

# LOWER SOUTH DISTRICT HEALTH IMPACT ASSESSMENT: Summary Report

March 2012



This Health Impact Assessment analyzes the connections between better health outcomes and key recommendations of the Lower South District Plan: **1)** an extension of the Broad Street Subway to the Navy Yard; **2)** a separated bicycle path to the Navy Yard; and **3)** land use changes along Pattison Avenue and Broad Street. By illustrating the significant public health benefits likely to accrue from these transportation and land use decisions, the Department of Public Health (PDPH) and the City Planning Commission (PCPC) hope to inform decision-makers who possess the authority to implement the District Plan's recommendations over the next 10-20 years.



## Introduction

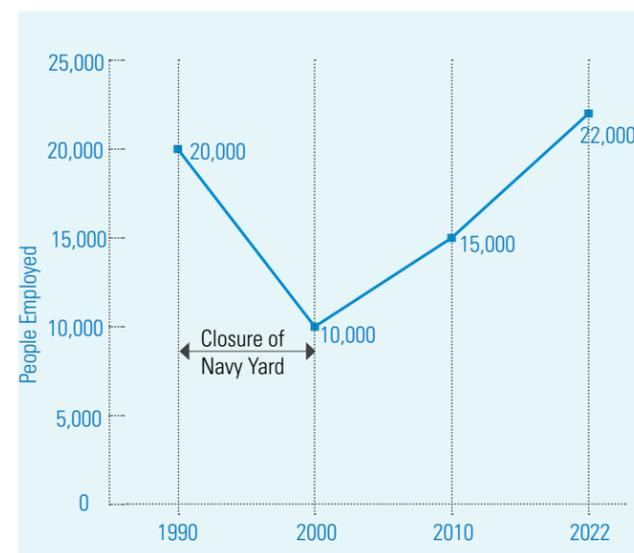
The built environment – the manmade systems of buildings, parks, and transportation networks that make up our cities and neighborhoods – contributes to the overall health of individuals and communities. The built environment can encourage physical activity, facilitate access to services, and provide recreational opportunities. It can also present obstacles to improved health, or even contribute to negative outcomes by subjecting individuals to unsafe streets, unclean air or water, and limiting access to goods and amenities. The choices that policy makers, planners, engineers, and community leaders make about the built environment are inextricably connected to public health.

### > Defining Health Impact Assessment (HIA)

HIAs use available evidence to estimate the future health impacts of projects, plans, or policies on a given population. Where possible, they describe the distribution of these effects across a population to identify any disparities that may be heightened or lessened by the proposed intervention. HIAs then produce recommendations to maximize health benefits and mitigate any negative health impacts associated with the project or policy. HIAs follow defined practice standards, but can incorporate a wide range of quantitative and qualitative methods. This HIA is the first undertaken by the City.

### > Policy Context

PDPH's HIA work is part of the City Planning Commission's ongoing comprehensive planning and zoning effort, **Philadelphia2035**. The Comprehensive Plan includes a series of 18 District Plans, each of which makes specific land use, transportation, and public facility recommendations for different areas of the city. Recommendations are based on the overarching goals and objectives of The Citywide Vision, a first phase of the Comprehensive Plan adopted by the City Planning Commission June 2011.



Above: Employment History and Projections for Lower South

### > Lower South District At A Glance

The Lower South District will see aggressive job growth over the next ten years. Of the 7,000 projected new jobs, 70% will be located within The Navy Yard.

The District Plan proposes to address this trend through targeted investments in transportation infrastructure. Improved circulation and mobility are critical components of managing and encouraging further economic growth.

Projections also show modest population increases in Lower South by 2022. Job growth and economic development activities may induce greater development demand. City control of several large parcels of land in critical locations represents an opportunity to shape the nature of future development, including mix of uses, density, and the provision of amenities to ensure that existing and future residents continue to achieve a high quality of life.



Lower South has three times as many workers as residents. Employment projections show jobs growing by nearly 50%.

Accounting for simultaneous but slower population growth, this ratio will stay relatively the same.

