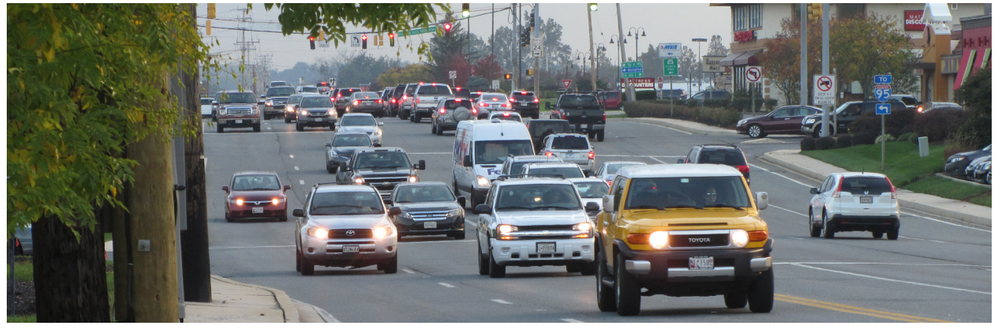

BUSINESS US 1 AND MD 22
MULTI-MODAL CORRIDOR STUDY

Final Report
July 2015

JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future®

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Executive Summary

The Business US 1 and MD 22 Corridor is a major east-west corridor linking Main Street, the commercial properties in and around Bel Air, numerous residential communities, educational facilities, and government offices. These routes provide mobility as a major commuter route and also as a major circulation route for shopping and daily lives. Previous capacity studies along the corridors have included widening for additional lanes, individual intersection improvements, and bypass considerations. **Harford County and the Town of Bel Air desire to have a multi-modal transportation plan that serves existing and future travel demand while blending with the character of the communities it serves, improving air quality and offsetting congestion. The purpose of this study is to provide feasible and cost efficient improvements that provide better complete streets, encourages better multi-modal cohesion and connectivity, provides mobility choices, and ensures positive results to the surrounding communities.**

The general findings of the investigation determined that the overall roadway capacity was adequate for vehicular commuting patterns. The origin-destination investigation identified that a majority of vehicles are not through trips and could not be diverted onto other roadways. However, overall mobility is lacking due to several factors:

- lack of good mobility choices except for vehicles
- incomplete networks and missing gaps
- excessive access points creating conflicts and inefficiency
- lack of inter-connectivity

While all of the multi-modal transportation needs are present along the corridor, the current roadway predominately addresses automobiles. Pedestrians and bicyclists find an incomplete and sporadic system that is missing many of the connections which in turn deters many users. This also impacts transit riders as transit riders all either begin or end as a pedestrian/bicyclist.

To meet the many demands and goals for the corridor, a balanced and complete street approach is required to achieve a sustainable transportation mobility system that supports the community context.

The "Complete Street" balances the demands and goals of the various transportation demands of automobiles, transit, pedestrians, and bicyclists, while being context sensitive to the surrounding communities and uses. Additionally, solutions must reduce conflict points and provide an efficient network. A "Complete Street" can provide a sustainable solution into the future that is also flexible to changing demands.

The solutions identified in the study address the transportation mobility needs for short term (2020), medium term (2030), and long term (2040). These improvements cover the full range of strategies to allow for the Business US 1 and MD 22 Corridor to truly become a "Complete Street" and meet the various goals and objectives.

For each solution, potential issues were identified and feasibility level cost estimates were developed. The feasibility level cost estimates provide an order of magnitude for each of the improvements as well as an overall understanding of the total capital cost projected for each term of improvements. All of the feasibility level cost estimates include contingencies, percentages for engineering, utilities, and construction major items in 2015 dollars. Right-of-way costs are NOT included at this time. The total cost range is:

- Short Term (2020): $10 – $25 million plus SHA Intersection Improvement Projects
- Medium Term (2030): $25 – $50 million plus r-o-w costs
- Long Term (2040): $55 – $75 million plus r-o-w costs

Implementation of these alternatives will require extensive coordination within Harford County Government, the Town of Bel Air, and the State Highway Administration (SHA) as the owner of the major corridors within this roadway. Additionally, key stakeholders such as MTA, Harford Transit, Harford County Public Schools, John Carroll School, the Chamber of Commerce, commercial centers, individual property owners, and the community must participate in the implementation.

As part of this study, no public outreach was included within the scope of work. It is recommended that a public outreach program be completed to allow the public to provide input into the ultimate solutions.

Each of the improvements provided in the summary table may require additional planning and design. For Harford County to successfully work towards having these projects implemented, it is imperative that the MD 24, Business US 1, and MD 22 Corridors be listed as a high priority to the SHA to ensure that the projects requiring capital investment funds remain competitive with the other needs throughout the state.

In addition, there are numerous other funds available that the County can request the State to pursue based on project type for the various alternatives developed for this corridor. These funds include items such as the ADA Retrofit, Access to Transit, and Sidewalk Retrofit. A more in-depth discussion regarding implementation strategies is provided in Section III of this report.

The Summary Matrix on the following page identifies the improvements by transportation mode and the estimated cost to implement. Due to the size of the study, mapping locating the proposed improvements is shown on 4 displays. The Summary Matrix provides the improvements by each geographic display. In some cases, the improvements overlap multiple displays and the estimate is for the entire improvement and shown separately. It is important in looking at a geographic area that the "Complete Street" of improvements is included at the same time.

Table ES-1: Summary of Proposed Improvements

Proposed Improvement	Timeframe and Feasibility Cost*		
	Short Term (2020)	**Medium Term (2030)**	**Long Term (2040)**
Transportation Demand Management and Transit System Improvements (coordination and efforts to be provided by Harford County, SHA, and Town of Bel Air)			
Roadway Safety Audit Improvements (completed by SHA, Harford County and Town of Bel Air)			
Access Management along Business Route 1 and MD 22		$4 - $6	
Reconstruction of Harford Mall (by Developer)			
Create Bel Air Boulevard			$40 - $50
Geographic Display Map 1			
Pedestrian and Bicycle Improvements			
• Sidewalk: along MD 24 from Boulton Street to Business US 1 • Shared-Use Path: from Boulton Street to MA & PA Trail, through Kelly Fields • Bike Lanes: along Boulton Street and Atwood Road • Sidewalk: along MD 24 from Business US 1 to Marketplace Drive • Shared-Use Path: from Boulton Street to MacPhail Road • Sidewalk along MD 24 from Marketplace Drive to MacPhail Road • Shared-Use Path from Thomas Street to MA & PA Trail • MacPhail Roadway Shared-Use Path Connection	$3.5 -$6	$0.2 - $0.5	
Roadway Improvements			
• MD 24 Widening from Boulton Street to MacPhail Road		$7 - $12	
• MacPhail Road Connection		$10 - $15	
• MD 24 / US 1 Bypass Interchange			$15 - $25
Intersection Improvements			
• MD 24 / US 1 Bypass	$2 - $5		
• MD 24 / Market Place	$0.5 - $1		
• Business US 1 / Tollgate Road		$0.8 - $1.5	
• Roundabouts: Boulton Street / Kelly Avenue, Marketplace Drive / Atwood Road		$0.2 – $0.6	
• Business US 1 / MD 24			

Proposed Improvement	Timeframe and Feasibility Cost*		
	Short Term (2020)	Medium Term (2030)	Long Term (2040)
Geographic Display Map 2			
Pedestrian and Bicycle Improvements			
• Sidewalk: along MD 22 • Bicycle Signing and Sharrow Pavement Markings: Thomas Street, Courtland Place, Shannon Drive, Pennsylvania Avenue, Lee Way, Ardmore Way, Hays Street, Broadway • Bike Lanes: Hickory Avenue, Lee Way	$0.7 - $1.5		
• Bike Lanes: Thomas Street, Courtland Place, Shannon Drive, Pennsylvania Avenue, Lee Way, Ardmore Way, Broadway		$0.4 - $0.7	
Roadway Improvements			
• Reconfigure Traffic Pattern in Bel Air		$1 - $3	
Intersection Improvements			
Geographic Display Map 3			
Pedestrian and Bicycle Improvements			
• Bicycle Signing and Sharrow Pavement Markings: Broadway • Sidewalk: along MD 22 • Shared-Use Path: along Moores Mill Road	$1 - $2		
• Shared-Use Path along Jackson Boulevard connecting Broadway and MD 22 (by Developer)			
• Shared-Use Path connecting Jackson Boulevard, Moores Mill Road, and Churchville Road (by Developer)			
• Bike Lanes: Broadway		$0.03 - $0.05	
• Sidewalk: along MD 22 from Brierhill Drive to John Carroll (only to be constructed as part of a MD 22 widening project)			
Roadway Improvements			
Intersection Improvements			
• MD 22 / John Carroll High School	$0.8 - $2		

Proposed Improvement	Timeframe and Feasibility Cost*		
	Short Term (2020)	Medium Term (2030)	Long Term (2040)
Geographic Display Map 4			
Pedestrian and Bicycle Improvements			
• Sidewalk along MD 543 from MD 22 to Amyclae Drive • Bicycle Signing and Sharrow Pavement Markings: Econ Drive, Amyclae Drive	$1 - $2		
• Sidewalk: along MD 22 from Moores Mill to Churchville Family Dentistry Building			
• Sidewalk: along MD 22 from Churchville Family Dentistry Building to MD 543			
Roadway Improvements			
Intersection Improvements			
• MD 22 / MD 543 and MD 22 / Econ Drive		$4 - $7	
Total Cost Per Term	**$10 – $25 Million**	**$25 – $50 Million**	**$55 – $75 Million**

***Feasibility cost is in millions and does NOT include right-of-way estimates. Cost Estimates are in 2015 dollars.**

I. Transportation Mobility Vision

The Business US 1 and MD 22 Corridor is a major east-west corridor linking the commercial properties in and around Bel Air, numerous residential communities, educational facilities, and government offices. These routes provide mobility as a major commuter route and also as a major circulation route for shopping and daily lives. Capacity studies along the corridors have included widening for additional lanes, individual intersection improvements, and bypass considerations. **Harford County and the Town of Bel Air desire to have a multi-modal transportation plan that serves existing and future travel demand while blending with the character of the communities it serves, improving air quality and offsetting congestion. The purpose of this study is to provide feasible and cost efficient improvements that provide better complete streets, encourages better multi-modal cohesion and connectivity, provides mobility choices, and ensures positive results to the surrounding communities.**

This study, *The Business US 1 and MD 22 Multi-Modal Corridor Study*, was developed as a project by Harford County and the Town of Bel Air as a means to identify short, medium and long term solutions, as well as safety improvements and upgrades that can be implemented immediately, for the Business US 1 and MD 22 corridor from the intersection with Tollgate Road to MD 543, a length of approximately 2.9 miles. In addition, a section of the MD 24 corridor, from the US 1 Bypass to MacPhail Road, a length of approximately 1.4 miles, was also included in the study. The previously assumed necessary long term solution was the widening of MD 22 from two lanes to three lanes and adding sidewalk for the extent of the corridor. This expansion would be non-sustainable, would be expensive, would create an impact on the adjacent properties, and is not within the community vision context.

A. Transportation Mobility Concerns

The initial project step was to evaluate the existing transportation conditions including understanding transit, pedestrian, bicycle and vehicular volumes and desires, and land uses. The Draft Existing Conditions report was completed in November, 2014 and submitted to Harford County and the Town of Bel Air. The final Existing Conditions analysis is located in the Appendix of this document. A detailed origin-destination study was completed to evaluate the circulation patterns of automobiles. In addition, a Roadway Safety Audit was completed in December 2014 in order to identify improvements that could be implemented immediately. This study also investigated future mobility needs evaluating the years of 2020, 2030, and 2040.

The general findings of the investigation determined that the overall roadway capacity was adequate for vehicular commuting patterns. The origin-destination investigation identified that a majority of vehicles are not through trips and could not be diverted onto other roadways. However, overall mobility is lacking due to several factors:

- lack of good mobility choices except for vehicles
- incomplete networks and missing gaps
- excessive access points creating conflicts and inefficiency
- lack of inter-connectivity

While all of the multi-modal transportation needs are present along the corridor, the current roadway predominately addresses automobiles. Pedestrians and bicyclists find an incomplete and sporadic system that is missing many of the connections which in turn deters many users. This also impacts transit riders as transit riders all either begin or end as a pedestrian/bicyclist.

B. Ultimate Mobility Goal

To meet the many demands and goals for the corridor, a balanced and complete street approach is required to achieve a sustainable transportation mobility system that supports the community context. The National Coalition for Complete Streets states that:

> "**Complete Streets are streets for everyone**. They are designed and operated to enable safe access for all users. Pedestrians, bicyclists, motorists and transit riders of all ages and abilities must be able to safely move along and across a complete street. Complete Streets make it easy to cross the street, walk to shops, and bicycle to work. They allow buses to run on time and make it safe for people to walk to and from train stations."

The "Complete Street" balances the demands and goals of the various transportation demands of automobiles, transit, pedestrians, and bicyclists, while being context sensitive to the surrounding communities and uses. Additionally solutions must reduce conflict points and provide an efficient network. A "Complete Street" can provide a sustainable solution into the future that is also flexible to changing demands.

II. Transportation Improvement Strategies

Alternatives were developed for this Study based on the evaluation of the existing conditions, understanding of the origin-destination study results and all traffic analysis results. All alternatives and options were considered that worked to address the existing and proposed deficiencies while working towards creating the Business US 1 and MD 22 Corridor as a Complete Street within the project limits.

Once the alternatives as presented below were evaluated for reasonableness and feasibility, planning level cost estimates were developed, as included in the charts throughout this section. These cost estimates were developed utilizing the SHA format for this level of study. All estimates made assumptions off of the aerial and County GIS mapping for major category quantities and utilized a percent contingency for items such as drainage, utilities, planning and preliminary engineering. At this time **no** right-of-way costs have been developed associated with these improvements.

A. Short Term (2020)

Short term improvements are defined as opportunities to implement improvements to the corridor that improve the movement and safety for transit, pedestrians, bicycles and motorists by approximately the year 2020 to provide better "Complete Streets". Capital projects that are already in design, such as the MD 22 (Churchville Road) Pedestrian Improvements Concept Design along the corridor, were considered as short term improvements, otherwise all other major capital projects were considered medium or long term. Likewise potential short term type improvements requiring right-of-way or significant environmental/utility impacts, determined that these projects were identified as either medium or long term. The short-term improvements for the entire MD 22 study corridor are provided in **Figures II-1 through II-4**. Levels of Service for the short term improvements are included in **Table II-1**.

i. Transportation Demand Management Solutions

Transportation Demand Management (TDM) Solutions are concepts that utilize and optimize the existing transportation systems without any capacity and/or construction activities. This is done by reducing the travel demand on the existing facilities during the heaviest traffic times. In other portions of Maryland some of the techniques that have been implemented include: employee transit pass subsidy, parking cashout, reduced SOV (single occupancy vehicle) parking spaces, shuttle services, create rideshare boards at employment centers, create parking charges, increased transit information, and electronic bulletin board by zip code for ridesharing.

TDM solutions are also being utilized to promote a change in behavior for the manner in which individuals think about transportation. For example, including a bicycle lane or sidewalk facility in an area may not immediately draw people to use these resources, the inclusion of these facilities with the promotion of wellness education, bike-to-work days, and other outreach efforts can encourage people to change their behavior and begin to use these resources over the next generation.

For the Business US 1 and MD 22 corridor, the following TDM solutions would provide overall benefits to mobility:

1. Flexible Work Schedules / Tele-commute Workers

Harford County should promote flexible work schedules as well as encourage appropriate businesses along the corridor and just off of the corridor to utilize tele-commuting as a viable option for their employees to utilize even one – two days per week.

These aspects would require coordination between the County and the major employment centers in the area prior to implementation. For further information, it is recommended that the County encourage employers along the corridor to coordinate with other employers in the area who have successfully implemented these programs. For example, flexible work hours and tele-commuting have been proven effective in companies such as CareFirst BlueCross BlueShield in Baltimore and McCormick & Co. in Hunt Valley.

2. High School Student Parking

There are several high schools within the study area in which the students drive themselves to school. It is recommended to maintain and continue to evaluate the implementation of the schools limiting the parking and providing parking privileges to students either as an earned benefit based on academic achievement, or as a need-based system for students with after school responsibilities such as athletics or employment. Implementation of a fee for obtaining a parking pass could further limit the number of students driving themselves to school.

3. Media Promotion

With any effort that is undertaken by Harford County, including encouraging flexible schedules, tax incentives for employers promoting transit, tele-commuting, etc. a media promotion utilizing the existing Harford County website as well as any social media outlets and working with local Chambers of Commerce to promote the initiatives should be completed. Media promotions of existing programs can also be completed throughout the year to continue to keep these programs in the forefront for employers and employees.

It is recommended that Harford County develop a request for proposal (RFP) for a media-based firm to develop a proposal to meet the media promotion desired. This RFP should include items to address concerns such as how TDM measures can be successfully implemented through a media promotion.

4. Off-Road Bicycle Connection from Jackson Boulevard to Moores Mill Road

This is a proposed shared-use path from Jackson Boulevard to Churchville Road and from Churchville Road to Moores Mill Road. This would provide a direct connection from the developments along Broadway to John Carroll, Bynum Run Park, and Brierhill Drive. This project is moving forward as part of a developer required improvement.

ii. Corridor-Wide

1. Transit Improvements

Shifting commuters from their automobile to transit requires that the commuter feels comfortable and can easily negotiate the transition. A key element of this transition is the availability of information. The primary source for transit information is the agency website. An improved website will provide a level of comfort to the new and/or occasional transit rider. Harford Transit is currently in the process of upgrading their website and intends to promote the website through a transit based grant. Elements anticipated to be provided both in the near term as well as those to be incorporated as the "next steps" for online marketing include the following listed below. It is also recommended that new website incorporate responsive design.

a) Inter-Agency Coordination/Transit Transfer Hub

- Review and coordinate the bus schedule between MTA and Harford Transit to ensure connectivity and build a system for transit users with nominal headways between transit links. In addition, Harford Transit should look to develop a full transit transfer hub at the Harford Mall that can be used by Harford Transit and MTA.

b) User Surveys

- Develop and dispense a survey on a regular basis for users to complete to identify strengths, challenges, and service desire lines to ensure Harford Transit is responsive to the changing needs of the users. This survey should be provided in multiple places in order to maximize distribution, including: an on-board survey to current users, a web survey available at the completed Harford Transit website, the Harford County website, and the Town of Bel Air website, and at the Harford Mall, with coordination of the Mall owners, to individuals visiting the retail center. The goal of the survey is to determine if there are additional needs from non-users to establish the viability of bringing in new users.

c) Alternative Payment Methods

- Harford Transit is currently a cash-only service. The organization should work to develop other methods of payment, such as the MTA CharmCard for user convenience.

d) Jitney Service Coordination

- Identify possible locations for a Jitney service within the study area. Work with the senior housing developments in the vicinity to discuss a daily or weekly Jitney bus route for use by the community. A Jitney service to connect Main Street with the major shopping centers and restaurants along the corridor should also be considered.

e) Geo-Coding Bus Routes

- Harford Transit is currently in the process of geo-coding the various bus routes to be able to link back to Google map services. Once this is completed, the user will have the capability to see the location of the bus vehicle en route as well as follow their progress. Currently the Maryland Transit Administration utilizes this technology as well as the City of Baltimore for the Charm City Circulator.

f) Incorporation of Quick Response (QR) Codes

- QR codes can be incorporated into the bus stop signage as well as other key locations and transit brochures to provide a link to the Harford Transit website, the location of the bus (for bus stop signs) or other useful information based on the location of the QR code.

g) Social Media

- With the completion of the website with the new branding and incorporating the real-time data, Harford Transit can look to provide further information through Social Media sites to predominantly target the Millennial generation that currently utilizes sites such as Facebook, Twitter, and YouTube as a means of communication. Social media can be and is currently being used in the transit industry to provide real-time service updates, build relationships with users, and promote employment with the agency. The importance of utilizing social media sites should not be underestimated as these sites can encourage a new generation in the workforce to establish transit as their primary option for transportation that is convenient, cost-effective, and can reduce their individual carbon footprint.

It is recommended that within the previously mentioned RFP for media promotion, a large component should be included for social media promotion and practice. Additionally, with the launch of social media sites, the responsibility of providing status updates and tweets should be specifically assigned to ensure an updated and frequent online presence.

With the completion of a fully functional and branded online presence, it is recommended that Harford Transit and Harford County work with large employment centers throughout the region (beyond the study limits) to incorporate a link to Harford Transit's site to promote transit as a viable option for their employees.

When the transit rider is looking for their stop, it is important that they can easily find the location. This requires increased visibility for the transit signage. The current Harford Transit branding includes orange on blue,

as seen in the photo below. For better visibility, it has been discussed with Harford Transit that reversing the color scheme would make their transit signage more visible. The improved transit signage would also be a prime indicator to automobile traffic along the corridor. The improved visibility of the signage may attract new patrons and would also indicate to the auto drivers to be more aware.

h) Pairing Bicycle Facilities with Transit

- Educating the public about connections between transit and bicycling can encourage both modes simultaneously. Connecting bicycles to transit can overcome barriers such as lengthy trips, riding up hills, and bad weather. The typical "catchment" area for bicycle trips connecting with transit is two to three miles. This is the area in which bicyclists will elect to bicycle to or from transit as a portion of a longer trip. The four most important components of bicycle and transit integration are: enabling bicycle access on transit vehicles, providing secure bicycle parking at transit locations, improving bikeways to transit, and promoting the use of bicycles and transit together.

i) Physical Improvements

- The Bel Air Courthouse is a major transfer hub for transit within the study area. Turn the existing bus stop into a bus pad for user convenience.
- Relocate the existing bus stop on MD 22 near Lee Way for a bus pull-off with a bus pad to be built at the new location.

Overall improvements to the system such as more visible signage, shelters, benches, and other amenities, even when outside of the study area, provide a benefit to the entire system through rider comfort. Because transit is largely based on ease and comfort of its riders, anything done to promote this anywhere in the system will benefit the entire system.

2. Non-Motorized Education and Outreach

Promote a community culture where walking, biking and public transportation are regarded as legitimate, healthy, safe and sustainable transportation modes. Harford County should engage the community and partner with the school district and local police department to make walking and bicycling safer and easier for all county residents. An education and outreach effort should be developed that educates residents of every age and ability about pedestrian, bicyclist and traffic safety, while simultaneously creating awareness of the health, environmental and economic benefits of walking and biking. This can be achieved by implementing the following strategies:

- Walking school bus or bicycle trains, using park and walk strategies so children living further from school can participate
- School mileage clubs, contests and incentives that generate enthusiasm for walking and biking
- On-campus walking activities or field trips
- Integration of bicycle and pedestrian safety education into school events and classrooms
- Educational materials, targeted at parents, highlighting how biking and walking can reduce childhood obesity, Improve health and create lifelong traffic safety skills
- Adult school crossing guard program
- Educational and media materials targeted at drivers to remind them how to share the road with bicycles and pedestrians and make it safer for them
- Additional school zone patrols to enforce speed limit, yielding to pedestrians and proper walking and biking behaviors
- Officer trainings focused on how law enforcement should occur to maximize behavior change and reduce crashes involving people walking and biking

Positive outcomes produced by any of the above strategies should be monitored and evaluated to understand what strategies work best for Harford County.

3. Bicycle Parking Improvements

Providing short term bicycle parking facilities is a fundamental component in establishing a comprehensive multi-modal transportation system. The installation of well-designed bicycle parking facilities provides safety against theft, furthermore it reduces bicycles being parked and locked to random objects. These erratically located bicycles often interfere with vehicular traffic flow or pedestrian movements, making sidewalks inaccessible to person with disabilities. Bicycle parking facilities should be strategically placed at trip origin and destination locations. Priority locations include places such as apartment buildings; restaurants; stores; offices and public facilities such as parks, libraries, schools and transit stops.

Bicycle parking should be easy to locate and to use. One of the most effective and simple type of short term bicycle parking facility is the "Inverted U" or "Bike Staple" bicycle rack. This type of rack provides space to park two bicycles simultaneously and can be clustered to provide additional spaces as needed. Bicycle parking facilities should be installed throughout the corridor at key locations based on prioritization of the above criteria.

4. Traffic Signal Modification within the Downtown Bel Air Pedestrian Zone

Create safer and easier street crossings for pedestrians by restricting right / left turns during a red signal. The highest priority movements, as identified by the Town of Bel Air Bicycle and Pedestrian Plan, are in the following locations:

- Westbound Churchville Road at Main Street
- Northbound Main Street at Pennsylvania Avenue
- Westbound Churchville Road at Bond Street
- Northbound Main Street at Fulford Avenue
- Southbound Bond Street at Churchville Road
- Westbound Lee Street at Main Street
- Eastbound Baltimore Pike at Main Street

5. Roadway Safety Audit Improvements

Roadway Safety Audit improvements are those that were identified during the December 15, 2014 Roadway Safety Audit with representatives from various agencies, including the Town of Bel Air, Harford County, and the State Highway Administration. These improvements are intended to be completed immediately to increase user safety within the study area:

a) Throughout the Study Area

Upgrade "One Way" and "Do Not Enter" signage on all one-way streets to be in accordance with the MD MUTCD Figures 2B-12 and 2B-15.

Included on Short Term Improvements Sheet 1

b) Intersection Improvements at MD 24 / Boulton Street

Incorporate a lane designation sign to the mast arm on Boulton Street heading westbound (toward the Best Buy).

The pedestrian crossing at the intersection corner near the Best Buy has limited sight distance due to grading. Re-grade the corner to minimize the height of the wall and improve sight distance.

The pedestrian signal for crossing MD 24 did not allow a crossing during a field visit. The signal went through three full cycles without changing to a walking man.

Add lighting to the recreational field parking lots to increase visibility and safety for the use of the lots.

Improve the crosswalk from the recreational parking lots to the recreational field by providing a striped pedestrian refuge area at the existing mid-block crossing. This will be accomplished by shortening the existing left turn lane to remove the taper from the crosswalk area and introduce the taper immediately after the refuge area.

c) Intersection Improvements at MD 24 / Business US 1

Consider placing a safety railing along the sidewalk by IHOP near the pinch point caused by an existing utility pole.

d) Intersection Improvements at MD 24 / Marketplace Drive

Restripe the inbound lane near the Einstein Bagels to accommodate two lanes and include a yield sign for the right turn lane. The current condition creates near-misses from vehicles entering from the free flow right turn lane at the same time that vehicles are entering from the left turn lane as both vehicles weave through the section. Striping the lanes and providing signage for the right turning vehicles will reduce the conflict.

e) Intersection Improvements at MD 24 / MacPhail Road

There is an exposed culvert and ditch along the edge of MD 24 near the Maryland Motor Vehicle Administration building. Provide guardrail along the length of the culvert to ensure vehicles do not stray into the area from MD 24.

f) Intersection and Roadway Improvements near Business US 1 / Tollgate Road

Resurface and restripe the pavement at the intersection. This should be completed though the regular maintenance of the roadway surface and elevated in priority to ensure it occurs in the near term.

Incorporate a pedestrian signal to the intersection to allow for safe passage across Business US 1. There is an existing crosswalk, however given the timing of the traffic signal, there is no set pedestrian movement nor any breaks in the traffic to allow for a pedestrian to make the crossing without having to stop in the middle of the roadway. The pedestrian signal would provide for a safe crossing in the existing crosswalk.

Included on Short Term Improvements Sheet 2

g) Intersection Improvements at Churchville Road / Main Street

Add "Do Not Enter" signs in the SE and SW corners near the Bank of America and the Harford County Administrative Building, respectively.

Repair the crosswalk at the intersection of Main Street and Churchville Road that requires continuous repair due to sinking. This will require excavation to determine the root cause of the problem for repair.

h) Intersection Improvements at Bond Street / Baltimore Pike

Remove and cap the drainage grate that is adjacent to the ADA ramp on the SE corner near the Looney's parking lot. This grate is not contributing to the drainage system.

i) Intersection Improvements at Fulford Avenue / Main Street

Add "Do Not Enter" sign in the SW Corner near Looney's Pub.

j) Roadway Improvements on Churchville Road between Main Street and Bond Street

Add "Do Not Enter" sign in the SE and NE corners near the Harford County Administrative Office and the open parking lot.

Conduct study to determine if "Curve Ahead" sign with Warning Speed on Churchville Road between Bond Street and Hays Street is warranted.

Extend Diagonal Cross Hatching on Churchville Road between Main Street and Bond Street.

k) Intersection Improvements at Fulford Avenue / Mailtand Street

Relocate Stop Line on Maitland Street further north.

l) Roadway Improvements on Churchville Road between Shamrock Road and Hickory Avenue

Construct the "MD 22 (Churchville Road) Pedestrian Improvements Concept Design."

m) Intersection Improvements at Churchville Road / Shamrock Road

Place additional signing and left turn arrow pavement markings to increase awareness for left turns from MD 22 Eastbound onto Shamrock Road.

Included on Short Term Improvements Sheet 3

n) Intersection Improvements at John Carroll School and Lee Way

Trim trees and shrubs approximately 50 feet east of Lee Way on the north side of the roadway.

o) Signage Improvements for the Bynum Run Park and Ride

Park and Ride signing is not visible from the street, increase signing and visibility to promote use.

p) Roadway Improvements on Brierhill Drive

Add "Do Not Enter" sign in the SE corner.

Evaluate converting the Rosedale Federal access points to Right-in / Right-out only.

Evaluate converting the Walgreens access point to Right-in / Right-out only.

Included on Short Term Improvements Sheet 4

q) Intersection Improvements on MD 22 / Moores Mill Road

Lengthen left turn lane 50 feet for movements from Moores Mill Road onto MD 22 Eastbound.

Re-mark crosswalks.

Eliminate or re-locate Pedestrian Crossing sign.

Add "Do Not Enter" sign on NE corner near the 7-Eleven.

r) Roadway Improvements along MD 22 between MD 543 and Econ Drive

Modify Pavement Markings in front of the WAWA according to the SHA planned improvement.

Review cross slope for drainage during next resurfacing.

Upgrade street name signs on MD 22 Westbound for Econ Drive.

Add "Do Not Enter" sign on SW corner at Econ Drive near Hillside Drive.

Add "Do Not Enter" sign at the median break before Moores Mill Road.

6. Short Term Improvements

Short term improvements are inclusive of the Roadway Safety Audit Improvements as well as opportunities to implement improvements for transit, pedestrian, bicycles and motorists by approximately the year 2020. Capital projects that are already in design, such as the State Highway Administration Pedestrian Improvements Concept, were considered as short term. Potential short term type improvements requiring right-of-way or significant environmental / utility impact were identified as either medium-term or long term.

