APPENDIX A Zoning

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A.1 Zoning Recommendations

Existing Land Use & Zoning

Subarea 8 includes a broad mix of neighborhoods, commercial corridors and industrial areas. The area's commercial corridors and thoroughfares contain a mix of commercial and industrial land use designations. The Westside/Marietta Area contains mostly commercial land uses with a growing number of new high density residential land uses for recent apartment development oriented towards students. Many thriving single-family neighborhoods exist surrounding these corridors including; Loring Heights, Home Park and Berkeley Park. There are also many existing industrial pockets of development within the study area, mostly concentrated north of Atlantic Station and in the area west of Howell Mill Road and south of Chattahoochee Avenue. The vast number of existing zoning districts reflect these various land uses. Overall, development that has occurred since 2000 is becoming more dense, more mixed use and more walkable as evident by the growing presence of Quality of Life Districts such as MR and MRC.

Zoning Summary Chart

ZONING DISTRICTS	ALLOWABLE USES	RES FAR	NON-RES FAR	BONUS FAR (RES)	TOTAL FAR	MAX HEIGHT	RES OPEN SPACE	NON-RES OPEN SPACE
R-4	Single-family	0.5	not allowed	not allowed	0.5	35'	not required	not required
R-4A	Single family	0.65	not allowed	not allowed	0.65	35'	not required	not required
R-5	Two-family	0.65	not allowed	not allowed	0.65	35'	not required	not required
RG-3	Multi-family	0.696	not allowed	not allowed	0.696	no limit	40%	not required
RG-4	Multi-family	1.49	not allowed	not allowed	1.49	no limit	35%	not required
RG-5	Multi-family	3.2	not allowed	not allowed	3.2	no limit	35%	not required
MR-4A	Multi-family	1.49	5% of FAR	not allowed	1.49	80'	35%	not required
MR-4B	Multi-family	1.49	5% of FAR	not allowed	1.49	52'	35%	not required
C-1	Commercial	0.696	2	not allowed	2.696	no limit	40%	not required
C-2	Commercial	0.696	3	not allowed	3.696	no limit	40%	not required
C-3	Commercial	3.2	5	not allowed	8.2	225'	35%	not required
C-4	Commercial	3.2	7	not allowed	10.2	no limit	35%	not required
MRC-1	Mixed Use	0.696	1	1	2.696	35'/52'/225'	40%	10% or 20%
MRC-3	Mixed Use	3.2	4	1	8.2	225'	35%	10% or 20%
O-I	Office/Industrial	3.2	3	not allowed	6.2	no limit	35%	not required
I-1	Industrial	2	2	not allowed	2	no limit	35%	not required
I-2	Industrial	not allowed	2	not allowed	2	no limit	not required	not required
PD-H	Residential	All development controls based on an approved site plan						
PD-OC	Commercial	All development controls based on an approved site plan						
PD-MU	Mixed Use	All development controls based on an approved site plan						

Translating Future Land Use into Zoning

The existing and proposed Future Land Use designations for the subarea are varied, including Single Family Residential, Medium Density Residential, High Density Residential, Very High Density Residential, Low Density Commercial, High Density Mixed Use, Industrial, Office/Institutional and Open Space designations. The primary future Land Use recommendations are for Mixed Use and High Density Residential categories, consistent with the transit-oriented development goals of the Atlanta BeltLine to support greater density and walkability.

The City of Atlanta has delineated a range of zoning district designations that are compatible with each Future Land Use category, as shown in the Proposed Land Use chart. These designation proposals constitute those zoning controls that best embody the detailed recommendations of this study. The City also has created a series of newer zoning districts that are designed to implement broader visions and goals oriented with plans such as these. These districts are titled the Quality of Life zoning districts and they consist of the following district designations: NC (Neighborhood Commercial, MRC (Mixed Residential Commercial), MR (Multifamily Residential) and LW (Live Work). These districts incorporate a broad set of regulations related to urban design, open space, pedestrian orientation and similar progressive planning concepts. The zoning recommendations for Subarea 8 rely heavily on the use of these districts to implement the vision of this plan.

Proposed Zoning Recommendations

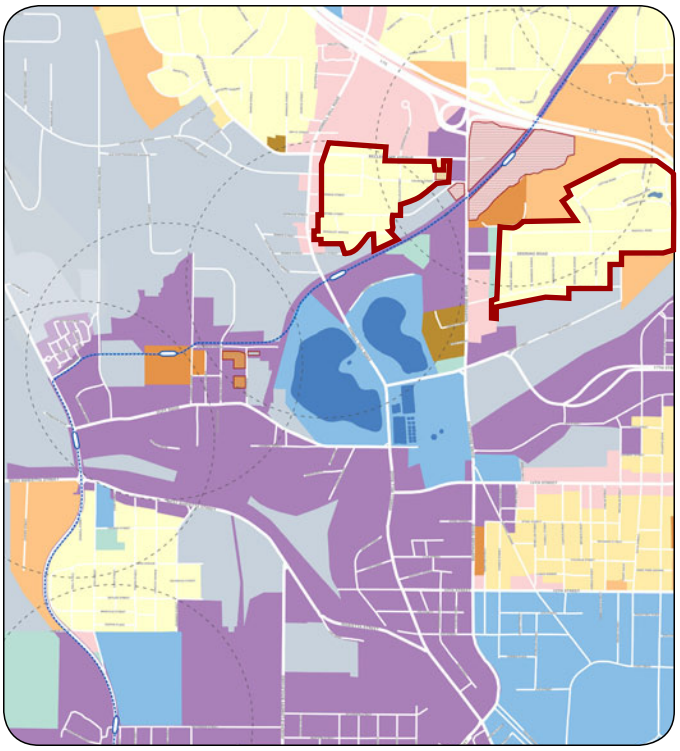
The following outlines the proposed zoning recommendations within each Future Land Use category. The Zoning Summary Chart outlines the basic use and development standards within each recommended zoning district.

Proposed Land Use Chart

PROPOSED LAND USE	COMPATIBLE ZONING
Single Family Residential	R-1 to R-4, PD-H
Medium Density Residential	R-1 to R-5, RG-1 to RG-3, MR-1 to MR-3, PD-H
High Density Residential	R-1 to R-5, RG-1 to RG-4, MR-1 to MR-4, PD-H
Very High Density Residential	R-1 to R-5, RG-1 to RG-6, MR-1 to MR-6, PD-H
Low Density Commercial	R-1 to R-5, RG-1 to RG-3, R-LC, MR-1 to MR-4, O-I, LW, NC, C-1 to C-2, MRC-1 to MRC-2, PD-H, PD-OC
High Density Mixed Use	R-LC, LW, NC, C-1 to C-5, MRC-1 to MRC-3, PD-MU, PD-OC
Industrial	LW, I-1, I-2, PD-BP
Office/Institutional	R-1 to R-5, RG-1 to RG-6, MR-1 to MR-6, O-I
Open Space	Varies

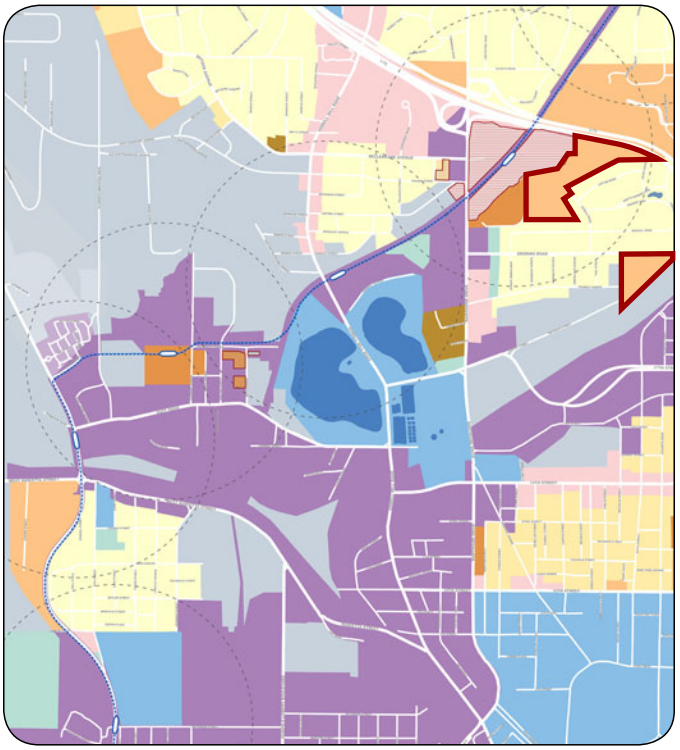
Future Land Use - Single Family Residential

Subarea 8 contains two single family residential neighborhoods: Berkeley Park and Loring Heights. Currently, Loring Heights is zoned a combination of R4 and R4-A, both single family zoning designations. These designations are appropriate and consistent with the study area recommendations and should be preserved as they are today. The current zoning designations within the Berkeley Park neighborhood are R4-A and RG-3. These are also consistent with the plan vision and should be maintained as they are. However, the RG-3 designation within Berkeley Park is inconsistent with the Single Family Residential Land Use designation for this area and should be reconciled in future zoning and/or Land Use updates.



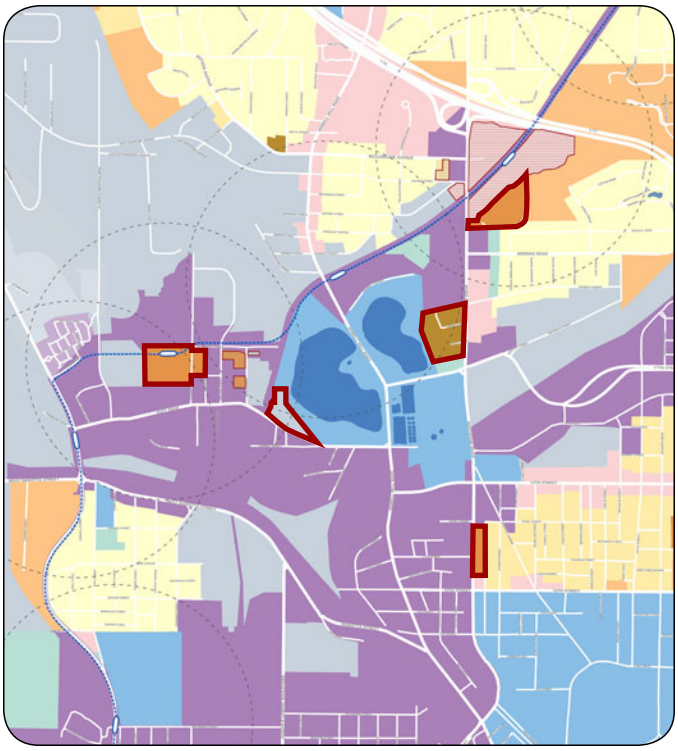
Future Land Use - Medium Density Residential

Within Subarea 8, there are two primary areas where the recommended Future Land Use is Medium Density Residential. These areas are zoned RG-3 today and the future recommendation is to rezone these to MR-3. MR-3 zoning allows for the same density of multifamily uses as RG-3, but the MR-3 zoning district has additional urban design standards that would apply as part of the Quality of Life zoning standards. The additional design standards for the MR district address architectural delineation, facade design, sidewalks, supplemental zones, street furniture, window fenestration, parking lot landscaping, block connectivity and size, building massing, pedestrian orientation, bicycle parking spaces and other various design-related provisions.



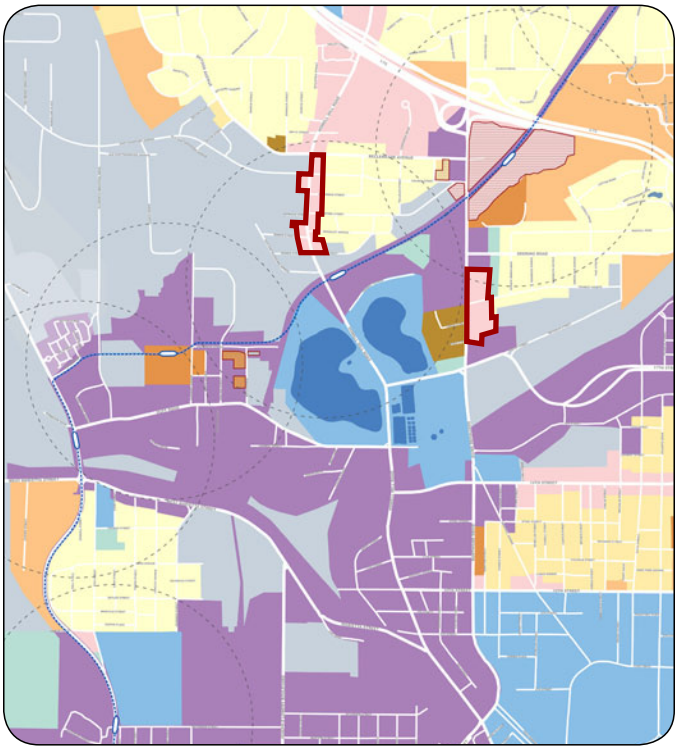
Future Land Use - High Density Residential and Very High Density Residential

There are several locations in the Subarea 8 with a recommended Land Use designation of High Density Residential and one area along Northside Drive with a recommended Land Use designation of Very High Density Residential. The areas with the High Density Residential Land Use designation are currently zoned either MR-4A, MR-4B, I-1 or PD-MU. With the exception of the MR-4B parcel, all other parcels are to be rezoned to the MR-4A zoning designation. The MR-4B district caps height at 52' and this particular lot should preserve this designation. The Very High Density Residential Land Use along Northside Drive near the Atlanta Waterworks is recommended to receive a zoning designation of MR-6, the highest density Quality of Life multifamily district.



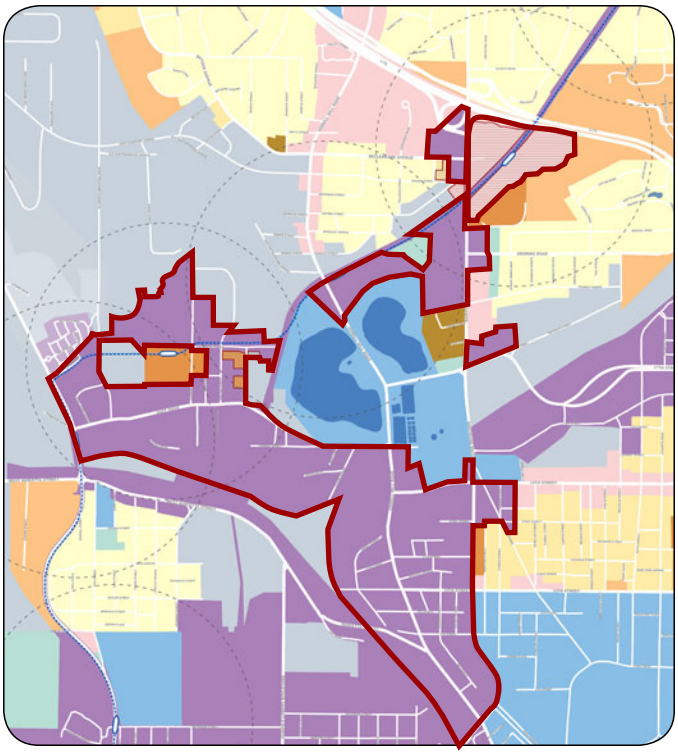
Future Land Use - Low Density Commercial

The major thoroughfares in Subarea 8 contain the Low Density Commercial Land Use designations. Along Howell Mill Road, south of Bellemeade Avenue, and along Northside Drive, north of 17th Street, are where the primary concentrations of this land use are found. The Howell Mill Road area is recommended to be rezoned to a new NC district designation. This district would be called NC Berkeley Park, and could be further tailored to meet the needs of this community. The remaining parcels along Northside Drive are to be rezoned to MRC-2 or a future MU+I district. Heights in MRC-2 are further restricted to 52' within 150' of single-family. A Mixed Use Industrial district could allow light industrial uses and limited residential.



Future Land Use - High Density Mixed Use

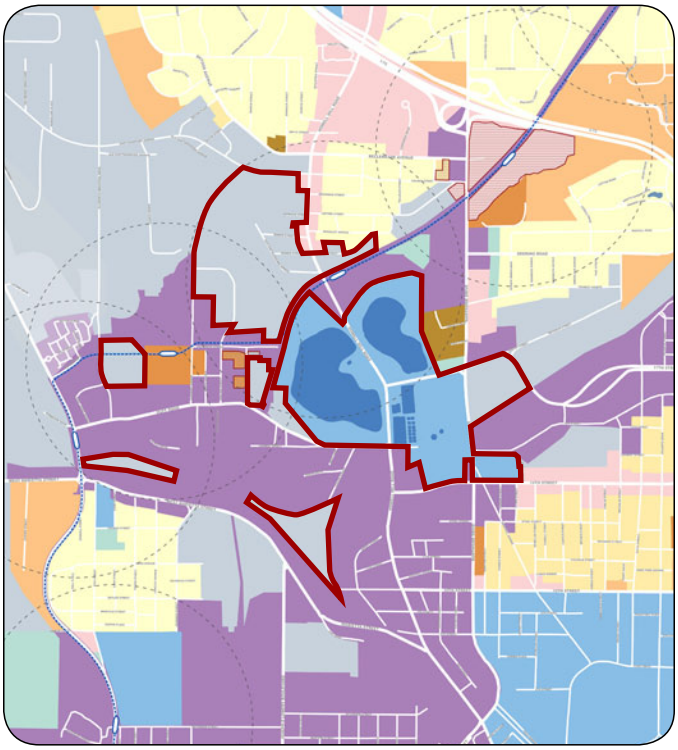
The vast majority of Subarea 8 is recommended for Mixed Use. Given the industrial nature of the area, some of these areas are to be rezoned to the LW designation to enable this production based character to continue. The areas to be rezoned to LW include the Mixed Use parcels to the far north of Huff Road, the Howell Mill frontage just north of the Waterworks, and the area west of Brady Avenue. All remaining Mixed Use areas are to have the MRC-3 designation, another Quality of Life district.



Future Land Use - Office/Institutional & Industrial

The remainder of Subarea 8 consists of parcels having the Office/Institutional and Industrial Land Use designations. These parcels are vital to retaining the area's manufacturing and production base, for future economic development. The City of Atlanta is in the process of developing and adopting an Industrial Policy for the Atlanta BeltLine Planning Area that will address all currently classified industrial land within the Atlanta BeltLine TAD. The primary objective of this policy is to balance the transit-supportive redevelopment goal of the Atlanta BeltLine with long-term protection of industrial opportunities within the City. The land use recommendations of this plan reflect the initial Industrial Policy, identifying select industrial parcels for mixed use development while protecting others.

The Waterworks site is designated as Office/Institutional in this plan, with the intent of highlighting the importance of preserving this civic use in the area. This is not to preclude the future public use of portions of the Waterworks for open space or preservation purposes. The Office/Institutional Land Use, as well as the Industrial Land Uses, are to retain their current O-I, I-1 and I-2 zoning designations, with no new changes proposed.



A.2 Other Considerations

Transit Station Areas

There are four proposed Atlanta BeltLine Transit stations located within this study area; Marietta/Huff, Elaine/Huff, Howell Mill Road, and Northside. The current Atlanta BeltLine Overlay District does not control permitted uses, allowable densities or open space for new development. The overlay focuses instead on design and quality of life development standards. The underlying districts instead determine the building bulk and development controls. Within these areas, there is a desire to have a greater level of control and predictability in terms of requiring transit-supportive residential densities, mixed uses and open space for new development.

A future strategy worth considering for implementing the recommendations of the Atlanta BeltLine Subarea Plans and visions is to create new Atlanta BeltLine districts for each of the transit station areas. The structure of the Overlay District could be expanded to include new TOD sub-districts that could be applied within the Overlay District at the transit stations. These new "stand-alone" sub-districts would apply all of the existing overlay standards while replacing the underlying zoning with new standards related to bulk and development controls. This would work in a way similar to how the Preservation and Historic Districts work today in Atlanta with overlays and stand alone districts working together throughout the city. The new Atlanta BeltLine sub-districts would utilize a series of potential classifications (e.g. Neighborhood Station Areas, Transit Community Station areas and Town Center Station Areas) which would reflect the full set of station types throughout the Atlanta BeltLine.

These sub-districts would also enable the creation of area-specific regulating plans that would delineate the location of future open space, streets, pedestrian ways and other similar infrastructure. Stations areas would ideally be defined as the area approximately ½ mile (a typical 10-minute walk) around each Atlanta BeltLine station. However, exact district boundaries will have to be carefully crafted for each station taking into account the specific parcels and properties of each station area. An example of the standards proposed for these example station area types is reflected in the Station Area Typology chart.

Station Area Typology Chart

STATION AREA TYPE	ALLOWABLE USES	RES FAR	NON-RES FAR	TOTAL FAR	MAX HEIGHT	OPEN SPACE
Neighborhood Stations	Mixed Use	1.49	1	2.49	52'	20% primary use + 20% of minor use floor area
Transit Community Stations	Mixed Use	3.2	2	5.2	110'	20% primary use + 20% of minor use floor area
Town Center Stations	Mixed Use	3.2	4	7.2	170'	20% primary use + 20% of minor use floor area

Changes to Live Work Zoning

Most of the current Industrial properties within the Study Area are proposed to retain their O-I, I-1 or I-2 zoning designations. There are however, a small number of parcels that are currently designated as Industrial Land Use that are proposed to be changed to Mixed Use. These areas have been given a Live Work zoning recommendation as part of this study.

To better enable Live Work zoning to allow for the variety of commercial, production and residential uses that define these types of formerly Industrial properties, it is recommended that further changes be made to the Live Work zoning ordinance. These revisions are necessary to adjust this district into the kind of a tool needed for areas like these that would enable a mixed use environment complete with compatible forms of production and industry that would provide valuable services, jobs and industry to areas of the city able to accommodate this type of character.

Key changes to Live Work zoning district are summarized in the Live Work District Changes Chart. The allowable densities and building heights should be adjusted to ensure that this type of development is feasible. Additionally, changes are needed to allow greater flexibility in the number of employees permitted, the location of commercial uses and to allow wholesaling as a permitted use in the district.

Live Work District Changes Chart

LW DISTRICT CHANGES	DEVELOPMENT RESTRICTIONS & CONTROLS	RES FAR	NON-RES FAR	BONUS FAR (RES)	TOTAL FAR	MAX HEIGHT
Existing LW	Limits of 3 Employees when on local streets Commercial uses only allowed at street intersections Commercial use size limited to 2,000 sqft on local streets Wholesaling is prohibited	0.696	0.5	0.804	2	35'/52'
Proposed LW	Remove limits on number of employees Remove limit on where commercial is allowed Enable all commercial uses up to 8,000 sqft maximum Add Wholesaling as a permitted use	1.49	1	1.01	3.5	70'

A.3 Affordable Live/Work Spaces for Artists

In response to the rich cultural conditions of Subarea 8, it is important to identify ways to support the cultural resources that serve the surrounding communities and to strengthen their abilities to thrive in their missions of creative cultural production and community outreach.

Creating affordable live/work opportunities for artists is a critical component of supporting the area's and City's cultural resources. Providing affordable housing and work spaces serves to maintain the creative capital of our communities, sustain cultural economic development and safeguard community access to the arts.

Significant initiatives to explore include creating sustainable live/work and reduced rate commercial properties through an Affordable Housing Program, specifically targeted to retain artists and arts professionals, and an Arts Incentive Program for arts institutions. There are a number of program models and methodologies that utilize zoning and overlay districts, leasing and ownership structures, partnerships and design guidelines that focus upon the needs of creative industries. Through these mechanisms city owned properties as well as new property developments could be allocated for Affordable Artist Housing, Live/work spaces and incentive programs in Art Districting and Overlay Districts.

Agencies

The managing agency of the affordable housing program for artists is usually identified among municipality entities involved in planning, economic development, housing authorities and specific project management bodies.

Collaborative Entity Resources include:

- Offices of Arts and Culture
- Consulting agencies in artist live/work development
- Non-profit developers

Zoning

Light industrial and commercial spaces are often desirable for artists and arts production, yet many times do not allow for live/work residential or are not economically feasible. Methods developed by municipalities across the country to implement sustainable arts infrastructures in their communities include:

- Allowance for artist live/work or workspaces in industrial zones
- Arts Districting and Overlay Areas
- Zoning bonuses, or incentives, for the inclusion of artist live/work spaces or cultural institution amenities at a reduced or subsidized rate

Zoning Codes Examples

The Artslink zoning review of the cities of Boston and Somerville summarizes special allowances for artist live/work space in industrial districts below.

Boston Zoning Code

Artist mixed-use (live/work) is the only residential use allowed in Boston's industrially zoned districts. Developers must establish legal occupancy and meet residential building code requirements, which protect life and safety of occupants.

Artist space is defined in two separate ways, as:

1. (3A) "Art use", the creation, manufacture, or assemblage of visual art, including two- or three-dimensional works of fine art or craft, or other fine art objects created, manufactured, or assembled for the purpose of sale, display, commission, consignment, or trade by artists or artisans; or classes held for art instruction.

2. (3B) "Artists' mixed-use", the use of all or a portion of a building for both art use and habitation. This defines live/work space.

Both of these definitions are allowed in industrial zones of the city but should be reviewed per project basis in order to identify conditional uses.

Somerville Zoning Code

Artist housing is specifically identified and allowed within a number of zoning districts including the following: (more information can be found in section 7.11.3E of the zoning ordinance)

- The IA classification is for industrial uses that are not compatible for commercial uses, but it allows living and studio spaces for artists (Section 6.1.8 in the zoning regulations).

- The IP classification is for industrial park districts. In this zone, if an artist housing project is six or less units, a special permit is required. For seven or more units, a special permit with site plan review is required.

- Artist housing is allowed in commercial districts, RC (multi-family residential), BA (smaller business zone), and BB (business zone) as of right for buildings with six or under units.

- For NB (neighborhood business) and CBD (central business district) zone it is allowed with a special permit. For all those five zones (RC, BA, BB, NB, and CBD), a special permit with a site plan is needed.

Arts and Cultural Overlay Districts

In response to the cultural asset inventory of Subarea 8, the preexisting Westside Arts District fits the criteria of a municipal district and should become a well-labeled, city amenity as a cultural district. These criteria include:

- *Geographically well-defined territory, Professionally organized structure,*
- *Sustained public programming, and*
- *Concentration of arts amenities*

These considerations in relationship to zoning overlay for artist live/ work and possible incentive programs for arts institution stabilization should be approached. The additional areas of growth and development around the Goat Farm Arts Center and Huff Road also provide potential outreach, partnerships and stabilization strategies with concurrent Artist Zoning Overlays, districting and incentive programs.

Incentive Zoning

Private development incentive programming utilizes mechanisms such as allowable increases in FAR (density) or by including bonuses in a Planned Urban Development zoning. As new partnerships must consider incentives for arts stabilization, alternatives will need to be developed that do not jeopardize the design standards of the Atlanta BeltLine but create a mutually beneficial set of arts development circumstances.

Design Guidelines & Property Use

How an artist uses space also is widely addressed nationwide through development design guidelines. As different genres have very different types of needs, spaces must provide the widest range of flexibility per tenant and/or owner. Municipalities develop these guidelines for artist live/work space to protect the intent of the permitting and ensure a consistently built property amenity. A basic range of artist-specific amenities may include the following:

- Open, flexible space
- High ceilings
- Heavy load floors/ exposed floors
- Natural light
- 220-volt electrical power
- High-speed data ports, cable connections
- Medium to large scaled spaces, 1000 sq ft minimum typically
- Soundproofing
- Commercially rated ventilation
- Loading zones and freight elevators

Definitions of Property Use

Within the zoning designations, definitions of "artists" and "arts uses" outline the qualifying criteria for participants and property designations. Along with the aforementioned artist definition options, how a space is used is commonly delineated into two categories; exemplified by the Cultural Development Corporation in Washington D.C.:

- Live/work housing—Emphasizes residential occupancy with commercial activity secondary (employees and walk-in trade are not usually permitted). The quiet enjoyment expectations of the neighbors in the building or adjacent buildings take precedence.

- Work/live housing—Emphasizes commercial or industrial activity with ancillary residential occupancy. Commercial activity takes precedence over the quiet enjoyment expectations of residents, in that there may be noise, odors, or other impacts, as well as employees, walk-in trade or sales, as appropriate in a commercial setting.

It is important to understand these as basic guidelines surrounding they ways artists live and work in a space, yet not be limiting to income opportunities for the artist.

Artist Certification

A key component of zoning and affordable space programs for artists is an artist certification process, prequalifying arts professionals for subsidized sales and leasing opportunities. At the city level, this certification requirement is outlined in zoning language tied to deed restrictions and provides an oversight structure to maintain the desired long-range artistic occupancy balance within a district, overlay or singular building initiative.

Municipality Certification Process

Facilitated by a municipal coordinating agency, an Artist Certificate Review Committee provides oversight to the certification process through an application review and, where appropriate, interview procedure. The review committee consists of agency stakeholders and established local arts professionals including but not limited to artists, gallery owners, non-profit institutional staff and academic arts personnel.

Definition of "artists"

In order to support a rich and diverse cross-section of the creative sector, a multidisciplinary approach strives to embrace a broad definition of arts professionals including artists, arts administrators and arts educators. This eligibility definition includes all disciplines of visual arts, craft, literary arts, design, media and performative genres of music, sound, dance, and theater. Professional practitioners include, but are not limited to: painters, sculptors, photographers, filmmakers, metal-smiths, writers, musicians, actors, dancers, media designers, computer animators, arts administrators, educators and other creative entrepreneurs.

Application Criteria

While certification policies vary nationwide based on the focus of property, the needs of the community and the capacities of the municipality, some basic criteria are commonly identified:

- Evidence of consistent artistic production through a portfolio of a recent body of work; created in the past 5 years; supported through materials such as production images, video and/or audio; scripts, works of fiction, non-fiction or poetry;

- Verification that the artist has formal training in the arts, as documented in a resume that summarizes that training; noting that self taught artists are also eligible and not discriminated against with an established practice and history;

- Evidence that the artist has presented his/her work in exhibition, performance, readings or comparable public programming, as documented in a resume, sample programs/invitations, catalogs, press clips, etc;

- Up to 3 letters of recommendation from artists and/or arts professionals (i.e., curators, producers, teachers, etc.) who are recognized within the arts community and who will attest that the applicant is a serious, working artist;

- Other criteria apply for arts professionals working in arts institutions and creative entrepreneurship should include: evidence of professional activities through resume of programming; critical writings; publications and arts employment histories

Financial Eligibility Requirements

Financial eligibility requirements vary based upon subsidy limitations, funding sources and development initiatives. Generally, income restrictions range from 30% to 80% of the Area Median Income (AMI). All projects are subject to Federal, State and Local fair housing regulations. An Affordable Housing Lottery system is used in many development cases. In the case of including artist designated spaces, the artist applicant would be required to present professional certification from the managing agency, as well as meet all financial requirements, in order to qualify.

Leasing & Ownership Structures

There are several types of legal and financial entities that are used in the development of artist live/work properties depending upon sale or leasing opportunities. These infrastructures can fulfill a wide variety of living and workspaces needs.

Cooperatives

In a cooperative, a corporate entity distributes shares to holders of the corporation as building owners. The shares are proportionate to the amount of space occupied by the owner. They retain a legal lease to their space.

Some advantages to a co-op entity include:

- There can be one "blanket" mortgage on the entire property (shared by the unit owners) or a series of smaller mortgages, or a combination of both.

- The overall financial strength of the borrowing group can carry along members with uncertain incomes or low net-worth. Some of the best group members fall into this category.

- Changes in unit boundaries do not need to be recorded in public documents (unlike internal changes to condominiums)

- Coops are inherently more flexible than condos and are easier to operate as mixed-use buildings.

- Cooperative can set their own rules about who can purchase shares (a unit), hence it is easy to require that all residents be artists.

Condominiums

In condominium properties, each owner holds their own deed and mortgage financing individually. They are also responsible separately for property taxes assigned to their proportionate unit in the property. Condo associations do elect a board of trustees to manage communal property oversight and regulated restrictions. This board may also enforce regulations in artist housing and resales, although their legal breadth is limited if the association changes long-term occupancy interests.

Limited Partnerships and Limited Liability Corporations

In limited partnerships, a group owns percentage shares of the "LP." Sometimes artist/developers team with investors who put up money in exchange for the right to use the depreciation of the property as a tax shelter. This is a business form of ownership not really suited for most owner-occupied residential projects.

Limited liability corporations (LLC's) are popular for one primary reason: members of an LLC are not personally liable for debts or liabilities of the company beyond the investment they made in the project. In most respects, however, LLC's and Limited Partnerships function almost identically, and serve the same purposes.

Rental Properties

Rental properties are typically owned by partnerships and LLC's. There are a number of artist space developers, many who operate as a non-profit corporation or for-profit LLC. Property development categories are balanced between renovations of previously city-owned properties, such as closed schoolhouses, or new construction, which can be in partnership with municipal and private entities.

Each building project has a site-specific set of artist space opportunities and requirements for occupancy. Typically they are mixed-use and support individual artists and their families, as well as commercial space for non-profit organizations, performance spaces and commercial only studio/gallery space. An artist certification process is incorporated into the qualification structure along with income verification and any limitations in AMI regarding affordable housing units and subsidized financing.

Tax Credit Partnerships

The federal government provides Low Income Tax Credits for creation of affordable housing and Historic Investment Tax Credits for the restoration of certified historic structures. New Markets tax credits are available to non-residential projects in economically challenged areas. Teaming with a for-profit developer, or a not-for-profit CDC, can bring expertise and project management. Therefore it is always wise to consider the potential for tax credits, especially if the project is large, is rental, is in an historic district, or a New Markets district.

Recommendations

1. Identify the Westside Arts District as a municipal district asset
2. Establish an Affordable Housing Program for Artists
3. Provide Artist Live/Work Zoning Overlay Districts
4. Include Design Guidelines for Artist Live/Work
5. Create an Artist Certification Process and Review Committee
6. Identify Affordable Housing Resources to allocate towards artist affordable housing
7. Identify partnerships and property development opportunities for artist affordable housing; whether partial or whole occupancy, based upon per property capacities
8. Encourage affordable artist and organization leasing and ownership models to help provide sustained arts amenities and a long-ranging creative environment.