Current and Proposed Projects	Baseline Employment
	<b>15,000</b>
Xfinity Live!	
Phase I	400
Phase II	600
<b>Total Employment</b>	<b>1,000</b>
Navy Yard Employment Growth	<b>16,000</b>
Port and Food Distribution Employment Growth	1,000
Transition of Sunoco Property to New Ownership/Use	no growth
<b>Total Lower South 2022 Employment Estimate</b>	<b>22,000</b>

Above: Job projections for major employment centers

### > The Lower South HIA Process

#### Step 1: Screening

PCPC based the decision to focus on the subway, bike path, and land use proposals on several factors:

- **timeline** (the opportunity to affect decisions not yet made related to these projects);
- **stakeholder interest** (these projects generated significant discussion among the plan's Steering Committee members and the public); and
- **public health literature** (a robust body of research identifies strong associations between land use, transportation, and health).  
(SEE BLUE BOXES, BELOW)

#### Step 2: Scoping

PDPH opted to focus on health determinants known to be of particular relevance to local stakeholders and city officials: air quality; traffic volume; commute mode; employment access; and access to goods and services.

#### Step 3: Assessment

The HIA combines data and analysis completed as part of the District Plan with new data on commuting patterns and preferences to make predictions about the impact of transportation improvements and land use changes. Methods and data sources included:

- **Existing Conditions analysis:** Air quality data, traffic volumes, bicycle and pedestrian counts, land use analysis.
- **Navy Yard employee commuter survey:** 1,169 employees responded to questions on commute mode choice and future preferences.
- **Health Economic Assessment Tool:** A World Health Organization tool that estimates the monetary value of health benefits accrued.
- **Literature review:** In some cases, findings from other cities can be applied to local data to estimate future impacts.

The **blue box at right** summarizes the highlights of the literature review to provide an overview of the researched associations between health outcomes and factors determined in whole or in part by the physical environment.

**The following pages summarize the major findings, analyses, and recommendations of the Lower South HIA. A more detailed report describing the research methodology and the overall HIA process will be made available through the Health Commissioner's Office and the City Planning Commission's Philadelphia2035 site.**

### > Connections to Health: Transportation & Mode Choice

Americans who used public transit spent a median of 19 minutes daily walking to and from transit; 29% achieved more than or equal to 30 minutes of physical activity a day solely by walking to and from transit. People who commute by bicycle 3 hours per week are 28% less likely to die from any cause than non-cyclists. (WHO Europe 2011; Andersen et al. 2000; Hamer and Chida 2008)

Spending more time in a car is associated with a greater likelihood of obesity (6% increase for every 1 hour in a car), while spending more time walking is associated with smaller likelihood of obesity (4.8% reduction for every hour walked). Lawrence D. Frank, James F. Sallis, et al. "Many Pathways from Land Use to Health" Journal of the American Planning Association 72(1):75-87 (Winter 2006)

In traffic-related studies, the additional non-cancer health risk attributable to highway proximity was seen within 1,000 feet and was strongest within 300 feet. California freeway studies show about a 70% drop off in particulate pollution levels at 500 feet. The California Air Resource Board, Air Quality and Land Use Handbook: A Community Health Perspective (2005)

When the Olympic Games were held in Atlanta, GA, peak traffic flow decreased by 22%, decreasing ozone by 28%. Subsequently, hospital admissions for asthma decreased by 11%. Friedman MS, Powell KE, Hutwagner L, Grahma LM, Teague WG. 2001. Impact of changes in transportation and commuting behaviors during the 1996 Summer Olympic Games in Atlanta on air quality and childhood asthma. Journal of the American Medical Association 285(7):897-905.

### > Connections to Health: Land Use & Density

Everyday retail destinations that are accessible by walking increase physical activity. Ewing R, Kreutzer R. 2006. Understanding the relationship between public health and the built environment. A report prepared for the LEED-ND Core Committee. U.S. Green Building Council.

Physical activity is associated with reductions in premature mortality; prevention of chronic diseases such as diabetes, obesity, hypertension; and improvements in psychological well-being. Transportation Research Board Institute of Medicine of the National Academies. 2005. Does the built environment influence physical activity? Examining the evidence. National Academies of Science.

