Hazelwood-specific installation where this potential can be realized. The Robot City concept was originated by the Robotics Institute to represent their vision for a pioneering initiative on the ALMONO site that assembles university, industry and community partners in a field setting with adjacent research and office facilities. The mission of Robot City is to commercialize existing research, bringing robots from the laboratory to the market. Robot City will nurture the technical commercialization that is emerging in the region. Numerous corporations have developed partnerships with Carnegie Mellon in order to bring the technologies developed at the Robotics Institute into the global marketplace. As these partnerships have deepened, many of these firms, such as Caterpillar, Intel, Google, Disney, and General Motors, have opened research offices in the Pittsburgh region. Startup firms have also been created by university-affiliated researchers to capitalize on the commercial potential of university technologies, several of whom have been acquired and kept in the region by larger firms. As such, this proposal represents the maturation of the Pittsburgh region from leading center of robotics engineering research to a leading producer of real world robotics applications.

The symbolic value of the redevelopment of a defunct and contaminated steel mill site and its surrounding neighborhood into a sustainably-designed community at the center of which is a world-class productive robotics research, development and commercialization cluster cannot be overstated.

Hazelwood's vacant ALMONO site offers an ideal and unparalleled context for Robot City. Centrally-located in Pittsburgh, one mile from the Robotics Institute on the Carnegie Mellon campus in Oakland, the site features a large open tract of land that can accommodate an outdoor research laboratory, commercial facilities, a large existing building structure suitable for reuse into a multi-functional Field Robotics Center (FRC) facility and access to the Monongahela River. The urban environment and surrounding neighborhood development offers the possibility of housing, services and recreational amenities, as well as potential for community interaction.

Situating Robot City in Hazelwood is consistent with the recommendations of two important regional economic development studies. The 2004 *Mon Valley Economic Development Strategy (MVEDS)* proposed adopting five strategies to maximize returns on private, county, state and federal economic investment throughout the region. The report recommends spatially concentrating development in primary and secondary hubs and strategically supporting these strategies through transportation and infrastructure. The ALMONO site in Hazelwood is identified as the optimal location for an "innovation zone" with strong economic ties to Oakland. Another study, *Advancing Southwestern Pennsylvania's Economic Future: The R&D Space Puzzle* (2004), argues that Southwestern Pennsylvania has an R&D competitive edge in biomedical drug discovery, bioengineering, multimedia technology, cyber security, robotics and multidisciplinary research. The study conservatively estimates that the city needs at least 1 million square feet of additional space for research and development, a number that could rise should the region continue to increase its share of federal research grants. The recommended strategies for accommodating this growth is to either cluster


Key: Robot City
Buildings
Existing Buildings
New Buildings
New Park Lands
New Park Land
Existing Parks
Active Recreation
Productive Landscapes
Multi-Use Trails
New Wetlands
New Woodlands
New Light Rail Line
Transit Station
5 Minute walk from station
(1/4 mile radius)

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Legibility

Possible Development Scenario

research and industry in multiple sites in and around Oakland or to concentrate a riverfront and technology park on the ALMONO site. Since the report was produced, the Pittsburgh Technology Center (PTC), which abuts the ALMONO property to the north, has begun construction on its plans to double its total square footage by nearly 1 million square feet. For robotics testing, outdoor land is as important as building space, making the empty ALMONO site with Building 19 an ideal location.

Carnegie Mellon's Robotics Institute's operations are currently dispersed over a number of sites in Pittsburgh. Its main site is the Carnegie Mellon campus in Oakland. Additional research is being conducted at the National Robotics Engineering Center (NREC), located on a 5.5-acre satellite facility in Lawrenceville which features both indoor and outdoor space. The Robotics Institute's Field Robotics Center (FRC) has been using the 178-acre ALMONO site for a variety of government and industrial research projects since 2000, with offices and workshop space in the historic B&O Roundhouse. The ALMONO site offers the combination of land, space of institutional and private facilities, proximity to Oakland and urban neighborhood context that is not available elsewhere.

The promise of Robot City's vision is emerging. Even with minimal capital investment, the ALMONO site has become a productive environment for robot development. For several of the FRC's recent projects, some vital portion of the research was conducted on the ALMONO site. In addition to these externally funded projects, the ALMONO site has provided a place to explore novel research concepts before their introduction to the market. The site has proved to be an indispensable test site for field robots.

The Robot City vision, with its unique indoor and outdoor laboratory spaces, institutional and commercial facilities, and urban context conveniently located close to Carnegie Mellon and Oakland, provides a place in which faculty and students can engage with commercial interests ranging from industry giants, such as Caterpillar and General Motors, to local Robotics Institute-based enterprises, such as RedZone and Sensible Machines. Robot City is a place where diverse creative and en
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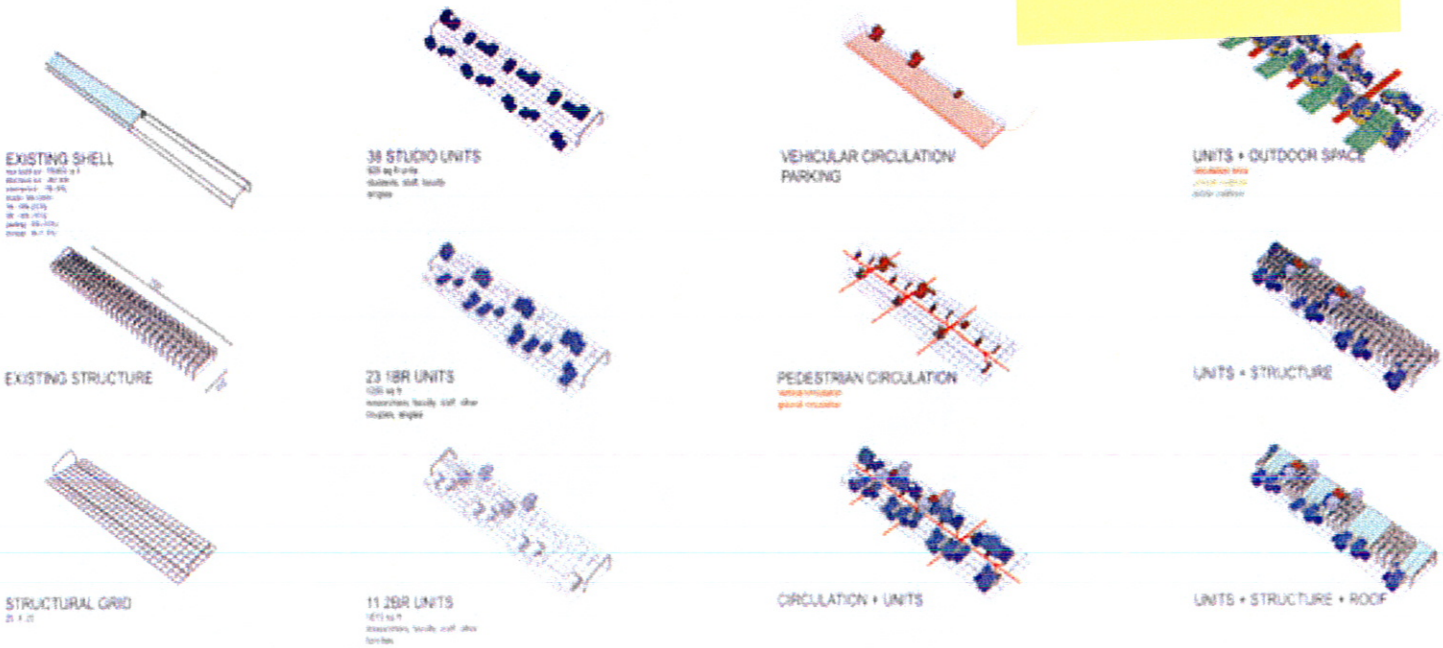
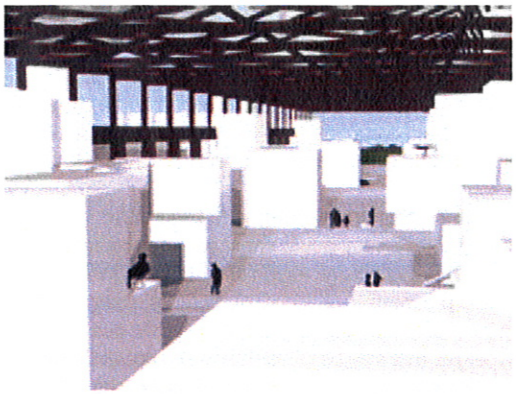
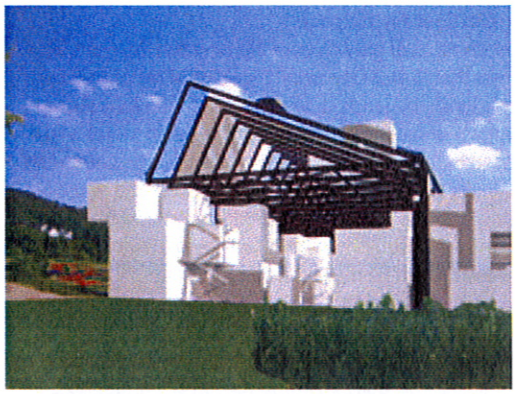
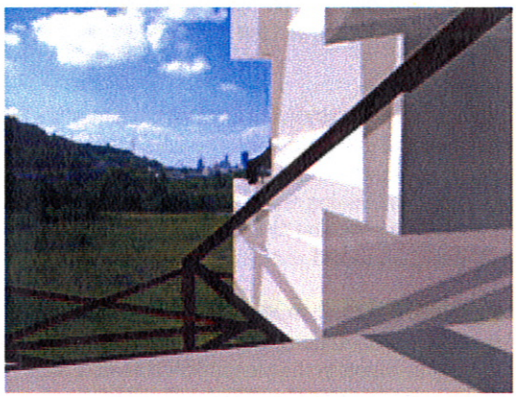
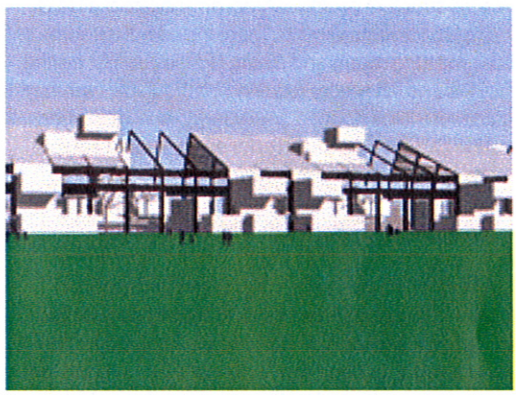


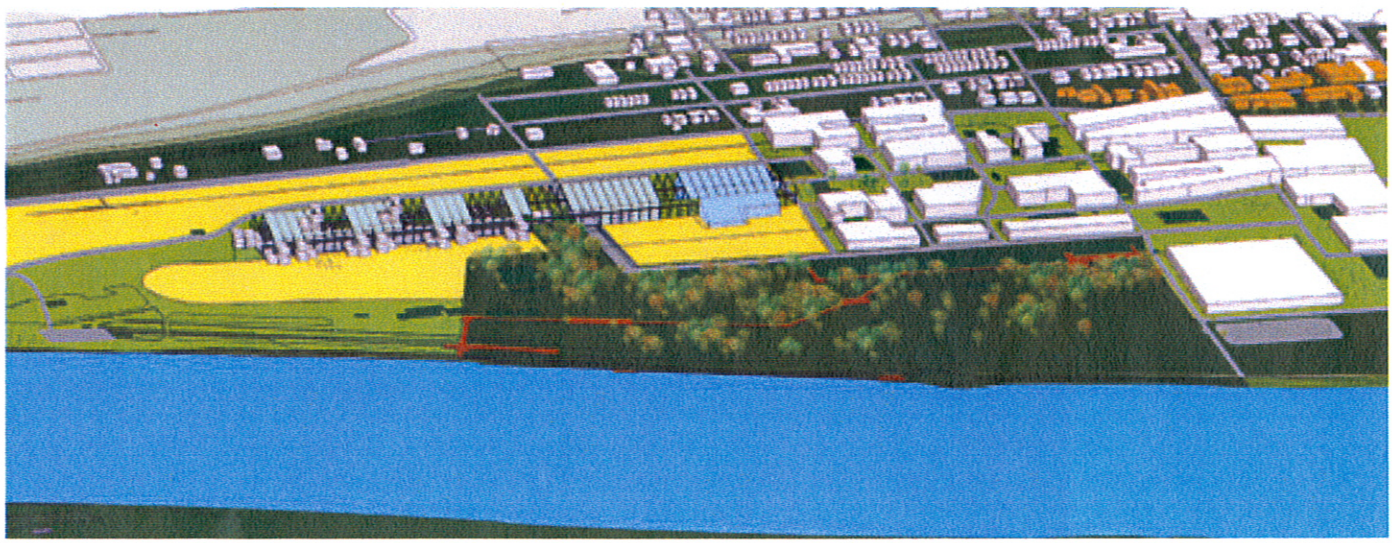








Reusing Building 19: Excerpts from Eastridge + Waldron, Urban Laboratory - Hazelwood, 2007.



Overview

Urban Form

Frameworks

Places
- Junction Hollow
- Four Mile Run Neighborhood
- Robot City
- Hazelwood Town Center
- Riverside Neighborhood
- Hazelwood Greenway
- Hazelwood Riverfront Park

Legibility

Possible Development Scenario

• Outdoor Field Space
Projections of growth over the next twenty years suggest that Robot City would need 50 acres of contiguous land. The land could be divided internally into a variety of reconfigurable parcels ranging in size and used for a variety of testing scenarios, such as off-road vehicle testing, agricultural applications and perception systems in vehicles. Mobile command trucks, containing equipment and facilities for monitoring the research, can be moved around the site.

• Indoor Space
With innovative renovation work, the existing Building 19 rolling mill shed, an immense 156,975 square foot (4-acre) structure could easily accommodate the FRC's indoor space requirements. These include: classrooms, offices, meeting rooms and dining facilities; indoor testing facilities and lab spaces requiring configurable high-bay space with large doors; manufacturing and fabrication stations; and storage facilities for earth moving equipment, tools, materials, physical barriers and lighting.

• Transportation Between Oakland
Accessing the ALMONO site by private vehicle from Oakland is circuitous and subject to the vagaries of local traffic surges. A permanent, speedy connection to Carnegie Mellon and Oakland via Junction Hollow is considered a requirement for Robot City's success, permitting an unobstructed flow of researchers, students and faculty. A fixed link between downtown and Robot City would facilitate access to city government, hotels and businesses. A proposal for an LRT line from downtown to Hazelwood and Lawrenceville via Oakland is currently being studied by the City of Pittsburgh.

• Colocation of Robotics Companies
A critical component of the Robot City concept is the inclusion of companies related to robotics. Office and laboratory space is required so that both industry giants and start-up companies can be involved in the development and commercialization efforts at Robot City.

• Visibility and Interaction with the Public
The FRC has several public engagement programs in place in the Pittsburgh region and wishes to incorporate similar programs in relation to Robot City. Being located in an urban context is very desirable for the possible synergies that may be created between Robot City and the neighboring community. The ALMONO site and Building 19 are highly visible from the Second Avenue transportation corridor and the Hot Metal Bridge.

• Housing
The work conducted by Robot City staff often means long hours and unconventional schedules. Temporary sleeping environments, such as cubicles or studios could be used by staff, visiting researchers and students. Longer-term off-site housing for FRC-related students, visitors and researchers should also be included in Hazelwood.

• Access to the Monongahela River
Researchers are enthusiastic about being able to test submersible robots in the Monongahela River. A dock should be incorporated for the use of the FRC.

The contribution of the Robotics Institute's FRC to the redevelopment of the ALMONO site has already begun with some levelling of land and phytoremediation work, undertaken with the help of robots and the

social enterprise GTECH Strategies. The FRC's robots can continue to be used in the future to shape, remediate and seed the site in preparation for reuse. Robots could further be engaged in agricultural work, possibly in conjunction with local job creation and training programs and productive landscape initiatives. There are also possible applications for public transportation, both in the short and long term, in partnership with regionally-based transportation engineering firms like Boeing. These efforts are multi-purpose, helping prepare the ALMONO site while advancing research and design into robotics engineering and strengthening multi-sector relationships and community programs.

Our recommendations for Robot City are as follows:

Location

From an overall district development perspective, the ideal location for Robot City is its current location in the narrowest section of the ALMONO site. In our Possible Development Scenario, it is wedged between two mixed-use urban nodes with LRT stops and buffered by landscape features that would assist in mitigating any noise or dust created on the site.

Layout

Robot City is flanked by Second Avenue and the steep Hazelwood Greenway to the east, and a major linear public park and the Monongahela River to the west. To the north, the historic B&O Roundhouse could be incorporated into the scheme as a public welcoming area, a museum featuring old robots and a viewing platform onto the site. Robotics-related firms and start-ups are clustered at either end of the site or, with preference, the Hazelwood Avenue end. These would be within easy reach of local LRT stations and be a potential customer base for the nearby retail corridor. In addition to new buildings on the ALMONO site, the FRC has suggested that landmark buildings, such as the former Carnegie Library of Hazelwood, might be sought out by robotics-related companies for their unique character and hillside location.

The site incorporates the existing rolling mill shed structure, called Building 19, an immense 156,975 square foot (4 acres) structure that is well suited to Robot City's need for a high-bay and storage space. This highly visible building is a landmark, not only as a wayfinding feature but also as a relic of Hazelwood's past, an optimistic symbol for the community's revitalization and its future, and as an icon for Carnegie Mellon's Field Robotics Center and the region's growing robotics industry. Building 19 could be readapted, modified, partially dismantled or added to in order to accommodate an indoor laboratory, flexible storage space, classrooms, offices, meeting rooms, lounges, dining space and short-term sleeping facilities. A large conference room and observation space could overlook the field site, the Monongahela River and Hay's Woods, taking advantage of the building's height and high vantage point on the site.

Arranging Robot City in a linear shape creates a long interface with Hazelwood's planned riverfront park. This location also brings Robot City close to the river, where a docking facility could be located to enable water-based research programs. In Phase I of the Possible Development Scenario, Robot City occupies a large portion of the ALMONO site. In subsequent phases, as development fills in, Robot City's size is

Remediating soil around Building 19. GTECH Strategies, a Pittsburgh-based social enterprise, has partnered with the Robotics Institute to plant pollution-soaking sunflowers and other species in the most contaminated section of the ALMONO site, "Area B." The energy garden was planted with the help of RI robots.

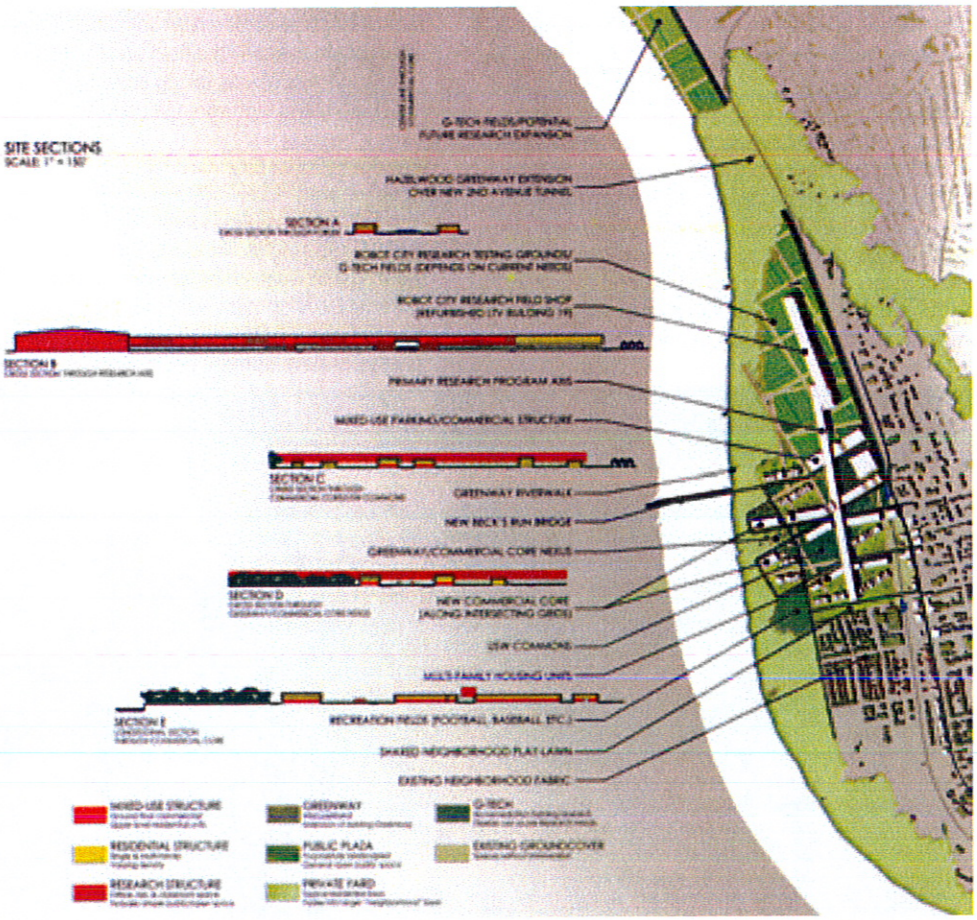
reduced to 40 acres, including the 4-acre Building 19. This size is subject to the FRC's requirements and final layout for Robot City.

Community Interaction

Locating the FRC in an urban settings allows for interesting opportunities for public engagement and contribution to Pittsburgh's riverfront park. While there are inherent safety and security protocols that have to be followed -- projects with defense and security applications cannot be viewed by the public, for example -- some level of visual permeability could be allowed. Robot enthusiasts and passersby could view non-military testing occurring on the site through viewing platforms. Perimeter fencing could be punctuated by viewing areas. The riverfront park could be graded higher as well in order to provide a view into the site. There is an interesting opportunity to have a temporarily transparent edge along the public riverfront park, perhaps using digital technology and Light Emitting Diodes (LED) to create panels that turn on or off depending on the security levels needed by Robot City researchers. These gestures will help deter perceptions that Robot City is meant to be a fortress in the middle of Hazelwood. The FRC is additionally interested in a public program of guided tours, lectures and youth robotics camps and programs.

