

# University of Cincinnati

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I, John Ritter, hereby submit this original work as part of the requirements for the degree of Master of Architecture in Architecture (Master of).

It is entitled:

**Infrastructure, Intervention, and Connectivity  
Exploring Urban Architecture through the Integration of Infrastructure and  
Landscape  
Cincinnati's Central Parkway**

Student's name: **John Ritter**

This work and its defense approved by:

Committee chair: Michael McInturf, M.Arch.

Committee member: Aarati Kanekar, Ph.D.



3585

**Infrastructure, Intervention, and Connectivity**  
**Exploring Urban Architecture through the Integration of Infrastructure and Landscape**  
**Cincinnati's Central Parkway**

A thesis submitted to the Graduate School of the University of  
Cincinnati in partial fulfillment of the requirements for the degree of

Master of Architecture

in the School of Architecture and Interior Design of the College of  
Design, Architecture, Art, and Planning by

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## **Abstract**

Central Parkway is an underutilized thoroughfare in the urban core of Cincinnati that has the potential to transform into a spine of development through urban design interventions. Recent urban development in Cincinnati has focused primarily on reestablishing amenities and pedestrian connectivity within the three core downtown districts, but it has not adequately sustained connectivity between these disparate districts.

Urban theorists and practitioners have long analyzed the overall benefits of connecting fragmented urban conditions. By analyzing extensive adaptive infrastructural precedents and drawing upon theories from scholarship in the fields of architecture, urban design, and economics, this project identifies effective design strategies for reconnecting downtown Cincinnati. These strategies will form the basis for a project whose objective is to catalyze environmental, economic, and mobility benefits for the City of Cincinnati.





## Acknowledgements

Thank you to all of those who contributed throughout this process and during the multiple design reviews. I would like to extend special appreciation to the graduate thesis committee for their time and coordination efforts and my classmates for listening, supporting, and providing thoughtful feedback throughout my time at the University of Cincinnati.

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Gratitude is especially due to the many professors in the School of Architecture and Interior Design and the Lindner College of Business that enriched my learning experiences during my graduate studies.

I am especially grateful to my brother, Michael Ritter, for his time and willingness to provide an outside perspective and editorial review.

Most importantly, I owe me greatest thanks to my wife, Stacey. Thank you for your constant love and support through the, at times, chaotic schedule over the past three years. Thank you for challenging me and encouraging me to continually pursue my passion for architecture and life.

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0.01 The underground subway in Cincinnati at Race Street Station.

## Part 1

### Introduction

For the past two centuries, history and economic circumstances have shaped Cincinnati's Central Parkway thoroughfare, overall for the better, but at times for the worse. A once-robust section of an industrial shipping canal, which was then excavated into an incomplete subway system, this vacant artifact once again awaits transformation. Just as the San Antonio Riverwalk, the New York City High Line, and the Vienna Gasometer projects have proved that abandoned infrastructural artifacts can be reappropriated as thriving urban systems, so too can Cincinnati reclaim the vibrancy and economic vitality of this two-mile stretch of idle infrastructure.

The abandoned subway below Central Parkway is meaningful because of its historical relevance in the city of Cincinnati. Like many abandoned buildings or structures, it has a mysterious and romantic quality spurring public interest, the publication of books, and content for online communities. Up until recent years, the tunnel has been accessed primarily by curious urban explorers and a small group of city enthusiasts for a biannual walking tour. The majority of residents, however, are unaware of the underground subway let alone its link to the city's past. Its potential in being uncovered and experienced by residents could add cultural value back into the collective memory of local citizens.<sup>1</sup> Inventing new urban spaces along Central Parkway and allowing access into this historical fragment can transform the vacant tunnel into a prominent symbol of the city. Central Parkway's street, buildings, vacant lots, and the underground subway are a combined infrastructural condition and cultural artifact. The subway is analogous to an archeological site. Rediscovering the subway, residents and visitors recover the knowledge of a physical landmark and a historical account of how the city of Cincinnati developed technologically, economically, and socially.

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<sup>1</sup> Aldo Rossi, "The Architecture of the City", (Cambridge, Mass.: MIT Press, 1982), 130.

While it has been suggested by some local Cincinnati architects and planners that the subway tunnel eventually be used for its intended purpose (i.e., transportation), such a project will likely never come to fruition due to the lack of population density and low public interest. The first question one must ask is, does Cincinnati really want a subway? Or, does the city want more places where you can live, work, and play without use of a car? While Central Parkway could provide both, the latter must come first. The southern section of Central Parkway could become a destination for living, working, and entertainment, defining a new densely populated district. The role of urban design and architecture provides the vision of a unique pedestrian-focused experience, adapting urban spaces and creating new programs that unite a buried infrastructure with the urban environment.

Central Parkway and the underground subway were conceived of as a thoroughfare connecting specific nodes. Today they remain perfectly situated to stitch together and further activate three detached downtown districts: Central Business District (CBD), Over the Rhine (OTR), and West End (fig 0.02). Cincinnati's economic vitality in its urban core has long been suppressed because of a lack of knowledge spillover, or the exchange of ideas, caused by years of misplaced suburban investments that have robbed density and coherence from its urban counterpart.<sup>2</sup> In the past decade, local developers and non-profits have invested heavily in Cincinnati's downtown, especially in Over the Rhine. The city can synthesize efforts by creating an urban system that will connect these districts that are now beginning to thrive. Strategic design and implementation will attract and retain additional talented workforce that will further ignite Cincinnati's capacity for greater knowledge spillover.

The Over the Rhine neighborhood continues to attract younger knowledge base workers looking for convenient urban living, adjacent to the highest concentration of jobs and economic activity in the Central Business District. Currently, Central Parkway operates as an organizing mechanism, designed for vehicle traffic, which discourages pedestrian access for newly arriving residents. Central Parkway also abuts historic landmark buildings and new office incubators, restaurants, retail, and housing developments. Rediscovering the subway by exposing strategic sections and integrating a public greenway along Central Parkway will provide the initial layers of urban renewal, linking the city dwellers through accessible landscaped paths, between districts and programs. This new public amenity will also attract development, drawing pedestrian activity to and through the city. Ultimately, this greenway will become a critical piece of the urban connective tissue that supports increased population growth and improved-quality urban living in downtown Cincinnati.

After careful analysis and application of urban infrastructure theories, this study will show how the aboveground condition along the same path as the concealed subway tunnel can be redefined as a combined interdependent system. This aboveground infrastructure exists and is spatially appropriate for development because of what the massive tunneling structure below the streets has mandated: an underutilized, eight-lane roadway that deprives the city of its urban identity. The unique position of Central Parkway, adjacent to the three separate districts, resulted from the industrial shipping canal that once connected and defined these same downtown districts. Activating this dormant infrastructure (above and below ground) could vastly improve the connectivity, density, and economic capability of Cincinnati's urban core.

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<sup>2</sup> Edward Glaeser, "Triumph of the City: How Our Greatest Invention makes us Richer, Smarter, Greener, Healthier, and Happier." (New York: Penguin Press, 2011) 6.

Observing how people currently circulate between CBD, West End, and OTR Districts indicates the intersections for the second layer of urban design intervention. Framing these naturally occurring zones with informal spaces and formal architectural development will amplify human interaction. Programming functions for the empty subway and expressing connectivity above and below the street strengthens legibility along Central Parkway. The subway and its stations have a defined spatial, material, and functional quality. This condition lays the foundation for new civic spaces, reestablishing forms of infrastructure that instigate human engagement and in person interaction. These include spaces for leisure and amenity (e.g., restaurants, cafés, and coffee houses), as well as new zones for testing technology (e.g., energy production and storage, and networking systems). The research, observations, and analysis put forward throughout this thesis will inform the design implications of a new urban system, greenway, and an architectural intervention responding to the site specific conditions along Central Parkway.

This study adds to the larger body of research and design testing that reutilizes, adapts, and reshapes urban infrastructural landscapes to improve the environmental, social, economic, and technological changes of the present and future.

### **Personal Note**

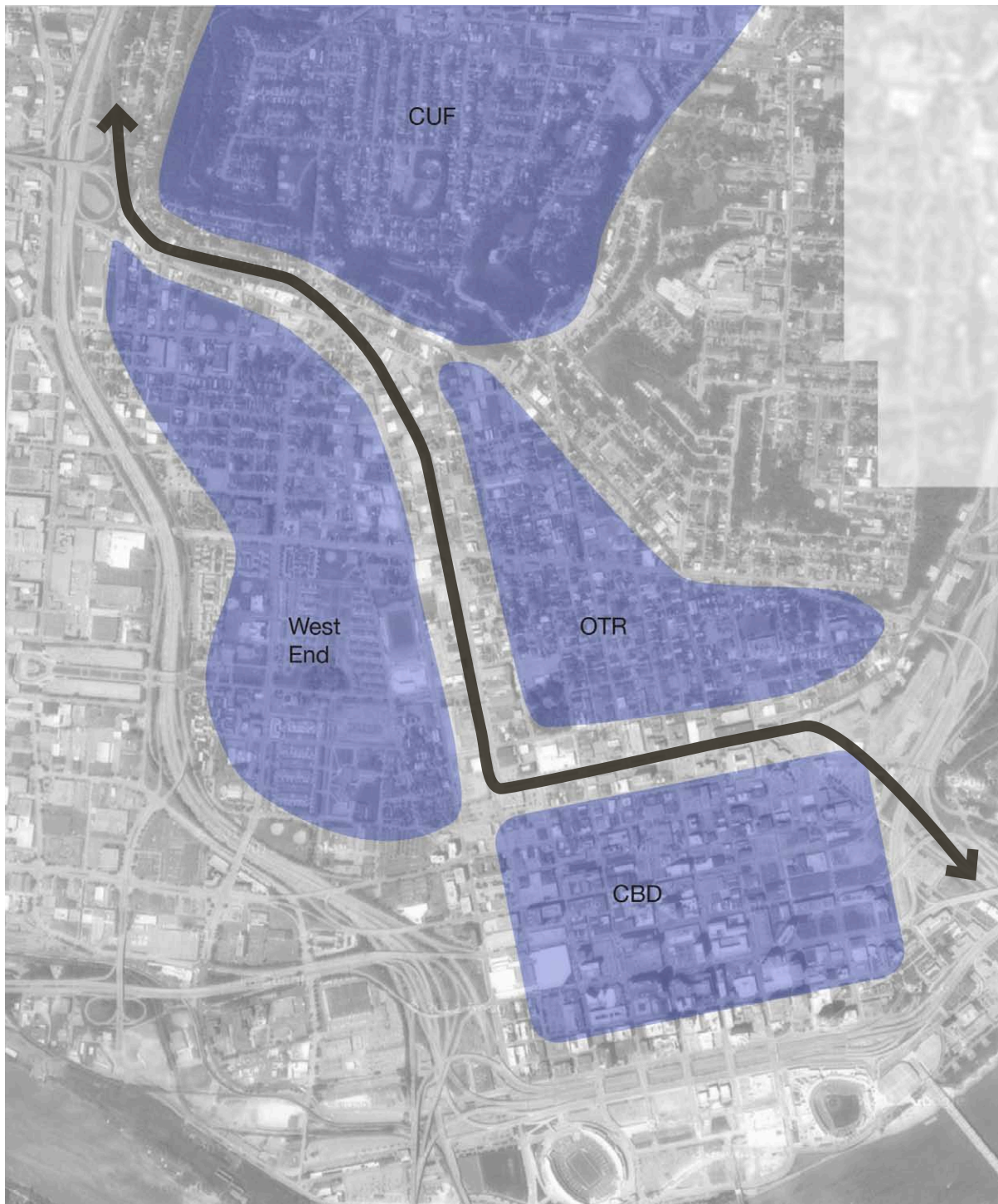
The topic for this thesis grew from my academic pursuits in architecture, urban design, and business along with several years of professional experience in architecture and urban design firms.

In a travel fellowship to Curitiba, Brazil in 2010, I explored interests intersecting architecture and urban planning. Curitiba is a compelling place, telling a story of a fast citywide transformation carried out in urban planning, public policies, social initiatives, and architecture. Exposure to Curitiba through this fellowship provided me new perspectives on how city planning impacts architectural experiences. Two major takeaways of my research included: 1) rethinking the role of an architect, in the case of Curitiba, as a politician and a visionary, with the ability to orchestrate major citywide transformations and 2) defining an architecture experience within the context of a city and its planning framework.

Academic pursuits outside of architecture led me to graduate studies in business, economics, and real estate. An obvious contrast exists between the subjects of architecture and real estate; I am interested in where these subjects overlap to define cross-disciplinary approaches to solve the increasingly complex problems in the world today. In broader terms, economics and design bridge the gap between architecture's captivation with buildings and real estate's development focus on financial performance analysis.

The research presented in this thesis explores multiple vantage points to engage in diverse perspectives that directly influence the field of architecture and the urban formation of cities.

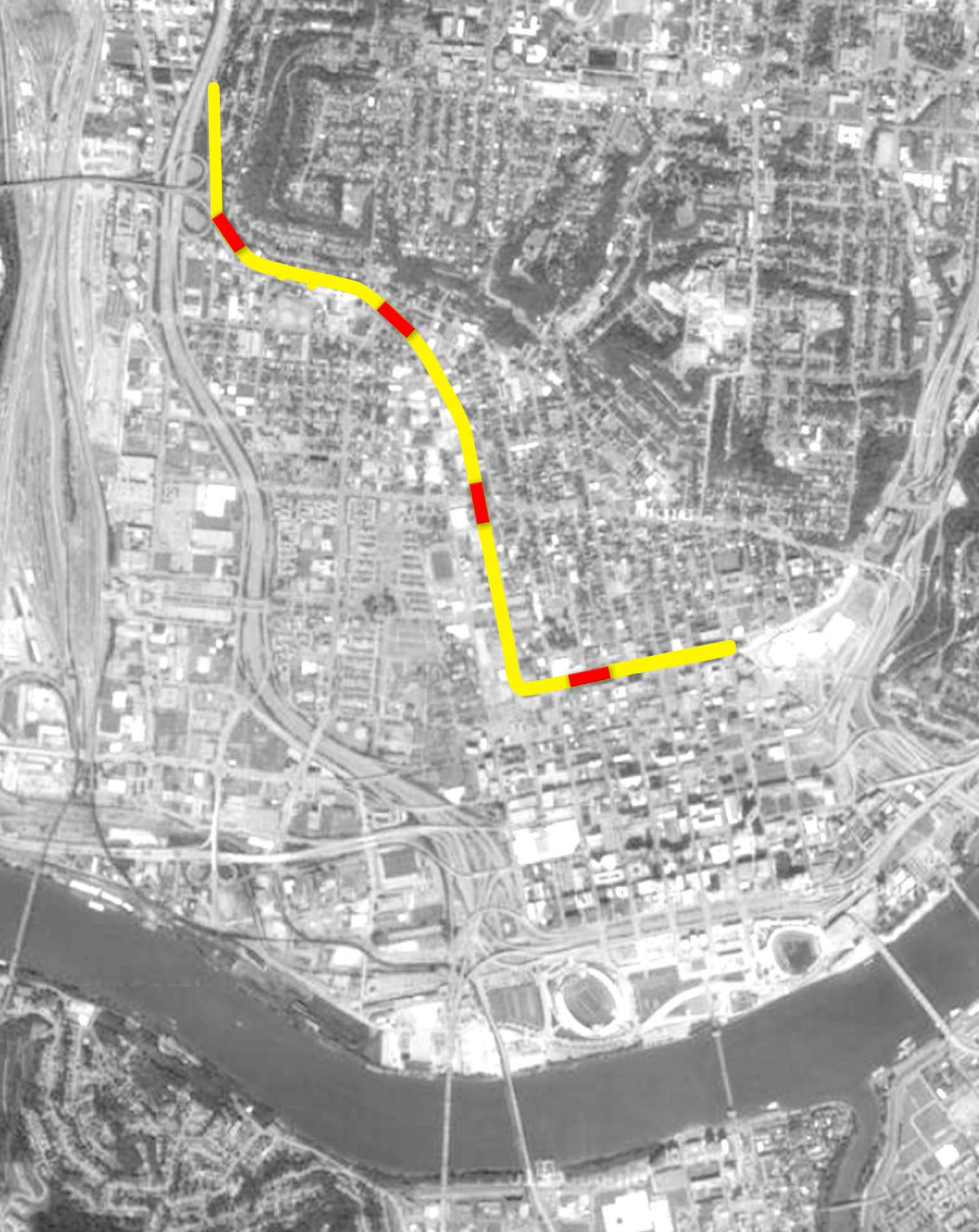
This has been a valuable endeavor, as no single profession is a silo unto itself. The varied sources in this thesis uncovered the interconnected and parallel conversations in urban, landscape, architecture, and economic theories.



0.02 (above) Map showing Over the Rhine, Central Business District, Clifton-Uptown-Fairview, and West End neighborhoods in Cincinnati. The black line indicates Central Parkway.

0.03 (right) The yellow line indicates the underground subway tunnel beneath Central Parkway. The red rectangles demarcate the existing subway stations below grade.







# 1 Conceptual Framework

Urban theorists and practitioners have analyzed the general benefits of connecting fragmented urban conditions and reusing abandoned structures. These theories have not yet been tested specifically in the unique context along Central Parkway and the underground subway as they exist today. The following is a brief introduction of authors, practitioners, and precedent approaches used as the conceptual framework for this thesis.

Roads, canals, docks, tunnels, funiculars, and trolleys are some forms of what we think of as infrastructure. The typical large-scale infrastructure project takes an extended period to complete, executed over multiple phases, and contingent on future circumstances. Eventually, infrastructure becomes outmoded, losing its utility and replaced or adapted, or, it can fade into a fallow and hidden cultural artifact. The site investigation along Central Parkway defines the abandoned underground subway, the Central Parkway roads and sidewalks, and the urban formation of buildings as a set of combined, historically significant infrastructural elements.

This conceptual framework begins with two influential theorists: architect Aldo Rossi and urban planner Kevin Lynch. Both Rossi and Lynch present research that has impacted the way architects and urbanists think of cities to this day.

Through the 1970s and 1980s, Rossi's theoretical and architectural work, greatly influenced the discipline. Rossi's writing reflected on cities as, "the collective memory of people, and like memory it is associated with objects and places. The city is the locus, or place, of the collective memory."<sup>1</sup> In the book *Architecture of the City*, Rossi provides context for how to envision city infrastructure as an urban artifact. Rossi describes an urban artifact as a collection of spaces, buildings, and programs that arrive, exist, and change over time.<sup>2</sup> This perspective shifts design thinking to consider the broader context and long-term contingent futures of a city's urban form. Here, urban architecture is a complex system constantly in motion.

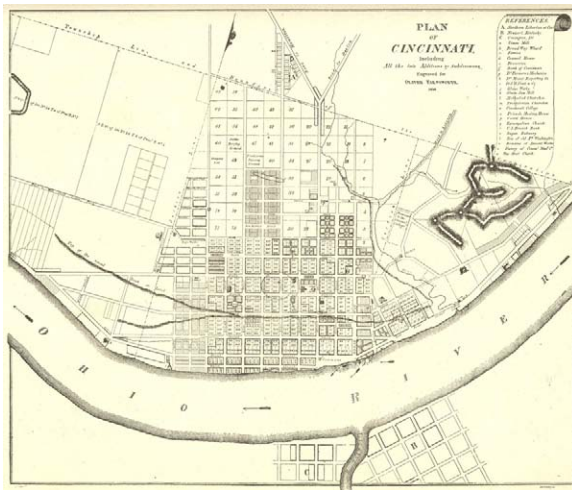
While Rossi's work challenged architects to reconsider a city's history, structure, and meaning over time, Kevin Lynch's research analyzed individuals in their perceptions of a city's character. In his influential text, *The Image of the City*, Lynch offers a lens to analyze existing conditions of urban space by defining five elements that make up a mental map of a city: paths, edges, districts, nodes, and landmarks (fig 1.07).<sup>3</sup> The five elements become tools to describe the existing conditions and proposed urban design interventions. These elements are critical when rethinking strategies to improve the quality and character of a city.

Architects, landscape architects, and urbanists have carried forward the conversations of Rossi and Lynch to the present day. In the past twenty years, the architecture discipline began engaging with adapting and defining infrastructure for the 21st century. Designing for new and existing infrastructure is relevant in how architects study the history of cities and define value in the urban collective forms over time. Infrastructure is also a powerful tool to reorganize landscapes that permit a city's ability to generate identity and legibility.

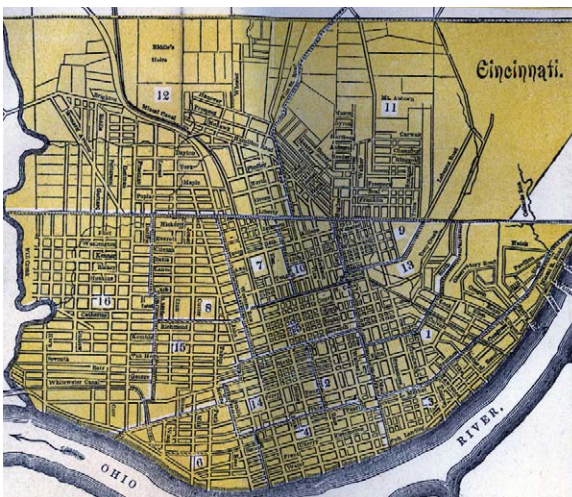
1 Rossi, 130

2 Rossi, 29.

3 Kevin Lynch. "The Image of the City," Cambridge, Mass.: MIT Press, 1960, 47-48.



1.01

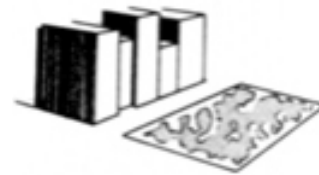


1.02

1.01, 1.02 Cincinnati maps depicting urban growth between 1815 (top) and 1855 (bottom).



Paths



Edges



Districts



Nodes



Landmarks

1.03 Kevin Lynch's five elements classify a set of urban scenarios that can create distinct memories and a mental map of a city.

Gary Strang connects ideas presented by Rossi and Lynch through infrastructural components in his essay, "Infrastructure as Landscape."

The potential these infrastructure systems have for performing the additional function of shaping architectural and urban form is largely unrealized. They have an inherent spatial and functional order that can serve as the raw material for architectural design or establish a local identity that has a tangible relationship to the region. They can be designed with formal clarity that expresses their importance to society, at the same time creating new layers of urban landmarks, spaces, and connections.<sup>4</sup>

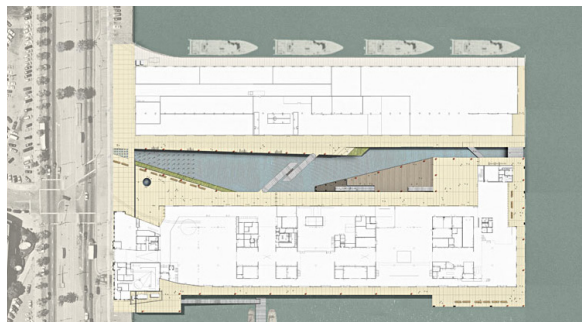
Strang's position is applicable in rethinking the use of Cincinnati's abandoned subway tunnel system. The tunnel conceived of as a spatial organization and "raw material", offers new avenues to investigate design strategies in the urban landscape at the architectural scale.

Infrastructure can also be described as an organizing mechanism. By this definition, infrastructure expands to a broader context of regulating systems. Keller Easterling discusses this notion in her essay "Fresh Field".

