



ISSUES AND OPPORTUNITIES

As part of its process, the Planning and Design Team has documented the issues and opportunities that will influence the process going forward and the outcome of the final design. The Issues and Opportunities Report, documented on the following pages, reiterates previous work conducted by the Urban Design Center (UDC) in its Phase 1 “Visioning Workshop” public process conducted in September 2012. It also draws conclusions from data obtained through site analysis and community and stakeholder input conducted in April 2014 as part of Phase 2 “Public Design Charrette” process. Workshops with the community, meetings with stakeholders, and analysis of the Urban Design and Transportation systems enables the Design Team to better understand specific issues that need to be overcome and opportunities that, once acted on, lead toward the creation of a plan that fits with the Community’s documented vision for Six Forks, captured below:

“Our vision is to enhance the Six Forks Road corridor in a way that defines a unique sense of place with enhanced fluidity of movement, environmental sensitivity, and connectivity for residents, workers, students, and visitors using transportation modes of all types, including cars, bikes, pedestrian and public transit. The Corridor should enable an active pedestrian life and integrate residential, commercial recreational, educational, faith and retail uses. Safety and accessibility are paramount in designing a distinctive streetscape that is uniquely Midtown with unifying features and green space that make it both an attractive urban thoroughfare and an irresistible gathering place”.

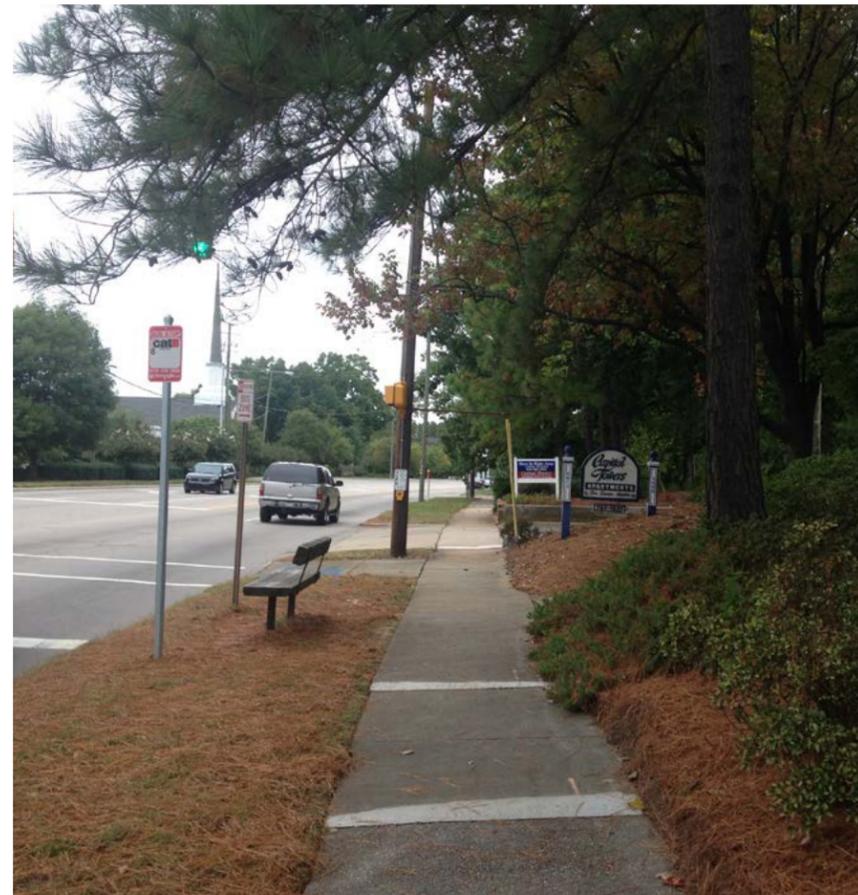
Summary of Issues:

Results of Phase 1 Visioning Workshop by UDC:

The Phase 1 Visioning Workshop conducted by UDC allowed input from the community on the issues to be addressed in the design and planning of the Six Forks Corridor (Corridor). The issues range in scale and complexity and effectively convey the hurdles that a successful design needs to resolve. The community’s list of issues includes items that can be easily corrected, such as fixing and connecting sidewalks. Other items require more costly solutions, such as undergrounding utilities and increasing the road’s

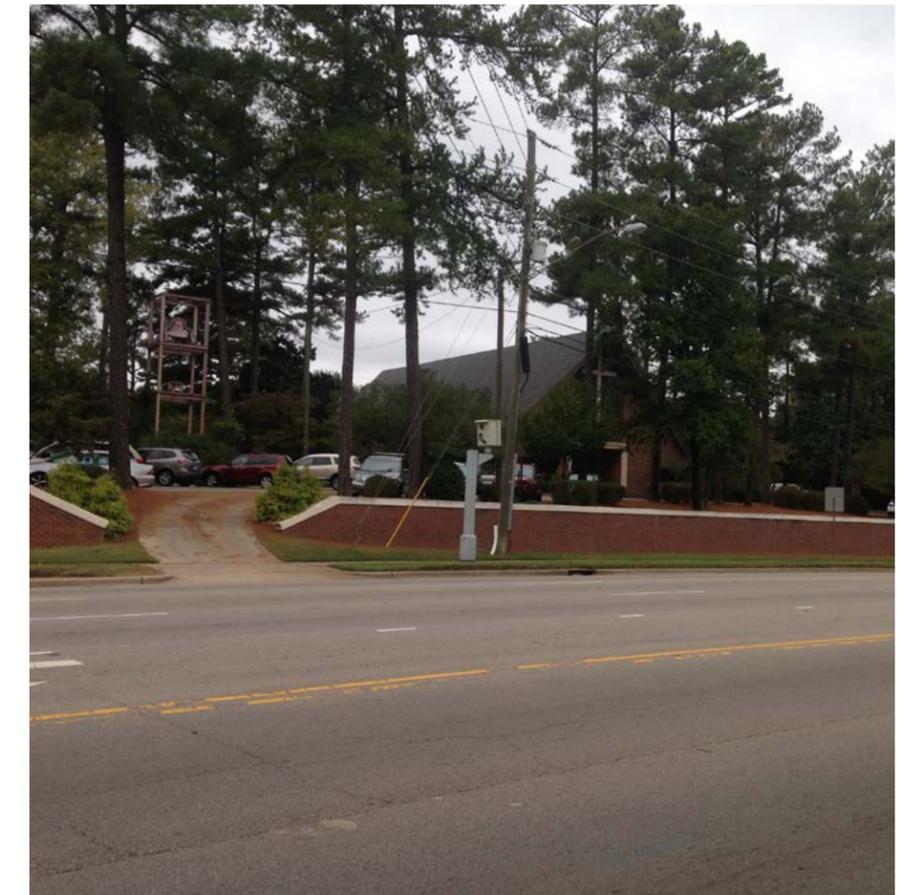
capacity for transit, cars and bicycles. The breadth of the Issues expressed by the community includes, but is not limited to:

- The lack of continuous and appropriate pedestrian and bicycling infrastructure including: narrow sidewalks that don’t provide proper separation between the curb and sidewalk; a lack of street trees or other elements that separate pedestrians from passing cars; disconnections in the sidewalk along its length; sidewalks that are in disrepair; zero accommodation for bicycles; and a lack of consistent and unifying street lighting and street furniture.
- Safety concerns related to crossing Six Forks Road, which include: poor pedestrian signal timing at intersections; people crossing mid-block; pedestrian and bicycle safety conflicts with automobiles at the I-440



interchange; and a lack of traffic signals and designated cross walks at each intersection.

- Insufficient transit accommodations including a lack of bus shelters, infrequent bus service, and a lack of cross town expressway transfers.
- Traffic flow concerns, which include: congestion; cut through traffic within the neighborhoods to local businesses; inconstant speed limits; inconsistent lane widths; tight turning radii at certain intersections; difficulty exiting driveways that front onto Six Forks; a lack of access control along the Corridor; long delays at traffic signals.
- Poor transitions and gateways between new development, Six Forks Road and adjacent neighborhoods; a lack of public greenspace along



the Corridor; a lack of connections to local greenways; and a lack of interconnectivity in general adjacent to the Corridor.

- Inconsistent character and aesthetics along the Corridor (Urban vs Suburban); an incomplete aesthetic that doesn't enable the Corridor to read as a special place; lack of signage and wayfinding; a lack of urban design quality and elements.

Issues from Phase 2 Urban Design and Transportation Analysis

As part of the Phase 2 process, the Design Team conducted an analysis of the existing urban design and transportation conditions of the Corridor to verify and augment the issues and opportunities already raised by the Community. In summary, following its analysis, the planning and design team identified the following items:

- The pedestrian environment is outdated, incomplete and insufficient to provide a pedestrian experience that would encourage people to want to walk. There are inadequate dimensional relationships between the curb, planting space, sidewalk and building frontage which keep it from feeling "urbane", safe and comfortable. There is limited space to provide street trees - which would make the pedestrian feel safer and more comfortable - due to the size of the current planting strips and the location of the overhead power lines. There is a lack of consistent and attractive street furniture that would enliven the street and make it more enjoyable and functional to walk on.
- There is no designated accommodation for bicycles, either within the roadway or within the pedestrian space above the curb. There is also no clear route behind the Right of Way due to a lack of a gridded street network to locate a bike route that could connect neighborhoods to each other and to the various destinations along the Corridor.
- Crossing Six Forks Road is difficult for pedestrians because of its number of travel lanes (in some cases), its width, lack of pedestrian refuge islands, lack of clearly marked crosswalks and lack of countdown pedestrian signals.
- It is also challenging to walk along the Corridor due to the use of right turn pockets, which some folks use as a de facto express lane. These

right turn lanes expand the width of the intersections and allow cars to roll through the turns at higher rates of speed than normal intersections.

- The topography adjacent to the Corridor is steep in places and may require walls if the roadway or pedestrian environment is expanded beyond its current dimensions. The topography may impact the design of the pedestrian environment and could possibly create access issues to properties adjacent to the right of way.
- There is a general lack of controlled access management along the Corridor which is exacerbated by the lack of interconnectivity between the neighborhoods adjacent to the Corridor (lack of street grid). There are multiple access points for single properties along the Corridor that create the potential for pedestrian and automobile conflicts. Many adjacent commercial properties accessed from Six Forks are not interconnected, requiring motorists to pull onto Six Forks to access adjacent properties. The lack of a continuous street grid behind the Corridor forces local trips between neighborhoods out onto Six Forks Road.
- The existing Right-of-Way is too narrow to allow for its expansion into a multimodal facility that includes adequate space for bicycles and pedestrians. The existing travel lanes do not enable "road diets" so that space could be reallocated and there may be a need to add travel lanes to serve the existing traffic effectively.
- There are above ground power lines that run along and across the Corridor, including a medium sized transmission line, which creates aesthetic, programmatic and dimensional issues. Roadway expansion and increasing the multimodal and streetscape potential of the Corridor will likely require these lines to be relocated or put underground.
- The lane dimensions change nine times along the Corridors length and the speed limit changes from 45 mph to 35 mph, which creates inconsistency and leads to confusion for the motorist. The 45 mph speed limit, in particular, is a concern since it is a speed threshold that affects safety and forces different roadway and streetscape design standards than 35 mph speed limits do.
- The properties adjacent to the Corridor have parking, buildings, and landscape features adjacent to the Right-of-Way which creates potential conflicts if Right of Way expansion is required to accommodate adequate multi-modal facilities.

- There is a "chicken and egg" issue associated with bus transit service. The Corridor does not have attractive facilities for Bus Transit services which would raise the awareness and ease of use. However, in order to justify these facilities, riderships would need to increase from current levels.

The Phase 2 Public Workshop – Keypad and Online Polling

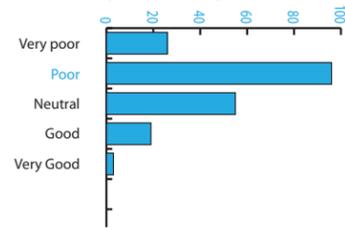
A Keypad Polling process was conducted in Phase 2 to prompt responses from the Community related to establishing priorities around the issues identified in the Phase 1 Visioning Workshop and the Phase 2 Urban Design and Transportation Analysis. The actual results tables from the keypad polling sessions are available for review in the appendix. In summary, the keypad polling sessions created the following responses:

- The Community rated the overall user experience of Six Forks Road as being neutral to poor.
- The Community rated the safety of Six Forks Road as being poor.
- When asked to rate the overall traffic flow of Six Forks Road the public rated it poor to very poor.
- The public identified the top three safety issues of concern as 1) Safety of Bicyclist; 2) Lack of Crosswalks and 3) Drivers not yielding to pedestrians.
- The top three pedestrian concerns are 1) Crossing the Street; 2) Lack of separation between the sidewalk and roadway and 3) Narrow sidewalks and a lack of sidewalks.
- The top three auto transportation concerns are: 1) Traffic congestion; 2) High traffic speeds; and 3) Making left turns coming out of local businesses

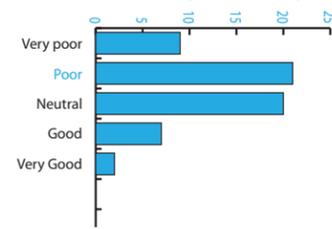
Selected examples of Keypad Polling Results:

The following tables show some but not all of the results derived from the keypad polling process. The complete results of the process are located in the appendix.

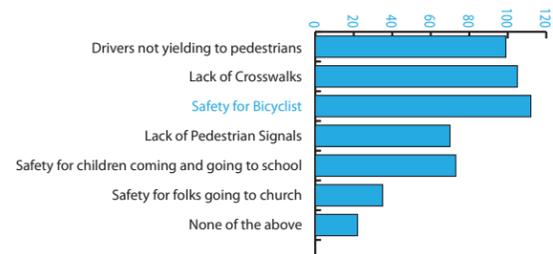
7. How would you rate the overall safety of Six Forks Road? (Choose one)



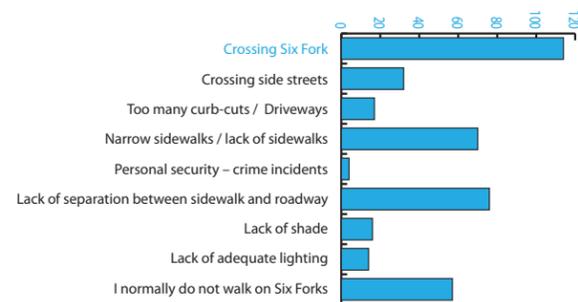
8. How would you rate the overall flow of traffic of Six Forks Road? (Choose one)



9. What safety issues concern you the most along Six Forks? (select all that apply)



10. When you are walking along Six Forks, what concerns you most? (Choose top 3)



11. Which auto transportation issues concern you most along Six Forks? (Choose your top 3)



Summary of Opportunities:

The issues determined and documented in the Phase 1 and Phase 2 processes create opportunities that, if acted upon, will enable the realization of the Community’s vision for Six Forks Road. Together, or in part, they respond to Community and City desires toward the creation of a Complete Street that enhances the mobility, image and livability of Six Forks Road. These opportunities establish an orientation for the design and planning process and create a thorough and prioritized wish list that can be evaluated in terms of cost, feasibility, ROI and their contribution to realizing the Communities vision for the Corridor.

Phase 1, conducted by UDC, created a list of opportunities that were generated by the public in the Visioning Workshop. In general, the opportunities were organized into several categories that included:

- Public Realm and Streetscape;
- Transit Infrastructure; Corridor Character;
- Roadway Capacity; Building Form and Height;
- Future Development.

These categories of opportunities, created in Phase 1, formed the basis for further discussions with the Community related to validating the list; adding to the list where needed; and prioritizing the list so that it can provide focus for the design and planning process.

The Phase 2 process included four types of interactions with the Community and the Site. The Planning Team and UDC conducted two public workshops that included:

- Asking pre-determined questions in a keypad polling format;
- Posting the polling questions online so that those not in attendance could respond to the polling questions;
- Facilitating public design participation that enabled participants at the Public Design Charrette to create their preferred conceptual street cross sections;

- And as experienced professionals, analyzing the Corridor ourselves to determine potential Opportunities based on experience, the existing condition of the Corridor and the review of the work prepared to date.

