Green Hills Area Plan

August 2011

TDOT · Nashville Area Chamber of Commerce · Nashville Area Metropolitan Planning Organization · TGHAP · Metropolitan Transit Authority · Lipscomb University

Sustainability. Livability. Mobility.

Acknowledgements

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Table of Contents

Executive Summary

Vision

Introduction....1-1
Green Hills Today....1-1
Steering Committee/Resource Team....1-4
Vision....1-5
Goals and Objectives....1-5

Previous Plans and Studies

Introduction....2-1
Previous Plans and Studies....2-1
Green Hills/Hillsboro Pike Transportation Study....2-1
The Green Hills Urban Village Plan....2-4
Green Hills Urban Design Overlay Design Guidelines....2-6
Green Hills-Midtown Community Plan 2005 Update....2-8
The Green Hills Gateway....2-13
Hillsboro Road Corridor Pedestrian Friendliness & Connectivity Suggestions....2-16

Land Use and Transportation

Introduction....3-1
Existing and Future Conditions....3-1
Land Use....3-1
Traffic and Roadway....3-4
Transit....3-13
Pedestrians and Bicycles....3-19

Recommendations

Introduction....4-1
Traffic and Roadway....4-1
Transit....4-14
Pedestrians and Bicycles....4-19
Access Management....4-24
Streetscape....4-28
Summary....4-35

Implementation

Introduction....5-1
Project Needs....5-1
Private Development....5-1
Potential Sources of Funding....5-1
Sources and Uses....5-8
Funding Cycles/Timing....5-10
Funding Allocation Recommendations....5-11
Summary....5-12

Green Hills Area Plan

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Executive Summary

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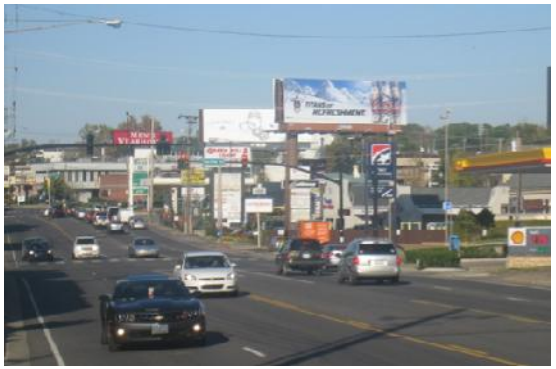
Green Hills Area Plan



Introduction

Over the past 25 years, the Green Hills Area has been the subject of numerous plans and studies. While all of these plans and studies have had their own objectives, the common theme throughout each has been the goal for Green Hills to become an improved pedestrian, bicycle, and transit-oriented center of shopping, residential, education, and office activities.

The vision for Green Hills outlined in this study is based on efforts over the past several years and the goals and objectives developed by a Resource Team comprised of business owners, property owners, residents, and representatives from the Tennessee Department of Transportation, the Metropolitan Nashville Department of Public Works, the Metropolitan Nashville Planning Department, the Nashville Metropolitan Transit Agency, and the Council members from the area.

Throughout 2010 and early 2011, a series of workshops were held with the Resource Team to identify future land use and transportation scenarios for Green Hills before reaching final consensus on the vision, goals, and objectives presented in this report.

Vision

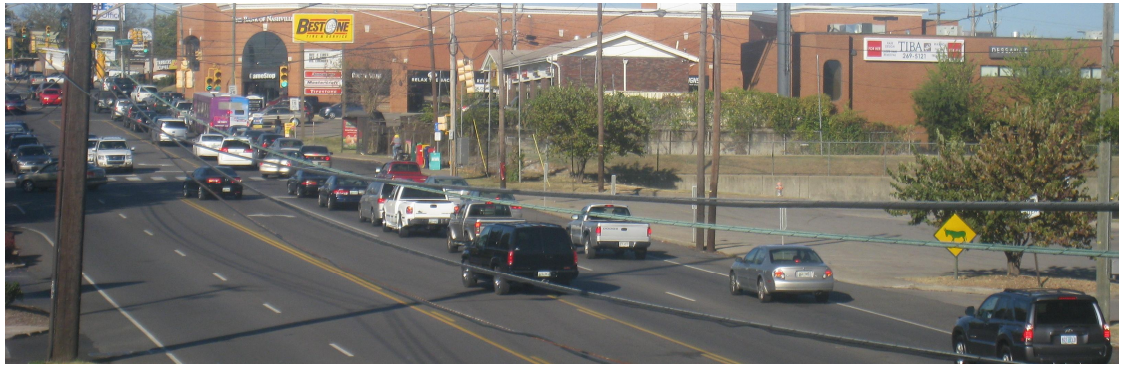
The vision outlined by the Resource Team reflects the desire for Green Hills to continue to be a destination, but also become a more dynamic, people-oriented community, filled with a mix of land uses and a variety of amenities and public facilities.

The Green Hills of tomorrow is made better through traffic improvements, more transportation options, a greater mix of uses, and improved pedestrian and transit connections to help reduce reliance on the automobile and alleviate some of the traffic congestion. Green Hills will not just be an island of commercial and office uses isolated from the surrounding residential areas, but rather connected to form a complete neighborhood.

Green Hills will be full of a variety of residential, office, retail, civic, educational and entertainment uses that are connected to each other and the surrounding neighborhood by pedestrian-friendly sidewalks and tree-lined streets. In addition, the connections between businesses will enable people to move easily within the Green Hills Area and lessen their reliance on the automobile.

Pedestrians and bicyclists will be able to safely traverse the main arteries throughout Green Hills to access businesses and a transit circulator will provide frequent access to locations throughout the area.

Green Hills will be redeveloped to create a mix of residential, commercial, and office land uses and the addition of landscaping, street furniture and art, building architecture, and other amenities will ensure a people-oriented focus.



Vision Statement

The Green Hills of 2050 will be a place where people want to live, work, and play. Balancing livability and growth, Green Hills will continue to be a destination for great shopping, a prestigious office location, a residential address featuring a variety of desirable housing choices, and a strong education center. Green Hills will be a community that is people-oriented and provides residents and visitors a range of transportation options to move both through and throughout the area. The Green Hills of tomorrow will contain a variety of open spaces, arts, and civic uses, interconnected with neighborhoods, housing, offices, stores, schools, and restaurants to encourage walking, bicycling, or the use of transit. Much as today, the area will continue to be a regional economic engine that is complementary to downtown Nashville and other activity centers of the region.

Goals and Objectives

As part of this study, the goals and objectives of previous plans and studies of the Green Hills Area were reviewed. Three primary goals were outlined in support of the overall vision established by the Resource Team.

Goal #1

Enhance the Livability of the Green Hills Community

Goal #2

Support and Expand the Economic and Environmental Sustainability of the Green Hills Area and its Role as the Economic Center of the Region

Goal #3

Improve the Integration of the Green Hills and Regional Transportation Systems and Expand Mobility Choices in the Green Hills Area

Green Hills Today

Located approximately four miles southwest of downtown Nashville, the Green Hills Area has developed and evolved from a suburban residential area in the 1940s to a premier regional shopping destination today. The land use changes (office, retail, apartments/condominiums) in the Green Hills Area, along with the growth of southern Davidson County and Williamson County to the south have created traffic issues for people attempting to drive both through and within the Green Hills Area.

Beyond the residential, commercial, and office uses, the area is home to a number of public destinations, including Hillsboro High School, the Green Hills library, and a U.S. Post Office. In 2000, nearly 19,000 residents lived in the residential areas surrounding Green Hills. However, despite the close proximity of the residential areas, the Green Hills Area is designed for automobiles. Green Hills is an automobile oriented shopping and employment destination, not a pedestrian-friendly place.

The residents, business and property owners, as well as representatives from the Metropolitan Government of Nashville and

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Davidson County, recognize that the transportation issues that can plague the area need to be addressed. The infrastructure of 50 years ago is serving a large population and employment base and the traffic volumes have increased significantly over the past several years. As trends continue, the increases in traffic will have significant impact on the future of the Green Hills Area. It is also clear that the transportation issues cannot be addressed without looking comprehensively at land use, pedestrian/bicycle, transit, and aesthetic opportunities.

Steering Committee/ Resource Team

In early 2010, TDOT, Public Works and the Citizens for a Better Green Hills (CBGH), a local group of business/property owners and residents, helped to initiate this land use and transportation study for the Green Hills Area with the goal of identifying both short- and long-term strategies to address the transportation issues that plague the area.

As part of this effort, a Steering Committee and Resource Team comprised of business owners, property owners, residents, and representatives from TDOT, Public Works, the Planning Department, and the Council members from the area was formed.

In addition to the input provided by the Steering Committee and the Resource Team, as part of the study a website survey was conducted. The survey was created and posted on the project website to solicit input and feedback from area residents, people who work or shop in the area, as well as visitors to the Green Hills Area. A total of 884 people took part in the survey and the input and feedback received was incorporated into the final recommendations.

Previous Plans and Studies

The Green Hills Area has been the subject of numerous plans and studies over the past 20 years. Several of these plans have been part of the normal planning process developed and implemented by the Planning Department as part of their planning efforts for the entire city, while other studies have been initiated by citizen groups or other agencies with an interest in the Green Hills Area. As part of this study, the goals, objectives, and recommendations of each of the previous plans were reviewed.

Existing and Future Conditions

The Hillsboro Road corridor is comprised of a mixture of land uses. The Green Hills area has been historically classified as a "Regional Activity Center" due to the presence of The Mall at Green Hills. The mall and its associated retail activities, as well as The Hill Center, attract local, regional, and visitor traffic to the Green Hills area. Although the Green Hills area is most often associated with the retail activities, it is also home to a significant amount of office space, with concentrations of professional offices near the mall and in the Burton Hills development toward the southern end of the study area.

Green Hills has historically been a suburban area of Nashville, and although higher intensity residential development (apartments and condominiums) has occurred along Hillsboro Road, the area surrounding the Green Hills commercial core is primarily comprised of lower-density, single-family homes. As a result, the Green Hills area is also home to a number of activities (i.e. grocery stores, drug stores, dry cleaners, etc.) that serve the local surrounding community.

In addition to retail, office, and residential uses, the Green Hills area is home to a number of churches, private schools, and other destinations (i.e. Hillsboro High School, Post Office, Green Hills Branch Library, YMCA, etc.) that contribute to the traffic problems that are experienced in the Green Hills area.

Based on existing land uses and redevelopment potential, the future growth potential of residential, office, and commercial land uses was calculated. These land use assumptions included the additional density/intensity under the UDO and therefore include growth beyond what the existing base zoning allows. For the purposes of this study, the Resource Team chose to use a Year 2035 time horizon and assumed that 75% of the forecasted land uses would build out over this 25 year time period. This 75% build out scenario assumed a total of 4.8 million square feet of residential, office, and commercial land uses in the Green Hills Area and was the basis for the future traffic conditions.

As part of this study, the transportation system was evaluated with respect to existing and future traffic conditions along the study area roadway system. The analysis of the traffic involved data gathering, evaluation of the existing traffic conditions along Hillsboro Road, and modeling future traffic conditions based on the forecasted land use scenario.

The evaluation of existing and future conditions showed traffic operation issues throughout the study corridor and at several of the study area intersections. Traffic conditions were improved in 2009 when the Tennessee Department of Transportation implemented a continuous center turn lane from Interstate 440 to Crestmoor Road. Prior to this improvement, significant back-ups would occur as the result of vehicles making left-hand turns. In addition to the traffic conditions in the area, the existing transit, pedestrian, and bicycle systems were also evaluated.

The following is a brief summary of some of the traffic issues experienced at key intersections located in the study area:

Woodmont Boulevard and Hillsboro Road
This intersection does not operate well, particularly in the westbound and southbound directions. The close spacing of Glen Echo Road and Crestmoor Road results in cars backing up to the north during the midday and afternoon peaks. This is attributed to heavy traffic volumes in the southbound direction as well as the westbound left turns.

Richard Jones Road and Hillsboro Road
This intersection operates at an acceptable level in the morning peak, but at a less than acceptable level in the midday and afternoon peak. The close spacing of Glen Echo Road and Crestmoor Road also causes a queue to form to the south during the midday and afternoon peak. The backup extends to Richard Jones Road and results in delay in the northbound direction.

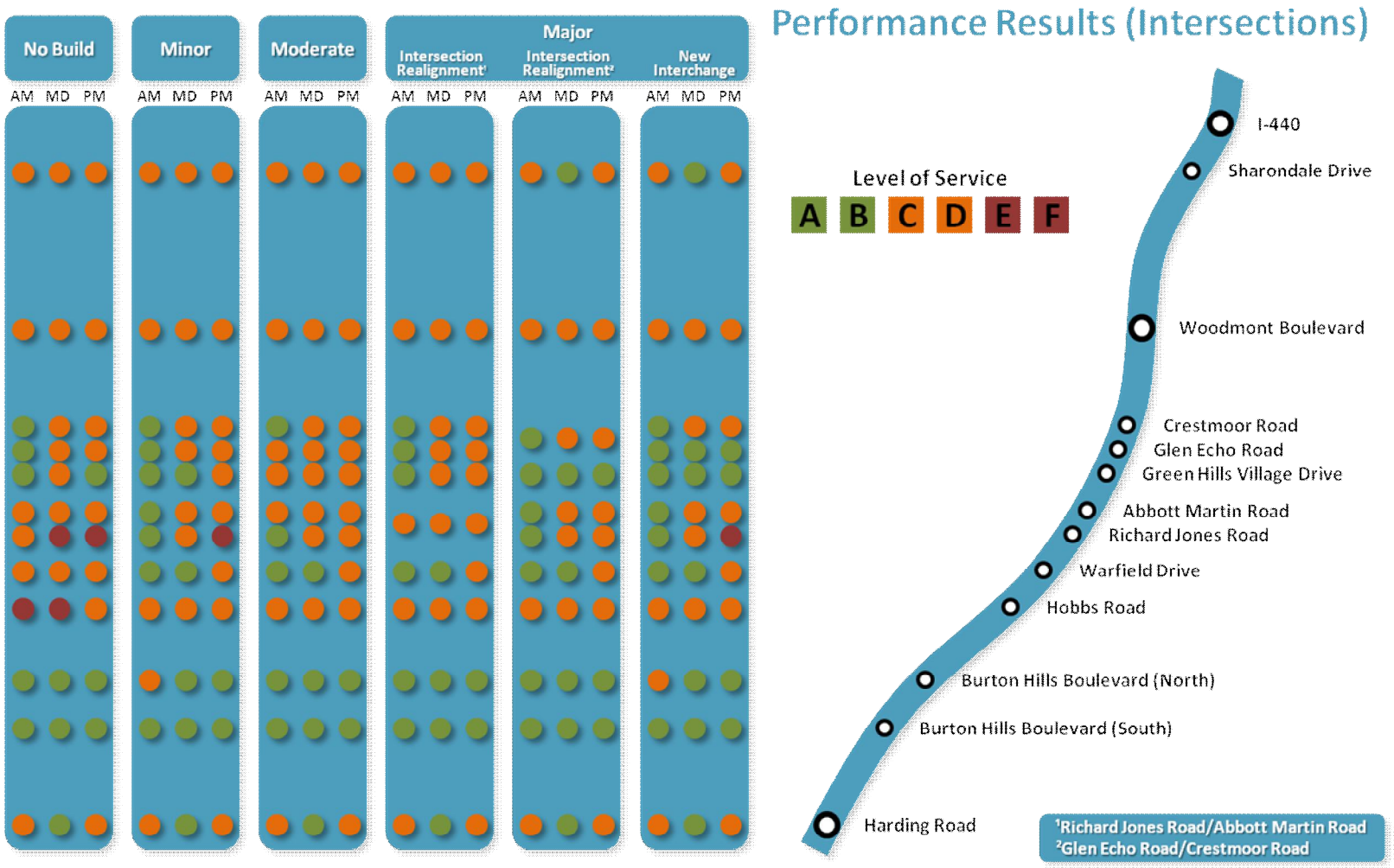


Figure ES.1: Overview of the Minor, Moderate, and Major Improvements and resulting Level of Service.

Warfield Drive and Hillsboro Road
The most significant delays at this intersection occur in the eastbound and westbound directions during the midday and afternoon peak.

Hobbs Road and Hillsboro Road
The westbound direction operates at LOS E in the morning peak, midday and afternoon peak.

Harding Place and Hillsboro Road
This intersection experiences high delays in the eastbound and westbound directions.

Recommendations

The study outlines recommendations and possible improvements in five categories:

- Traffic and Roadway
- Transit
- Pedestrian and Bicycle
- Access Management
- Streetscape

In order for Green Hills to remain a destination and a regional economic engine for the City of Nashville and the State of Tennessee, the traffic conditions in the Green Hills Area, especially during peak times, need to be addressed. With this in mind, the recommendations outlined in the Traffic and Roadway, Transit, and Access Management categories, all of which will have the most effect on current and future traffic conditions, should be given the highest priority for implementation.

Traffic and Roadway Recommendations

In order to improve operations, access, and safety, a wide range of options were evaluated and three improvement scenarios were developed.

- Minor Improvements
- Moderate Improvements
- Major Improvements

The minor improvements which included non-construction techniques such as signal optimization or signal re-phasing, as well as turn lane re-striping showed that these adjustments provided positive benefits.

It is important to note that signal timings (one of the minor improvement recommendations) were updated in November 2010 and again in May 2011 along the corridor as part of Public Works' ongoing signal timing maintenance program.

The moderate improvements which included geometric changes such as extending existing turn lanes to increase storage or even adding new turn lanes showed a benefit by increasing the amount north/south traffic through the area and also reduced some side-street delay.

The major improvements included:

- Re-alignment of Abbott Martin Road/Richard Jones Road
- Re-alignment of Crestmoor Road/ Glen Echo Road
- Addition of a new interchange along I-440 at Granny White Pike

This scenario showed that the realigned intersections improve system performance but do not solve traffic problems in all areas. The realigned intersections could also create a more pedestrian/bicycle friendly environment.

The Granny White Pike Interchange (including the Warfield Drive connection) provided a reduction in traffic along Hillsboro Road between Woodmont Boulevard and I-440, as well as reduced some east-west traffic and system traffic (i.e. traffic that no longer needs to use Hillsboro Road).

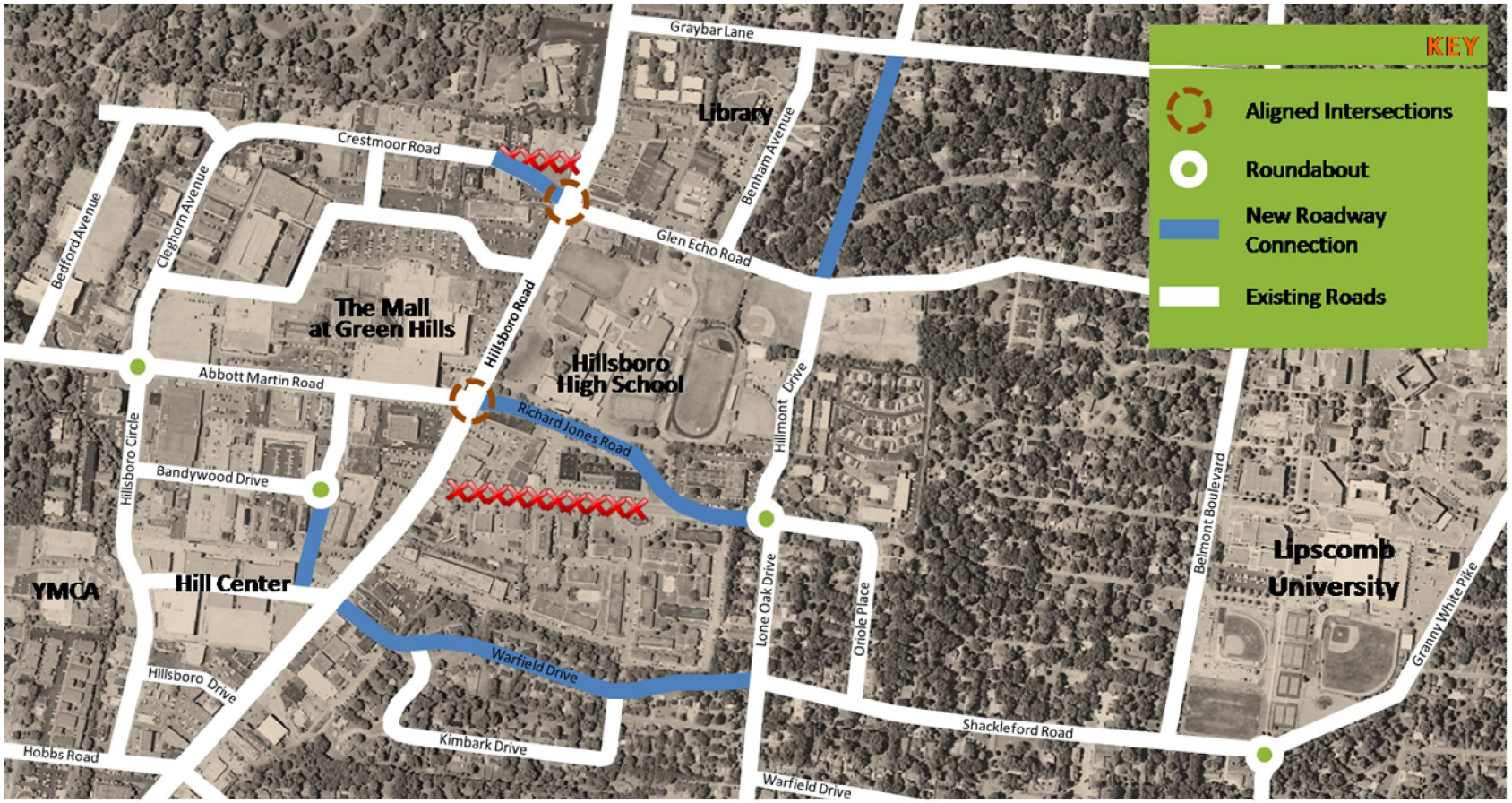


Figure ES.2: Possible future roadway network.

Because this study was focused on the Hillsboro Road corridor, overall traffic impacts (outside of the immediate study area) were not analyzed.

Transit Recommendations

Fixed-route bus service currently serves the Green Hills Area and the following enhancements and additions to broaden the availability and visibility of transit service in the area were considered, including:

Fixed-Route Local Bus Service
Development of a new transit mini-hub and extension of the #7-Hillsboro route to Burton Hills, appears to be the most short-term, cost-effective transit improvement for the Green Hills Area.

Span of Service/Service Frequency Improvements
Per the recommendations in the MTA Transit Master Plan, the #2 and #7 routes should have increased span of service and service frequency per the service goals identified in the Plan for the identified service class ("Frequent" for the #2 route, and "Most Frequent" for the #7 route).

Transit Stop Improvements
Coordinated with improvements to the sidewalk system in the Green Hills Area, accessibility improvements to bus stops in the area should be provided, to make them all ADA-accessible.

Transit Priority Improvements
Associated with intersection improvements along Hillsboro Road, transit signal priority (TSP) should be implemented at those intersections that today and in the future are projected to operate in fair to poor conditions. The approach and benefits of TSP are further described in Chapter 4.

Potential Interface with Broadway/West End Corridor
It would be desirable to create a fixed-route transit link from the Green Hills Mall and surrounding area retail/office area with the planned Broadway/West End premium transit corridor to the west.

Figure ES.3: Illustration of potential mini-hub location at the Old Library Site along Green Hills Village Drive.

Access Management Recommendations

The number of access points (driveways) and lack of connections between parking areas greatly affects the flow of traffic along Hillsboro Road and other commercial roads in the Green Hills Area. In order to address these issues, a phased approach to access management was developed (See Figure ES.4).

The first phase of an access management approach along Hillsboro Road would involve creating connections between parking areas and adjacent properties to allow vehicles to move more freely without having to exit onto Hillsboro Road.

The creation of internal connections would allow the implementation of a second phase of access management which involves reducing the number of driveways and access points along Hillsboro Road. By reducing or consolidating the number of access points, the number of turning movements and conflict points is greatly reduced, thus improving the flow of traffic along Hillsboro Road.

Finally, the third phase of access management could involve the creation of a median in the middle of Hillsboro Road. The median would greatly reduce the number of turning movements and conflict points and would also improve the aesthetics of Hillsboro Road. Turn lanes at key intersections and key access points along Hillsboro Road would be a part of this approach, but would need to be limited in order to achieve the desired benefits.

This study outlines some possible approaches to access management along Hillsboro Road, but it is recommended that a more detailed access management plan be developed. Implementing any access management approach will need to be undertaken in cooperation with existing and planned businesses. If done properly, a phased access management approach could significantly improve both the traffic conditions along Hillsboro Road and aesthetics of the Green Hills Area.

Figure ES.4: View of the phased approach to access management.

Beyond the traffic concerns, the vision outlined by the Resource Team of Green Hills as a "place where people want to live, work, and play" and "is people-oriented and provides residents and visitors a range of transportation options to move both through and throughout the area" can also be addressed through the recommendations contained in the Pedestrian and Bicycle and Streetscape categories.

Pedestrian/Bicycle Recommendations

As the Green Hills Area continues to grow, thought must be given to how pedestrians and bicycles will be integrated into the network of streets to create an environment that would encourage walking and biking. Due to safety concerns, this plan does not recommend that bike lanes be placed along Hillsboro Road. A further recommendation is that the *Strategic Plan for Sidewalks and Bikeways* be updated to remove bike lanes from Hillsboro Road. Emphasis should be placed on linking the residential areas with businesses, creating connections to transit stops, and the inclusion of pedestrian and bicycle amenities throughout the commercial area.

Sidewalks

The pedestrian network should be completed and improved throughout the Green Hills Area. Starting in and around The Mall at Green Hills, the missing segments of sidewalks and segments of sidewalks in disrepair should be improved or enhanced.

Crosswalks

In order to ensure safe crossing of Hillsboro Road and other roads throughout the area, clearly marked and signed pedestrian signals at intersections should be provided. Additional enhancements such as countdown signals could also be provided at specific intersections to encourage more pedestrian activity and to make it safer and easier for pedestrians and bicyclists to cross busy roadways.

Figure ES.5: Illustration of median and streetscape enhancements along Hillsboro Road.

Promenade
Development of a pedestrian promenade to enhance vacant, or underutilized areas, and to create connections between major destinations in the Green Hills Area (See Figure ES.6). The pedestrian promenade could involve a simple approach, such as painting symbols on the pavement and providing signage to direct people to their destination, or could be extensive and aid in the transformation of a particular property.

Greenway
The entire pedestrian network throughout the Green Hills Area would also connect to the proposed Sugartree Creek Greenway which would connect Green Hills Park (to the southeast of the study area).

Streetscape Recommendations

The Green Hills Area is viewed as an exclusive shopping, dining, and office destination in the Nashville area. However, in many ways the look of the area does not reflect this image. Overhead utilities and signage and billboards dominate the views of the Green Hills Area and contributes to a lack of cohesive design and consistent look and feel of the area.

The lack of landscaping and pedestrian amenities in the area reduces the likelihood that people will park their vehicles and visit other stores of businesses in the area. In addition the lack of a consistent look and proper wayfinding to direct people to their destinations contributes to additional congestion on Hillsboro Road.

Establishment of a streetscape hierarchy for the Green Hills Area combined with a wayfinding program will greatly enhance the aesthetic appeal of the area and encourage additional pedestrian activity.

Figure ES.6: Illustration of pedestrian promenade connecting The Hill Center and The Mall at Green Hills.

Implementation

It is recommended that the minor improvements (signal timing, signal phasing, and turn lane re-striping) all be implemented. The low-cost and general ease of implementation of these minor improvements make them ideal candidates for quick action.

In order to accomplish the broader vision outlined for the Green Hills Area in this study, a series of public and private infrastructure projects must be implemented. However, limited resources delay construction and implementation of these important improvements. As part of the study, public finance programs that can currently be utilized to aid in the implementation of the infrastructure needs were evaluated.

The total budget for all of the infrastructure needs identified (including traffic/roadway, pedestrian/bicycle, transit, access management and streetscape) ranges from $44.5 million on the low side to $73.45 million on the high side. Individual projects are as small as $50,000 to as large as $11 million.

Private Development

An important approach currently used across the country is the capture of "added value" from private sector development. Where a city or a private landowner has vacant or underutilized land, and the market exists for new development, the focus then becomes which of the public infrastructure activities would serve as an incentive to accelerate and/or intensify the private development. If that is accomplished, the new development becomes the beneficiary of the improvements and the city benefits from the new taxes. In many instances, the private sector might contribute to, or be responsible for the full cost of the infrastructure improvement depending on the size/scope of the proposed development. The value added proposition is an important element of the financing programs that can be utilized.

Potential Sources

There exists a series of programs that can support the infrastructure needs of Green Hills. Some are cash contributions with no requirement for repayment by the private sector and others are financing programs where the public assistance amounts must be repaid from property taxes, assessments, or other means.

Capital Improvements Budget (CIB)
Each of the projects identified is eligible to be part of Metro's CIB. Several of the projects identified as needed in Green Hills are identified in the CIB such as Hillsboro Road and Abbott Martin Road. Just as importantly, there are broad categories such as road reconstruction and improvements and sidewalks, that budget tens of millions of dollars without allocating funds to specific projects. Other categories do not have such robust budgets but allocate funds for bicycle lanes, traffic signal improvements, ADA compliance and median improvements without specifying where the work will be done throughout Metro.

Action Steps

- Identify from the Metro CIB the elements of the projects included in the CIB
- Determine scheduling of when the elements would be constructed
- Request acceleration of elements that are not scheduled to meet the project timeline
- Request addition of eligible elements that are not included in the CIB

- Coordinate with Metro Public Works on the design and construction of the elements

State Transportation funding
Hillsboro Road is a State highway and the interchange at Interstate 440 and Granny White Pike is also eligible for Federal funding that comes through the State to the Nashville Area Metropolitan Planning Organization (Nashville Area MPO) based on its Transportation Improvement Plan (TIP). As Hillsboro Road is currently part of identified major arterial roads in Nashville, modifying the TIP to include the improvements required for Hillsboro Road would be a reasonably easy process. The interchange at Interstate 440 is the most expensive project on the list, and would require extensive work to get included in the TIP.

Action Steps

- Secure a copy of the current TIP
- Submit projects to the Nashville Area MPO when TIP update is underway
- Determine scheduling of when each project would be constructed
- Request acceleration of improvements
- Coordinate with Metro Public Works on the design and construction of each project
- Initiate study and coordinate with FHWA to determine if the proposed interchange is "operational feasible" (this step should also involve outreach to the public)

Economic Impact Tax Increment Financing (TIF)
Under Tennessee law there are two approaches to using Tax Increment Financing (TIF) Districts, both of which are commonly employed in Nashville. One approach is through the Metropolitan Development and Housing Agency (MDHA), which has established a series of TIF Districts in Metro. The demographic of Green Hills do not exhibit unusually high poverty (5.6%) or unemployment (6.9%) based on the 2000 Census. It would be problematic to create a new TIF District or expand an existing District to be able to take advantage of this agency's approach.

A second, relatively simpler approach is to create a TIF District through the Industrial Development Board, which establishes Economic Impact TIF Districts.

Action Steps

- Develop a proposal to the Industrial Development Board for creation of the TIF District
- Negotiate the level of TIF revenues that would be available to support debt service
- Project the TIF revenues from proposed projects and the phasing of the revenue flow
- Decide on the issuance of IDB bonds or private financing repaid with TIF revenues
- Coordinate with the IDB, bond counsel, underwrites or private funders on the securing of the funds

Assessment District Funding
Tennessee allows the creation of assessment districts, where the property owners agree to allow a lien against their property and from that lien an annual assessment, which again becomes a revenue source to support debt. A formal evaluation is done by qualified experts to determine the appropriate level of assessment based on the use type, be it office, hotel, retail, restaurant, theaters, or residential.

Infrastructure Improvements	Metro CIP	State TIP	Surface Transportation	CMAQ	FTA	Assessment District	TIF District	Total
Traffic and Roadway								
Signal Timing/Phase Changes	$100,000					$100,000		
Additional Turn Lanes		$2,000,000	$2,000,000					
Realign Richard Jones Road/Abbott Martin Road			$9,000,000				$9,000,000	
Realign Crestmoor Road/Glen Echo Road	$9,000,000	$9,000,000						
Granny White Pike Interchange		$15,000,000					$15,000,000	
Pedestrian/Bicycle								
Sidewalks		$750,000		$750,000				
Bike Lanes		$500,000		$500,000				
Crosswalks		$300,000		$300,000				
Greenways		$2,000,000		$2,000,000				
Pedestrian Promenade						$1,000,000	$1,000,000	
Transit								
Bus Stop Improvements				$300,000	$300,000			
Enhanced Local Bus Service				$1,000,000	$1,000,000			
Mini Hub (Old Library Site)					$500,000	$500,000		
Extension to Burton Hills				$500,000	$500,000			
Local Circulator			$1,000,000			$1,000,000		
Transit Signal Priority	$200,000		$200,000					
Access Management								
Remove Parking Barriers	$300,000					$300,000		
Consolidate Access Points	$750,000		$750,000					
Hillsboro Road Median	$4,000,000		$4,000,000					
Streetscape								
Roundabouts						$4,000,000	$4,000,000	
New Roadway Segments	$2,500,000					$2,500,000		
Street Trees						$3,000,000	$3,000,000	
Street Lighting	$4,500,000						$4,500,000	
Street Furniture						$250,000	$250,000	
Gateways	$2,000,000					$2,000,000		
Bury Overhead Utilities	$9,000,000						$9,000,000	
Totals - Primary Sources	$27,550,000	$17,000,000	$9,000,000	$3,550,000	$1,800,000	$14,550,000	$0	$73,450,000
Totals - Secondary Sources	$4,800,000	$12,550,000	$7,950,000	$1,800,000	$500,000	$100,000	$45,750,000	$73,450,000

Figure ES.7: Potential sources and uses for the identified public infrastructure needs in the Green Hills Area.