Sustainable Design

In keeping with the sustainable development mission of the ALMONO partners, Robot City should follow LEED building guidelines as well as Low Impact Development (LID) site design. A rooftop rain water collection system could provide non-potable water for the FRC's testing operations. Robot City's energy needs could be met through the Hazelwood district co-generation energy plant and supplemented by on-site solar and wind generation. Other measures include green walls or rooftop and using regionally-sourced and recycled building products. Shipping containers could be reused to create mobile units or field barracks.



Washabaugh + Gleiche, Urban Laboratory - Hazelwood Studio, 2007.

This living green wall on Herzog & de Meuron's CaixaForum in Madrid provides inspiration for an interesting and unconventional facade along Robot City's Building 19 or its long perimeter wall. Photo courtesy Patrick Blanc.

The proposed adjacent B&O Roundhouse park could have a rotating programme of landscape artwork, such as seasonal flower picking fields, where the public is invited to pick fresh-cut flowers. This photo of a poppy field at the Showa Memorial Park in Japan, courtesy of Getty Images.

Overview

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Legibility

Possible Development Scenario

Hazelwood Town Center

Hazelwood Town Center is conceived of as a vibrant, commercial mixed-use district with multi-modal connections in the heart of Hazelwood's residential community. The ambition of the recommendations is to reinforce a sense of place and identity along Hazelwood's core thoroughfares, Hazelwood Avenue and Second Avenue, and to create a destination that will draw Hazelwood residents, Pittsburgh residents and out-of-town visitors.

Currently, commercial activities are concentrated along the six blocks of Second Avenue between Hazelwood Avenue and Johnson Avenue. This once-thriving business district has suffered since the decline of local industries and many of the storefronts sit empty. A considerable number of buildings have been torn down in the northern section near Minden Avenue, giving the street a "gap-toothed" appearance. A 2003 inventory found that less than half of Second Avenue's buildings are in "excellent" or "sound" condition and only half were occupied.

There are several notable historic and cultural buildings along Second Avenue, including the Episcopal Church of the Good Shephard, the Pittsburgh Railways Building (now the "Car Barn" seniors' center), and the Keystone Grocery Building. The Hazelwood Historic District, a 222-acre area surrounding Second Avenue, was designated in 1997 as eligible to be listed by the National Register of Historic Places.

In 2005, the local firm Loysen + Kreuthmeier Architects was commissioned to produce the *Hazelwood Second Avenue Design Strategy*. The strategy highlighted the parcels in the Keystone Opportunity Zone (KOZ), between Minden Avenue and Flowers Avenue. This 10-year designation, which began in 2000, allows for 100 percent local and state tax abatement for all property types. Since then, the Urban Redevelopment Authority (URA), the city's redevelopment agency, has acquired more than a dozen parcels. The Strategy's recommendations, which include a series of gateways, remain valid within the vision proposed by the Remaking Cities Institute.

The proposed Hazelwood Town Center is concentrated along two corridors, the historic main street, Second Avenue, between Mobile Street and Johnston Avenue, and Hazelwood Avenue, from the Gladstone School building down to the Monongahela River. A possible third mixed-use corridor, with an emphasis on live-work spaces and neighborhood-retail, would be located along Elizabeth Street. The Second Avenue "Parkway" concept would provide a contrast to the Hazelwood Town Center, acting as a linear entrance to the Town Center's main node at Hazelwood Avenue and Second Avenue.

In total, there are four core zones to the proposed Hazelwood Town Center and two complementary zones.

The core zones are:

I Second Avenue, between Mobile Street and Johnston Avenue

II Upper Hazelwood Avenue, above Second Avenue

III Lower Hazelwood Avenue, below Second Avenue

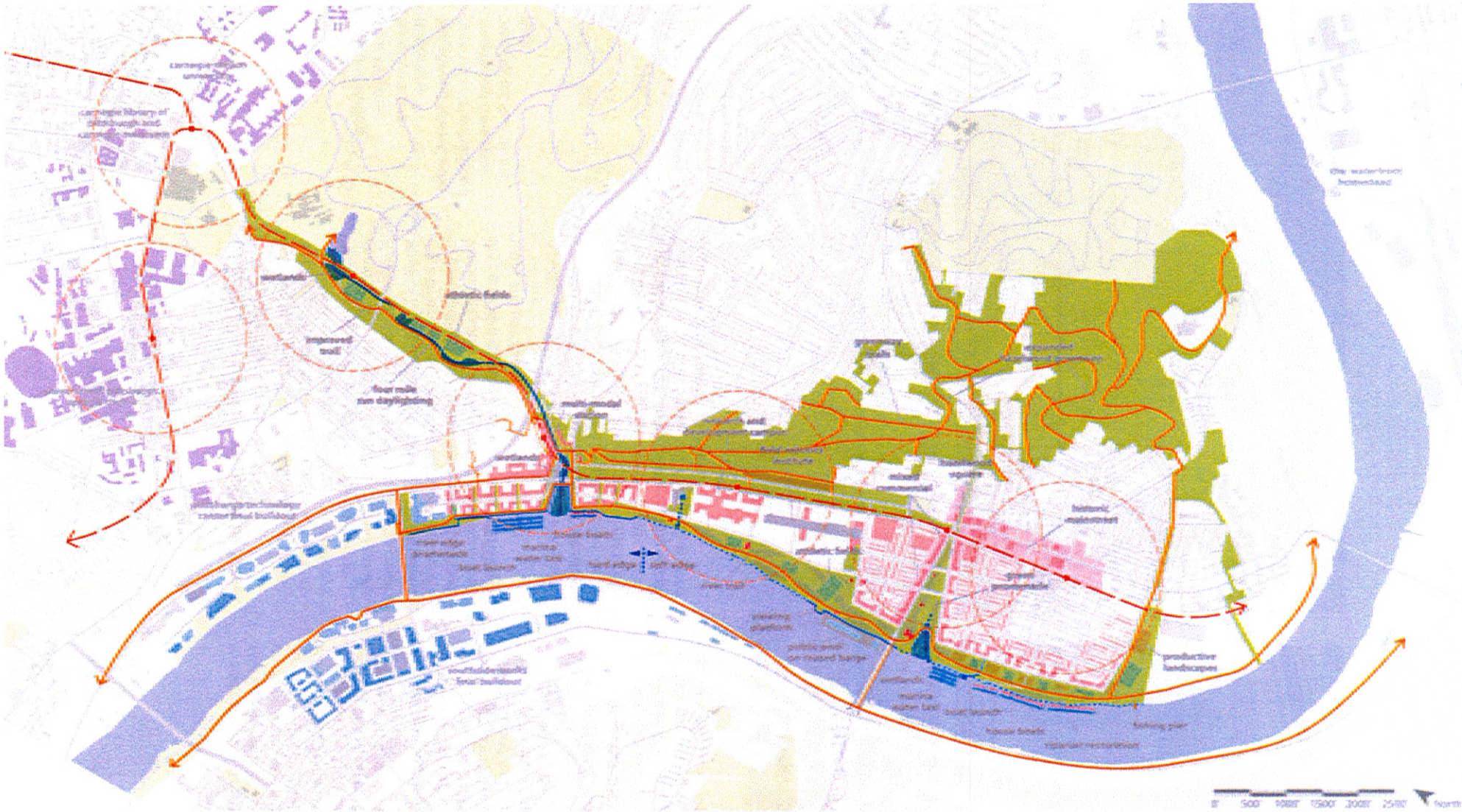
IV Intersection of Hazelwood Avenue and Second Avenue

The complementary zones are:

V Elizabeth Street, below Second Avenue

VI Second Avenue "Parkway", between Greenfield Avenue and Hazelwood Avenue

Linking Hazelwood to its riverfront and its past through design: Architect Adam Kalkin's Quick House, created from standard shipping containers, can be adapted to different uses, from disaster-relief housing to luxury dwellings or café. Photo courtesy Illy Caffe.



Key: Hazelwood Town Center

Buildings
- Existing Buildings
- New Buildings

New Park Lands
- New Park Land
- Existing Parks
- Active Recreation
- Productive Landscapes
- Multi-Use Trails
- New Wetlands
- New Woodlands

- New Light Rail Line
- Transit Station
- 5 Minute walk from station (1/4 mile radius)

Overview

Urban Form

Frameworks

Places
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Legibility

Possible Development Scenario

I Second Avenue, between Mobile Street and Johnston Avenue

This section of Second Avenue is the heart of Hazelwood's historic main street. Second Avenue currently accommodates 15,000 commuters during weekdays. With its narrow right-of-way, it is a challenge to accommodate vehicular traffic, cyclists and pedestrians. A redesigned Second Avenue should strive to create a sense of intimacy along the sidewalk using landscaping, a bike lane and on-street parking. Adding details to the buildings and sidewalk realm, such as signage, window treatments and vegetation, and clearly marking pedestrian crossings at intersections will help calm traffic and restore a "mainstreet" atmosphere.

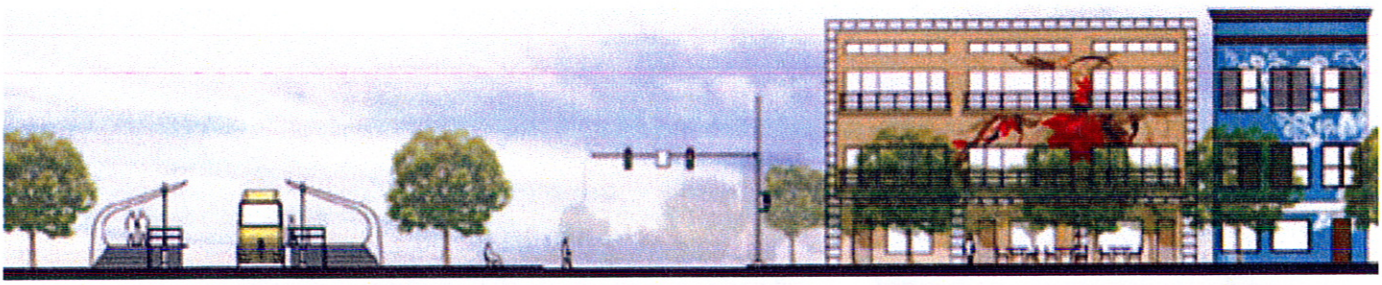
Running parallel to Second Avenue, on the riverside, is the proposed LRT line to Oakland. The LRT infrastructure can be made to be "felt" from Second Avenue, both literally through intermittent holes in the fabric that allow views and nighttime lighting, and creatively, with interactive digital kiosks or screens along Second Avenue on which are displayed train times, live views and multi-modal transfer information.

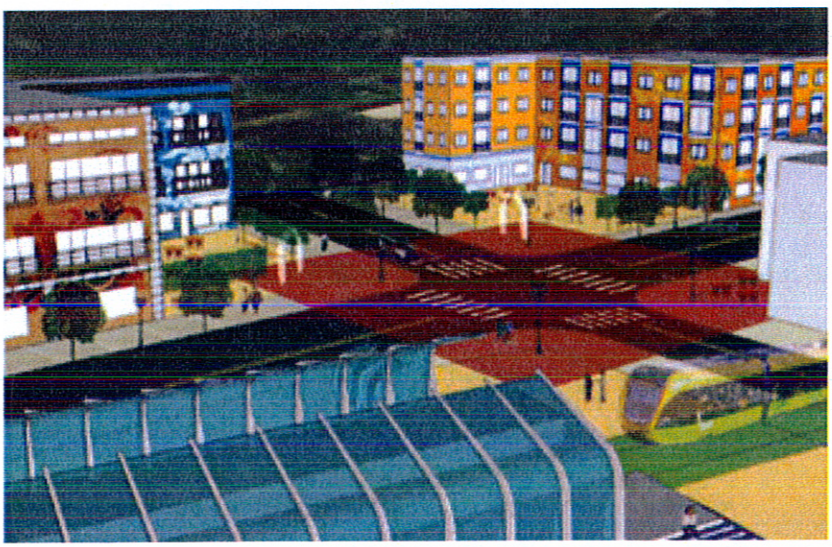
In addition to the Hazelwood LRT station and the Four Mile Run Neighborhood multi-modal station, we recommend a stop near Robot City and at the end of the Town Center, at Elizabeth Street. As explained in the Transportation Framework section, the recommendations are for two LRT stops along the business district: a station at the nexus of Hazelwood Avenue and Second Avenue and a sheltered stop at Elizabeth Street.

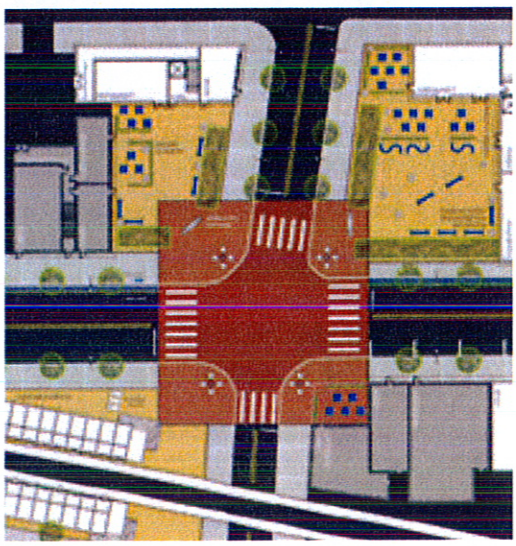
Together, these two stops englobe 90 percent of the residential streets within a quarter-mile or five-minute walking distance. Sheltered bike parking, interactive transportation information kiosks and a parking garage near Hazelwood Avenue and Second Avenue would provide multi-modal synergies. Gateways are discussed in the Legibility section.

II Upper Hazelwood Avenue, above Second Avenue

There is an opportunity to revive Upper Hazelwood Avenue, the portion rising uphill from Second Avenue, by enhancing and creating physical connections between important existing community buildings, including the







Church of Life's home base, the nearby YMCA building, the former Carnegie Library of Pittsburgh branch, the Woods House and the now-closed Gladstone Elementary School. Empty lots should be filled in to create more density or integrated into the public space network.

III Lower Hazelwood Avenue, below Second Avenue

We recommend that Hazelwood Avenue be extended beyond Second Avenue to the Monongahela Riverfront. In the long term, a new bridge to the South Side would create a necessary major regional access point to the city. Lower Hazelwood Avenue is conceived of as a wide boulevard, bordered on the north side by commercial uses fronted by wide sidewalks and outdoor patios, and on the south side by a large green promenade with stormwater capturing features, extending down to the Hazelwood Riverfront Park.

Buildings on the commercial side should be four to six storeys tall with residential apartments on upper floors taking advantage of the views. The green promenade is one of the four wedges of the Green-Blue Framework, acting as a visual connector to the Hazelwood Riverfront Park. It also contains Sustainable Urban Drainage Systems, designed to divert and retain urban runoff using attractive landscape features, such as boulevard swales, perched wetlands and treatment wetlands. The green promenade should be bordered by higher-density residential buildings on the Riverside Neighborhood side.

IV Intersection of Hazelwood Avenue and Second Avenue

The intersection of Hazelwood Avenue and Second Avenue is conceived of as a major node in Hazelwood. An LRT station and adjacent public space should mark the intersection. This public space should be part of a larger coordinated network of varied and hierarchical public spaces designed to accommodate all users.

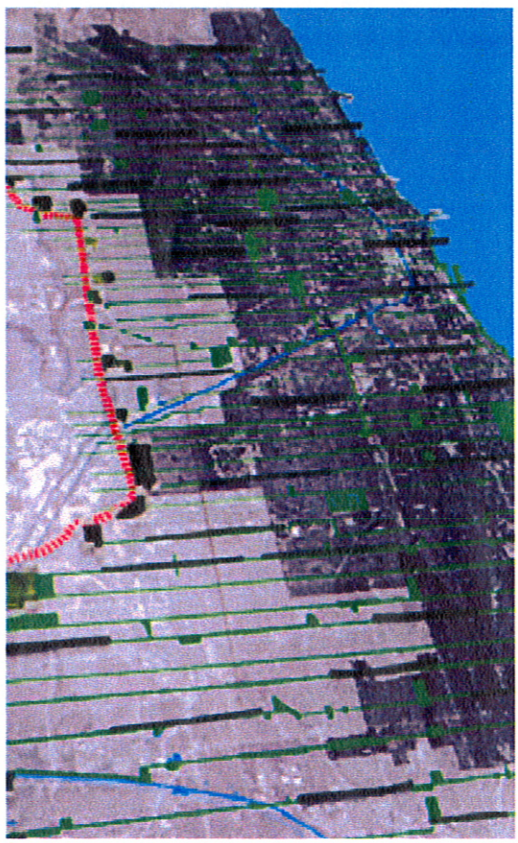
Within the Hazelwood Town Center, Hazelwood Avenue and Second Avenue should maintain continuous active frontages in order to create a sense of movement, vibrancy and safety for pedestrians. Occasional voids, such as small squares and recessed setbacks, can invite the pedestrian to explore shops or sit. Spill-out spaces, such as patios, should be encouraged, particularly on the wide, north commercial side of Lower Hazelwood Avenue. Given Second Avenue's narrower right-of-way, spill out spaces can be located between buildings, in front of new buildings that are set further back or on upper-floor patios.

The sidewalk should be treated as a linear public space leading to public squares and LRT access points.

Techniques for creating legible and functional urban form and quality public space in the core zones include:

- infilling along Second Avenue and Upper Hazelwood Avenue
- encouraging continuous and active frontages through articulated facades, transparency, narrower storefront widths and spillout zones
- emphasizing gateways
- making strong statements at street corners, particularly at gateways
- improvements to the streetscape
- connecting public spaces to special uses and buildings, such as transit infrastructure and cultural venues
- emphasizing landmarks through lighting
- preserving and highlighting views and landmarks
- traffic calming measures and Complete Streets
- parking garages instead of surface lots

Emphasis should be made on connections to buildings and uses that are embedded in the residential fabric,



LRT station at the redesigned intersection of Hazelwood Avenue and Second Avenue by Whang + Kim, Urban Laboratory - Hazelwood, 2008.

Reacting to the fact that one billion gallons of fresh water is extracted from Lake Michigan by Chicagoans each day and then moved into the Mississippi River system after treatment, Chicago's UrbanLab firm has partnered with the City of Chicago to research, design and develop the eco-boulevard project, a system of 50 strips of public land converted into green infrastructure that recycles and retains water used by the City. Courtesy of UrbanLab.

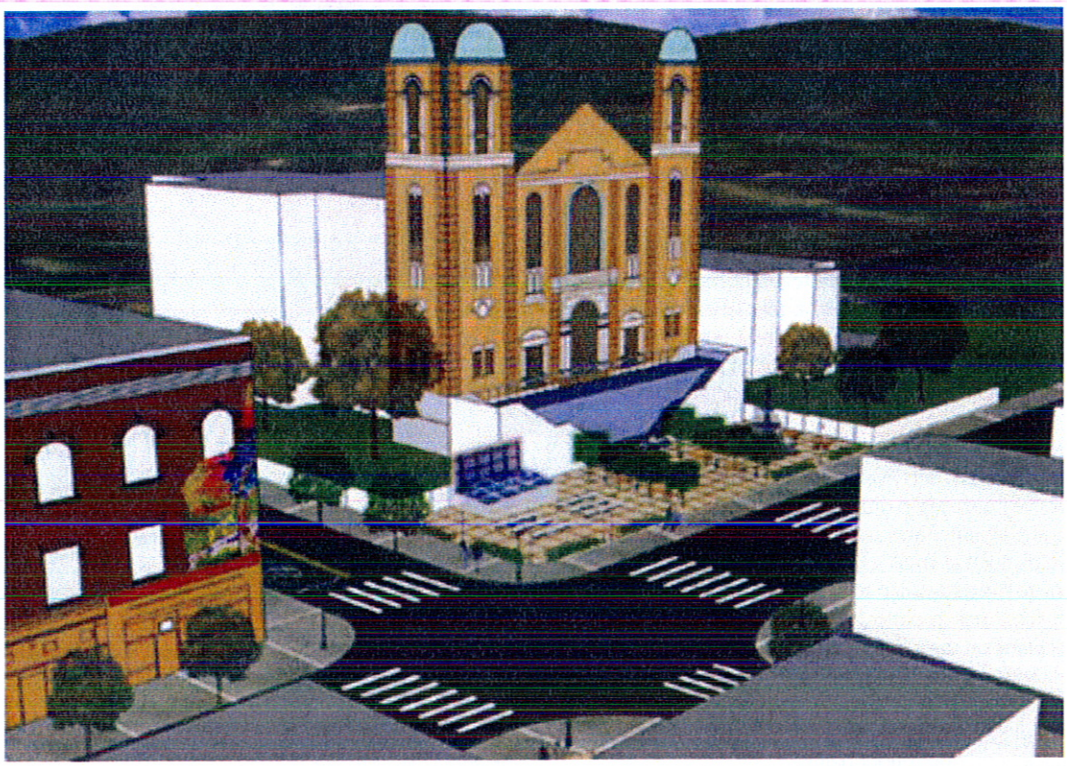
such as the Carnegie Library of Pittsburgh, the Woods House, Hazelwood Greenway and community gardens. Enhancing pedestrian connections to nearby residential streets can be achieved through safe and pleasant passageways.

V Elizabeth Street, below Second Avenue

In the long term, Elizabeth Street could function as a live-work zone with limited neighborhood services, such as cafés, restaurants and convenience stores. Buildings should be no higher than four storeys. Workshops, offices and studios with large windows fronting the street should be encouraged.

