Preserving the Ethos of Industry at The Carrie Furnaces: The Redevelopment of an Industrial Heritage Site and the Interpretation of Manufacturing Culture

By

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ABSTRACT

This thesis proposes design principles and a program for site of the Carrie Blast Furnace Plant, a National Historic Landmark in Pittsburgh’s Monongahela Valley. The Redevelopment Authority of Allegheny County intends to redevelop this 168-acre former industrial site in the near future. In anticipation of this regionally important redevelopment project, this thesis considers the philosophical commitments of historic preservation, weighs economic growth imperatives, explores how the Carrie Furnaces could be made to cultivate public memory of industrialism, and examines competing visions of significance, authenticity, and interpretation of heritage sites, particularly in the context of deindustrialization.

Four cases studies of internationally renowned projects demonstrate best practices in the redevelopment of historic blast furnace plants, ironworks, steelworks, and collieries. The Duisburg-Nord Landscape Park and Zollverein Park in Germany, the Belval City of Science project in Luxembourg, and the Parque Fundidora in Mexico all provide lessons in the preservation and adaptive reuse of derelict industrial infrastructure. Though their contexts differ, these four cases offer a common set of best practices to guide the Carrie Furnaces project.

First, through designs and programs, these projects interpret the stories of industrial heritage sites for contemporary audiences, thereby cultivating public memory. Second, these projects’ adaptive reuse of historic structures and spaces creates new, contemporary relationships between the sites and their various public audiences. This, as well as the fact that the designs are inspired by site-specific characteristics and are decidedly of their places and times, imparts authenticity. Third, these projects promote local economic revitalization through mixed-use development that engages broad constituencies. Finally, the projects use elements that pay homage to the industrial forms, materials, and culture that characterize their places.

This paper’s proposed development program and design for the Carrie Furnaces site preserves the site’s “ethos of industry” through a 21st-century manufacturing and tourism program that interprets the Carrie Blast Furnace Plant as a site of historic, vertically-integrated iron and steel production for the contemporary public consciousness. This program also promotes multi-sectoral economic growth, reconnects ailing nearby communities to the site, and conserves the material and cultural aesthetics of steel production, labor, thrift, and enterprise that made industrial Pittsburgh the center of American heavy manufacturing.

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Thesis Errata Sheet

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Errata - p.1
Pg. 8, bullet 9
Text: Programmatic Division of the Site (font Avenir, 10 pt.)
Corrected Text: Text reformatted to Avenir 11 pt.

Pg. 10, lines 2-4
Text: The Carrie Furnaces site…at the center of Pittsburgh (font Avenir, 10 pt.)
Corrected Text: Text reformatted to Times New Roman 12 pt.; text indented and realigned

Pg. 10, lines 5-10
Text: The site is oriented…to the Rivers of Steel Heritage Corporation (font Avenir, 10 pt.)
Corrected Text: Text reformatted to Times New Roman 12 pt.; text indented and realigned

Pg. 13, lines 4-5
Text: I first apply…, and then, apply a descriptive analytical framework I developed.
Corrected Text: I first apply…, and then apply a descriptive analytical framework I developed.

Pg. 17, citation 12

Pg. 21, citation 29
Text: Douet 2012 (essayist Neil Cossons, “Why Preserve the Industrial Heritage?”)

Pg. 21, citation 33
Text: Douet, 8 (essayist Neil Cossons, “Why Preserve the Industrial Heritage?”)
Corrected Text: Cossons in Douet, 8

Pg 22, citation 39
Text: Douet, 37 (essayist Louis Bergeron, “The Heritage of Industrial Society”)

Pg. 22, citation 40
Text: Douet, 8 (essayist Neil Cossons, “Why Preserve the Industrial Heritage?”)
Corrected Text: Cossons in Douet, 8

Pg. 25, citation 51
Text: “Battersea Power Station.” No Date. Web. 4 Mar 15. [www.batterseapowerstation.co.uk]

Pg. 25, Citation 52

Pg. 25, citation 53

Errata – p. 2

Pg 25, citation 54
Text: Pascual, Alberto. Battersea Power Station.” Creative Commons License.

Pg. 29, line 5-6
Text: …. would contribute to the cultivation of communal memory.
Corrected Text: …. would contribute to the cultivation of communal memory.

Pg. 29, citation 78
Text: Douet, 37 (essayist Louis Bergeron, “The Heritage of Industrial Society”)
Corrected Text: Bergeron in Douet, 37

Pg. 30, citation 90

Pg. 33, lines 10-11
Text: …industrial heritage may be exhibited through virtual reality (e.g., through online, “360 degree” tours of sites.
Corrected Text: …industrial heritage may be exhibited through virtual reality (e.g., through online, 360-degree tours of sites).

Pg. 34, line 30
Text: In Europe, there is “is a common, cross-cultural, and…”
Corrected Text: In Europe, there “is a common, cross-cultural, and…”

Pg. 37, citation 1

Pg. 38, citation 2

Pg. 39, citation 11
Text: Ghost V. “The Emscher Canal.” Flickr. No Date. Web. 6 Apr 15. Creative Commons.
Corrected Text: Ghost V. “Mirror Days (The Emscher Canal).” 23 Nov 14. Web. 6 Apr 15. CC BY-NC-ND 2.0. [www.flickr.com]

Pg. 41, lines 17-20
Text: [Suppose] visitors…ornamental landscape.
Corrected Text: Text reformatted to 10 pt. font, 1 in. indents added, and quotes removed

Pg. 42, citation 26

Errata – p. 3
2.1. Duisburg-Nord Landscape Park, the Emscher Landscape Park, Duisburg, Germany

Project Facts

The Thyssen Ironworks operated in north Duisburg from 1903 until 1985 (1). Following the closure of the ironworks, “the state of North-Rhine Westphalia acquired the site and [made] it an IBA project,” within the Emscher Landscape Park system (2). In 1990, the IBA Emscher Park, in cooperation with the local city council, held a landscape design competition, won by Peter Latz of the landscape architecture firm Latz and Partner (3) The park opened in 1994 and is 200 hectares, or approximately 500 acres (4). A 50-million euro investment financed the construction of the Duisburg-Nord Landscape Park (5).

1 Uttke, 32
3 Uttke, 32
4 Under the Open Sky, 64
5 Uttke, 32

Pg. 44, citation 37

Pg. 44, citation 38

Pg. 44, citation 39

Pg. 44, citation 40

Pg. 46, citation 50
Text: Radig, Guido “Zollverein’s Headframe.” Wikimedia Commons. No Date. Web. 2 Apr 15. Creative Commons License.

Pg. 47, citation 60

Pg. 47, citation 61

Pg. 49, citation 69

Pg. 49, citation 70

Pg. 53, citations 94 and 99

Pg. 54, citation 101

Pg. 57, citation 111

Pg. 57, citation 112

Pg. 57, citation 113

Pgs. 39 – 60
Correction: Realigned images because of preceding changes

Pg. 63, citation 12

Pg. 63, citation 13

Errata – p. 5

Pg. 67, line 8
Text: …on the flatlands nearest the mills, and middle-class and upper-middleclass housing…
Corrected Text: …on the flatlands nearest the mills, and middle-class and upper-middle class housing…

Pg. 72, citations 53 and 54
Corrected Text: Photograph by Author; Ibid

Pg. 80, lines 33-37
Text: Keystone Innovation Zones (KIZs)… and workforce and financial assistance (No indentation, font 12 pt).
Corrected Text: Text reformatted to Times New Roman 10 pt., 1 in. indents added

Pg. 85, line 11
Text: 2014 Revitalize American Manufacturing Act established…
Corrected Text: The 2014 Revitalize American Manufacturing Act established…

Pg. 90, line 14
Text: …The Carrie Furnaces Heritage Site and the Carrie Homestead Steel Museum, and The Industrial Meadow..
Corrected Text: ……The Carrie Furnaces Heritage Site and the Carrie Homestead Steel Museum, and The Industrial Meadow.

Pg. 95, line 13
Text: …would help users and visitors to understand that that Furnaces 6 and 7…
Corrected Text: …would help users and visitors to understand that Furnaces 6 and 7…

Pg. 96, citation 3

Pg. 98, citation 4

Pg. 98, citation 5

Pg. 101, citation 7

Pg. 103 (Works Cited and Images Cited), line 1

Errata – p. 6


Errata – p. 7
Pittsburgh. No Date. Web. 14 Apr 15. [historicpittsburgh.org]

Pg. 105, lines 9-10

Pg. 105, lines 11-12

Pg. 105, line 14
Text: Ghost V. “The Emscher Canal.” Flickr. No Date. Web. 6 Apr 15. Creative Commons License.
Corrected Text: Ghost V. “Mirror Days (The Emscher Canal).” 23 Nov 14. Web. 6 Apr 15. CC BY-NC-ND 2.0. [www.flickr.com]

Pg. 105, lines 19-20

Pg. 106, lines 1-2

Pg. 106, lines 11-12

Pg. 106, line 15
Text: Missing entry (was included in body of text, but not in Works Cited)
Correction: Added “Lère Fête des Hauts Fourneaux à Belval.” No Date. Web. 4 May 15. [www.redrock.lu]

Pg. 107, lines 9-10

Pg. 107, lines 23-24
Corrected Text: Text deleted (repeated citation)

Errata – p. 8
Errata – p. 9
Pg. 109, lines 5-6
Corrected Text: Maos. “IMG_3085.” 10 Jun 05. Web. 4 May 15. All Rights Reserved. [https://www.flickr.com/photos/maos/161358771]; moved to pg. 106, line 31

Pg. 109, line 10

Pg. 109, lines 16-17

Pgs. 100 – 110
Corrected errors in alphabetical ordering; separated works cited and image credits
Preserving the Ethos of Industry at The Carrie Furnaces: The Redevelopment of an Industrial Heritage Site and the Interpretation of Manufacturing Culture
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I am grateful to have had the opportunity to discuss the Carrie Furnaces site with those most dedicated to it. To those whom I interviewed, thank you for your open doors and insights.

To my advisor, Professor Dennis Frenchman, and my reader, Dr. Elisabeth Reynolds, your advice will influence my work beyond this project. Thank you for your guidance and for sharing your wisdom. I especially appreciate your enthusiasm for this project!

To my husband, Drew Peterson, thank you for your encouragement, your excitement for this project and my hometown, for accompanying me during my January fieldwork, and for supporting me as I continue to learn patient endurance.
# Table of Contents

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chapter 1: Introduction</td>
<td>9</td>
</tr>
<tr>
<td>Chapter 2: Literature Review</td>
<td>15</td>
</tr>
<tr>
<td>Chapter 3: Case Studies</td>
<td>37</td>
</tr>
<tr>
<td>Chapter 4: Analysis</td>
<td>60</td>
</tr>
<tr>
<td>Chapter 5: Principles, Program, and Design</td>
<td>90</td>
</tr>
</tbody>
</table>
List of Maps

1. The Carrie Furnaces Site within the Pittsburgh Region
2. The Site’s Local Context
3. The Carrie Furnaces Site
4. Municipal Boundaries
5. Leading Advanced Manufacturers’ Plants in the Region by Number of Employees
6. Leading ICT Firms in the Region by Number of Employees
7. Leading Life Science Firms in the Region by Number of Employees
8. Clustering of University, Government, and Corporate Research Centers
9. Programmatic Division of the Site
Introduction

“In its tragedy, Homestead became fashionable, as what might be called ‘working-class chic’ or ‘working-class voyeurism’ arose. For this to happen it was necessary that the mills be closed and the workers disappear. When the Homestead Works was operating and Homestead was a dirty steel town, people outside paid no attention to it. They had no desire to go to a dirty steel town or hang around with steelworkers. But once Homestead was a relic, Homestead was the rage.”1

In the summer or fall of 2015, the Redevelopment Authority of Allegheny County, Pennsylvania, will request proposals for the redevelopment of the Carrie Blast Furnaces site.2 The 168-acre site in Swissvale and Rankin, near Pittsburgh, was part of U.S. Steel’s Homestead Steel Works, a vertically-integrated steel manufacturing complex divided by the Monongahela River and composed of sites in Swissvale, Rankin, and Homestead.3 Carrie Blast Furnaces 6 and 7 and what remains of the Homestead Steel Works are of local and national historical significance. Furnaces 6 and 7 exemplify early 20th-century smelting technology, and the Homestead Steel Works was the site of the 1892 Homestead Strike, a violent event in the history of American labor.4 The Carrie Blast Furnace Plant is a National Historic Landmark, located within the Congressionally-designated Rivers of Steel National Heritage Area. Rivers of Steel Heritage Corporation, a non-profit educational and preservation organization administers the Carrie Furnaces Heritage Site as well as other former industrial sites across the region. U.S. Steel’s decision to close the complex in 1986 devastated Rankin’s and Homestead’s economies. Redevelopment of the Homestead site, across the river from the Carrie Blast Furnaces, began in 1998, and local residents hoped that the project would propel reinvestment in a historic downtown district, offer job opportunities to unemployed skilled workers, and commemorate steelworkers’ toils. Regrettably, The Waterfront, a shopping center of low design quality where ‘big box’ stores loom, failed to satisfy these aspirations. The imminent redevelopment of the Carrie Furnaces site is an opportunity to rethink conventional approaches to the redevelopment, preservation, and conservation of historic blast furnace plants, steelworks, collieries, and similar industrial sites. In 2011, Allegheny County received a $10 million Transportation Investment Generating Economic Recovery (TIGER) grant from the U.S. Department of Transportation to improve access to the site in preparation for redevelopment. This grant directs the county to create 1,000 jobs on the site. Development proposals will need to respond to this challenge.

2 The Redevelopment Authority is subordinate to the Allegheny County Economic Development Department (ACED)
1. The Site

The Carrie Furnaces site is strategically located. It is within half an hour’s drive from Carnegie Mellon University and the University of Pittsburgh, both in the Oakland neighborhood, as well as from Market Square, at the center of Pittsburgh.

Map 1: The Carrie Furnaces Site within the Pittsburgh Region

The site is oriented on a northwest-southeast axis, and it spans the boroughs of Swissvale, Rankin, and Munhall. The terminus of the Carrie Hot Metal Bridge is in Munhall, on the south bank of the Monongahela River. Braddock Borough lies to the site’s southeast. Swissvale and Rankin lie 100 to 150 feet uphill from the site. Of the site’s 168 acres, approximately 13 acres make up the Carrie Furnaces Heritage Site, entirely within the borough of Swissvale. Allegheny County leases this 13-acre parcel to the Rivers of Steel Heritage Corporation.

Map 2: The Site’s Local Context

5  The Rivers of Steel Heritage Corporation and the Historic American Engineering Survey do not refer to the site’s hot metal bridge by proper noun. This may be because the bridge is no longer in use. There is another hot metal bridge nearby that connects the Pittsburgh neighborhoods of Southside and Oakland, and it is properly called the Hot Metal Bridge. This paper will, therefore, refer to the site’s hot metal bridge as the Carrie Hot Metal Bridge.
2. Research Question

Most steelwork redevelopment projects – from the Duisburg-Nord Landscape Park in Germany to Parque Fundidora in Mexico – interpret and exhibit industrial heritage through a recreational program. These programs exhibit steelworks as sublime sculptural objects with a tragic narrative of power and loss. According to this narrative, all 19th- and 20th-century steelworks in North America and Europe are ruins. Alternatively, some redevelopment programs, like the Southside Works and The Waterfront in the Pittsburgh region, attempt to curate industrial heritage through the disembodied preservation of a few objects (e.g., smokestacks) while pursuing a retail-centric redevelopment program on the former mill site. The toil of steelworkers is erased to meet the demands of the 21st-century consumer. The method of preservation, interpretation, and exhibition aside, these programs often do not offer what the surrounding communities need most – economic diversification and regeneration.

Questions I aim to answer in this study include the following: 1) Can 21st-century industry, such as digital manufacturing, help to reclaim historic sites like the Carrie Blast Furnaces, while contributing to the diversification and transformation of the local economy; and 2) Are these European and Mexican cases applicable to the Pittsburgh context? In answering these questions, I will contribute to the discourse on the redevelopment and conservation of historic steelworks and similar industrial resources.
More specific questions that I aim to answer include:

1. How should job creation, on the site and within the region, be an aim of the design, given the depressed economic conditions throughout the Monongahela Valley? What opportunities would this create for enhanced cultural, public, interpretive, and curatorial programs?
2. Should the form and use of the Carrie Blast Furnace Plant inspire the redevelopment’s design and program?
3. What will be the physical relationship between the site and the adjacent communities of Rankin, Swissvale, and Braddock, the riverfront, and the other portion of the Homestead Steel Works that has already been redeveloped as a shopping center?
4. Who is the redevelopment for? The communities of Rankin, Swissvale, and Braddock, residents of Pittsburgh and Allegheny County, visitors, the region’s universities, or the region’s corporations, or some other constituency? If it is for a mixture of these groups, how are competing interests to be balanced?
5. The landmark sculpture on the site, the Carrie Deer, symbolizes the re-naturalization of the site; should the re-naturalization that has already occurred inspire further redesign? Should the re-naturalized landscape of the site be preserved or redeveloped, and to what extent?

This thesis is composed of four parts. First, it discusses the philosophical foundations of industrial heritage preservation and contemporary debates within the field over topics ranging from authenticity and significance to public memory and interpretation to economic growth imperatives. Second, the thesis analyzes and evaluates two cases of redeveloped steelworks in Europe, one case of a redeveloped colliery in Europe, and one case of a redeveloped steelworks in Mexico. Third, it examines the Carrie Furnaces site, including the portion recognized as a National Historic Landmark. Fourth, it includes a proposal for redevelopment of the site, including design principles and a program illustrated through a conceptual site plan.

3. Data Collection

3.1. Method 1 – Case Studies

This paper analyzes and evaluates four internationally acclaimed cases of industrial heritage conservation. Duisburg-Nord Landscape Park in Duisburg-Nord, Germany, is on the site of a former steelworks. The park conserves the steelworks within a contemporary landscape design and program inspired by environmental remediation and its industrial context. Zollverein Park in Essen, Germany, is on the site of a former colliery. A UNESCO World Heritage site, Zollverein Park preserves the colliery and is a workplace as well as a cultural and recreational venue. Belval City of Science in Belval, Luxemburg, is on the site of a former steelworks. Belval conserves the steelworks’ blast furnace plant as an iconic landmark within a new city dedicated to research, culture, and urbanism. Parque Fundidora in Monterrey, Mexico, is on the site of a former steelworks. An expansive recreational park and cultural and entertainment venue, Parque Fundidora conserves the steelworks’ blast furnace plant and repurposes a blast furnace into an industrial museum that narrates the history of the Mexican steel industry.

Through this analysis, I aim to understand these project’s designs and programs,
3.1. Method 1 – Literature Review

My analysis of the Carrie Furnaces site and surrounding neighborhoods is partially based on observations I made during a series of site visits in October 2014, January 2015, and March 2015. This fieldwork informed my understanding of the process of smelting iron at the Carrie Blast Furnace Plant as well as the spatial characteristics of the Carrie Blast Furnace Plant, its surrounding site, and the communities of Rankin, Swissvale, and Braddock. In surveying these places, I focused on their circulation patterns and accessibility, topography, land uses, open spaces, landscapes, relationship to the river, and architectural forms.

3.2. Method 2 – Site Visits

To better understand the Carrie Furnaces Site, I interviewed:

1. Ron Baraff, Director of the Rivers of Steel Museum and Archives;
2. Sam Robinson, Rivers of Steel guide and former railroad engineer;
3. Erin Deasy, Carrie Furnaces Redevelopment Project Manager, Allegheny County Economic Development Department;
4. Nathan Strum, Deasy’s predecessor;
5. Addy Smith-Reiman, Project Manager, RiverLife Pittsburgh; and
6. Jo Ellen Welsh, resident of Swissvale.

Based on my analysis of the information collected, I developed design principles and a program, and illustrated these through a conceptual design. These principles guided my approach to the conservation, interpretation, and exhibition of the site as well as my approach to the site’s land uses and program.
4. Hypotheses and Implications

Hypothesis 1: A manufacturing, heritage, cultural, and recreational program will interpret the Carrie Blast Furnace Plant and contribute to the diversification and regeneration of the local economy.

Hypothesis 2: Despite the contextual difference, certain European and Mexican practices are appropriate and applicable in the Pittsburgh context.

This thesis concludes the exhibition of industrial heritage through an exclusively recreational program fails to commemorate steelworkers’ labor. Within such a program, industrial heritage is imagined in exclusively tragic circumstances: conserved as ruins, the abandoned works emphasize economic collapse, environmental degradation, and human folly without paying homage to the labor, thrift, enterprise, and other virtues that, in and through the works, made our society safer and more prosperous. Such a blinkered approach can only fail to employ the heritage of industry to help regenerate the local economy and create jobs. Research and a design proposal that demonstrate the viability of an alternative approach contribute to discourse on the redevelopment and preservation of industrial heritage, particularly in the context of Pittsburgh, recognized as a leading U.S. city in the conversion of abandoned industry to new uses. An approach that captures the invention, innovation, and excellent design inherent in historic industrial sites as well as the workers’ pride and tenacity, while contributing to the diversification and regeneration of the local economy, will take full advantage of the Pittsburgh area’s resources and serve as a model for other urban regions.
Introduction

The preservation of the Carrie Blast Furnace Plant and the redevelopment of its surrounding 168-acre site is a project at the intersection of development and historic preservation. The bestowal of National Historic Landmark status on the plant differentiates this project from other large-scale, in-fill industrial redevelopment projects. How should the presence of the Carrie Blast Furnace Plant, an industrial heritage site, alter the design and program for the redevelopment project? Furthermore, how should the imperatives of economic transformation and development alter the preservation of the Carrie Blast Furnace Plant? This review of literature explores the philosophical foundations of the historic preservation discipline, as well as contemporary debates within the field, to offer a coherent normative framework for answering these questions.