Action Steps

- Work with qualified local counsel to develop a proposal to Metro to create an Assessment District
- When approved, develop the boundaries for the Assessment District
- Determine the elements of the project to be funded by the Assessment District
- Retain qualified consultant services for development of the rate and method for the establishment of the liens and assessments against each new parcel to be created based on the benefit to each parcel
- Establish the annual assessment revenue available to support debt
- Decide on the issuance of Assessment bonds or private financing repaid with the special assessments
- Coordinate with the Metro, bond counsel, underwrites or private funders on the securing of the funds

HUD Section 108 Loan and Brownfields Economic Development Initiative (BEDI) Grant

Every city in America with a population over 50,000 receives an annual grant from the Department of Housing and Urban Development (HUD), called the Community Development Block Grant (CDBG). Under the HUD Section 108 Loan program, Metro may borrow up to five times its annual CDBG funds. The Section 108 loan may be used for a variety of economic development purposes such as acquisition, relocation, demolition, environmental remediation, land write-downs and new construction or rehabilitation. The Section 108 loan is paid back over a period of 20 years. Metro has the right to utilize the Section 108 loan program, so the process for approval is administrative, not competitive with other jurisdictions.

To increase the use of Section 108 funds for economic development purposes, HUD established the Brownfields Economic Development Initiative (BEDI) grant program, which must be applied for in conjunction with a Section 108 loan request. The site to be developed must have some level of contamination to qualify under the BEDI program. The BEDI grants are competitive and are scored based on a series of rating factors, including the demographics of the site. The competition is based on the requirements outlined in a Notice of Funding Availability (NOFA).

Action Steps

- Develop a proposal to the for the use of the HUD funds for eligible activities under the Section 108 loan and, if a project might qualify, for a Brownfields Economic Development Initiative (BEDI) grant
- Coordinate with the Metropolitan Development and Housing Agency (MDHA) on the citizen participation process regarding the HUD funds
- Review the Notice of Funding Availability (NOFA) for the BEDI grant funds expected later this year
- Draft the BEDI grant and Section 108 loan applications for review by MDHA
- Coordinate with the local HUD Field Office on the draft applications
- Attend the various advisory and Metro Council public hearings on the HUD funding
- Finalize and submit on behalf of Metro the HUD applications

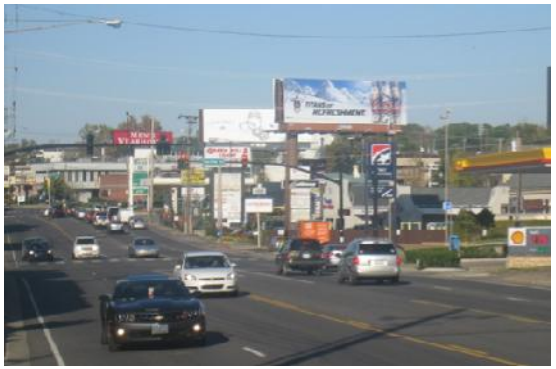
- Upon approval, provide MDHA with the draw schedule for the HUD funds for project elements
- Provide contractor billings to MDHA when appropriate for release of the HUD funds

Moving Forward

The vision for Green Hills outlined in this study is based on efforts over the past several years and the goals and objectives developed by a Resource Team. In order to ensure that the improvements outlined in this study are implemented, it will be necessary to establish a formal stakeholder committee specific to the Green Hills Area to review the recommendations contained in this study and develop an action plan.

1

Vision



Introduction

The vision for Green Hills outlined in this study is based on efforts over the past several years and the goals and objectives developed by a Resource Team comprised of business owners, property owners, residents, and representatives from the Tennessee Department of Transportation, the Metropolitan Nashville Department of Public Works, the Metropolitan Nashville Planning Department, the Nashville Metropolitan Transit Agency, and the Council members from the area.

Throughout 2010 and early 2011, a series of workshops were held with the Resource Team to identify future land use and transportation scenarios for Green Hills before reaching final consensus on the vision, goals, and objectives presented in this report. The vision outlined by the Resource Team reflects the desire for Green Hills to continue to be a destination, but also become a more dynamic, people-oriented community, filled with a mix of land uses and a variety of amenities and public facilities.

Green Hills will be redeveloped to create a mix of residential, commercial, and office land uses and the addition of landscaping, street furniture and art, building architecture, and other amenities will ensure a people-oriented focus.

Green Hills Today

Located approximately four miles southwest of downtown Nashville, the Green Hills Area has developed and evolved from a suburban residential area in the 1940s to a premier regional shopping destination and is home to many educational, residential, and office locations. The land use changes (office, retail, apartments/condominiums) in the Green Hills Area, along with the growth of southern Davidson County and Williamson County to the south have created traffic issues for people attempting to drive both through and within the Green Hills Area.

Beyond the residential, commercial, and office uses, the area is home to a number of public destinations, including Hillsboro High School, the Green Hills library, and a U.S. Post Office. In 2000, nearly 19,000 residents lived in the residential areas surrounding Green Hills. However, despite the close proximity of the residential areas, the Green Hills Area is designed for automobiles. Green Hills is an automobile oriented shopping and employment

destination, not a pedestrian-friendly place.

The infrastructure of 50 years ago is serving a large population and employment base and the traffic volumes have increased significantly over the past several years. As trends continue, the increases in traffic will have significant impact on the future of the Green Hills Area. Traffic count information at key locations throughout the corridor were evaluated and future growth in traffic was forecasted to 2035. This forecast shows that traffic in the area (based on historical trends) is expected to increase in the Green Hills Area anywhere from 17% to 34% during this time period.

Some of the key traffic and transportation issues facing the Green Hills Area, include:

- Hillsboro Road is the main north-south artery providing access to the Green Hills Area. A number of east-west cross streets do exist, but most vehicles must use Hillsboro Road to get around Green Hills.
- Hillsboro Road is congested and at times is highly congested with commuter traffic as well as residents, shoppers, and office workers that are moving through and within the Green Hills Area.
- Traffic along Hillsboro Road is slowed by the numerous cross-streets (traffic lights). Traffic is exacerbated by several offset cross-streets and the multiple driveways and entrances/exits along the corridor.
- Few safe pedestrian connections exist along Hillsboro Road and throughout the Green Hills Area. As a result, most all trips, even those within what should be an easy walking distance, are made via car.
- Most of the land within the Green Hills commercial area is covered by impermeable (buildings, streets, surface/structured parking, etc.) surfaces. The area is dominated by automobiles and automobile related uses (streets, surface/structured parking, etc.).
- The automobile-oriented development pattern of many of the retail and office developments is neither pedestrian-friendly nor welcoming to visitors. Buildings are typically set back from the roadways in order to allow parking in front of the commercial businesses.

The residents, business and property owners, as well as representatives from the Metropolitan Government of Nashville and Davidson County, recognize that the transportation issues that can plague the area need to be addressed. It is also clear to this diverse group that the transportation issues cannot be addressed without looking comprehensively at land use, pedestrian/ bicycle, transit, and aesthetic opportunities.

Website Survey

As part of the study a website survey was created and posted on the project website to solicit input and feedback from area residents, people who work or shop in the area, as well as visitors to the Green Hills Area. A total of 884 people took part in the survey and the following pages briefly summarize the input and feedback received.

According to the respondents to the survey, the "one thing" that attracts people to Green Hills is the shopping, and the fact that they work/live in the area.

When asked "What is the one thing that keeps you from visiting Green Hills more often?", survey participants most often cited the traffic in the area, the need to cut through the surrounding neighborhoods (due to the traffic) to get home, and that the area is not pedestrian-friendly.

When asked "How big a role does traffic play in your decision to travel to or through Green Hills?", nearly 68% of the survey respondents indicated that traffic was a major influence on their decision and an additional 24% indicated that traffic had a minor influence. Only 8% indicated that

What is the one thing that keeps you from visiting Green Hills more often?

"TRAFFIC! TRAFFIC! TRAFFIC!"

"the horrendous traffic"

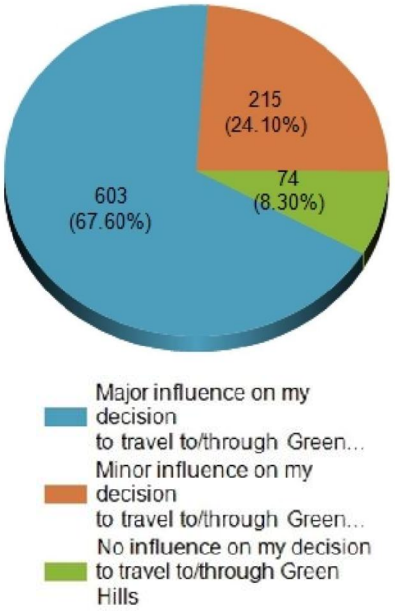
"I HATE the traffic. Thankfully, I'm able to bypass much of it [by] using back roads into the center of Green Hills."

"I try and avoid Hillsboro at all costs by taking back roads. If the traffic wasn't so bad, I would not be cutting through neighborhoods to get home."

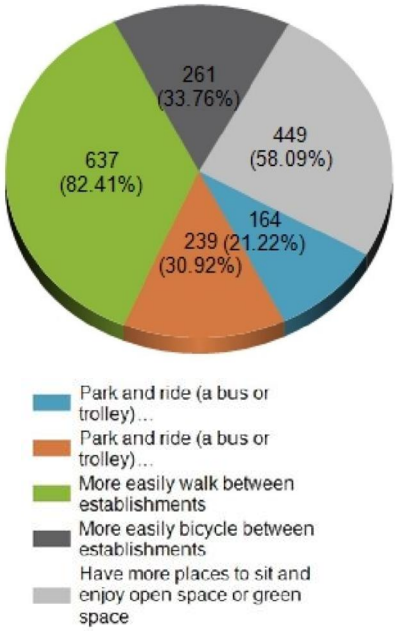
"I have to drive EVERYWHERE once I get there. Walking isn't possible."

"Not easy to walk - not enough sidewalks, crosswalks. Dangerous."

How big a role does traffic play in your decision to travel to or through Green Hills?



I would spend more time in Green Hills if I could...



traffic had no influence on their decision to travel to/through Green Hills.

Walking was the overwhelming choice of most respondents (82%) when asked, "I would spend more time in Green Hills if I could...". Respondents were also interested in having more places to sit and enjoy open space or green space in the Green Hills Area.

Steering Committee/ Resource Team

In early 2010, TDOT, the Metropolitan Department of Public Works and the Citizens for a Better Green Hills (CBGH), a local group of business/property owners and residents, helped to initiate this land use and transportation study for the Green Hills Area with the goal of identifying both short- and long-term strategies to address the transportation issues that plague the area.

As part of this effort, a Steering Committee and Resource Team comprised of business owners, property owners, residents, and representatives from TDOT, Public Works, the Planning Department, and the Council members from the area (See Acknowledgements page for a full list of the Steering Committee and Resource Team members) was formed.

One of the primary responsibilities of the Resource Team was reaching consensus on the vision and overall goals and objectives for the Green Hills Area and toward the end of the meeting, the members of the Resource Team were given an opportunity to prioritize the recommendations.

Vision Statement

The Green Hills of 2050 will be a place where people want to live, work, and play. Balancing livability and growth, Green Hills will continue to be a destination for great shopping, a prestigious office location, a residential address featuring a variety of desirable housing choices, and a strong education center. Green Hills will be a community that is people-oriented and provides residents and visitors a range of transportation options to move both through and throughout the area. The Green Hills of tomorrow will contain a variety of open spaces, arts, and civic uses, interconnected with neighborhoods, housing, offices, stores, schools, and restaurants to encourage walking, bicycling, or the use of transit. Much as today, the area will continue to be a regional economic engine that is complementary to downtown Nashville and other activity centers of the region.

Vision

The vision for Green Hills outlined in this study is based on efforts over the past several years and the goals and objectives developed by a Resource Team. While all of these plans and studies have had their own objectives and goals, the common theme throughout each has been the goal for Green Hills to become an improved pedestrian, bicycle, and transit-oriented center of shopping, residential, education, and office activities.

The vision developed by the Resource Team attempts to balance the desire to encourage continued retail, office, and commercial growth in the Green Hills Area while protecting the surrounding residential neighborhoods from increased development pressure and increased traffic. The vision also reflects the goals and objectives of earlier plans that the Green Hills Area develop into a mixed-use, urban village that is more pedestrian-oriented, and less automobile-dependent.

Goals and Objectives

As part of this study, the goals and objectives of previous plans and studies of the Green Hills Area were reviewed. Three primary goals were outlined in support of the overall vision established by the Resource Team. After each goal are listed several objectives from earlier studies that support the specific goal and overall vision for the Green Hills Area.

Goal #1: Enhance the Livability of the Green Hills Community

- Create an urban village concept with a pedestrian orientation.
- To provide wayfinder signs, landscaping, art and other features along the sidewalk corridors.
- Discourage through traffic on local residential areas.
- Provide more public/open space in the Green Hills Regional Activity Center.
- Encourage future development of civic areas in Green Hills.
- Encourage use of public art.
- Preserve and protect established residential areas (for areas facing pressure to redevelop, gentrify, or otherwise absorb new housing that may be out of character, seek protection to maintain the existing physical and social conditions of several older residential communities).

- Balance need to move large volume of traffic efficiently with the community desire to enhance pedestrian experience and visual character along "Main Street" of the Green Hills Regional Activity Center.

Goal #2: Support and Expand the Economic and Environmental Sustainability of the Green Hills Area and its Role as the Economic Center of the Region

- Develop an environmentally responsible transportation plan that encourages the use of traffic demand management (TDM) techniques to reduce trips, encourages transportation alternatives to the single occupancy vehicle,

and provides optimum air quality within the corridor.

- To encourage the removal of barriers between commercial property, in order to strengthen pedestrian connections.
- Provide more public/open space in the Green Hills Regional Activity Center.
- Improve the amount and quality of landscaping.
- Serve as a funding resource for both public and private investment to implement the Green Hills Urban Village Plan and other services (i.e., Creation of a Business Improvement District).
- Define the concept of public/ private partnerships for the Green Hills Area.

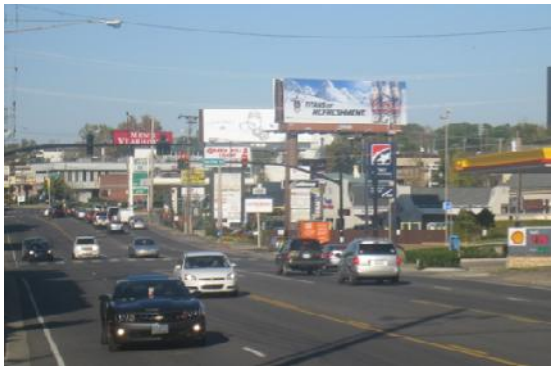
Goal #3: Improve the Integration of the Green Hills and Regional Transportation Systems and Expand Mobility Choices in the Green Hills Area

- Develop transportation solutions that are feasible, fiscally responsible and require a minimum of disruption to the existing businesses and residents in the area during construction.
- Establish a transportation system that supports the anticipated future growth in the area.
- To provide a complete network of sidewalks and bikeways throughout the Green Hills Area.
- Maximize shared utilization of available parking spaces.
- Establish new shared parking facilities.
- Increase shuttle use opportunities for lunch goers.
- Develop conditions that make pedestrians and bicyclists feel comfortable and safe.
- Provide shared parking located conveniently to multiple destinations.
- Provide multiple transportation service opportunities (pedestrian, car, transit, and bicycle).
- Enhance pedestrian circulation (provide additional and improved crosswalks, sidewalks, signage, and lighting in high-volume pedestrian-oriented areas).
- Improve inter-connectivity and eliminate barriers to connectivity between areas in Green Hills, not just with roads and sidewalks but also trails, or other creative ways to create connections and encourage mobility between properties.
- Look at an opportunity for a pedestrian/bicycle overpass across Hillsboro Road.
- Need for bicycle and pedestrian safety awareness, bike lanes on roadway.

Overall, this plan is intended to build on the previous plans and studies undertaken in the Green Hills Area, the Resource Team stressed the importance of developing a plan that not only identified phased improvements (short- and long-term components), but also identified possible regulatory changes that would need to be implemented, as well as potential sources (both public and private) of funding to implement the proposed improvements.

2

Previous Plans and Studies



Introduction

The Green Hills Area has been the subject of numerous plans and studies over the past 20 years (See Figure 2.1). Several of these plans have been part of the normal planning process developed and implemented by the Planning Department as part of their planning efforts for the entire city, while other studies have been initiated by citizen groups or other agencies with an interest in the Green Hills Area.

The Green Hills Area is defined as a Regional Activity Center (RAC) in the General Plan for Nashville and Davidson County. According to the plan, an RAC is defined by a concentrated mix of commercial activity that serves a regional market and has a substantial residential component. The area is one of five RACs in Nashville, the other four being Bellevue, Hickory Hollow, 100 Oaks, and Rivergate. In general, each of the activity centers is described as a compact area containing a regional shopping mall, ancillary retail space, consumer oriented office space, public facilities, and higher density residential uses.

Previous Plans and Studies

As part of this study, the goals, objectives, and recommendations of each of the previous plans were reviewed and are summarized in this section of the report.

Green Hills/Hillsboro Pike Transportation Study (1994)

This study was commissioned by the Nashville Area Metropolitan Planning Organization (MPO) to evaluate the existing transportation problems in the Green Hills/ Hillsboro Road corridor and to develop long term solutions for these problems. The plan was envisioned as a comprehensive effort to address transportation and land use concerns in the Green Hills Area and along the Hillsboro Road corridor.

As part of the study, three alternative improvement plans were analyzed to accommodate the projected year (2010) land use and transportation conditions. The final recommended plan included numerous roadway, pedestrian, bicycle, public transit, multimodal, and site access improvements, as well as recommendations regarding governmental policies and other various improvements. The goals of the recommended plan are shown in Figure 2.2.

The major components of the recommended plan included the following improvements:

Roadway Improvements

- Addition of turn lanes at several key intersections along Hillsboro Road.
- Addition of a center turn lane on Hillsboro Road from Lombardy Drive south to the five lane cross section just north of Crestmoor Road.
- Realignment of the offset intersections of Crestmoor Road/Glen Echo Road and

Figure 2.1: The Green Hills Area has been the subject of numerous plans and studies over the past 20 years.

Richard Jones Road/Abbott Martin Road.

- The extension of Hillsboro Circle south of Hobbs Road to intersect Hillsboro Road directly opposite the eastern section of Castleman Drive.
- Installation of a separate closed loop signal system to control the signalized intersections within the corridor and optimization of the signal timings for the traffic signals along Hillsboro Road.
- Installation of speed control measures on Valley Brook Road (speed humps) and at the intersection of Lone Oak Road/ Overhill Drive (three-way stop).

Pedestrian and Bicycle Improvements

- Addition of sidewalks along both sides of Hillsboro Road through the length of the study area, as well as along collector roads in the vicinity of Hillsboro Road.
- Establishment of pedestrian paths and walkways to connect commercial properties.
- Establishment of bicycle paths/ routes along Hopkins Street to provide access to Hillsboro High School, along Graybar Lane to provide access to David Lipscomb University, and along Crestmoor Road and Valley Brook Road to Woodmont Boulevard.
- Improved pedestrian crossings, including actuated (push button) signals, proper markings, and required signing.

Green Hills/Hillsboro Pike Transportation Study

Goal 1
Develop a transportation plan for the Green Hills/Hillsboro Road corridor that improves existing traffic conditions within the corridor, provides for the long term mobility needs for people traveling in the corridor, and is compatible with the community goals for the area.

Goal 2
Develop a balanced, comprehensive plan that encourages a multi-modal transportation system and enhances the quality of life for residents, businesses, and people traveling throughout the corridor.

Goal 3
Develop an environmentally responsible transportation plan that encourages the use of traffic demand management (TDM) techniques to reduce trips, encourages transportation alternatives to the single occupancy vehicle, and provides optimum air quality within the corridor.

Goal 4
Develop transportation solutions that are feasible, fiscally responsible and require a minimum of disruption to the existing businesses and residents in the area.

Figure 2.2: The goals of the *Green Hills/Hillsboro Pike Transportation Study*.

Public Transit Improvements

- Establishment of a trolley/bus circulator throughout the Green Hills Area.
- Improved transit stops, including additional markings, shelters, and appropriate pull-outs.
- Construction of a transit center near a common point for all transit routes and within walking distance of the center of the Green Hills Area.

Multi-modal Improvements

- Establishment of a park-and-ride program, primarily focused on commuter traffic.
- Establishment of a carpool program for the area.

Site Access Improvements

- Provision of inter-site accesses between properties.

Governmental Policies

- Implementation of a special zoning district for the Green Hills Area.
- Establishment of a Transportation Management Association to promote the use of the park-and-ride and carpool program, promote use of the trolley/bus circulator, and to work with property owners regarding shared driveways/parking, inter-site access, and other cooperative efforts.

Other Various Improvements

- Establishment of a system to rapidly respond to incidents (accidents and breakdowns), including a telephone number to report incidents and roving repair vehicles to assist motorists.

Public Parking

- Construction of additional public parking in conjunction with the transit center.

Shared Parking

- Promotion of shared parking within the Green Hills Area and removal of barriers to pedestrian flow between properties.

The Green Hills Urban Village Plan (1999)

The *Green Hills Urban Village Plan* was prepared by the Metropolitan Planning Department at the request of the Metropolitan Councilmember who, along with others, had an interest in discussing ways to recreate the suburban Green Hills Area as an urban village. The overall purpose of the *Green Hills Urban Village Plan* is shown in Figure 2.3.

The Green Hills Urban Village Plan

Goals

- To develop a strategy for implementing the recommendations of the Subarea 10 Plan (a component of the General Plan for Nashville-Davidson County) and the Green Hills/Hillsboro Pike Transportation Study; and
- To create an urban village concept with a pedestrian orientation.

Figure 2.3: The overall purpose of the *Green Hills Urban Village Plan*.

In support of these two overall goals, the plan outlined several supporting objectives, including:

- Reduce dependence on the automobile for trips within the Green Hills commercial area and between the commercial area and nearby residential areas;
- Provide adequate parking in locations that minimize the need to use the automobile for trips within the Green Hills commercial area;
- Identify major gateways and provide signage to direct visitors to public parking facilities and to identify shuttle trolley stops;
- Provide effective pedestrian connections between clusters of land use activities;
- Encourage land use development and redevelopment for working, shopping, education, entertainment, living, and recreation that reinforces the urban village concept;
- Provide traffic calming measures in and nearby the commercial area to improve traffic and pedestrian safety;
- Transform Green Hills into a memorable place with a visually attractive identity; and
- Identify and promote methods of implementation appropriate to creating and maintaining the urban village concept.

The plan recognized that coordination of the various recommendations were key and placed the responsibility for implementation of the goals and objectives of the plan on the residents, business leaders, and other private interests in the Green Hills Area. The plan suggested the formation of a Business Improvement District and establishment of Public/Private Partnerships to carry out the recommendations.

The plan summarized previous studies that in whole, or in part, affected the Green Hills Area and outlined issues, goals and objectives, recommendations, and phased implementation strategies for various transportation and public/open space and

aesthetics aspects of the Green Hills Area (See Figure 2.4).

Overall, the intent of the plan was to encourage the transformation of the Green Hills Area from a suburban Regional Activity Center to a visually coherent, pedestrian-oriented, mixed-use urban village. The plan also recommended the creation of an Urban Design Overlay (UDO) District in the Green Hills Area to establish special design standards and further the concept of an urban village.

Green Hills Urban Design Overlay Design Guidelines (2002, amended 2003, 2007)

The *Green Hills Urban Village Plan* encouraged the use of an Urban Design Overlay (UDO) as a method to guide the intensity, location, and visual quality of the future growth of the Green Hills Area to ensure consistency with the goals and objectives of the plan. In early 2000, the Metropolitan Planning Department began a series of meetings with property owners to discuss the possibilities of creating a UDO for the Green Hills Area.

According to the UDO guidelines which were adopted in 2002, subsequently amended in 2003 to add more incentives,

The Green Hills Urban Village Plan

Transportation
- Sidewalks
- Parking
- Transit Shuttle
- Traffic Calming
- Pedestrian Safety
- Bike Plan
- Wayfinder Signs

Public/Open Space and Aesthetics
- Recommended Public/Open Spaces
- Burton Hills Greenway
- Abbott Martin Road/Cross Creek Road Wetlands Area Neighborhood Park
- Creek Improvements
- Bandywood Connector
- Hillsboro High School Green Space Area
- "Old" Library Location
- Crestmoor Road/Glen Echo Road Gateway Park
- "New" Library Storm Water Detention Area
- Aesthetics
- Landscaping
- Streetscapes and Public Art
- Use of the Public Right-of-Way
- Street Lighting
- Utility Pole Consolidation
- Small Detail Street Art

Figure 2.4: Recommendations of the *Green Hills Urban Village Plan*.

and again in 2007 when the signage standards were made mandatory, the overall goal of the Green Hills UDO is to give three-dimensional form to the concept of the urban village as presented in *The Green Hills Urban Village Plan*. In order to achieve this goal, several objectives were adopted as part of the amendment to the Subarea 10 Plan that established the Green Hills UDO. These objectives are shown in Figure 2.5.

The main purpose of the guidelines is to outline for developers, property owners, government officials, residents, or other interested parties both requirements and suggestions for the redevelopment of property located within the UDO boundary. The guidelines include both mandatory and advisory design principals and are only invoked, except for the mandatory signage requirements, whenever a proposed development utilizes any of the incentive provisions of the UDO. The UDO guidelines include "shall" when referring to mandatory design standards and "should", "encouraged", and "discouraged" when referring to design standards that are suggested, but not mandatory. The guidelines address streetscapes; building placement, height, and massing; architectural treatment; parking; signage and awnings; and, development incentives.

The UDO guidelines are applicable whenever a proposed development utilizes any of the incentive provisions. The Metropolitan Planning Department and the Department of Codes Administration are responsible for the review of any developments in the UDO that require a building permit and any requested incentives shall not be granted unless certain conditions are met by the property owner/developer. If a property owner chooses not to seek the incentive provisions, the base zoning for the property applies, but the property owner/developer is still encouraged to follow the other suggested design standards.

The concept plan developed as part of the UDO encouraged a mixture of uses (residential, office, civic, and retail) along Hillsboro Road, Abbott Martin Road,

Green Hills Urban Design Overlay Design Guidelines

Objectives

- Establish a compact multilevel mixed-use development pattern distributed along a system of streets;
- Ensure that buildings are oriented to and linked by a cohesive pedestrian system;
- Provide shared parking located conveniently to multiple destinations;
- Provide multiple transportation service opportunities (pedestrian, car, transit, and bicycle);
- Provide high quality (functional and aesthetic open spaces for assembly, relaxation, civic events, display of public art, and other similar purposes; and,
- Provide a high level of pedestrian-generating activity along streets.

Figure 2.5: Objectives of the Green Hills Urban Design Overlay Design Guidelines.

Bandywood Drive, and Hobbs Road. This mixture of uses, along with a more interconnected street and pedestrian network envisioned as part of the plan, would encourage a more active, pedestrian-oriented street life. The UDO encouraged new buildings to be close to the street with retail and restaurant uses on the street level and residential and office uses above street level, to encourage activity throughout the day and evening.

The concept plan recommended the following transportation improvements:

- Extension of Warfield Drive from Hillsboro Pike to Hillsboro Circle;
- Extension of Bandywood Drive south to the extended Warfield Drive; and,
- Realignment of Abbott Martin and Richard Jones Road.

Finally, the concept plan envisioned an identifiable center (near the geographic center of the UDO), in the form of a park, plaza, prominent building, or civic use, to anchor the urban village.

Participants discussing the area south of Interstate 440 outlined that "they want to live in a convenient, affordable and accessible community with a good transportation system and character-filled pedestrian friendly neighborhoods."

Green Hills-Midtown Community Plan 2005 Update (2005)

In July 2005, the Metropolitan Planning Commission adopted the *Green Hills-Midtown Community Plan: 2005 Update*. The plan, which replaced the *Subarea 10 Plan* adopted in 1994, is intended to guide the community's development for a period of seven to ten years. The plan encompasses one of the 14 planning subareas within Nashville and Davidson County. The primary purposes of the community plan are shown in Figure 2.6.

The plan also serves as a guide for the many decisions and actions that shape the community, including:

- Planning Commission recommendations and Council's actions regarding zone change proposals and other regulatory measures that affect development;
- Planning Commission actions regarding the subdivision of land; and,
- Planning Commission recommendations to Council about the provision, extension, and replacement of public facilities and the disposal of surplus public property.

In addition, the community plan also guides the Metropolitan Government's annual Capital Improvements Budget and Program and serves as the basis for more detailed planning, such as small area commercial and neighborhood design plans.

The plan encompasses the area of Nashville and Davidson County that is generally bounded by the City of Belle Meade and the CSX railroad to the west, the Inner Loop of Interstates 40/65 to the north, Interstate 65 to the east, and Williamson County to the

south. The community ranges from the rapidly developing Midtown and Vanderbilt University areas to older urban residential areas and large-lot and estate suburban development to the south. The community plan was divided into two study areas and the study area of the Green Hills Area Plan is located entirely within Study Area 2.

As part of the plan, the Metropolitan Planning Department held a series of workshops to gather input from property owners, business owners, and residents.

Green Hills-Midtown Community Plan 2005 Update

Primary Purposes

- To establish a clear vision of the kind of plan the community's residents, businesses, and institutions would like it to be in the future; and
- To provide a course of action that strengthens the process of building the community envisioned.

Figure 2.6: The primary purpose of the *Green Hills-Midtown Community Plan: 2005 Update*.

The initial workshop focused on the vision for the future of the community. Participants discussing the area south of Interstate 440 outlined that "they want to live in a convenient, affordable and accessible community with a good transportation system and character-filled pedestrian friendly neighborhoods."

The primary concerns of the residents were traffic issues that accompany new development and ensuring that infrastructure is in place before new development occurs.

After the initial workshops, the Metropolitan Planning Department held a second series of workshops to discuss the "Structure Plan" for the community. The structure plan acts as the official policy document that guides future land use decisions. As part of these structure plan discussion, participants in the meetings were asked three questions about their community (See Figure 2.7).

The plan outlined six broad goals for the entire community based on the vision and input received during the various workshops:

1. Manage demand for infill and intensification
2. Preserve and protect established residential areas
3. Encourage revitalization of neighborhood centers
4. Enhance pedestrian circulation
5. Encourage pedestrian-oriented mixed use developments
6. Promote more active lifestyles (community-wide)

Of these six overall community goals, three directly affect the Green Hills study area:

1. Manage demand for infill and intensification
   Allow for modest increases in intensity to accommodate demand for new housing in

Green Hills. Areas for new housing should be focused around the existing Regional Activity Center. Townhouses, condominiums, and rental units should be designed in a way that encourages walking within and nearby Green Hills commercial centers.

2. Preserve and protect established residential areas
   For areas facing pressure to redevelop, gentrify, or otherwise absorb new housing that may be out of character, seek protection to maintain the existing physical and social conditions of several older residential communities.
3. Enhance pedestrian circulation
   Provide additional and improved crosswalks, sidewalks, signage, and lighting in high-volume pedestrian-oriented areas such as 12th, 21st, and Wedgewood/ Blakemore Avenues.

Green Hills-Midtown Community Plan 2005 Update

Community Questions/Responses

What do you like about your community?

- Location and convenience (close to downtown, great shopping, universities)
- Unique older homes, architecture, and big beautiful trees (a residential feel)
- Neighborhood atmosphere (nice people, family feeling, people out walking)

What do you dislike about your community?

- Heavy traffic, cut-through and speeding traffic (crowded streets, terrible rush hour, parking problems)
- Lack of sidewalks (connect more areas)
- Single-family homes torn down and replaced by duplexes and multi-family (changing the neighborhood character, increasing density)

What would you like to see in your community?

- Alternatives to always taking the car (better transit, bike lanes, more buses, trolley around mall area)
- More sidewalks (connect places, encourage walking)
- More open space (neighborhood parks, greenways, dog park, civic gathering places)

Figure 2.7: The questions posed and community responses gathered during the *Green Hills-Midtown Community Plan: 2005 Update*.

The *Green Hills-Midtown Community Plan: 2005 Update* Structure Plan consists of 19 different land use policy categories. In addition to the various land use policy categories, the plan also outlines Special Policy Areas (Figure 2.8). The land use policy categories and Special Policy Areas within or affecting the Green Hills Area Plan study area are listed below.

Special Policy Areas

There are several Special Policy Areas located within or affecting the Green Hills Area Plan study area, including:

Special Policy Area #4

- The Stokes elementary school site should be retained as a

park if it ceases to be needed for school purposes.

Special Policy Area #8

- Development within this area should be limited to one- and two-family dwellings;
- The intensity of new development in this area should be similar to the newer developments on the north side of Hobbs Road;

- Any redevelopment should incorporate design features that create a quality public realm, especially sidewalks, and cohesive placement and appearance of buildings.

Special Policy Area #9

- Development at Residential Low-Medium (RLM) intensities should be guided by the provisions of Special Policy #8 applicable to the Hobbs Road area.
- Development at Residential Medium (RM) intensities may be considered provided it is based on the aggregation of lots and a consolidated plan for the entire area.
- Development should be oriented toward the Green Hills Activity Center and should emphasize improved vehicular and pedestrian connections with Hillsboro Pike and the activity center.

