PROVIDENCE DOWNTOWN AND
KNOWLEDGE DISTRICT PLAN

December 21, 2012

PERKINS+WILL

Providence
Department of
Planning &
Development

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ACKNOWLEDGEMENTS

Mayor of Providence

Angel Taveras

Providence Department of Planning and Development

Robert Azar, AICP, Acting Director
Bonnie Nickerson, AICP, Director of Long-Range Planning
Christopher Riale, AICP, Principal Planner

Consultant Team

Perkins+Will
Michael Kwartler Associates
PARE Corporation

Technical Committee

John Sinnott, Chair, Gilbane Building Co.
Susan Bacher, Steere Engineering, Inc.
Barbara Bennett, Johnson & Wales University
Jody Bishop, Lifespan
Renee Codega, VHB
Keith Davignon, Vision 3 Architects
Stephen Durkee, Cornish Assoc./City Plan Commission
Michael McCormick, Brown University
Samuel Shamoon, Shamoon Planning
Luis Torrado, Latino Contractors Association
Todd Turcotte, Capital Properties
Michael Voccola, Procaccianti Group
Christine West, William Kite Architects, Inc.

Advisory Committee

Laurie White, Chair, Greater Providence Chamber of Commerce
Ian Barnacle, Fox Point Neighborhood Assn.
Leroy Belona, Center for Advancement of Minorities in the Building Trades
John Bowen, Johnson & Wales University
Arnold "Buff" Chace, Cornish Assoc.
Annie DeGroot, EpiVax, Inc.
Daniel Egan, Assoc. of Independent Colleges and Universities of R.I.
Kevin Flynn, R.I. Dept. of Administration
Robert Gilbane, Gilbane Development Co.
Peter Hayes, Hayes & Sherry
Constance Howes, Women & Infants Hospital
James Karam, First Bristol Corporation
Jef Nickerson, GCPVD
Joseph Paolino, Paolino Properties
Stacy Paterno, Lifespan
Constance Pemmerl, Real Estate Consulting Services
Marisa Quinn, Brown University
Michael Sabitoni, RI Building Trades Council
Arthur Salisbury, Jewelry District Association
Edward Sanderson, RIHPHC
Seth Yurdin, Providence City Council

Credit: All aerial photography by Maine Imaging Photography

CITY OF PROVIDENCE

Angel Taveras, Mayor

Dear Friends,

Downtown and the Knowledge District are fast-developing areas of Providence that are well-positioned to become a center for new economic growth in Rhode Island and the region.

The City of Providence is exploring ways to drive new economic development and has identified the Jewelry District and Hospital Area (collectively referred to as the Knowledge District) for future growth of knowledge-based industries. The Knowledge District will make Providence a preeminent location in basic, clinical and translational life science R&D. The City's recent planning initiatives are exploring ways to harness emerging knowledge-based industrial development to create jobs, drive innovation and entrepreneurship, improve sustainability, and enhance public health and quality of life. The City is also looking to capitalize on acres of land made available through the relocation of Interstate 195.

In early 2011, I commissioned a team of dedicated residents, local businesses owners, and institutional representatives to work with the Providence Department of Planning and Development on the creation of a long-range plan for Downtown and the Knowledge District. After many months of hard work, I am very pleased to present to you the Providence Downtown and Knowledge District Plan: a land use planning, urban design, and zoning strategy that will help guide future growth of the district, and establish a sustainable "blueprint" for future economic development in Providence.

I congratulate Laurie White and John Sinnott who respectively led the Project's Advisory and Technical Committees, the Perkins+Will consultant team, and the Department of Planning and Development on a truly visionary and inspirational plan that will help us achieve long-term economic growth and vitality.

Sincerely,

Angel Taveras

Angel Taveras

Mayor

OFFICE OF THE MAYOR

Providence City Hall | 25 Dorrance Street Providence, Rhode Island 02903

401 421 2489 ph | 401 455 8823 fax

www.providenceri.com

CONTENTS

1 EXECUTIVE SUMMARY

The planning effort for Downtown and the Knowledge District grew out of Providence's Knowledge Economy Initiative, a regional effort led by the Greater Providence Chamber of Commerce and the Providence Foundation to bring talent to the region, boost productivity, create wealth, and drive development.

Providence is a city endowed with world-renowned institutions of higher learning, regional centers of healthcare and research, and a strong creative class of artists and entrepreneurs. These characteristics are the cornerstone of a viable knowledge-based economy. Providence's Knowledge District will support the existing institutional and creative networks, while becoming an economic engine for growth and an attractive place to live, work and visit.

In addition to these attributes, a truly transformational opportunity has presented itself with the relocation of a section of Interstate 195. This relocation has unlocked approximately 23 acres of land prime for new development that has the potential to physically and economically stitch back together the Jewelry District and Downcity. One of the many goals for this plan is to provide for the full development potential of this land to attract investment, which will drive long-term growth for the entire city of Providence.

The study area comprises Downtown Providence, including Downcity and the Jewelry District, and the area of Upper South Providence around Rhode Island Hospital. The most detailed study was conducted on the area south of Pine Street (the "Knowledge District") because of the growing cluster of knowledge-based uses and large amounts of vacant land available for infill development. Despite being bisected by Interstate 95, the two halves of the Knowledge District are intricately connected due to the presence of institutional and research facilities in the Jewelry District and in the hospital campuses.

Today, it is commonly understood that 21st century cities require a diversity of economic engines. For urban districts, long-term resilience comes from mixed-use environments that offer a variety of opportunities and attractions. Therefore, it is imperative that Providence, and more specifically Downtown and the Knowledge District, continue to develop as a multi-purpose, multi-faceted, diverse urban center.

The process of this study began with a set of guiding principles, which were developed, reviewed, and vetted in stakeholder and community meetings. An in-depth analysis of the existing conditions examined patterns of streets, buildings, circulation, uses, demographics, and geography to understand the character of the area and the opportunities it offers. Drawing on a study of global and local precedents, a set of six urban design concepts were developed for sub-districts, highlighting a particular set of opportunities. These concepts framed the tone and character of each sub-district. The concepts led to the development of a set of design rules that will help actualize each concept. The plan describes strategies with respect to pedestrian circulation, vehicular circulation and parking, open space and views, new building development, and the massing and uses of that new development. This plan will serve as a guideline for future development, new zoning regulations, and areas for further investigation.

This plan strives to establish an inspirational vision that will spur investment and facilitate new growth and prosperity in Providence.

Figure 1-1 Perspective View, 40-Year Build-Out

Figure 1-2 Plan View, 40-Year Build-Out

2 GUIDING PRINCIPLES

The guiding principles help inform and steer the planning for Downtown and the Knowledge District. Developed at the outset of the planning process and endorsed by the Advisory and Technical Committees and in public meetings, the guiding principles represent a broad consensus on the goals, aspirations, and driving forces behind the development of the area. This shared vision served as a touchstone through the planning process and should guide the area as it is built out.

GUIDING PRINCIPLES

1. Economic Development

Strengthen and grow Providence's economy by creating jobs, attracting new investment, and fostering the development of knowledge industries.

2. Land Use & Placemaking

Create a vibrant, pedestrian-oriented, mixed-use district with office, retail, residential, healthcare, academic, entertainment, cultural, lab, research, and entrepreneurial development. Build on the Knowledge District's key existing qualities to reinforce urban identity and create a sense of place.

3. Urban Design

Develop attractive, pedestrian-oriented streetscapes with active street frontages and buildings that reinforce the scale of the District's streets and blocks. Ensure the use of high-quality building materials and promote design excellence in both the private and public realm.

4. Connectivity

Create and reinforce physical and visual connections within the Knowledge District and to Downcity, Upper South Providence, and the waterfront. Provide direct, convenient, and attractive connections to future transit stations and platforms.

5. Historic Preservation

Provide a mixed architectural pattern composed of preserved and rehabilitated historic buildings and new, innovative architecture. Encourage new development to be sympathetic to the historic fabric in both scale and massing.

6. Development Flexibility & Phasing

Develop a flexible plan that is a phased build-out over a long period in order to adapt to changes in real estate market conditions. Encourage activation of adjoining streets and other public spaces with interim land uses including "pop up" retail, urban agriculture, and food vender stalls for temporarily vacant property.

7. Transportation Infrastructure

Establish a street hierarchy that promotes a balanced mix of transportation modes including walking, bicycling, mass transit, and motoring. Reduce parking demand by encouraging use of mass transit and non-motorized transportation. Discourage the use of surface parking lots and site necessary parking structures in strategic locations to intercept vehicles at the edges of the District to minimize internal traffic congestion.

8. Sustainability

Create a sustainable urban district by using Low-impact development (LID) techniques and other best practices in building and land development for public and private improvements.

9. Open Space, Recreation & the Public Realm

Establish a strong, well-designed public open space network including sidewalks, plazas, multi-use paths, and parks that promotes safety, invites strolling and public gathering, and creates a "sense of place." Activate buildings that front public spaces with active ground floor uses and a high level of transparency.

10. Public & Private Coordination

Coordinate the public and private planning and development process and create comprehensive, streamlined zoning regulations for all land in downtown Providence including the I-195 surplus parcels and hospital area. Seek to facilitate private development, maximize economic development opportunities, and leverage public action for private investment while leveraging private development for public benefit.

3 PLANNING PROCESS

This study has endeavored to include and reflect the input of a diversity of stakeholders, including city officials, community leaders, local business owners, land holders, local institutions and the overall Providence community. Two working groups appointed by the Mayor, the Advisory Committee and the Technical Committee, met regularly with the Department of Planning and Development and the consultant team to provide input and feedback during the planning process. In addition, the project team held three community meetings were to solicit input from the public.

The project team performed an in-depth analysis of the existing conditions in the Knowledge District, and to a lesser extent, Downcity. The focus was placed on the Knowledge District, which includes the Jewelry District, the I-195 surplus land, and the hospital campuses, because of its large amount of underutilized land, and its high concentration of healthcare, higher education, and research uses. The analysis included comparing Providence's urban form and development opportunities to other cities with growing knowledge economies. It also included a study of key characteristics of a knowledge district, such as the prototypical requirements of high-tech, educational, and medical industries 'test-fitted' into the existing context. The team identified preferred land uses on a block-by-block basis, and created development concepts for sub-districts within the study area. These concepts formed the foundation for zoning regulations

Figure 3-1 Open Public Meeting and Workshop

that will assist in achieving the vision articulated in this plan.

Meanwhile, the project team conducted a "diagnostic" of existing regulations to determine their strengths and weaknesses relative to encouraging desired growth. It also performed an evaluation of the capacity of the physical infrastructure of the area and its ability to service a growing knowledge district.

Figure 3-2 Open Public Meeting and Workshop

4 EXISTING CONDITIONS ANALYSIS

A thorough existing conditions analysis forms the foundation of a vision for a place. Providence is a city rich in importance at every scale and timeframe. Therefore, the analysis began by benchmarking the physical characteristics at varying scales of the study area today and was followed by a study of the historical influences that contributed to the shaping of the place. The intent of this analysis was to understand the forces that helped to shape Providence's urban form. The team identified key physical characteristics and urban patterns. In addition, comparative analyses of precedents and "test fits" were performed to delineate the opportunities for weaving new uses into the existing urban fabric.

Knowledge District Study Area

It became evident as this study progressed that "the Knowledge District" is a problematic term as the knowledge economy in Providence is not constrained to a particular geography. It exists throughout Downtown, on all college and hospital campuses, in the Promenade area, and elsewhere. Throughout this planning process, some have suggested including all of Downtown in the Knowledge District. Others have suggested a "Knowledge Corridor" extending west and south of Downtown. Still others see no purpose to defining any area for the knowledge economy. With that said, many found value in a detailed study of an area with a high concentration of knowledge-based uses and ample available land conducive for high-density infill development. For purposes of this study, the Knowledge District is loosely defined by Pine Street to the northwest, the Providence River to the northeast,

Figure 4-1 Knowledge District Study Area Aerial Photo, with Neighborhoods

Public Street to the south, and Prairie Avenue to the west. This perimeter encircles approximately 360 acres. The specific recommendations of this plan are focused on the Knowledge District as defined here, although the benefits of these design ideas, if applied correctly, should transcend the physical boundaries. Currently, the Knowledge District is characterized by a tight urban grid in the Jewelry District and a collection of superblocks in the hospital area, formed by the abandonment of streets. This is represented in the figure ground plan (Fig. 4-2) and aerial photograph (Fig. 4-1). The images show that the density of buildings in the Knowledge District is much lower than that of Downcity, and development opportunities are revealed with the proliferation of large areas of surface parking.

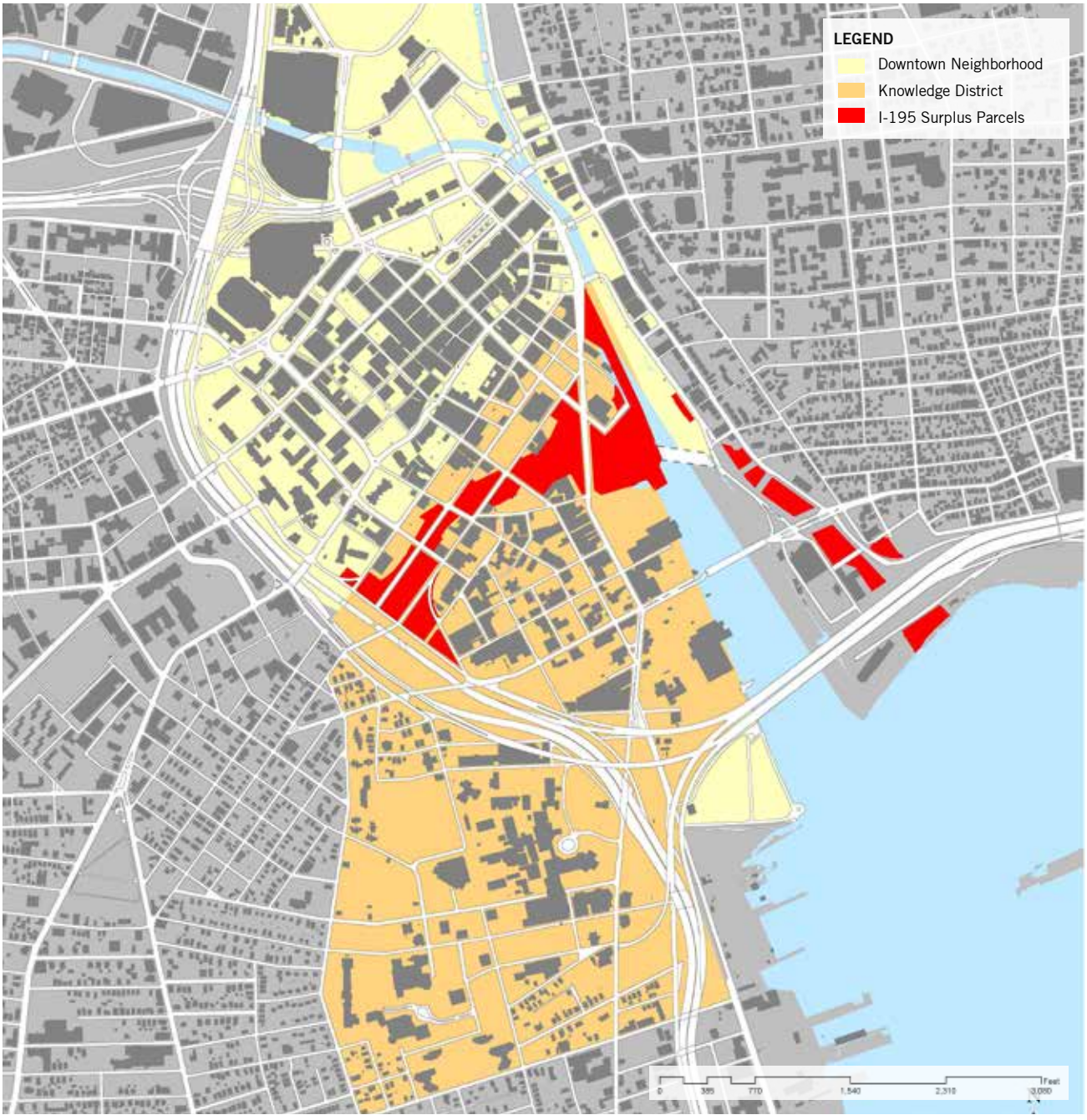


Figure 4-2 Downtown Neighborhood, I-195 Surplus Parcels and Knowledge District Study Area

History

SELECTED HISTORY OF THE AREA

Historic maps, illustrations, and photographs of Providence from the late 19th century depict a consistent street grid throughout the city that provided a high degree of connectivity. A series of streets are perpendicular or near-perpendicular to the water, creating a strong connection between the city center and its waterfront. Maps and photos from the early 20th century begin to show the creation of larger blocks for big developments, such as the Manchester Street Power Station, along the water's edge.

During the 1950s in America, urban populations began to shift outwards towards the suburbs. City planning and development in Providence responded by accommodating the growing popularity of automobiles with the construction of I-95 and I-195 through the

Figure 4-3 Knowledge District Aerial

Figure 4-4 Knowledge District in 1937

Figure 4-5 Geological Survey (U.S.); Massachusetts. Topographical Survey Commission, 1890

Figure 4-6 Providence Aerial, circa 1940

city, which led to the appropriation of large areas of urban fabric. While these highways linked the city to a wider regional and national transportation network, they challenged the local scale and separated the Jewelry District and the hospital area from the area of Downtown which came to be known as Downcity. As manufacturing declined in the Jewelry District, parking to accommodate the influx of commuters was prioritized. Similarly, as the geographic reach of Rhode Island Hospital grew and the number of patients increased, residential buildings around the hospital were given over to meet this new demand for parking. Cumulatively, this led to the growth of an area adapted to serve the demands of commuters at the expense of urban cohesiveness and walkability.

Figure 4-7 I-195 in Construction; 1950s

Figure 4-9 I-195 and I-95, 1970s

Figure 4-8 I-95 in Construction; 1960

JEWELRY DISTRICT

The Jewelry District was an industrial area specializing in jewelry manufacturing throughout the 19th and much of the 20th century. By 1880 Rhode Island was the leading producer of jewelry in the U.S. and the Jewelry District contained hundreds of jewelry companies and thousands of workers. Densely populated by factories and shipping businesses, the area also included some residential buildings. The Jewelry District was part of a continuous urban fabric that connected the center of the city to its port (Fig 4-11). Many historic buildings from the industrial and manufacturing era remain, and are landmarked within historic districts in Downtown (see Figure 7-3).

Figure 4-10 Jewelry District Workers, c. 1950

Figure 4-11 Jewelry District, 1920s

Figure 4-12 Jewelry District, 1955

Figure 4-13 Jewelry District, c. 1900

RHODE ISLAND HOSPITAL

Rhode Island Hospital's original building is a grand Victorian structure perched on high ground with commanding views of the harbor. Dedicated in 1868 (Fig. 4-14) with the singular mission of serving the citizens of Rhode Island, the hospital has grown steadily and has broadened its mission to include research and teaching. This growth is exemplified by the construction of additional buildings that followed the original building including the country's first 10-story patient care buildings (Fig. 4-15) in 1955. Today, the hospital is an urban campus within a residential neighborhood.

Figure 4-14 Rhode Island Hospital, c. 1880

Figure 4-15 Rhode Island Hospital, c. 1955

DECONSTRUCTING I-195

In the spring and summer of 2011, while this study was underway, the section of the I-195 highway separating Downcity from the Jewelry District was demolished, visually reconnecting parts of the city that had been hidden from each other for over half a century. Removing the highway offers the city the opportunity to physically reconnect separated sections of Downtown.

Figure 4-16 Pre-Demolition of I-195

Figure 4-17 Demolition of I-195, phase 1

Figure 4-18 Demolition of I-195, phase 2

Figure 4-19 Post-Demolition of I-195

Studies

PRIOR STUDIES AND PLANS

State and city agencies, private entities, universities, and advocacy groups have conducted studies of Downtown, the Jewelry District, and the I-195 land. These plans have all recommended the reconnection of the Downtown street grid and some form of infill development. They have also encouraged a mix of scales of development, pedestrian friendly streets, and new open spaces. The concept of redevelopment built on an engine driven by knowledge industries emerged in 1999 and was further evolved in the 2006 study, *Providence 2020*. This plan is a further advancement of the concept and marks the start of its implementation.

The Knowledge District, as noted earlier, includes the hospital campuses as a key component of the economic development strategy. This area has not been studied as much as the Jewelry District. Lifespan, a non-profit health system, which operates much of the hospital complex, has commissioned studies that have investigated different growth and development scenarios, such as how Brown University's Medical School might have been located near the hospital. Some of these studies have also looked at the expansion possibilities into the Jewelry District from the main hospital campus.

This plan builds on work done previously and benefits from the efforts of earlier studies.

Figure 4-20 Old Harbor Plan, 1992

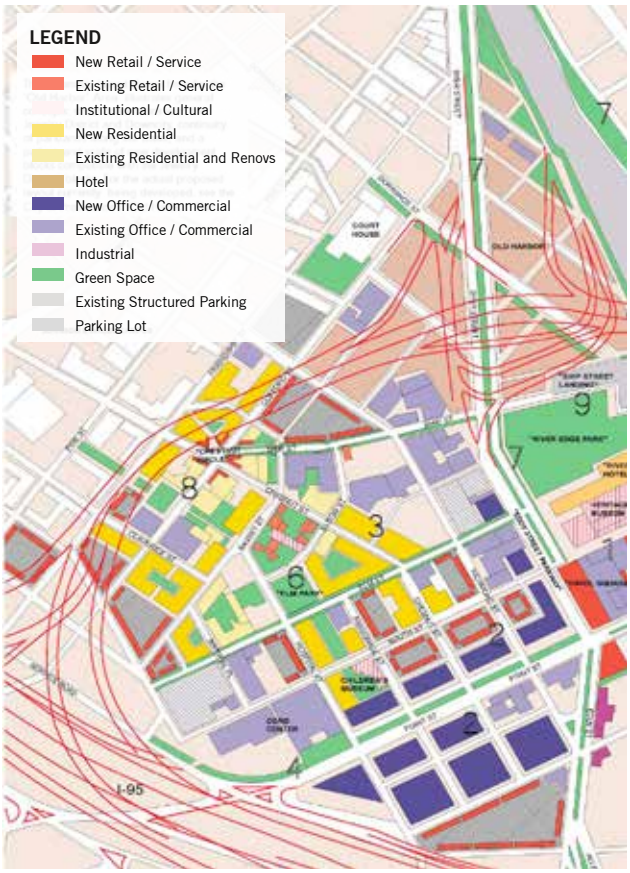


Figure 4-21 Jewelry District Concept Plan, 1999

Figure 4-22 Providence 2020 Plan, 2006

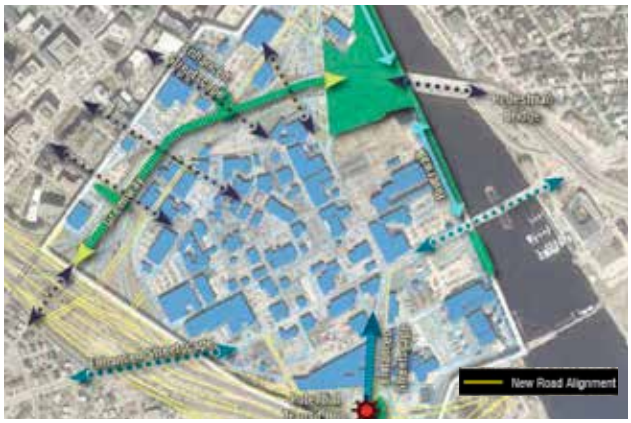


Figure 4-23 Old Harbor Planning Framework

PLANNED INFRASTRUCTURE & POTENTIAL DEVELOPMENT PROJECTS

The emerging Knowledge District is characterized by a number of development and infrastructure projects in the public and private sectors. Brown University has established a substantial presence in the Jewelry District anchored by its new medical school facility. It has also recently developed a publicly-accessible plaza on Ship Street. Johnson & Wales University has committed to expansion into the I-195 lands and is studying other options for growth in Downtown. Private developers have put forth plans for a number of key sites including the Victory Plating site at the south end of the Jewelry District. A proposed streetcar route will connect the significant educational, medical, employment and cultural destinations in Upper South Providence, College Hill, and Downtown (including the Knowledge District) to the state's bus hub in Kennedy Plaza and to regional and commuter rail service at the Providence Station. The project is expected to spur

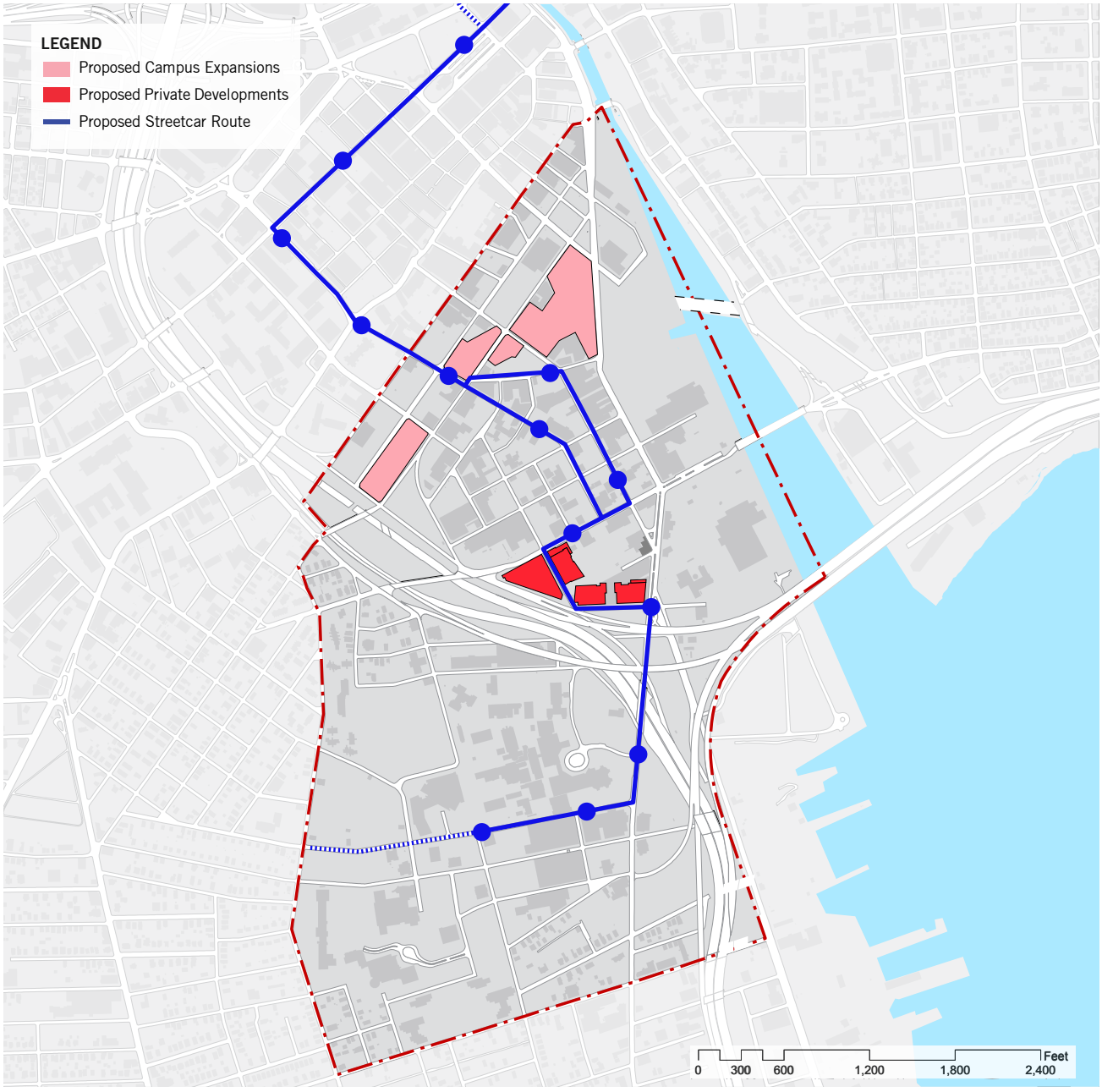


Figure 4-24 Planned Developments and Infrastructure

significant new development and create an estimated 6,000 jobs over the next 20 years. The Rhode Island Public Transit Authority is currently working with the state, city, and other local partners to finalize a finance plan for the project so that it can move into preliminary engineering and final design.

The development of the I-195 surplus land will include waterfront parks in Downtown and Fox Point connected by a pedestrian bridge that reuses the former I-195 Providence River bridge piers.

The number and variety of proposed projects reflects the high degree of interest and investor confidence in the future potential for Providence. This plan is a catalyst to further advance these proposed developments.

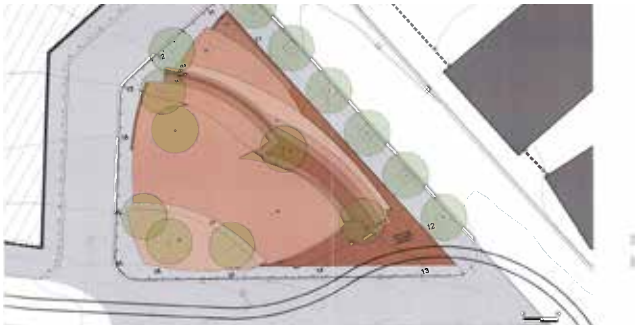


Figure 4-25 Brown University Ship Street Square

Figure 4-27 Victory Square Proposed by developer Commonwealth Ventures, Inc & Boston Science Dev. Group, LLC

Figure 4-26 Winning proposal for Providence River Pedestrian Bridge Competition, 2010, by inFORM Studio.

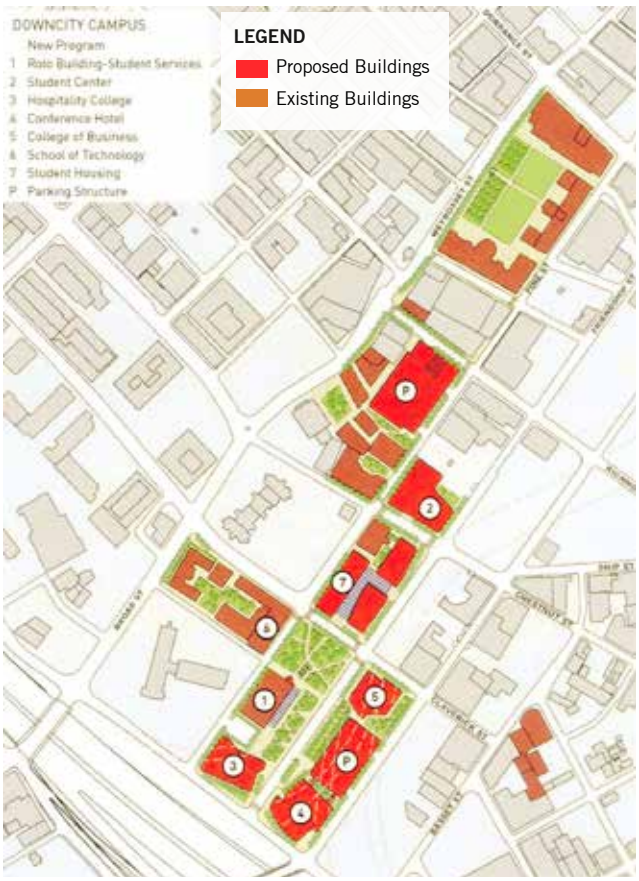


Figure 4-28 Johnson & Wales University Master Plan

Existing Conditions

TOPOGRAPHY

The Knowledge District has more than 70 feet of grade change from its highest point to its lowest point. It is bisected by Interstate 95. At the southern edge of the district the highway is above grade. It drops in grade from south to north, and is below grade at the northern end. These topographic variations require strategic highway crossings for pedestrians and automobiles. The high points on either side of the highway and at the western edge of the district act as visual connection points across the highway, and provide dramatic viewing platforms of the city and harbor.

