



## **MD 355 BRT Corridor Planning Study**

### **Phase 2**

### **Indirect & Cumulative Effects Technical Report**

DRAFT

**June 10, 2019**

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Impacts by Alternative Alignment Segment

Present and Future Actions

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## 1 Introduction

The Montgomery County Department of Transportation (MCDOT) is preparing a *Corridor Summary Report* for Phase 2 of the MD 355 Bus Rapid Transit (BRT) Planning Study. The project is evaluating detailed concepts for providing enhanced transit service along MD 355 from Bethesda to Clarksburg in Montgomery County, Maryland.

Phase 2 of the MD 355 BRT Study builds upon work completed in Phase 1, which developed Conceptual Alternatives that were evaluated to determine which should move forward for more detailed analysis. These alternatives have been refined and analyzed in further detail in Phase 2. The purpose of this Alternatives Technical Report is to consider potential indirect and cumulative effects of the conceptual alternatives under consideration for a BRT system along the MD 355 corridor. While the implementation of a BRT system along the corridor may evolve through multiple phases over a period of years, the consideration of potential indirect and cumulative effects most effectively considers the entire corridor to ensure adequate evaluation of the full range of potential effects. Information in this report, described below, will support discussions presented in the *Corridor Summary Report*.

### 1.1 MD 355 BRT Project Purpose and Need

The purpose of the MD 355 BRT Planning Study is to provide a new transit service with higher speed and frequency along MD 355 between Bethesda and Clarksburg. The purpose and need statement has been consolidated into four distinct goals to guide the development of alternatives and as a framework for comparing alternatives:

- Goal 1.* Provide an appealing, functional, and high-quality transit service
- Goal 2.* Improve mobility opportunities, accessibility, and transportation choices for all
- Goal 3.* Support planned development
- Goal 4.* Support sustainable and cost-effective transportation solutions

## 2 Alternatives

Five alternatives, including the No-Build Alternative, are being evaluated as part of Phase 2 of the MD 355 BRT Planning Study. The findings will be summarized in the *Corridor Summary Report* and are assessed in detail in this Technical Report. The four Build Alternatives are shown in **Figures 2-1 through 2-4**. This *Indirect and Cumulative Effects Technical Report* prepared in support of the *Corridor Summary Report* assesses existing conditions and the potential changes in the Community associated with each alternative.

### 2.1 No-Build Alternative

The No-Build Alternative would include no additional infrastructure improvements other than those already planned and programmed, including the Ride on extRa service launched in October 2017 from the Medical Center Metro Station to Lakeforest Transit Center. This service includes Transit Signal Priority (TSP) at key locations along the route.

## 2.2 Transportation System Management (TSM) Alternative

The TSM Alternative would consist of enhanced bus service operating in mixed traffic using existing lanes from the Bethesda Metrorail Station to Clarksburg along MD 355 and along Clarksburg Road to the Clarksburg BRT terminus.

This Alternative would extend the Ride On extRa service south from the Medical Center Metro Station to Bethesda and north from Lakeforest Transit Center to Clarksburg and would include additional TSP along the route.

## 2.3 Alternative A

Alternative A would incorporate elements of the TSM Alternative plus additional elements to create a BRT service with limited infrastructure improvements. Alternative A would consist of BRT service, operating in mixed traffic using existing lanes from the Bethesda Metrorail Station to Clarksburg along MD 355. In Segment 7, the BRT would travel along Middlebrook Road to Observation Drive, Goldenrod Lane, Germantown Road, then back to Observation Drive to Ridge Road, and across MD 355 to Snowden Farm Parkway to Stringtown Road to the BRT Terminus at Clarksburg.

Alternative A would include additional TSP along with queue jumps at key locations along the route. It would also include off-board fare collection, level boarding, articulated buses, and Flash branding.

## 2.4 Alternative B

Alternative B would generally operate in dedicated median lanes where feasible and in mixed traffic in Segments 1 and 7. In Segment 7, the BRT would travel along Middlebrook Road to Observation Drive, including the unbuilt portion, to Stringtown Road to the BRT Terminus at Clarksburg.

Alternative B would include additional TSP at key locations along the route, off-board fare collection, level boarding, articulated buses, and Flash branding.

## 2.5 Alternative C

Alternative C would generally operate in dedicated curb lanes where feasible. In Segment 7, the BRT would operate in mixed traffic along MD 355 from Middlebrook Road to the BRT Terminus at Clarksburg, via Clarksburg Road and Stringtown Road.

Alternative C would include additional TSP along with queue jumps at key locations along the route. It would also include off-board fare collection, level boarding, articulated buses, and Flash branding.



Figure 2-1: TSM Alternative

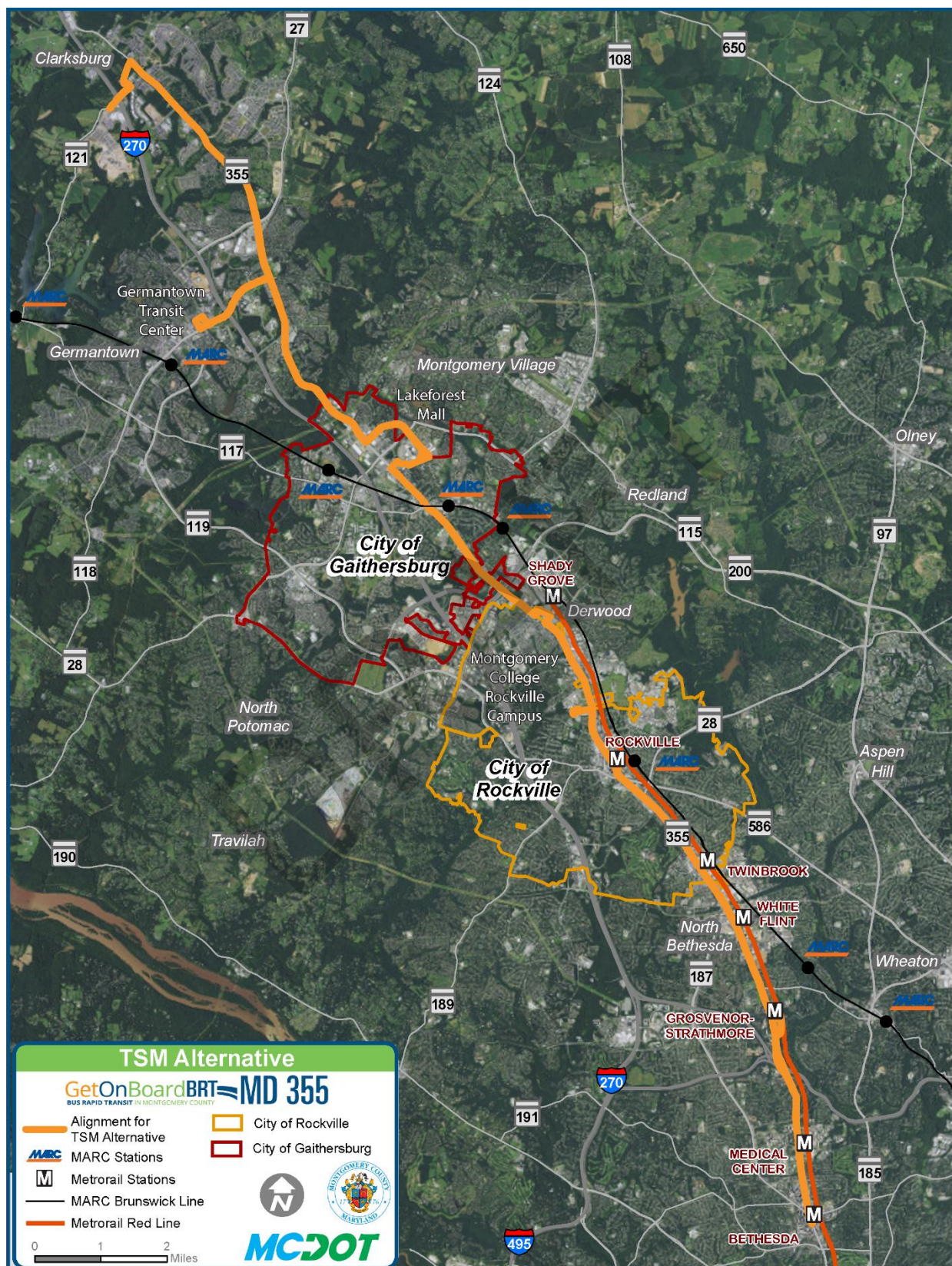




Figure 2-2: Alternative A

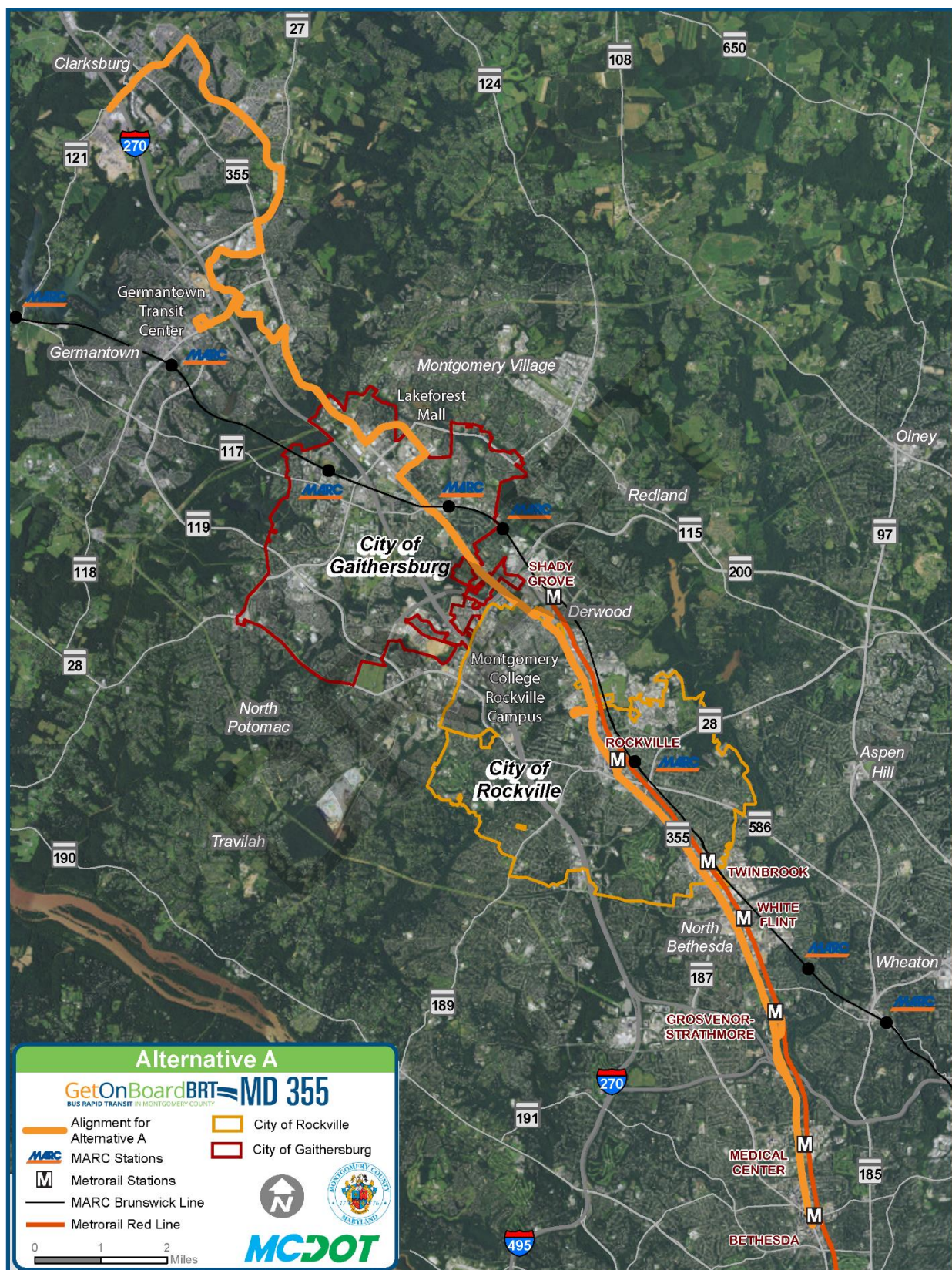




Figure 2-3: Alternative B

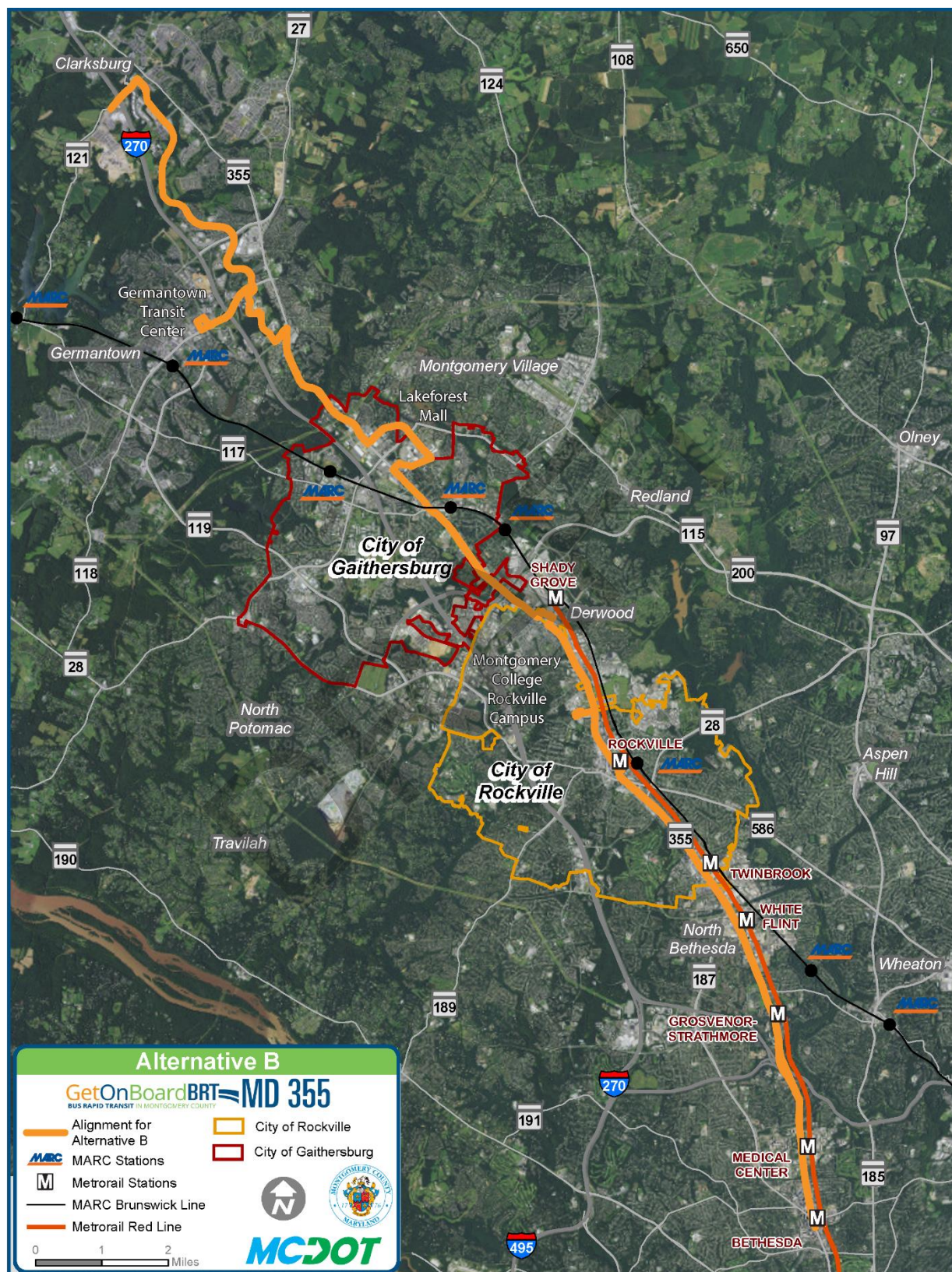
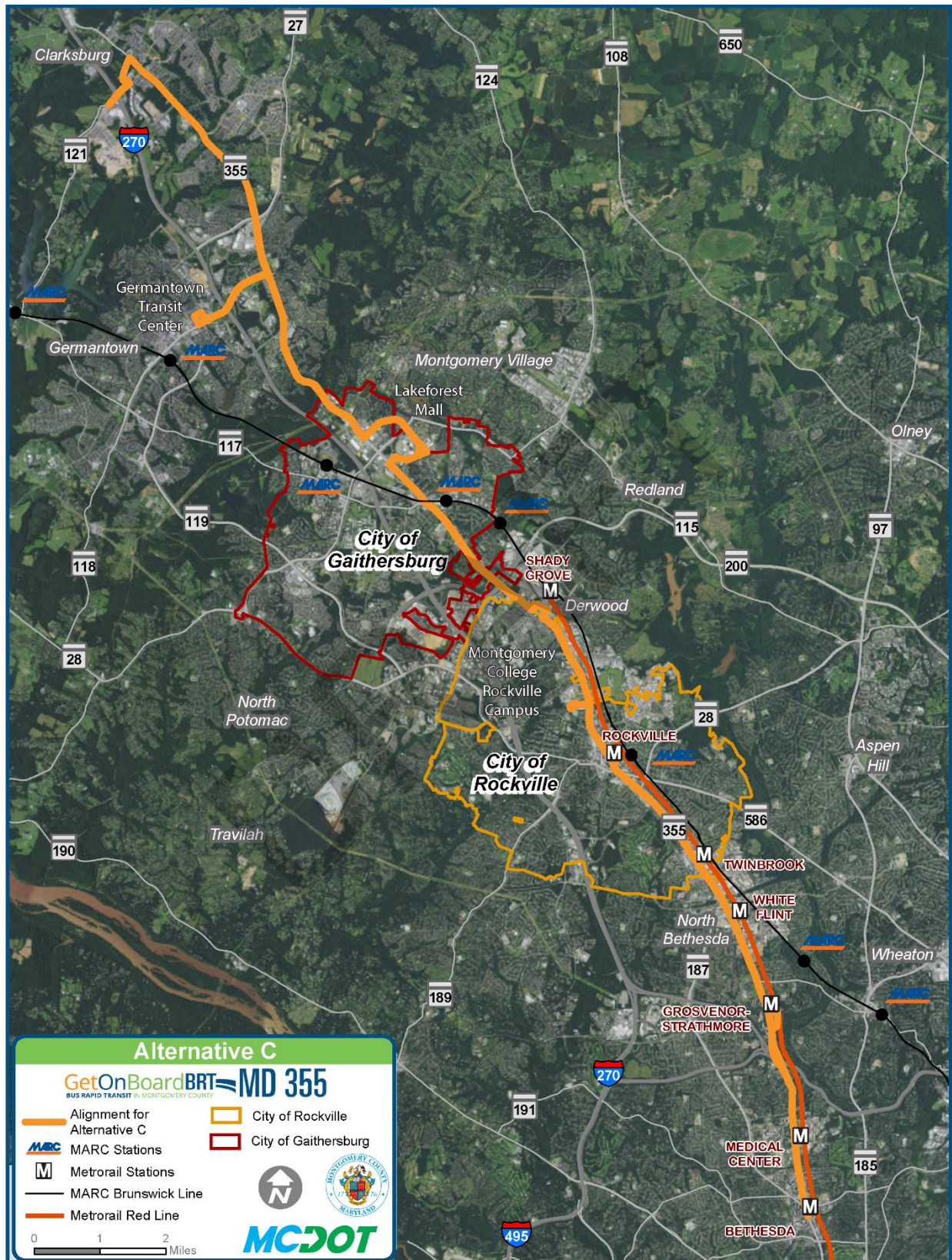




Figure 2-4: Alternative C



## 2.6 Alignment Segments

Due to the existing conditions that vary along MD 355 as the roadway transitions from an urban environment in downtown Bethesda to a suburban setting in Clarksburg, the corridor was divided into seven segments during Phase 1 of this study and carried forward into Phase 2. The segments were primarily geographically based with each having its own set of characteristics, opportunities, challenges, and constraints. The seven segments geographic descriptions are listed in **Table 2-1** and shown below in **Figure 2-5**.