Included on Short Term Improvements Sheet 1

a) Intersection Improvements at MD 24 / US 1 Bypass

There is currently a single lane for through movements in the southbound direction and two lanes in the northbound direction on US 1, and a single lane for left turns from southbound US 1 onto MD 24. Create a double left turn onto MD 24 from US 1 Bypass.

b) MacPhail Roadway Shared-Use Path Connection

Create an additional connection for pedestrians and bicyclists by constructing a shared-use path connection between MD 24 and MD 924. This will require coordination with the Harford County Public Schools to incorporate into their master plan. As the right-of-way is acquired for the trail the right-of-way for the road should also be acquired in anticipation for the future roadway improvement. The roadway installation to connect MacPhail Road through the school campus will be completed as a medium term improvement for MacPhail Road.

c) Intersection Improvements at MD 24 / Marketplace Drive

Widen the southwest corner to create a dedicated left turn lane, a left/through lane and a right turn lane. Close the secondary access to the Home Depot Parking Lot as a safety precaution for aggressive drivers trying to cut the queue line.

d) Marketplace Drive / Tollgate Marketplace Access / Home Depot Access Mini-Roundabout

Conduct a study to evaluate the installation of a mini-roundabout at this intersection for traffic calming.

e) On-Site Circulation Improvements at Bel Air High School

It is recommended to review options for on—site circulation improvements at Bel Air High School.

f) Pedestrian Improvements Along MD 24

Build sidewalk connection from Boulton Street to MacPhail Road on the eastern side of MD 24. There is a small existing section of sidewalk in this area, but it does not appear to be ADA compliant. This study recommends a fully compliant pedestrian connection along the MD 24 corridor between the two streets.

g) Pedestrian and Bicycle Improvements Along Kelly Avenue

Create a connection for bicycle and pedestrian traffic between Kelly Avenue and the shopping center. There is an existing sidewalk connection, but a pedestrian ramp should also be placed for accessibility.

h) Bicycle Improvements to Complete the Network

The MD 22 / Business US 1 corridor is, in general, lacking the appropriate bicycle comfort level to be a true multi-modal corridor. In addition, the necessary space for widening to allow bicycle lanes or off-road bicycle facilities is not available as a feasible solution for much of the area. Acknowledging these challenges, this study recommends creating a separate bicycle network using back roads with lower speeds and safer conditions that can still be used to access destinations along the corridor.

Build a shared-use path from Boulton Street to the Ma and Pa Trail. The proposed path will be approximately 1,300 feet long and on Boulton Street from Tollgate Road to Plumtree Park and on Atwood Road from Boulton Street to MacPhail Road. Also build a shared-use path for a direct connection from Thomas Street to the Ma and Pa Trail.

Build a shared-use path from MD 24 to MD 924 by connecting the two stub ends of MacPhail Road through the Bel Air Schools Campus.

Included on Short Term Improvements Sheet 2

i) Pedestrian Improvements along MD 22 from Main Street to Bond Street

The sidewalk between Main St and Bond Street on the south side of MD 22 Westbound is to be curbed and upgraded. The existing sidewalk is separated from the road by a mulch buffer area, but is at grade with the roadway. A curbed and upgraded connection would increase pedestrian safety and comfort level.

j) Pedestrian Improvements along MD 22 from Lee Way to Shamrock Road

Build sidewalk along the north side of MD 22 from Lee Way to Shamrock Road. The new sidewalk will connect with the SHA Intersection Improvement project that extends from Shamrock Road to Hickory Avenue.

k) Bicycle Improvements to Complete the Network

Use signing and sharrow pavement markings on the following roadways:

- On Thomas Street from Atwood Road to Bond Street,
- On Courtland Place from Bond Street to Hickory Avenue,
- On Lee Way from Bond Street to Shamrock Road,
- On Shamrock Road from Lee Way to Majors Choice Drive,
- On Majors Choice Drive from Shamrock Road to Moores Mill Road,
- On E Broadway from Moores Mill Road to Williams Street
- On Alice Ann Street from Williams Street to Bond Street,
- On Williams Street from Thomas Street to Ellendale Street.

Add bike lanes on the following roadways:

- On Hickory Avenue from Fulford Avenue to Lee Way,

Included on Short Term Improvements Sheet 3

l) Intersection Improvements at MD 22 / John Carroll High School

Extend left turn bay from MD 22 Westbound and widen John Carroll access road to improve traffic circulation.

- Option A – The new lane configuration for the John Carroll access road will be one receiving lane, a dedicated left turn lane and a dedicated right turn lane.
- Option B – The new lane configuration for the John Carroll access road will be two receiving lanes and a shared left / right turn lane.

Build sidewalk from Lee Way to John Carroll on the north side of MD 22 and put in a Pedestrian Crossing across MD 22 on the west side of the intersection.

m) Roadway Improvement along MD 22

Place a raised curb along the median on MD 22 from Moores Mill Road to Brierhill Drive. This is the only area of the MD 22 section of the corridor that does not have a raised median. The addition of the raised median in this location could create a “parkway” into the Town.

n) Bicycle Improvements to Complete the Network

Use signing and sharrow pavement markings on Broadway from Ardmore Way to Moores Mill Road.

Build a Shared-Use Path along Moores Mill Road from Broadway to MD 22.

o) Developer Based Pedestrian / Bicycle Improvements

There are two developer based pedestrian / bicycle improvements that this study recommends to be built only in conjunction with a proposed development.

- A bike path along Jackson Boulevard connecting Major's Choice with MD 22. In the event that this parcel is developed a bike lane or shared-use path should be provided as a connection to Bynum Run Park

- Shared-use path from Moores Mill Road to Jackson Boulevard. In the event that these parcels are developed, a shared-use path connection between Moores Mill Road and Jackson Boulevard should be built adjacent to the tree line beside the Southampton Middle School east of the baseball diamonds.

p) Pedestrian Improvements along MD 22 from Moores Mill Road to Brierhill Road

Build sidewalk from Moores Mill Road to Brierhill Drive and provide a pedestrian crossing of MD 22 at Brierhill Drive.

Included on Short Term Improvements Sheet 4

q) Intersection Improvements at MD 22 / Moores Mill Road

Use a permissive protective phase for left turns onto Moores Mill Road from MD 22 to reduce conflict caused by limited sight distance. This improvement will have a negative impact to the LOS, but it is included as a safety improvement instead of a traffic improvement due to the difficulty of making left turns at the light.

r) Pedestrian Improvements along MD 543 from MD 22 to Amyclae

Build sidewalk connections on MD 543 from MD 22 to Amyclae Drive. This includes approximately 900 feet of new sidewalk on the west side of MD 543 and 500 feet of new sidewalk on the east side of MD 543. Along the west side, add a connection from the proposed sidewalk to the existing commercial center.

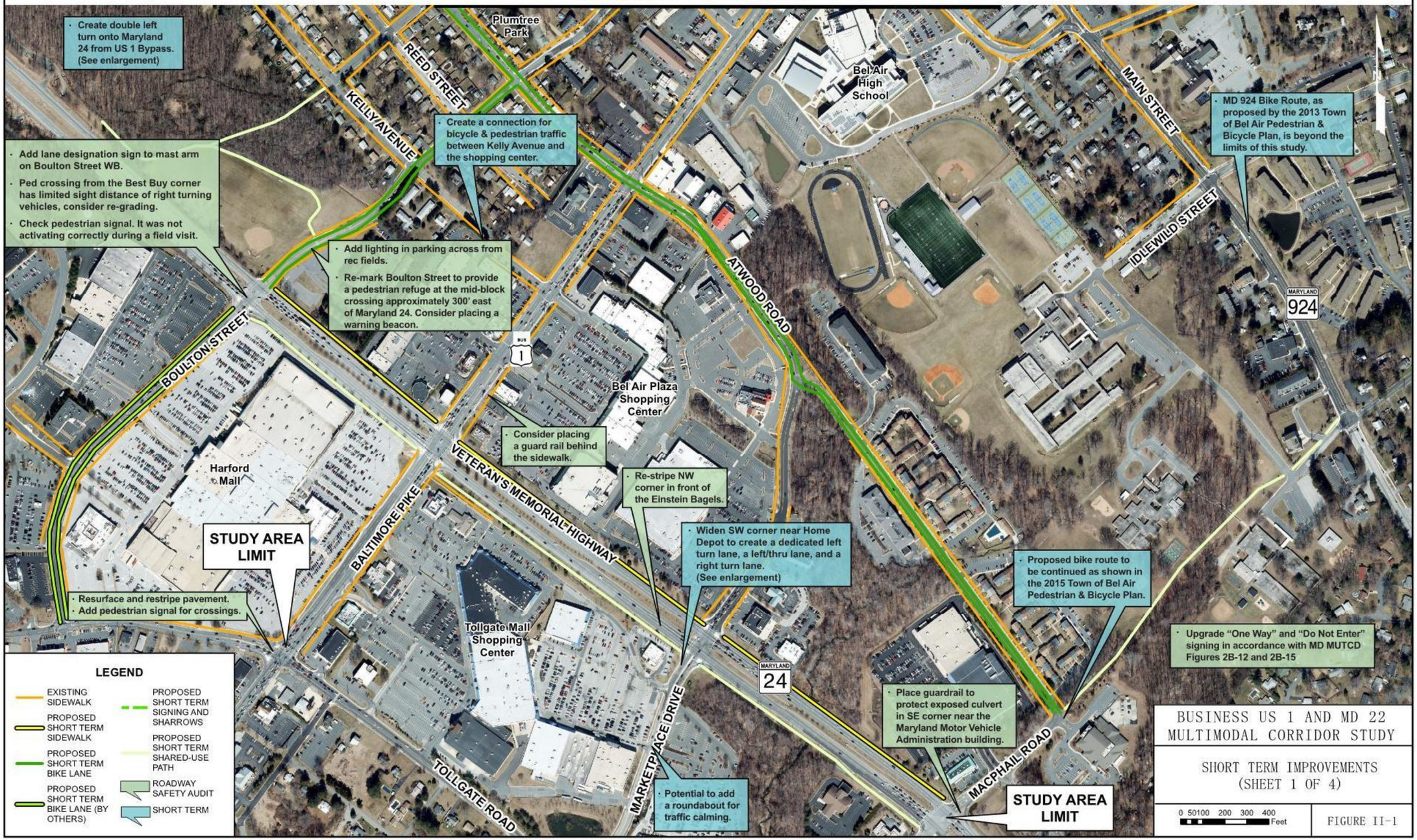
s) Bicycle Improvements to Complete the Network

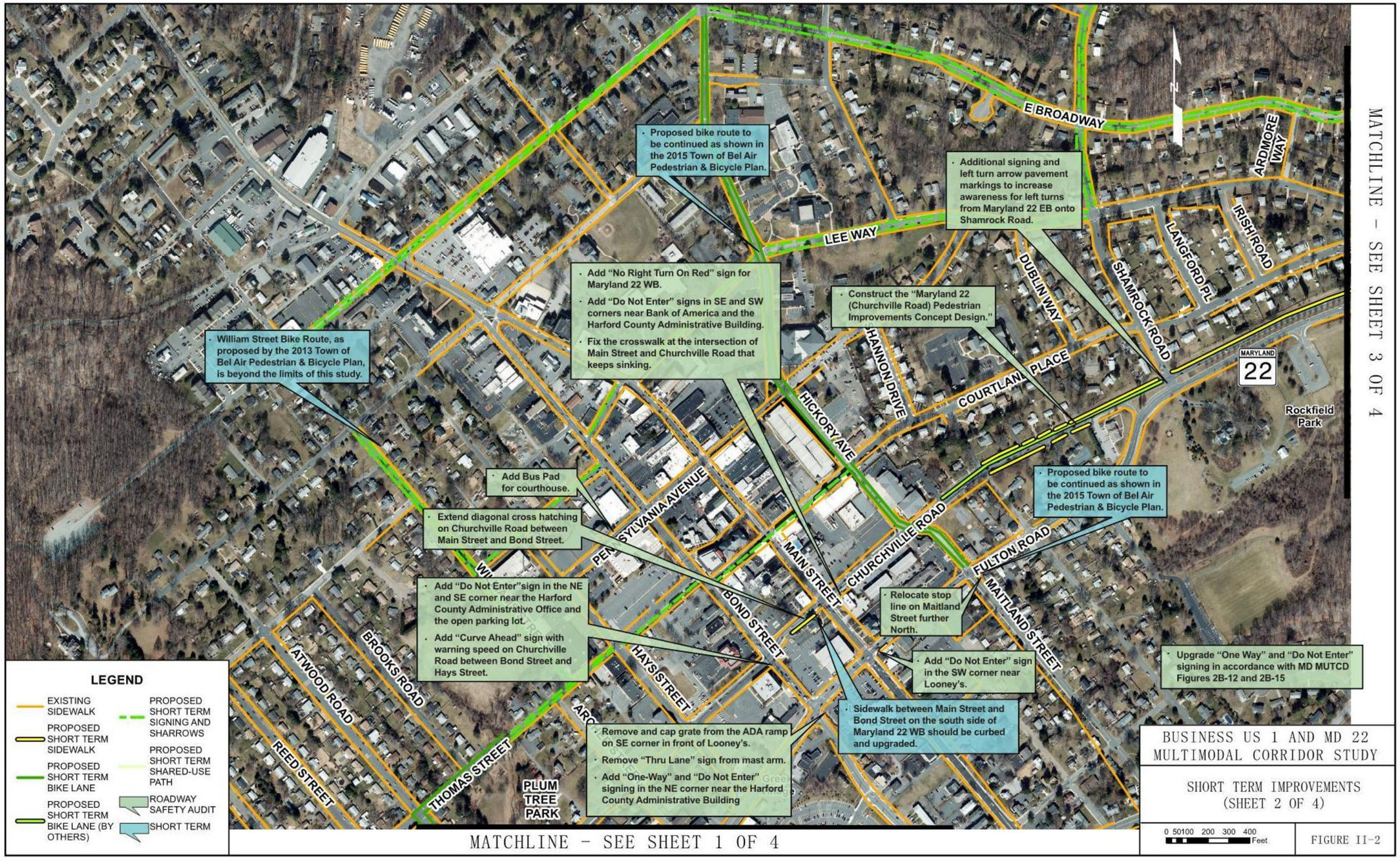
Use signing and sharrow pavement markings on the following roadways:

- On Econ Drive from Moores Mill Road to Amyclae Drive,
- On Amyclae Drive from Econ Drive to MD 543.

SHORT TERM IMPROVEMENTS

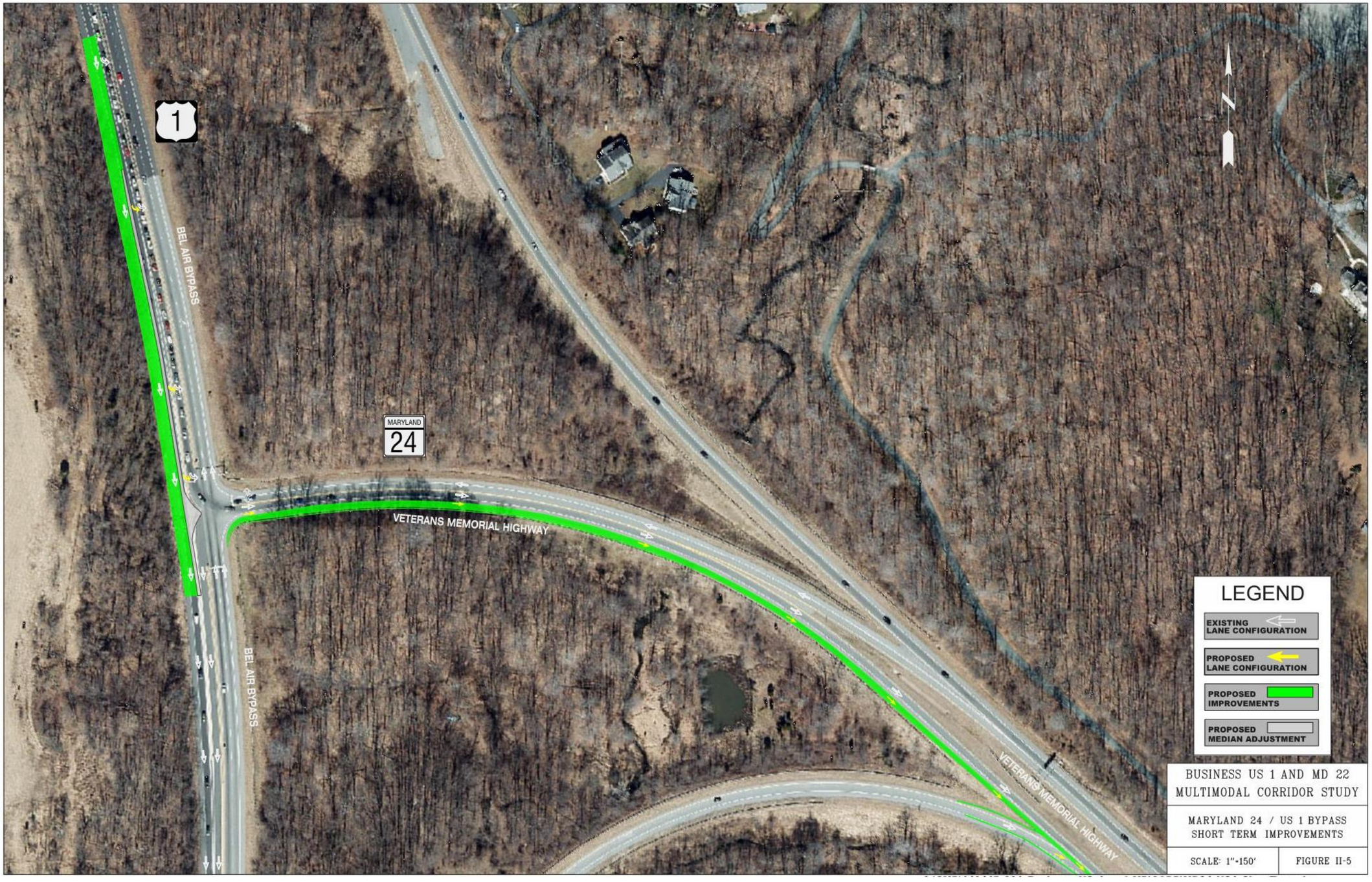
MATCHLINE - SEE SHEET 2 OF 4

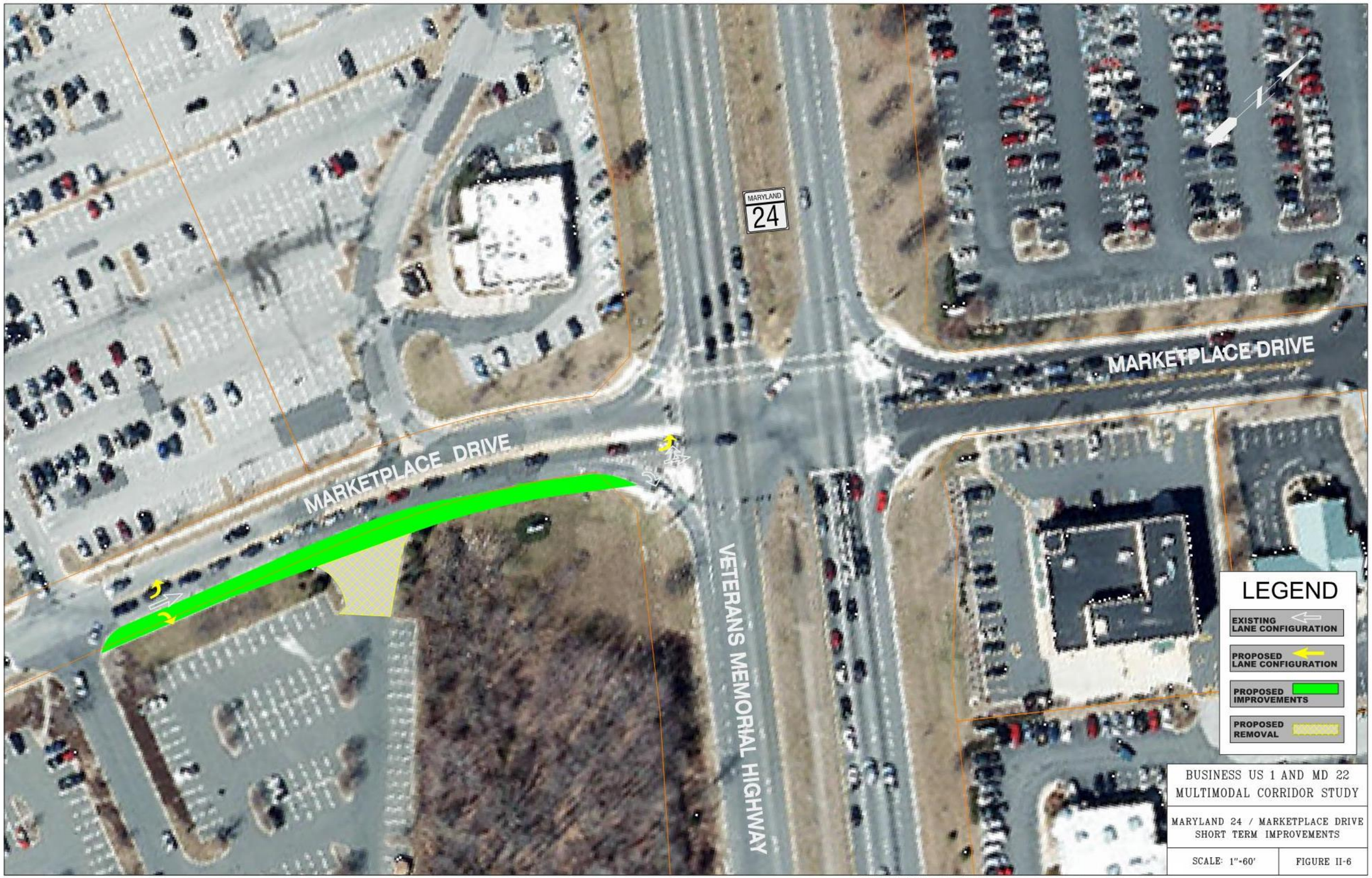


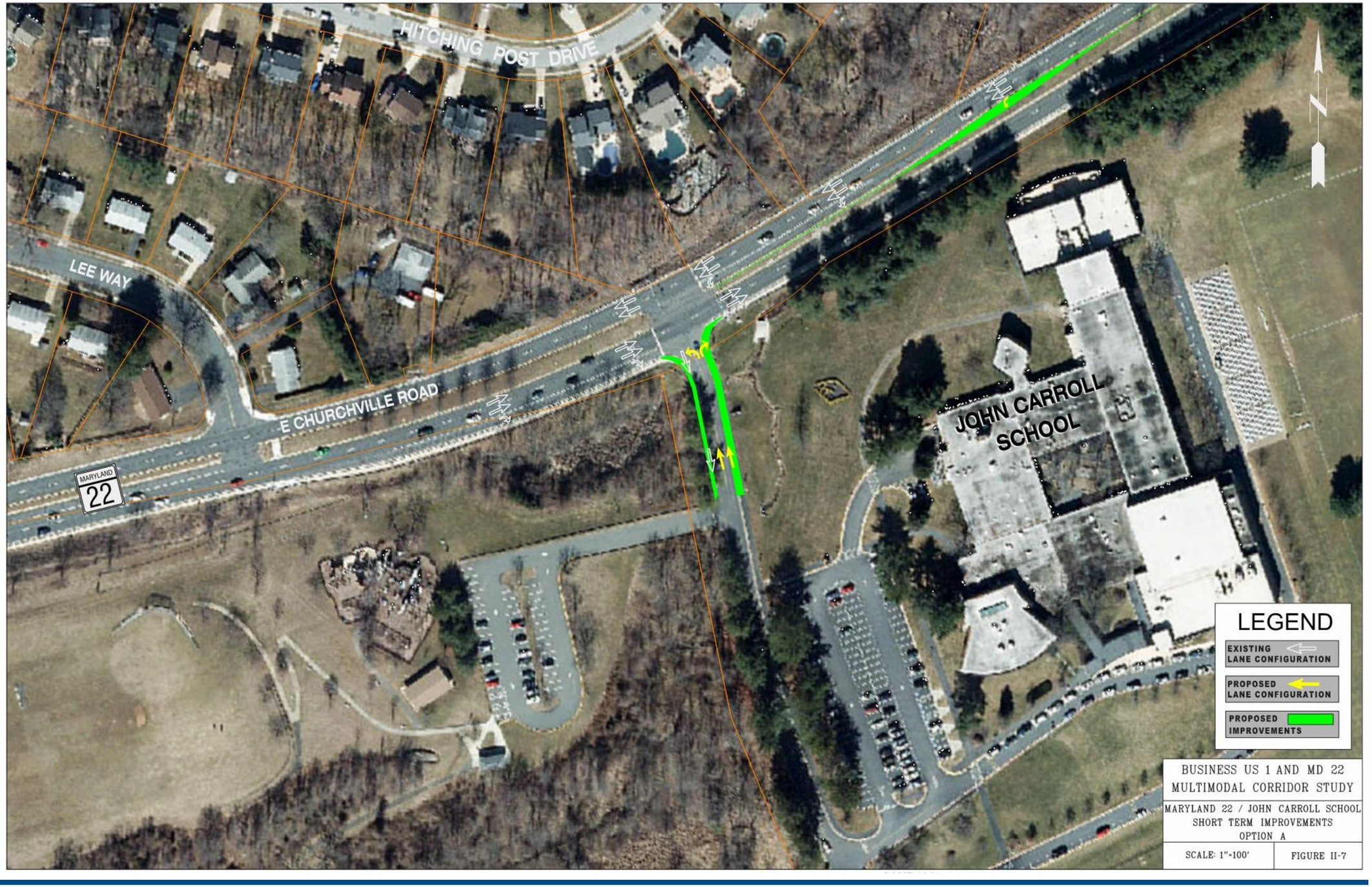

E BROADWAY
LEE WAY
ARDMORE WAY
IRISH ROAD
LANGFORD PL
SHAMROCK ROAD
DUBLIN WAY
COURTLAND PLACE
HANNON DRIVE
HICKORY AVE
MARYLAND 22
Rockfield Park
SYLVANIA AVENUE
MAIN STREET
CHURCHVILLE ROAD
FULTON ROAD
MAITLAND STREET
BOND STREET
HAYS STREET
BROOKS ROAD
ATWOOD ROAD
REED STREET
THOMAS STREET
PLUM TREE PARK
· Proposed bike route to be continued as shown in the 2015 Town of Bel Air Pedestrian & Bicycle Plan.
· Additional signing and left turn arrow pavement markings to increase awareness for left turns from Maryland 22 EB onto Shamrock Road.
· Add "No Right Turn On Red" sign for Maryland 22 WB.
· Add "Do Not Enter" signs in SE and SW corners near Bank of America and the Harford County Administrative Building.
· Fix the crosswalk at the intersection of Main Street and Churchville Road that keeps sinking.
· Construct the "Maryland 22 (Churchville Road) Pedestrian Improvements Concept Design."
· William Street Bike Route, as proposed by the 2013 Town of Bel Air Pedestrian & Bicycle Plan, is beyond the limits of this study.
· Add Bus Pad for courthouse.
· Extend diagonal cross hatching on Churchville Road between Main Street and Bond Street.
· Add "Do Not Enter"sign in the NE and SE corner near the Harford County Administrative Office and the open parking lot.
· Add "Curve Ahead" sign with warning speed on Churchville Road between Bond Street and Hays Street.
· Proposed bike route to be continued as shown in the 2015 Town of Bel Air Pedestrian & Bicycle Plan.
· Relocate stop line on Maitland Street further North.
· Add "Do Not Enter" sign in the SW corner near Looney's.
· Upgrade "One Way" and "Do Not Enter" signing in accordance with MD MUTCD Figures 2B-12 and 2B-15
· Sidewalk between Main Street and Bond Street on the south side of Maryland 22 WB should be curbed and upgraded.
· Remove and cap grate from the ADA ramp on SE corner in front of Looney's.
· Remove "Thru Lane" sign from mast arm.
· Add "One-Way" and "Do Not Enter" signing in the NE corner near the Harford County Administrative Building
LEGEND
EXISTING SIDEWALK
PROPOSED SHORT TERM SIDEWALK
PROPOSED SHORT TERM BIKE LANE
PROPOSED SHORT TERM BIKE LANE (BY OTHERS)
PROPOSED SHORT TERM SIGNING AND SHARROWS
PROPOSED SHORT TERM SHARED-USE PATH
ROADWAY SAFETY AUDIT
SHORT TERM
MATCHLINE - SEE SHEET 3 OF 4
MATCHLINE - SEE SHEET 1 OF 4
BUSINESS US 1 AND MD 22 MULTIMODAL CORRIDOR STUDY
SHORT TERM IMPROVEMENTS (SHEET 2 OF 4)
0 50100 200 300 400 Feet
FIGURE II-2