The building enclosures typically considered to be geometric formal objects have become infrastructural-physical, spatial media and technologies moving around the world as repeatable phenomena. No longer simply what is hidden or beneath another urban structure, many infrastructures are the urban formula, the very parameters of global urbanism.



1.04



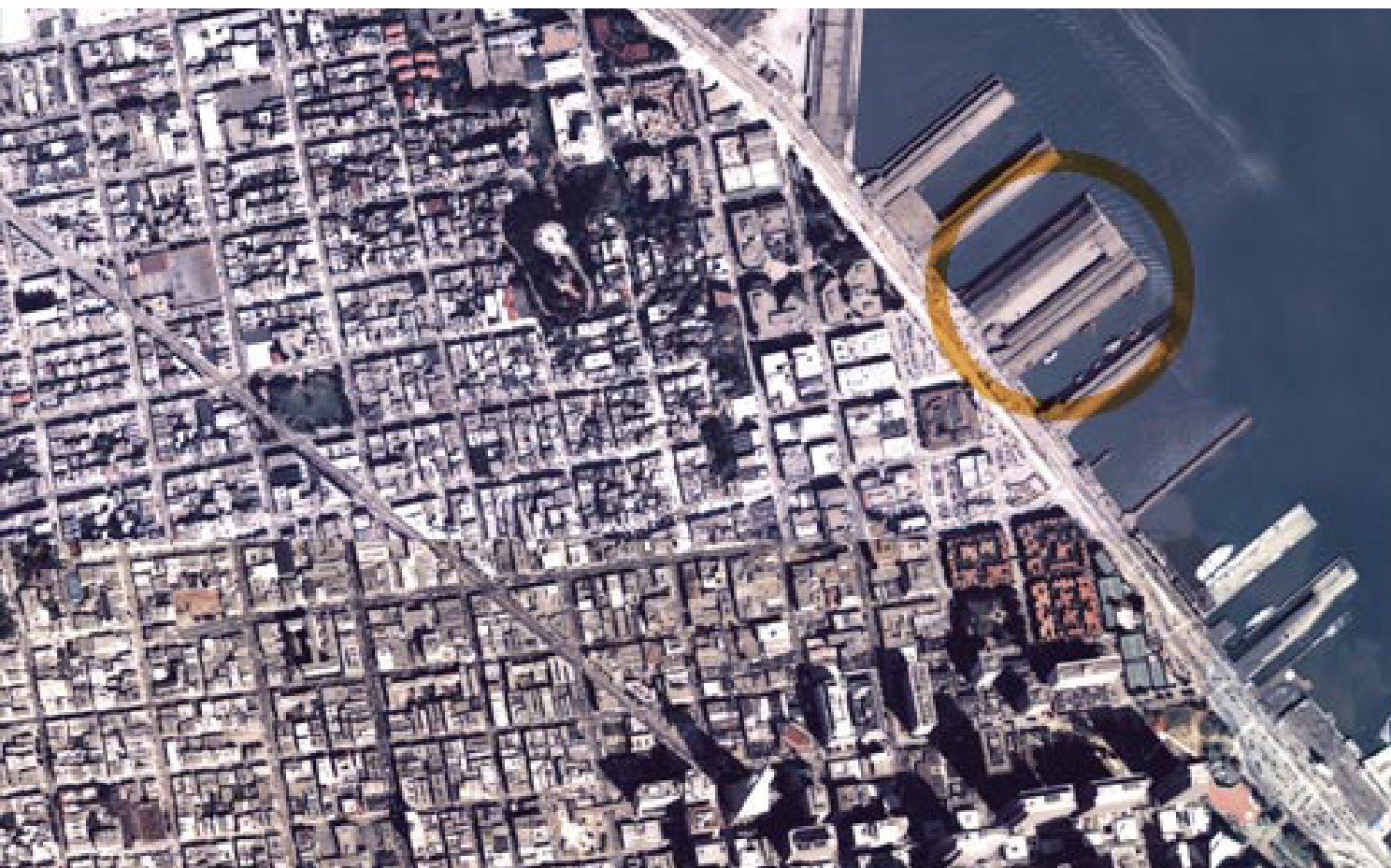
1.05



1.06

1.04, 1.05, 1.06 Exploratorium Science Museum, San Francisco, California. The images show the reuse and transformation of a pier in a underutilized stretch of waterfront in San Francisco.

<sup>4</sup> Gary Strang, "Infrastructure as Landscape," In *Theory in Landscape Architecture: a reader* (Philadelphia: University of Pennsylvania Press, 2002), 220-226.



1.07 (right) Aerial view site map of the Exploratorium Science Museum.

Infrastructure places buildings and even urban centers within a larger set of invisible parameters that define multiple scales. Easterling explains infrastructure as a “hidden substrate - the binding medium... between objects of positive consequence, shape, and law - yet also the point of contact and access, the spatial outcropping of underlying laws and logic.”<sup>5</sup>

The underground subway is a dormant organizing mechanism for Cincinnati. The subway’s status remains buried and abandoned. This condition creates a visible and distinct cavity in the downtown urban form.

Contemporary architects offer perspectives that explore alternative approaches that engage urban infrastructural landscapes. Designing a city block to defining a threshold between an exterior and interior space, architecture can respond to multiple urban conditions. Thom Mayne discusses this concept in his book *Combinatory Urbanism*.

Architects can and should deal with urban problems in projects of any scale. Our work has always been embedded in its urban circumstance, reflecting its layered and fragmented nature. Even our smallest projects claim no singularity but are instead dependent on and expressive of specific urban conditions.<sup>6</sup>

Several architects and urban designers today contextualize architecture creating lasting and evolving urban spaces; this in contrast to architecture conceived of as a static object in a city. Stan Allen offers a way of thinking about architecture as, “situated between the biological and the geological - slower than living beings but faster than the underlying ecology.”<sup>7</sup> Allen continues this idea:

In the design of a city, landscape, or territory, the question of process is shifted from design process - the short and limited province of the discipline - to the long life of a building, city, or landscape over time, enmeshed in complex social and cultural formation.<sup>8</sup>

Precedent analyses on infrastructural redevelopment at the building, district, and city scale offer paths to model successful urban design responses. Contemporary firms that integrate architecture and landscape with infrastructure include Stan Allen, James Corner, Diller Scofidio, Thom Mayne, Infranet Lab, and Lateral Office. Projects from these practicing firms apply design tactics that seek out performance and productivity, whether it is environmental, economic, or structural, that in turn gives shape to urban form. Conclusions drawn from precedent research can form a compendium of practical solutions that can be adopted to increase the vitality of the design proposal on the Central Parkway site.

5 Ibid.

6 Thom Mayne, “Combinatory Urbanism, The Complex Behavior of Collective Form” (Stray Dog Café, 2011), 11.

7 Stan Allen, “Landform Building: Architecture’s New Terrain” (Lars Müller Publishers, 2011), 21-22.

8 Ibid.

The site-specific context provides multiple layers to engage design scenarios. Existing structures, projects under construction, and planned projects for the future are synthesized in downtown Cincinnati to test the viability of Central Parkway's use as an urban corridor and connector. The existing conditions in Cincinnati, and along Central Parkway provide an apparent need for repairing urban fabric.

Planning and infrastructure improvements are a forecast into how the city might take form. This information provides a basis for multiple design operations that plan for contingency and promote the vitality of ongoing city proposals. The site analysis in Cincinnati also discovers symbiotic relationships in the built environment, framing the infrastructures of the city. This process creates guidelines for testing urban design and architecture strategies.

## 2 Context

### *Cincinnati*

Cincinnati lost over 10% of its population between 2000 and 2010.<sup>1</sup> The larger Hamilton County area also experienced a decline of 5%.<sup>2</sup> As the city has put many projects into place to support urban living in the city's core (e.g., Washington Park, Fountain Square, Fort Washington Way, and The Banks mixed-use development), continued outward shifts in population projections counteract future densification and development in the city's core neighborhoods. These projections are based on market research that designates financial resources toward infrastructural improvements (fig 2.01). Infrastructure is, however, a driver for development and population growth patterns. Continued suburban infrastructure is spreading financial resources away from the city center, exacerbating the effects of sprawling low density development. This hinders Cincinnati's urban core to develop at a faster rate.

Despite the global recession of 2009, there is still light at the end of the tunnel for Cincinnati. In 2011, downtown Cincinnati experienced a 12% growth in population, increasing to over 13,000 residents.<sup>3</sup> There have also been noticeable changes over the past three years as new businesses repopulate the historic Over the Rhine district. Non-profit organizations like 3CDC, Cincinnati Works, and United Way exemplify a collaboration of citizens and private firms investing financial and human capital back into the city.

Thus far, these encouraging efforts have focused primarily on reestablishing amenities and pedestrian connectivity within the three core downtown districts, but have not adequately addressed the need for connecting these disparate districts.

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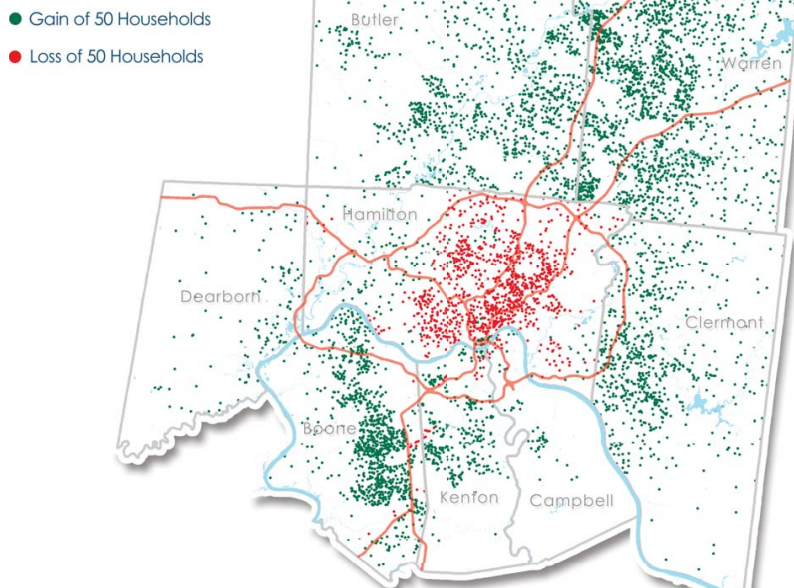
1 "Cincinnati QuickFacts from the US Census Bureau." State and County QuickFacts. <http://quickfacts.census.gov/qfd/states/39/3915000.html> (accessed March 1, 2013).

2 Ibid.

3 Downtown Cincinnati Inc., "2011 State of Downtown Report." Downtown Cincinnati Inc., [www.downtowncincinnati.com/Libraries/DCL\\_Publications/2011\\_SOD\\_lo\\_res.sflb.ashx](http://www.downtowncincinnati.com/Libraries/DCL_Publications/2011_SOD_lo_res.sflb.ashx) (accessed September 21, 2012).

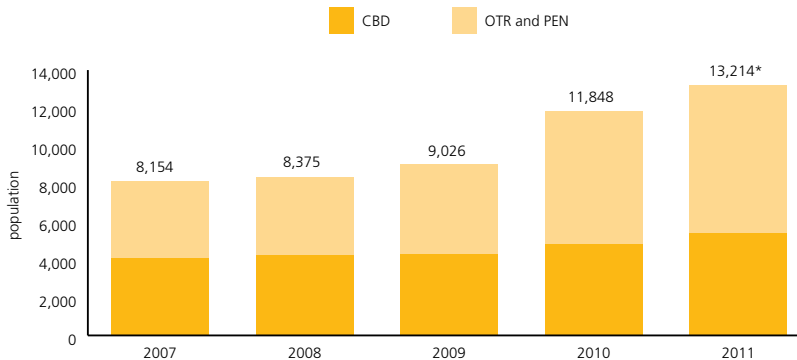


### Cincinnati Household Change, 2005-2040



2.01 Household change estimates from 2005-2040. The graphic shows a forecast of expected household growth spreading beyond the city core. Developed by the Ohio Kentucky Indiana Regional Council of Governments.

### Downtown Cincinnati Population Estimate



2.02 The downtown population estimate in 2011 shows substantial increases in the Over-the-Rhine, CBD, and Pendleton neighborhoods between 2007 to 2011. Data from the 2010 U.S. Census.



## Central Parkway

A major corridor through downtown Cincinnati is the Central Parkway thoroughfare, or Central. It exists today as a vehicular road connecting downtown traffic to nearby neighborhoods to the north. Central borders various neighborhoods defining the Central Business District, Over the Rhine, West End, Clifton Heights, University Heights, and Fairview (CUF). These districts represent the city's foremost historical sites, educational institutions, and businesses (e.g., Music Hall and Findlay Market, University of Cincinnati, and Proctor and Gamble). Central Parkway is a favorable site for development, as it connects existing city amenities and resources. Oversized and underutilized for vehicular traffic, Central Parkway is a logical site for new pedestrian focused urban development in Cincinnati. Central Parkway is uniquely positioned to stitch a new urban fabric along the three primary districts in downtown Cincinnati.

## The Miami Erie Canal and Underground Subway

Before Central Parkway was a vehicular thoroughfare, the location originally was an industrial shipping canal.<sup>1</sup> Cincinnatians drained the canal, which had lost its utility, and constructed a new subway tunnel. This vision did not ultimately come to fruition until 1925, and the abandoned tunnel has set idly since.<sup>2</sup>

The Miami-Erie Canal operated successfully from 1825 to 1856, connecting the Ohio River in Cincinnati to Lake Erie in Toledo, Ohio.<sup>3</sup> The Erie Canal had many challenges such as flooding, ice, and slow speeds to achieve consistent and efficient transporting of goods and people.<sup>4</sup> Competing with a new network of steam railroads led to the canal's demise with the loss of economic potential in the late 1800s.<sup>5</sup> A new design for the canal site, the "Kessler Plan," named after landscape architect George Kessler,

featured a 150-foot-wide "grand boulevard" conceived as a continuous urban landscape park with fountains and gardens within the city.<sup>6</sup> In a logical progression, moving from an outmoded to a progressive form of transportation infrastructure, the mayor at that time proposed a subway system to run below the grand boulevard.

Even more important is the Central Parkway. It is proposed that this improvement shall occupy the route of the present canal, which has fortunately been spared to the city, as a wide passage into the very heart of its business center...a feature of inestimable value for development... at present little used and unsightly in appearance... this improvement there would be secured a continuous and unobstructed thoroughfare serving...Millcreek Valley, as well as becoming the chief avenue into the city of many parts of Clifton and other communities...<sup>7</sup>

The city of Cincinnati began construction on the subway line starting in 1920.<sup>8</sup> Less than five years later the project came to a halt due to the economic impacts of the Great Depression and onset of World War II.<sup>9</sup> The completed subway tracks extended seven miles with just over two miles of tunnel. To this day, the subway has never been utilized for the original intent, only providing makeshift uses (water main and fiber optic communication lines). In 2008, a study developed by URS Corporation considered the following options: maintaining, infilling, or completing the subway at estimated costs of \$3 million, \$20 million, and \$115 million, respectively.<sup>10</sup>

Starting at Walnut Street downtown and ending at the Western Hills Viaduct, the abandoned subway rests beneath the streets of Central Parkway to this day. This idle infrastructural investment affords the city a unique

1 Allen Singer, *The Cincinnati Subway: History of Rapid Transit*. (Chicago, Ill.: Arcadia Pub., 2003), 17, 20.

2 Ibid.

3 Ibid.

4 Ibid., 25.

5 Ibid., 17.

6 Ibid., 19.

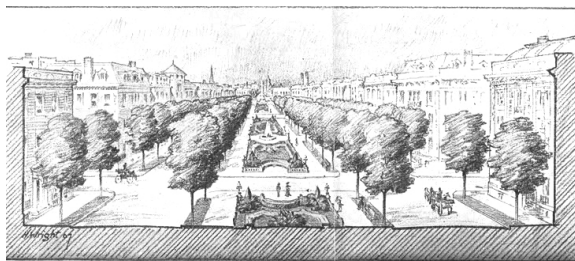
7 A Park System for the City of Cincinnati, 1907, 33.

8 Ibid., 8.

9 Ibid., 91-96.

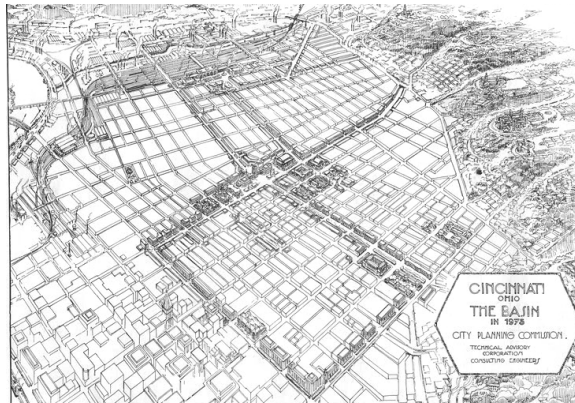
10 URS, *Cincinnati Subway Conversion Study* 2008.

opportunity to reuse the subway and the Central Parkway spine to both restore an abandoned artifact and create an urban pedestrian-focused amenity for downtown Cincinnati.



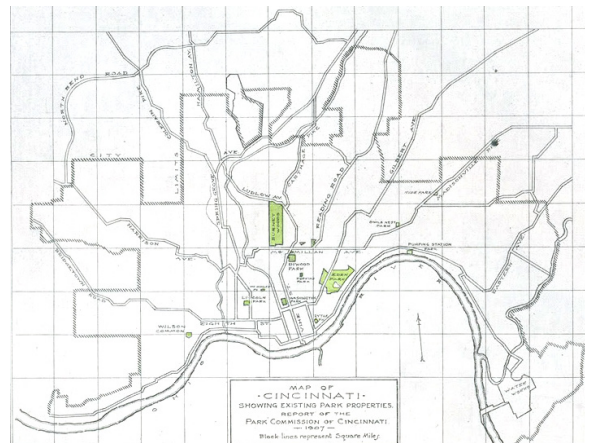
CENTRAL PARKWAY, LOOKING SOUTH FROM LIBERTY STREET.  
PRESENT CANAL.

2.03 The Kessler Plan proposal for boulevard along Central Parkway.



BIRDSYE VIEW OF HOW CINCINNATI WOULD LOOK 50 YEARS FROM NOW, AS DEVELOPED UNDER THE CITY PLAN

2.04 The Kessler Plan showing a development scheme fifty years in the future.



2.05 The Kessler Plan existing park properties, 1907.



2.06 The Kessler Plan proposed park system.



2.07 Cincinnati depicted in 1841 looking over the Miami Erie Canal and the Ohio River.





2.08 Cincinnati depicted in 1875 looking south where the Miami Erie Canal turns east.



2.09 A view of the Miami Erie Canal looking north.

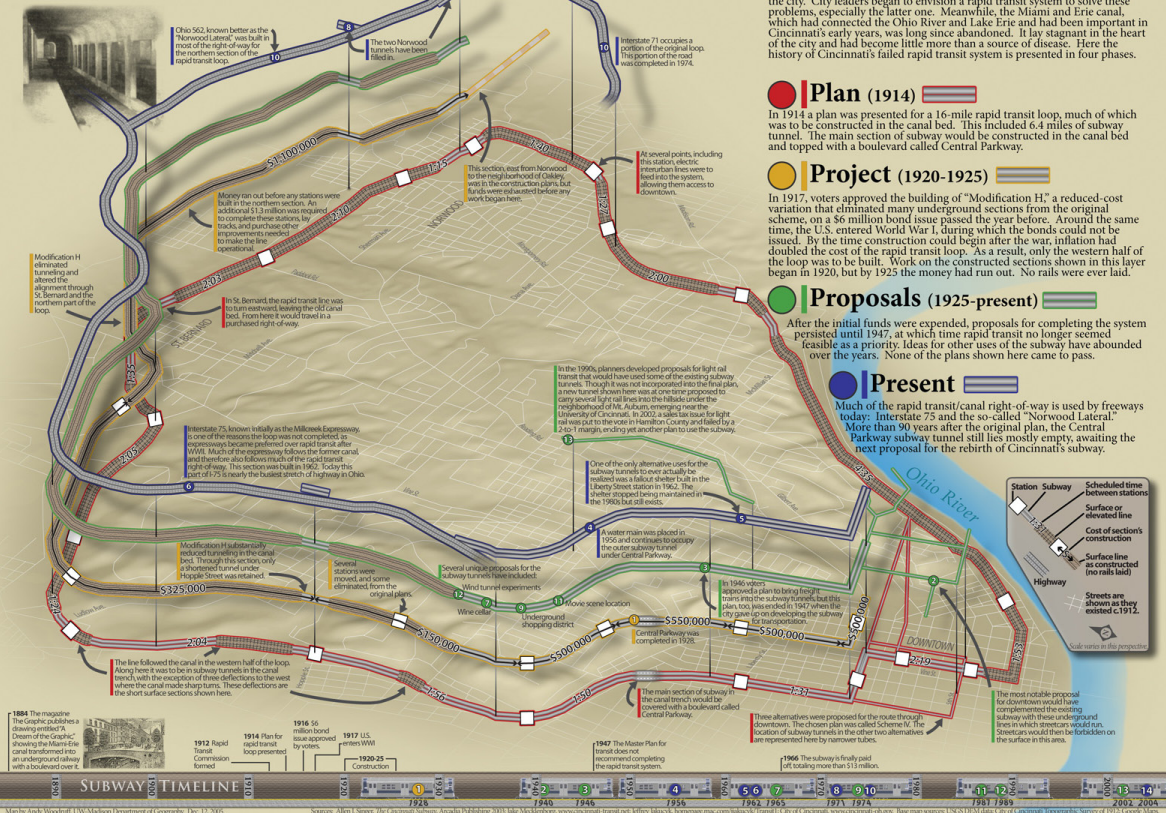


2.10 View of Miami Erie Canal looking east towards Mount Adams.



# THE CINCINNATI SUBWAY

## A DREAM ABANDONED



At the dawn of the 20th century, Cincinnati found itself in need of an improved transit system. As the city grew and more people moved to the hillsides surrounding the city's central basin on the Ohio River, congestion on the streets and streetcars increased. Many electric interurbans from other cities were unable to enter downtown on the wider streetcar tracks, forcing incoming passengers to transfer to slow streetcars at the outskirts of the city. City leaders began to envision a rapid transit system to solve these problems, especially the latter one. Meanwhile, the Miami and Erie canal, which had connected the Ohio River and Lake Erie and had been important in Cincinnati's early years, was long since abandoned. It lay stagnant in the heart of the city and had become little more than a source of disease. Here the history of Cincinnati's failed rapid transit system is presented in four phases.

### Plan (1914)

In 1914 a plan was presented for a 16-mile rapid transit loop, much of which was to be constructed in the canal bed. This included 6.4 miles of subway tunnel. The main section of subway would be constructed in the canal bed and topped with a boulevard called Central Parkway.

### Project (1920-1925)

In 1917, voters approved the building of "Modification H," a reduced-cost variation that eliminated many underground sections from the original scheme, on a \$6 million bond issue passed the year before. Around the same time, the U.S. entered World War I, during which the bonds could not be issued. By the time construction could begin after the war, inflation had doubled the cost of the rapid transit loop. As a result, only the western half of the loop was to be built. Work on the constructed sections shown in this layer began in 1920, but by 1925 the money had run out. No rails were ever laid.

### Proposals (1925-present)

After the initial funds were expended, proposals for completing the system persisted until 1947, at which time rapid transit no longer seemed feasible as a priority. Ideas for other uses of the subway have abounded over the years. None of the plans shown here came to pass.

