



PITTSBURGH, PA

# GREEN STEEL

BROWNFIELD REDEVELOPMENT OF THE CARRIE FURNACE





# GREEN STEEL

BROWNFIELD REDEVELOPMENT OF THE CARRIE FURNACE, PITTSBURGH, PA

RYOMA TOMINAGA | SPRING 2014 | SENIOR CAPSTONE

Presented to the faculty of the Landscape Architecture Department of the University of California, Davis in partial fulfillment of the requirements for the Degree of Bachelors of Science in Landscape Architecture.



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A handwritten signature in black ink, appearing to read "CNapawan", is positioned below the name of Claire Napawan.

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0.1 | Carrie Furnace . Graffiti along ore yard



## A B S T R A C T

Pittsburgh, Pennsylvania is ‘steel country’, and much of the regions civic pride stems from the steel industries driving force in which the towns and boroughs were shaped. The complication that faces the region following a crippling economic decline is the amount of contamination these super economies have left behind. Underutilized lands within prime real estate locations remain just as depressed as the surrounding community while residential housing and infrastructure continues to reach unprecedented levels of dilapidation.

The Carrie Furnace is a brownfield site that offers an opportunity to revitalize the local neighborhoods through development of sustainable infrastructure that encompasses open public space, recreational areas, artistic exhibitions, connections between bike trails, a riverfront connection, in addition to the needed quality jobs. The historic significance of the site makes for a special opportunity to capture the heart and soul of neighborhoods and create a destination that serves a wide variety of users. The intent is to holistically redevelop the site by avoiding past mistakes of a single-use program of retail chains and embracing the inherent complexities with the capacity to remain vibrant, and retain value for future generations to come. The Green Steel design hopes to alter the negative perceptions attached to brownfields and be a model for future public reinvestment projects in the Pittsburgh area and other cities across the nation.



# A C K N O W L E D G E M E N T S

## Committee Members

Thank you for all of your guidance and support throughout this entire process. This project would not have been possible without all of your help and inspiration.

A special shout-out to the professionals in Pittsburgh, PA: Erin Deasy, Deborah Lange, and Ronald Baraff for taking the time to help me navigate throughout the site visit and research. Your first hand accounts was invaluable to the projects success.

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Your dedication and expertise has helped establish a strong foundation that will carry me throughout my entire career.

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This experience would not have been possible without the perseverance and loving support of those who are closest to me.

## Friends and Colleagues

Thank you for making this short-lived studio life such a fun and wonderful experience; it has made all the difference in the world.



# INTRODUCTION

09 - Purpose

10 - Objectives

11 - Significance

The industrial revolution of the 19th century have left vast areas of underutilized properties, abandoned buildings, and urban decay that plague cities all over the country. These derelict sites come from formerly used industrial and commercial properties stigmatized by real and perceived contamination. Communities with numerous brownfields are directly related to multiple public health issues and the consequences are often compounded in damage. These issues include increased potential for exposure to harmful chemicals, contaminated soil and/or water, lack of green space, reduced property values, increased crime rates, poor air quality, and overall reduced quality of life.

While land restoration, adaptive reuse, and preservation works well in many cases, derelict large-scale industrial sites face a more difficult set of problems that are often left unaddressed. The approach to finding a solution to decaying industrial sites requires exploration of modern passive remediation, holistic adaptive reuse, and planning that will trump traditional measures that provide long-term value. By examining the published works and case study examples, a prescriptive recommendation can be drafted to re-imagine how the redevelopment of Carrie Furnace can be accomplished.



1.1 | Carrie Furnace . Moss Growing on sintering plant



# O B J E C T I V E S

1

To understand brownfield remediation as an integral part of future environmental planning and community development.



2

Find opportunities to alter public perception to thrust forward investment in brownfield re-development through the support of environmental agencies and design firms.



3

Reach aesthetic competency that captivates the public and provide a historical connection through innovative re-use.



4

Use the knowledge gained to integrate city planning and design the Carrie Furnace site.



# S I G N I F I C A N C E

Redevelopment of brownfields is important for a number of reasons. From an ecological perspective, cleanup of contaminated land reduces the direct contact of harmful substances making the environment a safer place for people and helps support plant and wildlife. Additionally, developing brownfields allows the land to be fully utilized, thwarting the demand for outward sprawl development of greenfields that provides precious habitat for wildlife and acts as an environmental buffer.

From a community perspective, brownfield remediation can be beneficial both socially and economically. Developing brownfields can improve

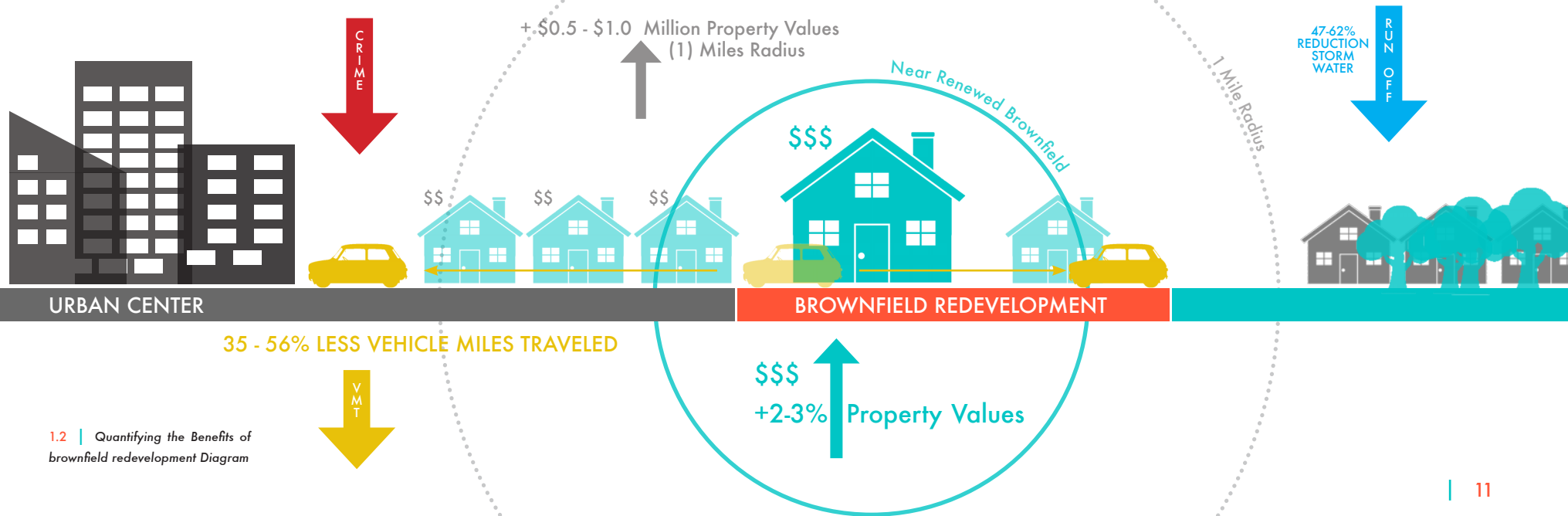
property values by making neighborhoods safer and more desirable as the quality of life improves in the region. It can attract commercial development back into a community to help create jobs in distressed areas, revitalize areas around town, and free up land resources for productive green spaces such as community gardens, or urban farms (Hollander, 3).

In certain situations, brownfields provide an excellent opportunity to enhance the visual landscape, highlight the sites rich historical significance, and provide educational opportunities for the public.

This is a critical time to explore the application of green infrastructure on remediated sites because of

the extensive increase in redevelopment investment expected in the next decade throughout the nation. As our urban areas continue to develop and become denser, the discussion of redeveloping brownfields and its associated benefits and constraints has become more pertinent with an estimated 450,000-brownfield properties in the United States alone (Doem, 23).

The advancement of remediation solutions have allowed many of these brownfield properties to surpass their former uses and become housing, new business incubators bringing forth new jobs, productive green space, and a fresh identity for the area.



1.2 | Quantifying the Benefits of brownfield redevelopment Diagram

More than

450,000+

Brownfields in the U.S. alone

D R O S S C A P E



21 Rail Hub . Norfolk & CSX's Tilford Yard, Atlanta, Georgia



# BROWN FIELDS

13 - Drosscape

14 - Overview

15 - Site Considerations

16 - Remediation

18 - Life-Cycle Analysis

Alan Berger, a MIT professor of urban design, introduced the concept of “DROSSCAPE”. The term Drosscape is part of a new vocabulary and landscape aesthetic used to help identify urban dross (waste) that may be “scaped” (reprogrammed) for adaptive reuse. Berger contends that the accumulation of these waste landscapes is a phenomenon of two primary processes. First, it addresses the physical dimension of rapid urbanization and sprawl that is proportional to the healthy growth of cities. The second is tied to the consequences of defunct economic and production systems. The creation of Drosscapes is an inevitable measure of industrial growth and a key indicator success of urban center that is not intrinsically bad. The adaptive re-use of the ensued and ensuing contraction of these economic systems will be one of the 21st century’s greatest infrastructural design challenges (Berger).

# BROWNFIELD OVERVIEW

According to the EPA, brownfields are abandoned, idled or underused industrial and commercial properties where expansion or redevelopment is complicated by REAL or PERCEIVED environmental contamination.

The term brownfield originated in the early 1990's when researchers observed how the regulatory frameworks designed to protect the environment had also in result, inhibited the reuse, cleanup, and redevelopment of former industrial and commercial sites, with contamination being the principle barrier (Hollander, 1).

Brownfields are found across all spectrums of development from small towns, cities, rural, suburban and urban. The greatest prevalence of brownfields are found within industrial zones, where the industrial boom in the 19th century has waned presently (Hollander, 4).

Common examples of brownfields include:

Steel Mills  
Metal Plating Factories  
Corner Gas Stations  
Electronic Manufacturing  
Textile Mills  
Dry-Cleaning  
Graveyards and Burial Grounds

The US EPA provides a major source of funding, technical assistance, and best practices for new brownfield projects. States develop their own programs, while the local government regulations will address whether the project is feasible or not. Financing incentives often provide capital for infrastructure developments. Understanding local politics, power structure, liability, and insurance is essential for successful redevelopment (Hollander, 7).

Even with billions of public and private dollars toward assessing, remediating, and redeveloping brownfields, the amount of remaining derelict land tell us that more work is needed.

Federal laws, known as CERCLA, originally introduced in 1980 established liability for contaminations to anyone in the chain of title making it difficult for redevelopment. In 2002, an amendment limited liability to those who had direct connection to contamination (Hollander, 18).

## SITE CONSIDERATIONS

No matter how many similarities brownfields sites share with each other, every project nets different types of barriers. When addressing contamination on brownfield sites, there are several specific site elements that need to be considered in order to identify the extent of the contamination.

### SOILS

A combination of contaminants can be found at varying depths ranging from metals in the top 18" to depths as extreme as 50-60 feet.

### GROUND WATER

The movement and conditions of ground water in brownfields to be affected by subsurface contamination plumes arising from spills or discharges. Polluted groundwater.

## EVALUATION AND SELECTION

The evaluation and selection of remediation technologies must be carefully selected in order to effectively and efficiently remediate contamination based on the desired result. In order to make the selection process easier, the following criteria will help guide and answer important questions with support of the required Phase I & II Environmental Assessment Report.

1. Ability to protect human health and the environment
2. Compliance with environmental statutes
3. Types of contaminations to be addressed
4. Long-term effectiveness and permanence
5. Reduction of toxicity, mobility, and volume
6. Short term effectiveness
7. Cost
8. Ability to be implemented
9. State acceptance
10. Community acceptance

### SURFACE WATER

Pools Lagoons often found in industrial sites. These constructed water bodies are likely to accumulate significant amounts of pollutants.

### EXISTING INFRASTRUCTURE

Safety of the building life and it's use in future planning.

### INDOOR & OUTDOOR AIR

Lead paint and asbestos, insulation, fragments of remaining systems. (Hollander, 28)

## COMMON HAZARDOUS SUBSTANCES

### Petroleum Products (TPH)

Heating oil	(from spills or ruptured underground tanks)
Gasoline	(spills and discharges)
Kerosene	

### Polychlorinated Biphenyls (PCBs)

Class of chemicals that are all entirely manmade. PCB's are used in different types of products, including hydraulic fluid, pigments, plasticizing vacuum pumps, compressors, and heat transfer systems. Their primary use is as a dielectric fluid as a transformer and capacitor coolant.

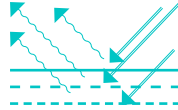
### Metals

Any metallic chemicals that have relatively high density are highly toxic, and poisonous to humans at low concentrations. Including: Arsenic, Beryllium, cadmium, chromium, nickel, lead, zinc, mercury, copper. Lead is commonly found in urban brownfield sites.

# REMEDIATION TECHNIQUES

## AIR SPARGING

Process of injecting air directly in severely polluted groundwater to remediate it by volatilizing or driving off contaminants to the surface. Extraction fan system are used to remove the vapors.



## BIOREMEDIATION

The use of biological agents, such as microbes or plants to remove or neutralize contaminants in polluted soil or water. Bacteria and fungi need nutrients. They break down organic compounds. Technology needs time to work and may not be appropriate for brownfields where immediate remedial action is required.



## BIOVENTING

Stimulating the biodegradation of petroleum hydrocarbons in soil by injecting air through drilling wells to increase oxygen concentration. Unlike air sparging, bioventing uses low airflow rates to provide just enough oxygen to sustain microbial activity.



## ENCAPSULATION

“Capping” refers to the installation of a cover of soil clay layer, or a durable waterproof membrane or a combination of both over contaminated material on site. The cap prevents human or environmental contact. Encapsulation is appropriate for all levels of polluted soil found on brownfields.



## EXCAVATION

is the isolation, digging up and removal of contaminated soil on-site. The soil is usually excavated with construction equipment. The soil is either cleaned or removed from the site and disposed of in an approved landfill. Often a space left open is then filled with clean soil or part of the site design strategy.



## INCINERATION

Process of burning hazardous materials such as polluted soil at a controlled temperature high enough to destroy harmful chemicals. An incinerator can be brought to the cleanup site.



# EMERGING TECHNIQUES

## Landfarming

is a bioremediation treatment process that is performed in the upper soil zone. Contaminated soils, sediments, or sludge's are incorporated into the soil surface and periodically turned over or tilled to aerate the mixture.

## Phytoremediation

is direct use of living plants to removed or neutralize site contaminants such as heavy metals and organic pollutants found in soils, groundwater, or sediments. “Phytotechnologies” describes a range of plants-based applications that use mechanisms in living vegetation to remove, degrade, or contain contaminants.

## Soil Washing

“scrubs” soil to remove and separate the portion of soil that is not polluted. The process separates the contaminated fine (silt & clay) from the coarse soil (sand & gravel). The smaller volume of soil is then treated by other methods.

## STORM WATER MANAGEMENT

### Bioremediation in Ponds and Wetlands

The level of biological productivity that helps treat and stabilize toxic materials is thought to be the highest of any natural system. While brownfield water quality issues may be complicated by the presence of toxins, the use of bioremediation technologies in conjunction with storm water management design represents an important element of brownfield site design. (Russ, 136)

### 2.2 | Bio-Treatment Wetland



## ADVANTAGES AND DISADVANTAGES OF BIOREMEDIATION

### + ADVANTAGES +

Cleanup costs using bioremediation are typically 3 to 10 times lower than more conventional technologies such as incineration or secure landfilling.

Bioremediation is aimed at biodegrading and detoxifying hazardous contaminants and is relatively simple technology compared to most others.

Bioremediation can be carried out with minimal site disruption, volatile compound emission, and health risk to neighboring residents or site occupants.

### - DISADVANTAGES -

Difficulty of predicting performance and the difficulty of scaling up from laboratory or pilot-plant tests. Success of bioremediation project is dependent on maintaining environmental conditions necessary for microbial growth such as sensitivities to temperatures, pH, toxicity, moisture, and nutrients.

# LIFE-CYCLE ANALYSIS

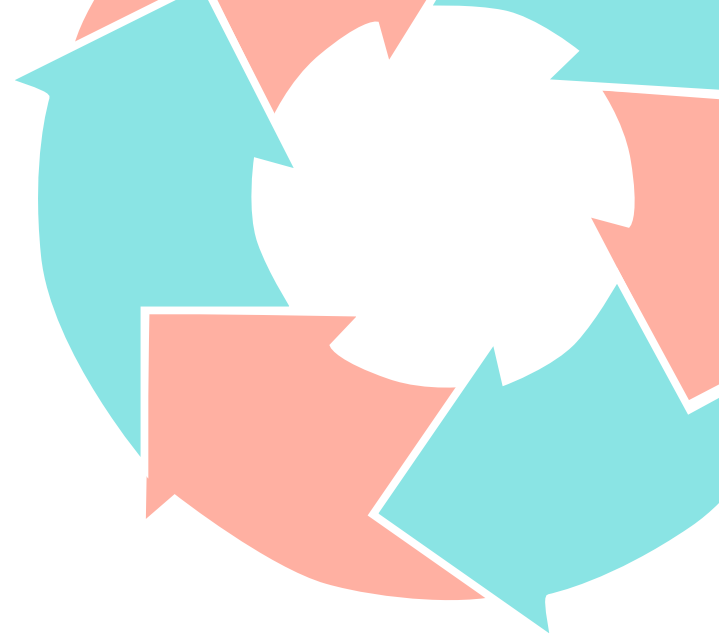
A study completed by Carnegie Mellon Universities, Department of Civil & Environmental Engineering has conducted a study that compares the life-cycle costs and Greenhouse Gas Emissions of residential development between brownfield and greenfields.

The study compiled data of past projects in order to establish a benchmark that has identified (5) major characteristics for comparative study:

- Brownfield Remediation
- Building Construction
- Infrastructure Costs
- Building Utilities & Maintenance
- Resident Travel

The comparison of the final averages reveal that brownfield development can save each person **\$150/yr**, compared with greenfield development. Greenhouse emissions savings are an average of **\$1,200 kgCO<sub>2</sub>/yr**, per person.

Although brownfields may incur high initial costs for environmental remediation, the significantly lower costs for infrastructure due to their compact nature and pre-existing roadways and pipelines, along with lower travel costs makes brownfield development a stronger alternative to greenfield development.



Brownfield developments are **6x** closer to the center city, have **5x** more households per acre, and have **2x** the walkability index compared to greenfield development.

## REMEDIATION COSTS





## BROWNFIELDS REDEVELOPMENT

- Eliminates health and safety hazards
- Eliminates visual eyesores of derelict sites
- Increases productivity of valuable land
- Brings new investment to the community
- Brings new jobs to the community
- Increases property values and tax receipts by local and state governments



2.3 | Carrie Furnace . Compactor remains of site materials





# CARRIE FURNACE

21 - Site Introduction

24 - Context

26 - Brownfield Inventory

28 - Three Rivers

30 - History

33 - The Vision

This Carrie Furnace project offers a comprehensive opportunity to identify solutions for applying green infrastructure to manage a multitude of site elements. The 168-acre industrial property adjacent to the Monongahela River and is roughly within 10 miles of downtown Pittsburgh. The Carrie site part of the historical Homestead Steel Waterfront District. Recently, the Waterfront District has been the focus of sustainable building and planning. With its commitment to explore new applications of green infrastructure in urban environments. The County of Allegheny, supported by local non-profits, applied for U.S. Environmental Protection Agency technical assistance to develop green infrastructure scenarios for the Carrie Furnace site. The goal of this effort is to develop a range of green infrastructure scenarios consistent with a 15 to 20-year development framework.



