Montgomery Planning
THE MARYLAND-NATIONAL CAPITAL PARK AND PLANNING COMMISSION

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Corridor Forward: The I-270 Transit Plan Preliminary Recommendations

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DESCRIPTION

Montgomery Planning staff will present the preliminary recommendations for Corridor Forward: The I-270 Transit Plan to the Planning Board. During the presentation, staff will describe the evolution of the Plan's approach since the approval of the Scope of Work, discuss the framework, organization, and supporting rationale of the preliminary recommendations, and conclude with a preview of the next steps in the planning process.

STAFF RECOMMENDATION

Planning staff recommends that the Planning Board discuss the preliminary recommendations and provide guidance to staff to inform the development of the Plan's Working Draft.

SUMMARY

The preliminary recommendations for Corridor Forward: The I-270 Transit Plan prioritize and build upon infrastructure currently advancing in Montgomery County, including the MD 355 and Veirs Mill Road Bus Rapid Transit projects, to provide additional dedicated transit lanes that connect communities and employment centers along and across the I-270 corridor. The preliminary recommendations also seek to further the vitality of existing and planned centers of activity, facilitate compact, corridor-focused growth, and improve regional transit connections to the county's north and south.

Contents

INTRODUCTION

Corridor Forward: The I-270 Transit Plan (Corridor Forward) defines the I-270 corridor as the transportation network extending through Montgomery County between points north in the City of Frederick in Frederick County, Maryland, and points south in Washington, DC and Northern Virginia. The corridor is not limited to the area immediately adjoining the interstate, but rather encompasses 46 communities designated by the Washington Metropolitan Council of Governments as "Activity Centers" most appropriate for growth, including Germantown, the Life Sciences Center, White Flint and Bethesda. Corridor Forward is the first transit-focused plan for the I-270 corridor and seeks to establish a recommended transit network and policy framework to improve transit connections, economic health, community equity, and environmental resilience along and within the corridor.

Background and Context

Several approved and adopted master plans recommend high-quality transit along the I-270 corridor, including Bus Rapid Transit (BRT) service along MD 355, the Corridor Cities Transitway (CCT) and the North Bethesda Transitway; a third rail for the MARC Brunswick Line; and new MARC stations in White Flint and Shady Grove. In addition, transit advocates have also proposed other solutions, such as a monorail system, an extension of the Purple Line into Northern Virginia and an extension of the Washington Metropolitan Area Transit Authority's (WMATA) Red Line north from Shady Grove.

As the county cannot realistically fund and operate all of these transit opportunities, the Montgomery County Council requested that Montgomery Planning initiate a transit plan to better understand the transit options available along the corridor and identify the options that could best benefit the county, particularly as funding opportunities materialize.

In response to this request, Montgomery Planning initiated Corridor Forward in spring 2020 to evaluate, prioritize and advance transit opportunities that achieve the best combination of the following values:

- **Strategic Connections:** Serve high-demand origin and destination pairs, balancing costs of implementation with projected benefits.
- **Economic Health:** Enable existing development and master planned communities to realize their potential as livable and economically vibrant places.
- **Community Equity:** Align with the county's social equity goals and principles.
- **Environmental Resilience:** Operate sustainably and reduce negative environmental impacts.

Concurrent with, but separate from the Corridor Forward planning process, the Maryland Department of Transportation's State Highway Administration (MDOT SHA) has pursued National Environmental Policy Act (NEPA) and Pre-NEPA efforts for two separate managed lanes projects on I-495 and I-270. These projects are intended to improve accessibility for automobile users between Frederick, Maryland, and Northern Virginia by providing managed lanes where users can elect to carpool or pay for shorter travel times. These projects are anticipated to generate revenue, which could be used to support transit.

Corridor Forward seeks to establish a recommended transit network and policy framework for communities and employment centers along the I-270 corridor regardless of the MDOT SHA's managed lanes projects. While the Plan will not specifically consider the role of transit in relation to the managed lanes project, it recommends a transit network as an alternative to travel by car, provides the opportunity to reduce vehicle miles traveled, and improves transit accessibility and competitiveness for communities along the corridor.

Problem Statement

Communities and employment centers along I-270 are not well-served by high-quality, frequent, and reliable transit today. Design for the MD 355 BRT is advancing, but the long master planned CCT, envisioned as high-quality transit to connect Clarksburg with the Shady Grove Metrorail Station has not advanced due to an inefficient and costly alignment. The lack of high-quality transit connecting communities and employment centers along I-270 limits the county's ability to attract and retain employers and workers, remain economically competitive within the region, connect our most vulnerable residents to growing employment opportunities, and achieve our climate goals.

As the CCT has been slow to advance, advocates and the general public have suggested that other transit options supporting Mid- and Upcounty accessibility should be seriously considered—including a monorail service, an extension of the Washington Metropolitan Area Transit Authority's (WMATA) Red Line, enhanced commuter bus service, and improved MARC Rail service. Understanding which master planned and suggested transit options create a complementary network is paramount to ensure future resources and focus are used strategically.

Plan Purpose

The purpose of Corridor Forward is to evaluate transit options and networks to determine which infrastructure can deliver a complementary corridor transit network, which furthers the Plan's values.

FRAMEWORK OF RECOMMENDATIONS

Planning staff initially approached Corridor Forward through the lens of regional transit connectivity between Frederick and points south in Washington, DC, and Northern Virginia to improve economic competitiveness. However, as Planning staff initiated public and stakeholder outreach as well as advanced technical analysis, the Plan approach shifted to one that refines and builds upon transit in the county's core to best advance the Plan's values, as well as facilitate compact, corridor-focused growth, further the vitality of existing and planned centers of activity, and improve regional transit connections.

The Plan's preliminary recommendations include a proposed transit network, and supporting recommendations, which reinforce the transit network as well as strengthen regional transit connections. The preliminary recommendations are the result of an iterative planning process informed by the following tasks:

- Compared transit vehicle attributes and inventoried transit options that could serve the I-270 corridor.
- Completed a pre-screening analysis, which evaluated the initial list of inventoried transit options based on indicators such as travel time, population access, job access, ability to accommodate growth and equitable access, and advanced six transit options for detailed analysis.
- Refined and analyzed the six transit options, including an evaluation of strategic merits, economic and financial outlook, and potential implementation challenges and risks.
- Completed additional evaluation on combinations of the six transit options to inform the development of the preliminary recommendations.

The preliminary recommendations are discussed in greater detail in the remainder of this memorandum, and are organized as follows:

- **Recommendation 1: The Proposed Transit Network –** The proposed transit network—the foundational recommendation for Corridor Forward—builds upon transit infrastructure currently advancing in Montgomery County – the MD 355 and Veirs Mill Road BRT – to serve communities and employment centers along the I-270 corridor. The proposed network includes near-term and long-term transit infrastructure and investments.
- **Recommendations 2-14: Supporting Recommendations –** The supporting recommendations strengthen the advancement and quality of the Plan's proposed network and strengthen connections to other jurisdictions in the region.

PRELIMINARY RECOMMENDATIONS

Recommendation 1: The Proposed Transit Network

The recommended transit network consists of near-term and long-term transit infrastructure and investments. With an appropriate policy approach and access to resources, transit infrastructure included in the near-term recommendation could be realized within 20 to 25 years. Transit options included as long-term investments have significant merit based on the Plan's technical evaluation but are envisioned to take longer due to a number of implementation challenges.

As discussed in detail below, Recommendation 1 includes the following:

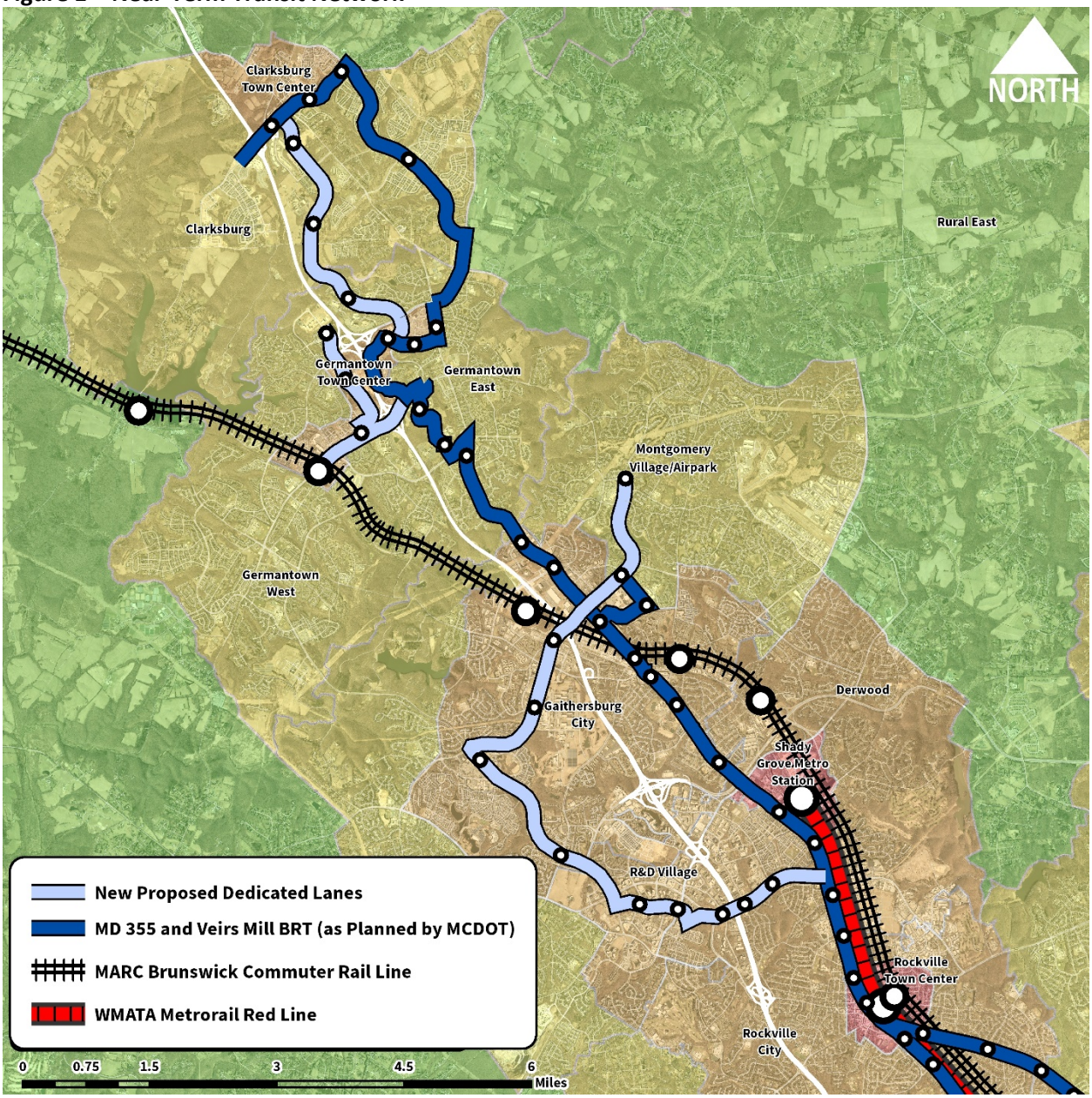
- Near-Term: A transit network with dedicated bus lane infrastructure to serve communities and employment centers along and across the I-270 corridor.
- Long-Term: An extension of Metrorail's Red Line from the Shady Grove Station to Germantown Town Center.

Near-Term Recommendations

The near-term transit network builds upon the work of previous plans and studies associated with the county's planned BRT network, including the 2013 *Countywide Transit Corridors Functional Master Plan*. The near-term network envisions a system of dedicated bus lane infrastructure that, once implemented in full, can support a series of different service patterns, to be determined by operating partners (for a description of the term 'service pattern' and roles and responsibilities across agencies, please see Attachment A in the Appendix – "Infrastructure and Service Patterns"). Figure 1 depicts the Plan's proposed near-term transit network, including:

- MARC Rail Brunswick Line Service, with existing stops at existing service levels
- WMATA Red Line Service, with existing stops at existing service levels
- MD 355 BRT
- Veirs Mill Road BRT
- Targeted Dedicated Bus Lane Infrastructure in the following locations (detailed in Table 1):
    - Clarksburg
    - Germantown
    - Montgomery Village
    - Great Seneca/Southwest Gaithersburg
    - Life Sciences Center

Figure 1 – Near-Term Transit Network



In the past, the county has generally recognized its BRT network as a series of single service transitways. For example, the dedicated bus lanes for the CCT were to be used solely for providing transit service between Shady Grove and Clarksburg on a single-defined route. This approach previously made sense as there are few locations in the current master planned BRT network where dedicated bus lane infrastructure intersect; however, as the network builds out over time, it is logical to plan branches of infrastructure that feed into the county's MD 355 dedicated lanes—which function as the main trunk of Corridor Forward's proposed network. This is because these lanes can efficiently and cost-effectively facilitate access along the corridor to a number of points of demand, including Germantown Town Center, Shady Grove, and Rockville Town Center. Corridor Forward's proposed near-term transit network focuses on maximizing the potential of infrastructure on MD 355 by envisioning infrastructure branches that feed into the service, which is currently in design. These infrastructure branches could also support enhanced commuter bus highway service and local bus services (see Recommendation 4).

Proposed Dedicated Bus Lanes in Near-Term Transit Network:
While the 2013 *Countywide Transit Corridors Functional Master Plan* envisions dedicated bus service entirely on MD 355, subsequent facility-planning work by MCDOT proposes to run the buses in mixed traffic on Snowden Farm Parkway (as depicted in Figure 1) between Germantown and Clarksburg. However, Montgomery Planning staff supports the provision of dedicated bus lanes on the Snowden Farm Parkway alignment because the provision of dedicated lanes will improve service reliability and suggest permanence, improving the desirability of the area.

The current master planned alignment of the CCT envisions service to communities west of I-270 at Dorsey Mill via Century Boulevard, and service to master planned communities and the COMSAT property via yet-to-be-constructed Observation Drive. The proposed network of dedicated bus lane infrastructure supports service to these communities as well, but instead integrates these communities into a connected network with the MD 355 BRT's dedicated lanes. The provision of dedicated lanes unlocks new potential service patterns for the MD 355 BRT by connecting northern communities to the Metrorail Red Line. Additionally, the Plan recommends dedicated bus lanes on MD 118, connecting Montgomery College, Germantown Town Center, and the Germantown MARC Rail station. In addition to BRT services, these lanes could potentially be used by local buses that traverse MD 118 connecting main points of demand in Germantown.

Dedicated lanes are also recommended on Gude Drive between MD 355 and Fallsgrove Drive, Fallsgrove Drive between Gude Drive and Blackwell Road, and Blackwell Road between Fallsgrove Drive and Johns Hopkins University (JHU) in the Life Sciences Center. These lanes would unlock new potential service patterns for both the MD 355 BRT and the Veirs Mill Road BRT. Staff recommends operating agencies—either MCDOT or MTA—provide service patterns that connect the Life Sciences Center with points of demand along the Veirs Mill Road BRT route and points of demand in Clarksburg and Germantown. These service patterns would improve connectivity for Equity Focus Areas (EFAs), including EFAs in the Wheaton, Twinbrook, Gaithersburg, and Germantown vicinities. Figure 4 on page 14 shows how the combined near-term and long-term networks supports access for EFAs. More information regarding the proposed network's support of equity needs can be gleaned from Attachment C – Network Package Report, in the Appendix.

Integrating established and growing communities into the MD 355 BRT's dedicated lanes can be advanced by providing additional Mid-County dedicated bus lanes. Extending dedicated lanes infrastructure from JHU to Kentlands on Great Seneca Highway, and then northward along MD 124 to MD 355, follows much of original alignment of the southern portion (or phase 1) of the CCT.[1] The Plan proposes additional infrastructure on MD 124 east of MD 355, extending past Lakeforest Mall to Montgomery Village Center. These lanes integrate an eastern EFA characterized by areas of low car ownership and high transit ridership into the corridor bus rapid transit network. Providing these dedicated lanes allows numerous possible service patterns.

[1] For a more direct comparison between the proposed near-term dedicated bus lanes infrastructure network and the master planned CCT, please see Figure 2.