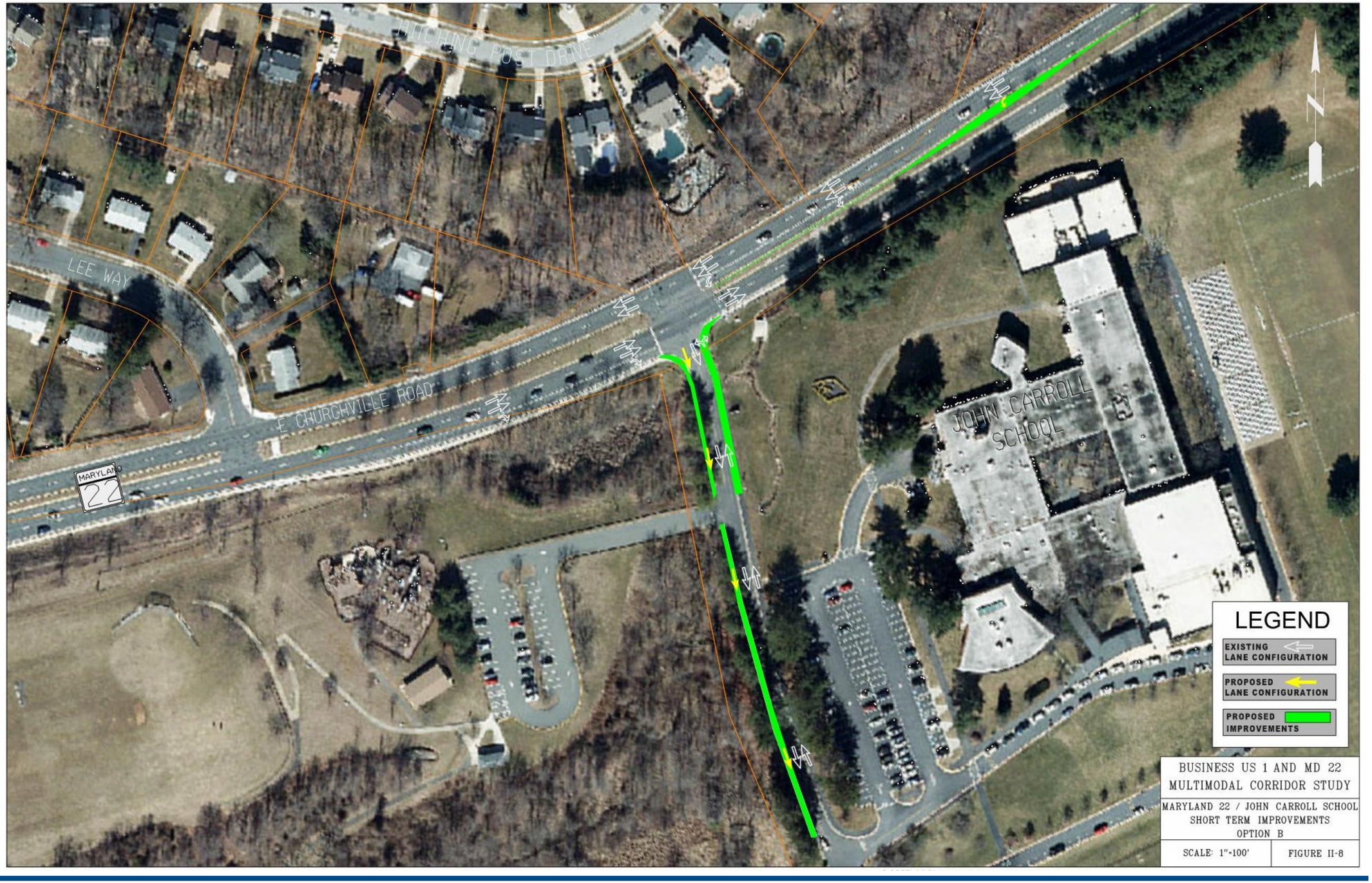

MATCHLINE - SEE SHEET 4 OF 4
Place a raised curb within the median from Brierhill Drive to Moores Mill Road to create a "parkway".
Evaluate converting Walgreens access point to a right-in, right-out only.
Evaluate converting Rosedale Federal accress points to Right-in/Right-out only.
St Matthew Lutheran Church
Add "Do Not Enter" sign in SE corner.
Re-move Two-Way Left Turn Lane between Moores Mill Road and Brierhill Road.
Build a pedestrian crossing across Maryland 22 on the east side of the intersection as part of the Proposed Short Term Sidewalk Improvements.
MOORES MILL ROAD
CHURCHVILLE ROAD
Increase signing and visibility for Park and Ride users.
Bynum Run Park
Southampton Middle School
John Carroll School
HITCHING POST DRIVE
E BROADWAY
JACKSON BLVD
Potential to provide bus pad pull-off with relocated bus stop.
Extend left turn bay from Maryland 22 WB and widen John Carroll access road to improve traffic circulation. (See enlargements)
Build a Pedestrian Crossing across Maryland 22 on the west side of the intersection with the John Carroll road as part of the Proposed Short Term Sidewalk Improvements.
Trim trees and shrubs approximately 50 feet east of Lee Way on the north side of the roadway.
LEE WAY
MARYLAND 22
Upgrade "One Way" and "Do Not Enter" signing in accordance with MD MUTCD Figures 2B-12 and 2B-15
TO BE BUILT IN CONJUNCTION WITH PROPOSED DEVELOPMENT
LEGEND
EXISTING SIDEWALK
PROPOSED SHORT TERM SIDEWALK
PROPOSED SHORT TERM BIKE LANE
PROPOSED SHORT TERM BIKE LANE (BY OTHERS)
PROPOSED SHORT TERM SIGNING AND SHARROWS
PROPOSED SHORT TERM SHARED-USE PATH
ROADWAY SAFETY AUDIT
SHORT TERM
MATCHLINE - SEE SHEET 2 OF 4
BUSINESS US 1 AND MD 22 MULTIMODAL CORRIDOR STUDY
SHORT TERM IMPROVEMENTS (SHEET 3 OF 4)
0 50100 200 300 400 Feet
FIGURE II-3


STUDY AREA LIMIT
Royal Farms
Rite Aid
Burger King
Wawa
AMYCLAE DRIVE
FOUNTAIN GREEN ROAD
ECON DRIVE
HILLSIDE DRIVE
CHURCHVILLE ROAD
TREDMORE RD
BRUSHING LANE
MOORES MILL RD
MARYLAND 543
MARYLAND 22
Proposed Eva Mar Development
Fountain Green Plaza Shopping Center
· Review cross slope for drainage during next resurfacing.
· Upgrade street name signs on Maryland 22 WB for Econ Drive.
· Modify pavement markings in front of the Wawa according to the SHA planned improvement.
· Add "Do Not Enter" sign on SW corner at Econ Drive near Hillside Drive.
· Add "Do Not Enter" sign at the median break before Moores Mill Road.
· Eliminate or re-locate Pedestrian Crossing sign.
· Add "Do No Enter" sign on NE corner near the 7-Eleven.
· Lengthen left turn lane 50 feet for movements from Moores Mill Road onto Maryland 22 EB.
· Re-mark crosswalks.
· Upgrade "One Way" and "Do Not Enter" signing in accordance with MD MUTCD Figures 2B-12 and 2B-15
LEGEND
EXISTING SIDEWALK
PROPOSED SHORT TERM SIDEWALK
PROPOSED SHORT TERM BIKE LANE
PROPOSED SHORT TERM BIKE LANE (BY OTHERS)
PROPOSED SHORT TERM SIGNING AND SHARROWS
PROPOSED SHORT TERM SHARED-USE PATH
ROADWAY SAFETY AUDIT
SHORT TERM
MATCHLINE - SEE SHEET 3 OF 4
BUSINESS US 1 AND MD 22 MULTIMODAL CORRIDOR STUDY
SHORT TERM IMPROVEMENTS (SHEET 4 OF 4)
0 50100 200 300 400 Feet
FIGURE II-4


1
BEL AIR BYPASS
MARYLAND
24
VETERANS MEMORIAL HIGHWAY
BEL AIR BYPASS
VETERANS MEMORIAL HIGHWAY
N
LEGEND
EXISTING LANE CONFIGURATION
PROPOSED LANE CONFIGURATION
PROPOSED IMPROVEMENTS
PROPOSED MEDIAN ADJUSTMENT
BUSINESS US 1 AND MD 22 MULTIMODAL CORRIDOR STUDY
MARYLAND 24 / US 1 BYPASS SHORT TERM IMPROVEMENTS
SCALE: 1"=150'
FIGURE II-5


MARYLAND
24
MARKETPLACE DRIVE
MARKETPLACE DRIVE
VETERANS MEMORIAL HIGHWAY
LEGEND
EXISTING LANE CONFIGURATION
PROPOSED LANE CONFIGURATION
PROPOSED IMPROVEMENTS
PROPOSED REMOVAL
BUSINESS US 1 AND MD 22 MULTIMODAL CORRIDOR STUDY
MARYLAND 24 / MARKETPLACE DRIVE SHORT TERM IMPROVEMENTS
SCALE: 1"=60'
FIGURE II-6

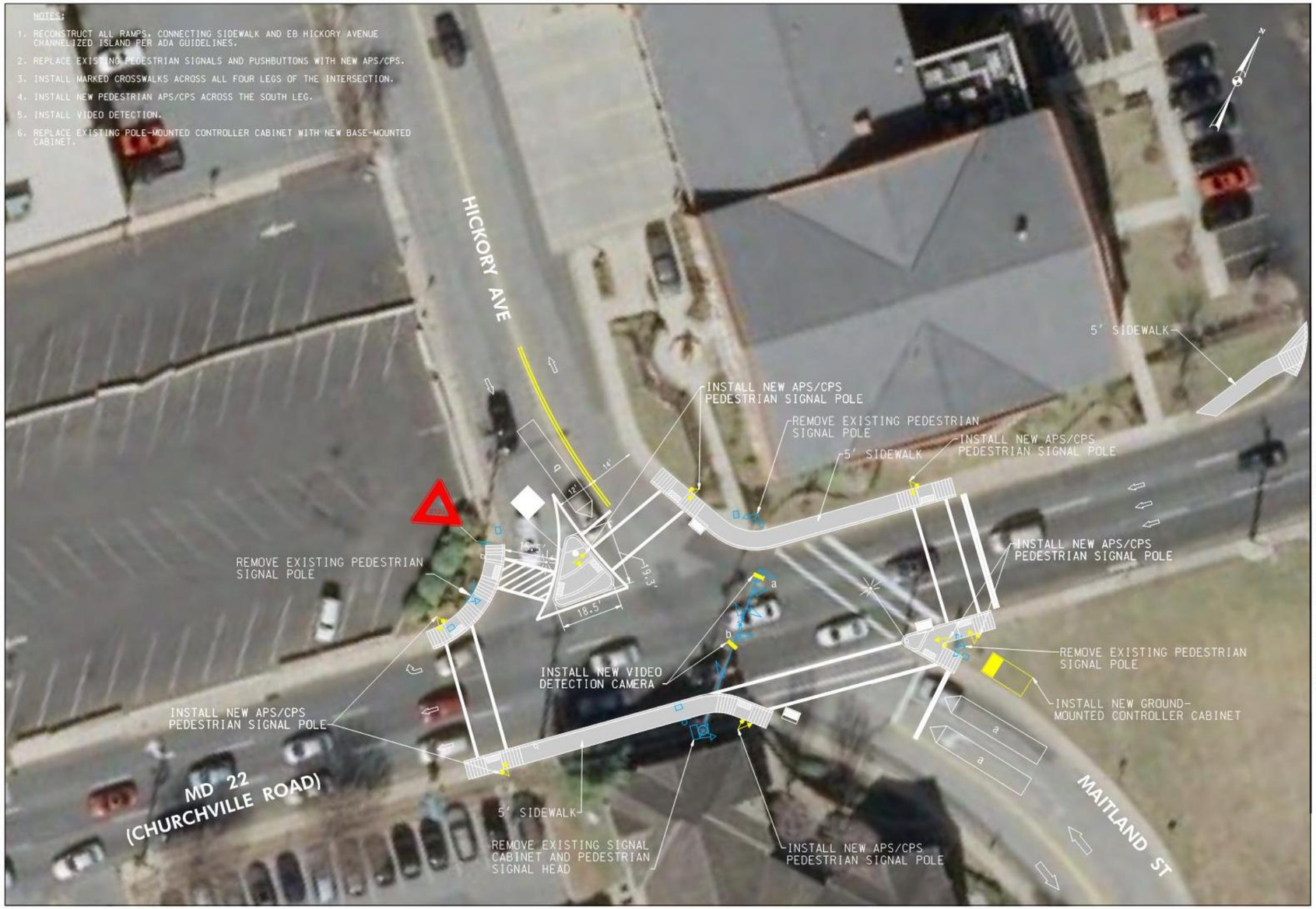

HITCHING POST DRIVE
LEE WAY
E CHURCHVILLE ROAD
MARYLAND
22
JOHN CARROLL
SCHOOL
LEGEND
EXISTING LANE CONFIGURATION
PROPOSED LANE CONFIGURATION
PROPOSED IMPROVEMENTS
BUSINESS US 1 AND MD 22
MULTIMODAL CORRIDOR STUDY
MARYLAND 22 / JOHN CARROLL SCHOOL
SHORT TERM IMPROVEMENTS
OPTION A
SCALE: 1"=100'
FIGURE II-7


HITCHING POST DRIVE
LEE WAY
E CHURCHVILLE ROAD
MARYLAND 22
JOHN CARROLL SCHOOL
LEGEND
EXISTING LANE CONFIGURATION
PROPOSED LANE CONFIGURATION
PROPOSED IMPROVEMENTS
BUSINESS US 1 AND MD 22 MULTIMODAL CORRIDOR STUDY
MARYLAND 22 / JOHN CARROLL SCHOOL SHORT TERM IMPROVEMENTS OPTION B
SCALE: 1"=100'
FIGURE II-8

PROPOSED IMPROVEMENTS FROM SHA BETWEEN HICKORY AVENUE AND SHAMROCK ROAD

NOTES:

1. RECONSTRUCT ALL RAMPS, CONNECTING SIDEWALK AND EB HICKORY AVENUE CHANNELIZED ISLAND PER ADA GUIDELINES.
2. REPLACE EXISTING PEDESTRIAN SIGNALS AND PUSHBUTTONS WITH NEW APS/CPS.
3. INSTALL MARKED CROSSWALKS ACROSS ALL FOUR LEGS OF THE INTERSECTION.
4. INSTALL NEW PEDESTRIAN APS/CPS ACROSS THE SOUTH LEG.
5. INSTALL VIDEO DETECTION.
6. REPLACE EXISTING POLE-MOUNTED CONTROLLER CABINET WITH NEW BASE-MOUNTED CABINET.



30' 0 30' 60'

SCALE: 1" = 30'

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www.WallaceMontgomery.com A Limited Liability Partnership

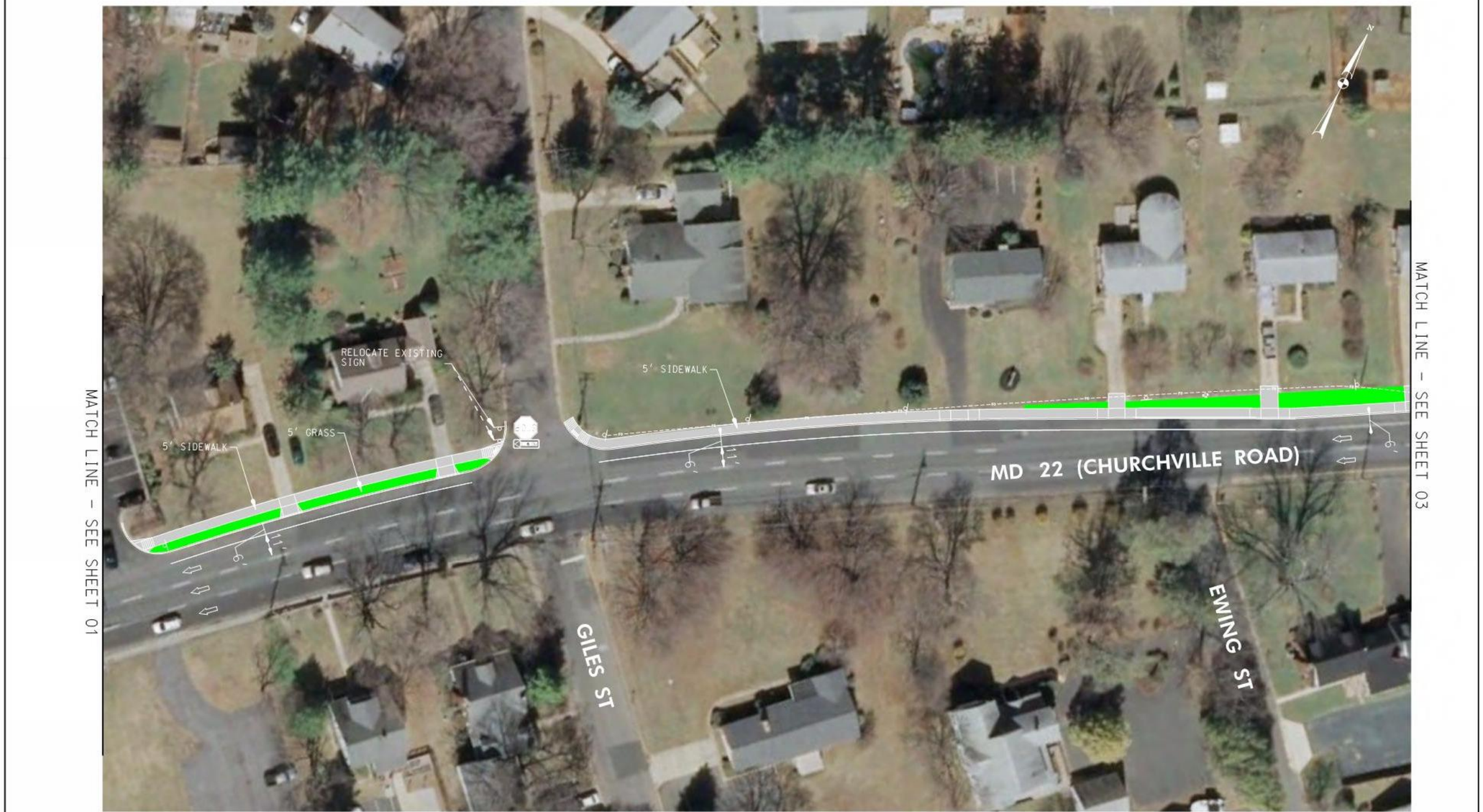
DESIGN	E.P.C.
DRAWN	E.P.C.
CHECK	J.L.R.
APPR	

MD 22 (CHURCHVILLE ROAD) HICKORY AVE TO SHAMROCK RD

PEDESTRIAN IMPROVEMENTS CONCEPT DESIGN

DATE: OCTOBER 2014

CONTRACT NO.
DRAWING NO.
SHEET NO. 01 OF 03



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DESIGN	E.P.C.
DRAWN	E.P.C.
CHECK	J.L.R.
APPR	

MD 22 (CHURCHVILLE ROAD)
HICKORY AVE TO SHAMROCK RD

PEDESTRIAN IMPROVEMENTS
CONCEPT DESIGN

DATE: OCTOBER 2014

CONTRACT NO.
DRAWING NO.
SHEET NO. 02 OF 03

50' 0 50' 100'
SCALE: 1" = 50'

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DESIGN E.P.C.
DRAWN E.P.C.
CHECK J.L.R.
APPR

MD 22 (CHURCHVILLE ROAD)
HICKORY AVE TO SHAMROCK RD
PEDESTRIAN IMPROVEMENTS
CONCEPT DESIGN
DATE: OCTOBER 2014

CONTRACT NO.
DRAWING NO.
SHEET NO. 03 OF 03

Table II-1 Short Term Traffic Analysis

INTERSECTION	EXISTING 2014		NO BUILD 2020		BUILD 2020	
	AM	PM	AM	PM	AM	PM
	HCM LOS	HCM LOS	HCM LOS	HCM LOS	HCM LOS	HCM LOS
Along MD 22 Churchville Road						
MD 543	D	D	E	E	E	E
Moores Mill Road/Brushing Lane	C	B	C	C	C	C
Brierhill Road	B	B	B	C	B	C
John Carroll High School	D	B	E	B	C	A
S Hickory Avenue	B	B	B	B	B	B
N Main Street	B	B	B	B	B	B
S Bond Street	B	C	B	C	B	C
Along MD 22 Fulford Avenue						
Maitland Street	B	A	B	A	B	A
N Main Street/MD 924	B	B	B	B	B	B
S Bond Street/MD 924	B	B	B	B	B	B

MD 22 Corridor Study
Existing Conditions and Year 2020 Build and No Build Scenario

INTERSECTION	EXISTING 2014		NO BUILD 2020		BUILD 2020	
	AM	PM	AM	PM	AM	PM
	HCM LOS	HCM LOS	HCM LOS	HCM LOS	HCM LOS	HCM LOS
Along US 1 Business						
Atwood Road	B	C	B	D	B	D
S Kelley Avenue	A	A	A	A	A	B
Bel Air Plaza	A	A	A	A	Signal Removed	Signal Removed
MD 24	D	D	D	D	D	D
S Tollgate Road/N Tollgate Road	D	D	D	D	C	D
Along MD 24						
W MacPhail Road	B	C	C	C	C	C
Marketplace Drive	C	C	C	D	C	D
Boulton Street	B	C	C	C	C	D
US 1 Bypass	D	E	E	F	C	D

Levels of Service Legend:

A
B
C
D
E
F

NOTE:

The No Build conditions reflect the existing signal timings.

The EB/WB MD 22 left turn movement is provided with exclusive left turn phasing and NB/SB Moores Mill Road left turn movement is exclusive/permissive.

MD 22 Corridor Study
Existing Conditions and Year 2020 Build and No Build Scenario

Table II-2: Short Term Improvements

Short Term Improvements Sheet 1						
Intersection	**Traffic Analysis**				**Feasibility Level Cost Estimate (Not Including ROW)**	**Remarks**
	Peak Hour	**2014 LOS**	**2020 NO BUILD LOS**	**2020 BUILD LOS**		
Pedestrian and Bicycle Improvements					$3.5 - $6 million*	Includes new sidewalks, shared-use path, bicycle lane markings and bicycle signing and sharrows.
MD 24 / US 1 Bypass	AM	D	E	C	$3 - $5 Million	Create a double left turn onto MD 24 from US 1 Bypass.
	PM	E	F	D		
MD 24 / Marketplace Drive	AM	C	C	C	$0.5 - $1 Million	Widen SW corner near the Home Depot to create a dedicated left turn lane, a left / through lane, and a right turn lane.
	PM	C	D	D		
Marketplace Drive / Home Depot Access / Tollgate Mall Access Mini-Roundabout					$100,000 - $300,000	Create a mini-roundabout at the Marketplace Drive / Home Depot Access / Tollgate Mall Access intersection.

*Bike lanes on Boulton Street from Tollgate Road to MD 22 not included in pricing.

Short Term Improvements Sheet 2						
Intersection	**Traffic Analysis**				**Feasibility Level Cost Estimate (Not Including ROW)**	**Remarks**
	Peak Hour	**2014 LOS**	**2020 NO BUILD LOS**	**2020 BUILD LOS**		
Pedestrian and Bicycle Improvements					$0.5 - $1.5 Million	Includes new sidewalks, shared-use path, bicycle lane markings and bicycle signing and sharrows.

Short Term Improvements Sheet 3						
Intersection	**Traffic Analysis**				**Feasibility Level Cost Estimate (Not Including ROW)**	**Remarks**
	Peak Hour	**2010 LOS**	**2015 NO BUILD LOS**	**2015 BUILD LOS**		
Pedestrian and Bicycle Improvements					$1 - $2 Million	Includes new sidewalks, shared-use path, bicycle lane markings and bicycle signing and sharrows.
Developer Based Pedestrian / Bicycle Improvements					**	Bike path along Jackson Boulevard. Shared-use path from Moores Mill Road to Churchville Road to Jackson Boulevard.
MD 22 / John Carroll High School	AM	D	E	C	Option A: $800,000 – $1,500,000	Extend left turn bay from MD 22 Westbound and widen John Carroll access road to improve traffic circulation.
	PM	B	B	A	Option B: $1 - $2 Million	

****Assumed cost to be paid by developer.**

Short Term Improvements Sheet 4						
Intersection	**Traffic Analysis**				**Feasibility Level Cost Estimate (Not Including ROW)**	**Remarks**
	Peak Hour	**2010 LOS**	**2015 NO BUILD LOS**	**2015 BUILD LOS**		
Pedestrian and Bicycle Improvements					$1 - $2 Million	Includes new sidewalk, bicycle line markings and bicycle signing and sharrows.
MD 22 / Moores Mill Road	AM	C	C	C	$3,000 - $5,000	Use a permissive protective phase for left turns onto Moores Mill Road from MD 22 to reduce conflict.
	PM	B	C	C		

B. Medium Term (2030)

Medium term improvements are defined as opportunities to implement improvements to the corridor that improve the movements for transit, pedestrian, bicycles and motorists by approximately the year 2030 to further provide for a "Complete Street". The Medium Term improvements build upon the Short Term improvements and assume that they have been completed.

The medium term improvements for the Business US 1 and MD 22 Corridor Study are provided in **Figures II-5 through II-8**. Levels of Service for the medium term improvements are included in **Table II-2**.

a) Upgrade the Pedestrian Network to be ADA Compliant

Upgrade Pedestrian facilities to the current ADA requirements in conjunction with access point consolidation. This includes items such as pinch points, driveway crossings, crosswalks, cross slopes, and detectable warning surfaces. Recent construction has been done along MD 24 and MD 924 at the intersection with Business US 1 and MD 22 to meet compliancy.

Included on Medium Term Improvements Sheet 1

b) Roadway Improvements on MD 24

Widen MD 24 from two lanes to three lanes in both directions from Boulton Street to MacPhail Road. Intersection improvements to Boulton Street and Business US 1 are to be included as part of this improvement. Add a second receiving lane on Boulton Street in front of the Best Buy to implement a double left turn from MD 24.

c) Access Management along Business US 1 / MD 22

The Business US 1 section of the corridor has numerous entrances and exits for the many businesses lining both sides of the roadway. The amount of access points could be causing delays, confusion and a lack of awareness in this section. Minimizing the amount of direct access points off of the corridor will reduce conflict and create a more efficient traffic flow.

d) MacPhail Roadway Connection

Create an additional roadway connection between MD 24 and MD 924 by connecting MacPhail Road through the school campus using the additional right-of-way acquired from the shared-use path constructed as part of the short term improvement for MacPhail Road. This will require coordination with the Harford County Public Schools to incorporate into their master plan. The new roadway is anticipated to be one lane in each direction with a separated shared-use path and sidewalk. The new intersections at MacPhail Road / Atwood Drive could be built with roundabouts as traffic calming measures. The existing MacPhail Road / MD 24 intersection will also be improved, on W MacPhail Road, the new lane alignment will include two left turns, a through lane, and a right turn lane.

e) Intersection Improvements at Business US 1 / Tollgate Road

Extend the right turn lane from Business US 1 WB onto Tollgate Road to the MD 24 intersection. The existing right turn lane can be blocked by a very small queue of through-moving traffic

f) Pedestrian Improvements along MD 24

Build sidewalk from Business US 1 to Marketplace Drive along the east side of MD 24.

Build a shared-use path from Boulton Street to MacPhail Drive along the west side of MD 24.

g) Reconstruction of Harford Mall

The Harford Mall is an aging facility that was based upon a previous shopping market analysis. The Harford Mall began an update with the restaurants and shops along Business US 1 into more of an "Avenue" style configuration several years ago. As many malls throughout the US have gotten older, they look to remake themselves; that includes deconstruction of a portion or even all of the buildings. If and when the Harford Mall looks to begin this process, Harford County should consider the highest and best use for the property that may include mixed-use development and higher densities. The creation of mixed-use development and higher densities may reduce the repetitive travel patterns.

The reconstruction of the Harford Mall would also present an opportunity to include a transit transfer hub as part of the plans for the Harford Mall. The hub could contain amenities for patrons and drivers, including restrooms and a waiting area. There could also be a deadhead area for buses waiting to depart.

Included on Medium Term Improvements Sheet 2

h) Close Two-Way Traffic on Business US 1 from South Bond Street to Hays Road

The existing traffic pattern features redundant movement for westbound traffic between South Bond Street and Hays Road. The pattern causes a weave condition for westbound vehicles attempting to make left turns onto Atwood Road. In addition, the existing pedestrian crossing of Business US 1 on the east side of Bond Street is difficult due to the lack of a pedestrian phase.

The proposed improvement will eliminate the redundant movement and begin the one-way pairs system at Hays Street instead of at Bond Street. The Hays Street / Business US 1 intersection will feature a double-right turn onto Business US 1 and a single left turn. The George Street / Churchville Road intersection will be reconfigured to provide better sight distance for vehicles merging onto Churchville Pike.

i) Bicycle Improvements to Complete the Network

Upgrade bike facilities from signing and sharrows to full bike lanes on the following roadways:

- On Thomas Street east of Hays Street,
- On Lee Way from Pennsylvania Avenue to Shamrock Road.
- On Broadway from Williams Street to Hickory Avenue.

Included on Medium Term Improvements Sheet 3

j) Bicycle Improvements to Complete the Network

Upgrade bike facilities from signing and sharrows to full bike lanes from Ardmore Way to Moores Mill Road on Broadway.

Included on Medium Term Improvements Sheet 4

k) Intersection Improvements at MD 22 / MD 543 and MD 22 / Econ Drive

The intersections of MD 22 / Econ Drive and MD 22 / MD 543 work in connection with each other due to their proximity as well as the location of several access points between them. At this time, there are two independent options developed for this location with the intention that one or the other be selected for this medium term improvement:

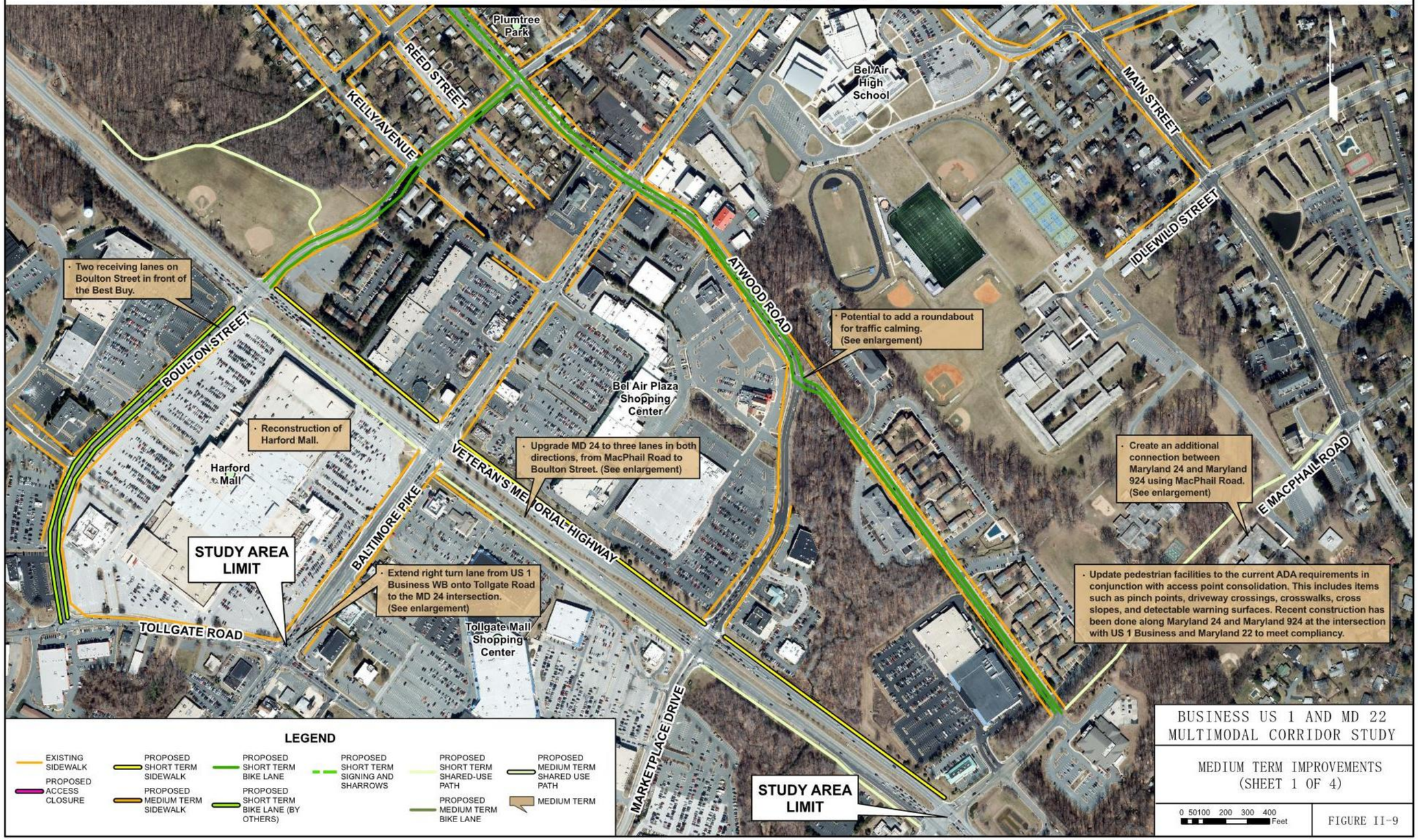
- Option A: The first option is to place a signal at Econ Drive that would work in conjunction with the existing signal at MD 543 and place a raised median on MD 22 between Econ Drive and MD 543. This option would require the completion of a full traffic signal warrant study.
- Option B: The second option is to create a raised "T" barrier to allow left turns out of the Wawa more space before merging onto westbound MD 22.