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A.4 Redevelopment Expectations

There are several key redevelopment sites within Subarea 8 that play a critical role in implementing the transit, connectivity and open space vision. When these sites redevelop negotiation and partnership between the City of Atlanta, Atlanta BeltLine Inc. and the landowner will be required in order to protect and implement important transit, trail, open space and street framework recommendations. These key sites and recommendations include:

West Town (Brock Built property & adjacent parcels)

The West Town Property, which extends from Huff Road on the south to Huber Street to the north, is currently zoned PDMU (Planned Development Mixed Use). Its current zoning entitlement requires the protection of a BeltLine transit corridor as well as several new street connections. Due to changing market conditions this site may likely be sold and redeveloped by several developers over time. The redevelopment concept envisioned in the Subarea Plan includes the following key components:

Transit:

Two BeltLine transit alignment options are proposed for protection and further analysis. Option 1 aligns transit south of the existing creek and utility easements from Ellsworth Industrial Boulevard to Culpepper Street. Option 2 aligns transit north of the existing creek and in between the utility easements from Ellsworth Industrial to Culpepper Street.

- Until further engineering analysis determines the preferred alignment, both transit alignments should be protected as development proposal come for review.
- These transit alignments along with their associated street framework alignments should be included in the BeltLine Overlay District regulations as part of the Street Framework recommendations.

Street Framework:

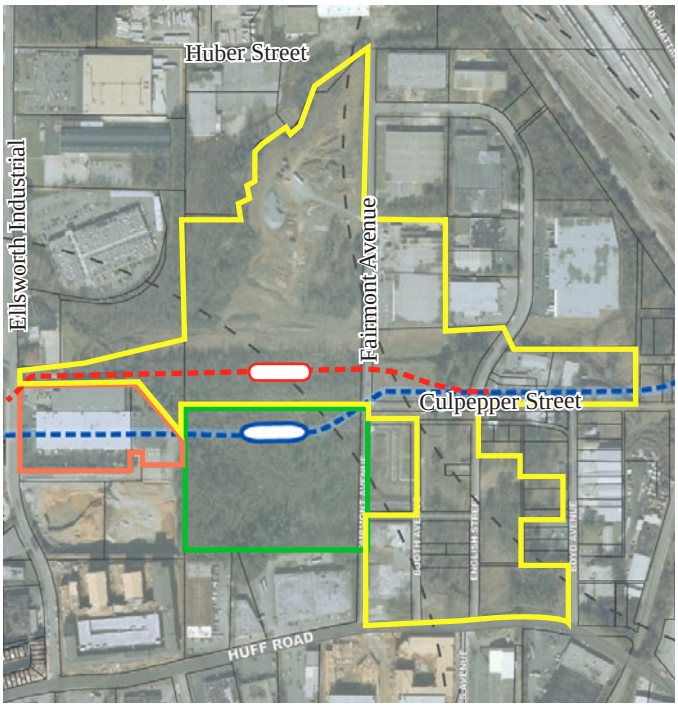
There are several key Street Framework recommendations that will need to be protected and implemented through both private redevelopment and public implementation.

- Huber Street Connection (project NR-37) – This connection from Huber Street to Fairmont Avenue creates an important north/south connection from Huff Road to Chattahoochee Avenue. This connection will require right-of-way from the industrial parcel north of the Fairmont Avenue and a crossing over the existing creek. This project should be identified as a public improvement that can be funded in part with adjacent development traffic impact funds. Preliminary engineering and design should be planned into the City's work program.
- Culpepper Street (project NR-1) – This connection will extend existing Culpepper Street east over to Howell Mill Road and west to Ellsworth Industrial Boulevard and is designed to run parallel to BeltLine transit. Several critical segments of this new street connection (i.e. the bridge over the CSX corridor to Howell Mill Road) is anticipated to be developed concurrent with BeltLine transit, while other segments can be dedicated and built by private development as redevelopment occurs. The City of Atlanta should program key projects and segments of this corridor including the new intersection at Elaine/Culpepper and Ellsworth Industrial (project NR-37) and bridge over CSX into the CIP for preliminary engineering and future construction.

Open Space:

The proposed open space includes lands that are predominantly undevelopable, including an existing creek system and overhead/underground utility easements. These conditions create an east-west open space corridor that provides a valuable place for BeltLine transit, trail and open space.

- This open space should be dedicated to the City of Atlanta as development occurs.
- City of Atlanta and/or Atlanta BeltLine Inc. should plan and program the design, construction and maintenance of this open space as private dedication and redevelopment occurs.

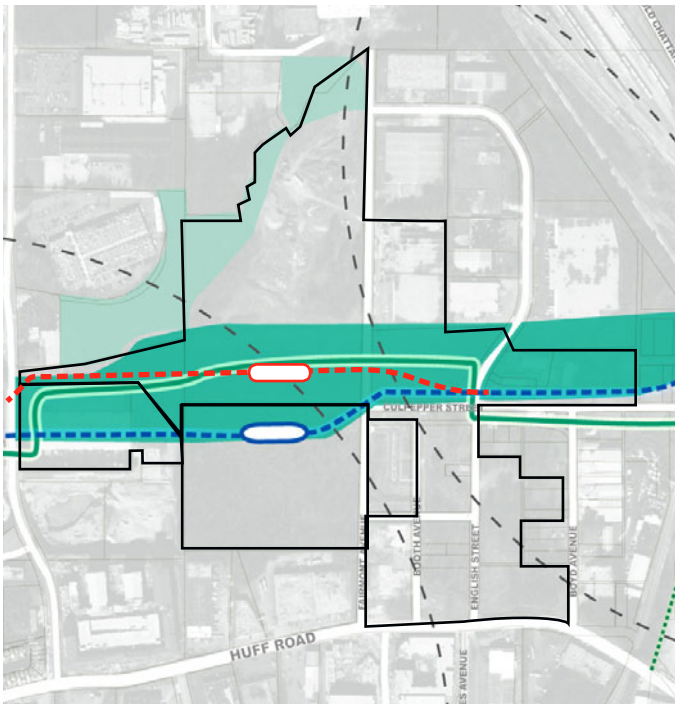


West Town Site (Brock Built Ownership)

- Option 1 Transit Alignment
- Option 2 Transit Alignment
- Brock Built
- Randall Luther
- 1359 Ellsworth Industrial

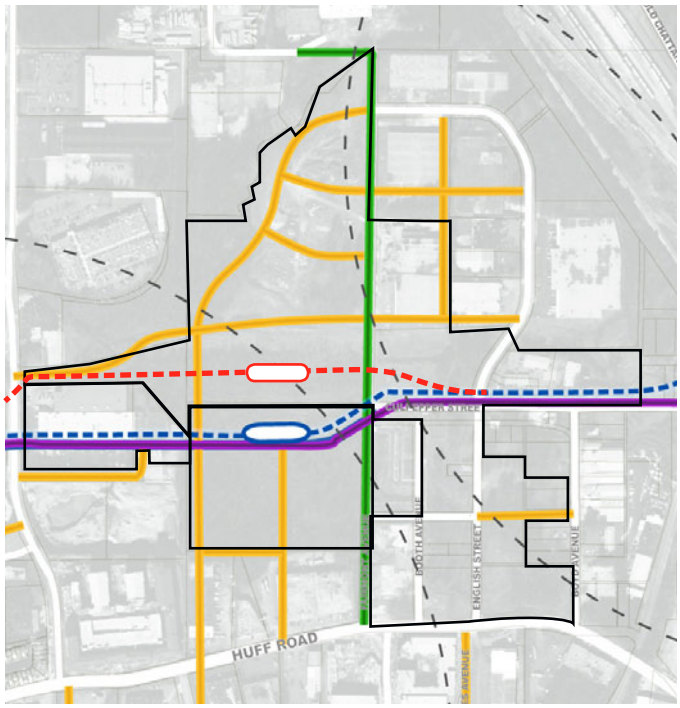
West Town Site with Illustrative Redevelopment Plan

- Option 1 Transit Alignment
- Option 2 Transit Alignment
- Single Family
- Multi-family
- Mixed Use
- Institutional
- Commercial
- Parks/Open Space



West Town Site with Proposed Open Space

- Option 1 Transit Alignment
- Option 2 Transit Alignment
- Existing Park Space
- Proposed Open Space
- Proposed Atlanta BeltLine Trail



West Town Site with Proposed Street Framework

- Option 1 Transit Alignment
- Option 2 Transit Alignment
- Street- Residential
- Avenue- Residential
- Avenue- Mixed Use

Atlanta Technology Center (ATC)

Atlanta Technology Center (ATC)

The Atlanta Technology Center is located east of Northside Drive and south of the active CSX corridor. The property is currently zoned industrial and includes single and two-story office developments. The property has only one access point to an unsignalized intersection with Northside Drive. This is a key site for future BeltLine transit and is anticipated to include a future transit station central to the development site. This site is also adjacent to two large multifamily sites to the south. Taken collectively, these three parcels represent over 40 acres of land with potential for redevelopment. The redevelopment concept envisioned in the Subarea Plan includes the following key components:

Transit:

BeltLine transit is proposed to run within or adjacent to the south side of the CSX rail corridor. The Subarea plan located the Northside station within the site in order to maximize the potential for future redevelopment to integrate and connect directly to transit on both the north and south sides of the corridor.

- Any redevelopment of the ATC site should include the dedication of right-of-way for the BeltLine transit corridor and proposed station outside and adjacent to the CSX corridor.
- Atlanta Beltline Inc. should plan and incorporate a new pedestrian bridge at the proposed station (project TR-6) as part of the design and construction of the BeltLine transit system.

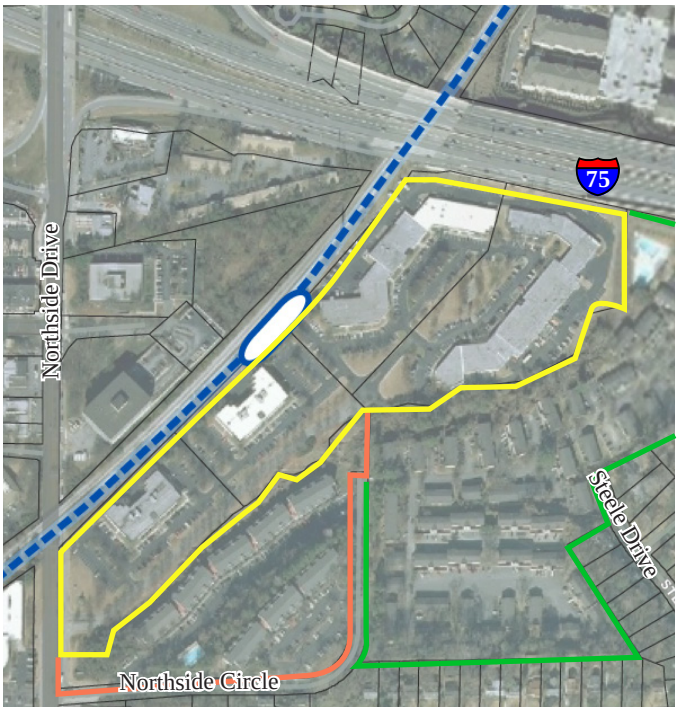
Street Framework:

- The revised street framework recommendations shall be incorporated into the BeltLine Overlay District.
- All proposed street framework recommendations should be dedicated and constructed as part of private redevelopment including the improvement and signalization of a realigned intersection with Northside Drive (project I-11).

Open Space:

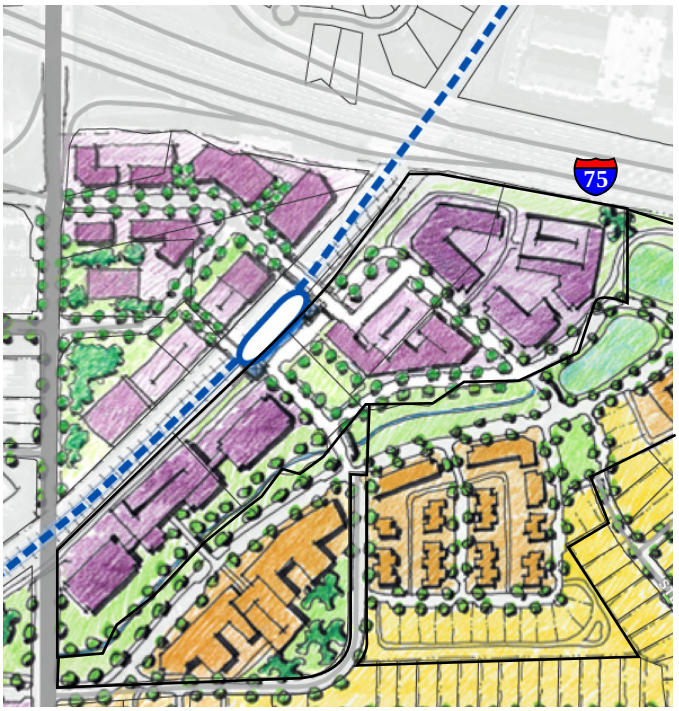
The central feature of the proposed redevelopment concept is the extension of an open space corridor along the existing creek. This open space connects the BeltLine trail through the site and provides a valuable place for the site's needed stormwater management. This open space envisions daylighting a portion of this creek as well as expanding the existing development setback.

- This open space should be dedicated to the City of Atlanta as development occurs. This will likely occur through a negotiated process that could identify key entitlement provisions that offset the open space dedication.
- City of Atlanta and/or Atlanta BeltLine Inc. should plan and program the design, construction and maintenance of this open space, including the BeltLine trail, as private dedication and redevelopment occurs.
- Atlanta BeltLine Inc. should evaluate the feasibility of purchasing all or portions of this open space when redevelopment occurs through funding opportunities such as the Trust for Public Land (TPL) that can act quickly during the development approval process.



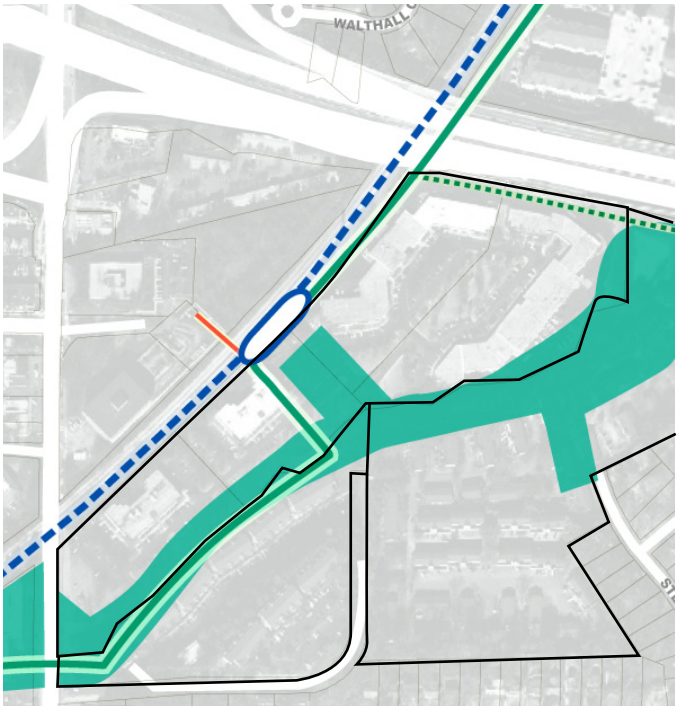
Atlanta Technology Center Site

- Proposed Transit Alignment
- Atlanta Technology Center (ATC)
- Hartford Place Apartments
- Highland Ridge Apartments



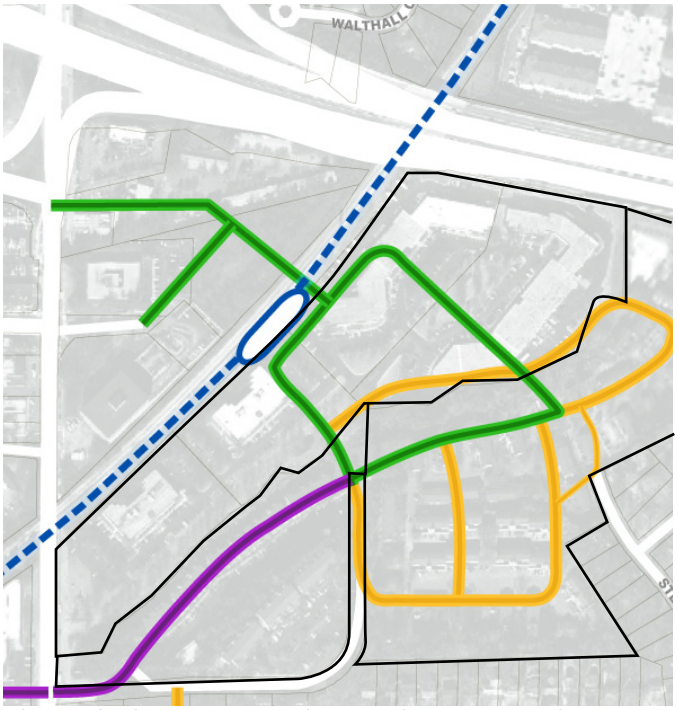
Atlanta Technology Center with Illustrative Redevelopment Plan

- Proposed Transit Alignment
- Single Family
- Multi-family
- Mixed Use
- Institutional
- Commercial
- Parks/Open Space



Atlanta Technology Center with Proposed Open Space

- Proposed Transit Alignment
- Proposed Open Space
- Proposed Atlanta BeltLine Trail
- Proposed Pedestrian Bridge
- Proposed Atlanta BeltLine Spur Trail



Atlanta Technology Center Site with Proposed Street Framework

- Proposed Transit Alignment
- Street- Residential
- Avenue- Residential
- Avenue- Mixed Use

Myers Carpet Property

The Myers Carpet site is located along the west side of Northside Drive and south of the CSX corridor. This is a key property that facilitates a street connection between Trabert Avenue and Northside Drive that would connect at the Deering Drive intersection. This street connection is identified in the Connect Atlanta Plan and the Subarea Plan has refined the alignment to include a range of other connections to support redevelopment and access to future open space at and around the Atlanta Waterworks site. The Myers Carpet site is bordered to the north by a City of Atlanta Public Works property and a private office development adjacent to the CSX corridor. The redevelopment concept envisioned in the Subarea Plan includes the following key components:

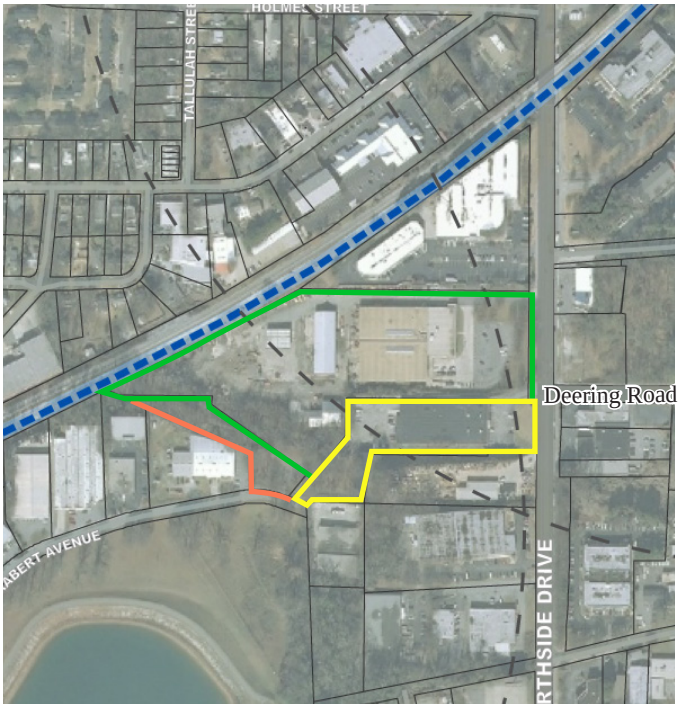
Street Framework:

- The connection of Trabert Avenue to Northside Drive will require the Myers Carpet site to implement. The City of Atlanta should program this project into the CIP in order to plan for preliminary design and construction of the road and new intersection (project NR-11) and (project I-11).
- A key component of implementing this connection will be the purchase of the Myers Carpet site through either City of Atlanta or Atlanta BeltLine Inc. funds. A BeltLine acquisition of this site would provide the added benefit of protecting the street alignment while allowing the remaining site to be marketed to potential developers.
- All additional street framework recommendations should be dedicated and constructed as part of private redevelopment.
- The revised street framework recommendations shall be incorporated into the BeltLine Overlay District.

Open Space:

The City of Atlanta property and office parcel are both located along the CSX corridor and will be impacted by the BeltLine transit corridor. The redevelopment concept envisions the protection and development of an open space corridor from Northside Drive to Trabert Avenue along the south side of the rail corridor. This is a strategic open space that will provide a corridor for the BeltLine trail, a connection to the Atlanta Waterworks site, potential stormwater management, and a key connection under the CSX rail corridor to the Berkeley Park Neighborhood.

- Atlanta BeltLine Inc. should evaluate the feasibility of purchasing all or portions of this open space in advance or when redevelopment occurs through funding opportunities such as the Trust for Public Land (TPL) that can act quickly during the development approval process.



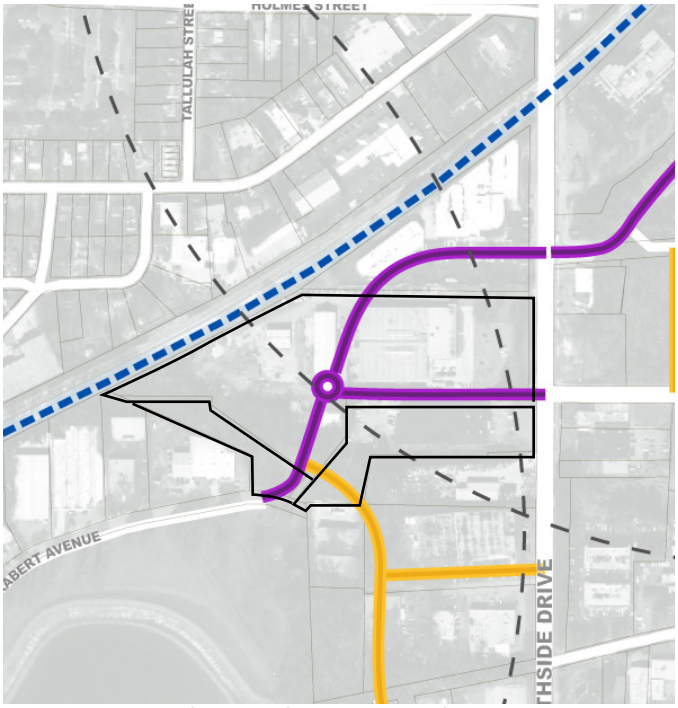
Myers Carpet Site

Myers Carpet Site with Illustrative Redevelopment Plan

- Proposed Transit Alignment
- Myers Carpet Site
- City of Atlanta
- Trabert Site
- Proposed Trabert Extension

- Proposed Transit Alignment
- Single Family
- Multi-family
- Mixed Use
- Institutional
- Commercial
- Parks/Open Space

Myers Carpet Site with Proposed Open Space



Myers Carpet Site with Proposed Street Framework

- Option 1 Transit Alignment
- Proposed Open Space
- Proposed Atlanta BeltLine Trail
- Proposed Pedestrian Path

- Option 1 Transit Alignment
- Street- Residential
- Avenue- Mixed Use

APPENDIX B Meeting Summary

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Meeting Summary

To: Jonathan Lewis, Atlanta BeltLine Inc / Bureau of Planning

From: Kevin Bacon, AECOM Design + Planning

BeltLine Subarea 8: Planning Committee Kick-off Meeting

Location: Piedmont Hospital, Classroom 4/5

Date: March 24, 2010

Agenda

1. Welcome & Introductions
2. BeltLine Overview & Planning Process
3. Overview of Previous Plans & Studies
4. Study Area Initial Observations
    a. Land Use & Urban Design
    b. Transportation & Mobility
    c. Community Character & Greenspace
5. Goals & Objectives Discussion
6. Questions & Next Steps

Handouts

1. Meeting Agenda
2. Draft Goals & Objectives

Consultant Team Attendees

1. Ed McKinney, AECOM Design + Planning
2. Kevin Bacon, AECOM Design + Planning

Summary

The purpose of this meeting was to kick-off the planning process for BeltLine Subarea 8 with the subarea's planning committee members. Introductions were made of all attending consultant team and planning committee members and a presentation was given. The presentation included an overview of the BeltLine and the planning process, summary of all previous plans and studies conducted in the subarea, and initial observations of the study area. The presentation concluded with a discussion with planning committee members regarding community concerns and goals and objectives for the planning process.

Meeting Items

Item 1: BeltLine Overview & Planning Process

Jonathan Lewis of Atlanta BeltLine, Inc and the City of Atlanta Bureau of Planning presented an overview of the BeltLine including scope and key elements of the project. The subarea and planning process including project timeline were presented.

Questions/comments regarding BeltLine Overview & Planning Process:
(consultant team responses are included in *italics*)

1. Who requires the Environmental Impact Study (EIS) for the BeltLine?
   The EIS is required by the Federal Transit Authority (FTA) for any project that may seek/receive federal funding to complete the work.

2. Is the Subarea 8 boundary negotiable? Underwood Hills would like to see a park constructed in an area just north of the subarea boundary.
   The Subarea 8 boundary cannot be changed. However, the planning process may consider potential connection to the proposed park area.

3. If the EIS recommends the Norfolk Southern rail corridor for the BeltLine transit alignment, can the BeltLine Tax Allocation District (TAD) be shifted to include adjacent areas?
   The BeltLine TAD has been established and cannot be changed.

4. What is the role of the City of Atlanta Department of Watershed Management in the planning process specifically regarding public access to the open space surrounding the Atlanta Water Works reservoirs?
   The Department of Watershed Management is a member of the City's BeltLine Subcabinet. The department's current position on the reservoirs is that access must be restricted due to homeland security requirements.

5. When will the BeltLine Final EIS be available for public review?
   The BeltLine Final EIS is anticipated to be made available May-June 2010.

6. Have all planning committee meeting dates been finalized?
   All planning committee meeting dates (except for the final meeting) have been finalized and should have been distributed to all committee members. Planning committee interviews will take place on Monday, March 29th and Thursday, April 1st. A design workshop will also take place in April with specific scheduling information to be decided and distributed.

Item 2: Overview of Previous Plans & Studies

Ed McKinney of AECOM Design + Planning presented an overview of all previous plans and studies conducted in the subarea. Plans and studies reviewed were at both the city-wide and neighborhood levels and will be considered and further refined in the Subarea 8 planning process. The plans and studies presented included:

City-wide Plans & Studies:

- BeltLine Redevelopment Plan (2005)
- Draft Industrial Preservation Policy (2009)
- BeltLine Environmental Impact Study (2009, ongoing)
- Connect Atlanta Plan (2008)

- Atlanta's Project Greenspace (2009)
- City of Atlanta Comprehensive Development Plan (2007)

Neighborhood Plans & Studies

- Northside Drive Corridor Study (2005)
- Upper Westside LCI (2005)
- Georgia Tech Campus Master Plan (2004)
- Berkeley Park Blueprint Study (2004)
- Greater Home Park Master Plan (2002)
- West Town Pattern Book (2007)

Questions/comments regarding Previous Plans & Studies:
(consultant team responses are included in *italics*)

1. Are the specific rail/track alignments for the BeltLine transit being selected? If not, when does this take place?
   The current BeltLine EIS is a Tier 1 EIS which will establish conceptual alignments and station locations only. A Tier 2 EIS (to be conducted later) will be responsible for establishing the specific rail/track alignments for the BeltLine transit.

Item 3: Study Area Initial Observations

Ed McKinney presented initial observations of Subarea 8 grouped under three major themes: land use and urban design, transportation and mobility, and community character and greenspace. The presentation included subarea mappings of land use, zoning, street networks, BeltLine trail and transit alignments, and development patterns. This was done for the purpose of framing the discussion of planning goals and objectives covered in the next section.

Questions/comments regarding Study Area Initial Observations:
(consultant team responses are included in *italics*)

1. Is the Industrial Preservation Policy map correctly drawn? There seems to be an inconsistency between the policy map and the zoning map in Berkeley Park. Specifically it appears that 4-5 parcels currently zoned and used for Single Family Residential (SFR) are being indicated on the policy map as an area for "Future Redevelopment."
   The Industrial Preservation Policy map should include currently zoned industrial land only. The noted inconsistency will be submitted to the city for review and correction.

Item 4: Goals & Objectives Discussion

Concluding the initial observations of the study area, Ed McKinney presented a draft set of planning goals and objectives tailored to Subarea 8 that were grouped into the same three key themes as set forth in the initial observations. The committee was asked to review the goals in preparation for the committee interviews next week, and then each member was given the opportunity to voice specific visions and concerns for the planning process. Comments from the committee members are noted in *italics* at the end of each section to which they relate.

1. Land Use & Urban Design

- Support redevelopment around future transit stations and in targeted areas of change.
- Promote development densities sufficient to support future transit.
- Establish the character & scale of redevelopment based on context, access & neighborhood adjacency.
- Reconnect transforming industrial areas to surrounding assets (e.g. Georgia Tech, neighborhoods, parks, and trails).
- Include a diversity of employment options by integrating new light industrial and other job-generating activities.

Comments regarding Land Use & Urban Design:

- *What will the impacts be on 14th Street? From Piedmont Park to White Provisions this is a major east-west corridor. Will there be a streetscape plan? What will the housing densities be? What will be the relationship between Home Park and Georgia Tech? (Home Park)*
- *The BeltLine needs to more than a vehicle for moving people: it should also be a vehicle for redevelopment. The alignment should be chosen based on the "best places" for redevelopment. The next step is to ensure that BeltLine (trail or transit) is actually built. (Brock Built)*
- *What are the major opportunities for internal capture in regards to employment areas outside the study are (e.g. Piedmont Hospital)?What is the potential for consolidated parking facilities at Northside Drive/I-75? (Atlanta Technology Center)*
- *How does the Atlanta Technology Center frontage address the BeltLine? Are there opportunities to connect through to adjacent neighborhoods? Topography will be a major issue at this location. (Atlanta Technology Center)*
- *Redevelopment plans of our property are contingent upon the Department of Watershed Management producing a documented policy for development adjacent to the Atlanta Water Works site. (Georgia Steel)*
- *How do you promote density without inducing blight in the interim? Speculative land use changes have the potential to stall redevelopment momentum that may already exist. (Berkeley Park)*

2. Transportation & Mobility
   - Increase east-west connectivity.
   - Enhance key streets to promote walkability (former industrial streets).
   - Maximize connectivity to the BeltLine trail & transit.
   - Implement traffic calming on busy neighborhood streets.
   - Structure redevelopment to promote connectivity.
   - Minimize, to the extent possible, the impacts of truck activity on residential areas.
   - Transform elements of the community that are in physical decline.

   Comments regarding Transportation & Mobility:

   - *What is the BeltLine intended service area and how does it connect to the larger, regional picture? The first focus should be its orientation to the neighborhoods.*
   - *What will the impacts be if the Norfolk Southern alignment is selected? Traffic on Deering Road is already a concern. We wish to preserve existing single-family neighborhoods. (Loring Heights)*

- *Will BeltLine trails be built to connect to surrounding neighborhoods? For example, vehicular connections to Atlantic Station were rejected and pedestrian trails were accepted but the those trails have yet to be constructed.*
- *Would it be possible to build another north-south connection perpendicular to Deering Road? Topography would be an issue but it would help take pressure off of Deering Road. (Atlanta Technology Center)*
- *Previous connections across Howell Mill Road to Westside that were broken by the railroad should be re-established. (Berkeley Park)*
- *How can traffic on Howell Mill Road be managed to allow residents great access? (Underwood Hills)*

3. Community Character & Greenspace
   - Provide identity for the area by celebrating its unique historic character and its role in Atlanta's rail and Civil War history.
   - Recognize the industrial roots of the area by promoting industrial materials, scale and character.
   - Protect the history, character, scale and intimacy of residential neighborhoods.
   - Capitalize on the area's unique open space opportunities (e.g. redevelopment sites and Waterworks).
   - Enliven and reinforce the area's identity through public art, cultural art, signs and unifying design themes.
   - Maximize accessibility to parks, trails, and open spaces .
   - Provide adequate open space through new plazas, parks and greenways, as well as the best use of existing parks and open spaces.

   Comments regarding Community Character & Greenspace:

   - *In terms of the Atlanta Water Works and The Howard School, we need to balance the need for safety and security with the aesthetic and community values in creating connections. (The Howard School)*
   - *What can the Atlanta Water Works site offer for park space? Limitations beyond the current reason of "homeland security" must be clearly defined by the Department of Watershed Management.*
   - *Georgia Power is currently negotiating a power line easement within the right-of-ways of Howell Mill Road and Huff Road. The power poles may be as tall as 85 feet. Can this be mitigated? What will happen if Huff Road is converted to a three-lane section as planned? (Georgia Steel)*
   - *Is there potential to develop the character and street frontage on Howell Mill Road and Chattahoochee Avenue?(Berkeley Park)*
   - *Despite existing truck traffic and current industrial zoning on Chattahoochee Avenue, is there a way to make this an urban destination corridor with a sense of character? (Underwood Hills)*
   - *What is the potential for creating or at least connecting to a potential park on the north side of the subarea? The park could provide an estimated 14-acres of greenspace and a valuable amenity. (Underwood Hills)*

Questions & Next Steps

- Interviews with individual planning committee members will be conducted on Monday, March 29th and Thursday, April 1st at the Senior Citizen Services

center on at 1705 Commerce Drive. A schedule was passed around at the presentation for committee members to sign-up for a time slot.

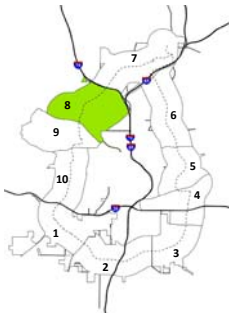
- A review of the inventory and assessment for Subarea 8 will be presented on Monday, April 5th. A revised set of planning goals and objectives based on the interviews will be included in the presentation.

Atlanta BeltLine Subarea 8

Planning Committee Kick-off:
Goals & Objectives

Agenda

- **Planning Process**
- **Study Area & Previous Study Overview**
- **Goals & Objectives Discussion**



March 24, 2010

WHAT IS THE BELTLINE?

KEY ELEMENTS

Parks and Arboretum

Trails

Transit & Transportation Infrastructure

Jobs & Economic Development

Affordable Workforce Housing

Historic Preservation

Streetscapes & Public Art

Environmental Clean-up

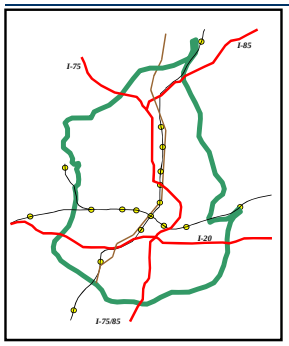
LIGHT RAIL TRANSIT

NATIONAL TRANSIT UPDATE

What are other cities doing on transit?