Table 1 – Proposed Dedicated Bus Lanes in Near-Term Transit Network

Roadway Proposed for Dedicated Bus Lanes	From	To	Notes
Stringtown Road/Clarksburg Road (MD 121)	Snowden Farm Parkway	Clarksburg Premium Outlets Entry	
Snowden Farm Parkway	Ridge Road	Stringtown Road	
Ridge Road	Snowden Farm Parkway	Brink Road	
Observation Drive	Stringtown Road	Germantown Road (MD 118)	Originally envisioned as a segment of CCT; not fully constructed
Century Boulevard	Crystal Rock Drive	Aircraft Drive	Originally envisioned as a segment of CCT
Aircraft Drive	Century Boulevard	Germantown Road (MD 118)	Originally envisioned as a segment of CCT
Germantown Road (MD 118)	Bowman Mill Drive (MARC access)	Frederick Road (MD 355)	
Montgomery Village Avenue (MD 124)	Club House Road	Frederick Road (MD 355)	Partially within City of Gaithersburg
Montgomery Village Avenue/Quince Orchard Road (MD 124)	Frederick Road (MD 355)	Great Seneca Highway (MD 119)	Originally envisioned as a segment of CCT; Partially within City of Gaithersburg
Great Seneca Highway (MD 119)	Quince Orchard Road	Blackwell Road	Originally envisioned as a segment of CCT; Partially within City of Gaithersburg
Blackwell Road	Great Seneca Highway	Shady Grove Road	
Blackwell Road	Shady Grove Road	Fallsgrove Drive	
Fallsgrove Drive	Blackwell Road	Gude Drive	Advisory only – completely within City of Rockville
Gude Drive	Fallsgrove Drive	Frederick Road (MD 355)	Advisory only – completely within City of Rockville

Multipurposing Dedicated Bus Lanes:

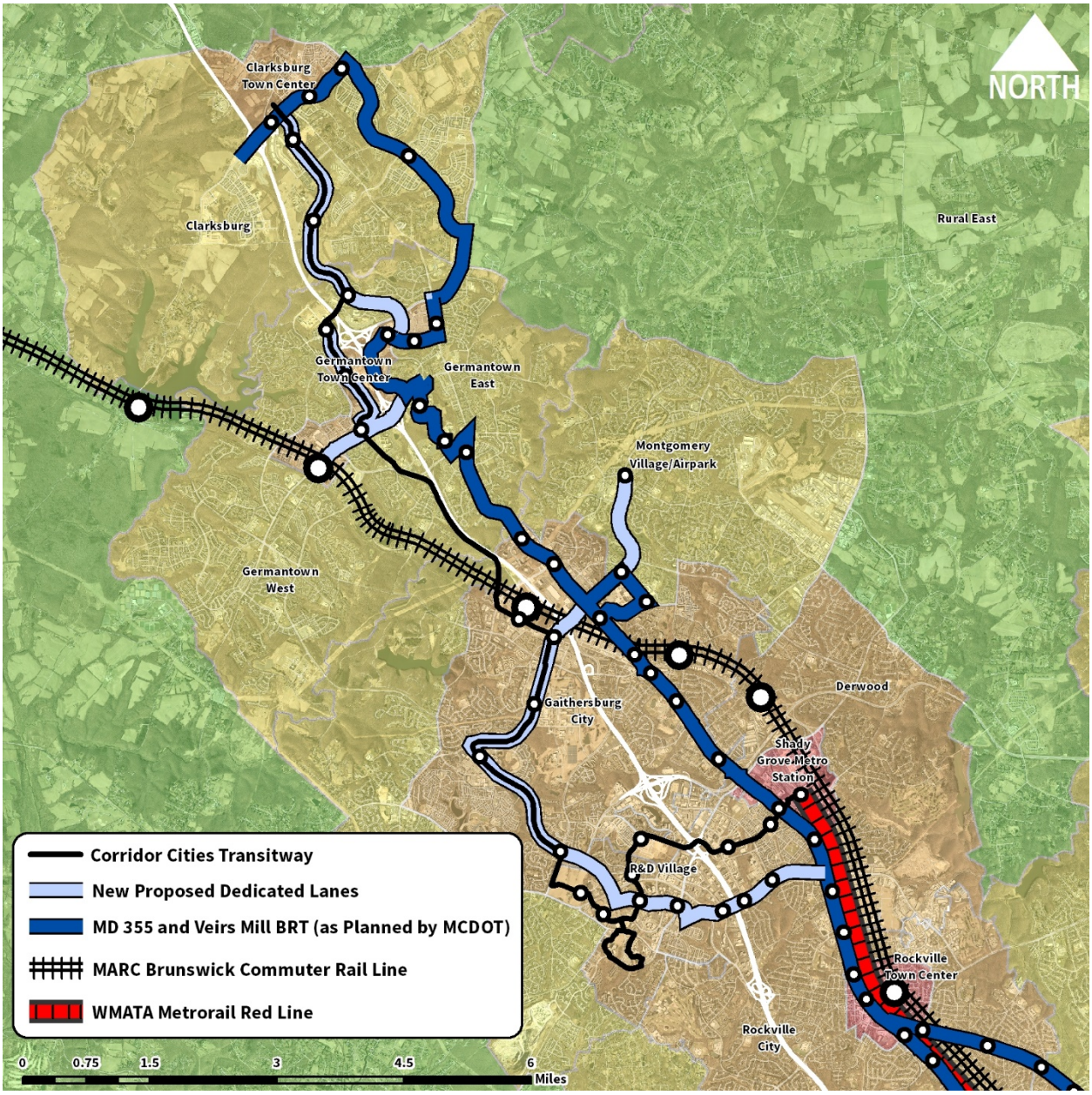
Dedicated bus lane infrastructure is not only important for local BRT access but can also support and enhance the potential for others' commuter bus services. In March of 2021, the MTA, in partnership with Virginia's Department of Rail and Public Transportation (DRPT), released a report showing how commuter bus services could connect Frederick County, Montgomery County, and Fairfax County. MTA and DRPT propose regional commuter bus service with stops located at Germantown Town Center and Lakeforest Mall, which are connected to I-270 via the proposed network's dedicated lanes. The recommended network allows buses to efficiently divert off the highway to serve points of local demand. If a managed lanes interchange was to be provided at Gude Drive as currently envisioned by the State, a commuter bus connection to the Life Sciences Center could also be established.

Rail Transit:
In the near-term, rail transit on the MTA-operated MARC Brunswick Line and WMATA-operated Red Line is anticipated to remain as it exists today. The long-term recommendations, beginning on page 11 provide more information and justification for long-term rail enhancements.

Refinements to the Master Planned CCT:
The near-term transit network recommends refinements to the master planned CCT, as shown in Figure 2. The proposed dedicated bus lanes in the near-term transit network seek to maximize use of the planning, design, and right-of-way dedication that has occurred over the last few decades in support of the CCT, while recommending refinements to improve cost and travel efficiency. These refinements include:

- Elimination of expensive highway grade-crossings, which have not been designed, at Dorsey Mill Road in Clarksburg and at Redland Road/Fields Road in the King Farm/Washington Rio vicinity;
- Elimination of long segments of dedicated lanes without transit stations along the western side of I-270 between Metropolitan Grove and Germantown Town Center;
- Strategically multipurpose infrastructure to reduce costs; and
- Directly connecting communities in Clarksburg and Germantown to the MD 355 BRT.

Figure 2 – Comparison of Master Planned CCT and Proposed Dedicated Bus Lanes in Near-Term Transit Network



While the near-term transit network serves many of the communities previously served by the master planned CCT, it cannot serve all of the previous stations while improving cost and travel efficiency. The recommended network does not directly serve Crown Farm and the DANAC property in Gaithersburg, or the Universities at Shady Grove. However, Corridor Forward supports MCDOT's proposal to serve these destinations with the Great Seneca Transit Network, a local bus service that reduces travel time through the provision of transit signal priority, queue jumps, and targeted dedicated bus lanes. The Great Seneca Transit Service can connect the aforementioned locations to the dedicated bus lanes in the near-term transit network.

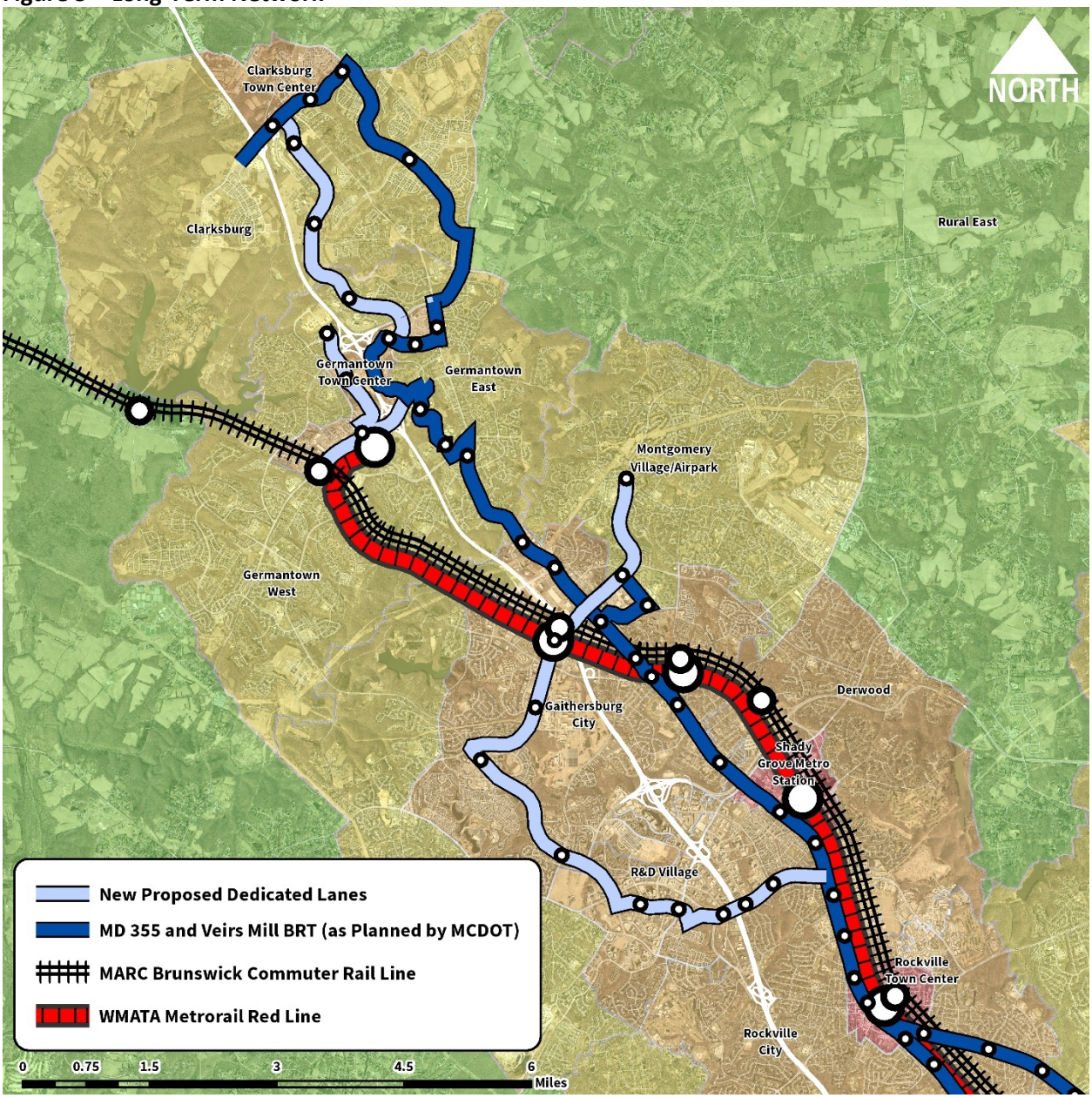
Rationale for Near-Term Proposed network:
The near-term transit network focuses on providing dedicated bus lane infrastructure that can:

- Maximize the value of infrastructure currently advancing, including MD 355 BRT and Veirs Mill Road BRT, by providing additional dedicated lanes that connect communities and employment centers along and across the I-270 corridor.
- Allow operating agencies like MCDOT or MTA to potentially provide numerous service patterns across the proposed network rather than focusing on single service patterns.
- Support equity by connecting Equity Focus Areas to the transit network and employment centers.
- Provide various means of accessing WMATA's Metrorail Red Line, either at Shady Grove, Rockville, or the stops proposed in the long-term recommendation.
- Promote cost-efficiency by refining the master planned CCT alignment.

To develop Recommendation 1, Planning staff quantitatively assessed the performance of potential near-term investments in tandem with long-term investments (described below) to inform the recommendations. Combinations of near-term dedicated bus lanes (referred to as network packages) were analyzed and compared. While the ultimate near-term transit network does not fully reflect one of the analyzed network packages, it represents a combination of quantitative and policy-oriented decisions intended to provide a transit network that can be implemented in the near-term, with dedicated infrastructure providing service to existing and planned centers of activity along the I-270 corridor. Attachment C, prepared by project consultant Steer, details the results of the tested network packages.

Long-Term Recommendations
In the long-term, the Plan recommends pursuit of a Red Line Extension from the Shady Grove Metrorail Station to Germantown Town Center, with two intermediary stops at Old Town Gaithersburg and MD 124/Fairgrounds, as shown in Figure 3. Corridor Forward's technical analysis suggests that this connection reduces daily vehicle miles traveled by 157,000 miles. In the technical analysis, this 157,000 daily mile reduction was the greatest among the six transit options retained for detailed analysis, and includes drivers accessing the new stations from points in Frederick County, suggesting that the option has regional benefits.

Figure 3 – Long-Term Network



Compared to other studied options, the Red Line Extension's one-seat ride to Washington, DC offers the greatest potential to increase job accessibility, both generally and for communities residing in EFAs. The extension reduces transit travel times between key county destinations; specifically, trips from Germantown and Gaithersburg to Bethesda would be reduced by 13 and 9 minutes respectively.

Prior to accounting for right-of-way and operations and maintenance facilities costs, the Red Line Extension also has the single-highest benefit-to-cost ratio (BCR)[2] of the six transit options retained for detailed analysis, which was 0.97, suggesting the costs just very slightly exceed the benefits (which is

[2] Benefit-to-cost ratios were developed by Steer Group, the project consultant, and the methodology employed differs from the Federal Transit Administration (FTA) guidelines.

common in the United States as transit is typically subsidized). The next closest BCR of the six transit options analyzed resulted from a transit option for highway-running bus service, which was only 0.65. Staff is currently working to integrate additional land costs into the BCRs to better understand their impacts.

While capital costs associated with the Red Line Extension are resource intensive, operating costs are anticipated to be less than other bus options explored. Consideration regarding how the State's operating transit resources are allocated may be warranted as increasing support for WMATA may be more financially prudent and beneficial than supporting operations for a Maryland-only bus line.

Because the Red Line Extension is proposed to have a station location at MD 124/Fairgrounds, and because this station will be served by the proposed dedicated bus lanes described in the near-term transit network, staff recommends relocating the Metropolitan Grove Station south to MD 124 to create a new Mid-County multimodal transit hub (see Recommendation 6, below). Designing the hub in a manner that provides non-motorized access from either side of I-270 will increase the station's catchment area, improve access to affordable housing units on the eastern side of I-270, improve access to the Fairgrounds—a significant cultural resource—and support the redevelopment of the proximate office buildings and parking facilities, which will have exceeded their useful life by the time the recommendation is advanced.

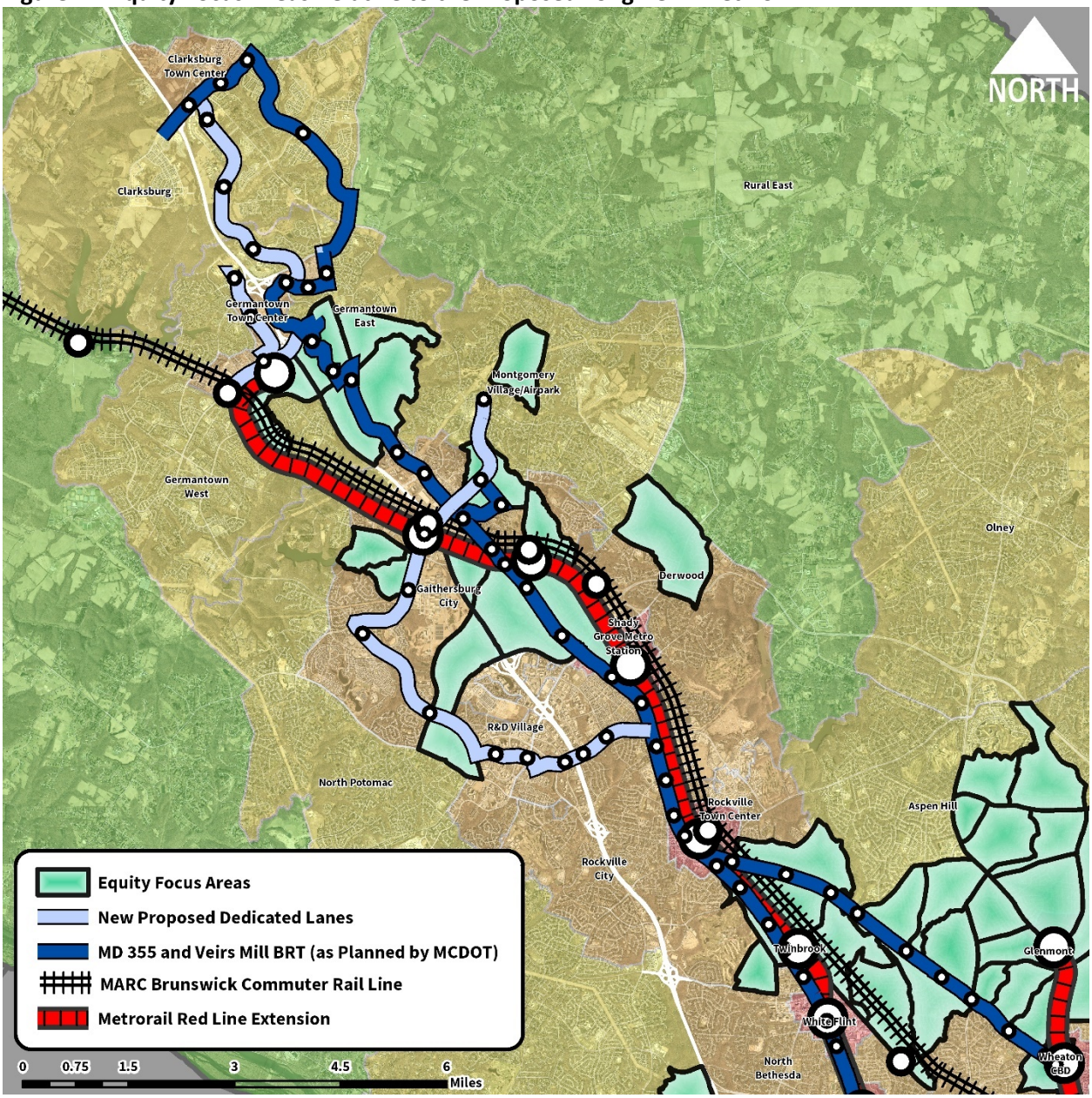
The Red Line Extension is not without challenges, and the benefits of this recommendation can only be realized through intentional, long-term planning and significant interagency coordination across various levels of government. This is because at a base cost of $1.4 billion (excluding land costs and cost associated with grade separation), the project is expensive. There is also numerous engineering, operational, and political challenges. The alignment would have to account for traversing 16 different features that would require grade separation. Staff assumes that the Red Line extension would require approximately 62-feet of additional right-of-way measured from the outermost southbound track per the Washington Metropolitan Area Transit Authority's (WMATA) specifications for Metro adjacent to rail corridors. While this figure is more conservative than the tight spacing where WMATA and CSX operate adjacent to one another in Silver Spring and the District of Columbia, new safety regulations necessitate the additional space.

In total, staff estimates that this would require approximately 20 acres of additional right-of-way, and that approximately 42 structures would be impacted. Staff estimates that approximately 70 acres of land would be required to support the extension with an operations and maintenance facility, and there are only a few properties in Germantown with that amount of space. The existing federally owned Department of Energy site may be the most realistic candidate for the location of an operations and maintenance facility. As a project of this magnitude would require federal funding, reconstruction of the facility could be considered to create a new transit-oriented General Services Administration (GSA) owned site.