3.1 | Carrie Furnace . Wheel Pulley

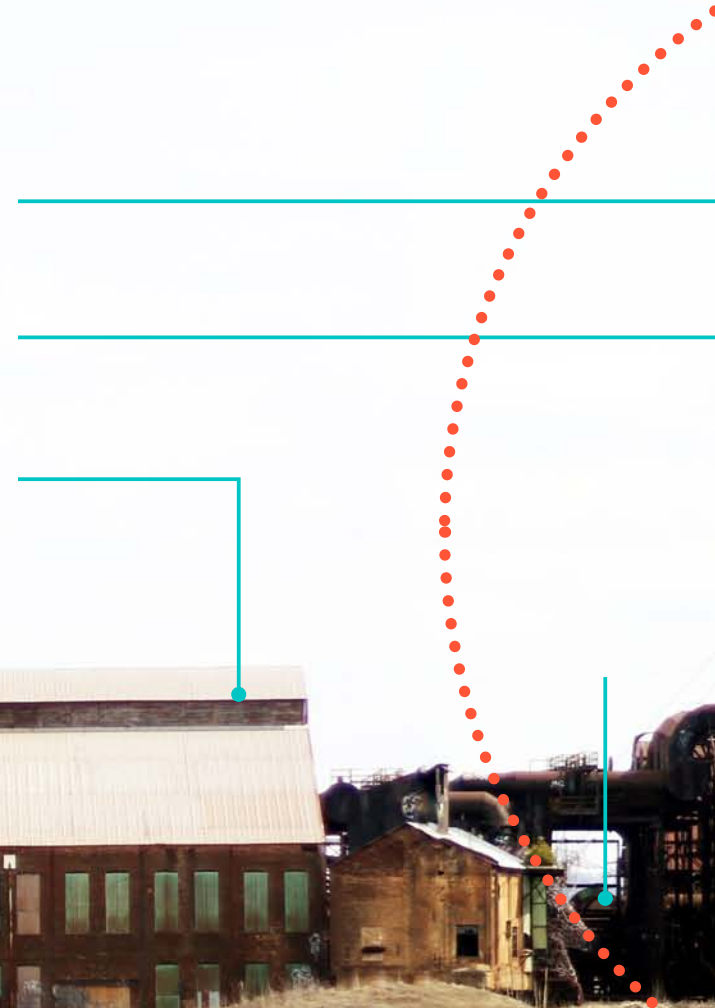
**350,000** cubic yards of clean fill was imported to raise over **80** acres of prime developable acreage out of the flood plain



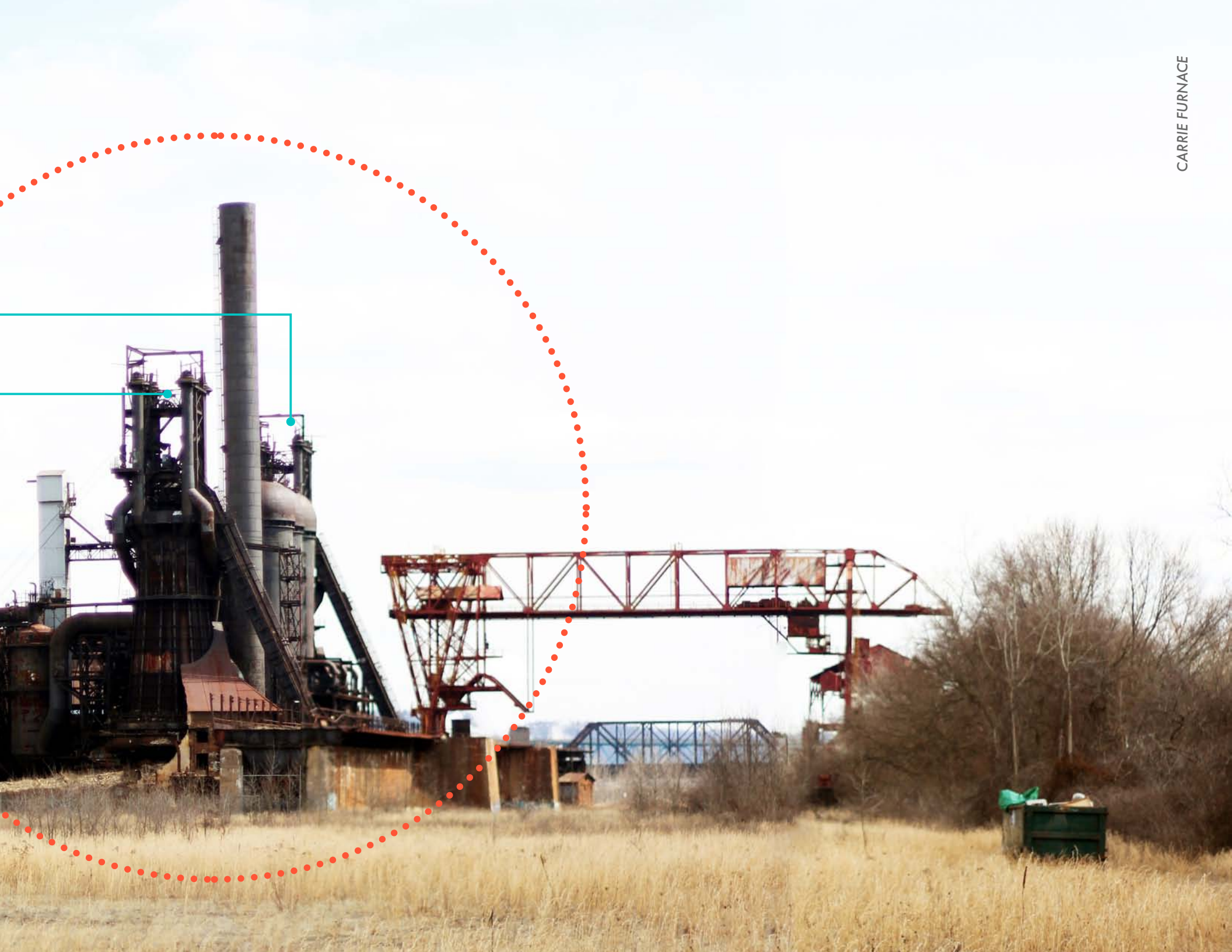
#6 Furnace

#7 Furnace

Boiler Shop







# REGIONAL CONTEXT

## Allegheny County Profile

For more than 75 years, Allegheny county has lagged behind the nation and state's growth rate. In each decade from 1970 to 2000, the county's population decrease stemmed from the continued economic restructuring of the regions employment center that is no longer reliant on heavy industry for jobs.

Between 1978 and 1983 alone, over 100,000 steel-related jobs were lost due to the collapse of the already declining steel production industry (Bright, 111). While manufacturing remains an important sector of the economy, the current job market is characterized by high tech and medical jobs at one end of the spectrum and low-wage dead-end jobs at the other.

Over the last year, Allegheny County has experienced the largest growth in venture capital investment of any area in the country and remains as one of the most livable areas in the nation.

“Pittsburgh was a symbol as well as a city. It was synonymous with the spectacular advance in American Industry, and the byproducts: labor unrest, poverty, assimilation of a heterogenous immigrant working force, and disruption of community cohesion (Lubove, 2).”

## Political Fragmentation

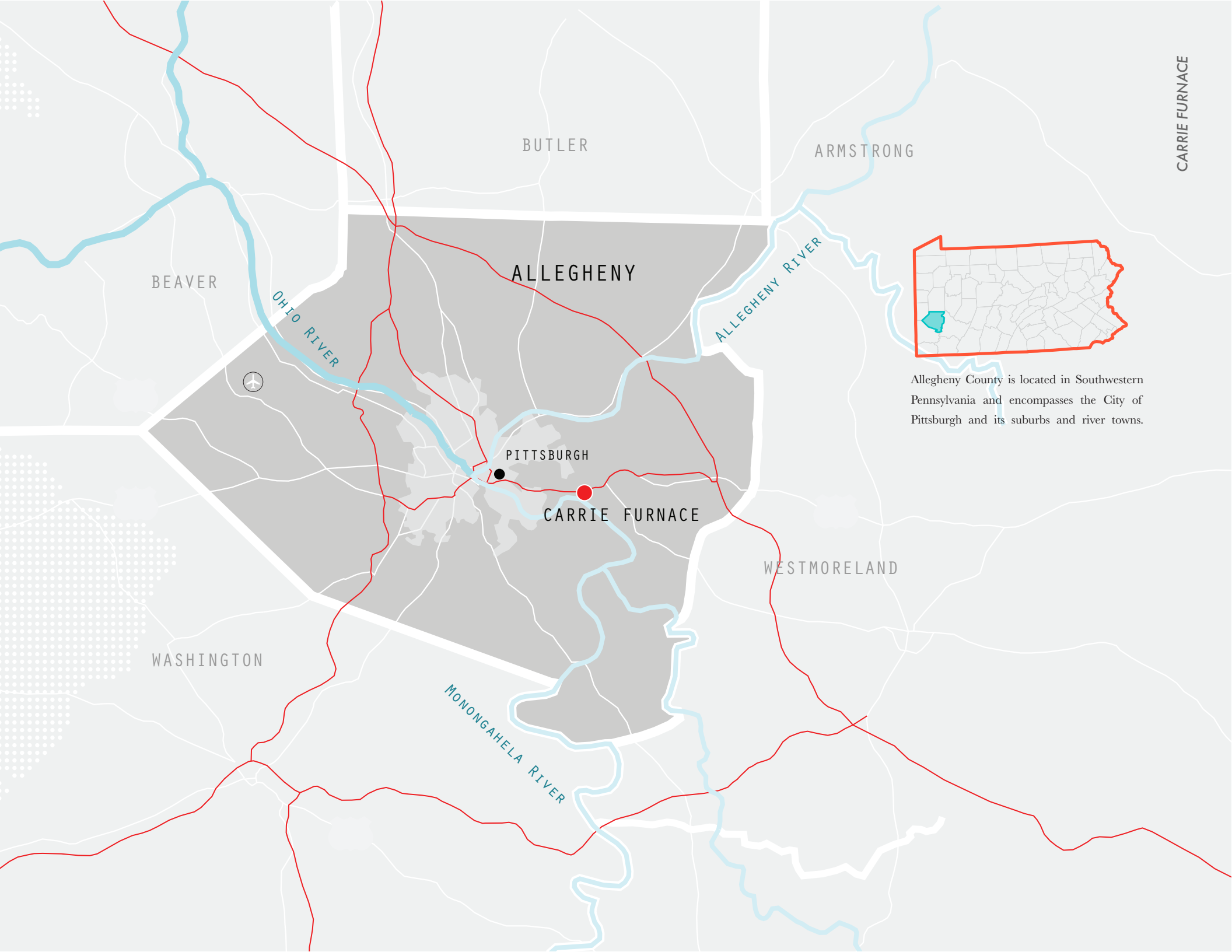
The land use pattern of Allegheny County is largely as a result of the mosaic of 130 different municipalities, historically with a large degree of autonomy.

## Land Use Pattern

The last two decades of development patterns have taken the form of low-density sprawl in all directions while ruining the natural environment. According to the Brookings Institution Center on Urban and Metropolitan Policy, from 1982 to 1997 metropolitan Pittsburgh developed an astonishing 8.5 acres of land for every new household while the national average was roughly 1.3 acres (Bright, 111).

The subsequent planning was driven by economic, governmental, and social fragmentation of the region. Throughout the U.S. and Allegheny County, the physical environment and social institutions were shaped largely by economic discipline (Lubove, 3).”

- 3.3 | (Left) Pennsylvania located on world map
- 3.4 | (Right) Allegheny County located within State Boundary
- 3.5 | (Right) Carrie Site within Regional Context



BUTLER

ARMSTRONG

BEAVER

ALLEGHENY

OHIO RIVER

ALLEGHENY RIVER

PITTSBURGH

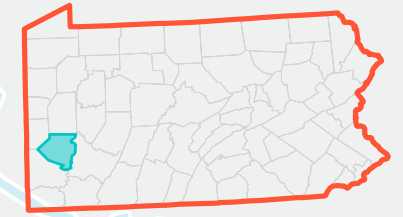
CARRIE FURNACE

WESTMORELAND

WASHINGTON

MONONGAHELA RIVER

CARRIE FURNACE



Allegheny County is located in Southwestern Pennsylvania and encompasses the City of Pittsburgh and its suburbs and river towns.






# BROWNFIELD INVENTORY

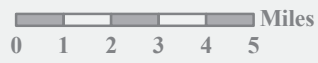
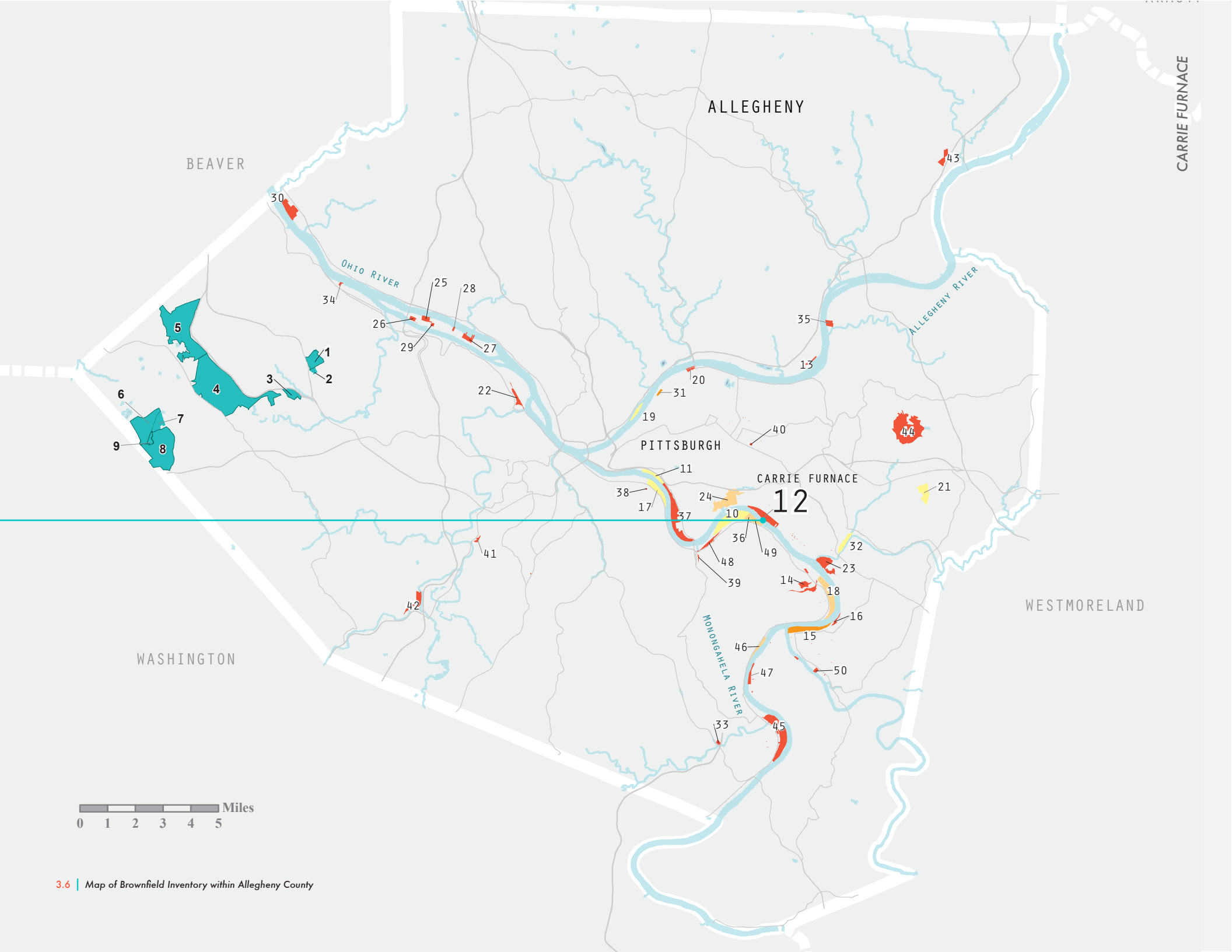
- 1 Cherrington Commerce Park Airport Redevelopment Site
- 2 Ewing Road Airport Redevelopment Site
- 3 Industry Drive Airport Redevelopment Site
- 4 Route 30 Commerce Park Airport Redevelopment Site
- 5 Clinton Commerce Park Airport Redevelopment Site
- 6 Chapman Commerce Center Airport Redevelopment Site
- 7 Imperial Land Company - Site 2 Airport Redevelopment Site
- 8 Imperial Land Company - Site 3 Area B Airport Redevelopment Site
- 9 Imperial Land Company - Site 3A Airport Redevelopment Site
- 10 The Waterfront Redeveloped
- 11 Eliza Furnace / Pittsburgh Technology Center Redeveloped

Allegheny County has identified a total of **50** key brownfields that are at different stages of redevelopment.

