Greater Lyttonsville Sector Plan

TECHNICAL APPENDIX

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Appendix A:
Affordable Housing

FORWARD: The initial housing conditions and recommendations for Greater Lyttonsville Sector Planning was compiled during the early stages of the planning process. As the planning process evolved, assumptions about redevelopment changed and the number of units in the final Greater Lyttonsville Sector Plan may differ from the number of units proposed for redevelopment in the initial housing conditions and recommendations.

Greater Lyttonsville Existing Housing Conditions

The Greater Lyttonsville Sector Plan aims to preserve the existing number of rent-restricted and market-rate affordable housing units in the community, while also expanding the housing opportunities for low and moderate income households. See the accompanying appendix for the affordability methodology.

Table 1– Lyttonsville Apartments

NAME	PROGRAM	EFFICIENCY	1 BEDROOM	2 BEDROOMS	3 BEDROOMS	4 BEDROOMS	UNITS	SUBSIDIZED
8600 APARTMENTS		3	55	101	12	0	171	
BARRINGTON APARTMENTS	Section 8 / Tax Credit	0	111	236	68	0	415	415
CLARIDGE HOUSE		58	111	52	10	0	231	
FRIENDLY GARDENS		0	0	23	34	28	85	85
PADDINGTON SQUARE	Section 8 HIF	0	0	153	11	0	164	67
ROLLINGWOOD		19	40	162	61	0	282	
ROUND HILL APARTMENTS		2	60	77	10	0	149	
SUMMIT HILLS		63	279	481	252	16	1091	
TOTAL		145	656	1285	458	44	2588	567

Table 2 – Lyttonsville Apartments Average Rents

NAME	AVGRENT EFFICIENCY	AVGRENT 1 BEDROOM	AVGRENT 2 BEDROOMS	AVGRENT 3 BEDROOMS	AVGRENT 4 BEDROOMS	AVG RENT TOTAL
8600 APARTMENTS	$1,050.67	$1,343.84	$1,604.01	$1,969.00		$1,536.23
BARRINGTON APARTMENTS		$1,155.87	$1,398.36	$1,626.01		$1,370.80
CLARIDGE HOUSE	$1,231.00	$1,533.59	$1,853.17	$2,001.00		$1,549.79
FRIENDLY GARDENS			$697.43	$790.74	$889.00	$797.86
PADDINGTON SQUARE			$1,347.19	$1,694.09		$1,370.46
ROLLINGWOOD	$1,175.58	$1,201.40	$1,468.56	$1,760.28		$1,474.02
ROUND HILL APARTMENTS	$1,115.00	$1,159.17	$1,393.08	$1,741.50		$1,318.54
SUMMIT HILLS	$1,382.57	$1,537.93	$1,782.53	$2,146.37	$2,402.50	$1,790.01

Cells highlighted in green are affordable at MPDU Level at 65 Percent of AMI

Table 3 –Lyttonsville Apartments Current Affordability/AMI Level (Based on 100 Percent of AMI in Table 4)

NAME	EFFICIENCY AMI	1 BEDROOM AMI	2 BEDROOMS AMI	3 BEDROOMS AMI	4 BEDROOMS AMI
8600 APARTMENTS	56%	65%	72%	73%	
BARRINGTON APARTMENTS		56%	63%	61%	
CLARIDGE HOUSE	66%	74%	83%	74%	
FRIENDLY GARDENS			31%	29%	32%
PADDINGTON SQUARE			61%	63%	
ROLLINGWOOD	63%	58%	66%	66%	
ROUND HILL APARTMENTS	60%	56%	63%	65%	
SUMMIT HILLS	74%	75%	80%	80%	86%

Table 4 – Income Affordability, Current AMI levels (30 percent)

NAME	EFFICIENCY SUGGESTED INCOME	1-BEDROOM SUGGESTED INCOME	2-BEDROOM SUGGESTED INCOME	3-BEDROOM SUGGESTED INCOME	4-BEDROOM SUGGESTED INCOME
8600 APARTMENTS	$42,015	$53,747	$64,168	$78,760	
BARRINGTON APARTMENTS		$46,229	$55,941	$65,041	
CLARIDGE HOUSE	$49,227	$61,336	$74,135	$80,040	
FRIENDLY GARDENS			$27,901	$31,629	$35,560
PADDINGTON SQUARE			$53,894	$67,764	
ROLLINGWOOD	$47,011	$48,050	$58,749	$70,411	
ROUND HILL APARTMENTS	$44,588	$46,361	$55,729	$69,660	
SUMMIT HILLS	$55,288	$61,510	$71,309	$85,855	$96,100

Using the current AMI affordability level for each apartment, the income needed to avoid being cost burdened is calculated (calculations assumes 30 percent housing costs)

Current Conditions

The housing stock in Greater Lyttonsville presently includes eight multi-family housing buildings within the Lyttonsville Sector Plan Area. These eight structures contain 2,588 units total, of which 567 (22 percent) are subsidized. Half of the units (1,285) are 2-bedroom units, 25 percent are 1-bedroom units, 18 percent 3-bedroom units, 6 percent efficiencies (studios) and 2 percent 4-bedroom units. All eight multi-family buildings are older than 40 years old, with the structures ranging from 44 years old to 63 years old. Typical of older multi-family structures, all rental units in the Greater Lyttonsville Sector Plan Area are market affordable, with non-subsidized units available to incomes at 56-83 percent of AMI.

Proposed Changes

Three multi-family buildings within the Greater Lyttonsville Sector Plan Area offer redevelopment potential. Paddington Square, which presently has 164 units, of which 67 are subsidized, has proposed an increase to 237 units, of which 30 would be affordable under MPDU. Rollingwood would increase to 730 units while keeping a minimum of 176 existing units (of 282), adding 70 affordable MPDU units and 554 new market units. Summit Hills' proposed redevelopment would add 2,719 units, which would add 340 affordable MPDU units.

These proposed changes would create a total rental supply of 4,737 units, of which 1,007 would be subsidized or MPDU (21 percent of total housing supply). Given the large supply of aging housing stock within the Greater Lyttonsville Sector Plan area, the plan recommends Commercial Residential Town (CRT) zoning to allow for redevelopment if the structures become obsolete and not cost-effective to rehabilitate but does not incentivize them to redevelop immediately.

Table 8 – Proposed Redevelopment

NAME	CURRENT UNITS	CURRENT SUBSIDIZED	UNITS PRESERVED	PROPOSED NEW UNITS	NEW MPDU	TOTAL AFFORDABLE HOUSING (MPDU 12.5% + CURRENT SUBSIDIZED)	TOTAL UNITS AFTER DEVELOPMENT	CATEGORY
PADDINGTON SQUARE	164	67		237	30	97	237	Likely to Redevelop
ROLLINGWOOD	282		176	554	70	70	730	Likely to Redevelop
SUMMIT HILLS	1091			2719	340	340	2719	Likely to Redevelop
BARRINGTON APARTMENTS	415	415				415	415	Unlikely to Redevelop
8600 APARTMENTS	171						171	Unlikely to Redevelop
CLARIDGE HOUSE	231						231	Unlikely to Redevelop
FRIENDLY GARDENS	85	85				85	85	Unlikely to Redevelop
ROUND HILL APARTMENTS	149						149	Unlikely to Redevelop
TOTAL	**2588**	**567**	**176**	**3510**	**440**	**1007**	**4737**	

Table 9 – Proposed Redevelopment Summary

CATEGORY	CURRENT UNITS	CURRENT SUBSIDIZED	UNITS PRESERVED IN DEVELOPMENT	PROPOSED NEW UNITS	NEW MPDU	TOTAL AFFORDABLE HOUSING (MPDU 12.5% + CURRENT SUBSIDIZED)	TOTAL UNITS AFTER DEVELOPMENT
LIKELY TO REDEVELOP	1537	67	176	3510	440	507	3686
UNLIKELY TO REDEVELOP	1051	500	0	0	0	500	1051
TOTAL	**2588**	**567**	**176**	**3510**	**440**	**1007**	**4737**

Takeaways

Findings from the Planning Department's 2015 Rental Housing Study show a surplus of units available in the 50 - 100 percent AMI range within the County. Within the current rental supply, affordability is greatest in smaller units and only meets the needs of specific households within the County. Only around 12 percent of larger units (3+ bedrooms) are affordable to incomes below 80 percent AMI. This

impediment suggests that while there is a large supply of affordable units to households within the 50 – 100 percent AMI range, only the affordability needs of smaller households are being met.

New development should aim to preserve existing large bedroom rentals while also pushing for greater workforce housing percentages (80-120 percent AMI), recognizing the importance of not only creating a balance between affordable and market rate rentals, but also a balance of bedroom mix. Options to ensure this balance include:

- The use of site-specific language. If a property were to redevelop, language within the Sector or Master Plan could be used that allows for redevelopment only with the protection, rehabilitation or creation of larger market-rate or affordable units.
- Protecting larger units by creating conditions and guidelines that allow redevelopment to occur only if larger bedroom units are preserved or if units are demolished, requiring replacement of larger units during redevelopment.
- Floating zones. A floating zone is an area that is to be used for a designated purpose, but is not assigned to a specific location and gives property owners the flexibility to change uses on their land in the future.

Affordable Housing Methodology

In order to determine affordability, households are first categorized by their income relative to the area median income (AMI). AMI is adjusted for household size. Low-to-moderate income households are those earning up to 65 percent of AMI. The income limits in the table below are based on income requirements for Montgomery County's moderately priced dwelling unit (MPDU) program and US Department of Housing and Urban Development (HUD) standards.

Table 1 - 2014 Income Limits

HOUSEHOLD SIZE	65% AMI	100% AMI (MEDIAN)	120% AMI
1	48,685	74,900	89,880
2	55,640	85,600	102,720
3	62,595	96,300	115,560
4	69,550	107,000	128,400
5	75,140	115,600	138,720

Source: Montgomery County DHCA, HUD

Second, rather than just count the number of households, we need to count the number of rental units affordable to them to understand the inventory of low-cost housing. We, therefore, need to assume the number of bedrooms that a household of a particular size needs. Households of different sizes will have different needs with respect to bedrooms. And households of the same size will even have different bedroom needs. For example, two unrelated adults would typically need two bedrooms, while a married couple would need one.

The following table provides the Planning Department's standard assumptions regarding the distribution of household sizes by number of bedrooms. (Note: We might want to reconsider this distribution. HUD typically accepts no more than 2 persons per bedroom for HUD-funded projects, while other programs use a standard of 1.5 persons per bedroom. HUD programs do not allow more bedrooms than persons.)

Table 2 – Household-Size Distribution by Number of Bedrooms

	NUMBER OF BEDROOMS				
HOUSEHOLD SIZE	**Efficiency**	**1**	**2**	**3**	**4**
1	100%	30%			
2		70%	10%		
3			60%	20%	
4			30%	50%	40%
5				30%	60%

Third, based on the previous two tables of household income limits and our assumptions about the distribution of household sizes by the number of bedrooms, we estimate income limits by number of bedroom rooms. This calculation is a weighted average of household-income limits for each bedroom size. For example, for one-bedrooms occupied by households up to 65 percent of AMI, the maximum weighted income is .3 x $48,685 + .7 x $55,640 = $ 53,554

Table 3 – Income Limits by Number of Bedrooms

# OF BEDROOMS	65% AMI	100% AMI	120% AMI
0	$48,685	$74,900	$89,880
1	$53,554	$82,390	$98,868
2	$57,727	$88,810	$106,572
3	$69,836	$107,440	$128,928
4	$72,904	$112,160	$134,592

Fourth, affordable housing is defined as housing that costs no more than 25 percent of household income, if utilities are not included, or 30 percent of household income if utilities are included. This definition is similar to the rent requirement for MPDUs set by the County Department of Housing and Community Affairs (DHCA). The maximum affordable rent by number of bedrooms is listed below.

Table 4 – Affordable Limits at 30 Percent of Income

# OF BEDROOMS	65% AMI	100% AMI	120% AMI	FMR
0	$1,217	$1,873	$2,247	$1,176
1	$1,339	$2,060	$2,472	$1,239
2	$1,443	$2,220	$2,664	$1,469
3	$1,746	$2,686	$3,223	$1,966
4	$1,823	$2,804	$3,365	$2,470

Appendix B:
Market Study

LYTTONSVILLE MARKET FEASIBILITY STUDY – WOODSIDE STATION

Prepared by the

RESEARCH & SPECIAL PROJECTS DIVISION
Montgomery County Planning Department

FORWARD

This report was undertaken during the early stages of the Greater Lyttonsville Sector Plan (back in 2014) and played a role in the initial thoughts and perspective regarding the density and building height recommendations on the Spring Center and Summit Hills properties. The purpose of the study was to identify the minimum amount of density/building height for each of the properties, under which redevelopment could be economically feasible. This study was designed to create a baseline condition to allow subsequent analyses to further refine assumptions, inputs, and perspectives as the planning process evolved. Notably, the study made the following assumptions that were revised later on in the planning process:

- *Although these properties possessed favorable market attributes (e.g. proximity to Downtown Silver Spring, transit) that could have potentially supported a larger development than what was identified in the report, the analysis was concerned about the market impact it could have on pending County development. Therefore, the analysis "constrained" the market demand available to these properties at a level which would not adversely affect projects under construction or in the pipeline.*
- *The economic impact to the developer of providing public benefits, including parkland dedication or park improvements, was expected to be considered later on in the planning process once they became more clear.*
- *The economic value of the land and the improvements were based on current fair market value, which could increase/decrease later on based on rezoning, market changes (such as introduction of new Purple Line station), etc.*

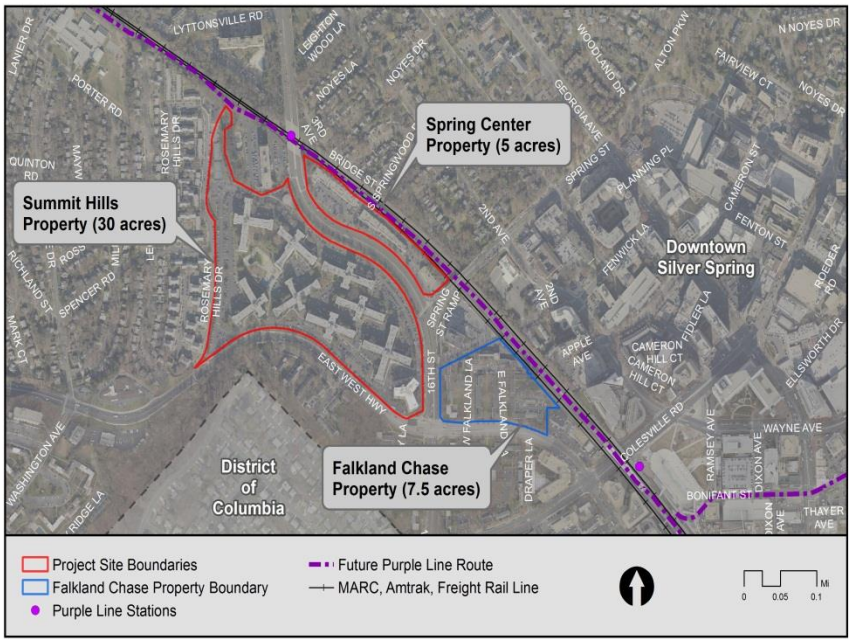
INTRODUCTION

This report was prepared in support of the *Lyttonsville Sector Plan.* It focuses on the redevelopment of two properties in Silver Spring, MD (within the Lyttonsville planning area) that are impacted by the Purple Line. The report further recommends zoning changes needed to enable redevelopment by considering their economic feasibility. It also examines the economic feasibility of structured and underground parking to serve future uses.

PROJECT CONTEXT AND METHODOLOGY

The Purple Line is a proposed 16-mile light rail line that will run from Bethesda to New Carrollton. Once completed it is expected to have a significant impact on land values and rents. It will also increase redevelopment pressures in the communities it serves. The Purple Line will run through Silver Spring and include the station proposed for the northeast corner of 16th Street NW and Spring Street (Spring Center property). In anticipation of this transit line many surrounding property owners have expressed interest in redeveloping their properties.

Figure 1: Project Site Boundaries



The immediate redevelopment opportunities that are of paramount concern are the following properties (see Figure 1):

- Spring Center – Northeast corner of 16th Street NW and Spring Street
- Summit Hills – Southwest corner of 16th Street NW and Spring Street
- Falkland Chase – Southeast corner of 16th Street NW and Spring Street[1]

This report analyzes and further recommends zoning controls appropriate for the Spring Center and Summit Hills properties (together referred to as the "project site"), while taking into consideration market competition from Falkland Chase, which currently has an approved redevelopment plan.

[1] Falkland Chase is currently approved for redevelopment with 1,250 units of housing and 70,000 square feet of retail. It would require demolition of 182 units of housing in order to clear the property.

The Research and Special Projects Division (R&SP) completed the following tasks for this effort:

- ***Economic and Market Overview****:* Conducted economic, financial, and market analyses of the surrounding residential market and competitive areas to generate development programs[2] whose scale is generally in line with market demand.
- ***Financial Feasibility Analysis****:* Analyzed the financial feasibility of two redevelopment scenarios[3]:

  Scenario 1: Spring Center redevelops alone.

  Scenario 2: Spring Center and Summit Hills properties redevelop together.

  Financial feasibility for each of these scenarios was assessed using a financial model incorporating development revenues and costs, and market demand variables from the Economic and Market Overview[4]*.*
- ***Recommendations****: Developed recommendations for zoning, FAR*[5]*s, building heights, and assessed the potential for structured/underground parking based on results from the Financial Feasibility Analysis.*

The two scenarios were reviewed separately due to their expected ability (or inability) to foster a true, mixed-use environment. According to the 2006 Conference on Mixed-Use Development[6], mixed-use development "*…has planned integration of some combination of retail, office, retail or other functions…,is pedestrian oriented and contains elements of a live-work-play environment."* In a presentation to the Montgomery County Planning Board on June 5, 2014, the R&SP staff noted that successful mixed-use development needs to be *"…physically and functionally integrated…"* [synergy and demand between uses] and *"…large enough to integrate these multiple uses…"* [successful examples generally were 15 acres or greater]. Thus, redeveloping the 30-acre, Summit Hills property could create a true, mixed-use environment, and provide the critical mass for a regional attraction that could leverage development of the Spring

[2] "Development Program" is defined as a development consisting of a specific quantity of retail, office, residential space. In this report different development programs may be used to test the economic feasibility of a development.
[3] For the purposes of this report, both scenarios assume redevelopment will occur in 2020 when the Purple Line is expected to commence operations. Additionally, the Falkland Chase property is assumed to redevelop prior to 2020 since it already obtained approval for redevelopment.
[4] In reality, development programs generated by the *Economic and Market Overview* will need to further undergo a site design to determine the format and layout of the buildings; this in turn may affect the maximum development levels used in this report.
[5] Floor area ratio (FAR) is the ratio of a building's total floor area to the size of the piece of land upon which it is built. It is widely used as a measure of the intensity of the site being developed, and can be used in zoning to limit or expand the amount of construction in an area.
[6] A working definition of mixed-use development was presented at the 2006 Conference on Mixed-Use Development. This definition was generated from a questionnaire conducted across industry organizations, which included the International Council of Shopping Centers (ISCS), the National Association of Industrial and Office Properties (NAIOP), the Building Owners and Managers Association (BOMA), and the National Multi Housing Council (NMHC) to identify characteristics associated with mixed use developments.

Center property. Conversely, redeveloping the five acre Spring Center property alone is unlikely to achieve this result due to size limitations[7] of the site.

[7] Multi-use typically can have multiple uses on a single site, but does not have the same degree of planning and integration as mixed-use, in order to create the critical mass needed to be a regional attraction.

SECTION 1: PROJECT SITE DESCRIPTION

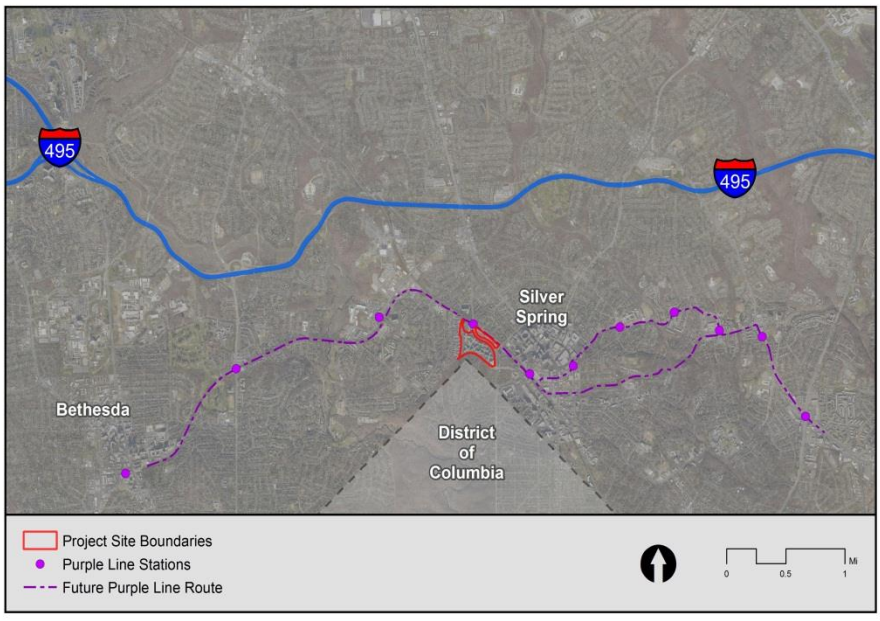
Project Site Boundaries

The project site centers on two properties at the intersection of 16th Street NW and Spring Street (see Figure 1):

- Spring Center – A 5-acre property currently zoned for commercial and residential use under the Commercial Residential Town (CRT) designation; it consists of about 42,000 square feet (SF) of one-story retail.
- Summit Hills – A 30-acre property currently zoned for residential use under the R-10 designation. The dominant use is residential, with nine apartment buildings containing 1,121 rental apartment units. A small area is zoned C-1 commercial and used as a resident fitness center and snack bar.

The project site is located in a relatively dense, urban area, surrounded by a multitude of uses. Immediately to the east is downtown Silver Spring, a major business and retail district. To the west are garden style apartments single family neighborhoods. To the south is the District of Columbia and a mixture of commercial and residential uses - although garden apartments dominate the landscape. The project site currently is bounded to the north by train tracks used by the Maryland Area Regional Commuter (MARC) trains, as well as freight rail and Amtrak (See Figure 1).

Figure 2: Project Site Location (Outview)

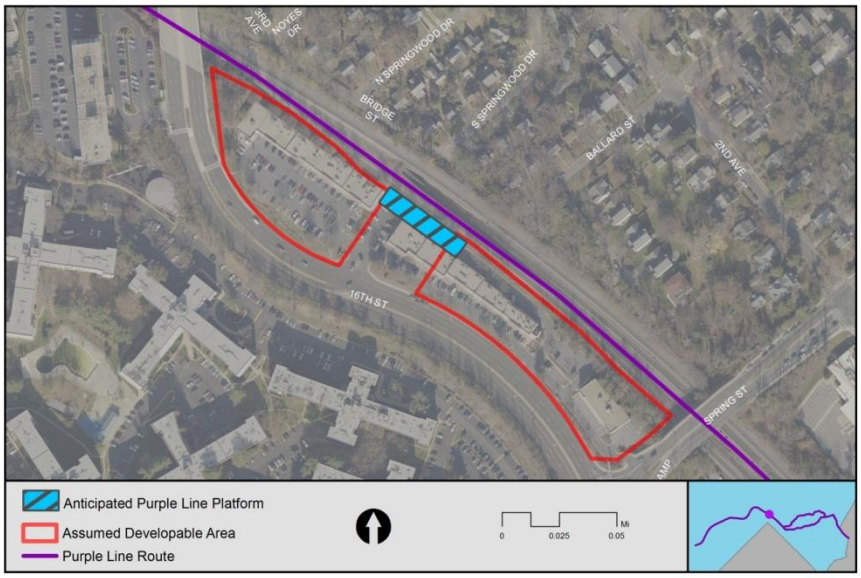


The project site is highly accessible to both autos and mass transit. It is adjacent to two major roads (16th Street and East-West Highway) and is about two miles south of I-495 (see Figure 2). It is located approximately a five minute walk from the Silver Spring Metro station. Although the immediate area around the project site is auto-oriented, its proximity to downtown Silver Spring provides access to a more walkable environment, with ample and well-connected sidewalks, and dining, shopping, and entertainment opportunities. Furthermore, the project site is proximate to major activity centers - less than a ten minute drive to downtown Bethesda and about six miles north of downtown Washington, DC. Once the Purple Line is

constructed it will benefit from enhanced east-west transit access to several communities inside the Beltway (see Figure 2).

Purple Line Impacts on the Development of the Spring Center Property

Figure 3: Developable Land on Spring Center Property



The proposed Purple Line station is expected to occupy part of the Spring Center property (tentatively named the "Woodside/16th St. Station" by the Maryland Transportation Authority [MTA]). While MTA's plans are very preliminary and subject to change, currently land east and west of proposed station would remain available for redevelopment. An estimate for the Spring Center property used in the *Financial Feasibility Analysis* assumes about 4.4 acres of developable land (2.1 acres to the west, 2.3 acres to the east); with the rest dedicated to the station platform and ingress/egress (see Figure 3).

SECTION 2: ECONOMIC AND MARKET OVERVIEW

The *Economic and Market Overview* accomplishes the following:

- Evaluates supply and demand factors for the residential, retail, and office markets surrounding the project site.
- Establishes the potential level of development for each use (used in the *Financial Feasibility Analysis*[8]).
- Projects market demand when the Purple Line opens in 2020, coinciding with the assumed redevelopment of the project site.

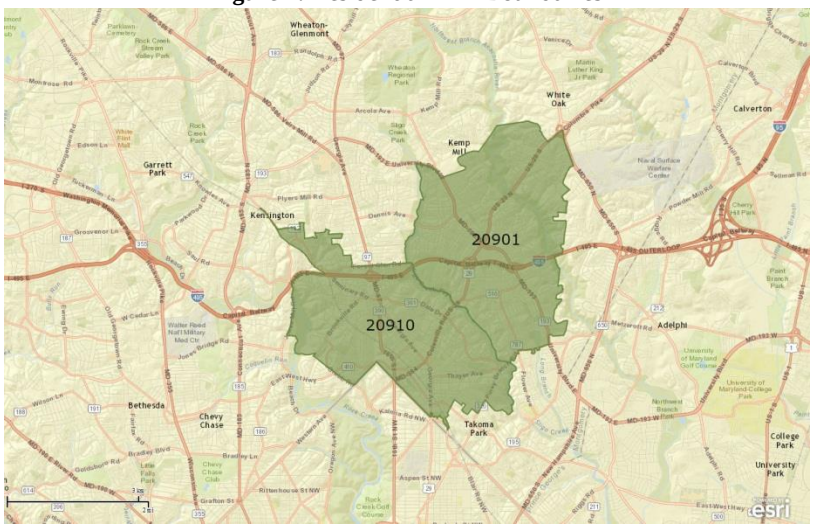
SECTION 2A: RESIDENTIAL MARKET ANALYSIS

R&SP conducted a residential market analysis to ascertain the approximate amount of housing that could be supported at the project site, based on demand. The analysis reviews demographic characteristics within defined Primary and Secondary Trade Areas (where future residents are most likely to be drawn from), estimates current and future housing supply, and projects housing demand that could be supported (both for-sale and for-rent).

Residential Market – Trade Areas

Redevelopment of the project site may draw future residents from Montgomery County and the Washington, D.C. metro area. However, to make such a determination, Trade Areas must be first defined.

Figure 4: Residential PTA Boundaries



A Trade Area is a good indicator of trends, characteristics, and consumer preferences and can be used to identify consumer potential, housing prices, and development scale. The Primary Trade Area for the residential market (the "Residential PTA") includes zip codes within Silver Spring (20910 and 20901) for the following reasons:

- The zip codes approximate Silver Spring Census Designated Place (CDP) (see Figure 4);
- The boundaries reflect housing and consumer characteristics that apply to the project site;
- Residential sales and supply information is available by zip code rather than CDP, enabling a more accurate comparison of supply and demand.

[8] While development programs in this report are controlled by the level of market demand estimated in the *Economic and Market Overview*, it is entirely possible that developers are willing to build larger developments. Factors other than market demand can drive development, including but not limited to access to financing, changes in construction costs, perceived market risk, regulatory restrictions, and availability of investment alternatives.

The project site may also attract a smaller percentage of households outside the Residential PTA. Therefore, Montgomery County is used as a larger, Secondary Trade Area ("Residential STA") from which to draw additional future residents.[9]

Residential Market – Demographic Overview

Population/Household Growth

In 2014 population in the Residential PTA was 74,455 (30,962 households). Household growth is expected to increase annually in the PTA, about 1.1% from 2014 – 2019. This is commensurate with population and household growth rates for all of Montgomery County – the Residential STA – for the same period 1.1% (see Figure 5).

Figure 5: Population and Household Growth

	2014	2019	Total Annual Change	Percent Annual Change
Population (Residential PTA)	74,455	78,232	755	1.0%
Households (Residential PTA)	30,962	32,651	338	1.1%
Population (Montgomery County)	1,003,571	1,059,534	11,193	1.1%
Households (Montgomery County)	367,499	387,482	3,997	1.1%

Source: American Community Survey, ESRI Business Analyst Online

Figure 6: Households by Size

	Residential PTA		Montgomery County	
	Households	Percent of total	Households	Percent of total
1 person household	10,443	33.7%	91,985	25.0%
2 person household	9,546	30.8%	111,830	30.4%
3+ person household	10,970	35.4%	163,647	44.5%
Households without Children	22,167	71.6%	236,278	64.3%

Source: 2010 U.S. Census, ESRI Business Analyst Online

There are a higher percentage of households without children in the Residential PTA than for Montgomery County as a whole (71.6% compared to 64.3%). The proportion of one-person households is also close to nine percentage points higher in the Residential PTA than for all of Montgomery County (33.7% compared to 25.0%). As apartments and condominiums often appeal to those without children, this may indicate strong market support for such housing.

[9] The majority of new homes are supported by future residents derived from a defined PTA and STA. However, new development will likely continue to draw a small portion of residents completely outside the PTA and STA – potentially other areas across the Metro region, nationally, and abroad.

Age and Income Distribution

Age and income distribution were also evaluated for the Residential PTA and Montgomery County to help identify housing types that would enjoy the strongest market support.