Implementing the Red Line would require cooperation with CSX, cooperation and support from WMATA, and likely federal funding support. Today, WMATA is focused on bringing the system's core into a state of good repair and is reluctant to consider extensions without a clear understanding of financial implications and downstream passenger capacity. While the equity case and growth justification may be clear from the county's perspective, and despite the high BCR, the county will need to compile resources, land, and partners over time to realize this recommendation. Additionally, other Metrorail safety and capacity needs would likely need to be addressed before the recommendation could advance.

The proposed long-term network builds upon the equity benefits of the proposed near-term network. Figure 4 depicts EFAs in relation to the proposed long-term network.

Figure 4 – Equity Focus Areas Relative to the Proposed Long-Term Network



Recommendations 2-14: Supporting Recommendations

In addition to the transit network presented in Recommendation 1, the Plan includes several additional recommendations, grouped in two categories:

- **Support the Recommended Transit Network:** These recommendations enhance the transit network presented in Recommendation 1, such as converting general-purpose travel lanes to dedicated transit lanes; limiting right-of-way expansions to mitigate auto congestion; supporting incremental implementation of transit projects; and enhanced bicycle, pedestrian, and micromobility access to stations.
- **Strengthen Regional Transit Connections:** These recommendations focus on improving transit connections to other jurisdictions, primarily the District of Columbia, Northern Virginia, and Frederick County.

Support the Recommended Transit Network

The recommendations in this section outline strategies to maximize the benefits of the transit improvements included in Recommendation 1.

2. Convert existing general-purpose travel lanes to dedicated transit lanes on targeted streets, including—but not limited to—the streets detailed in the right-of-way table (to be provided in the Working Draft). The Planning Board draft of *Thrive Montgomery 2050* recommends building a world-class transit system with a network of rail, bus rapid transit, and local bus infrastructure and services, as well as the conversion of existing general-purpose traffic lanes to dedicated transit lanes. Additionally, the county's Climate Action Plan (CAP) acknowledges the significant need to reduce transportation emissions both through the provision of transit and reduction of auto capacity (actions T-1: Expand Public Transit and T-2: Constrain Cars in Urban Areas).

Corridor Forward's long-term network recommendation supports the continued urbanization of Germantown, MD 124/Fairgrounds, Gaithersburg, and Downtown Rockville (through coordination with the municipalities), and the Great Seneca Science Corridor. As such, the recommendation to convert existing capacity is consistent with the county's approved Climate Action Plan.

Furthermore, right-of-way constraints pose a significant obstacle and cost toward realizing master planned BRT along Old Georgetown Road, MD 355, and other locations along the I-270 corridor. This challenge is amplified in residential locations, where opportunities to obtain land dedication are limited, and the prospect for property takings is politically unpalatable. Allowing the conversion of automobile capacity to transit capacity will render these facilities more realistic. If transit is forced to divert into a general-purpose lane, the benefit for riders is reduced, which impacts desirability and the overall value of the county and State's transit investments.

3. Limit the addition of travel lanes, as shown in the right-of-way table or figure (to be provided in the Working Draft). Use the remaining space in the master planned right-of-way for transit, walking, bicycling, and other micromobility modes. Results from Corridor Forward's transportation analysis suggest that—regardless of any significant investment in transit—driving will remain the county's primary mode of travel. Without making a real commitment to constrain automobile travel, the county will not achieve its CAP goals, or the countywide vision presented in the Planning Board draft of *Thrive Montgomery 2050*. The most effective mechanism to shift drivers to more efficient modes, like transit, is to reduce the travel time gap between transit and automobile travel.

The county's mode share goals suggest that for each policy area, a certain percentage of trips should be made by modes other than automobiles. If we continue to advance *both* driving and transit, percentages will largely remain unchanged. If we begin to prioritize transit investment and deprioritize auto investment, we are more likely to realize our goals.

4. Maximize the travel potential of dedicated bus lanes. As rights-of-way become more constrained and different varieties of transportation options advance in the marketplace, understanding how to maximize dedicated space effectively is paramount. Local buses and other private and public point-to-point services may derive utility from dedicated bus lanes, and in some cases their use should not be restricted to a single-service alone. Balancing the use of dedicated lanes in a manner that does not degrade primary route-based services like MD 355 or Veirs Mill Road BRT will require planning and policy development, coordinated with the Montgomery County Department of Transportation.

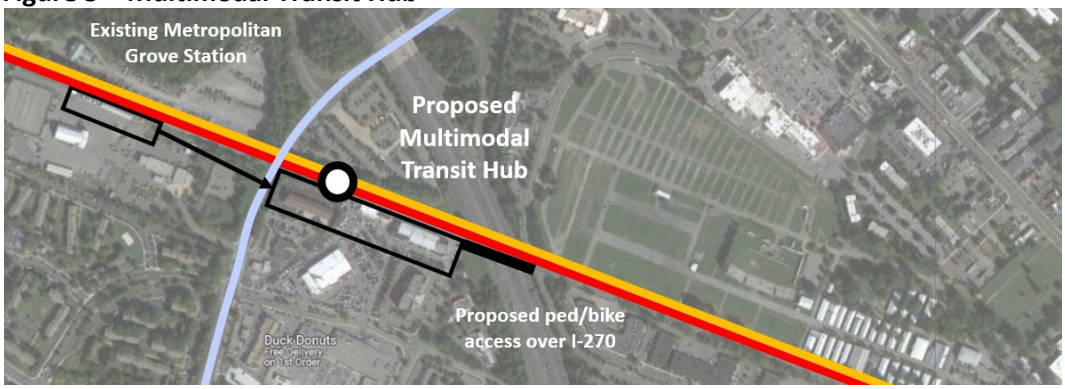
5. Support the incremental implementation of dedicated bus lanes rather than wait to realize an entire transitway facility if that facility proves immediately challenging to implement. Large-scale transit investments are typically only implemented when funding is obtained to finance a substantial project in full. Dedicated bus lane components can, however, have independent utility apart from their larger overall network, as they can be used to decrease the running time of existing local bus routes or decrease the trip time for shuttle buses and paratransit. A network of dedicated bus lanes that can be implemented piecemeal over time allows for greater flexibility in service planning and will allow the county to bridge the gap more quickly between automobile and bus travel times. As full master planned transitways are eventually realized, service pattern programming can re-assess use of the lanes by local bus and shuttle bus services to ensure high-quality facilities are not significantly impacted.

This recommendation envisions that the county's Capital Improvements Program will allocate some funds for design, engineering, and ultimately, construction during each budget cycle. While development is expected to provide the right-of-way to support transit facilities, it is not practical to expect development to provide useful facilities as most frontages do not extend beyond 200 to 300 feet.

6. Develop a new multimodal transit hub near the intersection of MD 124 and the CSX tracks. Co-locating MARC access with the recommended Red Line station improves transit riders' travel efficiency. This recommendation enables MARC, Red Line, BRT, and local bus riders to transfer across services and expands the geographic travel area along the region's premium network.

The new station could be designed as to provide direct pedestrian, bicycle, and micromobility access to the new transit hub from both the east and west side of I-270 via a new above or below grade connection, potentially at Perry Parkway and an extension of Bureau Drive, improving the porosity of the travel network, which will have significant equity benefits and better connect all to the County Fairgrounds—a significant cultural resource.

Figure 5 – Multimodal Transit Hub



7. Ensure safe and efficient access to planned transit stops for pedestrians, bicyclists, and other micromobility modes. Many of Corridor Forward's recommended stops are located along wide, high-volume roadways. Through the provision of sidewalks, protected crossings, bicycle facilities, lighting, and bicycle and scooter parking, the county can maximize the benefits of its transit investments throughout the corridor. Geographic designations, such as the Bicycle Pedestrian Priority Area (BiPPA) and Metro Station Policy Area (MSPA), could support the implementation of safe and accessible transit stations. In addition to advancing the values set forth in the Planning Board draft of *Thrive Montgomery 2050*, improved station access supports the county's Vision Zero policy.

8. Update relevant land use plans and guidelines to support master planned transit facilities. Corridor Forward recommends new transit for the corridor. Best practices evolve based on research and innovation in the transportation marketplace. As the county's understanding of safety and new forms of transportation advance, Montgomery Planning will need to update its guidelines and standards to align with best practices. For example, the current (2021) Complete Streets Design Guidelines may need to include a "transit" overlay "transit street" typology. The transit section of the document may require further development to discuss elements like target speeds, and bikeways and strategies such as transit signal priority and queue jumps.

In addition, this recommendation supports updates to the *Great Seneca Science Corridor Master Plan*, the *Germantown Sector Plan*, and the *MARC Rail Communities Sector Plan*, in support of incentivizing compact, transit-oriented development patterns. As transit investments can be associated with increased rents, master plan updates can address opportunities to create affordable housing and preserve small businesses in areas along transit corridors. In turn, streetscape designs should be updated in master plans to account for newly envisioned transit services. Attention should be provided to ensure streets support activity and provide adequate space for non-motorists to navigate to and around stops.

9. Support the North Bethesda Transitway as master planned; where necessary, repurpose automobile travel lanes with dedicated transit lanes in order to advance the Plan's vision. Corridor Forward did not advance a Tysons Corner-oriented extension of the master planned North Bethesda Transitway based on the pre-screening metrics of this particular effort; however, the current master planned facility is integral to achieve the mixed-use, transit-oriented vision established for the North Bethesda Planning Area through the 2010 *White Flint Sector Plan,* 2017 *Rock Spring Sector Plan,* and 2018 *Grosvenor-Strathmore Metro Area Minor Master Plan*. The Plan would maintain the recommendation from the 2013 *Countywide Transit Corridors Functional Master Plan* for the North

Bethesda Transitway, retaining the alignment that terminates at White Flint Metro Station and removing the alignment that terminates at Grosvenor Metro Station.

The development patterns along portions of the master planned facility, such as Old Georgetown Road, and competing demands for other transportation infrastructure, are a challenge for implementation. Advancing the facility with dedicated transit lanes may require repurposing the existing right-of-way to achieve the desired facilities. Degrading a master planned service by running buses in mixed- traffic lanes will likely impact the facilities' ability to compete with more efficient point-to-point services, like driving.

Strengthen Regional Transit Connections

The recommendations in this section build on the network presented in Recommendation 1 to enhance connections to Montgomery County's neighbors, specifically the District of Columbia, Northern Virginia, and Frederick County.

10. Obtain right-of-way, through dedication or acquisition, to support the long-term potential of the Maryland Transit Administration MARC Rail Brunswick Line. Increased service along the Brunswick Line could improve both county and regional transit access. While other options studied by this effort prove to have a more advantageous package of benefits for the county and region, the Brunswick Line will continue to be an integral component of the corridor's transit network. The 2013 *Countywide Transit Corridors Functional Master Plan* calls for the 25-foot wide dedication and maintaining the recommendation will support future long-term investment in MARC, should it be warranted.

11. Promote strategic and equitable MARC Rail access by supporting new stations and—when necessary—accepting constraints imposed by the line's owner and operator, currently CSX Corporation. The 2010 *White Flint Sector Plan* recommends an additional MARC station within the vicinity of White Flint, and the 2013 *Countywide Transit Corridors Functional Master Plan* and 2021 *Shady Grove Sector Plan* recommend a MARC station at Shady Grove.

Currently, CSX policy prohibits the provision of new stations on the Brunswick Line without the closure of existing stations. The Plan's evaluation suggests master planned stations at Shady Grove and White Flint have greater network value compared to existing adjacent stations at Washington Grove and Garrett Park, due to their potential for higher density development and ability to better serve the county's Equity Focus Areas, or parts of the county characterized by high concentrations of lower-income households, people of color and individuals who may speak English less than very well. As such, the line's current potential is not being maximized. Future work should examine if and how the additional master planned stations could be realized, with a pragmatic view of the line's potential based on the constraints of owning interests.

12. Design and construct the American Legion Bridge to support rail transit. Corridor Forward's horizon is approximately 25 years, whereas bridges are designed to last for significantly longer periods. Like the Woodrow Wilson Bridge over the Potomac River, the American Legion Bridge should be designed to accommodate the needs of the future, even if those needs are not explicitly understood today. This action will improve the long-term resilience of investments made today.

13. Study extensions of the Purple Line, accounting for costs and benefits, to understand if and where extension(s) of the county's light rail service may be warranted. Corridor Forward studied one potential alignment for a Purple Line Extension assuming a relatively efficient alignment that travels over the American Legion Bridge. Additional analyses are necessary to understand if this extension

makes sense based on travel demand as compared to other potential options, which may or may not have more merit. After demand patterns are understood, an analysis of planning-level costs should inform whether serving the desired point(s) of demand with light rail transit makes financial sense given the service's projected use.

14. Explore a direct transit connection between the recommended WMATA Red Line Terminus and Frederick County. Frederick County residents participate in Montgomery County's workforce, and some County residents make reverse commutes into Frederick. Balanced interventions that support travel without encouraging growth external to Montgomery County benefit both counties. Additionally, transit connections to the City of Frederick would improve access to the historic Downtown Frederick, which is a state asset with significant cultural richness.

The Maryland Department of Transportation's Monorail Feasibility Study and the results of the Corridor Forward technical evaluation suggest that there is transit demand between the City of Frederick and Montgomery County. A direct transit connection between the two communities offers strong environmental benefit if it were to be successful in shifting mode choice from automobiles as projected.

However, based on the overall results of the analysis, neither a light rail nor monorail option between Shady Grove and Frederick is included in the recommended transit network (Recommendation 1). This determination was made for two primary reasons:

- The costs of a rail link to Frederick far exceeded the anticipated benefits. The benefit-to-cost ratio for the monorail was low (a return of $0.32 for every $1.00 spent).
- Frederick stands to gain more from a rail connection to the Montgomery County. Roughly 67 percent of Vehicle Miles Traveled (VMT) reductions and 55 percent of new transit trips would occur outside of Montgomery County. While Montgomery County would benefit from a Frederick rail connection, other options prove more immediately beneficial.

STAKEHOLDER COORDINATION AND OUTREACH

Throughout the project, staff has worked with state and county agencies, neighboring jurisdictions, county municipalities, advocacy groups, and community members as we analyze and prioritize transit options. Results on the six studied transit options were shared with the Montgomery County Department of Transportation (MCDOT), Metropolitan Washington Council of Governments (MWCOG), WMATA, City of Gaithersburg, City of Rockville, and MTA. Staff is scheduled to receive feedback on preliminary recommendations from MCDOT, Gaithersburg Mayor and Council, and the Rockville Planning Commission. As a result, feedback from these agencies has not been incorporated into this staff report.

The preliminary recommendations modify and enhance some master planned transit options as well as introduce new transit options. Once the Planning Board's feedback on the preliminary recommendations has been received and incorporated, the recommended transit network and supporting recommendations will continue to be shared with the public, agencies and community groups, both through a scheduled community presentation on October 20, 2021, as well as through additional community events throughout the fall.

CONCLUSION AND NEXT STEPS

Planning staff recommends that the Planning Board discuss the preliminary recommendations and provide guidance to staff to inform the development of the Plan's Working Draft. Staff anticipates integrating the feedback and guidance received, developing an implementation plan to advance the proposed network, and returning to the Planning Board in November 2021 with a Working Draft of Corridor Forward: the I-270 Transit Plan. The Working Draft's implementation plan will detail the prioritization of infrastructure and major milestones necessary to achieve to realize the proposed network.

APPENDIX

Attachment A – Infrastructure and Service Patterns
Attachment B – Detailed Version of Recommendations 2-14
Attachment C – Network Package Report (Steer Group)

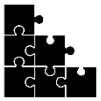
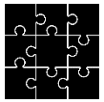
Attachment A: Infrastructure and Service Patterns

Montgomery Planning master-plans right-of-way needs. Planned infrastructure supports the needs of various users, including transit riders, non-motorists, and drivers. A 'service pattern' refers to how buses are routed and scheduled to use infrastructure. Other agencies, like the Montgomery County Department of Transportation (MCDOT) and Maryland Transit Administration (MTA), are responsible for developing transit service patterns and operating services. In short, Montgomery Planning is responsible for determining infrastructure needs, while others are responsible for operational needs. Table 1 compares the distinct concepts of infrastructure and service patterns.

Dedicated Transit Infrastructure	Transit Service Patterns
• **Definition:** The physical components of a transit system, including dedicated or separated bus lanes, express bus lanes, and queue jumps. • **Responsible Agency:** Montgomery Planning master-plans right-of-way widths to ensure infrastructure accommodates transit, as well as other modes. • **How It's Planned:** Montgomery Planning considers existing and planned population and employment density, equity needs, the potential to stimulate economic development, and environmental benefits. Montgomery Planning plans infrastructure to support existing and future quality of life.	• **Definition:** How buses are routed and scheduled to use provided infrastructure. • **Responsible Agencies:** MCDOT and/or MTA develop and implement service patterns • **How It's Planned:** The agencies above develop service patterns that account for anticipated demand at the time of implementation, operational costs of services, and the opportunities and constraints of existing infrastructure.

Attachment B: Recommendations 2-14 - The following tables describe the preliminary recommendations 2-14, outlining

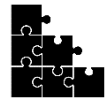
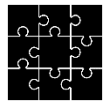
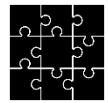
1. **Recommendation:** The master planned direction for the I-270 corridor's transportation network or County policy, made in support of equitable access and sustainable growth.
2. **County Action(s):** How the recommendation is realized in practice.
3. **Priority:** *From the perspective of the County*, how will the recommendation support the Corridor's vision for equitable access and sustainable growth? Each recommendation falls under one of three categories listed below.

Primary Recommendation	Supporting Recommendation	Future Need or Consideration
		
Primary recommendations are the Plan's foundational recommendations. These recommendations represent Plan's ultimate vision for Corridor accessibility.	Supporting recommendations strengthen the advancement and quality of the Plan's primary recommendations.	Future needs or considerations are recommendations that, while lower in priority, support long-term regional connectivity.