VI Second Avenue "Parkway", between Greenfield and Hazelwood Avenues

Currently, Second Avenue becomes Irvine Street at Hazelwood Avenue and continues toward Greenfield Avenue. As it passes Hazelwood Avenue, its character changes: The hillside becomes steeper and there are fewer and fewer buildings. With the redevelopment of the ALMONO site, there is an opportunity to create a distinct urban parkway effect between Mobile Street, just past Hazelwood Avenue, and Greenfield Avenue. In the proposed 20 year vision, Irvine Street would be closed and its right-of-way folded into the Hazelwood Greenway. A new avenue would feature the Hazelwood Greenway edge on one side and Robot City on the other. As the ALMONO site is developed, Mobile Street should become a through street crossing Second Avenue into the southern edge of Robot City.



Proposal for a public square in front of St. Stephen's Church at Second Avenue and Elizabeth Street. Whang + Kim, Urban Laboratory - Hazelwood, 2008

Framework plan depicting a new commercial axis extending diagonally from Second Avenue and Elizabeth Street to a new riverfront park and bridge. Feldman + Rakus + Watten, Urban Laboratory - Hazelwood, 2007.

Renewing Second Avenue by infilling and creating dynamic and connected public spaces. Whang + Kim, Urban Laboratory - Hazelwood, 2008.

Overview

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Frameworks

Places
- Junction Hollow
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- Robot City
- Hazelwood Town Center
- **Riverside Neighborhood**
- Hazelwood Greenway
- Hazelwood Riverfront Park

Legibility

Possible Development Scenario

Riverside Neighborhood

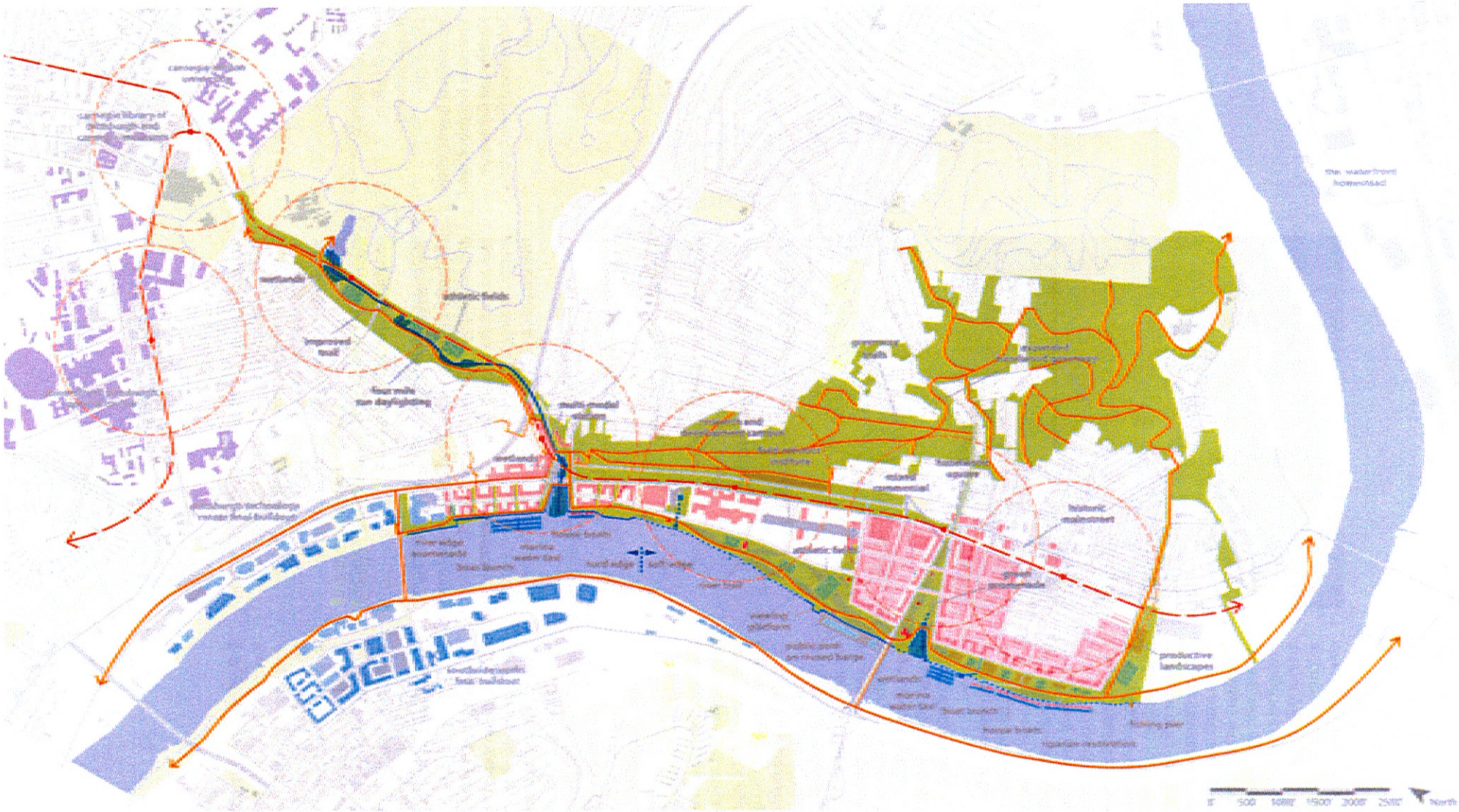
The ALMONO site is an opportunity to create a sustainable urban neighborhood, one that embraces the best of the city's past, such as its walkable streets and built heritage, with the promise of the region's growing multi-sectorial competency in sustainable building construction and design.

Reusing existing urban environments allows for continuity between generations through the preservation of older buildings and urban forms, as well as through contributions to existing social and cultural communities. Importantly, revitalizing cities can help lessen the appeal of new construction in greenfield sites. This is particularly important in the context of the Pittsburgh region.

Like many formerly industrial cities, Pittsburgh has simultaneously faced population decline and rising sprawl. A recent comparative study of American cities published in the *Quarterly Journal of Economics* identified the Pittsburgh, PA Metropolitan Statistical Area (MSA) as the most sprawling city in America. Within the MSA, only one in ten residents lives within Pittsburgh's city limits. This unplanned spatial growth can be attributed in part to the fragmented nature of government in the region. The Brookings Institute has called Pittsburgh "a curiosity among the 50 largest metropolitan areas", because although the region's population declined 6.6 percent from 1982 to 1997, local officials maintained more than 414 local governments and developers urbanized more than 200,000 acres of land, a 39 percent increase in urbanized area. During the same period, the number of persons per urbanized acre dropped from 4.8 to 3.3 and vehicle miles traveled doubled between 1970 and 1990.

Riverside, known colloquially as "below the tracks", is made up of six blocks located on the flatlands between the Monongahela River and Second Avenue. It directly borders the ALMONO site to the south. The community was reduced in 1952 when the URA agreed to allow J&L to expand its Hazelwood cokeworks operations. Today, it has a somewhat isolated "enclave" character, being bordered by Second Avenue, the ALMONO site, the Glenwood rail yards and light manufacturing operations. While statistically the poorest section of Hazelwood, Riverside is a lively and tight-knit community. The area is primarily residential, with a mix of single-unit dwellings, apartments and row houses. Hazelwood Harvest has been active in planting community gardens on vacant land in Riverside.

This proposal sought to match the existing block density and acreage of Riverside in a new extension, focusing on introducing more variety of housing types and amenities. The density and building heights at the periphery of the new development increase, creating a "pinnacle moment and corridor" at the entrance of a new riverfront park. Work by Miller, Urban Laboratory - Hazelwood, 2008.



Key: Riverside Neighborhood

Buildings
- Existing Buildings
- New Buildings

New Park Lands
- New Park Land
- Existing Parks
- Active Recreation
- Productive Landscapes
- Multi-Use Trails
- New Wetlands
- New Woodlands

New Light Rail Line
Transit Station
5 Minute walk from station
(1/4 mile radius)

Under our recommendations, the Riverside Neighborhood would double in size. This mostly residential neighborhood would mirror the residential portion of Hazelwood that rises above Second Avenue into the hillside, providing a solid local market for the Hazelwood Town Center. Residents would be within a five-minute walk of the Town Center's two LRT stations and the Hazelwood Riverfront Park.

The Riverside section of Hazelwood can attract new residents by offering a vibrant and livable environment and responding to the need for new housing typologies and tenureship. Options like cohousing, cooperative housing, low-rise apartments with views and houseboats can all help increase Hazelwood's draw.

Our recommendations for Riverside focus on:

I Peripheral Density

II Diversity of Housing

III Houseboat Community

IV Neighborhood Amenities

V Live-Work along Elizabeth Street

LEED
LEADERSHIP IN ENERGY AND ENVIRONMENTAL DESIGN

Left: Options for Homes' Mill Street Co-op, a 95-unit apartment condominium in the historic Gooderham & Worts Distillery District in downtown Toronto, sold two- and three-bedroom suites at $50,000 below other new construction condominiums in the same area. Resale values have since increased by over 19 percent. Photo by UrbanDB.

Miller's proposal demonstrates density along Elizabeth Street and at the park edge. Urban Laboratory - Hazelwood, 2008.

I Peripheral Density

Riverside's edges -- Second Avenue, Hazelwood Avenue and the Hazelwood Riverfront Park -- should feature higher-density housing on the order of four to six storey apartment blocks in order to take advantage of retail, transit and park amenities. Rowhouses and duplexes similar to existing typologies should fill in the center. The design of Riverside's development edges should explicitly address the park spaces, the Monongahela River and surrounding views.

II Diversity of Housing

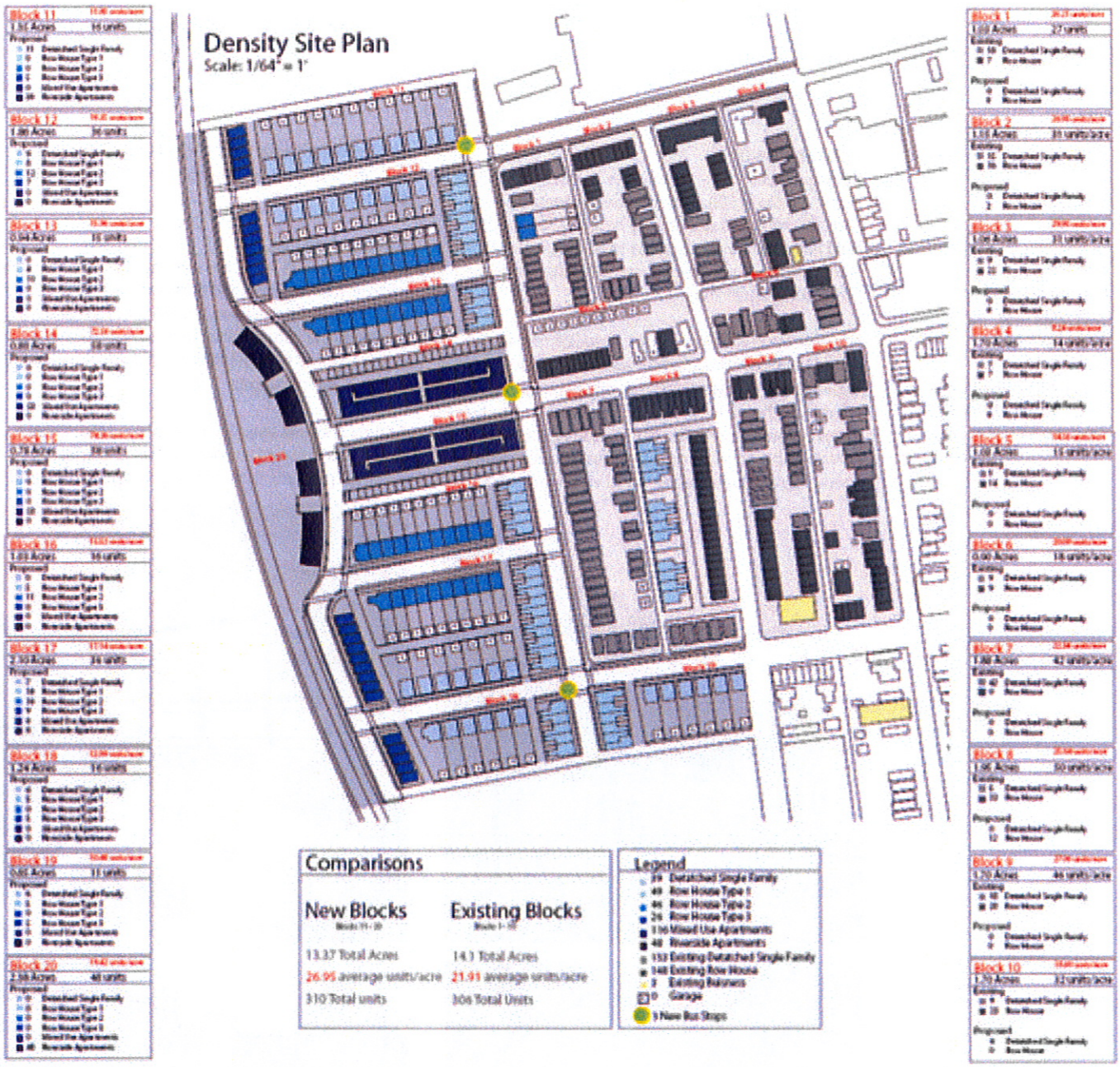
An early action should be to repair existing housing and help homeowners stay in their homes while providing affordable options for existing renters. Encouraging housing cooperatives for existing tenants is one way to ensure that lower-income residents will not be displaced as property values rise and rents increase.

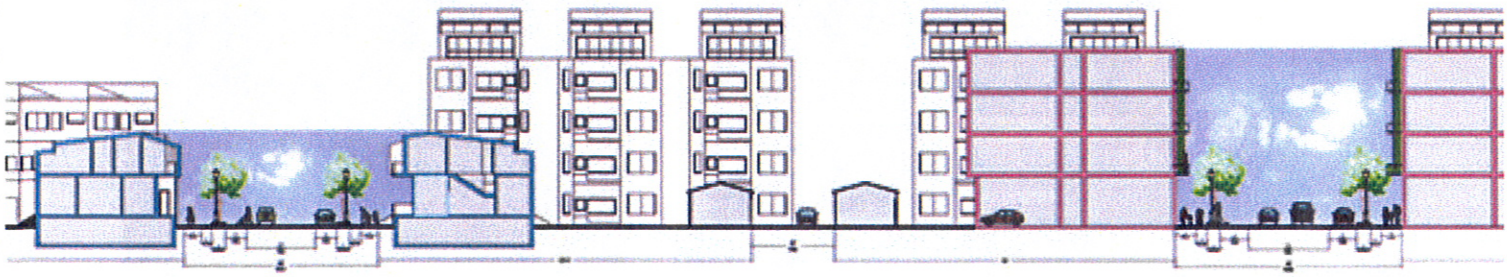
The following special housing types are recommended:

- **Affordable For-Sale and Rental Housing**

Hazelwood should strive to be an integrated community in which a range of people from different socio-economic and age backgrounds live together. Following the LEED ND guidelines, at least 15 percent of all rental units should be priced for households up to 50 percent of Pittsburgh's median income and an additional 15 percent of rental units priced for households at up to 80 percent of Pittsburgh's median income. These should be maintained at affordable levels for a minimum of 15 years. There are numerous examples of successful and attractive affordable rental housing models, including cooperatives and other non-profit structures.

A certain amount of for-sale housing should also be priced to be affordable. At least 10 percent of for-sale housing should be priced for households up to 80 percent of Pittsburgh's median income and an additional 10 percent of for-sale housing priced for households at up to 120 percent of the median income. Affordable housing should be offered in a variety of housing types, from rowhomes to apartments. One model to investigate is Options for Homes, a Toronto-based non-profit developer of for-sale housing of all types. This award-winning company eliminates unnecessary extras, such as marketing, in order to offer initial housing to purchasers with incomes as low as $40,000 (Canadian dollars), with mortgage payments often less than the average rent levels in Toronto. They also provide unique financing for first-time homebuyers with low-moderate incomes. This successful model is being adopted in cities like Montreal, Vancouver and Ottawa.


Density Site Plan
Scale: 1/64" = 1'
Comparisons
New Blocks
Existing Blocks
13.37 Total Acres
14.3 Total Acres
26.95 average units/acre
21.91 average units/acre
310 Total units
306 Total Units
Legend
39 Detatched Single Family
49 Row House Type 1
46 Row House Type 2
26 Row House Type 3
136 Mixed Use Apartments
48 Riverside Apartments
153 Existing Detatched Single Family
148 Existing Row House
3 Existing Business
0 Garage
5 New Bus Stops



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Legibility

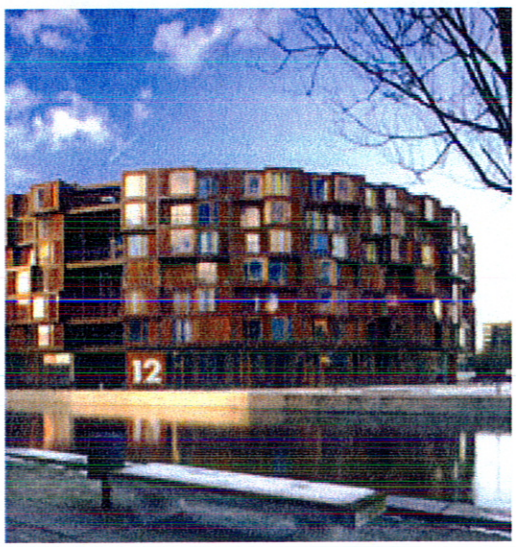
Possible Development Scenario

• **Student Housing**
Carnegie Mellon University's current needs for student housing include 500 units of undergraduate housing and 200 units of student family housing. Should the Field Robotics Center continue to be located in Hazelwood, they may also need housing for their student and visiting researchers.

A redeveloped Hazelwood with fixed link to Oakland would be an ideal location for additional student housing. Faculty and researchers may opt to buy an existing refurbished home in The Run or Hazelwood, or to buy a new home or apartment in Riverside or Four Mile Run Neighborhood. Temporary housing, such as that needed by graduate students and visiting researchers, can be located adjacent to Robot City, within walking distance to the Hazelwood Town Center and LRT station.

• **Senior Housing**
Over the next 25 years, it is estimated that the number of Americans aged 65 and older will double to 20 percent of the population. The post-war generation, known as the Baby Boomer generation, is better educated, more a uent, healthier and more engaged than previous senior cohorts.

A study of adults aged 55 to 64 showed that these early boomers want to continue learning after retirement (81 percent), try new things (70 percent), travel



Modular student housing in Utrecht. "Spacebox" units are designed to be quickly produced in a factory in any color using the safest materials available, and assembled on site to form complete buildings.

In Copenhagen, the wood-clad Tietgenkollegiet student dormitory building's circular form is meant as a symbol of equality and community while the 360 articulated individual units express each student's individuality. Photos courtesy of Lundgaard & Tranberg Architects.

Riverside as imagined by Carnegie Mellon University architecture students. Top, A spectacular view of downtown Pittsburgh and the Monongahela River, by Kozar + Couch. Bottom, housing that meets the river. Debolski + Lynch. Urban Laboratory - Hazelwood, 2007.

(65 percent) and pursue a new hobby or interest (63 percent). Their consumer and lifestyle preferences and expectations, which include lifelong learning opportunities and access to culture and entertainment, can be incorporated into the ALMONO redevelopment.

There are several housing types that may attract seniors to Hazelwood:

- Urban village-style environment, in which services and commodities are within easy walking distance. The ALMONO site is nearly flat and has the potential to be an accessible neighborhood. Service-rich locations include the Four Mile Run Neighborhood and the area surrounding the Hazelwood Town Center.

- University-affiliated housing is housing geared to seniors interested in partaking in university cultural and learning activities while living in proximity to a campus. These are typically in smaller college towns or rural settings. However an urban precedent is under development: MIT President Emeritus and colleagues from MIT and Harvard have created the University Residential Communities (URC) at 303 Third Street in Cambridge, MA, a multi-generational cooperative community aimed at allowing residents to "age gracefully and prosper professionally".

The building features 168 units of varying floorplans as well as common areas such as a private dining club, a library/lounge room, a media/screening room, a fitness facility, a swimming pool, open garden courtyard and wellness facility. The context is urban, and within walking distance to Kendall Square, MIT, Harvard, a major hospital, a new urban park, a large media center and shops.

- Cohousing is made up of privately-owned units, possibly in a row of townhouses or an apartment building that is clustered around common indoor and outdoor amenities, such as meeting rooms, workshops, studios, a pool and gardens. This is not a gated community but an intentional community, where residents democratically organize the services and amenities that they wish to share with people of similar interests.

Cohousing originated in Denmark but has been popular in California for decades. Cohousing used to be initiated by families with children but senior-oriented cohousing developments are on the rise. Silver Sage Village in Boulder, CO, is a sustainably built cohousing development formed by seniors for seniors. It occupies one acre and has 16 semi-detached and detached units organized around a community center and common green space.

- Houseboat community, located at the edge of the Four Mile Run Neighborhood and the Riverside Neighborhood. Retirees may enjoy living in Pittsburgh for the summer and then moving to a warmer locale for the winter.

- Many seniors in Pittsburgh are low-income and cannot afford to leave their homes. The site developer should include non-profit affordable senior housing in apartment style and look for service programs that can help seniors stay in their homes for as long as they can safely. An example is Fairmont Apartments on Penn Avenue in Garfield-Friendship, a 60-unit, mid-rise rental housing development available to seniors aged 62 and older.

Senior housing precedents:

URC at 303 Third Street, university-affiliated housing for seniors in the heart of Cambridge, MA. Photo courtesy of URC.

Silver Sage Co-housing Village conceived by and designed for seniors in Boulder, CO. Photo by Dana Romanoff.