WHAT IS THE BELTLINE?

TRANSIT



Overview

Existing rail corridor: 22-mile loop of transit using historic railroad corridor

In-town circulator: 2-3 miles from downtown, connects 45 neighborhoods

Light rail transit: Neighborhood-friendly, can be crossed on foot

Part of integrated transit system:
4 connections with MARTA
2 connections with Peachtree Corridor.

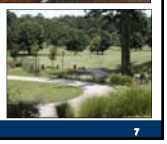
WHAT IS BELTLINE MASTER PLANNING?

- **Land Use**
  - **Policy guide and plan for future development**
  - **Location (parcels), type (industrial, mixed use, etc.), and intensity (how dense?)**

- **Transportation**
  - **Identification of new sidewalk, road, and intersection improvements**
  - **Enhances how individuals get to, from, and around, and across the BeltLine**
  - **Refines Street Framework Plan**

WHAT IS BELTLINE MASTER PLANNING?

- Historic Preservation
  - Inventory and prioritize important historic resources including buildings, structures, and objects
- Public Art
  - Classify locations for future art
- Parks & Public Spaces
  - Identification of additional park, greenway, trail, plaza, and other public space opportunities
  - Identify public and private opportunities



WHY MASTER PLAN?

Manage growth

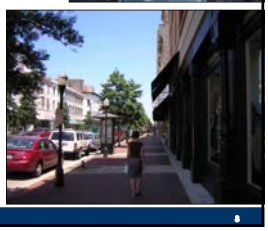
Shape redevelopment early

Improve access to the BeltLine

Manage growth in traffic congestion

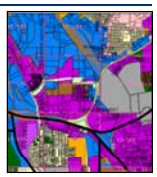
Create new parks

Protect the BeltLine corridor



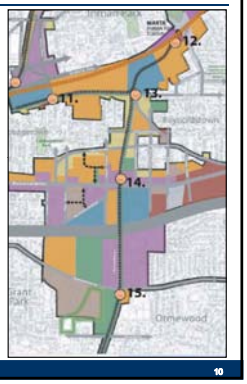
IMPLEMENTATION TOOLS

- Refines City Policy
- Details a Common Vision
- Refines Street Framework Plan
- Prioritize projects
- Explores Funding Opportunities



HOW DOES THIS RELATE TO OTHER PLANNING EFFORTS?

- BeltLine Redevelopment Plan
- Previous, relevant planning efforts
- Environmental Impact Statement
- Community Benefits & Economic Development Incentive Priorities
- BeltLine Affordable Housing Trust Fund
- 5 Year Work Plan

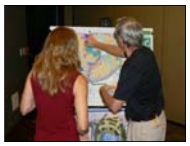


HOW ARE PROJECTS & PLANNING INFORMED?

How Projects and Planning Are Informed?

- ✓ Community Input
- ✓ Environmental Impacts
- ✓ Technical Feasibility including detailed traffic analysis
- ✓ Financial Resources

Final recommendations to City Council are made by ABI and weighed against these factors



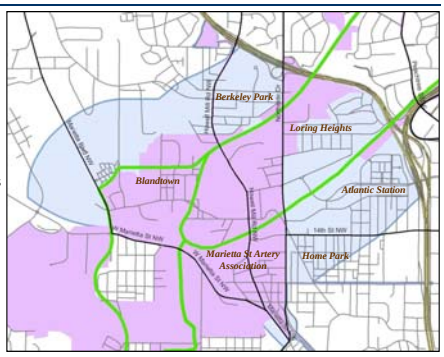
WHERE ARE WE MASTER PLANNING?

Subarea 8

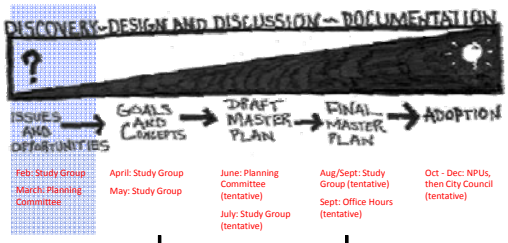
- Freight Line near W. Marietta St to I-75
- ½ Mile from BeltLine corridor + Tax Allocation District (TAD) Property

WHERE ARE WE MASTER PLANNING?

- TAD area is purple
- Land use Recommendations focus on the TAD
- TAD $ can only be spent in these areas
- Most redevelopment opportunities are in the TAD



MASTER PLANNING SUBAREA 8 PROCESS & KEY DATES



Feb: Study Group
March: Planning Committee

April: Study Group
May: Study Group

June: Planning Committee (tentative)
July: Study Group (tentative)

Aug/Sept: Study Group (tentative)
Sept: Office Hours (tentative)

Oct - Dec: NPUs, then City Council (tentative)

- Review previous studies
- Review vision statement and goals
- Analyze existing conditions

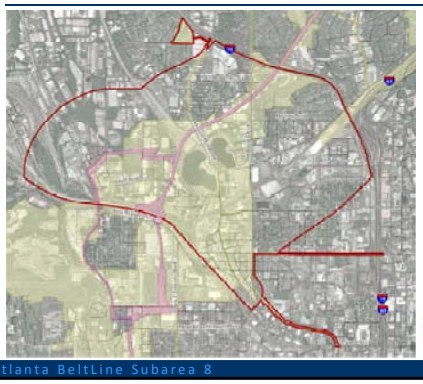
- Prepare concept plans
- Draft plan recommendations
- Refine master plan

- Take Master Plans to NPUs and City Council for adoption

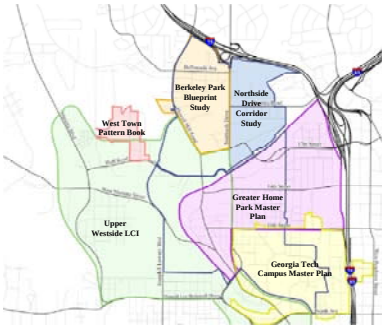
Overview:

Previous Studies & Plans

STUDY AREA



PREVIOUS STUDIES



City-Wide Plans

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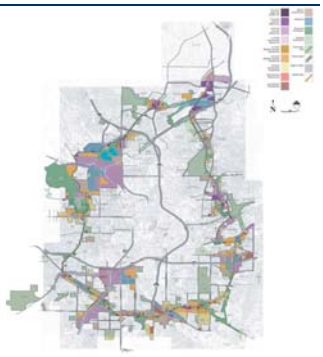
- Georgia Tech Campus Master Plan (2004)
- Berkeley Park Blueprint Study (2004)
- Greater Home Park Master Plan (2002)
- West Town Pattern Book (2007)

Previous Studies: BELTLINE REDEVELOPMENT PLAN

Overview

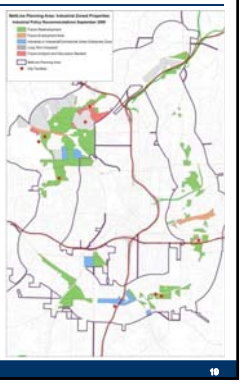
- Adopted in 2005 as the guide for BeltLine planning and redevelopment for the next 25 years
- Includes recommendations for land use based on redevelopment vision, public input, and technical assessment
- Guides subarea planning activities including land use refinements and transportation and park improvements



Previous Studies:
DRAFT INDUSTRIAL PRESERVATION POLICY

Overview

- Identifies all existing industrial land uses within the BeltLine Planning Area
- Designates land for continued industrial use, future redevelopment/employment area, or further analysis and discussion
- Final BeltLine EIS transit alignment will guide final policy decisions regarding land use
- Primary objective is to balance redevelopment of land adjacent to BeltLine transit with long term demand for industrial land within the city

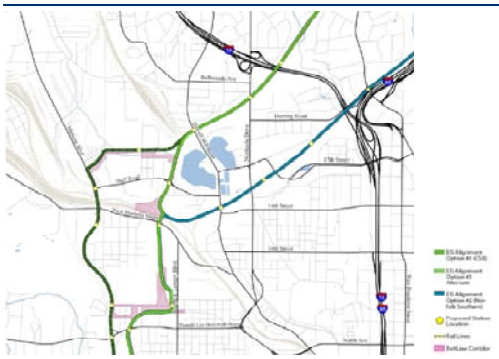


Previous Studies:
BELTLINE ENVIRONMENTAL IMPACT STATEMENT

Overview

- Currently being developed by MARTA and Atlanta BeltLine, Inc.
- Will establish alignments and right-of-way for all BeltLine multi-use trail corridors & transit
- Will establish conceptual locations for all stations and connections to trails & transit
- Two transit alignment alternatives located in Subarea 8 will be considered in planning process

Related Studies:
EIS TRANSIT ALIGNMENTS

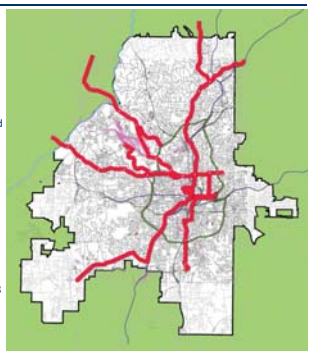


Related Studies:
EIS TRAIL ALIGNMENTS

Previous Studies:
CONNECT ATLANTA PLAN

Overview

- Adopted in 2008 as Atlanta's first comprehensive transportation plan
- Incorporates recommended transportation improvements from all previous small area plans and neighborhoods studies
- Transportation improvements include new street connections, new bike routes, intersection improvements, and potential future transit alignments
- Proposed transportation improvements in Subarea 8 will be tested and refined throughout the planning process and serve as the basis for additional recommendations



Previous Studies:
ATLANTA'S PROJECT GREENSPACE

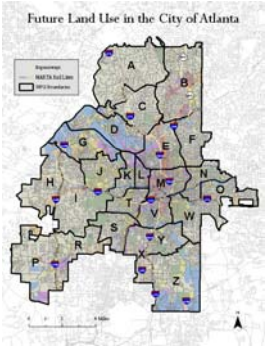
Overview

- Adopted in 2009 as an update to the 1993 *Parks, Open Space, and Greenways Plan*
- Identifies policies and actions to guide the preservation, management, and use of the City's greenspace
- Proposes the development of a citywide greenway network
- Proposed the creation of a citywide trail system that connects with BeltLine trails
- Proposed trail connections will be evaluated and refined in Subarea 8 plan recommendations

Previous Studies:
COMPREHENSIVE DEVELOPMENT PLAN

Overview

- Adopted in 2007 to guide physical, social, and economic growth and development in the City for the next 15-years
- Includes 15-Year Future Land Use Plan which has served as a reference document for many other small area plans and neighborhood studies in the Subarea 8
- All proposed future land use changes from studies within Subarea will be evaluated and refined in final Subarea 8 plan recommendations



Previous Studies:
NORTHSIDE DRIVE CORRIDOR STUDY

Overview

- Evaluates existing transportation infrastructure and develops alternative land use and transportation improvements for the Northside Drive corridor
- Study area runs from I-75 at the north end to I-20 at the south end
- Proposes land use changes, new street connections, and other transportation improvement within the study area

Key Goals & Objectives

- Provide a framework to meet future transportation needs and guides redevelopment within the corridor
- Intensifies development within the corridor and enhances existing communities

Previous Studies:
UPPER WESTSIDE LCI

Overview

- Assesses area needs and issues in developing a community vision for housing, economic development, transportation, land use, and development
- Study area includes 2 square miles along Marietta Blvd & Marietta St
- Proposed land use changes and transportation improvements through the study area

Key Goals & Objectives

- Support mix of land uses through network of transportation options
- Improve pedestrian access and environment
- Ensure continuity of industrial uses and employment balanced against support for variety of lifestyles

Previous Studies:
GEORGIA TECH CAMPUS MASTER PLAN

Overview

- Establishes plan for future development of the campus
- Includes study of area of interest beyond the core campus including new connections along west campus
- Recommended improvements proposed along Marietta Street

Key Goals & Objectives

- Improve campus accessibility
- Plan integrated, functional open space system that reduces storm water discharge to city system
- Accommodate future needs for academic, research, support, and related functions

Previous Studies:
BERKELEY PARK BLUEPRINTS STUDY

Overview

- Addresses critical planning issues from transportation improvements to architectural design concerns
- Includes entire Berkeley Park neighborhood and options for connection to Atlanta Water Works
- Proposes new street framework and other transportation improvements within the neighborhood

Key Goals & Objectives

- Protect history & character of residential core
- Balance momentum and growth with protection of residential core
- Advocate for community & public facilities
- Be in partnership with initiatives outside the core

Previous Studies:
GREATER HOME PARK MASTER PLAN

Overview

- Adopted in 2003 to integrate development of three disparate areas in Greater Home Park
- Includes Home Park Neighborhood, Atlantic Station, and area west of Northside Drive
- Proposes new street connections and development vision at boundaries with Northside Drive and Atlantic Station

Key Goals & Objectives

- Create a safe and pedestrian-friendly environment
- Transform elements of the community that are in physical decline
- Network the community with internal and external linkages

Previous Studies:
WEST TOWN PATTERN BOOK

Overview

- New urban neighborhood located in Upper Westside along Huff Road & Culpepper Street
- Proposes new streets and connections to existing street framework
- Guides development and architectural design within the district

Key Goals & Objectives

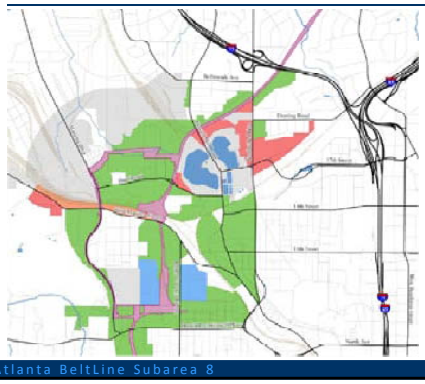
- Create a compact neighborhood that encourages walking
- Encourages mixed-use development including open spaces
- Established connections for streets, sidewalks, and bike paths with surrounding areas

Initial Observations:
Land Use & Urban Design

Patterns of Land Use:
ZONING

- **Lots of Industrial zoning**
- **Adjacent residential neighborhoods**
- **Incremental mixed use transformation**

Patterns of Land Use:
INDUSTRIAL PRESERVATION



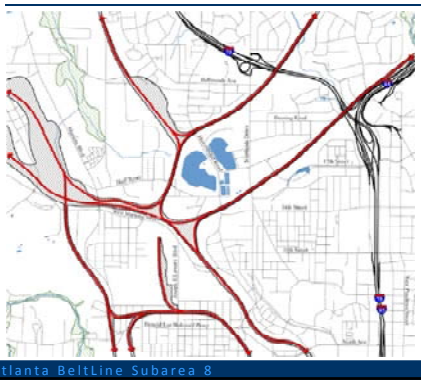
- **Protect key industrial areas**
- **Still some areas that need analysis / discussion**

Initial Observations:
Transportation & Mobility

Transportation & Mobility:
EXISTING STREET NETWORK

Transportation & Mobility:
Connectivity

Transportation & Mobility:
PHYSICAL CONSTRAINTS



Transportation & Mobility:
TRANSIT ACCESSIBILITY

Initial Observations:
Community Character

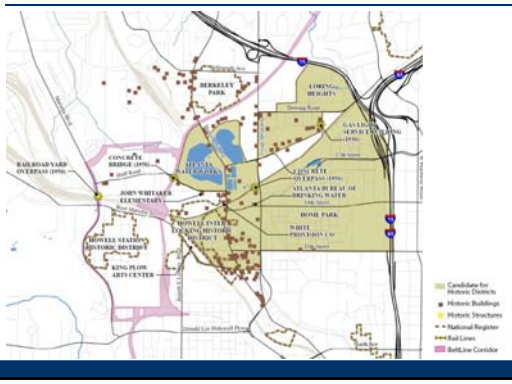
Community Character:
NEIGHBORHOODS

- **Diverse collection of historic neighborhoods**

Community Character:
BUILDING FIGURE GROUND

- **Clear Industrial and single-family residential patterns**

Community Character: HISTORIC RESOURCES



Goals & Objectives

Land Use & Urban Design

- Support redevelopment around future transit stations and in targeted areas of change.
- Promote development densities sufficient to support future transit.
- Establish the character & scale of redevelopment based on context, access & neighborhood adjacency.
- Reconnect transforming industrial areas to surrounding assets (e.g. Georgia Tech, neighborhoods, parks, and trails).
- Include a diversity of employment options by integrating new light industrial and other job-generating activities.

Goals & Objectives

Transportation & Mobility

- Increase east-west connectivity.
- Enhance key streets to promote walkability (former industrial streets).
- Maximize connectivity to the BeltLine trail & transit.
- Implement traffic calming on busy neighborhood streets.
- Structure redevelopment to promote connectivity.
- Minimize, to the extent possible, the impacts of truck activity on residential areas.
- Transform elements of the community that are in physical decline.

Goals & Objectives

Community Character & Greenspace

- Provide identity for the area by celebrating its unique historic character and its role in Atlanta's rail and Civil War history.
- Recognize the industrial roots of the area by promoting industrial materials, scale and character.
- Protect the history, character, scale and intimacy of residential neighborhoods.
- Capitalize on the area's unique open space opportunities (e.g. redevelopment sites and Waterworks).
- Enliven and reinforce the area's identity through public art, cultural art, signs and unifying design themes.
- Maximize accessibility to parks, trails, and open spaces .
- Provide adequate open space through new plazas, parks and greenways, as well as the best use of existing parks and open spaces.

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Meeting Summary

BeltLine Subarea 8: Existing Conditions Summary Meeting

Location: Piedmont Hospital, McRae Auditorium

Date: April 5, 2010

Agenda

1. Welcome, Announcements & Introductions
2. BeltLine Overview & Planning Process Update
3. Overview of Previous Plans & Studies
4. Study Area Initial Observations
    a. Land Use & Urban Design
    b. Transportation & Mobility
    c. Community Character
5. Goals & Objectives
6. General Questions & Comments
7. Small Group Discussions

Handouts

1. Meeting Agenda

Consultant Team Attendees

1. Ed McKinney, AECOM Design + Planning
2. Kevin Bacon, AECOM Design + Planning

Summary

The purpose of this meeting was to present a summary of the existing conditions in Subarea 8. The presentation included a status update on the subarea planning process, summary of all previous plans and studies conducted in the subarea, initial observations of the study area, and a draft of goals and objectives for Subarea 8. After the presentation study group members were given the opportunity to meet with consultant team members at four different stations to discuss individual concerns and specific planning elements within the study area.

Meeting Items

Item 1: BeltLine Overview & Planning Process Update

Jonathan Lewis of Atlanta BeltLine, Inc and the City of Atlanta Bureau of Planning presented an overview of the BeltLine including scope and key elements of the project. The subarea planning process timeline was reviewed and dates were given for the next meeting(s).

Questions/comments regarding BeltLine Overview & Planning Process:
(consultant team responses are included in *italics*)

None

Item 2: Overview of Previous Plans & Studies

Ed McKinney of AECOM Design + Planning presented an overview of all previous plans and studies conducted in the subarea. Plans and studies reviewed were at both the city-wide and neighborhood levels and will be considered and further refined in the Subarea 8 planning process. The plans and studies presented included:

City-wide Plans & Studies:

- BeltLine Redevelopment Plan (2005)
- Draft Industrial Preservation Policy (2009)
- BeltLine Environmental Impact Study (2009, ongoing)
- Connect Atlanta Plan (2008)
- Atlanta's Project Greenspace (2009)
- City of Atlanta Comprehensive Development Plan (2007)

Neighborhood Plans & Studies

- Northside Drive Corridor Study (2005)
- Upper Westside LCI (2005)
- Georgia Tech Campus Master Plan (2004)
- Berkeley Park Blueprint Study (2004)
- Greater Home Park Master Plan (2002)
- West Town Pattern Book (2007)

Questions/comments regarding Previous Plans & Studies:
(consultant team responses are included in *italics*)

None

Item 3: Study Area Initial Observations

Ed McKinney presented study maps and initial observations of Subarea 8 grouped under three major themes: land use and urban design, transportation and mobility, and community character.

Questions/comments regarding Study Area Initial Observations:
(planning team responses are included in *italics*)

1. Many studies have been conducted that have reviewed AM/PM peak LOS data for the intersection of Howell Mill Road and Bellmeade Avenue.

However traffic also becomes extremely congested during the lunch hour. Will this planning process review the data and make suggestions based upon a Noon peak LOS as well?
The planning team will look into this matter further and incorporate into the process as necessary.

Item 4: Goals & Objectives

Concluding the initial observations of the study area, Ed McKinney presented a draft set of planning goals and objectives tailored to Subarea 8 that were grouped into the same three key themes as set forth in the initial observations. Review and discussion of these goals and objectives was conducted as part of the small group discussions.

1. Land Use & Urban Design
   - Support redevelopment around future transit stations and in targeted areas of change.
   - Promote development densities sufficient to support future transit.
   - Establish the character & scale of redevelopment based on context, access & neighborhood adjacency.
   - Reconnect transforming industrial areas to surrounding assets (e.g. Georgia Tech, neighborhoods, parks, and trails).
   - Include a diversity of employment options by integrating new light industrial and other job-generating activities.

2. Transportation & Mobility
   - Increase east-west connectivity.
   - Enhance key streets to promote walkability (former industrial streets).
   - Maximize connectivity to the BeltLine trail & transit.
   - Implement traffic calming on busy neighborhood streets.
   - Structure redevelopment to promote connectivity.
   - Minimize, to the extent possible, the impacts of truck activity on residential areas.
   - Transform elements of the community that are in physical decline.

3. Community Character & Greenspace
   - Provide identity for the area by celebrating its unique historic character and its role in Atlanta's rail and Civil War history.
   - Recognize the industrial roots of the area by promoting industrial materials, scale and character.
   - Protect the history, character, scale and intimacy of residential neighborhoods.
   - Capitalize on the area's unique open space opportunities (e.g. redevelopment sites and Waterworks).
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   - Maximize accessibility to parks, trails, and open spaces .
   - Provide adequate open space through new plazas, parks and greenways, as well as the best use of existing parks and open spaces.

Item 5: General Questions & Comments

1. There were several participant questions about the EIS process and findings. Participants were advised to attend the upcoming public hearings on the BeltLine Tier I EIS in May or June 2010; the exact dates have not yet been set.

2. What are the guarantees on the funding sources for the BeltLine? Didn't the BeltLine lose the ability to receive money from the TAD?
   The BeltLine is exploring all potential sources for funding. There is a pending legal challenge to the use of school board increment in all TADs in Georgia. City and county tax increment is not affected by the legal challenge

Item 6: Small Group Discussions

Concluding the presentation four discussion stations where setup and study group participants were given the opportunity to meet with planning team members in small groups to address specific planning concerns in the study area. Comments and issues were placed on map of the study area with post-it notes.

1. "Good Places" – Places that are valued and should be protected.
   - Good neighborhoods (Berkeley Park, Westside, Huff Heights)
   - Preserve pedestrian grid (Home Park)
   - Good destination places
   - Sight lines & views
   - The Howard School
   - Westside Park

2. "Bad Places" – Places that need to be corrected or create a liability.
   - Traffic congestion on Howell Mill Road at Wal-Mart
   - No access across I-75 between Northside Drive & Deering Road
   - Potential Georgia Power substation in Home Park
   - Quality of fast food strip at Northside Drive & 14th Street
   - More sidewalks needed along 14th Street (Home Park West)
   - Traffic needs to be address both in lane widths and signal locations at Howell Mill and Huff Roads
   - Need connections to Westside Park; walking distance too far
   - Strip club on Marietta Boulevard
   - Huff West disconnected from the rest of the study area

3. "Your Vision" – Broad ideas and desires for the study area.
   - Possible loop trail
   - Greenspace with access (Atlanta Water Works)
   - Potential parks (Two locations in NW section of study area)
   - 14-16 acres of wooded area (along rail corridor)
   - Underwood Park and necklace of greenspace through the neighborhood
   - Infill mixed-use in Home Park
   - Enhancement of 14th Street as east-west pedestrian connection through Howell Mill Road
   - Un-fence green areas at reservoirs; mixed-use is safer than industrial
   - Safe connections to Westside Park
   - Sidewalks for Ellsworth Industrial Boulevard and Huff Road

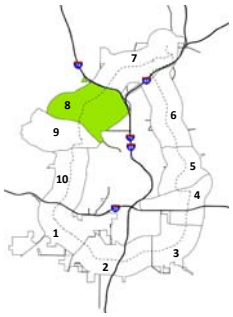
4. "Goals & Objectives" – Comments on the draft goals and objectives.
   - Workforce/green housing options (Land Use & Design)
   - Create an architectural review board? Hold architecture to a higher standard (e.g. LEED). (Community Character)

Atlanta BeltLine Subarea 8

Existing Conditions Summary

Agenda

- Planning Process
- Study Area & Previous Study Overview
- Goals & Objectives Discussion



April 5, 2010

WHAT IS THE BELTLINE?

KEY ELEMENTS

Parks and Arboretum

Trails

Transit & Transportation Infrastructure

Jobs & Economic Development

Affordable Workforce Housing

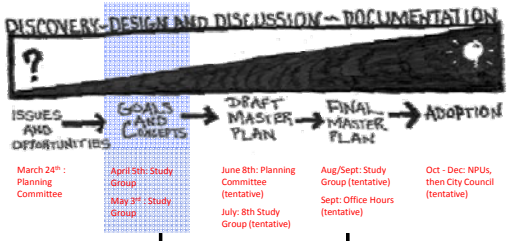
Historic Preservation

Streetscapes & Public Art

Environmental Clean-up

LIGHT RAIL TRANSIT

MASTER PLANNING SUBAREA 8 PROCESS & KEY DATES



March 24th : Planning Committee

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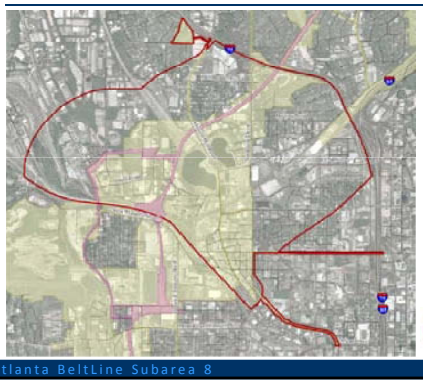
- Take Master Plans to NPUs and City Council for adoption

Overview:

Previous Studies & Plans

STUDY AREA



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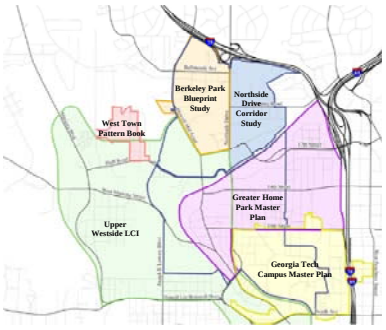

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- Plan integrated, functional open space system that reduces storm water discharge to city system
- Accommodate future needs for academic, research, support, and related functions

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Overview

- Addresses critical planning issues from transportation improvements to architectural design concerns
- Includes entire Berkeley Park neighborhood and options for connection to Atlanta Water Works
- Proposes new street framework and other transportation improvements within the neighborhood

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WEST TOWN PATTERN BOOK

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- New urban neighborhood located in Upper Westside along Huff Road & Culpepper Street
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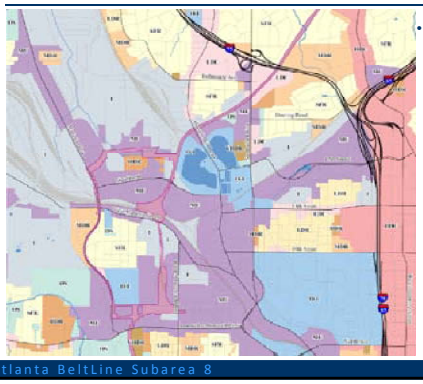
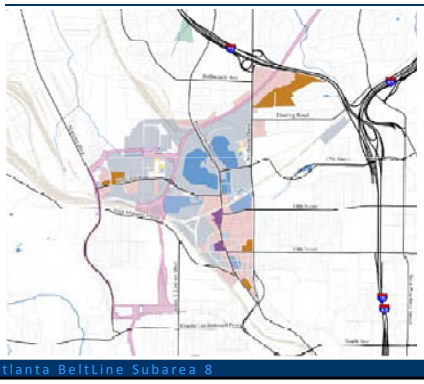
- **Adjacent residential neighborhoods**
- **Incremental mixed use transformation**

Land Use & Design:
FUTURE LAND USE

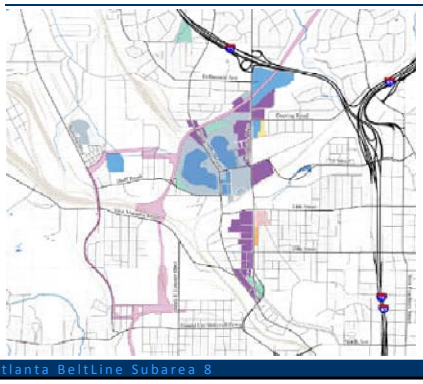


- **Mixed use transformation**

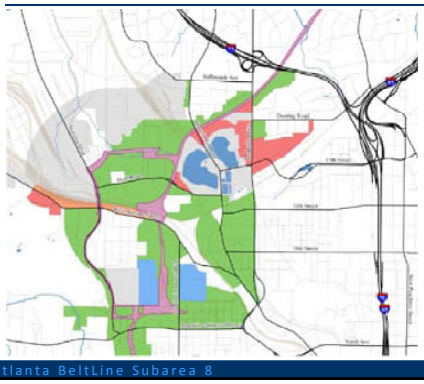
Land Use & Design:
EXISTING LAND USE



Land Use & Design:
LAND USE CHANGES



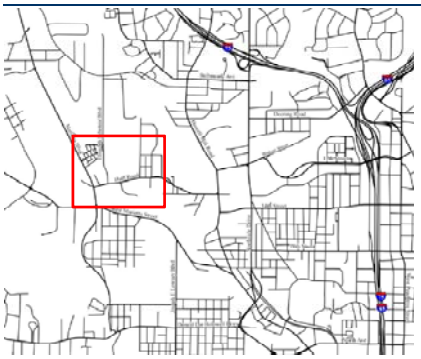
Patterns of Land Use:
INDUSTRIAL PRESERVATION



- **Protect key industrial areas**
- **Still some areas that need analysis / discussion**

Initial Observations:
Transportation & Mobility

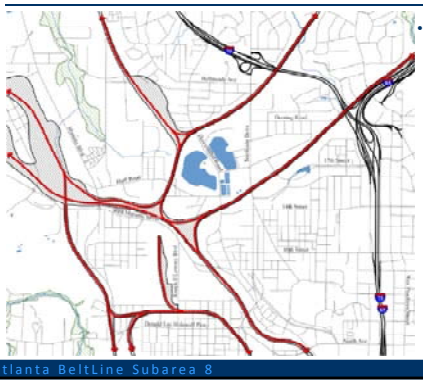
Transportation & Mobility:
EXISTING STREET NETWORK



- **Reflects the network of a former industrial area**

Transportation & Mobility:
TRANSIT ACCESSIBILITY

Transportation & Mobility:
PHYSICAL CONSTRAINTS

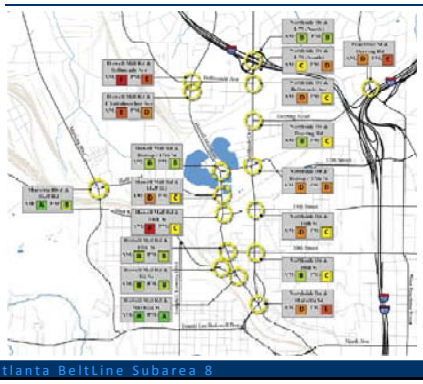


- **Significant barriers to connectivity**

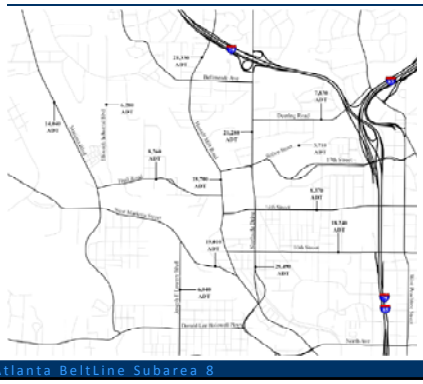
Transportation & Mobility:
Connectivity

- **Limited, disjointed east-west connectivity**

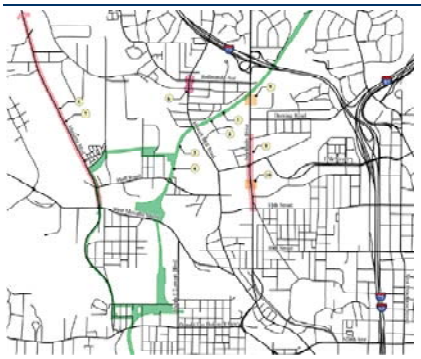
Mobility:
KEY INTERSECTIONS & LOS DATA



Mobility:
TRAFFIC VOLUMES

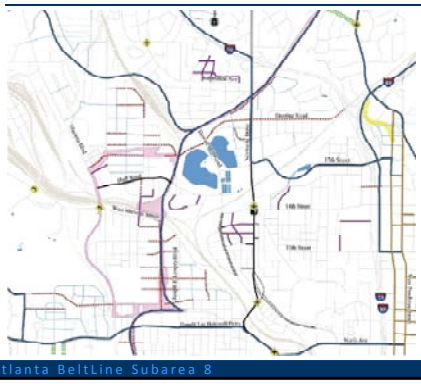


Mobility:
Programmed Projects



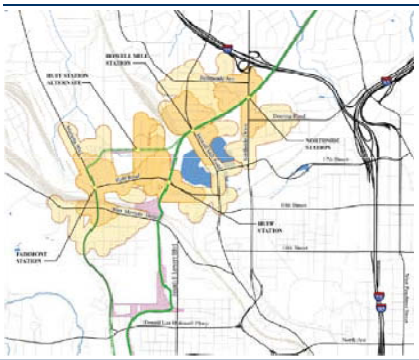
1. Marietta Blvd. Bike/Ped improvements
2-5 BeltLine
6. Howell Mill/Bellemeade/Chattahoochie Intersection
7. Marietta Streetscapes/sidewalks
8. Northside Drive Pavement improvements
9. CSX Railroad overpass (evaluation/design development)
10. NS Railroad bridge improvements