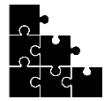
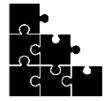
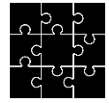
4. **Champion:** Who would likely take the lead on advancing the recommendation, based on the potential benefits? Each recommendation falls under one of three categories listed below.

Montgomery County	Shared by County and Others	Primarily Others
		
Montgomery County Government is the lead agency responsible for advancing a recommendation, and the County's constituents stand the most to gain from a recommendation's advancement.	Multiple parties within the region, including Montgomery County Government, are necessary to advance a recommendation. Benefits are relatively distributed across various stakeholders' constituents.	Montgomery County Government can cooperate and support the advancement of a recommendation, but the lead stakeholder is not Montgomery County Government. Montgomery County's constituents stand to gain from the recommendation, but benefits may be greater for other parties.

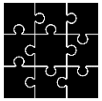
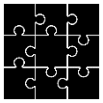
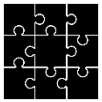
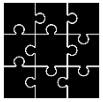
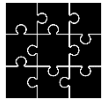
Support the Recommended Transit Network

Recommendation	Actions	Priority	Champion
2. Convert existing general-purpose travel lanes to dedicated transit lanes on targeted streets, including—but not limited to—the streets detailed in the right-of-way table.	A. Convert existing auto travel lanes to dedicated transit lanes to advance [the recommended transit network]. B. Modify congestion standards to include a BRT station designation between that of Metro station areas (120 seconds) and local bus (80 seconds). C. Continue to explore and prioritize other locations in the corridor where local bus service can be enhanced through the provision of express bus lanes, queue-jumps, and other facilities.		
3. Limit the addition of travel lanes, as shown in the right-of-way table or figure (to be provided in the Working Draft). Use the remaining space in the master planned right-of-way for transit, walking, bicycling, and other micromobility modes.	A. Within the corridor, eliminate capital improvement projects that support the addition of new travel lanes and turn lanes. B. Create a "Future I-270 Corridor Network" capital improvement project to absorb fee-in-lieu as alternate development mitigation when projects demonstrate impacts to the convenience of automobile travel relevant to the County's most up-to-date Growth and Infrastructure Policy.		
4. Maximize the travel potential of dedicated bus lanes.	A. Develop policy guidelines on the use of dedicated bus lanes to allow local bus, shuttles, etc. in appropriate contexts.		
5. Support the incremental implementation of dedicated bus lanes rather than wait to realize an entire transitway facility if that facility proves immediately challenging to implement.	A. When and where necessary, break infrastructure components of larger transit projects, like the North Bethesda Transitway, into smaller, more easily implemented components in the Capital Programming process, in support of a long-term vision.		
6. Develop a new multimodal transit hub near the intersection of MD 124 and the CSX tracks.	A. Relocate the existing Metropolitan Grove MARC Rail Station, in coordination with MARC Rail and WMATA, for the purposes of integrating MARC service and Red Line service at the planned MD-124/Fairgrounds transit hub. B. Provide direct pedestrian, bicycle, and micromobility access to the new transit hub from both the east and west side of I-270 via a new above or below grade connection, potentially at Perry Parkway and an Extension of Bureau Drive.		

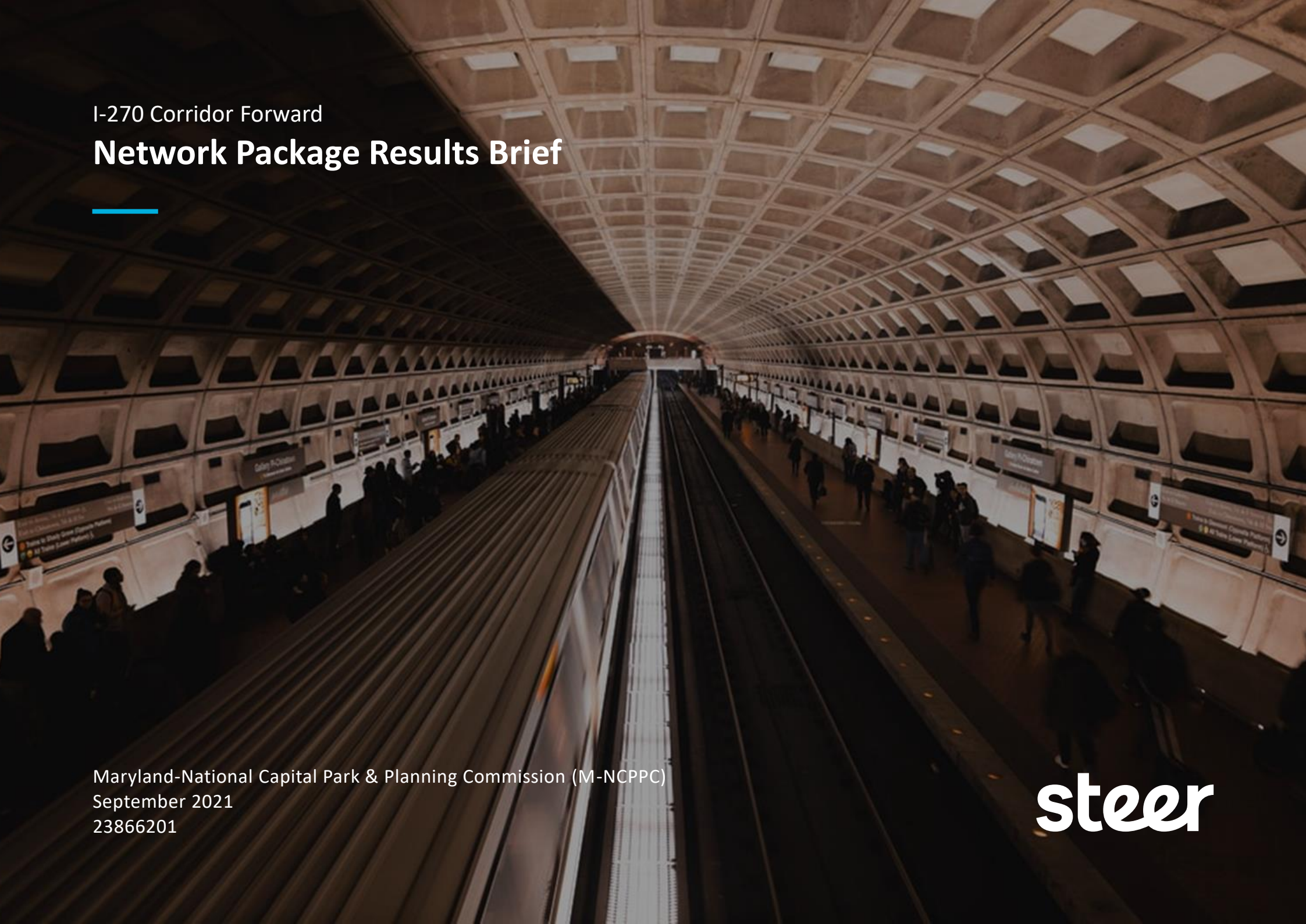
Support the Recommended Transit Network (cont.)

Recommendation	Actions	Priority	Champion
7. Ensure safe and efficient access to planned transit stops for pedestrians, bicyclists, and other micromobility modes.	A. As NEPA and facility planning processes progress, explore opportunities to create new Bicycle and Pedestrian Priority Areas (BiPPAs) and red Metro Station Policy Areas (MSPAs) to support new premium services. B. Provide buffered sidewalks, protected crossings, bicycle facilities, and lighting to serve new master planned facilities' stops and stations. C. Include bicycle and scooter parking facilities in the ultimate design of all new master planned stops and stations at the rate and size specified in the *Bicycle Master Plan* (Appendix G). D. Ensure access to all master planned transit stops is ADA accessible within a half mile. E. Develop countywide pedestrian and bicycle delay standards to limit crossing delay for pedestrians, bicycles, and other micromobility users, to be applied within a half-mile of a master planned facility's transit stop or station.		
8. Update relevant land use plans and guidelines to support master planned transit facilities.	A. Update master plans and sector plans, including but not limited to Thrive Montgomery 2050 (Corridor Focused Growth map), the Great Seneca Science Corridor Master Plan, the Germantown Sector Plan, and the MARC Rail Communities Plan, in support of incentivizing compact, transit-oriented development patterns. B. Identify and appropriately zone the locations of transit operations and maintenance facilities for the recommended transit network and integrate recommended locations for these needs into applicable plan's Land Use Vision. C. Create affordable housing and preserve small businesses in areas where new transit may increase rents. Increase affordable and diversity of housing types in areas already served by transit along the Corridor. D. Update the Complete Streets Design Guidelines, adding a "transit" overlay or "transit street" typology addressing transit-specific design elements.		
9. Support the North Bethesda Transitway as master planned; where necessary, repurpose automobile travel lanes with dedicated transit lanes in order to advance the Plan's vision.	A. Maintain the recommendation from the 2013 *Countywide Transit Corridors Functional Master Plan* for the North Bethesda Transitway, retaining the alignment that terminates at White Flint Metro Station and removing the alignment that terminates at Grosvenor Metro Station. B. In constrained locations where right of way acquisition proves challenging, repurpose automobile travel lanes to improve the ease of the project's implementation.		

Strengthen Regional Transit Connections

Recommendation	Actions	Priority	Champion
10. Obtain right-of-way, through dedication or acquisition, to support the long-term potential of the Maryland Transit Administration MARC Rail Brunswick Line.	A. Continue to advance the long-term potential of the Brunswick Line by obtaining 25-foot wide land dedications adjacent to the northbound tracks of the Brunswick Line right-of-way along the segments identified in the MARC Cornerstone Plan.		
11. Promote strategic and equitable MARC Rail access by supporting new stations and—when necessary—accepting constraints imposed by the line's owner and operator, currently CSX Corporation.	A. Support the 2010 *White Flint Sector Plan* recommendation to construct an additional MARC-Station within the vicinity of White Flint. B. If CSX maintains its current policy that no new station can be added without the removal of an existing station or provision of additional mainline track, develop a plan or strategy to support the elimination of service at underutilized stations in order to advance new stations projected to have greater network value. C. If Red Line stations are constructed at locations with existing MARC service (Metropolitan Grove and/or Gaithersburg), amend the 2013 *Countywide Transit Corridors Functional Master Plan* and 2021 *Shady Grove Sector Plan* to remove the recommendation for a MARC Station at Shady Grove.		
12. Design and construct the American Legion Bridge to support rail transit.	A. Advocate for an American Legion Bridge design that can structurally accommodate the rail transit needs of the future.		
13. Study extensions of the Purple Line, accounting for costs and benefits, to understand if and where extension(s) of the County's light rail service may be warranted.	A. Add an initial study to the Planning Department's work program to assess travel demand between locations along the under-construction Purple Line and potential points of demand, including but not limited to the National Institutes of Health, Rock Spring, Tysons, Georgetown/Rosslyn, and Arlington. B. Coordinate with jurisdictions, as relevant and if warranted following the initial study, to scope further technical feasibility analyses that explore potential extension alignments, their costs, and their benefits.		
14. Explore a direct transit connection between the recommended WMATA Red Line Terminus and Frederick County.	A. Support others' efforts by recommending alignments and stations for any portion of a direct service that falls within Montgomery County. B. Participate as a cooperative stakeholder in others' study and design efforts.		

Attachment C: Network Package Report (Steer Group)



I-270 Corridor Forward

Network Package Results Brief

Maryland-National Capital Park & Planning Commission (M-NCPPC)
September 2021
23866201

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Contents

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Section 1

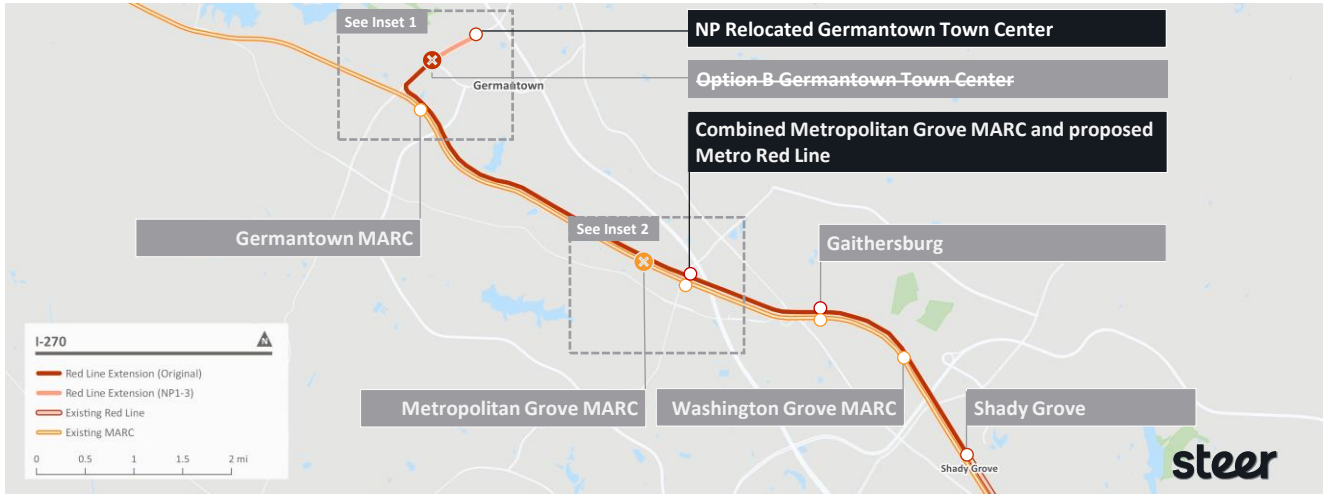
Introduction

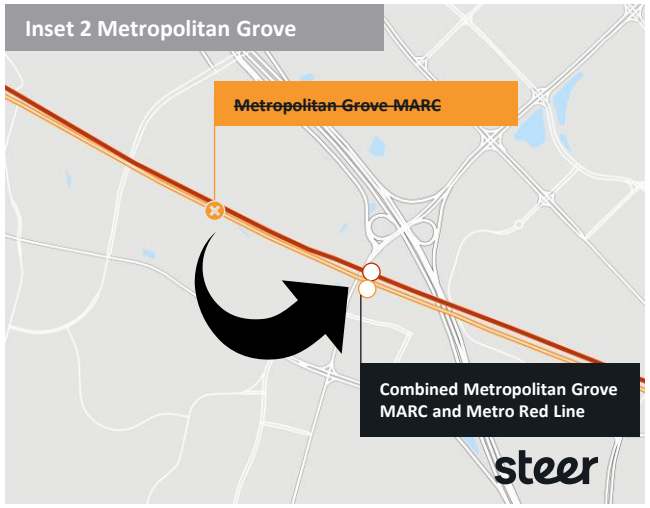
- Steer was commissioned by M-NCPPC to develop a strategic plan for long-term transit investment for Montgomery County along the I-270 corridor ("I-270 Corridor Forward").
- The primary aim of the Network Package Results Brief is to provide the results from the additional Network Package (NPs) runs, which are combinations of the six transit options analyzed as part of Report 4.
- The Montgomery County Planning team is expected to conduct further analysis of these network package runs and to inform prioritization of transit options as part of Report 5 led by the Planning team.
- This section provides a summary of the NPs specifications.

This report discusses results of the Network Packages building from the previous Report 4

- **Project Overview:** Steer was commissioned by the Maryland-National Capital Park and Planning Commission (M-NCPPC) to assist with the development of a transit plan for the I-270 Corridor, between Frederick County (FRCO), Maryland (MD) and Tysons in Fairfax County (FFXCO), Virginia (VA) via Montgomery County (MCO).
- **Report Overview:** This report has been prepared for M-NCPPC as a supplementary report of modeling results for the three additional Network Packages (NP) following the development of the initial six transit options.
  - All three NPs include the Option B Metro Red Line Extension as the main "backbone" for the I-270 Corridor, along with different combinations of transit options and services and/or variations of Options C (CCT) and F (I-270 BRT).
  - Given the packaging of the different options, the MCO planning team also requested relocations of two stations to enable connections between the different transit services: (1) relocation of Germantown Town Center station 2,200 feet northeast to the corner of Germantown Road and Aircraft Drive (not costed at request of the Montgomery County Planning Team); (2) relocation of the Metropolitan Grove MARC station to the Metropolitan Grove Red Line station to the east of MD 124.
  - In addition, the Planning team requested removal of River Road Park and Ride stop on the I-270 BRT Network (not shown in the maps).