1. The Philosophical Foundations of the Historic Preservation Discipline

1.1. The Origin of the Preservation Discipline

To situate industrial heritage within the field of historic preservation and to understand why industrial heritage is a particular subset of this field, it is important to understand that heritage preservation emerged in reaction to industrialization.1,2,3,4 In the late 18th century, early industrialization brought with it rapid changes to the built environment. Unprecedented population growth, urbanization, and mechanization led to the destruction of many historic structures. Proponents of industrialization touted the new way as replacing unsanitary, medieval warrens with sounder, cleaner, and more rational edifices. By the turn of the 19th century, however, critics responded to the accelerating pace of industrialization in Great Britain and the Low Countries by drawing on romantic thought to argue for preservation of buildings that they felt were more authentic, beautiful, and culturally significant than the new structures that were replacing them. Late in the 18th century, the philosophical tradition extending from Jean-Jacques Rousseau moderated the era of “unprecedented confidence in human reason” that

followed Sir Isaac Newton’s scientific and mathematical discoveries. Sensibility tempered reason: “emotion and visionary intuition as a mode of human perception became as important as thought and rational calculation.” This movement away from the exaltation of reason in general culture influenced taste in the arts, including architecture and garden design: “Rousseau’s philosophy, which enlarged the freedom Locke had granted the senses, was instrumental to reinvesting classicism with poetic visions of a lost Golden Age.”

Architectural styles of the first half of the 19th century were predominately revivalist, in keeping with classicism’s nostalgia for antiquity and romanticism’s fixation on the medieval. These styles had their genesis in earlier centuries, but came to define 19th century architecture, especially in the English-speaking world: Gothic Revival (1650-onward) and Neo-Classicism (1760-1850), including Greek Revival (1760-1850) and Italianate (1830-1890). In tandem with the emergence of preservationist sentiments, the Arts and Crafts style gained popularity later in the century (1870-1940). This style emphasized craftsmanship and was likewise a reaction to industrialization, and, more specifically, to the transformation of the production process within the decorative arts and building construction. Within garden design, the Picturesque style (1770 – 1920) remained popular and favored natural, seemingly wild, landscapes that bordered on the sublime and often incorporated fabricated ruins. In this context, foundational debates within the field of preservation arose: what is the duty of curators of the built environment? Should stewardship be judged by its commitment to significance, authenticity, utility, or some other standard? Indeed, what is ‘significance’?; what is ‘authenticity’?; and what is ‘utility’? Is to restore to adulterate? Is fabrication a falsehood? And if so, does that have a bearing on the responsibility of preservationists?

1.2. A Brief Survey of 19th-century Thought on Architectural Preservation and Restoration

Early contributors to debates over architectural preservation and restoration include John Ruskin (1819-1900), William Morris (1834-1896), and Eugene Viollet-le-Duc (1814-1917). Their perspectives are best understood as situated along a continuum based on their view of what constitutes a legitimate and authentic intervention to protect a historically significant structure. Although a nascent American preservation movement began with the successful campaign to preserve Mount Vernon in 1853, the field emerged through the Historic American Building Survey of 1933 and the National Historic Preservation Act of 1966. Since that time, the U.S. Department of the Interior has administered the National Register of Historic Places. The philosophies discussed in this section provided the Western intellectual framework that gave rise to the discipline of historic preservation, including the Department of the Interior’s standards and guidelines.

6 Ibid, 233
7 Ibid
9 Ibid
10 Ibid
In *The Seven Lamps of Architecture*, John Ruskin ardently asserts that stewardship, a moral imperative, is at odds with the act of restoration. With regard to buildings and other architectural works, Ruskin contends, “We have no right whatever to touch them. They are not ours. They belong partly to those who built them, and partly to all the generations of mankind who are to follow us,” and he goes on to argue “…what other men gave their strength and wealth and life to accomplish, their right over does not pass away with their death…” Society’s mandate is therefore merely to protect, from Ruskin’s viewpoint.

William Morris critiques intervention, but his stance is more interventionist than Ruskin’s. Lambasting restoration in the “Manifesto of the Society for the Protection of Ancient Buildings,” Morris asserts that the very concept of restoration fraudulently implies that *it is possible* to return a building or other work to its original state. Morris contends that this is an unachievable end because it is impossible to recapture the societal mores and norms of the constructors. Therefore restorations are fundamentally forgeries, and restoration is an illegitimate intervention. Stylistic and material contrasts are records of human activity in different centuries, according to Morris. Thus, provided that an alteration (e.g., an addition for safety or for continued or adaptive reuse) is readily discernible, it is legitimate.

Morris and Ruskin’s French contemporary, Eugene Viollet-le-Duc, an architect, advocates ardently in favor of restoration. He argues that the discretion of the restorer should guide restoration. For example, rhetorically, Viollet-le-Duc asks if a restorer is errant if he elects to replace a timber roof with wrought iron to reduce the threat of destruction by fire. An intervention of this sort is pernicious from Ruskin’s perspective. It is important to note that architectural restorations made up most of Viollet-le-Duc’s work. Viollet-le-Duc viewed restoration as a method by which to improve on buildings’ designs. His work is subject to notable criticism because he liberally interpreted the original designs for the buildings he restored. Interestingly, however, le-Duc’s work is now viewed as historically significant in its own right.

This body of thought shaped contemporary understandings of what constitutes a legitimate and authentic intervention, and it influenced modern approaches to preservation, conservation, restoration, and reconstruction. Cesare Brandi (1906-1988) wrote *Theory of Restoration* in the mid-20th century. He put forth guidelines for restorers, stating that restoration “must allow itself to be emphasized as a true historical event—for it is a human action…” and to this end, Brandi advocates for the conservation of “…sample areas that show the work of art before the restoration…” Brandi is more interventionist than Morris, but is more principled.
than Viollet-le-Duc. Brandi’s approach to restoration is more common in contemporary practice and, to a certain extent, more widely accepted than Viollet-le-Duc’s, which has been largely discredited. For instance, in contemporary practice, the incorporation of modern safety systems, including fire and security alarms and protection against fire, up-to-date electricity and heating systems, and handicapped access are broadly accepted as legitimate interventions. The question arises, however—where should the line be drawn?

In contemporary theory, preservation demands minimal intervention and allows only the protection, stabilization, and maintenance of the structure in question. Restoration aims to depict a structure as it was in an earlier period by removing anachronistic elements and reconstructing lost components as accurately as possible. Conservation (rehabilitation, adaptive reuse) involves the repair of a structure to permit a compatible use while “preserving those portions or features which convey its historical, cultural, or architectural [worth].” In the United States, the Secretary of the Interior sets standards for the historic preservation discipline. These standards use the term rehabilitation, as opposed to conservation. This paper will use the term conservation instead because rehabilitation does not imply adaptive reuse and thus rehabilitation and reconstruction may be confused. In practice, in the United States, projects that receive federal and state historic preservation tax credits substantially alter buildings to make them inhabitable and to cater to the needs of visitors.

Stewardship is a societal responsibility. Ruskin’s definition of stewardship is impractical in 21st-century society in which sustainable development, including the reuse of historic structures, is an imperative. Cesare Brandi’s guidance risks reducing rehabilitation to the tokenistic preservation of superficial, even stereotypical, elements of old structures. Viollet-le-Duc’s notion of untrammeled architectural prerogative is incompatible with any notion of preservation or adaptation. Morris’s approach demands stewardship and encourages sustainability through reuse, making his thought most compatible to the contemporary context. Moreover, by valuing stylistic and material contrasts as evidence of human activity in different centuries, Morris’s approach creates an opportunity to extend the narrative of a historic structure.

1.3. Contemporary Preservation Practice: Intrinsic Worth and Strategic Aims

Alois Riegel in “The Modern Cult of Monuments” rationalizes divergent approaches to preservation, conservation, and restoration by associating these approaches with their underpinning values. The use of values within the preservation discipline refers to the intrinsic worth of a structure to society. In other words, values-centered theory asks, what is the structure or place in question worth, and to whom? Values inform design principles, which guide the design concept for a site or place.

Riegel explains that those who value the age of architectural works may accept and desire decay (to the extent that decay does not threaten destruction), while those who value the
historical importance of architectural works aim to halt decay, but not to erase its traces. Those who value continued use aim to preserve and restore architectural works as needed to permit continued occupancy. Conflicts between proponents of one approach and those of another often ensue. Resolving these conflicts is the focus of research by Heike Oevermann and Harald Meig.

Oevermann and Meig propose a ‘values-centered’ framework by which they evaluate industrial heritage conservation case studies. In a three-year study, funded by the German Research Fund, of industrial heritage sites in transformation in Europe, Oevermann and Meig conclude that a singular understanding of conservation and development does not prevail. Approaches to the practice of planning vary: understandings of and approaches to conservation and development at the national, regional, and sub-regional levels diverge. Oevermann and Meig attribute this variation to a difference of values (e.g., authenticity, reuse, etc.) and value prioritization among stakeholders, which they classify under the following three discourses:

1. Heritage conservation, “[to protect] and [to preserve] monuments, listed sites, and buildings;”
2. Urban development, “[to provide] a prosperous and livable city;” and
3. Architectural production, “[to convert] existing space into new forms and expressions of architecture.”

Oevermann and Meig’s heritage conservation discourse is of the tradition of John Ruskin. Their urban development and architectural production discourses are, by definition, broader than the field of preservation. The William Morris, Cesare Brandi, and Alois Riegel tradition, which legitimates rehabilitation, including reuse and restoration, is at the intersection of the Oevermann and Meig’s heritage conservation, urban development, and architectural production discourses. The Viollet-le-Duc tradition (moderated by contemporary professional ethics), which legitimates the creative re-imagination of historic structures, is at the intersection of Oevermann and Meig’s heritage conservation and architectural production discourses.

The aforementioned discourses are the basis of Oevermann and Meig’s descriptive analytical framework, according to which they classify their case studies. Within each of these discourses, Oevermann and Meig outline sub-discourses, and describe their “concepts (e.g., development-led conservation), objectives or ends (e.g., to protect and preserve testimony to the past), core assumptions (e.g., the material heritage is a testimony to the past, a landmark, and a resource), and values (e.g., re-use, sensitivity).” Discourses, while not mutually exclusive, may diverge and may clash. Sub-discourses mediate between sources of conflict or

20 Ibid
22 Ibid
23 Ibid, 17
24 Ibid, 18
25 Ibid, 18
26 Ibid, 4
competition. Insightful conservation and imaginative development and design result from this process of resolving conflicts between different values.

Oevermann and Meig identify industrial heritage as a sub-discourse within the core discourses of heritage conservation, urban development, and architectural production. The concept of industrial heritage within heritage conservation is “development-led conservation,” according to the researchers. The industrial heritage sub-discourses within heritage conservation and urban development both value reuse, accessibility, and character, for example; therefore these sub-discourses resolve the conflicts between these core discourses. Conflicts arise from: 1) a desire to preserve industrial heritage unchanged, so as to maintain the authenticity and integrity of the material heritage; 2) the long-term impossibility of unqualified preservation in the context of a depressed economy. 27

Oevermann and Meig’s framework is an excellent analytical tool. It elucidates significant policy and design decisions and trade-offs. In addition, it uses the sub-discursive lens to explain how inventive or imaginative conservation, development, and design concepts can arise through conflict mediation.

In my view, environmental conservation is absent from Oevermann and Meig’s discourses and should be added to the definitions, as follows:

1. Heritage conservation, “[to protect] and [preserve] monuments, listed sites, and buildings;”
2. Urban development, “[to provide] a prosperous and livable city;”
3. Architectural production, “[to convert] existing space into new forms and expressions of architecture;” and 28
4. Environmental conservation, or to remediate and protect the natural landscape and ecology.

The strategy and design for any given project must evaluate and assign weight to these discourses and to Riegel’s values (age value, historical value, continued use value, etc.). There is no single prioritization of values or discourses that holds true for all contexts. Most importantly, however, the intrinsic worth of a structure or an ensemble should inform the strategic and design aims. The opinions of the local community as well as the opinions of preservationists and developers should influence perceptions of this worth and the strategic aims of preservations and development.

2. The Foundations of Industrial Heritage Conservation

2.1. The Value and Challenges of Industrial Heritage

At its inception, the field of historic preservation was inherently anti-industrial. The physical transformation of the landscape of industrial communities throughout Europe and North America led preservationists and others to question the historical significance and worth

27 Oevermann and Mieg, 18.
28 Ibid, 17
Immediately before the closure of mills and factories in the mid-20th century and for a period after, the public on both sides of the Atlantic did not view these places of production as potential heritage sites, but as their livelihood. Such buildings were perceived to have no cultural or aesthetic merit and were to be dispensed with once they had outlived their economic usefulness. Author Laurie Graham was one of three spectators who observed the early morning demolition of the Duquesne Works, an iron- and steel-manufacturing complex in southwestern Pennsylvania. In *Singing the City*, Graham recounts the remarks one of the other observers, a former steelworker, made to her while awaiting the controlled detonation: “He speaks angrily about U.S. Steel’s closing of the mills and the brutal way in which it was done. He talks of being laid off… the lack of opportunity here.” In response and while looking toward the mill’s structures, Graham comments, “I think they’re beautiful” and the steelworker returns, “They are.” This anecdote is indicative of public sentiment immediately before and for a period after the mills’ closure in southwestern Pennsylvania, and it may be indicative of public sentiment in similar industrial communities throughout the American Rust Belt and in Western Europe. In this anecdote, it is clear that economic needs triumphed over sentimentality. But sentimentality was present in the recess of the public mindset and it would emerge in southwestern Pennsylvania in support of the Rivers of Steel National Heritage Area. Alice Mah adds, “…the rise of dereliction tourism and artistic interest in abandoned industrial sites is sociologically interesting because it shows that these sites are formidable enough in their presence to capture the popular and artistic imagination.”

In addition, in the beginning of the second half of the 19th century, it was difficult for the public to conceive of mills and factories as historic. Neil Cossons explains, “…the public’s perceptions of heritage [derived] from different roots, sentiments, and attitudes that [lay] … in an earlier age and in a different aesthetic.” That is, preservationists generally deemed only sites associated with people of economic and social prominence, the heights of architecture styles, or well-recorded historical events, including battles, worthy of saving. An example of this may be found in Winterthur, an industrial city within the Zurich metropolitan region of Switzerland. Macroeconomic shifts in global manufacturing compelled the Sulzer Corporation, a Swiss manufacturing firm, to put forth plans to redevelop its excess land. Sulzer proposed the demolition of its industrial buildings and the construction of a modern, mixed-use development that would include residences. “Sulzer felt the industrial architecture was ‘not beautiful enough.’ The technical architecture fulfilled utilitarian purposes; without a relevant function, its preservation seemed absurd to Sulzer.” The development was never built because of a lack of investors. Hilary Orange offers a description of the evolution of public sentiment based on
her observations of the British experience: the public accepts deindustrialization, forgets their tribulations (e.g., disagreements between labor and management, occupational hazards, job loss), and the crafting of “triumphal national narratives” follows forgetfulness. Orange concludes, “Thereby symbols of...economic decline become symbols of regional and national pride.”

Practically, heavy industrial sites are distinct from other types of potential heritage sites and may pose unique challenges as a result. A building or ensemble of buildings is the most common type of heritage site. While industrial sites often include buildings, frequently of the shed style, the most aesthetically striking and historically important elements of these sites are generally their structures – the blast furnaces of iron-making complexes, the mines and conveyor belt systems of coalmines, and the turbines of power plants, for example. It is simpler to convert a building from one use to another than to repurpose these structures. Some industrial structures may be inhabitable (e.g., silos), while others (e.g., turbines) are not – these structures are, essentially, large objects in need of a function. In addition, industrial structures – often very large machines, really – are usually made of metal, which is not as durable as marble, stone, or brick. The cost of preserving these structures may be comparatively higher. Moreover, the public may cease to understand the function of industrial ensembles decades following their shutdown, after those who worked in the mills and factories have died. Furthermore and finally, a tourism-based approach, which is a common approach to preservation, is often unreasonable, especially immediately following the closure of an industrial complex. Neil Cossons explains, “To advocate preservation of a redundant industrial site...does not always look attractive to a community afflicted by economic collapse or high unemployment. Even when a site includes buildings, the identification of a future use “in the context of economic fragility...” may be difficult, Cossons remarks.

2.2 Examples of Approaches to Industrial Heritage: The Project Scale

These projects exemplify extant approaches to preservation, conservation, and restoration, and reconstruction. They demonstrate how industrial heritage projects mediate between Riegel’s values, including age value, historical value, and continued use value, and how they navigate Oevermann and Meig’s framework (as adapted by the author), including the competing priorities of heritage conservation, urban development, architectural production, and environmental conservation.

Voelklingen Ironworks in Saarland, Germany, is a world heritage site. The ironworks have been preserved. The site includes 12 garden spaces, collectively entitled “The Paradise,” that circumscribe and pervade the ironworks. The post-industrial transformation of the ironworks is evident in these gardens. The ironwork’s Blower Shed was converted into a museum and art exhibition space. There is also a science center on the site. The ironworks are

38 Ibid
39 Douet, 37 (essayist Louis Bergeron, “The Heritage of Industrial Society”)
40 Douet, 8 (essayist Neil Cossons, “Why Preserve the Industrial Heritage?”)
41 Ibid
illuminated at night. The ironworks possess age and historical value, while the Blower Shed possesses continued use value. Architectural production occurs through the illumination of the ironworks and the growing of the gardens. Through the gardens, environmental remediation also occurs. Urban development is achieved through tourism.42

The Big Pit National Coal Museum in Blaenavon, Wales, is a former colliery that has been converted into a museum about the mining industry and Blaenavon’s history as a mining community. Visitors descend 90 meters into the pit. The adjacent Blaenavon Ironworks includes models that demonstrate how the site once functioned. Heritage preservation and development through tourism are the aims of the National Coal Museum.43

Gas Works Park in Seattle, Washington, is a former coal gasification works on Lake Union that has been converted into a public park. The gas works have been preserved and are the centerpiece of the park. This project is at the intersection of preservation, environmental conservation, and architectural production – the preserved gas works are given a new form of expression as a sculptural object in a park constructed on remediated land.44

Westergasfabriek is a former coal gasification works on a 14.5-hectare site in Amsterdam, the Netherlands. It has been converted into a cultural center and public park. The Zuiveringsgebouw was converted into an expansive performance space. Within the park, the foundations of former gasholders were converted into ponds. Environmental remediation has been the central aim of the project and Westergasfabriek has produced new architectural expressions by rehabilitating elements of the gas plants (e.g., the gasholders) for use in the site’s landscape and environmental design. Restaurants, shops, galleries, music venues, and a diverse range of organizations occupy the historic buildings on the site. Through the establishment of cultural venues and by attracting creative firms and organizations, Westergasfabriek contributes to urban development.45,46

42 Voelklingen Ironworks. No Date. Web. 4 Mar 15. [www.voelklinger-huette.org]
43 Blaenavon, Big Pit National Coal Museum, European Route of Industrial Heritage. No Date. Web. 4 Mar 15. [erih.net]
44 “Gas Works Park and Lake Union.” No Date. Web. 4 Mar 15. [www.seattle.gov]
45 Westergasfabriek. No Date. Web. 4 Mar 15. [www.westergasfabriek.nl/en/]
46 Project Westergasfabriek. No Date. Web. 4 Mar 15. [www.project-westergasfabriek.nl/english]
The oil-fired Bankside Power Plant in London was converted into the Tate Modern, one of the most renowned contemporary art museums in the world. Turbine Hall, aptly named for the electricity-generating turbines it once housed, is an expansive space where large sculptural objects and installation art are displayed. Through adaptive reuse, the Tate Modern conserved the Bankside Power Plant. This conversion was an act of architectural production because it altered the plant’s form of expression. As a prominent cultural venue, the Tate Modern contributes to London’s economic and cultural development.

The coal-fired Battersea Power Station, also in London, is the anchor for a live-work-play development that includes 3,700 homes, offices, shops and restaurants. This development project adapts the Battersea Power Station and, in doing so, creates a new architectural expression – thus placing it at the intersection of development, preservation, and architectural production. Battersea Power Station’s four chimneys are iconic elements of the London skyline. The developer is dismantling and rebuilding the chimneys, which were in poor condition – the

48 Blaenavon, Big Pit National Coal Museum, European Route of Industrial Heritage. No Date. Web. 4 Mar 15. [erih.net]
49 “Gas Works Park and Lake Union.” No Date. Web. 4 Mar 15. [www.seattle.gov]
rebuilt chimneys “will be water-tight and undamaged, unlike their predecessors, which bear the scars of discharging 500 tonnes of CO2 per hour over the course of half a century.” This project subordinates preservation to development. The reconstruction of the chimneys is an example of the prioritization of continued use value over age value.51

Other examples of approaches to industrial heritage at the project scale include Duisburg-Nord Landscape Park and Zollverein Park, redevelopment projects within the Emscher Landscape Park system, in Duisburg and Essen, Germany, respectively, Belval: City of Science, a redevelopment project under development in Belval, Luxemburg, and Parque Fundidora, a redevelopment project in Monterrey, Mexico. These projects will be examined in depth and are, therefore, not included in this cursory introduction to industrial heritage conservation.

51 “Battersea Power Station.” No Date. Web. 4 Mar 15. [www.batterseapowerstation.co.uk]
54 Pascual, Alberto. Battersea Power Station.” Creative Commons License.
55 Battersea Power Station. Development Official Website. No Date. Web. 4 Mar 15. [www.batterseapowerstation.co.uk]
2.3. Examples of Approaches to Industrial Heritage: The City Scale

The subsequent vignettes on Lowell, Massachusetts and Liverpool, England describe how industrial heritage can be an important element of an urban regeneration strategy. The vignette on Liverpool also elucidates problems that may arise when development and preservation aims clash.