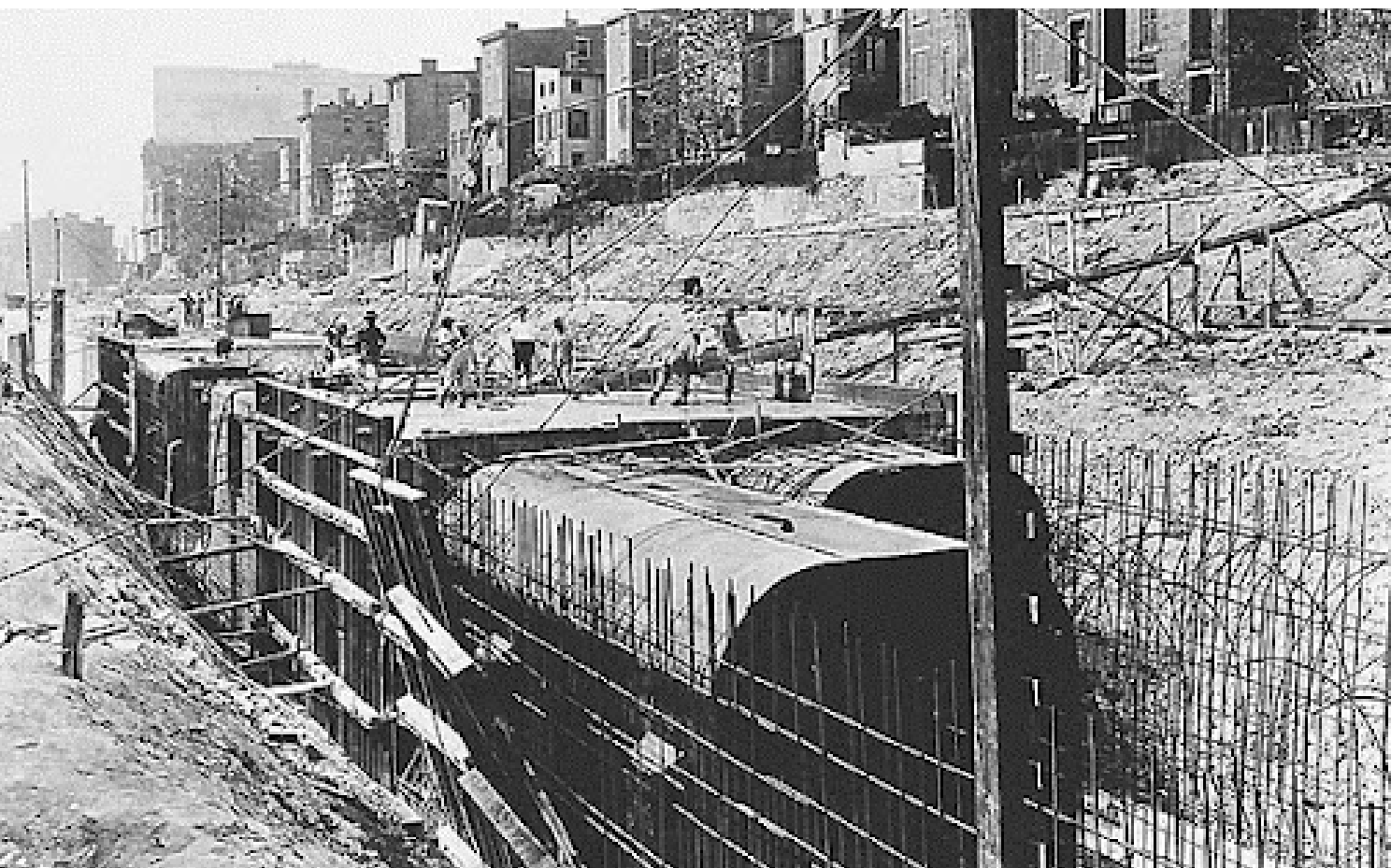
### Present

Much of the rapid transit/canal right-of-way is used by freeways today: Interstate 75 and the so-called "Norwood Lateral." More than 90 years after the original plan, the Central Parkway subway tunnel still lies mostly empty, awaiting the next proposal for the rebirth of Cincinnati's subway.



2.12 The Cincinnati Subway under construction between 1920 and 1929, in place of the Miami Erie Canal.





2.13 The Cincinnati Subway under construction between 1920 and 1929.



2.14 Photograph showing subway station condition as of today.



2.15 After completion of the subway, the roadway system was implemented covering the subway. The center median along Central became a decorative landscape.



2.16 Street view depicting Central Parkway today. Interstate 75 accommodates majority of traffic moving north and south from downtown to surrounding suburban neighborhoods. This has left Central Parkway underutilized as a roadway thoroughfare.

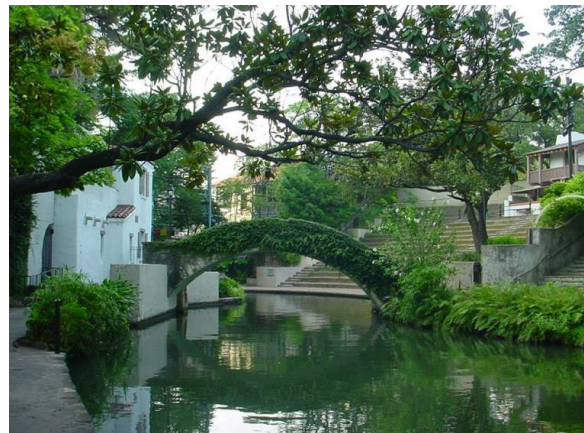
### 3 Adapted Infrastructure

#### *Paseo del Rio [Promenade of the River]*

In the late 1920s, the city of San Antonio was improving its flood control with infrastructural improvements to support the banks of the San Antonio River.<sup>1</sup> The river is buffered from traffic congestion, winding through downtown one level lower than the city streets (fig 3.3). While the city considered installing a paved sewer system, Robert Hugman, a young architect, had a vision to transform the river into a landscaped pedestrian strip, which would later become a spine of development attracting shops, restaurants, and hotels.<sup>2</sup> The Paseo del Rio, famously known today as the Riverwalk, took a decade for the city to approve, and several more decades to realize its full potential.<sup>3</sup> Architects, planners, and politicians have defined the Riverwalk as a successful urban design project measured by its transformation into a public amenity and its positive economic impact. San Antonio holds the rank of the most visited city in Texas, in large part due to the successful implementation of the Riverwalk.<sup>4</sup> While the Riverwalk is seen as a prototype, and many cities in the U.S. have borrowed its plan, to this day the city of San Antonio has continued to implement design improvements and expansions.<sup>5</sup> The Riverwalk is an innovative example of how a visionary idea can transform an uninhabited infrastructural territory into a city amenity and pedestrian landscape.



3.01 The riverwalk contains a significant density of restaurants, bars, retail shopping, and a river boat tour.



3.02 Pathways that follow along the Riverwalk are linked by bridges connecting people back and forth across the San Antonio River.

1 Jon Lang, *Urban Design: a Typology of Procedures and Products*, Illustrated with 50 Case Studies. (Burlington: Elsevier, 2005), 350.

2 Ibid., 350.

3 Ibid., 351.

4 "San Antonio Riverwalk," [www.sanantonioriverwalk.com](http://www.sanantonioriverwalk.com) (accessed January 12, 2013).

5 Lang, 352.





## New York City High Line

New York City's High Line, designed by James Corner Field Operations and Diller Scofidio + Renfro, exemplifies infrastructure reuse through a strategy termed "agri-tecture," defined as weaving the design of landscape and architecture.<sup>6</sup>

The High Line was built in 1930 as an elevated freight rail line raised thirty feet in the air to keep dangerous trains away from the busy streets of Manhattan.<sup>7</sup> By the 1980s, the rail line was no longer in use. Over the next twenty years, parts of the High Line were demolished and the remaining portions left abandoned.<sup>8</sup> In the early 2000s, an advocacy group formed to save the High Line from being demolished.<sup>9</sup> Soon after, a planning study created the framework for the High Line adaptation into a public space.<sup>10</sup> The community, local residents, and city came together preserving the abandoned infrastructure laying the ground work for a linear city park that is still expanding to this day.<sup>11</sup>

Similar to the Riverwalk, the High Line project is now a model for transforming vacant infrastructure into a landscaped amenity for the public. The resulting public space is a safe zone for walking and meeting in the city. New development projects and increased real estate values are an example of the positive economic impact resulting from the High Line linear park.



3.04 New York City High Line before renovations.



3.05 New York City High Line landscaped  
3.06 (right) Neighborhood Context Map

6 "The High Line | Friends of the High Line," <http://www.thehighline.org/design/design-team> (accessed February 13, 2013).

7 Ibid.

8 Ibid.

9 Ibid.

10 Ibid.

11 Ibid.







### **Gasometer – Vienna, Austria**

Innovations in architecture have emerged from adaptive reuse projects in respect to environmental responsiveness, maintaining historical value, and defining new spatial programmed relationships. Gasometer City is a project that utilized gas containers built in the 1890s. The original containers were a significant energy store of gas in Vienna, Austria, for almost a hundred years.<sup>12</sup> When new technology superseded the Gasometers, the city dedicated the four gas containers as historic landmarks.<sup>13</sup> A winning competition entry assigned a team of designers including Jean Nouvel, Coop Himmelblau, Manfred Wehdorn, and Wilhelm Holzbauer to each adapt one of the containers creating a mixed program of housing, offices, and entertainment venues.<sup>14</sup> All of the Gasometer containers link together by bridges running continuously through a central spine.



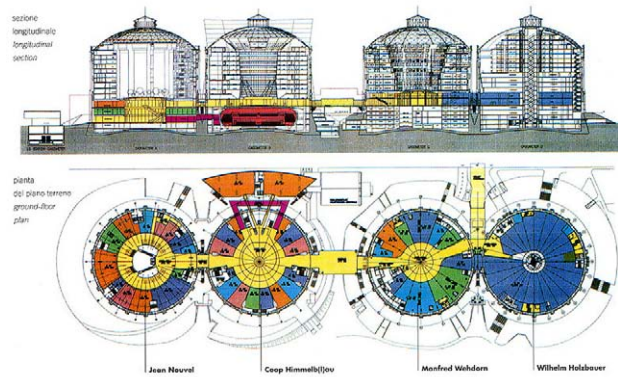
3.07 (above) Aerial View of Gasometer City.

<sup>12</sup> Adaptive Reuse, "Gasometer City – Adaptive Reuse," Adaptive Reuse, <http://adaptivereuse.info/portfolio/gasometer-city/> (accessed February 9, 2013).

<sup>13</sup> Ibid.

<sup>14</sup> Ibid.

These three projects all share a similarities in their approach to redesigning unconventional structures converted into human focused spaces. The relevance of adaptive reuse projects, as exhibited in the Riverwalk, High Line, and Gasometer projects are even more compelling today considering the recent economic recession's negative impact on total construction spending in the U.S. Emerging from the global recession of 2009 with lackluster growth, spending should be focused on projects that offer innovative, long-term, pedestrian-focused, and environmentally sustainable solutions that renew and preserve cities (as opposed to the highway focused suburban sprawl model). Reusing infrastructural artifacts in the city, especially in the case of the High Line, requires combined enthusiasm and ingenuity from designers, developers, politicians, and most importantly, citizens. The urban adaptive reuse model is an alternative path to suburban greenfield development offering increased density in cities, efficiency in economic output, and gives residents greater potential to maximize utility. These three projects all reclaim a preexisting infrastructure as a cultural artifact and repurpose them for the present and future.



3.08 Floor plan and section diagrams. Yellow spine indicates the bridge connection through all four gasometer tanks.





3.09 (right) Gasometer City view from the street.

## 4 Economy and City

### *Cincinnati's Strategic Position*

The city of Cincinnati has world-class higher education and business resources. The University of Cincinnati (UC) has over 9,000 employees and 41,000 students with top ranked programs in medicine, business, design, and engineering.<sup>1</sup> UC's economic impact on Ohio and the Greater Cincinnati area is estimated to be \$1.52B from UC's main institution and \$4.19B from UC Medical Center.<sup>2</sup> Other large institutions of higher education include Cincinnati State technical college and Xavier University. The city boasts several top companies that attract and retain technically advanced and creatively focused work force. Fortune 500 companies in Cincinnati include Proctor & Gamble, Fifth-Third Bank, GE Aviation, Macy's, Western & Southern Financial, and Kroger. The city has also emerged in recent years as a "branding hub," hosting some of the largest branding firms in the world: Landor, Interbrand, and LPK.<sup>3</sup> This strong educational and business environment is a positive indicator of the greater economic potential that Cincinnati may achieve by attracting and retaining a denser mass of educated work force and businesses in the city's urban center.

### *Density*

In his 2011 *New York Times* article, "One Path to Better Jobs: More Density in Cities," Ryan Avent presents density as the defining attribute of cities. He asserts "cities have long been incubators and transmitters of ideas, and, correspondingly, engines of economic growth."<sup>4</sup> He also argues that density facilitates interaction, which in turn increases productivity.<sup>5</sup> Avent's observations are true for

many of the leading cities in the US, including New York City and San Francisco, that have considerable economic advantage as they are homes to sizable talent pools, living in an entrepreneurial environment. This combination of a dense and well-educated workforce is the main ingredient for today's knowledge-driven economy. Thus, cities can garner competitive advantage by recruiting and retaining this population mixture, based on college education and metropolitan statistical area (MSA) density.

### *Knowledge Spillover*

According to Edward Glaeser, "Cities are the absence of physical space between people and companies. They are proximity, density, closeness."<sup>6</sup> A dense clustering of people in a city does not alone account for economic prosperity. Access to natural resources, stable government systems, and forms of free enterprise are also major contributors. Density facilitates personal interaction through increased face-to-face contact, and this personal interaction contributes to increased idea generation and productivity.<sup>7</sup> This concept is further explained when looking at the production and exploitation of information externalities, or knowledge spillover.<sup>8</sup> A 2006 study in the *Journal of Urban Economics* entitled "Urban Density and the Rate of Invention," shows evidence that the per capita invention rate is positively related to the density of employment in urbanized areas.<sup>9</sup> More specifically, a city with double the employment density of another city will have an increase of 20% in patents per capita. Interestingly, the findings in this report reveal that a density of 2,200 jobs per square mile leads to a maximized patent intensity.<sup>10</sup>

1 "UC Facts, University of Cincinnati." University of Cincinnati. <http://www.uc.edu/about/ucfactsheet.html#impact> (accessed March 19, 2013).

2 *ibid.*

3 "Cincinnati Carves Identity as Hub for Branding Firms - Business Courier." *Business News - The Business Journals*. <http://www.bizjournals.com/cincinnati/stories/2005/05/30/story4.html?page=all> (accessed March 19, 2013).

4 The *New York Times*, "One Path to Better Jobs: More Density in Cities," September 3, 2011. [http://www.nytimes.com/2011/09/04/opinion/sunday/one-path-to-better-jobs-more-density-in-cities.html?pagewanted=all&\\_r=0](http://www.nytimes.com/2011/09/04/opinion/sunday/one-path-to-better-jobs-more-density-in-cities.html?pagewanted=all&_r=0) (accessed January 8, 2013).

5 "One Path to Better Jobs: More Density in Cities."

6 Edward Glaeser, *Triumph of the City: How Our Greatest Invention makes us Richer, Smarter, Greener, Healthier, and Happier*. (New York: Penguin Press, 2011) 6.

7 *Ibid.*, 251.

8 Gerald A. Carlino, Satyajit Chatterjee, Robert M. Hunt, "Urban Density and the Rate of Invention," *Journal of Urban Economics*, (Volume 61, Issue 3, May 2007), 390.

9 *Ibid.*, 397.

10 *Ibid.*, 389.

Density, face-to-face contact, and the resulting knowledge spillover are especially relevant to cities that will continue to rely on a service economy or knowledge economy. Not surprisingly, one of the strongest and most predictable measures of economic growth in cities is education, measured by per capita productivity.<sup>11</sup> The retention of college graduates, who become the highly skilled educated workforce, is a key component of success in urbanized places. Cincinnati's talented and diverse university systems are already in place to leverage more knowledge sharing. Richard Florida, in his book *The Creative Class*, offers his research that expands upon Peter Drucker's outlining of the "knowledge economy." Florida defines the knowledge economy as one that is fundamentally creative.<sup>12</sup> The Creative Economy is made up of knowledge resources and information tools, in which innovation is the product.<sup>13</sup> The creative class in the U.S. is about 30% of the total workforce and consists of two groups: the Super Creative Core (e.g., scientists, engineers, designers, and architects) and the Creative Professionals (e.g., financial services, legal, and health care, and business management).<sup>14</sup> By Florida's measurements, only a minority of the workforce has creative jobs, which will continue to drive a majority of our current and future economy.

Knowledge spillover in Cincinnati appears to be underdeveloped. Currently, neighborhood districts isolate business and individuals. For example, Central Parkway, in its current condition, detaches incubators in Over-the-Rhine from the largest concentration of developed companies. Connecting these districts along Central Parkway would encourage intermingling of workers, creating opportunities for greater knowledge spillover in Cincinnati.

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11 Ibid., 253.

12 Richard Florida, *The Rise of the Creative Class: and how it's transforming work, leisure, community and everyday life*. (New York, NY: Basic Books, 2002), 44.

13 Ibid., 44, 74.

14 Ibid., 69.

## Retention

Having defined above several ingredients that are needed for innovation, what appears to put a mid-size city, like Cincinnati, at a disadvantage is the retention and aggregation of a creative and well-educated work force. Firms compete for individuals by offering quantifiable metrics like competitive salary, medical and retirement benefits, and expense allowances. In the same vein, cities offer financial incentives to attract and retain companies. However, this strategy is outmoded because Americans today are more mobile, moving between cities and jobs at a higher rate than previous generations. Increasingly, companies move to where the talent pool is living.<sup>15</sup> Therefore, a city should adopt the strategies of the private market, attracting firms by first attracting people through diverse public amenities. Examples have been discussed previously (e.g. Riverwalk and High Line). Cincinnati has had its own share of amenity upgrades in recent years, including Fountain Square and Washington Park.

Silicon Valley copycats, office research parks and large incubator developments, are examples of failed attempts to optimize innovative output. They have resulted in quickly manufactured generic suburban conditions that repel the creative class who seeks out historically relevant and diverse social and cultural amenities in a place of residence.<sup>16</sup> The failure of suburban incubator models further supports the approach of utilizing culturally rich urban sites. Similar to the three precedent adaptive infrastructures described previously, Central Parkway is conducive to creating a new compact district with diverse cultural amenities.

The equation for retention could be synthesized as follows: greater the perception of quality of life and higher quantities of diverse amenities increases knowledge workforce labor, thereby attracting new knowledge

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15 Florida, 283.

16 Florida, 284.

base firms. Outside of the Manhattan and Silicon Valley contexts, Austin, Texas, is a good example of this equation. Austin Texas has Dell Inc. in its backyard and the city attracts individuals based on warm weather and low cost of living. The city has adopted a differentiation strategy, promoting outdoor and cultural amenities, (e.g., live music) and branding itself as green, liberal, and laid back (evangelized no more visibly than the motto, "Keep Austin Weird"). Much of these characteristics are similar in Cincinnati, moderate weather, low cost of living, and large corporations such as Proctor and Gamble. Where Austin has come out on top is the city's ability to market and develop itself into a destination for live, work, and play.

Cincinnati has the framework to achieve a critical density of knowledge based workers. While the city population is mid sized, the metropolitan area is among the top thirty in the US and the largest in Ohio.<sup>17</sup> Cincinnati is broken in up into several unique neighborhoods. The neighborhood model has shown to be successful, considering the world leading city of London is effectively a series of distinct boroughs. Cincinnati has meaningful history, cultural diversity, top research institutions, ample business opportunity, and entertainment amenities. It seems that all of the factors needed to define a "livable" city have been checked off.

Livability is the sum of the factors that add up to a community's quality of life—including the built and natural environments, economic prosperity, social stability and equity, educational opportunity, and cultural, entertainment and recreation possibilities.<sup>18</sup>

What then is missing from this formula to attract and retain? The framework is missing a key component: connectivity. The following section discusses how communities and cities gain value in an integrated and interconnected approach to architecture and planning.

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17 [www.census.gov](http://www.census.gov)

18 "What is Livability?" [www.livable.org](http://www.livable.org) (accessed January 7, 2013).







## 5 Integration, Interconnectedness, & Value

Cities all over the world have implemented planning guides to encourage sustainable development, restore communities, and minimize the negative effects of suburban sprawl. With this direction in mind, the challenge and opportunity for architects is to define new paradigms that support this framework. To increase density and improve urban experience, architects can focus on adding long-term value through creative solutions.

In his book *Creating Value*, Vernon Swaback outlines how design can add value for communities, neighborhoods, and cities.<sup>1</sup> Making the case for an integrated approach, Swaback argues that smart development and green design is key to improving the economic, social, and environmental quality of communities.<sup>2</sup> Holistic, “smart” development addresses a range of issues, including: community interconnectedness, environmental conditions, market forces, sprawl, transportation, and the potential increase in global warming.<sup>3</sup>

Moving from the 20th century adage, “location, location, location,” the 21st century will need to adopt the connective approach, “integration, integration, integration.”<sup>4</sup> While integration describes a combined effort to synthesize into a whole, interconnectedness explains how relationships are co-dependent in an ecosystem. Identifying and codifying interconnected conditions of an urban site is a precursor, offering a path to define integrated design strategies. This approach will naturally encourage projects to focus less on satisfying architectural images or forms and to give more consideration to public access of city resources and infrastructure (e.g., public forms of transportation, parks, hospitals, and grocery stores).

Transportation issues in America are highly politicized and generally polarize the public into two segments. One

supports independent vehicular transport (i.e. cars) and improved highway systems, while others promote mass transit, including light rails, buses, and trains.<sup>5</sup> One overarching problem within the transportation debate is the lack of communication and unwillingness to combine the two approaches of highway and mass transit development. In the context of our decentralized and spreading suburban cities, current lifestyles necessitate independent vehicular transport in almost every suburban area in the U.S. Compared with cars, light rail has many limits including: lack of flexibility, initial up front and long-term cost, and the negative political impacts associated with increasing taxes.<sup>6</sup> Light rail has been most successful in high-density centralized cities. A hybrid, middle-ground approach is bus rapid transit (BRT). Conceived in Curitiba, Brazil, BRT is a fast and practical solution, providing residents with efficient mass transportation at a relatively low cost.<sup>7</sup> Although Americans generally view buses as the least attractive option for transportation, a BRT system is easy to adopt.<sup>8</sup> The BRT has been exported to numerous cities around the world including Boston, Los Angeles, and Cleveland.

Large-scale planning projects, such as transportation, define a vital framework of a city. A BRT system along Central Parkway would offer another mode of transit, promoting access and density in downtown Cincinnati at a minimal up front cost. The BRT strategy minimizes additional parking requirements currently demanded by commuter traffic. The BRT represents one example of Curitiba’s innovative approach to holistic city development, demonstrating how the integration of transportation, public space, and architecture creates value.

1 Vernon Swaback, *Creating Value: Smart Development and Green Design*, (Washington, D.C.: ULI-the Urban Land Institute, 2007).