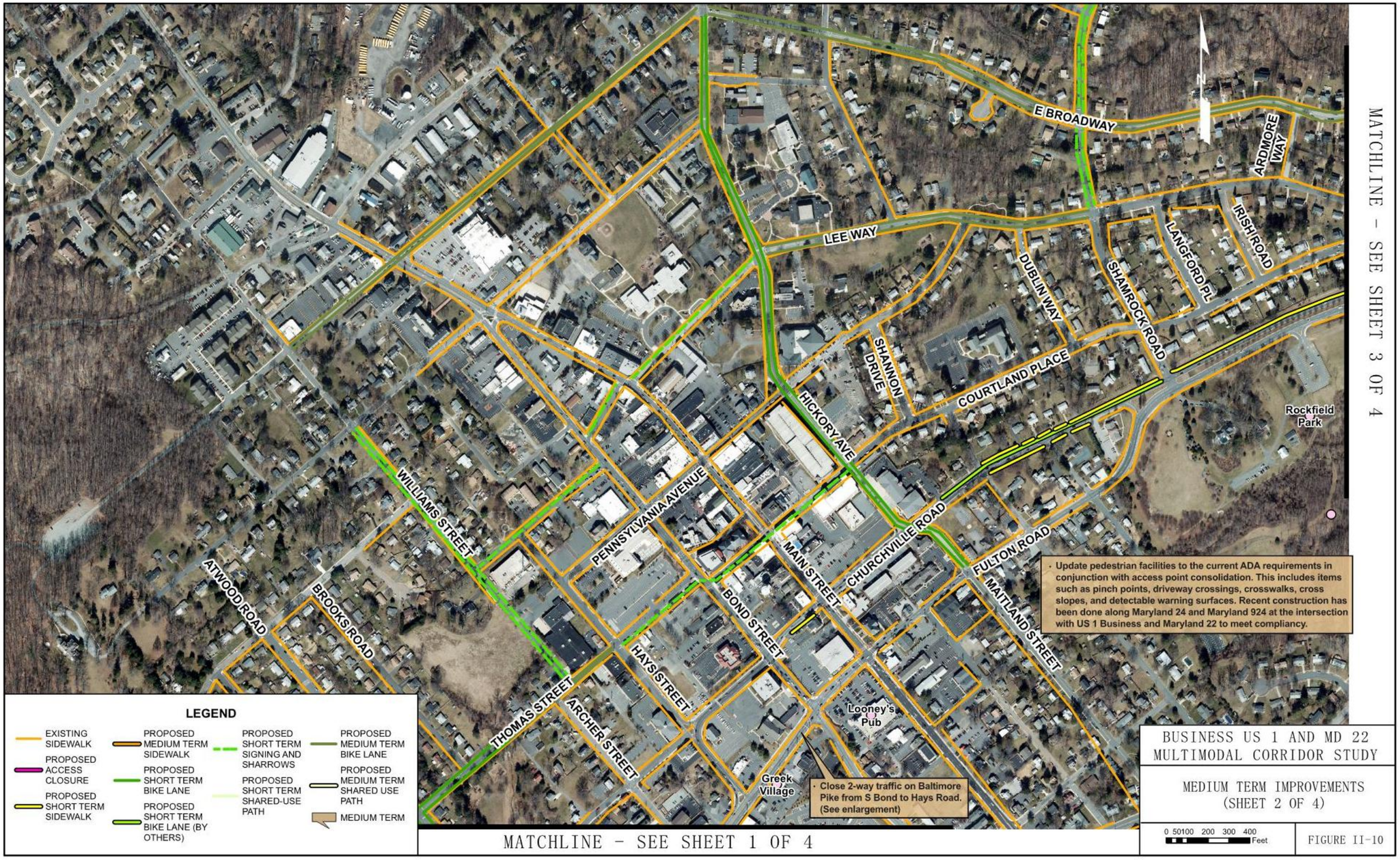
l) Pedestrian Improvements along MD 22 from Moores Mill Road to Churchville Family Dentistry Building

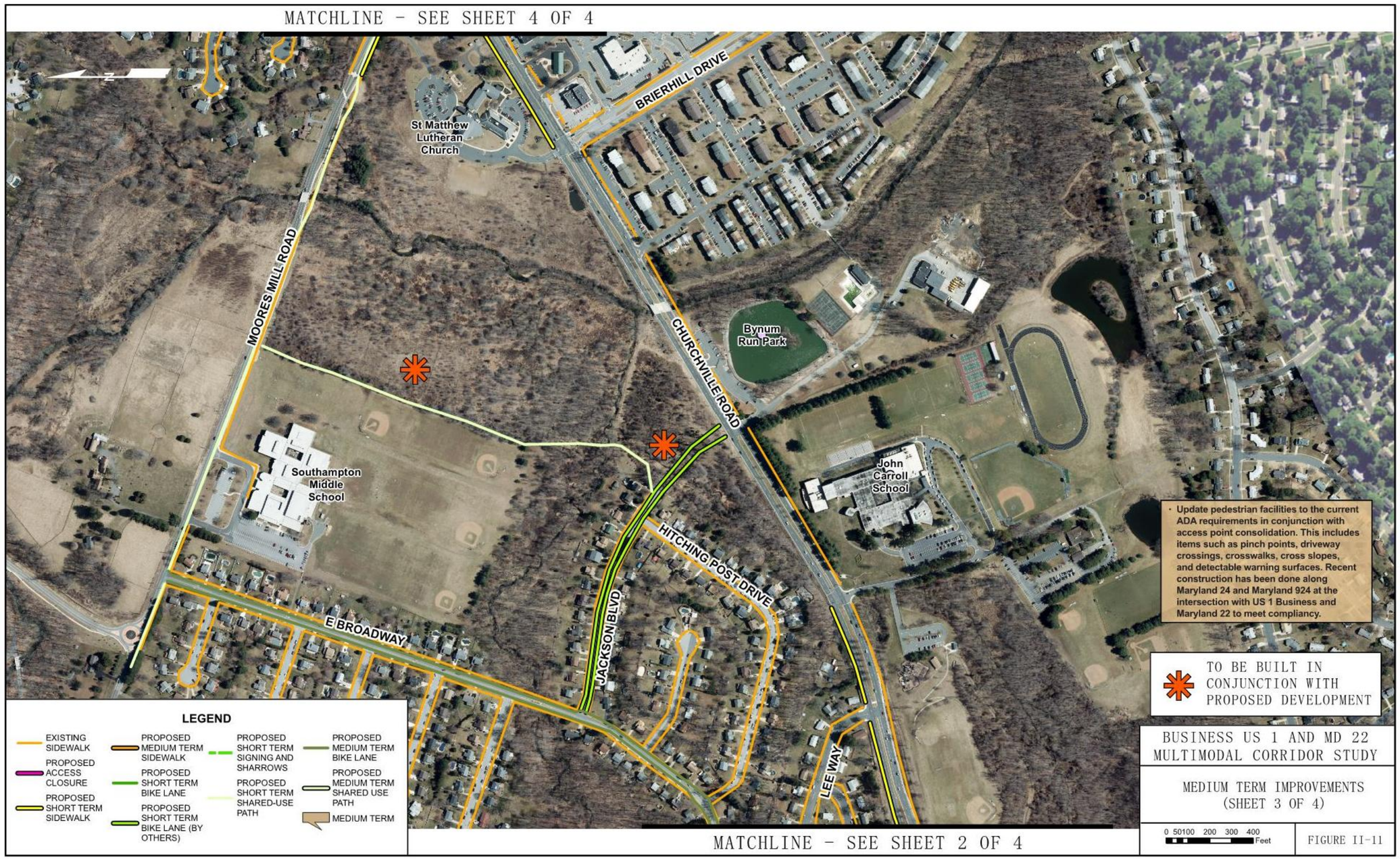
This improvement will feature approximately 1,100 feet of sidewalk from the end of the existing sidewalk just east of Moores Mill Road to the Churchville Family Dentistry.

MEDIUM TERM IMPROVEMENTS

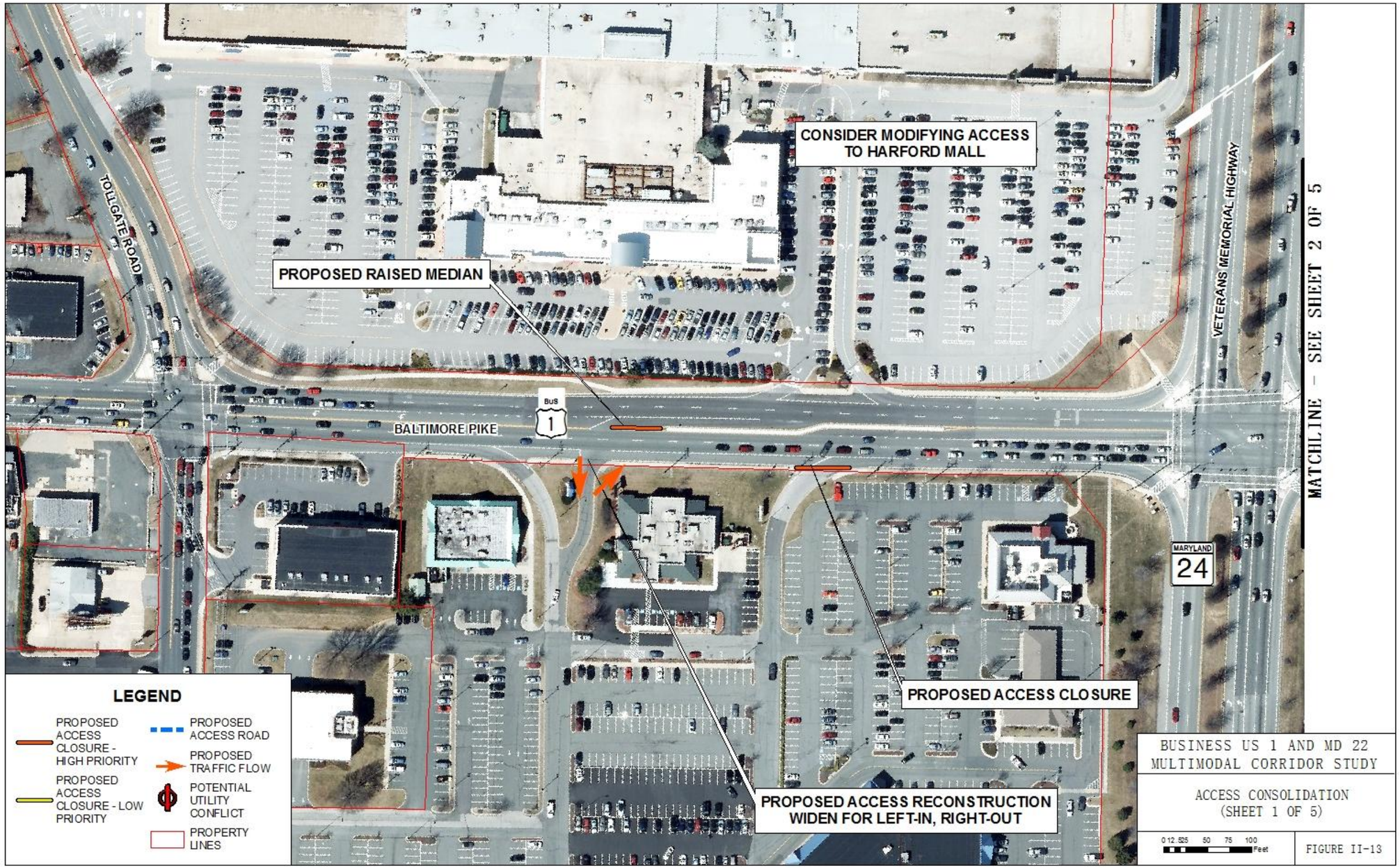
MATCHLINE - SEE SHEET 2 OF 4

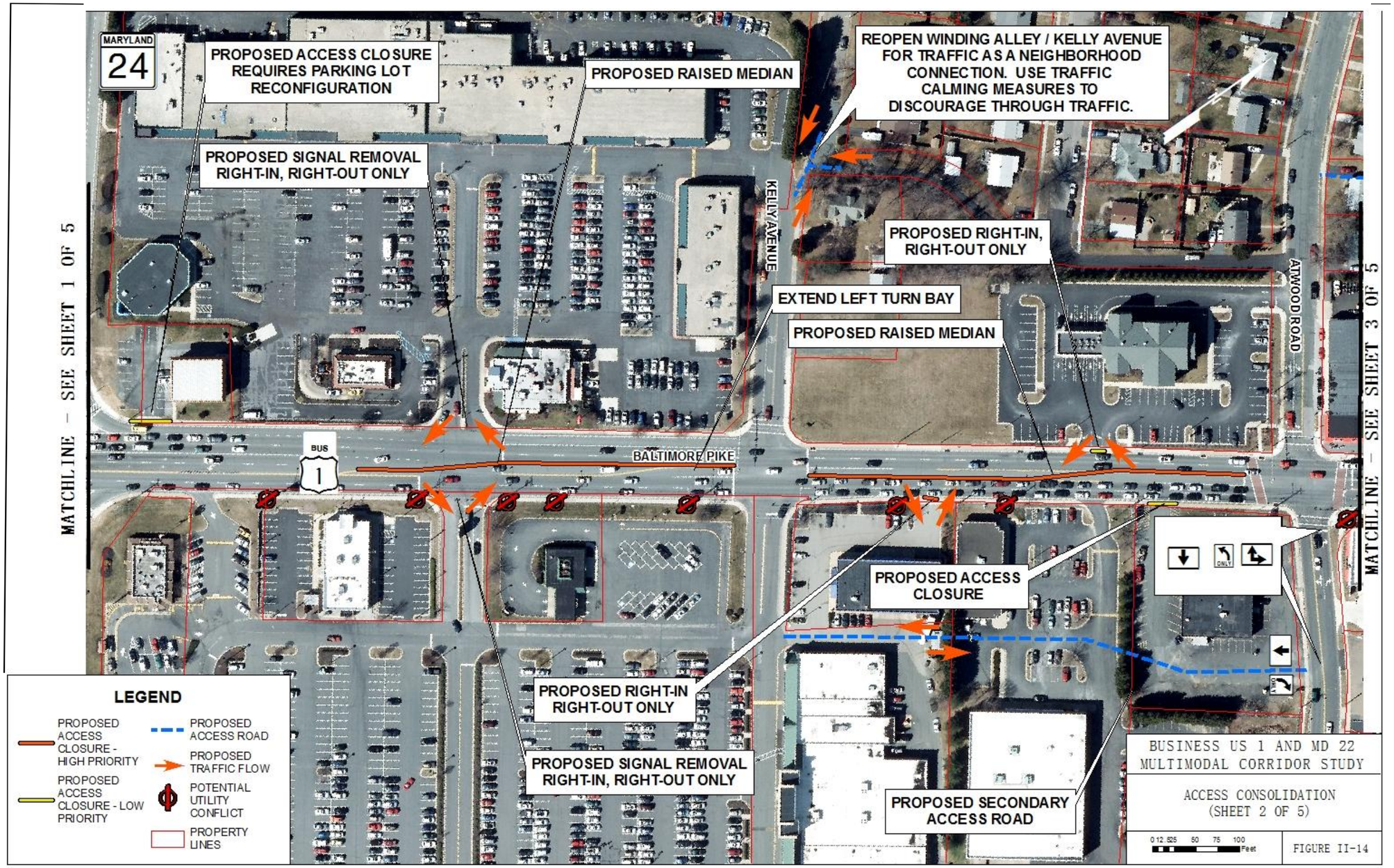


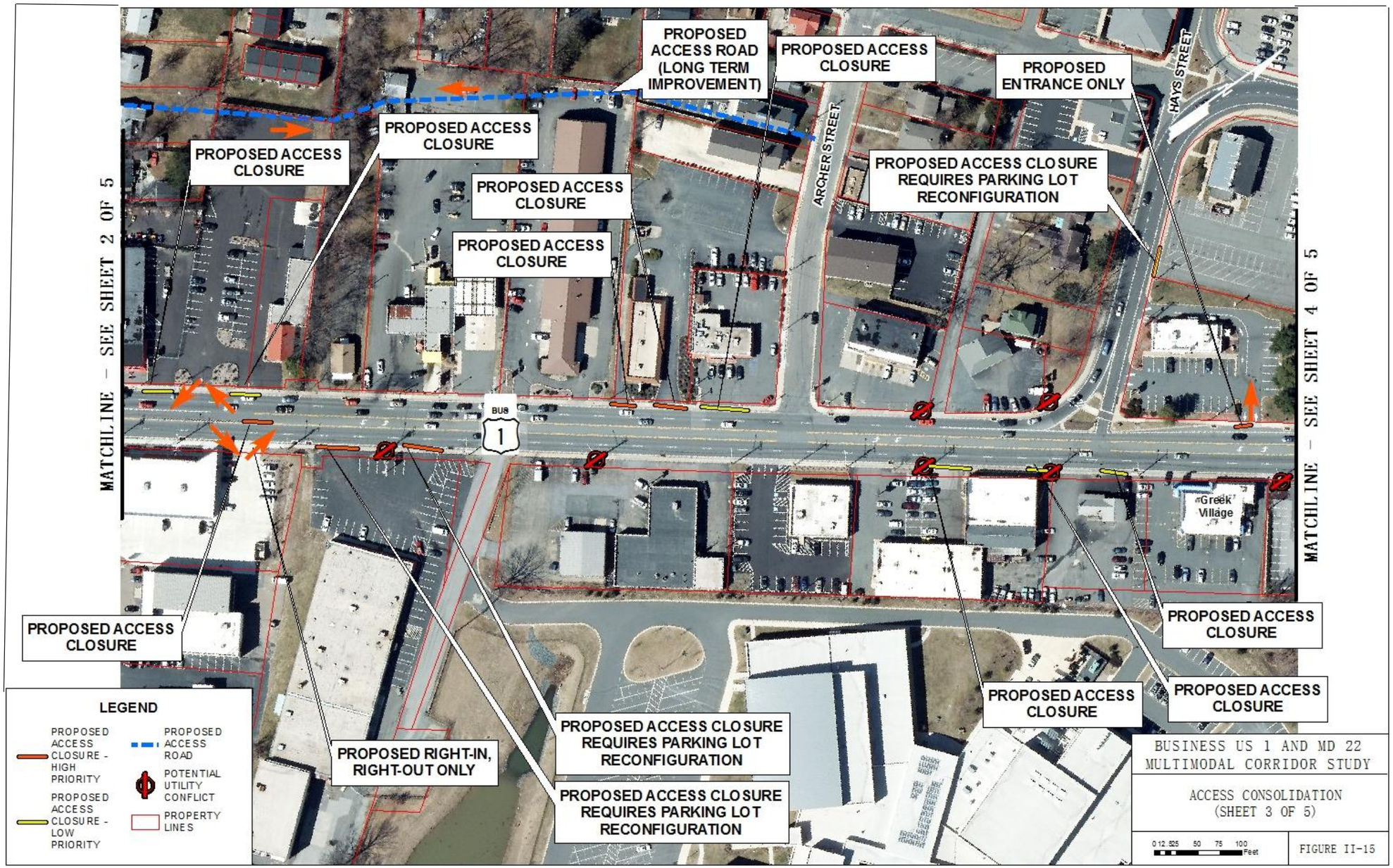

E BROADWAY
ARDMORE WAY
IRISH ROAD
LANGFORD PL
SHAMROCK ROAD
DUBLIN WAY
LEE WAY
SHANNON DRIVE
COURTLAND PLACE
HICKORY AVE
Rockfield Park
WILLIAMS STREET
PENNSYLVANIA AVENUE
CHURCHVILLE ROAD
FULTON ROAD
MAITLAND STREET
MAIN STREET
BOND STREET
HAYS STREET
ATWOOD ROAD
BROOKS ROAD
THOMAS STREET
ARCHER STREET
Looney's Pub
Greek Village
· Update pedestrian facilities to the current ADA requirements in conjunction with access point consolidation. This includes items such as pinch points, driveway crossings, crosswalks, cross slopes, and detectable warning surfaces. Recent construction has been done along Maryland 24 and Maryland 924 at the intersection with US 1 Business and Maryland 22 to meet compliancy.
· Close 2-way traffic on Baltimore Pike from S Bond to Hays Road. (See enlargement)
LEGEND
EXISTING SIDEWALK
PROPOSED ACCESS CLOSURE
PROPOSED SHORT TERM SIDEWALK
PROPOSED MEDIUM TERM SIDEWALK
PROPOSED SHORT TERM BIKE LANE
PROPOSED SHORT TERM BIKE LANE (BY OTHERS)
PROPOSED SHORT TERM SIGNING AND SHARROWS
PROPOSED SHORT TERM SHARED-USE PATH
PROPOSED MEDIUM TERM BIKE LANE
PROPOSED MEDIUM TERM SHARED USE PATH
MEDIUM TERM
MATCHLINE - SEE SHEET 3 OF 4
MATCHLINE - SEE SHEET 1 OF 4
BUSINESS US 1 AND MD 22 MULTIMODAL CORRIDOR STUDY
MEDIUM TERM IMPROVEMENTS (SHEET 2 OF 4)
0 50100 200 300 400 Feet
FIGURE II-10

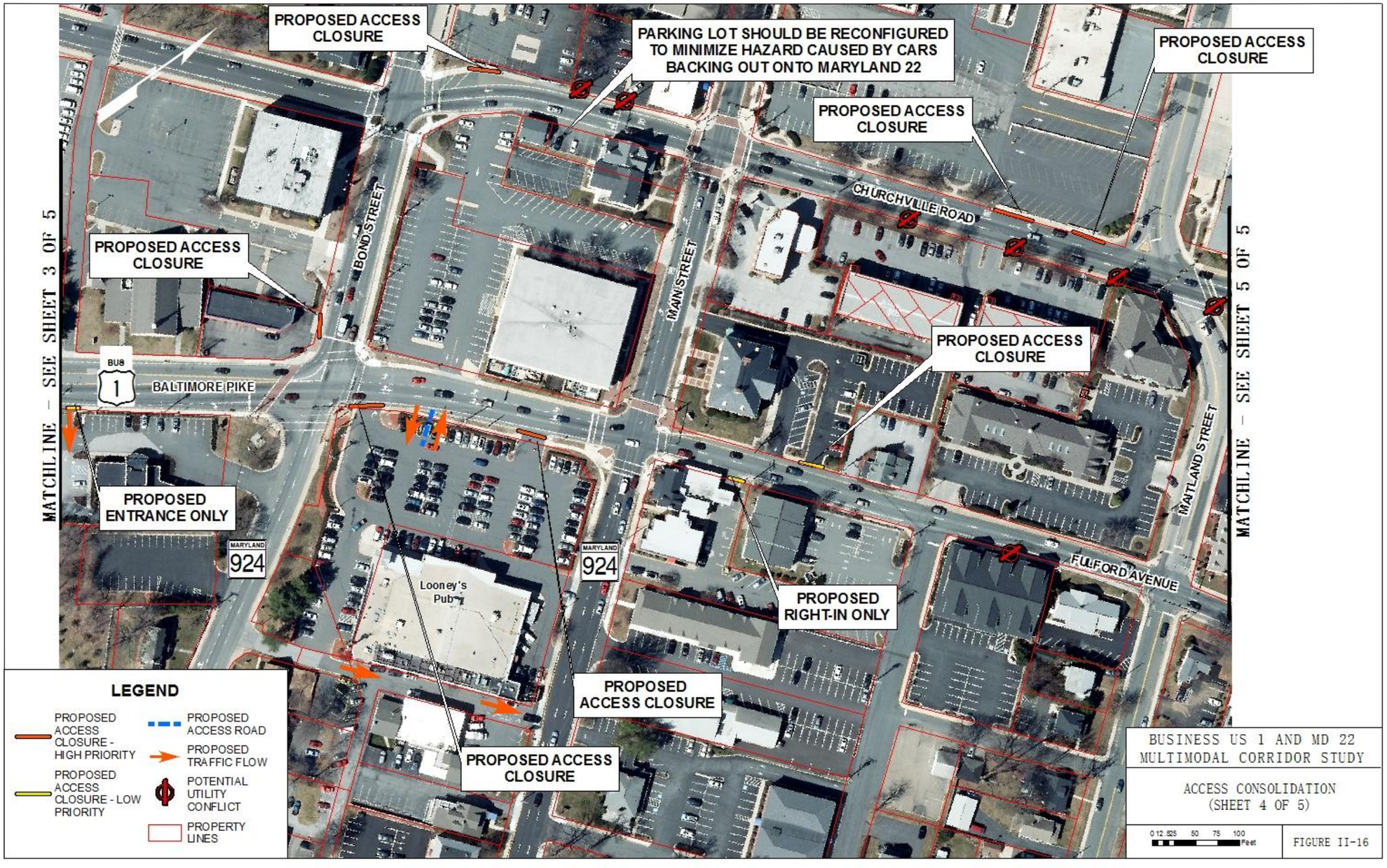

MATCHLINE - SEE SHEET 4 OF 4
N
St Matthew Lutheran Church
BRIERHILL DRIVE
MOORES MILL ROAD
CHURCHVILLE ROAD
Bynum Run Park
Southampton Middle School
John Carroll School
HITCHING POST DRIVE
JACKSON BLVD
E BROADWAY
LEE WAY
· Update pedestrian facilities to the current ADA requirements in conjunction with access point consolidation. This includes items such as pinch points, driveway crossings, crosswalks, cross slopes, and detectable warning surfaces. Recent construction has been done along Maryland 24 and Maryland 924 at the intersection with US 1 Business and Maryland 22 to meet compliancy.
LEGEND
EXISTING SIDEWALK
PROPOSED ACCESS CLOSURE
PROPOSED SHORT TERM SIDEWALK
PROPOSED MEDIUM TERM SIDEWALK
PROPOSED SHORT TERM BIKE LANE
PROPOSED SHORT TERM BIKE LANE (BY OTHERS)
PROPOSED SHORT TERM SIGNING AND SHARROWS
PROPOSED SHORT TERM SHARED-USE PATH
PROPOSED MEDIUM TERM BIKE LANE
PROPOSED MEDIUM TERM SHARED USE PATH
MEDIUM TERM
TO BE BUILT IN CONJUNCTION WITH PROPOSED DEVELOPMENT
BUSINESS US 1 AND MD 22 MULTIMODAL CORRIDOR STUDY
MEDIUM TERM IMPROVEMENTS (SHEET 3 OF 4)
0 50100 200 300 400 Feet
FIGURE II-11
MATCHLINE - SEE SHEET 2 OF 4


STUDY AREA LIMIT
Maryland 22 and Maryland 543 intersection upgrades. (See enlargements)
Royal Farms
Rite Aid
Burger King
Wawa
AMYCLAE DRIVE
FOUNTAIN GREEN ROAD
ECON DRIVE
HILLSIDE DRIVE
CHURCHVILLE ROAD
TREDMORE RD
BRUSHING LANE
MOORES MILL RD
Proposed Eva Mar Development
Fountain Green Plaza Shopping Center
Update pedestrian facilities to the current ADA requirements in conjunction with access point consolidation. This includes items such as pinch points, driveway crossings, crosswalks, cross slopes, and detectable warning surfaces. Recent construction has been done along Maryland 24 and Maryland 924 at the intersection with US 1 Business and Maryland 22 to meet compliancy.
LEGEND
EXISTING SIDEWALK
PROPOSED ACCESS CLOSURE
PROPOSED SHORT TERM SIDEWALK
PROPOSED MEDIUM TERM SIDEWALK
PROPOSED SHORT TERM BIKE LANE
PROPOSED SHORT TERM BIKE LANE (BY OTHERS)
PROPOSED SHORT TERM SIGNING AND SHARROWS
PROPOSED SHORT TERM SHARED-USE PATH
PROPOSED MEDIUM TERM BIKE LANE
PROPOSED MEDIUM TERM SHARED USE PATH
MEDIUM TERM
MATCHLINE - SEE SHEET 3 OF 4
BUSINESS US 1 AND MD 22 MULTIMODAL CORRIDOR STUDY
MEDIUM TERM IMPROVEMENTS (SHEET 4 OF 4)
0 50100 200 300 400 Feet
FIGURE II-12


CONSIDER MODIFYING ACCESS TO HARFORD MALL
PROPOSED RAISED MEDIAN
TOLLGATE ROAD
VETERANS MEMORIAL HIGHWAY
BALTIMORE PIKE
BUS 1
MARYLAND 24
MATCHLINE - SEE SHEET 2 OF 5
PROPOSED ACCESS CLOSURE
PROPOSED ACCESS RECONSTRUCTION WIDEN FOR LEFT-IN, RIGHT-OUT
LEGEND
PROPOSED ACCESS CLOSURE - HIGH PRIORITY
PROPOSED ACCESS CLOSURE - LOW PRIORITY
PROPOSED ACCESS ROAD
PROPOSED TRAFFIC FLOW
POTENTIAL UTILITY CONFLICT
PROPERTY LINES
BUSINESS US 1 AND MD 22 MULTIMODAL CORRIDOR STUDY
ACCESS CONSOLIDATION (SHEET 1 OF 5)
0 12.525 50 75 100 Feet
FIGURE II-13


MARYLAND 24
PROPOSED ACCESS CLOSURE REQUIRES PARKING LOT RECONFIGURATION
PROPOSED RAISED MEDIAN
REOPEN WINDING ALLEY / KELLY AVENUE FOR TRAFFIC AS A NEIGHBORHOOD CONNECTION. USE TRAFFIC CALMING MEASURES TO DISCOURAGE THROUGH TRAFFIC.
PROPOSED SIGNAL REMOVAL RIGHT-IN, RIGHT-OUT ONLY
KELLY AVENUE
PROPOSED RIGHT-IN, RIGHT-OUT ONLY
EXTEND LEFT TURN BAY
PROPOSED RAISED MEDIAN
ATWOOD ROAD
BUS 1
BALTIMORE PIKE
MATCHLINE – SEE SHEET 1 OF 5
MATCHLINE – SEE SHEET 3 OF 5
PROPOSED ACCESS CLOSURE
PROPOSED RIGHT-IN RIGHT-OUT ONLY
PROPOSED SIGNAL REMOVAL RIGHT-IN, RIGHT-OUT ONLY
PROPOSED SECONDARY ACCESS ROAD
LEGEND
PROPOSED ACCESS CLOSURE - HIGH PRIORITY
PROPOSED ACCESS CLOSURE - LOW PRIORITY
PROPOSED ACCESS ROAD
PROPOSED TRAFFIC FLOW
POTENTIAL UTILITY CONFLICT
PROPERTY LINES
BUSINESS US 1 AND MD 22 MULTIMODAL CORRIDOR STUDY
ACCESS CONSOLIDATION (SHEET 2 OF 5)
0 12.525 50 75 100 Feet
FIGURE II-14


