Rt. 1 Corridor

Transportation and Transit Assessment

HOWARD COUNTY
MARYLAND

Howard County Department of Planning and Zoning – January 2020

ROUTE 1 TRANSPORTATION AND TRANSIT

I. INTRODUCTION

The Route 1 Corridor serves the easternmost part of Howard County, which runs parallel to I-95 (Map 2, pg. 5). Before the Interstate system was constructed, Route 1 served as the main north/south highway serving the eastern U.S. from Maine to Florida. As such, the land use patterns along this historic highway are typically characterized by vintage motels and hotels, roadside restaurants, trucking terminals, warehouses and various other uses. The roadway was designed to support the movement of goods and people.

Over many decades, Route 1 has become a secondary corridor to the interstate highway system and it now serves local and regional transportation needs in most of the states where it's located along the eastern seaboard.

II. PURPOSE OF THE ASSESSMENTS

Transition from the Corridor Plan

In 2018, a Route 1 Corridor Master Plan was initiated to develop recommendations on revitalization strategies specific for Route 1 and was anticipated to be an amendment to the current General Plan, *PlanHoward 2030*. RKG and Associates, Inc. were hired to develop the Route 1 Corridor Master Plan. In July 2020, the County accelerated the next General Plan update and launched HoCo by Design, a project to update *PlanHoward 2030*. With both projects occurring simultaneously, the Route 1 Corridor Master Plan was folded into the General Plan update. Through the Route 1 Corridor Master Plan process, RKG & Associates prepared reports and recommendations based on community input received and an evaluation of conditions along the corridor.

The HoCo by Design consulting team will incorporate these reports and assessments into their analysis and modeling. Integrating the Route 1 Master Plan into the General Plan Update allows for a more comprehensive evaluation of the corridor and an opportunity to evaluate Route 1 in a wider context relative to Howard County as a whole. These papers will be used as resources by the general plan consultant team. The content of these papers is based on the work of RKG and its consultant team, Howard County staff, the HoCo By Design consulting team, and input from citizen engagement. The Transportation and Transit assessment will address transportation and transit infrastructure needs in the corridor. Transportation-related policy considerations are presented to support the vision for economic development, and case studies provide precedents from other areas in Maryland that are located along State Highway Administration (SHA) roads and that have successfully transitioned into more lively, dense, prosperous, and people-oriented places.

This paper and the Market Assessment and Trends paper will provide baseline of information that will offer a framework for the Land Use and Urban Design Assessment. The Land Use and Urban Design Assessment will provide detailed context for six possible **Candidate Investment Areas** where redevelopment and infrastructure could be targeted (Map 1, pg. 4). These assessments together will outline a revitalization strategy for the Route 1 corridor with a system of well-designed, market-based nodes where development and redevelopment can be focused.

Regional Transportation Context and Importance of Route 1

Route 1 in Howard County is approximately a 12-mile corridor that provides one of several connections between Washington D.C. and the City of Baltimore. In North Laurel, it operates as a one-way couplet with three lanes in each direction and a block of primarily commercial uses in the median until the intersection with Davis Avenue. As it continues north, Route 1 turns into a five-lane road with a center turn lane and crosses the Hammond Branch Stream. Route 1 then passes through Savage where it again becomes a divided highway as it crosses the Little Patuxent River and comes together in a cloverleaf interchange with Patuxent Freeway (MD-32).

Route 1 is undivided where it intersects with Guilford Road and crosses the Columbia Branch stream. Farther north, the highway crosses Dorsey Run twice before it meets Waterloo Road (MD-175) in Jessup. It then crosses Deep Run before intersecting Meadowridge Road (MD-103), creating a partial cloverleaf with MD-100 near Dorsey. After

Route 1 crosses Bealmear Branch stream it passes through Elkridge, where it intersects with Montgomery Road. The highway then meets with the northern end of Old Washington Road and passes under the CSXT Capital Subdivision railroad bridge, where it is divided by a Jersey barrier as it passes through the commercial strip in Elkridge. Before crossing the Upper Patapsco River into Baltimore County, Route 1 passes ramps to and from the Harbor Tunnel Throughway (I-895).

Washington-Baltimore Boulevard was built in 1908 and was referred to as State Road No. 1. It was signed as US Route 1 in 1926 with the inception of the US Highway System, and in 1928 it was reconstructed to a four-lane road with shoulders. From its start as a dirt road through Maryland's countryside, Route 1 has undergone several transitions as the surrounding neighborhoods have developed and motor vehicle volumes have increased. Route 1 has a reputation as being a dangerous place for pedestrians and bicyclists.

According to County Police data, there were 1,023 crashes along Route 1 in 2016, four of which involved pedestrians; all the pedestrian crashes were fatal. Since 2001, a series of studies have been performed to assess Route 1 and propose improvements that would address safety concerns and contribute to revitalization.

Rt. 1 Planning Context

These assessments build upon prior Route 1 studies, plans and initiatives that are outlined in the Executive Summary.

In 2001 and 2002, Howard County completed Phases 1 and 2 of the *Howard County Route 1 Corridor Revitalization Reports*. Key transportation recommendations from these reports include constructing new sidewalks, upgrading pedestrian infrastructure, and introducing traffic calming devices along the corridor to promote walking and enhance pedestrian safety. In addition to providing bicycle access to rail stations and bus stops, the recommendations also target improving bicycle access with new infrastructure, amenities, and education and awareness programs. They also focus on enhancing safety for all modes in certain areas and intersections, for example at MD-175, Guildford, Whiskey Bottom, Howard, Corridor, and Gorman Roads.

In 2004, following both reports, the County adopted new zoning districts for Route 1 and developed the *Route 1 Design Manual* to establish standards that would support land use patterns with a more urban character.

Between 2006 and 2008, the *US 1 Corridor Improvement Strategy* was prepared for the Maryland State Highway Administration (MDOT SHA). The report provides an overview of existing issues and opportunities deduced from a Reconnaissance Survey, refines a vision for the future of the corridor, provides tools to implement the vision, and sets a Transportation Improvement Strategy that identifies near-term and long-term physical improvements and relevant agency actions. The main findings of the report are that intersections are reaching travel capacity, pedestrians, and bicyclists lack connectivity and safe crossing opportunities, and transit use is not at its optimum level.

In 2009, Howard County updated the *Route 1 Manual* to include specific recommendations to increase safety for pedestrians and bicyclists and to enhance pedestrian and bicycle accessibility and connectivity in the corridor.

In 2016, Howard County adopted *Bike Howard*, the Howard County Bicycle Master Plan. The plan makes long-term and short-term recommendations for a bike network throughout the County. For Route 1, the Bike Howard Plan recommended separated bike lanes for the entire corridor and multiple long-term crossing improvements. In the short-term, the plan includes intersection facility recommendations; for example, a trail connection and crossing improvement at Howard Street, as well as bike lanes and a connection to the Dorsey MARC station at MD-103. In 2017, the County developed the draft plan for *Walk Howard*, the Howard County Pedestrian Master Plan which is an update of the *2007 Pedestrian Master Plan*. The Plan also recommends developing Complete Streets Guidelines in the context of the *Howard County Design Manual*, developing the County's Complete Streets Policy to address multimodal transportation more broadly, providing a clear sidewalk policy and better aligning the fees collected from developer fees in lieu with the actual cost of sidewalk construction. This will be reviewed and updated as a future revision to the Subdivision and Land Development Regulations.

Since completion of the SHA study and Rt. 1 Manual update, several traffic studies have been conducted as part of site development applications. Most of these studies have focused on meeting State and County traffic operations standards where recommendations targeted modifying traffic signal operations, adding new traffic signals, and revising lane assignments to improve Level of Service. Some geometric improvements to add additional traffic capacity in the form of turn lanes were recommended, especially at the intersection of Route 1 and Whiskey Bottom Road.

Recent crash trends show a clear increase in pedestrian-related crashes and fatalities along Route 1. In response, the Howard County Office of Transportation undertook an evaluation of bicyclists and pedestrian safety, focusing on traffic hazard conflicts for pedestrians and bicyclists. The report, *US 1 Safety Evaluation on Bicycle and Pedestrian Safety*, started in Spring 2018 and was published in February 2019. Four focus areas were selected based on historical crash trends and needs for improvement: the Laurel area (south of Whiskey Bottom Road), the Jessup area (around Guilford Road), the Elkridge area (north of MD-175), and the northern Elkridge area (around Montgomery Road). The toolbox was applied to the four focus areas, which included identifying priority gaps in sidewalks, implementing a context-sensitive speed limit, installing roadway lighting, providing for additional designated and controlled pedestrian crossings, and aligning bus stops with designated pedestrian crossings. From the general recommendations, five improvements were selected for prioritization and concept development. These include the following:

- Institute a road diet in the couplet section of Route 1 in North Laurel.
- Repurpose the outer travel lanes in each direction for a buffered one-way bike lane.
- Install a pedestrian-activated traffic signal at Brewers Court.
- Upgrade the intersection at Guilford Road with pedestrian signals and crosswalks across all four legs as well as construct connecting sidewalks.
- Upgrade the intersection at Rowanberry Drive with pedestrian signals and crosswalks across all four legs.
- Construct sidewalks and install additional roadway lighting and a pedestrian-activated traffic signal at Doctor Patel Drive.

Two projects funded by the Baltimore Regional Transportation Board (BRTB) Transportation Improvement Projects (TIP) fund are planned to be completed around the Route 1 Corridor in 2024. The first is a road widening of Dorsey Run Road from

MD-175 to the CSX Railroad Spur. This project is to study, design, and reconstruct Dorsey Run Road to four lanes from MD-175 south to the CSX railroad spur crossing, which is around 6,000 linear feet. The project will incorporate sidewalks and, potentially, bike facilities. The second is a road widening for Guilford Road from Route 1 to Dorsey Run Road. This project is to study, design, and reconstruct Guilford Road to three lanes from Route 1 to Old Dorsey Run Road, which is around 5,800 linear feet. The project will incorporate sidewalks and bike facilities to increase transportation alternatives for residents.

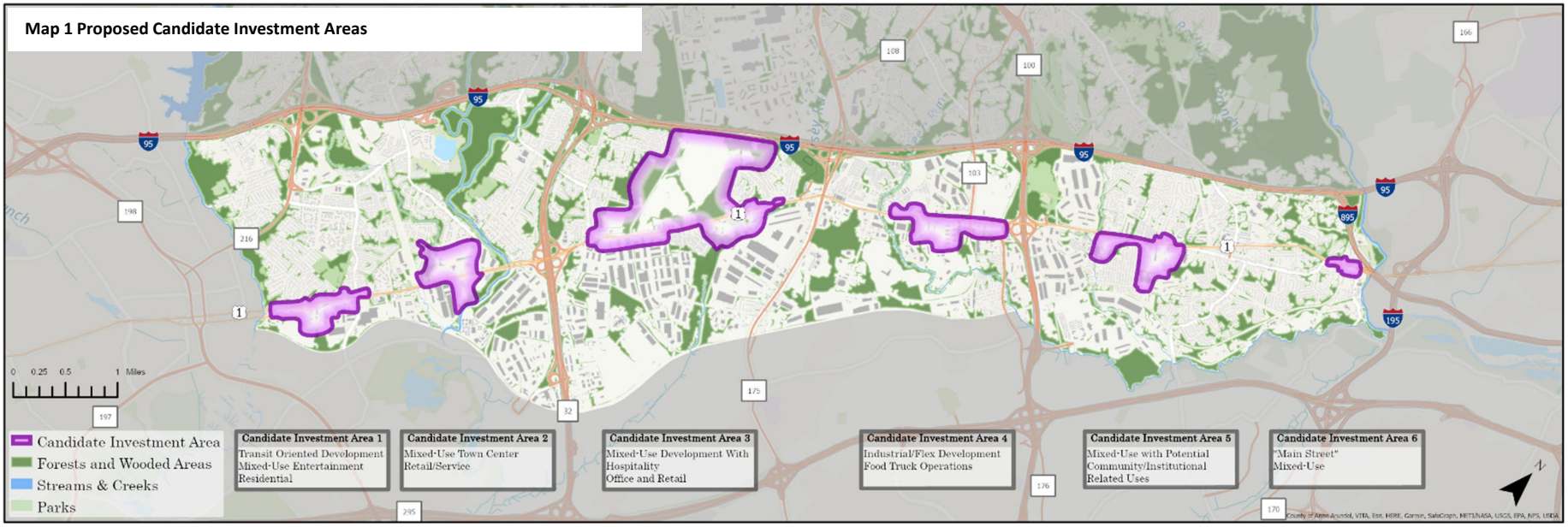
Vision for the Route 1 Corridor

The Route 1 Corridor in Howard County will be enhanced as a significant employment corridor with a series of vibrant, livable, walkable activity centers with a mix of uses characterized by improved pedestrian, bicycling, and transit mobility. The corridor will successfully blend needed community services with a sustainable industrial base. Key transportation guiding principles include the following:

- Increase mobility throughout the corridor for pedestrians, bicyclist, transit and automobiles.
- Make improvements to the linkages within each node, between nodes, from the parks and trail system, and to the other resources in the regional area.
- Provide transportation enhancements to maximize the economic potential of Route 1 including a continuous network of sidewalks, bikeways and trails within the nodes.
- Undertake corridor-wide traffic and pedestrian safety audit improvements at high risk locations and where future development is planned.
- Continue to invest in completed streets and multimodal transportation infrastructure to enhance mobility and access to diverse transportation options.

Transportation plays a critical role in the vision for a vibrant/revitalized Route 1 Corridor in Howard County and in the emergence and development of six proposed Candidate Investment Areas (see Map 1). These six proposed areas are outlined in more detail in the Land Use and Urban Design Assessment. During the HoCo By Design process, these areas will be further evaluated, refined and possibly reduced in number.

Map 1 Proposed Candidate Investment Areas



In addition to improving safety and multimodal connectivity for everyone, targeted transportation infrastructure investments will reinforce specific nodes of activity within the corridor and improve connectivity along the corridor to and from larger metropolitan areas, including Baltimore, MD and Washington, DC (See Map 2).

Safe, accessible, and comfortable transportation options for all users within the nodes will help them thrive. Rebalancing the transportation system will set the stage for robust economic development while cultivating a sense of place that is distinct from the broader corridor. Future transportation efforts should plan and program for distinct, vibrant, multimodal, and thriving nodes of activity. The proposed Candidate Investment Areas will provide a way to target and speed up progress by prioritizing multimodal infrastructure and focusing attention on the places that have multimodal demand, while also considering areas hazardous safety conditions exits. These are also the places where multimodal improvements can potentially be made as a part of planned redevelopment, which will benefit appeal to residents, tenants, and visitors alike.