Results of Phase 1 Visioning Workshop:

The Phase 1 Visioning Workshop conducted by UDC provided many opportunities that in whole or in part create the potential for a revitalized street that is achievable in the near term as well as adaptable and scalable over the long term, depending upon available funding and support. The Community’s list of opportunities includes both near term “quick fixes” as well as visionary ideas that may or may not be feasible. In summary, the breadth of the opportunities expressed by the Community includes:

- Improving the streetscape and public realm including street trees, street lights, wider and continuous sidewalks, more separation between sidewalk and curb, signage and wayfinding, bike lanes, traffic signals and signal timing, crosswalks, and placing utilities underground, amongst other things.
- Improving multimodal transit opportunities to include more bus stops, more frequent service, shuttle buses, people movers from North Hills to the future transit station, turn outs for bus shelters, transit hubs at North Hills and Millbrook, enhanced bus stops, and specialized bus service for seniors, amongst other things.
- Improving roadway capacity by adding more lanes, reducing speed limits, making lane widths consistent throughout the Corridor, creating access management, creating a continuous center median and turn lane.
- Improving neighborhood character by enhancing connections to neighborhoods, adding sidewalks within the neighborhoods, providing wider sidewalks, creating greenway connections and public parks.
- Promoting redevelopment opportunities on the Millbrook site and other vacant lots to include new mixed use development.

Opportunities from Urban Design and Transportation Analysis

As referenced earlier in the document, the Design Team conducted its own analysis of the Corridor's Urban Design and Transportation environment. Stemming from this analysis, the Planning Team created its own list of Opportunities:

- Design an attractive “Complete Street”, even if that means expanding the Right of Way, that integrates all modes of transportation effectively and in balance. Create efficiencies in the designs to respond to Right of Way dimensional concerns.
- Move forward with the ‘Quick Fixes’ associated with creating a safer and clearer pedestrian environment by providing crosswalks where they are needed, fixing sidewalks, completing sidewalks, providing landscape, lighting and furniture.
- Plan for and design a for longer term vision that includes: Adequate travel lane quantities and widths consistently applied along the Corridor; multimodal infrastructure; access management; a vital and safe pedestrian environment; a complete bicycle system; attractive street landscaping; branding and wayfinding; art; and neighborhood gateways; amongst other things.
- Define and limit travel speeds to 35 MPH so that transportation design standards can respond to slower speed requirements, which are more pedestrian friendly and safer.
- Consider the Corridor in its entirety from an aesthetic, image and multimodal transportation mobility standpoint. In areas where it is to the Corridor's advantage, alter the design to respond to “context sensitive” nuances such as to promote the preservation of large stands of trees or the character that is created by the Churches.
- Consider creative and innovative ways of providing the “Complete Street” mindful of the costs and complexity associated with Right of Way purchase and the nature of the existing conditions of the Corridor.
- Promote infrastructure that looks toward the future and that considers potential changes in behavior related to how people may prefer to move around in the future.



In recently developed North Hills area many of the crosswalks are high visibility and have pedestrian countdown signals while these intersections are above average compared to other intersections in the corridor there is still an opportunity to create pedestrian refuges and a cohesive streetscape that promotes walkability.



Quick fix: Carroll Middle School needs a sidewalk along Six Forks Road, as evident by the worn path next to the street.

The Phase 2 Public Workshop – Keypad and Online Polling

Keypad polling questions were asked of the Community related to establishing priorities associated with the opportunities generated in the Phase 1 Visioning Workshop. The actual tables of results from these sessions are available for review in the appendix. It is important to note that some of the polling responses create conflicts. For instance, folks wanted a more safe pedestrian environment and also wanted more right hand turn pockets, which create a less safe pedestrian environment. They wanted the design to be mindful of costs, but also wanted a people mover, which is an expensive way to move people around. It will be the job of the Design Team to resolve these conflicts in the design. In summary the keypad polling sessions described the following priorities:

1. Improving auto circulation and safety and reducing congestion was deemed the most important objective. This was closely followed by improving pedestrian safety and circulation and improving bicycle safety, access and circulation. However, all of the strategies proposed received reasonable levels of support.
2. Of the “Quick Fixes” developed by the Community in the Phase 1 Visioning Work Session, the most supported item was to adjust signal timing to make walking across the street safer. This was followed closely by fixing broken or incomplete infrastructure and adding street landscaping, lighting, signage and new sidewalks. Access management and crosswalks were also strongly considered.
3. In terms of the “Visionary Ideas” promoted in the Phase 1 process, providing a grade separated pedestrian and bicycle way at North Hills received the most support. This was followed closely by the desire to purchase vacant or under utilized property to create parks along the road and to place utilities underground.
4. All of the “Public Realm” / Streetscape opportunities were deemed equally important. Of those, the most preferred items include making the sidewalk environment more complete and continuous; providing more space between the sidewalk and curb; and providing a multipurpose path along one or more sides of the roadway.
5. All of the “Transit Infrastructure” opportunities were deemed to be equally important. Of those, the most important ones included creating

turn-outs for bus stops; creating a people mover to a future transit station; and providing more frequent and faster bus services.

6. The most important “Roadway Capacity” fix is to make lanes and lanes widths consistent along the length of the Corridor. Providing a center median was also an important priority. However, many thought that all of the proposed opportunities were equally important.

7. In terms of “Access Management” strategies, installing medians with left hand turn pockets was most preferred, followed by installing additional right turn pockets. Combining or reducing the number of driveways and curb cuts was also well-supported.

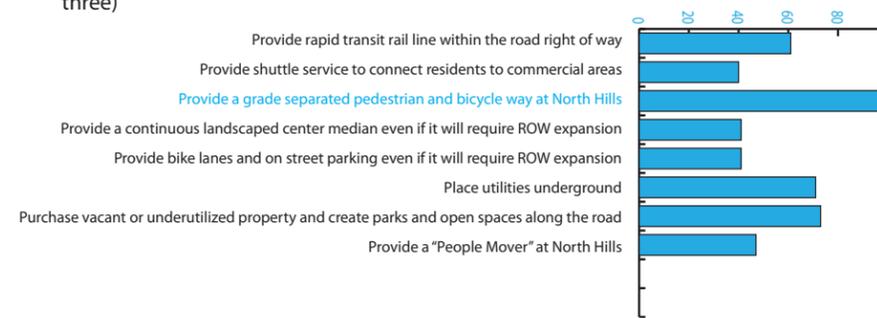
8. Most folks wanted to promote a balance between new mixed use developments and to preserve existing development along the Corridor.

9. 3-5 story new development achieved the most support although many people indicated a preference for a mix of development that included buildings greater than 5 stories, buildings that were 3-5 stories and the buildings that promoted the suburban character that exists out there right now.

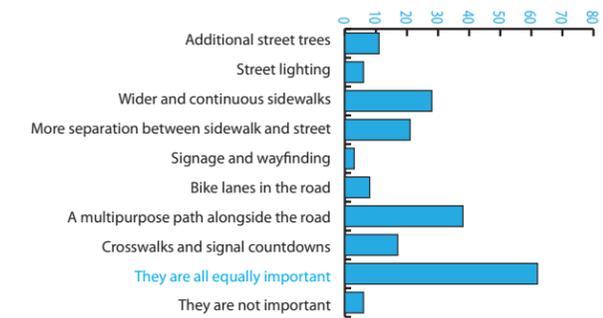
10. Almost all of the respondents thought that the Planning and Design Team should focus on a phased plan that starts with quick fixes and leads toward visionary ideas.

11. By a large margin, respondents wanted the Planning and Design Team to create a plan that was mindful of the cost of infrastructure and additional ROW.

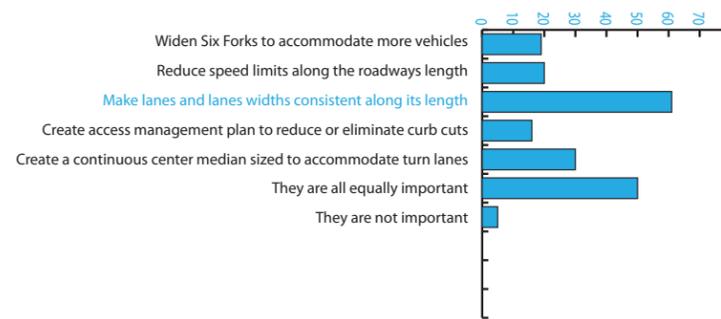
14. The public process has yielded some visionary ideas. What visionary idea(s) did you connect with in the previous meeting (Choose your top three)



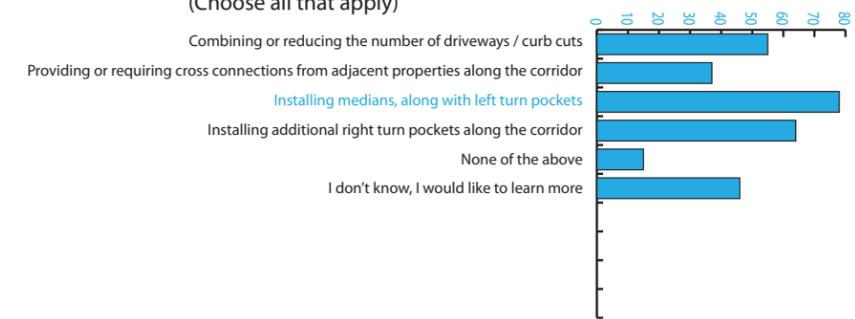
15. The most important Public Realm / Streetscape fix is: (Choose 1)



17. The most important Roadway Capacity fix is: (Choose 1)



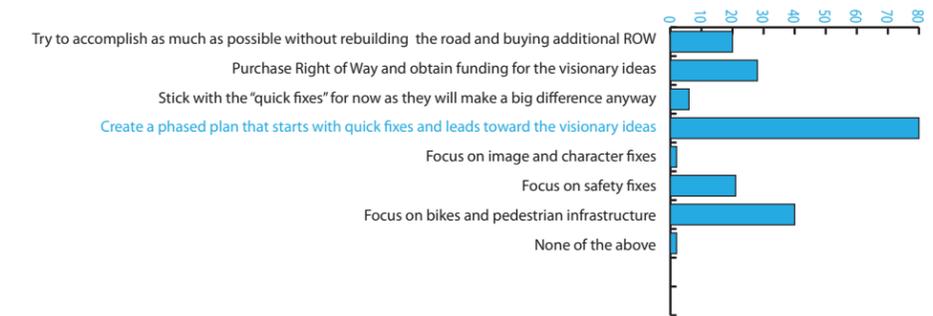
18. Which of the following access management strategies would you favor implementing along various segments of Six Forks? (Choose all that apply)



20. If redevelopment were to occur, I think the character should be: (Choose 1)



21. In order to implement the vision crafted so far for the project, I think you should: (Choose 1)



Selected examples of key pad polling results, for all results see appendix

Concept Streetscape Design Exercise:

The Streetscape Design Exercise yielded additional insight into how the Community prioritizes their preferences, once they have an opportunity to actually design a street to a set of accurate dimensions and with the knowledge that creating new infrastructure, new curbs, purchasing additional Right of Way, and undergrounding utilities will require a significant investment. The participants broke into teams and created a preferred street cross section that included elements that were important to them. They were asked to value the trade-offs between their desires for streetscape elements versus the cost of additional Right of Way. Some recurring themes from this exercise to consider as the design and planning process proceeds are:

- All the teams thought that a bike lane or multipurpose facility that combines bikes and pedestrians is important and provided them on their plans, regardless of the impact on overall Right of Way dimensions. Proposals included combining pedestrians and bicycles into a multi-use path, creating a separated bike and pedestrian path next to each other, and including bike lanes within the roadway.
- All of the teams but two thought that a landscaped center median with a turn lane is important. One team proposed a narrower center median to save space, while another team did not provide a center median at all.
- The average Right of Way width proposed, after adding up each cross section, was 103 feet. The largest was 124 feet and the smallest was 86 feet. To achieve these dimensions the teams compromised or combined elements to keep the Right of Way as narrow as possible to avoid conflicts with existing parking lots, buildings, or to reduce the amount of Right of Way that needs to be purchased.
- One team proposed an overhead pedestrian bridge at North Hills to connect people across Six Forks.
- One team proposed an “Urban” building edge to the street with buildings brought to the edge of the sidewalk.
- All of the teams thought that more space should be provided between the street and sidewalk and proposed street trees to be planted between the curb and sidewalk.



Team presenting their ideas for their cross section to the group

Common Elements





Critical Items to Consider in the Design Process:

As described in the previous analysis of the Phase 1 and Phase 2 processes and data, there are many relevant community and stakeholder supported opportunities that, in whole or in part, would make the Corridor safer, more attractive and more multimodal. There are also opportunities to express, through the design of the streetscape elements, an appropriate image and “brand” for the Corridor that is consistent with the quality of Raleigh’s streets as well as an expression that is “uniquely Midtown”.

Based on experience working on other Corridors, and analyzing the existing conditions against what the Community and City hope to achieve, the following items are highlighted as needing more study in terms of feasibility, cost/benefit and broader commitment:

1. Regardless of the spatial impact, the Community desires a safe, comfortable and **pleasant and adequate place within the Corridor to walk and bike** that is separated from the roadway. Ideally, the bikes would be separate from the pedestrians too.
2. The Community may accept innovative or **flexible designs** that lead toward an efficient use of space and an efficient use of resources.
3. **The Plan needs to provide near term as well as long term improvements.** Near term fixes should be prioritized and completed as soon as they are able to be funded.
4. **Providing more traffic capacity, multimodal functionality, and a desirable streetscape environment will require the purchase of additional property for Right of Way expansion.** The Community recognizes this and based on their responses within the public polling process and street cross section exercises support the idea that the existing street width and Right of Way is inadequate. The processes that follow this Phase will need to determine how much additional Right of Way is needed and if efficiencies, trade-offs, prioritizations, or phasing can be integrated into the design to accommodate the desirable design elements within a new Right of Way dimension that is feasible to fund and acquire.
5. In addition to the acquisition of property, **the expansion of the Right of Way to a desirable dimension that enables a more safe, functional and attractive street will require the undergrounding or relocation of the**

above ground utilities that run parallel to the Corridor. This will require funding and coordination with Duke Energy. Doing so, however, will enable more desirable items to be included within the streetscape and will enhance the visual quality of the Corridor.

6. **The ultimate design and dimension of the travel lanes, traffic signal locations, center medians, and other improvements such as street trees, landscape art, planters, etc. will require approval from NCDOT.** Items which may be in conflict with their typical design standards include:

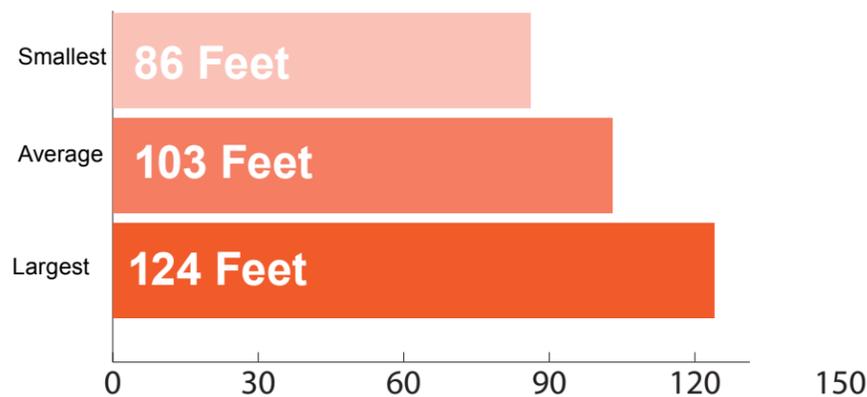
- Reduced center median dimensions to save space
- Providing street trees alongside the roadway to create a more pleasant and safe feeling pedestrian environment
- Providing street trees within the center median to enhance the landscape of the street will require NCDOT approval

The Design Team will use best practices and the NCDOT Complete Street Guidelines to develop recommendations that adhere to NCDOT policies and standards, and work collaboratively with NCDOT staff to discuss potential design exceptions that may be considered due to the restricted nature of the Corridor.

7. **The design of a safe, multimodal and pedestrian friendly street cross section that accommodates traffic needs is a high priority for the Community.** A potential conflict arises because the roadway width dimension required to accommodate the travel and multimodal systems may expand the distance that pedestrians will need to walk to get across the intersection. Designing adequate crosswalks, timed pedestrian signals, center island refuge islands, and other devices at each intersection will help resolve the conflict between enhancing car travel while also safer pedestrian crossings at the intersections.