PROPOSED ACCESS ROAD (LONG TERM IMPROVEMENT)
PROPOSED ACCESS CLOSURE
PROPOSED ENTRANCE ONLY
PROPOSED ACCESS CLOSURE
PROPOSED ACCESS CLOSURE
PROPOSED ACCESS CLOSURE
PROPOSED ACCESS CLOSURE REQUIRES PARKING LOT RECONFIGURATION
ARCHER STREET
HAYS STREET
BUS 1
"Greek" Village
MATCHLINE - SEE SHEET 2 OF 5
MATCHLINE - SEE SHEET 4 OF 5
PROPOSED ACCESS CLOSURE
PROPOSED ACCESS CLOSURE
PROPOSED ACCESS CLOSURE
PROPOSED RIGHT-IN, RIGHT-OUT ONLY
PROPOSED ACCESS CLOSURE REQUIRES PARKING LOT RECONFIGURATION
PROPOSED ACCESS CLOSURE REQUIRES PARKING LOT RECONFIGURATION
LEGEND
PROPOSED ACCESS CLOSURE - HIGH PRIORITY
PROPOSED ACCESS CLOSURE - LOW PRIORITY
PROPOSED ACCESS ROAD
POTENTIAL UTILITY CONFLICT
PROPERTY LINES
BUSINESS US 1 AND MD 22 MULTIMODAL CORRIDOR STUDY
ACCESS CONSOLIDATION (SHEET 3 OF 5)
0 12.525 50 75 100 Feet
FIGURE II-15


PROPOSED ACCESS CLOSURE
PARKING LOT SHOULD BE RECONFIGURED TO MINIMIZE HAZARD CAUSED BY CARS BACKING OUT ONTO MARYLAND 22
PROPOSED ACCESS CLOSURE
PROPOSED ACCESS CLOSURE
PROPOSED ACCESS CLOSURE
BOND STREET
MAIN STREET
CHURCHVILLE ROAD
BALTIMORE PIKE
BUS 1
MARYLAND 924
MARYLAND 924
FULFORD AVENUE
MARYLAND STREET
Looney's Pub
PROPOSED ENTRANCE ONLY
PROPOSED RIGHT-IN ONLY
PROPOSED ACCESS CLOSURE
PROPOSED ACCESS CLOSURE
MATCHLINE - SEE SHEET 3 OF 5
MATCHLINE - SEE SHEET 5 OF 5
LEGEND
PROPOSED ACCESS CLOSURE - HIGH PRIORITY
PROPOSED ACCESS CLOSURE - LOW PRIORITY
PROPOSED ACCESS ROAD
PROPOSED TRAFFIC FLOW
POTENTIAL UTILITY CONFLICT
PROPERTY LINES
BUSINESS US 1 AND MD 22 MULTIMODAL CORRIDOR STUDY
ACCESS CONSOLIDATION (SHEET 4 OF 5)
0 12.525 50 75 100 Feet
FIGURE II-16


MATCHLINE – SEE SHEET 4 OF 5
COURTLAND PL
CHURCHVILLE ROAD
SHAMROCK ROAD
GILES STREET
EWING STREET
FULFORD AVENUE
MARYLAND 22
MARYLAND 22
LEGEND
PROPOSED ACCESS CLOSURE - HIGH PRIORITY
PROPOSED ACCESS CLOSURE - LOW PRIORITY
PROPOSED ACCESS ROAD
PROPOSED TRAFFIC FLOW
POTENTIAL UTILITY CONFLICT
PROPERTY LINES
BUSINESS US 1 AND MD 22
MULTIMODAL CORRIDOR STUDY
ACCESS CONSOLIDATION
(SHEET 5 OF 5)
0 12.525 50 75 100 Feet
FIGURE II-17


VETERANS MEMORIAL HIGHWAY
BOULTON STREET
BALTIMORE PIKE
BUSINESS 1
MARYLAND 24
BLUM COURT
LEGEND
EXISTING LANE CONFIGURATION
PROPOSED LANE CONFIGURATION
PROPOSED IMPROVEMENTS
PROPOSED REMOVAL
PROPOSED TRAFFIC BARRIER
BUSINESS US 1 AND MD 22
MULTIMODAL CORRIDOR STUDY
MARYLAND 24
MEDIUM TERM IMPROVEMENTS
SHEET 1 OF 3
SCALE: 1"=150'
FIGURE II-18

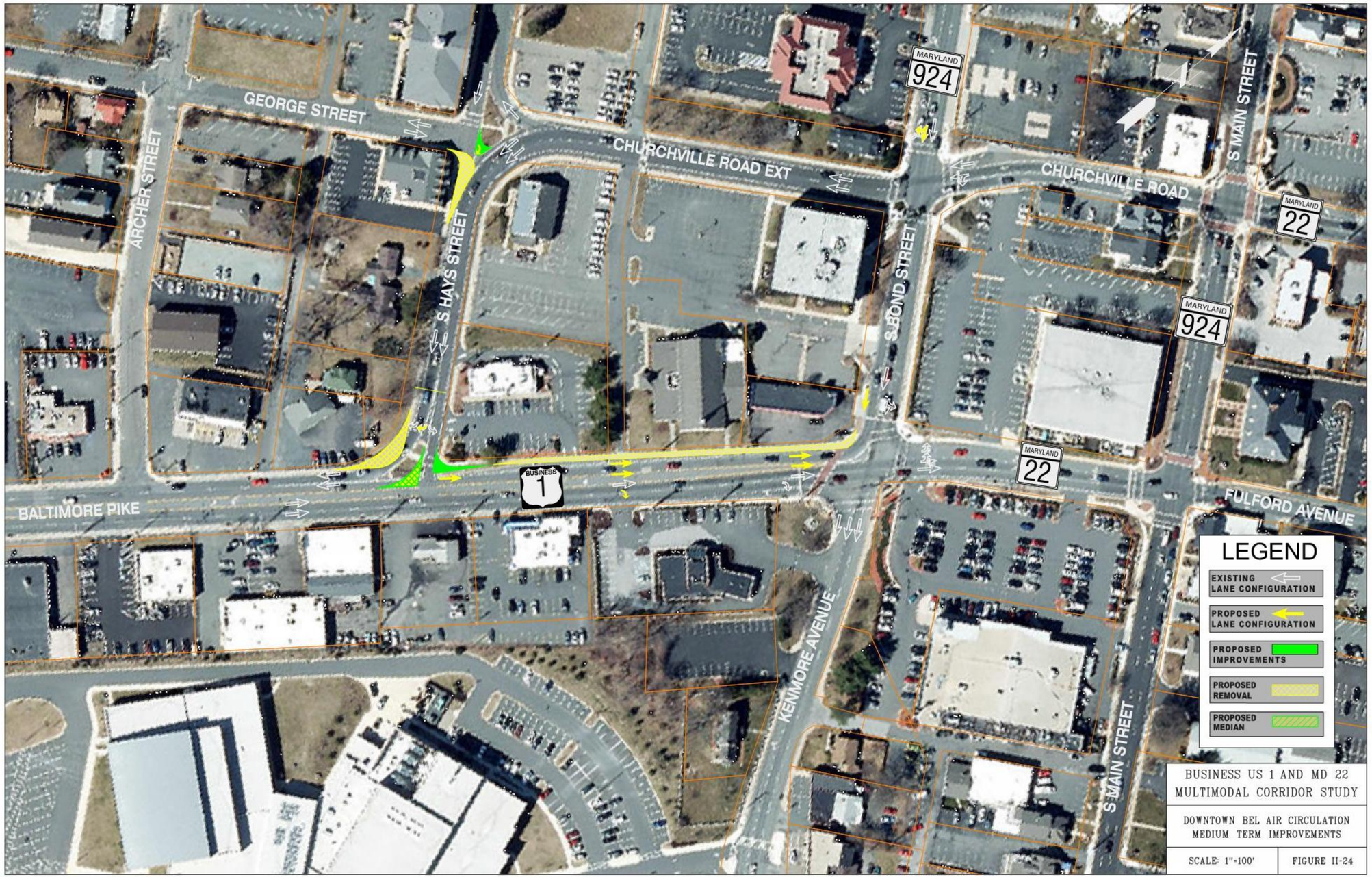

MARKETPLACE DRIVE
MARYLAND
24
VETERANS MEMORIAL HIGHWAY
LEGEND
EXISTING LANE CONFIGURATION
PROPOSED LANE CONFIGURATION
PROPOSED IMPROVEMENTS
PROPOSED REMOVAL
PROPOSED TRAFFIC BARRIER
BUSINESS US 1 AND MD 22
MULTIMODAL CORRIDOR STUDY
MARYLAND 24
MEDIUM TERM IMPROVEMENTS
SHEET 2 OF 3
SCALE: 1"=150'
FIGURE II-19

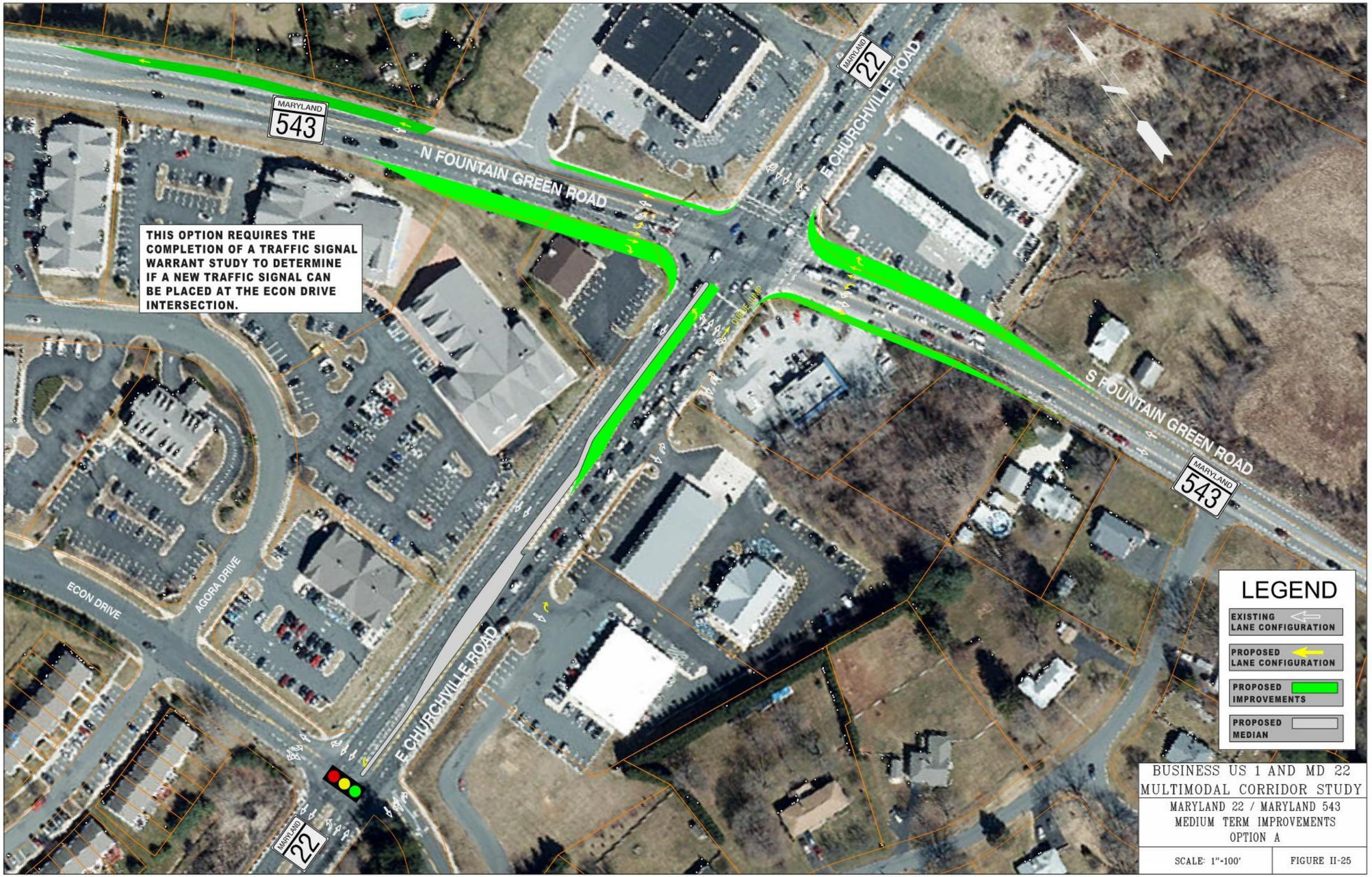

W MACPHAIL ROAD
W BELCREST ROAD
MARYLAND
24
W HEATHER ROAD
VETERANS MEMORIAL HIGHWAY
UPPER CHESAPEAKE DRIVE
W MACPHAIL ROAD
LEGEND
EXISTING LANE CONFIGURATION
PROPOSED LANE CONFIGURATION
PROPOSED IMPROVEMENTS
PROPOSED REMOVAL
BUSINESS US 1 AND MD 22
MULTIMODAL CORRIDOR STUDY
MARYLAND 24
MEDIUM TERM IMPROVEMENTS
SHEET 3 OF 3
SCALE: 1"=150'
FIGURE II-20


N TOLLGATE ROAD
BALTIMORE PIKE
BUSINESS
1
MARYLAND
24
S TOLLGATE ROAD
VETERANS MEMORIAL HIGHWAY
LEGEND
EXISTING LANE CONFIGURATION
PROPOSED LANE CONFIGURATION
PROPOSED IMPROVEMENTS
BUSINESS US 1 AND MD 22
MULTIMODAL CORRIDOR STUDY
US 1 BUSINESS / TOLLGATE ROAD
MEDIUM TERM IMPROVEMENTS
SCALE: 1"= 100'
FIGURE II-21


BEL AIR MIDDLE SCHOOL
S ATWOOD ROAD
WHITE OAK DRIVE
S MAIN STREET
MARYLAND 24
W MACPHAIL ROAD
W MACPHAIL ROAD
E MACPHAIL ROAD
HOMESTEAD/WAKEFIELD ELEMENTARY SCHOOL
VETERANS MEMORIAL HIGHWAY
W BELCREST ROAD
CHATHAM ROAD
MARYLAND 924
LEGEND
EXISTING LANE CONFIGURATION
PROPOSED LANE CONFIGURATION
PROPOSED IMPROVEMENTS
PROPOSED ROUNDABOUT
PROPOSED REMOVAL
BUSINESS US 1 AND MD 22 MULTIMODAL CORRIDOR STUDY
MACPHAIL ROAD CONNECTION MEDIUM TERM IMPROVEMENTS
SCALE: 1"= 200'
FIGURE II-22


ATWOOD ROAD
MARKETPLACE DRIVE
ATWOOD ROAD
LEGEND
EXISTING LANE CONFIGURATION
PROPOSED LANE CONFIGURATION
PROPOSED IMPROVEMENTS
PROPOSED ROUNDABOUT
BUSINESS US 1 AND MD 22
MULTIMODAL CORRIDOR STUDY
ATWOOD ROAD / MARKETPLACE DRIVE
ROUNDABOUT
MEDIUM TERM IMPROVEMENTS
SCALE: 1"= 50'
FIGURE II-23


GEORGE STREET
ARCHER STREET
S HAYS STREET
CHURCHVILLE ROAD EXT
S BOND STREET
CHURCHVILLE ROAD
S MAIN STREET
MARYLAND 924
MARYLAND 22
MARYLAND 924
MARYLAND 22
BUSINESS 1
BALTIMORE PIKE
FULFORD AVENUE
KENMORE AVENUE
S MAIN STREET
LEGEND
EXISTING LANE CONFIGURATION
PROPOSED LANE CONFIGURATION
PROPOSED IMPROVEMENTS
PROPOSED REMOVAL
PROPOSED MEDIAN
BUSINESS US 1 AND MD 22
MULTIMODAL CORRIDOR STUDY
DOWNTOWN BEL AIR CIRCULATION
MEDIUM TERM IMPROVEMENTS
SCALE: 1"=100'
FIGURE II-24


MARYLAND 543
N FOUNTAIN GREEN ROAD
MARYLAND 22
E CHURCHVILLE ROAD
THIS OPTION REQUIRES THE COMPLETION OF A TRAFFIC SIGNAL WARRANT STUDY TO DETERMINE IF A NEW TRAFFIC SIGNAL CAN BE PLACED AT THE ECON DRIVE INTERSECTION.
ECON DRIVE
AGORA DRIVE
S FOUNTAIN GREEN ROAD
MARYLAND 543
MARYLAND 22
E CHURCHVILLE ROAD
LEGEND
EXISTING LANE CONFIGURATION
PROPOSED LANE CONFIGURATION
PROPOSED IMPROVEMENTS
PROPOSED MEDIAN
BUSINESS US 1 AND MD 22
MULTIMODAL CORRIDOR STUDY
MARYLAND 22 / MARYLAND 543
MEDIUM TERM IMPROVEMENTS
OPTION A
SCALE: 1"=100'
FIGURE II-25

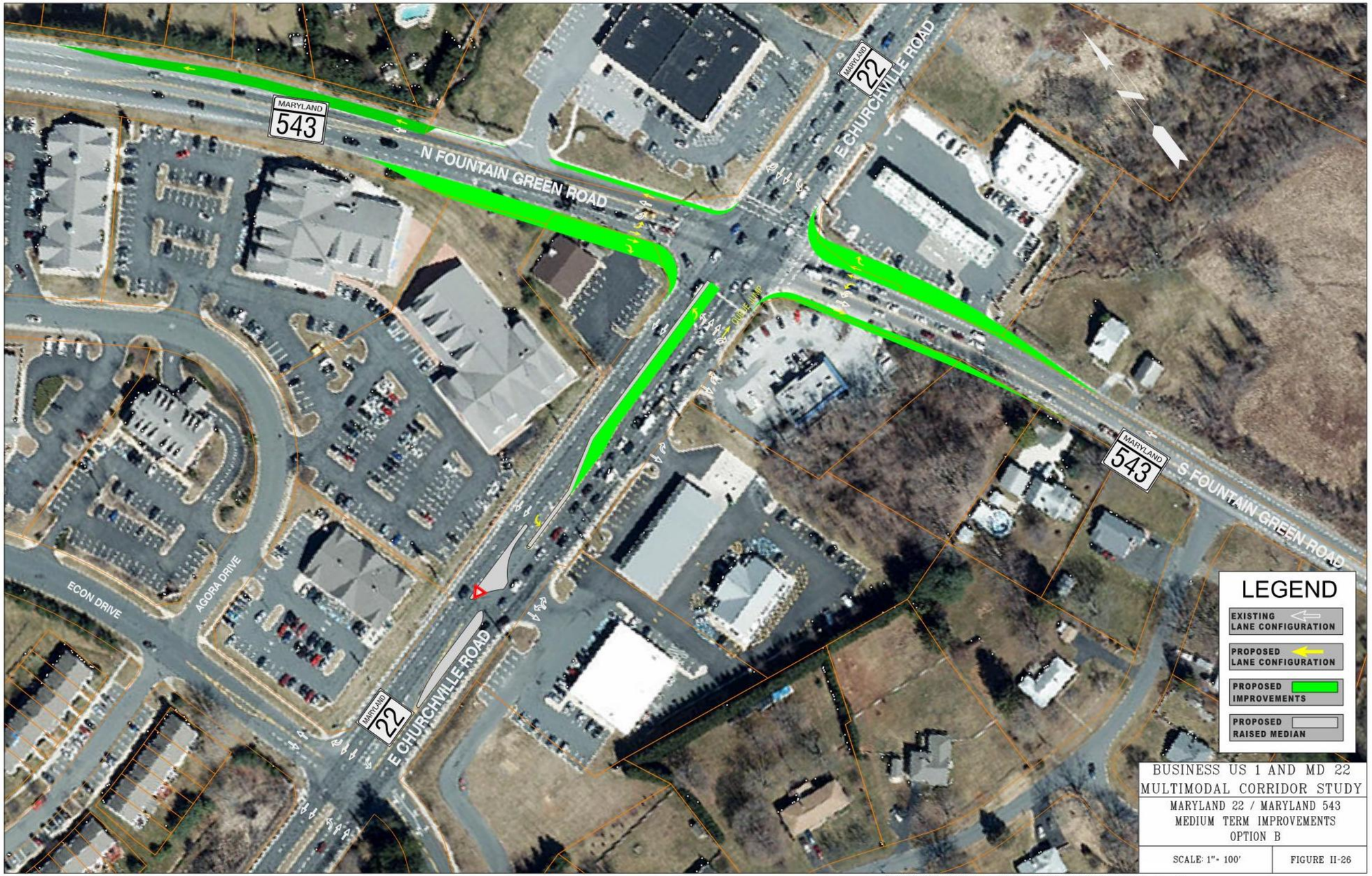

MARYLAND 543
N FOUNTAIN GREEN ROAD
MARYLAND 22
E CHURCHVILLE ROAD
DOUBLE LANE
MARYLAND 543
S FOUNTAIN GREEN ROAD
ECON DRIVE
AGORA DRIVE
MARYLAND 22
E CHURCHVILLE ROAD
LEGEND
EXISTING LANE CONFIGURATION
PROPOSED LANE CONFIGURATION
PROPOSED IMPROVEMENTS
PROPOSED RAISED MEDIAN
BUSINESS US 1 AND MD 22
MULTIMODAL CORRIDOR STUDY
MARYLAND 22 / MARYLAND 543
MEDIUM TERM IMPROVEMENTS
OPTION B
SCALE: 1"= 100'
FIGURE II-26

Table II-3 Medium Term Traffic Analysis

INTERSECTION	EXISTING 2014		NO BUILD 2030		BUILD 2030	
	AM	PM	AM	PM	AM	PM
	HCM LOS	HCM LOS	HCM LOS	HCM LOS	HCM LOS	HCM LOS
Along MD 22 Churchville Road						
MD 543	D	D	E	E	D	D
Moores Mill Road/Brushing Lane	C	B	D	C	D	D
Brierhill Road	B	B	B	C	B	C
John Carroll High School	D	B	E	B	D	B
S Hickory Avenue	B	B	B	B	B	B
N Main Street	B	B	B	C	B	C
S Bond Street	B	C	C	D	B	D
Along MD 22 Fulford Avenue						
Maitland Street	B	A	B	B	B	B
N Main Street/MD 924	B	B	B	B	B	B
S Bond Street/MD 924	B	B	B	B	B	B

MD 22 Corridor Study
Existing Conditions and Year 2020 Build and No Build Scenario

INTERSECTION	EXISTING 2014		NO BUILD 2030		BUILD 2030	
	AM	PM	AM	PM	AM	PM
	HCM LOS	HCM LOS	HCM LOS	HCM LOS	HCM LOS	HCM LOS
Along US 1 Business						
Atwood Road	B	C	C	E	B	D
S Kelley Avenue	A	A	A	A	A	B
Bel Air Plaza	A	A	A	A	Signal Removed	Signal Removed
MD 24	D	D	D	D	D	D
S Tollgate Road/N Tollgate Road	D	D	D	E	D	D
Along MD 24						
W MacPhail Road	B	C	C	D	C	D
Marketplace Drive	C	C	C	D	C	D
Boulton Street	B	C	C	C	C	D
US 1 Bypass	D	E	F	F	E	E

Levels of Service Legend:

A
B
C
D
E
F

NOTE:

The No Build conditions reflect the existing signal timings.

The EB/WB MD 22 left turn movement is provided with exclusive left turn phasing and NB/SB Moores Mill Road left turn movement is exclusive/permissive.

MD 22 Corridor Study
Existing Conditions and Year 2020 Build and No Build Scenario

Table II-4: Medium Term Improvements

Medium Term Improvements Sheet 1						
Intersection	**Traffic Operations**				**Feasibility Level Cost Estimate (Not Including ROW)**	**Remarks**
	Peak Hour	**2014 LOS**	**2030 NO BUILD LOS**	**2030 BUILD LOS**		
Pedestrian and Bicycle Improvements					$200,000 – $500,000	Includes new sidewalk and a shared-use path.
Access Management along Business US 1 / MD 22					$4 – $6 Million	Estimated as new curb and new sidewalk to replace existing depressed curb at different access points.
Roadway Improvements to MD 24					$7 – $12 Million	Roadway widening on MD 24 to six lanes from Boulton Street to MacPhail Road.
Business US 1 / Tollgate Road	AM	D	D	D	$0.8 – $1.5 Million	Extend right turn lane from Business US 1 WB onto Tollgate Road to the MD 24 intersection.
	PM	D	E	D		
MacPhail Roadway Connection					$10 – $15 Million	Create an additional connection between MD 24 and MD 924 using MacPhail Road.
Marketplace Drive / Atwood Road Roundabout					$100,000 - $300,000	Potential roundabout for traffic calming.

Medium Term Improvements Sheet 2						
Intersection	**Traffic Operations**				**Feasibility Level Cost Estimate (Not Including ROW)**	**Remarks**
	Peak Hour	**2014 LOS**	**2030 NO BUILD LOS**	**2030 BUILD LOS**		
Pedestrian and Bicycle Improvements					$400,000 - $600,000	Upgrade bike facilities from signing and sharrows to full bike lanes:
Reconfigure Traffic Pattern in Bel Air					$1 - $3 Million	Close two-way traffic on Baltimore Pike from S Bond Street to Hays Road. Create a raised intersection table at the intersection of MD 22 / Hayes Street for traffic calming.

Medium Term Improvements Sheet 3						
Intersection	**Traffic Operations**				**Feasibility Level Cost Estimate (Not Including ROW)**	**Remarks**
	Peak Hour	**2014 LOS**	**2030 NO BUILD LOS**	**2030 BUILD LOS**		
Pedestrian and Bicycle Improvements					$35,000 - $75,000	Upgrade bike facilities from signing and sharrows to full bike lanes from Ardmore Way to Moores Mill Road on Broadway.

Medium Term Improvements Sheet 4						
Intersection	**Traffic Operations**				**Feasibility Level Cost Estimate (Not Including ROW)**	**Remarks**
	Peak Hour	**2014 LOS**	**2030 NO BUILD LOS**	**2030 BUILD LOS**		
MD 22 / MD 543 and MD 22 / Econ Drive					Option A: $4 – $7 Million Option B: $3.5 – $6 Million	The intersections of MD 22 / Econ Drive and MD 22 / MD 543 work in connection with each other due to their proximity as well as the location of several access points between them. At this time, there are two independent options developed for this location with the intention that one or the other be selected for this medium term improvement:

C. Long Term (2040)

Long term improvements include opportunities to upgrade the corridor to the "ultimate" condition including widening MD 24 to a six-lane section between the US 1 Bypass and MacPhail Road and completing the US 1 Bypass and MD 24 interchange. These are improvements anticipated to be completed by approximately the year 2040.

The long term improvements for the Business US 1 and MD 22 Corridor Study are provided in **Figures II-9 through II-12**. Levels of Service for the medium term improvements are included in **Table II-3.**

The Ultimate Condition Improvements, showing all improvements recommended by this study are provided in **Figures II-13 through II-16**.

Included on Long Term Improvements Sheet 1

a) Complete the US 1 Bypass / MD 24 Interchange

Complete the MD 24 / US 1 Bypass interchange. This includes an approximately 100 foot by 30 foot overpass structure. As part of this improvement, MD 24 SB from the US 1 Bypass to Boulton Street will be widened to three lanes.

Included on Long Term Improvements Sheet 3

b) Pedestrian Improvements only as Associated with Other Roadway Widening Projects

New sidewalk from Brierhill Road to Lee Way on the north side of MD 22. This is recommended to be completed only if it is included in a road-widening project because it would require a new structure over Bynum Run.

Included on Long Term Improvements Sheet 4

c) "Bel Air Boulevard"

Business US 1 is a major corridor for all travelers coming into the Town of Bel Air from the west. The existing corridor is focused entirely on commercial interests instead of creating a welcoming entrance to the Town. Many of the commercial establishments are aging and do not provide the highest and best use. As the economy and business market improves and continues to prepare for the future, many of the parcels will look to redevelop. The Town of Bel Air and Harford County should identify the most appropriate land use and zoning for the corridor. As part of the redevelopment cycle, a new Bel Air Boulevard could be created and the roadway width could be reallocated. The reallocated roadway would remove the center lane and add a grass buffer and a pedestrian or bicycle facility. This creates a multi-modal corridor in the area of the study that would not otherwise have the space for separated facilities.

There were two options developed for this redevelopment. The first option considered is the preferred recommendation for this roadway, which consists of a new roadway that would include two 12' travel lanes in each direction, a 5' bike lane in each direction separated from the travel lane by a 3' protective buffer, and 3' grass or hardscape buffer and a 6' sidewalk. In addition, the travel lanes would be separated by a 20' raised median for landscaping and left turn lanes.

The existing right-of-way is not available for this option, but it could be done as part of an overall land use change for the corridor. The new roadway will be rebuilt with businesses fronting the roadway, parking provided in the back of the building, and rear circulation/access alley behind the parking that connects the properties together.

The second option to be considered contains the following three typical sections.

From Tollgate Road to MD 24, the existing typical curb-to-curb roadway width is approximately 70'. The proposed typical curb-to-curb width is 50'. The remaining 20' can be used for either a 10' grass buffer and a 10' shared-use path or a 15' grass buffer and a 5' sidewalk.

From MD 24 to Kelly Avenue, the existing typical curb-to-curb roadway width is approximately 75'. The proposed typical curb-to-curb width is 50'. The remaining 25' can be used for either a 15' grass buffer and a 10' shared-use path or a 20' grass buffer and a 5' sidewalk.

