ECONOMIC EFFECTS TECHNICAL REPORT

AUGUST 2013

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1. Introduction and Project Description

1.1 Introduction

The purpose of this Economic Effects Technical Report is to document current and projected economic conditions in the region, study area neighborhoods, and project corridor, as well as to assess the potential effects of the proposed Purple Line on the regional and local businesses, employment levels, and tax revenue.

1.2 Project Description

The Purple Line is a proposed 16.2-mile transit line located north and northeast of Washington DC, inside the circumferential I-95/I-495 Capital Beltway. The Purple Line would extend between Bethesda in Montgomery County and New Carrollton in Prince George's County. The "Purple Line corridor" includes five major activity centers: Bethesda, Silver Spring, Takoma/Langley Park, College Park, and New Carrollton.

The purposes of the Purple Line project are the following:

- Provide faster, more direct, and more reliable east-west transit service connecting the major activity centers in the Purple Line corridor at Bethesda, Silver Spring, Takoma/Langley Park, College Park, and New Carrollton,
- Provide better connections to Metrorail services located in the corridor, and
- Improve connectivity to the communities in the corridor located between the Metrorail lines.

There are two Alternatives discussed herein: the No Build Alternative and the Preferred Alternative.

1.2.1 No Build Alternative

The No Build Alternative represents the future conditions of transportation facilities and services in 2040 in the corridor if the Purple Line were not built. The No Build Alternative includes the existing highway network and transit service, plus those transportation projects listed within the Purple Line corridor for which funding sources have been identified and have been included in the National Capital Region Transportation Planning Board's (TPB) *Financially Constrained Long-Range Transportation Plan* (CLRP) for implementation by 2040. The No Build Alternative provides the basis against which the Preferred Alternative is compared.

1.2.2 Preferred Alternative

The Preferred Alternative would be at grade except for one short tunnel section and three sections elevated on structures. The Preferred Alternative would operate mainly in dedicated or exclusive lanes, providing fast, reliable transit operations.

The following 21 stations are planned for the Preferred Alternative:

- Bethesda
- Chevy Chase Lake
- Lyttonsville
- Woodside/16th Street
- Silver Spring Transit Center
- Silver Spring Library
- Dale Drive
- Manchester Place

- Riggs Road
- Adelphi Road/West Campus
- UM Campus Center
- East Campus
- College Park
- M Square
- Riverdale Park
- Beacon Heights

- Long Branch
- Piney Branch Road
- Takoma/Langley Transit Center

- Annapolis Road/Glenridge
- New Carrollton

Stations would include ticket vending machines, weather shelters for passengers, lighting, wayfinding and informational signage, trash receptacles, seating, and security equipment such as emergency telephones and closed circuit television cameras. Most riders would walk to the stations or transfer from other transit services. Access plans for each station have been developed to enhance pedestrian and transit access for nearby communities. The stations would have either side or center platforms depending on the site characteristics and space availability.

Two storage and maintenance facilities are proposed: one at Lyttonsville in Montgomery County and the other at Glenridge in Prince George's County. Additionally, traction power substations, used to convert electric power to appropriate voltage and type to power the light rail vehicles, would be required approximately every mile.

As part of the Preferred Alternative the permanent Capital Crescent Trail would be constructed within the Georgetown Branch right-of-way for a distance of 3.3 miles between Bethesda and the CSXT Metropolitan Branch. At the junction with the CSXT the trail is planned to continue on the north side of the CSXT corridor to the SSTC. The permanent Capital Crescent Trail would replace the existing Georgetown Branch Interim Trail which currently extends from Bethesda to Stewart Avenue within the Georgetown Branch right-of-way. The completion of the trail along the CSXT corridor is contingent on agreement with CSXT on the use of their property on the north side of the CSXT tracks for the trail. If agreement is not reached by the time the Purple Line construction occurs, MTA would construct the trail from Bethesda to Talbot Avenue. From Talbot Avenue to Silver Spring an interim signed bike route on local streets would be used. MTA will plan, design, and construct the permanent Capital Crescent Trail between Bethesda and Silver Spring concurrently with the Purple Line. The Capital Crescent Trail will be owned and operated by Montgomery County, which will be responsible for providing the funds to construct it.

2. Methodology

The study area for economics includes all census tracts within 500 feet of the Preferred Alternative alignment or within 1/2 mile around a station location. The study area was divided into 16 neighborhoods by clustering census tracts that encompass loosely defined existing communities, as shown on Figure 1. For some of the analyses, as well as for comparison purposes, larger areas were examined to reflect the fact that the study area is part of a larger integrated economic region. Effects are presented qualitatively at the neighborhood level and quantitatively at the regional level, which includes Montgomery County, Prince George's County, and Washington, DC.

Primary data sources for the economic analyses included the following:

- *Bureau of Labor Statistics*: Regional and state employment and unemployment statistics database, 2010-2012 annual averages.
- *District of Columbia Department of Employment Services*: Washington Metropolitan Statistical Area employment projections by industry and occupation for 2008-2018, major employers in Washington, DC
- *Dun and Bradstreet Selectory, Inc.*: Commercial database of businesses in Prince George's and Montgomery Counties and Washington, DC
- *Maryland Department of Business and Economic Development*: Major employers in Prince George's and Montgomery Counties.
- *Maryland Department of Labor, Licensing and Regulation*: 2010 annual average statistics on civilian labor force, employment and unemployment in Maryland, by place of residence.
- *Metropolitan Washington Council of Governments:* Future employment projections for the Washington region through the Cooperative Forecasting Program (Round 8.0, revised for 2011).
- *U.S. Census Bureau, 2000 Census*: Decennial census conducted to record information on demographic, social, economic, and housing conditions of the U.S. population.
- *U.S. Census Bureau, 2006-2010 American Community Survey 5-Yr Estimates*: Nationwide annual survey conducted to record information on demographic, social, economic, and housing conditions of the U.S. population. 5-year estimates are the data provided for geographic areas smaller than 20,000 persons.

Primary data sources were supplemented as necessary with additional data collection, field verification, aerial mapping, and coordination. To categorize existing economic conditions, trends in the labor force, employment and unemployment, major employers, and income were measured. Regional economic trends and potential effects were measured at the county and/or state level. Study area economic trends and potential effects were identified at the census tract geographic level. To categorize the Purple Line study area business community, information was collected from the Dun and Bradstreet Selectory commercial business database (2011) and corroborated through field verification and stakeholder coordination.

To identify potential future labor force trends, data was obtained from the Cooperative Forecasting program administered by the MWCOG. The program publishes series of forecasts, or "Rounds," which provide land use activity forecasts of employment, population, and households by five year increments, typically covering a 20- to 30-year timeframe.

Neighborhood data was compiled using traffic analysis zones (TAZs), the geographical boundaries used within the MWCOG employment model. Figure 2 shows the TAZ boundaries.

Figure 1. Neighborhoods and U.S. Census Tracts

Neighborhoods and U.S. Census Tracts

Source: U.S. Census Bureau

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Legend:
- Proposed Station Location
- Connection to Metrorail
- Proposed Alternative
- Proposed Alternative in Tunnel
- Proposed Alternative on Aerial Structure
- Census Tracts
- MARC Commuter Rail