Land Use & Design:
RELATED STUDIES: TRANSPORTATION

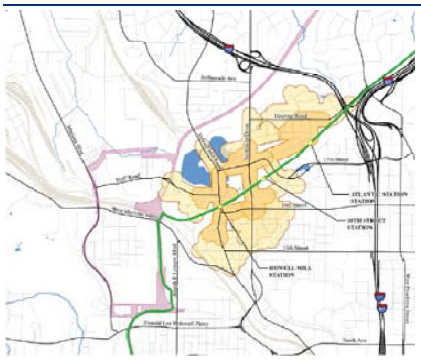


Related Studies:
EIS TRANSIT ALIGNMENTS

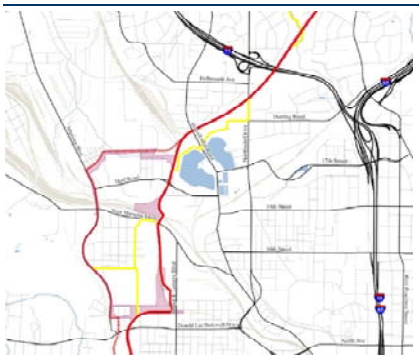
Mobility:
TRANSIT ACCESSIBILITY: CSX



Mobility:
TRANSIT ACCESSIBILITY: NORFOLK



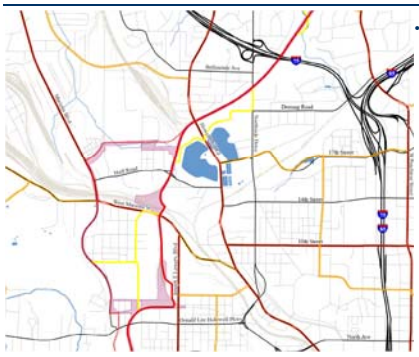
Related Studies:
EIS TRAIL ALIGNMENTS



Mobility:
SIDEWALK NETWORK

- **Lack of sidewalks in many neighborhood areas**

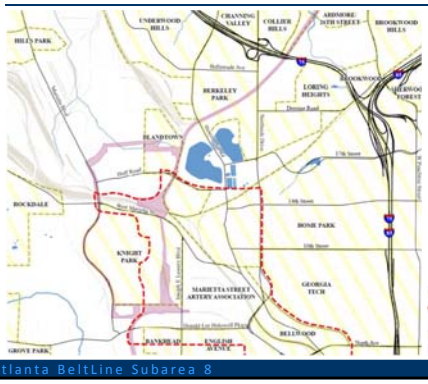
Mobility:
BICYCLE NETWORK



- **A future system that needs to be implemented through street design**

Initial Observations:
Community Character

Community Character:
NEIGHBORHOODS

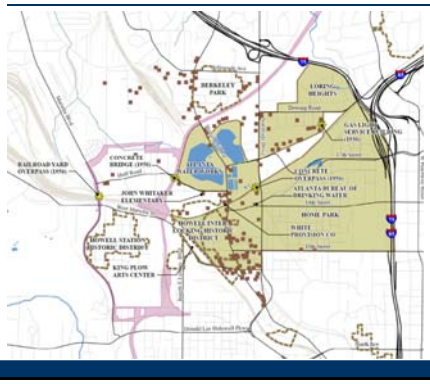


- **Diverse collection of historic neighborhoods**

Community Character:
BUILDING FIGURE GROUND

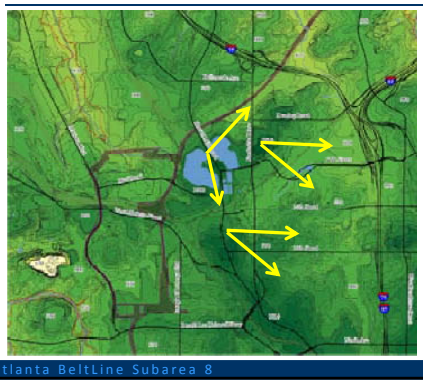
- **Clear Industrial and single-family residential patterns**

Community Character:
HISTORIC RESOURCES



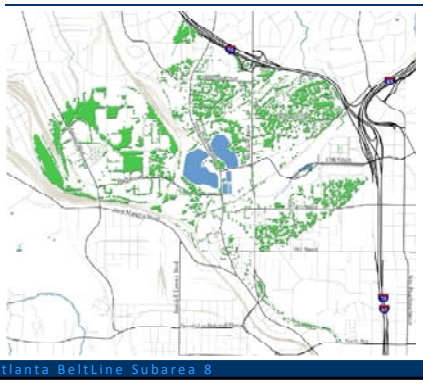
- **A rich industrial & residential history**

Parks & Greenspace:
TOPOGRAPHY



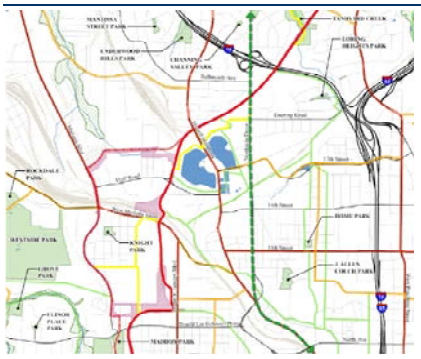
- **Unique ridges & high points with special views to Buckhead, Midtown, Downtown**

Parks & Greenspace:
TREE CANOPY

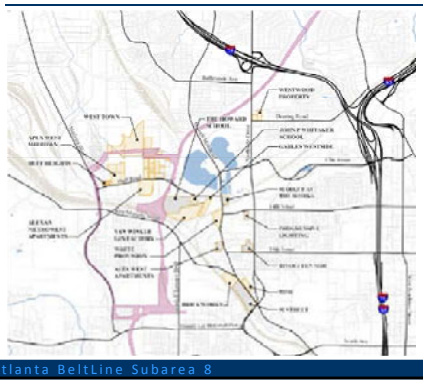


- **Need for greenspace in redeveloping areas**

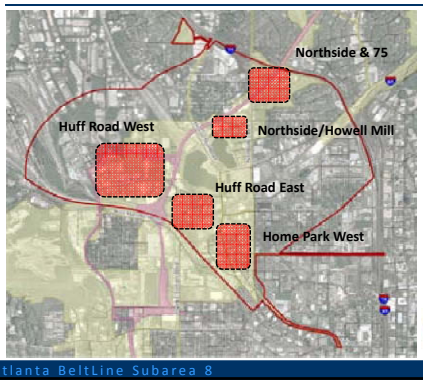
Parks & Greenspace:
PARKS & OPEN SPACE



Land Use & Design:
DEVELOPMENT ACTIVTY



Focus Areas



- Redevelopment
- Land Use Change
- Street Connectivity
- Connections to BeltLine
- Parks & Open Space

Goals & Objectives

Land Use & Urban Design

- Support redevelopment around future transit stations and in targeted areas of change.
- Promote development densities sufficient to support future transit.
- Establish the character & scale of redevelopment based on context, access & neighborhood adjacency.
- Reconnect transforming industrial areas to surrounding assets (e.g. Georgia Tech, neighborhoods, parks, and trails).
- Include a diversity of employment options by integrating new light industrial and other job-generating activities.

Goals & Objectives

Transportation & Mobility

- Increase east-west connectivity.
- Enhance key streets to promote walkability (former industrial streets).
- Maximize connectivity to the BeltLine trail & transit.
- Implement traffic calming on busy neighborhood streets.
- Structure redevelopment to promote connectivity.
- Minimize, to the extent possible, the impacts of truck activity on residential areas.
- Transform elements of the community that are in physical decline.

Goals & Objectives

Community Character & Greenspace

- Provide identity for the area by celebrating its unique historic character and its role in Atlanta's rail and Civil War history.
- Recognize the industrial roots of the area by promoting industrial materials, scale and character.
- Protect the history, character, scale and intimacy of residential neighborhoods.
- Capitalize on the area's unique open space opportunities (e.g. redevelopment sites and Waterworks).
- Enliven and reinforce the area's identity through public art, cultural art, signs and unifying design themes.
- Maximize accessibility to parks, trails, and open spaces .
- Provide adequate open space through new plazas, parks and greenways, as well as the best use of existing parks and open spaces.

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Map/Input Stations

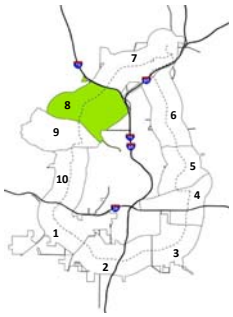
- **Good Places** – things to protect and preserve
- **Bad Places** – Things to change and Fix
- **Your Vision** – new parks, connections, redevelopment opportunities…??
- **Goals & Objectives** – revise, edit, add, delete

Atlanta BeltLine Subarea 8

Draft Concept Presentation

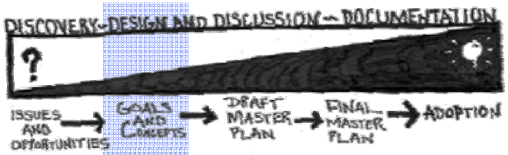
Agenda

- **Presentation of Draft Concepts**
- **Open House Discussion & Comment**



May 3, 2010

MASTER PLANNING SUBAREA 8 PROCESS & KEY DATES



March 24 : Planning Committee

April 5 : Study Group

May 3 : Study Group

June 8: Planning Committee (tentative)

July: 8 Study Group (tentative)

Aug/Sept: Study Group (tentative)

Sept: Office Hours (tentative)

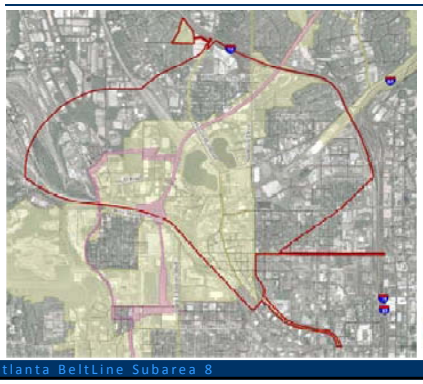
Oct - Dec: NPUs, then City Council (tentative)

- Review previous studies
- Review vision statement and goals
- Analyze existing conditions

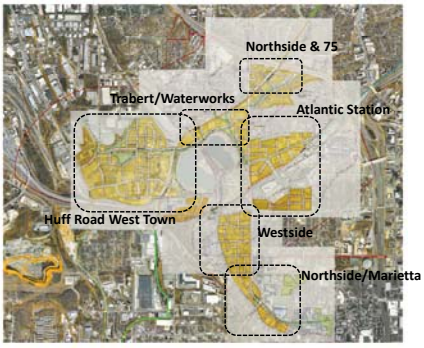
- Prepare concept plans
- Draft plan recommendations
- Refine master plan

- Take Master Plans to NPUs and City Council for adoption

STUDY AREA

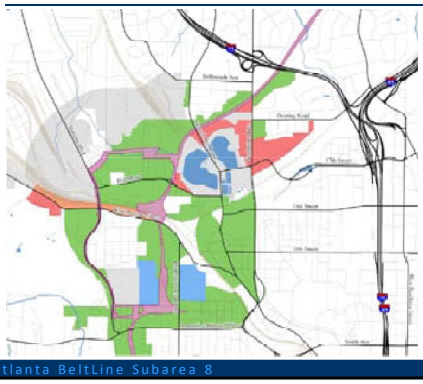


Preliminary Concept Plans: Focus Areas

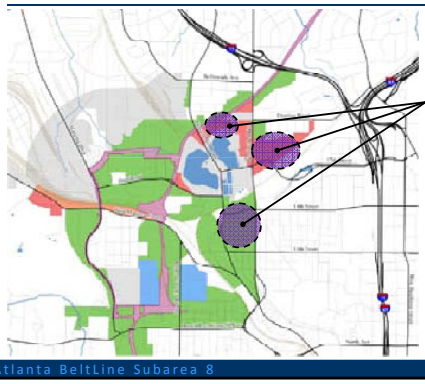


- **Redevelopment**
- **Land Use Change**
- **Street Connectivity**
- **Connections to BeltLine**
- **Parks & Open Space**

Industrial Transformation: **Live/Work?**



Industrial Transformation: **Live/Work?**

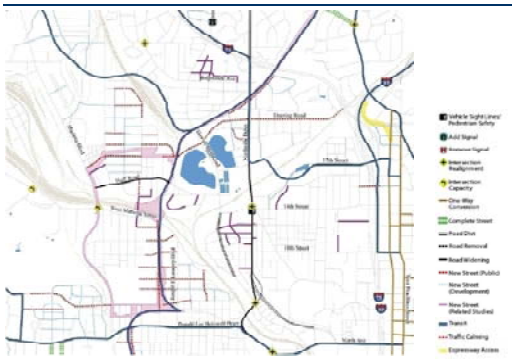


Industrial Transformation: **Live/Work?**

Opportunity exists to modify the Live-Work district to both preserve those existing Live-Work districts but also to enable existing underutilized Industrial districts to transform into new Live-Work districts for artists, galleries, light production and manufacturing type uses

- Existing Live –Work district designed to allow for mixed uses at low densities in existing industrial districts in close proximity to single-family neighborhoods
- One of the Quality of Life zoning districts complete with extensive urban design controls and regulations
- Commercial uses have very low density (.5) and are limited to intersection corners and have size limits (2,000sf to 8,000sf)
- Residential uses permitted at a low density (.696)
- A unique district in that it allows for the working/manufacturing/studio/shop uses that define many intown Industrial districts today
- These uses however are limited to no more than 3 employees per use

Land Use & Design: **RELATED STUDIES: TRANSPORTATION**



Related Studies: **EIS TRAIL ALIGNMENTS**

Related Studies: **EIS TRANSIT ALIGNMENTS**

Focus Area: **Northside/Marietta**

- **Lack of connection between GA Tech and "Westside"**
- **GA Tech desire to eliminate, repurpose Tech Parkway**
- **Northside Drive is a pedestrian & vehicular barrier**
- **Freeway-like character of Northside Drive conflicts with surrounding areas**

Focus Area: **Northside/Marietta**

- **Realign Northside Drive -** expand northbound lanes & bridge to relocate southbound lanes
- **Redesign Tech Parkway** - to "shrink" roadway and create multi-use trail connecting from "Westside" to Tech Campus
- **New Park at Northside/Marietta** - former Northside southbound lanes
- **8th Street Connection** – new signal at Northside and extension into campus
- **3rd Street Intersection** – realign intersection with 8th Street.
- **Redevelopment Opportunities** – Housing & Campus Facilities

Focus Area: **Westside**

- **Small scale industrial converting to mixed use**
- **Lack of block structure to support redevelopment**
- **Lack of connection to Home Park (Northside Drive barrier)**

Focus Area: **Westside**

- **New Street Framework** – small street & pedestrian connections to break up superblocks
- **Extend Ethel** – connect from Northside to Howell Mill (new signal and extension to Home Park?
- **11th Street Intersection** – realign intersection with Howell Mill
- **Brady Intersection** – realign intersection with Howell Mill
- **Howell Mill Streetscape** – Sidewalk and pedestrian improvements for safety & comfort, lane reconfiguration?
- **Howell Mill/14th Street BeltLine Station**
- **Redevelopment Opportunities** – Live/Work, with employment focus

Focus Area: **Huff Road/West Town**

Focus Area: **Huff Road/West Town**

- **Huff Road BeltLine Station** –
- **Huff Road Street Design** – 3-lane, bike lanes? On-street parking?
- **Elaine Avenue Extension** – connecting through West Town to Howell Mill (bridge over BeltLine & CSX)
- **Elaine/Ellsworth Ind. Intersection** – realign
- **Menlo/Earnest Connection** – new bridge over BeltLine & CSX
- **Howard School/Murray Mill Connection** – New street from Foster to Elaine
- **BeltLine Trail** – park and trail on west & north side of Reservoir w/security & public art installation
- **Redevelopment Opportunities** – Residential, live/work

Focus Area: **Trabert/Waterworks**

Focus Area: **Trabert/Waterworks**

- **Howell Mill BeltLine Station** –
- **Extend Trabert** – to connect Howell Mill to Northside Drive, connecting at Deering Road
- **Deering Road Traffic Calming** – intersection & on-street parking bulb outs
- **BeltLine Trail** – open space and trail along Trabert & along east side of reservoir
- **Berkeley Park Trail** – tunnel under CSX & BeltLine, connects to future neighborhood parks
- **"City View Park"** - new park at Northside and 17th Street
- **Redevelopment Opportunities** – Residential, live/work

Focus Area: **Northside & 75**

Focus Area: **Northside & 75**

- **Northside BeltLine Station** – Locate station east of Northside to be center of redevelopment opportunities
- **Pedestrian Connection Across CSX** – provide ped. Bridge over CSX and BeltLine at station to provide access and connect Loring Heights & Berkeley Park
- **Loring Heights Connection** – Street and/or ped connection at Steele Drive
- **Northside Circle Intersection** – new traffic signal on Northside Drive and street alignment
- **BeltLine Trail** – open space and trail along existing creek with potential to "daylight"
- **Redevelopment Opportunities** – New office (with I-75 orientation) and residential

Focus Area: **Atlantic Station**

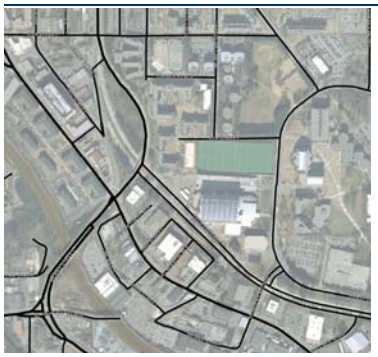
Focus Area: **Atlantic Station**

- **Atlantic BeltLine Station** – Locate station at south end of Target with pedestrian bridge
- **Station Park Opportunity** – new park at Mecaslin & Bishop adjacent to potential station
- **BeltLine Spur Trail** – trail connection from Northside to Bishop & along NS to Deering Road
- **Street Framework** – extend Flynn, Center & Tumlin from 14th to 16th Street.
- **Redevelopment Opportunities** – Live/work and residential (Bishop) High intensity mixed use (17th & Northside) Office & Residential (14th Street)

Concept Review & Discussion:

- Review maps
- Comment cards
- Post it notes - comment & place on maps
- One-on-one discussion with Team members

Focus Area: **Northside/Marietta**



Context

- **Lack of connection between GA Tech and "Westside"**
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- **Freeway-like character of Northside Drive conflicts with surrounding areas**

Focus Area: **Northside/Marietta**

Proposed Street Framework

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Focus Area: **Northside/Marietta**

City of Atlanta Future Land Use

- **Notes**– notes

Focus Area: **Northside/Marietta**

Proposed Future Land Use

- **Notes**– notes

Focus Area: **Westside**

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Focus Area: **Westside**

Proposed Street Framework

small street & pedestrian connections to break up superblocks

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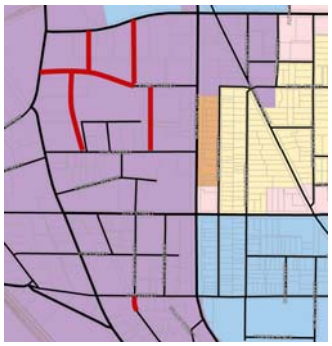
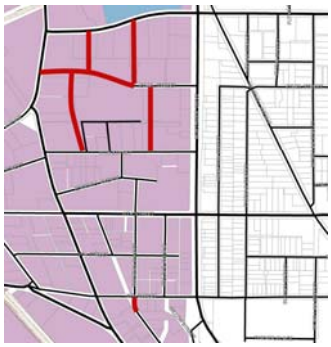
Focus Area: **Westside**



City of Atlanta Future Land Use

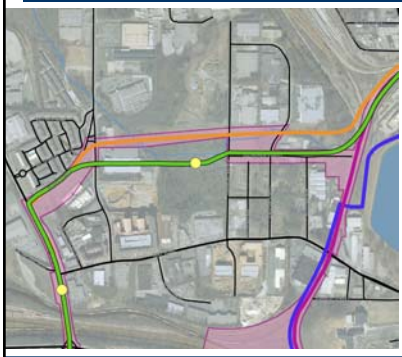
- **Notes**– notes

Focus Area: **Westside**



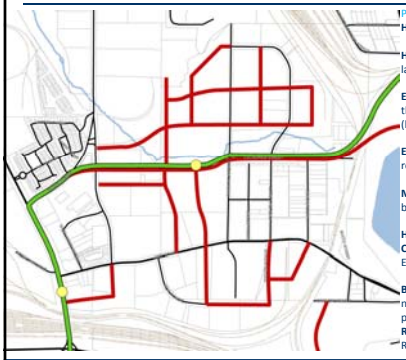
Proposed Future Land Use
- **Notes**– notes

Focus Area: **Huff Road/West Town**



Context
- **notes**

Focus Area: **Huff Road/West Town**



Proposed Street Framework

Huff Road BeltLine Station –

Huff Road Street Design – 3-lane, bike lanes? On-street parking?

Elaine Avenue Extension – connecting through West Town to Howell Mill (bridge over BeltLine & CSX)

Elaine/Ellsworth Ind. Intersection – realign

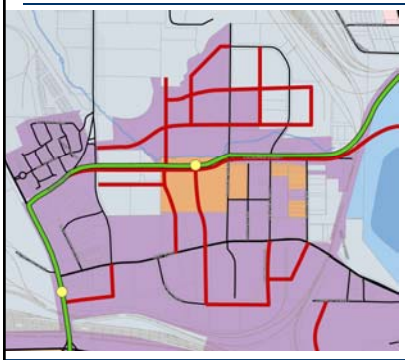
Menlo/Earnest Connection – new bridge over BeltLine & CSX

Howard School/Murray Mill Connection – New street from Foster to Elaine

BeltLine Trail – park and trail on west & north side of Reservoir w/security & public art installation

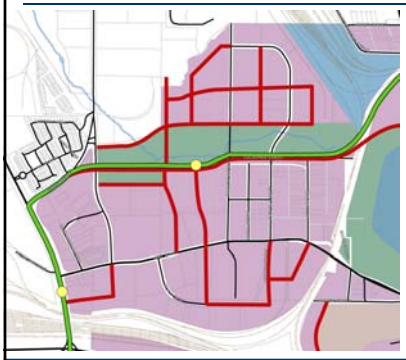
Redevelopment Opportunities – Residential, live/work

Focus Area: **Huff Road/West Town**



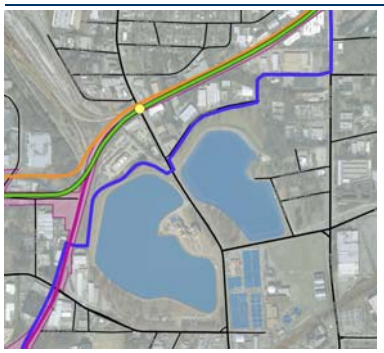
City of Atlanta Future Land Use
- **Notes**– notes

Focus Area: **Huff Road/West Town**



Proposed Future Land Use
- **Notes**– notes

Focus Area: **Trabert/Waterworks**



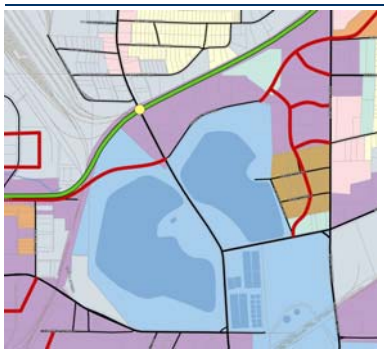
Context
- **notes**

Focus Area: **Trabert/Waterworks**

Proposed Street Framework

- **Howell Mill BeltLine Station** –
- **Extend Trabert –** to connect Howell Mill to Northside Drive, connecting at Deering Road
- **Deering Road Traffic Calming –** intersection & on-street parking bulb outs
- **BeltLine Trail –** open space and trail along Trabert & along east side of reservoir
- **Berkeley Park Trail –** tunnel under CSX & BeltLine, connects to future neighborhood parks
- **"City View Park"** - new park at Northside and 17th Street
- **Redevelopment Opportunities –** Residential, live/work

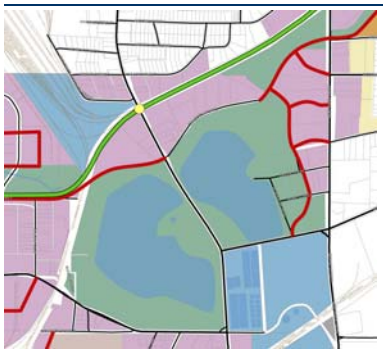
Focus Area: **Trabert/Waterworks**



City of Atlanta Future Land Use

- **Notes**– notes

Focus Area: **Trabert/Waterworks**



Proposed Future Land Use

- **Notes**– notes

Focus Area: **Northside & 75**

Context

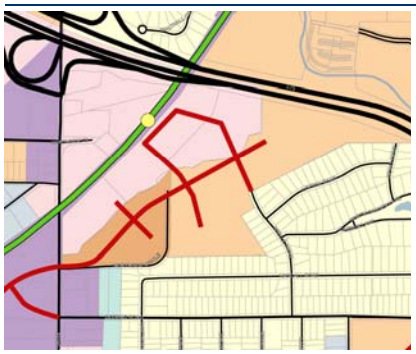
- **notes**

Focus Area: **Northside & 75**

Proposed Street Framework

- **Northside BeltLine Station** – Locate station east of Northside to be center of redevelopment opportunities
- **Pedestrian Connection Across CSX –** provide ped. Bridge over CSX and BeltLine at station to provide access and connect Loring Heights & Berkeley Park
- **Loring Heights Connection** – Street and/or ped connection at Steele Drive
- **Northside Circle Intersection –** new traffic signal on Northside Drive and street alignment
- **BeltLine Trail –** open space

Focus Area: **Northside & 75**



City of Atlanta Future Land Use

- **Notes**– notes

Focus Area: **Northside & 75**

Proposed Future Land Use

- **Notes**– notes

Atlanta BeltLine Subarea 8

Meeting Summary

BeltLine Subarea 8: Draft Design Concepts Presentation

Location: Piedmont Hospital, Classroom 7

Date: May 3, 2010

Agenda

1. Welcome & General BeltLine Announcements
2. Subarea 8 Planning Process Update
3. Review of Key Design Concept Drivers
4. Draft Design Concepts Presentation
    a. Northside/Marietta Focus Area
    b. Westside Focus Area
    c. Huff Road/West Town Focus Area
    d. Trabert/Waterworks Focus Area
    e. Northside & I-75 Focus Area
    f. Atlantic Station Focus Area
5. Small Group Discussions

Handouts

1. BeltLine Master Plan Comment Cards

Consultant Team Attendees

1. Ed McKinney, AECOM Design + Planning
2. Kevin Bacon, AECOM Design + Planning
3. Aaron Fortner, Market + Main, Inc.

Summary

The purpose of this meeting was to present the draft design concepts of Subarea 8 produced during the Design Workshop on April 27-29. The presentation included a status update on overall BeltLine development activities, subarea planning process progress update, brief review of key design concept drivers, and draft of design concepts for different focus areas. After the presentation study group members were given the opportunity to meet with consultant team members at five different stations to discuss ideas and concerns for each of the focus area design concepts.

Meeting Items

Item 1: Subarea 8 Planning Process Update

Jonathan Lewis of Atlanta BeltLine, Inc and the City of Atlanta Bureau of Planning gave an update as to the overall progress of the planning process for Subarea 8 and an introduction to the purpose of the meeting. The purpose of this meeting was to present and receive study group feedback on the draft design concepts that were produced during the workshop on April 27-29. The comments will be used to refine the design concepts as the consultant team moves forward into the draft master plan phase.

Questions/comments regarding the Subarea 8 Planning Process Update:
(consultant team responses are included in *italics*)

None

Item 2: Review of Key Design Concept Drivers

Ed McKinney of AECOM Design + Planning introduced the overall draft design concept for the subarea and the design's organization into six focus areas. Key information from the existing conditions survey was presented for its role in driving design decisions. The information reviewed included the following:

- Industrial Preservation Policy
- Industrial Transformation: Potential for Live/Work?
- Related Transportation Projects
- EIS Trail Alignments
- EIS Transit Alignments

Questions/comments regarding the Review of Key Design Concept Drivers: *None*

Item 3: Draft Design Concepts Presentation

Ed McKinney presented the design concept for each of the following six focus areas in greater detail:

Northside/Marietta Focus Area: Key planning issues in this focus area include a lack of connection between Georgia Tech and Westside, the desire of Georgia Tech to eliminate Tech Parkway, and the development/pedestrian/vehicular barrier created by Northside Drive due to its freeway-like character. The design concept proposes to realign Northside Drive, redesign Tech Parkway, create a park near the intersection of Northside/Marietta, create a new street connection at 8th Street, realign the intersection of 3rd and 8th Street, and provide redevelopment opportunities for Georgia Tech housing and campus facilities.

Questions/comments regarding the Northside/Marietta Focus Area: *None*

Westside Focus Area: Key planning issues in this focus area include conversion of small scale industrial to mixed-use, lack of block structure to support development, and lack of connections to Home Park. The design concept proposes to create a new street framework, extend Ethel Street, realign the intersections of 11th Street and Brady Ave with Howell Mill Road, enhance the streetscape of Howell Mill, designate a

BeltLine station location at Howell Mill and 14th Street, and provide redevelopment opportunities for live/work with a focus on employment.

Questions/comments regarding the Westside Focus Area:

1. The majority of the property in the focus area is zoned Industrial. What would happen to the proposed block size and structure if it were all re-zoned to Mixed-Use?
   The final,adopted framework will guide development regardless of zoning. Under a Mixed-Use zoning each parcel could potentially subdivide further but would have to do so in conformance with the overall framework plan.

2. What are the specific traffic abatement measures being designed for Howell Mill Road and Northside Drive?
   The designs of Howell Mill and Northside will be detailed and reviewed in the draft master plan phase. Potential calming measures may include increasing the number of intersections, altering the lane configurations, and enhance the streetscape with landscaping.

Huff Road/West Town Focus Area: The design concept proposes to redesign Huff Road, connect Elaine Ave with Howell Mill Road via the Hanier Street in the proposed West Town development, realign the intersection of Elaine and Ellsworth Industrial, construct a new bridge to connect Menlo Drive and Ernest Street, align the BeltLine trail adjacent to the Waterworks site, and provide redevelopment opportunities for residential and live/work.

Questions/comments regarding the Huff Road/West Town Focus Area:

1. What is happening on the vacant land adjacent to Murray Mill?
   The vacant land is part of the Murray Mill property. A redevelopment plan for the property is already under consideration.

2. Does the reconfiguration of Huff Road use the Siskin Steel property?
   Not entirely – the new configuration for Huff Road has been aligned over existing property lines but the new right-of-way would require some of the property.

3. Doesn't the Subarea 10 already connect Marietta Street with Huff Road?
   A connection was proposed during the draft plan phase but not included in the final, adopted master plan for the subarea. Also, no connection is included in the Connect Atlanta Plan.

4. Coming from West Town, where will people (vehicles, pedestrians, etc.) go?
   All of the design concepts propose to increase the number of east-west connections across the site. The proposed connections will be review and refined in the draft master plan.

5. Do you have approval from the Department of Watershed Management / Department of Public Works to use city property adjacent to the reservoir?
   Not yet – the draft concepts are a first attempt to balance the departments' need of security with the desire to provide green space and connectivity.

Trabert/Waterworks Focus Area: The design concept proposes to extend Trabert to connect with Northside Drive, provide traffic calming on Deering Road, continue the BeltLine trail alignment adjacent to the Waterworks site, provide a trail connection

to the proposed Berkeley Park trail, create a "City View Park" at Northside Drive and 17th Street, and provide redevelopment opportunities for residential and live/work.
Questions/comments regarding the Trabert/Waterworks Focus Area:

1. If one of the primary objectives of the BeltLine is to increase city greenspace, why doesn't the concept provide more particularly at the Waterworks site?
   The team will review the design concepts for the potential for more greenspace in the draft master plan. Increasing publicly accessible greenspace at the Waterworks site is problematic due to the policies of the Department of Watershed Management. The trail alignment and smaller parks adjacent to the site in the design concept are a proposed "first step" in negotiating public access to the area.
2. Can't TAD funds be used to acquire land for the purpose of constructing new parks?
   Yes – TAD funds can be used for new infrastructure and acquiring land for new parks but is not an endless resource.

Northside & I-75 Focus Area: The design concept proposes to locate the transit station east of Northside Drive, provide a pedestrian connection over the CSX rail alignment to the station, create a street or pedestrian connection to Loring Heights at Steele Drive, create a signalized intersection at Northside Drive and Northside Circle, daylight an existing creek and align the BeltLine trail in the Atlanta Technology Center site, and provide redevelopment opportunities for new office and residential.

Questions/comments regarding the Northside & I-75 Focus Area:

1. Why aren't more connections being shown particularly on Chattahoochee Avenue?
   The team will revisit potential connections but the area's location outside of the TAD boundary decreases the likelihood of their inclusion in this plan.

Atlantic Station Focus Area: The design concept proposes to locate the transit station across from the Target site, create a new park adjacent to the transit station, create a BeltLine spur trail to Deering Road via Bishop Road, create new street framework, and provide redevelopment opportunities for office and residential.

Questions/comments regarding the Atlantic Station Focus Area: *None*

<u>Item 4: Small Group Discussions</u>

Concluding the presentation five discussion stations were setup and study group participants were given the opportunity to meet with planning team members in small groups to address specific planning concerns regarding the design concepts. Comments and issues were placed on maps of the focus areas with post-it notes or handed-in on the BeltLine Master Plan comment cards.

1. Overall Design Concept Plan (all focus areas shown)
   - 10th Street pedestrian bridge (to Marietta Street).
   - More greenspace, entryway to Atlantic Station.
   - Dam trail built as bridge (at Trabert near West Town).
   - Stagnant water could be used for greenspace with (retention) pond (north of Waterworks side along Northside Drive).
   - Reconnect Chattahoochee Ave with Old Chattahoochee Ave.
   - No connection (at Steele), young children, less safe, too much traffic.

- 10-acre wood pledged for public use (along Ellsworth Industrial).
- For sale 6-acres (along Ellsworth Industrial).
- Connection to park (Berkeley Park).
- 14-acre woods could be park (Underwood Hills).
- New connection, minimum traffic on Chattahoochee Ave.

2. Northside/Marietta & Westside Focus Areas
   - How about an LRT line from Northside Station to Tech (via Hemphill)?

3. Huff Road/West Town Focus Area
   - The Howard School has concerns over impact of making Ernest a 3-lane road and connecting to Menlo. Right-of-way and infrastructure issues would exist. Security of the campus could be greatly affected.
   - Issues arise with this (new street from Ernest to Foster) being a public street if it runs through The Howard School's campus.