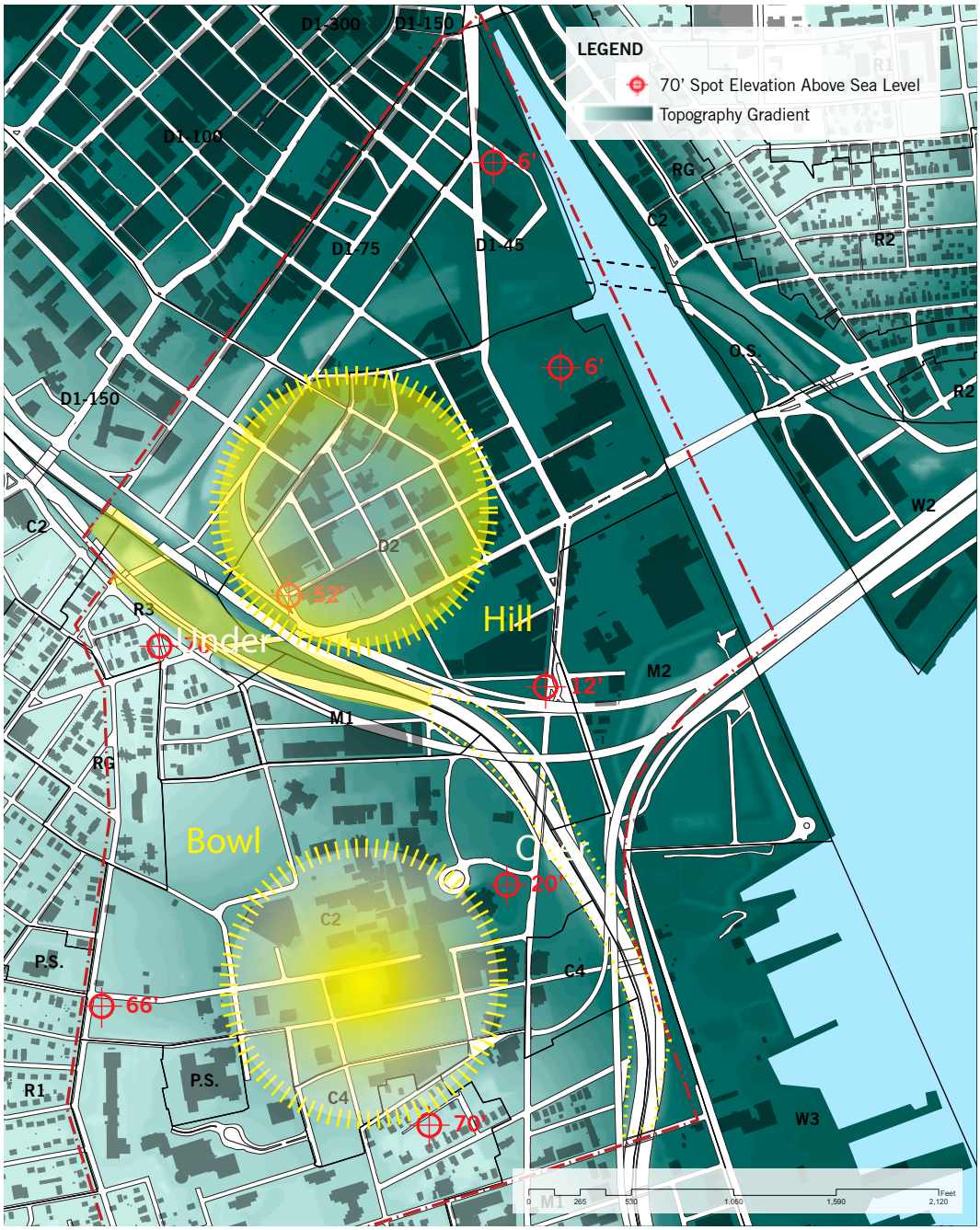


Figure 4-29 Topography

BUILDING HEIGHT

Building heights across the district vary from single-story shed structures to towers that reach nearly 200 feet. As with the topography, the Jewelry District and the hospital area are inverses of each other. Taller buildings in the Jewelry District surround a central core of lower smaller scale buildings. The Downcity neighborhood adjacent to the Jewelry District contains taller buildings. Taller buildings in the hospital district are clustered near the center of the area and buildings generally decrease in height moving out from the hospital core. The surrounding neighborhoods to the south and east are much smaller in scale, dominated by 2- and 3-story residential structures.

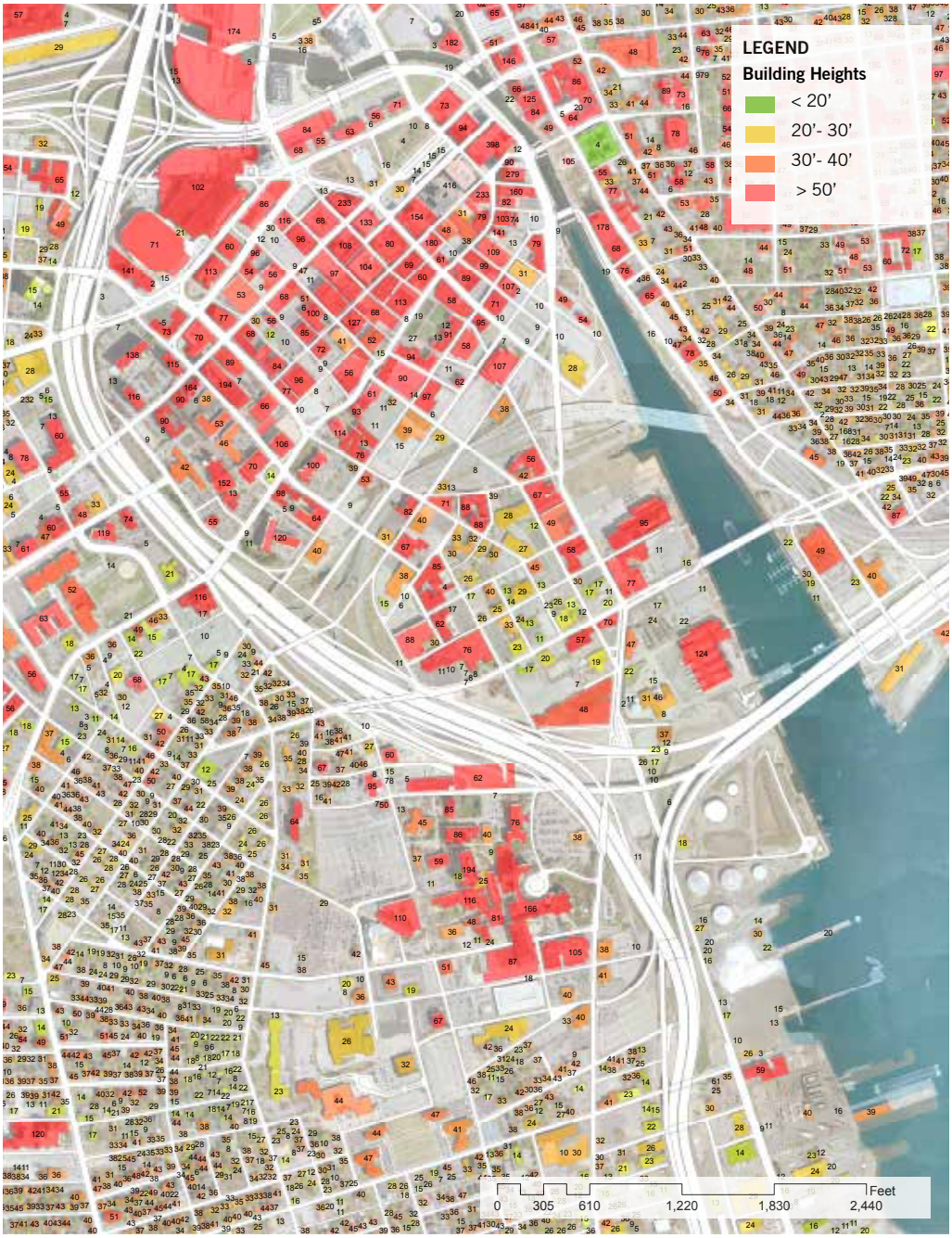


Figure 4-30 Building Heights

VACANT AND UNDERUTILIZED LAND

Today, one of the most noticeable features in the Knowledge District is the large amount of vacant and underutilized land. (Figure 4-32 highlights the underutilized areas).The Knowledge District comprises approximately 360 acres with roughly 220 acres of developed or developable building lots. Approximately 140 acres are vacant or underutilized including the 23 acres of land that the relocation of I-195 has made available. The remainder consists of vacant lots, unused buildings, and surface parking. This means that approximately 37% of the Knowledge District is available in terms of development potential.

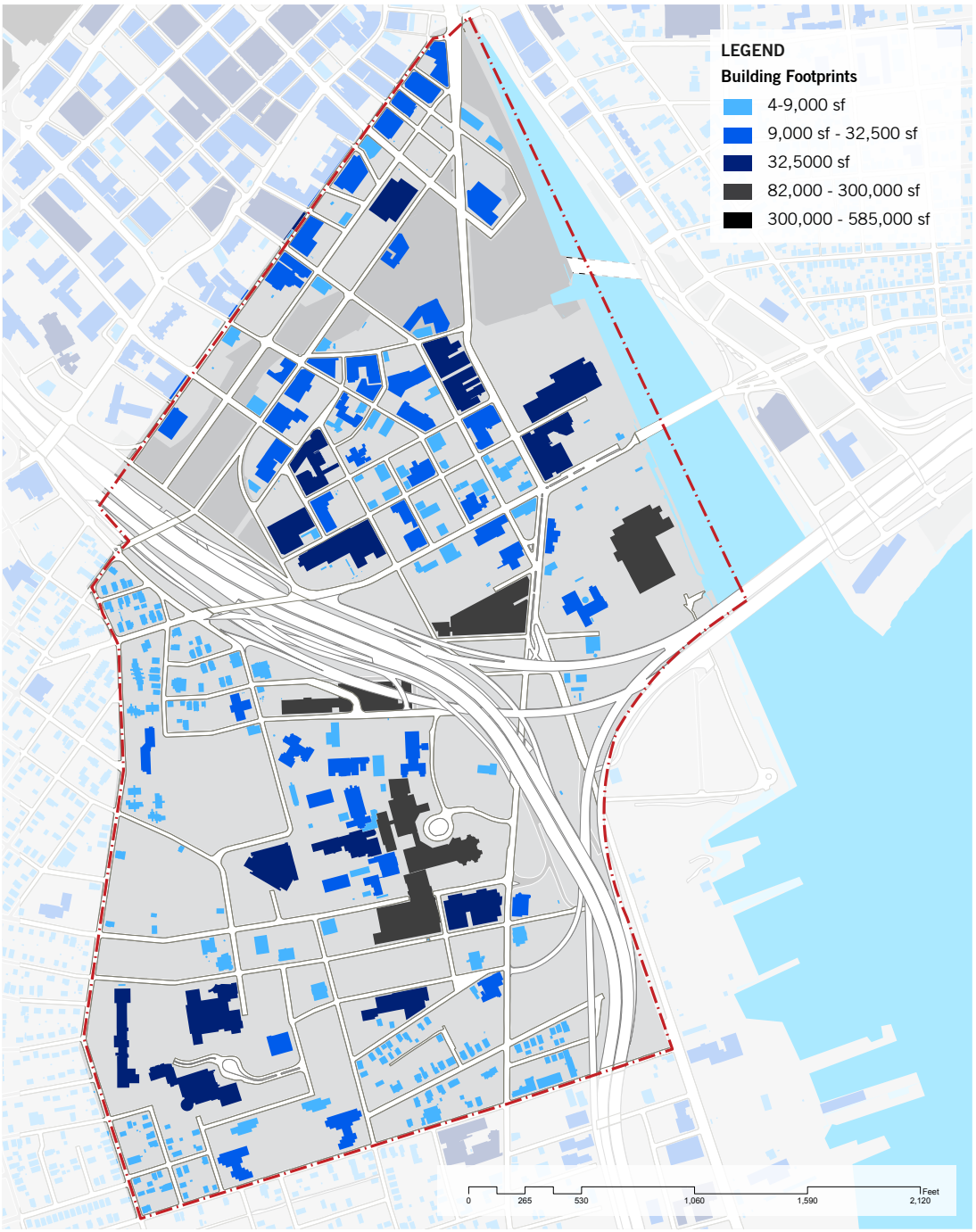
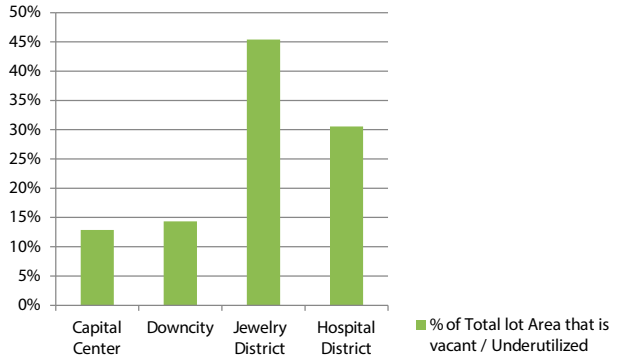
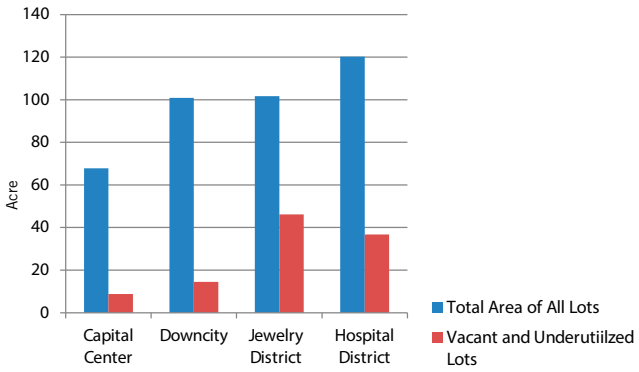


Figure 4-31 Building's Footprint Size Range Map

While much of the underutilized land provides needed parking, the Knowledge District represents tremendous development potential: an average floor area ratio of only 2 would represent more than seven million square feet of building potential.





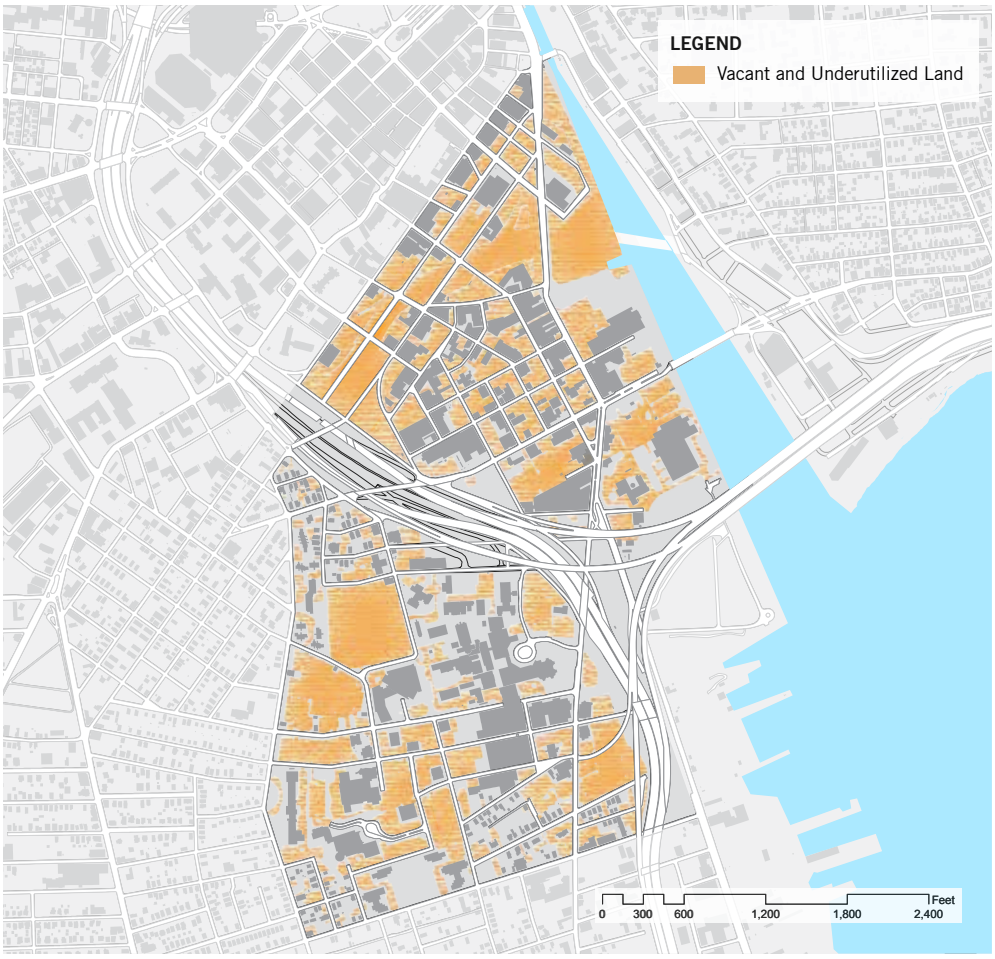


Figure 4-32 Vacant and Underutilized Land

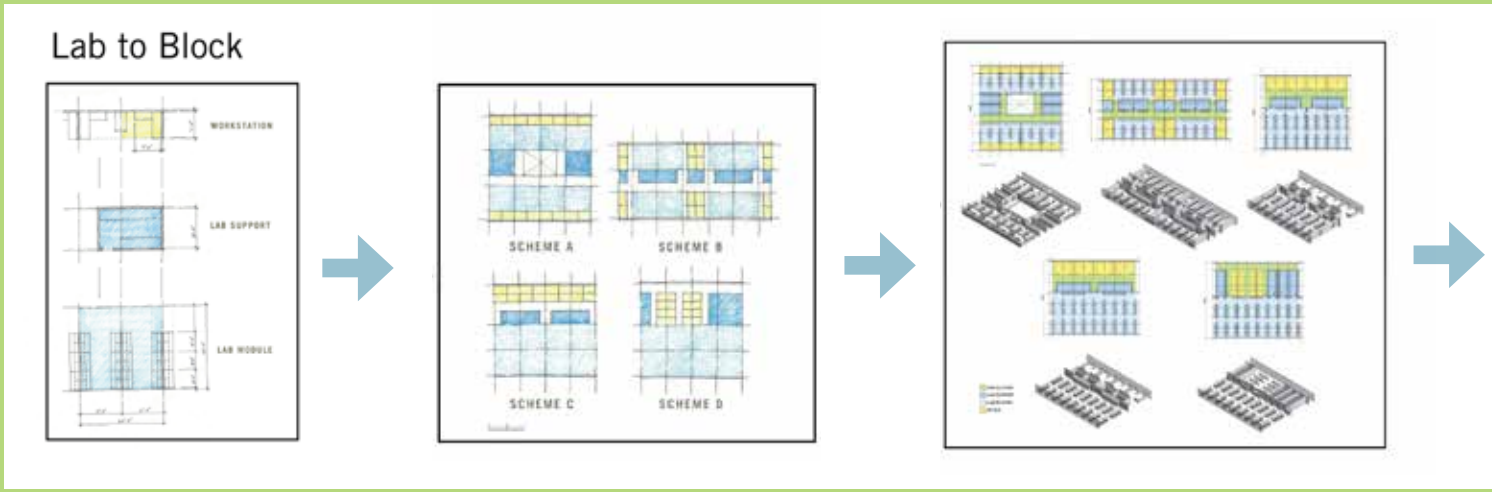


Figure 4-33 Lab Module to Lab Block

TEST FIT: LAB

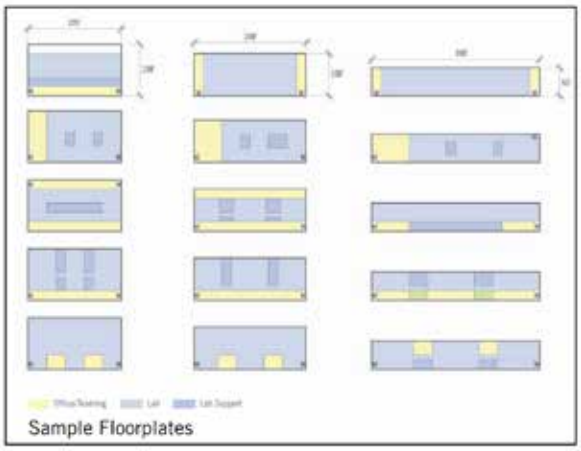
The Knowledge District should leverage the strong higher education and medical institutional networks in Providence as anchors of future development. To this end, a common program element for higher education and medical institutions is laboratory space. While there are various shapes, sizes, and configurations of lab buildings, large biomedical lab buildings represent a specific challenge in an urban context because of their scale and the lack of activity on the ground level.

To help inform the framework, the team studied lab buildings at different scales. Typically, a biomedical lab consists of three primary types of spaces: workstations, lab support, and a laboratory module. These lab units represent a variety of configurations of circulation space, common areas and vertical circulation (elevators and stairs). A typical building floor-plate would suggest a typical block size. These range from a minimum of 35,000 square feet up to an ideal block size of 225,000 square feet. The large blocks are more flexible and easier to expand.

Only a few blocks with footprints larger than 35,000 square feet which do not contain significant occupied buildings are available within the district. Some possible sites have been identified through this analysis, though in many cases development would require assemblage of numerous lots to create a single lab development parcel.

Figure 4-34 Frick Chemistry Lab, Princeton University.

Figure 4-35 National Institutes of Health, Bethesda, MD



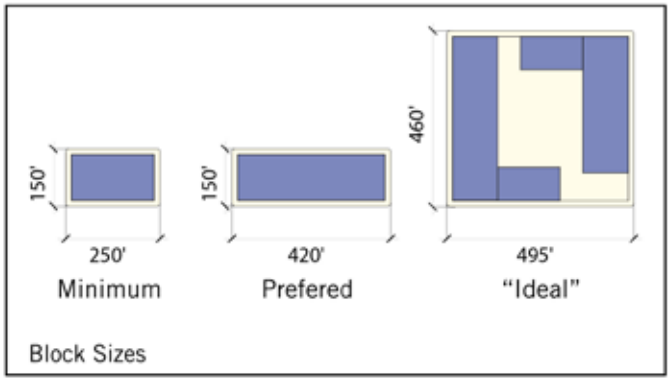


Figure 4-36 University of Washington

Figure 4-37 Richmond College, Dallas, TX

Figure 4-38 University of Texas at Arlington

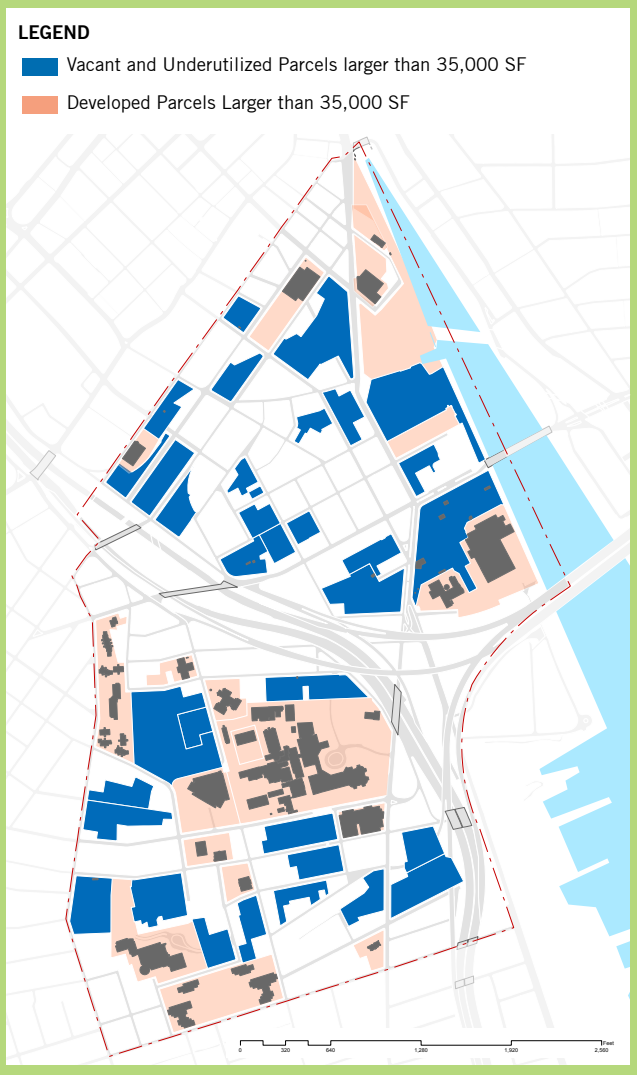


Figure 4-39 Potential Lab Building Parcels

TEST FIT: MEDICAL RESEARCH DISTRICTS

To further inform the framework, the team performed another detailed analysis comparing the urban structure of Providence's Knowledge District to two existing precedents of other biomedical research districts: Boston's Longwood Medical Area and Houston's Texas Medical Center. Both precedents

Figure 4-40 Providence Knowledge District

Figure 4-43 Providence Knowledge District

Figure 4-41 Houston Texas Medical Area

Figure 4-44 Houston Texas Medical Area

Figure 4-42 Boston Longwood Medical Area

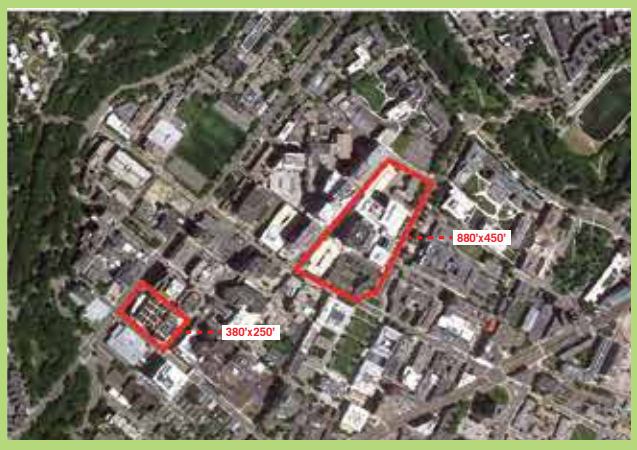


Figure 4-45 Boston Longwood Medical Area

Figures 4-41– 4-49 are Comparisons of District and Block Sizes. Scale is the same.

have been visited by city and state officials and have been noted as successful models from which to learn.

As noted earlier, the Knowledge District is approximately 360 acres. The Longwood Medical Area has a smaller footprint at about 160 acres and the Houston Medical Area is much larger at about 780 acres. The most notable difference between Providence's Knowledge District and these precedents is the urban context. The Houston Medical Area lies nearly four miles from downtown Houston; the Longwood Medical Area lies about two and a half miles from downtown Boston and roughly the same distance from Harvard Square in Cambridge. Providence's Knowledge District is directly adjacent to Downcity, the physical and symbolic center of the city.

Most blocks in the Knowledge District are considerably smaller than the typical block sizes of these two precedents. These comparisons suggest that biomedical research facilities similar in block size to the two precedents will be limited to a few key areas within the Knowledge District. To that end, other elements of a knowledge economy such as startups, incubators, media and creative, smaller scale labs, and tech companies will be essential to developing the remainder of the area.

Figure 4-46 Baltimore- Life Science Park

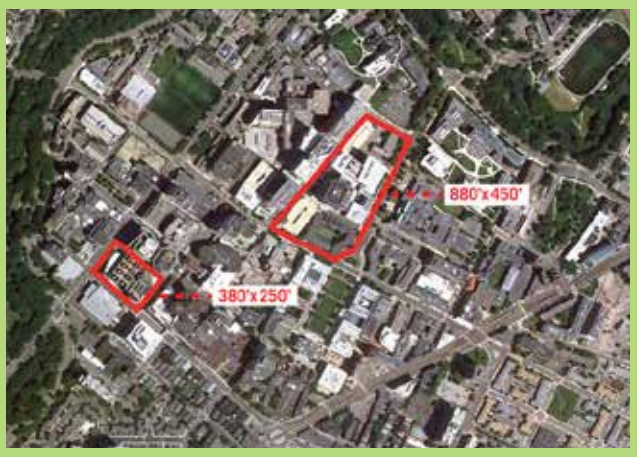


Figure 4-48 Baltimore- Life Science Park

Figure 4-47 Cambridge- Kendall Square

Figure 4-49 Cambridge- Kendall Square

LINKAGES AND ACCESS

Currently, streets provide the main access to the Knowledge District. Several strong southwest to northeast (nominally "east-west") connections run through Downcity. Both the Jewelry District and the hospital area have few east-west connections through streets. North-south connector streets that weave together the hospital area, the Jewelry District, Downcity, and Capital Center are also limited. While I-95 provides some degree of connection, the grade separation, the intersection with I-195, and the complex on and off ramp system make it less effective as a connector between districts. Strengthening the north-south connections, especially to Downcity, will help integrate the Jewelry District and hospital area.

A "porosity" analysis of the number of street connections that cross each edge of the district indicates that the strongest connections are to Downcity. Roadway connections to Upper South Providence are weaker. Connections between Lower South Providence and the Knowledge District as well as between the Knowledge District and Fox Point and College Hill offer opportunities for improvement. Connections across I-95 between the two halves of the Knowledge District could be strengthened. Connections to the industrial waterfront area to the southeast represent a key opportunity for improvement.