NPs include relocations to the Metro Germantown Town Center station and MARC Metropolitan Grove station





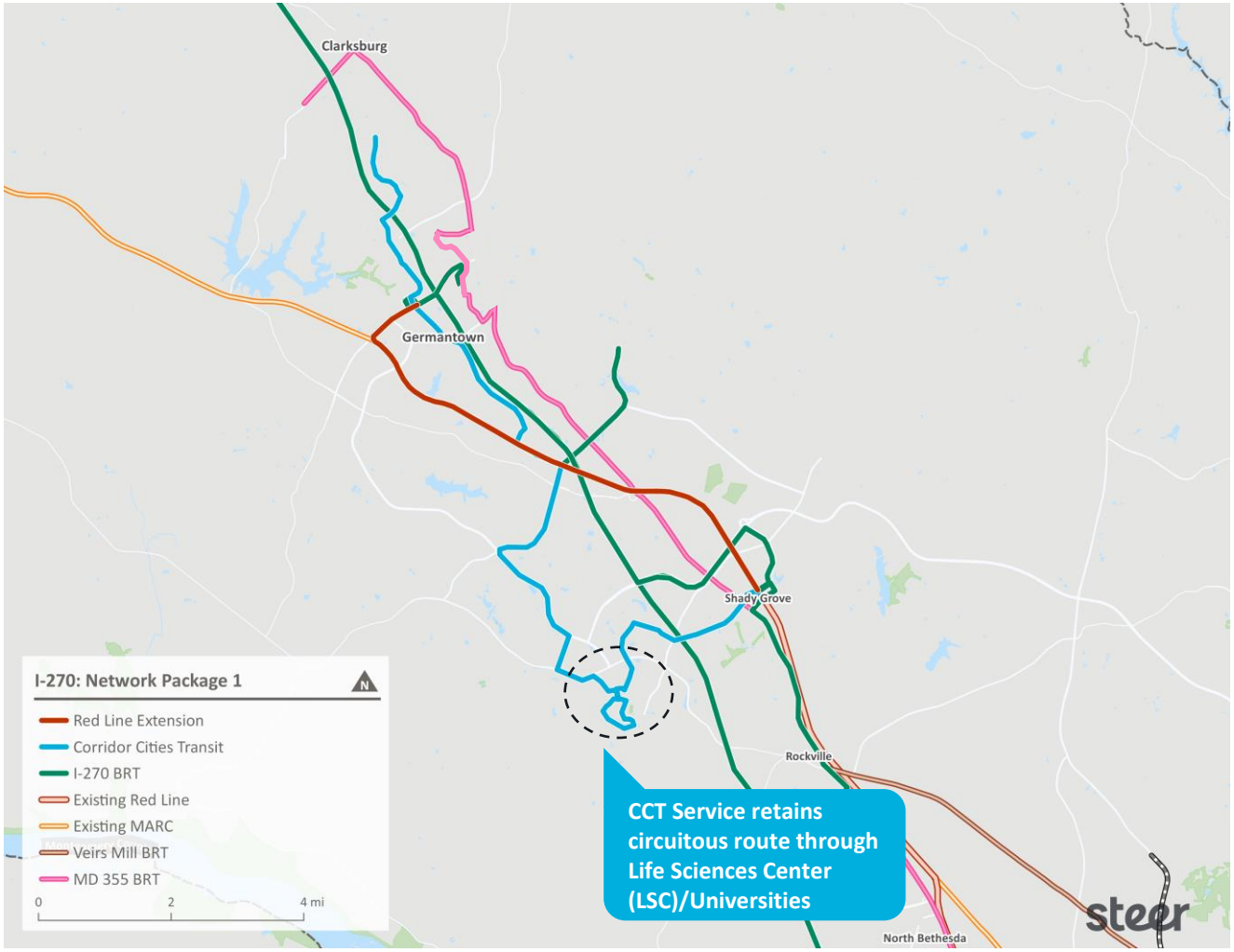
Source: Steer

Network Package 1: Combination of Options B, C, and F ("Original Combos")

NP1

- **Summary:** NP1 includes a combination of the original Option B Metro Red Line Extension, Option C CCT Stages 1 + 2, and Option F I-270 BRT with station changes as described on p. 3.
  - Station relocations as discussed in the preceding page, in addition to the relocation of the Metropolitan Grove CCT stop as proposed for the original Option C to realign with the combined MARC and Metro Red Line Metropolitan Grove Station
  - For the I-270 BRT, to only include the following service patterns: Service Pattern C (Montgomery Village to Tysons Corner) and Service Pattern D (Fredrick to Tyson) as per the original Option F.
  - For local bus assumptions, this package includes those modeled in the original Options B and F.
- **For further details:** Please refer to Appendix A.

Retaining the original options, NP1 is the only NP that has local connectivity to the Great Seneca Science Corridor



Source: Steer geographical information analysis

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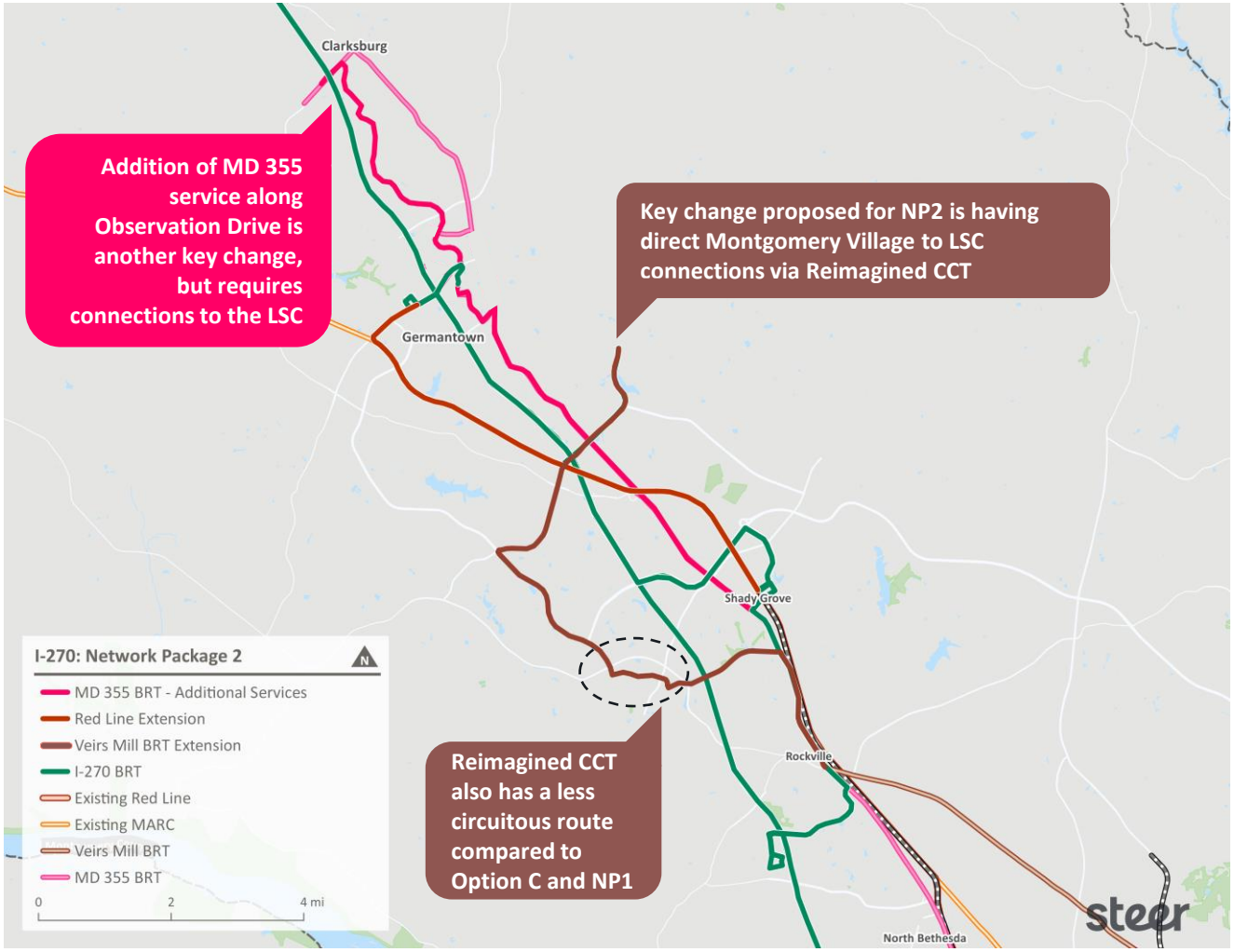
Network Package 2: Veirs Mill Extension as Reimagined CCT ("Veirs Mill CCT")

NP2

- **Summary:** NP2 includes a combination of the original Option B Metro Red Line Extension, Veirs Mill BRT Extension, additional MD 355 BRT services on Observation Drive, and Option F I-270 with station changes as described on p. 3.
  - Extension of the Veirs Mill BRT along a reimagined CCT service connecting Montgomery Village via Metropolitan Grove station to Rockville
  - For the I-270 BRT, to only include the following service patterns: Service Patterns C and D as per NP1.
  - For local bus assumptions, this package includes those modeled in the original Options B and F
  - Addition of MD 355 BRT along Observation Drive in addition to the service along Frederick Road.
- **For further details:** Please refer to Appendix A.

NP2 retains some connectivity to the Great Seneca Sciences Corridor via the Reimagined CCT



Source: Steer geographical information analysis

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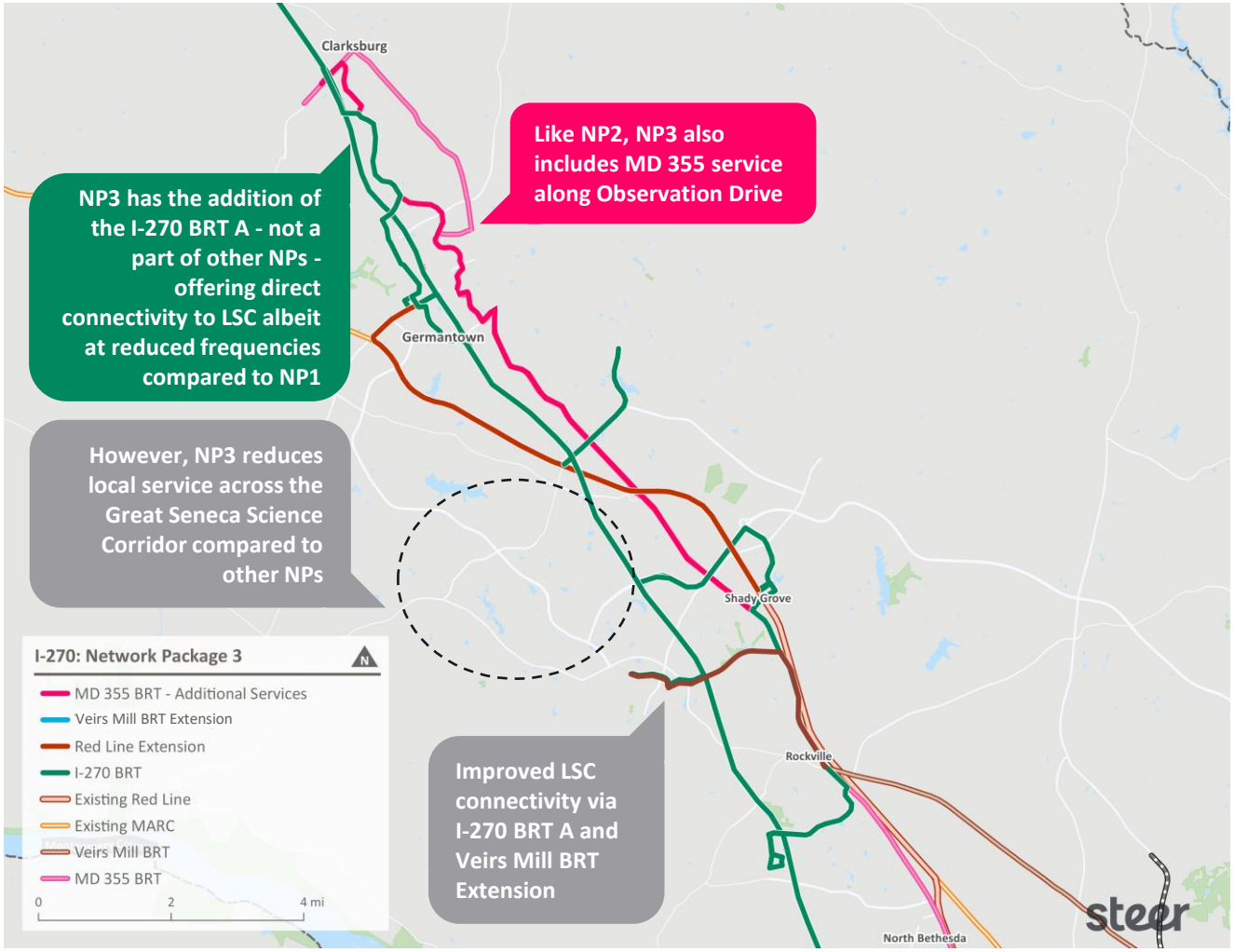
Network Package 3: With Veirs Mill BRT Extension to LSC ("Veirs Mill LSC")

NP3

- **Summary:** NP3 includes a combination of the original Option B Metro Red Line Extension, extension of Veirs Mill BRT to the LSC, additional MD 355 BRT services on Observation Drive, and Option F I-270 BRT with station changes as described on p. 3.
  - Extension of the Veirs Mill BRT to the LSC, effectively retaining a BRT connection to Rockville per NP2.
  - For the I-270 BRT, to only include the following service patterns Service Patterns A, C, and D.
  - Addition of MD 355 BRT along Observation Drive as per NP2.
- **For further details:** Please refer to Appendix A.

NP3 service pattern combinations reduce local service across the Great Seneca Sciences Corridor



Source: Steer geographical information analysis

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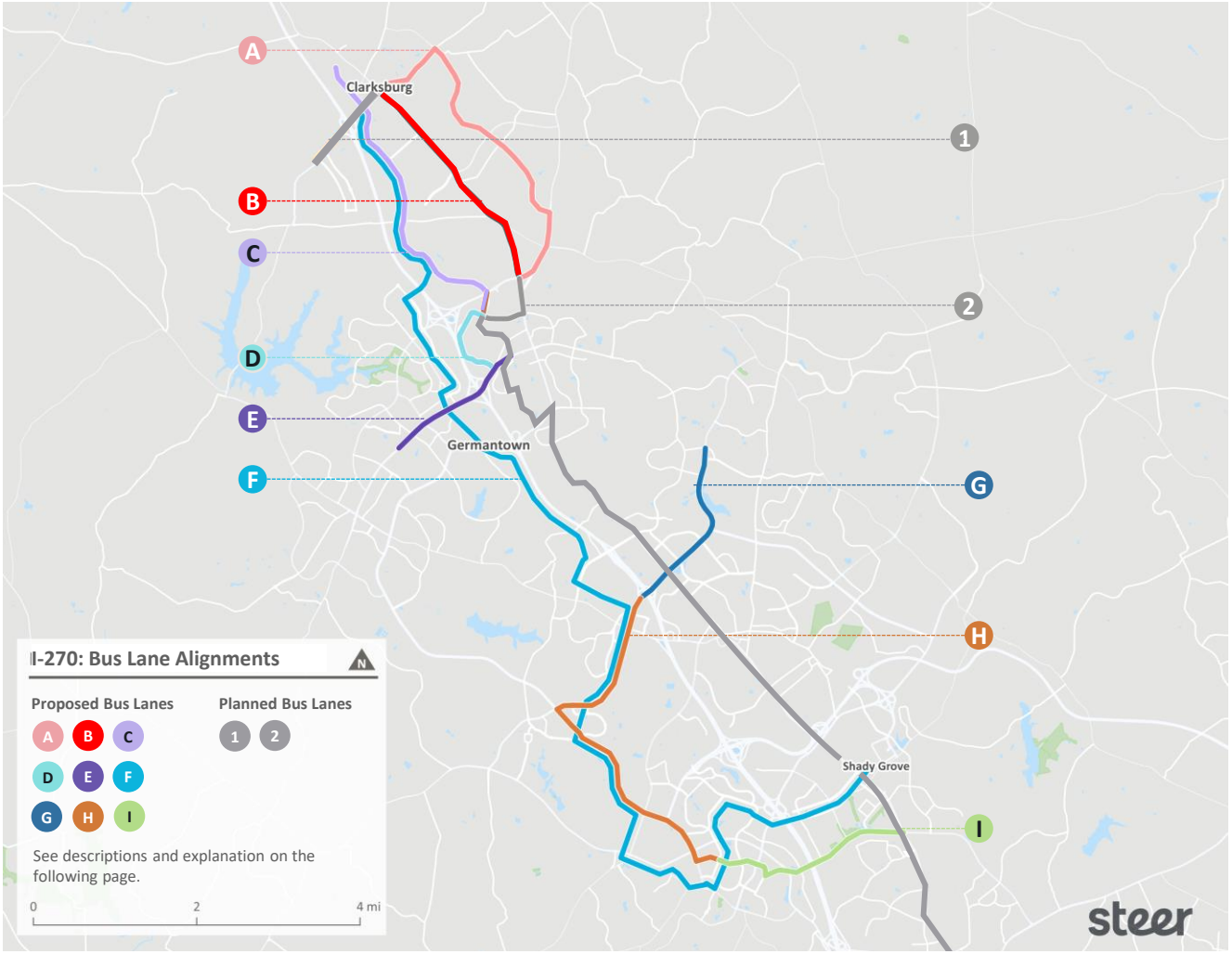
Capital and Operating Expenditure Approaches

- **Capital Expenditure – Infrastructure Approach:** Consistent with Report 4, infrastructure costs were estimated by multiplying an average unit length of a given mode multiplied by its total distance of the alignment. To calculate the NPs, this required the addition of multiple transit service options, including revisions to the Red Line to account for the relocation of Germantown Town Center station, as well as assessing each of the different BRT services alignment lengths per NP as each NP contains different combination of BRT services (for example, the Veirs Mill BRT differs across each of the NPs). This process as done together M-NCPPC.
  - The map illustrates the different proposed bus lanes as part of Option F and the NPs as well as planned bus lanes (MD 355 BRT).
  - The table on the corresponding page details which of the planned bus lanes are included in each of the NP used to derive the infrastructure costs.
- **Capital Expenditure – Vehicles and Operating Expenditure Calculation Approaches:** The approaches used were consistent of that of Report 4 for the NPs.
  - However, to account for the different NP vehicle and operating requirements for Veirs Mill BRT, specifically for NP2 and NP3, Steer estimated the incremental requirements of providing an extension.
  - For MD 355 BRT, no incremental costs were assumed given that Service Patterns 1 and 4 branches had reduced frequencies (in half) and served similar alignments.
- **For further information:** Please refer to Appendix A.

Bus lane combinations across the I-270 Corridor Forward Options



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Breakdown of bus lane configurations by option/Network Package to calculate the alignment length to estimate infrastructure costs

ID	Description	Distance (mi)	Option F	NP1	NP2	NP3
Additional Alignments						
A	MD 355 BRT Service Pattern 5 Only Snowden Parkway/Stringtown Road Branch	4.6	✓			
B	MD 355 BRT Service Pattern 1 Only Frederick Road Branch	3.0	(Subtract)[1]	(Built Anyway)[2]	(Built Anyway)[2]	(Built Anyway)[2]
C	MD 355 BRT Service Pattern 4 Only Observation Drive Branch	3.6	✓	(CCT Overlap)	✓	✓
D	MD 355 BRT Service Pattern 5 Only Seneca Meadows Parkway	1.4	✓			
E	MD 118	1.8	✓	✓	✓	✓
F	Masterplan CCT	17.0		✓		
G	I-270 BRT Service Pattern B to Montgomery Village	2.3	✓	✓	✓	✓
H	Viers Mill BRT Alignment as Reimagined CCT LSC to Metropolitan Grove	4.9			✓	
I	Viers Mil BRT MD 355 to LSC	2.5	✓		✓	✓
Alignments Already Costed in the CLRP (and thus not included in the costing of options and network packages)						
1	MD 355 Shared Service Patterns 1 with 4 and/or 5 – Clarksburg Road and Stringtown Road	N/A				
2	MD 355 Shared service Patterns 1 with 4 and/or 5 – Multiple Roads	N/A				
Total Bus Lanes (mi)			**13.2**	**21.1**	**15.1**	**10.2**

[1] Given that I-270 BRT proposes to replace the MD 355 BRT Service Pattern 1 with Service Patterns 4 and 5, capital costs for bus lanes along Frederick Road can be repurposed for parallel alignments.
[2] This would have been built anyway as part of the MD 355 BRT CLRP and thus excluded for capital costing purposes of the NPs.
Source: Steer geographical information analysis.

