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EXECUTIVE SUMMARY
EXECUTIVE SUMMARY: INTRODUCTION

The 2004 Navy Yard Master Plan provided a framework to attract the investment in infrastructure, open space, building renovations, and new construction necessary to begin establishing The Navy Yard as a progressive, urban campus for office, industrial, research, and residential activity. Since 2004, the public and private sectors have responded to this vision with enthusiasm and support, with hundreds of millions of dollars in new investment and a clear identity for The Navy Yard in the marketplace as the region’s most dynamic and progressive business, academic, and research location. Today, more than 125 companies are based at The Navy Yard with an employee base exceeding 10,000, occupying more than 6.5 million square feet of facilities.

With its growing reputation and business base; its progressive energy and stormwater infrastructure; its stunning historic landscape and building renovations; an expansive open space network; its leading investments in new corporate workplaces from investors including Liberty Property Trust, Urban Outfitters, GlaxoSmithKline, Tasty Baking Company, Unique Industries, WuXi AppTec Laboratory Services, Rhoads Industries, and Iroko Pharmaceuticals; and its emerging R&D sector led by the Navy’s pre-eminent Ships Systems Engineering Station, Penn State University and the Department of Energy’s $129 million Energy Efficient Buildings Hub, an update to the 2004 Master Plan is now necessary to define The Navy Yard’s next cycle of investment and place making.

This report is an update to the 2004 Master Plan, with the goal of reinforcing and expanding on the 2004 Plan’s vision of The Navy Yard as an urban, mixed-use, waterfront campus on the edge of the city. It responds to the market conditions that have emerged since 2004, including the positive response from tenants and investors for new corporate office space in The Navy Yard Corporate Center, the Navy’s desire to expand its research campus along the Delaware River, emerging R&D activity around energy efficient buildings and smart microgrids, and the Commonwealth of Pennsylvania’s plans for an expanded port and distribution complex occurring at the property’s east end.
EXECUTIVE SUMMARY: 2013 UPDATE OVERVIEW

The Navy Yard Master Plan 2013 Update expands on the 2004 Plan’s vision for a corporate campus, originally extending from a new gateway at the Broad Street entrance along the first portion of Rouse Boulevard, by now extending similar development all the way to the Delaware River framed by a complement of open spaces and amenities. The 2013 Update builds upon the successes achieved to date in the Historic Core and Corporate Center (to become re-branded as Central Green) districts, proposing modifications to each, but replacing the 2004 Research Park, Marina and East End districts with three new districts:

- **Mustin Park District** (81 acres): Located at the northeast intersection of Rouse Boulevard and League Island Boulevard, this district is organized around a large public space surrounded by eight office buildings ranging in size from 60,000 square feet to 250,000 square feet, totaling 710,000 square feet of office space. Flex space on the edges of the Mustin Park District offers an additional 191,000 square feet of development capacity for a total of 982,000 square feet.
- **Canal District** (58 acres): Located south of the Mustin Park District and extending to the Delaware River, between League Island Boulevard and the Port Expansion Area, this district offers a corporate campus totaling 950,000 square feet that is organized around the creation of a new canal as the anchoring open space element, reminiscent of the existing dry dock and building configurations located in the Historic Core and Shipyard districts.
- **Port Expansion Area** (192 acres): South of Kitty Hawk Avenue and east of the Canal District, the Port Expansion Area is a 192-acre site that the Commonwealth of PA intends to develop as a combination of port facilities, encompassing 36 acres, and a large distribution center with up to 980,000 square feet of total building area.

The Historic Core is reinforced as the “downtown” for The Navy Yard, with additional emphasis on this district growing into a mixed-use center with the amenities required to establish The Navy Yard as a distinctive urban campus. Central to the urban campus, the 2013 Update reexamines a proposed residential program at The Navy Yard. Where the 2004 Plan originally envisioned development of a separate large residential community, the Marina District, the 2013 Update now provides a tighter community of apartment buildings envisioned in a mix of renovated historic buildings and new construction to be centered in the Historic Core, where it will anchor an amenity base that supports the surrounding commercial and industrial activity.

Lastly, the 2013 Update revises the proposed Education and Research Campus within The Historic Core, to include an expansion of the Navy’s energy research complex and, immediately adjacent, development of a new research and academic campus complementing the continued growth of the property’s emerging federal, university and corporate R&D activities.

These new components of the overall Navy Yard development will build on a combination of the utilities, street grid and open spaces proposed in 2004, updated with new investments in infrastructure essential to define and support this next generation of development at The Navy Yard.

With this update, The Navy Yard now proposes to grow from its current 6.5 million SF to a total of 6.2 million SF of office and research, 5.7 million SF of industrial, and 1,018 units of residential, representing significant private investment and supporting more than 10,000 additional jobs over the next 15 years. In order to attract and support this level of private investment, $100 million of investment in new public infrastructure, including new roads, utilities and open space will be required.
MASTER PLAN 2013 UPDATE
BACKGROUND
2004 MASTER PLAN
INTRODUCTION AND BACKGROUND

The 2004 Master Plan created a comprehensive vision for The Navy Yard that capitalized on the site’s existing essential assets, which include: its enormous scale; its location at the center of the region’s transportation networks and labor force; the critical mass of its existing activities; its extensive frontage along the Delaware and Schuylkill Rivers; an unmatched historic district with extraordinary turn-of-the-century architecture and landscape; and its proximity to the cultural amenities and intellectual capital of the region.

The 2004 Plan envisioned creating a dynamic, mixed-use waterfront community that would integrate everything expected from a great city: industrial development, new office developments, historic rehabilitation, retail, waterfront amenities, executive conferencing and hosting, research and development, improved mass transit, great public spaces, and the potential for residential development. This vision was grounded in the essential urban planning values of historic preservation, mixed-use development, increasing public access to the water, pedestrian-oriented streets and sidewalks, mass transit, smart regional growth, and environmental sustainability. At the same time, the 2004 Plan was also based on a realistic evaluation of market opportunities and challenges that existed at that time.

Five districts were created to the east of the existing Shipyard, each with its own distinct character, assets, and development objectives and purpose. These included:

- **Corporate Center** (72 acres) with approximately 1.4 million square feet of new office space, 110,000 square feet of potential retail, and 5,600 parking spaces.

- **Historic Core** (167 acres) with approximately 2.4 million square feet of existing building space reuse, integrated with approximately 1.4 million square feet of new development. Overall, this would create 950,000 square feet of office space, 850 residential units, 110,000 square feet of cultural use, and 64,000 square feet of retail. The Plan also created an opportunity for a 750,000-square-foot academic or research campus.

- **Research Park** (81 acres) designated with as much as 668,000 square feet for research and development, office, light manufacturing, and distribution facilities.

- **Marina District** (115 acres) featuring a new 250-slip marina and including an executive conference center, recreation spaces, and marina support facilities. Two development options, one primarily residential and one primarily commercial, were evaluated.

- **East End** (87 acres) presented in three alternative configurations:
  - a 1.5 million-square-foot industrial development; a 3,500-unit residential neighborhood; or an 18-hole championship golf course.
ACTIVITIES AND SUCCESSES SINCE 2004

The Navy Yard has undergone a substantial transformation since adoption of the 2004 Master Plan. One of the more ambitious aspects of the overall Navy Yard development has centered on the considerable infrastructure improvements that have been completed during this time. The network of streets has been updated between Broad Street and League Island Boulevard according to the 2004 Plan which has served to reinforce and extend the importance of the Historic Core at the center of The Navy Yard community. Several major street extensions have been completed that include creation of the first leg of the diagonally-themed boulevard, recently dedicated as Rouse Boulevard, realignment and expansion of 11th Street as a north-south connector, inclusive of bicycle lane amenities, and in 2010, the completion of The Navy Yard’s 26th Street entrance.

Likewise, a network of open spaces has been developed that includes completion of two parks, Crescent Park and Dry Dock Park. League Island Park and the Riverfront Greenway, a 1.5 mile pedestrian and bicycle path along the Delaware River, will both be completed in 2013. Finally, a series of utility improvement projects has been occurring to upgrade and expand the electric, domestic water, stormwater and sewage, and gas distribution systems throughout the property.