- Any development within this area should create a sustainable and walkable neighborhood. Buildings shall form an appropriate street wall consistent with the width of the street. This is critical for scale and to provide a clear definition to the street. The streetscape elements

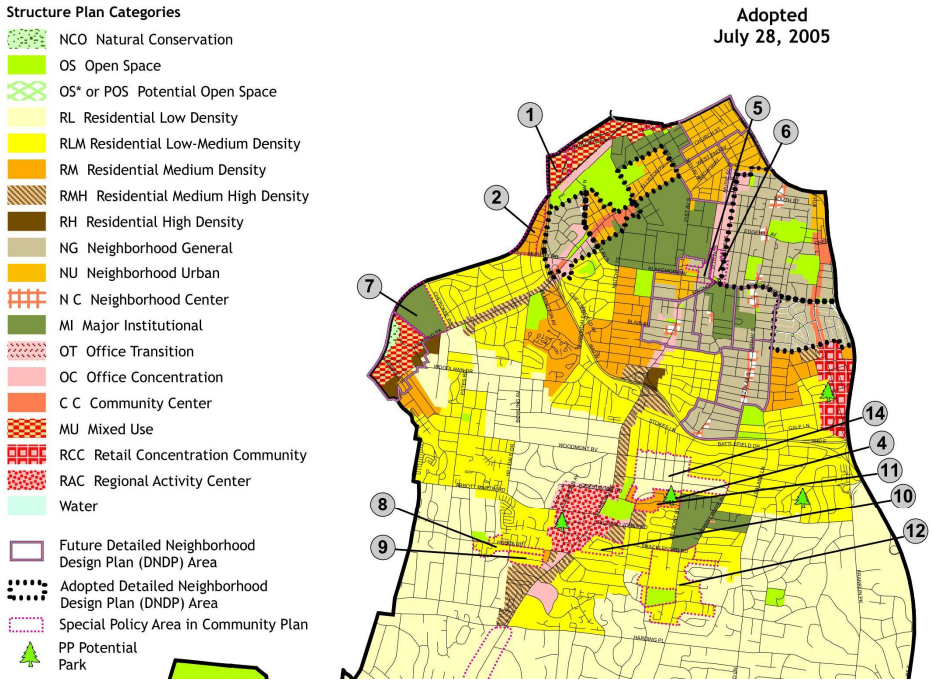


Figure 2.8: A map of the different land use policy categories and Special Policy Areas as outlined in the *Green Hills-Midtown Community Plan: 2005 Update*.

(sidewalks, street trees, street furnishings, etc.) shall fully support the development form. The massing of buildings shall complement each other in quality of construction and materials, scale, height, massing, and rhythm of buildings solid to open void. Any redevelopment shall achieve sensitive transition to surrounding development.

- Development at Residential Medium (RM) intensities should be implemented only through Planned Unit Development (PUD) or Urban Design Overlay (UDO) zoning together with the appropriate base zoning.

Special Policy Area #10

- Development up to Residential Medium-High intensities may be considered provided it is based on the aggregation of lots and a consolidated plan for the entire area. Development should be oriented toward the Green Hills Activity Center and should emphasize improved vehicular and pedestrian connections with Hillsboro Pike and the activity center.
- Any development within this area should create a sustainable and walkable neighborhood. Buildings shall form an appropriate street wall consistent with the width of the street. This is critical for scale and to provide a clear definition to the street. The streetscape elements (sidewalks, street trees, street furnishings, etc.) shall fully support the development form. The massing of buildings shall complement each other in quality of construction and materials, scale, height,

massing, and rhythm of buildings solid to open void. Any redevelopment shall achieve sensitive transition to surrounding development.

- Development at Residential Medium (RM) intensities should be implemented only through Planned Unit Development (PUD) or Urban Design Overlay (UDO) zoning together with the appropriate base zoning.

Special Policy Area #11

- Development within this area should be limited to one- and two-family structures and townhouse type structures that are on separate lots

designed for individual ownership.

- Any development within this area should create a sustainable and walkable neighborhood. Buildings shall form an appropriate street wall consistent with the width of the street. This is critical for scale and to provide a clear definition to the street. The streetscape elements (sidewalks, street trees, street furnishings, etc.) shall fully support the development form. The massing of buildings shall complement each other in quality of construction and materials, scale, height, massing, and rhythm of buildings solid to open void. Any redevelopment shall achieve sensitive transition to surrounding development.
- Development at Residential Medium (RM) intensities should be implemented only through Planned Unit Development (PUD) or Urban Design Overlay (UDO) zoning together with the appropriate base zoning.

Special Policy Area #14

- Maintaining the current 40,000 square foot lot size requirement and established character of development in this Residential Low (RL) policy area is recommended, except for properties along the east margin of Benham Avenue where proposals for rezoning to RS20 and development in accordance with that zoning may be considered on their merits.

Although it is located just to the south of the study area, Special Policy Area #3 may affect the Green Hills Area Plan study area.

Special Policy Area #3

- The quasi-rural estate character of the Hillsboro Pike corridor south of Harding Place should be preserved, including the stately homes with generous setbacks, the viewsheds to the surrounding hillsides; and the abundant trees, landscaping, and other natural features.
- As part of the character, any reconstruction of Hillsboro Pike should be context-sensitive and help define, reinforce and embellish the corridor's quasi-rural estate character.

The plan also outlines a transportation plan, pedestrian and bicycle network plan, and an open space plan which identifies the general locations where public parkland is needed and/or recommended.

The Green Hills Gateway (2009)

The West Area Business Council is one of four Area Advisory Councils established by the Nashville Chamber of Commerce. The West Area Business Council is comprised of Chamber members from the Green Hills, Forest Hills, and Belle Meade areas. The

business council provides members with an opportunity for getting involved in solving problems, discussing issues, and implementing special projects and events for the benefit of the area in which they work.

In 2009, the West Area Business Council prepared a brief study entitled *The Green Hills Gateway*. The study outlined an overall goal (See Figure 2.9) and an opinion of the West Area Business Council that the single biggest obstacle to the advancement of the quality of life and economic growth in Green Hills is the outdated and poorly functioning transportation system.

Referencing the sometimes unbearable traffic, the study made the point that the community has lost much of its appeal to prospective residents and businesses and has negatively impacted the ability of Green Hills to compete in the Middle Tennessee marketplace for sales tax revenue that Nashville so vitally needs. The study expressed the concern that shoppers and businesses were choosing the better planned, more beautiful, commercial corridors found in areas like Cool Springs, Murfreesboro and Mt. Juliet.

The study outlined the thoughts of the West Area Business Council with respect to the infrastructure and roadways serving the Green Hills Area.

Gateway
One of the objectives outlined in the study was creation of a true "gateway" into Green Hills to properly reflect the character of the area and welcome residents and visitors into the community. The overall intent of the suggestions was to help improve the quality of life in the Green Hills Area and stimulate new commercial opportunities that will not only make the area a better place to live but also create valuable new sources of revenue for the City of Nashville and the State of Tennessee.

Roadway Improvements
With regard to roadway improvements, the study outlined three principal strategies that were recommended for implementation in two phases:

- Continuous turn lanes on Hillsboro Road
  Citing significant delays in the flow of traffic caused by vehicles making turns and serious safety issues, the study recommended a continuous five-lane road with a single, center turn lane between Interstate 440 and Hobbs Road.

  This recommendation was implemented by the Tennessee Department of Transportation in 2009 and has resulted in positive benefits to the traffic flow in the area.

- Roadway realignment
  The study recommended the re-alignment of several intersections throughout Green Hills in order to improve traffic

The Green Hills Gateway

Goal
- To help find solutions that both improve the quality of life in Green Hills and enhance the long term economic future of Green Hills.

Figure 2.9: The overall goal of the *Green Hills Gateway*.

function, including connecting Crestmoor Road to Glen Echo Road, Lone Oak Road to Hillmont Drive, and Warfield Drive to Shackleford Drive. In addition, the study recommended that Abbott Martin be extended to Hillmont Drive and that Richard Jones should be closed as a through street. Also, the addition of a turn signal to support left-hand turning movements for both northbound and southbound traffic should be added at the intersection of Abbott Martin and Hillsboro Road.

- New signalization
  Replacement of the existing wire traffic signals with new black mast arms in order to improve the synchronization of the signals, improve the flow of traffic, and enhance the aesthetics for the gateway. The study also suggested additional traffic lights at the following locations:
  - Crestmoor Road (new) and Glen Echo intersection
  - Abbott Martin (new extension)
  - Warfield Drive (retain existing traffic signal)

The study also stated that other future roadway improvements that will provide alternate means to disburse traffic on roadways other than Hillsboro Road should be considered.

Utilities
In support of the "gateway" to Green Hills and other suggested roadway improvements for the area, the study recommended that the overhead utility lines along Hillsboro Road should be placed underground. The study acknowledged the expense of this undertaking, but stated that this action was essential to creating the streetscape required for the Green Hills Gateway.

Sidewalks/Lighting/Landscaping
The study proposed the addition of a landscape strip (not less than three feet wide), five foot sidewalks, and environmentally friendly street lighting (serving both pedestrians and vehicles) along both sides of Hillsboro Road. The

purpose of the landscape strip was to allow for the symmetrical planting of trees (along with grass and other plant material) to add color and enhance the beauty of the gateway. The sidewalk, along with the landscape strip, would help to create a walkable streetscape to encourage pedestrian activity, as well as a beautiful frame for the roadway.

Pedestrian Amenities
In order to enhance the aesthetics of the entire community, it was recommended that park benches, bus shelters, magazine racks, welcome signs, and historical markers should be carefully designed with "stack stone" bases and a uniform design theme.

The study stated that the outlined suggestions were a good start to finding a solution to the challenges facing the Green Hills community, but acknowledged that other ideas and suggestions to alleviate congestion in the Green Hills Area were also needed.

Hillsboro Road Corridor Pedestrian Friendliness & Connectivity Suggestions (2009)

The Green Hills Action Partners (TGHAP) is a community organization comprised of concerned neighbors and businesses working together to make the Green Hills Area a safer and more enjoyable place to live, work, walk, bike, drive, shop, and play. The mission of TGHAP is "*to achieve positive urban planning and design solutions for the heart of Green Hills by raising community awareness and serving as a liaison between businesses, neighbors, and Metro Government*".

In 2009, the Transportation and Sidewalks Committee of TGHAP outlined a number of suggestions to improve the pedestrian friendliness and connectivity of the Green Hills Area. The study outlined an overall goal (See Figure 2.10) and contained a number of recommendations addressing traffic flow, public transit, sidewalks/bike lanes, and crosswalks.

Traffic Flow

- Reconfiguration of the intersection at Hillsboro Road, Sharondale Drive, and Lombardy Avenue to allow for a right turn lane from Sharondale Drive onto Hillsboro Road.
- Addition of left turn lane on Hillsboro Road southbound at Graybar Lane (may need to consider "no left turn" signage for peak travel hours).
- Working with property owners and developers to consolidate curb cuts for parking lots. Also, consider the addition of "right turn only" and "no left turn" signage in and out of particularly congested areas.

Public Transit

- Addition of concrete pads and benches for all bus stops on Hillsboro Road between Graybar Lane and Sharondale Drive/Lombardy Avenue.

Sidewalks/Bike Lanes

- All new sidewalks should be to the improved standard (adopted by the Metropolitan Government of Nashville and Davidson County), including a three foot landscape buffer, where possible. No light poles, signs, fire hydrants and bus benches in the middle of sidewalks.
- Addition of trees wherever possible (in grated tree wells or in grass) along corridor to provide shade and absorb run-off.
- Addition of sidewalk from Graybar Lane south (along the east side of Hillsboro Road) to connect the existing sidewalk in front of The Glendale Shopping Center.
- Completion of sidewalk network along the east side of Hillsboro Road between Burton Hills Boulevard (North) and Overhill Drive.
- Consolidation of utility (Nashville Electric Service) poles when possible and use pedestrian-scaled lighting.

- Provide safe access for pedestrians and bicyclists along Hillsboro Road to connect residential areas to the north (Hampton Avenue/Golf Club Lane) with the Green Hills commercial areas.
- Addition of "Share the Road" bike signage along Hillsboro Road to and from Woodmont Boulevard bike lanes. In addition, addition of bike route signage to direct both northbound and southbound bicyclists to Hillsboro Drive, Crestmoor Road, Cleghorn Avenue as an alternate to Hillsboro Road.

Crosswalks

- Provide consistent and highly visible crosswalk striping and signage in the Green Hills corridor, including the use of iridescent paint for night-time visibility and/or raised reflector "dots".
- Addition of signalized, striped crosswalks at the intersection of Glen Echo Road. In addition, the best configuration of the Crestmoor Road, Glen Echo Road, Hillsboro Road intersection is needed in order to maintain good traffic flow in and out of the Green Hills Mall.
- Addition of signage/striping to facilitate pedestrian crossing of Hillsboro Road in the vicinity of Hillsboro Drive.
- Addition of signage/striping to facilitate pedestrian crossing (between Hillsboro Court and Graces Plaza) of Hillsboro Road (this area also has a congested center turn lane as entry points to both developments are directly across from each other).
- Addition of signage/striping to facilitate pedestrian crossing of Hillsboro Road from Jefferson Square and Georgetown condominium area to Burton Hills.

The recommendations also posed a general question about the use of "on demand" pedestrian crossing signals at certain intersections, but recognized that this may present a problem for traffic signal timing/ sequencing.

Hillsboro Road Corridor Pedestrian Friendliness & Connectivity Suggestions

Goal

"...all projects in the Hillsboro Road corridor will work to balance the important goal of moving a large volume of traffic through Green Hills efficiently with the long-demonstrated need and community desire to enhance the pedestrian experience and visual character along the "Main Street" of one of the Nashville area's busiest retail and regional activity centers."

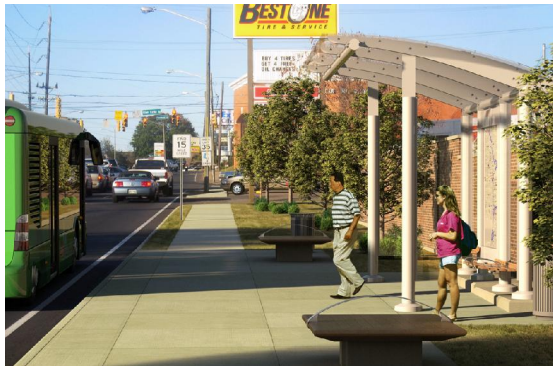
Figure 2.10: Goal of the *Hillsboro Road Corridor Pedestrian Friendliness & Connectivity Suggestions.*

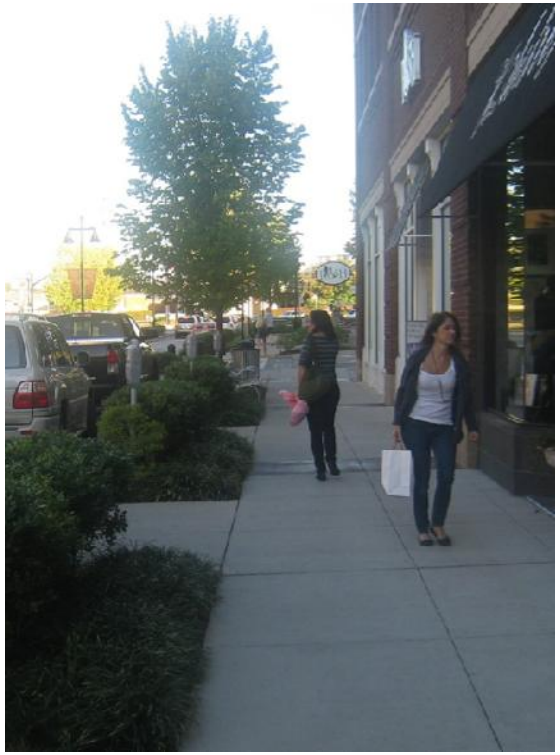
3

Land Use and Transportation

August 2011

Green Hills Area Plan





Introduction

Hillsboro Road, which is classified as State Route 106 (SR 106) and US Highway 431 (US 431), is an important spoke in the City of Nashville's radial arterial roadway network. Historically, the road has provided access between downtown Nashville and the City of Franklin, Tennessee. Throughout the years, as more and more development (residential, office, commercial, etc.) has located along and adjacent to the corridor, Hillsboro Road has become one of the more congested arterials in the City of Nashville.

This study is focused on the portion of Hillsboro Road between Interstate 440 and Harding Place. On an average day, up to 40,000 vehicles travel this section of Hillsboro Road to work, attend school, shop, or enjoy the restaurants and other amenities in the Green Hills area.

Existing and Future Conditions

The following sections summarize the existing and future land use and transportation conditions of the study corridor. The existing conditions, along with the historical trends for the area, help to establish a baseline for understanding how land use changes may affect future traffic conditions in the Green Hills area.

Land Use

The Hillsboro Road corridor is comprised of a mixture of land uses. The Green Hills area has been historically classified as a "Regional Activity Center" due to the presence of The Mall at Green Hills. The mall and its associated retail activities, as well as The Hill Center, attract local, regional, and visitor traffic to the Green Hills area. Although the Green Hills area is most often associated with the retail activities, it is also home to a significant amount of office space, with concentrations of professional offices near the mall and in the Burton Hills development toward the southern end of the study area.

Green Hills has historically been a suburban area of Nashville, and although higher intensity residential development (apartments and condominiums) has occurred along Hillsboro Road, the area surrounding the Green Hills commercial core is primarily comprised of lower-density, single-family homes. As a result, the Green Hills area is also home to a number of activities (i.e. grocery stores, drug stores, dry cleaners, etc.) that serve the local surrounding community.

In addition to retail, office, and residential uses, the Green Hills area is home to a number of churches, private schools, and other destinations (i.e. Hillsboro High School, Post Office, Green Hills Branch Library, YMCA, etc.) that contribute to the traffic problems that are experienced in the Green Hills area.

Recently, the Metropolitan Planning Department (MPD) undertook an effort to forecast the future land use of the Green Hills area. These land use scenarios were based on the full development potential of the Green Hills Area including the incentives for mixed use buildings constructed in accordance with the goals and objectives of the *Urban Design Overlay (UDO)* and the *Green Hills Urban Village Plan*.

A variety of development incentives are available under the UDO and most result in an increase in floor area. Recognizing that growth and development in the Green Hills Area is likely to continue and some of this future development would take advantage of the development incentives of the UDO, the land use forecast that serves as the basis for this study is derived from this earlier effort. As part of their efforts, the MPD looked at the future potential growth

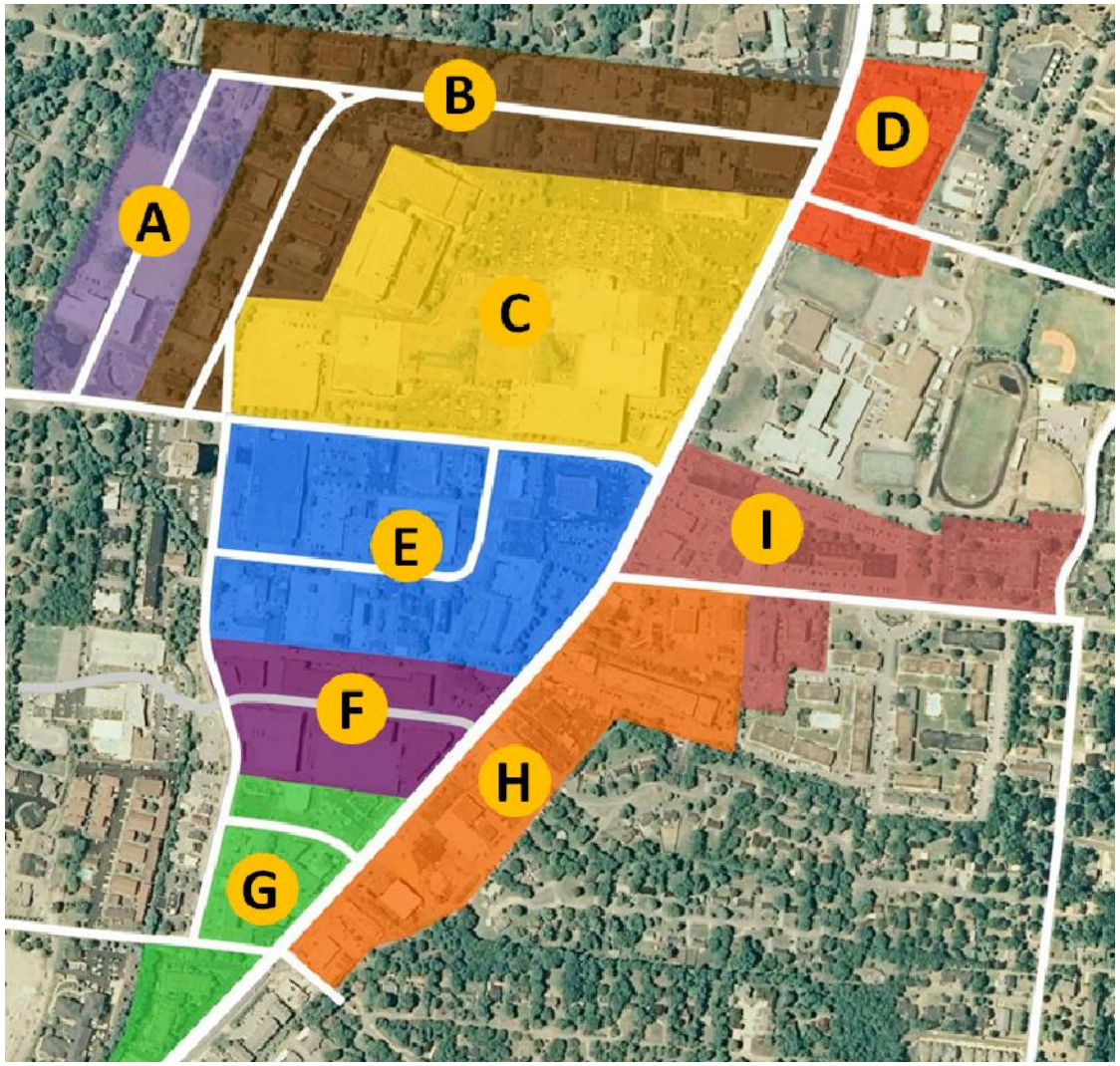


Figure 3.1: The nine (9) land use scenario areas within the Green Hills Area.

of 22 scenario areas within the Green Hills Area. For the purposes of this study, these 22 areas were combined into nine (9) future scenario areas (See Figure 3.1). Based on the existing land uses and redevelopment potential, the future residential, office, and commercial land use was calculated for each scenario area. In developing this future land use forecast, the additional density/intensity that can be achieved under the UDO was considered.

This future growth potential is summarized in Figure 3.2, but assumes that 1.6 million square feet of the existing 3.4 million square feet of residential, office, and commercial land uses in the area will redevelop over time and an additional 4.6 million square feet of new land uses will be added. This approach assumes a total of 6.4 million square feet (a 47% increase over current conditions) of residential, office, and commercial land uses in the Green Hills Area by the Year 2050.

For the purposes of this study, the Resource Team chose to use a Year 2035 time horizon and assumed that 75% of the forecasted land uses would build out over this 25 year time period. This 75% build out scenario assumed a total of 4.8 million square feet of

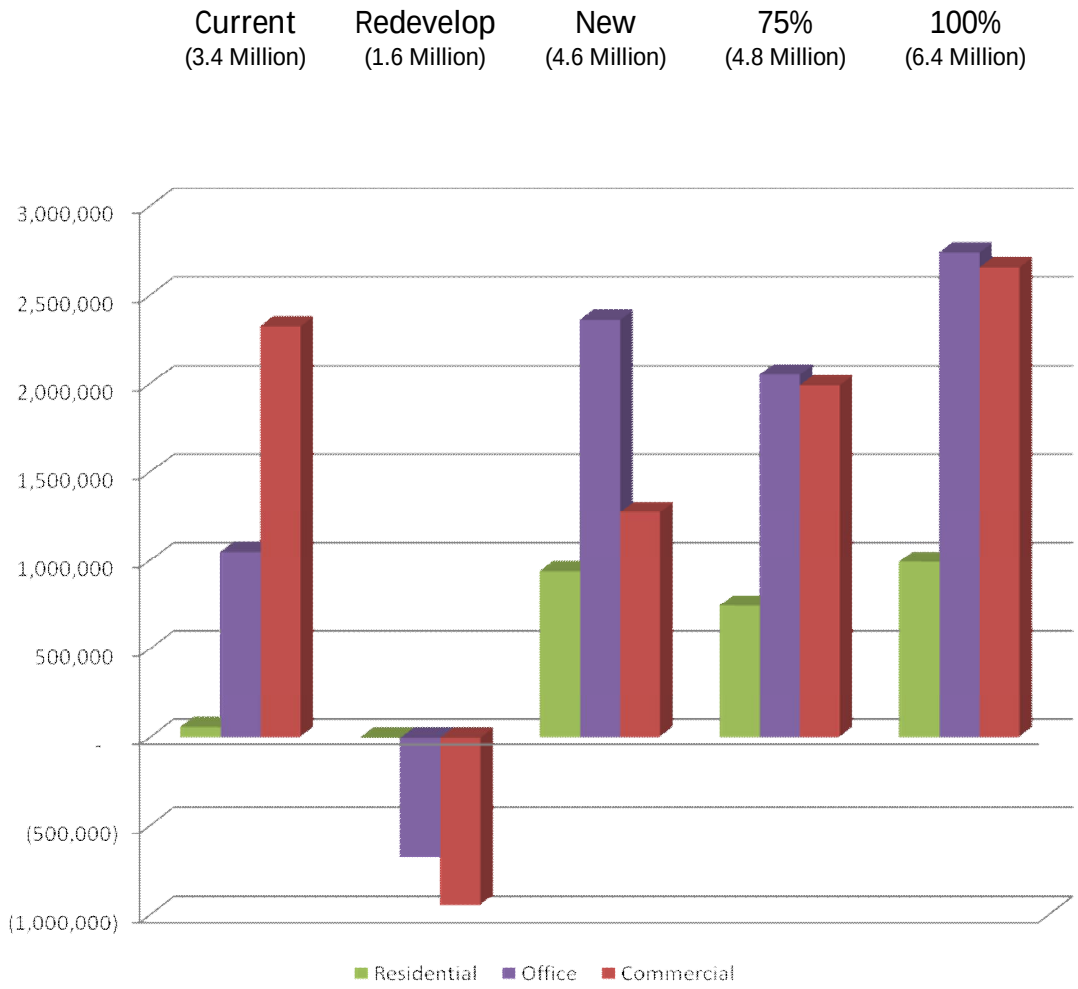


Figure 3.2: Current and future residential, office, and commercial square footage in the Green Hills Area. The 75% scenario was selected for this study.

residential, office, and commercial land uses in the Green Hills Area and was the basis for the future traffic conditions.

Traffic and Roadway

Hillsboro Road serves as the north/south connection for people traveling to/from downtown Nashville and is the primary route used to access the various activities and destinations in the Green Hills Area. Because the area was historically a suburban residential area of Nashville, the surrounding roadway network was not designed to support the concentration of higher density residential, office, and commercial activities along Hillsboro Road.

The lack of a parallel street network and offset east/west connections, combined with the delays that are experienced at the signalized intersections between Interstate 440 and Harding Place contribute to the traffic congestion that is experienced during peak times. In addition, the pattern of development that has occurred over time has diminished connectivity and created access management issues. Adding to the traffic problems is the limited use of transit, a lack of a complete pedestrian and bicycle network, and an observation that most trips are made via automobile.

Traffic/Roadway

The cross-section of Hillsboro Road is a four -lane roadway with a center turn lane throughout the entire length of the study corridor as a result of the widening that was implemented by TDOT in 2009 between Interstate 440 and Crestmoor Road. The majority of the roadway is classified as an urban principal arterial which typically provides good connectivity to the urbanized area. The portion of the roadway closest to the Interstate 440 interchange is classified as an urban minor arterial which typically provides service for trips with a more moderate length and has slightly less mobility than a principal arterial.

As mentioned in the previous section, there is a mix of land uses including residential, office, and commercial spread throughout the corridor. The retail and commercial land use is more densely concentrated around The Mall at Green Hills. In addition to the roadway network, there are numerous access points along the corridor which increase in number in the retail/ commercial area surrounding the mall.

As part of this study, the transportation system was evaluated with respect to existing and future traffic conditions along the study area roadway system. The analysis of the traffic involved data gathering, evaluation of the existing traffic conditions along Hillsboro Road, and modeling future traffic conditions based on the land use scenario described earlier in this chapter. The land use assumptions are based on the additional density/intensity under the UDO and therefore include growth beyond what the existing base zoning allows. The sources of traffic data and the multiple tools used to evaluate current and future traffic conditions are presented in the following sections.

Data Collection

The following is a brief overview of the primary sources of data used as the basis for the evaluation of existing and future traffic conditions within the study area.

Local Traffic Data
As part of the study, 2010 turning movement counts and the most recent signal timings were collected from the Metropolitan Nashville Department of Public Works. In addition, the Nashville Metropolitan Planning Organization (Nashville MPO) provided the TransCAD Travel Demand Model. Each of these data sources were key inputs for the development of the traffic models.

Origin-Destination Data
In order to gather additional information about the vehicular origins and destinations along the corridor, an Origin-Destination Study of the Green Hills Area was undertaken. The approach involved the use

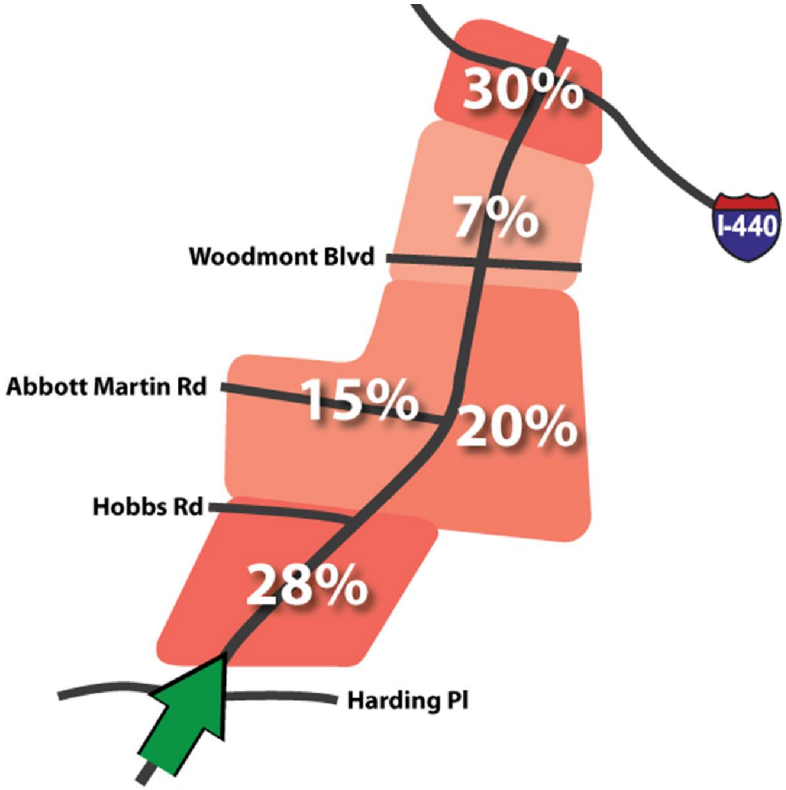


Figure 3.3: Morning peak destinations as identified by the Origin-Destination Study.

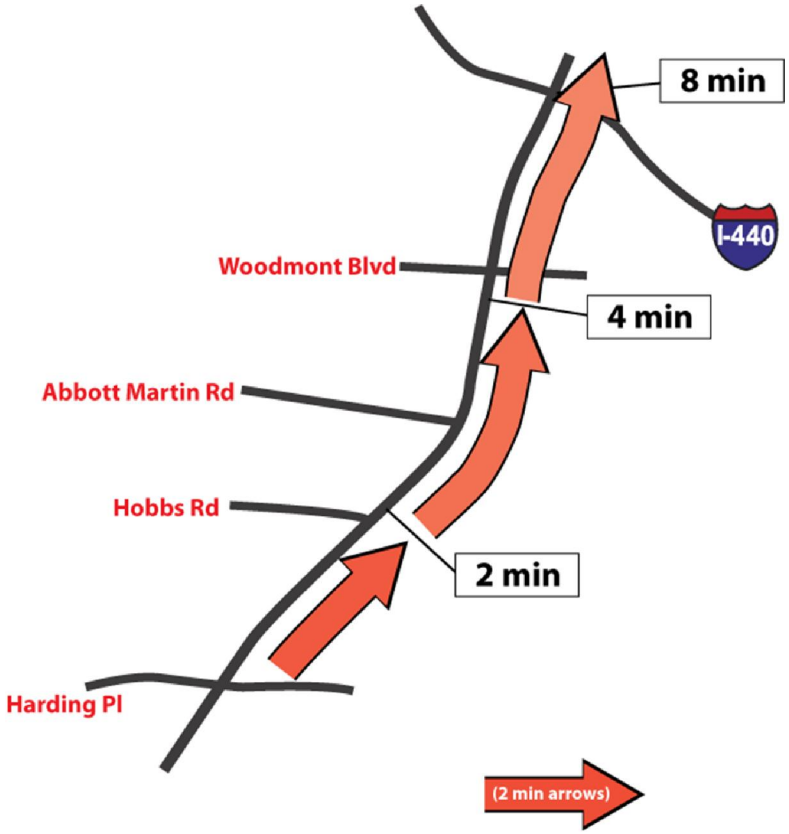


Figure 3.4: Morning peak travel times as identified by the Origin-Destination Study.

of airplanes to capture high resolution imagery of study area roadways which was then analyzed using sophisticated computer equipment. The vehicular origin and destination data was collected and analyzed for three time periods:

- Morning (7:00 AM – 8:30 AM)
- Midday (11:30 AM – 1:00 PM)
- Afternoon (4:30 PM – 6:00 PM)

The data, collected for both the northbound and southbound directions along Hillsboro Road, included destination data as well as average travel times between the origins and destinations.

