

---

---

# Analysis of Job Creation in PlaNYC

## Final Report

---

---

*Submitted to:*

**New York City Economic Development Corporation**  
New York, New York  
and



**The Mayor's Office of Long-Term Planning and Sustainability**  
New York, New York



*Submitted by:*

**The Louis Berger Group, Inc.**  
New York, New York



March 2008



## TABLE OF CONTENTS

	<b>Page</b>
<b>1.0 INTRODUCTION</b> .....	1
1.1 Purpose of Study .....	1
1.2 Overview of the Methodology .....	1
1.2.1 Job Creation by Category: Construction and Operations.....	1
1.2.2 Job Creation Effects: Measuring Direct and Total Effects .....	2
1.2.3 Study Area / Affected Region.....	2
1.3 Summary of Job Impacts .....	4
1.4 Remainder of the Report.....	8
<b>2.0 JOB IMPACTS</b> .....	9
2.1 Land – Open Space .....	9
2.1.1 Introduction.....	9
2.1.2 PlaNYC Goals and Initiatives.....	9
2.1.3 General Findings.....	9
2.2 Land – Brownfields .....	12
2.2.1 Introduction.....	12
2.2.2 PlaNYC Goals and Initiatives.....	12
2.2.3 General Findings.....	13
2.3 Water – Water Quality .....	15
2.3.1 Introduction.....	15
2.3.2 PlaNYC Goals and Initiatives.....	15
2.3.3 General Findings.....	16
2.4 Water – Water Network .....	18
2.4.1 Introduction.....	18
2.4.2 PlaNYC Goals and Initiatives.....	18
2.4.3 General Findings.....	18
2.5 Transportation.....	21
2.5.1 Introduction.....	21
2.5.2 PlaNYC Goals and Initiatives.....	21
2.5.3 General Findings.....	22
2.6 Energy.....	25
2.6.1 Introduction.....	25
2.6.2 PlaNYC Goals and Initiatives.....	26
2.6.3 General Findings.....	26
2.7 Air Quality .....	30
2.7.1 Introduction.....	30
2.7.2 PlaNYC Goals and Initiatives.....	30
2.7.3 General Findings.....	30
Appendix      Methodology for Analysis of Job Creation in PlaNYC	



## TABLE OF CONTENTS (CONTINUED)

Page

### LIST OF FIGURES

Figure 1	Economic Impacts: A Diagram of Effects .....	3
Figure 2	PlaNYC Job Creation Timeline - Job Creation Trends for Capital and Operations. 2007-2030.....	5

### LIST OF TABLES

Table 1	Summary of Job Impacts, 2007- 2030* .....	4
Table 2.1-1	Summary of Land - Open Space Job Impacts, 2007 - 2030 .....	11
Table 2.2-1	Summary of Land – Brownfields Job Impacts, 2007 - 2030 .....	14
Table 2.3-1	Summary of Water – Water Quality Job Impacts, 2007 - 2030.....	17
Table 2.4-1	Summary of Water – Water Network Job Impacts, 2007 - 2030.....	20
Table 2.5-1	Summary of Transportation Job Impacts, 2007 - 2030.....	23
Table 2.6-1	Summary of Energy Job Impacts, 2007 – 2030.....	29
Table 2.7-1	Summary of Air Quality Job Impacts – Capital Plans and Construction, 2007-2030 .....	32

## 1.0 INTRODUCTION

### 1.1 Purpose of Study

On April 22, 2007 Mayor Michael R. Bloomberg announced *PlaNYC: A Greener Greater New York*. PlaNYC consists of 127 separate initiatives to make New York City an even more sustainable city. The initiatives ranged from creating long-term funding sources for plans that have been in the works for decades, but were previously unfunded, to new ideas that provided solutions to old problems. Each of the 127 initiatives has an assigned timeline and funding source to ensure completion. PlaNYC initiatives are intended to upgrade and modernize the City of New York's infrastructure in order to improve the City's quality of life, and support its environmental and economic sustainability.

This study presents estimates of the number of new jobs likely to be created by PLANYC's initiatives. This report focuses on those initiatives that satisfy four criteria necessary for the development of reliable and meaningful job creation estimates. First, an initiative was included only if there is a direct link between the spending mobilized by the initiative and increased employment. Second, only those initiatives that are expected to generate significant levels of new temporary or permanent jobs are included. Third, inclusion required that there be sufficient information to allow a reliable estimate. Finally, initiatives were included in this report only if their job creation impacts have not already been measured in another Mayoral initiative (e.g., New Housing Marketplace Plan).

### 1.2 Overview of the Methodology

The estimated job figures are derived from estimates of government and private sector spending or employment directly attributable to each initiative. These direct spending or employment estimates were drawn from a variety of sources, including: 1) primary interviews with knowledgeable agencies and project sponsors; 2) review of reports (e.g. environmental impact statements or feasibility studies) for relevant data; and 3) analytical research on select subject infrastructure or operations. Sources include *PlaNYC: A Greener Greater New York* and interviews with government officials familiar with the initiatives historic or anticipated project budgets. Budgets and other reports supplied by interviewed agencies were examined to develop an estimate of the direct expenditures for each project as well as to explore critical industries and occupations required to support the job creation effects of project investments and annual operations. (See Appendix, Methodology).

#### 1.2.1 Job Creation by Category: Construction and Operations

This study of PlaNYC job creation has involved the research, analysis and estimation of the total jobs generated across various PlaNYC initiatives from proposed capital construction and permanent operations spending. This report, respectively, places employment into two categories: 1) capital plans and construction or 2) operations and maintenance:

- *Capital Plans and Construction Jobs* – Although the duration may vary, the planning and construction of capital projects are classified as “temporary jobs” because the subject projects are of limited duration, ranging over a few months to several years and, in some exceptional cases, a decade or more. Employees will have a finite on-site tenure supporting the construction, assemblage, or creation of a project or facility. Capital plan and construction jobs are measured in terms of total person-years, which captures the cumulative effects rather than a peak-year or annual measure of employment demand.
- *Operations and Maintenance Jobs* – Operations and maintenance work that is attributable to individual PLANYC 2030 initiatives will create permanent jobs. Employees are assumed to have

a continuing position supporting the operations or maintenance of a project or facility. These jobs are reported in annual terms.

### **1.2.2 Job Creation Effects: Measuring Direct and Total Effects**

Economic impact studies, including estimates of job creation, typically assess three distinct but related effects – direct, indirect and induced – arising from a project, an investment, or the operations of an ongoing entity. These effects, and the input-output modeling approach that has been utilized for their estimation, are described in the accompanying text box in this chapter (see accompanying text box, Definition of Effects and Input-Output Methods).

Using the construction and operating budgets developed through agency interviews and reviews of secondary reports, the *direct* and *total* jobs impacts of PlaNYC on the New York City metropolitan area economy are estimated separately. Total jobs are the sum of the direct, indirect and induced employees which are defined as follows:

- A *direct* employee of a project would be any individual paid from a project’s budget for the sole purpose of providing support to a project. For expenses funded by the plan, the agencies involved are expected to follow all legally applicable prevailing wage laws.
- An *indirect* employee would be any individual who was not paid by a project’s budget but received employment by providing products or services for the project.
- An *induced* employee would be any individual whose employment was attributable to the consumer spending requirements of both the direct and indirect employees.

For initiatives and/or projects that have not been the subject of prior economic impact studies, project budgets are examined to estimate the labor payroll component in each sector to assist in the determination of direct job impacts. The project budgets, in conjunction with an input-output table of the US economy, are used to estimate the inputs by sector (i.e., the input vector) required to produce the goods or services that the budget will consume. For example, the input-output table reveals the expenditures on concrete, steel, lumber, electrical parts and other items required to construct a building.

The direct expenditures plus indirect expenditures by sector gathered from the input-output vectors determine the total demand for goods and services in different sectors. Additionally, the payroll expenditures by industries supplying demand for goods and services of the project budgets also translate into income for laboring households. After accounting for after-tax income, these laboring households spend their incomes and generate an “induced impact” including the support of jobs.

### **1.2.3 Study Area / Affected Region**

The study area or “region of influence” for the estimation of PlaNYC jobs generation impacts is defined as New York, Northern New Jersey, Long Island, NY-NJ-PA Metropolitan Statistical Area, which contains 27 counties. The U.S. Department of Commerce RIMS-II Modeling system, a widely used regional economic impact assessment modeling system, was used to create New York-New Jersey metropolitan-area-specific multipliers to facilitate estimation of the total impacts.

In addition to the regionalization adjustments embedded in the RIMS-II Modeling system, additional adjustments to expenditures are made to avoid overstating regional job creation impacts for the metropolitan region, including leakages caused by out-of-region laborers, purchases of goods from out-of-region, and other leakages for taxes and savings. For example, initial budgetary estimates of expenditures are adjusted based upon location quotients or other procurement-related information to account for

purchases of goods outside the region. A location quotient represents the ratio of a specific regional industry's share of the regional economy vis-à-vis the specific national industry's share of the national economy. The location quotient provides an indicator of the region's diversity and specializations and is a proxy measure for the relative ability to supply demand for specific commodities.

### Definition of Effects and Input-Output Methods

**Direct Impact.** The *direct* impact of a project is defined as the change in economic activity in the industry under study resulting from a particular project, investment, business operation or program. The impact can be quantified by examining the magnitude and profile of project expenditures, including sales, disbursements to vendors, wages paid, and taxes and fees paid.

**Indirect Impact.** The indirect impact is defined as the effect of increased economic activity in those sectors that supply services, materials, and machinery necessary to support the study industry. For example, one of the Air Quality Initiatives calls for retrofitting and modernizing school boilers which will result in an increase in orders for HVAC-related systems. (direct impact). This increase in demand for systems and parts generates additional activity in industries involved in providing raw materials, energy, and transportation for their manufacturing, which in turn provides stimulus to the industries supplying those industries. This ripple effect stemming from a change in final demand for products and services in the industry under study is multiplied throughout the economy and can account for a significant portion of the total effect.

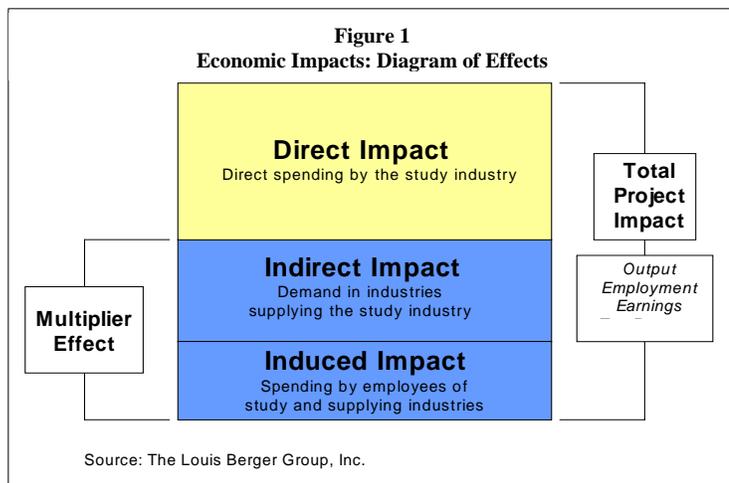
**Induced Impact.** The induced impact is the effect of increased consumer spending by wage earners in the study industry and other supporting industries. The ripple effect from this spending can also be followed through the economy.

**Multiplier Effect.** Together, the direct, indirect, and induced impacts constitute the multiplier effect. The ratio between the total economic impact and direct economic impact is termed the multiplier. Expressed numerically, a multiplier of 2.5 indicates that for every dollar directly generated by the industry under study, an *additional* \$1.50 of ripple effects are felt within the local region, for a total impact of \$2.50. The multiplier effect is derived from input-output methods founded upon the assumptions of economic base theory.

**Input-Output Tables and the Multiplier Effect.** The multiplier effect of activity in an industry can be estimated using input-output modeling techniques. The multiplier estimates rely upon the latest data supplied by the Bureau of Economic Analysis (Benchmark Input-Output Accounts of the United States, 1997), which tracks the interrelationships of producing and supplying sectors in the U.S. economy. This database provides production recipes and observed ratios of materials needed for production in various industries. The national input-output tables (e.g., the Use Tables) also identify the proportion of total output by industry devoted to compensation to employees – that is, the labor-to-total output ratio.

An input-output table includes information on intermediate production (commodity output required for industry output), total output (intermediate production and sales to final users), and value-added inputs (such as compensation and indirect business taxes). Input-output modeling explores the matrix of inter-industry production requirements so that the effect of a change in final demand in one industry can be estimated for all other industries in the economy thereby enabling an assessment of the multiplier effect.

Input-Output (I/O) models are commonly used to assess the economic impacts of changes in fiscal policy, public and private investment, employment policy and a variety of other economic initiatives that have the potential to change expenditure patterns and labor market structure.



### 1.3 Summary of Job Impacts

Initiatives (and sub-initiatives referred to as “projects”) were selected for analysis, as stated in section 1.1 above, if they were determined to have direct, measurable and significant job creation impacts. PlaNYC encompasses six areas: Land (housing, open space and brownfields), Water (water quality and water supply networks), Transportation, Air Quality, Energy and Climate change.

- *Capital Plans and Construction* activity anticipates \$100 billion in total spending to undertake the studied initiatives. The capital plans and construction phase for these initiatives are expected to support 422,000 direct jobs (in person-years) and, after all rounds of the multiplier effect are considered, 865,000 total jobs (in person-years). Table 1 shows these job impacts by PlaNYC section. The highest levels of funding and job creation are produced by the Transportation, Water Quality, Water Network, and Energy categories.
- *Annual Operations and Maintenance* spending is assumed to be \$1.04 billion to support the PlaNYC initiatives. Annual operations and maintenance would directly support 7,700 permanent jobs and, after all rounds of the multiplier effect, the total operational spending is estimated to support nearly 12,000 jobs annually. Table 1 shows the annual Operations and Maintenance jobs generated by PlanNYC.

**Table 1**  
**Summary of Job Impacts, 2007- 2030\***

	Capital Plans and Construction			Operations and Maintenance		
	Direct Spending (\$ millions)	Cumulative Direct Jobs (Person-Years)	Cumulative Total Jobs (Person-Years)	Direct Spending (\$ millions)	Direct Jobs (Annual)	Total Jobs (Annual)
Land – Open Space	\$1,026	4,666	9,326	\$18.3	303	547
Land – Brownfields	\$62	227	450	\$2.0	28	50
Water – Water Quality	\$6,568	26,651	52,918	N/A	102	259
Water – Water Network	\$25,825	108,935	215,421	\$33.0	2,858	3,643
Transportation	\$48,447	210,176	454,464	\$983.0	4,103	6,797
Energy	\$17,157	67,933	125,895	\$.7	236	630
Air Quality	\$887	3,402	6,273	\$4.3	36	73
<b>TOTALS</b>	<b>\$99,971</b>	<b>421,990</b>	<b>864,747</b>	<b>\$1,041.3</b>	<b>7,666</b>	<b>11,999</b>

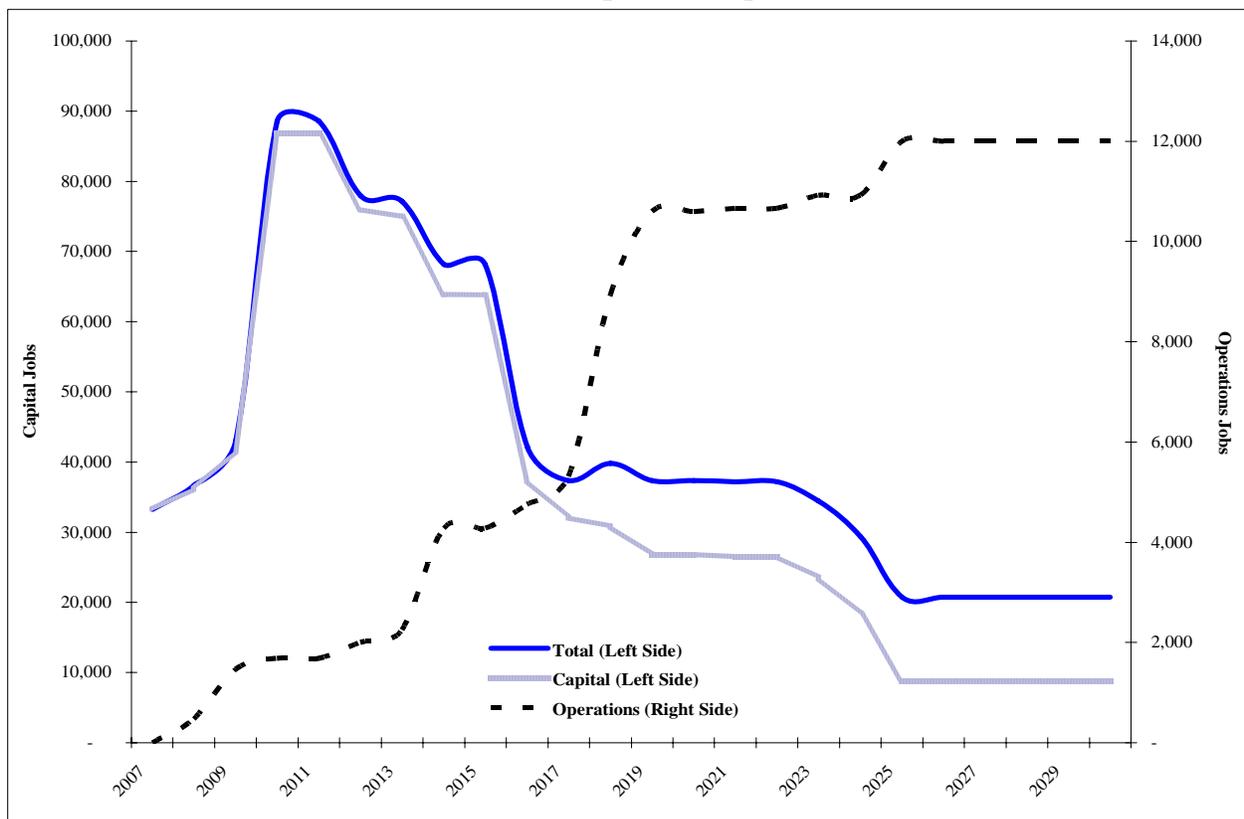
\* Does not include secondary impacts, some of which will be substantial, such as jobs expected to be created as a result of rezoning.