All of the public infrastructure work, exceeding $130 million in value, has served effectively to attract significant private investment. Nine new buildings have been constructed at The Navy Yard, and two are under construction as of this writing, resulting in over one million square feet of new building inventory. During this same period, renovations to more than 25 buildings, mostly within the Historic Core, have also been completed resulting in private investment of more than $700 million within the entire Navy Yard community.

The following are some of the private development highlights that have occurred in the last eight years:

- GlaxoSmithKline is moving into its new 205,000 SF office in The Navy Yard’s Corporate Center. Developed by Liberty Property Trust and Synterra Partners, this new office is designed to achieve LEED® Platinum certification. Occupancy is occurring in early 2013.
- Liberty Property Trust and Synterra Partners have developed 11 new buildings in The Navy Yard Corporate and Commerce Centers and Research and Development Park, representing $270 million of investment in office, flex, industrial and hotel. All the multi-tenant buildings have been designed to LEED® certification.
  - Urban Outfitters established a new corporate headquarters at The Navy Yard in 2006. Their campus now includes more than 1,400 employees, 407,000 SF of renovated historic buildings and more than $150 million of private investment.
  - Tasty Baking Company moved its headquarters and primary baking and distribution center to The Navy Yard’s Commerce Center in 2009. Its 345,000 SF facility is certified as LEED® Silver, the USGBC’s largest certified bakery.
MASTER PLAN 2013 UPDATE
2013 UPDATE PLANNING PRINCIPLES AND CONCEPTS

The 2004 Master Plan was conceived and created before an established commercial sub-market at The Navy Yard had been realized. The hope and vision of the sponsors was to create a new and dynamic urban campus for Philadelphia that would extend and complement Center City and its surrounding submarkets, providing the City with a campus that would attract jobs and investment, ideally suited outside of the core. The activities and successes in the years since 2004 have proven the merit of this vision, and this purpose has been well received by the marketplace. In short, progress at The Navy Yard has proceeded according to the Plan and has performed in accordance with, or in excess of, expectations.

Several key factors drove the planning for this 2013 Master Plan Update:

1. The Navy Yard has established itself as a viable and attractive sub-market offering unique attributes for office space users, industrial enterprises, and collaborative academic, governmental and private research, particularly focused on the pharmaceutical, applied sciences and energy sectors. This success has created the opportunity to expand the corporate office, research, and light industrial development at the property.

2. The Commonwealth of Pennsylvania and the Philadelphia Regional Port Authority (PRPA) are proceeding with a plan to expand the existing Port of Philadelphia onto 192 acres at the east end of The Navy Yard in an effort to facilitate continued growth of the Port. The Port’s lands now extend from the eastern end of The Navy Yard to the center of what had been proposed in the 2004 Plan as the Marina District.

3. The Navy, which has maintained vital operational roles at The Navy Yard, continues to grow and plans to expand its existing engineering, office and R&D facilities on and beyond its current riverfront site.

4. The 2004 Plan proposed the new concept of residential use to The Navy Yard. Given new land restrictions and emerging patterns of commercial development, the sponsors have concluded that a more focused and tightly defined residential component in the Historic Core will be appropriate to achieve the urban vitality and support the amenities necessary for the emerging urban campus.
THE NAVY YARD MASTER PLAN 2013 UPDATE

The 2013 Master Plan Update focuses analysis on the area outlined in the plan above. The 2004 Master Plan and Design Guidelines will continue to apply for all other areas.

In light of the successes at The Navy Yard since the 2004 Master Plan’s creation and the influences of the above referenced factors, the sponsors of the 2004 Master Plan have determined to revisit the Plan with this 2013 Update. The goal of The Navy Yard Master Plan 2013 Update is to provide a clear, compelling, and visible vision for continued development of The Navy Yard as a progressive urban campus.

The key planning objectives are to:

- Extend the successful Corporate Center to the southeast along the diagonal of Rouse Boulevard to create a new vibrant commercial and public environment along the water’s edge.
- Provide an assortment of new office and light industrial buildings offering environmentally friendly workplaces, each with strong project identity and located within attractive mini-campus environments.
- Refine a residential component in the Historic Core that helps to draw new amenities, extend the city, and emphasises the sense of neighborhood and strong pedestrian connections between the commercial zones.
- Integrate the new development with current design guidelines and projects completed in the Historic Core and Corporate Center districts.
- Continue and expand on the integrated system of public open spaces and pedestrian routes defined by the 2004 Plan, and facilitate public access to the waterfront and recreational areas.
- Capitalize on and enhance the site’s existing historic buildings and landscape features.
- Encourage environmentally sustainable development through a continuation of “green” planning and building practices.
- Establish a clear and efficient circulation network east of League Island Boulevard.
- Plan for mass transit in order to reinforce the site’s central regional location and to connect the property more effectively to the city and regional workforce.
- Develop a cohesive plan that will complement and properly integrate the proposed industrial and port components planned within the adjacent Port expansion area.
- Develop clear strategies to meet the logistical considerations regarding the phased development of the new infrastructure being proposed.
CREATION OF NEW AND MODIFICATION OF EXISTING DISTRICTS

The 2013 Update makes the following changes and additions to Districts from the 2004 Plan:

• **Historic Core:** The original Historic Core district is now expanded by seven acres to the east to accommodate the anticipated Navy expansion.

• **Central Green District:** This is the original Corporate Center district of the 2004 Master Plan, of which no changes to the boundaries are made, but which is now referred to as the Central Green District.

The districts east of League Island Boulevard have been revised into three new districts to include:

• **Mustin Park District:** Located at the end of Rouse Boulevard and east of its intersection with League Island Boulevard, this district is organized around a large open space surrounded by eight office buildings ranging in size from 60,000 square feet to 250,000 square feet. The 81-acre Mustin Park District supports up to 710,000 square feet of office space and an additional 172,000 square feet of flex, research, and light manufacturing space.

• **Canal District:** Situated south of the Mustin Park District and Kitty Hawk Avenue extending to the Delaware River, and between League Island Boulevard and the Port Expansion Area, this 38-acre district offers a corporate environment organized around the creation of a new canal as the anchoring open space element, reminiscent of the existing dry docks located in the Historic Core and Shipyard districts. A 12-story tower on the axis of Rouse Boulevard acts as a gateway to the Canal District, while an eight-story building on the western terminus of Kitty Hawk Avenue helps to frame the district’s eastern boundary and transition to the Port Expansion Area beyond. Eight four-story buildings line the Canal, forming a pedestrian-friendly plaza around an iconic water feature. The 38-acre Canal District supports up to 950,000 square feet of office space.

• **Port Expansion Area:** South of Kitty Hawk Avenue and east of the Canal District, the Port Expansion Area is a 192-acre site offering a large area that will be divided into two related functions. To the east of the historic seaplane hangar, PRPA will develop an expanded seaport, in all likelihood centered on the container shipping business. The western portion of the property will most likely be developed as a distribution center, complementing and supporting expanded port activities with as much as 970,000 square foot of enclosed area. Included at the western boundary is a 147’ wide landscape buffer zone that will be a heavily planted
open space providing stormwater management and view shed transition between the Canal District and this area.

These districts, while distinct in character, are designed to connect to each other in order to achieve benefits from their planned adjacencies. The 2013 Update proposes focal points that define the image and character of both The Navy Yard as a whole and each individual district. Parks and public open spaces define the centers or edges of districts. Buildings create gateways, frame views, or terminate vistas, all contributing to this emerging and expanding urban campus.
STREET NETWORKS

The 2013 Master Plan Update makes no changes to the street network of the 2004 Master Plan west of 11th Street. The design guidelines established with the 2004 Master Plan continue to apply throughout the 2013 Update.

Changes to the street network east of 11th Street include the following:

• Rouse Boulevard now terminates at the new Mustin Park, with a 12-story tower as its focal point, and providing a proposed subway entrance.