4. Trabert/Waterworks & Atlantic Station Focus Areas
   - The highest spot in Atlanta. Perfect view of city surrounded by water. (site southeast of reservoir)
   - Bishop Street is the natural flow for traffic. It is industrial. Connect to Peachtree.
   - Slow/deter cut-through traffic on Trabert.
   - Unsafe – do not connect Trabert to Deering. Loring Heights is a neighborhood with 116 small children.
   - Make Amtrak face lumber yard/Atlantic Station.
   - Pedestrian only connection (at Steele).
   - Signalized intersection north of Bellmeade/Northside must be improved (striping & signage) plus be signalized four ways (currently three).

5. Northside & I-75 Focus Area
   - Bridge or street level (pedestrian connection at Atlantic Station transit station)? Who builds? With what funds (as this is not in the TAD)?
   - DPW (Department of Public Works) property (northwest of reservoir) should be able to move to more industrial area. Make this property a park.
   - Because this is a capped site (environmental), can we consider a hardscape park/skate park here (Atlantic Station transit station park site)? Tennis courts?
   - Underpass purposes (near Amtrak)?
   - With the Watershed Management opposition, this site (northeast of reservoir) offers BeltLine adjacency for a park yet adequate separation from Waterworks pond.
   - Steele connection to ATC (Atlanta Technology Center)/Hartford Place: bike/pedestrian only; slight chance of vehicular connection only if connecting to single-family residential/townhomes on redeveloped property. No office/retail/multi-family – generates traffic.

6. BeltLine Master Plan Comment Cards
   - Like what you are doing with trails and traffic but I too am disappointed we can't get more park area. The focus on connectivity from Brock Built's development to Tanyard Creek Park is exciting and offers a wonderful opportunity for a park at the city-owned maintenance facility north of Myers Carpet. Of all industrial properties that seems easiest to relocate and an ideal location given your plan for an underpass to Berkeley Park.

I have walked that area and it alleviates Watershed Management's security concerns.

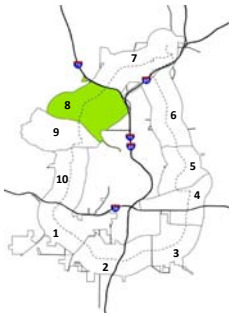
- The Howard School would have concerns regarding the connection of Ernest Street to Menlo. In addition, making Ernest Street a 3-lane road would impact property lines and infrastructure. On the south side of the property, the idea of running a street through Murray Mill and then onto our campus, connecting to Ernest, would present serious security concerns for our students and facilities.
- More green space. 17th at Northside should be made the largest green space 1) highest topography in the city 2) open space 3) looks over water – think New York Central Park 4) best use to create beautiful entrance to Atlantic Station. Also, now is the time to create green along Northside from Bellmeade south up to Bishop. Green. Green. Traffic is being created by the new development and pressure is going to destroy existing single-family areas. Ingress and egress (are) becoming more and more difficult.
- I am a resident of Loring Heights and I live on Steele Drive. I am strongly opposed to the construction of Steele out to Northside or any continuation of Steele for that matter. We have MANY small children in our neighborhood and increasing traffic on Steele will also increase traffic through the entire neighborhood AND decrease our home value. We need traffic calming on Deering.

Atlanta BeltLine Subarea 8

Draft Concept Presentation

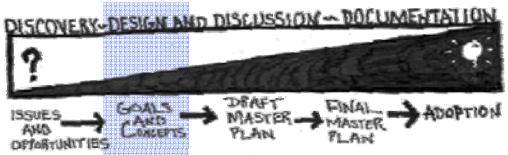
Agenda

- **Presentation of Draft Concepts**
- **Open House Discussion & Comment**



May 3, 2010

MASTER PLANNING SUBAREA 8 PROCESS & KEY DATES



March 24 : Planning Committee

April 5: Study Group

May 3 : Study Group

June 8: Planning Committee (tentative)

July: 8 Study Group (tentative)

Aug/Sept: Study Group (tentative)

Sept: Office Hours (tentative)

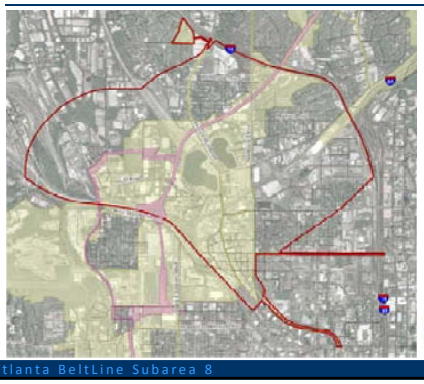
Oct - Dec: NPUs, then City Council (tentative)

- Review previous studies
- Review vision statement and goals
- Analyze existing conditions

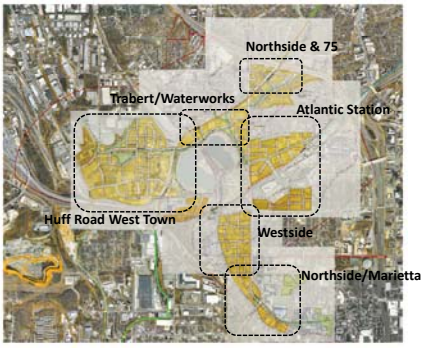
- Prepare concept plans
- Draft plan recommendations
- Refine master plan

- Take Master Plans to NPUs and City Council for adoption

STUDY AREA

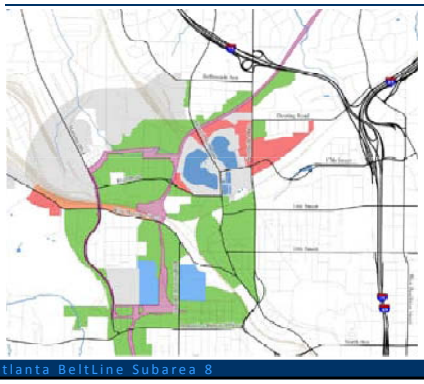


Preliminary Concept Plans: Focus Areas

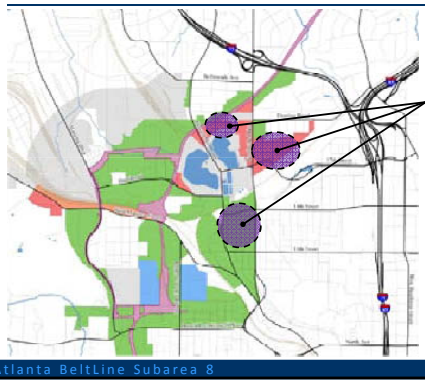


- **Redevelopment**
- **Land Use Change**
- **Street Connectivity**
- **Connections to BeltLine**
- **Parks & Open Space**

Industrial Transformation: **Live/Work?**



Industrial Transformation: **Live/Work?**

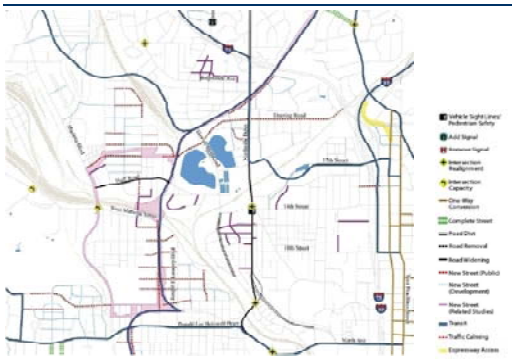


Industrial Transformation: **Live/Work?**

Opportunity exists to modify the Live-Work district to both preserve those existing Live-Work districts but also to enable existing underutilized Industrial districts to transform into new Live-Work districts for artists, galleries, light production and manufacturing type uses

- Existing Live –Work district designed to allow for mixed uses at low densities in existing industrial districts in close proximity to single-family neighborhoods
- One of the Quality of Life zoning districts complete with extensive urban design controls and regulations
- Commercial uses have very low density (.5) and are limited to intersection corners and have size limits (2,000sf to 8,000sf)
- Residential uses permitted at a low density (.696)
- A unique district in that it allows for the working/manufacturing/studio/shop uses that define many intown Industrial districts today
- These uses however are limited to no more than 3 employees per use

Land Use & Design: **RELATED STUDIES: TRANSPORTATION**



Related Studies: **EIS TRAIL ALIGNMENTS**

Related Studies: **EIS TRANSIT ALIGNMENTS**

Focus Area: **Northside/Marietta**

- **Lack of connection between GA Tech and "Westside"**
- **GA Tech desire to eliminate, repurpose Tech Parkway**
- **Northside Drive is a pedestrian & vehicular barrier**
- **Freeway-like character of Northside Drive conflicts with surrounding areas**

Focus Area: **Northside/Marietta**

- **Realign Northside Drive -** expand northbound lanes & bridge to relocate southbound lanes
- **Redesign Tech Parkway** - to "shrink" roadway and create multi-use trail connecting from "Westside" to Tech Campus
- **New Park at Northside/Marietta** - former Northside southbound lanes
- **8th Street Connection** – new signal at Northside and extension into campus
- **3rd Street Intersection** – realign intersection with 8th Street.
- **Redevelopment Opportunities** – Housing & Campus Facilities

Focus Area: **Westside**

- **Small scale industrial converting to mixed use**
- **Lack of block structure to support redevelopment**
- **Lack of connection to Home Park (Northside Drive barrier)**

Focus Area: **Westside**

- **New Street Framework** – small street & pedestrian connections to break up superblocks
- **Extend Ethel** – connect from Northside to Howell Mill (new signal and extension to Home Park?
- **11th Street Intersection** – realign intersection with Howell Mill
- **Brady Intersection** – realign intersection with Howell Mill
- **Howell Mill Streetscape** – Sidewalk and pedestrian improvements for safety & comfort, lane reconfiguration?
- **Howell Mill/14th Street BeltLine Station**
- **Redevelopment Opportunities** – Live/Work, with employment focus

Focus Area: **Huff Road/West Town**

Focus Area: **Huff Road/West Town**

- **Huff Road BeltLine Station** –
- **Huff Road Street Design** – 3-lane, bike lanes? On-street parking?
- **Elaine Avenue Extension** – connecting through West Town to Howell Mill (bridge over BeltLine & CSX)
- **Elaine/Ellsworth Ind. Intersection** – realign
- **Menlo/Earnest Connection** – new bridge over BeltLine & CSX
- **Howard School/Murray Mill Connection** – New street from Foster to Elaine
- **BeltLine Trail** – park and trail on west & north side of Reservoir w/security & public art installation
- **Redevelopment Opportunities** – Residential, live/work

Focus Area: **Trabert/Waterworks**

Focus Area: **Trabert/Waterworks**

- **Howell Mill BeltLine Station** –
- **Extend Trabert** – to connect Howell Mill to Northside Drive, connecting at Deering Road
- **Deering Road Traffic Calming** – intersection & on-street parking bulb outs
- **BeltLine Trail** – open space and trail along Trabert & along east side of reservoir
- **Berkeley Park Trail** – tunnel under CSX & BeltLine, connects to future neighborhood parks
- **"City View Park"** - new park at Northside and 17th Street
- **Redevelopment Opportunities** – Residential, live/work

Focus Area: **Northside & 75**

Focus Area: **Northside & 75**

- **Northside BeltLine Station** – Locate station east of Northside to be center of redevelopment opportunities
- **Pedestrian Connection Across CSX** – provide ped. Bridge over CSX and BeltLine at station to provide access and connect Loring Heights & Berkeley Park
- **Loring Heights Connection** – Street and/or ped connection at Steele Drive
- **Northside Circle Intersection** – new traffic signal on Northside Drive and street alignment
- **BeltLine Trail** – open space and trail along existing creek with potential to "daylight"
- **Redevelopment Opportunities** – New office (with I-75 orientation) and residential

Focus Area: **Atlantic Station**

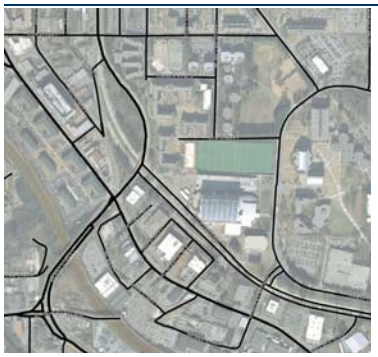
Focus Area: **Atlantic Station**

- **Atlantic BeltLine Station** – Locate station at south end of Target with pedestrian bridge
- **Station Park Opportunity** – new park at Mecaslin & Bishop adjacent to potential station
- **BeltLine Spur Trail** – trail connection from Northside to Bishop & along NS to Deering Road
- **Street Framework** – extend Flynn, Center & Tumlin from 14th to 16th Street.
- **Redevelopment Opportunities** – Live/work and residential (Bishop) High intensity mixed use (17th & Northside) Office & Residential (14th Street)

Concept Review & Discussion:

- Review maps
- Comment cards
- Post it notes - comment & place on maps
- One-on-one discussion with Team members

Focus Area: **Northside/Marietta**



Context

- **Lack of connection between GA Tech and "Westside"**
- **GA Tech desire to eliminate, repurpose Tech Parkway**
- **Northside Drive is a pedestrian & vehicular barrier**
- **Freeway-like character of Northside Drive conflicts with surrounding areas**

Focus Area: **Northside/Marietta**

Proposed Street Framework

- **Realign Northside Drive -** expand northbound lanes & bridge to relocate southbound lanes
- **Redesign Tech Parkway** - to "shrink" roadway and create multi-use trail connecting from "Westside" to Tech Campus
- **New Park at Northside/Marietta -** former Northside southbound lanes
- **8th Street Connection** – new signal at Northside and extension into campus
- **3rd Street Intersection** – realign intersection with 8th Street.
- **Redevelopment Opportunities** – Housing & Campus Facilities

Focus Area: **Northside/Marietta**

City of Atlanta Future Land Use

- **Notes**– notes

Focus Area: **Northside/Marietta**

Proposed Future Land Use

- **Notes**– notes

Focus Area: **Westside**

Context

- **Lack of connection between GA Tech and "Westside"**
- **GA Tech desire to eliminate, repurpose Tech Parkway**
- **Northside Drive is a pedestrian & vehicular barrier**
- **Freeway-like character of Northside Drive conflicts with surrounding areas**

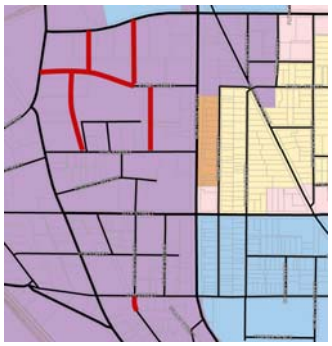
Focus Area: **Westside**

Proposed Street Framework

small street & pedestrian connections to break up superblocks

- **Extend Ethel –** connect from Northside to Howell Mill (new signal and extension to Home Park?
- **11th Street Intersection** – realign intersection with Howell Mill
- **Brady Intersection** – realign intersection with Howell Mill
- **Howell Mill Streetscape** – Sidewalk and pedestrian improvements for safety & comfort, lane reconfiguration?
- **Howell Mill/14th Street BeltLine Station**
- **Redevelopment Opportunities** – Live/Work, with employment focus

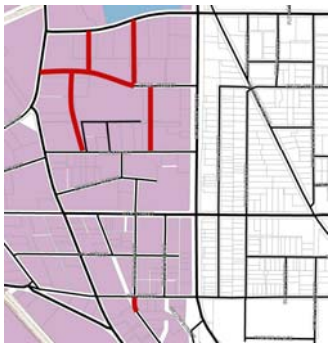
Focus Area: **Westside**



City of Atlanta Future Land Use

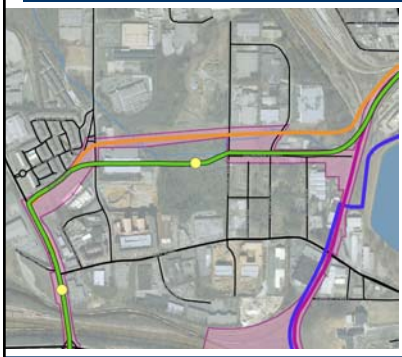
- **Notes**– notes

Focus Area: **Westside**



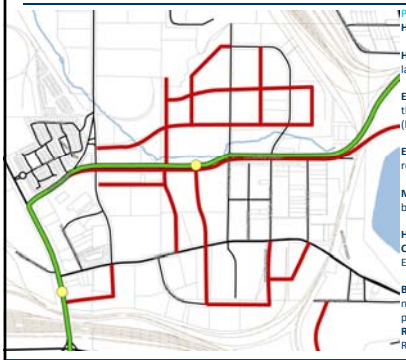
Proposed Future Land Use
- **Notes**– notes

Focus Area: **Huff Road/West Town**



Context
- **notes**

Focus Area: **Huff Road/West Town**



Proposed Street Framework

Huff Road BeltLine Station –

Huff Road Street Design – 3-lane, bike lanes? On-street parking?

Elaine Avenue Extension – connecting through West Town to Howell Mill (bridge over BeltLine & CSX)

Elaine/Ellsworth Ind. Intersection – realign

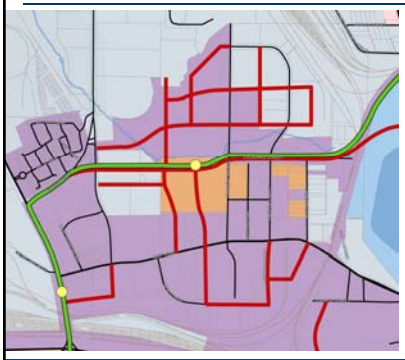
Menlo/Earnest Connection – new bridge over BeltLine & CSX

Howard School/Murray Mill Connection – New street from Foster to Elaine

BeltLine Trail – park and trail on west & north side of Reservoir w/security & public art installation

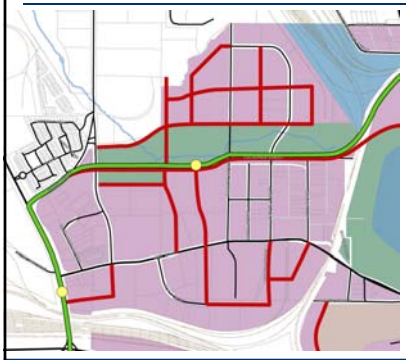
Redevelopment Opportunities – Residential, live/work

Focus Area: **Huff Road/West Town**



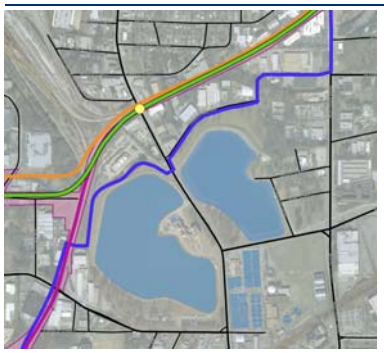
City of Atlanta Future Land Use
- **Notes**– notes

Focus Area: **Huff Road/West Town**



Proposed Future Land Use
- **Notes**– notes

Focus Area: **Trabert/Waterworks**



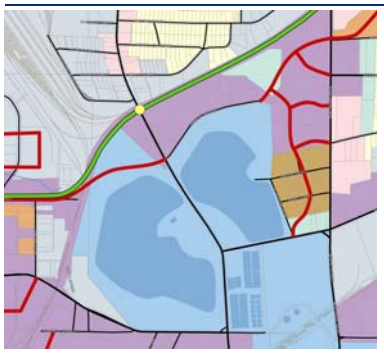
Context
- **notes**

Focus Area: **Trabert/Waterworks**

Proposed Street Framework

- **Howell Mill BeltLine Station** –
- **Extend Trabert –** to connect Howell Mill to Northside Drive, connecting at Deering Road
- **Deering Road Traffic Calming –** intersection & on-street parking bulb outs
- **BeltLine Trail –** open space and trail along Trabert & along east side of reservoir
- **Berkeley Park Trail –** tunnel under CSX & BeltLine, connects to future neighborhood parks
- **"City View Park"** - new park at Northside and 17th Street
- **Redevelopment Opportunities –** Residential, live/work

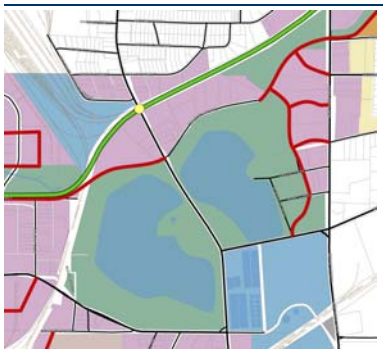
Focus Area: **Trabert/Waterworks**



City of Atlanta Future Land Use

- **Notes**– notes

Focus Area: **Trabert/Waterworks**



Proposed Future Land Use

- **Notes**– notes

Focus Area: **Northside & 75**

Context

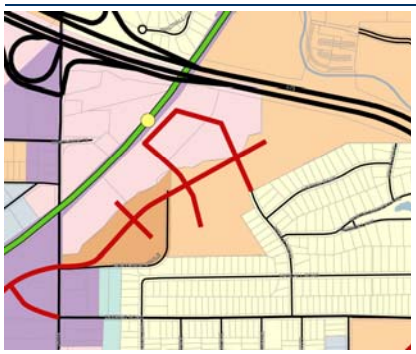
- **notes**

Focus Area: **Northside & 75**

Proposed Street Framework

- **Northside BeltLine Station** – Locate station east of Northside to be center of redevelopment opportunities
- **Pedestrian Connection Across CSX –** provide ped. Bridge over CSX and BeltLine at station to provide access and connect Loring Heights & Berkeley Park
- **Loring Heights Connection** – Street and/or ped connection at Steele Drive
- **Northside Circle Intersection –** new traffic signal on Northside Drive and street alignment
- **BeltLine Trail –** open space

Focus Area: **Northside & 75**



City of Atlanta Future Land Use

- **Notes**– notes

Focus Area: **Northside & 75**

Proposed Future Land Use

- **Notes**– notes

Atlanta BeltLine Subarea 8

Meeting Summary

Atlanta BeltLine Master Plan for Subarea 8: Draft Design Concepts Presentation

Location: Piedmont Hospital, Classroom 7

Date: Thursday, August 25, 2011

Agenda

1. Welcome & Introduction
2. Atlanta BeltLine Update
3. Review of Design Concepts
4. Presentation of Draft Land Use and Street Framework
5. Table Discussion

Handouts

1. Agenda
2. Atlanta BeltLine Corridor Environmental Study Fact Sheet

Consultant Team Attendees

1. Ed McKinney, AECOM Design + Planning
2. Addie Weber, AECOM Design + Planning

Summary

The purpose of this meeting was to present where we are today with the Atlanta BeltLine EIS and review the draft design concepts of Subarea 8 produced during the Design Workshop on April 27-29, 2010. The presentation included a status of the Atlanta BeltLine EIS which included the preferred transit alternative, brief review of key design concept drivers and a draft land use and street framework plan. After the presentation, AECOM and ABI walked the group through a table session to informally discuss the concepts.

Meeting Items

Item 1: EIS Process Update

Jonathan Lewis of Atlanta BeltLine, Inc and the City of Atlanta Office of Planning gave an update as to the overall progress of the Environmental Impact Statement (EIS). Mr. Lewis gave an overview of the EIS process and the proposed transit and trail alignments that were analyzed in the study area.

Questions/comments regarding the EIS Process Update:
(consultant team responses are included in *italics*)

1. Who scored the proposed alignments?
   The consulting team of AECOM developed a set of criteria to evaluate potential environmental effects on resources. The criteria was approved by the Federal Transit Administration (FTA), the Metropolitan Atlanta Rapid Transit Authority (MARTA) and Atlanta BeltLine, Inc.
2. Is development progressing on the Brock property?
   Development is currently stalled.
3. What type of vehicle technology are they looking at for the transit corridor? And will it run in the street or within dedicated right-of-way?
   The transit vehicles will run both in the street and within dedicated right-of-way. The vehicle is a contemporary streetcar with overhead power.
4. Where does the proposed Cobb County Light Rail Transit travel?
   Currently the Cobb County LRT is planned to run from the Arts Center MARTA Station to Cobb Galleria and then, eventually, on to northern Cobb County. It is currently planned to travel from Arts Center along 17th Street then north either along Northside Drive or Howell mill Road. The LRT will then travel north along Interstate 75, Marietta Boulevard, or adjacent to the railroad.

Item 2: Review of Design Concepts

Ed McKinney of AECOM Design + Planning reviewed the draft design concepts and key design drivers for the six focus areas. The information reviewed included the following:

- Industrial Preservation Policy
- Related Transportation Studies
- Related Area Plans
- EIS Trail Alignments
- Overall Connectivity

Questions/comments regarding the review of dsign concepts:

1. What will the impact of Cobb County LRT on the design concepts?
   The City is waiting to see if funding is approved and which alignment they select before formally developing station area plans.

Item 3: Presentation of Draft Land Use and Street Framework

Mr. McKinney presented the current adopted City of Atlanta future land use plan and a draft Atlanta BeltLine future land use and street framework plan. In general, the plan:

- Solidifies the City of Atlanta's mixed-use policy along Huff Road and Northside Drive.
- Encourages redevelopment south of Berkeley Park into lower intensity mixed-use.
- Encourages redevelopment north of Loring Heights into a mixed-use/residential development.
- Provides open space connections through the Waterworks site.

Mr. Lewis continued the discussion about the Atlanta Waterworks site and public access to the site. Lewis stated that ABI supports park access that includes a trail on the Waterworks site. It was noted that the development of the Atlanta BeltLine transit and trail alignment is not dependent on Waterworks access.

Questions/comments regarding the Draft Land Use and Street Framework:

1. Have there been precedents for public access along water works sites?
   Yes, many cities allow public access around water storage. Cities include: Portland, OR, Seattle, WA, Denver, CO, and Cambridge, MA.
2. How will TAD funding be spent in the area?
   The study will conclude with a list of projects and their preliminary costs. Items that could receive TAD funding include bicycle and pedestrian connections, intersection improvement and traffic calming.

<u>Item 4: Table Discussion</u>

Concluding the presentation the committee group members gathered around maps illustrating the proposed Atlanta BeltLine Future Land Use Plan and Street Framework Plan. Mr. McKinney walked through the study area discussing key future land use changes and new network opportunities.

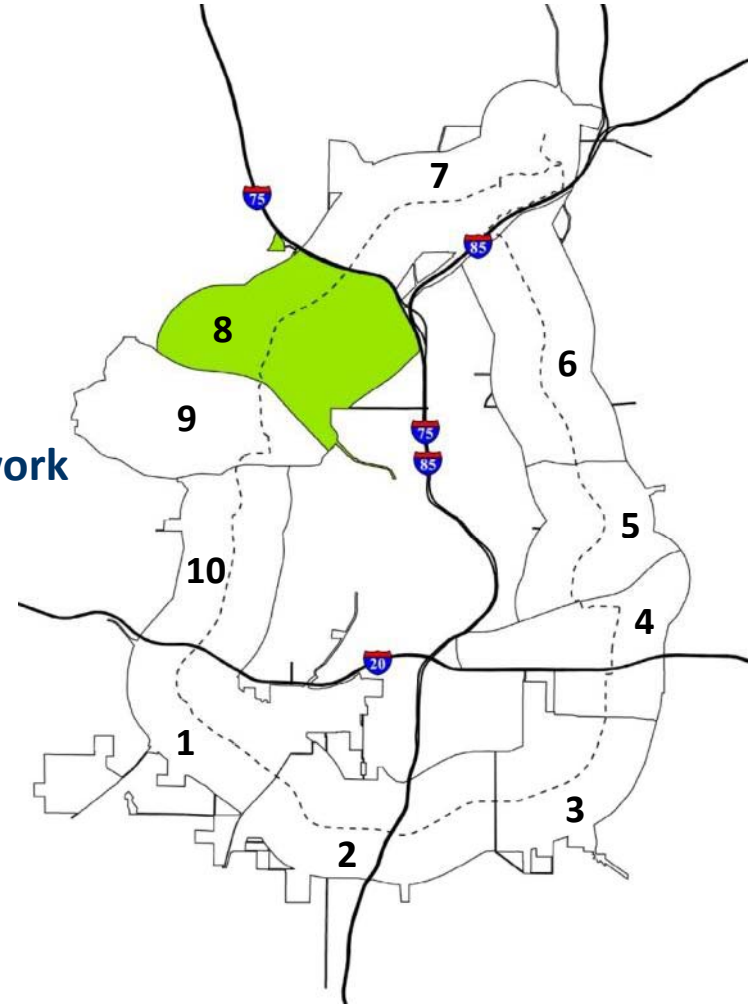
Questions/comments from the table discussion:

1. Berkeley Park recommends the following changes:
   - Change the FLU one parcel west of Northside Drive to Single Family Residential from High Density Residential.
   - Change Proposed Open Space associated with trail under the rail corridor. New owners on the proposed open space property.
   - There are 14 acres along the rail corridor and Defoors that could be a nice park. *This is outside study area.*
   - Complete Chattahoochee Avenue connection.
   - Change Industrial designation to Single Family along Forrest Street.
2. Group discussion about the Marietta/Huff Road station and who it serves since a bulk of the residential/commercial will be served by the station adjacent to the Brock property.
3. The Howard school would still like to see an Edson Drive extension.
4. Consultant team mentioned that there is currently project that would widen Huff to 3 lanes.
5. Comments concerning the Loring Heights area include:
   - No vehicular connections to Loring Heights from the north. *Mr. Lewis mentioned traffic calming along Steele but neighborhood prefers pedestrian and bicycle connections.*
   - Community would like to see lower density residential immediately adjacent to the back of Loring Heights and transition to higher density residential.
   - The neighborhood supports the idea of the extension of Deering Road to Trabert Avenue.
   - Deering Road needs traffic calming similar to Peachtree Hills Ave.