A more dense mix of uses, well served by mass transportation systems, can ensure access to essential needs and services while reducing vehicle miles traveled, thereby reducing environmental and health costs associated with personal vehicle trips. US Environmental Protection Agency. Vehicle travel: recent trends and environmental impacts. In: Our Built and Natural Environments: A Technical Review of the Interactions Between Land Use, Transportation, and Environmental Quality. Washington, DC: US Environmental Protection Agency; 2001: chapter 3.

Areas with high vehicle miles traveled (VMT) per capita tend to have higher accident and injury rates. Frumkin H, Frank L, Jackson R. 2004. Urban sprawl and public health. Island Press.

## Findings: Subway Extension

To determine how current employees at The Navy Yard commute to work, and the potential for future transportation projects to shift commuters' travel choices, PDPH and PCPC partnered with the Philadelphia Industrial Development Corporation (PIDC) and their consultants, Parsons Brinkerhoff, in crafting and disseminating a transportation survey in the Fall of 2011. A total of 1,169 respondents completed the survey of baseline questions, including current travel mode, and 747 respondents answered questions about the effects of a subway extension and bicycle path on their choices.

### > Survey Results & Analysis

#### Baseline

80% of the Navy Yard population (6,400 employees) drive alone.\* This generates nearly 50,000,000 vehicle miles every year.\*\*

If employment growth keeps up with projections and commute mode splits stay the same, the Year 2022 employee population will drive 10,400 cars a total of 90,000,000 miles\*\* commuting to The Navy Yard each year.

#### Future Projections

23.7% of respondents indicated that they would "definitely switch" to transit with the new subway extension.\*

An additional 41.4% of respondents indicated that they would "consider switching" to transit with the new subway extension.\*

Applying these responses to the projected Navy Yard population, 3,081 commuters would definitely switch to the subway by 2022; an additional 5,378 Navy Yard employees would consider switching.\*\*

PDPH estimates for total likely cumulative switch: 5,700 people (based on 50% of those considering the switch deciding to do so).\*\*

5,700 fewer cars would result in 206,000 fewer miles driven per day, which would in turn reduce CO2 by 27,696,000 pounds.+

5,770 more transit users would cumulatively spend an additional 109,630 minutes walking each day.+

**Right:** Home zip codes of Navy Yard employees were mapped to estimate the total vehicle miles traveled by commuters on the average day in 2011. The map at left shows the distribution of survey respondents' home zip codes, out to a 20-mile radius. The average one-way commute distance was 18.4 miles.

Survey respondents travel from as far away as New York and Maryland to reach the Navy Yard, traveling close to 100 miles in each direction. Despite these outliers, nearly half (48.3%) of those surveyed live in zip codes served by regional rail, subway/elevated, or PATCO stations. This is one proxy measure for willingness and ability to switch to mass transit.

## Findings: Bicycle Sidepath

PDPH staff used responses from the commuter survey to determine current rates of cycling for Navy Yard commuters. Additional questions asked respondents to indicate the likelihood that the construction of a grade-separated, fully protected bicycle facility to The Navy Yard would influence future commute mode decisions. Staff entered these responses into the World Health Organization's *Health Economic Assessment Tool* (HEAT) to produce estimates of the future monetary value of the health benefits associated with the project, as well as a benefit-to-cost ratio.

