GREENING PITTSBURGH'S GOLDEN TRIANGLE

An Assessment of Opportunities for Downtown Greening

Prepared by Western Pennsylvania Conservancy
Fall, 2007

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About the Western Pennsylvania Conservancy

To date, the Western Pennsylvania Conservancy has protected nearly a quarter-million acres of natural lands in Pennsylvania. Now in its 75th year, Pennsylvania's first conservancy continues to partner with grassroots organizations to protect land, restore watersheds and save natural habitats.

The Western Pennsylvania Conservancy (WPC) preserves Frank Lloyd Wright's Fallingwater®, which was designed in 1935 and entrusted to the Conservancy in 1963 by Edgar Kaufmann jr. A symbol of living in harmony with nature, Fallingwater is open to the public and offers a wide variety of educational programs to its more than 135,000 annual visitors.

Each year, WPC plants and maintains community gardens and greening projects throughout Western Pennsylvania. In 2007, WPC partnered with more than 5,000 volunteers and dozens of community organizations to plant 140 gardens in 19 western Pennsylvania counties.

Prepared by the Community Gardens and Greenspace Program of the Western Pennsylvania Conservancy
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Cover Art: Jenna Kappelt for WPC, 2007

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INTRODUCTION

The Vision

Imagine this: When you cross into the heart of downtown Pittsburgh it is so visibly green and attractively "greenscaped" that it catches the attention, delights the eye and turns the head. Imagine that the green technology and green building for which Pittsburgh is gaining a national reputation are actually visible "on the outside" in the landscape itself. Imagine that (the increasing number of) downtown residents, businesses, corporations and important cultural and institutional organizations all wholeheartedly adopt a green plan for downtown and collaborate to make Pittsburgh a symbol of a whole new urban experience, even in the industrial belt of the country. Imagine that Pittsburgh becomes a memorable green destination, wearing its values and quality of life on its sleeve.

The Need and the Opportunity

In the last year, there have been unmistakable signs that Pittsburgh is beginning to reach a transition point in its financial and economic status. Pittsburgh is now experiencing increased investment downtown, particularly in the residential sector, along with some key related efforts including the redesign of Point State Park, expansion of Point Park University, and announcement of plans for a new cultural district development. According to news sources, by 2006 more than $1 billion of new investment was underway in greater Downtown Pittsburgh.[1] From mixed-use projects like Piatt Place and Three PNC Plaza, to residential projects like 151 First Side, The Carlyle and Encore on Seventh, Downtown has become a magnet for commercial and residential development.

With construction underway, the sound of change is ringing along Fifthth and Forbes and at the Point. This is the perfect moment to take stock of the state of the downtown environment, particularly its greenspace and related components. The condition of the downtown environment, particularly the green infrastructure that provides so many crucial services to residents, may well be one of the deciding factors in the success of all these efforts to revitalize the city. Residential development was determined to be a key strategy for reviving the city in several studies over the past ten years. Residents will be particularly attracted by the look, feel and functioning of the city as an environmentally comfortable and pleasing place to live. They will be **retained** by the existence of accessible and magnetic green resources – including views, active and passive recreational spaces, working greenspaces and multipurpose green infrastructure such as trails.

This is the ideal time to identify the best opportunities to move Pittsburgh to an entirely new level of green identity and green reality in its physical landscape. The need is to identify the best opportunities that key stakeholders can grasp and implement to begin a greening

renaissance in the Golden Triangle. Pittsburgh is now entering what may be a new era of redevelopment and regeneration. An opportunity of this magnitude may not appear again for many years. Now is the time to align the vision, the ideas and the resources to transform downtown Pittsburgh into one of the greenest cities in the country.

The Process

This project was undertaken by a small team from the Western Pennsylvania Conservancy's Community Gardens and Greenspace program and their consultants, with the input and advice of a number of partners.

Steps in the process included: A review of relevant previous studies, collection and analysis of data related to downtown resources and patterns of use, interviews and discussions with various stakeholders, and a review session with central downtown parties and potential partners.

Previous Relevant Studies

The first step was to review existing studies and information including:

- *Downtown Circulation Operations Plan and Implementation Strategy*, prepared for the Pittsburgh downtown Partnership in January of 2005;
- Minutes of the Joint meetings of the Pittsburgh Downtown Plan Transportation and Urban Design Task Forces, spearheaded by the Allegheny Conference;
- *Streetscapes Study*, prepared in 2004 for the Downtown Living Initiative by the Community Design Center of Pittsburgh;
- *Cultural Trust District Development Plans,* 2006;
- *The Downtown Pittsburgh Plan: A blueprint for the 21st century,* prepared in 1998 for the City of Pittsburgh; and
- *Fifth and Market District: Pittsburgh, PA, July, 2006,* Urban Design Associates for the Downtown Partnership.

Additional Information

At the same time a variety of other information was collected and reviewed including:

- Census data;
- Traffic flow data;
- Tree survey by the city Shade Tree Commission;

- Business and employment information;
- New project information;
- Downtown parking sites and figures; and
- Visitor statistics.

Numerous meetings were held with potential partners and stakeholders as well as with sources of information. Contacts were made with, among others, the Pittsburgh Downtown Partnership, the Community Design Center of Pittsburgh, the Pittsburgh Parking Authority, staff of the Cultural District, the Pittsburgh Planning Department, the city's Urban Redevelopment Authority, the Riverlife Task Force and the Convention Center.

Building on the work of the past, this study will borrow the five "districts" used in the Streetscapes Study prepared by the Community Design Center of Pittsburgh in its 2004 study of downtown streetscapes with minor changes. The five districts are:

1) Gateway
2) Firstside
3) Fifth and Forbes/Market Square
4) The Cultural District
5) Grant Street.

In October, 2007, representatives of the Pittsburgh Downtown Partnership, the Heinz Endowments, PNC Bank, the Department of City Planning, the Community Design Center of Pittsburgh, Point Park University and the Cultural Trust were invited to review the findings of this assessment, and all but one attended. We greatly appreciate their thoughtful critique and insights, which have been largely incorporated into this final report.

Map of Pittsburgh Downtown Districts

Map # 1

Districts

- Cultural District
- First Side
- Forbes & Fifth
- Gateway Center
- Grant Street
- Parks

Source: Allegheny County Assessment Website

Created: Chris Koch for Western PA Conservancy, 2007

THE VALUE OF GREEN

Why should proponents of reviving Pittsburgh's downtown district consider greenspace and green infrastructure as significant components of the efforts to bring new energy to the Golden Triangle? Increasing numbers of studies hold the answer. A growing body of research documents the value of greenspace in human communities, especially dense urban communities. Benefits range from social and economic to environmental and ecological.

Social Capital

Numerous studies have found that green spaces provide an opportunity for people to congregate and to engage in positive social interactions with neighbors, friends, and even visitors to an area. This interaction produces a multitude of benefits for a community and its residents.

Some of the most commonly documented societal benefits including increasing job satisfaction, helping to build a strong sense of community, catalyzing business development and improving conditions for child development.

Residents living near green common spaces "had more social activities and more visitors, knew more about their neighbors, reported their neighbors were more concerned with helping and supporting one another and had stronger feelings of belonging."[2]

Economic Value, Growth and New Development

The Commission for Architecture and the Built Environment produced a report in 2005 titled *Does Money Grow on Trees?* that focused on whether the civic and social value of greenspace in urban areas translates into an economic return. In its opening pages, the report acknowledges that green spaces are typically created for tangible reasons such as, "relaxation, recreation, refreshment and relief." It goes on to say that these qualities are often in short supply in our towns and cities, making them all the more valuable. Although green spaces are not primarily created to be economic drivers, the report concludes that green spaces and parks are "instrumental in encouraging redevelopment and development." [3]

Many American cities both large and small are creating parks as focal points for economic development and neighborhood renewal. "Revitalizing public parks is a phenomenally cost-effective way to generate community economic development," says Steve Coleman, a Washington, D.C., open space activist.[4]

A report entitled "The Economic Benefit of Parks and Open Space," published by the Trust for Public Land, says this about urban greenspace projects: "Amenity industries – parks, cultural corridors, and downtown arts communities – can attract new residents and visitors, increasing tourist and tax revenues. Moreover, these amenities also attract the support and dollars of local residents who spend their disposable dollars near their homes in enterprises that add to the quality of life, animate their streets, and attract more commerce." [5]

A specific example of how green space and new development go hand in hand is related below from a Trust for Public Lands report called *Revitalizing Cities*:

> In the late 1980's at the request of city government, the local Flagstar Corporation of Spartanburg, South Carolina, selected downtown instead of a suburban site for a new corporate office building. Because part of the goal was to revitalize the downtown area, Flagstar executives realized that a single office building would not do the trick, so a formal corporate plaza and a traditional downtown park with flower gardens, walkways, benches, and lawns were added as magnets for downtown renewal. The result? By 1993, property values in the central business district had increased 325 percent over their 1983 value. Retail sales had also risen, with some downtown businesses reporting increases of as much as 100 percent. Residential rents in the area have more than doubled since creation of the redevelopment and park. In all, more than $250 million in investment flowed into downtown Spartanburg between 1988 and 1996. In the fall of 1996, officials announced a $100 million development proposal that includes a four-star hotel, a conference center, a golf course, an exhibit hall, and new office and residential development.[6]

Sustaining Population

While the reasons people move out of more dense urban areas can be multiple and complex, there is evidence that in areas where there is no accessible greenspace people leave to seek out a connection to nature: "In a city that lost nearly 50,000 residents between 1990 and 2000, neighborhoods with gardens did relatively better, losing 6 percent of their population over the decade compared with 13 percent for the city as a whole." [7]

Environmental Impacts of Greenspace

Temperature Control

With so much of our land in urban areas covered by asphalt and concrete, it becomes essential to look for ways to offset the negative effects of these impervious materials. Greenspace plays an important role in temperature regulation by reducing the heat island effect, or the increase in urban air and surface temperatures as compared to surrounding areas. If used instead of asphalt or other dark colored impervious surfaces (such as rooftops) vegetation can reduce the impacts of the heat island effect (by creating areas ranging from a simple bed of grass and flowers to a park or rain garden area to green paving). While surface area is extremely important, another option to help reduce temperatures is to use street trees that provide ample shade on sidewalks or in medians. Urban trees and shrubs also help to cool cities by reducing heat sinks. Heat sinks are 6-19 degrees F warmer than their surroundings.[8] A tree can be a natural air conditioner. The evaporation from a single large tree can produce the cooling effect of 10 room size air conditioners operating 24 hours/day.[9]

On the opposite end of the spectrum, natural buffers can be created to block wind in colder temperatures. Trees properly placed around buildings as windbreaks can reduce winter heating costs by 20 to 40% by reducing cold air infiltration into buildings.[10]

Water Absorption and Retention

Vegetation not only absorbs rainwater and runoff, but also can act as a filter to remove some of the pollutants from the water before it reaches a local stream or river. Storm water retention becomes especially important in a city like Pittsburgh with its hilly topography and proximity of homes and businesses to our rivers.

Air Pollution

Air pollution affects our quality of life. Through photosynthesis and evapotranspiration air is filtered through foliage plants and trees, cleaned, cooled, and released back into the atmosphere. Plants act a collection site for dust and other airborne particles until rain can wash the particles away. There is up to a 60% reduction in street level particulates with trees.[11]

In one urban park (212 ha.), for example, tree cover was found to remove the following amounts of pollutant particles each day:

- 48 pounds of particulates
- 9 pounds of nitrogen dioxide
- 6 pounds of sulfur dioxide
- 100 lbs of carbon
- 2 pounds of carbon monoxide, which alone adds up to a value of $136/day based upon pollution control technology.[12]

Additionally, since smog is created in part by the heat island effect and as previously mentioned vegetation reduces this occurrence, plants also help combat air pollution.[13]

Habitat and Biodiversity

In some instances, a combination of behavioral adaptability and successful reproductive strategies has enabled some plants and animals to thrive in human-dominated areas.[14] In other situations, urban natural areas provide habitat that is otherwise limited and aids in the diversity of species in an area, as illustrated in the following example:

> Bird watchers have observed more than half of the 408 bird species documented in Wisconsin in Milwaukee County alone. One hundred eighteen bird species are confirmed to nest in that county, and of these, 16 are listed as endangered, threatened, or special concern. More than 150 other bird species pass through the county during spring and autumn migrations. This high level of diversity results directly from the availability of habitat scattered throughout the county's parks, parkways, plazas, and other open spaces.[15]

In this way, even small urban sites can play a role in sustaining local plant and animal populations and can also be a vital link for migratory species. One prominent example of this in downtown Pittsburgh is the nesting of the peregrine falcons at the Gulf Tower. Provision of nesting boxes at this site has aided substantially in conservation efforts for this once critically endangered bird.[16]

Physical Health Benefits

Many studies have now proven that there is a direct link between a lack of physical activity and obesity and poor health. As reported by the Trust for Public Land, "People who engage in regular physical activity benefit from reduced risk of premature death; reduced risk of coronary heart disease, hypertension, colon cancer, and non-insulin-dependent diabetes; improved maintenance of muscle

strength, joint structure, and joint function; reduced body weight and favorable redistribution of body fat; improved physical functioning if they suffer from poor health; and healthier cardiovascular, respiratory, and endocrine systems." [17]

According to the same study, expenses relating to obesity and overweight are significant and totaled $117 billion in the year 2000. "Access to parks increases frequency of exercise, which can reduce obesity levels and its associated problems and costs." [18] Green space such as parks, trails, or other natural areas allow people opportunities to bike, walk, do yoga, garden, walk a pet, or participate in other forms of exercise which can significantly reduce some of these health care costs.

While parks and larger green spaces provide ideal settings for activity and exercise, smaller green spaces play just as important a role as they make an area more inviting and accessible: "the perception of having safe and aesthetically pleasing surroundings for walking and ready access to green spaces are associated with increased physical activity levels." [19]

Mental Health Benefits

A growing body of research shows that mere contact with the natural world improves physical and psychological health.[20] Exposure to nature has been shown to:

- Reduce stress from commutes and reduce road rage; [21]
- Reduce severity of symptoms of Attention Deficit Disorder; and
- Relieve symptoms of depression and anxiety, improve mood, and enhance psychological well-being.[22]

In addition it has been shown that patients in a hospital can be discharged earlier, are less anxious and require less strong pain killers if exposed to natural views and sounds. Also there is evidence that the elderly are "less agitated and have greater powers of concentration after resting in natural surroundings compared to remaining indoors." [23]

In *The Health Benefits of Parks*, the propensity of humans to seek out nature is explained as "biophilia," (a term introduced by Harvard biologist Edward O. Wilson, 1984) which refers to "the innately emotional affiliation of human beings to other living organisms." While the concept that plants play a role in mental health is well established, detailed studies are still being done in a number of areas to determine the degree to which they impact specific mental conditions.

THE SETTING

Ensconced in one of the country's most interesting and beautiful landscapes, bounded by rivers and green hills, downtown Pittsburgh is in an enviable position in terms of its physical attributes. Given these positive features, Pittsburgh has a head start in creating a visually memorable place for residents and visitors. In the recent past, some admirable efforts have been undertaken to green the downtown center of the city. However, time takes its toll and there is a need to refresh some of the existing greenspace; at the same time there remain many locations that offer opportunities to add green resources to the downtown area.

Features of the Golden Triangle

For the purposes of this study, the Golden Triangle was identified as the 412.6 acres bounded by the rivers and 1-579. The area within the Golden Triangle was subdivided into five districts or corridors to correspond with both the Pittsburgh Downtown Plan and the Community Design Center of Pittsburgh's Streetscapes Study: Cultural District, Fifth, Forbes and Market Square District, First Side District, Gateway District, and Grant Street District. A few minor boundary changes were made to these districts to accommodate recent changes in downtown features.

Major Streets of Each District

There are several challenges to getting around downtown Pittsburgh because it is a city that is nestled in a triangular area between rivers. The following summary of the two-grid road system spells out several of the confusing factors for visitors:

> Downtown surface streets are based on two distinct grid systems that parallel the Allegheny and Monongahela rivers. These two grids intersect along Liberty Avenue, creating many unusual street intersections. Furthermore, the Allegheny grid contains numbered streets, while the Monongahela grid contains numbered avenues. And, in fact, there are cases where these numbered roadways intersect, creating some confusion (i.e. the intersection of Liberty Avenue and 7th Street/6th Avenue). In addition, there appear to be some "duplicate" intersections. For example, if one says they are at the intersection of Sixth and Penn, they could be referring to the intersection of Sixth Street and Penn Avenue (in the Cultural District north of Liberty Avenue) or Sixth Avenue and William Penn Place, a few blocks away and south of Liberty Avenue.[24]

Cultural District

- Fort Duquesne Boulevard runs parallel to but not exactly along the bank of the Allegheny River. It is a high speed road with at least four lanes of traffic flow. The number of lanes is increased in many sections by the addition of turning lanes. Fort Duquesne Boulevard primarily serves travelers coming from or going north of the city and those coming from or going to the Convention Center and the Strip District.

- Penn Avenue provides parking for and access to many of the venues and events taking place in the Cultural District. It will also provide direct access from within downtown to the new bus station and feeds into the beginning of the Strip District. Once in the Strip District, it turns into a one-way street serving to bring people into town from the east of Pittsburgh.

- Liberty Avenue is a major two-way road that links the Cultural District to the other sections of downtown.

Fifth, Forbes and Market Square District

- Market Square is currently undergoing redesign and renovations to allow a more pedestrian friendly atmosphere and to increase opportunities for social interactions. Traffic restrictions vary on these roads based on events happening within the square.

Firstside District

- Boulevard of the Allies is multiple lanes in both directions and is the main artery of Pittsburgh on the Monongahela River side. It is a main approach to many of the streets that cross the city (Grant, Smithfield, Wood), as well as providing access to Fort Pitt Boulevard and connections to Route 376 East, the Liberty Bridge, the Smithfield Street Bridge, and the Fort Pitt Bridge.

- Fort Pitt Boulevard runs along the Monongahela River and in that way mirrors Fort Duquesne Boulevard. Fort Pitt Boulevard provides the main entryways to Route 376 West leading to Route 279 North via the Fort Duquesne Bridge and Route 279 South via the Fort Pitt Bridge.

Gateway District

- Stanwix Street is a high-traffic four-lane connector between Fort Duquesne Boulevard and Fort Pitt Boulevard. It is currently under construction due to the North Shore Connector project and will likely be impacted for the next three years.

- Commonwealth Place is the main street running along the front of Point State Park and the Hilton Hotel. The Gateway Center area is served by this road which also leads to Liberty Avenue and the Cultural District.

Grant Street District

- Grant Street runs directly along what would be the eastern side of the Golden Triangle and many of the city's major corporations as well as government offices are located here. This street is a prime example of how a planted median can give users a more welcoming and aesthetically pleasing experience.

- Other major connectors include Smithfield Street, which is a primarily one-way street that runs from the Smithfield Street Bridge to Liberty Avenue, and Wood Street, which also helps to move users across the triangle.

Existing Green space

Of the 413 acre study area, there is relatively little useable public green space. Notable green areas are listed below and provide a total of 41.78 acres of green. That is a mere 10% of the total area, a number which drops to 5.78 acres and 1.4% when the largest of the parcels (Point State Park) is removed.

Point State Park: ~ 36 acres
Mellon Square: ~ 1.4 acres
Gateway Center: ~ 1.92 acres
Market Square: 0.16 acres
Community Gardens: ~ 0.12 acres
Green around community garden: ~ 0.31 acres
PNC Firstside Park: ~ 1.5 acres
Islands on Commonwealth Place: ~ 0.37 acres
Ft. Duquesne Blvd medians: 2.57 acres
Gateway Center strip/medians: 1.16
Thomas Park (green strip across from PNC Firstside Park): 0.32

TOTAL: Approximately 41.78 acres or 10% of downtown area is "green." This number is reduced to 5.78 acres and 1.4% when the largest parcel (Point State Park) is removed.

Map # 2

Green Space in the Golden Triangle of Pittsburgh

Source: Allegheny County Assessment Website

Created: Chris Koch for Western PA Conservancy, 2007

New developments and related greenspace is planned in a number of locations. These are summarized in the chart below.

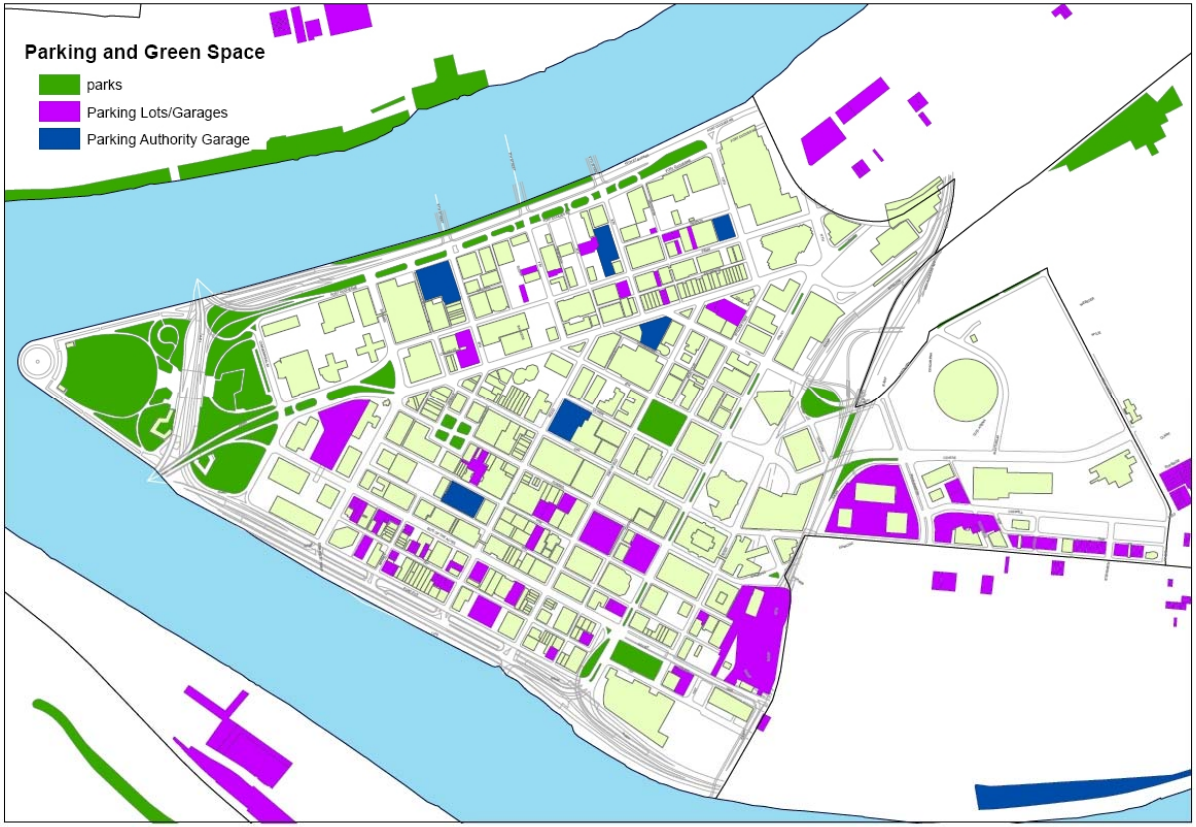
Development Name/Area	Housing Units Planned	Green Space Planned	Business Planned	Other Space Planned	Estimated Construction Timeframe
Cultural District					
Cultural Trust Riverfront Dev.	700?	Urban parklets, green roofs, green walls, public green space near river	Mixed use; residential and restaurants	Still in planning stages; hotel planned	Planned to begin in 2008
Century Building (137 Seventh Street)	60 rental units	-	-	-	
The Granite Building (313 Sixth Avenue)	6 units	-	-	-	
941 Penn Avenue (Solara Group)	14 units	-	-	-	2007 start
Forbes and Fifth and Market District					
Three PNC Plaza	30 condos	Triangular park at Market Street and Liberty Avenue	HQ Reed Smith law firm; ground floor restaurants & retail	Pavilion building at Market Street and Liberty Avenue; 150-room luxury hotel	Underway
The Carlyle	63 condos	-	-	-	Began April 2006
Piatt Place	47 lofts and town homes	-	Ground floor retail; 3 floors of offices	-	
Marketplace Square	50 condos	-	25,000 sf ground floor retail	-	
Forbes Village	150 apartments	-	20,000 sf ground floor retail	-	
Point Park University	Housing for 200 students	?	Ground floor retail	Faculty offices, classrooms	
First Side District					
Mon Wharf Parking Lot	-	Planters with a natural berm and landscaping; bioswales to reduce highway and storm water runoff	-	2,600 foot restored promenade that links Point State Park to the existing trail system	2007/2008
151 First Side	82 condos	-	-	-	Began April 2006
Gateway District					
Point State Park	-	City-side festival grounds	-	Restore promenade around the river edge; Mon Wharf pedestrian causeway; water landing and plaza on Allegheny River side; Historical Interpretation and Visitors Center	Underway
Total number of new housing units planned = 682 + Cultural District					

Parking

Some 37 acres are covered by parking garages or lots in the Golden Triangle. A list of parking lots is presented on Map 3, though current data do not provide a clear accounting of the difference between city-owned facilities and privately managed open lots and garages.

