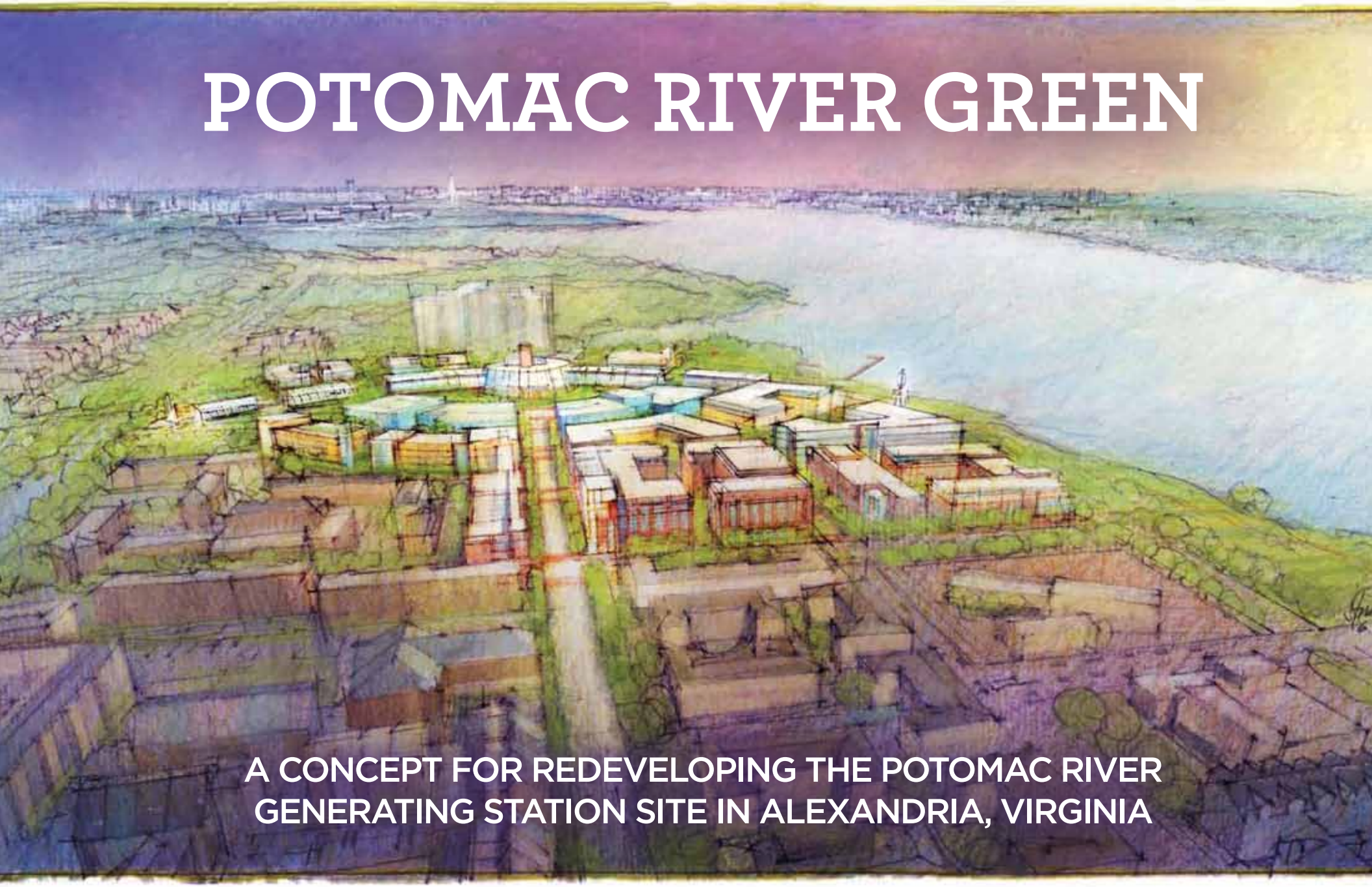
POTOMAC RIVER GREEN



A CONCEPT FOR REDEVELOPING THE POTOMAC RIVER GENERATING STATION SITE IN ALEXANDRIA, VIRGINIA

www.PotomacRiverGreen.com

LOOKING NORTH FROM THE RIVER FRONT

POTOMAC RIVER GREEN:

A CONCEPT FOR REDEVELOPING THE POTOMAC RIVER GENERATING STATION SITE IN ALEXANDRIA, VIRGINIA

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POTOMAC RIVER GREEN™

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INTRODUCTION

To many people, the sprawling coal-fired power plant on the north end of Alexandria has long been an incongruous gateway to that city as well as the nation's capital.

Figure 1.
Potomac River
Generating Station (2011)

Dating from 1949, the Potomac River Generating Station (PRGS) was originally constructed in a warehouse and industrial district when cleaner generating fuels were unavailable and when other sources of electricity were inadequate. Sixty years later, the situation is quite different.

The PRGS is now surrounded by vibrant residential neighborhoods. Alternative and far less polluting sources of power are available. The capital area is now integrated into a regional electricity grid. These changes have led to persistent calls to close the plant.

Nearby residents and the City of Alexandria have charged the PRGS with serious public health and environmental violations, as has the Virginia Department of Environmental Quality. In 2008, these complaints led the plant's owner to escrow over $30 million for additional air pollution controls. Since then, however, even stricter pollution controls proposed by the Environmental Protection Agency (EPA) have called into question the adequacy of the prior escrow (still unused, pending selection of an engineering vendor) and have led the plant's current owner, GenOn Energy, to caution investors about the facility's future.

At the same time, prior concerns regarding adequate local power supplies (i.e., reliability) that once led federal officials to mandate the plant's continued operation are no longer a controlling factor. Thanks to the construction of multiple new transmission lines and other network upgrades, the regional grid operator and Pepco, the local utility which still owns the land under the PRGS, have said that the facility will no longer be needed for reliability purposes. The Washington, D.C. area can now count on alternative electricity supplies.

In short, the time has come to start planning for what will come next. Today, the prime riverfront site the PRGS occupies (some 25 acres) is worth much more for alternative civic and commercial purposes than for generating electricity.

Our concept for Potomac River Green (PRG) reflects this new reality. It presents an innovative vision for transforming one of Alexandria's last remaining industrial sites into a thriving and sustainable 21st century residential and commercial neighborhood.

Potomac River Green will create hundreds of jobs, add over 500 new homes along the waterfront, generate millions of dollars in new tax revenues and open public access to a broad swath of Potomac River property that has been closed off since the 1930s.

In addition, the plan will put Alexandria and the greater D.C. Metro area at the center of the new energy economy. The energy museum and clean energy enterprise center that provide the architectural focus for Potomac River Green will create a hub for the region's energy R&D, start-up, consulting and investment communities. These unique energy efficient structures, complete with public meeting rooms, an auditorium, exhibition space and restaurants are also designed to provide a gathering place for local residents as well as a major new draw for outside visitors.

The concept presented here stems from an extensive year-long collaboration between the American Clean Skies Foundation (ACSF) – a Washington, D.C. based non-profit, environmental groups, community organizations and a talented multi-disciplinary group of consultants.

Principal roles were played by Matthew Slavin, founder of Sustaingrüp, an urban development consultancy, and the Alexandria office of the Cooper Carry architectural firm, led by David Kitchens, Layton Golding, and Allison Bickers. Major contributions were also made by Russell Archambault of RKG Associates, an Alexandria based fiscal and economic consultancy, and Pete Jervey of Westpath Real Estate. MJ Bradley and the Analysis Group advised on utility planning and reliability issues. The team also relied extensively on the advice of ACSF's outside counsel, David Lubitz of Schaner & Lubitz.

The American Clean Skies Foundation initiated Potomac River Green and brought this planning team together as part of its ongoing program to expand the country's clean electricity options. By showcasing the potential for repurposing sites now used by some of the oldest and least efficient power plants, we hope that the power sector's transformation will be accelerated and the constituency for change enlarged.

In the next decade, as stricter air and water pollution controls take hold across America and cleaner generation options increase, dozens of other aging coal and oil-fired power plants will be retired. As with the Potomac plant, many of these sites are likely to provide attractive redevelopment options. Indeed, numerous such projects have already been completed and a companion ACSF report, "Repurposing Legacy Power Plants," profiles some of the most instructive cases.

Realizing the promise of Potomac River Green will not be easy. It will take time and sustained commitment by all the major stakeholders. But it can be done and, in the months ahead, ACSF looks forward to working with the City, GenOn Energy, Pepco and interested community stakeholders to bring Potomac River Green to life.

Gregory C. Staple
CEO, American Clean Skies Foundation

Figure 2.
Potomac River Green (2015-2017)

Figure 3.
Potomac River Green
Neighborhood

Figure 4.
Potomac River Green
Neighborhood

Figure 5. Site Plan Before/After

EXECUTIVE SUMMARY

Potomac River Green will transform the waterfront site of Alexandria's coal-fired power plant into an environmentally friendly, mixed-use community.

The concept envisions expanded river access and open space amenities; contains hundreds of new riverfront housing units; greatly improves community connectivity to the City's Old Town area; and, at the heart of the site, creates a world-class new energy center for the Washington, D.C. region.

This redevelopment concept is designed to catalyze a market-based solution to the plant's retirement.

The team creating this plan had three aims: (1) to design an economically viable redevelopment roadmap for a sixty-year-old waterfront coal power plant; (2) to bring increased recreational and social amenities to the waterfront site; and (3) to improve community connectivity.

These goals are the foundation for a larger vision – one that features sustainable neighborhoods with smart, energy-efficient buildings and provides space for a clean energy business and museum complex. Each element of the redevelopment plan plays an important part in fulfilling this vision.

The museum building offers an innovative and efficient 21st century energy model that captures and produces more energy than it uses and feeds the surrounding neighborhood excess power.

Interior and exterior energy systems utilize solar orientation, solar energy, site topography, natural water flow, airflow, fuel cells and geothermal systems. Building exhibits display these state-of-the-art energy systems for visitors. There are also community meeting rooms and research and development space. Just across the exterior plaza sits additional "incubator" office space for energy start-up businesses, research and development (R&D) activities and consultants.

The museum building also recycles wastewater and storm run-off for the new community. This process extracts energy that is returned to the surrounding buildings for use. The ground under adjacent neighborhoods hosts geothermal and air ventilation networks that help feed energy back to the development.

Figure 6.
Potomac River Green Building Guide

- Multifamily Residential - 556 Units
- Townhouse Residential - 46 Units
- Retail - 105,000 SF
- Commercial Office - 99,100 SF
- Hotel - 125 Rooms
- Energy Buildings - 75,700 SF
- Relocated Substation

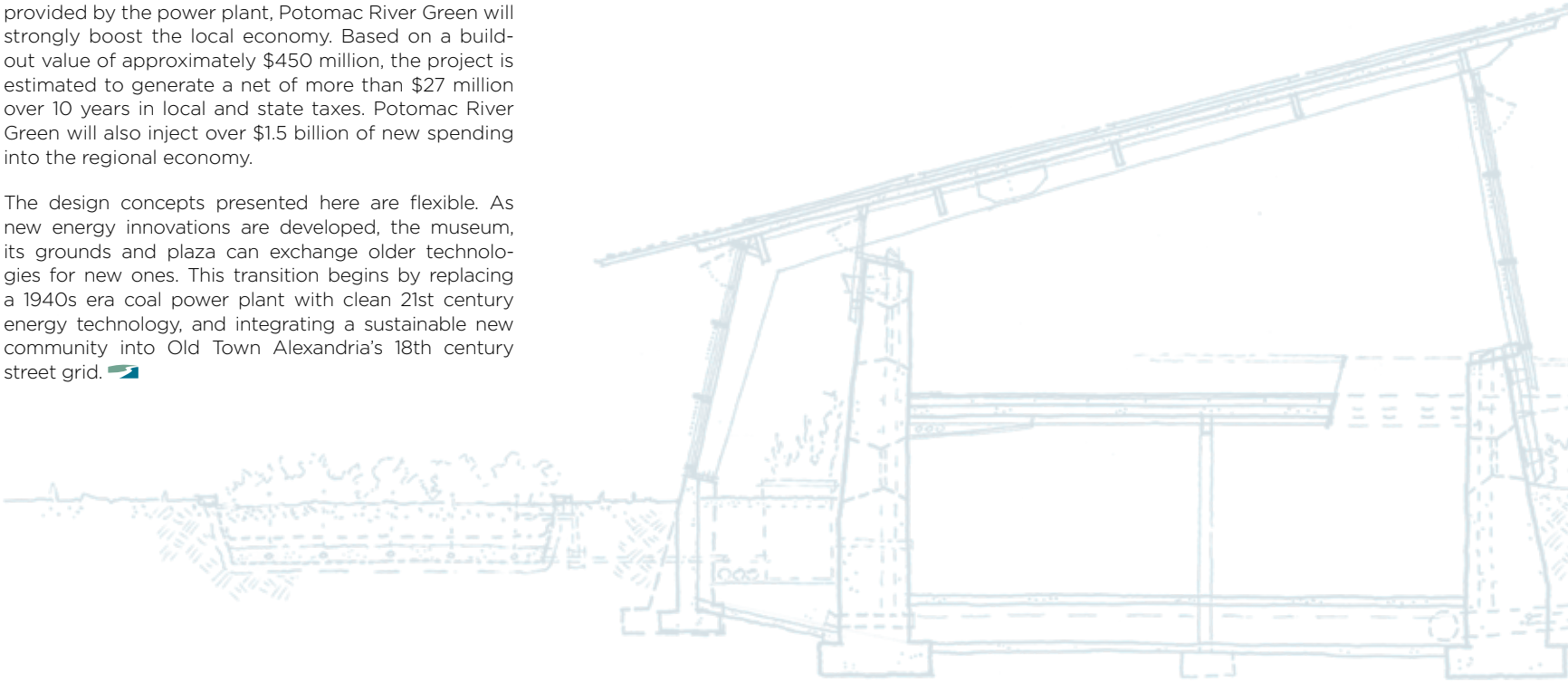
The street plan for Potomac River Green, as well as the sidewalks and garden spaces, serve an important dual purpose. In the northern neighborhood, they are the conduit for moving water and energy between the central building and the community. They also connect the community to surrounding neighborhoods, parks and the waterfront. Trails traverse the site for pedestrians and cyclists, including the regional Mt. Vernon Trail.

The mix of uses and density planned for the site has been carefully thought out to create an environment where people can live, visit, shop, and work with minimal environmental impact. The placement of retail, recreation, entertainment and office space on the same site is designed to reduce car trips for residents and visitors alike. A natural gas refueling station and electric vehicle (EV) charging stations provide alternative fuel options for vehicles.

Public amenities are also aimed at supporting a lifestyle that has a lower impact on the environment. These amenities include a bike station for cyclists to store their bikes, shower, get a tune-up and rest on the Mt. Vernon Trail. Community gardens are located throughout the residential areas to grow food and increase site permeability. The waterfront area includes a plaza, a performance area, a boardwalk, a boathouse and a water taxi station. The site itself can be reached on foot, by bike or by boat.

From the start of construction in 2015 through planned completion in 2017 and operation, Potomac River Green is estimated to create over 2,200 new jobs. Compared with the approximately 150 jobs now provided by the power plant, Potomac River Green will strongly boost the local economy. Based on a build-out value of approximately $450 million, the project is estimated to generate a net of more than $27 million over 10 years in local and state taxes. Potomac River Green will also inject over $1.5 billion of new spending into the regional economy.

The design concepts presented here are flexible. As new energy innovations are developed, the museum, its grounds and plaza can exchange older technologies for new ones. This transition begins by replacing a 1940s era coal power plant with clean 21st century energy technology, and integrating a sustainable new community into Old Town Alexandria's 18th century street grid.



PLANNING CONTEXT

The vision for Potomac River Green draws inspiration from key policies and plans adopted by the City of Alexandria to guide its future development. They include Alexandria's Eco-City Charter, Environmental Action Plan 2030, and the Energy and Climate Change Action Plan endorsed by the City Council in May 2011.[1]

Figure 7.
Environmental Action Plan

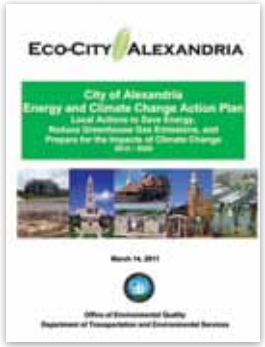


Figure 8.
Eco-City Alexandria

These documents articulate the City's goals and aspirations, and outline what is necessary to build a community that sustainably balances economic, social and environmental progress.

Alexandria's 2008 Eco-City Charter provides a starting point. It advances eleven principles for a more sustainable city:

- Build Wisely
- Embrace Natural Beauty
- Improve Water Quality
- Clear the Air
- Move Smartly
- Conserve Energy and Resources
- Minimize Waste
- Support Healthy Living
- Ready for Change
- Lead Intelligently & Holistically
- Share Responsibility

In 2009, the Alexandria City Council also adopted an Environmental Action Plan. It explains what Alexandria will do to address climate change, promote an emerging green economy, and preserve its high quality of life. The major goals of this plan are listed in Table 1.

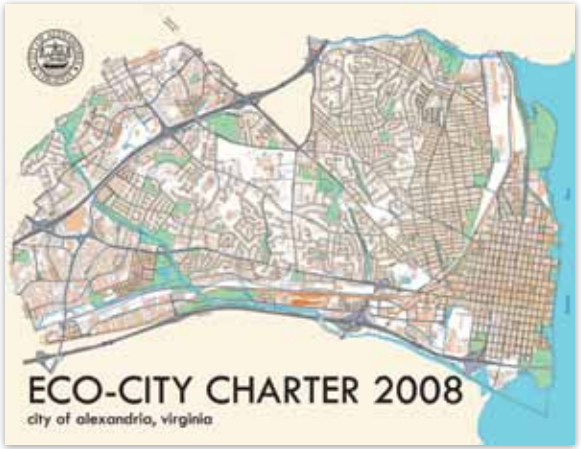


Figure 9.
Eco-City Charter 2008

[1] See, Eco-City Charter, City of Alexandria, Virginia, (June 2008) available at: http://alexandriava.gov/uploadedFiles/tes/oeq/EcoCityCharter2008.pdf; Environmental Action Plan FY2009-2030, City of Alexandria, Virginia (2009) available at: http://alexandriava.gov/uploadedFiles/tes/eco-city/EAP_FINAL_06_18_09.pdf; Energy and Climate Change Action Plan, City of Alexandria, Office of Environmental Quality, Department of Transportation and Environmental Services (April 20, 2011) available at: http://alexandriava.gov/uploadedFiles/tes/oeq/info/EnergyandClimateActionPlan_April-20-2011-EPC.pdf]

Table 1. Goals of the Alexandria 2009 Environmental Action Plan

• Reduce emissions at the Potomac River Generating Station and reuse the site for clean energy generation, open space, community functions, and river-based transportation.	• Encourage the use of materials recovered from demolition sites; promote the construction of new buildings that are carbon neutral and meet LEED© Gold and Platinum standards, harvest gray water.
• Accommodate increases in people and jobs through green development and related technical assistance.	• Promote more compact, walkable and bike friendly land use patterns.
• Promote the education and involvement of residents, organizations, and businesses on issues of sustainability and smart growth – such as green building, energy conservation, local clean energy generation, and environmental protection.	• Support new infrastructure for zero and low-emission vehicles such as hydrogen, electric, and plug-in hybrids; and encourage the development of a green taxi fleet.
• Develop an Eco-City Alexandria Outreach and Education Center to hold activities for city staff and local schools, as well as sustainability-focused workshops for home and business owners.	• Enhance open space and incorporate the natural environment into the built milieu with trails, watershed protection, and community gardens.
• Have 50 percent of the restaurants and grocery stores in Alexandria qualify as eco-friendly.	• Make the built environment more energy and water efficient, minimize its ecological impact, and reduce per capita energy use in Alexandria by 15 percent through conservation and the adoption of cleaner, more energy efficient technologies and practices.