Of the four case studies examined by the Community Revitalization Project under the direction of Ross Gittell, Lowell “experienced the most dramatic turnaround during the period of observation [1985-1989].” Gittell contends, “…the use of the history of the city as an economic development asset” was decisive. America’s early textile industry was based in Lowell’s mills. The city applied to be recognized by Congress as a national park. Importantly, the process of establishing an urban, industrial national park reframed the city’s historical narrative and positively changed citizens’ collective identity. Gittell explains, “The continual feeling of defeat brought on by a half century of economic decline created a mindset that had become self-perpetuating.”

This reframing was an intangible contribution of the city’s history to its revitalization. Critically, the city’s definition of Lowell’s industrial heritage included its natural features, housing, and social and cultural institution. In proposing the establishment of a national historical park, the city aimed to preserve and tell the story of all of the elements associated with the city’s industrial past.

Completing the application to the National Park Service and Congress also helped Lowell craft an economic development plan. Gittell explains, “A key benefit of documenting the past was to increase awareness of the way industry was first attracted to Lowell and what it would take in the future to attract new industry to the city, including an available labor force, sound infrastructure, and local leaders promoting the city.” Moreover, the inclusion of the park in the city’s economic development plan helped Lowell to secure state and federal funding. Perhaps most importantly, the bill for the creation of a national park at Lowell “authorized a total of $40 million for the Lowell Historic Park and a Lowell Historical Preservation District.” This park and preservation district provide a framework within which 1) tax incentives are available for building reuse and 2) zoning regulations set a design standard for new construction and renovation.

Liverpool is a historic port city in England. In 1983, the British government, in cooperation with the Merseyside Development Corporation, undertook the restoration and repurposing of the iconic Albert Dock. Completed in 2003, Albert Dock became Liverpool’s

57 Ibid, 67
58 Ibid, 71
59 Ibid, 72
60 Ibid, 74
61 Ibid
62 Oevermann and Mieg, 33
“showpiece.” In the final decade of the 20th century, the injection of European Union capital into Liverpool spurred investment in the city, and “… an unparalleled array of heritage-led initiatives and partnerships between the public and private sectors” accompanied this investment. In 2002, English Heritage in concert with a range of public, non-profit, and private entities initiated the Historic Environment of Liverpool Project (HELP) through which the Rope Walks, “a largely Georgian mercantile quarter of merchants’ houses and warehouses… [was transformed into] one of the most vibrant commercial and residential areas of the city center,” and St. George’s Hall, a “neo-Grecian masterpiece,” was restored. In 2004, UNESCO designated a 136-acre site within the city a World Heritage Site. Private development followed. Controversial, new ‘iconic’ construction and high-rise waterfront developments, including Liverpool Waters, challenged the integrity and authenticity of the UNESCO World Heritage Site. According to researchers Oevermann and Meig, heritage and development objectives are in competition in Liverpool. Oevermann and Meig contend, “Liverpool remains in search of an identity to replace that which it has lost.” They further assert, “At present the dominant motivation in Liverpool is political and reinforced by a simplistic approach to economic growth: an approach that favors large-scale projects funded by outside investors-speculators regardless of their impact on the heritage of the city and its people.”

2.4. Industrial Heritage as Civic and Economic Resource

Industrial heritage, as a sub-set of cultural heritage, is a civic resource. Karima Kourtit explains, “Cultural heritage…is a human-made capital asset that is in many cases characterized by many externalities, as it offers often unpaid services (e.g., quiet atmosphere, memory of the past, unique place identity, historical-cultural awareness, etc.) to visitors or the community at large.” A historic industrial ensemble may be iconic. In may include capacious buildings. Or, it may be devoid of use and inexpensive to inhabit. Economic revitalization initiatives, including city and regional branding strategies, may capitalize on these attributes. Alternatively, these attributes may attract citizens’ groups to initiate economic renewal as an organic process. Patterns emerge from a review of the trajectories of transformed historic industrial sites and ensembles.

The government, independently or in cooperation with private and/or citizen’s groups, invests in the preservation, conservation, restoration, or reconstruction of an industrial heritage site or ensemble. This investment is sufficiently large that it demonstrates a long-term public commitment to the surrounding city or region. The project and the government’s investment attract private capital. This generates ‘buzz.’ Tourism follows or increases. This process may be thought of as economic regeneration through the cultivation of an ‘experience economy.’

63 Oevermann and Mieg, 33
64 Ibid
65 Oevermann and Mieg, 33-34
66 Ibid, 34-39
67 Oevermann and Mieg, 43
68 Ibid, 42
Examples of this process include the International Building Exhibition Emscher Landscape Park in the Ruhr Valley region of Germany, the Lowell National Historical Park in Lowell, Massachusetts, the restoration of Albert Dock and the Historic Environment of Liverpool Project in Liverpool, England.

Gert-Jan Hospers questions whether the restoration of industrial sites for tourism is an effective regional economic development strategy in Europe. This approach gained popularity in Europe following the success of the Emscher Landscape Park in Germany. Hospers contends, “European policymakers are increasingly interested in the development of industrial [tourism].”

Hospers notes that European Commission funds financed the ‘European Route of Industrial Heritage,’ for example. “The economic development strategy is one is one of the ways in which industrial communities can go along with the rising demand among households for (leisure and recreation) services...” Hosper notes. The crux of the problem with this economic development approach is that it has a “relatively low impact on regional employment.”

The number of jobs generated in local communities will be very limited. Hosper advocates instead for an approach that uses industrial heritage to “complement and reinforce other regeneration initiatives, such as local innovation policy and business support.”

Alternatively, private capital or a public-private partnership can finance the conversion of an industrial heritage site into a science and technology research and development center, an educational campus, or into residences, most frequently loft-style condominiums and apartments. This process may be thought of as economic regeneration through the cultivation of an ‘innovation economy.’ Examples of this process include Belval: City of Science under development in Belval, Luxembourg, and the AEG Oberspree Cable Works site in Berlin, Germany, which was converted into the Berlin University of Applied Sciences, as well the Lowell Historic Park and a Lowell Historical Preservation District.

3. Contemporary Debates in the Historic Preservation Discipline

3.1. Historical ‘Significance’ Debated: To Protect Objects or Cultivate Public Memory?

‘Significance’ may be defined as the summation of the reasons for preservation, including “why a structure or place is meaningful, and what aspects require most urgent protection.” Statements of significance guide “policy, planning, and design decisions,” and are, therefore, highly influential. Traditionally and too frequently, preservationists’ interpretation of the significance of a structure or a place objectifies the structure or place and is overly scientific,

71 Hospers, 401
72 Ibid
73 Ibid
74 Ibid, 402
75 Mason, 64
76 Ibid
rather than humanistic. For example, in the process of manufacturing steel, steel manufacturers once used ingot molds. These molds may be preserved and displayed, but if their display is not accompanied by an explanation, their meaning is lost – they are large, circular objects, nothing more. In contrast, an explanation that included steelworkers’ stories of pouring molten steel into the molds would be captivating and would contribute to the cultivation of communal memory.

Louis Bergeron argues for an understanding and view of industrial heritage that situates sites and ensembles in the landscape or urban fabric. Imagination, invention, and creativity are needed to “[reintegrate industrial ensembles] into daily life, employment and other cultural or public service needs…”77 Paz Benito Del Pozo and Pablo Alonso Gonzalez critique Spanish academic and institutional elites’ object-oriented approach to industrial heritage preservation.78 In Spain, academics and bureaucrats viewed “industrial remains as monuments—single, isolated elements of note—rather than as elements that could be incorporated into policies for regional and urban development.”79 Pozo and Gonzalez provide this additional critical insight, “Heritage can only function as a self-fulfilling prophecy in economic terms when local communities are involved and feel connected to projects that aim to shift from a productive economy to a tourism-based one.”80 This insight is applicable to the shift from a productive economy to a service- or retail-based economy, as well.

Writing more than a decade ago and commenting on the trajectory of the discipline, Randall Mason remarks, “more critical and progressive uses of the concept [of significance] have begun to appear.”81 The emergence of a broader understanding of significance is based in an alternative view of preservation, that is, that the purpose of preservation is the cultivation of memory.82 This understanding “seeks to be more extensive, detailed, and complicated; it suggests that there may be multiple valid arguments about the meaning of a place,” argues Mason.83 This necessitates a participatory process. In addition to architects, preservationists, and governing entities, the public and stakeholders – in the case of industrial heritage sites, former workers and the former management – must participate in defining significance.84 This process is a means to an end; it is a search for historical truth. The end, ideally, is an objective history of the site.

Howard Green advocates for a process similar to that described by Mason. The significance of a structure or a site could be better understood if preservationists adopted historians’ approach to investigation, Green contends. History is made through historians’

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77 Mason 2003
78 Douet, 37 (essayist Louis Bergeron, “The Heritage of Industrial Society”)
80 Ibid, 451
81 Ibid, 447
82 Ibid, 451
83 Ibid, 65
84 Ibid, 66
85 Ibid
methodological approach and interpretative frames of reference. Historians consult diverse sources, infer, deduce, interpret and, finally, narrate multiple versions of historical fact. Green argues, “Meaning is socially made. Historical significance is about meaning in the public realm.” When articulating historical significance, Green cautions, “We must acknowledge that any particular recounting of the past risks violating someone else’s way of thinking about it. This calls for reaching more deeply into the communities where we work.”

Dolores Hayden more thoroughly develops the concept of preservation as a medium through which to cultivate communal memory and narrate public history. Hayden quotes philosopher Edward S. Casey, writing, “[Place memory] is the stabilizing persistence of a place as a container of experiences that contributes so powerfully to its intrinsic memorability.” Hayden advocates for an interdisciplinary approach to preservation that incorporates public history, architectural preservation, environmental protection and landscape preservation, public art, and public processes.

When deciding what to preserve or conserve and how to interpret and exhibit heritage, including industrial heritage, it is imperative that preservationists and developers take into account the facets of significance. Preservationists and developers’ objective should not be merely the protection of a historically, technologically, or aesthetically important structure, but the cultivation of the public’s memory of the place that the structure embodies. Bergeron, Pozo, and González are correct: industrial heritage must be brought into the public’s day-to-day life. Green’s contention that preservationists and developers should reach “more deeply” into the places that they are trying to adapt should be heeded. As Mason, Green, and Hayden assert, heritage should cultivate public memory and preservationists and developers should include the public in their design process (the process of preserving, interpreting, and exhibiting heritage). This public process should seek historical truth and should strive for an objective history of the site.

3.2. Authenticity

In contemporary debates about preservation, conservation, restoration, and reconstruction, the concept of “authenticity” often assumes a central place. But what does it mean to be authentic? And why is that important? Is something that is preserved, conserved, restored, or reconstructed ever truly authentic?

Thomas Leary and Elizabeth Sholes survey examples of industrial heritage sites and develop a definition of authenticity and recommendations for delivering authentic industrial

87 Ibid
88 Ibid
89 Ibid
91 Ibid
heritage sites. According to Leary and Sholes, authenticity refers to, on the one hand, visitors’ experience of the industrial heritage site and, on the other, the extent to which the exhibition and interpretation of the industrial ensemble “reflects current knowledge of the past.”

This definition is problematic. It is reductive to argue that an industrial site is authentic if it feels authentic to visitors. In addition, Leary and Sholes’ inclusion of “current knowledge of the past” implies a possible disconnect between the knowledge of contemporary preservers and the knowledge of historical communities that participated in the life of the site before it was a locus of public memory. This is problematic because an exhibit that reflects incomplete or incorrect knowledge of the past is inherently inauthentic. A site of historical memory should not simply reflect “current” or the “latest” knowledge; it should give voice to multifarious historical perspectives and interpret them as objectively as possible in terms understandable to the contemporary viewer.

Leary and Sholes do offer an insight that is instructive, however. Without function, industrial sites – mills, factories, power plants, and mines – are inherently inauthentic. William Morris opposed restoration because he argued that it is impossible to recapture the societal mores and norms of an earlier period. Similarly, it is impossible to recapture the scene of an operating iron- and steel-making complex – the extreme heat, the black soot, and the steelworkers are all gone. In the absence of function, Leary and Sholes contend that it is distinctiveness of place and voice that impart authenticity. This distinctiveness comes from “recovering industrial experiences,” which “calls for immersion in the details of everyday life. The physical features of textile mills, for example, differ from those of steel plants in scale, sounds, smells, and other sensory details.”

Phillip Bess, a professor of architecture at Notre Dame, argues that authenticity “[should be] outside of the discourse of traditional architecture and urbanism,” and that instead, craftsmanship, including unity, harmony, quality of construction, and clarity, should be appraised. Leary and Sholes’ call for distinctiveness of place and voice and Bess’ call for unity, harmony, quality of construction, and clarity, if answered by preservers of industrial heritage, will capture the true spirit and image of the site. The spirit and image of the site contribute to the site’s significance to contemporary society. It is the place of the site in contemporary society that endows it with authenticity. The place of the site in historical society cannot be recaptured or recreated – sites can only be authentic in their own place and time, in their own context. The 21st-century milieu must influence preservationists and developers’ approaches to the conservation, interpretation, and exhibition of industrial heritage.

A vignette is instructive. The Skandinavisk Eternit Company manufactured a popular building material, Eternit, a mixture of concrete and asbestos fibers, which became the most

93 Leary and Sholes, 51
94 Ibid, 52
common building material construction companies used in Sweden in the 20th century. The company ceased operations following a prohibition on the sale of Eternit in 1976. Anders Hogberg cites evidence indicating that the company had been aware of the danger of asbestos exposure. In 2003, a developer began the process of converting the site into a luxury residential neighborhood. To determine which parts of the former factory complex to preserve, the developer consulted experts “from one of the local regional museums.” On their work, Hogberg comments, “Their report focused on objects…” The experts recommended the preservation of select buildings constructed prior to 1960 for preservation as monuments to industrialization and industrialization’s impact on the Lomma Eternit’s growth. A silo, built in 1961, was iconic within the local community, but was not saved due to its comparatively recent date of construction. Instead of recollecting the local collective memory of the factory, including the narrative of the workers’ endangerment, through the factory’s former buildings, the site plan proposed a memorial park, “a beautiful place designed for contemplation…” Distinctiveness of place and voice were lost with the destruction of the iconic silo. Thus was Lomma Eternit’s narrative lost. The aim of preservationists and developers should be the preservation of a place’s story, not the tokenistic preservation of objects based on their supposed architectural and historic merit.

The integration of preserved, conserved, restored, or reconstructed structures and buildings with new construction should mediate a historical narrative for visitors. This narrative should give voice to the perspectives of the people for whom the site was historically significant while interpreting those voices and translating them into exhibitions. Theses exhibition should have a special concern for the connection between the site and the modern community surrounding it. Authenticity is the contemporary significance of the site to society, to its community. Authentic sites are of their time and place.

3.3. Approaches to Interpretation and Exhibition

Leary and Sholes remark on the unique challenge that industrial heritage sites present with regard to visitor attraction. They explain, “Industrial sites and museums rest on the fundamental assumption that the vestiges of this epoch are, in and of themselves, major potential attractions. However, as these relics [become] more remote from the everyday lives of many who will view them, the dynamic museum must provide a powerful interpretive package for the eager but untutored visitor.”

Leary and Sholes discuss some of the media through which industrial heritage may be
exhibited and interpreted:

1. The standard gallery and the conventional display;
2. A simulated environment or the display of active machinery in an otherwise conventional gallery;
3. As a collection of artifacts that demonstrate the evolution of an industry;
4. As an ensemble that “preserves the scale and texture of the industry” to preserve the local industrial narrative (e.g., Sloss Furnaces National Historic Landmark);
5. The open-air museum/the heritage area or corridor;
6. A regional network of museums, each dedicated to a different industry.104

In addition, industrial heritage may be exhibited through virtual reality (e.g., through online, “360 degree” tours of sites.

The Kelham Island Museum in Sheffield, England, creates a simulated environment, as termed by Leary and Sholes. The museum narrates the history of Sheffield’s steel manufacturing and stainless steel tool making industries. A rehabilitated power plant hosts the museum. Craftsmen, including blacksmiths, demonstrate their skills at the museum during the Forge Festival and on Science Sundays, part of the Sheffield Festival of Science and Engineering.105 In addition, at the museum, “Children can experience the steel industry at close quarters in the Melting Shop where they can get themselves processed like steel, melted, rolled and hammered into shape by genuine machines.”106

The National Waterfront Museum in Swansea, Wales, employs extensive interactive media to engage its visitors. This is another take on the “a simulated environment” medium. In a series of historic dockside warehouses and a modern glass and steel building, there are “multi-media [presentations] [that demonstrate] how fireproof bricks, iron and steel were manufactured.”107 There are also “computer screens with interactive film sequences.”108 The European Route of Industrial Heritage advertises the museum’s interactive media, remarking, “Here you can be reduced to sudden poverty, exploited, have your health or even your life put at risk as a collier, and shortly afterwards bask in the fairy-tale wealth of an industrial tycoon.”109 Similarly at Brede Works, an industrial museum devoted to the Danish textile industry, near Copenhagen, Denmark, visitors can use “[a ticket] to activate individual characters who tell personal stories about work and life at the factory.”110

In Johnstown, Pennsylvania, the Iron and Steel Gallery at the Frank and Sylvia Pasquerilla Heritage and Discovery Center is a theater “equipped with infrared heaters and

104   Leary and Sholes, 53-58
105  “Sheffield Industrial Museums Trust.” No Date. Web. 4 Mar 15. [www.simt.co.uk]
106  “Kelham Island Museum.” European Route of Industrial Heritage. No Date. Web. 4 Mar 15. [erih.net]
108  Ibid
low-resolution speakers so that visitors will feel the heat and rumble of a working steel mill” as they view “The Mystery of Steel,” a film documenting Johnstown’s role in the steel industry that incorporates footage shot in Bethlehem Steel’s mills prior to their shutdown.111

The Kelham Island Museum, the National Waterfront Museum, the Brede Works, and the Frank and Sylvia Pasquerilla Heritage and Discovery Center all employ interactive exhibits. In “Designing for Audience Participation within Museums,” Sara Radice defines interaction in this context: “interaction implies reciprocity: the user performs an action and something happens in reply to the visitor’s action—mechanically, digitally or kinesthetically.”112 Curators may (and should) incorporate interactive exhibits into any of the types of museums Leary and Sholes identified. Development can and should curate and interpret industrial heritage, especially in the context of:

1. An ensemble that “preserves the scale and texture of the industry” to preserve the local industrial narrative;
2. The open-air museum/the heritage area or corridor; and
3. A regional network of museums, each dedicated to a different industry.113

4. European and American Approaches to Preservation: Institutional Differences

In the United States, the National Park Service within the Department of the Interior recognizes historic landmarks and sites, both manmade and natural. Since the passage of the National Historic Preservation Act of 1966, it has also maintained the National Register of Historic Places, the origins of which were in the Historic American Building Survey of 1933. The National Park Service also provides limited financial and technical support for National Heritage Areas. These areas, or in some instances, corridors, are designated through Congressional legislation, but managed by non-profit corporations and/or local or state entities, as opposed to the National Park Service. Through the application of regulatory controls, local governing entities may designate historic districts.

The institutional framework in the United States extends from the local level to the federal level, but participates in international bodies only without submitting itself to their jurisdiction — this is the most significant institutional difference between the U.S. and European states with regard to preservation. In Europe, there is “is a common, cross-cultural, and international commitment to maintaining standards and policies established by The International Committee for the Conservation of Industrial Heritage (TICCIH) and UNESCO.”114 Industrial heritage sites in Europe, including, for example, the Zollverein Coal Mine Industrial Complex in

113 Leary and Sholes, 53-58
114 Ibid
Essen, Germany, have been accorded World Heritage Status, a UNESCO designation.115

Europeans’ commitment to rehabilitation is another departure from the American framework. Leary and Sholes assert that there is a greater willingness in Europe to use industrial heritage as the basis for economic development schemes.116 In addition, Leary and Sholes contend that while “the resolution to undertake monumental salvage and rehabilitation projects” exists in Europe, it is absent in the United States.”117

In addition, in both the United States and Europe, design competitions are a mechanism through which governments as well as non-profit and private entities commission designs for projects and developments. In Europe, design competitions are often held to commission designs for the redevelopment of industrial heritage sites. Design competitions generated designs for the Emscher Landscape Park (North Rhine-Westphalia, Germany), Voelklingen Ironworks (Saarland, Germany), and Westergasfabriek (Amsterdam, the Netherlands). In the United States, design competitions to this end are held with less frequency, however.

Conclusion

The milieu that produced the discipline of historic preservation continues to influence contemporary preservationists’ ethics. Early preservation essayists contested the ethical implications of conservation, restoration, and reconstruction. Today, the discipline confers legitimacy upon interventions ranging from preservation and conservation to restoration and reconstruction. The temporal, historical, social, cultural, and economic context of a project should dictate the appropriate intervention. Interveners – preservationists as well as developers – should be mindful of William Morris’s dictum to curate stylistic and material contrasts as evidence of human activity in different centuries. This creates an opportunity to extend the narrative of a historic structure regardless of intervention preservationists and developers select. The ‘values-centered’ descriptive framework proposed by researchers Heike Oevermann and Harald Meig is a useful structuring device for the analysis of case studies in preservation and development. It elucidates significant policy and design decisions, as well as trade-offs. In subsequent sections, this paper will draw on this framework.

Western societal attitudes toward industrial heritage, including the public’s perception of its value to posterity, evolved between the close of the 20th century and the opening of the 21st century. Lowell, Massachusetts was the first instance in the United States of an industrial national park, a national historical park that narrates the life of a historic working class. The preservation and conservation of heavy industrial sites can be uniquely challenging. Blast furnaces, hot blast stoves, gas cleaning equipment, rolling mills, conveyor belt systems, and turbines, for example, must be preserved or conserved and curated. This is more difficult than simply adapting a building to a new use. Today, there are numerous precedents for industrial heritage conservation, including the conservation of heavy industrial sites. These examples

116 Leary and Sholes, 57
117 Leary and Sholes, 57
demonstrate that industrial heritage is a civic and an economic resource. This paper will examine four of these cases, Duisburg-Nord Landscape Park and Zollverein Park in Duisburg and Essen, Germany, respectively, Belval: City of Science in Belval, Luxemburg, and Parque Fundidora in Monterrey, Mexico, in the subsequent chapter.