Figure 7: Age Distribution

	2014		2019		Annual Change	
	Households	% of Total	Households	% of Total	Households	Percent
Residential PTA						
0 - 4	4,797	6.4%	4,878	6.2%	16	0.3%
5 - 9	4,737	6.4%	4,769	6.1%	6	0.1%
10 - 14	3,942	5.3%	4,831	6.2%	178	4.5%
15 - 19	3,472	4.7%	3,703	4.7%	46	1.3%
20 - 24	4,781	6.4%	4,974	6.4%	39	0.8%
25 - 34	13,524	18.2%	13,429	17.2%	-19	-0.1%
35 - 44	11,426	15.3%	11,550	14.8%	25	0.2%
45 - 54	10,037	13.5%	10,207	13.0%	34	0.3%
55 - 64	9,100	12.2%	9,269	11.8%	34	0.4%
65 - 74	5,131	6.9%	6,539	8.4%	282	5.5%
75 - 84	2,328	3.1%	2,811	3.6%	97	4.1%
85+	1,180	1.6%	1,272	1.6%	18	1.6%
Median Age	36.7		37.1			
Montgomery County						
	2014		2019		Annual Change	
	Households	% of Total	Households	% of Total	Households	Percent
0 - 4	61,023	6.1%	64,221	6.1%	640	1.0%
5 - 9	67,467	6.7%	69,905	6.6%	488	0.7%
10 - 14	68,191	6.8%	74,909	7.1%	1,344	2.0%
15 - 19	60,000	6.0%	62,415	5.9%	483	0.8%
20 - 24	57,028	5.7%	53,836	5.1%	-638	-1.1%
25 - 34	132,478	13.2%	136,066	12.8%	718	0.5%
35 - 44	136,569	13.6%	145,617	13.7%	1,810	1.3%
45 - 54	148,260	14.8%	143,334	13.5%	-985	-0.7%
55 - 64	131,701	13.1%	140,677	13.3%	1,795	1.4%
65 - 74	78,646	7.8%	97,178	9.2%	3,706	4.7%
75 - 84	40,448	4.0%	47,825	4.5%	1,475	3.6%
85+	21,760	2.2%	23,551	2.2%	358	1.6%
Median Age	39.2		39.6			

Source: 2010 U.S. Census, ESRI Business Analyst Online

In 2014 the median age for the Residential PTA was 36.7, about 3 years younger than for all of Montgomery County (39.2). However, the overall age distribution in the Residential PTA and Montgomery County are similar. People in "prime working ages" (25-64) continue to comprise over half the population in both. While the Residential PTA will continue to remain relatively youthful over the next five years, projected **growth** for all groups under 64 though are expected to slow, or in some cases decline. Conversely, seniors in the groups 65-84 are projected to grow the fastest during that period, with annual increases ranging from 4.1% to 5.5%. (see Figure 7 above).

Figure 8: Households by Income						
	2014		2019		Annual Change	
	Households	% of Total	Households	% of Total	Households	Percent Change
Residential PTA						
<$15,000	2,265	7.3%	2,185	6.7%	-16	-0.7%
$15,000 - $24,999	1,573	5.1%	1,258	3.9%	-63	-4.0%
$25,000 - $34,999	2,674	8.6%	1,912	5.9%	-152	-5.7%
$35,000 - $49,999	3,978	12.8%	3,636	11.1%	-68	-1.7%
$50,000 - $74,999	4,375	14.1%	4,308	13.2%	-13	-0.3%
$75,000 - $99,999	4,110	13.3%	4,867	14.9%	151	3.7%
$100,000 - $149,999	6,175	19.9%	6,680	20.5%	101	1.6%
$150,000 - $199,999	3,096	10.0%	4,053	12.4%	191	6.2%
$200,000+	2,716	8.8%	3,752	11.5%	207	7.6%
Median Household Income	$77,911		$88,800			
Average Household Income	$99,076		$115,574			
Per Capita Income	$41,296		$48,349			
Montgomery County						
	2014		2019		Annual Change	
	Households	% of Total	Households	% of Total	Households	Percent Change
<$15,000	19,491	5.3%	17,789	4.6%	-340	-1.7%
$15,000 - $24,999	14,792	4.0%	11,415	2.9%	-675	-4.6%
$25,000 - $34,999	23,161	6.3%	16,242	4.2%	-1,384	-6.0%
$35,000 - $49,999	35,076	9.5%	31,073	8.0%	-801	-2.3%
$50,000 - $74,999	51,319	14.0%	48,613	12.5%	-541	-1.1%
$75,000 - $99,999	41,860	11.4%	47,575	12.3%	1,143	2.7%
$100,000 - $149,999	76,125	20.7%	77,565	20.0%	288	0.4%
$150,000 - $199,999	44,658	12.2%	56,693	14.6%	2,407	5.4%
$200,000+	61,017	16.6%	80,517	20.8%	3,900	6.4%
Median Household Income	$98,530		$109,775			
Average Household Income	$124,504		$146,358			
Per Capita Income	$45,753		$53,715			
Source: 2010 U.S. Census, ESRI Business Analyst Online						

In 2014 median household income for the Residential PTA was $77,911, while for Montgomery County as a whole it was $98,530 (See Figure 8). One noticeable trend is the projected increase, for both the Residential PTA and County, in households earning an annual income of $75,000 and above. Annual household growth in the Residential PTA is expected to be particularly strong for the $150,000-$200,000 and $200,000+ income groups - 6.2% and 7.6% respectively. This suggests the Residential PTA – relative to the County as a whole – may be somewhat more attractive to wealthier households who enjoy lifestyles that are supported by a more transit accessible and urban environment.

Figure 9: Income by Household Age Group in Residential PTA							
	<25	25-34	35-44	45-54	55-64	65-74	75+
<$15,000	17.1%	7.3%	4.0%	3.8%	5.0%	7.1%	14.9%
$15,000-$24,999	8.3%	4.2%	3.3%	2.7%	3.1%	4.2%	5.5%
$25,000-$34,999	13.3%	7.2%	4.6%	3.7%	4.2%	6.3%	8.8%
$35,000-$49,999	18.2%	15.4%	10.6%	6.9%	6.8%	10.0%	18.9%
$50,000-$74,999	17.8%	14.9%	12.1%	9.3%	10.4%	15.4%	20.2%
$75,000-$99,999	11.3%	17.2%	16.2%	12.1%	14.8%	17.3%	11.2%
$100,000-$149,999	10.9%	20.6%	22.0%	26.7%	22.3%	16.9%	10.1%
$150,000-$199,999	1.9%	8.9%	15.5%	16.9%	16.8%	9.3%	5.4%
$200,000+	1.3%	4.4%	11.9%	17.9%	16.5%	13.5%	5.0%
Total	100%	100%	100%	100%	100%	100%	100%
Source: 2010 U.S. Census, ESRI Business Analyst Online							

A higher share of households without children and one-person households (see Figures 5 and 6) would indicate support for apartments and condominiums in the Residential PTA. Such new market rate housing would typically be supported by those ages 25-34 and 55-74 and be affordable to households earning $100,000 or more[10]. Figure 9 shows the distribution of age groups, cross-tabulated with annual income for the Residential PTA. It indicates strong support for apartment and condominium housing as 33% of those ages 25-34, 50% of those ages 55-64, and 40% of those ages 65-74 have incomes over $100,000.

Community Tapestry Segments

ESRI Business Analyst Online, used for this study, applies information such as labor force characteristics, median income, age, and spending habits to categorize demographic information according to a trademarked Community Tapestry classification system[11]. These tapestries provide insights into housing preferences and can help inform the types of housing that may be successful.

The Community Tapestry Segments within the Residential PTA and STA (Montgomery County) most likely to support multi-unit apartments and condominiums on the project site are shown in Figure 10. The target markets for such multifamily[12] housing are significant and include approximately 67% of the Residential PTA's population and 24% of the Residential STA.

[10] Affordability factors assumes housing costs at 30% of annual income and housing rental rates of $2.50/SF on the project site. See Appendix E.
[11] Community Tapestry segments identify nationwide trends and averages rather than data specific to a region or local jurisdiction.
[12] Multifamily housing can refer to both for-rent (apartments), and for-sale (condominiums).

Figure 10: Community Tapestry Segmentation			
	Percent of Population (Residential PTA)	**Percent of Population (Montgomery County)**	**Characteristics**
Metro Renters	28.10%	5.90%	Younger singles with active careers and social lives. Median Age: 31.8; Median Income: $52,000; typically live in 20+ unit apartment units in mixed use areas; 80% are renters.
Urban Chic	13.20%	5.80%	Older professionals living a sophisticated, exclusive lifestyle. Median Age: 42.6; Median Income: $98,000; two-thirds are owner occupied; over one in four live in multiunit structures.
City Lights	12.70%	5.10%	Urban lifestyle professionals passionate about social welfare and equality. Median Age: 38.8; Median Income: $60,000; half of homes are multiunit structures.
Trendsetters	7.80%	2.70%	Younger educated singles who prize upscale city living and entertaiment. Median Age: 35.5; Median Income: $51,000; 75% rent in upscale, multiunit structures; most are singles, living with roommates or partners.
Emerald City	2.50%		Well-educated, socially conscious denizens who enjoy arts, travel, and cuisine. Median Age: 36.6; Median Income $52,000; over half are renters; live in older, well established neighborhoods.
Metro Fusion	2.50%	0.70%	Young, ethnically diverse, hardworking, and mobile market. Median Age: 28.8; Median Income: $33,000. Three quarters are renters; over 60% are multiunit structures.
Young and Restless		2.20%	Gen-Y young workers beginning in technical, sales, and office or administrative occupations. Median Age: 29.4; Median Income: $36,000. One in five move every year; nearly three quarters are apartment rentals.
Laptop and Lattes		2.00%	Affluent, single, well-educated professionals who are partial to city living. Median Age: 36.9; Median Income: $93,000; most are renters; many owner-occupied homes valued at $500,000+.
Total	**66.80%**	**24.40%**	
Source: ESRI Business Analyst Online			

Residential Market – Current and Future Supply

The number of units in the Residential PTA that would directly compete with future residential development on the project site were estimated. Current housing stock was inventoried and vacant (available) homes and those in the development pipeline within the Residential PTA[13] were added. Adjustments were made to account for units demolished/added under each of the following redevelopment scenarios (see Figure 11)[14].

Figure 11: Housing Supply Profile in Residential PTA

					Scenario 1: Spring Center redevelops alone		Scenario 2: Spring Center and Summit Hills redevelop together	
	Total Housing Units	Vacancy Rate	Vacant Units	Housing Units in Pipeline	Redevelopment of Falkland Chase[1]	Total Available Units in 2020	Demolition of Summit Hills & Redevelopment of Falkland Chase[2]	Total Available Units in 2020
Homeowner Units	18,136	1.0%	181	13		194		194
Rental Units	15,895	3.3%	519	5,136	1,068	6,723	(53)	5,602

Source: State of Maryland Department of Assessments and Taxation 2014, Montgomery County Planning Development Pipeline April 2014, 2012 Rental Survey of Montgomery County 2012

[1] Redevelopment of Falkland Chase (1,250 new homes - 182 existing homes = 1,068 net new homes)

[2] Demolition of Summit Hills (-1,121 homes) + Redevelopment of Falkland Chase (1,250 new homes - 182 existing homes = 1,068 net new homes) = Reduction of 53 homes

Scenario 1 considered only the redevelopment of Falkland Chase, while Scenario 2 assumed both the demolition of Summit Hills and the redevelopment of Falkland Chase. The number of homes in the Residential PTA that could be on the market and available for occupancy by 2020 for each scenario are shown below:

- Scenario 1: 6,917 homes (~194 for-sale, ~6,723 for-rent)[15]
- Scenario 2: 5,796 homes (~194 for-sale, ~5,602 for-rent)

The scenarios assume that: demand and supply do not change; the vacancy rate remains constant; all homes in the pipeline are constructed, no additional homes beyond the pipeline will be constructed; and the current housing stock is not demolished or converted to other uses. While few of these assumptions are likely to be fully realized, since housing markets are fluid, the residential totals merely provide a reference point for the amount of housing expected to be available in the Residential PTA by 2020. This information can in turn be used to calibrate demand and market absorption for residential development on the project site.

[13] See Appendix A for pipeline projects in Residential PTA. Residential projects in the PTA – rather than STA – will represent more direct competition with the project site, due to similarities in their regional location, housing attributes, and surrounding environment.

[14] This approach only projects future supply based on current conditions. In reality, the level of vacant units and new construction may change.

[15] The mix between rental and for-sale homes in the residential projects in pipeline are constantly subject to change based on market conditions. Therefore, the residential component used in the *Financial Feasibility Analysis* will not distinguish between for-sale and for-rent housing types.

Residential Market – Expected Demand on the Project Site

The market potentials for two types of housing were assessed: for-sale multifamily (generally defined as condominiums and townhomes), and for-rent multifamily (apartments). To calculate demand for for-rent multifamily, two sources of market demand were studied: 1.) demand generated from new households, and 2.) demand generated by existing renter households (i.e. household "turnover"). For-sale multifamily demand considered three sources of market demand: 1.) demand from new households (in-migration), 2.) demand from renters converting to owners, and 3.) turnover from existing owner-occupied households.

The analysis for each market segment for both for-sale and for-rent demand also considered household income, tenure, lifestyle preference, and turnover rate to generate demand potential[16]. The results are presented in Figure 12.[17]

Figure 12: Housing Demand on Project Site

	Scenario 1: Spring Center redevelops alone		Scenario 2: Spring Center and Summit Hills redevelop together	
	Residential PTA	Rest of Montgomery County (Residential STA)	Residential PTA	Rest of Montgomery County (Residential STA)
For-Rent (Multifamily)				
Demand from New Households (2020)	402	931	583	886
Demand from Existing Renter Households (2020)	1,996	4,721	2,012	4,693
Total Target Area Market Demand	2,399	5,652	2,595	5,579
Anticipated Capture Rate	10%	1%	0	0
Project Site Absorption Potential	**240**	**57**	**259**	**56**
For-Sale (Multifamily)				
Demand from New Households (2020)	262	1,943	554	1,954
Demand from Renter Converting to Owner Households (2020)	172	480	173	477
Turnover of Existing Owner-Occupied Households	259	2,501	475	2,339
Total Target Area Market Demand	692	4,923	1,202	4,770
Anticipated Capture Rate	10%	1%	0	0
Project Site Absorption Potential	**69**	**49**	**120**	**48**
Total Project Site Absorption		**415**		**483**

Source: ESRI Business Analyst Online, American Community Survey 2008, AECOM

The number of homes that could be absorbed (both properties), without considering physical site constraints are approximately:

- **415 - if Spring Center alone is redeveloped**
- **483 - if Summit Hills is demolished and cleared for future redevelopment[18]**

[16] Sources and additional details on methodology can be found in Appendix B, Figure B1.
[17] Sources and additional details on methodology can be found in Appendix B, Figure B2.
[18] This assumes a housing absorption period of 12 months for the project.

These estimates are based on demand from new and existing households, but they also consider factors such as income eligibility, frequency of moves to a new home, proportion of those who rent vs. buy, and lifestyle preferences (from the Community Tapestry Segmentation) in the Residential Trade Areas, to determine a "Total Target Market Annual Demand" (see Appendix B, Figures B1 and B2).

Subsequently, a "capture rate"[19] was applied to the total demand to estimate the number of future residents who would actually choose to live within the project site.[20] This residential development program was then used to test the economic feasibility of redevelopment scenarios for each property.

SECTION 2B: RETAIL MARKET ANALYSIS

A retail market analysis was conducted to determine the amount of retail space that the project site could potentially support. The analysis initially reviews retail supply and demand within defined trade areas (where retail establishments draw most of their customers) and subsequently estimates the potential level of additional retail space that the project site could support. This analysis is based on existing retail conditions, including retail currently under construction and in the development pipeline. Unforeseen developments – such as additional land being rezoned for retail, introduction of new retail competition into the trade area, etc. – may affect the findings.

Retail Market – Trade Area

The retail market trade analysis focuses on two principal trade areas:

- **Local Retail Trade Area** (defined as a five minute driveshed from the intersection of 16th Street NW and Spring Street, which is the nearest intersection to the project site).

- **Destination Retail Trade Area** (defined as a 10 minute driveshed in the west and south direction, and a 15 minute driveshed in the east and north direction from the intersection of 16th Street NW and Spring Street, which is the nearest intersection to the project site).

A Trade Area is the area from which most of a retail establishment's customers originate. However, trade areas can differ based on the types of products offered. For example, the trade area for a Convenience Good (local retail), such as milk, is typically smaller than that for a Shoppers Good (destination retail), or "comparison" goods, such as furniture or apparel.

Another factor affecting trade areas for Convenience and Shoppers Goods is comparison shopping. To purchase milk one does not typically compare brands or stores; however, when purchasing furniture, consumers are willing to travel farther to compare merchandise.

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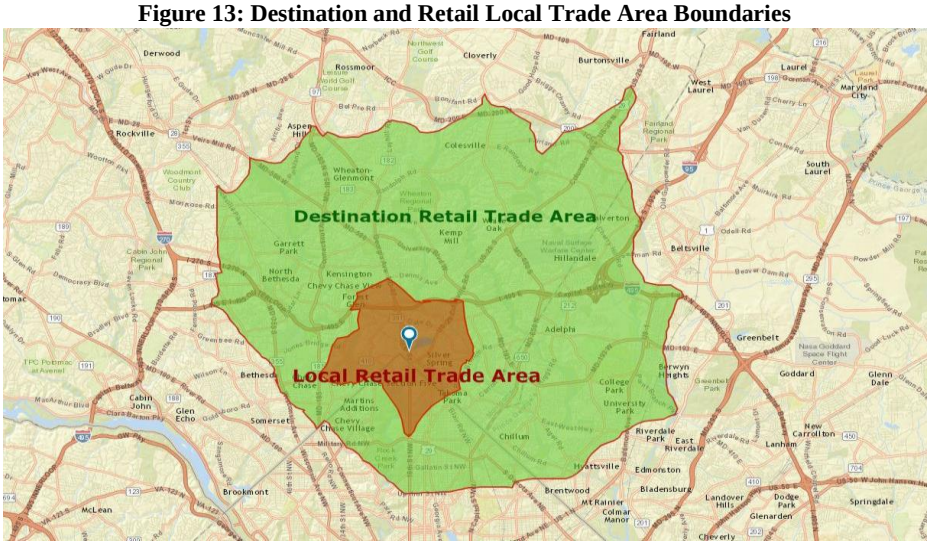
[19] A capture rate measures the percent of market demand (using metrics such as households (for residential development), consumer spending (for retail development), employment (for office development) – that can be captured within a defined trade area.

[20] These figures only take into consideration the market potential of the project site and its ability to draw prospective buyers and renters based on its geographic location and proximity to amenities; it does not take into consideration whether the development's layout and design on the property would be feasible.

"Entertainment" retail, such as destination restaurants, bars, or comedy clubs, are often considered to be like Shoppers Goods, given a willingness to travel longer distances for entertainment and recreation. Trade areas are also impacted by competitive retail destinations. A shopping district with little nearby competition will have a much larger trade area than one with significant regional competition.

The location of the project site affects its trade areas, since it is close to Silver Spring and Bethesda – both cultural, retail, and entertainment centers – and six miles from downtown Washington, DC. Given the significant nearby competition, the trade areas (see Figure 13) for the project site are defined as a 5-Minute Driveshed for Convenience Goods (Local Retail Trade Area) and a combination of a 10-minute driveshed (south and west of the project site) and 15-minute driveshed (north and east of the project site) for Shoppers Goods (Destination Retail Trade Area).[21] The shorter drivesheds to the west and south are due to considerable retail competition from downtown Bethesda and Chevy Chase (to the west) and northeast DC neighborhoods (to the south and west), such as Tenleytown, Cleveland Park, and Adams Morgan.

Figure 13: Destination and Retail Local Trade Area Boundaries



Retail Market – Supply and Demand Analysis

The analysis quantifies existing retail demand and supply in the Local Retail Trade Area for Convenience Goods and in the Destination Retail Trade Area for Shoppers Goods and Entertainment Retail. Convenience and Shoppers Goods are organized by the North American Industrial Classification System (NAICS) codes as follows:

- Convenience Goods:
  - Food and Beverage Stores

[21] Nationally, shopper's goods typically possess a 30-minute driveshed according to the Urban Land Institute. The smaller drivesheds represented in the Destination Retail Trade Area indicate the presence of significant regional competition around the project site.

    - Health and Personal Care Stores
    - Miscellaneous Store Retailers

- Shoppers Goods:
    - Food Service and Drinking Places[22]
    - Furniture and Home Furnishings Stores
    - Electronics and Appliance Stores
    - Building Materials, Garden Equipment and Supply Stores,
    - Clothing and Clothing Accessories Stores,
    - Sporting Goods, Hobby, Book & Music Stores
    - General Merchandise

Consumer expenditures (retail potential) provide a measure of household demand for goods and services for different retail categories. Retail sales provide a measure of inventory and supply for the same categories. The retail gap – retail demand minus retail sales – represents available purchasing power, or retail opportunities. If supply is greater than demand, the retail market is considered saturated and there is no surplus demand to support a new store. If estimated spending by area households (demand) exceeds sales by existing retailers (supply), the area is losing sales to retailers outside the trade area. The retail gaps for the trade areas are currently about $1.2 billion for destination retail and Shoppers Goods, and $127 million for local retail and Convenience Goods (see Figure 14).

[22] Food Service and Drinking Places may be classified under either Convenience or Shoppers Goods. However, given the project site's transit access and location within a major intersection, restaurants that are developed on the site are likely to be able to draw regional customers.

Figure 14: Retail Gap in Retail Trade Areas			
	Demand (Retail Potential)	Supply (Retail Sales)	Retail Gap in Trade Areas
Destination Retail Trade Area			
Furniture and Home Furnishings Stores	$ 158,521,289	$ 107,580,658	$ 50,940,631
Electronics and Appliance Stores	$ 189,788,388	$ 101,828,272	$ 87,960,116
Building Materials, Garden Equipment and Supply Stores	$ 217,867,732	$ 80,227,538	$ 137,640,194
Clothing and Clothing Accessories Stores	$ 476,153,399	$ 317,631,090	$ 158,522,309
Sporting Goods, Hobby, Book & Music Stores	$ 190,685,822	$ 163,519,053	$ 27,166,769
General Merchandise	$ 897,704,772	$ 341,064,640	$ 556,640,132
Food Services and Drinking Places	$ 763,074,427	$ 606,634,862	$ 156,439,565
Total	**$ 2,893,795,829**	**$ 1,718,486,113**	**$ 1,175,309,716**
Local Retail Trade Area			
Food and Beverage Stores	$ 174,657,876	$ 109,821,931	$ 64,835,945
Health and Personal Care Stores	$ 72,437,751	$ 20,321,832	$ 52,115,919
Miscellaneous Store Retailers	$ 26,776,386	$ 17,148,878	$ 9,627,508
Total	**$ 273,872,013**	**$ 147,292,641**	**$ 126,579,372**
Source: ESRI Business Analyst, ULI Dollars and Cents of Shopping Centers 2008			

Retail Market – Retail Development Potential

A retail gap indicates potential support for new retail space. Therefore, a new store, or an existing store that repositions itself in the market, could try to capture all, but most likely just part of that gap. The amount captured is called the market capture rate and it was derived for each retail category relevant to the "Immediate Retail Market Area"[23].

Capture rates can vary based on the nature of a retail establishment; the retail category; the age, quality, and variety of merchandise; the customer base; a store's competitive position; and whether an establishment caters to local or regional consumers. For retail categories where convenience and proximity are essential – such as grocery or convenience stores – there is a comparatively larger share of sales derived from trade area households (approximately 60-70%) to the Immediate Retail Market Area. Categories that draw people regionally – such as Shoppers Goods or entertainment retail – have a smaller share of sales derived from trade area households

[23] The Immediate Retail Market Area is the area expected to directly compete with retail proposed for the project site. The Immediate Retail Market Area uses the same boundaries as the Residential PTA (zip codes 20910, 20901) as they approximate the Silver Spring CDP boundaries and provide readily available information.

to the Immediate Retail Market Area. This study assumes a 70% capture rate for convenience retail and an 11% capture rate for destination retail.[24]

Supportable retail space for the Immediate Market Area was derived using retail expenditures available to Immediate Retail Market Area (see Figure 15). The expenditures were then divided by national sales per square foot per retail category averages (sales productivity factors)[25] to arrive at current supportable space estimates (see Figure 15).

Figure 15: Current Retail Potential in Immediate Retail Market Area

	A. Retail Gap in Trade Areas	B. Assumed Capture Rate	C. Retail Expenditures available in Immediate Retail Market Area [A x B]	D. Sales Productivity Factors (Sales/SF)	Retail Potential in Immediate Retail Market Area (SF) [C / D]
Shoppers Goods (Destination Driveshed)					
Furniture and Home Furnishings Stores	$ 50,940,631	11%	$ 5,569,576.31	$ 302	18,442
Electronics and Appliance Stores	$ 87,960,116	11%	$ 9,617,088.92	$ 412	23,342
Building Materials, Garden Equipment and Supply Stores	$ 137,640,194	11%	$ 15,048,843.10	$ 325	46,304
Clothing and Clothing Accessories Stores	$ 158,522,309	11%	$ 17,331,981.94	$ 245	70,743
Sporting Goods, Hobby, Book & Music Stores	$ 27,166,769	11%	$ 2,970,269.31	$ 311	9,551
General Merchandise	$ 556,640,132	11%	$ 60,860,056.70	$ 253	240,554
Food Services and Drinking Places	$ 156,439,565	11%	$ 17,104,265.84	$ 470	36,392
Subtotal	**$ 1,175,309,716**		**$ 128,502,082.12**		**445,328**
Convenience Goods (Local Driveshed)					
Food and Beverage Stores	$ 64,835,945	70%	$ 45,385,161.50	$ 479	94,750
Health and Personal Care Stores	$ 52,115,919	70%	$ 36,481,143.30	$ 231	157,927
Miscellaneous Store Retailers	$ 9,627,508	70%	$ 6,739,255.60	$ 339	19,880
Subtotal	**$ 126,579,372**		**$ 88,605,560.40**		**272,557**
Total from Both Trade Areas					
Total	**$ 1,301,889,088**		**$ 217,107,642.52**		**717,885**

Source: CoStar, ULI Dollars and Cents 2008

Up to 717,885 SF of retail are **currently** supportable within the Immediate Retail Market Area (see Figure 15). However, since retail demand is also projected to 2020, a more accurate estimate would consider additional retail demand due to population growth, anticipated Purple Line

[24] The 11% capture rate for destination retail was based on the percentage of current retail expenditures in the Silver Spring area, relative to current retail expenditures in the Destination Retail Trade Area. This capture rate assumes the ratio of consumer spending between Silver Spring and the Destination Retail Trade Area will remain constant.
[25] Sales per square foot were obtained from the Urban Land Institute, *Dollars & Centers of Shopping Centers* 2008, using the sales PSF factors for regional shopping centers.

ridership, and competition from approved plans for retail in the Immediate Retail Market Area (see Figure 16[26]).

Figure 16: Future Retail Potential in Immediate Retail Market Area					
A. Current Retail Potential (SF)	B. Retail Demand from Population Growth by 2020 (SF)	C. Retail Demand from Purple Line Trips	E. Pipeline Retail Development (SF)	F. Demolition of Spring Center Retail (SF)	G. Retail Development Potential (SF) [A+B+C-E+F]
717,885	40,947	6,549	514,134	42,635	293,882
Source: ESRI Business Analyst Online, Montgomery County Planning Department, Maryland Transit Administration					

Applying those factors would yield about an **additional** 294,000 SF of retail space that could be absorbed within the Immediate Retail Market Area by 2020. A portion of this may be captured by the project site, assuming retail is not over-built by that time and assuming that consumer shopping patterns have not significantly changed. Based on market capture rates Figure 17 shows the amount of potential retail space for the project site in 2020.

Figure 17: Future Retail Potential on Project Site		
	Scenario 1: Spring Center redevelops alone	Scenario 2: Spring Center and Summit Hills redevelop together
Retail Development Potential (SF) [Immediate Retail Market Area]	293,882	293,882
Assumed Capture Rate	20%	70%
Retail Development Potential (SF) [Project Site]	58,776	205,717

The project site could potentially support up to 59,000 SF of retail if the Spring Center property redevelops alone; but up to 206,000 SF if the Spring Center and Summit Hills properties redevelop together.

The capture rates for each scenario are different and are influenced by the feasibility of creating a true mixed-use center at the project site. Scenario 2 assumes this with the redevelopment of the 30-acre Summit Hills property. The resulting mixed-use center helps leverage economies of agglomeration, making the area more attractive to retailers benefiting from clustered development. Under this scenario a larger capture rate of retail potential could also be commanded (estimated at 70%). Conversely, redevelopment of just the 5-acre Spring Center property is unlikely to create such an environment and the retail capture rate would be at best 20%. Potential retail development for each scenario is used as the basis used to test their economic feasibility.

[26] For additional details for sources on demand from population growth, Purple Line ridership, as well as the inventory of pipeline retail development projects, see Appendix C.

SECTION 2C: OFFICE MARKET ANALYSIS

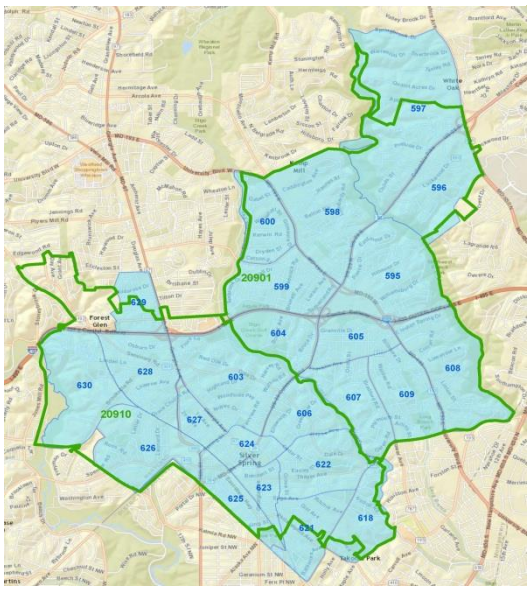
A market analysis was conducted to evaluate supply and demand within a defined trade area (the "Office Trade Area") to determine the potential for additional office space at the project site, both currently and in 2020.