Estimated Health Care Costs from Potomac power plan pollution:
$287.1 million
(Clean Air Task Force, 2010)

Alexandria's 2011 Energy and Climate Plan builds on the Eco-City Charter and Environmental Action Plan. It includes goals and measures to reduce local greenhouse gas emissions (e.g., a 20% reduction from 1990 levels by 2020) and recommends that all new buildings be carbon-neutral by 2030.

Potomac River Green will help the City achieve many of its environmental goals. First and foremost, the plan is designed to accelerate the closure of the PRGS. In the last decade, this power station has emitted up to 1.5 million tons of carbon dioxide annually and was the largest single-point source of carbon dioxide and other polluting emissions within city limits. Closing the PRGS will substantially help the City meet the emissions reduction targets established in its Energy and Climate Change Action Plan.

Pollution Reductions from Closing the PRGS

PRGS Emissions	Tons[2]
SO2	1,417 (2010)
NOx	1,451 (2010)
CO2	1,119,693 (2010)

Potomac River Green will also restore the northern end of Alexandria's spectacular riverfront. The plan envisions a broad range of pedestrian, bike, kayak and boating uses at the waterside parks running north from the foot of Bashford Lane for over a mile to the Marina in Daingerfield Island Park. An Interpretive Center will encourage conservation of the riverbank and associated wetlands while also educating visitors about the evolution of Alexandria's maritime heritage and local ecosystems.

The plan's energy business and museum complex are designed to meet or exceed LEED© Platinum standards. The museum is designed to be carbon-neutral, use no more energy that it generates, and recycle black and gray water.

The commercial areas of Potomac River Green will also be built to LEED© standards and incorporate office and meeting space for clean energy start-ups, investors and consultants. Together, these components have been designed to attract sustainable businesses and to foster new jobs. The Alternative Fuels Center will help reduce the City's transport-related emissions. Supporting the growth of local green vehicle and fleets, including taxis, this station will refuel a variety of vehicles powered by compressed natural gas (CNG) and electricity.

[2] Based on 2010 data from U.S. Environmental Protection Agency, "Clean Air Markets – Data and Maps," p.49, available at http://camddataandmaps.epa.gov/gdm, accessed 15 July 2011.

Finally, Potomac River Green is designed to complement Alexandria's evolving plans for the local waterfront. There is currently an active dialogue between the City and local residents regarding the provisions of a new draft Small Area plan for waterfront development that was released in February 2011.[3] While the Small Area plan is primarily focused on properties that lie substantially south of the power plant and, hence, are at some geographic distance from the site addressed here, the waterfront green space, public access, recreation and community-oriented features of Potomac River Green should be compatible with any plan ultimately adopted by the City. In any case, given the construction timetable contemplated for this project (See Section VI below) there is no reason to delay adoption of the current waterfront Small Area plan; the power plant site can be rezoned following the adoption of any new plan to the south.

In sum, Potomac River Green is consistent with the goals set forth in the City's master plan, as well as with the Small Area plans for surrounding neighborhoods, the Transportation Master Plan, and the Bicycle and Pedestrian Mobility plans. The project presents a harmonious mix of commercial, community, and recreational facilities that maintain an appropriate economic base while enlarging the parklands available to all Alexandrians.

Figure 10.
Alexandria Waterfront 2011

[3] See, "Alexandria Waterfront DRAFT Small Area Plan, City of Alexandria, Department of Planning and Zoning, available at http://alexandriava.gov/Waterfront#Draft_Waterfront. Small_Area_Plan_Released_Feb252011. Later events are chronicled at http://alexandriava.gov/Waterfront.

Figure 11.
Overview Map

1. Energy Center Building
2. Office Plaza
3. Hotel + Waterfront Plaza
4. Mixed Use Residential
5. Quiet Residential
6. Park Space

DEVELOPMENT CONCEPT

Potomac River Green is an innovative mixed-use real estate development concept for transforming the 25 acre site now occupied by the Potomac power station and an associated Pepco substation.[4]

It features extraordinary waterfront access and an economically sound mix of eco-smart residential, commercial and civic buildings capped by a landmark new Energy Center building that will house a museum and new business center. The development will conform to LEED© standards, and in many areas, strive to exceed these requirements.[5] Individual buildings will reflect LEED© standards and the Energy Center will be designed to approach net zero for carbon emissions.

The land use plan for Potomac River Green is designed to mesh with and enhance the current street grid for Alexandria while providing a new focal point for the City's northern waterfront. The street plans and buildings also align with the topography, taking advantage of natural water flows for storm water treatment and energy production.

The architecture for Potomac River Green has been chosen to reflect its proximity with Old Town Alexandria. It draws on federal 18th and 19th century architectural design, but from south to north transitions to 21st century design concepts across the project's three neighborhoods. The buildings at the south vary from four to five stories and blend with the adjacent predominantly brick and stone buildings. Just one block to the north, the style and materials take on a more contemporary look that includes metal and glass, as well as brick and stone.

The architectural focus of Potomac River Green is the Energy Center (Figure 27). This building is also the hub for certain on-site utility services (electricity, waste water treatment) that branch out from the building to provide sustainable services to nearby neighborhoods. The Energy Center is three stories, but includes an atrium space for natural ventilation that rises to 60 feet. The core masonry wall of this building will be built from the old power plant's exterior brick and salvaged concrete. This building will also use recycled wood beams, solarium glass and stone. Many of these elements will come to the site prefabricated.

Figure 12. Site Model

The northern neighborhood steps down to three story energy-efficient townhomes. The neighborhood will use clean geothermal and solar energy systems. It will be built from energy-efficient components (e.g., wood panels and siding, metal panels).

[4] As discussed in Section V. below, the Pepco electrical substation, which is now co-located at the PRGS and which plays an essential role in the local transmission and distribution grid, would be upgraded and integrated into the development plan contemplated for PRG.

[5] Leadership in Energy & Environmental Design (LEED) is an internationally recognized green building certification system, providing third-party verification that a building or community was designed and built using strategies intended to improve performance in metrics such as energy savings, water efficiency, CO2 emissions reduction, indoor environmental quality, and stewardship of resources. LEED was developed by the U.S. Green Building Council (USGBC). LEED for Neighborhood Development (LEED-ND) provides a rating system for neighborhood planning and development based on the combined principles of smart growth, New Urbanism, and green infrastructure and building. LEED-ND places emphasis on the site selection, design, and construction elements that bring buildings and infrastructure together into a neighborhood and relate the neighborhood to its landscape as well as its local and regional context.

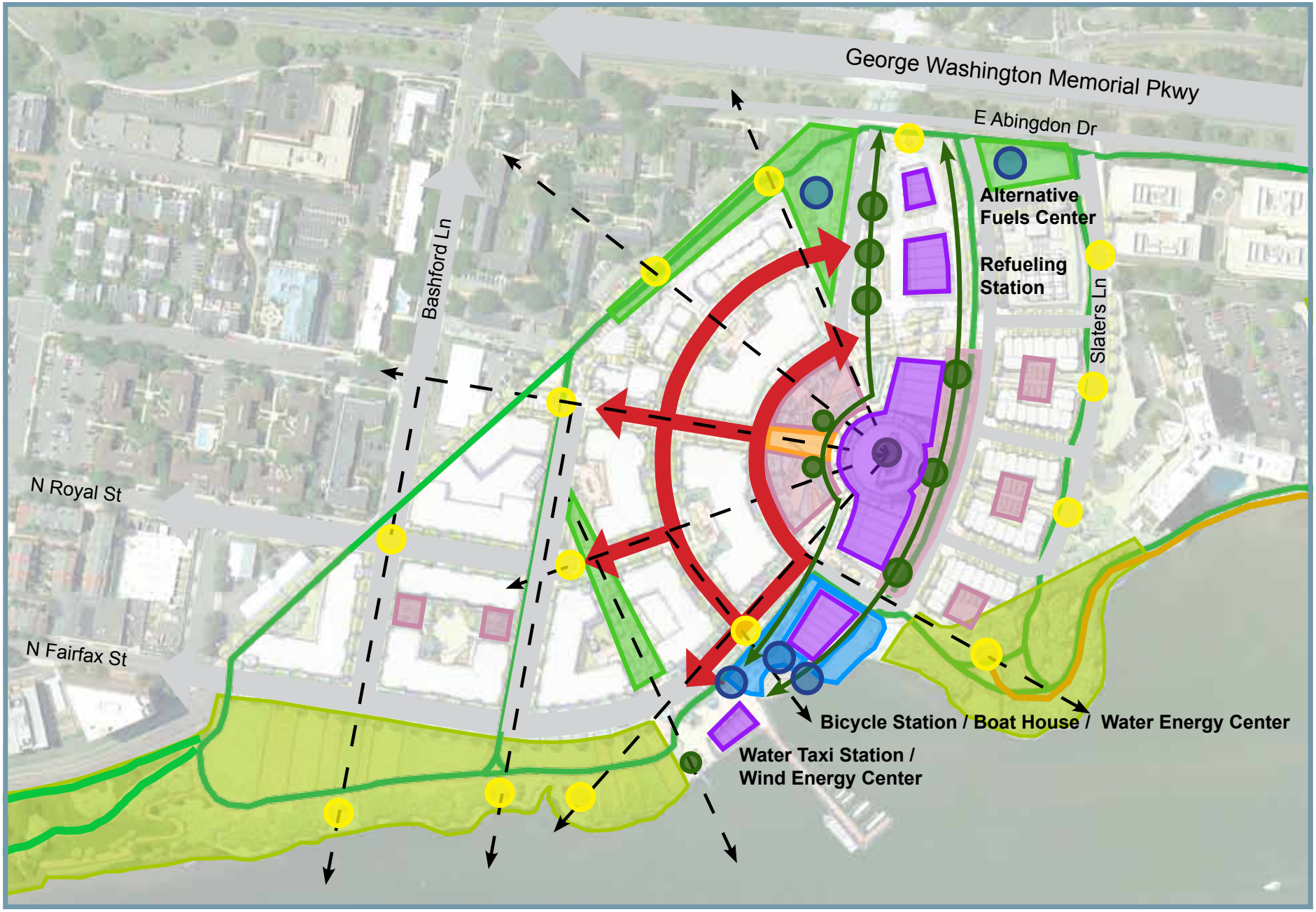
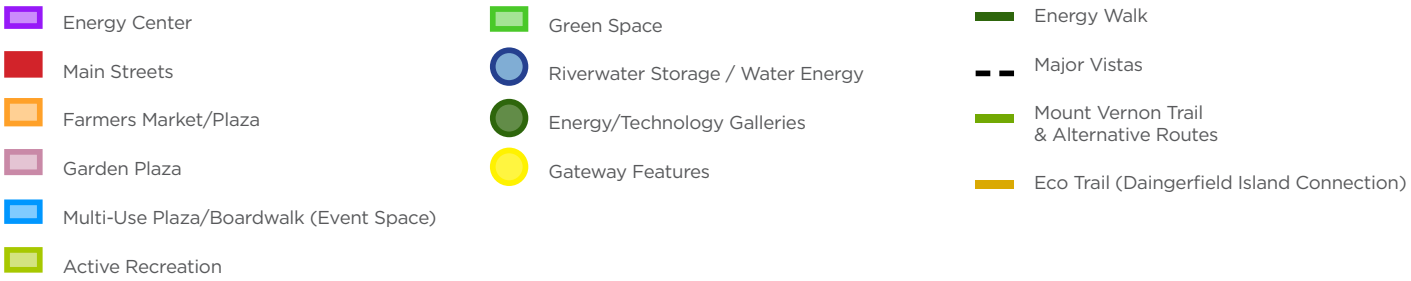

George Washington Memorial Pkwy
E Abingdon Dr
Alternative Fuels Center
Refueling Station
Slaters Ln
Bashford Ln
N Royal St
N Fairfax St
Bicycle Station / Boat House / Water Energy Center
Water Taxi Station / Wind Energy Center

Figure 13.
Street Map & Public Amenities



GREEN SPACE & PUBLIC AMENITIES

Unimpeded public access to the Potomac waterfront is central to Potomac River Green. There is an exceptional amount of recreational and green space. Almost one-third of the total site — nearly seven acres – remains free from built structures.

Waterfront

The plaza area on the north end of the waterfront will be very active. The Mount Vernon Trail will bisect it, making the plaza an ideal location for an integrated bike station. The public boathouse and docks also adjoin the plaza and will provide a local gathering place for nearby residents and visitors.

Figure 14.
Waterfront Guide

1. Bike Station
2. Boathouse
3. Water Energy Center
4. Water Taxi Station
5. Public Restrooms
6. Wind Energy Center
7. Water Energy Display
8. Public Dock / Water Taxi
9. Public Boatramp / Dock
10. Plaza / Performance Space
11. Wind Powered Turbine
12. Pedestrian Throughway / Vista
13. Restaurant / Entertainment Zone
14. Mt. Vernon Bike Trail

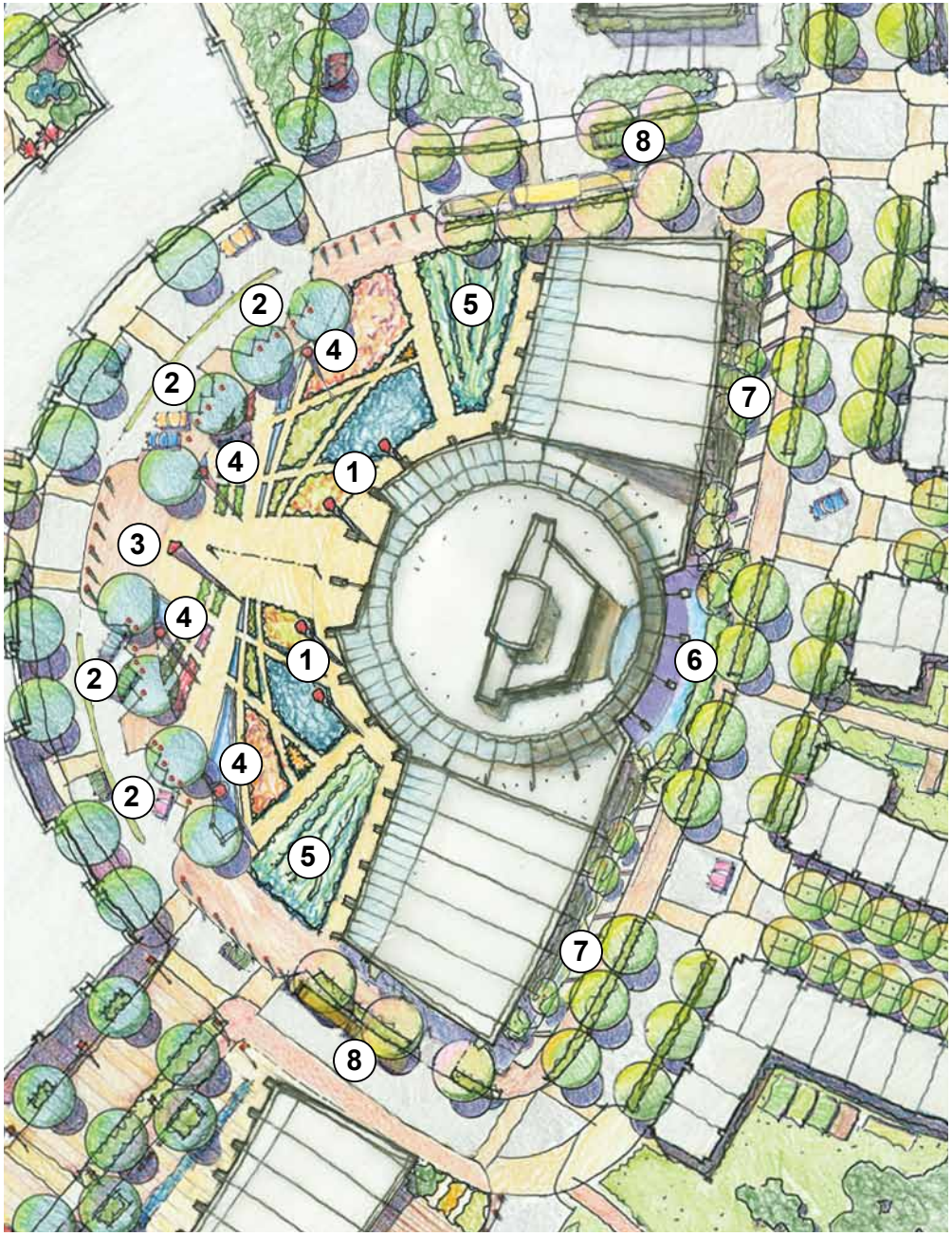
Interpretive Center

An interpretive center complements a new eco-trail connecting to Daingerfield Island. Programs at the Center will focus on the ecology of the adjacent wetlands and river system, as well as the maritime history of the area.

The center is located at the apex of a hill, which will offer expanded public views of the river. *See the view below from the river bank.*

Figure 15. North Viewpoint

1. Interpretive Center
2. Mt. Vernon Trail
3. Nature Walking Trail Connection to Daingerfield Island
4. Improved Vista Overlooking the River



Garden Plaza

The central garden and plaza introduce one of the core ideas behind PRG: smart land use and innovative energy technology can bring new life to the grounds of a former coal-fired power plant. From this space, visitors enter the new Energy Center.

The plaza can host community events, such as concerts and farmers' markets. Displays in the garden engage visitors on sustainable land use, energy production, and water management. Plantings and pavings will form a functional sun dial. There are vertical-axis wind turbines, wetland gardens that treat wastewater, and stormwater filtration centers that work with the varying topography of the site.

Underneath the plaza, parking space is provided for the central building and adjacent office.

Figure 16.
Energy Building & Plaza

1. Renewable Energy Displays
2. Electric Vehicle Charging Stations
3. Sundial Garden Plaza - accommodates a solar clock, civic events, farmers' market, etc.
4. Vertical-Axis Wind Turbines
5. Wetland For Wastewater Treatment
6. Water Storage Pond
7. Stormwater Treatment Gardens
8. Bus Turnaround

Figure 17. Neighborhood Guide

NEIGHBORHOODS

The land use plan for Potomac River Green extends Alexandria's existing street plan. Residential uses predominate. Most residences will be multi-family buildings. Single family homes are also located on the north end of the site. The residential mix provides opportunities for all incomes and ages. Some residential buildings have retail on the ground floor. Others offer a more secluded location with private green space.

Retail uses thread through the site to draw people to the central garden and the waterfront plaza. Sidewalks are wide enough to accommodate shoppers, benches and, in select locations, outdoor dining. Trees and bioswales will provide shade and filter storm water.

The major office space is located across the central plaza and will link to the Energy Center. These office buildings have small footprints and are designed for start-up and mid-stage businesses. They also include retail and underground parking for the Energy Center.

PRG comprises three distinct neighborhoods. The following pages highlight what makes each neighborhood unique and also how each extends the current attributes of Old Town Alexandria.

Figure 18. South Neighborhood

Potomac River Green South

The south neighborhood buildings are primarily residential perimeter units integrated with the immediately adjacent residential communities. These buildings will reflect the Old Town architectural style. A new waterfront residential community also flanks the expanded park area along the river. The street grid is extended to provide direct access to the river and public spaces. A new small-scale community grocery store sits opposite the existing neighborhoods and begins the retail transition inward to the core of the development. Building heights range from 40 feet at the waterfront to 60 feet at the mixed-use retail parcel.

Moving north, the street grid and public spaces change from rectilinear to radial — creating dynamic public spaces, while the residential street level environment transitions from residential to retail and commercial. Traditional architectural style gives way to the introduction of more varied materials and oversized windows facing the core and the waterfront.