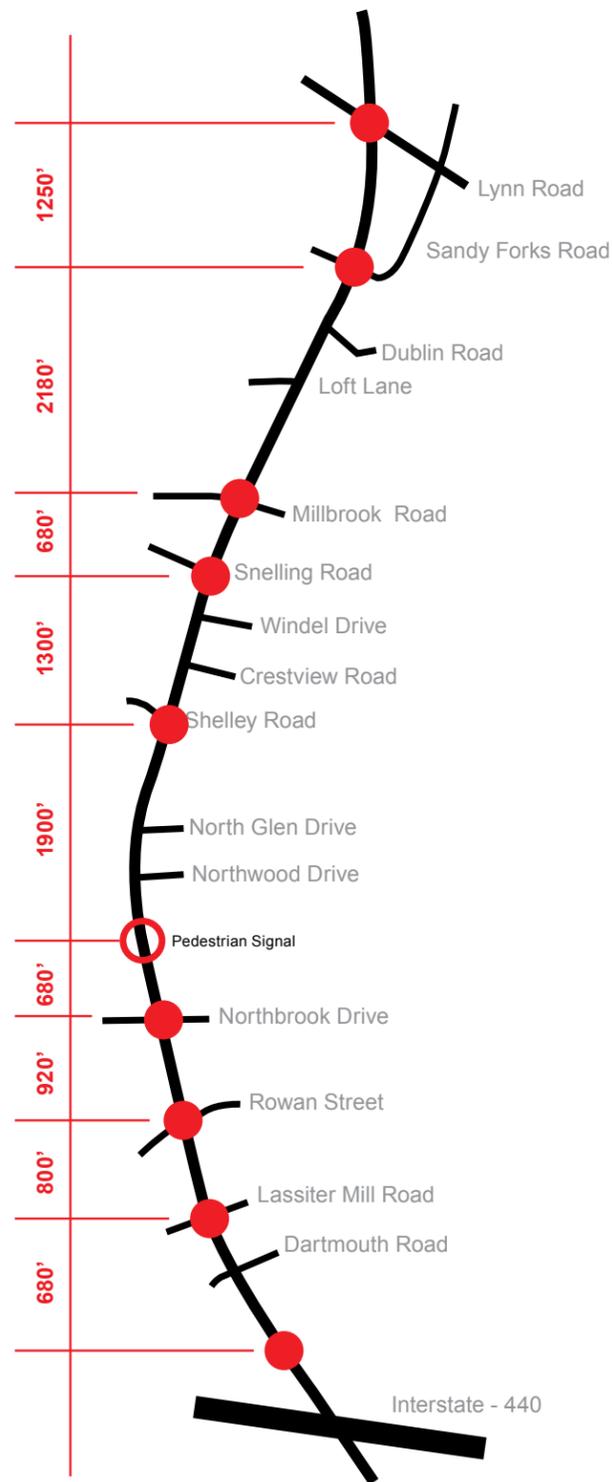
8. **Providing an adequate and continuous bicycling and pedestrian system** is highly desired by the Community and City and is part of creating a “Complete Street”. It will require additional Right of Way space depending upon the trade-offs between the level of functionality and safety in the system and the cost and feasibility of expanding the Right of Way, assuming it is located within the Right of Way. Finding the right balance in the design will require

Summary of Section Widths





Right of Way Widths - the above diagram shows the expansion and contraction of the right of way through the study area. Available right of way and need for right of way expansion will need to be addressed in the design phase.



Intersection Spacing - The above diagram shows existing intersection spacing along the Corridor. Providing controlled intersections for pedestrians to cross safely is important to a Corridors walkability. New controlled intersections associated with future development would improve the long sections of the Corridor that do not have controlled crossings.

further design discussion amongst the Stakeholders to determine how to make it the most space efficient while also providing for a clear and safe system. In order to resolve spatial issues, other opportunities may exist to consider some or all of the bike and pedestrian system to be located outside of the Six Forks Right of Way in a connected “back street” or greenway system, especially as part of redevelopment planning. Ideas such as this may be explored as an alternative.

10. There are places along the Corridor that are challenging from an existing conditions and/or dimensional standpoint given either the depths of the properties that front the Corridor, the location of parking lots or buildings, the location of large existing trees, and/or the varying topography that exists. **The design will respond to these locations and consider changes that accommodate any or all of the above;** the purchase of the shallow lots for parks or public open spaces; the reality that the existing landscape character may change or evolve to accommodate the desired improvements; and the recognition that phasing may be required.

11. Given the level of investment that will be required to create the Complete Street that is warranted, **a strategy for how the improvements are phased, funded and implemented is required.** For instance, the streetscape improvements, defined in a set of design guidelines, may be able to be funded and implemented in whole or in part by the redevelopment of the properties adjacent to the Corridor.

12. **Some of the improvements desired by and supported by the Community may not be feasible or reasonably implemented by the City.** For instance, there is a support for a grade separated walkway across Six Forks and a people mover along Six Forks. There was also support for a neighborhood shuttle type transit system that linked neighborhoods to each other and to the shopping centers. While it is understood that there is a relationship between these improvements and safer and more enhanced mobility, these sorts of improvements may fall outside of what is practical for the City to implement. Other funding sources may need to be considered.

13. **Enhancing the transit services along the Corridor is a high value item.** Given the spatial difficulties described above, creating a designated transit lane may not be possible or provide an appropriate return on investment. However, as habits change, services improve and more people shift from car dependency to using transit, lanes or medians that are being planned into the Corridor for cars in the near term may be able to shift toward

using them as dedicated transit lanes if it is warranted in the future. The lane dimensions and median dimensions need to be designed to anticipate this opportunity.

14. Provision will need to be made to provide maintenance along the Corridor that enables it to be consistently attractive and well maintained along its length. In our experience, **NCDOT does not assume the responsibility to maintain the streetscape and landscape along its roadways.**

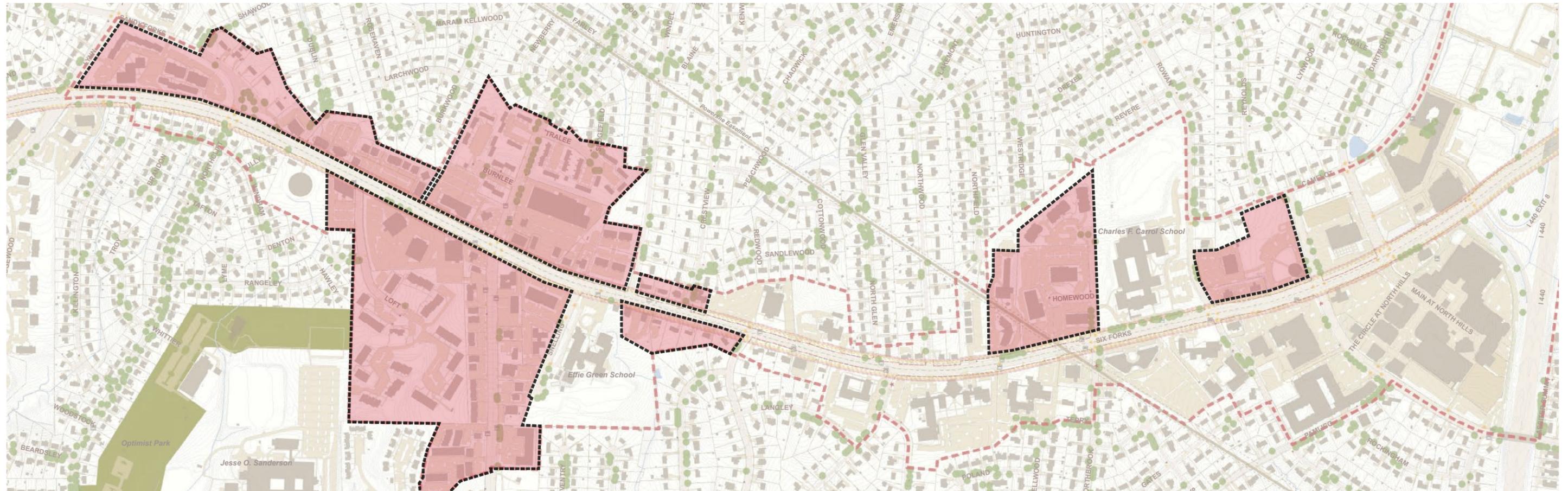
15. Continue with **further implementation of the Six Forks Transit Priority Corridor plan by making two specific transit route changes:** 1) Operate #8 on Six Forks between North Hills and Wake Forest Road, south on Wake Forest Road, and express to downtown Raleigh on Capital Blvd. 2) Append the Lassiter Mill and St. Marys portion of the the current #8 route to the 24L route, operating two-way on Hardimont and St. Albans. This change would reduce

the travel time between North Hills and downtown from 24 minutes to ~15 minutes. It would also improve crosstown connectivity. It would require only slightly more operating resources than the current operations, depending on the exact frequencies. The current operation of 8 serves two different markets (on either side of North Hills). Please look at the stop ridership data.

16. **Adjacent to the Corridor are several sites that have the potential to be redeveloped into higher density residential or mixed use projects.** As more investment is brought to this corridor and as Mid-town continues to grow as a destination within Raleigh, the land uses along the Corridor will change. These anticipated changes need to be accounted for in the traffic modeling and in the design of the streetscape.

The successful resolution of all of the above items will result in a design that meets the needs and expectations of the Community and City as it relates to providing a Complete Street for Six Forks Road. These items will shape the strategic direction of the design and planning processes that follow.

Examples of areas that potentially could be redeveloped in the future, other sites in the corridor could exist and should be investigated.



Transportation Analysis

Summary

Six Forks Road is a major arterial facility that provides mobility for daily commuters as well as a destination for residents and visitors to a multitude of shopping, restaurant, and civic amenities. The corridor is a link that connects suburban residential communities north of Raleigh to I-440 and downtown business district and includes several major pedestrian, bicycle, and transit crossings. It experiences congested conditions during traditional peak hour periods with off-peak congestion coinciding with North Hills attractions and entertainment schedules.

Safety in the corridor is a concern. Traffic volumes and congestion levels are increasing, as are the number of pedestrian and bicycle trips crossing Six Forks. The adjacent neighborhoods and development, “Midtown” is committed to creating a pedestrian-friendly entertainment and retail district as one of its guiding principles and, but looks to create a safe and effective way to redirect the majority of pedestrian/bike movements along and across Six Forks onto facilities that would separate those trips from general vehicular traffic. This will aid Six Forks Road in becoming a healthy and more active corridor.

Existing Conditions, Data Collection, Review and Analysis

Existing conditions represent years of decision-making that focused on maintaining the dominance of motorized forms of travel, even in areas where many pedestrians, cyclists, and transit users share the same space. This section provides key information to help inform the development of alternatives and justify the means for change. The intent is to ensure the vision and need for the surrounding area are understood and seeks a collaborative vision for improved safety and mobility. The following provides essential information to understand existing conditions.

Field Reconnaissance

A full-day in-field inventory of the corridor was conducted to document existing conditions, operations, and issues. Occurring at the kick-off of the project, this initial collaboration of the team members provided a rich context and understanding with regard to the public perception (memorialized during the visioning process in 2012) of the problems, issues, needs, and limitations within the corridor. The team walked the corridor, took field measurements, and made extensive notes on what they observed. Project team participants noted the following list of issues to consider and discuss:

- Sight distance
- Ramps

- Sidewalk conditions
- Pedestrian push buttons
- Crosswalks
- Signage
- Land uses
- Origins and destinations
- Non-motorized comfort levels
- Transit stops and accessibility
- Barriers to walking
- Lighting features
- Conflict points

Pedestrian and Bicycle Safety Comments

- Unpleasant experience trying to walk or bike the corridor
- Lack of pedestrian-level lighting along corridor
- Gateway and pedestrian/cyclist signage is needed within corridor to alert motorists of the heavy crossing traffic by pedestrians.
- Adjust traffic signal timing and pedestrian signal timing to prioritize pedestrian flow
- Lack of bike facilities along entire corridor
- Develop and install wayfinding signage for bicycle, pedestrian and vehicular users along the corridor
- Install sidewalk in gaps on streets in the study area, including the portion of Six Forks Road in front of Carroll Middle School
- Long pedestrian wait time crossing Six Forks at Dartmouth Road
- Narrow sidewalks without adequate separation between pedestrians and vehicle travel lanes
- Poor connectivity between residential neighborhoods and Six Forks commercial and civic district, represented by the lack of streets connecting residential development with commercial areas.
- Lack of marked crosswalks and signal countdown timers
- Pedestrian and bicycle safety on I-440 bridge over Six Forks Road
- Lack of maintenance of ped/bike facilities along corridor

Transit Comments

- Relocate bus stop locations closer to intersections and install additional shelters

- Bus turning radii and integrating them into the rest of the transportation system is a key element in design/planning.
- Big demand for connecting transit to Wake Forest Road and smaller buses with shorter routes, as expressed by meeting participants.
- Priority at-grade transit opportunities should be explored, and improvements to bus stop furniture and signing.
- Make bus stop shelters attractive facilities with possible public art pieces
- More frequent bus service – 15 minute headways
- Interest in a people mover from North Hills to future transit station

Traffic Oriented Comments

- Analyze opportunities for access management along the corridor
- Need for driveway consolidation and access control (median use) along entire corridor
- Drivers using right turn lanes as passing lanes
- Traffic congestion on Six Forks Road
- No adherence to school traffic zones/restrictions by commuters
- Excessive vehicular speed measurements
- Limited collector street connectivity
- Long delay for minor street movements
- Egress issues – vehicular traffic entering and exiting individual driveways on corridor
- Limited sight distance visibility in locations
- Cut-through traffic concerns
- Lack of traffic calming and gateway treatments for surrounding neighborhood entrances
- Inconsistent cross section along entire corridor

These field observations, combined with public involvement work and data collection, provided a more nuanced understanding of the character of Six Forks Road. More information is presented in the following section.

Character of Six Forks Road

Baseline data including topography, lighting, crash analysis, and vehicular travel (AADT, LOS, travel speeds and behavior) information provided a foundation for understanding the conditions and perceptions that comprise the character of Six Forks Road. The following topics are represented in graphical format and described below.

Topography

Six Forks is generally a level ride (or walk), descending only by 100 feet over its approximately 2.3 mile length traveling from south to north. In some areas, the road follows a ridge line, but predominantly it is relatively flat. Steep grades occur between Dartmouth Road to Rowan Street, “falling away” from the roadway. This topography actually presents some moderate ascents towards Six Forks and poses some challenges to designers seeking to improve or modify Six Forks.

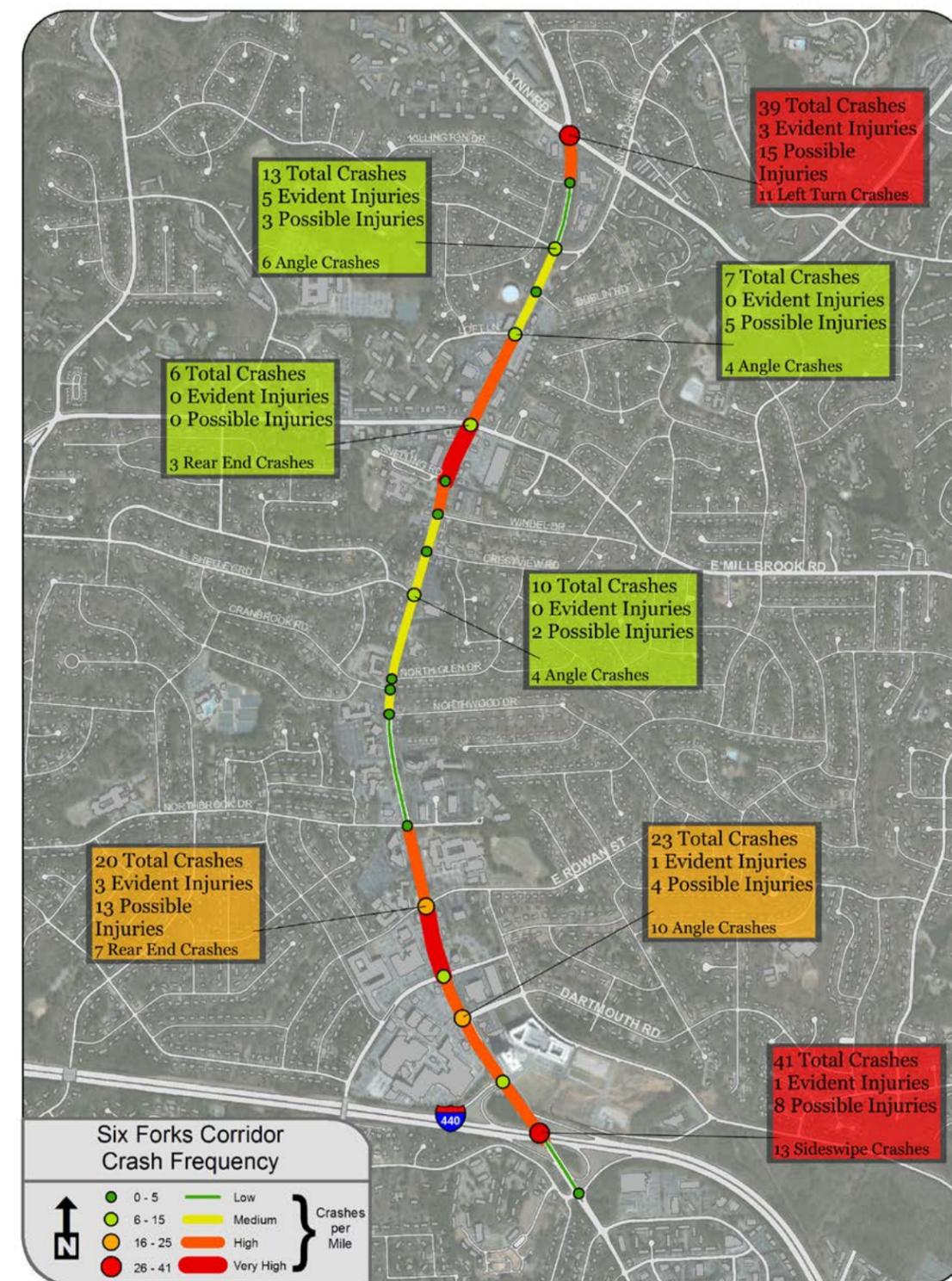
Crash Analysis

Crash data from 9/1/2010 – 8/31/2013 is illustrated in Figure 1. This figure indicates that the majority of bicycle, pedestrian, and auto crashes within this corridor happen at intersections between I-440 and Northbrook Drive and focus on the intersections at Lynn Road and at Dartmouth Road. Although crossing at intersections is generally the safest point for pedestrians to cross, this result is not surprising since intersections are also the places where the most pedestrian crossings occur and hence present the highest rate of exposure for conflicts between pedestrians, cyclists and automobiles. Seven (7) pedestrian and four (4) bicycle crashes were recorded during this period within the study area, none of which were fatal. All of these crashes were infrastructure-related occurrences. High visibility crosswalks, lighting, and proper bicycle lanes and signage would increase the visibility, safety, and comfort of pedestrian and cyclists and assist motorists in identifying non-motorized travel as a key mobility component in the corridor. Figure 2 provides an alternative view of the crash data by intersection location and injury type.