Metrorail
- Red Line
- Orange Line
- Green Line

Map Index
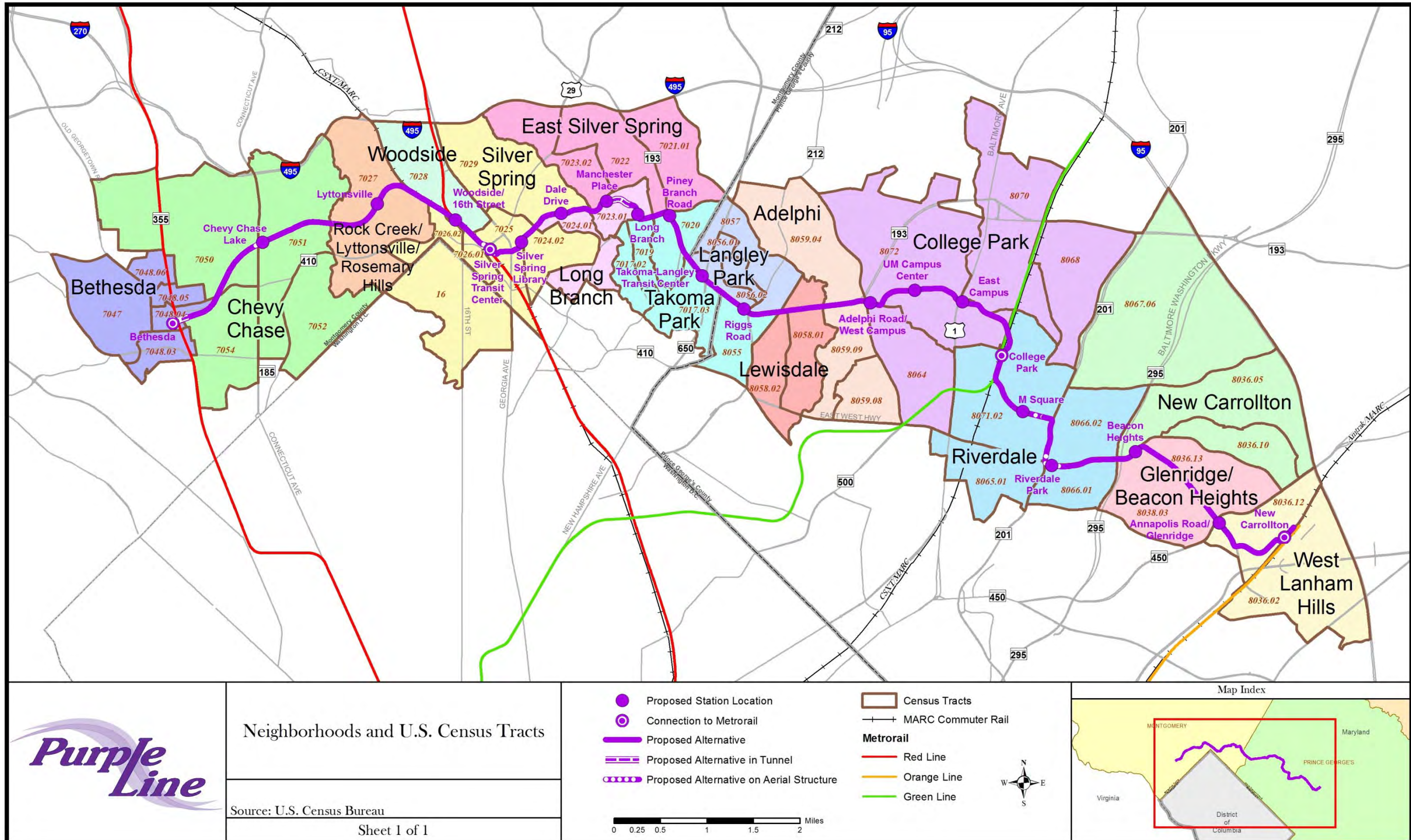
Figure 2. Neighborhoods and Traffic Analysis Zones

Neighborhoods and Traffic Analysis Zones

Legend:
- Proposed Station Location
- Connection to Metrorail
- Proposed Alternative
- Proposed Alternative in Tunnel
- Proposed Alternative on Aerial Structure
- Traffic Analyis Zones
- Railroad

Metrorail
- Red Line
- Orange Line
- Green Line

Source: Metropolitan Washington Council of Governments

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Map Index
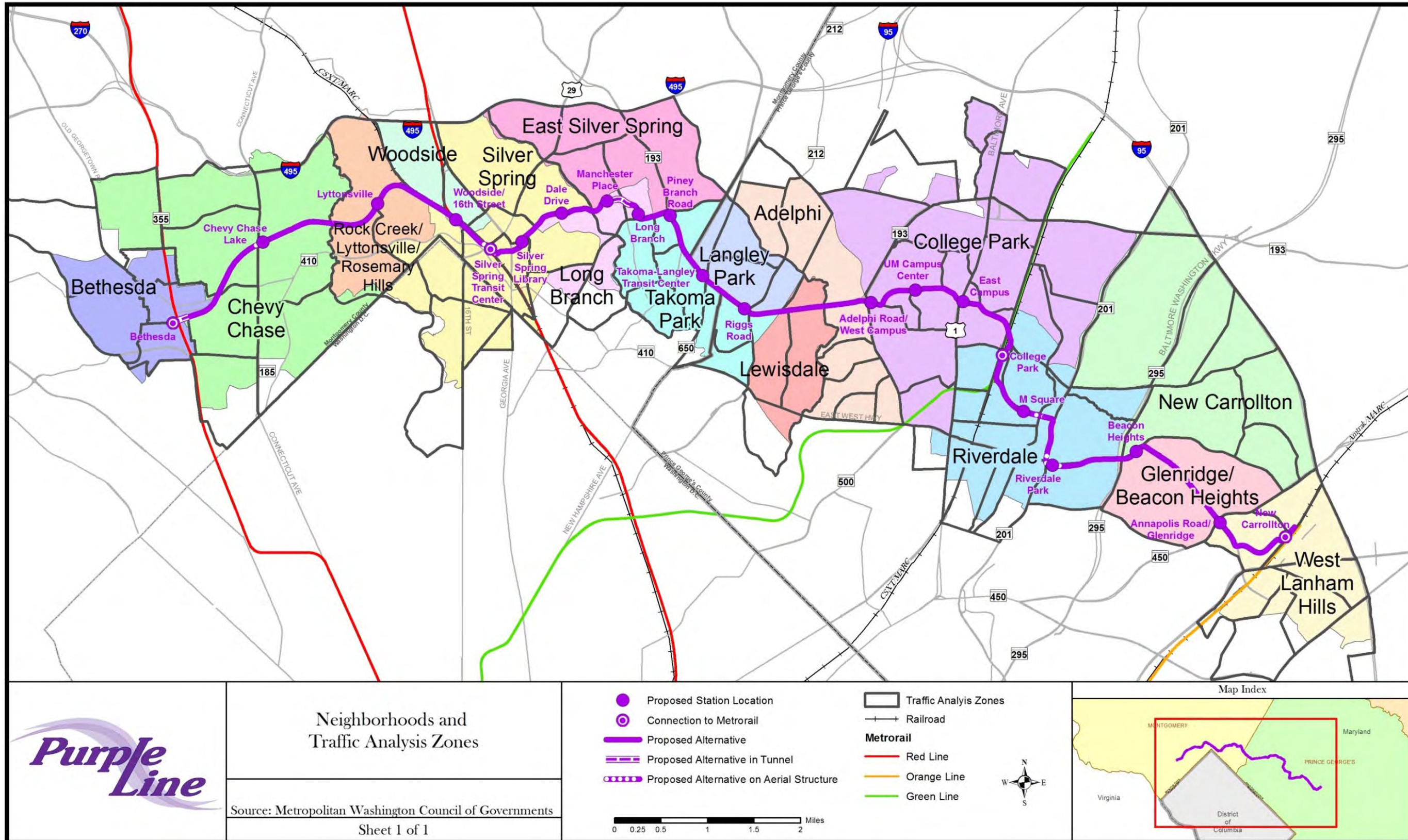
As shown, the boundaries are highly similar. Therefore, it was considered methodologically appropriate to present future employment data using TAZ boundaries. However, no quantitative comparisons were drawn between disparate data sources.

The following analyses were performed to understand the project-related economic effects:

Job Creation and Earnings Impact—the effects of operations and maintenance spending (long-term) and construction expenditures (short-term) on employment, earnings, and output (a measure of economic activity, representing the annual dollar value of all goods and services produced) were estimated using regional multipliers (Regional Input-Output Modeling System, also known as RIMS II) from the U.S. Department of Commerce, Bureau of Economic Analysis (BEA).

The regional multipliers cover Washington, DC, and Montgomery and Prince George's Counties. Type II multipliers for 2008 (Regional Input-Output Modeling System or RIMS II) from the U.S. Department of Commerce, Bureau of Economic Analysis (BEA), which include direct, indirect, and induced impacts, were used. These multipliers measure the total change in employment, earnings, and output that results from an incremental change to a particular industry.

Direct effects would result from construction and operation expenditures. Direct effects include spending and employment in construction; employment related to the production of the goods and materials for the project; design, engineering, and architectural services employment; and employment generated to operate and maintain the Purple Line transit system.