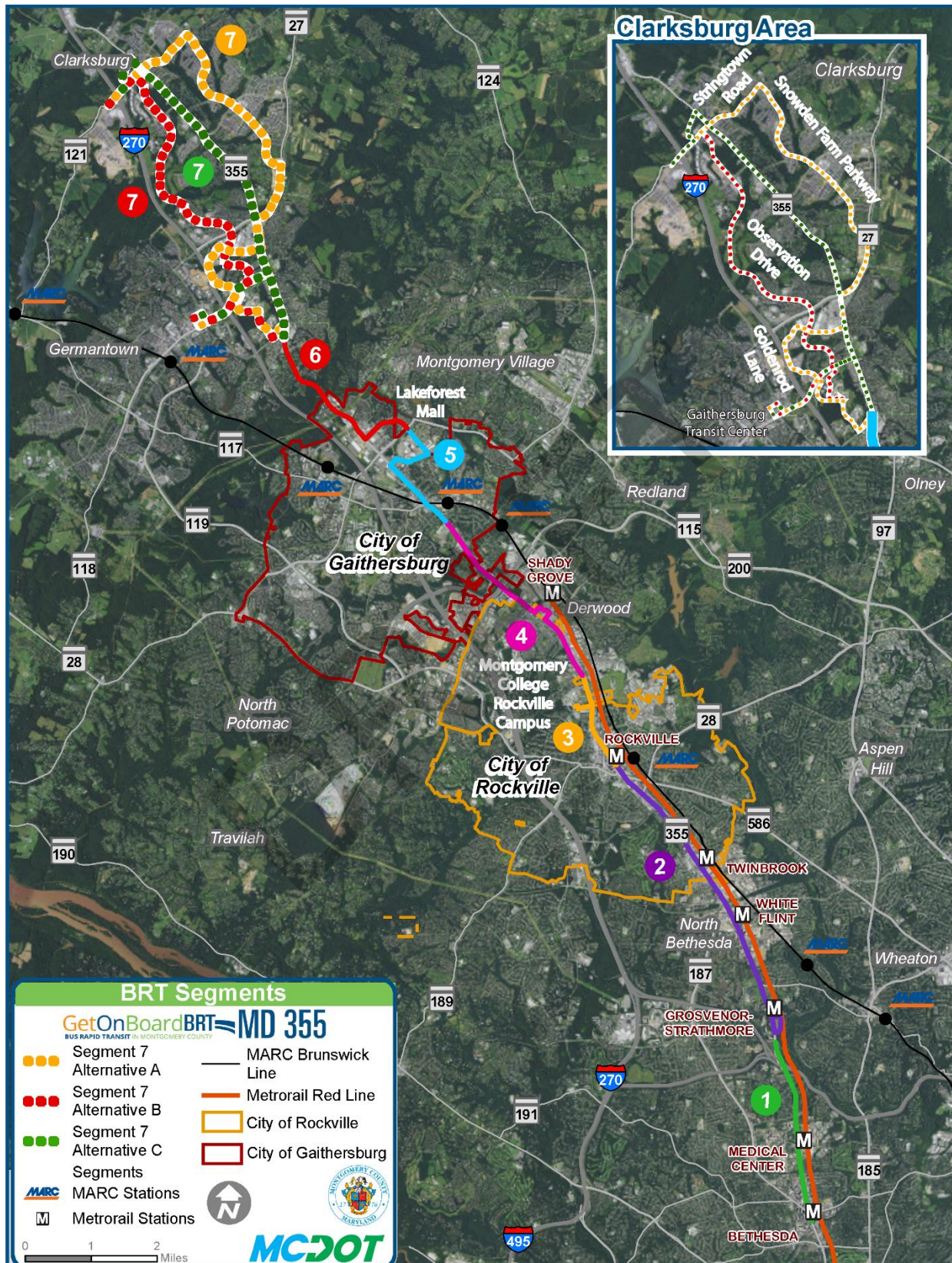
**Table 2-1: Alternative Alignment Segments**

Segment	Geographic Description
1	Bethesda Metrorail Station to Grosvenor Metrorail Station
2	Grosvenor Metrorail Station to Dodge Street
3	Dodge Street to College Parkway
4	College Parkway to Summit Avenue
5	Summit Avenue to MD 124
6	MD 124 to Middlebrook Road
7	Middlebrook Road to Clarksburg

Given the length of the corridor and its varying characteristics and uses, it is expected that a Recommended Alternative would be constructed in stages. In addition, a Recommended Alternative could be pieced together from segments of different alternatives to form a “hybrid” Recommended Alternative. In order to facilitate the identification of a Recommended Alternative, the alternative benefits and impacts have been quantified, as appropriate, based on the seven roadway alignment segments and are presented in **Appendix A**.



Figure 2-5: Alternative Alignment Segments





### 3 Methodology

The Council on Environmental Quality (CEQ) regulations for implementing the National Environmental Policy Act (40 CFR 1500-1508) require the evaluation of indirect and cumulative effects of a proposed action, in addition to those effects which cause a direct resource impact.

*Indirect effects are defined as those “which are caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.” (40 CFR 1508.8)*

*Cumulative effects are defined as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.” (40 CFR 1508.7).*

The consideration of indirect and cumulative effects recognizes that the environmental consequences of human activities can combine and interact to cause aggregate effects that may be different in nature or extent in comparison to direct impacts or disturbances of a singular action. While the direct effects of a human action on a community or ecosystem may not generate a substantial change which the system cannot accommodate, the combination of effects from multiple actions may threaten the sustainability of those same communities and ecosystems and may require physical mitigation and/or alterations to plans, policies or protections affecting those resources.

This Indirect and Cumulative Effects (ICE) analysis has been developed based on the Maryland Department of Transportation State Highway Administration (SHA) *Indirect and Cumulative Effects Analysis Guidelines, May 2007* and *Considering Cumulative Effects Under the National Environmental Policy Act, January 1997* guidance from the CEQ.

#### 3.1 Resources of Interest

To determine which environmental resources should be considered in a broader ICE analysis, resources that would be directly or indirectly impacted by the proposed BRT alternatives were identified. *(Resources not directly or indirectly impacted by the BRT alternatives were not included in the ICE analysis, as the proposed project would have no contribution to cumulative resource effects from a broader, landscape perspective).* Determination of resources of interest for the ICE analysis (**Table 3-1**) also considered the context and intensity of impacts associated with the BRT alternatives and the availability and quality of resource data.

Table 3-1: ICE Analysis Resources of Interest

Resource		Rationale	Representative Sub-boundary/Data Source
Socioeconomic Resources	Community Character	Direct and/or Indirect impacts: including displacements, permanent and temporary access changes, development attraction, and community cohesion	Census Tracts, Montgomery County Planning Areas, TAZs
	Community Facilities, including Parks and Recreation	Direct and/or Indirect impacts: from land conversion or change in use or access	Census Tracts, Montgomery County Planning Areas
	Historic Resources	Direct and/or Indirect impacts: from conversion or change in historical context	Census Tracts, Montgomery County Planning Areas
Natural Resources	Terrestrial Resources/Habitat	Direct and/or Indirect impacts: from conversion or change in habitat context	8-digit watershed
	Water Quality	Direct and/or Indirect Effects: from construction and additional impervious surface	8-digit watersheds
	Waters/Wetlands	Direct and/or Indirect Effects: from construction and additional impervious surface	8-digit watersheds (MDNR wetlands within watershed)
	Floodplains	Direct and/or Indirect Effects: from construction and additional impervious surface	8-digit watersheds (FEMA floodplains within watershed)

### 3.2 Geographic Boundary

The geographic boundary for the ICE analysis is generally considered to be the area within which the indirect and cumulative effects of the proposed action could occur. Based on the linear character of the project, the typical one-half mile “impact shed” (i.e., the extent of pedestrian influence and potential Transit-Oriented Development attraction) of transit stops, and the built nature of much of the corridor, it was assumed that all indirect effects and contributing cumulative effects that could be associated with a proposed action would be captured within a two-mile buffer from the existing MD 355 corridor. This buffer extends the length of Montgomery County and is approximately 26 miles in length.

#### 3.2.1 Socioeconomic Boundaries (Census Tracts, TAZs, Planning Areas)

Census tract boundaries from the U.S. Census Bureau, Metropolitan Washington Council of Governments (MWCOC) transportation analysis zones (TAZs), and Montgomery County planning areas were identified as the most appropriate boundaries for assessment of indirect and cumulative effects on socioeconomic resources and communities associated with implementation of the proposed MD 355 BRT project.

110 census tracts intersect the two-mile MD 355 corridor buffer (**Figure 3-1**). Additionally, 216 MWCOC TAZs generally correlate to the same extent providing population, household, and jobs future forecasts (**Figure 3-2**).

Both of these sub-boundaries (census tracts and TAZs) intersect with the following Montgomery County Planning Areas (**Figure 3-3**) which correlate with the master plans and land use objectives of these communities:

- Bethesda/Chevy Chase
- North Bethesda
- Kensington/Wheaton
- Rockville
- Aspen Hill
- Rock Creek
- Gaithersburg
- Gaithersburg and vicinity
- Germantown
- Goshen
- Clarksburg
- Bennett

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Figure 3-1: Census Tracts

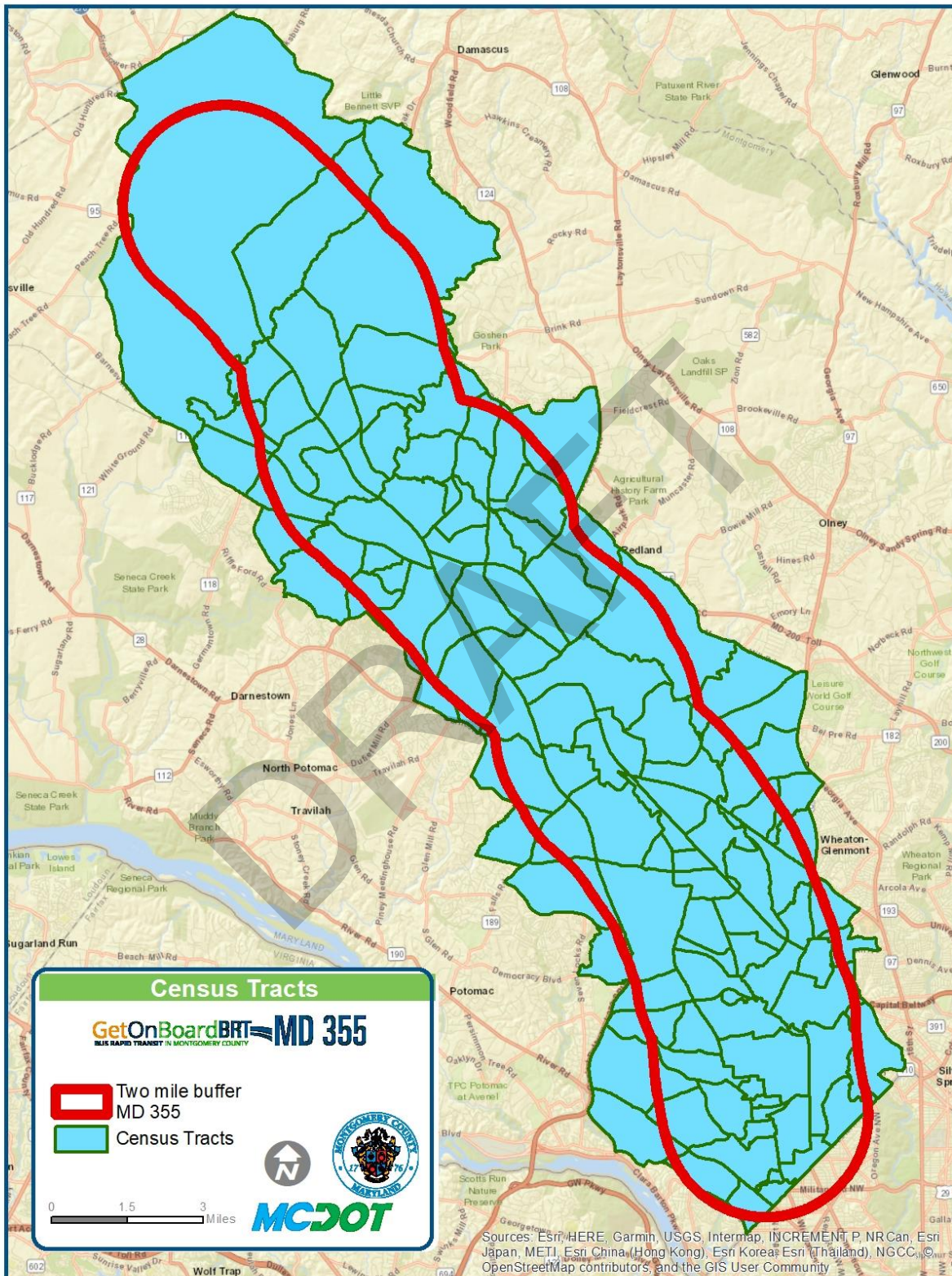




Figure 3-2: MWCOG Transportation Analysis Zones

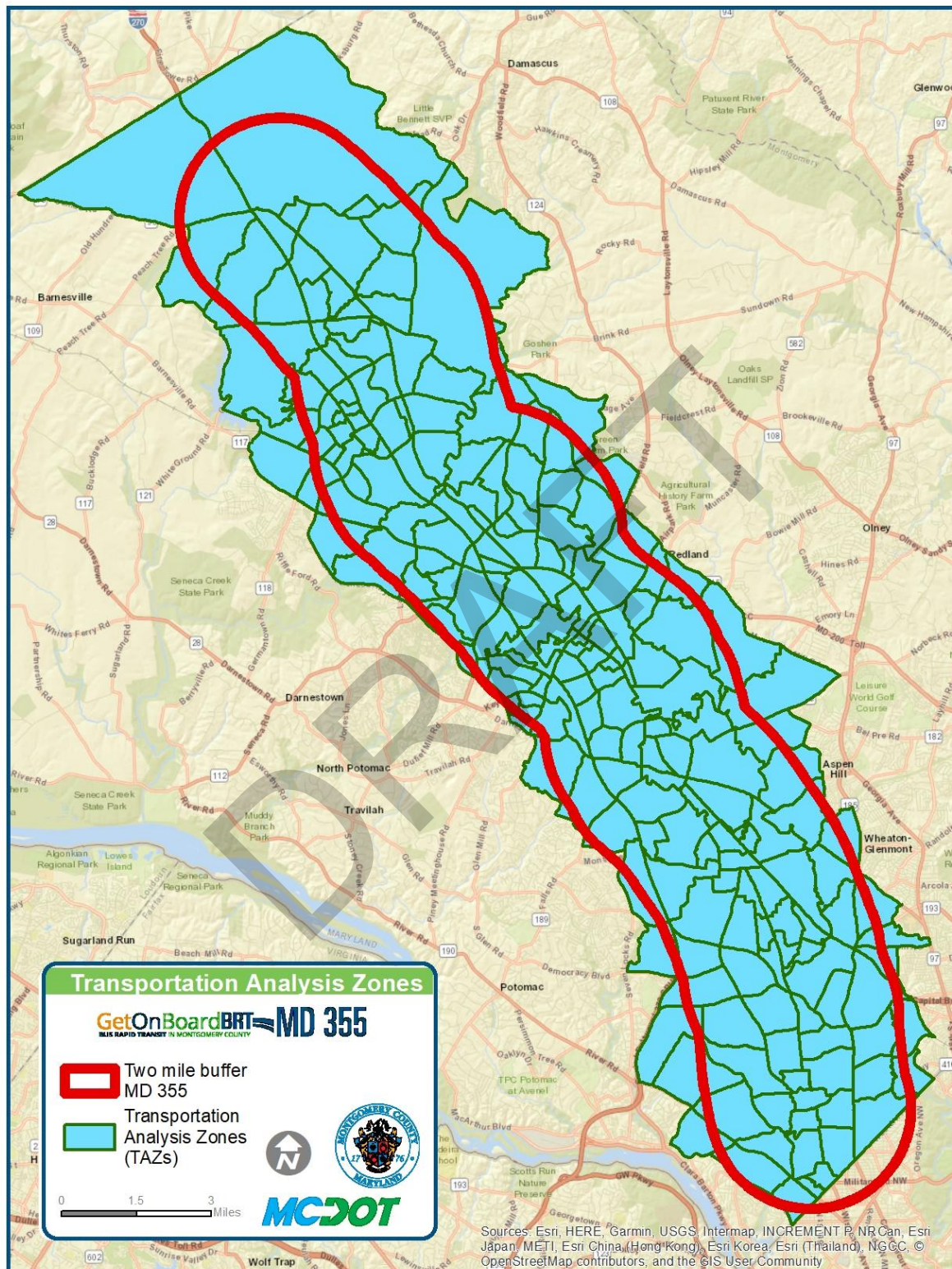
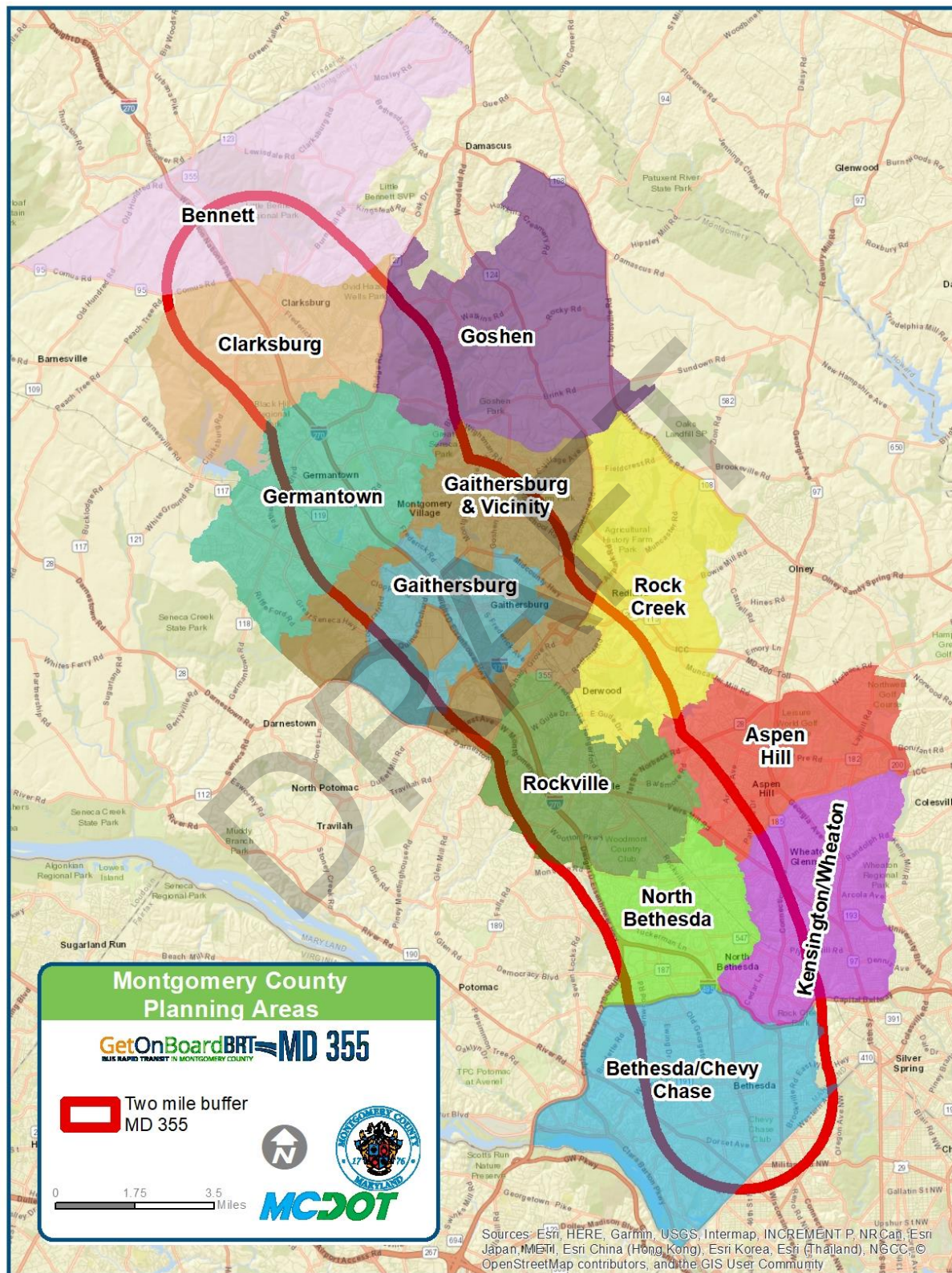