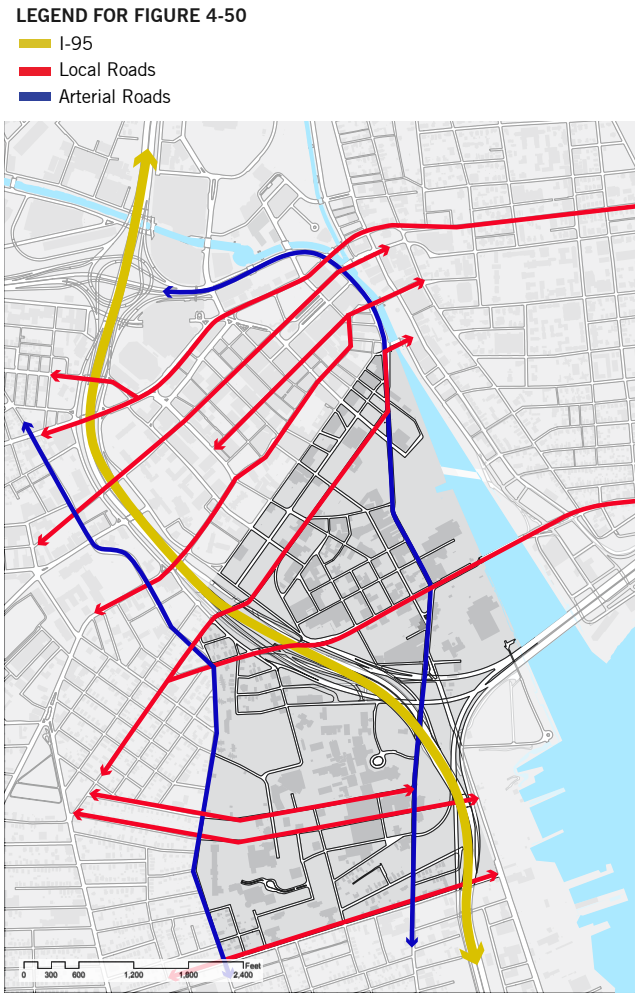


Figure 4-50 Vehicular Network

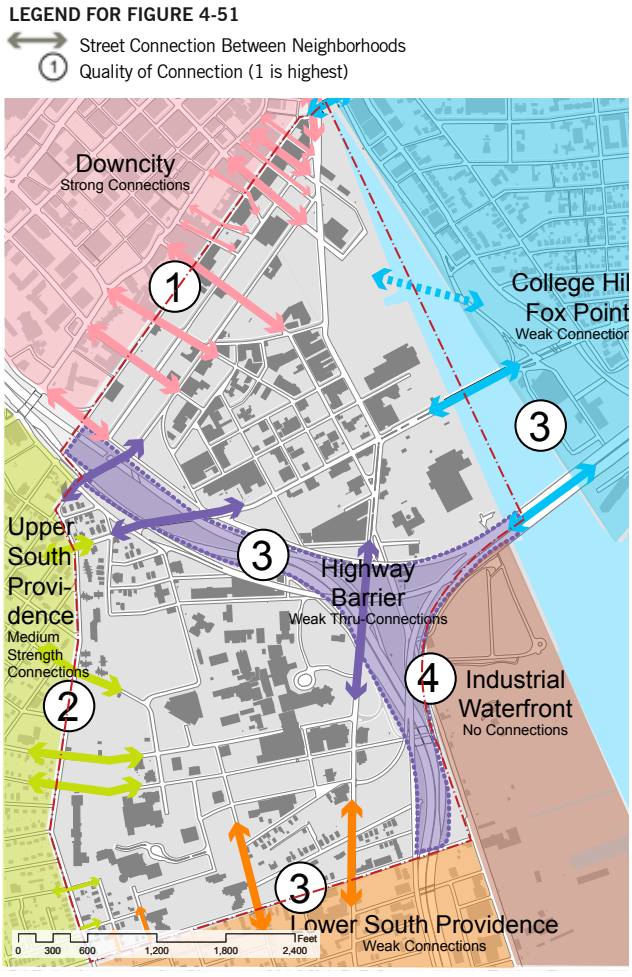


Figure 4-51 District Edge Permeability

VEHICULAR CIRCULATION AND PARKING

The network of vehicular circulation in Downtown is relatively strong, but presents another opportunity for improvement. A highly connective street grid, main streets, and side streets provide both the redundancy and hierarchy necessary for good circulation. While the basic grid remains fairly strong, the Jewelry District's streets are narrower and through traffic is limited by dead-ends. The reconstruction of the street grid following the relocation of I-195 will alleviate many of these issues.

With limited vehicular connections across I-95, the highway acts as a circulation bottleneck for traffic flow. Within the hospital area, the street grid has been eroded and only a few through-streets connect to surrounding neighborhoods.

Parking in an urban district should ideally be in structures. This allows for a high density of buildings and a more connected pedestrian realm. While the Knowledge District contains a handful of parking structures, it is dominated by surface parking. The market in Providence is such that construction of parking structures is in most cases uneconomical. In theory, if the supply of surface parking is limited or the demand for parking is increased (through increased density), the price of parking will increase. As the price of parking increases, the cost to develop and operate structured parking should become more economically feasible. The graph in Figure 4-54 illustrates a theoretical relationship between these elements. In reality, the majority of parking structures will likely be constructed only if assisted by some sort of public subsidy.

LEGEND FOR FIGURE 4-52
- I-95
- Street Directions

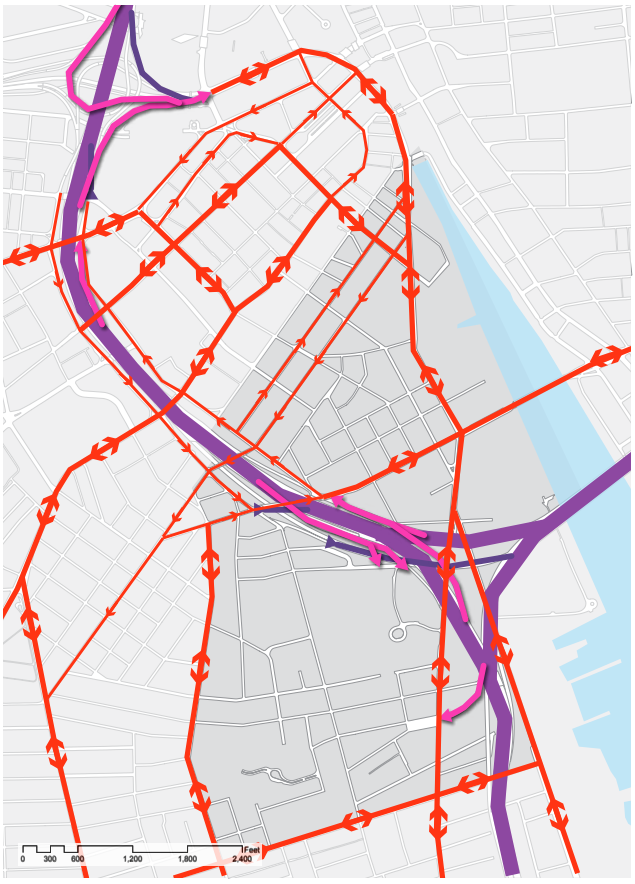


Figure 4-52 Vehicular Circulation

Figure 4-53 Shuttle bus connecting hospital to parking lots

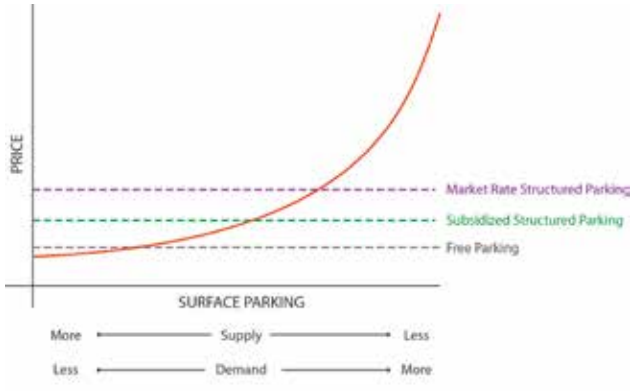


Figure 4-54 Theoretical Parking Economics

TEST FIT: PARKING

Development of the Knowledge District into a higher density mixed-use zone equivalent to Downcity in diversity and amenities will require structured parking. The framework plan examined inserting structured parking into the existing urban fabric and the impact those structures may have. Figure 4-55 shows a test fit overlay of the existing parking structure at Blackstone and Culver Streets (measuring approximately 325' x 200') on various blocks in the Knowledge District. This test fit illustrates that while many blocks in the hospital area are large enough to support a parking structure of a similar footprint size, the Jewelry District has relatively few such blocks. The small square blocks in the Jewelry District measure approximately 200'x200'. This size block can fit only the smallest of parking structures, typically a 123'x146' split-level structure.

A minimally-sized parking structure with an efficient layout measures 123'x272'. This size structure fits comfortably on some of the blocks in the I-195 corridor. However, these dimensions require at least one side of the parking garage to be exposed, which compromises the quality of the public realm and streetscape and may have a negative visual impact on adjacent streets.

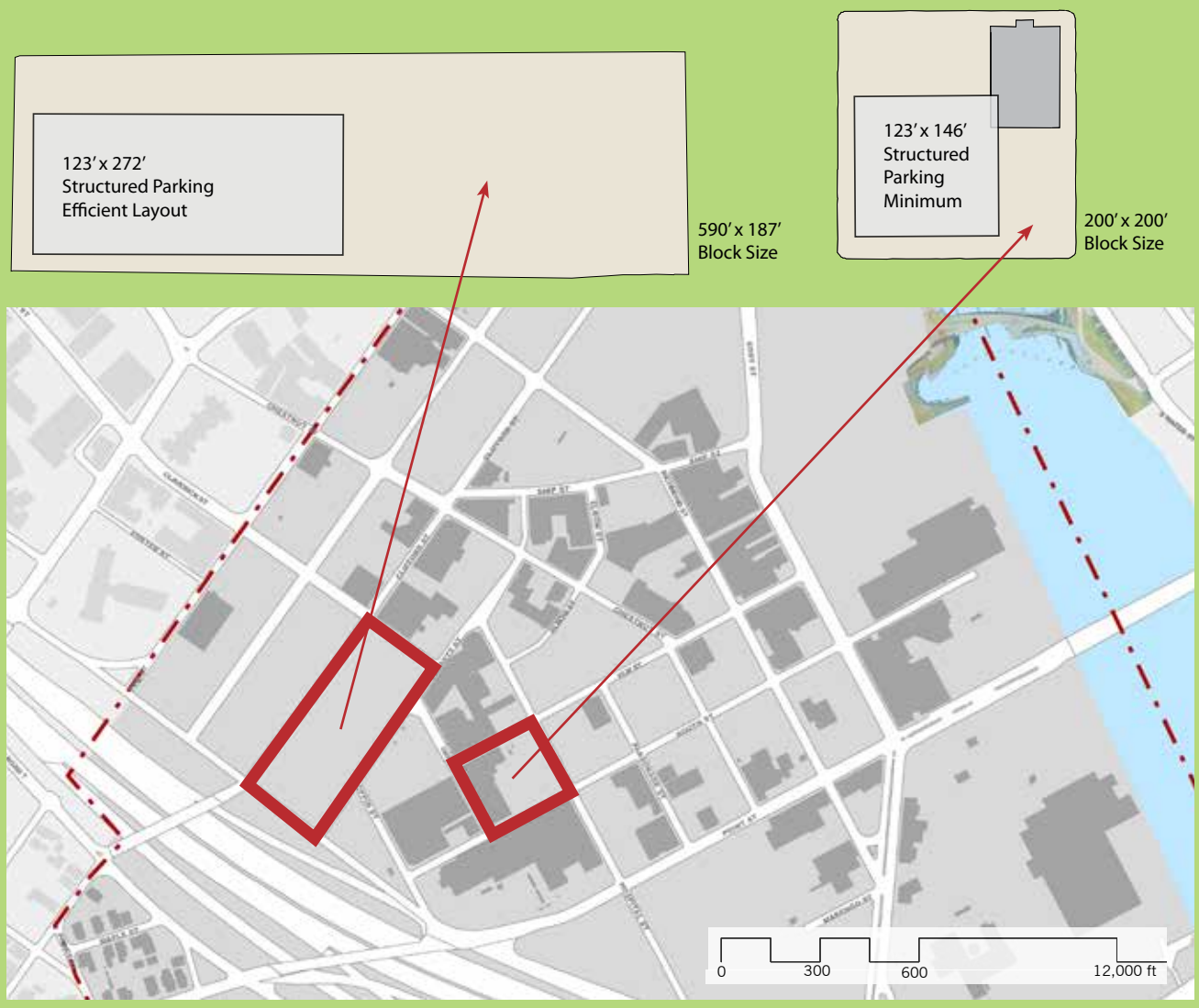


Figure 4-55 Parking Garage Test Fit

Figure 4-56 Potential Parking Garage Sites

TRANSIT

The Knowledge District is served by several bus routes. Generally, these routes follow a north-south path connecting the hospital area to the Jewelry District, Downcity, and onward toward College Hill and the northern neighborhoods of Providence. These routes are supplemented by private shuttle bus routes that cross the area, run by the major institutions such as Brown University and Lifespan, or by private operators of parking lots. Many of the shuttles are used to cover relatively short distances. In interviews some users noted that they walk if they do not see a shuttle. The redundancy between the various private shuttles as well as overlap with the public bus system offers an opportunity for greater coordination or integration of bus routes.

A streetcar line connecting the hospital area, the Jewelry District, Downcity, and College Hill has been planned and partially designed. Connecting the significant educational, medical, employment and cultural destinations in Upper South Providence, this project is expected to spur significant economic development and create thousands of jobs. Planners are currently exploring funding mechanisms before moving the project into preliminary engineering and final design, which is likely to occur within the next three to six years.

Improved and integrated transit systems will reduce the road congestion significantly and provide a higher return for developers through more efficient and higher density development.

LEGEND FOR FIGURE 4-57

- Knowledge District
- Trolley
- Bus
- Proposed Streetcar Route

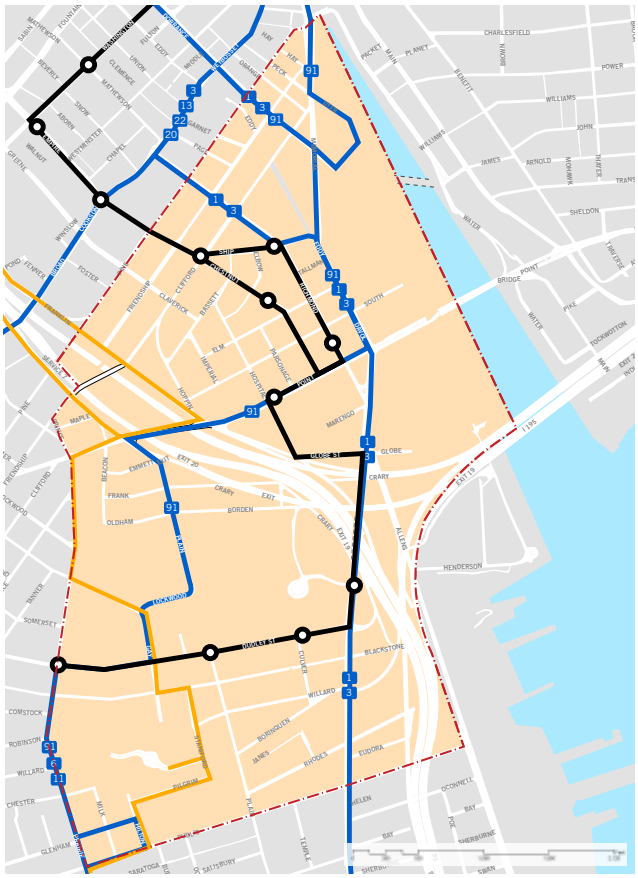


Figure 4-57 Existing Bus and Proposed Streetcar Routes

Figure 4-58 Bus serving Knowledge District

Figure 4-59 BrownMed / Downcity Express Stops

OWNERSHIP

A map of property ownership, color coded by type of owner, echoes the pattern seen in the land use maps (Fig 4-60). The hospital area is dominated by healthcare-related ownership with pockets of private and institutional ownership. The Jewelry District contains the key elements of a knowledge economy, boasting a higher education institution adjacent to healthcare-related ownership. With the exception of the I-195 lands, very little of the land is publicly owned. Therefore, much of the growth and transformation of the Knowledge District will rely on the private sector

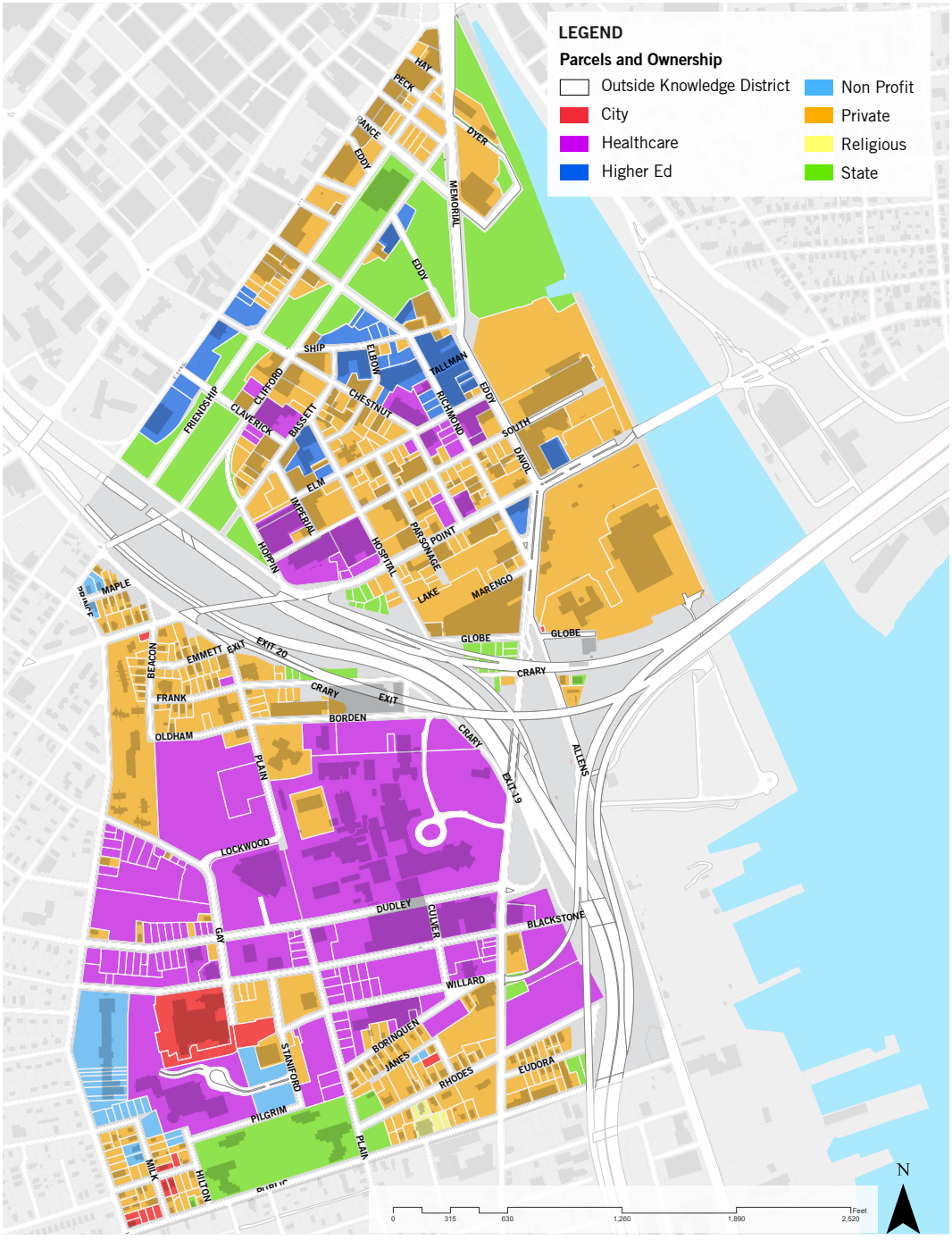


Figure 4-60 Parcel Ownership

PEDESTRIAN & BICYCLE NETWORK

The scale of the Knowledge District is ideal for pedestrians and cyclists. The Jewelry District and the hospital area are about one-half mile across (a 10 minute walk) and all of the Jewelry District is within a mile of Downcity (Fig. 4-61). With existing connections and available amenities, the Jewelry District is a more walkable neighborhood than the area around Rhode Island Hospital. Walk Score, a website that calculates neighborhood walkability, awards a high score on the Jewelry District, but a low score for the hospital area. (Fig. 4-62). Addressing the quality of the streetscape through sidewalk condition and width, street trees, site furniture, and lighting conditions will enhance the overall pedestrian network. Interstate 95 is one of the primary pedestrian barriers. Because the Point Street overpass and the Eddy Street underpass cross the highway at oblique angles, they are nearly twice as long than they would be if they crossed perpendicular to the highway. Offering sidewalks on both sides, increasing street crossings at either end, and providing pedestrian lighting would enhance the pedestrian experience of both crossings.

The existing bicycle network in the Knowledge District consists of on-street routes. The city has recently launched a new bike study which will explore improvements to markings and wayfinding.

LEGEND FOR FIGURE 4-61

- Knowledge District
- Building Footprints
- Parks+Rec Public Space

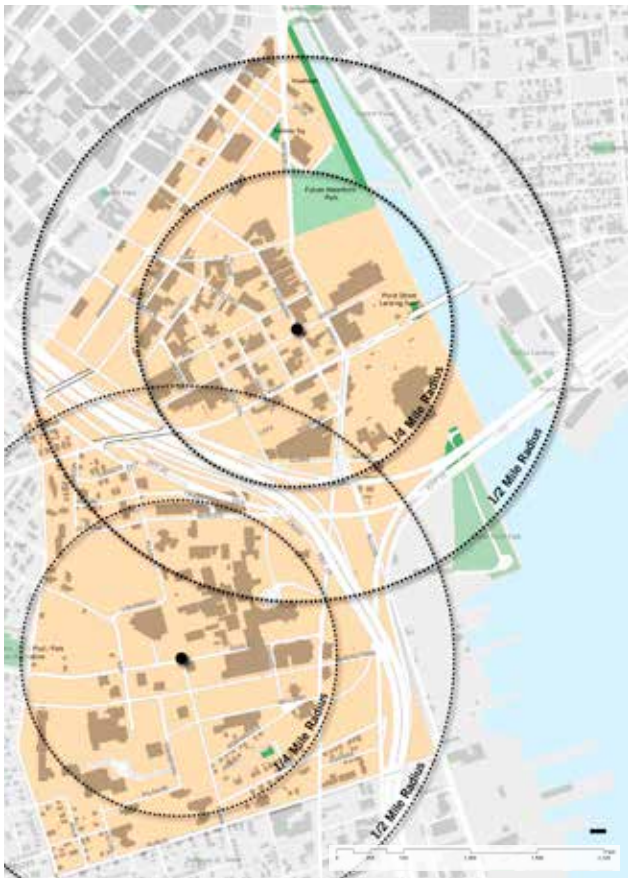


Figure 4-61 Pedestrian Walking Radii

LEGEND FOR FIGURE 4-62

Walkscore

- 0-49
- 50-69
- 70-89
- 90-100

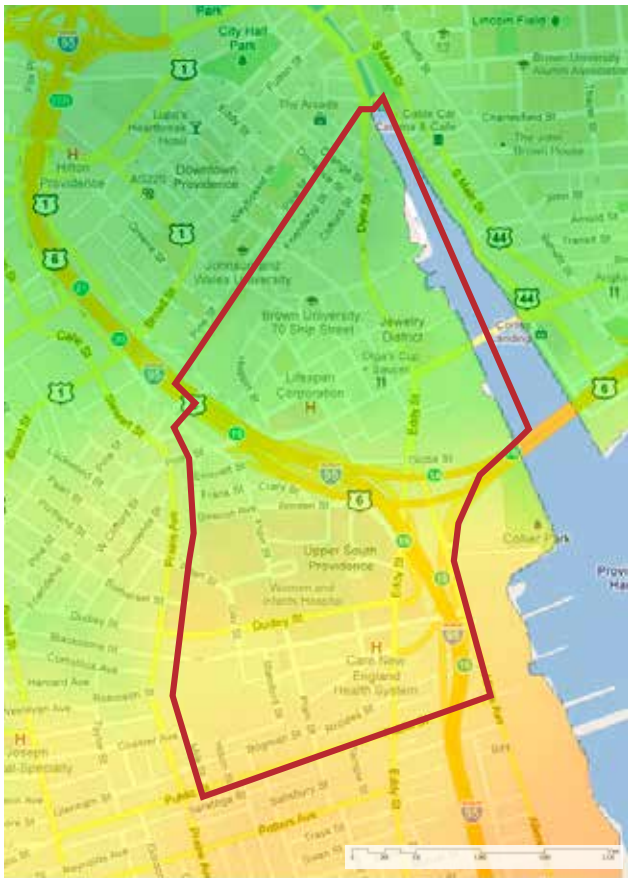


Figure 4-62 Pedestrian Walkscore Map

Figure 4-63 Providence Bike Plan

OPEN SPACE & GREEN SPACE

Providence has a variety of public and private open spaces at a range of scales. The Knowledge District's open space is concentrated in the planned public waterfront park at the northern edge of the district. This offers an opportunity to increase and enhance public open space. A park constructed by Brown University recently opened at the corner of Ship and Richmond Streets. Though smaller in scale, this provides additional public open space in that part of the Jewelry District. The creation of waterfront open spaces along the river has made a huge contribution to the revival of Downcity. These spaces form a connected network with the planned waterfront park,

Figure 4-64 Waterfront

Figure 4-66 Burnside Park

Figure 4-65 Water Place

Figure 4-67 Johnson and Wales

Figure 4-68 Winslow Street

building on past successes. Development of vacant and underutilized land will offer an opportunity to contribute to the creation of a larger open space network.

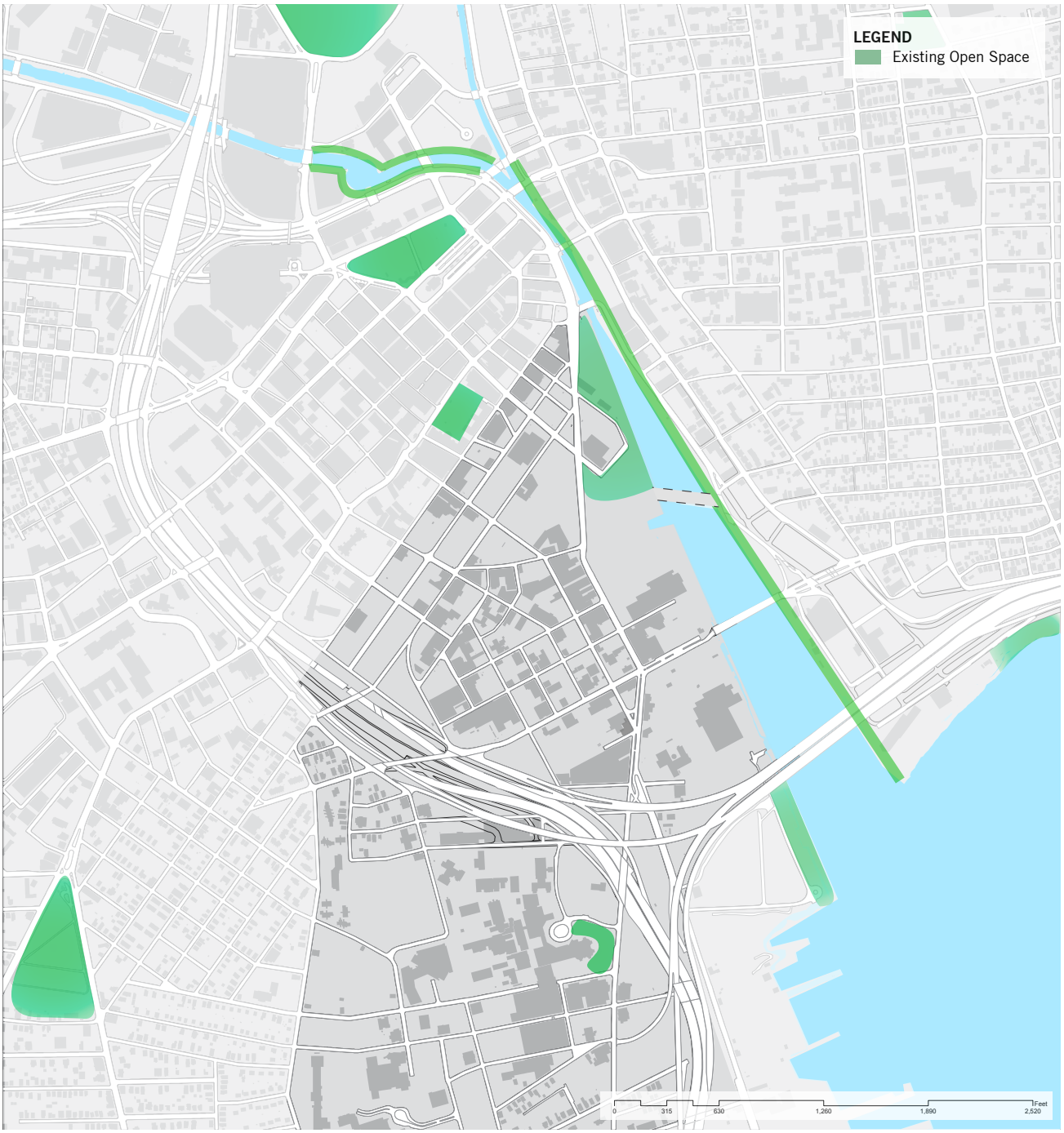


Figure 4-69 Existing Green Open Space for Recreation

LAND USE

The Knowledge District houses a variety of different uses (Fig 4-72). An examination of residential and mixed-use properties in the Knowledge District reveals four distinct clusters (Fig 4-70). Three of these clusters lie at the western and southern edges of the hospital area. The fourth cluster of housing at the northern end of the Jewelry District consists primarily of industrial buildings that have been converted to residential units.

Figure 4-71 indicates that while some retail uses exist in the Jewelry District, only a few of these uses appear in the hospital area. The limited amount of retail around the hospitals may reflect the fact that large medical centers typically provide amenities like food service and shops within their campuses.