Preservationists and developers should strive to cultivate public memory through preservation, conservation, restoration, and reconstruction. To do this, preservationists and developers must tell the story of industrial heritage and bring the site into the public’s day-to-day life. Authenticity is the contemporary significance of the site to society, to its community. Preservationists and developers should include the public in their design process (their process of preserving, interpreting, and exhibiting heritage), and this process should seek historical truth and end with an objective history of the site. In addition, this process should strive to create a design of the current milieu because authentic sites are of their time and place. Interactive exhibits are a medium through which to create a 21st-century industrial museum. Finally, development can and should curate and interpret industrial heritage. Heritage sites that conserve industrial ensembles, open-air museums or heritage areas, and regional networks of industrial museums are compatible with development and can confer distinction on compatible, interpretive developments.

The framework below summarizes the definitions of the topics discussed in this literature review. This paper will use these definitions to describe the case studies in the subsequent section.

<table>
<thead>
<tr>
<th>Approach</th>
<th>Economic Model</th>
<th>Significance</th>
<th>Public Memory</th>
<th>Authenticity</th>
<th>Interpretive Methods</th>
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<tr>
<td>Preservation; Conservation; Restoration; Reconstruction</td>
<td>Program (e.g., Heritage Tourism, Recreation, Arts and Culture, Education)</td>
<td>Weight in Design and Policy Decisions Given to Public Memory, Scientific, Architectural, or Cultural Significance, and so on</td>
<td>How the Design Tells the Story of the Site and Brings Contemporary Society into Contact with the Historic Ensemble</td>
<td>How the Design Captures, Relates to, and Reinterprets a Historic Narrative or Element; Contemporary Significance to the Community</td>
<td>Types of Media</td>
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1. Case Study Selection

The cases that follow exemplify European and Mexican best practices in the preservation, conservation, and redevelopment of historic blast furnace plants, ironworks, steelworks, and collieries. Of the four cases, three involve the conservation of historic blast furnace plants, ironworks, and steelworks, while one concerns a historic coalmine, similar in scale and form to the other cases and to the Carrie Blast Furnace Plant. Blast furnace plants, ironworks, steelworks, and collieries are distinct from other industrial sites predominately or exclusively composed of buildings, including automotive factories, textile mills, and power-generation plants, for example. These heavy industrial sites possess massive machines operated in the open air, including blast furnaces, dust collectors, and head frames. This difference necessitates a different preservation or conservation strategy. Three of the cases are European examples, German and Luxembourgish, and one is Mexican. Germany’s comparatively early experience of deindustrialization and its tradition of heritage conservation contributed to its position at the forefront of industrial heritage conservation. The Luxembourgish government learned from the

German exercise in industrial heritage conservation. The Luxembourgish case represents an adaptation of the German model. The Mexican case is germane in two respects, first, it shows that the problem of redundant, but historic industrial sites is not limited to Europe and the United States, and, second, the Mexican case repurposes the iron and steel works’ blast furnaces for use as a museum. This is proposed, but not completed in the Luxembourgish case. The purpose of this in-depth study is firstly, to understand best practices in the field of industrial heritage conservation and, secondly and most importantly, to determine how European and Mexican best practices could inform a design for the Carrie Furnaces site and for similar sites in Pennsylvania.

2. Emscher Landscape Park, the Ruhr Valley, Germany

Project Facts

Bounded by the Ruhr and Lippe rivers and encompassing the Emscher River from Bergkamen to Duisburg, Emscher Landscape Park spans 457 square kilometers and is a collaborative venture between 20 municipalities, the government districts of Münster, Dusseldorf, and Arnsberg, and the federal state of North-Rhine Westphalia. It is composed of more than 200 completed projects, ranging from the Duisburg Nord Landscape Park to the Rheinelbe Science Park to the Zollverein Shaft XII Coal Mine and Coking Plant. A sustained, concerted governmental effort led to the conception and creation of this regional park. The state of North-Rhine Westphalia held the International Building Exhibition (IBA) Emscher Park from 1989 to 1999. This IBA was of the tradition of German Building Exhibitions – it was a framework within which architectural, urban, and landscape design competitions were held and it was a development policy instrument. To administer the IBA, the state of North-Rhine Westphalia founded a subsidiary, the IBA Emscher Park, GmbH. IBA Emscher Park oversaw the completion of more than 100 projects between 1989 and 1999. In this period, “approximately 2.5 billion euros were invested” in IBA projects, 40 percent of this funding came from private investors and 60 percent came from governmental sources. Although the IBA ended in 1999, the period specified for the park’s first phase of construction was one generation, or 30 years; the 2010 master plan now guides the Emscher Landscape Park’s evolution.

5 Uttke, 8
6 Ibid, 9
7 GmbH is the German abbreviation for a limited liability company.
8 Uttke, 9
9 Ibid
10 Ibid, 16
Design Concept

The IBA Emscher Park’s interpretation of the spatial organization of the Ruhr region strongly influenced the organization’s approach. There was a pattern of decentralized agglomeration, and the spaces in between included industrial sites and open spaces. These were “crossed and carved up by motorways, dual carriageways, railway lines, power lines, and drainage canals.”12 The IBA Emscher Park interpreted this as a “cohesive region.”13 This interpretation led to an approach that made this interpretation manifest: through the Emscher Landscape Park, decentralized cities and towns, industrial heritage sites, and open spaces would be connected, creating a spatially coherent region, its parts unified by the idea of composing a whole in the form of a regional landscape park.

The IBA Emscher Park extracted six guiding principles from a robust public response to an appeal for proposals:

1. “The Emscher Landscape Park;”

11 Ghost V. “The Emscher Canal.” Flickr. No Date. Web. 6 Apr 15. Creative Commons.
12 Uttke, 16
13 Ibid, 8
2. “The ecological reconstruction of the Emscher river system;”
3. The creation of places of employment in the park;
4. “New residential and urban development;”
5. “Conservation of industrial monuments and industrial culture;”
6. “New facilities for social, cultural, and sporting activities.”

Of these principles, the Emscher Landscape Park, and the remediation of the Emscher river system and the conservation of industrial heritage and culture within the park, became the basis of the IBA Emscher Park’s design concept. The other three principles – working, living, and leisure in the park – strongly influenced the IBA Emscher Park’s approach to environmental remediation, including park-building, and industrial heritage conservation. Environmental remediation was central to the concept because the name Emscher had been “synonymous with the abuse of a river landscape and [with] the ecological backwardness of an entire industrial region [for 100 years].”

The aesthetic of the region’s industrial heritage and the industrial landscape strongly influenced the IBA Emscher Park’s approach to heritage and landscape conservation. Through the conservation and artistic reinterpretation of the region’s industrial heritage and landscape, the IBA Emscher Park aimed to narrate the region’s economic and natural history. The protection and restrained cultivation of industrial nature was one important, artistic reinterpretation. Industrial nature includes, for example, vegetation that grows on industrial wastelands as well as “[plants] that owe their presence to the handling of industrial goods from all over the world...” This nature is wild and it creeps into and onto industrial structures, creating the visual effect of the mighty being tamed. In addition, the evolution of the natural landscape over time, including the spontaneous reclamation of industrial heritage, narrates industrial sites’ post-industrial transformations. The illumination of industrial heritage (at Duisburg Nord Landscape Park, for example) was another artistic reinterpretation of conserved industrial structures. “It was the function of artists’ interventions to create “landmarks” by producing art that – entirely within the tradition of the history of landscape awareness – allowed the observer exceptional insights into a region [undergoing] change.”

This design concept led to the implementation of five types of open spaces within the Emscher Landscape Park:

1. “Industrial landscape parks;”
2. “Municipal parks in industrial landscapes;”
3. “Pre-industrial cultivated landscape parks;”
4. “Wild industrial forest;”
5. “Slag heaps and waste dumps.”

14 Uttke, 9
15 Uttke, 8
16 Under the Open Sky, 31
17 Ibid, 33
18 Uttke, 18
These purpose and aesthetic of these open spaces varies with their attributes (e.g., the IBA Emscher Park treated slag heaps and waste dumps differently than industrial landscape parks).

This design concept was also a development strategy; “ecological and cultural renewal [was] regarded as an important precondition for future economic development.”19 The development of the Emscher Landscape Park heralded the economic, social, and aesthetic transformation of the Ruhr from a 19th-century industrial region to a 21st-century cultural, recreational, and innovative region.

Critique

The IBA Emscher Park conserved industrial heritage. In the IBA Emscher Park’s design, industrial objects (e.g., blast furnaces) were made iconic both through their interaction with nature and their illumination by lighting designs; this conserved their historical and architectural significance. In adapting and reusing the Ruhr’s industrial heritage, the IBA Emscher Park made this heritage contemporarily significant, giving industrial buildings and structures new purposes and meanings for the 21st-century. The IBA Emscher Park made the region’s industrial heritage perpetually a part of life within the region.

On the authenticity of the Emscher Landscape Park, Henri Bava writes,

“[Suppose] visitors to the Duisburg-Nord Landscape Park…associate it with English landscape parks where pieces of lost or faraway [civilizations] are nostalgically staged in bucolic idylls – they would be under a misconception. What has emerged out of the ruins here is [genuine] and thus the exact opposite of a contemplative bourgeois ornamental landscape.”20

The Emscher Landscape Park’s industrial heritage and industrial landscape are unique to the Ruhr region. The interactions between nature and industrial heritage, art and industrial heritage, and nature and art, including the spontaneous evolution of the natural landscape, are, likewise, particular to this place and time. This imparts authenticity.

In analyzing the Emscher Landscape Park, it is useful to return to Oevermann and Mieg’s discourses (heritage preservation, urban development, and architectural production) and the author’s addition to these (environmental conservation). The IBA Emscher Park’s approach to the Ruhr region is at the intersection of these discourses. The IBA’s design concept demonstrates how one aim (e.g., development or architectural production) can be achieved in the context of another (e.g. environmental remediation and heritage conservation). The design concept for the IBA Emscher Park was bold and imaginative, and its realization required an extraordinary governmental commitment.

Duisburg-Nord Landscape Park and Zollverein Park, cases that will follow and projects with the Emscher Landscape Park system, will explore the IBA Emscher Park’s approach to

19 Uttke, 10
20 Under the Open Sky, 37
Duisburg-Nord Landscape Park

Design Concept and Program: A Discussion and Critique

Practical necessity inspired the unconventional and transformative design of the Duisburg-Nord Landscape Park. The remediation of the ironworks’ polluted landscape and the restoration of the Old Emscher, a narrow waterway that functioned as an open sewage canal, were imperative. The ironworks, of local and regional historical significance, were conserved. An aesthetic interaction between the natural and the man-made emerged as the design’s nexus.

The design’s deference to nature allows the re-naturalization of the landscape to proceed organically and perpetually. The conserved ironworks, “[resounding] with power, [even silent],” are a monumental trellis. Creeping vegetation contributes to the sublimity of the

21 Uttke, 32
23 Uttke, 32
24 Under the Open Sky, 64
25 Uttke, 32
27 Under the Open Sky, 63
ironworks and contemporizes the 20th-century industrial ensemble. This juxtaposition is repeated in spaces within the ironworks, but altered. Select spaces within the ironworks contain man-made, or artificial, gardens. Within the former bunkers of the sinter plant, there are gardens patterned on classical design, for example. Also, gardens of varied microclimates, accompanied by “sound effects and various artistic interventions,” are within the cells of the ironworks’ former ore bunker, now turned into a labyrinth. Entrances cut into the cells’ walls make the gardens accessible from a network of newly constructed paths and extant footbridges. Finally, at the core of the ironworks, the Piazza Metallica is constructed of iron-plate tiles; the iron plates were “once used to cover casting [molds] in the pig iron casting works.” Although the plates compose a formal square, Latz’s design envisions these becoming weathered, altered by nature.

Duisburg-Nord’s design and its resultant, multilayered aesthetic interaction between the natural and the man-made is authentic. Duisburg-Nord’s design is particular to Duisburg-Nord in the 21st-century. It is derived from a local and regional, historical environmental problem. While this design may be imitated, it may not be replicated. The evolution of the ironworks’ transformation, spontaneous as it is, is perpetually changing.

In 1996, Jonathan Park composed a colorful lighting scheme that illuminates the ironworks at night. The historical iconic significance of the Thyssen Ironworks to the community inspired this art intervention. The ironworks “had been operational 24-hours [a] day – and when [it] closed, residents said, ‘it was a though the sky had died.’ The illumination of the ironworks is both commemorative and transformative. It grants the ironworks a contemporary significance that is similar and, yet, dramatically different from its former iconic significance.

Duisburg Nord’s nature versus man aesthetic appeals to the intrepid, and adventure is, appropriately, the theme of Duisburg-Nord’s recreational program. Elements of the Thyssen Ironworks have been repurposed for recreational use. The walls of the former ore bunker now serve as a climbing wall, a gasometer, now filled with water, has been repurposed into a diving center, and a former casting house contains a high ropes course. There is also a tube slide through two of the former ore bunkers and a 70-meter high viewing platform on one of the conserved blast furnaces. Duisburg-Nord even offers helicopter rides. The relationship between Duisburg-Nord’s aesthetic and its adventure-themed recreational program also contributes to Duisburg-Nord’s authenticity. With regard to interpretation, it is important that the purpose and function of these structures – ore bunkers, gasometers, blast furnaces, etc. – be known. Their historical significance would be otherwise lost as time marched on. The adaptation and continued use of these structures ensures that successive generations will engage with these structures and question their purpose and function.

29 Uttke, 32
31 Uttke, 33
32 Landschaftspark Duisburg Nord. No Date. Web. 14 Mar 15.[en.landschaftspark.de]
33 Ibid
Duisburg-Nord’s natural versus man-made visual contestation is also the backdrop for its extensive cultural program. This program includes theatrical and musical performances, film viewings, and festivals. In the summer, films may be viewed in an open-air cinema. Converted industrial buildings, ranging from a former power plant to a former casting house to a former blower house, are cultural and special event spaces. Continued use extends a contemporary significance to these spaces, and recollects their historical significance by bringing the public into these cathedrals of industry.

Top Left: Man-made Gardens at Duisburg-Nord
Top Right: A Labyrinth in the Former Ore Bunker
Middle: Duisburg-Nord Landscape Park at Night
Bottom Right: Bunker Turned Climbing Wall

34 Uttke, 33
35 Landschaftspark Duisburg Nord. No Date. Web. 14 Mar 15. [en.landschaftspark.de]
36 Ibid
38 Holmblad, Ole. “A Labyrinth in the Former Ore Bunker.” No Date. Web. 6 Apr 15. Creative Commons License.
Conclusion

Duisburg-Nord is not merely historically significant. Its transformation makes it significant to contemporary Duisburg and to the Ruhr region. The ironworks’ transformation symbolizes regional and local environmental and social change. Duisburg-Nord’s design, strongly influenced by the need to remediate the adulterated landscape and restore the Old Emscher, is authentic. The resultant aesthetic interaction between the natural and the man-made and the layers of this interaction is place- and temporally specific. The relationship between the theme of the park’s recreational program and the park’s aesthetic contributes to its authenticity. The recreational program is also interpretive.

Duisburg-Nord’s design concept and program are at the intersection of Oevermann and Mieg’s heritage preservation and architectural production discourses and the author’s addition to these, environmental conservation. Duisburg-Nord conserves a historic ironworks. The remediation of the site and the re-naturalization of the landscape, the creation of hidden man-made gardens and art interventions within the ironworks, and the ironworks’ illumination all combine to transform the ironworks into a new, contemporary architectural expression. A recreational program that is thematically linked to this expression is an element of a development strategy that aims to cultivate a tourism industry in Duisburg and in the Ruhr.

2.2. Zollverein Park, the Emscher Landscape Park, Essen, Germany

Project Facts

Zollverein Park comprises the former Zollverein coalmine and coking plant. The coalmine includes shaft XII and shaft 1/2/8, designed by German industrial architects Fritz Schupp and Martin Kremmer in the Bauhaus style between 1928 and 1932. Fritz Schupp later designed the coking plant in the Modernist style between 1957 and 1961. The coalmine closed in 1986, and the coking plant’s shutdown followed in 1993. Both were made IBA projects, the coalmine in 1989 and the coking plant in 1998. In 2001, UNESCO conferred World Heritage status on the Zollverein coalmine and coking plant ensemble. The IBA Emscher Park held a competition for the design of Zollverein Park in 2004. 209.6 million euros were invested in the coalmine, and another 6.65 million euros were invested in the coking plant. Zollverein Park is 100 hectares, or approximately 247 acres and it attracts 500,000 visitors annually.
The evolution of Zollverein’s design concept began with the Bauhaus architecture of the coalmine’s shaft buildings. Design and the arts were selected as the focus of Zollverein’s program in reference to the site’s industrial architecture as well as the shafts’ and coking plant’s industrial design. In the design concept for Duisburg-Nord Landscape Park, environmental remediation and heritage conservation were central. In contrast, at Zollverein, heritage conservation and job creation (the IBA’s “Working in the Park” principle) were dominant. The head frame of shaft XII, the most recognizable icon of the Zollverein, was made a focal point in the design, and it is illuminated at night. The head frame possesses significance as an architectural and historical icon. The Bauhaus style originated in German industrial architecture and, disseminated by the interwar German diaspora, gained international acclaim and influenced Modernism. Designed in this style, shafts XII and 1/2/8 also symbolize regional and local economic and social history, and are representative of early to mid-20th-century coalmining technology. The head frame’s transformation endows it with contemporary significance; it symbolizes regional and local economic and social transformation. The “six nearly 100-meter high chimneys” of the coking plant are likewise iconic and also possess architectural, historical,
British architect Sir Norman Foster conserved the coalmine’s powerhouse and converted it into the Red Dot Museum and Design Center. The powerhouse is the centerpiece of a group of buildings similar in style. Foster and Partners, articulating their approach to the powerhouse and the adjacent buildings, writes, “These magnificent structures, with their towering chimneys and vast halls, are celebrated within the complex as if cathedrals of the industrial age…” Foster restored the powerhouse’s façade and preserved one of five boilers as an example of 1930s technology. The other boilers were hollowed and now contain galleries. The Red Dot Museum exhibits commendable industrial designs and holds design competitions, including in the sub-category of product design, for example. The Design Center contributes to Zollverein’s design and arts program, as well as to its commercial development, as it attracts creative firms to the park. Also established within Zollverein is the Zollverein School of Management and Design. A Japanese firm won the international architectural competition to design the school, the first new building in the park. This program, which includes tourism, commercial, and educational components, endows Zollverein with authenticity because its unifying theme, design and art, refers to the inherent qualities of the coalmine and coking plant: high-quality industrial architecture and design.
Zollverein Park’s design- and arts-inspired design concept strongly influenced the park’s recreational program, centered at the coking plant, as well. ‘The Sonnerad,’ a solar-powered Ferris wheel “transports visitors to Zollverein deep into the coke ovens and high over the rail discharge terminal hall.”62 A swimming pool, constructed of containers welded together, is set into a space around which the coking plant wraps. The pool was opened as a project within the Contemporary Art and Criticism exhibition in 2001.63 In the winter, a rectangular ice-skating rink is set up in front of the coke ovens.64 While ‘The Sonnerad,” the pool, and the rink are recreational amenities, their designs and, more so, their juxtapositions with the coking plant, are of architectural note, especially because of Zollverein’s status as a World Heritage Site. The World Heritage Committee will revoke World Heritage Site status if the Committee interprets interventions as threatening to the integrity or authenticity of a site. The design of Zollverein’s recreational amenities is in accordance with the standards set by the Committee, but it also provokes architectural commentary. In addition, while the theme of Duisburg-Nord’s recreational program is adventure, the theme of Zollverein’s is creativity and ingenuity (through design). The design- and arts-inspired concept that directs Zollverein’s recreation program also endows Zollverein with authenticity. The conceptual or thematic contrast between these parks’ recreational programs also imbues the Emscher Landscape Park with authenticity because the parks’ programs are place-based, unique to their settings.

The coalmine and coking plant’s status as a World Heritage Site led to the establishment of the Ruhr Museum at Zollverein. Zollverein’s emphasis on design and art influenced the museum’s architecture and approach to interpretation. The Office for Metropolitan Architecture (OMA), led by architect Rem Koolhaas, converted Zollverein’s coal-cleaning plant into the Ruhr Museum. A 24-meter glass escalator, the “longest standalone escalator” on the continent, leads to the museum.65 Inside, “orange-colored lighting strips on the internal stairway…recollect [molten] iron.”66

While heritage conservation with a site-specific design and arts dimension, as well as job creation, strongly influenced Zollverein’s overall design and program, environmental conservation influenced Zollverein’s landscape design and recreational program. Between the coalmine and the coking plant there is an industrial forest cultivated on slag heaps. In addition, “The railway tracks from [shaft] XII to the coking plant form the central axis in the site’s interior and were developed into pedestrian and bicycle paths.”67 Also, visitors can “walk along the conveyor belt tracks” and look down on nature, including Zollverein’s industrial forest.68 This unifies Zollverein Park with the other parks in the Emscher Landscape Park system and this unity contributes to the Ruhr’s coherence as a region.

62 Uttke, 281
63 Ibid
64 Ibid
65 Under the Open Sky, 88
66 Ibid
67 Ibid, 278
68 Ibid
Conclusion

The conserved coalmine and coking plant are significant, both architecturally and historically. Zollverein’s transformation and integration into the contemporary social and economic life of Essen and the Ruhr region grants it – the shaft XII head frame and the coalmine, the chimneys and the coking plant – contemporary significance. The Ruhr Museum interprets the economic and social history of Zollverein, Essen, and the Ruhr region. The design concept for Zollverein Park grants the project authenticity. Its design and arts dimension is not historicist. Rather, it is derived from intrinsic qualities of the coalmine and coking plant – their high-quality industrial architecture and design. In addition, this design concept is decidedly of the 21st century, not the early 20th century.