• Kitty Hawk Avenue extends to the east and connects with a new Mustin Road, providing a new loop back to League Island Boulevard and the Broad Street and 26th Street entrances. In the future, Kitty Hawk Avenue could continue to the east, past Mustin Road, to connect with the Delaware Avenue entrance, if that connection is desired based on traffic compatibility. A jog in Kitty Hawk Avenue at the east end of Mustin Park helps to slow traffic and delineate the Mustin Park and Canal business districts from the Port.

• A new road, Mustin Road, connects League Island Boulevard to the east end of Kitty Hawk Avenue.

• A new road wraps around Mustin Park, and new streets extend southward from Kitty Hawk Avenue to the waterfront.

• League Island Boulevard is maintained as a visual corridor only south of Kitty Hawk Avenue. Access to the Boulevard between Kitty Hawk Avenue and Admiral Peary Way will be controlled by the Navy.
One of The Navy Yard's primary assets is its existing street grid with its stock of historic buildings. The construction of League Island Boulevard in 2001 created the first portion of a multi-lane arterial roadway connecting the Broad Street entrance to the East End and waterfront. Building upon these existing conditions, the 2013 Update reinforces and clarifies the historic street grid within the Historic Core and proposes a new network of streets east of League Island Boulevard. It further supports the proposed construction of a new Delaware Avenue entrance to The Navy Yard from the east to support port-related traffic. In addressing The Navy Yard's street network, the 2013 Update seeks to:

- Create a clear hierarchy of streets that vary in character in response to the needs of vehicles, bicyclists, pedestrians, and adjacent land uses.
- Create visual links and establish or reinforce connections between existing development and new development at The Navy Yard.
- Improve pedestrian, bicycle, and mass transit access into and through the site and enhance access by transportation modes other than the car.
- Provide pleasant, walkable streets with points of interest, connecting open spaces, and direct links to the waterfront.

Proposed Secondary Streets and Greenway Streets have been adjusted from a total width of 36' in the 2004 Master Plan, to 38' curb to curb (8.00' parallel parking, 11' drive aisles) in the 2013 Update.
To the east of League Island Boulevard, the 2013 Update proposes a concentration of office space in the Mustin Park and Canal Districts in place of the proposed residential Marina District from the 2004 Master Plan. East of those two districts, the site is now controlled by the Port Authority. The Master Plan shows a potential distribution center west of the existing hangar. The Historic Core still features mixed-use of office, residential, research and development, and campus space, functioning as The Navy Yard’s downtown district.

Figure 2.10 Building Uses
Rouse Boulevard remains a key organizing axis of The Navy Yard in the 2013 Update. The 2013 Update proposes a 12-story office tower at the terminus of Rouse Boulevard. This tower – the tallest proposed building at The Navy Yard – will act as a beacon not only along the Boulevard, but also from all locations within the site and from I-95. It will be a landmark for The Navy Yard, and more locally for the Mustin Park and Canal Districts. The tower serves as a gateway to the Canal District and overlooks Mustin Park to the northeast, the Historic Core to the west, and the river to the south.

An eight-story building on axis with Kitty Hawk Avenue helps to frame the Mustin Park and Canal Districts on their east ends, and creates a jog in Kitty Hawk Avenue, redirecting it slightly north and allowing it to follow the north side of the Port and connect to the future Mustin Road, providing an access loop tying back to League Island Boulevard. This jog has the added benefit of slowing traffic passing through this public, pedestrian, and bicycle-friendly part of the site.
Parking in the 2013 Update areas of study has been designed at the following ratios:

- 3.5 spaces per 1,000 rentable square feet of office space
- 4 spaces per 1,000 rentable square feet of campus space
- 1 space per residential unit

New buildings have been designed to face public open spaces on at least one side and provide parking on the opposite side. Two new parking decks east of League Island Boulevard are proposed in order to park the 12-story and 8-story buildings in the Canal District.

Service and delivery spaces are tucked away from public view while still being easily accessible to trucks. Vegetated plazas and greenways help shield building services.

Street parking is proposed along all streets to support parking ratios and activate the streetscape.

**Figure 2.12 Parking & Service**
Parking is evenly distributed across the site, generally within 400 feet of employee entrances, and within no more than 600 feet for larger surface parking areas.
SUSTAINABILITY

A driving principle that shaped the 2004 Master Plan was an emphasis on developing comprehensive sustainability principles and practices as a foundation for planning, design, property management, and branding. Many of the 2004 objectives developed with sound sustainability practices have been carried out, or are in progress, and the 2013 Update envisions a continued emphasis on these priorities.
The 2013 Master Plan Update proposes a network of new and existing public open spaces, the incremental development of which is a key component of the original Plan and continues in this 2013 Update. By integrating these open space amenities into the earliest stages of development of each district, a new public realm is established within which individual buildings can be introduced over time. The proposed open space plan seeks to:

- Add value to development parcels by providing adjacent green space and recreational amenities.
- Provide public access to a continuous 1.5 mile length of waterfront.
- Forge social communities within The Navy Yard’s neighborhoods by providing public areas of gathering and outdoor activity.
- Create areas of pervious surface, facilitating natural water filtration and, on some sites, providing wetlands and stormwater management.

In addition to areas planned as part of the 2004 Master Plan, three new open spaces will be introduced as part of the revised 2013 Master Plan: Mustin Park, the Canal, and the Buffer Zone. Although these areas will work together as part of The Navy Yard’s unified open space network, each will also have its own distinct character that adds to the diverse range of experiences within each district. The core of public realm activity will be accomplished within the combined Mustin Park and Canal District areas, which create a landscape and recreation center around which the building program is developed. Pedestrian entry will be possible from numerous locations, whereas vehicular access across and around this combined zone will be limited. Additionally, the Buffer Zone, which is a transition zone between the commercial buildings and industrial port uses to the east, will feature a naturalized landscape setting consisting of groves, grassland, and mowed paths.

The balance of open space, landscape program, and architectural massings will evolve with each phase of development, resulting in a series of interim conditions that are not dependent on immediate future development to succeed. In the plan, landscape elements are used to weave the new development together with the Historic Core and, in some cases, separate incompatible uses.

The relative lack of landscape vitality in the existing Mustin Park and Canal District sites will be transformed through the strategic introduction of new landscape typologies that support sustainable ecosystems. The Mustin Park, Canal District, and Buffer Zone areas will include vibrant living landscapes that offer recreational diversity across the site without creating an unsustainable demand on project resources. Proximity to the Philadelphia International Airport places restrictions on the types of landscapes that can be developed on the site, for example, discouraging the creation of conditions that attract large migrating birds like Canada Geese.

The combined palette of landscape program will offer accessible recreation, relaxation, and exercise, along with progressive stormwater management strategies. Short or long trips can be taken along pathways that create access to tree-lined greenways, past sporting fields and courts, along canal pathways, and through new naturalized areas. Site amenities such as benches, chairs, lights, pedestrian and bike paths, bike racks, and shaded areas will be included throughout to increase the sense of welcome.
The Navy Yard’s close proximity to the Philadelphia International Airport means that development will continue to abide by FAA regulations, to limit the potential for collisions between large migrating birds, like Canada Geese, and aircraft. The Navy Yard already includes a large number of open lawns, which are very attractive to geese, but the total lawn area will be greatly reduced as a result of development. Within Mustin Park, the landscape will be dominated by plant communities that discourage use by migrating birds. Similarly, wetlands environments, which might otherwise have been used by virtue of the proximity to the riverfront, will not be created on The Navy Yard site due to their favorability as habitat for the types of birds that have been involved in the greatest number of incidents.

**Figure 3.4** Brooklyn Bridge Park

**Figure 3.3** Existing Open Lawn Spaces

**Figure 3.2** Brooklyn Bridge Park

**Figure 3.5** Existing and Proposed Open Lawn Spaces

**Figure 3.1** Existing: 44.5 acres of open lawn

**Figure 3.5** Proposed: 3.4 acres of open lawn (93% total reduction)

**LAWN AREA**
MASS TRANSPORTATION: SHUTTLE SERVICES AND POTENTIAL SUBWAY EXTENSION

Improving public transit infrastructure is an important part of PIDC’s commitment to environmental sustainability and to creating a high-quality work environment at The Navy Yard. Currently, just under 10% of workers at The Navy Yard commute daily using mass transit and this percentage can be improved. Two important components exist concerning the overall effort to encourage the use of mass transportation, namely, the continuing evaluation and improvement of shuttle bus transit services serving the property, and, for the longer term benefit, establishing the case for extension of the Broad Street Subway south with one or more stops within The Navy Yard.