LEGEND FOR FIGURE 4-70

- I-195 Surplus Parcels
- Mixed-use
- Residential, 1 Family
- Multi-Family Residential

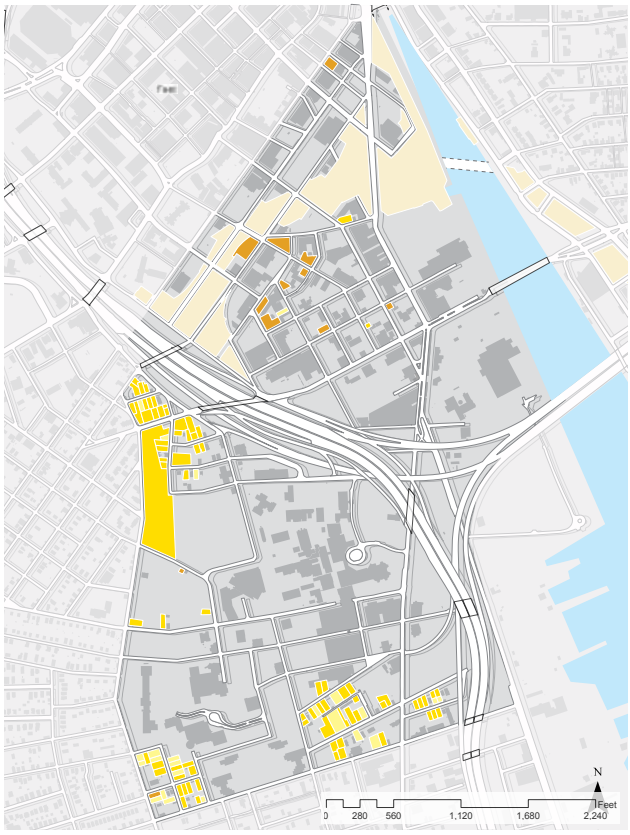


Figure 4-70 Residential & Mixed Use

LEGEND FOR FIGURE 4-71

- Retail
- Mixed-Use

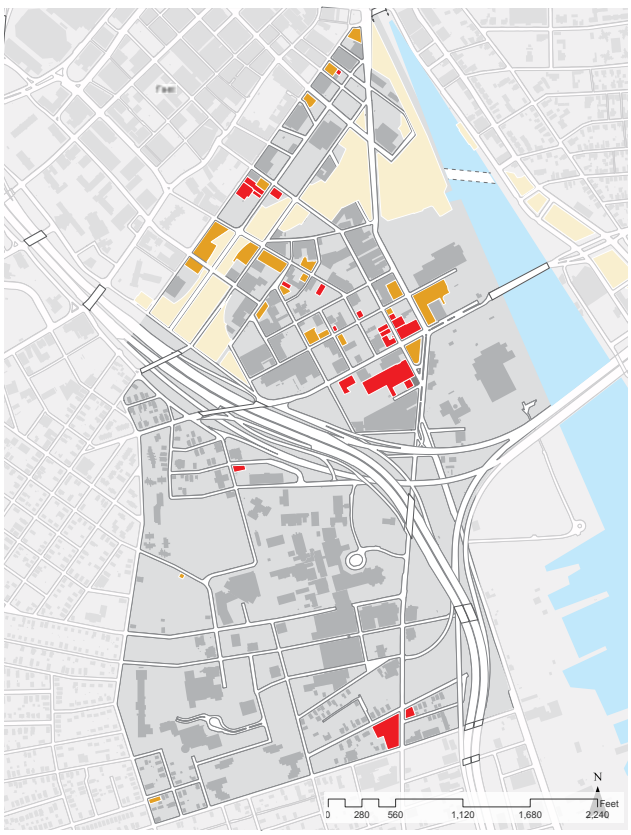


Figure 4-71 Retail & Mixed Use

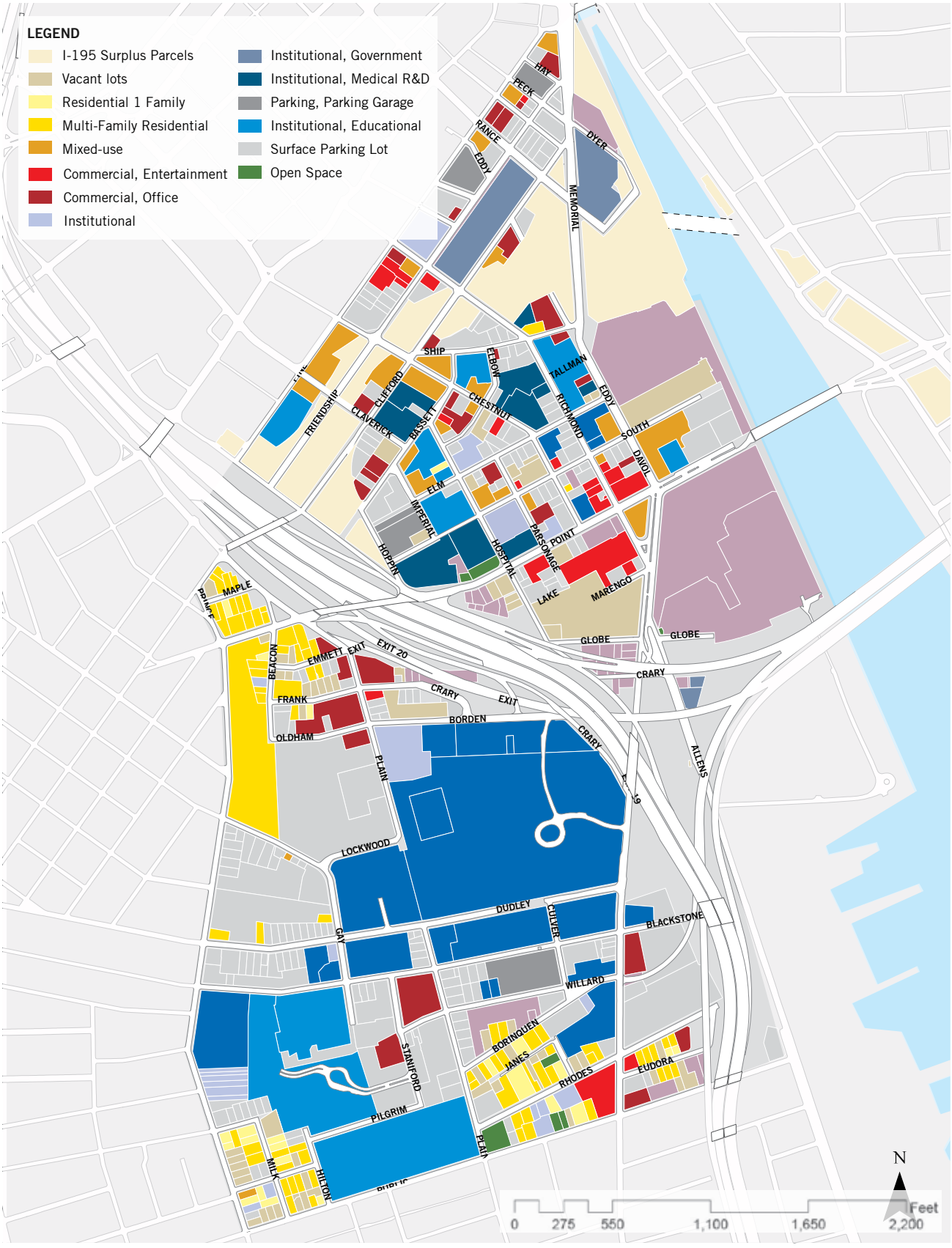


Figure 4-72 Existing Land Use

District Identity

ARRIVAL

An important consideration in the creation of a Knowledge District is a recognizable identity for the district. Arrival points offer an opportunity to define the image and character of an area. Many visitors enter the district from the highway. While the Downcity skyline creates dramatic views, the Knowledge District is less recognizable. The three smokestacks of the power plant currently act as icons for the city's identity from the Knowledge District's southern gateway. From the north, the district is not visible from I-95 until after the highway emerges from below grade.

Figures 4-73– 4-76 Approach Sequence from South on I-95

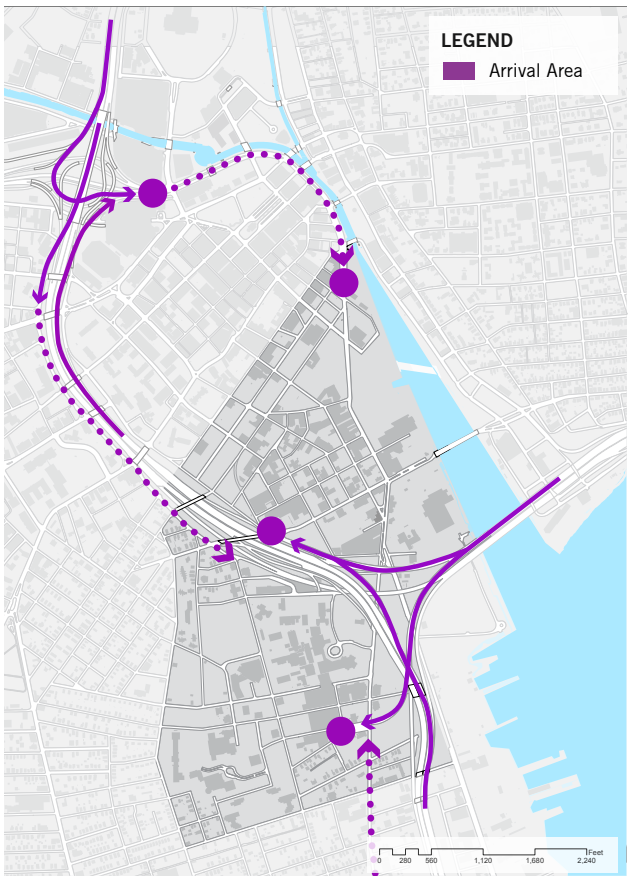


Figure 4-77 Arrival Areas

Figure 4-78 Arrival Area from North

Figure 4-79 Identity Marker

FOCAL POINTS

Focal points, often iconic buildings, provide another source of identity for cities or neighborhoods. Representations of a city, these icons often relate to the uses, functions or character of the city. Rhode Island Hospital's original building creates a clear iconic statement about its leadership role in the community. However, its clarity as a focal point has been lost over time- even as the hospital's importance in the city has grown- because newer buildings have obscured it. As noted before, the smokestacks of the power plant are easily identifiable focal points for the district. Approaching from the east, the power plant complex also acts as a gateway to the district.

Figure 4-80 Original Hospital Focal Point

Figure 4-82 Original Hospital Focal Point

Figure 4-81 Power Plant's Iconic Smokestacks

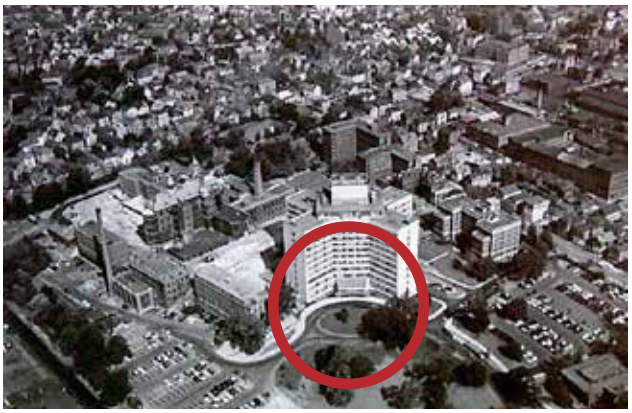


Figure 4-83 Original Hospital Focal Point

Figure 4-84 Original Hospital Focal Point is less visible today

URBAN EDGE

Edges and borders also play a role in defining the identity of a district. The Knowledge District has at least three distinct urban edges, each with a different character that suggests a different approach in the district's development. Along the Knowledge District's shared border with Downcity, the strong street connections create a highly permeable edge. Future development in this area has the opportunity to knit these formerly divided areas of the city together. Along Eddy Street, the edge of the district transitions from a waterfront focus with large scale sites to the tight urban character and then to the finer scale structures of the Jewelry District core. Lastly, the edge between the hospital area and the residential neighborhoods to the west and south weaves between parking lots and small-scale residential pockets.

Figure 4-85 I-195 land between the Jewelry District and Downcity

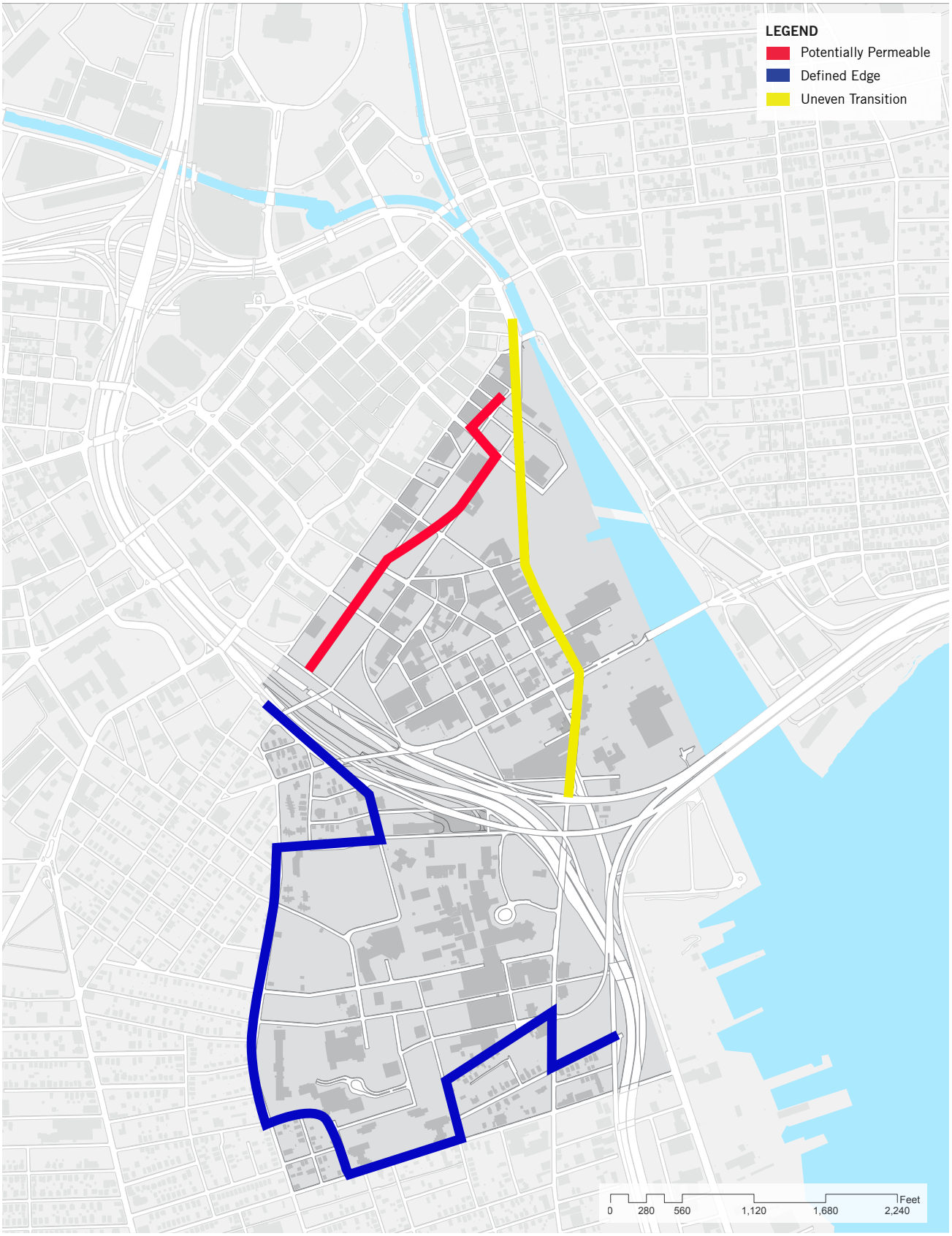


Figure 4-86 Urban Edges

5 CONCEPTS

The preceding analysis lays the foundation for a series of concepts that both capture the defining characteristics of the Knowledge District and provide direction for future growth. These concepts are rooted in the urban fabric of Providence. They are intended to restore and enhance that fabric, while providing for the development of a thriving city district. While promoting the development of knowledge-based industries is one of the impetuses for this plan, these concepts also recognize that the Knowledge District will be most successful only if it develops as a multi-faceted, mixed-use environment.

The six concepts described below work to strengthen the identity of sub-districts within the study area while providing for better connections between them. The concepts work together to provide a flexible platform for various kinds of development to occur.

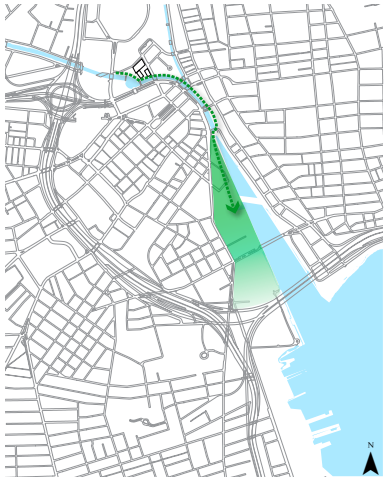
Figure 5-1 Street Pattern (after I-195 relocation)

Figure 5-2 Building Footprint Figure-ground

Figure 5-3 Subdistrict Areas

SIX CONCEPTS

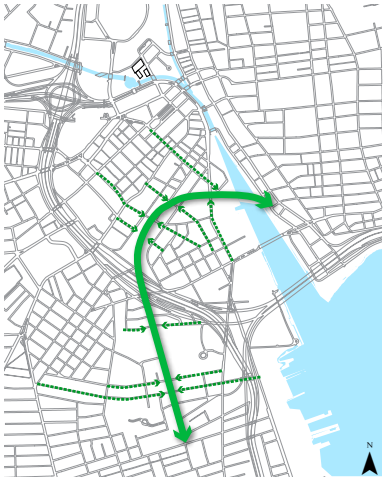
Riverwalk Expansion



Riverfront

- Build on Past Success by Extending Park
- Strengthen Urban Edge at Waterfront
- Provide Pedestrian Access to Park
- Create Recreational Amenities
- Enhance District Gateways

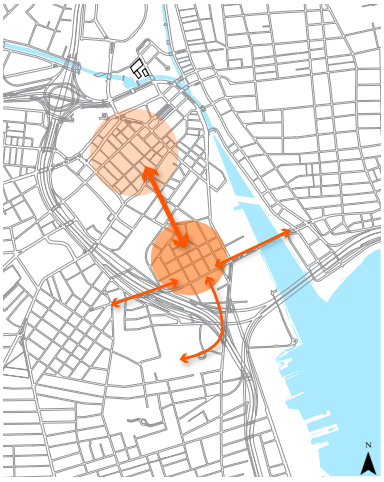
Green Link



Undeveloped Land

- Weave Urban Fabric to Integrate with Downcity & Other Neighborhoods
- Support Institutional & Academic Development
- Create Linear Green Walk Linking River, Jewelry District & Hospital Campus

Interactive Place



District Cores

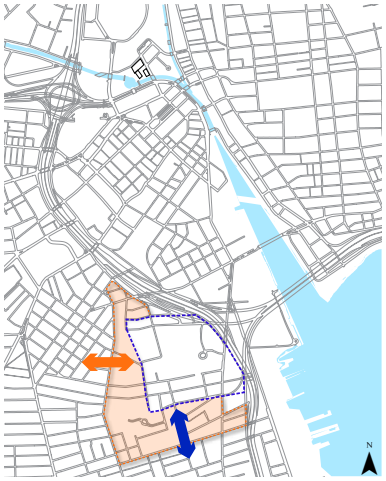
- Infill Lots to Maintain Character & Scale & Create Streetwall
- Develop Street Hierarchy Connecting Downcity & Jewelry District
- Improve Streetscape & Activate with Retail
- Create Lively, Offbeat Neighborhood

Health Science Campus

Hospital Area

- Create Clear Identity, Entry, & Circulation
- Increase Density & Reduce Surface Parking
- Develop Clear Expansion Zones for Hospital & Research
- Provide Public Gathering Place

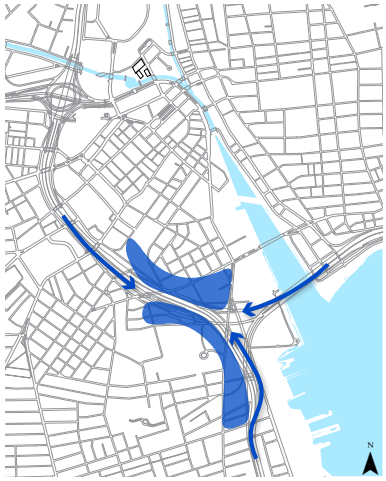
Blended Edge



Transition Zone

- Add Infill Residential with Smaller Scale Health Science & Commercial Uses
- Increase Density & Reduce Surface Parking
- Integrate Hospital & Neighborhood
- Support Urban Agriculture

New Providence Gateway



I -95 Corridor

- Create New Identity for Providence & Knowledge District
- Identify Large Scale Development Sites
- Mediate Scale and Buffer I-95
- Celebrate City Gateway
- Create Iconic Views

Concept 1: Riverwalk Expansion

The riverwalk along the Providence River is one of the greatest assets of Downtown. Development of open space in the I-195 corridor will extend the energy south into the Knowledge District Construction of the pedestrian bridge will also create a gateway to the district from the water.

Eddy Street moves inland as it moves south from Downcity, creating a wide and potentially open zone for the Knowledge District's riverfront block. This is in contrast to the rest of Downcity where development is densely built up along the water's edge. This presents an opportunity to create a unique riverfront zone with open space amenities adjacent to large buildings. It is important to note the width of the zone will require specific focus in order to maintain connections – both visual and physical – to the riverfront.

Figure 5-4 View from Eddy Street

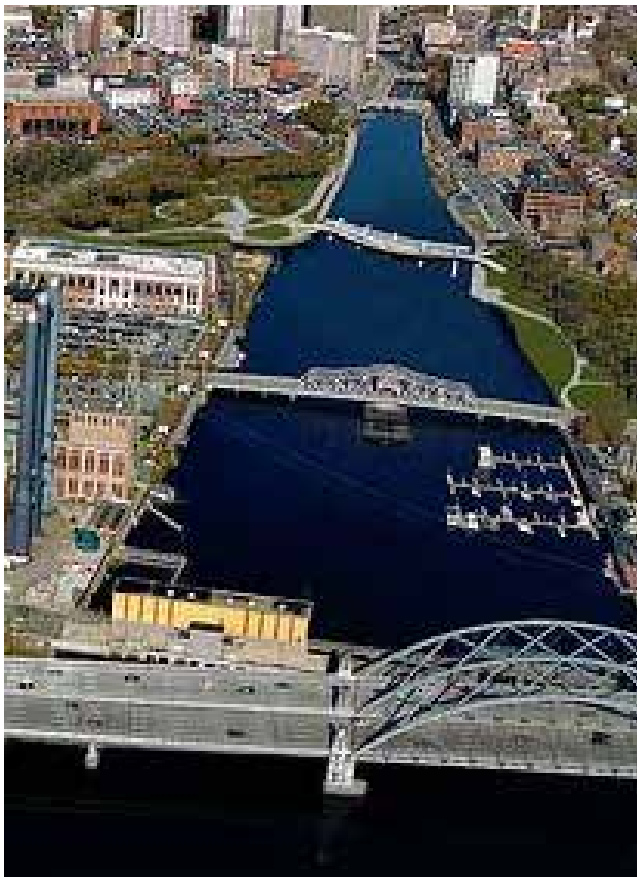


Figure 5-5 Aerial View of Riverfront

Figure 5-6 Aerial View of Riverfront

Figure 5-7 View from Eddy Street

Figure 5-8 Providence Riverfront

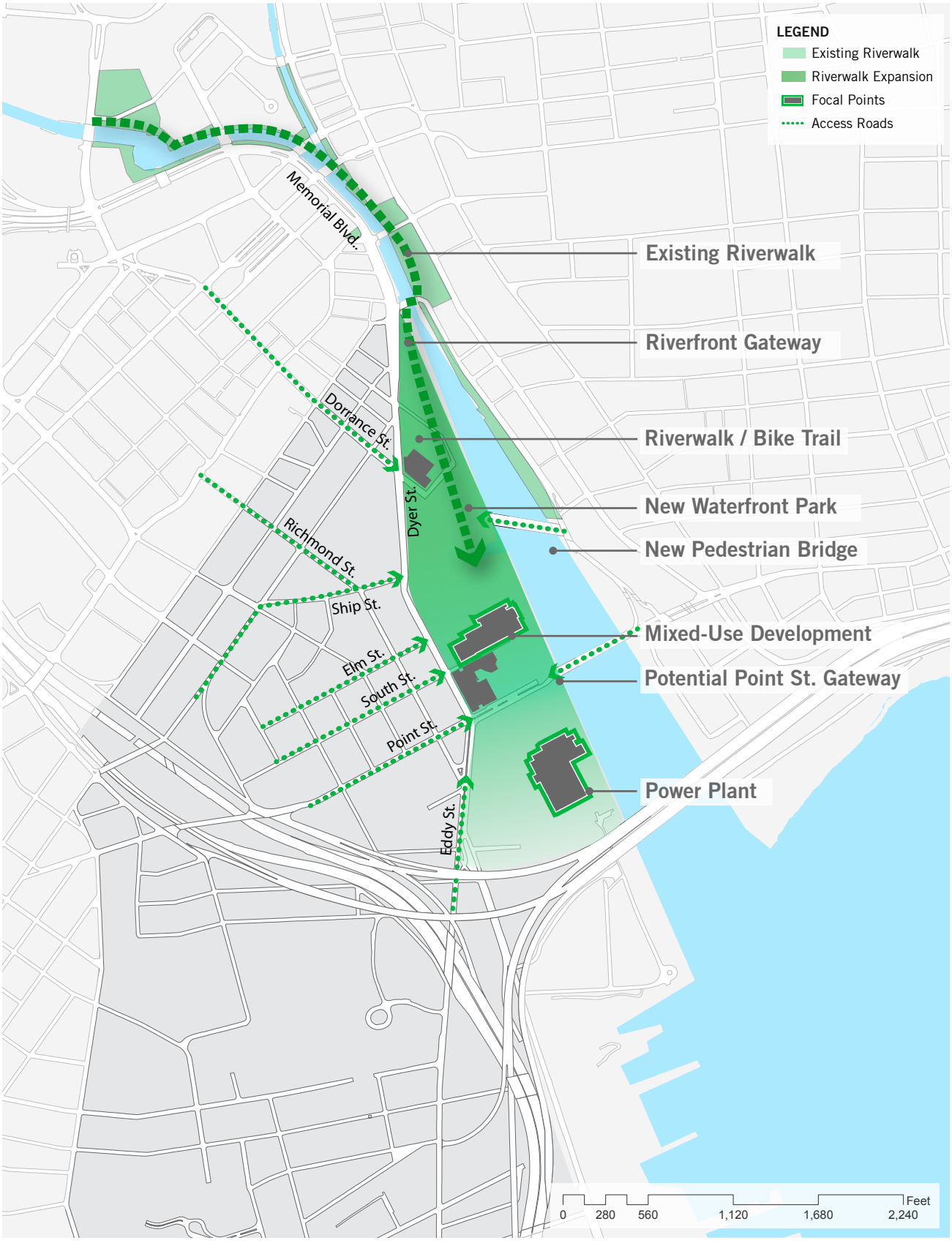


Figure 5-9 Riverwalk Expansion Concept

The riverwalk expansion turns the riverfront into an attraction. The pedestrian bridge and riverfront park have already been designed to establish the recreational nature of the riverfront. Plans for the Dynamo House as a museum or a cultural center will further enhance the public nature of the riverfront, ensuring its place as a citywide amenity.

This plan envisions a riverfront public walkway within a 50' coastal easement that ensures public access to the water. Buildings at this easement should host active uses to help activate the water's edge. The long-term vision is to extend public access on both sides of the river to its mouth, completing a riverfront greenway system. View corridors are established to maintain water vistas both from the Jewelry District and from Downcity. These view corridors will help re-establish and preserve a connection between the city and its riverfront.

Figure 5-10 Winning Proposal for the East Side Park, 2006, by Brown, Richardson, and Rowe

Figure 5-11 Winning proposal fro Providence River Pedestrian Bridge Competition, 2010, by inFORM Studio

Figure 5-12 Riverwalk Precedent

Figure 5-13 Riverwalk Precedent

The large-scale industrial buildings that characterize the riverfront, including the Dynamo House and the Manchester Street Power Station, should be celebrated as important components that make up the riverfront and serve as identifying markers for the district. The public spaces and rights of way around these buildings, especially those that connect to the riverfront, should be designed to welcome visitors. Future expansions or renovations to the power plant should also recognize the importance of the public realm to a thriving Knowledge District.

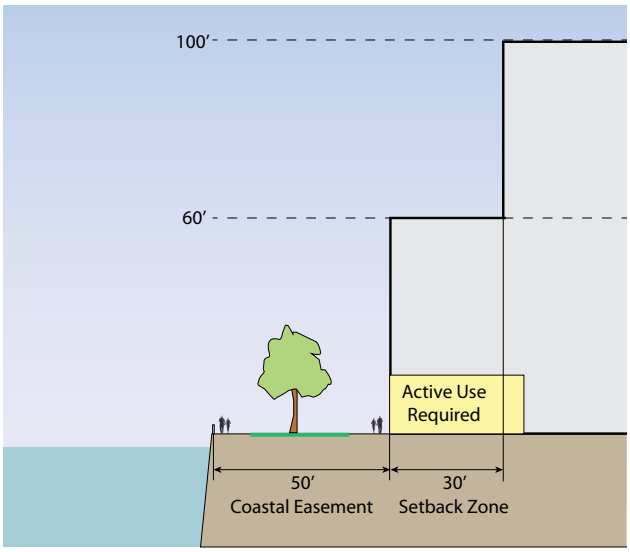


Figure 5-14 Waterfront Easement Zoning

Figure 5-16 Riverfront Perspective View, 40-Year Build-out

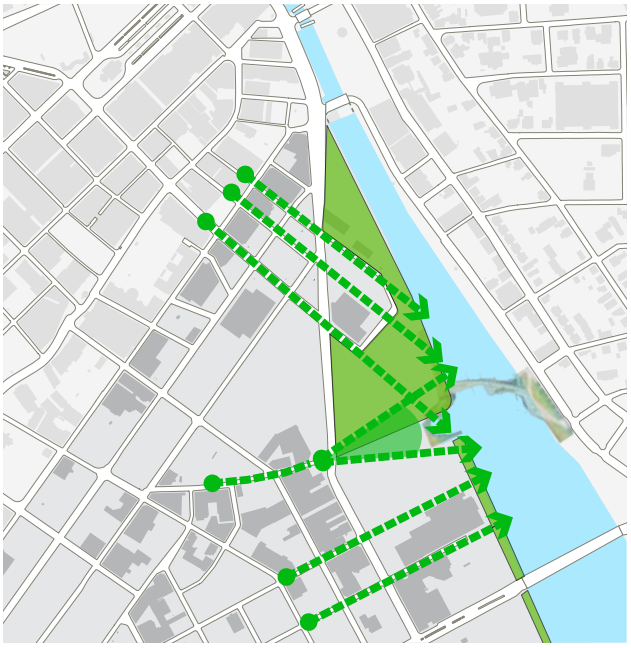


Figure 5-15 View Corridors

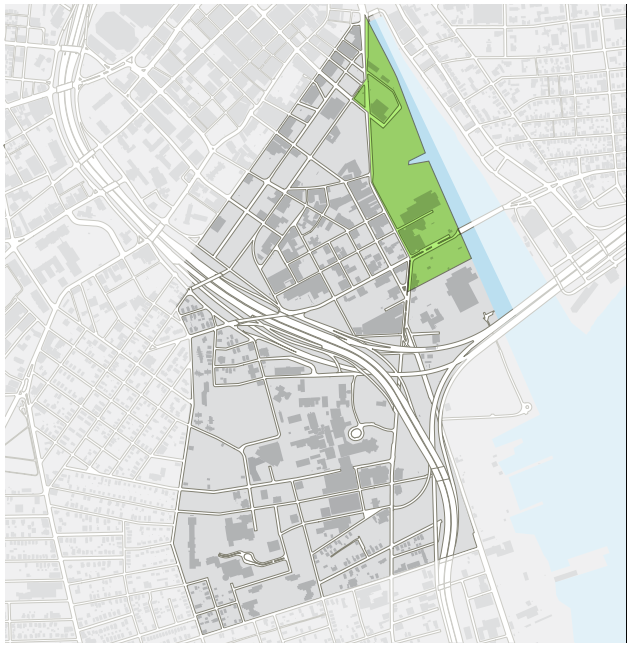


Figure 5-17 Riverfront Zone

Concept 2: Green Link

The green link concept offers an integrated network of open spaces and paths that links the waterfront to and through the Knowledge District. The green link is not a grand boulevard, but rather a series of more loosely connected smaller spaces, which strung together form a route through the district. Its route may change depending on how land is developed, but what is critical is that there is a clear pedestrian route connecting open spaces across the district. New zoning for Downtown and the I-195 parcels has incorporated height and density bonuses for the inclusion of open space, and encourages a network of connected spaces. It is critical that the I-195 Commission, in considering development proposals, ensure the development of the green link. One possible route is illustrated in Figure 5-23. Starting from the east side of the river, the green link crosses the planned pedestrian bridge, bisects the waterfront park to a through-block easement and on to Ship Street. From there the route continues along Clifford Street and across the Clifford Street Bridge. An easement on the south side of the access road connects the bridge to Plain Street. The green link continues south through the hospital area helping to unite the two halves of the Knowledge District. The green link may also become part of a larger city-wide path network as envisioned in the cityWALK concept proposed by the Providence Foundation, L+A Architects, and the Jewelry District Association. (see Figure 5-24).