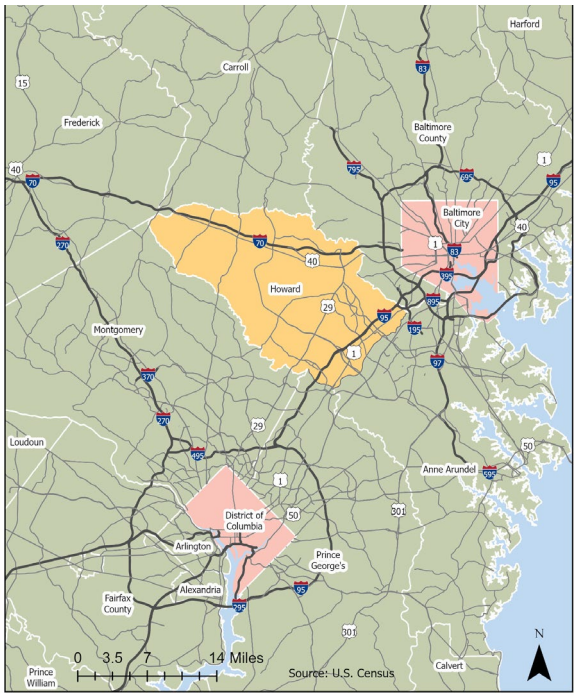
Serving State, Regional and Local Needs

Route 1 is a state road that functions as a local road. It features a mix of uses including residential, commercial, industrial, and institutional in addition to several hotels and motels. Residential and industrial uses are the most dominant along the corridor. The existing land use follows a general pattern where most of the residential uses are concentrated west and north of the corridor while the industrial uses are concentrated east of Route 1. There are some industrial businesses within predominately residential areas, for example, the Savage Stone Quarry on the west side of Route 1 between MD-32 and MD-175. Businesses along Route 1 that generate activity are the Laurel Race Track, CarMax, Jailbreak Brewing Company, Nestle Dreyer's Grand Ice Cream, Allied Trailer Sales and Rentals, Savage Volunteer Fire Company, Savage Stone quarry, Maryland Food Center Authority, Verde at Howard Square, Washington Boulevard Marketplace, and UPS Worldwide Express Freight Center. Most of these businesses also generate truck traffic.

The Camden Line MARC commuter rail line runs parallel to Route 1 along the Howard/Ann Arundel County line. There are four stations in Howard County in proximity to Route 1, all providing connections to Washington, D.C. and Baltimore City. The stations are Laurel Racetrack, Savage, Jessup, and Dorsey. These are significant transportation amenities that attract transit-oriented developments to the area.

Despite its proximity to commuter rail stations and the residential nature of certain sections of the corridor, Route 1 has an industrial-suburban character. It has four wide lanes that lack street furniture and street trees in addition to the abundance of truck traffic. These characteristics make it uncomfortable for people walking and bicycling. A thorough mapping of the existing conditions and a field study of the Route 1 Corridor highlight several issues that contribute to the low walkability of the corridor and may contribute to pedestrian and bicyclist safety concerns. These issues include disconnected pedestrian facilities, lack of bike facilities, lack of accommodations for pedestrians and transit users, and automobile-oriented intersection design.

Map 2 Washington/Baltimore Metropolitan Areas



MDOT SHA is in the process of updating standard roadway design guidance to allow for greater emphasis on pedestrians and bicycles in more urban and suburban areas. Many offices are working together to evaluate innovative solutions and implementation strategies to address pedestrian safety in corridors with urban characteristics. The MDOT SHA updated their design guidance with the

2019 publication, *Context Driven - Access and Mobility for All Users*. The guide is a planning and design resource offering practitioners' guidelines focused on creating safe, accessible, and effective multi-modal transportation systems.

Community Engagement

The public engagement process for the Route 1 Master Plan was designed to obtain meaningful community and stakeholder input at key points in the process, particularly during the examination of existing conditions (to provide a ground-truthing of what the consultant team learned) and during the development of concepts. Additional details about the community engagement process is found in the Executive Summary.

Citizens who attended the open houses and responded to the online survey were asked a variety of questions related to the presentations and displays. Surveys included multiple-choice and open-ended questions dealing with desired changes in the corridor, things to be retained, and how the public envisions the future of Route 1.

Transportation Focused Feedback

The results from all the community events are categorized by five recurring themes:

- Improved Transportation Infrastructure
- Business Employment and Services
- Preservation of Environmental/Historic Assets
- Growth Management
- Quality of Life

This paper will focus on the feedback categorized in the Improved Transportation Infrastructure theme. The other themes are covered in the market and economic trends and land use and urban design assessments.

Improved Transportation Infrastructure

Participants agreed that Route 1 is challenging for drivers, bicyclists, and pedestrians alike. The corridor is lacking in walking and biking facilities which limits the options for getting around beyond driving. They highlighted problematic intersections like Whiskey Bottom Road and Guilford Road that have high volumes and speeds and conflicts with truck traffic. The attendees indicated a preference for implementing separated facilities along the corridor to provide the highest forms of protection for pedestrians and bicyclists.

In addition, participants indicated that connectivity was a key concern and provided considerable positive feedback including:

- Complete continuous sidewalk infrastructure through "filling in" the missing sections along the corridor.
- Provide sidewalks that are sufficiently wide to allow for both streetscaping and buffering from traffic.
- Coordinate sidewalk improvements and pedestrian crosswalks at all key intersections.
- Provide multimodal transportation options along Route 1, including bicycle lanes, interconnected trails, and adequately designed sidewalks.
- Encourage future transit expansion through a mix of land uses that could support Transit Oriented Development (TOD) in the future.
- Consider various traffic calming measures, including a speed limit reduction and a "road diet" which would narrow or repurpose traffic lanes.

III. KEY TRANSPORTATION CHALLENGES AND OPPORTUNITIES

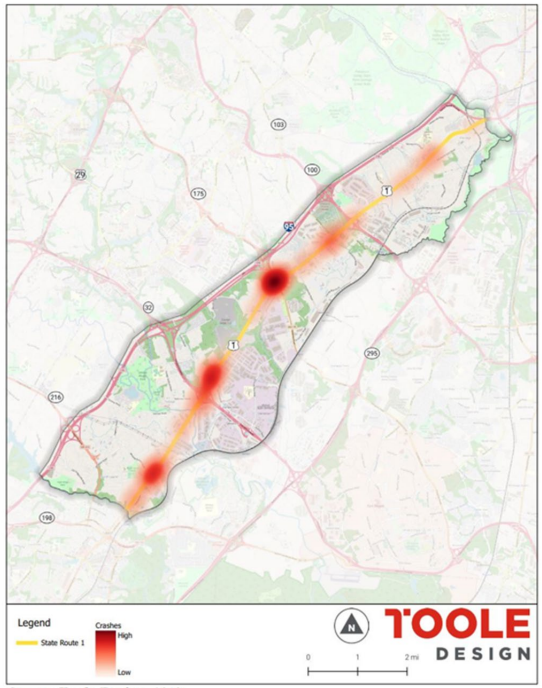
This section highlights key transportation-related challenges and opportunities along and across Route 1. The information is organized around three concepts: 1) *safety and comfort* relates to real and perceived exposure to risk, 2) *connectivity* refers to a seamless, interconnected multimodal system, and 3) a *sense of place,* or people's perception of an area and the extent to which it's considered special or unique.

Challenges

Safety and Comfort: There were 4,425 total crashes and 14 fatalities in the study area between the years 2012 and 2016. As shown in Map 3, crashes were concentrated around major intersections like Guilford Avenue, Whiskey Bottom Road, and Route 175. Of the total crashes, 1,647 (37 percent) were in the Candidate Investment Areas. Of the 52 crashes that involved bicyclists or pedestrians, 24 (46 percent) of them happened in Candidate Investment Areas. Four of the 14 total fatalities (29 percent) were in Candidate Investment Areas.

Road and intersection design play a big role in diminishing safety and comfort along the corridor. Most intersections along Route 1 are uncontrolled and do not have marked crossings. Turning radii and travel lanes are wide, and pedestrian crossing distances are long and lack pedestrian refuge islands. These design challenges, along with limited street lighting and a high-speed limit of 50 mph on most of the corridor, increase the exposure of people walking or biking and heighten crash risk.

Map 3 Heat Map of All Crashes in Corridor from 2012-2016



Source: Toole Design, 2019

The automobile-centric built environment along the corridor reduces the safety and comfort of pedestrians throughout the study area, which is detrimental to walkability and transit ridership. Without a walkable street network, transit ridership will be limited.

Connectivity: For people walking and bicycling, Route 1 is a barrier. There are significant gaps in the existing sidewalk network along Route 1. Also, there are no biking facilities along the corridor and the lack of safe crossings limits the use of facilities on nearby roads. While the corridor is 12 miles long, there are only four miles of sidewalk on the east side and approximately six miles of sidewalk on the west side; less than two miles have parallel sidewalks on both sides as shown in the Corridor Attribute Map (Map 4, pg. 13). Existing sidewalks and bikeways terminate without adequate transitions, and they are frequently disrupted by gaps, even around bus stops and residential areas. For example, the sidewalk disappears at the intersection with Corridor Road, limiting accessibility to the many riders who use the bus stop in the area, see photos below (pg. 8).

Lack of connectivity is an issue at the neighborhood level, as well as regionally. A MARC station is within walking distance from a number of neighborhoods along Route 1, but it is difficult to access for many of them. For example, crossing Route 1 at the unsignalized North Laurel Road intersection to get to Laurel Racetrack MARC station is very challenging. In this area, motor vehicles are accelerating from 35 mph to 50 mph, there is no marked crosswalk and no warning signs, and wayfinding is limited, see Figures 1 and 2 on pg. 8.

From a transit perspective, north/south connectivity between Howard County and the

Baltimore and Washington regions are mostly limited to peak periods, discouraging non-work-related transit trips. There are no central hubs for transit to operate from in the corridor other than the MARC stations (for example: at the MD Food Center many bus transfers are possible, but only one shelter and few sidewalk connections). There is no apparent "organization" to the system in the area. Additionally, lower density development along the entire corridor discourages investment in more frequent transit service.

Sense of Place: In addition to safety, comfort, and connectivity challenges, Route 1 struggles with providing a distinctive and welcoming environment for many of its users. Wide travel lanes and the absence of streetscaping and street furniture inhibit the experience of the place. It also has automobile-oriented land use characteristics such as large parking lots, frequent driveways, and relatively long distances between destinations. The uniform and dispersed suburban commercial uses often do not lend themselves to the creation of distinctive nodes along the corridor.

Figure 1 No Sidewalk at Bus Stop

Source: Toole Design, 2018

Figure 2 No Marked Crosswalk at Laurel Race Track

Source: Toole Design, 2018

Opportunities

Safety and Comfort: Wide roads and travel lanes along Route 1 provide space that can be reallocated through road diets and lane diets (i.e. removing excess capacity and narrowing existing motor vehicle travel lanes). The additional space could be used for buffered bike facilities, refuge islands, sidewalks, and green buffers. These safety countermeasures will increase comfort and lower the risk of crashes. Also, a buffer between the sidewalk and road will make the pedestrian experience more comfortable, especially given the speed of motor vehicle traffic.

Narrowing roads and providing buffers will not only provide safety for all users especially around truck traffic, but it can also lower motor vehicle speeds and help direct truck traffic toward major full-access intersections and away from local/neighborhood roads and intersections.

The low-density nature of development and the existing setbacks of developments along the corridor provide potential space for greater pedestrian and transit amenities. Large sections of the corridor have the capacity for sidewalks, bus shelters, and landscaping to increase pedestrian comfort and safety which in turn can encourage transit access and ridership. However, the details of these improvements and space to accommodate them will need to be confirmed at the project level.

Connectivity: Transit access exists within the corridor. The Camden MARC line runs parallel to Route 1, making hubs like Baltimore and Washington a train ride away for commuters. There are also seven Regional Transportation Agency of Central Maryland (RTA) bus routes and two Maryland Transit Administration (MTA) commuter bus routes that serve the study area. In 2017 RTA and MTA had more than 300,000 and 180,000 boardings respectively. There is a network of neighborhood and secondary streets that, in some cases, allows people biking to get where they need to go without having to use Route 1.

Multimodal improvements can enhance access to existing transit and encourage people to walk or ride a bike rather than drive for short trips, such as to MARC stations. Wayfinding can provide better awareness of local and regional connections, for example to MARC stations and nearby trails and bike paths.

Route 1 is a valuable artery that connects Howard County to both Baltimore and Washington, DC, and it can be better leveraged to integrate with both

markets. Higher frequency bus service with connections to Baltimore and Washington's transit networks can act as an inexpensive complimentary service to MARC Commuter Rail, especially when the latter is reduced to peak service, delayed, or over capacity.

Sense of Place: The analysis completed in this study suggests that the market appears to support Transit-Oriented Development (TOD). Several new mixed-use development proposals have recently been proposed in the area around Route 1, especially centered around the MARC stations. For the long-term success of TOD, increases in the frequency of MARC stops and greater local transit connectivity is critical. These would create hubs where it is possible to walk to a variety of commercial uses and services.

Market demand appears to support higher density development, which can lead to more street life and customers for local businesses etc. In many cases, new development can contribute on-site and, in some cases, off-site sidewalks and other multimodal improvements. Higher density development can also be achieved in tandem with open space preservation, which contributes to quality of life for residents and visitors.

Route 1 in Howard County stretches along three town centers: North Laurel, Savage, and Elkridge. These have the potential to transform Route 1 back into a place rather than just a vehicular corridor. Streetscape, street furniture, and other gateway treatments that reflect the identity of each of these town centers can create a better sense of place and unique, distinguishable nodes along the corridor.

The large parcels of undeveloped or underdeveloped land along the corridor provide opportunity for mixed-use development of moderate to high density that, with ample transit connections, can become truly integrated into the region's urban destinations. Additionally, the corridor's multiple MARC rail stations are ideal anchors for developments that provide a sense of place and should be fully leveraged in this strategy.

Corridor-wide Strategy and Approach

This section highlights corridor-wide transportation related strategies for achieving the objectives identified during this planning process.

Implement systemic safety improvements: The Howard County US 1 Safety Evaluation on Bicycle and Pedestrian Safety was published in February 2019. A systemic safety approach is recommended along the entire Route 1 corridor in the study area.

Systemic safety analysis relates priority crash types to the roadway contexts in which they most frequently occur, and then prioritizes countermeasures that provide a solution to those crash types at the identified location types. The innovative element in this approach is that it allows for prioritizing locations where crashes have not occurred in recent years simply because they have a high propensity for crashes to occur. This involves proactively targeting road safety improvements in high-risk locations where the most frequent and severe crashes occur, see Map 3 (pg. 7) for example.

Additional study is needed to identify appropriate and targeted systemic safety improvements for Route 1.

Conduct speed studies and evaluate opportunities to reduce posted and operating speeds: In 2019, the speed limit along U.S. Route 1 in Elkridge and Laurel was reduced from 50 mph to 45 mph. The study supporting the reduction was conducted in part with Howard County's U.S. 1 Safety Evaluation on Bicyclists and Pedestrian Safety. As the Candidate Investment areas are further refined, speed limits need to be reassessed on a continual basis as development progresses.

Implement accessibility improvements: A corridor-wide strategy and approach to accessibility is recommended. The strategy for ensuring accessibility over time is outlined in SHA's ADA Transition Plan. This study did not include a comprehensive accessibility analysis; however, accessibility issues were observed such as non-compliant curb ramps and sidewalk gaps. Every project along the corridor should be treated as an opportunity to improve accessibility. Refer to national guidance and best practices on accessibility, such as Accessible Shared Streets and Achieving Multimodal Networks for design solutions that consider the most vulnerable road users.

Improve transit service: While the current density along the Route 1 Corridor does not justify an increased transit level of service, consideration should be given to increasing service to match future demand and planned and proposed transit-oriented developments. This corridor service should not only connect developments along the corridor, but should also improve transit connections to external destinations, such as the City of Laurel, Columbia, and/or transit stations at the peripheries of Washington and Baltimore (such as the Greenbelt Metrorail Station, the future MTA Purple Line, and/or the MTA Light Rail).