Indirect and induced effects would result from the "multiplier effect" of these expenditures in the national, regional, and study area neighborhood economies. Indirect effects would occur when the direct investment in capital purchases (e.g., transitway and station construction materials) and direct purchases for ongoing operations (e.g., power, parts and other materials) generate sales and supporting jobs in supplier industries. Induced effects would result when the earnings of construction workers and public transportation operations workers, as well as growth in earnings at suppliers, lead to further sales for businesses that provide consumer goods and services.

Economic effects from capital investment were estimated separately from operations and maintenance effects.

Capital investment can be defined as: (1) development of facilities –including project design and construction of stations, maintenance yard and shops, and right-of-way routes, and (2) purchases of equipment – vehicles and supporting control and operations equipment. Capital investment effects would be one-time impacts that last for the duration of construction. The effect of capital investments are discussed in Section 4.2. Short-term Construction Effects.

Operations and maintenance expenditures, including rail service, maintenance activities, and administration, would result in recurring economic effects. These economic effects are measured in dollars (output and earnings) or number of jobs (employment). One job is defined as a job for one person of one year's duration. A job that lasts five years would be defined as five person-year jobs. The effect of operations and maintenance expenditures are discussed in Section 4.1. Long-term Operational Effects.

Tax Revenue—the effect of proposed displacements associated with the Preferred Alternative and the subsequent projected change in tax revenue were quantified using the 2011-2012 real property tax rates for Montgomery and Prince George's Counties.

3. Affected Environment

The following is a description of the labor force, current and future employment, and income characteristics within the region and study area neighborhoods. A description of businesses within the project study area is also provided.

3.1 Labor Force

The labor force is composed of the population 16 years or older who are employed or searching for work. In 2010, there were more than three million people in the labor force in Maryland, which was a 13 percent increase over the 2000 labor force (see Table 1). Between 2000 and 2010, the labor force in Montgomery and Prince George's Counties grew at a similar pace to the state of Maryland. The labor force in Washington, DC grew at a slightly slower pace. In 2010, Montgomery and Prince George's Counties accounted for 17 and 16 percent of the available workforce in the state of Maryland, respectively. Labor force participation as a percentage of total population 16 and over increased slightly during the period in Maryland, Montgomery County, Prince George's County, and Washington, DC.

Table 1. Regional and Neighborhood Labor Force, 2000-2010

Geographic Area	In Labor Force			Percentage of Population in Labor Force	
	2000	2010	% increase	2000	2010
Washington, DC	298,225	331,072	11%	64%	67%
Maryland	2,769,525	3,134,131	13%	68%	70%
Montgomery County [2]	477,123	543,824	14%	71%	73%
Bethesda [1]	10,408	10,183	-2%	70%	75%
Chevy Chase	8,052	8,371	4%	66%	66%
Rock Creek Forest/ Lyttonsville/Rosemary Hills	3,460	3,825	11%	68%	76%
Woodside	2,879	2,937	2%	75%	78%
Silver Spring	15,623	17,863	14%	73%	79%
East Silver Spring	7,213	8,423	17%	69%	78%
Long Branch	3,446	4,295	25%	69%	82%
Takoma Park	12,877	14,446	12%	71%	80%
Prince George's County [2]	431,120	496,700	15%	71%	74%
Langley Park	7,708	12,007	56%	64%	88%
Lewisdale	3,735	5,293	42%	65%	79%
Adelphi [1]	4,779	4,428	-7%	66%	70%
College Park	13,537	13,133	-3%	65%	52%
Riverdale	12,084	14,729	22%	69%	78%
Glenridge/Beacon Heights	6,470	7,398	14%	70%	80%
New Carrollton	4,841	5,109	6%	67%	69%
West Lanham Hills	3,500	3,942	13%	66%	78%
Study Area	120,612	136,382	13%	68%	74%

Note: (1) The U.S. Census Bureau divided census tract 8059.01 into 8059.08 and 8059.09, and divided census tract 7055 into 7055.01 and 7055.02 between the 2000 and 2010 Decennial Censuses. Therefore, labor force growth may possibly be higher in the Adelphi and Bethesda neighborhoods than the results shown. (2) County data in this table is for the entire county, not the portion of the county within the study area.

Source: U.S. Census Bureau, 2000 Census and 2010 American Community Survey.

Between 2000 and 2010, the labor force in each study area neighborhood grew, with the exception of a decrease in the College Park neighborhood's labor force (while Bethesda and Adelphi also experienced

reductions in labor force, those may be based upon changes the census tract boundaries and not a trend in labor force). The decline in the size of the labor force in the College Park neighborhood may be due to: 1) fewer full time college students choosing to participate in the labor force while enrolled in school, combined with 2) a nearly 18 percent increase in full-time equivalent student enrollment at The University of Maryland (UMD) (University System of Maryland Budget Office, 2011). Similarly, the College Park neighborhood also had the lowest labor force participation rate of the study area neighborhoods. Overall, labor force participation rates grew substantially over the decade from 2000 to 2010 in the majority of the study area neighborhoods, with the Langley Park neighborhood having the largest increase (24 percentage points) as well as the highest 2010 labor force participation rate (88 percent).

3.2   Employed Persons

3.2.1   Employment Status

Between 2000 and 2010, total employed persons (the number of residents who work) in the study area grew by 11 percent; in Montgomery and Prince George's Counties, it grew 12 and 13 percent, respectively. The number of employed persons grew 11 percent in the State of Maryland and 13 percent in Washington, DC (see Table 2).

The study area unemployment rate increased substantially between 2000 and 2010, from five percent to eight percent, due largely to the national recession of 2007-2009. Depending on population growth and the number of people entering and leaving the labor force, unemployment can increase even as the number of jobs grows. The Montgomery County unemployment rate increased to five percent and the Prince George's County unemployment rate increased to eight percent by 2010. The state of Maryland overall was at seven percent unemployment in 2010, higher than Montgomery County and lower than Prince George's County. The 2010 unemployment rate in Washington, DC (nine percent) is greater than the two neighboring counties or state of Maryland.

According to the Bureau of Labor Statistics (BLS), since 2010, overall unemployment in the two study area counties, Washington, DC, and the State of Maryland has decreased somewhat. While BLS data varies in collection methodology from the U.S. Census Bureau, the regional trend in unemployment is clear. Between 2010 and the first half of 2012, unemployment fell by 0.7 percentage points in Montgomery County and 1.0 percentage points in Prince George's County. Unemployment decreased by 0.9 percentage points in Maryland and 0.7 percentage points in Washington, DC between 2010 and the first half of 2012 (BLS 2012).

Total employed persons increased between 2000 and 2010 in the overall study area and most neighborhoods, with the exception of Woodside (while Bethesda and Adelphi also experienced reductions in employed persons, those may be based upon changes the census tract boundaries and not a trend in employed persons). Similar to the counties and state, the unemployment rate increased substantially over the decade in most study area neighborhoods. The unemployment rate decreased in the College Park neighborhood over the decade, but again, this may be partially due to a change in both the number of UMD students overall, and the number choosing to participate in the labor force. Langley Park, Lewisdale, and Glenridge/Beacon Heights neighborhoods had the highest unemployment rates in 2010, each greater than 11 percent. The Chevy Chase and Long Branch neighborhoods had the lowest unemployment rate in 2010 at three percent.

Table 2. 2000 and 2010 Employed Person Trends by Area of Residence

Region/Neighborhood	Employed [1]			Unemployment Rate [2]	
	2000	2010	% Change 2000–2010	2000	2010
Washington DC	263,108	297,027	13%	7%	9%
Maryland	2,608,457	2,904,475	11%	3%	7%
Montgomery County [4]	458,824	511,790	12%	2%	5%
Bethesda [3]	10,171	9,632	-5%	2%	5%
Chevy Chase	7,413	7,756	5%	1%	3%
Rock Creek Forest/ Lyttonsville/Rosemary Hills	3,263	3,509	8%	3%	8%
Woodside	2,795	2,722	-3%	1%	5%
Silver Spring	14,871	16,819	13%	3%	4%
East Silver Spring	6,820	7,638	12%	3%	9%
Long Branch	3,347	4,169	25%	2%	3%
Takoma Park	12,075	13,116	9%	6%	9%
Prince George's County [4]	399,355	452,459	13%	4%	8%
Langley Park	7,052	10,535	49%	5%	12%
Lewisdale	3,507	4,576	30%	4%	13%
Adelphi [3]	4,435	4,080	-8%	4%	7%
College Park	11,072	11,833	7%	12%	11%
Riverdale	11,174	13,132	18%	7%	9%
Glenridge/Beacon Heights	5,978	6,470	8%	6%	12%
New Carrollton	4,625	4,666	1%	3%	9%
West Lanham Hills	3,237	3,537	9%	7%	9%
Study Area	111,835	124,190	11%	5%	8%

Notes: (1) Employed here means the number of individuals residing in each geography who were employed. (i.e., these numbers are based on residents of these areas and do not reflect the number of jobs in these areas)

(2) Unemployment data is also based on the residents of these geographies and indicate the number of individuals who are actively seeking work, as a percentage of the population 16 years and older.