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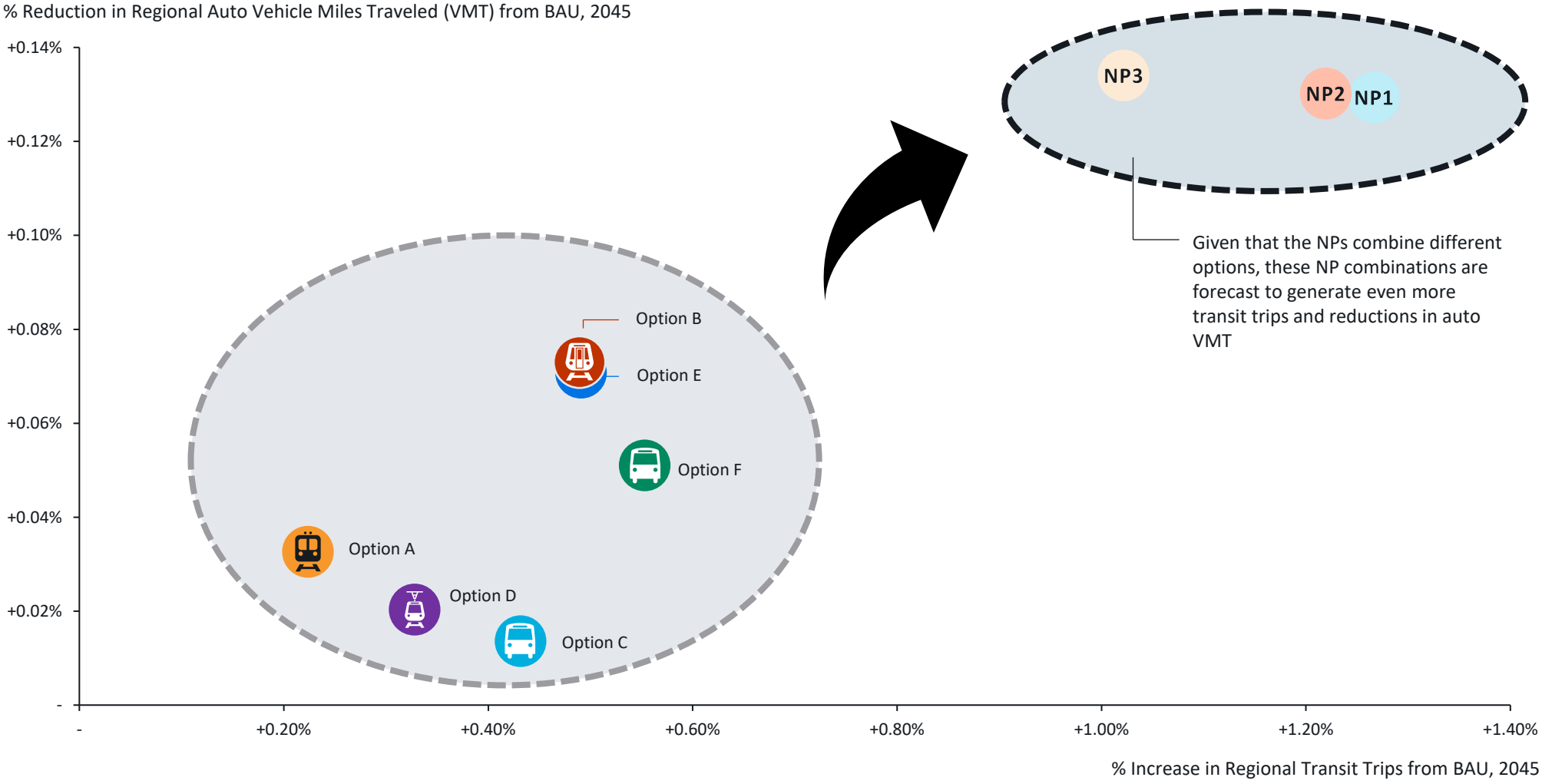
Section 2

Key Findings

- NP1 and NP2, which provide more local transit service within the mid-county via the CCT and Veirs Mill BRT Extension as the Reimagined CCT, are forecast to generate more regional and MCO transit trips than NP3.
- In addition, NP2 is forecast to have a higher potential to benefit MCO equity in terms of increasing the number of jobs accessible and access to cultural, social, educational, and recreational institutions within 45 minutes of transit from MCO EFAs.
- However, NP3 is forecast to have a higher Benefits-Cost Ratio (BCR) and financial performance due in part to the lower capital requirements.
- This section provides the summary key findings.

NP1 and NP2 are forecast to generate the highest relative increase in transit trips in 2045

NP2 and NP3 are forecast to have similar levels of regional transit trip performance and reductions in regional auto VMT



Source: Steer forecasts using the Maryland-National Capital Park and Planning Commission *Travel/4* model.

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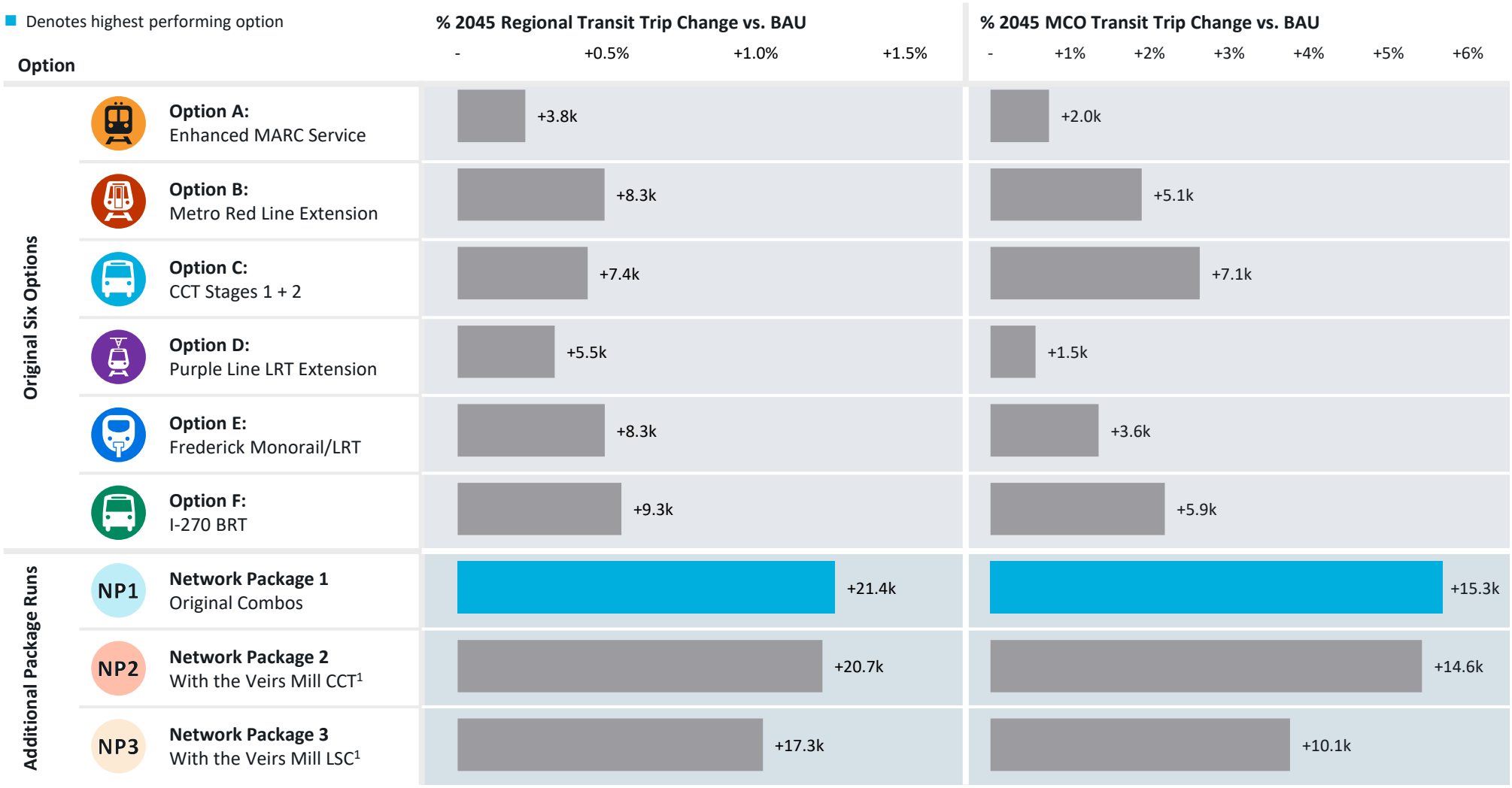
NP1 is also forecast to generate the highest increases in MCO transit trips in 2045…

… with NP2 finishing a close second



[1] "Ext" Stands for Extension.
Source: Steer forecasts using the Maryland-National Capital Park and Planning Commission *Travel/4* model.

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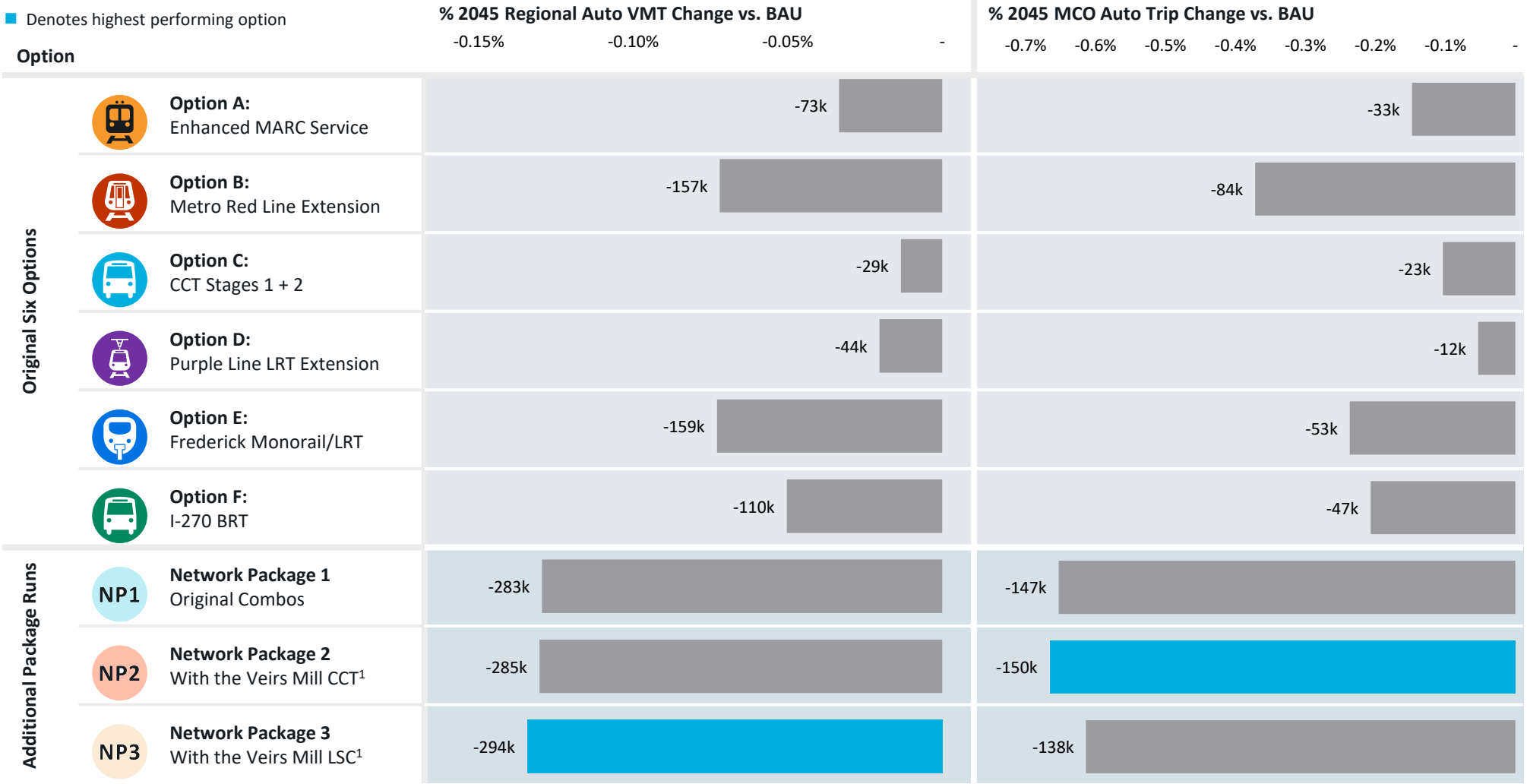
NP3 is forecast to generate the highest regional VMT reductions, but NP1/NP2 is similar

NP3's regional performance attributed to direct trips to I-270 BRT A; NP1 MCO performance due to local MCO service via CCT

■ Denotes highest performing option



[1] "Ext" Stands for Extension.

Source: Steer forecasts using the Maryland-National Capital Park and Planning Commission *Travel/4* model.

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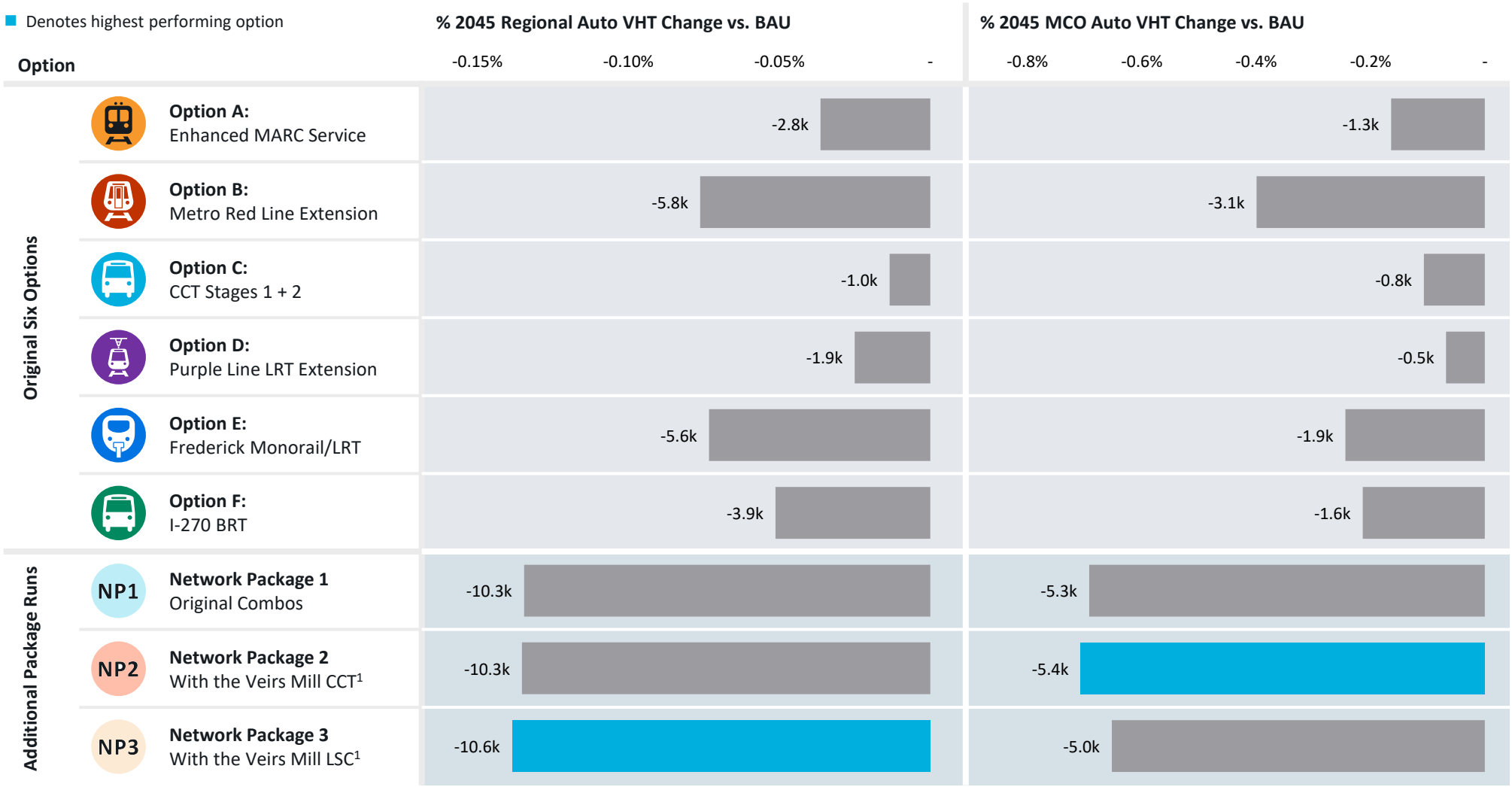
Similarly, NP3 is also forecast to generate the highest reductions in regional auto VHT

While NP1 is forecast to generate the highest reductions in MCO auto VHT – Broadly though performance across NPs are similar



[1] "Ext" Stands for Extension.
Source: Steer forecasts using the Maryland-National Capital Park and Planning Commission *Travel/4* model.