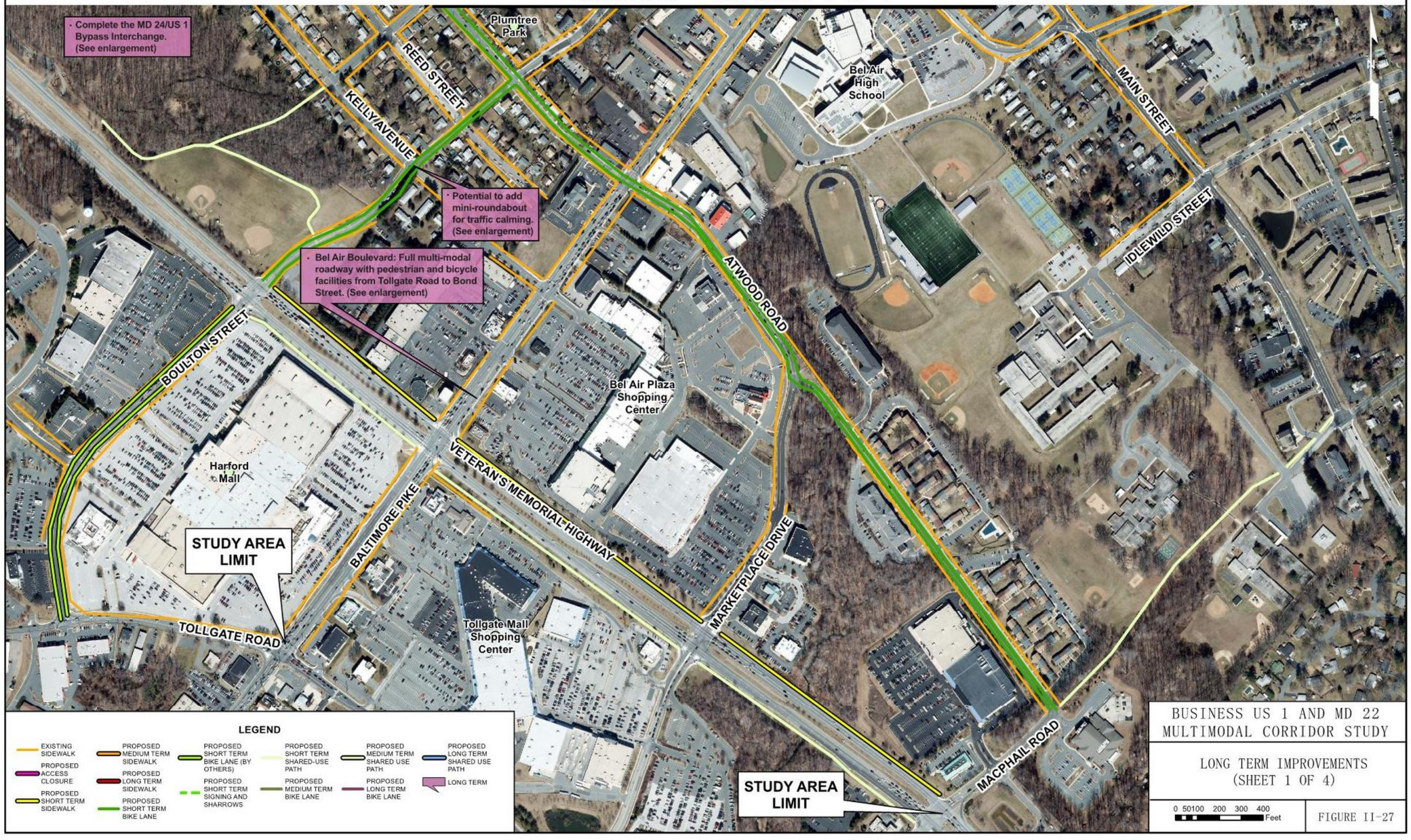
From Kelly Avenue to Hays Street, the typical existing curb-to-curb roadway width is approximately 55'. The proposed typical curb-to-curb roadway width is 50'. The remaining 5' will include a 2' section of pavers and a 3' section of new sidewalk that will tie-in to the existing sidewalk to make an 8' sidewalk.

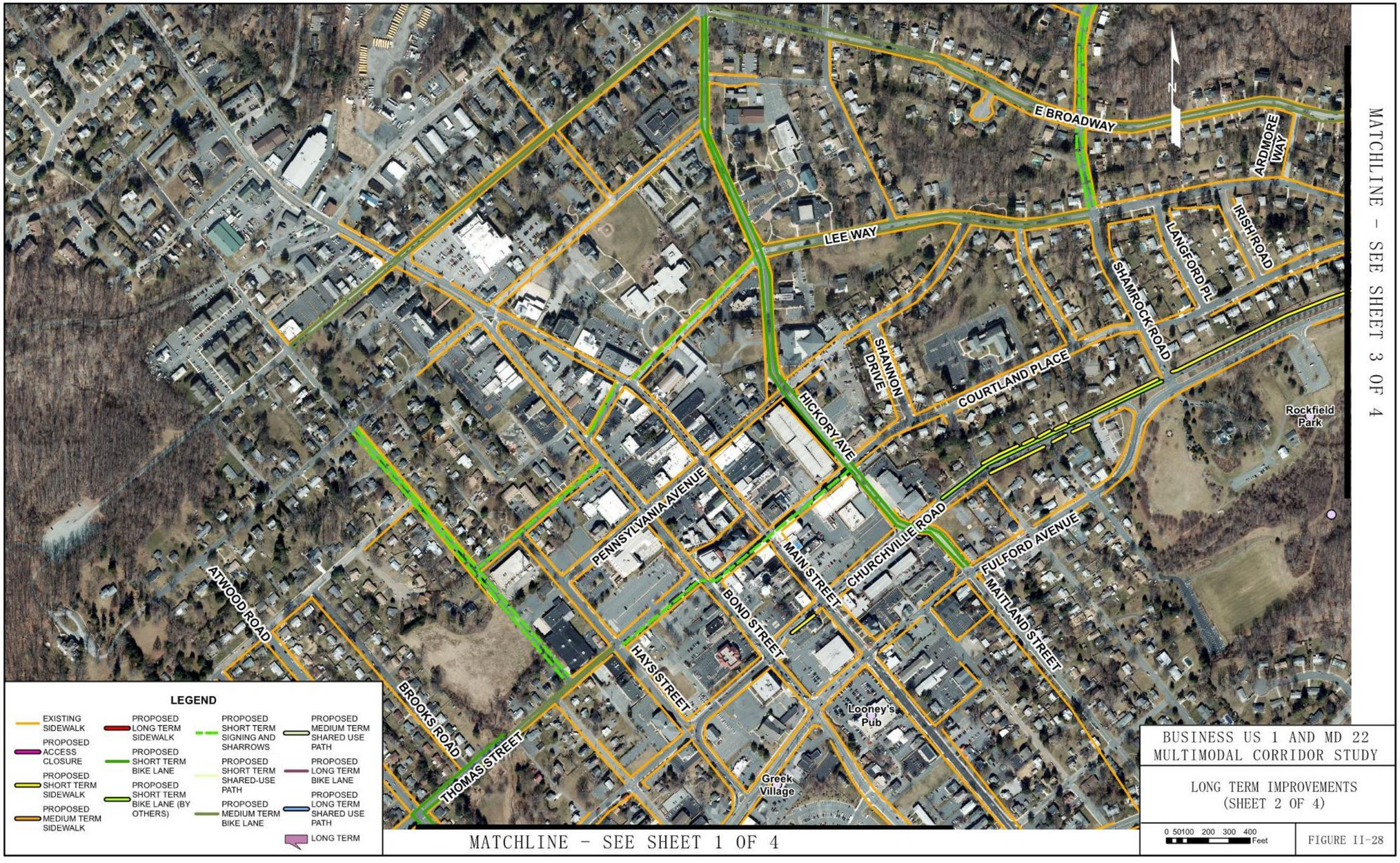
d) Potential Mini-Roundabout

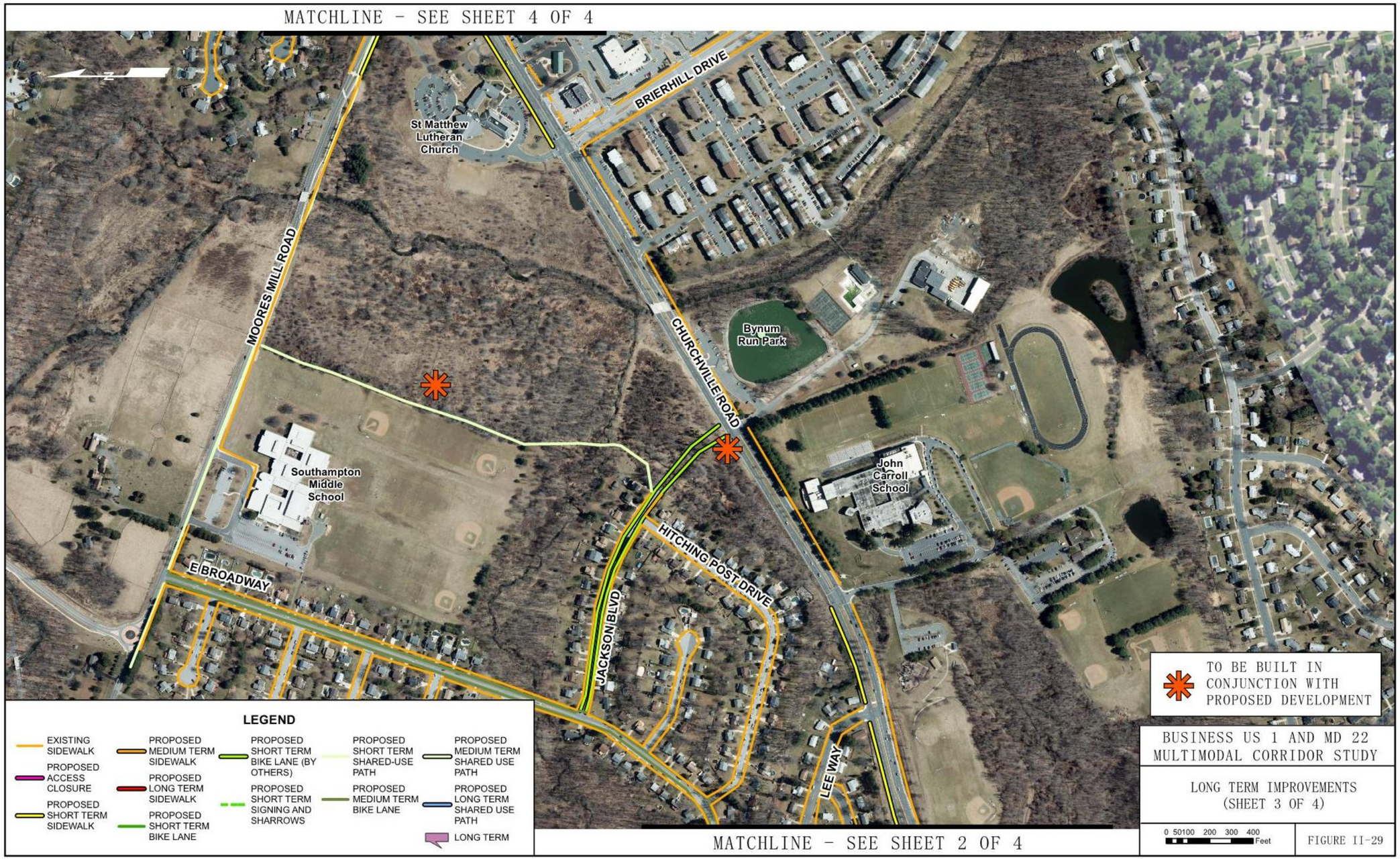
The intersections of Boulton Street and Kelly Avenue and of Marketplace Drive and Atwood Road should be studied for potential mini-roundabout placement to help with traffic flow.

LONG TERM IMPROVEMENTS

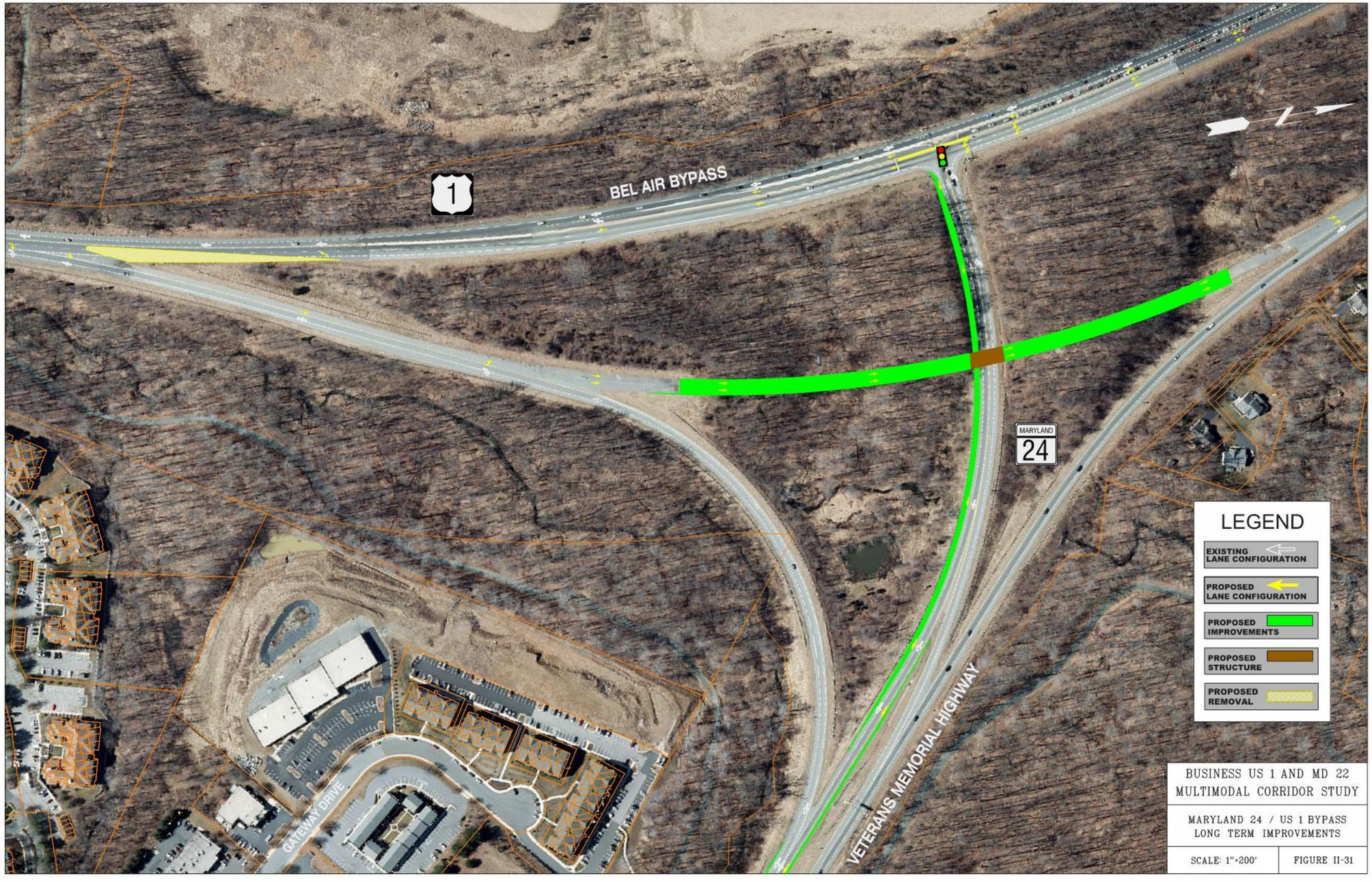
MATCHLINE - SEE SHEET 2 OF 4

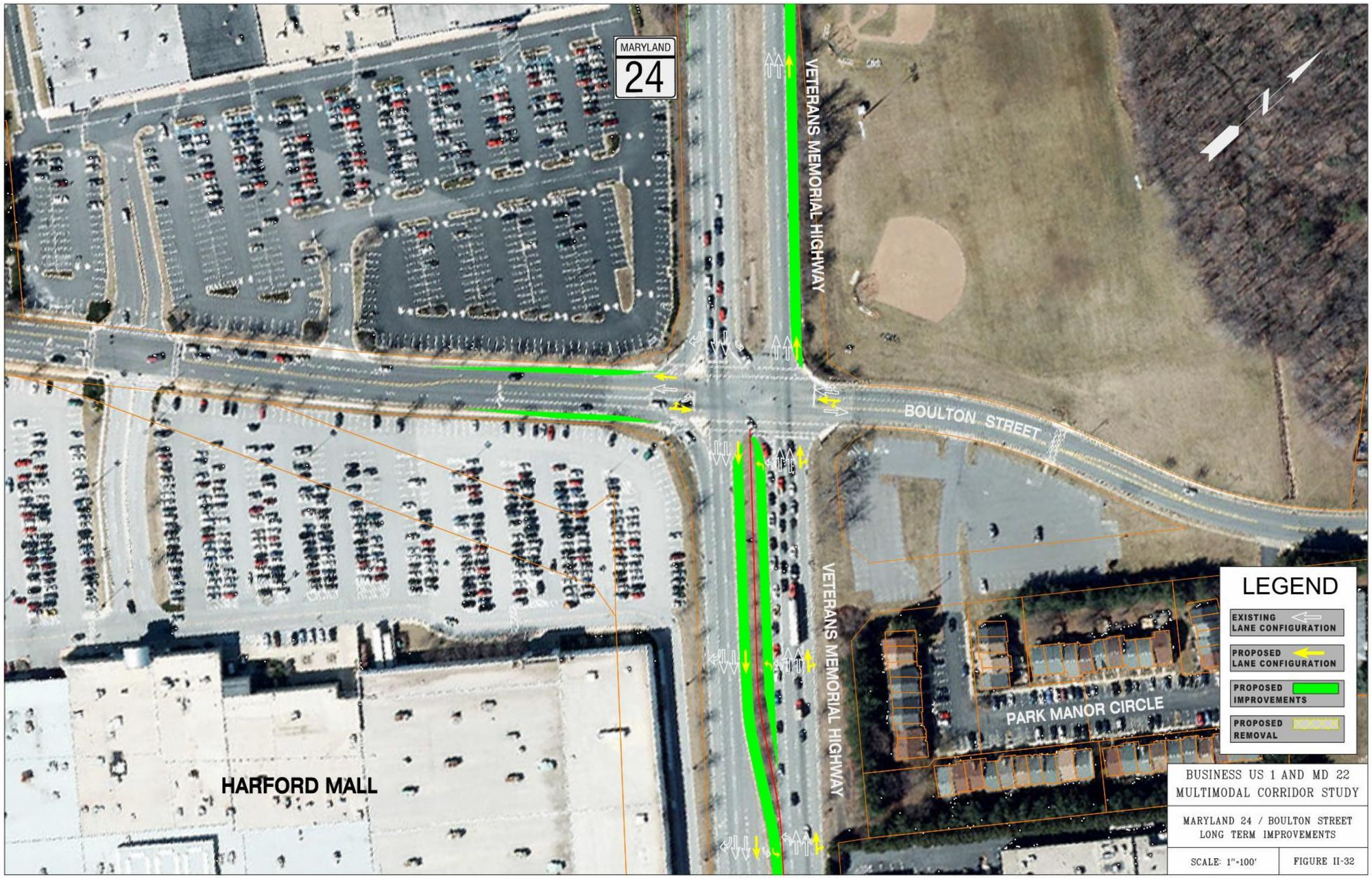



E BROADWAY
ARDMORE WAY
IRISH ROAD
LANGFORD PL
SHAMROCK ROAD
LEE WAY
SHANNON DRIVE
COURTLAND PLACE
HICKORY AVE
Rockfield Park
PENNSYLVANIA AVENUE
MAIN STREET
CHURCHVILLE ROAD
FULFORD AVENUE
MATTLAND STREET
BOND STREET
HAYS STREET
ATWOOD ROAD
BROOKS ROAD
THOMAS STREET
Looney's Pub
Greek Village
MATCHLINE - SEE SHEET 3 OF 4
MATCHLINE - SEE SHEET 1 OF 4
LEGEND
EXISTING SIDEWALK
PROPOSED ACCESS CLOSURE
PROPOSED SHORT TERM SIDEWALK
PROPOSED MEDIUM TERM SIDEWALK
PROPOSED LONG TERM SIDEWALK
PROPOSED SHORT TERM BIKE LANE
PROPOSED SHORT TERM BIKE LANE (BY OTHERS)
PROPOSED SHORT TERM SIGNING AND SHARROWS
PROPOSED SHORT TERM SHARED-USE PATH
PROPOSED MEDIUM TERM BIKE LANE
PROPOSED MEDIUM TERM SHARED USE PATH
PROPOSED LONG TERM BIKE LANE
PROPOSED LONG TERM SHARED USE PATH
LONG TERM
BUSINESS US 1 AND MD 22
MULTIMODAL CORRIDOR STUDY
LONG TERM IMPROVEMENTS
(SHEET 2 OF 4)
0 50100 200 300 400 Feet
FIGURE II-28


MATCHLINE - SEE SHEET 4 OF 4
N
St Matthew Lutheran Church
BRIERHILL DRIVE
MOORES MILL ROAD
CHURCHVILLE ROAD
Bynum Run Park
Southampton Middle School
John Carroll School
E BROADWAY
HITCHING POST DRIVE
JACKSON BLVD
LEE WAY
LEGEND
EXISTING SIDEWALK
PROPOSED ACCESS CLOSURE
PROPOSED SHORT TERM SIDEWALK
PROPOSED MEDIUM TERM SIDEWALK
PROPOSED LONG TERM SIDEWALK
PROPOSED SHORT TERM BIKE LANE
PROPOSED SHORT TERM BIKE LANE (BY OTHERS)
PROPOSED SHORT TERM SIGNING AND SHARROWS
PROPOSED SHORT TERM SHARED-USE PATH
PROPOSED MEDIUM TERM BIKE LANE
PROPOSED MEDIUM TERM SHARED USE PATH
PROPOSED LONG TERM SHARED USE PATH
LONG TERM
TO BE BUILT IN CONJUNCTION WITH PROPOSED DEVELOPMENT
BUSINESS US 1 AND MD 22 MULTIMODAL CORRIDOR STUDY
LONG TERM IMPROVEMENTS (SHEET 3 OF 4)
0 50100 200 300 400 Feet
FIGURE II-29
MATCHLINE - SEE SHEET 2 OF 4

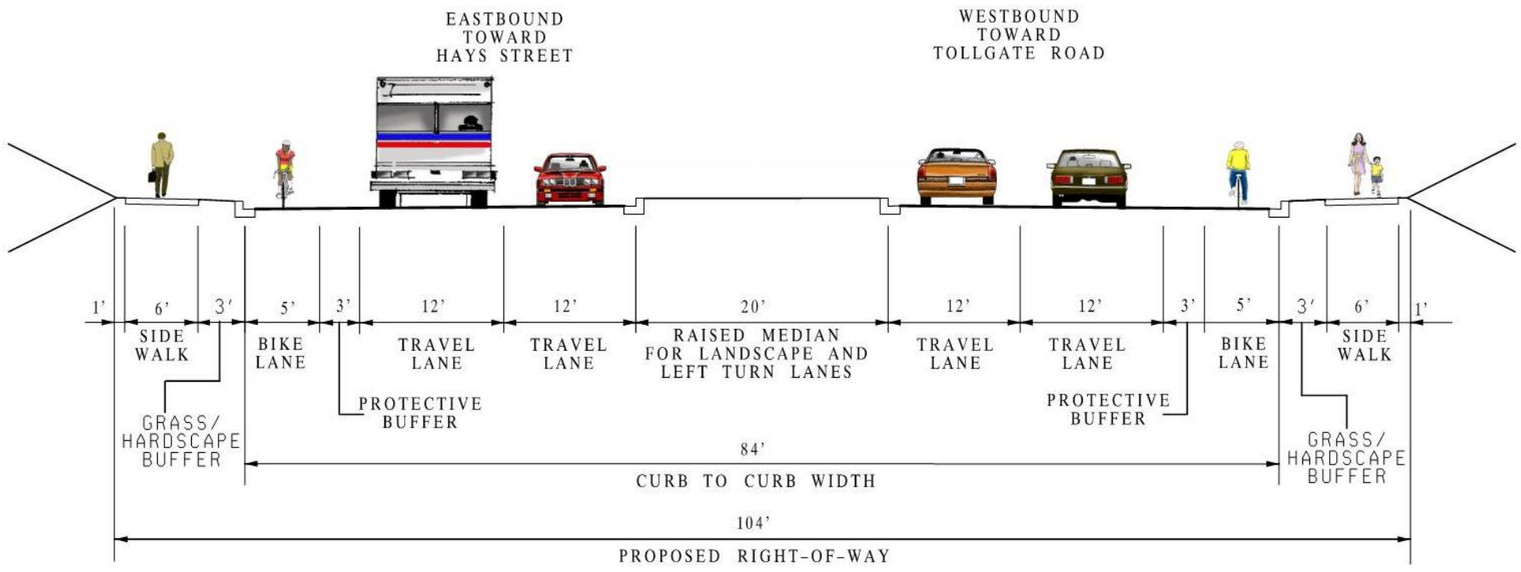

STUDY AREA LIMIT
Royal Farms
Rite Aid
Burger King
Wawa
AMYCLAE DRIVE
FOUNTAIN GREEN ROAD
ECON DRIVE
CHURCHVILLE ROAD
TREDMORE RD
MOORES MILL RD
Proposed Eva Mar Development
Fountain Green Plaza Shopping Center
LEGEND
EXISTING SIDEWALK
PROPOSED ACCESS CLOSURE
PROPOSED SHORT TERM SIDEWALK
PROPOSED MEDIUM TERM SIDEWALK
PROPOSED LONG TERM SIDEWALK
PROPOSED SHORT TERM BIKE LANE
PROPOSED SHORT TERM BIKE LANE (BY OTHERS)
PROPOSED SHORT TERM SIGNING AND SHARROWS
PROPOSED SHORT TERM SHARED-USE PATH
PROPOSED MEDIUM TERM BIKE LANE
PROPOSED MEDIUM TERM SHARED USE PATH
PROPOSED LONG TERM BIKE LANE
PROPOSED LONG TERM SHARED USE PATH
LONG TERM
BUSINESS US 1 AND MD 22 MULTIMODAL CORRIDOR STUDY
LONG TERM IMPROVEMENTS (SHEET 4 OF 4)
0 50100 200 300 400 Feet
FIGURE II-30
MATCHLINE - SEE SHEET 3 OF 4


1
BEL AIR BYPASS
MARYLAND
24
GATEWAY DRIVE
VETERANS MEMORIAL HIGHWAY
LEGEND
EXISTING LANE CONFIGURATION
PROPOSED LANE CONFIGURATION
PROPOSED IMPROVEMENTS
PROPOSED STRUCTURE
PROPOSED REMOVAL
BUSINESS US 1 AND MD 22
MULTIMODAL CORRIDOR STUDY
MARYLAND 24 / US 1 BYPASS
LONG TERM IMPROVEMENTS
SCALE: 1"=200'
FIGURE II-31

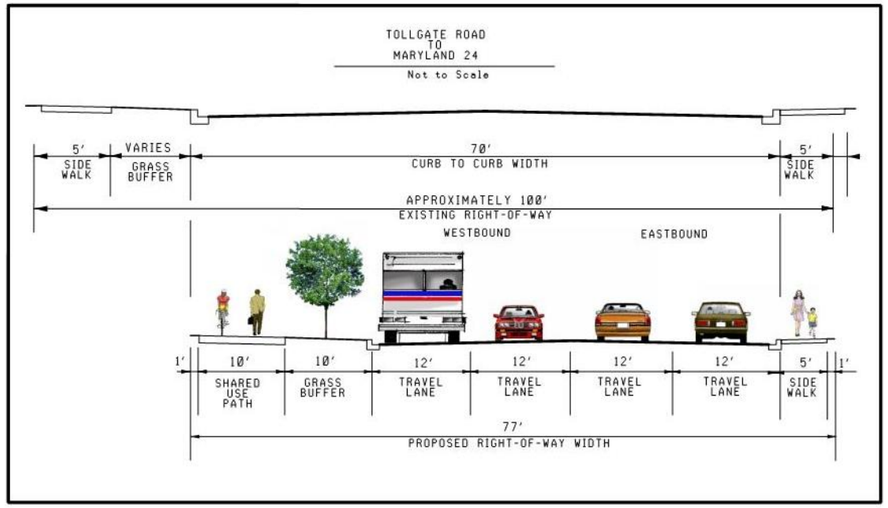

MARYLAND
24
VETERANS MEMORIAL HIGHWAY
BOULTON STREET
HARFORD MALL
VETERANS MEMORIAL HIGHWAY
PARK MANOR CIRCLE
LEGEND
EXISTING LANE CONFIGURATION
PROPOSED LANE CONFIGURATION
PROPOSED IMPROVEMENTS
PROPOSED REMOVAL
BUSINESS US 1 AND MD 22
MULTIMODAL CORRIDOR STUDY
MARYLAND 24 / BOULTON STREET
LONG TERM IMPROVEMENTS
SCALE: 1"=100'
FIGURE II-32