(3) The U.S. Census Bureau divided census tract 8059.01 into 8059.08 and 8059.09, and divided census tract 7055 into 7055.01 and 7055.02 between the 2000 and 2010 Decennial Censuses. Therefore, growth in employed persons may possibly be higher in the Adelphi and Bethesda neighborhoods than the results shown.

(4) County data in this table is for the entire county, not the portion of the county within the study area.

Source: U.S. Census Bureau, 2000 Census and 2010 American Community Survey.

3.3   Major Employers

3.3.1   Major Regional Employers

Overall, there were approximately 8,180 businesses in Montgomery County and 5,474 businesses in Prince George's County as of 2011. Major employers in Montgomery and Prince George's Counties are listed in Table 3. Eleven federal government agencies are located within Montgomery and Prince George's Counties, which makes the federal government the largest employer in the two counties. Other major employers include county school districts and governments, healthcare and hospital facilities, higher education (Montgomery College and the University System of Maryland), and a variety of private businesses.

Immediately adjacent to the project corridor, the District of Columbia is the major employment center for the region. The Washington, DC Department of Employment Services (DCDES) publishes a list of the

top 200 firms in the District. Table 4 shows the 15 largest private firms (ranked by size of workforce) identified by DCDES.

Table 3. Major Employers within Montgomery and Prince George's Counties

Business	Number of Employees (within County/DC)	Description
Montgomery County		
Montgomery County School District	20,288	County school district
National Institutes of Health	14,761	Federal government agency (medical research)
Adventist Healthcare, Inc.	8,789	Hospital/outpatient clinic and nursing services
United States Department of the Navy, National Naval Medical Center	8,108	Federal government agency (hospital and research facility)
Montgomery County Government	7,689	County government
U.S. Food and Drug Administration	5,745	Federal government agency (R&D and standards)
Marriott International	5,025	Hotels, motels
Lockheed Martin	4,741	Defense, aerospace, electronics
Giant Food	4,377	Groceries
Montgomery College	3,451	Higher education
Kaiser Foundation Health Plan	2,244	Medical services
National Geospatial-Intelligence Agency	3,000	Federal government agency (national security intelligence)
Verizon	2,895	Telecommunications
Holy Cross Hospital	2,890	Medical services
National Institute of Standards and Technology	2,700	Federal government agency (testing and standards, R&D)
Prince George's County		
University System of Maryland	16,014	Higher education
Prince George's County School District	12,969	County school district
Prince George's County Government	8,348	County government
Joint Base Andrews Naval Air Facility Washington	8,057	Military installation
U.S. Internal Revenue Service	5,539	Federal government agency (Revenue collection and data processing)
U.S. Census Bureau	4,287	Federal government agency (Demographic research & analysis)
United Parcel Service (UPS)	4,220	Mail and package delivery services
Giant Food	3,600	Groceries
NASA - Goddard Space Flight Center	3,171	Federal government agency (space research)
Verizon	2,738	Telecommunications
Dimensions Healthcare System	2,500	Medical services
Gaylord National Resort and Convention Center	2,000	Resort and conference center
Shoppers Food Warehouse	1,975	Groceries
U.S. Department of Agriculture	1,850	Federal government agency (agricultural research)
National Maritime Intelligence Center	1,724	Federal government agency (maritime intelligence analysis)

Source: MD Department of Business and Economic Development and Dun and Bradstreet Selectory, Inc.

Table 4. Major Private Employers within Washington, DC

Business	Description
Georgetown University	Higher education
George Washington University	Higher education
Washington Hospital Center	Medical services
Children's National Hospital	Medical services
Howard University	Higher education
Georgetown University Hospital	Medical services
American University	Higher education
Fannie Mae	Mortgage finance (government-sponsored enterprise)
The Catholic University of America	Higher education
Providence Hospital	Medical services
Howard University Hospital	Medical services
Sibley Memorial Hospital	Medical services
The George Washington Hospital	Medical services
Admiral Security Service	Security services corporation
The Washington Post	Media corporation

Source: Washington, DC Department of Employment Services.

Educational institutions and hospitals are the predominant and largest non-government employers. In addition to the organizations listed, District of Columbia Public Schools and the District of Columbia government are large city employers.

3.3.2   Federal Government Employment

The federal government is an important employer for residents of Montgomery and Prince George's Counties, as well as Washington, DC, residents. Approximately 16 percent and 20 percent of the employed civilian workforce in Montgomery and Prince George's Counties, respectively, worked for the federal government in 2010 (see Table 5). In comparison, approximately 13 percent of the employed workforce for the state of Maryland was employed by the federal government. In Washington, DC, 20 percent of the employed civilian workforce worked for the federal government in 2010. The relative importance of the federal government as an employer has grown in both counties, the district, and the state over the decade from 2000-2010, as shown in Table 5.

Table 5. County and State Federal Government Employment, 2000-2010

Geographic Level	Total: Employed civilian population 16 years and over		% Federal government workers	
	2000	2010	2000	2010
Montgomery County	458,824	511,790	13%	16%
Prince George's County	399,355	452,459	19%	20%
Maryland	2,608,457	2,904,475	10%	13%
Washington, DC	263,108	297,027	17%	20%

Source: U.S. Census Bureau, 2000 Census and 2010 American Community Survey.

To summarize regional employment trends collected by the U.S. Census Bureau during the 2010 American Community Survey, as of 2010, the professional, scientific, management, administrative, and waste management services industry was the largest employment sector in Montgomery County, while education, health, and social services was the largest sector for Prince George's County and the state. The

professional, scientific, management, administrative, and waste management services industry was the largest employment sector in Washington, DC (Census Bureau 2013).

Management, professional, and related occupations captured the largest proportion of employment for both counties, Washington, DC, and the state of Maryland over the decade from 2000-2010. Sales and office occupations and service occupations also captured significant percentages of employment from 2000-2010 for the counties, Washington, DC and state of Maryland (Census Bureau 2013).

3.3.3   Neighborhood Employment Centers

Major regional activity centers, as defined by MWCOG, in the regional study area include the Bethesda CBD, Silver Spring CBD, and New Carrollton (MWCOG 2007). The MWCOG regional activity center designation has been used extensively as a technical and policy tool to analyze the effects of growth and change in the region. Both the Bethesda and Silver Spring CBDs in Montgomery County are identified as Mixed-Use Centers. Mixed-Use Centers are generally urban in character and contain either a dense mix of retail, employment, and residential activity or substantial levels of employment and housing; they are accessible by transit or commuter rail and by major highways. New Carrollton is identified as a Suburban Employment Center. Suburban Employment Centers are more dispersed, lower-density areas.

Other regional activity centers in the study area include Takoma Park/Langley Park and UMD in College Park. Each of these activity centers contains a mix of retail, office, industrial, commercial, and residential land uses that support major employment and residential bases. In addition, a number of regional shopping areas are located in the study area, including downtown Silver Spring, University Boulevard in Takoma/Langley Park, and Annapolis Road in New Carrollton. Smaller local retail and service establishments are interspersed on the roadways that connect the activity centers. The study area contains a growing population that is expected to continue to increase and thus rely heavily on transit to reach these activity and employment centers (see Table 6, Population and Employment Forecasts at Regional Activity Centers).

Table 6. Population and Employment Forecasts at Regional Activity Centers

Location	Population			Employment		
	2010	2040	Change	2010	2040	Change
Bethesda CBD	13,949	24,827	78%	35,503	41,207	16%
Silver Spring CBD	14,123	23,953	70%	30,857	38,860	26%
Takoma/Langley Park	36,803	43,838	19%	7,245	11,386	57%
University of Maryland/College Park	28,641	47,580	66%	31,581	48,604	54%
New Carrollton	1,374	5,983	335%	10,513	17,540	67%

Source: MWCOG Regional Activity Centers, Round 8.0 Cooperative Forecasting*: Employment Forecasts to 2040 by Traffic Analysis Zone 2010.*

3.3.4   Major Study Area Employers

There are approximately 580 businesses within 500 feet to each side of the alignment. The businesses are concentrated in the Bethesda, Silver Spring, Langley Park, and Riverdale neighborhoods. The type and number of businesses within the study area are shown in Table 7. The data demonstrate that the study area economy, even at the study area level, is quite economically diverse. The professional, scientific and technical services industry and the retail trade industry account for the largest number of business in the study area.