Office Market – Trade Area

The market trade area for office represents the area within which office uses directly compete with office uses at the project site. The Office Trade Area includes Traffic Analysis Zones (TAZs) approximating Silver Spring zip codes 20910 and 20901 (see Figure X[27]). These zip codes were used for the analyses because:

- They approximate the Silver Spring Census Designated Places (CDP).
- Office inventory and sales information is readily available by zip codes not CDP, enabling a more accurate comparison of supply and demand.
- Official employment forecasts are issued using Traffic Analysis Zones.

Figure 18: Office Trade Area Boundaries



Office Market – Office Development Potential

Montgomery County is currently experiencing unprecedented challenges in its office market. It has an overall 14.8% vacancy rate (compared with 11.1% in the District of Columbia); almost 11 million SF of vacant space, and average reported rents have declined 7.6% since 2008. Absorption of existing office space and employment growth have slowed, brought about by Federal budget cuts, office technology advances, and the changing nature of office demand. Prospects for office development on the project site will be affected by these hurdles.

Employment growth is the primary driver for office demand. Estimates for future employment growth[28], as well as estimated supportable office space, are presented in Figure 19.

[27] In Figure X, the shaded blue areas represent the various TAZs that make up the Office Trade Area, while the green boundaries represent the zip codes 20901 and 20910 that it approximates.

[28] Employment growth estimates generated by the Metropolitan Washington Council of Governments (MWCOG) based on the TAZs used in the Office Trade Area.

Figure 19: Office Space Demand (Office Trade Area)				
	2010	2020	Annual Change	Additional Capacity by 2020
Office Employment (Jobs)	25,205	26,431	123	736
Supportable Office Space (SF)[1]			26,972	161,832
Source: MWCOG				
[1] Montgomery County Planning Department standard for office space per employee (Downcounty) is 220 SF				

Based on employment growth, approximately 162,000 SF of additional office space would be needed for the Trade Area by 2020. This could either be satisfied by new office space or by reoccupying vacant existing space.

The Trade Area currently has approximately 7.5 million SF of office space, of which 15.2%, or about 1.1 million SF, are vacant. This is about 978,000 SF more than what is likely to be absorbed by 2020. There are no office proposals currently in the development pipeline. While analyses indicate a continued glut of space in the Office Trade Area for 2020, there is always a possibility that market trends reverse, or that unforeseen demand for office space emerges.

Figure 20: Office Space Supply (Office Trade Area)	
Existing Office Space in 2014 (SF)	7,501,919
Vacancy Rate	15.20%
Current Available Office Space (SF)	1,140,292
Source: CoStar	

According to the *2014 Office Market Assessment for Montgomery County*, prepared by the Partnership for Economic Solutions, office preferences have changed. Increasingly employers are seeking office space located in vibrant, mixed-use business districts that offer walkable environments with retail, restaurants, residential, and services. Based on occupancy rates, Metro-served mixed-use employment areas appear to be in even higher demand. Given the location of the project site, adjacent to a proposed Purple Line Station, and the adequacy of the Summit Hills property (15+ acres) to accommodate mixed-use development, a modest amount of office space could be feasible under the following assumptions:

- Future development includes a critical mass of mutually supportive, complementary development (retail, residential, employment, and/or lodging uses).
- A vibrant, walkable, mixed-use district is realized and is designed to be patronized by a wide variety of people.
- Office development occurs at a smaller scale (perhaps no more than 50,000 SF, depending on the development program) to mitigate market risk.

SECTION 3: FINANCIAL FEASIBILITY ANALYSIS

Based on the *Economic and Market Overview* results, the financial feasibility of different development programs was tested, which helped inform the following:

- Zoning – based on current zoning, development programs were analyzed to determine if they were economically feasible. If not, a "market" zoning designation, allowing more uses and a larger development scale, was tested.
- FAR – an appropriate FAR was identified based on economically feasible, market-supported development programs.
- Building heights – the economic feasibility of concrete and steel construction, which is typically about 25% more expensive than wood-frame construction, was analyzed. The study assumed building heights in excess of 65' would require concrete and steel construction.
- Parking – the economic feasibility of structured (above-ground) or underground parking was tested.

SECTION 3A: METHODOLOGY – REQUIRED RETURN ON INVESTMENT

The *Financial Feasibility Analysis* assumes that if the revenue generated by the building improvements divided by total development costs (i.e. return on investment) is between 1.5% and 2.5% (assume 2.0%) higher than prevailing capitalization rates[29] for a building use, then a project may be economically feasible. This methodology does not account for land or site preparation costs, which can be considerable, particularly given the size and the urban setting of the project site. As such, the approach was modified to increase the required return on investment by adding a premium based on land value, costs for demolition and site preparation, and forgone income, which is the revenue lost from existing leases during a two-year construction period (see Appendix D for details).

SECTION 3B: METHODOLOGY – DEVELOPMENT PROGRAMS

Future development is limited by the size of a property, site constraints, applicable zoning regulations, and market demand (from the *Economic and Market Overview*).[30] For each Scenario, development programs were tested under current zoning and "market zoning", which is defined as zoning that permits more types of uses and a more intense development scale (in terms of buildings heights and FARs).[31] Market zoning merely represents one zoning option used

[29] Capitalization rate is the ratio between the net operating income produced by an asset (in this case, a real estate asset) and its capital cost (the price paid to buy the asset) or alternatively its current market value. Lower capitalization rates are typically associated with lower market risk and better expected market performance.
[30] This study does not provide site designs that specifically address the number of buildings, building placement, or visual compatibility on the property. These results are expected to be subsequently used in producing concept site designs, which may affect the development programs proposed in this report.
[31] Market zoning designations can be defined as zoning that allows a property to reach its highest market potential.

to test different planning assumptions. Other zoning designations may exist that could also accommodate a recommended development program.[32]

SECTION 3C: REDEVELOPMENT SCENARIOS

Scenario 1: Spring Center Property redevelops alone.

The zoning designations are as follows:

Figure 21: Project Site - Current and Market Zoning (Scenario 1)

	Spring Center Property	
	Current Zoning	**Market Zoning**
Zoning Designation	CRT-0.75	CRT
Floor Area Ratio	Commercial - 0.75 Residential - 0.5 Maximum - 0.75	Commercial - 0.25 to 3.5 Residential - 0.25 to 3.5 Maximum - 0.25 to 4.0
Height Restrictions	40 ft.	35' - 150'
Open Space Requirements	10%	10%
Setbacks	Front: 0' ft. Side: 0' ft. Rear: 0' ft.	Front: 0' ft. Side: 0' ft. Rear: 0' ft.
Site Coverage	90%	N/A

Source: Montgomery County Planning Department

The current zoning for Spring Center is Commercial Residential Town (CRT), with unique FAR and height restrictions. The market zoning tested in Scenario 1 also applies the CRT designation but with higher FAR and building heights; permitting greater development and better reflecting market potential. Development programs with the greatest market potential for Spring Center are outlined in Figure 22.

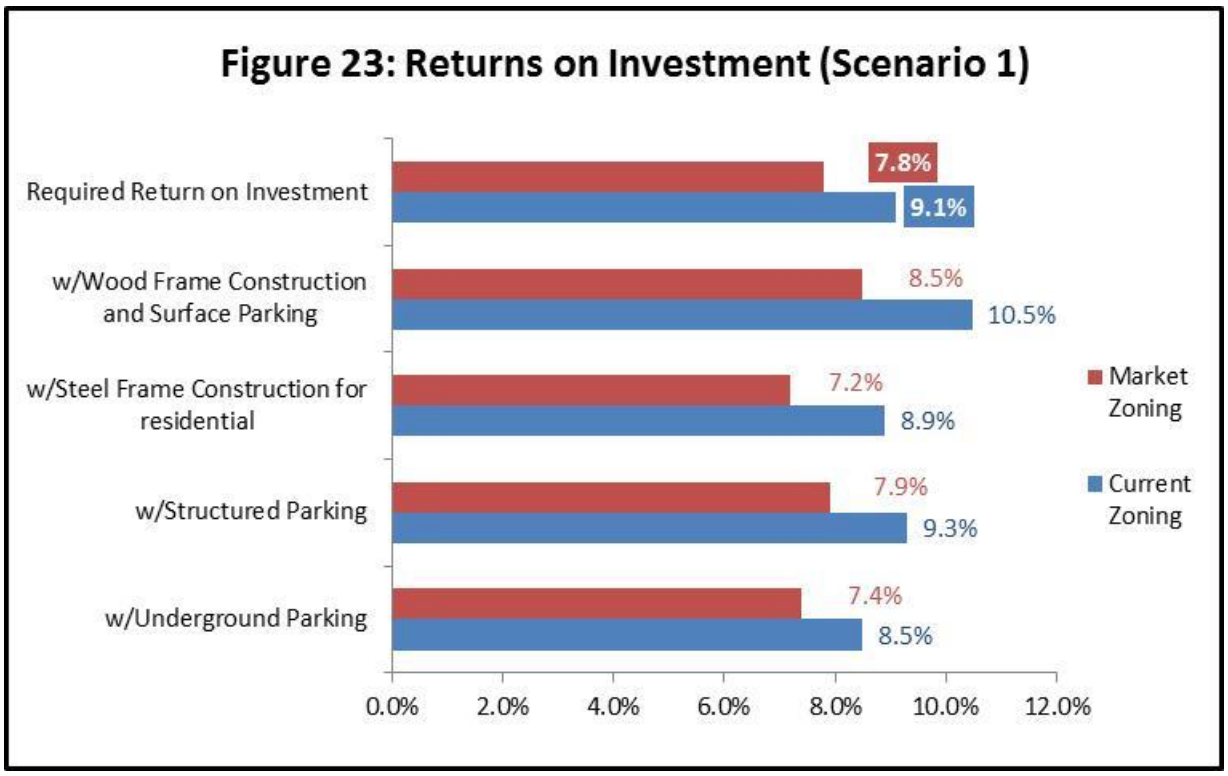
[32] Specific zoning development restrictions related to design, such as build-to-lines or required percentage of transparent surfaces, were not considered in this study and should be further refined by Planning Staff.

Figure 22: Development Programs (Scenario 1)		
	Scenario 1: Spring Center redevelops alone	
	Current Zoning	**Market Zoning**
Development Program		
Retail (SF)	58,776	58,776
Residential (housing units)	61 Market-Rate 8 MPDU	160 Market Rate 20 MPDU
Office (SF)	0	0
FAR	Commercial - 0.31 Residential - 0.44 Total - 0.748	Commercial - 0.31 Residential - 1.14 Total - 1.456
Building Heights	Under 40' (4 stories)	Under 40' (4 stories)
Both development programs comply with setbacks, open space, and site coverage requirements as stated in their zoning designation		

Ground floor retail in both development programs (58,776 SF) assumes capturing 20% of the retail potential from the Immediate Retail Market Area.[33] However, for residential the development programs differ. Under current zoning, Spring Center could accommodate 69 units (61 market-rate, 8 moderately priced dwelling units [MPDUs]) before exceeding the allowable FAR. Under market zoning, which allows a greater FAR, up to 180 units (160 market-rate, 20 MPDUs) could be accommodated. This is an approximately 39% capture of the residential market potential for Scenario 1. For either program, office uses were not considered because of a weak overall office market, the improbability of a stand-alone mixed-use development, and the location of the Purple Line station occupying a significant part of the Spring Center property. All of these factors complicate traditional office development. The development returns on investment for Scenario 1 are presented in Figure 23.[34]

[33] Under current and foreseeable market conditions in Montgomery County, retail in general provides a higher developer yield than office or residential development. Thus, development programs representing the greatest market potential would want to maximize retail development as supported by the market.

[34] Financial assumptions used to calculate development yields are specified in Appendix D.



The returns on investment needed to make redevelopment feasible under current zoning (9.1% return on investment) and market zoning (7.8% return on investment) – using on the methodology previously described in Section 3A – suggest that:

- Wood frame building construction and surface parking are likely to make development economically feasible under both current and market zoning.
- Concrete and steel construction is unlikely to be economically feasible in either zoning scenario.
- Structured above-ground parking **may** be economically feasible in either zoning scenario, but will depend on the development program.
- Underground parking is unlikely to be economically feasible in either zoning scenario.

Scenario 1: Planning Recommendations

Assuming the Spring Center property redevelops alone, the following apply:

- The current CRT zoning maximizes the market potential of the Spring Center property; however, the following adjustments may be necessary:
    - If a policy promoting more housing is pursued, the FAR should be increased to at least 1.5 and up to 2.0[35] [36].

[35] Per Montgomery County Planning Department policy of setting FAR thresholds in 0.25 increments, all FAR recommendations are rounded up to nearest 0.25.

[36] While a 1.5 FAR is the minimum needed to make redevelopment economically feasible, a 30% increase (1.95 – rounded up to 2.0) enables more market flexibility, which may generate more developer interest, yield better site configurations, and provide site amenities such as open space that may be desired by the community at-large.

- Building heights should not exceed 70 feet[37] since taller buildings require concrete and steel construction - unlikely given foreseeable market conditions.
- Redevelopment plans for the Spring Center property should consider providing structured parking, and/or some underground parking because site design will be constrained by the future Purple Line Station.

Figure 24: Scenario 1 Planning Recommendations				
	Zoning	**FAR**	**Building Heights**	**Parking**
Recommendations for Spring Center Property	All CR zoning designations (CR, CRT, CRN) are suitable	~1.5 – 2.0	70' or lower	Consider 100% structured and/or partial underground parking

Scenario 2: Spring Center and Summit Hills redevelop together.

The zoning designations are as follows:

Figure 25: Project Site - Current and Market Zoning (Scenario 2)				
	Spring Center Property		**Summit Hills Property**	
	Current Zoning	**Market Zoning**	**Current Zoning**	**Market Zoning**
Zoning Designation	CRT-0.75	CRT[1]	R-10	CR
Floor Area Ratio	Commercial - 0.75 Residential - 0.5 Maximum - 0.75	Commercial - 0.25 to 3.5 Residential - 0.25 to 3.5 Maximum - 0.25 to 4.0	N/A	Commercial - 0.25 to 7.5 Residential - 0.25 to 7.5 Maximum - 0.5 to 8.0
Height Restrictions	40'	35' - 150'	150'	35' to 300'
Open Space Requirements	10%	10%	50%	10% (for multiuse)
Setbacks	Side: 0' ft. Rear: 0' ft.	Side: 0' ft. Rear: 0' ft.	Side - 12' Rear - 12'	Side - 0' Rear - 12'
Site Coverage	90%	N/A	12%	N/A
Source: Montgomery County Planning Department				

In Scenario 2 for Spring Center - both zoning designations remain the same as in Scenario 1 - CRT. However, they are different for Summit Hills, which is currently zoned for mid-to-high rise residential (R-10), which precludes commercial uses. The market zoning designation for Summit Hills was tested using CR (Commercial Residential). This zoning better reflects market potential by allowing a larger scale development, taller buildings, and a wider variety of uses.

[37] Limiting heights to 65' needlessly restricts development. Allowing 68' or 70' heights leaves open the opportunity for developers to incorporate articulation along roofs, or increase the ceiling height of ground floor or top floor units.

The development programs for Scenario 2 with the greatest market potential for Spring Center and Summit Hills are presented in Figure 26.[38]

Figure 26: Development Programs and Yields (Scenario 2)				
	Scenario 2: Spring Center and Summit Hills redevelop together			
	Current Zoning		**Market Zoning**	
	Summit Hills	Spring Center	Summit Hills	Spring Center
Retail (SF)	0	58,776	176,329	29,388
Residential (housing units)	483	0	323	160
Office (SF)	0	0	50,000	0
FAR	Commercial - 0 Residential - 0.55 Total - 0.55	Commercial - 0.31 Residential - 0 Total - 0.31	Commercial - 0.13 Residential - 0.33 Total - 0.46	Commercial - 0.16 Residential - 1.14 Total - 1.30
Building Heights	Under 40' (4 stories)	Under 40' (4 stories)	Under 40' (4 stories)	Under 40' (4 stories)
All development programs comply with setbacks, open space, and site coverage requirements as stated in their zoning designation				

Under current zoning, and based on market demand for residential, redevelopment of Summit Hills would likely absorb all 483 residential units, due in part to the size of the property to accommodate housing[39]. Under the current residential zone a large scale, mixed-use development at Summit Hills is precluded. This leaves only about 58,776 SF of retail for Spring Center (the same as in Scenario 1). Under this circumstance, Spring Center retail uses would likely be neighborhood serving – particularly to Summit Hills residents – as well to Purple Line riders (dry cleaners, newsstands, food stands, etc.).

Under market zoning, a much larger mixed-use environment could be developed at Summit Hills. It would provide the critical mass and scale to attract new development that would have otherwise located elsewhere. Assuming safe, direct, and connected pedestrian routes and road crossings, Spring Center could leverage this development, extending the mixed-use environment.

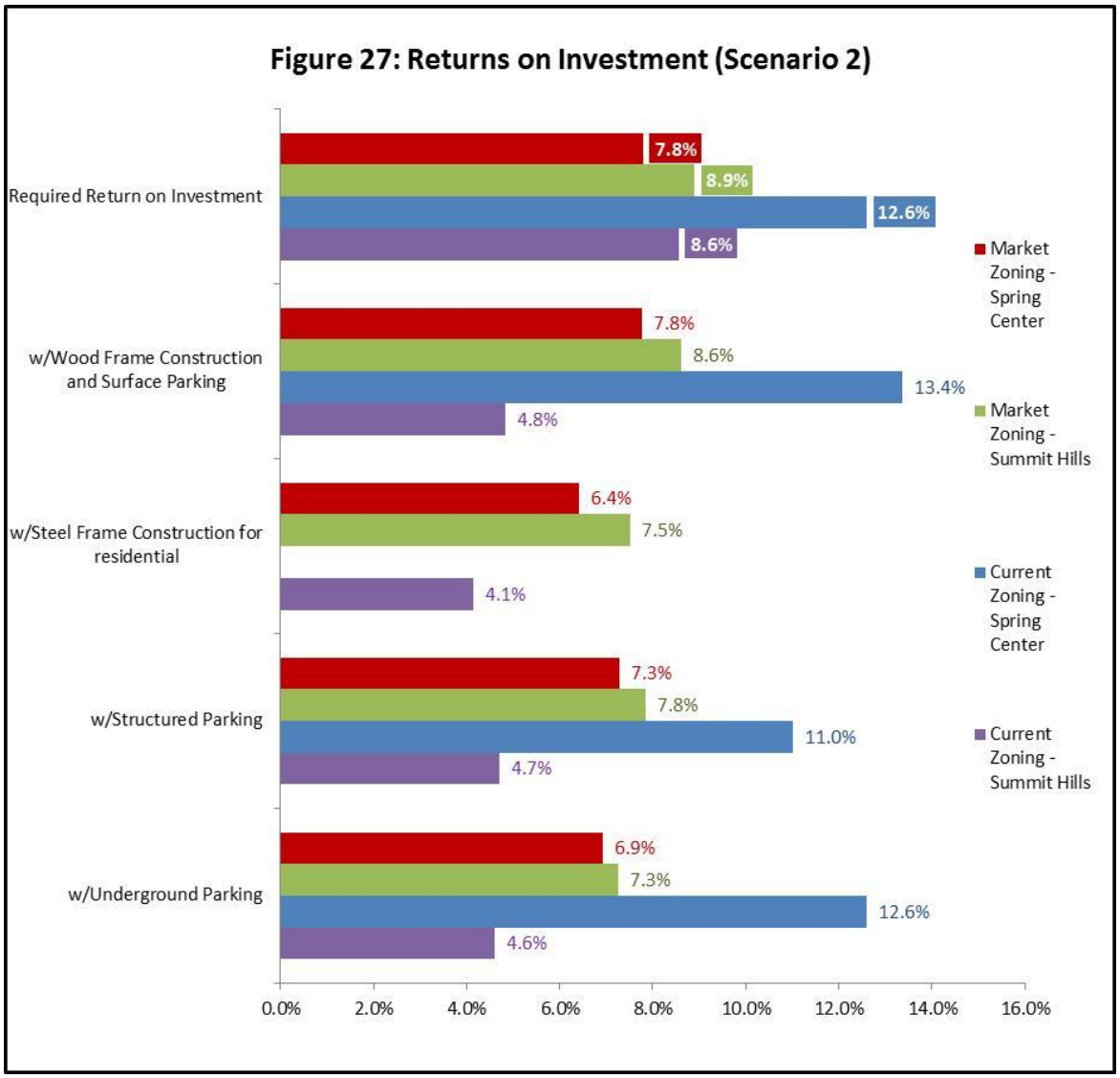
About 205,717 SF of retail space could be supported at the project site (70% of market capture in the Immediate Retail Market Area). This is split between Summit Hills (60% capture) yielding about 176,329 SF of retail and 29,388 SF would go to Spring Center (10% capture)[40]. For residential, 160 homes were allocated to Spring Center and the remainder (483 – 160 = 323

[38] In crafting the development programs, total market demand was "allocated" between the two properties in such a way to promote sufficient development on each property to render them both economically feasible. Planning Staff should be mindful of recommending zoning restrictions that are too permissive, which may lead to certain properties absorbing a disproportionate amount of the market demand, leaving an insufficient amount for others.

[39] Notwithstanding land and site preparation costs, larger sites are more attractive to developers than smaller sites as it is generally more difficult to construct the desired housing features on smaller sites.

[40] Although it is possible for either property to absorb more or less retail space than what is tested here, such a scenario would maintain market balance and provide each the best opportunity to be economically feasible.

homes) to Summit Hills. Lastly, this larger mixed-use development, with complementary uses, would likely support some office – up to 50,000 SF for Summit Hills. The returns on investment for Scenario 2 are presented in Figure 27.[41]



Assuming the returns on investment needed to make redevelopment economically feasible under current zoning are 12.6% for the Spring Center and 8.6% for Summit Hills, and under market zoning are 7.8% for the Spring Center and 8.9% for Summit Hills, the following apply:

Spring Center

- Wood frame building construction and surface parking are likely to make development economically feasible under both current and market zoning.
- Concrete and steel construction is unlikely to be economically feasible in either zoning scenario.

[41] Assumptions used to calculate returns on investment are specified in Appendix D.

- Structured above-ground and underground parking are unlikely to be economically feasible under either zoning scenario.

Summit Hills

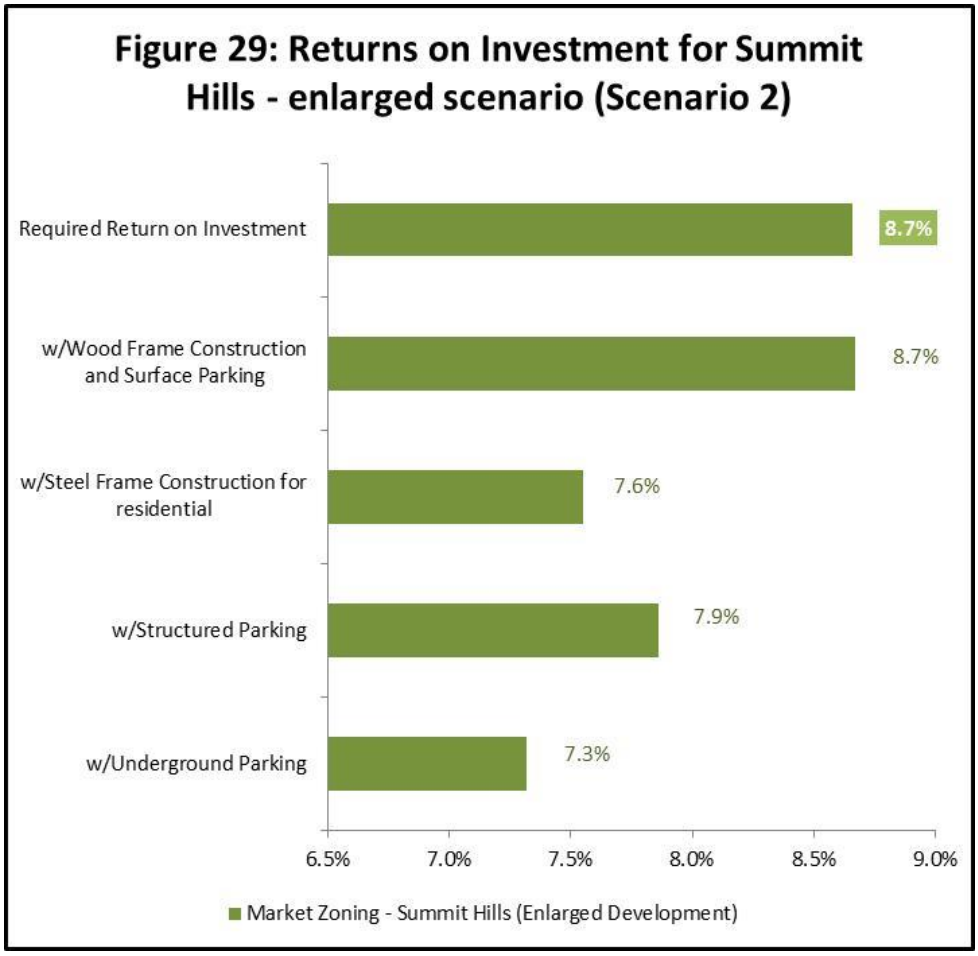
- Return on investment under current zoning is significantly less than what is required under traditional wood frame building construction. This is largely due to 1.) the high land costs for the Summit Hills property, and 2.) insufficient market demand needed to produce an adequate return on investment. The return on investment is even lower when concrete and steel construction and structured and underground parking are considered.
- The anticipated return on investment under market zoning is affected by the same factors as the above current zoning approach.
- For a developer yield to equal or be higher than the required return on investment, the market will need to support a residential and retail component that is 13% larger than the development program, while continuing to command the same lease rates/prices. This would exceed the market demand in the *Economic and Market Overview*.[42]

The high land costs for Summit Hills constrain development potential and may prohibit complete property redevelopment by 2020. A subsequent development program was tested that increased the amount of residential and retail space by 13%; the minimum needed to make redevelopment economically feasible (see Figure 28). Since this would exceed projected 2020 market demand, complete site redevelopment would be more likely after 2020. New returns on investment for "Market Zoning – Summit Hills" are presented in Figure 29.

Figure 28: Summit Hills Development Program - Enlarged Development (Scenario 2)

Retail (SF)	199,252
Residential (housing units)	365
Office (SF)	50,000
FAR	Commercial - 0.15 Residential - 0.37 Total - 0.52
Building Heights	Under 40' (4 stories)
Development program complies with setbacks, open space, and site coverage requirements as stated in its zoning designation	

[42] However, it is possible that a development program could be conceived after 2020, when market demand increases due to population and/or income growth.



Assuming the required return on investment for market zoning on the Summit Hills property needs to be met for redevelopment to occur, the following apply:

- Redevelopment of Summit Hills may be economically feasible when traditional wood frame building construction is used and the amount of residential and retail space is increased by 13%, which is more than can be currently supported by the market.
- Even with 13% more residential and retail space the economic feasibility of concrete and steel building construction and all above-grade structured parking or underground parking are unlikely.
- Given market uncertainty, redevelopment of the entire site is more likely after 2020; however, it may be economically feasible to redevelop a portion sooner. This would reduce the underlying land and site preparation costs and avoids forgone income from the apartments.

Scenario 2: Planning Recommendations

Assuming Spring Center and Summit Hills redevelop together, the following recommendations include:

Spring Center

- Minimum FAR 1.5 and potentially up to 1.75 to provide greater market flexibility.
- Maximum building heights 70 feet [43] since concrete and steel construction is unlikely.
- 100% above ground structured parking should not be required because the property is small and physically constrained, but it should be encouraged.
- Commercial-Residential zoning designations (CR, CRT, CRN).

Summit Hills

- R10 zone is not likely to stimulate redevelopment of Summit Hills because of insufficient market demand.
- Redevelopment of the entire property for mixed-use may not be supportable by 2020, but is more likely after 2020.
- An earlier and smaller commercial/mixed-use development on part of the site is more likely.
- Assuming the property is developed in its entirety at some point the minimum FAR of an economically feasible development program (requiring a larger retail and residential component) begins around 0.52; thus, the recommended FAR should start around least 50% higher (0.75) to provide greater market flexibility and to accommodate different development proposals[44].
    - FAR allowances may wish to be even higher than 0.75, as additional site amenities (parks, roads, civic gathering spaces) which occupy land without producing revenue would be needed to create and solidify a mixed-use environment.
- Maximum building heights 70 feet[45] since concrete and steel construction is unlikely.
- 100% structured parking should not be required, but it should be encouraged and to a lesser extent underground parking, for larger development proposals.
- Commercial-Residential zoning designations (CR, CRT, CRN).

[43] Limiting heights to 65' needlessly restricts development. Allowing 68' or 70' heights leaves open the opportunity for developers to incorporate articulation along roofs, or increase the ceiling height of ground floor or top floor units.

[44] Market flexibility is key to developing a large property where various configuration options exist to create a true mixed-use environment, as well as to accommodate potential infrastructure improvements (road networks, parks, etc.). While a 0.52 FAR is the minimum needed to make redevelopment economically feasible on Summit Hills, a 50%-100% increase enables an adequate level of market flexibility to yield better site designs, improve infrastructure, and provide community amenities.

[45] Limiting heights to 65' needlessly restricts development. Allowing 68' or 70' heights leaves open the opportunity for developers to incorporate articulation along roofs, or increase the ceiling height of ground floor or top floor units.

Figure 30: Scenario 2 Planning Recommendations				
	Zoning	**FAR**	**Building Heights**	**Parking**
Recommendations for Spring Center Property	All CR zoning designations (CR, CRT, CRN) are suitable	~1.5 – 1.75	70' or lower	Consider partial structured parking on case-by-case basis
Recommendations for Summit Hills Property	All CR zoning designations (CR, CRT, CRN) are suitable	~0.75 – 1.0	70' or lower	Consider partial structured parking on case-by-case basis

SECTION 4: CONCLUSION

The anticipated Woodside/16th Street Purple Line Station and interest to redevelop three surrounding properties (Spring Center, Summit Hills, Falkland Chase) create opportunities for a mixed-use development that can become a destination. Success will depend on a strong vision for the area and the ability of property owners to implement it. Also important is the sequence in which properties redevelop. The key to creating a vibrant mixed-use environment for this area is the redevelopment of the 30-acre Summit Hills Property. It offers the size and location to create a special place that extends into and influences surrounding properties, such as the Spring Center and Falkland Chase. To help accomplish this, and to foster a seamless and continuous public realm, safe and accessible pedestrian connections must be made between properties. Assuming 16th Street and East-West Highway will remain major thoroughfares, a well-conceived pedestrian bridge or underpass from Summit Hills to neighboring properties should also be explored.