In October 2020, the state completed the Regional Transit Plan, which is a 25-year plan for improving public transportation in Central Maryland (Anne Arundel County, Baltimore City, Baltimore County, Harford County, and Howard County). The Plan addresses traditional transit (buses and trains) and explores new mobility options and technology. This high-level plan is an additional element for advancing transit on this corridor.

Evaluate locations with excess roadway width and reallocate space: There are many locations along the corridor that appear to have excess roadway width. A comprehensive assessment of the existing roadway width is recommended to identify locations where a lane diet and/or a road diet are possible. Reallocating the roadway width can provide space within the existing right-of-way for things like separated bike lanes, while also improving safety for users.

Pursue access management along the entire corridor: A comprehensive corridor-wide access management study is recommended to identify potential opportunities to close or consolidate driveways. This can reduce conflict points and improve traffic operations.

Evaluate the Corridor Design Manual and existing National Environmental Policy Act (NEPA) document to determine if changes are needed to align with the new vision: There is an existing Corridor Design Manual and NEPA document for the Route 1 Corridor. Both documents should be reviewed, and changes should be considered to improve safety and comfort, connectivity, and sense of place consistent with the refinement of the Candidate Investment Areas through the HoCo By Design framework.

Reconsider regulations relating to private sector development such as Level of Service and parking requirements: Additional private sector development is anticipated along the entire Route 1 Corridor in the coming years. Development regulations should be reviewed to ensure that requirements and developments align with and don't undermine established goals. For example, parking requirements should be evaluated to discourage oversupply of parking and current best practices should be consulted for ways to evaluate performance beyond just motor vehicle Level of Service.

Candidate Investment Areas Strategy and Approach

This section highlights Investment-specific transportation strategies. These strategies would apply to the Investment Areas after evaluation and refinement during the HoCo By Design modeling.

Prioritize multimodal improvements along and across Route 1 with an emphasis on reducing speed and exposure: In the Investment Areas, multimodal improvements should be prioritized to enhance conditions traveling along and across Route 1. Given the higher density development in the Candidate Investment Areas, higher volumes of people walking, and biking are anticipated. Therefore, emphasis should be placed on reducing speed and exposure to risk, especially for pedestrians.

Fill key gaps in the network: Gaps in the pedestrian and bicycle network that exist within or connect to Candidate Investment Areas finalized through HoCo By Design should be prioritized for funding and implementation. Sidewalk gaps should be filled, especially around key destinations and in proximity to transit (Pg. 11, Figures 3 and 4). Existing on road bike facilities should be extended to connect to destinations and transitions should be seamless, comfortable, and safe.

Implement wayfinding and spot improvements to promote linkages to regional destinations: In the finalized Investment Areas, wayfinding should be improved to enhance connections to regional trail systems and to and from transit. Spot improvements, such as crossing enhancements, trail connections, and neighborhood biking routes should also be implemented.

Enhance transit service and amenities: For the finalized Investment Areas proposed along the Route 1 Corridor, smaller-scale transit options to encourage circulation and ease-of-access to MARC rail stations is key. Smaller-capacity shuttles can facilitate connections between larger, less pedestrian friendly business parks and/or provide circulation within them, along with frequent service to MARC commuter rail stations. These shuttles would make it possible for commuting workers from outside the region to leave their car at home by guaranteeing last-mile connections, which in turn would help reduce traffic along Route 1 for local residents and transit vehicles alike.

Create a plan for separated all ages and abilities networks in the Investment Areas: Development in each Investment Area should plan for a separated all ages and abilities pedestrian and bicycle network. Development plans for individual sites and parcels should acknowledge that many people will never feel comfortable or safe biking on-road next to vehicles without separation especially on a road like Route 1. The all ages and abilities network should include a system of separated bike lanes, shared-use paths, neighborhood routes, and safe intersections that allow everyone to feel comfortable and safe traveling in the finalized Investment Areas.

Establish modal priorities in finalized Investment Areas: As the targeted Investment Areas develop and become denser, modal priorities should be considered. These modal priorities can provide the framework for decision-making and for balancing trade-offs. An example of a modal priority is to say that the safety and comfort of pedestrian crossings near a school or transit facility will be prioritized over motor vehicle convenience. This may, for example, lead an agency to add a formal pedestrian crossing at an area of high crossing demand even if this contributes to some motor vehicle delay.

Implement streetscape improvements in finalized Investment Areas to promote sense of place: Streetscape improvements should be prioritized in the Investment Areas to make these nodes of activity more visibly recognizable. These streetscape improvements can also improve safety, for example by enhancing the buffer between the sidewalk and roadway.

Pursue SHA Pedestrian and Bicycle Priority Area designation for all or some of the finalized Investment Areas: Designation as a Pedestrian and Bicycle Priority Area should be considered for some or all the Investment Areas. The Annotated Code of Maryland states that the "Bicycle and pedestrian priority area means a geographical area where the enhancement of bicycle and pedestrian traffic is a priority."

Figure 3 Gaps in Sidewalks

Source: Toole Design, 2018

Figure 4 Pedestrian Walking on Route 1

Source: Toole Design, 2018

IV. TRANSIT EXISTING CONDITIONS ASSESSMENT

Key Transit Challenges and Opportunities

Table 1 below shows a list of the studies reviewed during the existing conditions analysis by Toole Design Group and FourSquare ITP, highlighting the focus of and context for each study. The team also compiled and analyzed a wide variety of information ranging from crash data and demographic distribution to median type and frequency of utility poles.

Map 4 on pg. 13 highlights key corridor attributes that inform the recommendations that follow. For example, the corridor attribute map shows areas with major sidewalk gaps on both sides of the road. It also shows that many locations have eight-lane cross-sections with no medians or refuge islands. This highlights the need to provide sidewalks, pedestrian crossing improvements, and medians in these locations. These also may be locations to consider reallocating the cross-section. A further analysis of existing sidewalks and locations of transit stops and stations, shows gaps in the sidewalk network around stops. This highlights priority areas for pedestrian improvements.

Table 1 Previous Studies Reviewed

Study Title	Firm(s)	Year
Howard County Rt 1 Revitalization Study Phase 1	Nelessen Associates, Inc., Greenman-Pedersen, Inc., Streetscapes, Inc. and URS Corporation	2001
Howard County Rt 1 Revitalization Study Phase 2	Nelessen Associates, Inc., Greenman-Pedersen, Inc., Streetscapes, Inc. and URS Corporation	2002
US Corridor Improvement Strategy Reconaissence Survey	Kittleson and Mahan Rykeil	2006-2008
Route 1 Manual	DPZ	2009
Bike Howard Bicycle Master Plan	Toole Design Group	2016
Walk Howard Pedestrian Master Plan	Toole Design Group	2017
Rt. 1 Safety Study	Sabra and OoT	2018-2019

In addition to reviewing previous studies and performing an existing conditions analysis, the team conducted several public open house meetings to listen to residents, learn about their needs, and enable them to inform the development of the vision for the corridor. Attendees agreed that the lack of connected walking and biking facilities limits the options for getting around beyond driving. They highlighted problematic intersections like Whiskey Bottom Road and Guilford Road that have high volumes and speeds and conflicts with truck traffic. The attendees indicated a preference for implementing separated facilities along the corridor to provide the highest forms of protection for pedestrians and bicyclists.

Existing Transit Level of Service

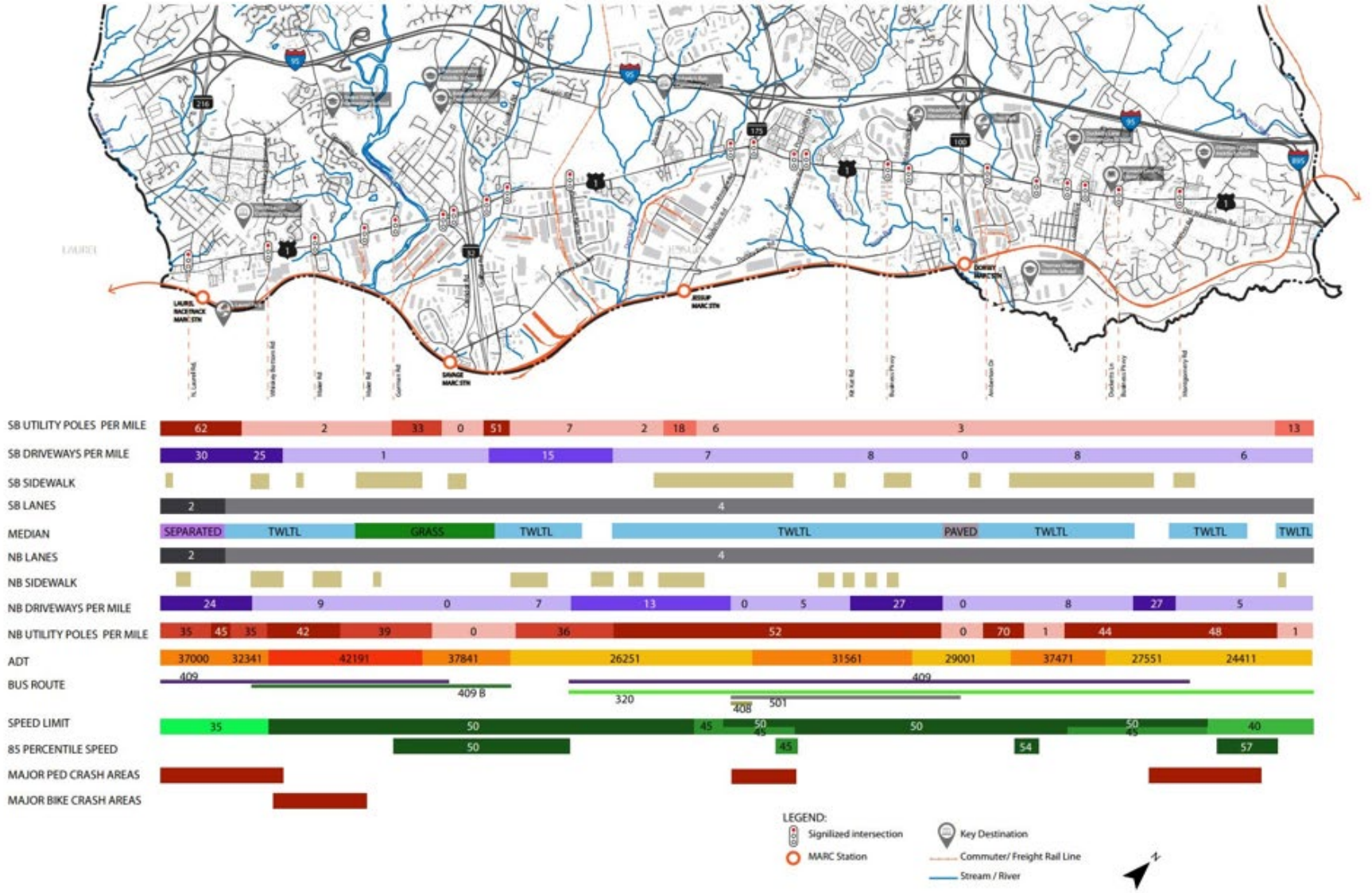
The transit study area consists of the length of US-1 in Howard County, bound to the west by I-90, and to the east by the Howard County boundary, and includes communities such as Laurel, Dorsey, Elkridge, Savage and Jessup.

The area is served by two transit providers: the Maryland Transit Administration (MTA) (operated by Maryland Department of Transportation) and the Central Maryland Regional Transit Agency (RTA). The former provides mainly commuter bus and rail service to Greater Washington and Greater Baltimore, while the latter provides local service throughout Central Maryland (Howard County, Anne Arundel County, Northern Prince George's County, and the City of Laurel).

While the RTA provides extensive coverage in the southern and central portions of the corridor, the northern end (Elkridge and St. Denis MARC station) only has access to MTA commuter service and thus has extremely limited transit availability during non-peak periods.

Within the majority of the study area, transit services operate every hour along US-1 and the major east-west arterials that intersect it. More frequent service occurs on the Route 504 and the MARC rail connections during the morning and afternoon peak periods. Bus service from both agencies is focused between 6:00 AM and 7:00 PM, with less early morning service and very few late period options.

Map 4 Key Corridor Attributes



Regional Transit Agency

The RTA provides local fixed-route service within the study area and surrounding communities. The routes operate approximately every hour (see routes on next page). The RTA provides important north-south coverage along the length of the corridor, connecting the City of Laurel to Elkridge. It also provides numerous east-west connections to employment and commercial opportunities at Columbia Mall, Arundel Mills, and Fort Meade. RTA routes also act as a feeder to local MARC stations on both the Camden and Penn Lines (via the Savage MARC Station and the Odenton MARC Station, respectively).

Maryland Transit Administration

The MTA provides commuter bus service within the study areas and surrounding communities. Route 201 operates on an hourly basis, 20 hours a day, as a feeder service to Baltimore-Washington International (BWI) Airport for Montgomery and Howard counties. Route 320 serves as a commuter service from Columbia Mall, Elkridge, and Jessup to Downtown Baltimore. It offers more frequent service during the peak periods, and no service after 7:00 PM. Routes are shown on the next page.

Maryland Area Regional Commuter Train

MARC Train Service, also operated by the MTA, provides the study area with direct access to Downtown Baltimore and Downtown Washington via three regular stops and three flag stops either in or adjacent to the corridor study area. These stations are served by the MARC's Camden Line.

Similar to the MTA bus routes, this train service caters to commuting needs, with no trips outside early or peak periods. See MTA routes in Table 3 on the next page.

Existing Transit Ridership

Annual Ridership by Route

Among all the routes that serve the study area, the MTA Route 201 to the BWI Airport has the highest ridership, almost double that of the RTA's Routes 501 and 503. RTA Routes 408 and 409, which have alignments largely along the US-1 and MD-175 corridors, show less ridership than Routes 501, 502, and 503, cross-corridor connections that provide access to Arundel Mills Mall, Columbia Mall, and the City of Laurel.

Finally, Routes 409 and 504 show the lowest ridership by far. The former could be due to its redundancy with Route 408, the latter due to its shorter length and service focus (mainly to connect Fort Meade to MARC service). The annual ridership for all study area routes can be found below in Figure 5 and the Corridor Ridership Activity Map on pg. 16.