Prominent vistas between buildings tie them to the waterfront. This area is lined with larger format retail and a wider streetscape. A boutique hotel engages this dynamic area directly across from the heart of the public space and a performance area is provided at the water's edge. The blocks' circular edge toward the north defines the main retail street drawing patrons and the community toward the waterfront. The western edge of this circular thoroughfare transitions to the existing neighborhoods with low rise residential buildings buffering the property and forming a continuous style that connects to the gateway drive at George Washington Parkway.

Figure 19. Central Neighborhood

Potomac River Green Central

These curved blocks frame the core public open space and create multiple grand vistas at their corners showcasing the radial grid. The outer perimeter forms the retail main street environment leading to the waterfront while the inner perimeter forms the more formal forecourt or garden space for the Energy Center. All sides of the buildings engage the streetscape with retail that wraps around the buildings. These buildings complete the transition from Old Town to the core space and will be the most dynamic architecturally.

The primary use in this central neighborhood will be offices with street level retail and community facilities. Offices will house businesses that can profit from their relationship with the Energy Center. They will be designed for clean-tech and support services, with incubator space for start-up and mid-stage entities. Clean-tech research and development will occur in dedicated space within the Energy Center, creating a campus-like relationship between the buildings. Street and sub-surface parking for the main building is also provided. Street level office space oriented to the gateway entrance drive will accommodate sustainable business-oriented uses such as a green jobs training center. There is also space for pubic community meetings as well as a day care center.

Building height is reduced to 45 feet, permitting views of the central building from all directions. Because these buildings form a gateway to the core space they will include strong corner elements and be more modern in design with sustainable materials along with brick, cast stone and concrete to blend with adjacent transitional buildings. The facades that face the core and waterfront will be primarily glass to take advantage of the views. The street level will be open and inviting to pedestrians.

Figure 20. North Neighborhood

Potomac River Green North

The residential neighborhood at the north end of the plan fans out along Slater's lane, with roads and sidewalks focused southward toward the central building at successively lower grades as the land falls toward the river. The neighborhood grid contains multiple utility and energy connections with the core building to take advantage of the slope from west to east. Serving as a broad green buffer, this neighborhood enjoys prime waterfront views. In the summer, community gardens shade and cool in-ground air ducts that ventilate the core building. Multiple small streets and garden vistas create a walkable fined-grained neighborhood.

Building heights in the north neighborhood will be no more than 30 feet. Sustainable materials and low energy construction will be utilized. Neighborhood homes will be composed of prefabricated modular shells with prefabricated customizable kitchen and bathroom components. Parking and garden spaces will be at grade level, with wood balconies, siding and detailing. There will be a mix of green roofs and solar photovoltaic systems.

The neighborhood is designed to minimize parking demands and maximize access to public transportation. Space between buildings will offer recreational and gardening space. Bioswales and rain gardens will collect storm water, which will be fed to the central building for reuse.

A broad greenway is proposed to the north along Slater's lane, which will become a new route for the Mount Vernon Bike Trail tying into both the Parkway and river front segments. This will reduce bike crossing at the more highly traveled streets interior to the development.

Solar Power + Energy Storage

The Potomac River Green neighborhoods will be powered, in part, by some of the most advanced and efficient technology currently available. The northern neighborhood and the central building are designed, in part, for maximum capture of solar energy through photovoltaic cells. Energy captured through photovoltaics will be converted and stored to power the neighborhood and the building as well as other facilities such as the EV charging stations.

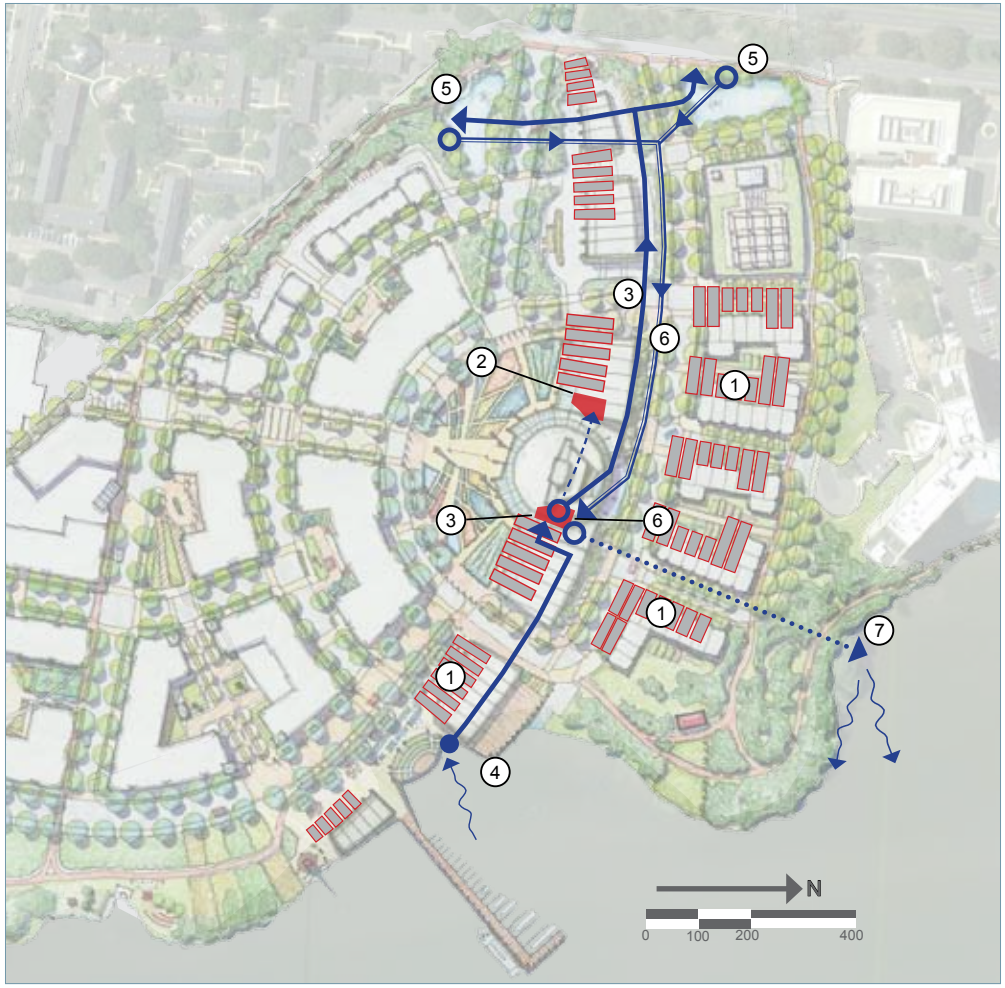
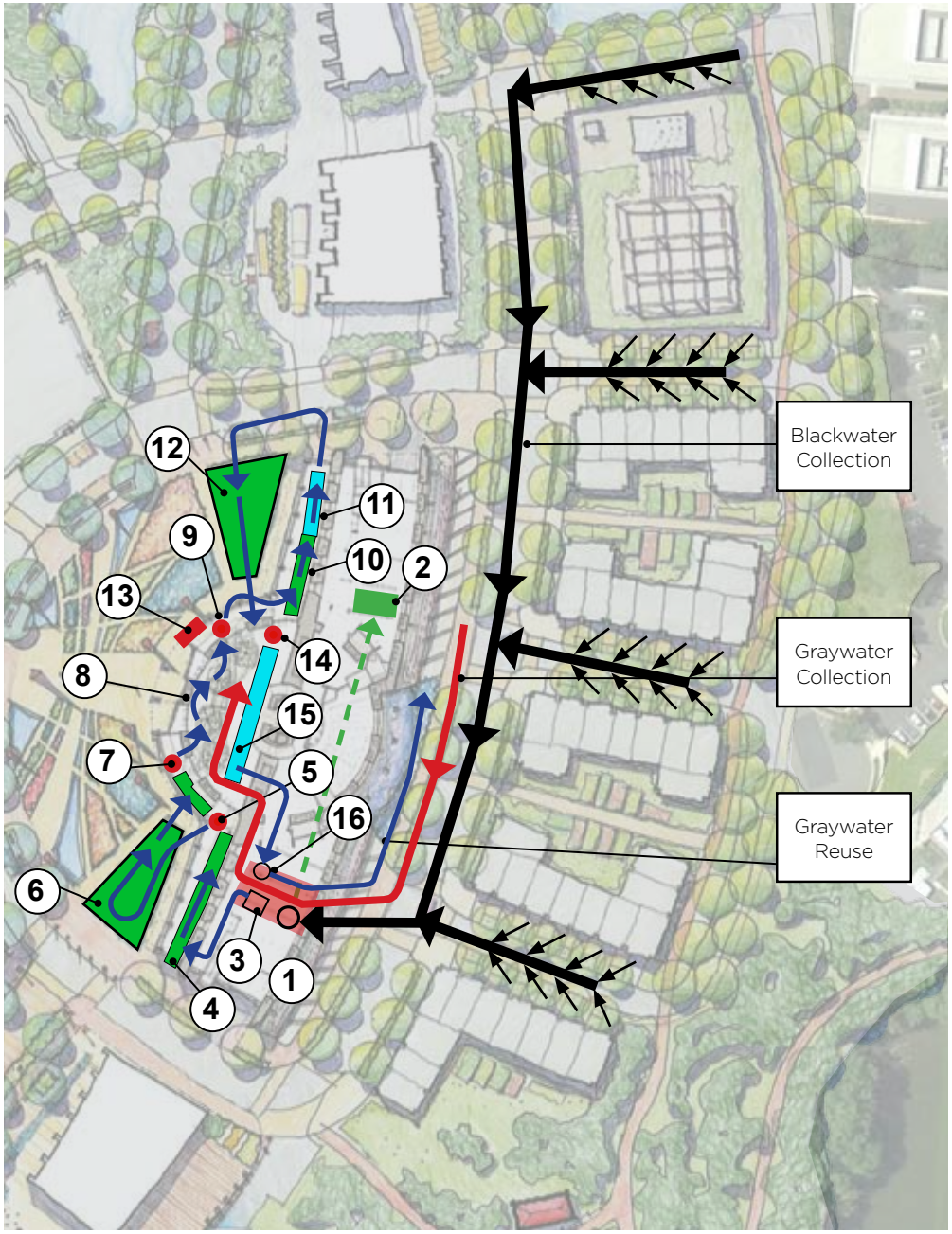


Figure 21.
Solar Power & Energy Storage Guide

1. Photovoltaic arrays
2. Photovoltaic-powered hydrogen production and flywheel energy/storage
3. Photovoltaic-powered river-water pump up grade
4. River water intake
5. Upgrade water storage ponds
6. Water penstock to microturbine generators·
7. Water discharge to river at existing outlet



Waste Water Treatment

The northern neighborhood and the central building also work together to treat waste water and generate energy. Neighborhood waste water from the northern neighborhood will be collected along the fan shaped streets for processing within the central building. Black and gray water will be processed through hydroponic gardens and hardy plant species that can remove contaminants. The water will be used to feed gardens in the central building complex and central neighborhood. Methane harvested from the treated water will be collected and used in fuel cells which will power the central building.

Figure 22.
Waste Water Treatment Guide

1. Upflow Anaerobic Reactor
2. Methane to Hydrogen Fuel Cell
3. Anoxic Reactor
4. Tidal Flow Hydroponic Gardens
5. Clarifier
6. Tidal Flow Wetland Gardens
7. Polishing
8. Atrium Stream Garden
9. Filter
10. Hydroponic Gardens
11. Aquaponic Production
12. Horizontal Flow Wetland Gardens
13. Vermiposting/ Composting
14. Filter
15. Cistern
16. UV Filter

Geothermal Systems

Three geothermal systems, one operating in each of the neighborhoods (north, central and south), will take advantage of the site's proximity to the Potomac River to provide an additional source for heating and cooling. A closed loop horizontal system will operate in the northern neighborhood, furnishing energy to the central building. A second closed loop system will derive energy from the river itself and link to the first closed loop system, providing additional energy to the central building. The third system, which will operate below the garages underneath the central and southern neighborhoods, will be an open loop system. It will utilize ground water that could otherwise accumulate in garages, and discharge it into the river.

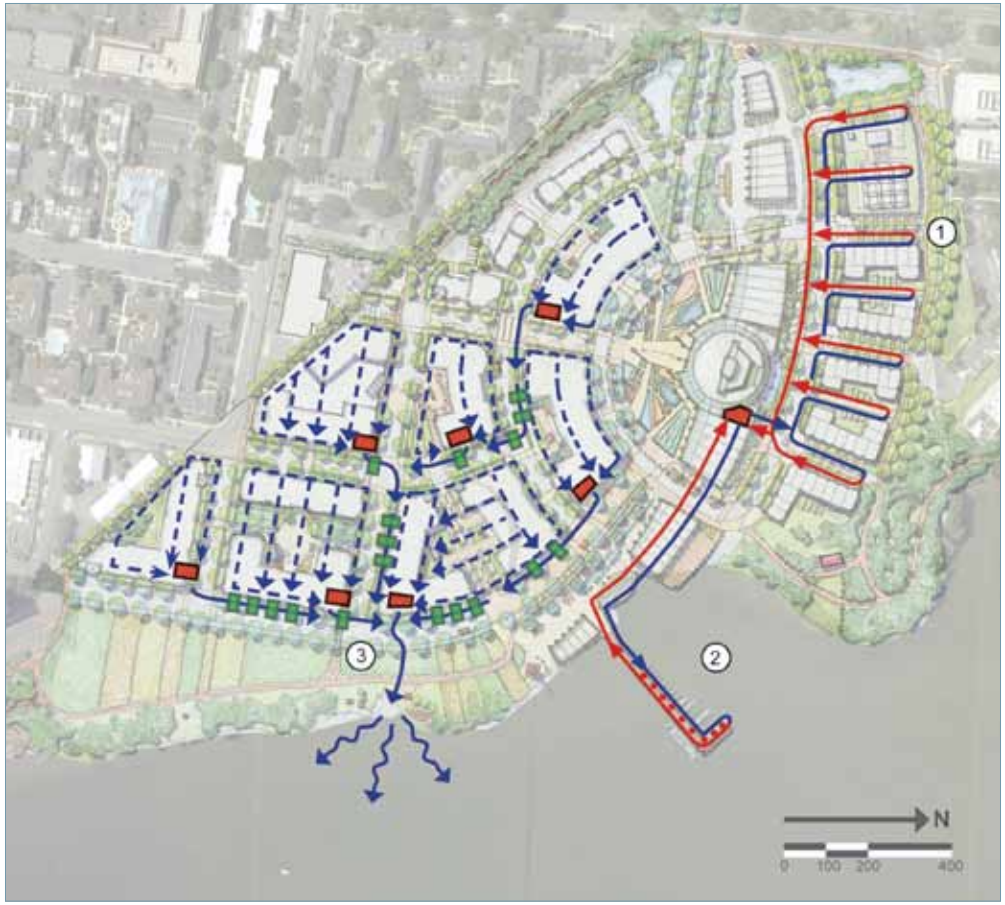


Figure 23. Geothermal Systems

1. Horizontal Closed Loop System
2. Closed Loop River Pylon System
3. Basement Garage Dewatering System

Storm-water Treatment/Cooling

Figure 24.
Cross-Section of
Geothermal & Utility Lines

The circulation lines for the northern neighborhood's closed loop geothermal system sit below air, storm water and waste water line conduits, that tie into the central building.

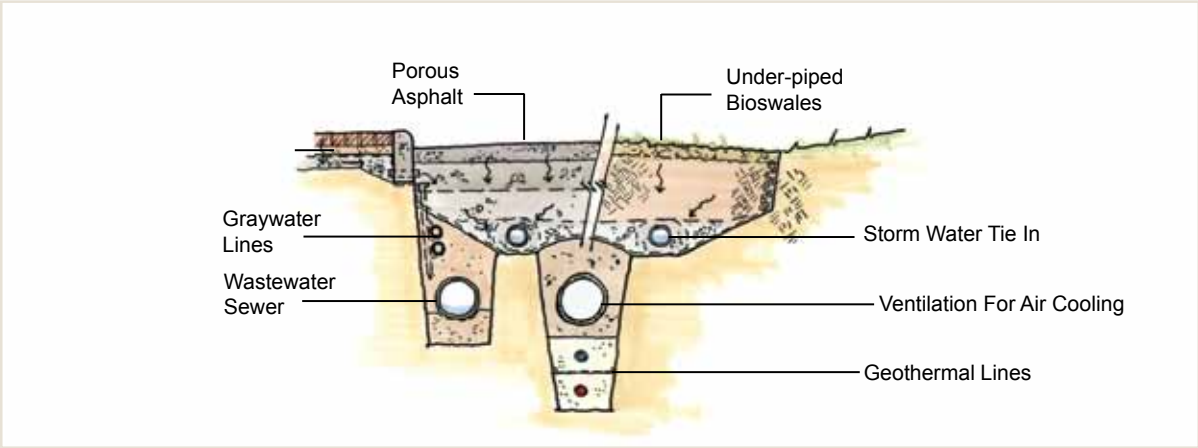
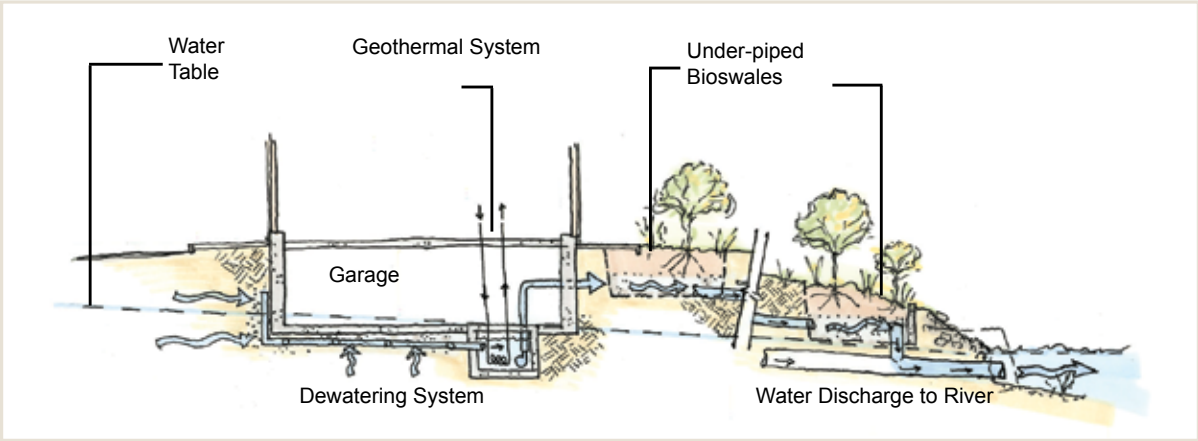


Figure 25.
Basement Geothermal System

In this open loop system running through the southern neighborhood, water is drawn from the water table below garages and then is discharged into the river.