Map # 3

Parking Surfaces and Garages in Downtown Pittsburgh



Created: Chris Koch for Wester PA Conservancy, 2007

Data: Allegheny County GIS

Downtown Parking
Fort Duquesne Boulevard and 8th
Fort Duquesne and 7th
7th near Penn
Penn and 10th
Penn near Convention Center
Penn and 6th
4th b/t Market Street and Wood St.
5th near Smithfield
3rd b/t Wood and Smithfield (1)
3rd b/t Wood and Smithfield (2)
Smithfield and Liberty
4th and Grant Street
Boulevard of the Allies at Grant Street
Fort Pitt Boulevard and Wood Street
Market Street and Fort Pitt Boulevard
Boulevard of Allies near Stanwix St.
Fort Pitt Blvd & Commonwealth Pl.(1)
Fort Pitt Blvd and Commonwealth Pl. (2)

Special Places

Although the Golden Triangle is bordered on two of three sides by water, there are very few access points to the rivers, making the ones that do exist increasingly valuable. Point State Park is currently under construction but upon completion promises to allow visitors a closer connection to the water. Another potential connection is at the Mon Wharf, which is due to undergo improvements in the near future to allow pedestrians and bicyclists to experience the river as they travel along its banks. A third planned area is behind the Convention Center where a new park may eventually offer a look at the water.

Since access to the water and greenery are at a premium in the Golden Triangle and tend to draw pedestrian and visitor activity, it is useful to identify some of the special places that already exist and generate pedestrian and visitor activity. These places are important to consider when selecting additional greening efforts to emphasize.

The Cultural District offers the Heinz Hall garden and plaza to the 18,000 Pittsburgh Symphony subscribers that visit downtown regularly. Katz Plaza is a small but dynamic parklet, enhanced by a waterfall and interesting sculptural seating, that provides a small outdoor venue for jazz concerts and other Cultural Trust functions in the summer and fall. The Roberto Clemente Bridge (6th Street Bridge) is often closed for Pittsburgh Pirate home games to allow people to walk safely to the game while enjoying a view of the river and the hanging flower baskets that are on display there.

The Firstside District boasts the PNC Firstside Park, 1.5 acres of new public greenspace, an important new investment in the open space available in the Golden Triangle. At the other end of the district is the Smithfield Street Bridge, allowing pedestrians easy movement to and from Station Square just across the water.

Grant Street itself provides a green corridor with its planted medians with the trees, brick road, and scale providing the feeling that Grant Street is indeed a town center. Other distinctive spots in the **Grant Street District** include a meandering trellised pathway at Mellon Park.

Who Uses the Golden Triangle?

Residents

According to Pittsburgh census numbers, the population in the Golden Triangle dropped from 3,785 residents in 1990 to 2,721 residents in the year 2000.[25]

Calculations for 2007 suggest a population of 4,000 current residents and over 1,300 new residential units already being built or on the drawing boards for 2008.[26]

Workers and Key Businesses

According to a study completed by the Pittsburgh Downtown Partnership there are currently 3,900 business establishments in the Golden Triangle employing approximately 109,600 people.

The numbers of business establishments and employees working downtown have both steadily increased from 1996-2006. During that time, the number of businesses grew at an annual rate of 0.08% annually with the number of employees working in downtown increasing by 2.1% per year.[27]

The leading employers in 2006 were from the service industry (33 percent) and finance (31 percent) which together account for almost two-thirds of the current work force. The industry base also includes technology, retail, finance and medicine, and includes seven Fortune 500 corporations and six Fortune 1000 companies.[28]

Major Pittsburgh Employers

Fortune 500 Corporations:
Allegheny Technologies, H. J. Heinz Company, Mellon Financial Corporation, PNC Financial, PPG Industries , WESCO International, U.S. Steel

Fortune 1000 Corporations:
Allegheny Energy, American Eagle Outfitters, Consol Energy, Dick's Sporting Goods, Kennametal, Wheeling-Pittsburgh Steel

Largest Employer: University of Pittsburgh Medical Center

Downtown Universities and Professional Institutes

Point Park University's enrollment has steadily increased over the past 10 years and is expected to continue to grow as the university expands. Point Park has the opportunity to provide a "university district" on Wood Street and on parts of Fifth and Forbes.
Point Park Enrollment Numbers, 2004-2007:

Fall 2004 – 3,250
Fall 2005 – 3,441
Fall 2006 – 3,546
Fall 2007 - 3,600 students.

Approximately 700 students live on Point Park's campus in one of the following student housing locations:

Lawrence Hall - corner of Boulevard of the Allies and Wood Street;
Thayer Hall - Boulevard of the Allies between Wood Street and Market Street;
Conestoga Hall & Suites - First Avenue and Wood Street; and
Pioneer Hall & Suites - First Avenue and Wood Street, opposite Conestoga.

Though on the edge of downtown, *Duquesne University* has a growing presence on the eastern side of the Golden Triangle. Duquesne University was founded in 1878 and opened as a Catholic college with six faculty members and 40 students.[29] Enrollment has continued to increase in recent years:

Fall 2004 – 9,803
Fall 2005 – 9,985
Fall 2006 - 10,184.

More than 3,600 students live on campus in five residence halls and one apartment complex:

Assumption Hall – intersection of Stevenson Street and Bluff Street
Duquesne Towers - Bluff Street;
St. Ann Hall - Vickroy Street;
St. Martin Hall - Bluff Street;
Vickroy Hall - Vickroy Street;
Brottier Hall – Boyd Street.

The University is currently building a new multi-purpose recreation center, aimed to meet the need for more student fitness facilities on campus brought about by both an increased enrollment and increased interest in health and wellness. According to the University's website, the 125,000-square-foot multi-purpose recreational center on Forbes Avenue will be completed by 2008 and "will house a student fitness center, athletic facilities and more. It is the first stage of a mixed-use development, which will serve both the campus community and the Uptown neighborhood." [30]

Robert Morris University's main campus is in Moon Township; however, their School of Adult and Continuing Education and the Media Arts Program increase the number of downtown students by approximately 560 students.

Founded in 1921, the *Art Institute of Pittsburgh* (AIP) is the oldest of the Art Institutes existing in North America. AIP has moved six times since it began because of growth due at least partially to the unique programming it offers. Enrollment has continued to increase steadily and took a significant jump in 2007.

Art Institute Enrollment Numbers:

2004 = 3,424
2005 = 4,828
2006 = 6,052
2007 = 11,637.

Current Student Housing Locations:

Shannon Hall - 615 First Avenue;
The Standard Life Building - 345 Fourth Avenue;
Miller Hall - 100 Smithfield Street.

The *Pennsylvania Culinary Institute* is located in the heart of the Cultural District in downtown Pittsburgh. The school offers a variety of programs to prepare students for careers in the culinary and hospitality industries. In March of 2002, a partnership was formed with the world-renowned Le Cordon Bleu Cooking School of Paris. Over the past three years, enrollment has remained steady and averages 1,000 students per year.

Special Events

In addition to the residents and employees who can be found in the city, there are many Pittsburgh organizations that offer cultural and sporting events that draw additional visitors. Some of these visitors come from surrounding counties, but many others also end up here who are from around the country and even the world. Some of the venues or activities that draw more people to our city are listed below.

Arts Festival
Pittsburgh has hosted a well regarded juried Three Rivers Arts Festival for 30 years. The 17-day long Festival in June brought nearly **600,000** people to downtown Pittsburgh to experience music, dance, theater, visual art, craft and family activities.

TRAF also presents exhibits in its gallery, open year round, and co-presents CDLive! and Mellon Jazz concerts and the semi-annual nighttime arts event FLUX.

Cultural District
Includes: The Benedum Center for the Performing Arts, Heinz Hall, Cabaret at Theater Square, The Byham Theater, The Harris Theater, The O'Reilly Theater, Wood Street Galleries, and SPACE (gallery).

In 2006 there were over 1,700 events, exhibitions, and programs that drew more than **1.1 million** people downtown.

Convention Center Events
In 2006 the total number of unique visitors to Convention center events was **447,423** people. Thirty seven percent of these people returned a second time during multi-day events. There were 210 events, 22 open to the public, held at the Convention Center in 2006.

Altogether there were nearly **2.2 million** people downtown due to these events and venues.

Sports Events
While PNC Park and Heinz Field are not actually located in the Golden Triangle, they do have a substantial impact on downtown businesses including parking garages, restaurants, and bars.

2006 PNC Park Events
Events: Pittsburgh Pirate baseball games, concerts
Attendance: Pirates = 1,861,549; Concerts (Bruce Springsteen, Jimmy Buffet, Pearl Jam/Rolling Stones) = 119,896
TOTAL: 1,981,445

2006 Heinz Field Event
Events: Pittsburgh Steelers football, University of Pittsburgh Panthers football, concerts
Attendance: Pittsburgh Steelers = 610,400; University of Pittsburgh Panthers = 303,138; 3 concerts = 163,116 (assumes a sellout of 54,372 for each concert)
TOTAL: 1,076,654

Mellon Arena Events
Events: Pittsburgh Penguins, concerts, and others.
TOTAL: 997,470

Altogether these venues adjacent to the Golden Triangle drew **over 4,055,500** participants.

CONSTRAINTS, CHALLENGES AND CHAMPIONS

Pittsburgh is only recently beginning to move out of a period of severe fiscal stress. Just four years ago the city was required to register under Act 47 as a "distressed" community and submit all its finances to oversight. In the intervening time, local investment has nonetheless surged, part of a national trend of greater interest in downtowns and city living. In mid 2007 the city was showing evidence of funds to be directed to a surplus for the year.

However, serious financial constraints continue and must be part of a realistic plan for downtown greening. Not only will there be constraints on design and installation of any additional green resources, but also the support for long-term maintenance, whether for street trees, planter boxes or more elaborate green spaces, will need to be taken into account.

Other apparent constraints include the current dense nature of construction in downtown Pittsburgh. While there are many buildings available for occupancy or renovation and re-use, there is very little open ground in the city. Finally, the topography and defining physical characteristics of the city itself – its many steep hills, loose soils, long history of extractive industries that have disturbed the landscape, and the rivers themselves – play a role in defining greening opportunities. Proximity to rivers means flood zones or hardscape designed to allay flood water threats along major roads and river edges. The rivers also necessitate numerous bridges – more than any other city in the world besides Venice. The accompanying cement ramps, aerial highways and abutments, combined with the climate, to some extent defy certain greening approaches.

Champions for the effort to breathe new life into the Golden Triangle include the Cultural Trust, the Downtown Partnership, key developers, key employers such as PNC and PPG, the History and Landmarks Foundation, and the city and county governments who understand the importance of downtown to the entire region. A number of new faces have become active in the revitalization of downtown, such as Piatt and TREK Development (on 7th Avenue). Less clear are the champions of improving the city's greenscape. While interest is emerging in the more technological sector to position Pittsburgh as a "green city," the concept is largely focused on green building materials and design rather than the full context of the landscape.

When the city unexpectedly lost the leadership of its newly elected Mayor Bob O'Connor, momentum for various changes was lost. The new administration is gaining its own momentum but has not yet comprehensively embraced greening as a key to downtown and community development. Hopefully with its keen interest in building a viable and energetic new economy and neighborhood downtown, the city will become a central leader in the greening of the Golden Triangle.

In the meantime, several foundations, notably the Heinz Endowments and the Laurel Foundation, and advocates such as the Community Design Center of Pittsburgh and the Downtown Partnership, are keenly aware of the value of green resources for improving the appearance, feel and functioning of the city. The Cultural Trust has made a huge commitment to investing in the Golden Triangle and their plans reflect recognition of the value of greenspace as an important feature of a residential and cultural sector. A few corporations such as PNC have invested directly in increasing the greenspace available downtown. With the leadership of these groups, it should be possible to engage other partners, including other major corporations and downtown businesses, to support a new era in improving the city's physical environment.

This is a transitional period in downtown development, a time that is fraught with both huge potential and possible impediments to a greener city. City government has been in transition with the unexpected shift in leadership, but there is some evidence there is interest in city hall in creating a strong green legacy. Sometimes the focus on building new facilities becomes so intense it can overtake the related work on the landscape context for new development. Sometimes funding runs low and green is perceived as "extra." But as this transition takes place, there is tremendous energy to be tapped and creativity to be brought to the quest for a more livable downtown. The greening of Pittsburgh can be an important outcome of this time of dynamic change.

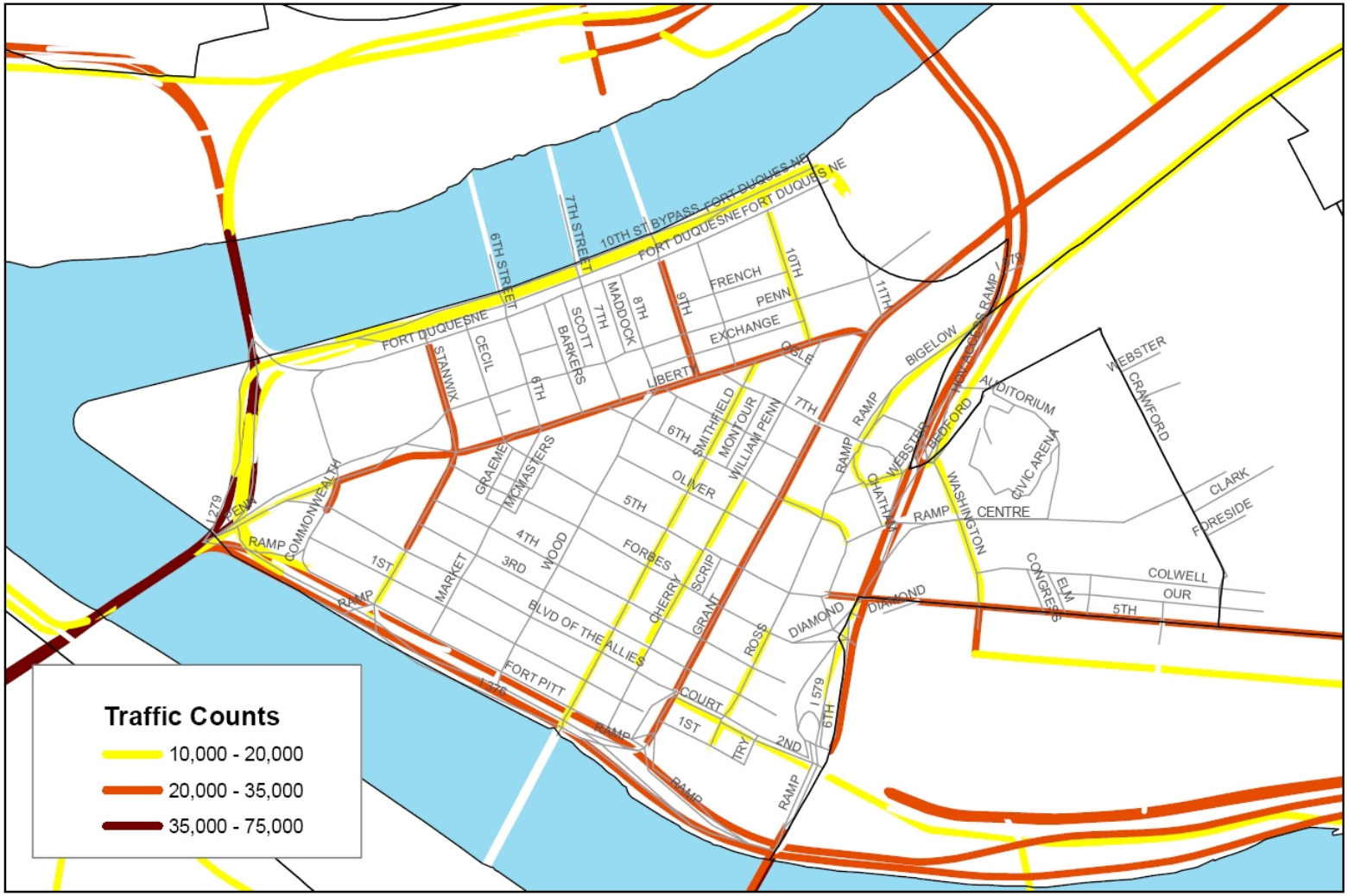
Traffic Flow

The **traffic patterns** of downtown largely follow the perimeter of the Golden Triangle. At the far outer edge to the west is 579; on the south along the Monongahela is 376; along the north, at the edge of the Allegheny, the traffic is less dense, but still busier than the interior of the downtown district. The two busiest bridges on the north are the Ft. Duquesne Bridge and the 9th Street, or Rachel Carson, Bridge. On the south side the Fort Pitt Bridge is most heavily traveled, and then the Liberty Bridge. Cutting through the Golden Triangle is a second level configuration of traffic flow – Liberty and Grant Streets are primary routes, and Boulevard of the Allies less so, but still a major conduit for traffic in and out of the city especially on the east side. Fifth Avenue is a major contributor to this flow to and from the east beyond Ross Street.

Map # 4 illustrates the major traffic patterns of the Golden Triangle.

Map # 4

Current Annual Average Daily Traffic Through Downtown Pittsburgh



Created: Chris Koch for Western PA Conservancy, 2007

Source: PennDOT

Energy Nodes

Given the traffic patterns, the interior streets are significantly less heavily used. But key developments or resources become destinations for people moving through the interior of the Golden Triangle. These are outlined below. There are some key employment and residential locations worth noting in an analysis of the pedestrian and energy flow of the area.

Residential nodes include:

- Gateway Center
- Piatt Place (planned)
- PNC Skyscraper (planned)
- Encore Building
- The Granite Building
- The Cultural District – 8th Avenue (planned)
- Marketplace Square
- Forbes Village
- The Century Building
- The Carlyle.

Residential and day schools include:

- Duquesne University
- Point Park University
- CAPA (Public high school for the performing arts)
- Art Institute (with residential dorms)
- The Culinary Institute
- Robert Morris University.

Hotels and Tourist destinations include:

- Renaissance Hotel
- Convention Center
- Hilton Gateway Center
- Marriott Courtyard at the Convention Center
- Westin Convention Hotel
- The Omni William Penn
- Downtown Hilton by the Point
- Doubletree Hotel Pittsburgh City Center
- Marriott Pittsburgh City Center
- PPG Fountain and Skating Rink

- Market Square
- Just beyond the Golden Triangle are the John Heinz History Center and the Strip District with its many clubs, vendors and shops.

Major Employment centers include:

- Mellon Center
- USX Tower
- PPG Place
- Fifth Avenue Place
- Oxford Center
- PNC Plaza (Wood Street)
- PNC Firstside Center
- City and county offices, including Courthouse and 200 Ross Street

Cultural destinations include numerous theatres and attractions such as the following:

- August Wilson Center (under construction)
- Byham Theatre
- O'Reilly Theatre
- Cabaret Theatre
- Heinz Hall
- Wood Street Galleries
- Benedum Center
- Harris Theatre
- Katz Plaza.

Sports features include:

- Arena just at the edge of downtown
- In addition, downtown provides direct pedestrian access to PNC Park and Heinz Field.

Government locations include:

- The City County Building (Grant Street)
- City Planning and the URA (Ross Street)
- The County Court House (Grant Street)
- The State Office Building (Gateway Center)
- Federal Office building (Grant Street)

There are four key public transit stops in the Golden Triangle:

- First Side to the southeast
- Gateway to the west
- Wood Street to the north
- Steel Plaza to the northeast.

Also to the east is the new bus terminal under construction on 11th between Penn and Liberty as well as the Amtrak Train station at 1100 Liberty Avenue.