MTA Commuter Bus

Source: Tri-County Council for Southern Maryland

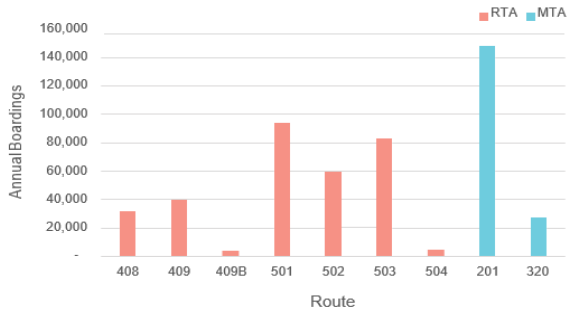
RTA Bus

Source: Youtube, MW Transit Vids

MARC Train

Source: Maryland Transit Administration

Figure 5 Corridor Annual Ridership by Route

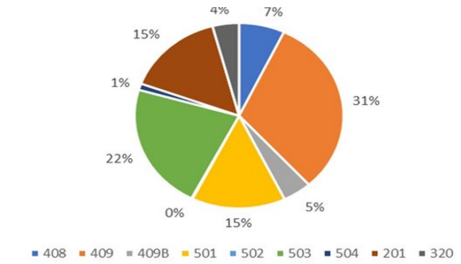


Source: RTA & MTA FY2017 Ridership Data

Source: Toole Design, 2018

Source: Toole Design, 2018

Figure 6 Daily Bus Boarding by Study Area



Source: RTA & MTA APC data

Table 2 Service Characteristics of Select RTA Routes

Route Number	Destinations / Areas Served	Weekday							Saturday					Sunday				
		Span	Headways by Period						Span	Headways by Period				Span	Headways by Period			
			Early	AM	Midday	PM	Evening	Late		Early	Day	Evening	Late		Early	Day	Evening	Late
408	Columbia Mall - MD Food Center	5:53 AM - 10:17 PM	37	60	90	60	120	-	7:53 AM - 10:17 PM	120	120	-	-	-	-	-	-	-
409	Elkridge Corners - Laurel	6:00 AM - 9:55 PM	-	60	72	60	60	-	9:00 AM - 10:50 PM	-	120	120	-	-	-	-	-	-
409B	MD Food Center - North Laurel Community Center - Salvation Army	5:49 AM - 5:57 PM	60	60	60	60	-	-	8:49 AM - 8:41 PM	60	60	60	-	-		-	-	-
501	Columbia Mall - Arundel Mills	5:35 AM - 10:53 PM	100	90	90	90	60	60	7:03 AM - 10:53 PM	60	60	120	120	9:03 AM - 10:53 PM	-	120	-	-
502	Arundel Mills - Laurel	6:00 AM - 10:48 PM	-	60	60	60	60	60	9:00 AM - 10:26 PM	-	120	150	-	10:00 AM - 7:50 PM	-	150	150	-
503	Columbia Mall - Laurel	5:30 AM - 9:15 PM	60	60	60	60	60	-	8:30 AM - 8:45 PM	60	60	60	-	-	-	-	-	-
504	Savage MARC - Sentinel Dr - Ft. Meade - Odenton MARC - Piney Orchard	5:43 AM - 6:38 PM	30	30	30	30	-	-	-	-	-	-	-	-	-	-	-	-

Source: RTA GTFS Feed

Table 3 Service Characteristics of Select MTA Routes

Route Number	Destinations / Areas Served	Weekday							Saturday					Sunday				
		Span	Headways by Period						Span	Headways by Period				Span	Headways by Period			
			Early	AM	Midday	PM	Evening	Late		Early	Day	Evening	Late		Early	Day	Evening	Late
201	Gaithersburg - BWI Business District	4:00 AM - 12:20 AM	60	60	60	60	60	60	4:00 AM - 12:17 AM	60	60	60	60	4:00 AM - 12:17 AM	60	60	60	60
320	Laurel - Baltimore	5:05 AM - 6:22 PM	20	30	47	38	-	-	-	-	-	-	-	-	-	-	-	-

Source: MDOT MTA GTFS Feed

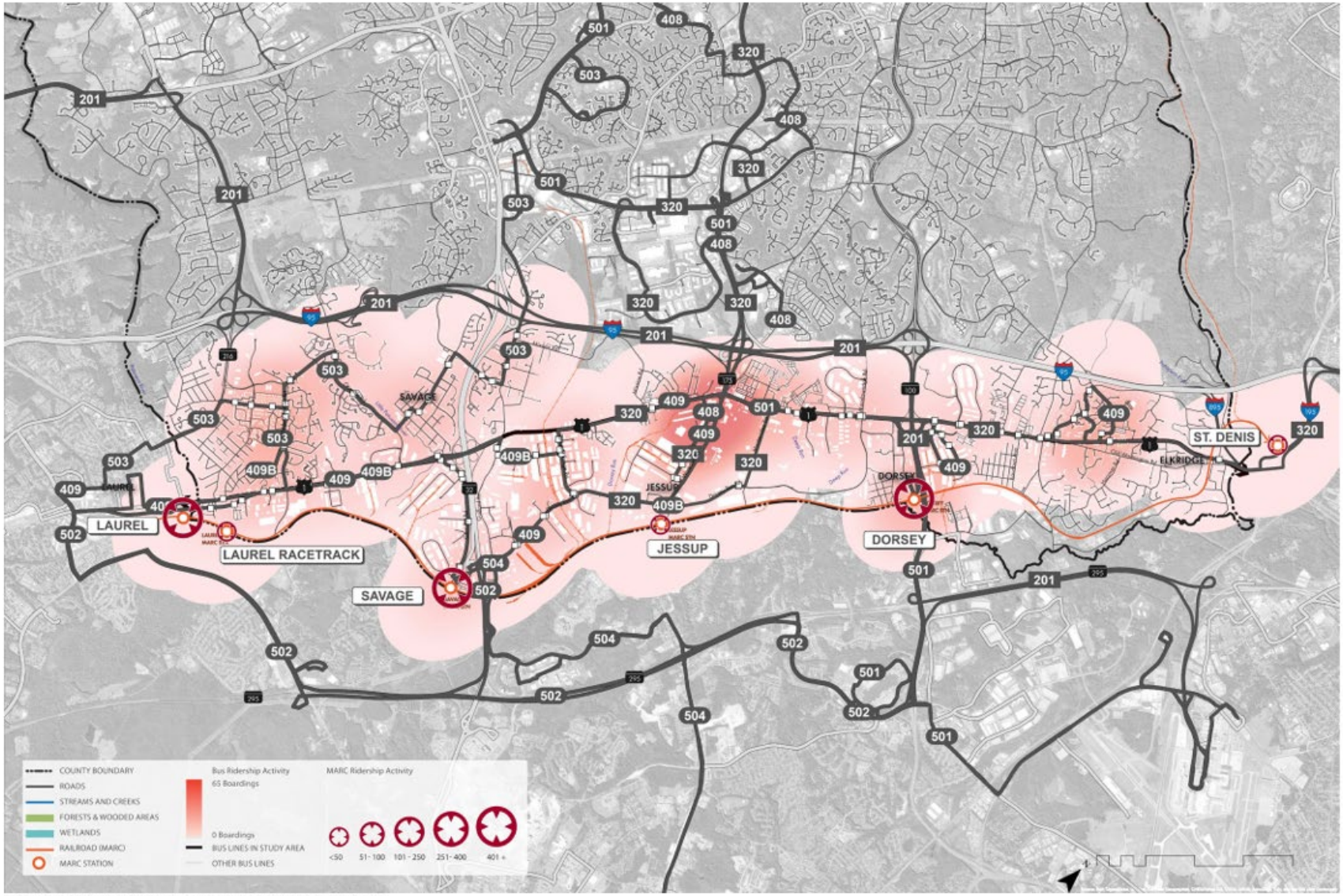
Table 4 Service Characteristics of Select MARC Routes

Line	Weekday							Saturday					Sunday				
	Span	Headways by Period						Span	Headways by Period				Span	Headways by Period			
		Early	AM	Midday	PM	Evening	Late		Early	Day	Evening	Late		Early	Day	Evening	Late
Camden Eastbound	6:32 AM - 9:08 AM, 3:30 PM - 8:55 PM	-	20-40	-	30-45	50	-	-	-	-	-	-	-	-	-	-	-
Camden Westbound	5:00 AM - 9:12 AM, 3:40 PM - 7:23 PM	30	20-55	-	30-55	-	-	-	-	-	-	-	-	-	-	-	-

Source: MDOT MTA GTFS Feed

Map 5

Corridor Ridership Activity



Source: RTA & MTA FY2017 Ridership Data

Daily Boardings in Study Area

The percentage of boardings in the study area by routes is summarized in the pie chart on pg. 15 (see Figure 6). Study area ridership activity is dominated by the MTA Route 201 (to BWI Airport) and RTA Routes 409, 501, and 503. These four routes account for 83 percent of bus boardings in the study area. While Route 409 serves as an almost exclusive corridor service along US-1 from Elkridge to the City of Laurel, the latter two, Routes 501 and 503, connect the area to the job and recreational opportunities to the east and west, including Columbia Mall and Arundel Mills Mall.

Transit activity (defined as boardings at an individual stop) is concentrated at select rail stations and at the intersections of multiple bus routes. Among the rail stations, Laurel, Savage, and Dorsey see the bulk of MARC Train ridership. Laurel Racetrack, Jessup, and St. Denis stations see relatively few boardings due to their status as flag-stops. For bus ridership, there is higher ridership activity at the junction of US-1 and MD-175 in Jessup, with other moderate ridership areas around Dorsey Station, Elkridge, and West Laurel.

Transit Analyses

The following assessments uses a standardized process where the metric under review is displayed at the census block in the Rt. 1 Corridor study area. In the following map series, Maps 6 – 7 and Maps 14 and 15 display aggregated data. Maps 8 – 13 use a transit propensity model that incorporates a variety of data.

Corridor Level of Service

To visualize the level of service during the afternoon peak period (from 3:00 PM to 7:00 PM), the number of trips in that period for each line provided by MTA, RTA, and MARC was aggregated to each Census block they served, as displayed in Map 6 (on pg. 18). Because the MARC trips were limited to the train tracks that define the eastern edge of the study area, the eastern part of the study area had more service opportunities than the western areas. Combined with trips by MTA and RTA bus lines, the highest level of service in the corridor is clustered around the center of the study area: the areas surrounding the Savage and Jessup MARC stations, and the intersection of US-1 and MD-175.

The southern edge of the study area has fewer trips available in the afternoon peak, while Elkridge and the northern tip of the study area have the lowest level of service in the afternoon peak period. This same method for analyzing the level of service was applied to the midday period, 9:00 AM to 3:00 PM (see Map 7 on pg. 19).

While many areas throughout the study area have a higher trip count in this period, this does not necessarily reflect a higher level of service due to the midday period being twice as long as the afternoon peak. Accordingly, midday service is more evenly distributed across the corridor than peak service, with numerous hot spots of activity in Laurel, Savage, Jessup, and Dorsey.

Transit Propensity

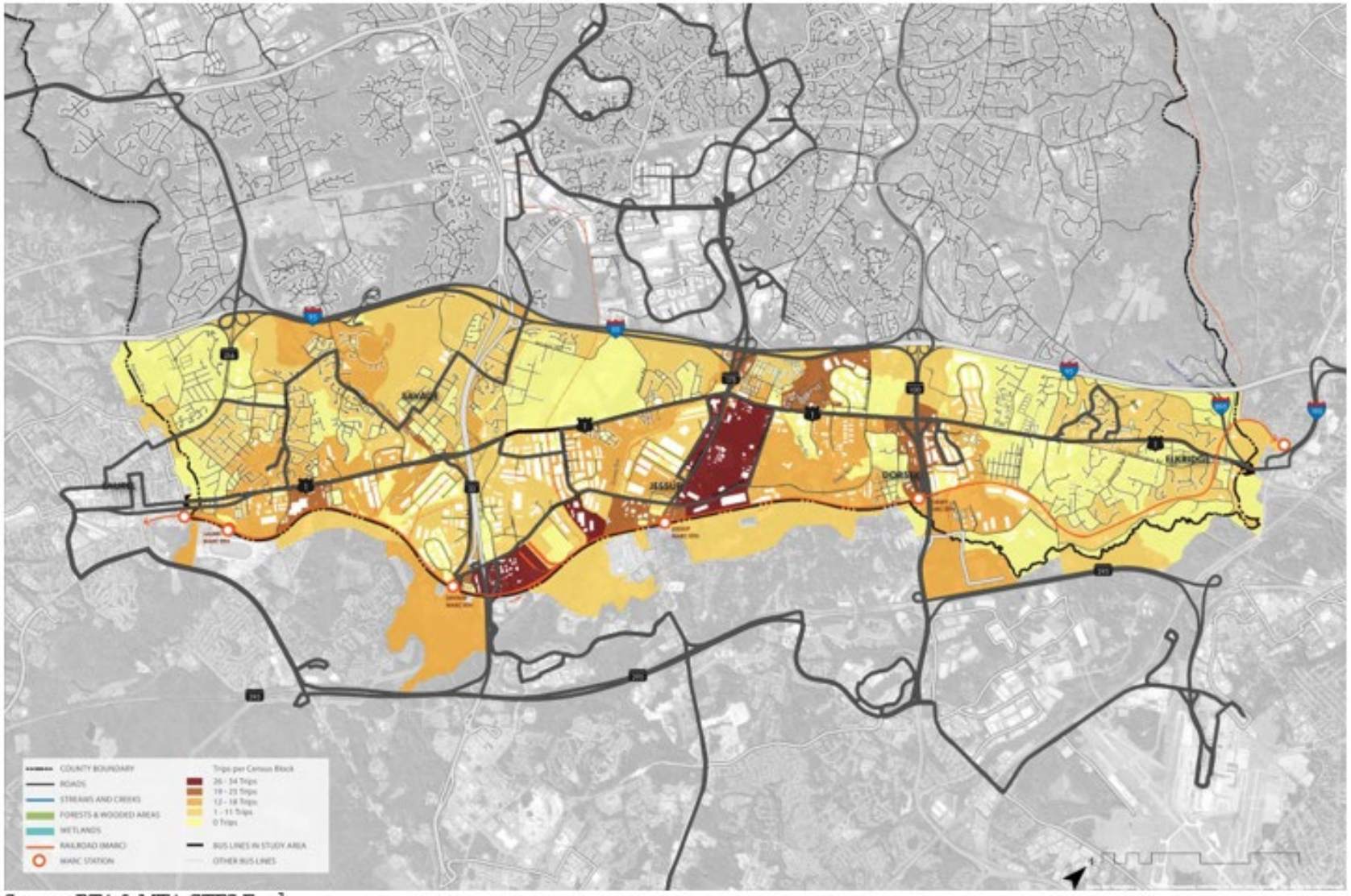
To determine the likelihood of transit demand or need in and around the study area, a transit propensity analysis was also performed. This analysis differs from the transit potential analysis in that it goes beyond density measures to examine attributes of jobs and residents which are typical indicators of transit need or demand.

The Transit Propensity Model combines a broad array of data sources into indices that identify where the highest propensity for transit use exists. Every Census block group receives a unique score in each propensity index and is then ranked relative to the study area. These indices are designed to be visualized and combined with other information about trip patterns, transit service distribution, and transit level of service to help evaluate the demand for or gaps in transit service.

This analysis employs multiple demographic and socioeconomic factors tied to transit utilization which help identify geographic areas of high demand for transit. The analysis consists of four transit indices that focus on: transit-oriented population origins; commuter population origins; employment destinations; and activity destinations (see Table 5 on pg. 20).