6. Committee wants to encourage Watershed Management to allow access to waterworks site.

Atlanta BeltLine Subarea 8

Draft Concept Presentation



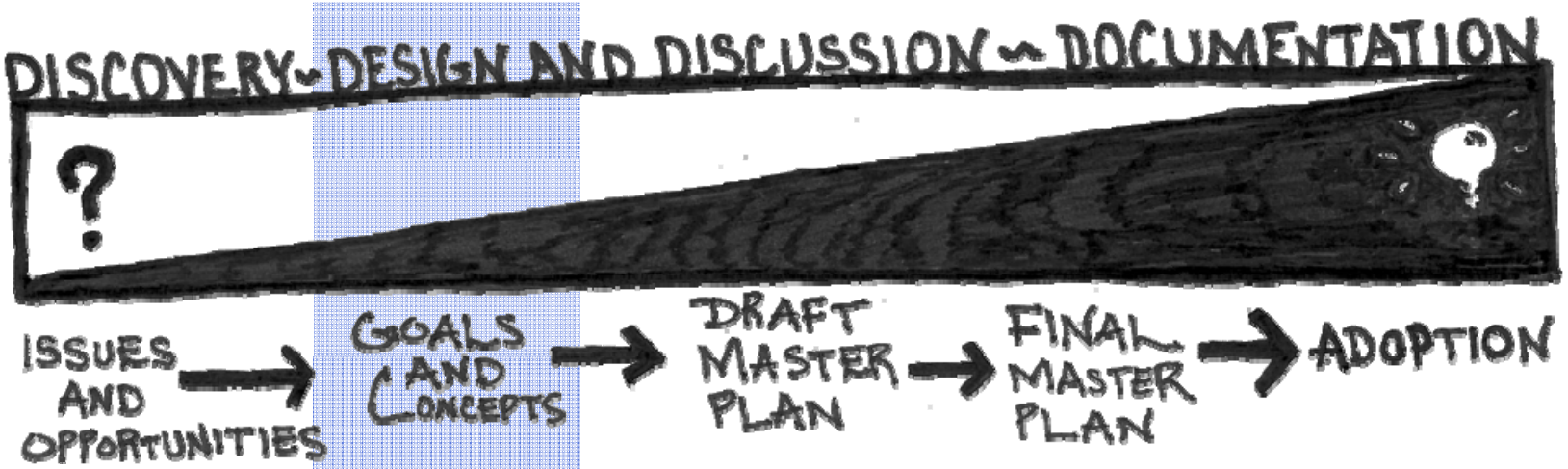
Agenda

- EIS- Where We Are Today
- Review Draft Concepts & Preliminary Framework
- Table Discussion

August 25th, 2011

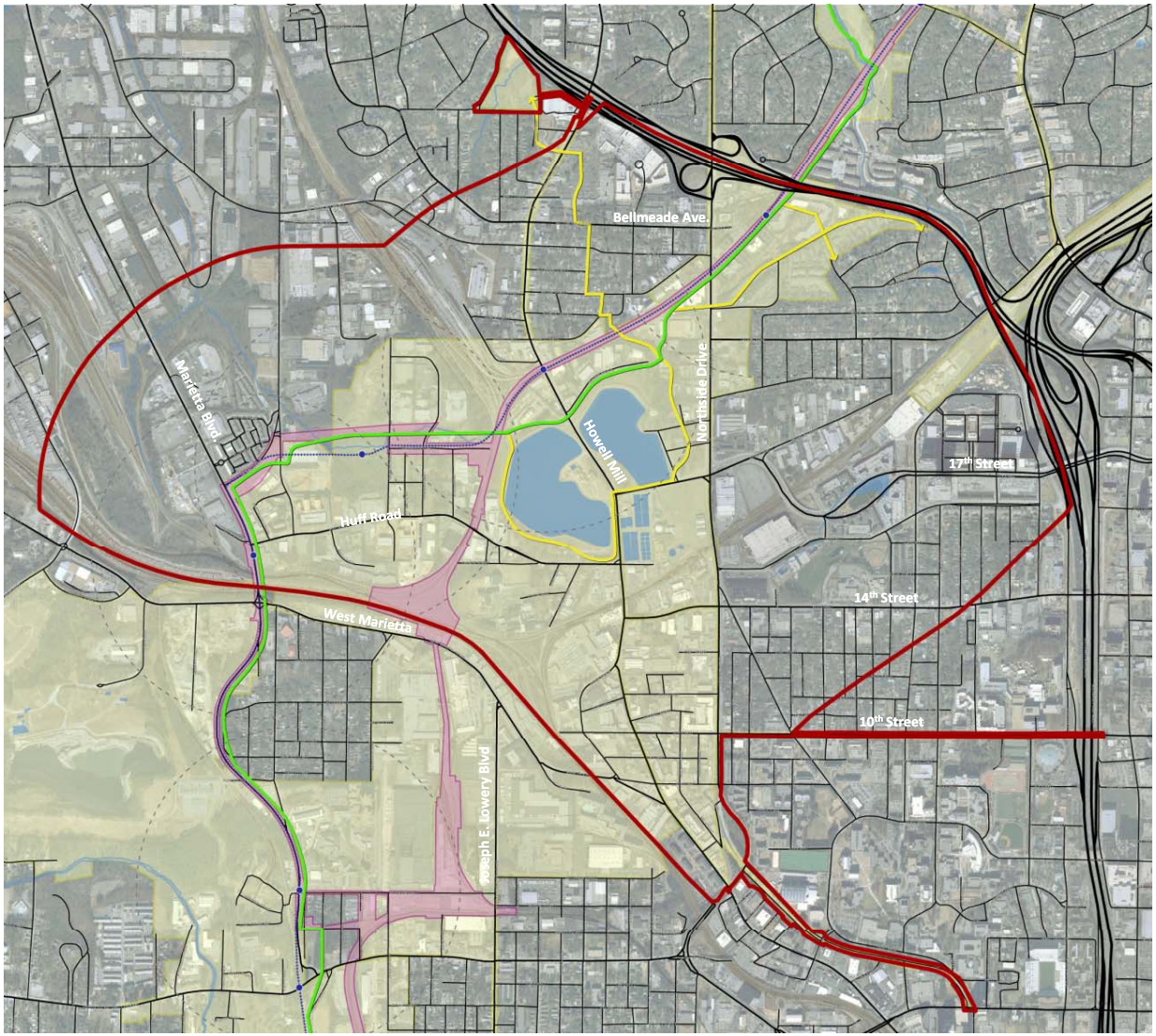
MASTER PLANNING SUBAREA 8

PROCESS & KEY DATES



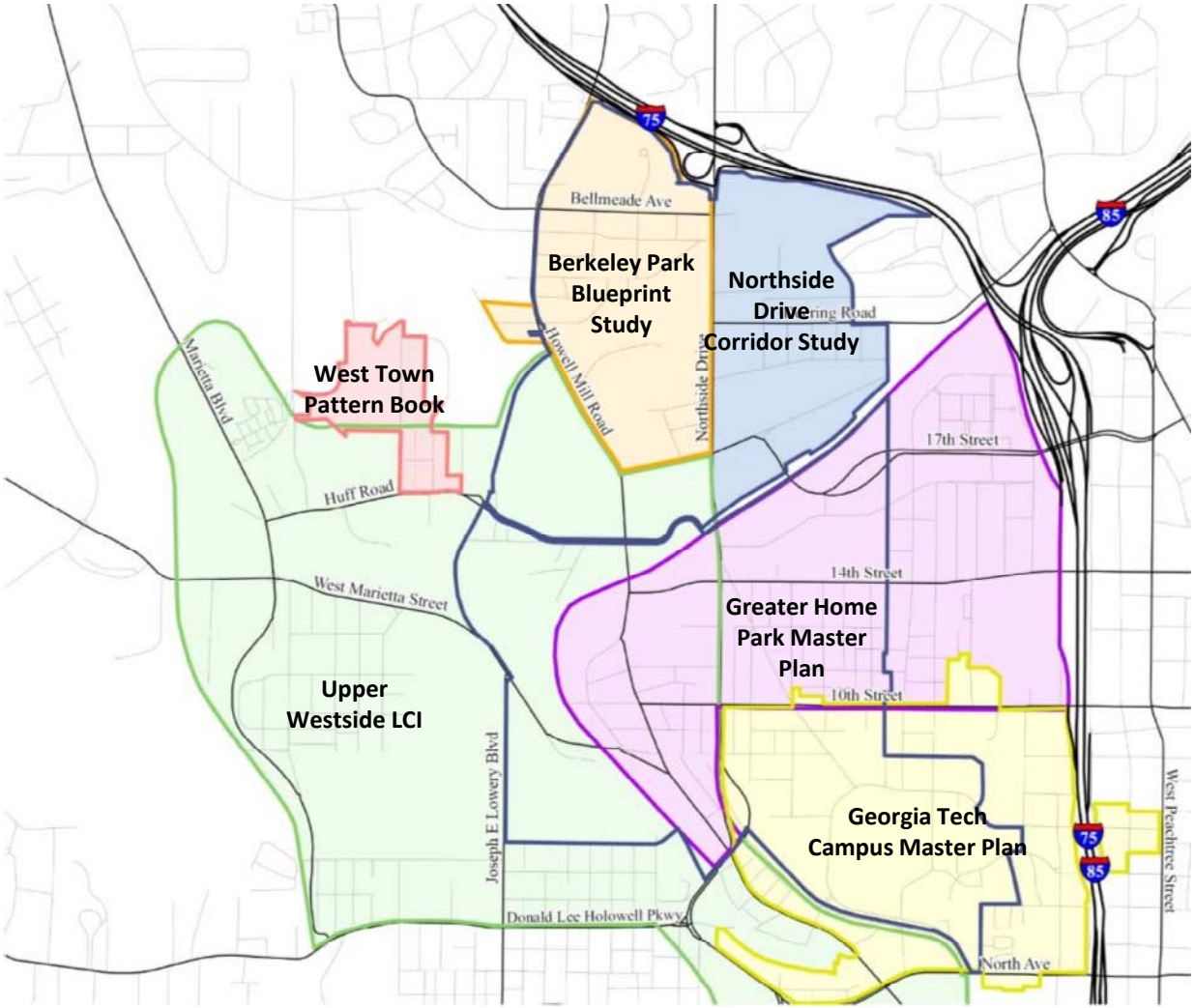
2010	August 25: Planning Committee	October 3: Study Group November 7: Study Group	November-January NPU Meetings	Early 2012
• Review previous studies • Review vision statement and goals • Analyze existing conditions		• Prepare concept plans • Draft plan recommendations • Refine master plan		• Take Master Plans to NPUs and City Council for adoption

Study Area



- Study Area Boundary
- TAD Boundary
- BeltLine Corridor
- Transit Alignment
- Proposed Trail Alignment
- Proposed Spur Trail Alignment

Study Area



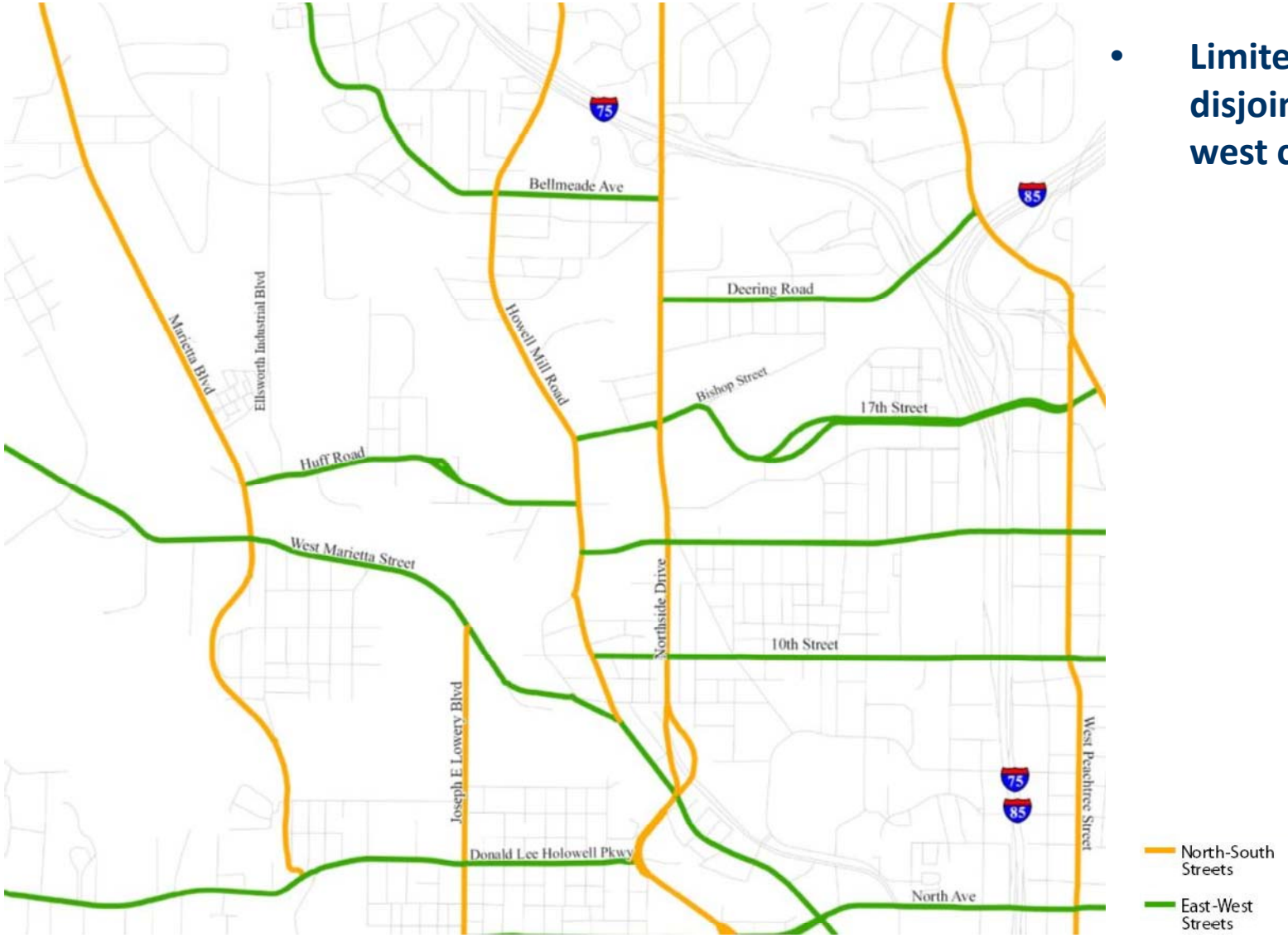
City-Wide Plans

- BeltLine Redevelopment Plan (2005)
- Draft Industrial Preservation Policy (2009)
- BeltLine Environmental Impact Statement (EIS, 2009)
- Connect Atlanta Plan (2008)
- Atlanta's Project Greenspace (2009)
- Comprehensive Development Plan (2007)

Neighborhood Plans & Studies

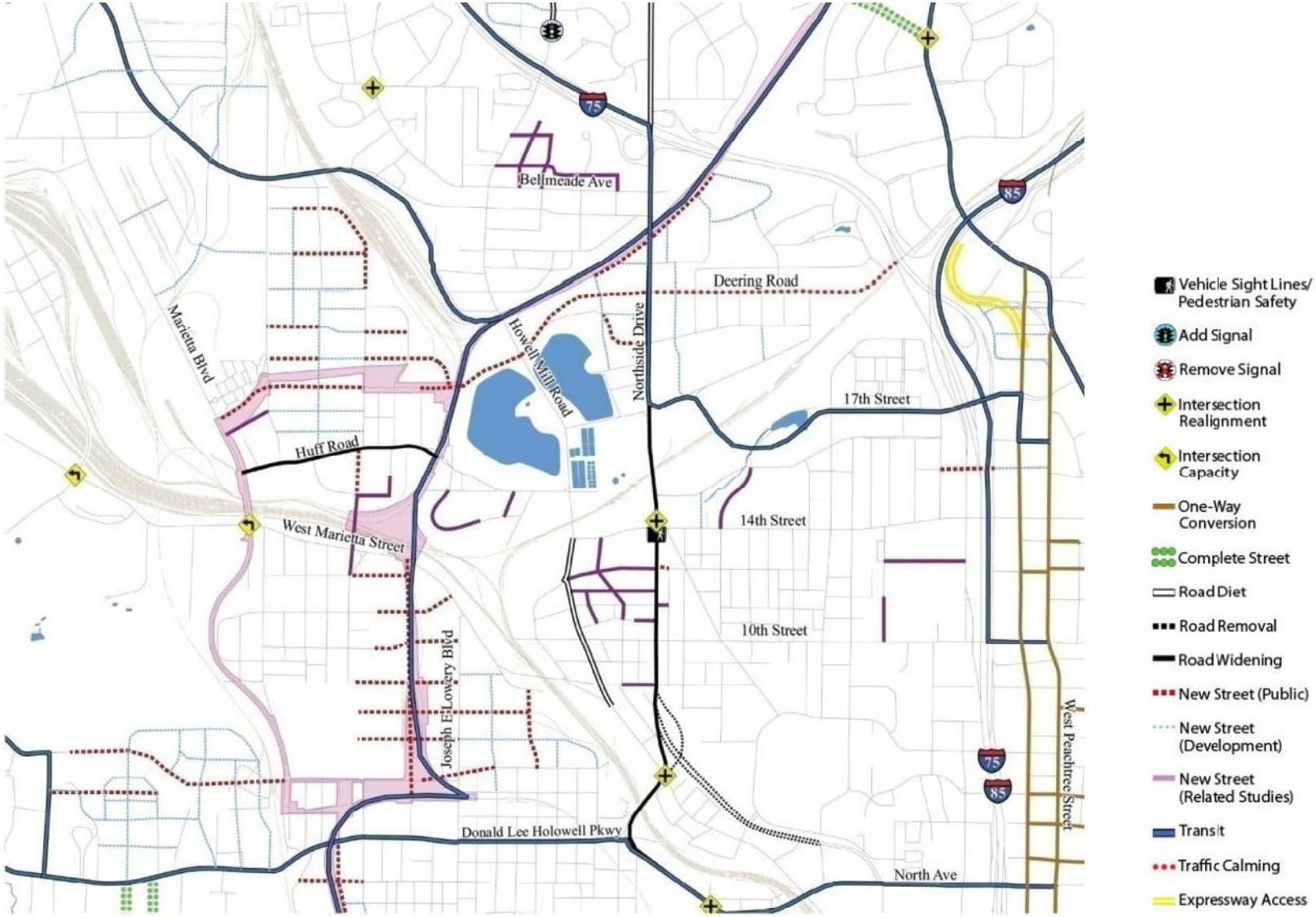
- Northside Drive Corridor Study (2005)
- Upper Westside LCI (2005)
- Georgia Tech Campus Master Plan (2004)
- Berkeley Park Blueprint Study (2004)
- Greater Home Park Master Plan (2002)
- West Town Pattern Book (2007)

Connectivity

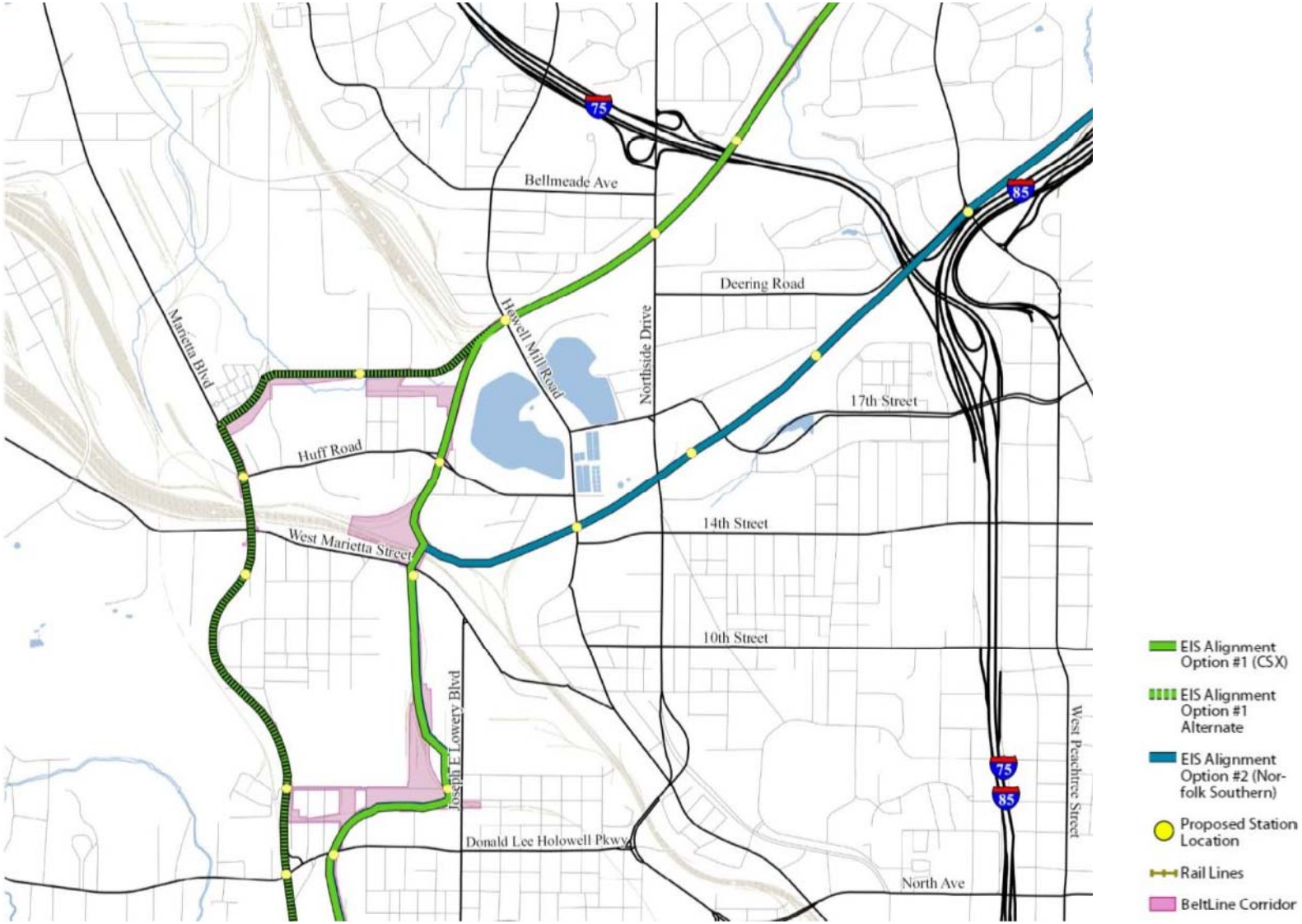


- **Limited, disjointed east-west connectivity**

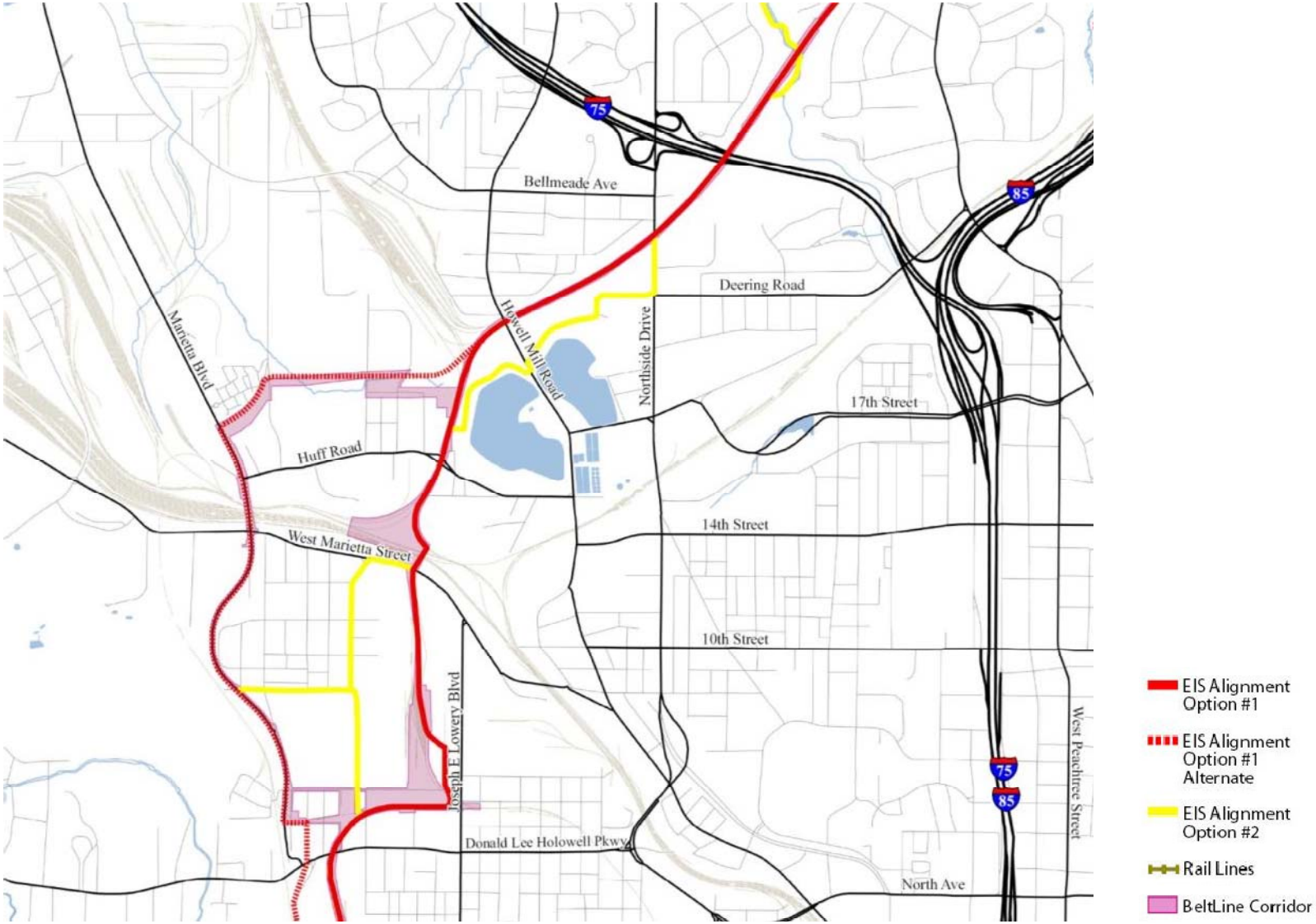
Related Studies: Transportation



Related Studies: EIS Transit Alignment



Related Studies: EIS Trail Alignment



Goals & Objectives

Land Use & Urban Design

- Support redevelopment around future transit stations and in targeted areas of change.
- Promote development densities sufficient to support future transit.
- Establish the character & scale of redevelopment based on context, access & neighborhood adjacency.
- Reconnect transforming industrial areas to surrounding assets (e.g. Georgia Tech, neighborhoods, parks, and trails).
- Include a diversity of employment options by integrating new light industrial and other job-generating activities.

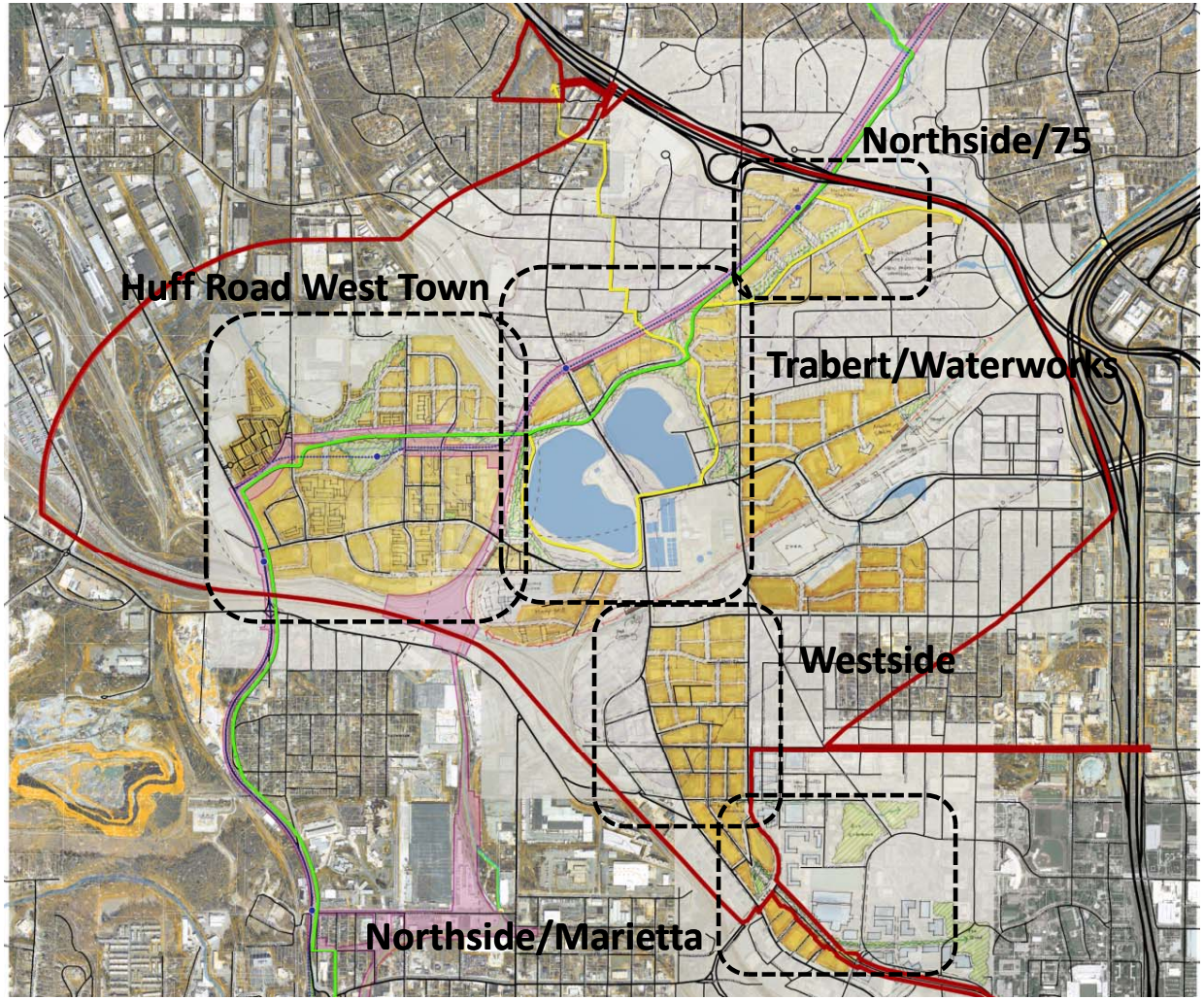
Transportation & Mobility

- Increase east-west connectivity.
- Enhance key streets to promote walkability (former industrial streets).
- Maximize connectivity to the BeltLine trail & transit.
- Implement traffic calming on busy neighborhood streets.
- Structure redevelopment to promote connectivity.
- Minimize, to the extent possible, the impacts of truck activity on residential areas.
- Transform elements of the community that are in physical decline.

Community Character & Greenspace

- Provide identity for the area by celebrating its unique historic character and its role in Atlanta's rail and Civil War history.
- Recognize the industrial roots of the area by promoting industrial materials, scale and character.
- Protect the history, character, scale and intimacy of residential neighborhoods.
- Capitalize on the area's unique open space opportunities (e.g. redevelopment sites and Waterworks).
- Enliven and reinforce the area's identity through public art, cultural art, signs and unifying design themes.
- Maximize accessibility to parks, trails, and open spaces .
- Provide adequate open space through new plazas, parks and greenways, as well as the best use of existing parks and open spaces.

Preliminary Concept Plans

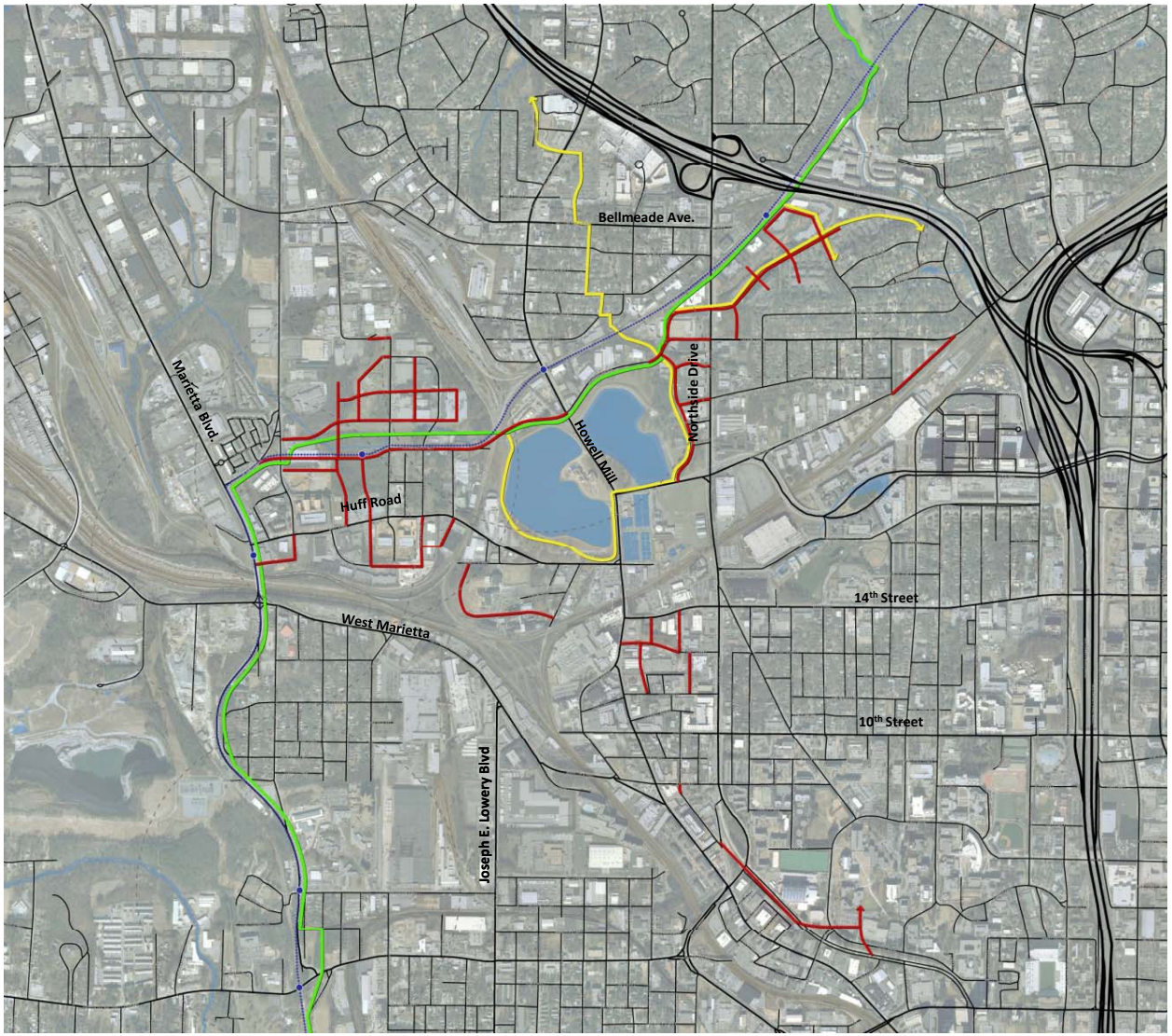


Focus Areas

- **Huff Road and West Town**
- **Northside and I-75**
- **Trabert and Water Works**
- **Westside**
- **Northside and Marietta**

Study Area Boundary
BeltLine Corridor
Transit Alignment
Proposed Trail Alignment
Proposed Spur Trail Alignment

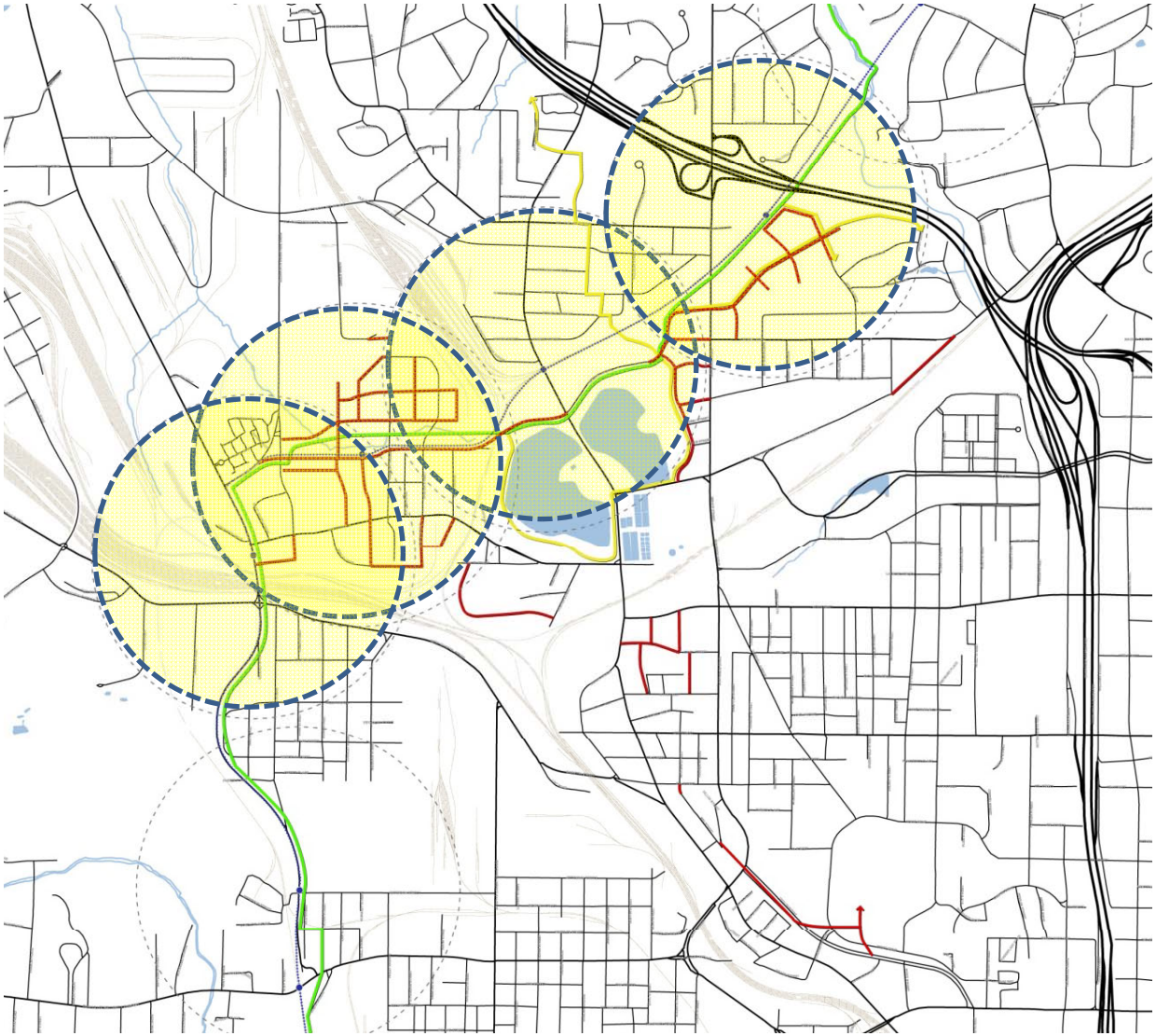
Preliminary Concept Plans



Proposed Street Network

- Transit Alignment
- Proposed Trail Alignment
- Proposed Spur Trail Alignment
- Existing Street Network
- Proposed Street Network