The Zollverein Park design proposes an economic development strategy that is inspired by and sensitive to Zollverein’s industrial heritage. This development strategy includes the creation of a center for design and art to attract creative firms as well as visitors and the establishment of a tourism industry based on Zollverein’s World Heritage Site status, the Emscher Landscape Park system, and Zollverein’s design and arts attractions. Zollverein’s design and its development strategy are at the intersection of Oevermann and Mieg’s heritage conservation, development, and the production of new architectural expressions discourses. Zollverein’s landscaping conserves and interprets its industrial nature, unifying the park with other parks in the Emscher Landscape Park system.

3. Belval: City of Science for Research and Innovation, Belval, Luxembourg

Project Facts

The old ironworks at Belval, Luxembourg, stand about 12 miles from Luxembourg City, and provide an example of 20th-century Luxembourgish steel manufacturing technology. For the construction of the iron and steel works in 1909, Escher Bësch, a forest between Belvaux and Esch, was cleared; Escher Bësch’s aesthetic was enchanting and the forest featured in fairytales. To remain internationally competitive, ARBED, Luxembourg’s national steel manufacturer, upgraded the works between 1965 and 1969. This modernization included the replacement of six outdated blast furnaces with three more efficient furnaces. A single electric furnace replaced these in 1993, and shortly thereafter, one of the three ‘modern’ blast furnaces was sold to a Chinese firm. The works were shut down in 1997, and a discussion of the site’s future

71 “Lère Fête des Hauts Fourneaux à Belval.” No Date. Web. 4 May 15. [www.redrock.lu]
73 Ibid
74 Ibid
75 Ibid
76 Ibid
immediately followed. In 2000, ARBED (ArcelorMittal) and the Luxembourgish government formed the Agora Development Company and in 2001 Agora, in cooperation with the Ministry of Interior, held a competition to solicit proposals for a master plan. Jo Coenen and Company won the competition. Fonds Belval, a public office, was established in 2002, to implement “the state investment program in Belval.” The Belval ironworks site is approximately 100 hectares or 247 acres.

Design Concept and Program: A Discussion and Critique

The design for Belval proceeds from the iron and steel works’ history as a modern mill compared to its contemporaries, as an early adopter of new technology, and as a production site. This design proposes a City of Science for Research and Innovation, anchored by the University of Luxembourg, on the iron and steel works’ site. It aims to cultivate educational, cultural, and recreational amenities that contribute to a high quality of life for residents and those who work

78 Ibid
79 Ibid
80 Le Fonds Belval (Development Authority’s Official Website). No Date. Web. 4 Mar 15 [http://www.fonds-belval.lu]
82 Le Fonds Belval (Development Authority's Official Website). No Date. Web. 4 Mar 15 [http://www.fonds-belval.lu]
at Belval. In addition to technology and innovation, urbanism is a principle of the design. The origination of this design with the iron and steel works’ characteristics contributes to the design’s authenticity.

The centerpiece of Belval’s design is the Blast Furnace Terrace, a civic square anchored by blast furnaces A and B.\textsuperscript{83} The furnaces’ heights, at 82 and 90 meters, respectively, “largely determine the silhouette of Belval.”\textsuperscript{84} Belval’s furnaces exemplify mid-20th-century iron-making technology and symbolize local and regional industrial and economic history as well as Luxembourg’s historic commitment to technological modernization. In stark contrast to the designs for Duisburg-Nord Landscape Park and Zollverein Park, Belval’s design incorporates these historic, iconic furnaces into an entirely new urban fabric, disregarding the furnaces’ historic context. It is, therefore, unlikely that the World Heritage Committee would declare Belval a World Heritage Site. Belval’s approach is bold. This design imbues the furnaces with a new relevance as icons of the City of Science and as sources of inspiration. Belval’s deviation from preceding European approaches to large-scale industrial heritage conservation and development generates an authentic, distinctly Luxembourgish heritage-inspired urban district. The centrality of furnaces A and B, which were historically central within the iron and steel works, also contributes to this authenticity.

Landmark buildings with facades that are bright red frame the Blast Furnace Terrace; their red hue is a reference to southern Luxembourg’s red iron ore, once transformed into molten iron at Belval.\textsuperscript{85} It is also a reference to southern Luxembourg’s nickname, “The Land of Red Rocks.”\textsuperscript{86} This is a visually bold interpretive architectural design.

The design for Belval divides the former ironworks’ site into four sections, distinct in concept, density, and program: the Blast Furnace Terrace, the Square Mile, Park Belval, Belval Sud, and Belval Nord.\textsuperscript{87} The Blast Furnace Terrace is the center of the City of Science, a space devoted to education, research, culture, and leisure as well as to urban-style living.\textsuperscript{88} The University of Luxembourg’s campus is located on the Blast Furnace Terrace. The university’s departments are clustered by discipline, and these disciplines are, in turn, clustered in buildings or groups of buildings to engender inter-departmental interaction. For example, the natural sciences are clustered in a group of buildings, the Houses of Life Sciences, Environment, and Materials.\textsuperscript{89} The Rockhal, Luxembourg’s largest concert venue, and Belval Plaza, a mixed-use, residential and leisure complex, is also in this core area. Luxembourg plans to relocate its national archives to the Blast Furnace Terrace in the future.

Belval’s design conserves blast furnaces A and B. Furnace B will remain as it is, while

\textsuperscript{83} Jo Coenen and Company. “Belval West.” No Date. Web. 15 Mar 15. [jocoenen.com]
\textsuperscript{86} \textit{Ibid}
\textsuperscript{88} \textit{Ibid}
\textsuperscript{89} Le Fonds Belval (Development Authority’s Official Website). No Date. Web. 4 Mar 15 [http://www.fonds-belval.lu]
the interior of furnace A, which remains in excellent condition, will be converted into the National Center for Industrial Culture. An access road “on concrete supports that linked the foundry buildings of blast furnaces A and B” will be partially reconstructed and “integrated into the [new] urban context.” The volume of the Stock House, a 170-meter long shed where the blast furnace charges were prepared, will be conserved. It will be an exhibition space for the National Center for Industrial Culture and a library for the University of Luxembourg. The Blasting Hall, a “160-meter long, 70-meter wide, and 28-meter high” behemoth of a building will be conserved, but a new use for the building has not been identified. Other conservation projects include the steelworks’ former administrative building, now Agora’s headquarters, and the building housing the workers’ changing rooms and sanitary blocks, now a business center. The adaptation of Blast Furnace A, the Stock House, and the Blasting Shed grants new purpose to these structures while recollecting their historic purpose and function.

The Square Mile, adjacent to the Terrace, is devoted to commercial activity, including business, retail, and leisure, and includes urban-style residences. The Belval Park separates the Blast Furnace Terrace and the Square Mile from Belval Sud and Belval Nord. Belval Sud is intended to become a family-oriented neighborhood, and its program includes residences, a primary school, and recreational facilities. Belval Nord shares Belval Sud’s amenities. It is another neighborhood, distinguished from Belval Sud by its views of the Belval Park. Belval is a large-scale transformation of a brownfield site into a 21st-century community, connected to historic Belval through the Blast Furnace Terrace.

In “Belval? Make it Yours!,” a short promotional film by Agora, young professionals and students discuss what it is like to live in Belval. The demographic that Agora aims to attract is professionals and students ages 20 to 40, and Belval’s design and programming is directed toward that demographic.

Conclusion

The historical significance of the iron and steel works, and furnaces A and B, in particular, inspires Belval’s design. The design endows the blast furnaces with a new relevance. The furnaces mark Belval’s civic center, the Blast Furnace Terrace, and are meant to inspire researchers and the University of Luxembourg’s students. Belval’s disregard for the furnace’s historic context is intentional and bold as is the design’s emphasis on urbanism. Belval emerges
as an authentic urban district as a result.

The City of Science is meant to be a national research, educational, cultural, and leisure center and not necessarily a tourist attraction, in contrast to Duisburg-Nord Landscape Park and Zollverein Park. Belval is at the intersection of Oevermann and Mieg’s urban development, heritage conservation, and architectural production discourses. The furnaces’ historic context is sacrificed for a dense urban-style development. This sacrifice creates a unique opportunity to transform the blast furnaces into iconic landmarks. This invents a new architectural expression: an industrial icon as the center of a new city. For development to proceed, environmental remediation was required, but neither remediation nor environmental conservation strongly influenced Belval’s design, the natural beauty of Belval Park notwithstanding.

4. Parque Fundidora, Monterrey, Mexico

![Map of Parque Fundidora](http://www.parquefundidora.org/en)

Project Facts

Parque Fundidora is a 350-acre public park and entertainment and cultural center on the grounds of a former iron and steel works in the city of Monterrey, Mexico, roughly 500 miles north of Mexico City. Fundidora Iron and Steel Company built and operated the iron and steel works there at the beginning of the 20th-century. The Mexican government and the state of Nuevo Leon led the initiative to conserve the iron and steel works and to convert the site into a public park and center for entertainment and culture in 1988, following the works’ closure in 1986.

Design Concept and Program: A Discussion and Critique

The Fundidora Company’s iron and steel works in Monterrey decisively contributed to the establishment of the steel industry in Mexico and to Monterrey’s status as an industrial and...
technologically progressive city.\textsuperscript{105} The iron and steel works were the first in Latin America.\textsuperscript{106} In the mid 20\textsuperscript{th} century, Fundidora was Mexico’s most productive steel mill.\textsuperscript{107} In addition to the works’ historical significance, the works have been a local and regional landmark. The iron and steel works’ status as a contemporary icon for the city of Monterrey is reinforced by a lighting scheme that illuminates the iron and steel works at night.

The Mexican government set aside Fundidora for an industrial museum and parkland at the urging of local businessmen, the Mexican steel industry, and the public following the bankruptcy of the Fundidora Company.\textsuperscript{108} The state of Nuevo Leon established a subordinate agency, the Fundidora Trust, to redevelop Fundidora. In addition to establishing the Horno\textsuperscript{3} Museum and transforming an industrial wasteland into a large public park, the Fundidora Trust developed extensive entertainment and cultural programs at Parque Fundidora.

Built between 1965 and 1986, the #3 blast furnace has been adapted into an industrial museum and science center, focused on the Mexican steel industry and science and technology. The museum engages visitors through interactive media. In addition, on film screens, former steelworkers recount their memories of Fundidora, accompanied by special effects, for visitors.\textsuperscript{109} This conversion subordinates preservation to continued use and the creation of a new form of expression. It cultivates public or collective memory by extending to visitors an opportunity to experience the #3 blast furnace. Visitors’ experience of the #3 furnace is vastly different from that of formers steelworkers, but interactive media, film, sound effects, and lighting create an important link between these experiences.

Parque Fundidora’s conserved industrial buildings serve as an art museum that includes exhibition spaces, a theater, and a cinema. The mission of the cinema includes the preservation of the culture of the state of Nuevo Leon through film and photography. The cinema is an entertainment venue and a medium that curates and interprets local and regional history.\textsuperscript{110} Parque Fundidora’s arts program also includes a plastic experimentation workshop. Within Parque Fundidora there is a sports arena with nearly 18,000 seats, a concert venue, a children’s amusement park, and a convention, exposition, and business center. While Parque Fundidora’s arts and cultural programs contribute to the project’s authenticity, its entertainment and business programs somewhat undermine its authenticity. There is not a clear thematic relationship between Parque Fundidora’s history and its steel museum and science center and its entertainment and business programs. These may contribute to Monterrey’s economy, however.

\textsuperscript{105} Horno\textsuperscript{3} Museum Official Website. No Date. Web. 20 Mar 15.  [horno3.org]
\textsuperscript{106} Ibid
\textsuperscript{107} Ibid
\textsuperscript{109} Cantu, 6-7
\textsuperscript{110} Parque Fundidora Official Website. No Date. Web. 4 Mar 15.  [www.parquefundidora.org/en]
Conclusion

The Fundidora Company’s iron and steel works are important to the economic, technological, and social history of Monterrey, the state of Nuevo Leon, and Mexico. The Horno³ museum and science center interprets the history of the Mexican steel industry through interactive media. In doing so, and in bringing visitors into the #3 blast furnace, it cultivates public memory. The absence of a thematic link between Parque Fundidora’s historical, educational, artistic, and cultural programs, on the one hand, and its entertainment, recreational, and business programs, on the other, challenges the project’s authenticity.

Parque Fundidora is at the intersection of Oevermann and Mieg’s heritage conservation and development discourses and the author’s addition to these, environmental conservation. Fundidora creates a new form of architectural expression through its conservation and reuse of the #3 blast furnace. The remediation of the extant industrial land was a necessary prerequisite for the creation of an accessible, high-quality public park in the city of Monterrey.

5. Conclusion

The framework, below, describes the cases I examine in this chapter in the context of the definitions discussed in Chapter 2: Literature Review.

<table>
<thead>
<tr>
<th></th>
<th>Definition</th>
<th>Duisburg Nord Landscape Park</th>
<th>Zollverein Park</th>
<th>Belval</th>
<th>Parque Fundidora</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Approach</strong></td>
<td>Preservation; Conservation; Restoration; Reconstruction</td>
<td>Preservation</td>
<td>Preservation</td>
<td>Conservation</td>
<td>Conservation</td>
</tr>
<tr>
<td><strong>Economic Model</strong></td>
<td>Program (e.g., Heritage Tourism, Recreation, Arts and Culture, Education)</td>
<td>Heritage and Eco-Tourism; Adventure-Recreation; Eco-Industrial Art</td>
<td>Heritage Tourism; Art, Design, and Cultural Production and Tourism</td>
<td>Research; Education; Culture;</td>
<td>Heritage Tourism; Amusement; Recreation</td>
</tr>
<tr>
<td><strong>Significance</strong></td>
<td>Weight in Design and Policy Decisions Given to Public Memory, Scientific, Architectural, or Cultural Significance, and so on</td>
<td>Technological; Historical (esp. as related to its Shutdown); Ecological; Steelworkers’ Narrative is Underdeveloped</td>
<td>Technological; Architectural; Historical; Miners’ Narrative is Underdeveloped</td>
<td>Technological; Historical; Oversights Unclear as Development is in Progress</td>
<td>Technological; Historical</td>
</tr>
<tr>
<td><strong>Public Memory</strong></td>
<td>How the Design Brings Contemporary Society into Contact with the Historic Ensemble</td>
<td>Continued-use; Ecological Restoration/ Environmental Narrative; Lighting Scheme</td>
<td>Continued-use; Art/Design Production; Continued-use as Workplace; Lighting Scheme</td>
<td>Re-use; Continued-use as a Center for Invention and Innovation</td>
<td>Re-use; Education; Comparatively Design Fails to Cultivate Public Memory</td>
</tr>
<tr>
<td><strong>Authenticity</strong></td>
<td>How the Design Captures, Relates to, and Reinterprets a Historic Narrative or Element; Contemporary Significance to the Community</td>
<td>Narrative: Plant Shutdown/ Eco-Renewal</td>
<td>Element: Industrial Architecture</td>
<td>Narrative: Technological Invention and Innovation</td>
<td>Design does not Actively Relate to or Reinterpret a Historic Narrative or Element</td>
</tr>
<tr>
<td><strong>Interpretive Methods</strong></td>
<td>Types of Media</td>
<td>Landscape Design; Lighting Scheme</td>
<td>The Red Dot Design Museum (Product Design); The Ruhr Museum; Art/Design Events and Installations</td>
<td>Landmark Red Buildings (Land of the Red Rocks); National Center for Industrial Culture (Conserved Blast Furnace)</td>
<td>Museum of Steel (Conserved Blast Furnace; Interactive Exhibits); Plastic Exp. Workshop</td>
</tr>
</tbody>
</table>
The following observations are important takeaways from the German, Luxemburgish, and Mexican cases. These observations influence my analysis of the Carrie Furnaces site as well as the design principles and program I propose for the site in Chapter 5: Design Principles, Program, and Illustrative Design.

1. The conservation and redevelopment of iron and steel works and collieries requires an extraordinary commitment from all levels of government (local, regional, national, cross-national) and investment of funds, public or private.

2. International landscape design, urban design, and architecture competitions can generate creative and authentic design concepts for industrial heritage sites’ redevelopment and can generate positive publicity about the repurposed site and its economic and symbolic importance to the local community. This publicity is important to the development of heritage tourism, cultural, and recreational industries.

3. The origination of a design in the unique attributes of an industrial heritage site, including, for example, the site’s purpose, the architecture of the site’s buildings, or the site’s geography and natural features, strongly influences its authenticity.

4. Enabling visitors to experience steel mills and coalmines through the repurposing and continued use of industrial buildings and structures, including blast furnaces, cultivates public memory, interprets the buildings and structures, and imbues the buildings and structures with a new relevance. This also endues these sites with authenticity.

5. Illumination was one artistic intervention common to all of the cases. This intervention recalls steel mills’ and coalmines’ 24-hour operations. The punctured darkness of the nighttime sky is an important shared memory within industrial communities in Europe and North America.

6. Duisburg-Nord Landscape Park, Zollverein Park, Belval City of Science, and Parque Fundidora are all regional destinations. Duisburg-Nord and Zollverein Park are national and international tourist destinations. Belval is a regional educational, institutional, and cultural destination. Parque Fundidora is a national recreational, entertainment, and business destination.

7. These cases’ economic development strategies layer tourism with arts and cultural programs, recreational programs, and educational or commercial programs. Members of the public visit these sites to engage in a range of activities, and this generates multiple sources of revenue.

8. The relocation of the University of Luxemburg from the City of Luxemburg to Belval will contribute to the project’s success because it will consistently attract large population young and educated denizens to the site.
The Carrie Furnaces Site: Analysis of Context and Current Planning

Introduction

The cases demonstrate how design and creative programming can balance redevelopment and the conservation of historic heavy industrial sites. How might the design for the Carrie Furnaces site tell the story of the Carrie Blast Furnace Plant? How might it create a contemporary relationship between the site and the communities of Swissvale, Rankin, and Braddock, as well as between the site and visitors from throughout the region? Place-specific characteristics inspired the designs for Duisburg-Nord Landscape Park, Zollverein Park, and Belval, and these designs are decidedly of their place and time. What characteristics or elements might inspire a design for the Carrie Furnaces site? How could this project exemplify the Monongahela Valley in the 21st-century? The purpose of this chapter is to develop a

1 Photograph by Author
more thorough understanding of the Carrie Blast Furnace Plant, the Carrie Furnaces, and the communities of Swissvale, Rankin, and Braddock to answer these questions. In addition, this chapter examines the state of planning for the site’s redevelopment and identifies gaps in the Redevelopment Authority’s current conceptual master plan.

1. Context: The Carrie Furnaces Heritage Site and the Boroughs of Rankin, Swissvale, and Braddock

1.1. The Carrie Furnaces Heritage Site

In 2006, the National Park Service conferred National Historic Landmark status on Carrie Blast Furnaces Numbers 6 and 7. Furnaces 6 and 7 are representative of pre-World War II smelting technology in the context of a vertically integrated manufacturing process. From 1907 to 1978, the Carrie Blast Furnace Plant smelted up to 2,500 tons of iron per day for the Homestead Steel Works. The mills converted Carrie’s iron into steel and then into beams, plates, and other finished products. Shut down in 1986, the Homestead Steel Works’ mills were subsequently demolished. The only evidence that remains of the Carrie Blast Furnace Plant’s

3 Ibid, 4
4 Ibid
integration is its hot metal bridge; built in 1900, the bridge was designed for the transportation of molten iron via torpedo car, a special type of rail car.5

Notable historic elements of the Carrie Blast Furnace Plant include the following:

1. Stationary Car Dumper
2. Ore Yard
3. Ore Bridge
4. Stocking Trestle
5. Stock House
6. Carrie 6 and 7 Hot Blast Stoves
7. Hot Blast Stoves’ Draft Stack
8. Carrie 6 and 7 Blowing Engine House
9. AC Power House 6
10. Furnace No. 6
11. No. 6 Hoist House
12. No. 6 Cast House
13. No. 6 Dust Catcher
14. Furnace No. 7
15. No. 7 Hoist House
16. No. 7 Dust Catcher
17. The Hot Metal Bridge
18. The Carrie Deer

Looking Northwest 7

6 “U.S. Steel Homestead Works, Along Monongahela River, north of Eighth Avenue, Homestead, Allegheny County, PA.” General Plan, 1965, Historic American Engineering Record, 6
7 Photograph by Author
The production of iron begins with the delivery and storage of raw materials and ends with the production of iron, slag, and gas, a byproduct steelworks used to generate electricity. The preserved elements of the Carrie Blast Furnace are exemplary of the 20th century steelmaking process. The Carrie Furnaces’ car dumper, which overturned railcars full of raw materials, may be the oldest in the United States, having been built in 1925-26. Transfer cars then transported the materials to be sorted and stockpiled in the ore yard. The ore yard that served Furnaces 6 and 7 was vast enough to stockpile an immense quantity of raw materials to sustain the furnaces’ operation through the winter. The ore bridge, built in 1951, spans the ore yard. The ore bridge’s electrical trolley, equipped with hoisting machinery, separated raw materials by grade, mixed the ore, and retrieved and transported ore and limestone to railcars that transferred the ore and limestone to the stock house via the stocking trestle. The trestle is an elevated concrete and steel platform over which rail tracks run. Below the trestle, the stock house’s raw material bins are suspended. The trestle also received coke via bottom-drop railroad hopper cars from U.S. Steel’s Clairton Works in Clairton, up the Monongahela River from the Carrie Blast Furnace Plant. Under the stock houses’ bins, a rail line for scale cars ran. The scale cars transported a measured mixture of ore, limestone, and coke to the skip car pits to be transported via the skip car hoists to the top of Furnaces 6 and 7, both of which are 92 feet high.