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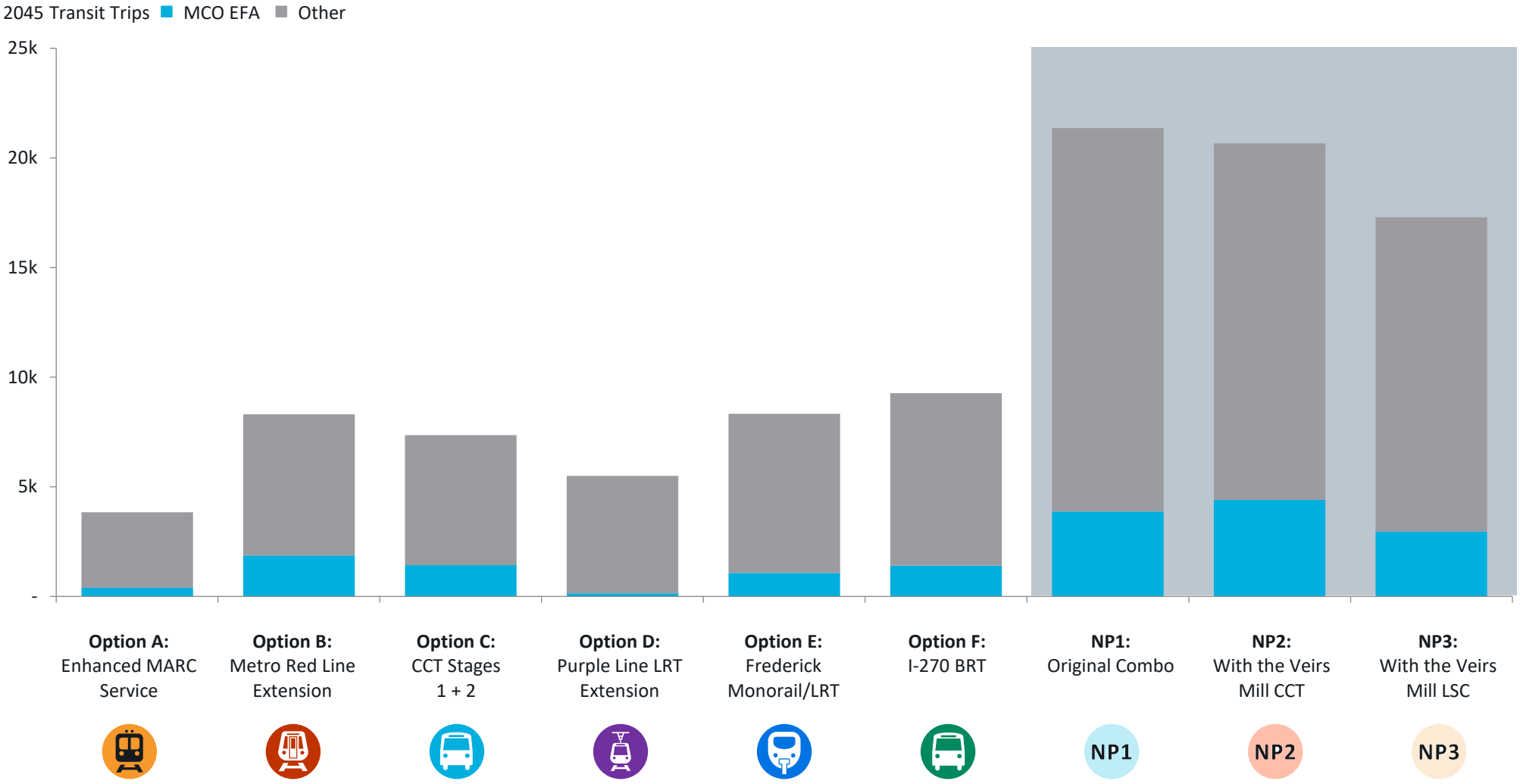
NP2 also generates the highest transit trips in 2045 from MCO EFAs…

…likely due to the frequent local service provided stretching along the I-270 corridor from COMSAT to LSC via the proposed CCT Stages 1 + 2 service



Source: Steer forecasts using the Maryland-National Capital Park and Planning Commission *Travel/4* model.

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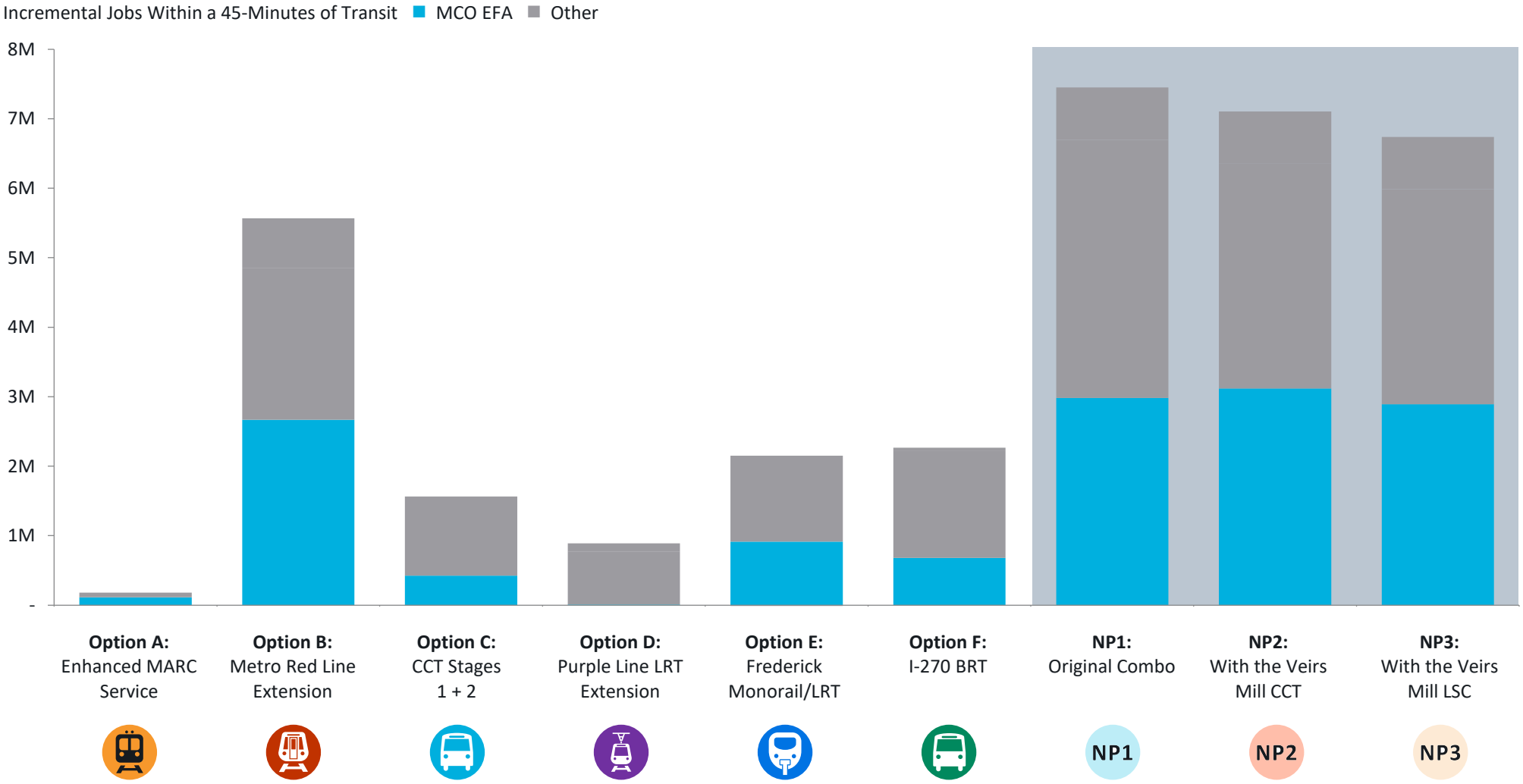
NP1 has the highest number of incremental jobs within 45 minutes of transit

However NP2 has the higher incremental benefit for jobs in terms of MCO EFAs



Source: Steer forecasts using the Maryland-National Capital Park and Planning Commission *Travel/4* model.

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Among the NPs, NP1 performs best in terms of transit trips followed closely by NP2

However, NP3 has the highest reductions in VMT while NP2 has the highest performance in terms of MCO equity

■ Denotes highest performing option

Category	Metric	2045 BAU	Change from 2045 BAU: Option A	Option B	Option C	Option D	Option E	Option F	NP1	NP2	NP3
Strategic Dimension	Regional transit trips	1.7M	+0.23% (+3.8k)	+0.49% (+8.3k)	+0.44% (+7.4k)	+0.33% (+5.5k)	+0.49% (+8.3k)	+0.55% (+9.3k)	**+1.26% (+21.4k)**	+1.22% (+20.7k)	+1.02% (+17.3k)
	MCO transit trips	268.4K	+0.74% (+1.9k)	+1.90% (+5.1k)	+2.63% (+7.1k)	+0.57% (+1.5k)	+1.36% (+3.6k)	+2.19% (+5.9k)	**+5.68% (+15.3k)**	+5.42% (+14.6k)	+3.76% (+10.1k)
	Regional Transit Mode Share	7%	+0.02%	+0.03%	+0.03%	+0.02%	+0.03%	+0.04%	**+0.09%**	+0.08%	+0.07%
	MCO Transit Mode Share	7%	+0.05%	+0.14%	+0.19%	+0.04%	+0.10%	+0.16%	**+0.42%**	+0.40%	+0.28%
	Daily VMT	219M	-0.03% (-73.0k)	-0.07% (-157.4k)	-0.01% (-29.4k)	-0.02% (-44.5k)	-0.07% (-159.4k)	-0.05% (-110.0k)	-0.13% (-283.2k)	-0.13% (-285.0k)	**-0.13% (-293.7k)**
	Annualized VMT on number of crashes causing fatalities	576	-0.2	-0.4	-0.08	-0.1	-0.4	-0.3	-0.75	-0.75	**-0.77**
	Annualized VMT on number of crashes causing injuries	49.7k	-16.60	-35.78	-6.68	-10.11	-36.24	-25.01	-64.37	-64.78	**-66.75**
Economic Health	Total jobs accessible within 45 minutes on transit	778.4M	+0.02% (+179.4k)	+0.72% (+5.6M)	+0.20% (+1.6M)	+0.11% (+890.1k)	+0.28% (+2.1M)	+0.29% (+2.3M)	**+0.96% (+7.5M)**	+0.91% (+7.1M)	+0.87% (+6.7M)
	Jobs Filled	2,194,065	+0.018% (2,194,453)	+0.101% (2,196,272)	+0.006% (2,194,187)	+0.001% (2,194,086)	-0.004% (2,193,977)	-0.015% (2,193,728)	N/A[1]	N/A[1]	N/A[1]
	Population	3,512,563	+0.003% (3,512,673)	+0.007% (3,512,808)	+0.001% (3,512,592)	+0.001% (3,512,600)	+0.004% (3,512,689)	-0.001% (3,512,529)	N/A[1]	N/A[1]	N/A[1]
Environmental Resilience	CO_2 emissions (grams)	88.3B	-0.03% (-29.5M)	-0.07% (-63.6M)	-0.01% (-11.9M)	-0.02% (-18.0M)	-0.07% (-64.4M)	-0.05% (-44.4M)	-0.13% (-114.4k)	-0.13% (-115.1M)	**-0.13% (-118.6k)**
MCO Equity	Jobs accessible by MCO EFA populations in 45 minutes on transit	31.5M	0.35%	8.47%	1.35%	0.03%	2.90%	2.16%	9.46%	**9.89%**	9.18%
	Cultural, social, educational, and recreational institutions accessible withing 45 minutes on transit by MCO EFA populations	141M	0.32%	8.48%	1.03%	-0.30%	2.97%	2.32%	9.09%	**9.77%**	9.00%

[1] A Regional Dynamic Model run was not calculated as agreed by the Montgomery County Planning Team.
Source: Steer analysis

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In economic terms, NP3 has the highest benefit cost ratio of the network packages

This is due to substantially lower costs and broadly similar benefits. Note the benefit cost ratio for NP3 is similar to that for Option B (Red Line only)

■ Denotes highest performing option

Category	Metric	Option A	Option B	Option C	Option D	Option E	Option F	NP1	NP2	NP3
Costs[1]	Capital and renewal costs	$1.2B	$1.4B	$640M	$1.6B	$2.9M	$700M	$2.5B	$2.2B	**$1.9B**
	Operating costs	$400M	$250M	$620M	$670M	$1.6B	$1.1B	$1.5B	$1.3B	**$1.0B**
User benefits	Transit travel time savings[2]	$210M 44M hours	$690M 157M hours	$320M 53M hours	$230M 40M hours	$520M 58M hours	$530M 74M hours	**$1.3B 256M hours**	$1.3B 253M hours	$1.2B 232M hours
	Auto travel user impacts - operating and decongestion	$230M	$510M	$90M	$140M	$510M	$350M	$910M	$920M	**$940M**
External benefits	GHG reductions	$10M	$20M	$4M	$10M	$20M	$10M	$30M	$30M	**$40M**
	Air quality improvements	$20M	$50M	$10M	$20M	$50M	$30M	**$90M**	**$90M**	**$90M**
	Reduced collisions	$150M	$320M	$60M	$90M	$330M	$220M	$570M	$580M	**$600M**
	Improved health	$10M	$20M	$20M	$20M	$20M	$30M	**$60M**	**$60M**	$50M
Economic indicators	Benefit cost ratio (BCR)	0.40	0.97	0.40	0.22	0.32	0.65	0.74	0.83	**0.96**
	Net present value	-$950M	-$50M	-$760M	-$1.7B	-$3B	-$630M	-$1.0B	-$590M	**-$120M**

[1] The Economic and Financial dimensions use a different discount rate, which will cause a variation in cost estimations between both calculations
Source: Steer analysis

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NP3 also performs the best in financial terms among the network packages

Although NP2 generates more revenue, NP3 has the least negative net financial impact.

■ Denotes highest performing option

Category	Metric	Option A	Option B	Option C	Option D	Option E[1]	Option F	NP1	NP2	NP3
Costs[2]	Capital and Renewal Costs	$1.3B	$1.5B	$821M	$2.0B	$3.8B	$895M	$2.9B	$2.5B	**$2.2B**
	Operating Costs	$360M	$170M	$490M	$282M	$862M	$990M	$1.2B	$1.1B	**$866M**
Revenue	Fare Revenue	$30M	$57M	$128M	$66M	$293M	$282M	**$323M**	$287M	$264
Financial Indicators	**Revenue / Operating Cost Ratio**	**8%**	**33%**	**26%**	**24%**	**34%**	**28%**	**27%**	**26%**	**30%**
	Net Financial Impact	**-$1.6B**	**-$1.6M**	**-$1.2B**	**-$2.3B**	**-$4.4B**	**-$1.6M**	**-$3.8B**	**-$3.4B**	**-$2.8**
Risk/ Funding Analysis	**Net Operating Costs**	**-$330M**	**-$113M**	**-$362M**	**-$216M**	**-$569M**	**-$708M**	**-$860M**	**-$814M**	**-$602M**

[1] The Economic and Financial dimensions use a different discount rate, which will cause a variation in cost estimations between both calculations
Source: Steer analysis

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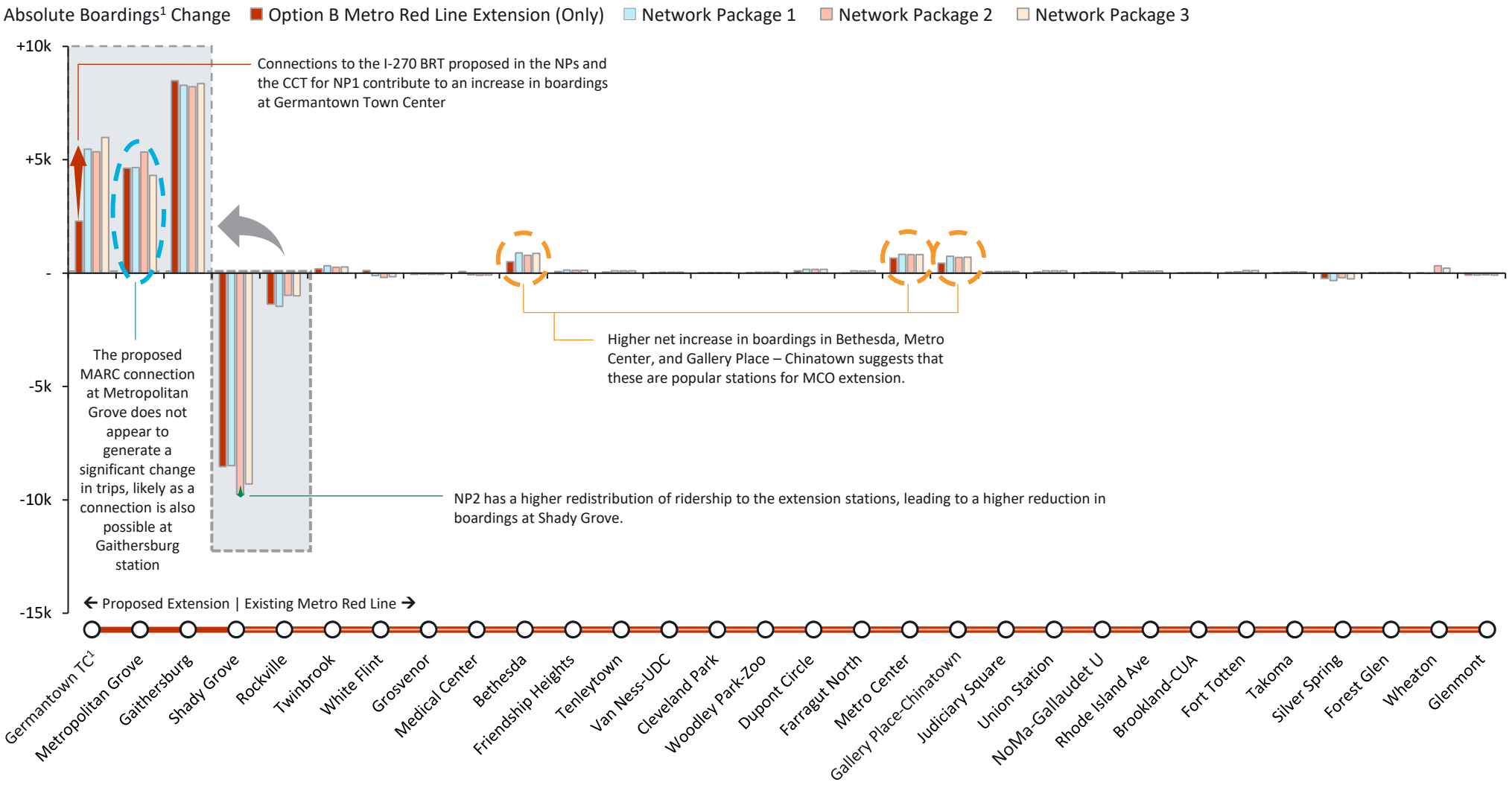
Section 3

Detailed Analysis

- The following section provides detailed analysis snapshots for the three NPs.
- Beyond these NPs, Steer has prepared the analysis for the Montgomery County Planning team to conduct any further analysis as necessary. These may include removing the Red Line Extension or adjusting bus services to assess the impact of transit trips.
- Appendix B provides other detailed results as a Transfer Sheet for the Montgomery County Planning team.