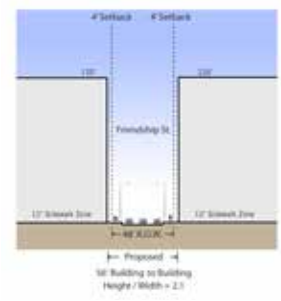


Figure 5-18 Friendship St. RIDOT Proposal

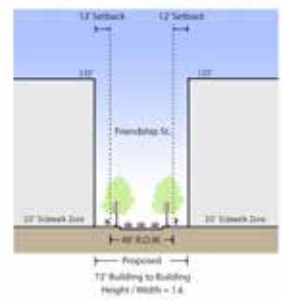


Figure 5-19 Friendship St. Proposed Easement

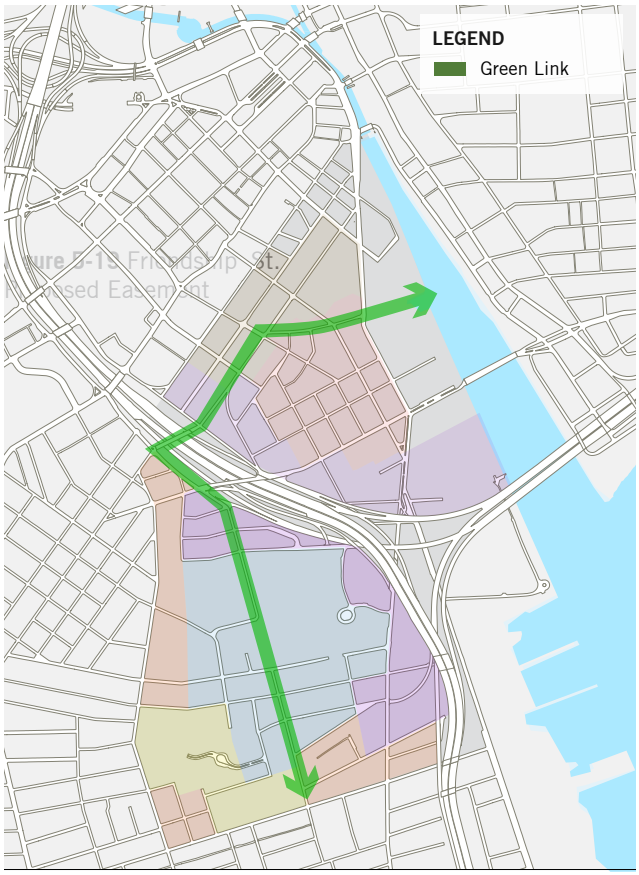


Figure 5-20 I-195 Zone Concept

Figure 5-21 Aerial View Plain St., 40-year Build-out

Figure 5-22 Precedent: Teardrop Park, New York, NY

To keep the existing narrow rights-of-way along Friendship and Clifford Streets from becoming too narrow, additional setbacks or easements should be added to widen the space between buildings. The cross-streets maintain a tight and active urban edge creating a dynamic weave between landscaped green streets and more defined connectors, both punctuated by nodes of activity.

There is an additional opportunity to incorporate enhanced highway crossings in the green link concept. One possibility includes using relatively low-cost art installations along the route of the two bridges and the Eddy Street underpass to improve the quality of

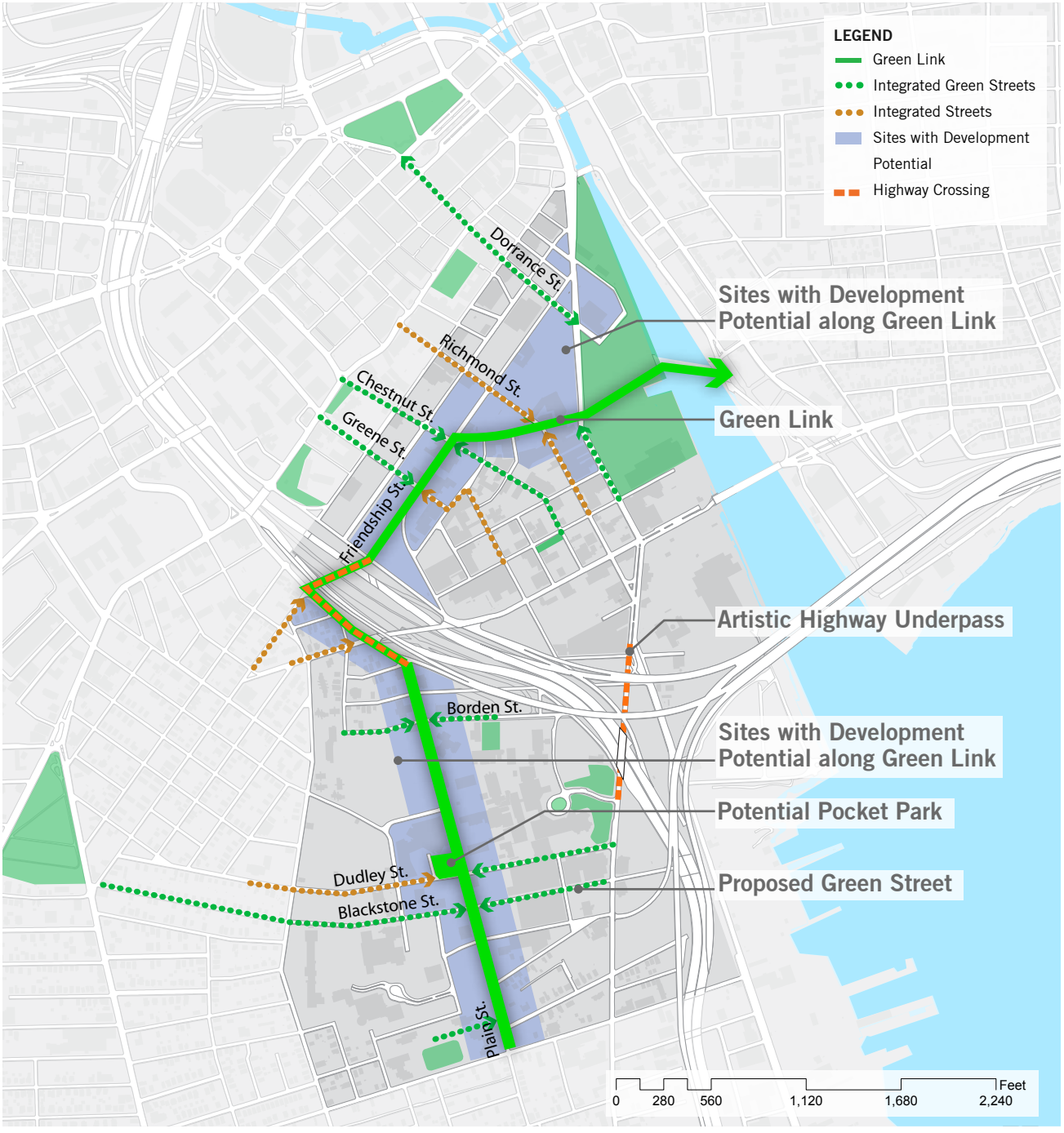


Figure 5-23 Green Link Concept Plan

the crossings. Harnessing the artistic talent of the Rhode Island School of Design and the identity of Providence as "The Creative Capital," this concept has the opportunity to artistically upgrade bridges and underpasses. The pedestrian underpass connecting under Memorial Boulevard has been similarly decorated with tiles painted by children and exhibit panels on Providence history, dramatically enlivening and transforming the pedestrian experience.

Figure 5-24 CityWALK Concept

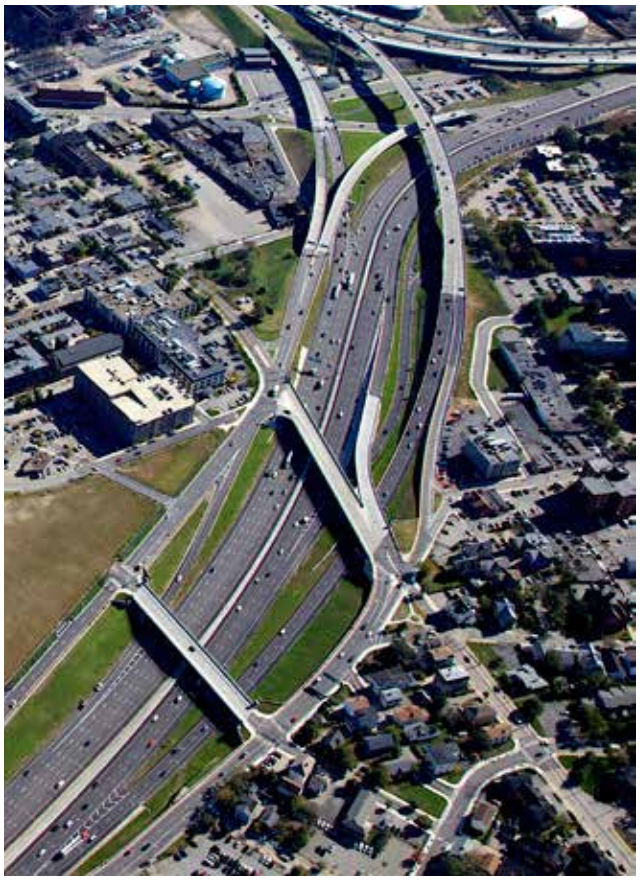


Figure 5-25 Highway Crossings - Existing Conditions

Figure 5-26 Highway Crossings - Point Street

Figure 5-27 Highway Underpass - Eddy Street

Figure 5-28 Eddy Street

Figure 5-29 Crossing Precedent - 9th Street Bridge, Seattle, WA

Figure 5-30 Crossing Precedent - Brooklyn Bridge Underpass, Brooklyn, NY

Figure 5-31 Crossing Precedent - Memorial Boulevard Underpass, Providence, RI

Concept 3: Interactive Place

The core of the Jewelry District already embodies a diversity of uses, architectural styles, and scales in a tight urban grid of narrow streets. It contains cultural institutions like the Children's Museum, large and small scale technology and research companies, Brown University's new medical school building, bars and nightclubs, and residential buildings. It has many of the ingredients of a dynamic and diverse mixed-use urban center, but would benefit from a higher degree of organization.

Figure 5-32 Jewelry District Core Existing Conditions Aerial

The interactive place concept seeks to preserve the character of the Jewelry District core while giving it order by emphasizing key corridors. The concept envisions a mix of adaptive reuse of existing buildings, in-fill development, public streets and open space. Retail activity should be concentrated along key corridors with well-defined street walls.

Former industrial areas have been successfully developed as mixed-use centers in Providence and in other northeastern cities. The building types and urban structure of these areas lend themselves well to creating lively amenities. Loading and freight areas become public plazas; large scale buildings are sub-divided into shops and offices or apartments; theaters, museums, or other cultural venues can take advantage of large building spaces' layered character and sense of history.

Figure 5-33 Chestnut Street

Figure 5-34 Richmond Street

Figure 5-35 View from South Street

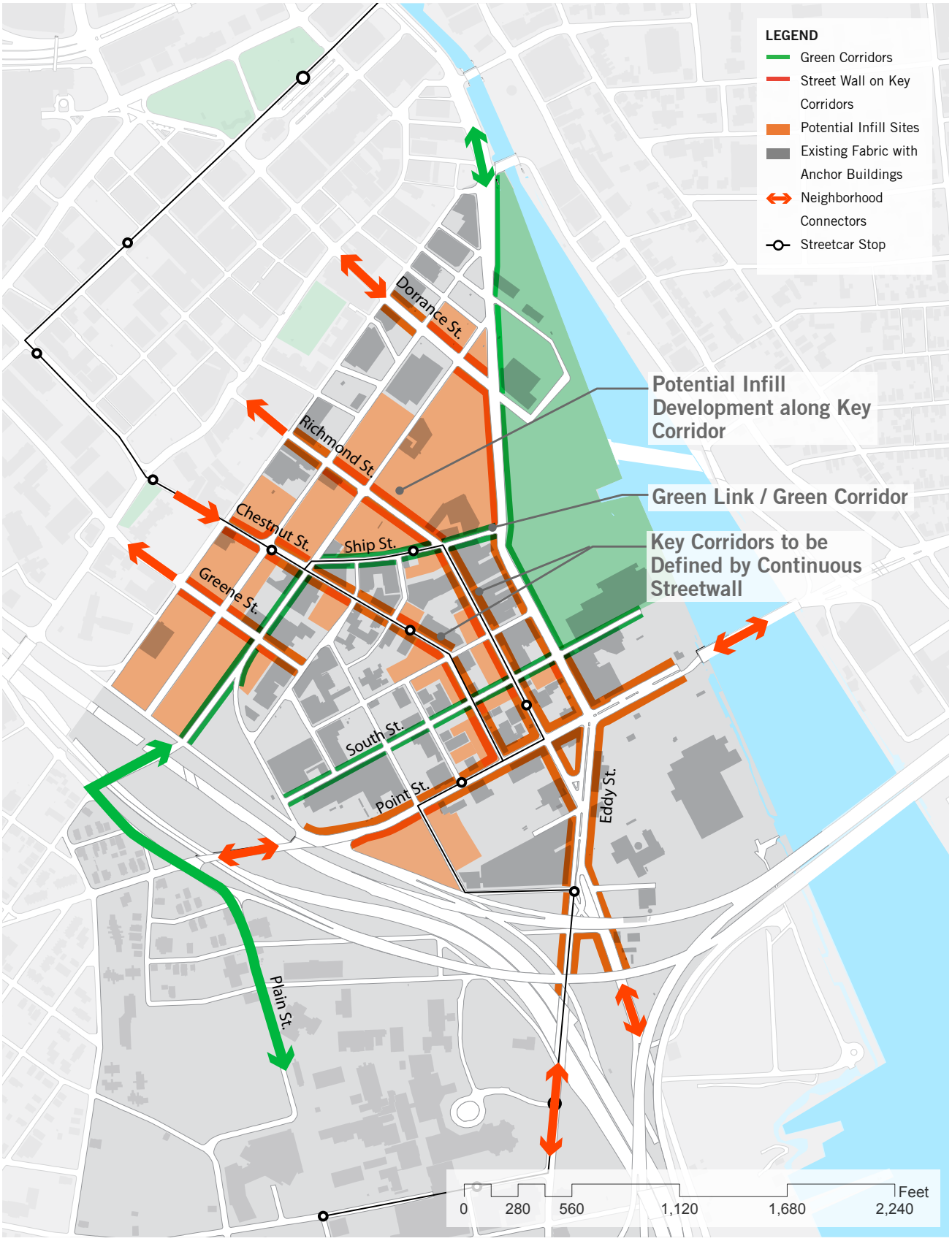


Figure 5-36 Jewelry District Core Concept

Figure 5-37 Main St. Ann Arbor, MI

Figure 5-39 Centro Ybor, Tampa, FL

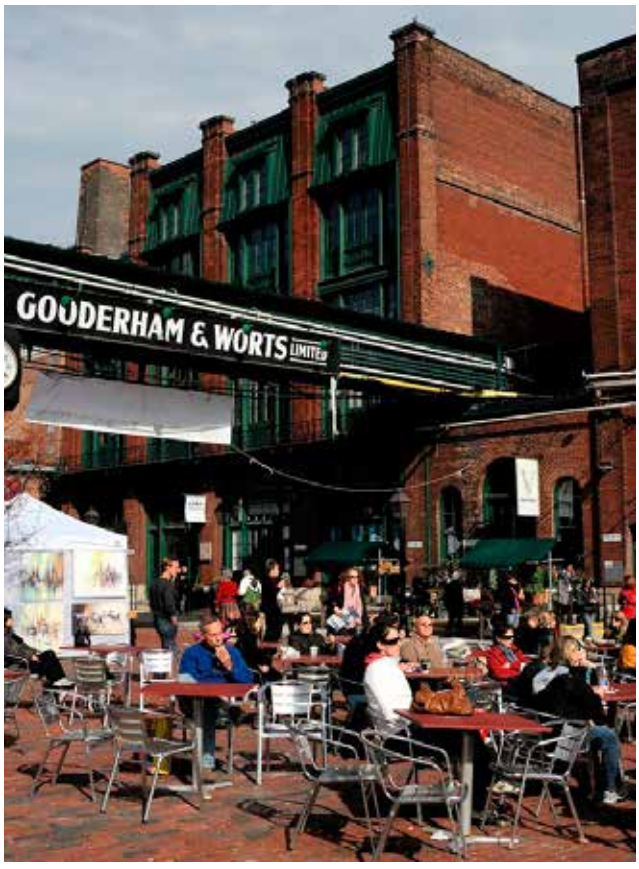


Figure 5-38 Distillery District, Toronto, Canada

Figure 5-40 West End, Dallas , TX

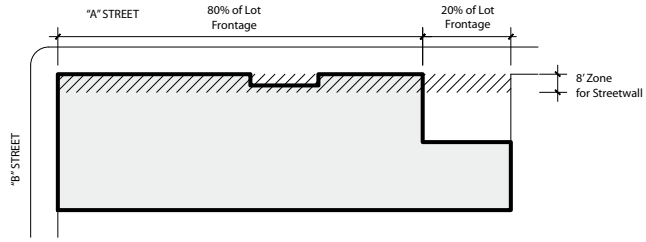


Figure 5-41 Build-to-Zone

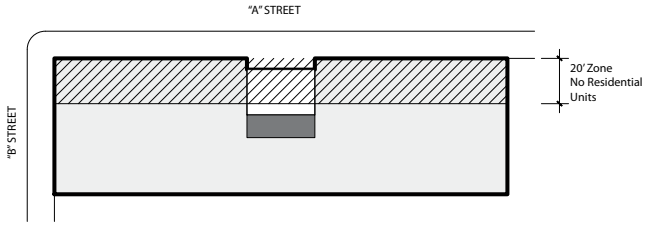


Figure 5-42 Active Use Zone

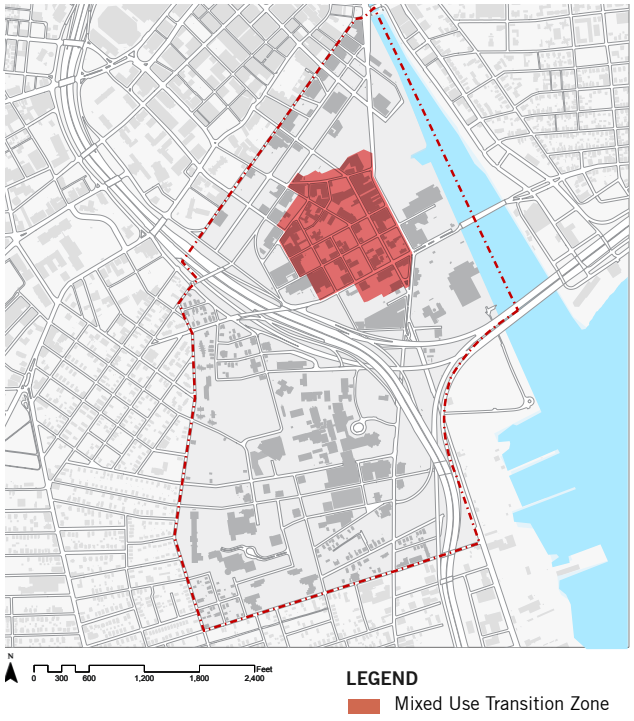


Figure 5-45 Jewelry District Core

Figure 5-43 Wide Sidewalks with Seating

Figure 5-46 Rendering Jewelry District, 40-year build out

Figure 5-44 Potential Open Space Site on South Street

Concept 4: Health Science Campus

As an anchor of the Knowledge District, the hospitals' physical presence and relationship to the rest of the city should reflect their importance to the city. Integrating the existing street organization into the city will better accommodate the traffic to the hospital. New construction, additions, and reconfigurations of the hospital area have recently occurred on Dudley Street, including the expansion of the bridge building over the street. Dudley Street is also the route of the planned streetcar line. A narrow 50' right-of-way, with only one lane of traffic in each direction, currently serves two emergency entrances, two service entrances, and four other entrances within a quarter mile length. This volume and variety of traffic on a relatively low-capacity street will likely continue to be congested unless addressed.

Figure 5-47 Hospital District Aerial

Figure 5-49 View from Staniford Street

Figure 5-48 View from Dudley Street

Figure 5-50 View from Dudley Street

Figure 5-51 View from Borden Street

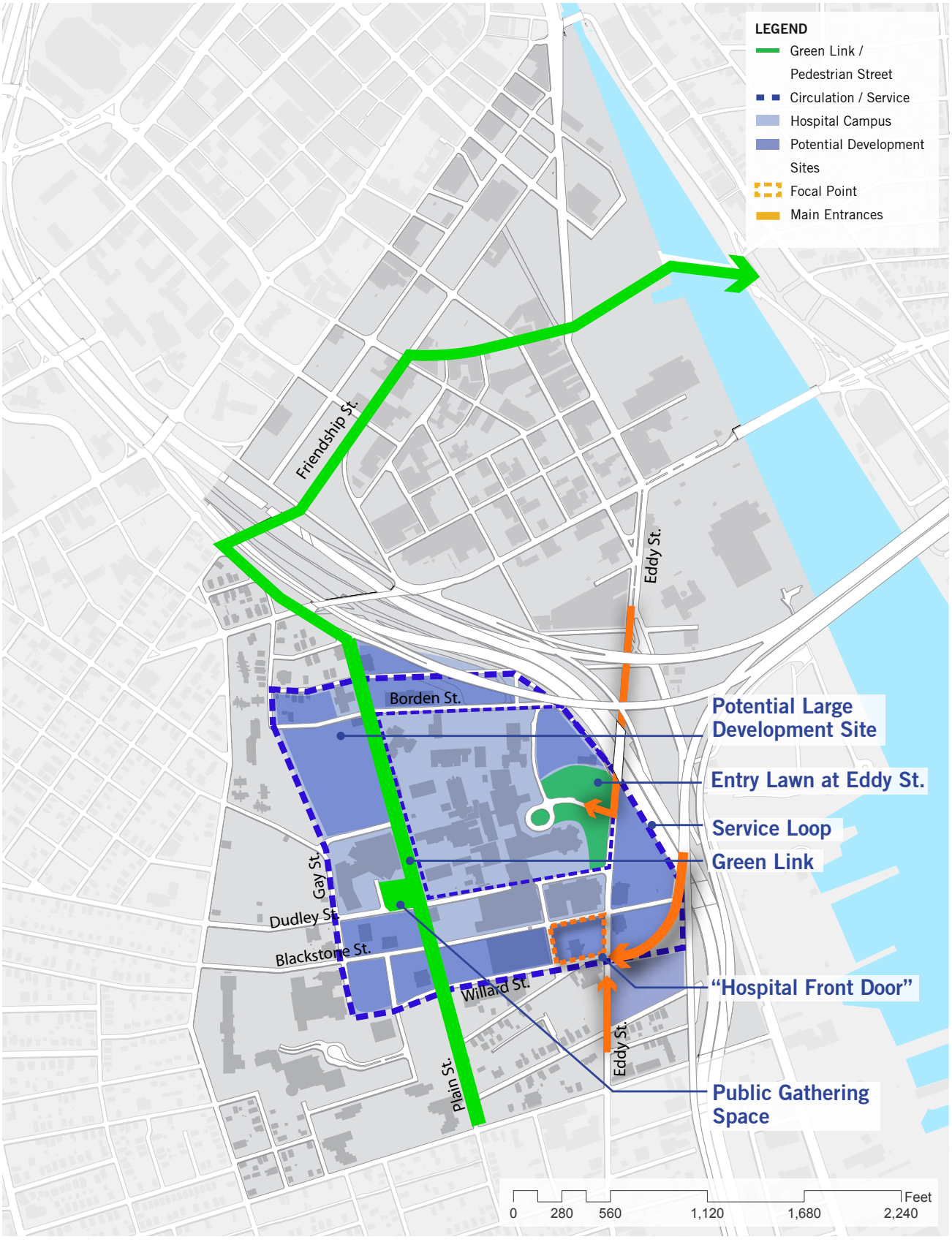


Figure 5-52 Health Science Campus Concepts

The health science campus concept would alleviate the congestion by creating a new front door and secondary entry points, focusing future development within a prescribed area and establishing a service circulation loop, shared open space, and pedestrian-friendly streets. As a large number of people will now arrive via the Willard Street exit ramp, the area facing this ramp has the opportunity to become a new iconic gateway for the hospital. This gateway could be a visual focal point, much like the clock tower at Rikshospitalet University Hospital in Oslo, Norway. An open-space, such as a square or wide planted median, could also be created to mark this entrance area. The restoration of the lawn along Eddy Street would act as an identity marker for those arriving from the north.

The concept proposes Dudley and Blackstone streets become a paired set of one-way streets to ease congestion and improve access to parking areas. Blackstone Street becomes a focus for future development and

Figure 5-53 Rikshospitalet Univ. Hospital, Oslo, Norway

Figure 5-55 University Park, Cambridge, MA

Figure 5-54 Clark Center, Stanford, CA

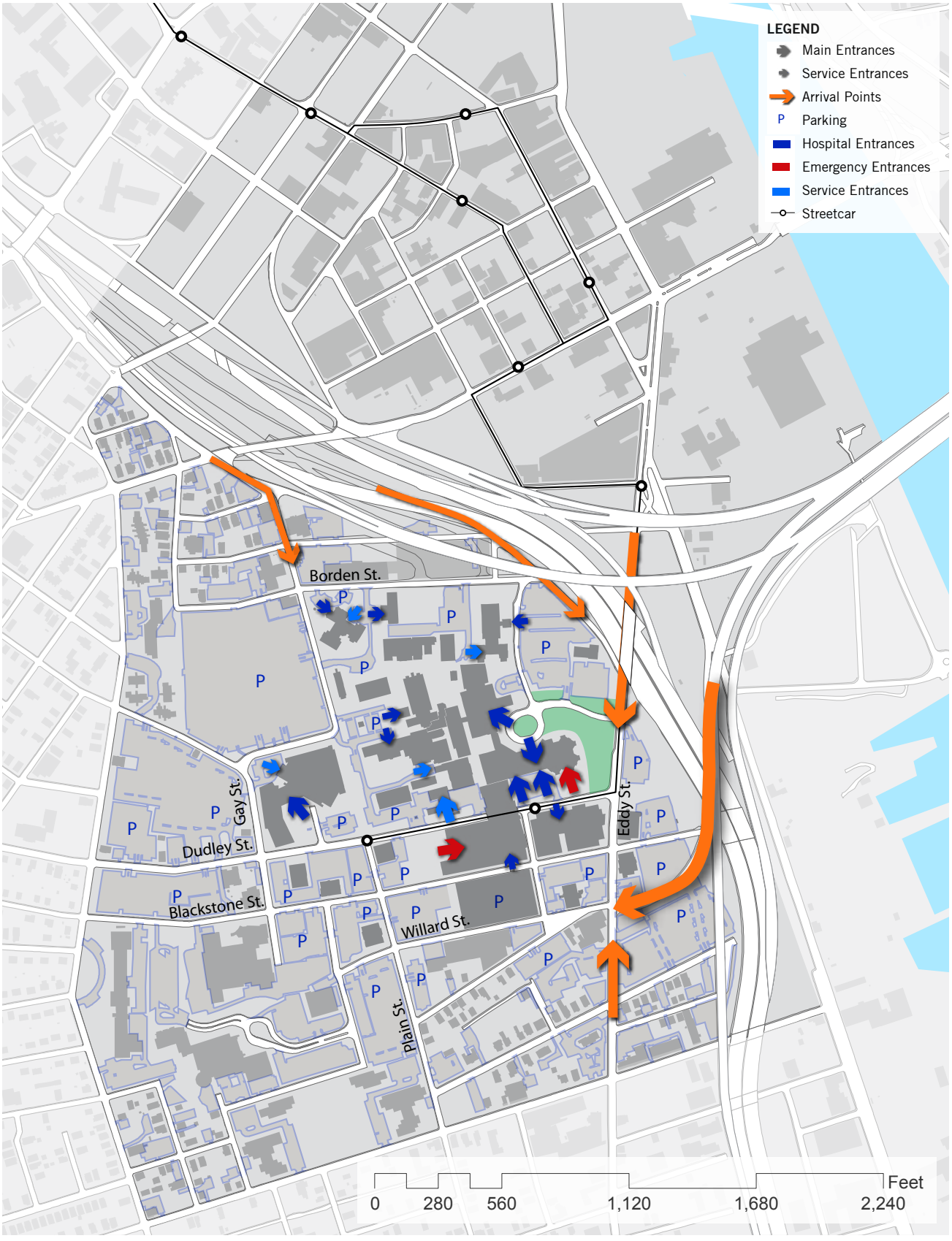


Figure 5-56 Existing Hospital Area Arrivals and Entrances

expansion with special attention to greening it and making it pedestrian-friendly. In addition to having capacity for future expansion and connecting to parking areas, Blackstone is unique in that it passes underneath the highway and has an unobstructed view corridor to the water. Complementing the Dudley-Blackstone pair, Plain Street will provide a north-south circulation axis and another spine for development. If a connection cannot be made directly along the line of the former right-of-way, allowing vehicles and pedestrians through this block will greatly improve the connectivity of the campus. The Plain Street spine will also link the hospital area to the Jewelry District, thus complementing the green link concept.

A public open space or gathering space at the intersection of Plain and Blackstone streets marks the center of the pedestrian-friendly cross axis, integrating different segments of the campus and the surrounding neighborhood. Shared social gathering spaces are essential to research institutions, as in the Clark Center at Stanford University, and also improve relations between institutions and surrounding residential communities. Lastly, this concept envisions surface parking consolidated into parking structures around the perimeter of this core campus. While structured parking poses financial challenges, the value created by greater density of development and better circulation systems would make structured parking a more financially viable option.