Map 6

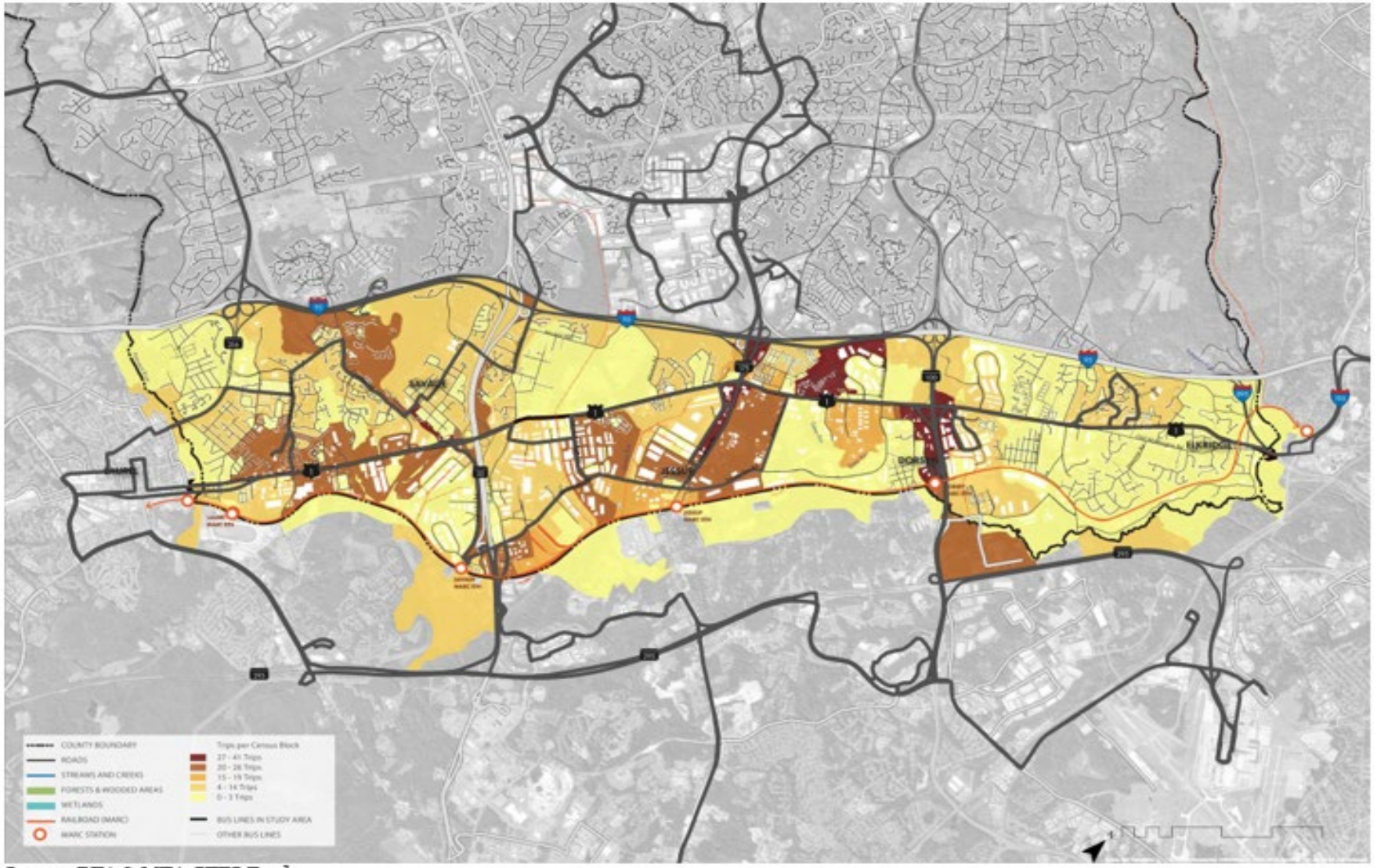
Afternoon Peak Level of Service



Source: RTA & MTA GTFS Feed

Map 7

Mid-day Level of Service



Source: RTA & MTA GTFS Feed

The analysis combines several different metrics used as indicators of potential transit ridership, including population density, employment density, household density, and the locations of traditionally transit-dependent populations, such as zero-car households or low-income households. Each index is comprised of individual data sets obtained from the 2011-2015 American Community Survey (ACS), the 2010 United States Census, and the 2016 Longitudinal Employer House Dynamic (LEHD). Table 3 below shows all of the specific variables and data sets that comprise each index.

Transit-Oriented Population Origins: The transit-oriented population index (see Map 8 on pg. 21) looks for variables that indicate where the population lives that relies on transit as a major or exclusive mode option, for both work and non-work trips. These variables can include income level, age (both seniors and youth populations), car ownership, disability status, and population metrics. Along the US-1 corridor, the strongest concentration of transit-oriented populations is on the west side of the corridor around Laurel, around Savage to the south, and within Elkridge to the north. The lowest concentrations are in the southeastern portion of the corridor. These are neighborhoods and origins to consider for all-day service.

Commuter Populations: The commuter populations index looks for variables to identify commuters, who might use transit for work-based trips in the morning and evening peaks (see Map 9 on pg. 22). This analysis includes variables such as labor force size, employment numbers, and non-single-occupancy vehicles (SOV) mode share. Along the US-1 corridor, the commuter populations are located mainly on the western side of the corridor, in the southwest corner just outside Laurel, and the northern tip of the study area around Elkridge. There are also some smaller concentrations around the intersection of US-1 and MD-175. These are neighborhoods and origins to consider serving with commuter and peak-oriented service.

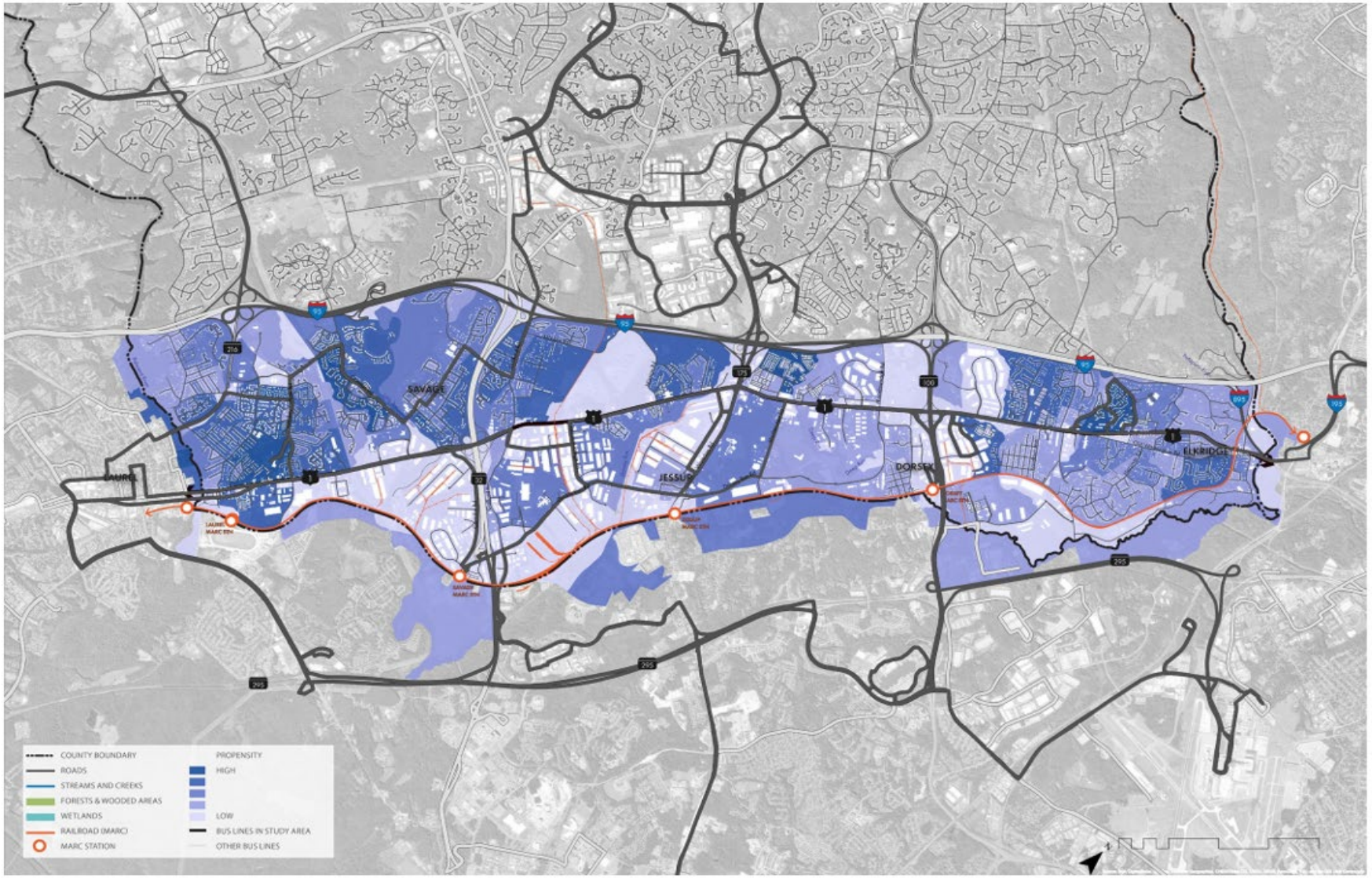
Employment Destinations: The employment destinations index identifies areas where people are likely to travel to for work (see Map 10 on pg. 23). This index is based on the total number of jobs in a given area. The eastern half of the study area is the primary employment destination in the study area, primarily due to its more industrial and commercial land use (compared to the western side of the corridor), with high employment zones running from Laurel Racetrack MARC station in the south to Dorsey MARC station in the north. This employment zone is characterized by food

Table 5 Transit Propensity Analysis Factors

	Index	Data Groups	Data Set
Primary Indices	Transit-Oriented Population Origins	Population	Total Population
		Age	Seniors
			Youth
		Income	Population at or below 150% of the Poverty Line
		Vehicle Ownership	Zero-Car Households
			One-Car Households
		Disability Status	Population with a Disability
	Commuter Population Origins	Labor Force	Labor Force Size
			Employed Persons
			Commuters
		Non-Single Occupancy Vehicle (SOV) Commute Mode	Non-SOV Commuters
	Employment Destinations	Employment	Jobs
	Activity Destinations	Retail & Restaurant	Retail Jobs
			Restaurant Jobs
		Recreation	Entertainment / Recreation Jobs
		Healthcare & Social Assistance	Healthcare & Social Assistance Jobs
		Education	Education Jobs
		Government	Public Administration Jobs

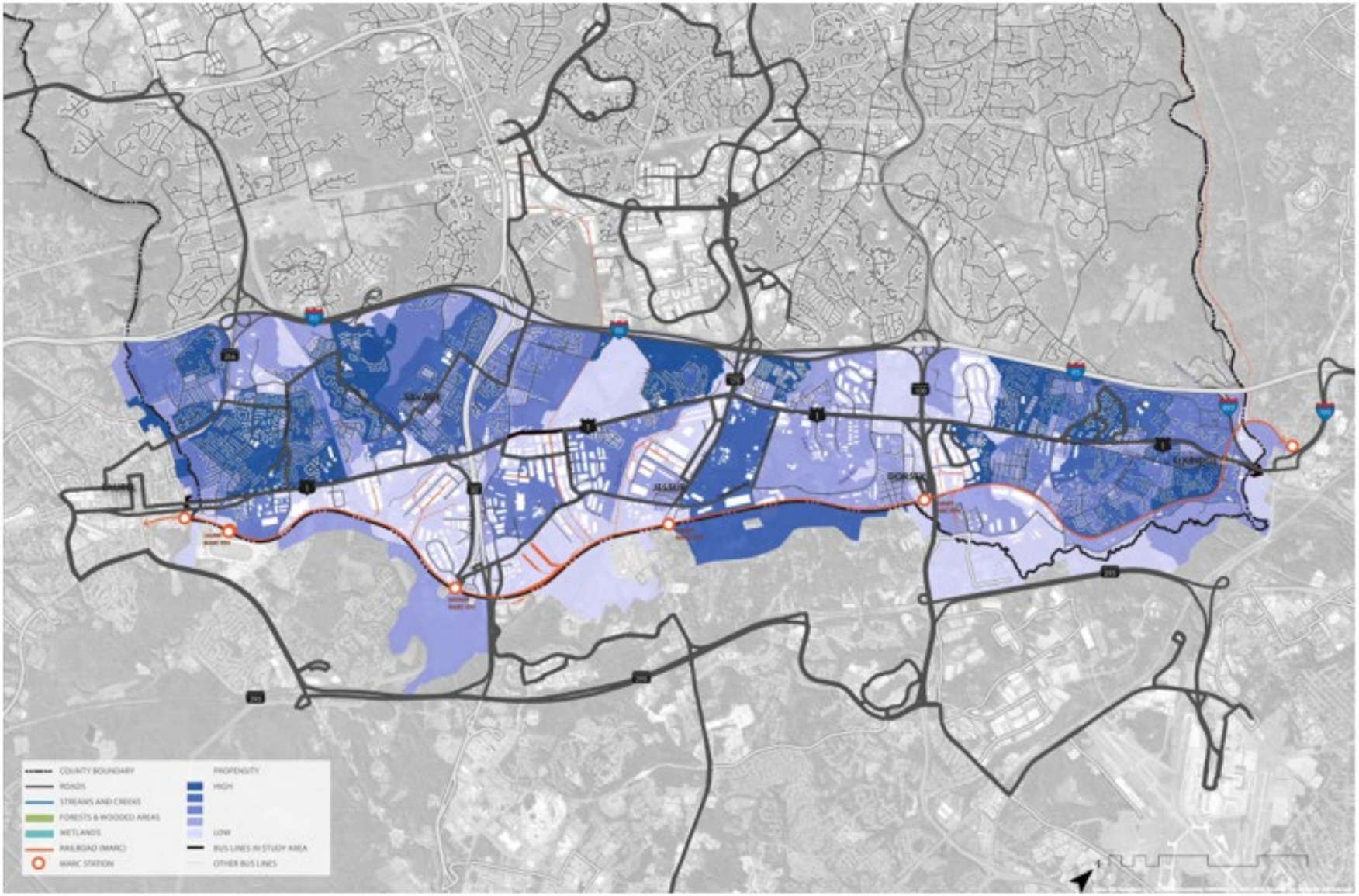
Map 8

Transit-Oriented Population Origins



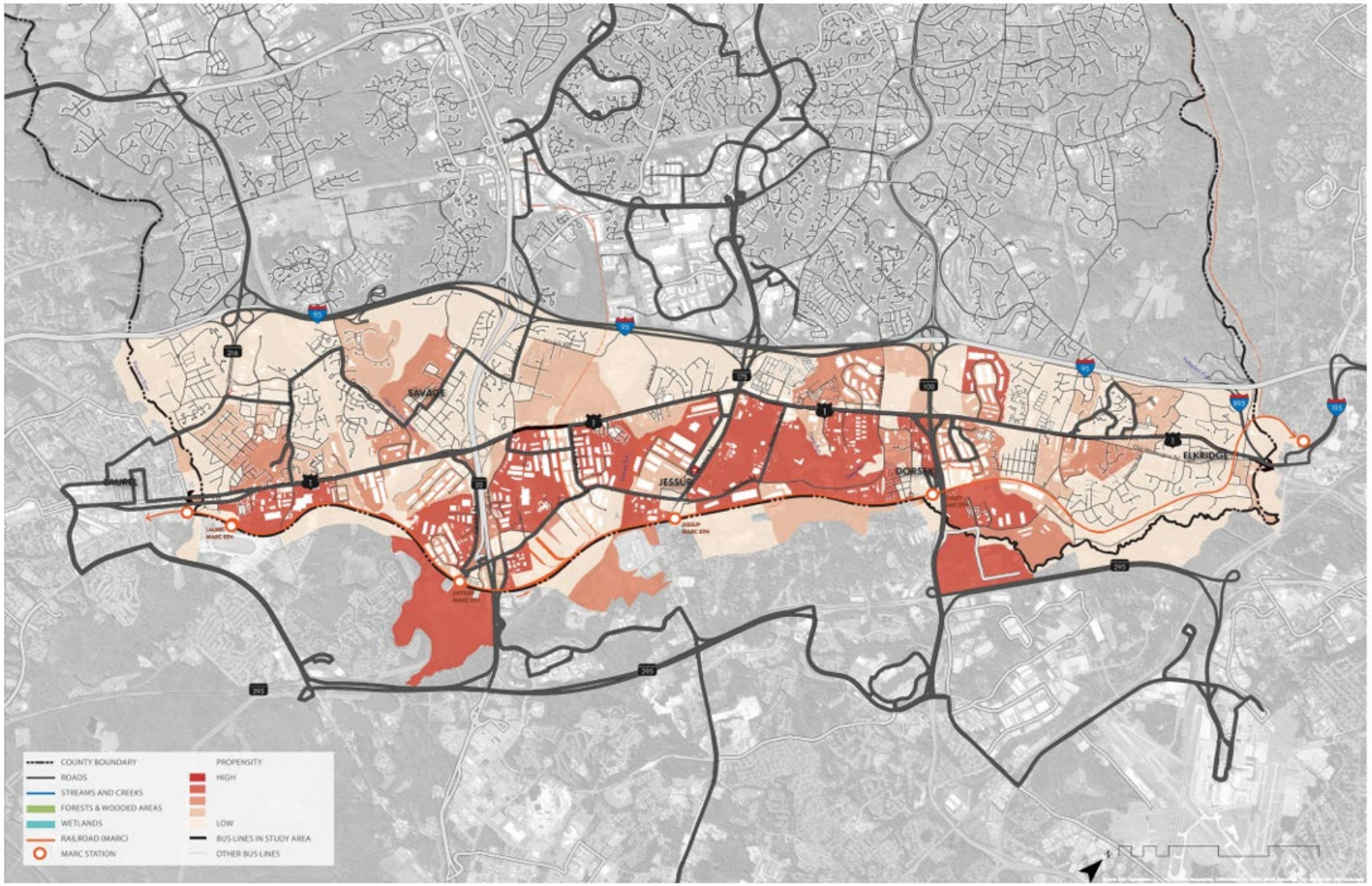
Map 9

Commuter Population Origins



Map 10

Employment Destinations



warehouses and distribution centers, including Nestle, Giant Foods, and other produce distributors. These are destinations to consider when looking at peak-oriented service.