During the morning peak (Figure 3.3) the results of the study indicated that beginning

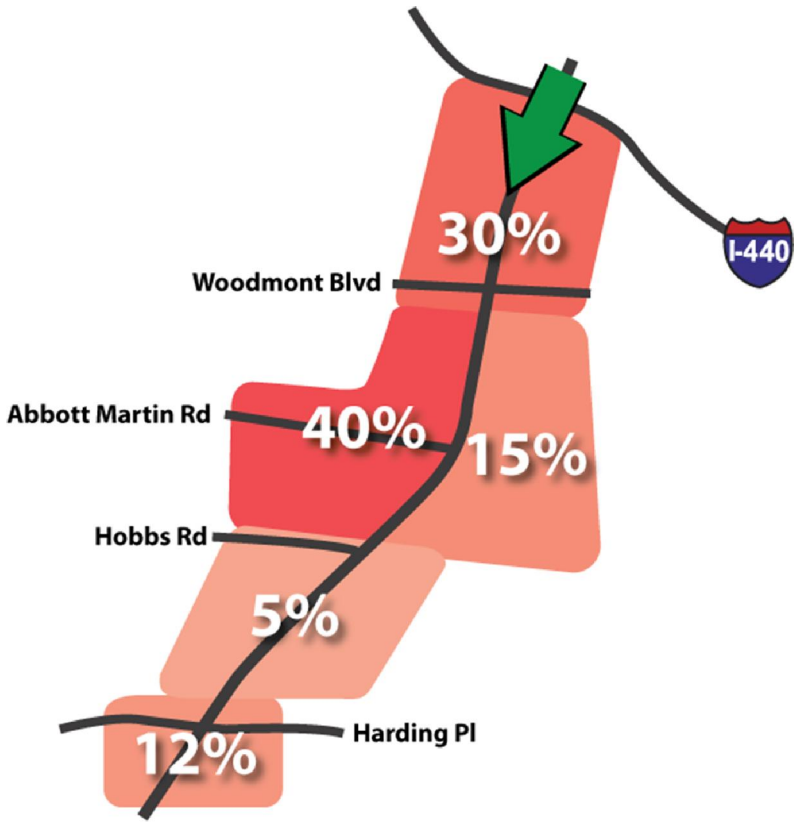


Figure 3.5: Evening peak destinations as identified by the Origin-Destination Study.

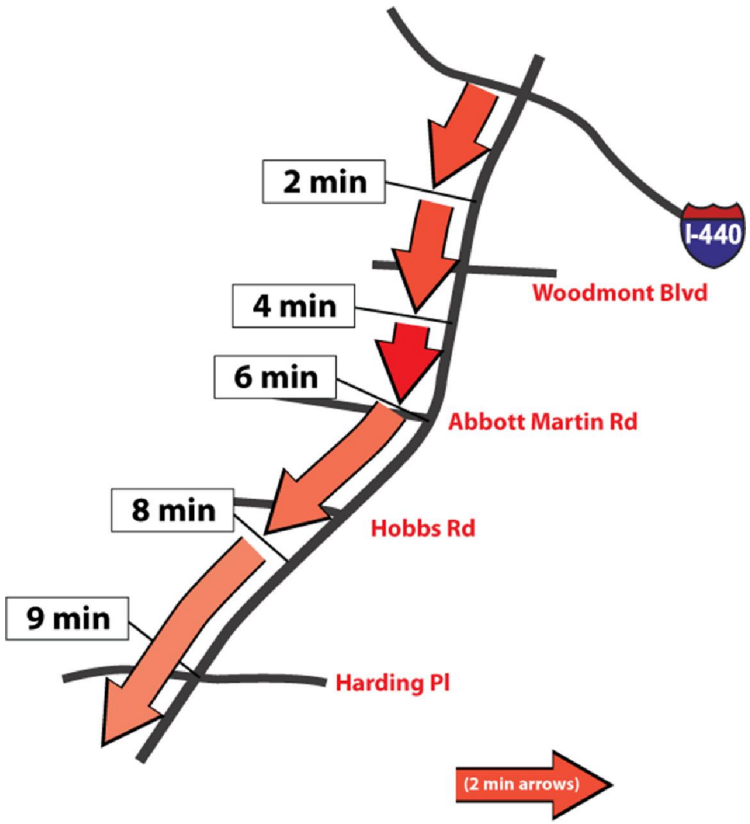


Figure 3.6: Evening peak travel times as identified by the Origin-Destination Study.

at Harding Place in the southern end of the study area, 28% of drivers had a destination at or before Hobbs Road. Another 35% (15% west and 20% east of Hillsboro Road) had destinations between Hobbs Road and Woodmont Boulevard, 7% had destinations at Woodmont Boulevard or slightly north, and approximately 30% had a destination of I-440 or north of the study area. The study also calculated travel times during the morning peak (Figure 3.4) beginning at Harding Place. The study found it took approximately eight (8) minutes to get to I-440 from Harding Place with the area between Woodmont Boulevard and I-440 being the most congested.

During the evening peak (Figure 3.5), beginning at the northern end of the study area, 30% of drivers had destinations between I-440 and Woodmont Boulevard, 55% had destinations between Woodmont Boulevard and Hobbs Road, with 40% of those going west and 15% going east, 5% had destinations between Hobbs Road and Harding Place and approximately 12% were going to Harding Place or further south. During the evening peak the travel time (Figure 3.6) from I-440 to Harding Place was calculated to be nine (9) minutes, the area between Crestmoor Road and Abbott Martin Road being the most congested.

Overall, the Origin-Destination Study demonstrates that although there are numerous destinations (primarily in the southern and middle portions of the study area), a significant amount of traffic in the morning (30%) is pass-through traffic. However, in the evening, only a small amount (12%) is pass-through traffic and a majority of the people traveling through the area have destinations in Green Hills. The area to the west of Hillsboro Road which contains The Mall at Green Hills, The Hill Center, Kroger, the YMCA, is the primary location of many after work destinations.

Traffic Model Development

Two key software packages were used to perform the traffic analysis, including TransCAD, a macro modeling tool, and VISSIM, a microsimulation software for multi-modal traffic flow modeling. TransCAD is a Geographic Information System (GIS) software that includes mapping, visualization, and analysis tools for travel demand forecasting, public transit, logistics, routing, etc. VISSIM allows accurate simulations of urban and highway traffic, including pedestrians, bicyclists, and motorized vehicles.

The first step in the traffic modeling process was to review the Nashville MPO's TransCAD network, specifically the Green Hills Area Plan study area. Additional links within the study area were created to allow more precise analysis of certain intersections and access points.

The next step included summarizing the origin-destination data. The data was entered into a spreadsheet and a full review of the system used to collect the origin-destination data was conducted. Next, a TransCAD network was created to match the origin-destination data. Once a 1:1 match with the origin-destination network was created, matrices were created and filled with the origin-destination data. These became the seed matrices for the morning, midday, and afternoon time

periods. A traffic assignment was then run in TransCAD using these matrices, and the results were verified to make sure that the vehicle paths were accurate.

The next step was to take the turning movement counts received from the Department of Public Works and add the intersections to match the origin-destination data coverage and balance the traffic counts for all three time periods. This step was performed independent from modeling. Next, these balanced volumes were entered into the TransCAD software as a method of further refining the trip tables. At this point, an Origin-Destination Matrix Estimation (ODME) procedure was performed, utilizing a seed matrix, link volumes, and turning movement counts. This iterative process refines the origin and destination matrix until it meets convergence criteria.

The next step was to develop a Base (Year 2010) VISSIM model. This included links, connectors, traffic control, speeds and conflict areas. Then, the links in TransCAD that matched the VISSIM network were identified as a new subarea network, which created a 1:1 relationship between TransCAD and VISSIM. A subarea assignment was run in TransCAD and the resulting matrix was imported into VISSIM. The new matrix was run in VISSIM and an analysis of how well the turning movement counts processed in VISSIM matched with the balanced volumes was performed. Nearly all approaches were within 10% of the counted volumes, with most closer to 5%. The queue lengths and travel times

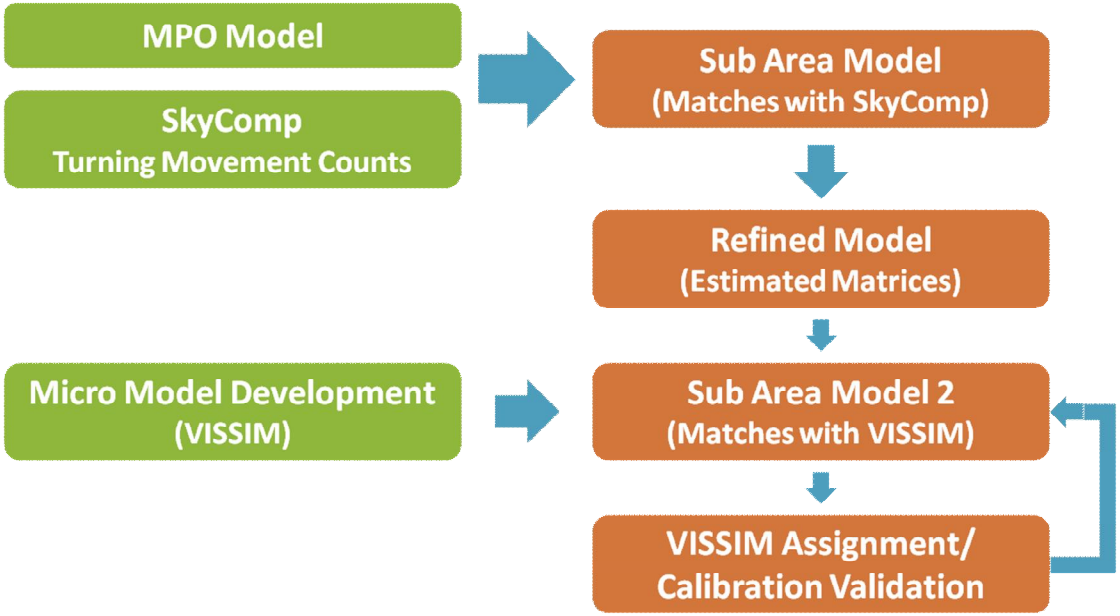


Figure 3.7: Traffic Model Development Phase using the TransCAD and VISSIM modeling tools.

obtained from origin-destination study were also used to calibrate/validate the VISSIM model. Figure 3.7 illustrates the traffic model development phase using the two modeling tools.

Existing Model Results

The base existing conditions models for year 2010 were run to determine the average delay and Level of Service (LOS) of the study area intersections in the morning, midday, and afternoon peak periods. LOS is used to provide a rating scale for congestion and operations of a roadway with LOS A representing a free-flowing facility (best) and LOS F representing a congested over-capacity facility (worst). Figure 3.8 shows the different LOS ratings graphically. Because the goal is for Green Hills to become more pedestrian/bicycle friendly and to encourage a mix of land uses, LOS D was considered acceptable for this study.

The existing conditions model demonstrates that all intersections in the study area currently operate at LOS C or better with the exception of the Harding Place intersection during the morning peak and the Hobbs Road intersection during the afternoon peak. Also, the only approaches

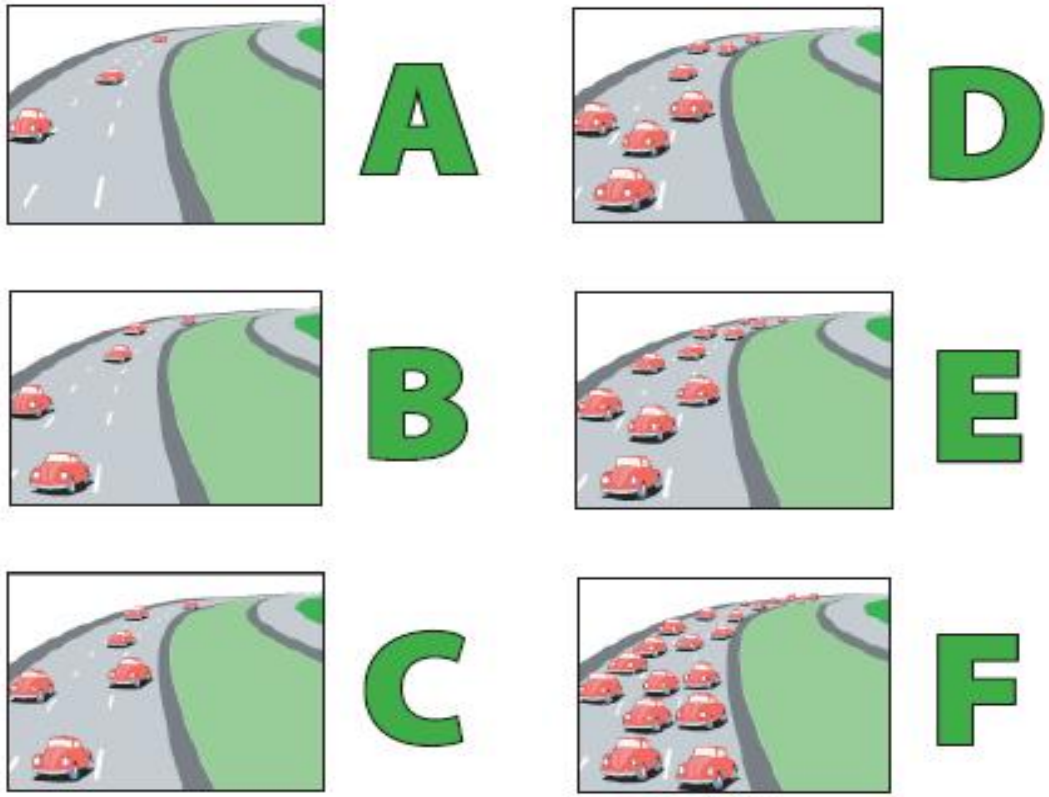


Figure 3.8: Graphical depiction of different Levels of Service.

with a LOS E or F are cross streets. All Hillsboro Road approaches operate at LOS D or better. Table 3.1 (on the following page) shows the results of the existing VISSIM model analysis.

The following is brief summary of some of the traffic issues experienced at key intersections located in the study area:

Woodmont Boulevard and Hillsboro Road
This intersection has a poor level of service, particularly in the westbound and southbound directions. The close spacing of Glen Echo Road and Crestmoor Road results in queuing to the north during the midday and afternoon peaks. This is attributed to heavy traffic volumes in the southbound direction as well as the westbound left turns.

Richard Jones Road and Hillsboro Road
This intersection operates at an acceptable LOS in the morning peak, but at LOS E in the midday and afternoon peak. The close spacing of Glen Echo Road and Crestmoor Road also causes a queue to form to the south during the midday and afternoon peak. The backup extends to Richard Jones Road and results in delay in the northbound direction.

Warfield Drive and Hillsboro Road
The most significant delays at this intersection occur in the eastbound and westbound directions during the midday and afternoon peak. To address the observed problems, an exclusive left turn lane was added to the westbound direction.

Hobbs Road and Hillsboro Road
The westbound direction operates at LOS E in the morning peak, midday and afternoon peak.

Intersection	Delay (seconds)/Level of Service		
	Morning	Midday	Afternoon
Sharondale Drive	20 / C	13 / B	11 / B
Woodmont Boulevard	29 / C	24 / C	29 / C
Crestmoor Road	12 / B	29 / C	32 / C
Glen Echo Road	9 / A	18 / B	21 / C
Green Hills Village Drive	4 / A	11 / B	17 / B
Abbott Martin Road	8 / A	17 / B	22 / C
Richard Jones Road	7 / A	17 / B	24 / C
Warfield Road	9 / A	17 / B	25 / C
Hobbs Road	27 / C	24 / C	40 / D
Burton Hills Boulevard (N)	4 / A	5 / A	7 / A
Burton Hills Boulevard (S)	2 / A	3 / A	3 / A
Harding Road	38 / D	15 / B	27 / C

Table 3.1: Existing VISSIM model results showing the seconds of delay and the Level of Service at each of the 12 signalized intersections in the study area.

Harding Place and Hillsboro Road
This intersection experiences high delays in the eastbound and westbound directions.

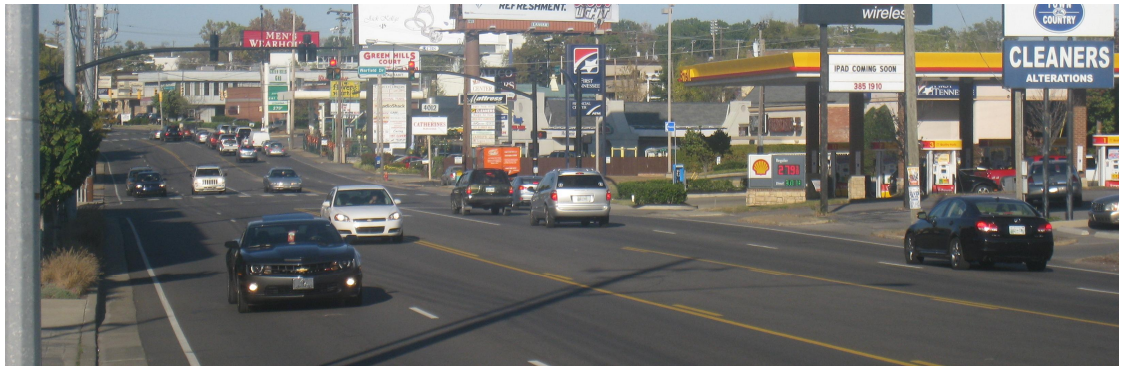
Future Year Traffic
The future year analysis for this study was determined to be the Year 2035. For growth rates, zones within the base model were analyzed one at a time.

Zones representing land use were grown based on the land use scenario outlined earlier in this chapter. Other zones were grown considering an average of land use for the study area along with historical traffic growth.

In order to improve operations, access, and safety, a wide range of options were evaluated and three improvement scenarios were developed.

- Minor Improvements
- Moderate Improvements
- Major Improvements

In order to determine the benefits of each of these scenarios, a "No-Build Scenario" was developed. The No-Build scenario proposes no new signal changes or geometric improvements. The data used



Intersection	Delay (seconds)/Level of Service		
	Morning	Midday	Afternoon
Sharondale Drive	29 / C	37 / D	31 / C
Woodmont Boulevard	41 / D	45 / D	54 / D
Crestmoor Road	19 / B	35 / C	34 / C
Glen Echo Road	17 / B	24 / C	23 / C
Green Hills Village Drive	13 / B	25 / C	16 / B
Abbott Martin Road	25 / C	45 / D	52 / D
Richard Jones Road	36 / D	67 / E	56 / E
Warfield Road	33 / C	40 / D	23 / C
Hobbs Road	60 / E	62 / E	45 / D
Burton Hills Boulevard (N)	5 / A	6 / A	8 / A
Burton Hills Boulevard (S)	1 / A	3 / A	3 / A
Harding Road	46 / D	16 / B	43 / D

Table 3.2: Future Conditions (No Build) VISSIM model results showing the seconds of delay and the Level of Service at each of the 12 signalized intersections in the study area.

was the origin-destination matrices for the year 2035 with no other changes to the model. Table 3.2 shows the results of the future year traffic models.

Based on the model output, the following observations were made regarding the future year No-Build traffic conditions:

- During the morning peak, a heavy volume of southbound vehicles waiting to turn left onto Hobbs Road causes significant back up (i.e. by the end of the traffic modeling simulation, the backup of vehicles extends north to Crestmoor Road). With the exception of the Hobbs Road intersection, the remaining intersections in the study area operate at LOS D or better.

- During the midday peak, southbound traffic queues form between the short distance between Crestmoor Road and Glen Echo Road, causing backups to Interstate 440 and further north. This back up causes the poor levels of service in the southbound direction at Crestmoor Road, Woodmont Boulevard, and Sharondale Road. Also, similar to the morning peak conditions, in the southbound direction the Hobbs Road intersection has a poor LOS due to the high volume of vehicles turning left. With the exception of Hobbs Road and Richard Jones Road (which both operate at LOS E), the remaining intersections in the study area operate at LOS D or better.

- The afternoon peak has the same issues as the midday peak in the southbound direction at the Crestmoor Road and Glen Echo Road intersections, causing backups to Interstate 440 and further north. During the afternoon peak, Richard Jones Road is the only intersection that operates at LOS E due to poor operations in the eastbound and westbound direction. All other intersections operate at LOS D or better.

The existing and future traffic analysis demonstrate that traffic backups and delays are experienced at various intersections throughout the Green Hills Area. However, these individual backups must be considered cumulatively to understand the full impact of these delays on motorists traveling through or to the Green Hills Area.

The individual intersection delays combined with delays caused by vehicles turning into or out of various driveways further adds to the congestion. In addition, the traffic in the Green Hills Area can be reduced to a "crawl" during peak times for shopping (i.e. weekends, holidays) which greatly impacts the residents and people that work in the area. A range of solutions to address the traffic issues is addressed in Chapter 4.

Transit

Today, the Green Hills area is served by two MTA local bus routes, the #2-Belmont and the #7-Hillsboro. Each route has the following characteristics:

MTA Route #2 – Belmont

The Belmont route (Figure 3.9) connects downtown Nashville with Green Hills, using 16th/17th Streets through Midtown, then Belmont Avenue to access Lipscomb University. The route then turns east via Shackleford Road and Richard Jones Road to access Hillsboro Road, where it makes a loop using Abbott Martin Road and Hillsboro Circle to serve the retail area south of The Mall at Green Hills.

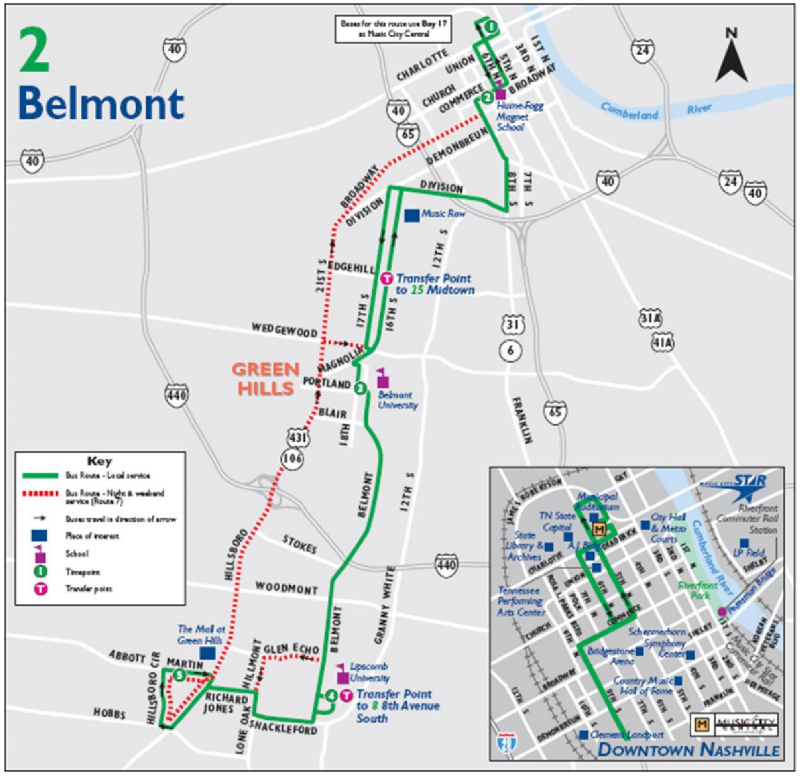


Figure 3.9: Existing (June 2011) Nashville Metropolitan Transit Authority Belmont (Route #2) bus route.

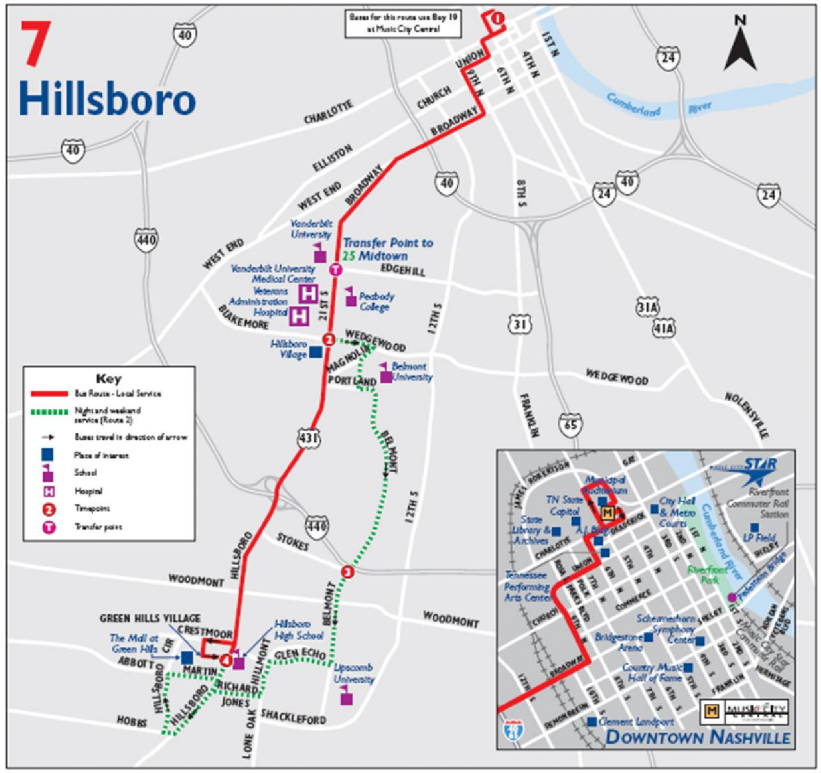


Figure 3.10: Existing (June 2011) Nashville Metropolitan Transit Authority Hillsboro (Route #7) bus route.

The route is a designated "Frequent Route" (intended mostly to serve neighborhoods). The service operates only on weekdays, running from 5:40 AM to 6:45 PM. The service frequency varies from 30 to 70 minutes during peak periods, and 60 minutes during off-peak periods. In terms of route productivity, the #2 route carried 17 passengers per hour in June 2010, versus a MTA system average for frequent routes of 15 passengers per hour.

MTA Route #7 - Hillsboro

The Hillsboro route (Figure 3.10) also connects downtown Nashville with Green Hills, but traversing the area slightly to the west using Broadway and 21st Avenue through Midtown, then Hillsboro Road south to The Mall at Green Hills. The route makes a counterclockwise loop using Crestmoor Drive and Green Hills Village Drive in the mall area, with its major stop on Green Hills Village Drive just south of Crestmoor Road.

The route is designated as a "Most Frequent Route" (intended to serve major corridors). The service operates seven days a week, 5:40 AM to 12:10 PM on weekdays, 6:15 AM to 11:00 PM on Saturdays, and 6:15 AM to 10:00 PM on Sundays. The service frequency varies from 20 to 30 minutes during peak periods, and 60 minutes on weekends. In terms of route productivity, the #7 route carried 24 passengers per hour in June 2010, similar to the MTA system average during that period.

Ridership

Figure 3.11 identifies the distribution of transit ridership (boardings and alightings) for the #2-Belmont and #7-Hillsboro routes for 15 sampled runs on each route from July 5, 2009 through August 30, 2010. The most significant boarding location is for the #7

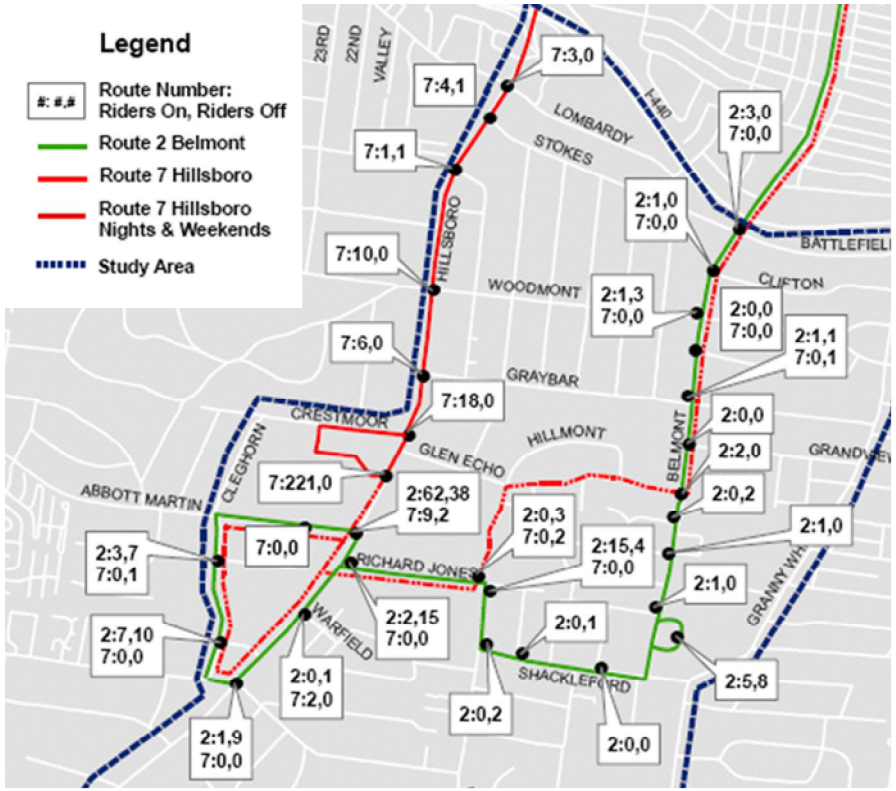


Figure 3.11: Map showing transit ridership (boardings and alightings) for the #2-Belmont and #7-Hillsboro bus routes.

route at The Mall at Green Hills (221 boardings). The most significant boarding location for the #2 route is the stop at the Hillsboro Road/Abbott Martin Road intersection (62 boardings). All other stops for the #2 and #7 routes had under 20 boardings, with most under 5 boardings.

Fare Structure

Basic one-way fares on the #2 and #7 routes are $1.60 for adults, $0.80 for seniors and people with disabilities, and $1.05 for youth. All-day passes range in cost from $4.80 for adults, to $3.00 for seniors and the disabled, to $3.30 for youth. Twenty (20) ride and seven- and 31-day passes are also available.

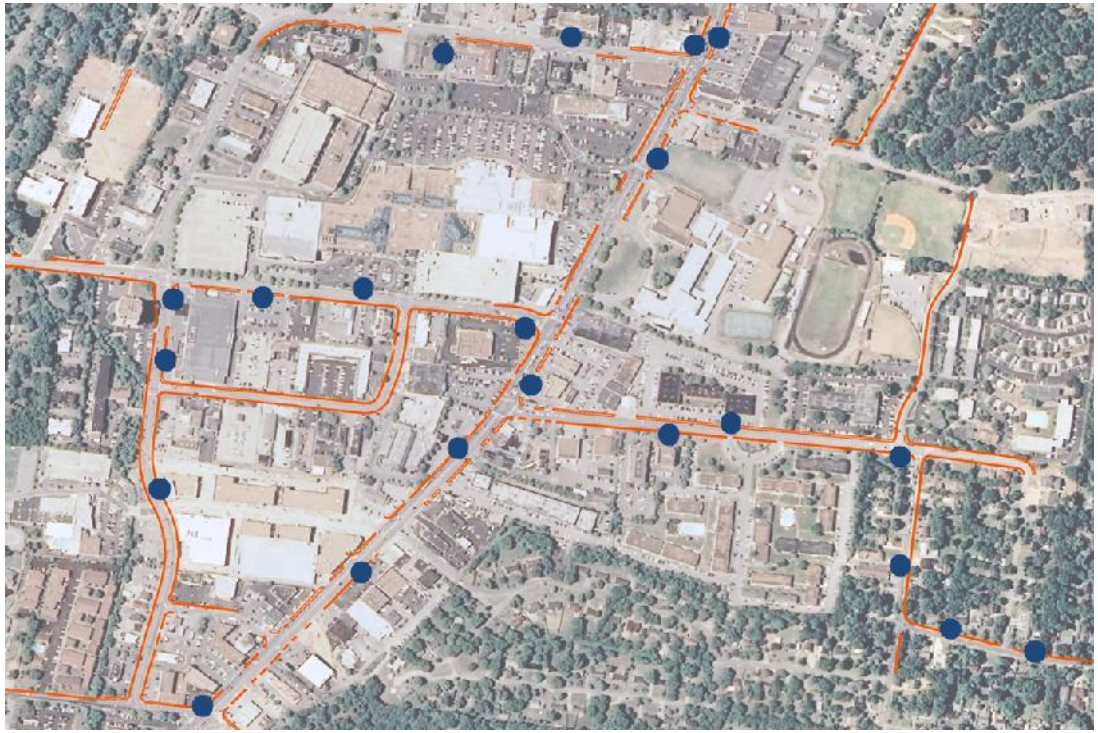


Figure 3.12: Map showing sidewalks and bus stops in the Green Hills Area.

Figure 3.13: Photos of existing bus stop and sidewalk conditions in the Green Hills Area.

Transit Stops

Many of the transit stops in the Green Hills Area are at locations with current poor pedestrian access. This is illustrated in Figure 3.12 which shows sidewalk locations with respect to bus stops, where several stops have no sidewalk access. This is also illustrated in the ground-level photos in Figure 3.13.

There is no designated transit center in the area which could serve as a single transfer point between existing and future services. There are also no designated transit park-n-ride facilities in the area.

Relationship of Route Usage to Modal Warrants

Neither the existing #2 nor #7 routes have sufficient ridership today to warrant an upgrade to a more premium transit mode. To be eligible for Very Small Starts funding through the Federal Transit Administration (FTA), at least 3,000 existing riders must be potentially shown to divert to a new premium service along these routes, whether that be bus rapid transit or streetcar. Both routes have ridership significantly below that number. Table 3.3 relates residential development levels to warrants for different transit modes. The

Transit Modes Related to Residential Density

Mode	Service	Minimum Necessary Residential Density (dwelling units/acre)	Remarks
Dial-a-bus	Many origins to many destinations	6	Only if labor costs are not more than twice those of taxis
Dial-a-bus	Fixed destinations or subscription service	3.5 to 5	Lower figure if labor costs twice those of taxis; higher if thrice those of taxis
Local bus	"Minimum," ½ mi. route spacing, 20 buses/day (~60 min. freq.)	4.5	Average, varies as a function of downtown size and distance from residential area to downtown
Local bus	"Minimum," ½ mi. route spacing, 40 buses/day (~30 min. freq.)	7	
Local bus	"Minimum," ½ mi. route spacing, 120 buses/day (~10 min. freq.)	15	
Express bus-reached on foot	5 buses during 2-hour peak period	15 Average density over 2 sq. mi. tributary area	From 10-15 miles away to largest downtowns only
Express bus-reached by auto	5-10 buses during 2-hour peak period	3 Average density over 20 sq. mi. tributary area	From 10 to 20 miles away to down-towns larger than 20 million sq. ft. of non-residential floor space.
Light rail	5-minute headways or better during peak hour	9 Average density for a corri-dor of 25 to 100 sq. mi.	To downtowns of 20 to 50 million sq. ft. of nonresidential floor space
Rapid transit	5-minute headways or better during peak hour	12 Average density for a corri-dor of 100 to 150 sq. mi.	To downtowns larger than 50 million sq. ft. of nonresidential floor space
Commuter rail	20 trains a day	1 to 2	Only to largest downtowns, if rail line exists

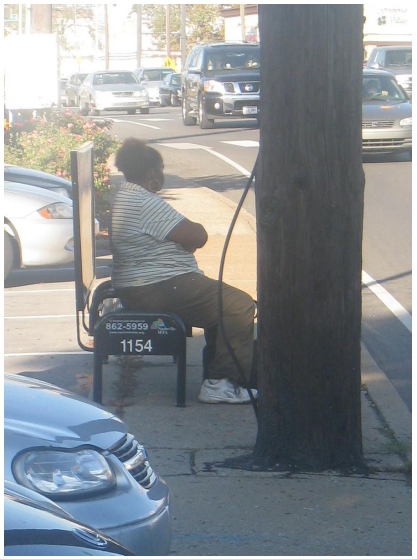
Source: *Public Transportation & Land Use Policy*, by Boris S. Pushkarev and Jeffrey M. Zupan, 1977.