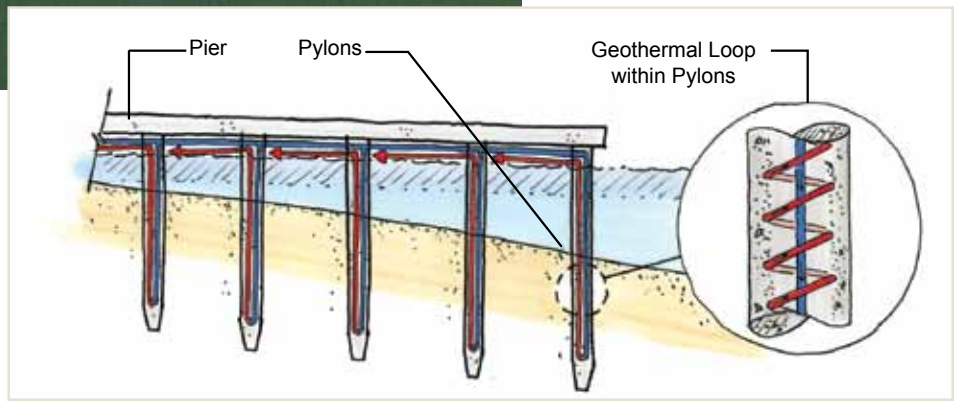
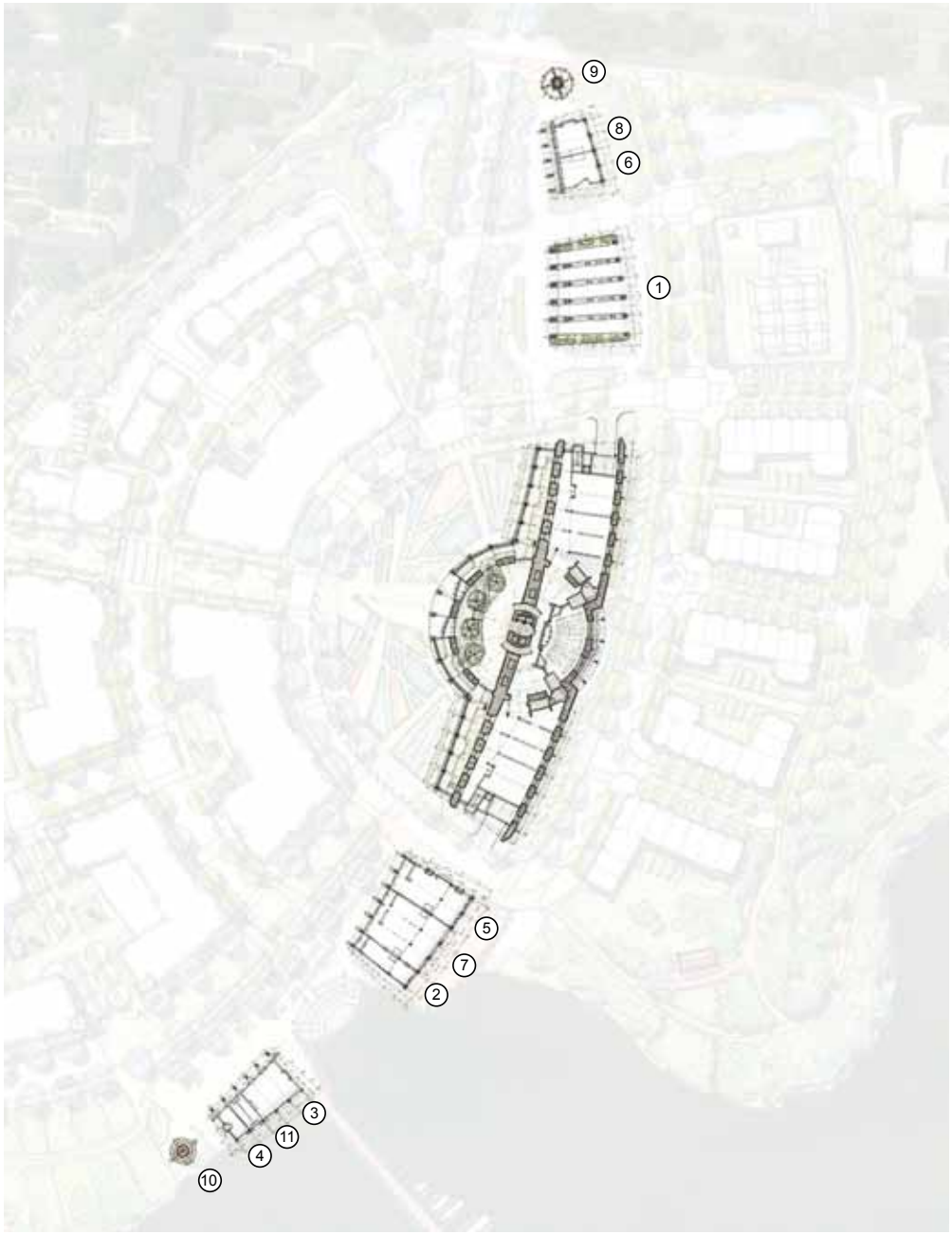


Figure 26.
Potomac River Pier
Geothermal System

The concrete pylons supporting the public dock anchor geothermal circulation lines that connect to the central building and provide heating and cooling services to the northern neighborhood.



CENTRAL BUILDING

The central building is designed to house three main activities: (1) a working energy museum that will also supply energy to surrounding neighborhoods; (2) community meeting space and a restaurant (café); and (3) administrative offices for the adjacent clean energy enterprise center (i.e., business incubator). The main areas of the building devoted to these activities are described below.

Museum

The central building will exhibit a wide range of energy systems that will change over time as new technologies arise. Some will be experimental in nature. Others will power the building itself and the surrounding neighborhoods. Located throughout the facility, these systems become interactive learning opportunities.

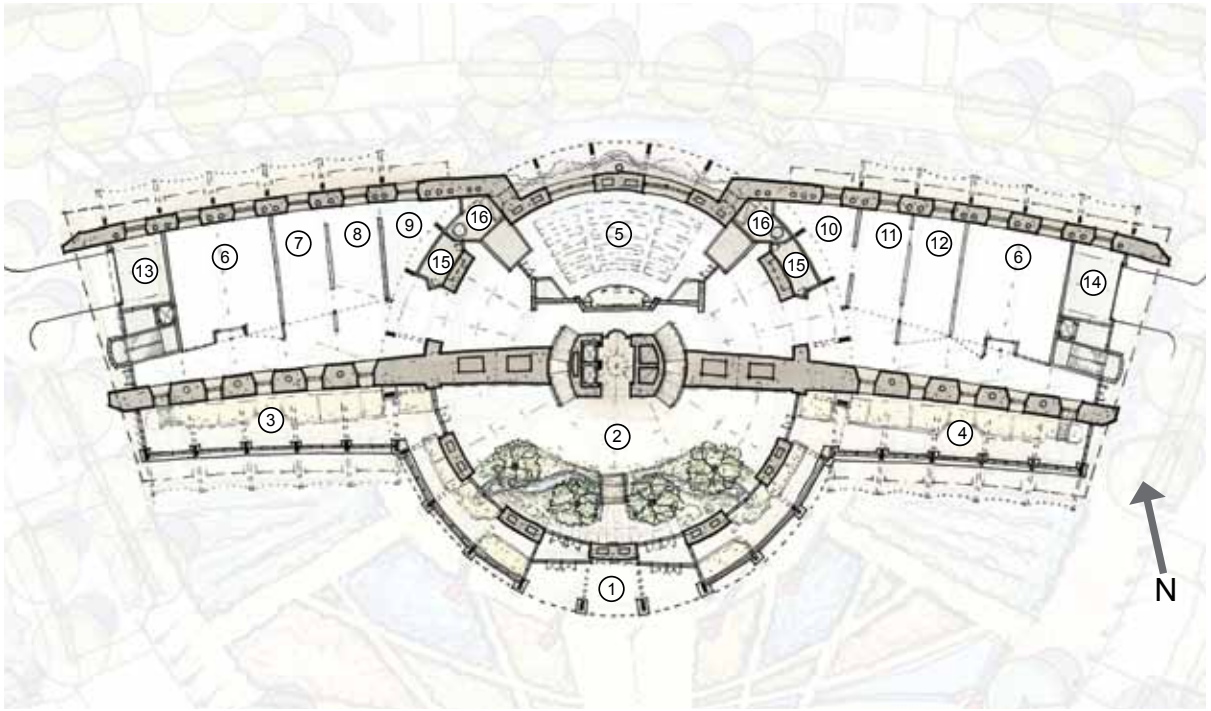
Exhibits within the museum will showcase the major current energy options. Low carbon and renewable energy systems will retain a special place within the museum. These systems will be presented in a way that allows even casual visitors to understand their benefits and advantages. At the same time, the use of these technologies within the PRG site will demonstrate their practical value.

Figure 27.
Energy Center
& Related Buildings

1. Refueling Station
2. Water Energy Center
3. Water Taxi Station
4. Wind Energy Center
5. Bicycle Station
6. Refueling Center
7. Boat House
8. Zip Car Office
9. Gateway Icon
10. Wind Energy Tower
11. Public Restrooms

Figure 28.
Energy Center Ground Floor

1. Entry
2. Atrium and Gardens
3. Solarium (Graywater Treatment)
4. Solarium (Blackwater Treatment)
5. Auditorium
6. Research + Development
7. Fuel Cell Energy
8. Bio-Fuel Production
9. Photovoltaic + Electrical Storage
10. Geothermal + Solar Thermal
11. Hydro Power
12. Waste-Water Treatment + Methane Recovery
13. Loading
14. Service
15. Restroom
16. Mechanical



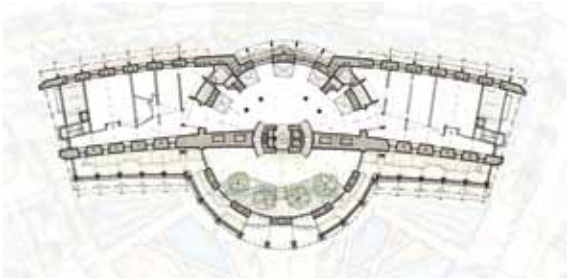


Figure 29.
Energy Center Second Floor

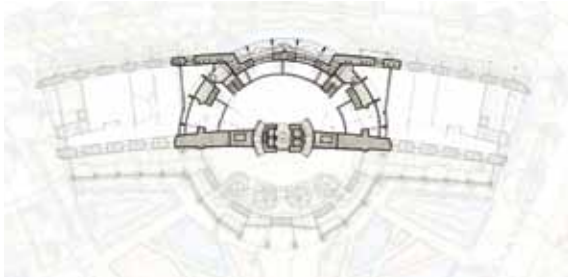


Figure 30.
Energy Center Top Floor

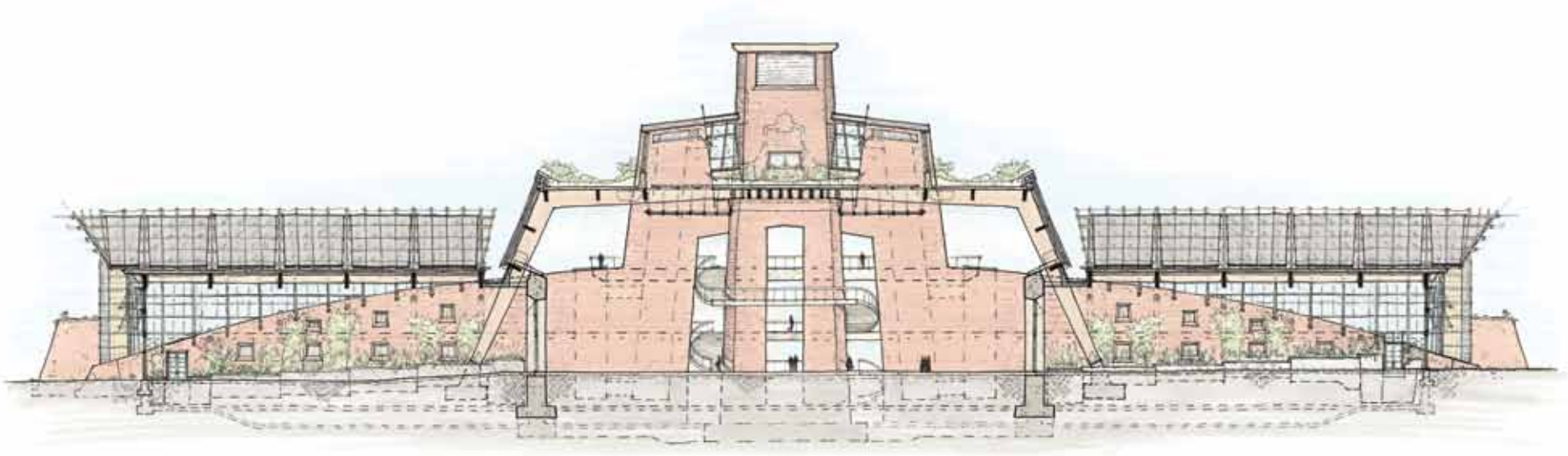


Figure 31.
Energy Center South Exposure

The solar, geothermal and fuel cell energy systems that power the central building and the PRG neighborhoods will be displayed to the public throughout the museum. The unique features of the building – its net zero carbon design, energy production and waste water recycling capabilities, use of salvaged and other low energy building materials, and other bio-friendly characteristics also will be on display. Perhaps the most innovative feature of the building -- unique use of solar energy and seasonal lighting patterns -- will turn the building itself into a museum exhibit.

The central building is designed to function as a living and breathing machine capable of passively and naturally conditioning itself year round. Several interrelated systems work together in concert creating natural ventilation flows, passive solar benefits and natural light patterns that wax and wane throughout the seasons in direct proportion to the energy needs of the building. See Figures 32 - 37.

An innovative passive solar system that shades and insulates the central building continuously controls solar energy production, building ventilation, and variable insulation in a simple and dynamic way. Two concentric half-circle rings of insulation act as shields that slowly rotate outside a circular story of windows. They interact to create openings that admit sunlight, provide shade, and close each evening to provide much needed insulation. Openings created by the rotation of the insulating shields balance seasonal and daily average outside temperatures, optimizing passive solar heating and cooling.

The outer ring rotates once a year while the inner rotates slightly more than once a day, mimicking the sun-earth relationship. The daily gain of the inner ring causes the opening to align toward the south in the winter at noon, and to the north in the summer at noon, optimizing sun or shade. The rings also rotate in a perpetual clock-like fashion to close off each evening. This simple constant motion system also activates ventilation ports around the building throughout the year in a way that increases the building's in-ground ventilation capacity in the summer and heating capacity (from solariums) in the winter. This multipurpose system will be a central display for visitors to the museum space.

Energy Incubator

Across the plaza from the museum building, Potomac River Green will offer approximately 100,000 square feet of office space for a clean energy enterprise center or business "incubator" for energy service and technology start-ups.

Business incubators are designed to facilitate commercialization pathways for entrepreneurs. They are a proven vehicle for accelerating the successful development of new companies, providing office support and infrastructure services, strategic counsel and operational guidance. By bringing together a diverse mix of scientific, engineering, and business talent, PRG's incubator is also designed to provide ongoing opportunities for collaboration and cross-pollination.

There is currently no central office park or business incubator for clean energy R&D and innovation activities in the Washington, D.C. area, even though the Metro area is home to a growing number of alternative energy and smart grid companies, as well as related trade associations.[6] In recent years, R&D spending on energy innovation by the Department of Energy and its Advanced Research Projects Agency (ARPA-E), the Pentagon and the National Science Foundation (NSF) have also boosted Washington's role in the new energy economy.[7] The energy enterprise center is intended to draw on the activities of these government agencies, along with the presence of a growing network of private sector consultants, technical advisers, university departments and entrepreneurs.

The importance of clean energy R&D to America's economic prospects has been underscored by several recent reports.[8] The business incubator at Potomac River Green responds to that imperative.

Community Space

The central building will be a social gathering and educational space for the local community, including residents, visitors and people working at the small and medium-sized businesses hosted by the energy incubator.

Figure 32.
Energy Center Atrium

1. Atrium + Public Space
2. Auditorium
3. Exhibit Space + Classrooms
4. Passive Solar Exhibit
5. Cafe
6. Observation Deck
7. Solarium / Green House

The interior open spaces and exhibits are open year round and include places for visitors to enjoy views to the river, have a meal or hold meetings. The rooftop café, water features and gardens are available year-round.

The educational space includes community classrooms and an auditorium. The auditorium and related spaces will host conferences and events for the museum and associated energy incubator.

[6] In 2009, a small (3,000 sq. ft.) green business incubator was created in Bethesda, Maryland. See http://www.bethesdagreen.org/ Another center is located in Blackstone, Virginia, near Virginia Tech: the National Institute for the Commercialization of Clean Energy, Inc. (NICCE). See http://www.virginiaenergynetwork.com/ Other incubators in Virginia include the Riverstone Energy Center (South Boston), Dominion Resource's CleanTech Incubator (Ashland), the Sustainability Park (Hopewell), and the Va Beach Clean Tech Incubator (Virginia Beach).

[7] Notably, in 2010, the Department of Energy established three Energy Innovation Hubs: Fuels from Sunlight; Efficient Energy Building Systems Design; Modeling and Simulation for Nuclear Reactors. See http://www.energy.gov/hubs/qanda.htm. The prior year, DOE's Office of Basic Energy Sciences provided $2-5 million in funding for 46 new Energy Frontier Research Centers (EFRCs). These Centers involve universities national laboratories, nonprofit organizations, and for-profit firms. See http://science.energy.gov/bes/efrc].

[8] See e.g., "The Impact of Clean Energy Innovation," Google Foundation (June 2011) available at: http://cleaneconomynetwork.org/sites/default/files/Google.org-The_Impact_of_Clean_Energy_Innovation_0.pdf See also: "Creating a Clean Energy Century - Recapturing the Lead in Clean Tech Innovation," Third Way Foundation (November 2010) available at: http://content.thirdway.org/publications/351/Third_Way_Report_-_Creating_a_Clean_Energy_Century.pdf; and "A Business Plan for America's Energy Future," American Energy Innovation Council (June 2010) available at: http://www.americanenergyinnovation.org/the-plan/

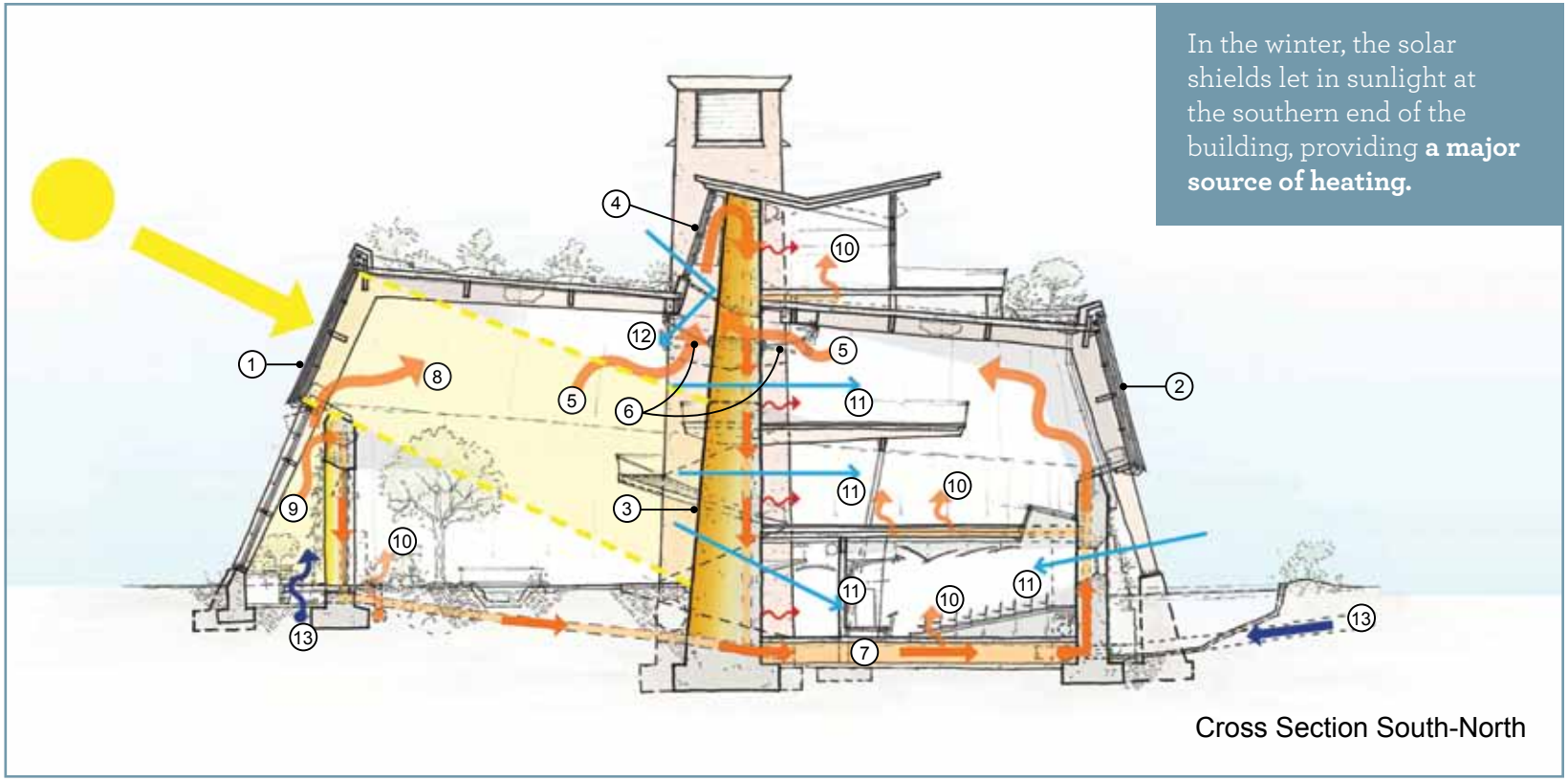


Figure 33.
Energy Center Winter Heating & Ventilation

1. South Facing Clearstory, Open Aperture; Direct Solar Gain
2. North Facing Clearstory, Closed Aperture; Shading and Insulation
3. Thermal Mass Wall, Delayed Heat Release
4. Trombe Wall Warm Air Return & Light Monitor
5. Warm Air Return Through Thermal Mass Wall
6. Operable Ventilation Panel & Light Monitor
7. Air Distribution & Humidification Plenum
8. Solar Heat Port Controlled by Clearstory Aperture
9. Solarium Heat Collection
10. In-Floor Warm Air Supply/Distribution
11. Daylighting Over & Through Mass Wall Portals
12. Light Monitor Indirect Daylighting
13. Outside & Make-Up Air

An innovative passive solar system that shades and insulates the central building also controls energy production, building ventilation, and variable insulation in a simple and dynamic way. Two concentric half-circle rings of insulation act as shields that slowly rotate within the central building at constant but different speeds. They interact to create openings that admit sunlight, provide shade, and close each evening to provide much needed insulation. These events occur in direct proportion to the seasonal and daily average outside temperatures, resulting in an ideal passive solar system.