Figure 3-3: Montgomery County Planning Areas



### 3.2.2 Natural Resource Boundaries

The evaluation of indirect and cumulative effects on natural resources for a proposed action is most appropriate at a sub-watershed level, which best captures the interrelationships of waters, wetlands, floodplains, and habitat effects.

Using the two-mile buffer along the corridor, the following five eight-digit hydrologic unit code (HUC) sub-watersheds (**Figure 3-4**) intersect the corridor:

- Potomac Direct
- Rock Creek
- Cabin John Creek
- Seneca Creek
- Lower Monocacy River

### 3.2.3 Overall ICE Boundary

The overall ICE boundary was established by evaluating and synthesizing appropriate sub-boundaries to determine the most appropriate study area. Depictions of the composite ICE boundary for socioeconomic resources and natural resources are provided in **Figure 3-5** and **Figure 3-6**, respectively.

Based on the largely built environment within the corridor consisting primarily of a mix of urban and suburban development, the socioeconomic boundaries were identified as the primary core of the ICE impact area. As a close correlation between census tract and TAZ geographies was applicable, the census tract boundaries were selected to approximate the ICE boundary. The county planning areas that were also considered as a close fit with the key planning areas (Bethesda/Chevy Chase, North Bethesda, Rockville, Gaithersburg, Gaithersburg and vicinity, Germantown, and Clarksburg) along the corridor are provided with the ICE boundary (**Figure 3-5**). Watershed boundaries were taken into consideration as well (**Figure 3-6**), but the majority of indirect and cumulative effect contributions of the project are related to socioeconomic concerns. Therefore, the selected ICE boundary is considered appropriate for identifying indirect and cumulative effects within the MD 355 corridor.



Figure 3-4: Sub Watersheds within the Study Area

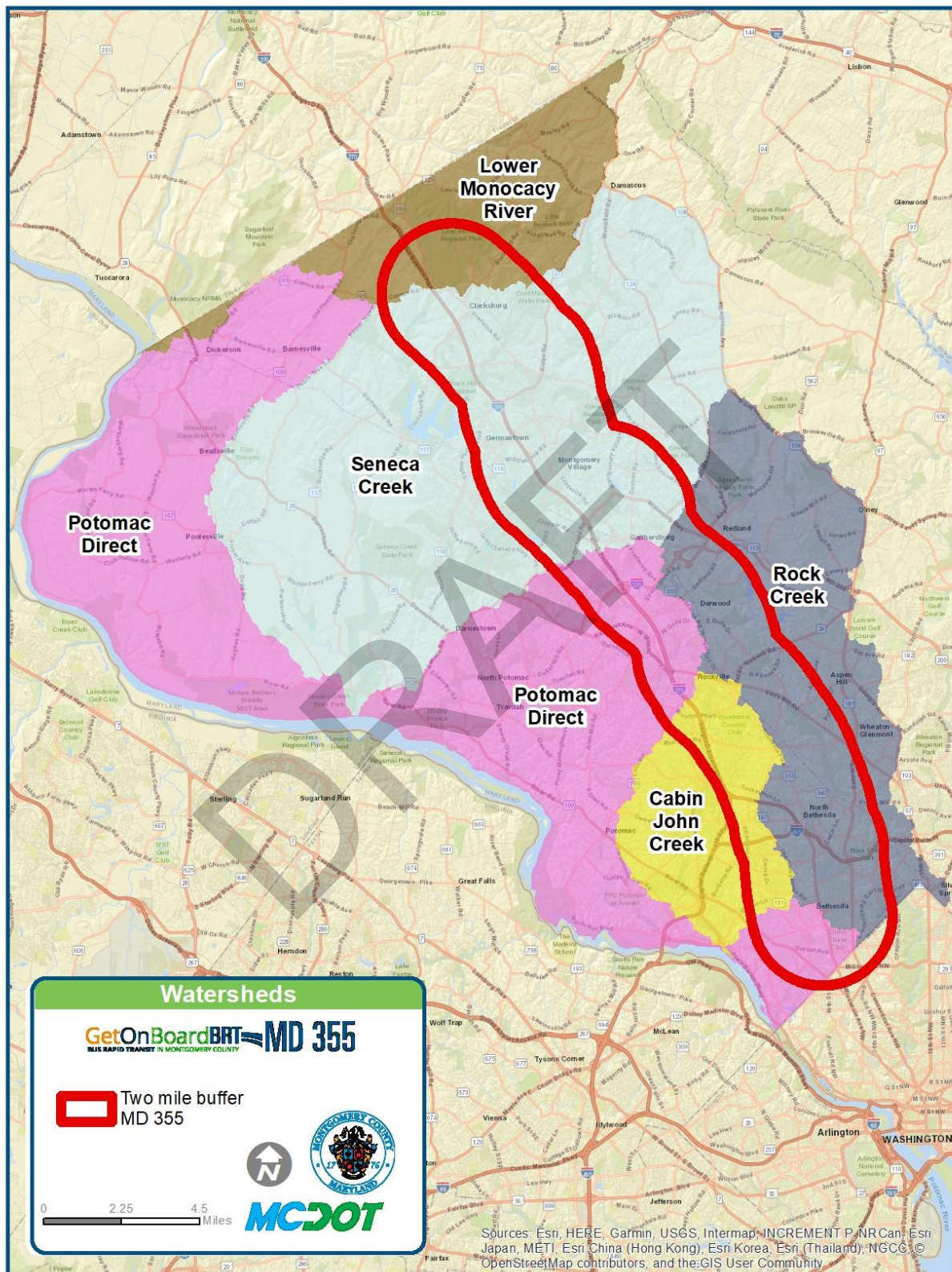




Figure 3-5: ICE Boundary – Socioeconomic Composite

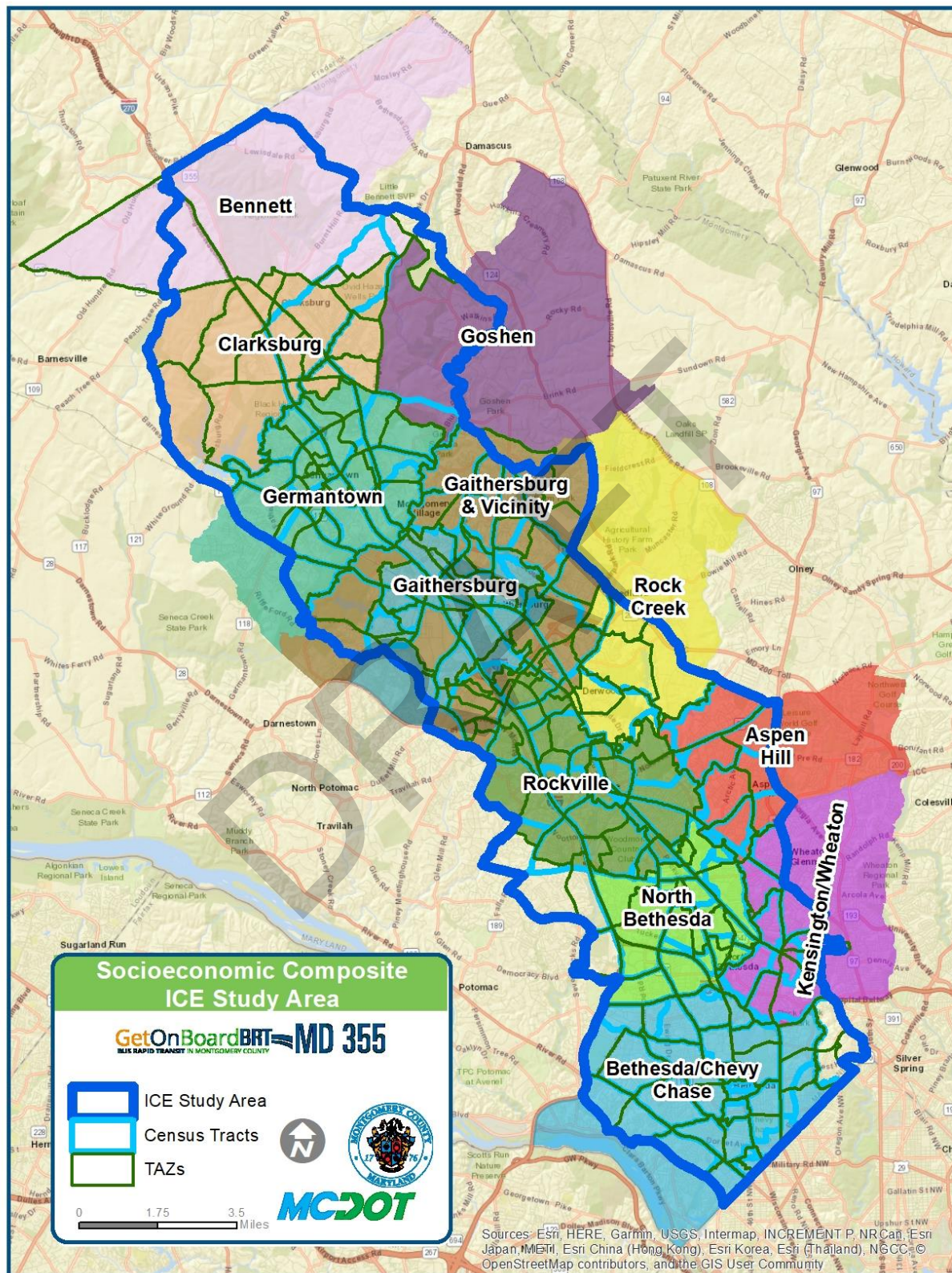
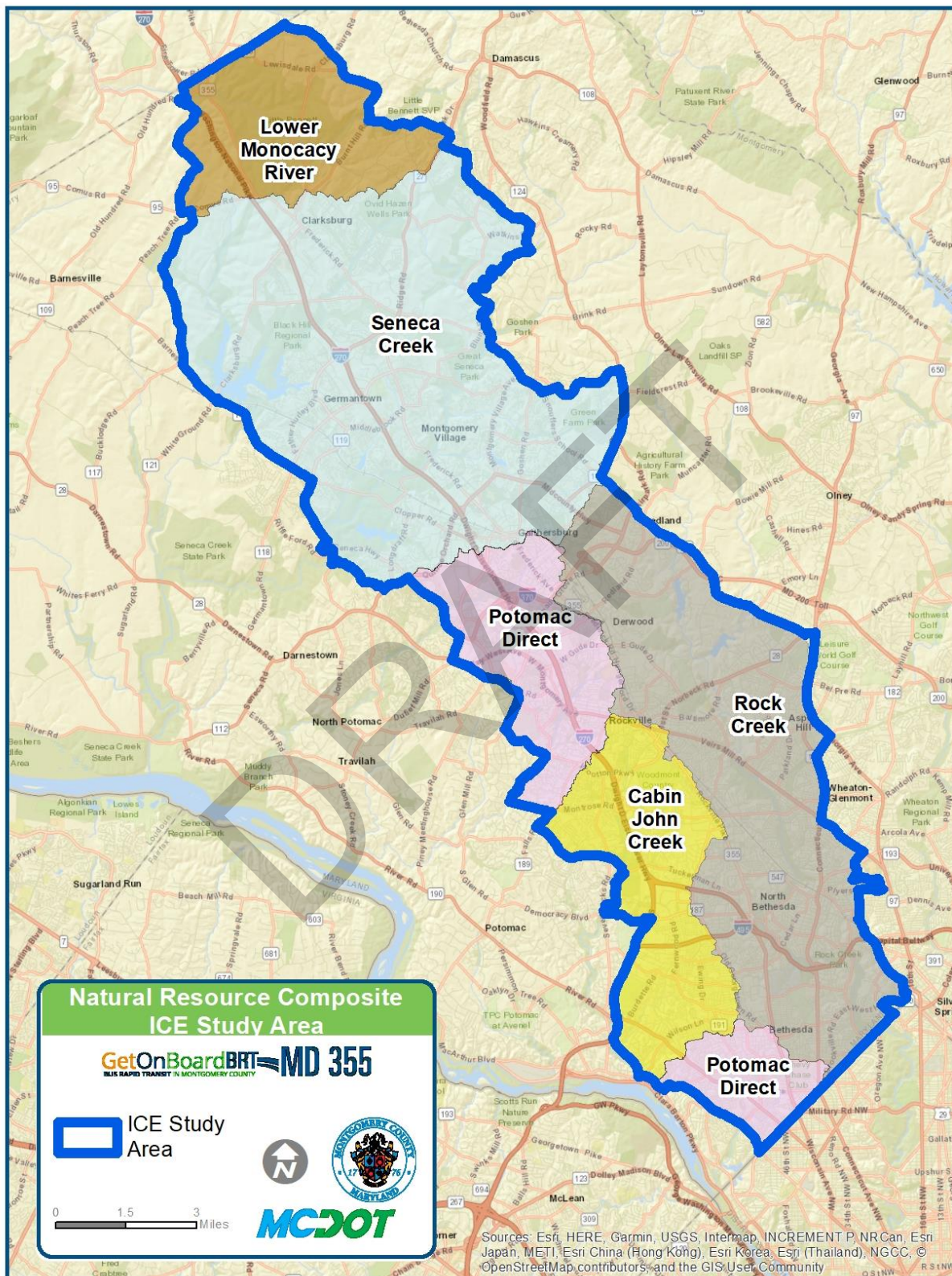




Figure 3-6: ICE Boundary – Natural Resource Composite



### 3.3 Temporal Boundary

The overall ICE time frame for the purpose of analysis includes the year 2000 to the year 2040.

The past time frame of 2000 was chosen to reflect the change in area population and employment growth. Between 1970 and 2000, Montgomery County experienced substantial growth and urbanization/suburbanization, especially within those areas in proximity to Washington D.C. (e.g. Bethesda, Rockville). This was in large part due to the expansion of the Federal government workforce and supporting industries in the region and the completion of mass transit services (Metrorail and MARC) in the 1980s. Between 1970 and 2000, Montgomery County experienced population growth of 67 percent and jobs growth of 152% (Table 3-2).

**Table 3-2: Montgomery County Historic and Future Growth Trends**

Year	Population		Jobs	
	Total	Change	Total	Change
1970	522,809	NA	235,394	NA
1980	579,053	11%	349,504	48%
1990	757,027	31%	512,644	47%
2000	873,341	15%	592,976	16%
<b>Change, 1970-2000</b>	<b>350,532</b>	<b>67%</b>	<b>357,582</b>	<b>152%</b>
<b>Average Annual Rate of Change 1970-2000</b>	<b>2.2%</b>		<b>5.0%</b>	
2010	971,777	11%	644,992	9%
2020	1,052,050	8%	715,200	11%
2030	1,128,800	7%	759,000	6%
2040	1,197,150	6%	792,500	4%
<b>Change, 2000-2040</b>	<b>323,809</b>	<b>37%</b>	<b>199,524</b>	<b>34%</b>
<b>Average Annual Rate of Change 2000-2040</b>	<b>0.93%</b>		<b>0.85%</b>	

Source: U.S. Census 1970 – 2010 and Maryland Department of Planning, Population Projections August 2017 and Jobs Projections, January 2015

After 2000, growth rates in the county and the corridor slowed down from those witnessed between 1980 and 2000. Increasingly, the current and future focus of growth is in the northern portions of the county, as the southern part of the county adjacent to Washington D.C. has been largely urbanized. This trend is anticipated to continue, with new growth continuing to be predominantly in the suburban northern sections of the county and growth in population and employment in the southern portion of the county occurring as urban redevelopment.

The year 2040 was selected as the future time frame endpoint for the ICE analysis as this encompasses the design year for the MD 355 BRT system and also correlates with the extent of available and reasonably foreseeable development forecasts considering existing regional plans and projections.

## 4 Land Use and Development Impacts

### 4.1 Past and Present Population and Employment

Population and employment growth within the ICE Study Area was evaluated based on the MWCOG Round 9.0 Cooperative Forecasts at the individual TAZ level. Increases in population within the ICE Study Area are projected to outpace growth in the county overall, with an average annual 1.03 percent growth in both population and jobs in comparison to the county's 0.93 percent annual increase in population and a 0.85 percent annual increase in jobs (see **Table 4-1**). Areas of concentrated growth are forecast to occur in the Clarksburg, Germantown, Gaithersburg and vicinity, Gaithersburg, and Rockville planning areas (**Figure 4-1**).