2 Ibid., 7-12.

3 Ibid.

4 Ibid., 8.

5 Ibid., 14-20.

6 Ibid., 17.

7 Ibid., 22.

8 Ibid.

## Case Study: Curitiba, Brazil

### Connectivity

There is often a lack of connectivity between architecture and the adjacent programs, services, and amenities. Ignorance of history and the identity of place in the design process, from the urban scale to material assembly, lead to countless examples of self-serving object buildings that do little to support the activity that occurs within interior spaces or the external environment.

Connectivity is relevant in how architecture is able to respond to contextual circumstances that are qualified by environmental, social, and economic improvements. Environmentally responsible decisions reduce energy consumption and material waste and urban design gestures can provide access to public resources. Connectivity in design has potential to improve conditions at multiple scales. For interior design, a space that has ample natural day lighting will improve productivity of office employees in the work place and student focus in academic settings. On the urban scale, collective meeting grounds and landscape paths are designed to provide the pedestrian with pleasurable and functional accessibility. The quality of environment and social conditions are the foundation for sustainable long-term economic prosperity.

Curitiba's citywide transformations are examples of a successful social, environmental, and economic development, carrying out a theme of centrality and connectivity. These themes are evident through urban planning, architecture, and even social programs. Curitiba and Cincinnati are similar to each other as they are both relatively smaller urban centers respective to their broader regional context (i.e., Cincinnati relative to Chicago and New York or Curitiba relative to Rio de Janeiro and Sao Paolo). Curitiba offers a city like Cincinnati visions of how to explore affordable mass transit, connected public parks, and site responsive architecture.

Curitiba, Brazil, successfully captures the interconnectedness model because it provides social, environmental, and economic benefits through urban design strategies.

The Curitiba Master Plan of 1968 improved the existing infrastructure of road systems, maximized density of land use, and proposed a new mass public transportation system.<sup>1</sup> In addition to the physical planning approaches, the city considered many community initiatives to help balance social, economic, and environmental concerns. Programs ranged from a public-private partnership to implement and operate the BRT mass transit systems to tax incentives for business allocating public green space in new development projects.<sup>2</sup> One successful proposal, All Clean, provided street cleaning jobs for unemployed citizens who could then separate and sell recyclable material.<sup>3</sup> The All Clean program, implemented along with dozens of other social programs, worked together to improve the quality of life for disadvantaged citizens. Curitiba's recycling program is one of the most successful in the world due in large part to its bottom-up strategy of educating the youngest age group about the value of conservation and preservation.<sup>4</sup> These programs were implemented on minimal municipal budgets and achieved both strong ecological improvements and economic vitality. Due to the development of strong real-estate markets, superior infrastructure, and quality of life standards, Curitiba attracted large private businesses such as Siemens, Equitel, and Volvo.<sup>5</sup>

1 Giovanni Bello, "A Convenient Truth: Urban Solutions from Curitiba, Brazil". DVD. Del Bello Pictures, 2007.

2 Ibid.

3 Hugh Schwartz, *Urban Renewal, Municipal Revitalization: The Case of Curitiba, Brazil*, (Alexandria, VA: Hugh Schwartz, 2004) 84.

4 "A Convenient Truth."

5 Schwartz, 103-105.

## Transportation

Five structural spines fracture outward from the center of Curitiba. These spines became arteries of development and density after the city's implementation of the Trinary Road System.<sup>6</sup> This design rerouted driving lanes into a one-way traffic system on two outside lanes and allowed for a centrally positioned, dedicated bus lane. The BRT consists of highly integrated bus zones with dedicated bus-lanes that give buses priority over cars.<sup>7</sup> Private companies own and operate the busses, and the local government regulates the industry.<sup>8</sup> There is a single fee for riders with unlimited transfers, and multiple bus sizes accommodate the city's various parts.

The BRT system is an original innovation of Curitiba. It was designed to achieve the same results as a subway system at a much lower up front cost. Capital cost per kilometer for Curitiba is at \$2 million whereas an underground metro system can cost up to \$100 million.<sup>9</sup> In the BRT system, one can pre-pay and enter into an elevated glass tube station. Because of the dedicated bus lanes, busses are able to arrive on one- to two-minute intervals, shortening wait and travel times. The results of the system are over 1,100 busses making 12,500 daily trips serving 2.2 million passengers per day (Chicago provides 1.7 million per day).<sup>10</sup> Curitiba's BRT system effectively connects all neighborhoods and is an economic driver for the city. Glass BRT tubes have become an image unique to Curitiba, and over seventy different cities around the world have adopted a Curitiba-like BRT system.

6 Joseli Macedo, "City Profile Curitiba," *Cities* 21, no. 6, 2004, <http://www.sciencedirect.com/science/article/pii/S0264275104001003#> (accessed May 12, 2012) 544.

7 Jo Beall and Sean Fox, *Cities and Development*. (Milton Park, Abingdon, Oxon: Routledge, 2009) 160.

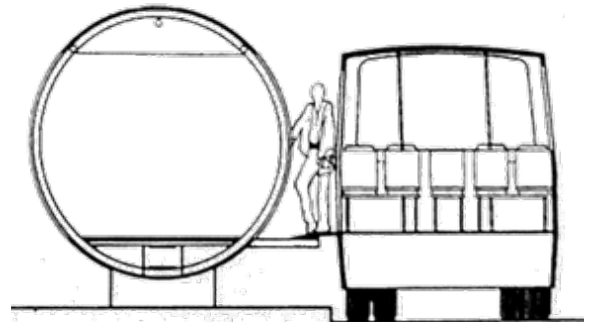
8 Beall, 160.

9 Jonas Rabinovitch, "Curitiba: Towards Sustainable Urban Development," *Environment and Urbanization* 4, no. 2, 1992, <http://eau.sagepub.com/content/4/2/62> (accessed February 1, 2013), 66.

10 Joseph Goodman, Melissa Laube, and Judith Schwenk. "Issues in Bus Rapid Transit." FTA. [www.fta.dot.gov/documents/issues.pdf](http://www.fta.dot.gov/documents/issues.pdf) (accessed January 15, 2013), 14-15.



5.01 Curitiba City Plan. The red lines indicate the five development arteries.



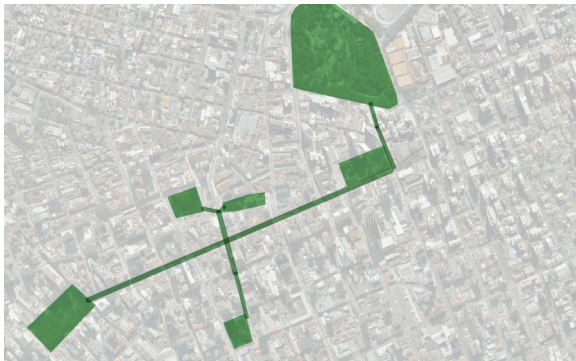
5.02 Section diagram of BRT design.



5.03 Street view of Curitiba at a BRT bus stop.



5.04



5.05

## Public Space

In 1970, there was approximately 4 square feet of serviced green space per person in Curitiba.<sup>11</sup> By 2000, with implementation of over 16 parks and 1,000 plazas, there was over 550 square feet of serviced green space per person.<sup>12</sup> Moreover, the park space not only serves as an amenity for city dwellers, but is also utilized as a land use mechanism for retaining water for effective flood controls. These flood control areas are regulated to prevent informal housing to develop in potentially life-threatening conditions.

By taking a closer look at the many plazas throughout Curitiba, it is not only the sheer number of plazas that are impressive, but it is also the connectivity of these plazas to diverse and dense urban populations, linked by continuity of pedestrian-dedicated spaces. Nothing explains this linkage of urban spaces better than the Rua Quinze do Novembro Street transformation. In 1971, Jaime Lerner was appointed mayor under dictatorship rule. Lerner established the first pedestrian mall in Brazil by transforming a road occupied with cars into a “pedestrian only” zone. The first phase of Rua Quinze finished in 72 hours, despite initial objections to the project.<sup>13</sup> This swift transition prompted an immediate increase in retail activity along the pedestrian mall. The Rua Quinze pedestrian mall later expanded at the request of citizens and business owners.

Today, Rua Quinze is teeming with activity, connecting the main city center urban parks and plazas. Similar to the transportation scheme, this urban intervention takes a satellite condition and creates a thriving network (figs. 5.04 and 5.05). The urban design and planning approach share a similar goal to develop strategies that improve the lives for the people in the city. The BRT design and implementation emerged by envisioning a city that serves the pedestrian connecting people to and from the

<sup>11</sup> “A Convenient Truth.”

<sup>12</sup> Ibid.

<sup>13</sup> “Jaime Lerner on Making Curitiba’s First Pedestrian Street,” <http://www.streetfilms.org/jaime-lerner-on-making-curitiba-s-first-pedestrian-street/> (accessed March 1, 2013).



5.06 Top view of Rua Quinze do Novembro.

city center (fig. 5.02). The Rua Quinze transformation follows the same logic, where public space is a linking mechanism between existing amenities (figs. 5.06, 5.07, 5.08, and 5.09).





5.07 Rua Quinze do Novembro before street transformation.



5.08 Rua Quinze do Novembro under construction in 1972.



5.09 Rua Quinze do Novembre today as pedestrian thoroughfare.



## Architecture

In an investigation of three architectural examples in Curitiba: UNILIVRE, Jardim Botânico, and Museu Oscar Niemeyer, a clear relationship exists between the urban planning, urban design, and the architectural formations in the city. For Curitiba, the relationships are complimentary because architecture enhances the urban design experience, and urban design gives form to planning concepts. Architecture is more than just experiential, it is a cultural response that integrates itself into a local landscape. These three projects range in budget, style, program, site location, and material assembly. Yet all three examples carry a common theme of integrating components of architecture that link people to their respective landscape.

## UNILIVRE – University of the Free Environment

UNILIVRE is a nongovernmental organization (NGO) that provides free educational classes and environmental social outreach, both of which improve the quality of life in the city. The site is positioned in an abandoned quarry, allowing visitors to transition through an intimate winding landscaped park prior to arrival at the building. The design uses primarily reused utility poles for construction. Visitors have access to walk around the exterior of the building via continuous ramps, experiencing the city's views and natural landscape. The project reveals how the utilization of an existing vacant quarry could be activated. More importantly, UNILIVRE emphasizes the city's attitude of improving environmental and social awareness through education.



5.10 The highlighted section of the aerial view indicate the transition from the street to UNILIVRE and the reclaimed abandoned quarry.



5.11 The project is designed to integrate with a recovering habitat.



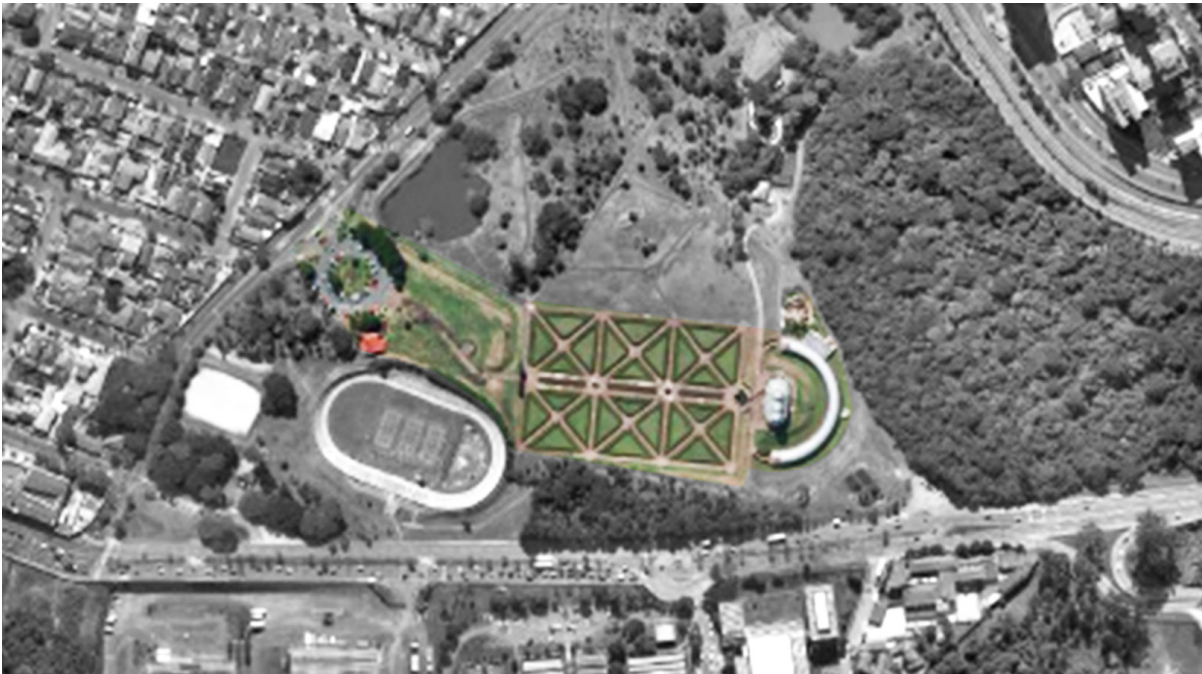
5.12 Reclaimed telephone posts are used for structural beams and columns.



5.13 Visitors can freely circulate, experiencing multiple views of the site and UNILVRE's various programs.

### *Jardim Botanico*

The Botanical Gardens of Curitiba (Jardim Botanico) is situated within a larger park near the city center and abuts a dense neighborhood. The multiple means of accessing the site allow for more architectural opportunities due primarily to the minimal amount of parking spaces. The Botanical Gardens are experienced by a gradual arrival and transition that make the modest architecture more spatially impactful. The architecture takes advantage of dramatic views of the skyline and uses an inexpensive recycled pipe steel construction. Although the project is known to be a tourist attraction, the Botanical Gardens project is unique in that its location within the larger open park allows for more interaction between tourists and residents.



5.14 The highlighted section of the aerial view show the transition from the parking lot (left) moving through a garden promenade to the botanical gardens and art museum.



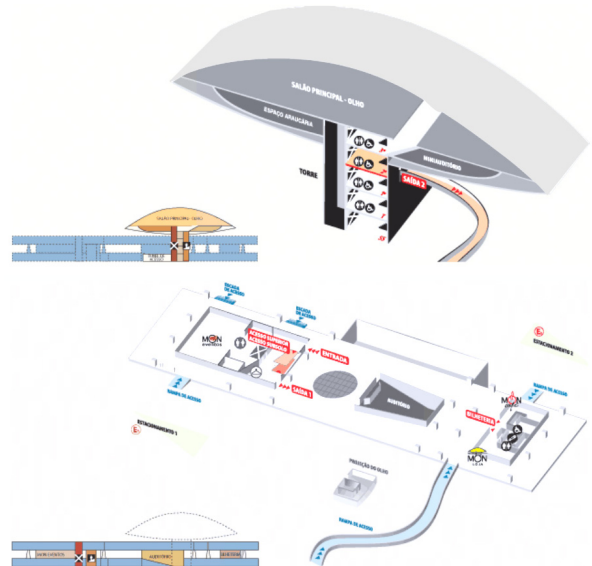


5.15 View from the botanical gardens entry looking over the city.



5.16 The art museum wraps around the Jardim Botânico's greenhouse.





### Museu Oscar Niemeyer

The Museu de Oscar Niemeyer is an architectural museum designed by Oscar Niemeyer. While this building design contrasts greatly from the previous two examples, the diagram defining the allocation of park space, building space, and car space remains relatively static. The Museum sits next to a protected landscape along with ample public green space for visitors to the museum. The strength of this architectural experience can be realized by its connectivity of the architecture with wide expansive spaces that open up to public parks. The integration of architecture experience is further reinforced by the landscape that was initially framed by the urban planning initiatives.

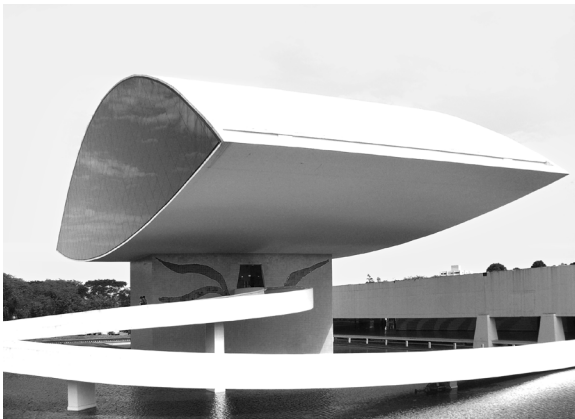
5.17 The museum is comprised of three levels. The main floor, "Primeiro Piso", is at the street level allowing movement through the site. The Oscar Niemeyer addition (the "eye"), adds a large exhibit space and is accessed through the original museum below ground. The Niemeyer addition also connects an organic pedestrian path from the street to the main level.



5.18 The highlighted section of the aerial view show the site for the Museu de Oscar Niemeyer



5.19 The main levels openness connects a city landscape to the museum. The park and the museum blend together operating as a shared public space.



5.20 Niemeyer museum addition showing the connected pathways.



5.21 The separation between the original museum and new addition.

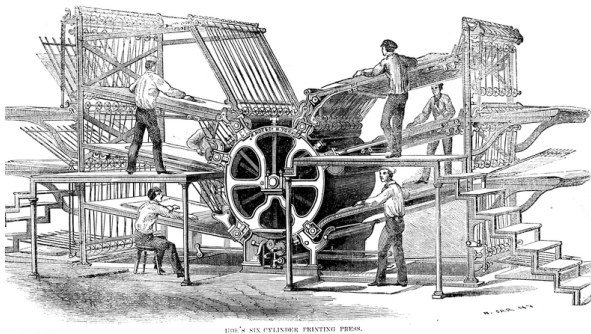
Continued efforts and development in urban planning, land use, effective public transportation, along with well-executed socioeconomic programs and strategically positioned public green space have all led to the successful framework in which the city and its architecture exist. Curitiba's success is also due to its ability to integrate pedestrian friendly, environmentally sustainable, and economically vital initiatives. Cincinnati, like Curitiba and many other cities around the world, must continue to adapt its urban planning, ecological, and social improvement strategies to maintain successful results, as the effects of urbanization will continue to change.

For Cincinnati and Central Parkway, Curitiba offers insight on how to reconsider an architectural response in relation to planning and urban design strategies of a city. The Curitiba case study and the adaptive infrastructure precedents (e.g., Riverwalk, High Line, and Gasometer) provide a look at projects completed over the past 80 years. However, as technology and cities are rapidly changing, architecture's role in defining landscape and infrastructure in the present and future is the topic of ongoing practice and theoretical debate.

## 6 Technology and Sustainability

As momentum builds for sustainable practices in and outside of architecture, it is critical that architecture question its own assumptions about technology and sustainability as well as the techniques we deploy to practice and achieve it.<sup>1</sup>

In recent decades, an increase in the environmental awareness of the general population has initiated a desire for “green” buildings. Regulations are also adding pressure to the building industry to provide more energy efficiency in order to decrease costs and reduce carbon emissions. Architectural responses take form in the design of passive solutions such as orientation. Energy efficiency also takes form in active strategies that include on-site power generation through geothermal heat pumps, wind turbines, and solar photovoltaic arrays to name a few. However, noble attempts to implement sustainable tactics without an overall sustainable design strategy are less effective in their long term performance. Despite the awareness and concern over protecting the earth’s habitat, green technology has yet to see wide adoption to the broader market.



6.01 Richard March Hoe's printing press—six cylinder design. Drawing by N. Orr. Technology advancements led to Hoe's innovative design, vastly increasing the speed and the range of options from the original flatbed printing press.

1 “Technique Is the Architecture of Sustainability” in *New Directions in Sustainable Design*, ed. Adrian Parr and Michael Zaretsky (London: Routledge, 2011), 173.

Historical advancements in economic development have come from innovations in energy technology (e.g., the first industrial revolution arising by the printing press - powered by a steam powered rotary system fig 6.01).<sup>2</sup> Economist Jeremy Rifkin projects that oil will soon need a replacement as prices increase to unstable levels.<sup>3</sup> Rifkin also highlights the global impacts of burning fossil fuels as the basis for his energy agenda, the *Third Industrial Revolution*.<sup>4</sup> Three pillars make up the Third Industrial Revolution: 1) renewable forms of energy including wind, solar, and hydrogen power, 2) development of energy storage systems, and 3) a reconfiguration of the power grid employing businesses and residents to produce their own on-site energy.<sup>5</sup> Many changes since Rifkin published this material call some of his assertions into question. Despite Rifkin's projections, the price and demand for energy specific resources is difficult to predict; however, we do know the building sector is a foremost consumer of resources. According to the U.S. Department of Energy, the building industry accounted for 41% of primary energy consumption in 2010.<sup>6</sup> The building industry should follow in the path of the third pillar, not only becoming a source of energy, but also adopting a stronger attitude of conservation. New construction and the renovation of existing buildings should therefore bear the burden of providing for their own energy needs in order to reduce dependence on non-renewable energy resources. Furthermore, architects and others in the building industry have the responsibility to minimize the environmental footprint of new development in order to prevent long-term adverse effects on the environment.

2 Jeremy Rifkin, “The Third Industrial Revolution,” *Engineering & Technology* 3, no. 7 (2008): 26-27.

3 Ibid.

4 Ibid.

5 Ibid.

6 “Buildings Energy Data Book.” *Energy Efficiency & Renewable Energy*. <http://buildingsdatabook.eren.doe.gov/ChapterIntro1.aspx> (accessed March 1, 2013).

Architects today are increasingly approaching design from a landscape and technological perspective. The book *Landform Building* discusses this idea providing a "lens through which to view architecture's role in the shifting ecology of the contemporary city..." A 2009 conference engaged this topic of landscape as a new territory for design exploration.

Green roofs, artificial mountains, and geological forms; buildings you can walk on or over; networks of ramps and warped surfaces; buildings that carve into the ground or landscapes lifted high into the air: all these are commonplace in architecture today. New technologies, new design, techniques, and a demand for enhanced environmental performance have proved a re-thinking of architecture's traditional relationship to the ground. Some of today's most innovative buildings no longer occupy a given site but instead construct the site itself.<sup>7</sup>

This idea of landform buildings "constructing site" is expressed in the following projects, the Yokohama Terminal by Foreign Office Architects and Olympic Sculpture Park by Weiss Manfredi. What is interesting about these projects is their link to an urban sustainable concept carried out through human-centered urban design transformations in a city. Architecture can achieve sustainability within a given site, but a larger urban strategy is needed for a sustainable city.

Jan Gehl describes simple technologies to achieve sustainable measures in his book, *Cities for People*.

The sustainable city is strengthened generally if a large part of the transport system can take place as "green mobility," that is travel by foot, bike, or public transport. These forms of transport provide marked benefits to the economy and the environment, reduce resource consumption, limit emissions, and decrease noise levels.<sup>8</sup>

Green mobility focuses on the "human dimension" of a city space.<sup>9</sup> What Gehl highlights is that not only are green parks and public plazas enough, they have to be part of a larger system linked together with alternative means of transportation. The projects in Yokohama and Seattle take a non-linear approach to pedestrian oriented design at the infrastructural scale. Both projects extend the urban fabric of a city and integrate landscape, architecture, and infrastructure, celebrating human-centered urban spaces.