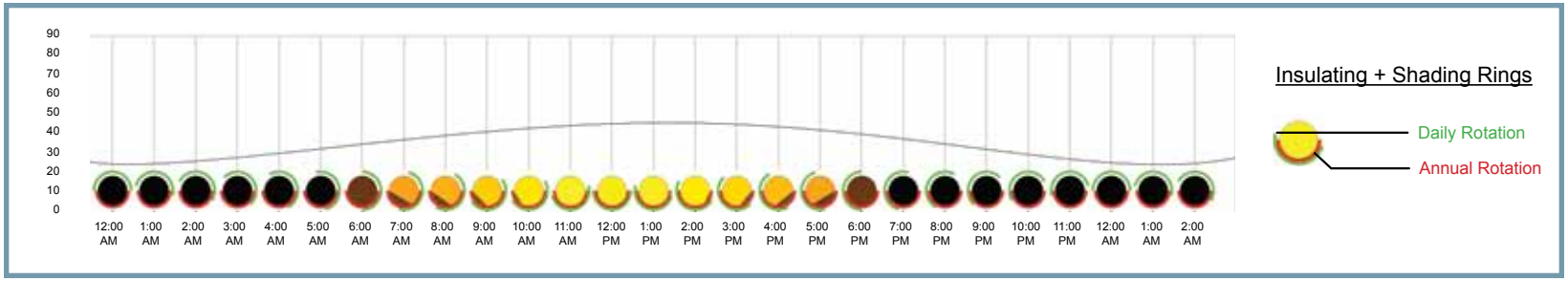


Figure 34.
Passive Solar Aperture Shading
& Insulation Ring Dynamics

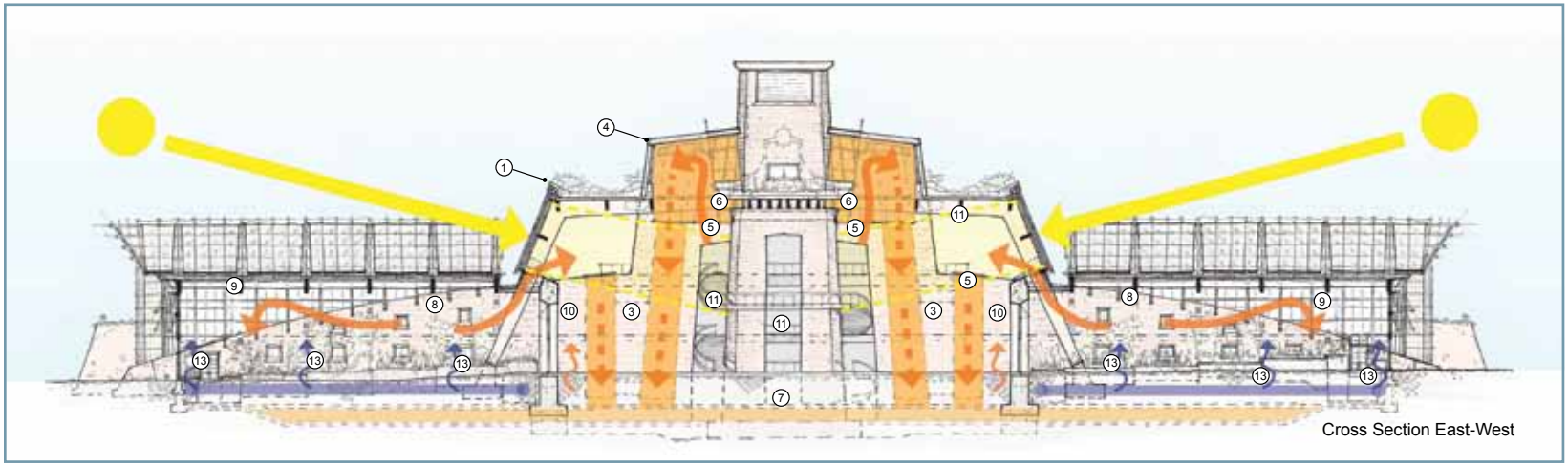


Figure 35.
Passive Solar
Heating & Ventilation

The outer ring rotates once a year while the inner rotates slightly more than once a day mimicking the sun-earth relationship. The daily gain of the inner ring causes the opening to align toward the south in the winter at noon, and slowly transition to align facing north in the summer at noon, providing an optimal amount of solar access or shade continuously as well as abundant daylight. The shading in the remaining seasons is also proportionate to the average needs of the building.

This simple constant motion system also activates ventilation ports around the building throughout the year that increases the building's summer cooling capacity, and heating capacity in the winter. This multipurpose system will be a central display for visitors to the museum space.

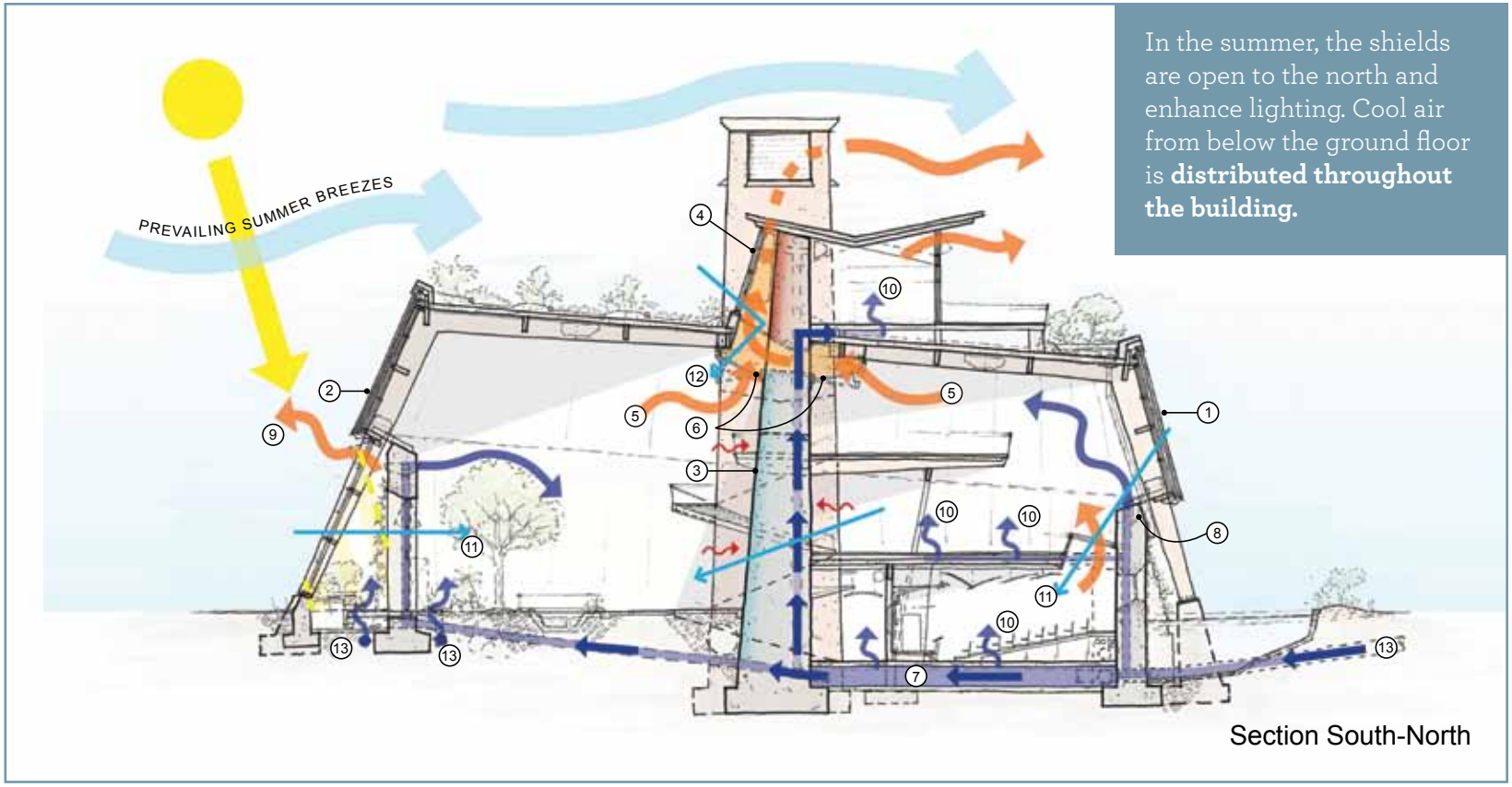


Figure 36.
Energy Center Summer
Cross-Section & Cooling

1. North Facing Clearstory, Open Aperture, Maximum Daylighting
2. South Facing Clearstory, Closed Aperture; Maximum Shading
3. Thermal Mass Wall, Heat Absorbing
4. Trombe Wall Solar Chimney & Light Monitor
5. Warm Air Ventilation Through Solar Chimney
6. Operable Ventilation Panel & Light Monitor
7. Air Cooling and Dehumidification Plenum
8. Cooling Air Port Controlled by Clearstory Aperture
9. Solarium Heat Ventilation
10. In-Floor Cool Air Supply & Distribution
11. Daylighting Through Light Monitor & Solarium Portals
12. Light Monitor with Direct Daylighting
13. Ground Cooled Gravity Driven & Outside Air

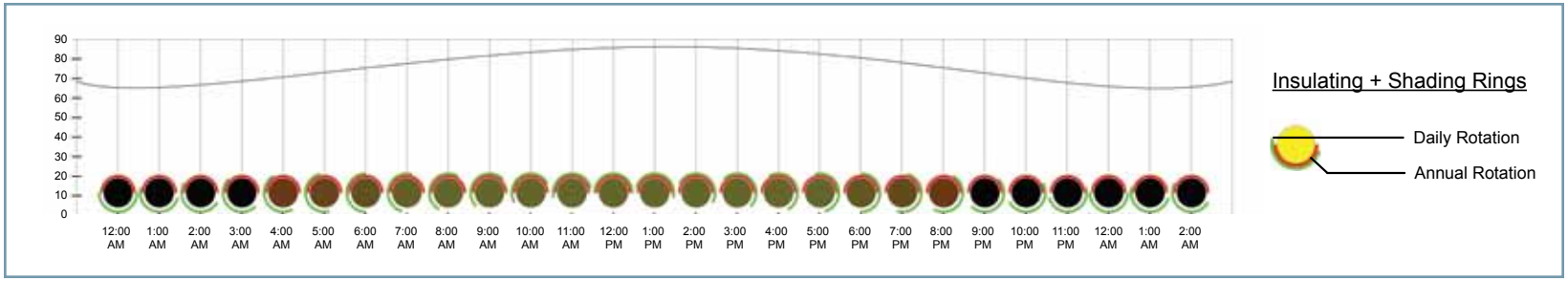


Figure 37.
Passive Solar Aperture Shading
& Insulation Ring Dynamics

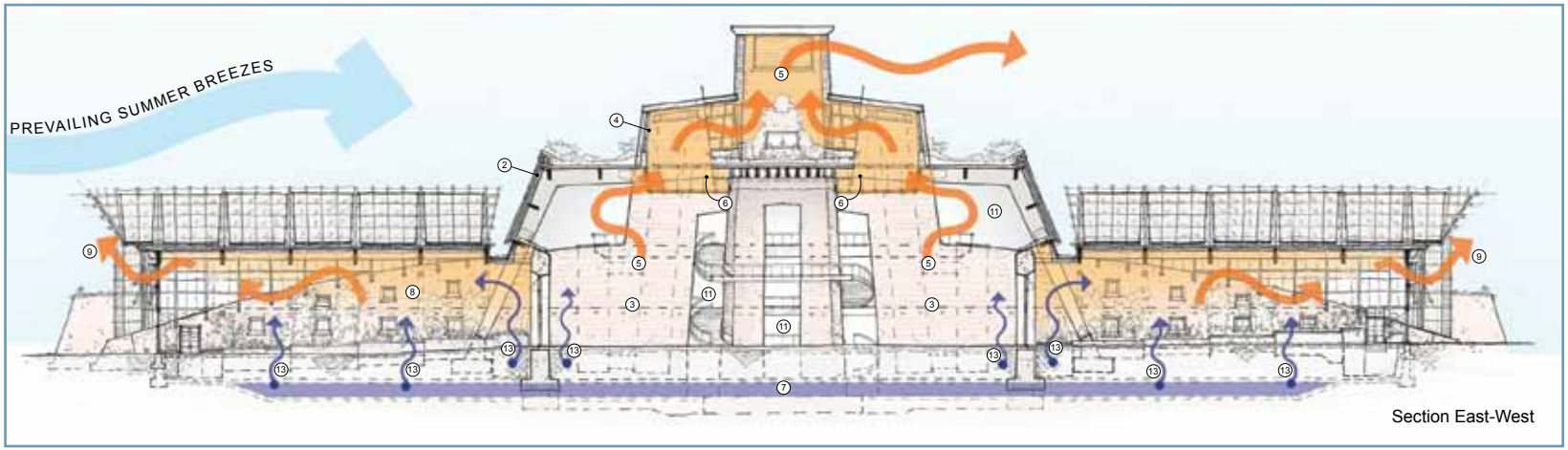


Figure 38.
Passive Solar
Cooling & Ventilation

Residents, employees of local businesses and visitors will take advantage of the **many shops and restaurants** offered at Potomac River Green.

Figure 39.
Commercial Street View

COMMERCIAL AMENITIES

Potomac River Green features approximately 90,000 square feet of commercial office space and over 110,00 square feet of retail and restaurant space. These amenities will complement the residential use of the site, relieving offsite commuter traffic, and enhance the development's overall economic viability.

LEED© quality office space is designed to appeal to clean energy businesses, consultancies, and government agencies. Hosting tenants like these will be essential to making PRG an integrated energy center for the region.

A small five-story, 125-room hotel on 80,000 sq. ft. will strengthen the Potomac River Green mixed-use network. It will offer expanded opportunities for meetings and conferences related to the nearby museum and energy business center, as well as providing additional restaurant facilities.

Potomac River Green **completes Alexandria's street grid** on the northeast end of the city.

TRANSPORTATION

Potomac River Green incorporates extensive sidewalks and trail systems to connect the site's residential, retail and commercial areas. Reduced car trips and walkable neighborhoods contribute to improved air quality and public health.

PRG also seeks to improve transportation choices locally and regionally:

Public Transportation

The PRG development will be readily accessible by public transportation. DASH, Metro buses, Metro rail, Virginia Railway Express (VRE) and Amtrak stations will be within easy reach.

Improvements to the Mt. Vernon Bike Trail also connect commuters and visitors to the planned Metro stop at Potomac Yards by way of Daingerfield Island. (See Figure 41 below). In addition, water taxis will give visitors and residents access to tourist destinations north and south of Alexandria.