Two bus services currently exist, both provided by Southeastern Pennsylvania Transportation Authority (SEPTA). In late 2012, PIDC enhanced these services with the addition of an Express shuttle service connecting The Navy Yard directly to the Market East Station at 10th and Market Streets in Center City, operating during a broad peak service time at the beginning and end of the workday. Additionally, PIDC replaced one of SEPTA’s existing services, the Route 71 bus, with an expanded Loop service. PIDC is also working with SEPTA to increase the frequency of its Route 68 service to the western end of the property, via the 26th Street entrance.

The Broad Street Line Extension Feasibility Study of 2008 confirms the viability of constructing a 1.5 mile, tunneled subway extension into The Navy Yard, adding one or two new stations. The study substantiates that this extension will support a significant increase in residential and commercial uses at The Navy Yard by connecting to Center City and the regional transit system. The study demonstrates the strong ridership, development potential, and economic benefit for the City of Philadelphia and the Commonwealth of Pennsylvania as a whole. The subway’s expansion also impacts land values and the potential for improved development opportunity. The Broad Street subway extension would support greater densities and produce a positive net benefit to property values within a walkable proximity of its station(s). The Broad Street Line Extension will leverage, catalyze, and greatly enhance the development potential of the entire Navy Yard, generating investment, employment, and tax takeables for the city and state.

Figure 3.6 Broad Street Line Extension Feasibility Study

Figure 3.7 Mass Transportation
PEDESTRIAN AND BICYCLE PATHS

Pedestrian Paths

Safe and convenient pedestrian movement continues as a priority in the 2013 Update’s proposed Main, Greenway, Secondary, and Waterfront Streets. Sidewalks are proposed adjacent to all these streets, and the proposed design of the Canal District includes a broad public esplanade adjacent to the water.

Bicycle Paths

The proposed Navy Yard street network is designed to encourage bicycle use. A proposed network of bicycle paths includes on-street bike routes on 11th Street, Kitty Hawk Avenue, and Broad Street, and an off-street bike path along the waterfront esplanade and adjacent to League Island Boulevard for more than 4.5 miles of bicycle lanes. The 2013 Update’s emphasis on bicycle use is consistent with the 2004 Plan’s sustainable design goals, and includes provision for additional bike routes on all streets in new districts within the Plan. Most of the time, LEED® buildings will also include the provision for bicycle lockers and showers to further support bicycle usage for commuting purposes.

Network of Paths

The 2013 Update continues to place focus on encouraging pedestrian and bicycle circulation by enhancing the network of paths connecting The Navy Yard’s districts. In addition to the numerous traditional paths being planned and constructed, Greenways have been designed in the new parking lots, with pedestrian paths on either side to allow for pedestrians to safely walk between their cars and buildings. These Greenways lead from parking lots to vegetated plazas in the Canal and Mustin Park districts. Greenways and paths also connect to the Buffer Zone, where mowed paths provide a network of walkable and rideable trails for recreation. A pedestrian and bicycle trail connects the Canal waterfront and Buffer Zone to the historic hangar and back along the Riverfront Greenway. The waterfront, the Canal, the Fair End, and Mustin Park are thus connected, and provide a variety of pedestrian and bicycle routes throughout this area of The Navy Yard.

Specific improvements unique to both the Mustin Park and Canal Districts are described in greater detail in those sections.
SURFACE AND STORMWATER MANAGEMENT

In addition to providing considerable interest as landscape features, the new inland water bodies introduced in the 2013 Update will form the backbone of water management strategies for the Mustin Park and Canal Districts. Given the sites are beyond the current extents of the city sewer system, surface water currently drains directly into the river. In the new development proposal, parking lots are graded to drain surface runoff into a system of greenways. The speed of runoff is slowed by the rough texture of the greenway, and is gradually conveyed to the Canal or Reflecting Pool, which together form a linked system of collected water on the site. Given the combined capacity of these two water bodies in relation to the estimated amount of annual rainfall, there will be sufficient holding capacity throughout the year, with the possible need for the replenishing of water at certain points.

Specific improvements unique to both the Mustin Park District and Canal Districts are described in greater detail in those sections.

Figure 3.9 Water Management
Working in conjunction with the parking areas, the greenways combine multiple site functions, including circulation, stormwater management, and environmental improvements, in a single site feature. As shown in the previous section, each greenway swath will include a pathway on either side, creating a welcoming pedestrian environment that will help users walk safely and comfortably between buildings and parking areas. The parking lots are graded to drain surface water into the greenways, thus retaining storm water on-site, rather than discharging it into city water systems. Plants in the greenway will be selected for landscape effect and for their tolerance within a broad range of moisture conditions, minimizing potential damage caused by periods of drought or inundation.

**Figure 3.10** Section Through Greenways

**Figure 3.11** Sheet Drainage Strategy

**Figure 3.12** Suggested Plantings

**Figure 3.13** Herman Miller Factory

- Juniperus virginiana: Juniper
- Panicum virgatum: Switchgrass
- Aster spp.: Asters
- Amelanchier canadensis: Serviceberry
- Quercus phellos: Willow Oak
- Dryopteris marginalis: Marginal Wood Fern
- Betula nigra: River Birch
- Comptonia peregrina: Sweet Fern
- Aronia melanocarpa: Black Chokeberry

**WATER MANAGEMENT IN THE GREENWAYS**
EXPANDING THE WATERFRONT

Waterfronts are an excellent means to create community usage and collaboration and to engage a wide range of daily and occasional visitors. In addition to the attraction of the water itself, shorelines create a draw by offering different types of walkway edges and views. The 2013 update includes strategies for bringing new waterfront edges deeper into the site. These include the canal frontage and the Mustin Park reflecting pool, both of which are integrated into the stormwater management infrastructure of the site, as well as the recreational network at the center of the development. This inland waterfront network will also connect site users with the riverfront itself through the system of paths, esplanade, and bikeways.

Figure 3.13 Section through Causeway
Figure 3.14 Cross-Section through Canal
Figure 3.15 Pedestrian Walkway Example: Nyhavn Canal, Denmark
Figure 3.16 Axonometric View of Waterfront
Figure 3.17 Occupied Greenways: Kendall Square
Figure 3.18 Rip Rap Edge Example: Brooklyn Bridge Park
Figure 3.19 Existing Condition
Figure 3.20 Proposed Water Edge: Linear Water Bodies

4,546 Linear feet of additional edges
SMART ENERGY AND THE ENERGY MASTER PLAN

Another significant accomplishment since the publication of the 2004 Master Plan is establishing The Navy Yard as the Greater Philadelphia region’s preeminent energy and applied sciences hub.

The Smart Energy Campus

Commencing after the completion of the 2004 Master Plan, the Smart Energy Campus was established by various Navy Yard stakeholders. The Smart Energy Campus has matured as a diverse collaboration of businesses, universities, and government, focused on making The Navy Yard a national center for energy research, education, and commercialization. By actively engaging all of The Navy Yard’s assets – its people, infrastructure, and buildings – the Smart Energy Campus is where next generation solutions are being researched and actively deployed in the energy efficiency, smart grid technology, and related distributive generation and storage fields.

The Smart Energy Campus continues to evolve as a unique platform for a number of programs that are being developed for scalable smart energy solutions that can be expanded throughout the region and the nation.

Energy Efficient Buildings Hub (EEB Hub)

The Energy Efficient Buildings Hub (EEB Hub) was created by the U.S. Department of Energy as an Energy Regional Innovation Hub (E-RIC), and is led by the Pennsylvania State University. The EEB Hub is funded by seven federal agencies, functioning with a unique dual mission of improving energy efficiency in commercial buildings, while promoting regional economic growth and job creation.