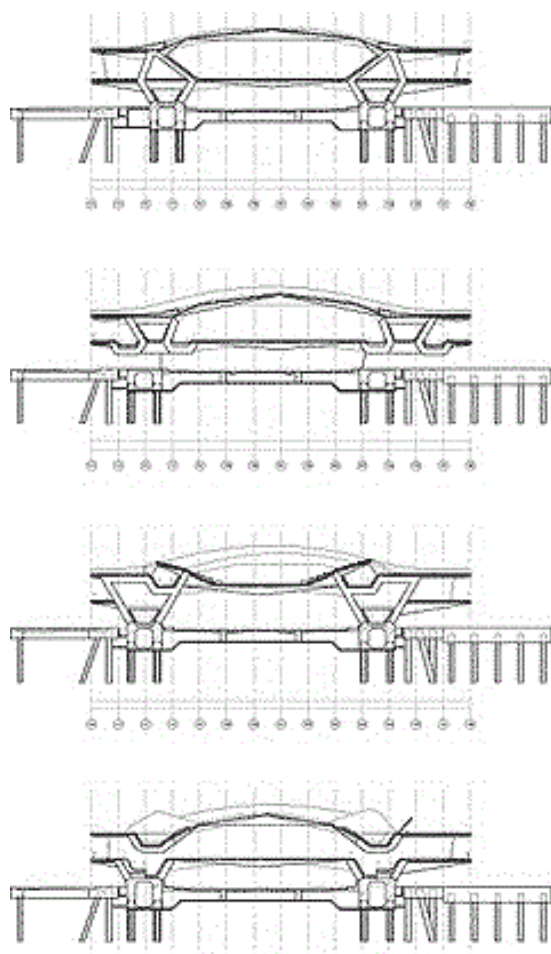
The following section, Combined Infrastructure, transitions the discussion to other contemporary architecture proposals engaging in infrastructural design that incorporate cultural contexts, technology change, and sustainable techniques.

7 Stan Allen, "Landform Building: Architecture's New Terrain" (Lars Müller Publishers, 2011), 40.

8 Jan Gehl, "Cities for People" (Island Press, 2010), 7.  
9 Ibid., 3.



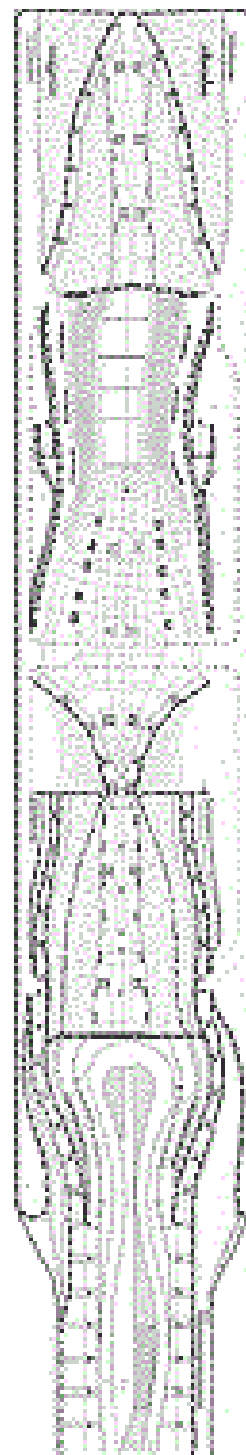




6.02 (left) The design for the Yokohama International Port Terminal blurs the boundaries of architecture, landscape, and infrastructure. The project creates an inviting urban space and provides the necessary function of shipping transportation. The structural tectonics, seen in the folding forms, enhance lateral stability, accounting for the local seismic activity in Japan.

6.03 (above) Sectional diagrams.

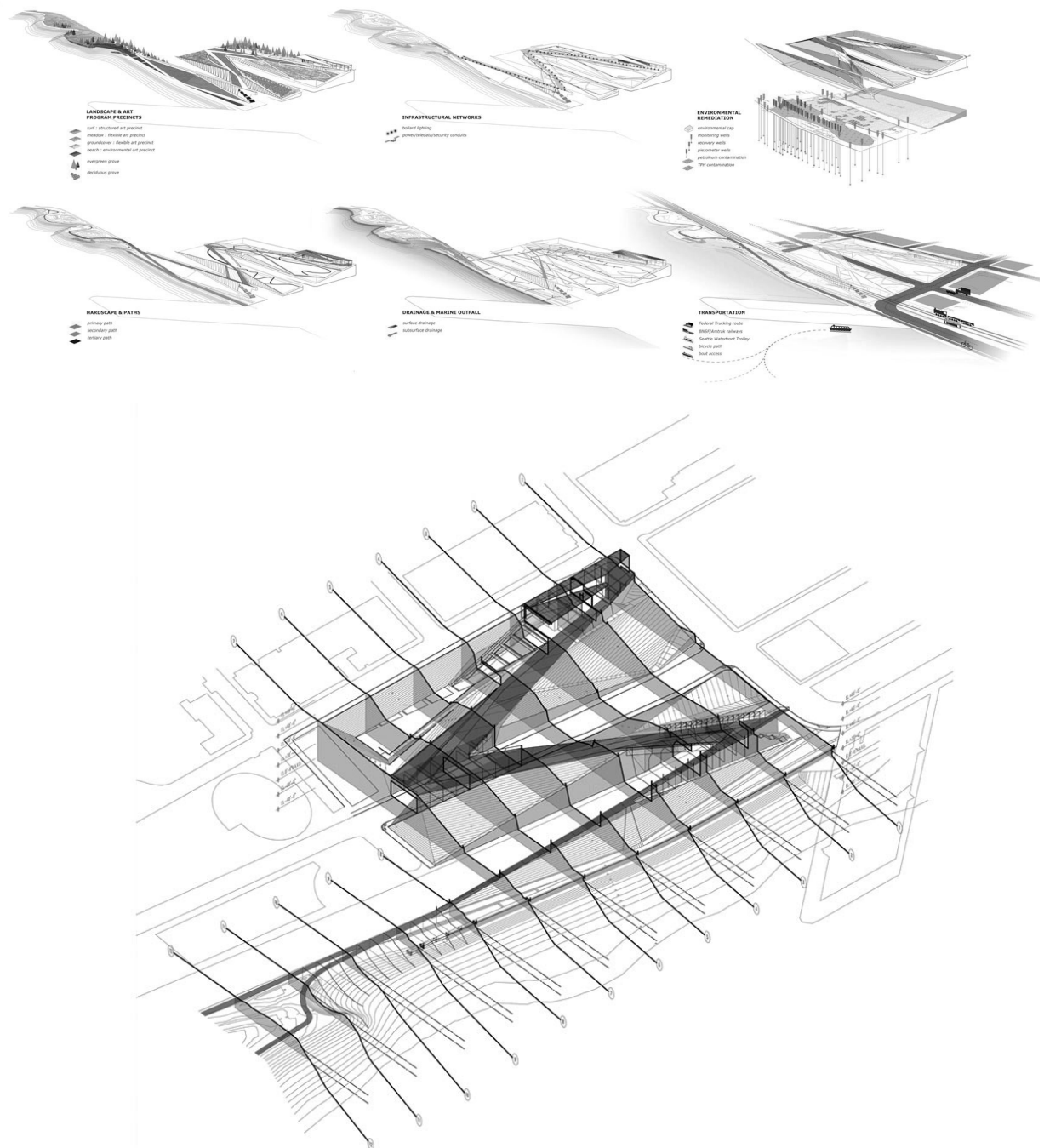
6.04 (right) Site plan.







6.05 (left) Before and after images of the Seattle's Olympic Sculpture Park. The sculpture park reclaims an industrial site with a layered and interweaving network of public spaces that do not disrupt the existing transportation systems. Design strategies also incorporate site remediation, filtration, and marine fall out.



6.06 (top) Diagrams indicate the multiple layers developed in the sculpture park design including remediation, pedestrian pathways, infrastructure, transportation, and drainage.

6.07 (right) Axonometric diagram of site construction.



## 7 Combined Infrastructure

Abandoned infrastructural systems exist in almost all urbanized cities around the world. These sometimes monumental structures have a residual identity as they wait for their repurposing into city landscapes. Over several decades, architects, landscape architects, and urbanists have researched and developed proposals that explore the role of design within larger infrastructural and organizational systems. Cincinnati's Central Parkway exists as one site fragment amongst many infrastructural zones in the city that could be repurposed. Uncovering and codifying layers of infrastructure provide a broader city, regional, and national context. This process reveals strategies that respond to specific cultural, environmental, and economic landscapes of the city.

### **Theory and Precedent**

Rossi's definition of urban architecture provides a contextual framework for how to view urban infrastructure.<sup>1</sup> Rossi describes urban architecture as a combination of engineering and architecture constructed over time as a series of urban artifacts.<sup>2</sup> The urban artifact can be an entire piece of the city, easily identifiable, characterized by a collective of structures, complexes, and spaces.<sup>3</sup> Rossi cites the European city as having a long history of building complexes changing in program and functional use over time. The present uses of large complexes are independent of the original form, but the original structure is still what defines the experience.<sup>4</sup> Considering Central Parkway to be an urban artifact, it is identifiable by a lack of definition. Central Parkway was once part of a natural untouched valley before becoming a canal system and then eventually an underground subway. Abandoning the subway project and building subsequent highway systems in Cincinnati drove development away from Central Parkway, leaving behind an unoccupied and frag-

mented zone. The present urban condition is defined by a history of landscape and economic forces. The residual infrastructural formations define the current cavity of space in the city.

Architecture is a unique discipline, having the ability to compose and structure plans for buildings and cities while also maintaining sensitivity to social and cultural conditions.<sup>5</sup> Architect Stan Allen, elaborates on "infrastructural urbanism" as a practice that the architect can construct, "going beyond the stylistic or formal issues" in a design process that can structure the city.<sup>6</sup> Seven propositions synthesize this process and describe the potential of infrastructural urbanism, summarized as follows: 1) infrastructure constructs the site, 2) infrastructures are flexible and open to changes over time, 3) infrastructure is a bottom-up system that creates a field and sets a direction where architects and designers can contribute, 4) infrastructure accommodates local contingency, 5) infrastructures organize and manage the flow, movement, and exchange of complex systems, 6) infrastructure behaves as an artificial ecological system, and 7) infrastructural urbanism facilitates an architectural approach, where form is of value for how it performs more than how it appears.<sup>7</sup>

The following projects are contemporary examples of projects engaging theory and design in infrastructure, relating to aspects of this thesis framework. Each project, set within an urban context, includes a dialogue that incorporates technology and communication systems, economic output, and knowledge networks.

1 Aldo Rossi, *The Architecture of the City*, (Cambridge, Mass.: MIT Press, 1982), 29.

2 Rossi, 29.

3 Rossi, 29.

4 Rossi, 29.

5 Stan Allen, *Points + Lines: Diagrams and Projects for the City*, (New York: Princeton Architectural Press, 1999), 54.

6 Allen, 53.

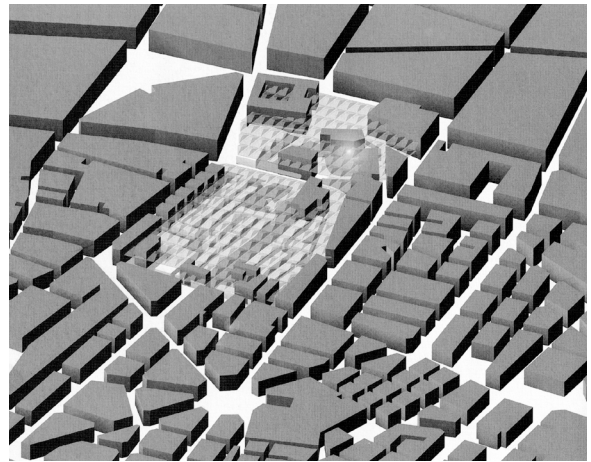
7 Allen, 56-57.

***The Reconstruction of the Souks of Beirut, Competition 1994, Stan Allen***

In this competition entry by Stan Allen, several strategies put the aforementioned propositions into practice. The design focuses on a unity of a single urban space through the repetition of a single canopy roof structure. Conversely, below the rhythmic canopy, spaces remain as an open framework, allowing for unique responses that reflect the diversity of city life. The Souks of Beirut competition builds an argument for utilizing new infrastructures visually demarcating naturally occurring city ecosystems.

This is a fundamentally architectural approach, concentrating the design effort at the level of the urban infrastructure. Unity is achieved by the continuous rhythm of the roof structure, while the diversity of city life is cultivated below.<sup>8</sup>

For this project, Allen asks the question, “How can one impose a measure of unity while respecting the essential diversity of the city to come?” The design team proposes four distinct interrelated operations including: Preservation of existing historic structures, recover the ground of the site with continuous surfaces, new construction of buildings to accommodate multiple functions, and to construct a roof that stitches together a fragmented context.<sup>9</sup>



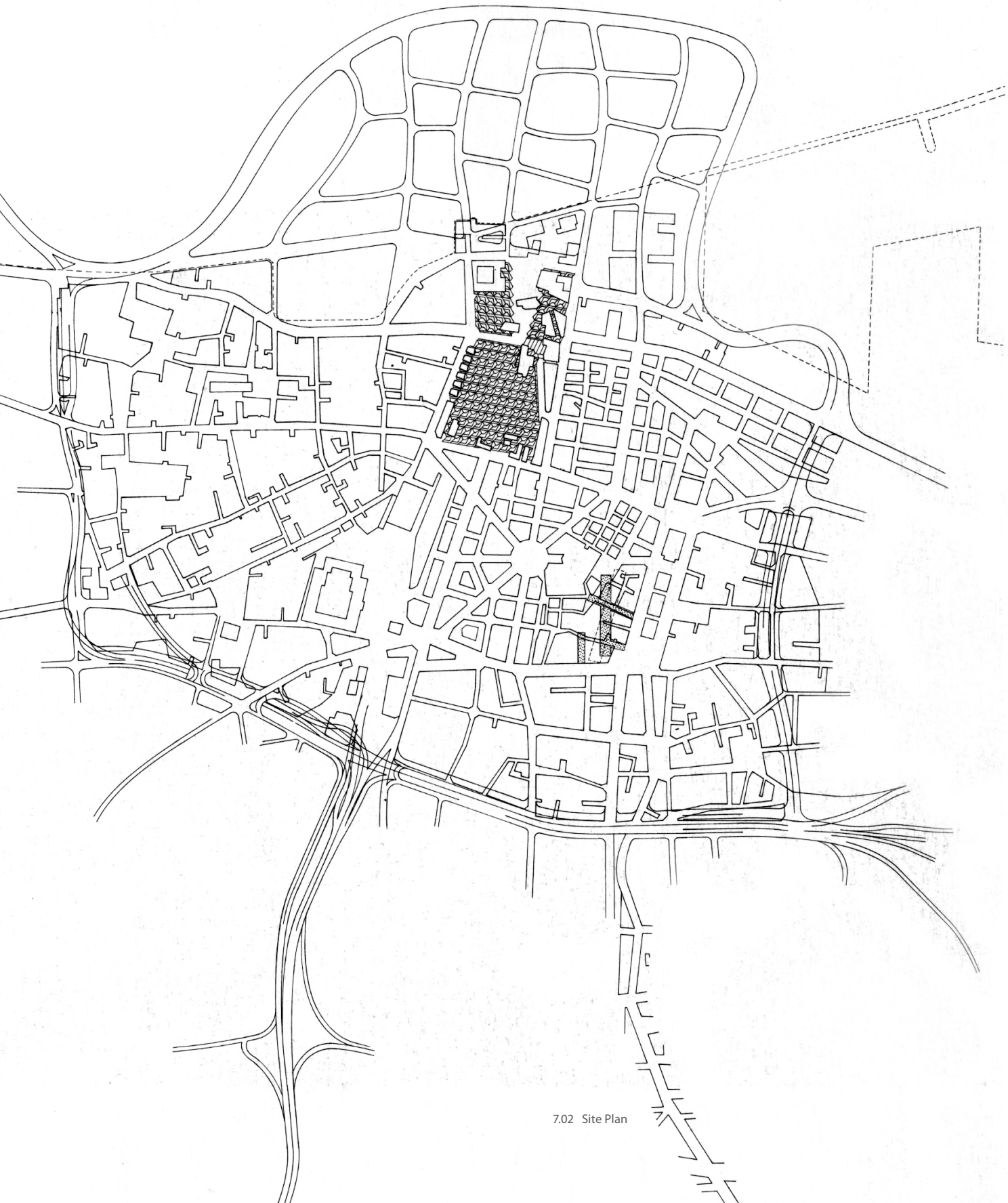
7.01 Context plan showing the continuous roof scheme.

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<sup>8</sup> Ibid.

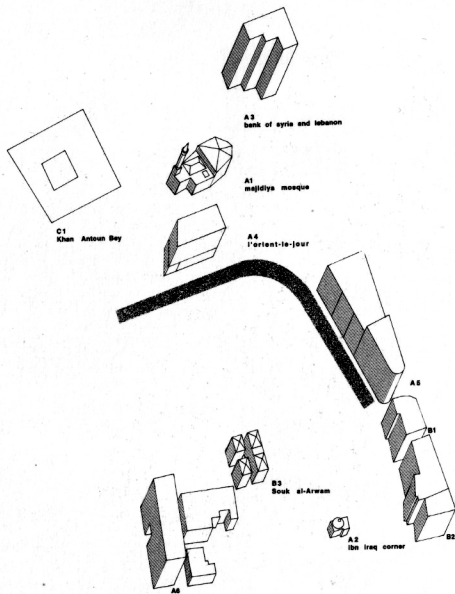
<sup>9</sup> Allen, 59.



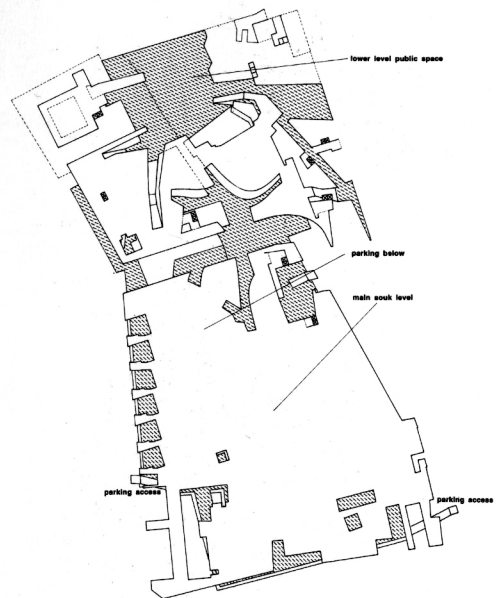


7.02 Site Plan

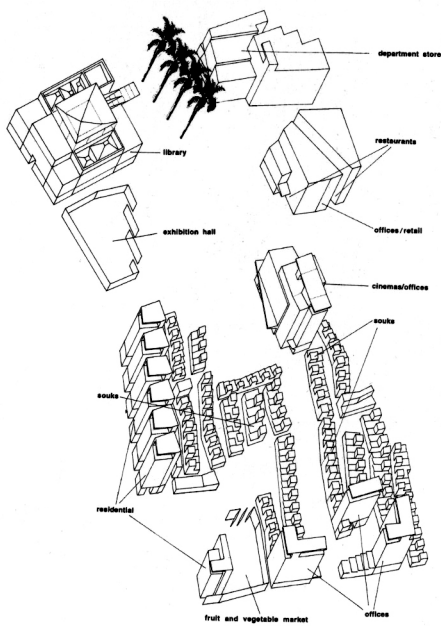




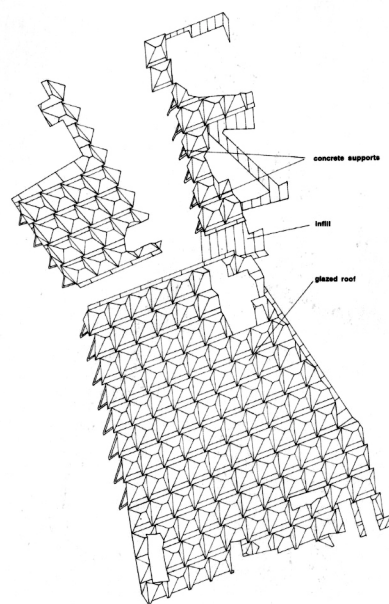
7.03 Existing Structure.



7.04 New Surfaces.

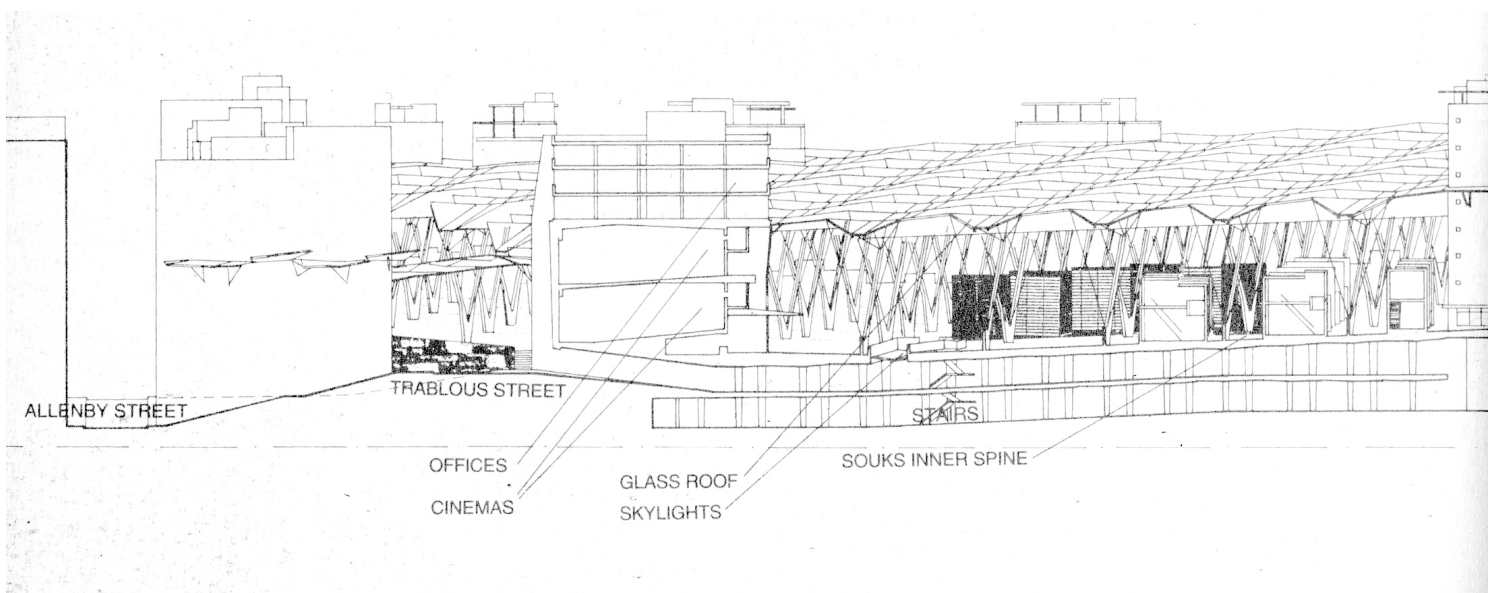


7.05 Proposed Buildings.



7.06 Continuous Roof.

7.03, 7.04, 7.05, 7.06 Axonometric diagrams of existing conditions and proposed design.