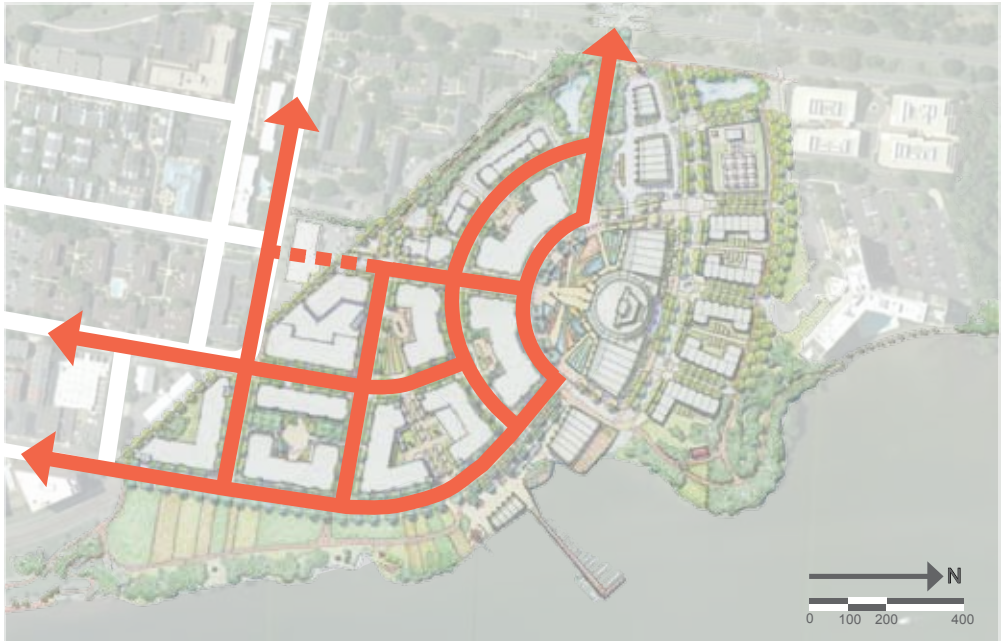
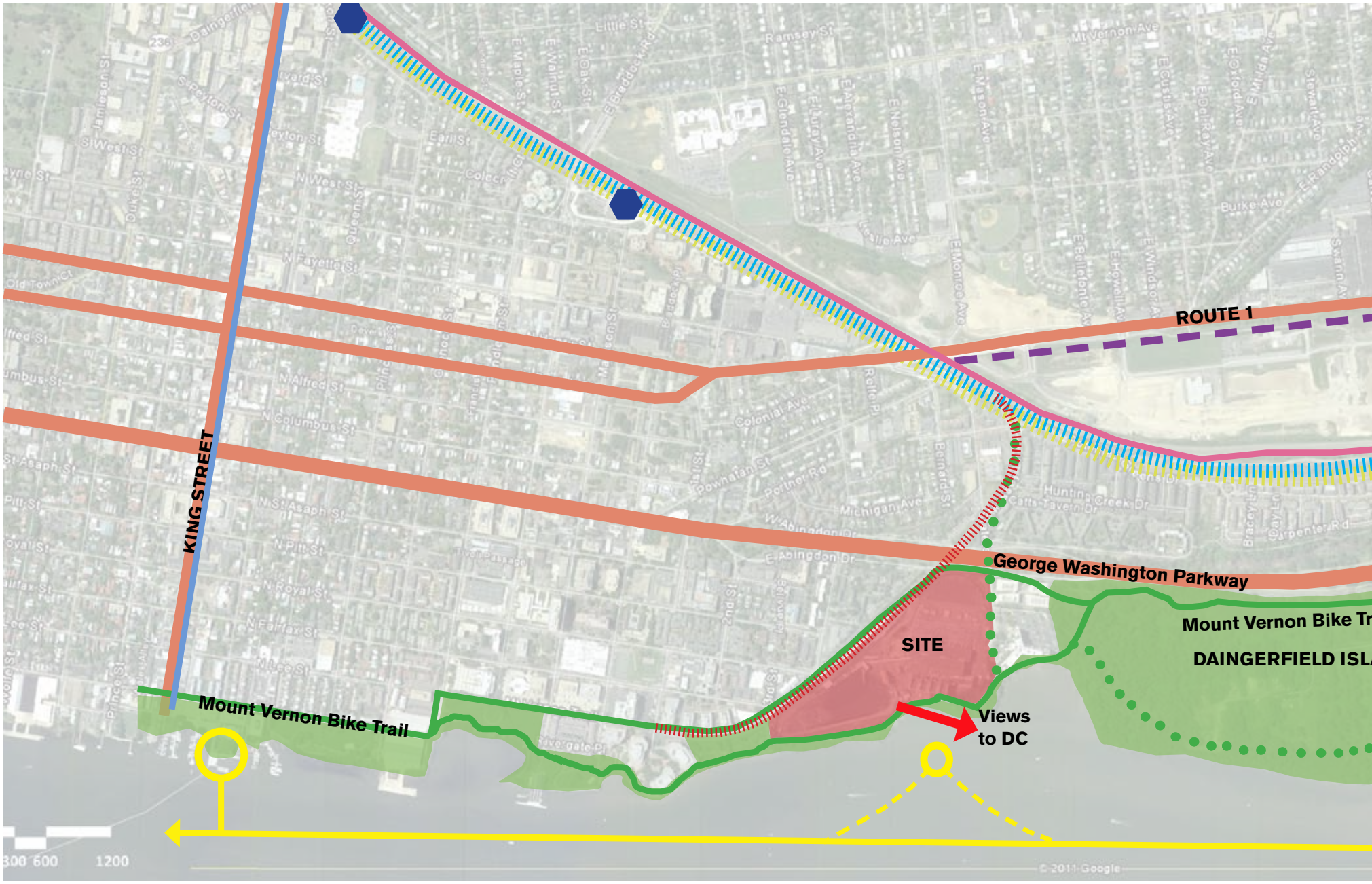
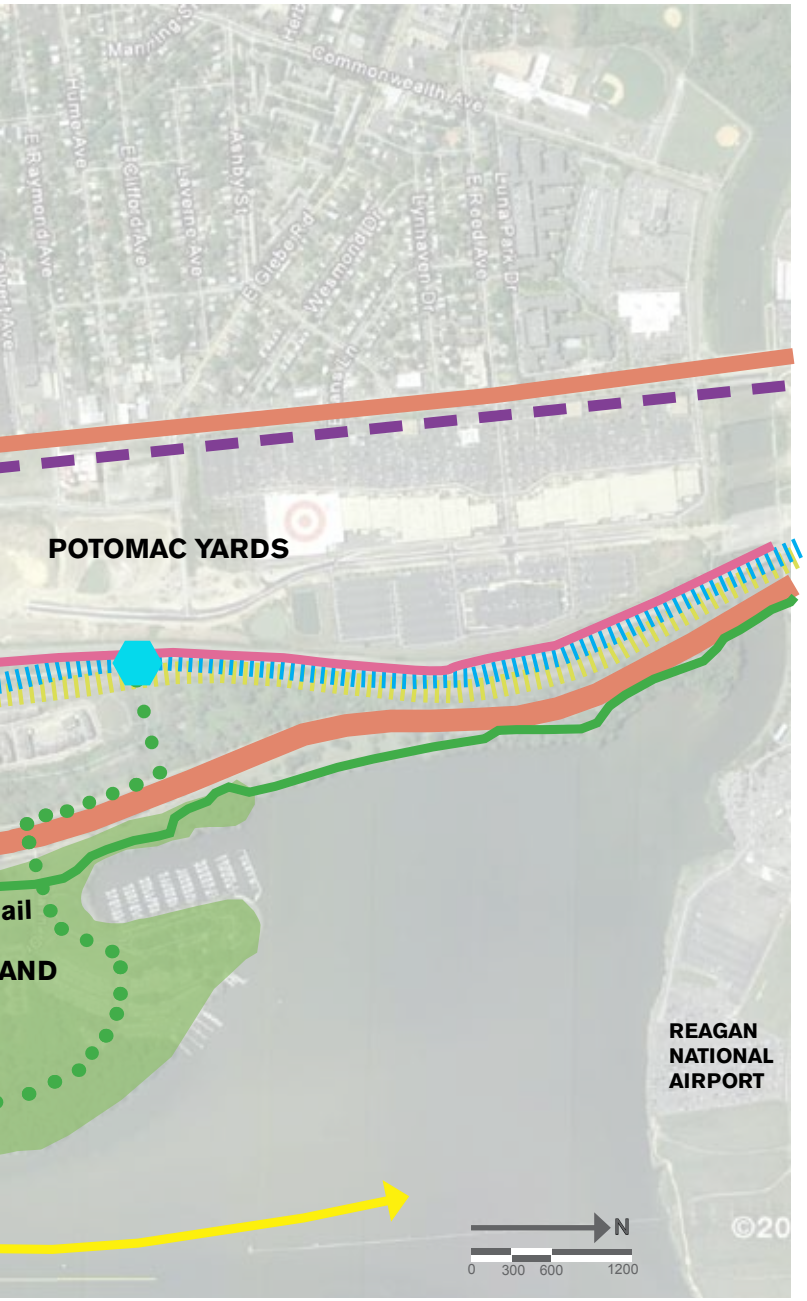
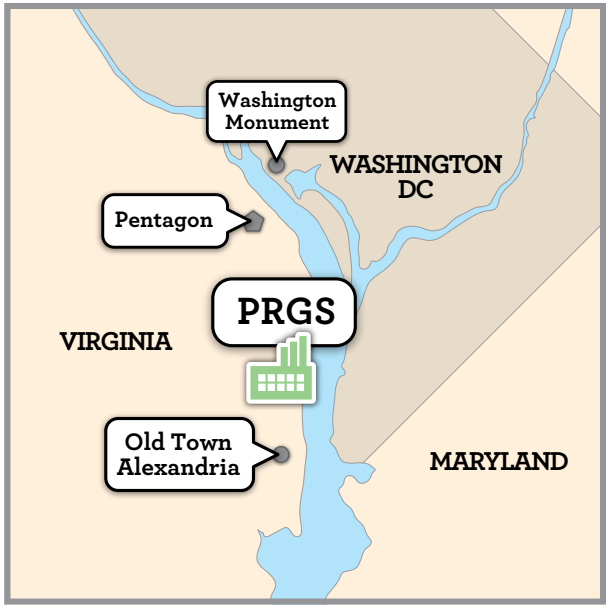


Figure 40. Major Streets


ROUTE 1
KING STREET
George Washington Parkway
SITE
Mount Vernon Bike Trail
Views
to DC
Mount Vernon Bike Tr
DAINGERFIELD ISL
300 600 1200
© 2011 Google





Potomac River Green will **connect** Alexandria's Old Town river front parks to the south with **improved recreational facilities** to the north at the Daingerfield Island federal park, where pedestrian access will be provided to Metro's planned Potomac Yard station.

Figure 41. Regional Transportation Map

- Major Roads
- Existing Metro Stations
- Future Metro Station at Potomac Yards[9]
- Blue Line
- Yellow Line
- Rail Spur
- VRE Line
- Proposed Mixed Use Trail
- Existing Bicycle Trail
- Water Taxi
- Existing Trolley
- Proposed Light Rail
- Existing Water Taxi Route
- Proposed Water Taxi Route

[9] A planning process has been underway for several years to add a new Metro station on the Blue and Yellow lines to serve the Potomac Yards shopping area and adjacent neighborhoods. The station would be located between Alexandria's Braddock Road station and the Ronald Reagan National Airport stop. See, e.g., Potomac Yard Metro Station Environmental Impact Station Scoping Summary Report (June 2011) available at http://www.potomacyardmetro.com/Scoping%20Report_main.pdf. Additional background on this project can be found at http://alexandriava.gov/planning/info/default.aspx?id=19982]. These connections will improve public access to Alexandria's waterfront for both residents and visitors.

Figure 42.
Alternative Fuels Center

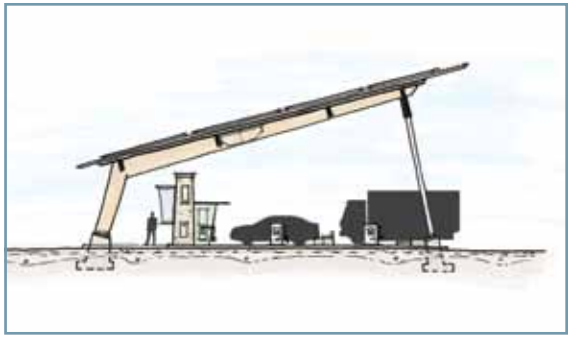


Figure 43. Fueling Schematic

Alternative Fuels Center

An Alternative Fuels Center (AVC) will be located at the northwestern tip of the site. It will recharge electric vehicles and serve as a public compressed natural gas (CNG) refueling center for taxis, corporate fleets, and government vehicles. The Center is convenient to the George Washington Parkway and could also accommodate Metro buses.

The AVC's architecture will create a visual gateway to Potomac River Green and draw people in from the Parkway. Its design also echoes the main Energy Center and signals the site's role as a 21st century energy hub.

The CNG component will be a fast-fill refueling station, for which this location is well suited. Washington Gas has advised that eight- and six- inch gas mains are already located nearby and will produce sufficient pressure to fuel the CNG station at the 40-70 pounds of pressure required for operation. In addition, there are several large vehicle fleets in the Northern Virginia area. These include over 1,500 taxis which could be converted to natural gas. Other potential CNG fleets include utility (gas, electric, telephone) vehicles as well as fleets run by police, paratransit, florists, landscape crews, and cable TV providers.[10]

[10] Demand for CNG services is expected to grow over time as wholesale natural gas prices are forecast to remain substantially below that for gasoline and diesel fuel. Currently CNG typically retails for less than $2.00 for the equivalent of a gallon of gasoline.

DAINGERFIELD ISLAND

Potomac River Green is also designed to provide significant new recreational benefits.

The Daingerfield Island park occupies 106 acres of land along the river, just north of the power plant and at the northeastern end of Alexandria. The park is administered by the U.S. Park Service and offers the potential for a number of recreational opportunities that have not been fully realized to date. Given its proximity to Potomac River Green and the scope for a connecting trail system, this proposal envisions expanded uses of the park with improved amenities including bike and walking trails, new public playing fields and increased access via public transportation.

The effort to expand transportation options across the City and to adjacent areas is reflected in the new eco-trail and bike path, which runs from just north of the redeveloped site to Daingerfield Island. From the park, the bike path continues across the George Washington Parkway (on a new pedestrian bridge) to the planned Potomac Yard Metro Station.

Figure 44.
Potomac River Green -
Daingerfield Island Trail System

Figure 45.
Daingerfield Island
Recreational Improvements

The Mt. Vernon trail currently traverses the eastern edge of Daingerfield Island and is divorced physically and visually from the waterfront. The new walking and bike trail proposed here will diverge from the Mt. Vernon trail and lead users through the undeveloped areas of the island along the river. Previously cleared, but currently unused, parkland outside of the wetlands would be made newly available to the public for sports events (soccer, lacrosse, etc.).

To promote greater public use of the island, the Potomac River Green concept also envisions the creation of a new park conservancy (or trust). The conservancy would augment existing public funds to make much needed recreation and transportation improvements at the park. These improvements might include two or three new multi-purpose playing fields, extension of the PRG eco-trail along the shoreline and a pedestrian overpass to allow easy access to and from Daingerfield Island by way of the new Potomac Yards Metro station.

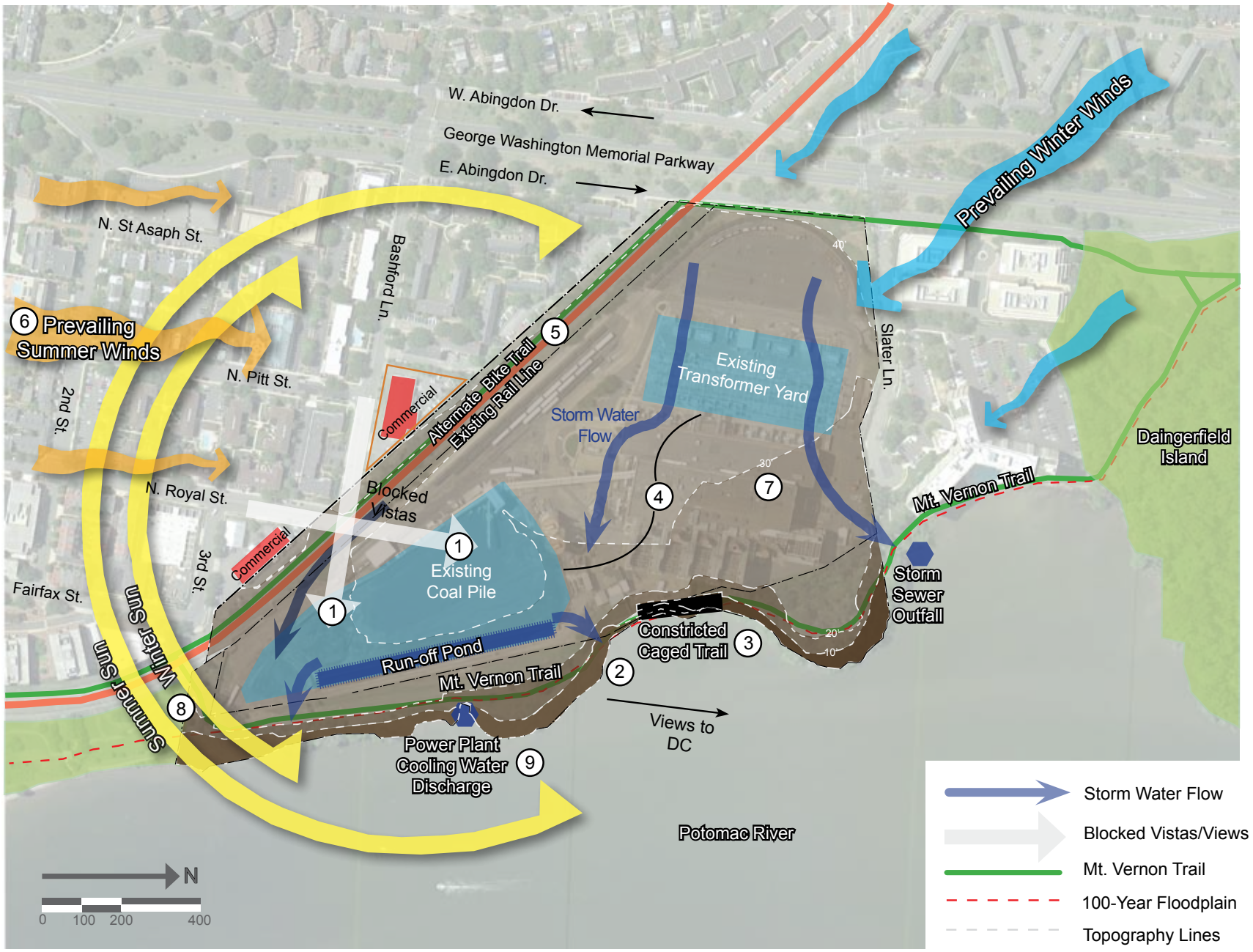
Well-known conservancies that could provide a model for a Daingerfield Island Conservancy include the Central Park Conservancy in New York City and the Trust for the National Mall in Washington, D.C.[11]

Other notable park conservancies include:

- *The Pittsburgh Parks Conservancy, Pittsburgh, PA:* The Conservancy operates as an official public-private partnership for the restoration of four regional parks. Since 1998, it has raised nearly $50 million toward capital projects, woodland management, programming, and visitor services.
- *The Forest Park Conservancy, Portland, OR:* This non-profit corporation works collaboratively with the City Nature Division of Portland Parks & Recreation, which manages the city-owned park. It focuses on fundraising, trail maintenance and improvement, habitat restoration, environmental education, signage improvements, and public outreach.

Figure 46.
Recreation

[11] Details on these organizations can be found at: http://www.centralparknyc.org/ and http://www.nationalmall.org/ respectively.


W. Abingdon Dr.
George Washington Memorial Parkway
E. Abingdon Dr.
N. St Asaph St.
Bashford Ln.
Prevailing Winter Winds
6 Prevailing Summer Winds
N. Pitt St.
2nd St.
Commercial
Alternate Bike Trail
Existing Rail Line
5
Existing Transformer Yard
Slater Ln.
Storm Water Flow
Daingerfield Island
N. Royal St.
Blocked Vistas
4
7
Mt. Vernon Trail
Commercial
3rd St.
1
Existing Coal Pile
Storm Sewer Outfall
Fairfax St.
Summer Sun
Winter Sun
1
Constricted Caged Trail
3
Run-off Pond
Mt. Vernon Trail
2
8
Views to DC
Power Plant Cooling Water Discharge
9
Potomac River
N
0 100 200 400
Storm Water Flow
Blocked Vistas/Views
Mt. Vernon Trail
100-Year Floodplain
Topography Lines

REDEVELOPMENT BENEFITS

Figure 47.
Existing Drawbacks
& Considerations

Existing Drawbacks & Considerations

1. Street grid and public vistas to the waterfront are blocked by the PRGS and coal pile.
2. The waterfront park ends abruptly and is not connected directly to Daingerfield Island.
3. The PRGS water intake facilities force the Mount Vernon bike trail to be routed through a narrow wire fence tunnel.
4. PRGS coal storage and the electrical substation may contaminate percolating rain water and runoff.
5. The rail right-of-way encumbers waterfront access and any extension of the City's street grid.
6. Prevailing summer breezes are forced along a north-south axis and oblique to buildings.
7. The topography drops approximately 50 feet from the Parkway in the west to the river but much of the site has been broadly leveled at the center.
8. At the south end of the site, green space along the water is abruptly reduced and offers no river access.
9. The PRGS discharges plant cooling water at an elevated temperature; the discharge pipes disrupt riverfront access.