The vehicular crashes are very different than the pedestrian and cyclist crashes reported. Figure 1 highlights the crash type and severity for different sections along the corridor. There were over 700 vehicle crashes reported over a three year period. This translates to a crash rate of 783 Crashes per 100 million vehicle miles (MVM) along the corridor compared to an average crash rate of 274 (MVM) for a similar roadway statewide. The increase between the Six Forks crash rate is 2.86 times the State average

crash rate. Unlike the crash frequency, the crash severity rate was relatively low at an average of 2.52 for the corridor. According to the NCDOT Division of Mobility and Safety’s Traffic Engineering Accident Analysis System (TEAAS) User Manual, a severity index of 8.4 or higher indicates that the area is likely to have more serious crashes and therefore warrant mitigation measures. The highest crash severity occurred within the section between I-440 and Northbrook. Crash types ranged considerably between each section. The predominant crash type was rear-end crashes at 53% followed by 47% were represented by angled crashes (15%), side-swipe crashes (16%), and other (16%). Although the crash frequency is surprising, the types of crashes (predominantly rear-end) and low rate of severity is not. These types of crashes are indicative of high volumes of traffic traveling at slower speeds and distracted driver behavior. Limiting conflicts like left turn demand will have a profound impact on the frequency of crashes along the corridor.

Figure 2. 2010-2013 Crash Frequency and Injury Type Figure 2 provides an alternative view of the crash data by intersection location and injury type.



Vehicular Travel (Daily Traffic, Speeds and Behavior)

Six Forks Road serves approximately 29,000 – 42,000 annual average daily trips (AADT), with the heaviest volume in proximity to I-440 and North Hills Shopping Center.

The posted speed limit along the section of Six Forks between Lynn Road and Millbrook Road is 45 mph with the remaining section at 35 mph. Speed studies were completed over two weekday periods from 7:30 am until 11am. The corridor travel speeds shown in Figure 3 represent the free-flow conditions considering traffic lights and platooning of vehicles. Data was collected by dynamic flow-speed observations (traveling with traffic through the corridor multiple times) and static observations (a radar speed gun was used at intersections and mid-block locations along the corridor to observe speeds). The recorded speeds throughout the corridor dropped to 68% of the posted speed limit during the AM and PM peak hours on average, an indication of high levels of congestion and commuting demand.

The character of driving is the most critical element of data observed. The race car mentality of drivers and the unexpected pedestrian crossings within this corridor make mobility unpredictable and dangerous. Lane shifts occur between I-440 and Rowan Street for northbound vehicles pose a danger as weaving is occurring at a very high volume in this short roadway segment.

Traffic analyses for intersection operations and corridor conditions for 2013 traffic volumes for the AM and PM peak hours along Six Forks corridor were provided by the City of Raleigh to further detail information on the vehicle delay and operation. (Figure 40, Average Daily Traffic and Intersection LOS and Delay for more information.) This data confirmed the field observations of our team that congestion and delay are lengthy at the intersections of Lynn Road, Millbrook Road and I-440. That is, the average delay per vehicle at the intersection with Millbrook is 97 seconds during AM peak period.

Overall, the corridor's volume-to-capacity ratio ranges from 0.95 – 1.41, warranting consideration for improvements such as widening or signal improvements. The addition of new development and redevelopment along the corridor will push the limits of the Six Forks corridor towards widening to a six lane facility. The long delays and queues at the major intersections are complicated by fact that peak hour congestion is no longer predominantly, one direction. The average directional split for both the AM and PM peak hours are only 45% – 55%. This is an indication of Six Forks becoming more of destination corridor.

Transit Ridership

Overall, two Capital Area Transit bus routes travel along Six Forks Road. Route 8-Northcliff travels along the entire Six Forks Corridor, beginning in downtown Raleigh and ending at Strickland Road just south of I-540. Route 24L is primarily an east-west route, but does have two stops near North Hills Mall along Six Forks Road just north of I-440.

In terms of transit ridership, the largest portion of people get on and off at the North Hills Mall stop, with 43 people boarding the bus at this station and 75 people alighting from the bus on the outbound trip of Route 8-Northcliff. The same is true on the inbound route, with 70 people boarding the bus and 27 alighting from the bus at the North Hills Mall stop. The Millbrook stop also has a substantial number of boardings (14 Outbound, 18 Inbound) and alightings (24L Outbound, 16 Inbound). With only two stops along Six Forks Road, Route 24L-North Crosstown has substantial boardings and alightings at Six Forks Road and North Hills Mall, with 52 people boarding the bus and 69 alighting. Figure 5 provides all of the boardings and alightings for both transit routes in the study area.

Transit service in the study area is configured partly into a grid pattern. 8-Northcliff is the major radial route to downtown Raleigh, operating on Six Forks and Lassiter Mill. East/West lines exist at three places along the study area. 24L-North Crosstown connects Six Forks to Wake Forest Road and Capital Blvd. It operates in a one-way loop along Wake Forest, Six Forks, St. Albans, and Hardimont, connecting to 8 at North Hills. 23L-Millbrook Crosstown operates on Millbrook Rd., connecting to Capital Blvd at the east end and Crabtree Valley Mall at the west. 54L-Spring Forest Road Crosstown crosses Six Forks Rd at Lynn Road. The most direct transit service from Six Forks Rd to downtown Raleigh (8-Northcliff) services a number of inside the beltline neighborhoods instead of taking a more direct route along radial arterial streets.

Within this framework, nodes at Lassiter Mill, Millbrook, and Lynn provide opportunities for transit-oriented development where major radial service intersects crosstown service.

This data indicates that, as the Six Forks Road corridor continues to develop in the Midtown area, it is likely that transit ridership will increase. The provision of safer, more comfortable accommodations for pedestrians and bicyclists will also stimulate transit ridership in the corridor.

Transportation Needs Assessment

“What needs improvement?” was a fundamental question asked throughout the planning process, one which solicited insights, opinions, and opportunities for meeting the goals of this project from stakeholders, decision-makers, and planners alike. The base for our “needs” started in 2012 through a well-attended Visioning process. This information was augmented with second phase public outreach session, data analysis, and a full day field reconnaissance and was summarized in three main categories of improvement:

- Facility
- Safety/Access Management
- Aesthetics/Signage

A quick list of main needs noted include the following:

- Widen Six Forks Road from I-440 to Lynn Road to a 6-lane divided with planted median
- Improve the visibility and crossing provisions for bicyclists and pedestrians at all major intersections
- Increase driver awareness of bicycle/ pedestrian crossings
- Provide continuous wide sidewalks and separate bicycle facilities
- Implement access management strategies throughout corridor (driveway consolidation, median use, cross access between complimentary uses
- Incorporate traffic calming (street trees, bollards, plantable median, etc.) to limit speed differentials
- Improve transit stops, frequency and amenities

These needs provided direction for the corridor-level improvements and the consideration of a grade separation and how it will interface and connect with the existing transit, pedestrian, and cycling infrastructure and travel patterns.

Figure 1 highlights the crash type and severity for different sections along the corridor. There were over 700 vehicle crashes reported over a three year period. This translates to a crash rate of 783 Crashes per 100 million vehicle miles (MVM) along the corridor compared to an average crash rate of 274 (MVM) for a similar roadway across the State of North Carolina.

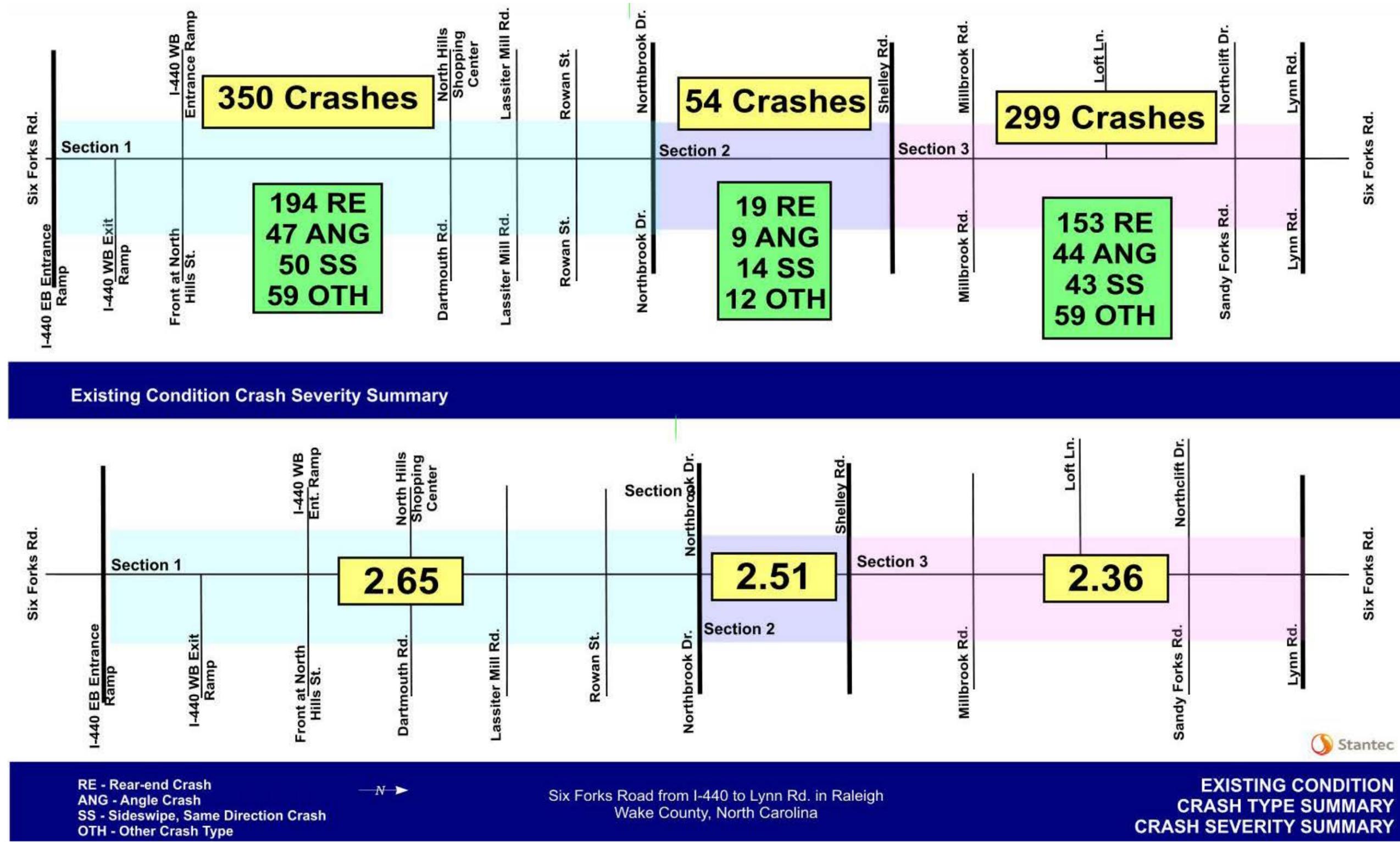


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Figure 3. Average Travel Time and Speed - The corridor travel speeds represent the free-flow conditions considering traffic lights and platooning of vehicles. Data was collected by dynamic flow-speed observations (traveling with traffic through the corridor multiple times) and static observations (a radar speed gun was used at intersections and mid-block locations along the corridor to observe speeds).

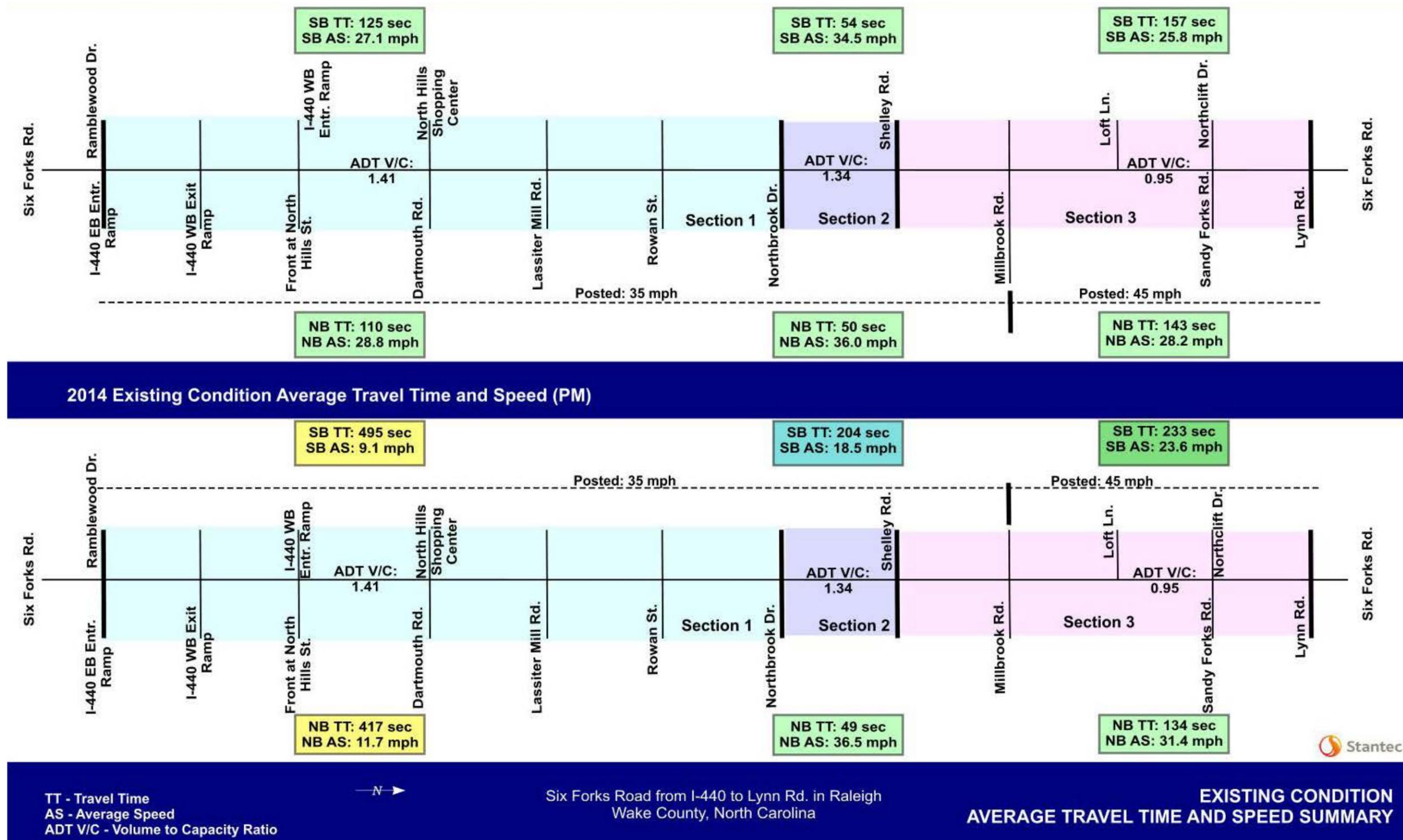
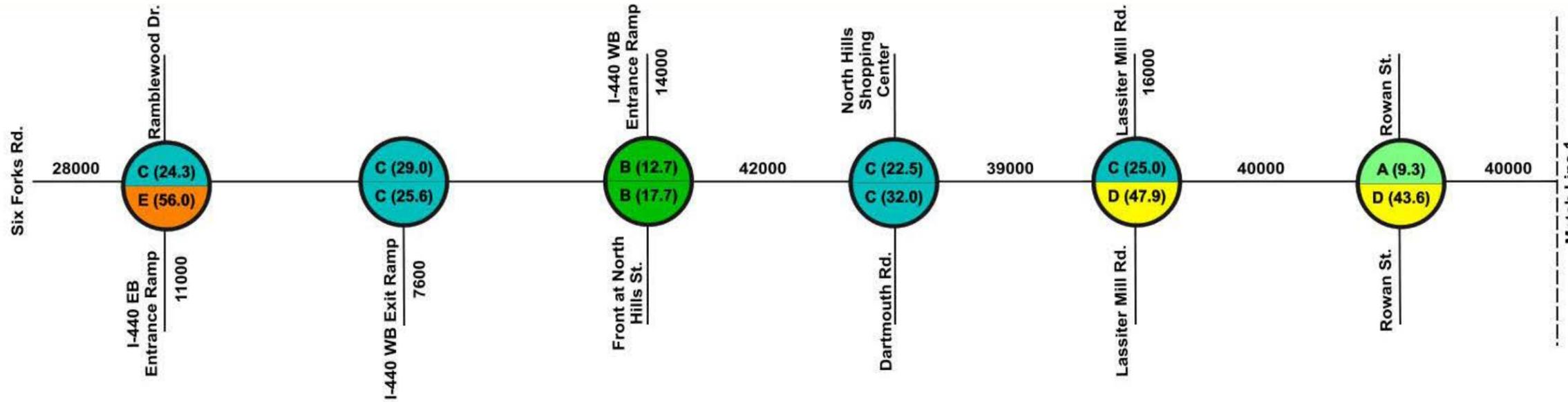