#### Baseline

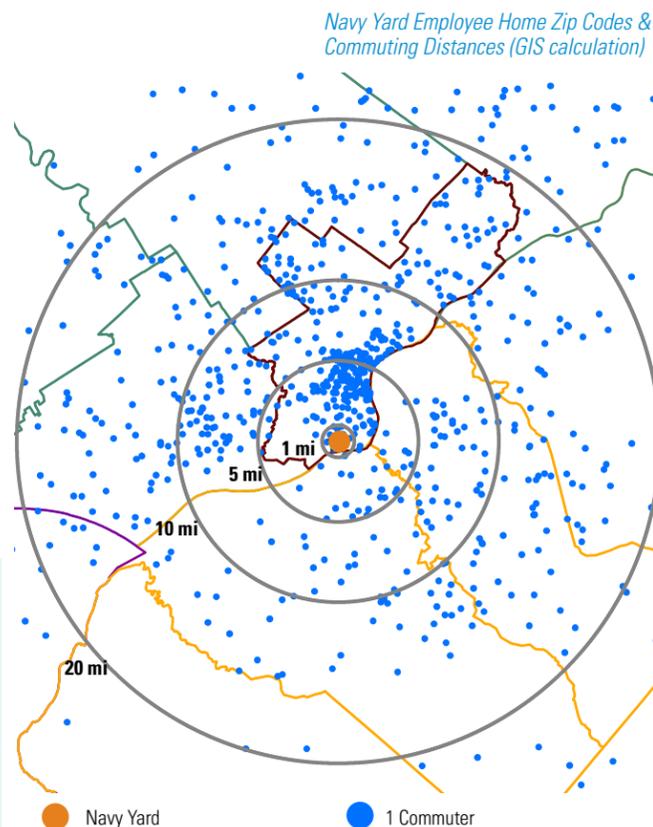
Less than 1% of the Navy Yard population bikes to work. The average bicycle commute is approximately 10 miles.\*

#### Future Projections

Nearly 5% of survey respondents said they would "bike or walk everyday" if the proposed bike path were constructed. Applied to the total population in 2022, this would mean that approximately 620 persons would use the sidepath to commute.\*\*

With this more than ten-fold increase, commuters would log nearly 1.5 million cycling miles\*\* during their commutes.

The HEATTool estimates a 5:1 benefit to cost ratio, and an average of .53 deaths prevented\*\* per year.

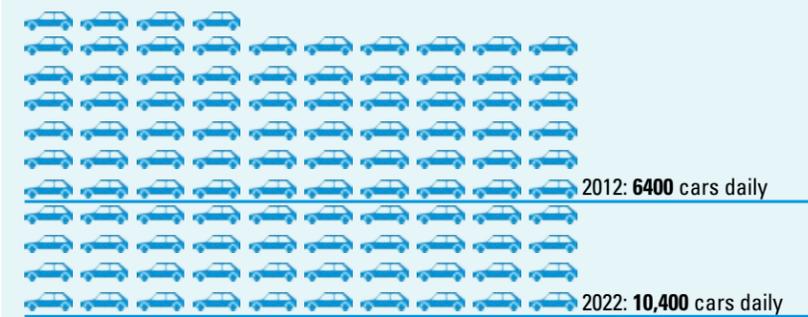


### > Summary Table: Projected Impacts of Transportation Investments

	MODE SHARE	# OF CARS	ANNUAL VMT (miles)	CO2 EMISSIONS (pounds)	ANNUAL WALKING (hours)	ANNUAL CYCLING	ACTIVE TRANSIT MILES
Baseline (2012)	80% CAR 18% TRAIN 0.8% BIKE	6,400	55,000,000	31,000,000	108,000	60 Persons 148,000 Miles	472,000
Without proposed transportation investments (2022)	80% CAR 18% TRAIN 0.8% BIKE	10,400	89,000,000	50,000,000	175,000	100 Persons 240,000 Miles	745,000
With proposed transportation investments (2022)	36% CAR 57% TRAIN 5% BIKE	4,600	40,000,000	22,000,000	567,000	620 Persons 1,448,000 Miles	3,148,000

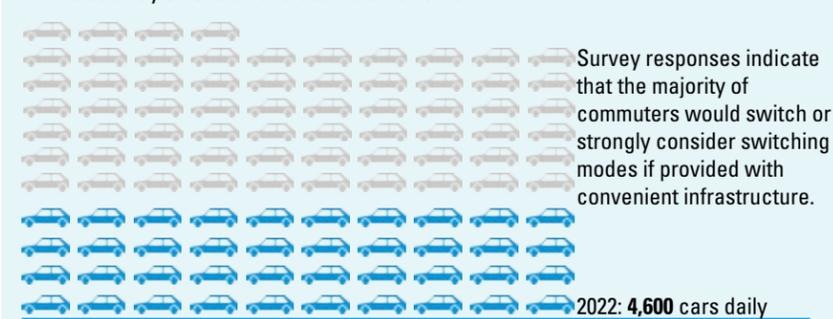
### > Infographic: Changes in Vehicle Miles Traveled (VMT) with and without transportation investments

Without alternative transportation investments...