Major retail shopping destinations include:

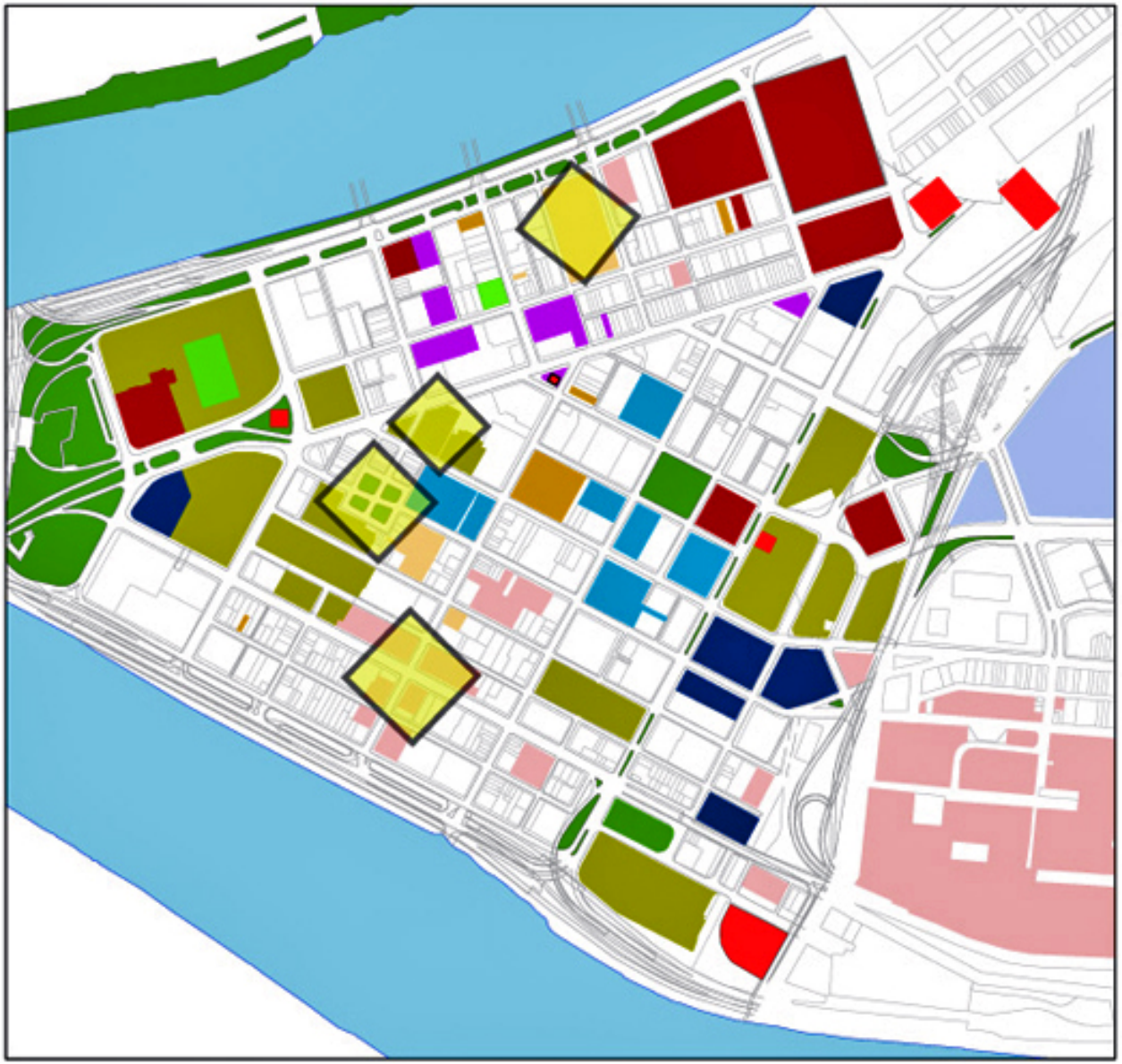
- Macy's
- Lord and Taylor's
- Brooks Brothers
- Saks Fifth Avenue
- Burlington Coat Factory
- Larrimor's
- 5th Avenue Place
- One Oxford Place.

Planned retail is included in a number of mixed use developments underway or planned including the Cultural Trust's new development, 3 PNC Plaza, Piatt Place, Forbes Village, Marketplace Square, and Point Park University.

Restaurants are too numerous to mention, but tend to be along Liberty, Market, 5th Avenue, Penn Avenue, and 7th Street between Penn and Fort Duquesne.

Energy Nodes in Downtown Pittsburgh

Map # 5



Types of Nodes

- Cultural Destination
- Employment Center
- Government
- Major Retail
- Proposed Residential
- New Residential
- School
- Sports
- Tourist Destination
- Transit Hub
- Park
- Green Space
- Current High Development Areas

Source: Allegheny County Assessment Website

Created: Chris Koch for Western PA Conservancy, 2007

Use Patterns

Assessing these points of energy, many have their own seasonal or periodic cycles, it is possible to identify certain "force fields" of likely pedestrian and traffic flow through downtown in addition to the high traffic streets. A number of these are listed below:

GATEWAY

1) Point State Park to and from:
   - Link to new Cultural District Development, both residential and visitors
   - State office workers and Gateway center workers
   - Market Square
   - University students at Point Park, Duquesne and Art Institute
   - Convention center.

2) Gateway Center to and from:
   - Fort Duquesne Boulevard greenway and riverfront walk
   - Cultural Center, via Penn Avenue.

FIFTH/FORBES/MARKET SQUARE

3) PPG Fountain and Rink to and from:
   - Market Square
   - To Heinz Hall or beyond to
   - 6th Street Bridge (Roberto Clemente) to Federal Street (North Side) and PNC Park.

4) Point Park University to and from:
   - Market Square
   - Point State park via Fourth or Boulevard of the Allies.

CULTURAL DISTRICT

5) New Cultural District development to and from:
   - Wood Street Gallery (and subway)
   - Point State Park
   - Smithfield Street Bridge to South Side and Station Square
   - Strip District including Heinz History center
   - 6th and 9th Street bridges to riverwalk, Andy Warhol Museum, PNC Park.

6) Convention Center to and from:
   - August Wilson Arts Center
   - William Penn Place Park to 5th/Forbes restaurants, shops
   - Bus Station, Amtrak
   - Civic Arena to east or Point State Park to west
   - Heinz History Center
   - Strip District.

GRANT STREET DISTRICT

7) Duquesne University to and from:
   - August Wilson Arts Center
   - Point State Park via Forbes
   - Galleries and shops down Liberty
   - Firstside park.

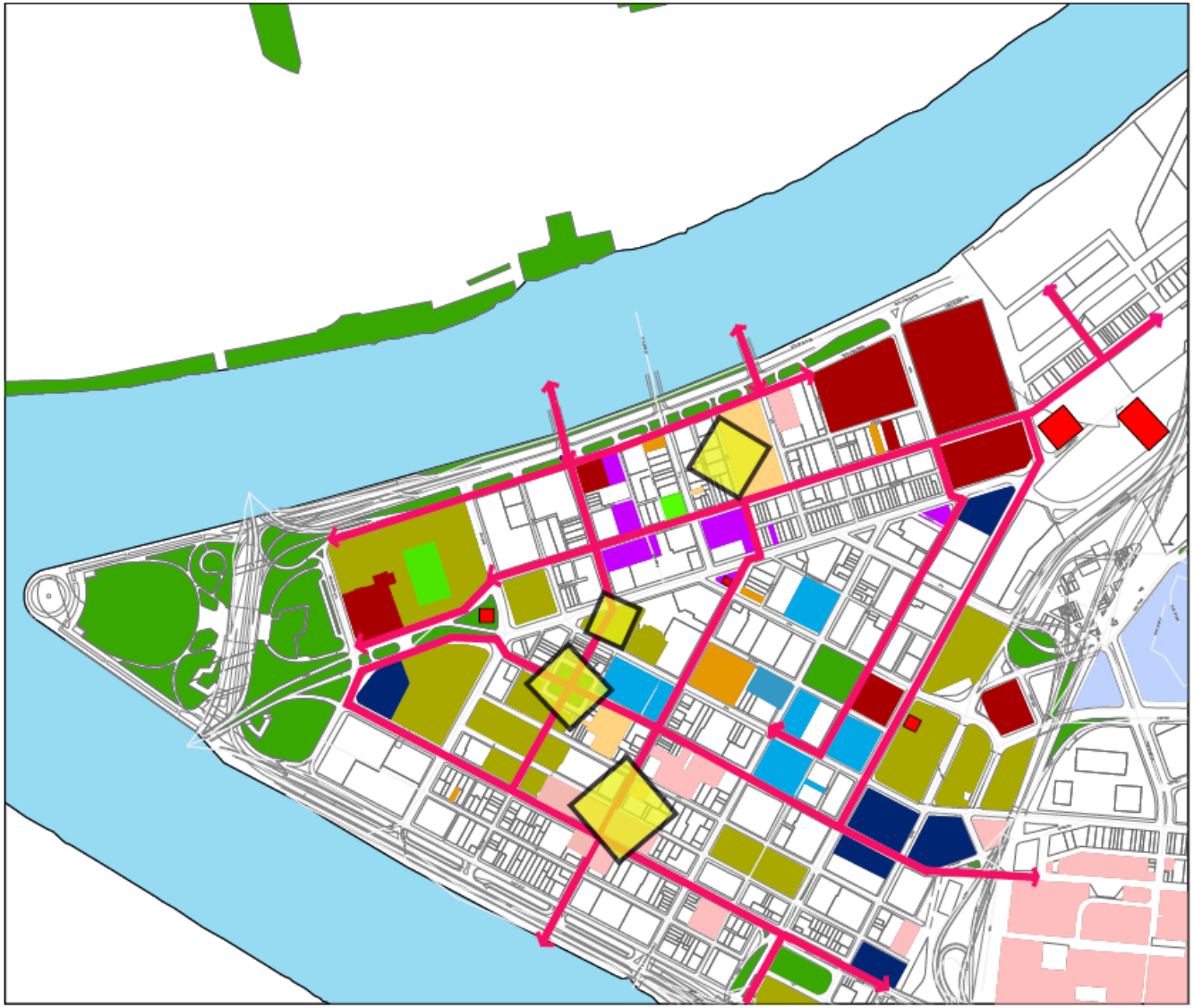
FIRSTSIDE

8) PNC Firstside building to and from:
   - Grant Street
   - Market Square via Boulevard of the Allies
   - Firstside station.

Using the cross-currents of energy and pedestrian or internal traffic use, interacting with the highest volume car and bus traffic use, some patterns and specific "hot spots" for greening become apparent. Map # 6 indicates the likely use patterns that will help identify these good locations for greening.

Map # 6

Activity Patterns in Downtown Pittsburgh



Source: Allegheny County Assessment Website

Created: Chris Koch for Western PA Conservancy, 2007

Greenspace Factors

A general framework for greening strategies needs to take into account a considerable range of factors. For travelers passing through heavy traffic flow, the impact of greening will be primarily visual and somewhat fleeting. In stop and go traffic greening may provide a welcome momentary diversion from the frustration of traffic, but it should not be distracting. The visual line of sight may also be limited as drivers will not be able to see features very high above their windshields or a horizon of green. Green resources should not obscure a driver's line of sight for intersections, turning or oncoming traffic. In areas with high traffic greening can have a strong impact simply from the number of people who receive an impression of "green" as they pass by.

For pedestrians the experience can be very different. Pedestrians can see a broader array of items, high and low, and into the distance. They will also be able to linger and see more detail than a passing car driver or passenger. The physical qualities of the environment will be much more evident to a pedestrian, too, whether temperature from shade, textures and colors, or wind and rainwater. The types of greening that may have the biggest impact for pedestrians may be both the overall view of a streetscape as well as the functional dimensions of a greenspace: Can a person sit and enjoy the shade? Can a person enjoy a close-up look at flowers or plantings?

There are different types of greenspace as well, with different uses. "Useable" greenspace includes locations that provide seating or other amenities for people, as opposed to "visual" greenspace that lends different color, texture and design features that are noticed by passersby. Both useable and visual greenspace can have valuable environmental effects. "Active" greenspace describes useable areas that allow more energetic uses, whether walking, jogging, cycling, skating, or sports activities such as tennis or Frisbee. Ideally the Golden Triangle will have adequate amounts of all these types of greenspace.

To ensure sufficient green assets of a variety of types, there are different strategies that can be employed to add green to the downtown area. First is to enhance the cityscape by adding general types of greening such as trees, hanging baskets and planters. This type of greening is primarily visual, though these assets can have important environmental impacts such as cooling or pollution reduction. Second is to add very site specific types of greenspace or green resources that will be magnets or significant enhancements in their own right. In an area like the Golden Triangle which has so little unbuilt land (98% of the land is built upon), some of the more generic approaches to greening will be needed to soften hardscapes and add the benefits of greener surroundings. Where more site-specific projects are possible, it will be all the more important to make these additions to the greenscape memorable and multi-functional to gain the maximum benefit from the small amount of additional greenspace that will be possible.

The recommendations derived from this assessment will encompass both types of experience, and both strategies, in order to support the creation of a wholly functional and appealing environment that improves the overall impression of the Golden Triangle as a green and thriving place.

RECOMMENDATIONS

This assessment has identified four general strategies for adding a significant amount of additional greenscape to the Golden Triangle: Street trees, planters, hanging baskets and green parking lots. Another strategy, somewhat more challenging, but fast becoming more familiar in the region, includes green roofs and green walls. Finally, there is a set of site specific opportunities for making a dramatic difference in the Golden Triangle. Each of these approaches will be summarized in the following sections.

Street Trees – Pittsburgh's Urban Forest

Benefits of the Urban Forest

A healthy urban forest provides many socio-economic and environmental benefits to the city's landscape. A survey conducted by the University of Washington found prices were, on average, about 11 percent higher for products offered in landscaped business districts. They also found comfort and amenity ratings to be 80 percent higher for a tree lined sidewalk compared to an unshaded street.[31] There is also a positive effect on property values when trees are present. A study in the Chicago area found a 6 percent increase in value for property with trees, as well as a 30 percent difference in appraised value based on the amount and variation of tree cover.[32] The Wharton School found a 9 percent increase in the value of housing with a tree within 50 feet. There are also a number of studies showing a decrease in crime and an increase in social interaction within tree covered areas.[33]

There are many benefits to general environmental quality as well. Trees provide shade that can cool buildings and lower fuel consumption. Properly placed trees can reduce noise pollution. Some studies have shown a 50 percent reduction of noise with wide belts of trees.[34] Shade from trees can significantly increase the life of road and parking lot surfaces by reducing temperature and runoff on blacktop. Trees absorb rainwater into the ground water, reducing run off and erosion. Trees can also moderate winds exacerbated by buildings. In park settings, large and small, trees can provide shelter for animals and even habitat for birds and insects. A healthy urban forest can be one of a city's most important natural resources.

Existing Conditions in Pittsburgh

In 2005, the Pittsburgh Shade Tree Commission conducted a survey of all the trees in Downtown Pittsburgh. One of the survey's main objectives was to identify the trees that are dead or in poor condition for removal. This information is very important; however, there are a number of other factors that help determine the long term needs of the urban forest.

Composition refers to the different species of trees that live and grow in Pittsburgh's urban forest. Two important areas of composition are diversity and distribution. A healthy urban forest will have a number of different species types that fit the different growing conditions with in the city. It is also important to identify the trees that are considered invasive and those that are native. The following list names the tree species that are present in Pittsburgh's urban forest as well as the number of trees.

The trees in red are considered invasive and the trees in green are native to this region. We have 11 species of native trees. Native trees naturally perform well and provide native habitat for birds and small animals. Invasive trees may grow out of control and begin to spread to places where they are not wanted, leading to a growing cost for removal and an “un-groomed” looked around the city. Overall Pittsburgh has a good number of different tree species creating a relatively diverse forest.

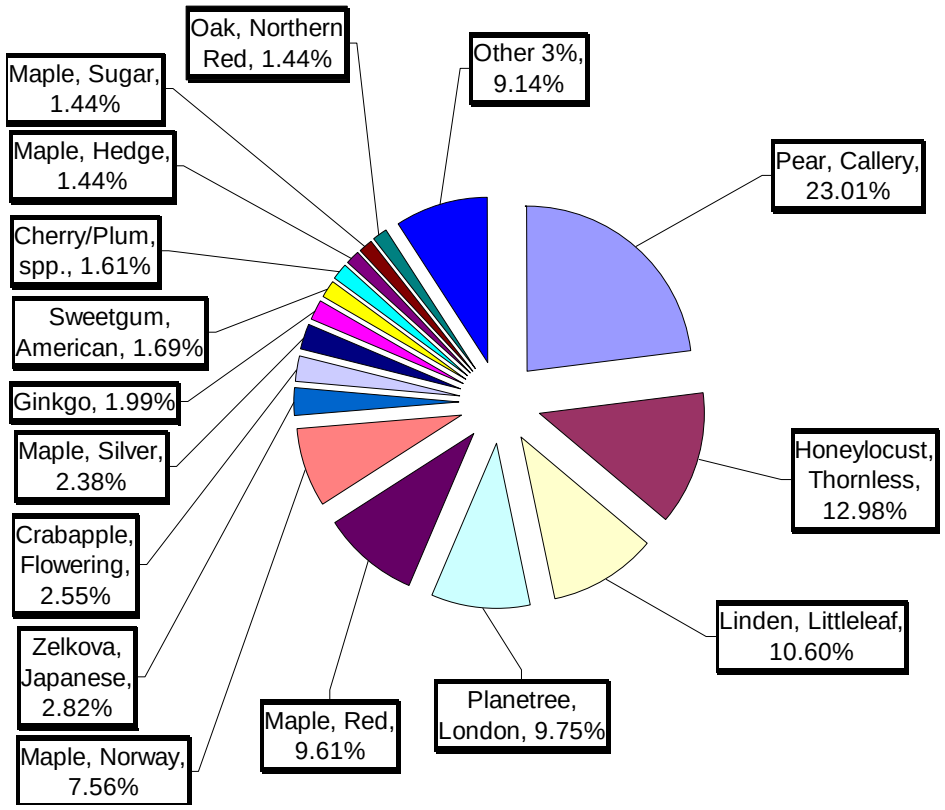
Tree Species Present in Downtown Pittsburgh

COMMON	BOTANICAL	# of Trees
Maple, Hedge	Acer campestre	52
Maple, Amur	Acer ginnala	24
Boxelder	Acer negundo	5
Maple, Japanese	Acer palmatum	1
Maple, Norway	Acer platanoides	273
Maple, Sycamore	Acer pseudoplatanus	2
Maple, Red	Acer rubrum	347
Maple, Silver	Acer saccharinum	86
Maple, Sugar	Acer saccharum	52
Maple, Tatarian	Acer tataricum	8
Horsechestnut	Aesculus hippocastanum	4
Tree-of-Heaven	Ailanthus altissima	33
Birch, River	Betula nigra	6
Birch, European White	Betula pendula	1
Hornbeam, European	Carpinus betulus	3
Hornbeam, American	Carpinus caroliniana	12
Catalpa, Northern	Catalpa speciosa	1
Hackberry, Common	Celtis occidentalis	1
Redbud, Eastern	Cercis canadensis	6
Hawthorn, spp.	Crataegus spp.	6
Ash, White	Fraxinus americana	7
Ash, Black	Fraxinus nigra	4
Ash, Green	Fraxinus pennsylvanica	26
Ginkgo	Ginkgo biloba	72
Honeylocust	Gleditsia triacanthos	25
Honeylocust, Thornless	Gleditsia triacanthos inermis	469
Coffeetree, Kentucky	Gymnocladus dioicus	2
Juniper, spp.	Juniperus spp.	7
Sweetgum, American	Liquidambar styraciflua	61

COMMON	BOTANICAL	# of Trees
Osage-orange	Maclura pomifera	1
Crabapple, Flowering	Malus spp.	92
Mulberry, White	Morus alba	2
Mulberry, spp.	Morus spp.	15
Hophornbeam, American	Ostrya virginiana	4
Spruce, Norway	Picea abies	1
Spruce, Colorado	Picea pungens	3
Pine, Red	Pinus resinosa	1
Sycamore, American	Platanus occidentalis	3
Planetree, London	Platanus x acerifolia	352
Cherry, Black	Prunus serotina	6
Cherry/Plum, spp.	Prunus spp.	58
Pear, Callery	Pyrus calleryana	831
Pear, Common	Pyrus communis	1
Oak, Sawtooth	Quercus acutissima	2
Oak, Scarlet	Quercus coccinea	1
Oak, Pin	Quercus palustris	33
Oak, Northern Red	Quercus rubra	52
Locust, Black	Robinia pseudoacacia	33
Lilac, Japanese Tree	Syringa reticulata	3
Arborvitae, Eastern	Thuja occidentalis	2
Linden, American	Tilia americana	7
Linden, Littleleaf	Tilia cordata	383
Linden, Silver	Tilia tomentosa	1
Hemlock, Eastern	Tsuga candensis	4
Elm, American	Ulmus americana	16
Elm, Lacebark	Ulmus parvifolia	4
Elm, Siberian	Ulmus pumila	3
Zelkova, Japanese	Zelkova serrata	102

The numbers of each tree reveal how dependent the city is on any one particular species. The following chart shows the percentage of each species in relation to the whole forest.

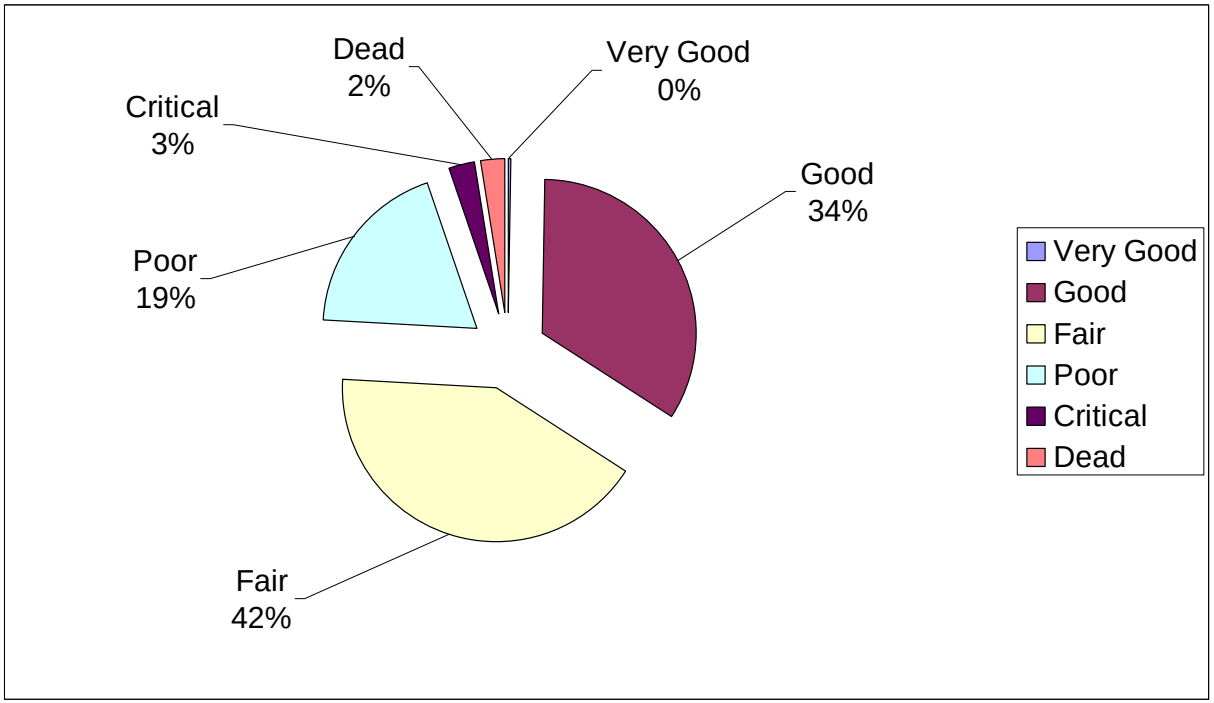
Chart 1: Urban Forest Composition



The largest group of trees is Callery Pears. The pear is a strong and popular street tree and has had positive results in long term studies. However, it is not the best practice to depend on one type of tree. If an insect or disease problem were to occur and kill the pears rapidly, 23% of our forest would be lost. Also the chart indicates that many other species have low numbers and could be rapidly eliminated by disease or age, lowering diversity, within a very short period of time.