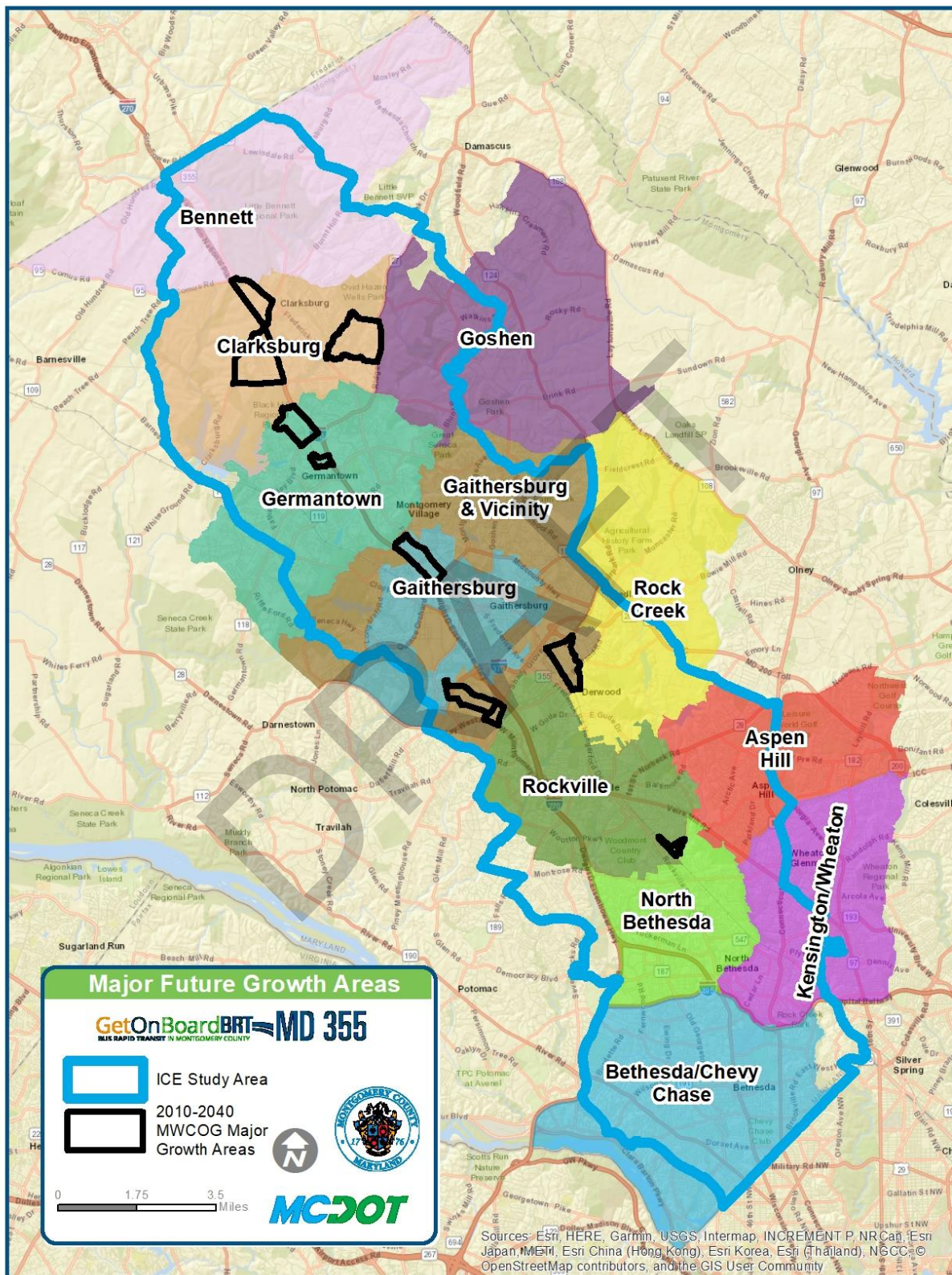
**Table 4-1: ICE Study Area Growth Trends**

Year	Population		Jobs	
	Total	Change	Total	Change
2010	462,046	NA	348,485	NA
2020	520,513	13%	387,414	11%
2030	574,035	10%	432,061	11%
2040	606,198	6%	457,646	6%
<b>Change, 2010-2040</b>	<b>144,152</b>	<b>31%</b>	<b>109,161</b>	<b>31%</b>
<b>Average Annual Rate of Change</b>	<b>1.03%</b>		<b>1.03%</b>	

Source: MWCOG Round 9.0 Cooperative Forecast



Figure 4-1: Major Growth Areas



## 4.2 Past and Present Land Use

Past land use characteristics and trends within Montgomery County and the ICE study area were derived from Maryland Department of Planning land use and land cover data. Developed land within the county is dominated by residential with commercial and institutional uses playing a supporting secondary role. Major resource land use/land cover is dominated by agriculture and forest cover.

### 4.2.1 Montgomery County Land Use

Developed land within the county (**Table 4-2**) has experienced an 86 percent increase between 1973 and 2010, with the majority of change attributable to residential land use growth. Between 1973 and 2002, total residential land use increased by 76 percent (a 2.6 percent average annual growth rate), whereas between 2002 and 2010 total residential land use increased only 14 percent (a 1.7 percent average annual growth rate). Institutional use grew substantially between 1973 and 2002 (increasing approximately 72 percent) but has remained generally stable since 2002.

In comparison, total resource lands within the county experienced a 31 percent decrease between 1973 and 2010, with the largest decreases being in agriculture (47 percent) and forest (14 percent) lands. Loss (e.g. conversion) of total resource lands has generally occurred at a -1.0 percent average rate annually between 1973 and 2010.

**Table 4-2: Montgomery County Land Use 1973-2010**

Use	1973		2002		2010		Development Trend
	Acres	Percent of Total Land	Acres	Percent of Total Land	Acres	Percent of Total Land	
Developed Land							
Residential	62,487	19.3%	110,153	34.0%	109,854	33.9%	↑
Large Lot Subdivision	0	0.0%	0	0.0%	15,891	4.9%	↑
Commercial	7,020	2.2%	6,895	2.1%	7,198	2.2%	
Industrial	386	0.1%	5,290	1.6%	5,070	1.6%	
Institutional	6,550	2.0%	11,302	3.5%	11,321	3.5%	↑
Extractive	649	0.2%	398	0.1%	361	0.1%	
Open Urban Land	9,088	2.8%	11,753	3.6%	8,916	2.8%	
Transportation	0	0.0%	0	0.0%	1,860	0.6%	
Resource Lands							
Agriculture	130,445	40.3%	77,419	23.9%	68,494	21.1%	↓
Forest	99,635	30.8%	91,931	28.4%	85,998	26.5%	↓
Water	6,581	2.0%	7,376	2.3%	7,382	2.3%	
Wetlands	171	0.1%	1,438	0.4%	1,438	0.4%	
Barren Land	557	0.2%	204	0.1%	376	0.1%	
Developed Land	86,189	26.7%	145,791	45.0%	160,471	49.5%	↑
Resource Lands	237,218	73.3%	178,368	55.5%	163,688	50.5%	↓

#### 4.2.2 ICE Study Area Land Use

Land use characteristics of the ICE Study Area are similar to those trends evident for the county.

Developed land within the ICE Study Area (**Table 4-3**) has experienced a 52 percent increase between 1973 and 2010, with the majority of change attributable to residential land use growth. Between 1973 and 2002, total residential land use increased by 47 percent (a 1.6 percent average annual growth rate), whereas between 2002 and 2010 total residential land use increased only 6 percent (a 0.8 percent average annual growth rate). Of particular note is the 140 percent increase in high density residential use between 2002 and 2010. This appears to be indicative of the “redevelopment” focus of much of the corridor in response to the demand for more urban scale and transit-oriented development.

Institutional use grew substantially between 1973 and 2002 (increasing approximately 59 percent) with minor increases since 2002.

In comparison, total resource lands within the ICE Study Area experienced a 40 percent decrease between 1973 and 2010, with the largest decreases being in agriculture (63 percent) and forest (19 percent) lands. Loss (e.g. conversion) of total resource lands has generally slowed from an average annual rate of -1.2 percent between 1973 and 2002 to an average annual rate of -0.9 percent between 2002 and 2010.

**Table 4-3: ICE Study Area Land Use 1973-2010**

Use		1973		2002		2010		Development Trend
		Acres	Percent of Total Land	Acres	Percent of Total Land	Acres	Percent of Total Land	
Developed Land								
Residential	Low	6,945	7.7%	8,299	9.2%	7,335	8.1%	
	Medium	16,679	18.5%	26,338	29.2%	24,609	27.3%	
	High	2,424	2.7%	3,588	4.0%	8,624	9.6%	↑
	Total	26,048	28.9%	38,225	42.4%	40,568	45.0%	↑
Commercial		5,273	6.0%	4,311	4.8%	4,605	5.1%	
Industrial		59	<0.1%	3,598	4.0%	3,496	3.9%	
Institutional		3,620	4.0%	5,754	6.4%	6,000	6.7%	↑
Extractive		39	<0.1%	0	0.0%	0	0.0%	
Open Urban Land		4,223	4.7%	5,402	6.0%	3,823	4.2%	
Transportation		0	0.0%	0	0.0%	1,201	1.3%	
Resource Lands								
Agriculture		25,308	28.0%	10,895	12.1%	9,382	10.4%	↓
Forest		24,899	27.7%	21,029	23.3%	20,035	22.3%	↓
Water		351	0.4%	879	1.0%	880	1.0%	
Barren Land		300	0.3%	27	<0.1%	130	0.1%	
Developed Land		39,262	43.6%	57,290	63.6%	59,693	66.2%	↑
Resource Lands		50,858	56.4%	32,830	36.4%	30,427	33.8%	↓

#### 4.3 Land Use Policies and Plans

Land use and development policies within Montgomery County are based on the Montgomery County General Plan, first adopted in 1964 with comprehensive refinements completed in 1969 and 1993. The general development pattern envisioned through this plan was focused development along major



highway corridors, thereby providing for “wedges” of open space, farmland, and low-density residential use between corridors. The 1993 refinement recognized the existing and emergent growth patterns in the county, especially the Urban Ring (communities adjacent to Washington D.C.) and the I-270 Corridor.

The Urban Ring includes the Bethesda/Chevy Chase, North Bethesda, and Kensington/Wheaton planning areas (**Figure 4-1**) representing older, well-established, and densely developed communities. The other planning areas within the ICE Study Area are designated as part of the I-270 Corridor, which includes the cities of Rockville and Gaithersburg and adjacent suburban-scale communities. The corridor also supports substantial commercial and employment activities.

Future growth in the Urban Ring and I-270 Corridor is envisioned to focus on mixed use, transit-oriented development at medium to high density generally occurring as redevelopment in the Urban Ring and a mix of new and redevelopment in the I-270 Corridor.

This character is implemented through a series of integrated planning objectives:

- Direct the major portion of Montgomery County’s future growth to the Urban Ring and I-270 Corridor, especially to transit station locales.
- Recognize the importance of identifiable centers of community activity at all levels: city, town, neighborhood, and rural community.
- Provide for moderate density residentially-based Suburban Communities adjacent to the edges of existing development in the Urban Ring and I-270 Corridor.
- Preserve farmland and rural open space in the Agricultural Wedge.
- Maintain a low-density Residential Wedge to provide a large-lot housing resource and as one way to help protect sensitive environmental areas.
- Provide zoned land for different types and intensities of housing and employment uses.
- Coordinate residential land use patterns with employment and retail development to provide communities and neighborhoods where people can live and work.
- Provide a coordinated and comprehensive system of parks, recreation, and open space.
- Recognize the importance of implementing the goals, objectives, and strategies of the General Plan Refinement when allocating public investments in community facilities.

Administratively, the objectives of the County Master Plan are carried through community master plans. Within the ICE study area, 36 community master plans provide land use and development policies and objectives to distinct portions of the ICE.



*Friendship Heights CBD, 1998*

*Westbard Sector Plan, 2016*

*Greater Lyttonsville Sector Plan, 2017*

*North and West Silver Spring Master Plan, 2000*

*Bethesda Chevy Chase Master Plan, 1990*

*Bethesda CBD Master Plan, 1994*

*Bethesda Downtown Plan, 2017*

*Chevy Chase Lake Master Plan, 2013*

*Woodmont Triangle Amendment, 2006*

*Kensington Wheaton Master Plan, 1990*

*Kensington Sector Plan, 2010*

*Grosvenor Minor Master Plan Amendment, 2017*

*North Bethesda Garrett Park Master Plan, 1992*

*Rock Spring Sector Plan, 2017*

*White Flint Sector Plan, 2010*

*White Flint Sector Plan Phase 2, 2017*

*Twinbrook Master Plan, 2009*

*Potomac Subregion Plan, 2002*

*Aspen Hill Master Plan, 1994*

*Aspen Hill Minor Amendment, 2015*

*Rockville Comprehensive Master Plan, 2002*

*Upper Rock Creek Master Plan, 2004*

*Shady Grove Study Area Master Plan, 1990*

*Shady Grove Sector Plan, 2006*

*Great Seneca Science Corridor Master Plan, 2010*

*Washington Grove Master Plan, 2009*

*Gaithersburg Vicinity Master Plan, 1985*

*Gaithersburg Master Plan, 2016*

*Montgomery Village Master Plan, 2016*

*Germantown Master Plan, 1989*

*Germantown Sector Plan, 2009*

*Boyd's Master Plan, 1985*

*Clarksburg Master Plan, 1994*

*Agriculture and Rural Open Space Master Plan, 1980*

*Clarksburg Ten Mile Creek Limited Amendment, 2014*

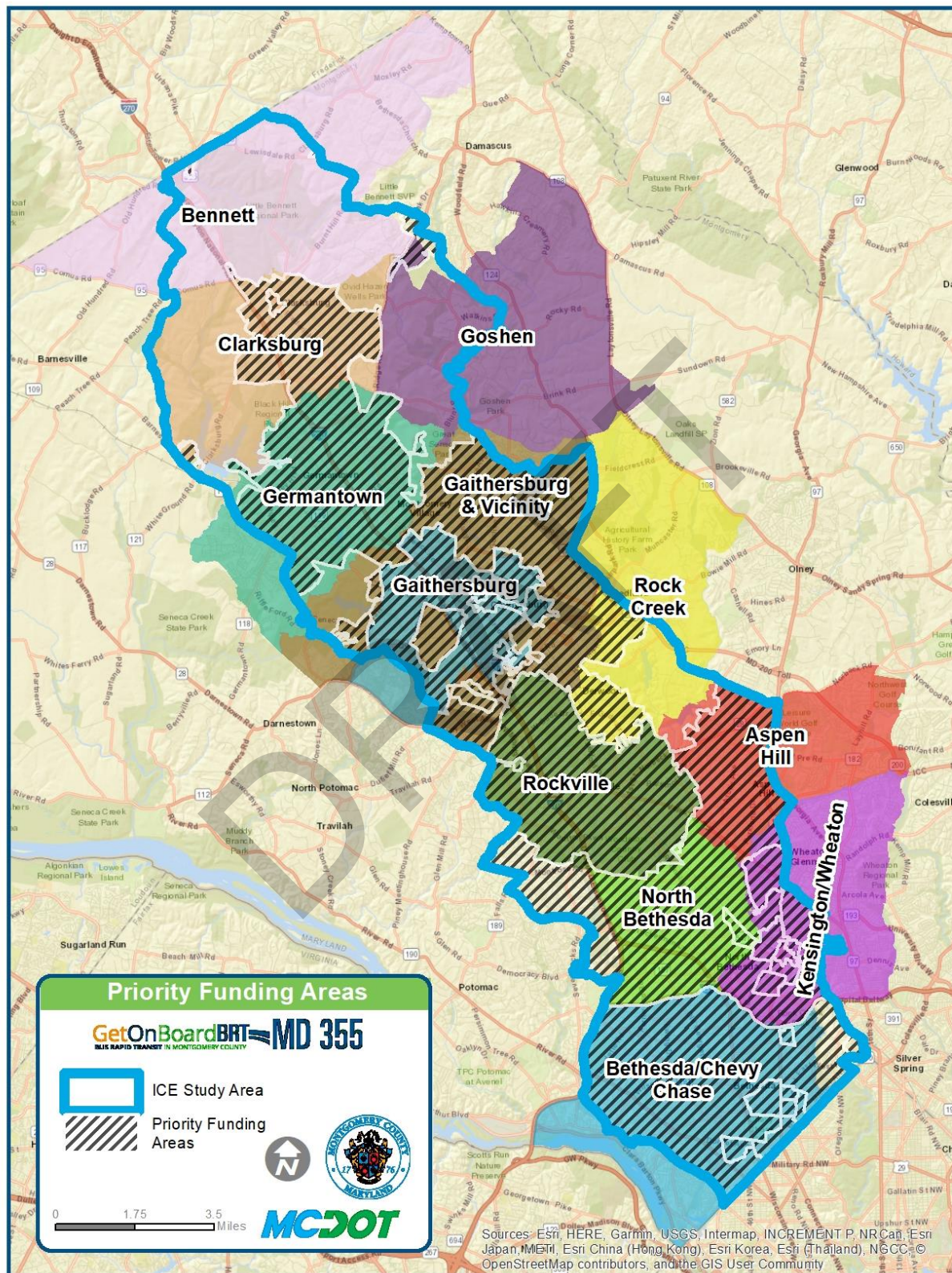
*Damascus Master Plan, 1985*

These community master plans provide for the orderly development and mix of land uses envisioned by the County General Plan. With the exception of the plans for the cities of Rockville and Gaithersburg and the town of Washington Grove, all of these community master plans have been developed by the Montgomery County Planning Department, approved by the Montgomery County Council, and adopted by the Maryland National Capital Park and Planning Commission.

In addition to Montgomery County planning policy and objectives, Maryland's Smart Growth Priority Funding Areas Act of 1997 (known as the "Smart Growth Act") directs state infrastructure funds to areas within or connecting to county-designated and state-certified Priority Funding Areas. Approximately 73% of the ICE Study Area is located within a Priority Funding Area (PFA) (**Figure 4-2**).

From a policy perspective, PFA designations are used to focus state investment in areas where growth and economic development is encouraged through community master plans. State investments in projects (such as highways, transit systems, and water/wastewater utilities) or policies and funds regarding state government facilities or assistance for employer attraction are targeted for PFAs to support planned growth. Proposed state investments in areas outside of PFAs are carefully considered and must acquire additional approvals to ensure that such actions do not induce inappropriate growth or the expansion of "sprawl" development which generally contributes to the loss of valued open space and resource lands statewide.

Figure 4-2: Priority Funding Area





#### 4.4 Present and Reasonably Foreseeable Future Development

The following present and future projects have been identified as potentially contributing to indirect and cumulative resource effects within the ICE Study Area. Project information has been compiled from the Montgomery County Planning Department Development Database; Fiscal Year 2019 Capital Improvement Plans for Montgomery County, the City of Rockville and the City of Gaithersburg; and the MWCOG 2016 Constrained Long Range Transportation Plan.