**2012:** Cycling makes up < 1% of all commute trips to the Navy Yard (approx. 60 persons per day)

With a subway extension and dedicated bike trail...



**2022:** Cycling makes up nearly 5% of all commute trips (based on survey responses, approx. 620 persons per day)

### > VMT Reduction: Land Use Implications & Potential Health Impacts

**At The Navy Yard:** The elimination of 6,400 cars affects more than the roads and highways that carry them: it also changes the parking formula at the Navy Yard, where an update to the Master Plan for development is currently in progress. Surface parking takes up land that would otherwise be available for additional development. Using the commuter survey calculation of 6,400 fewer cars, PCPC & PDPH conservatively estimate that between 14 and 24 acres of land could be repurposed for additional development or open space.

**Throughout the region:** 17.5% of survey respondents said that they would consider moving closer to regional rail stations and 14.6% indicated they would consider moving to Philadelphia neighborhoods with direct subway access if the extension were built. Applying these response rates to the 2022 population, 1,800 and 2,300 households would consider relocating to transit-oriented towns and city neighborhoods respectively.

The health and environmental implications of such a shift are significant: people who live in transit-oriented, walkable communities can reduce their VMT by anywhere from 20-40%, the energy footprint of their homes by 38%, and transportation costs by over \$9,000 per year.+

## Findings: Land Use Changes

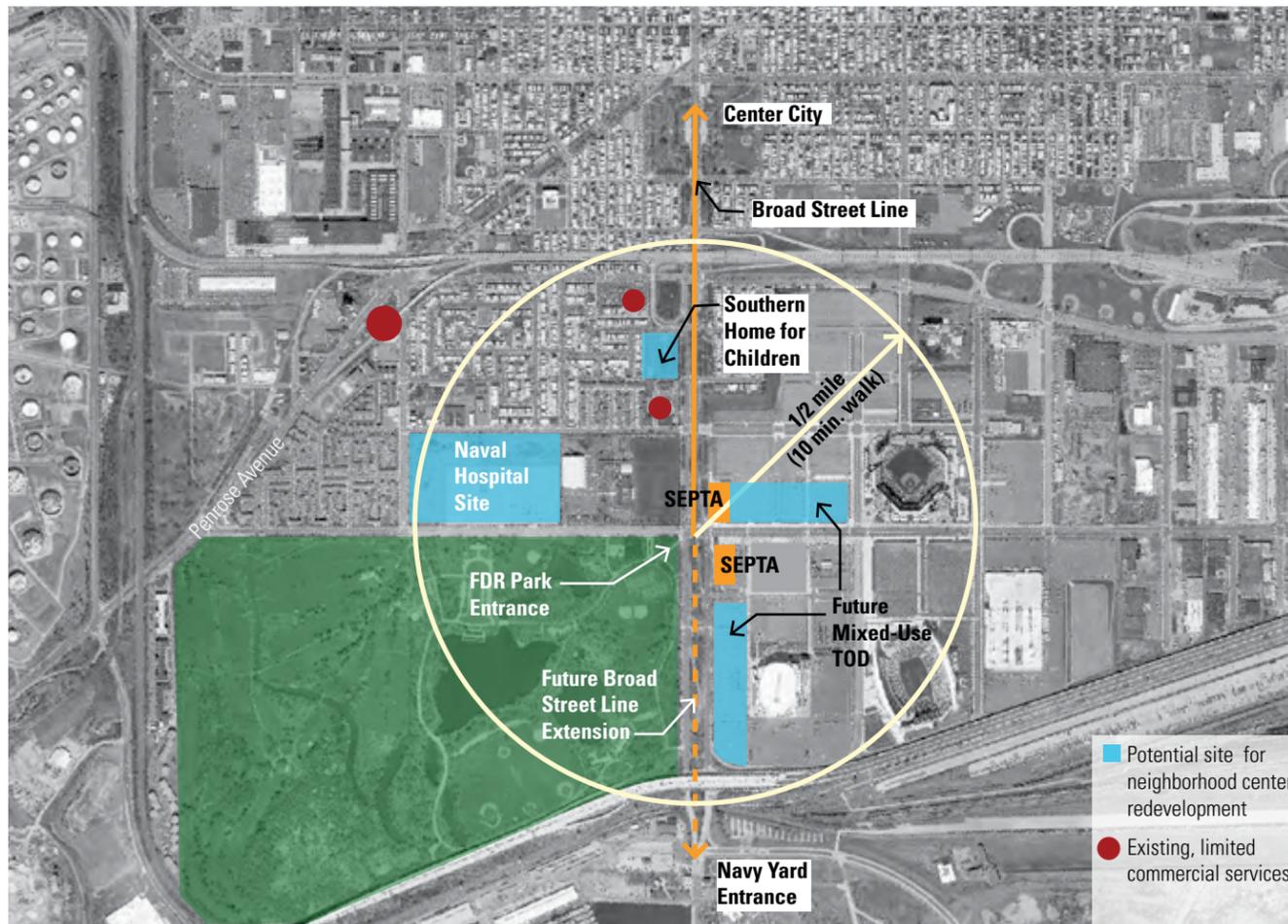
Current land use patterns and street grid patterns are not conducive to walking or the use of public transit, limiting residents' options for reaching retail and other basic services. Moreover, there is virtually no neighborhood-serving commercial land in the district, requiring most residents to seek groceries and other essentials in large auto-oriented shopping centers north of I-76. The district has the highest automobile ownership rate of any planning district in Philadelphia (85.6%),\* but driving is not a viable option for seniors and others who may live on fixed incomes and lack the financial ability to own a car.