The largest number of capital planning and construction jobs is expected within the Transportation, Energy, and Water Network sections. The projects in these sections with the largest number of such jobs are:

- *Transportation, Initiative 1: Increase capacity on key congested routes* (includes Access to the Region’s Core, LIRR Third Track, East Side Access, Lower Manhattan Rail Link, Second Avenue Subway (Phases 1 and 2) – 327,062 person-years
- *Transportation, Initiative 14: Close the Metropolitan Transportation Authority’s State of Good Repair gap* – 94,935 person-years
- *Energy, Initiative 5: Prioritize five key areas for targeted incentives* – 76,383 person-years.
- *Energy, Initiative 8: Facilitate repowering and construct power plants and dedicated transmission line* – 48,098 person-years.
- *Water Network, Initiative 7: Complete Water Tunnel No. 3* – 58,303 person-years

Figure 2 illustrates the distribution of jobs over time through 2030 for both capital and operations phases. The level of capital jobs peaks at 88,300 jobs in 2011. The vast majority of jobs generated by capital projects are created between 2007 and 2017 with somewhat lower but relatively steady levels of capital-related employment continuing through 2023. As capital projects are completed, demand for operations employment to maintain new infrastructure and deliver services will rise. While capital projects constitute a much greater share of total jobs created, operations jobs increase significantly after 2017 and eventually peak to a level of 12,000 annual permanent jobs by 2025.

**Figure 2**  
**PlaNYC Job Creation Timeline**  
**Job Creation Trends for Capital and Operations. 2007-2030**



Note: Capital jobs assumed to be evenly distributed over the duration of life of capital project; Operations jobs are assumed to be permanent annual jobs.

**Other Employment Opportunities.** In addition to the job impacts of PlaNYC presented in Table 1, which includes impacts to the extent that there is a direct link between project spending and employment, there are potential “secondary” or “dynamic” effects that can be reasonably anticipated to occur as firms and individuals make long-term adjustments to policy or investment initiatives. These jobs may be created in response to the lower costs and enhanced amenities conferred on New York businesses and residents by the initiatives. The additional job creation opportunities beyond the measured impacts can be seen in several PlaNYC categories:

- *Land: Housing/Land Use and Rezoning* – Looking ahead to 2030, PlaNYC recognizes the challenge of housing a predicted 900,000 additional people. The preparation of land use and rezoning studies will have minor, short-term job creation effects, but once approved and implemented, the provisions and standards will be established to create the capacity to accommodate population growth, real estate investment and development activity and other job creation opportunities. PlaNYC anticipates that the rezoning actions proposed in the Housing section will spur the development of 54,000 to 80,400 new residential units. Coupled with existing initiatives, these actions will result in the necessary 265,000 new residential units by 2030 to meet demand, a scale of development expected to support 781,000 person-years of direct, indirect and induced employment in the region. The magnitude of this real estate development effect as a source of employment nearly matches the job creation levels reported by the seven PlaNYC categories studied in this report.
- *Land: Open Space* – The creation of parks and open space often enhances the attractiveness of surrounding neighborhoods, particularly in communities presently underserved by such a desirable amenity. Parks are often a critical attribute for making a residential choice and the newfound presence of such an asset can be an impetus for future real estate investment which, in turn, can create new employment opportunities in property management, real estate development services and the construction trades. The eight new regional parks also known as destination parks, may lead to increased tourism and related activity.
- *Land: Brownfields* – Removing regulatory or financial hurdles can lead to faster clean-ups of brownfield sites as well as create more favorable conditions for real estate development to take place where land is currently vacant or underdeveloped. This investment can create new job opportunities in the construction trades and generate jobs in property management, retail and other residential population-serving sectors. Site clean-ups and redevelopment may also trigger neighborhood-level ripple effects in the form of private sector reinvestment which may prove beneficial to small contractors and their workforce.
- *Water: Water Quality* – Water Quality improvements can be expected to enhance interest in the region’s riverfronts and more intensive recreational use of waterways and tributaries. The reclamation of waterways for public use opens up new opportunities for employment in tourism-related and recreation-related industries to serve residents and visitors. The Mayor’s BMP Task Force report, which studies Best Management Practices for stormwater runoff may result in new design and construction standards that may increase demand for stormwater management technologies (i.e., blue roof technologies, structured soils, pavers) as well as professional services (i.e., landscape architects, green roof installers).
- *Water: Water Network* – PlaNYC calls for the establishment of rebate programs for toilets and high-efficiency washing machines in laundromats and apartment buildings to reduce water usage. Other projects are being considered to promote greater water efficiency in industrial and restaurant equipment, early leak detection, water audits and gray water reuse and recycling. When implemented, these projects will likely require new products and services from equipment manufacturers and sales representatives, wholesalers, plumbing suppliers and contractors. Mechanical systems engineers trained to design or inspect greywater reuse and recycling systems would be in demand.
- *Transportation* – The expansion and improvement of commuter rail and mass transit are intended to facilitate a more efficient and reliable commute for the City’s work force. Improved access to

neighborhoods as well as several major infrastructure projects, such as *Access to the Region's Core*, *East Side Access*, and the *Second Avenue Subway*, can deliver travel-time savings for regional commuters as well transform the accessibility of specific localized areas surrounding transit station nodes. This improved accessibility will increase the supply of available labor and reduce the congestion barriers for workers connecting to employers as well as make certain neighborhoods more desirable for employment growth. Since reduction in congestion delays lowers the cost of doing business in the City, demand for labor can follow from productivity gains. Similarly, as transportation systems accommodate greater density without an adverse consequence to accessibility, there is greater potential to enjoy productivity gains from better skill-matching between employers and employees.

- *Energy* – Through conservation and supply expansion initiatives, New York's consumers are expected to have reductions in their relative energy costs. These efficiency gains would allow businesses to increase their demand for labor, particularly in the case of energy intensive business operations. Several PlaNYC energy initiatives call for the adoption of more energy efficient technologies, products and systems. The majority of new jobs created will be for engineers, designers, construction professionals, but new career pathways and further professionalization of the jobs in energy management can also be anticipated. Demand may be created for new positions such as building auditors, energy managers and energy analysts, as conservation and energy efficiency goals are built into future building codes. Although some of these positions will be filled by existing occupations in construction and building management, they are likely to require skills development and, thus, may result in better-paying jobs. The training programs will also require knowledgeable trainers including engineers, architects, and adult and vocational education instructors.
- *Air Quality* – The promotion of cleaner burning heating fuels in the City's school systems will stimulate demand for personnel with skills to maintain more advanced, energy efficient boilers and heating distributions systems. The commitment to retrofitting school buses, ferries and other heavy duty equipment will similarly demand mechanical crews capable of performing work on more advanced, emissions-reducing diesel engine systems. PlaNYC's commitment to reforest target areas of parklands and street tree plantings as natural solutions to improve air quality are likely to require landscaping contractors and tree pruners. Of greater long-term significance, improved air quality may decrease premature deaths and other health afflictions such as asthma, minimizing health care costs externalized to local business and consumers and health stresses that affect workforce productivity.
- *Climate Change* – It is too early to determine the job impacts of the Climate Change Adaptation Study that will be launched. It is possible that the study could lead to large infrastructure projects such as building storm water barriers and sea walls as well as adapting existing government facilities to protect against the rising sea level.

In its comprehensive vision, *PlaNYC: A Greener, Greater New York* recognizes that meeting the challenges of global competition is intertwined with implementation of strategies for fostering a more livable city. While this plan was not solely intended to create jobs, its enormous investment in infrastructure projects will lead to the creation of tens of thousands of additional jobs that will spur new industries and long term economic development far past 2030.

## 1.4 Remainder of the Report

The remainder of this report has been organized into the following sections:

- *Chapter 2 – Job Impacts* provides further information on the various sections of PlaNYC and describes individual initiatives and projects that comprise each PlaNYC section. The chapter also highlights the prospective growth in permanent jobs by occupation that can be anticipated and also includes a short discussion of potential “dynamic” effects or “secondary” effects – additional employment opportunities beyond the measured impacts – that may result from long-term adjustments to the policy or investment initiatives.
- *Appendix – Methodology for Analysis of Job Creation in PlaNYC* describes the methods for estimating the number of jobs likely to be generated by a host of initiatives comprising PlaNYC through the year 2030. The methods discussion highlights the study region, data collection approach, source documentation, modeling tools, and definition of output metrics.



## 2.0 JOB IMPACTS

### 2.1 Land – Open Space

#### 2.1.1 Introduction

Open spaces in New York City are among the most treasured assets enhancing the New York experience. They not only improve quality of life but also provide important health as well as economic benefits and enhanced civic pride. Currently, 51 neighborhoods have less than 1.5 acres of park per 1,000 people. As the residential population increases and the demand for real estate intensifies, the city’s ability to create new open space will be further stretched.

As part of the solution, PlaNYC will engage in several strategies to reconstruct and better utilize city resources as open space and expand their recreational capacity for residents and visitors. In addition to developing 8 regional parks and increased recreation in over 60 parks, PlaNYC will create a greener New York with a new public plaza in every community, 290 schoolyards open for public use, one million more trees along city streets and open spaces, and conversion of unused road space into new “Greenstreets”.

#### 2.1.2 PlaNYC Goals and Initiatives

Within the Land Section of PlaNYC, the Open Space chapter describes three broad goals. These goals are served by seven supporting initiatives, six of which have been analyzed for their direct and total job creation impacts. The adjacent text box provides further information on the subject goals and initiatives within open space. Table 2.1-1 summarizes their job creation impacts.

<b>PlaNYC Open Space: Goals and Initiatives</b>	
<b>Make existing sites available to more New Yorkers</b>	
✓	1 Open schoolyards across the city as public playgrounds
✗	2 Increase options for competitive athletics
✓	3 Complete underdeveloped destination parks
<b>Expand usable hours at existing sites</b>	
✓	4 Provide more multi-purpose fields
✓	5 Install new lighting
<b>Re-imagine the public realm</b>	
✓	6 Create or enhance a public plaza in every community
✓	7 Green the cityscape
Key:	
✓	Analyzed
✗	Not Analyzed
Note: Initiatives were analyzed if determined to have direct, measurable and significant job creation impacts.	

To ensure that nearly every New Yorker lives within a 10-minute walk of a park by 2030, three main approaches will be taken: making existing sites available to more New Yorkers; expanding usable hours at existing sites; and re-imagining the public realm for public spaces capable of fostering the connections that create vibrant communities.

#### 2.1.3 General Findings

Million Trees NYC will be achieved through the combination of several initiatives. Initiative 7, particularly the section on filling every available street tree opportunity, will produce about 20 percent of the one million trees proposed in PlaNYC. The remaining 80 percent are expected to be accomplished by initiatives summarized in Section 2.7 (Air Quality). The feasibility of contracting directly with growers to insure the availability of trees to meet the Million Trees goals is presently under consideration by the City.

**Capital Plans/Construction.** The total capital outlay for these initiatives is estimated at approximately \$1 billion and this expenditure will support approximately 9,300 person-years of employment during this phase of implementation. A more detailed breakdown of the effect that this expenditure will have on job creation is summarized in Table 2.1-1.



**Operations and Maintenance.** The total operating and maintenance budget for these initiatives is estimated at approximately \$18.3 million annually which should support an estimated 547 new jobs. A detailed breakdown of the effect that these budgets will have on job creation in the region is summarized in Table 2.1-1.

**Occupational Profile for Operations and Maintenance.** For the estimated 303 direct permanent jobs created during the operations and maintenance phase of the projects, the major anticipated occupations will include landscape maintenance, project managers, landscape architects, foresters, city planners and urban design specialists. Planning and maintaining open space to accomplish greenhouse gas sequestration will require trained botanists, chemists and other specialists. Additionally, open space contributes to stormwater retention with the support of additional trained civil engineers and hydrologists. The Public Plaza Initiative will lead to at least 44 new jobs through maintenance agreements with Business Improvement Districts and local community organizations. The selected community partner will conduct routine maintenance, management and programming of the constructed plaza's amenities, program events, and planting.

**Other Employment Opportunities.** In addition to the total job creation impacts estimated, secondary job creation effects arising from these initiatives should be considered. Some reasonably foreseeable additional opportunities stemming from PlaNYC open space initiatives include:

- *Real Estate Development* – The improvement and expansion of park space is likely to incentivize real estate development particularly in those areas where underdeveloped parks are revitalized. This will likely create new employment opportunities in property management, real estate development services and the construction trades.
- *Recreation and Tourism* – The reclamation of underdeveloped park space opens up new opportunities for employment in the service industries supporting recreational activities for residents and visitors to the City. Making existing school yards available for recreational use, increasing options for competitive athletic sites, and expanding usable hours at existing sites may support athletic programs which can be a source of jobs for youth, those trained in physical education, and parks maintenance. Sports programs provide employment for those operating community-based and school-based leagues. Fields and lighting systems require enhanced maintenance programs for active sports.



**Table 2.1-1  
Summary of Land - Open Space Job Impacts, 2007 - 2030**

Category and Initiative	Capital Plans and Construction			Operations and Maintenance (Annual)		
	Direct Spending (\$ millions)	Cumulative Direct Jobs (Person-Years)	Cumulative Total Jobs (Person-Years)	Direct Spending (\$ millions)	Direct Jobs	Total Jobs
<b>Make existing sites available to more New Yorkers</b>						
1. Open schoolyards across the city as public playgrounds <sup>1</sup> <i>-Open schoolyards as playgrounds in every neighborhood</i>	\$117.0	571	1,133	\$3.5	35	52
3. Complete underdeveloped destination parks <i>-Fulfill the potential of at least one major undeveloped park site in every borough</i>	\$386.4	1,890	3,760	\$4.2	98	186
<b>Expand usable hours at existing sites</b>						
4. Provide more multi-purpose fields <i>-Convert asphalt into multi-use fields</i>	\$42.0	198	393	0.0	0	0
5. Install new lighting <i>-Maximize time on our existing turf fields by installing lights for nighttime use</i>	\$21.6	105	195	\$0.4	0	0
<b>Re-Imagine the public realm</b>						
6. Create or enhance a public plaza in every community <sup>2</sup> <i>-Create a new or enhance an existing public plaza in every community</i>	\$196.7	688	1,365	\$0.7	46	73
7. Green the cityscape <sup>3</sup> <i>-Expand Greenstreets program</i> <i>-Fill every available street tree opportunity in New York City</i>	\$262.0	1,214	2,480	\$9.5	124	236
<b>TOTALS</b>	<b>\$1,025.7</b>	<b>4,666</b>	<b>9,326</b>	<b>\$18.3</b>	<b>303</b>	<b>547</b>

<sup>1</sup>Direct permanent jobs reflect full-time employment equivalent. The initiative is estimated to produce 5 additional hours a week per playground of additional staffing requirements for the 290 playgrounds opened.

<sup>2</sup>Operations and Maintenance Direct Spending figure does not include private funding

<sup>3</sup>Green streets maintenance employment increases by 20 employees in 2009, 2010, and 2011. Nine more employees will be in planning and administrative roles. Street Tree projects expected to employ an additional 55 persons.

Sources: *Initiatives 1, 4, 5 and 7* information was obtained from interview with NYC Department of Parks & Recreation (DPR); *Initiative 3* information obtained from interviews with DPR and Mayor's Office of Long Term Planning and Sustainability (OLTPS); *Initiative 6* information obtained from interview with NYC Department of Transportation (DOT).



## 2.2 Land – Brownfields

### 2.2.1 Introduction

For the City of New York to accommodate the projected growth of 900,000 residents and anticipated 750,000 more jobs, previously underutilized land must be used more efficiently. To meet this challenge, PlaNYC puts forward several initiatives to make existing brownfield cleanup programs faster and more efficient, encourage more brownfields to enter into clean-up programs, increase community planning around brownfields redevelopment, and create a new City program to spur the redevelopment of sites currently ineligible for existing State programs.

All five boroughs contain sites where previous uses have left behind contamination, resulting in a total of an estimated 7,600 acres of potentially contaminated land across the city. State programs currently oversee the remediation of over 1,900 contaminated acres, or one-fourth of the city’s brownfields. These programs can be cumbersome, costly, and time consuming. PlaNYC proposes to accelerate the cleanup of brownfields by streamlining existing State programs, which manage the cleanup of the City’s most contaminated sites and expanding the definition of eligible sites to increase enrollment into these programs.

To address sites that still remain outside of State program enrollment, PlaNYC proposes an expedited City cleanup program for mild and moderately contaminated sites. Accelerating the clean up of brownfields will stimulate local environmental improvements, encourage sustainable infill development, and increase housing and economic development. Brownfields tend to cluster in low-income communities. If proper clean-up standards and monitoring are followed, the legacy of past contamination can be reconciled with the public health concerns of nearby residents – a concern at the heart of the environmental justice issue.

PlaNYC includes initiatives to accelerate the testing of sites and reduce the length of time to negotiate remedies by establishing city presumptive remedies. A new city office will serve as a resource for the State, developers, and communities interested in planning brownfield redevelopment for their neighborhoods. To ensure greater participation by community groups in the redevelopment planning process, the City proposes a new state tax credit for developers who build according to community plans.