Table 7. Businesses within the Purple Line Study area, 2011

NAICS Industry Classification	# Business within Study Area
Professional, Scientific and Technical Services	128
Retail Trade	72
Manufacturing	51
Other Services (except public administration)	51
Finance and Insurance	44
Health Care and Social Assistance	31
Administrative and Support and Waste Management and Remediation Services	28
Accommodation and Food Services	25
Information	25
Real Estate Rental and Leasing	25
Educational Services	24
Public Administration	24
Wholesale Trade	21
Construction	20
Arts, Entertainment and Recreation	5
Mining	2
Transportation and Warehousing	2
Utilities	1
Management of Companies and Enterprises	1
TOTAL	580

Source: Dun and Bradstreet Selectory, Inc.

Major employers within the study area are summarized in Table 8, with UMD being the largest employer. The major employers include four federal government agencies, demonstrating the important employment role of the federal government in the study area.

Table 8. Major Employers within the Purple Line Study area, 2011

Business	# Employees within Study area	Description
University of Maryland	3,169	College/University
CBMC Capital Building Maintenance	1,800	Janitorial and building maintenance service
National Marine Fisheries Service	767	Federal government agency
Westwood One Inc.	610	Radio receiver network manufacturer
Altos Federal Group Inc.	450	Management consulting services
Godwin Corporation	400	Medical offices
Animal and Plant Health Inspection Service, U.S. Department of Agriculture	371	Federal government agency
U.S. Consumer Product Safety Commission	345	Federal government agency
National Environmental Satellite, Data & Information Service, National Oceanic and Atmospheric Administration	334	Federal government agency
Acacia Life Insurance Company	320	Life insurance company/investment and security brokers

Source: Dun and Bradstreet Selectory, Inc.

3.4   Employment Projections

3.4.1   Regional Employment Projections

The MWCOG projections of future regional job growth reveal large increases in employment, households, and population between 2010 and 2040. The greatest employment growth, 43 percent between 2010 and 2040, is projected for Montgomery County, while Prince George's County and Washington, DC also show strong employment gains (32 percent and 24 percent, respectively) (MWCOG 2011b). Employment projections from Round 8.0 are summarized in Table 9. Round 8.0 (as well as several previous rounds) assume the Purple Line will be constructed by approximately the year 2020.

Table 9. Regional and Neighborhood Employment Projections by Job Location

Geographic Area	2010	2020		2040	
	Total Employment	Total Employment	Projected % Change in Total Employment 2010-2020	Total Employment	Projected % Change in Total Employment 2010-2040
Washington, DC	785,788	868,256	10%	977,163	24%
Montgomery County	506,000	585,000	16%	723,000	43%
Bethesda	38,543	41,367	7%	44,286	15%
Chevy Chase	29,572	35,328	19%	36,071	22%
Rock Creek Forest/ Lyttonsville/Rosemary Hills	3,390	3,848	14%	3,863	14%
Woodside	1,462	1,475	1%	1,512	3%
Silver Spring	36,448	39,637	9%	44,710	23%
East Silver Spring	1,311	1,367	4%	2,167	65%
Long Branch	674	675	0%	677	0%
Takoma Park	5,010	3,611	-28%	5,359	7%
Prince George's County	358,385	383,635	7%	474,635	32%
Langley Park	1,649	2,658	61%	5,228	217%
Lewisdale	1,460	1,580	8%	2,076	42%
Adelphi	1,399	1,412	1%	1,597	14%
College Park	22,830	24,665	8%	33,926	49%
Riverdale	13,385	15,100	13%	22,407	67%
Glenridge/Beacon Heights	2,406	2,491	4%	3,008	25%
New Carrollton	1,403	1,431	2%	1,625	16%
West Lanham Hills	20,456	16,563	-19%	28,011	37%
Study Area	181,398	193,208	7%	236,523	30%

Notes:
(1) MWCOG does not publish data for the State of Maryland as a whole, so statewide data could not be included for comparison in this table.
(2) Employment data presented in this table represent the number of jobs located in each geography listed above and are not reflective of the number of employed persons residing in these geographies.
(3) County data in this table is for the entire county, not the portion of the county within the study area.

Source: MWCOG. November 2011. Round 8.0 Cooperative Forecasting: Employment Forecasts to 2040 by Traffic Analysis Zone.

Employment forecasts are based on the projected square footage of development anticipated in each of four major land use categories: industrial, retail, office, and other. Table 10 shows employment projections divided into the four land use/employment categories: Industrial, retail, office, and other. In

Montgomery County, between 2010 and 2040, the largest increase in both the number and percentage of jobs is projected to occur in the office employment category.

Table 10. Employment Projections by Employment Category and Geographic Area, 2010–2040

| Geographic Area | 2010 Baseline Employment (# of emp) | | | | Projected Change by Employment Category, 2010-2040 | | | |
	Industrial	Retail	Office	Other	Industrial	Retail	Office	Other
Washington DC	63,893	86,811	452,268	182,816	67% (+42,810 emp.)	25% (+22,083 emp.)	19% (+85,818 emp.)	21% (+39,164 emp.)
Montgomery County	47,231	90,830	247,631	120,308	41% (+19,296 emp.)	24% (+21,750 emp.)	61% (+150,497 emp.)	21% (+25,457 emp.)
Bethesda	207	4,695	29,765	3,876	2% (+4 emp.)	12% (+573 emp.)	17% (+5,034 emp.)	4% (+135 emp.)
Chevy Chase	0	310	860	28,402	0% (+0 emp.)	131% (+407 emp.)	67% (+574 emp.)	19% (+5,518 emp.)
Rock Creek Forest/ Lyttonsville/ Rosemary Hills	1,372	50	77	1,891	1% (+18 emp.)	0% (+0 emp.)	5% (+4 emp.)	24% (+451 emp.)
Woodside	813	238	181	230	3% (+28 emp.)	3% (+8 emp.)	4% (+7 emp.)	3% (+7 emp.)
Silver Spring	1,129	6,923	25,666	2,730	3% (+31 emp.)	23% (+1,573 emp.)	24% (+6,125 emp.)	19% (+533 emp.)
East Silver Spring	26	426	126	733	0% (+0 emp.)	18% (+78 emp.)	618% (+778 emp.)	0% (+0 emp.)
Long Branch	2	30	52	590	0% (+0 emp.)	0% (+0 emp.)	0% (+0 emp.)	1% (+3 emp.)
Takoma Park	43	1,447	715	2,805	14% (+6 emp.)	25% (+365 emp.)	142% (+1,013 emp.)	-37% (-1,035 emp.)
Prince George's County	56,652	83,653	84,639	133,441	15% (+8,414 emp.)	36% (+30,228 emp.)	40% (+33,499 emp.)	33% (+44,109 emp.)
Langley Park	72	1,224	156	197	225% (+162 emp.)	217% (+2,657 emp.)	213% (+332 emp.)	217% (+428 emp.)
Lewisdale	52	645	239	524	42% (+22 emp.)	50% (+319 emp.)	34% (+82 emp.)	37% (+193 emp.)
Adelphi	136	371	206	686	15% (+20 emp.)	14% (+53 emp.)	8% (+17 emp.)	16% (+108 emp.)
College Park	1,410	2,125	1,649	17,646	37% (+518 emp.)	27% (+567 emp.)	36% (+597 emp.)	53% (+9,414 emp.)
Riverdale	1,627	2,443	4,798	4,517	46% (+745 emp.)	63% (+1,547 emp.)	77% (+3,696 emp.)	67% (+3,034 emp.)
Glenridge/ Beacon Heights	130	1,477	343	456	30% (+39 emp.)	22% (+325 emp.)	28% (+95 emp.)	31% (+143 emp.)
New Carrollton	133	536	189	545	25% (+33 emp.)	4% (+19 emp.)	4% (+8 emp.)	30% (+162 emp.)
West Lanham Hills	3,472	6,441	4,509	6,034	36% (+1,246 emp.)	20% (+1,302 emp.)	51% (+2,309 emp.)	45% (+2,698 emp.)
Study Area	10,624	29,381	69,531	71,862	**27% (+2,872 emp.)**	**33% (+9,793 emp.)**	**30% (+20,671 emp.)**	**30% (+21,792 emp.)**

Note:
(1) MWCOG does not publish data for the State of Maryland, so it could not be included for comparison.
(2) County data in this table is for the entire county, not the portion of the county within the study area.