Activity Destinations: The activity destinations index (see Map 11 on pg. 25) looks at variables that identify trips that residents might need to do outside of a typical work trip, including school, medical, shopping, and other general trips. Variables included in this index include job counts associated with these destinations: retail and restaurants, medical, public administration and government, education, and entertainment and recreation.

Activity destinations are the most scattered of the four indices, with notable hot spots in Savage, Jessup along MD-175, Dorsey (west of the MARC station), and around the Laurel MARC station. These are the destinations to consider when planning for all-day service.

All-Day Suitability Analysis: The all-day service suitability index in Map 12 (see pg. 26) combines variables from the activity and transit-oriented population propensity indices to determine where there is a need for consistent service during the day, in particular during the non-peak periods (such as midday and evening) to account for general trips outside of the peak period.

Given the suburban nature of the study area, there are very few high-scoring areas on this particular index. The highest need for all-day service is at the northwest corner of US-1 and MD-175, with moderate-scoring areas at the southern and northern ends of the study area (Savage, Laurel, and Elkridge) to connect primary residential zones.

Peak Suitability Analysis: The peak service suitability analysis in Map 13 (see pg. 27) combines the commuter and employment indices to determine where extra capacity is needed during the morning and evening commute, also known as the peak periods. Compared to the all-day index, there is a higher demand for peak-period service in most communities along the corridor, matching the suburban nature of the study area. While the industrial side of the corridor still shows less overall transit demand than the residential side, both show a higher propensity for peak service, with hotspots in Savage, Laurel, Dorsey, Elkridge, and the northern side of the MD-175 and US-1 junction.

Transit Potential in the Corridor

As transit service is generally most effective in areas with higher concentrations of residents and/or job opportunities, combining both residential and employment densities illustrate the locations with the highest potential to support transit service and generate strong transit ridership.

Population Density

Public transportation is most efficient when it connects population and employment centers where people can easily walk to and from bus stops. The reach of transit is generally limited to within one- quarter mile to one-half mile of the transit line (depending on the built environment), or a 10-minute walk. As such, the size of the travel market is directly related to the density of population in that area.

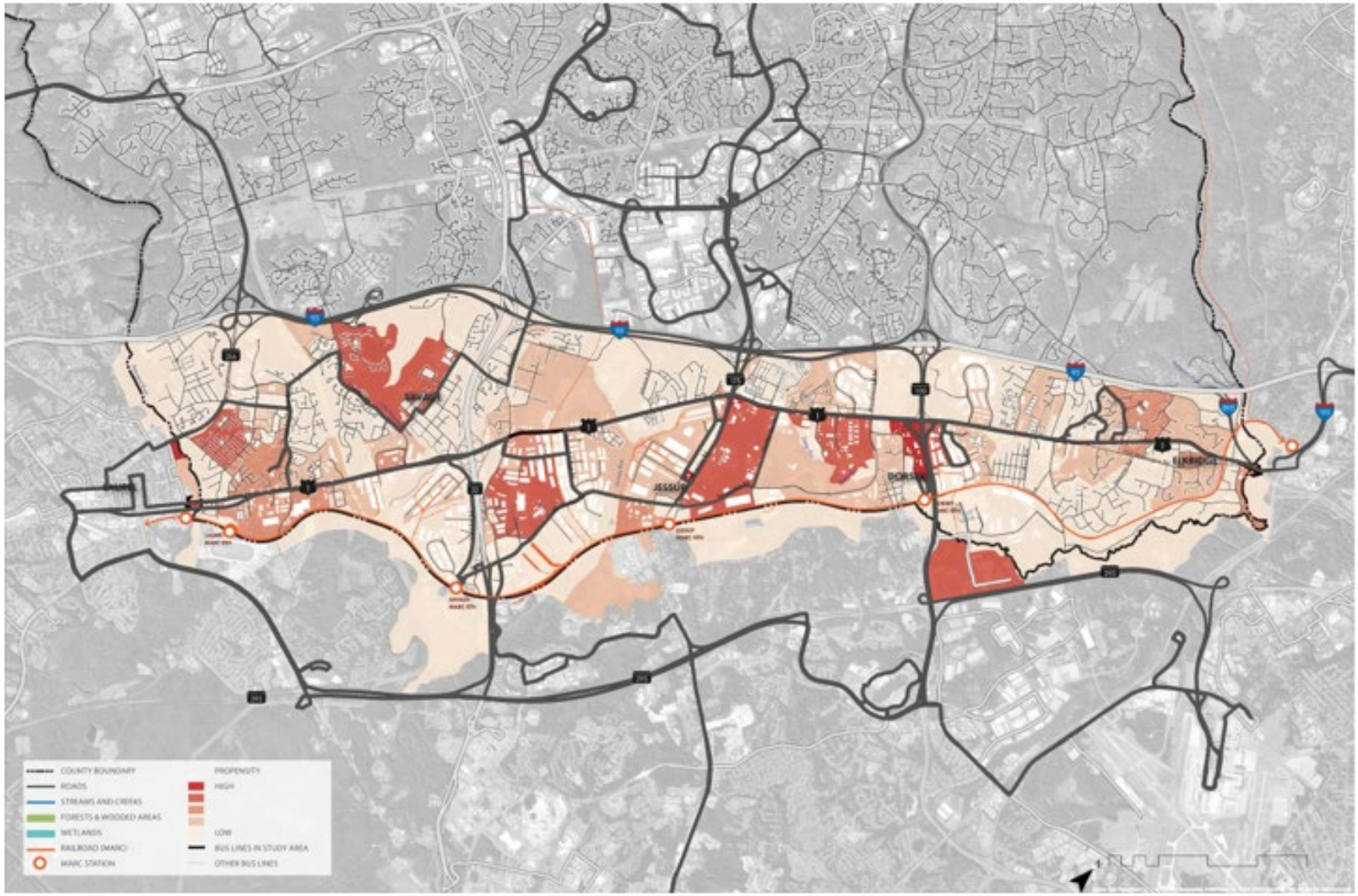
The Transit Cooperative Research Program (TCRP) Transit Capacity and Quality of Service Manual, 2nd Edition estimates that the densities of three households per acre (approximately six people per acre) can support hourly fixed route transit service. Map 14 on pg. 28 shows the population density of the study area. The yellow color indicates densities where fixed-route service begins to make sense; areas with darker colors have the potential to support more frequent service.

Existing population density patterns indicate higher residential densities in communities at the southern portion of the corridor closer to Laurel, at the intersection of US-1 and MD-175, and up by Elkridge.

In the southern portion of the study area residents are concentrated on both the eastern and western side of the corridor, while in the northern portion people live almost exclusively west of the corridor. These results are consistent with those of the transit-oriented population and commuter indices, which showed their highest scores in similar areas.