The data also describe the health of the individual trees or their **condition**. The chart below illustrates the overall condition of the urban forest by describing the rating of very good, good, fair, poor, critical, or dead assigned during the survey.

Chart 2: Urban Forest Condition in Pittsburgh

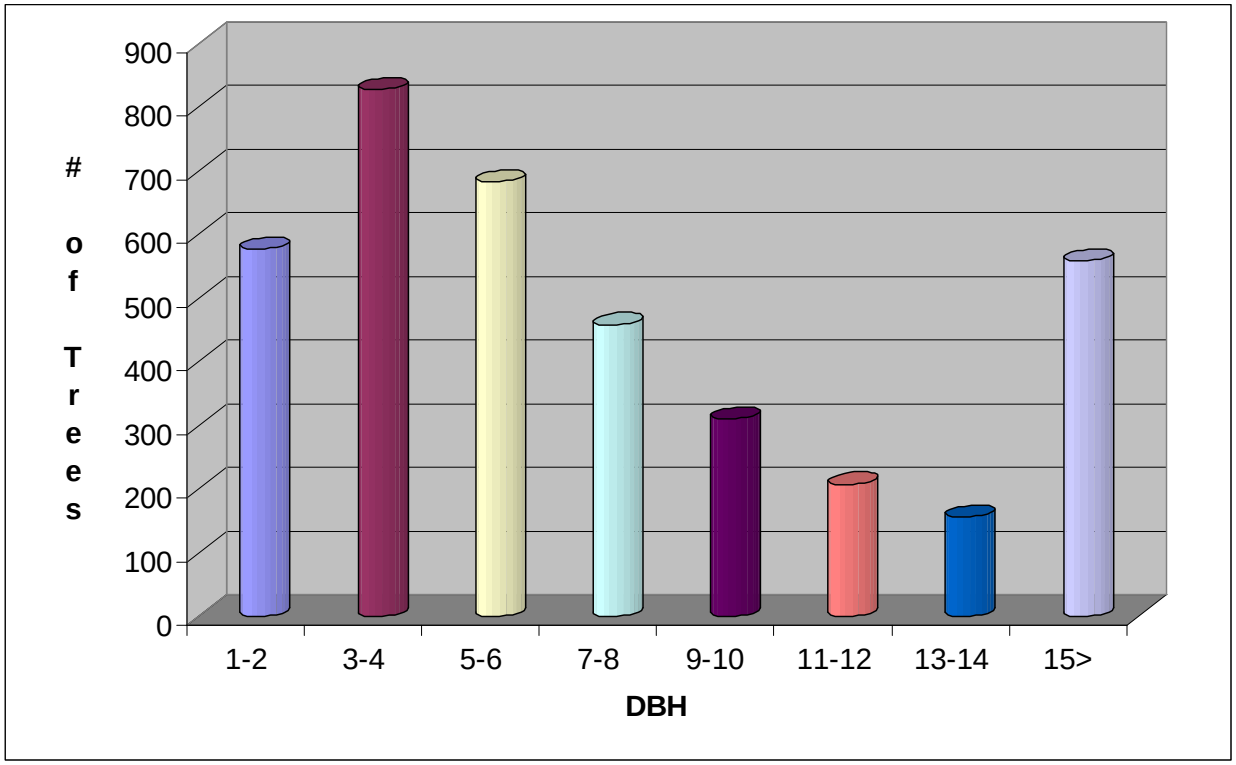


More than half of Pittsburgh's urban forest falls in the good to fair rating, indicating that the forest is healthy overall, but there are some health issues and a small number of dead trees that can be a safety issue. An important goal is to look at the healthy trees more closely and see what steps need to be taken to increase the number of trees toward the "very good" and "good" ratings.

Size class distribution is a good way to assess an urban forest's age. Using the measurement of diameter at breast height (DBH) taken during the survey, Chart 3 indicates that a good part of the urban forest is relatively young (1" to 6"), but a good number of trees are in

the older range (>15”). A healthy urban forest should have an even distribution of size to insure that as older trees decline and are removed there are younger trees to take their place. It is also a good idea to consider the condition of the trees in relation to their size. Charts 4 to 7 show that the general health of the trees across the size classes is good, but the older trees show a higher number of poor ratings. This should happen naturally as a tree gets older, but the goal is to keep that poor column as low as possible to reduce maintenance and safety problems.

Chart 3: Size Class Distribution of Downtown Pittsburgh’s Trees



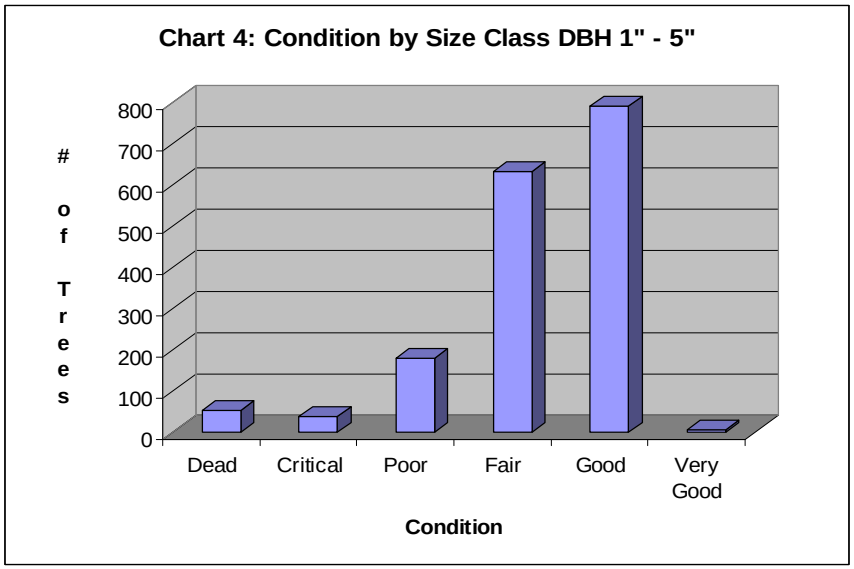


Chart 4: Condition by Size Class DBH 1" - 5"
# of Trees
800
700
600
500
400
300
200
100
0
Dead
Critical
Poor
Fair
Good
Very Good
Condition

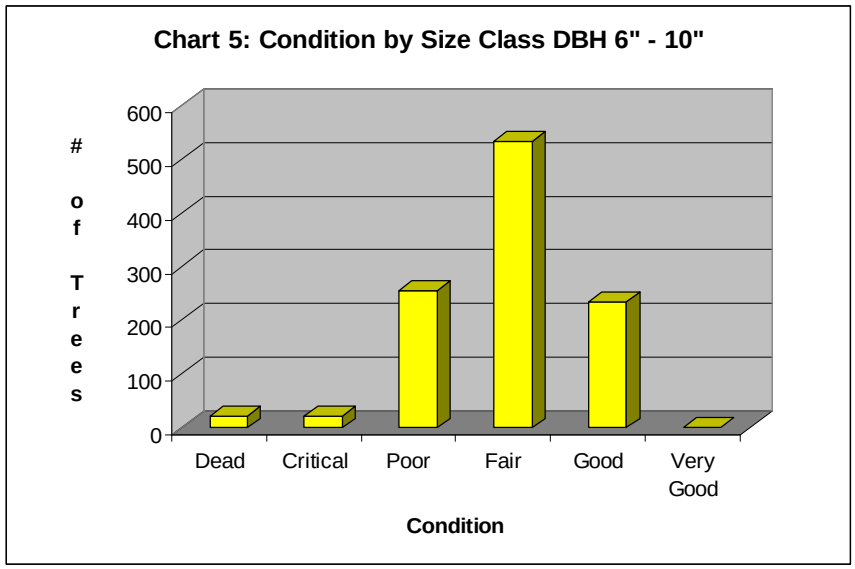


Chart 5: Condition by Size Class DBH 6" - 10"
# of Trees
600
500
400
300
200
100
0
Dead
Critical
Poor
Fair
Good
Very Good
Condition

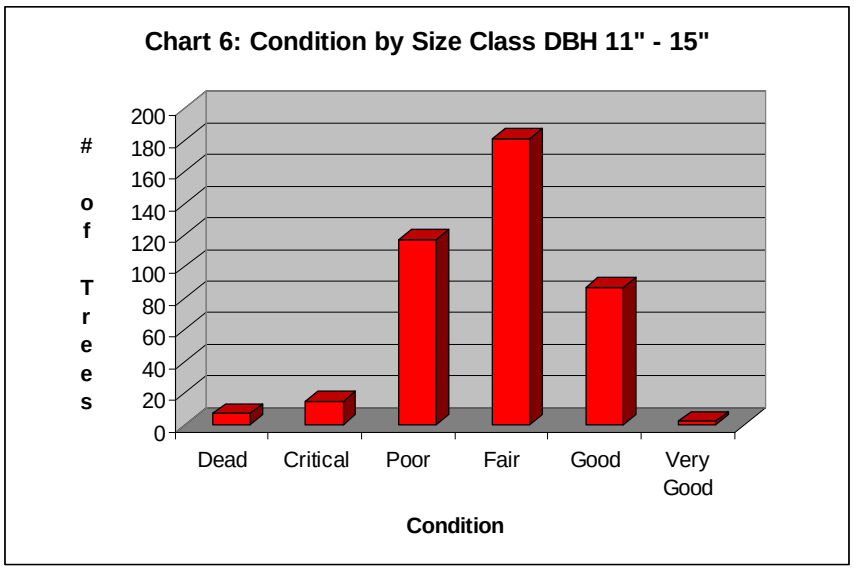


Chart 6: Condition by Size Class DBH 11" - 15"
# of Trees
200
180
160
140
120
100
80
60
40
20
0
Dead
Critical
Poor
Fair
Good
Very Good
Condition

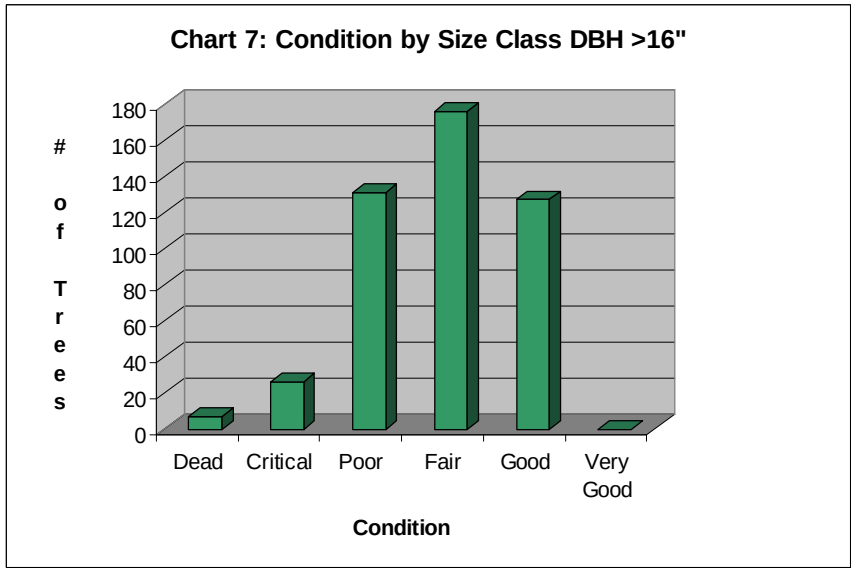


Chart 7: Condition by Size Class DBH >16"
# of Trees
180
160
140
120
100
80
60
40
20
0
Dead
Critical
Poor
Fair
Good
Very Good
Condition

Recommended Tree Locations

Map #7 shows the areas of the city that are missing trees and should be the major areas of consideration for new tree planting. If efforts are concentrated on these areas, tree coverage will be appropriately spread across the city, evening out the distribution of species.

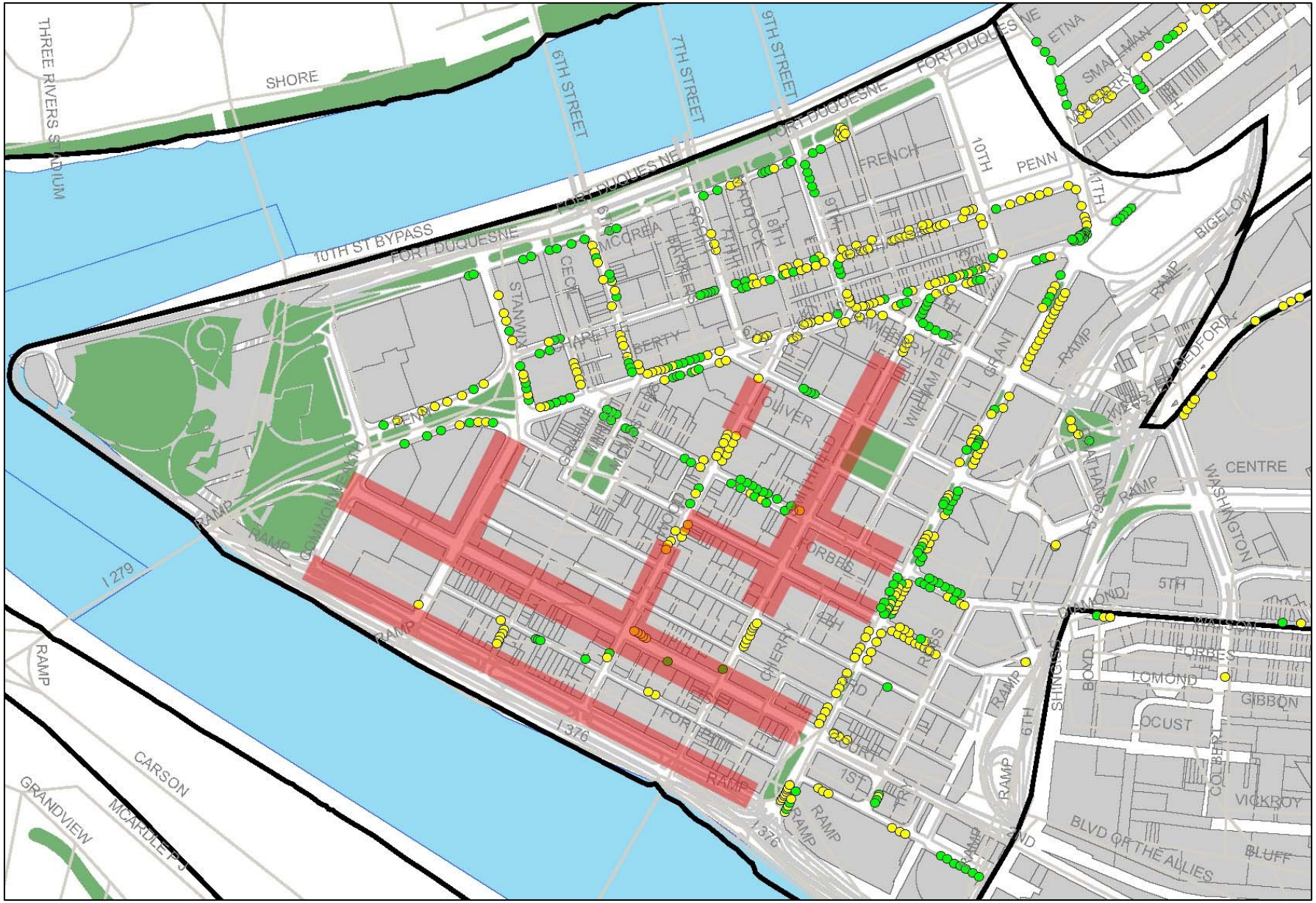
The list on the following page recommends tree species for the city of Pittsburgh. For each type of tree a preferred type of location is suggested. Some trees will perform well in the shade of a building whereas others would do better in an open sunny park. There are also trees listed that can cast shade for areas where shade is needed. Pittsburgh needs to increase the diversity of the urban forest and become less dependent on three or four species of trees. Top priority should be given to native trees; however, harsh downtown conditions warrant considering some successful non-native but also non-invasive species for specific locations.

The selected areas complete streets with sections of trees or highlight streets that are generally wide enough to accommodate correct planting as well as pedestrian traffic. The streets selected also reflect some of the "energy lines" identified during the assessment of activity zones and special areas, both current and planned.

The difference between streets with and without trees can be dramatic as seen in the accompanying photos. Some streets such as Boulevard of the Allies have recently been identified as action areas for Point Park University. The potential impact is dramatic.

Map # 7

Recommended Tree Locations



Suggested Tree Species for Pittsburgh Street Trees

Scientific Name	Common Name	Height	Spread	Native	Exposure
Acer rubrum	Red maple	40'-60'	30'	X	Full shade to full sun
Alnus serrulata	Smooth alder	6'-10'		X	Partial shade to full sun
Betula papyrifera	Paper birch, Canoe birch	50'	25'		Partial shade to partial sun
Cercis Canadensis	Eastern redbud	25'-30'	35'	X	Partial shade to full sun
Cornus florida	Flowering dogwood	10'-30'	25'	X	Full shade to full sun
Crataegus spp	Hawthorne thornless cockspur	15'-20'	20'-25'		Full sun
Fagus grandifolia	American beech	50'-70'		X	Full shade to full sun
Fraxinus americana	White ash	50'-80'	40'-70'	X	Partial shade to full sun
Fraxinus pennsylvanica	Green ash	30-50	40'-50'	X	Full sun
Ginko biloba	Ginko	60'	30'-40'		Partial shade to full sun
Gleditsia triacanthos car. Inemis	Thorless honeylocust	60'	40'		Partial shade to full sun
Liriodendron tulipfera	Tulip poplar	75'-100'	40'	X	Full sun
Malus spp.	Flowering crabapple	20'-30'	18'-20'		Full sun
Plantus x acerifolia	London Planetree	80'	60'		Full sun
Platanus occidentalis	Sycamore	75'-100'	60'	X	Partial shade to full sun
Populus alba	White Poplar	80'	50'		Full sun
Prunus Serrulata	Flowering Cherry	20'	20'		Full sun
Quercus palustris	Pin oak	60'-70'	35'	X	Full sun
Robinia pseudoacacia	Black Locust, Common Locust	55'	30'		Partial shade to full sun
Taxodium distichum	Baldcypress	70'	30'		Partial shade to full sun
Tilia americana	American linden	50'-70'	30'-45'		Partial shade to full sun
Tsuga canadensis	Canada hemlock	40'-70'		X	Full shade to full sun
Ulmus spp.	Elm Hybrids: Homestead, Regal, Pioneer	40'-50'	40'		Partial shade to full sun
Zelkova serrata	Japanese Zelkova, Saw-Leaf Zelkova	70'	60'		Full sun

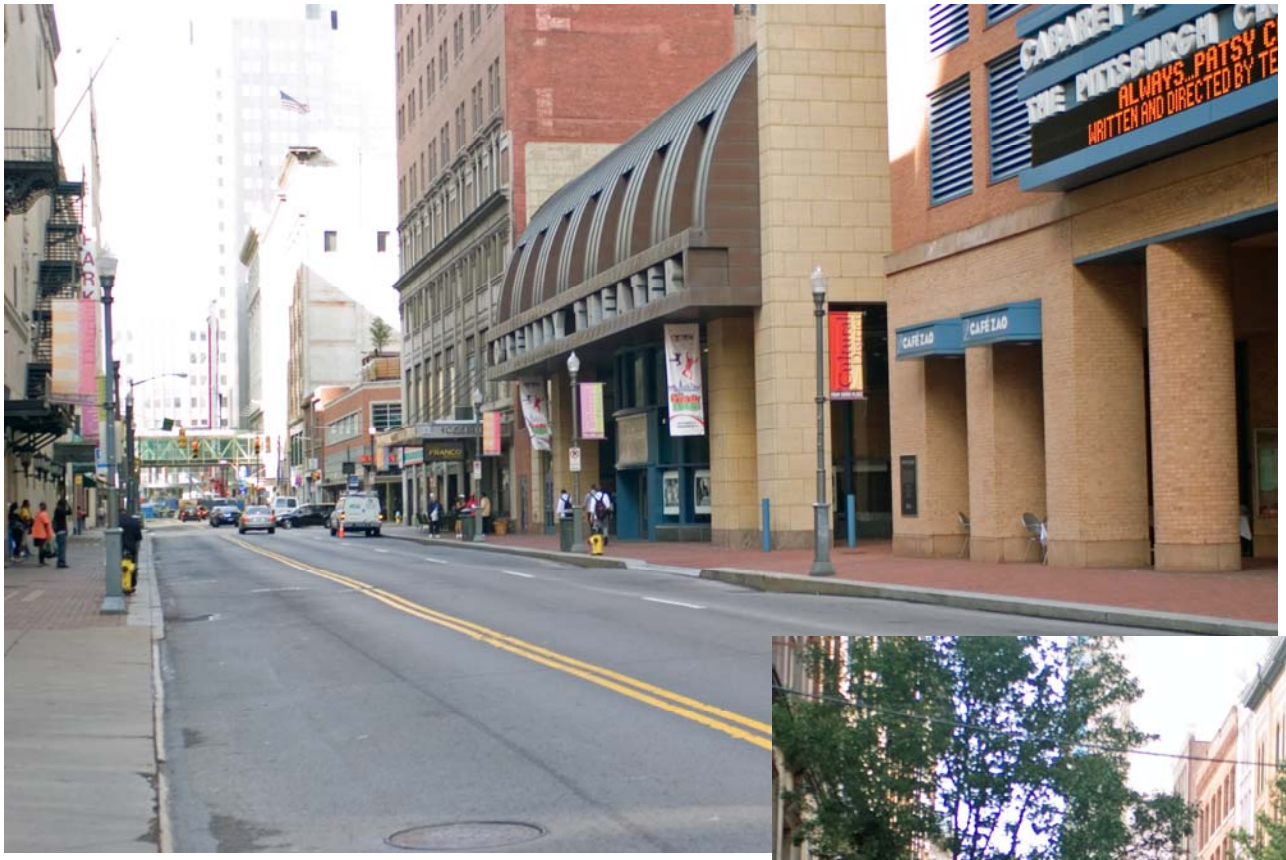
Tree Pit Standards

One of the most important factors in tree health is proper planting. In order for a tree to survive it needs to be placed properly as well as planted in the right conditions. The following is a list of recommended planting techniques and standard recommendations for tree pit construction.

A properly constructed tree pit is an important factor in the maintenance of a healthy tree. A properly constructed tree pit should be no smaller than 6' wide and 12' long. The depth of the pit should be 4' deep with an additional 12" of gravel for drainage. If the sub grade has poor drainage then a 4" perforated pipe should be run from the gravel to an existing storm drain system. There should be at least an 8" curb between the pit and the street. Edging around the pit should be installed unless extremely heavy pedestrian traffic is present.