Table 3.3: Relationship of residential development levels to warrants for different transit modes.

Green Hills Area today has development densities that would still warrant consideration of local bus as the primary transit mode.

The low ridership of the existing #2 and #7 routes reflects the limited service frequency on both routes, and only 12-hour weekday service on the #2 route. Increased service frequency and span of service will have an impact on ridership that combined with further densities to be developed in the Green Hills Area in the future, may warrant longer-term consideration of Bus Rapid Transit (BRT) along Hillsboro Road, and/or the development of a limited stop bus or streetcar circulator within the Green Hills Area.

BRT feasibility along Hillsboro Road will also need to be assessed with respect to other developments which could be served along the route, as well as the impact of the proposed premium transit service in the Broadway/West End corridor.



Past Service Demonstration Effort

In 2007, MTA initiated a new and innovative zone-based demand-response bus service within the Green Hills/Belle Meade area. This pilot project (called "BusLink") was

provided in an area that was previously served by fixed route bus service which was eliminated two years previously. Instead of operating large fixed route buses within the designated "zone", MTA operated a smaller para-transit vehicle that is the same as used for MTA's AccessRide service. The smaller vehicle provided maximum flexibility while also allowing MTA to achieve greater access into the community. The BusLink service was targeted at seniors, non-drivers, working professionals, and anyone who prefers not to drive in a congested area.

The BusLink on-demand service operated from 10:00 am to 7:00 pm Monday through Saturday. The service area or "zone" is bordered by Woodmont Boulevard on the North, Harding Road on the South, Belle Meade Boulevard on the West, and Hillsboro Road on the East (Figure 3.15). There were approximately 60 specialized BusLink stops placed throughout the zone. These stops were designed with a European

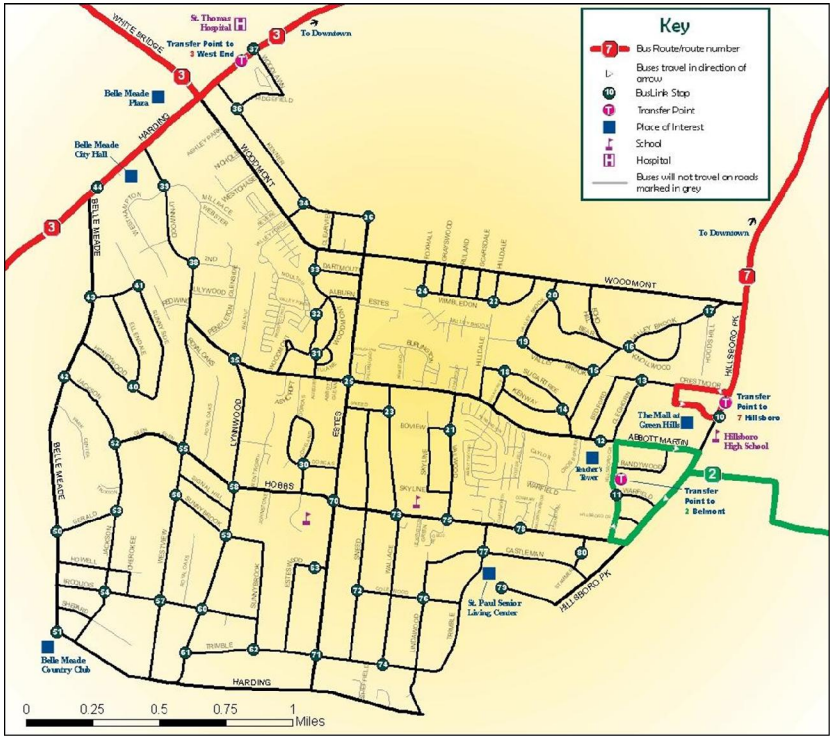


Figure 3.15: Map showing the BusLink Service Zone and stops (April 2007).

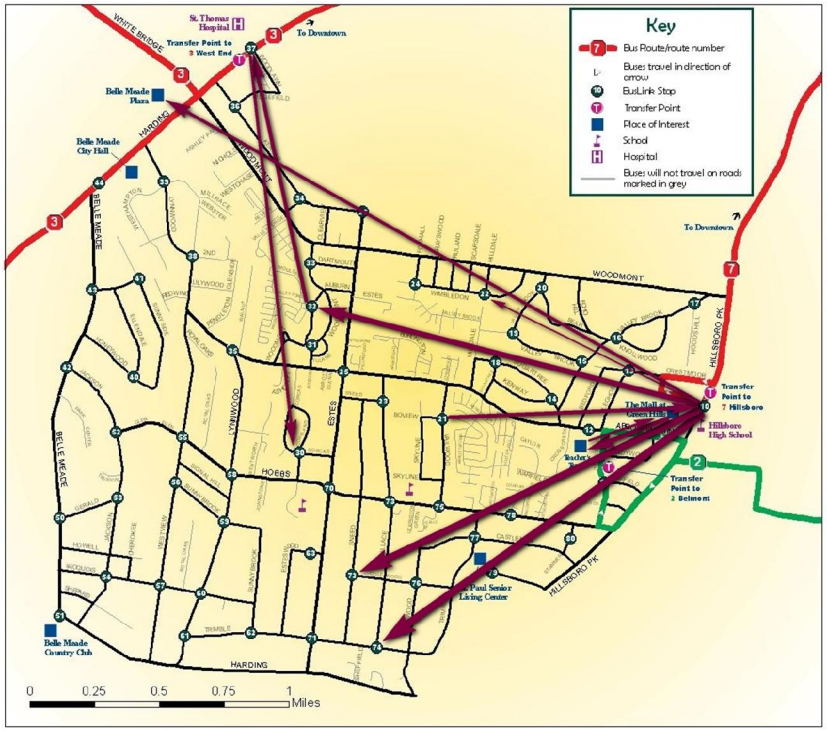


Figure 3.16: Map showing the BusLink Service Top 10 Stop Pairs (April—July 2007).

look and were round to differentiate this service from fixed route service. BusLink accepted all MTA fare media and the cost per trip was the same as fixed route service at the time at $1.25.

For the period the service operated - covering April 2 through July, 28, 2007, ridership averaged about 54 passengers a week and the passengers per hour was only 1.1. Based on the ridership during the demonstration time period, MTA decided not to continue the pilot project. Figure 3.16 identifies the top ten trip pairs served by BusLink in the Green Hills area.

Pedestrians/Bicycles

Although the design and layout of the Hill Center and the anticipated sidewalk improvements along Abbott Martin Road can both be pointed to as positive steps, overall the Green Hills Area is not very pedestrian-friendly. The historic pattern of development in the area has been focused on the automobile and the numerous curb cuts and lack of pedestrian connections between businesses, diminishes the ability for people to park their cars and walk to a nearby business or restaurant.

These conditions along with sidewalks in disrepair or a lack of sidewalks in parts of the Green Hills Area (Figure 3.17) and the surrounding residential neighborhoods, adds to the traffic congestion in the area.

The numerous curb cuts and lack of bike lanes in much of the Green Hills Area also creates an unsafe environment for bicyclists. Although it may not have a significant impact on the amount of through traffic, there are some more localized trips that potentially could be made by walking or biking, that are more than likely currently being made by car due to the existing conditions.

Figure 3.17: Map showing the priority areas for sidewalk improvements and/or crosswalk enhancements as identified by the Working Group.

A small working group of residents from the Green Hills Resource Team met to discuss the priority areas for sidewalk improvements and/or crosswalk enhancements. In addition, as mentioned in the previous section, the sidewalks in disrepair and/or a lack of sidewalks also can greatly affect the ability of people to access the bus stops in the Green Hills Area.

In 2009, the Nashville MPO undertook a regional Bicycle and Pedestrian Study to

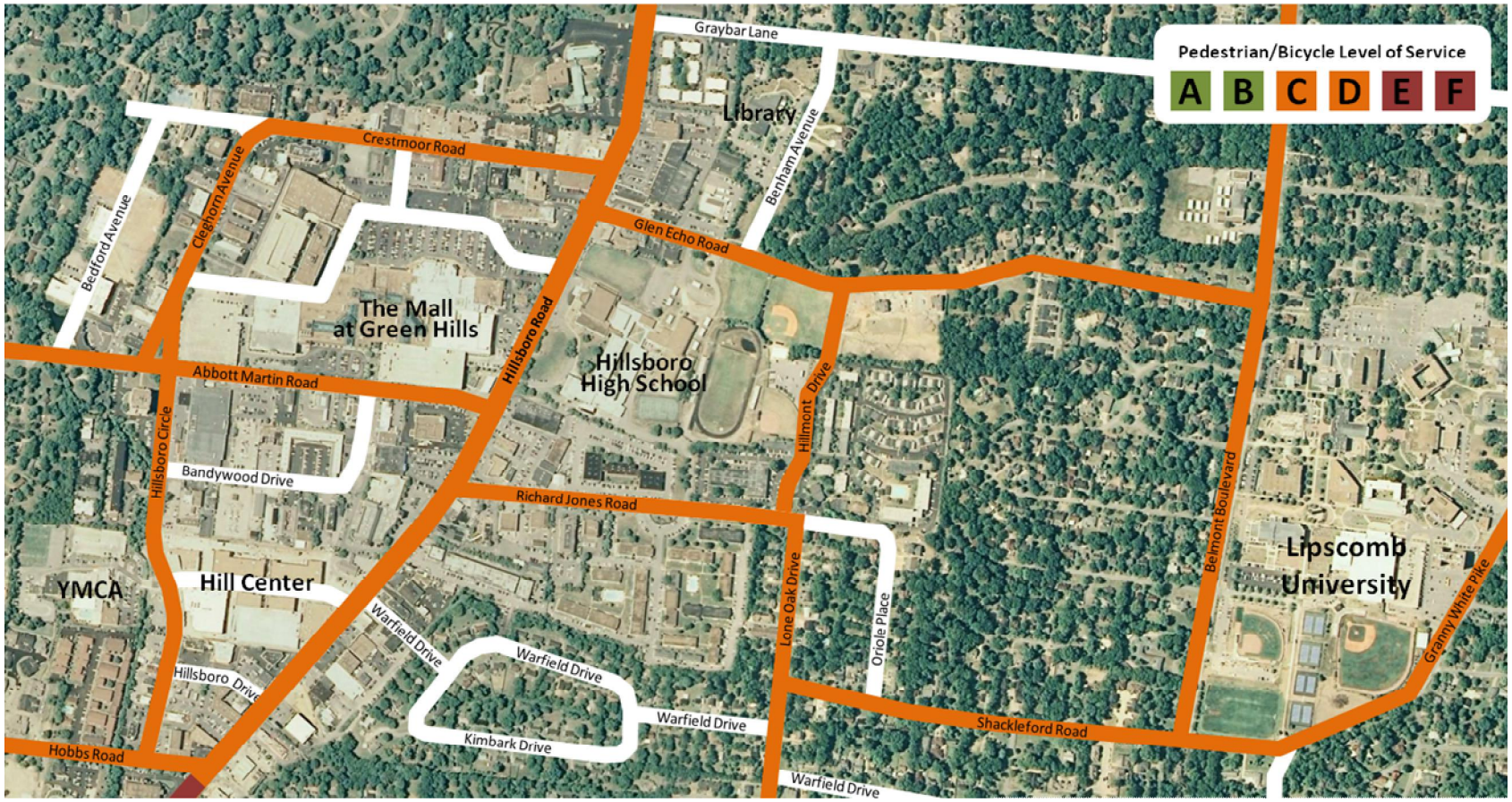
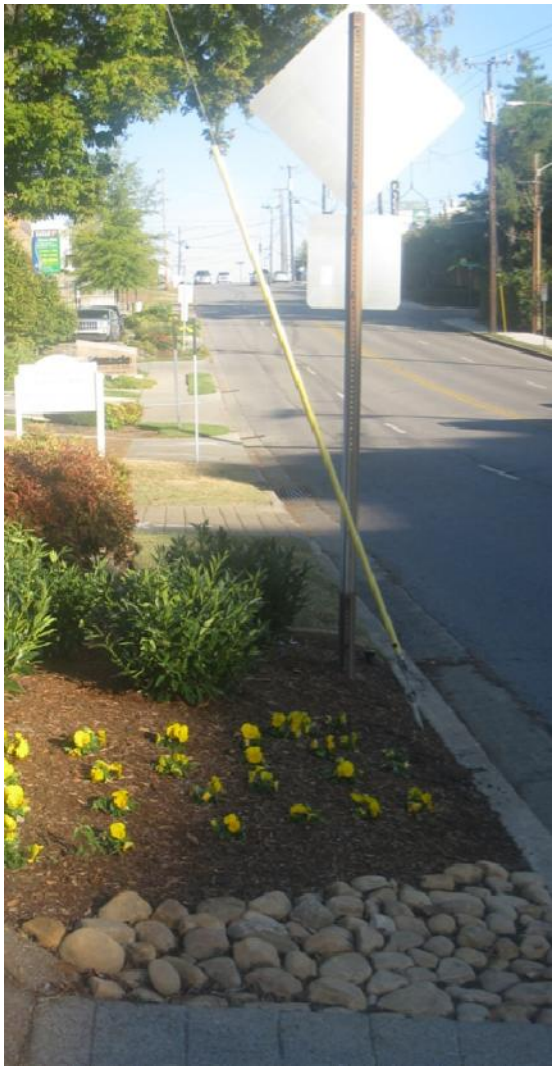


Figure 3.18: Map showing the Pedestrian Level of Service and the Bicycle Level of Service for roadways in the Green Hills Area.



"help establish a strategic vision for improving walking and bicycling opportunities in the greater Nashville region". As part of the study, the Nashville MPO looked at a variety of factors affecting both pedestrians and bicyclists throughout Nashville. Much like the Level of Service (LOS) calculations for a roadway or intersection, these factors were weighted to calculate a Pedestrian Level of Service (PLOS) and Bicycle Level of Service (BLOS) for roadways throughout Nashville.

The factors that were considered in calculating the PLOS included:

- Pedestrian Flow Rate (i.e. the number of pedestrians per hour)
- Sidewalk Width
- Buffer Width
- Presence of Barriers
- Shoulder Width
- Presence of On-Street Parking
- Outside Lane Width
- Directional Traffic Volume
- Traffic Speed

The factors that were considered in calculating the BLOS included:

- Bike/Shoulder Lane Width
- Outside Lane Width
- Number of Directional Travel Lanes
- Percent of On-Street Parking
- Divided or Undivided Roadway
- Peak Hour Traffic Volumes
- Percent of Heavy Vehicles
- Speed Limit
- Pavement Rating

Based on the factors listed above, the roadways in the Green Hills Area were assigned a PLOS and BLOS. Although the PLOS and BLOS for a roadway do not always match, in the case of the Green Hills Area, the results were almost identical for both pedestrians and bicyclists. The map in Figure 3.18 shows both the PLOS and BLOS for the Green Hills Area. The majority of the roads that were looked at received a LOS of C or D and the portion of Hillsboro Road to the south of Hobbs Road was classified as LOS E.

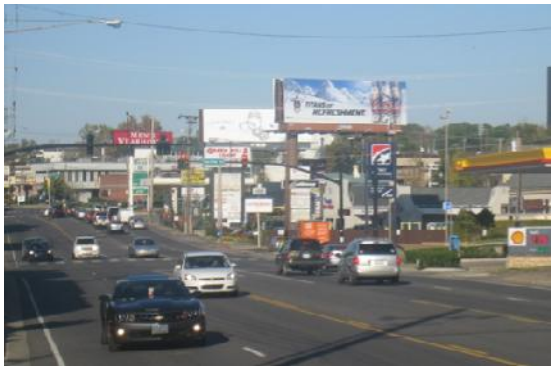
As transportation improvements are considered in the Green Hills Area creating opportunities for more and safer pedestrian and bicycle travel should be a priority. A higher PLOS and BLOS is a valuable

component of creating a greater mix and variety of uses in the Green Hills Area and encouraging more pedestrian and bicycle activity.

The concentration of residential, office, and commercial activities along Hillsboro Road draws local residents and visitors to Nashville to the Green Hills Area. As the area continues to grow, the traffic conditions will only worsen over time. In order to address these traffic issues and transform the Green Hills Area into a more walkable community, it will be necessary to implement both short– and long–term efforts across a variety of transportation modes.

4

Recommendations



Introduction

During the development of the study, it was recognized that no one solution would alleviate the traffic problems that are currently experienced, or are forecasted to be experienced, in the Green Hills Area over the next 25 years. Beyond the traffic concerns, the vision outlined by the Resource Team of Green Hills as a "place where people want to live, work, and play" and "is people-oriented and provides residents and visitors a range of transportation options to move both through and throughout the area" required consideration of a broader approach.

The following sections outline recommendations and possible improvements in five categories, 1) Traffic and Roadway, 2) Transit, 3) Pedestrian and Bicycle, 4) Access Management, and 5) Streetscape. In order for the Green Hills Area to remain a destination and a regional economic engine, it will be necessary to address issues in each of these categories.

Traffic and Roadway

The following section summarizes the future transportation conditions resulting from a series of alternatives intended to improve operations, access, and safety. The alternatives include a wide range of options and vary in cost and complexity.

There are identified traffic operation issues at several of the study area intersections. To determine the appropriate solutions to address these issues, three improvement scenarios were developed.

- Minor Improvements
- Moderate Improvements
- Major Improvements

Each of these three scenarios is discussed in more detail in the following sections.

It is important to note that signal timings (one of the minor improvement recommendations) were updated in November 2010 and again in May 2011 along the corridor as part of Public Works' ongoing signal timing maintenance program.

Minor Improvements

The operations of an intersection can often be improved without major construction or disruption to the flow of traffic. Instead, minor improvements (which are usually lower cost options) can be implemented, including:

Signal Timing

The reallocation of green time (i.e., time to pass through intersection from an approach) to other phases can result in the traffic signal operating more efficiently to move traffic. For instance, the side street may receive five seconds more green time while the major street would receive five seconds less green time. Finding the optimal timings for an individual intersection and/or the entire study area network is referred to as "optimization".

Signal Phasing

Changing the traffic signal phasing can be considered to accommodate heavier traffic movements. For instance, a left turn phase that may normally yield to opposing traffic may be changed to a protective movement so that the movement can proceed without a conflict from opposing traffic.

Turn Lane Re-striping

The re-striping of a turn lane or an approach may better serve an intersection. For instance, a shared left-through lane with an exclusive right-turn lane may be converted to a shared through-right turn lane with an exclusive left turn lane. This method can be used to change lane allocations if growth of one movement is greater than another.

Table 4.1 lists the minor improvement options for each intersection as designated by the example projects listed above. The VISSIM models were run with these minor improvements with the following results:

- In the morning peak, the heavy left turning movement onto Hobbs Road was able to be accommodated. All of

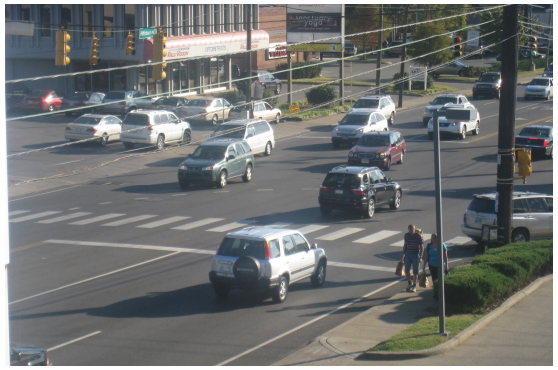
Intersection	Minor Changes
Sharondale Drive	Optimize splits (i.e. improved signal timing/phasing)
Woodmont Boulevard	Optimize splits (i.e. improved signal timing/phasing)
Crestmoor Road	Optimize splits (i.e. improved signal timing/phasing)
Glen Echo Road	Reduce green time from Westbound phase and add exclusive phase for Southbound left turn.
Green Hills Village Drive	Optimize splits (i.e. improved signal timing/phasing)
Abbott Martin Road	Eliminate max recall for North/South phases to increase intersection efficiency.
Richard Jones Road	Remove lead-lag for North/South approaches.
Warfield Road	Eliminate max recall for North/South phases to increase intersection efficiency.
Hobbs Road	Remove green time from North/South phases and add to East/West phases.
Burton Hills Boulevard (N)	Extend Westbound green phase and eliminate max re-call for North/South phases.
Burton Hills Boulevard (S)	Optimize splits (i.e. improved signal timing/phasing)
Harding Place	Remove green time from North/South phases and add to East/West phases.

Table 4.1: Summary of the minor improvement options for each intersection.

the intersections operate at LOS D or better. There are approaches that operate at LOS F and only six side street approaches operate at LOS E.

- During the midday peak southbound traffic still backs up at the short distance between Crestmoor Road and Glen Echo Road and backs up to I-440 and further north, causing poor southbound LOS at Crestmoor Road, Woodmont Boulevard, and Sharondale Drive.
- The afternoon peak continues to have heavy southbound traffic flow. Adjustments were made in an attempt to reduce side street traffic delay which was often higher than the Hillsboro Road movements. In some instance, delay is decreased, especially at the northern end of the study area. Other intersections worsen as a result of increased efficiency at other intersections.

Table 4.2 provides an overview of the resulting level of service for each peak period (morning, midday, and afternoon).



Intersection	Delay (seconds)/Level of Service		
	Morning	Midday	Afternoon
Sharondale Drive	27 / C	44 / D	28 / C
Woodmont Boulevard	40 / D	39 / D	50 / D
Crestmoor Road	18 / B	37 / D	33 / C
Glen Echo Road	17 / B	22 / C	25 / C
Green Hills Village Drive	12 / B	14 / B	22 / C
Abbott Martin Road	12 / B	22 / C	54 / D
Richard Jones Road	18 / B	54 / D	63 / E
Warfield Road	12 / B	19 / B	35 / D
Hobbs Road	43 / D	42 / D	49 / D
Burton Hills Boulevard (N)	21 / C	6 / A	7 / A
Burton Hills Boulevard (S)	5 / A	3 / A	3 / A
Harding Road	39 / D	17 / B	34 / C

Table 4.2: Overview of the resulting level of service for each peak period after implementation of the Minor Improvements.

Moderate Improvements

In some cases, non-construction techniques such as signal optimization or signal re-phasing cannot adequately accommodate traffic volumes and additional capacity is necessary. Often required at this point are geometric changes such as extending existing turn lanes to increase storage or even adding new turn lanes. These options typically cost more than the minor improvements; however, they are still less expensive when compared to major construction projects.

The improvements tested in this scenario include new moderate improvement alternatives as well as the signal optimization improvements described in the last section.

This moderate approach to improving traffic flow along Hillsboro Road is presented in Table 4.3 and Figure 4.1 by intersection. The improvements made to the roadway network in VISSIM are described in more detail later in this section.

Woodmont Boulevard and Hillsboro Road
This intersection has a poor level of service, particularly in the westbound and southbound directions. The close spacing of Glen Echo Road and Crestmoor Road results in queuing to the north during the midday and afternoon peaks. This is attributed to heavy traffic volumes in the southbound direction as well as the westbound left turns. To address the observed problems:

- Dual left turn lanes were added to the eastbound and westbound approaches.
- An exclusive right turn lane was added to the southbound approach.

The results of these improvements include reduced delay at this intersection when compared to the minor improvements scenario in the midday peak.

Intersection	Minor Changes
Sharondale Drive	None
Woodmont Boulevard	Convert exclusive right turn lane on Westbound approach to a shared through-right.
Crestmoor Road	None
Glen Echo Road	None
Green Hills Village Drive	None
Abbott Martin Road	None
Richard Jones Road	Add exclusive left turn lane and shared through-right for Eastbound approach.
Warfield Road	Add exclusive left turn lane for Westbound approach, extend existing right turn for Westbound approach, and eliminate split phase.
Hobbs Road	Add exclusive left turn lane for Westbound approach and eliminate split phase.
Burton Hills Boulevard (N)	None
Burton Hills Boulevard (S)	None
Harding Place	Add exclusive right turn bay on Eastbound approach.

Table 4.3: Summary of the moderate improvement options for each intersection.

Richard Jones Road and Hillsboro Road
This intersection operates at an acceptable LOS in the morning peak, but at LOS E in the midday and afternoon peak. The close spacing of Glen Echo Road and Crestmoor Road also causes a queue to form to the south during the midday and afternoon peak. The backup extends to Richard Jones Road and results in delay in the northbound direction.

To address the observed problems:

- An exclusive right turn lane was added in the northbound direction; and
- An exclusive left turn lane in the westbound direction was added to accommodate the high westbound traffic volumes. The additional westbound left turn only lane results in one left turn, one shared thru and left and one right turn lane in the westbound approach.

Warfield Drive and Hillsboro Road
The most significant delays at this intersection occur in the eastbound and westbound directions during the midday and afternoon peak. To address the observed problems, an exclusive left turn lane was added to the westbound direction.

This improvement resulted in a reduction in delay in both the eastbound and westbound directions in the midday and afternoon peaks. Towards the end of the simulation, the queue from Glen Echo Road and Crestmoor Road began to affect this intersection which, in turn, impacted the westbound right turning vehicles.

Hobbs Road and Hillsboro Road
The westbound direction operates at LOS E in the morning peak, midday and afternoon peak. To address the observed problems:

- An exclusive right turn lane was added in the eastbound direction; and,
- An exclusive left turn lane was added in the westbound direction.

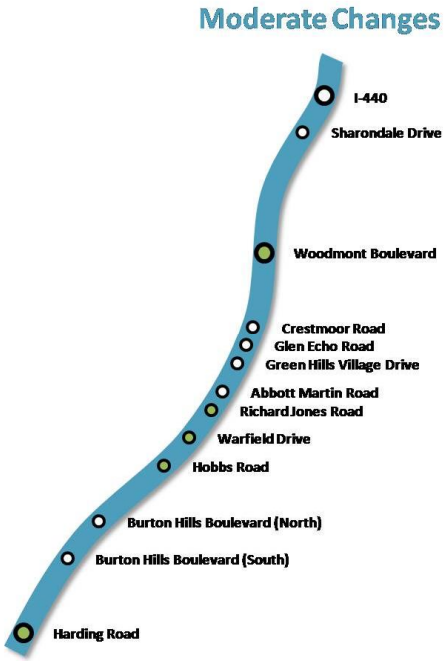


Figure 4.1: Summary of proposed moderate intersection changes.

The improvements result in all approaches operating at LOS D or better in the morning peak and midday. In the afternoon peak, the eastbound and westbound delays improve but the northbound and southbound approaches are worsened, resulting in higher overall delay for the intersection.

Harding Place and Hillsboro Road
This intersection experiences high delays in the eastbound and westbound directions. To address the observed problems, exclusive right turn lanes are added in the eastbound and westbound directions. These changes reduce delay in the afternoon peak and have little effect on the morning and midday peaks.

The moderate build improvements listed above had very little impact on the delays and LOS in the morning peak. The midday peak was most positively affected by the improvements. The afternoon peak is largely unchanged due to these moderate improvements.

Table 4.4 provides an overview of the resulting level of service for each peak period (morning, midday, and afternoon).

Major Improvements

To address some of the more complex traffic operation issues, a broader perspective is sometimes necessary where improvements are performed in combination at multiple locations. Three major improvements were tested for this study:

- Re-alignment of Abbott Martin Road/Richard Jones Road
- Re-alignment of Crestmoor Road/ Glen Echo Road
- Addition of a new interchange along I-440 at Granny White Pike

Intersection	Delay (seconds)/Level of Service		
	Morning	Midday	Afternoon
Sharondale Drive	29 / C	30 / C	26 / C
Woodmont Boulevard	40 / D	35 / D	45 / D
Crestmoor Road	19 / B	34 / C	38 / D
Glen Echo Road	21 / C	22 / C	33 / C
Green Hills Village Drive	23 / C	25 / C	23 / C
Abbott Martin Road	20 / C	29 / C	35 / C
Richard Jones Road	17 / C	31 / C	54 / D
Warfield Road	12 / B	16 / B	24 / C
Hobbs Road	34 / C	31 / C	47 / D
Burton Hills Boulevard (N)	18 / B	6 / A	10 / A
Burton Hills Boulevard (S)	4 / A	3 / A	2 / A
Harding Road	37 / D	17 / B	26 / C

Table 4.4: Overview of the resulting level of service for each peak period after implementation of the Moderate Improvements.

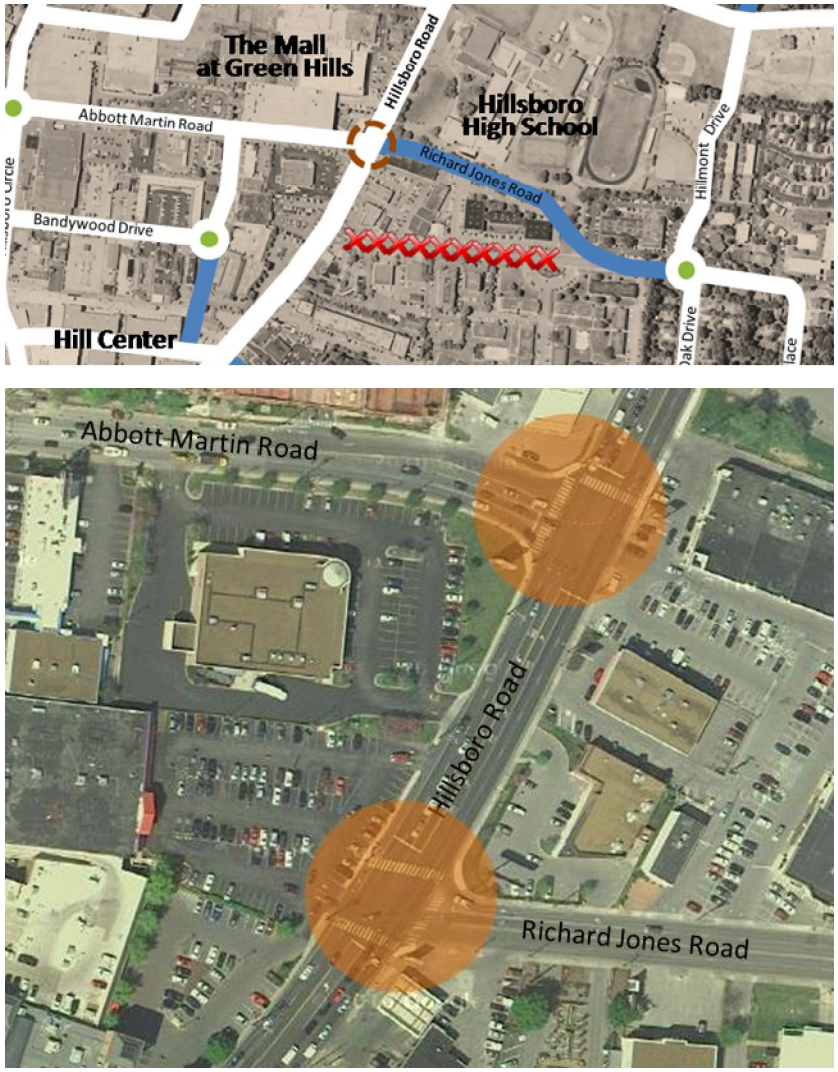


Figure 4.2: View of the existing Abbott Martin Road and Richard Jones Road intersections.