III Houseboat Community

Long-time residents of Pittsburgh can still remember when houseboats use to line the shores of Pittsburgh's three rivers. While living on the river is no longer a common cultural practice, it hasn't entirely disappeared. Artist Carolyn Lambert from Carnegie Mellon's Studio for Creative Inquiry documented life on the water and at its edge in the Ohio River Lifeboat Project. She spent three months on a pontoon boat recording what she calls "the perfect linear narrative", the stories of the Ohio River and the people who depend on it and even live on it. Local architect and preservationist Rob Pfaffman proposed converting barges into "River Lofts" in a 2000 entry to the Pittsburgh Chapter of the American Institute of Architect's annual Design Awards competition.

We propose a continuation of this "river narrative" by including a permanent houseboat community on the northern shore of the Monongahela River. Comparable precedents exist in Seattle, WA, Victoria, BC, and Sausalito, CA, as well as in cities throughout Europe. The houseboat community would be an extension of Hazelwood's residential fabric, not a private or gated community. Docks would be considered part of the pedestrian path system, analogous to a public sidewalk.

The community could be operated by the City or as a non-profit cooperative, with residents sharing communal services, such as a ZipCars and club house. Non-permanent houseboats could accommodate short-term visitors and seasonal residents who might travel south along the Ohio River and Mississippi during the winter months.

IV Neighborhood Amenities

With more than double the current population, the Riverside Neighborhood will require additional neighborhood amenities, including parklets and pocket parks, and perhaps a new school or community center.

V Live-Work along Elizabeth Street

As mentioned in the Hazelwood Town Center section, a live-work district could be created along Elizabeth Street in the expanded Riverside Neighborhood. Neighborhood businesses, such as a convenience store or restaurant, could be also be included.

Urban boathouses: Top three photos depict modern designs while lower photos show a Fisherman's Wharf dock with boathouses in Victoria, Canada, and a colorful collage of boathouses in Seattle's Puget Sound.

Overview

Urban Form

Frameworks

Places
- Junction Hollow
- Four Mile Run Neighborhood
- Robot City
- Hazelwood Town Center
- Riverside Neighborhood
- Hazelwood Greenway
- Hazelwood Riverfront Park

Legibility

Possible Development Scenario

Hazelwood Greenway

A greenway is a linear piece of land that connects people to different places. These corridors of open green space are typically located along natural areas, such as river and stream valleys, or man-made landscapes, such as abandoned railroad beds and utility corridors.

Greenways provide many benefits to communities and the environment. As vegetated, permeable landscapes, they offer natural habitat, improve water quality by reducing the impacts of surface flooding, and cool the urban environment. They provide transportation connections via trails, enabling residents to live a more active lifestyle. They also enhance cultural awareness of the environment and promote community identity through place-making. Like parks in general, greenways create value for surrounding real estate, support the goal of public health and active living, filter air pollution and generate economic activity by promoting outdoor recreation. These benefits are amplified when greenways are combined into a regional network of green transportation, recreational trails and wildlife corridors, with connections to waterways.

The scenic and touristic value of Pittsburgh's forested hillsides and rivers are well documented but their ecological and recreational value have yet to be fully embraced. In his book about Pittsburgh and its topography, *The Spectator and the Topographical City* (2006), Carnegie Mellon University Architecture Librarian Archivist Martin Aurand writes:

"Despite the despoilments of industry, the density and reach of urban development, and the dominating stance of contemporary skyscrapers, the land remains, and arguably has the upper hand. While Pittsburgh was, for a time, the quintessential industrial city, it was always and is today the quintessential topographical city" (ix).

The city's hillsides provide an unusual hiking environment in an urban context, offering a cool green forest climate in the summer, a multicolored tapestry in the fall, and outstanding panoramic views in the winter. Hillsides also provide habitat and critical corridors of movement for wildlife, providing hikers with opportunities to see deer, turkeys and birds of prey, as well as countless species of native plants. The report *Opportunities for Hillside Protection* (2005) offers recommendations for conserving Pittsburgh hillsides.

Hazelwood's hillside rises 300 feet, one of the steepest in the city. It is currently underused due to a lack of recreational infrastructure and clear access points. There is an existing trail but it is not well-maintained and is difficult to access. Hazelwood is particularly well positioned to become a neighborhood that fully takes advantage of its magnificent slopes by consciously adopting a greenway strategy in conjunction with the consolidation of the urban fabric.

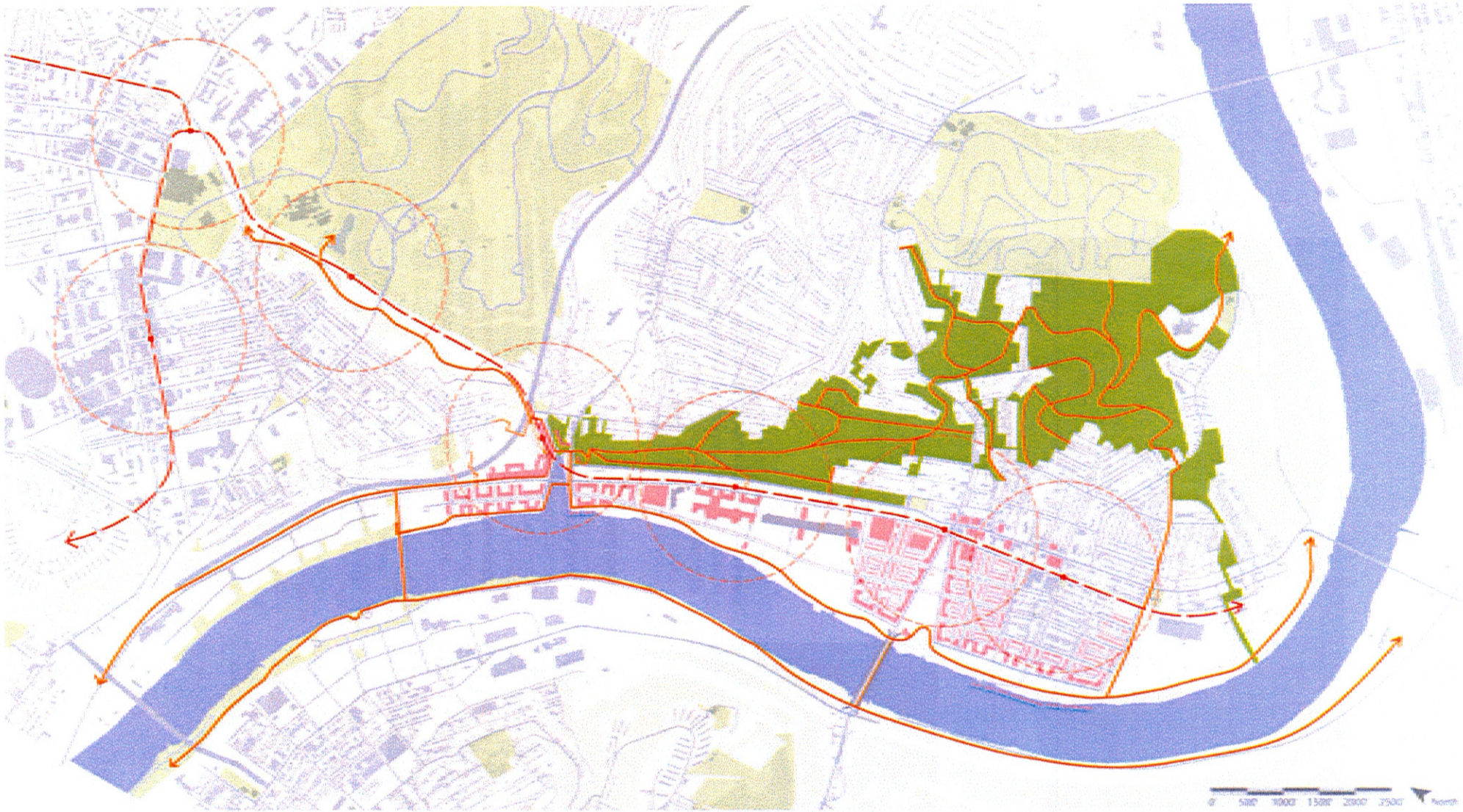
Our recommendations for a Hazelwood Greenway:

I Definable Edge and Entrances

II Greenway Amenities

III Connection to Existing City Parks

Polish Hill, Pittsburgh. Photo courtesy City-Data.com



Key: Hazelwood Greenway

- Expanded Greenway
- Expanded Parklands
- Existing Green Spaces
- Multi-Use Trails

- New Light Rail Line
- Transit Station
- 5 Minute walk from station (1/4 mile radius)

Overview

Urban Form

Frameworks

Places
- Junction Hollow
- Four Mile Run Neighborhood
- Robot City
- Hazelwood Town Center
- Riverside Neighborhood
- **Hazelwood Greenway**
- Hazelwood Riverfront Park

Legibility

Possible Development Scenario

I Definable Edge and Entrances

The expanded Hazelwood Greenway should have a definable edge as much as possible, and clearly marked entrances. Removing ambiguity over property ownership leads to better maintenance. Given the terrain, it may be that the Greenway backs onto private property in some areas. Privately-owned forested land that is contiguous to the Greenway can be incorporated through conservation easements and other measures.

Access points should be located throughout the neighborhood, and at least two or three entrances should be placed within walking distance to a public transit stop. A wayfinding system should be developed both to help with finding greenway entrances and also to navigate the interior. Access points should be made whenever possible from public-use buildings, such as schools, community centers and libraries, or in connection to a public space, such as a park or public square.

II Greenway Amenities

The greenway should include a diversity of amenities that have a low-impact on natural processes and wildlife. These could be used by individuals and small groups as well as larger groups, such as university track teams and Girl Guides/Boy Scouts. Amenities could include:

- trails
- viewing platforms
- climbing/bouldering infrastructure
- ropes and ladders
- interpretive cultural signage and maps
- resting areas and picnic tables
- shelters
- staircases and pedestrian overpasses
- compostable rest room
- an enclosed dog run
- pocket parks and playgrounds where the greenway meets the street
- bike parking at entrances
- a sledding hill

While amenities in the greenway should be low-impact, more intensive uses, such as playgrounds, garden and dog parks, can occur at its edges. Han + Liu, Urban Laboratory - Hazelwood Studio, 2008.

Going vertical: A member of the Pittsburgh-based Explorers Club practices ice climbing technique and fitness by climbing a dead tree in Schenley Park. Photo by Bob Coblentz.

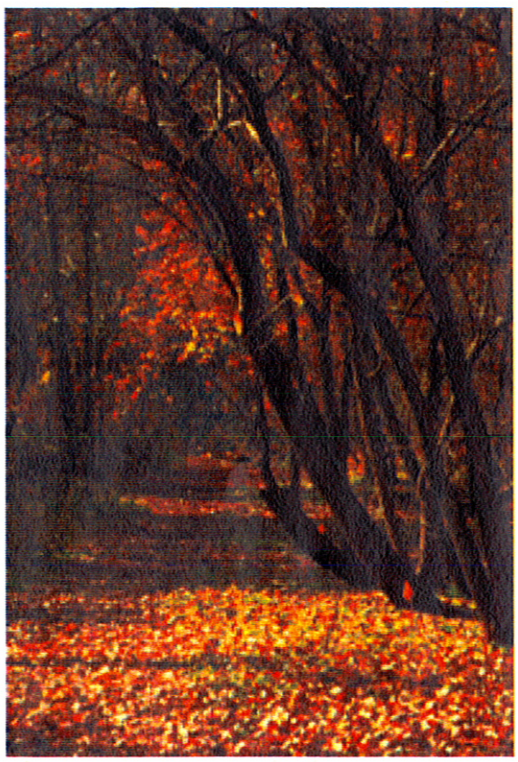
Measures to increase wildlife habitat and food sources can also be included. Birdhouses, raptor roosts and bat houses can easily and unobstructively be incorporated. Indigenous fruit-bearing shrubs and trees can be planted and invasive species removed.

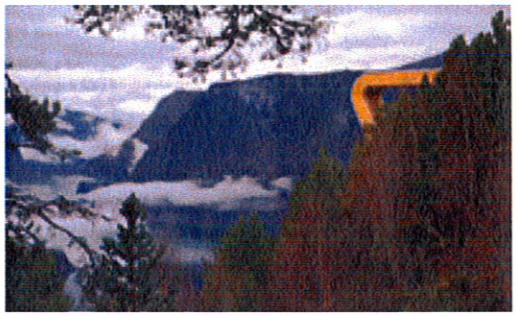
Productive landscapes for human consumption, such as pear and apple trees and small orchards, can also be integrated into the greenway. The produce can be collected by the public at will or harvested for local food banks and school lunch programs. Public garden plots can be located at park edges along residential streets.

III Connections to Existing City Parks

In its final expanded state, the Hazelwood Greenway could both complement and rival Pittsburgh's existing urban parks.

Ultimately, efforts should be made to join the Hazelwood Greenway to Schenley Park via Junction Hollow, and Frick Park via the Nine Mile Run, helping to form a network of pan-urban forests, wildlife habitats and recreational green spaces in Pittsburgh's East End. This system could eventually be tied into a regional greenspace network.



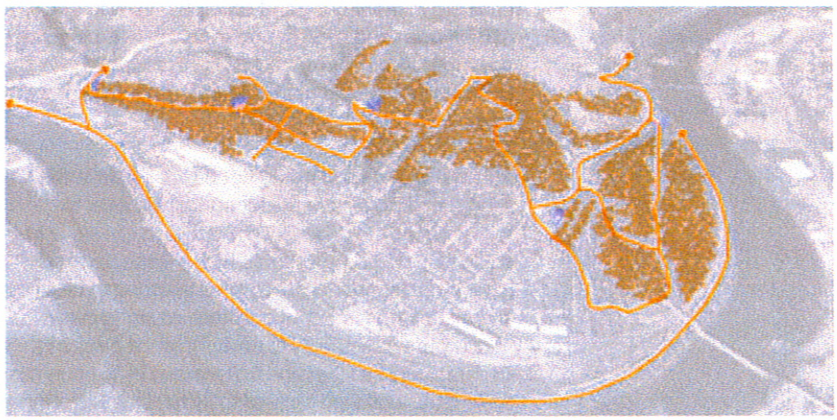


Aurland Fjord viewing platform, Norway.

Proposal for Hazelwood Greenway with trails connecting to existing parks and trails. Han + Liu, Urban Laboratory - Hazelwood Studio, 2008.

Rock climbing an adapted ore bunker in the Duisburg-Nord Landscape Park International Building Exhibition (IBA), Emscher Park, Duisburg, Germany. Photo by Harf Zimmermann.

Pittsburgh's Mount Washington's hillside Grand View Scenic Byway Park provides wildlife habitat and biodiversity corridor as well as a pleasant environment for hikers.



Overview

Urban Form

Frameworks

Places
- Junction Hollow
- Four Mile Run Neighborhood
- Robot City
- Hazelwood Town Center
- Riverside Neighborhood
- Hazelwood Greenway
- Hazelwood Riverfront Park

Legibility

Possible Development Scenario

Hazelwood Riverfront Park

Throughout the last 250 years, Pittsburgh's three rivers -- the Allegheny, the Ohio and the Monongahela -- have duly served as the region's main transportation artery, connecting the region to the Mississippi River and international waters. In addition to traditionally being a dumping ground for industrial pollution and urban runoff, these waterways continue to be the area's main source of drinking water, providing water to 90 percent of Allegheny County residents. The Port of Pittsburgh remains one of the busiest inland river ports in the United States, directly reaching markets in 24 states. Riverlife has begun to recover, with the return of a diversity of fish and aquatic species, and recreational use, from fishing to kayaking, is on the rise.

Urban rivers are being rediscovered as mulit-use environments, with environmental stewardship, water recreation, economic development and public health in mind. The Living River Principles have been developed to help guide policy-makers in the development of uses affecting waterways. The Living River perspective views rivers and water bodies as a public good with multiple benefits. In order to take full advantage of their rivers, they suggest that cities focus on improving water quality, natural riverbanks, public access and recreational uses. Communities should be actively engaged in monitoring and caring for the water quality of their rivers and streams and should fully explore the economic value of rivers. Public rights to waterways and wetlands should not be compromised by private interests.

An ambitious goal that may not be attainable in the short term is to restore the Monongahela River to swimmable status. The City of Pittsburgh can strive to attain Blue Flag certification, a highly respected and recognized international eco-label awarded to beaches and marinas that meet strict criteria covering everything from water quality to environmental programs. To date, 2,633 beaches and 620 marinas in 36 countries around the world are allowed to fly the Blue Flag. None of these are currently in the United States. Returning the region's three rivers to swimmable condition may be an outcome of efforts to reduce stormwater flooding through a Stormwater Capture and Cleansing System featuring Sustainable Urban Drainage Systems as proposed in this report.

Our urban design recommendations for Hazelwood's portion of the Monongahela River edge are based on the premise that Pittsburgh's rivers are one of our greatest public goods and collectively represent a tremendous ecological, economic and cultural asset.

The recommendations call for a 90-acre linear public park running the entire length of Hazelwood. The new 1.5-mile long Hazelwood Riverfront Park would be enriched with public amenities both inland and off-shore. More than a park near a river, it would be a park that integrates the river into its very identity. It would create a new standard for riverfront development and become a regional and tourist destination.

In addition to being a generator of cultural, recreational, ecological and economic activity, the Hazelwood Riverfront Park would help protect the surrounding neighborhoods from flooding by acting as a sponge during heavy rain.

The major proposed interventions for the Hazelwood Riverfront Park focus on:

I Flood Protection

II Edge Conditions

III Connections and Access

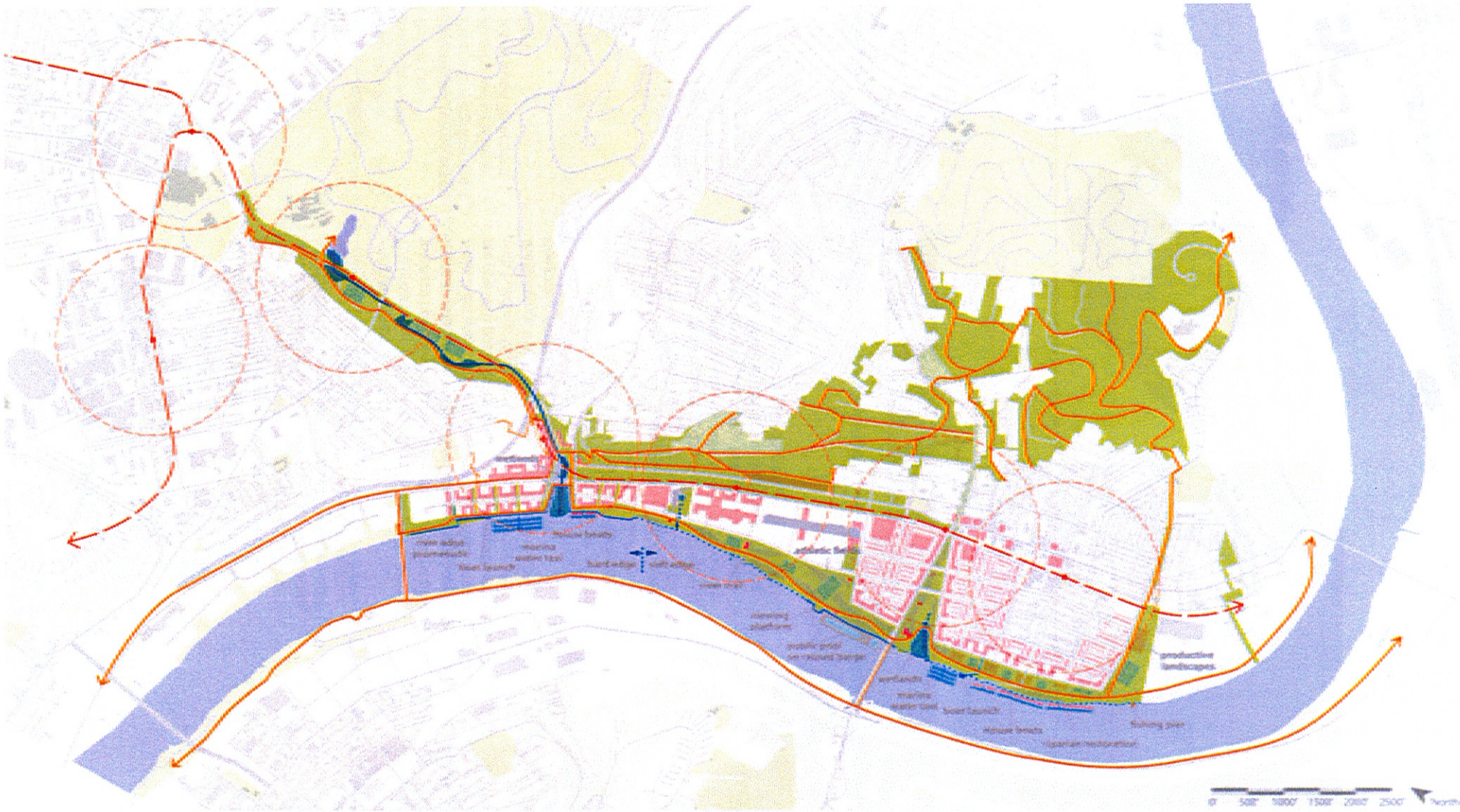
IV Park Amenities

I Flood Protection

The area near the mouth of the Four Mile Run is currently part of the 100-year flood plain. The Hazelwood Riverfront Park would be an integral part of the Greater Hazelwood area's hydrological system, both as a receiving ground for surface water collected from local streets and as an absorption zone for rainwater and occasional flood waters.

The proposed Stormwater Capture and Cleansing System diverts stormwater that is not collected by green rooftops, rainbarrels and permeable surfaces throughout Hazelwood to a series of treatment wetlands and perched wetlands located throughout the Green-Blue Framework. These environments would swell with rainwater, preventing flooding into urbanized areas.