Present and reasonably foreseeable future actions include continued residential, commercial, and institutional development and redevelopment and infrastructure and transportation improvements to accommodate the forecasted growth. As previously discussed, given the largely urban/suburban land use character of the ICE Study Area, most present and future development would have limited cumulative effects on natural resources as these resources are generally absent or protected through the existing county, state, and federal policy and regulatory framework. Effects on socioeconomic resources would be generally limited to community character considerations related to planned or induced redevelopment and potential associated effects.

The list of local development pipeline projects (**Appendix B, Table B-1**) includes only those defined as “substantive”, involving a minimum of 25 housing units and/or a minimum of 10,000 square feet of developed total gross square footage of other uses.

The list of capital improvements projects (**Appendix B, Table B-2**) does not include projects comprised of renovations, reconstruction, additions or modernization of existing facilities but identifies only those projects involving new construction or increased capacity/expansion (i.e. conversion of undeveloped land to built use) as contributing to future cumulative effects. Capital improvement projects (beyond a conceptual or planning level activity) that have some level of funding commitment for implementation are generally considered to be reasonably foreseeable.

## 5 Analysis of Indirect and Cumulative Impacts

This section discusses the potential contribution of the proposed MD 355 BRT project on indirect and cumulative effects on resources of interest, as discussed in **Section 3.1**, within the ICE Study Area. The analysis considers both the identified impacts (direct effects) and the potential for induced growth from implementation of the MD 355 BRT system (indirect effects). The overall contribution of the project (direct and indirect effects) and other foreseeable actions to additive (cumulative) effects are evaluated to provide an understanding of future conditions related to those resources of interest.

## 5.1 Communities

### 5.1.1 Direct and Indirect Effects of MD 355 BRT

Land impacts of the Build Alternatives result from station development, potential stormwater management needs, and roadway widening to accommodate BRT components including queue jumps and dedicated transitways. The TSM Alternative and Alternative A would therefore have the least impact on land use as these alternatives include minimal physical improvements in comparison with Alternatives B and C which would include dedicated transit lanes. **Table 5-1** includes a summary of land and community impacts. At this phase in the MD 355 BRT Planning Study, property impacts are preliminary. As the study progresses, further avoidance and minimization to reduce property impacts will be investigated.

**Table 5-1: MD 355 BRT Direct Community Impacts**

Measure	TSM Alternative	Alternative A: Mixed Traffic	Alternative B: Median	Alternative C: Curb
Acres of Land Within LOD	0.35	12.39	60.77	38.55
Number of Properties Partially Impacted	22	160	464	369
Number of Potential Displacements	0	0	29	12

As part of the MD 355 Planning Study, an analysis was conducted to determine the market value premium of a new BRT route along MD 355. The analysis suggests that the implementation of a BRT system along the MD 355 corridor would result in an additional 1.2 million square feet of commercial real estate development, or transit-oriented development, over 20 years. It also suggests that an additional 9.8 million square feet of residential development over 20 years would occur along the MD 355 BRT corridor.

### 5.1.2 Cumulative Effects

Much of the ICE Study Area is comprised of mature communities which are largely built-out and would not be expected to realize substantive changes from either the MD 355 BRT project or other foreseeable future actions. Within those communities, change in character would be gradual, as redevelopment would be likely to increase development density and community appearance over a rather lengthy period. Similarly, population and demographic changes would be gradual.

In the northern portions of the ICE Study Area, especially the Clarksburg area, communities are undergoing a more perceptible change with new development replacing former open areas and more rapid population and demographic changes.

## 5.2 Community Facilities, including Parks and Recreation

According to the Montgomery County Parks department, public recreation sites within Montgomery County serve to “protect and interpret our valuable natural and cultural resources; balance demand for recreation with the need for conservation; offer various enjoyable recreational activities that encourage healthy lifestyles; and provide clean, safe and accessible places.”

Within the ICE Study Area, public parks encompass 17,936 acres of land, with another 2,593 acres proposed for future parks (**Table 5-2** and **Figure 5-1**).

In Montgomery County, the Maryland National Capital Parks and Planning Commission manages a variety of public recreation facilities, including conservation, local, neighborhood, neighborhood conservation, recreational, special, stream valley, and urban parks.

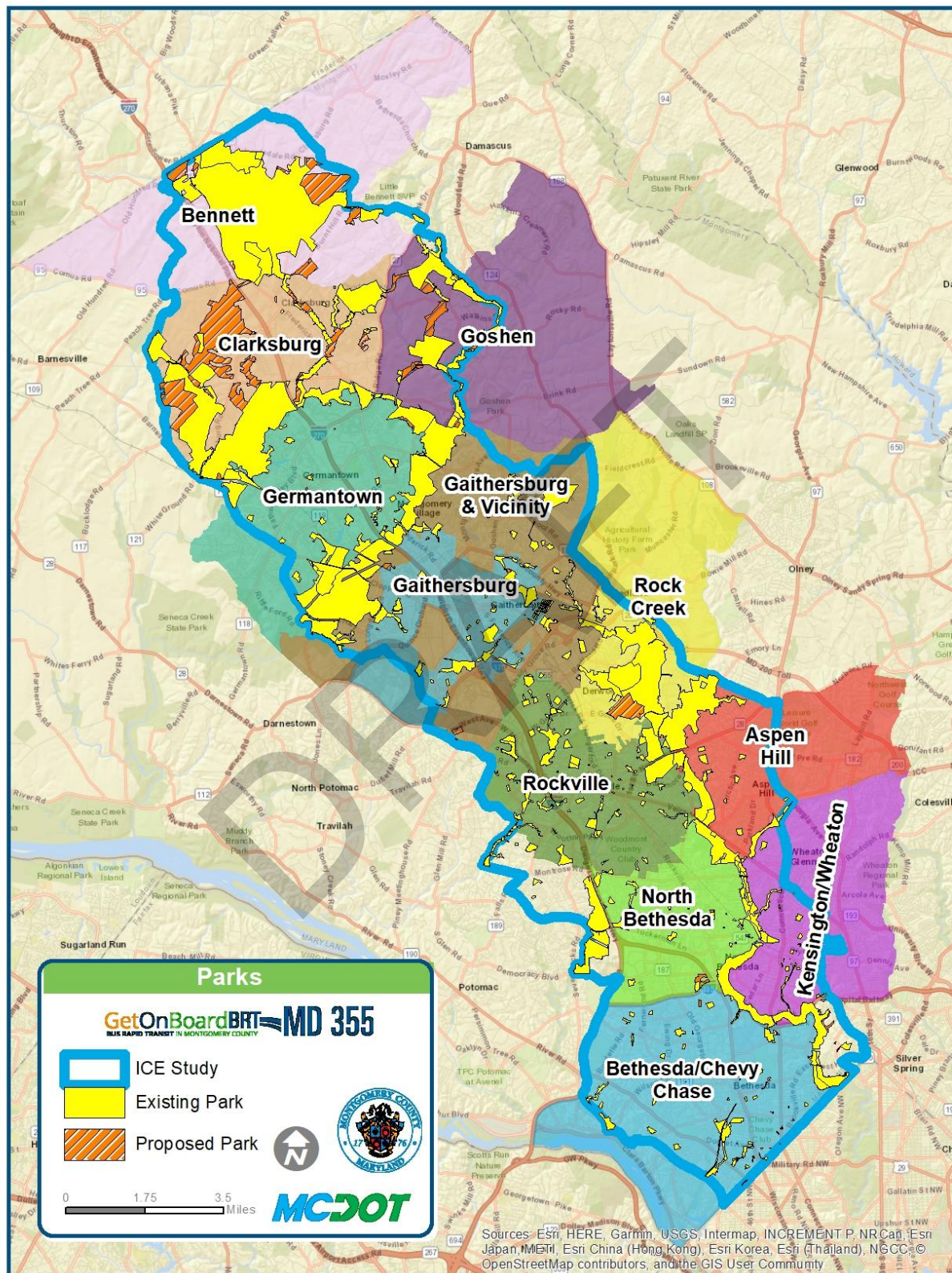
Of the 388 parks within the ICE Study Area, 183 are managed by M-NCPPC and four are managed by the state of Maryland. Municipal governments and neighborhood organizations are responsible for the management of the other 201 parks within the ICE Study Area. M-NCPPC manages the three largest parks in the ICE Study Area; Little Bennett Regional Park, Black Hill Regional Park, and Rock Creek Regional Park. Seneca State Park, managed by the state of Maryland, is also one of the largest parks in the area. M-NCPPC stream valley parks, intended to preserve quality natural areas and environmental resources, are another substantive park type covering approximately 4,167 acres within the ICE Study Area.

**Table 5-2: ICE Parks and Recreational Facilities**

Park Type	Status	Acres
Conservation	Existing	386.25
	Proposed	84.63
Local	Existing	944.36
	Proposed	90.35
Municipal	Existing	1,626.49
	Proposed	19.26
Neighborhood	Existing	201.53
	Proposed	2.60
Neighborhood Conservation	Existing	136.69
	Proposed	19.94
Recreational	Existing	859.66
	Proposed	247.10
Regional	Existing	7,981.21
	Proposed	701.26
Special	Existing	49.58
	Proposed	65.77
State	Existing	1,564.69
Stream Valley	Existing	4,167.72
	Proposed	1,353.26
Urban	Existing	18.43
	Proposed	9.38



Figure 5-1: Parks



### 5.2.1 Direct and Indirect Effects of MD 355 BRT

Direct and indirect effects of the MD 355 BRT project on public parks is limited to potential effects on two parks – Bohrer Park in Gaithersburg and the Great Seneca Creek Stream Valley Park. Alternatives B and C would potentially require sliver takes from both of these resources. **Table 5-3** summarizes direct park impacts.

**Table 5-3: MD 355 BRT Direct Park Impacts**

Measure	TSM Alternative	Alternative A	Alternative B	Alternative C
Acres of Public Park Land Potentially Impacted	0.0	0.08	1.08	0.94

### 5.2.2 Cumulative Effects

Based on the review of present and reasonably foreseeable future projects, no adverse cumulative effects on public parks lands or facilities are anticipated. Montgomery County Capital Improvement Plan (CIP) projects currently envisioned include the development of future parks and/or amenities, thereby adding to public opportunities for recreation. Other private development and public improvements are not anticipated to directly affect park lands, as those projects would be required to comply with state and local ordinances that preserve existing open space. Transportation projects using Federal funds would need to comply with Section 4(f) requirements of the Department of Transportation Act of 1966. This act requires federally funded or approved transportation projects to use all reasonable and prudent measures to avoid the taking of lands from public parks and recreation open space.

Future planned development and growth in the ICE Study Area would generate additional demand on parks and recreation facilities. Through the Montgomery County Park, Recreation, and Open Space (PROS) Plan, the needs and recommendations for the development of park and recreation facilities, protection of natural resource area, and preservation of historic and cultural areas have been developed through 2030. The PROS Plan specifically identifies strategies for park and recreation spaces within mixed-use and high density (both existing and future) areas while continuing to provide needed open space throughout the county. The Plan's Park Equity and Park Proximity analyses measure access to and the variety of recreational space available to underserved populations. Based on the 2017 results presented in the PROS Plan, the ICE Study Area generally exhibits low to moderate concerns related to park equity and proximity, with only one small area in the Gaithersburg vicinity exhibiting greater concern. These analyses will be used to help guide future investments in parks to achievable equitable services.

## 5.3 Historic Resources

Within the ICE Study Area, there are 184 sites identified as having historic significance according to the Montgomery County Master Plan for Historic Preservation (**Table 5-4 and Figure 5-2**). Sites included in the Master Plan for Historic Preservation include those sites, based on Montgomery County Code Chapter 24A Historic Resources Preservation, determined to exhibit one or more of the following qualities:

- Historical and cultural significance – has character, interest, or value as part of the development, heritage or cultural characteristics of the county, state or nation; is the site of a significant historic event; is identified with a person or group of persons who influenced society; or exemplifies the cultural, economic, social, political or historic heritage of the county and its communities.
- Architectural and design significance – embodies the distinctive characteristics of a type, period or method of construction; represents the work of a master; possess high artistic value; represents a significant and distinguishable entity whose components may lack individual distinction; or represents an established and familiar visual feature of the neighborhood, community or county due to its singular physical characteristic or landscape.

**Table 5-4: ICE Historic Standing Structures**

Planning Areas	Historic Properties
Bethesda Chevy Chase	79
North Bethesda	19
Kensington Wheaton	6
Rockville	6
Aspen Hill	3
Rock Creek	4
Gaithersburg	6
Gaithersburg Vicinity	8
Germantown	12
Goshen	6
Clarksburg	11
Bennett	24
TOTAL	184

Of the identified historic resources, 36 are currently listed on the National Register of Historic Places (NRHP) (Table 5-5 and Figure 5-2). Resources considered eligible for listing in the NRHP have national historic importance and are afforded consideration and protection when federal actions may impact those resources.

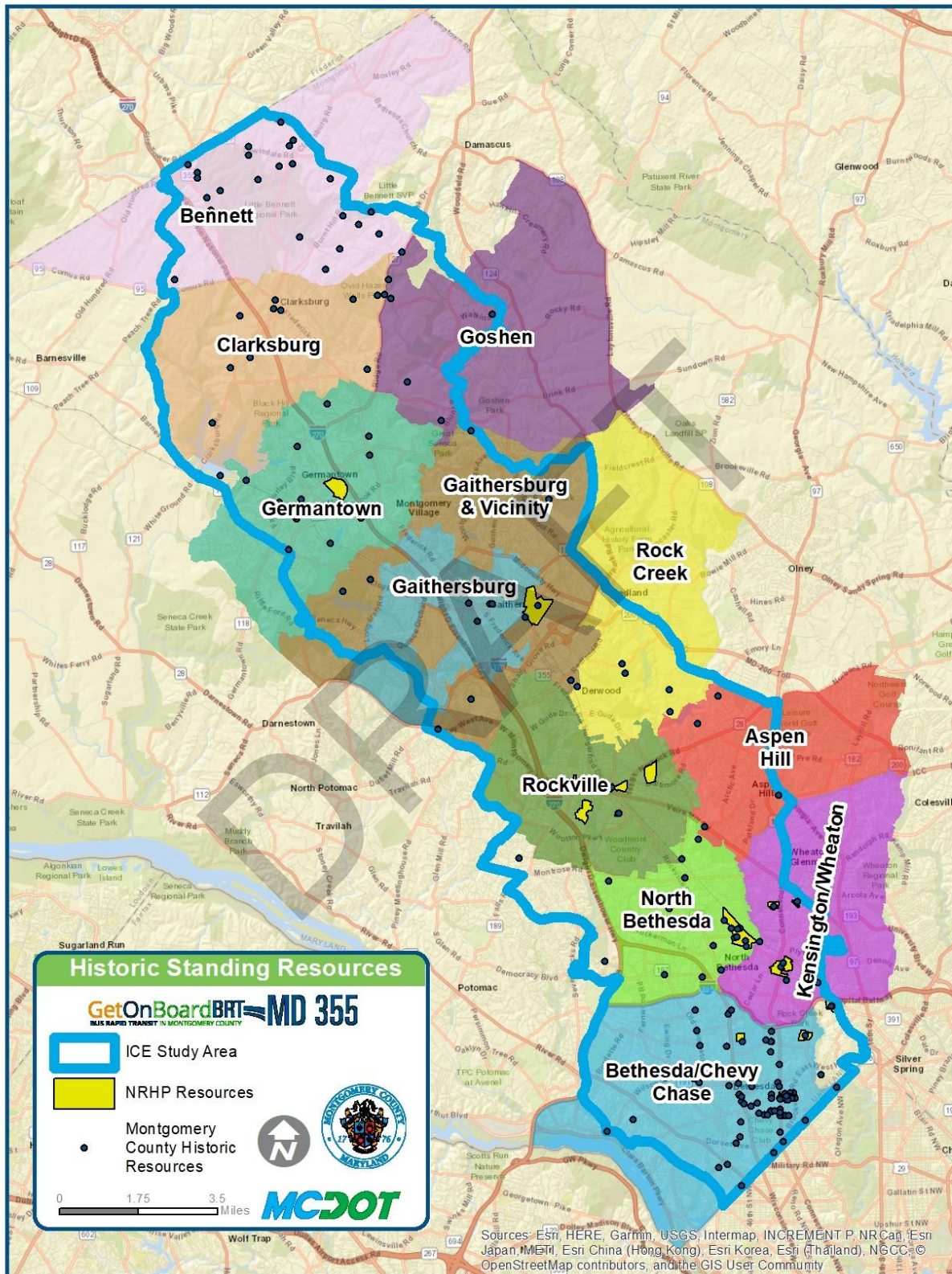
**Table 5-5: ICE National Register of Historic Properties (NRHP) Resources**

Planning Areas	Historic Properties	Category
Bethesda Chevy Chase	Milton	Building
Bethesda Chevy Chase	Bethesda Naval Hospital Tower	Building
Bethesda Chevy Chase	Bethesda Meeting House	Building
Bethesda Chevy Chase	Woodend	Building, Site
Bethesda Chevy Chase	National Park Seminary Historic District	Building



Planning Areas	Historic Properties	Category
Bethesda Chevy Chase	Cabin John Aqueduct	Structure
Bethesda Chevy Chase	Bethesda Theatre	Building
Bethesda Chevy Chase	Wiley-Ringland House	Building
Bethesda Chevy Chase	Salmon-Stohlman House (Clover Crest)	Building
Bethesda Chevy Chase	Moreland	Building
Bethesda Chevy Chase	Washington Aqueduct	District
Bethesda Chevy Chase	Seymour Krieger House	Building
Bethesda Chevy Chase	Mesrobian, Mihran, Residence	Building
North Bethesda	Garrett Park Historic District	District
North Bethesda	Montrose Schoolhouse	Building
North Bethesda	Riley/Bolten House	Building
Kensington Wheaton	Kensington Historic District	District
Kensington Wheaton	Rock Creek Woods Historic District	District
Kensington Wheaton	Hammond Wood Historic District	District
Rockville	Dawson Farm	Building
Rockville	Montgomery County Courthouse Historic District	District
Rockville	West Montgomery Avenue Historic District	District
Rockville	Bingham-Brewer House	Building
Rockville	Rockville Railroad Station	Building
Rockville	Third Addition to Rockville and Old St. Mary's Church & Cemetery	District
Rockville	Glenview Farm	Building
Rockville	Beall-Dawson House	Building
Rockville	Rockville Park Historic District	District
Rockville	New Mark Commons	District
Gaithersburg	Gaithersburg B & O Railroad Station and Freight Shed	Building
Gaithersburg	J.A. Belt Building	Building
Gaithersburg	Gaithersburg Latitude Observatory	Building
Gaithersburg	Thomas & Company Cannery	Building
Gaithersburg Vicinity	Washington Grove Historic District	District
Germantown	U. S. Atomic Energy Commission	Buildings
Clarksburg	The Clarksburg School	Building

Figure 5-2: Historic Standing Resources



### 5.3.1 Direct and Indirect Effects of MD 355 BRT

For the proposed MD 355 BRT project, potential direct and indirect impacts to cultural resources would include partial right-of-way impacts (direct impacts) affecting the historic resource property and/or structure and potential access or visual effects (indirect impacts) for architectural properties.