The organizers of the EEB Hub, a 27-member consortium of educational institutions and corporations, chose The Navy Yard as its headquarters and “living laboratory” for the diversity of buildings – old and new, large and small office, retail, and manufacturing – all served by the independent unregulated electric distribution grid, managed by PIDC.

One of the core functions in which the EEB Hub will continue to deploy and demonstrate its mission will be the full-spectrum retrofit of Building 661, a former Navy recreation center building. In addition, Penn State University is constructing a 25,000 square foot building adjacent to Building 661, which will be an anchor to the education and research campus in the Historic Core (as described in greater detail in the Historic Core section of this update).

Center for Distributed Power

The Center for Distributed Power at The Navy Yard is a fast-growing consortium of organizations focused on solving the challenges of distributed power production and management at scales, ranging from micro-districts to regional grids. Founding members include Ben Franklin Technology Partners of Southeastern PA, Delaware Valley Industrial Resource Center, NAVSEA, Penn State University, and PIDC. Technology commercialization, collaborative research and development, and Science, Technology, Engineering, and Math (STEM) education are key focus areas. The Center’s research, development, and technology commercialization emphasis includes a number of areas of state-of-the-art green technology, including fuel cells, power generation, and distribution and renewable energy.

The Navy Yard Energy Master Plan

Concomitant with the completion of this Navy Yard Master Plan 2013 Update, PIDC completed a 10-year Energy Master Plan that defines an infrastructure investment and business plan that will provide a strategic and implementation plan for deployment of significant smart grid technologies, with resulting reductions in the need for off-site external energy consumption. This progressive strategic plan is organized around five core focus areas—infrastructure improvements, the business plan and tariff structures, Navy Yard stakeholder involvement around distributive generation and energy efficiency, test bedding opportunities for technology deployment, and carbon footprint reduction.

The 10-year Energy Master Plan provides a unique opportunity for the deployment of numerous “smart grid” technologies. The smart grid will be implemented in phases. The first phase will focus on creating a basic grid Networks Operation Center (NOC) and installing capable and proven smart metering technology along with a robust, secure communications network. The advanced metering will support active business-to-grid interactions for demand response and energy market transactions. The communications backbone will facilitate the development of a common utility real-time database, allowing The Navy Yard to improve situational awareness and better manage current grid operations. Tenants will also have the ability to engage directly in monitoring their energy use, and will be able to earn revenue through demand response, supply capacity, and ancillary service programs. The second, long-term phase will focus on improving operating economics and system reliability through digital substation and advanced NOC functions.

In addition to addressing the challenges within The Navy Yard relating to its projected energy requirements brought on by the anticipated internal program growth defined by this 2013 Update, the Energy Master Plan provides scalable solutions that will possibly apply to numerous similarly-sized economic communities across the nation. Many of the proposed deployment steps will likely encourage considerable increase in the location of various technology and educational institutions as a significant contributor to The Navy Yard community’s Smart Energy Campus.
HISTORIC CORE
The 2004 Master Plan guiding principles for the Historic Core continue for the 2013 Update. Greater emphasis is placed on the Historic Core’s purpose in housing more amenities and as the primary residential community, both functions supporting the entirety of The Navy Yard community.

While the 2004 Master Plan proposed 850 residential units in the Historic Core, the 2013 Update proposes a total of 1,018 residential units as new and renovated units, planned with an average ratio of 1 parking space per residential unit, distributed across parking lots, street parking, and parking integral to renovated buildings.

The block east of Building 100 is redesigned as a residential quadrangle framed by a 6-story tower at the southwest corner, and a 10-story residential tower anchoring the northeast corner. This quadrangle also acts as a visual and pedestrian connection between Buildings 100 and 640, extending east to west, and as a connection extending diagonally between Building 101, the chapel, and opening into League Island Park and the Educational and Research Campus.

To the north of this block and east of Building 101, the large office building proposed in the 2004 Master Plan has been redesigned as a 4-story 75,000 square foot office building, and a 5-story, 64-unit residential building, in part to avoid an existing utility line through that site.

At the southwest corner of 11th Street and Kitty Hawk Avenue, a new two-story, 40,000 square foot office/research building with ancillary parking is proposed for the remainder of the site.

The proposed Education and Research Campus has been slightly modified to tie the proposed Penn State building and League Island Park to the subway pavilion and Mustin Park to the east. The Campus features 410,000 square feet spread across six buildings, and is served by a parking structure and street parking at an average of four cars per 1,000 square feet.

The Navy site has been redesigned to meet the Navy’s expansion needs and unique federal regulatory criteria. The Navy would no longer expand to the west as proposed in the 2004 Master Plan, but to the north and east of its existing facilities. The Navy would retain control of a portion of League Island Boulevard crossing its site, while that portion of the Boulevard would remain as a visual corridor down to the water.

The Navy Yard Master Plan 2013 Update
HISTORIC CORE: MASSING AND ZONING

The building massing in the Historic Core is intended to reinforce the urban grid and the main street axes of Broad Street, 11th Street, and Kitty Hawk Avenue. A high priority is given to enhancing the strong pedestrian character in the Historic Core in order to encourage this district of The Navy Yard as a center for vibrant residential and amenity programs. The combined massing of new construction with preservation of the historic structures helps to define League Island Park, while preserving the open character of the historic Marine Parade Grounds and the Delaware River and Reserve Basin waterfronts by minimizing the impact of new construction in these areas. Important design criteria continue as proposed in the 2004 Master Plan:

- New buildings shall be constructed within the Building Zone.
- New buildings shall be at least 30 feet in height.
- New building facades shall be constructed at or near the Build-to lines.
- Building facades shall not be less than 30 feet tall along Build-to lines.
- Ground floor building facades along Build-to lines should be activated with windows, lighting, and pedestrian scale elements. Bland walls and unvaried materials are strongly discouraged.
- Parking and service areas shall be built within Parking & Service Zones.

**MASSING SUMMARY**

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Figure 4.2 Massing and Zoning
HISTORIC CORE: VEHICULAR AND PEDESTRIAN CIRCULATION

The circulation in the Historic Core is intended to reinforce the hierarchy of the urban grid, with Broad Street, 11th Street, and Kitty Hawk Avenue acting as main streets. Parking is concentrated primarily in freestanding and embedded parking structures. Vehicular access to parking areas is kept away from Broad Street and 11th Street as the major, green, park-lined routes to the waterfront. Key pedestrian paths through blocks, and along open spaces and waterfront areas are designated to maintain a walkable environment. The Campus Area is intended as a pedestrian-friendly zone, with restricted vehicle access.

Vehicular Circulation

Proposed vehicular circulation remains as specified in the 2004 Master Plan, aside from the closing of League Island Boulevard through the Navy’s property relating to the proposed expansion of the Navy’s 77-Complex (see “Navy Expansion”). League Island Boulevard would remain an important vehicular thoroughfare until reaching Kitty Hawk Avenue and will continue as a visual corridor to the waterfront.

Pedestrian Circulation

The Historic Core is designed to encourage strong pedestrian character given the concentration of amenities and the significant residential program. Important to achieving these elements:

• Key pedestrian routes shall be created as shown in Figure 4.3. These routes should allow and encourage pedestrian circulation.

• Pedestrian routes shall be paved, handicap accessible, and at least six feet in width.

• Shading from trees or man-made structures along these routes is encouraged.

• Lighting and other way-finding enhancements are also encouraged. Pedestrian routes may be covered or in some cases enclosed, but shall be accessible at all times.

Figure 4.3 Vehicular and Pedestrian Circulation
HISTORIC CORE: NAVY EXPANSION

The Navy expansion site provides a net 265,000 square feet of new construction in four new buildings. This staged development, that will be managed by the Navy, will include demolition of Buildings 75, 76, and 77L to make room for a 555-space parking lot and a 160-space single level parking deck. Additional demolition of Buildings 752 and 79 could make room for up to 44 additional spaces, for a total of 759 spaces on-site.