7.07 Section Diagram.

## Coupling

Integrating several design disciplines such as ecology, engineering, architecture, urban design, or social policy can find the potential for new evolutionary patterns.<sup>10</sup> Stephen Luoni describes this idea as “recombinant ecologies” whereby design can improve through the borrowing of other disciplines tools and metrics (defined in biological systems as, cross-over structures, that have improved qualities not achievable within an operational silo).<sup>11</sup> Infranet Lab and Lateral Office won the Pamphlet Architecture 30 competition that called for inventive proposals for infrastructure. Their winning submission included six projects, that were later published in the book, *Coupling: Strategies for Infrastructural Opportunism*. Each project focuses on a set of strategies in three formats: productive surfaces, programmed containers, and civic conduits.<sup>12</sup>

Coupling employs interventions that also operate extrinsically, sometimes at a territorial scale... these infrastructures double as landscape life support, creating new sites for production and recreation. Seeking opportunistic associations between economy, ecology, politics, and information, is... a typological investigation into new spatial formats for the twenty-first century.<sup>13</sup>

## Wiring Runways: Framing and Farming the Void

Wiring Runways capitalizes on existing infrastructure and environmental resources. This project proposes activated “Greenways” in the site of a decommissioned airport in Reykjavik, Iceland. Each Greenway is a no-build zone, having separate functions that focus on recreation, production, and ecology. Data servers reengage with infrastructure running below the Greenways while energy is harvested from Iceland’s abundant geothermal sources.<sup>14</sup>

Synthesizing productivity through a balance of public and private zones, this project integrates space below ground for data servers and geothermal energy. This is a concept easily adapted for Central Parkway. In this instance, new and existing development along Central could tap into the underground subway with new systems for data fiber-optic, energy storage, geothermal heating and cooling, and future technologies. Incorporating these types of infrastructures could increase network connectivity and reduce the cost of energy for buildings. Just as the Miami Erie Canal was an artery for commerce in the 19th century, the subway tunnel along Central will become the new arterial “conduit” for the 21st century.

10 Stephen Luoni, “Building Recombinant Ecologies” in *New Directions in Sustainable Design*, ed. Adrian Parr and Michael Zaretsky (London: Routledge, 2011), 65.

11 Luoni, 65.

12 Neeraj Bhatia, *Coupling: Strategies for Infrastructural Opportunism*. (New York: Princeton Architectural Press, 2011) 9.

13 Bhatia, 9.

14 Bhatia, 58.

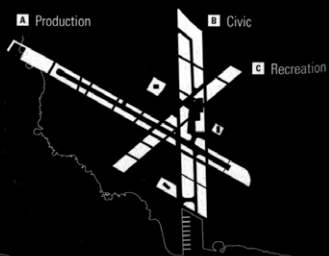




Existing: runways



Proposed: voids



Production

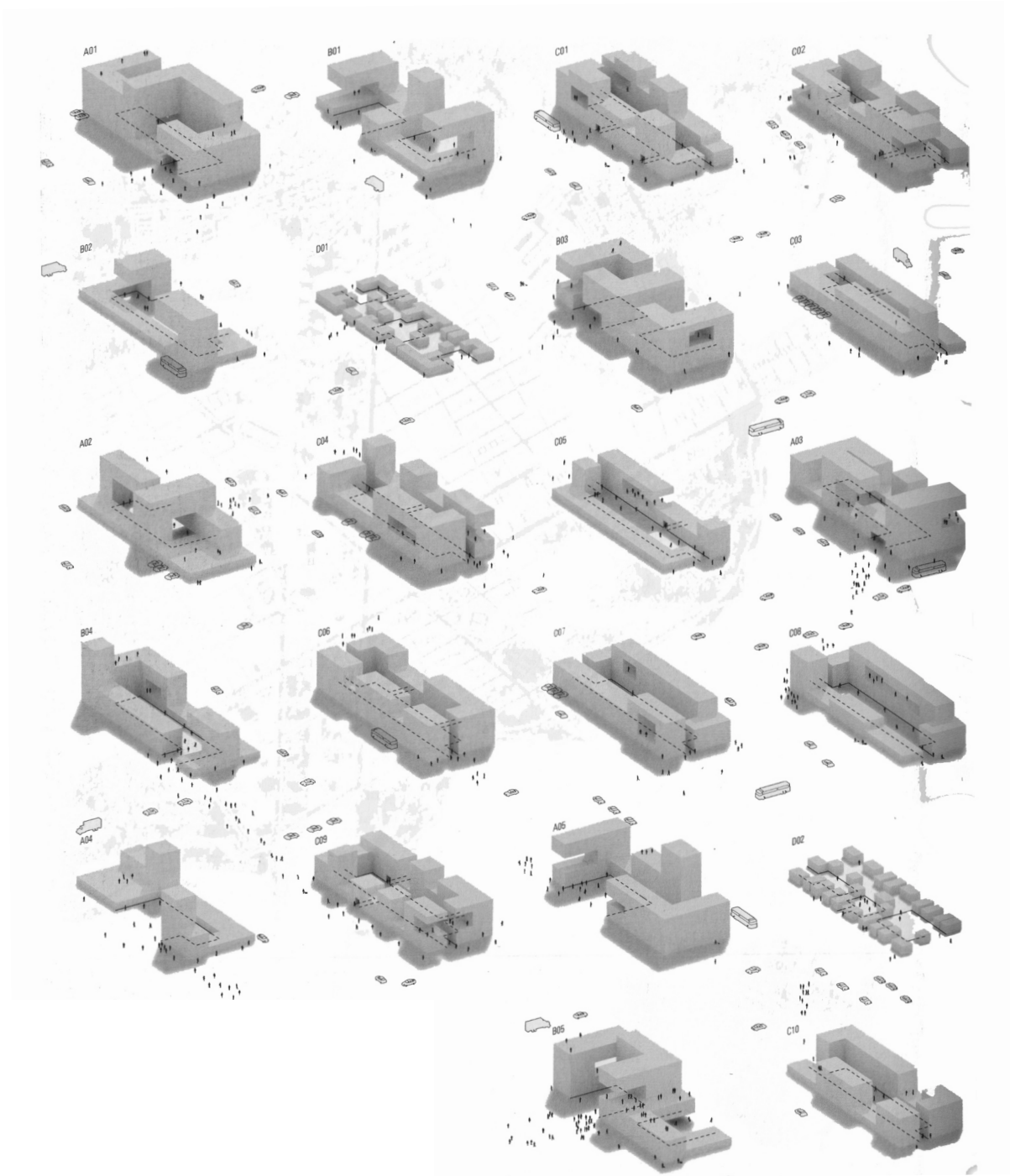
Civic

Recreation

Proposed: wired greenways

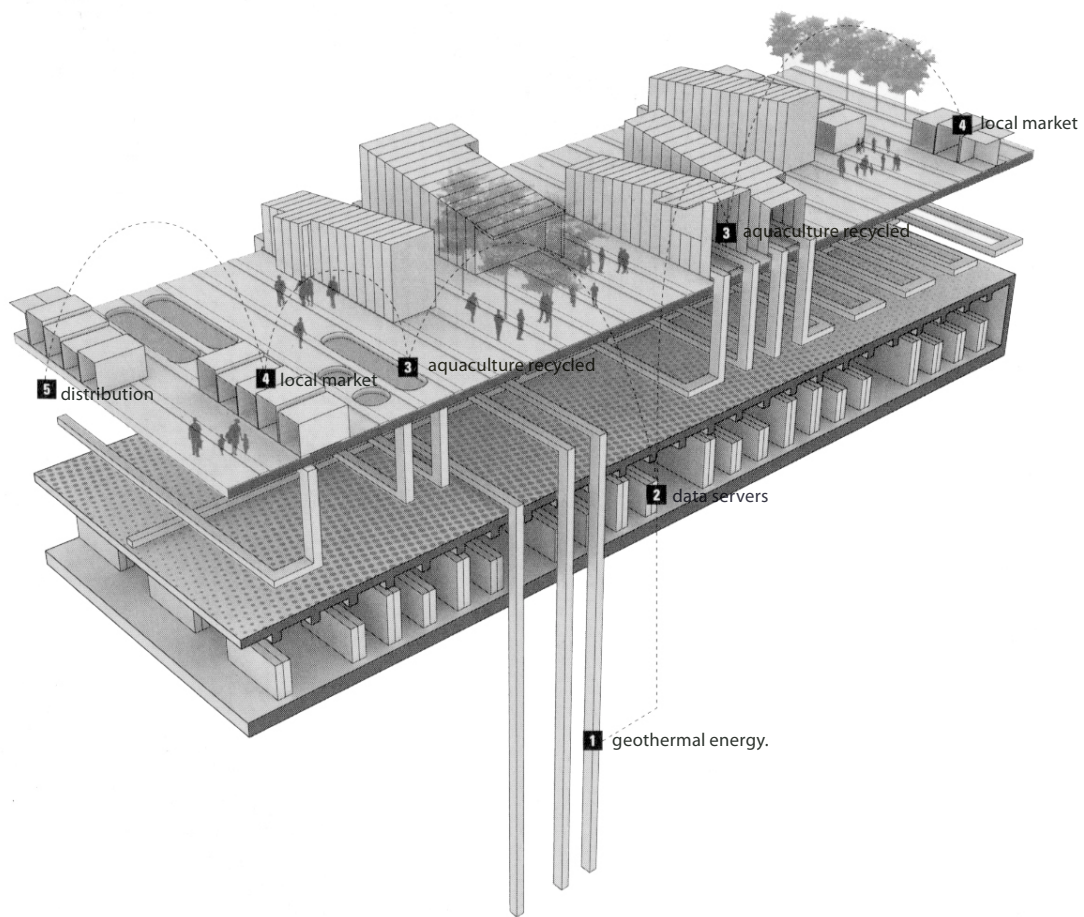
7.08 Diagramming of Wiring Runways.

7.09 The map indicates the greenways that cut through the sites larger territory.



7.10 Massing studies document the configurations that define new block typologies increasing permeability of public spaces.





7.11 Section diagram shows system integration and process flows.



## Cornell Tech

New York City is currently developing a new technology hub on twelve acres of Roosevelt Island, Cornell Tech. This joint collaboration between Cornell University and Technion, the Israel Institute of Technology, will serve as a “global magnet for tech talent and entrepreneurship.”<sup>15</sup> New York City’s Economic Development Corporation is putting up \$100 million in funds paired with \$300 million for real estate, as part of a billion dollar educational complex to bring in thousands of jobs for New York City.<sup>16</sup> Architects SOM, Weiss Manfredi, Morphosis and landscape architect James Corner are involved in the designs working toward the initial proposals.

Cornell Tech represents a multifaceted development directly aimed at catalyzing an infrastructural landscape to spur economic productivity. It has multiple support systems to ensure its success: prominent educational institutions, financial support from the city, resources from New York’s business pool (e.g., Google lending out 20,000 square feet of its facilities), and approval of local residents.<sup>17</sup> The overwhelming support of this project highlights the competitive awareness of the city leadership and citizens (Cornell Tech already being dubbed “Silicon Island”). Roosevelt Island’s location provides access to the Manhattan’s already abundant infrastructural support. It is further enhanced by creating a targeted population density to achieve face-to-face contact of creative class individuals. Despite some significant differences in context and scale, Cincinnati has the institutional framework to create a version of the Cornell Tech endeavor. Central Parkway provides a confined zone in the urban core, between the largest concentrations of jobs in the city (e.g., the downtown Central Business District in the south and the University of Cincinnati Main Campus,

Medical Campus, and multiple hospital systems to the north in Clifton).

Cornell Tech attempts to capitalize on knowledge spillover. The island-incubator model mixes a pedagogy of entrepreneurial business and engineering technologies. This project is reinforced by its setting in the thriving context of New York City. Cornell Tech’s institutional framework is formed to cultivate innovation across disciplines. Roosevelt Island, in one sense, will become an urban laboratory, encouraging face-to-face interaction within a group of individuals set to be the future creative class of tomorrow.

Central Parkway’s site can adopt strategies of framing new infrastructure and producing ecologically and economically productive landscapes. The theories set forth by Rossi and Allen provide an understanding of urban architecture as both collective spaces created over time and design generation producing form that performs. The concept of framing carries out the notion of how infrastructure constructs a site and allows for contingent futures. These projects respond to the present environmental, social, economic, and technological conditions of today, and at the same time, define the urban infrastructural networks of the future.

<sup>15</sup> “Cornell in NYC,” Cornell University, <http://www.cornell.edu/nyc/> (accessed March 1, 2013).

<sup>16</sup> “Cornell NYC Tech Will Foster Commerce Amid Education - NYTimes.com,” The New York Times - Breaking News, World News & Multimedia, <http://www.nytimes.com/2013/01/22/nyregion/cornell-nyc-tech-will-foster-commerce-amid-education.html?pagewanted=all> (accessed March 1, 2013).

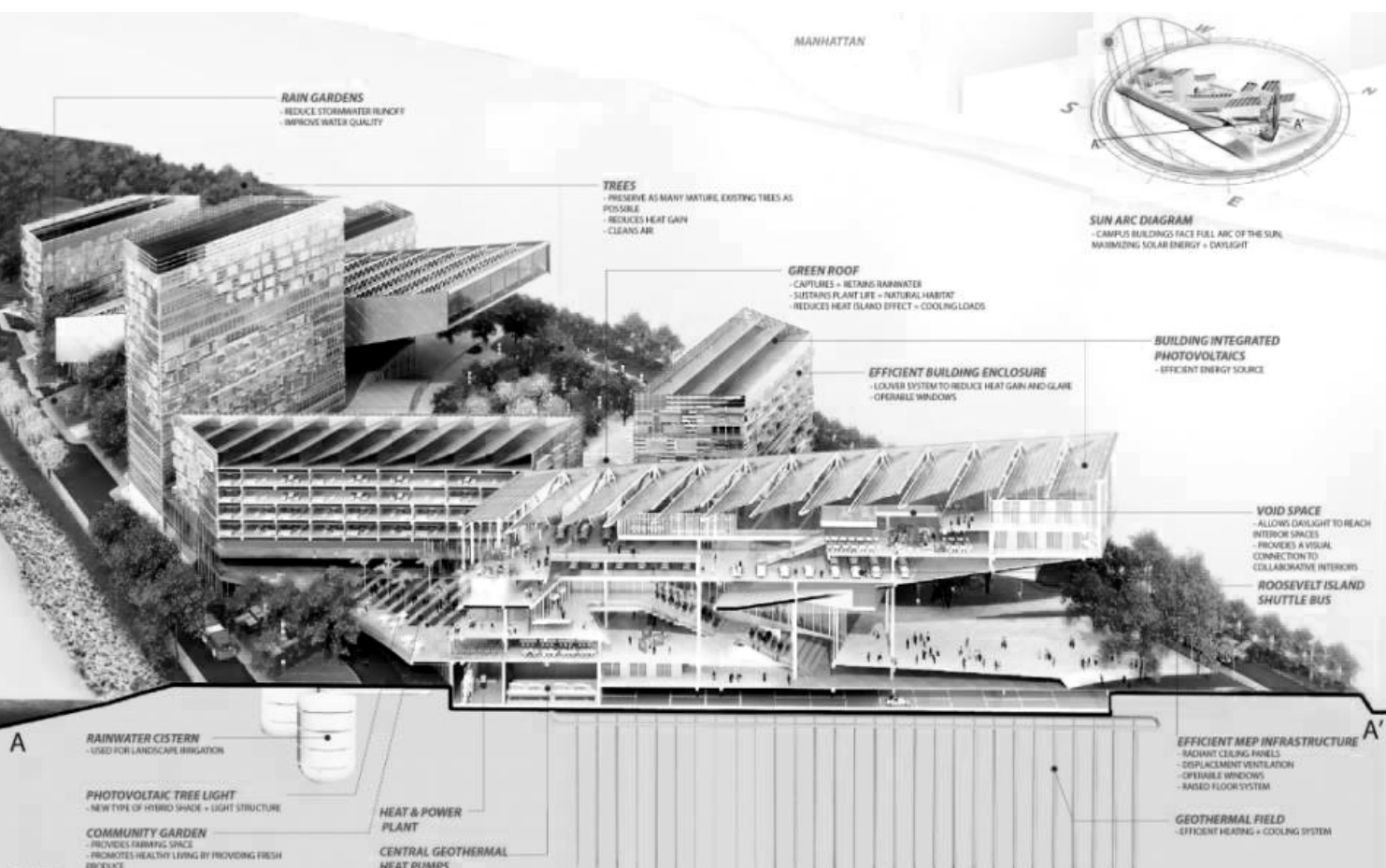
<sup>17</sup> “Cornell NYC Tech Will Foster Commerce Amid Education”



7.12 Roosevelt Island as it exists today.



7.13 Rendering depicts the new Cornell Tech campus on Roosevelt Island.



7.14 Rendering depicts a holistic strategy to sustainable design through integrated building systems.



7.15 Rendering shows a new pedestrian path connecting Roosevelt Island to Manhattan.





## Part 2

### Implications

The topic of adapting infrastructure and integrating landscape design into architecture is transitioning. Architects, landscape architects, and urbanists are still experimenting with how to define infrastructure and how infrastructure provides a framework for new design evolutions. The field is ripe for testing. Cities all over the world will continue to recapture existing infrastructure, but also diversify the ways that infrastructure can serve broader integrated economic, sustainability, and livability goals.

As explained through theoretical positions, precedent projects, and site analysis in this study, the potential for Central Parkway and the underground subway is realized in a concept of adapting infrastructure by creating a new pedestrian greenway, architectural interventions, and public transportation improvements. The new greenway development relies on the ability to implement the human-dimension of design along Central Parkway, connecting the existing network of successful pedestrian spaces. Central Parkway's site can adopt strategies of framing new infrastructure and producing ecologically and economically productive landscapes. The theories set forth by Rossi and Allen provide an understanding of urban architecture as both collective spaces created over time and design generation producing forms that perform. The concept of framing carries out the notion of how infrastructure constructs a site and allows for contingent futures. As shown in the precedents in this study, it is critical to balance multiple perspectives between the environmental, social, economic, and technological forces.

The research regarding how this project could begin or unfold from a social and political perspective has been deferred. Mobilizing citizens and garnering political support is an entirely different challenge, especially when deviating from a city's traditional planning and development models. The New York City High Line, for example, began as a grass roots project to save an urban artifact from demolition. Conversely, in Curitiba, the bus rapid transit, pedestrian streets, and social programs were the results of top-down planning initiatives within a localized technocratic government. Cornell Tech exemplifies an aggregated effort of support from government, public, and private stakeholders. As seen with the fragmented attempts to build a streetcar line, the Cincinnati community is divided politically on the implementation of public transportation. To achieve an even more ambitious project than a streetcar, a citywide cultural shift toward green mobility and urban living must be in place. Furthermore, a long-term unified collaboration between local governments, citizens, public institutions, and the private sector is necessary to successfully carry out a large-scale adapted infrastructure reuse project.

This study set out to inform the design process to test strategies along Central Parkway and the underground subway. Research in this document indicates Cincinnati's Central Parkway thoroughfare is an opportune location to restitch the urban fabric of Cincinnati's downtown. Currently, Cincinnati is rightly investing in its urban core and is positioned to coalesce these efforts by creating an urban system that will connect newly thriving districts. The design and implementation strategies will help the city meet its goal to increase a population density of a creative and knowledge based workforce that will further ignite Cincinnati's economic capacity.

## Criteria

The criteria for what makes a city livable is borrowed from the book, *Our City Ourselves: Principles for Transport in Urban Life*, by Jan Gehl and Walter Hook. The principles are a guidelines that “lay behind the design” promoting the quality of life, sustainability, and competitiveness of cities around the world.<sup>1</sup>

The diagram below connects the general principles, on the left, to site-specific strategies for Central Parkway on the right. The proposal for Central Parkway is only part of the solution to the economic and mobility gaps identified in Cincinnati. The Principles for Transport in Urban Life is a holistic approach reflecting a city’s attitude towards mobility and urban space.

Strategies for Central Parkway are addressed at three scales of operation: 1) the master plan, 2) the urban node, and 3) the architectural site. The master plan provides a broad vision for Central Parkway and the underground subway within the context of Cincinnati. The urban node is a strategic precinct within the master plan and it addresses urban place making at targeted intersections. The architectural site connects people between the existing subway infrastructure and the new urban fabric. At the architectural scale, the project integrates the new landscaped thoroughfare with old infrastructure, mediating between vacant lots, new and existing buildings. The three scales of operation are a form of interdependent relationships. Architecture in the city does not exist without urban space, and urban spaces are a series of elements that define a city. Design and architecture ultimately operate between multiple scales, creating a contextual transformation along Central Parkway.

## Principles for Transport in Urban Life

**Walk:** great cities start with great pedestrian environments

**Cycle:** make cycling convenient and safe

**Connect:** Create dense networks of streets and paths

**Transit:** promote convenient, cost effective solutions

**Mix:** mix people and activities, buildings and spaces; keep ground-floors active


**Densify:** match density and transit capacity

**Compact:** Create compact regions with short commutes


**Shift:** increase mobility by regulating parking and road use

<sup>1</sup> Our Cities Ourselves Principles for Transport in Urban Life. New York, N.Y.: Institute for Transportation and Development Policy, 2011.

### ***Strategies for Central Parkway***



Adapt Central Parkway into a pedestrian greenway linking to existing parks and pedestrian networks




Promote access to existing cultural amenities and anchor institutions




Define location for new park spaces to encourage meeting spaces



Promote higher density, low to mid rise, mixed-use development along Central Parkway



Promote socially diverse, mixed income neighborhood blocks



Identify vacant lots and structures in need of redevelopment and rehabilitation



Identify locations to tap into underground subway for human activity and alternative infrastructure use



Provide hybrid bus-rapid-transit system along Central Parkway linked to other bus and streetcar networks



8.01 Diagram showing a portion of the North South Transportation Initiative (NSTI). NSTI is a multi-billion dollar regional initiative primarily focused on vehicular transportation improvement in the Cincinnati Dayton regional corridor.

- a. The I-75 Mill Creek Expressway project splits into eight phases to construct new overpasses and interchanges along I-75.
- b. Brent Spence Bridge connects I-75 and I-71 from Cincinnati, Ohio to Covington, Kentucky. The bridge is determined to be functionally obsolete and planning is underway to develop a higher capacity vehicular bridge.
- c. Hamilton 71 Uptown Access project is comprehensive transportation plan to improve traffic flows, public transportation, parking management, wayfinding, and bicycle and pedestrian circulation.

### Layering Infrastructure

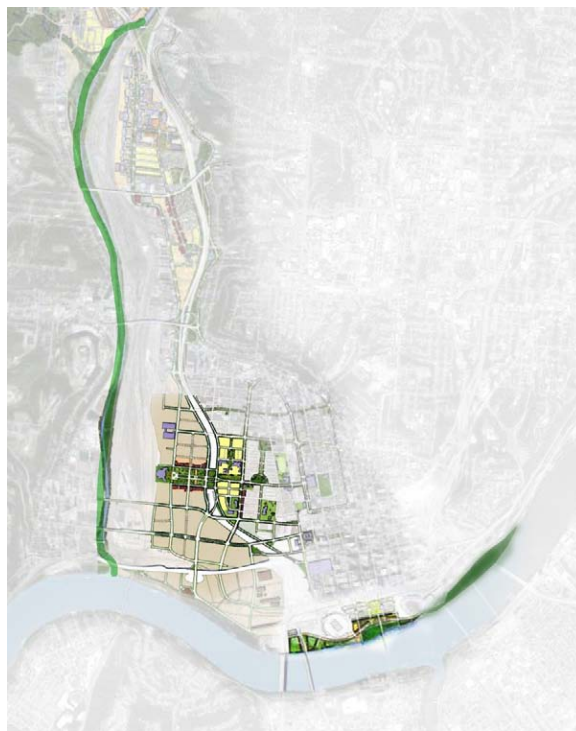
Cincinnati has multiple infrastructural projects underway. Several more are planned for the near future. The projects vary widely in their primary function. The North South Transportation Initiative, NSTI, improves the safety and access of vehicular transportation in the Cincinnati-Dayton region. The NSTI breaks down into several projects (fig. 8.01) along Interstate 75. In Cincinnati, these three development zones wrap around the downtown urban core. In contrast, to the NSTI, the Mill Creek Greenway focuses on ecological and habitat renewal through community based planning (figs 8.02, 8.03). East of the Mill Creek Greenway are neighborhood development proposals at Hopple Street and the Queensgate West End (fig 8.04, 8.05). Urban neighborhood developments also include Over the Rhine revitalization through the efforts of the non-profit development corporation 3CDC (fig 8.06, 8.07). Analyzing and overlaying infrastructural projects in Cincinnati reveals the unconnected urban spaces and programmatic gaps.