LEGEND FOR FIGURE 5-57

Hospital Zone

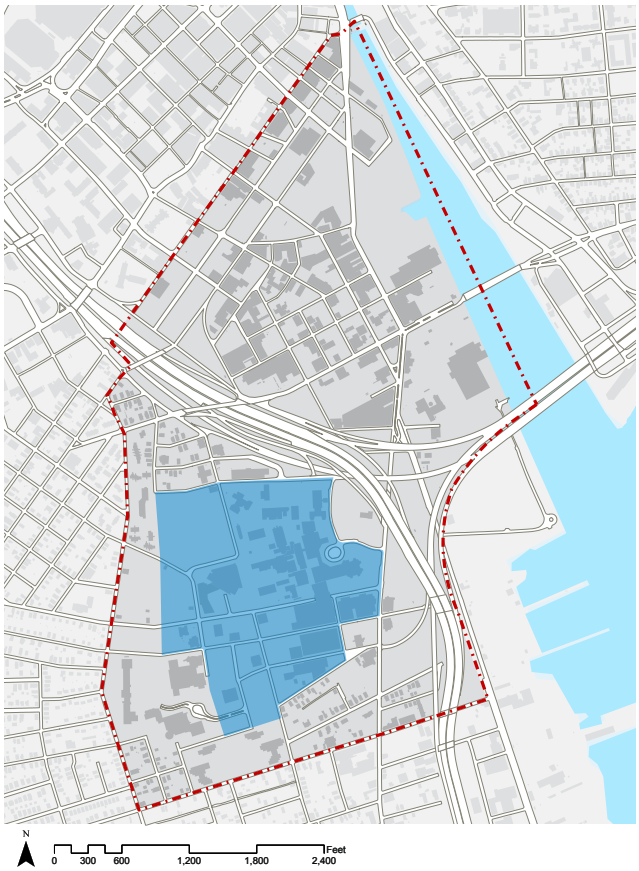


Figure 5-57 Hospital Campus Core

Figure 5-58 Health Science Campus

Figure 5-59 Hospital Area Aerial 40-Year Build-out

Figure 5-60 Hospital Campus Circulation Concept

Concept 5: Blended Edge

The area surrounding the core hospital zone is currently a mix of parking lots, community-oriented educational institutions, and residential buildings. While the overall mix of uses may be generally appropriate for a transition zone, the fragmented arrangement of uses coupled with the large parking lots results in a lack of cohesion.

The blended edge concept is a mixed-use corridor that relates to the adjacent neighborhoods and mediates between the low scale of buildings in the residential neighborhoods and the large scale hospital buildings. A mix of 3- and 4- story residential buildings and smaller scale medical arts commercial buildings will line the east side of Prairie Avenue. Beacon Avenue will be

Figure 5-61 Hospital District Transition Zone Existing Conditions Aerial

Figure 5-62 Milk Street

Figure 5-63 View from Public Street

Figure 5-64 Hilton Street

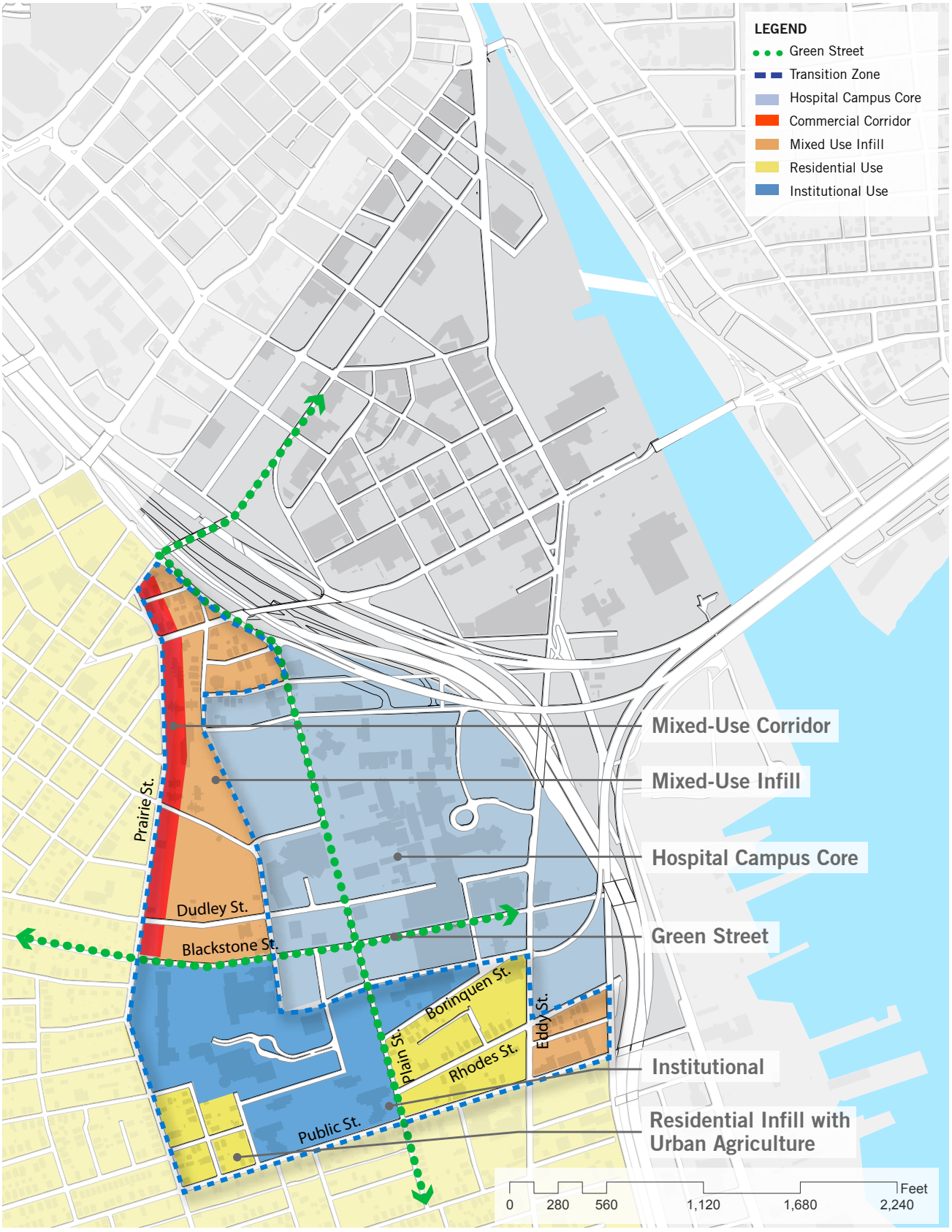


Figure 5-65 Blended Edge Concept

extended south to Dudley Street acting as a buffer between the large-scale hospital buildings from the smaller scaled structures of the abutting residential neighborhood. The Beacon Avenue extension will also complete a circulation loop.

Taking advantage of the proposed terminus of the streetcar line and the proximity of several bus routes, a transit center is proposed for the block of Prairie Avenue between Dudley and Blackstone streets. This transit center will include a retail center and structured parking and will serve both the local residential community and workers commuting to and from the hospital. New housing units of either 3-story row houses or attached triple-deckers along Prairie Avenue and mid-rise multifamily along Beacon Avenue will also help to blend together the boundaries between areas. Structured parking could be shared between daytime users including hospital workers and drivers who might continue on to Downcity or College Hill by transit and night time users including the residents of the new multifamily housing in the area. With its proximity to services and jobs, this location would be ideal for affordable housing.

A further opportunity exists to reconnect the street grid bringing Borinquen Street or Willard Avenue, which have a direct feed from the highway off-ramp, west to Prairie. The Edmund W. Flynn Elementary School, which is currently closed, and other buildings might be demolished or reconfigured to allow the through streets to provide better circulation for the hospital and better connections to the community.

Figure 5-66 Potential Street Grid Reconnections

Figure 5-67 Blended Edge Precedent

Figure 5-68 Underpass Precedent

Figure 5-69 Precedent: Transit Center

Figure 5-70 Precedent: Parking Garage

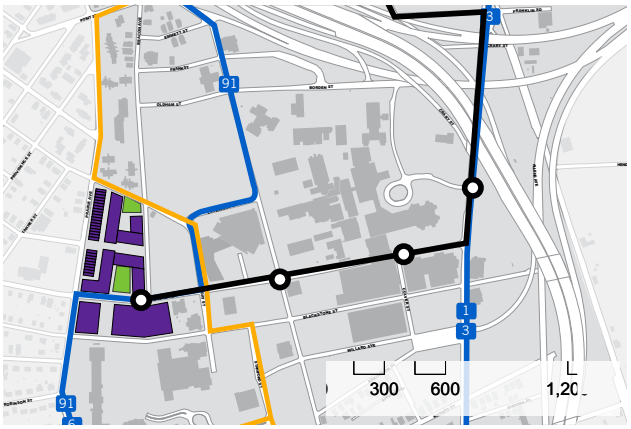


Figure 5-73 Blended Edge Zone

Figure 5-71 Precedent: Residential Above Whole Foods

Figure 5-72 Blended Edge Aerial 40-Year Build-out

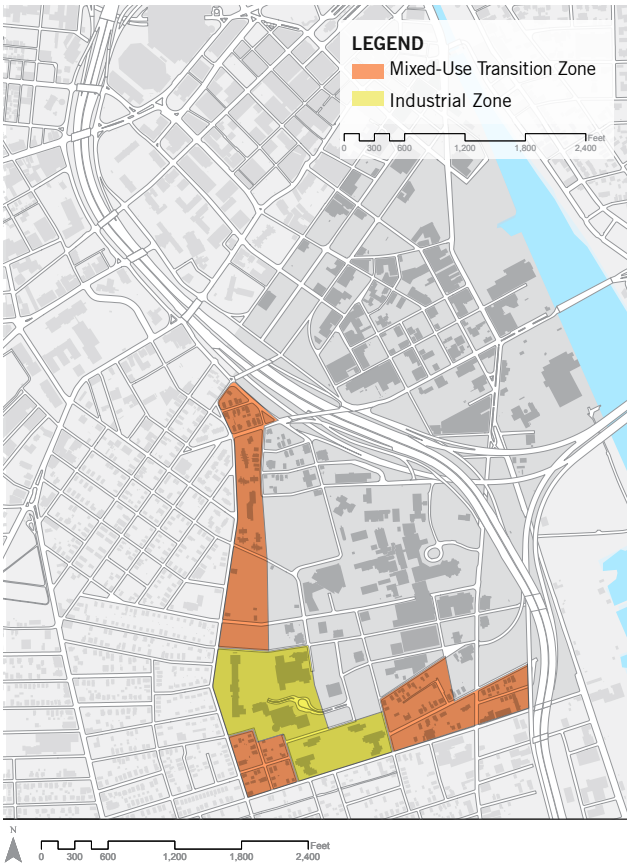


Figure 5-74 Transit Center and Residential

Concept 6: New Providence Gateway

The bisection of the Knowledge District by the I-95 corridor presents the greatest challenge to the creation of a cohesive district. The scale of the gulf created by the highway presents an obstacle to the unity of the district. Nearly all the existing buildings in Providence neighboring the highway are oriented away from it and most of the buildings are small in comparison to the scale of the highway. (Other cities along the I-95 corridor, such as Philadelphia, Stamford, and Bridgeport have iconic developments along their highways). Approaching from the south along I-95, the only visible markers for the Knowledge District are the triple smokestacks of the power plant.

Figure 5-75 Highway Zone Existing Conditions Aerial

While the highway presents a hurdle to connecting the Jewelry District and the hospital area, it also presents a unique district-defining regional opportunity. The highway provides strong and convenient regional connections for the Knowledge District and offers the district the potential for high visibility to all who arrive or pass through Providence by highway. The new Providence gateway concept seeks to capitalize on this opportunity by creating a new identity for the district and the city. This concept envisions sites along the highway for larger scale iconic buildings that create a new gateway to the city, visible from all three highway approaches. By creating sites on both sides of the highway, this concept unites the two halves of the district with a shared identity and visually links the gulf created by the highway. The scale of these buildings will help to mediate the scale of the highway

Figure 5-76 Highway Zone Existing Conditions

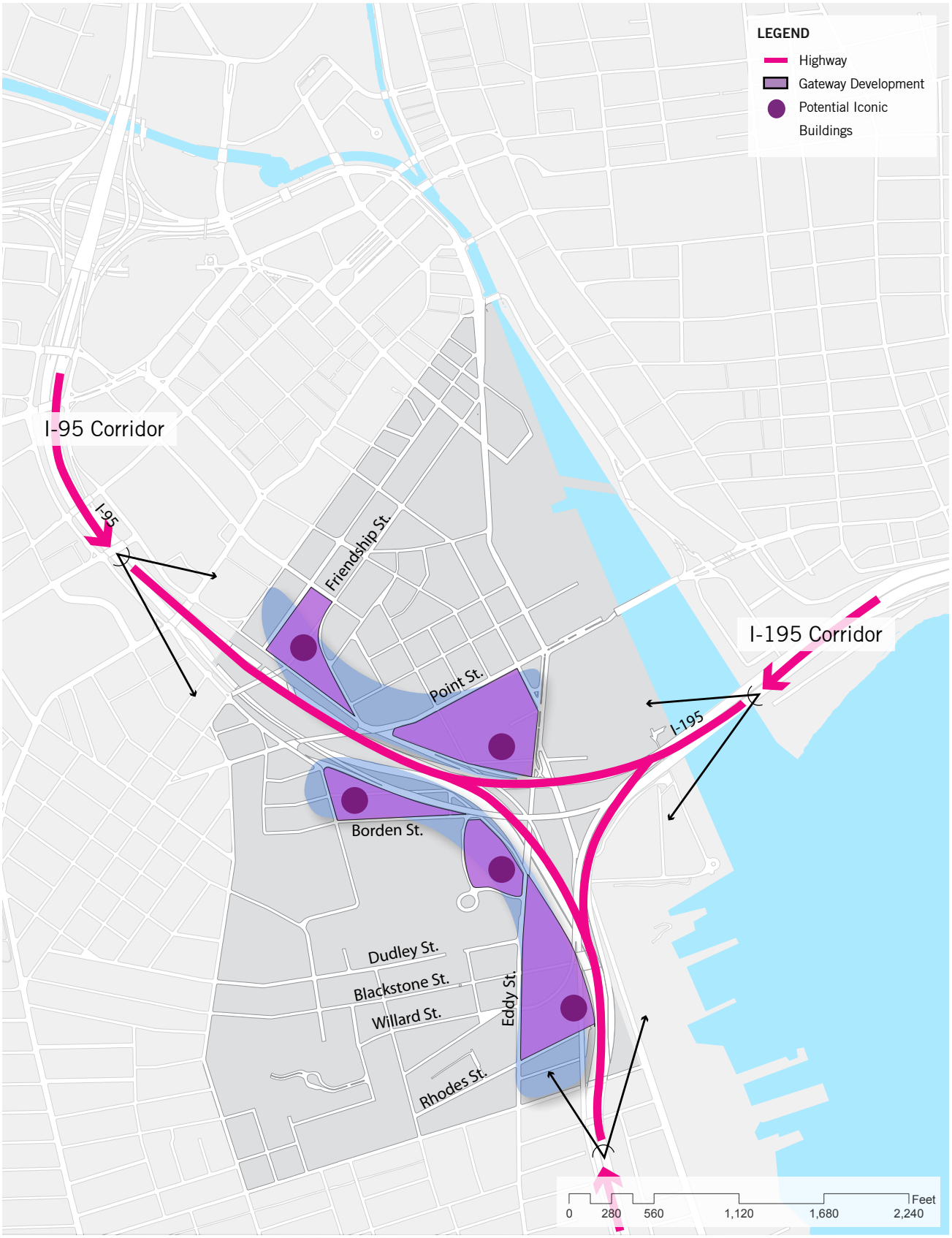


Figure 5-77 Providence Gateway Concept

and reduce the psychological distance between the Jewelry District and the hospital area. While height is the most straightforward way to create an iconic presence, identity can equally be created with strong architectural statements, as seen in this European example (Figure 5-78).

It is important for the city to have sites available for large scale development that can attract new investment. By designating areas appropriate for large scale development, the new Providence gateway concept also relieves pressure to develop in more historic areas at a scale that would not be appropriate to the architectural heritage of the city.

Figure 5-78 Cira Center, Philadelphia, PA

Figure 5-79 Bridgeport Center, Bridgeport, CT

Figure 5-80 Bridgeport Center, Bridgeport, CT

Figure 5-81 Providence Gateway Towers Study

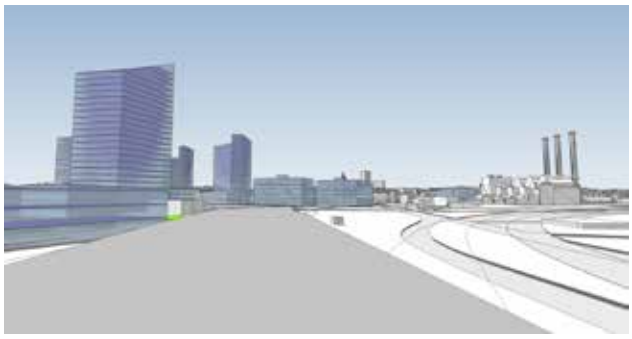


Figure 5-82 Providence Gateway Towers Study

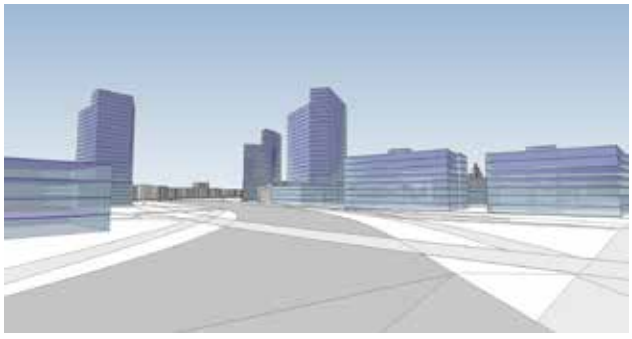


Figure 5-83 Providence Gateway Tower Study

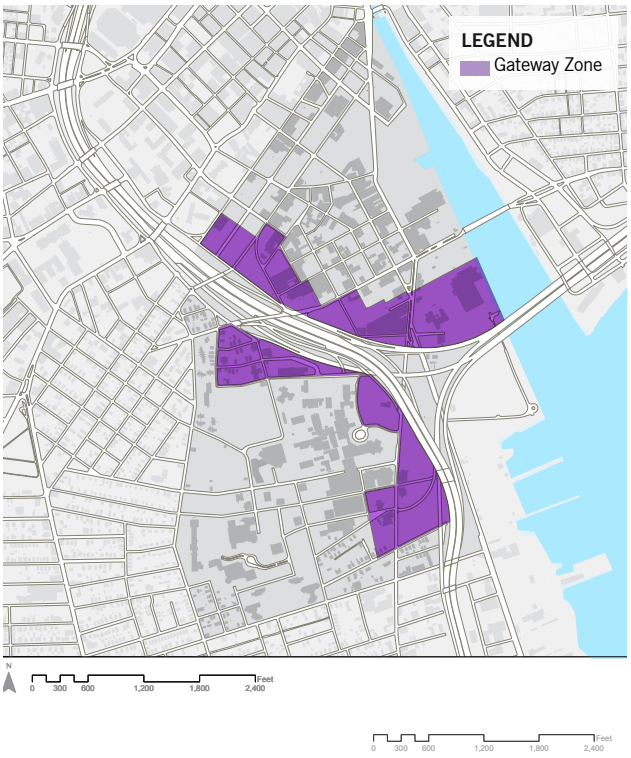


Figure 5-84 New Providence Gateway

Figure 5-85 Providence Gateway Precedent: ING House Meyer & Van Shooten

Figure 5-86 Providence Gateway Precedent

6 URBAN DESIGN FRAMEWORK

This section describes the urban design framework built on the six concepts presented previously. It will serve as the basis for regulation of land in Downtown and the Knowledge District, and a guide for future development.

The first part of the framework describes in greater detail an approach for circulation, open space and the massing for future development within the district. This includes a set of layered systems: streets and blocks, development massing, vehicular circulation and parking, pedestrian networks and views. This part of the plan is intentionally flexible to accommodate a broad range of current and future uses. The plan has been designed to support flexible development models, which can grow separately or symbiotically as needed.

The framework describes the long-range opportunities for growth and development over the next 40 years. Drafted using basic city-building measures and urban design and planning principles, the framework is intentionally flexible to accommodate market realities and new opportunities. This recognition of the inevitability of change is fundamental to this framework and is based upon the belief that strong cities are flexible and resilient. While the impetus for the Knowledge District is the promise of economic growth in knowledge-based industries, for this growth to be successful it needs to be an extension of Providence's vibrant urban fabric.

The framework is simultaneously a vision of a possible future of Providence, an area on the forefront of research and entrepreneurial investment in the expansion of the frontiers of knowledge. The vision presented herein is of the urban environment as a home and an incubator and a partner for the schools, businesses and the people of the city. Renderings and study models are presented here to give a sense of one potential future build scenario, but many variations on this vision are possible within the framework. The nominal time frame for the envisioned build out is approximately 40 years.

Figure 6-1 Aerial View of Capital Center from 1983

Figure 6-2 Aerial View of Capital Center from 2011

Figure 6-3 Framework Plan 40-Year Build-out

Figure 6-4 Aerial Rendering, 40-Year Build-out

Vehicular Circulation & Parking

The framework builds on the existing pattern of streets and circulation extending the grid of Downcity streets into The Jewelry District and re-establishing a functional street grid in the hospital area. A well-connected street grid provides the connectivity and redundancy essential for efficient circulation and increased development value. The framework also creates a hierarchy of streets and paired one-way streets to clarify routing and maximize the system's capacity.

Parking is shifted from surface lots to structured parking to maximize development capacity. Parking structures are placed in key locations within the two main activity centers: the core of the Jewelry District and the hospital. Traffic congestion and parking demand are also addressed through improvements to mass transit, bike paths and infrastructure, and a combination of mixed uses and walkable streets to encourage more trips on foot.

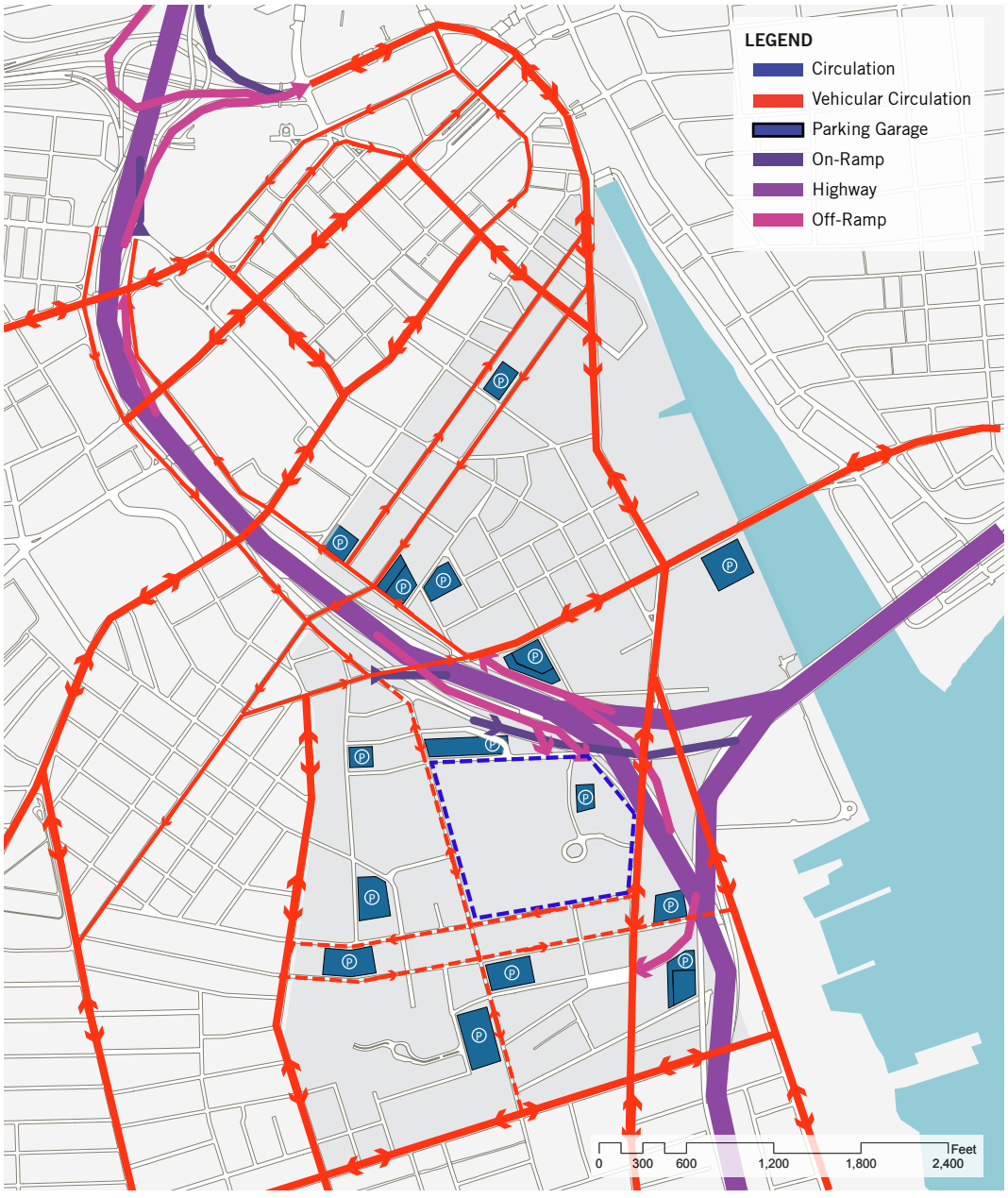


Figure 6-5 Vehicular Circulation Network

Pedestrian Circulation Network

An extensive network of walkable streets and paths extends the pedestrian network of Downcity into the Jewelry District and establishes a pedestrian-friendly connection to the hospital area. A system of secondary and tertiary pedestrian-friendly streets and pedestrian paths feed into key streets. In addition to providing enjoyable alternatives to car travel, the network promotes the health of residents by encouraging physical activity. The pedestrian network also brings people to the waterfront, giving a broad population access to this resource.

To make the network functional, streetscape improvements must be made to streets, sidewalks, and paths including wider sidewalks, street trees, landscaping, lighting, street furniture, crosswalks, and transparent ground floor façades.

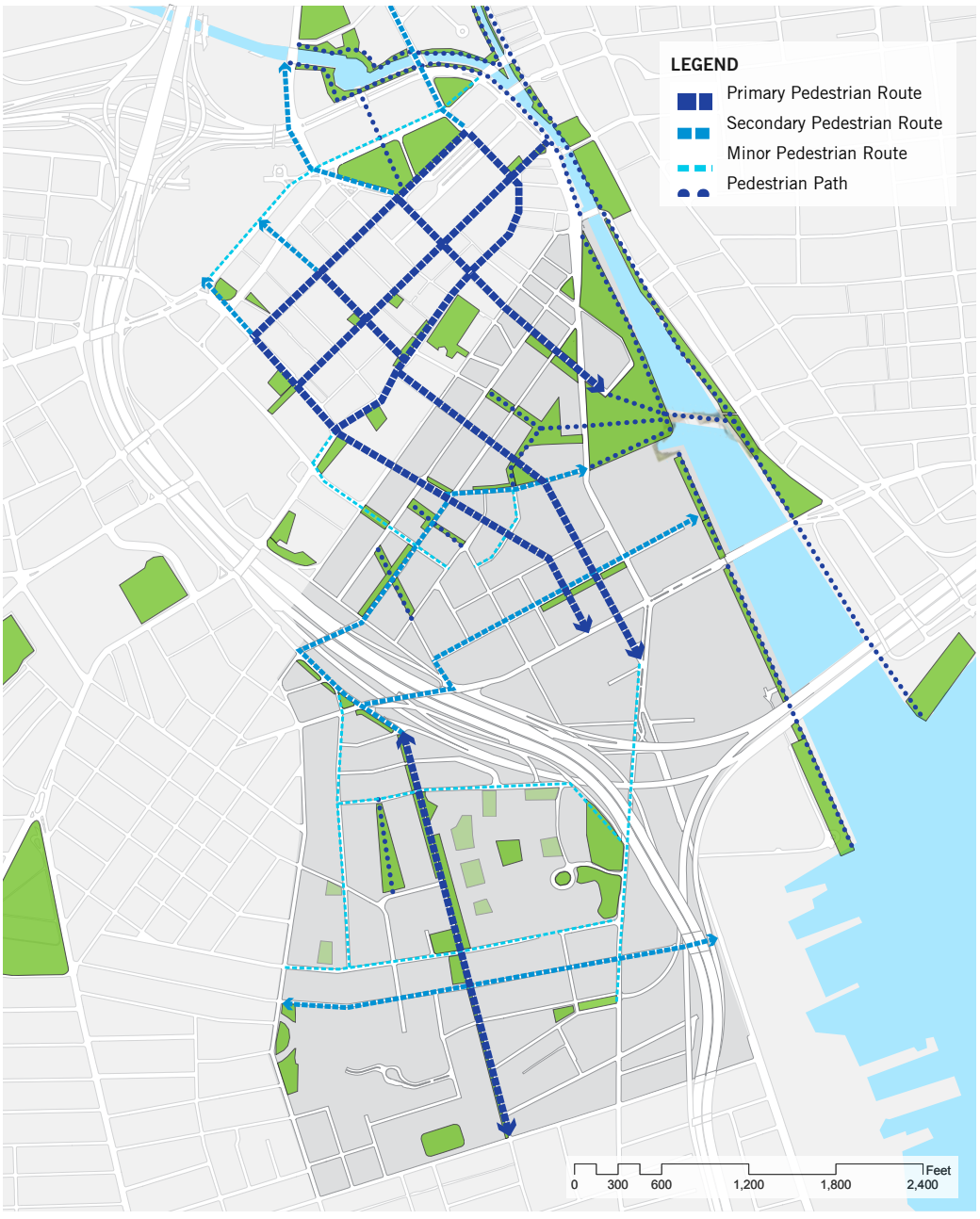


Figure 6-6 Pedestrian Circulation Network

Figure 6-7 Richmond Street East Side Elevation

Key Streets

Chestnut and Richmond streets are the key connectors between Downcity and the Knowledge District. These streets link major development parcels, historic blocks, and key open spaces. They have key parcels suited for large scale labs and blocks desired by colleges for campus expansion, or by knowledge-based industries. They will be vitally important in knitting new development into the existing fabric of Downcity. The intent is that these streets are mixed-use, pedestrian-friendly, and with high levels of street level activity. The district, especially in the early stages of its development, will only be able to support a finite amount of retail activity and pedestrian traffic. The intent is to concentrate this activity on key streets in order to achieve a critical mass. These streets can become the anchor and the catalyst for further development.

Figure 6-8 Brown's Streetscape Improvements on Richmond Street

This plan calls for the ground floor of buildings along these streets to be active uses and publicly engaged spaces including stores, building lobbies, restaurants and cafes; community or cultural uses; and other high activity uses that generate foot traffic and visual interest.

A concerted program of streetscape improvements will be essential to help establish the character and importance of these streets. Such improvements may come from public investments, private coalitions (e.g. Business Improvement Districts), or direct private investment, as Brown University has done adjacent to their new medical school building on Richmond Street.