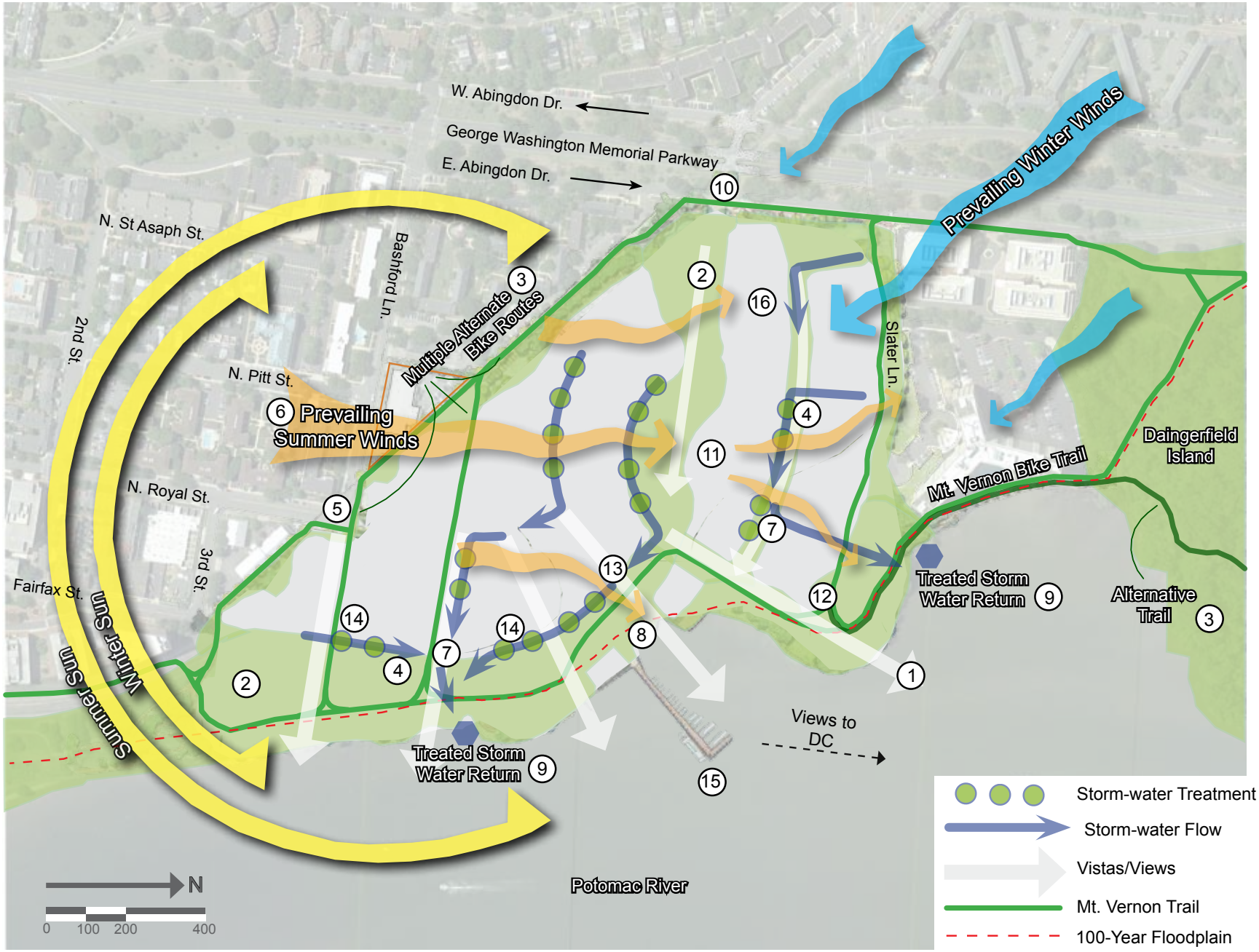

W. Abingdon Dr.
George Washington Memorial Parkway
E. Abingdon Dr.
Prevailing Winter Winds
N. St Asaph St.
Bashford Ln.
2nd St.
N. Pitt St.
Multiple Alternate Bike Routes
6 Prevailing Summer Winds
Slater Ln.
Daingerfield Island
Mt. Vernon Bike Trail
N. Royal St.
3rd St.
Fairfax St.
Winter Sun
Summer Sun
Treated Storm Water Return 9
Alternative Trail 3
Views to DC
Potomac River
N
0 100 200 400
Storm-water Treatment
Storm-water Flow
Vistas/Views
Mt. Vernon Trail
100-Year Floodplain

Figure 48.
Potomac River Green Benefits

Benefits of Potomac River Green

1. Street grid and multiple public vistas to the waterfront provide sweeping new views in all directions, including a long-axis northward along the waterfront and a commanding gateway vista from the Parkway to riverfront.
2. The waterfront park is expanded in several directions and connected to the Parkway as well as to Daingerfield Island.
3. Continuity of the Mount Vernon Bike Trail along the waterfront is extended northward and in several alternate directions and is interconnected with the extended street grid.
4. The coal pile and substation are replaced by open natural areas, permeable on-street parking and sidewalks lined with bioswales and in-ground treatment cells, community gardens, and below grade parking garages covered by permeable surfaces and green roofs, all returning clean water to the earth and river.
5. Existing street grid access is extended to the waterfront, creating prime development opportunities with sweeping vistas while preserving and enhancing waterfront open spaces.
6. Prevailing summer breezes are used by the central building and energy grid to ventilate and cool open spaces.
7. The site's topography returns treated storm water to the river, and is used to deliver black water, gray water and ground-based ventilation to the central building. Stored water is used to generate energy.
8. The redevelopment provides more public waterfront space than now exists in Old Town Alexandria (e.g., at the Torpedo Factory) and offers direct river access.
9. The former site of the PRGS water discharge is converted into a clean water return to the river showcasing the City's stewardship of water quality.

Additional Benefits

10. Alexandria gains a distinctive northern gateway with a unique and prominent extension of the City and its street grid.
11. The new Energy Center — the central building on the site — dramatically caps the City's grid and provides a nationally prominent destination for both local residents and visitors.
12. The Eco-Trail and its associated interpretive center provide new opportunities for learning about the natural environmental and local history.
13. A small hotel enhances the Energy Center's activities and expands opportunities for community events, increasing tourist and retail choices.
14. Public parking is provided along the waterfront areas.
15. The water taxi system is expanded and linked to the north end of Alexandria.
16. A Parkway accessible natural gas and alternative fuel filling station contributes to the City's clean energy goals.

ECONOMIC, FISCAL & RECREATIONAL BENEFITS

RKG Associates, an economic development consulting firm with extensive experience in northern Virginia, has completed an economic and fiscal impact analysis of the municipal benefits of redeveloping the site. The analysis shows increased tax revenues, and substantial new business formation and job opportunities.

Between **2015** and **2024,** Potomac River Green will generate **OVER $1.53 BILLION** in new direct spending throughout the Washington, D.C. region.

ECONOMIC DEVELOPMENT BENEFITS

RKG's analysis assumes that development of Potomac River Green begins in 2015 and continues for ten years. Over this period, more than 1,481 jobs are created directly, through the demolition and remediation of the existing PRGS site and facilities, and through operations at Potomac River Green. Over the same period, associated spending will indirectly create another 725 jobs across the regional economy.

The results of this economic development analysis can be summarized as follows:

- Construction is estimated to begin in 2015 and end in 2018. Total costs of demolishing the power plant, remediating the site, and constructing Potomac River Green is estimated at $442.7 million (in 2008 dollars).
- At full operation in 2018, office use is projected to create 556 jobs.
- Retail use is estimated to generate 362 jobs.
- The proposed 125-room hotel is projected to create 56 direct jobs.

Altogether, it is projected that closing the power plant and developing Potomac River Green will create a total of 2,205 new jobs for the residents of Alexandria and surrounding communities. The current power plant supports approximately 150 jobs. In contrast, Potomac River Green will create almost ten times as many jobs on the site itself – and many more jobs indirectly.

According to RKG's projections, between 2015 and 2024, Potomac River Green will generate over $1.53 billion in new direct spending across the region. This is spending that will benefit families and businesses throughout Alexandria and the neighboring communities.

Table 2. Assumed Construction Cost Per Square Foot*

Residential	$175
Commercial Office	$300
Retail	$290
Energy Center (Civic)	$430

*Excludes land acquisition and site remediation

Table 3: Direct and Indirect Employment Potomac River Green Development [1]

DIRECT EMPLOYMENT	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	TOTAL
Construction	36	57	137	125	88	39	0	0	0	0	484
Operations											
Commercial Office	0	0	164	332	496	496	496	496	496	496	496
Anchor Store	0	0	14	47	76	96	96	96	96	96	96
Other Retail	0	0	31	100	161	204	204	204	204	204	204
Central Building											
Museum	0	0	21	42	64	85	85	85	85	85	85
Incubator Office	0	0	15	30	45	61	61	61	61	61	61
Hotel	0	0	0	0	28	56	56	56	56	56	56
Total - Direct	**36**	**57**	**382**	**677**	**958**	**1,036**	**997**	**997**	**997**	**997**	**1,481**
INDIRECT EMPLOYMENT											
Construction	21	34	81	74	52	23	0	0	0	0	285
Operations											
Incubator/Commercial Office [2]	0	0	109	222	331	340	340	340	340	340	340
Anchor Store	0	0	3	10	16	20	20	20	20	20	20
Other Retail	0	0	6	21	33	42	42	42	42	42	42
Central Building	0	0	2	4	5	7	7	7	7	7	7
Hotel	0	0	0	0	15	31	31	31	31	31	31
Total - Indirect	**21**	**34**	**201**	**329**	**452**	**463**	**440**	**440**	**440**	**440**	**725**
TOTAL DIRECT & INDIRECT	**58**	**91**	**583**	**1,006**	**1,410**	**1,499**	**1,436**	**1,436**	**1,436**	**1,436**	**2,205**

Source: RIMS II and RKG Associates, Inc., 2011
[1] Indirect employment is jobs created in all industries as a result of development.
[2] Includes museum building office space.

There is a net positive fiscal impact of **$27 million** to the City of Alexandria over ten years based on total projected tax revenue of $72.1 million.

FISCAL BENEFITS FOR THE CITY OF ALEXANDRIA

The fiscal benefits to the City are equally compelling. The analysis is also based on a 10-year projection beginning in 2015. This period starts from demolition and continues through site remediation, building construction, and initial occupancy and commercial operations. The project revenues included in this comprehensive analysis are:

- Real Property Taxes
    - Personal Property Taxes
    - Personal Vehicles
    - Furniture & Fixtures
    - Computers & Equipment
- Retail Sales (including construction materials)
    - Retail Goods
    - Construction Materials
    - Meals
- Business Professional Occupational License Taxes (BPOL)
- Transient Lodging Taxes

The fiscal impact analysis includes both revenue to the City (and the state), as well as public service expenditures that the City would incur under the development scenario. The fiscal benefits to the City are presented in Table 4 and can be summarized as follows:

- There is a net positive fiscal impact of $27 million to the City of Alexandria over ten years based on total projected tax revenue of $72.1 million.
- Total municipal public service expenditures for PRG are projected to be $42.1 million over the 10-year period. About two-thirds of this is attributable to the approximately 590 new housing units.
- Non-residential uses are projected to require only $10.9 million in municipal services over a 10-year period. Average municipal expenditures per household in 2021 are projected at roughly $6,000 per household.

By comparison, in 2010, according to GenOn Energy, the PRGS site paid approximately $2.48 million in taxes.

Table 4: Potomac River Green Project Net Fiscal Impact Projections **(2015-2024)**

Cost Items	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	Total Revenues (2015-2024)	% of Total
Municipal Revenues												
Real Property (Rate/$100 Value)	$493,795	$1,021,077	$2,140,453	$3,256,015	$4,098,831	$4,543,965	$4,650,876	$4,757,787	$4,864,698	$4,971,609	$34,799,105	56%
Tangible Personal Property												
Personal Property (Vehicles)	$-	$64,669	$229,337	$392,609	$462,012	$473,139	$484,265	$495,392	$506,519	$517,646	$3,625,588	6%
Furniture & Fixtures	$-	$-	$97,874	$288,660	$560,490	$800,065	$1,006,584	$1,179,242	$1,317,236	$1,431,997	$6,682,148	11%
Computer Hardware	$-	$-	$93,148	$243,373	$441,529	$577,028	$671,138	$729,397	$766,164	$803,402	$4,325,180	7%
Local Retail Sales Tax	$-	$-	$48,069	$160,426	$264,132	$341,287	$348,231	$355,174	$362,118	$369,061	$2,248,498	4%
Construction Sales & Use	$-	$159,332	$563,572	$585,922	$441,060	$206,544	$-	$-	$-	$-	$1,956,431	3%
Meals Tax	$-	$-	$24,715	$82,484	$135,805	$175,474	$179,044	$182,614	$186,184	$189,754	$1,156,076	2%
Transient Lodging Tax	$-	$-	$-	$-	$-	$326,338	$443,970	$620,744	$692,512	$720,494	$2,804,057	4%
BPOL	$38,820	$68,514	$246,407	$415,232	$753,557	$717,198	$674,255	$686,766	$699,227	$711,737	$5,011,713	8%
Total - Tax Revenues	$532,615	$1,313,593	$3,443,574	$5,424,721	$7,157,415	$8,161,039	$8,458,363	$9,007,116	$9,394,657	$9,715,702	$62,608,794	100%
Municipal Expenditures												
Residential - Gen. Govt. Services	$-	$411,725	$1,458,926	$2,493,782	$2,927,207	$2,987,997	$3,048,787	$3,109,578	$3,170,368	$3,231,158	$22,839,528	65%
Education Services	$-	$54,231	$192,164	$328,471	$385,560	$393,567	$401,574	$409,581	$417,588	$425,595	$3,008,330	9%
Non-Personal Property (Vehicles)	$17,000	$74,170	$396,103	$711,727	$1,123,462	$1,404,481	$1,404,481	$1,404,481	$1,404,481	$1,404,481	$9,344,868	27%
Total - Municipal Expenditures	$17,000	$540,126	$2,047,192	$3,533,980	$4,436,228	$4,786,045	$4,854,842	$4,923,640	$4,992,437	$5,061,235	$35,192,727	100%
Net Fiscal Benefits/(Deficit)	$515,614	$773,466	$1,396,382	$1,890,740	$2,721,186	$3,374,994	$3,603,521	$4,083,476	$4,402,220	$4,654,467	$27,416,067	

Source: RKG Associates, Inc., 2011

THE POTOMAC RIVER GREEN BUSINESS PROPOSITION

The property occupied by the PRGS will have a **much higher economic value when redeveloped** than it does now.

Underlying Potomac River Green is a business proposition: the property occupied by the power plant will have a much higher economic value when redeveloped than it does now. By retiring the plant, GenOn Energy (and Pepco) win the opportunity to share a portion of that economic value rather than continuing to bear the mounting economic and legal risks associated with operating an aging and environmentally challenged facility.

A confluence of factors makes the PRGS site an exceptional redevelopment opportunity. The Washington, D.C., metropolitan region is a premier area for attracting institutional real estate investment – and Alexandria is one of its most attractive locales. The site is located along prime waterfront property, just north of Alexandria's Old Town. Simply put, the PRGS site represents one of the very few close-in, large-tract waterfront redevelopment opportunities that still exist in the greater Washington area.

The difficulty of bringing new sites to the market – and the exclusive reputation of Old Town, Alexandria – means that demand has traditionally exceeded supply for retail residential housing stock in Old Town. Even in weak economic times, Old Town residential housing has held its value and continues to sell. The inclusion of a premier energy center on this site will boost the value of associated residential and commercial buildings. It will also bolster Alexandria's reputation as a leading destination for visitors. Taken together, these factors make Potomac River Green an exceptional redevelopment opportunity.

SITE CONSTRAINTS

ENVIRONMENTAL REMEDIATION

Industrial users have occupied the PRG site for at least 80 years. During the 1930s, the northwestern portion of the site was home to the Potomac River Clayworks; the American Chlorophyll Company occupied the site's southern expanse. Scattered homes and outbuildings dotted the surrounding properties.

The Washington, D.C. region grew rapidly after World War II, leading to increased demand for electricity throughout the area. In 1949, the Potomac Electric Power Company, now known as Pepco, began construction of the PRGS. Between 1949 and 1957, five coal-fired boilers, a turbine house, an electric transmission switchyard and other ancillary facilities were constructed on the site.

An existing railroad spur, used to service the Robinson Terminal and other waterfront warehouses, was developed to bring in coal. The track often saw several coal trains a day. A three-acre coal storage pile (typically several weeks' supply) was also sited on the southeast corner of the property.

Given the property's industrial legacy and the long-time presence of coal residue, environmental remediation will be necessary before the site is ready for redevelopment. An initial environmental review by Environmental Consultants and Contractors, Inc. (ECC) suggests that a range of contaminants may be present on the site. Among these are asbestos in the PRGS turbine hall and boiler building; possible PCB contamination associated with the transmission switchyard; fly ash deposits; and fuel oil residues and related contamination typically associated with coal-fired electric generating stations. Based on repurposing plans implemented at other power plants, however, it is reasonably certain that the PRGS site can be successfully remediated.[12]

Industry estimates for the cost of demolition and site remediation of coal-fired power plants like the PRGS are in the range of $75,000 to $100,000 per megawatt of capacity installed. Given that the PRGS has a nameplate capacity of 482 megawatts, this suggests site preparation costs may be in the range of $35 to $50 million. Cost estimates include labor, equipment and materials expenditures to make the PRGS safe for demolition, abatement of asbestos and other site contaminants, contingency costs, credits for sale of scrap metal and other recovered materials, site restoration and post-retirement monitoring of environmental quality.

As the long term lessee of the PRGS site and the current operator, GenOn Energy may initially be required to bear the cost of remediating the site. Remediation costs might also be recovered, in part, from a future developer in exchange for surrender (or modification) of the lease and/or a subsequent sale of the property by the lessor, which is Pepco.

Given the property's industrial legacy and the long-time presence of coal residue, **environmental remediation will be necessary before the site is ready for redevelopment.**

[12] "Repurposing Legacy Power Plants: Lessons for the Future," Washington, D.C.: American Clean Skies Foundation, August 2011.

"PJM and Pepco are confident that they successfully have addressed the potential reliability problems they identified earlier, including actual and projected violations of any reliability standards and/or reliability criteria, in the Washington, D.C. area absent the Potomac River Generating Station power plant."

Letter from Jeffrey W. Mayes, Senior Counsel, PJM Interconnection LLC, and Craig Glazer, Vice President, Federal Government Policy, PJM Interconnection LLC, to Kimberly D. Bose, Secretary, Federal Energy Regulatory Commission, Re: District of Columbia Public Service Commission, EL05-145-001, September 24, 2007.

"Based upon the substantial transmission system upgrades that have been put in place since 2005, we do not think that relevant authorities would find the PRGS needs to remain in operation in order for the District of Columbia to have reliable power supply... Last year, the combined output of all PRGS units represented... only two percent of the total generation in the local Mid-Atlantic area of PJM and just 0.3 percent of the wider PJM grid."

"Potomac River Generating Station: Update on Reliability and Environmental Considerations," Analysis Group Inc., July 2011.

The brownfield redevelopment process is well established in Virginia and a voluntary remediation program, overseen by the State Department of Environmental Quality (DEQ), provides protection to property owners. Parties participating in the DEQ's program are eligible for a DEQ "certification of satisfactory completion of remediation." This certification provides assurance that the remediated site will not later become the subject of a DEQ enforcement action, unless new issues are discovered.[13]

Whatever the provisions for site remediation, however, the PRG plan contemplates an early resolution of the responsibility and funding for demolishing the PRGS and site clean up.

TRANSMISSION SUBSTATION & RELIABILITY

A key feature of the current PRGS site is the electrical transmission substation, which occupies approximately 2.5 acres. The substation – but not, as explained below the power plant – is important for local reliability purposes. The substation distributes power to the Washington, D.C. downtown area and portions of Southwest D.C. Once the power plant is retired, it will be critical to ensure that the co-located substation is upgraded and remains available to maintain the reliability of the local and regional electrical distribution grid.

It bears emphasis that, after 2012, retirement of the 60-year-old plant should not pose any reliability problems to Alexandria or Washington D.C. This was confirmed by a recent July 2011 reliability study carried out by the Analysis Group, a respected electrical utility and economic consulting firm.[14]

The Analysis Group concluded that since 2005, when reliability issues led Washington DC and federal officials to keep the plant running despite ongoing pollution concerns, Pepco and the regional grid operator, PJM (short for Pennsylvania - NewJersey – Maryland) have implemented sufficient transmission and substation upgrades to allow the PRGS to be retired.