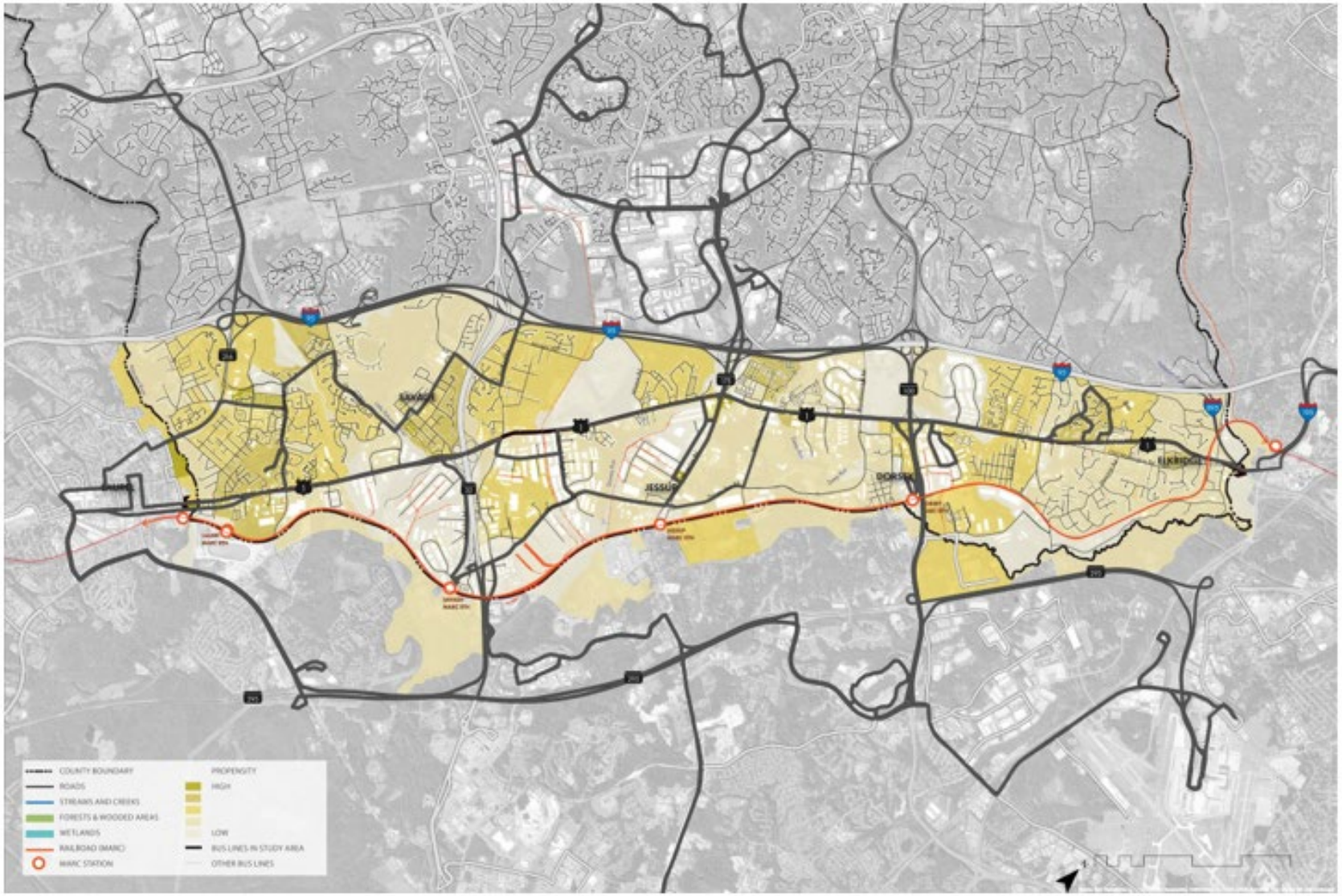
Map 11

Activity Destinations



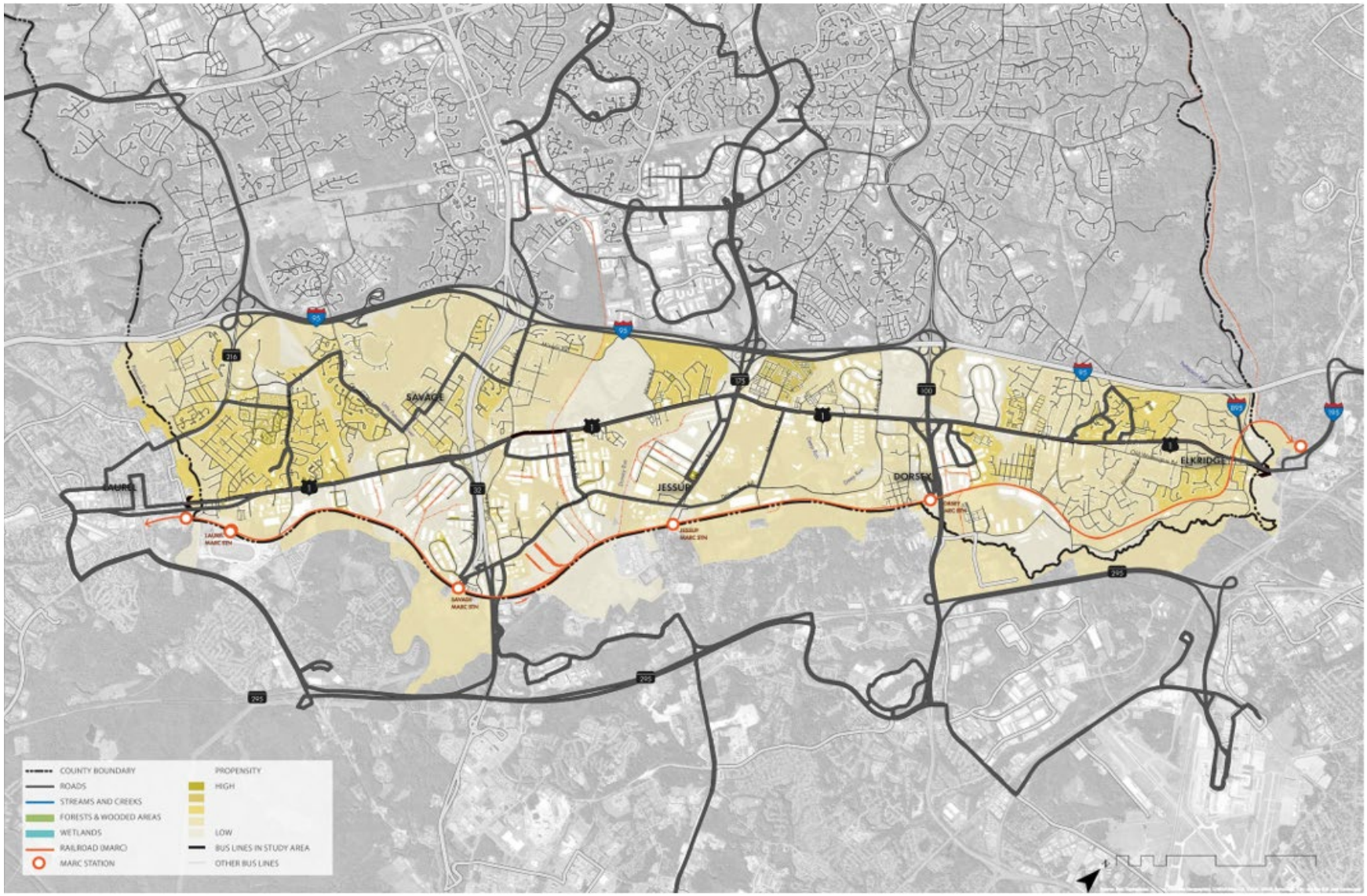
Map 12

All-Day Suitability Analysis



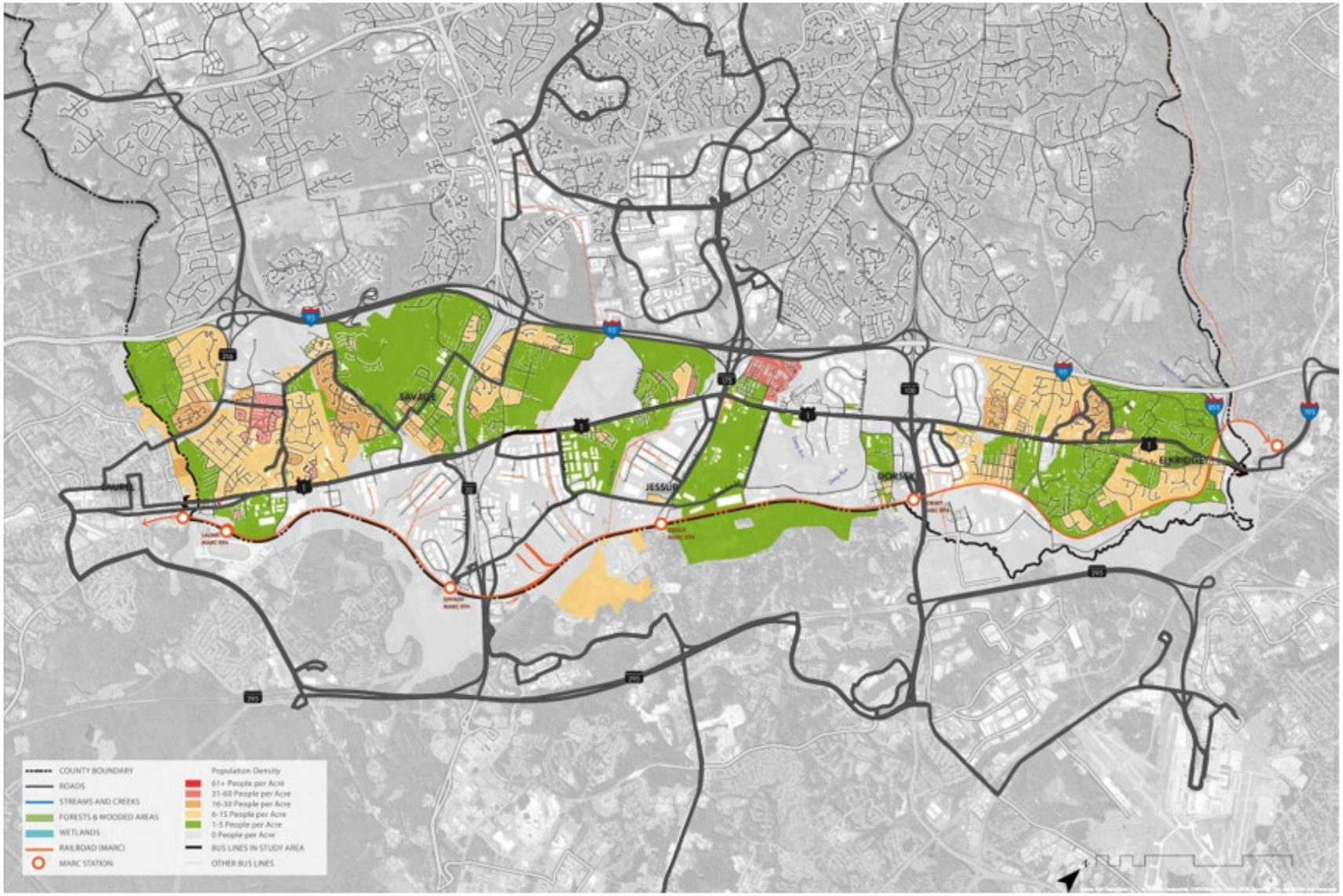
Map 13

Peak Suitability Analysis



Map 14

Population Density



Job Density

The location and number of jobs is a second strong indicator of transit demand, as traveling to and from work accounts for the largest single segment of transit trips in most markets.

Additionally, transit that serves areas of high employment density provides key connections to job opportunities. Like population density, the Transit Cooperative Research Program (TCRP) *Transit Capacity and Quality of Service Manual, 2nd Edition* estimates that the densities of four jobs per acre can support hourly fixed route transit service. This density corresponds to the yellow and orange colored areas in Map 15 (see pg. 30). Higher employment densities can potentially support greater frequency.

Existing job density indicates that most jobs and employment areas are concentrated east of the corridor. MD-175, MD-32, and MD-100 are the anchors for these job concentrations, and to a lesser extent, existing MARC rail stations. This job distribution is consistent with the findings of the workplace and activity indices, which showed the highest concentration along US-1 and east of the corridor.

Transit Potential

Transit potential, shown in Map 16 on pg. 31, is a composite of the population and employment densities for each Census block and is an indicator of the viability of fixed route service in a particular area. On this map, two census blocks (light red) are between 31-60 jobs/people per acre and the dark tan census blocks range between 31-60 jobs/people per acre. These indicate the areas with the greatest potential to support consistent fixed route transit along and immediately adjacent to US-1.

Density hot spots include the neighborhoods adjacent to All Saints and Gorman Roads, the MD-32 corridor, the intersection of US-1 and MD-175, and the entire northern portion of the study area (everything north of MD-100).

GAP Analysis

All-Day Gap Analysis

The US-1 corridor sees an adequate level of service during the midday period with most routes operating at least one vehicle an hour, or approximately 60-minute headways (Map 17 on pg. 32). Certain segments of US-1 and MD-100 see higher frequency service due to the overlap of multiple routes. Given the study area's mostly suburban nature, this level of service is adequate, but a few gaps do emerge.

First, with the MARC train not running during the midday, there is a lack of options connecting the study area to Washington and Baltimore along US-1: all routes end around Laurel to the south, and only one MTA commuter route operates north of Elkridge with limited non-peak service.

This lack of outside connectivity also reflects resident concerns with access to places such as Montgomery County, Baltimore County, and Baltimore City. Additionally, there is very little fixed-route service around Elkridge, another concern which was expressed during community engagement.

Peak Gap Analysis

Map 18 on pg. 33 shows that peak service along the corridor largely mirrors all-day service, with the main difference being the operation of MARC commuter trains along the Camden line between Washington and Baltimore during peak hours.

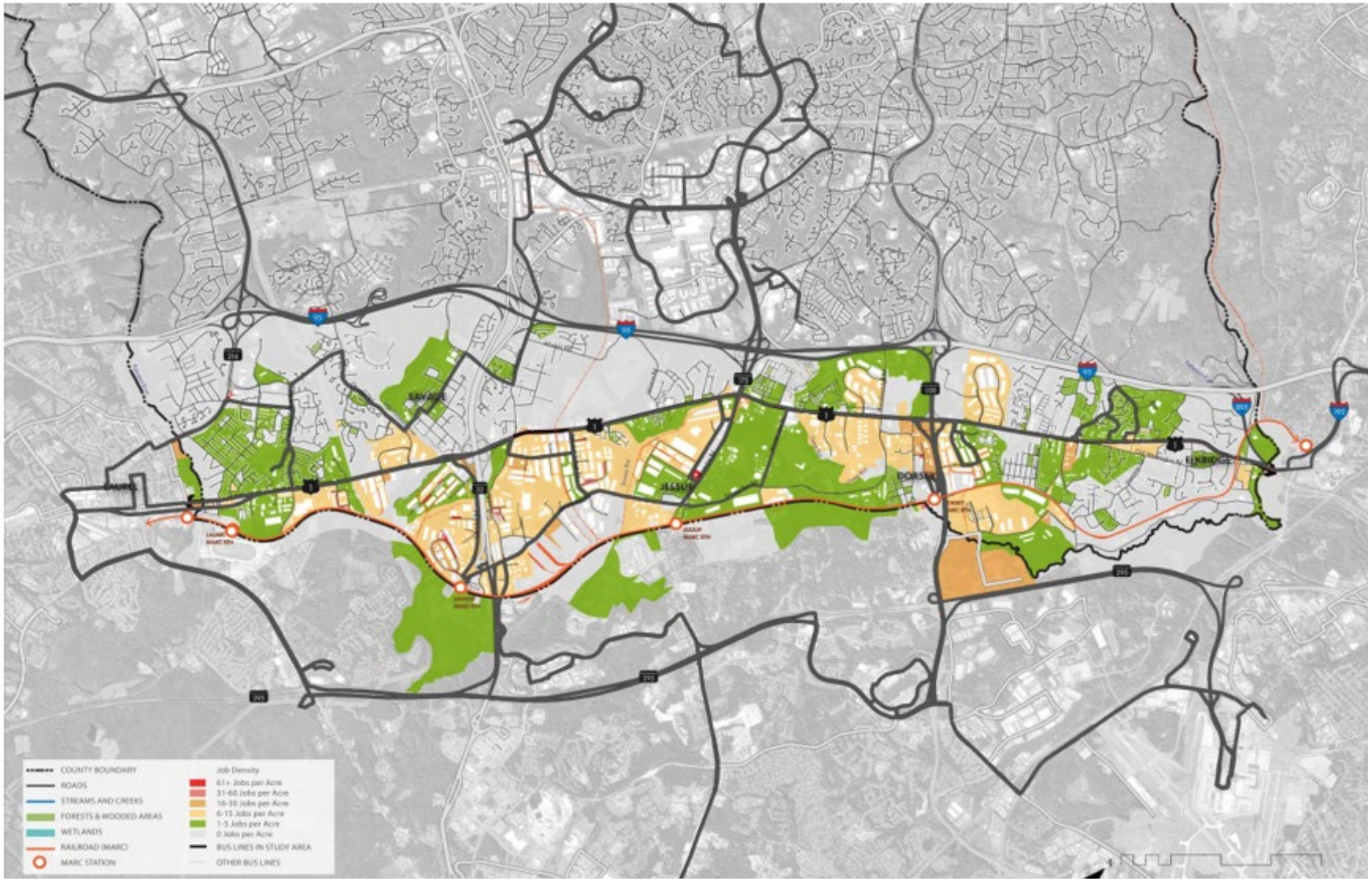
The RTA Route 504 to Fort Meade, and the MTA Route 320 to Downtown Baltimore operate at higher frequencies during this period, approximately every 30-40 minutes.

The remaining RTA routes operate with the same frequency as they do during the midday period, meaning that there is no extra capacity between peak and non-peak service to destinations other than D.C. and Baltimore.

This could limit the opportunity to access other employment opportunities both along the corridor and in the greater region (such as the rest of Howard County and Montgomery County), as well as the number of areas easily accessible during the peak period.