<b>PLANYC 2030 Brownfields: Goals and Initiatives</b>	
<b>Make existing brownfield programs faster and more efficient</b>	
✘ 1	Adopt on-site testing to streamline the cleanup process
✘ 2	Create presumptive remedies for New York City cleanups
✓ 3	Establish a City office to promote brownfield planning and redevelopment
<b>Expand enrollment into streamlined programs</b>	
✘ 4	Expand participation in the current State Brownfield Cleanup Program (BCP)
✘ 5	Create a City program to oversee all additional cleanups
✓ 6	Provide incentives to lower costs of remediation
<b>Encourage greater community involvement in brownfield redevelopment</b>	
✘ 7	Encourage the State to release community-based redevelopment grants
✘ 8	Provide incentives to participate in Brownfield Opportunity Area (BOA) planning
✘ 9	Launch outreach effort to educate communities about brownfield Redevelopment
<b>Identify remaining sites for cleanups</b>	
✓ 10	Create a database of historic uses across New York City to identify potential brownfields
✓ 11	Limit liability of property owners who seek to redevelop brownfields
Key:	
✓	Analyzed
✘	Not Analyzed
Note: Initiatives were analyzed if determined to have direct, measurable and significant job creation impacts.	

### 2.2.2 PlaNYC Goals and Initiatives

Within the Land Section of PlaNYC, the Brownfields chapter includes four major efforts and eleven initiatives, as shown in the adjacent text box. The results of the job creation analysis for the initiatives considered most likely to generate significant direct job impacts are shown in Tables 2.2-1. The



overarching purpose of the Brownfields initiatives is to increase the pace and volume of site cleanups across the city in order to return the land to more productive uses. The Brownfield initiatives are intended to work in concert and produce a synergistic effect. They are expected to encourage remediation through new financial incentives (Initiatives 6, 7, and 8), streamline the regulatory process (Initiatives 1 and 4), create a City expedited cleanup program, (Initiatives 2 and 5), inform community groups and developers of brownfield sites (Initiatives 9 and 10), and further incentivize developers and land-owners to redevelop sites via subsidies in insurance and legal protection (Initiative 11).

### **2.2.3 General Findings**

The Brownfields initiatives call for regulatory streamlining, incentives and other strategies to address financial and regulatory barriers to brownfields redevelopment. Potential jobs from real estate developments built on remediated brownfields are of considerable significance but are not in the scope of this study.

**Capital Plans/Construction.** The total capital outlay for these initiatives is estimated to leverage approximately \$60 million and this expenditure should support approximately 450 person-years of employment during this phase of implementation. A more detailed breakdown of the effect that this expenditure will have on job creation is summarized in Table 2.2-1.

**Operations and Maintenance.** The total operating and maintenance budget for these initiatives is assumed to be approximately \$2 million annually, which is estimated to support approximately 50 new jobs. A detailed breakdown of the effect that these budgets will have on job creation in the region is summarized in Table 2.2-1.

**Occupational Profile for Operations and Maintenance.** The permanent jobs will include positions for the newly created office including: environmental scientists and specialists; urban and regional planners; public relations specialists; and administrative personnel.

**Other Employment Opportunities.** In addition to the total job creation impacts identified, secondary job creation effects arising from these initiatives should be considered. This study does not estimate the employment effects that will be induced from building on brownfield sites, but these impacts would be substantial and long-lasting. Some reasonably foreseeable additional opportunities stemming from PlaNYC Brownfields Initiatives include:

- **Land Use Development Effects.** If the initiatives are successful, New York City will benefit from an increase in construction activity, an improved tax base, and ultimately more efficient use of City land that will produce the housing, commercial, industrial and retail spaces, and the parks and open space that the City's future population will need. This will create jobs in the construction and property management industries as well as the retail and service sectors.
- **Indirect Reinvestment Effects.** In many instances, site clean up and redevelopment are likely to trigger neighborhood-level ripple effects in the form of reinvestment in adjacent properties. These reinvestment effects may prove beneficial to small contractors.
- **Increasing Demand for Environmental Engineering.** According to the State Department of Labor, environmental engineering technicians will have "very favorable" employment prospects in the near to medium term future in part due to increased brownfield site remediation and development activities. Other additional opportunities may arise for waste management and remediation managers, city and state brownfield administrators, and technicians in laboratory and testing facilities.



**Table 2.2-1  
Summary of Land – Brownfields Job Impacts, 2007 - 2030**

Category and Initiative	Capital Plans and Construction			Operations and Maintenance (Annual)		
	Direct Spending (\$ millions)	Cumulative Direct Jobs (Person-Years)	Cumulative Total Jobs (Person-Years)	Direct Spending (\$ millions)	Direct Jobs	Total Jobs
<b>Make existing brownfield programs faster and more efficient</b>						
3. Establish a City office to promote brownfield planning and redevelopment <i>-Create a new City office to increase resources dedicated to brownfield planning, testing and cleanups</i>	0	0	0	\$2	27	48
<b>Expand enrollment into streamlined programs</b>						
6. Provide incentives to lower costs of remediation <sup>1,2</sup> <i>-Dedicate \$15 million to capitalize a fund to support brownfield redevelopment</i>	\$50	223	444	0	0	0
<b>Identify remaining sites for cleanups</b>						
10. Create a database of historic uses across New York City to identify potential brownfields <sup>3</sup> <i>-Conduct a historic use assessment for all city sites in order to measure long-term progress towards goal</i>	\$1.5	4	6	N/A	1	2
11. Limit liability of property owners who seek to redevelop brownfields <sup>2</sup> <i>-Create an insurance program and legal protections to limit the liability of developers willing to clean up land they did not pollute</i>	\$10	0	0	0	0	0
<b>TOTALS</b>	<b>\$61.5</b>	<b>227</b>	<b>450</b>	<b>\$2</b>	<b>28</b>	<b>50</b>

<sup>1</sup>Assumes \$15 million in City funding and \$35 million in private matching funding.

<sup>2</sup>Job estimates based on combination of funding from Initiatives 6 and 11 and are reported under Initiative 6.

<sup>3</sup>Operations employment based on direct jobs estimate rather than spending estimate.

Sources: Information for the analysis of *Initiatives 3, 5, 6, 10 and 11* was obtained from interviews with the NYC Mayor’s Office of Long-Term Planning and Sustainability (OLTPS).



## 2.3 Water – Water Quality

### 2.3.1 Introduction

For most of its history, New York City has depended upon its waterfront areas for transportation, industrial and commercial uses, and used its waterways for waste disposal as well as industrial and non-point pollution. The post-industrial era has transformed the city’s landscape, including how New Yorkers value and treat our waterfronts and waterways. Recognition of the public health and environmental threats of our prior adaptation and practices accelerated the City’s transformation. In 1972, the U.S. Clean Water Act established ambitious new pollution regulations, with the goal of making every water body in the country safe for active recreation. Since then, the City has dedicated \$35 billion to improving the quality of its waterways.

PlaNYC 2030 reflects on this history and our remarkable ability to change, setting forward strategies to accommodate growth and address the legacy of our past practices without losing sight of the responsibility to protect the public health and environment. Several new and continuing challenges are identified. For example, virtually all of New York City’s sewage can be treated in dry weather, but the additional volume of stormwater runoff generated during major storm events results in Combined Sewer Overflows (CSOs). While infrastructure upgrades have significantly increased the capture rate of overflow from 30 percent to 70 percent in New York City, to meet the goal of opening our most polluted waterways to recreation, the City must do more.

As efforts to reclaim former industrial land along polluted riverbanks accelerate, the need to improve water quality becomes more important. Even though significant advances have been made in this area, progress has recently slowed as conditions around the city have changed – wetlands shrunk by 90 percent in the last century while 9,000 acres of permeable surface were lost in the last 25 years. With this shifting landscape, PlaNYC suggests that the City must be more ambitious in its approach to reduce CSO discharges and that it should harness both a full range of Best Management Practices (BMPs) designed to retain and cleanse storm water as well as continued infrastructure improvements.

### 2.3.2 PlaNYC Goals and Initiatives

The City will adopt a combination of infrastructure solutions and natural strategies in order to protect and improve water quality. The City has outlined three broad plans comprised of ten supporting initiatives. The adjacent text box provides further information on the subject goals and initiatives for Water Quality in PlaNYC. Table 2.3-1 summarizes the job creation impacts of initiatives expected to produce measurable direct job impacts.

The City plans to continue implementing infrastructure upgrades with documented success in dealing with sewer and wastewater treatment issues. Preventing storm water from entering the combined sewer system in the first place is also a priority and solutions that work towards this goal will be pursued – including a variety of Best Management Practices.

<b>PlaNYC Water Quality: Goals and Initiatives</b>	
<b>Continue implementing infrastructure upgrades</b>	
✓ 1	Develop and implement Long-Term Control Plans
✓ 2	Expand wet weather capacity at treatment plants
<b>Pursue proven solutions to prevent stormwater from entering the system</b>	
✓ 3	Increase use of High Level Storm Sewers (HLSS)
✗ 4	Capture the benefits of our open space plan
✓ 5	Expand the Bluebelt program
<b>Expand, track, and analyze new Best Management Practices (BMPs) on a broad scale</b>	
✗ 6	Form an interagency BMP Task Force
✓ 7	Pilot promising BMPs
✗ 8	Require greening of parking lots
✓ 9	Provide incentives for green roofs
✗ 10	Protect wetlands
Key:	
✓	Analyzed
✗	Not Analyzed
Note: Initiatives were analyzed if determined to have direct, measurable and significant job creation impacts.	



### 2.3.3 General Findings

The vast majority (92 percent) of the capital budget for the Water Quality category falls under Initiative 1, *Develop and Implement Long-Term Control Plans* which includes expansions and upgrades to the existing waste water treatment systems. The size and scale of the various projects within Initiative 1 varies greatly. Some of the system upgrades included in Initiative 1 will include remedial improvements addressed in Initiative 2, *Expand Wet Weather Capacity at Treatment Plants*. The other initiatives in this category assist in enhancing water quality through natural systems, and the expansion and optimization of current drainage systems.

**Capital Plans/Construction.** The total capital outlay for these initiatives is estimated at approximately \$6.5 billion and this expenditure should support approximately 53,000 person-years of employment during this phase of implementation. A more detailed breakdown of the effect that this expenditure will have on job creation is summarized in Table 2.3-1.

**Operations and Maintenance.** New York City Department of Environmental Protection (NYCDEP) provided an estimate of 102 direct permanent new jobs for Initiative 1. When combined with indirect jobs, the Water Quality initiatives in PlaNYC are expected to result in a total 259 new permanent jobs. A detailed breakdown of the effect that these budgets will have on job creation in the region is summarized in Table 2.3-1.

**Occupational Profile for Operations and Maintenance.** For the estimated 102 direct permanent jobs likely to be created during the operations and maintenance phase of the subject projects, it is anticipated that major occupations will be water and liquid waste treatment plant and system operators. Optimal management of system maintenance and rehabilitation will require the work of skilled civil and environmental engineers.

**Other Employment Opportunities.** In addition to the total job creation impacts identified, some reasonably foreseeable additional opportunities stemming from PlaNYC Water Quality improvements include:

- *Real Estate Development* – The improvements in water quality and the subsequent revitalization of waterfront areas is likely to increase real estate values and provide conditions for greater future real estate development which will likely create new employment opportunities in construction-related industries, property management and maintenance.
- *Recreation and Tourism* – The reclamation of tributaries and waterways for recreational use opens up new opportunities for employment in the tourism-related and service industries capable of supporting recreational activities for residents and visitors to the City.
- *Green Systems: Architecture, Landscaping, Civil and Mechanical Systems* – Residential and commercial pilot programs and incentives for installation of green roofs may be extended beyond the sunset period if the benefits of the program are apparent. Architects and mechanical engineers, hydrologists, landscaping contractors and garden suppliers and wholesalers would benefit from this innovation. Other programs for greening of parking lots, vegetated swales, mollusk habitat programs would likely engage civil engineers, environmental scientists, landscape architects and contractors.



**Table 2.3-1  
Summary of Water – Water Quality Job Impacts, 2007 - 2030**

Category and Initiative	Capital Plans and Construction			Operations and Maintenance (Annual)		
	Direct Spending (\$ millions)	Cumulative Direct Jobs (Person-Years)	Cumulative Total Jobs (Person-Years)	Direct Spending (\$ millions)	Direct Jobs	Total Jobs
<b>Continue implementing infrastructure upgrades</b>						
1. Develop and implement Long-Term Control Plans <sup>1</sup> <i>-Complete Long-Term Control Plans for all 14 New York City Watersheds, as required by law</i>	\$6,000	24,225	48,092	N/A	102	259
2. Expand wet weather capacity at treatment plants <sup>2</sup> <i>-Reduce Combined Sewage Overflow discharges by more than 185 mgd during rainstorms</i>	0	0	0	0	0	0
<b>Pursue proven solutions to prevent stormwater from entering the system</b>						
3. Increase use of High Level Storm Sewers (HLSS) <i>-Convert combined sewers into HLSS and integrate HLSS into major new developments, as appropriate</i>	\$419	1,692	3,358	0	0	0
5. Expand the Bluebelt program <i>-Expand Bluebelt in Staten Island and other boroughs, where possible</i>	\$109	531	1,053	0	0	0
<b>Expand, track, and analyze new Best Management Practices (BMPs) on a broad scale</b>						
7. Pilot promising BMPs <i>-Reintroduce 20 cubic meters of ribbed mussel beds</i> <i>-Design five expanded tree pits and monitor impacts</i> <i>-Pilot one vegetated swale to collect rainfall from roadways</i>	\$17	74	149	0	0	0
9. Provide incentives for green roofs <i>-Construct green roofs for four residential and two commercial buildings as a pilot program</i> <i>-Encourage the installation of green roofs through a new incentive program</i>	\$23	129	266	0	0	0
<b>TOTALS</b>	<b>\$6,568</b>	<b>26,651</b>	<b>52,918</b>	<b>N/A</b>	<b>102</b>	<b>259</b>

<sup>1</sup>Operations employment based on direct jobs estimate rather than spending estimate.

<sup>2</sup>Funding and job impacts included in Initiative one.

Sources: Information for the analysis of *Initiatives 1, 2, 3, 5 and 7* was obtained from interviews with the NYC Department of Environmental Protection (DEP); *Initiative 9, Projects 1 and 2* information was obtained from interview with NYC Mayor’s Office of Long-Term Planning and Sustainability and information obtained from [www.glwi.uvm.edu/research/genomics/ecli/greenroof/roofinstall.php](http://www.glwi.uvm.edu/research/genomics/ecli/greenroof/roofinstall.php).



## 2.4 Water – Water Network

### 2.4.1 Introduction

Although New York’s supply of water exceeds its demand, the maintenance of its supply and distribution system faces serious challenges. The majority of the water network was constructed prior to World War II and nearly 15 percent of the pipes carrying water into homes are over 100 years old. Furthermore, there is little redundancy for the aqueducts and pressured water tunnels, which limits the City’s ability to make repairs to this infrastructure.

In addition to addressing the problem of an aging water network, continued investments are needed in projects and programs that will protect the quality of New York City’s drinking water. By continuing to meet stringent watershed management regulations, and preserving the ability of some natural systems to protect water quality, New York City can continue to deliver clean drinkable water into the future and avoid construction of what would be the largest water filtration plants in the world.

In order to maintain a sustainable network that reliably provides water to its residents, the City needs to address its aging infrastructure while ensuring that the quality of New York City’s water supply continues to meet and exceed existing regulations.

### 2.4.2 PlaNYC Goals and Initiatives

The City looks to address three fundamental but challenging questions with respect to the Water Network: How can we continue to protect the quality of our water supply, ensure its safe arrival to the city, and deliver it reliably to residents? PlaNYC will answer those questions through three broad plans and nine initiatives. Plans include a way to ensure the quality of drinking water as well create system redundancy for the Delaware Aqueduct that has historically provided 50 percent of the City’s water supply. This action will require greater conservation of current water use, the efficient use of existing facilities, the exploration of new water sources, or the construction of a parallel aqueduct.

<b>PlaNYC Water Network: Goals and Initiatives</b>	
<b>Ensure the quality of our drinking water</b>	
✓ 1	Continue the Watershed Protection Program
✓ 2	Construct an ultraviolet disinfection plant for the Catskill and Delaware systems
✓ 3	Build the Croton Filtration Plant
<b>Create redundancy for aqueducts to New York City</b>	
✗ 4	Launch a major new water conservation effort
✓ 5	Maximize existing facilities
✓ 6	Evaluate new water sources
<b>Modernize in-city distribution</b>	
✓ 7	Complete Water Tunnel No. 3
✓ 8	Complete a backup tunnel to Staten Island
✓ 9	Accelerate upgrades to water main Infrastructure
Key:	
✓	Analyzed
✗	Not Analyzed
Note: Initiatives were analyzed if determined to have direct, measurable and significant job creation impacts.	

The adjacent text box provides further information on the subject goals and initiatives related to the Water Network. Table 2.4-1 summarizes the job creation impacts for the initiatives for which there are direct measurable effects.

### 2.4.3 General Findings

All of the Water Network projects are large capital projects which will provide a significant amount of work for contractors and their construction crews. Beyond the maintenance required after the completion of these projects, Initiatives 2 and 3 will provide permanent employment needed to maintain newly constructed facilities. Initiative 2 will construct a specialized Ultraviolet Disinfection Plant, which is a new project and technology for the New York City Department of Environmental Protection (NYCDEP).

**Capital Plans/Construction.** The total capital outlay for these initiatives is estimated at approximately \$26 billion and this level of capital expenditure should support approximately 215,000 person-years of



employment during this phase of implementation. A more detailed breakdown of the effect that this expenditure will have on job creation is summarized in Table 2.4-1. Although the construction employment could be characterized as temporary work, these large projects may take a significant amount of time to complete. If past water network construction projects are an indicator of future project durations, then some of the largest projects may span a range of five to fifteen years or more.

***Operations and Maintenance.*** Only Initiatives 2 and 3 currently have reported operations and maintenance budgets. The annual operating and maintenance budgets for these initiatives are estimated at approximately \$33 million, which will support an estimated 312 jobs within the study area. A detailed breakdown of the effect that these budgets will have on job creation in the region is summarized in Table 2.4-1. In addition, 3,331 new jobs derived from the watershed protection initiative will be located outside of the study area in the municipalities surrounding the upstate watershed area. If these permanent employees are counted, the total employment increases to 3,643 jobs created by PlaNYC.