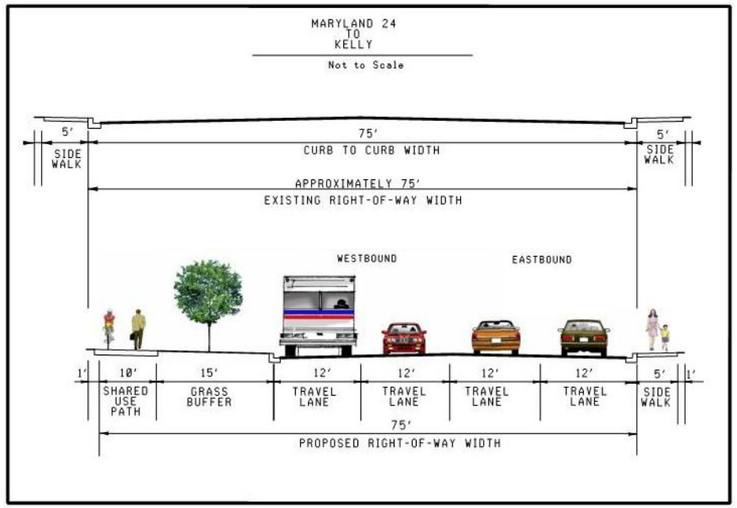
BEL AIR AVENUE
TYPICAL SECTION

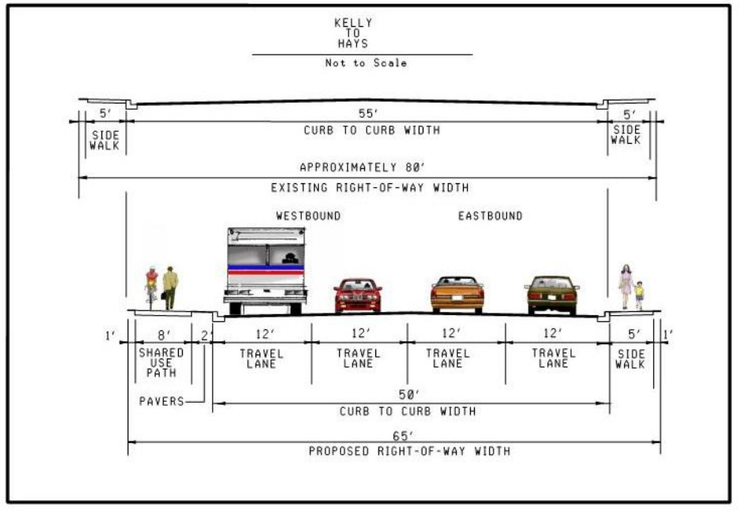
BEL AIR BOULEVARD
Not to Scale



BUSINESS US 1 AND MD 22 MULTIMODAL CORRIDOR STUDY	
"BEL AIR BOULEVARD" ALTERNATIVE A	
SCALE: N.T.S.	FIGURE II-33



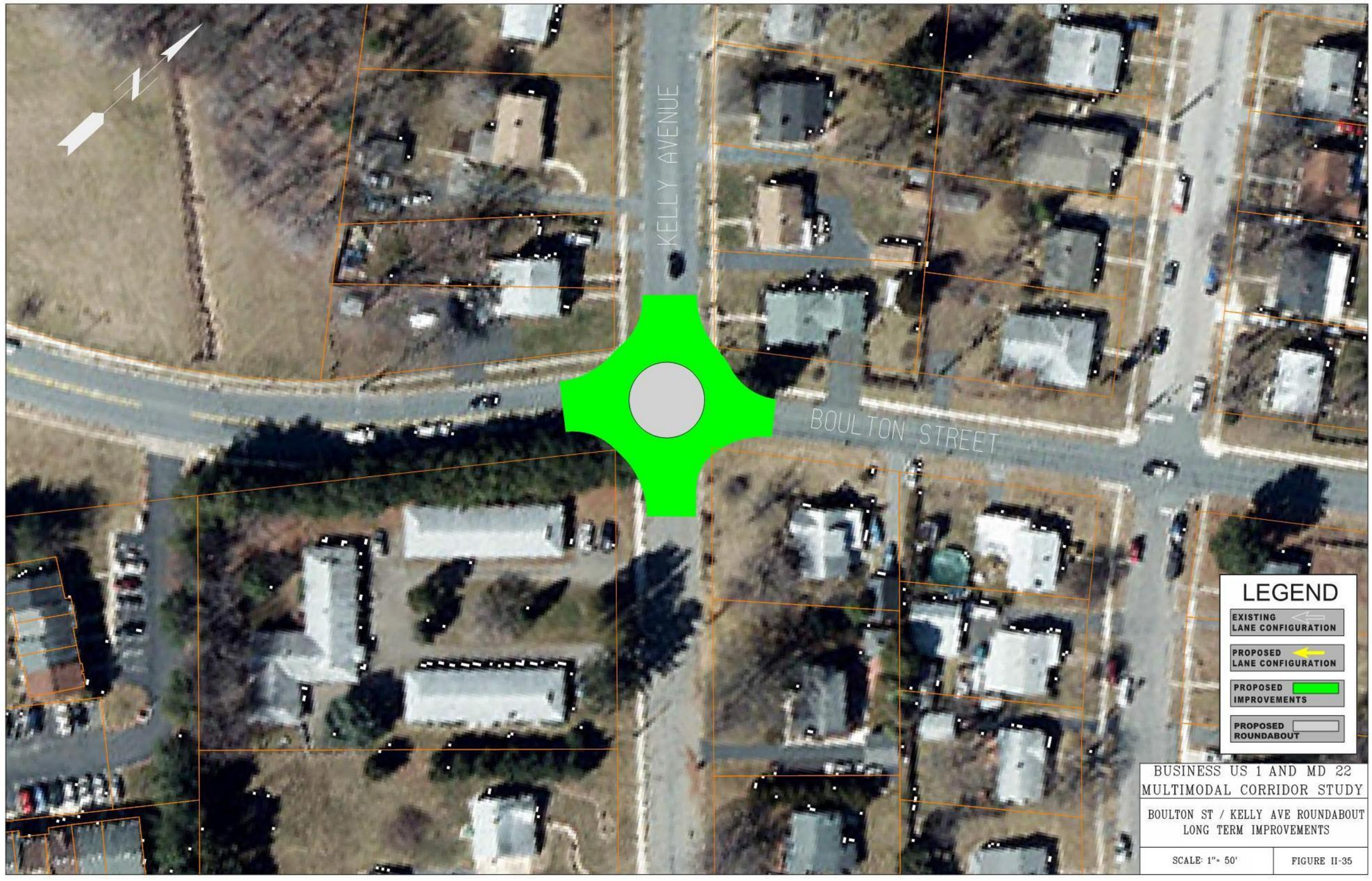




BUSINESS US 1 AND MD 22
MULTIMODAL CORRIDOR STUDY

"BEL AIR BOULEVARD"
ALTERNATIVE B

SCALE: N.T.S. | FIGURE II-34


KELLY AVENUE
BOULTON STREET
LEGEND
EXISTING LANE CONFIGURATION
PROPOSED LANE CONFIGURATION
PROPOSED IMPROVEMENTS
PROPOSED ROUNDABOUT
BUSINESS US 1 AND MD 22
MULTIMODAL CORRIDOR STUDY
BOULTON ST / KELLY AVE ROUNDABOUT
LONG TERM IMPROVEMENTS
SCALE: 1"= 50'
FIGURE II-35

MDSHA SELECTED ALTERNATIVE FOR THE MD 24 AND US 1 BYPASS INTERCHANGE

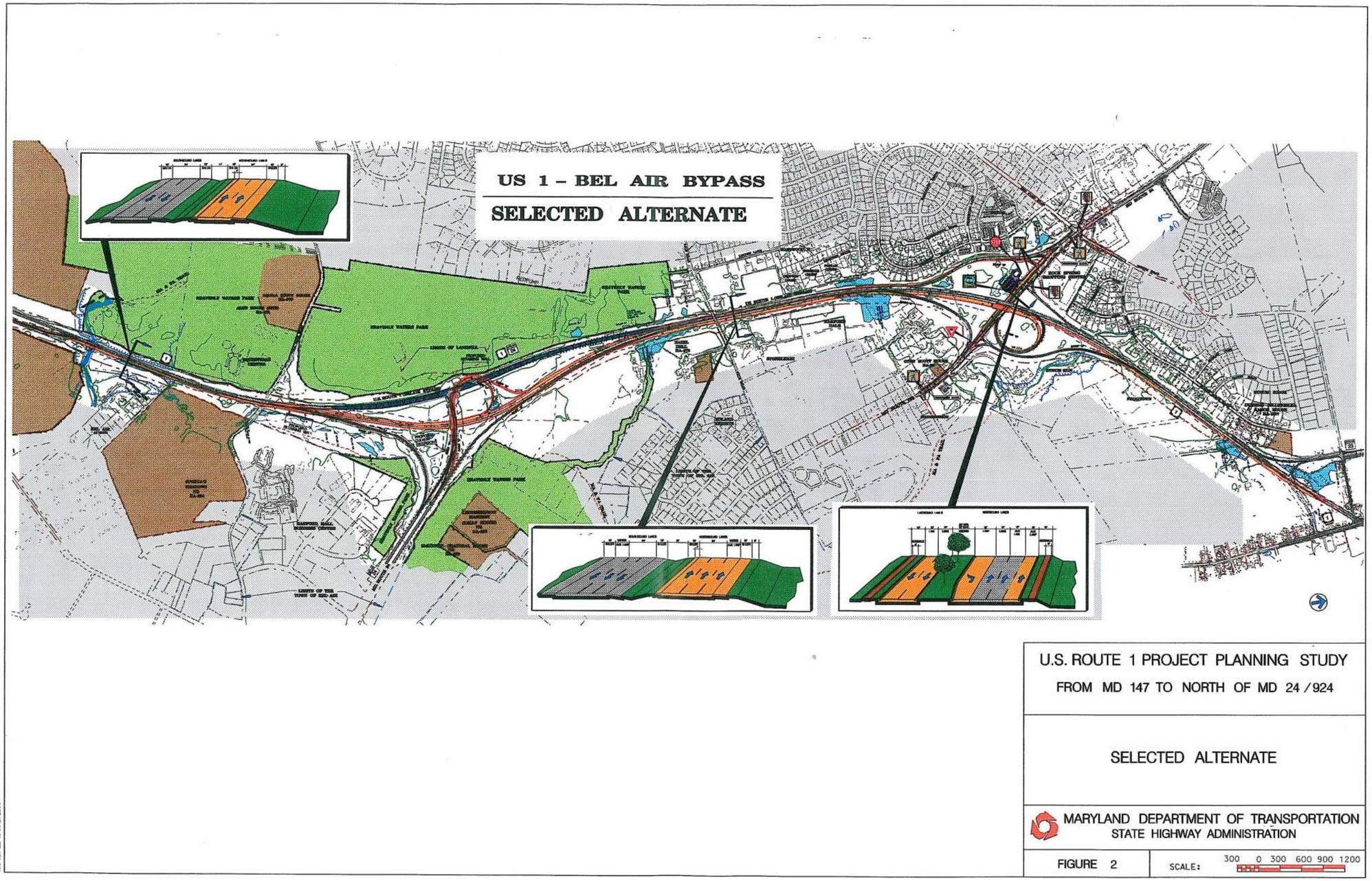

US 1 – BEL AIR BYPASS
SELECTED ALTERNATE
U.S. ROUTE 1 PROJECT PLANNING STUDY
FROM MD 147 TO NORTH OF MD 24 / 924
SELECTED ALTERNATE
MARYLAND DEPARTMENT OF TRANSPORTATION
STATE HIGHWAY ADMINISTRATION
FIGURE 2
SCALE: 300 0 300 600 900 1200

Table II-5 Long Term Traffic Analysis

INTERSECTION	EXISTING 2014		NO BUILD 2040		BUILD 2040	
	AM	PM	AM	PM	AM	PM
	HCM LOS	HCM LOS	HCM LOS	HCM LOS	HCM LOS	HCM LOS
Along MD 22 Churchville Road						
MD 543	D	D	F	F	D	D
Moores Mill Road/Brushing Lane	C	B	E	C	E	D
Brierhill Road	B	B	C	C	C	C
John Carroll High School	D	B	F	B	E	B
S Hickory Avenue	B	B	B	B	B	B
N Main Street	B	B	B	C	B	C
S Bond Street	B	C	D	E	D	E
Along MD 22 Fulford Avenue						
Maitland Street	B	A	B	B	B	B
N Main Street/MD 924	B	B	B	C	B	C
S Bond Street/MD 924	B	B	B	C	B	B

INTERSECTION	EXISTING 2014		NO BUILD 2040		BUILD 2040	
	AM	PM	AM	PM	AM	PM
	HCM LOS	HCM LOS	HCM LOS	HCM LOS	HCM LOS	HCM LOS
Along US 1 Business						
Atwood Road	B	C	C	F	C	E
S Kelley Avenue	A	A	A	B	A	B
Bel Air Plaza	A	A	A	A	Signal Removed	Signal Removed
MD 24	D	D	E	D	D	D
S Tollgate Road/N Tollgate Road	D	D	D	F	D	E
Along MD 24						
W MacPhail Road	B	C	C	E	C	D
Marketplace Drive	C	C	C	E	C	D
Boulton Street	B	C	D	C	C	D
US 1 Bypass	D	E	F	F	A	B

Levels of Service Legend:

A
B
C
D
E
F

NOTE:

The No Build conditions reflect the existing signal timings.

The EB/WB MD 22 left turn movement is provided with exclusive left turn phasing and NB/SB Moores Mill Road left turn movement is exclusive/permissive.

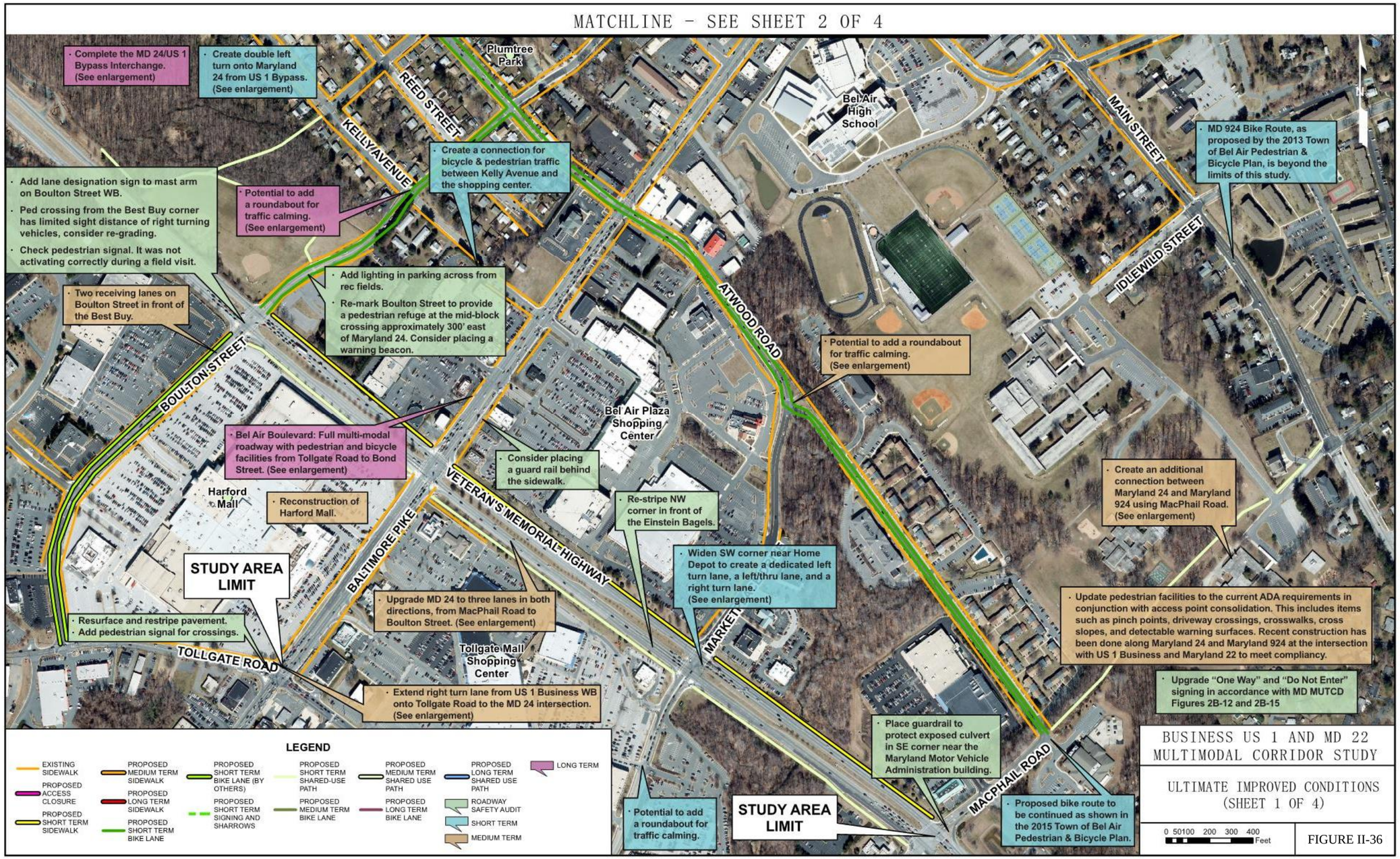
The levels of service at Boulton Street and W MacPhail Road under build conditions differ because of traffic progression along MD 24 due to the improvements provided at US 1 Bypass/MD 24 intersection.

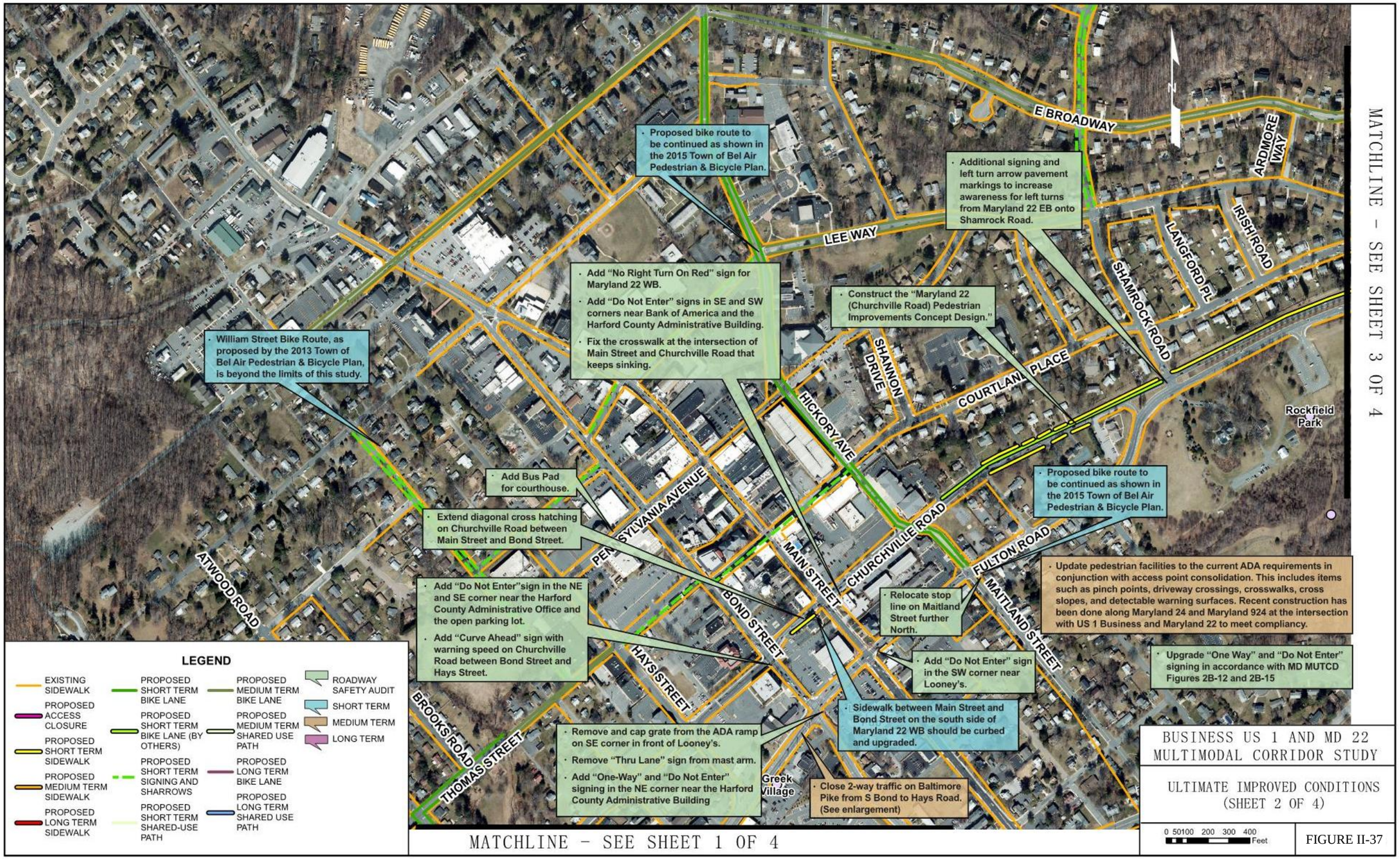
Under 2040 Build conditions, the US 1 Business and MD 24 intersection was analyzed as a CFI. See comparison of this alternative on next page.

MD 22 Corridor Study
Existing Conditions and Year 2020 Build and No Build Scenario

Table II-6: Long Term Improvements

Long Term Improvements Sheet 1						
Intersection	**Traffic Operations**				**Feasibility Level Cost Estimate (Not Including ROW)**	**Remarks**
	Peak Hour	**2014 LOS**	**2040 NO BUILD LOS**	**2040 BUILD LOS**		
"Bel Air Boulevard"					$40 - $50 Million	Reconstruction of Business US 1 to create a full multi-modal corridor.
Complete the US 1 Bypass / MD 24 Interchange	AM	D	F	A	$15 – $25 Million	Complete the MD 24 / US 1 Bypass interchange.
	PM	E	F	B		
Boulton Street / Kelly Avenue Roundabout					$100,000-$300,000	Potential roundabout for traffic calming.


MATCHLINE - SEE SHEET 2 OF 4
Complete the MD 24/US 1 Bypass Interchange. (See enlargement)
Create double left turn onto Maryland 24 from US 1 Bypass. (See enlargement)
Plumtree Park
REED STREET
KELLY AVENUE
Bel Air High School
MAIN STREET
MD 924 Bike Route, as proposed by the 2013 Town of Bel Air Pedestrian & Bicycle Plan, is beyond the limits of this study.
Add lane designation sign to mast arm on Boulton Street WB.
Ped crossing from the Best Buy corner has limited sight distance of right turning vehicles, consider re-grading.
Check pedestrian signal. It was not activating correctly during a field visit.
Potential to add a roundabout for traffic calming. (See enlargement)
Create a connection for bicycle & pedestrian traffic between Kelly Avenue and the shopping center.
IDLEWILD STREET
Add lighting in parking across from rec fields.
Re-mark Boulton Street to provide a pedestrian refuge at the mid-block crossing approximately 300' east of Maryland 24. Consider placing a warning beacon.
Two receiving lanes on Boulton Street in front of the Best Buy.
ATWOOD ROAD
Potential to add a roundabout for traffic calming. (See enlargement)
BOULTON STREET
Bel Air Plaza Shopping Center
Bel Air Boulevard: Full multi-modal roadway with pedestrian and bicycle facilities from Tollgate Road to Bond Street. (See enlargement)
Consider placing a guard rail behind the sidewalk.
Harford Mall
Reconstruction of Harford Mall.
VETERAN'S MEMORIAL HIGHWAY
Re-stripe NW corner in front of the Einstein Bagels.
Create an additional connection between Maryland 24 and Maryland 924 using MacPhail Road. (See enlargement)
STUDY AREA LIMIT
BALTIMORE PIKE
Widen SW corner near Home Depot to create a dedicated left turn lane, a left/thru lane, and a right turn lane. (See enlargement)
Upgrade MD 24 to three lanes in both directions, from MacPhail Road to Boulton Street. (See enlargement)
MARKET
Update pedestrian facilities to the current ADA requirements in conjunction with access point consolidation. This includes items such as pinch points, driveway crossings, crosswalks, cross slopes, and detectable warning surfaces. Recent construction has been done along Maryland 24 and Maryland 924 at the intersection with US 1 Business and Maryland 22 to meet compliancy.
Resurface and restripe pavement.
Add pedestrian signal for crossings.
TOLLGATE ROAD
Tollgate Mall Shopping Center
Upgrade "One Way" and "Do Not Enter" signing in accordance with MD MUTCD Figures 2B-12 and 2B-15
Extend right turn lane from US 1 Business WB onto Tollgate Road to the MD 24 intersection. (See enlargement)
Place guardrail to protect exposed culvert in SE corner near the Maryland Motor Vehicle Administration building.
MACPHAIL ROAD
Potential to add a roundabout for traffic calming.
STUDY AREA LIMIT
Proposed bike route to be continued as shown in the 2015 Town of Bel Air Pedestrian & Bicycle Plan.
LEGEND
EXISTING SIDEWALK
PROPOSED ACCESS CLOSURE
PROPOSED SHORT TERM SIDEWALK
PROPOSED MEDIUM TERM SIDEWALK
PROPOSED LONG TERM SIDEWALK
PROPOSED SHORT TERM BIKE LANE
PROPOSED SHORT TERM BIKE LANE (BY OTHERS)
PROPOSED SHORT TERM SIGNING AND SHARROWS
PROPOSED SHORT TERM SHARED-USE PATH
PROPOSED MEDIUM TERM BIKE LANE
PROPOSED MEDIUM TERM SHARED USE PATH
PROPOSED LONG TERM BIKE LANE
PROPOSED LONG TERM SHARED USE PATH
ROADWAY SAFETY AUDIT
SHORT TERM
MEDIUM TERM
LONG TERM
BUSINESS US 1 AND MD 22 MULTIMODAL CORRIDOR STUDY
ULTIMATE IMPROVED CONDITIONS (SHEET 1 OF 4)
0 50100 200 300 400 Feet
FIGURE II-36


Proposed bike route to be continued as shown in the 2015 Town of Bel Air Pedestrian & Bicycle Plan.
Additional signing and left turn arrow pavement markings to increase awareness for left turns from Maryland 22 EB onto Shamrock Road.
Add "No Right Turn On Red" sign for Maryland 22 WB.
Add "Do Not Enter" signs in SE and SW corners near Bank of America and the Harford County Administrative Building.
Fix the crosswalk at the intersection of Main Street and Churchville Road that keeps sinking.
Construct the "Maryland 22 (Churchville Road) Pedestrian Improvements Concept Design."
William Street Bike Route, as proposed by the 2013 Town of Bel Air Pedestrian & Bicycle Plan, is beyond the limits of this study.
Add Bus Pad for courthouse.
Extend diagonal cross hatching on Churchville Road between Main Street and Bond Street.
Add "Do Not Enter"sign in the NE and SE corner near the Harford County Administrative Office and the open parking lot.
Add "Curve Ahead" sign with warning speed on Churchville Road between Bond Street and Hays Street.
Remove and cap grate from the ADA ramp on SE corner in front of Looney's.
Remove "Thru Lane" sign from mast arm.
Add "One-Way" and "Do Not Enter" signing in the NE corner near the Harford County Administrative Building
Close 2-way traffic on Baltimore Pike from S Bond to Hays Road. (See enlargement)
Relocate stop line on Maitland Street further North.
Add "Do Not Enter" sign in the SW corner near Looney's.
Sidewalk between Main Street and Bond Street on the south side of Maryland 22 WB should be curbed and upgraded.
Proposed bike route to be continued as shown in the 2015 Town of Bel Air Pedestrian & Bicycle Plan.
Update pedestrian facilities to the current ADA requirements in conjunction with access point consolidation. This includes items such as pinch points, driveway crossings, crosswalks, cross slopes, and detectable warning surfaces. Recent construction has been done along Maryland 24 and Maryland 924 at the intersection with US 1 Business and Maryland 22 to meet compliancy.
Upgrade "One Way" and "Do Not Enter" signing in accordance with MD MUTCD Figures 2B-12 and 2B-15
E BROADWAY
LEE WAY
ARDMORE WAY
IRISH ROAD
LANGFORD PL
SHAMROCK ROAD
SHANNON DRIVE
COURTLAND PLACE
HICKORY AVE
Rockfield Park
SYLVANIA AVENUE
MAIN STREET
CHURCHVILLE ROAD
FULTON ROAD
MAITLAND STREET
BOND STREET
HAYS STREET
ATWOOD ROAD
BROOKS ROAD
THOMAS STREET
Greek Village
LEGEND
EXISTING SIDEWALK
PROPOSED ACCESS CLOSURE
PROPOSED SHORT TERM SIDEWALK
PROPOSED MEDIUM TERM SIDEWALK
PROPOSED LONG TERM SIDEWALK
PROPOSED SHORT TERM BIKE LANE
PROPOSED SHORT TERM BIKE LANE (BY OTHERS)
PROPOSED SHORT TERM SIGNING AND SHARROWS
PROPOSED SHORT TERM SHARED-USE PATH
PROPOSED MEDIUM TERM BIKE LANE
PROPOSED MEDIUM TERM SHARED USE PATH
PROPOSED LONG TERM BIKE LANE
PROPOSED LONG TERM SHARED USE PATH
ROADWAY SAFETY AUDIT
SHORT TERM
MEDIUM TERM
LONG TERM
MATCHLINE - SEE SHEET 3 OF 4
MATCHLINE - SEE SHEET 1 OF 4
BUSINESS US 1 AND MD 22 MULTIMODAL CORRIDOR STUDY
ULTIMATE IMPROVED CONDITIONS (SHEET 2 OF 4)
0 50100 200 300 400 Feet
FIGURE II-37

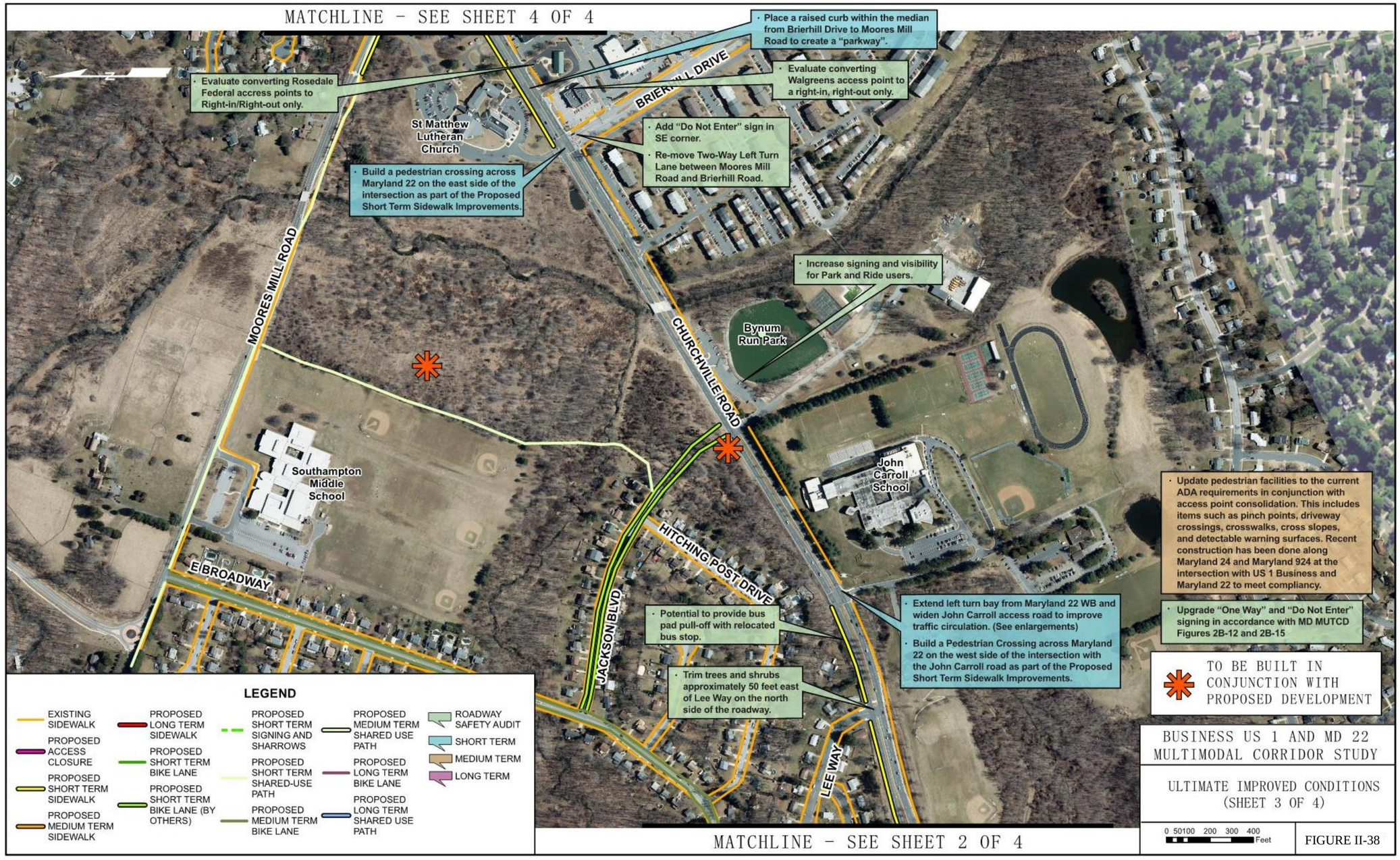
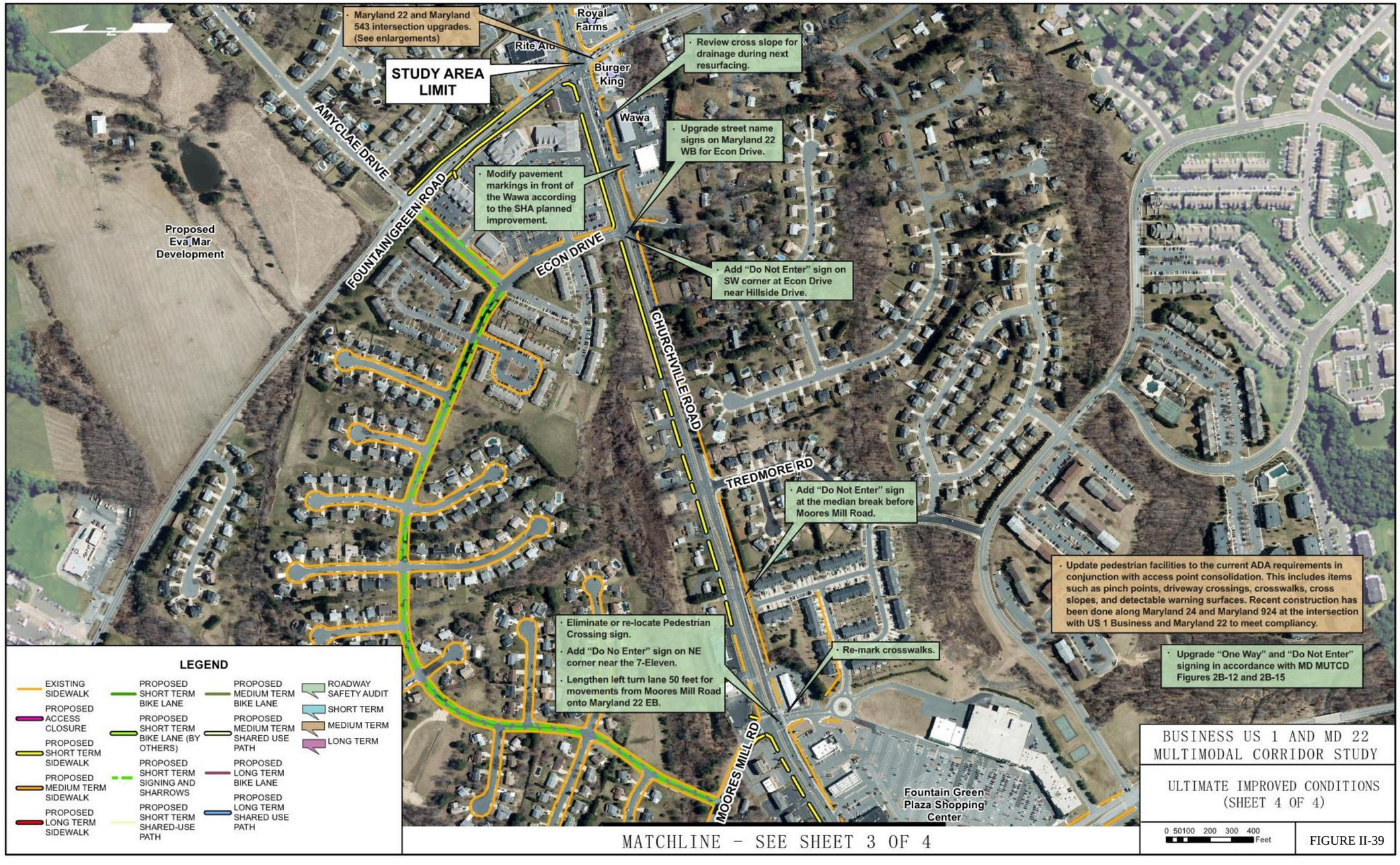