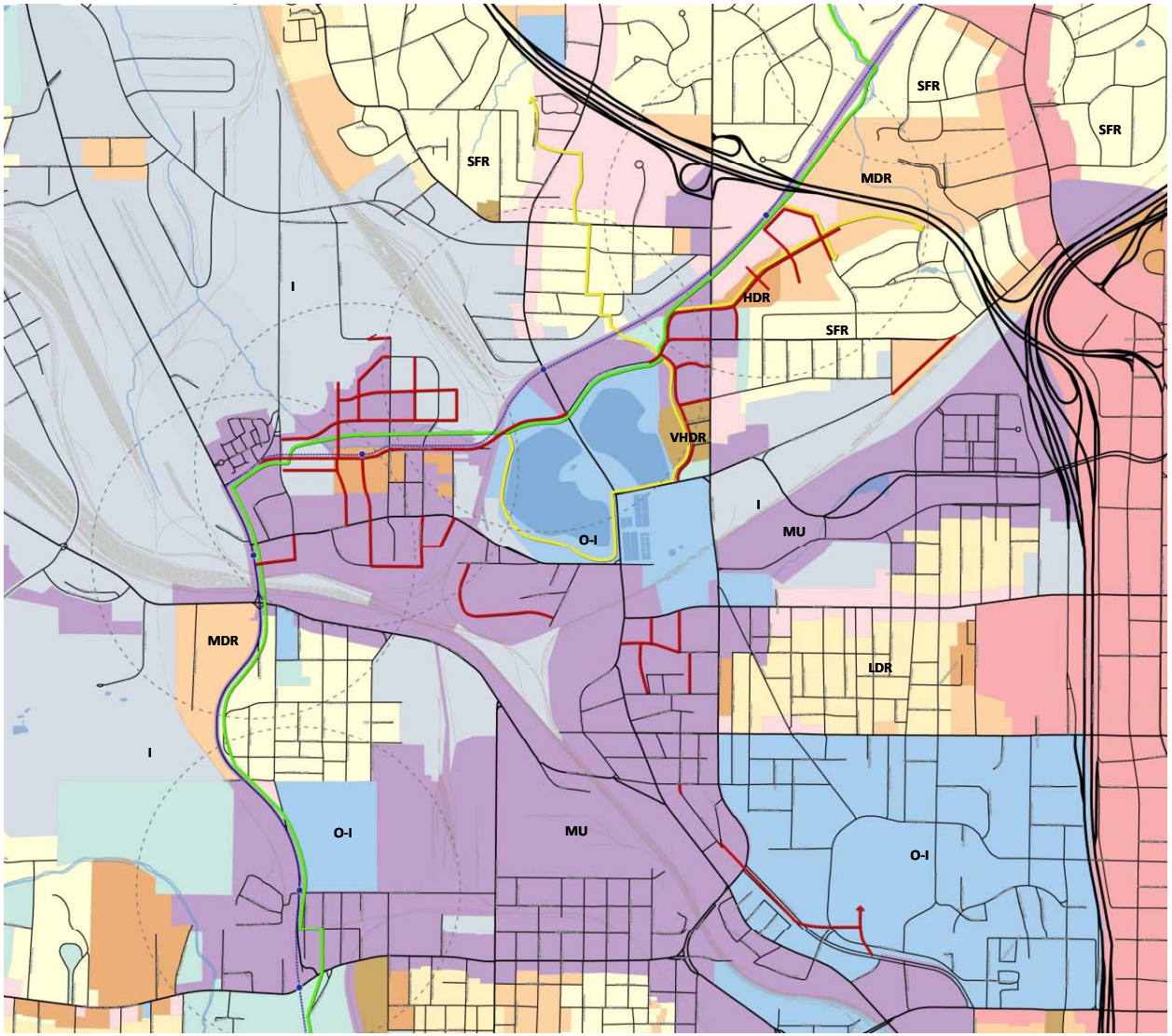
Preliminary Concept Plans



BeltLine Transit

- Transit Alignment
- Proposed Trail Alignment
- Proposed Spur Trail Alignment
- Existing Street Network
- Proposed Street Network

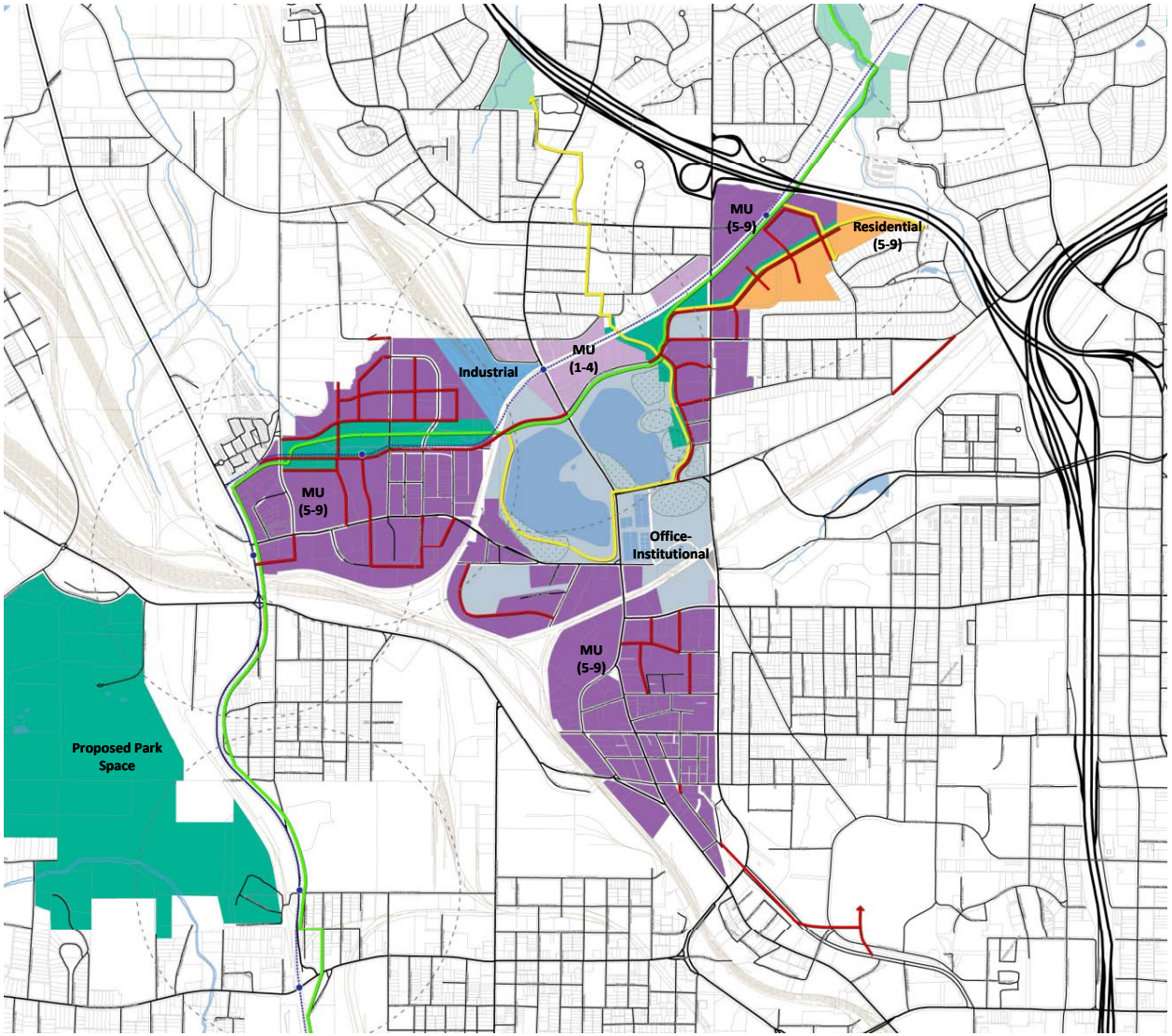
Preliminary Concept Plans



City of Atlanta Future Land Use

- Transit Alignment
- Proposed Trail Alignment
- Proposed Spur Trail Alignment
- Single Family Residential
- Low Density Residential
- Medium Density Residential
- High Density Residential
- Very High Density Residential
- Low Density Commercial
- High Density Commercial
- Mixed Use
- Industrial
- Office/Institutional
- Open Space
- Existing Street Network
- Proposed Street Network

Preliminary Concept Plans



Proposed Future Land Use

- Transit Alignment
- Proposed Trail Alignment
- Proposed Spur Trail Alignment
- Residential (5-9 Levels)
- Mixed Use (1-4 Levels)
- Mixed Use (5-9 Levels)
- Industrial
- Office/Institutional
- Proposed Park Space
- Existing Open Space
- Proposed Public Access Areas
- Existing Street Network
- Proposed Street Network

Table Discussion

Meeting Summary

Atlanta BeltLine Master Plan for Subarea 8: Presentation of Draft Plan

Location: Piedmont Hospital, Classroom 7

Date: Monday, October 3, 2011

Agenda

1. Open House
2. Welcome & Introduction
3. Atlanta BeltLine Update
4. Presentation of Draft Plan
5. Small Group Discussion

Handouts

1. Agenda
2. Atlanta BeltLine Survey

Consultant Team Attendees

1. Ed McKinney, AECOM Design + Planning
2. Addie Weber, AECOM Design + Planning

Summary

The purpose of this meeting was to present the SubArea 8 draft plan. The meeting commenced with a 30-minute open house followed by a PowerPoint presentation. The presentation included an overview of the Atlanta BeltLine, the general background of SubArea 8 and the draft plan. The meeting concluded with a question and answer session followed by informal small group discussions centered on the presentation boards.

Meeting Items

Item 1: Overview of Atlanta BeltLine

Jonathan Lewis of Atlanta BeltLine, Inc and the City of Atlanta Office of Planning gave an overview of the benefits that the Atlanta BeltLine can provide to City residents. These benefits include:

- Parks and Open Space
- Trails
- Transit and Transportation
- Jobs and Economic Development
- Affordable Workforce Housing
- Historic Preservation
- Streetscapes and Public Art
- Environmental Clean-up

Mr. Lewis also presented the vehicle type that BeltLine will likely use for transit. It is similar to the system recently installed in Madrid, Spain. Mr. Lewis concluded his portion of the presentation with an overview of where we are in the process and the date of the next presentation.

Questions/comments regarding the overview of Atlanta BeltLine:
(consultant team responses are included in *italics*)

1. Is there a national example of the proposed transit technology?
   The example presented is the newest technology available and the type of vehicle Atlanta BeltLine is interested in using. Portland has a similar vehicle that can run either in-street or designated right-of-way.
2. What will be the short-term projects for this area?
   This process will uncover projects that can occur over the short-term. The recent construction of Tanyard Creek Trail is an example of a short term project constructed within 2 years of SubArea 7's adopted plan.

Item 2: Overview of Previous Studies

Ed McKinney of AECOM Design + Planning presented an overview of previous studies within the area. The information reviewed included the following:

- Previous City-wide and Neighborhood Plans and Studies
- The Connect Atlanta Transportation Plan
- Preferred EIS Transit Alignment

Questions/comments regarding the overview of previous studies:

1. What impact will the current referendum have on this area?
   Mr. Lewis stated that the referendum does not include anything within this area related to the Atlanta BeltLine. However, it does include funding for the Cobb County LRT which would provide access to MARTA's Art Center Station and the Cobb Galleria area.

Item 3: Presentation of Draft Plan

Mr. McKinney presented the draft plan which divided the Subarea into two key areas: BeltLine Transit Corridor and Westside/Marietta.

- BeltLine Transit Corridor key discussion points:
  - Open Space and Water Works
    - Dialogue with City of Atlanta's Water Works has been initiated to allow public access to the site.

        - Several proposed open spaces are structured around existing stream buffers and power easements.
    - New Streets and Transportation
        - Key public projects include the Trabert Avenue and Deering Road extensions.
        - Potential exists for a Steele Drive connection.
        - Key intersection improvements include Huff and Howell Mill and Deering and Northside Drive.
    - Elaine/Huff Road Station
        - Two possible scenarios for the station location.
        - New development would include a mix of uses with a residential focus.
        - Potential for large open space within existing utility easement and stream buffer.
    - Howell Mill Station
        - Passive open space access along Water Works.
        - BeltLine Trail along Trabert extension.
        - New development would include a mix of uses with a residential focus.
    - Northside Station
        - New development adjacent to station would include a mix of office, retail and residential uses.
        - BeltLine Trail would run parallel to creek
        - New development would include a mix of residential developments adjacent to Loring Heights.
- Westside/Marietta key discussion points:
    - Identified key land holdings and their potential to redevelop
    - Identified new street connections and intersection improvements

<u>Item 4: Small Group Discussion</u>

The presentation concluded with an informal question and answer session followed by small group discussions..

Questions/comments from the QA period and small group discussions:

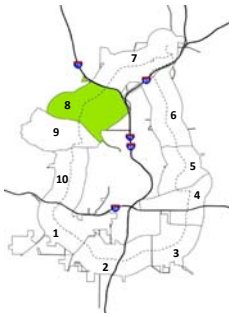
1. How does this process shape development and zoning?
   Once this plan is adopted it will provide the framework for how development will be structured and how development will look.
2. How is zoning affected once the plan is adopted?
   The zoning does not affect residentially zoned properties. Businesses can continue to operate as long as they operate within their zoning designation. The BeltLine will support pro-active rezoning but is no longer designating industrial property non-conforming.
3. How critical is a vehicle connection along Steele Drive for development?
   The connection is not critical. It is the goal of this plan to maximize connectivity throughout the subarea and we'd be remiss if we did not include a connection. This process is tangent to the Loring Height Neighborhood Plan which will also look at the potential to extend Steele Drive through a vehicular or pedestrian connection.

Atlanta BeltLine Subarea 8

Draft Plan Presentation

Agenda

- **Review Draft Plan**
- **Open House Discussion**



October 3, 2011

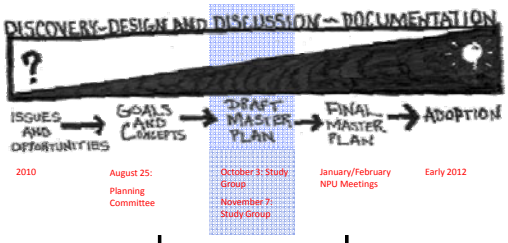
Parks and Arboretum | Trails | Transit & Transportation Infrastructure | Jobs & Economic Development

Affordable Workforce Housing | Historic Preservation | Streetscapes & Public Art | Environmental Clean-up

LIGHT RAIL TRANSIT

MASTER PLANNING SUBAREA 8

PROCESS & KEY DATES



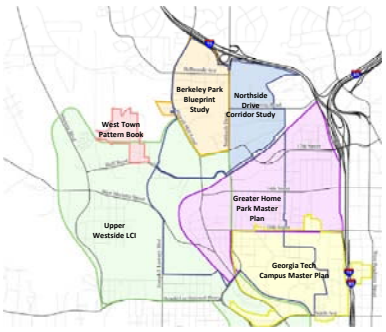
- Review previous studies
- Review vision statement and goals
- Analyze existing conditions

- Prepare concept plans
- Draft plan recommendations
- Refine master plan

- Take Master Plans to NPUs and City Council for adoption

Subarea 8 Study Area

Study Area



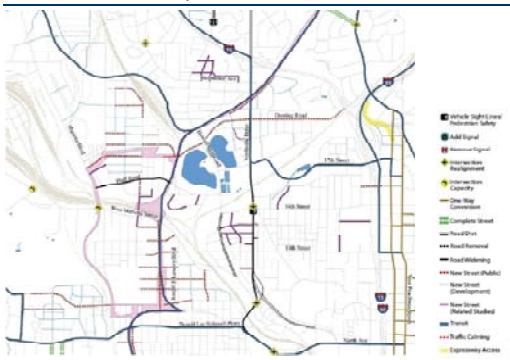
City-Wide Plans

- BeltLine Redevelopment Plan (2005)
- Draft Industrial Preservation Policy (2009)
- BeltLine Environmental Impact Statement (EIS, 2009)
- Connect Atlanta Plan (2008)
- Atlanta's Project Greenspace (2009)
- Comprehensive Development Plan (2007)

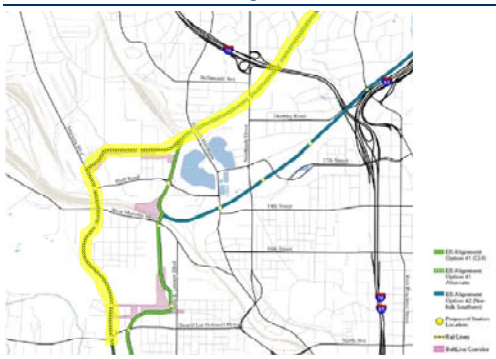
Neighborhood Plans & Studies

- Northside Drive Corridor Study (2005)
- Upper Westside LCI (2005)
- Georgia Tech Campus Master Plan (2004)
- Berkeley Park Blueprint Study (2004)
- Greater Home Park Master Plan (2002)
- West Town Pattern Book (2007)

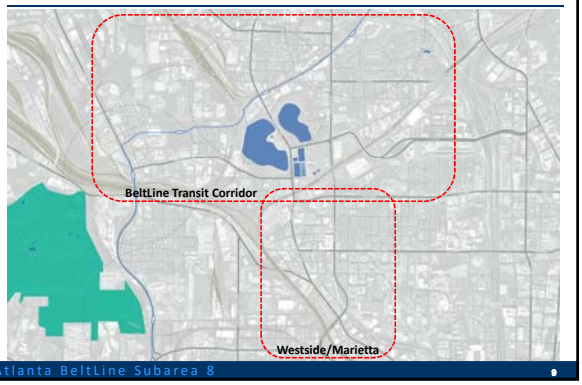
Related Studies: Transportation



Related Studies: EIS Transit Alignment



Illustrative Concept Plan



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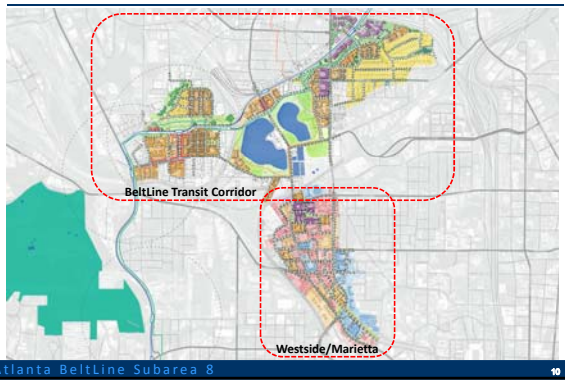
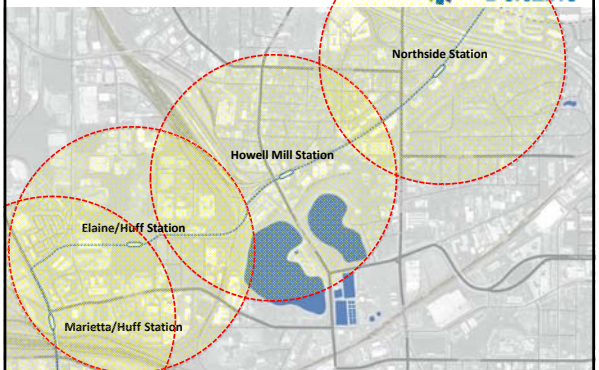


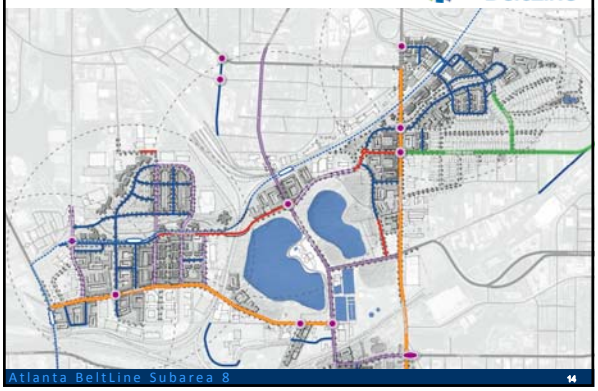
Transit



Illustrative Concept Plan

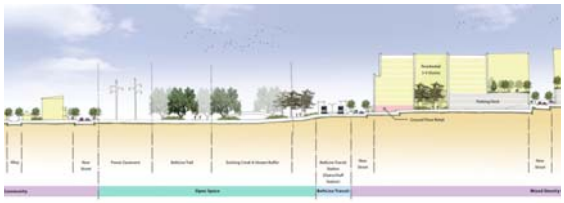
Open Space & Water Works

New Streets & Transportation



Elaine/Huff Station

Elaine/Huff Station



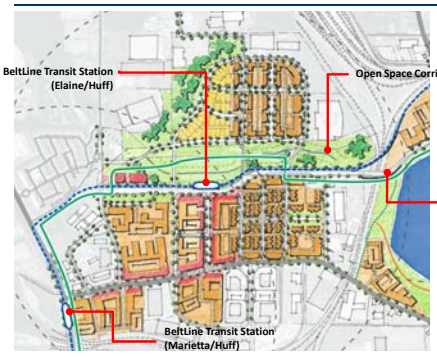
Open Space Corridor

- Existing power easement
- Existing creek
- BeltLine Transit & New street (Elaine/Culpepper)
- BetLine Trail
- Redevelopment fronting on both sides

Mixed Use Development

- Residential focus, with supporting office & retail
- 5-9 stories
- Ground floor retail/activation on key streets

Elaine/Huff Station



Street Framework & Character

Huff Road/Elaine Extension

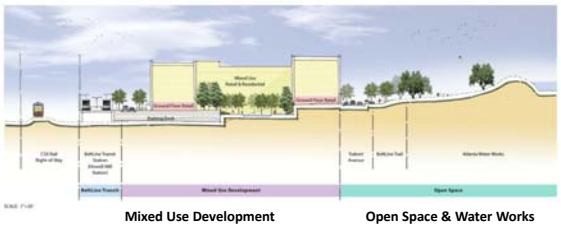
Elaine/Huff Station - Alignment Options:

Option 1: South of Creek
- Puts station closer to Huff Road and redevelopment opportunities

Option 2: Between Easement & Creek
- Potentially minimizes needed ROW
- Puts station in center of open space

Howell Mill Station

Howell Mill Station



Mixed Use Development
- Residential focus, with supporting office & retail
- 5-9 stories
- Ground floor retail/activation on key streets
- BeltLine Transit integrated with development with station at Howell Mill Road

Open Space & Water Works
- Passive open space access along Water Works
- BeltLine Trail along Trabert to Northside
- Pedestrian paths around Water Works to 17th Street

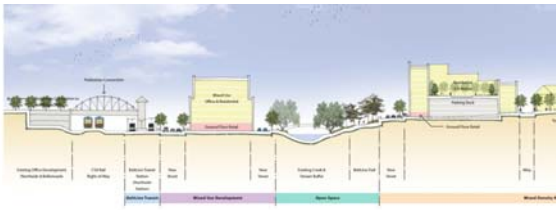
Howell Mill Station

Street Framework & Character

Trabert Extension

Northside Station

Northside Station

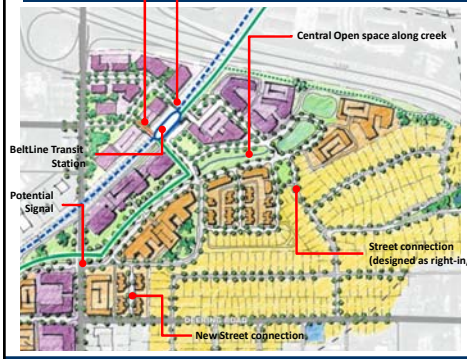


Mixed Use Development
- Mix of new office and residential around future BeltLine Transit Station
- 5-9 stories
- Ground floor retail/activation on key streets
- Pedestrian and vehicular connection over rail ROW to Northside Drive

Open Space
- Focused on existing creek & site stormwater areas
- BeltLine Trail running parallel to creek through center of site

Mixed Density Residential
- Range of residential from single-family to townhome to multifamily
- Max. 5-9 stories with transition from Loring Heights neighborhood
- Ground floor retail/activation on key streets

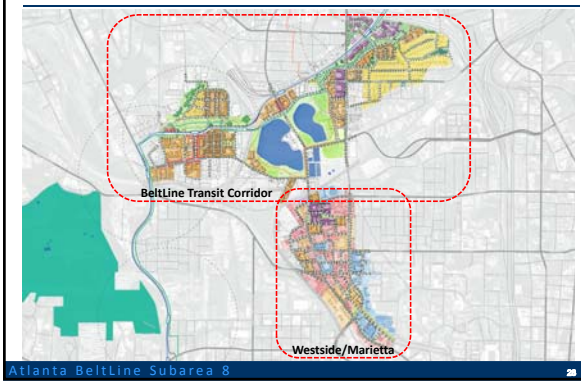
Northside Station



Street Framework & Character

Spine Road along Open Space Corridor

Illustrative Concept Plan



Westside/Marietta

Next Steps

Study Group Meeting (November 7th)
- Refined Land Use Recommendations
- Project Refinement & Definition
- Transportation Analysis
- Public Art Plan
- Historic Resources Plan

Adoption Process
- NPU review & adoption (January/February 2012)
- Final City Council Adoption (March 2012)

Meeting Summary

Atlanta BeltLine Master Plan for Subarea 8: Presentation of Draft Plan

Location: Piedmont Hospital, Classrooms 1 and 2

Date: Monday, November 7, 2011

Agenda

1. Open House
2. Welcome & Introduction
3. Atlanta BeltLine Update
4. Presentation of Draft Plan
5. Small Group Discussion

Handouts

1. Agenda
2. Atlanta BeltLine Survey
3. Comment Cards
4. Flyer

Consultant Team Attendees

1. Ed McKinney, AECOM Design + Planning
2. Addie Weber, AECOM Design + Planning

Summary

The purpose of this meeting was to present the SubArea 8 revised draft plan. The meeting commenced with a 30-minute open house followed by a PowerPoint presentation. The presentation included an overview of the Atlanta BeltLine, the general background of SubArea 8 and the revised plan. The meeting concluded with a question and answer session followed by informal small group discussions centered on the presentation boards.

Meeting Items

Item 1: Open House

The Public Meeting kicked-off with an informal 30-minute open house. Fifteen (15) boards were displayed for the public to view. The consultant team members, along with Jonathan Lewis were available for questions.

Item 2: Overview of BeltLine Activities

Beth McMillan, Director of Community Engagement for the Atlanta BeltLine, Inc, gave an overview of current activities and initiatives within the BeltLine. Ms. McMillan also asked all participants to fill out the BeltLine survey and comment cards.

Item 3: Overview of Atlanta BeltLine

Jonathan Lewis of Atlanta BeltLine, Inc and the City of Atlanta Office of Planning gave an overview of the benefits that the Atlanta BeltLine can provide to City residents. These benefits include:

- Parks and Open Space
- Trails
- Transit and Transportation
- Jobs and Economic Development
- Affordable Workforce Housing
- Historic Preservation
- Streetscapes and Public Art
- Environmental Clean-up

Mr. Lewis also presented the vehicle type that BeltLine will likely use for transit. It is similar to the system recently installed in Madrid, Spain. Mr. Lewis concluded his portion of the presentation with an overview of where we are in the process and the date of the next presentation.

Item 4: Overview of Previous Studies

Ed McKinney of AECOM Design + Planning presented an overview of previous studies within the area. The information reviewed included the following:

- Previous City-wide and Neighborhood Plans and Studies
- The Connect Atlanta Transportation Plan
- Preferred EIS Transit Alignment

Item 5: Revised Draft Plan: Future Land Use

Mr. McKinney presented a draft of future land use and development within the two key subareas: BeltLine Transit Corridor and Westside/Marietta.

- Westside/Marietta key discussion points:
    - Identified key land holdings and their potential to redevelop.
    - Identified new street connections and typologies.
    - Surrender of Atlanta Historical marker provides an opportunity for new park space.
    - BeltLine future land use remains mixed use (5-9 levels) with proposed open space at the historical marker.
- BeltLine Transit key discussion points:
    - Encourage mixed use at proposed station location.
    - Encourage open space along existing stream locations and easements.
    - Elaine/Huff Road Station Area

        - Two possible scenarios for the station location.
        - New development would include a mix of uses with a residential focus.
        - Potential for large open space within existing utility easement and stream buffer.
        - Illustration of potential development along Culpepper.
    - Howell Mill Station Area
        - Passive open space access along Water Works.
        - BeltLine Trail along Trabert extension.
        - New development would include a mix of uses with a residential focus.
        - Illustration of potential development around Howell Mill/Trabert and the Water Works.
    - Northside Station Area
        - New development adjacent to station would include a mix of office, retail and residential uses.
        - BeltLine Trail would run parallel to the existing creek.
        - New development would include a mix of residential developments adjacent to Loring Heights.
        - Illustration of potential development around Northside Station.

<u>Item 6: Revised Draft Plan: Transportation & Mobility</u>

Mr. McKinney presented a draft of the proposed transportation system within Subarea 8. Key discussions included:

- Proposed public and private street connections and their typologies
- Existing major north-south and east-west corridors and intersection pinch-points.
- Identification of proposed transportation projects including;
    - Intersections with added turn lanes
    - Intersections with signal improvements
    - Suggested road widening
    - PM Intersection Delay and Level of Service for existing conditions, 2020, and 2030 along Northside Drive and Howell Mill. 2020 and 2030 scenarios were developed with and without BeltLine.

Questions/comments from the Transportation and Mobility section:

1. Will the Technology Park area have a signal?
   Yes, the analysis included signalization.
2. What are the assumptions for transit's capture?
   The model assumes 30% of estimated traffic will use BeltLine transit.
3. How much traffic was modeled to use Steele?
   None. We assumed the worst-case scenario of Steele not providing a vehicular connection to the site.
4. What are your development assumptions? Are they based on the full build-out outlined in the Future Land Use?
   No, development is based on the market study.
5. Howell Mill has noon rush hour. Was that studied?
   Our analysis pointed to the PM rush hour as the worst-case scenario along the corridor.

<u>Item 7: Revised Draft Plan: Open Space and Cultural Arts</u>

Mr. McKinney presented a draft of the proposed open spaces and cultural arts within Subarea 8. Key discussions included:

- Identification of open space and how it could be defined and structured to include natural habitat, passive and active recreation, and water management.
- Identification of public art opportunities throughout the corridor and how they could be applied.

Item 8: Small Group Discussion

The presentation concluded with an informal question and answer session followed by small group discussions.

Questions/comments from the QA period and small group discussions:

1. In general, several members of the public were happy to see the various public art components.
2. What are your plans for parking at the stations?
   That level of detail will be explored in the next phase. The stations in this area would be bike and walk-up stations.
3. What are your plans for Water Works within the Subarea 8 plan?
   Mr. Lewis stated that the plan shown tonight will likely be the plan illustrated in the final document. It will include caveats to address the sensitivity of the site and agency concerns.
4. Is an at-grade crossing at Howell Mill likely?
   The engineering has yet to determine the feasibility of an at-grade crossing.