Collection areas in the Hazelwood Riverfront Park correspond to the four green wedges elaborated in the Green-Blue Frameworks section:
- the new Four Mile Run estuary
- the Roundhouse wetlands
- the base of the Hazelwood Avenue green promenade
- the southern edge of the park, at the foot of Melancthon Street



Key: Hazelwood Riverfront Park

- Green Framework
- Active Recreation
- Productive Landscapes
- Multi-Use Trails
- New Wetlands
- New Woodlands

- New Light Rail Line
- Transit Station
- 5 Minute walk from station (1/4 mile radius)

Overview

Urban Form

Frameworks

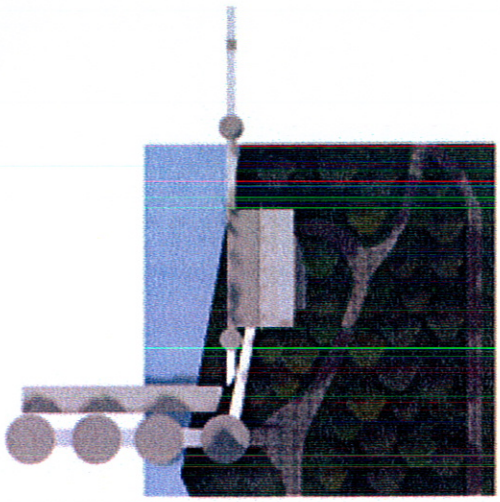
Places
- Junction Hollow
- Four Mile Run Neighborhood
- Robot City
- Hazelwood Town Center
- Riverside Neighborhood
- Hazelwood Greenway
- Hazelwood Riverfront Park

Legibility

Possible Development Scenario

II Edge Conditions

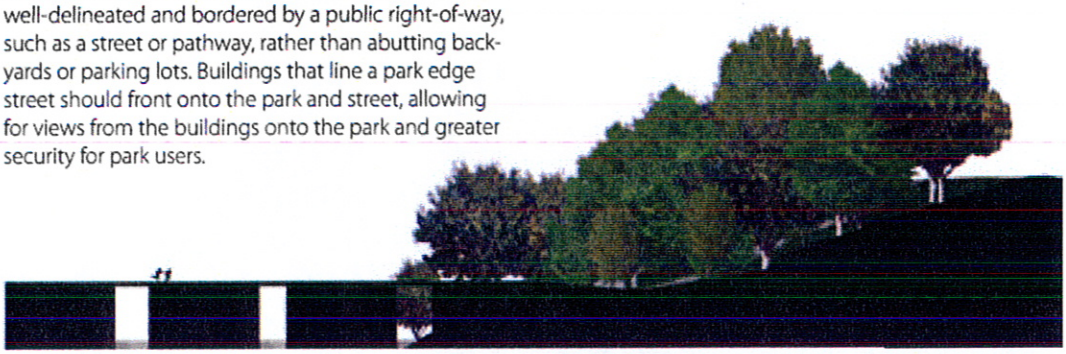
The Hazelwood Riverfront Park has two very different edge conditions, each with its own concerns and opportunities: The urban edge, where the park is adjacent to neighborhoods and other uses, and the water edge, where the park interfaces with the Monongahela River.



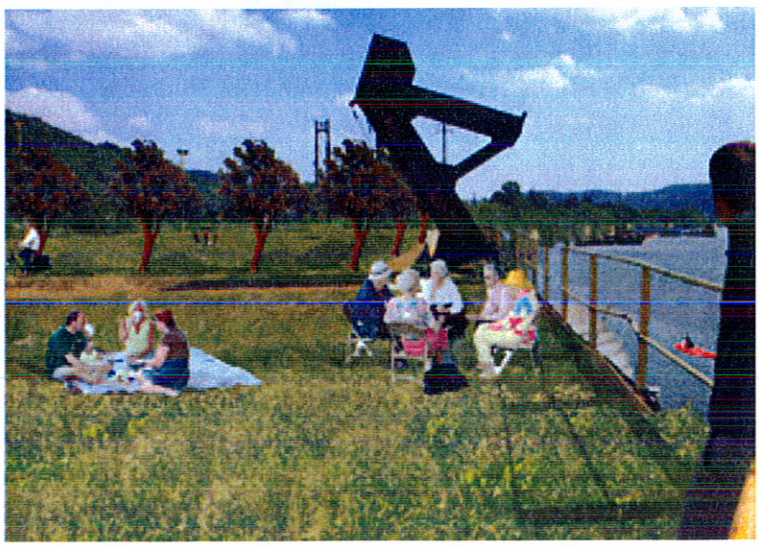
- **Urban Edge**

The urban edge of the Hazelwood Riverfront Park is the interface between the urban environment and the park space. In total, under our Possible Development Scenario, there are 2.6 miles of park frontage. These areas are ripe with possibilities for contrasting environments, with buildings facing open or vegetated spaces, and the buildings that line the park with views of the park, downtown Pittsburgh, hillsides and the river.

It is imperative that the edge of the park retain a sense of public access. Access can include well-indicated entrances and trail heads, adjacent public facilities, active pedestrian-oriented edges, as well as distant views and scenic corridors. The edge of the park should be well-delineated and bordered by a public right-of-way, such as a street or pathway, rather than abutting backyards or parking lots. Buildings that line a park edge street should front onto the park and street, allowing for views from the buildings onto the park and greater security for park users.



Proposals for integration of industrial relics into a riverfront park in Hazelwood. Above: McKinney + Knapp. Below, Eastridge + Waldron. Urban Laboratory, Hazelwood Studio, 2007.



The interface between Robot City and the park will require special treatment in order to avoid creating a monolithic wall effect. Robot City's security perimeter wall can be creatively treated with materials, vegetation, artwork, lighting and interactive digital technology as proposed in the section Robot City.

• Water Edge

Hazelwood's shoreline has been severely altered since industry arrived in the second half of the 19th century. The Monongahela River's banks have been raised at least 25 feet with a railroad berm and slag in order to raise the land out of the floodplain. Currently, much of Hazelwood's riverfront is covered in slag or buttressed with concrete and steel walls. A portion also has barge docking infrastructure.

We recommend that the current river edge conditions be diversified to include both "hard" and "soft" urban edges, such as concrete or wooden edges, platforms, staircases, wetlands, rocks and soil edges.

The types of river edge conditions can further be diversified by being linear and continuous in some areas, hemmed in by walls and infrastructure, or perforated, modulated and extruding in others. Extrusions can include wharves, jettys, lookout points and floating docks. Water can be brought onto the ALMONO site by way of canals or wetlands. Wildlife islands can also be added for the benefit of nesting birds and other riparian life.

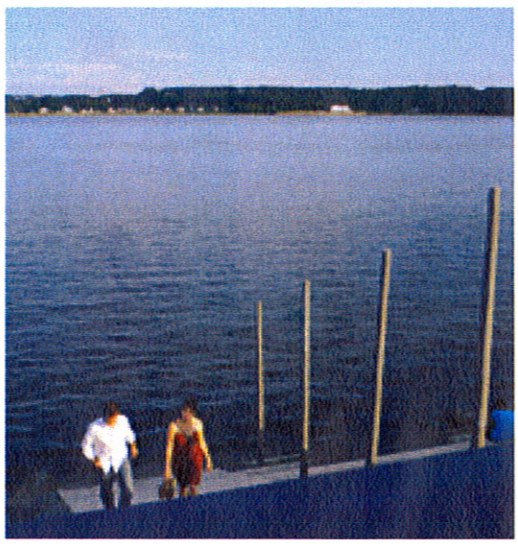
There are many opportunities for integrating remaining industrial relics into the new riverfront park. Doing

Small access points create a more intimate experience, like these stairs descending to the St. Lawrence Seaway along the Promenade Samuel de Champlain, Quebec City. Photo by Elise Gatti.

A temporary waterfall under the Brooklyn Bridge in New York Harbor. Rendering courtesy the artist, Olafur Eliasson.

Urban-edged riverfront in Chattanooga, TN. Photo by David Adams.

Marshlands and boardwalk create a peaceful winter scene in this proposal for the renaturalization of the Don River in Toronto by Michael Van Valkenburgh Associates.



so will help ensure that Hazelwood's rich history is not forgotten and also contribute to a sense of place-making. Possibilities include:
- waterfalls that tumble over existing riverside walls
- reusing the pumphouse as a public gathering place, outdoor café or museum
- adding a climbing wall onto existing infrastructure
- using existing retaining walls as a base for riverside boat docking facilities
- creating artwork from salvaged materials
- using light to change shapes at night
- converting river barges into floating swimming pools

III Connections and Access

The Green-Blue Framework includes four major green wedges that provide continuity between the river and Hazelwood Riverfront Park, Junction Hollow and the Hazelwood Greenway. These four links are major conduits, allowing people, wildlife and water collected inland to reach the Monongahela River via:
- Four Mile Run Neighborhood
- B&O Roundhouse Park
- Hazelwood Avenue
- Melancthon Street

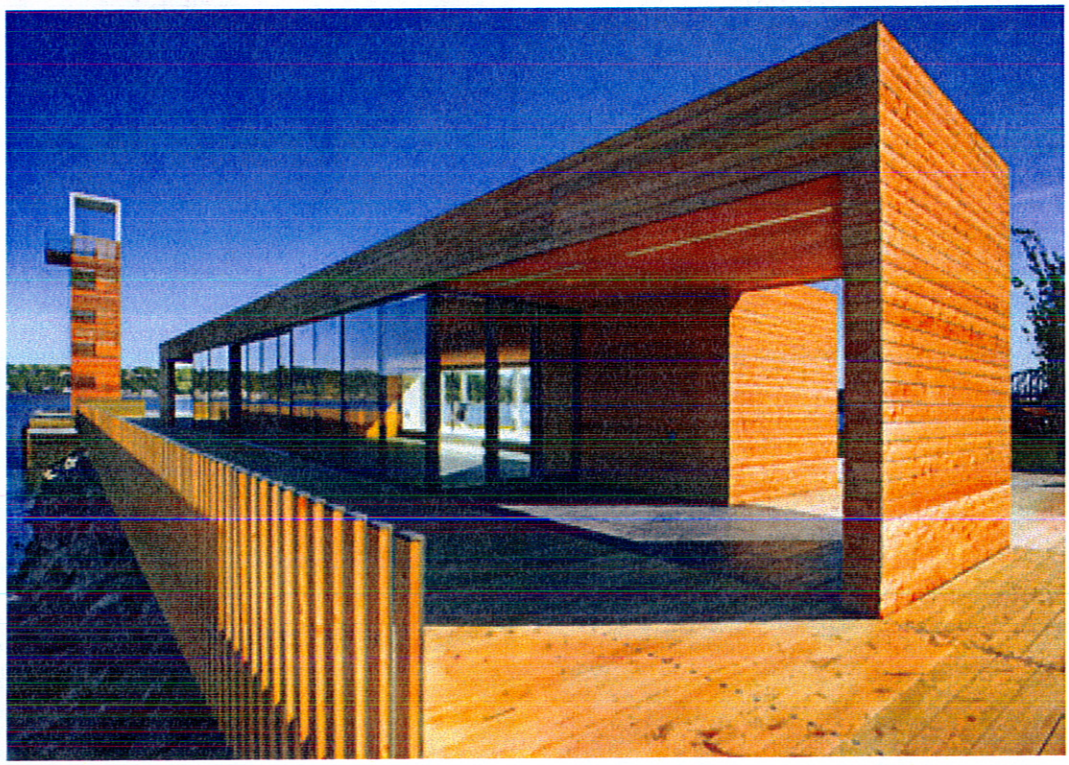
Connections to the Hazelwood Riverfront Park are land-based and water-based. Cyclists, roller-bladers, wheelchair users and pedestrians can access the Hazelwood Trail via the Eliza Furnace Trail, Junction Hollow Trail and Duck's Hollow Trail. Watercraft can be docked at two marinas, at the Four Mile Run Neighborhood and next to the Hazelwood Bridge.

Because the Hazelwood Riverfront Park flows out of and into the green wedges, there are few obvious gateway moments. Gateways should be emphasized at the tops of both the Four Mile Run Neighborhood and the Hazelwood Avenue promenade, as well as at the B&O Roundhouse entrance and the northernmost and southernmost ends of the park, where the trail enters the park. Each marina also acts as a gateway from the river.

In addition to these main access points, there should be as many opportunities to enter and exit the park along the entire urban interface. Along the river edge, smaller staircases, piers and modest kayak and canoe docks will increase access and quiet spots.

IV Park Amenities

Hazelwood Riverfront Park is large enough to accommodate a variety of amenities addressing the broad spectrum of active and passive uses. The park should at



The Quai des Cageux along Quebec City's Promenade Samuel-De Champlain on the St-Lawrence River includes a viewing tower and café. Photo by Marc Cramer.

a minimum include flexible open spaces, athletic fields, productive landscapes, boat access and a riverfront trail that connects to the city and regional networks, including the Three Rivers Heritage Trail, the Great Allegheny Passage and the Steel Valley Trail.

The park should strive to include amenities not found elsewhere in Pittsburgh and should be universally accessible. Land-based amenities to consider include:

- open flexible space
- athletic fields
- riverfront trail
- productive landscapes
- wildflower gardens
- outdoor stage and movie theater
- playgrounds and accessible play structures
- small restaurants, cafés
- seating areas
- water features
- public art
- free WI-FI
- restrooms

River edge amenities should encourage use of the river as a recreational playground. Amenities can include:

- river edge promenade
- viewing platforms
- marina
- boat launches
- fishing piers
- boathouse row
- floating pool
- ecological features, such as waterfowl nesting islands

If you can't swim in it, swim on it! Cities are experimenting with public floating swimming pools, often reusing old barges. Counterclockwise:

Barge Beach Budapest is a "migrating recreational pier" that sits atop three recycled former coal barges on the Danube River.

Copenhagen City Centre's Havnebad includes a jumping platform.

Floating on the Spree River in East Berlin, "Winter Badeschiff" is an open-air pool in the summer and a covered heated pool with sauna and bar in the winter.

The Floating Pool Lady barge, named after its long-time proponent, is a roving ADA-compliant seven-lane, 82-foot pool made from a reused barge.

Overview

Urban Form

Frameworks

Places

Legibility
- Gateways
- Landmarks
- Views

Possible Development Scenario

Legibility

Gateways

While every city has its own unique visual resources, some cities have more than others. Pittsburgh, and particularly Hazelwood, is especially gifted in this regard. Visual resources include unique and important public views, built features, and natural features, such as rivers, hillsides, topography, geologic formations and vegetated landscapes. Enhancing a city's visual resources -- views, gateways, landmarks and landscape features -- to create more legible environments is one of the many central tasks of urban design. This is especially important in a city with irregular topography and streets.

Gateways are located at the edge of a neighborhood or district, along major transportation corridors. Gateway features can be a node, such as an intersection or, for example in medieval cities, literally a gate, or even a linear feature, such as a bridge or length of pathway that has a particular character and leads to a new district.

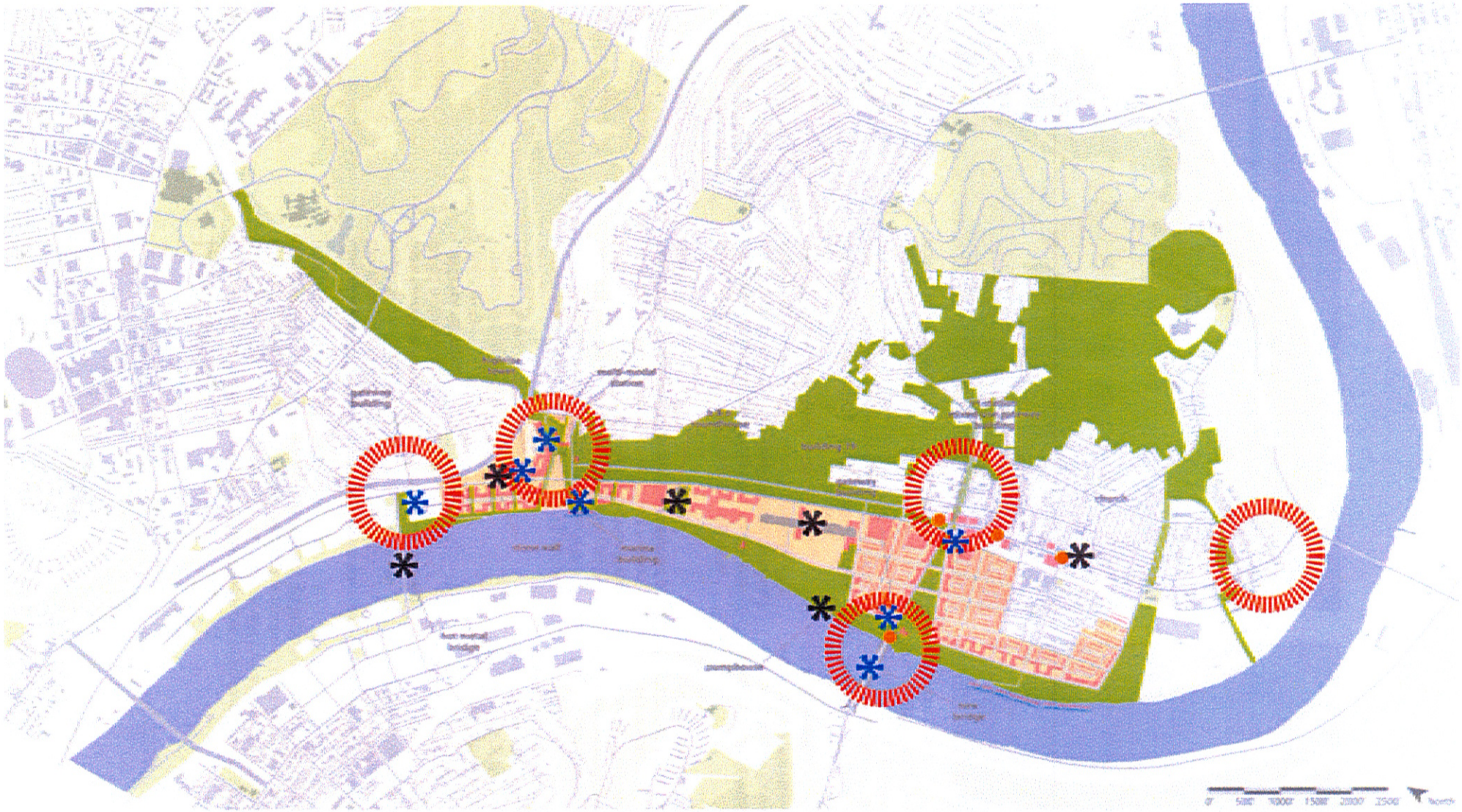
Each mode of transportation has its own gateway moments experienced from their unique vantage point and travel speed.

We recommend emphasizing five main gateways to Hazelwood, beginning to the south:
- Second Avenue at the Glenwood Bridge
- Second Avenue and Hazelwood Avenue
- Junction Hollow at The Run neighborhood
- Second Avenue at the Hot Metal Bridge
- Hazelwood Bridge (proposed)

The Hazelwood Town Center should also have designated gateways. These can be similar to what Loysen + Kreuthmeier in their *Urban Design Strategy for Second Avenue* (2005) call "multidirectional portals" along Second Avenue, with the new Hazelwood Bridge being an additional gateway to the Hazelwood Avenue portion:
- Hazelwood Avenue
- Flowers Street
- Elizabeth Street
- Hazelwood Bridge (proposed)

Nankai Electric Railway requested the designer to create a gateway that would redefine Osaka's identity. The result, Namba Parks, is a large park in the middle of Osaka.

A linear gateway in Strasbourg, France. Photo courtesy of CincyStreetcar Blog.


Key:
Major Gateways
Town Center Gateways
Existing Landmarks
New Landmark Opportunity
Existing Buildings
New Buildings
Green Framework
Existing Green Space

Landmarks

Landmarks can be buildings and structures that have social and cultural meaning, or they can be objects that are prominently visible. A cultural landmark's use, materials and style refer to our economy, cultural values and periods or specific events in our history, and are important reminders of from where we have come as a society. Visual landmarks, including buildings or even natural features, are important tools for wayfinding, acting as visual reference markers.

Cultural and highly visible landmarks in Hazelwood should be preserved and enhanced to help with wayfinding and create a sense of place. We suggest the following buildings and structures on the ALMONO site be highlighted:
- B&O Roundhouse
- Building 19
- the stone wall near Second Avenue
- Pump House

Historic buildings in the neighborhood, including the original Carnegie Library of Pittsburgh branch, the Woods House, the Gladstone Middle School and the Burgwin Elementary School, as well as the Hot Metal Bridge and historic churches along Second Avenue should all be considered landmarks and preserved or reused.

Natural features can also be considered landmarks. Pittsburgh's green hillsides have become iconic, and Hazelwood's forested hillside should also be conserved as green space and visual backdrop for the urbanized portion of the neighborhood.

In addition to accentuating existing landmarks, there are opportunities for the creation of new landmarks in Hazelwood with the redevelopment of the ALMONO site. These landmarks should be buildings or structures that are symbolic of important new uses, institutions and values. New civic buildings, such as schools, community centers, and learning institutions, should particularly strive to "stand out from the crowd".

For example:

- **Adaptive Reuse of Building 19**
Robot City's adaptive reuse of Building 19 will signify resilience and creativity, as well as Hazelwood's transition into the new economy.