***Occupational Profile for Operations and Maintenance.*** Of the 128 direct permanent jobs estimated to be created in the Metropolitan Statistical Area of New York and Northern New Jersey during the operations and maintenance phase of the subject projects, it is anticipated that major occupations will include: water treatment plant and system operators; installation, maintenance and repair; and security guards. Asset management of water infrastructure requires system maintenance and rehabilitation including the application of innovative tools – for example, performance indicators, statistical models forecasting physical degradation, and multi-criteria decision making support systems – which will require additional skilled civil and environmental engineers.

***Other Employment Opportunities.*** The Water Network projects primarily provide construction jobs whose effects are measured in Table 2.4-1. Initiative 4, *Launch a major new water conservation effort*, was not measured because the details of the plan were not developed as of the date of publication of this report. PlaNYC calls for the establishment of rebate programs for toilets, high-efficiency washing machines in laundromats and apartment buildings to reduce water usage. Other projects under consideration would promote greater water efficiency in industrial and restaurant equipment use, early leak detection, water audits and grey water reuse and recycling in building systems. If implemented, these projects will require new products and services from equipment manufacturers and sales representatives, wholesalers, plumbing suppliers and contractors. Mechanical systems engineers who are trained to design or inspect greywater reuse and recycling systems would be in demand.



**Table 2.4-1  
Summary of Water – Water Network Job Impacts, 2007 - 2030**

Category and Initiative	Capital Plans and Construction			Operations and Maintenance (Annual)		
	Direct Spending (\$ millions)	Cumulative Direct Jobs (Person-Years)	Cumulative Total Jobs (Person-Years)	Direct Spending (\$ millions)	Direct Jobs	Total Jobs
<b>Ensure the quality of our drinking water</b>						
1. Continue the Watershed Protection Program <sup>1,2</sup> <i>-Aggressively protect our watersheds as we seek to maintain a Filtration Avoidance Determination for the Catskills and Delaware Water Supplies</i>	\$346	1,446	2,328	N/A	2,730	3,331
2. Construct an ultraviolet disinfection plant for the Catskill and Delaware systems <i>-Construct an ultraviolet disinfection plant to destroy disease-causing organisms in our upstate watershed.</i>	\$1,734	7,001	13,898	\$11	54	132
3. Build the Croton Filtration Plant <i>-Construct a water filtration plant to protect the Croton supply</i>	\$2,817	11,372	22,576	\$22	74	180
<b>Create Redundancy for Aqueducts to New York City</b>						
5. Maximize existing facilities <i>-Add 245 mgd to our supply potential through increased efficiency</i>	\$343	1,385	2,749	0	0	0
6. Evaluate New Water Sources <i>-Evaluate 39 projects to meet the shortfall needs of the city during a prolonged shutdown of the Delaware Aqueduct</i>	\$12,741	56,060	110,998	0	0	0
<b>Modernize In-City Distribution</b>						
7. Complete Water Tunnel No. 3 <i>-Complete construction of stage 2 and begin repairing Water Tunnel No. 1</i> <i>-Complete stage 3 and 4 of Water Tunnel No. 3</i>	\$7,274	29,369	58,303	0	0	0
8. Complete a backup tunnel to Staten Island <i>-Replace pipelines connecting Staten Island to Tunnel No. 2</i>	\$70	283	561	0	0	0
9. Accelerate upgrades to water main Infrastructure <i>-Increase replacement rate to over 80 miles annually</i>	\$500	2,019	4,008	0	0	0
<b>TOTALS</b>	<b>\$25,825</b>	<b>108,935</b>	<b>215,421</b>	<b>\$33</b>	<b>2,858</b>	<b>3,643</b>

<sup>1</sup> Direct spending figure excludes land acquisition costs.

<sup>2</sup> Operations employment based on direct jobs estimate rather than spending estimate

Sources: *Initiative 1* information was made available through interview with NYC Department of Environmental Protection (DEP) supplemented with Draft 3 of “Water Works: Economic Impacts of Water Supply and Watershed Protection in the Delaware, Catskill and Croton Watershed Region” ( 2007); *Initiative 2* from interview with DEP supplemented with “The Catskill/ Delaware Ultraviolet Light Disinfection Facility Final Environmental Impact Statement” (2004); *Initiative 3* information from interview with DEP supplemented with “Croton Water Treatment Plant Final Supplemental Environmental Impact Statement” ; Information for *Initiatives 5, 7, 8 and 9* obtained from interview with DEP.



## 2.5 Transportation

### 2.5.1 Introduction

The City of New York has had a history of inadequate investment in the basic maintenance of its roads and mass transit infrastructure. The state of disrepair peaked in the 1970s with some highly visible failures such as an incident where a truck plunged through a hole on the West Side Highway. Since then the Metropolitan Transportation Authority (MTA) and City’s investment priorities’ have focused on rebuilding and repairing existing transit networks and roadways and significant progress has been made. In the past ten years, New York City Department of Transportation’s East River Bridge program has restored all four major bridges. Since the early 1980s, the MTA’s capital programs have modernized buses and subway cars and brought the system to a higher level of reliability. Despite this progress, more than half of the City’s transit stations are still awaiting repairs, 40 percent of the network’s signal systems are obsolete, more than 30 percent of NYCDOT’s streets are in need of resurfacing or reconstruction, and the City is facing a \$15 billion funding gap in its goal of achieving a state of good repair in its overall transportation infrastructure network.

Furthermore, the challenge today is no longer a matter of simply maintaining the system in good repair; there is an urgent need to expand critical elements of the transportation infrastructure. Most subway routes are currently congested and operating close to capacity at key times of the day. With 750,000 new jobs and 1 million new residents expected by 2030, it is conceivable that rush hour conditions could extend to 12 hours everyday. To compete successfully with other U.S. cities and globally, the City must be able overcome current funding gaps and make crucial investments in its transportation infrastructure.

### 2.5.2 PlaNYC Goals and Initiatives

PlaNYC has six broad transportation goals that it hopes to achieve. Those goals are served by sixteen supporting initiatives. The adjacent text box provides further information on the subject goals and initiatives within the Transportation category and Table 2.5-1 summarizes their job creation impacts.

The existing transit system needs to be expanded to address the congestion and capacity problems affecting the system’s operational efficiency. Other smaller scale improvements to existing infrastructure not requiring massive capital investment are also expected to improve mass transit access and performance. Moreover, PlaNYC has proposed congestion pricing for Manhattan’s Central Business District – a paradigm for managing traffic that has been successfully adopted in London, Stockholm and several other major cities around the world.

<b>PlaNYC Transportation: Goals and Initiatives</b>	
<b>Build and expand transit infrastructure</b>	
✓ 1	Increase capacity on key congested routes
✓ 2	Provide new commuter rail access to Manhattan
✓ 3	Expand transit access to underserved areas
<b>Improve transit service on existing infrastructure</b>	
✓ 4	Improve and expand bus service
✓ 5	Improve local commuter rail service
✓ 6	Improve access to existing transit
✓ 7	Address congested areas around the city
<b>Promote other sustainable modes</b>	
✓ 8	Expand ferry service
✓ 9	Promote cycling
<b>Improve traffic flow by reducing congestion</b>	
✓ 10	Pilot congestion pricing
✓ 11	Manage roads more efficiently
✓ 12	Strengthen enforcement of traffic violations
* 13	Facilitate freight movements
<b>Achieve state of good repair on our roads and transit system</b>	
✓ 14	Close the Metropolitan Transportation Authority’s state of good repair gap
✓ 15	Reach a state of good repair on the city’s roads and bridges
<b>Develop new funding sources</b>	
* 16	Establish a new regional transit financing authority
Key:	
✓	Analyzed
*	Not Analyzed
Note: Initiatives were analyzed if determined to have direct, measurable and significant job creation impacts.	



### 2.5.3 General Findings

PlaNYC will create a mechanism for financing the region's largest transportation infrastructure projects through the implementation of a congestion-based toll pricing initiative. This initiative will expand the City's tool box for managing congestion on the city's streets and transportation network. It is also expected to yield a revenue stream to leverage for additional capital funding of the City's critical transportation projects.

**Capital Plans/Construction.** The total capital outlay for these initiatives is estimated at approximately \$48 billion and this expenditure should support approximately 454,000 person-years of total employment during this phase of implementation. A more detailed breakdown of the effect that this expenditure will have on job creation is summarized in Table 2.5-1.

**Operations and Maintenance.** The aggregate operating and maintenance budget for the measured initiatives is estimated at approximately \$983 million annually excluding the annual operating costs of the pilot congestion pricing program, a level of expenditures which would support an estimated 6,800 new permanent jobs. A detailed breakdown of the effect that the various budgets will have on job creation in the region is summarized in Table 2.5-1.

**Occupational Profile for Operations and Maintenance.** The major job occupations expected to be created during the operations and maintenance phase of these initiatives include: bus drivers (transit and intercity); parking enforcement workers; police supervisors; IT/system administrators; and data processors.

**Other Employment Opportunities.** In addition to the total job creation impacts already identified, secondary job creation effects and other potentially beneficial economic spillovers arising from these initiatives should be considered. Some reasonably foreseeable additional opportunities stemming from PlaNYC in transportation include:

- *Real Estate Development* – The improvement and expansion of mass transit for instance is likely to raise real estate values which will provide incentives for more real estate development. This will likely create new employment opportunities in property management and construction.
- *Increased Supply of Labor* – The expansions and improvements of commuter rail and mass transit should facilitate a more efficient and reliable daily commute for the City's work force. The extension of access to new and existing neighborhoods as well as several major infrastructure projects will translate into localized and region-wide travel time savings for commuters. This improved accessibility, in turn, should lead to an increased supply of labor – both in number of employees and hours worked.<sup>1</sup>
- *Reductions in Congestion Delays* – Alleviation of congestion in the Central Business District will lower the cost of business in the City. This could translate into secondary job creation opportunities as business operations that benefit from reduced congestion capitalize on the emerging productivity gains and increase their demand for labor.

---

<sup>1</sup> LMDC et al., *Lower Manhattan Rail Link Study*, May, 2004.



**Table 2.5-1  
Summary of Transportation Job Impacts, 2007 - 2030**

Category and Initiative	Capital Plans and Construction			Operations and Maintenance (Annual)		
	Direct Spending (\$ millions)	Cumulative Direct Jobs (Person-Years)	Cumulative Total Jobs (Person-Years)	Direct Spending (\$ millions)	Direct Jobs	Total Jobs
<b>Build and expand transit infrastructure</b>						
1. Increase capacity on key congested routes <i>-Access to the Region's Core -LIRR Third Track -East Side Access<sup>1</sup> -Lower Manhattan Rail Link -Second Avenue Subway (Phases 1 and 2)</i>	\$30,668	146,563	327,062	\$830.0	3,333	5,182
2. Provide new commuter rail access to Manhattan <i>-Seek to expand options for rail commuters(Penn/Moynihan Station)</i>	\$705	3,432	6,814	0	0	0
3. Expand transit access to underserved areas <i>-Seek to provide transit to new neighborhoods (North Shore Alignment)</i>	\$351	1,837	3,647	\$6.0	40	55
<b>Improve transit service on existing infrastructure</b>						
4. Improve and expand bus service <sup>2</sup> <i>-Initiate and expand Bus Rapid Transit -Dedicate Bus/High Occupancy Vehicle (HOV) lanes on the East River bridges</i>	\$383	927	2,757	\$128.0	139	192
5. Improve local commuter rail service <i>-Seek to make better local use of Metro-North and LIRR Stations (Metro North Penn (Hudson and New Haven);Nassau Hub)</i>	\$812	3,953	7,848	0	0	0
6. Improve access to existing transit <i>-Facilitate access to subways and bus stops citywide</i>	\$23	92	183	0	0	0
7. Address congested areas around the city <i>-Develop congestion management plans for outer-borough growth corridors</i>	\$298	1,036	1,990	0	0	0
<b>Promote other sustainable modes</b>						
8. Expand ferry service <i>-Seek to expand service and better integrate it with the city's existing mass transit system (Ferry Service)</i>	\$4	19	38	\$9.0	12	116
9. Promote cycling <sup>3</sup> <i>-Complete the 1,800-mile bike master plan -Facilitate Cycling</i>	\$256.6	897	1,781	\$1.2	5	14



**Table 2.5-1 (cont.)  
Summary of Transportation Job Impacts, 2007 - 2030**

Category and Initiative	Capital Plans and Construction			Operations and Maintenance (Annual)		
	Direct Spending (\$ millions)	Cumulative Direct Jobs (Person-Years)	Cumulative Total Jobs (Person-Years)	Direct Spending (\$ millions)	Direct Jobs	Total Jobs
<b>Improve traffic flow by reducing congestion</b>						
10. Pilot congestion pricing <sup>3</sup> <i>Seek to use pricing to manage traffic in the Central Business District</i>	\$224	310	753	N/A	360	891
11. Manage roads more efficiently <sup>4</sup> <i>-We will create an integrated traffic management system</i>	\$297	687	1,490	\$1.0	5	8
12. Strengthen enforcement of traffic violations <sup>5</sup> <i>-Expand the force of Traffic Enforcement Agents (TEAs)</i>	0	0	0	N/A	117	156
<b>Achieve state of good repair on our roads and transit system</b>						
14. Close the Metropolitan Transportation Authority's state of good repair gap <i>-Seek a grant from the SMART Authority to cover the MTA's funding gap</i>	\$13,681	47,822	94,936	0	0	0
15. Reach a state of good repair on the city's roads and bridges <i>-Seek a grant from the SMART authority to fund accelerated repairs and upgrades (lane-mile resurfacing) -Invest in bridge and tunnel upgrades</i>	\$744	2,601	5,165	\$7.8	92	183
<b>TOTALS<sup>6</sup></b>	<b>\$48,446.6</b>	<b>210,176</b>	<b>454,464</b>	<b>\$983.0</b>	<b>4,103</b>	<b>6,797</b>

<sup>1</sup>East Side Access Operation and Maintenance (O&M) budget includes cost for Initiative 5.

<sup>2</sup>Project to *Explore other improvements to bus service* was not included in analysis as it is not expected to have significant job impacts.

<sup>3</sup>Operations employment based on direct jobs estimate rather than spending estimate.

<sup>4</sup>Project to *Expand use of Muni meters* was not perceived to have significant job impacts.

<sup>5</sup>Projects not included in this line because they were not expected to have significant job creation impacts are: *Enable TEAs to issue blocking-the-box tickets; Expand the use of traffic enforcement cameras.*

<sup>6</sup>Direct spending for permanent operations does not include estimate of spending for Initiative 10, *Pilot Congestion Pricing.*

Sources: *Initiative 1* information from interview with NYC Department of Transportation (DOT), Metropolitan Transportation Authority (MTA) and the Long Island Rail Road (LIRR). Additional information obtained from U.S. Department of Transportation, Federal Transit Administration (FTA) and NJ Transit, *Access to the Region's Core Draft Environmental Impact Statement (2007)*; FTA and Metropolitan Transportation Authority of the State of New York (MTA), *East Side Access Final Environmental Impact Statement (2001)*; Parsons/Systra Engineering, Inc, *Lower Manhattan Airport and Commuter Access Alternatives Analysis (2004)*; FTA and MTA, *Second Avenue Subway Final Environmental Impact Statement (2001)*; FTA, *Second Avenue Subway MOS Preliminary Engineering Section*, pp A 245 to A 251 (2005);

*Initiative 2* information obtained from interviews with the Deputy Mayor's Office and Moynihan Station Development Corporation (MSDC) with additional information obtained from Empire State Development Corporation and MSDC, *Final General Project Plan (2006)*; and Federal Railroad Administration, Office of Railroad Development, *Environmental Assessment Pennsylvania Station Redevelopment Project (1999)*; *Initiative 3* information from interviews with NYC Mayor's Office of Long-Term Planning and Sustainability (OLTPS), Port Authority of New York and New Jersey; and Staten Island Chamber of Commerce with additional information obtained from URS & SYSTRA, *Feasibility Study of the North Shore Railroad Right-of-Way (2004)* and the Transit Cooperative Research Program (TCRP), *Synthesis 61 Maintenance Staffing Levels for Light Rail Transit (2005)*; *Initiative 4, Project 1* information from interviews with DOT and MTA with additional information obtained from <http://www.djmjharris.com/MarketsAndServices/46/67/index.jsp>; *Initiative 4, Projects 2 and 3* information obtained from interviews with DOT and MTA; *Initiative 5* information obtained from interview with MTA; Information for the analysis of *Initiatives 6, 7, 8, 9, 10, and 11, Projects 1 and 2* was obtained from interviews with DOT; Information for the analysis of *Initiative 12, Projects 1 and 2* was obtained from interviews with OLTPS; *Initiatives 13 and 15, Projects 1 and 2* information obtained from interview with DOT; *Initiative 14* information obtained from interview with MTA.



## 2.6 Energy

### 2.6.1 Introduction

New York City’s energy supply is not as affordable, clean or efficient as it could be. Energy demand is on the rise to meet our individual needs, and when coupled with projected population growth, the issues of reliability, affordability and pollution become even more challenging to solve. PlaNYC addresses the many interrelated energy issues facing the City by focusing on initiatives that improve energy planning, reduce energy consumption, increase the clean energy supply and modernize the electricity infrastructure. By identifying these emerging issues today and proactively addressing them, all New Yorkers will reap the benefits of a cleaner, more reliable energy supply.

Today, the average monthly residential energy bill is \$145 and New Yorkers collectively spend approximately \$13.4 billion on energy annually. Continued population and economic growth will not only put a strain on the energy systems, it will make energy less affordable for New Yorkers. By 2015, the City’s heating and electricity costs could increase by approximately \$3 billion, leaving the average New York household with energy costs that are \$300 to \$400 higher annually than current levels.

Most of the City’s aging power plants use 30 to 60 percent more fuel and produce more air pollution than newer plants with more energy efficient technologies. In addition, with 80 percent of the City’s power plants using natural gas and only four pipelines that carry natural gas into the City, the reliability of this infrastructure is of concern.