**Table 5-6: MD 355 BRT Direct Historic Architectural Property Impacts**

Impact	TSM Alternative	Alternative A	Alternative B	Alternative C
Historic Standing Structures within LOD (number of sites)	0	24	24	28
Historic Standing Structures Indirectly Impacted (number of sites)	0	27	26	30

None of the impacts noted in **Table 5-6** would affect resources listed or eligible for the NRHP.

As previously noted, final design activities will include efforts to further avoid and minimize direct and indirect impacts to historic properties along the corridor. Design approaches that may be investigated to reduce impacts may include lane shifts, retaining walls, reduction of buffers, and landscaping or screening approaches. Final consideration of avoidance and minimization measures regarding cultural resources will need to consider other environmental resource impacts and likely require additional coordination with Maryland Historic Trust (MHT).

### 5.3.2 Cumulative Effects

Damage or loss of historic resources within the ICE Study Area, as well as all of Montgomery County, had been far more substantial from past actions, both private and public, prior to the establishment of the National Historic Preservation Act of 1966. This act, combined with the enactment of additional historic resource protection policies and objectives at the county and community level, have reduced the rate of impacts to historic resources and heightened the overall importance of those remaining resources as vital community assets. Substantial future permanent loss of historic resources, while still possible, is not foreseen. From a federal perspective, Section 106 regulations of the National Historic Preservation Act and Section 4(f) regulations of the Department of Transportation Act serve to protect historic properties, minimize adverse effects, and require mitigation for unavoidable impacts. Locally, M-NCPPC, Montgomery County, and municipalities administer a variety of local laws and regulations (including zoning and special consultation/approval procedures) aimed at preserving locally significant historic properties and districts. Cumulative effects of future actions on historic resources is anticipated to be attributable to proximity and context changes resulting from changes in air quality, noise, vibration, and visual setting. As much of the ICE Study Area is already developed, redevelopment opportunities to protect and/or repurpose historic resources (while maintaining specific historical value) may be prevalent throughout the corridor.



#### 5.4 Terrestrial Resources/Habitat

Forest coverage in the ICE Study Area (**Table 5-7** and **Figure 5-3**) ranges from a low of 10.8 percent in the Potomac Direct watershed portion of the study area to 59.2 percent in the Lower Monocacy Creek watershed, reflecting the general land use pattern which transitions from urban to suburban from Bethesda toward Clarksburg.

**Table 5-7: ICE Study Area Forest Lands**

Watershed	Forest Acres within ICE Study Area (acres)	Percent of Watershed within ICE Study Area
Potomac Direct	1,245	10.8%
Rock Creek	4,439	17.7%
Cabin John Creek	1,684	16.3%
Seneca Creek	15,860	45.8%
Lower Monocacy Creek	5,323	59.2%
TOTAL	28,551	32%

Forests in the context of Maryland are typically considered to be at least 1 acre in size and 120 feet in width. Within the ICE study area, the largest contiguous forest tracts are located within the Rock Creek, Seneca Creek, and Little Bennett stream valley parks and adjacent lands. These areas function as primary habitat areas for terrestrial wildlife.

Contiguous tracts of mature forest lands are particularly important for optimal reproduction and survival of Forest Interior Dwelling Species (FIDS), especially birds, amphibians, and bats. FIDS habitat is defined by the Maryland Department of Natural Resources (MDNR) as existing riparian forests at least 300 feet in width or upland forests of at least 100 contiguous acres. According to MDNR, the ICE Study Area contains approximately 23,846 acres (26 percent of the ICE Study Area) of potential FIDS habitat, largely synonymous with the larger county-identified forest areas (**Figure 5-4**).

##### 5.4.1 Direct and Indirect Effects of MD 355 BRT

Due to the linear nature of the transportation network and largely urban/suburban character of the corridor, no forest impacts (**Table 5-8**) are anticipated through implementation of the MD 355 BRT. While individual trees or small stands may be affected, these areas are largely ornamental in nature and do not possess highly valued natural habitat.

**Table 5-8: MD 355 BRT Forest Land Impacts**

Impact	TSM Alternative	Alternative A	Alternative B	Alternative C
Montgomery County Forest impact (acres)	0	0	0	0

Individual and small tree stand impacts that may be required based on final project design would be subject to mitigation under the Maryland Forest Conservation Act, the Montgomery County Forest Conservation Law, and the Maryland Roadside Tree Law.

#### 5.4.2 Cumulative Effects

As noted, forest land within Montgomery County decreased approximately 14 percent between 1973 and 2010. The rate of forest loss was much less than could be expected, as much of the development growth over that period took advantage of agricultural lands (a decrease of 41 percent) without forest cover. With the identification of the importance of natural resource conservation based on the 1964 General Plan and the ultimate designation of protected stream valley parks, much of Montgomery County's forest parcels are largely protected from development pressure. Additionally, forest lands in Maryland are protected through the Forest Conservation Act (FCA) of 1991, which seeks to minimize the conversion and loss of the state's forest resources. Local municipalities, including Montgomery County, implement local forest conservation programs, policies and regulations in accordance with the FCA. In general, proposed land disturbances of 40,000 square feet or greater, regardless of proponent, are subject to the regulations applicable with the FCA and require the development and implementation of a Forest Conservation Plan to minimize and mitigate proposed forest impacts. Montgomery County Code Chapter 22A Forest Conservation, establishes a general reforestation mitigation ratio of 2:1. State-funded highway projects are also subject to the requirements of the Maryland Reforestation Law (which require one-to-one basis mitigation for forest removal) and the Maryland Roadside Tree Law and Montgomery County Roadside Tree Law which requires replacement of individual trees removed along highway right-of-way. Each of these regulations serve to protect and replace generally smaller forest areas outside of stream valley's which serve to support and connect to FIDS habitat and provide cover for a host of urban wildlife species. Most of the 2010-2040 growth areas based on MWCOG projections, with the exception of the Clarksburg area) do not include large forest tracts. Recent and future development in the Clarksburg area, which typically has involved larger tracts of land and suburban-scale development, would require compliance with local forest ordinances and provide opportunity for minimization of forest land loss through innovative design.

Figure 5-3: Forests

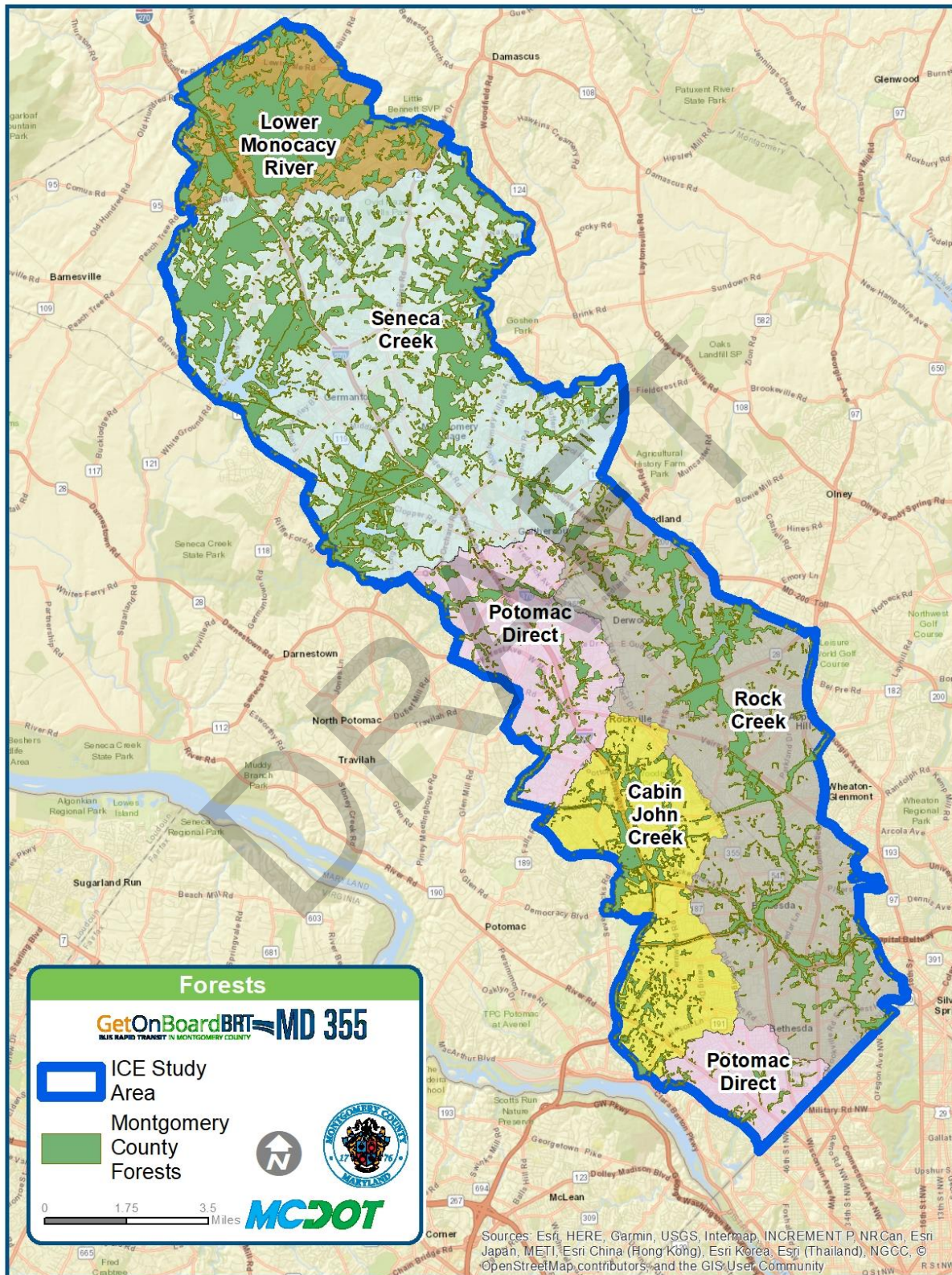
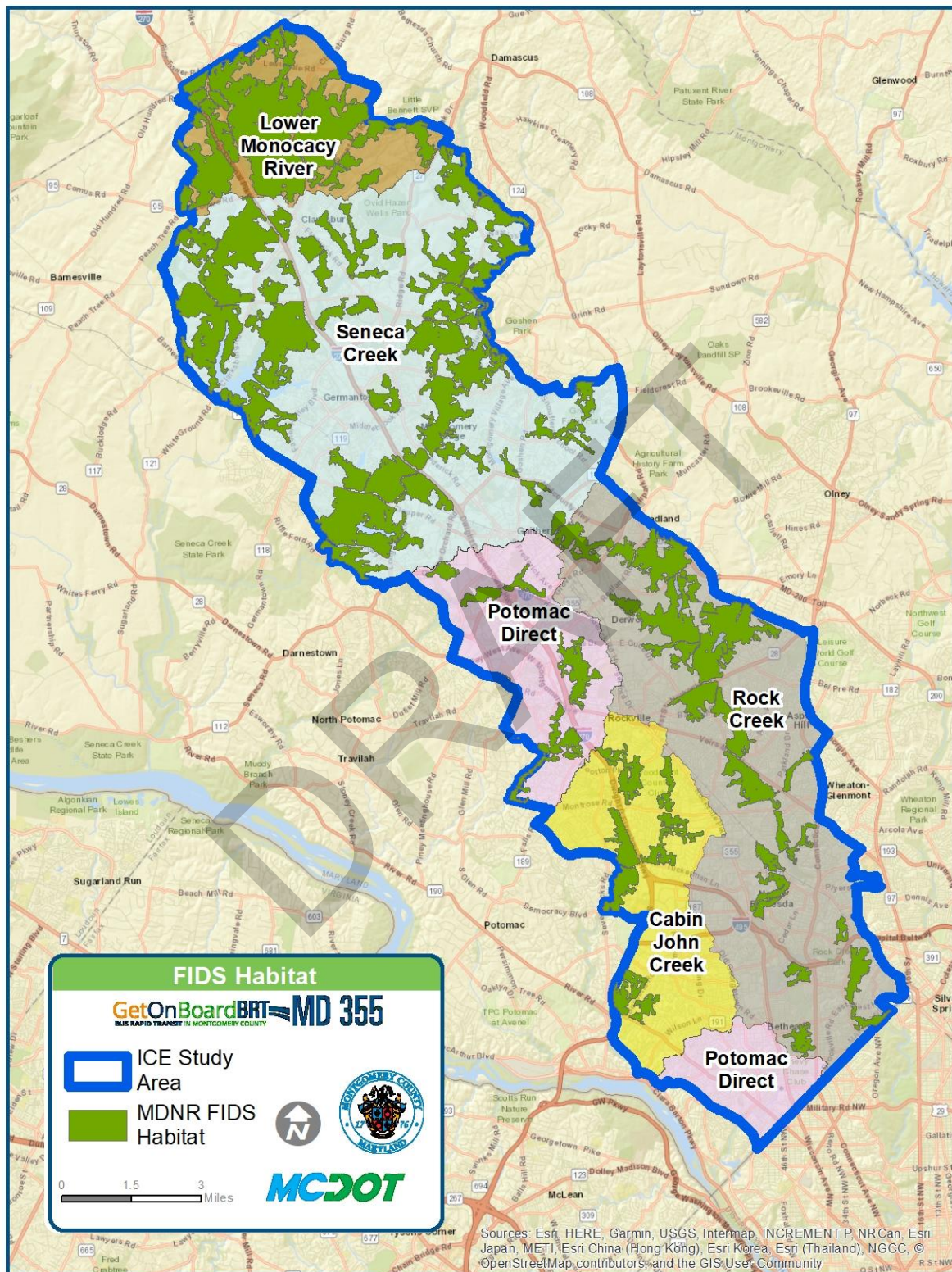




Figure 5-4: FIDS Habitat



## 5.5 Water Quality

Water quality conditions within the five watersheds within the ICE Study Area are generally reflective of the land use conditions (urban vs. suburban). Each of the watersheds have in place one or more Total Maximum Daily Load (TMDL) action plans to address identified water quality deficiencies based on federal and state water quality standards. The impairment types of the individual TMDL plans are generally reflective of the intensity and context of urban development within a particular watershed (**Table 5-9**).

**Table 5-9: ICE Study Area TMDL Action Plans**

Watershed	TMDL Pollutant	Major Sources
Potomac Direct	Sediment	Flow/sediment stressors (runoff) from urban areas
Rock Creek	Fecal bacteria	Livestock and wildlife, loadings
	Nutrients (Phosphorus)	Flow/sediment stressors (runoff) from urban areas
	Sediment	Flow/sediment stressors (runoff) from urban areas
Cabin John Creek	Fecal bacteria	Human (combined sewer overflows) and domestic/livestock loadings
	Sediment	Flow/sediment stressors (runoff) from urban areas
Seneca Creek	Sediment	Flow/sediment stressors (runoff) from urban areas
Lower Monocacy Creek	Fecal bacteria	Multiple
	Nutrients (Phosphorus)	Agricultural crops and urban land use

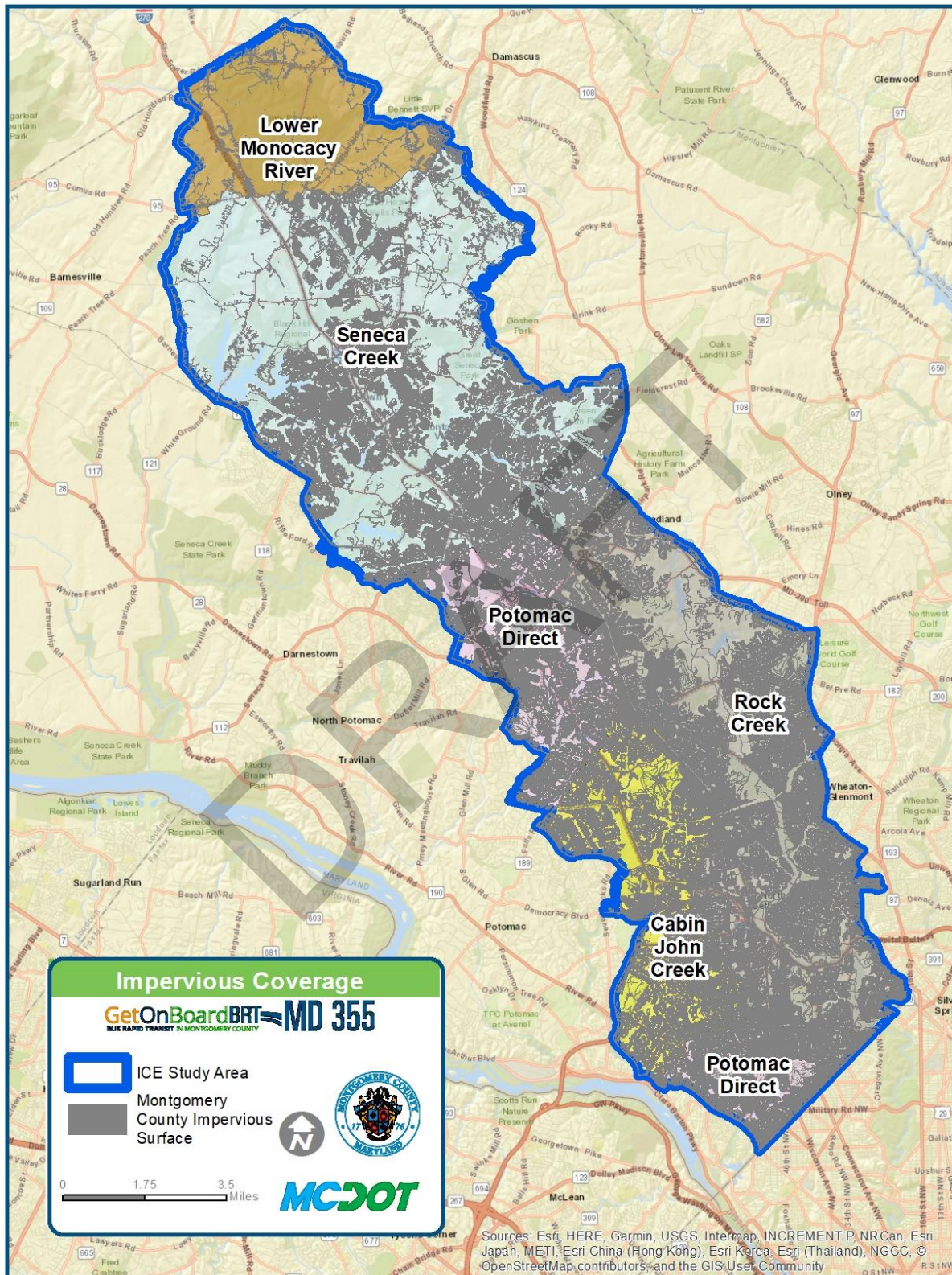
A majority of the water quality concerns in the ICE Study Area are related to urban runoff from impervious surfaces (**Table 5-10** and **Figure 5-5**).