Both the Spring Center and Summit Hills properties require mixed-use zoning (primarily commercial and residential) to achieve the vision for the area and to be economically feasible. While Spring Center can realize development options under both current and market zoning that are economically feasible, increased FARs and building heights, as suggested in this analysis, may enhance planning objectives, such as housing and integrated mixed-use development. Summit Hills will likely require mixed-use zoning if redevelopment is to be economically feasible. Increasing FARs beyond the minimum necessary to promote economically feasible redevelopment options can help foster an even wider array of land uses and support site amenities such as parks, enhanced pedestrian connections, civic spaces.

FARs that are greater than the minimums identified in the *Financial Feasibility Analysis* for both properties will serve to support greater market flexibility. However, FARs and building heights that are too aggressive – particularly for Summit Hills – could result in absorbing a disproportionate amount of the market demand. The impacts to neighboring properties could be delayed redevelopment or under-development.

Appendix A: Development Pipeline

Figure A1: Housing Pipeline in Residential PTA			
Project	**Type**	**Rent/For-Sale**	**Number of Units**
Four Corners Estates	Residential	For-Sale	5
Brand Property	Residential	For-Sale	4
Woodside	Residential	For-Sale	1
Chelsea Court	Residential	Rent	64
Easley Subdivision (The Adele)	Mixed	Rent	96
Midtown Silver Spring	Mixed	Rent	385
Bonifant Plaza	Residential	Rent	72
814 Thayer Avenue	Residential	Rent	52
Silver Spring Park	Mixed	Rent	58
Falkland Chase	Mixed	Rent	1,250
Fenwick Station	Residential	Rent	310
Fenton Street	Mixed	Rent	259
Studio Plaza	Mixed	Rent	749
The Blairs Master Plan	Mixed	Rent	1,110
8621 Georgia Avenue	Mixed	Rent	292
Silver Spring Library Residential	Mixed	Rent	155
8001 Newell Street	Mixed	Rent	187
University Gardens	Residential	Rent	97
Takoma Park BF Gilberts Addition	Residential	For-Sale	3
TOTAL			**5,149**
Source: Montgomery County Planning Department Pipeline April 2014			

Appendix B: Residential Market Demand on Project Site

Scenario 1 – Spring Center redevelops alone

Figure B1: Scenario 1 - Housing Demand (Multifamily For-Rent)		
	Residential PTA	Rest of Montgomery County (excluding PTA)
Demand from New Households (2020)		
New Households	2,206	21,773
Income Qualified 1/	44%	55%
Tenure Qualified 2/	61%	32%
Estimated Lifestyle Preference 3/	68%	24%
New Target Market Households	402	931
Demand from Existing Renter Households (2020)		
Total Households	33,168	356,104
Income Qualified	44%	55%
Tenure Qualified	61%	32%
Estimated Lifestyle Preference	68%	24%
Annual Turnover Rate 4/	33%	31%
Existing Target Market Households	1,996	4,721
Annual Absorption Potential		
Total Target Market Annual Demand	2,399	5,652
Planning Area Capture	10%	1.00%
Planning Area Annual Absorption Potential	**240**	**57**
1/ Target market income range is $100,000/year based on monthly rent of $2,500, in which housing costs do not exceed 30% of income		
2/ Based on proportion to owners to renters, 2010 U.S. Census		
3/ Estimated Lifestyle Preference is based on segmented demographic data provided by ESRI Business Analyst Online		
4/ Annual turnover rate from the 2012 American Community Survey		

Figure B2: Scenario 1 - Housing Demand (Condominium For-Sale)

	Residential PTA	Rest of Montgomery County (excluding PTA)
Demand from New Households (2020)		
New Households	2,206	21,773
Income Qualified 1/	44%	55%
Estimated Lifestyle Preference 2/	68%	24%
Propensity to Own 3/	39%	68%
New Target Market Households	262	1,943
Demand from Renter Converting Households (2020)		
Total Households	33,168	356,104
Income Qualified	44%	55%
Existing Renters	50%	32%
Estimated Annual Turnover Rate 4/	34%	32%
Estimated Lifestyle Preference	68%	24%
Propensity to Buy	10%	10%
Conversion Target Market Households	172	480
Turnover of Existing Owner-Occupied Households (2020)		
Total Households	33,168	356,104
Income Qualified	44%	55%
Tenure Qualified 5/	32%	76%
Estimated Lifestyle Preference	68%	24%
Estimated Annual Turnover Rate 6/	8%	7%
Existing Target Market Households	259	2,501
Annual Absorption Potential		
Total Target Market Annual Demand	692	4,923
Planning Area Capture	10%	1.00%
Planning Area Annual Absorption Potential	**69**	**49**

1/ Target market income range is $100,000/year based on monthly payment of $2,702, in which housing costs do not exceed 30% of income

2/ Estimated Lifestyle Preference is based on segmented demographic data provided by ESRI Business Analyst Online

3/ Based on proportion to owners to renters

4/ Annual turnover rate from the 2012 American Community Survey

5/ 2010 U.S. Census

6/ Annual turnover rate from the 2012 American Community Survey

Scenario 2 – Spring Center and Summit Hills redevelop together

Figure B3: Scenario 2 - Housing Demand (Multifamily For-Rent)		
	Residential PTA	Rest of Montgomery County (excluding PTA)
Demand from New Households (2020)		
New Households	3,271	20,708
Income Qualified 1/	44%	55%
Tenure Qualified 2/	61%	32%
Estimated Lifestyle Preference 3/	67%	24%
New Target Market Households	583	886
Demand from Existing Renter Households (2020)		
Total Households	34,233	353,974
Income Qualified	44%	55%
Tenure Qualified	61%	32%
Estimated Lifestyle Preference	67%	24%
Annual Turnover Rate 4/	33%	31%
Existing Target Market Households	2,012	4,693
Annual Absorption Potential		
Total Target Market Annual Demand	2,595	5,579
Planning Area Capture	10%	1.00%
Planning Area Annual Absorption Potential	**259**	**56**
1/ Target market income range is $100,000/year based on monthly rent of $2,500, in which		
2/ Based on proportion to owners to renters, 2010 U.S. Census		
3/ Estimated Lifestyle Preference is based on segmented demographic data provided by ESRI Business Analyst Online		
4/ Annual turnover rate from the 2012 American Community Survey		

Figure B4: Scenario 2 - Housing Demand (Condominium For-Sale)

	Residential PTA	Rest of Montgomery County (excluding PTA)
Demand from New Households (2020)		
New Households	3,271	20,708
Income Qualified 1/	44%	55%
Estimated Lifestyle Preference 2/	67%	24%
Propensity to Own 3/	58%	72%
New Target Market Households	554	1,954
Demand from Renter Converting Households (2020)		
Total Households	34,233	353,974
Income Qualified	44%	55%
Existing Renters	50%	32%
Estimated Annual Turnover Rate 4/	34%	32%
Estimated Lifestyle Preference	67%	24%
Propensity to Buy	10%	10%
Conversion Target Market Households	173	477
Turnover of Existing Owner-Occupied Households (2020)		
Total Households	34,233	353,974
Income Qualified	44%	55%
Tenure Qualified 5/	58%	72%
Estimated Lifestyle Preference	67%	24%
Estimated Annual Turnover Rate 6/	8%	7%
Existing Target Market Households	475	2,339
Annual Absorption Potential		
Total Target Market Annual Demand	1,202	4,770
Planning Area Capture	10%	1.00%
Planning Area Annual Absorption Potential	**120**	**48**

1/ Target market income range is $100,000/year based on monthly payment of $2,702, in

2/ Estimated Lifestyle Preference is based on segmented demographic data provided by

3/ Based on proportion to owners to renters

4/ Annual turnover rate from the 2012 American Community Survey

5/ 2010 U.S. Census

6/ Annual turnover rate from the 2012 American Community Survey

Appendix C: Additional Sources of Demand for Retail Space

Figure C1: Supportable Retail Space from Population Growth by 2020	
A. Additional Households in Immediate Retail Market Area	2,206
B. Additional Households in Destination Trade Area (2014 - 2020) 1/	9,442
C. Assumed Market Capture from Destination Trade Area to Immediate Retail Market Area	20%
D. Assumed Retail SF per household (SF)	10
E. Additional Supportable Retail Space in Immediate Retail Market Area (SF) (A x D) + (B x C x D)	**40,947**
ESRI Business Analyst Online, AECOM *1/ Additional Households in Destination Trade Area is exclusive of those in Immediate Retail Market Area*	

Figure C2: Supportable Retail Space from Purple Line Ridership	
A. Woodside/16th St. Station Daily trips (Maryland Transit Authority)	1,570
B. Woodside/16th St. Station Annual trips	573,050
C. Assumed Spending per Rider 1/	$4
D. Total Spending from Ridership (B x C)	$2,292,200
E. Average Sales Productivity Factor (Sales/SF)	$350
F. Additional Supportable Retail Space to Immediate Retail Market Area (SF) (D / E)	**6,549**
1/ Spending per rider assumed to be a cup of coffee, newspaper, and snack which is approximately $4	

Figure C3: Retail Pipeline in Immediate Retail Market Area

Project	Type	Retail Square Footage
Fontana	Non-Residential	9,226
Easley Subdivision (The Adele)	Mixed	15,020
Silver Spring Park	Mixed	63,472
Falkland Chase	Mixed	70,000
Fillmore Music Hall	Non-Residential	140,500
Fenton Street	Mixed	18,650
Studio Plaza	Mixed	17,756
United Therapeutics SS Campus - Phase 3	Non-Residential	10,000
The Blairs Master Plan	Mixed	163,801
8621 Georgia Avenue	Mixed	1,619
Silver Spring Library Residential	Mixed	920
Chevy Chase Bank Hillandale	Non-Residential	3,170
TOTAL		**514,134**

Source: Montgomery County Planning Department Pipeline April 2014

Appendix D – Required Return on Investment

The financial feasibility analysis uses the following development "rule of thumb": if the revenue generated by the non-land building improvements divided by non-land development costs (i.e. return on investment) is about 1.5%-2.5% (assume 2.0%) higher than the prevailing capitalization rates[46] for the building use, the project may be economically feasible. Prevailing capitalization rates used in the report are based on a blended average of the capitalization rate of each building use in a development program, which is also weighted using the proportion of each building use in the development program. This can be illustrated in the following example.

Figure D1: Blended Capitalization Rate Calculation

Building Use	A. Capitalization Rate	B. Proportion of Development Program	C. Weighted Proportion of Capitalization Rate (A x B)
Residential	4.5%	60%	2.7%
Retail	5.75%	30%	1.7%
Office	6.25%	10%	0.6%
Total			**5.1%**

Thus, capitalization rates are different for different development programs, as each will have a different composition of building uses.

However, this methodology does not take into account the value of the land nor the costs needed to prepare the properties for development; these costs can be considerable, particularly given the size and the relatively desirable location of the project site. As such, a modified version of this approach is used for this study that will raise the required return on investment by adding a premium based on the land value, costs for demolition and site preparation, and forgone income (assuming revenue-producing real estate on the property). This "premium" is determined by calculating the percentage of non-building costs (land, demolition, site preparation, forgone income) to total development costs (non-building + building costs), and multiplying it by the weighted capitalization rate as found above. This can be illustrated in the following table through continuation of the previous example.

[46] Capitalization rate is the ratio between the net operating income produced by an asset (in this case, a real estate building) and its capital cost (the price paid to buy the asset) or alternatively its current market value. Lower capitalization rates are typically associated with lower market risk and better expected market performance.

Figure D2: Additional Premium for Non-Building Costs	
A. Weighted Capitalization Rate	5.1%
B. Non-building costs (land, demolition, site preparation, forgone income) in development program	25% of total development cost
C. Premium for Non-Building Costs (A x B)	**1.3%**

The premium added to the weighted capitalization rates will also differ by development program, as the percentage of non-building costs to total development costs will change, based on the scale of the development program as well as acreage of the property.

Using these factors, we would be able to calculate the required return on investment to make the development program economically feasible. This is illustrated in the following table.

Figure D3: Calculation of Required Return on Investment	
Weighted Capitalization Rate	5.1%
Additional Premium for Non-Building Costs	1.3%
Additional 2% to mitigate developer risk ("rule-of-thumb")	2.0%
Required Return on Investment	**8.4%**

Appendix E – Assumptions Used in Financial Feasibility Analysis

The proforma methodology and assumptions used to calculate development returns on investment can be observed in the tables below. The same methods were used for each development program in each Scenario.

Figure E1: Revenue Statement	
Revenue Related Items	**Sources and Assumptions**
Retail	
Annual Retail Rents (@ $41 PSF)	*Co-Star: Retail on the ground floor of the Crescent Building is at $41/PSF for a triple net lease (tenant pays taxes, insurance, and common area maintenance)*
Operating Cost PSF (3% of total rent)	*Incidental costs related to tenant improvements, tenant turnover, renovations, etc.*
Total Retail Net Operating Income	*Calculated*
Residential	
Market Rate - Number of Units	*Varies*
Market Rate - Monthly Rents Per Unit ($2.50/PSF)	*Based on rent per square foot comparables from the Fenwick and Citron residential buildings in Downtown Silver Spring*
Market Rate - Average Unit Size	*Assumed 1,000 NSF (1,250 GSF)*
MPDU - Number of Units	*12.5% of market rate homes, per Department of Housing And Community Affairs*
MPDU - Monthly Rents Per Unit	*Department of Housing And Community Affairs: Estimated around 70% of market rate rents*
MPDU Unit Size	*Assumed 1,000 NSF (1,250 GSF)*
Residential Vacancy (5% Market, 3% MPDU)	*Based on 2012 Montgomery County Rental Housing Survey*
Annual Operating Cost ($8043 per unit annually)	*Dollars and Cents of Multifamily Housing: 2001, plus 2% inflation annually*
Total Residential Net Operating Income	*Calculated*
Office	
Annual Office Lease Revenue (@ $35 PSF)	*Co-Star: Based on Discovery Building in Silver Spring ($35/PSF)*
Operating Cost PSF (32% operating ratio)	*IREM 2012 Survey of Office Buildings - Downtown*
Total Office Net Operating Income	*Calculated*
Total Net Operating Income	*Calculated*

Figure E2: Development Regulations	
Land Use	**Sources and Assumptions**
Retail Development (SF)	*Varies. Assume ground floor and/or 2nd story retail.*
Retail Parking (SF)	*MNCPPC: 4 parking spaces/1,000 SF per zoning regulations. Assume 320 GSF per parking space.*
Residential Development (SF)	*Varies. Assumed to be on top of ground floor retail.*
Residential Parking (SF)	*MNCPPC: Used shared parking zoning regulations of 0.5 spaces/housing unit, assuming they are rented or sold separately from the unit. Assume 320 GSF per parking space.*
Office (SF)	*Varies.*
Office Parking (SF)	*MNCPPC: 2 parking spaces/1,000 SF per zoning regulations. Assume 320 GSF per parking space.*
Total Development Program (SF)	*Calculated*

Figure E3: Non-Building Costs	
Costs	**Sources and Assumptions**
Land Acquisition	
Land Value	*MNCPPC: Geographic Information System Database Assessed Value*
Demolition (along with hauling, disposal, and recycling credit)	*Tammel Demolition*
Pavement Removal	*Independent Estimator at ~$30,000/acre*
Total demolition and pavement removal costs	*Calculated*
Forgone Income at Summit Hills/Spring Center	
Number of Units	*Southern Management Company/CoStar*
Monthly Rent Per Unit	*Southern Management Company/CoStar*
Average Size	*Southern Management Company/CoStar*
Gross Rental Income	*Southern Management Company/CoStar*
Annual Operating Costs/Unit	*Dollars and Cents of Multifamily Housing: 2001, plus 3% annual inflation*
Annual Net Operating Income	*Calculated*
Income Loss during Development Period	*Calculated*

Figure E4: Construction Costs	
Construction Costs	**Sources and Assumptions**
Ground Floor Retail Building Construction (@ $150 PSF)	*RS Means*
Retail Tenant Improvements ($49 PSF)	*RS Means*
Residential Building Construction (@ $176 or $220 PSF)	*RS Means. ~$176/PSF for stick frame construction, ~$220/PSF (25% higher) for steel frame construction.*
Office Construction (@ 180/PSF)	*RS Means*
Office Build-out Improvements ($55/PSF)	*Colliers International*
Retail Parking (Surface/Structured/Underground)	*Assumed $3,000 per surface parking space*
Residential Parking (Surface/Structured/Underground)	*Assumed $20,000 per structured parking space*
Office Parking (Surface/Structured/Underground)	*Assumed $35,000 per underground parking space*
Repaving (non-building and open space footprint)	*Independent Estimator at ~$25/SY*
On-Site Open Space & Landscaping (concrete walkways, bermuda grass, garden landscaping)	*Homewyse, MNCPPC Development Review historic information*
Utilities (Electric, Gas, Sanitary Sewer, Water, Stormwater, Amenities and off-site improvements)	*MNCPPC Dvelopment Review Historic Information, NJ Retail Realty ~$6.00/PSF of building and parking construction*
Planning, Design, Approvals, Contingency, and Soft Costs (25% of Hard Costs)	*Generally ranges between 20%-30%*
Financing Cost (6.5% of development cost)	*Urban Land Institute*
Total Development Cost	*Calculated*

Appendix C:
Transportation

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Executive Summary

This appendix represents a compilation of existing conditions at the time the Greater Lyttonsville Sector Plan was drafted and provides a summary of the methodology and analysis behind sector plan transportation recommendations. Those recommendations are intended to promote a safe and efficient multimodal transportation system within the Greater Lyttonsville community over the life of the sector plan through "Complete Streets" principles. Complete Streets encourage equitable roadway utilization by all modes of transportation. It is anticipated that an enhanced multimodal transportation network, resulting from this plan's recommendations, will meet future transportation demand within the sector plan area. In order to achieve this goal, transportation recommendations included in the sector plan focus on strategic improvements to existing transportation infrastructure as a means of improving connectivity and mobility.

A consultant[1] was hired to assist with the quantitative assessment of intersection system performance for the master plan vision. This assessment used the regional Metropolitan Washington Council of Governments (MWCOG) travel demand model, National Cooperative Highway Research Program (NCHRP) 765 post-processing assessments, and Critical Lane Volume/Highway Capacity Manual techniques to evaluate the sector plan's land use vision.

Sector Plan Study Area and Plan Boundary

The sector plan boundary was formally established by the Planning Board at the outset of this planning process. Since traffic congestion represents a regional issue that extends beyond the plan's boundaries, the Greater Lyttonsville Sector Plan transportation analysis encompasses an area beyond the sector plan boundary, generally comprised of the transportation analysis zones[2] (TAZs) within and contiguous to the plan boundary (Figure 1). Definition of the study area is an important first step in establishing the interface between the regional transportation model and the sector plan specific local area model (LAM), which allows a more refined local analysis of the roadway network within the sector plan boundary.

At a more refined level of detail, the sector plan boundary represents the geographic area that is the focus of the sector plan's land use recommendations. Within the sector plan area, land use recommendations are focused into "Character Districts," defined by the Urban Design team (Figure 3). These character districts helped provide guidance in establishing the building height limitations, site density, and land use recommendations that ultimately served as inputs into the traffic analysis. The LAM reflects these character districts by dividing each TAZ into subzones representing areas of similar land use and density within the sector plan area. Each of the subzones is included within one of the three TAZs within the sector plan area. Further discussion of the traffic analysis methodology, using the MWCOG model and NCHRP post processing is discussed later in this appendix.

[1] Renaissance Planning Group

[2] TAZs are the unit of geography most commonly used in conventional transportation planning forecasting models. The size of a zone varies, however, land use and population within TAZs tends to be consistent. TAZs are defined by the Metropolitan Washington Council of Governments.

Figure 1: Sector Plan Transportation Study Area and Plan Boundary

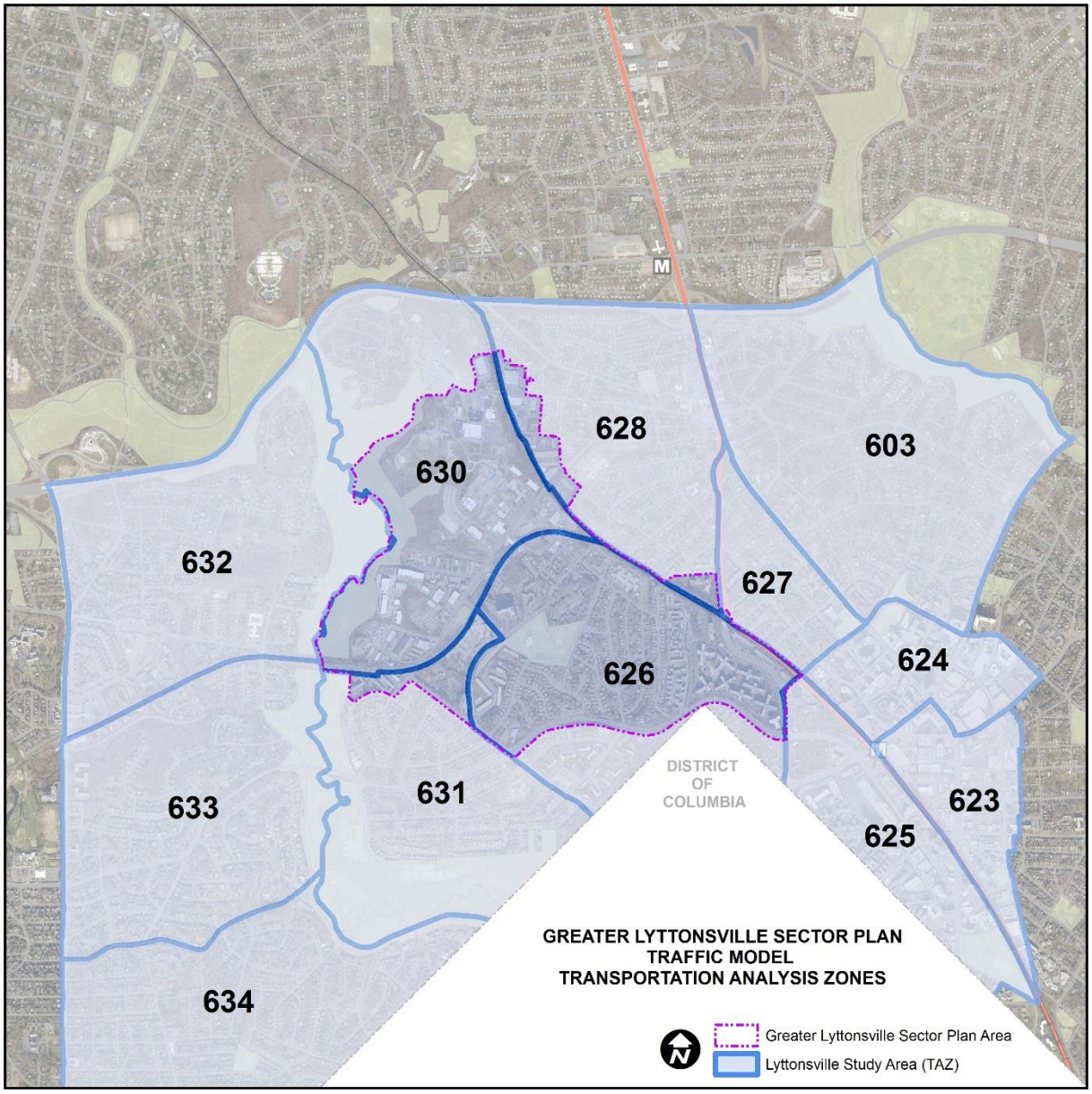


Figure 2: Sector Plan Sub-TAZ Boundaries

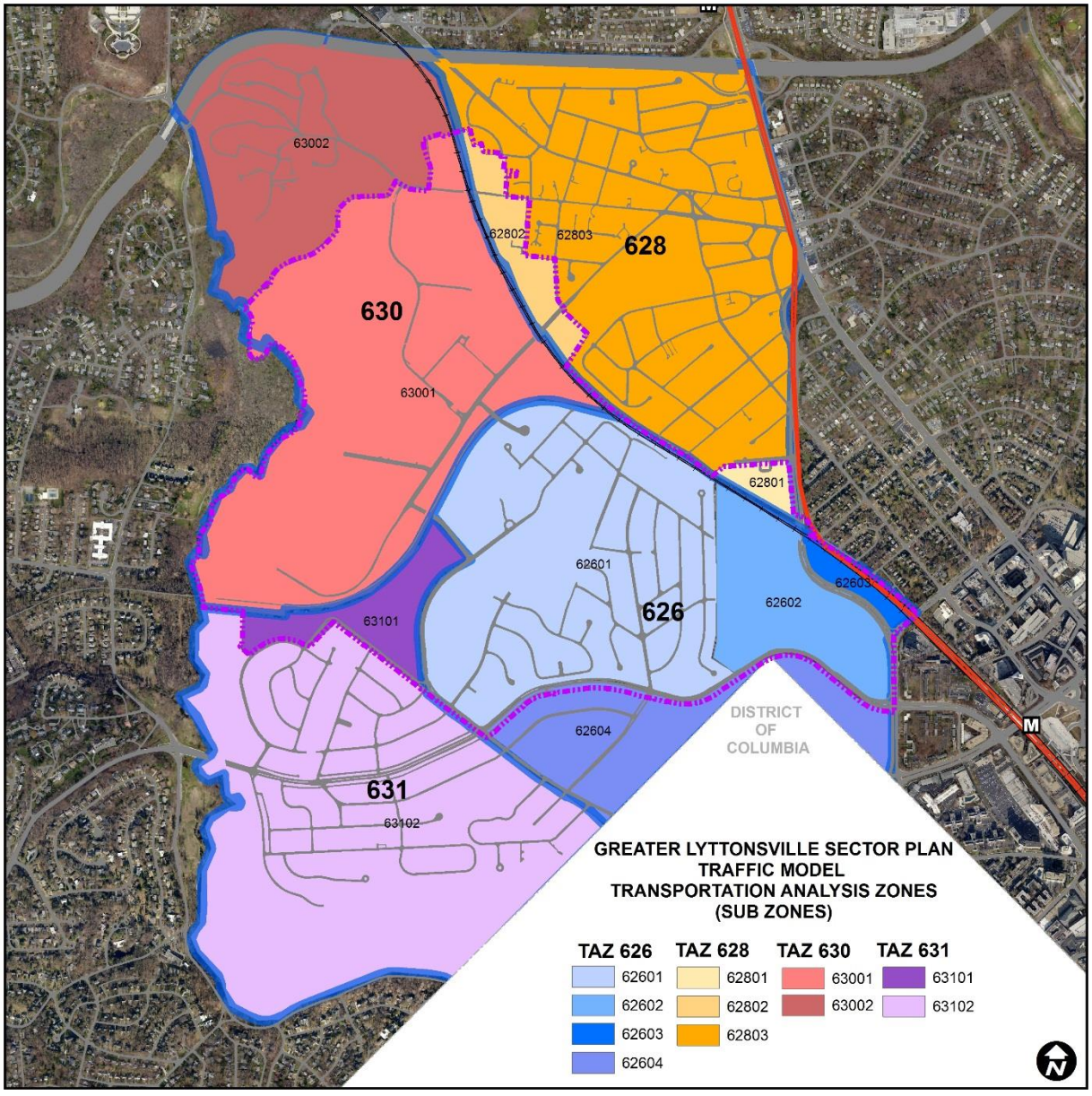
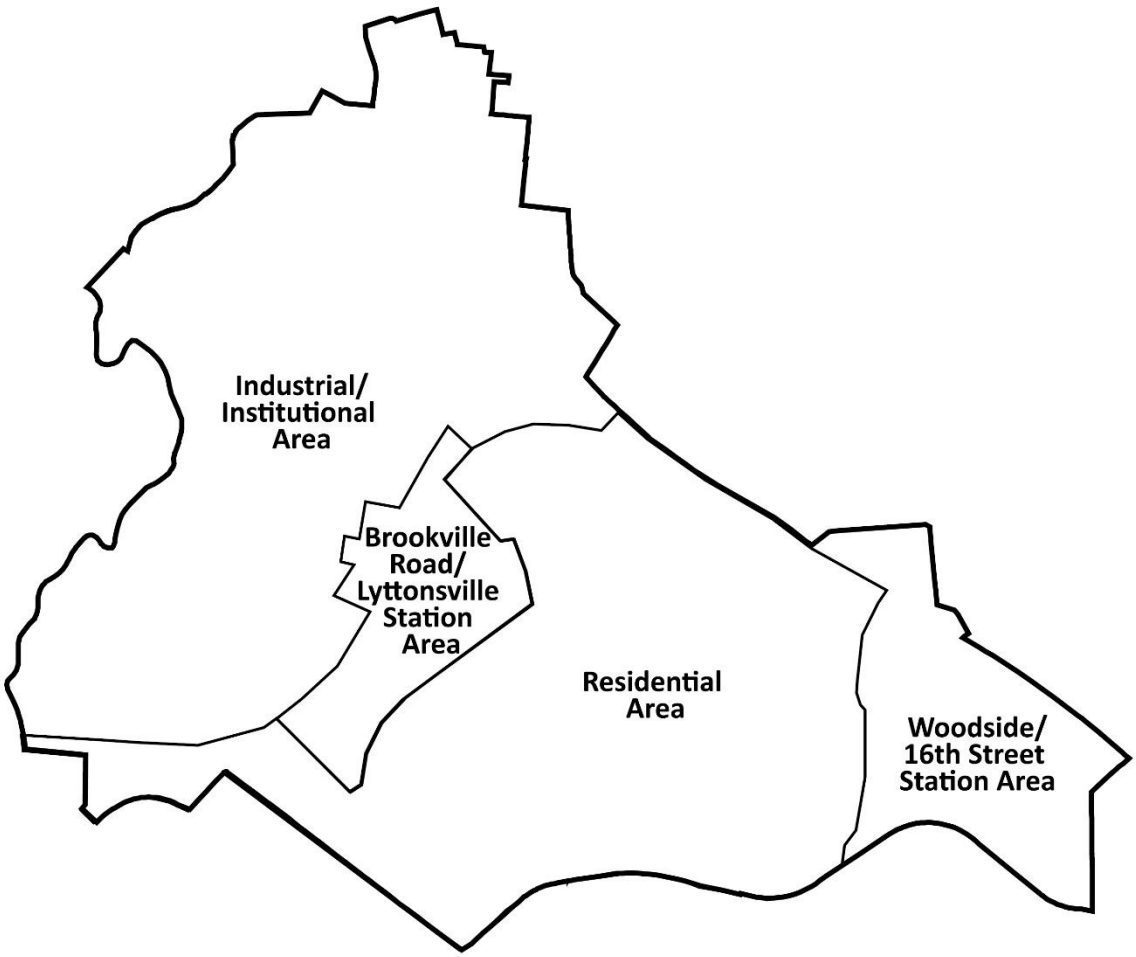


Figure 3: Sector Plan Character District Concept



Existing Conditions

The Greater Lyttonsville Sector Plan area encompasses established residential neighborhoods located in close proximity to the Capital Beltway (I-495) and easily accessible to such regional transportation corridors as East-West Highway (MD 410), Georgia Avenue (MD 97), Colesville Road (US 29/ MD 384), and 16th Street (MD 390). Access to the sector plan area is limited to the north and east by the United States Army Garrison (USAG) and CSX rail facility, to the west by Rock Creek Park, and to the South by access restrictions along East-West Highway. As a result of these limited access points, the community has several distinct gateways: Brookville Road, Lyttonsville Road, Spencer Road, and Sundale Road. A grid of local streets completes the transportation network by promoting safe and efficient travel throughout the community for pedestrians, bicyclists, and motorists. The proposed Purple Line light rail is planned to enhance the sector plan area with stations in the following locations:

a) Lyttonsville Station: near the intersection of Lyttonsville Place and Brookville Road
b) Woodside Station: on 16th Street, north of Spring Street.