These issues are further complicated by projections that suggest that the City’s energy demand will exceed present energy supply by 2012. Evidence of skyrocketing demand already exists. In August of 2006 the city set consecutive records for electricity demand, forcing businesses to use pollution-emitting diesel generators to avoid a blackout.

Without a single institution charged with taking environmental and cost considerations into account when planning for New York’s energy future, the opportunity for effective change is limited. PlaNYC sets out an aggressive agenda that calls for a more holistic planning process that tackles the city’s rising energy demand with cleaner supply options and energy consumption reduction programs and mandates, while ensuring that the City has a role in that planning process. In order to keep New York City’s economic engine moving, a comprehensive package of energy initiatives will help spur investment in cleaner energy infrastructure and increase programs aimed at demand reduction, while improved standards will raise the energy performance floor on development.

**PlaNYC Energy:  
Goals and Initiatives**

**Improve energy planning**

- ✘ 1 Establish a New York City Energy Planning Board

**Reduce New York City’s energy consumption**

- ✘ 2 Reduce energy consumption by City government
- ✘ 3 Strengthen energy and building codes for New York City
- ✘ 4 Create an energy efficiency authority for New York City
- ✓ 5 Prioritize five key areas for targeted incentives
- ✘ 6 Expand peak load management
- ✘ 7 Launch an energy awareness and training campaign

**Expand the city’s clean power supply**

- ✓ 8 Facilitate repowering and construct power plants and dedicated transmission lines
- ✘ 9 Expand Clean Distributed Generation (“Clean DG”)
- ✓ 10 Support expansion of natural gas infrastructure
- ✓ 11 Foster the market for renewable energy

**Modernize electricity delivery infrastructure**

- ✘ 12 Accelerate reliability improvements to the city’s grid
- ✘ 13 Facilitate grid repairs through improved coordination and joint bidding
- ✘ 14 Support Con Edison’s efforts to modernize the grid

Key:  
 ✓ Analyzed  
 ✘ Not Analyzed  
 Note: Initiatives were analyzed if determined to have direct, measurable and significant job creation impacts.



### 2.6.2 PlaNYC Goals and Initiatives

PlaNYC identifies four broad energy goals supported by fourteen initiatives. The text box provides further information on the energy goals and initiatives and Table 2.6-1 shows the subset of these initiatives that were analyzed for their measurable job creation impacts.

PlaNYC calls for the expansion of clean power supply to meet future demand while lowering emissions. This will include efforts to add an additional 2,000-3,000 MWs of cleaner, more efficient power to the city by repowering older facilities, constructing new ones and building dedicated transmission lines from neighboring areas. The City will also support the expansion of natural gas infrastructure as well as support the market for renewable energy technology within the city. In addition, the City will supplement these supply efforts with an aggressive set of initiatives to reduce energy consumption and upgrade the distribution system.

### 2.6.3 General Findings

Total capital outlays to repower and construct new power plants, build transmission lines, expand natural gas infrastructure and modernize the electric grid will be significant. For example, the repowering and construction of power plants and dedicated transmission lines to meet the city's power needs alone are estimated to cost nearly \$5 billion.<sup>2</sup> Moreover, many of these individual projects will involve financing, construction and operation by the private sector, implying significant private investment in the energy infrastructure of New York City.

Equally significant will be the capital expenditure entailed in improving the energy efficiency of the city's buildings, particularly the existing buildings, which account for the majority of the city's energy consumption. Initiative 5, *Prioritize five key areas for targeted incentives*, lays out a package of mandates, challenges, and incentives designed to spur investment in energy enhancements, such as retrofits or retro-commissioning, in buildings. These enhancements for existing buildings will include improvements to building envelopes, lighting, and heating and cooling systems, and it is expected that public incentives for these measures will be augmented by private sector funding because of the long-term profitability of energy-efficiency.

Additional investment from the private sector is expected to be spurred by incentives. Initiative 11, *Foster the market for renewable energy*, provides tax incentives for the purchase and installation of solar panels and will also assist a non-profit in the creation of New York City's first carbon neutral building. The building, Solar 2, will be a functioning commercial space as well as a venue for workshops, classes, and forums for architects, planners, students, and others interested in learning first hand about "green buildings."

**Capital Plans/Construction.** The total capital outlay for these initiatives is estimated at approximately \$17.1 billion – not including the cost of expanding the natural gas infrastructure – and this expenditure should have a significant impact on employment in the region, generating just under 126,000 total person-years of employment jobs during this phase of implementation. A more detailed breakdown of the effect that these capital expenditures will have on job creation is summarized in Table 2.6-1.

**Operations and Maintenance.** The additional annual operating and maintenance budgets for several of the initiatives for expanding the clean power supply is estimated at approximately \$0.7 million which will generate an estimated 630 new jobs for the duration of the investment programs. This estimate does not include additional permanent jobs that may result from private sector project investments intended to

---

<sup>2</sup> Based on the New York City Economic Development Corporation assumption of three in-city CCGT power plants and two New Jersey-based CCGT power plants with dedicated transmission lines. Cost estimates were taken from a 2007 McKinsey study prepared for the New York Economic Development Corporation.



reduce energy consumption (Initiative 5). Operations and maintenance costs of expanding natural gas infrastructure and running the new power plants are not included in this estimate, however, employment information was provided from secondary sources for these projects. A detailed breakdown of the effect this will have on job creation is summarized in Table 2.6-1.

***Occupational Profile for Operations and Maintenance.*** Of the 236 direct permanent jobs estimated to be created during the operations and maintenance phase of the subject projects, it is anticipated that major occupations will include: power plant operators; office and administrative support; and maintenance workers.

Improvements to the energy performance of buildings and adoption of alternative energy sources and new technologies in the energy field are also expected to support opportunities for job skill upgrades. For example, Initiative 5 challenges the private sector to “green” New York City buildings. This initiative addresses energy efficiency and could serve as a catalyst for retraining in many of the building maintenance and inspection professions.

***Other Employment Opportunities.*** In addition to the total job creation impacts already identified, secondary job creation effects arising from these initiatives should be considered. Some reasonably foreseeable opportunities stemming from PlaNYC energy initiatives include:

- *Lower Energy and Operating Costs for Businesses* – The expansion of the energy supply to not only keep pace with, but exceed future demand estimates, coupled with programs aimed at reducing energy consumption, means that New York businesses will save on their energy costs in general. These efficiency gains would allow businesses to increase their demand for labor particularly in the case of energy intensive business operations.
- *Careers in New Technologies to Meet Higher Standards* – The adoption of more energy efficient practices and alternative and new technologies in the energy field not only supports opportunities for job skill upgrades but also promises the creation of new jobs and career paths in green energy that were not directly measurable in this analysis. A study of municipal building retrofits in Canada estimated that 20 jobs are created for every \$1 million invested in retrofits, and the anticipated investment in similar retrofits in New York City is substantial. The majority of new jobs created will be similar to existing occupations – engineers, designers, construction professionals – but new career pathways and further professionalization of the jobs in energy management can be anticipated. Further demand may be created for new positions such as building auditors, energy managers and energy analysts, as conservation and energy efficiency goals are built into future building codes. Although some of these positions will be filled by existing occupations in construction and building management, they are likely to require additional skills development and thus result in better paying jobs. Additional benefits will be experienced by the city’s architectural and engineering sectors, since keeping abreast of green building technologies and energy efficiency will ensure that this sector continues to be viable and competitive in the international marketplace.
- Energy Initiative 7, *Launching an Energy Awareness and Training Campaign*, seeks to educate contractors and building professionals about technologies, products and processes to improve energy efficiency and prepare the industry to meet future demand that could be triggered by higher energy prices, incentives, and higher standards. This type of initiative should help support contractor and workforce preparedness on the supply-side to meet future demand for energy efficiency products and systems. Increased demand for energy systems specialists should provide added incentives for construction firms to train and upgrade the skills of their workers. The



training programs will also require knowledgeable trainers including engineers, architects, and adult and vocational education instructors.



**Table 2.6-1  
Summary of Energy Job Impacts, 2007 – 2030**

Category and Initiative	Capital Plans and Construction			Operations and Maintenance (Annual)		
	Direct Spending (\$ millions)	Cumulative Direct Jobs (Person-Years)	Cumulative Total Jobs (Person-Years)	Direct Spending (\$ millions)	Direct Jobs	Total Jobs
<b>Reduce New York City's energy consumption</b>						
5. Prioritize five key areas for targeted incentives <i>-Use a series of mandates, challenges, and incentives to reduce demand among the city's largest energy consumers</i>	\$12,160	42,982	76,383	0	0	0
<b>Expand the city's clean power supply</b>						
8. Facilitate repowering and construct power plants and dedicated transmission lines <sup>1,2</sup> <i>-Facilitate the construction of 2,000 to 3,000 MW of supply capacity by repowering old plants, constructing new ones, and building dedicated transmission lines</i>	\$4,976	24,228	48,098	NA	150	484
10. Support expansion of natural gas infrastructure <sup>3</sup> <i>-Support critical expansions to the city's natural gas infrastructure</i>	NA	630	1,251	NA	60	90
11. Foster the market for renewable energy <sup>4</sup> <i>-Support the construction of the city's first carbon-neutral building, primarily powered by solar electricity</i> <i>-Increase use of solar energy in City buildings through creative financing</i>	\$21.4	93	163	\$0.7	26	56
<b>TOTALS</b>	<b>\$17,157.4</b>	<b>67,933</b>	<b>125,895</b>	<b>\$0.7</b>	<b>236</b>	<b>630</b>

<sup>1</sup>Based on jobs estimate using data from the comparable Astoria Energy Project.

<sup>2</sup>Operations employment based on direct jobs estimate rather than spending estimate.

<sup>3</sup>Data obtained from Broadwater Socioeconomic Report for Project to Construct and Operate a Liquefied Natural Gas Receiving Terminal in Long Island, New York, January 2006 and The Millennium Pipeline SFEIS 2006. Funding information was withheld from both reports. Reported estimates of construction jobs created are not limited to the NY-NJ-PA Metropolitan Statistical Area.

<sup>4</sup>Projects not likely to have significant job creation impacts include: *Study the cost-effectiveness of solar electricity when evaluated on a Real Time Pricing scenario; Work with the State to eliminate barriers to increasing the use of solar energy in the city; Pilot one or more technologies for producing energy from solid waste; End methane emissions from sewage treatment plants and expand the use of digester gas; and Study the expansion of gas capture and energy production from existing landfills.*

Sources: *Initiative 5* information was obtained from interview with NYC Mayor's Office of Long-Term Planning and Sustainability (OLTPS); *Initiative 8* information from interview with NYC Economic Development Corporation (EDC) with additional information from the <http://www.astoriaenergy.com/project/article/xprojdes.htm>; *Initiative 10* from interview with EDC supplemented with information from Broadwater LNG Facility Resource Report No.5 (2006); the Environmental Analysis Section of Millennium Pipeline Project SFEIS (2006); and at <http://www.millenniumpipeline.com/regulatory.htm>; *Initiative 11, Project 3* information was acquired from both EDC, and EDC/ Solar One; and *Initiative 14* data from OLTPS.



## 2.7 Air Quality

### 2.7.1 Introduction

New York City has made important strides in recent decades addressing the soot, smog and other pollutants caused by incinerators, industry, traffic, dry cleaners, and high diesel consumption. Cleaner school and public buses, better construction standards, plus initial efforts to plant more trees filtering carbon dioxide have made New York’s air quality today the cleanest in half a century.

Still, much remains to improve the city’s air quality. New York’s citizens still live near heavily trafficked streets, suffer from the effects of pollution emanating from power plants and factories in other states, and have high incidence rates of asthma and other airborne diseases. PlaNYC proposes several solutions to help provide relief from the pollutants in the air we breathe.

### 2.7.2 PlaNYC Goals and Initiatives

PlaNYC’s Air Quality chapter is composed of four broad goals supported by 14 initiatives. The adjacent text box provides further information on those plans and initiatives. Table 2.7-1 summarizes the job creation impacts for the initiatives expected to have measurable direct job creation benefits.

The Air Quality chapter concentrates on reducing PM2.5, NOx, and other noxious emissions through initiatives listed under four plans: greater fuel efficiency and reduced emissions in the transportation chapter, rationalizing electricity generation and heating, increasing green space and natural areas that can filter carbon dioxide from the air, and improving knowledge about communities affected by sub-standard air through expanded monitoring programs.

Initiatives 1 and 9 draw upon the large categories described in other sections: see 2.5 (Transportation) and 2.6 (Energy).

<b>PlaNYC Air Quality: Goals and Initiatives</b>	
<b>Reduce road vehicle emissions</b>	
✘	1 Capture the air quality benefits of our transportation plan.
✘	2 Improve fuel efficiency of private cars.
✘	3 Reduce emissions from taxis, black cars, and for-hire vehicles.
✘	4 Replace, retrofit, and refuel diesel trucks
✓	5 Decrease school bus emissions
<b>Reduce other transportation emissions</b>	
✓	6 Retrofit ferries and promote use of cleaner fuels
✘	7 Seek to partner with the Port Authority to reduce emissions from Port facilities
✘	8 Reduce emissions from construction vehicles
✘	9 Capture the air quality benefits of our energy plan
✓	10 Promote the use of cleaner burning heating fuels
<b>Pursue natural solutions to improve air quality</b>	
✘	11 Capture the benefits of our open space plan
✓	12 Reforest targeted areas of our parkland
✓	13 Increase tree planning on lots
<b>Understand the scope of the challenge</b>	
✓	14 Launch collaborative local air quality study
Key:	
✓	Analyzed
✘	Not Analyzed
Note: Initiatives were analyzed if determined to have direct, measurable and significant job creation impacts.	

### 2.7.3 General Findings

Initiative 10, which includes reducing the emissions from 100 or more school boilers, is the most significantly funded of the Air Quality initiatives. The approximate cost per boiler replacement or upgrade is \$5.7 million, including materials and labor. In some cases major construction might entail the removal of an old boiler from a school and replacing it with a more efficient one. In other cases, the entire heating distribution system will be overhauled, including duct work, piping, and other auxiliary components linked with the boiler.

Air Quality funding also supports “Million Trees NYC”. In addition to the City efforts, individuals and private organizations will plant a significant number of trees. Initiative 12, *Reforest targeted areas of our parkland*, and Initiative 13, *Increase tree planning on lots*, will each contribute approximately 40 percent



of the million trees. The majority of this work will be conducted by contractors paid for by donations received from citizens and corporations.

**Capital Plans/Construction.** Those initiatives expected to be funded within the Air Quality category will total \$887 million in capital expenditures including private capital that is leveraged. This should support approximately 6,300 person-years of temporary work through capital planning and construction. The details of the investments and jobs created appear in Table 2.7-1.

**Operations and Maintenance.** The annual operating and maintenance budget for these initiatives is estimated at approximately \$4.3 million, which in turn will support an estimated 73 new permanent jobs. A detailed breakdown of the effect these budgets will have on job creation in the region is also summarized in Table 2.7-1.

**Occupational Profile for Operations and Maintenance.** Of the 36 permanent jobs the Air Quality chapter will create during the operations and maintenance phase of the project, the major occupations will include nursery and greenhouse laborers, office and administrative support, and life, physical, and social science technicians.

**Other Employment Opportunities.** In addition to the measurable job creation impacts identified, secondary job creation effects and other potentially beneficial economic spillovers arising from these initiatives deserve consideration. Some reasonably foreseeable opportunities arising from PlaNYC under the Air Quality category include: tree pruners, landscaping contractors; and maintenance crews requiring the skills necessary to work with more advanced, more energy efficient boilers and heating distributions systems; and mechanical crews capable of performing work on more advanced, emissions-reducing diesel engine systems.



**Table 2.7-1  
Summary of Air Quality Job Impacts – Capital Plans and Construction, 2007-2030**

Category and Initiative	Capital Plans and Construction			Operations and Maintenance (Annual)		
	Direct Spending (\$ millions)	Cumulative Direct Jobs (Person-Years)	Cumulative Total Jobs (Person-Years)	Direct Spending (\$ millions)	Direct Jobs	Total Jobs
<b>Reduce road vehicle emissions</b>						
5. Decrease school bus emissions <i>-Retrofit both large and small school buses and reduce their required retirement age</i>	\$5.1	23	36	\$0.0	0	0
<b>Reduce other transportation emissions</b>						
6. Retrofit ferries and promote use of cleaner fuels <sup>1</sup> <i>-Retrofit the Staten Island Ferry fleet to reduce emissions</i>	\$8.0	57	82	\$0.0	0	0
10. Promote the use of cleaner burning heating fuels <sup>2</sup> <i>-Reduce emissions from boilers in 100 city public schools</i>	\$570.0	2,677	5,314	\$0.0	0	0
<b>Pursue natural solutions to improve air quality</b>						
12. Reforest targeted areas of our parkland <i>-Reforest 2,000 acres of parkland</i>	\$118.0	250	325	\$0.7	15	31
13. Increase tree planting on lots <i>-Partner with stakeholders to help plant one million trees by 2017</i>	\$184.5	391	508	\$2.8	15	31
<b>Understand the scope of the challenge</b>						
14. Launch collaborative local air quality study <i>-Monitor and model neighborhood-level air quality across New York City</i>	\$1.2	4	8	\$0.8	6	11
<b>TOTALS</b>	<b>\$886.8</b>	<b>3,402</b>	<b>6,273</b>	<b>\$4.3</b>	<b>36</b>	<b>73</b>

<sup>1</sup>Project to *Work with private ferries to reduce their emissions* is not expected to have significant job impacts.

<sup>2</sup>Project to *Lower the maximum sulfur content in heating fuel from 2,000 ppm to 500 ppm* is not expected to have significant job impacts.