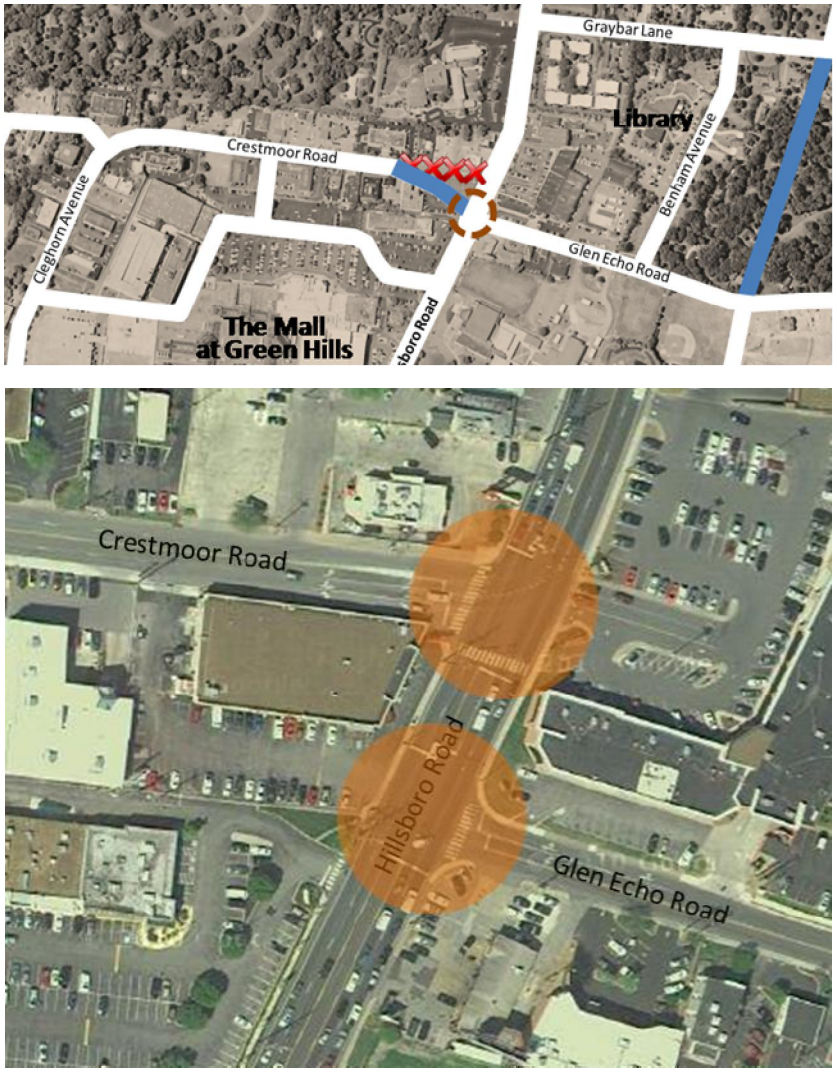


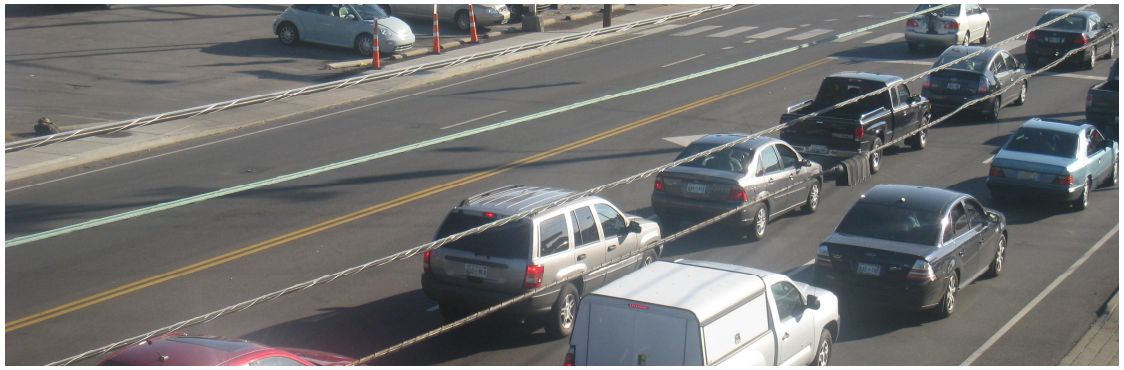
Figure 4.3: View of the existing Crestmoor Road and Glen Echo Road intersections.

These are described in more detail in the following paragraphs. It should be noted that the improvements in the minor and moderate categories are also included in the major improvements. However, the major improvements themselves are not built upon each other.

Re-alignment of Abbott Martin Road/ Richard Jones Road

The re-alignment of the intersections of Abbott Martin Road and Richard Jones Road with Hillsboro Road has been analyzed in past studies. This is the due to the close proximity of the two intersections and the impact of that closeness on the traffic operations (Figure 4.2).

The realignment was tested in VISSIM to determine the impact on the combined intersection as well as the system as a whole. The results of this approach to improving traffic flow along Hillsboro Road is presented in Table 4.5 by intersection. As shown, all intersections operate at LOS D or better for each time period.

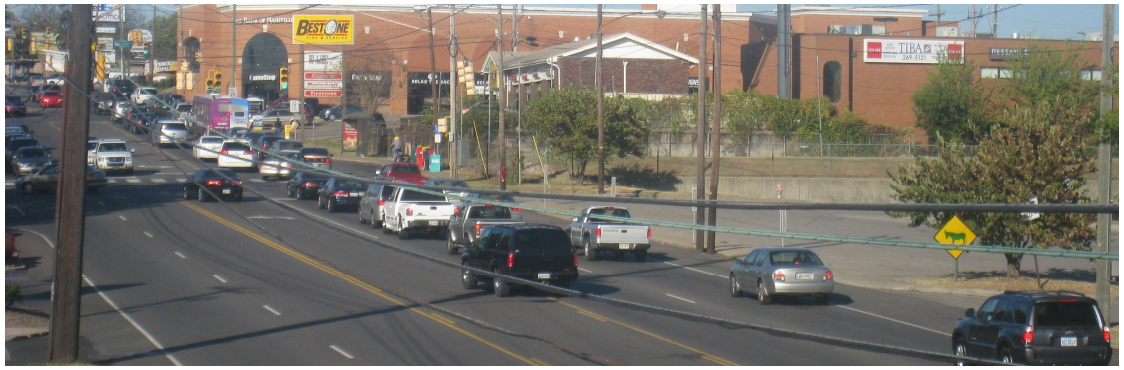


Intersection	Delay (seconds)/Level of Service		
	Morning	Midday	Afternoon
Sharondale Drive	28 / C	21 / C	21 / C
Woodmont Boulevard	39 / D	41 / D	41 / D
Crestmoor Road	17 / B	31 / C	30 / C
Glen Echo Road	18 / B	26 / C	30 / C
Green Hills Village Drive	18 / B	31 / C	22 / C
Abbott Martin Road/ Richard Jones Road	24 / C	43 / D	45 / D
Warfield Road	12 / B	18 / B	27 / C
Hobbs Road	33 / C	25 / C	44 / D
Burton Hills Boulevard (N)	4 / A	5 / A	8 / A
Burton Hills Boulevard (S)	2 / A	3 / A	3 / A
Harding Road	36 / D	16 / B	26 / C

Table 4.5: Overview of the resulting level of service for each peak period after implementation of the re-alignment of the intersections of Abbott Martin Road and Richard Jones Road with Hillsboro Road.

Re-alignment of Crestmoor Road/ Glen Echo Road
As with Abbott Martin Road and Richards Jones Road, the re-alignment of the intersections of Crestmoor Road and Glen Echo Road has been considered as an option in past studies due the close proximity of the two intersections. This is shown in Figure 4.3.

The results of this approach to improving traffic flow along Hillsboro Road are presented in Table 4.6 by intersection.



Intersection	Delay (seconds)/Level of Service		
	Morning	Midday	Afternoon
Sharondale Drive	26 / C	18 / B	20 / C
Woodmont Boulevard	37 / D	31 / C	38 / D
Crestmoor Road/ Glen Echo Road	17 / B	26 / C	31 / C
Green Hills Village Drive	5 / A	18 / B	14 / B
Abbott Martin Road	18 / B	24 / C	37 / D
Richard Jones Road	12 / B	36 / D	29 / C
Warfield Road	9 / A	16 / B	27 / C
Hobbs Road	33 / C	28 / C	36 / D
Burton Hills Boulevard (N)	5 / A	5 / A	10 / B
Burton Hills Boulevard (S)	1 / A	4 / A	3 / A
Harding Road	40 / D	16 / B	24 / C

Table 4.6: Overview of the resulting level of service for each peak period after implementation of the re-alignment of the intersections of Crestmoor Road and Glen Echo Road with Hillsboro Road.

Addition of a new interchange along I-440 at Granny White Pike

An additional project being considered is a new interchange at Granny White Pike and I-440. The new interchange would be just east of the current interchange of I-440 and Hillsboro Road. Improvements to Granny White Pike will be necessary along with an improved connection to Hillsboro Road via Warfield Drive. Figure 4.4 shows the location of the new interchange as well as other improvements to the study area.

When I-440 was original planned and designed, an interchange was envisioned at Granny White Pike. Although the right-of-way was purchased (Figure 4.5), the interchange was never constructed due to opposition from the adjacent neighborhoods.

This new interchange was tested in the Nashville MPO's travel demand model as the interchange was expected to have an impact on trips beyond just the study area for this project. The traffic volumes were then entered into the VISSIM model and the following results were obtained. Table 4.7 summarizes the results of the VISSIM analysis. The new interchange and accompanying roadway improvements

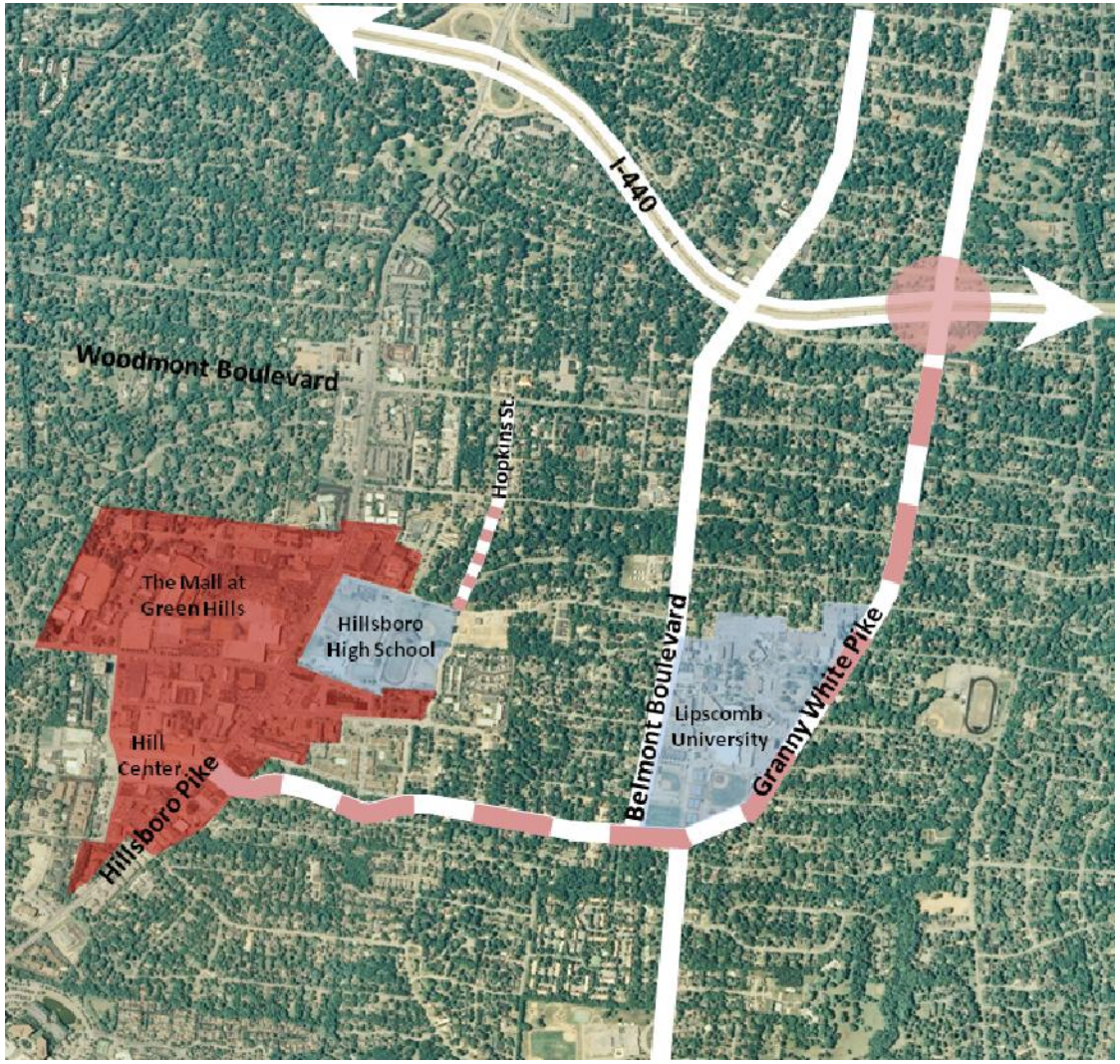


Figure 4.4: View of the proposed interchange along I-440 at Granny White Pike.

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would reduce traffic along Hillsboro Pike between Woodmont and I-440 and reduce some east to west traffic in the Green Hills Area, although an increase in the east to west traffic closer to I-440 was observed. Overall, the addition of the new interchange would divert traffic to Granny White Pike and reduce the amount of traffic along Hillsboro Road.

As shown, all intersections operate at LOS D or better, except Hillsboro Road and Richard Jones Road in the afternoon period. This is attributed to a higher volume of traffic resulting from improved connectivity between Hillsboro Road and Granny White Pike.

Summary

To address issues identified in the existing (No-Build) system, three scenarios were developed: minor improvements, moderate improvements, and major improvements. Each scenario was evaluated utilizing traffic models and level of service results were determined from the resulting modeled traffic volumes.

The minor improvements scenario showed that signal timing adjustments provided positive benefits.

Figure 4.5: Aerial view of the proposed interchange along I-440 at Granny White Pike (top) and a property map of the area showing the existing right-of-way (bottom)..

The moderate improvements scenario showed increased vehicles entering the system and may reduce side-street delay. These improvements, however, add more north/south traffic.

The major improvements scenario shows that the realigned intersections improve system performance but do not solve traffic problems in all areas. The Granny White Pike Interchange generally provides reductions in traffic. This includes Hillsboro Road between Woodmont Boulevard and I-440, some east-west traffic, and some reductions in system traffic (i.e. traffic that no longer needs to use Hillsboro Road). While each of the improvements had a positive impact, no one solution provided the necessary benefits to resolve the traffic issues that can plague the Green Hills Area.

Intersection	Delay (seconds)/Level of Service		
	Morning	Midday	Afternoon
Sharondale Drive	20 / C	15 / B	14 / B
Woodmont Boulevard	41 / D	31 / C	35 / D
Crestmoor Road	12 / B	31 / C	25 / C
Glen Echo Road	10 / B	19 / B	19 / B
Green Hills Village Drive	5 / A	16 / B	24 / C
Abbott Martin Road	11 / B	25 / C	35 / D
Richard Jones Road	8 / A	28 / C	56 / E
Warfield Road	14 / B	15 / B	23 / C
Hobbs Road	30 / C	33 / C	38 / D
Burton Hills Boulevard (N)	4 / A	5 / A	9 / A
Burton Hills Boulevard (S)	2 / A	3 / A	3 / A
Harding Road	33 / C	17 / B	23 / C

Table 4.7: Overview of the resulting level of service for each peak period after implementation of the interchange along I-440 at Granny White Pike.

Figure 4.6 shows the resulting improvements at key intersections throughout the corridor based on the minor, moderate, and major improvements. The recommended improvements do result in improved performance at these key intersections, but it is also necessary to look at the improvements from a system-wide approach.

Because of the variety of uses (residential, commercial, office, educational, etc.) and the solution to the traffic problems in the area will need to be addressed through a comprehensive approach that includes improvements to the existing transit system, pedestrian/bicycle network, and incorporates access management techniques.

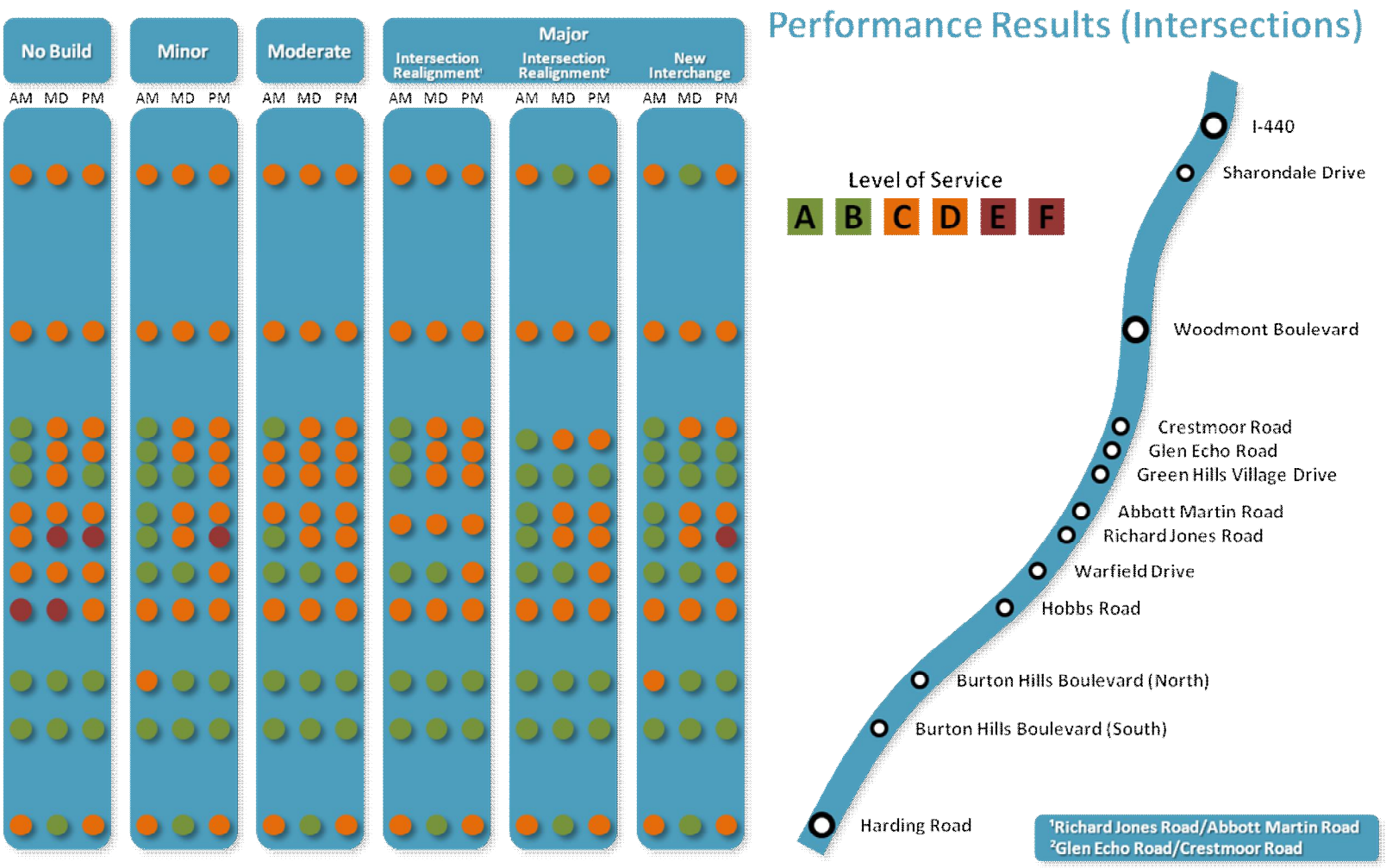


Figure 4.6: Overview of the Minor, Moderate, and Major Improvements and resulting Level of Service.

Transit

Although fixed-route bus service currently serves the Green Hills Area, the following section summarizes possible enhancements and additions to broaden the availability and visibility of transit service in the area.

Fixed-Route Service Alternatives

Given the limited fixed-route bus service in the Green Hills Area today, two service improvement options were identified. The options focus on expanding the coverage and connectivity of MTA local bus service, with a higher service frequency than currently in place. The options are distinguished by whether or not a local fixed-route circulator would be developed to complement the #2-Belmont and #7-Hillsboro routes.

Option #1 – Connect #2 and #7 Routes at New Mini-Hub/Extension of #7 Route to Burton Hills

With this service improvement, the #2 and #7 routes would be connected at a new mini-hub location at The Mall at Green Hills or another location. Figure 4.7 illustrates a concept where the #2 route would be extended north to connect with the #7 route at the mall. Figure 4.8 identifies a potential on-street transit station on the

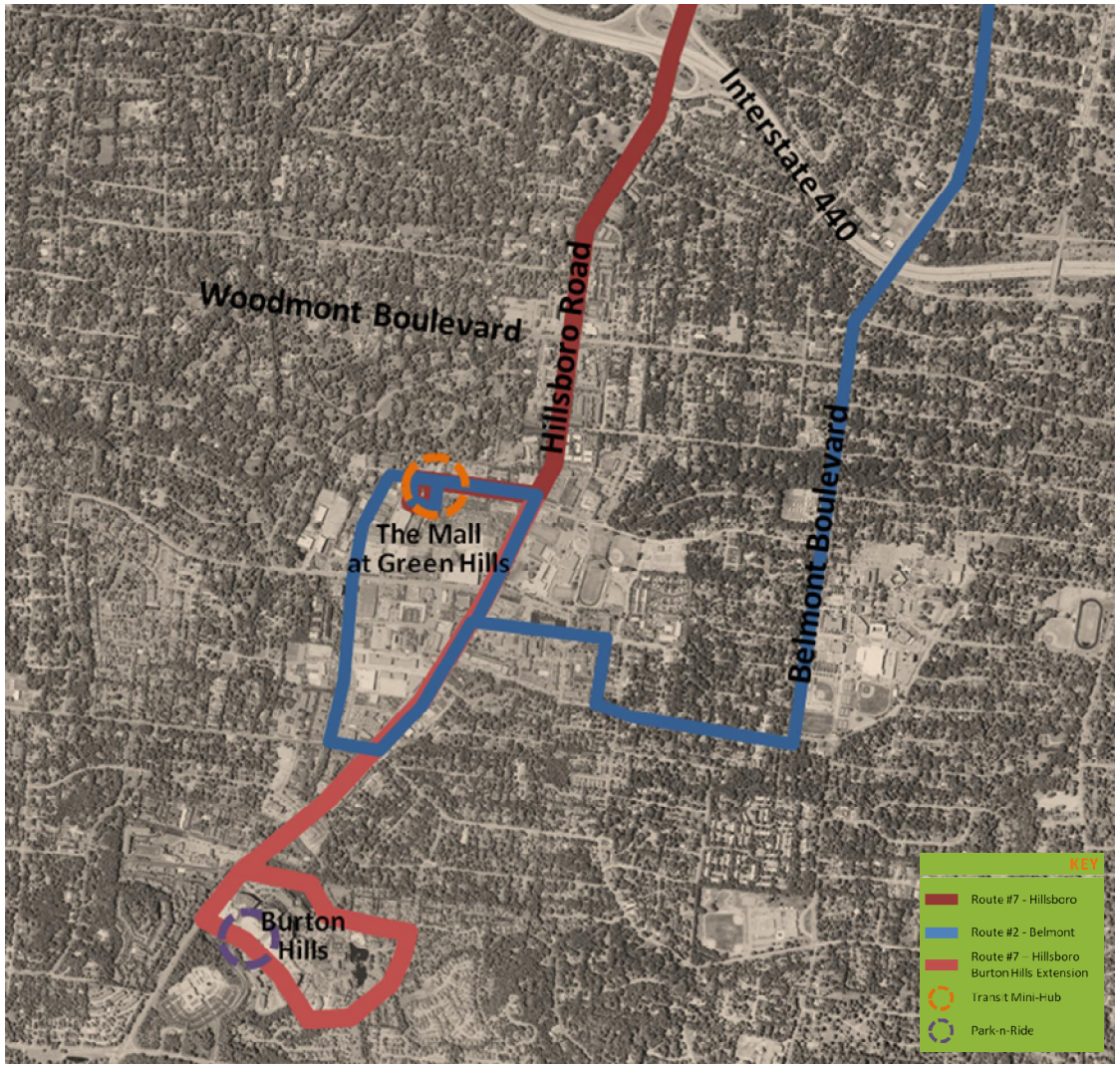


Figure 4.7: View of Option #1 which includes connecting the #2 and #7 Routes at a New Mini-Hub and the extension of #7 Route to Burton Hills.

Figure 4.8: Location and view of the existing conditions at a potential mini-hub location at the Old Library Site along Green Hills Village Drive.

Figure 4.9: Illustration of potential mini-hub location at the Old Library Site along Green Hills Village Drive.

west side of Green Hills Village Drive just south of Crestmoor Road (next to the old library site) that could be one potential location for a mini-hub. Figure 4.9 illustrates what such a stop could look like with bus pullout area, enhanced shelters and other passenger amenities.

MTA has expressed a desire to not operate its buses in the future further south through the mall parking lot on Green Hills Village Drive, and hence if this identified mini-hub site were developed, buses after serving the stop would be routed around the west side of the library site to get back to Crestmoor Road.

With this concept, the #7 route would be extended south to Burton Hills to provide transit access to the office park there and surrounding multi-family development. The #7 route could access the Burton Hills either from the north or south access road, a final routing probably dependent on a final site for any park-and-ride facility. If desired, a park-n-ride site could be developed through some joint use parking arrangement with the office park or on a new site in the vicinity.

Option #2 – New Local Circulator Service

The second local bus improvement concept would involve the development of a new local bus circulator that would tie into the #2 and #7 routes at a new mini-hub location. Such a circulator would connect the different retail/office areas in the Green Hills Area, including serving the Burton Hills area and Lipscomb University. Figure 4.10 identifies a potential routing of the #2 and #7 routes and a circulator if a mini-hub were developed at the north end of The Mall at Green Hills. With this option, the #2 route would directly tie into the mini-hub, and not provide any local circulation through Green Hills (which would be done by the circulator).

Recommendations

The transit improvement recommendations associated with this study focus on improvements to the local bus service in the area. It is recognized that longer-term, greater development densities in the area might make the development of bus rapid transit along Hillsboro Road or a streetcar within the Green Hills Area attractive, but those services do not appear to be cost-effective to pursue in the short-term.

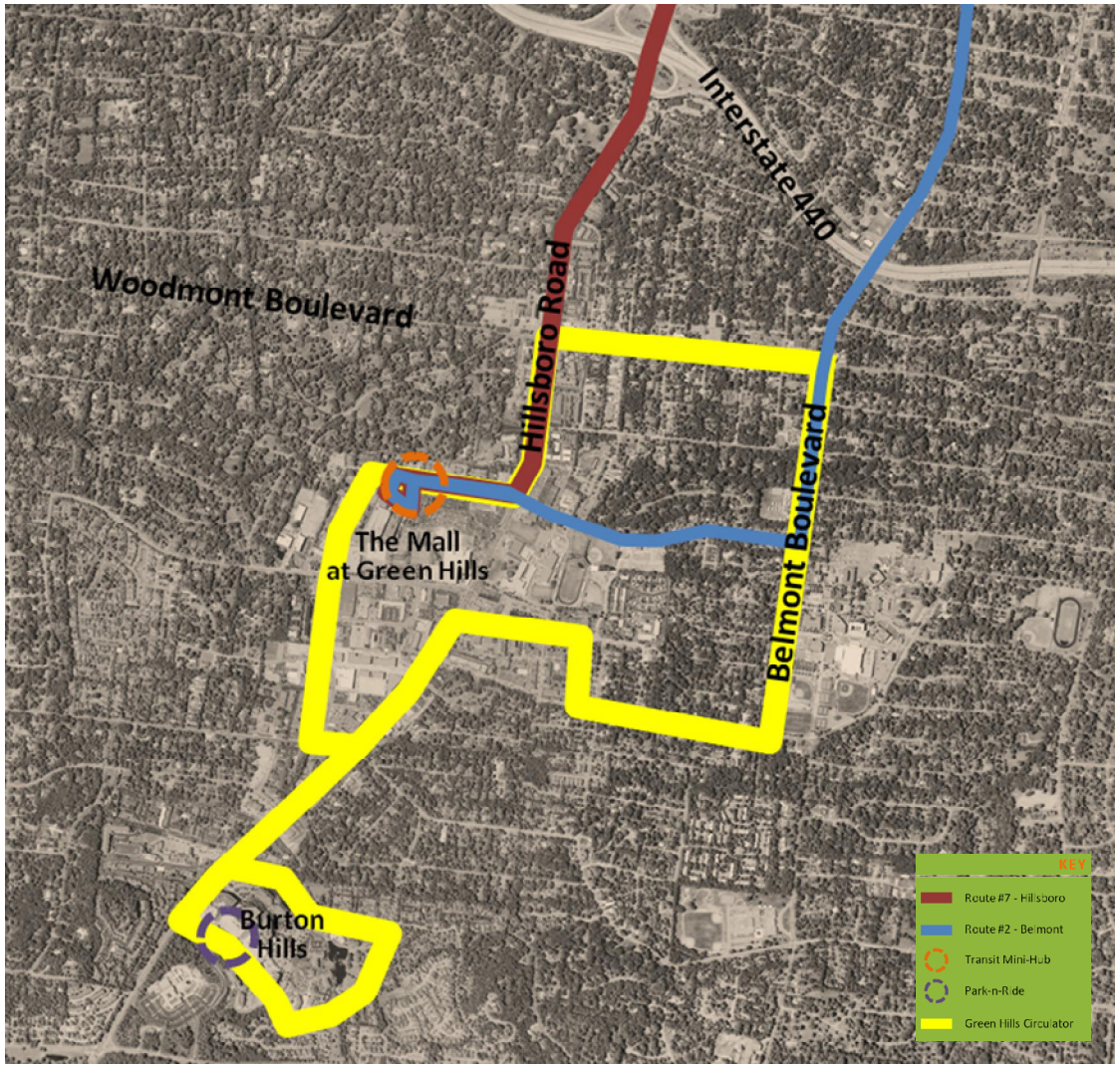


Figure 4.10: View of potential routing of the #2 and #7 routes and a circulator if a mini-hub were developed at the Old Library site.

Fixed-Route Local Bus Service

Option #1, development of a new transit mini-hub and extension of the #7-Hillsboro route to Burton Hills, appears to be the most short-term, cost-effective transit improvement for the Green Hills Area. Further evaluation is needed to assess potential sites for the mini-hub, and a potential park-n-ride facility in the Burton Hills area. Other possible sites for the mini-hub include the Hill Center and the existing parking lot in front of the Hillsboro High School gymnasium.

Span of Service/Service Frequency Improvements

Per the recommendations in the MTA Transit Master Plan (Figure 4.11), the #2 and #7 routes should have increased span of service and service frequency per the service goals identified in the Plan for the identified service class ("Frequent" for the #2 route, and "Most Frequent" for the #7 route).

Transit Stop Improvements

Coordinated with improvements to the sidewalk system in the Green Hills Area, accessibility improvements to bus stops in the area should be provided, to make them all ADA-accessible. Accessibility

Service Class	Span of Service	Minimum Frequency	Goal Frequency	Goal for Hours of Service Provided
Most Frequent	Peak (Monday-Friday 6am-9am and 3pm-6pm)	30 minutes	15 minutes	18 Hours
	Midday (9am – 3pm)	30 minutes	20 minutes	
	Evening	60 minutes	30 minutes	
	Saturday	60 minutes	30 minutes	18 hours
	Sunday	60 minutes	30 minutes	12 hours
Frequent	Peak (Monday-Friday 6am-9am and 3pm-6pm)	60 minutes	30 minutes	17 Hours
	Midday (9am – 3pm)	60 minutes	45 minutes	
	Evening	60 minutes (if service is provided)	30 minutes	
	Weekends	60 minutes (If service is provided)	30 minutes	17 Hours Saturday, 10 hours Sunday
Commuter	Peak (Monday-Friday 6am-9am and 3pm-6pm)	30 minutes	30 minutes	6 Hours
Circulator	Daytime (Monday-Friday 6:30am--8pm)	10 minutes	10 minutes	17 Hours
	Evenings (8pm to 11:30pm)	15 minutes	10 minutes	
	Saturday and Sunday	15 minutes	10 minutes	8 Hours
BRT	Peak (Monday-Friday 6am-9am and 3pm-6pm)	10-15 minutes	10-12 minutes	18 Hours
	Midday (9am – 3pm)	15-30 minutes	10-15 minutes	
	Saturday	15-20 minutes	10-15 minutes	13 Hours
	Sunday	30 minutes	15 minutes	13 Hours
Flexible Route Services	Weekdays (Monday-Friday 6am--8pm)	N/A	N/A	14 Hours
	Saturday (10am – 8 pm)	N/A	N/A	10 hours

Figure 4.11: Proposed Span of Service and Service Frequency by Service Class (*Source: Nashville Strategic Transit Master Plan Final Report*).

improvements to stops along Hillsboro Road as well as in and around the mall area are recommended and should receive priority.

As an illustration of how a transit stop improvement might be developed, a review of the northbound bus stop on Hillsboro Road north of Abbott Martin Road was conducted. Figure 4.12 shows in plan and cross-section view the existing stop, which includes a pullout and limited pedestrian waiting area at the stop. Figure 4.13 shows what type of improvements could be provided that would eliminate the bus pullout and provide more pedestrian space at the stop. Such an improvement would also provide greater priority for buses at this location because they would not have to wait for a gap in traffic to pull back into the flow of traffic.

Figure 4.12: Aerial view and a photograph of the existing transit stop along Hillsboro Road opposite The Mall at Green Hills.

Figure 4.13: Illustration of potential improvements to the transit stop along Hillsboro Road opposite The Mall at Green Hills.

Transit Priority Improvements

Associated with intersection improvements along Hillsboro Road, transit signal priority (TSP) should be implemented at those intersections that today and in the future are projected to operate in the LOS C-D condition. Under this LOS window, there would be benefit to bus operations as well as negligible impact to general traffic

operations. Thus it is recommended that TSP should be implemented at the following Hillsboro Road intersections:

- Woodmont Boulevard
- Crestmoor Road
- Glen Echo Road
- Abbott Martin Road
- Richard Jones Road
- Warfield Drive
- Hobbs Road

The TSP would involve a green extension/ red truncation treatment at these signal locations. Further assessment of the appropriate technology for bus detection and signal hardware/software modifications will be required. It is proposed that initially "conditional" priority be provided, triggering TSP only if the bus is behind schedule. The bus stops at these intersections should also be located on the far side of the intersection in order to maximize the effectiveness of the TSP operation.

Potential Interface with Broadway/West End Corridor

Given the low-density residential nature of the Green Hills Area west of the retail/office area along Hillsboro Road, a fixed-route bus circulator in that area does not appear to be feasible, verified through the low ridership on the BusLink demonstration project in 2007. However, it would be desirable to create a fixed-route transit link from the Green Hills Mall and surrounding area retail/office area with the planned Broadway/West End premium transit corridor to the west. The feasibility of connecting the Broadway/West End corridor to Green Hills should be a consideration in the current Alternatives Analysis study.