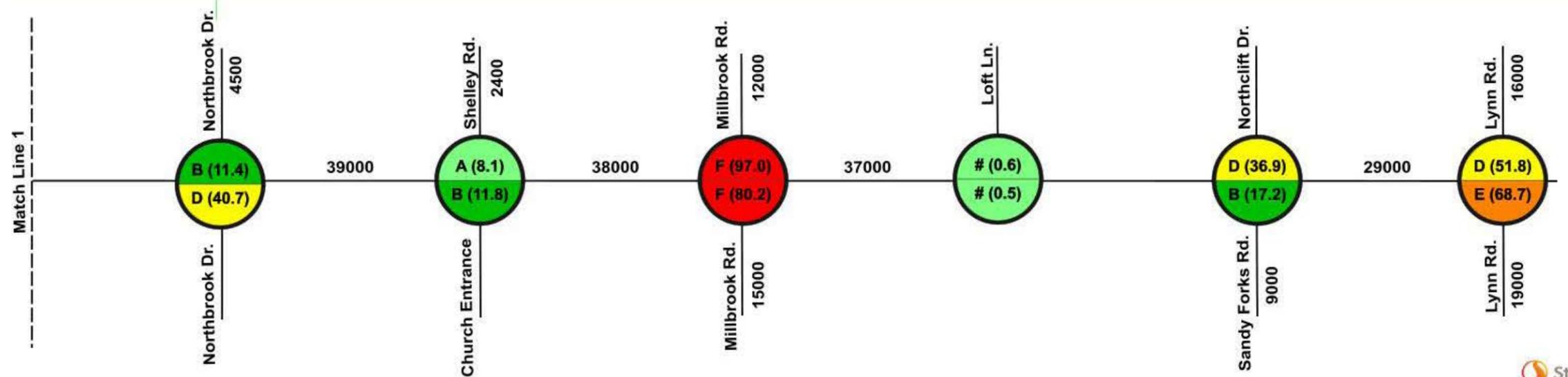
Figure 4. Average Daily Traffic and Intersection LOS & Delay Figure 4 - Traffic analyses for intersection operations and corridor conditions for 2013 traffic volumes for the AM and PM peak hours along Six Forks corridor were provided by the city of Raleigh to further detail information on the vehicle delay and operation. This data confirmed the field observations of our team that congestion and delay are lengthy at the intersections of Lynn Road, Millbrook Road and I-440. That is, the average delay per vehicle at the intersection with

Millbrook is 97 seconds during AM peak period. Overall, the intersections seem to be operating acceptably. However, the corridor volume to capacity exceeds acceptable limits. Based on the historical traffic volumes along Six Forks corridor, the volumes have increased by 2% over the past decade (2003-2013). Although, this represents a slight increase, the low number can be attributed to the effects of the recession. In fact, over the past three years, we have seen a healthy increase in volumes.

Today Six Forks Road carries an average of 37,000 vehicles per day (VPD). As a comparison, other radial routes within proximity to Six Forks are carrying similar traffic volumes, including Creedmoor Road at 30,000 vpd and Falls of the Neuse at 34,000 vpd, on average.



2013 Existing Condition Level of Service and Average Daily Traffic (cont'd)



X (XX) - LOS (Delay in seconds/vehicle) →

AM and PM Level of Service and Delay

Six Forks Road from I-440 to Lynn Rd. in Raleigh Wake County, North Carolina

EXISTING CONDITION LEVEL OF SERVICE AND DELAY SUMMARY AVERAGE DAILY TRAFFIC SUMMARY

Figure 5. Transit Boarding and Alighting Figure 5 provides all of the boardings and alightings for both transit routes in the study area. As expected, the North Hills Mall location has the highest level of ridership.

Route 8-Northclift			
Outbound		On	Off
8449	North Hills Mall	43	75
8451	Six Forks and Rowan	2	3
8919	Six Forks and Northbrook	0	2
8452	Six Forks and Capital Towers	8	18
8453	Six Forks and North Glen	0	0
8454	Six Forks and Grace Lutheran Church	0	1
9400	Six Forks and Windel	0	7
9131	Six Forks and Millbrook	14	25
8785	Six Forks and Sandy Forks	3	10
8786	Six Forks and Lynn	4	9
Inbound			
8854	Six Forks and Lynn	10	5
8809	Six Forks and Northclift	5	2
8470	Six Forks and Loft	3	0
8471	Six Forks and Millbrook	18	16
8472	Six Forks and Snelling	5	1
8473	Six Forks and Shelley River	2	0
8456	Six Forks and Grace Lutheran IB	0	0
8474	Six Forks and Cranbrook	0	0
8475	Six Forks and Trinity Baptist Church	12	4
8476	Six Forks and Northbrook	0	0
8477	Six Forks and Rowan	0	0
8920	Six Forks and Lassiter Mill	1	3
8450	North Hills Mall	70	27
Route 24L-North Crosstown			
9671	Lassiter Mill and Six Forks	0	0
8449	North Hills Mall	52	69

Urban Design Analysis

- | | |
|---|---|
| ① No existing crosswalks | ⑨ Fence |
| ② Ramps not ADA compliant | ⑩ Wall |
| ③ Power pole between sidewalk and curb | ⑪ Lighting on poles, 25' mounting height |
| ④ Narrow Sidewalk 5' or less | ⑫ Trees underneath and/or growing into power lines |
| ⑤ Wide curb cut for drive | ⑬ Irrelevant curb cut |
| ⑥ Above ground control cabinets | ⑭ Bus stop with shelter |
| ⑦ Large trees outside and on edge of right-of-way | ⑮ Topography that potentially will impact roadway expansion |
| ⑧ Crosswalk (non-high visibly) | ⑯ Median |

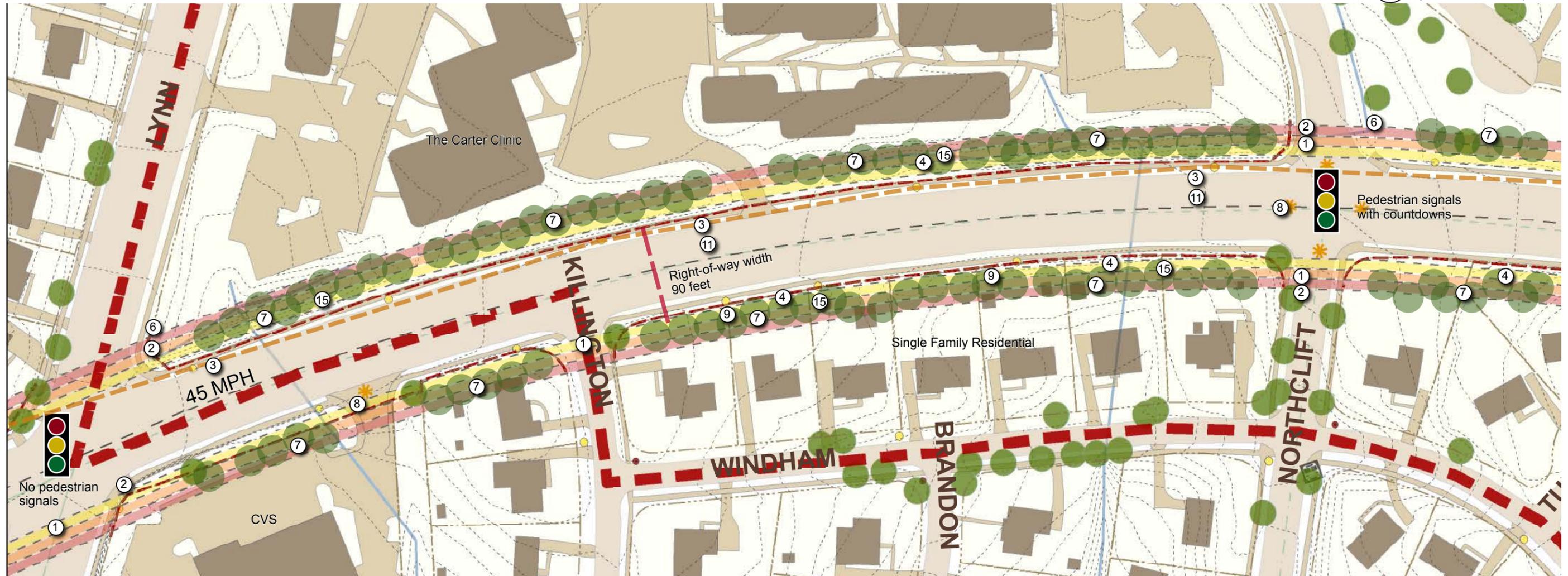
Legend

- Major power line route
- Current right-of-way
- Power pole
- Existing Street Trees
- Road Center Line Offsets**
 - 100-120 feet wide
 - 120-140 feet wide
 - 140-160 feet wide
- Crosswalks

Notes

This section of road way has mature trees along both sides of the road and single family homes.

Power poles in this section are mostly back of curb.



Urban Design Analysis

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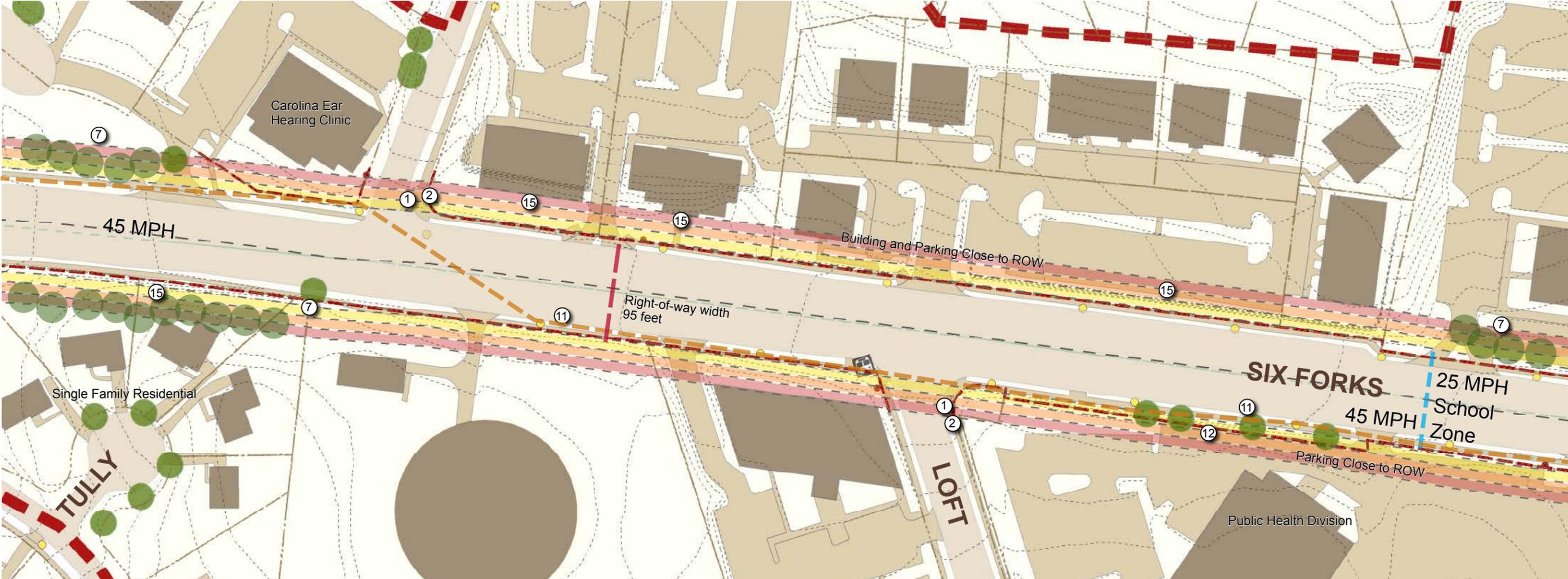
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Notes

This section of road way has some mature trees and recent redevelopment.

Opportunities for redevelopment exist along this section of the corridor.

There are topographic challenges along side the road which may impact road expansion.



Urban Design Analysis

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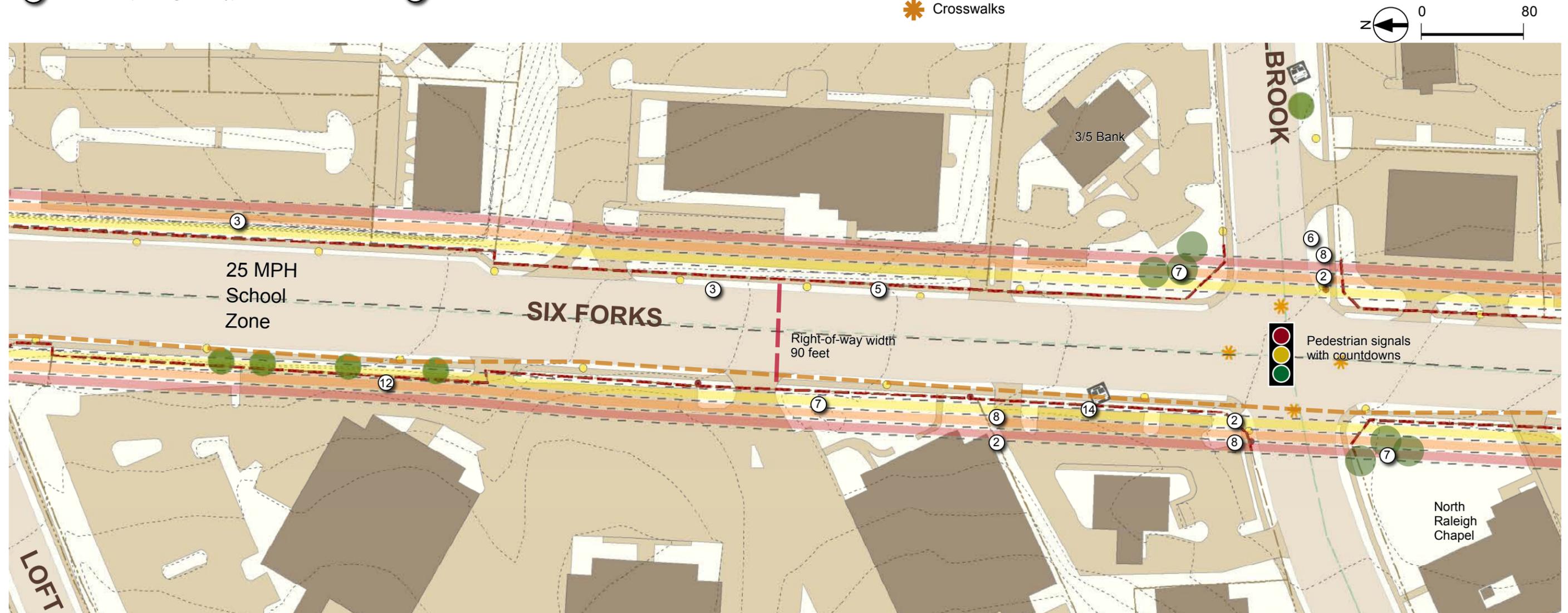
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Notes

This section of road way has many opportunities for redevelopment.

Millbrook is a busy intersection that is difficult to cross.