According to Analysis, the PRGS is also unnecessary for reliability reasons because demand for the plant's relatively high-cost power had fallen as newer more efficient plants were connected to the grid. In 2010, for example, the PRGS only operated at about 20% of capacity and accounted for just 2% of the total electricity generated in the local PJM area, and less than one half of 1% of PJM's total power supply.

While the PRGS is no longer essential to supply electricity to D.C.; there remains a continued need for

[13] See, http://www.deq.state.va.us/vrp/homepage.html. The DEQ's certificate provides immunity to enforcement actions under the Virginia Waste Management Act (Section 10.1-1400 et seq. of the Code of Virginia), the Virginia State Water Control Law (Section 62.1-44.2 et seq. of the Code of Virginia), the Virginia Air Pollution Control Law (Section 10.1-1300 et seq. of the Code of Virginia), or other applicable Virginia law.

[14] The Analysis Group study was commissioned by the American Clean Skies Foundation in connection with the development of the PRG concept and can be found here: http://www.cleanskies.org/?publication=prgs

Pepco's switchyard operations to ensure connectivity throughout the regional transmission and local distribution grids. Based on a separate consulting study conducted for this proposal, it appears that future needs for switchyard operations might best be satisfied by consolidating and upgrading Pepco's current facilities on a smaller parcel at the current site. Portions of the switchyard might be sited below ground to further reduce the footprint.[15] Reconfiguring the switchyard in this fashion would free up a central piece of real estate for reuse as part of the PRG plan.

A number of new technologies also might be deployed at the site to further reduce the surface footprint of any new substation. These could include modern gas insulated switchgear and advanced silicon carbide (SiC) power transistors. Both technologies may also improve transmission efficiency and, hence, might provide an instructive complement to the clean power technologies on show at the nearby Energy Center.[16]

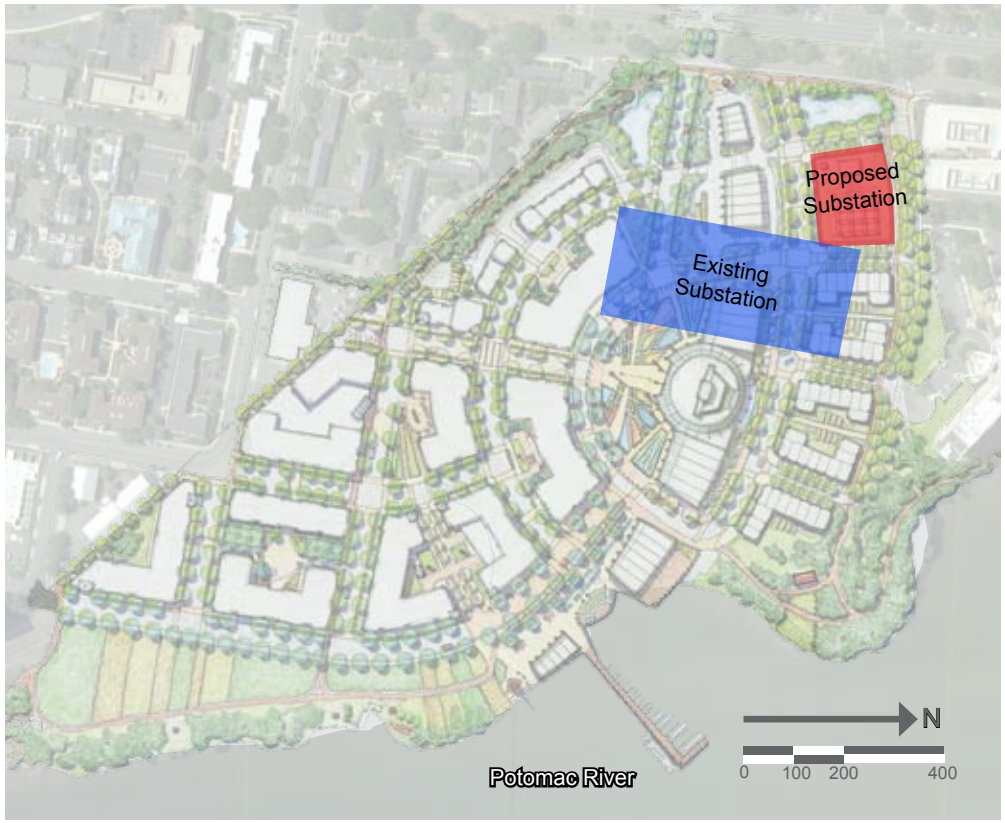


Figure 49.
Substation Siting

[15] See, e.g,, Hope Cohen , The Neighborly Substation , Manhattan Institute, New York City, (December 2008) available at: http://www.manhattan-institute.org/pdf/crd_neighborly_substation_emb.pdf

[16] Gas insulated switchgear (where the conductors and contacts are insulated by pressurized sulfur hexafluoride gas) typically saves space compared with air-insulated equipment. ARPA-E, the DOE's new advanced R&D agency, has already begun to fund SiC power transistors that could allow the very heavy (8000 pound) transformers currently used for power distribution to be replaced with much smaller high frequency transformers that are the size of a suitcase. ARPA-E estimates that such new, high voltage SiC transistors also could reduce electricity losses by 50 percent compared to existing power conversion technologies. See, Advanced Research Projects Agency-Energy, FY2010 Annual Report, Department of Energy, Washington D.C. (2011), page 24, available at http://arpa-e.energy.gov/LinkClick.aspx?fileticket=JPgM-ETf-o0%3D&tabid=438.

Figure 50. Rail Corridor

RAIL CORRIDOR

The western boundary of the existing PRGS site is marked by the rail spur used to deliver freight to the Robinson Terminal properties and coal to the PRGS. Upon closure of the PRGS and the redevelopment of the Robinson Terminal properties (as envisioned by Alexandria's proposed Small Area waterfront plan), the need for the rail line will end. Accordingly, this document assumes that the property occupied by the rail line ultimately will be acquired and incorporated into Potomac River Green. Eliminating the line will not only provide for a well-planned and congruous mixed-use development, but will also eliminate freight rail deliveries through the adjacent residential neighborhoods, greatly reducing noise and traffic disruptions.

FLOODPLAIN

As depicted in the floodplain map (facing page), small portions of the Potomac River Green site lie within the 100-year floodplain. However, every built structure planned for the development lies outside the 50-year flood plain. Only minimal construction is planned within the 100-year flood zone, principally involving the waterfront plaza, a wind turbine tower and the boat dock. Studies will be needed to determine whether mitigation measures should be undertaken to compensate for floodplain exposure. Overall, Potomac River Green has been designed to ensure safety in the event of flooding and to facilitate the restoration of riverfront riparian areas.

Figure 51. Map of Floodplain

PLAN IMPLEMENTATION

There are several possible ways forward. In one scenario, the City of Alexandria and GenOn **decide to revisit the 2008 agreement on pollution controls** and replace it with a new agreement for retiring the Potomac River Generating Station.

There will be many challenges in turning Potomac River Green from a planning concept to a place where people actually live, work and visit. It will also take time (See timeline on next page). Community support and the commitment of key business and government stakeholders will be essential.

However, there is reason to be optimistic. Several major development projects have been successfully completed recently, or soon will be, in Alexandria and the greater metropolitan area (e.g. Potomac Yards along Route 1 in Alexandria, and the Washington, D.C. Southeast Yards and Southwest Waterfront projects). There is no reason why the northern riverfront in Alexandria cannot be similarly transformed from a dirty 1940s era factory and power plant site into a neighborhood-friendly 21st century clean energy showcase.

This report is not intended to provide a detailed blueprint for guiding this transformation — there are far too many legal, economic, financial, construction and regulatory variables. Much will also depend on how the development concept outlined here is received (and refined) by Alexandria residents, potential builders and various other constituencies. The engagement of GenOn Energy and Pepco will be especially crucial, of course.

Although there are several possible ways forward, one plausible approach is outlined below. It draws on the historic 2008 agreement between the City of Alexandria and GenOn's predecessor, Mirant, to reduce the harmful pollution associated with the plant's current operations.[17]

The 2008 Agreement, since assumed by GenOn, committed the power company to escrow $32 million to install a set of fabric filters (known as a "baghouse"), primarily to limit the harmful release of fine particles of soot from the plant's smoke stacks.[18] In return, and provided the upgraded pollution control measures are effective, the City agreed not to oppose the power plant's continued operation.

Since this Agreement was crafted, however, the economic and regulatory environment has changed significantly. Most notably, the Mirant plant has become the property of GenOn, a much larger company — GenOn Energy owns over 40 power plants with a total capacity of over 24 GWs — and demand for the electricity produced by the plant has fallen off as more efficient and lower cost power producers compete to sell electricity to Pepco and other local distribution companies.[19] That has materially reduced the future commercial value of the PRGS.[20]

[17] See, "Project Schedule and Agreement," between Mirant Potomac River, LLC and City of Alexandria , Virginia (July 2008) available at: http://alexandriava.gov/uploadedFiles/tes/oeq/info/SettlementAgreementJuly2008.pdf

[18] Very fine particles less than 10 micrometers in diameter (PM10) pose a health concern because they can be inhaled into and accumulate in the respiratory system. Particles less than 2.5 micrometers in diameter (PM2.5) are referred to as "fine" particles and are believed to pose the greatest health risks. Because of their small size (approximately 1/30th the average width of a human hair), these very fine particles can lodge deeply into the lungs. See, e.g., http://www.epa.gov/pmdesignations/faq.htm#0.

[19] The declining energy sales from the PRGS are detailed in the Analysis Group reliability study discussed earlier.

[20] In 2010, GenOn reported that, due to reduced revenues, and the cost of the proposed baghouse, it was writing down the value of the PRGS to zero and considered the PRGS to be an "impaired asset." Specifically, in 2009, Mirant wrote down the value of the PRGS — booked at $244 million in 2008 — by $207 million. See, Mirant's 2009 Form 10K, filed with the U.S. Securities and Exchange Commission at pp. 59 and F-45, available at http://www.genon.com/investors/investors-sec-filings.aspx. An additional $42 million write down was taken in 2010, thus reducing the book value to zero. See, GenOn's 2010 Form 10K, filed with the U.S. Securities and Exchange Commission at page F-44, available at http://www.genon.com/investors/investors-sec-filings.aspx.

In addition, the federal Environmental Protection Agency (EPA) recently has proposed much stricter limits on the emission of harmful air pollutants — especially sulfur dioxide (SO2), nitrous oxides (NOx), mercury and other toxic metals — from coal-fired power plants, including the Potomac plant. Augmented EPA standards for treating the water used to cool coal-fired power plants are also under consideration.[21]

Although the additional pollution controls that Mirant agreed to install at the PRGS in 2008 were designed to satisfy environmental rules applicable at the time, these controls may be inadequate to meet new EPA standards that will become effective during the next decade. That means the owner of the PRGS may be required to make substantial additional investments beyond those already pledged, or cease operation.

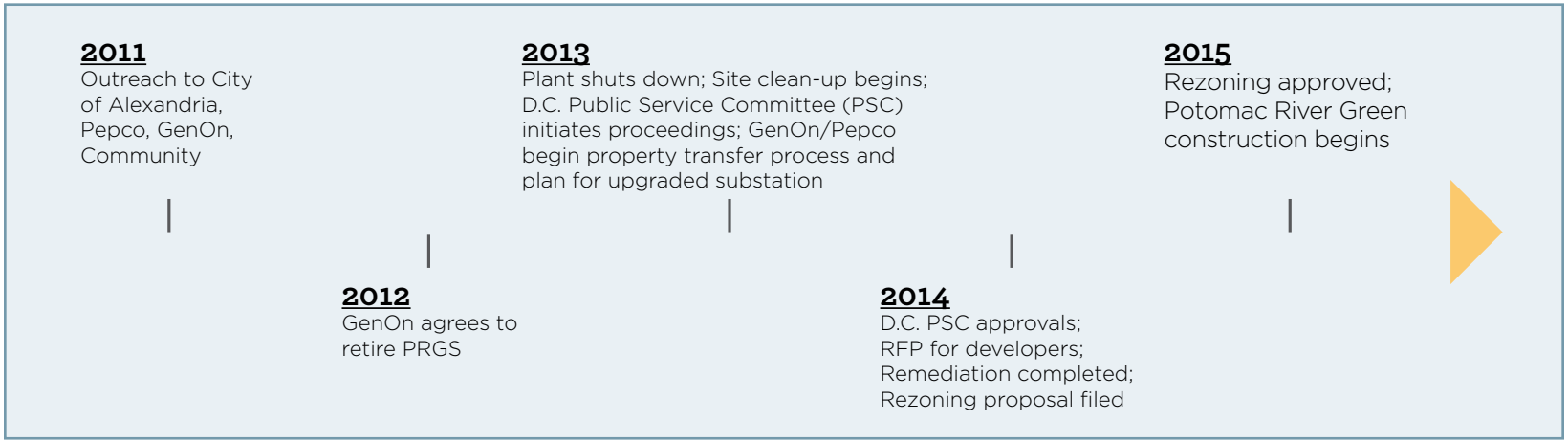


Figure 52. Development Timeline

[21] For an overview of these new EPA regulations see Gregory C. Staple and Christopher K. Carr, "Growing The Market For Clean Power: The EPA's New Power Plant Regulations and What They Mean For Utilities and Public Health," American Clean Skies Foundation, Washington, D.C. (December 16, 2010) available at http://www.cleanskies.org/pdf/12-20AG_MEF.pdf.

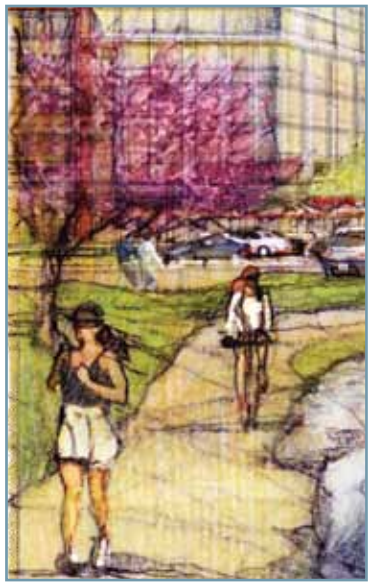


Figure 53. Neighborhood View

Toward a Negotiated Retirement Schedule

Taking into account changed circumstances, the City of Alexandria and GenOn might decide to revisit the 2008 Agreement on pullution controls and replace it with a new agreement — one that sets a schedule for retiring the PRGS and, in the interim, suspends implementation of the plant upgrades contemplated in 2008.

The new agreement might also provide that a portion of the $32 million escrow which, at this writing has yet to be disbursed (an engineering contract for the new baghouse is still being negotiated), be used to defray the cost of retiring the plant and remediating the site. Beyond that, the agreement could address how GenOn and Pepco will modify GenOn's long-term lease for the PRGS site so that the property can be converted into uses similar to those described in this report (subject to protection of the Pepco substation and, perhaps, the City's approval of certain zoning and other conditions).

There are a number of precedents for the negotiated retirement of old coal-fired power plants under similar circumstances. For example, in 2009, prior to merging with GenOn, a Mirant subsidiary negotiated an agreement with the City of San Francisco for the retirement of the Potrero coal-fired power plant, which was located within that city. Significantly, this agreement was facilitated by the construction of new transmission and other grid upgrades by the local utility, Pacific Gas and Electric, to ensure that no adverse electric reliability problems would be created by retiring the Potrero plant.[22]

In 2008, Mirant also negotiated an agreement to close down and demolish its Lovett Generating Facility, located in Tomkins Cove, New York, on the Hudson River. The company did so after battling New York State for years over environmental concerns related to the plant.[23]

[22] Background on the Potrero plant's closure may be found here: http://www.baycitizen.org/energy/story/shuttered-sf-power-plant-be-demolished/. A copy of the Potrero settlement agreement is available here: http://www.sfcityattorney.org.

[23] See, Mirant 2009 10-K; http://idc.api.edgaronline.com/efx_dll/edgarpro.dll?FetchFilingConvPDF1?SessionID=58PBH3wDnOOtoIS&ID=7081868.

Additional Steps

While an agreement between GenOn and the City of Alexandria for the orderly retirement of the PRGS would provide a strong starting point for Potomac River Green, many other approvals and agreements will also be needed. Some of these are common to any large real estate development project. For example, repurposing the site would require rezoning by the City and amendments to its Master Plan and Old Town North Small Area plan.

Other required steps stem from the unique regulatory history of the PRGS and the need to retain the existing Pepco substation in some form. For instance, given that Pepco still owns the PRGS site as well as the substation, any sale of the property would likely require public review and consent by the District of Columbia Public Service Commission (PSC), both when the sale is initiated (e.g., before bids are solicited) and prior to consummation. The same applies as to the consolidation and reliability upgrade envisioned for the existing Pepco substation. Certain consents may also be required from federal and state environmental officials to cancel operating permits that have previously been granted for the PRGS.

In principle, however, there appears to be no reason why any of the foregoing governmental consents and private agreements cannot be secured. The scope of this proposal may seem daunting, but it is important to remember that there are numerous successful precedents for redeveloping old power plant sites — even ones where no de-commissioning schedule has been established for the existing plant.

What is important now is this: A new vision for Alexandria's northern waterfront is before us. Potomac River Green offers extensive community benefits, embraces a clean energy future and is economically realistic. This vision can also be realized reasonably soon, if stakeholders begin the work now. The first step is for GenOn to agree with other key institutional stakeholders that retirement of the PRGS is preferable to the foreseeable alternatives (the City and its residents have long held this view). The earlier this consensus is reached the sooner the benefits of Potomac River Green will be realized.

Figure 54. Neighborhood View

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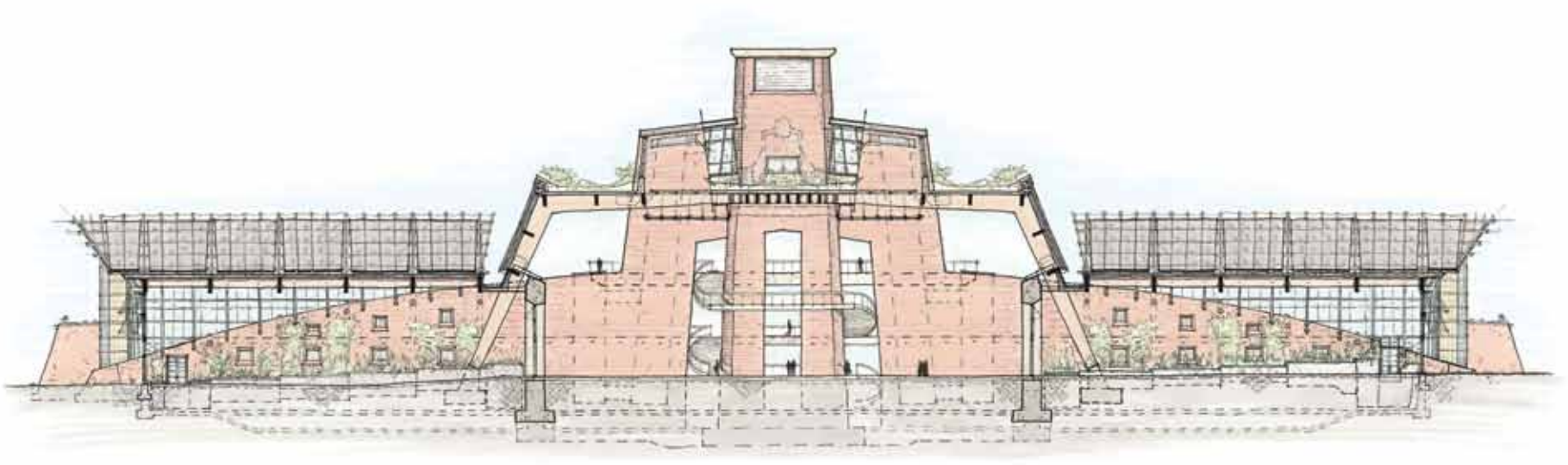

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