MATCHLINE - SEE SHEET 4 OF 4
Place a raised curb within the median from Brierhill Drive to Moores Mill Road to create a "parkway".
Evaluate converting Rosedale Federal accress points to Right-in/Right-out only.
Evaluate converting Walgreens access point to a right-in, right-out only.
BRIERHILL DRIVE
St Matthew Lutheran Church
Add "Do Not Enter" sign in SE corner.
Re-move Two-Way Left Turn Lane between Moores Mill Road and Brierhill Road.
Build a pedestrian crossing across Maryland 22 on the east side of the intersection as part of the Proposed Short Term Sidewalk Improvements.
MOORES MILL ROAD
Increase signing and visibility for Park and Ride users.
Bynum Run Park
CHURCHVILLE ROAD
John Carroll School
Southampton Middle School
E BROADWAY
HITCHING POST DRIVE
JACKSON BLVD
Potential to provide bus pad pull-off with relocated bus stop.
Trim trees and shrubs approximately 50 feet east of Lee Way on the north side of the roadway.
Extend left turn bay from Maryland 22 WB and widen John Carroll access road to improve traffic circulation. (See enlargements)
Build a Pedestrian Crossing across Maryland 22 on the west side of the intersection with the John Carroll road as part of the Proposed Short Term Sidewalk Improvements.
LEE WAY
Update pedestrian facilities to the current ADA requirements in conjunction with access point consolidation. This includes items such as pinch points, driveway crossings, crosswalks, cross slopes, and detectable warning surfaces. Recent construction has been done along Maryland 24 and Maryland 924 at the intersection with US 1 Business and Maryland 22 to meet compliancy.
Upgrade "One Way" and "Do Not Enter" signing in accordance with MD MUTCD Figures 2B-12 and 2B-15
LEGEND
EXISTING SIDEWALK
PROPOSED ACCESS CLOSURE
PROPOSED SHORT TERM SIDEWALK
PROPOSED MEDIUM TERM SIDEWALK
PROPOSED LONG TERM SIDEWALK
PROPOSED SHORT TERM BIKE LANE
PROPOSED SHORT TERM BIKE LANE (BY OTHERS)
PROPOSED SHORT TERM SIGNING AND SHARROWS
PROPOSED SHORT TERM SHARED-USE PATH
PROPOSED MEDIUM TERM BIKE LANE
PROPOSED MEDIUM TERM SHARED USE PATH
PROPOSED LONG TERM BIKE LANE
PROPOSED LONG TERM SHARED USE PATH
ROADWAY SAFETY AUDIT
SHORT TERM
MEDIUM TERM
LONG TERM
TO BE BUILT IN CONJUNCTION WITH PROPOSED DEVELOPMENT
BUSINESS US 1 AND MD 22 MULTIMODAL CORRIDOR STUDY
ULTIMATE IMPROVED CONDITIONS (SHEET 3 OF 4)
0 50100 200 300 400 Feet
MATCHLINE - SEE SHEET 2 OF 4

FIGURE II-38


· Maryland 22 and Maryland 543 intersection upgrades. (See enlargements)
STUDY AREA LIMIT
· Review cross slope for drainage during next resurfacing.
· Upgrade street name signs on Maryland 22 WB for Econ Drive.
· Modify pavement markings in front of the Wawa according to the SHA planned improvement.
· Add "Do Not Enter" sign on SW corner at Econ Drive near Hillside Drive.
Proposed Eva Mar Development
AMYCLAE DRIVE
FOUNTAIN GREEN ROAD
ECON DRIVE
CHURCHVILLE ROAD
TREDMORE RD
MOORES MILL RD
Royal Farms
Rite Aid
Burger King
Wawa
· Add "Do Not Enter" sign at the median break before Moores Mill Road.
· Update pedestrian facilities to the current ADA requirements in conjunction with access point consolidation. This includes items such as pinch points, driveway crossings, crosswalks, cross slopes, and detectable warning surfaces. Recent construction has been done along Maryland 24 and Maryland 924 at the intersection with US 1 Business and Maryland 22 to meet compliancy.
· Eliminate or re-locate Pedestrian Crossing sign.
· Add "Do No Enter" sign on NE corner near the 7-Eleven.
· Lengthen left turn lane 50 feet for movements from Moores Mill Road onto Maryland 22 EB.
· Re-mark crosswalks.
· Upgrade "One Way" and "Do Not Enter" signing in accordance with MD MUTCD Figures 2B-12 and 2B-15
Fountain Green Plaza Shopping Center
LEGEND
EXISTING SIDEWALK
PROPOSED ACCESS CLOSURE
PROPOSED SHORT TERM SIDEWALK
PROPOSED MEDIUM TERM SIDEWALK
PROPOSED LONG TERM SIDEWALK
PROPOSED SHORT TERM BIKE LANE
PROPOSED SHORT TERM BIKE LANE (BY OTHERS)
PROPOSED SHORT TERM SIGNING AND SHARROWS
PROPOSED SHORT TERM SHARED-USE PATH
PROPOSED MEDIUM TERM BIKE LANE
PROPOSED MEDIUM TERM SHARED USE PATH
PROPOSED LONG TERM BIKE LANE
PROPOSED LONG TERM SHARED USE PATH
ROADWAY SAFETY AUDIT
SHORT TERM
MEDIUM TERM
LONG TERM
MATCHLINE - SEE SHEET 3 OF 4
BUSINESS US 1 AND MD 22 MULTIMODAL CORRIDOR STUDY
ULTIMATE IMPROVED CONDITIONS (SHEET 4 OF 4)
0 50100 200 300 400 Feet
FIGURE II-39

III. Implementation Strategies

One of the most challenging and difficult aspects of a Corridor Study is the implementation strategy. While many agencies, residents, and key stakeholders recognize that changes must be made; they often get bogged down in the characteristics of their individual needs and impacts. Based upon past successes, several recommendations are provided to assist Harford County and the Town of Bel Air with implementation.

A. General

- Harford County and the Town of Bel Air should identify to other agencies that the County has completed and funded this study. Several potential funding sources require County participation of funding and the costs for this study may meet some of the requirements.

- Coordination and involvement with SHA is required. SHA is the owner and responsible for maintenance of right-of-way for MD 22, Business US 1, and MD 24. It is imperative that Harford County and SHA work together to implement the recommended improvements.

- It is imperative that the County identify the Business US 1 and MD 22 study area as one of their priority corridors to the State to ensure that the various projects throughout the different terms identified that require capital investment (CIP) remain competitive with the other projects throughout the state for funding.

- It is recommended that the County request the SHA establish a Business US 1 / MD 22 Task Force that would meet quarterly and stay focused on the corridor study implementation strategies. Membership on the task force could include the SHA District Four Engineer, ADE-Project Development, ADE-Traffic, Harford County Traffic Area Engineer, Town of Bel Air Engineer, Deputy Administrator for Planning & Engineering, SHA Director of Planning, SHA Engineering Access Permits Division Chair, SHA Travel Forecasting Chief, along with representatives from MTA, HCC, John Carroll, Bel Air Schools, Local Businesses, and State Elected Official(s). This above panel of experts can address discussion on access consolidation and strategies for reserving and purchasing right-of-way for the ultimate improvements as well as ensuring that the corridor remain a high priority for the County.

- Coordination and involvement of several key stakeholders such as John Carroll, and Harford Public Schools is necessary. Harford County Director of Planning and Zoning should initiate these meetings.

- When appropriate, presentations and input from the residents and businesses along the corridor should be held. This can be accomplished through community association meetings or a general public meeting. Harford County's website should be updated to include this report. The importance of the entire corridor working together must be stressed.

- Local and State elected officials should be briefed on the needs and implications of not implementing the improvements on their constituents, the local economy, and the quality of life.

- Harford County and SHA should review any new development along the corridor to ensure that they are consistent and include the recommendations of this report. Sidewalks and bicycle facilities should be required for all projects.

- The Town of Bel Air should brand the Business US 1 / MD 22 study area as the "Gateway to the Town of Bel Air". This will allow the County to tie in economic development and roadway improvements and possibly fund through bond issuance. A marketing campaign should be developed.

- Add the ability to the Harford County Adequate Public Facilities ordinance to require minimum vehicle occupancies and a five year monitoring plan for the newly branded corridor.

- Market to existing and potential developments the tax benefits associated with the TDM strategies outlined within the report.

- Harford County should coordinate with and elicit the involvement of the Harford County Chamber of Commerce to promote the corridor.

B. Short Term (2015)

- Harford County should request that SHA adopts this plan as completion of a Roadway Safety Audit. Many of the signing, marking, and maintenance improvements can be implemented mainly with County and SHA maintenance crews. Adoption of this plan will allow SHA to proceed without additional studies needing to be completed. To do this, the County should request a meeting with the District Four Engineer and key staff to begin the process for adoption.

- In areas of new sidewalk, the County and SHA should confirm the right-of-way and utility avoidance with more detailed plans and site walks prior to implementation.

- Harford County and SHA should work with the adjacent property owners on access consolidation as shown with

several of the improvements. Property owners must be educated that full access is not guaranteed to all individual properties. The County and SHA must educate the property owners that if access consolidation is not achieved, then medians may be installed resulting in only right in / right out access for all of the properties.

- Discuss with SHA the schedule for routine maintenance projects along the corridor, such as roadway resurfacing, and coordinate the improvements from this study at the same time.

- Funding programs managed by the Maryland Department of Transportation should be investigated for bicycle and pedestrian improvements and projects. These funding sources include programs such as the Maryland Bikeways Program, Safe Routes to School Program, Transportation Enhancements/Alternatives Program and Recreational Trails Program.

- Non-traditional funding sources administered by the Maryland Transit Administration (MTA), the U.S. Department Transportation (USDOT), and Federal Transit Administration (FTA) should also be evaluated for bicycle, pedestrian, and transit related projects. Some potential funding sources include programs such as the Urbanized Area Formula Program, TOD Planning Pilot Grants, and Fixed Guideway Capital Investment Grants.

- Work with SHA for possible funding of pedestrian access along Business US 1, MD 22, and MD 24, including through the New Sidewalk Construction for Pedestrian Access Program ($21.8 million statewide FY 2015-2020), the ADA Compliance Program ($59.7 million statewide FY 2015-2020), and possibly the Areawide Geometric Improvement Contract.

- Coordinate bicycle project improvements through the SHA Bicycle Retrofit Program ($17.5 million statewide FY 2015-2020).

C. Medium Term (2025) and Long Term (2035)

- Harford County should request that SHA begin detailed Project Planning Studies for the proposed improvements. Major capital improvements typically take 10 – 15 years from initiation to implementation.

- Reserve the right-of-way for the new roadway and intersection improvements related to potential new developments.

- Harford County should investigate and prepare a strategy to purchase available right-of-way along the corridor if it becomes available.

D. Recommendations Matrix

In order to organize and present such a massive amount of information in a concise and manageable manner, a matrix has been developed. Recommended projects and improvements have been organized based on estimated cost and perceived overall impact on the corridor in order to determine a proposed timeframe for implementation of each.

Table III-1: Recommendations Matrix

Matrix of Recommendations/Responsibilities Short-Term Improvements: Roadway Safety Audit								
Project	**Cost***	**Timeframe**						**Process to Implement / Remarks**
		2015	**2016**	**2017**	**2018**	**2019**	**2020**	
Trim Trees/Vegetation *Trim trees and shrubs approximately 50 feet east of Lee Way on the north side of the roadway at John Carroll School and Lee Way*	Maintenance							
Signing/Marking *Upgrade "One Way" and "Do Not Enter" signage on all one-way streets to be in accordance with the MD MUTCD* *Incorporate a lane designation sign to the mast arm on Boulton Street/MD 24 heading westbound (toward the Best Buy)* *Improve the crosswalk from the recreational parking lots at Boulton Street/MD 24 to the recreational field by providing a striped pedestrian refuge area at the existing mid-block crossing.* *Restripe the inbound lane on MD 24 / Marketplace Drive near the Einstein Bagels to accommodate for two lanes and include a yield sign for the right turn lane.* *Resurface and restripe the pavement at the intersection near Business US 1 / Tollgate Road* *Add a "No Right Turn on Red" sign for MD 22 Westbound at Churchville Road / Main Street* *Add "Curve Ahead" sign with Warning Speed on Churchville Road between Bond Street and Hays Street* *Extend Diagonal Cross Hatching on Churchville Road between Main Street and Bond Street* *Relocate Stop Line on Maitland Street further north at Fulford Avenue / Mailtand Street* *Increase signing and visibility for the Bynum Run Park and Ride* *Re-mark crosswalks on MD 22 / Moores Mill Road* *Eliminate or re-locate Pedestrian Crossing sign on MD 22 / Moores Mill Road* *Modify Pavement Markings in front of the WAWA according to the SHA planned* *Upgrade street name signs on Maryland 22 Westbound for Econ Drive along MD 22 between MD 543 and Econ Drive*	Maintenance							

Matrix of Recommendations/Responsibilities
Short-Term Improvements: Roadway Safety Audit

Project	Cost*	Timeframe						Process to Implement / Remarks
		2015	2016	2017	2018	2019	2020	
Miscellaneous *Consider placing a safety railing along the MD 24 / Business US 1 sidewalk by IHOP* *Provide guardrail near MD 24 / MacPhail Road along the length of the culvert to ensure vehicles do not stray into the area from MD 24.* *Incorporate a pedestrian signal near Business US 1 / Tollgate Road intersection to allow for safe passage across Business US 1* *Add lighting to the recreational field parking lots to increase visibility and safety for the use of the lots at Boulton Street/MD 24* *Repair the crosswalk at the intersection of Main Street and Churchville Road that requires continuous maintenance due to sinking.* *Remove and cap the drainage grate that is adjacent to the ADA ramp on the SE quadrant near the Looney's parking lot at Bond Street / Baltimore Pike* *Construct the "Maryland 22 (Churchville Road) Pedestrian Improvements Concept Design" on Churchville Road between Shamrock Road and Hickory Avenue* *Place additional signing and left turn arrow pavement markings to increase awareness for left turns from Maryland 22 Eastbound onto Shamrock Road* *Evaluate converting the Rosedale Federal access points to Right-in / Right-out only on Brierhill Drive* *Evaluate converting the Walgreens access point to Right-in / Right-out only on Brierhill Drive* *Remove the Two-Way Left Turn Lane between Moores Mill Road and Brierhill Road. Place a raised median with designated left turn pockets on Brierhill Drive* *Re-grade the quadrant at Boulton Street / MD 24 to minimize the height of the wall and improve sight* *Lengthen left turn lane 50 feet for movements from Moores Mill Road onto Maryland 22 Eastbound* *Review cross slope for drainage during next resurfacing along MD 22 between MD 543 and Econ Drive*	Maintenance							

Matrix of Recommendations/Responsibilities
Short-Term Improvements

Project	Cost*	Timeframe						Process to Implement / Remarks
		2015	2016	2017	2018	2019	2020	
Transportation Demand Management Solutions *Flexible Work Schedules / Tele-commute Workers* *High School Student Parking* *Media Promotion*								
Transit Improvements *Inter-Agency Coordination* *User Surveys* *Alternative Payment Methods*								
Geo-Coding Bus Routes *Incorporation if Quick Response (QR) Codes* *Social Media* *Pairing Bicycles with Transit*								
Physical Improvements *Turn the existing Bel Air Courthouse bus stop into a bus pad for user convenience* *Relocate the existing bus stop on Maryland 22 near Lee Way for a bus pull-off with a bus pad to be built at the new location.*								
Jitney Service Coordination								
Non-motorized Education and Outreach *Walking school bus or bicycle trains* *School mileage club* *On-campus walking activities or field trips* *Integration of bicycle and pedestrian safety education into school events and classrooms* *Educational materials, targeted at parents, highlighting how biking and walking can* *adult school crossing guard program* *educational and media materials targeted at drivers* *Additional school zone patrols* *Officer trainings*								
Provide bicycle parking at priority locations throughout the corridor								
Pedestrian and Bicycle Improvements	$6 - $12							
Developer Based Pedestrian / Bicycle Improvements *Build a bike path along Jackson Boulevard connecting Majors Choice with Maryland 22* *Build a shared-use path from Moores Mill Road to Churchville Road to Jackson Boulevard*	$1 - $2							
Maryland 24 / US 1 Bypass *Create a double left turn onto Maryland 24 from US 1 Bypass*	$3 - $5		Design	Construction				
Marketplace Drive / Home Depot Access / Tollgate Mall Access *Mini-Roundabout for Traffic Calming*	$0.1 - $0.2					Design	Construction	
Maryland 24 / Marketplace Drive *Widen SW corner near Home Depot to create a dedicated left turn lane, a left / through lane and a right turn lane.*	$0.5 - $1.0			Design	Construction			
John Carroll Entrance Intersection Improvements *Extend left turn bay from Maryland 22 Westbound and widen John Carroll access road to improve traffic circulation*	$0.8 - $2		Design	Construction				

Matrix of Recommendations/Responsibilities

Medium-Term Improvements

Project	Cost*	Timeframe											Process to Implement / Remarks
		2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
Upgrade the Pedestrian Network to be ADA Compliant													
Pedestrian and Bicycle Improvements to Complete the Network	$0.6 - $1.5												
Roadway Improvements on MD 24 *Widen Maryland 24 from two lanes to three lanes in both directions from Boulton Street to MacPhail Road* *Intersection improvements to Boulton Street and Business US 1* *Add a second receiving lane on Boulton Street in front of the Best Buy to implement a double left turn from MD 24* *Create a double left turn onto Maryland 24 Northbound from Business US 1 Eastbound*	$7 - $12	Design	Construction										
Access Management to minimize the amolunt of direct access points along Business US 1 / MD 22	$4 -$7	ROW				Construction							
Business US 1 / Tollgate Road Intersection Improvements *Extend right turn lane from Business US 1 WB onto Tollgate Road to the MD 24 intersection*	$0.8 - $1.5			Design	Construction								
MacPhail Roadway Connection *Create an additional connection between MD 24 and MD 924 using MacPhail Road.*	$10 - $15		Design	ROW	Construction								
Roundabouts *Marketplace Drive / Atwood Road for traffic calming*	$0.1 - $0.3						Design	Construction					
Reconfigure Traffic Pattern in Bel Air *Close two-way traffic on Baltimore Pike from S Bond Street to Hays Road. Create a rasied intersection table at the intersection of MD 22 / Hayes Street for traffic calming.*	$2 - $5	Design	Construction										
MD 22 / MD 543 and MD 22 / Econ Drive Intersection Improvements *The intersections of MD 22 / Econ Drive and MD 22 / MD 543 work in connection with each other due to their proximity as well as the location of several access points between them. At this time, there are two independent options developed for this location with the intention that one or the other be selected for this medium-term improvement:calming.*	Option A: $4 - $7 Option B: $3 - $6	Design		Construction									

Matrix of Recommendations/Responsibilities

Long-Term Improvements

Project	Cost*	Timeframe											Process to Implement / Remarks
		2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	
Pedestrian and Bicycle Improvements to Complete the Network													
MD 24 / US 1 Bypass Interchange *Complete the MD 24 / US 1 Bypass interchange.*	$15 - $25		Design		Construction								
Bel Air Boulevard *Reconstruction of Baltimore Pike to create a full multi-modal corridor.*	$40 - $50						Design	ROW		Construction			
Roundabouts *Boulton Street / Kelly Avenue for traffic calming*	$0.1 - $0.3	Design	Construction										

E. Potential State Funding Sources

Finding funding for various projects can be challenging. As mentioned above, it is imperative for the County to specify that the Business US 1 and MD 22 Corridor is a high priority for the County to the State to ensure that the various improvements projects requiring capital investment through the CIP remain competitive with the various needs throughout the state for funding.

In addition, there are numerous other funding sources through the State that the County can consider, such as the Sidewalk Retrofit Program already mentioned in this section. Finally, any type of match program the County can do with the State will make these projects more competitive for implementation. The various funding sources are listed below:

- ADA Retrofit (Fund 33): This is a fund to retrofit existing, non-compliant sidewalks to the latest ADA standards.

- Access to Transit (Fund 78): This is a fund to provide short connections and upgrade access to transit stops (bus, light rail, and heavy rail) with sidewalks along state roadways.

- Sidewalk Retrofit (Fund 79): This is a fund to construct missing sidewalk segments to fill gaps within the pedestrian network. The missing segment must be located either in a "designated neighborhood" per Section 6-301 of the Housing and Community Development Article, or within a Priority Funding Area.

- Bicycle Retrofit (Fund 88): This is a fund to provide bicycle improvements along state roadways.

- Community Safety and Enhancement Program (Fund 84): This is a fund for "streetscape" projects to promote safety and economic development.

- Transportation Enhancement Program (TEP): This program funds a variety of transportation related projects. In relation to bikeways and trails, TEP funding can be used to construct pedestrian and bicycle trails adjacent to abandoned railroad corridors; installation of pedestrian and bicycle amenities at intermodal nodes or trailheads; and construction or rehabilitation of bicycle and pedestrian facilities for off-road trails, trailheads, bike parking, bike lane striping that is part of an off-road system, bike and pedestrian bridges, and underpasses.

IV. Other Options Considered

During development of this study, there have been several alternatives that were considered and dropped from further consideration. These include the following:

A. Medium Term (2030)

1. Marketplace Drive Extension

Extend Marketplace Drive through the existing intersection with Tollgate Road to form a new connection with Business US 1 to extend the grid network within the region. After consideration, this improvement was dropped due to several factors, including: additional right-of-way required from both commercial and residential properties, large grade differences, and the addition of a new signal at the proposed Business US 1 intersection.

2. Boulton Street Extension

Extend Boulton Street through the existing intersection with Tollgate Road to form a new connection with Business US 1. This connection would further extend the grid network in the region and also allow easier access to "buried" commercial properties. After consideration, this improvement was dropped due to several factors, including: the need for additional right-of-way and the addition of a new signal at the proposed Business US 1 intersection. In addition, the benefits of this improvement are negligible without the corresponding improvement listed under item 1 above.

3. Roundabout at Hays Road / Churchville Road / George Street Intersection

Remove the existing channelized island and replace with a roundabout. This improvement would enable traffic calming at the intersection and allow through traffic from Churchville Road onto George Street. After consideration, this was dropped due to a lack of space at the intersection and the wish to keep George Street and Boulton Street as residential roadways with minimal traffic.

4. Restricting left turns from Econ Drive onto MD 22

This improvement was originally included as part of the proposed medium term improvements near the MD 543 / MD 22 intersection. The goal of the improvement was to force Econ Drive traffic heading westbound on MD 22 to use Amyclae Drive and then make a left turn at the signalized intersection. This option was dropped from consideration due to an ongoing study that will have an impact along MD 543 from Amyclae Drive to the intersection with MD 22. A traffic study is currently being completed and should be reviewed for final roadway recommendations.

B. Long Term (2040)

1. Grade Separation of MD 24 / Business US 1

This improvement would build a flyover ramp structure from MD 24 onto Business US 1. Evaluation of the project resulted in several challenges, including a lack of available right of way or overall context sensitivity. After consideration, this option was dropped in favor of a recommendation to create an aesthetically pleasing "Gateway to Bel Air" to promote a sense of community and pride.

2. Extend One-Way Pairs System for the Corridor to MD 24

This improvement would take the existing One-Way Pairs system along the corridor from Shamrock Road to Hays Street and extend it to MD 24. This would turn Churchville Road / George Street / Boulton Street into a one-way westbound roadway from Hays Street to MD 24 and Business US 1 / Fulton Avenue into a one-way eastbound roadway from MD 24 to Shamrock Road. Business US 1 from MD 24 to Bond Street could be given a "road diet" which would open space for a more welcoming town gateway. After consideration, this improvement was dropped due to a desire to keep George Street / Boulton Street as a residential roadway with minimal traffic and the desire to continue direct access to the businesses located along Business US 1.

3. Extend One-Way Pairs System for the Corridor to Tollgate Road

This improvement would take the existing One-Way Pairs system along the corridor from Shamrock Road to Hays Street and extend it to Tollgate Road. This would turn Churchville Road / George Street / Boulton Street into a one-way westbound roadway from Hays Street to Tollgate Road and Business US 1 / Fulton Avenue into a one-way eastbound roadway from Tollgate Road to Shamrock Road. Business US 1 from Tollgate Road to Bond Street could be given a "road diet" which would open space for a more welcoming town gateway. After consideration, this improvement was dropped due to a desire to keep George Street / Boulton Street as a residential roadway with minimal traffic and the desire to continue direct access to the businesses located along Business US 1.

4. Continuous Flow Intersection Improvements at Business US 1 / MD 24

This improvement would create a partial Continuous Flow Intersection (CFI) for the Business US 1 and MD 24 intersection. After further study, the cost-benefit ratio of the proposed improvements was not advantageous, which led to Harford County and the Town of Bel Air requesting it to be dropped from consideration. A table is located on page IV-3 that compares the measures of effectiveness between the CFI and a standard intersection in 2040.


VETERANS MEMORIAL HIGHWAY
MARYLAND 24
BOULTON STREET
BALTIMORE PIKE
MARKETPLACE DRIVE
VETERANS MEMORIAL HIGHWAY
MARYLAND 24
BOULTON STREET
BALTIMORE PIKE
LEGEND
EXISTING LANE CONFIGURATION
PROPOSED LANE CONFIGURATION
PROPOSED IMPROVEMENTS
PROPOSED REMOVAL
BUSINESS US 1 AND MD 22 MULTIMODAL CORRIDOR STUDY
US 1 BUSINESS / MARYLAND 24 CONTINUOUS FLOW INTERSECTION OTHER OPTIONS CONSIDERED
SCALE: 1"=200'
FIGURE IV-1

Table IV-1: Measure of Effectiveness for US 1 Business and Maryland 24 Intersection

	Build 2040 CFI		Build 2040 With Proposed 3-Lane Improvement along MD 24	
Network Delay (Veh/Sec)	**AM**	**PM**	**AM**	**PM**
	144.2	176.3	151.3	180.4
95th Percentile Queue				
Approach	**AM**	**PM**	**AM**	**PM**
US 1 BUS NB Left	105	155	110	180
US 1 BUS NB Through	215	300	315	420
US 1 BUS NB Right	-	-	-	-
US 1 BUS SB Left	245	180	150	240
US 1 BUS SB Through	350	330	300	415
US 1 BUS SB Right	-	-	410	180
MD 24 NB Left **	55	165	195	805
MD 24 NB Through	170	425	500	505
MD 24 NB Right	50	100	185	225
MD 24 SB Left	40	95	85	185
MD 24 SB Through	390	395	375	395
MD 24 SB Right	80	195	-	280

* 95th percentile queue extends through the storage lane provided

** The difference is explained by the left turn movement occurring as a two-stage turn. In reality the queue is formed at two different locations.

The intersection analysis revealed that the traditional MD 24 and US 1 Business intersection would continue to operate through all traffic conditions during both AM and PM peak at level of service 'D'. The level of service is obtained without any significant improvement to the intersection.

The CFI would allow the main intersection to operate at level of service 'A' during the AM peak and 'B' during the PM peak. This does not include the delays at the mid-block intersections along MD 24. The total network delay shows the CFI would operate slightly better.

The comparison of queue along the MD 24 and US 1 Business approaches also revealed that the overall reduction is less than significant under the CFI option.