Sources: *Initiative 5* information obtained from interview with NYC Department of Education (DOE); *Initiative 6* from interview with NYC Department of Transportation (DOT); *Initiative 10* from interview with NYC School Construction Authority (SCA); *Initiative 12* from interview with NYC Department of Parks & Recreation (DPR); *Initiative 13* from interview with DPR and the New York Restoration Project, with additional information gathered from New York Restoration Project's Consolidated Financial Statements and Additional Information Years Ending Sept 30 2006 and 2005 prepared by Citrin Cooperman & Company LLP; and United State Forest Service, Northeastern Research Station (2006); and *Initiative 14* data was derived from interview with DOHMH (NYC Department of Health and Mental Hygiene).



## **APPENDIX**

### **METHODOLOGY FOR ANALYSIS OF JOB CREATION IN PLANYC**

#### **Preface**

This paper presents a working methodology for estimating the number of jobs likely to be generated by a host of initiatives comprising PlaNYC through the year 2030. PlaNYC initiatives are intended to upgrade and modernize the City of New York's infrastructure in order to improve the City's quality of life, and support its environmental and economic sustainability. PlaNYC consists of 6 sections: Land (housing, open space, brownfields), Water (water quality and networks), transportation, air quality, energy and climate change. The goal of this study is to provide the City of New York with estimates of the number of jobs likely to be created by these initiatives; these estimates offer a basis for understanding and predicting the economic impacts of PlaNYC.

The Louis Berger Group, Inc. (Berger) has researched, analyzed and estimated the direct, indirect and induced jobs generated from spending for proposed construction and/or permanent operations across PlaNYC initiatives. The study drew upon a combination of methods including: 1) primary interviews with implementing agencies and sponsors; 2) review of relevant reports; and 3) analytical research on select subject infrastructure or operations.

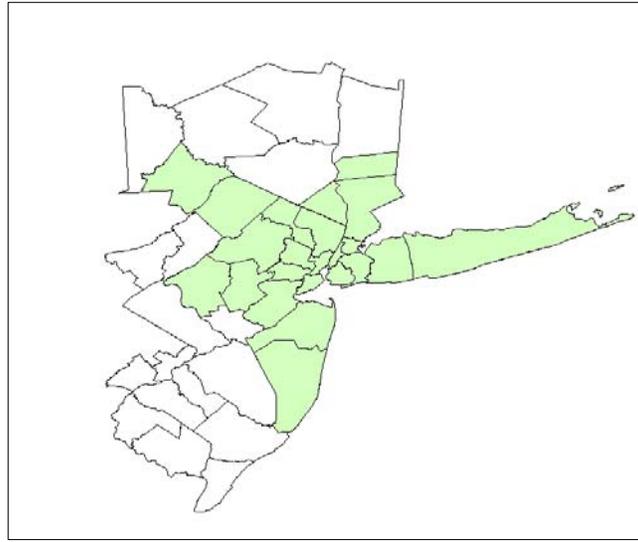
Berger relied extensively on the National Input-Output Accounts data maintained by the U.S. Department of Commerce's Bureau of Economic Analysis (BEA). These data included regional multipliers from the BEA's Regional Input-Output Modeling System (RIMS II) which served as the primary quantitative method for estimating the total job creation impacts of PlaNYC. Input-Output (I/O) models are commonly used to assess the economic impacts of changes in fiscal policy, public and private investment, employment policy and a variety of other economic initiatives that have the potential to change expenditure patterns and labor market structure. I/O models are discussed in more detail in Section 4.



### 1.0 Study Area / Affected Region

The study area or region of influence for the estimation of PlaNYC jobs generation impacts is defined as New York, Northern New Jersey, Long Island, NY-NJ-PA Metropolitan Statistical Area. The counties included in the study area are illustrated in Figure 1 and listed in Table 1 below.

**Figure 1  
Study Area**



**Table 1  
Constituent Counties of the  
NY-NJ-PA Metropolitan Statistical Area**

<b>New Jersey</b>	<b>New York</b>	<b>Pennsylvania</b>
Bergen	Bronx	Pike
Essex	Dutchess	
Hudson	Kings	
Hunterdon	Nassau	
Mercer	New York	
Middlesex	Orange	
Monmouth	Putnam	
Morris	Queens	
Ocean	Richmond	
Passaic	Rockland	
Somerset	Suffolk	
Sussex	Westchester	
Union		
Warren		

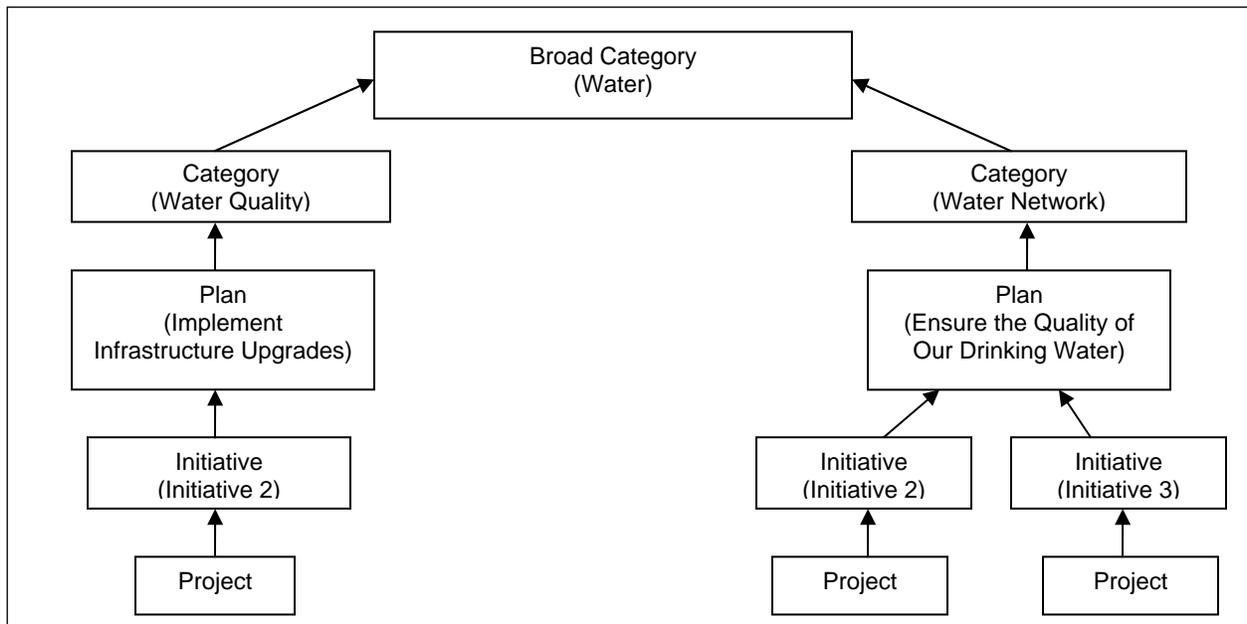


## 2.0 Data Framework and Aggregation

PlaNYC features 127 initiatives (including sub-initiatives referred to as “projects” in this report) to be undertaken between 2007 and 2030, each with its own milestones for implementation. In total, 62 projects were analyzed in this study. Initiatives (or projects) were selected for analysis if they were determined to have direct, measurable and significant spending resulting in job creation (see Exhibit E).

The general research approach estimated the jobs impact of each individual project and then aggregated (i.e., “rolled-up”) the numbers in order to create a total employment impact calculation. This “bottom up” approach sought to quantify the impacts at the project level. Once the project level employment impacts were estimated, the data for each project were summed to broad category and then eventually to the region-wide total employment impacts. Figure 2 below presents a schematic diagram of this approach (this study refers to sub-initiatives as “projects”).

**Figure 2**  
**Sample Employment Estimate Aggregation**





### 3.0 Calculating Regional Employment Impacts

#### 3.1 Data Collection Method

The objective of the data collection effort is to support I/O model calculations of the number and types of jobs PlaNYC will generate. The analysis of job generation potential accounted for direct, indirect and induced jobs (as defined in the next section) and also assessed the potential occupational characteristics of permanent employment.

The proper profiling, characterization and sorting of the expenditures contained in the capital and operating budgets collected through interviews and/or review of secondary reports represented the key research challenges for the job creation impact analysis. Front-end accounting was performed to minimize the potential for “double-counting” which would lead to an overestimation of impacts. For example, PlaNYC includes three projects that call for increases in the number of trees planted in the City. To accurately estimate the job impact of these activities, the analytical approach separately examined capital budgets and operations and maintenance budgets for each these initiatives and then allocated anticipated outputs (in this example, net tree plantings) to the various projects. Only when the anticipated outputs equaled the desired outcome were the budgets considered reconciled.

Clear delineations were made between existing maintenance and operations staffing levels and the incremental staffing effect these projects will generate. For example, trees planted as a result of PlaNYC will require a marginal increase in agency staff for annual maintenance above any previously-projected increases in headcount. Data collection and interview efforts clarified and quantified how operations requirements (e.g., labor and operations expenditures) would require adjustment as capacity or service volumes expand.

The collection of data focused on two types of data – primary and secondary – which differed in the way they were collected as well as by the type of output generated.

*Primary data* collection consisted of phone calls, e-mails, interviews and other requests for detailed budgets and reports from agency representatives needed to assemble as complete a set of data as possible. The primary data collection effort was tracked in a customized database file, accounting for calls and interviews with key department officials. A list of standard agency interview questions can be found in Exhibit A.

*Secondary data* collection consisted of extracting relevant information from prior economic impact studies and other reports (e.g., environmental impact statements or feasibility studies) containing estimates of economic effects, including employment impacts or types of permanent employment expected to be created. These prior studies assisted in determining the direct, indirect, and induced effects and, in particular, the job creation impacts of the construction and operational phases.

Reliance upon prior economic studies as source materials for this analysis required consideration of these report’s primary assumptions. Each report had its own timing, definition of region of influence (i.e., study area) and modeling assumptions. When appropriate, the critical assumptions apparent from review of prior reports were explored through follow-up interview questions with sponsoring agencies.

The goal of both the primary and secondary data collection effort was to satisfy requirements for data needed as input to a detailed input-output model.



### 3.2 Methodology for Modeling Employment Impacts

An economic impact study, including estimates of job creation, typically involves the assessment of three distinct but related effects arising from a project, investment, or the operation of an ongoing entity. These impacts and the methods for their estimation are described below.

**Direct Impact.** The *direct* impact of a project is defined as the change in economic activity in the industry under study resulting from a particular project, investment, business operation or program. The impact can be quantified by examining the magnitude and profile of project expenditures, including sales, disbursements to vendors, wages paid, and taxes and fees paid.

**Indirect Impact.** The *indirect* impact is defined as the effect of increased economic activity in those sectors that supply services, materials, and machinery necessary to support the study industry. For example, an increase in orders for automobiles will result in an increased demand for auto parts (direct impact). This increase in demand for parts generates additional activity in industries involved in providing raw materials, energy, and transportation for manufacturing parts, which in turn provides stimulus to the industries supplying those industries. This ripple effect stemming from a change in final demand for products and services in the industry under study is multiplied throughout the economy and can account for a significant portion of the total effect.

**Induced Impact.** The *induced* impact is the effect of increased consumer spending by wage earners in the study industry and other supporting industries. The ripple effect from this spending can also be followed through the economy.

**Multiplier Effect.** The ratio between the total economic impact and direct economic impact is termed the multiplier. Expressed numerically, a multiplier of 2.5 indicates that for every job directly generated by the industry under study, an *additional* 1.5 jobs are supported by the ripple effects within the local region, for a total impact of 2.5. The multiplier effect is derived from input-output methods which are founded upon the assumptions of economic base theory.

**Input-Output Models.** The multiplier effect of activity in an industry can be estimated using input-output modeling techniques. The multiplier estimates rely upon the latest data supplied by the Bureau of Economic Analysis (*Benchmark Input-Output Accounts of the United States, 1997*), which tracks the interrelationships of producing and supplying sectors in the U.S. economy. This database provides production recipes and observed ratios of materials needed for production in various industries. The national input-output tables (e.g., the Use Tables) also identify the proportion of total output by industry devoted to compensation to employees – that is, the labor-to-total output ratio.

An input-output table includes information on intermediate production (commodity output required for industry output), total output (intermediate production and sales to final users), and value-added inputs (such as compensation and indirect business taxes). Input-output modeling explores the matrix of inter-industry production requirements so that the effect of a change in final demand in one industry can be estimated for all other industries in the economy thereby enabling an assessment of the multiplier effect.

Using the construction and operating budgets for initiatives (and projects) developed through interviews and secondary report reviews the total job impacts of PlaNYC on the metropolitan area employment were measured. The total job impact included the construction and permanent operations spending as well the regional economic activity that this spending generates for metropolitan area businesses. The regional economic impacts for temporary and permanent effects were distinguished and expressed in terms of employment.



The U.S. Department of Commerce, RIMS-II Modeling system, a widely used regional economic impact assessment modeling system provides area-specific multipliers that describe inter-industry linkages and consumer spending patterns. The RIMS-II system adjusts national multipliers for region-specific estimates of indirect and induced effects. The RIMS-II multipliers for the metropolitan region are listed in Exhibit C.

RIMS II provides two types of multipliers for estimating the impacts of changes in employment: *final-demand* multipliers and *direct-effect* multipliers. Both are shown in Exhibit C. Final-demand multipliers for employment were used if data on final demand changes was available. Expressed numerically, a final demand employment multiplier of 20, for example, indicates that for every one million dollars in final demand generated by the industry under study, an additional 20 new employees are hired to meet the new demand. Direct-effects multipliers for employment were used when the data on the initial changes in employment by industry were available. In this case each entry indicated the total change in employment in the region that resulted from a change of one job in the “row” industry Exhibit C provides a complete list of RIMS II Summary Multipliers for all industries in its 60-sector model of the metropolitan area for background informational purposes, but it should be recognized that PlanNYC initiatives do not necessarily directly stimulate a change in all row industry sectors.

**Price adjustments.** All dollar amounts obtained from agencies that were used in the model were adjusted to have the same price level as the RIMS-II model’s base year. This adjustment for inflation employed the Bureau of Labor Statistics’ Producer Price Index as a standard adjustment tool. This allowed the model to adjust for the “real” effects and removed any inflation associated with specific industries or commodities used in the analysis.

**Regionalization.** When there was no information provided about the location of the initial economic activity, location quotients were used to estimate the local portion. Location quotients represent the ratio of an industry’s share of the regional economy to its national share; they provide an estimate of local production patterns. The primary goal of regionalization is to estimate the region’s relative availability of requisite materials, services, and labor needed in the production process. Location quotients were estimated using Bureau of Labor Statistics employment data. Construction employment was generally assumed to be supplied from within the metropolitan region.

**Distribution Costs and Margins.** When detailed budget information was available, specific purchases were translated from purchasers’ prices into producers’ prices, taking into account transportation cost and trade margins. The national input-output accounts from the Bureau of Economic Analysis provided the source data for the distribution cost and margins data.

### 3.3 Methods of Utilizing the Input Output Model based on Data Quality

Three methods were utilized to measure job creation impacts once the project data was collected. The selected method depended upon the quality of data gathered during the collection process.

**Method 1 (Preferred Method).** This method was used when a detailed budget was provided by the appropriate department or agency. If a detailed budget was not available for an entire program then an average or prototypical project budget was utilized by scaling the budget to the full PlaNYC prescribed expenditure level. For example, the average cost of field lighting was multiplied six times to match the annual total budget. Purchasing data was adjusted for inflation, regionalization, and distribution costs as discussed in Section 3.2 above. Industry-specific final demand employment multipliers were applied to adjusted purchasing data to produce an estimate of the jobs generated by the project’s spending on goods and services (See Exhibit D).



Employee compensation information included in the budget was utilized to estimate the number of direct jobs created by the project. Regional data from the Bureau of Economic Analysis were used to translate total employee compensation into wages. The direct number of jobs was estimated by dividing the resulting compensation payroll number by the region's average wage for the specific industry using data from the Bureau of Labor Statistics. Employee compensation information was also used to estimate the total impact of employee household spending.

**Method 2.** If there were not sufficient data available to undertake Method 1, then the following steps were taken to estimate the project's total impact:

1. Identify the project's primary business function by finding the project's applicable North American Industrial Classification System (NAICS) Code. That is, the industry that most resembles the proposed investment or operations.
2. If an estimate of the number of jobs that would be created as part of the project was available, then the industry's direct effect employment multiplier was applied to these direct jobs, yielding the total job impact. This was the preferred sub-method when estimating the operational impact of a project.
3. If the total capital or operations budget was provided, the number of direct jobs was estimated based on the industry's average labor cost and compensation adjusted for the employer's contributions -- divided by the industry's average regional wage. Purchasing data was adjusted for inflation and regionalization. Employee compensation coefficients from the direct requirements vectors of the relevant industries were identified along with compensation-to-wage ratios from the Bureau of Economic Analysis and average wage data from the Bureau of Labor Statistics. The industry's direct effect employment multiplier was applied to the resulting number of direct jobs to estimate the project's total employment impact.

**Method 3.** In cases where the data collection process revealed the existence of a prior economic impact study (e.g., from an Environmental Impact Statement or other report) that data was used in place of a primary source.

### 3.4 Assumptions of Input-Output Analysis

Input-output analysis seeks to quantify, at a specific point in time, the economic interdependencies in an economy, such as the New York-New Jersey metropolitan region. Several critical assumptions of input-output analysis have been recognized in the regional science including those listed below.<sup>3</sup>

- The output of each sector is produced with a unique set of inputs, without substitution between inputs.
- The amount of input purchased by a sector is determined solely by its level of output (no price effects, economies of scale, or changing technologies).
- There are no external economies of scale and, therefore, the effect of additional types of production are additive.
- The distribution of sales and purchases within and outside the region are fixed.

---

<sup>3</sup> Miller and Blair (1985), *Input-Output Analysis: Foundation and Extensions*; Otto and Johnson (1993) *Microcomputer-Based Input-Output Modeling*; Hastings & Brucker (1993). *An Introduction to Regional Input Output Analysis*.



- Supply is infinite and perfectly elastic and, thus, there is no constraint on resources.
- Local resources are being utilized efficiently without slack utilization.