In order to meet unique federal military building requirements, a 148-foot standoff dimension is respected between all new Navy buildings and public curbs, as well as between Navy buildings and Navy parking lots. Within the standoff zone, a 40-foot landscaped buffer lines the east, north, and west edges of the Navy property.
CANAL DISTRICT
CANAL DISTRICT: OVERVIEW

The Canal District consists of approximately 38 acres and includes two-thirds of a mile of waterfront – over 1,000 feet along the Delaware River, and over 2,000 feet of building frontage along a new inland canal.

Stretching from the eastward expansion of Kitty Hawk Avenue south to the Delaware River waterfront, the Canal District is organized along a 100-foot-wide by 1,000-foot-long “canal” jutting inland from the river. The canal is a series of four pools, separated by causeways, that provide a pedestrian connection between the two banks. As part of the stormwater management system, the canal collects stormwater from the adjacent greenways and provides controlled connection directly to the Delaware River. Flanked by 4-story buildings, the canal and its pedestrian-friendly esplanades create a sense of openness and expansion towards the waterfront, and help to bring the water’s edge inland on the site in order to tie northward to the Mustin Park District. One of the prominent features, a 12-story tower, will anchor the southeast end of Rouse Boulevard, standing as a gateway to the Canal District. This building will be designed to be highly visible from I-95 and down Rouse Boulevard when approaching from the Central Green District. All of the buildings are designed to provide outstanding views along the Delaware River waterfront.

The Canal District supports up to 950,000 square feet of Class A office space in 10 buildings, ranging from four stories to twelve stories in height. Parking is planned in a combination of surface parking, structured parking, and street parking, with a parking ratio of approximately 3.5 spaces per 1,000 rentable square feet of office space. A study has also been completed to plan the Canal District more densely in the event that a subway extension is completed with a station planned on the edge of the Canal District.

The front doors of the office buildings are located on the sides opposite the canal, fronting East Canal and West Canal Streets, thus keeping the canal and its plaza exclusively pedestrian. Parking for these buildings is located across the street from their front entrances. The 60,000 square foot buildings are serviced by surface parking, while the 12-story tower at the end of Rouse Boulevard is served by a five-level parking deck. The 8-story tower at the end of Kitty Hawk Avenue is served by a one-level deck. Greenways within the parking lots, which function as water management features, also offer pedestrian paths leading users from their vehicles to the buildings. These greenways terminate at the canal plaza, softening the hardscape and allowing shade in the summer months. On the eastern side of the Canal District, the greenways tie into the landscaped Buffer Zone located in the Port Expansion Area, making this open space also easily accessible to pedestrians from the canal.

Figure 5.1 New and Existing Buildings
Building massing in the Canal District is organized to create a pedestrian urban environment along the canal, with the two taller buildings providing focal points for major streets and well-defined building edges helping to frame the major public spaces.

Design elements of the Canal District include:

- Buildings shall be constructed within the Building Zone.
- Buildings shall be at least 60 feet in height. Portions of buildings may be lower than 60 feet but the average must meet this minimum threshold.
- Building facades shall be constructed at or near the Build-to-lines.
- Building facades shall not be less than 60 feet tall along Build-to lines.
- Ground floor building facades along Build-to lines should be activated with windows, lighting, and pedestrian scale elements. Bland walls and unvaried materials are strongly discouraged whereas amenities are encouraged.
- Parking and service areas shall be built within Parking & Service Zones.

**MASSING SUMMARY**

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The future subway implementation at The Navy Yard would decrease dependency on surface parking and allow for a higher building density on the site. In this future phase, the Canal District can take advantage of its prime location on the waterfront with four additional 60,000 square foot buildings along the river, for a total build-out of 1,188,000 square feet of office space.

The parking reduction for these four additional buildings results in a parking ratio of 2.2 spaces per 1,000 square feet of office space.

**Figure 5.3** New and Existing Buildings
The Canal District offers separate but linked networks of vehicular and pedestrian circulation.

**Vehicular Circulation:**

- Vehicular circulation through the Canal District is provided via the eastward expansion of Kitty Hawk Avenue and East and West Canal Streets, which connect Kitty Hawk Avenue with Admiral Peary Way along the waterfront.
- Building drop-off areas are located along Kitty Hawk Avenue and East Canal and West Canal Streets.
- Parking areas are accessed from East Canal Street and West Canal Street, and from the internal parking drives on the east and west ends of the Canal District.

**Pedestrian Circulation:**

- The esplanades lining the canal are major pedestrian, vehicular-free zones that also link Mustin Park and the waterfront with assorted amenities at street level.
- The east-west greenways act as both pedestrian friendly paths and bicycle trails that lead users from the parking lots to the building entrances, and link the Canal District with the Buffer Zone open area.
- Causeways, separating the canal into four quadrants, allow for pedestrian and bicycle movement across the canal.

---

**Figure 5.4** Vehicular and Pedestrian Circulation
CANAL DISTRICT: PEDESTRIAN AND BICYCLE PATHS

An active, accessible bicycle and pedestrian friendly system of paths throughout the Canal District will connect the Historic Core and Mastin Park with the Delaware River’s edge. The vehicle-free space of the central canal esplanade will provide a welcoming environment for a variety of users and activities.

Bicycle and pedestrian paths shall be paved, accessible, and at least six feet in width. Shading from trees or man-made structures along these routes is encouraged. Lighting and other way-finding enhancements are also encouraged. Pedestrian routes may be covered, or in some cases enclosed, but shall be accessible at all times.

Bicycle paths in the Canal District are part of the larger network of bicycle circulation throughout The Navy Yard. The Canal esplanade allows a connection for bicycles between the waterfront bicycle path and Mastin Park. The waterfront path also connects to the Buffer Zone open area to the east.

Figure 5.5 Pedestrian and Bicycle Circulation
The new canal forms the heart of the Canal District, framed by adjacent buildings, and creating a sense of openness and expansion along an urban esplanade that is punctuated with benches, cafes and other user amenities, and periodic groves of trees. The greenways connect across the canal space, creating separations between each link in the canal, allowing for a gradual stepping down in water elevation as users approach the Delaware River waterfront.

Steep canal edges will be lined with large rocks to create an angled slope along the waterfront. This design provides an affordable approach that has the added benefit of not attracting large water fowl. The Canal Esplanade, working in conjunction with the reflecting pool to the north and the Delaware River to the south, is a continuous link in a larger narrative of water that informs the entire site.
MUSTIN PARK DISTRICT
MUSTIN PARK DISTRICT: OVERVIEW

This 81-acre District is organized around a major new seven-acre landscaped recreational park. The new Mustin Park features rolling hills, athletic fields, and a reflecting pool on the southeastern end all connected by a network of pedestrian and bicycle paths.

Two buildings on either side of Rouse Boulevard act as the primary gateway to the Mustin Park District, accompanied by two subway station pavilions, while the Canal District Tower acts as a beacon for both Districts. Upon arriving in the Mustin Park District from Rouse Boulevard, the first glimpse of park landscape will be visible, dramatically unfolding as one turns off-axis and begins to head east. Mustin Park’s reflecting pool will accent the surrounding landscape and provide a center of activity. Mustin Park reveals itself to the left when driving east on Kitty Hawk Avenue, then opens up to the Canal to the south.

The Park is surrounded by 710,000 square feet of office space. These office buildings range in size from 60,000 to 250,000 square feet. Parking is organized on the opposite sides of these buildings, shielded from the Park. Similar to the Canal District, these parking lots feature greenways that manage stormwater, provide bicycle paths, and include sidewalks for pedestrians. The Park is framed on its southwest end by the Canal Districts 12-story tower, and on its northeast end by a 250,000 square foot office building.

Within the Mustin Park District landscape, plants will be used to provide microclimatic comfort, create views from surrounding buildings, and increase the sense of ecologic vitality on the site. By selecting high-branched shade trees, care will be taken to preserve visibility through the park, while providing landscape diversity and a range of views and experiences. A balance of open landscape, dense plantings, accessible pathways, and landscape furnishings will provide multiple opportunities for pedestrian activity around the Park. As with the Canal District, the decision to concentrate parking on one side, and the Park on the other, will support the social and recreational uses of this District.