8.04 Neighborhoods of the Mill Creek Valley - Hopple Street. Planning and design developed by Urban Design Associates.



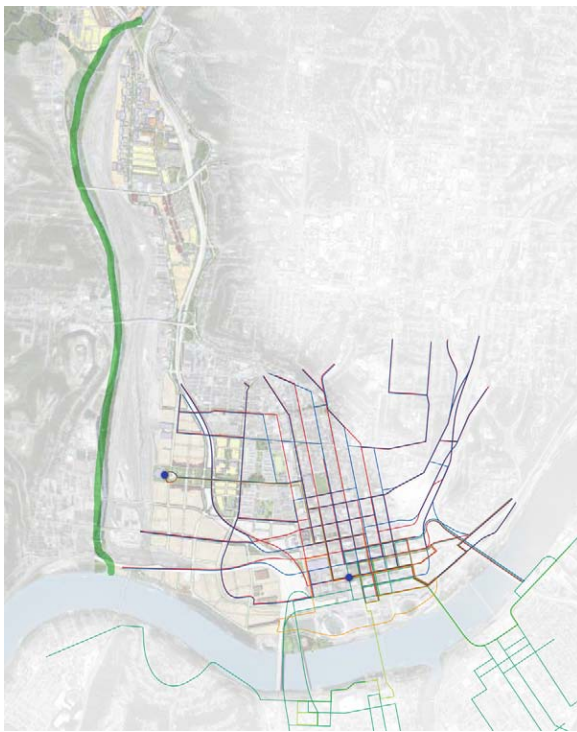
8.05 Neighborhoods of the Mill Creek Valley - Queensgate & West End. Planning and design developed by Urban Design Associates.



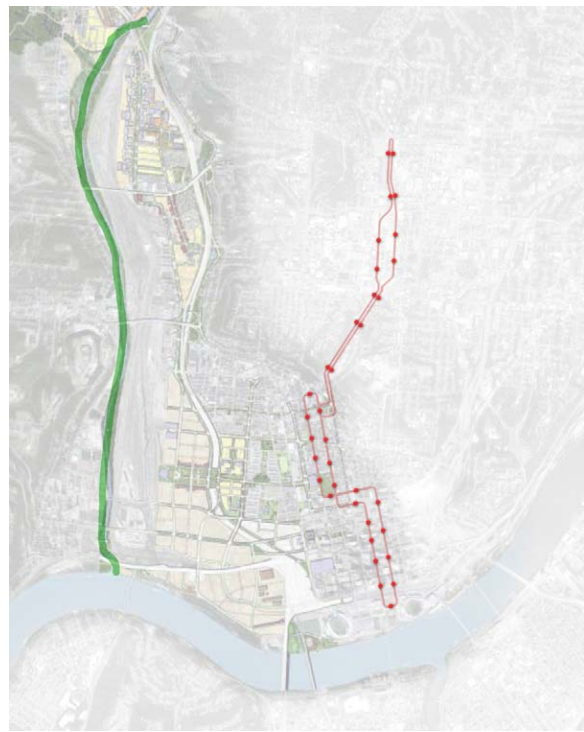
8.06 Brewery District Master Plan (BDMP). Located in the northern half of Over the Rhine, the BDMP's goal is to repopulate and increase private development and investment in the area.



8.07 3CDC Project map. Over the past decade, 3CDC revived a large portion of the southern half of Over the Rhine.

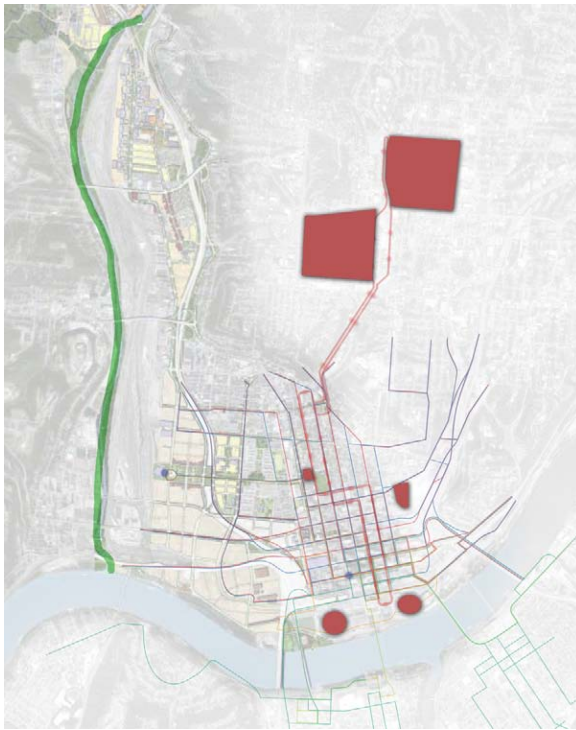


8.08 Bus network map for downtown Cincinnati.

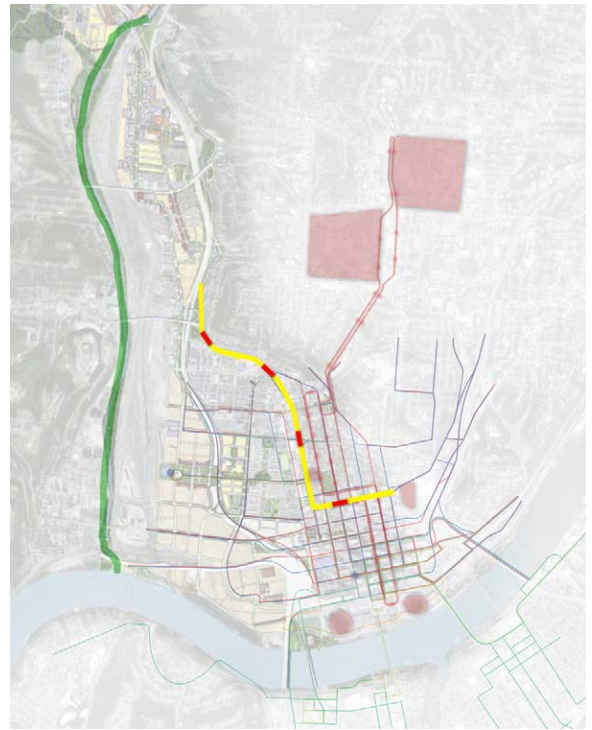


8.09 Street Car map. The Streetcar line has long term plans to circulate from the waterfront downtown to the University of Cincinnati.

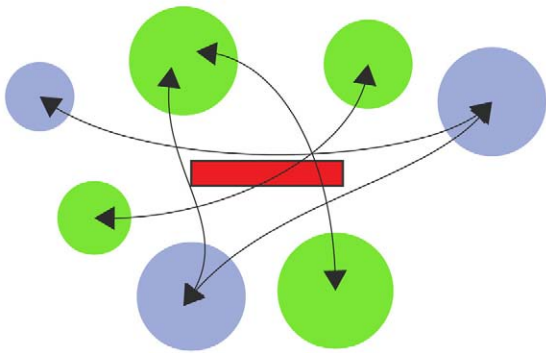
The diagrams in figure 8.08 and 8.09 show public transportation of the existing bus network and the future streetcar line. Large institutions and public event spaces become key locations for public transportation terminations (fig 8.10). In reviewing the several projects, none give prominence to walkable and bikeable urban spaces. Central Parkway runs directly through the city attaching to all of the infrastructure projects aforementioned. Central's underutilization and linear form lends itself to becoming a linear park and green mobility network (fig 8.11). From the layering of infrastructure, key intersections began to materialize, identifying nodes for new development (fig 8.14).



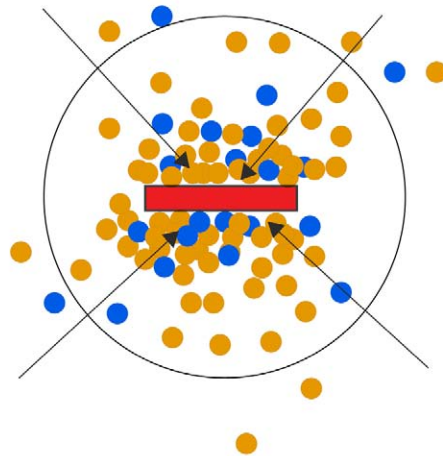
8.10 The sections indicated in red are major landmark in Cincinnati representing large quantities of human activity. The University of Cincinnati and UC Medical Campus are to the far north and Paul Brown Stadium and The Great American Ball Park at the southern end.



8.11 Central Parkway and Underground Subway. The yellow line indicates the subway tunnel. The red rectangles indicate subway stations. Central Parkway and the subway are positioned to connect pedestrian focused greenway stitching together existing and new infrastructure in Cincinnati.

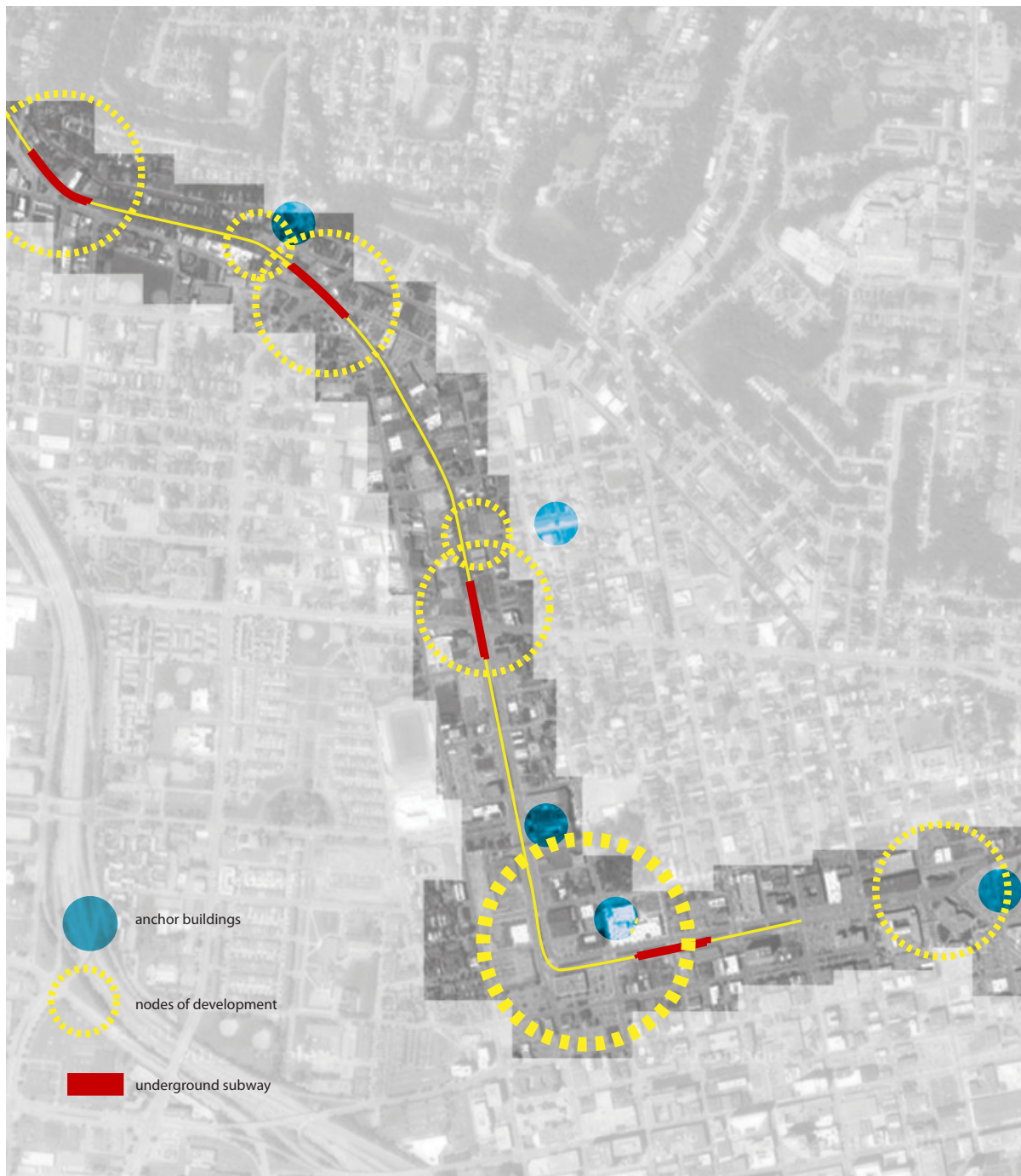


8.12 Linking Diagram. Connect park and amenity space to civic and educational institutions.



8.13 Attracting Concept. Increase density of residential and office space at urban nodes of development.

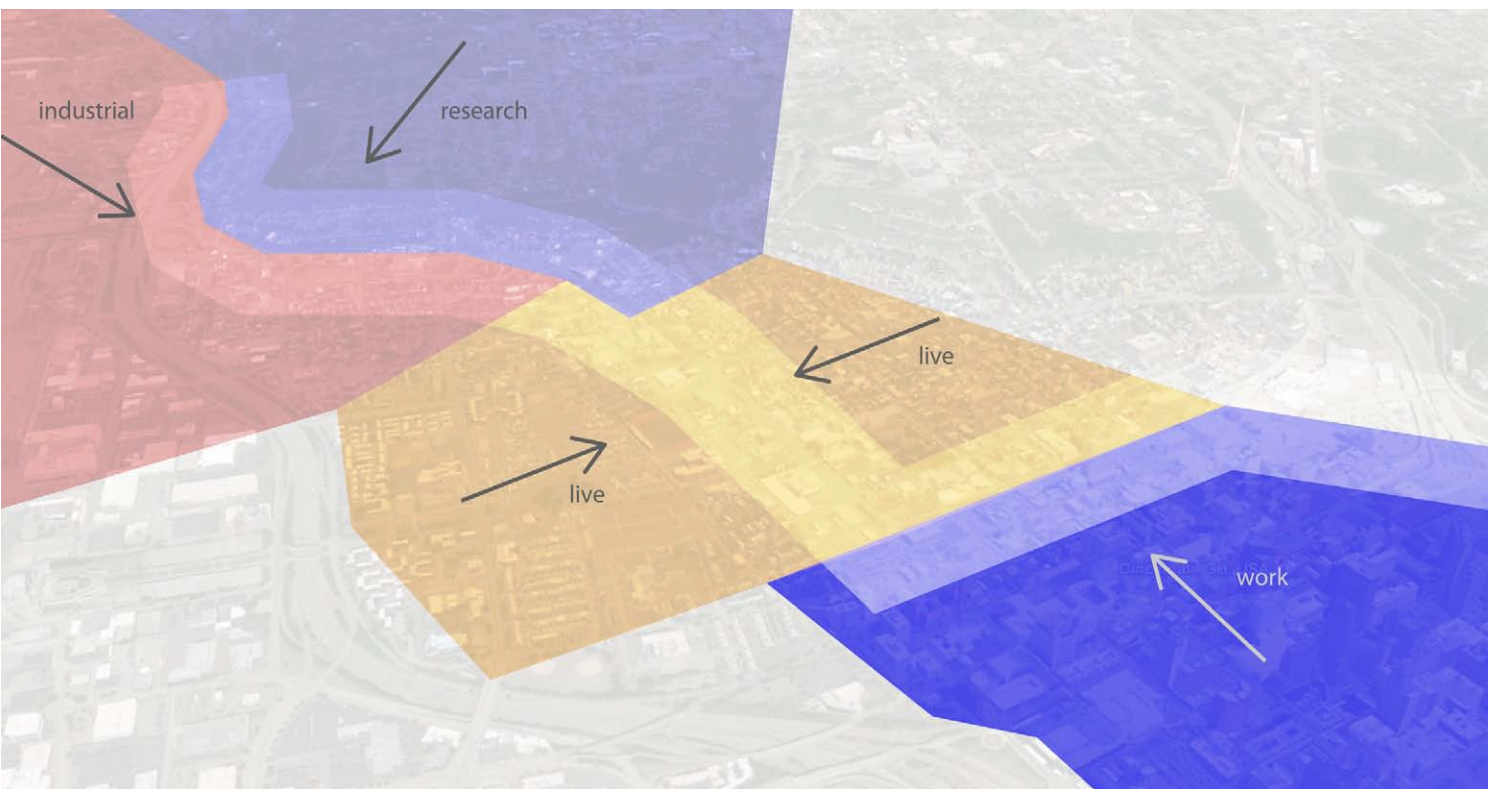




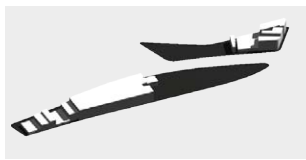
8.14 Central Parkway nodes of development. This map indicates zones to create urban nodes at targeted intersections.



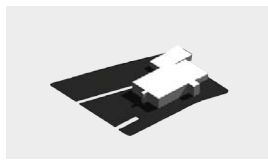
8.15 Existing program in study area along Central Parkway.



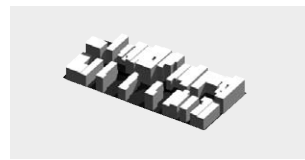
8.16 External influence of surrounding neighborhoods.