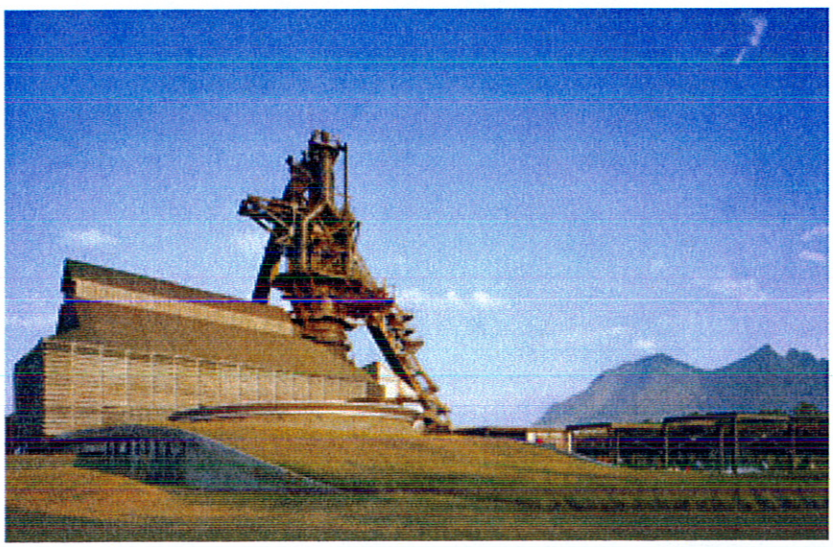
- **Multi-Modal Station**
A high-rise residential tower and multi-modal station in the Four Mile Run Neighborhood will signal a new mode of transportation and thinking about urban living, and be a beacon visible from downtown, surrounding neighborhoods and the Penn Lincoln Parkway.

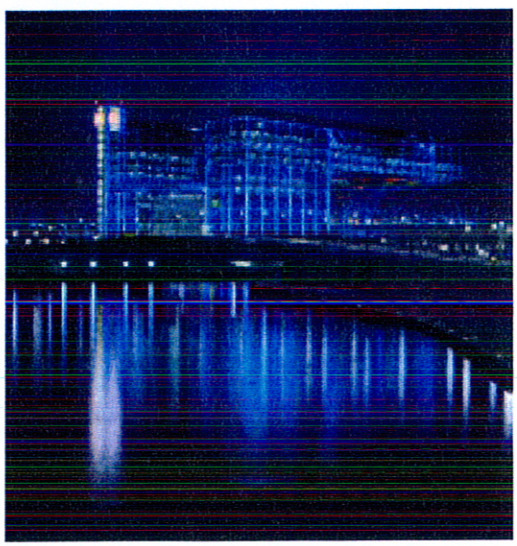
- **District Co-Generation Plan**
A unique structure for the district co-generation plant will announce that Hazelwood is being powered in a sustainable way.

- **Monongahela River**
Monongahela River landmarks, such as a marina, floating outdoor pool, viewing tower and artwork will bring attention to Hazelwood's dynamic new public waterfront park.

Cultural landmark: The Museo del Acero Horno in Monterrey, Mexico, reuses a decommissioned blast furnace on a brownfield site to create a sustainable modern history museum dedicated to the region's rich history of steel production. Photo courtesy archicentral.com.

Visual landmark: Berlin's Hauptbahnhof is a multi-modal landmark by day and night on the edge of the Spree River. Photo by Stefan Le Breton.

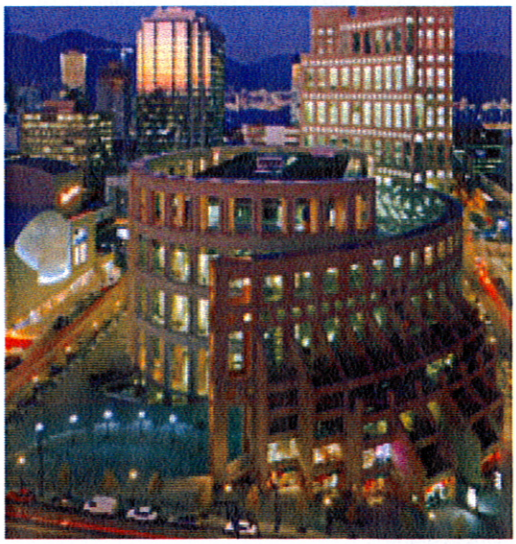


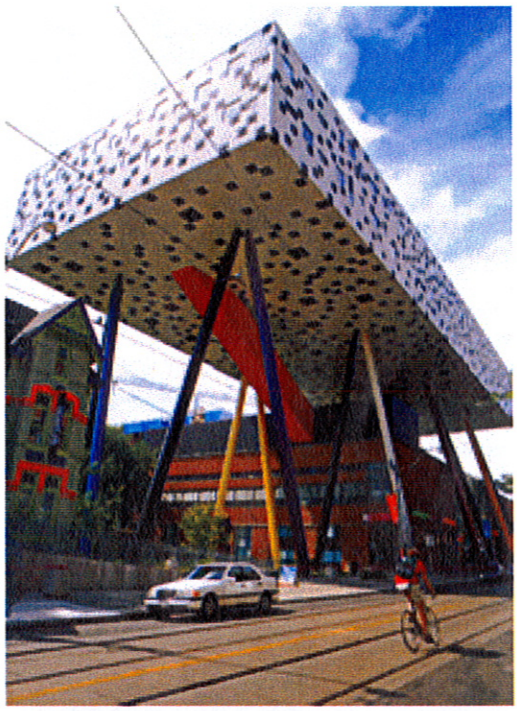


Hazelwood Bridge & LRT
The Hazelwood Bridge and LRT lines will symbolize Hazelwood's new connectivity and inclusion in the regional economy.

Gateways and important intersections, such as Hazelwood and Second Avenue, are good candidates for landmark buildings. At the very least, each important intersection should have strong corner buildings of architectural interest.

Lighting can be used to reinforce landmarks and even create new, night-time only landmarks. A lighting master plan for Hazelwood is recommended to make the most of its visual assets.





Public-use buildings are perfect candidates for landmark status:

Vancouver Public Library's Central Branch features reading rooms wrapped around a central facility. Photo by Timothy Hursley.

Ontario College of Art and Design's (OCAD) new addition is unmistakable. Photo by Patrick Leduc.

The angular Seattle Public Library is a city-wide landmark. Photo courtesy The Seattle Times.

It is possible to stand out even in Tokyo thanks to contrasting lighting. Photo courtesy Vincent Loy.

Overview

Urban Form

Frameworks

Places

Legibility
- Gateways
- Landmarks
- Views

Possible Development Scenario

Views

Hazelwood's position on a deep bend of the Monongahela River allows for views of downtown Pittsburgh's skyline from the northern end of the site. Views of the South Side hills and Hays Woods, as well as the Greenfield hillside are also available from most points on the site.

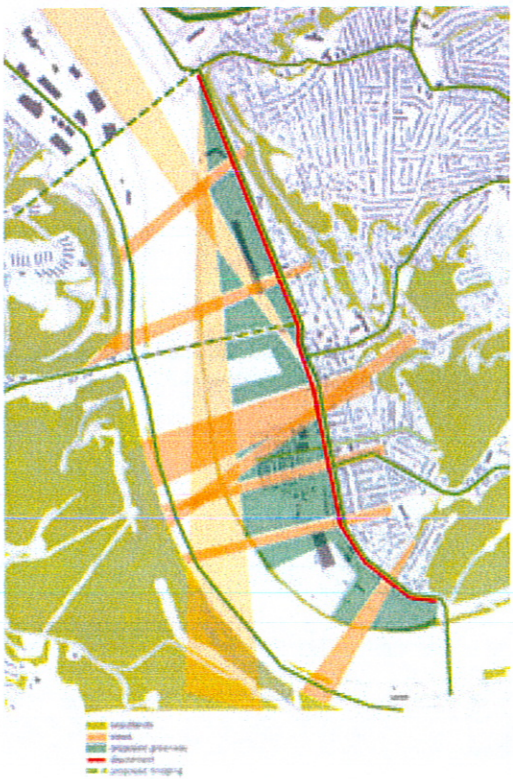
These views should be considered carefully in the redevelopment of the ALMONO site. Mapping the various views, focal points, backdrops, skylines, visual landmarks and view corridors prior to site design will ensure that opportunities are not lost.

Views of Hazelwood from surrounding hillsides and the South Side should also be considered, with special focus on the roofscape through the careful use of materials and green rooftops. Using similar rooflines for similar clustered uses, such as housing, can help emphasize legibility.

There are a variety of "views" that can be considered in Hazelwood, including:

- **Vantage Point**

A position that allows a broad overall view or perspective of an area is called a vantage point. There are many opportunities vantage points along the Hazelwood Greenway and the Hazelwood Riverfront Park. Viewing platforms can invite users to explore a particular vantage point.



A study of view corridors by Chi + Lau, Urban Laboratory - Hazelwood Studio, 2007.

- **Vista**

A vista is an enclosed or framed view, typically long and narrow, such as a narrow street with continuous frontage or a transportation corridor with continuous tree cover. Second Avenue from Greenfield to Minden Street holds promise for vista-type views.

- **Panorama**

An unobstructed and sweeping view of an extensive area in all directions. A conference room built into the top portion of Building 19, for example, or a residential highrise tower above the Four Mile Run multi-modal station, would provide sweeping views of Hazelwood, Greenfield and the South Side.

- **Glimpse**

A glimpse is a view or panorama that is partially screened but still visible, such as views from the Hazelwood Greenway trails.

Other concepts related to views include:

- **View Terminus**

The end of a vista, for example a building at the end of a street, is an opportunity to create a memorable view.

- **Focal Point**

An piece of art, a building or a landscape feature can be the central or principal point of focus and attention in a particular view. Lighting can accentuate a focal point at night.

- **Backdrop**

The background or setting of an area, such as a hillside. A natural backdrop, such as a mountain or hillside, can change color seasonally, providing different views.

- **Skyline**

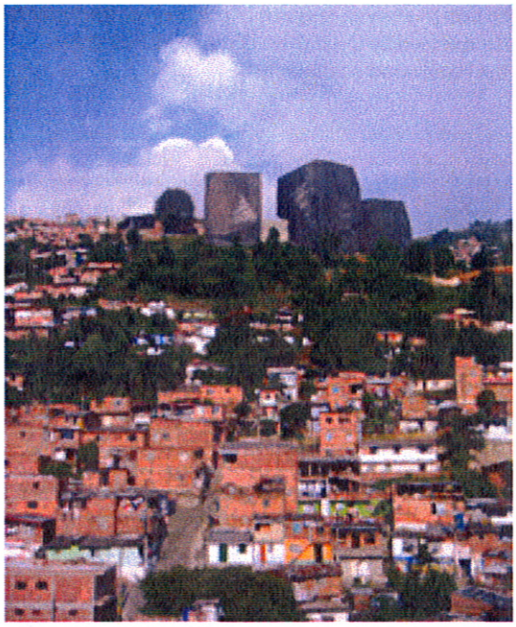
The silhouette or outline of the city -- buildings, structures or vegetation -- as seen against the sky.

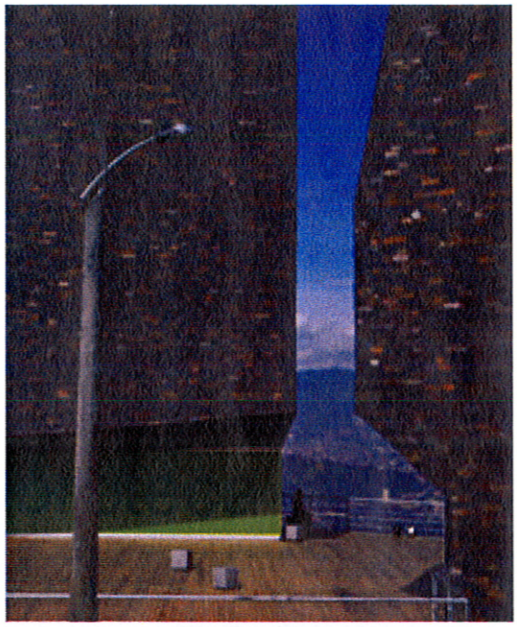
- **Visual Landmark**

A visual landmark, as opposed to historic or cultural landmark, is a prominent or conspicuous object or distinguishing landscape feature marking a site or location.

- **View Corridor/Visual Axis**

A view closed by the built form and permitting a view from one end to the other. This is most often created by a street that is built up on both sides or a tunnel.





Perched atop a hillside, the España Library in Medellín, Colombia is both a focal point and a vantage point from which to survey the city in the valley below.

An iconic view of downtown Pittsburgh as provided by the Mount Washington Overlook. Photo by Andrew Koch.

Traditional Tuscan roofscape: Siena, Italy. Photo by Steve Jurvetson.

Street trees create a vista in Vancouver. Photo by Ward Perrin, Vancouver Sun.

Overview

Urban Form

Frameworks

Places

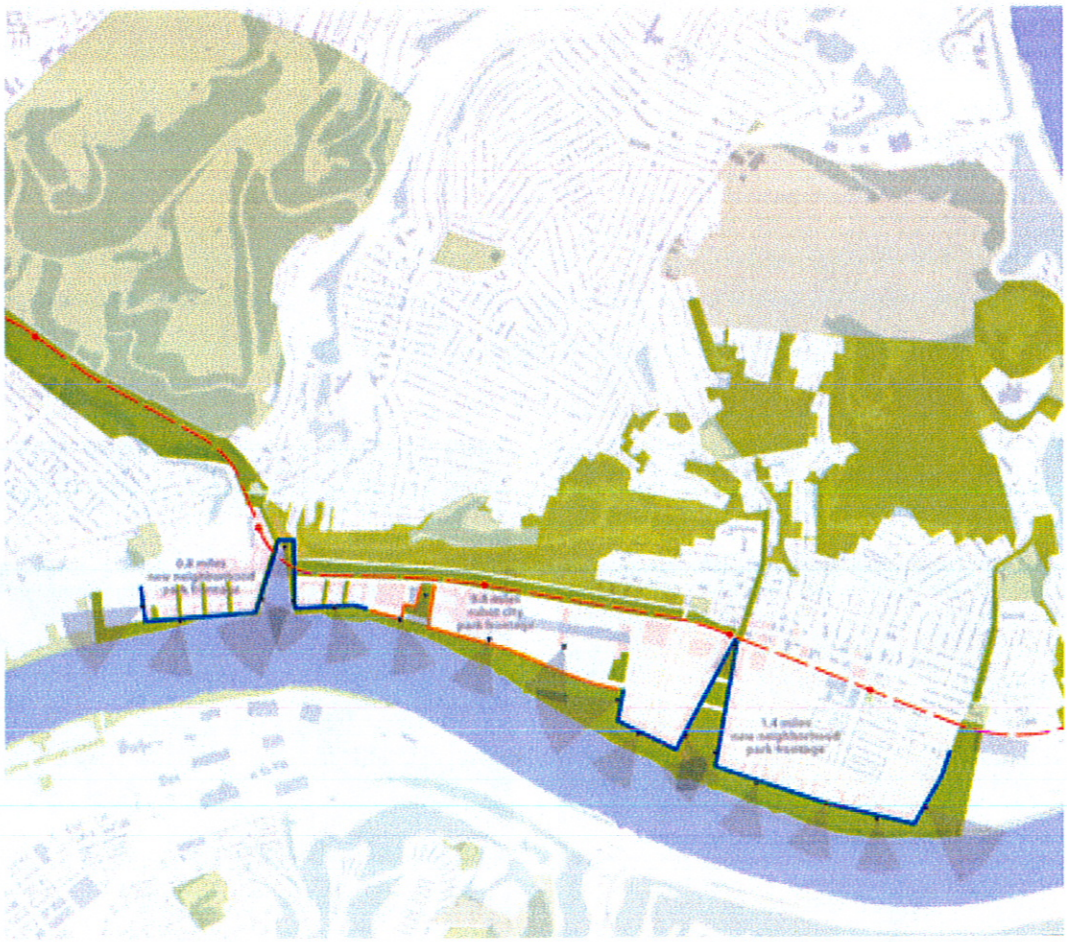
Legibility

Possible Development Scenario

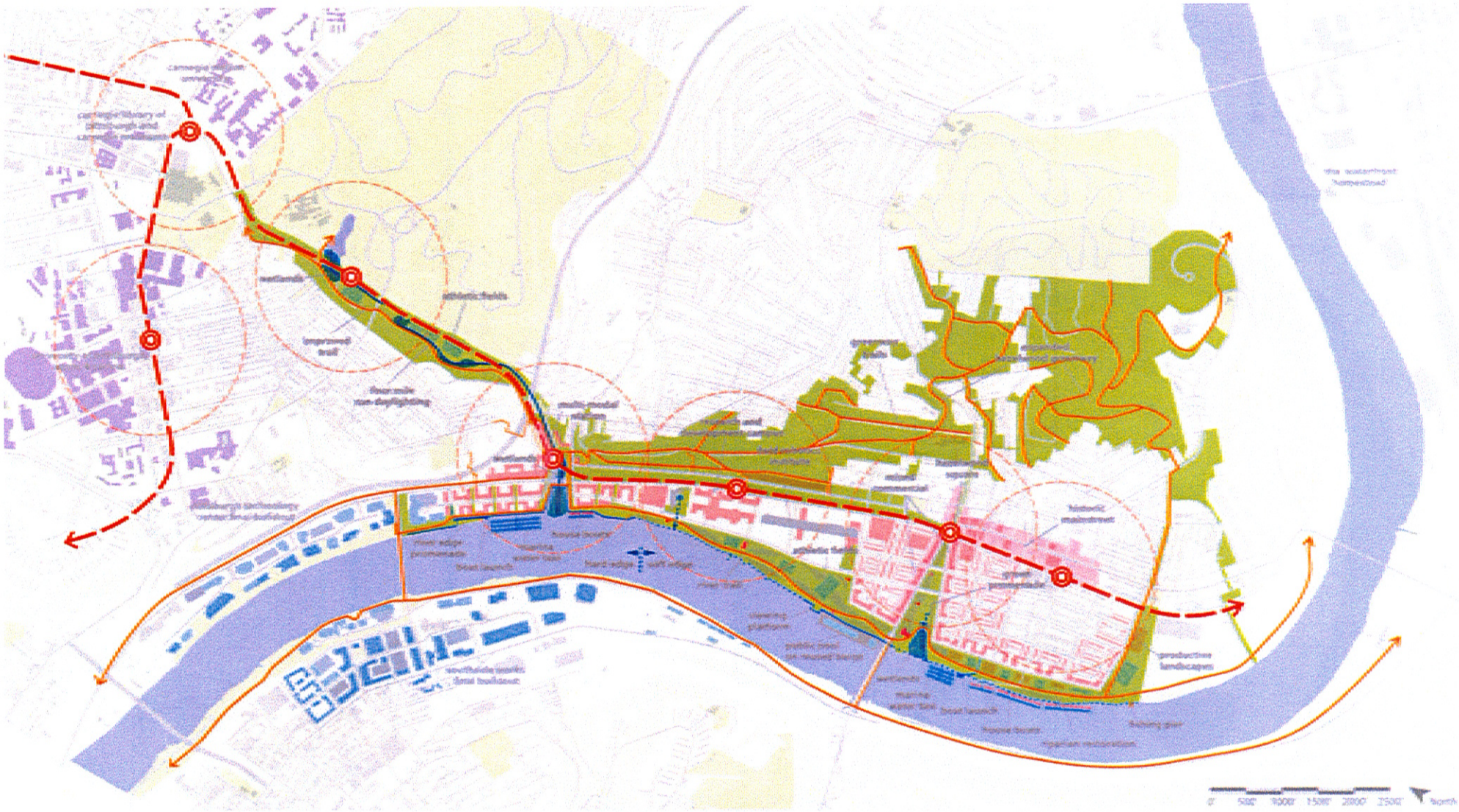
Possible Development Scenario

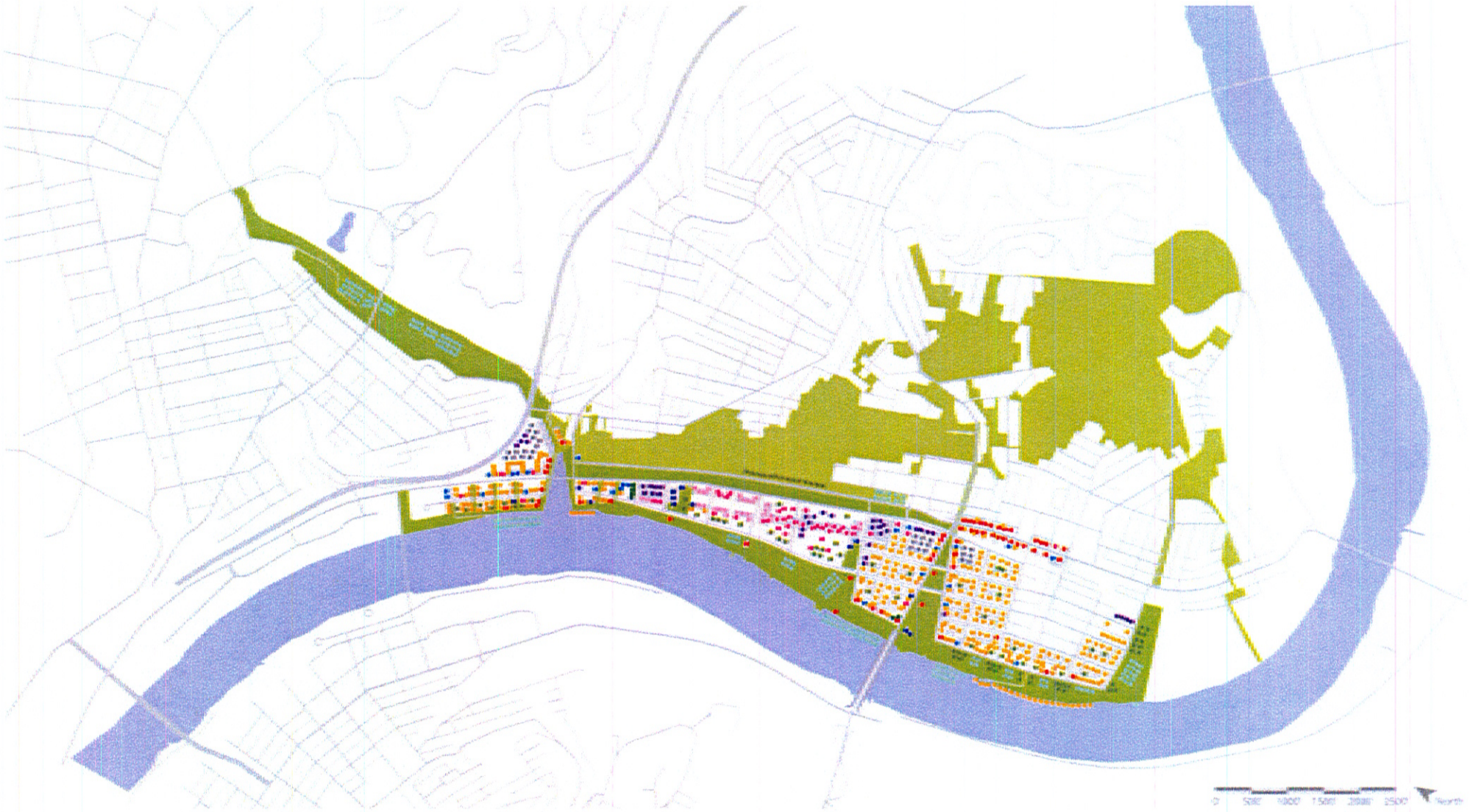
The Possible Development Scenario is the product of our urban design analysis, research of past market studies and plans as well as our understanding of the programmatic needs expressed by the owners of the ALMONO site, its existing tenant (Carnegie Mellon's Field Robotics Center) and the Hazelwood community.