Source: MWCOG 2011a.

In Prince George's County, the largest absolute employment increase would occur in other employment, while the largest percentage increase would occur in office employment. In Washington, DC, the greatest absolute employment increase is projected to occur in office employment, while industrial employment is expected to grow at the fastest rate.

3.4.2 Neighborhood Employment Projections

By the year 2020, employment is expected to remain steady or grow in all study area neighborhoods except Takoma Park and West Lanham Hills. In the study area neighborhoods overall, employment growth of 7% is expected. The largest percentage increase in employment is projected to occur in the Langley Park neighborhood, while the largest absolute employment increase is projected to occur in the Chevy Chase neighborhood. By 2040, employment growth is expected to occur in all study area neighborhoods. The largest percentage increases in neighborhood employment are projected to occur in Langley Park (217 percent), Riverdale (67 percent), and East Silver Spring (65 percent). The largest absolute job growth is projected to occur in the College Park, Riverdale, Silver Spring, West Lanham Hills, Chevy Chase, and Bethesda neighborhoods.

As shown in Table 10, for the study area overall, job growth between 27 and 33 percent is predicted in all categories of employment. Employment in the study area neighborhoods is expected to grow or remain stable during the three decades between 2010 and 2040, with the exception of Takoma Park, which shows a substantial decline in "other" employment by 2040. While this decline will be offset by an increase in office employment, these estimates demonstrate that the Takoma Park employment base is expected to undergo major changes, as redevelopment and potential shifts in land use occur in the area (e.g., due to the Takoma Langley Crossroads Sector Plan and the Washington Adventist Hospital move to White Oak campus).

Silver Spring, Bethesda, and Riverdale are projected to have the greatest absolute increases in office employment. The office employment gains can be expected since Bethesda and Silver Spring are growing regional employment centers, and Riverdale contains UMD's recently established M Square research park. Office employment is projected to grow at the greatest rate in East Silver Spring.

College Park and Chevy Chase are projected to show the strongest absolute gains in "other" employment, which can be expected since "other" employment includes college and universities; College Park is home to UMD's main campus and University College campus, while the Chevy Chase neighborhood abuts American University, Trinity Washington University, and a branch of Georgetown University.

Riverdale and West Lanham Hills also show substantial growth in "other" employment by 2040, and they would likely benefit from future planned transit oriented development around Metrorail, MARC, and the proposed Purple Line rail stations.

3.5 Income

Table 11 summarizes median household income in Montgomery and Prince George's Counties, Washington, DC, and the State of Maryland. It shows annual income in inflation-adjusted 2012 dollars to allow for appropriate comparison between time periods. Median household income in the two counties and a majority of study area neighborhoods decreased or remained flat over the decade from 1999-2010. This decline corresponded with a smaller decline at the state level.

A number of trends come together to affect household income. The lack of growth in overall study area median income likely reflects both national and local economic trends. The 2007-2009 national recession likely contributed to the decline in household income for many residents of the study area. Locally, two demographic trends: 1) an influx of immigrants who tend to initially earn lower wages, and 2) a moderate rise in average population age (increasing the proportion of residents who rely on pensions and Social Security income instead of salary income), may have contributed to the lack of growth in median

household income. In contrast, median household income rose in Washington, DC between 1999 and 2010.

Table 11. Median Household Income, 1999–2010

Geographic Area	Median Household Income in 1999 (2012 $) [1][2]	Median Household Income in 2010 (2012 $) [2]	Percent Change, 1999–2010
Washington DC	$57,935	$61,780	7%
Maryland	$76,331	$74,575	-2%
Montgomery County	$103,305	$98,565	-5%
Bethesda [3]	$105,339	$122,476	16%
Chevy Chase	$174,519	$174,484	0%
Rock Creek Forest/Lyttonsville/ Rosemary Hills	$95,095	$81,334	-14%
Woodside	$86,094	$90,032	5%
Silver Spring	$83,707	$82,079	-2%
East Silver Spring	$88,759	$78,645	-11%
Long Branch	$76,925	$90,722	18%
Takoma Park	$58,005	$65,973	14%
Prince George's County	$79,779	$75,222	-6%
Langley Park	$57,326	$53,439	-7%
Lewisdale	$78,593	$77,709	-1%
Adelphi [3]	$63,734	$51,770	-19%
College Park	$78,689	$78,521	0%
Riverdale	$57,447	$57,774	1%
Glenridge/Beacon Heights	$65,882	$58,864	-11%
New Carrollton	$96,933	$72,524	-25%
West Lanham Hills	$54,026	$56,994	5%
Study Area	$83,715	$83,762	0%

Notes:
(1) Income data in the 2000 Census was collected based on respondents' prior 12-month income, or income in 1999.
(2) Median household income for each neighborhood is based on the average of the median household incomes for the census tracts within each neighborhood, weighted by the number of households for each census tract.
(3) The U.S. Census Bureau divided census tract 8059.01 into 8059.08 and 8059.09, and divided census tract 7055 into 7055.01 and 7055.02 between the 2000 and 2010 Decennial Censuses. Therefore, the change in income level in the Adelphi and Bethesda neighborhoods may vary slightly from the results shown.

Source: U.S. Census Bureau, 2000 Census, and 2010 American Community Survey.

In the study area neighborhoods overall, income remained flat, in contrast to the decline at the state level and two counties, but lower than income growth in Washington, DC. Income declines were the steepest in the New Carrollton, Adelphi, Rock Creek Forest/Lyttonsville/Rosemary Hills, Glenridge/Beacon Heights, and East Silver Spring neighborhoods. However, median household income increased in several study area neighborhoods. The greatest increases in median household income occurred in the Bethesda (16 percent), Long Branch (18 percent), and Takoma Park (14 percent) neighborhoods. The Riverdale and Woodside neighborhoods also experienced modest gains in median household income.

4. Environmental Consequences

4.1 Long-term Operational Effects

The Preferred Alternative would foster employment growth in the study area both by creating new permanent jobs (discussed under "Employment, Earnings, and Output Effects" below) and by supporting existing and future employment opportunities in the study area.

Implementing the Preferred Alternative would support employment growth in both Montgomery and Prince George's Counties by providing faster, more direct, and more reliable east-west transit service between existing high density residential areas, regional shopping centers, and major employment centers in the study area, such as Bethesda, Silver Spring, UMD in College Park, and New Carrollton, as well as other commercial areas, including Langley Park and Riverdale. By connecting directly with Metrorail and other public transportation services, the Preferred Alternative also improves connections not just within the study area, but between the study area and the other parts of the regional economy

Long term effects on business conditions resulting from the Preferred Alternative are anticipated to be positive. Increased transportation capacity and new/improved connections created by the Preferred Alternative would create competitive advantages for businesses in the study area by improving connections between businesses and their employees and customers. From the labor force perspective, the Preferred Alternative would improve connections for study area residents to access jobs and educational opportunities. In addition, the project is expected to support planned TOD at some station locations (see *Section 4.2 Land Use and Chapter 7: Indirect and Cumulative Effects*).

The industries, occupations, and major employers that dominate the study area are of the type that could take advantage of additional transit opportunities and may be influenced by transit access when selecting employment locations. The federal government, a major employer in the region and study area, prioritizes access to public transit when locating new federal facilities, as per *Executive Order 13514 Federal Leadership in Environmental, Energy and Economic Performance* (2009). The federal focus on site sustainability is echoed in the growing private sector demand for locations with Leadership in Energy and Environmental Design (LEED) certification. The Preferred Alternative can thus be expected to improve the study area's ability to retain existing employment and attract new employment opportunities in the study area. To the extent that the Preferred Alternative creates and/or supports employment and educational opportunities, it would have a positive effect on the income of affected study area households in the study area neighborhoods.