On the outskirts of the Mustin Park District, to the northwest and the east, areas for flex development will allow for an additional 190,000 square feet for light manufacturing and flex industrial requirements at The Navy Yard.

Figure 6.1 New and Existing Buildings
MUSTIN PARK DISTRICT:
MASSING

The building massing in the Mustin Park District is intended to reinforce the major public spaces, giving them strong, well-defined edges around Mustin Park, with the following design guidelines:

- Buildings shall be constructed within the Building Zone.
- Buildings shall be at least 60 feet in height. Portions of buildings may be lower than 60 feet but the average must meet this minimum threshold.
- Building facades shall be constructed at or near the Build-to lines.
- Building facades shall not be less than 60 feet tall along Build-to lines.
- Ground floor building facades along Build-to lines should be activated with windows, lighting, and pedestrian scale elements. Bland walls and unvaried materials are strongly discouraged.
- Parking and service areas shall be built within Parking & Service Zones.

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**MASSING SUMMARY**

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MUSTIN PARK DISTRICT: VEHICULAR AND PEDESTRIAN CIRCULATION

The loop around Mustin Park is the main circulation spine in this district and is intended to be an active, pedestrian and bicycle-friendly route. Parking lots are to be located behind the office buildings that front on the Park. Key pedestrian routes through and around the Park, and along the greenways connecting to the Park, are designed to maintain a walkable environment.

Vehicular Circulation:

• Vehicular circulation through Mustin Park District is restricted to the loop around the park.
• Building entrances face the park and drop-off areas are located along the loop.
• Parking areas are accessed from the park loop.
• A secondary through-lot circulation connects the loop to Mustin Road.

Pedestrian Circulation:

• Pedestrian circulation benefits from the location of the transit station at the west end of Mustin Park District.
• Key pedestrian routes through and around the Park are designated to maintain a walkable environment.
• Greenways through parking lots provide pedestrian connections back to the buildings and to the Park.

Figure 6.3 Vehicular and Pedestrian Circulation
Mustin Park District is organized around a major landscape center. Buildings are accessed by greenways that cross parking lots located along the northern and eastern perimeters of the district. The southern and western facades of the same buildings face a recreational green space that accommodates multiple types of circulation, including pedestrians, bicycles, and limited vehicular access around its perimeter. Within the park space, the reflecting pool and a gently rolling topography and palette of seasonally distinct trees and shrubs, will make the Mustin Park District distinctive in The Navy Yard’s system of open spaces, creating a comfortable environment for a variety of recreation and activities.

Pedestrian and bicycle routes shall be paved, accessible, and at least six feet in width. Shading from trees or man-made structures along these routes is encouraged. Lighting and other way-finding enhancements are also encouraged. Pedestrian routes may be covered, or in some cases enclosed, but shall be accessible at all times.

Bicycle paths in the Mustin Park District form an important connection between the paths along Rouse Boulevard and in the Central Green District and the Canal District, allowing users to reach the riverfront traveling along paths through the park itself and on roadways with less vehicular traffic.

Figure 6.4 Pedestrian and Bicycle Circulation
MUSTIN PARK DISTRICT: WATER MANAGEMENT

Water conveyed through greenways from parking lots to the north and east of Mustin Park will be piped underneath the roadway into the reflecting pool. Surface water within the shaped topography of the park will be absorbed into the landscape. A subsurface connection between the reflecting pool and the canal system will allow for maximum flexibility in site-wide water management.

Figure 6.5: Suggested Planting and Materials

Platanus xacerifolia
London Plane Tree

Fagus grandiflora
American Beech

Quercus palustris
Pin Oak

Poa pratensis
Kentucky Bluegrass

Rip-Rap at Water’s Edge

Figure 6.6: Water Management

Key

Water Flow in Greenways / Canal

On-Site Water Flows
The Mustin Park District reflecting pool will be a dramatic anchor feature within its larger landscape setting, providing landscape range and experiential diversity along its primary east-west axis. Although it will be similarly calm and reflective, the water body in the Mustin Park District will be distinctive from the Canal District by virtue of its landscape setting. The articulated topography, open lawn, and surrounding trees will support the casual and organized recreational activities that will take place around the water feature.

A regulation softball field in Mustin Park will be available for pick-up games, or organized league play. Given the popularity of existing civic fields, the introduction of this recreational facility in The Navy Yard might be used as a way to build camaraderie within offices, across the multiple districts of The Navy Yard, or with the Greater Philadelphia community at large.
PORT EXPANSION
PORT EXPANSION: OVERVIEW

The 2013 Update reflects that the Philadelphia Regional Port Authority (PRPA) now controls the portion of The Navy Yard located south of the Kitty Hawk Avenue extension and east of the Canal District. In this area, the PRPA has committed to a 140-foot landscape buffer. The 2013 Update envisions that this Buffer Zone might also serve as an Open Area amenity that can be designed for recreational use.

Because of its proximity to the port facilities, and road, rail, and shipping transportation networks, the area between the Buffer Zone and the Hangar is ideally suited for a distribution center. This document illustrates one potential industrial development option for this portion of the Port Expansion Area, containing two warehouse/distribution facilities, of approximately 615,000 and 350,000 square feet respectively. These facilities can be 40-foot-high bay buildings with attached office/administration space. A counterclockwise loop road allows truck access to all sides of both buildings. Parking for employees is provided at the east end of these proposed buildings. Vehicular access to these facilities is provided via the planned Delaware Avenue connection from the east.

Figure 7.1 New and Existing Buildings
PORT EXPANSION:
PORT BUFFER ZONE

A 140-foot buffer zone is provided between the far eastern parking area of the Canal District and the turn edge of the Port Expansion Area. Although this area will be free of buildings or other structures, it needs to be developed with a low-maintenance landscape that will create an effective transition between two vastly different scales of use. As with the Mustin Park District, the overall elevation will be raised to provide greater range of experience and a more effective separation between the two areas.

Initial plantings will include a large proportion of meadow grasses, punctuated by periodic groves of trees and shrubs. The overall effect will be a naturalized landscape, with mown path rather than paved walkways.

The raised elevation of the southern edge of the Port Buffer Zone will produce an unparalleled prospect out across the river. At its riverfront edge, it will connect into a continuous waterfront circulation network that will provide direct pedestrian access between the Port Expansion Area, the Canal District, and the Historic Core.
Andropogon geradii
Big Blue Stem

Schizachryium scoparium
Little Blue Stem

Sorghastrum nutans
Indiangrass

Juniperus virginiana
Juniper

Panicum virgatum
Switchgrass

Solidago canadensis
Goldenrod

Rudbeckia hirta
Black Eyed Susan

Betula nigra
River Birch

Juniperus virginiana
Juniper

Schizachryium scoparium
Little Blue Stem

Panicum virgatum
Switchgrass

Andropogon geradii
Big Blue Stem

Aster spp.
Asters

Figure 7.4 Landscape Typology

Swale

Grasslands

Grove

Mowed Paths

Clearings
IMPLEMENTATION
**Assumes an average ratio of 250 square feet per employee in Office/R&D and 1,000 square feet per employee in Industrial areas**

![Figure 8.1 Configuration of the proposed roadway phasing system at The Navy Yard](image)

**Program Summary**

The Master Plan 2013 Update proposes strategies for continuing development at The Navy Yard. The purpose of this section is to summarize the total development program that is envisioned as described in earlier sections of the 2013 Update, and to define the infrastructure costs associated with proceeding with these recommended program objectives. Solutions are proposed that address the various infrastructure constraints and phase sequencing, while providing the flexibility to adapt to changing market dynamics.

Development at The Navy Yard has progressed substantially since creation of the 2004 Master Plan. With more than 6.5 million occupied square feet and approximately 10,000 jobs, The Navy Yard has reestablished itself as a major center of economic activity in the Philadelphia region. This 2013 Update builds upon these successes and redéfines itself as a vibrant and viable submarket in the region. Figure 8.2 summarizes the overall development program components proposed by this 2013 Update.