Figure 6-9 Chestnut Street East Side Elevation

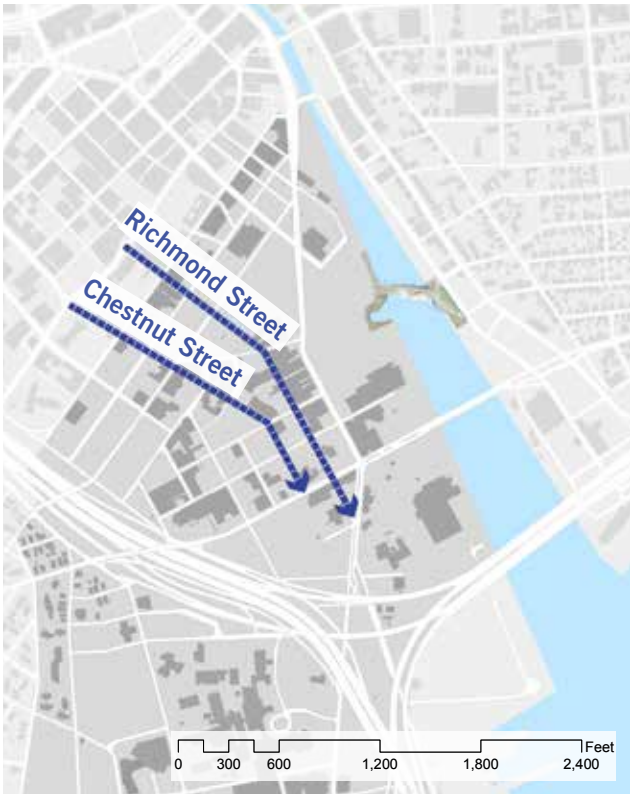
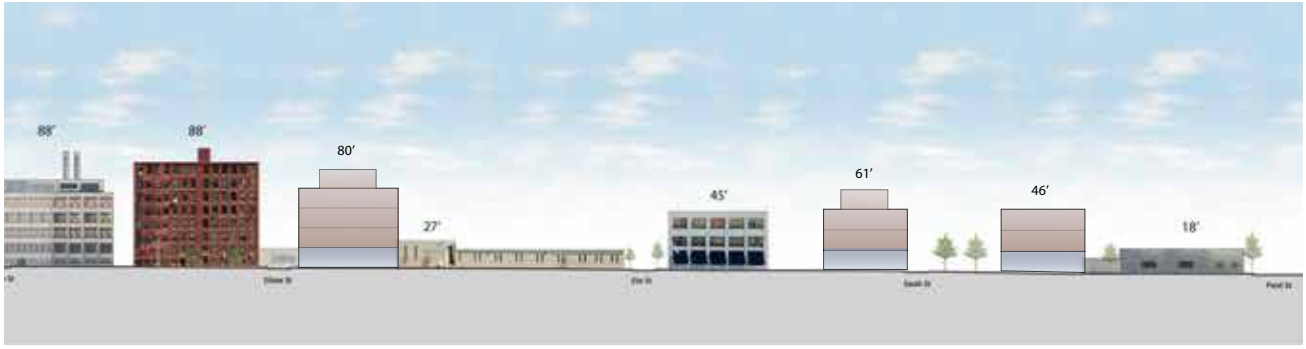


Figure 6-10 Chestnut and Richmond Streets

Figure 6-11 Aerial View Chestnut and Richmond Streets



Open Space

The open space left by the removal of I-195 presents the opportunity to ensure that open space is well integrated into future development in the Knowledge District. The waterfront park is the main open space in the district; because it sits at one edge of the district, other green spaces should be considered in the district's core. A system of linked open spaces including pocket parks, through-block easements and landscaped right-of-ways will allow the open spaces in the Knowledge District to connect to one another. This integrated network is especially important because of the potential scale of some lab buildings and the relative lack of pedestrian-oriented activity at the ground level of these buildings. Small parks and plazas can become nodes of activity. Key streets running between Downcity and the Knowledge District should also function as green urban connectors. In a similar fashion, the large areas of surface parking in the hospital area could allow for the creation of new open spaces, particularly along Plain Street. A bike and pedestrian path would become a sustainable transportation alternative within the district and integrate into a city-wide bike and pedestrian network.

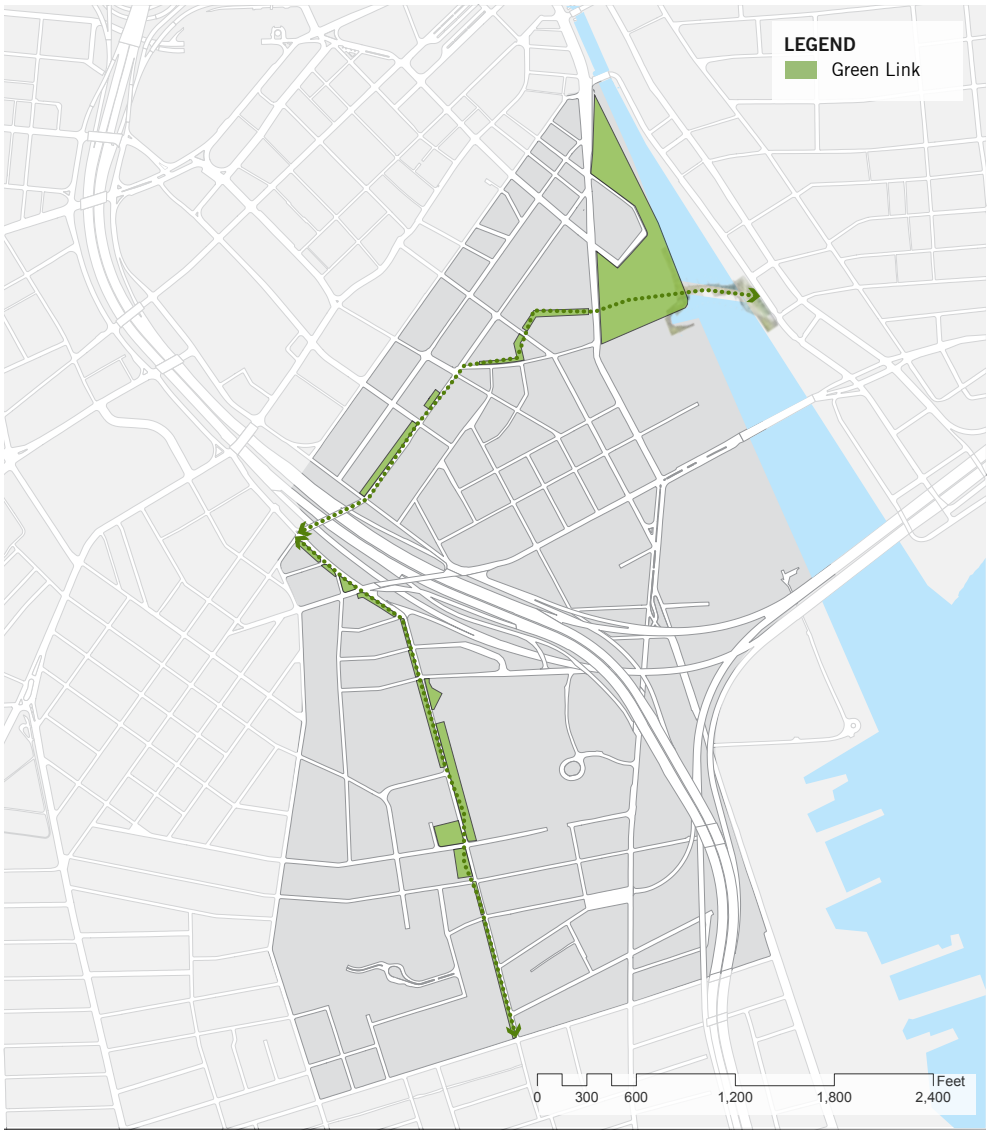


Figure 6-12 Green Link

Figure 6-13 Chestnut Street Looking South (Existing)

Figure 6-14 Rendering of Chestnut Street and Friendship Street Looking South

Land Use

The Knowledge District is intended to be a mixed-use development area. The framework plan and the associated zoning strategies do not prescribe uses to particular areas in order to let the free market guide development toward uses that have the greatest economic benefit.

To ensure the quality of the public realm, uses should be most tightly regulated at the ground level. Transparency and active uses are required on key streets and parking areas and garages must be tucked inside development at grade or shielded from view.

The size and pattern of the blocks and lots, the structure of the framework plan and certain adjacencies suggest likely patterns of use. The-195 blocks are apt to be predominantly institutional-related uses, such as lab buildings. The Jewelry District core will have a mix of residential and commercial office uses suited to smaller start-up users. Larger scale commercial office development will likely occur adjacent to the I-95 corridor. Hospital related uses including research buildings will develop immediately west and south of the hospital. The plan and 3D model show the possible use scenario for the Knowledge District, see Fig. 6-16.

LEGEND FOR FIGURES 6-15,16

- Institutional / Lab
- Commercial / Office / Flex
- Residential
- Parking Structure

Figure 6-15 Potential Build-out Plan Land Use 3D View from North

Figure 6-16 Potential Build-out Plan Land Use

Sustainability

SUSTAINABILITY OVERVIEW

As an urban development, the Knowledge District represents innovation and forward thinking. Part of this includes sustainable design. This framework is inherently sustainable in many ways as it promotes mixed uses, a walkable pedestrian-friendly city, urban in-fill and brownfield development, density and reduced sprawl, access to nature (the waterfront), and integrated mass transit. In addition, the zoning principles described in Section 7 have been developed based on this framework and includes specific measures that promote sustainable urban development. These sustainability measures should be carried out for new and old buildings, with the open space network, and with the upgrading of existing or the creation of new infrastructure systems.

It is important to note that institutions, such as Brown University, Johnson and Wales University, Lifespan, and Women and Infants Hospital have a long-term interest in the health of their constituents and a long-term ownership of property and buildings. This positions them to reap the long-term health and the economic benefits of sustainable building. Campuses and larger-scale facilities also have the opportunity to create district infrastructure for power generation that has economic and environmental advantages over building-based systems.

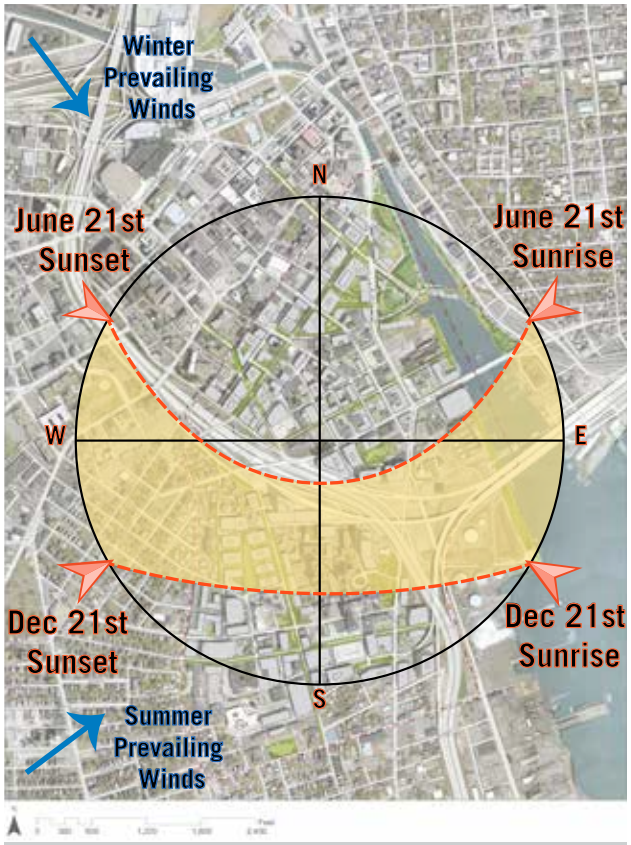


Figure 6-17 Solar Path and Prevailing Winds

GREEN STANDARDS

The Knowledge District plan does not establish a single standard for measuring sustainability, but encourages owners, developers, and designers to adopt one or more green rating systems, goals, and principles. The following is a brief summary of the predominant ones:

LEED – The Leadership in Energy and Environmental Design (LEED) rating system created by the USGBC (U.S. Green Building Council) is the most widely used and recognized of the sustainability rating systems in the U.S. The LEED certification system provides third-party verification that a building or community is designed and built using strategies for improving environmental performance metrics such as energy savings, water efficiency, improved indoor environmental quality, and stewardship of resources. The LEED system has several rating frameworks that might be applied to development in the Knowledge District:

- New Construction
- Existing Buildings: Operation & Maintenance
- Commercial Interiors
- Core & Shell
- Schools
- Retail
- Healthcare
- Neighborhood Development

Living Building Challenge – The Living Building Challenge (LBC) seeks to raise the sustainable bar above LEED standards. This certification program covers building at all scales with the goal of creating a future that is socially just, culturally rich, and ecologically restorative. The Living Building Challenge [LBC] is comprised of seven performance areas or 'petals': Site, Water, Energy, Health, Materials, Equity, Energy. The petals are subdivided into a total of twenty imperatives that each focus on a specific sphere of influence. Unlike LEED that has a credit system under which credits are earned and tallied as a measurement of overall environmental performance, the LBC has no

credits. To be certified as a Living Building Project, all the petals must be earned. Projects that achieve the LBC level of performance can claim to be among the 'greenest' anywhere.

Net Zero Energy – A Zero Energy Building (ZEB) or net zero energy building is a general term for a building that operates with zero net energy consumption.

2030 Challenge – Architecture 2030 issued the 2030 Challenge as a call to the global architecture and construction community to achieve reductions in greenhouse gas emission, fossil fuel use, and energy consumption for new and renovated buildings with the goal of being carbon-neutral by the year 2030. To accomplish this, the following fossil fuel reduction targets are set for all new buildings and major renovations:

- 60% now
- 70% in 2015
- 80% in 2020
- 90% in 2025
- Carbon-neutral in 2030 (using no fossil fuel GHG emitting energy to operate).

Smart Growth – Smart Growth is a program developed by the Environmental Protection Agency (EPA) to guide urban development. Smart Growth is not technically a sustainability guide, but many of its principles have environmental benefits. Its 10 basic principles are:

- Mix land uses
- Make advantage of compact building design
- Create a range of housing opportunities and choices
- Create walkable neighborhoods
- Foster distinctive, attractive communities with a strong sense of place
- Preserve open space, farmland, natural beauty, and critical environmental areas
- Strengthen and direct development towards existing communities
- Provide a variety of transportation choices
- Make development decisions predictable, fair, and cost effective
- Encourage community and stakeholder collaboration in development decisions

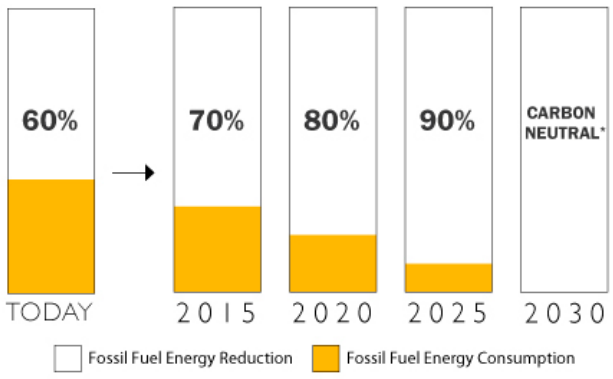


Figure 6-18 The 2030 Challenge

7 ZONING

As this plan was being developed, the Rhode Island General Assembly enacted a law that created the I-195 Commission, a special board that will oversee all aspects of development of the I-195 surplus land. The Commission will own, sell, and regulate the land, but will be subject to the city's zoning ordinance in effect as of July 1, 2012. Because of this deadline, the city had to quickly advance the development of zoning revisions for Downtown. Working from the concepts developed during the planning process, the Department of Planning and Development crafted the new zoning.

The Downtown zoning adopted in April 2012 creates a cohesive, streamlined process for development project review, while recognizing and protecting the historic fabric of the area. Future zoning will be written in a similar process with area stakeholders (including the hospitals) for the area south of I-95.

Diagnostic Review

To aid in the development of new zoning, the consultant team prepared a diagnostic review of the existing zoning regulations. The diagnostic review was intended to determine where the current zoning requirements aligned with or where they were asynchronous with the anticipated needs of the Knowledge District. Using Providence Tomorrow: the Comprehensive Plan for guidance, the consultant team evaluated the Providence Zoning Ordinance's (PZO) "fit" with the needs of the Knowledge District. In particular, the team looked at:

- The responsiveness of the current zoning regulations to accommodate future building types and their attributes/requirements.
- Development review process and the degree to which the regulations lend themselves to official reviews.
- How environmental and sustainability concerns are addressed.
- The effectiveness of current zoning incentives and potential new incentives.

The diagnostic found that there was much to build on in the current regulations. For example, Providence has a long and successful history of using building volume to regulate form and density, rather than a combination of Floor Area Ratio ("FAR") and height and setback regulations used in many American cities. While FAR has many advantages (e.g. establishing floor area for Transfer-of-Development-Rights, aka TDRs) the primary advantage to volume based zoning, as it is practiced in Downcity, is that it is context based rather than being overly prescriptive. Other aspects of the current zoning regulations that work well with the intentions of the framework are: the extension of the "A" and "B" street concept into the I-195 corridor and Jewelry District, time standards for development review, the adoption of a regulatory approach to building form, use and siting that is under-determined and that provides the flexibility to adapt development to the district/ built context and site, and the extension of the incentive program and the addition of new incentives to promote a voluntary and market driven response.

Framework Recommendations for Zoning

The Knowledge District Plan is tailored to the specifics of each of the sub-districts identified in the plan. Each of these districts has different zoning drivers and accordingly the zoning requirements for each sub-district within the larger Knowledge District are different. The zoning sub-districts are:

- Downcity
- Waterfront
- I-195 Corridor (frontage)
- Gateway (I-95 frontage)
- Jewelry
- Medical Center

The zoning and regulations are tailored to address key issues:

- Pedestrian experience.
- Means to create and sustain a vibrant urban experience.
- Urban design controls for key streets that offer flexibility enough to accommodate new building types and encourage new development.
- Focus design review on critical issues and decision-making by creating more opportunities for ministerial reviews by Planning Department staffs based on clear standards (performance, etc.).
- Parking.
- Integrate the adjoining areas, (in the case of the I-195 corridor, blending the existing Downcity and Jewelry District into one larger downtown district.
- Sustainability.