The site-specific recommendations underlying the Possible Development Scenario reflect a rigorous effort to balance the agendas of these multiple stakeholders through consideration of the relationship between the proposed new and existing sections of the Hazelwood community. The Possible Development Scenario reinforces our guiding urban design principles of connectivity, community engagement, arts/cultural development, economic revitalization and environmental sustainability through systemic integration of LEED ND and sustainable energy infrastructure into the new built development.

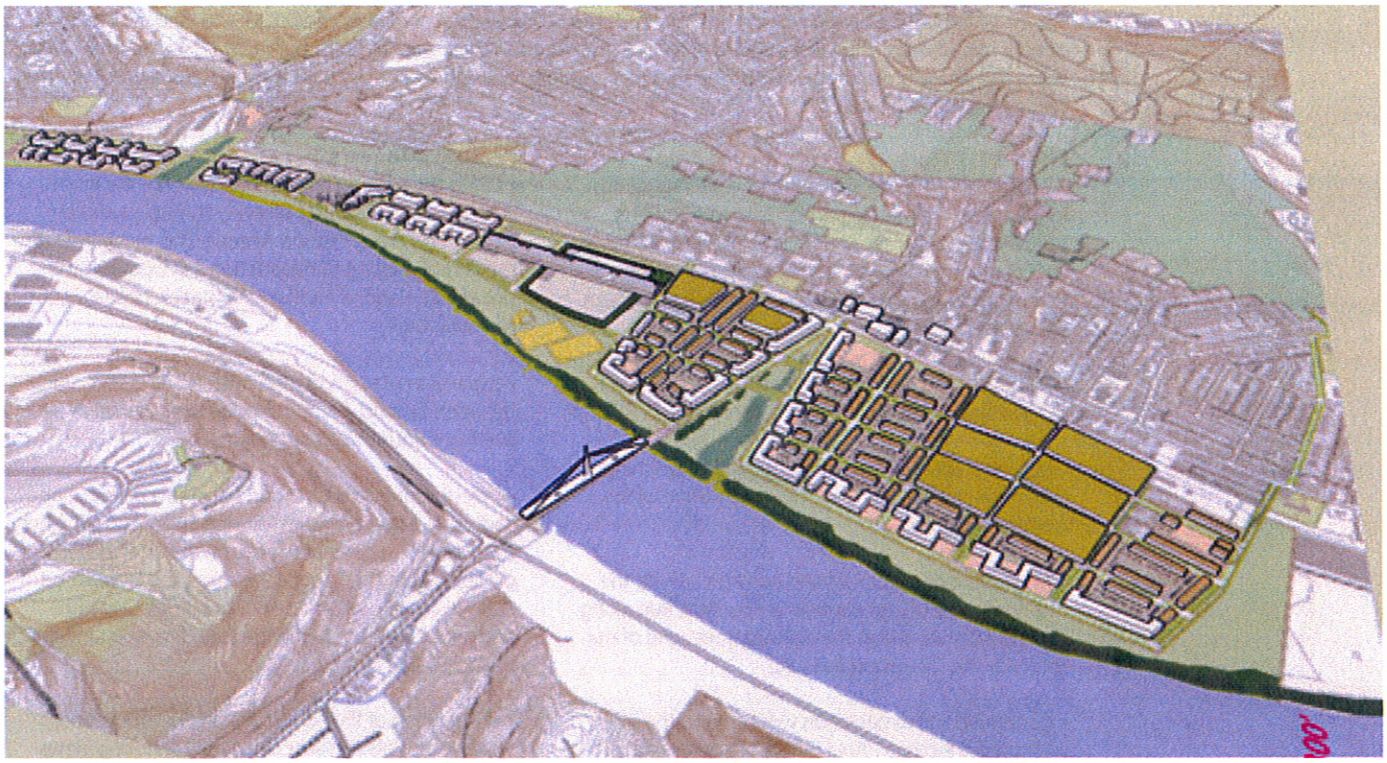


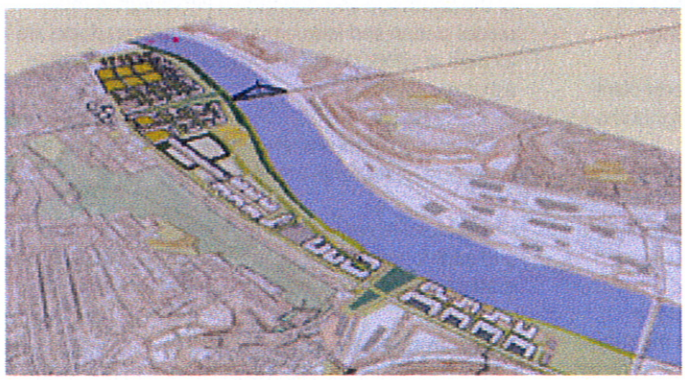
Views and frontages afforded by the Possible Development Scenario.

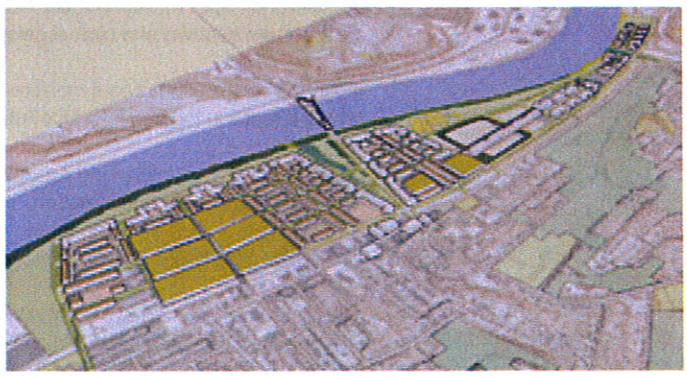

0' 5000' 10000' 15000' 20000' 25000'
North
Key: Possible Development Scenario
Existing Buildings
New Buildings
Green Framework
Existing Green Space
New Light Rail Line
Transit Station
5 Minute walk from station
(1/4 mile radius)


Key: Possible Program Distribution
Residential
Office
Retail
Academic
Productive Landscapes
Research
Arts and Culture
Hospitality
Light Industry
Recreation
Parking

3-D renderings by Murtuza Bhopalwala for RCI.







Phasing

The phasing plan is based on existing constraints, current knowledge of market conditions and land availability. It offers a hypothetical snapshot into the ALMONO site's future in three time periods: 1-7 years, 7-14 years and 14-20 years. The phasing plan begins when funding and development approvals have been secured, and a detailed master plan has been drawn.

Phase I: 1-7 Years

- Four Mile Run landscape alterations, with terraforming duties performed in part by Carnegie Mellon's Fields Robotics Center. Four Mile Run is partially daylit and its estuary reconstructed in a naturalized form. Removal of the barge docking facility at the northern end of the site.

- Removal of the CSX rail line infrastructure, including the levelling of berms along the Monongahela River.

- Expansion of the Field Robotics Center's teaching and research operations with the renovation of the landmark Building 19.

- Acquisition of properties and construction for the first phase of a TOD at the end of Four Mile Run along Second Avenue, and at the southernmost end of the site, near the Glenwood Rail yard.

- Continued soil remediation work around the site, with special focus on "Area B". Use of appropriate productive landscapes throughout the ALMONO site to aid in soil remediation and biofuel generation.

- Construction of a district co-generation energy plant and data center in the new Four Mile Run Neighborhood.

- The transformation of Second Avenue's commercial corridor into an urban boulevard. Shaping of the future Hazelwood Avenue green promenade to accommodate Sustainable Urban Drainage features.

- Recontouring, grading or naturalization of the Monongahela River edge and addition of a multi-use trail connecting to the downtown-bound Eliza Furnace Trail, and to the Duck Hollow Trail toward Braddock.

- Acquisition and, if necessary, sustainable dismantling of vacant properties, adjacent to the Hazelwood Greenway, reusing all materials possible, in preparation for its expansion.

Phase II: 7-14 Years

- Using the existing railroad right-of-way, the installation of an LRT line and bikeway through Junction Hollow and along Second Avenue. This move provides the critical missing transportation link between the site and Oakland. A multi-modal station near Junction Hollow is built.

- Expansion of existing residential fabric in Riverside, between Second Avenue and the river, as well as a riverfront houseboat community.

- Investment into Hazelwood's business district along Second Avenue, between Minden Street and Johnston Avenue, with a particular focus on the intersection of Hazelwood and Second Avenues. The Hazelwood Avenue green promenade is also completed, with adjacent mixed-use higher density development along the north side of the avenue.

- Completion of the Four Mile Run Neighborhood, a mixed-use, high density community featuring views of the Southside and downtown Pittsburgh. A multimodal station and leisure marina/houseboat docks are located at either side of the naturalized Four Mile Run estuary.

- Completion of the Hazelwood Riverfront Park, with all-season recreational infrastructure.

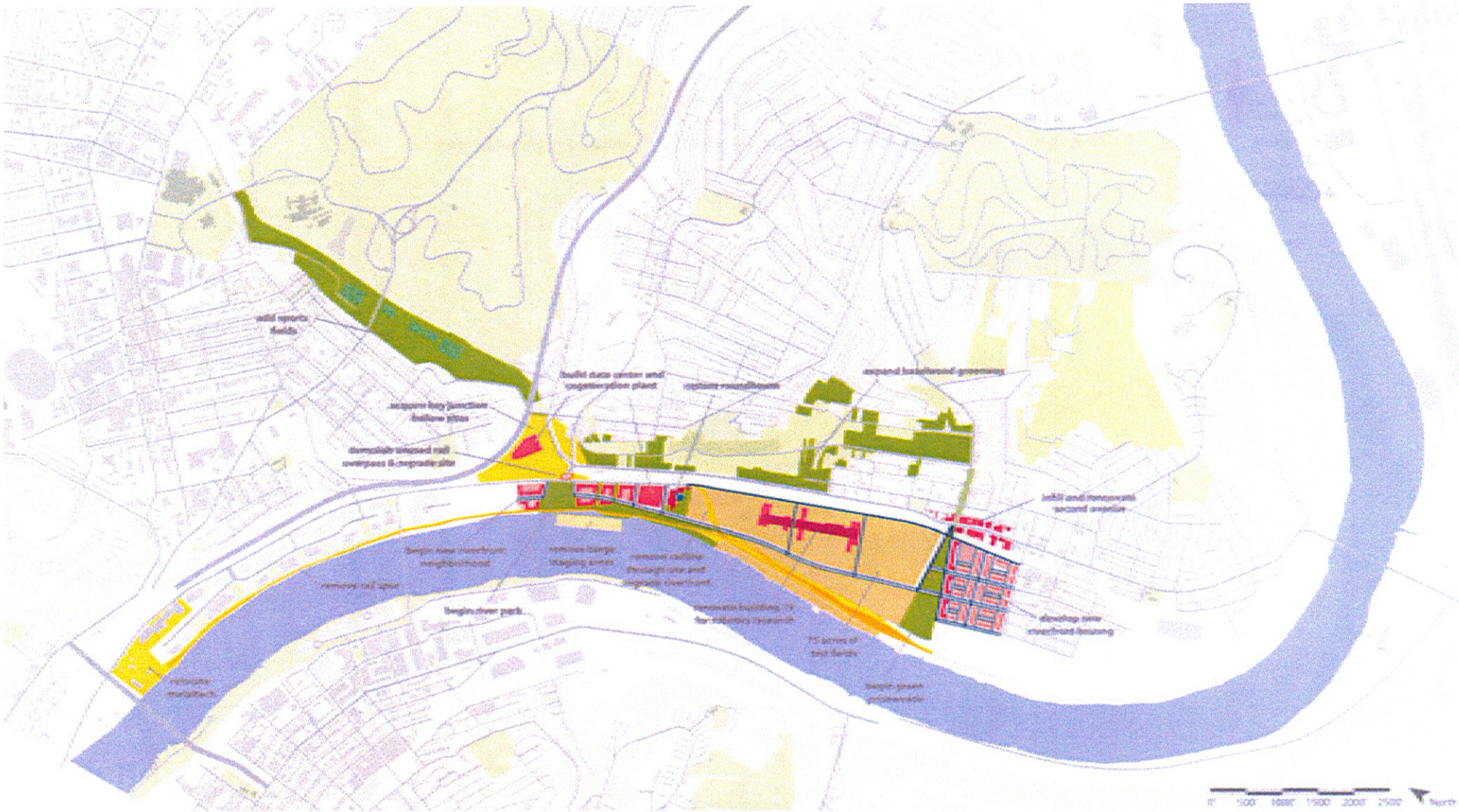
- Continued expansion of the Hazelwood Greenway and addition of viewing platforms and gateways, integration of productive landscapes and other amenities.

Phase III: 14-20 Years

- Construction of the Hazelwood Bridge to the Southside, creating a major connection to Carson Street and Becks Run Road.

- Completion of the Robot City research, development, and commercialization zone for the robotics industry.

- Possible closure of Irvine Street between Greenfield Avenue and Mobile Street, and incorporation of the lands into the Hazelwood Greenway.

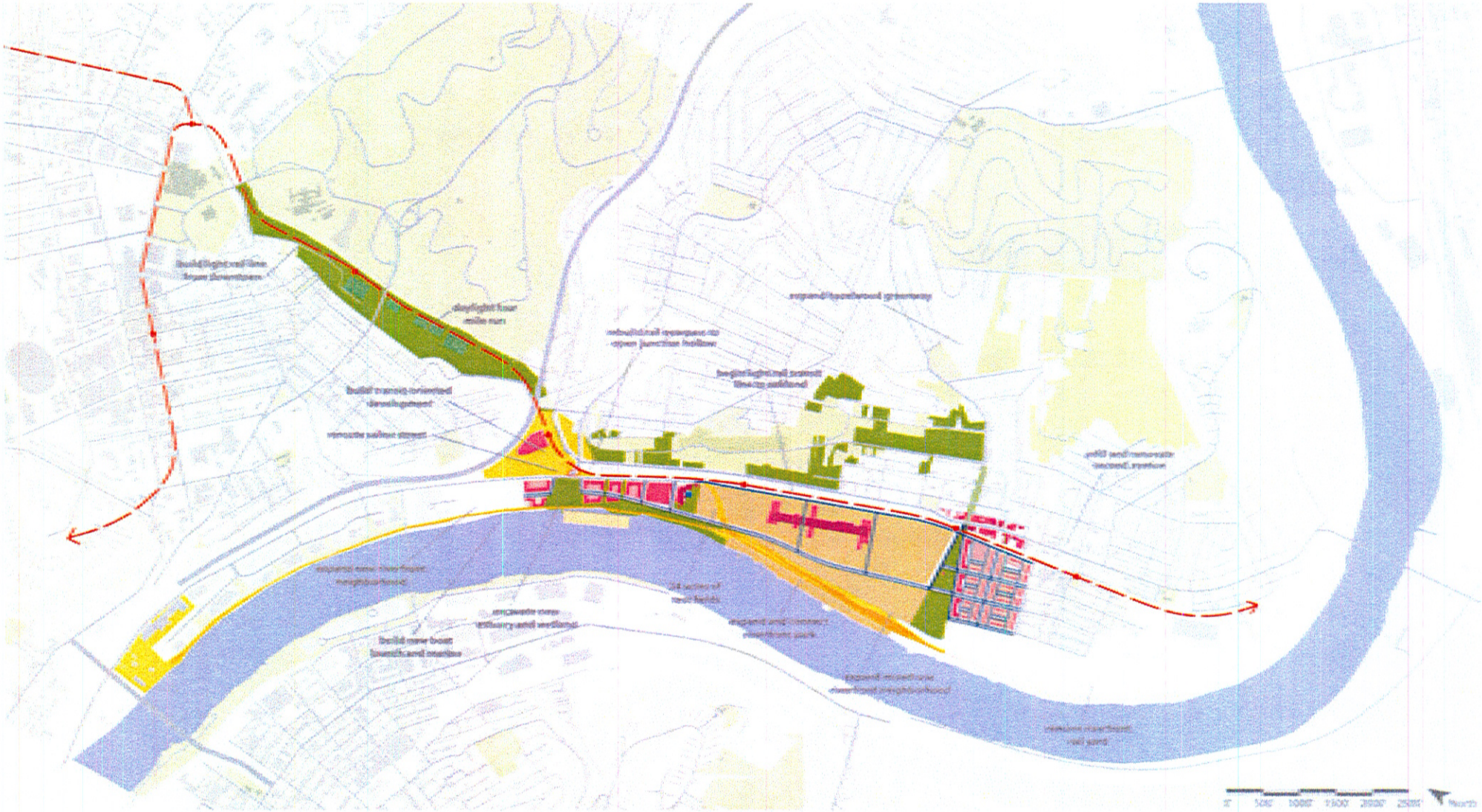


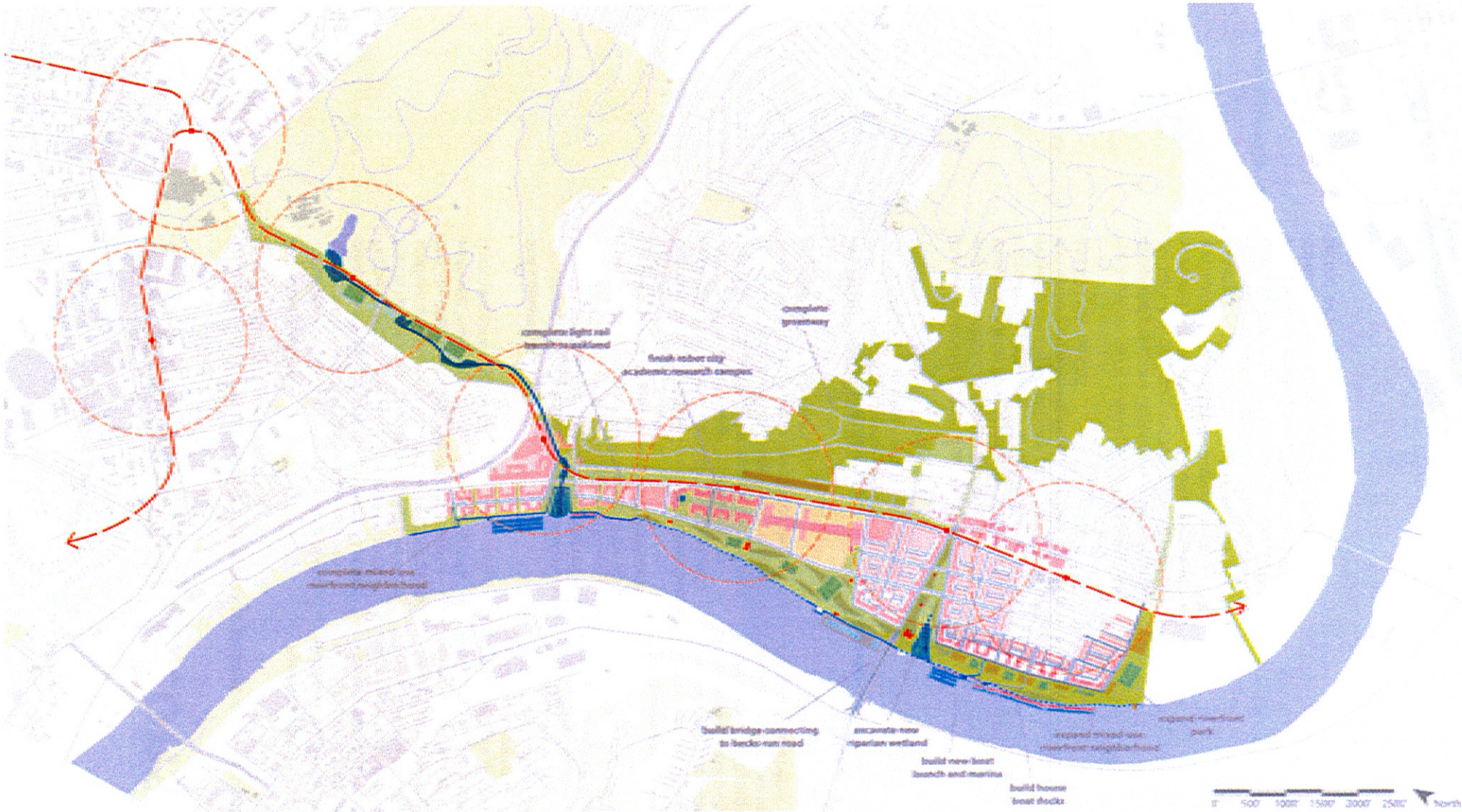
Key: Phase I (1 - 7 Years)

Acquisition & Demolition
- Key Off Site Parcels
- Railroad Removal
- Soil Remediation

Development
- New Roads
- New Development
- New Parking
- Building Renovation

Open Space
- New Park Land
- Active Recreation
- New Wetlands
- Robotics Test Fields


Key: Phase II (7 - 14 Years)
Acquisition & Demolition
Key Off Site Parcels
Railroad Removal
Soil Remediation
Development
New Roads
New Development
New Parking
Building Renovation
Open Space
New Park Land
Active Recreation
New Wetlands
Robotics Test Fields
Transit
New Light Rail Line
Transit Station
5 Minute walk from station
(1/4 mile radius)



Key: Phase III (14 - 20 Years)

Development
- New Roads
- New Development
- New Parking
- Building Renovation

Open Space
- New Park Land
- Active Recreation
- New Wetlands
- Robotics Test Fields

Transit
- New Light Rail Line
- Transit Station
- 5 Minute walk from station (1/4 mile radius)

Development Constraints

There are several existing development constraints and prerequisite moves that have to be addressed before redevelopment can take place.