8 “Carrie Blast Furnaces 6 and 7.” National Historic Landmark Nomination, P. 7.  
9 Ibid 8  
10 Ibid 10  
11 Ibid, 11  
Six 90-foot tall hot blast stoves, built in 1936, supplied Furnaces 6 and 7 with preheated air to combust coke. The combustion of coke produced the carbon monoxide and the heat required to deoxidize the iron ore. Within the furnaces’ hearths, molten iron and slag, a byproduct composed of limestone and the ore’s impurities, settled, with the slag floating on top. Workers tapped the furnaces in their respective cast houses. “The No. 6 cast house is an extremely rare example of a complete 1930s-era cast house…” and is in good condition. The No. 7 cast house is derelict. Runners transported the iron and slag from the cast houses. Below the cast houses, torpedo cars received the molten iron from the iron runners for transportation across the hot metal bridge. Furnaces 6 and 7’s gas cleaning systems collected gases exiting from the furnaces’ tops. The three-stage processing of the gases began in the systems’ dust catchers. The dust catchers for Furnaces 6 and 7 “are extremely rare examples of pre-World War II gas-cleaning equipment.” The processing of the gases continued with their routing through the systems’ gas-washing towers and electrostatic precipitators.

15 “Carrie Blast Furnaces 6 and 7.” National Historic Landmark Nomination, P. 10, 12.
16 Ibid, 12
17 Ibid,
18 Photograph by Author
19 Ibid
Shut down in 1984, the Carrie Blast Furnace Plant underwent a partial demolition. In 1997, a group of local artists surreptitiously entered the Rivers of Steel heritage site every weekend for a year to construct the Carrie Deer, a 40-foot sculpture of a deer, from materials salvaged at the site. The artists’ earlier sculpture, an owl, was demolished, and the artists expected that the Carrie Deer would meet a similar end. The Carrie Deer emerged, however, as the icon of the heritage site. Rivers of Steel initiated a successful Kickstarter campaign in the summer of 2014 to stabilize and restore the Carrie Deer and to repurpose a portion of the building on which it is built for a permanent exhibit. Some of the artists went on to form Pittsburgh’s Industrial Arts Cooperative. The Cooperative’s programs include the Mobile Sculpture Workshop, summer workshop that educates local youth on metalworking while producing a large-scale sculpture for public display.

1.2. The Structure Governing the Site

The structure that governs the Carrie Furnaces Heritage Site and the concentric redevelopment site is complex. Allegheny County owns the 168-acre site and leases the 13-acre heritage site to the Rivers of Steel Heritage Corporation. The Redevelopment Authority is responsible for the site’s redevelopment.

The site spans the boroughs of Swissvale, Rankin, Munhall, and Whitaker (see map 4). Excluding the Carrie Hot Metal Bridge, the Carrie Furnaces Heritage Site is within Swissvale. The segment of the site between the heritage site and the Rankin Bridge is in Rankin. The Carrie Hot Metal Bridge connects Rankin and Munhall. The borough of Braddock is adjacent to the site to the southeast.

Map 4: Municipal Boundaries

Swissvale, Rankin, Munhall, Whitaker and Braddock are five of Allegheny County’s 130 municipalities. Policymaking and implementation within the county requires a high level of cross-municipality and county-municipality coordination and collaboration. This is a challenge that at times impedes policymaking and implementation and it has long been recognized as such: the Carnegie Steel Company designed the Carrie Furnaces and the Homestead Works to span multiple jurisdictions in order to limit governmental interference in their operations.23 The Carrie Furnaces Steering Committee is the entity through which coordination and collaboration occurs. It is best categorized as an advisory body to the County. Participants include the municipalities of Swissvale, Rankin, Munhall, and Whitaker as well as the Rivers of Steel Heritage Corporation and other vested groups.

1.3. The Boroughs of Rankin, Swissvale, and Braddock

“Live in Swissvale, work in Rankin, and shop in Braddock” was a local adage.24 In reality, Steelworkers first settled in Braddock, then in Rankin, and, later, in Swissvale. Living in Rankin and Swissvale, workers overlooked the sprawling Carrie Furnaces, operated 24 hours a day seven days a week, and, across the river, the Homestead Steel Works. From Rankin, workers descended to the blast furnace plant’s gates. The Carrie Furnaces and U.S. Steel’s Edgar Thomson Plant were the termini of Braddock Avenue, Braddock’s once renowned commercial thoroughfare. The Edgar Thomson Plant remains in operation and it is part of U.S. Steel’s Mon Valley Works, an integrated steelworks that includes U.S. Steel’s Clairton coke works.

23 Baraff, Ron, Director of the Rivers of Steel Museum and Archives. Interview with author. Rankin, PA. 22 January 2015.
Rankin

The construction of the Hawkins and Rankin Railroad Stations led to clusters of population growth in Rankin, a rural agricultural community that was incorporated in 1892.26 Rankin urbanized when successive waves of immigrants migrated to the community to work at the Carrie Blast Furnaces Plant, the Edgar Thomson Plant, and other industrial sites nearby, including Union Switch and Signal in Swissvale. Overcrowding in Braddock compelled families to move from Braddock to Rankin in the early 20th century.27 In Pittsburgh’s mill towns, workers’ housing was on the flatlands nearest the mills, and middle-class and upper-middleclass housing was on the slopes – as families’ socioeconomic status improved, they literally moved upward, in a topographical sense. Rankin’s population peaked prior to World War II. Desiring better housing conditions, residents moved from Rankin to neighboring Swissvale and North Braddock, as well as to the outer suburbs east of Pittsburgh, including Forest Hills, Churchill, and Monroeville, often still commuting to Rankin to work at the Carrie Blast Furnaces Plant until its closure.28

Railroad tracks and the Martin Luther King Jr. Busway to the north, and a steep, forested slope to the south bound the small hilltop municipality of Rankin. The slope separates Rankin from the Carrie Furnaces below. 2,000 or so people populate the municipality, and seventy-six percent of this population is African-American.29 With a median household income of $20,000, Rankin is one of the poorest municipalities in the Commonwealth of Pennsylvania.30 In addition, single women head about thirty-three percent of Rankin’s households.31

20th-century houses in the vernacular styles of Pittsburgh, two- and three-story walk-up apartment buildings, public housing complexes, and places of worship, as well as brutalist municipal buildings, a community healthcare center, a light-industrial site, and a small number of commercial buildings (e.g., a restaurant, an auto-service station) constitute the municipality of Rankin. The bell tower of the former Visitation of the Blessed Virgin Mary Croatian church,

25 Author’s Diagram based on Diagram Created by WQED for “Mapping Pittsburgh’s Past.” Web. 17 Apr 15. [wqed.org]
27 Ibid, 6.
28 Ibid
30 Ibid
31 Ibid
the steeples of Saint Michael’s Orthodox church, and the roofs of Rankin’s residences define the neighborhood’s skyline. Vacant parcels dot Rankin and the ground floors of the neighborhood’s walk-up apartment buildings, once dedicated to commercial use, are generally vacant and boarded up. From Rankin Boulevard and Third Avenue, there are excellent views of the Carrie Furnaces and the Monongahela River below. Rankin’s governmental and institutional core is Hawkins Street. Rankin is not a suburb, but rather a mill town, and as such it includes urban and suburban elements.

Swissvale

As in Rankin, the construction of the Swissvale Railroad Station in 1852 was a harbinger of change in Swissvale. Named for abolitionist Jane Grey Cannon Swisshelm and incorporated
in 1898, Swissvale developed as a suburb in the mid to late 19th-century. Wealthier families initially moved to Swissvale to escape the city of Pittsburgh. Swissvale’s northern tip abuts the suburb of Point Breeze, which was a favorite neighborhood of steel executives and includes the residence of Henry Clay Frick, a prominent American industrialist and the Chairman of the Carnegie Steel Company. Although a portion of the Carrie Blast Furnace Plant was in Swissvale, the Union Switch and Signal Company, founded in 1881 by George Westinghouse and colloquially known as “The Switch,” was the principal source of employment for Swissvale’s residents. Millworkers sought better housing in Swissvale in the mid-20th century. Divisions formed between residents who worked in the mills’ management and residents who labored in the mills and were largely of Central and Eastern European descent.

Swissvale is an irregularly shaped municipality. A steep, forested slope separates Swissvale from the Carrie Furnaces below. Interstate 376, railroad tracks, and the Martin Luther King Jr. Busway divide Swissvale into sections. The Regent Square neighborhood, which is north of I-376, partially in Swissvale, and abuts Point Breeze and Frick Park, is comparatively affluent. The eastern section of Swissvale between I-376 and the busway may be characterized as middle income. The western section, nearest Rankin and also between I-376 and the busway, is depressed.

At $38,794, Swissvale’s median income is notably higher than Rankin’s, and the municipality is more populous, boasting a population of about 9,000. Single women are heads of only about sixteen percent of Swissvale’s households, a markedly smaller percentage than the percentage of households headed by a woman without a husband present in Rankin. While Rankin’s population is 76% African-American, Swissvale’s population is 64% white.

Like Rankin, 20th-century Pittsburgh vernacular-style houses and two-to-three story, walk-up apartment buildings (often with commercial uses on the ground floor) make up most of Swissvale. Because transportation infrastructure divides Swissvale into multiple sections, the municipality has multiple nodes of commercial activity, comprising older one- and two-story commercial buildings, some of which have apartments on the second floor. There is also a strip mall dating to the late 1980s.

38 Ibid, 3
39 Deasy, Erin, Project Manager, Allegheny County Economic Development Department, Interview with author on 23 January 2015. Pittsburgh, PA.
41 Ibid
42 Ibid
Braddock

Industrialist Andrew Carnegie built the Edgar Thomson Steel Works on the Monongahela River in Braddock in 1875. Workers, including successive waves of recently arrived immigrants, migrated to Braddock to work at the Edgar Thomson Steel Works and the Carrie Blast Furnace Plant. Braddock’s topography slopes downward toward Braddock Avenue, Braddock’s main street, and then remains flat from Braddock Avenue to the Monongahela River. On Braddock’s flatland, a dense pattern of development emerged. Compact, narrow houses and row houses intermixed with industrial sites and civic institutions characterized this once working-class area. This pattern emerged because workers needed residences within walking distance of their places of employment. Braddock Avenue was a vibrant, bustling commercial thoroughfare until the mid-20th century, when out-migration and the construction of suburban malls and, later, the collapse of Pittsburgh’s steel industry, led to extraordinarily high vacancy rates and

43 Photographs by Author
44 Ibid
46 Ibid
abandonment. Andrew Carnegie built his first library in Braddock, on the slope, just off of Braddock Avenue, in 1888.

U.S. Steel continues to operate its Edgar Thomson Plant, and, in October 2014, announced that it would invest $187 million to expand its operations there. Nonetheless, out-migration has wrought economic catastrophe in Braddock. Those able to afford to move away from this heavy industrial site have done so. According to the 2013 American Community Survey, Braddock has roughly 384 vacant housing units. This means that for every 6.5 Braddock residents there is an empty house. On the flatland, numerous industrial sites, inhabited houses, vacant houses, vacant parcels, and former civic buildings, including Braddock’s former junior high school, the Holliday Memorial Zion African Methodist Episcopal church, and the Church of God in Christ, mingle. The resultant aesthetic is surreal. For example, a well-maintained house, complete with brightly colored flowers in hanging planters on the front porch, abuts a vacant, boarded-up duplex on one side, and multiple vacant parcels on the other, and sits across from the closed and vacant junior high school and the Church of God in Christ. Two parcels or so away are the railroad tracks and what appears to be a concrete manufacturing yard.

Braddock Avenue remains the community’s commercial thoroughfare. It, too, has a high rate of vacancy. Because Braddock Avenue curves near the Edgar Thomson Plant, the Edgar Thomson Plant is the terminus of Braddock Avenue’s view corridor, looking eastward.

Approximately 2,400 people live in Braddock, and about 66% of the population is African-American. The municipality’s median income, like that of Rankin, is extraordinarily low: $20,212. Women without a husband present head thirty-nine percent of Braddock’s households.

There are signs that Braddock may be on the upswing, however. Braddock’s mayor, John Fetterman, marketed the community to Grow Pittsburgh, a non-profit urban produce grower, and Grow Pittsburgh established Braddock Farms, an urban organic farm, on Braddock Avenue in 2007. Fetterman has also extensively used public art to raise Braddock’s profile. Levi’s featured Braddock in its Ready to Work campaign, and donated one million dollars to the community. Braddock, under Fetterman’s direction, used the funds to conserve the vacant First Presbyterian Church and reuse it as a community center. The church-turned-community center is across the street from the Braddock Carnegie Library.

48 Ibid
50 Ibid
Rankin and Swissvale are predominately residential communities, with the exception of Swissvale’s Regent Square neighborhood, which has a small but thriving restaurant and retail corridor. Braddock is a mixed-use community, but because it boomed prior to the enactment of zoning ordinances in the United States, its layout is inconsistent with contemporary land use preferences. Through strategic planning and with economic stimulus, Braddock, Rankin, and Swissvale could evolve into Smart Growth communities. Swissvale and especially Rankin and Braddock need a stronger tax base and, relatedly, more in-migration. Braddock’s civic-sphere improvements have altered outsiders’ perception of the community. Braddock must build on these improvements and Rankin and Swissvale must follow Braddock’s lead. Fundamentally, these communities need to be integrated into a broader spatial, social, and economic network. The catchment area for Braddock Avenue, Braddock’s main street, cannot be Braddock and, likewise, the catchment area for Regent Square cannot be Swissvale.

54 Photographs by Author
55 Ibid
56 Ibid
2. Redevelopment Imperatives and Opportunities as Related to the Heritage Site

Left: Furnace 7; Right: Furnace 6 57

2.1. The Carrie Furnaces Site

On a northwest to southeast axis, the site’s features segment it into three distinct sections (See Map 3, Chapter 1). The Carrie Furnaces Heritage Site defines the northwesterly section, the hot metal bridge and its historic connection to Munhall define the middle section, and the Rankin Bridge defines the southeastern section. The site is only accessible in its southeastern section, and, therefore, this section is the gateway to the site.

The Site’s Aesthetic

Carrie Furnaces 6 and 7 are the only non-operative blast furnaces in the Pittsburgh region. Because operational steelworks are restricted sites, a visit to the Carrie Furnaces is the public’s primary opportunity to experience Pittsburgh’s integrated steelworks. The historic site’s aesthetic raised the public’s consciousness of this opportunity. The site is not a sanitized attraction; liability waivers are required. Graffiti, permitted on the ore-yard wall, and the Carrie Deer contribute to the site’s appeal. Visitors view the Carrie Blast Furnace Plant as a ruin representative of the might and downfall of Pittsburgh’s steel sector. The site’s landscape

57 Photographs by Author
enhances this perception. In the period that followed the partial demolition of the site, nature burgeoned. In Rivers of Steel’s early years, fewer young adults visited. This aesthetic, at the intersection of industry and art, attracts a younger cohort curious about the Rust Belt and the remnants of its industries.\textsuperscript{58} If respected, the historic Carrie Blast Furnace Plant will confer distinction on any future development on the site. Nathan Strum, a former project manager within the Allegheny County Economic Development Department, notes that business, research and development, and manufacturing parks struggle to engage the public and to create iconic public art that makes their parks landmarks.\textsuperscript{59}

The River’s Edge: an Opportunity to Curate the Monongahela River

From the railroad that brought cars to the car dumper, there are excellent views of the Monongahela River. To the northwest of this rail line, the site’s edge is natural and wooded and the river is at grade. To the southeast, it is a man-made, concrete retaining wall and the river is tens of feet below grade, generally. In 2012, the Allegheny County Redevelopment Authority leased the six mooring cells next to the Carrie Furnaces site on both sides of the Monongahela

\textsuperscript{58} Author’s Interview with Ron Baraff
\textsuperscript{59} Strum, Nathan, former Project Manager, Allegheny County Economic Development. Interview with author. Pittsburgh, PA. 26 January 2015.
\textsuperscript{60} Photographs by Author
\textsuperscript{61} Ibid
to Gulf Materials, a Braddock-based water transit company, for a period of five years. In an interview with *The Pittsburgh Post-Gazette*, then ACED Director Dennis Davin noted, “Of greater value to the authority than the rent is that Gulf Materials will maintain the docking devices at no cost to the authority.”62 Views of the Monongahela and access to the river are important because the public’s changing attitude toward the river.63 For more than one hundred years, heavy industry separated riverfront communities in the Monongahela Valley from the Monongahela: riverfront communities forgot that they had a river.64

The Ore Yard: Where the Visitor’s Experience Should Begin

The ore yard impresses on visitors the scale of operations that took place at the Carrie Blast Furnace Plant. It is central to the historic site’s interpretation. If the stocking trestle were accessible, the public could view the ore yard, as well as Furnaces 6 and 7 and their hot blast stoves, from a different and exciting perspective. The ore bridge and its electric trolley, which was manned, are noteworthy artifacts and could offer impressive views to visitors.

Top from Left: The Monongahela River; The Ore Yard and Ore Bridge
Bottom from Left: The Electric Trolley; The Stocking Trestle; Bins under the Trestle

63 Author’s Interview with Nathan Strum
64 Ibid
65 Photographs by Author
66 Ibid
The Need for an Iron and Steel Museum

Rivers of Steel starts its tours in the Blower Engine House, where it exhibits the 48” Universal Plate Mill, built in 1899 and part of the Homestead Steel Works until 1979, as well as other artifacts from the Carrie Blast Furnace Plant and the Homestead Steel Works. Rivers of Steel also maintains a small museum in the Bost Building, its headquarters on Homestead’s main street, 8th Avenue. Pittsburgh has a laudable system of museums – The Carnegie Museums of Natural History and Art, the Carnegie Science Center, the Senator John Heinz History Center, and the Andy Warhol Museum – but the steel city does not have large-scale, comprehensive iron and steel heritage museum. An industrial museum that would narrate not only the story of steel production in the region, but also the story of life in Pittsburgh’s mill towns, would be a great contribution to the region’s cultural life. Pittsburgh Tribune-Review journalist John Conti argues that, despite Pittsburgh’s synonymy with steel, the city is behind other, smaller cities, including Coatesville, Pennsylvania, and Youngstown, Ohio, in establishing an industrial museum.

The Carrie Hot Metal Bridge is Central to the Heritage Site’s Interpretation

The Carrie Furnaces’ hot metal bridge is an infrastructural masterpiece. The Union Railroad donated the bridge to Rivers of Steel under the Railroad Banking Act. A condition of that donation was that the bridge must be connected to the Greater Allegheny Passage, a regional bicycling and hiking trail that extends from Point State Park in downtown Pittsburgh to Washington, DC. Rivers of Steel transferred the bridge to Allegheny County and included that same conditional clause in the transfer agreement. Fearing that the bridge’s approach would constrain development on the site, the Redevelopment Authority, a subsidiary of the county’s economic development department, demolished the bridge’s approach. The Redevelopment Authority intends to realize the proposed trail link to the Greater Allegheny Passage. The hot metal bridge is central to the interpretation of the Carrie Furnaces because it is the only evidence of the vertical integration of the Carrie Blast Furnace Plant and the Homestead Steel Works. Public access to the hot metal bridge would enhance the Carrie Furnaces’ interpretation.

68 Author’s Interview with Ron Baraff
70 Author’s Interview with Ron Baraff
71 Ibid
72 Ibid
73 Ibid
74 Author’s Interview with Erin Deasy
The Process of Re-naturalization is a Central Narrative in the Site’s Contemporary History

Tucked into the Carrie Blast Furnace Plant near Furnace 7, the Carrie Deer stoically surveys with an air of haunting whimsy the surrounding meadow, where a variety of vegetation assaults the foundations of demolished structures. Standing in the meadow, a torpedo car creates a strong visual juxtaposition against the overgrowth. Ron Baraff, the Director of the Rivers of Steel Museum and Archives, notes the site has “an amazing wildlife population” that includes red-tailed hawks. 78  

Master Gardeners from the Penn State University Extension School curated the site’s native and invasive species by designing plaques cast in iron at the Cast the Iron Garden event at the Carrie Furnaces. The “aerial gardens,” mosses that are growing on the plant’s structures, including on the stationary car dumper, are a point of contention between the Master Gardeners and Rivers of Steel: the Master Gardeners want to see the mosses conserved, but Rivers of Steel removes the mosses to protect the structures’ integrity. 79

75  Photographs by Author
76  Photograph by Drew Peterson
77  Photographs by Author
78  Author’s Interview with Ron Baraff
79  Meeting of the Penn State University Extension School Master Gardeners attend by the Author. Pittsburgh, PA.  27 Jan 15
3. State of Planning for the Carrie Furnaces Site

3.1. State of Planning at the Site Scale

In 2011, the Allegheny County Economic Development Department (ACED) received a $10 million Transportation Investment Generating Economic Recovery (TIGER) grant from the U.S. Department of Transportation to construct a railway flyover ramp from the Rankin Bridge interchange (Kenmawr Avenue) to the Carrie Furnaces site. The grant directs ACED to create 1,000 jobs within a five-year period following the ramp’s completion. Challenges the Redevelopment Authority must confront include a short time frame for completion, as well as balancing the achievement of this standard and the continued protection and conservation of the National Historic Landmark Carrie Furnaces. The Redevelopment Authority intends to issue a request for proposals (RFP) for the Carrie site once the ramp is open. Development proposals will need to respond to the challenge posed by this job-creation standard. The Redevelopment Authority will entertain responses that propose the redevelopment of the entire site by a single

80 Photographs by Author
81 Ibid
82 Author’s Interview with Erin Deasy
developer, as well as those that involve multiple developers. The redevelopment of the site by multiple developers will threaten the Carrie Furnaces Heritage Site if done haphazardly, as jumbled development will degrade the visitor experience. The establishment of design guidelines is thus imperative for the protection of the visitor experience.