### Baseline

More than **20%** of the district's population is **65 years or older**.\*

The closest residence is **0.3 miles** from AT&T Station on the Broad Street Subway, limiting connectivity to regional resources and jobs.\*\*

**Proposed Future Land Use Changes within 1/2 Mile of transit and parks:** Areas with proposed future land use changes, shown in blue, can accommodate neighborhood-serving retailers such as a grocer, fitness center, hardware store, bank, or other basic services. Mixed-use redevelopment of the Sports Complex sites not already committed to the expansion of Xfinity Live! would provide such amenities directly on site with new residential units.



\* Number derived directly from primary data source (Navy Yard commuter survey, US Census)

\*\* Number calculated from primary data using Geographic Information System (GIS) and/or survey responses

+ Based on published literature from public health and planning journals and periodicals.

\*\* Estimates produced through the World Health Organization's HEAT Tool. Full methodology available at: [http://www.euro.who.int/\\_\\_data/assets/pdf\\_file/0003/155631/E96097.pdf](http://www.euro.who.int/__data/assets/pdf_file/0003/155631/E96097.pdf)

## Future Projections

Proposed land use changes at the Naval Hospital site would increase density to levels capable of attracting an estimated **30,000 square feet of additional neighborhood-serving retail** uses, increasing overall walkability by providing more daily goods and services on site.†

Proposed land use changes at the Sports Complex would concentrate **residential units adjacent to rapid transit and park space**, creating conditions that would **reduce reliance on cars** which contribute to already high traffic volumes and poor air quality.†

Introduction of a **new street grid** into these large parcels will **improve connectivity** between neighborhoods and FDR Park, easing access and encouraging walking as a means of reaching current and future amenities.\*\*

## Recommendations

*Based on the public health evidence, PDPH offers these recommendations in conjunction with PCPC's District Plan:*

### 1) Make the extension of the Broad Street Subway a transportation priority.

The Navy Yard's growth is not merely an optimistic projection; it is very real and happening quickly. By 2013 alone, an additional 2,000 people will have started work in new and expanded businesses. Every year that Philadelphia waits to move the subway project towards shovel-readiness means tens of millions of miles traveled by car, steadily increasing levels of air pollutants, and thousands of Philadelphians lacking a direct connection to one of the region's most important employment centers.