Urban Design Analysis

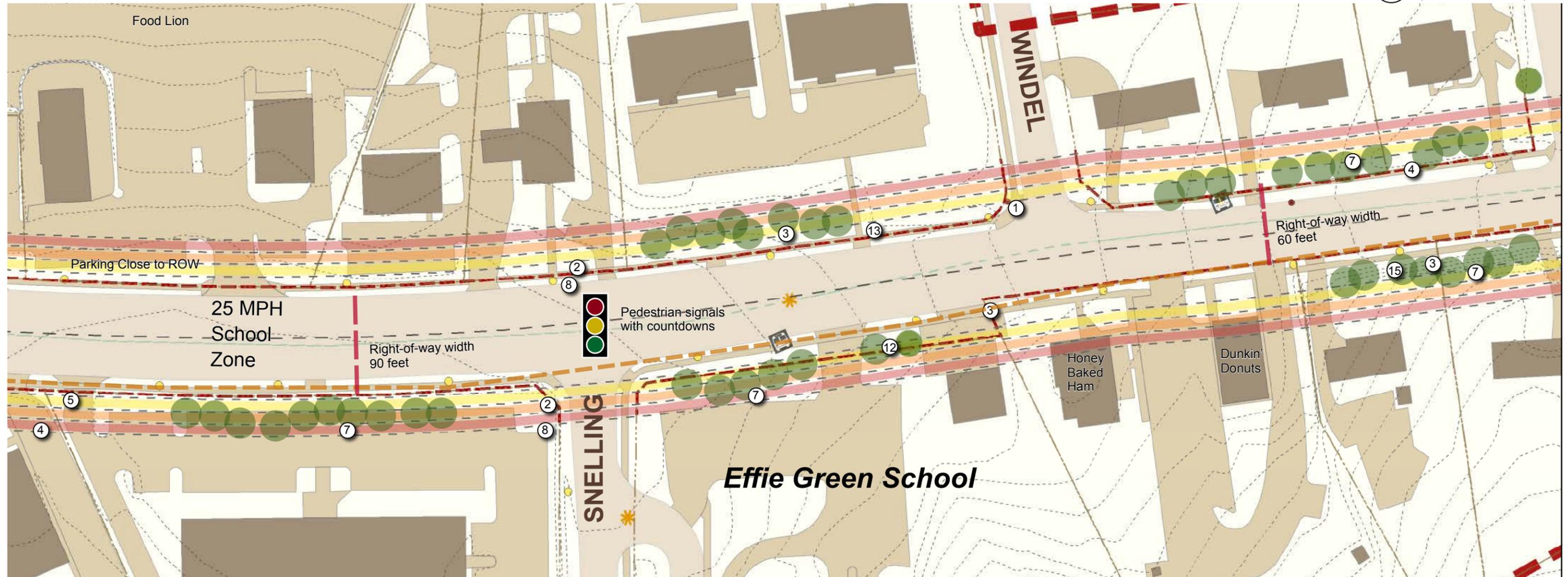
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Notes

The Food Lion in this section of road creates more pedestrian traffic in this area. While in the corridor we noticed several pedestrians crossing at the mid-block.



Urban Design Analysis

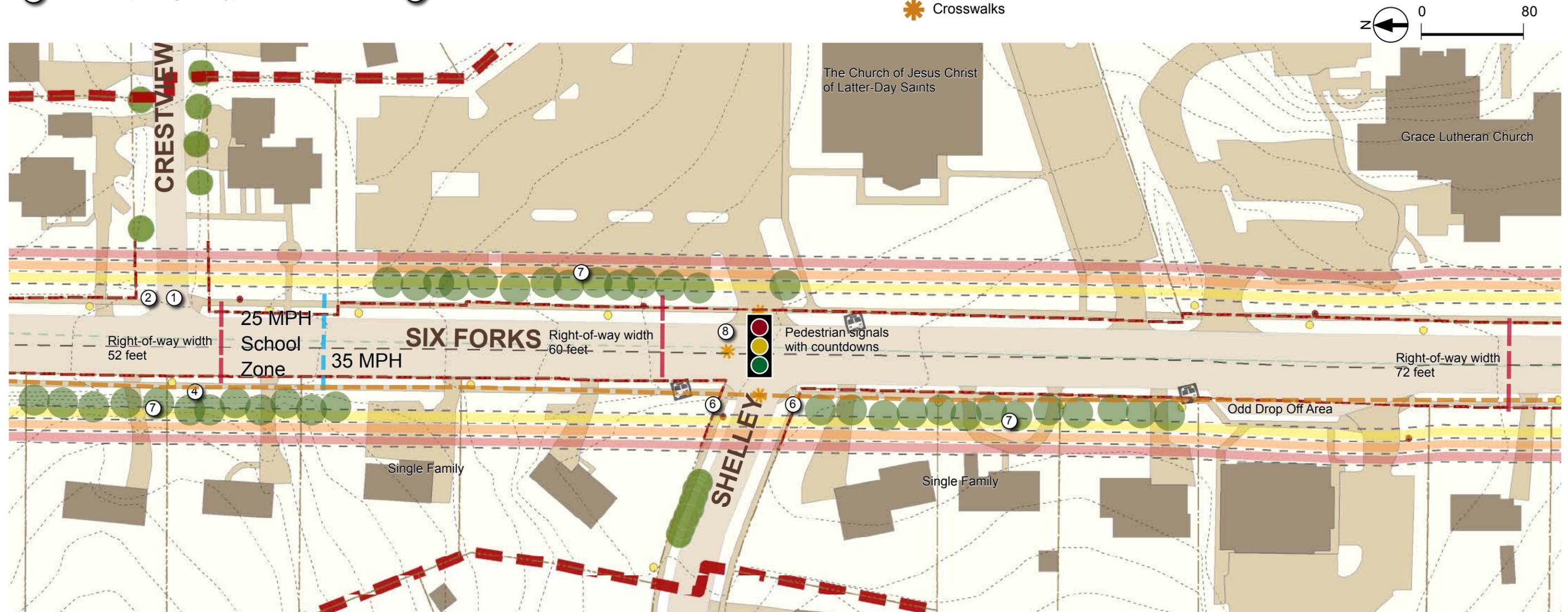
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Notes

This middle section of the corridor has more churches, schools and single family residential than any other section. Traffic can be briefly heavy Saturdays, Sundays and Wednesday evenings.



Urban Design Analysis

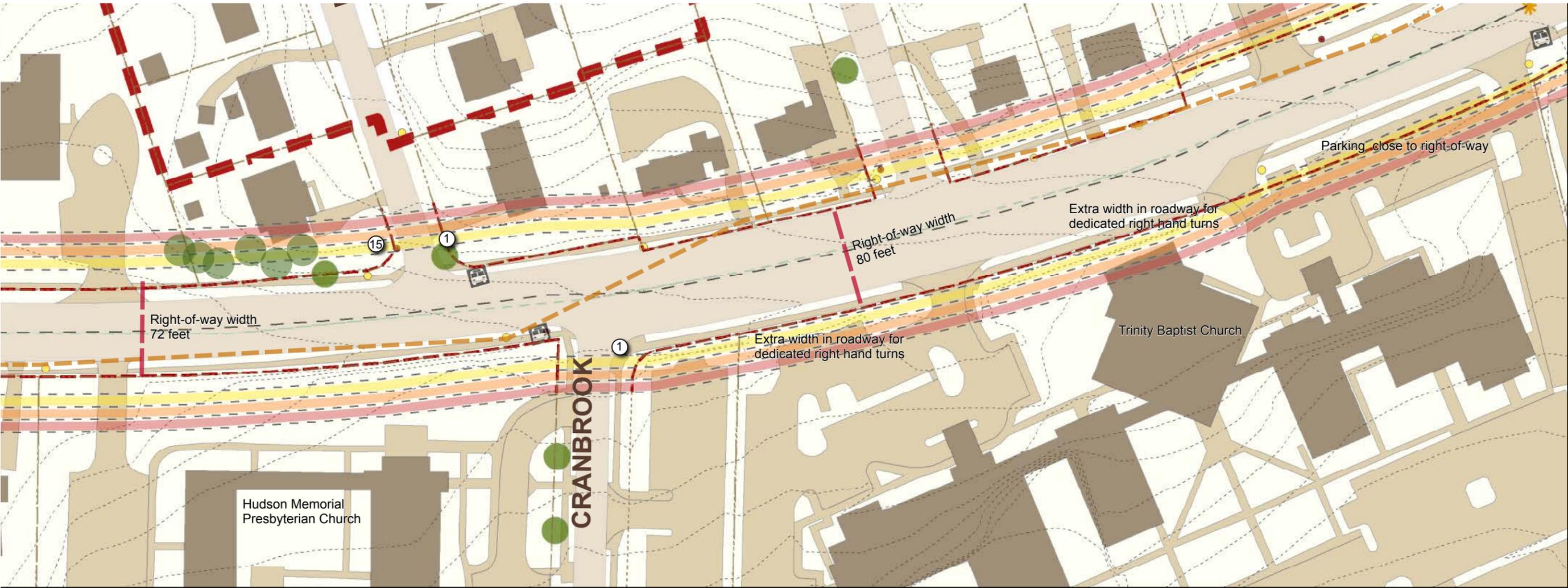
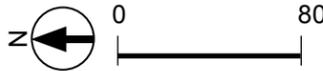
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Notes

This continues the middle section of the corridor which is predominantly churches, schools and single family residential.



Urban Design Analysis

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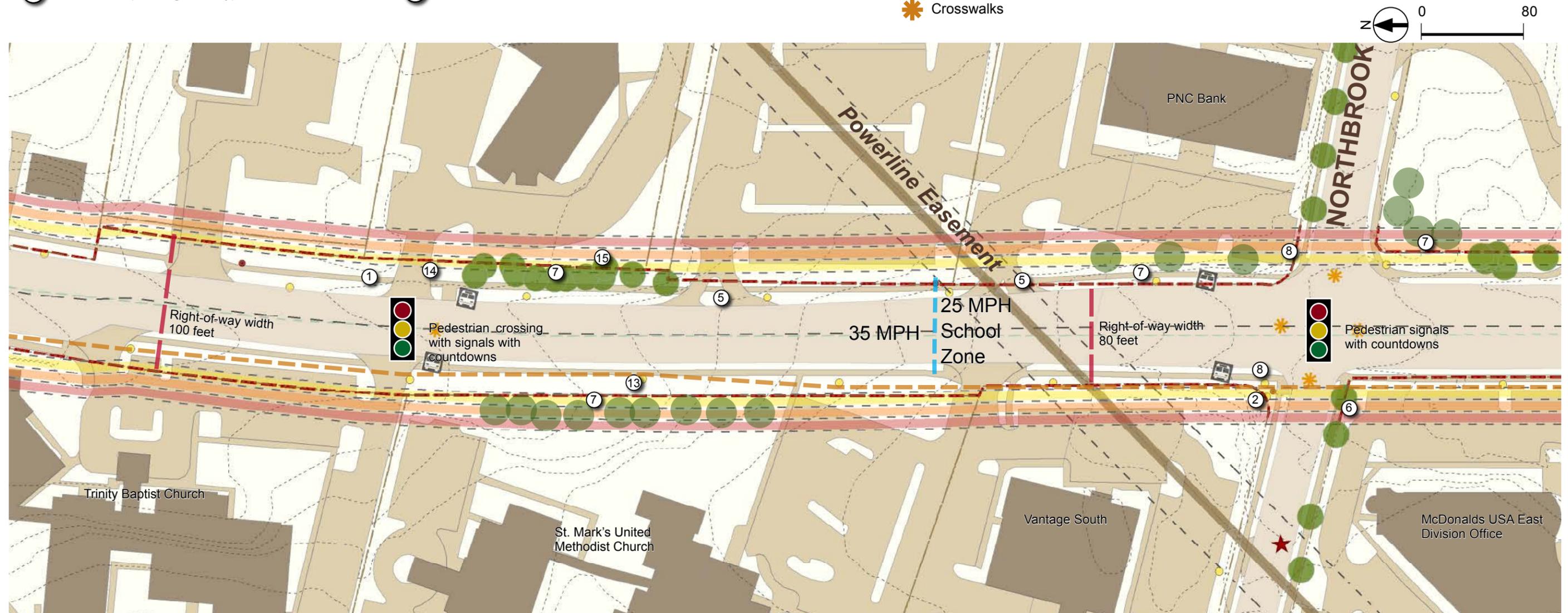
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Notes

Churches continue to flank the west side of the road with well establish landscapes.

Redevelopment is occurring on the east side of the road where there are also properties with potential for higher and better use.



Urban Design Analysis

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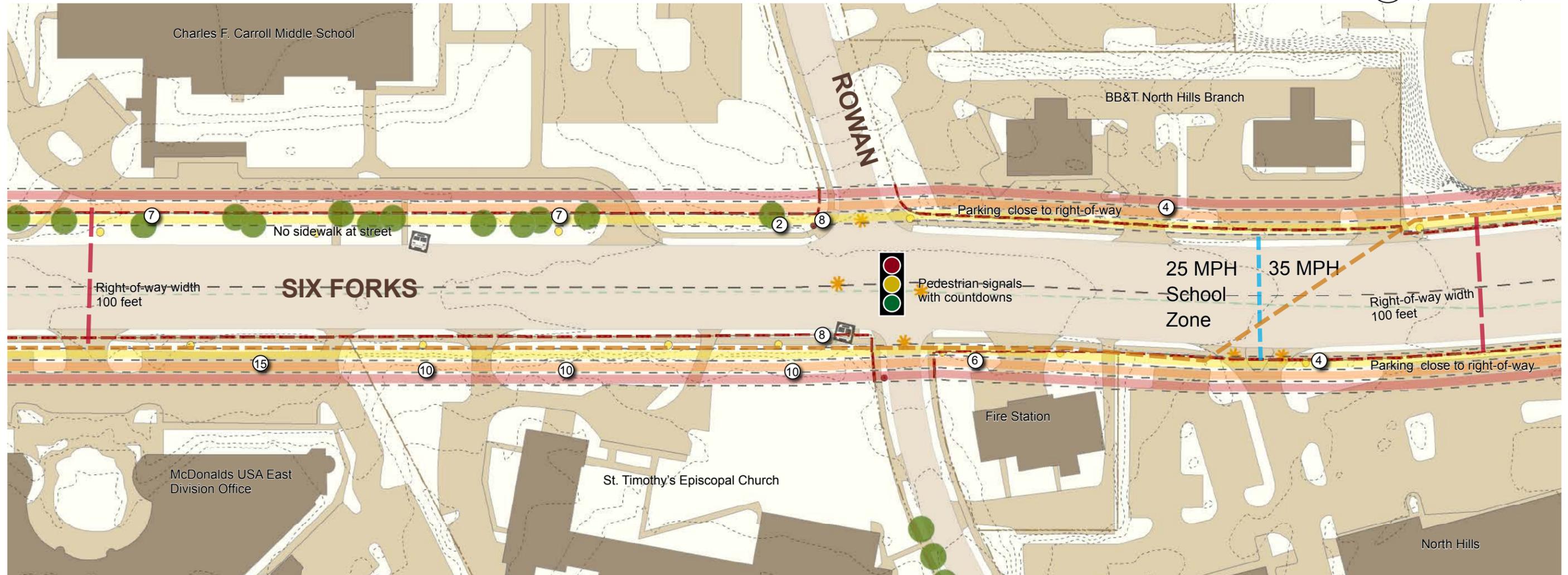
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Notes

Carroll Middle School has several access challenges.

The private schools associated with the local churches also generate a considerable amount of trip during the morning rush hour period.

The intersection of Rowan and Six Forks is critical for pedestrians traveling to and from the schools.