The Redevelopment Authority drafted a Public Involvement Plan for the Carrie Furnaces redevelopment project in 2013. Prior to the Redevelopment Authority’s execution of site preparation work, the Redevelopment Authority engaged the public through the Carrie Furnaces Steering Committee, which includes municipal and Rivers of Steel representatives. The Redevelopment Authority expects that, once selected, the site’s developer (or developers) will hold public meetings, in cooperation with the Redevelopment Authority, to inform and engage the public. The public wants the redevelopment project primarily to create well paying, long-term jobs and a stronger tax base and, secondarily, an open recreational space. Jo Ellen Welsh, the daughter of a Homestead steelworker who worked in fundraising for Braddock Hospital and resides in Swissvale, remarks that members of the communities would like to see a “beautiful destination.” She adds, “We got screwed by the mills; now we want a say.”

3.2. The Site within Regional Plans

The Mon Valley Economic Development Strategy and Allegheny Places, Allegheny County’s comprehensive land use plan, situate the Carrie Furnaces in a regional economic and spatial framework.

The Mon Valley Economic Development Strategy proposes the segmentation of the Mon Valley into an innovation zone, centered on Pittsburgh’s research- and development-oriented Oakland neighborhood, and a production zone, within which inventions developed in the former zone might be commercialized. The strategy contends, “Without links [to] Oakland, the innovation economy and associated value-added opportunities will [bypass] the Valley.” The strategy identifies the site of a former coke works, operated by the LTV Steel Corporation, in Pittsburgh’s Hazelwood neighborhood as the anchor of this proposed innovation zone based on the site’s proximity to Oakland, the Pittsburgh Technology Center, and SouthSide Works. The Almono consortium is currently redeveloping this site. The strategy identifies the Carrie Furnaces site as the transition point between the innovation and production zones. For the site, the strategy recommends the implementation of “programs geared toward…the creative sector, technology start-ups and expanding technology-based enterprises, and younger adults and persons representative of the ‘creative class.’” This is where the strategy falls short. Within this innovation – production zone spatial framework, Carrie Furnaces site is unique because it is the only site on which there might be uses related to both innovation and production. The

83 Author’s Interview with Erin Deasy
84 Ibid
85 Author’s Interviews with Erin Deasy, Nathan Strum, and Ron Baraff
86 Welsh, Jo Ellen, resident of Swissvale, Interview with author. Pittsburgh, PA. 29 January 2015.
88 Ibid, 23
strategy fails to discuss the opportunities this creates. The uses the strategy recommends for the Carrie Furnaces site are strikingly similar to the uses proposed for the Almono site, which is closer to Oakland. Moreover, the strategy uses the terms ‘innovation’ and ‘production’ loosely. What do these terms mean in the context of the Carrie Furnaces site and the other sites that comprise this spatial-economic development framework? Robotics is a field that spans mechanical engineering and computer science as well as, in some instances, medicine and other scientific disciplines. It is a field for which Carnegie Mellon University and Pittsburgh are renowned and it is also a field in which Pittsburgh’s engineers have innovated. The research and development of robotics or digital manufacturing, for example, may be categorized as ‘innovation’ uses, but for the purposes of crafting implementing a strategic economic development plan, it is necessary to qualify terms like ‘innovation’ and ‘production’ with specific terminology or examples, like digital manufacturing. Likewise, what are “programs geared toward the creative sector”? Specificity would not only communicate the types of facilities that need to be built, but also give the reader a sense of how the strategy envisions the interaction of uses at Carrie, the geographic linchpin of the plan.

In addition, through an analysis of economic sectors (sector presence analysis, location quotient analysis, industry growth analysis, shift-share analysis, and industry targeting analysis), the *Mon Valley Economic Development Strategy* identifies extant, strong sectors to target for future growth. These sectors included amusement and recreation services. The strategy also identifies extant sectors that should be retained; these include research, development, and testing services. What would it mean to grow the Mon Valley’s amusement and recreation sector through the Carrie Furnaces site? Furthermore, what would this mean in the context of the Carrie Furnaces categorization as a transition point between the Mon Valley’s innovation and production zones? Could the redevelopment link the Carrie Furnaces Heritage Site to nearby Kennywood Amusement Park?

*Allegheny Places* recognizes the Carrie Blast Furnace Plant as an important historical and cultural resource and categorizes the redevelopment of the Carrie Blast Furnaces site as a top-priority economic development project. The comprehensive plan states the intent of Keystone Innovation and Keystone Opportunity zones, tax-exempt districts within Allegheny County designed to generate economic development and, in the case of the Mon Valley, to realize its segmentation into innovation and production zones as proposed by the *Mon Valley Economic Development Strategy*.

Keystone Innovation Zones (KIZs) are intended to foster innovation and create entrepreneurial opportunities…KIZs create ‘knowledge neighborhoods’ close to colleges, universities and research institutions that focus talent and resources in clusters…Entrepreneurs can find an unbroken chain of ready resources, including research and peer groups, entrepreneurial support, venture capital, and workforce and financial assistance.90

89 *Mon Valley Economic Development Strategy*, xxxiv

There is a Keystone Innovation Zone (KIZ) in greater Oakland, “a partnership between the University of Pittsburgh and Carnegie Mellon University, concentrating in software engineering, computer-related technologies, and medicine,” and a KIZ in central Pittsburgh, “a partnership between Duquesne University and Robert Morris University, concentrating in digital media, cyber security, nanotechnology, pharmaceutics and compliance engineering.” The Collaborative Innovation Center anchors the Greater Oakland Keystone Innovation Zone. Its purpose is to stimulate collaboration between Carnegie Mellon University and industry by providing proximate office and lab space for technology companies. The Collaborative Innovation Center is “a four-story, 136,000-square-foot, dry-lab research facility.”

Keystone Opportunity Zones extend tax incentives to property owners, businesses, and residents in economically depressed communities to stimulate revitalization. Designees include the former site of the Duquesne Steel Works, now the Regional Industrial Development Corporation’s City Center of Duquesne development, the former site of National Tube Works, now RIDC’s Industrial Center of McKeesport development, and the McKeesport Firth Sterling and Steel Foundry redevelopment sites. The Carrie Blast Furnaces site is likely to be designated a Keystone Opportunity Zone as the Allegheny County’s redevelopment of the site proceeds.

There is not an inherent conceptual problem with the segmentation of the Mon Valley into innovation and production zones; indeed, it is an idea informed by the Mon Valley’s economic history. The designation of Keystone Innovation and Keystone Opportunity zones, however, is not sufficient to cultivate a relationship between these zones, which is the stated objective of the KIZ – KOZ spatial-economic development framework. Tax incentives alone are unlikely to be sufficient to compel firms within KIZs to commercialize their inventions in KOZs. ACED must recruit firms and/or educational institutions interested in locating their research, development, and production facilities within the KIZ – KOZ spatial economic development framework. How could this framework increase firms’ or institutions’ productivity or create opportunities for collaboration? In addition, ACED must invest in the underlying infrastructure needed to support this framework.

3.3. The Site within the Region’s Economic Geography

To understand how the Carrie Furnaces site might fit into the Mon Valley as a transition point between the *Mon Valley Economic Development Strategy's* innovation and production zones, a more complete picture of the region’s economic geography is necessary.

The American consciousness continues to associate Pittsburgh and southwestern Pennsylvania with steel production. Although this association is a source of immense pride for some of the region’s residents, it is also outdated. Pittsburgh’s 21st century economy, built on the technical knowledge of the region’s workforce, includes specializations in advanced manufacturing, robotics, healthcare technology, and software.

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91 *Allegheny Places: The Allegheny County Comprehensive Plan, 4C-6 – 4C-7*
92 *Ibid, 4C-8*
The U.S. Cluster Mapping project provides an insightful, region-level snapshot of traded clusters in the Pittsburgh Economic Area. According to the project, Pittsburgh’s strongest traded clusters are

**Cluster (‘strong’ sub-clusters, other sub-clusters)**

1. **Education**
2. **Upstream Metals Manufacturing** *(iron and steel mills and forging, metal processing, metal products, wires and springs)*
3. **Financial Services** *(financial investment activities, credit bureaus, credit intermediation, monetary authorities - central bank, securities brokers, dealers, and exchanges)*
4. **Coal Mining**
5. **Information Technology** *(process and laboratory instruments, medical apparatus, electronic components, computers and peripherals, semiconductors, software publishers, software reproducing, audio and video equipment)*
6. **Oil and Gas** *(support activities for oil and gas operations, drilling wells, oil and gas extraction, oil and gas machinery, pipeline transportation, petroleum processing)*
7. **Metalworking** *(metalworking machinery, machine tools and accessories, hand tools, metal processing, fasteners)*
8. **Vulcanized Materials** *(clay products and refractories, glass products, rubber products)*
9. **Electric Power** *(fossil fuel electric power, alternative electric power, electric power transmission)*
10. **Downstream Chemicals** *(Processed Chemical Products, Dyes, Pigments and Coating, Lubricating Oils and Greases, Personal Care and Cleaning Products, Explosives)*
11. **Tobacco**

*Listed by Size of Cluster Based on Number of Employees
*‘Strong’ in this context implies a high level of job specialization in a cluster in this region.

Advanced manufacturers’ production facilities are spatially distributed across the region (see map 5). This distribution indicates a preference for sites in a suburban or rural condition. Zoning regulations, governmental incentives, and manufacturers’ space requirements likely influence this preference. There is some clustering of advanced manufacturers along the Allegheny and the Monongahela Rivers. The region’s largest advanced manufacturers by estimated regional employment, the Westinghouse Electric Company and the United States Steel Corporation, maintain plants in the Monongahela River Valley. Manufacturers of metals are dispersed throughout the region and tend to cluster near manufacturers of other industrial products (e.g., electrical components). Food processors and manufacturers of products related to the life sciences (e.g., chemicals, nutritional supplements) seem to prefer sites closer to the city’s center. The number of these manufacturers is small compared to manufacturers of electrical

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94 The following explains the U.S. Cluster Mapping Project’s methodology: [http://clustermapping.us/content/cluster-mapping-methodology](http://clustermapping.us/content/cluster-mapping-methodology).
components, metals, and industrial machinery.

The Westinghouse Electric Co. and the U.S. Steel Corp. maintain manufacturing facilities near the Carrie Furnaces site. Moreover, there are corporate research centers focused on metals, electrical apparatuses and equipment, asphalt, concrete, soils, steel, and aggregates nearby. The Monongahela Valley continues to support advanced manufacturing.

With limited exception, information and communication technology firms cluster in downtown Pittsburgh, near the Point, and in Oakland, near Carnegie Mellon University and the University of Pittsburgh (see map 6). One of the most prominent ICT firms with an office in Pittsburgh is Google. Google’s office is in the East Liberty neighborhood of Pittsburgh, in close proximity to CMU’s campus.

The region’s life sciences firms are clustered near downtown Pittsburgh and dispersed throughout Allegheny County and the neighboring counties (see map 7). The firms that are dispersed are manufacturers of medical devices (e.g., Bayer Co.; see map 5), scientific instruments, and laboratory apparatuses. The firms that are clustered near downtown include firms at the intersection of the life sciences and technology (e.g., Invivodota), firms engaged in work related to that of nearby research centers, and other life science firms (e.g., General Nutrition Corp.).
Map 6: Leading ICT Firms in the Region by Number of Employees *
* Due to space constraints some firms have been omitted

1. ANSYS Inc.
2. Crown Castle USA
3. Software Engineering Institute
4. Vocollect
5. Compunetix
6. Google
7. Fujitsu Consulting
8. TEKsystems, Inc.
9. NetApp
10. LANtek Computer Service
11. CIBER, Inc.
12. SDLC Partners
13. SDLC Partners
14. VITAC
15. Modcloth
16. Electro Optics Center
17. Electronics for Imaging

Map 7: Leading Life Science Firms in the Region by Number of Employees *
* Due to space constraints some firms have been omitted

5. GlaxoSmithKline Consumer Healthcare
6. Precision Therapeutics
9. Omnyx, Inc.
10. Invivodata
11. The Tomayko Group
12. Berkley Surgical Corp.
13. Thar Technologies
14. Net Health Systems
20. Instrumentation Industries
21. Red Path Integrated Pathology

Carrie Furnaces Site
Pittsburgh
In *Pittsburgh: Clusters of Innovation Initiative*, Michael Porter advises the City of Pittsburgh to “move from excellence [in] basic research to excellence in commercialization” by improving knowledge transfer from universities and research centers to the private sector.”95 The transfer and commercialization of basic research could occur at the Carrie Furnaces site given its location in a sub-region that supports advanced manufacturing. Moreover, the site’s proximity to Pittsburgh’s core is a valuable asset, given the importance of proximity between researchers and manufacturers. Susan Berger, author of *Making in America: From Innovation to Market*, explains, “…[proximity] is important not only for control and to avert disaster, but to accelerate time to market and to explore and develop multiple variants (and price points) of a new product.”96

2014 Revitalize American Manufacturing Act established the National Network for Manufacturing Innovation recommended by the Advanced Manufacturing Partnership Steering Committee.97 The Act provides federal funding, initially, for up to 15 institutes.98 When President Obama requested Congressional funds for the program, he envisioned the network

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98 Ibid.
expanding to eventually include 45 institutes. The Act requires private and non-federal sources to match federal funds. A few of the institutes currently operating include the following:

1. The Digital Manufacturing & Design Innovation Institute in Chicago, Illinois, a partnership between UI Labs and the Department of Defense;
2. America Makes in Youngstown, Ohio, a partnership between the National Center for Defense Manufacturing and Machining and the Department of Defense; and
3. The Institute for Advanced Composites Manufacturing Innovation, in Knoxville, Tennessee, a partnership between the University of Tennessee, Knoxville/Department of Energy.

ACED and the Redevelopment Authority should look to shepherd a NNMI institute in Pittsburgh and consider proposing the Carrie Furnaces site as its location.

The Advanced Manufacturing Technology Consortia (AMTech Program) under the National Institute for Standards and Technology within the Department of Commerce awards grants to consortia to research and disseminate new advanced manufacturing technologies. ACED and the Redevelopment Authority should also consider marshalling an AMTech-funded consortia on the Carrie Furnaces site.

A systematic approach to innovation policymaking could aid in the site’s redevelopment by purposefully linking its future uses to the region’s academic, government-sponsored, and corporate research centers.

With regard to the redevelopment of the Carrie Furnaces site, the Redevelopment Authority could pursue one or any combination of the following strategies:

1. Entice firms within the region to relocate to the site or to expand their operations at the site;
2. Attract new firms to the region;
3. Create an incubator space on the site with the objective of scaling start-up; or
4. Create a university-industry partnership that may include an educational or research component and a technical or production component related to prototyping or the commercialization of inventions.

Given the site’s categorization as a transition point between the Mon Valley’s innovation and production zones and the availability of federal financial incentives, the Redevelopment Authority should pursue the last of these strategies first.


4. Gaps in the Plan for the Carrie Furnace Site’s Redevelopment

The Redevelopment Authority commissioned a conceptual master plan for the Carrie Furnaces site in 2005 and subsequently revised this plan in 2009 and 2011.¹⁰¹

The Redevelopment Authority intends to establish design guidelines for the Carrie Furnaces site, but it has not yet done so.¹⁰³ A visual analysis of the Redevelopment Authority’s conceptual plan indicates that a potential guideline might be to create views of the Monongahela River and make the river publicly accessible. Although this guideline is commendable, additional guidelines are needed, especially given the historical and cultural significance of the Carrie Furnaces Heritage Site.

Although the plan indicates that there should be a relationship between the site’s new buildings and the Monongahela River, the plan does not indicate how, if at all, new construction on the site should relate to the Carrie Furnaces Heritage Site. In addition, the concept segments the site into five sections and, with the exception of the proposed *meandering trail and green area*, which parallels the river, does not propose or indicate that there should be a spatial or spatial...

¹⁰¹ Author’s Interview with Nathan Strum
¹⁰³ Author’s Interview with Erin Deasy
programmatic relationship between these sections. Where the Carrie Furnaces Heritage Site and Development Area 2 meet there is a green buffer, rather than a civic space. This will diminish the capacity of the Carrie Furnaces to confer distinction on the new development. Moreover, this indicates that the Carrie Furnaces is not anticipated to be an amenity for those employed on the site.

The Carrie Furnaces’ hot metal bridge is crucial to the historic site’s interpretation, as it is the only evidence of the Carrie Furnaces’ vertical integration. The conceptual plan does not indicate how, if at all, the bridge will be interpreted for visitors. In addition, the plan fails to conceptualize view corridors through the site – from the Carrie Furnaces Heritage Site, looking toward the new development, and from the hot metal bridge looking toward the Carrie Furnaces Heritage Site. The plan places a large parking lot in the view corridor.

Although the flyover ramp from the Rankin Bridge interchange will improve site access and establish a direct link between the site and Rankin, the Redevelopment Authority’s conceptual plan falls short of fully integrating the communities of Rankin, Swissvale, and Braddock into the site. While AECO is aware of the programmatic shortfall of The Waterfront, the development on the site of the former Homestead Steel Works, it is not cognizant of the urban design shortfall of The Waterfront. The development’s rear is oriented toward Homestead’s historic main street, 8th Avenue, and there is only one point of pedestrian access from Homestead, via Amity Street. Amity Street is not designed for pedestrians, and walking from Homestead to The Waterfront is unpleasant. The conceptual plan for the Carrie Furnaces site repeats this urban design failure.

The Mon Valley Economic Development Strategy and Allegheny Places articulate the Redevelopment Authority’s intent to develop knowledge, technology, and innovation industries at the Carrie Furnaces, but the Redevelopment Authority has not pondered the potential of this program to interpret the site and Mon Valley’s history as a manufacturing region. Discussing the potential of a showpiece manufacturing facility, Nathan Strum, a former project manager for ACED, notes, “I think it would succeed here because people have [an] interest in seeing how things are actually made, what the process really is…”

5. Conclusion

The historic and culturally important elements of the Carrie Blast Furnace Plant are the stationary car dumper, the ore yard, the ore bridge, the stocking trestle, the stock house, the Carrie 6 and 7 hot blast stoves, the hot blast stoves’ draft stack, the Carrie 6 and 7 blowing engine house, the AC power house, the Carrie Hot Metal Bridge, and the Carrie Deer. These elements constitute a heritage site that should remain the focal point of the redeveloped site.

105 Author’s Interview with Nathan Strum
106 Ibid, 6
The ore bridge and the stocking trestle are striking visual and historical elements that should inspire the design for the site. The river’s edge should be curated. The site needs a large-scale iron and steel museum and the blower engine house and the AC powerhouse should comprise this museum. In honor of the Carrie Deer and story of the site’s recent past that it conveys, the design for the redevelopment should conserve the site’s landscape and incorporate the landscape and nature conservation into the design.

The downward socio-economic spiral of Rankin and Braddock began as recent immigrants’ economic prospects improved and residents’ housing preferences changed. Economically, Swissvale is comparatively better off, but the community is segmented by transit infrastructure into better- and worse-off enclaves. These communities need an economic stimulus, and Rankin, especially, needs the Carrie Furnaces site to provide it with a sustainable tax base. The symbiotic relationship between these communities must be restored. These communities must be reconnected to the Carrie Furnaces site. The site and these communities must be viewed as a socio-economic-cultural-historical system. A redeveloped site will not flourish as long as blight persists in its vicinity, so the Carrie Furnaces project should be an agent for the integrated redevelopment of the wider tri-borough area.

The Mon Valley Economic Development Strategy and Allegheny County’s comprehensive plan frame the Carrie Furnaces site as a transition point within the spatial-economic development framework of innovation and production zones. Keystone Innovation Zones and Keystone Opportunity Zones are the mechanisms through which ACED is creating this framework. The Mon Valley Economic Development Strategy fails to put forth a vision for the Carrie Furnaces site as the linchpin of this strategy, however. What should be the relationship between innovation and production uses on the site? Given the site’s location within an advanced manufacturing region, the site could support a university-industry partnership. This would, potentially, involve the research, development, and commercialization of products on the site. How might a program of this sort interpret the Carrie Blast Furnace Plant as a place of 19th- and 20th-century manufacturing? How might a program of this sort take advantage of federal, advanced-manufacturing financial incentives?

The Redevelopment Authority’s current conceptual master plan for the site fails to envision a relationship between the site’s new development and the Carrie Furnaces Heritage Site. The Carrie Blast Furnace Plant should be the icon for this new development, not merely a compatible use on the site. It is the repurposed plant that will distinguish the redeveloped area. The county’s master plan needs to be revised so as to seize the opportunity presented by the repurposing of the historic blast furnace and its integration into the new development as a regional symbol, attraction, and amenity.
5 Principles, Program, and Design

Introduction

Building on my analysis of the Carrie Blast Furnace Plant, the Carrie Furnaces site, and the neighborhoods of Rankin, Swissvale, and Braddock, I apply lessons learned through a study of internationally acclaimed industrial heritage redevelopment and conservation projects to the Carrie Furnaces site by drafting design principles. To illustrate the intent of these principles, I propose a conceptual program and design for the site. These principles are intended to inspire the redevelopment project’s design, and are meant to preserve the ethos of industry on the Carrie Furnaces site.

The site’s elements – the Carrie Furnaces Heritage Site, the Carrie Hot Metal Bridge, and the Rankin Bridge – segment the site into three sections. I segment these sections into three additional sections based on my design proposal (see map 9). I will refer to these sections, from southeast to northwest, as The Manufacturing District, The Mon River Walk, The Museum of Contemporary Manufacturing, Ore Yard Square, The Carrie Furnaces Heritage Site and the Carrie Homestead Steel Museum, and The Industrial Meadow.