A tremendous asset in the community is the Metropolitan Branch Trail/ Future Capital Crescent Trail (CCT), located on the former B&O Railroad right-of-way. This pedestrian and bicycle trail is a major regional connection that also serves as recreational resource within the Greater Lyttonsville area.

Like Montgomery County as a whole, a majority of trips to, from, within, and through Greater Lyttonsville are made using private automobiles. Most of the vehicles traveling through the sector plan area are on East-West Highway and 16th Street. While automobiles still need to be accommodated, US Census data trends indicate a shift in mode choice or commuting patterns away from the automobile. This is shown with the 2010 decennial census and 2014 American Community Survey both published by the United States Census Bureau as well as yearly average annual daily traffic (AADT) downward trending data published by SHA. The census data (census tracts 7026.02 and 7027), summarized in Table 1, indicates that driving alone to work in the Greater Lyttonsville area is estimated to be approximately ten percent lower than the rest of Montgomery County.

Table 1: Means of Commuting to Work

	Montgomery County, Maryland		Census Tract 7026.02, Montgomery County		Census Tract 7027, Montgomery County	
	Estimate	**Margin of Error**	**Estimate**	**Margin of Error**	**Estimate**	**Margin of Error**
Total	**525,752**	**+/-2,666**	**3,213**	**+/-302**	**4,175**	**+/-400**
Car, truck, or van - drove alone	344,467	+/-2,962	1,744	+/-285	2,249	+/-341
Car, truck, or van - carpooled	53,016	+/-1,850	255	+/-120	436	+/-268
Public transportation (excluding taxicab)	81,495	+/-2,050	965	+/-254	1,050	+/-307
Walked	10,747	+/-726	133	+/-98	80	+/-59
Taxicab, motorcycle, bicycle, or other	6,312	+/-497	43	+/-70	42	+/-50
Worked at home	29,715	+/-1,061	73	+/-53	318	+/-149

Source: U.S. Census Bureau, 2010-2014 American Community Survey 5-Year Estimates

Existing Conditions

Major Roadways

Roads within the Greater Lyttonsville Sector Plan Area carry three tiers of traffic: through-trips, circulation within the community, and local access for adjacent properties. Each of the roadway classifications that comprise these tiers is integral to the success of the overall network. The highest roadways within this hierarchy are the master planned major highways and arterial roadways (Table 3). Stemming from these roads is a local street network that provides safe and efficient multimodal transportation within the community as well as direct access to abutting properties. Each of the respective street classifications can be seen in the Roadway Classification map, below (Figure 5).

Master Plan Roadway Character

The following summarizes the current configuration, lane allocation, and operation of Greater Lyttonsville's major roadways and illustrates the 2013 Average Annual Daily Traffic (AADT) as summarized by the Maryland State Highway Administration (Figure 4).

16th Street

16th Street (MD 390) is a six-lane divided roadway. This road is owned and maintained by the Maryland State Highway Administration. Access to abutting parcels is mostly via lower classification side streets, however, some direct access to abutting property is permitted. Channelized right-turn lanes are common at signalized intersections on this roadway. Within the vicinity of the sector plan area, traffic signals are located at the following intersections:

- Georgia Avenue (MD 97)
- Second Avenue
- Spring Street
- East-West Highway (MD 410)

East-West Highway

East-West Highway (MD 410) is a four-lane roadway that is owned and maintained by the Maryland State Highway Administration. Access to abutting parcels is mostly via direct access driveways. Within the sector plan area, traffic signals are located at the following intersections:

- 16th Street (MD 390)
- Rosemary Hills Drive
- Sundale Drive
- Grubb Road

Brookville Road

Brookville Road is a two-lane roadway with on-street parking permitted during the off-peak periods. This road is owned and maintained by the Montgomery County Department of Transportation. Access to abutting parcels is mostly via direct access driveways. Left-turn lanes are common on this roadway where left turns are permitted. There are no traffic signals on Brookeville Road within the sector plan area, though a flashing amber signal exists at the main entrance to the USAG at Forest Glen.

Figure 4: 2013 AADT Volumes (Source: Maryland State Highway Administration)
http://sha.maryland.gov/Traffic_Volume_Maps/montgomery.pdf

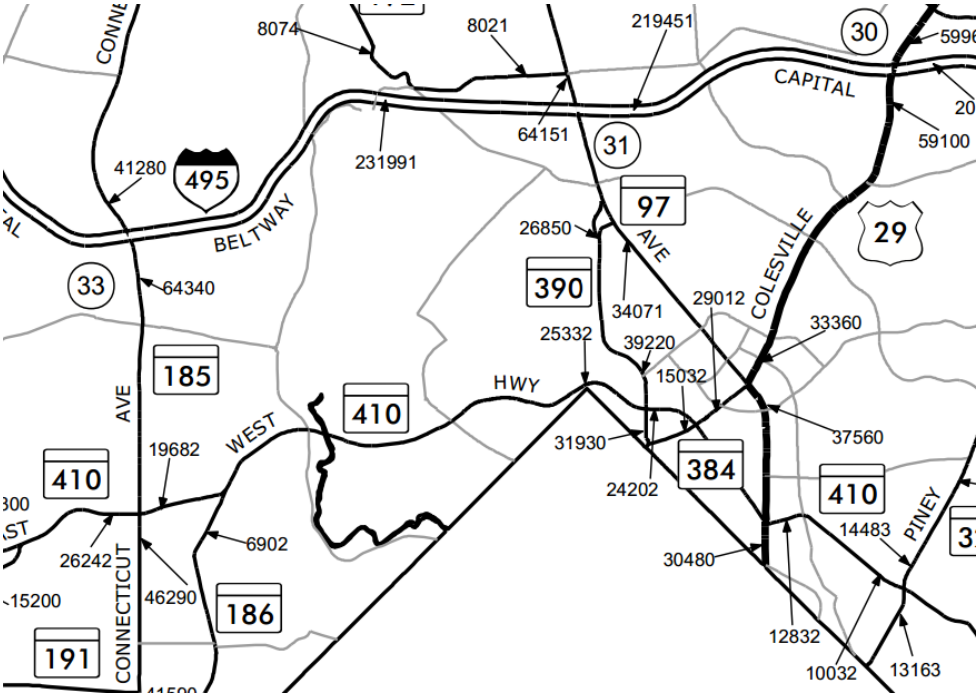


Table 2: Average Annual Weekday Traffic (Source: MD SHA)

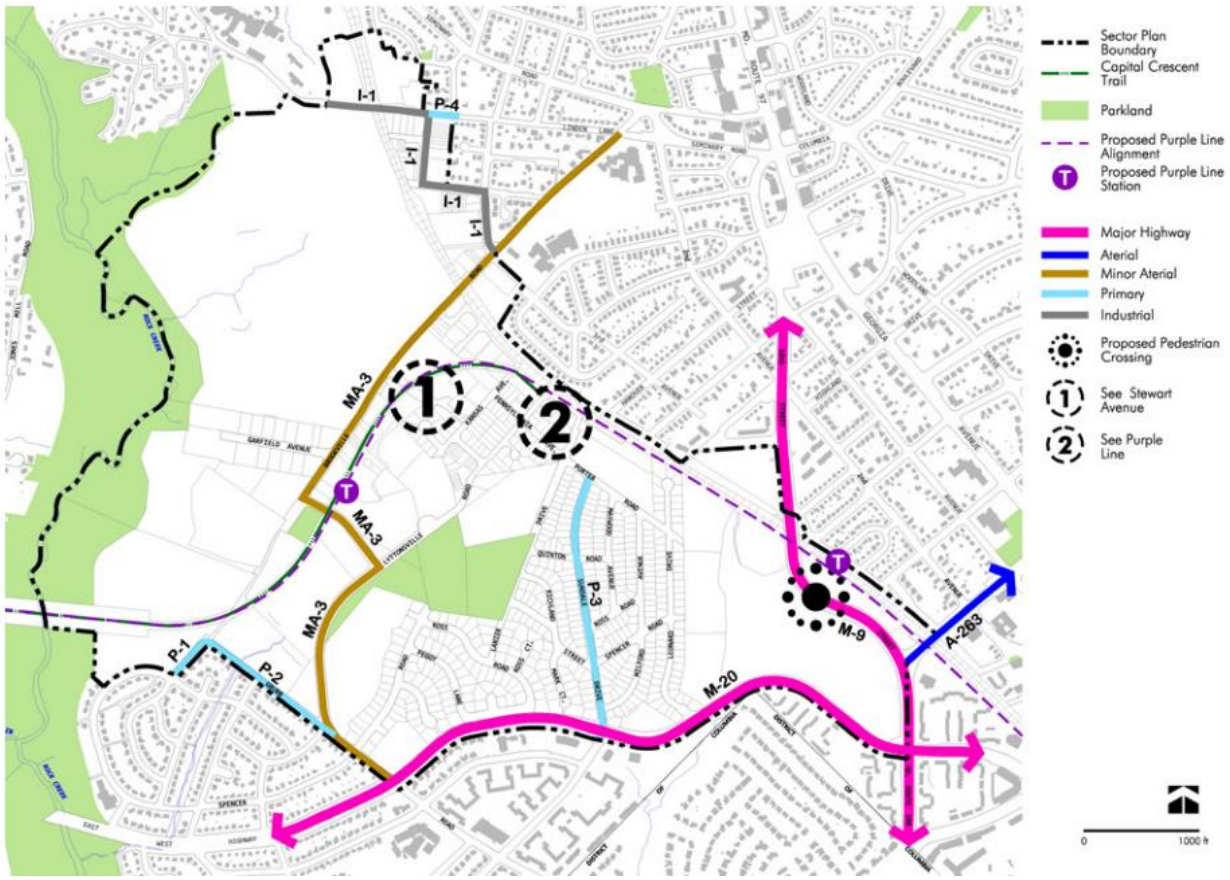
Count Segment		Year				3 Year Trend (2011)	Decennial Growth (2003)
		2013	2012	2011	2003		
16th Street	0.1 Mile S. of Georgia Ave	29,000	31,262	31,511	29,225	- 0.79%	- 0.007%
	0.1 Mile N. of East-West Hwy	42,360	40,412	40,731	38,825	0.04%	0.09%
East-West Highway	0.3 Mile W. of 16th St	25,332	25,281	25,480	32,050	-0.006%	- 0.20%
Brookville Road	.1 Mile S. of Linden Ln	13,271	13,240	--	--	--	--

Roadways

Table 3: Functional Classification Table

Designation	Roadway	Limits	Minimum Right-of-way	Lanes
Major Highway				
M-9	16th Street (MD 390)	North Sector Plan Boundary to East-West Highway	120 feet	4
M-20	East-West Highway (MD 410)	Grubb Road to 16th Street	120 feet	4
Arterial				
A-263	Spring Street	16th Street to East Sector Plan Boundary	100 feet	4
Minor Arterial				
MA-3	Grubb Road	East-West Highway to Lyttonsville Road	80 feet	2
	Lyttonsville Road	Grubb Road to Lyttonsville Place	80 feet	2
	Lyttonsville Place	Lyttonsville Road to Brookville Road	80 feet	2
	Brookville Road	Lyttonsville Place to Linden Lane	80 feet	2
Industrial				
I-1	Fraser Avenue	Linden Lane to Montgomery Street	70 feet	2
	Linden Lane	Stephen Sitter Avenue to Fraser Avenue	70 feet	2
	Montogomery Street	Fraser Avenue to Warren Street	70 feet	2
	Warren Street	Montgomery Street to Brookville Road	70 feet	2
Primary				
P-1	Terrace Drive	Grubb Road to West Sector Plan Boundary	70 feet	2
P-2	Grubb Road	Lyttonsville Road to Terrace Drive	70 feet	2
P-3	Sundale Drive	East-West Highway to Porter Road	70 feet	2
P-4	Linden Lane	Fraser Avenue to East Sector Plan Boundary	50 feet	2

Figure 5: Roadway Classification



Transit

The Greater Lyttonsville Sector Plan area is currently served by both Montgomery County Ride-on and Washington Metropolitan Area Transit Authority (WMATA) Metrobus. Some portions of the sector plan area, such as the Summit Hills residential community, are within a 10-minute walk of the Silver Spring Metrorail Station. Additionally, facility planning is underway for light rail stations at:

a) The intersection of Brookville Road/ Lyttonsville Place (Lyttonsville station), and
b) The Spring Center on 16th Street, between the CSX bridge and Spring Street (Woodside)

Figure 6: Greater Lyttonsville Transit. Source: WMATA

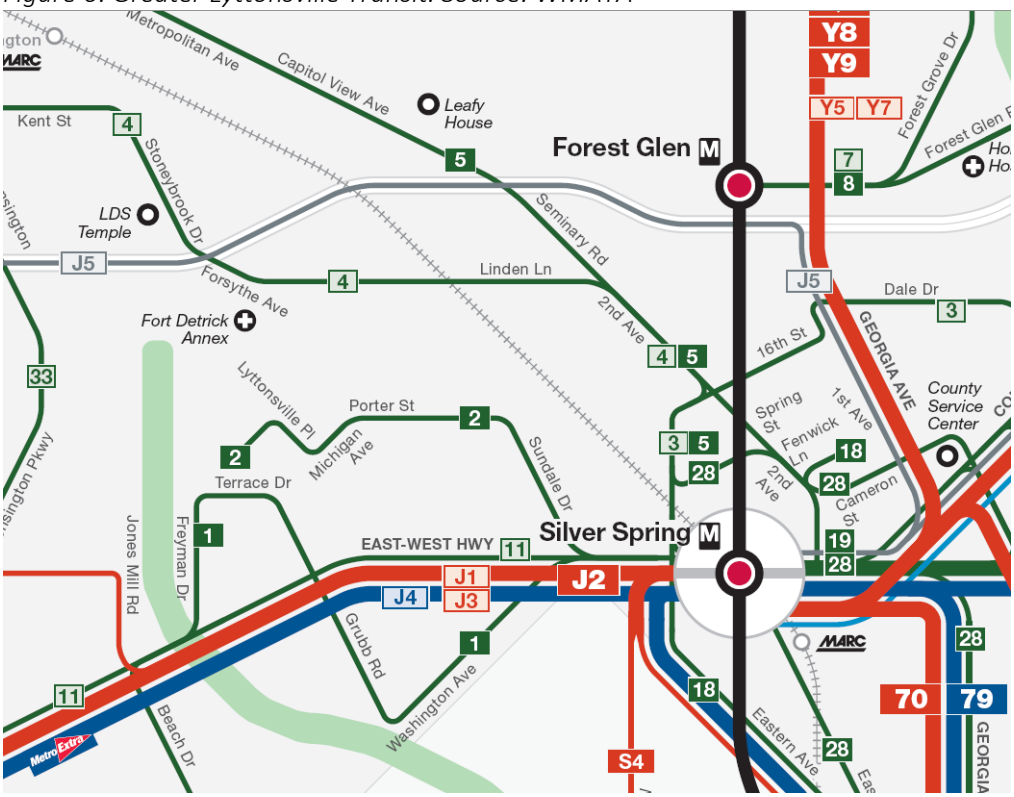


Table 4: Transit Route Ridership

Greater Lyttonsville Transit Ridership (Passenger Boardings)			
Route	Average Weekday Ridership (2015)	Name	Destination
WMATA – J1, J2, J3	5,901	Bethesda/ Silver Spring Line	Montgomery Mall/ Silver Spring Metrorail Station
WMATA – J4	1,031	College Park/ Bethesda Line	College Park Metrorail Station/ Bethesda Metrorail Station
RideOn – 1/11	2,991	1	Silver Spring Metrorail Station/ Friendship Heights Metrorail Station
RideOn – 2	985	2	Silver Spring/ Lyttonsville (Ride On Facility & USAG Forest Glen)
RideOn – 3	54	3	Silver Spring Metrorail Station/ Takoma Metrorail Station
RideOn – 4	201	4	Silver Spring Metrorail Station/ Kensington MARC Station
RideOn – 5	1,926	5	Silver Spring Metrorail Station/ Twinbrook Metrorail Station

Metrobus

WMATA Metrobus J1, J2, and J3 – Bethesda/ Silver Spring Line

This line provides service between the Montgomery Mall Transit Center and the Silver Spring Metro Station.

WMATA Metrobus J4 – College Park/ Bethesda Line

This line provides express service (limited stops) between the Bethesda Metro Station and the College Park Metro Station (Green Line) every 20 minutes.

Montgomery County Ride On

Montgomery County Ride On 1/ 11

This route provides service between the Silver Spring Metrorail station and the Friendship Heights Metrorail station via Connecticut Avenue. Typical weekday service begins at the Silver Spring Metrorail station at 5:07 AM and continues through 10:55 PM with half-hour headways.

Montgomery County Ride On 2

This route provides service between the Lyttonsville Ride On Operations Center (Brookville Road) and the Silver Spring Metrorail station via Sundale Drive and East-West Highway. Typical weekday service begins at the Ride On Operations Center at 4:32 AM and continues through 10:06 PM with 20 – 30 minute headways.

Montgomery County Ride On 3

This route provides weekday peak-hour service between the Silver Spring Metrorail station and Takoma Metrorail station via 16th Street and points east of the sector plan boundary. Typical weekday morning

service begins at the Friendship Heights Metrorail station at 7:02 AM and continues through 8:15 AM with 30 – 40 minute headways. Typical weekday evening service begins at the Silver Spring Metrorail station at 5:08 PM and continues through 6:21 PM with 30 – 40 minute headways.

Montgomery County Ride On 4

This route provides service between Kensington and the Silver Spring Metrorail station via the United States Army Garrison Forest Glen Walter Reed Annex (Stephen Sitter Avenue) and Brookville Road. Typical weekday service begins at the Silver Spring Metrorail station at 6:06 AM and continues through 6:36 PM with half-hour headways.

Montgomery County Ride On 5

This route provides service between the Silver Spring Metrorail station and Twinbrook Metrorail station via Seminary Road and points east of the sector plan boundary. Typical weekday service begins at the Silver Spring Metrorail station at 5:05 AM and continues through 11:48 PM with 20 – 30 minute headways.

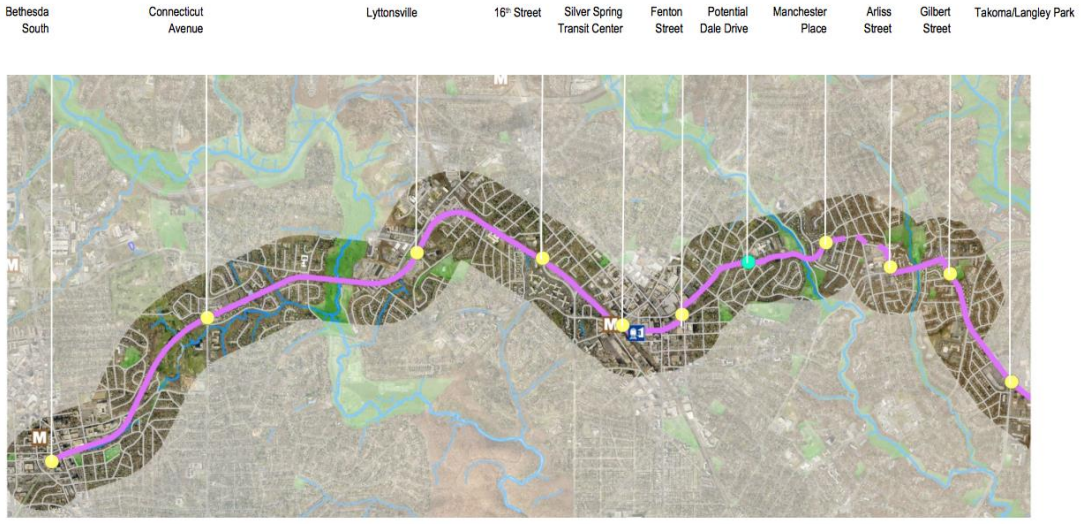
Future Purple Line Light Rail

As previously noted, the Purple Line is a planned 16-mile long light rail transit facility that will extend from Bethesda to New Carrollton and will include two stations within the Greater Lyttonsville sector plan area:

a) Lyttonsville Station: near the intersection of Lyttonsville Place and Brookville Road
b) Woodside Station: on 16th Street, north of Spring Street.

The Purple Line will provide east-west service between Montgomery and Prince George's County and will result in direct connections to Metrorail Red, Green and Orange Lines, local and inter-city bus, the MARC train and Amtrak. Upon completion, the Purple Line is expected to operate on a 6-minute headway frequency during a typical weekday peak period. No new parking will be provided to serve the new Purple Line station, therefore, it is anticipated that most riders will arrive at the station by means other than car. The M-NCPPC Purple Line Functional Master Plan was approved and adopted in September 2010. The Purple Line alignment through the plan area as depicted in the Functional Plan is shown below in Figures 7 through 12. It should be noted that although the illustrative plans refer to a "potential" Dale Drive station in Silver Spring, the determination has been made to include the Dale Drive station as part of the initial Purple Line construction independent of the Greater Lyttonsville sector plan.

Figure 7: Purple Line Alignment in Montgomery County



Note: The Takoma/Langley Park Station is in Prince George's County.

Figure 8: Purple Line Alignment Rock Creek Park to Lyttonsville Place

Figure 9: Purple Line Alignment Lyttonsville Place to Stewart Avenue

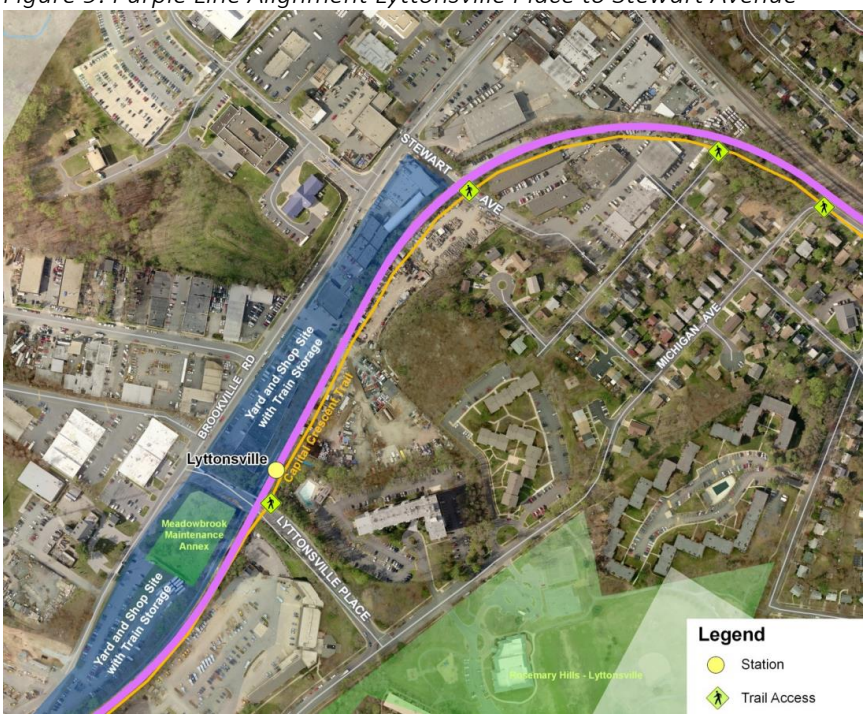


Figure 10: Purple Line Alignment Stewart Avenue to CSX Right-of-Way

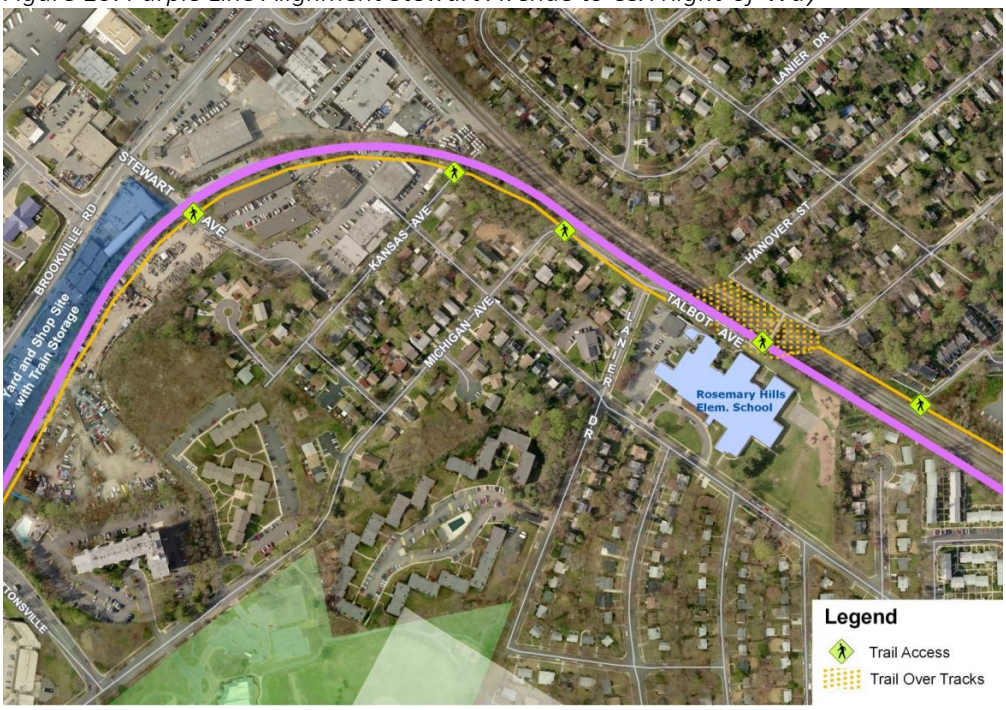


Figure 11: Purple Line Alignment CSX Right-of-Way to 16th Street

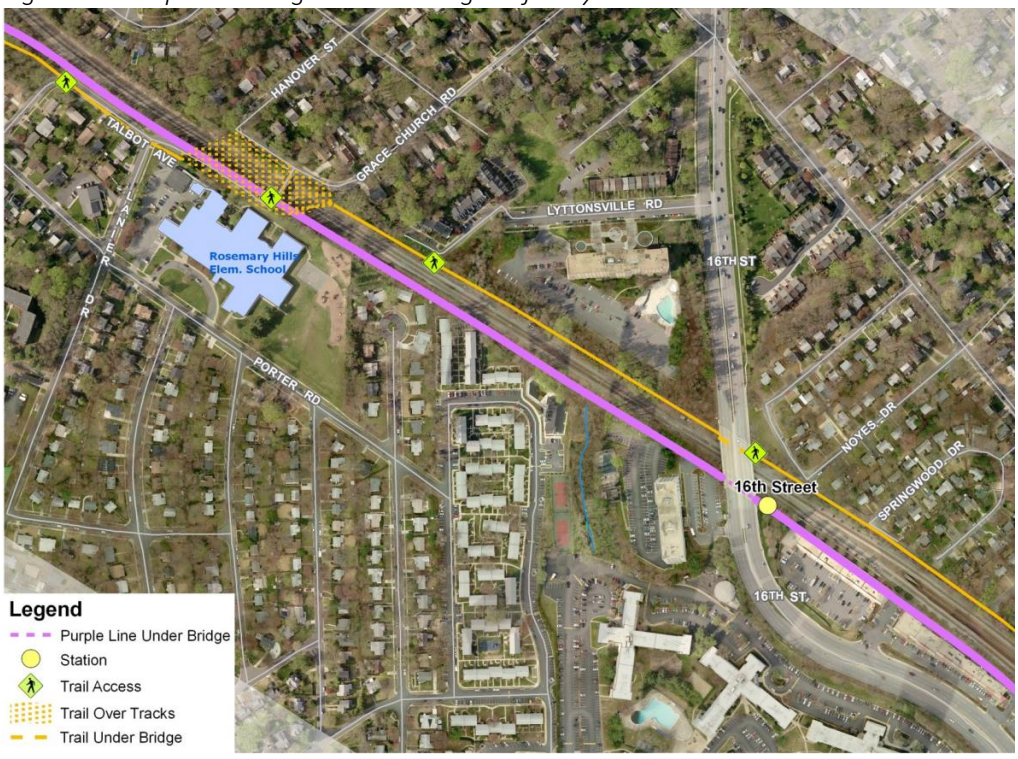
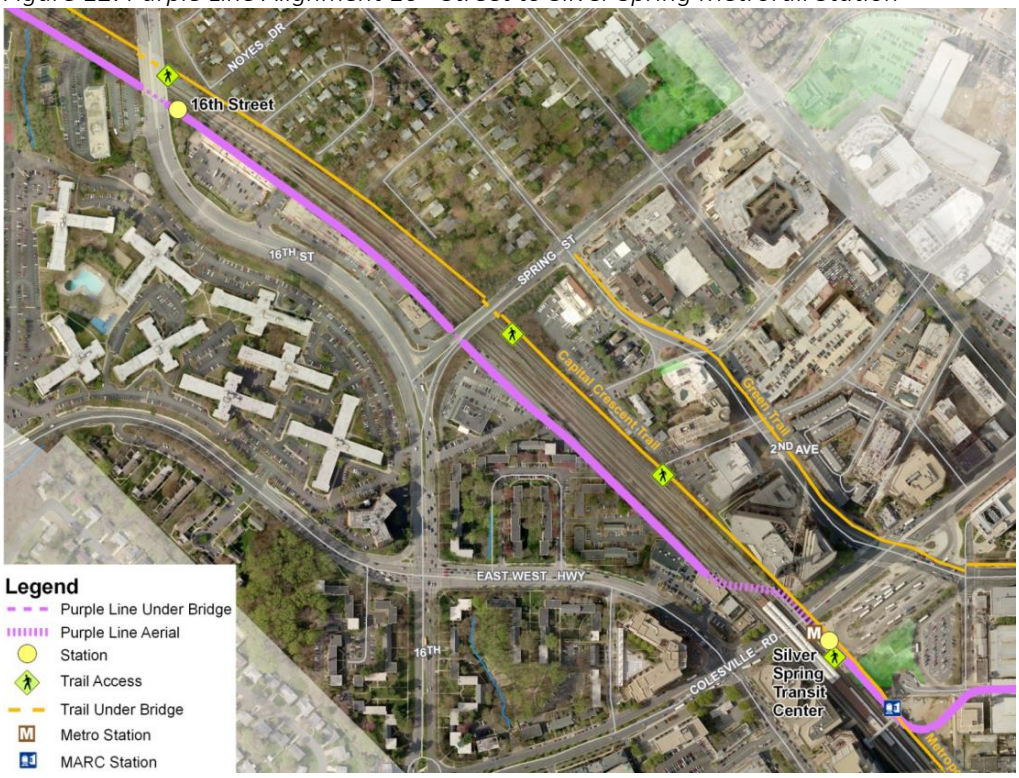


Figure 12: Purple Line Alignment 16th Street to Silver Spring Metrorail Station



Bicycle and Pedestrian Facilities

Bicycle Facility Classification

Bicycle facilities in Montgomery County are designed to be used by a diverse variety of bicyclists with differing travel purposes, abilities, and levels of comfort with vehicular traffic. In response to that diversity, there exists a range of bicycle accommodation available for implementation. Existing and proposed bicycle facilities within the sector plan area include the following (See also, Figure 13):

(a) Shared use path: A paved path that is typically 10 feet wide but can vary between 8 and 14 feet wide, designated for bicycles and pedestrians that is separated from motorized traffic by a curb, barrier, or landscape panel.