Urban Design Analysis

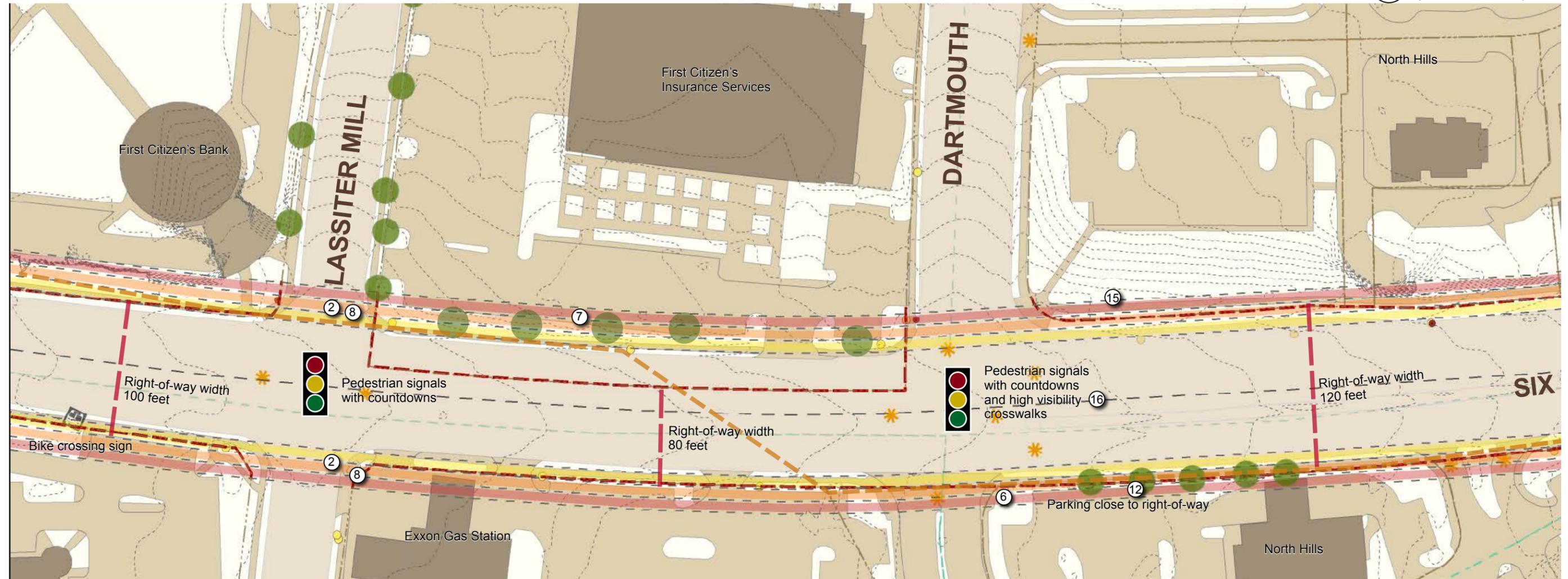
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Notes

North Hills is a popular destination in the Mid-town and the greater Raleigh areas. It has created attractive internal streets and upgraded the intersections that turn into North Hills.



Urban Design Analysis

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- ⑪ Lighting on poles, 25' mounting height
- ⑫ Trees underneath and/or growing into power lines
- ⑬ Irrelevant curb cut
- ⑭ Bus stop with shelter
- ⑮ Topography that potentially will impact roadway expansion
- ⑯ Median

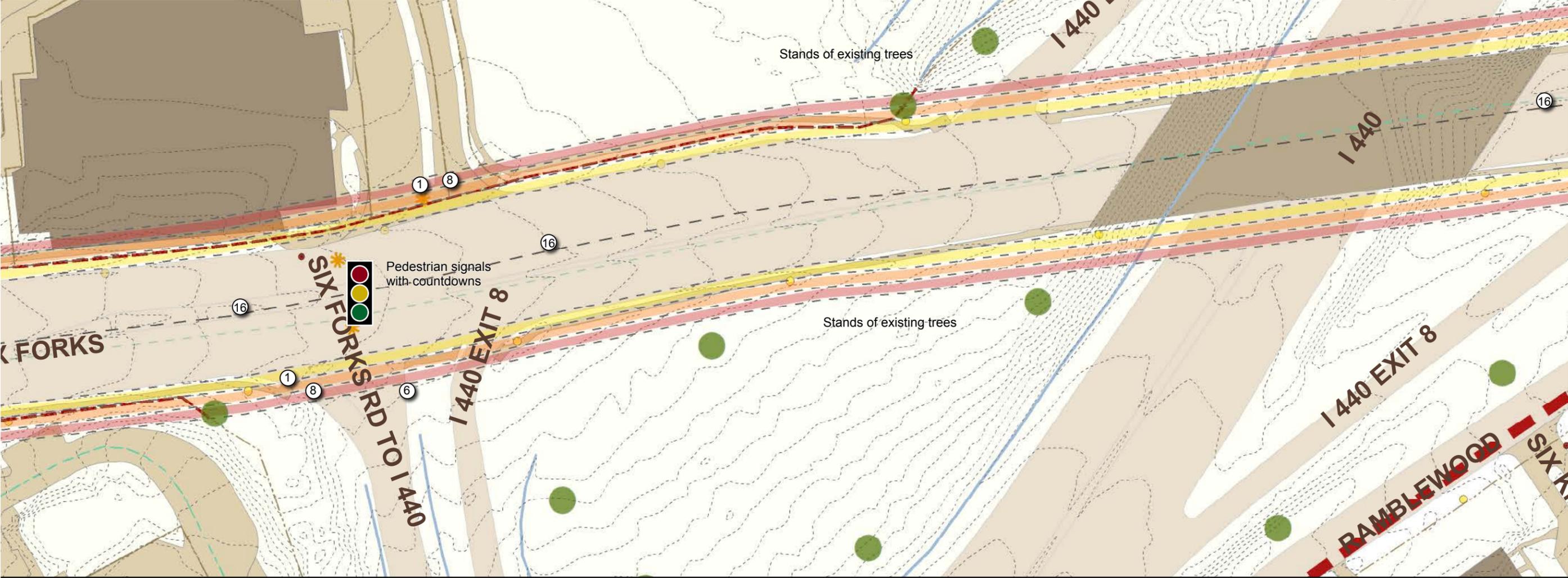
Legend

- Major power line route
- Current right-of-way
- Power pole
- Existing Street Trees
- Road Center Line Offsets**
 - 100-120 feet wide
 - 120-140 feet wide
 - 140-160 feet wide
- Crosswalks

Notes

Conditions at the on and off ramps for I-440 vary. Treatment should be consistent and ideally all turning movements be inside a controlled intersection.

This exit off of I-440 could have a much stronger identity with signage and planting.



Urban Design Analysis

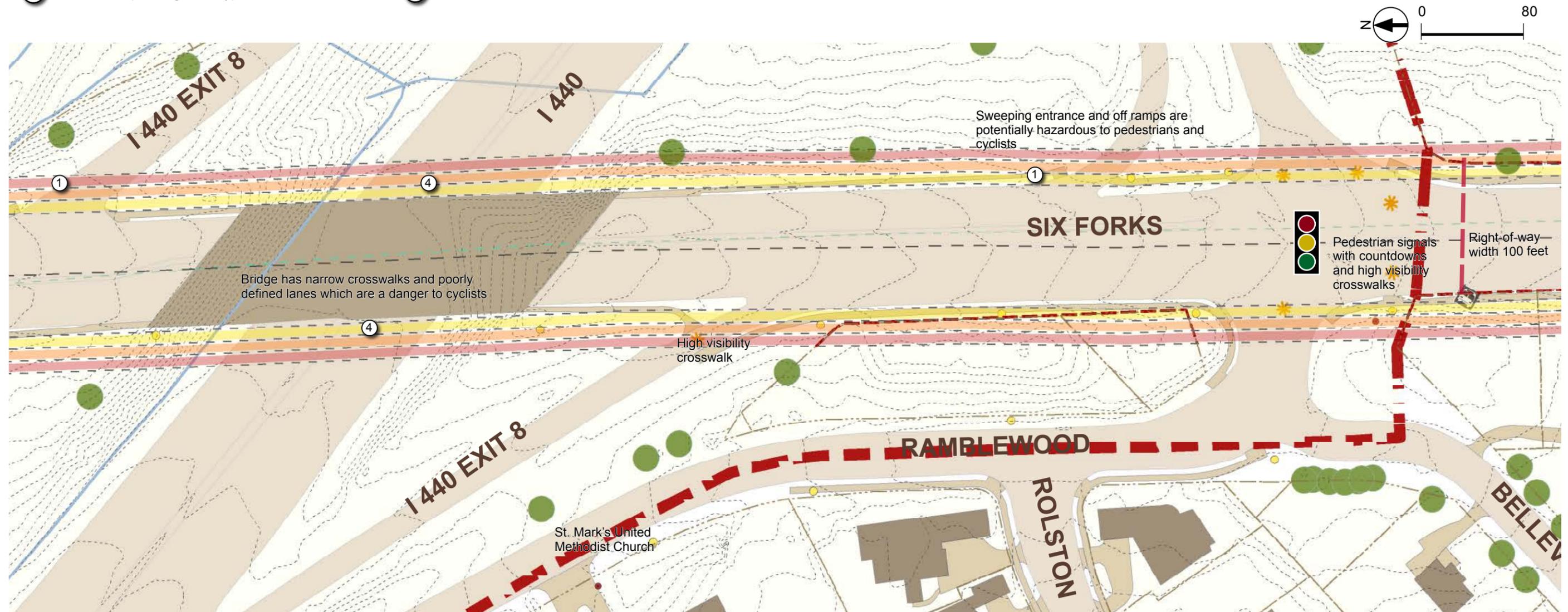
- ① No existing crosswalks
- ② Ramps not ADA compliant
- ③ Power pole between sidewalk and curb
- ④ Narrow Sidewalk 5' or less
- ⑤ Wide curb cut for drive
- ⑥ Above ground control cabinets
- ⑦ Large trees outside and on edge of right-of-way
- ⑧ Crosswalk (non-high visibly)
- ⑨ Fence
- ⑩ Wall
- ⑪ Lighting on poles, 25' mounting height
- ⑫ Trees underneath and/or growing into power lines
- ⑬ Irrelevant curb cut
- ⑭ Bus stop with shelter
- ⑮ Topography that potentially will impact roadway expansion
- ⑯ Median

Legend

- Major power line route
- Current right-of-way
- Power pole
- Existing Street Trees
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 - 100-120 feet wide
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 - 140-160 feet wide

Notes

Conditions at the on and off ramps for I-440 vary. Treatment should be consistent and ideally all turning movements be inside a controlled intersection.



Public Involvement - Keypad and Online Polling Results

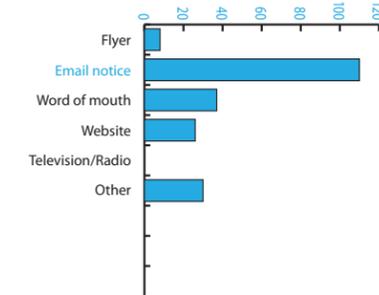
Public meetings and website polling was conducted to gather the public's opinion about the Six Forks Corridor project. The purpose of these meetings was to kickoff Phase 2 of the project and to reintroduce the Community to the conclusions of the Visioning Work Sessions that were part of Phase 1.

The results below are an aggregate of the polling collected. In total we had 205 respondents.

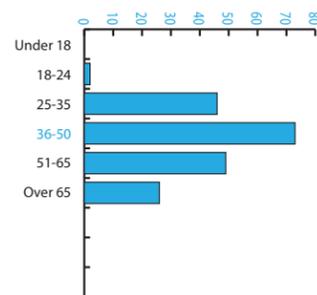
1. My affiliation with the Six Forks Corridor is? (choose all that apply)



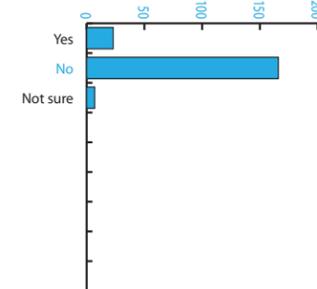
2. I found out about this meeting from... (choose all that apply)



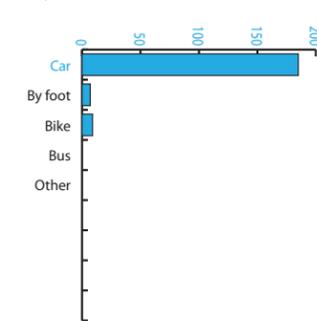
3. What is your age? (Choose one)



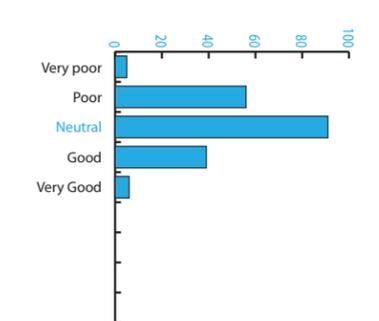
4. Were you involved in the previous meetings? (Multiple Choice)



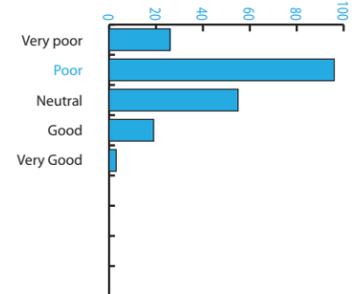
5. My primary mode of travel along Six Forks is: (Choose one)



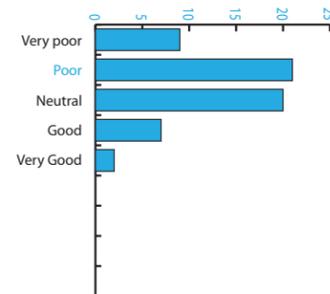
6. How would you rate the overall appearance of Six Forks Boulevard? (Choose one)



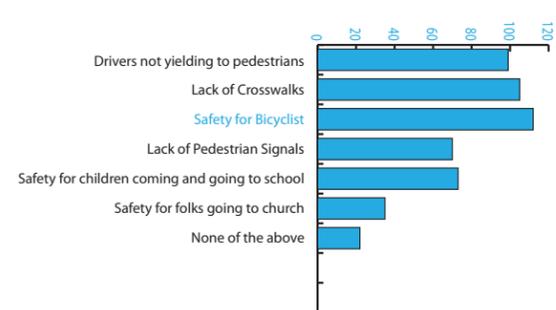
7. How would you rate the overall safety of Six Forks Road? (Choose one)



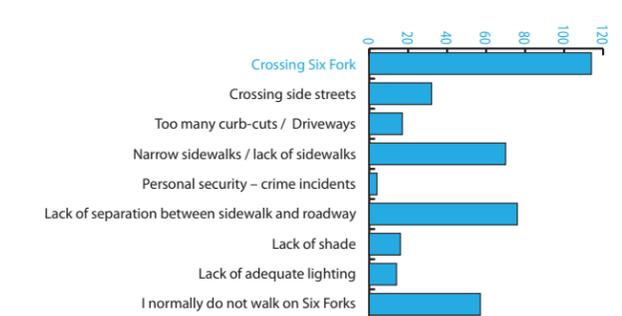
8. How would you rate the overall flow of traffic of Six Forks Road? (Choose one)



9. What safety issues concern you the most along Six Forks? (select all that apply)



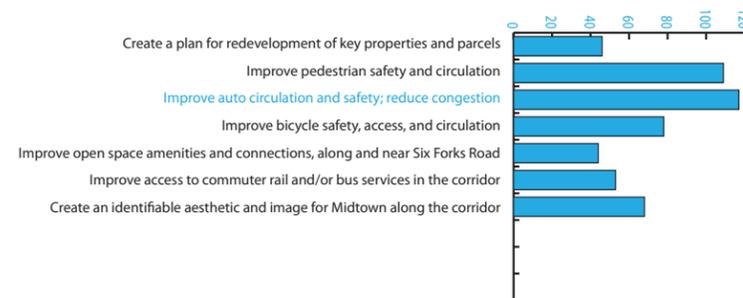
10. When you are walking along Six Forks, what concerns you most? (Choose top 3)



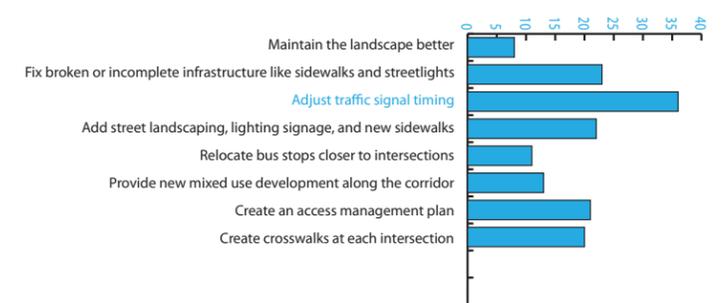
11. Which auto transportation issues concern you most along Six Forks? (Choose your top 3)



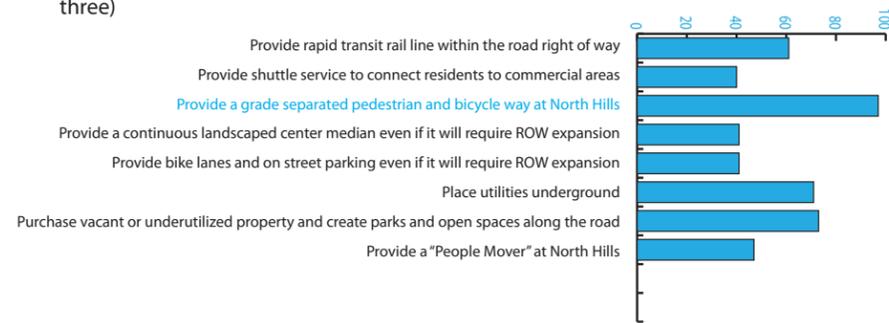
12. Which objectives are the most important for Six Forks Road? (Choose your top 3)