## 12 Carrie Furnace Not Redeveloped/Not Developed

- 13 Blawnox Not Redeveloped/Not Developed
- 14 Duquesne Not Redeveloped/Not Developed
- 15 RIDC Riverplace Industrial Center of McKeesport Planned
- 16 Fifth Sterling Not Redeveloped/Not Developed
- 17 South Side Works Redeveloped
- 18 RIDC City Center of Duquesne Partially Redeveloped
- 19 Washington's Landing Redeveloped
- 20 Tippins Site Not Redeveloped/Not Developed
- 21 Tech One Office and Research Park Redeveloped
- 22 PL&E Site - McKees Rocks Not Redeveloped/Not Developed
- 23 Port Perry - North Versailles Not Redeveloped/Not Developed
- 24 Nine Mile Run - Summerset at Frick Park Partially Redeveloped
- 25 Neville Island KOZ Not Redeveloped/Not Developed
- 26 Neville Island KOZ Not Redeveloped/Not Developed
- 27 Neville Island Industrial and Office Complex Not Redeveloped/Not Developed
- 28 3400 Grand Ave - Neville Island Not Redeveloped/Not Developed
- 29 M & B Development Not Redeveloped/Not Developed
- 30 Leetsdale Industrial Park Not Redeveloped/Not Developed
- 31 Lawrenceville RIDC Not Redeveloped/Not Developed
- 32 Keystone Commons Redeveloped
- 33 Former Westinghouse Research Lab Not Redeveloped/Not Developed
- 34 Fab Tech and Buckeye Pipeline Not Redeveloped/Not Developed
- 35 Edgewater Steel Not Redeveloped/Not Developed
- 36 Steel Valley Area - Siemens Partially Redeveloped
- 37 Hazelwood LTV Not Redeveloped/Not Developed
- 38 W.N. Dambach Inc. Not Redeveloped/Not Developed
- 39 Hays Former Army Ammunition Plant Not Redeveloped/Not Developed
- 40 Point Breeze Manufacturing Center Not Redeveloped/Not Developed
- 41 Carnegie Glass Plant Not Redeveloped/Not Developed
- 42 Koppers Site Not Redeveloped/Not Developed
- 43 Tarentum Not Redeveloped/Not Developed
- 44 Untied Atlas Not Redeveloped/Not Developed
- 45 USS Clairton Not Redeveloped/Not Developed
- 46 USS Dravosburg Partially Redeveloped
- 47 Glassport Foundry Not Redeveloped/Not Developed
- 48 Steel Valley Area - WHEMCO Not Redeveloped/Not Developed
- 49 Steel Valley Area - Warehouse Partially Redeveloped
- 50 McKeesport Steel Foundry Not Redeveloped/Not Developed

-  Planned
-  Partially Redeveloped
-  Redeveloped
-  Airport Redevelopment Sites
-  Not Redeveloped; Not Developed



3.6 | Map of Brownfield Inventory within Allegheny County



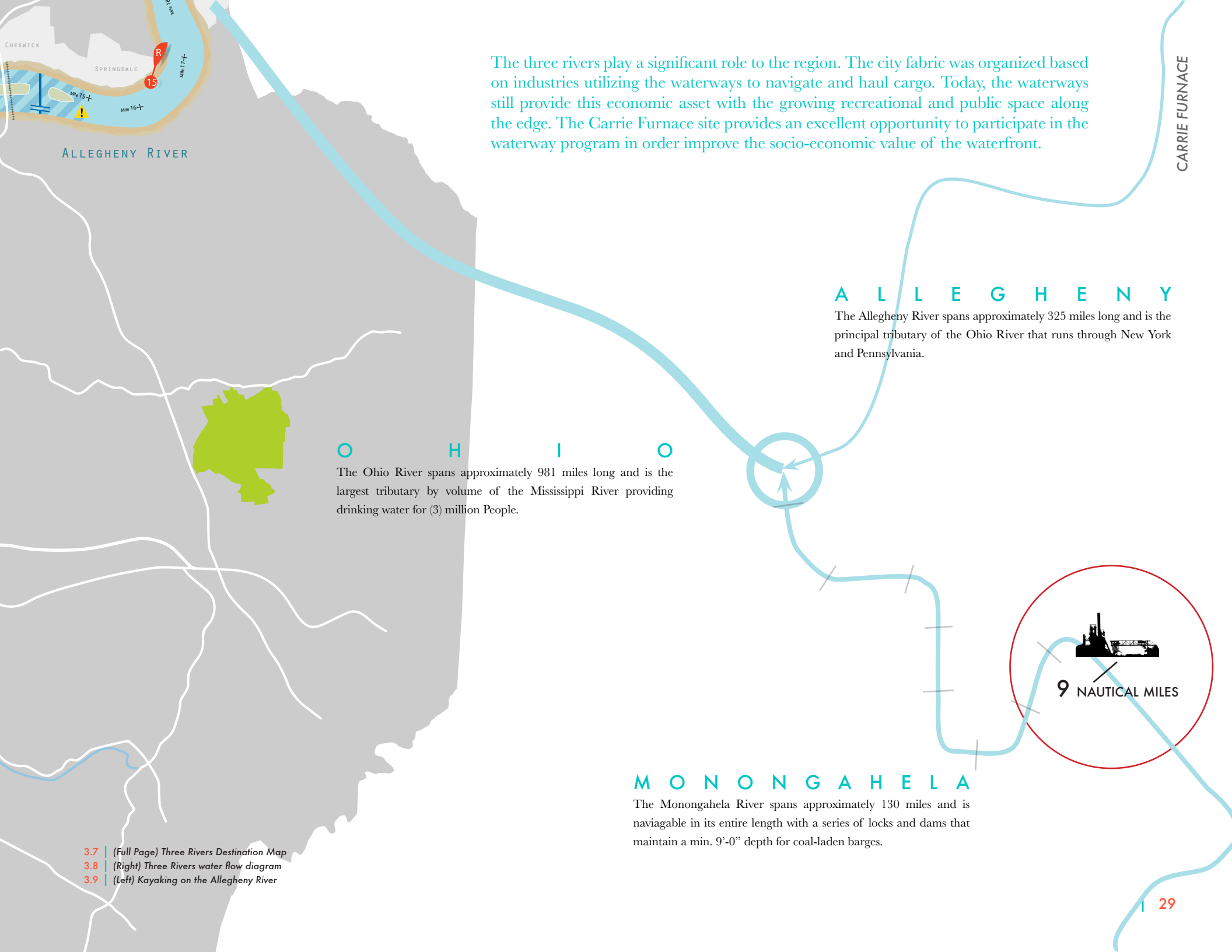
# 3

## THE THREE RIVERS



### WHAT IS A WATER TRAIL?

Water trails are recreational waterways on rivers between specific access points that provide day-use and camping sites for the boating public. Water trails emphasize low-impact use and promote resource stewardship.



The three rivers play a significant role to the region. The city fabric was organized based on industries utilizing the waterways to navigate and haul cargo. Today, the waterways still provide this economic asset with the growing recreational and public space along the edge. The Carrie Furnace site provides an excellent opportunity to participate in the waterway program in order improve the socio-economic value of the waterfront.

## A L L E G H E N Y

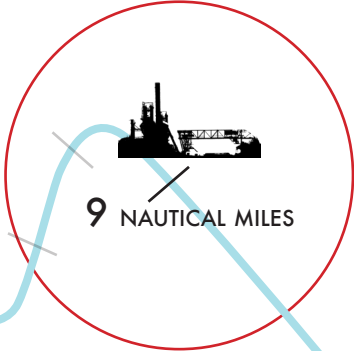
The Allegheny River spans approximately 325 miles long and is the principal tributary of the Ohio River that runs through New York and Pennsylvania.

## O H I O

The Ohio River spans approximately 981 miles long and is the largest tributary by volume of the Mississippi River providing drinking water for (3) million People.

## M O N O N G A H E L A

The Monongahela River spans approximately 130 miles and is navigable in its entire length with a series of locks and dams that maintain a min. 9'-0" depth for coal-laden barges.



- 3.7 | (Full Page) Three Rivers Destination Map
- 3.8 | (Right) Three Rivers water flow diagram
- 3.9 | (Left) Kayaking on the Allegheny River



# 7

# 6

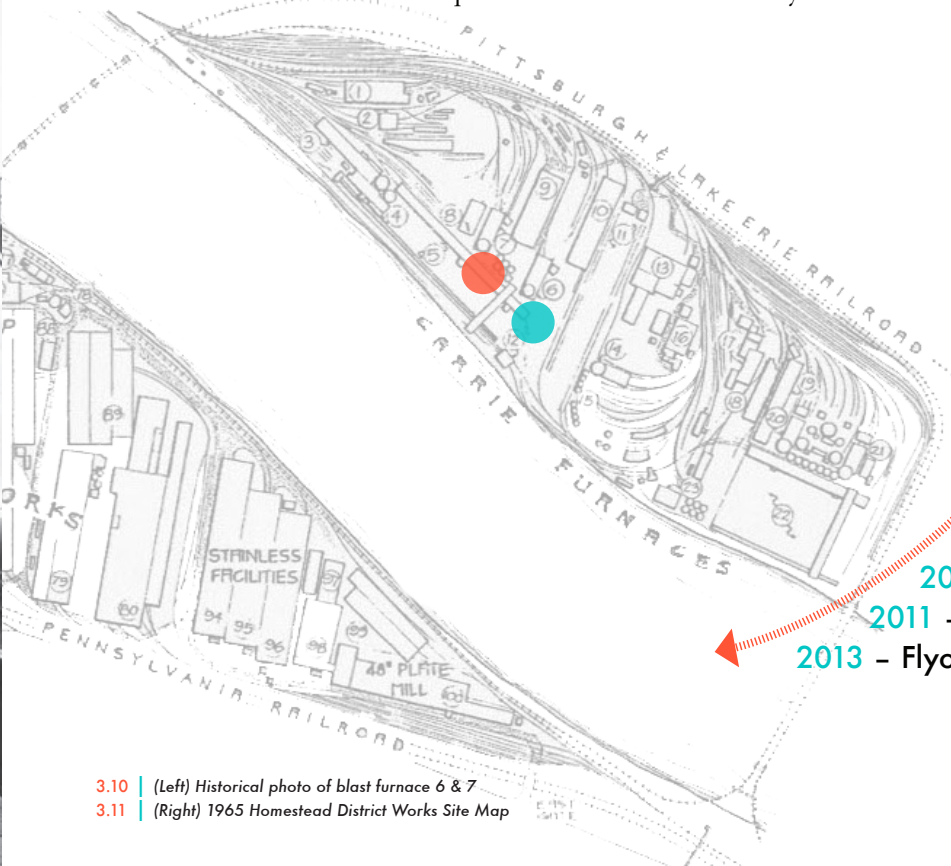


# B R I E F H I S T O R Y

**Title:** Carrie Furnace  
**Location:** Allegheny County, PA  
**Size:** 168 Acres  
**Features:** Large Parcel, Flat Land, and Riverfront Location  
**Contaminants:** PCB's, Sulfates, Asbestos, Iron, and Petroleum  
**Status:** Declared a National Historic Landmark  
 Shovel-Ready Status by 2014

The Carrie Blast Furnace site was built in 1881 as part of US Steel's Homestead Works. In 1898, Andrew Carnegie purchased the only remaining blast furnace in the Pittsburgh area and remains the focus of preservation on the site today. The Carrie

Furnace was acquired by Allegheny County in 2006 and is now a National Historic Landmark. The site remains largely vacant and waiting developmental plans through a collaborated effort between Allegheny County and the Rivers of Steel entity.



- 1881 - Carrie Furnace is built
- 1884 - Original furnaces built in Ohio
- 1892 - Carrie Furnace takes part in Battle of Homestead
- 1898 - Carrie Furnace is purchased by Andrew Carnegie
- 1901 - Carrie Furnace becomes part of the US Steel Corp
- 1907 - Furnaces 6 & 7 built
- 1978 - Furnaces 6 & 7 closed
- 1978 - Carrie Furnace is shut down
- 1982 - Last operable furnaces (3 and 4) closed
- 1988 - Carrie Furnace is sold to Park Corporation
- 2005 - Allegheny County buys site from Park Corporation
- 2006 - Carrie Furnace 6 & 7 become a National Historic Landmark
- 2011 - Site cleared its Phase II Environmental Site Assessment by the US EPA
- 2013 - Flyover Construction and Cap Fill for shovel-ready Development

3.10 | (Left) Historical photo of blast furnace 6 & 7  
 3.11 | (Right) 1965 Homestead District Works Site Map

# HISTORICAL CONDITION

There is immense amount of negativity tied to the site. During its heyday, the labor conditions were horrifying and city was conceived as an economic rather than a civic entity. Employees worked 12 hours day/7 days a week and compensated based per man with hazardous conditions

caused more than 500 deaths per year. Being surrounded by access to raw materials stimulated the growth of the regions industrial manufacturing (Lubove). By 1910, large plant concentration and overspecialization inhibited adaptation to 20th century economic trends.



3.12 | Snap-Shots of the Great Battle of Homestead Steel Strike

# CURRENT CONDITION

As part of an ongoing effort to redevelop severely blighted areas of the River Valleys of Allegheny County, the Office of the County Executive & Redevelopment Authority of Allegheny County continue to acquire and remediate former heavy-industry based brownfields throughout the county with intentions to sell these properties back into the private sector for future redevelopment. Today, the site is listed on the National Registry of Historic Places by

the Department of Interior with pending Congressional Legislation to adopt approximately 30 acres of the site as a National Park that will pay homage to the history of steel making in the region. With the importation of over 350,000 cubic yards of clean fill to raise over 80 acres of prime developable acreage out of the flood plain, over 50 acres of shovel ready pads using DEP/EPA approved clean fill has been created (Deasy).

# THE VISION

## Shared & Supported Vision

The vision that is embraced by this joint Comprehensive Plan for the redevelopment of the Carrie Furnace site is established based on a shared and supported vision among a collection of all key stakeholders and is summarized as follows:

The redevelopment would remain consistent with the goals of the Multi-Municipal Plan and reflect the rich historic heritage in a positive light while maximizing the sites full economic potential. Development of the site would result in an increase in the tax-base and the creation of quality jobs of a non-retail nature for residents of the boroughs of Rankin, Swissvale, and Edgewood. Development would also increase the overall economic vitality and development potential of surrounding neighborhoods. Planning shall address potential negative social and environmental impacts to surrounding properties and provide the adequate and safe ingress and egress to the site. The principles also include a section titled “Promoting Sustainable Development” that is to be a major component toward ‘greening’ the Carrie Furnace Site.

The Allegheny County Redevelopment Authority is will move forward with a Request for Development Proposals (RFDP) for the site that will incorporate the principles of an sustainable environment once all of the necessary infrastructure construction is complete and ‘shovel-ready’.

One of the chief objectives for the site is to encourage the incorporation of “green technologies and industry” through assistance with the Commonwealth of Pennsylvania’s Enterprise Zone Program, which allows for priority assistance through competitive grants and loan.

## Guiding Principles

The vision is accomplished by identifying key elements that will be required for the success of the redevelopment. These elements are identified within the comprehensive plan collective to develop a benchmark for the effective re-purpose and implementation to the site.

The heart of the guiding principles of urban projects calls for a commitment to understanding the critical mass as an ecosystem in which physical coexistence can be fostered through design. It is not about making a stage set but making of social space able to generate a sense of ownership and connectivity (Bullivant, 11). To make waterfronts come alive, they must become places for people to dwell and not just visit or recreate to capture the benefits of the waters assets.

## Capital Investment

US Government

- U.S. HUD CDBG Program
- U.S. HUD EDI-SP Program
- U.S. EPA

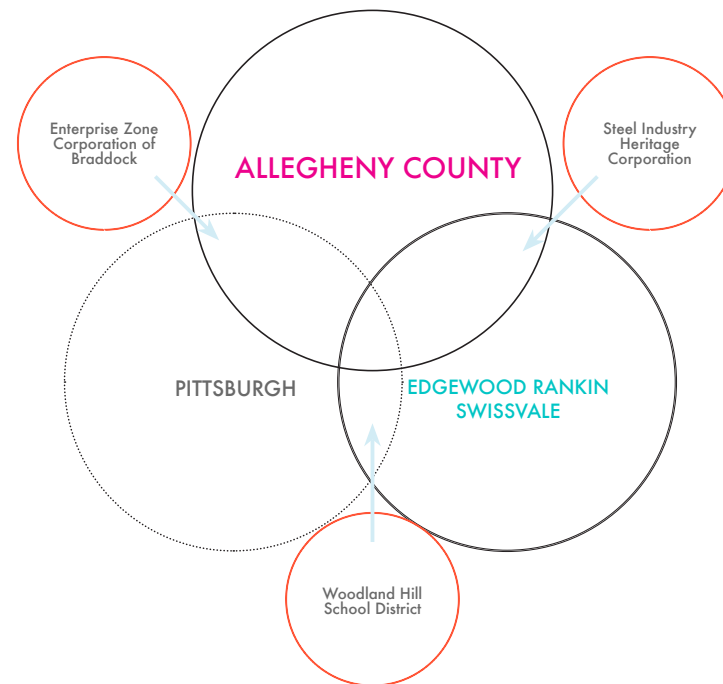
Commonwealth of Pennsylvania

- Redevelopment Capital Assistance Program
- Industrial Sites Reuse Program

Private Dollars (On-going)

- Leverage Matching Grants
- Create Unified Vision
- Expedite Development/Construction

## COMPREHENSIVE PLAN COLLECTIVE



3.13 | Relationship Diagram among different stakeholders and influences





# PRECEDENT STUDIES

36 - Gasworks Park

38 - Landschaftspark

40 - Battery Park City

42 - Museo del Acero

44 - The Highline

46 - Sands Bethworks

Public Forum  
Recreation  
Mixed-Use  
Opportunity  
Exposition  
Historical

The following six case studies were selected in order to draw inspiration in remediating, redeveloping, and redesigning the Carrie Furnace site. Each study highlights their individual strength within their regional capacity and the variety of its socio-economic success provides a significant contribution toward careful application of similar strategies.

# GASWORKS PARK

Seattle, Washington

Size:  
19 Acres



Client:  
City of Seattle

Project Team:  
Landscape Architect    Richard Haag

## Public Forum

On the shore of Lake Union opposite from downtown Seattle is a park that was built on a former Seattle Gas Light Company coal gasification plant. The site was acquired by the city in 1965 with the intent to turning it into green space. Ten years later, the park was opened under the direction of Richard Haag; a landscape architect was responsible for the design of the park. In 2013, Gas Works Park was listed in the National register of Historic Space.



Starting from Top of Left Page:

- 4.1 | Gasworks Park Present Day
- 4.2 | Arches made from concrete
- 4.3 | Guerrilla Art . Golden paper mache sculpture
- 4.4 | Fourth of July Fireworks

Starting from Top of Right Page:

- 4.5 | Gathering at outdoor grass mound
- 4.6 | Exhaust compressor play-barn
- 4.7 | Historical Aerial Plan View





A Great Earth Mound summit, created using on-site excavated fill, was designed for passive recreation that allows strolling or flying a kite. It also allows large community gatherings of various scales, political rallies, and particularly well utilized during the Fourth of July festivities. While some of the old plant components stand in ruins, others were reconditioned for creative re-purpose. A central feature, the boiler house, has been converted to a picnic space. A former exhauster-compressor building was transformed into a open ‘play-barn’ space that is



both colorful and safe. Gas Works Park is one of the first projects that garnered the support of the public and remains one of the first projects that altered public perceptions of post-industrial landscapes. It is also considered a pioneer in exploring non-traditional methods of treating contaminating using the natural process of bioremediation as part of the master plan.





# LANDSCHAFTSPARK

Duisburg Nord, Germany

Size:  
500 Acres



Client:  
International Exhibition Emscher Park (IBA)

Project Team:  
Landscape Architect     Latz+Partner

## Recreation

In the early 1990's, an old industrial brownfield in the Ruhr district in Germany began its transformation into a notable green space. The IBA, an overseeing planning body for the site, held a competition where landscape architecture firm Latz + Partner were selected for the design.



Starting from Top of Left Page:

- 4.8 | Blast Furnace during winter
- 4.9 | Aerial shot of music concert
- 4.10 | Walkway with red steel art installation

Starting from Top of Right Page:

- 4.11 | Gathering Space . 'Piazza Metallica'
- 4.12 | Wall Climbing
- 4.13 | Landscape Design Plan





Among the array of garden spaces on site, the ‘Piazza metallica’ serves as one of the major symbolic expression for when the remaining infrastructure was once active. Its grid-like organization of massive cast iron plates is centrally located within the blast furnace plant. The identity of the site is amplified by observing the change in materiality as it continues to age in rust. The success of this attraction is made possible by the numerous activities that can be explored. Concrete walls are re-used as climbing walls and underground lakes are formed and used as water parks for diving and swimming. Promenades and art installations



bio-remediate the contamination for a long-term value added solution and recreation. The Duisburg Nord Landscape Park embraces the complex system and reuses existing infrastructure to create an identity that serves the public.