Over time, critical investments and other changes may induce dynamic changes not captured in the static framework and modeled inter-industry relationships. Some of these potential secondary effect changes are highlighted qualitatively in the report to provide a fuller context for understanding PlaNYC’s potential effects.

### 3.5 Estimation of Occupations

The agency interviews sought detailed information on potential job creation during the operations phase. Questions addressed the type of occupations that would be funded on a permanent basis and the anticipated job titles. Permanent employment generated by PlaNYC was identified by the Standard Occupational Code (SOC). The 2000 Standard Occupational Classification (SOC) system is used by Federal statistical agencies to classify workers into occupational categories for the purpose of collecting, calculating, or disseminating data.

### 3.6 Job Creation Reporting Metric

The final output measures for job creation impacts are shown in Table 2.

**Table 2**  
**Typical Reporting Metric for Job Creation Impacts**

	<b>Duration</b>	<b>Direct Impacts</b>	<b>Total Impacts</b>
Capital Plans / Construction	Temporary	• Person-Years (Cumulative)	• Person-Years (Cumulative)
Operations and Maintenance Expenses/Budgets	Permanent	• Annual Jobs	• Annual Jobs



***Exhibit A***  
***Budgetary-Related Questions for Agency Interviews and Data Collection***

**General**

- 1a. Do you have a total budget for the program?
- 1b. [IF YES] What is the total budget for the project?  
[If NO—SKIP TO QUESTION 8]
  
2. How many individual projects will be associated with the budget?

**Specific**

3. May we receive the most detailed version of the budget?
  
- 4a. Do the expenditures breakout material costs and labor costs?
- 4b. [If YES] What is the breakout between material costs and labor costs?
  
5. What is the year of the budget (in what dollars)?
  
- 6a. Does the project's budget include overhead?
- 6b. [If Yes] Can the overhead be identified?
  
7. How much of the budget is contracted out to private firms?
  
8. Do you have budgets for comparable, prototypical, projects?
  
9. How long is the construction phase of the project?
  
10. How much of the total project budget is expected to be leveraged or matched for this project?

**Employment Related Questions**

**Construction Phase:**

1. Will there be temporary construction workers on this project?
2. How many temporary/construction workers will be working on this project?
3. How many temporary /construction workers will be contracted to complete the work?

**Operations Phase:**

- 4a. Is there a creation of permanent jobs during or after the completion of the project?
- 4b. {IF YES} How many permanent jobs will be created in total?
  
- 4c. What types of occupations do you envision filling the permanent positions?  
(Main job responsibilities or titles)?
  
- 5a. Will there be workers contracted on a permanent or ongoing basis?
  
- 5b. [IF Yes] How many workers will be contracted on a permanent or ongoing basis?
- 5c. What types of occupations do you envision filling on a contract basis (Job title or responsibility)
  
- 6a. Do you have a percentage estimate of union members in your organization currently?
- 6b. [IF YES] What is the estimated percentage of union affiliated employees?
  
7. Do you envision that any new employees hired for the project will have the possibility of union membership?
  
8. Do you have an official request with OMB for new hires generated by PlaNYC initiatives?



***Exhibit B***  
***Glossary of Key Terms***

*Permanent Employee* - Employees that will have an assumed infinite tenure supporting the operations or maintenance of a project or facility

*Temporary Employee* - Employees that will have a finite tenure supporting the construction, assemblage, or creation of a project or facility

*Direct Employee* - Any employee paid from a project's budget for the sole purpose of providing support to a project

*Indirect Employee* - Any employee not paid by a project's budget but receives employment through providing products or services for a project

*Full-Time Employee* - An employee that works equal to or more than 40 hours a week

*Standard Occupational Code* - A system is used by Federal statistical agencies to classify workers into occupational categories for the purpose of collecting, calculating, or disseminating data.

*Occupation* - A set of activities or tasks that employees are paid to perform. Employees that perform essentially the same tasks are in the same occupation, whether or not they work in the same industry. Some occupations are concentrated in a few particular industries; other occupations are found in many industries. Categories are based on work performed, skills, education, training, and credentials.



**Exhibit C**  
**RIMS II- Summary Multipliers 60-Sector Industry Categories**  
*New York-Northern New Jersey-Long Island, NY-NJ-PA MSA*

IO Industry Titles	FD Output	FD Earnings	FD Emp	Direct Effects Emp
Crop and animal production	1.6469	0.3735	19.6505	1.3315
Forestry, fishing, and related activities	1.8124	0.4911	18.0817	1.5497
Oil and gas extraction	1.7261	0.2893	5.5813	3.8611
Mining, except oil and gas	1.7861	0.4605	9.7625	2.4145
Support activities for mining	2.1378	0.5736	13.716	2.5031
Utilities*	1.4931	0.313	5.5847	3.0894
Construction	2.068	0.6662	16.5096	1.9701
Wood product manufacturing	1.7206	0.41	11.6478	1.7906
Nonmetallic mineral product manufacturing	1.7765	0.4203	9.4163	2.325
Primary metal manufacturing	1.7245	0.3405	7.216	2.9812
Fabricated metal product manufacturing	1.7706	0.4534	10.7155	2.009
Machinery manufacturing	1.8496	0.4775	10.0606	2.4119
Computer and electronic product manufacturing	1.8707	0.425	8.207	3.4299
Electrical equipment and appliance manufacturing	1.8715	0.4309	9.2065	2.7373
Motor vehicle, body, trailer, and parts manufacturing	1.6263	0.2997	6.4264	3.1982
Other transportation equipment manufacturing	1.8504	0.4729	9.1307	2.8001
Furniture and related product manufacturing	1.8547	0.4854	13.0608	1.8451
Miscellaneous manufacturing	1.9307	0.4849	10.1621	2.6527
Food, beverage, and tobacco product manufacturing	1.7431	0.3203	7.9348	2.8919
Textile and textile product mills	1.9327	0.4199	10.9314	2.2836
Apparel, leather, and allied product manufacturing	2.1313	0.4815	13.1677	2.4552
Paper manufacturing	1.7691	0.3539	7.643	2.8743
Printing and related support activities	1.9821	0.544	12.8387	2.1037
Petroleum and coal products manufacturing	1.5827	0.2707	4.8499	4.6133
Chemical manufacturing	1.9862	0.3726	7.1152	5.3729
Plastics and rubber products manufacturing	1.8552	0.4123	9.6836	2.2717
Wholesale trade	1.9512	0.581	12.5308	2.3568
Retail trade	2.0756	0.6319	21.9033	1.5541
Air transportation	2.1339	0.5939	14.2113	3.5299
Rail transportation	1.8485	0.486	9.9487	2.7866
Water transportation	2.3006	0.5446	11.9716	6.3296
Truck transportation	2.0072	0.554	14.216	2.0918
Transit and ground passenger transportation	2.1471	0.7225	32.9424	1.3679
Pipeline transportation	2.0365	0.5439	10.9784	3.5896
Other transportation and support activities*	2.0501	0.7332	17.45	1.8816
Warehousing and storage	2.0349	0.7301	19.9691	1.6187
Publishing including software	1.9713	0.5217	11.5255	2.4569
Motion picture and sound recording industries	2.3414	0.5555	13.1222	3.0267
Broadcasting and telecommunications	2.133	0.5292	10.7674	3.4213
Information and data processing services	2.1197	0.7763	16.9582	2.0582
Federal Reserve banks, credit intermediation and related services	1.7881	0.4373	9.4618	2.6775
Securities, commodity contracts, investments	2.4197	0.8768	16.3924	2.8098
Insurance carriers and related activities	2.4037	0.6408	13.3247	3.0112
Funds, trusts, and other financial vehicles	3.2263	0.8753	16.2785	4.5255
Real estate	1.466	0.1835	5.4588	2.6202
Rental and leasing services and lessors of intangible assets	1.2598	0.1862	4.4845	1.8222
Professional and technical services	2.0673	0.7377	15.9034	2.1151
Management of companies and enterprises	2.0563	0.7167	12.5972	2.5404
Administrative and support services	1.9908	0.6964	24.9451	1.4644
Waste management and remediation services	2.0933	0.5949	14.8503	2.253



IO Industry Titles	FD Output	FD Earnings	FD Emp	Direct Effects Emp
Educational services	2.2233	0.7423	24.5222	1.5755
Ambulatory health care services	2.1654	0.833	19.0719	1.8892
Hospitals and nursing and residential care facilities	2.2538	0.8082	22.1148	1.7536
Social assistance	2.1824	0.7308	31.7489	1.382
Performing arts, museums, and related activities	2.3932	0.7934	28.6886	1.7739
Amusements, gambling, and recreation	2.0946	0.6822	29.9264	1.3598
Accommodation	1.9349	0.6077	20.8996	1.5125
Food services and drinking places	2.0653	0.6652	35.2329	1.2755
Other services*	2.0062	0.5807	19.2635	1.6364
Households	1.3144	0.3683	10.6278	



**Exhibit D**  
**Example of Expansion of Prototypical Project Site Budget Data into PlaNYC “Project” Level**  
**Bridging Construction Data into I/O Model Coding Categories**

**Prototypical Expenditure Budget for Lighting a Field**

ITEM DESCRIPTION	1 Project Site TOTAL	IO Code	6 Project Sites Annual Allocation	Adjustments for Leakage	Final Demand Employment Multiplier
MOBILIZATION (N.T.E. 6% OF TOTAL OF ALL OTHER ITEMS )	\$20,000	484000	\$120,000	0.517	14.1938
CONSTRUCTION SIGN ON FRAME	\$1,000	339950	\$6,000	0.950	13.361
VEHICLE FOR ENGINEER'S USE (SUV)	\$20,000	532100	\$120,000	0.824	8.7081
RECREATIONAL LIGHTING SYSTEM	\$30,000	335120	\$180,000	0.780	10.2667
EXTERIOR UNDERGROUND CONCRETE PULLBOXES/MANHOLES W/FRAME & COVER 48"L x 24"W x 30"D TYPE #4824 (6-R)	\$3,000	327390	\$18,000	0.094	11.7847
EXTERIOR UNDERGROUND CONCRETE PULLBOXES/MANHOLES W/FRAME & COVER 36"L x 24"W x 26"D TYPE #3624 (5-R)	\$6,000	327390	\$36,000	0.094	11.7847
EXTERIOR UNDERGROUND CONCRETE PULLBOXES/MANHOLES W/FRAME & COVER 30"L x 18"W x 26"D TYPE #3018 (3-R)	\$3,000	327390	\$18,000	0.094	11.7847
EXTERIOR UNDERGROUND CONCRETE PULLBOXES/MANHOLES W/FRAME & COVER 24"L x 18"W x 26"D TYPE #2418 (2-R)	\$5,000	327390	\$30,000	0.094	11.7847
1" DIA. HOT-DIPPED GALVANIZED RIGID STEEL CONDUIT	\$6,000	331222	\$36,000	0.000	7.8846
1 1/2" DIA. HOT-DIPPED GALVANIZED RIGID STEEL CONDUIT	\$2,000	331222	\$12,000	0.000	7.8846
2" DIA. HOT-DIPPED GALVANIZED RIGID STEEL CONDUIT	\$19,200	331222	\$115,200	0.000	7.8846
2 1/2" DIA. HOT-DIPPED GALVANIZED RIGID STEEL CONDUIT	\$17,500	331222	\$105,000	0.000	7.8846
3" DIA. HOT-DIPPED GALVANIZED RIGID STEEL CONDUIT	\$6,000	331222	\$36,000	0.000	7.8846
4" DIA. HOT-DIPPED GALVANIZED RIGID STEEL CONDUIT	\$10,000	331222	\$60,000	0.000	7.8846
#10 AWG COPPER, 600V, TYPE THWN CABLES	\$3,000	331422	\$18,000	0.000	8.3552
#8 AWG COPPER, 600V, TYPE THWN CABLES	\$600	331422	\$3,600	0.000	8.3552
#6 AWG COPPER, 600V, TYPE THWN CABLES	\$750	331422	\$4,500	0.000	8.3552
#4 AWG COPPER, 600V, TYPE THWN CABLES	\$600	331422	\$3,600	0.000	8.3552
#2 AWG COPPER, 600V, TYPE THWN CABLES	\$3,000	331422	\$18,000	0.000	8.3552
#2/0 AWG COPPER, 600V, TYPE THWN CABLES	\$8,800	331422	\$52,800	0.000	8.3552
#4/0 AWG COPPER, 600V, TYPE THWN CABLES	\$10,800	331422	\$64,800	0.000	8.3552
350 MCM COPPER, 600V, TYPE THWN CABLES	\$20,000	331422	\$120,000	0.000	8.3552
500 MCM COPPER, 600V, TYPE THWN CABLES	\$8,800	331422	\$52,800	0.000	8.3552
WARNING TAPE (12" WIDE)	\$14,000	325520	\$84,000	0.583	7.0886



**Prototypical Expenditure Budget for Lighting a Field (cont.)**

ITEM DESCRIPTION	1 Project Site TOTAL	IO Code	6 Project Sites Annual Allocation	Adjustments for Leakage	Final Demand Employment Multiplier
UNCLASSIFIED EXCAVATION	\$5,000	230000	\$30,000	0.709	16.5842
SAW CUT PAVEMENT	\$3,500	230000	\$21,000	0.709	16.5842
AVERAGE CONCRETE	\$5,200	327310	\$31,200	0.000	5.9162
ASPHALTIC CONCRETE TOP COURSE	\$600	327310	\$3,600	0.000	5.9162
TEMPORARY WOODEN TREE GUARD WITH TREE WRAP	\$740	113A00	\$4,440	0.000	5.0714
RECONSTRUCT LAWN	\$200	111400	\$1,200	0.331	23.966
CONSTRUCTION FENCE - 8'-0" HT.	\$2,000	332600	\$12,000	0.388	10.7085
CORE DRILLING & MICRO TUNNELING	\$600	230000	\$3,600	0.709	16.5842
CONTROLLED CONCRETE	\$8,260	327320	\$49,560	0.189	8.495
STEEL BAR REINFORCEMENT	\$5,000	331210	\$30,000	0.000	6.6365
BROKEN STONE - LOOSE MEASURE	\$1,200	327991	\$7,200	0.309	13.5642
REMOVE & RESET CONSTRUCTION FENCE	\$10,000	230000	\$60,000	0.709	16.5842
ALLOWANCE FOR HOLLOW STEM AUGER BORING	\$10,000	230000	\$60,000	0.709	16.5842
ALLOWANCE FOR HELICAL SCREW PILE	\$76,800	230000	\$460,800	0.709	16.5842
ALLOWANCE FOR TRANSIT AUTHORITY SUPERVISION	\$2,500	561600	\$15,000	0.950	32.1679
Compensation Allowance 30%		V00100	\$1,192,500	0.950	



**Exhibit E**  
**PlaNYC Initiatives with Measurable Job Creation Benefits**

New York City Economic Development Corporation, the Mayor’s Office of Long Term Planning and Sustainability, and the Louis Berger Group, Inc. evaluated the list of initiatives (and sub-initiatives referred to as “projects”) and determined, as described in section 1.1, whether each initiative had measurable, direct and significant estimates of spending or employment and sufficient information to estimate job creation impacts. Those initiatives were the focus of data collection efforts with the sponsoring agencies and analytical efforts focused on quantifying direct and total job estimates.

Table E-1 lists projects by major category, goal, and initiative, with many initiatives having only one project. Those studied are listed with a “✓” mark to the right; those excluded appear with an “✗” mark ( ).

There are several housing initiatives that involve land use and rezoning studies which, once approved and implemented, are expected to create the capacity to accommodate population growth, real estate investment and development activity and job creation opportunities that will contribute to our economy and create a significant number of new jobs. PlaNYC anticipates that the rezoning actions proposed in the Housing section will spur the development of 54,000 to 80,400 new residential units. Coupled with existing initiatives, these actions will result in 265,000 new residential units by 2030, a scale of development expected to support 781,000 person-years of direct, indirect and induced employment in the region. The magnitude of this real estate development effect as a source of employment nearly matches the job creation levels reported by the seven PlaNYC categories studied in this report.