Riverfront Rail Line

The largest and most imminent barrier to redevelopment is the little used riverfront rail line servicing the Metaltech, Inc. facility at the northern end of the Pittsburgh Technology Center. It, along with all rail lines in Hazelwood and the Glenwood Rail Yard at the southern end of the site, is owned by the CSX Corporation. The Allegheny Valley Railroad company has a multi-year lease to operate the Glenwood rail yard, interchange and riverside rail line.

Soil Contamination

A second constraint is residual soil contamination, particularly in the area around Building 19 (known as "Area B"). Soil remediation work began with the closure of the former coke works in 1998 but not all of the site is considered up to standard for residential development.

Currently, phytoremediation work is being undertaken by GTECH Strategies, the local social enterprise, with the help of the Field Robotics Center. Six acres of switch grass, 2 acres of sunflowers and 500 trees have been planted on the ALMONO site. There is federal funding available to continue remediation through the ALMONO partner foundations.

Scattered Property Ownership

A third constraint is the consolidation of properties in Junction Hollow, below the Riverside Neighborhood and along Second Avenue near Junction Hollow.

The landholder of the relevant parcels at the southern end of the ALMONO site is the CSX Corporation. The land is much more fragmented at the northern end near Junction Hollow. Major landholders are a private individual, the City of Pittsburgh and the CSX Corporation (under the names Pittsburgh Junction Railroad Co. and B&O Railroad Co.).

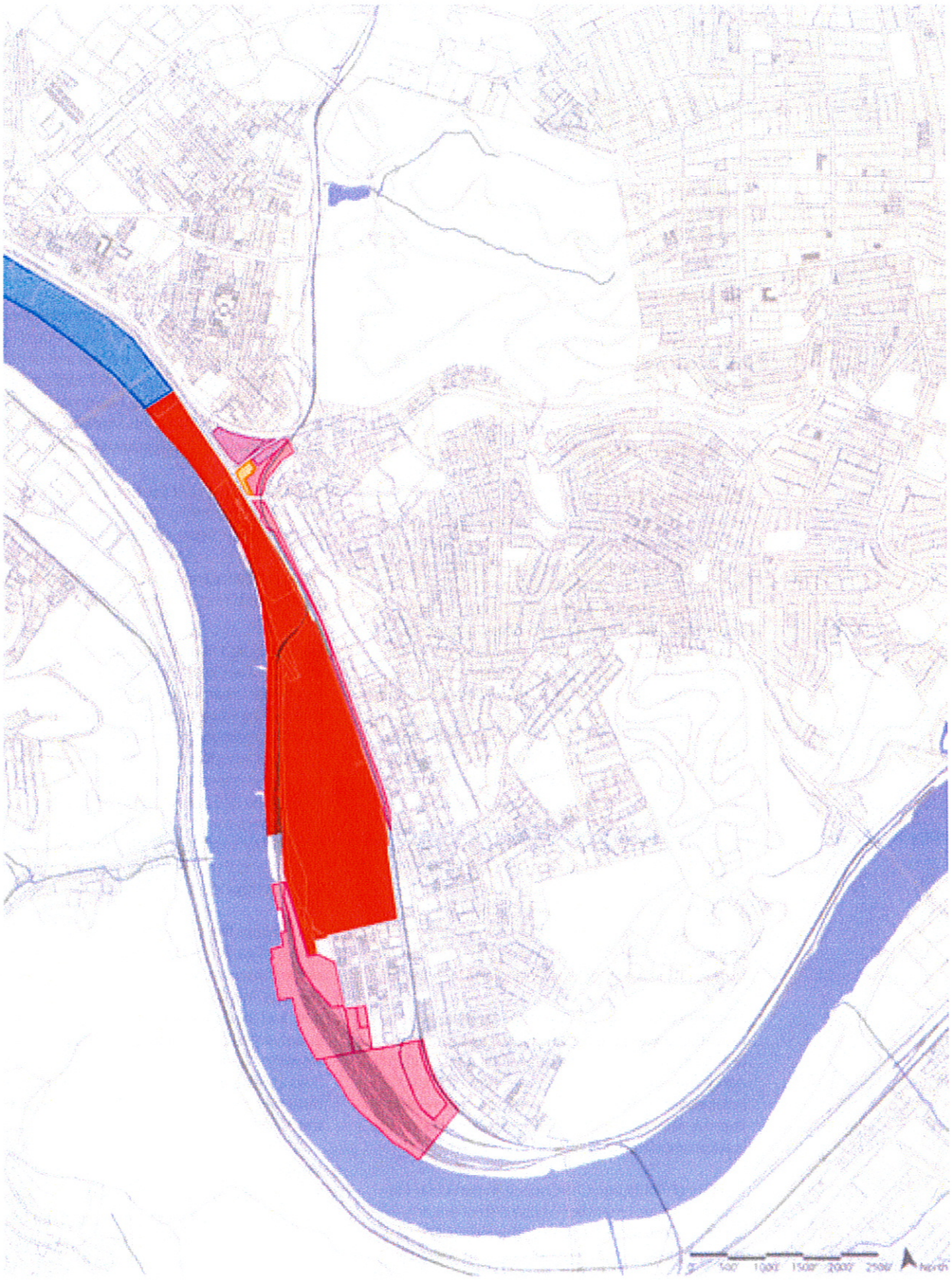
The 3-acre, 44-parcel commercial core of Hazelwood is designated a Keystone Opportunity Zone (KOZ) until 2010, at which time state and local taxes will no longer be abated. The City of Pittsburgh owns several lots and the Urban Redevelopment Authority (URA) has acquired a 12 parcels along Second Avenue between Flowers Avenue and Minden Street, in addition to Gladstone Middle School on Hazelwood Avenue. The vacant lot at the southeastern corner of the commercial district's key intersection, Hazelwood Avenue and Second Avenue, is publicly owned.

Poor Access

A fourth constraint to development is the uneven access to the site, both in terms of regional and local connections. Road access is configured so that it is easy to get to the Penn Lincoln Parkway in the eastbound direction from Hazelwood via Bates Street but not westbound. Drivers must exit in Squirrel Hill and drive through Greenfield down to Hazelwood Avenue in order to reach the site. This limits the site's potential for industrial use but this constraint is less relevant since the programmatic focus is on research uses and housing oriented toward Oakland institutions. Resolving the confusion at the intersection of Second Avenue and Greenfield Avenue, and adding an LRT line and bikeway through Hazelwood are critical measures to improving local access and redevelopment success.

Negative Image

A final constraint is the perception that Hazelwood no longer offers a hospitable residential or commercial environment. Making significant investments into public space and transportation infrastructure will give the public confidence that Hazelwood's fortunes are changing for the better.



Key: Parcel Ownership

- ALMONO Site
- Baltimore & Ohio Railway Co.
- Single Private Owner
- City of Pittsburgh
- Pittsburgh Technology Center/Urban Redevelopment Authority (URA)

Phasing

Development Constraints

Project Partners

Funding

Project Partners

The successful redevelopment of the ALMONO site requires vision, commitment and cooperation between the following stakeholders and actors. Each of the organizations listed has a critical role to play -- as regulators, investors, providers of services and infrastructure, and visionaries -- in ensuring that Hazelwood's redevelopment fulfills its full local and regional potential.

Site Owners

ALMONO, LP is a partnership between the Richard King Mellon Foundation, the Heinz Endowments, the McCune Foundation, the Claude Worthington Benedum Foundation and the Regional Industrial Development Corporation of Southwestern Pennsylvania (RIDC). ALMONO have provided the overall vision and resources to redevelop Hazelwood to date.

Government Partners

The City of Pittsburgh's Department of City Planning regulates development through zoning, ordinances and building standards. The redevelopment of the ALMONO site into a sustainable LEED ND-certified urban district is an opportunity for City Planning to research and adopt new norms based on ecological performance and other quality of life measures, using the research conducted by Carnegie Mellons' Remaking Cities Institute and students in the Urban Laboratory.

The City's development arm, the Urban Redevelopment Authority (URA), is a major land owner and has already invested in Hazelwood, particularly along Second Avenue and in the greenway. The URA can continue to assist in Hazelwood's redevelopment by aquiring critical property adjacent to the ALMONO site and by further expanding the greenway.

The Port Authority of Allegheny County (PAAC) is the region's public transit agency and can leverage federal and state funding for expanding its Light Rail Transit system from downtown to Oakland and Hazelwood.

The Port of Pittsburgh Commission facilitates goods movement along the region's waterways. The Port of Pittsburgh is the second busiest inland port in the nation, moving 40 million tons of cargo annually. Its involvement in the redevelopment process will ensure that this important segment of the regional economy is accommodated.

The City of Pittsburgh City Council, in particular the District 5 council member whose district encompasses Hazelwood, can support the redevelopment by advocating that resources be allotted to critical infrastructure.

Institutional Partners

Carnegie Mellon University is exploring the possibility of establishing the Robotics Institute - Field Robotics Center headquarters on the site and of building student undergraduate, graduate and family housing nearby. A dialogue with the University of Pittsburgh and University of Pittsburgh Medical Center (UPMC) may also find additional institutional interest.

Civic and Non-Profit Partners

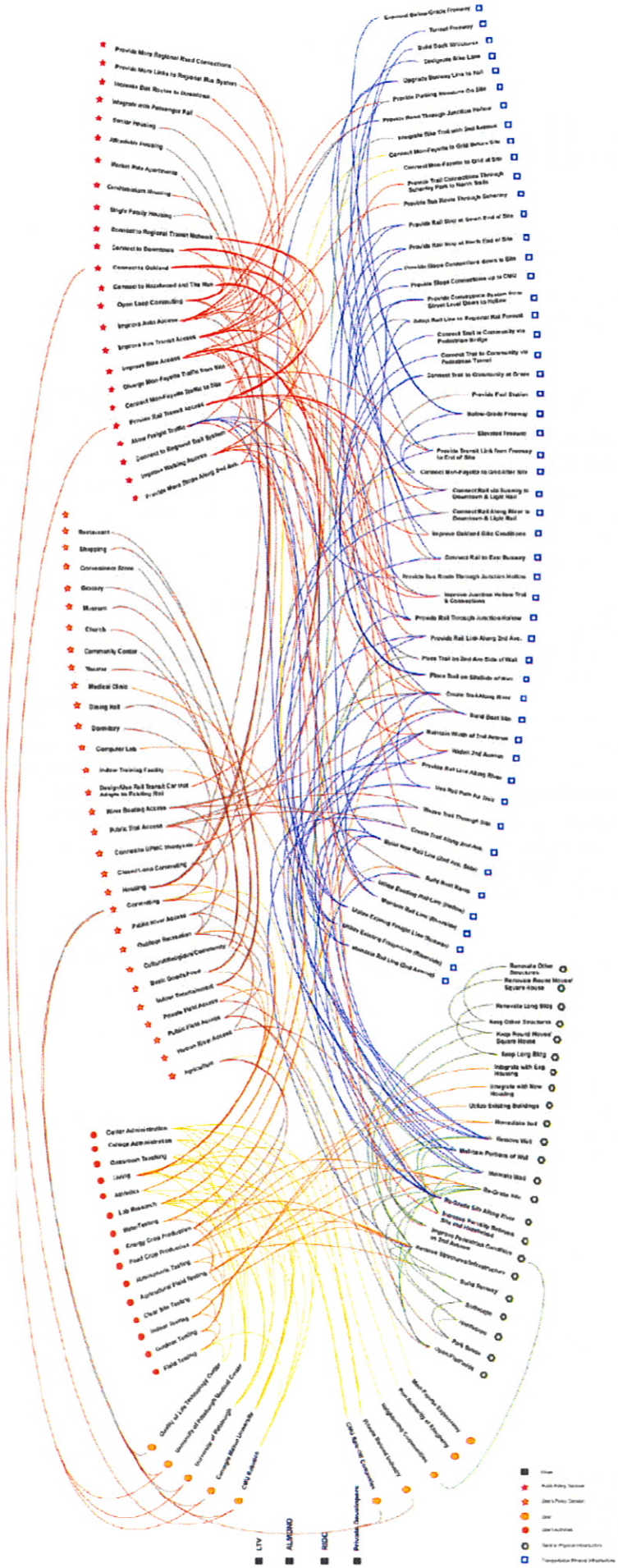
Existing community groups, including the Hazelwood Initiative, Inc., Center of Life non-profit and Hazelwood Harvest, can be a vehicle for the participation of Hazelwood residents and businesses in the redevelopment process, ensuring that their voices are heard.

The Pittsburgh Parks Conservancy (PPC) in partnership with the City of Pittsburgh manages the city's four major urban parks, including a section of Junction Hollow. The Hazelwood Greenway can be folded into the PPC's portfolio of parks, creating a connected system of woodlands and parks that includes Schenley Park, the Hazelwood Greenway and Frick Park. Hays Woods, the 635-acre wooded hillside across the river from Hazelwood, may also be integrated in the future as it contains valuable ecological features, including six streams and three wetlands, wildlife habitat and aids with stormwater management.

Civic groups like Sustainable Pittsburgh, Bike-PGH, the Riverlife Task Force, the Allegheny Trail Alliance, Friends of the Riverfront, Grow Pittsburgh, the Steel Valley Heritage Trail Council, the Three Rivers Rowing Association, and many, many more, are working hard to make improvements to Pittsburgh's ecological, cultural and recreational amenities. These grass-roots organizations hold a wealth of knowledge, vision and passion, and must be included in the master planning process for the ALMONO site

Private Partners

The CSX railway company operates an important freight rail line along Second Avenue and through Junction Hollow. CSX's cooperation will be critical in the establishment of a passenger rail line in its right-of-way. Regional companies like Bombardier and robotics firms may also be interested in contributing to the redevelopment.



ALMONO Redevelopment Decision Tree Diagram: Blue lines represent infrastructure decisions; red lines represent access and connectivity decisions; brown lines are decisions made by partners; green lines are decisions about general physical infrastructure; yellow lines represent users' decisions. From Master of Urban Design - 2007 Decision Making Studio, School of Architecture, Carnegie Mellon University.

Phasing

Development Constraints

Project Partners

Funding

Funding

There are a number of grants and funding sources for the interventions proposed in these urban design recommendations. We have identified more than 30 sources of external governmental, foundation and corporate funding dealing with accessibility, green infrastructure and stormwater management, brownfields, compact and transit-oriend development, affordable housing, sustainable energy, public space and recreational amenities, and historic restoration. The list is not meant to be exhaustive and further inquiries should be made.

Accessibility

- Residential Visitability Design Tax Credit Program

Green Infrastructure, Stormwater Management and Landscape Restoration

- EPA Clean Water State Revolving Fund
- EPA Water Quality Cooperative Agreements
- EPA 5 Star Restoration Program
- Community Conservation Partnerships Program (C2P2), Pennsylvania Department of Conservation and Natural Resources
- Conservation Easement Assistance Program (CEAP)
- PA DEP Growing Greener Watershed Grants
- Pennsylvania Infrastructure Investment Authority (PENNVEST)
- DCNR Rivers Conservation Grants
- EPA Clean Water Act 319 Grants

Brownfields Redevelopment

- EPA Brownfields Funding
- Brownfields Economic Development Initiative (BEDI), U.S. Department of Housing and Urban Development
- EPA Clean Water State Revolving Fund Programs (CWSRF)

Transit Oriented Development, Smart Growth

- EPA Smart Growth Grants
- PA House Bill 994 Transit Revitalization Investment District (TRID) Act funding

Affordable Housing

- Window of Opportunity: Preserving Affordable Rental Housing, MacArthur Foundation
- HOME Investment Partnerships and Self-Help Homeownership (SHOP), U.S. Department of Housing and Urban Development, Housing Office of Community Planning and Development
- Public Housing Capital Funds, U.S. Department of Housing and Urban Development
- Affordable Housing Built Responsibly Grant, Home Depot Foundation
- Home Improvement Loan Program (HILP), Pittsburgh Home Rehabilitation Program (PHRP), Urban Redevelopment Authority of Pittsburgh

Public Space and Recreational Amenities

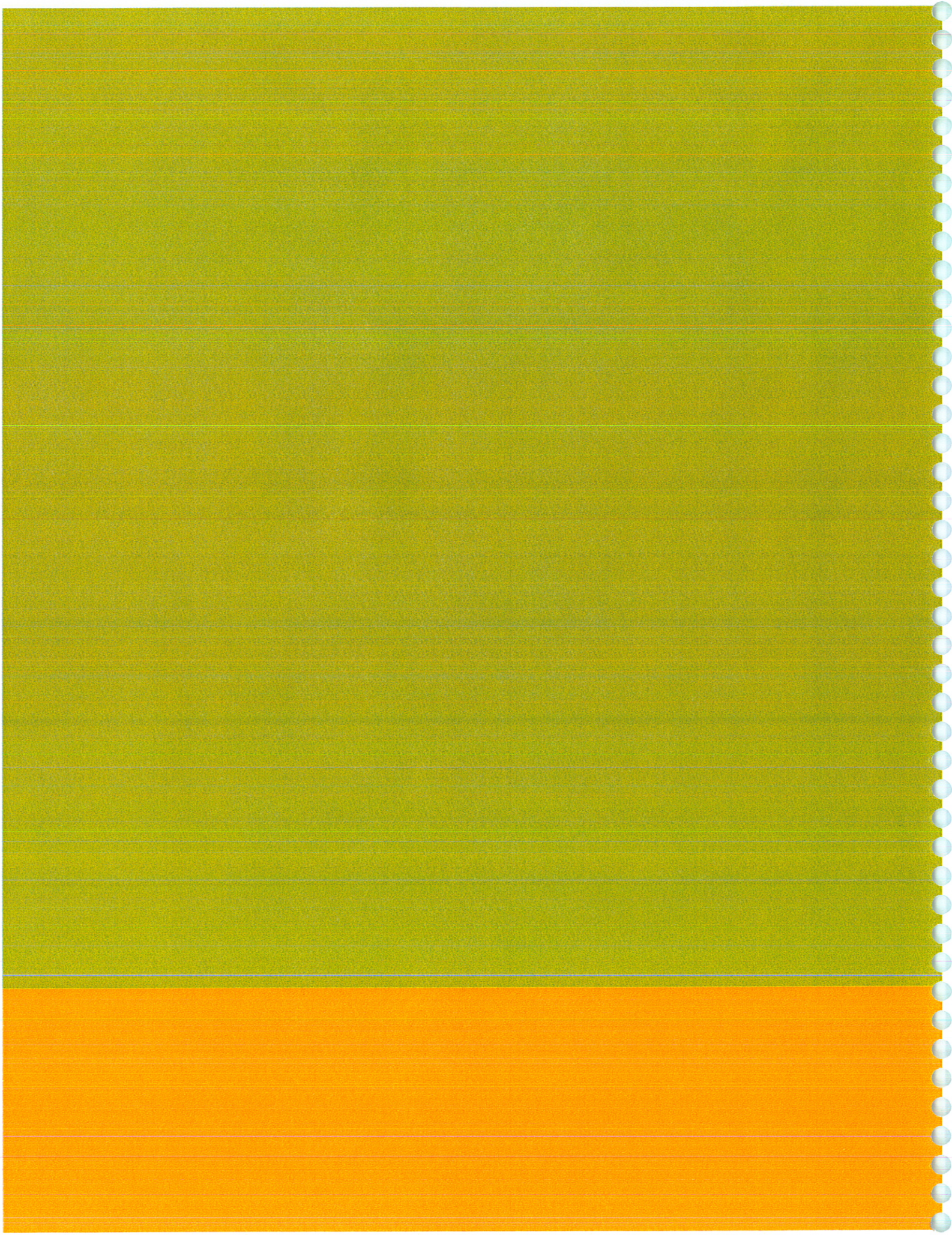
- Design Fund, Community Design Center of Pittsburgh (CDCP)
- Community Conservation Partnerships Program (C2P2) , Pennsylvania Department of Conservation and Natural Resources

Sustainable Energy

- Solar America City Program, U.S. Department of Energy (DOE)

Historic Restoration Grants

- LCCC Preservation Loan Fund, Landmarks Community Capital Corporation (LCCC)
- PHLF Historic Religious Properties Program, Pittsburgh History and Landmarks Foundation (PHLF)
- Seeding Preservation Projects, Pittsburgh History and Landmarks Foundation (PHLF)
- Rehabilitation Investment Tax Credits (20 percent and 10 percent), U.S. Government
- National Trust Preservation Fund, National Trust for Historic Preservation
- Johanna Favrot Fund for Historic Preservation, National Trust for Historic Preservation
- Cynthia Woods Mitchell Fund for Historic Interiors, National Trust for Historic Preservation

Remaking Cities Institute
School of Architecture
College of Fine Arts
Carnegie Mellon University
Pittsburgh, PA 15213 USA

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