# BATTERY PARK CITY

Lower Manhattan, New York

**Size:**  
92 Acres Planned Community



**Client:**  
Battery Park City Authority (BPCA), New York

**Project Team:**  
**Architect** Alex Cooper  
Stanton Eckstut  
Phillip Johnson  
**Landscape Architect** Hanna/Olin

## Mixed-Use

At the southern tip of Manhattan, an original master plan was jointly presented by the city and state in 1969 to develop the site. The collapse of the real estate market left the proposed Battery Park City site vacant until 1982 with an alternative plan that follows a flexible urban design guideline. The residential condominiums as the original Battery Park City were built on a landfill that failed to sell and the original esplanade park portion was small and unattractive until the city added more landfill for its expansion.



Starting from Top of Left Page:

- 4.14 | Aerial view of Battery Park
- 4.15 | Park space during fall
- 4.16 | Historical aerial view of Battery Park
- 4.17 | South Cove Waterfront

Starting from Top of Right Page:

- 4.18 | South Cover Jetty Boardwalk
- 4.19 | Promenade along waterfront
- 4.20 | Masterplan Program





The waterfront was recaptured with a esplanade that draws thousands of cyclists, walkers, joggers, children, boaters, artists, locals, and people from every culture of the world moving along the various viewpoints along the Hudson River. The entire length of Battery Park City is lined with park space, gardens, and marinas. The walkways and bike paths were constructed out of concrete and granite pavers along with traditional bronze artwork details, lights, and railings. At the terminus of the walkway along the water is a small jetty at South Cove that was



opened in 1988 with collaboration between artists, architects, and landscape architects. The plantings work beautifully the different seasons. With a city backdrop, a multitude of green space, and public art installations that lead to the water beyond makes Battery Park City one of the most unforgettable visual and experiential waterfront development in the world.





# MUSEO del ACERO

Monterrey, Mexico

Size:  
3.7 Acres



Client:  
City of Monterrey

Project Team:  
Architect Grimshaw Architects  
Landscape Architect Surface Design, Inc.

## Exposition

In 1986, the city of Monterrey reclaimed the former steel production facility and former brownfield site. Eleven years later, the blast furnace has emerged into a 'Museo Del Acer', the Museum of Steel in order to maintain the historical relevancy of the area to serve as a new focal point of the region.



Starting from Top of Left Page:

- 4.21 | View of Green Roof and Museum
- 4.22 | Main Entry way
- 4.23 | Re-purposed stepped water canal
- 4.24 | Site Plan

Starting from Top of Right Page:

- 4.25 | Circular Viewing Platform
- 4.26 | Steel Art Installation with viewport
- 4.27 | Ore Rock Art Installation





Expressing the values of the post-industrial relic through a narrative capacity has founded much of the sites design. In order for the narrative element to shine through, many elements of the site have been reclaimed through adaptive re-use for outdoors exhibit spaces to define public plazas. Steel plates that formerly covered part of the exterior façade were repurposed into a stepped canal where water then cascades leading to the entrance of the museum where rocks represent the ore's heating process within a sea of mist. A green roof rises from the ground



plane into the roof subdues the heaviness of the structure below as it leads to a circular viewing platform full of drought-tolerant sedums. All of the storm run-off within the site boundaries is directed through treatment runnels former canals used to move steel by-products. The thoughtfulness of interpretation and inventive repurpose makes the Museo del Acero a successful museum and landscape space.





# THE HIGHLINE

Lower West-Side Manhattan, New York

**Size:**  
1.0 Mile Linear Park



**Client:**  
New York City

**Project Team:**  
Landscape Architect James Corner  
Field Operations  
Diller Scofidio + renfro



This one and a half mile long elevated railroad was once used for transportation, known as the highline. With the introduction of trucks to transport goods around town, the use for this method of transport in Manhattan quickly declined. As a result, the abandoned railway was overtaken by natural growth of vegetation, which inspired the development of the current highline promenade.



Starting from Top of Left Page:

- 4.28 | Aerial View of Highline
- 4.29 | Steps leading up to platform
- 4.30 | Visitors walking along Highline

Starting from Top of Right Page:

- 4.31 | Elevation shot at the start
- 4.32 | Vegetation growing above platform
- 4.33 | Dance performance
- 4.34 | Rendered Perspective before construction





The signature linear aesthetic of the High Line is carried throughout the entire span of the public space. The existing railroad tracks have been incorporated into the planting beds and the walkways. Visitors float twenty-five feet above the ground to a different world to walk the promenade with a thousand different vantage points that one can experience. The flora rises between the spaces of the linear paving plan as it did when it took over the railroad tracks during its non-use. Various art and recreation space is programmed along in different parts of the



park. Pockets of resting space are organized with differing themes. In turn, the increased attraction to the area improved the regional social and economic vibrancy. The improvement of the High Line plays a significant role in the fabric of the dense urban network altering the negative perceptions of a rusted industrial object to a highly praised green ribbon.





# SANDS BETHWORKS

Bethlehem, Pennsylvania

Size:  
Phase I - 20 Acres



Client:  
RTKL Associates Inc.

Project Team:  
Architect RTKL Associates Inc.  
Landscape Architect SWA Group  
Civil & Geotechnical French & Parrello Associates, PA

## Historical

The headquarters of Bethlehem Steel Corporation continued to operate until 1998 when they closed their doors due to foreign competition and profit goals. After almost a century in operation, what was once the beating heart of the town has instantly left thousands without jobs and turned 1,200 acres of real estate into unproductive land.



Starting from Top of Left Page:

- 4.35 | View of furnaces from roadway
- 4.36 | Bethlehem Steel Logo on Facade
- 4.37 | Worker by hot furnace
- 4.38 | Historic aerial view of site

Starting from Top of Right Page:

- 4.39 | Along train tracks riverfront
- 4.40 | Lighted furnace during nighttime
- 4.41 | New plantings and walls
- 4.42 | New roadway and plantings





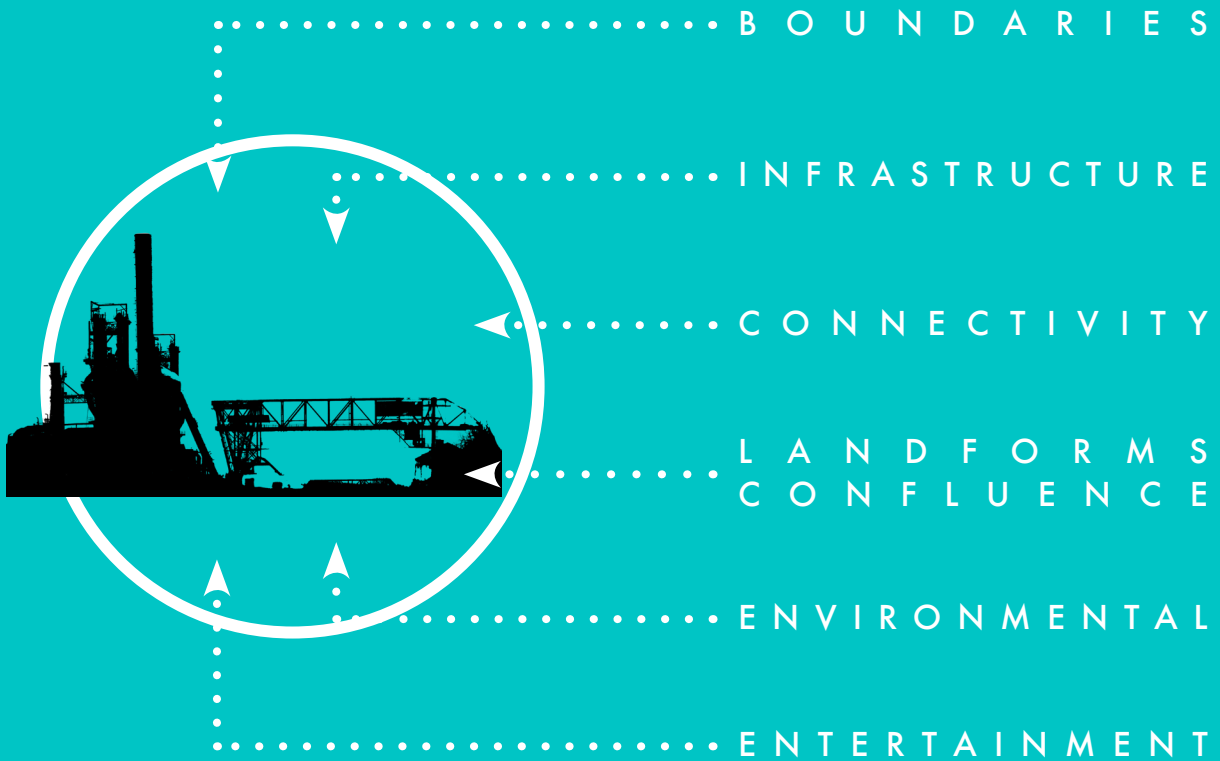
On the south banks of the Lehigh Canal, an assembly of industrial ruins quickly grabs your attention as you approach the waterfront edge. Large relic furnaces stand tall, setting the backdrop juxtaposed to a lush green space. The deep colors of red, purple, and blue turn machines into monuments during the night as a constant reminder of the rise and fall of Bethlehem Steel as we embark on a new age. Newly planted trees and vegetation shape new roads and walkways that serve as an outward catalyst of the restoration process; a symbol of healing in the city of Bethlehem. The 20-acre Sands Bethworks project is determined to preserve the historic industrial setting while capturing the essence of its birth and recapture



the economic strength it once stood for. The reclamation of this disturbed land is a complex process that required a comprehensive team of professionals. In collaboration with the Pennsylvania Department of Environmental Protections and the U.S. EPA, a cleanup agreement was enacted to begin one of the largest brownfield conversion plans in the nation. With 375 tons of contaminated soil excavated then backfilled with clean soil and the removal of petroleum residue, a new historic landscape is formed.









# SITE FORCES

50 - Boundaries

51 - Infrastructure

52 - Connectivity

54 - Landforms  
Confluence

56 - Environmental

57 - Assets

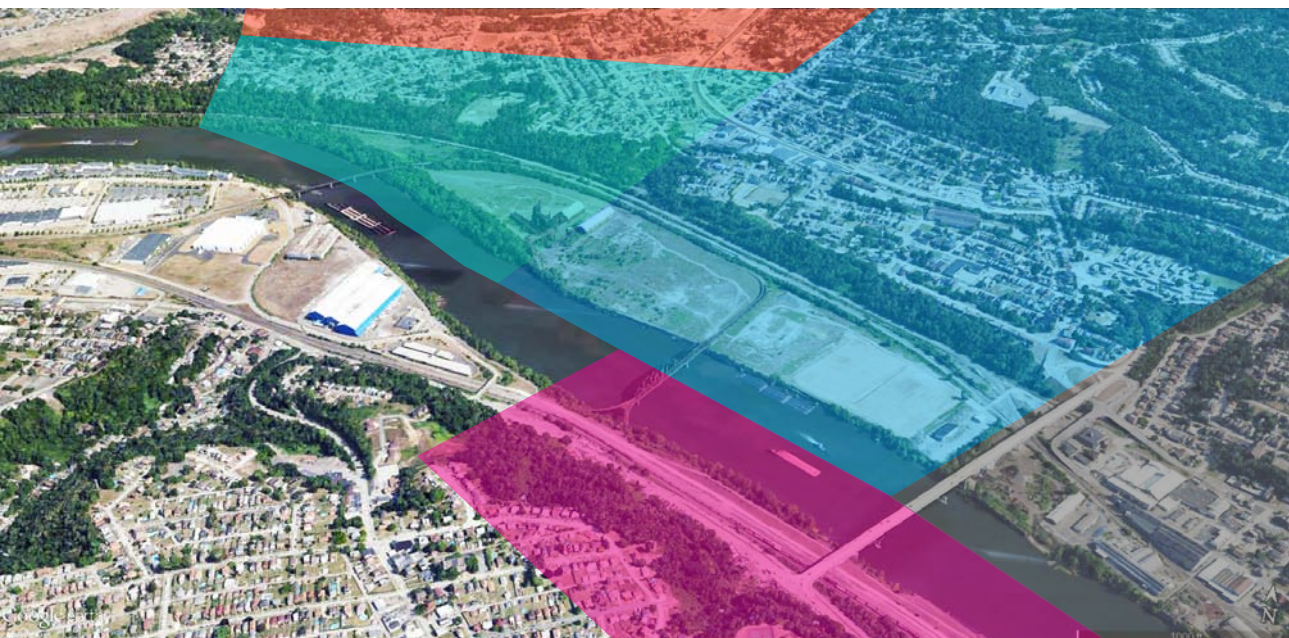
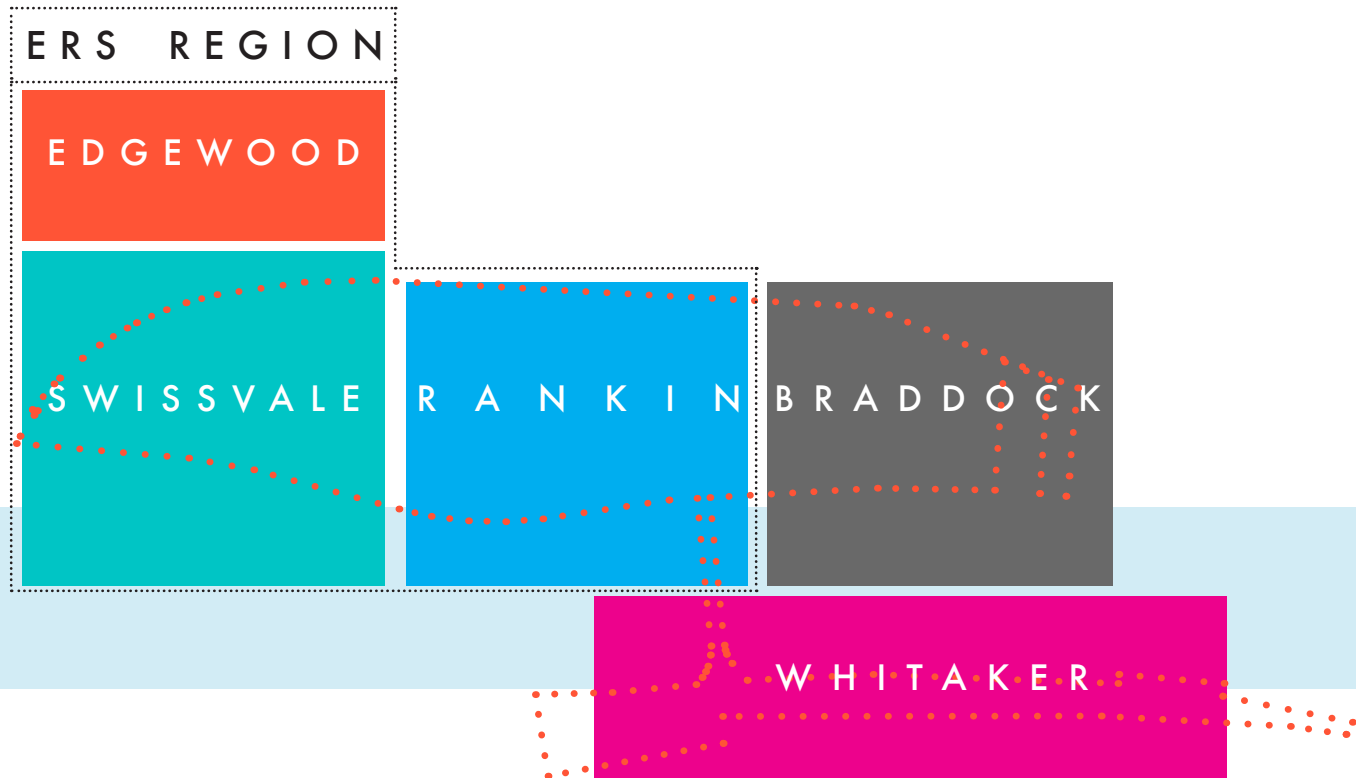
5.1 | (Left) Site Forces Diagram

5.2 | (Right) Carrie Furnace . Aerial Site



# BOUNDARIES

The Carrie Furnace site falls within multiple jurisdictions of Edgewood, Swissvale, Rankin, Braddock, and Whitaker, making it difficult to find a consensus to help develop the distressed region. Therefore, the site is declared a State-designated “Enterprise Zone” through June 2014. The Enterprise Zone Corp. of Braddock serves as the overseeing body for Zone comprised of Braddock, North Braddock, Rankin and Swissvale. The Enterprise Zone program makes available special incentives to assist in providing resources to promotes business development (ERS).

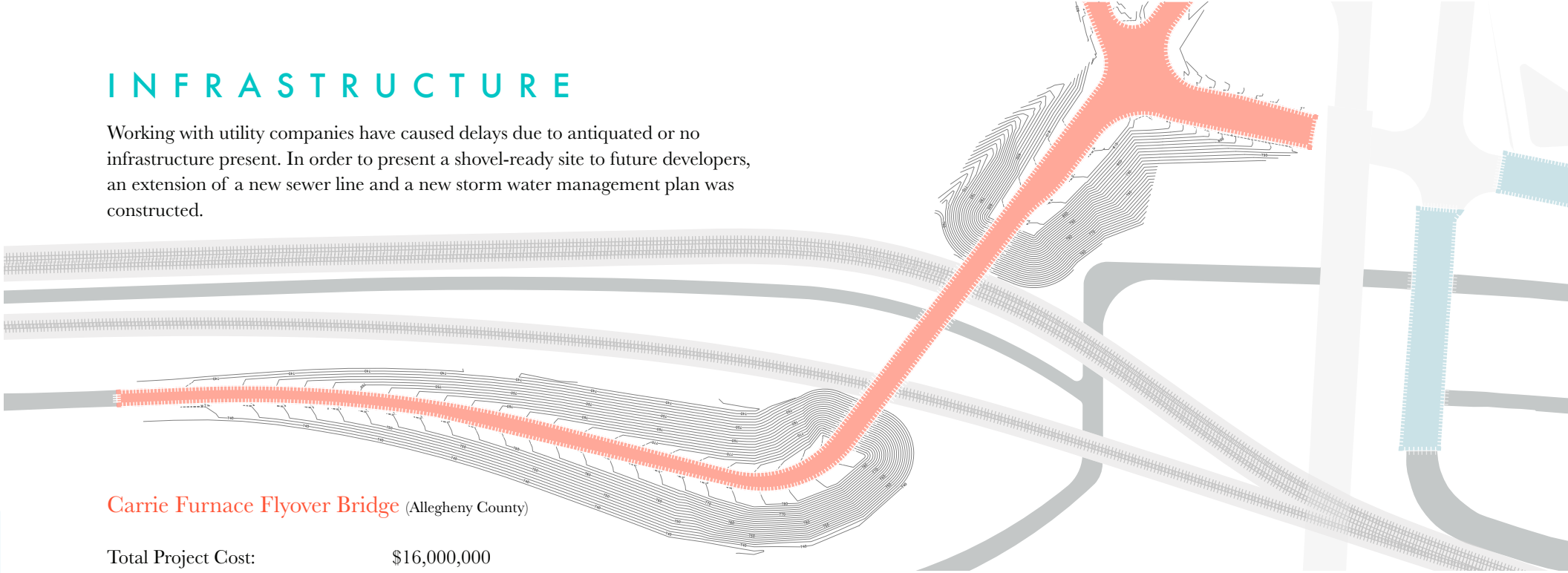


5.3 | (Top) Site Forces Diagram

5.4 | (Bottom) Site Forces Aerial Map

# INFRASTRUCTURE

Working with utility companies have caused delays due to antiquated or no infrastructure present. In order to present a shovel-ready site to future developers, an extension of a new sewer line and a new storm water management plan was constructed.