In the current political climate, transportation funding, particularly for transit, is very scarce. This does not mean that the project cannot move forward incrementally. Alternative analyses, preliminary engineering, and other steps required to receive federal funds can proceed with very modest investments. Local, state, and federal grant programs present opportunities to complete these necessary pre-requisites.

### 2) Seek funding to engineer and build the sidepath to achieve the projected health benefits of increased active transportation and lower VMT.

Analysis shows that the financial costs of sidepath project are outweighed by the financial value of the health benefits associated with the project, by a factor of approximately 5:1. As with the subway extension, local stakeholders need to think creatively about funding solutions to advance this project to the construction phase.

### 3) Rationalize Sports Complex development by imposing the street grid as recommended in the District Plan to enhance walkability and improve safety.

The street grid is critical to the successful transformation of the Sports Complex into a district that can adequately and safely accommodate a more diverse mix of uses and users. Regulatory actions should be taken to ensure that any near-term development projects adhere to the grid.

### 4) Monitor development proposals for the Sports Complex to ensure appropriate siting of projects to maximize positive health benefits and minimize potential adverse outcomes.

PCPC's long-term land use scheme for the Sports Complex proposes a mix of uses that can help attract desired services for existing and future residents. It also proposes residential uses in closest proximity to AT&T Station and FDR Park, physical infrastructure that can help promote active living and reduce automobile reliance. These are two factors strongly associated with better health outcomes. Regulatory agencies should support this scheme by taking appropriate action with development proposals that do or do not conform to these general principles.

Public health literature shows strong associations between proximity to mobile sources of particulate matter and ozone pollutants and increased rates of respiratory and cardiovascular health problems. Studies say the deleterious effects of such pollution are most significant within a range of 100-300 meters of the source.† This HIA supports the District Plan's recommendations to integrate residential uses into ongoing redevelopment of the Sports Complex, but recommends such uses be placed at least 300-500 feet from the northern wall of I-95 to prevent unnecessary exposure to harmful air pollutants. Overall, restricting residential uses on land between the Wells Fargo Center and I-95 will achieve the recommended buffer distance.

### 5) Incorporate mixed-income and visitable housing units into future developments to provide affordable options for seniors and employees of the Port, Navy Yard, and Sports Complex

Public ownership of the district's large development sites gives the city greater leverage to determine the appropriate program for these sites. This HIA recommends that the City encourage mixed-income residential units factor into these sites through Request For Proposals (RFP) guidelines, and that City officials consider the need for the provision of such housing types as they review proposals. The district's growing senior population would benefit from visitable units that feature a zero-step entrance, a wheelchair accessible bathroom on the main level, and front doors that allow easy clearance of wheelchairs.

## Conclusion

There is adequate public health research available to conclude that investments in transportation alternatives to promote walking, cycling, and transit usage can influence behavior and result in beneficial health-related shifts over time, including:

- > Increased rates of physical activity
- > Fewer vehicle miles traveled
- > Reduced risk of vehicular-pedestrian crashes
- > Decreased risk of negative respiratory and cardiovascular conditions
- > Greater access to necessary goods & services

The literature also provides sufficient evidence to conclude that the street grid and land use changes proposed for the District will promote healthy communities by reducing reliance on cars, calming and diverting traffic, and maximizing access to commercial services, parks, and transit.

Any steps the City, land owners, and major employers can take in the Lower South District to decrease the need for additional cars and increase access to jobs and services will be a step towards the City's goals of a healthier population and more sustainable development patterns.

**Available on [www.phila2035.org](http://www.phila2035.org) starting April, 2012.**

A full-length report with references and a complete explanation of the HIA process and methodologies will be made available through the agencies and programs listed below. Contact [clint.randall@phila.gov](mailto:clint.randall@phila.gov) with any questions.



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**Philadelphia City Planning Commission**

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