Penn Station at 34th and 7th, New York City, with marble edging produced in Pittsburgh.

The area around the tree can then be used for additional plantings such as annuals or perennials depending on light conditions. If the resources are not available to maintain plants, a two inch layer of mulch will keep moisture to the soil and provide a nice groomed look. It is important to keep the trees trunk flare free of mulch and soil.



WPC Photos, Summer 2007

Downtown street without trees

Downtown street with trees

Key Strategies for Trees:

- TreeVitalize, a potential new tree planting program sponsored by the PA Department of Conservation and Natural Resources, may offer Pittsburgh a dynamic new approach to increasing street trees in the downtown area and beyond.
- Key Partners such as Point Park University and the Cultural District are engaged in design work that could incorporate sections of downtown for the addition of trees and other streetscape plantings. With a number of partners taking segments the total goal can be reached more readily, particularly if standards (planting structures, species, and other specifications) are uniformly met.

Key Partners:

- Shade Tree Commission and Friends of the Pittsburgh Urban Forest
- City of Pittsburgh, particularly URA and City Planning
- Western PA Conservancy
- Point Park University
- Cultural District
- PNC and other downtown development leaders
- Key businesses and corporations

Next steps:

Work to launch TreeVitalize and build partnerships to leverage the state funding that may become available as part of that program.

Hanging Baskets – Coloring the Sky

Why Planters and Hanging Baskets

There are many urban conditions that prevent a municipality from planting a street tree. Utility lines above and below ground, width of walkway and existing streetscape elements can prevent or limit tree planting. However, there are ways to "green up" a streetscape when trees cannot be planted. Planters and floral baskets hanging from the light poles can be a very useful greening tool.

The Western Pennsylvania Conservancy maintains 400 hanging baskets in downtown Pittsburgh. Even with this number of baskets there are still further opportunities to increase baskets downtown. The red areas on Map # 8 show the location of existing baskets downtown; the blue areas show potential new sites for hanging baskets. Adding these additional baskets would green the majority of the major entrance ways to the city and add greenery and color to some very "hard" areas where it is too difficult to plant trees.

Strategy: Continue private foundation support for hanging baskets; identify and add new corporate and business support.

Key Partners: Western Pennsylvania Conservancy
Laurel Foundation
Downtown Partnership
Businesses and corporations

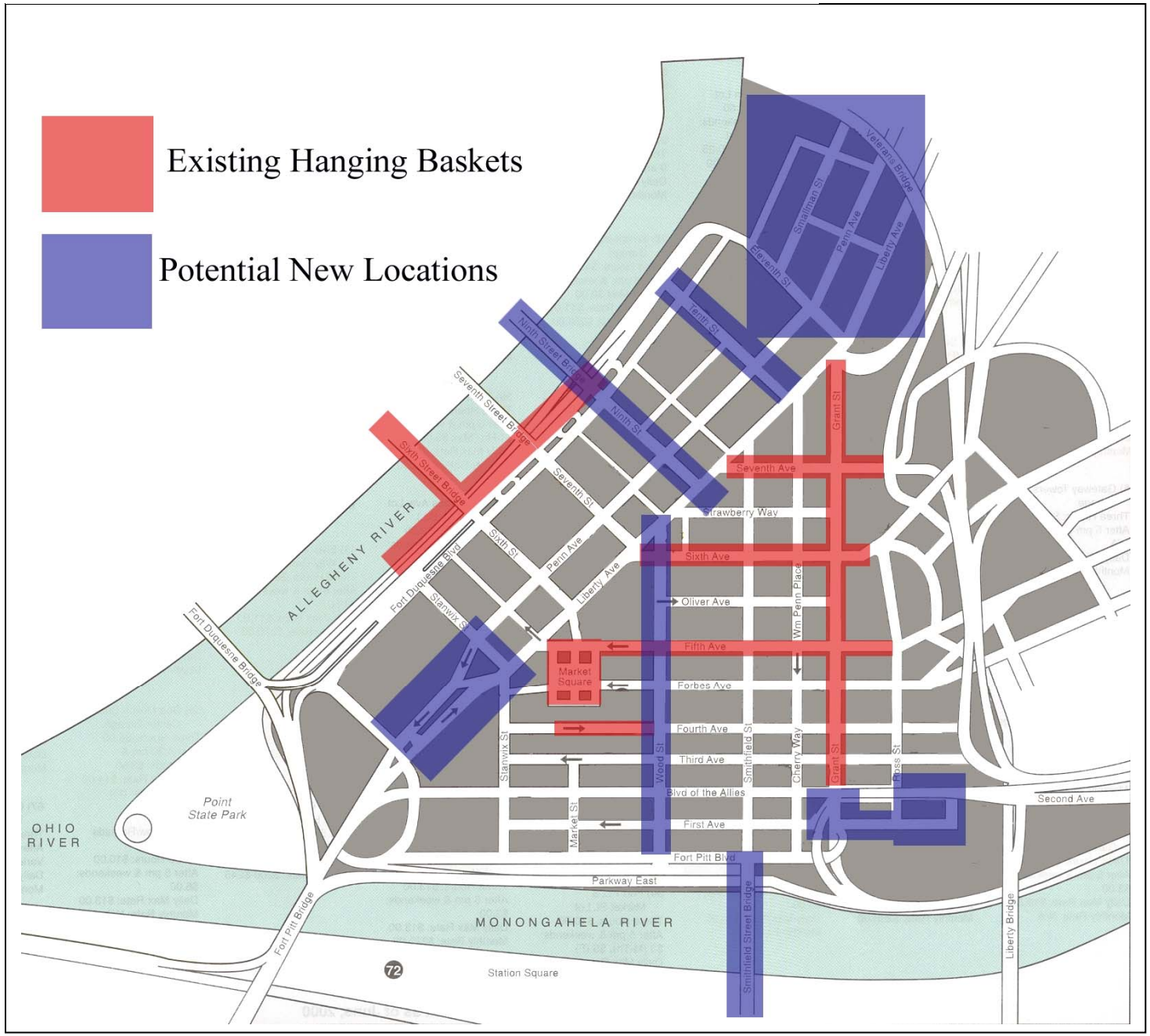
Key Issues: A crucial factor to expanding such installations will be long-term maintenance. If significant expansion is considered, it may be beneficial to consider linking care of hanging baskets and planters to a youth summer training program.

Costs: One-time set-up per basket (including bracket, signage, coordination): $800
Annual flowers and daily care for 16-20 week season: $250 per basket.

Set up costs consist of materials and labor. The basket and bracket that attaches to the light pole, signage, flowers (including selection and growing to specification) and special potting mix are the material costs. Labor costs cover attaching the brackets to the pole, hanging the baskets, watering and daily, feeding routinely, trimming as needed and coordination of the project.

Map # 8

Existing and Proposed Hanging Basket Locations



WPC Photos, Summer, 2007

Planters – Streetside Color and Texture

Street planters can have multiple uses in a streetscape. They can be used to set off an entrance to a building or highlight a specific area of a street face. They can also be used to create a safe walkway for pedestrians when heavy traffic is present. Planters can offer area for holiday and winter displays as well as spring and summer display. Planters come in an astonishing assortment of sizes, shapes and types allowing planters to be designed for almost any specific situation.

Pittsburgh Hilton at the Point, Summer 2007

Container Garden at Versailles, France, Summer 2006

Container planting in Newburyport, MA June, 2007

Planter in Newburyport, MA Summer 2007

Planter at Versailles, France, 2006

New York City, 34th St. Partnership Planters at 6th Ave., Broadway and 34th St.

Planters for pedestrian protection, New York City

Map # 9 shows some streets that have high pedestrian as well as high auto traffic. These streets would be prime locations for planters. Planters would create a pleasant and safe pedestrian experience, increase pedestrian traffic and most likely increase business along the streets. Some cities have used planters and widow boxes to be a signature feature of their main shopping streets. Special themes can be created to highlight specific types of businesses. For instance, planters featuring edible flowers and herbs could highlight the Culinary Institute and restaurants in the Cultural District.

Key Strategy: Develop new private and public support for added planter areas. Work with existing businesses and Downtown Partnership to identify and prioritize best high-impact locations.

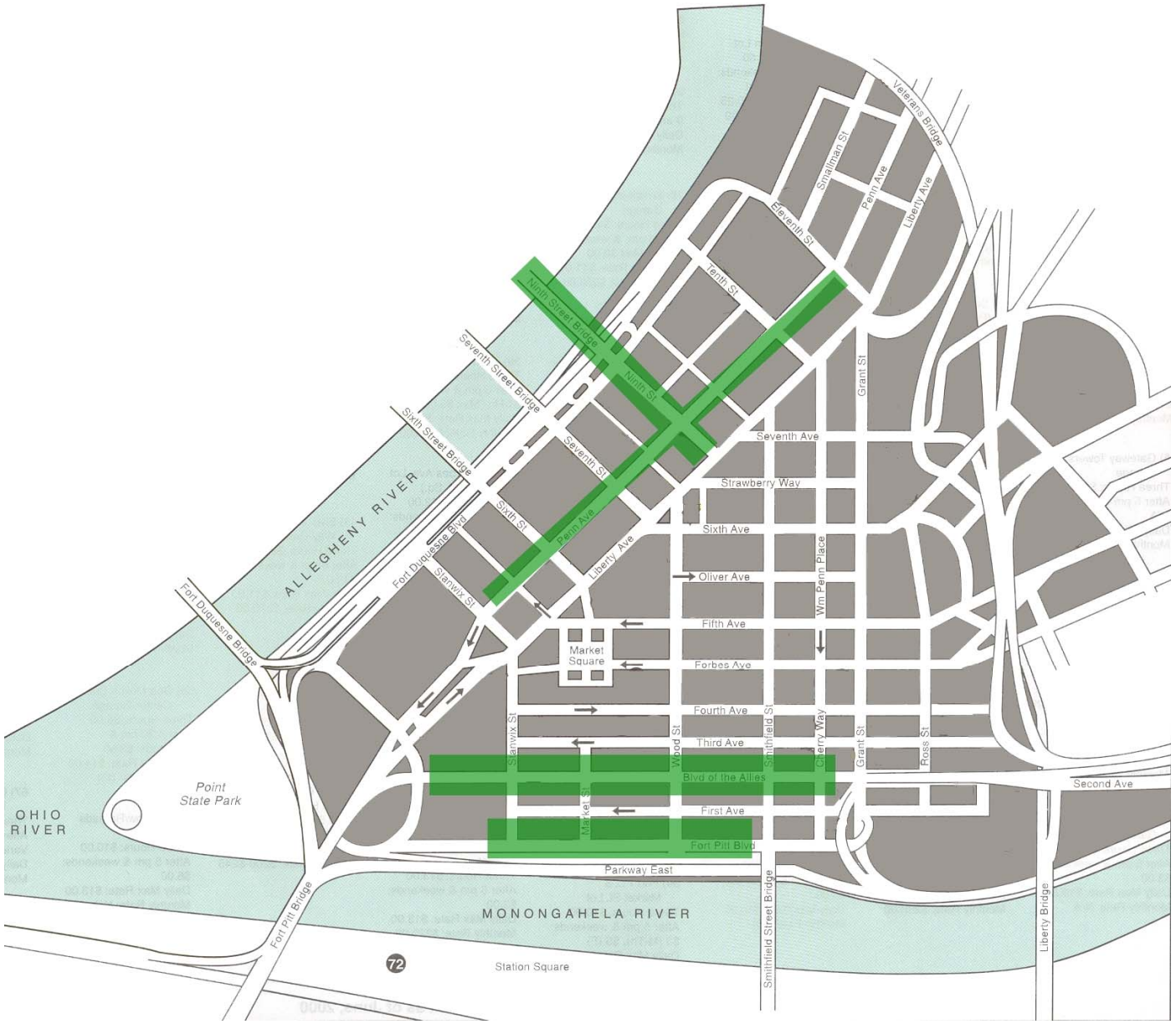
Key Partners: Western Pennsylvania Conservancy
Downtown Partnership
Downtown businesses and cultural institutions

Key Issues: Chief among issues with the use of planters is care of the flowers and watering. The downtown baskets managed by the Western Pennsylvania Conservancy are watered daily by a contractor. These costs could potentially be reduced by having a city-based team of youth summer workers or a horticultural training program undertake the planter care.

Costs: Set up $300 to $600 per planter (cost of planter itself and coordination)
Annual costs per planter for plants and daily care: $300 per planter
Planter costs for set up reflect the tremendous range of options available in terms of size and material. Care costs cover nightly watering and weekly fertilizing from mid May to the end of September.

Map # 9

Potential Locations for Street Planters



Green Roofs and Walls – Greening Top Down and Sideways

Pittsburgh is gaining a reputation for green engineering and design of a significant number of its buildings, but as of yet, there is only modest movement toward adopting the concept of green roofs. However, green roofing is being tried in Oakland at Carnegie Mellon University, and in locations such as the new Giant Eagle store in Shadyside. There is even one green roof installed six years ago on a Smithfield Street building. Is it worth a look to add green roofs to the Golden Triangle? Recent research suggests so.

Ninety-eight percent of the land area of the downtown area, with the exception of Point State Park, is covered by building foot prints or parking. Of that a scan of Google Sky maps indicates that between 25 and 40 percent of this area may be suitable for a green roof installation. In a few places, buildings have already taken advantage of rooftops for a more familiar roof top patio area, such as the one atop the building at the corner of Sixth and Penn Avenue.

Image of the corner of 5th Avenue, Forbes Avenue and Smithfield Street, Downtown Google Satellite Images

Restaurant Roof Planting at Sixth and Penn, Cultural District

Roof garden on Smithfield Street building.

In some locations around downtown, there are also "green walls" created by established plantings already in place that, whether intentional or not, are making some hard surfaces greener and more pleasing to the eye.

Allegheny County Courthouse at the corner of 6th Street and Diamond Square, WPC photo

Wall behind parking lot along Boulevard of the Allies, summer 2007, WPC photo

But green roofs and walls can do much more:

A recent study in Toronto testing the effects of green buildings and walls found that there was a nearly 6 percent savings in heating energy required by a house, an amount that increased to 11 percent when the top floor alone was considered (the site of greatest energy need). In a mixed residential-commercial setting, the energy savings were very significant – 34 percent for the entire structure and 60 percent for the top floor! (In the same study, preliminary results showed that green walls may have an even greater impact than green roofs.) The energy savings from these design innovations could become a significant factor in overall energy consumption in urban areas.

Another potential contribution of green roofs is reduction of the urban heat island effect. Where there is a large amount of dark and impervious surface, heat is absorbed and then re-radiated back into the air over time.

According to one source:

> Through the daily dew and evaporation cycle, plants on vertical and horizontal surfaces are able to cool cities during hot summer months. In the process of evapotranspiration, plants use heat energy from their surroundings (approximately 592 kcal per L of water) when evaporating water. One m2 (10.76 ft2) of foliage can evaporate over 0.5 liters of water on a hot day and on an annual basis the same area can evaporate up to 700 liters of water.

This process reduces the "Urban Heat Island Effect" in the summer. The "Urban Heat Island Effect" is the difference in temperature between a city and the surrounding countryside. It is mainly due to the expanse of hard and reflective surfaces, such as roofs, which absorb solar radiation and re-radiate it as heat. Reduction of the "Urban Heat Island Effect" will also reduce the distribution of dust and particulate matter throughout the city and the production of smog. This can play a role in reducing greenhouse gas emissions and adapting urban areas to a future climate with warmer summers.[35]

Estimates about the amount of difference green roofs can make are still being gathered and vary, of course, depending on the specific location, type of building and other factors. However, the findings to date are intriguing.

Temporary green wall around construction site in Tokyo, Japan. See http://www.treehugger.com

It has been determined by various studies that the surface temperatures of dark built-up roof surfaces typically can raise from 160° F to 190° F or about 100°. According to another source, "Individual green roofs reduce energy consumption by dramatically reducing summer daytime temperature of a building's roof surface. A conventional tar roof can reach 187 degrees F, while a green roof, thanks to the insulating and evaporative properties of soil and plants, remains a cool 75 degrees. A green roof, by protecting the underlying

roof, can extend the roof's lifespan, perhaps doubling or even tripling it. And each green roof provides a potential habitat for urban dwellers of all species."[36]

In addition, increasing evidence suggests that green roofs may play a significant role in urban air quality improvement. For example, public health benefits per metric ton of NOx reduction are estimated to range from $1,683 to $6,383. These benefits indicate that this translates to an annual benefit of $895 to $3392 for a 2,000 square meter vegetated roof.[37]

A study of the city of Toronto assessed the potential benefit of adding green roofs to 50 percent of the city's roof area. Based on an area of 50 million m2 the benefits were astonishing:

* Reduction of storm water flow of 12 million m3 per year
* Infrastructure savings worth $79 million
* Erosion control measures savings worth $25 million
* Pollution control cost avoidance worth $13 million
* 3 additional "beach open" days per year worth $700,000.
* Citywide savings from reduced energy for cooling at $22 million (equivalent to KWh/m2 per year
* Cost avoided due to reduced demand at peak times is $68 million
* Reduction in local ambient temperature from .5 to 2 degrees C
* Cost avoided due to reduced demand at peak times of $80 million.[38]

WPC Photo, 2007

Another study assessed large-scale roof greening within the Detroit and Chicago metropolitan areas. The study found that: Greening ten percent of metropolitan roofs would result in 1.53E4 to 1.85E4 Mg of NOx reduction (from direct and indirect uptake) reducing annual public health costs between $25.8 million to $97.7 million in Detroit and between $31 million to $118 million in Chicago. Through innovative policies, the inclusion of air pollution mitigation and the reduction of municipal storm water infrastructure costs in economic valuation of environmental benefits of green roofs can reduce the cost gap that currently hinders US investment in green roof technology.[39]

Instituting green roofs and walls in Pittsburgh will likely be a matter of slow acceptance. It will take one or two bold leaders to demonstrate the potential and document the benefits of such a design. One or more models that people can visit first hand or that can be publicized to the public to build awareness may be the best avenue to expanding interest. In some cases, roofs are attempting to green themselves as the photo of the old Murphy building shows. Why not make it official as the building is renovated and put to new uses?

There are increasing numbers of examples of green walls in climates similar to Pittsburgh, indicating that the technology to develop these resources is becoming more and more available and time-tested. The photo below shows a building in Brooklyn, N.Y., that has been converted to a living greening wall.

alivestructures.com/oulu.html

Two green roof projects and several green walls are suggested below in the Special Opportunities Projects List.

Key partners:

Green Building Alliance
Downtown Partnership
Western Pennsylvania Conservancy
The Sprout Fund
Pittsburgh URA
Pittsburgh City Planning Department

Next Steps:

Conduct a deeper assessment of interest among businesses and seek to identify additional locations for future green roof and wall projects.

Convene working groups to discuss the specific sites suggested below.

Costs:

Green roofs and walls vary tremendously in size and to some extent by type and design. A basic cost per square foot is probably $30.
Costs are higher for smaller installations.

Roof garden at Carnegie Mellon University

Parking Lots and Fencing – Greening the Blacktop

Over 9 percent (38 acres) of the total land area (412.6 acres) in the Golden Triangle is covered by parking structures or parking lots. By comparison, 42 acres or 10 percent of the total area of the Golden Triangle is greenspace. If you remove the 20 acres of Point State Park, however, the Golden Triangle has a meager 1.4 percent of greenspace (5.78 acres), much of which is medians or "visual" rather than "useable" greenspace for all its workers and residents to share. While a resident of downtown may be able to walk down to the Point, the average worker or visitor is not likely to see the Point routinely or benefit from its greenery. It is imperative to add much more widespread green features to the city's downtown to balance and spread the positive impacts from greenscapes to a larger percentage of the daily population of the Golden Triangle.

Why Green Parking?

Cars dominate our lives as never before. Huge amounts of land are dedicated to cars, in all areas of our lives from schools and churches to shopping areas and even parks. These large amounts of land are covered in impermeable surfaces that increase surface runoff of water, capture and re-radiate heat thereby increasing ambient temperatures, and create visually discouraging locations. By identifying ways to "green-up" the existing parking facilities in the Golden Triangle, all this land might be able to have a more versatile role. Rather than being solely dedicated to storing cars, this space could also bring a small measure of additional green to the local landscape. Great strides have been made in the technical dimensions of this challenge. Some of the factors and findings are described in this section. It is assumed that changes to surface parking lots will take place only as repairs and replacement of existing materials are needed, and or as city regulations encourage or require owners of such lots to make green improvements.

Techniques & Best Practices

Three features of parking lots can make a dramatic difference in the function and visual impact of these sites in the city.

- First, the fencing surrounding the lot can be designed to include green components to soften the hard edges of the sites and screen the vehicles in the lot from passersby.
- Second, the surface of the lot itself can be managed to reduce runoff and increase permeability. This treatment can make a significant difference in the heat island effect and the amount of runoff and pollution transferred from the lots to storm drains or gutters.
- Finally, the lot itself can be designed to include vegetation, specifically shade trees and shrubs to cool the parking surface, the cars and the surrounding buildings and streets. Trees also capture a significant amount of rainwater and pollution, improving air quality and reducing runoff.

Green fencing most successfully involves substantial metal fencing with shrubs, flowers, trees or a combination planted in front or behind to soften the look of the fence itself and the shield the view of people passing by.

Even a sturdy new fence as noted in the photo can look bare and emphasize the cars and unattractive hardscape.

On the other hand, selective plantings can make a tremendous difference at the perimeter of lots. In locations where safety is a concern, these plants can be spaced and selected for height to allow for visibility and easy access. At the very least a seasonal

WPC Photos, Summer, 2007

vine such as morning glories can be added to cover fences for the growing season. More pleasing, however, is a combination of evergreen and annual plants to provide more year-round coverage.

Permeable paving is gaining credence in many circles and a widening variety of options is available to use when resurfacing is needed and substitution for common paving is selected. Some of these options include permeable asphalt and paving blocks designed for porosity and water management.

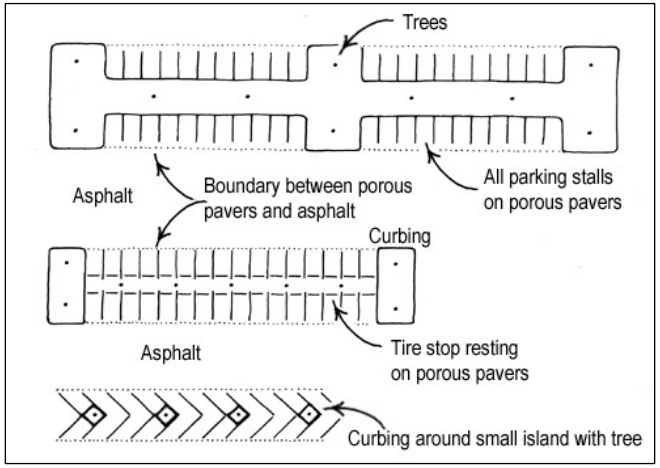
Permeable paving has been used and tested extensively in some locations such as the parking lot of the famous Walden Pond in Concord Massachusetts:

A look at a porous asphalt parking lot that is over 20 years old—Walden Pond (Concord, MA). Courtesy VHB.