## Carrie Furnace Flyover Bridge (Allegheny County)

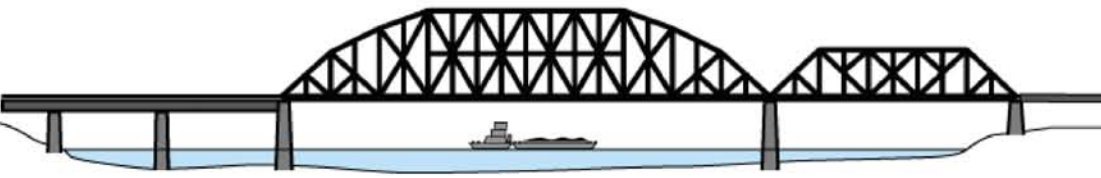
Total Project Cost: \$16,000,000  
TIGER Grant Funding: \$10,000,000  
(Transportation Investment Generating Economic Recovery)

Project Description: The project will help develop the historic blast furnace site by connecting it to the residential community. It ramp will improve ingress and egress safety by removing the need to pass three railroad crossings and providing direct access from the Ranking street bridge. These access improvements will enable the redevelopment and revitalization of the area.

5.5 | (Top) Flyover Ramp Contour Map  
5.6 | (Bottom) Flyover Ramp in construction







SECTION OF HOT METAL BRIDGE DEMOLISHED FROM SITE

5.7 | Hot Metal Bridge Elevation/Demolition Diagram

## CONNECTIVITY

The Carrie site currently has only a single point of entry and exit. When the planned completion of the flyover ramp in mid 2014, the site can now be accessed without the need to cross the railroad tracks.

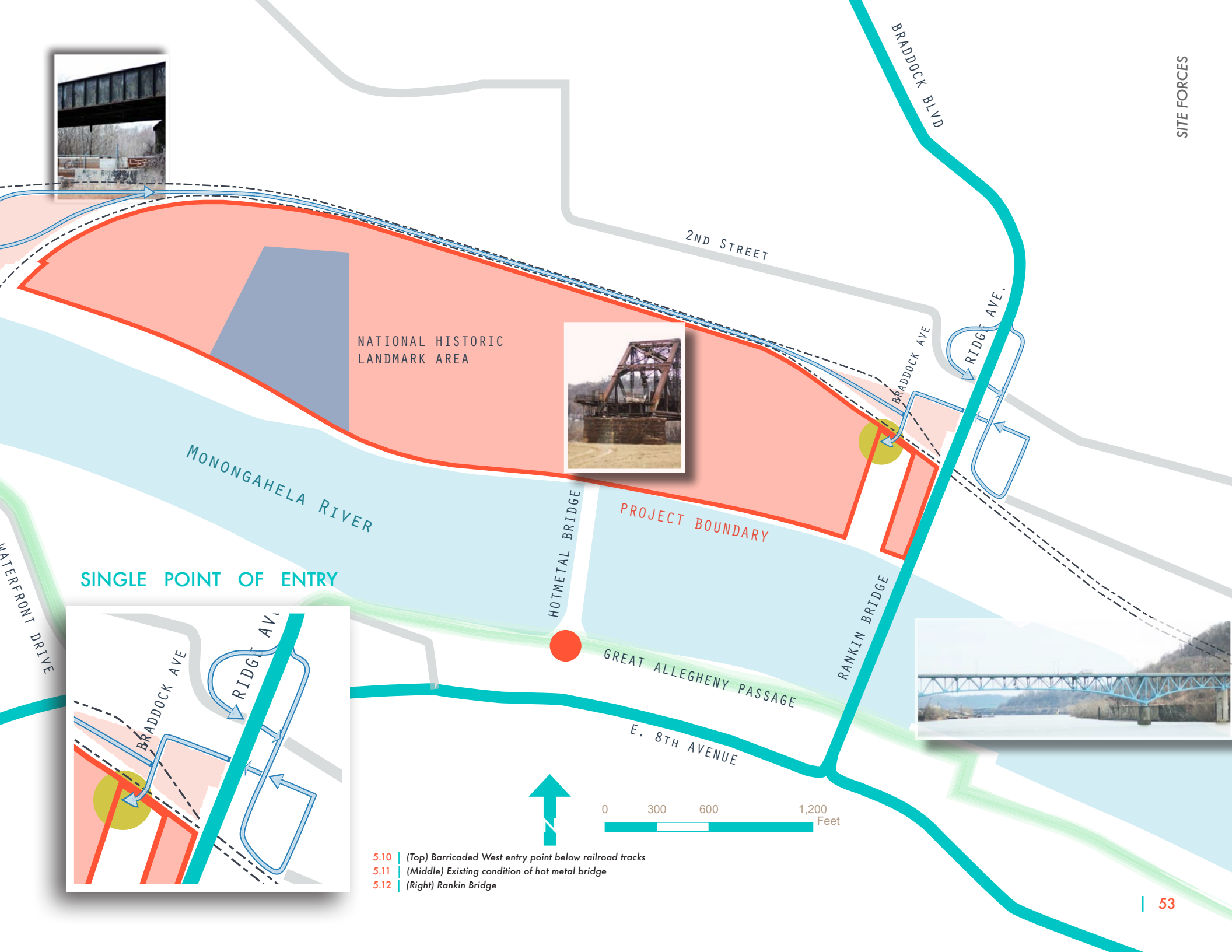
The Hot Metal Bridge extension, that had originally bisected the site in half, has been de-commissioned and demolished. However, the bridge that crosses the Monongahela river is still intact but not in use. The bridge exposes contaminants to visitors, primarily asbestos, and will require safe and contained removal. Should the bridge be re-imagined as a pedestrian and bike only crossing, not only will it capitalize on the existing infrastructure, it will allow the connection between the Duck Hollow Trail ● and the Great Allegheny Passage ●.

The western end of the site is closed off to prevent trespassing while the site continues to undergo the process of redevelopment. It will allow the connection to other neighborhoods and take advantage of the real estate along the riverfront.

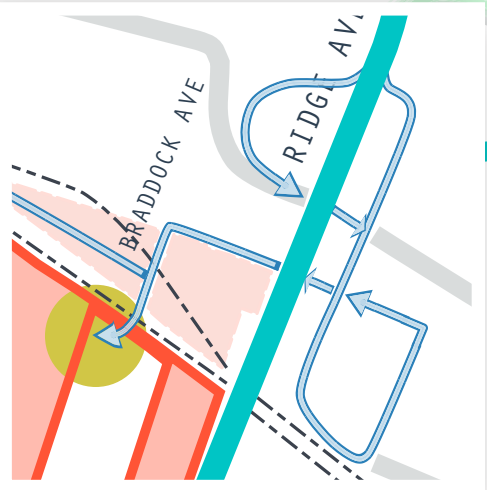


5.8 | (Left) Flyover Ramp facing Carrie Furnace  
5.9 | (Right) Existing connectivity map





SINGLE POINT OF ENTRY



- 5.10 | (Top) Barricaded West entry point below railroad tracks
- 5.11 | (Middle) Existing condition of hot metal bridge
- 5.12 | (Right) Rankin Bridge



# LANDFORMS

## SLOPES

The north edge include areas of slope that are 25% or greater (ERS). The steep slopes makes development in these areas difficult due to limited soil stability and increased erosion. Much of the steel slope areas remained undeveloped due to these constraints.

## WOODLANDS

There are small woodland areas found within the region. The majority of this typology corresponds to the steep slopes that surround the edge of the Carrie Furnace site. The woodlands expands further west toward the regions larger recreational parks: Frick Park and Les Getz Memorial park.

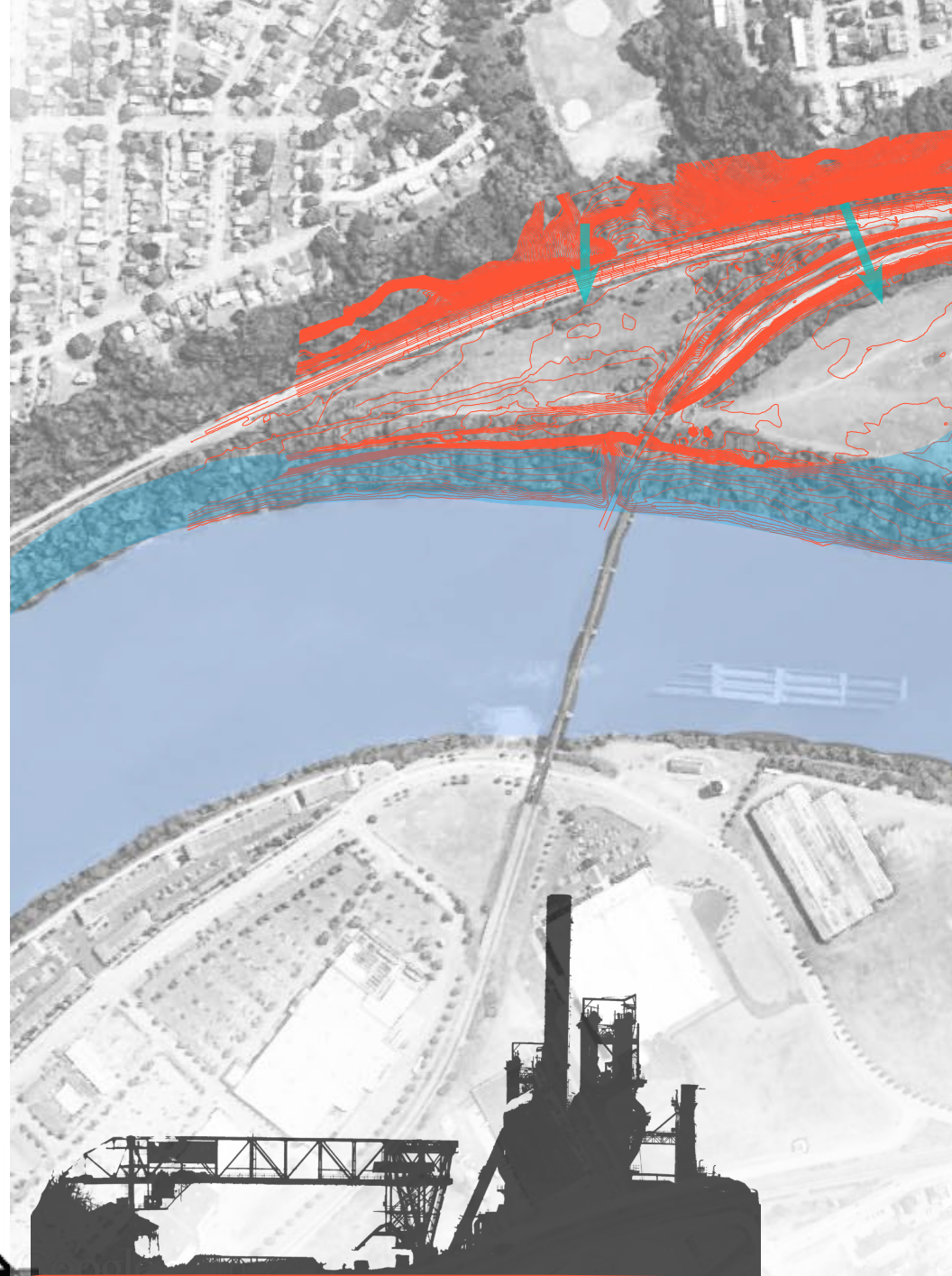
# CONFLUENCE

## FLOODPLAINS

Development in a floodplain can result in damage and destruction of property due to flooding, habitat destruction, and loss of riparian buffers, and increase downstream flooding. The 100-year floodplain is primarily located along the Monongahela River, the most significant water feature, on the Carrie Furnace Site (ERS).

## WATERSHEDS

A watershed is the area of land where all of the surface and ground water travels to the same place. Watersheds conform to natural hydrologic boundaries, rather than political boundaries. Water from all adjacent boroughs reaches the Monongahela River and eventually ends up in the Ohio River Watershed. There are two sub-watersheds which is the Nine Mile Run, and the Monongahela River Watershed. The Nine Mile Run Watershed includes the majority of Edgewood and Swissvale run-off while the Monongahela River Watershed includes the southern portion of Swissvale and all of Rankin (ERS).

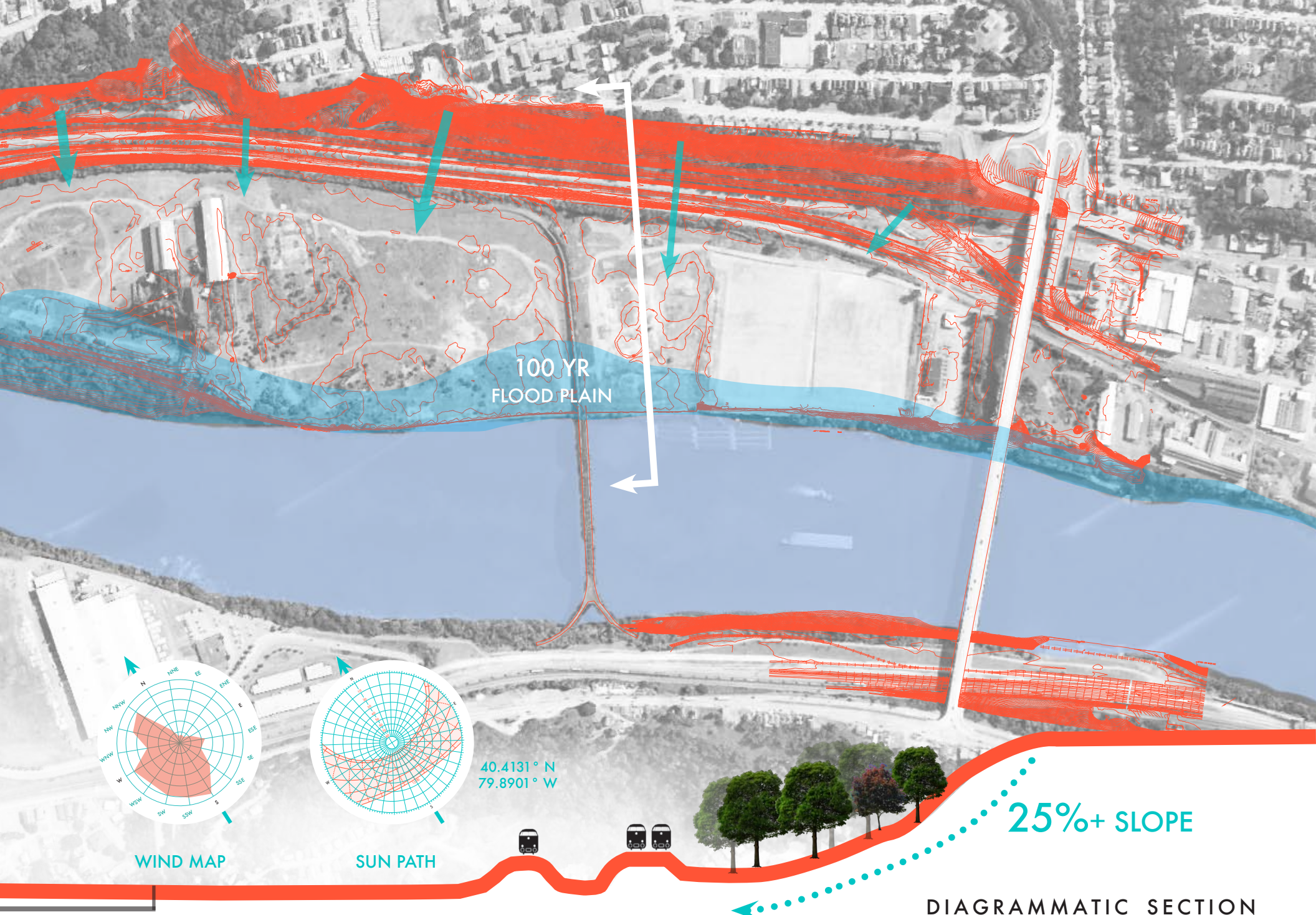


'MON' RIVER

Hot Metal Bridge

DIAGRAMMATIC SECTION





5.13 | (Main) Landforms and Confluence Map with wind map and sun path  
 5.14 | (Bottom) Diagrammatic Section

DIAGRAMMATIC SECTION

# ENVIRONMENTAL

## CONTAMINANTS IDENTIFIED ON-SITE

The nature of steel mills and their operation has led to a site that is contaminated with the following elements:



## PRIMARY METHOD OF CONTAINMENT - ENCAPSULATION

“Capping” refers to the installation of a cover of soil clay layer, or a durable waterproof membrane or a combination of both over contaminated material on site. The cap prevents human or environmental contact. Encapsulation is appropriate for all levels of polluted soil found on brownfields.



## REASONS FOR ENCAPSULATION

There are a couple main reasons encapsulation was the primary mode of control. The Phase I & II of the site assessment recognized that the amount and type of contamination can be addressed with capping. Since no soil was excavated, it was financially motivated to bring soils from the regional, often from previously excavated or demolished sites for construction, as the source for clean fill (Allegheny County).

In addition, it was imperative that the site increase the grade to address 100-year flood plain that would have affected or delayed any future redevelopment effort (Deasy).

This does not mean that contamination will never pose a risk to public health. There are always risks involved with the unknown and effectively future water systems will play a large role in maintaining the safety of visitors to the site.

By using a soil cap, the remaining contaminated soil, buried deep underground, does not pose an environmental or health risk.



ENTERTAINMENT VALUE

The Carrie Furnace site, being one of the few remaining steel mill that retains a charming derelict aesthetic in close proximity to downtown Pittsburgh, has repeatedly turned the constraint often tied to brownfields into an opportunity. Movie productions, documentaries, and music videos from native music artists such as Whiz Kalifa has made the Carrie Furnace continue to provide a significant contribution to the entertainment industry.



EVENTS

The site hosts a number of events throughout the year. Steel tours, beer, and food fairs occur far more often than the host of concerts that also makes its way into the programming.



5.15 | Out of the Furnace movie poster  
5.16 | Furnace Bash logo



ARTISTIC OUTLET

Art installations are now a part of the Carrie Furnace personality. In 1997, a group of young Pittsburgh artist risked injury and persecution during their guerilla site-specific artworks. Abandoned industrial sites were their canvas using materials found on site. One of their most successful expressions is the the 40-ft tall deer sculpture made primarily by steel. The ‘Carrie Deer’ has survived 15 years of change, spearheading the arts co-op movement (Carrie Deer).



Today, artists are welcomed through tours and workshops to help foster artistic expression and deterring vandalism at the same time.

5.17 | Urban Art Tours flyer  
5.20 | 40-ft tall Carrie Deer guerilla artwork installation





After a thorough analysis of the sites opportunities and constraints, stakeholder interview, and long-term plan, the site was divided into (3) categories of space: The Furnace, Steel Forum, and The Exchange. Each of these spaces are will be responsible for carrying out a specific set of program elements that will play on top of each other strengths to create a destination that will be an asset for adjacent neighborhoods and the region.