Pedestrians and Bicycles

Today, the Green Hills Area is not a place where many people walk or bike. The condition of many of the sidewalks and a lack of bike lanes along side streets, combined with the amount of traffic in the area makes walking and biking unsafe and unpleasant.

Enhancements to the existing pedestrian and bicycle network, along with establishing pedestrian-friendly connections between businesses would increase the opportunities for people to park their cars in one location and visit a variety of destinations. In addition, linking the surrounding residential areas with a network of sidewalks and bikeways would greatly increase the accessibility of the commercial area to the surrounding residents.

Recommendations

As the Green Hills Area continues to grow, thought must be given to how accommodations for pedestrians and bicycles will be integrated into the network of streets to create an environment that would encourage walking and biking. Due to safety concerns, this plan does not recommend that bike lanes be placed along Hillsboro Road. A further recommendation is that the *Strategic Plan for Sidewalks and Bikeways* be updated to remove bike lanes from Hillsboro Road. Emphasis should be placed on linking the residential areas with businesses, creating connections to transit stops, and the inclusion of pedestrian and bicycle amenities throughout the commercial area.

Sidewalks

The pedestrian network should be completed and improved throughout the Green Hills Area. Starting in and around The Mall at Green Hills, the missing segments of sidewalks and segments of sidewalks in disrepair should be improved

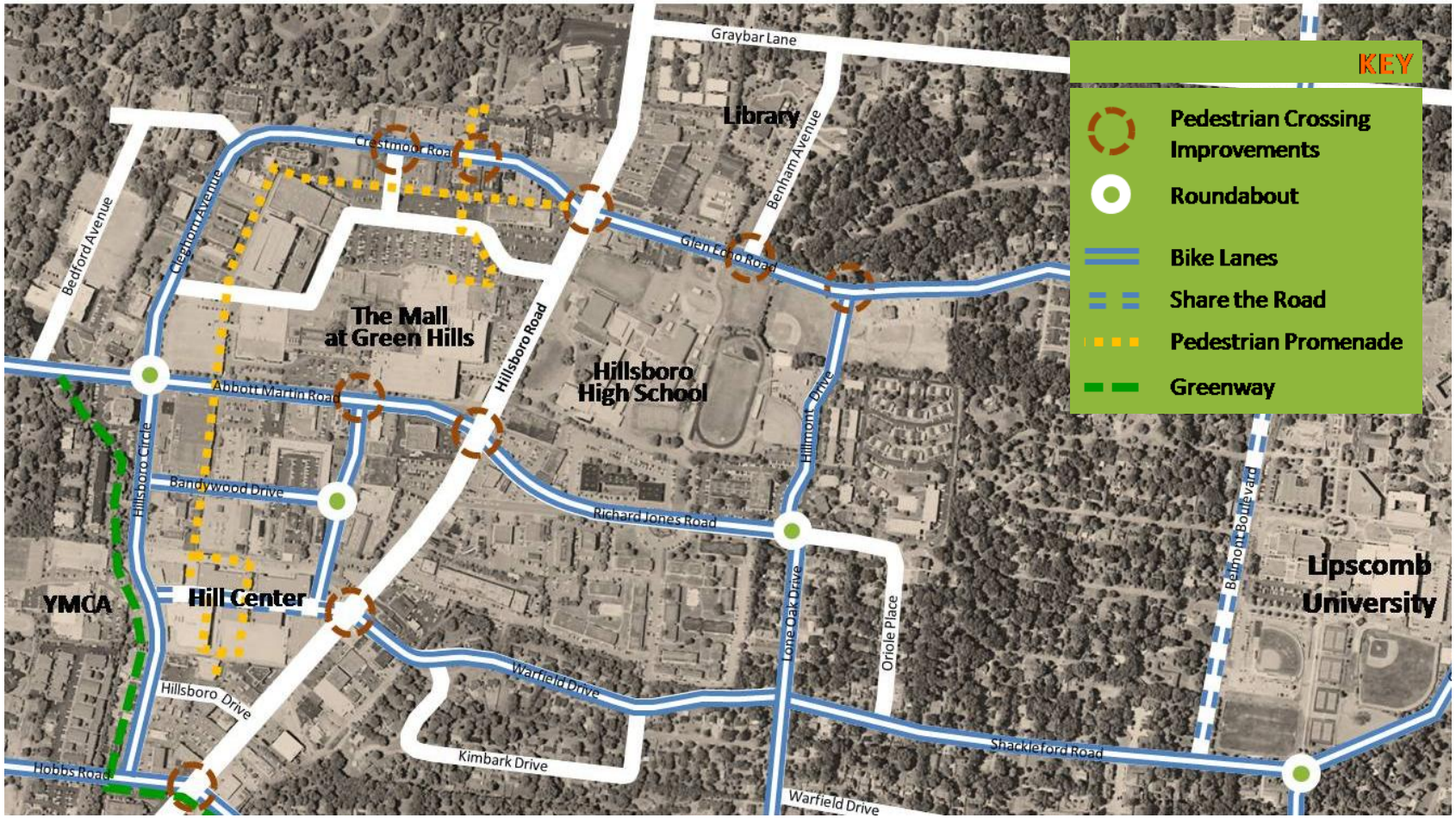


Figure 4.14: Proposed pedestrian and bicycle network throughout the Green Hills Area.

or enhanced. These improvements should be made in accordance with the improved street network (Figure 4.14) and in keeping with the streetscape designs discussed later in this Section.

Crosswalks

In order to ensure safe crossing of Hillsboro Road and other roads throughout the area, clearly marked and signed pedestrian signals at intersections should be provided. Additional enhancements such as countdown signals could also be provided at specific intersections to encourage more pedestrian activity and to make it safer and easier for pedestrians and bicyclists to cross busy roadways. The locations shown in Figure 4.14 are the priority locations for these pedestrian-friendly improvements.

Promenade

One of the issues that arose during the development of the study was the lack of informal connections between businesses. The issue was described by some members of the Resource Team as being able to view your destination but not knowing how to get there by foot, so instead choosing to hop in the car and drive. Based on this feedback, the idea of a pedestrian promenade throughout the Green Hills Area was developed.

Figure 4.15: Location and existing view of an underutilized area near The Hill Center, The Mall at Green Hills can be seen in the distance).

Figure 4.16: Illustration of pedestrian promenade connecting The Hill Center and The Mall at Green Hills.

The pedestrian promenade approach would enhance vacant, or underutilized areas, to create connections between major destinations in the Green Hills Area. The approach would require cooperation between the City and private entities, but could potentially add to the walkability of the Green Hills Area. The pedestrian promenade could involve a simple approach, such as painting symbols on the pavement and providing signage to direct people to their destination, or could be extensive and aid in the transformation of a particular property (Figures 4.15 and 4.16).

Greenway

The entire pedestrian network throughout the Green Hills Area would also connect to the proposed Sugartree Creek Greenway which was recommended for additional study in the *Green Hills-Midtown Community Plan 2005 Update*. Preliminary plans for the greenway were developed by the Greenways Commission (Figure 4.17) for this greenway which would connect Green Hills Park (to the southeast of the study area).

The greenway is envisioned (Figure 4.18) to follow Sugartree Creek and parallel Hillsboro Circle before heading to the west just north of Abbott Martin Road. The location of the YMCA along Sugartree Creek is an ideal opportunity to connect this destination with the residential areas to the north and south of the Green Hills Area via the greenway.

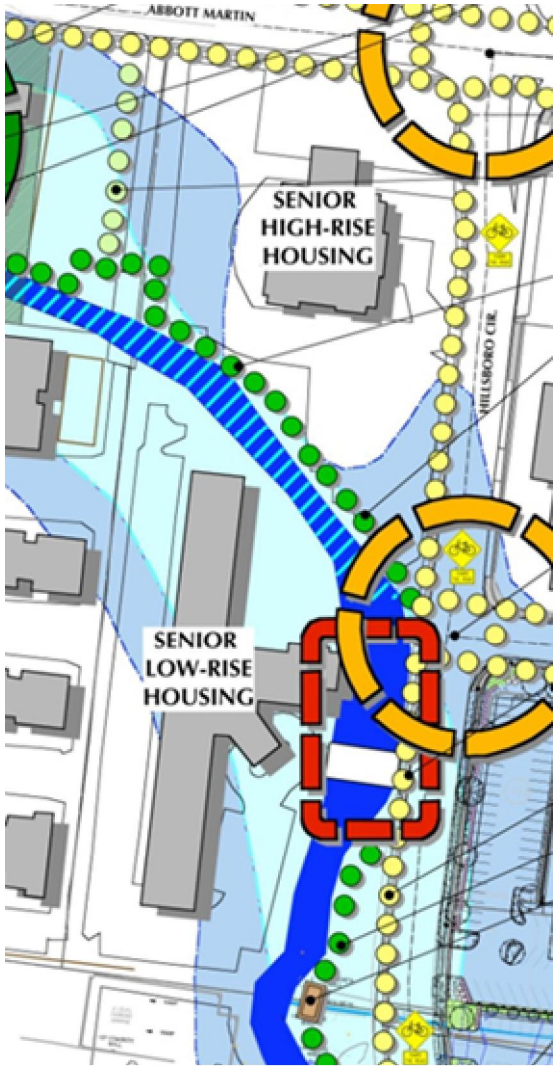


Figure 4.17: Preliminary plans for Sugartree Creek greenway. (*Source: Greenways Commission*)

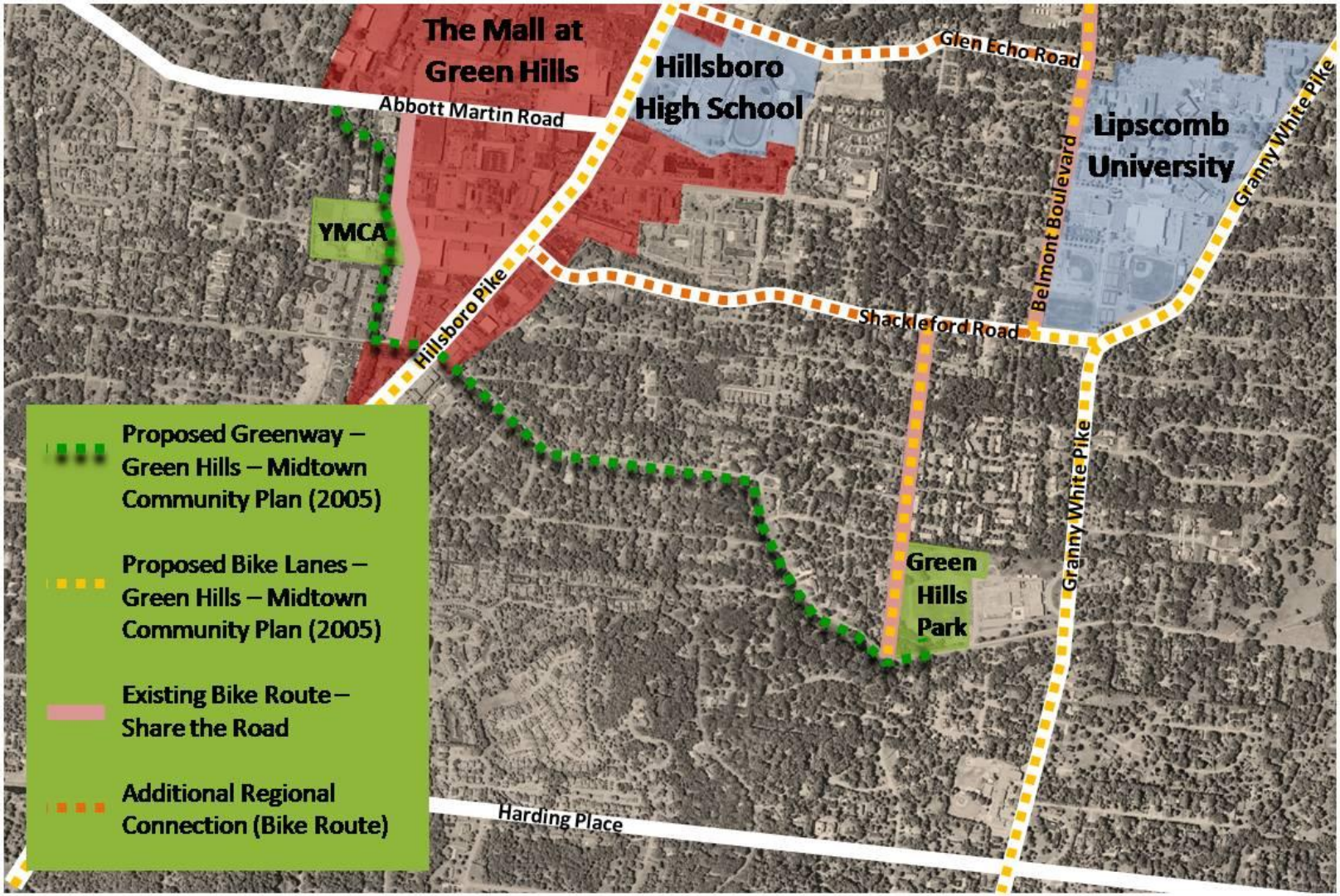


Figure 4.18: Map depicting the route of the proposed Sugartree Creek Greenway which would connect Green Hills Park and Richland Creek and pass through the Green Hills Area.

Access Management

As mentioned in earlier sections, the Green Hills Area has grown over a number of years. This growth and development has, for the most part, occurred on individual properties or small groups of properties, and not been undertaken in a comprehensive manner. As a result, properties have developed with their own access points and parking areas. In some cases, attempts have been made to share parking or driveways between businesses, but in many cases the pattern of development has led to individual driveways and a lack of interconnected parking areas.

The number of access points (driveways) and lack of connections between parking areas greatly affects the flow of traffic along Hillsboro Road and other commercial roads in the Green Hills Area. In order to address these issues, a phased approach to access management has been developed as part of this study. According to the National Cooperative Highway Research Program (NCHRP), access management involves "improvements in access control, spacing, and design to preserve the functional integrity and operational viability of the road system. It attempts to balance the movement and access functions associated with streets and highways."

Because Hillsboro Road serves travelers coming both to and through the Green Hills Area, the access management approach is focused on this main artery. However, the access management approach is transferable to other roads in the Green Hills Area.

In many cases, business and property owners express concerns about access management because of concerns about loss of access or visibility to their businesses, but many of the comments expressed in the website survey were concerning the traffic and difficulty in getting around the Green Hills Area. Access management has the potential to improve accessibility to the businesses in the area and make the area more inviting to pedestrians and bicyclists.

In addition, in the Green Hills Area, implementation of an access management approach along Hillsboro Road has the potential of improving the flow of traffic and addressing safety concerns involving cars turning into businesses and/or turning onto Hillsboro Road. Figure 4.19 shows the number of turning movements (blue arrows) and the resulting conflict points (red dots) that result from each access point along a roadway.

"Access management is the process that provides or manages access to land development while simultaneously preserving the flow of traffic on the surrounding road system in terms of safety, capacity needs, and speed."

National Cooperative Highway Research Program, Report 348: *Access Management Guidelines for Activity Centers*, 1992.

Where multiple driveways exist (on both sides of the road), the turning movements and conflict points become intertwined. The result is a potential delay of traffic along Hillsboro Road to accommodate the cars that are making turns into and out of parking areas. In addition, the opportunity for crashes which can cause injuries and further delay the movement of traffic

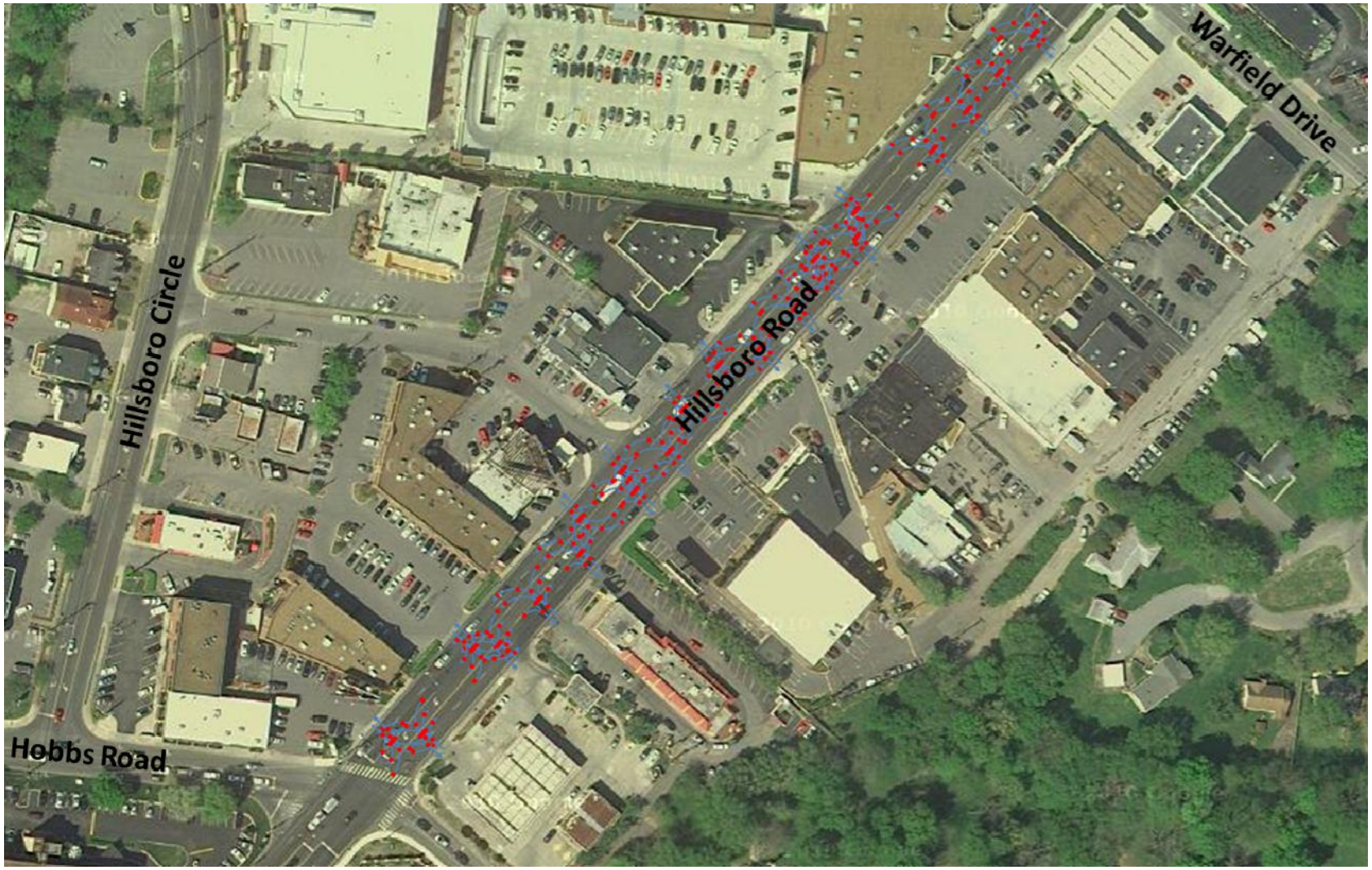


Figure 4.19: Map depicting the number of turning movements (blue arrows) and the resulting conflict points (red dots) that result from each access point along a roadway. Where multiple driveways exist (on both sides of the road), the turning movements and conflict points become intertwined.

increases with the number of driveways and resulting conflict points.

The first phase of an access management approach along Hillsboro Road involves creating connections between parking areas and adjacent properties to allow vehicles to move more freely without having to exit onto Hillsboro Road. Figure 4.20 shows how this initial phase of access management might be implemented along Hillsboro Road.

The creation of internal connections would allow the implementation of a second phase of access management which involves reducing the number of driveways and access points along Hillsboro Road. By reducing or consolidating the number of access points, the number of turning movements and conflict points is greatly reduced, thus improving the flow of traffic along Hillsboro Road.
Figure 4.21 shows how this second phase of access management could be implemented along a portion of Hillsboro Road.

Finally, the third phase of access management would involve the creation of a median in the middle of Hillsboro Road. The median would greatly reduce the

Figure 4.20: The initial phase of access management would involve creating connections between parking areas and adjacent properties to allow vehicles to move more freely.

number of turning movements and conflict points (See Figure 4.22) and would also improve the aesthetics of Hillsboro Road. (See Figures 4.23 and 4.24) Enhancement of rear connections to properties could also be a part of the median approach to ensure that access is provided to all businesses. Turn lanes at key intersections and key access points along Hillsboro Road would be a part of this approach, but would need to

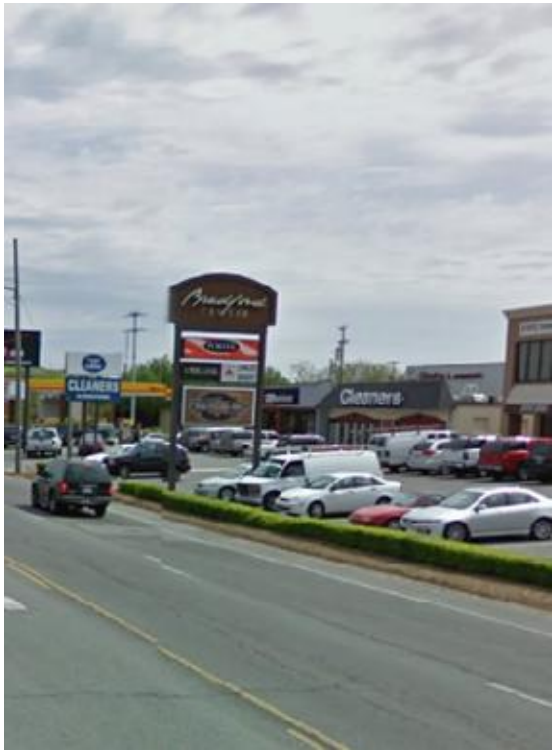


Figure 4.21: The second phase of access management would involve reducing the number of driveways and access points along Hillsboro Road.

be limited in order to achieve the desired benefits. An alternative to the median, could potentially be the creation of right-turn only driveways, to limit the turning movements and conflict points along Hillsboro Road.

Implementing any of the access management approaches will need to be undertaken in cooperation with existing and planned businesses in the Green Hills Area. However, if done properly, the phased access management approach could significantly improve both the traffic conditions along Hillsboro Road and aesthetics of the Green Hills Area.

Streetscape

The Green Hills Area is viewed as an exclusive shopping, dining, and office destination in the Nashville area. However, in many ways the look of the area does not reflect this image. Overhead utilities and signage and billboards dominate the views of the Green Hills Area. The growth and development pattern discussed earlier not only affects the transportation components of the area, but also has contributed to a lack of cohesive design and consistent look and feel of the area.

Figure 4.22: A third phase of access management would involve creation of a median in the middle of Hillsboro Road.

The lack of landscaping and pedestrian amenities in the area reduces the likelihood that people will park their vehicles and visit other stores of businesses in the area. In addition the lack of a consistent look and proper wayfinding to direct people to their destinations contributes to additional congestion on Hillsboro Road.

Establishment of a streetscape hierarchy for the Green Hills Area combined with a wayfinding program will greatly enhance the aesthetic appeal of the area and encourage additional pedestrian activity. Based on a complete streets approach, whereby all users (including bicyclists, public transportation vehicles and riders, and pedestrians of all ages and abilities are considered), the streetscape hierarchy involves four levels, including Hillsboro Road, Commercial Collector Streets, Residential Streets, and Commercial Streets (See Figure 4.25).

This hierarchy of streetscapes was developed to support the various office, retail, residential and mixed use areas of the Green Hills Area and to improve the aesthetics and pedestrian– and bicycle-friendliness of the area.

Figure 4.23: Location and existing view of Hillsboro Road.

Figure 4.24: Illustration of median and streetscape enhancements along Hillsboro Road.

The streetscape cross-sections were developed based on a review of aerial maps of the Green Hills Area. Further engineering and traffic analysis would need to be undertaken to ensure that the recommendations could be implement. In addition, the map below does not reflect where turn lanes or other requirements may impact the ability to implement the median or other characteristics of the proposed cross-sections.

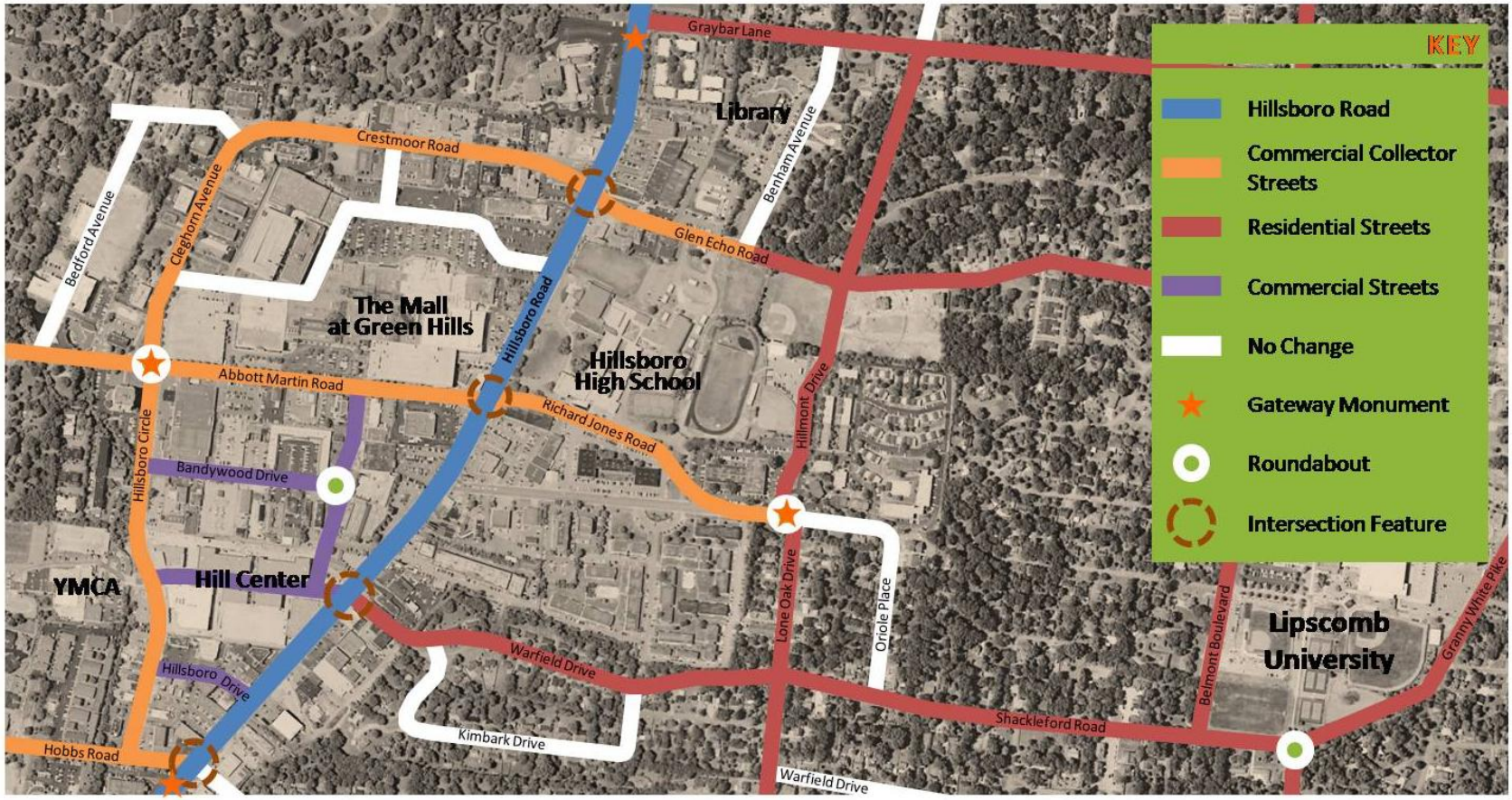


Figure 4.25: Map depicting the streetscape hierarchy which involves four levels, including Hillsboro Road, Commercial Collector Streets, Residential Streets, and Commercial Streets.

Hillsboro Road

Along Hillsboro Road the streetscape (Figure 4.26) would include:

- Two vehicle lanes each way (12' desirable, 11' minimum inside lane and a 13' outside lane to accommodate buses, etc.)
- 13' landscaped median/turn lane
- 8' landscape strip/buffer
- 10' sidewalk/utility corridor (plus a 2' landscape strip)
- Ultimate commercial build-out up to the sidewalk
- Place overhead utilities underground

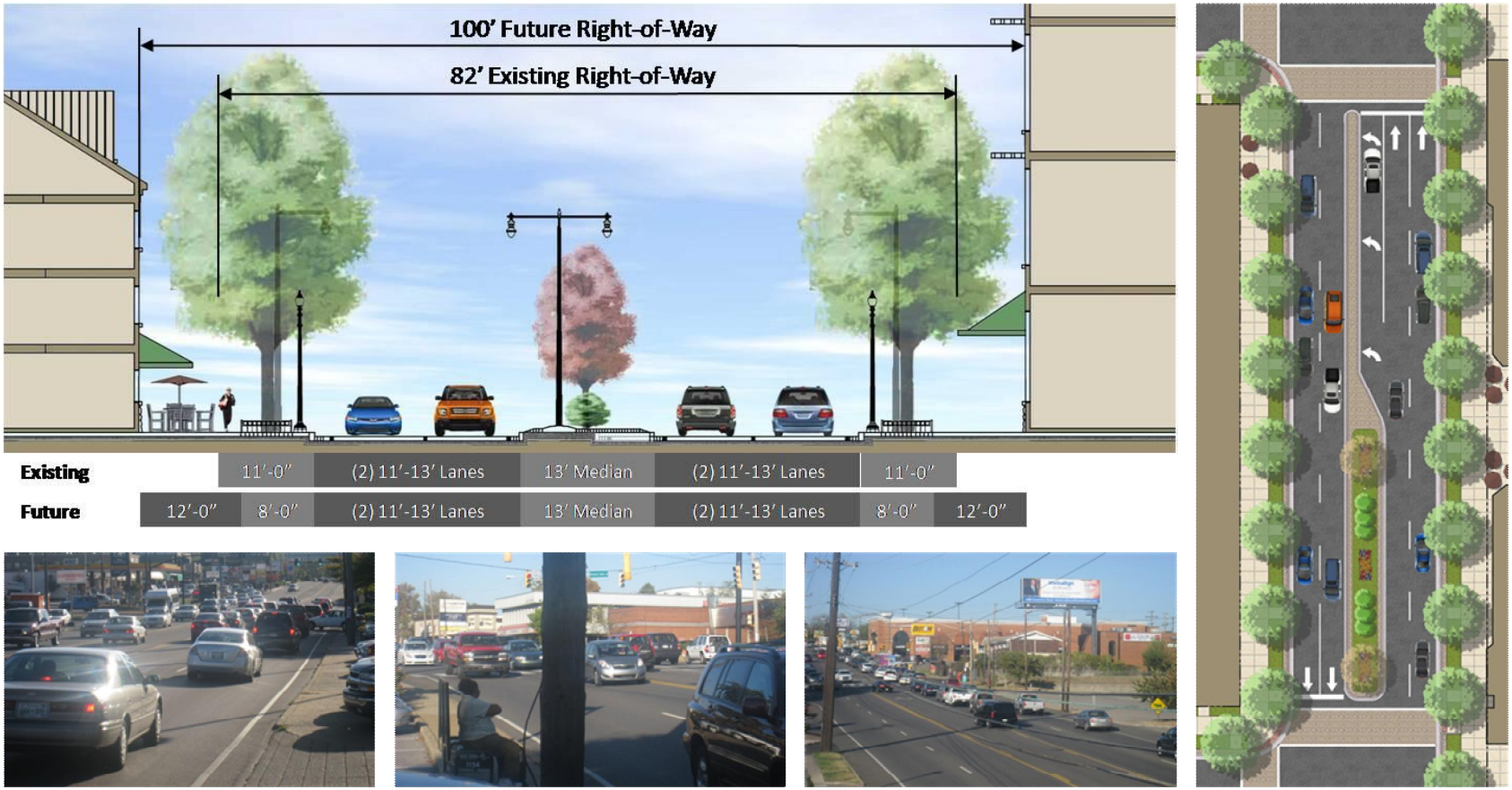


Figure 4.26: Hillsboro Road proposed streetscape.

Commercial Collector Streets

Along Commercial Collector Streets (i.e. Crestmoor Road, Abbott Martin Road) in the Green Hills Area, the streetscape (Figure 4.27) would include:

- Vehicle lanes each way (12' desirable, 11' minimum)
- 13' landscaped median/turn lane
- 6' bicycle lane each way
- 8' landscape strip/buffer
- 10' sidewalk/utility corridor
- Place overhead utilities underground

Figure 4.27: Commercial Collector Streets (i.e. Crestmoor Road, Abbott Martin Road) proposed streetscape.

Residential Streets*

Along Residential Streets (i.e. Graybar Lane, Lone Oak Drive) in the Green Hills Area, the streetscape (Figure 4.28) would include:

- Vehicle lanes each way (12' desirable, 11' minimum)
- 6' bicycle lane each way
- 10' ditch/utility corridor each side
- 5' sidewalk each side

*NOTE: The cross-section below only represents one possible configuration, a curb/gutter cross-section in certain locations is also feasible.

Figure 4.28: Residential Streets (i.e. Graybar Lane, Lone Oak Drive) proposed streetscape.

Commercial Streets

Along Commercial Streets (i.e. Bandywood Drive, Hillsboro Drive) in the Green Hills Area, the streetscape (Figure 4.29) would include:

- Vehicle lanes each way (12' desirable, 11' minimum)
- 13' landscaped median/turn lane
- 14' combined bicycle and on-street parking lane, both ways
- 8' landscape strip/buffer
- 10' sidewalk/utility corridor (plus 2' landscape strip)

Figure 4.29: Commercial Streets (i.e. Bandywood Drive, Hillsboro Drive) proposed streetscape.

Summary

As identified in this section, no one solution will alleviate the traffic problems that are currently experienced, or are forecasted to be experienced, in the Green Hills Area over the next 25 years. In order to achieve the vision outlined by the Resource Team that the Green Hills Area be a "place where people want to live, work, and play" and "is people-oriented and provides residents and visitors a range of transportation options to move both through and throughout the area", a comprehensive approach is necessary.