(b) Bike lane: A portion of a roadway designated by striping, signing, or pavement markings for the preferential or exclusive use of bicycles, and on which through-travel by motor vehicles is not allowed.

(c) Shared use roadway: A roadway open to both bicycle and motor vehicle travel and which is designated as a preferred route for bicycle use by warning or informational signs.

(d) Separated bike lane: also known as a protected bike lane or cycle track; a bikeway that is physically separated from motor vehicles and pedestrian facilities. The separation may be vertical, such as a curb; horizontal, such as a landscape panel or parking lane; or a combination.

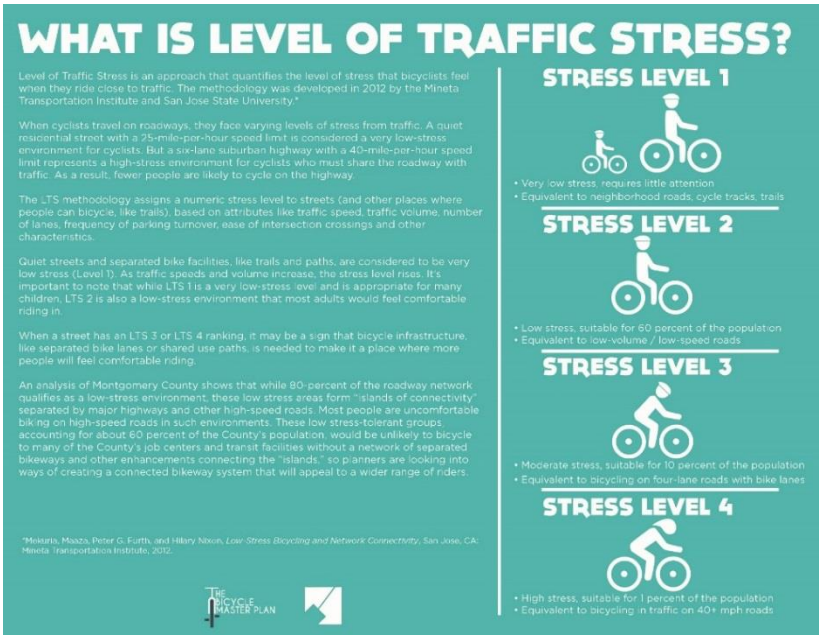
(e) Buffered bike lane: a bikeway separated from a motor vehicle travel lane with an area of striped pavement.

Figure 13: Types of Bicycle Facilities

Bicycle Level of Traffic Stress Test

This plan uses the Level of Traffic Stress (LTS) method which is currently being used in the update to the Countywide Bicycle Master Plan to identify roadways stress on bicyclists. LTS analysis measures the amount of stress that bicyclists feel when riding on a roadway alongside vehicular traffic. A synopsis of the LTS methodology is presented in Figure 7. The existing conditions LTS results are presented in Figure 15.

Figure 14: Level of Traffic Stress



The LTS revealed the following:

- Although most residential streets within the plan area are low stress, connectivity to the surrounding region is very limited.

- The completed portions of the Capital Crescent Trail and East-West Highway shared use path provide low stress bicycle facilities, but neither is complete through the plan area and therefore cannot be counted as a low stress facility overall.

- There is a general lack of local bicycle routes in the study area.

Bicycle Level of Traffic Stress Test Results and Recommendations

The recommendations to improve bicycling within the Greater Lyttonsville Sector Plan area are shown in Figure XX. These improvements are intended to provide a network of LTS 1 (low stress) bikeways that will make Greater Lyttonsville more accessible to users of all bicycle riding groups and provide connectivity to the surrounding region.

Figure 15: Existing Level of Traffic Stress Results

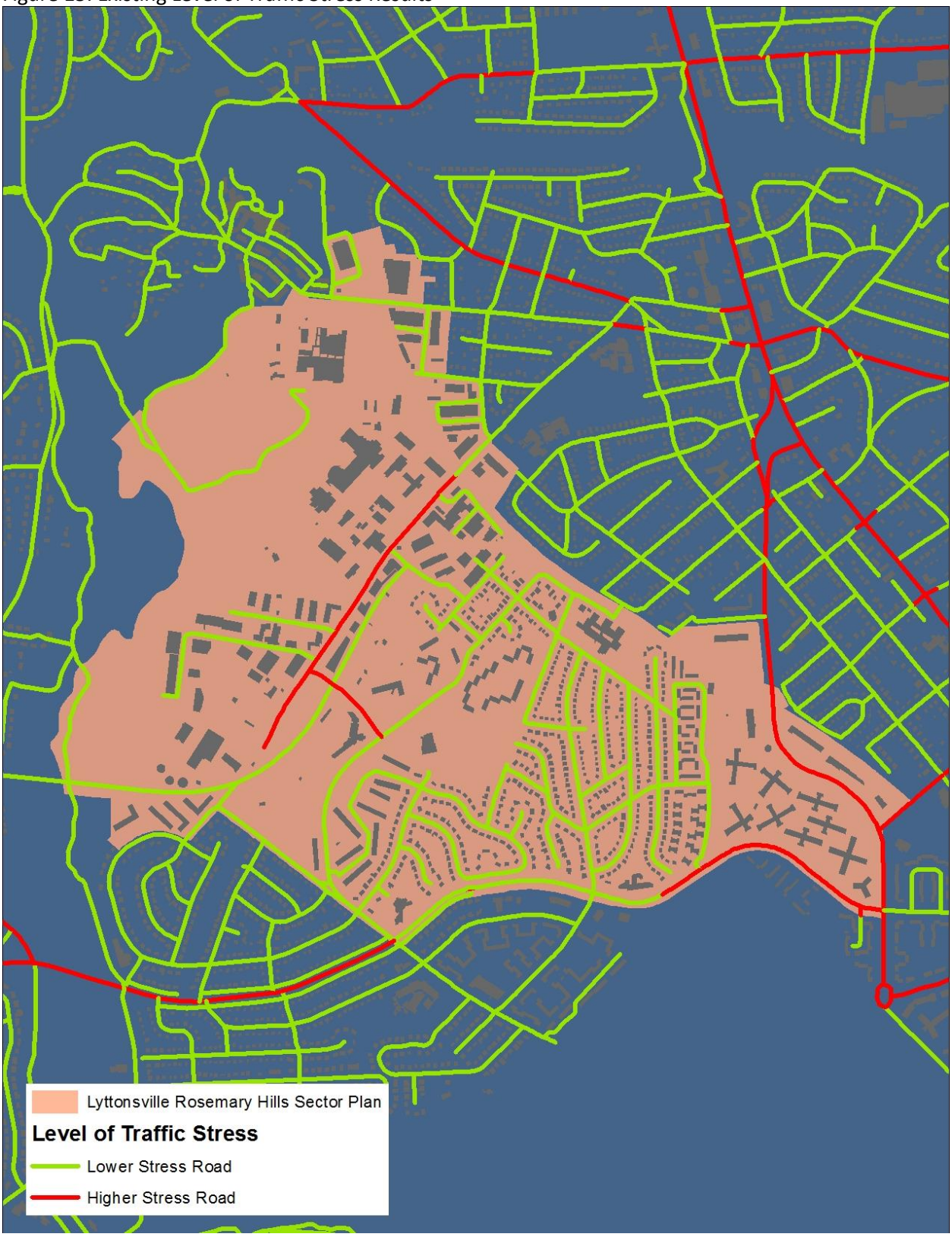


Figure 16: Bikeway Recommendations Map

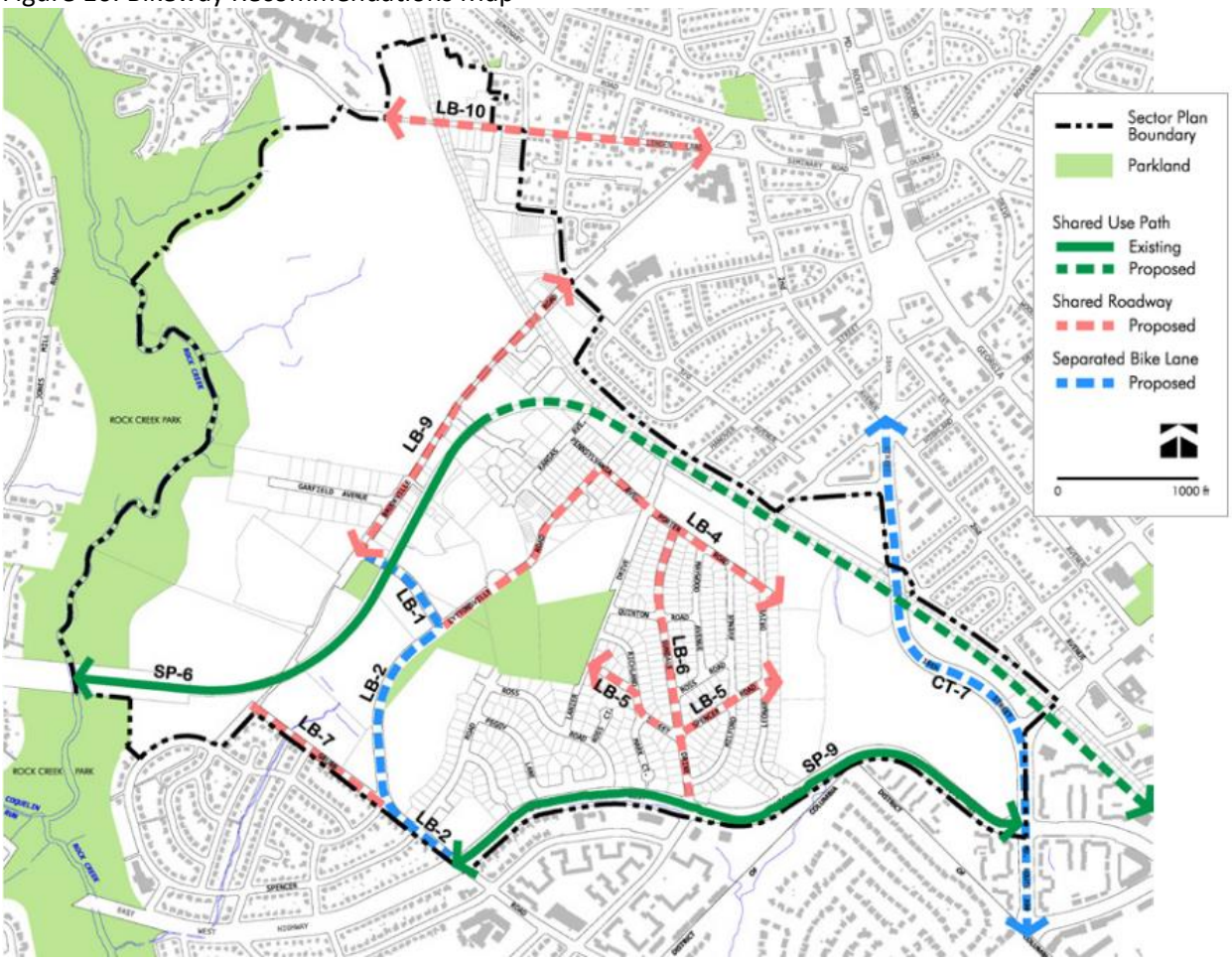


Figure 17: Future Level of Traffic Stress

Intersection Capacity and Roadway Operations

There are a number of ways to measure the quality of service provided by a transportation network. In Montgomery County, the method of measuring network performance is established by the County's Subdivision Staging Policy (formerly called the Growth Policy). This policy requires consideration of the critical lane volume (CLV) at major intersections as the key metric used to measure the quality of service provided by the network. CLVs are essentially the sum of vehicles passing through an intersection at a single point (the most critical point of the intersection) during the peak hour. The level of CLVs considered acceptable varies by Policy Area within the County. Master Plan intersections included in this analysis are located within the Silver Spring/ Takoma Park Policy Area, which currently has a congestion standard of 1,600 CLV set by the Montgomery County Council.

Existing Intersection Performance

Table 2 below shows the existing CLVs at the three intersections studied within and adjacent to the Greater Lyttonsville Sector Plan boundary. As shown in Figure 2 and Table 3, all three intersections operate within the acceptable CLV threshold.

The three intersections studied are:

1. Seminary Road/ Linden Lane
2. East-West Highway (MD 410)/ 16th Street (MD 390)
3. East-West Highway (MD 410)/ Grubb Road

The Greater Lyttonsville area is one of the new Sector Plan areas predicated on the development of the Locally Preferred Alternative for the Purple Line, which will include light rail transit (LRT) stations near the intersection of Lyttonsville Place/ Brookville Road and on the north side of 16th Street, north of Spring Street. The transportation elements of the Greater Lyttonsville plan are designed to facilitate local accessibility and connectivity, with a recognition of the plan area's relationship to the more urban Silver Spring Central Business District (CBD) to its east. The plan area's size and prevailing existing and planned development densities are small enough that the transportation system capacity is much more heavily influenced by through traffic than by locally-generated traffic. Nevertheless, a key element of the transportation capacity analysis is to demonstrate the level and types of investment needed to achieve APFO objectives.

The Greater Lyttonsville plan analyses demonstrate that there are only minor outstanding transportation system capacity needs that are not already incorporated in other existing master plans and that sufficient capacity exists to accommodate development per the proposed changes to the land use plans described in the subsequent sections of this white paper. Civic concerns regarding localized development plans and traffic patterns are addressed in the sensitivity analyses completed in support of this plan.

Travel Demand Forecasting Analysis Process

The following steps were undertaken to develop peak hour forecasts and conduct operational analysis of plan area intersections. The first section describes the travel demand modeling conducted to generate 2040 daily forecasts, and the second outlines the process used to gather existing intersection counts and develop 2040 peak hour forecasts.

Travel Demand Modeling

- Obtained 2015 and 2040 models from M-NCPPC
    - Travel demand model version: MWCOG V2.3.52
    - Baseline model incorporates land use from the Round 8.2 Cooperative Forecasts
- Model Assumptions

    - No modifications were made to the network or Traffic Analysis Zone (TAZ) structure of the model
    - The model structure was used as-is, including the year 2020 transit constraint and two-step assignment for High Occupancy Toll (HOT) lanes
        - The 2020 constraint year utilized baseline land use; not an interim Vision land use plan
        - The multistep distributed processing was deactivated for the model run due to licensing constraints
        - Intrastep distributed processing was included in the model run with four subnodes
- Greater Lyttonsville 2040 Vision Plan Model Run
    - The model run for the 2040 Vision Plan included the land use inputs as shown in Table 5 for the TAZs representing Greater Lyttonsville
    - The model run also incorporated the land use changes contemplated by the staff analyses for the Bethesda Downtown and Westbard Sector Plans
    - Daily traffic was extracted from the model
        - Using daily volumes from the model – as opposed to peak period volumes – makes for a simpler comparison to available Annual Average Daily Traffic (AADT) data
        -

Table 5: Land Use Inputs for 2040 Vision Greater Lyttonsville Sector Plan

TAZ	Households	Population			Employment				
		Household	Group Quarters	Total	Industrial	Retail	Office	Other	Total
626	7,686	16,244	328	16,572	32	1,905	767	464	3,168
628	1,026	3,188	133	3,321	1,021	220	225	35	1,501
630	366	967	50	1,017	2,528	433	861	1,411	5,233
631	834	2,854	0	2,854	187	0	0	224	411
Total	9,912	23,253	511	23,764	3,768	2,558	1,853	2,134	10,313

- Daily traffic forecasts were estimated utilizing procedures from the *NCHRP 765: Analytical Travel Forecasting Approaches for Project-Level Planning and Design*
    - The forecasts were developed individually for each intersection in isolation
        - Forecasts were not balanced between intersections
        - The 2013 AADT daily traffic was used as the existing count data (see below for source of the counts)
        - The 2015 baseline model results (using Round 8.2 land use) were used as the base year traffic assignment
        - The 2040 Vision Plan model results (using Round 8.2 land use with the exception of Vision Plan data within the Sector Plan areas of downtown Bethesda, Greater Lyttonsville and Westbard) were used as the future year traffic assignment
        - No interim year model results were used for the post-processing
    - The daily forecasts resulting from the NCHRP 765 post-processing were taken as-is with minimal manual adjustments

Existing and 2040 Intersection Analysis

- Acquired count data from Montgomery County's Intersection Analysis website (http://www.mcatlas.org/Intersections/)
    - Used most recent count only
    - Counts for a number of locations were unavailable from the website; these locations were supplemented with data provided by the county
    - AM and PM peak hours were extracted for each location based on the peak hour as indicated in count file
        - The peak hour did not necessarily align with a clock hour, e.g., it could be 7:45-8:45 AM
        - The peak hour listed in the count file generally, but not always, aligned with the highest total traffic hour (i.e., the hour with the highest number of total turn movements)
    - Existing TMC data for the three Lyttonsville plan area intersections was collected during October 2014.
- Acquired daily roadway volume data from the Maryland State Highway Administration (SHA)
    - Traffic data was extracted from shapefiles provided at the SHA website: http://www.roads.maryland.gov/pages/GIS.aspx?PageId=838
    - The data used for this study was AADT from SHA for the year 2013
- Development of peak hour forecasts
    - K-factors were calculated for each approach of the analysis intersections based on the existing intersection Turning Movement Counts (TMCs) and AADT data, where available
    - The k-factors were applied to the post-processed daily traffic volume on each approach of each intersection to calculate an initial estimate of peak hour traffic
        - Where a k-factor was unavailable due to incomplete AADT data, approach volume was estimated based on available data at the intersection. The ratio of existing year approach volumes and forecasted approach volumes (on available approaches) was used to scale existing year approach volumes (for approaches without data).
            - For example, if an intersection had existing year AADT data for the north, south, and east legs but not the west leg, future year approach volume was calculated for the north, south, and east legs. Then, a ratio of existing TMC volume and this calculated approach volume was calculated for these three approaches. These ratios were averaged and applied to the existing approach volume on the west leg to obtain a future year approach volume for the west leg.
    - The intersection traffic was balanced. The initial estimates of traffic on inbound links to the intersection were summed, as were the estimates of the outbound traffic. These two sums were averaged, and the individual inbound and outbound approaches were scaled proportionally based on this total. This was done because each approach link has its own k-factor and growth rate from the traffic forecasts which will often lead to unbalanced traffic coming into and out of the intersection.
    - Forecast turning movements were estimated based on the existing TMCs and the approach link volumes calculated above
        - Utilized a Fratar (iterative balancing) technique
        - The existing TMCs act as a seed value for the balancing
        - The 2040 forecast link volumes are the target values for the balancing

- No manual adjustments were made to the resulting balanced turning movement volumes; some link volume totals differed slightly from those forecasted due to rounding of numbers during the balancing process

Intersection Analysis

Table 6 summarizes the CLV analysis for the existing conditions and future 2040 Vision Plan. These locations are all located either within the Silver Spring CBD Policy Area, where the congestion standard is an 1800 CLV, or within the Silver Spring / Takoma Park Policy Area, where the congestion standard is a 1600 CLV. In either case, the appropriate CLV standard for each intersection's policy area was used in assessing potential improvements. No analyzed intersections are forecast to exceed the policy area congestion standard under the 2040 Vision Plan scenario.

Rollingwood Sensitivity Test

An independent sensitivity test was performed to assess the effect of a contemplated expansion to the Rollingwood Apartments on Ross Road, near the intersection of East-West Highway (MD 410) and Grubb Road. The potential expansion would increase the number of apartments at the development from 283 to 832, an increase of 549 dwelling units. The Local Area Transportation Review process was used to consider the effect on the East-West/Grubb intersection, with a conservative assumption that all new trips would travel through the intersection (and none would travel north towards Brookeville Road). The increased density on the Rollingwood site would generate an additional 223 vehicle trips in the AM peak hour and an additional 259 trips in the PM peak hour. Turning volumes for this traffic on the north leg of the intersection would be roughly evenly split between the other three approaches. The 2040 CLV would increase from 1050 in the AM peak hour and 952 in the PM peak hour (without the increased Rollingwood site density) to 1128 in the AM peak hour and 1147 in the PM peak hour, still well within the policy area congestion standard of 1600 CLV.

Table 6: Intersection Analysis Results

Location	**Congestion Standard**	**Condition**	**CLV Results**							
			Existing				**2040 Vision**			
			AM	**PM**	**AM V/C**	**PM V/C**	**AM**	**PM**	**AM V/C**	**PM V/C**
Seminary Rd/ Linden Ln	1600	Existing	687	904	0.43	0.57	771	1031	0.48	0.64
East-West Hwy/ 16th St	1800	Existing	1335	1398	0.74	0.78	1282	1529	0.71	0.85
East-West Hwy/ Grubb Rd	1600	Existing	1124	1052	0.70	0.66	1128	1147	0.71	0.72

Figure 18: Existing Intersection Critical Lane Volumes

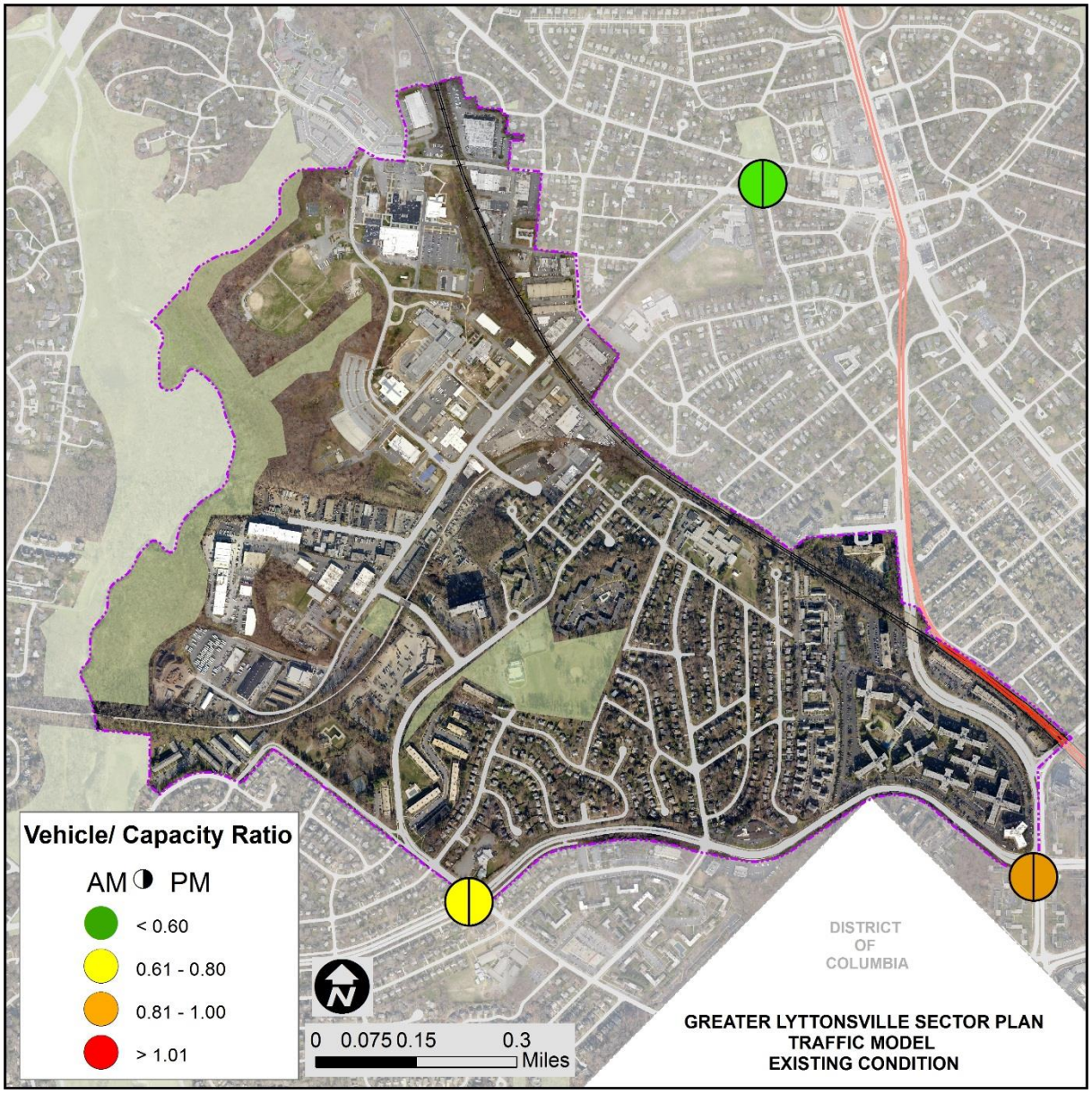
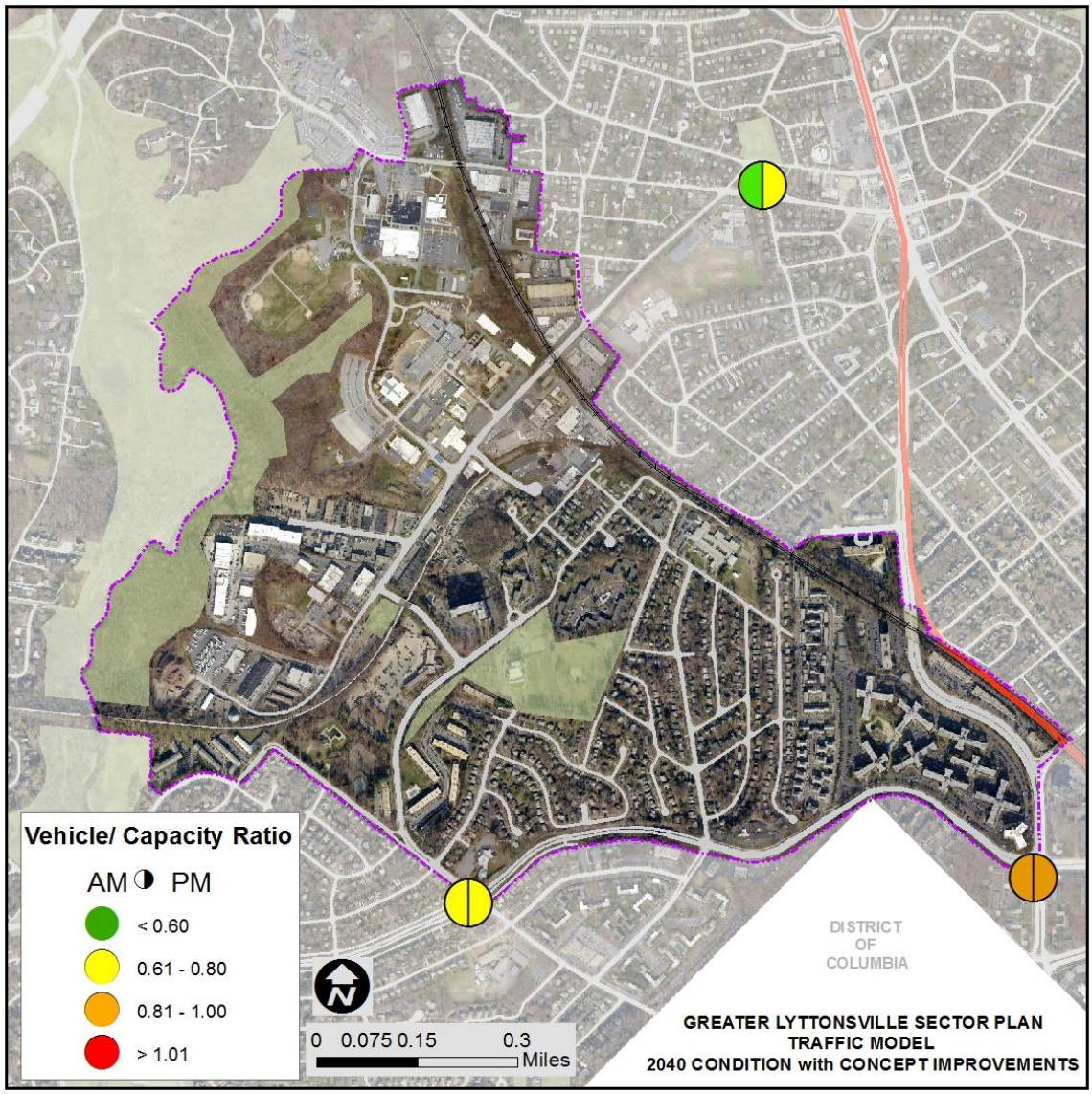


Figure 19: Future Intersection Critical Lane Volumes



Additional Considerations

Three additional considerations assessed during the analysis process and are described in greater detail in the sections below:

- Spring Street Extension
- Road Diet for 16th Street
- Georgia Avenue Bus Rapid Transit

Spring Street Extension

Staff's proposal for an extension of Spring Street, westward from its 16th Street terminus to East-West Highway, was dropped from the plan during Planning Board work sessions on transportation. Discussion of this element is included in this appendix for context because it was part of staff's consideration during the analytical stage of this master plan.