**Infrastructure Costs**

Significant public and private investment will be required to support the proposed development. Though detailed costs are typically difficult to obtain at an early planning stage, ongoing design and construction work that has been occurring at The Navy Yard provides a basis for increased cost accuracy. The table in Figure 8.3 provides information on the conceptual costs of the Master Plan (2013 dollars).

An infrastructure implementation and staging plan has been created for development of the Mustin Park District and Canal District. As these districts are large development areas, they will likely be constructed in phases. The phasing of specific building sites within each district is also anticipated, as determined by market demand. In order to establish a balance between the amount of base infrastructure that would likely be required to market this area of The Navy Yard, while allowing maximum flexibility in the sizing and location of new building sites, this phased infrastructure plan was developed. The infrastructure plan proposes four separate and distinct phases:

1. **Base Scope:** This is the minimal area and infrastructure required in order to provide the basis for infrastructure and tie-ins to the remaining phases of development.

2. **North Scope:** This scope will include proceeding with the majority of the Mustin Park District improvements but does not include tie-ins for the two light industrial buildings proposed for this area.

3. **South Scope:** This scope will include proceeding with all of the Canal District improvements not already addressed in the Base Scope.

4. **East scope:** Anticipated as the final phase, the East Scope will provide roadways and utility tie-ins to service the Port Expansion area and to service the two light industrial buildings proposed in the Mustin Park District. Alternatively, a combination of the Base and East scopes could proceed initially if development of the Port Expansion Area and Mustin Park industrial buildings is required sooner.

<table>
<thead>
<tr>
<th>Program Summary</th>
<th>Summary of Capital Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ACRES</strong></td>
<td><strong>Base Scope</strong></td>
</tr>
<tr>
<td>Central Green</td>
<td>72</td>
</tr>
<tr>
<td>Historic Core</td>
<td>194</td>
</tr>
<tr>
<td>Canal District</td>
<td>36</td>
</tr>
<tr>
<td>Mustin Park District</td>
<td>709</td>
</tr>
<tr>
<td>Port Expansion</td>
<td>192</td>
</tr>
<tr>
<td>Shipyard and Commerce Center</td>
<td>235</td>
</tr>
<tr>
<td><strong>TOTALS</strong></td>
<td><strong>SUMMARY OF CAPITAL COSTS</strong></td>
</tr>
<tr>
<td>Residential Units</td>
<td></td>
</tr>
<tr>
<td>EMPLOYMENT</td>
<td>1,599</td>
</tr>
<tr>
<td><strong>Figure 8.2 Program summary of The Navy Yard</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Figure 8.3 Capital Costs Summary for the Mustin Park and Canal Districts**

<table>
<thead>
<tr>
<th><strong>Program Costs</strong></th>
<th><strong>Base Scope</strong></th>
<th><strong>North Scope</strong></th>
<th><strong>South Scope</strong></th>
<th><strong>East Scope</strong></th>
<th><strong>Total</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Demolition, Cleaning, and Earthwork</td>
<td>$1,775,324.00</td>
<td>$10,319,123.09</td>
<td>$7,409,637.00</td>
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<td>Roads and Sidewalks</td>
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<td>$5,171,083.00</td>
<td>$5,171,083.00</td>
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<td>$2,507,658.00</td>
<td>$2,507,658.00</td>
<td>$2,507,658.00</td>
<td>$10,031,424.00</td>
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<tr>
<td>Site Utilities</td>
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<td>$8,998,315.00</td>
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<td>Electrical Distribution Expansion</td>
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<td>$12,596,600.00</td>
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<tr>
<td>Electric Distribution</td>
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<td><strong>TOTALS</strong></td>
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<td>$101,875,381.00</td>
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</tbody>
</table>

*Square feet of Residential Units are included in Future Renovations and New Construction Area Totals.

**North Scope includes additional shovel-ready costs and big-ticket items such as the Northeast 3rd Street Bridge.**
INFRASTRUCTURE COMPONENTS

The implementation analysis for the 2013 Area of Study focused on seven areas of infrastructure improvement:

1) Sanitary Sewer System
As in all areas of The Navy Yard, the proposed sanitary sewer system will be constructed separately from the storm sewer system. The new public sanitary sewer system will be constructed in accordance with Philadelphia Water Department (PWD) standards and dedicated to the City. Due to anticipated site conditions, cost estimating for sanitary sewer service includes a pile support system.

Sanitary sewer service for the office buildings in the Mustin Park and Canal Districts will be provided by a new gravity sewer system that will collect waste from the sites and convey them to the existing sanitary sewer system in Kitty Hawk Avenue.

Sanitary sewer for the industrial sites within the Mustin Park District will be provided by a public pump station and force main that will service both building sites and will have the flexibility to be sized to accommodate additional gravity laterals from the industrial buildings in the Port Expansion area.

2) Electrical System
Electric service for the Mustin Park and Canal Districts will be provided from a new PECO service feeder to The Navy Yard. This will then require a service extension from the intersection of League Island Boulevard and Crescent Drive to a new substation in the Mustin Park District. From this new substation, the new electrical service will be looped within the Mustin Park and Canal Districts to allow for redundancy. The electrical service will be provided in concrete encased ducts constructed in accordance with DTE Energy standards.

3) Water Main System
The new public water main sewer system will be constructed in accordance with Philadelphia Water Department (PWD) standards and dedicated to the City. Water service for the Mustin Park and Canal Districts will be provided in the form of three proposed loops: one for the office buildings in the Mustin Park District, a second one for the office buildings in the Canal District, and the third separate loop for the industrial buildings in the Mustin Park District. The proposed water main loops will connect to the existing PWD water system located in Kitty Hawk Avenue and Rouse Boulevard.

4) Natural Gas System
The natural gas system will originate from the recently completed Philadelphia Gas Works (PGW) high pressure gas main located in Kitty Hawk Avenue. The high pressure system will allow for cogeneration or combined heat and power (CHP), in accordance with The Navy Yard Energy Master Plan. A low pressure gas main will provide service to building sites in the Mustin Park and Canal Districts.
tricts. The gas mains will be constructed in accordance with PGW standards.

5) Stormwater System
The new public storm sewer system located within the roadways will be constructed in accordance with Philadelphia Water Department (PWD) standards and dedicated to the City. Due to anticipated site conditions, cost estimating for the public sewer service includes a pile support system.

A privately maintained water quality system, consisting of a reflecting pond and canals, will help support the building site systems comprised of green roofs, rain gardens, bio-retention and porous pavement. The pond and canals will be part of a regional stormwater management system, and will supplement the individual building site systems. In tandem, the regional and site specific systems will provide quality and quantity management to meet PWD requirements.

The Mustin Park site will be elevated to drain by gravity to the proposed reflecting pond. The reflecting pond will then drain by gravity to the series of four canal basins within the Canal District. The proposed canals will have an overflow drain directed to the Delaware River. The canal system is proposed to be isolated from the river.

The water features of the reflecting pond and canals will contain a pumping system to circulate and aerate the water to maintain an acceptable level of water quality. Based on an assumed loss of 1”-2” per week during dry months, approximately 17,000 gal/day of additional water would be required for the canal, and 7,500 gal/day for the reflecting pool, in order to keep water levels at an acceptable level.

More detailed engineering would be needed to evaluate alternative methods to support minimum water levels.

6) Communication System
The new communication services will be looped within the Mustin Park and Canal Districts to allow for redundancy. The communication service will be provided in concrete-encased ducts constructed in accordance with utility provider standards. The new looped ducts will connect to existing services located in League Island and Rouse Boulevards.

7) Fill
In order to accommodate the site design for the Mustin Park and Canal Districts, a large volume of imported fill will be required. In order to minimize site costs, PIDC is completing a procedure to allow contractors to place imported fill in staging areas, so that as fill becomes available at different times, these costs can be substantially reduced. The Mustin Park District requires the largest amount of fill to provide an elevated site, which allows for the gravity sanitary sewer collection system as well as the flow path for the stormwater through each district to the Delaware River.