# GREEN STEEL

60 -Photo Collage  
70 - Steel Forum

62 - Master Plan  
72 - Forum Perspective

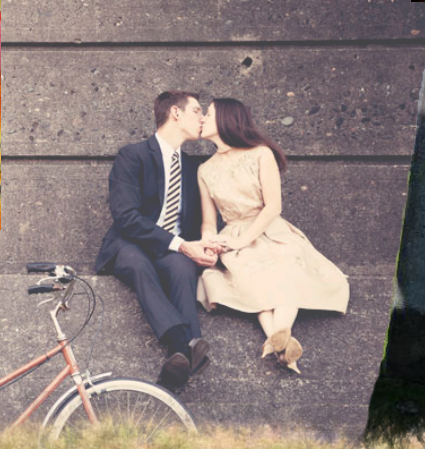
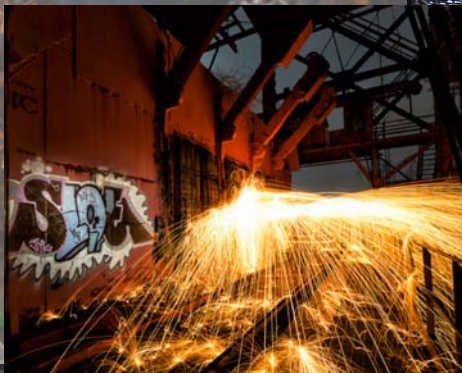
64 - Axonometric  
74 - Cafe Square

65 - Plant Palette  
76 - The Exchange

66 -The Furnace  
78 - Waterfront

68 - Homestretch  
80 - Waterfront Aerial



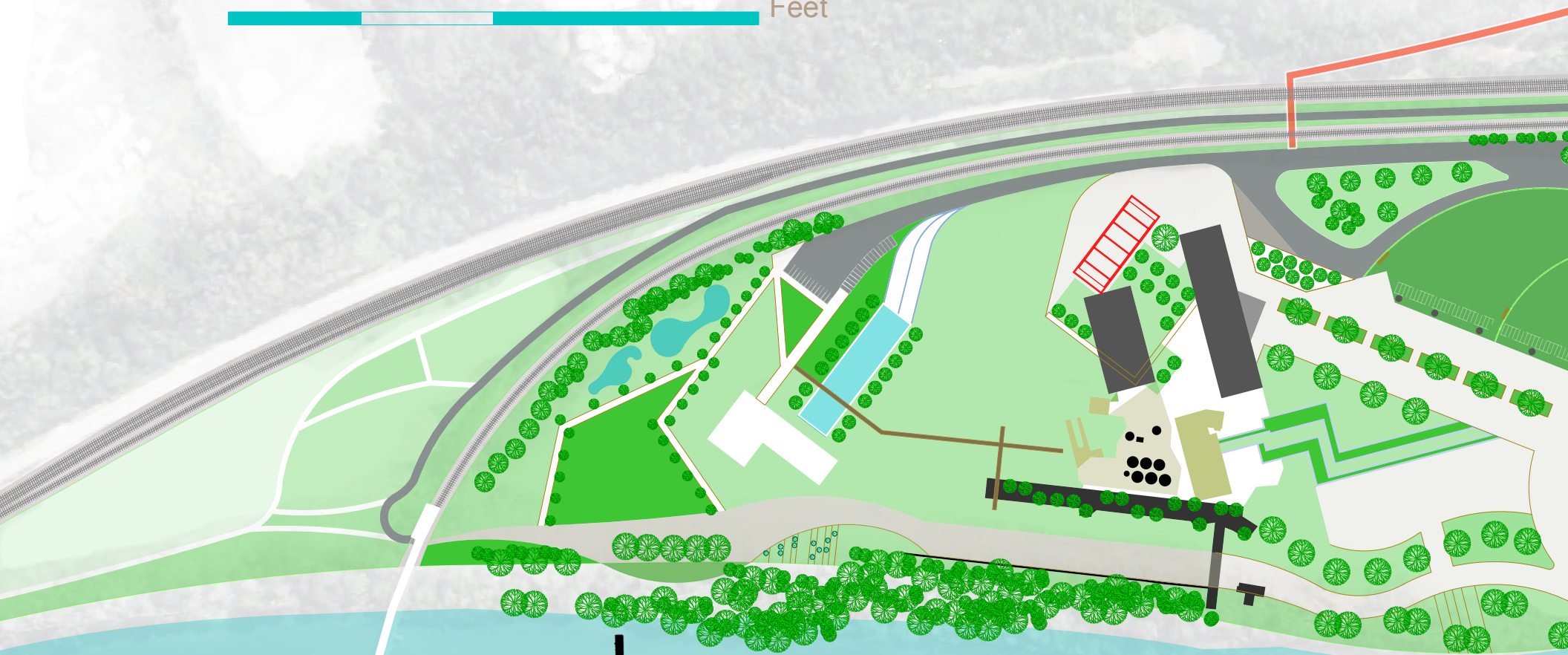
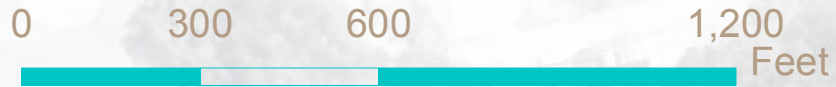








# MASTER PLAN

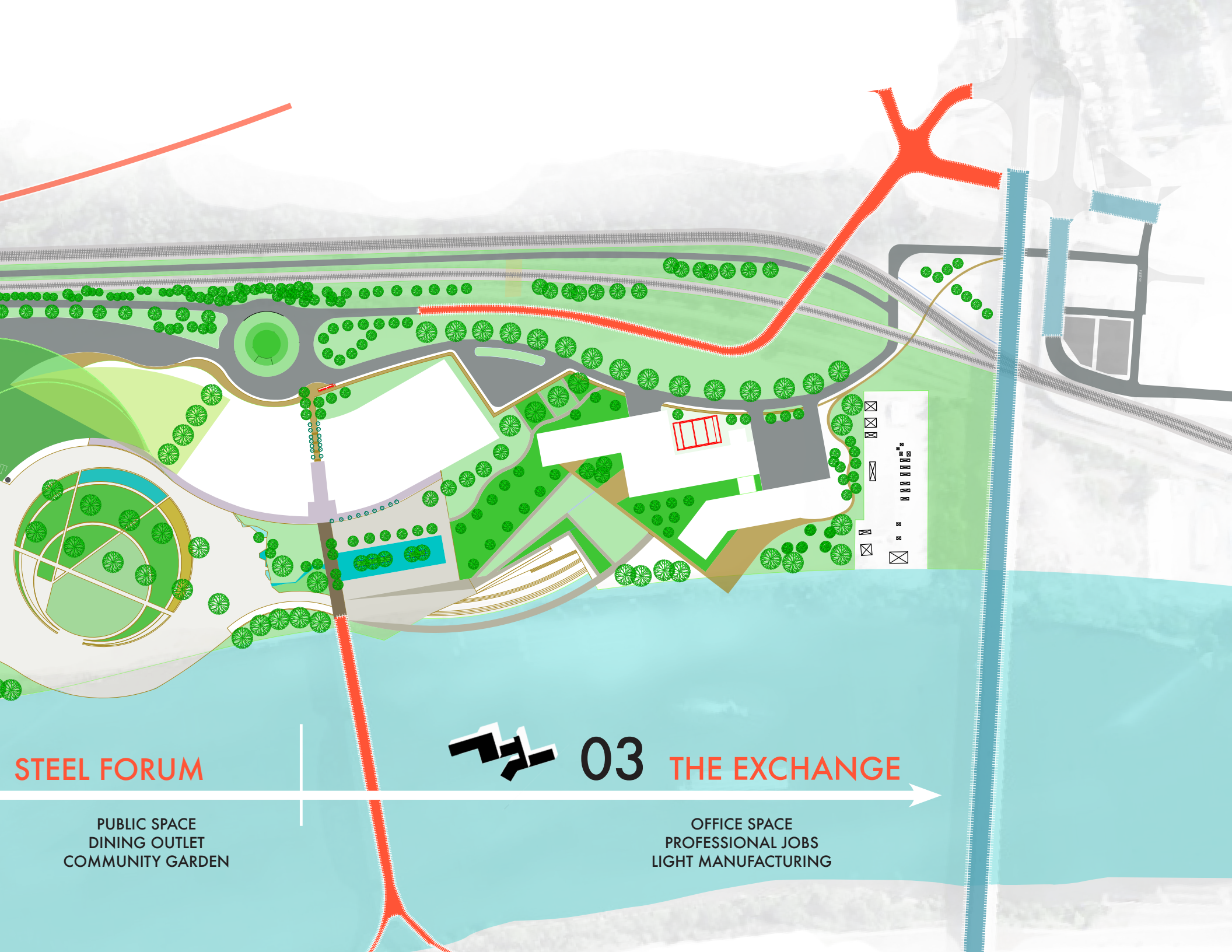


## 01 THE FURNACE



## 02

STEEL MUSEUM  
ART EXHIBITION  
RECREATION



**STEEL FORUM**

PUBLIC SPACE  
DINING OUTLET  
COMMUNITY GARDEN



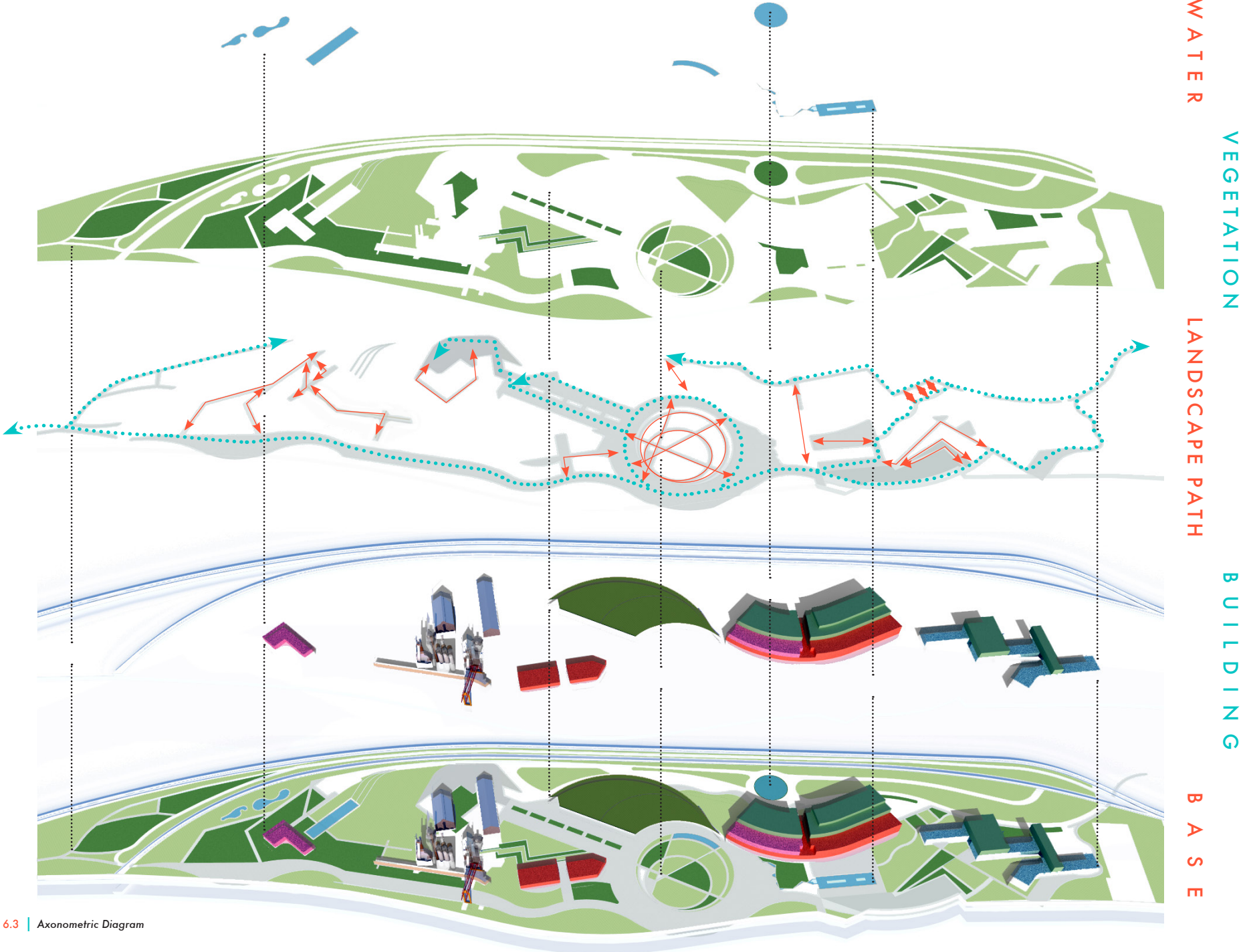
**03**

**THE EXCHANGE**

OFFICE SPACE  
PROFESSIONAL JOBS  
LIGHT MANUFACTURING



# AXONOMETRIC DIAGRAM



# PLANTING FOR BROWNFIELDS

A brownfield redevelopment site may be a difficult environment to established vegetation. There are concerns relating to poor soil conditions as in addition to problems related to a construction site such as compaction. It is essential to identify species that are tolerant of contamination and/or do not require deep penetration passed the capped layer.

## GRASSES

Bluestem, big  
*Andropogon gerardii*

Buffalograss  
*Buchloe dactyloides*

Tall fescue  
*Festuca arundinacea*

Switchgrass  
*Panicum virgatum*

Deertongue grass  
*Paricum cladestinum*

Annual ryegrass  
*Lolium multiflorum*

## FORBES & LEGUMES

Alfalfa  
*Medicago sativa*

Crownvetch  
*Coronilla varia*

Common lespedeza  
*Lepedeza striata var. Kobe*

Serica lespedeza  
*Lepedeza cuneata*



6.4 | Buffalograss  
6.5 | Crownvetch

## SHRUBS

Indigobush  
*Amorpha fruticosa*

Silky dogwood  
*Cornus amomum*

Autumn olive  
*Elaeagnus umbellata*

Viburnum  
*Viburnum spp.*

## TREES

Loblolly pine  
*Pinus taeda*

Black locust  
*Robinia pseudoacacia*

Red maple  
*Acer rubrum*

Silver maple  
*Acer saccharium*

River birch  
*Betula nigra*

Ginkgo  
*Ginkgo biloba*

Red Oak  
*Quercus rubra*

London plan tree  
*Platanus x acerfolia*

Hybrid poplars  
*Populus spp.*

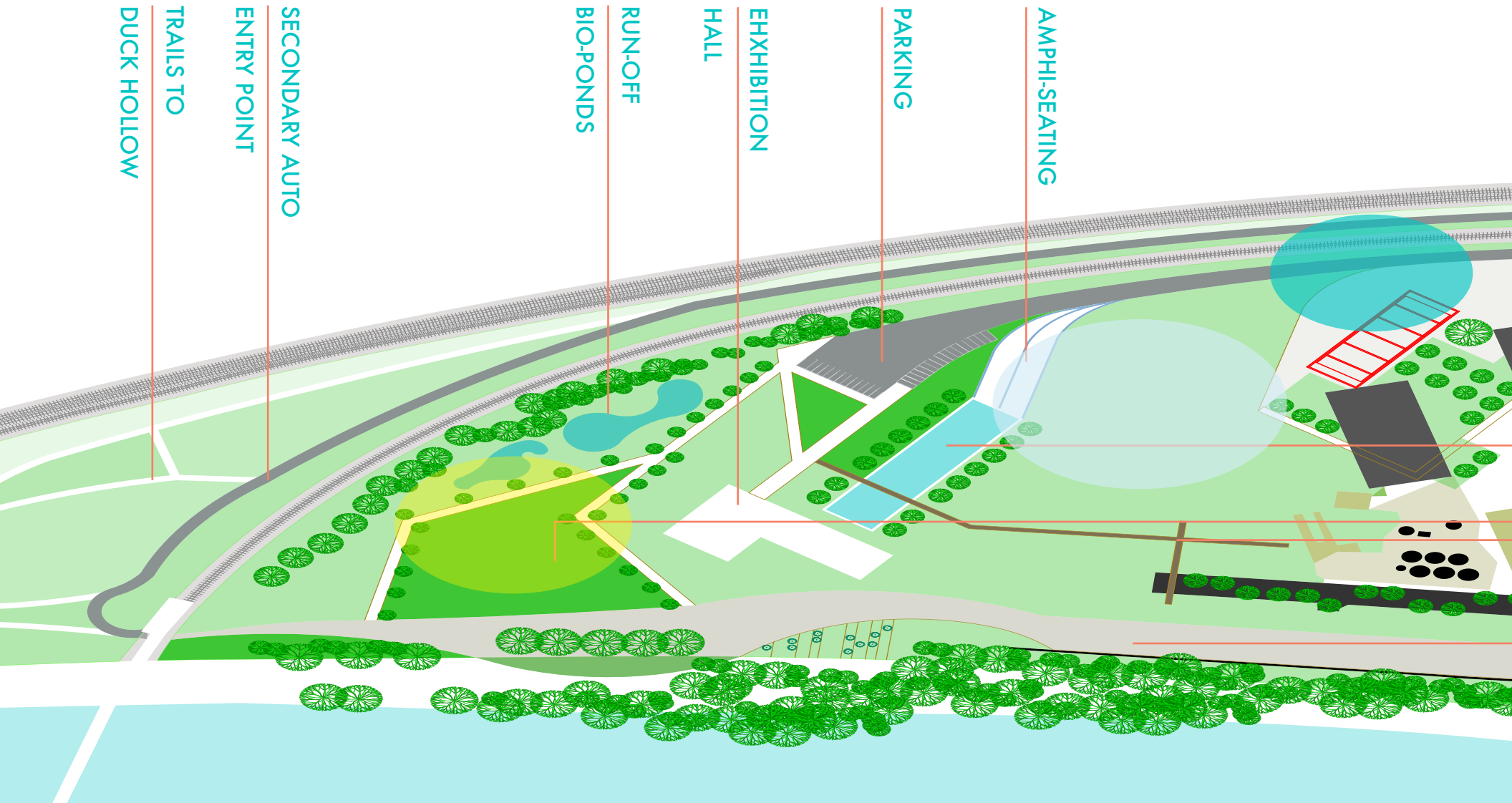


6.6 | Viburnum  
6.7 | Black locust

# 01 THE FURNACE

The western end of the site, known as 'The Furnace' is programmed to highlight the historic Carrie Furnace as the grounds of the official museum. This end requires flexible space through an open platform that allows a multitude of activities to happen

simultaneously without obstruction. From tours of the furnace, exhibition of urban art installations, indoor and outdoor concerts, garden showcase, and beer festivals, the opportunities for will be endless for any temporal bliss within a permanent backdrop.