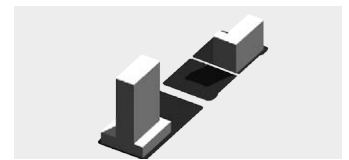
*industrial*  
CUF



*research*  
West End



*live*  
Over the Rhine



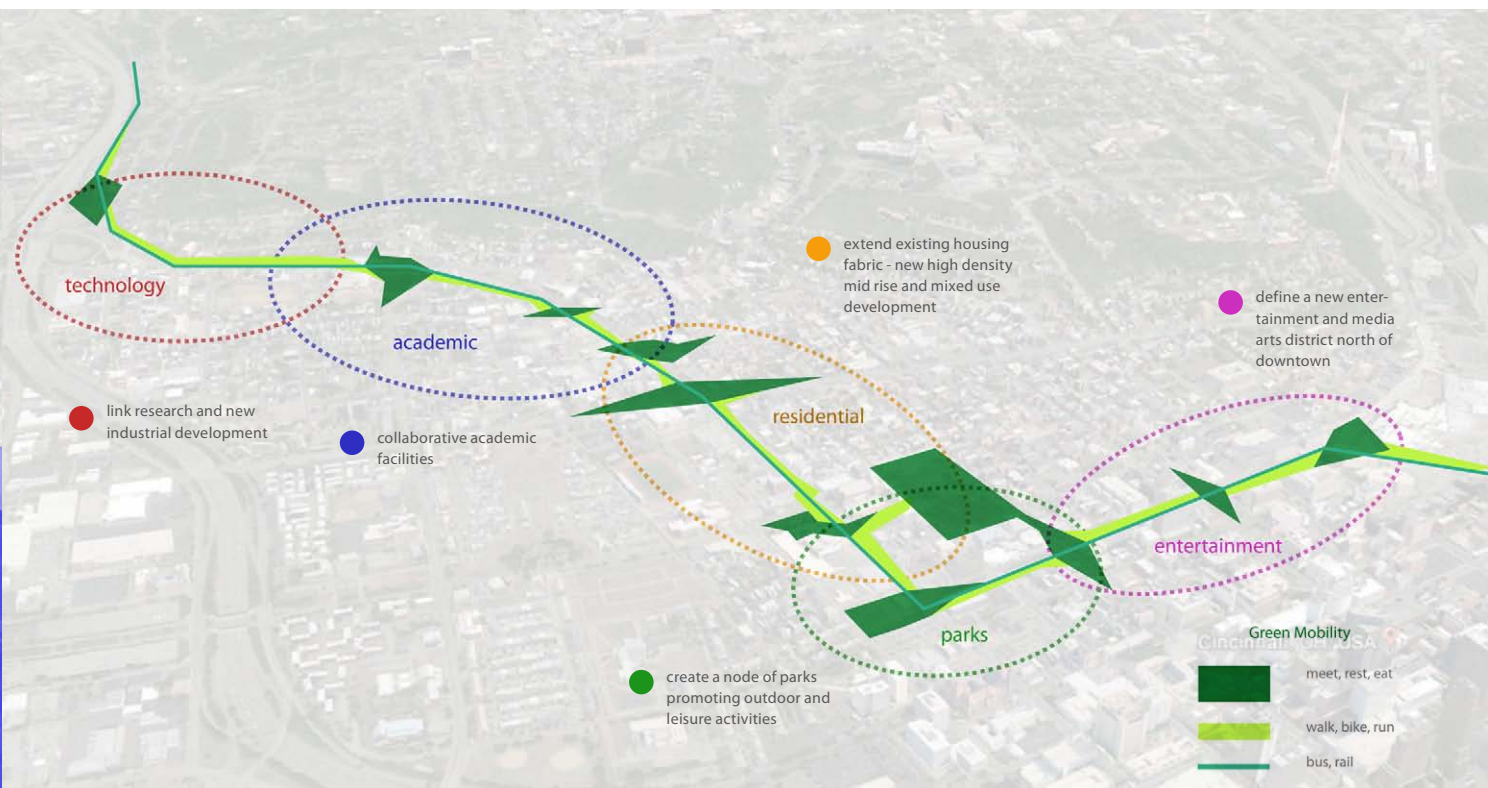
*work*  
Central Business District

8.17 Existing typologies from Central Business District, Over the Rhine, and the CUF.

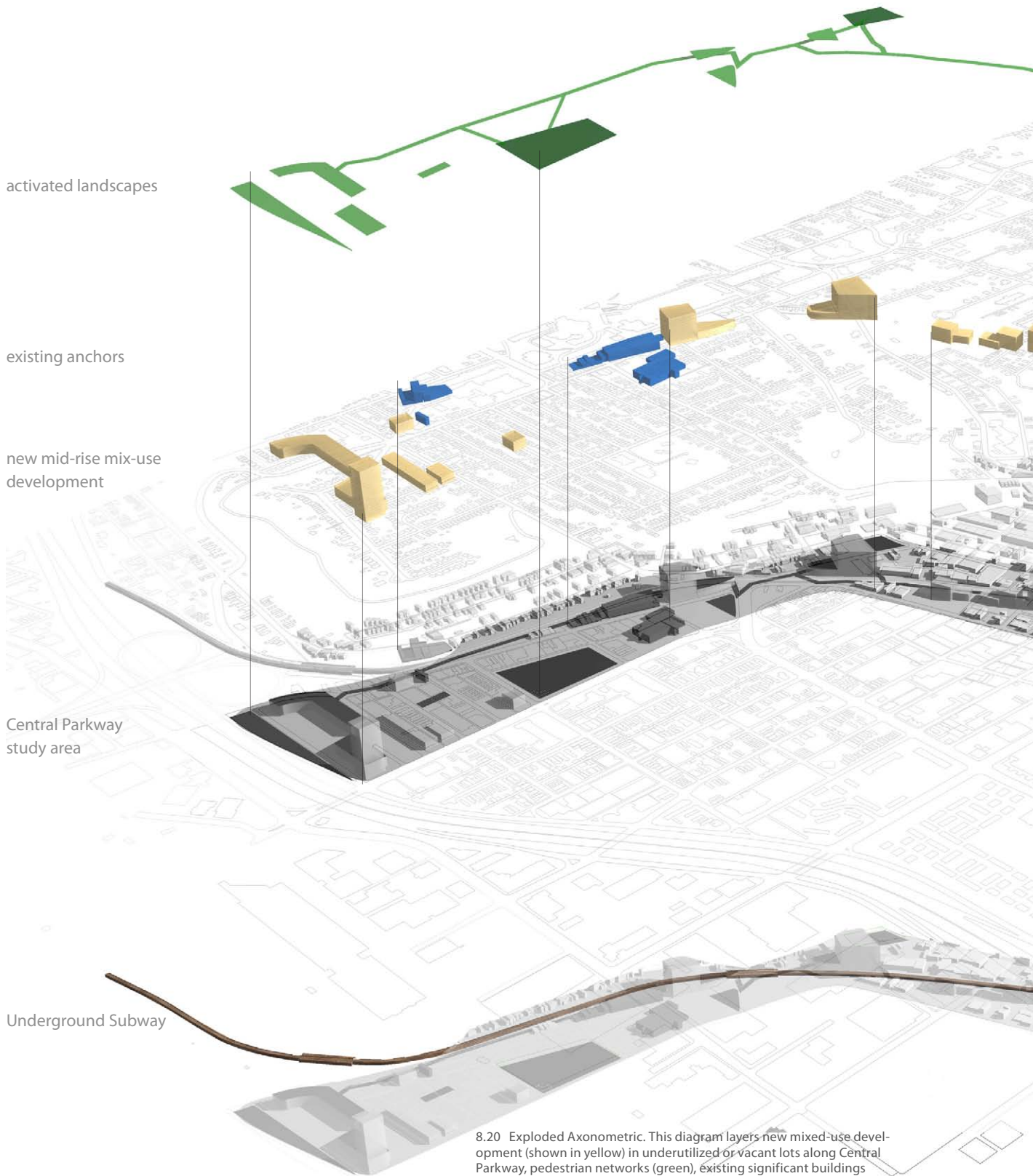




8.18 Preliminary sketch exploring green mobility networks.



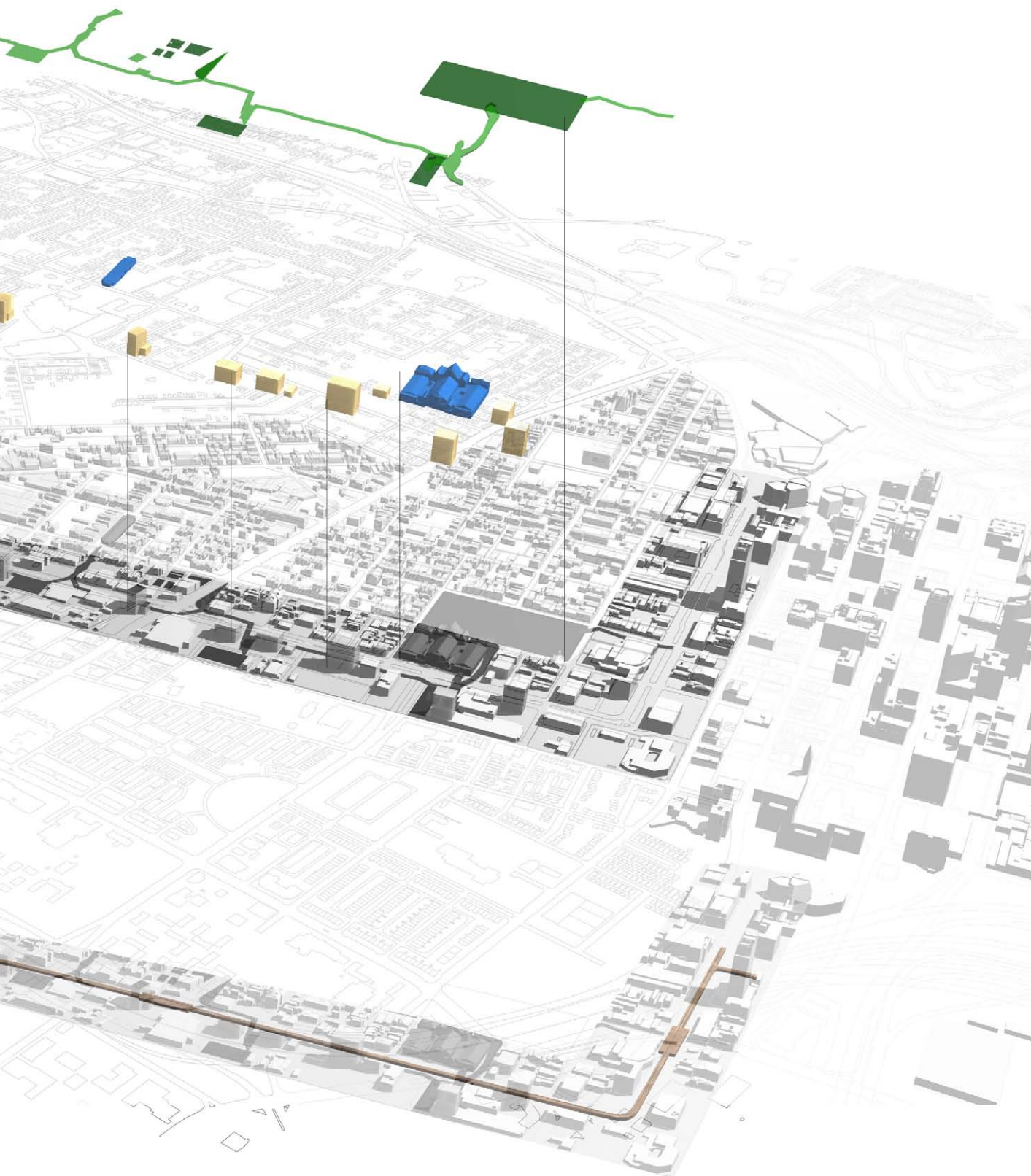
8.19 Green Mobility and Development Corridors.



8.20 Exploded Axonometric. This diagram layers new mixed-use development (shown in yellow) in underutilized or vacant lots along Central Parkway, pedestrian networks (green), existing significant buildings (blue), and the underground subway (brown).

8.21 (next page) Central Parkway looking north from downtown

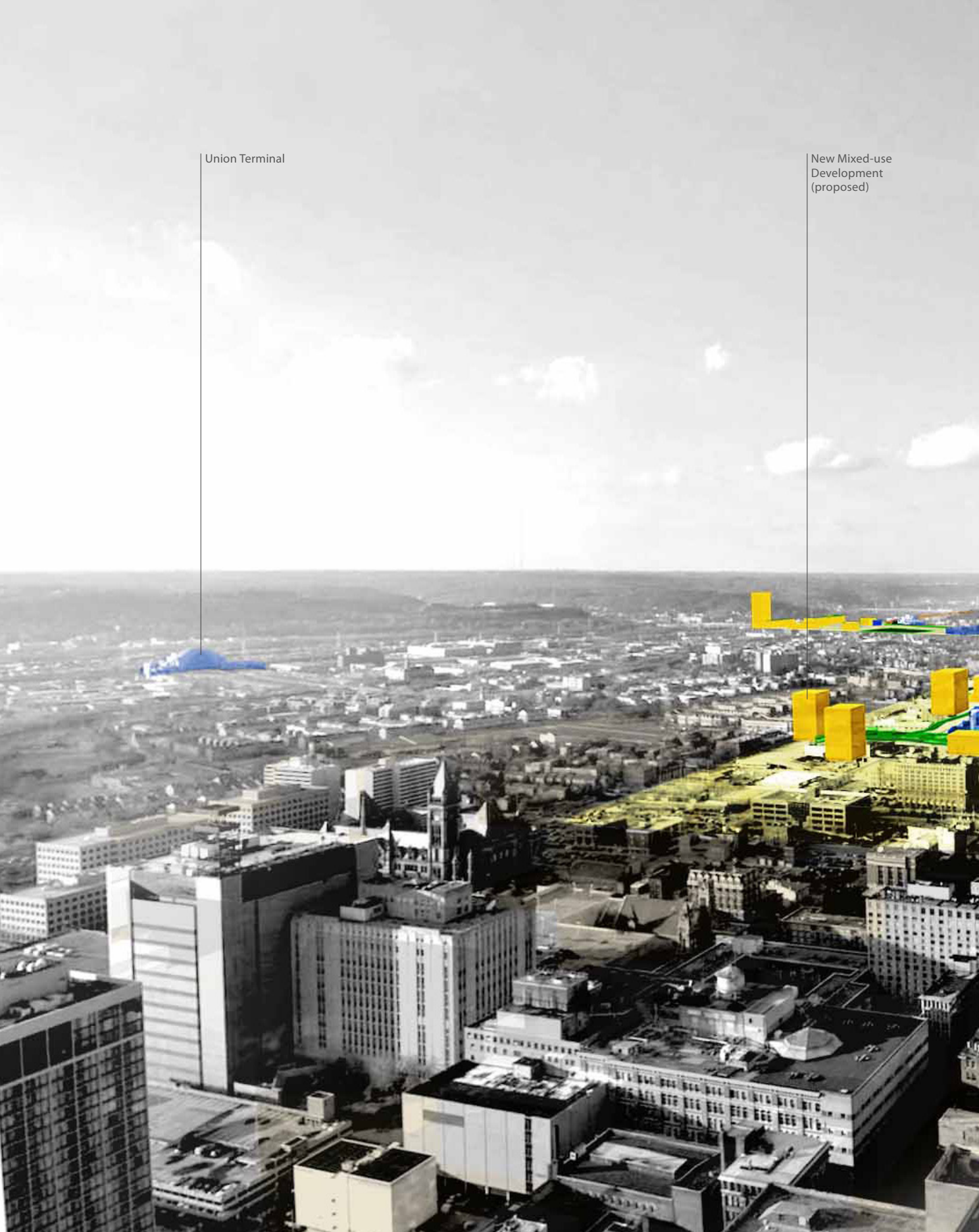






Union Terminal

New Mixed-use  
Development  
(proposed)

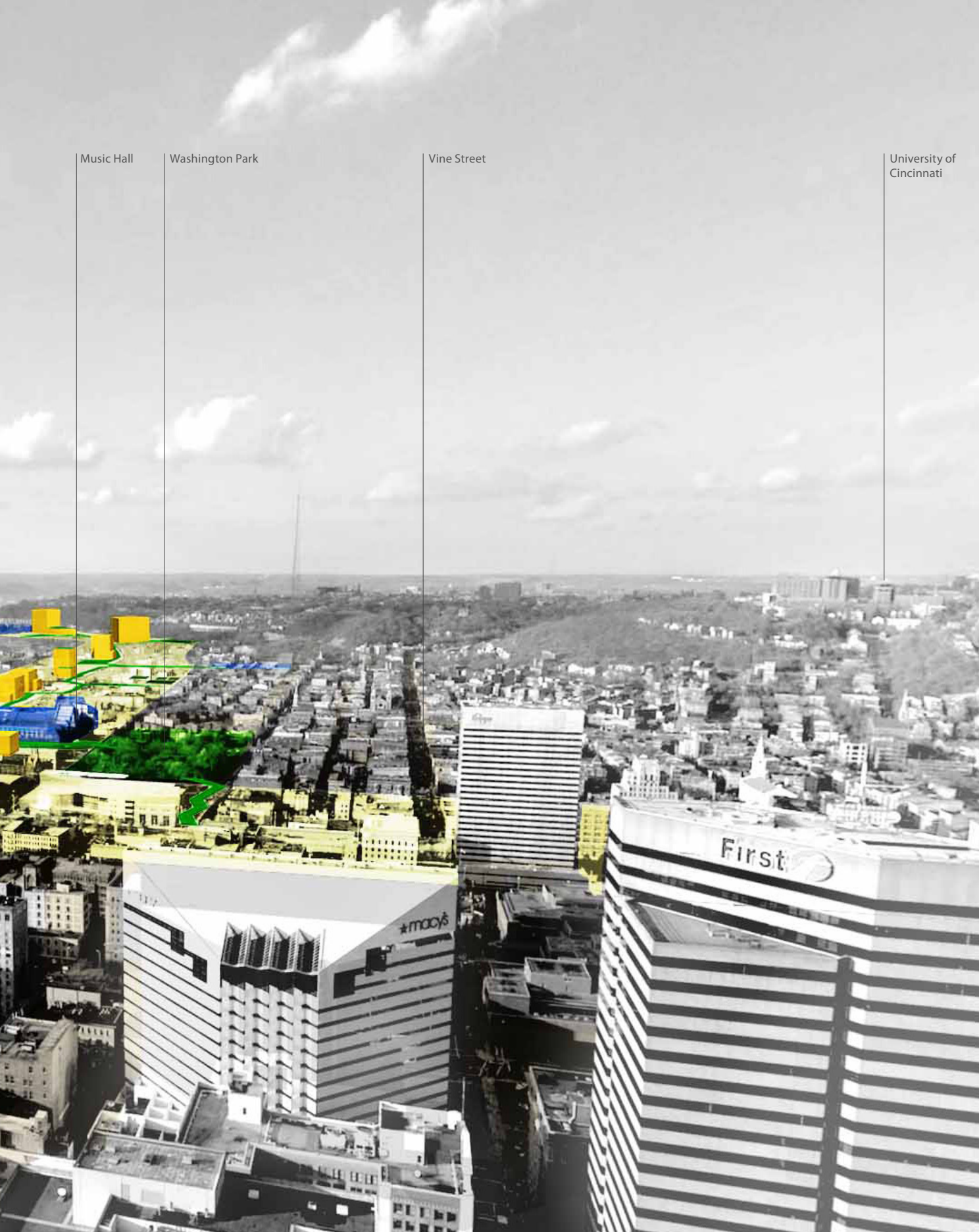


Music Hall

Washington Park

Vine Street

University of Cincinnati



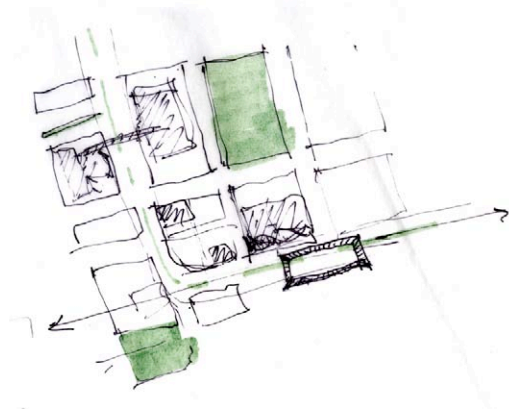
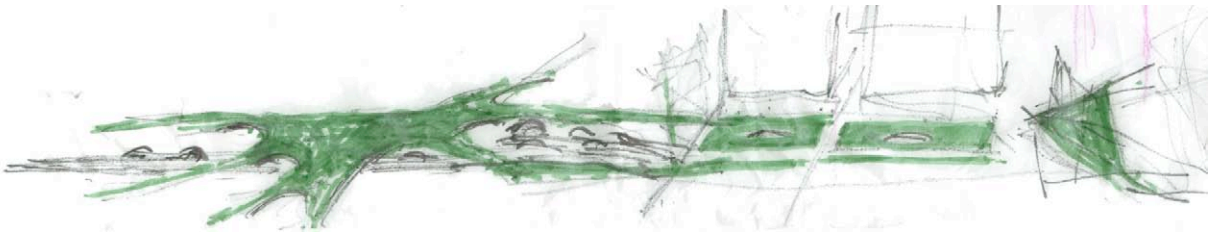


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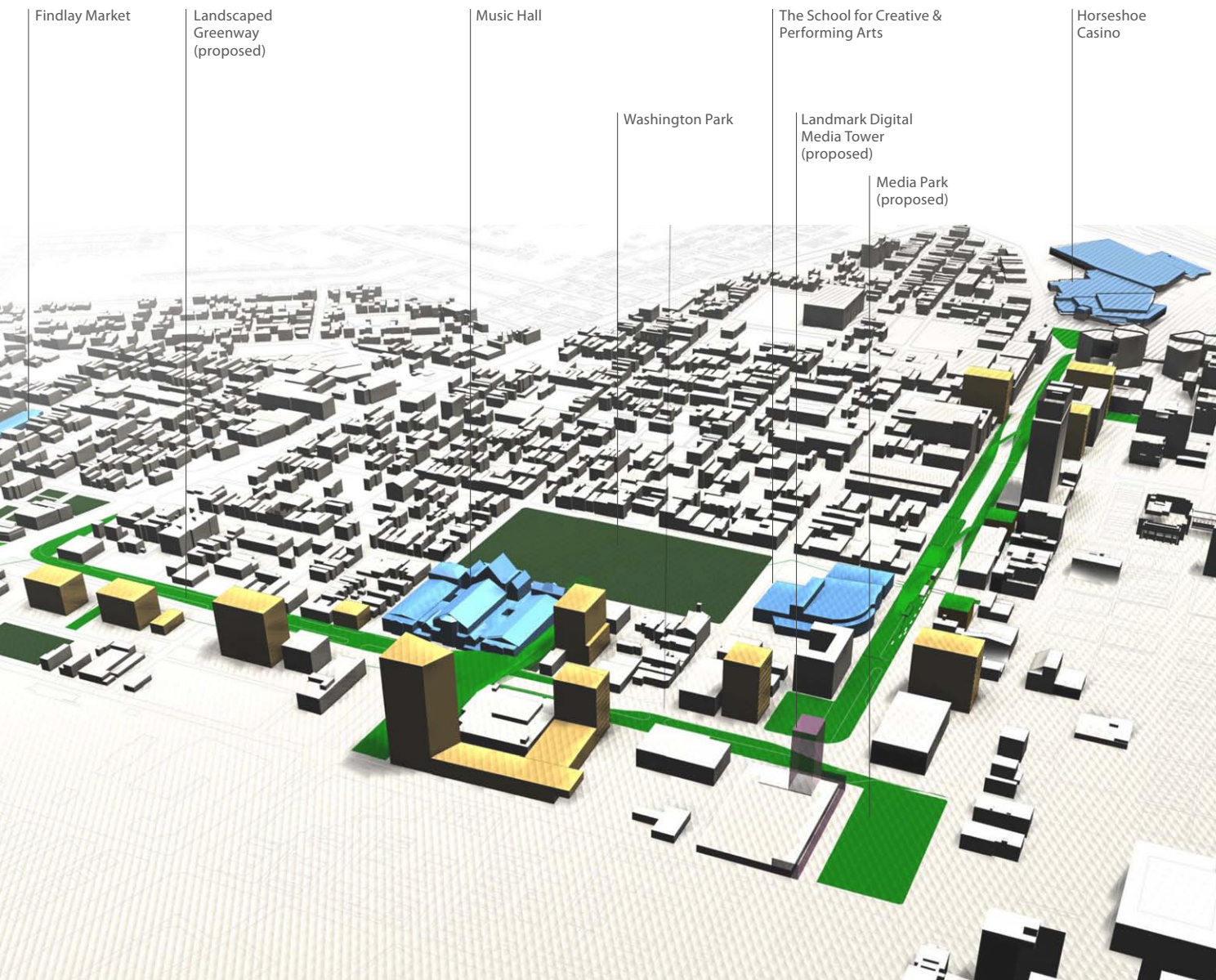
8.23 Rendering of Central Parkway looking north. The landscape zone in this image takes over four lanes of street, nearly half of Central Parkway for pedestrian only activity. Another pedestrian focused strategy allows for uninterrupted walking paths between neighborhoods. In the back of this image a landscape bridges east to west, connecting the West End neighborhood to Washington Park.



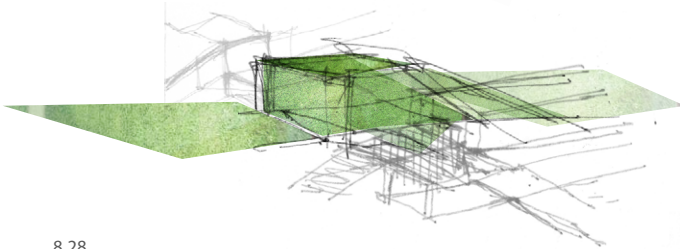
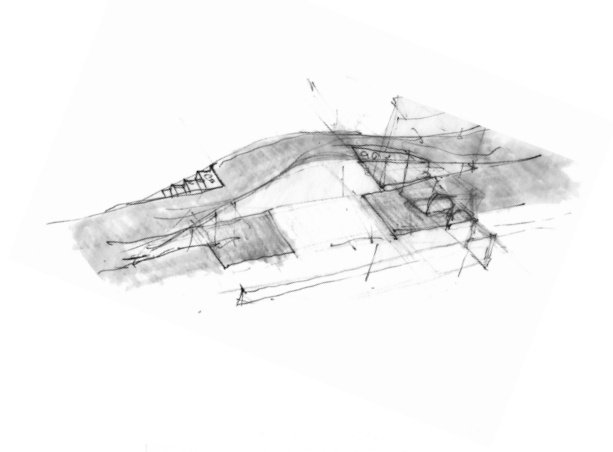
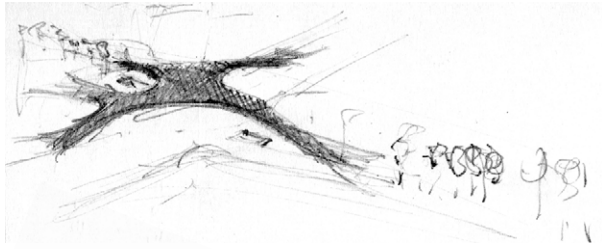
8.24. The model shows a decreased size of roadway and a new path of travel for cars.

8.25, 8.26 Sketches explore urban design strategies and continuous landscapes at the southern end of Central Parkway.





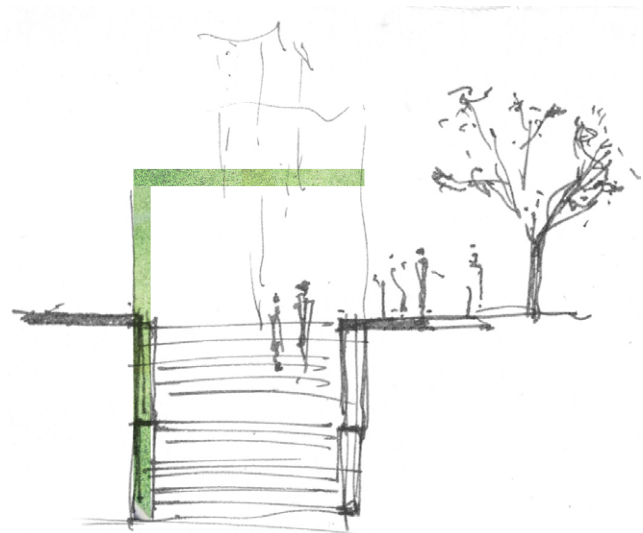
8.27 Urban node on south west portion of Central Parkway



8.28

### Moving Forward

Looking forward, additional studies will explore the specific architectural operations, given the defined landscape and transportation parameters. The urban architecture project will integrate thresholds of space within the subway station, the street, the greenway, and new programmatic functions.



8.29

8.29, 8.30 Concept sketches exploring the transition space between the underground subway and new urban fabric.



8.31 Adapted undergrounds subway station. Rendering depicting the Race Street Station used as a bar.



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- |   |  |
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