One good porous pavement installation was installed by the Commonwealth of Massachusetts at Walden Pond as a demonstration project in 1977. Twenty years later, a *long* time for one paving job on that busy parking lot, it *still* looks good and works well. And, as many of the doubting engineers will confirm, Walden Pond is in a *worst* climate condition for this material. Eastern Massachusetts has more freeze-thaw cycling during a winter than most other parts of the world. But this porous pavement *does* work in eastern Massachusetts, and it will work in most climates worldwide.[40]

This source goes on to report that the permeable paving requires little or no salting or sanding. The surface can handle up to 60 inches of rainfall per hour. Spring potholes were reduced because there is less freeze-thaw dynamic. And 25 years later it was still functioning well.

In a related article, an official from Oregon DOT is quoted as saying: "We've been building porous pavements for highways in Oregon since 1979 and they've taken truck traffic and help up very well…and lasted for 20 years." [41]



In addition to permeable paving there are numerous developments of paving block systems that allow water to filter below the surface. These are being used by an increasing number of municipalities to reduce their storm water burdens and

enhance the look of their parking areas. Combinations of these techniques can also be used to gain the best advantage for specific sites.

Adding trees and shrubs to the interior of parking lots is a matter of design and up front costs. There are now many guidelines for designing parking lots to accommodate the same number of cars with some tree islands between rows. Even a few trees can make a significant difference in temperature and also the visual impression of the site. Shaded sites are almost always the first to be selected by drivers.

As with other tree planting, proper planting must be done at the outset and maintenance needs to be scheduled throughout the tree's life. If trees are correctly planted at the time of site improvements, they will be healthy for a long time and require minimal care.

Finally, in addition to open parking lots, a significant amount of land is used by city-owned parking garages. As one official stated, "These sites are the first thing a lot of people see when they come to downtown in the morning and the last thing they see at night. We should make it a more welcoming experience." The City Parking Authority has indicated interest in assessing the potential for **greening existing parking garages** throughout the city. One such effort was tested this year (2007) with great success, funded by a private funder, and other options can be identified. The map below indicates all the city-owned parking garages.

Key Partners: Pittsburgh Parking Authority
Western Pennsylvania Conservancy
Business, foundations and other potential funders

Next Steps: Test potential for greening parking lots by improving green fencing and adding other physical changes such as trees, shrubs and more permeable paving.
Test interest in supporting additional garage greening among potential partners.
Conduct in-depth assessment of best sites, estimate costs and identify priority order for additional sites.

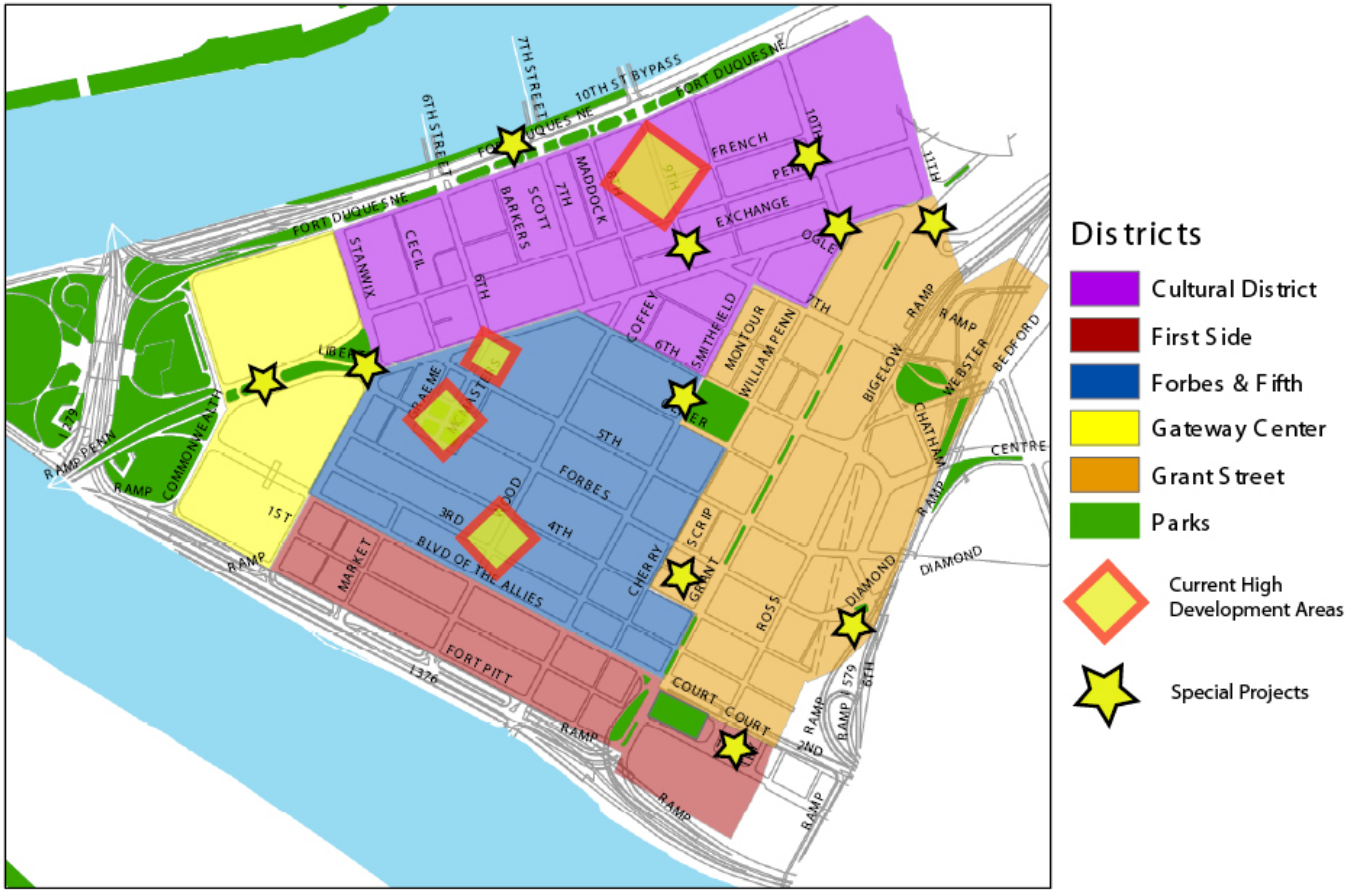
Costs: Costs for green fencing and green plantings in lots, as well as permeable paving, will be highly variable depending on each site. The Fourth Avenue Garage test site already had flower box containers installed, reducing costs for set-up. Costs for flowers and maintenance alone, with summer and fall flowers, were under $3,500.

Special Opportunities for Greening

This analysis has identified eleven special and sometimes dramatic opportunities for greening. They are outlined here by district. For each district the concept or design idea is presented, and a general approach is suggested. Where possible, a list of potential partners and costs are provided.

Map # 10

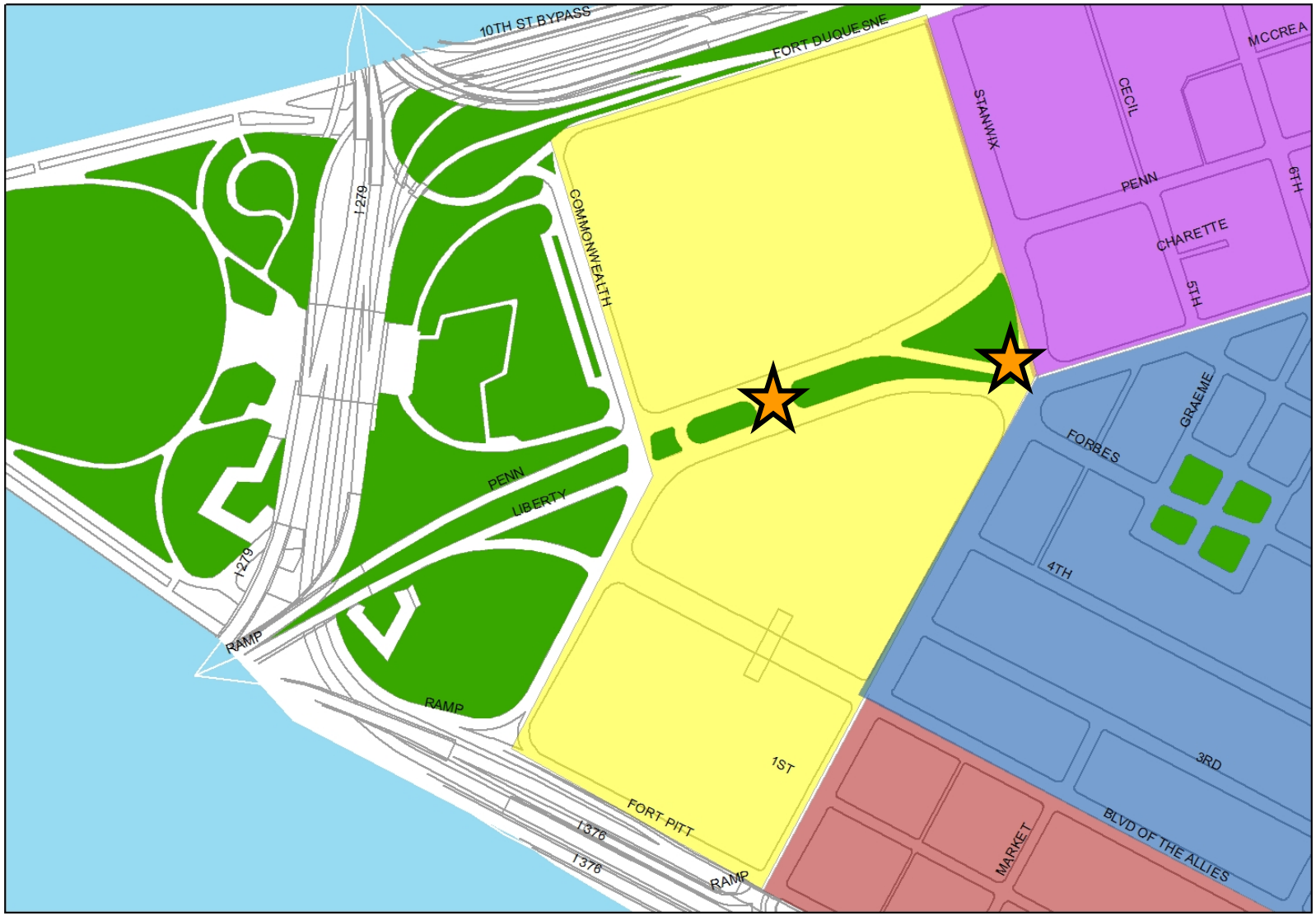
Special Opportunities for Greening



Source: Allegheny County Assessment Website

Created: Chris Koch for Western PA Conservancy, 2007

Gateway Center District



Gateway Center—Special Opportunities

Gateway Welcome Island

As travelers arrive in Gateway Center primarily from the Fort Pitt Bridge, they pass by a large community flower garden sponsored by Western Pennsylvania Conservancy covering three corners at the intersection with Liberty Avenue and Commonwealth Place. Just at that point travelers pass a set of three green islands in the median that have a stone monument, two pieces of sculpture and some perennial plantings. The fourth island used to hold another, smaller WPC garden site, Faith's Garden, and will be significantly redesigned with the advent of the new north shore connector of the subway system.

WPC Photos, 2007

Concept: Restore the islands to a new level of welcoming greenery. The existing plantings in these islands would greatly benefit from some redesign and replanting. Most of the trees are still alive, but more than one has been lost and several appear to be unhealthy. Much of the ground cover is struggling to survive and many of the blooming spring bushes have died back or appear diseased. With some simple design changes and careful selection of plants, this are could be wonderfully refreshed and revitalized as the doorway to the Golden Triangle. Residents, visitors, and tourists alike, especially when the Point State Park restoration is completed, will benefit from a new and improved look to this area.

The existing stone monument is missing letters and the existing sculpture needs paint. And there are some locations where pedestrians have created new pathways across the greenspace. Renovations could extend to new lighting and rethinking the art installations of the area.

Potential Partners:
Gateway Center
Palomino's
City of Pittsburgh
Western Pennsylvania Conservancy
Port Authority
KDKA
Community Design Center of Pittsburgh

Next Steps:
Convene a meeting of interested parties to discuss options, funding and deployment.

Costs:
$20,000 to do a basic redesign and replanting of the first three islands.

Green Roof and Wall at McDonald's

Gateway Center has two WPC Gateway gardens at the Point and at Faith's Garden. While the latter will be disturbed by the construction of the new subway station over the next two years, the final outcome should retain the bright highlight of color and potentially add a green feature as part of the roof and wall structure of the station. However, as visitors or workers enter downtown they are greeted by a McDonald's sign and a blank concrete wall rising above McDonald's where its roof abuts the neighboring and taller building.

Concept: Add a green roof to the McDonald's building, and pair it with a green wall treatment on the adjacent building. Even simple trellises as part of the green roof installation would be an improvement to add a surprising element of green into the first impression of the Golden Triangle from this viewpoint. The shape of the buildings should provide shelter for any installations and protect them from winds.

Potential Partners: McDonald's and surrounding neighboring businesses who would like to see a more finished look to that location of the Gateway area.

Next Steps: Design and cost information from green roof specialists such as Roofscapes, Inc. 7114 McCallum Street Philadelphia, PA 19119 tel: 215-247-8784 fax: 215-247-4659. 3025 who worked on CMU's green roof installations. Or Civil and Environmental Engineering, who worked on the Giant Eagle Green Roof project.

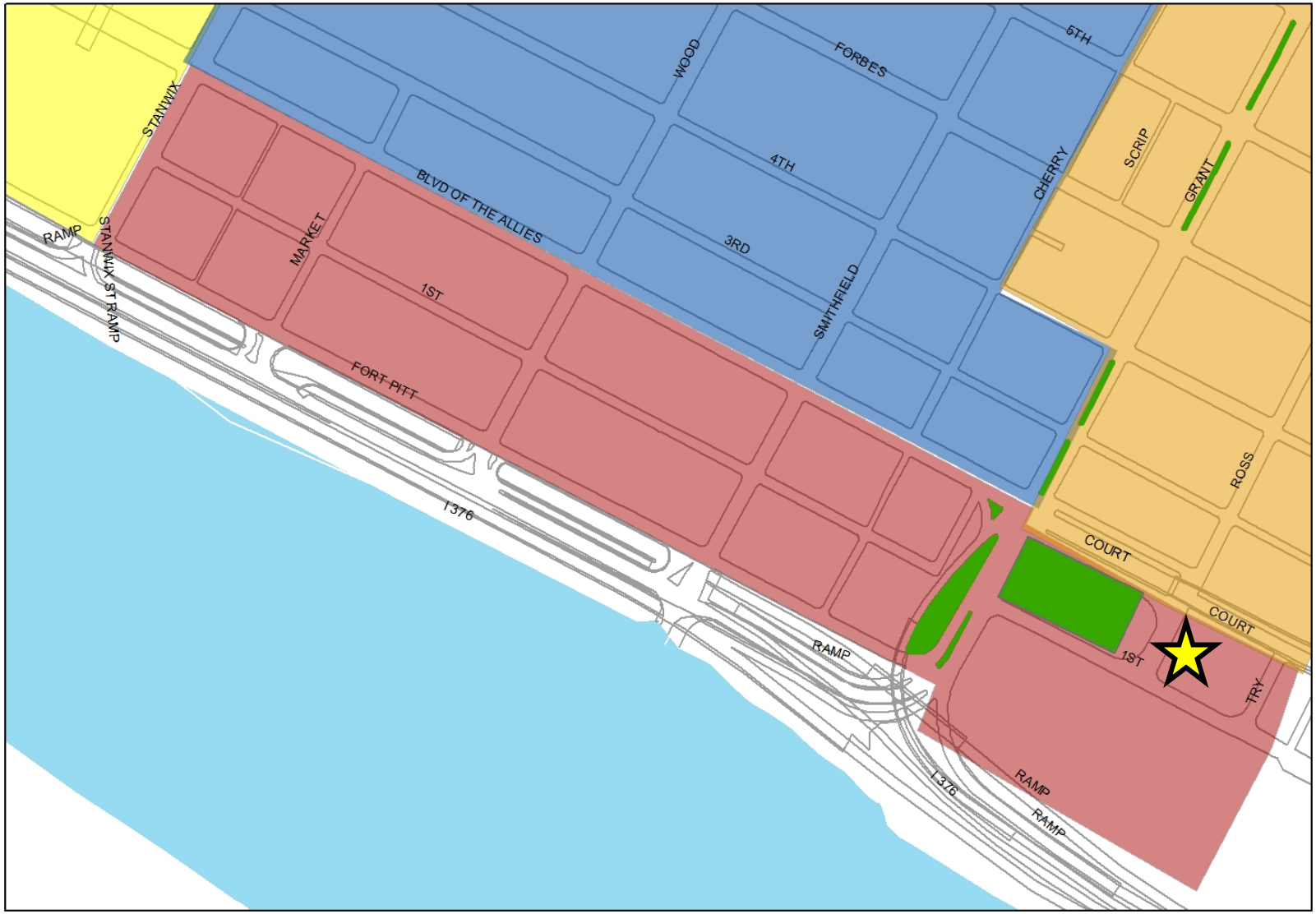
WPC Photo, 2007

Before

Image by Jenna Kappelt for WPC, 2007

After

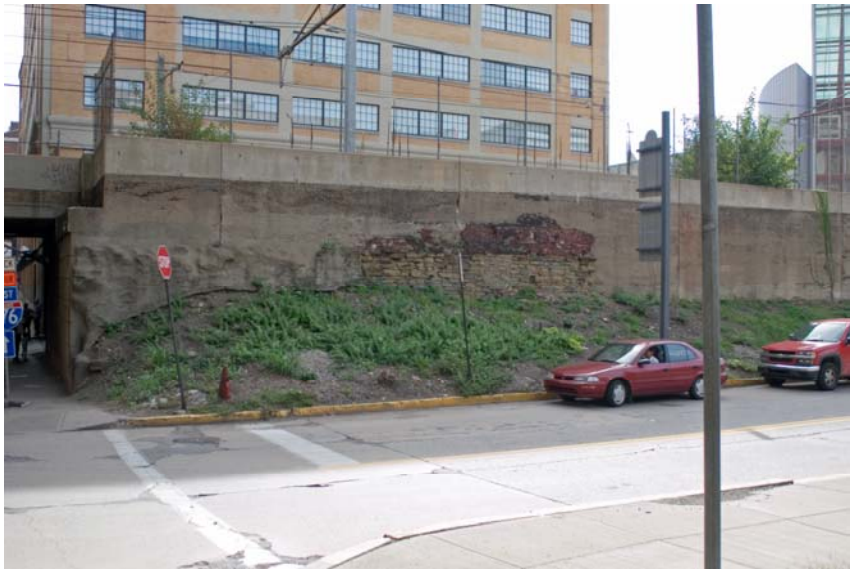
Firstside District



Firstside

Green Wall at Second and B Streets

To complete the wonderful transformation undertaken by PNC with its new Firstside Park, and to accent the subway station and significantly upgrade views from Second Avenue going toward the 10th Street Bridge, a green wall would secure an area in poor physical condition and transform a detraction for all the users of the subway system. The style of green wall could range from as simple as plantings on trellis to a more elaborate designed green wall with color and texture to complement the PNC Firstside Building and the new adjacent park. Just on the other side of the entryway ramp to the Liberty Tunnels the ramp wall has been planted, providing a nice softening to the scale and material of the ramp.



WPC Photos, 2007

BEFORE

Likely Partners:
PNC
City of Pittsburgh Department of Public Works (whose office is just up Second Avenue)
PAT
Owner of the small parking lot below this wall
The Art Institute of Pittsburgh (with a dorm within a short distance of this site)
Sprout Fund

Image by Jenna Kappelt for WPC, 2007

AFTER

Next Steps: Design and cost estimates from experts; perhaps a design competition utilizing the Art Institute, the Phipps Conservatory, the Sprout Fund and local landscaping companies.

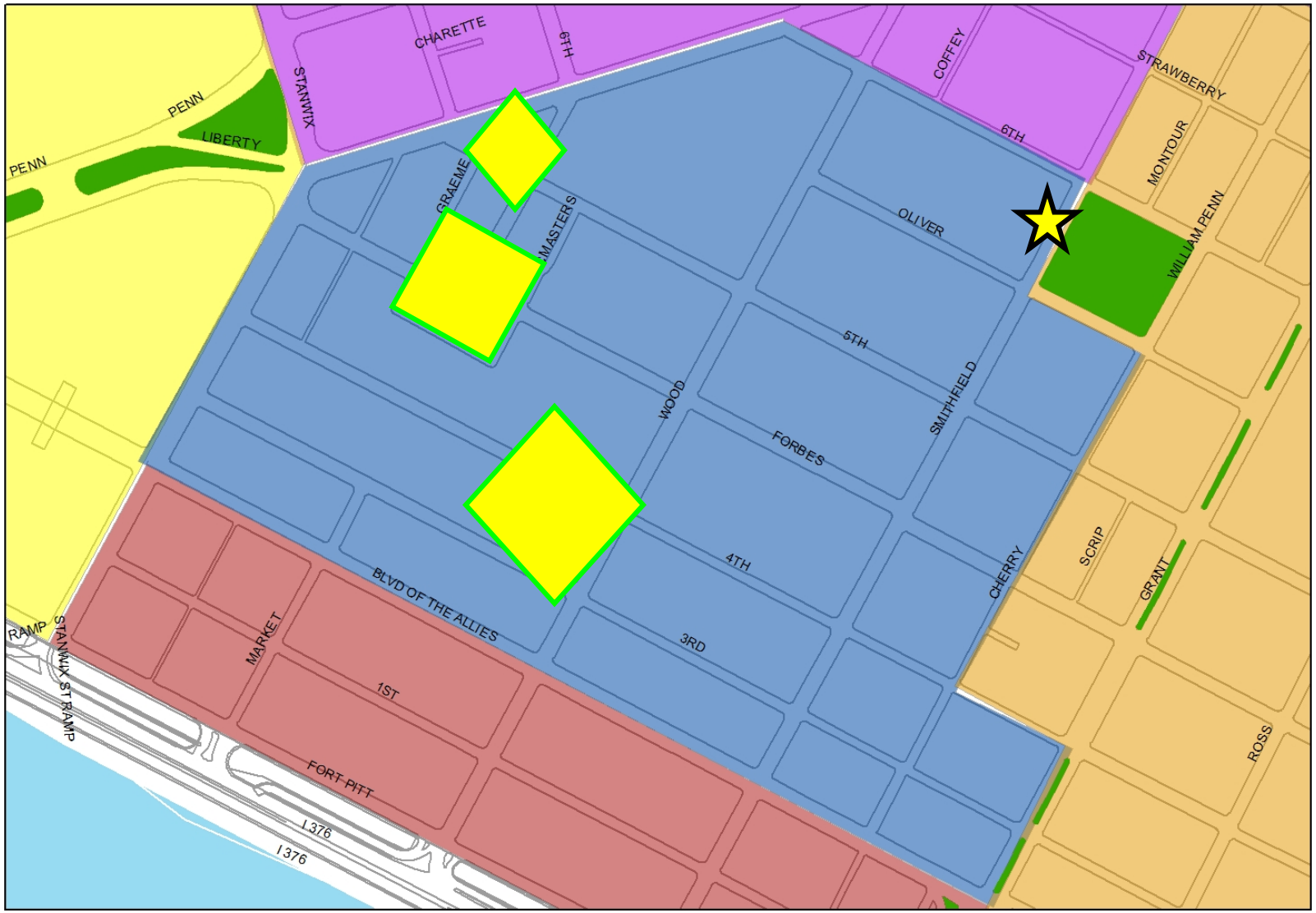
Special Opportunities:

- **First Green Wall Downtown**
- This site might lend itself to a rain capturing system to demonstrate the use of greening to manage runoff from hard surfaces.