A summary of the recommended improvements in each of the five categories, 1) Traffic and Roadway, 2) Transit, 3) Pedestrian and Bicycle, 4) Access Management, and 5) Streetscape is shown in Figure 4.30. In order for the Green Hills Area to remain a destination and a regional economic engine, it will be necessary to address issues in each of these categories. The following section will outline possible funding sources and an action plan for implementation of these improvements.

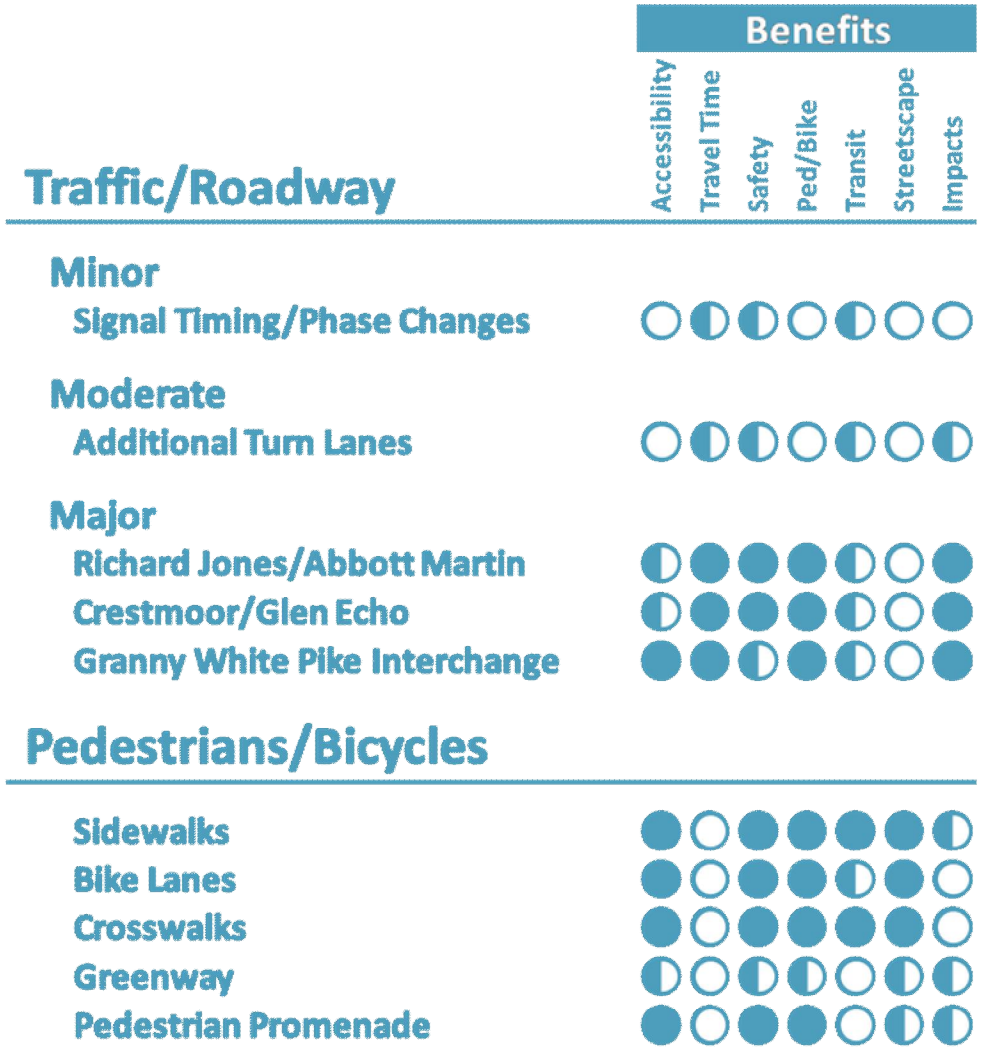


Figure 4.30: Identified public infrastructure needs including traffic/roadway, pedestrian/bicycle, transit, access management and streetscape projects.

	Benefits						
	Accessibility	Travel Time	Safety	Ped/Bike	Transit	Streetscape	Impacts
Transit							
Bus Stop Improvements	●	○	●	●	●	●	◐
Enhanced Local Bus Service	●	◐	○	○	●	○	○
Mini Hub (Old Library Site)	●	○	◐	◐	●	○	◐
Extension to Burton Hills	●	◐	○	○	●	○	○
Local Circulator	●	◐	○	◐	●	○	○
Transit Signal Priority	○	●	◐	○	●	○	○
Access Management							
Remove Parking Barriers	●	◐	●	◐	○	○	○
Consolidate Access Points	◐	◐	●	●	○	●	◐
Hillsboro Road Median	○	●	●	●	○	●	◐
Streetscape							
Roundabouts	◐	◐	●	◐	○	●	◐
New Roadway Segments	●	●	◐	●	○	●	●
Street Trees	○	○	○	●	○	●	○
Street Lighting	○	○	◐	●	○	●	○
Street Furniture	○	○	○	●	○	●	○
Gateways	○	○	○	○	○	●	◐
Bury Overhead Utilities	○	○	●	●	○	●	●

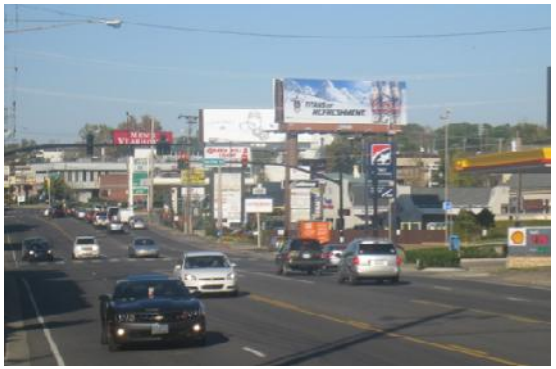
Figure 4.30: Identified public infrastructure needs including traffic/roadway, pedestrian/bicycle, transit, access management and streetscape projects.

5

Implementation

August 2011

Green Hills Area Plan



Introduction

In order to accomplish the vision outlined for the Green Hills Area in this study, a series of public and private infrastructure projects must be implemented. However, limited resources delay construction and implementation of these important improvements. This section of the study identifies public finance programs that can currently be utilized in Tennessee and outlines how they relate to the infrastructure needs in Green Hills Area.

Project Needs

The previous chapter identified public infrastructure needs including traffic/ roadway, pedestrian/bicycle, transit, access management and streetscape projects. The projects, their potential benefits, and a range of costs are summarized in Figure 5-1 The total budget for all the projects ranges from $44.5 million on the low side to $73.45 million on the high side. Individual projects are as small as $50,000 to as large as $11 million.

Private Development

An important approach currently used across the country is the capture of "added value" from private sector development. Where a city or a private landowner has vacant or underutilized land, and the market exists for new development, the focus then becomes which of the public infrastructure activities would serve as an incentive to accelerate and/or intensify the private development. If that is accomplished, the new development becomes the beneficiary of the improvements (and the private sector might contribute to those costs) and the city benefits from the new taxes. The value added proposition is an important element of the financing programs that can be utilized.

Potential Sources of Funding

There exists a series of programs that can support the infrastructure needs of Green Hills. Some are cash contributions with no requirement for repayment by the private sector and others are financing programs where the public assistance amounts must be repaid from property taxes, assessments, or other means.

Capital Improvements Budget (CIB)

Every local jurisdiction has a Capital Improvements Budget (CIB), which lays out the funding plan for roads, water, sewer, parks and other public improvements. In

Nashville's case, the CIB primarily has funding directly allocated from the annual General Fund. The CIB not only identifies the specific activities to be carried out, but also sets the timing for the construction of the improvements over a six year period.

The scheduling of the activities within the CIB is based on a variety of factors. In some cases there may be an immediate need based on new projects being developed. In other cases, the scheduling is based on the General Plan for the city or maintenance of existing infrastructure. Once the administration of the Metropolitan Government of Nashville and Davidson County (Metro) determines that a new major private development is ready to move forward, there is strong motivation and logic to re-order the priorities in the CIB to fund the backbone infrastructure that local government typically pays for, such as the road, water, sewer, and storm drain improvements.

Each of the projects included in Figure 5.1 is eligible to be part of Metro's CIB. Several of the projects identified as needed in Green Hills are identified in the CIB such as Hillsboro Road and Abbott Martin Road. Just as importantly, there are broad categories such as road reconstruction and improvements and sidewalks, that budget tens of millions of dollars without allocating funds to specific projects. Other categories do not have such robust budgets but allocate funds for bicycle lanes, traffic signal improvements, ADA compliance and median improvements without specifying where the work will be done throughout Metro.

Action Steps

- Identify from the Metro CIB the elements of the Green Hills projects included in the CIB
- Determine scheduling of when the elements would be constructed
- Request acceleration of elements that are not scheduled to meet the project timeline
- Request addition of eligible elements that are not included in the CIB
- Coordinate with Metro Public Works on the design and construction of the elements

State Transportation funding

Hillsboro Road is a State highway and the interchange at Interstate 440 and Granny White Pike is also eligible for Federal

funding that comes through the State to the Nashville Area Metropolitan Planning Organization (Nashville Area MPO) based on its Transportation Improvement Plan (TIP). As Hillsboro Road is currently part of identified major arterial roads in Nashville, modifying the TIP to include the improvements required for Hillsboro Road would be a reasonably easy process. The interchange at Interstate 440 is the most expensive project on the list, and would require extensive work to get included in the TIP.

Action Steps

- Secure a copy of the current TIP
- Submit projects to the Nashville Area MPO when TIP update is underway

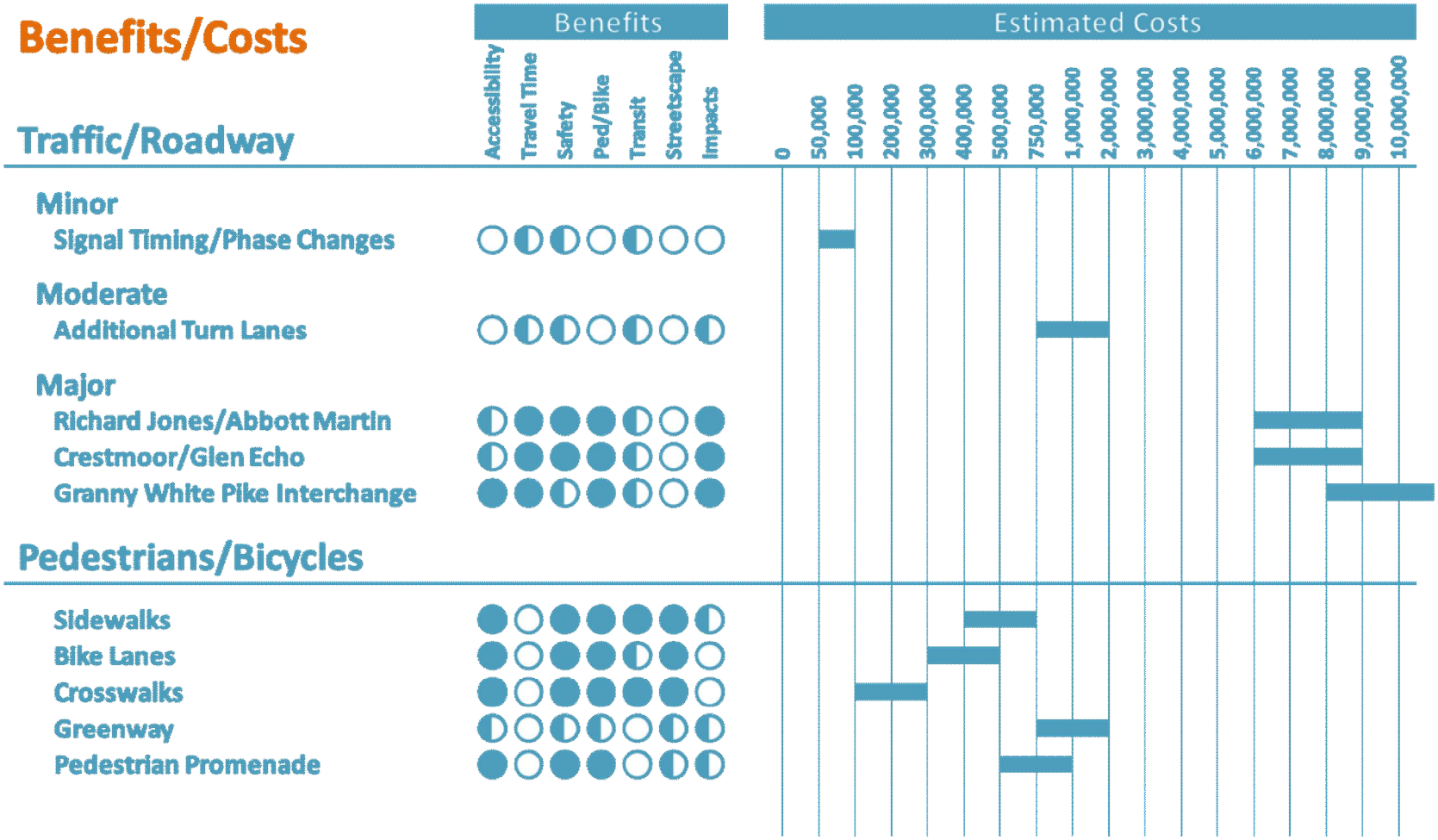


Figure 5.1: Identified public infrastructure needs including traffic/roadway, pedestrian/bicycle, transit, access management and streetscape projects

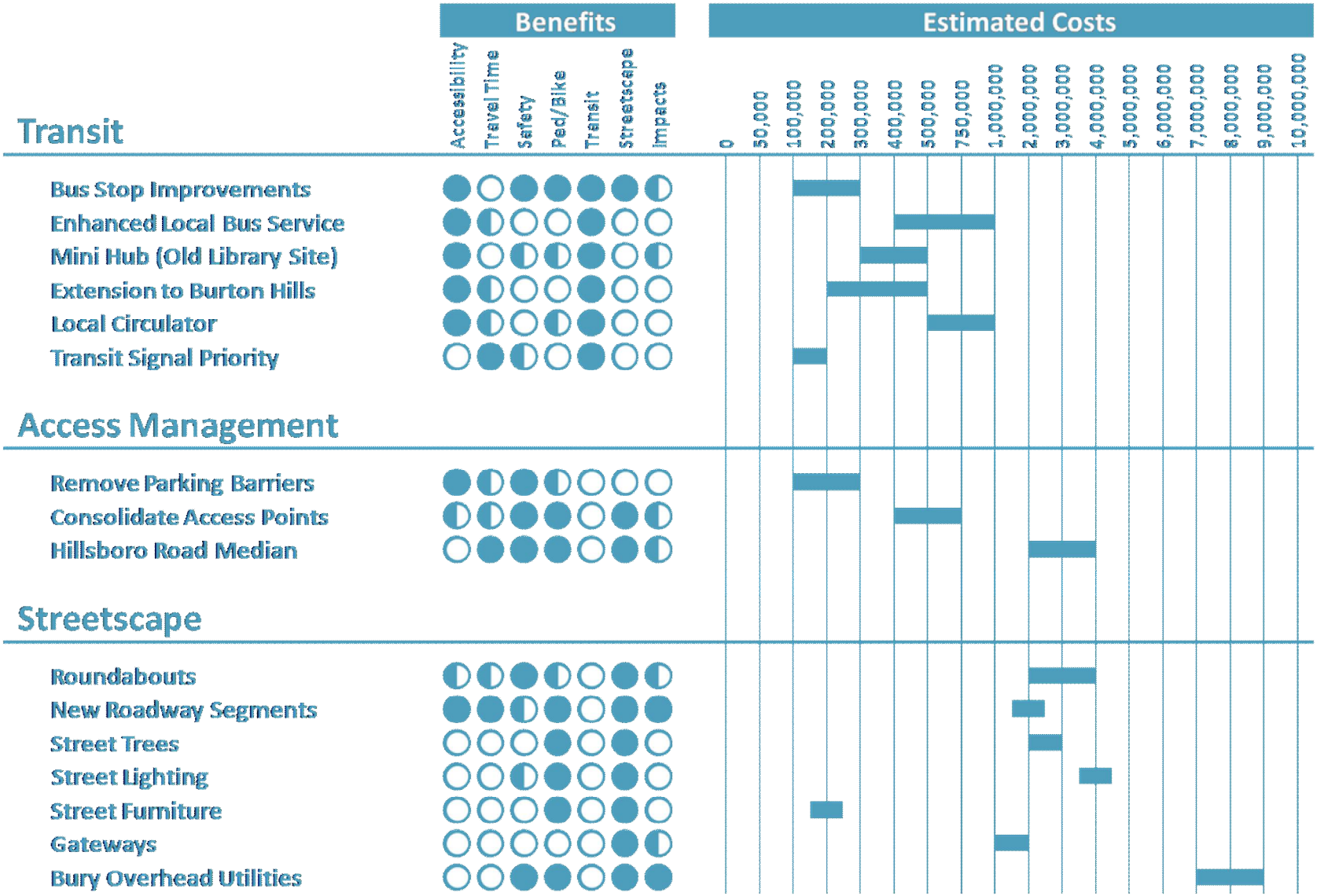


Figure 5.1: Identified public infrastructure needs including traffic/roadway, pedestrian/bicycle, transit, access management and streetscape projects.

- Determine scheduling of when each project would be constructed
- Request acceleration of improvements
- Coordinate with Metro Public Works on the design and construction of each project
- Initiate study and coordinate with FHWA to determine if the proposed interchange is "operational feasible" (this step should also involve outreach to the public)

Economic Impact Tax Increment Financing (TIF)

Under Tennessee law there are two approaches to using Tax Increment Financing (TIF) Districts, both of which are commonly employed in Nashville. One approach is through the Metropolitan Development and Housing Agency (MDHA), which has established a series of TIF Districts in Metro. A requirement of this type of TIF District is areas of high poverty or unemployment. The demographic of Green Hills do not exhibit unusually high poverty (5.6%) or unemployment (6.9%) based on the 2000 Census so it would be problematic to create a new TIF District or expand an existing District to be able to take advantage of this agency's approach.

A second, relatively simpler approach is to create a TIF District through the Industrial Development Board, which establishes Economic Impact TIF Districts.

In consultation with local counsel, we are advised that the second approach would be more efficient and provide the highest prospect for success. It is here that the value added from the new private development generates additional property taxes that are captured within a TIF District and can be committed to repaying bonds issued to fund the needed public infrastructure.

The extent to which public infrastructure can be financed through a TIF District is totally dependent on the value of the new development and the tax increment revenues that the project will generate. When reviewing proposals from developers or end users, one of the initial tasks is to calculate the tax increment and determine the level of TIF financing that could be secured.

Action Steps

- Develop a proposal to the Industrial Development Board for creation of the TIF District
- Negotiate the level of TIF revenues that would be available to support debt service
- Project the TIF revenues from proposed projects and the phasing of the revenue flow
- Decide on the issuance of IDB bonds or private financing repaid with TIF revenues
- Coordinate with the IDB, bond counsel, underwrites or private funders on the securing of the funds

Assessment District Funding

Tennessee allows the creation of assessment districts, where the property owners agree to allow a lien against their property and from that lien an annual assessment, which again becomes a

revenue source to support debt. A formal evaluation is done by qualified experts to determine the appropriate level of assessment based on the use type, be it office, hotel, retail, restaurant, theaters, or residential.

For new development projects, it has been found that an assessment in the .5% to .75% of the value of the new development does not affect the rents that can be achieved or the sale price of parcels. In addition, the assessment approach allows the purchaser of a parcel, who would otherwise be required to fund their pro-rata share of the off-site improvements, to utilize this financing method to pay their share over 25 to 30 years. The assessment bonds are also exempt from taxes on the interest earned by the bond owners, and therefore have lower interest rates that more traditional financing.

Assessment districts are fully supported by local government, as the full faith and credit of the local government is not pledged to repay the debt. Only the assessments on the properties and the liens that back the assessments are pledged.

The sale of any parcel would be subject to the new owner paying the assessments against that parcel. For projects developed and leased, the assessments would be passed through to the tenants just as property taxes, insurance and common area maintenance charges. The developer would be responsible for the payment of the assessments on any vacant parcel until such time as the parcel is sold or developed.

Assessment Districts may also be formed in built up areas where the property owners agree to share in the costs of improvements in their area because they see the value in the proposed public improvements.
A Business Improvement Districts (BID) are one type of Assessment District in which property owners vote to initiate, manage and finance supplemental services or enhancements above and beyond the baseline of services already provided by the local government.

Assessment Districts are voluntary as it takes agreement from the majority of the properties included in the proposed District to accept liens on their properties and the corresponding annual assessments. The starting point is to identify which public improvements will directly benefit the

property owners.

Along with that, the boundaries would be established identifying the properties that will benefit from the improvements. The next step is to carry out a rate and method process, which justifies the level of assessment against each property. Simple approaches would be the number of lineal feet of roadway that fronts on each property. But more usually the assessments are based on the property and building uses, square feet of building area and other calculations which more fairly distribute the assessments.

Action Steps

- Work with qualified local counsel to develop a proposal to Metro to create an Assessment District

- When approved, develop the boundaries for the Assessment District
- Determine the elements of the project to be funded by the Assessment District
- Retain qualified consultant services for development of the rate and method for the establishment of the liens and assessments against each new parcel to be created based on the benefit to each parcel
- Establish the annual assessment revenue available to support debt
- Decide on the issuance of Assessment bonds or private financing repaid with the special assessments
- Coordinate with the Metro, bond counsel, underwriters or private funders on securing the funds

HUD Section 108 Loan and Brownfields Economic Development Initiative (BEDI) Grant

Every city in America with a population over 50,000 receives an annual grant from the Department of Housing and Urban Development (HUD), called the Community Development Block Grant (CDBG). The Nashville/Davidson Metro gets $5,263,336 in annual CDBG funds. Under the HUD Section 108 Loan program, Metro may borrow up to five times its annual CDBG funds, or $26,966,680. From that Section 108 capacity, there is a deduction for any outstanding Section 108 loan balances.

Metro has $3,625,000 in outstanding loans, leaving a Section 108 capacity of $23,341,680. The Section 108 loan may be used for a variety of economic development purposes such as acquisition, relocation, demolition, environmental remediation, land write-downs and new construction or rehabilitation. The Section 108 loan is paid back over a period of 20 years. Metro has the right to utilize the Section 108 loan program, so the process for approval is administrative, not competitive with other jurisdictions.

To increase the use of Section 108 funds for economic development purposes, HUD established the Brownfields Economic Development Initiative (BEDI) grant program, which must be applied for in conjunction with a Section 108 loan request. The site to be developed must have some level of contamination to qualify under the BEDI program. The BEDI grants are competitive and are scored based on a series of rating factors, including the demographics of the site.

The competition is based on the requirements outlined in a Notice of Funding Availability (NOFA). A NOFA that will have approximately $17,325,000 is expected later this year, with a maximum grant of $2,000,000. The $2,000,000 cash grant can be used to pay for project elements as well as the interest on the Section 108 loan for a series of years. If the Section 108 loan were structured as interest only in the early years, use of the BEDI grant funds to pay the interest would allows the project to proceed with no requirement of third party repayment for those years.

Projects are typically in the predevelopment stage when HUD funding is sought. However, the more advanced is the project (anchor tenants committed, financing committed, site control and entitlements in place) the more competitive the BEDI grant application will be.

The Section 108 funds can be used as construction financing, where Metro would draw down the funds in a lump sum and pay it out based on construction draws. The BEDI funds draw cannot exceed the

percentage the BEDI grant is to the Section 108 loan. To the extent the BEDI funds are used to pay the interest on the Section 108 loan, that is not an issue, as the BEDI funds would be expended over a period of years. It should be noted that one of the rating factors for a BEDI grant application is the level of distress in the immediate area of the project.

Given the relatively low poverty and unemployment, new development projects on sites within Green Hills might not be a competitive BEDI project. However, for the project to qualify for a Section 108 loan, the key element is whether the project will generate jobs, the majority of which would be at lower-income levels, meaning persons earning not more than 80% of the median income. Additionally, the Urban Land Institute (ULI) specifically identifies the Section 108 loan program as a tool "to stimulate local retail business as part of the site acquisition and preparation process". With the weight of the ULI study, serious consideration of the HUD funding is far more likely.

Action Steps

- Develop a proposal for the use of the HUD funds for eligible activities under the Section108 loan and, if a project might qualify, for a Brownfields Economic Development Initiative (BEDI) grant
- Coordinate with the Metropolitan Development and Housing Agency (MDHA) on the citizen participation process regarding the HUD funds
- Review the Notice of Funding Availability (NOFA) for the BEDI grant funds expected later this year
- Draft the BEDI grant and Section 108 loan applications for review by MDHA
- Coordinate with the local HUD Field Office on the draft applications
- Attend the various advisory and Metro Council public hearings on the HUD funding
- Finalize and submit on behalf of Metro the HUD applications
- Upon approval, provide MDHA with the draw schedule for the HUD funds for project elements
- Provide contractor billings to MDHA when appropriate for release of the HUD funds

Sources and Uses

A Sources and Uses analysis is a very useful tool in developing a strategy for funding infrastructure projects. Use of CIB or State TIP funds for infrastructure projects is not dependent on private activity. Funding through Assessment Districts becomes feasible depending on the benefit to existing property owners from the proposed infrastructure activity. As private development projects are proposed and the new values and tax revenues are estimated, the use of tax increment financing (TIF) becomes a viable tool.

It is useful to create a chart that lists all the activities, both public and private on the one axis and then list the potential funding sources on the other axis. Figure 5.2 is a table is a sources and uses analysis for the

Infrastructure Improvements	Metro CIP	State TIP	Surface Transportation	CMAQ	FTA	Assessment District	TIF District	Total
Traffic and Roadway								
Signal Timing/Phase Changes	$100,000					$100,000		
Additional Turn Lanes		$2,000,000	$2,000,000					
Realign Richard Jones Road/Abbott Martin Road			$9,000,000				$9,000,000	
Realign Crestmoor Road/Glen Echo Road	$9,000,000	$9,000,000						
Granny White Pike Interchange		$15,000,000					$15,000,000	
Pedestrian/Bicycle								
Sidewalks		$750,000		$750,000				
Bike Lanes		$500,000		$500,000				
Crosswalks		$300,000		$300,000				
Greenways		$2,000,000		$2,000,000				
Pedestrian Promenade						$1,000,000	$1,000,000	
Transit								
Bus Stop Improvements				$300,000	$300,000			
Enhanced Local Bus Service				$1,000,000	$1,000,000			
Mini Hub (Old Library Site)					$500,000	$500,000		
Extension to Burton Hills				$500,000	$500,000			
Local Circulator			$1,000,000			$1,000,000		
Transit Signal Priority	$200,000		$200,000					
Access Management								
Remove Parking Barriers	$300,000					$300,000		
Consolidate Access Points	$750,000		$750,000					
Hillsboro Road Median	$4,000,000		$4,000,000					
Streetscape								
Roundabouts						$4,000,000	$4,000,000	
New Roadway Segments	$2,500,000					$2,500,000		
Street Trees						$3,000,000	$3,000,000	
Street Lighting	$4,500,000						$4,500,000	
Street Furniture						$250,000	$250,000	
Gateways	$2,000,000					$2,000,000		
Bury Overhead Utilities	$9,000,000						$9,000,000	
Totals - Primary Sources	$27,550,000	$17,000,000	$9,000,000	$3,550,000	$1,800,000	$14,550,000	$0	$73,450,000
Totals - Secondary Sources	$4,800,000	$12,550,000	$7,950,000	$1,800,000	$500,000	$100,000	$45,750,000	$73,450,000

Figure 5.2: Potential sources and uses for the identified public infrastructure needs in the Green Hills Area.

proposed improvements in the Green Hills Area. This table represents just one approach to identifying potential sources of funding for these infrastructure projects. Understanding the eligibility requirements for each funding program is important when matching up activities with the program. Listing the private activities is important as well, because providing public infrastructure that the developer would otherwise have to fund, becomes an incentive to the developer. It is important to also note that depending on the scope and size of the proposed development, some improvements (adding sidewalks, reducing curb cuts, turn lanes, etc.) may be a required of the private entity.

Funding Cycles/Timing

Understanding the funding cycles and timing of grant opportunities is important as well. The following sections outline the potential funding mechanisms and detail the cycles and/or timing of each.

Capital Improvements Budget

Established annually by Metro, but amendments to the CIB can occur as necessary during the year. Funding occurs in phases for design and engineering, followed by constructions. Assume construction no sooner than eight months after the inclusion in the CIB for that year.

State Transportation Funding

The funding cycle is typically two years, with the introduction of the requested funding occurring at the MPO level, which then adopts the plan and forwards it to the State for their application to federal DOT. The funding back to the State and local MPO therefore would be two years from the initial inclusion of the project in the local plan.

Economic Impact TIF District

The creation of TIF Districts is typically a six month process, during which time the development agreement would be negotiated to include the percentage of tax increment available for debt service versus into the General Fund. Once established, the tax increment revenue would flow with the normal cycle for paying the property taxes. Assume the lag between the placing of the property on the tax rolls and the receipt of the tax revenues to be 12 to 15 months. Funding through bonds or private advancement of funds would occur as the tax revenues are received, which would be a direct function of the development schedule for the vertical construction.

Assessment District Funding

The timing of the creation of the District would be approximately the same as the TIF District. The Special Assessments are typically included on the property tax bill, so the flow of annual assessments would coincide with the payment of the property taxes. Assume 12 to 15 months from the creation of the Assessment District and the receipt of the assessment payments.

HUD Section 108 loan and BEDI grant funds

The Notice of Funding Availability (NOFA) for the BEDI grant funds is expected later this year. The NOFA will provide between 60 and 90 days for the submittal of the applications and HUD will then take

between 60 and 90 days to review and award the BEDI grant. If the Section 108 loan is submitted with the BEDI grant, it is approved simultaneously with the BEDI grant. Assume HUD funding could be available by the fourth quarter of 2011.

Funding Allocation Recommendations

The attached chart provides the recommendations for the allocation of the various Green Hills Area Plan Proposed Improvements. Funding is allocated among the Metro Capital Improvement Plan (CIP), the State Transportation Improvement Plan (STIP), the Surface Transportation Funds, the Congestion Management Air Quality (CMAQ) funds, Federal Transit Administration (FTA), Assessment District funds and Tax Increment Financing (TIF) District funds.

The chart shows the recommended primary funding source and then the backup funding source, shown in yellow shading. All of the proposed improvements are included in the chart. To be conservative, each of the proposed improvements is show at the upper end of the cost estimate.

Assessment District Funding

Under the Tennessee statutes, Assessment Districts are created by the Metro government. The action would occur at the request of Green Hills with a plan that would outline the proposed boundaries, the activities to be constructed and the costs related to the activities. The method of assessing would be to fairly allocate the assessments against each property. For simplicity sake, short of the full evaluation and allocation of fair assessments based on the benefit of the parcels to the activities to be carried out, we have identified the commercial square feet along Hillsboro Road. Were each property assessed at $.04 per square foot per month, or $.48 per square foot annually, the annual assessments could support about $20 million of Assessment District Bonds.

Tax Increment Financing (TIF) District Funding

To provide some perspective on the level of funding that a TIF District could support, we have arbitrarily projected the revenues from a $500 million development, assuming Metro would agree the 60% of the TIF revenues would be retained within the District to fund public infrastructure improvements. Given the 40% assessed

value from the actual costs to develop the project, and a tax millage rate of 41, the hypothetical development would generate $8.2 million in annual TIF revenues, or $4.92 million in shared TIF revenues. That level of TIF revenues would support approximately $60 million in bonds. Those funds would not be available until the project was completed and the TIF revenues were actually collected by Metro, which is nearly a year after the property is placed on the tax rolls. Therefore, it should be assumed that it would be approximately four years before TIF funded projects could be constructed.

Due to the fact that the TIF revenues will not be available for approximately four years, each of the categories where TIF funded is allocated, the allocation is as a

backup. The strategy would be to pursue the primary sources during the first three years and then utilize the TIF funding where funding through the primary sources was not successful.

Surface Transportation

Surface Transportation Program (STP) funds are distributed annually to state DOTs by the Federal government. These funds may be used as capital funding for a wide variety of transportation improvement projects including: roadway improvements, public transportation capital improvements, fringe and corridor parking facilities, bicycle and pedestrian facilities, and intercity bus terminals and bus facilities. The Tennessee Department of Transportation (TDOT) has the ability to use STP funds on state highways, such as Hillsboro Road. The Nashville Area MPO also receives an annual allocation of STP funds which are allocated to transportation improvement projects in the Middle Tennessee area which are decided upon by their technical and policy boards, using established selection criteria.

Congestion Mitigation and Air Quality (CMAQ)

The Congestion Mitigation and Air Quality Improvement Program (CMAQ) is a Federal program which has the objective of improving the Nation's air quality and managing traffic congestion. CMAQ projects and programs are often innovative solutions to common mobility problems and are driven by Clean Air Act mandates to attain national ambient air quality standards.

Eligible activities under CMAQ include transit system capital expansion and improvements that are projected to realize an increase in ridership; travel demand management strategies and shared ride services; pedestrian and bicycle facilities and promotional activities that encourage bicycle commuting. Programs and projects are funded in air quality nonattainment and maintenance areas for ozone, carbon monoxide (CO), and small particulate matter (PM-10) that reduce transportation-related emissions. CMAQ funds are awarded by TDOT through a competitive grant process.

Federal Transit Administration (FTA) Funding

The Federal Transit Administration (FTA) provides several funding sources for transit projects across the US. A limited amount of funding is allocated to the Nashville MTA annually which is typically used for

operations and maintenance of their current transit system and new vehicle purchases. FTA also offers competitive grants which local transit agencies can apply for annually.

Summary

Understanding the potential sources of funding as well as the funding cycles and timing of grant opportunities is important. A formal stakeholder committee should be formed specific to the Green Hills Area to review the recommendations contained in this study and develop a plan based on the action steps outlined in this section.