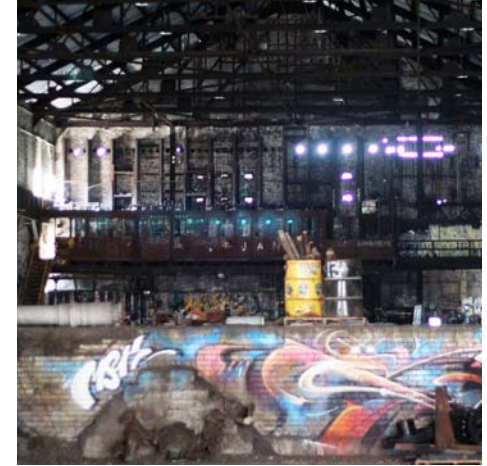






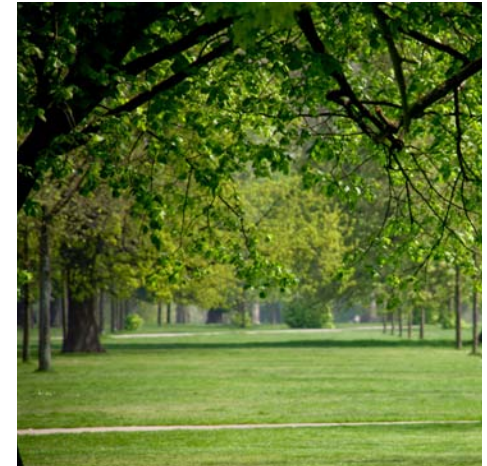
H I S T O R I C

E X H I B I T I O N



GREEN STEEL

G A R D E N



WELCOME

TEMPORAL

GATHERING

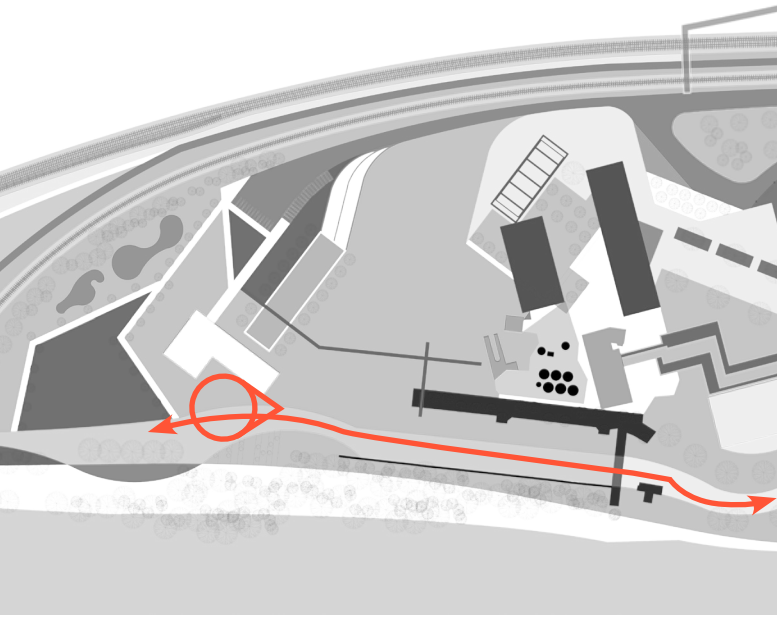
WATER GARDEN

GARDEN ROW

EXTENDED BOARDWALK

HOMESTRETCH

- 6.8 | (Left) 01 Furnace
- 6.9 | (Top Left) Carrie Furnace Panorama
- 6.10 | Carrie Furnace - Inside Warehouse
- 6.11 | Row of Trees



# HOMESTRETCH

OBSERVATION PLATFORM

RESTING SPACE

MUSEUM RE-USE

HOMESTRETCH LANE

LIGHTED PATHWAY





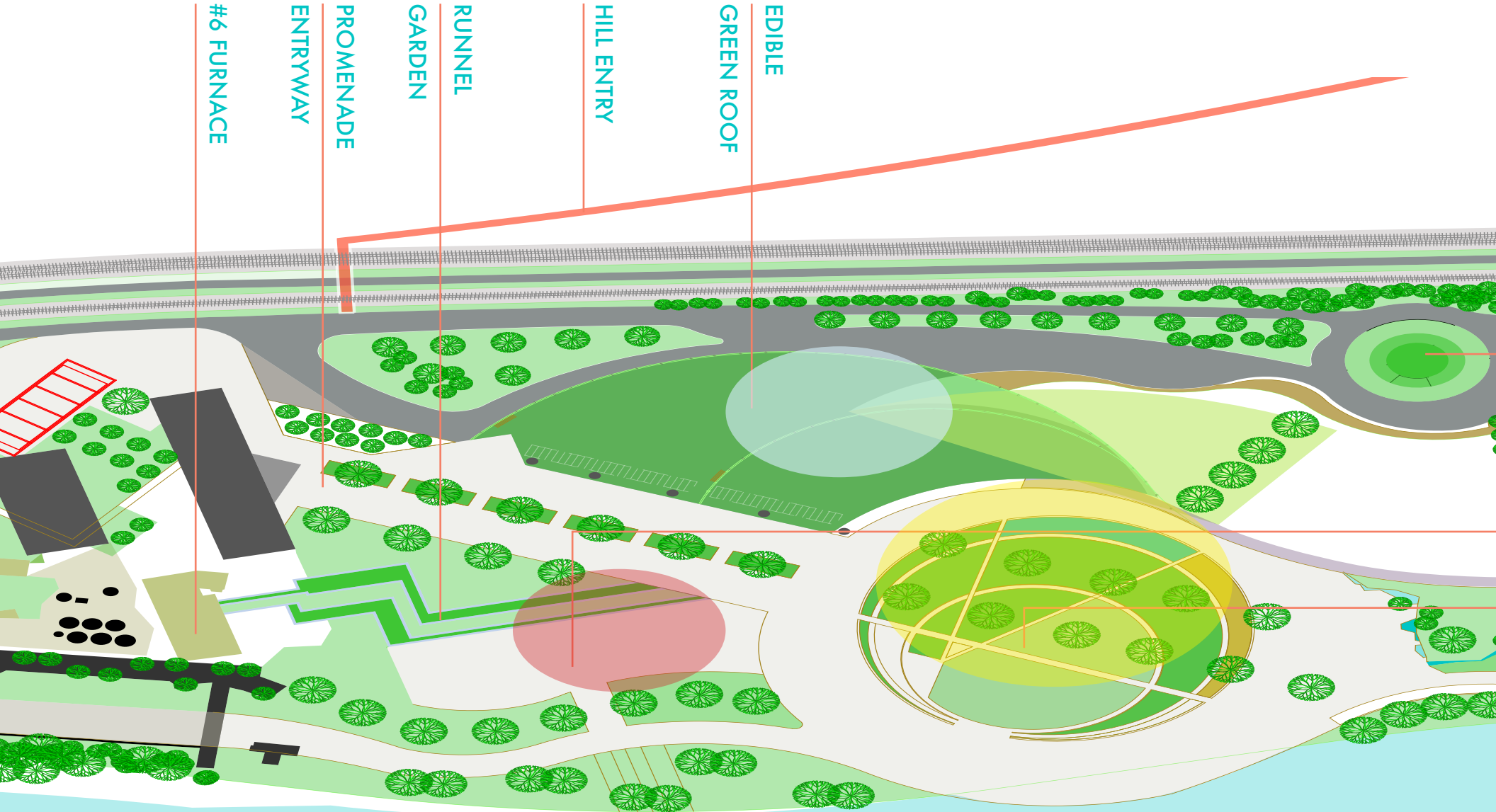




# 02 STEEL FORUM

The central “Steel Forum” is an active public space that acts as a buffer between the two ends. The circular layered green space tied with boardwalks allows a large community gathering perfect for special holiday occasions. A green-roof covers the main parking lot, located to provide event parking

outside of normal business hours. The roof serves to reduce heat islands and provide a edible garden for community outreach without the risk of contact to contaminated soils. ‘Eatery Square’ is an outlet to provide food, on-site.





COMMUNITY INTEGRATION

DINING AREA

PUBLIC GATHERING

ROUND-ABOUT

RAIN GRADEN

CAFE SQUARE

P U B L I C

R E C R E A T I O N



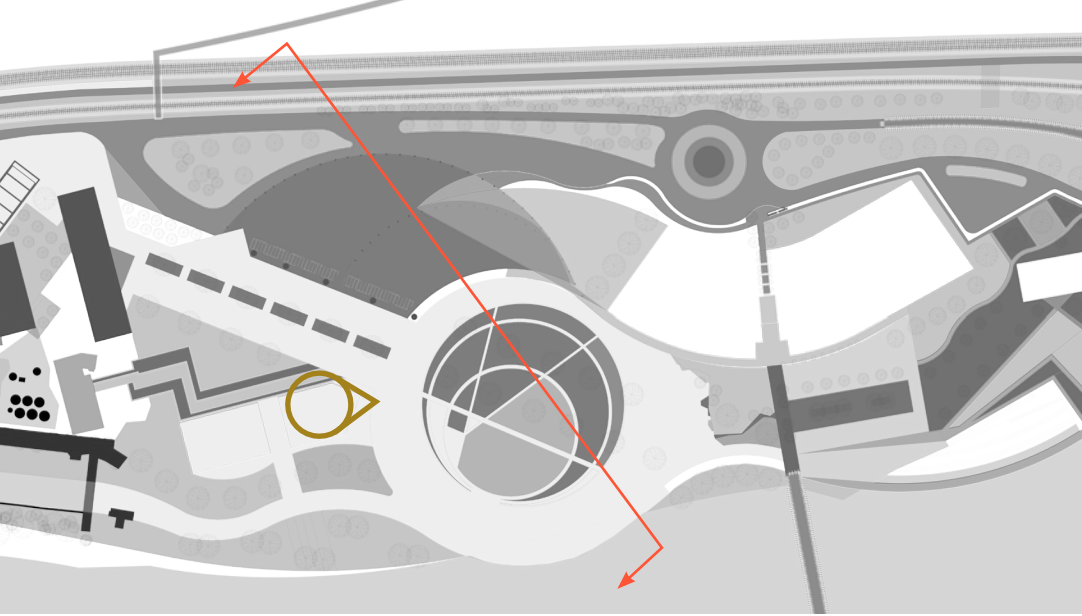
C O M M U N I T Y



GREEN STEEL

STEEL FORUM

- 6.13 | (Left) 02 Steel Forum
- 6.14 | (Top Left) Crowd of People
- 6.15 | Sitting on Grass
- 6.16 | Edible Garden