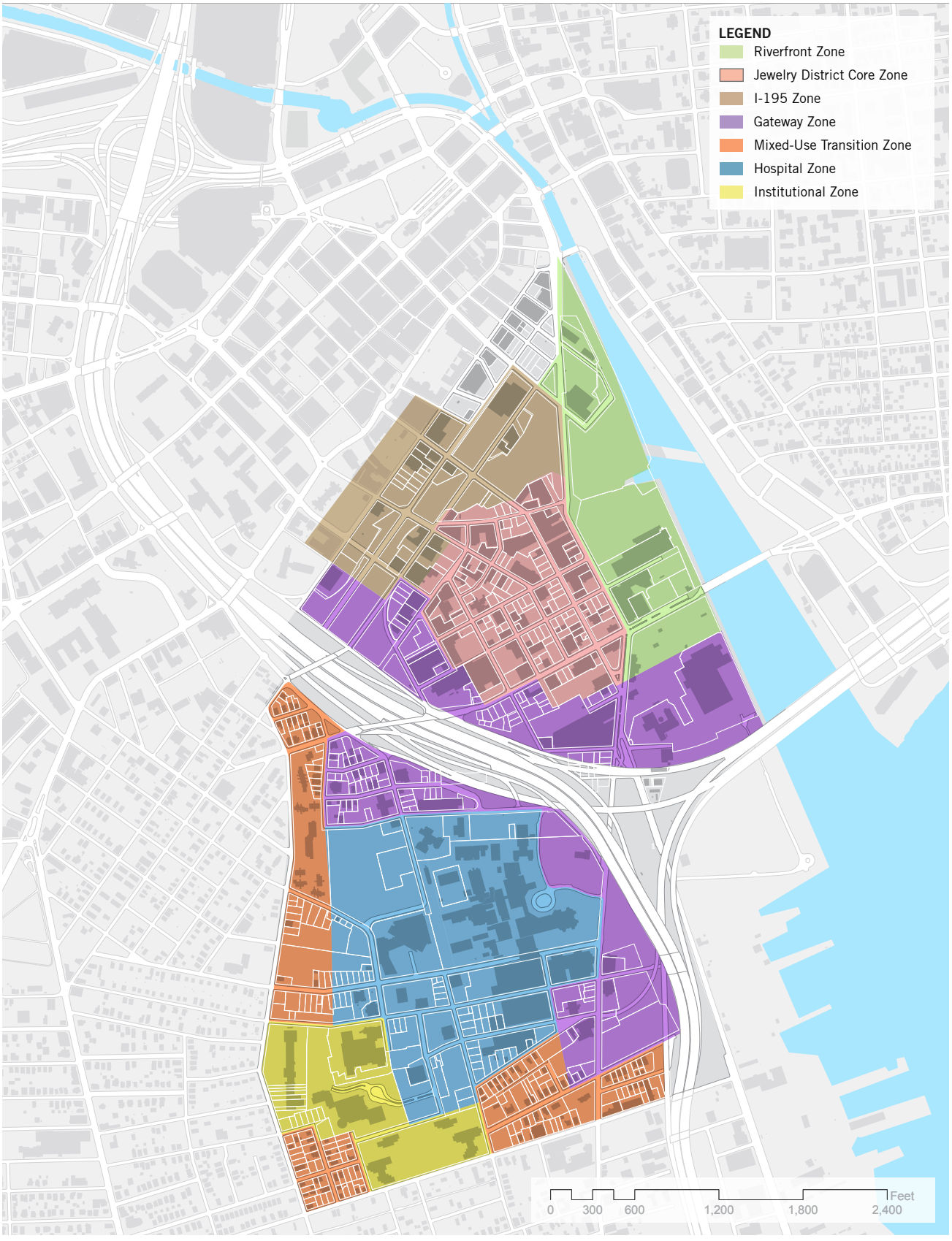


Figure 7-1 Proposed Zoning Districts

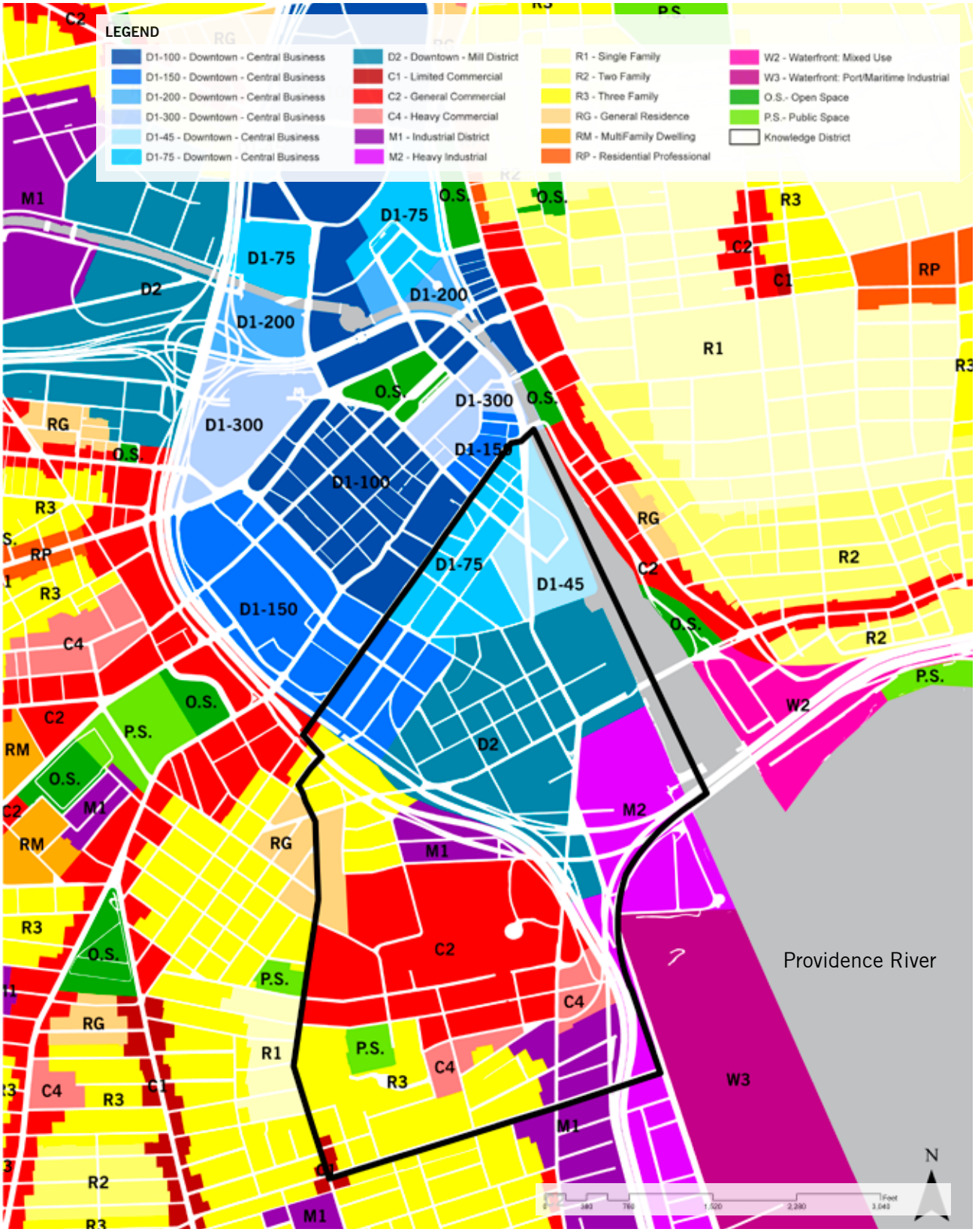


Figure 7-2 Previous Zoning

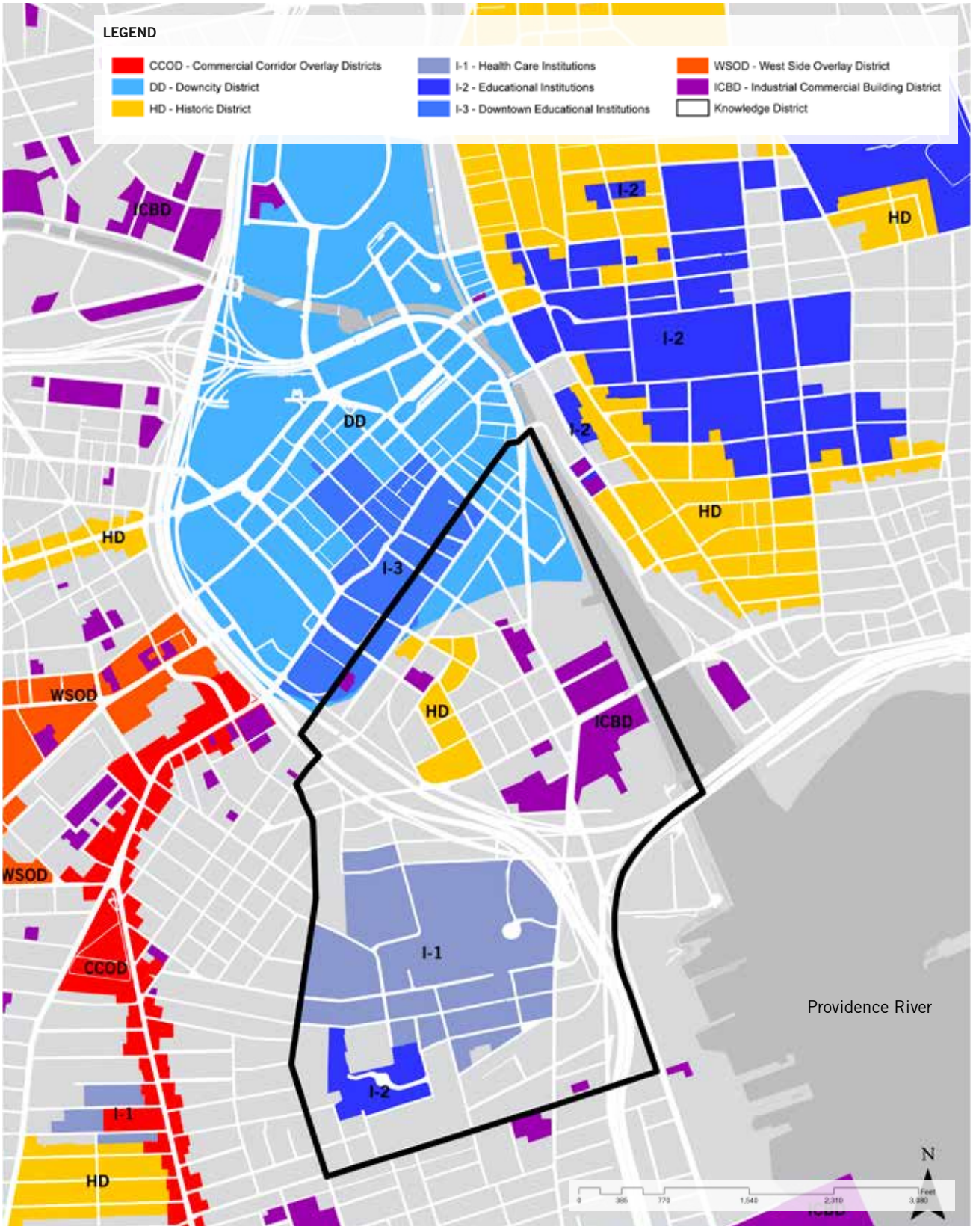


Figure 7-3 Previous Zoning Overlay Districts

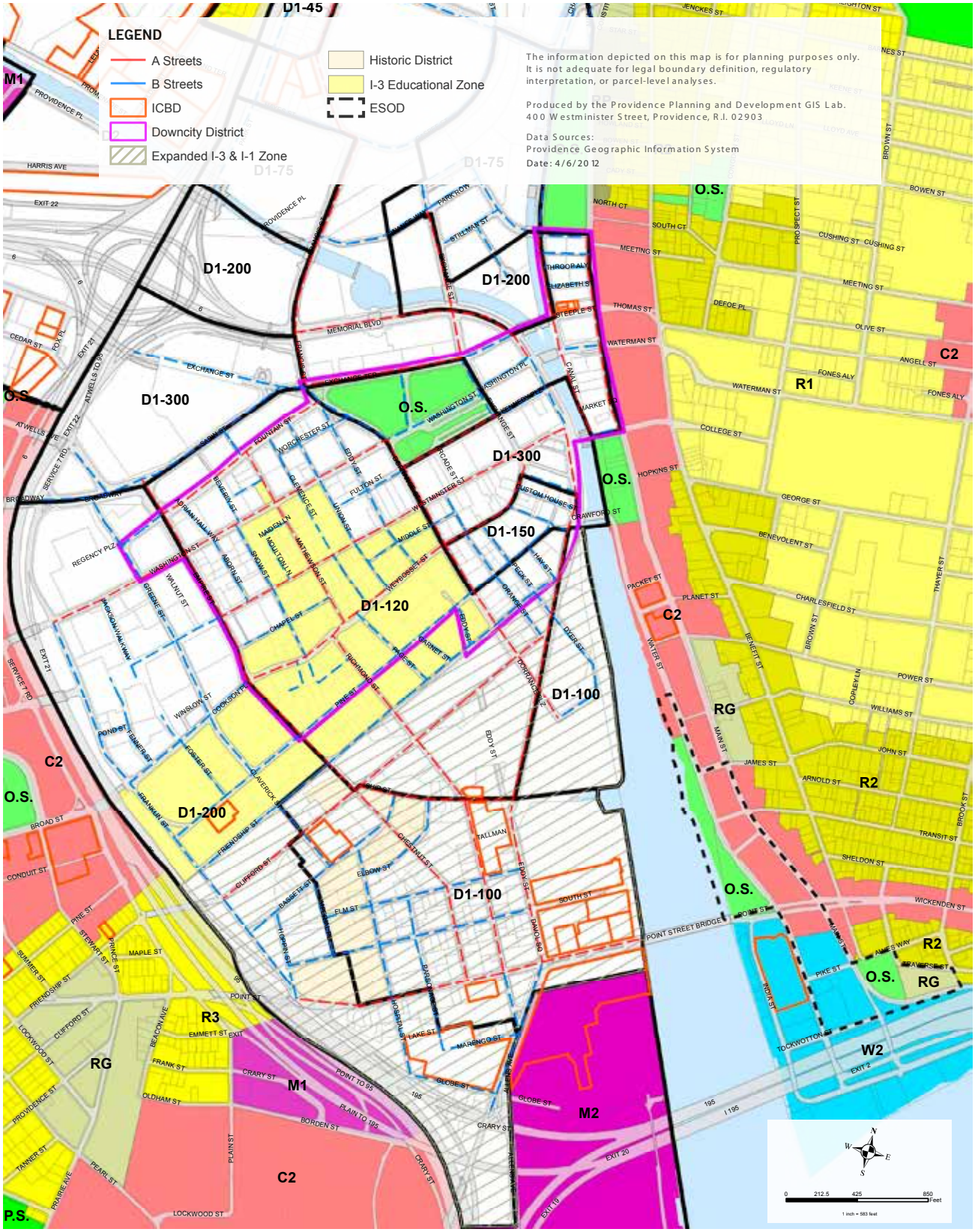


Figure 7-4 New Downtown Zoning Map

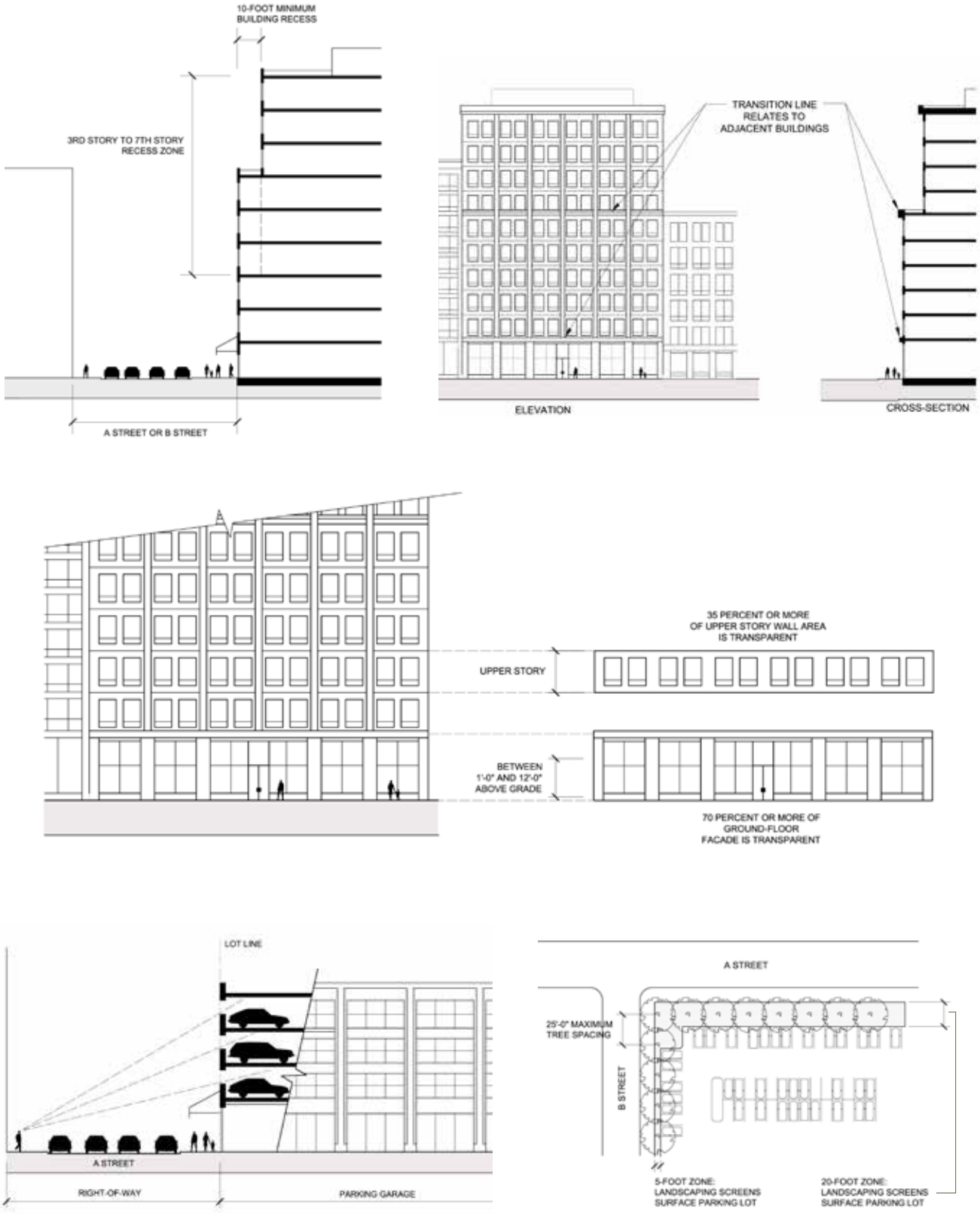


Figure 7-5 Sample Images from Adopted Downtown Zoning

8 UTILITY INFRASTRUCTURE

As part of the planning for the future redevelopment of the downtown area of Providence, Pare Corporation (PARE) assessed the existing utility infrastructure in two areas of the city, the Jewelry District and the hospital district (collectively referred to as the future Knowledge District). The purpose of the assessment was to evaluate the adequacy of the existing utilities for future use by knowledge-based businesses, such as research facilities, laboratories, and medical facilities.

Utility companies/agencies that participated in this assessment included:

- National Grid (natural gas and electric);
- The Narragansett Bay Commission (sewer and stormwater),
- The Rhode Island Department of Transportation (stormwater)
- Providence Water Supply Board (water);
- Cox Communications (cable and internet), and
- The City of Providence Department of Public Works (sewer and stormwater).

The intent of this assessment was to identify potential significant weaknesses within the existing utility infrastructure that would restrict or significantly impact the redevelopment of any specific area within the proposed Knowledge District and to capitalize on the functionally adequate portions of the infrastructure to make growth more attractive to prospective developers. The intent was also to identify potential upgrades in areas where weaknesses may exist. This assessment will help to inform the city's decision about what types of redevelopment and in what areas of the district may be the most feasible.

PARE's assessment of the existing utility infrastructure is based primarily on our review of prior assessments, interviews with utility agency personnel, and our review of existing utility mapping information. PARE requested available record drawings from each utility, which were compiled into a single utility base plan that served as the starting point for the utility assessment. PARE also requested recent engineering assessments and/or capital improvement plans prepared by the respective utility agencies. In cases where written reports and past assessments were not made available, PARE relied on interviews with utility personnel.

Two studies reviewed by PARE included one commissioned by the Jewelry District Association and the Providence Foundation (Jewelry District/Old Harbor Planning Framework Study – September 2008) and one commissioned by the Rhode Island Economic Development Corporation, the City of Providence, and the RI DOT (Rhode Island Interstate 195 Relocation Surplus Land: Redevelopment and Marketing Analysis – September 2009). These studies focused on the redevelopment of the Jewelry District and the I-195 land, both located in the northern half of the Jewelry District. Both of these studies analyzed the northern section of the proposed Knowledge District in the vicinity of the former I-195. The primary focus of the reports was the redevelopment potential of this area of the district; however, both reports provide a brief discussion of utilities in this area. The September 2008 report indicates that utilities meet existing demands and have the potential to accommodate modest growth. The September 2009 report indicates that the RI DOT is planning on connecting several streets during the I-195 demolition and local utility companies will connect electric, cable, and other utilities across the new street sections as part of this work.

The September 2009 report indicates that NBC may require developers to offset the increase in proposed sewer flows by removing stormwater inflow and groundwater infiltration upstream of their proposed developments. The study goes on further to say that upgrades to the telecommunications utilities in the area may be warranted as proposed developments include research and development facilities and also academic institutions.

WATER UTILITY

The Providence Water Supply Board (PWSB) owns and operates the water distribution system within the City of Providence including the Knowledge District. PARE contacted PWSB to obtain GIS mapping of the existing infrastructure within the Knowledge District and conducted an interview with Mr. Peter Lepage, an engineer with PWSB, on March 29, 2011. PARE also reviewed PWSB's *20-Year Infrastructure Replacement Plan*, dated December 2010, and their *Water Supply System Management Plan – Five Year Update*, dated April 2010.

Mr. Lepage indicated that water pressure in the Knowledge District ranges from 60-90 psi. A High Service Area with pressures ranging from 120 to 140 psi also exists within the Knowledge District. Water mains within the Knowledge District range from 6-inches to 30-inches in diameter and are primarily ductile iron (DI) or cast iron (CI).

PARE's evaluation of the water system was based on standards set forth by the American Water Works Association (AWWA). Based on PARE's review of the system and information provided by PWSB relative to AWWA standards, the system appears to have adequate pressure for existing development in the Knowledge District and for potential future development. In addition, the current system configuration is well

gridded with 6-inch diameter pipes and larger. PWSB reports that the available fire flow in this area of their system ranges from 600 to 2,700 gallons per minute (gpm). Typically, new large-scale buildings require between 500 gpm and 2,000 gpm for fire protection, which appears to be available in the Knowledge District. Some new buildings may require fire pumps; however, individual fire pumps would need to be evaluated during the design phase of any such proposed building.

Water quality in this area of PWSB's system is generally good. PWSB reports that they receive very few rusty water complaints and very infrequently detect harmful pathogens, such as coliform in their daily water quality sampling. However, recent water quality reports issued by PWSB indicate that lead has been reported to exceed its Environmental Protection Agency (EPA) action level limit of 15 parts per billion (ppb). As a result PWSB notified its customers about the hazards of lead in drinking water and provided recommendations on how to minimize exposure to lead in drinking water. PWSB continues a rigorous sampling program within its system and is actively replacing old lead house services with new copper services to help mitigate the lead issue.

DRAINAGE AND SEWER

The sewer and drainage systems in this area of the city are owned and operated by either the Narragansett Bay Commission (NBC), the City of Providence, or the RI DOT. NBC currently maintains and owns all the sewer pipes in the Knowledge District, while the city owns the majority of the stormwater collection pipes in the district. The city's collection system discharges to NBC's interceptor system or outfalls to the Providence River in a variety of locations. The majority of the sewer and drainage system in the Knowledge District is part of a combined sewer overflow system, which means that stormwater and sanitary wastewater are conveyed in the same pipe system to NBC's Fields Point Wastewater Treatment Plant (WWTP). When the combined flow in the collection system exceeds the plant's capacity, it overflows untreated or undertreated wastewater into Narragansett Bay. This is a common practice in older systems, but is being phased out due to water quality concerns in downstream receiving water bodies.

Sanitary wastewater pipes within the district range in size from 6-inches to 102-inches in diameter.

Figure 8-1 Existing Water Utility Plan

Figure 8-2 Existing Sewer Drain CSO Utility Plan

No information is readily available on the types of material that make up these pipes, but it is presumed that most of the sewer pipes are vitrified clay (VC), brick, asbestos cement (AC), concrete, and/or polyvinyl chloride (PVC). Drainage pipe diameters are similar to that of the sewer pipes ranging from 8-inch for under drains to a 102-inch interceptor. The majority of these pipes are believed to be reinforced concrete or PVC while some of the older pipes may be brick or clay.

The most significant drainage and sewer weakness identified during our review is the capacity of the 102-inch interceptor owned by NBC. The interceptor, which runs approximately 4,500 feet along Allens Avenue, collects sanitary wastewater and stormwater from the entire district and transports it to the Field's Point WWTP. NBC reports that under dry weather flow the pipe is at 67 percent capacity. However, during wet weather conditions, there are a number of sections where the flow in the pipe exceeds the interceptor's capacity. NBC may not allow any future stormwater connections to the system and may require that redevelopment of existing parcels include on-site management of stormwater. Furthermore, NBC may require that any redevelopment of parcels that connect to the NBC system, not just in the Knowledge District but in the entire contributing drainage area, include provisions for off-site mitigation of inflow and infiltration (I/I).

Figure 8-3 Existing Natural Gas Utility Plan

While PARE has much of the sewer information for this area of Providence, there may be sewer lines that PARE does not have information on, which may be less than 8-inches in diameter. Investigations should be made into local site conditions before connecting to the sewer system to determine adequacy of the existing infrastructure. In addition, the RI DOT is currently performing upgrades to the sewer and drainage system in the vicinity of the old I-195 alignment to connect existing streets that have not been connected since the original I-195 was constructed and to separate the combined sewer and drainage system in that area.

NATURAL GAS

National Grid owns, operates, and maintains the natural gas distribution system in the Knowledge District. Distribution pipe diameters range from 2-inch to 30-inch in size and include bare steel, cast iron, ductile iron, polyethylene, polyethylene wrapped steel, and wrought iron. Based on email correspondence with National Grid, the existing distribution system adequately serves the existing customer base in the Knowledge District and there are no known deficiencies or weaknesses in their distribution system that impact service to the current customer base. However, National Grid also reports that there is limited potential for growth in the area of the Knowledge District.

The types of improvements that may be required to support redevelopment in the Knowledge District may include gas main extensions or upgrades in material or size. The costs of those upgrades and how it will impact the future development of the Knowledge District will be based largely on the potential gas load for individual parcels. For each new or upgraded service requested National Grid performs a profitability analysis of the proposed use. If the estimated gas usage is significant, National Grid may participate in the cost of certain upgrades and, in some cases, pay for the entire upgrade. Otherwise the developer or building owner will be required to pay for system upgrades.

ELECTRIC

National Grid owns, operates, and maintains the electrical transmission and distribution system in the Knowledge District. PARE held a meeting with Ms. Claire Livingston and Mr. Mark Domino of National Grid Electric on April 6, 2011. According to National Grid Electric, the existing electric system is comprised of underground duct banks in the northern and middle areas of the Knowledge District and overhead wires in the western and southern edges of the Knowledge District. The entire electrical system in this area of Providence is radial in type (an older type of electric system). To the north of the Knowledge District, in the Capital Center area of Providence, there is a network or gridded electrical system. National Grid indicated that this is a superior type of system for providing redundancy and increased efficiency in the distribution system. Based on discussions with National Grid, there are no plans to convert the radial system in the Knowledge District to a network system due to the cost of such a conversion.

Information provided by National Grid Electric can support normal level of growth; however, their growth forecasts do not include the projected redevelopment of the Knowledge District. National Grid Electric indicated that information related to this redevelopment would be essential in their long term planning for the Providence area, particularly projected developments that would require loads greater than 1,000 kVA to begin contacting National Grid Electric during the early stages of project development.

As with the gas system, the costs associated with any upgrades to the electrical transmission and distribution system would be based largely on the potential electrical load for individual parcels. For each new or upgraded service, National Grid will perform a profitability analysis similar to the analysis they will do for gas system upgrades. The costs of these upgrades will similarly be divided between the utility and developer or building owner based on the estimated usage.

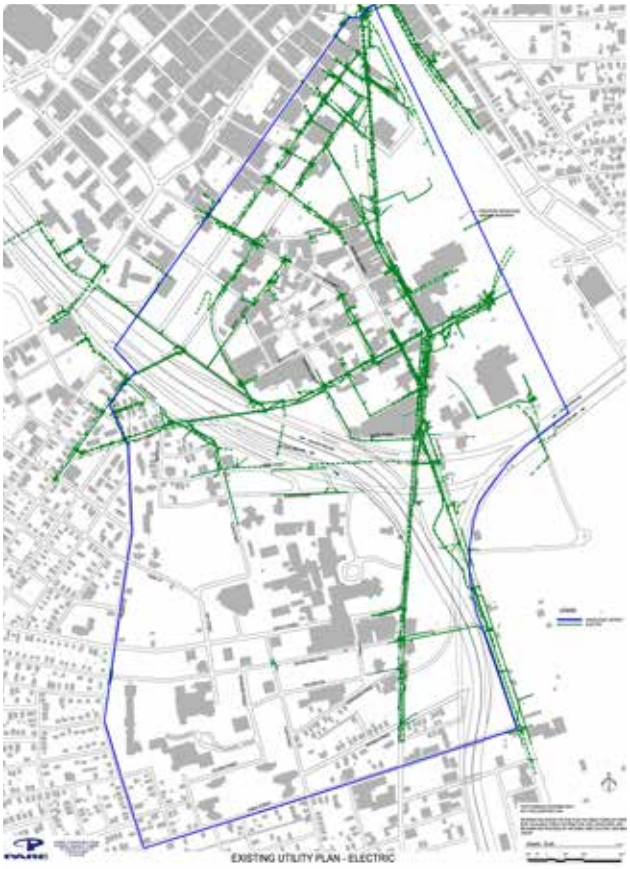


Figure 8-4 Existing Electric Utility Plan

Figure 8-5 Existing Telecom Utility Plan

TELECOMMUNICATIONS AND DATA

Telecommunication infrastructure in the Knowledge District is provided by two separate entities. Cox Communications provides cable and fiber optic while Verizon supplies telephone service and fiber optic. Both Verizon and Cox Communications were contacted to obtain information regarding their systems in the Knowledge District, but we were only able to successfully contact Cox Communications to participate in this evaluation. A meeting was held with Cox Communications on August 4, 2011, to discuss the current infrastructure and ability of this infrastructure to handle redevelopment of the Knowledge District. Cox stated during that meeting that the current infrastructure is capable of handling modest redevelopment in the area. Although Cox Communications is a major entity in regards to telecommunications within the Knowledge District, other entities exist that provide competitive communications service, such as OSHEAN, Fibertech Networks, Lightower Fiber Networks and Sidera Networks, which run over the Cox and Verizon cable infrastructure in the Knowledge District area.

FUTURE CONDITIONS

Perkins+Will provided PARE with a proposed build out scenario for the Knowledge District. With this build out scenario, PARE identified three distinct areas within the Knowledge District for the purposes of evaluating future utility demands. The first area is the new vacant parcels resulting from the relocations of I-195. While these parcels have the highest build-out potential in terms of overall increase in build-out, these parcels currently have either minimal or no utility infrastructure available. However, the RI DOT is actively reconnecting streets and installing new infrastructure in this area. It is assumed that the new utilities will be sized in accordance with applicable guidelines and standards and with consideration to the potential build-out of this area of the city. As such, it is anticipated the I-195 parcels will have adequate infrastructure for redevelopment.

The second area identified by PARE is the Jewelry District. This area appears to have significant development potential based on the build-out scenario. Much of the development appears to be redevelopment of existing parcels. As such, the proposed utility loading for this area will be offset to some degree by the existing utility loads in the area. In addition, the infrastructure appears to be robust, therefore, there does not appear to be any significant systemic deficiencies that will prohibit future growth in this area.

The third area is the hospital district, which appears to have only modest redevelopment potential. The hospital district, like the Jewelry District, has robust utility infrastructure. Given the modest redevelopment potential and the robust infrastructure, it is not anticipated that the utility infrastructure will present a significant restriction of redevelopment in this area.

The one exception in the utility infrastructure is the sanitary sewer and stormwater collection system. The city's sewer and stormwater infrastructure is generally suitable for redevelopment, but may require some localized upgrades to addresses specific future uses. The NBC interceptor system, which is the ultimate discharge point for sanitary and stormwater flow in this area, exceeds its design capacity during wet weather events. As a result, NBC may require that new development or redevelopment in the Knowledge District address stormwater flow at a parcel level (e.g.,

Figure 8-6 Power Plant from Eddy Street

infiltration or below ground detention basins) rather than allow stormwater flow to discharge to NBC's system. This will likely add cost to the redevelopment of any individual parcel. NBC may also require owners or developers to participate in off-site mitigation of stormwater flows in addition to addressing stormwater at a parcel level, which would add cost to the redevelopment of any individual parcel. At this time, the exact nature of NBC's stormwater mitigation requirements for this area is unknown.

UTILITY RECOMMENDATIONS

PARE's overriding recommendation is that a potential build out scenario of the Knowledge District be provided to each utility agency so they can start to review their utility infrastructure relative to future loads. We recommend that each utility be provided with potential building square footage for each parcel in the Knowledge District along with potential uses. This will allow each utility agency the opportunity to make their assessment of future loads and to plan accordingly. This should be followed by close coordination between any new development and all utility agencies to streamline the process of obtaining permits and avoid complications during construction.

Given the nature of proposed development within the Knowledge District, extra treatment of domestic water may be warranted before being used for any sensitive purposes (e.g., medical research) to remove trace amounts of certain parameters that may be present in the water system. Such treatment technologies can include simple and relatively inexpensive granular activated carbon (GAC) filtration to more costly reverse osmosis or membrane filtration depending on the needs of the facility. These types of systems will be customer-owned systems (i.e., on the customer side of the water meter) and will likely be borne by the developer of the site or building owner/tenant and not the city of Providence or PWSB. In addition, hydraulic modeling should be conducted for each new development to evaluate if the required fire flow of each site can be obtained from the existing distribution system.

Due to the possibility of I&I mitigation being part of NBC's sanitary sewer connection approval, PARE believes it may be prudent to develop a district-wide I/I management policy in coordination with NBC. This policy should take into account NBC's desire to mitigate I/I while at the same time spread the cost of the potential I/I removal over all developments appropriately. PARE recommends that the city contact NBC about the possibility of developing a district-wide I/I management policy relatively soon in order to develop a cost-effective I/I removal program before redevelopment of the Knowledge District comes to fruition.

With regard to the drainage system, RI DOT is currently performing sewer separation in the northern sections of the Knowledge District. This process is not taking place across the entire Knowledge District and, as a result, not all developments may have the ability to discharge stormwater into a drainage system. However, the RI DOT has reported that they have removed several acres of run-off from the NBC combined sewer interceptor, which may make some capacity available for future development. Further sewer/stormwater separation projects should be considered in other areas of the Knowledge District to allow for greater redevelopment potential of parcels without causing significant site restraints due to on-site stormwater management.

Figure 8-7 Transformer Yards Next to Dynamo House

9 IMPLEMENTATION

This plan provides the conceptual structure and a long range vision for the redevelopment of the district. Implementation will require stewardship, advocacy, and collaborative cooperation among private interests and public sector agencies. The framework is the first step in a long series of decisions, actions, and investments to realize the vision. The following section suggests some of the key steps that will need to be taken to begin the implementation process.

RECOMMENDED FURTHER STUDIES

Implementation of the plan will require additional study, refinement, and investment. This document's authority comes only from the power of its ideas and the collaboration and support of the public officials and private stakeholders that went into the creation of those ideas. It will take many years of ongoing efforts by these and others to realize the potential described by the plan.

One key piece of implementation is already complete: the rewriting and adoption of new zoning regulations for downtown Providence. The new zoning removes regulatory impediments, adds development incentives, and streamlines the approvals process to promote new development in accordance with this plan.

This plan makes a number of recommendations that will require additional study and development in order to be implemented. Some suggested areas for further exploration are:

Economics and Market Study – Previous studies have made a strong case for the general economic viability and benefits of knowledge based industries for Providence. A targeted study should determine the level of market demand for particular types of development space for specific industries and how those match opportunities within the Knowledge District. When industries with sufficient demand for development space are identified, their specific needs and program requirements should be detailed. A financial case should then be made for the viability of those industries locating in the Knowledge District. This analysis should also identify other needs of the community or opportunities that might be met within the district.

Circulation and road network improvement – Further studies should be performed to properly analyze the capacity of the road network in relation to increases in density and the changes proposed in this framework including the extension and reconnecting of key streets and the creation of one-way pairs. Particular attention should be given to traffic routing near the three highway crossings, the highway exit ramps, and pedestrian safety and convenience in these areas. The intent should be to improve vehicular traffic and the pedestrian experience. Areas for study include:

- Plain Street
- Willard Avenue or Borinquen Street
- Willard Avenue Gateway
- Beacon Avenue

Streetscape – A comprehensive streetscape plan should be developed for the Knowledge District including a program of recommended and prioritized upgrades. Two areas of great importance are the new connections between Downcity and the Jewelry District and the three highway crossings. Streetscape improvements could include re-paved and wider sidewalks; street trees, plantings, and landscaping; lighting; benches, waste cans, and other street furniture; crosswalks; wayfinding; and public art installations. A coordinated system of streetscape elements will help to identify and brand the Knowledge District. A streetscape study should also examine improvements to the bicycle path network and bicycle infrastructure (e.g., bike stands and bike share programs.)

Parking – Since a reduction in surface parking and overall parking demand as well as a transition to structured parking are essential to the realization of the framework plan, a more detailed study should examine potential district-wide solutions to parking. Such a study should examine the economics and cost thresholds for structured parking and specific opportunities for shared parking. The study should also examine potential solutions, such as payment to a city-sponsored parking fund, as an alternative to providing required parking, public-private partnerships for providing parking, or parking associations or partnerships among institutions that might share parking. Potential funding sources and revenue streams should be identified. The areas under the raised highway should be examined for parking use.

District-level Sustainability – As the potential opportunity for implementing sustainable infrastructure systems at a district-wide (or partial district) scale exist, further exploration is merited. These might be done in conjunction with National Grid, which owns a substantial amount of property in the district or other utility or technology companies in the area.

Infrastructure – Although this study identified few system-wide infrastructure obstacles, localized improvements are required. A more detailed study to identify and prioritize those upgrades in relation to specific development or types of development should be undertaken.

OUTREACH

The city should continue outreach efforts to inform a wide audience about the Knowledge District and to attract investors, developers, and tenants to the Knowledge District. The latter should include local and non-local companies, institutions, and developers. The economics and market study mentioned above should be used to identify particular targets for the outreach. The city should consider the development of a clearly branded identity for the Knowledge District as part of future outreach efforts.

DIALOGUE WITH STAKEHOLDERS

The city should make a concerted effort to continue dialogue with several key stakeholders, especially those that have a degree of autonomy in terms of planning and development. With each of these stakeholders the effort should be to establish a set of common goals and potential areas for cooperation and action. Suggested stakeholders dialogues include:

Brown University, Johnson & Wales University, and other institutions of higher learning – The city has already engaged in conversations regarding Payments in Lieu of Taxes (PILOT) with these institutions, but the dialogue might be expanded to include priorities for the city such as placemaking. These institutions are likely to be among the biggest developers in the district and a set of shared goals will make sure the investments help both the universities and the city.

Lifespan/Care New England– As the largest employment center in the city and anchors of the Knowledge District, the hospitals depends on the health and success of the city and, conversely, the city depends on the health and success of the hospitals. Like with the higher education institutions, a dialogue about a set of shared priorities will make both the city and the hospitals stronger.

National Grid – As one of the key stakeholders in the area with prime real estate holdings and a vested interest in the growth of the district, the power company is a key development partner.

INTERIM USES

In the near-term, the next three to five years, the city will be faced with the prospect of a great deal of vacant and underutilized parcels of land. Both the city and private interests should work to create a program of temporary uses that will enliven the vacant parcels and underutilized areas, increase awareness of the development potential, and bring the potential of the Knowledge District to the forefront. It is recommended that public agencies, private organization, public-private partnerships or a combination take on responsibility for identifying, organizing, and implementing interim uses.

Temporary interim uses might include:

Pop-up Retail – In recent years, short-term retail has enlivened urban areas. These might be single stores, flea markets or "retail villages" set up in tents in public parks for the holiday shopping season. At DeKalb Market in Brooklyn, New York, shipping containers are used to house retail stores and cafes for a seasonal market on a large vacant lot.

Farmers Markets and Urban Agriculture – In recent years there has been an increase in farmers markets as a strong interest in locally grown food continues to

Figure 9-1 Shipping Container Mall, London

Figure 9-2 Cirque Du Soleil, Randala Island New York City

expand. Vacant lots can also be converted to farmers markets or into community gardens, especially adjacent to residential areas.

Music and Theater – Temporary outdoor festivals or shows, concerts, outdoor theatrical productions, such as Cirque du Soleil could be erected on vacant lots.

Food Trucks – Providence already has a number of vendors in food trucks who serve the Downcity community. Food truck vendors could be invited to occupy a specific vacant lot(s) at a given time creating a temporary mobile "food court' and an event that would attract visitors and serve locals.

Sports & Recreation Facilities – Underutilized areas could be used as temporary facilities for outdoor sports and recreation, such as ice skating rinks, beach volleyball courts, mini-golf courses, or skateboard parks. It is recommended that any such facilities be seasonal and explicitly temporary in nature to avoid public attachment to the facilities that could become an obstacle to permanent development.

Public Art Exhibits – Outdoor exhibits of public art could occupy underutilized areas. These could be site-specific creations or installations of sculpture or other durable pieces of art. Performance art, lighting displays, and other more ephemeral exhibitions could compliment more fixed displays. A public art exhibition is an opportunity to showcase the depth and creativity of the artistic community in Providence or to bring outside artists and traveling exhibits to the city

PRIORITIES

To begin a process of implementation, Providence should seek to identify and prioritize two areas for action:

Early-Action Items – These include low cost ideas with little opposition and high impact. A design competition for lighting installations for the highway crossings, for example, would generate attention, innovative ideas, and clearly signal the city's intent to improve the district by creating stronger links between the Jewelry District and the hospital area.

Long Lead Items – These items require more time and may cost more, but need to be started soon in order to be implemented. Some of the areas recommended for further study described above would fall into this category.

CLOSING THOUGHTS

The process of developing this plan is one of the key steps in shaping a diverse economic and social vision for the future of the city of Providence. This historically rich city is already positioned with many of the primary components for a robust knowledge-based economy. The Knowledge District vision endeavors to both re-adapt, in-fill and create a rich environment from which the high tech industries and start-ups can gather, prosper and support new 21st century mixed-use live/work lifestyles. Accordingly, captured over a 40 year period, the Knowledge District framework hopes to reflect both the current and future voices of those who reside in the city of Providence and all those who contribute to the economic and political future of this place.

Figure 9-3 Art Rink, Yokohama, Japan

Figure 9-4 Outdoor Farmers Market

Figure 9-5 Plan

FIGURES & TABLES

Executive Summary

Planning Process

Existing Conditions Analysis

FIGURES & TABLES

FIGURES & TABLES

Concepts

FIGURES & TABLES

FIGURES & TABLES

Urban Design Framework

Zoning

Utility Infrastructure

Implementation

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