4.1.1 Employment, Earnings and Output Effects from Operations and Maintenance Expenditures

Annual operations and maintenance expenditures resulting from the implementation of the Preferred Alternative are expected to be $38.3 million more than expenditures under the No Build Alternative. The overwhelming majority of operations and maintenance spending is expected to occur within the regional study area economy (defined as Montgomery and Prince George's Counties and Washington, DC). Employment associated with operating and maintaining the Preferred Alternative would fall under the transit and ground passenger transportation industry sector. Table 12 shows the applicable regional multipliers and the employment, earnings, and output effects from Preferred Alternative operations and maintenance expenditures. The multiplier effect for the transit and ground passenger transportation industry indicates that every million dollars of spending supports approximately 12 jobs in the study area economy.

Table 12. Regional Operations and Maintenance Jobs, Earnings, and Output Created by the Preferred Alternative

Industry	Final Demand Multiplier		
	Employment (jobs)[2]	Earnings (2012 $)	Output (2012 $)
Transit and Ground Passenger Transportation	11.9561	0.2393	1.3141
Total	Economic Effects[1]		
	425	$9,165,000	$50,330,000

[1]Based on total O&M cost of $38.3 million over the No Build Alternative, and BEA RIMS II Direct Effect Multipliers. To calculate employment effects, O&M costs were deflated to 2008 using BLS price index (Series id: PCU482).
[2]One job is defined as a job for one person for one year. A job that lasts five years would equate to five person-year   jobs.

Source: BEA 2011.

Purple Line operations and maintenance expenditures ($38.3 million annually over the No Build Alternative) would result in 425 ongoing permanent jobs for the regional study area economy. This employment would support a $9.165 million annual increase in household earnings for the regional study area. This effect can also be expressed as a $50.33 million increase in regional output. Because the MWCOG employment projection model assumed construction of the Purple Line, these jobs are included in the study area employment projections, and would not be in addition to the MWCOG estimates shown in Table 9. The numbers in Table 4-15 reflect the difference between the No Build and the Preferred Alternative.

4.1.2   Tax Revenue Impacts

All real estate acquisitions for the Purple Line project would occur in either Montgomery or Prince George's Counties. In Maryland, real estate is assessed once every three years. The real property tax rate in Montgomery County for fiscal year 2011-2012 was $0.713 per $100.00 of assessed value. The real property tax rate in Prince George's County for fiscal year 2011-2012 was $0.960 per $100.00 of assessed value. In both counties, owner-occupied houses are assessed at 100 percent of the full assessed value.

Table 13 shows the tax revenue effects resulting from the residential and commercial displacements related to the Preferred Alternative. A total of $294,300 in property tax revenue would be lost in Montgomery County, and $129,800 would be lost in Prince George's County once these properties are transferred to MTA ownership. These losses are small (0.02 percent) relative to the total tax base for the two counties, as shown in Table 13. In addition, the Preferred Alternative is anticipated to have a net positive effect on the tax base by increasing property values in the study area and potentially attracting new businesses (see Chapter 7 of the FEIS).

Slight decreases in municipal tax revenue would also result from displacements related to the Preferred Alternative. The impact would be small relative to the tax bases of the study area municipalities. In addition, eight of the 16 study area neighborhoods would not experience any displacements. The largest number of residential displacements in a neighborhood (22) would occur in the unincorporated portion of the Riverdale neighborhood. The overall tax base in incorporated Riverdale Park is steadily growing due to the build-out of the M Square Research Park and will likely continue to grow with the 37-acre Cafritz future mixed-used development. The greatest value of commercial real estate would be displaced in Silver Spring and Takoma Park. However, these neighborhoods have large and diverse commercial tax bases. For these reasons, the immediate effect on municipal tax revenue is expected to be negligible, and the long-term effect is anticipated to be positive.

Table 13. Tax Revenue Effects Resulting from Preferred Alternative Displacements

Region	2011–2012 Real Property Tax Rate (per $100 assessed value)	Reduction in Assessed Value due to Displacements	Change in Tax Revenue Resulting from Project Displacements	% of Total Projected 2011–2012 Property Tax Revenue
Montgomery County	0.713	-$41,277,400	-$294,300	0.02%
Prince George's County	0.960	-$13,525,000	-$129,800	0.02%
Total: Purple Line Study Area	n/a	-$54,802,400	-$424,100	0.02%

Note: The results presented are for the counties only; the tax loss to the municipalities is not quantified. Tax loss was calculated for full acquisitions (which result in displacements) only; partial acquisitions were not included in the analysis.

Source: Tax rates from Montgomery County Approved FY 2012 Operating Budget, Prince George's County Budget in Brief, FY 2012; tax revenue analysis by PL GEC. Analysis based on total tax revenues of $1.472 billion in Montgomery County, $721 million in Prince George's County, and $2,192 billion for the combined county region.

4.1.3   Avoidance and Minimization

MTA has worked to avoid or minimize property acquisition and displacement throughout the design and planning of the project. Recent design refinements such as the Lyttonsville Yard and Kenilworth Avenue are two areas where the number of commercial displacements was substantially reduced. See Section 8.2.2 of the FEIS for a description of the Purple Line business outreach program and the activities conducted throughout the development of the project.

4.1.4   Mitigation

No mitigation is warranted.

4.2   Short-Term Operational Effects

4.2.1   Construction Impacts on Businesses

As described in Chapter 5 of the FEIS, in selected areas of the study area, temporary construction easements, lanes or road closures, or other property restrictions could have negative impacts to some businesses, thus negatively affecting the economy within the study area. Losses of parking and difficulty accessing businesses could deter customers and disrupt deliveries. Small businesses in particular could have difficulty withstanding the resulting loss of commerce.

MTA is committed to supporting local businesses in the Purple Line corridor during construction. The Purple Line public outreach program includes a specific outreach effort to businesses. See Section 8.2.2 for more information on this program.

MTA will develop a Business Impact Mitigation Plan to support small businesses in the corridor during construction. MTA is evaluating the experiences of other cities to minimize or mitigate impacts and will use the "best practices" to support local businesses as much as possible. The following strategies have been used successfully in other locales, and may be included in the Purple Line plan:

- Construction of the project in segments, to keep disruption to a small area at a time
- Maintaining access to business during construction both for customers and deliveries
- Maintaining or relocating bus stops
- Maintaining parking lot access
- Providing directional signage

- Developing "Open for Business" marketing and advertising tools for use during construction
- Promotion of corridor businesses through social media and the project website
- Construction hotline open 24/7

MTA has reached out to the Montgomery and Prince George's County Economic Development offices as well as CASA de Maryland to identify support services and resources available for small businesses. MTA will continue to coordinate with CASA de Maryland and other local business advocacy groups such as the Takoma Langley Crossroads Development Authority, and local Chambers of Commerce, and will continue to coordinate with the counties on how to facilitate use of these services and resources by Purple Line corridor businesses.

Most importantly, MTA will maintain open communication between the Purple Line public outreach team and local businesses, so business have no surprises and know who to call when they have questions or problems. As noted above, MTA coordination with affected commercial property owners has already started and will continue through project construction and implementation.

4.2.2   Employment and Output Effects from Capital Expenditures

The capital expenditure for the Preferred Alternative is estimated to total $1.847 billion, based on planning design cost estimates (June 2012). Table 14 summarizes the capital costs by spending category.

The expenditures associated with the construction of the project would, like the ongoing O&M expenditures, impact jobs, earnings, and output in the regional study area (defined as Montgomery and Prince George's County and Washington, DC). The economic impact of these capital expenditures to the region is dependent upon whether the goods and services in each spending category are produced locally. Two categories—general construction and professional services—are expected to be predominantly produced within the regional study area economy and would therefore affect local employment. Construction firms would not purchase all materials within the regional study area; however, the RIMS II multipliers are constructed so as to account for these leakages, or purchases made by local suppliers to sources outside the study area. Two cost categories—vehicles and right-of-way—were excluded from the Purple Line analysis because they would not cause an economic effect on the region. Light rail vehicles are not manufactured within the region and thus would not be purchased locally; right-of-way purchases do not involve the production of goods or services.