The potential extension of Spring Street has several desirable characteristics and some fairly severe constraints. Most importantly, extension of this street could help extend the more walkable grid street network from the Silver Spring CBD into the Greater Lyttonsville Plan area, providing shorter pedestrian and bicycle connections from Greater Lyttonsville to both the Silver Spring CBD and to the future Woodside Purple Line station. Such a grid network would also facilitate dispersion of traffic around the 16th Street / East-West Highway intersection, which is congested in part due to the lack of alternatives for traffic heading to or from the Silver Spring CBD to the west.

The constraints facing a Spring Street Extension are due to both the existing development on the site and topographic elements. It is not feasible to construct a new roadway through the existing Summit Hills apartment complex without significant redevelopment of the site. Furthermore, existing topography of the site places the grade of the current Summit Hills apartment complex about 15' lower than the grade of 16th Street at the existing Spring Street terminus. Any future site redevelopment attempting to construct the Spring Street extension would need to design the site to facilitate the new roadway at an acceptable horizontal and vertical alignment. An initial concept of such an alignment includes incorporating a structured parking podium as a means of eliminating the topographical differences between 16th Street and the subject site.

Forecasts for the 2040 Vision Plan indicate that the intersection of 16th Street and East-West Highway will operate well within the 1800 CLV congestion standard, as shown in Table 2. Therefore, the recommendation for an extension of Spring Street Extension is not predicated on traffic congestion and is instead intended to enhance the existing street grid.

Road Diet for 16th Street

16th Street is currently a six-lane divided Major Highway through the Greater Lyttonsville Plan area. To the north, the roadway terminates at Georgia Avenue, another six-lane divided Major Highway. To the south, the roadway transitions to a four-lane arterial roadway as it enters the District of Columbia. Due to the closely spaced intersections of East-West Highway and Spring Street, the six-lane typical section will be warranted through the year 2040 to provide sufficient roadway capacity. The segment of 16th Street north of Spring Street, however, may function at acceptable levels as a four-lane roadway. This transition would be desirable in front of the future Woodside Purple Line Station as it would provide the space necessary for multimodal station access enhancements, such as:

- Reduced pedestrian crossing distances, perhaps enhanced by a median refuge

- Bus stops facilitating through service along 16th Street
- Kiss-and-ride or taxi pullouts

The Woodside Purple Line station is currently the site of the Spring Center strip retail center which is accessed by an unsignalized entrance on 16th Street. The existing land uses on site are expected to be demolished to accommodate the construction of the Woodside station. Over the long term, the Greater Lyttonsville Plan envisions a potential joint use development with a potential 3.0 FAR (maximum 1.5 FAR commercial and 2.0 residential) on the site that would accommodate both the Purple Line station and mixed use redevelopment.

The existing unsignalized intersection is a "Maryland-T" intersection in which the southbound traffic on 16th does not need to stop; left turns from the Spring Center have an acceleration lane to complete a left hand merge. The Planning Board recommended replacement of this intersection with a more conventional T intersection as part of the Purple Line Mandatory Referral in spring 2014. Chapter 3 of the 2013 Purple Line Final Environmental Impact Statement (FEIS) does indicate that at least a signalized pedestrian crossing of 16th Street is anticipated. We presume that it is likely that this location will someday be signalized, particularly if private development significantly increases side street volumes.
One way of gauging the potential for a road diet on 16th Street at the Woodside station entrance is to consider the "reserve capacity" for side street volumes considering the 2040 Vision plan traffic volumes on 16th north of Spring Street. At this location, the peak period peak direction volumes are:

AM: 5,100*.417 = 2,127 vehicles per hour (vph)
PM: 6,896*.294 = 2,027 vph

From the perspective of a CLV calculation, 2,200 vph in two lanes at a .53 lane use factor (for two travel lanes) is 1,166 CLV for the through movement, allowing about 434 CLV remaining capacity for opposing left turns. This is only an issue in the evening peak period due to the orientation of both the T-intersection to the east and the prevailing 16th Street flows – in which northbound flows oppose the left turns in the evening peak period – and exiting traffic from the future Purple Line station.

Taking the "reserve capacity" concept one step further, we can examine some potential developments using the following, relatively conservative assumptions, to consider the possible impacts of left turns into and out of the site:

- 6-minute headways for 2 "pulsing" feeder bus routes along 16th Street that would turn into the station would yield a total of 20 buses per hour (both entering and exiting the site), with a 50-50 directional split
- 15% of the 1,620 daily transit alightings forecast in the Purple Line FEIS occurring in the peak hour and a 10% kiss-and-ride mode split would yield 25 additional entering and leaving vehicles per hour; a 50-50 directional split could also be assumed for these vehicles
- A 400,000 square foot office building (roughly what a joint use development at 1.5 FAR could yield, if the market and site constraints would permit it) would generate 596 PM peak hour vehicle trips, with about 500 outbound trips and 96 inbound trips. Assuming a 50-50 split would again be conservative (more office trips would logically head north rather than south, per the LATR Guidelines trip distribution guidance.

These trip generation components would yield a total of 70 southbound (inbound) left turns and 272 outbound left turns. Even if the outbound left turns were limited to a single lane, the additional "side street" CLV would be 342, and the total CLV would be 1166+342=1508, lower than the 1,600 CLV threshold.

Further consideration for implementing a road diet on 16th Street should be considered in conjunction with planning for the Georgia Avenue Bus Rapid Transit (BRT) concept. The 2013 Countywide Transit Corridors Functional Master Plan (CTCFMP) recommends lane repurposing for the portion of Georgia Avenue south of 16th Street for BRT, but acknowledges that operations in mixed traffic should also be considered. The Road Diet concept and the CTCFMP are related because some traffic on Georgia Avenue may divert onto 16th Street if the capacity of Georgia Avenue is reduced south of the 16th Street intersection.

Georgia Avenue Bus Rapid Transit

There exists an opportunity to implement operational elements on a future Georgia Avenue BRT corridor that could reduce transit times without significant diverting traffic from the corridor. Such elements were assumed for the purpose of the 16th Street Road Diet concept and are briefly described in this report. This technical analysis, much like the analysis completed in support of the 2013 Countywide Transit Corridors Functional Master Plan (CTCFMP), assumes that additional study will be necessary as part of the BRT Corridor planning process to full understand the impact to traffic.

From an operational perspective, given current peak period travel conditions both within the CBD and Montgomery Hills, it is reasonable to assume that Bus Rapid Transit would be implemented on Georgia Avenue as curb lane restriping between 16th Street and Spring Street. This configuration could be operated as a long queue jump for buses without creating unnecessary levels of delay for general purpose traffic. In concept, cars would stack in two travel lanes rather than three, and the two key operational issues would be how far back the downstream end of the queue jump would need to be to retain most of the motor vehicle throughput at the downstream signal and whether or not the "restacking" would materially affect conditions/delay/traveler choices at the upstream end.

Purple Line

The Purple Line was assumed an integral part of the 2040 transportation analysis. The MWCOG model incorporates the increased accessibility provided by the Purple Line into the trip distribution and mode split analyses so that the vehicle trip generation rates coming from the model are an output rather than an input (such as in the LATR vehicle trip generation rates). For instance, the MWCOG model indicates that for the current year conditions, the Lyttonsville plan area generates about 45,800 person trips on a daily basis, of which about 3,770 (or 8.2%) are walk-access transit trips. For the 2040 Vision Plan, which includes the Purple Line, the Lyttonsville plan area generates about 73,000 person trips on a daily basis of which about 7,620 (or 10.4%) are walk-access transit trips. The increase in transit mode share is attributable in part to the presence of the two Purple Line stations.

Transportation Demand Management (TDM) Recommendation

A specific Non-Auto Mode Share (NADMS) goal is not being recommended for the Greater Lyttonsville area; however, new development should strive to minimize its impact on the transportation network by encouraging the use of travel modes other than single occupancy vehicles.

TDM should be considered as a mitigation strategy and thus is recommended as part of any development in the Greater Lyttonsville area. TDM strategies could include the use of the latest information technology

techniques to encourage teleworking, provide sufficient information to enable commuters and other trip makers to choose travel modes and travel times, or decide if travel is actually necessary at that time. Strategies also included encouraging transit use, shared parking for uses which have different peak demand periods, instituting paid parking or other parking reduction strategies are encouraged. The appropriate mix of uses is also a TDM strategy that helps to reduce congestion by providing services within close proximity to minimize trips and trip lengths, or by better balancing trips on the road network to promote non-peak period directional travel or off - peak period travel. The TDM program should be specific to a given site given the proposed mix of uses, density, and location within the Greater Lyttonsville area.

A more detailed summary of the NADMS-Journey to Work data is provided in Table 2.1. This table shows Greater Lyttonsville within the context of the nearby Bethesda Downtown and Westbard Sector Plan areas and breaks the data down into both inbound and outbound trips.

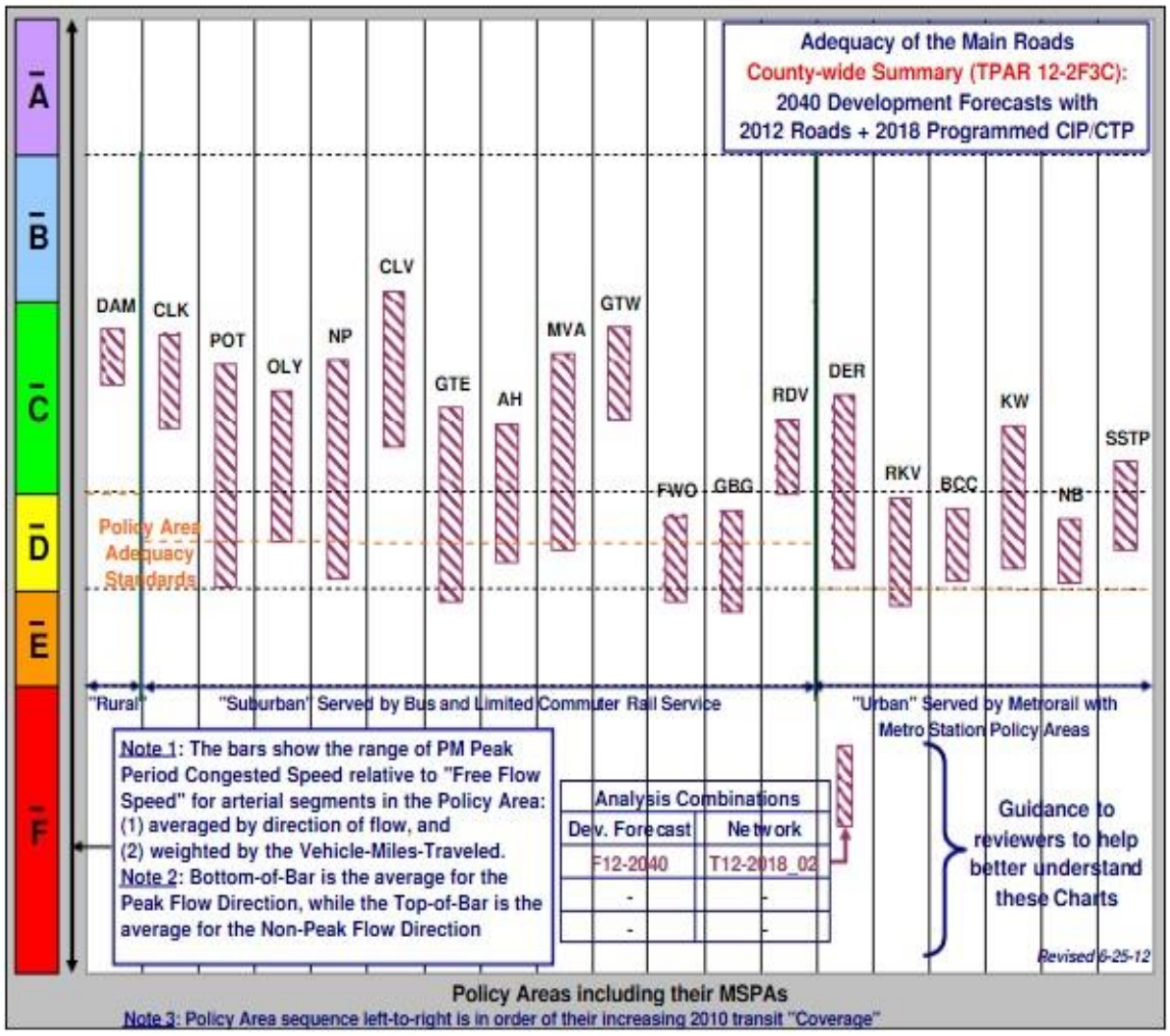
Table 7: Non-Auto Driver Mode Share Journey to Work

NADMS for Journey to Work							
Plan Area		**From Area**			**To Area**		
		Total Ps	Auto Ps	NADMS	Total Ps	Auto Ps	NADMS
Bethesda	637	3090.15	1158.148	62.5%	9344.33	4960.89	46.9%
	662	4211.55	1462.301	65.3%	28464.97	13331.92	53.2%
	663	4969.46	1889.119	62.0%	8039.25	4386.052	45.4%
	Total	**12271.16**	**4509.568**	**63.3%**	**45848.55**	**22678.86**	**50.5%**
Westbard	641	1091.41	581.125	46.8%	1141.77	870.9707	23.7%
	642	3343.1	2194.889	34.3%	1592.08	1268.876	20.3%
	Total	**4434.51**	**2776.014**	**37.4%**	**2733.85**	**2139.847**	**21.7%**
Greater Lyttonsville	626	5104.13	1997.914	60.9%	940.43	550.7414	41.4%
	628	1826.22	817.55	55.2%	1695.44	996.8821	41.2%
	630	668.01	359.5836	46.2%	2883.14	1896.926	34.2%
	631	1205.22	597.125	50.5%	306.89	181.135	41.0%
	Total	**8803.58**	**3772.172**	**57.2%**	**5825.9**	**3625.685**	**37.8%**

Policy Area Roadway Network Adequacy Test

In support of the 2012 Subdivision Staging Policy (SSP), a Transportation Policy Area Review (TPAR) analysis was performed for each policy area in the county to test the roadway network's adequacy in 2040. The year 2040 TPAR analysis took into account buildout of all the adopted master plans by the year 2040 in combination with the implementation of all the unbuilt master planned projects anticipated to be constructed by 2040. It should be noted that this differs from TPAR analysis for year 2024 that is currently used in the context of the regulatory review process. In the 2012 SSP year 2040 TPAR analysis, the Silver Spring/ Takoma Park Policy Area is shown to be adequate for the roadway test. Given that the Greater Lyttonsville Sector Plan area is a small subset of a much larger policy area and the planned growth in Greater Lyttonsville is anticipated to be relatively minor compared to what is zones but not built, the transportation network is considered to be in balance with the land use and densities proposed by the Greater Lyttonsville Sector Plan.

Figure 20: 2040 Transportation Policy Area Review Results



Note that the analysis conducted for this Master Plan is not intended to be a blanket traffic study for new development in Greater Lyttonsville. Instead, it is intended to demonstrate that at a high level, the anticipated year 2040 transportation network, in combination with improvements as recommended in the plan can adequately support the zoning recommendations and increased densities in the Sector Plan.

Conclusion

The recommendations as outlined above are intended to promote a multimodal transportation system through a complete network of streets that encourage equitable roadway utilization by all modes of transportation within the Greater Lyttonsville community over the life of the sector plan. It is anticipated that an enhanced multimodal transportation network, resulting from this plan's recommendations, will meet future transportation demand within the sector plan area through the horizon year of this document.

Appendix D:
Environment

Environment

1.1 Sustainability

1.2 Environment

1.3 Water

- 1.3.1 Watersheds
- 1.3.2 Historic Streams
- 1.3.3 Impervious Cover and Water Quality
- 1.3.4 Heat Island Effect
- 1.3.5 Stormwater Management

1.4 Ecology

- 1.3.1 Canopy Cover & Habitat

1.3 Energy

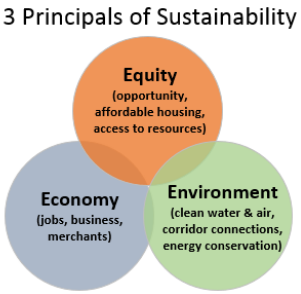
1.4 Carbon Footprint Analysis

1.5 Site Specific Property Recommendations

1.6 Performance Areas

1.1 SUSTAINABILITY: A Methodology for Good Planning

Sustainability is defined as meeting the needs of the present without compromising the ability of future generations to meet their own needs. A sustainable community integrates economic viability, environmentally conscious design, social equity, and even smart energy generation and conservation. To pursue sustainability is to create and maintain the conditions under which each of these principals works in tandem with each other.



The compact, walkable, and green community envisioned for the Plan incorporates many aspects of sustainability. It accommodates new residents and businesses while concentrating development around transit to reduce vehicle miles traveled thereby reducing the carbon footprint of new development. The expanded street grid, improved sidewalks, and the planting of additional street trees fosters walking and bicycling to local destinations and connection areas. Affordable housing options maintains the economic diversity that already exists within the Lyttonsville community. Stormwater management requirements on all new development will improve water quality and reduce impacts on the receiving streams. Additional parks improve access to natural resources, playgrounds, build community, and connects people with nature. Energy efficient buildings will reduce heating and cooling costs for buildings making them more affordable for owners or tenants while saving non-renewable natural resources.

These sustainable 'good planning' approaches increase the economic wellbeing of a community while building a more equitable community to restore and protect lost natural resources.

ENVIRONMENT

This section addresses one-third of the sustainability puzzle: the environment. A healthy environment makes for a desirable place to live, work, and play which stimulates the other two sustainability principals: equity and economy.

Decades ago, Lyttonsville was once part of a large intact ecosystem that provided clean and filtered water, carbon sequestration via its rich forest, wildlife habitat, and a plethora of other ecosystem services. Over the years, habitats have been altered, forests have been removed, streams have been channeled, land has been converted to lawns, buildings, streets, parking lots, and other impervious surfaces, and stormwater runoff has increased.

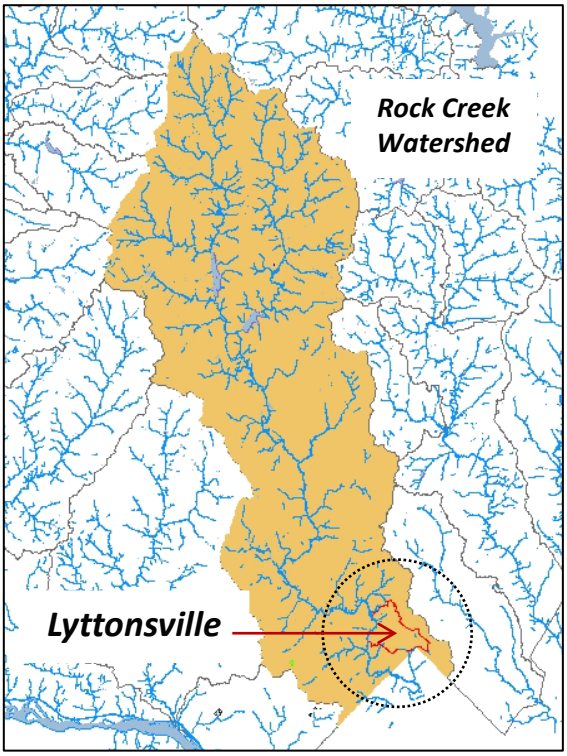
The overall environmental recommendations and goals intend to restore and mitigate for these lost ecosystem services. Ecosystem services are the human and animal benefits of the environment. They are wide in scope include functions such as: air and water purification; provide shade; reduce heating and cooling demand; reduce street temperatures; sequester carbon; provide outdoor recreational experiences, reduce stress, even provide food. When ecosystem services are considered during the planning process the opportunities to improve these services can significantly mitigate losses and enhance a community's environmental sustainability.

WATER

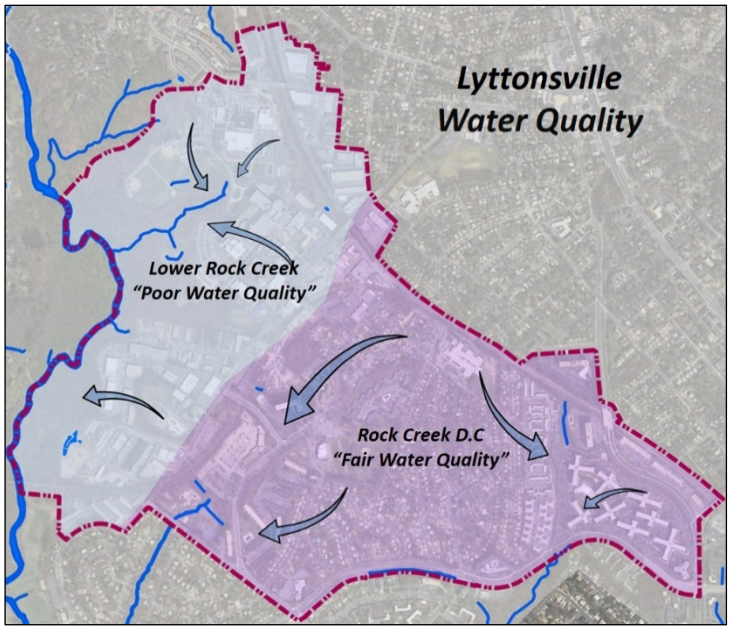
Watersheds

A watershed is an area of land with a ridge or crest line that divides two drainage areas. There two watersheds within Lyttonsville: Rock Creek D.C; and Lower Rock Creek. Both drain into Rock Creek and ultimately the Potomac River. Per biological fish and bug monitoring done by the Montgomery County Department of Environmental Protection Lower Rock Creek has poor water quality while Rock Creek D.C. has fair water quality. Poor water quality is most often associated with anthropogenic stressors such as: impervious cover, loss of vegetation, illicit discharge, nutrients, landfill leaching, etc.

The receiving streams of Lyttonsville include one unnamed tributary with the northwest corner of the Sector Plan area within the Lower Rock Creek watershed. Two partially channeled tributaries are within the Rock Creek District of Columbia watershed: Donnybrook Tributary and Fenwick Branch.



Lyttonsville is within the Rock Creek Watershed

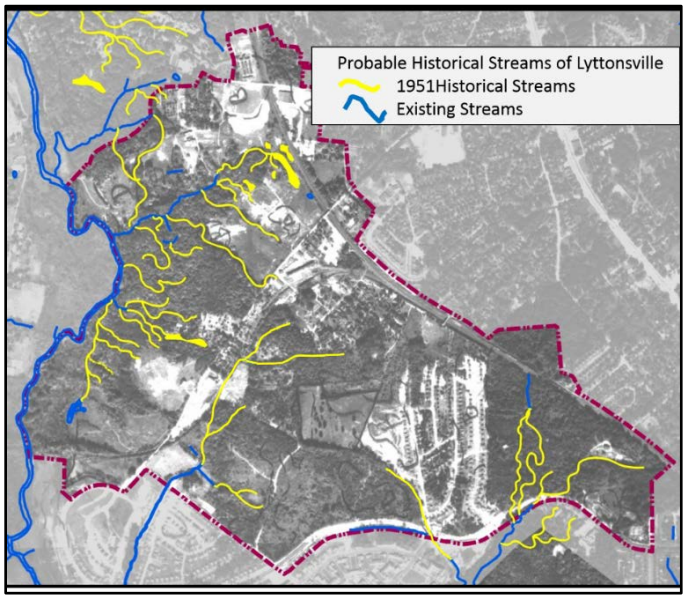


Lyttonsville Water Quality

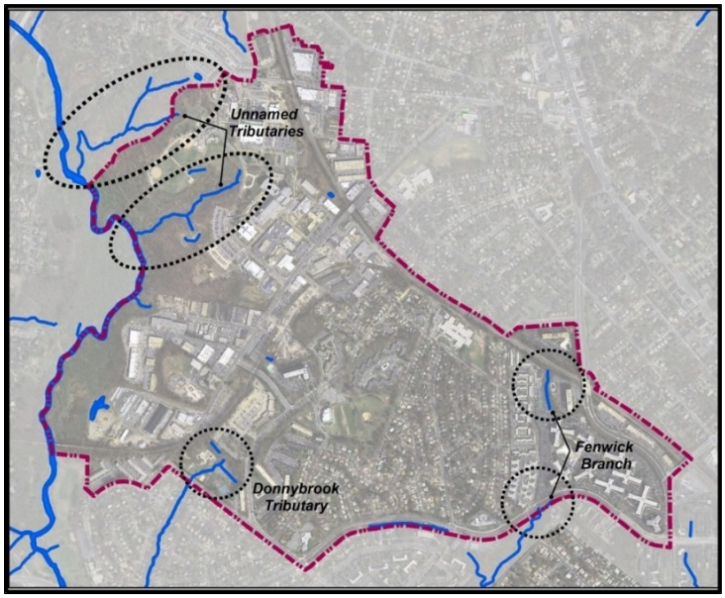
Historic Streams

The images below show likely historical streams and tributaries that have been filled, covered or channeled to make room for development. They are based on historical topography and available aerial photography and do not represent the exact locations and/or all the streams that were once a part of the Lyttonsville landscape. Restoring existing streams and springs that were piped and channeled are goals of the Plan. Daylighting and connecting these water networks will expand natural corridors, link habitat, increase aquatic and plant biodiversity, provide opportunities to play and exploration, and increase open space.

Although the benefits are many, daylighting streams is expensive and reduces developable land. Never-the-less serious consideration should be taken as the opportunity to reconnect and restore these important water ways may not happen again within this century, if at all.



Probable historic streams of Lyttonsville: 1951

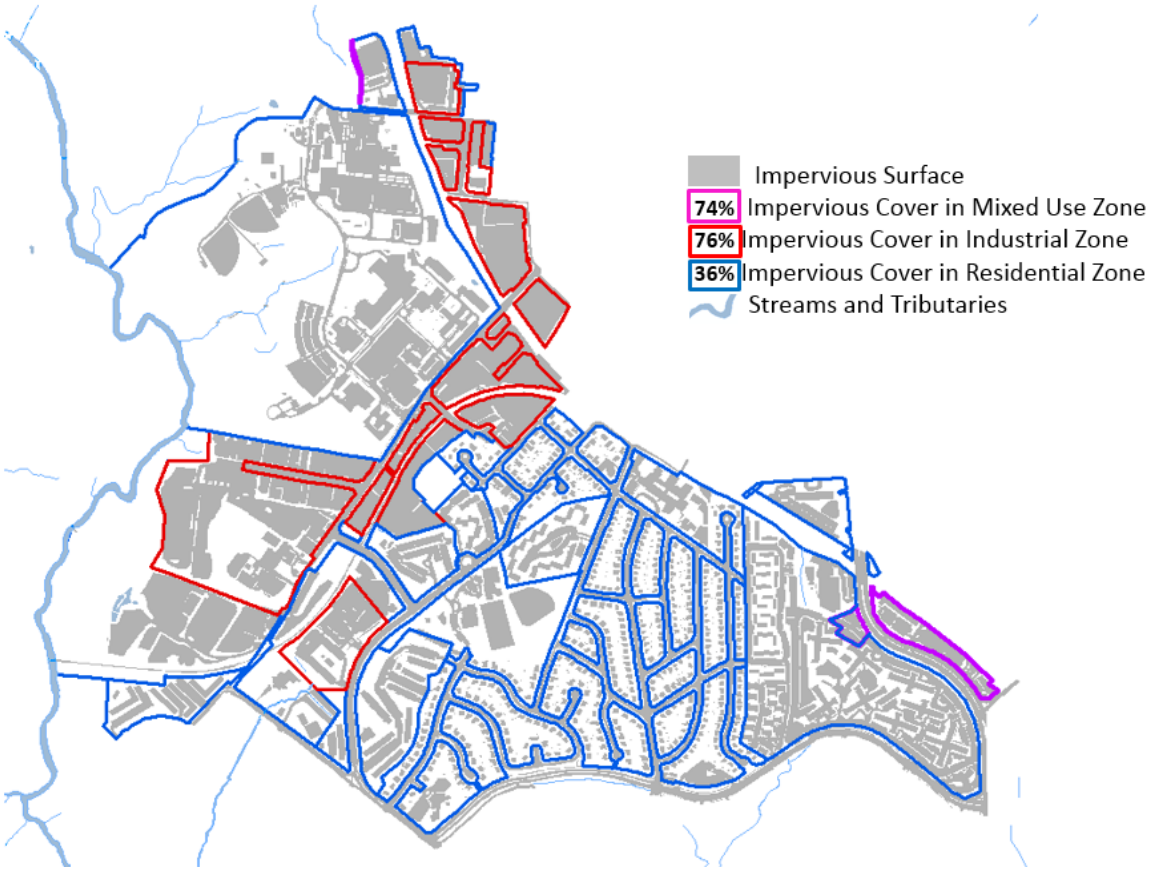


Existing streams of Lyttonsville: 2016

Impervious Cover and Water Quality

The large amount of impervious area in the Lyttonsville watersheds impede stormwater from infiltrating naturally into the ground as it would in a forested environment. Instead it stormwater flows off rooftops, parking lots, and roadways into storm drains where it delivers hot, fast, and dirty water to the streams and its tributaries instead of recharging the ground water table. This fluctuation impacts aquatic life by eroding stream banks, raising stream temperatures, decreasing oxygen levels, and scouring stream beds.

Research has shown that "when impervious cover reaches 10-25% of a landscape, major alterations in stream morphology (shape) occur that significantly reduce habitat quality. At greater than 25% impervious cover, streams suffer from loss of habitat, floodplain connectivity, and bank stability, as well as decreased water quality."[1] Within the Lyttonsville Sector Plan the average impervious cover is 43 percent. The industrial and mixed use have an impervious cover of over 70 percent which contributes to the poor quality of the receiving streams.