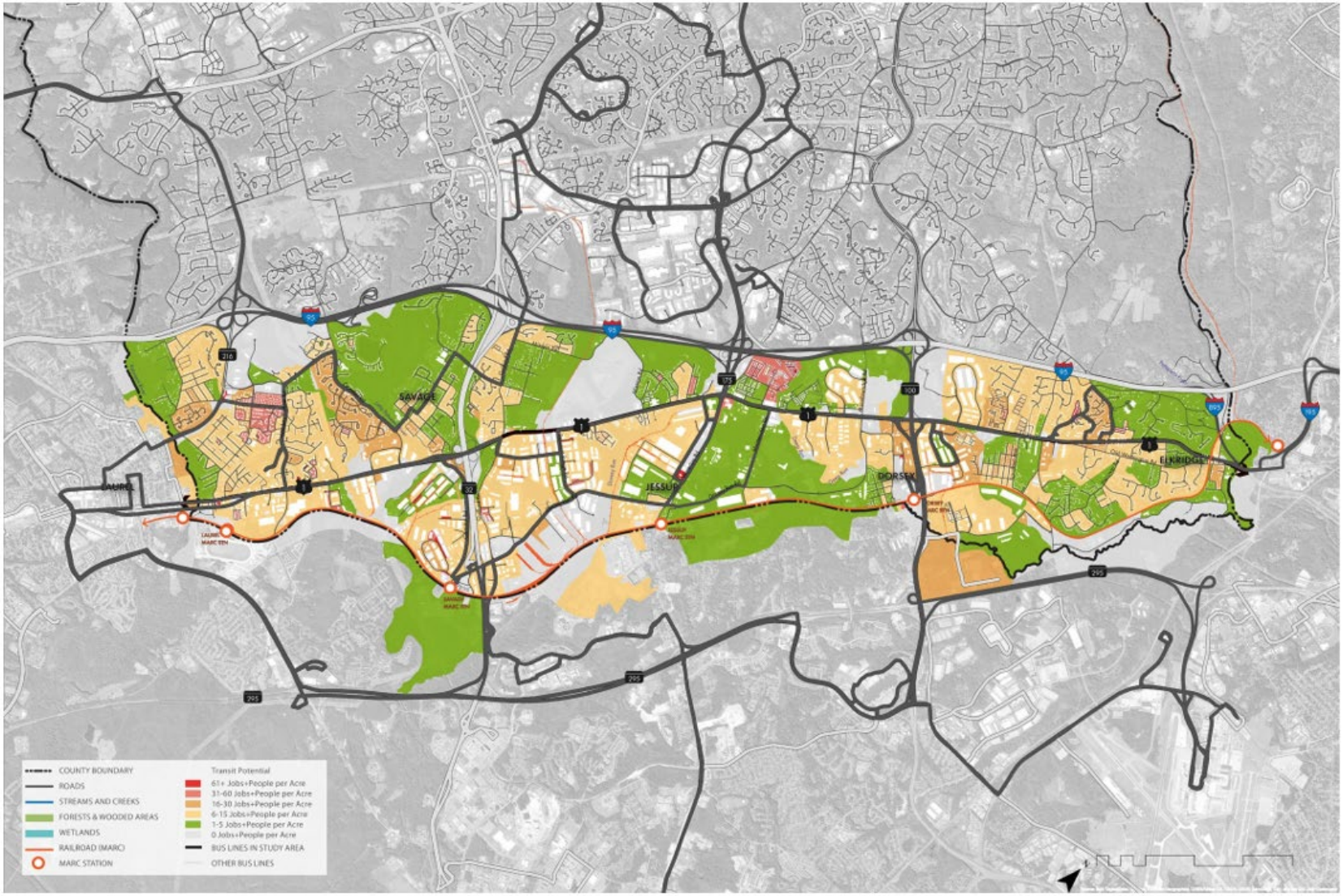
Map 15

Job Density



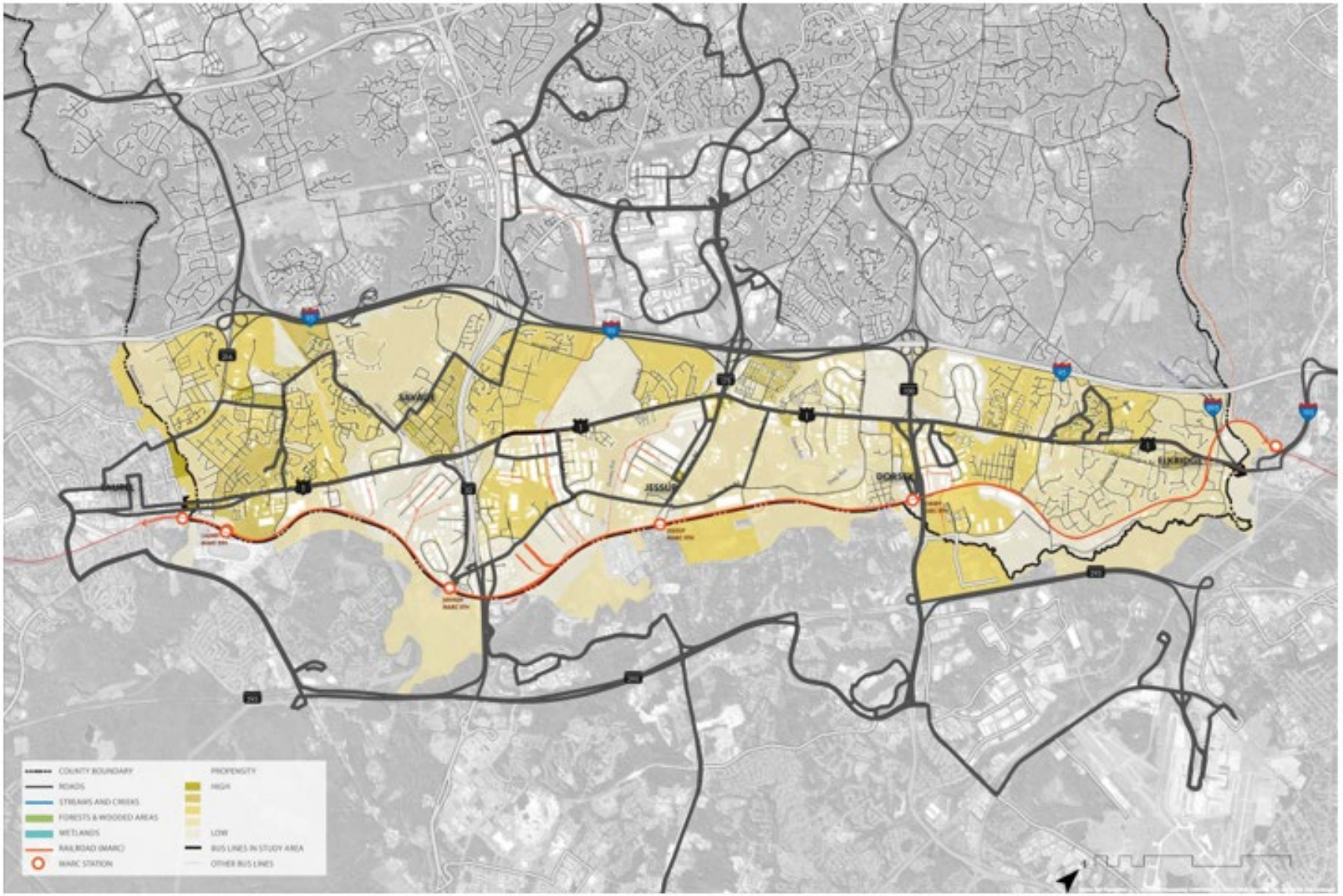
Map 16

Transit Potential



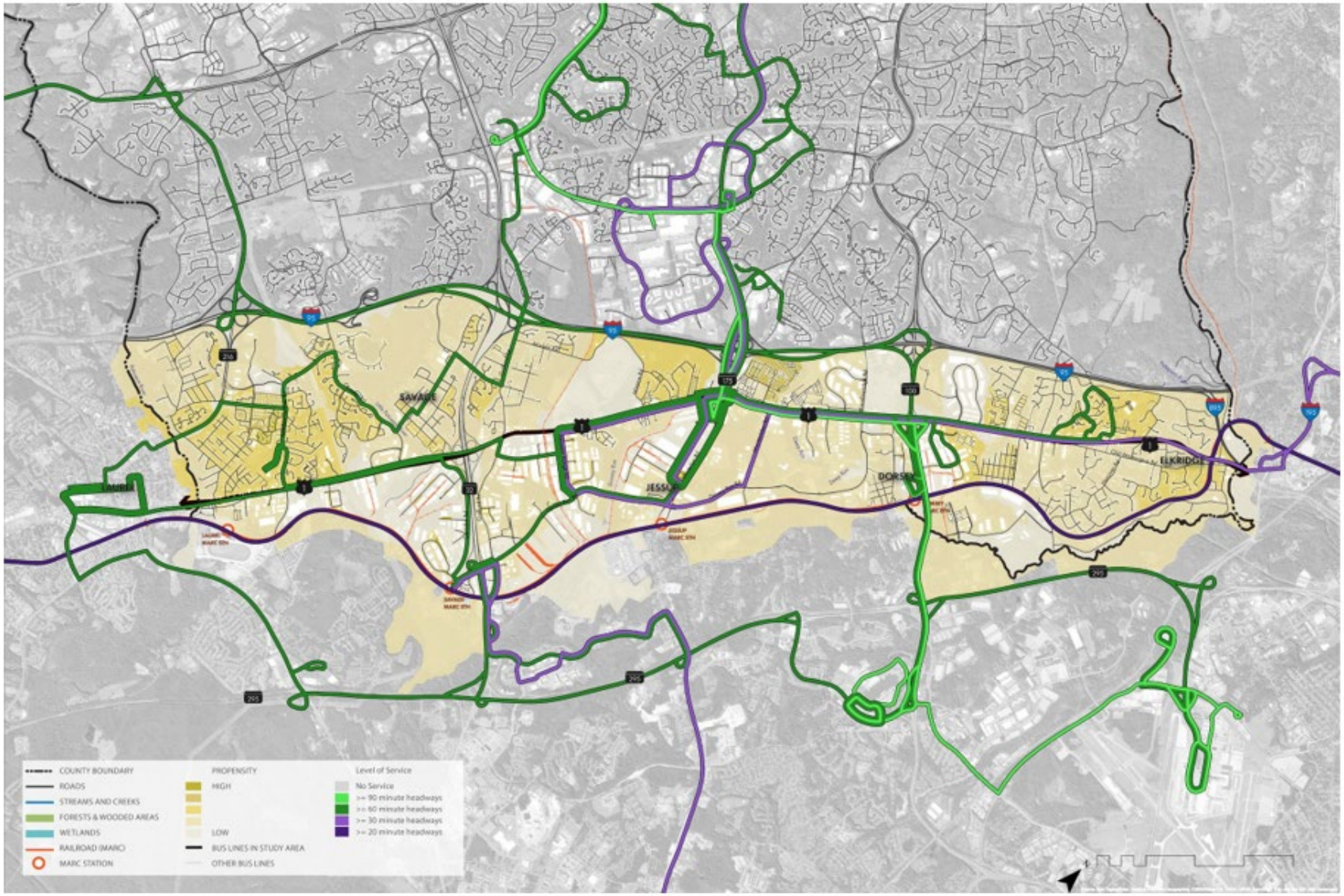
Map 17

All-Day Gap Analysis



Map 18

Peak Gap Analysis



CASE STUDIES

This assessment concludes with two case studies below that provide precedents from other areas in Maryland that are located along State Highway Administration (SHA) roads and that have successfully transitioned into more lively, dense, prosperous, and people-oriented places.

Case Study #1

Riverdale Park Station on Route 1 (SHA District 3)

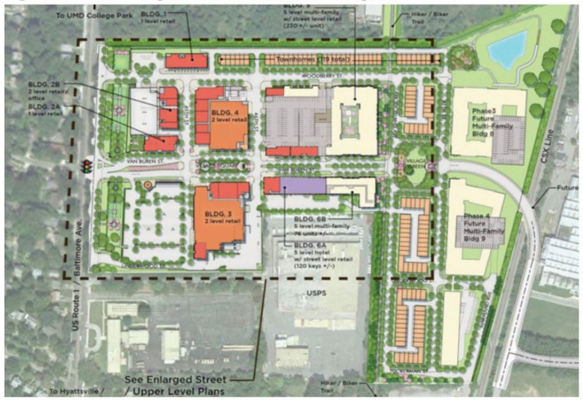
Riverdale Park Station (Figure 7) is a mixed-used development located in Prince George's County that opened in 2017. It achieves similar redevelopment goals as those suggested for Candidate Investment Area 1 in North Laurel: increased economic activity and internal parallel connections to retail, residences and transit.

For example, Riverdale Park Station contributes 463 full-time jobs, 746 new households and $4.9 million in annual recurring tax revenue to the County. The economic benefits to the community are bolstered by easier travel to MARC and metro stations between Riverdale Park and College Park.

Additional retail options and residences within the site reduce the need to use Route 1 for short trips. Bicyclists and pedestrians also benefit from a trail connection that provides access between Riverdale Park and College Park that did not exist before.

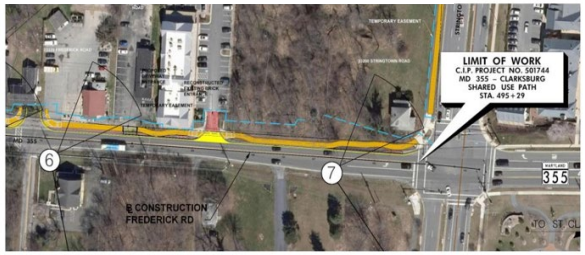
In addition to providing bicycle and pedestrian connections, the development provided new traffic and pedestrian signals, curb extensions and ADA ramps, truck aprons and reduction in lane widths to ensure safer and more comfortable bike and pedestrian mobility. Also, the development creates visual separation from the existing industrial uses to create a sense of place.

Figure 7 Schematic Plan of Riverdale Park Development



Source: Mushinsky Voelzke Associates, 2018

Figure 8 Schematic Plan for the Shared Use



Source: Montgomery County, 2019

Case Study #2

MD-355 Shared-Use Path (SHA District 3)

The proposed shared-use path on Frederick Road (MD-355) connects Snowden Farm Parkway to Clarksburg Road (Figure 8). This project is a coordinated effort between Montgomery County DOT and SHA to facilitate bike and pedestrian travel and is in the final design phase.

A shared-use path was selected because on-road bike facilities did not provide enough separation and reasonable level of comfort for riders. In addition to providing safe and comfortable connection to bicyclists and pedestrians, ADA compliant upgrades, and streetscape elements like lighting and trees are proposed within the project area. It demonstrates how collaboration between state and local agencies can provide improved multimodal access.

This is important for Route 1 as there are several locations where short shared-use path connections can facilitate travel between destinations and Candidate Investment Areas in the corridor.

IMPLICATIONS FOR IMPLEMENTATION

Aided by the vision of the Route 1 Corridor in Howard County as **a *significant employment corridor with a series of vibrant, livable and walkable nodes with retail and improved pedestrian, bicycling, and transit mobility,*** this assessment provides the framework for the transportation and land use papers which will support the vision of targeted "nodes" along the corridor where development could be supported in the future.

The following are the transportation considerations that should be explored in the general plan update.

Consideration 1:

Consider improvements to the linkages within and between each investment area, from the parks and trail system, and to the other resources in the regional area.

a. Should the Corridor Design Manual be updated to better align with the goals and objectives identified in Rt.1 Corridor assessments?
b. Are there locations with excess roadway width where space can be reallocated for bike and pedestrian facilities, streetscaping, and open green space?
c. What conceptual streetscape improvements can be targeted in Investment Areas to provide open space for gathering and promote a sense of place?

Consideration 2.

Increase mobility throughout the corridor for pedestrians, bicyclist, transit and automobiles.

a. Are there opportunities to direct truck traffic toward major full-access intersections and away from local/ neighborhood roads and intersections?
b. Are there examples of zoning and/or overlay districts applicable to the corridor to encourage better pedestrian amenities and adjust parking minimums?
c. What are possible new approaches for funding which could include developer contributions to contribute resources to improved bicycle/pedestrian and transit amenities?

Consideration 3.

Provide regional transportation enhancements to maximize the economic potential of Route 1 including a continuous network of sidewalks, bikeways and trails within the nodes.

a. What are possible options/nodes for a corridor transit route along Route 1 that provides direct connections to high frequency transit options into Washington DC (WMATA Green Line) and Baltimore (MTA CityLink Yellow and/or MTA Light Rail Station)? Could the route later become a candidate for BRT service?
b. What is the best timing/phasing to improve levels of service on local routes intersecting the Route 1 Corridor and connecting the corridor to key destinations throughout Howard County?

Consideration 4.

Phase in improvements to public transit services to better serve existing users and provide enhanced transit services as future ridership demands.

a. Where are the priority missing sidewalks that connect to bus or MARC stops, prioritizing stops with higher ridership and those connecting to larger employment locations along the corridor and its surroundings?
b. What is the prioritization for improved, accessible, and ADA-compliant transit shelters and benches at the corridor bus and MARC transit stations?
c. What new targeted transit investment can best encourage increased transit ridership? Where can anticipated improvements such as transit signal prioritization (TSP) and/or queue jumps be planned so that when

higher frequency transit becomes feasible, the infrastructure is already in place?

Consideration 5.

Continue to invest in complete streets and multimodal transportation infrastructure to enhance mobility and access to diverse transportation options.

a. Identify key projects of the Bike Howard and Walk Howard to implement along and across Route 1.
b. What steps are needed to implement the Howard County Complete Streets Policy in the finalized Investment Areas?

Consideration 6.

Undertake traffic and pedestrian safety improvements at high-risk locations and where future development is planned.

a. Are there opportunities to narrow travel lanes at high-risk locations and Investment Areas to slow traffic to posted speed and create a safer pedestrian environment?
b. What would be required for SHA Pedestrian and Bicycle Priority Area designation for all or some of the Investment Areas and some corridor high-risk locations?

Questions for the General Plan Update to Answer

1. How can the corridor design successfully balance the "human scale" needs of pedestrians and bicyclists with its role it plays in the movement of goods and commerce?
2. How can the county enhance and leverage existing county and state investments in public transit rail infrastructure, including advancing strategies with neighboring jurisdictions?
3. Are there other successful examples from around the country that can be used as potential templates for transportation improvements and development on Route 1?
4. How is the County currently using its capital program to advance the US 1 vision? What are the most important and transformative improvements that could/should occur over the next decade or two?
5. What is the land use/transportation vision and coordination with Anne Arundel County? Anne Arundel is proposing different solutions which should be coordinated with Howard County's planning approach. (Examples: new MD 295 interchange at Hanover Road; cross section of MD 175 between MD 295 and US 1; east-west BRT along MD 32)
6. How can the County's development regulations and design manuals support the enhancements needed to achieve the desired US 1 vision?