Example of a green wall on the west coast designed by G-Sky

Websites for greenwalls: G-Sky http://www.g-sky.com
Patrick Blanc: http://www.verticalgardenpatrickblanc.com/

Fifth & Forbes/Market Square District



Fifth & Forbes/Market Square

Market Square Greenscaping

Concept: The summer of 2007 was a time of testing the effects of adding significantly to the greenery in Market Square and an adjacent area. Working with the Pittsburgh Downtown Partnership, Western Pennsylvania Conservancy added flowers and shrubs to large planters used to delineate new seating areas for area restaurants and coffee shops. Special plantings were added to the large planters beside the performance stage and a perennial bed was installed in one of the large raised tree planters in the Square. These plantings were coordinated with the hanging baskets that the Conservancy has provided through the support of the Laurel Foundation for the past few years. Still to be tested is the effect of window boxes on one of the historical business buildings.

The Pittsburgh Downtown Partnership reports that reaction to the plantings has been very favorable and some merchants are reporting an improvement in the volume of business. The Downtown Partnership is continuing planning and design work for a renovation of Market Square that will include additional improvements to the hardscape and the greenscape.

WPC Photos, Summer 2007

WPC Photos, Summer 2007

Over the same time period, WPC carried out a pilot project to add flowers and greenery to the front of a city garage on 4th Avenue. Supported by a local foundation, this effort tested the effects of planting the flower baskets on the front of the garage. The results were appealing and this particular site will be continued into 2008.

These efforts appear successful enough to consider continuation and even additions. WPC will continue to explore possibilities with the Downtown Partnership and the private foundation that supported the garage greening experiment.

BEFORE 3rd and 4th Street garage with planters, Summer, 2007 AFTER

Image by Jenna Kappelt for WPC, 2007

Several other opportunities are visible in this district:

1) The design and use of the small triangle at Market Street and Liberty will be crucial to the visual and pedestrian flow of users in the area. The fountain at PPG Place is one of the most-used features of the district, and there is nearly a visual connection to the waterfall behind Heinz Hall in the plaza garden at the corner of Liberty and 6th. This intervening triangle can link these two oases, and support the natural flow of people between Firstside District, Market Square and the Cultural District. **The design of this space will be very important to its value and impact in the corridor.**

Ongoing construction at 5th and Market, site of future triangle park. WPC photo, Summer, 2007

2) Point Park University is also undertaking an important assessment of its new environs which could make a significant contribution to the tone, visual appeal and environmental quality of the entire area. **Point Park University is a key link between the First Side District and the Market Square District and its students and employees will be crucial constituencies to anchor the revitalization of the area both visually and economically.** The recent study commissioned by the University to identify its best footprint and expansion opportunities for its future include some excellent ideas about environment of the Market Square district of downtown. In particular the study indicates a need to address Boulevard of the Allies. This is an area identified on the recommended streets for trees map. Planters would also be an effective approach to this long, bare and wide road.

3) Another opportunity for greening may appear along Smithfield Street at the edge of the William Penn Place Plaza. The park itself is due for a renovation, but the edge along Smithfield Street is potentially a significant addition to greenery for the streetscape below

the park. The Parking authority has indicated an interest in considering design approaches that would add more visible green to that edge to encourage people to access the park and to better link the upper and lower streetscapes.

WPC Photos, Summer, 2007

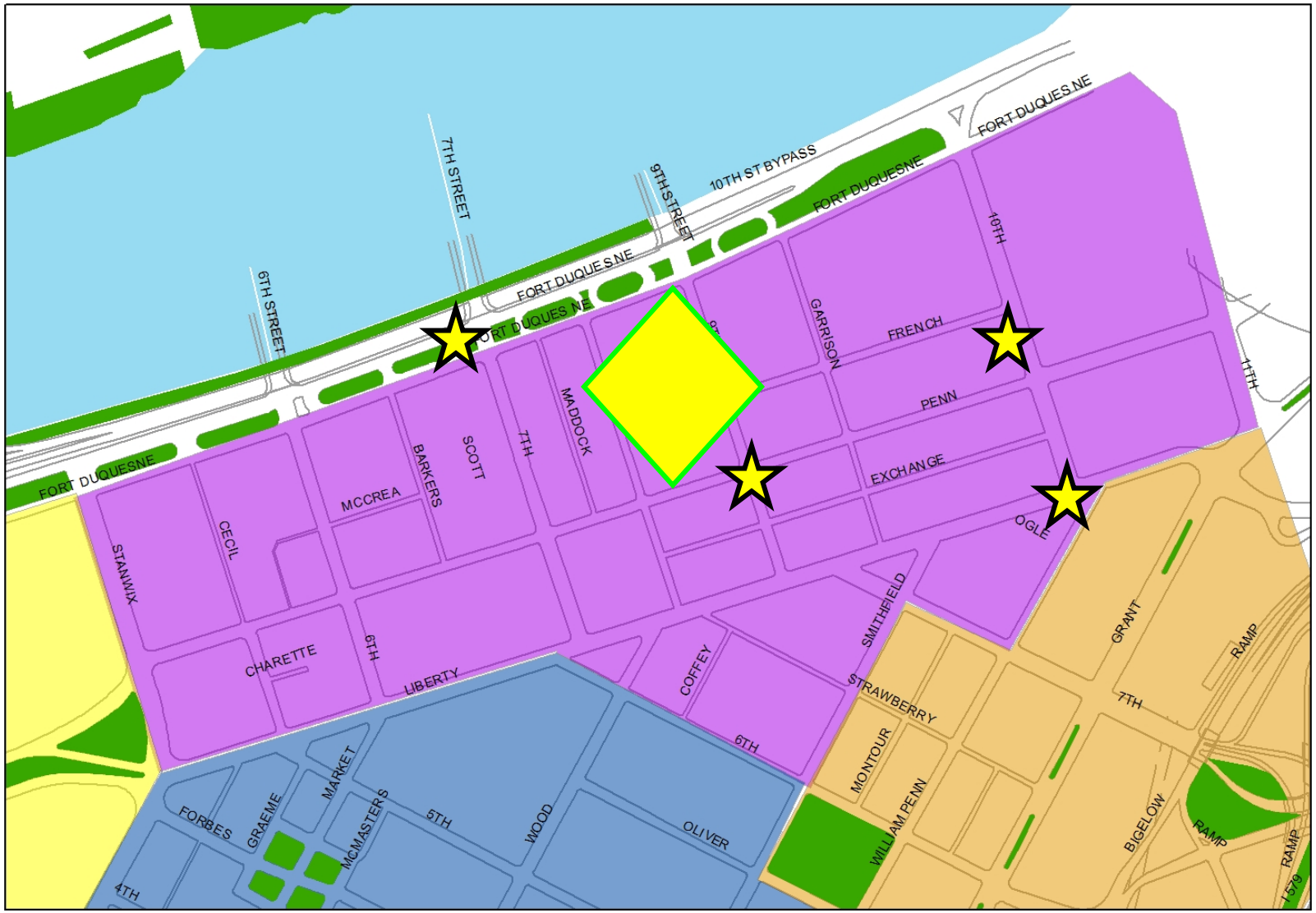
Two views from Smithfield Street of the edge of Mellon plaza, WPC photo, summer 2007

Key Partners for all these ventures:

PNC Bank
Point Park University
Western PA Conservancy
Downtown Partnership
Pittsburgh Parking Authority

Next Steps: Ongoing projects and plans for the park need to be completed before specific action steps can be identified.
Create a Market District consortium of partners to support on-going efforts to green this area so crucial to downtown.

Cultural District



The Cultural District

The physical design face of the Cultural District will largely be defined by the forthcoming development project announced by the Pittsburgh Cultural Trust in 2007. Initial plans appear to encompass a considerable number of green features that will enhance the new development and the entire district. However, in the meantime, and to complement the planned development, there are some opportunities for other greening efforts.

Fort Duquesne Boulevard

Along the Fort Duquesne Boulevard on the northern border of the Cultural district, impressive efforts have been made in the recent past to add greenery to the river's edge with the wide pedestrian walkway with trees and groundcover. However, in some locations the trees are crowded and do not appear very healthy, and the groundcover has become unkempt and unsightly.

Rather than inviting people to linger and sit, the current landscaping is somewhat discouraging. It would be worth revisiting the plantings both along the Boulevard and also along the road on the Tenth Street Bypass below.

WPC Photo, Summer, 2007

WPC Photo, Summer, 2007

Originally planted with vines to soften the massive concrete depressed roadway, the existing cement walls are in many cases not well covered and weedy along the edge. An exceptionally difficult location, this area would still be worth a limited review of possible plant materials to achieve the desired effect.

WPC photo, Summer, 2007

Another concern is the unsightly and ineffective wire fencing along the island down the center of the boulevard. Undoubtedly intended to protect pedestrians who might try to cross, other strategies including well marked walkways, lights, pedestrian signs or denser plantings along this strip might work more effectively. Again, a limited effort to review the options in this location could yield positive results.

Possible Partners: Cultural District
Downtown Partnership

Next Steps: Determine interest in a review of plantings and refreshing of planted areas of Fort Duquesne Boulevard. Pay particular attention to the seating areas and the median fencing.

Additional Option: Consider closing Fort Duquesne Boulevard or the 10th Street Bypass on Sundays or other days that will complement downtown sports or cultural events. Make a full-scale pedestrian promenade of the area like Memorial Drive which has become a major draw for residents and tourists alike in Cambridge, Massachusetts. This would provide new areas for more active sports such as skate boards or frisbee, a type of open space sorely lacking in Downtown, particularly for students and young visitors.

Green Wall in Cultural District

Concept: At the corner of Penn and Ninth Street there is a parking area with a blank wall that greets all inbound visitors to the Cultural District. This site could make a wonderful and surprising green statement for the district, while softening the adjacent parking and surrounding buildings.

BEFORE 9th and Penn, Summer 2007, WPC photo

Possible Partners:
Cultural Trust
Downtown Partnership
Sprout Fund
Western Pennsylvania Conservancy

Next Steps:
Research best type of green wall; approach land and building owners, convene discussion of the option; develop costs. Perfect site to hold a design competition for a dramatic new addition to the cultural district.

AFTER Image by Jenna Kappelt for WPC, 2007

Green the Convention Center

Concept: Our magnificent green convention center, sadly, does not have physical attributes that appear "green" from the street. Designed to "face" the Allegheny River, where a new public greenspace is planned for the future, the Convention Center is in fact seen by large numbers of people who approach from Penn Avenue, Liberty Avenue and Grant Street. What these people see is temporary parking for the nearby hotel. Rather than an attractive greenspace, visitors (and all guests of the Westin Hotel) are greeted with a view of the blacktop and automobiles. While a minimal amount of planting has been added at the edges, it does not disguise the choice to store automobiles rather than accommodate people. The small sitting area to the west of the parking area is so hard to notice that it is easy to miss. This could be a small but spectacular gem of a greenspace that would serve the multiple purposes of greeting convention visitors, hotel residents, restaurant patrons and even many people moving farther east to the Strip District. The site has been identified as a good one for another hotel. In the meantime, however, there is a tremendous opportunity to improve this view of our largest "green" building and the entire streetscape on Penn Avenue. Even if this were only a temporary change, it could have a valuable positive impact on adjacent businesses.

Ironically, there is a roof garden intended for the top of the Center to round out the "green" value of this facility. What would make a stronger impact is a "green carpet" to visually welcome people and invite them to visit this beautiful and groundbreaking facility.

The current view of the Convention Center from Penn Avenue, Summer, 2007

BEFORE

Key Partners: Convention Authority
City of Pittsburgh
Marriott Hotel on Penn
Visitor's Bureau
The Fish Market Restaurant
Westin Convention Hotel

Key Challenges: Existing use agreements; future construction plans. Solution: Design handsome useable greenspace. If it must be temporary design a space akin to the Magnolia Tree parklet farther down Penn Avenue.

Next Steps: Initiate discussions with all parties to free the space for a truly visionary design and use.

AFTER

Image by Jenna Kappelt for WPC, 2007

Context for New August Wilson Center

Concept: The dramatic new August Wilson Center at the corner of Tenth, Liberty and William Penn Place will add a striking destination to the Cultural District. Because the new design appears not to include any greenspace, it is important to add green accents outside the gorgeous new center. The simplest strategy would be to use hanging baskets along 10th Avenue between the Convention Center and the corner of Liberty and William Penn Place to make a visual link for pedestrians.

Key partners: August Wilson Center
City of Pittsburgh
Cultural Trust
Westin Convention Hotel

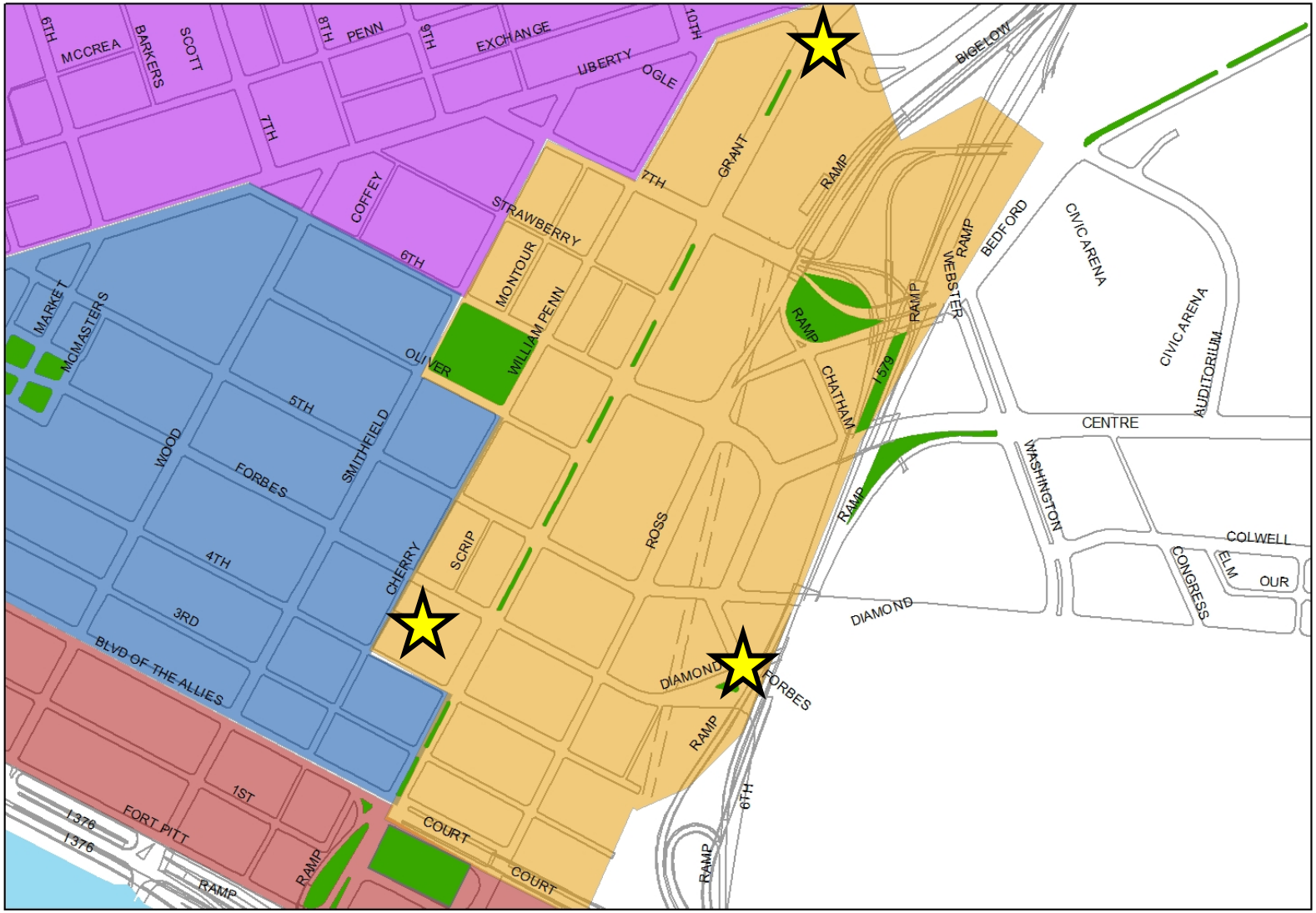
Next Steps: Convene meeting of potential parties, provide basic cost and maintenance information for discussion

Costs: $250-275 /basket for 6 baskets = $1,050

$200-800/planter for 6 planters = $1,200-$4,800

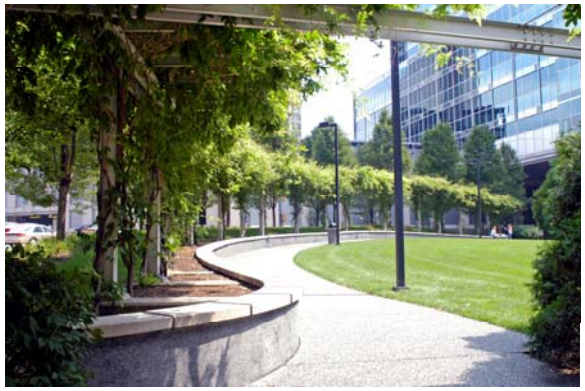
WPC Photo, Summer 2007

Grant Street District



Grant Street District

Grant Street has been well attended to with past streetscaping work and active and extensive participation by key corporate partners such as Mellon and USX. The street tree islands down Grant are sometimes cited in textbooks as exemplary for greening a busy urban thoroughfare. And the handsome landscaping and park at the corner of Grant and 7th Street is another example of well done and well maintained urban greening.



WPC Photo, Summer, 2007

Other efforts, including potted trees and plantings in front of other key buildings, complement the best features of Grant Street. However, some dramatic opportunities remain to be seized along Grant Street.

"Renaissance Square"

Concept: The handsome City County building, seat of government for 2.1 million residents and taxpayers, looks out over a surface parking lot. While there are excellent green accents along Grant Street, the "usable" greenspace where people can actually sit and gather, is at the other end of the Street and unlikely to be used or noticed by people on business at the City County Building.

Using a model similar to the brilliantly successful Post Office Square in Boston, this site could host an underground parking facility and a beautiful greenspace to welcome visitors to downtown Pittsburgh as "Renaissance Square" – symbol of all this is right with Downtown Pittsburgh. Post Office square was developed by surrounding businesses and they will retain ownership of the garage until the costs of development have been recovered. At that point they will sell the facility

Post Office Square in Boston: Why It Works

"Park above, park below" is the slogan at Boston's Post Office Square. A public-private partnership financed the design and construction of the park and garage, while fees from the garage are targeted to repay capital costs and ongoing maintenance.

At lunchtime in the warmer months, the grass is usually covered with people enjoying jazz concerts.

A nearby restaurant, the Milk Street Cafe, operates an outpost within the park, and pays rent to Friends of Post Office Square, the nonprofit consortium of local businesses that developed the park. Garage attendants patrol the park and provide general maintenance, while Friends of Post Office Square pays for a private park ranger in the summer. The park/garage design has received more than 20 planning and architecture awards, and created open space in an extremely dense quarter of the city. Before the park's creation, the area was a "ghost town" after working hours. Now, the well-lit park and the activity from the 24-hour garage make people feel safer.

Post Office Square is on Project for Public Space's list of the best squares and plazas in the world.

For details on financing and management, go to story at: http://www.pps.org/great_public_spaces/one?public_place_id=20

to the city of Boston for a minor amount and the city will continue to care for the garage and the park. This site has become one of the most heavily used greenspaces in all of the city, and a tremendously successful magnet for workers and residents alike.

WPC Photos, 2006

Photos of Post Office Square, taken in the summer of 2006, show the discreet entrance to underground parking, the handsome built-in benches, brick sidewalks and the remarkable landscaping achieved over the parking garage.

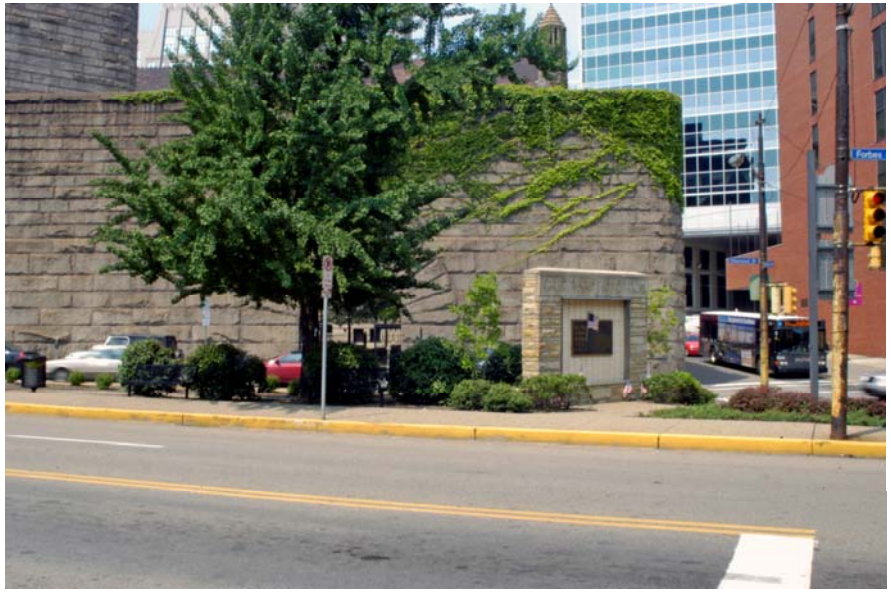
While smaller than Post Office Square, the site on Grant Street could achieve a similarly dramatic transformation of a center for regional government.

Potential Partners: City of Pittsburgh, URA
Allegheny County
Local businesses, property owners and financial institutions
Pittsburgh Downtown Partnership
Pittsburgh Parking Authority

Next Steps: Present concept to landowner, city, county and other potential partners; consider a design competition for transformation of this site.