6.17 | (Right) Cafe Square Perspective  
 6.18 | (Bottom) Site Section

## CAFE SQUARE



SECONDARY ROADWAY

RAILWAY TRACKS

PAVED GROUND

STEEL FORUM

GREEN SPACE

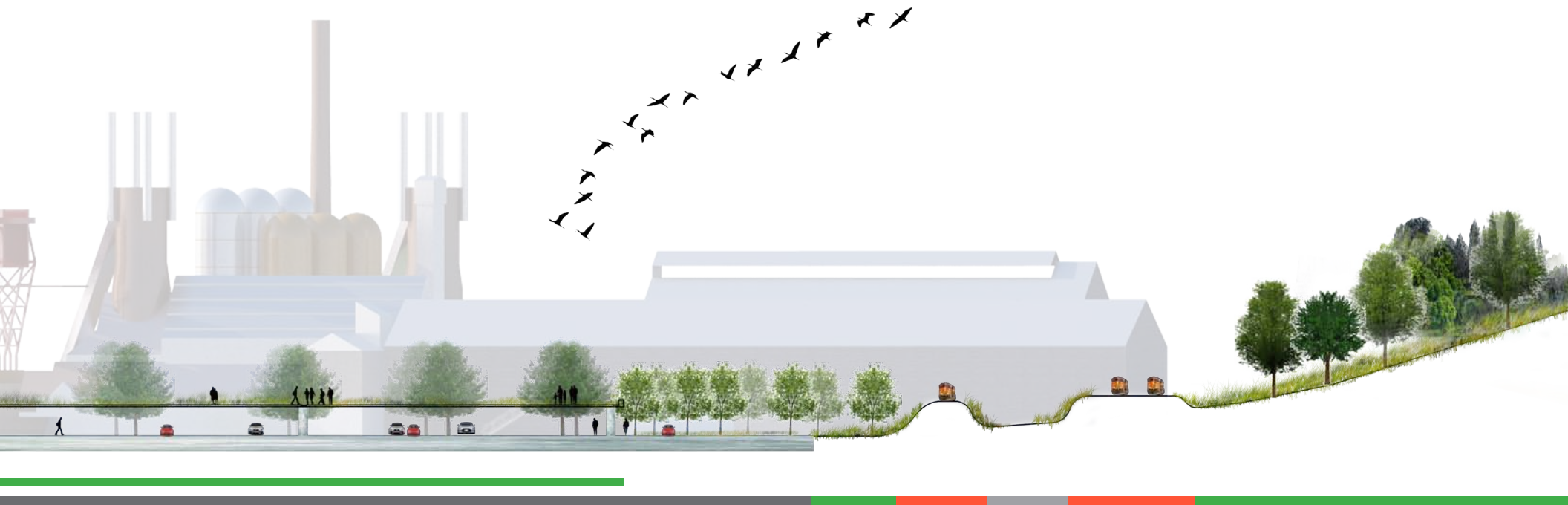
PEDESTRIAN PATHWAY

WATER

## SECTION

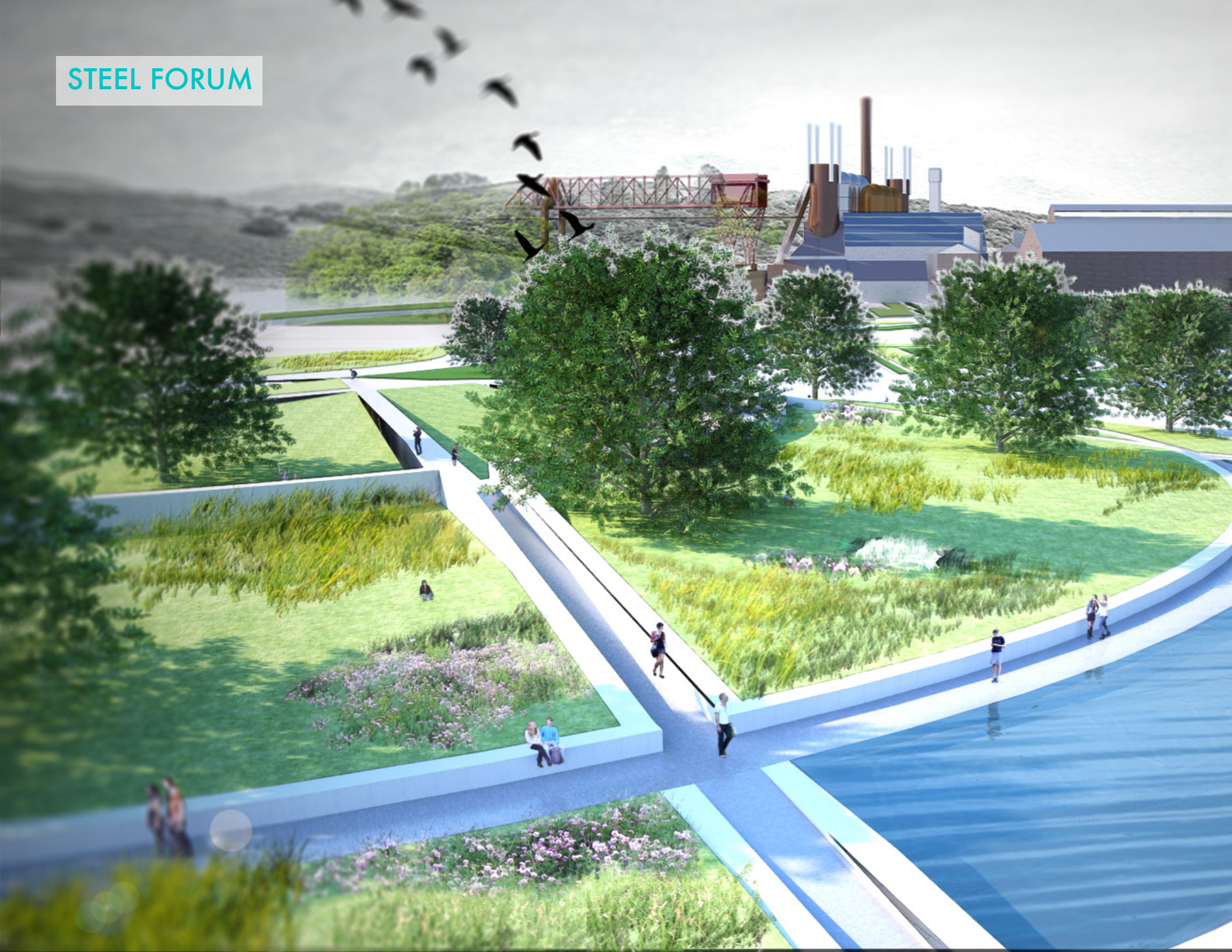




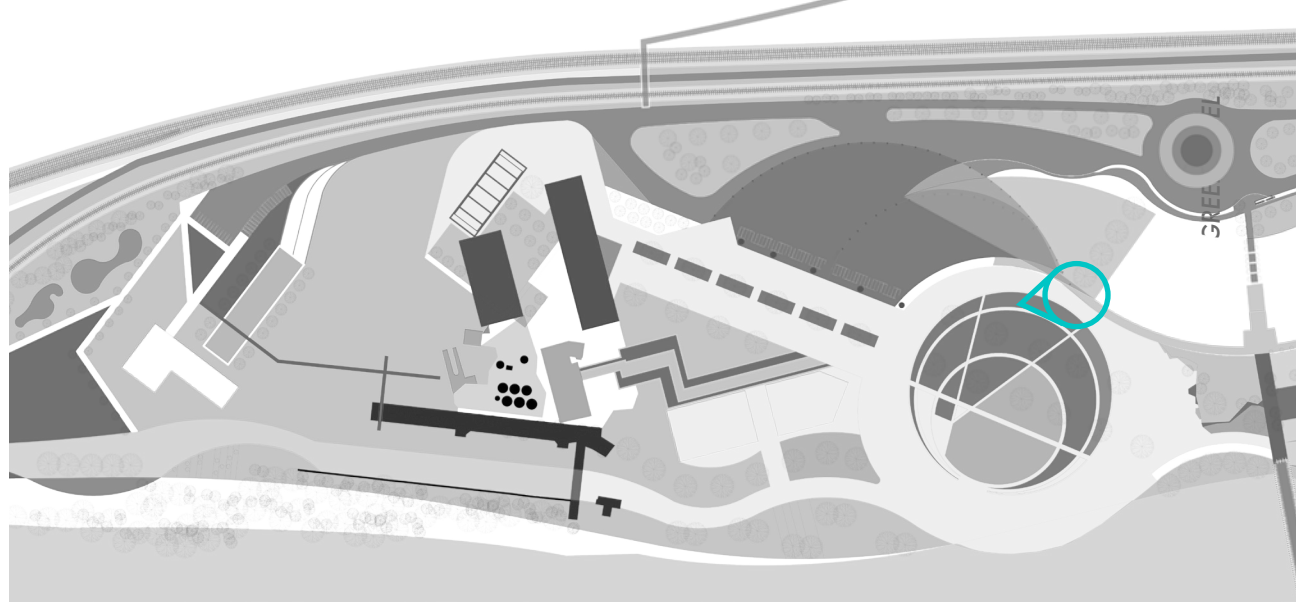
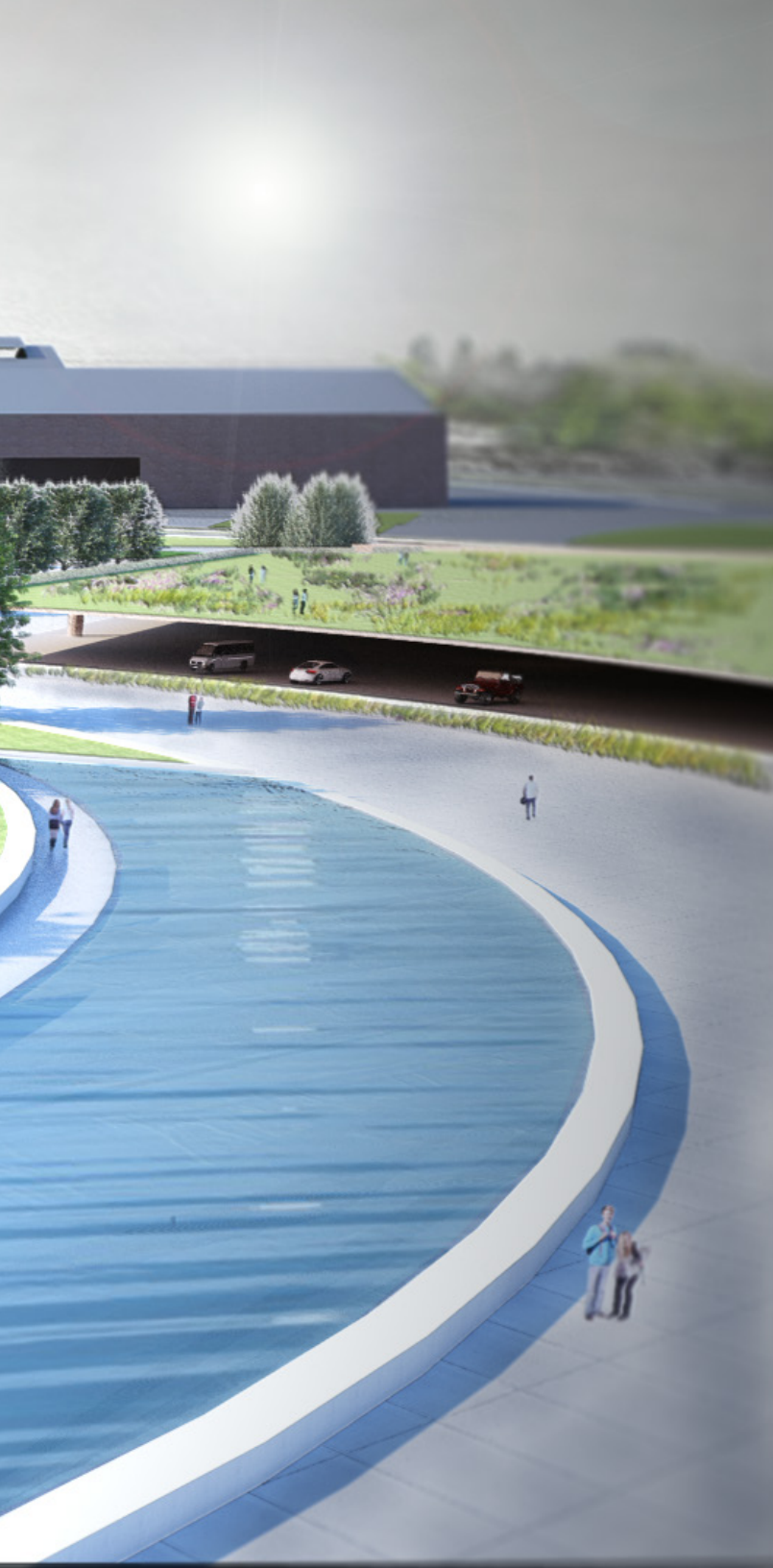




# STEEL FORUM







## GREEN ROOF SECTION

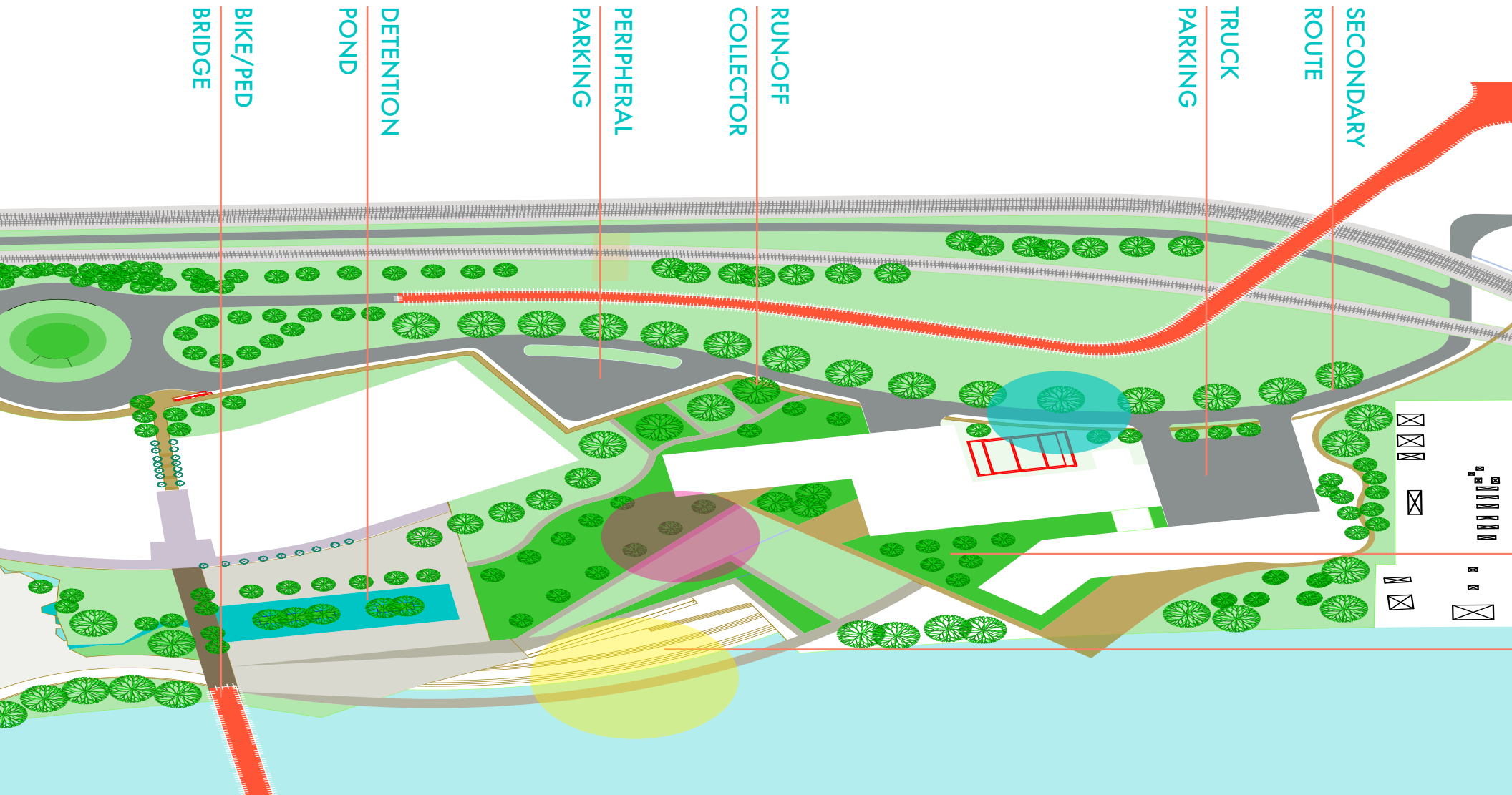
- 6.19 | Green Roof Section
- 6.20 | (Left) Steel Forum Perspective



# 03 EXCHANGE

On the east end is the 'Exchange', where the economic engine of the site is primarily located. This end provides a 3-story office space adjacent to the steel forum. This development is key to attracting established companies, emerging industries, and

vocational schools. The collection of buildings next to the utility site are designed as a open warehouse platform to accomodate light manufacturing industries for blue-collar jobs. The large parking space allows space for shipping trucks to maneuver.





## RIVERFRONT



## ECO-TECH OFFICE



GREEN STEEL

## LIGHT MANUFACTURING



WELCOME

EMPLOYEE GATHERING

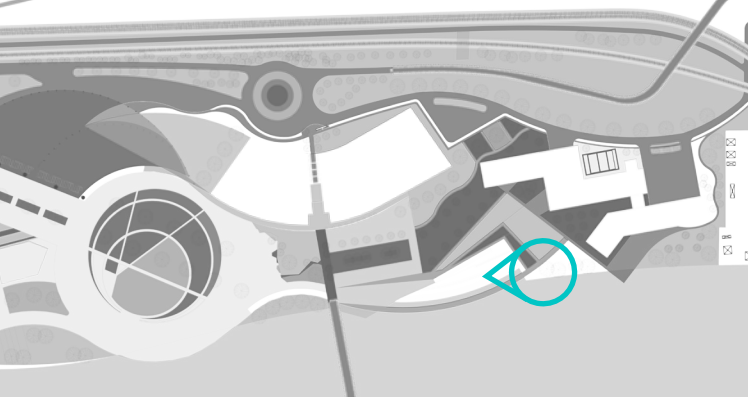
RECREATION

## GARDEN ROW

## WATERFRONT

- 6.21 | (Left) 03 Exchange
- 6.22 | (Top Left) Seattle River Edge
- 6.23 | Eco-Park Building
- 6.24 | Light Manufacturing Worker





6.25 | Waterfront Perspective

## WATERFRONT



### OUTDOOR SEATING AREA

### TIERED RIVER EDGE FLOOD PROTECTION

### BOARDWALK

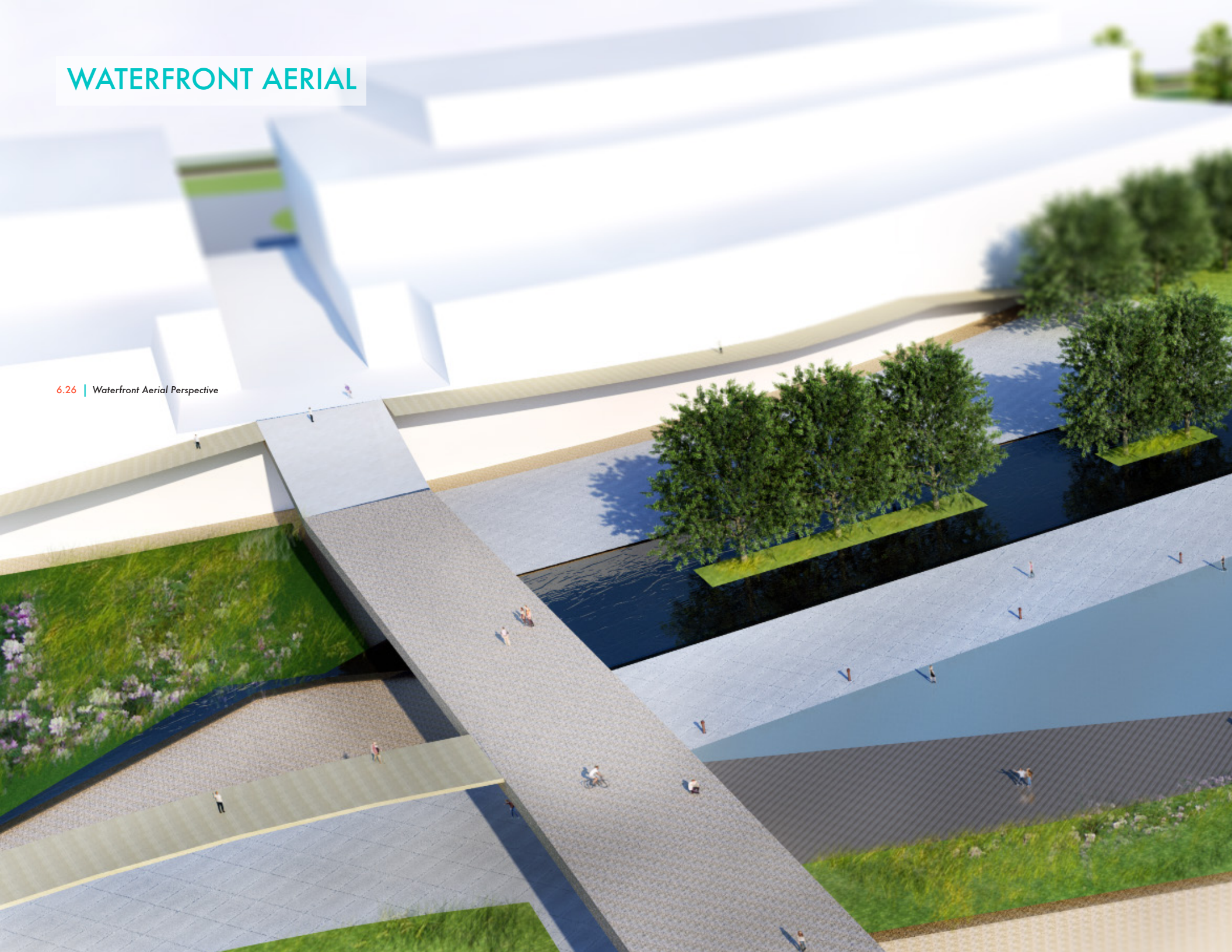




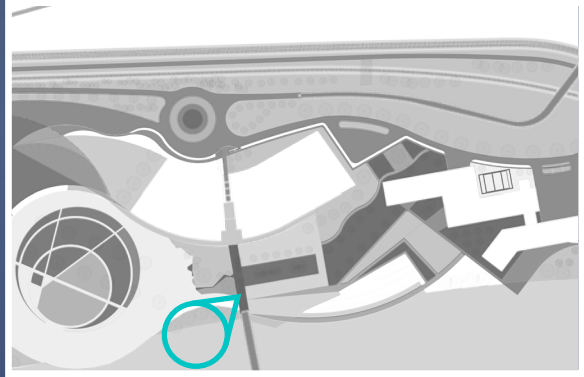
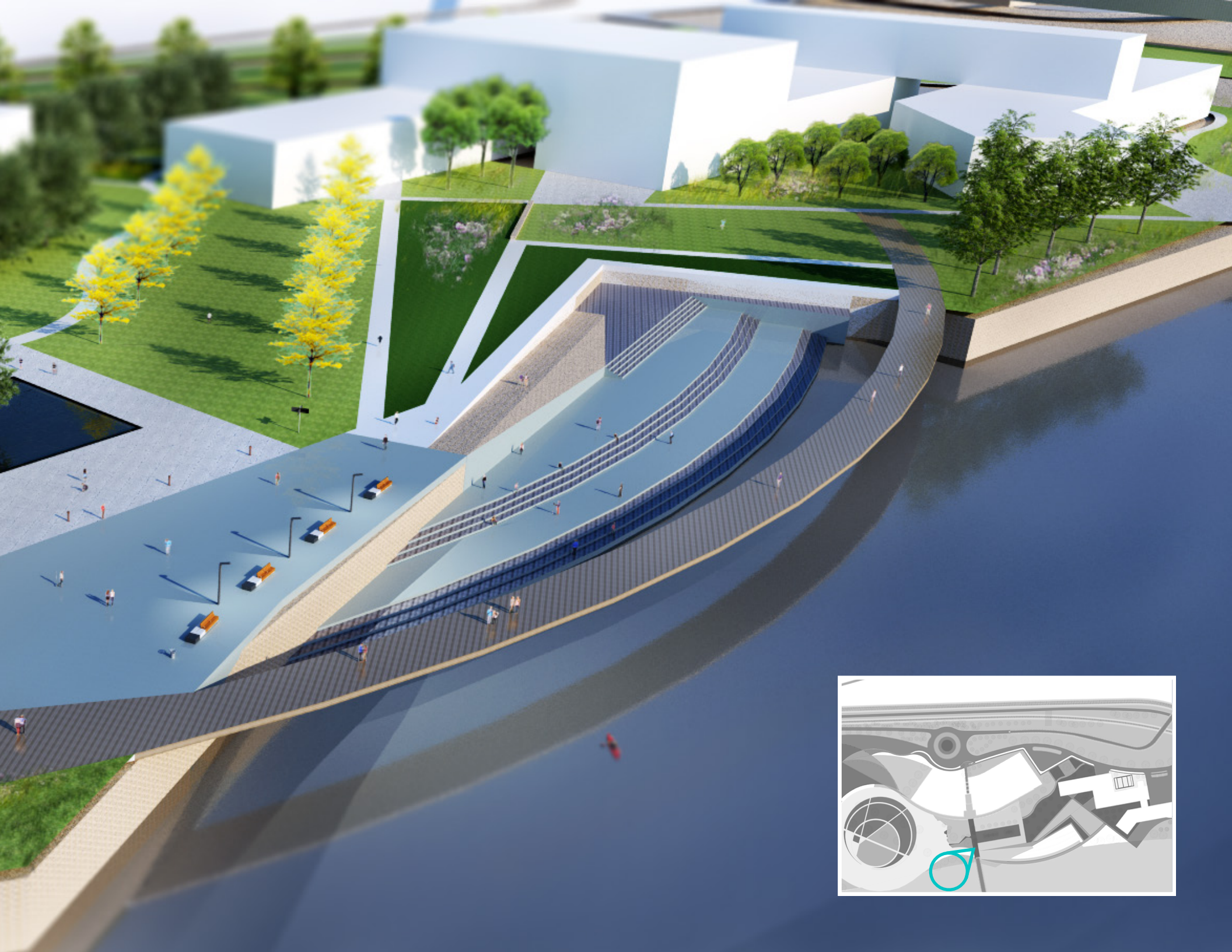


# WATERFRONT AERIAL

6.26 | Waterfront Aerial Perspective











Drosscapes is an inevitable part of human progress and will remain at the cusp of the ever-changing urban fabric. The Carrie Furnace stands as an excellent model for future processes that may provide an invaluable economic, social, and environmental contribution to the surrounding community where it is needed the most.

The necessary tools and financial support continue to grow through both private and public entities. The positive feedback from the public, through successful projects, help steer the positive momentum this paradigm toward sustainability and human health has created. This inherent awareness to the responsibilities for brownfield redevelopment is an extension of self-preservation and improved quality of life.

The reclamation of these disturbed lands is a complex process that requires a comprehensive team of professionals; where landscape architects continue to remain at the focal point of the creation, destruction, decay, and regeneration of this residual landscape.

There is no doubt that the road to reach the rate of redevelopment to match or overtake the rate of the destroying land and leaving derelict areas is a long one, but we are headed in the right direction.

## CONCLUSION

83 - Synopsis

84 - References

85 - Thank You



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THANK . YOU

**GREEN STEEL**  
RE-DEVELOPING A FORMER BROWNFIELD STEEL MILL