Ridership redistribution found in Option B is forecast to continue for the NPs

Riders previously connecting to the Red Line from Shady Grove and Rockville can use other stations along the new extension



[1] TC stands for Town Center.
Source: Steer forecasts using the Maryland-National Capital Park and Planning Commission *Travel/4* model.

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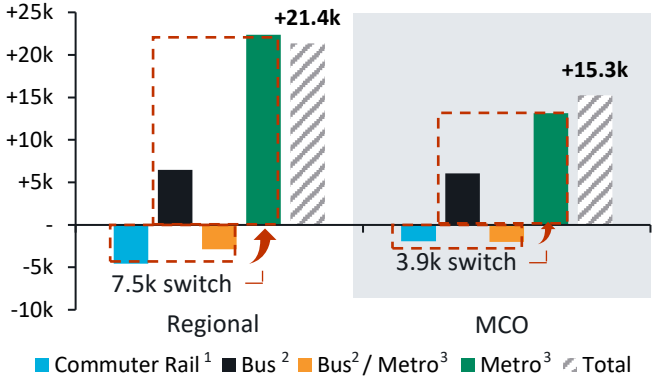
NP1 is forecast to generate 21.4k new regional transit trips and 15.3k for MCO

NP1

NP1 is forecast to draw from some transit modes including Commuter Rail and Bus Transfer to Metro trips

Absolute Transit Trip Change Compared to BAU, 2045

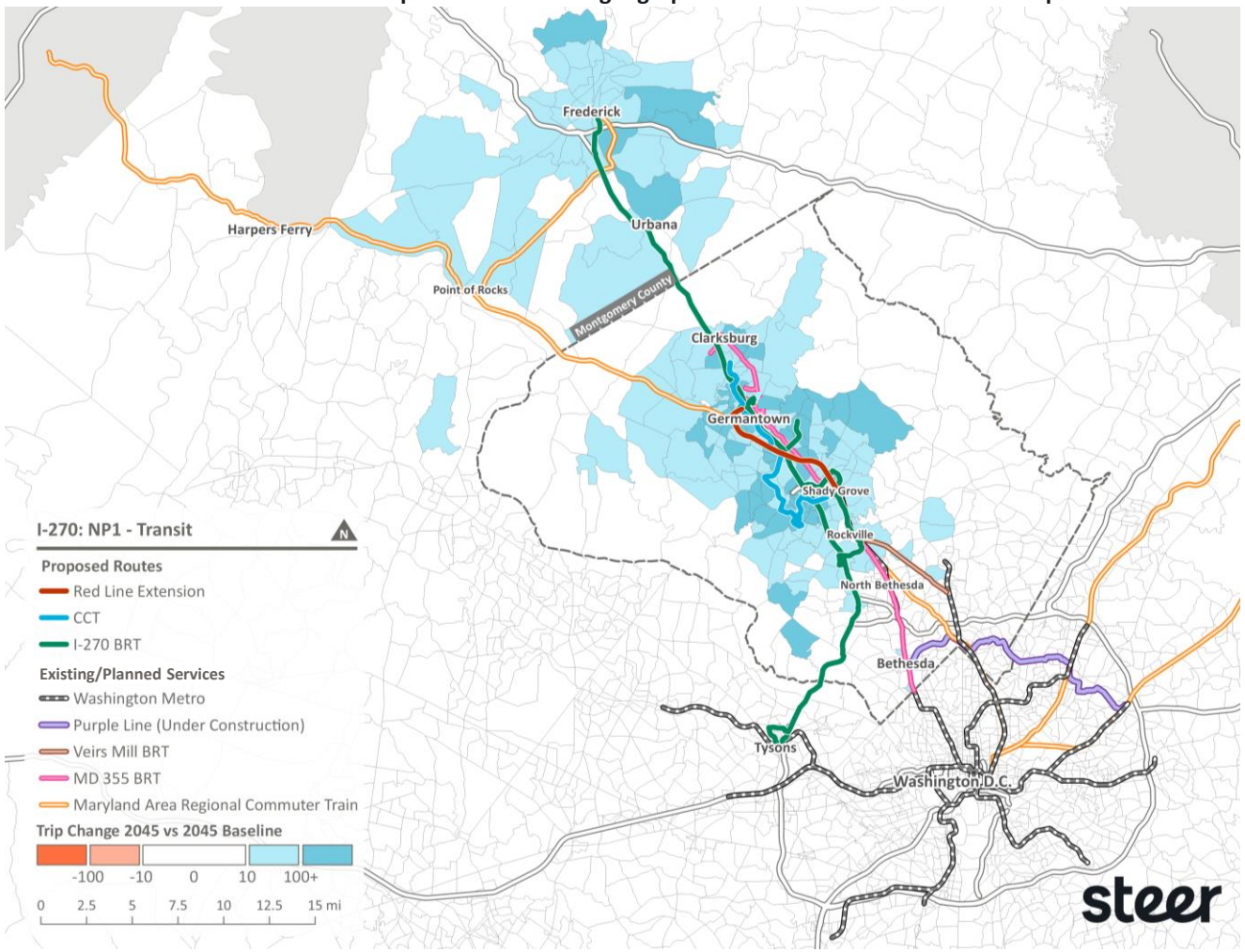


The proposed package of services is forecast to draw ridership from MD 355 and MARC Brunswick Line

Absolute Change in Daily Ridership from BAU, 2045

Service	2045
Metro Red Line	+11.6k
CCT	+20.9k
I-270 BRT	+11.8k
MD 355 BRT	-6.6k
Veirs Mill BRT	+0.2k
MARC Brunswick Line	-2.3k

NP1 combination of different transit options extends the geographic reach of the individual transit options



[1] Commuter Rail is non-exclusive and includes other modes (Commuter Rail only, Commuter Rail with Metro and/or Bus).
[2] Bus includes BRT.
[3] Metro includes LRT.
Source: Steer forecasts using the Maryland-National Capital Park & Planning Commission *Travel/4 Model*

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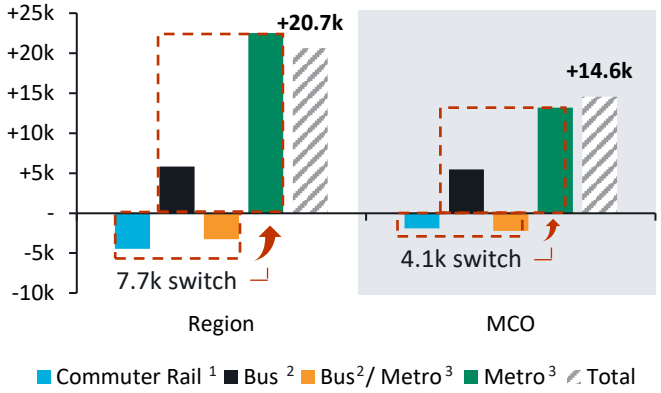
NP2 is forecast to generate 20.7k new regional transit trips and 14.6k for MCO

NP2

NP2 forecast to draw even more Commuter Rail and Bus/ Metro trips to Bus and Metro modes compared to NP1

Absolute Transit Trip Change Compared to BAU, 2045

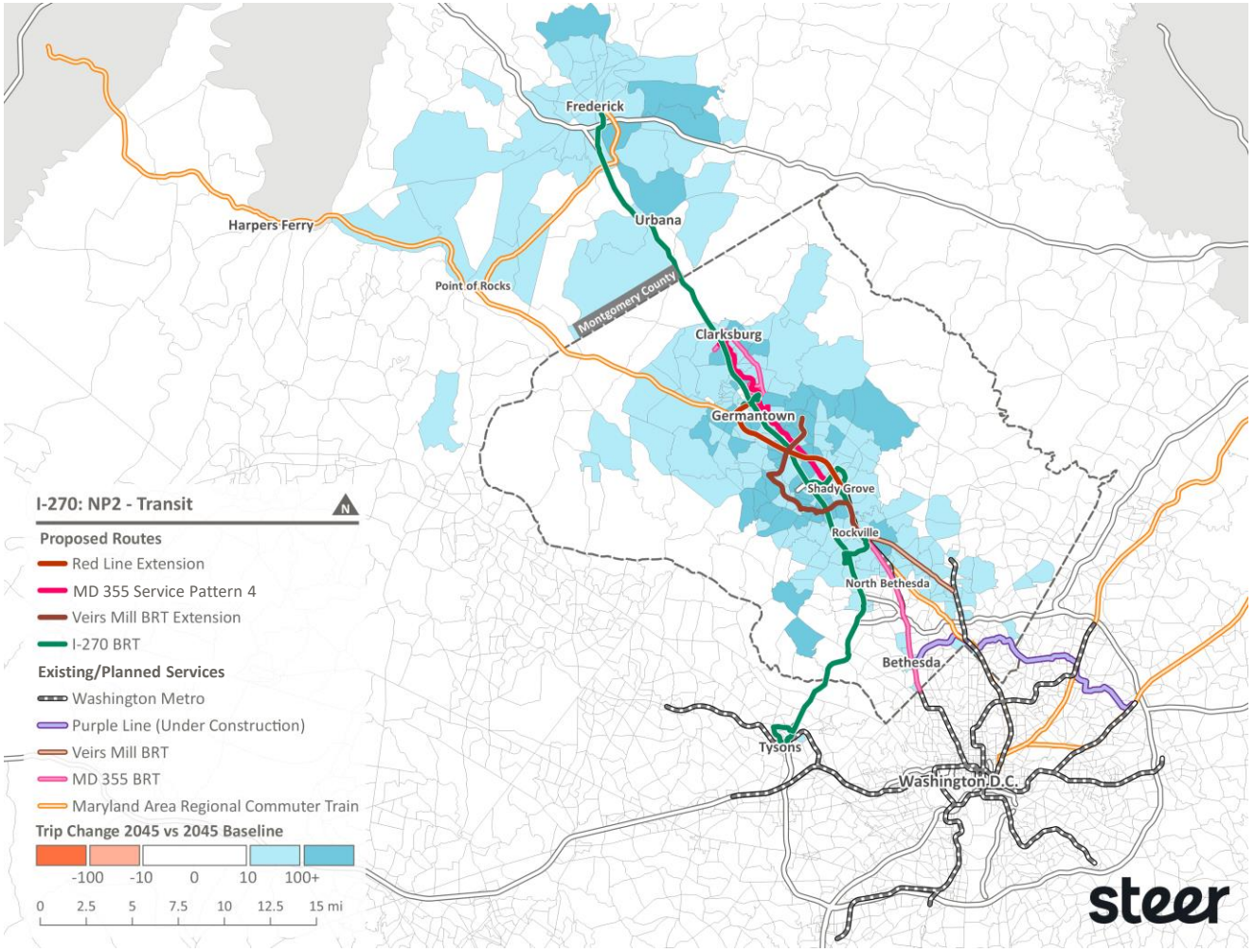


Shortened route in the Reimagined CCT is forecast to have less ridership than the full CCT route in NP1

Absolute Change in Daily Ridership from BAU, 2045

Service	2045
Metro Red Line	+11.5k
CCT	N/A for this NP
I-270 BRT	+11.5k
MD 355 BRT	-6.4k
Veirs Mill BRT	+21.2k
MARC Brunswick Line	-2.2k

NP2 is forecast to have a smaller increase in LSC transit trips vs. NP1, likely due to lack of Clarksburg-LSC direct service



[1] Commuter Rail is non-exclusive and includes other modes (Commuter Rail only, Commuter Rail with Metro and/or Bus).
[2] Bus includes BRT.
[3] Metro includes LRT.
Source: Steer forecasts using the Maryland-National Capital Park & Planning Commission *Travel/4 Model*

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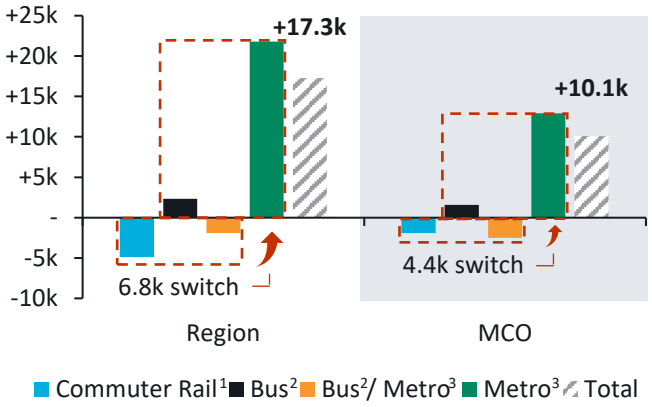
NP3 is forecast to generate 17.3k new regional transit trips and 10.1k for MCO

NP3

The addition of I-270 BRT A is forecast to further reduce regional Commuter Rail switching to Bus

Absolute Transit Trip Change Compared to BAU, 2045

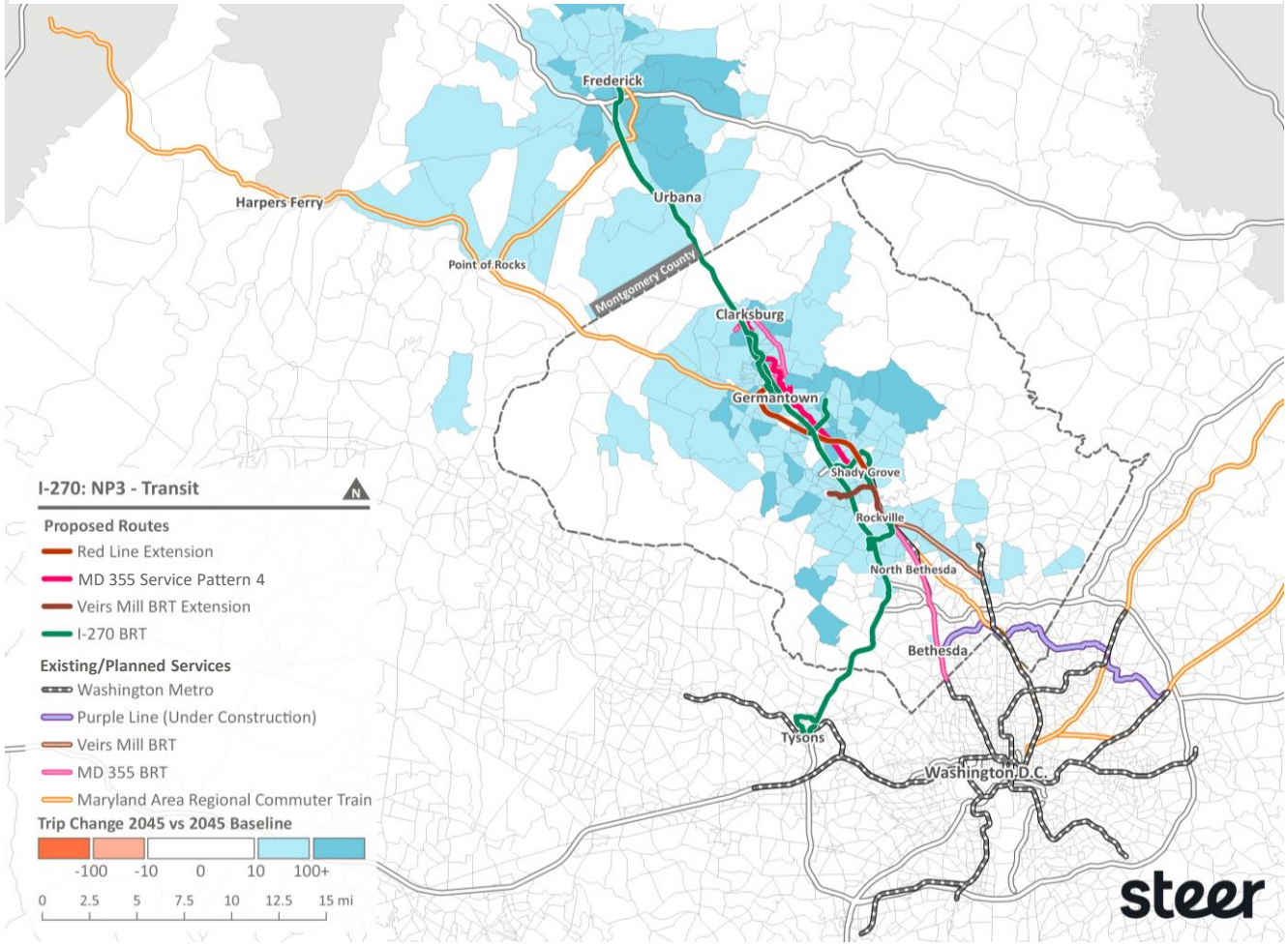


Extending Veirs Mill BRT service to LSC is forecast to increase ridership

Absolute Change in Daily Ridership from BAU, 2045

Service	2045
Metro Red Line	+11.7k
CCT	N/A for this NP
I-270 BRT	+14.9k
MD 355 BRT	-5.7k
Veirs Mill BRT	+6.3k
MARC Brunswick Line	-2.4k

NP3: Increase in transit trips for FRCO due to inclusion of I-270 BRT A; LSC forecast to not have as high of an increase compared to other NPs due to a reduction in proposed transit service



[1] Commuter Rail is non-exclusive and includes other modes (Commuter Rail only, Commuter Rail with Metro and/or Bus).
[2] Bus includes BRT.
[3] Metro includes LRT.
Source: Steer forecasts using the Maryland-National Capital Park & Planning Commission *Travel/4 Model*

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Our global practice

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Appendices

A. Assumptions
B. Transfer Sheets

Appendix A

Assumptions

Appendix B

Transfer Sheets

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