Map 9: Programmatic Division of the Site

1. The Manufacturing District
2. The Mon River Walk
3. The Museum of Contemporary Manufacturing
4. Ore Yard Square
5. The Carrie Furnaces Heritage Site
6. The Industrial Meadow
1. Design Principles and Conceptual Program

Based on my analysis of the site and the neighboring communities, as well as my research on similar, internationally renowned projects, I propose that the Redevelopment Authority adopt the design principles listed in the matrix below. In addition, I recommend two interventions by which a developer, along with the Redevelopment Authority, could put into practice these principles.

<table>
<thead>
<tr>
<th>Principle</th>
<th>Intervention 1</th>
<th>Intervention 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Focus the project on the Carrie Blast Furnaces 6 and 7 National Historic Landmark Site</td>
<td>Make the Carrie Furnaces a nexus of cultural and recreational activity on the site</td>
<td>Use historic forms and materials similar to the Carrie Furnaces in any new structures on the site to reinforce the industrial aesthetic and pay homage to the ethos of industry</td>
</tr>
<tr>
<td>2. Interpret the history and national, regional, and local significance of the Carrie Furnaces and the Monongahela Valley</td>
<td>Unite contemporary uses with the site’s historical purpose under the theme of “Making” (e.g., from the metal arts to high-tech research and development)</td>
<td>Rebuild certain demolished elements of the Carrie Furnaces (as contemporary buildings); Create the Carrie Homestead Steel Museum</td>
</tr>
<tr>
<td>3. Make the Carrie Furnaces site a regional destination</td>
<td>Mix uses, including tourism, research, development, manufacturing, art and culture, and recreation</td>
<td>Make ALL of the uses on the site an attraction</td>
</tr>
<tr>
<td>4. Connect the communities of Rankin, Swissvale, and Braddock to the site</td>
<td>Construct footbridges between the hilltop neighborhoods and the site to reestablish historic connections; Design to recall the Carrie Furnaces’ Footbridges</td>
<td>Create a multi-modal connection between the site and Braddock</td>
</tr>
<tr>
<td>5. Curate and design the landscape to tell the story of the Carrie Deer and an environmentally cleaner Monongahela Valley</td>
<td>Conserve evidence of the site’s re-naturalization; Make the river’s edge accessible and curate views of the river</td>
<td>Design complimentary and contrasting gardens in the Ore Yard Square and around the Museum of Contemporary Manufacturing</td>
</tr>
<tr>
<td>6. Build on the legacy of public art at the Carrie Furnaces Heritage Site</td>
<td>Incorporate public art into the site’s design</td>
<td>Design a permanent light installation for the Carrie Furnaces</td>
</tr>
</tbody>
</table>
Illustrative Design

- Retail, Makerspaces, Galleries, Dining
- Museum of Contemporary Manufacturing Pavilion
- Traditional Manufacturing
- Promenade and Square
- Gradient of Planting (Wooded to Lawn)
- Boat Path
- Major Pedestrian Path
- Minor Pedestrian Path
- Other Pedestrian Path
- Road
- Rail
- Interpretive Point
- Parking
1. Carrie Furnaces Heritage Site
2. Museum of Contemporary Manufacturing
3. Approach to the Carrie Hot Metal Bridge
4. Restored Stocking Trestle
5. Restored Shed-style Factory Building and Smokestacks
6. Glass Atrium
7. Site-Specific Retail, Makerspaces, and Galleries
8. The Mon River Walk
9. Ore Yard Square
10. Visitor Center
11. Ice-Skating Rink
12. Blast Furnaces 3 and 4 Pavilion
13. Dock
14. Pedestrian Bridges
15. Pedestrian and Bicycle Connection to Braddock
16. The Industrial Meadow
17. River Access
18. In-ground Amphitheater
1.1. Focus the Project on the Carrie Blast Furnaces 6 and 7 National Historic Landmark Site

The National Park Service conferred National Historic Landmark status on the Carrie Blast Furnaces in 2006. The 6 and 7 blast furnace plant is of notable historic and cultural value. It is the most recognizable, non-operational blast furnace plant in the Pittsburgh region. The plant represents a century of iron and steel production in the Monongahela Valley as well as life in the Monongahela Valley’s communities. In addition, the plant is of technological value as Furnaces 6 and 7 are representative of pre-World War II smelting technology in the context of a vertically integrated manufacturing process. Redevelopment of the site must focus on and respect this heavy industrial National Historic Landmark (see design, item 1). Ore Yard Square should be a nexus of cultural and recreational activity.

For the Carrie Blast Furnaces to be the focal point of the site, the design should create a visual relationship between the blast furnace plant and any new construction. The emergence of an authentic design requires a relationship or an exchange between the contemporary and the historic. The medium for this exchange should be materiality and architectural forms. The Carrie Furnaces produced molten iron for steel, a revolutionary building material in its time, which was used in buildings and structures across the site. From an interpretive perspective, steel remains the most appropriate building material to use at the Carrie Furnaces site, employed either in traditional or contemporary forms of steel construction. Contrasts of new and old uses of steel could give the site a powerful interpretive aesthetic.

1.2. Interpret the History and National, Regional, and Local Significance of Carrie Furnaces and the Monongahela Valley

In order to preserve site’s and the Monongahela Valley’s ethos of industry, the design must convey the blast furnace plant’s historical function, the production of iron for steelmaking, as well as the cultural identity of the Monongahela Valley as a manufacturing region—a place where people are makers. The program of the site can be a medium of interpretation as well as an economic stimulus. The re-introduction of production to the site through 21st-century technologies of digital “making,” designing, engineering, prototyping, and experimentation could thematically unite the site’s contemporary uses and the blast furnace plant’s historical function.

The investments made in Pittsburgh’s workforce and its educational, social, and cultural institutions have laid the foundation on which Pittsburgh’s 21st-century economy is being built. Extending this economy from Oakland to the Carrie Furnaces site will strengthen this narrative in a way consistent with the Furnaces’ and the Valley’s past. 20th-century Pittsburgh made steel. 21st-century Pittsburgh makes robots and robotics, human tissue, medical devices, and specialty materials, including steel products, at least in higher concentration than almost any other major metropolitan area in America. The site’s program may include the production of high value components and assemblies, especially those whose medium is metal. Since metal can now be digitally printed, this technology is a means to reintroduce steel making and some forms of fabrication to the site. The site’s program may also include wet and dry laboratories and/or small-batch prototyping facilities as well as makerspaces for artists and craftsmen. Facilities
to house these production functions should be designed as workplaces and as exhibits: these production facilities should be housed in a Museum of Contemporary Manufacturing (see design, item 2). By demonstrating 21st-century production to the public, these living exhibitions can connect the past to the present and inspire Pittsburgh’s next generation of makers. The Digital Manufacturing and Design Innovation Institute (DMDII) in Chicago, Illinois, could serve as a model for this. DMDII is a research institute dedicated to the development, demonstration, and deployment of digital manufacturing technologies. DMDII is a cooperative initiative between UI LABS, “a Chicago-based research and commercialization collaborative,” and its extensive network of partners in industry, academia, and government.

The remains of the Carrie Blast Furnace Plant give a sense of the huge scale of the Homestead Steel Works and steel production in the Monongahela Valley and in Pittsburgh. Recalling the scale of integrated steel production in the future development of the site would help users and visitors to understand that that Furnaces 6 and 7 were not isolated, but existed within a vast network of relationships. For example, as a large local employer of skilled and unskilled workers, it was an intra- and inter-communal nexus and, as a blast furnace plant, it was a part of U.S. Steel’s system of coke and iron works and steel mills in the Monongahela Valley. Reinforcing or re-establishing some of these historic relationships (physical and emotional; economic, social, and cultural), to the extent possible, will contribute to the development of a more authentic design. In addition, this could interpret the furnaces’ historic relationships for visitors. To understand the blast furnace plant’s former scale and context, the project should restore selected, demolished elements of the blast furnace plant that are critical to understanding how it functioned. Most important are 1) restoration of the approaches to the Carrie Hot Metal Bridge, which connected the furnaces to steel fabrication plants on the other side of the river; 2) restoration of the furnaces’ stocking trestle used by ore- and limestone-transfer cars and coke cars; 3) selected reconstruction of shed-style factory building and smokestacks that once existed near the AC power house (see design, items 3, 4, and 5). The reconstructed stocking trestle should be a promenade that offers visitors another perspective of 1) Furnaces 6 and 7 and their hot blast stoves; 2) the Monongahela River; and 3) the Industrial Meadow. The footbridges through the ore bunkers at Duisburg-Nord Landscape Park could serve as models for such construction.

Although 19th-century preservationist William Morris lambastes restoration in the “Manifesto of the Society for the Protection of Ancient Buildings,” in this case it is justified. Morris opposes restoration because of his view that it fraudulently implies that it is possible to return a building or other work to its original state, and, as records of human action in different centuries, he appreciates stylistic and material contrasts. The purpose of the restoration of selected, demolished elements of the blast furnace plant is not to recreate the plant as it was, but to refer to the plants’ former scale and context and through this, to interpret the plant and cultivate public memory. A precedent for this could be Bernard Tschumi’s Le Fresnoy National Studio for Contemporary Arts in Tourcoing, France. The shed-style building adjacent to the former AC power house should be restored based on its former image, its smokestacks may

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2 UI LABS. “About.” No Date. Web. 3 May 15. [http://www.uilabs.org/#about]
be restored in glass, and a glass atrium could connect this building to the adjacent shed-style building (see design, item 6).

This cluster of historic plant sheds, reconstructed in contemporary idiom, in conjunction with Furnaces 6 and 7 and the interpretive site features, will provide the infrastructure for a new Carrie Homestead Steel Museum. Intended as a regional educational attraction for visitors from a broad audience, the museum will narrate the histories of:

- steel production (the process, steel mill design, the engineering and function of railroads and waterways),
- steelworkers (including African-American and female steelworkers), and
- life in the Monongahela Valley and Pittsburgh’s mill towns.

1.3. Make the Carrie Furnaces Site a Regional Destination

To stimulate the local economy and remain commercially viable, the site must attract workers and visitors from throughout the region. With regard to tourism, there should be more than one reason for the public to visit the site. Sustaining the public’s interest in the site and attracting repeat visitors is critical. Rivers of Steel currently organizes cultural and social events at the Carrie Furnaces to entice prior visitors to visit again, for example. An expanded program may include recreation, education, entertainment, culture, and artistic creation as well

as dining and site-specific retail (e.g., the sale of products made in the Museum of Contemporary Manufacturing or the artistic creations made onsite) (see design, item 7). For private sector investment, it is essential that the site also become a workplace for 21st-century occupations, from research to development and digital production. This combination of activities can be mutually reinforcing and can create a critical mass of attractions on the site.

The site’s workplaces must be attractions, in and of themselves, as well as centers of employment. The Museum of Contemporary Manufacturing should also include production facilities and makerspaces. The manufacturing process within a small-batch prototyping facility could be a public exhibit, for example. From the outside, the public should be able to see the internal workings of small-scale factories, prototype testing facilities, and laboratories, for instance. The public should also be able to tour these production facilities. These facilities might include gallery and stores where prototypes or products made onsite could be displayed and/or sold. In addition, the site’s program should include makerspaces for artists, craftsmen, and the public, along with associated galleries and stores. Precedents for this include Artisans’ Asylum in Somerville, Massachusetts, Maker Works in Ann Arbor, Michigan, and TechShop in Pittsburgh’s East Liberty neighborhood.

With regard to recreation, a riverfront promenade and a bicycling and running trail should connect the Museum of Contemporary Manufacturing to the Carrie Furnaces Heritage Site and the Carrie Homestead Steel Museum (see design, item 8). This is an amenity for those who will work on the site as well as for local residents. The trail should connect via the Hot Metal Bridge to the Greater Allegheny Passage, a regional bicycling, running, and hiking trail.

Finally, the site demands a focal civic place that can interpret the Carrie Furnaces as a historic place of iron and steel making, which ties all of these activities together. Ore Yard Square, the space between the Carrie Furnaces and a new development northwest of the Carrie Hot Metal Bridge is potentially an excellent location (see design, item 9). This was the former ore yard for Carrie Furnaces No. 3 and 4. The river promenade and path network should terminate at Ore Yard Square, fronted, on one side, by Furnace No. 6, the No. 6 casting house, and the Carrie Homestead Steel Museum, and, on the other side, by commercial development, including restaurants, retail, makerspaces, and exhibits that will enliven the space. This space would be a good location for a visitor center for the heritage site as well as local recreational amenities such as an outdoor ice-skating rink/swimming pool (see design, items 10, 11). The ice-skating rink and swimming pool within Zollverein Park’s former coke works is a precedent for the Ore Yard Square’s recreational amenities. In addition, Carrie Furnaces No. 3 and 4, their hot blast stoves, and draft stacks should be rebuilt as contemporary landscape art (see design, item 12). The Orchideorama, a wooden mesh pavilion in the Medellin Botanical Garden in Medellin, Colombia, may provide a prototype for such a design. A canopy could span the “rebuilt” furnaces, hot blast stoves, and draft stacks. Under this canopy, restaurants could offer seating and, during the summer, this canopy could shade pool-goers. This landscape art would interpret the narrative of the site’s post-production re-naturalization and contribute to the site’s legacy of nature-inspired public art.
Nearby regional recreational destinations include Kennywood Amusement Park and Sandcastle Waterpark. There is an important historic relationship between the Carrie Furnaces and Kennywood Park. Kennywood Park, built amidst steel mills and accessible via trolley, opened in 1898 and served as an attraction for the region’s steel-working communities. There was once a ferry connection between Swissvale and Homestead. This water connection should be restored, but between the Carrie Furnaces site and Kennywood Park. The dock should be at the start of the promenade (see design, item 13). After docking, visitors may then walk along a river promenade, under the Carrie Hot Metal Bridge, and past production exhibition spaces and related stores to the site’s civic heart at Ore Yard Square and the Carrie Furnaces.

If a developer, along with the Redevelopment Authority, makes the site a regional destination, those who might regularly visit include:

- Workers (engaged either 21st-century manufacturing or in “traditional” manufacturing);
- Tourists (regional, national, and international);
- Makers, including inventors, artisans, and craftsmen;
- Artists;
- Residents of the neighboring communities;

• Children (to visit the Carrie Furnaces and to enjoy the site’s other amenities);
• Bicyclists, runners, and walkers as well as kayakers; and
• Shoppers (to buy specialty items available only at the Carrie Furnaces site).

1.4. Connect the Carrie Furnaces Site to the Communities of Rankin, Swissvale, and Braddock

At the height of steelmaking, the adjacent neighborhoods of Rankin, Swissvale, and Braddock were linked to the Carrie Furnaces and to one another. Suburbanization after World War II led to disinvestment in these neighborhoods. Rankin was later devastated by the closure of the Carrie Furnaces, an important source of tax revenue. This had both economic and physical consequences. The former pedestrian linkages between steelworkers’ homes and the mills fell into disuse and were severed. The site’s redesign must be conscious of these communities, their historical relationships to the site, and their contemporary economic needs. The more the Carrie Furnaces alleviate the blight on neighboring communities, the more attractive a cultural destination they will become. Reestablishing a physical connection between these communities and the Carrie Furnaces site is therefore imperative.

The design should connect the hilltop communities of Rankin and Swissvale to the site via pedestrian bridges (see design, item 14). Footbridges from Rankin and Swissvale to the site would be functional and would interpret the Carrie Furnaces’ past for the contemporary passerby. The Carrie Furnaces produced iron for steel for many American bridges. The connection of Rankin and Swissvale to the site via bridge would symbolize this contribution to America’s infrastructure, and would honor the labor of the steelworkers who commuted daily to the Carrie Furnaces by foot for decades. The form of the Carrie Furnaces’ footbridges should inspire the designs for these bridges. These bridges should also be designed to be an attraction – the design should curate aerial views of the site.

Braddock’s main thoroughfare, Braddock Avenue, is at the same elevation as the Carrie Furnaces site. Braddock Avenue was once a bustling, lively main street. The design should incorporate a pedestrian and bicycle connection between the site and Braddock (see design, 15). Preferably, the design should connect West Braddock Avenue to Braddock Avenue. Alternatively, the ramp that will extend from the site to Kenmawr Avenue should be designed to accommodate pedestrians and bicyclists as well as vehicles. For the site’s development to stimulate Braddock’s economy, a direct connection between the development and Braddock must exist.

1.5. Curate and design the landscape to tell the story of the Carrie Deer and an environmentally cleaner Monongahela Valley

The site’s evolving landscape and the Carrie Deer tell the story of what happened to the Carrie Furnaces after its shutdown – “after the work ended and people left.” Flora and fauna exiled from the site in the 19th-century have returned and flourished, creating some beautiful

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6 Author’s Interview with Ron Baraff
settings along the river. The design should conserve the site’s landscape as evidence of the site’s re-naturalization (see design, item, 16). This is a method of interpreting the Carrie Furnaces’ post-shutdown narrative, including the symbol of the Carrie Deer and the reality of a cleaner Monongahela Valley. Moreover, the site’s design should exemplify the 21st-century, symbiotic relationship between industry and nature — an inverse of the 20th-century, adversarial relationship between industry and nature. Today, manufacturers and science and technology firms seek environmentally and ecologically sustainable landscapes because these landscapes confer distinction, not only on their corporate headquarters, but also on their research and development and production facilities. Being “green” implies that a firm is committed to sustainable development and therefore an ethical choice for consumers.

River traffic on the Monongahela River connects the river, visually, to its past. Tugboats and barges remain a common sight. Despite the redevelopment of former steelworks downriver from the Carrie Furnaces site, the Monongahela remains a working landscape. The design must engage the river. The site’s design and programming must preserve, curate, and create views of the river from the edge and make the river publicly accessible (see design, item 17). This will contribute to the emergence of an authentic design because it will recall the historical relationship between the Monongahela River, the Carrie Furnaces, and the communities of Rankin, Swissvale, and Braddock. It will also create a new, contemporary relationship between the river, the Carrie Furnaces, and the public. This recollection is an interpretive method that will cultivate the public’s shared memory of the Monongahela. In addition, curating the river’s edge is a method of interpreting the historical and contemporary industrial site selection preferences.

To create an interaction between the site’s design and the natural landscape, the site’s design should incorporate gardens that complement the site’s natural landscape. These should be within the portion of the site between the Carrie Furnaces and the Hot Metal Bridge and between the Hot Metal Bridge and the Rankin Bridge, respectively. Creating this interaction will contribute to the design’s authenticity. The proposed pedestrian bridges extending from the communities of Rankin and Swissvale should be viewing platforms for these gardens; the gardens should be an attraction in and of themselves. The gardens will contribute to the site’s economic model, that is, the successful marketing of the site as a regional destination.

1.6. Build on the Legacy of Public Art at the Carrie Furnaces

There is a rich, contemporary legacy of public art at the Carrie Furnaces Heritage Site. Artists’ surreptitious sculpture of the Carrie Deer re-framed the image of the Carrie Furnaces in the public’s mindset. The creation of art on the site prompted the public to see the Carrie Furnaces as art — as a sculptural object representative of Pittsburgh’s Age of Steel and its wane. The Carrie Furnaces’ public art, including the site’s graffiti wall (the former ore-yard wall) and temporary, small-scale art installations, as well as the Carrie Deer, contribute to an aesthetic that attracts a younger demographic to the site. In addition, Rivers of Steel has organized a number of special events at the intersection of art and metalworking that have raised the public’s awareness of the site and its history and attracted large crowds to the Carrie Furnaces. The site’s design should build on this legacy of public art. The Carrie Furnaces site should be a destination
for art, especially the metal arts. The site could also be a destination for music. Within the Industrial Meadow, an in-ground amphitheater could be constructed (see design, item 18). With the Carrie Deer and the blast furnace plant as its backdrop, this would be a special performance venue. Making the Carrie Furnaces site a destination for the arts will contribute to the site’s economic sustainability and its vibrancy, as well as that of the wider Pittsburgh region, which has a burgeoning cultural scene. In addition, the incorporation of public art into the site’s design will also interpret the Carrie Furnaces’ recent history and the narrative of the site’s redevelopment.

Light installations are a design element common to Duisburg-Nord Landscape Park, Zollverein Park, Belval, and Parque Fundidora. The Carrie Furnaces’ redesign should include a permanent light installation, as well. The Monongahela Valley’s steel mills once illuminated the night’s sky, and the Edgar Thomson Steel Works in Braddock continues to pierce the Valley’s nighttime darkness. The artistic illumination of the Carrie Furnaces would be a poignant method of interpreting the relationship between the Valley’s coke, iron, and steel works and its communities.

![Lighting Design at Duisburg-Nord Landscape Park](image)

The Lighting Design at Duisburg-Nord Landscape Park

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7 Andy_BB. “Duisburg-Nord at Night.” *Flickr*: No Date. Web. 6 Apr 15. Creative Commons License.
2. Conclusion

Internationally renowned heavy industrial heritage redevelopment projects provide inspiration for conserving the historical and culturally important elements and characteristics of the Carrie Blast Furnace Plant, as well as the physical qualities of the Carrie Furnaces site. Combined with the histories and contemporary needs of the communities of Rankin, Swissvale, and Braddock, these cultural heritage assets inform the design principles this paper puts forth. The intention of these principles, as well as their illustration through a conceptual program and design is to inspire the imminent Carrie Furnaces redevelopment project, to persuade project overseers to preserve the site’s ethos of industry and the Monongahela Valley’s manufacturing culture, and to put forward the idea of using 21st-century manufacturing 1) to stimulate the local economy and 2) to interpret the Carrie Furnaces as a historic, vertically-integrated smelting plant through a Museum of Contemporary Manufacturing. The redevelopment of the Carrie Furnace site will likely be Allegheny County’s only opportunity in the near future to build a crucial link between Pittsburgh’s innovative districts and its distressed mill towns through the adaptation of an iconic industrial form to new economic, cultural, and recreational uses. This opportunity should not be wasted.
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