**Table 5-10: ICE Study Area of Impervious Surface**

Watershed	Impervious Surface within ICE Study Area (acres)	Percent of Impervious Surface within Watershed
Potomac Direct	4,054	35.2%
Rock Creek	7,405	30.1%
Cabin John Creek	3,131	30.4%
Seneca Creek	7,002	20.2%
Lower Monocacy Creek	377	4.2%
TOTAL	21,969	24.4%



Figure 5-5: Impervious Coverage



### 5.5.1 Direct and Indirect Effects of MD 355 BRT

The MD 355 BRT project would add to impervious coverage in the ICE study area, mainly under Alternative B and Alternative C related to roadway widening (**Table 5-11**). The majority of impervious coverage increase would occur in the Seneca Creek and Lower Monocacy Creek watersheds. These watersheds are the least developed within the ICE Study Area and would present only a minor increase in overall impervious coverage. Use of innovative stormwater management techniques and infrastructure would provide for both quantity and quality treatment of runoff and limit water quality effects of the BRT project.

**Table 5-11: MD 355 BRT Impervious Coverage Impacts**

Impact	TSM Alternative	Alternative A	Alternative B	Alternative C
Additional Impervious Surface Area (acres)	0.5	49.5	450.6	200.4

### 5.5.2 Cumulative Effects

Cumulative effects on water quality may be realized in the future from increased impervious coverage that would increase non-point stormwater runoff. Stormwater management measures, such as detention basins, vegetative controls, and other measures, would be implemented in accordance with federal, state, and local regulations to minimize on-site and downstream water quality impacts of the Build Alternatives and other future actions. These measures will reduce or detain discharge volumes and remove sediments and other pollutants, thus avoiding substantial further degradation of impaired water bodies. Increasingly stringent future stormwater management regulations are anticipated to address TMDL and Chesapeake Bay action plans, including enhanced stormwater quality treatment. Furthermore, local master plan objectives strive to focus future growth through redevelopment of existing urban infrastructure and away from sensitive areas and open space.

## 5.6 Waters and Wetlands

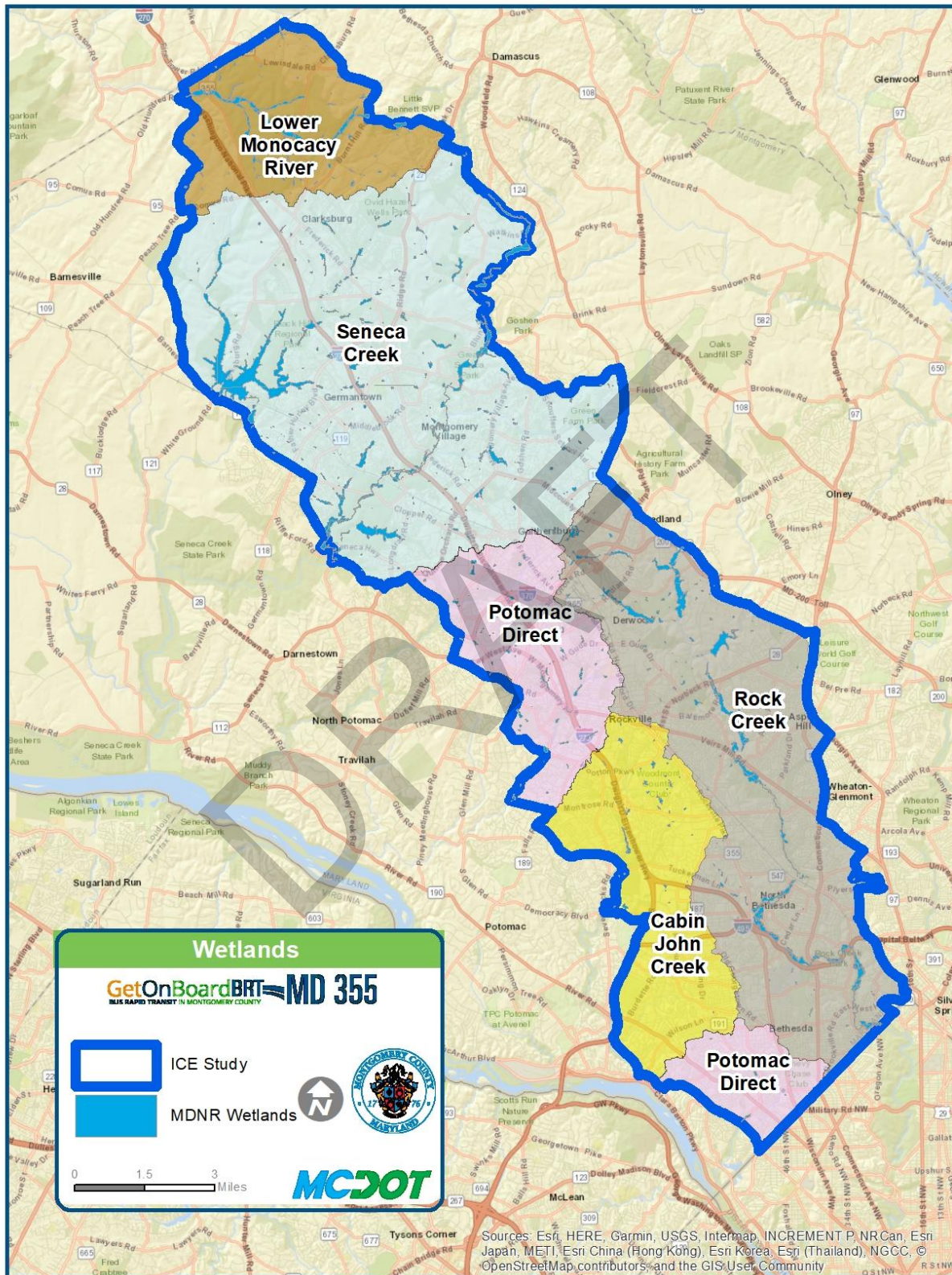
Based on Maryland Department of Natural Resources wetland data, approximately 1,776 acres of various wetlands are found within the ICE Study Area (see **Table 5-12** and **Figure 5-6**). The majority of wetlands are located in the northern reaches of the study area, mainly associated with the hydrologic network of the major stream valleys.

**Table 5-12: ICE Study Area Wetlands**

Watershed	Palustrine	Lacustrine	Riverine
Potomac Direct	104.7	0.0	0.0
Rock Creek	552.9	137.8	62.1
Cabin John Creek	47.6	0.2	0.0
Seneca Creek	751.9	611.3	40.2
Lower Monocacy Creek	318.4	0.0	6.0
<b>TOTAL</b>	<b>1,775.5</b>	<b>749.3</b>	<b>108.3</b>



Figure 5-6: Maryland DNR Wetlands



### 5.6.1 Direct and Indirect Effects of MD 355 BRT

Much of the proposed project would use or expand existing infrastructure and much of the corridor is already developed. Therefore, wetland resources along the corridor are generally present only within protected stream valley areas. The only wetland that is anticipated to be impacted by the MD 355 BRT is a small palustrine wetland in Gaithersburg (**Table 5-13**).

**Table 5-13: MD 355 BRT Wetland Impacts**

Impact	TSM Alternative	Alternative A	Alternative B	Alternative C
MDNR Wetlands within the LOD (acres)	0	0	0.15	0.08

Because of the small size of the impacted wetland, it appears there may be adequate space to avoid impact to this resource in later stages of design through alignment shifts or treatments such as retaining walls. If impact is unavoidable, federal and state permits would need to be obtained and compensatory mitigation may be necessary.

### 5.6.2 Cumulative Effects

Cumulative effects to wetlands may occur through planned or other future development within the ICE Study Area. Wetlands impacts proposed as a result of future public or private actions would require review by the U.S. Army Corps of Engineers and the Maryland Department of the Environment. These agencies carry out the regulatory program of the federal Clean Water Act (Section 404) and companion state regulations associated with the Maryland Non-Tidal Wetlands Protection Act. Permits requiring avoidance, minimization, and/or mitigation would avoid or offset most wetland conversion caused by cumulative development actions. In addition, expected future land use would be directed away from wetlands areas which are not already protected through protected public conservation lands. While conversion of wetlands may continue, the wetland context within the ICE Study Area is not anticipated to undergo a significant future change.

## 5.7 Floodplains

The major floodplains of the ICE Study Area are associated with Seneca Creek and Rock Creek, based on existing Federal Emergency Management Agency (FEMA) mapping (**Table 5-14** and **Figure 5-7**). These locations are largely within protected stream valley conservation areas and have retained flood attenuation values. Other floodplains in other areas of the study area have been impacted by urban development and increasing impervious surface, diminishing their floodplain functions and contributing to localized flooding issues.



Figure 5-7: Floodplains

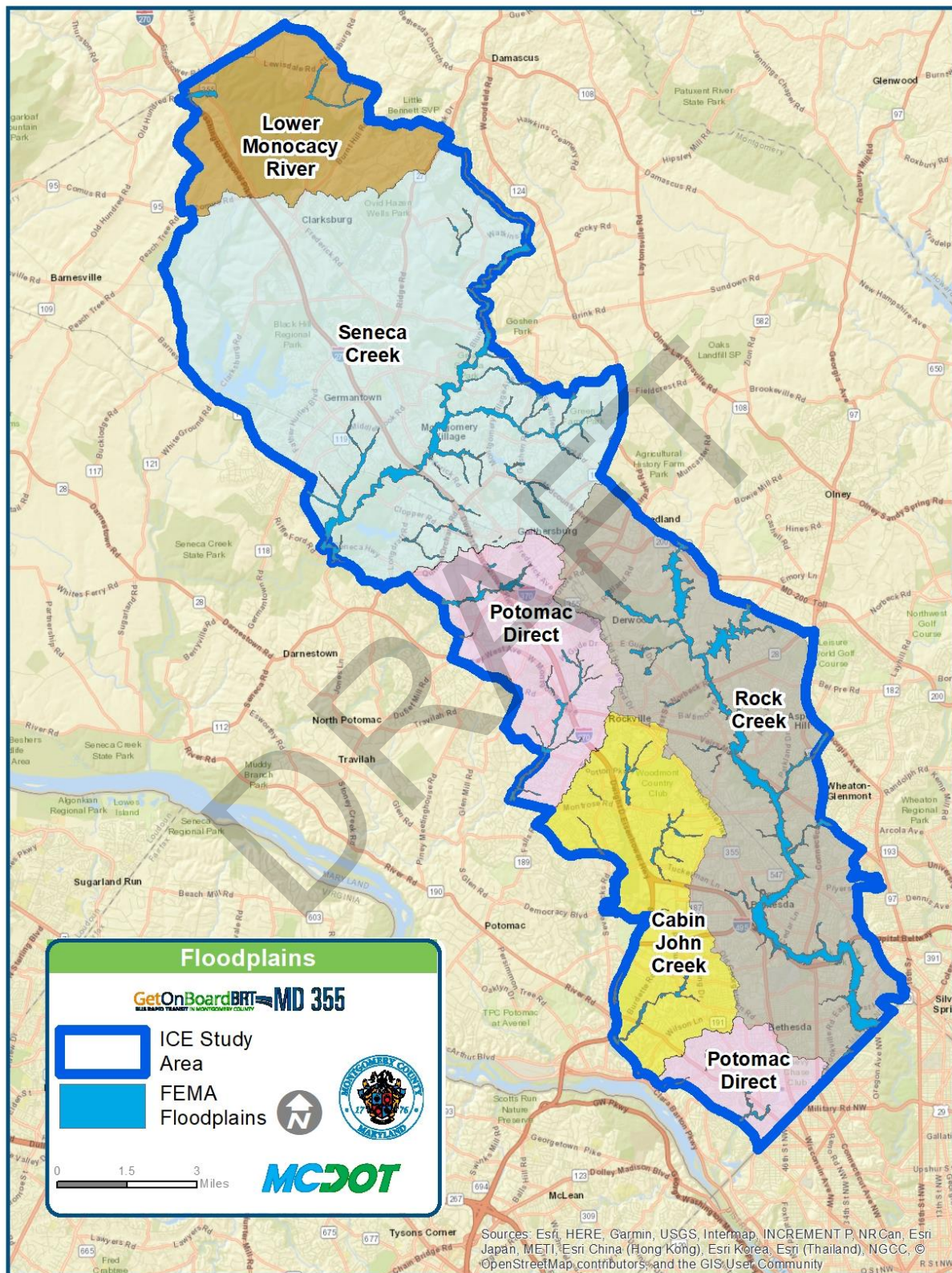


Table 5-14: ICE Study Area Floodplains

Watershed	Floodway (acres)	100-Year Floodplain (acres)	500-year Floodplain (acres)
Potomac Direct	138.9	134.6	85.8
Rock Creek	15.1	1,765.4	286.1
Cabin John Creek	6.6	174.1	74.3
Seneca Creek	102.6	1,185.9	78.2
Lower Monocacy Creek	0.0	37.4	72.8
TOTAL	263.2	3,297.4	597.2

### 5.7.1 Direct and Indirect Effects of MD 355 BRT

Potential floodplain impacts of the Build Alternatives are generally limited to the crossing of Great Seneca Creek in Segment 6 under Alternative B and Alternative C (Table 5-15) associated with roadway widening. Floodplain impacts to the Seneca Creek watershed from the MD 355 BRT would affect less than 0.1 percent of the existing 100-year floodplain. This impact would not have an adverse effect on natural floodplain values and the roadway design would be required to provide adequate hydraulic capacity to accommodate the 100-year storm flow

Table 5-15: MD 355 BRT Floodplain Impacts

Impact	TSM Alternative	Alternative A	Alternative B	Alternative C
100-Year Floodplains within the LOD (acres)	0	0	0.73	0.57

### 5.7.2 Cumulative Effects

Executive Order 11988 requires federal agencies to consider floodplain management and impacts in planning actions and to take all practicable efforts to avoid or minimize impacts to 100-year floodplains and restore and preserve their natural and beneficial values. The Maryland Department of the Environment regulates development in floodplains through the State Waterway Construction Permit regulatory program. Local development and zoning ordinances also restrict development within floodplain areas. Existing and future development are anticipated to be subject to increasingly stringent stormwater management regulations and implementation of best management practices to address both water quality and localized flooding concerns within the county and statewide. Therefore, anticipated present and future projects may result in minor floodplain encroachment, but regulatory requirements and mandated use of innovative best management practices (use of pervious pavement, Environmental Site Design stormwater management measures, stream restoration, etc.) are not anticipated to reduce overall flood attenuation values within the study area.



## **Appendix A**

### **Impacts of the Build Alternatives**

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Alternatives Comparison – Environmental Impacts

Comparison Factors	No-Build Alternative	TSM Alternative	Alternative A	Alternative B	Alternative C
<b>Cultural Resources</b>					
Historic Sites (number)	0	0	24	24	28
Indirect Impacts to Historic Sites (number)	0	0	27	26	30
Area of Potentially Intact Soil (archaeology) (acres)	0	0	17.3	37.5	24.7
Public Park Property Required (acres)	0	0	0.08	1.08	0.94
<b>Natural Resources</b>					
Prime or Statewide Important Farmland Soil Impacts	0	0	311.8	277.5	281.1
Stream Impact (linear feet)	0	0	0	0	0
100-Year Floodplain (acres)	0	0	0	0.73	0.57
Wetlands (acres)	0	0	0	0.15	0.08
Forests (acres)	0	0	0	0	0
Properties with hazardous materials present (number)	0	174	173	170	174
RTE Species (number)	0	0	1	1	0
Air Quality Impacts	0 lbs CO <sub>2</sub> reduction	271,962 lbs CO <sub>2</sub> reduction	733,646 lbs CO <sub>2</sub> reduction	731,605 lbs CO <sub>2</sub> reduction	729,173 lbs CO <sub>2</sub> reduction



## **Appendix B**

### **Present and Reasonably Foreseeable Future Actions**

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Table B-1: Montgomery County Development Pipeline

Planning Area	Watershed	Name	Development Type	Approved Residential Units	Single Family Units	Multifamily Units	Office Gross Floor Area	Commercial Gross Floor Area	Industrial Gross Floor Area	Other Gross Floor Area
Bethesda Chevy Chase	Potomac Direct	Holladay at Edgemoor	Residential	120	0	120	0	0	0	0
Bethesda Chevy Chase	Potomac Direct	Koseian Property	Non-Residential	0	0	0	12,090	0	0	0
Bethesda Chevy Chase	Potomac Direct	7359 Wisconsin Avenue	Non-Residential	0	0	0	357,968	0	0	135,000
Bethesda Chevy Chase	Potomac Direct	Millers Addition to Bethesda	Non-Residential	0	0	0	132,790	22,481	0	0
Bethesda Chevy Chase	Potomac Direct	Artery Plaza	Non-Residential	0	0	0	196,883	1,916	0	0
Bethesda Chevy Chase	Rock Creek	Air Rights Center 7300 Pearl	Non-Residential	0	0	0	150,000	0	0	0
Bethesda Chevy Chase	Potomac Direct	7340 Wisconsin Avenue	Mixed	225	0	225	0	3,904	0	0
Bethesda Chevy Chase	Potomac Direct	7272 Wisconsin Ave	Mixed	480	0	480	211,253	0	0	0
Bethesda Chevy Chase	Potomac Direct	Edgemont at Bethesda II	Residential	282	0	160	0	0	0	0
Bethesda Chevy Chase	Rock Creek	Friendship Commons	Mixed	500	200	300	295,743	0	0	0
Bethesda Chevy Chase	Potomac Direct	Washington Episcopal Day School	Mixed	121	0	120	0	0	0	0
Bethesda Chevy Chase	Rock Creek	FASEB	Non-Residential	0	0	0	40,000	0	0	0
Bethesda Chevy Chase	Cabin John Creek	Suburban Hospital	Mixed	13	0	0	0	0	0	235,597
Bethesda Chevy Chase	Rock Creek	Pooks Hill	Mixed	631	0	631	0	0	0	0
Bethesda Chevy Chase	Rock Creek	Chevy Chase Lake	Residential	262	100	133	0	0	0	0
Bethesda Chevy Chase	Rock Creek	Chevy Chase Lake East	Mixed	534	0	534	0	40,695	0	0
Bethesda Chevy Chase	Potomac Direct	Westbard Self Storage	Non-Residential	0	0	0	0	0	0	94,232