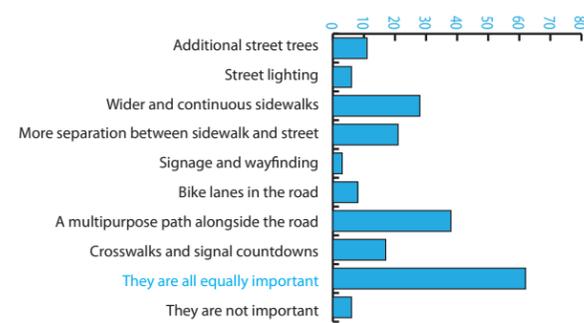
13. The public process has outlined some "Quick Fixes": (Choose your top three)



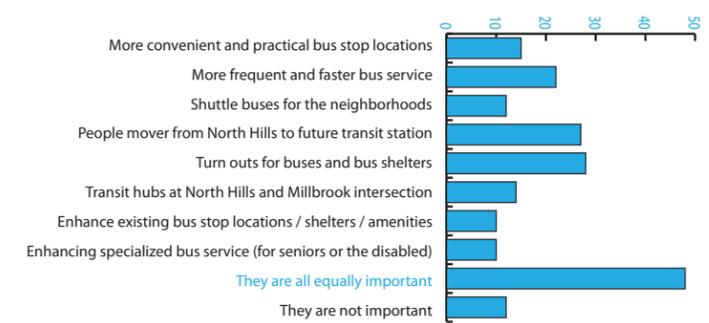
14. The public process has yielded some visionary ideas. What visionary idea(s) did you connect with in the previous meeting (Choose your top three)



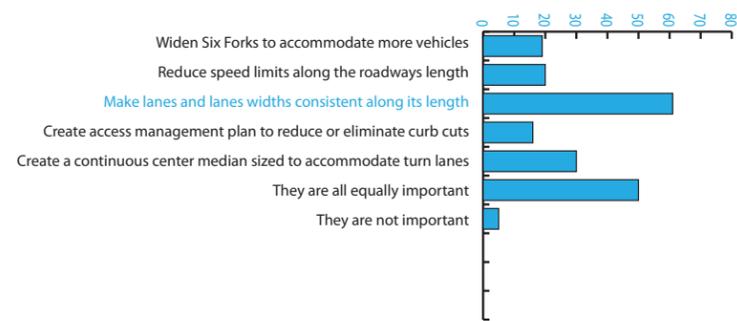
15. The most important Public Realm / Streetscape fix is: (Choose 1)



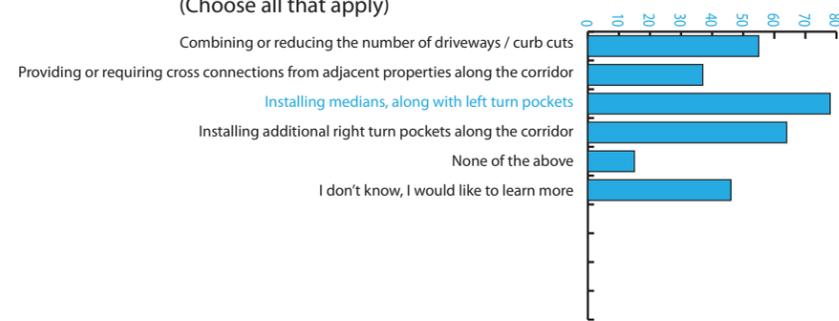
16. The most important Transit Infrastructure fix is: (Choose 1)



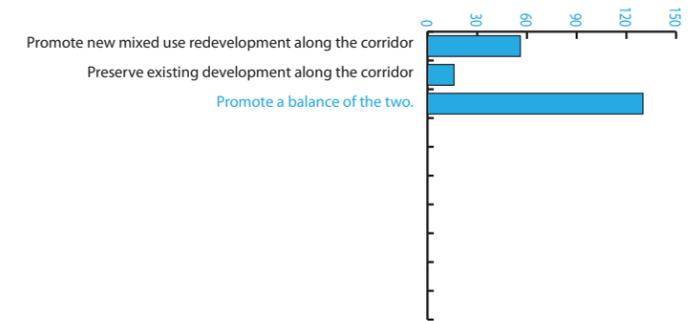
17. The most important Roadway Capacity fix is: (Choose 1)



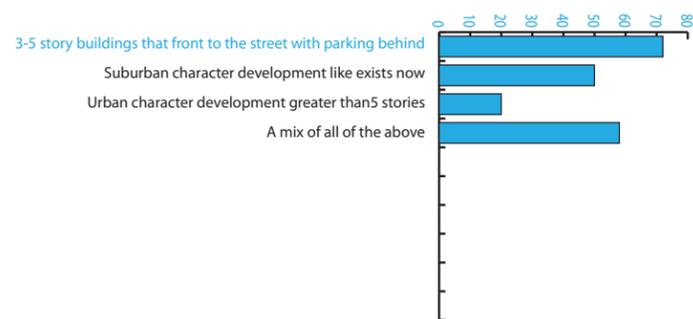
18. Which of the following access management strategies would you favor implementing along various segments of Six Forks? (Choose all that apply)



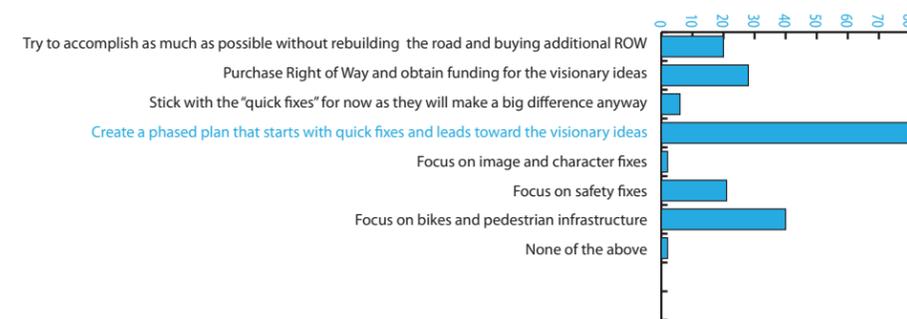
19. The most important Land Use fix is: (choose 1)



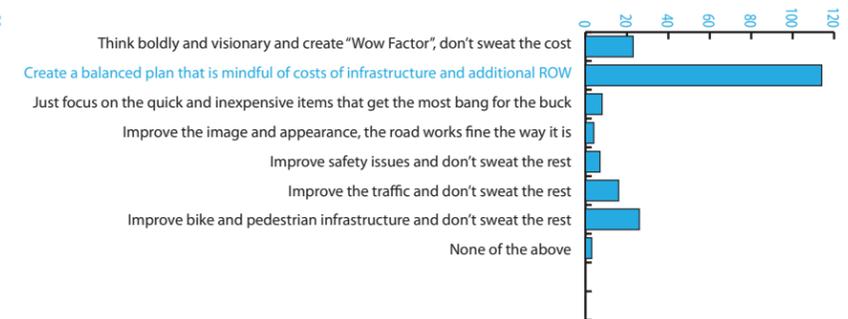
20. If redevelopment were to occur, I think the character should be: (Choose 1)



21. In order to implement the vision crafted so far for the project, I think you should: (Choose 1)



22. The most important mind-set that the planning team should bring to this study is: (Choose 1?)



Public Involvement - Street Section Exercise
 First Session Results

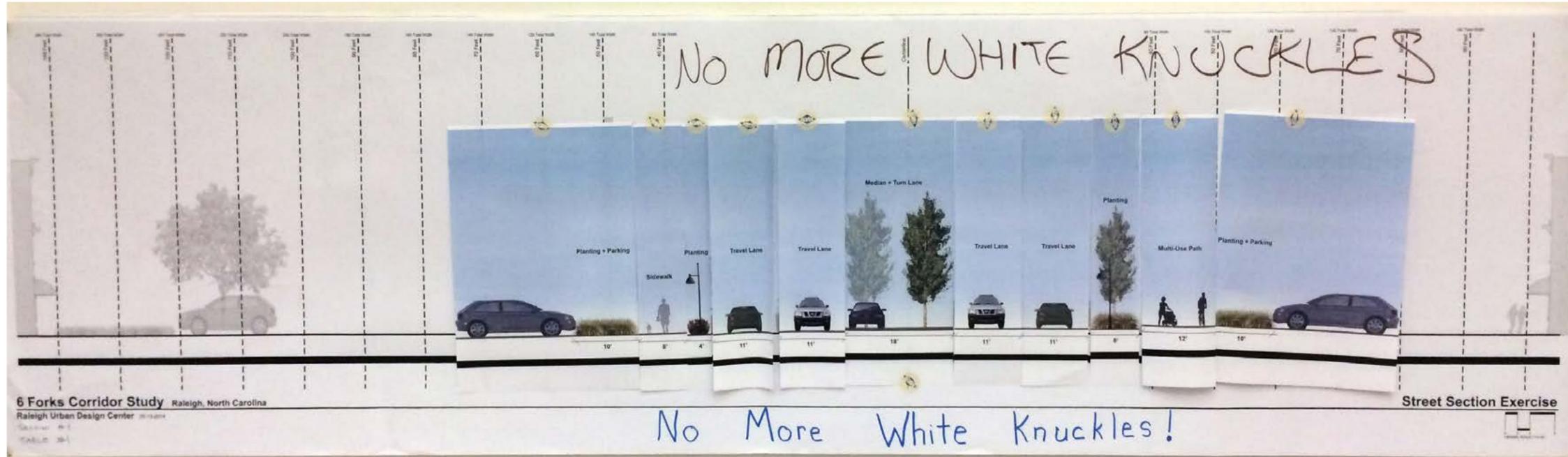


Table 1 - Total Width 94 Feet



Table 2 - Total Width 99 Feet

Public Involvement - Street Section Exercise
 First Session Results



Table 3 - Total Width 106 Feet



Table 4 - Total Width 110 Feet



Table 5 - Total Width 120 Feet

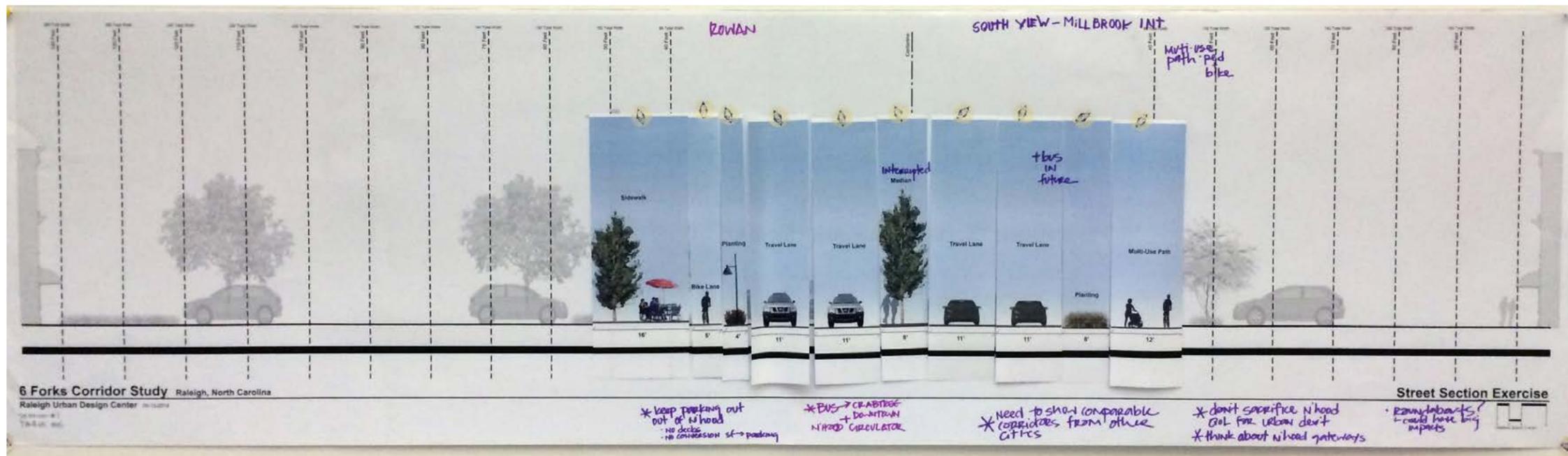


Table 6 - Total Width 97 Feet

Public Involvement - Street Section Exercise
 Second Session Results

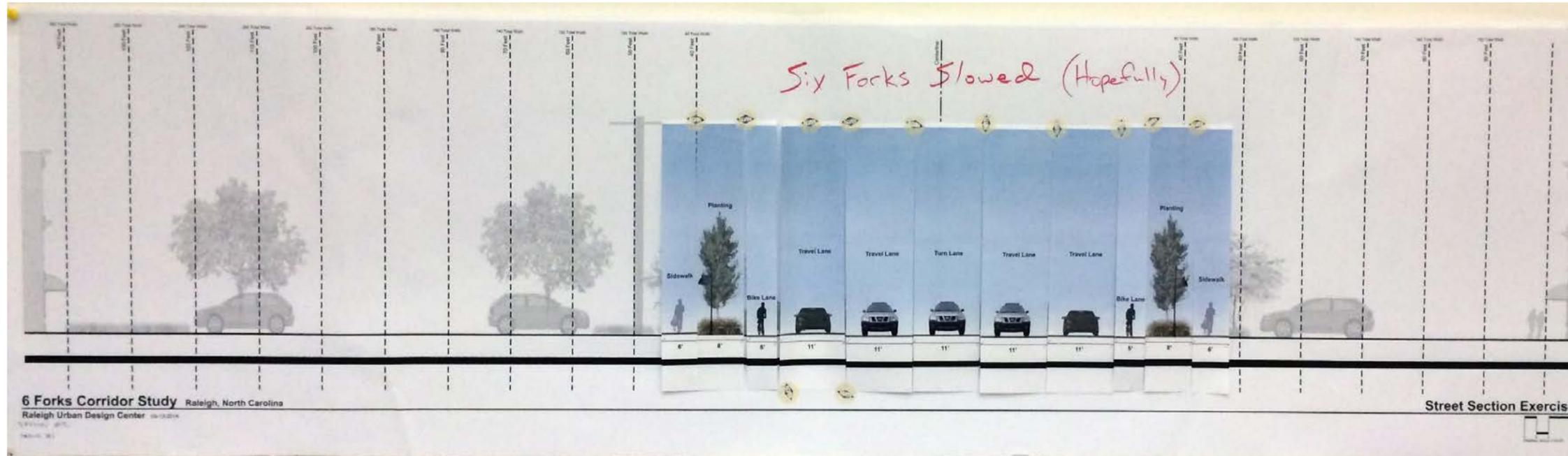


Table 1 - Total Width 93 Feet



Table 2 - Total Width 88 Feet



Table 3 - Total Width 124 Feet

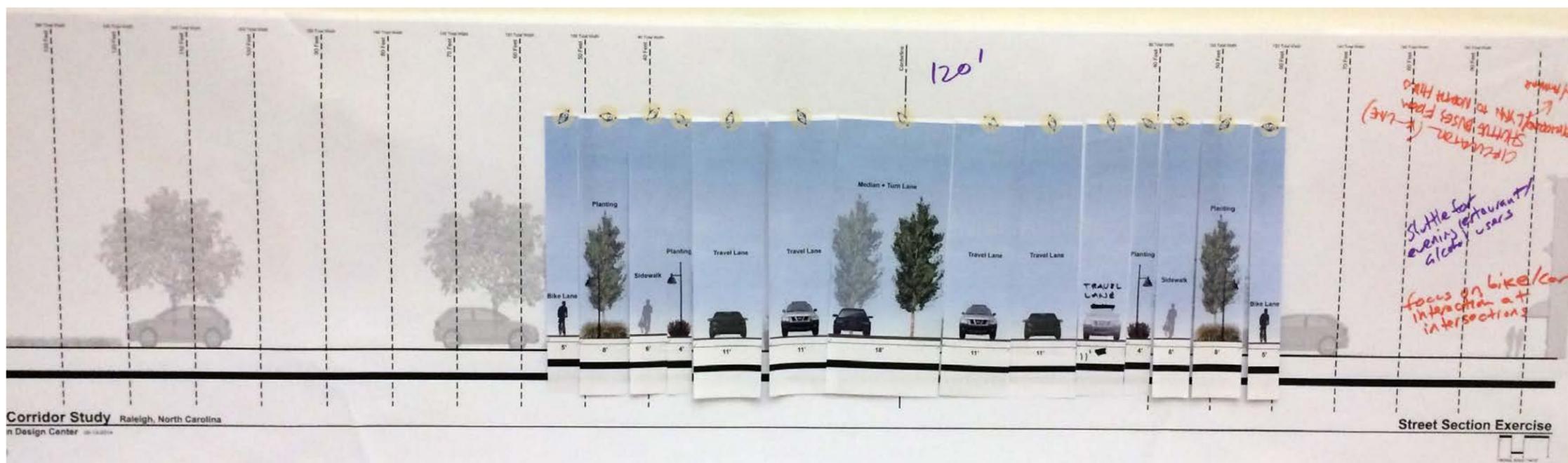


Table 4 - Total Width 119 Feet