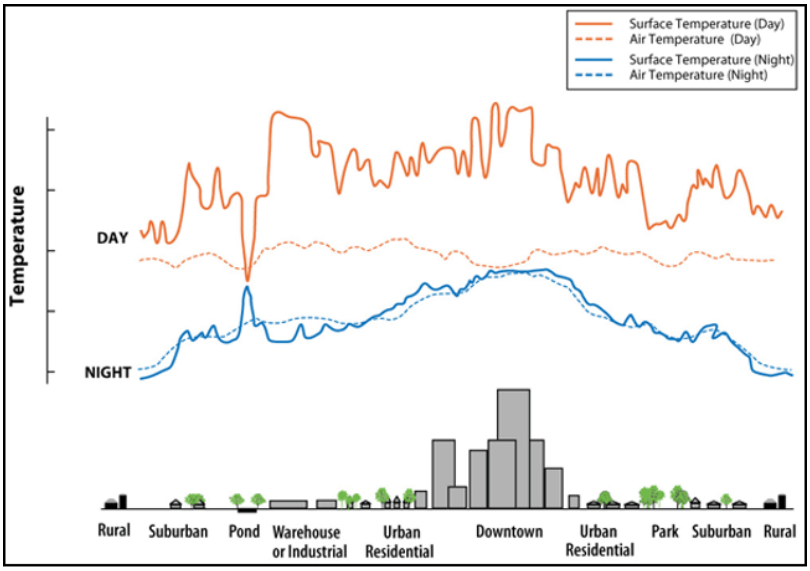
[1] Center for Watershed Protection, "Impacts of Impervious Cover on Aquatic Systems", Ellicott City, MD, 20003

Heat Island Effect

Impervious surfaces collect solar heat in their dense mass. When the heat is released, it raises air temperatures of the surrounding area producing an urban 'heat island'. According to the U.S. Environmental Protection Agency, urban areas can get as much as 22 degrees[2] Fahrenheit higher than their surrounding greener areas. Increased local temperatures increases the demand for cooling which utilizes greater amounts of energy. In Montgomery County sixty percent of the energy used for heating and cooling buildings is generated from coal and other fossil fuels[3] where the combustion byproduct is carbon dioxide (CO_2), sulfur dioxide (SO2), nitrogen oxide (NOx), particulate matter (PM), carbon monoxide (CO), and mercury (Hg). These pollutants are harmful to human health and also contribute to complex air quality problems such as the formation of ground-level ozone (smog), fine particulate matter, climate change, and acid rain.

Heat island effect and its associated pollution levels can impact human health by contributing to discomfort, respiratory difficulties, exhaustion, heat stroke, and even mortality. Elevated levels of harmful ozone pollution can occur during hot weather due to the chemical reaction between oxides of nitrogen (NOx) and volatile organic compounds (VOC) in the presence of sunlight. It is a major portion of urban smog.

This Plan recommends strategies that will assist in the goal to reduce heat island effect. Planting trees and vegetation, installing green or cool roofs, reducing impervious surfaces and black asphalt, and providing stormwater will help cool streets, sidewalks, and roof surfaces to directly lower surrounding temperatures as much as 33-percent.



Graphic source: http://www.epa.gov/hiri/images/UHI_profile-rev-big.gif

The image to the left demonstrates the increase in energy demand when temperatures rise above 80 degrees.

Image provided by USEPA.

[2] Akbari, H. 2005. Energy Saving Potentials and Air Quality Benefits of Urban Heat Island Mitigation (PDF) (19 pp, 251K). Lawrence Berkeley National Laboratory.

[3] http://www6.montgomerycountymd.gov/dectmpl.asp?url=/content/dep/energy/EnergyWise.asp

Stormwater Management

Protecting and improving the quality and the ecological health of Montgomery County's streams is a considerable planning objective. This goal is especially important because Montgomery County is part of the Chesapeake Bay watershed, a national treasure constituting the largest estuary in the United States and one of the largest and most biologically productive estuaries in the world.

On December 29th, 2010, the United States Environmental Protection Agency (EPA) in cooperation with Bay watershed jurisdictions of Maryland, Virginia, Pennsylvania, Delaware, West Virginia, New York, and the District of Columbia (DC), developed a nutrient and sediment pollution diet for the Bay, consistent with Clean Water Act requirements, to guide and assist Chesapeake Bay restoration efforts. This 'diet' is known as the Chesapeake Bay Total Maximum Daily Load (TMDL). After determining impaired streams, rivers, and waters, Maryland identified a comprehensive set of stormwater management control strategies that collectively will achieve the nutrient and sediment reductions needed to meet the State's 2017 and 2025 goals for restoring the Bay and improving local waters.

How does this influence Lyttonsville? There are many techniques to minimize the effects of stormwater runoff. In the past, stormwater management required large areas of land where the runoff was collected in pond-like depressions and released slowly over a period of time. However, in May of 2009 the State amended its 2007 stormwater manual requiring the application of Environmental Site Design (ESD) methods. ESD is used to minimize onsite and offsite hydrologic and water quality impacts due to runoff by attempting to incorporate and mimic natural hydrologic processes into the built environment. These measures must be designed and implemented on new developments. ESD's can also be integrated into the streetscape or along sidewalks. ESD stormwater management practices have the capability to significantly improve the quality of stormwater runoff and improve the quality of the receiving streams to ultimately meet the goals of the Chesapeake Bay Total Maximum Daily Load (TMDL) for pollution reduction.

Not only are ESD's good for water quality, but they can be vegetated with a complex variety of plants from native grasses to shrubs and trees. These ESD's have an enormous potential to fill in green gaps in Lyttonsville while assisting with improved air quality, reduced greenhouse gases and heat island effect, increased health and quality of place, and added aesthetic appeal.

Improving water quality in the Lyttonsville tributaries is an important goal that will take many years to achieve. With each new development and streetscape design, the construction of integrated stormwater management treatments will begin to reduce the quantity and improve the quality of stormwater runoff and water in the receiving streams.

Environmental Site Design are water quality management techniques such as: green roofs, tree plantings, rain gardens, permeable pavement, that mimic natural hydrologic functions. They are proven to help solve stream and water quality problems while improving the health and livability of neighborhoods.

Goals to improve water quality:

- Reduce quantity and improve quality of stormwater runoff.
- Reduce impervious cover to maximize infiltration and/or green space.
- Promote groundwater recharge.
- Increase buffers along streams and tributaries.
- Improve aquatic biodiversity.

B. Recommendations

- Integrate visible environmental site design strategies that provide multiple benefits for water quality, habitat, health and community identity improvements.
  Strategies include:
  - Intensive green roofs (6 inches or greater to maximize water treatment and species diversity).
  - Stormwater planters.
  - Pervious pavement.
  - Bioswales/ biofiltration / bioretention/bioinfiltration.
  - Rainwater harvesting for retention, irrigation and gray water.
  - Permeable paving for portions of roads, road shoulders, sidewalks walkways and parking lanes where feasible.

- Utilize environmental site design for parks and open space as opportunities for community education and interpretation.
- Provide stream buffers along open channels and waterways.
- Stormwater management waivers are often sought by developers during the redevelopment process. Since waivers limit stormwater benefits in already impaired watersheds, redevelopment projects must meet or exceed all County stormwater management requirements.

ECOLOGY

Ecology is the relationships between living organisms, including humans, and their physical environment; it's the vital connections between plants, people, animals, and the world around them. It is well known that humans have influenced this ecological balance. Knowing this it becomes possible to design sites that mitigate for lost resources and integrate green features to enhance the 'ecology' of a community for humans, plants and animals alike.

Ecosystem services are the multiple humankind benefits of a well-functioning ecosystem. Green elements such as parks, street trees, tree clusters, green roofs, green walls, planted areas including vegetated stormwater management systems, streams, and community gardens provide critical ecosystem services. There is mounting evidence on the psychological, physical, and economic benefits of living and working in areas with green. Numerous communities are now greening their landscape in an effort to improve the quality of life for its residents, increase commerce, raise property value, attain regional and national attention, and draw new businesses and residents.

Equally, green elements clean air, filter water, support a greater variety of beneficial insects, pollinators, birds, and wildlife, and reduce ground temperatures that cool streets and reduce energy demands during summer.

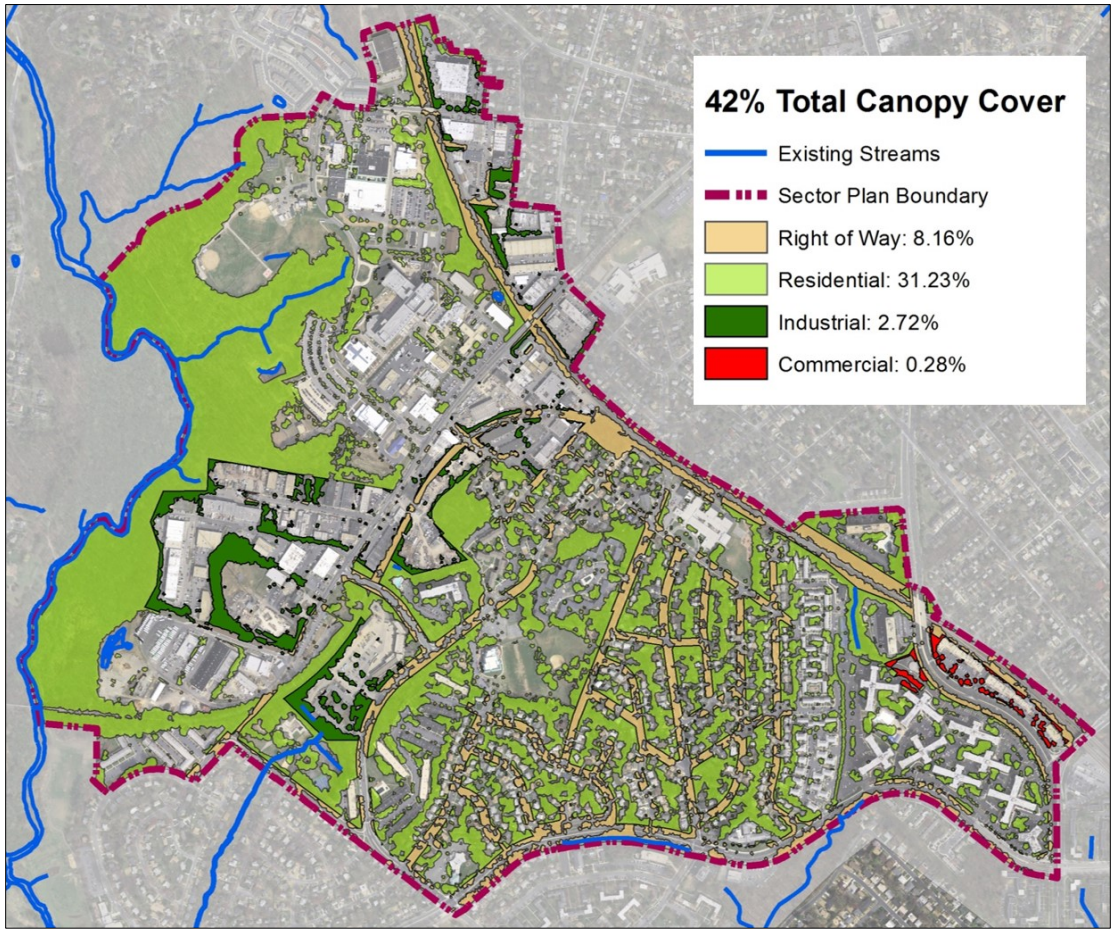
Canopy Cover & Habitat

Habitats comprise plants, living organisms and their physical surroundings. Intact habitats provide numerous benefits such as: enhanced quality of life; increased biodiversity; and improved air and water quality. All habitats within Greater Lyttonsville have been degraded over time through habitat loss and fragmentation, some more than others.

A Georgraphic Information Systems (GIS) analysis was completed by the Maryland National Capital Park and Planning Commission staff to determine the amount of tree canopy (leaves, branches, and stems of trees that cover the ground when viewed from above) within the Lyttonsville Sector Plan boundary. The total tree canopy cover is 42 percent, which is relatively high. Canopy cover within the industrial area is less than 3 percent and commercial property is less than 0.3 percent. Increasing canopy cover with the industrial and commercial areas is a priority for this Plan.

The ecology goals and recommendations aim to reestablish and link green spaces via tree canopy corridors along streets and bicycle networks, stratified vegetation plantings and green roofs. Increased open space and parkland will provide additional greening to enhance the overall ecology and performances of Lyttonsville.

Existing Tree Canopy Cover



Goals:

- Re-establish contiguous green corridors along bicycle networks linking parks, open space, community neighborhoods and destinations.
- Reduce heat island effect in mixed-use and industrial zones through plantings.
- Improve overall habitat and pollination opportunities through herbaceous and woody species plantings.
- Improve carbon sequestration capacity.

Green Corridors are areas of connecting habitat (tree cover or/and green space) enabling the movement of small animals, especially birds, from tree to tree, until they find a safe habitat to nest in. They provide unbroken habitat, food, shelter, nesting, and breeding areas

Recommendations

- Prioritize street tree planting along connecting streets with proposed bicycle lanes, sidewalks and stormwater management facilities.
- When incorporating green roofs, utilize intensive planting depth.
- Strive to achieve a minimum canopy cover per zone as follows:
    - 40 percent canopy cover within residential zones.
    - 10-15 percent canopy cover within industrial zones.
    - 10-15 percent canopy cover within commercial zones.
    - 40 percent canopy cover within the right-of-way.
- There are steep slopes over 25 percent along with forest cover within the sector plan area which could require protection, mitigation, or both.

ENERGY

Energy is used to power and heat buildings, produce goods, and fuel vehicles. Land use affects energy use through:

- The types and energy efficiency of buildings;
- The density and mix of uses; and
- The transportation options available for residents and commuters.

Most the homes and buildings within the Sector Plan were constructed in the 1970s, a time when building systems were not as energy-efficient as they are today. Consequently, these older structures require a great deal of energy to heat and cool. Past zoning and density restrictions limited compact development and mixed use which supported sprawl and energy inefficiencies. Conserving energy and minimizing energy consumption is an important economic and environmental objective of the County. The following goals and recommendations aim to reduce energy demand, support alternative energy sources, and reduce carbon emissions associated with resource consumption and climate change.

Goals

- Reduce energy demands on the local power grid system.
- Encourage and support energy-efficient building construction.
- Reduce carbon dioxide and other noxious emissions.
- Improve public awareness of alternative energy sources and efficient building strategies.
- Maximize use of renewable energy systems to supply a portion or all of a building's energy demand.

Recommendations

- Provide and improve alternatives to automobile travel, through:
    - Improved access to public transit.
    - Improved local bus service and shelters.
    - Efficient and safe access to the future Purple Line light rail stations.
- Utilize "whole building design" and high performance building approaches for new construction.
- Use building deconstruction techniques to facilitate reuse and/or recycling of existing building materials.
- Consider recycled materials, locally sourced and produced materials, and/or local construction labor for new and renovated buildings.
- Incorporates renewable energy systems to supply a portion of a building's energy needs, where feasible. Such systems may include:
    - solar power
    - wind power
    - geothermal heating and cooling systems

CARBON FOOTPRINT ANALYSIS RESULTS

Methodology

Montgomery County Bill number 34-07 requires the Planning Department to model the carbon footprint associated with its master plans, and to make recommendations for the reduction of carbon emissions. MNCPPC currently uses a greenhouse gas model developed by King County, Washington. The inputs are derived from national averages, and wherever possible we have substituted Montgomery County data obtained by the Planning Department's Research and Technology and the Transportation Division. The results are reported in terms of the equivalent effect of a given volume of carbon dioxide ("carbon dioxide equivalents").

To project total emissions for Lyttonsville, the spreadsheet model considered embodied energy emissions, building energy emissions, and transportation emissions. The model documentation defines embodied emissions as "emissions that are created through the extraction, processing, transportation, construction and disposal of building materials as well as emissions created through landscape disturbance (by both soil disturbance and changes in above ground biomass). Building energy emissions are created in the normal operation of a building including lighting, heating cooling and ventilation, operation of computers and appliances, etc. Transportation emissions are released by the operation of cars, trucks, buses, motorcycles, etc.

Inputs for Lyttonsville include the numbers and types of housing units and the square footage of different categories of retail, commercial, and public buildings (Table 1). The model is run once using 2015 data to establish baseline results. The model is run again using housing units, and commercial and retail space projected to develop under the sector plan (2040) to estimate future greenhouse gas emissions. The model estimates emissions over the life of the development, and results are given in metric tons of CO2 equivalents. The actual outcome of the model is likely to be higher than the reality due to continuous innovations in energy efficiencies.

To project total emissions for an area, the spreadsheet model considers embodied energy emissions, building energy emissions, and transportation emissions. The model documentation defines embodied emissions as "emissions that are created through the extraction, processing, transportation, construction and disposal of building materials as well as emissions created through landscape disturbance (by both soil disturbance and changes in above ground biomass). Building energy emissions are created in the normal operation of a building including lighting, heating cooling and ventilation, operation of computers and appliances, etc. Transportation emissions are released by the operation of cars, trucks, buses, motorcycles, etc.

This is different from the County Emissions Inventory prepared by the Montgomery County Department of Environmental Protection, which estimates annual emissions. The model used for Lyttonsville only deals with emissions; no calculations are included to estimate potential carbon offsets from best management practices. The estimates do not assume changes in technology, energy efficiencies, and alternative energy sources when projecting emissions.

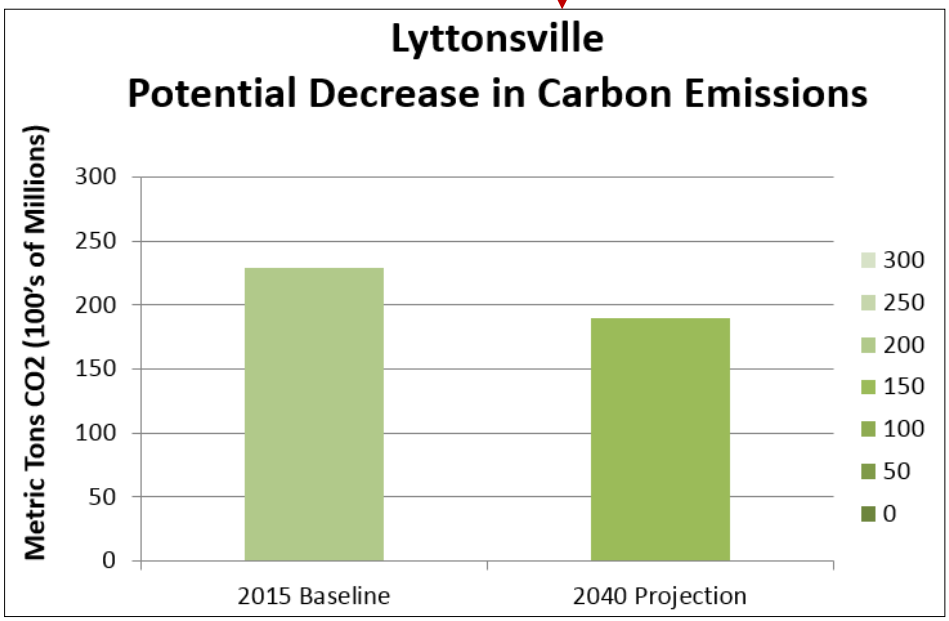
Findings

The projected population is expected to increase by nearly 60 percent to approximately 23,253 residents and 10,313 employees by 2040 for an approximate total population of 33,566. Although population will increase, vehicle miles travelled per capita will significantly decrease along with a decrease in greenhouse gas per capita by nearly 42 percent.

Efforts to moderate carbon emissions have been applied to the Plan's recommendations and align with the County's 2009 Climate Protection Plan. The Sector Plan addresses carbon reduction by encouraging and supporting Smart Growth principals such as a mix of building types and uses, diverse housing and transportation options such as the Purple Line, creating walkable and bike-able neighborhoods, and reduce sprawl by constructing compact communities. Further carbon reductions can be achieved through the construction of energy efficient buildings and the restoration of landscapes from asphalt to green. Comprehensively, significant reductions in greenhouse gas can be achieved when all sectors implement these strategies.

The results of the carbon model for Lyttonsville using the King County, Washington carbon modeling methodology are shown below.

Year	Emissions *MTCO2e**	Metric Tons per Person/Travelled MTCO2e*
2015 (Baseline)	4,843,958 ÷ 21,132 (population) = **229.22**	1.25
2040 (Projection)	6,406,192 ÷ 33,566 (population) = **190.85**	0.72



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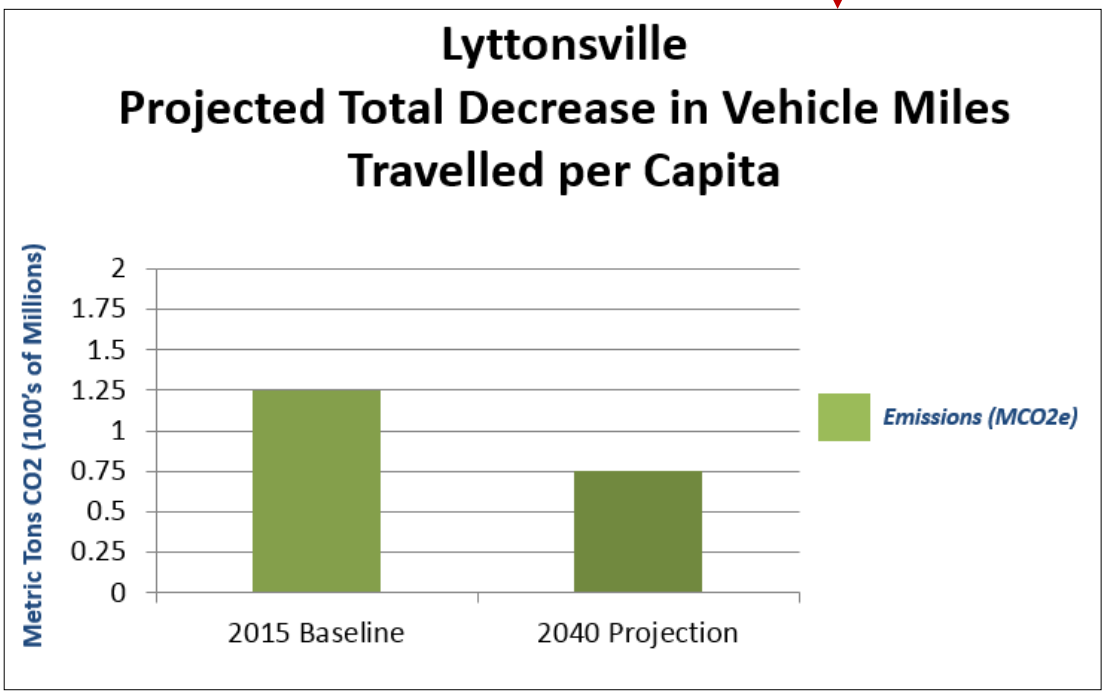


SITE SPECIFIC PROPERTY RECOMMENDATIONS

- Summit Hills
  - Existing Condition
    The 30-acre site is predominantly impervious with large surface parking lots. Fenwick Branch begins at a spring in the woodland patch just north of Summit Hills. It was channeled under Summit Hills where a surface parking lot was constructed.
  - Recommendations
    -Remove 3+ acres of the existing parking lot's impervious cover.
    -Daylight the underground stream channel using a sinuous natural channel design. The project should include an extensive reforestation and landscaping plan to provide a riparian buffer, shade trees along with passive and active recreation areas creating a contiguous wildlife corridor.
    - Minimize surface parking on redevelopment areas
- WSSC Property
  - Existing Condition
    Donnybrook stream emerges from an underground pipe into an in-line stormwater management pond/wetland on the south side of the Washington Suburban Sanitary Commission (WSSC) property. The pond also receives untreated stormwater and surface debris from the WSSC facility and surrounding drainage area.
  - Recommendations
    - Clean up debris and trash from the stream channel and open space area.
    - Remove encroaching invasive plant species.
    - Consider separating stormwater treatment from the Donnybrook tributary.
    - Create a native planting buffer around the tributary and stormwater area.
    - Protect the pond/wetland with a planted buffer
    - Consider daylighting the piped underground stream channel that runs parallel to the existing trail and along the site's property line and incorporate it into the site as a public amenity.
      - A significantly reduced stream buffer would be considered in order to accommodate this amenity and potential redevelopment
      - If the stream is daylit, it should provide for a landscaped setting rather than protected forest and encourage open stream connectivity.
      - The stream and its buffer should be integrated into any proposed open space as an amenity but shall not replace the requirement of the Civic Green.
- Rock Creek Pool
  - Existing Condition
    Donnybrook stream runs north to south through the center of the property. The low-flow stream was recently stabilized and landscaped by the Montgomery County Department of Environment.
  - Recommendation
    - Maintain a minimum of a 100-foot buffer on each side of the stream.
    - Provide an additional mix of shade and understory trees along the stream buffer.
- Friends Non-Profit Housing (vacant lot)
  - Existing Condition
    The lot is presently forested with steep slopes along the western portion of the property. There is historical evidence of the site being used as a landfill.
  - Recommendations

- Prior to redevelopment a Phase I and Phase II Environmental Site Assessment are needed to determine the content of the landfill debris.
- Landfill mitigation must be completed prior to the beginning of any construction.
- The steep slopes on the site may be unnatural due to the dumping of debris and soil. Stabilizing the slopes will be necessary prior to construction.

- Serra Jose Property
  - Existing Condition
    The site is nearly 100% asphalt and presently used as a storage for landscaping materials and parking lot. There are no stormwater management treatments onsite to reduce polluted runoff. In conjunction with the construction of the Purple Line, the Maryland Transportation Authority is planning on using the site as a regional stormwater management facility pond.
  - Recommendations
    - Remove surface asphalt and debris from sitefrom site.
    - MNCPPC strongly recommends that the proposed stormwater management facility serve dual purposes: as a public open space amenity, and as a stormwater management facility.
- Claridge House
  - Existing Condition
    A small unnamed tributary that likely once lead into Donnybrook Tributary emerges onto the northern side of the Claridge House property. The channel is bordered by eroding banks and contains large quantities of debris and sediment deposited from the adjacent properties.
  - Recommendations
    - Clean up debris, sediments and trash from the channel.
    - Remove encroaching invasive plant species.
    - Stabilize stream banks using natural stone.
    - Provide a stream valley buffer around the tributary.
- Garfield Avenue Stormwater Management
  - Existing Conditions
    Garfield Avenue is a linear street that descends into Rock Creek Park. Stormwater sheet-flows from the top of the road to the bottom transporting industrial debris, oils, and sediment into the park causing bank erosion, sediment deposition, pollution, and loss of trees.
  - Recommendations
    - Where feasible provide environmental site design features for stormwater management within the right-of-way. Stormwater management areas may include the existing street panel.
- Campanaro Property
  - Existing Conditions
    The property is now used as a landscaping storage and construction site. The southern portion of the property is bordered by trees that buffer a stream on the adjacent property. Runoff, debris, and sediment flow from the Campanaro property into the stream and its banks.
  - Recommendations
    - Upon redevelopment, protect existing trees and plant additional the trees along the tributary banks and slopes.
    - Expand stream buffer to its required minimum of 100’ feet.

- Clean up debris, and stabilize banks where needed along the stream banks of property.

- Pilgrim Church Tract
  - Existing Conditions
    The property abuts Rock Creek Park along the north side of Garfield Avenue. Along the properties western border is a forested eroding slope with trees and debris throughout. At the top of the slope are outdoor storage bins and containers stored along with sand deposits and other materials. Stormwater from the impervious site sheet-flows across the property picking up debris where it is deposited along the forest edge or it into an outfall within Rock Creek Park.
  - Recommendations
    Upon redevelopment, restore the steep slopes through stabilization, cleanup and replanting. The sloped portion of the site should be used as an access point for the community into Rock Creek Park.

Six Sustainability Performance Areas or Indicators:

Performance areas are indicators that guide the recommendations found within this plan. They are measurable with clear objectives and desired outcomes. Each of the six performance areas are subcategories of the three principals of sustainability: Social *Equity*; *Economic* viability; and *Environment*ally sensitive design.

The list of goals and objectives for each performance area below outline what has been addressed in this Plan. Together, they make the Plan sustainable by including each principal and their associated performance areas.

1. Access and Mobility

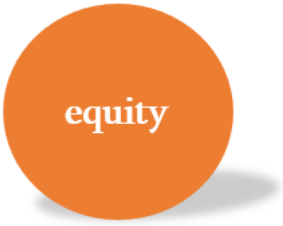
   Goal: Enhance transportation options to accommodate all users.

   - Objectives:
     - Increase bicycle and pedestrian mobility, safety and networks.
     - Support complete streets.
     - Provide multiple points of access to the Purple Line.
     - Provide multi-modal transportation options.

2. Equity

   Goal: Provide affordable housing, business opportunities and access to natural and cultural resources.

   Objectives:
   - Preserve affordable retail and commercial space for small businesses.
   - Increase mixed-income housing.
   - Retain and increase a wide range of housing and work choices.
   - Enhance livability and accessibility for seniors and the disabled.
   - Provide live/work opportunities.

3. Community Identity

Goal: Preserve, enhance and expand a cohesive neighborhood identity

Objectives:

- Support neighborhood retail.
- Allow mixed-use development.
- Create civic greens.
- Continue industrial uses.
- Create a community destination near the Purple Line.
- Highlight community history through signage, artwork, and future
- evaluation of historic resources.
- Revitalize Paddington Square.
- Improve Lyttonsville Community Park.
- Foster social networks through an increase in open spaces, parks, and trail connections.

4. Health and Habitat

Goal: Strengthen health, livability and community well-being. Regenerate and improve ecological stability.

Objectives:

- Connect canopy corridors and greenways.
- Increase open space, parkland and trail networks.
- Create linear green spaces.
- Improve pedestrian and bikeway safety.
- Improve water quality and stream buffers.
- Increase habitat opportunities through plantings.
- Improve air quality through plantings, increased pedestrian mobility and reduced demand for cars.
- Reduce heat island effect.
- Plant native plant communities that support local birds, pollinators, insects, other species.

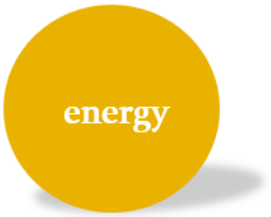
5. Water

Goal: Reduce untreated stormwater runoff and impervious cover to improve water quality.

Objectives

- Reduce quantity and improve quality of stormwater runoff.
- Reduce impervious cover to maximize infiltration and/or green space.
- Improve aquatic biodiversity.
- Increase buffers along streams and tributary.

6. Energy



Goal: Support building efficiency and alternatives to non-renewable resources. Reduce energy demand.

Objectives

- Reduce energy demands on the local power grid system.
- Encourage and support energy-efficient building construction.
- Reduce carbon dioxide and other noxious emissions.
- Improve public awareness of alternative energy sources and efficient building strategies.
- Maximize use of renewable energy systems to supply a portion or all building's energy demand.

Greater Lyttonsville Sector Plan

TECHNICAL APPENDIX

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