**Table E-1**  
**Summary of PlaNYC Initiatives and Projects Under Study**

**OPEN SPACE:**

<b>MAKE EXISTING SITES AVAILABLE TO MORE NEW YORKERS</b>	
Initiative 1: Open schoolyards across the city as public playgrounds	
Open schoolyards as playgrounds in every neighborhood	✓
Initiative 2: Increase options for competitive athletics	
Make high-quality competition fields available to teams across the city	✗
Initiative 3: Complete underdeveloped destination parks	
Fulfill the potential of at least one major undeveloped park site in every borough	✓
<b>EXPAND USABLE HOURS AT EXISTING SITES</b>	
Initiative 4: Provide more multi-purpose fields	
Convert asphalt into multi-use fields	✓
Initiative 5: Install new lighting	
Maximize time on our existing turf fields by installing lights for nighttime use	✓
<b>RE-IMAGINE THE PUBLIC REALM</b>	
Initiative 6: Create a public plaza in every community	
Create a new or enhance an existing public plaza in every community	✓
Initiative 7: Green our underutilized street and sidewalk space	
Fill every available street tree opportunity in New York City	✓
Expand the Greenstreets Program	✓



**Table E-1 (cont.)  
Summary of PlaNYC Initiatives and Projects Under Study**

**BROWNFIELDS:**

<b>MAKE EXISTING BROWNFIELD PROGRAMS FASTER AND MORE EFFICIENT</b>	
Initiative 1: Adopt on-site testing to streamline the cleanup process	
Pilot the “Triad” program on two sites	✘
Initiative 2: Create remediation guidelines for New York City cleanups	
Analyze New York City’s soil and develop a set of standard cleanup remedies appropriate to the city	✘
Initiative 3: Establish a city office to promote brownfield planning and redevelopment	
Create a new City office to increase resources dedicated to brownfield planning, testing and cleanups	✓
<b>EXPAND ENROLLMENT INTO STREAMLINED PROGRAMS</b>	
Initiative 4: Expand participation in the current State Brownfield Clean-up Program (BCP)	
Ask State to redistribute BCP tax credits to relieve budgetary pressures, and begin covering New York City-specific contamination	✘
Initiative 5: Create a City program to oversee all additional clean ups	
Create a City-sponsored program to provide oversight of cleanups for any sites not enrolled in other programs	✘
Initiative 6: Provide incentives to lower costs of remediation	
Dedicate \$15 million to capitalize a fund to support brownfield redevelopment	✓
<b>ENCOURAGE GREATER COMMUNITY INVOLVEMENT IN BROWNFIELD REDEVELOPMENT</b>	
Initiative 7: Encourage State to release community-based redevelopment grants	
Advocate for State to reform the Brownfield Opportunity Area (BOA) program and release planning grant funds to community groups	✘
Initiative 8: Incentivize developers to participate in Brownfields Opportunity Area (BOA) planning	
Advocate for financial incentives for developments constructed in coordination with a BOA	✘
Initiative 9: Launch outreach efforts to educate communities about brownfield redevelopment	
Educate, outreach, and provide technical assistance to communities, private developers, and City agencies to promote brownfield redevelopment	✘
<b>IDENTIFY REMAINING SITES FOR CLEANUPS</b>	
Initiative 10: Create a database of historic uses across New York City to identify potential brownfields	
Conduct a historic use assessment for all city sites in order to measure long-term progress towards goal	✓
Initiative 11: Limit liability of property owners who seek to redevelop brownfields	
Create an insurance program and legal protections to limit the liability of developers willing to clean up land they did not pollute	✓



**Table E-1 (cont.)  
Summary of PlaNYC Initiatives and Projects Under Study**

**WATER QUALITY:**

<b>IMPLEMENT INFRASTRUCTURE UPGRADES</b>	
Initiative 1: Develop and implement Long Term Control Plans	
Complete Long Term Control Plans for all 14 New York City Watersheds, as required by law	✓
Initiative 2: Expand wet weather capacity at treatment plants	
Reduce Combined Sewage Overflow (CSO) discharges by more than 185 mgd during rainstorms	✓
<b>PURSUE PROVEN STRATEGIES TO PREVENT STORM WATER FROM ENTERING SYSTEM</b>	
Initiative 3: Increase use of High Level Storm Sewers (HLSS)	
Convert combined sewers into HLSS and integrate HLSS into major new developments, as appropriate	✓
Initiative 4: Capture the benefits of our public realm plan (Capture across category)	x
Initiative 5: Expand the Bluebelt program	
Expand Bluebelt in Staten Island and other boroughs, where possible	✓
<b>EXPAND, TRACK, AND ANALYZE NEW BMPS ON A BROAD SCALE</b>	
Initiative 6: Form interagency BMP task force	
Make the reduction of CSO volumes and other environmental issues a priority for all relevant City agencies	x
Initiative 7: Pilot promising Best Management Practices (BMPs)	
Reintroduce 20 cubic meters of ribbed mussel beds	✓
Design five expanded tree pits and monitor impacts	✓
Pilot one swale to collect rainwater from roadways	✓
Pilot additional BMPs	x
Initiative 8: Require greening of parking lots	
Modify the zoning resolution to include design guidelines for off-street parking lots for commercial and community facilities	x
Initiative 9: Provide incentives for the installation of green roofs	
Construct Green Roofs for four residential and two commercial building as a pilot program	✓
Encourage the installation of green roofs through a new incentive program	✓
Initiative 10: Protect wetlands	
Assess the vulnerability of existing wetlands and identify additional policies to protect them	x



Table E-1 (cont.)  
Summary of PlaNYC Initiatives and Projects Under Study

**WATER NETWORK:**

<b>ENSURE THE QUALITY OF OUR DRINKING WATER</b>	
Initiative 1: Continue the Watershed Protection Program	
Aggressively protect our watersheds as we seek to maintain a Filtration Avoidance Determination for the Catskill and Delaware Water Supplies	✓
Initiative 2: Construct an ultraviolet disinfection plant for the Catskill/Delaware systems	
Construct an ultraviolet disinfection facility to destroy disease-causing organisms in our upstate watershed	✓
Initiative 3: Build the Croton Filtration plant	
Construct a water filtration plant to protect the Croton supply	✓
<b>CREATE REDUNDANCY FOR AQUEDUCTS TO NEW YORK CITY</b>	
Initiative 4: Launch a major new water conservation effort	
Implement a water conservation program to reduce citywide consumption by 60 million gallons a day	✗
Initiative 5: Maximize existing facilities	
Add 245 mgd to our supply potential through increased efficiency	✓
Initiative 6: Evaluate new water sources	
Evaluate 39 projects to meet the shortfall needs of the city during a prolonged shutdown of the Delaware Aqueduct	✓
<b>MODERNIZE IN-CITY DISTRIBUTION</b>	
Initiative 7: Complete Water Tunnel No. 3	
Complete construction of stage 2 and begin repairing Water Tunnel No. 1	✓
Complete stage 3 and 4 of Water Tunnel No. 3	✓
Initiative 8: Complete a backup tunnel to Staten Island	
Replace pipelines connecting Staten Island to Tunnel No. 2	✓
Initiative 9: Accelerate upgrades to water main infrastructure	
Increase replacement rate to over 80 miles annually	✓



**Table E-1 (cont.)  
Summary of PlaNYC Initiatives and Projects Under Study**

**TRANSPORTATION:**

<b>BULID AND EXPAND TRANSIT INFRASTRUCTURE</b>	
Initiative 1: Increase capacity on key congested routes	
Access to the Region's Core	✓
East Side Access	✓
LIRR Third Track	✓
Lower Manhattan Rail Link	✓
Second Avenue Subway (Phases 1 and 2)	✓
Seek to fund five projects that eliminate capacity constraints	✗
Initiative 2: Provide new commuter rail access to Manhattan	
Seek to expand options for rail commuters	✓
Initiative 3: Expand transit access to underserved areas	
Seek to provide transit to new neighborhoods	✓
<b>IMPROVE TRANSIT SERVICE ON EXISTING INFRASTRUCTURE</b>	
Initiative 4: Improve and expand bus service	
Initiate and expand Bus Rapid Transit	✓
Dedicate Bus/High Occupancy Vehicle (HOV) lanes on the East River Bridges	✓
Explore other improvements to bus service	✗
Initiative 5: Improve local commuter rail service	
Seek to make better local use of Metro-North and Long Island Rail Road (LIRR) stations	✓
Initiative 6: Improve access to existing transit	
Facilitate access to subways and bus stops citywide	✓
Initiative 7: Address congested areas around the city	
Develop congestion management plans for outer-borough growth corridors	✓
<b>PROMOTE OTHER SUSTAINABLE MODES</b>	
Initiative 8: Expand ferry service	
Seek to expand service and better integrate it with the city's existing mass transit system	✓
Initiative 9: Promote Cycling	
Complete the City's 1,800-mile bike master plan	✓
Facilitate cycling	✓
<b>IMPROVE TRAFFIC FLOW BY REDUCING CONGESTION</b>	
Initiative 10: Pilot congestion pricing	
Seek to use pricing to manage traffic in the Central Business District (CBD)	✓
Initiative 11: Manage roads more efficiently	
Expand the use of Muni Meters	✗
Create an integrated traffic management system	✓
Initiative 12: Strengthen enforcement of traffic violations	
Expand the force of Traffic Enforcement Agents (TEAs)	✓
Enable all TEAs to issue blocking-the-box tickets	✗
Expand the use of traffic enforcement cameras	✗
Initiative 13: Facilitate freight movements	
Improve access to John F. Kennedy International Airport (JFK)	✗
Explore High Occupancy Truck Toll (HOTT) Lanes	✗



**Table E-1 (cont.)**  
**Summary of PlaNYC Initiatives and Projects Under Study**

**TRANSPORTATION (cont'd):**

<b>ACHIEVE A STATE OF GOOD REPAIR ON OUR ROADS AND TRANSIT SYSTEM</b>	
Initiative 14: Close the Metropolitan Transit Authority's State of Good Repair gap	
Seek a grant from the SMART Authority to cover the MTA's funding gap	✓
Initiative 15: Close the City's road and bridge state of good repair gap	
Seek a grant from the SMART authority to fund accelerated repairs and upgrades	✓
Invest in bridge and tunnel upgrades	✓
<b>DEVELOP NEW FUNDING SOURCES</b>	
Initiative 16: Establish a new regional transit financing authority	
Seek to create a Sustainable Mobility and Regional Transportation (SMART) Financing Authority to advance new projects and achieve a state of good repair	✗



**Table E-1 (cont.)  
Summary of PlaNYC Initiatives and Projects Under Study**

**ENERGY:**

<b>IMPROVE ENERGY PLANNING</b>	
Initiative 1: Establish a New York City Energy Planning Board	
Work with the State and utilities to centralize planning for the city's supply and demand initiatives	x
<b>REDUCE NEW YORK CITY'S ENERGY CONSUMPTION</b>	
Initiative 2: Reduce energy consumption by City government	
Commit 10% of the City's annual energy bill to fund energy-saving investments in City operations	x
Initiative 3: Strengthen energy codes in New York City	
Strengthen our energy and building codes to support our energy efficiency strategies and other environmental goals	x
Initiative 4: Create an energy efficiency authority for New York City	x
Create an energy efficiency authority for New York City (NYCEEA) responsible for reaching the city's demand reduction targets	
Initiative 5: Prioritize five key areas for targeted incentives	
Use a series of mandates, challenges, and incentives to reduce demand among the city's largest energy consumers	✓
Initiative 6: Expand Promote Peak Load Management	
Expand participation in Peak Load Management Programs through smart meters	x
Support expansion of real-time pricing across the city	x
Initiative 7: Launch an energy awareness and training campaign	
Increase the impact of our energy efficiency efforts through a coordinated energy education, awareness, and training campaign	x
<b>EXPAND THE CITY'S CLEAN POWER SUPPLY</b>	
Initiative 8: Facilitate repowering and construction of power plants	
Facilitate the construction of 2,000 to 3,000 MW of supply capacity by repowering old plants, constructing new ones, and building dedicated transmission lines	✓
Initiative 9: Expand Clean Distributed Generation ("Clean DG")	
Increase the amount of Clean DG by 800 MW	x
Promote opportunities to develop district energy at appropriate sites in New York City	x
Initiative 10: Support expansion of gas infrastructure	
Support critical expansions to the city's natural gas infrastructure	✓
Initiative 11: Foster the market for renewable energy	
Support the construction of the city's first carbon neutral building, primarily powered by solar electricity	✓
Create a property tax abatement for solar panel installations	✓
Study the cost-effectiveness of solar electricity when evaluated on a Real Time Pricing scenario	x
Increase use of solar energy in City buildings through creative financing	✓
Work with the State to eliminate barriers to increasing the use of solar energy in the city	x
Pilot one or more technologies for producing energy from solid waste	x
End methane emissions from sewage treatment plants and expand the productive use of digester gas	x
Study the expansion of gas capture and energy production from existing landfills	x



**Table E-1 (cont.)**  
**Summary of PlaNYC Initiatives and Projects Under Study**

**ENERGY (cont'd):**

<b>MODERNIZE ELECTRICITY DELIVERY INFRASTRUCTURE</b>	
Initiative 12: Accelerate reliability improvements to the city's grid	
Advocate for Con Edison to implement recommendations from the City's report on the northwest Queens power outages	x
Initiative 13: Facilitate grid repairs through improved coordination and joint bidding	
Pursue the passage of joint bidding legislation	x
Ensure adequate pier facilities are available to Con Edison to offload transformers and other equipment	x
Initiative 14: Support Con Edison's efforts to modernize the grid	
Support Con Edison's 3G System of the Future Initiative	x



**Table E-1 (cont.)  
Summary of PlaNYC Initiatives and Projects Under Study**

**AIR QUALITY:**

<b>REDUCE ROAD VEHICLE EMISSIONS</b>	
Initiative 1: Capture the air quality benefits of our transportation plan (Capture across category)	x
Initiative 2: Improve fuel efficiency of private cars Waive New York City's sales tax on the cleanest, most efficient vehicles	x
Work with the MTA, the Port Authority, and the State DOT to promote hybrid and other clean vehicles	x
Pilot new technologies and fuels, including hydrogen and plug-in hybrid vehicles	x
Initiative 3: Reduce emissions from taxis, black cars, and for-hire vehicles Reduce taxi and limousine idling	x
Work with the Taxi and Limousine Commission (TLC) and the taxicab industry to double the taxi fleet's efficiency	x
Work with stakeholders to double the fuel efficiency of black cars and for-hire vehicles	x
Initiative 4: Replace, retrofit, and refuel diesel trucks Introduce biodiesel into the City's truck fleet, go beyond compliance with local laws, and further reduce emissions	x
Accelerate emissions reductions of private fleets through existing Congestion Mitigation and Air Quality (CMAQ) programs	x
Work with stakeholders and the State to create incentives for the adoption of vehicle emission control and efficiency strategies	x
Improve compliance of existing anti-idling laws through targeted educational campaign	x
Initiative 5: Decrease school bus emissions Retrofit both large and small school buses and reduce their required retirement age	✓
<b>REDUCE OTHER TRANSPORTATION EMISSIONS</b>	
Initiative 6: Retrofit ferries and promote cleaner fuels Retrofit the Staten Island Ferry fleet to reduce emissions	✓
Work with private ferries to reduce their emissions	x
Initiative 7: Partner with the Port Authority to reduce emissions from port facilities Seek to work with the Port Authority to reduce emissions from the Ports marine vehicles, port facilities and airports	x
Initiative 8: Implement more efficient construction management practices Accelerate adoption of technologies to reduce construction related emissions	x
<b>REDUCE EMISSIONS FROM BUILDINGS</b>	
Initiative 9: Capture the air quality benefits of our energy plan (Capture across category)	x
Initiative 10: Promote the use of cleaner burning heating fuels Reduce emissions from boilers in 100 city public schools	✓
Lower the maximum sulfur content in heating fuel from 2000 ppm to 500 ppm	x
<b>PURSUE NATURAL SOLUTIONS TO IMPROVE AIR QUALITY</b>	
Initiative 11: Capture the benefits of our public realm plan (Capture across category)	x
Initiative 12: Reforest targeted areas of our parkland Reforest 2,000 acres of parkland	✓
Initiative 13: Increase tree plantings on lots Partner with stakeholders to help plant one million trees by 2017	✓



**Table E-1 (cont.)**  
**Summary of PlaNYC Initiatives and Projects Under Study**

**AIR QUALITY (Continued):**

<b>UNDERSTAND THE SCOPE OF THE CHALLENGE</b>	
Initiative 14: Launch collaborative local air quality study	
Monitor and model neighborhood-level air quality across New York City	✓



Table E-1 (cont.)  
Summary of PlaNYC Initiatives and Projects Under Study

**HOUSING:**

<b>CONTINUING PUBLICLY INITIATED REZONINGS</b>	
Initiative 1: Pursue transit-oriented development	
Use upcoming re-zonings to direct growth toward areas with strong transit access	✘
Initiative 2: Reclaim underutilized waterfronts	
Continue restoring underused or vacant waterfront land across the city	✘
Initiative 3: Increase transit options to spur development	
Use transit extensions to spark growth as the subways did more than a century ago	✘
<b>CREATE NEW HOUSING ON PUBLIC LAND</b>	
Initiative 4: Expand co-locations with government agencies	
Pursue partnerships with City and State agencies throughout the city	✘
Initiative 5: Adapt outdated buildings to new uses	
Seek to adapt unused schools, hospitals, and other outdated municipal sites for productive use as new housing	✘
<b>EXPLORE ADDITIONAL AREAS OF OPPORTUNITY</b>	
Initiative 6: Develop underused areas to knit neighborhoods together	
Continue to identify underutilized areas across the city that are well-served by transit and other infrastructure	✘
Initiative 7: Capture the potential of transportation and infrastructure investments	
Examine the potential of major infrastructure expansions to spur growth in new neighborhoods	✘
Initiative 8: Deck over rail yards, rail lines and highways	
Explore opportunities to create new land by constructing decks over transportation infrastructure	✘
<b>DEVELOP TARGETED AFFORDABILITY PROGRAMS TO CREATE AND PRESERVE HOUSING</b>	
Initiative 9: Develop new financing strategies	
Continue to pursue creative financing strategies to reach new income brackets	✘
Initiative 10: Expand inclusionary zoning	
Seek opportunities to expand the use of inclusionary zoning, harnessing the private market to create economically integrated communities	✘
Initiative 11: Encourage home ownership	
Continue to develop programs to encourage home ownership, emphasizing affordable apartments over single-family homes	✘
Initiative 13: Preserve the existing stock of affordable housing throughout New York City	
Continue to develop programs to preserve affordable housing that so many New Yorkers depend upon today	✘



Table E-1 (cont.)  
Summary of PlaNYC Initiatives and Projects Under Study

**CLIMATE CHANGE:**

<b>PROTECT OUR VITAL INFRASTRUCTURE</b>	
Initiative 1: Create an interagency task force to protect our city's vital infrastructure	
Expand our adaptation strategies beyond the protection of our water supply, sewer, and wastewater treatment systems to include all essential city infrastructure	✘
<b>WORK WITH VULNERABLE NEIGHBORHOODS TO DEVELOP SITE-SPECIFIC PROTECTION STRATEGIES</b>	
Initiative 2: Work with vulnerable neighborhoods to develop site-specific protection strategies	
Create a community planning process and "toolkit" to engage all stakeholders in community-specific climate adaptation strategies	✘
<b>INCORPORATE CLIMATE CHANGE CONCERNS INTO THE PLANNING PROCESS</b>	
Initiative 3: Launch a citywide strategic planning process for climate change adaptation	
Create a strategic planning process to adapt to climate change impacts	✘
Ensure that New York's Federal Emergency Management Administration (FEMA) 100-year floodplain maps are updated	✘
Document the City's floodplain management strategies to secure discounted flood insurance for New Yorkers	✘
Amend the building code to address the impacts of climate change	✘