Polish Up Diamond Square

At one of the more heavily traveled intersections in the Grant Street district at the eastern end of the Golden Triangle, a small park in Diamond Square at Forbes is in need of an upgrade. The basic landscaping at 6th Street and Diamond Street has been improved recently, and though sparse, it presents a nice season of color and looks well kempt. The small triangle of greenspace with the Honor Roll monument, however, does not fare so well. With a relatively small investment this bit of green could be improved with refreshed groundcover, shrubs and some perennial blooming flowers.



Photos by WPC, Summer, 2007

Likely Partners:
Duquesne University for whom this area is a doorway to their campus.
Adjacent businesses
City of Pittsburgh public works/parks department

Two other smaller opportunities present themselves in this same area.

Roof Planting at Robert Morris

Concept: As traffic comes down 5th Avenue at 6th Avenue and jogs to Forbes or adjacent highways, there is a head-on view of the Robert Morris Business School – a rather blank brick façade adorned with a few flags on the flat roof. The edge of that roof is an enticing location for some trailing and softening green plants that could be placed in containers. Just across the street, in contrast, is the handsome vine-covered wall of the Court House.

By adding green to its front door, Robert Morris could tip the balance of the eastern corner of the Golden Triangle and offset some of the effects of being overshadowed by the overhead roadway of I-579.

Key Partners: Robert Morris University

Next Steps: Present concept to University
Develop engineering and design information to determine suitability of roof for added greenery. Develop cost estimates.

WPC Photo, Summer, 2007 BEFORE

AFTER Image by Jenna Kappelt for WPC

Planters below I-579

Though the highway shades most of the area below and limits the potential uses of the space for any greenery, there is one small area directly across from Diamond Square that could accommodate several small planters for shrubs and vines. Along and just behind the railing/fence that delineates a small city parking area, there is adequate sunlight for some types of shrubs and shade tolerant plants. The major challenge would be watering. However, the addition of a small amount of greening at that location would help offset the looming darkness of the overhead highway at an important gateway entrance and exit for the east site of downtown.

Likely Partners: City of Pittsburgh
Western Pennsylvania Conservancy
Duquesne University

Next Steps: Examine water options
Coordinate plantings with Diamond Square efforts

Cost Estimates: Set up: $200 to $600
Maintenance for 20 weeks over the summer: $300 per planter including watering.

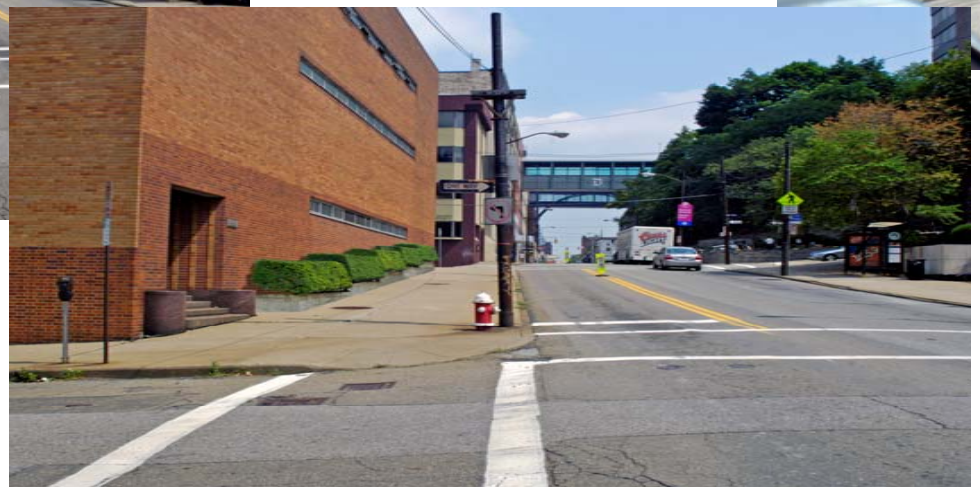
WPC Photo, Summer, 2007 BEFORE

AFTER Image by Jenna Kappelt for WPC

Planters at Duquesne University

Concept: Although it is just outside the boundaries of the Golden Triangle, Forbes Avenue is nevertheless a heavily traveled corridor for workers and students. Duquesne University has been systematically improving its campus landscaping, so plans may already be upcoming. However, our assessment identified a spot at the corner of Forbes and Shingess Street which could handle sidewalk planters for sculptured bushes to reflect the wonderful stair-step shrubs alongside the building going up by Rockwell Hall. By adding a planter with the playfully designed shrubs, Duquesne would add a balance and emphasis to their ongoing greening work and their strong efforts to create more of a campus entryway from Forbes Avenue.

BEFORE



AFTER
Image by Jenna Kappelt for WPC, 2007

Likely partner: Duquesne University
Next steps: Present concept to University and encourage plans to incorporate complementary greening at this location.

Busway and Train Station Island

At the other end of Grant Street at the junction with Liberty, there is a handsome pair of streetscapes below the train station. However, there is a blank and unattractive island of cement beside the federal building and adjacent to the busway. With some planters and trees or shrubs this cement area could become a handsome walkway for passengers disembarking at the train station stop, and walking toward Grant Street. Properly done, these plantings could become part of the security system for the federal building by adding a reinforcing phalanx of large planters between the busway and the building.

Potential partners: Federal agencies
The Pennsylvanian
Port Authority

Next Steps: Convene a meeting of partners

Costs: $200-600 for 6-8 planters or $1,200 -$4,800 (including care)
$200-400 for hanging baskets on light poles and/or along railing or
Another $1,200 to $2,400 (including care for full season).

WPC Photos, 2007

Handsome landscaping at the lower edge of the Pennsylvanian is a highlight of the east end of Grant street. However, just above this scene at the busway and the corner of the federal post office building, it is a different situation.

Imagine the impact of planters or potted trees to make a proper walkway to Grant Street from the Busway. WPC Photos, Summer 2007

Special Connections

There are some connecting links between the Golden Triangle and the rest of the city that require some attention simply because they are such avenues to and from the Golden Triangle for many commuters and other users of downtown. Four key areas have been identified during this assessment:

1. Entryway to Strip District along Smallman Street; Heinz History lot;
2. Entryway to Downtown from the Strip along Penn Avenue;
3. Liberty Avenue between Downtown and 30th Street; parklet; parking lot adjacent; concrete and stone walls along liberty with parking above
4. Fifth Avenue outbound to Jumonville and Forbes Avenue inbound from Jumonville to 6th Street.

Area 1: Entryway to Strip District along Smallman Street

There are two key entryways to the Strip District that may benefit from attention to greening. First is the corner of 11th and Smallman, where a large parcel is occupied by a surface parking lot. Attention was clearly paid to the edges of the lot when it was constructed with some plantings outside of basic but attractive fencing. With time, however, many of the plants have died or are in distress. And the lot itself is a sea of black asphalt that is sweltering in the summer and bleak in the winter. This site is a defining feature for many visitors to the Heinz History Center and for guests at the new Hamilton Inn and for many other visitors to the Strip District. This lot is large enough to handle a revised planting design that would add enough trees and shrubs to transform the area to a greener and more welcoming site, not to mention one that produces less runoff and reduces heat retention. This lot is also a major visual feature for travelers coming to the Golden Triangle from Fort Duquesne Bouldvard/10th Street Bypass.

There is also a hillside directly across from this parking lot that is in poor condition. It could be improved with some perennial plantings. Ownership will be a key to possible efforts. It would certainly benefit the Convention Center and the Heinz History Center to have that particular view improved.

Image by Jenna Kappelt for WPC, 2007

WPC photo, Summer, 2007

BEFORE

BEFORE WPC Photo, Summer, 2007

AFTER Image by Jenna Kappelt for WPC, 2007

Area 2: Entryway into the Strip District at Penn and 16th Street Bridge

Because Penn is one way into town, it is difficult to know how many people approach the Strip District from the Golden Triangle on foot. However, more people could certainly be encourage to walk there from the Convention Center or the new August Wilson Center or the pending development by the Cultural District if there were a more inviting and clear pedestrian path from 11th Street to 16th Street along Penn Avenue. The simplest strategy would likely be hanging baskets along Penn Avenue from the new bus station to the 16th Street Bridge. The Bridge itself has built-in hangers that could also be used if there were an interest in connecting the Golden Triangle/Strip District more strongly to East Ohio Street on the North Side. Western Pennsylvania Conservancy already has a garden at the corner of Chestnut and East Ohio, at the Teutonia Mannerchor building, making a nice potential linkage of color and flowers.

Likely partners: Strip Business Leaders
Convention Center
City of Pittsburgh

Next steps: Discuss with area businesses and Visitors' Bureau
Price out components

Costs: Roughly $330 per basket for start up and first year; $250 each after.

WPC Photos, Summer, 2007

View West on Penn inbound to Golden Triangle; note handsome trees on one side of the street; hanging baskets would make a good balance and add green on the other.

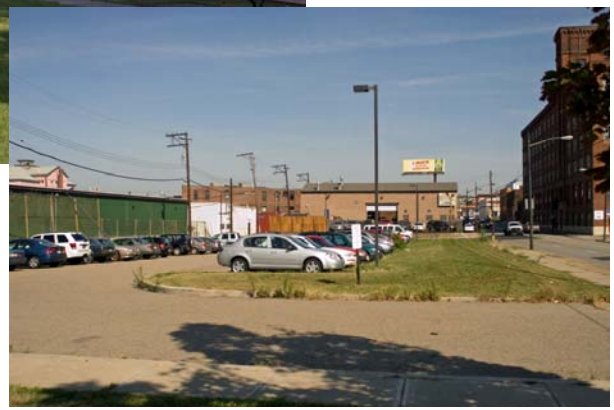
Hanging brackets are built into the 16th Street Bridge.

View East on Penn toward Strip District from 11th.

Area 3: Liberty Avenue from 11th to 30th Street

Liberty Avenue is one of the main thoroughfares into the downtown area, and out, from the east side of the city. The street itself is fairly high speed and because of the high concrete walls on the outbound side, it feels like an enclosed corridor. Some effort has been made to plant the top edges of the walls in several areas, especially along the parking lots used by AT&T. However, additional changes could be made to better screen the cars parking all along the edges of this cement barrier using low evergreen shrubs or small trees. Visually, this area could be improved significantly so that instead of feeling like a back door through a warehouse district, it could present a more intentional avenue of greenery, at least on the wall side.

At 30th Street, there is a parklet with playground equipment and, adjacent, a number of parking spaces. There are several trees in the playground, but there is a particularly unkempt area along the low barrier at 29th Street, as well as a bare chain link fence along the back, and there is no screening of the parking lot which has sufficient greenspace to add a number of trees and shrubs both to increase the attractiveness of the site and the drive along Liberty Avenue.



WPC Photos, Summer, 2007

Likely partners: Adjacent businesses
City of Pittsburgh

Next Steps: Present concepts to stakeholders
Engage partners
Secure design estimates and funding

Area 4: Fifth and Forbes Corridors to and from Jumonville and 6th Street

These two roads accommodate between them 10,000 to 35,000 trips each way per day. The streets are both marked by a large number of temporary or adjunct parking lots, some identified as belonging to downtown businesses, some apparently private in nature. However, they all share the unattractive look of chain link fence and asphalt, usually set in the crumbling remnants of foundations from the buildings that previously occupied these sites.

Many of these are probably awaiting future development. In the meantime however, a very inexpensive improvement would be to plant a corridor of sunflowers to hide the fences during the summer and play on both the black and gold colors of Pittsburgh and the potential for the future of biofuels in our region. This transformation could be done with extremely minimal investment in small planters and volunteer care. Costs would be less than $500 per site.

Particularly with the addition of the new Arena that will likely draw additional travelers down this route, a modest investment by the city and partners could create a Sunflower Corridor to leave people with a memorable image of their trip into and out of the Golden Triangle.

Key Partners:
Landowners and/or leasers
URA
Uptown community groups
Western PA Conservancy
GTECH
Steel City Biofuels

WPC Photos, Summer, 2007

BEFORE

AFTER Image by Jenna Kappelt for WPC, 2007

IMPLEMENTATON STRATEGIES

Successfully implementing the ideas presented in this report will require a variety of strategies that activate selected partnerships and generate widespread support. Here are six general strategies that serve as the foundation of an action plan for downtown greening:

1) Target the top five strategies highlighted in this report for action.

2) Piggyback efforts onto upcoming events or projects that are underway:
   a. Hanging baskets or planters – create a challenge for the 250th birthday;
   b. TreeVitalize – create a tree challenge to local business and residents to leverage state funding;
   c. Other anniversaries, celebrations or activities – identify connections to greening.

3) Build greening more emphatically into plans for new downtown development including:
   a. Careful coordination on street and sidewalk upgrades (such as around new development like the August Wilson Center) to incorporate tree planting and light poles that will readily accommodate hanging basket brackets in the future;
   b. Work with developers and business to incorporate stronger greening features into their plans and developments.
   c. Hold public design sessions to enlist public ideas for long-term success.

4) Review city regulations to see where existing guidelines can be leveraged, especially for downtown parking, or strengthened to help achieve a stronger green result.

5) Initiate a multi-year information and education campaign for downtown businesses and residents to build understanding of opportunities like green roofs, green parking, green walls and specific projects.

6) Convene a downtown Green Leadership Team to lead by example and engage new partners to accomplish specific goals tied to economic and environmental benefits of greening. Initial green team should incorporate representatives of the corporate and business community, the Downtown Partnership, Cultural District and arts organizations, Green Building Alliance, educational institutions, foundation community and city government. Initial tasks should include developing innovative partnerships for sustaining and providing maintenance for high quality green spaces downtown.

To explicate the selection of priorities for implementation, the following table sums up some of the factors that need to be considered: owners, city officials and developers.

ACTION CHOICE TEMPLATE

Choice	Environ. Advantages	Theft or damage vulnerability	Visibility	Damage liability	Set-up costs	Care Costs	Volunteer Potential	Notes
New Street Trees	Air, temp., r.e. values, visual, energy safety ↑	↔	↑	↔	$400/tree	$40 per year	↑	Supporting initiative in the works--TreeVitalize
Hanging Baskets	Visual, r.e. values, ↑	↓	↑	↔	$80/basket	$250* each per season	↓	Baseline of 400 baskets to build on
Street Planters	Visual, r.e. values, ↔	↑	↑	↓	$200 to $800	$200* each per season	↔ to ↑	
Green Roofs/ Green Walls	Air, temp., energy, return on investment ↑	↓	↓ / ↑	↓	$ 20-30 per sq. ft. (depends on size/type)		↓	Build on green leadership image
Green Parking & Fences	Air, temp., r.e. values, visual, energy safety ↑	↔	↑	↔	$1,100 per 100 sq. ft. without fencing	$100* per section per season	↓	Tremendous potential shift in visual look of downtown

* Care costs could be lowered using volunteers or a city youth program

These recommendations are listed below in order of potential cost.

Project	**Cost Range***	**Impact**
Gateway Center Islands:	Low	High
Diamond Square	Low	Medium
Added projects	Low to Medium	Combined: Medium to High
August Wilson	Low	Medium
Busway and Train Station	Low	Medium
McDonald's Green Roof:	Medium	High
Fort Duquesne Boulevard	Medium	Medium
Green Wall at 2nd	Medium	Medium to High
Green Wall on Penn	Medium	High
Convention Center	Medium	High
Renaissance Park:	High	High
Gateway Areas:		
Area 1: Strip at Smallman	Medium	High
Area 2: Strip at Penn & 16th	Low	Medium
Area 3: Liberty 11th to 30th	Medium	Medium to High
Area 4: 5th & Forbes Corridor	Low	High

*Low Cost = Up to $20,000
Medium Cost = $50,000 to $200,000
High Cost = Over $200,000

RECOMMENDED STRATEGIES

Based on these and other factors, the following are recommended as the five most effective strategies:

1) **CONVENTION CENTER:** To highlight their trip to Pittsburgh and capture the attention of the nearly half a million visitors to the Convention Center each year, add a welcoming "green carpet" in the form of twin parklets at the Penn Avenue entrance.

2) **"RENAISSANCE PARK:"** To provide a spectacular new open space for the 1.2 million residents and taxpayers for whom the City County building is the seat of government, convert the surface parking lot at the corner of Grant Street and Fourth Avenue to a new park with underground parking.

3) **TREES:** To enhance the overall environment and experience of downtown residents, workers and visitors, energetically improve the tree canopy of the Golden Triangle, particularly in visibly bare areas such as Boulevard of the Allies and parts of the Market District.

4) **PARKING GARAGES AND LOTS:** Green up all city parking facilities by adding green accents to Parking Authority garages and encouraging all surface lots to add green fencing, trees and, where feasible, alternative surfaces to gain environmental benefits.

5) **GATEWAY GREEN ROOF AND WALL:** To present a dramatic green view to those entering the Golden Triangle from Gateway Center using green roofs and walls to enhance key buildings.

These priorities reflect the fact that there are already some leaders, such as the Laurel Foundation, Downtown Partnership and Colcom Foundation which have invested in downtown Pittsburgh in highly visible ways including the downtown hanging baskets and the planters and plantings in Market Square during the summer of 2007. These priorities are meant to complement and round out the variety of greening activities downtown to produce an even greater impact for the Golden Triangle.

In addition to these five major action areas, two additional priorities emerged from review of four important "connecting corridors" to the Golden Triangle:

1) **GREEN PARKING SITE:** Refresh the large lot at Smallman and 11th.
2) **SUNFLOWER CORRIDOR:** Add simple sunflower plantings along unattractive surface parking fences along both the Forbes and 5th Avenue corridors.

KEY ROLES

City of Pittsburgh

The city of Pittsburgh is a crucial leader in the effort to establish and implement a greener downtown. The city has already stepped up to take a lead role in the proposed TreeVitalize project for Pittsburgh. Here are seven additional steps the city needs to take:

- Take the lead in convincing businesses and developers that adding greening is crucial to the future of the downtown business area.
- Leverage partnerships as needed with specific landowners and institutions to accomplish priority projects.
- Seek financial support for an assessment of downtown parking garages for additional greening efforts; authorize Parking Authority to take a lead in the assessment and implementation thereof.
- Institute an incentive program for private parking lots to add greenery to all fencing, add cooling trees at perimeter and wherever possible in the interior of lots by adopting revised standards for lot design and materials.
- Facilitate permitting for other green strategies including green roofs and walls by working with local building owners and resources such as the Green Building Alliance and sister cities such as Philadelphia that have begun widespread implementation of such efforts to establish guidelines and criteria for projects.
- Collaborate with Downtown Partnership to develop a workable plan for long-term care for green resources – perhaps including a youth summer program or public-private green maintenance team.
- Take steps to speedily implement several of the site-specific improvements identified by the assessment including the small park at Liberty and 30th (fencing, trees); the sunflower fences along 5th and Forbes; Diamond Park upgrade and adjacent planter box.

Western Pennsylvania Conservancy and Other Non-Profit Partners

- Provide technical and logistical support for specific projects.
- Lead way with additional information gathering and research as needed to activate specific projects
- Continue building partnerships with important non-profit partners such as the Shade Tree Commission/ Friends of the Urban Forest, Community Design Center of Pittsburgh, Green Building Alliance, Friends of the Riverfront and RiverLife Task Force, GTECH and others, to develop effective consortiums to support specific greening goals.
- Take a lead on discussions about long-term care and funding for greening efforts to maximize scarce city resources and encourage public-private partnering.
- Raise the profile of greening efforts through publicity and events

Pittsburgh Downtown Partnership

As the leading advocate for downtown revitalization, the Partnership is in a unique position to shift the spotlight toward greening efforts. Here are some crucial roles:

- Become an opinion leader on the role of greening as a crucial dimension to revitalization.
- Take a leadership role as key partner on specific projects, as it has done in Market Square, focusing on Gateway Center, Convention Center, Grant Street "Renaissance Park" and August Wilson Walkway.
- Collaborate with other non-profit partners to carry out further development and implementation of projects large and small.
- Convene group including city of Pittsburgh, Western Pennsylvania Conservancy, and others to tackle the question of best long-term maintenance strategies for downtown greenery.

Corporate and Business Community

It will be crucial for key corporations to take the lead with the work at hand. The most important role of business leaders will be to:

- Lead by example; set the bar for others.
- Support dissemination of information on best practices, "how to" and "why."
- Help identify incentives and mechanisms that will engage other businesses successfully.
- Participate in discussions of public-private strategies for high quality long-term maintenance of the downtown environment.
- Review all plans for future site development or improvements that could be used to upgrade green infrastructure.
- Invest in green infrastructure through the downtown BID and other mechanisms.

Institutions

Without a doubt downtown institutions such as Point Park University, other educational institutions and the Cultural Trust will be invaluable to these efforts. Here are some key roles:

- Lead by example; convince counterparts of the importance of greening for the success of your institutions and downtown as a viable community.
- Participate in discussions of public-private strategies for long-term maintenance of the downtown environment.
- Create innovative partnerships whereby students, faculty or employees can partner on specific efforts and further designs, studies and research.

Foundations

The foundation community has been the driving force for a variety of important downtown improvements and planning efforts over long years. This role of "spark plug" may be shifting toward implementation and sustaining momentum. The support of foundations directly or through engaging the involvement of others is vital to generating the long-term support needed to implement and sustain high impact downtown greening strategies.

- Convening groups of interested stakeholders and funders.
- Supporting interim advocacy and additional supportive research or detailed feasibility efforts.
- Help develop incentives, matching grants or other strategies to encourage public private efforts on green infrastructure for downtown.

NEXT STEPS

As of the date of publication, follow up discussions have been held or scheduled with the Downtown Partnership, the URA, contacts from Duquesne University, Pennsylvania Resources Council, and G-TECH, among other potential partners. Working from the small but representative group assembled to review and critique this report in draft in the fall of 2007, Western Pennsylvania Conservancy will convene further discussion groups and plan a series of meetings with key constituencies such as foundations and downtown businesses. Stakeholders such as land and building owners that might be involved in some specific opportunities will be sought out and invited to participate, and the appropriate city agencies will be engaged. The report will be circulated to the original group of reviewers and then made available more widely through the planned meetings and the web. A power point presentation to introduce the key concepts and findings of the report is also available for circulation.

CONCLUSION

A variety of circumstances have recently converged to create a window of opportunity for more comprehensive and creative greening of Pittsburgh's Golden Triangle. Building on its growing reputation as a center for "green building," Pittsburgh can make its leadership more visible through intentional greening of the downtown streetscape and structures. Taking action at this moment, when momentum for new development (particularly residential development) is growing, will help Pittsburgh attract and retain new residents and downtown users, both crucial to an economic renaissance. This assessment documents an abundance of opportunities, large and small, and a strong cadre of potential partners capable of seizing this unusual opportunity. Greening Pittsburgh's Golden Triangle is a strategy that can both significantly enhance Pittsburgh's quality of life **and** directly demonstrate the city's values and potential to the world.

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