Table 14. Preferred Alternative Capital Expenditure by Spending Category

Spending Category	Capital Expenditure (2012$ x000)
General Construction - guideway elements, stations, yards and shops, sitework, systems, and contingencies	$1,070,525
Vehicles acquisition	$239,768
Right-of-Way acquisition - all rights-of-way, land and existing improvements	$152,457
Professional Services Costs - engineering and related services	$316,094
Unallocated Contingencies - additional unforeseen costs that may occur in any of the above categories	$67,692
Total	$1,846,536

Table 15 shows the impacts of expenditures in construction and professional services (engineering) that would be required for the implementation of the Preferred Alternative. These impacts show the jobs, earnings, and output impacts within the regional study area, including direct, indirect, and induced effects.

In total, the construction of the Preferred Alternative would result in approximately 6,300 new person-years of employment in the regional study area over the approximate five-year construction period. These jobs are associated with the construction of the project and do not represent an

Table 15. Regional Jobs, Earnings, and Output Created by Capital Expenditures of the Preferred Alternative

Industry	# of Jobs[1]	Earnings (2012 $)	Output (2012 $)
Construction	4,800	$235,039,000	$1,539,613,000
Professional, Scientific and Technical Services	1,500	$89,600,000	$485,300,000
Total	6,300	$324,639,000	$2,024,913,000

Note: These impacts are based on construction cost of $1,071 million and a professional services cost of $316 million, plus 5 percent unallocated contingency for construction and a 2% unallocated contingency for professional services ($54 million and $6 million, respectively), and BEA RIMS II 2008 Type II Final Demand Multipliers (4.6128 and 4.9461 for employment; 0.2091 and 0.2779 for earnings; and 1.3697 and 1.5052 for output for construction and professional, scientific and technical services, respectively). Construction and professional services costs were deflated to 2008 using BLS price indices (Series id: PCUBNEW and CWUR0100SA0 respectively). The employment multiplier represents the total change in number of jobs that occurs in all industries for each $1 million of output delivered to final demand. The output and earnings multipliers represent the total dollar change that occurs in all industries for each additional dollar of output delivered to final demand.
[1]One job is defined as a job for one person for one year. A job that lasts five years would equate to five jobs in this table.

Source: BEA 2011

ongoing change to regional employment. This new employment would result in a $325 million increase in household earnings for the regional study area. This effect can also be expressed as a $2.0 billion change in output, or the value of goods and services produced, for the regional study area. It is important to note that employment and output generated are alternative units of measurement of the same economic impact, so they should not be added together.

4.2.3   Avoidance and Minimization

Where reasonably feasible, vacant or publicly-owned property, rather than developed property, would be identified for temporary use during construction activities. In addition, project design and the construction staging plans are continuing to be developed to reduce economic and other impacts on the surrounding communities. These avoidance and minimization efforts are described in the FEIS. Some of the more relevant measures include the careful scheduling and staging of construction activities to reduce the duration of short-term impacts and the development of a Transportation Management Plan considering the needs of affected properties, which would be developed in consultation with affected property owners and businesses.

4.2.4   Mitigation

MTA has and will continue to coordinate with affected commercial property owners to identify strategies to minimize the effects of temporary construction easements, lane or road closures, and other property restrictions on existing corridor businesses. MTA will implement a Business Impact Mitigation Plan as described in Section 4.19 of the FEIS, Environmental Justice.

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Appendix A – List of Acronyms and Abbreviations

APPENDIX A

List of Acronyms and Abbreviations

BEA	United States Department of Commerce, Bureau of Economic Analysis
BLS	United States Department of Labor, Bureau of Labor Statistics
CBD	Central Business District
CLRP	Constrained Long Range Plan
DC	Washington, DC
DCDES	District of Columbia Department of Employment Services
FEIS	Final Environmental Impact Statement
FTA	Federal Transit Administration
LOD	Limit of Disturbance
LRT	Light Rail Transit
MARC	Maryland Area Regional Commuter
MDBED	Maryland Department of Business and Economic Development
MDLLR	Maryland Department of Labor, Licensing and Regulation
MDOT	Maryland Department of Transportation
MSHA	Maryland State Highway Administration
MTA	Maryland Transit Administration
MWCOG	Metropolitan Washington Council of Governments
NEPA	National Environmental Policy Act
RIMS II	Regional Input-Output Modeling System
ROW	Right of Way
TAZ	Transportation Analysis Zones
TOD	Transit Oriented Development
UMD	University of Maryland
USDOT	United States Department of Transportation
WMATA	Washington Metropolitan Area Transit Authority

Appendix B – Glossary/Terminology

APPENDIX B

Glossary/Terminology

Acquisition: the act of obtaining or gaining possession of properties

Central Business District: the commercial, and often geographic, heart of a city

Capital Crescent Trail: the existing paved trail between Bethesda and Georgetown. When the trail alongside the Purple Line is built, the Capital Crescent Trail will extend all the way from Silver Spring to Georgetown.

Capital Investment: expenditure on transit facility development including project design and construction of stations, maintenance yard and shops, and right-of-way routes, as well as purchases of vehicles and supporting control and operations equipment.

Census Tracts: a geographic region defined for the purpose of collecting demographic and economic data

Community Facility: the buildings and services benefiting particular communities

Displacement: to move a resident, business, or community facility from its current location

Earnings: the sum of wage or salary income and net income from self-employment.

Easement: the right provided to a person or entity to use someone else's property. The property owner transfers this right while retaining ownership through execution of an easement document. May be temporary or permanent.

Georgetown Branch right-of-way: the land adjacent to the CSX railroad between Bethesda and Silver Spring (where the trail is today) that was dedicated to a future transit project

Georgetown Branch interim trail: the crushed stone trail existing today in the Georgetown Branch right-of-way

Labor force: people 16 years or older who are classified as employed or unemployed.

Limit of Disturbance: the boundary within which construction, materials storage, grading, landscaping, and related activities shall occur

M Square: the University of Maryland Research Park; this is not part of the UMD campus

Maryland Area Regional Commuter: a regional/commuter rail system consisting of three lines in the Baltimore-Washington Metropolitan Area

Maryland-National Capital Parks and Planning Commission: leaders who plan for orderly development and the protection of natural resources in Maryland's two suburban counties bordering the District of Columbia

Maryland State Highway Administration: the state agency responsible for maintaining numbered Maryland highways outside of Baltimore City

Maryland Transit Administration: the state-operated mass transit administration in Maryland; part of the Maryland Department of Transportation

Metropolitan Washington Council of Governments: a regional organization of consisting of 21 local governments in the Washington Metropolitan Area, as well as members of the Maryland and Virginia state legislatures, the US Senate, and the US House of Representatives

Metrorail: the rapid transit system in Washington, DC, and its surrounding suburbs

Mitigation: efforts to reduce or compensate for adverse impacts

Multiplier: Estimated number by which a capital investment or change in demand is multiplied to give the total amount by which the national income is increased. This multiplier takes all direct and indirect benefits from the capital investment or change in demand into account.

National Environmental Policy Act: a United States environmental law that established a national policy promoting the enhancement of the environment; also established the President's Council on Environmental Quality (CEQ)

No Build: the baseline against which the environmental and community impacts of the Preferred Alternative are compared; consists of the transit service levels, highway networks, traffic volumes, and demographics forecasted for horizon year 2040.

Operations and maintenance expenditure: includes annual costs for rail service, maintenance activities, and administration.

Output: a measure of economic activity; represents the annual dollar value of all goods and services produced in the economy.

Preferred Alternative: the build alternative that is studied in detail in the FEIS (this alternative is a modified/refined/updated version of the Locally Preferred Alternative)

Public Law: regulations governing the relationship between individuals (citizens, companies) and the state

Right-of-way: legally granted access

Study area: the geographic extent that is examined to assess impacts

Surface Transportation and Uniform Relocation Assistance Act: a bill to authorize funds for construction of highways, for highway safety programs, and for mass transit programs, to expand and improve the relocation assistance program, and for other purposes

Transit Center: a sheltered waiting area where multiple mass transportation routes converge; there are two on the alignment, the Silver Spring Transit Center and the Takoma/Langley Transit Center

Transit-oriented Development: a mixed-use residential or commercial area designed to maximize access to public transportation; often incorporates features to encourage transit ridership

Transportation Analysis Zones: the unit of geography most commonly used in conventional transportation planning models.

Unemployment rate: Represents the number of unemployed people as a percentage of the civilian labor force.

Uniform Relocation and Real Property Acquisitions Policies Act: federal law intended to make compensation to persons subjected to federal eminent domain standard and uniform

Urban land: acreage within a city

US Census Bureau: the government agency that is responsible for gathering demographic and economic data in the United States