Planning Area	Watershed	Name	Development Type	Approved Residential Units	Single Family Units	Multifamily Units	Office Gross Floor Area	Commercial Gross Floor Area	Industrial Gross Floor Area	Other Gross Floor Area
Bethesda Chevy Chase	Rock Creek	Marriott International Headquarters	Non-Residential	0	0	0	1,045,660	0	0	0
Bethesda Chevy Chase	Rock Creek	7900 Wisconsin Avenue	Mixed	475	0	475	0	0	0	0
Bethesda Chevy Chase	Rock Creek	8008 Wisconsin Avenue	Mixed	106	0	106	0	0	0	0
Bethesda Chevy Chase	Rock Creek	The Claiborne	Mixed	58	0	58	0	2,800	0	0
Bethesda Chevy Chase	Rock Creek	8015 Old Georgetown Road	Mixed	107	0	105	0	0	0	26,000
Bethesda Chevy Chase	Rock Creek	Brightview Bethesda	Mixed	120	0	120	0	0	0	0
Bethesda Chevy Chase	Rock Creek	St. Elmo Apartments	Mixed	210	0	210	0	0	0	0
Bethesda Chevy Chase	Rock Creek	Rugby Condominium	Residential	61	0	60	0	0	0	0
Bethesda Chevy Chase	Rock Creek	4823 Rugby Avenue	Non-Residential	0	0	0	17,238	0	0	0
Bethesda Chevy Chase	Rock Creek	Woodmont Central	Mixed	455	0	221	81,107	25,634	0	0
North Bethesda	Rock Creek	Wildwood Manor Shopping Center	Non-Residential	0	0	0	30,000	0	0	0
North Bethesda	Cabin John Creek	Rock Spring Center	Mixed	1,250	0	844	549,900	500,000	0	29,999
North Bethesda	Rock Creek	Saul Centers White Flint West	Mixed	655	0	655	136,950	0	0	0
North Bethesda	Cabin John Creek	Marriott Headquarters	Non-Residential	0	0	0	440,860	0	0	0
North Bethesda	Cabin John Creek	Mid Pike Plaza	Mixed	1,603	0	734	682,691	143,835	0	0
North Bethesda	Rock Creek	North Bethesda Market II	Mixed	470	0	470	0	103,753	0	0
North Bethesda	Cabin John Creek	Rock Spring Park	Mixed	168	60	0	377,063	0	0	0
North Bethesda	Cabin John Creek	Washington Science Center	Non-Residential	0	0	0	157,052	0	0	0
North Bethesda	Rock Creek	Grosvenor	Mixed	155	67	0	0	0	0	0

Planning Area	Watershed	Name	Development Type	Approved Residential Units	Single Family Units	Multifamily Units	Office Gross Floor Area	Commercial Gross Floor Area	Industrial Gross Floor Area	Other Gross Floor Area
North Bethesda	Rock Creek	Wildwood Manor Shopping Center	Non-Residential	0	0	0	0	3,692	0	0
North Bethesda	Rock Creek	Randolph Farms	Residential	104	104	0	0	0	0	0
North Bethesda	Rock Creek	Brightview Bethesda	Non-Residential	0	0	0	0	0	0	85,000
North Bethesda	Cabin John Creek	Rock Spring Park	Non-Residential	0	0	0	119,263	0	0	0
North Bethesda	Cabin John Creek	WMAL Bethesda	Residential	309	309	0	0	0	0	0
North Bethesda	Rock Creek	5500 Edson Lane	Non-Residential	0	0	0	12,694	0	0	0
North Bethesda	Rock Creek	Grosvenor Place	Residential	46	46	0	0	0	0	0
North Bethesda	Cabin John Creek	Washington Science Center	Non-Residential	0	0	0	12,857	0	0	0
North Bethesda	Rock Creek	Higgins Estate	Non-Residential	0	0	0	12,379	0	0	0
North Bethesda	Cabin John Creek	Gables White Flint	Mixed	476	0	475	0	20,890	0	0
North Bethesda	Cabin John Creek	Fortune Parc	Mixed	600	0	0	293,000	195,403	0	0
North Bethesda	Cabin John Creek	Cabin John Shopping Center	Non-Residential	0	0	0	0	9,999	0	0
North Bethesda	Cabin John Creek	Fishers Place	Non-Residential	0	0	0	255,380	1,200	0	0
North Bethesda	Cabin John Creek	East Village at North Bethesda Gateway	Mixed	614	0	614	0	0	0	0
North Bethesda	Cabin John Creek	North Bethesda Town Center	Mixed	1,350	0	697	809,338	152,791	0	0
North Bethesda	Cabin John Creek	White Flint View	Mixed	183	0	182	0	10,964	0	0
Kensington/Wheaton	Rock Creek	Kensington Nursing LLC	Mixed	2	1	0	0	0	0	0
Rockville	Potomac Direct	Montgomery College Student Services Center	Non-Residential	0	0	0	0	128,000	0	0
Rockville	Rock Creek	Duball (2K)	Mixed	222	0	222	0	22,100	0	0
Rockville	Rock Creek	Avalon Bay at Twinbrook Station	Residential	238	0	238	0	0	0	0
Rockville	Potomac Direct	CubeSmart Self Storage	Non-Residential	0	0	0	0	0	122,854	0



Planning Area	Watershed	Name	Development Type	Approved Residential Units	Single Family Units	Multifamily Units	Office Gross Floor Area	Commercial Gross Floor Area	Industrial Gross Floor Area	Other Gross Floor Area
Rockville	Rock Creek	Avery Road Treatment Center	Non-Residential	0	0	0	0	0	0	5,432
Rockville	Cabin John Creek	Rockville BMW	Non-Residential	0	0	0	0	0	35,881	0
Rockville	Rock Creek	1750 Rockville Pike	Non-Residential	0	0	0	0	11,650	0	0
Rockville	Potomac Direct	Upper Rock Phase III	Non-Residential	0	0	0	0	34,700	0	0
Rockville	Rock Creek	Kettler	Mixed	275	0	275	0	6,114	0	0
Rockville	Cabin John Creek	New Elementary School	Non-Residential	0	0	0	0	0	0	95,360
Rockville	Rock Creek	Silverwood Residential	Residential	405	0	405	0	0	0	0
Rockville	Potomac Direct	Research Row	Non-Residential	0	0	0	10,165	91,930	0	0
Rockville	Potomac Direct	King Farm - Ingleside (Phase 2)	Non-Residential	0	0	0	0	0	0	376,135
Rockville	Potomac Direct	King Farm Townhouses	Residential	129	129	0	0	0	0	0
Rockville	Potomac Direct	Redland Tech Center	Non-Residential	0	0	0	300,000	2,500	0	0
Rockville	Cabin John Creek	EYA at Tower Oaks	Residential	375	247	128	0	0	0	0
Rockville	Rock Creek	EZ Storage	Non-Residential	0	0	0	0	0	109,764	0
Rockville	Rock Creek	Syms Site	Mixed	380	61	319	5,125	0	0	0
Rockville	Cabin John Creek	50 Monroe Place	Mixed	70	0	70	0	9,372	0	0
Rockville	Cabin John Creek	Tower Oaks West of Lake	Mixed	100	0	100	0	230,560	0	0
Rock Creek	Rock Creek	Lincoln Park	Non-Residential	0	0	0	0	0	42,160	0
Gaithersburg	Seneca Creek	Fishman Site	Mixed	109	0	109	0	11,998	0	0
Gaithersburg	Seneca Creek	Fitzgerald Auto Mall Expansion	Non-Residential	0	0	0	0	0	3,007	0
Gaithersburg	Potomac Direct	Washingtonian South	Non-Residential	0	0	0	203,136	0	0	0
Gaithersburg	Seneca Creek	Watkins Mill Town Center (Casey West)	Residential	455	17	0	0	0	0	0

Planning Area	Watershed	Name	Development Type	Approved Residential Units	Single Family Units	Multifamily Units	Office Gross Floor Area	Commercial Gross Floor Area	Industrial Gross Floor Area	Other Gross Floor Area
Gaithersburg	Potomac Direct	MedImmune - The Meadows	Non-Residential	0	0	0	280,187	0	0	0
Gaithersburg	Potomac Direct	Neighborhood 1	Mixed	1,030	4	379	3,795	33,522	0	0
Gaithersburg	Seneca Creek	Archstone Gaithersburg Station	Non-Residential	0	0	0	0	17,030	0	0
Gaithersburg	Potomac Direct	Hillside Senior Living (Hyatt House)	Residential	140	0	140	0	0	0	0
Gaithersburg	Seneca Creek	Mini of Montgomery Addition	Non-Residential	0	0	0	0	0	3,710	0
Gaithersburg	Seneca Creek	Monument Tech Park (Phase 2)	Non-Residential	0	0	0	200,000	0	0	0
Gaithersburg	Potomac Direct	Neighborhood 4	Mixed	445	0	445	0	15,000	0	0
Gaithersburg	Potomac Direct	Neighborhood 3	Residential	429	285	144	0	0	0	0
Gaithersburg	Potomac Direct	Washingtonian North	Mixed	365	0	365	240,000	0	0	0
Gaithersburg	Seneca Creek	Rosenthal Mazda Showroom Addition	Non-Residential	0	0	0	0	0	815	0
Gaithersburg	Seneca Creek	Monument Tech Park (Phase 3)	Non-Residential	0	0	0	260,000	0	0	0
Gaithersburg	Potomac Direct	Neighborhood 2	Residential	346	73	0	0	0	0	0
Gaithersburg	Potomac Direct	MedImmune - The Ridges	Non-Residential	0	0	0	908,000	0	0	0
Gaithersburg	Seneca Creek	Spectrum at Watkins Mill (Casey East)	Mixed	669	0	204	72,100	83,510	58,293	0
Gaithersburg	Potomac Direct	MedImmune - The Summit	Non-Residential	0	0	0	298,000	0	0	0
Gaithersburg	Potomac Direct	North Westland Building	Non-Residential	0	0	0	12,700	0	0	0
Gaithersburg Vicinity	Seneca Creek	Bloom MV	Residential	494	494	0	0	0	0	0
Gaithersburg Vicinity	Seneca Creek	Montgomery Village Marketplace	Non-Residential	0	0	0	0	8,800	0	0

Planning Area	Watershed	Name	Development Type	Approved Residential Units	Single Family Units	Multifamily Units	Office Gross Floor Area	Commercial Gross Floor Area	Industrial Gross Floor Area	Other Gross Floor Area
Gaithersburg Vicinity	Potomac Direct	Washingtonian Industrial Park	Non-Residential	0	0	0	0	0	12,000	0
Gaithersburg Vicinity	Potomac Direct	Walnut Hill Shopping Center	Non-Residential	0	0	0	0	9,999	0	0
Gaithersburg Vicinity	Potomac Direct	Shady Grove Life Sciences	Non-Residential	0	0	0	201,701	0	0	0
Gaithersburg Vicinity	Potomac Direct	Mallory Square	Mixed	690	0	324	0	0	0	0
Gaithersburg Vicinity	Potomac Direct	Johns Hopkins Research Campus	Non-Residential	0	0	0	1,410,000	0	0	0
Gaithersburg Vicinity	Potomac Direct	9800 Medical Center Drive	Non-Residential	0	0	0	263,200	0	0	0
Gaithersburg Vicinity	Potomac Direct	DANAC Stiles	Mixed	475	0	0	146,327	0	0	0
Gaithersburg Vicinity	Potomac Direct	Montgomery County Medical Center	Non-Residential	0	0	0	320,771	0	0	0
Gaithersburg Vicinity	Potomac Direct	Decoverly Hall South	Non-Residential	0	0	0	19,341	0	0	0
Gaithersburg Vicinity	Rock Creek	Shady Grove Metro	Residential	156	15	111	0	0	0	0
Gaithersburg Vicinity	Rock Creek	Shady Grove Station	Mixed	2,210	651	1,126	0	0	0	0
Germantown	Seneca Creek	Seneca Meadows Corporate Ctr	Non-Residential	0	0	0	143,356	57,054	0	0
Germantown	Seneca Creek	Milestone Industrial	Mixed	485	0	484	0	28,250	0	0
Germantown	Seneca Creek	Symmetry at Cloverleaf	Mixed	1,100	150	950	625,000	125,000	0	0
Germantown	Seneca Creek	Mateny Hill Road Property	Residential	46	30	0	0	0	0	0
Germantown	Seneca Creek	Topgolf - Germantown	Non-Residential	0	0	0	0	64,232	0	0
Germantown	Seneca Creek	Century Technology Campus	Mixed	488	160	328	94,920	0	0	0
Germantown	Seneca Creek	Qiagen-Germantown Business Park	Non-Residential	0	0	0	84,000	0	158,600	60,000



Planning Area	Watershed	Name	Development Type	Approved Residential Units	Single Family Units	Multifamily Units	Office Gross Floor Area	Commercial Gross Floor Area	Industrial Gross Floor Area	Other Gross Floor Area
Germantown	Seneca Creek	Montgomery College Germantown Campus	Non-Residential	0	0	0	150,000	0	0	0
Germantown	Seneca Creek	Germantown Estates	Non-Residential	0	0	0	15,600	0	0	0
Germantown	Seneca Creek	Crystal Rock	Mixed	1,089	0	1,089	1,097,800	334,020	0	140
Germantown	Seneca Creek	Chestnut Ridge/Arden Courts of Germantown	Mixed	1	0	0	0	0	0	30,500
Clarksburg	Seneca Creek	Tapestry	Residential	67	66	0	0	0	0	0
Clarksburg	Seneca Creek	Garnkirk Farms	Residential	392	185	184	0	0	0	0
Clarksburg	Seneca Creek	Clarksburg Village	Mixed	2,753	9	0	0	0	0	0
Clarksburg	Seneca Creek	The Courts at Clarksburg	Residential	140	92	0	0	0	0	0
Clarksburg	Seneca Creek	Clarksburg Town Center	Mixed	1,118	220	36	76,640	129,544	0	0
Clarksburg	Seneca Creek	Linthicum West Property	Residential	253	252	0	0	0	0	0
Clarksburg	Seneca Creek	Cabin Branch	Mixed	2,386	1,279	500	1,882,500	37,500	0	0
Clarksburg	Seneca Creek	Dowden's Station	Residential	105	105	0	0	0	0	0
Bennett	Lower Monocacy	Snow Hill Farm	Non-Residential	0	0	0	12,999	5,600	0	0

Source: Montgomery County Planning Department Development Database, accessed

Table B-2: CIP and CLRP Projects

Planning Area	Watershed	Name	Development Type	Description
<b>Rockville CIP</b>				
City of Rockville	Potomac Direct	Community Center West of I-270	Institutional	9,000 sq ft community center bldg
City of Rockville	Rock Creek	Maryland/Dawson Extended	Transportation	900 feet of urban street
<b>Montgomery County CIP</b>				
Gaithersburg Vicinity	Seneca Creek	6th District Police Station	Institutional	28,294 sq ft police station and 2-story parking garage
Gaithersburg Vicinity	Rock Creek	Animal Services and Adoption Center	Institutional	49,160 sq ft animal shelter
Kensington/Wheaton	Rock Creek	Bethesda - Chevy Chase Middle School #2	Institutional	New 944 student capacity, four-story middle school; 155,087 sq ft footprint
Kensington/Wheaton	Rock Creek	Veirs Mill BRT	Transportation	New 7-mile premium bus transit service between Wheaton and Rockville Metrorail stations
Kensington/Wheaton	Rock Creek	Century Boulevard	Transportation	New 4-lane divided roadway approximately 2,565 ft in length
Clarksburg	Seneca Creek	Clarksburg Fire Station	Institutional	New 22,600 sq ft fire station and apparatus
Clarksburg	Seneca Creek	Clarksburg Transportation Connections	Transportation	5,800 feet of new 4-lane highway along Snowden Farm Parkway and Little Seneca Parkway
Germantown	Seneca Creek	Dorsey Mill Road Bridge	Transportation	1,500 ft extension of bridge over I-270 and total of 0.5 mile of new 4-lane roadway
Rockville	Cabin John	Falls Road East Side Hiker/Biker Path	Transportation	4 mile shared use path
Germantown	Seneca Creek	Father Hurley Road Extension	Transportation	1.2 mile extension of 4-lane roadway
Clarksburg	Seneca Creek	Frederick Road Bike Path	Transportation	2.5 mile shared use path
Germantown	Seneca Creek	Germantown Town Center Urban Park	Recreation	New 8.8 acre park
Gaithersburg Vicinity	Seneca Creek	Goshen Road South	Transportation	3.5 mile of roadway widening
Clarksburg	Seneca Creek	Hallie Wells Middle School	Institutional	New 988 student capacity, three-story middle school; 154,400 sq ft footprint; opened 2016
Rockville	Cabin John	Richard Montgomery ES #5	Institutional	New 600 student capacity, two-story elementary school
North Bethesda	Cabin John	Montrose Parkway East	Transportation	New 4-lane divided roadway approximately 1.6 miles in length
North Bethesda	Cabin John	Montrose Parkway West	Transportation	New 4-lane divided roadway approximately 0.9 mile in length
North Bethesda	Rock Creek	Nebel Street Extended	Transportation	1,300 ft extension of four-lane roadway
Rock Creek	Rock Creek	Needwood Road Bikepath	Transportation	1.7 mile shared use path
Rockville	Potomac Direct	North Branch Trail	Recreation	2.2 mile hiker-biker trail
Clarksburg	Seneca Creek	Observation Drive Extension	Transportation	New 2.2 mile. 4-lane roadway
Gaithersburg Vicinity	Seneca Creek	Public Safety Training Academy Relocation	Public Safety	Total 185,000 sq ft of academic, training, and support facilities; opened 2016
Aspen Hill	Rock Creek	Rock Creek Trail Pedestrian Bridge	Recreation	Grade separated trail crossing over Veirs Mill Road; completed 2011

Planning Area	Watershed	Name	Development Type	Description
Germantown	Seneca Creek	Seneca Crossing Local Park	Recreation	New 28 acre local park
Gaithersburg Vicinity	Seneca Creek	Snouffer School Road Improvements	Transportation	Widening of approximately 7,150 feet of roadway widening
Clarksburg	Seneca Creek	Stringtown Road Extended	Transportation	2,400 ft extension of 4-lane roadway
Clarksburg	Seneca Creek	Stringtown Road Construction	Transportation	1,200 ft of 4-lane roadway and 2,000 ft of 2-lane roadway
Gaithersburg Vicinity	Seneca Creek	Watkins Mill Road Extension	Transportation	4,000 ft of 6-lane roadway
North Bethesda	Rock Creek	White Flint Eastern Transportation	Transportation	3,000 ft of 4-lane roadway and new 80-ft bridge, 3-lane bridge at White Flint Metro
North Bethesda	Rock Creek	White Flint Fire 23	Public Safety	Approx. 20,000 sq ft fire station and apparatus
North Bethesda	Rock Creek	White Flint Western Transportation	Transportation	1,200 ft of 4-lane roadway and roadway reconstruction and relocation
North Bethesda	Rock Creek	White Flint West Workaround	Transportation	1,200 ft of 2-lane roadway and roadway reconstruction and relocation
<b>MWCOG CLRP</b>				
Clarksburg, Gaithersburg Vicinity, Germantown	Seneca Creek	Mid County Highway: MD 27 to Middlebrook Road	Transportation	Approx. 8.0 miles of new 4-lane roadway
Gaithersburg and Gaithersburg Vicinity	Seneca Creek, Potomac Direct, and Rock Creek	Corridor Cities Transitway	Transportation	9 mile BRT between Metropolitan Grove MARC and Shady Grove Metrorail stations

Sources: City of Gaithersburg Strategic Plan, Fiscal Year 2019; City of Rockville Operating Budget and Capital Improvements Program, Fiscal Year 2019; Montgomery County, MD Capital Improvements Program FY 2019;; Fiscal Year 2019 Capital Improvement Plans for Montgomery County, the City of Rockville and the City of Gaithersburg; and the MWCOG 2016 Constrained Long Range Transportation Plan.