Item 9: Comment Cards

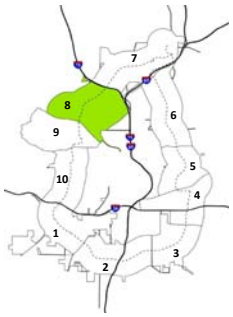
1. Please DO incorporate a spurt trail south of the Water Works to encourage pedestrian access to the trail and stations north on Howell Mill. Great Meeting!
2. Land Use Comments:
   a. LU-13: to be consistent with Northside Drive corridor change to MU-MD
   b. LU-1: check FLU
   c. LU-2: should we mess with this in the middle of Brock's West Town?
   d. LU-6: HDR is preferred-zoned MR5

Atlanta BeltLine Subarea 8

Draft Plan Presentation

Agenda

- **Review Draft Plan**
- **Open House Discussion**



November 7, 2011

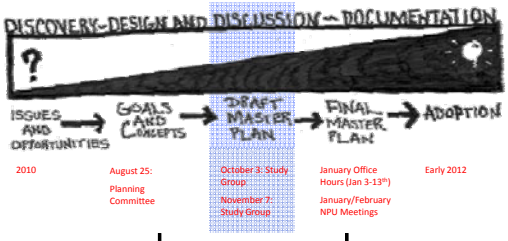
Parks and Arboretum | Trails | Transit & Transportation Infrastructure | Jobs & Economic Development

Affordable Workforce Housing | Historic Preservation | Streetscapes & Public Art | Environmental Clean-up

LIGHT RAIL TRANSIT

MASTER PLANNING SUBAREA 8

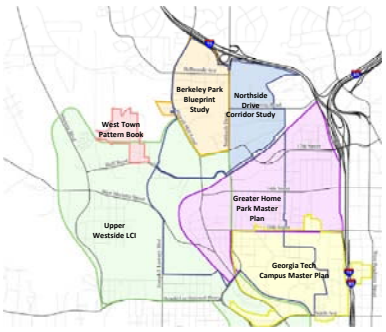
PROCESS & KEY DATES



2010	August 25: Planning Committee	October 3: Study Group November 7: Study Group	January Office Hours (Jan 3-13th) January/February NPU Meetings	Early 2012
• Review previous studies • Review vision statement and goals • Analyze existing conditions		• Prepare concept plans • Draft plan recommendations • Refine master plan	• Take Master Plans to NPUs and City Council for adoption	

Subarea 8 Study Area

Study Area



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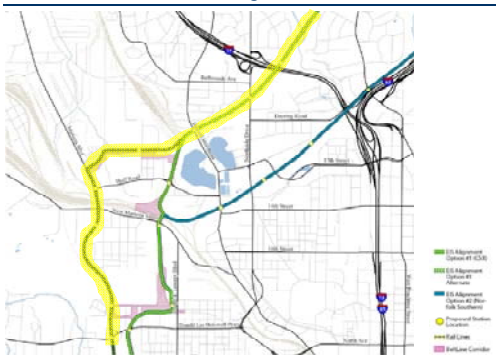
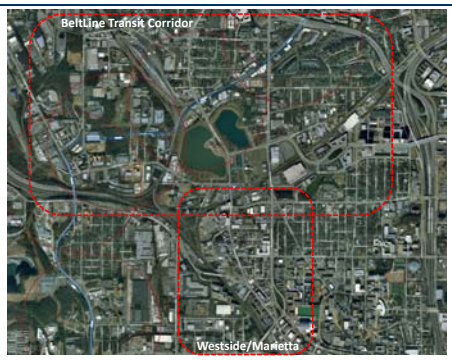
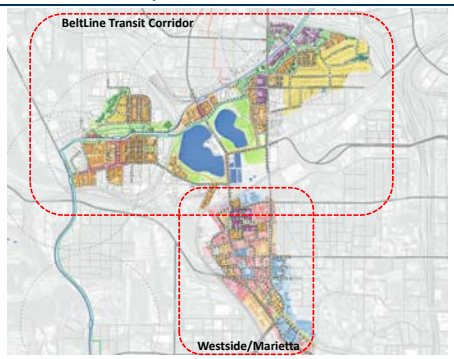
Related Studies: EIS Transit Alignment



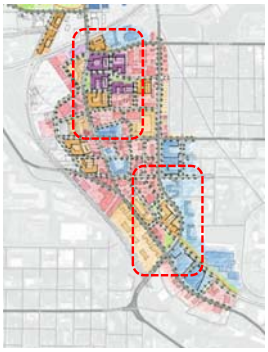
Context



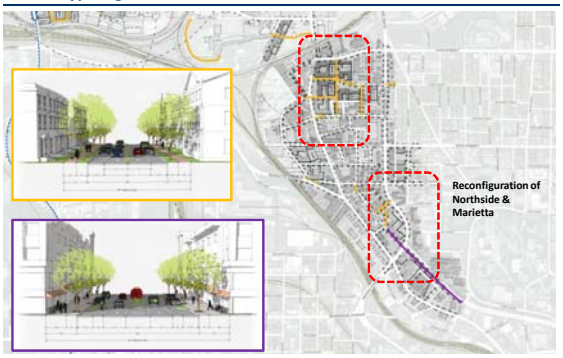
Overall Illustrative Concept



Illustrative Concept: Westside/Marietta



Street Typologies



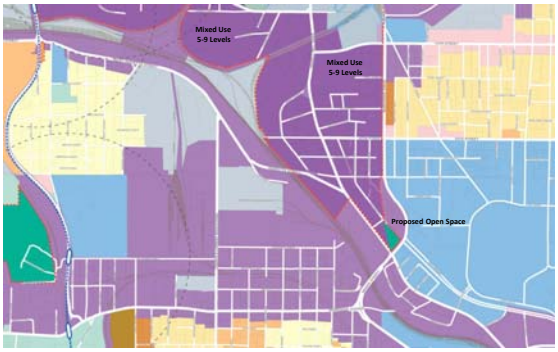
Open Space and Trails: Westside/Marietta

Park Opportunity:

Surrender of Atlanta Historical Marker

Northside & Marietta

Future Land Use: BeltLine



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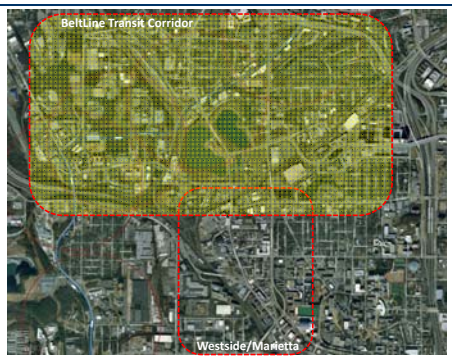
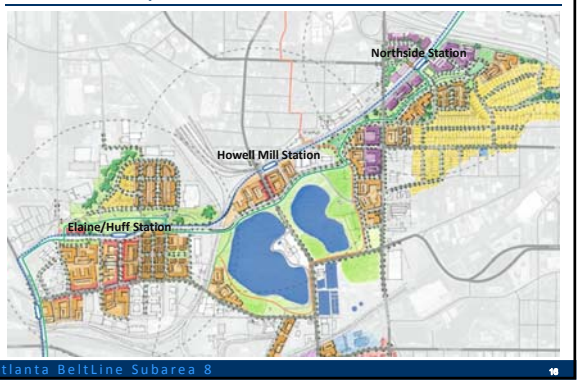
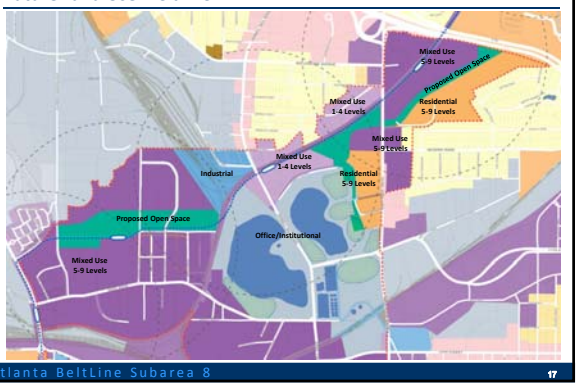


Transit

Illustrative Concept: BeltLine Corridor



Future Land Use: BeltLine



Elaine/Huff Station

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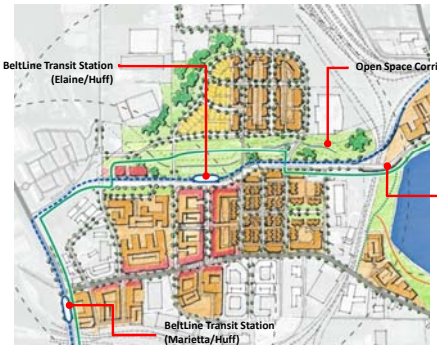

Elaine/Huff Station - Alignment Options:

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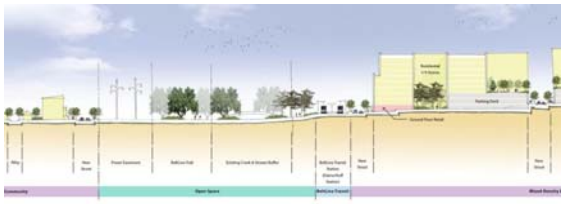
Elaine/Huff Station



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Elaine/Huff Station: Today

Elaine/Huff Station: Phase 1

Elaine/Huff Station : Phase 2

Howell Mill Station

Howell Mill Station

Howell Mill Station

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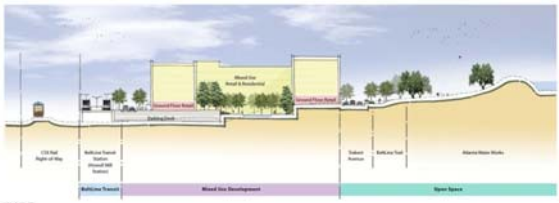

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Open Space & Water Works

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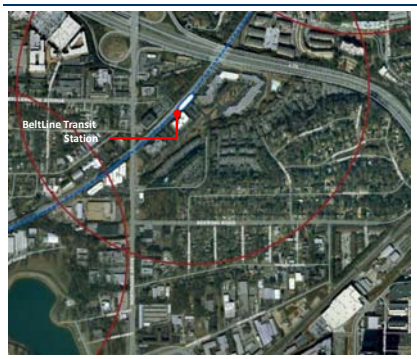
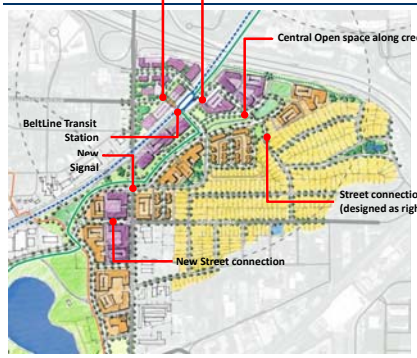
Howell Mill Station: Today

Howell Mill Station : After

Northside Station

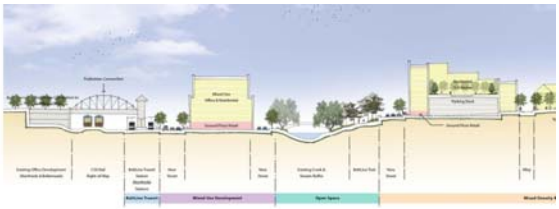


Northside Station



Northside Station

Northside Station



Mixed Use Development
- Mix of new office and residential around future BeltLine Transit Station
- 5-9 stories
- Ground floor retail/activation on key streets
- Pedestrian and vehicular connection over rail ROW to Northside Drive

Open Space
- Focused on existing creek & site stormwater areas
- BeltLine Trail running parallel to creek through center of site

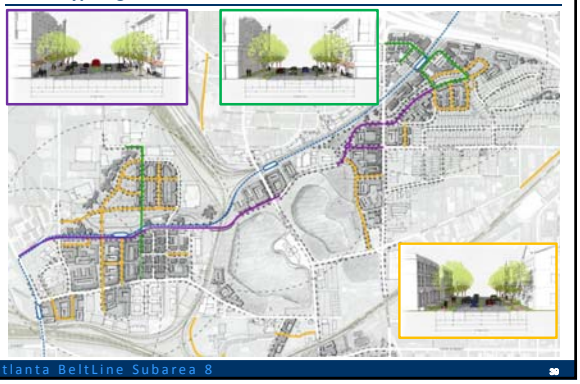
Mixed Density Residential
- Range of residential from single-family to townhome to multifamily
- Max. 5-9 stories with transition from Loring Heights neighborhood
- Ground floor retail/activation on key streets

Northside Station

Transportation & Mobility

Street Connectivity

Street Typologies



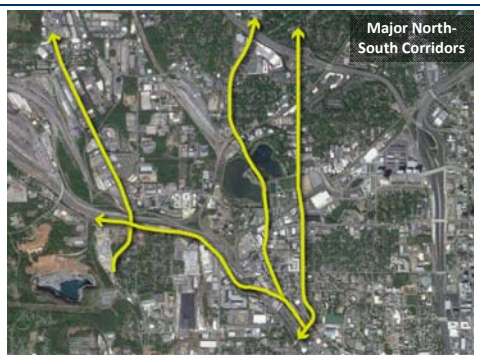
Street Typologies

Street Typologies: Avenue Mixed Use

Street Typologies : Street- Residential

Street Typologies : Avenue Residential

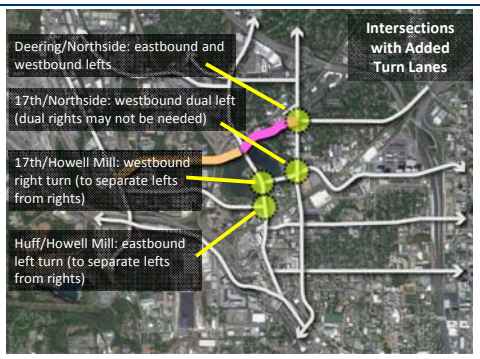
The Subarea 8 Transportation Network



The Subarea 8 Transportation Network

Summary of Transportation Improvements

Summary of Transportation Improvements



Summary of Transportation Improvements

Summary of Transportation Improvements

The Subarea 8 Transportation Analysis

The Northside Corridor

Draft Analysis: (11/7/11)

PM Intersection Average Delay and Level of Service

Intersection	Today	2020, no BeltLine	2020 with BeltLine	2030, no BeltLine	2030 with BeltLine
Bellemeade	23 sec (C)	42 sec (D)	38 sec (D)	23 sec (C)	23 sec (C)
Technology Park	N/A	12 sec (B)	10 sec (B)	11 sec (B)	8 sec (A)
Deering	23 sec (C)	31 sec (C)	38 sec (D)	36 sec (D)	31 sec (C)
17th Street	39 sec (D)	100 sec (F)	90 sec (F)	54 sec (D)	53 sec (D)
14th Street	34 sec (C)	100 sec (F)	101 sec (F)	47 sec (D)	47 sec (D)
10th Street	20 sec (C)	57 sec (E)	57 sec (E)	77 sec (E)	70 sec (E)

The Subarea 8 Transportation Analysis

The Howell Mill Corridor

Draft Analysis: (11/7/11)

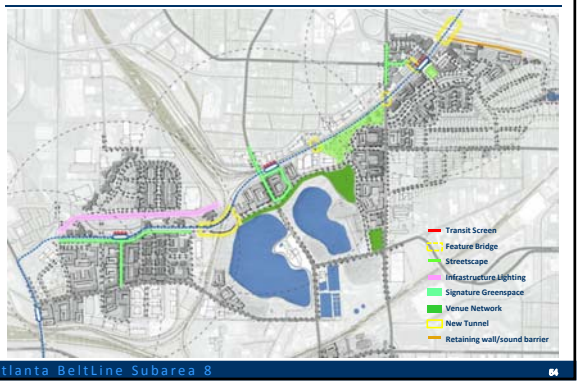
PM Intersection Average Delay and Level of Service

Intersection	Today	2020, no BeltLine	2020 with BeltLine	2030, no BeltLine	2030 with BeltLine
Bellemeade	47 sec (D)	45 sec (D)	46 sec (D)	77 sec (E)	72 sec (E)
Chattahoochee	24 sec (C)	46 sec (D)	27 sec (C)	57 sec (E)	31 sec (C)
Trabert Extension	N/A	5 sec (A)	13 sec (B)	8 sec (A)	16 sec (B)
17th Street	17 sec (B)	24 sec (C)	19 sec (B)	24 sec (C)	23 sec (C)
Huff Road	26 sec (C)	35 sec (D)	28 sec (C)	41 sec (D)	35 sec (D)
14th Street	28 sec (C)	40 sec (D)	36 sec (D)	54 sec (D)	46 sec (D)
10th Street	11 sec (B)	20 sec (C)	11 sec (B)	15 sec (B)	10 sec (B)

Open Space & Cultural Arts

Open Space and Trails: BeltLine Corridor

The Cultural Arts



The Cultural Arts

Signature Green Spaces & Art Venues

The Cultural Arts

Feature Bridges

The Cultural Arts

Lighting

Elaine/Huff Station: Phase 1

Elaine/Huff Station: Art Application

Elaine/Huff Station: Art Application

Next Steps

Atlanta BeltLine

Plan Finalization & Adoption Process

- **Office Hours**: January 3-13, 2012
- **NPU review & adoption:** (January/February 2012)
- **Final City Council Adoption:** (March 2012)

Interview Summary

BeltLine Master Plan: Subarea 8 (Upper Westside – Northside)

Jim Martin, NPU D

- Mapped out a way to piece together a bicycle/pedestrian connection between Underwood Hills Park and the Reservoir, utilizes Appletree Street (vacant right-of way behind Piedmont Offic building).
- Neigborhood residential lots peaked around $160K
- Discussed possible park locations:
    - Four SF homes on the CSX line
    - One home and vacant lot at Forest and Antone
    - Apartment complex
    - Back half of DPW property
    - Waterworks park
    - A portion of a redeveloped Kroger site
- Identified the giant curb cut at the apartment complex as a problem
- Need for a defined boundary between the Chattahoochee Industrial area and the Huff Road redevelopment area. Neighborhood has denied past rezoning along Chattahoochee Ave.)
- Open to adaptive rezoning of industrial buildings for residential uses.
- Potential greenspace north of M West to Chattahooche/Ellsworth Industrial intersection. (Westinghouse site, forested, undisturbed portion).
- The Westinghouse property is reportedly contaminated.
- Street Connections 1) Identified potential connection between Hubert and Fairmont, north of Brock site, 2) use of Old Chattahoochee through CSX Transfer site.
- Need to correct the MDR land use change between Holmes, Bellemeade, and Leona. Revert to LDR or SFR.
- Overlay District: boundary needs to be on both sides of Howell Mill Rd.
- Need to reconfigure Howell Mill between Morris and 17th, add left turn at Howell Mill and Bishop/17th.
- Too many curb cuts on Howell Mill Rd.
- Cut-through traffic in Berkeley Park (Bellemeade)
- The “Techtoriums” in the same area are a problem.

David Baycura and Lee Walker, LeCraw

- Downplayed need for street connection from Atlanta Tech Park to Loring Heights as politically infeasible and not helpful.
- Need better access to Northside Drive, especially a signal.
- Thought access across the APS/Selig property was interesting, but a coordination problem.

- Very concerned about the property impacts of the rail and trail along the northwestern edge of their property

Shaun Green and Kieth Wiley, Home Park

- Need to signalize16th and Northside Drive
- Consolidate Hemphill and 14th
- Add signal to 11th and Northside Drive
- Need street grid at SRTA block and Tech Foundation block
    - Shaun to send a street grid concept for the Tech Foundation block
- Support Redevelopment along 14th in Home Park – this would be controversial
    - Questioned intensity due to lot depth
- Support redevelopment in the Hemphill/10th/Northside superblock – this would be controversial
- Support improving turning movements between Home Park and Atlantic Station – this would be controversial
- Raised idea of a design competition for small infill houses with GT COA.
- Neighborhood has been working on an update to SPI – 8
    - Shaun to send latest draft.
- Identified two new needed signals on 14th St
- There is an existing trail connection, compliments of Turner, between 10th and 14th
- Need bike lanes on State St in Home Park

Jo Ann Chitty and Kevin Curry, Selig

- Support redevelopment on Northside and Huff Road
- Have not assembled enough for a sizable redevelopment in either area
- Oppose industrial preservation in Chattahoochee Area
- Huff Road redesign/widening is important
- Huff Road @ Howell Mill intersection is a congestion problem

Angelle Hamilton and _____, Brookwood Neighborhood

- Need to address Amtrak congestion, access, pick-up/drop-off
- Need context-sensitive sidewalk widths with redevelopments
- Brookwood Alliance is working on an SPI district and bluprint-type study

Marifred Cillela, Howard School

- 232 students from 70 zip codes
- Build out of campus plan ➔ 450 students
- They run a “very sophisticated” carpool program
- Want to be an “urban school”, one campus, urban site, where we could grow.

- Site's access to I-75 and downtown employment destinations is why they chose this location.
- Primary concern is security for their property and students
- Would consider a public-access street/lane behind the school along the CSX ROW

Terry Horgan, Berkeley Park

- Traffic congestion is the primary neighborhood concern
- Need for a park
- There is a potential beltline connection under the CSX freight line between howell Mill and Northside Drive
- Selig paid them about $100,000 ➔ money could be leveraged for the creation of a new park or the connection under the ROW.
- There are about 650 SF homes in Berkeley Park
- Howell Mill frontage needs attention.

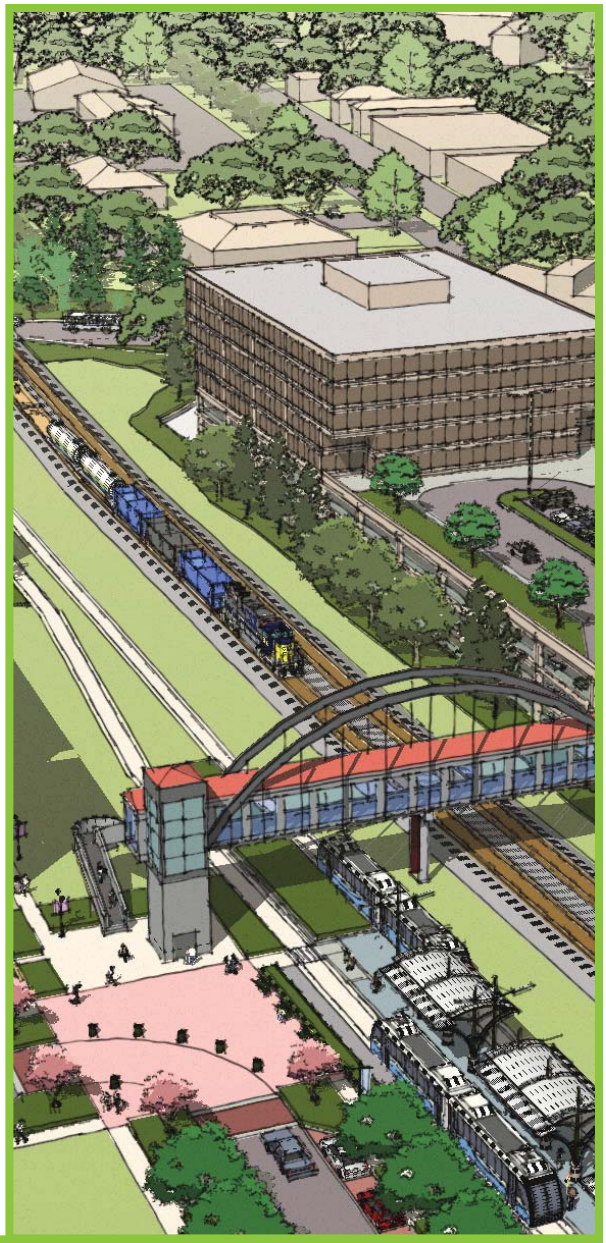
Ron Grunwald, Loring Heights

- Need a neighborhood playground
- Need a solution for the pond during drought
    - Ron to send landscape plan for the park
- Possible hardscape park at the old smelter property, possible ped connection using that property instead of the end of Mecaslin
- Possible park/community pool/day care at the Doors Unlimited property
- Ped access to Atlantic Station
    - Target interrupted
    - Late 2009, AIG agreed to give LH $700,000 in lieu of constructing the access. Overhead access would cost about $1.8M
    - Ron to send design for the bridge
- They are half way through the preparation of their master plan. TSW summary document represents charrette findings
- Steele and Geary could be bike/ped connections
    - Street connections would be vigorously opposed by some neighbors (i.e. hiring lawyers)
- Deering is at about 8800 vpd. It has gone up a lot since Atlantic Station began
- Deering: ~29' of pavement and 50' of ROW
- Need traffic calming on Deering and Trabert
    - How to fund improvements when not in TAD?
- Two other problems on Trabert are event spaces and liquor licenses (closing the street/parking, drinking for events but otherwise illegal)
- Need truck route enforcement or an enforceable truck route plan
- Federal law allows trucks to go from A to B – city's plan apparently is insufficient
- Amtrak traffic is a problem

- LH views the NS alignment as the better option
- Sees the Bishop industrial area as and “orderly transition” of industrial to mixed use.

John Majeroni, Georgia Tech

- Likely sell the softball field and the other building nearby on 14th Street (which they are investing $5M in)
- Likely keep the golf practice field and the building on Northside
- May consider selling or continue assembling at the 14th/howell mill/Northside block
- Would like to reconfigure Tech Parkway and the GT drive and their intersection with Northside, but too expensive (plan to eliminate Tech Parkway and re-front on Marietta Street)
- Planning to front Northside, take down fencing, etc. recognizes need for better gateway/image here
- New focus “area of interest” is Midtown
-



Atlanta BeltLine Master Plan

SUBAREA 8

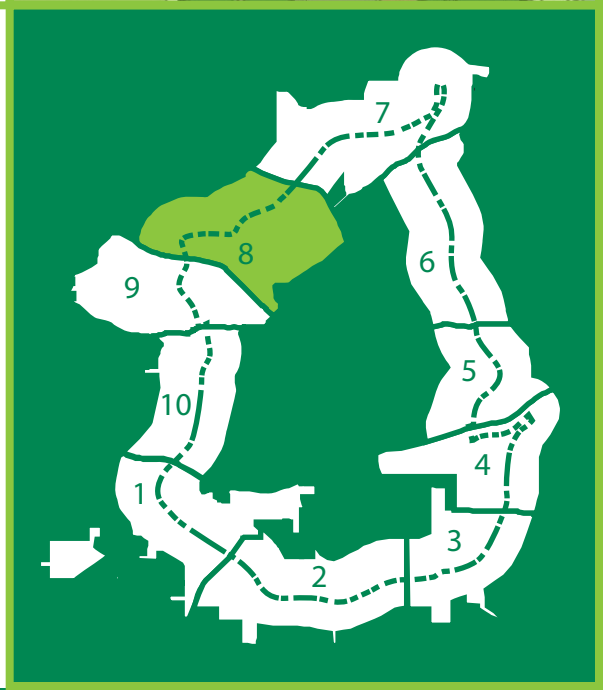
Upper Westside/Northside

TRANSPORTATION ANALYSIS REPORT

Prepared for
Atlanta BeltLine, Inc.
by AECOM

Adopted by
The Atlanta City Council
March 19, 2012

Legislation Number: 12-O-0151/12-O-0150/CDP-12-001



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Appendix A: Traffic Analysis Synchro Reports

1.0 Introduction

This report documents a detailed traffic and transportation analysis performed for Atlanta BeltLine's Subarea 8. It supports the overall recommendations of the Subarea 8 Master Plan and provides descriptions of several transportation project recommendations.

1.1 BeltLine Subarea 8 Overview

The Atlanta BeltLine follows a 22-mile corridor of largely abandoned and underutilized railroad rights-of-way encircling the business districts and neighborhoods of central Atlanta. For community planning purposes, the study area includes all properties within a half-mile distance from the Atlanta BeltLine corridor; this area has been further subdivided into 10 master planning subareas.

Subarea 8 is in the northwestern portion of the Atlanta BeltLine ring and encompasses the Atlanta neighborhoods of Loring Heights, Berkeley Park and Blandtown. It also includes part of the City-designated area for the Home Park neighborhood, although the portion of this neighborhood within Subarea 8 (west of Northside Drive) is popularly known by a variety of other names based on recent residential and retail development and is not always associated with the predominantly single-family residential character of the eastern portion of Home Park. Aside from the designated neighborhoods, a large portion of the land in Subarea 8 features industrial and commercial uses, with many modern businesses occupying buildings featuring formerly industrial uses.

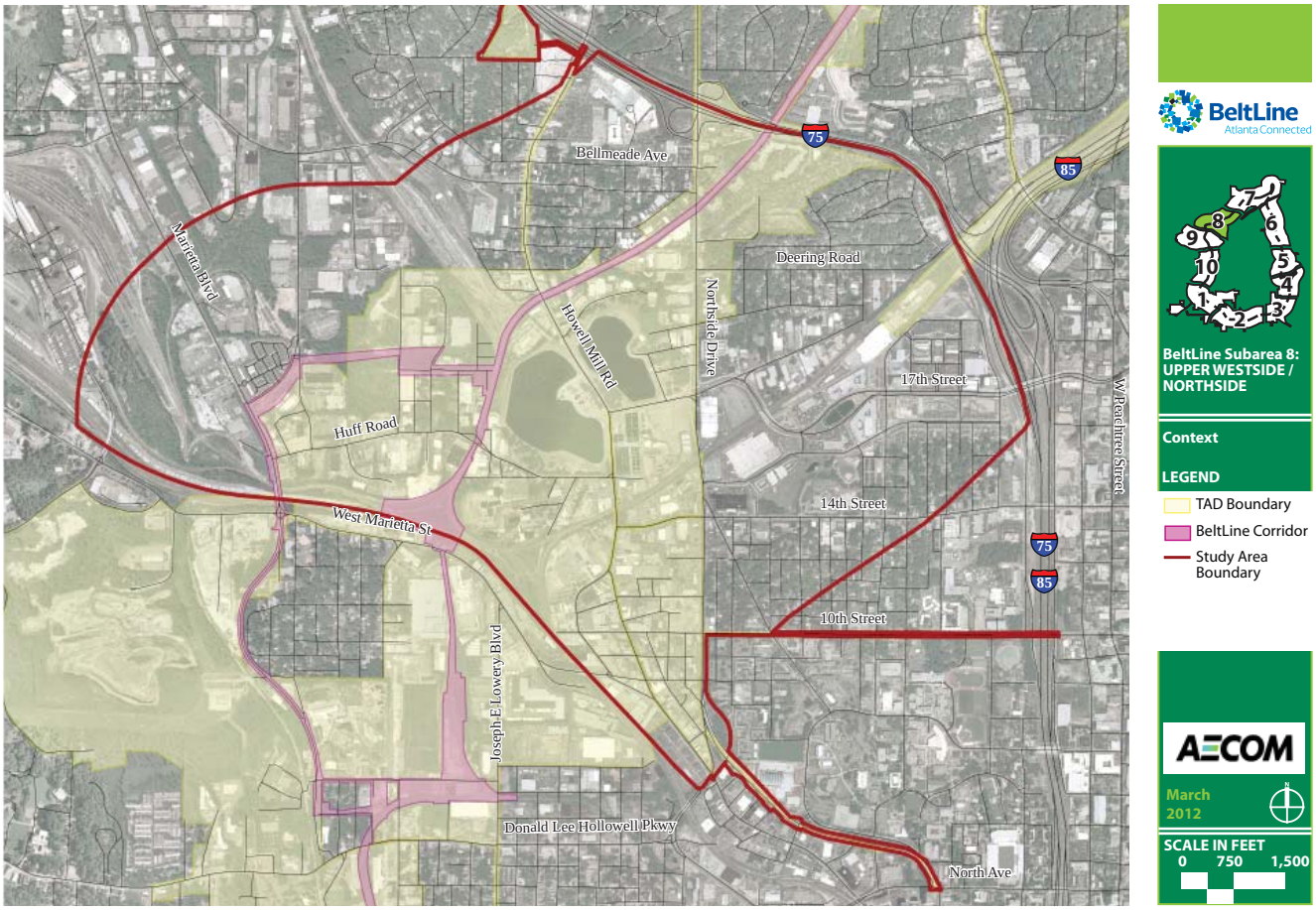


Figure 1.1: Atlanta BeltLine Subarea 8 Context

Subarea 8's northern and western boundaries follow a half-mile buffer distance from the CSX railroad. It is generally bounded on the south by the combined Norfolk Southern and CSX railroads, extending as far south as approximately the interchange of Northside Drive and Marietta Street. On the east it is bounded by Northside Drive and a half-mile buffer from the CSX railroad.

Apart from forming many of the Subarea's boundaries, railroads are perhaps the most remarkable feature relative to alignment of the overall Atlanta BeltLine corridor and physical connections within the Subarea. The original conceptual transit alignment of the Atlanta BeltLine Redevelopment Plan followed the CSX railroad alignment and navigated railroad wyes adjacent to the CSX-owned Howells Yard and Norfolk Southern-owned Inman Yard to continue southward into Subarea 9. Later refinements of the alignment through the Atlanta BeltLine Draft Environmental Impact Statement (DEIS) recommended a transit alignment that is the basis of the Subarea 8 Master Plan study.

Even with this alignment selected, railroads remain a defining feature of Subarea 8 and make its physical geography more complex than in many other planning subareas. Opportunities to move from one side of the study area to the other are constrained by current railroad crossings, and the volume of rail traffic suggests that the only additional crossings that may be achieved will be grade-separated.

Subarea 8 also includes the Atlanta Waterworks, which comprise a water treatment facility and two small reservoirs on either side of Howell Mill Road near its intersection with 17th Street. In addition to the limitations that the Waterworks present for movement and street connectivity enhancement, they also represent vitally important public infrastructure to be kept secure; this has implications for where and how land development and new public works projects can be located.

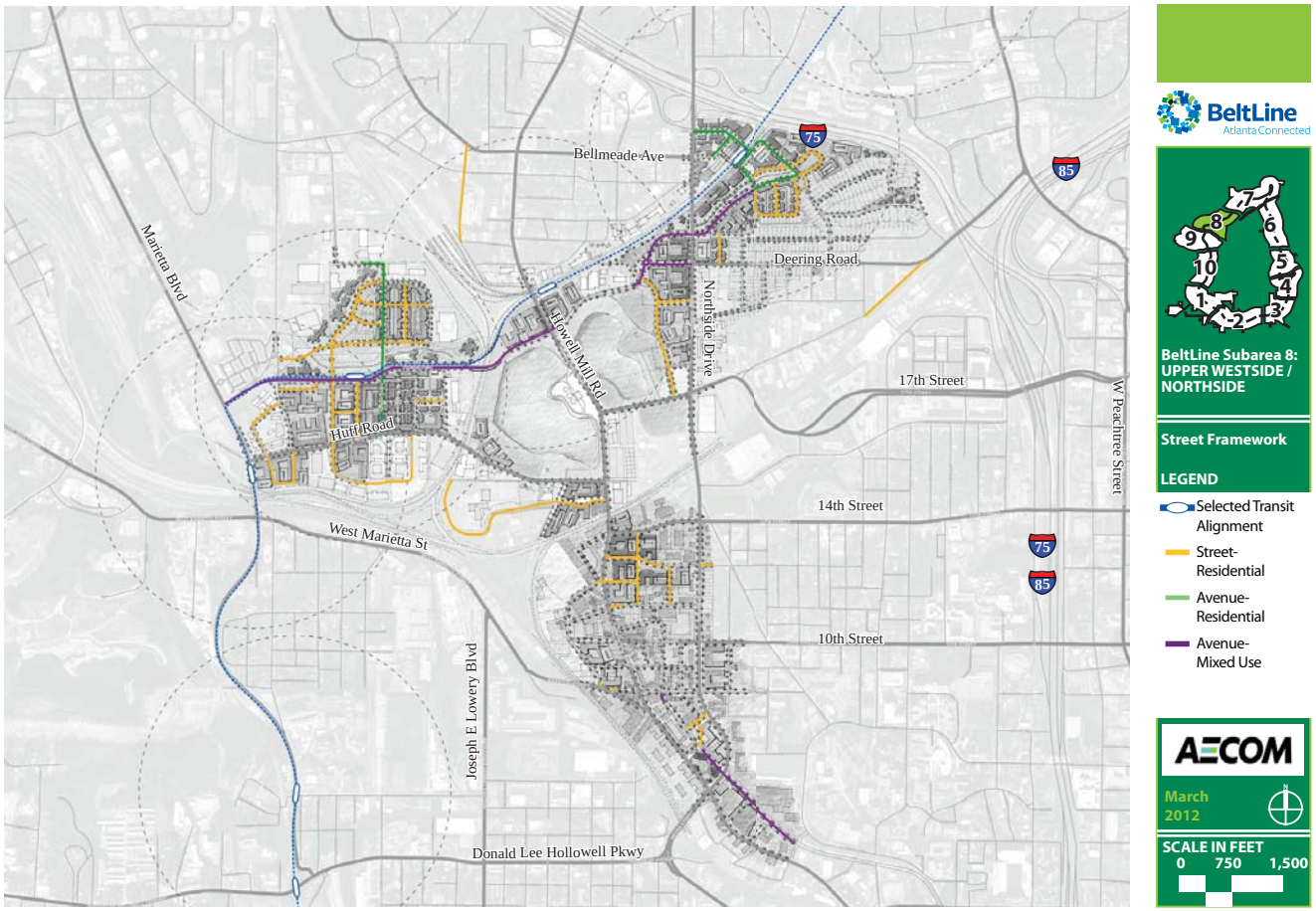


Figure 1.1: Atlanta BeltLine Subarea 8 Context

1.2 Opportunities of this Study

Discussions with community residents and stakeholders in the subarea suggested several opportunities for capital projects or policy change that could enhance the subarea's connectivity and mobility. Many of these ideas had been developed in previous plans and studies, including the Connect Atlanta transportation plan, neighborhood plans for Berkeley Park and Loring Heights, and the various Livable Centers Initiative (LCI) studies undertaken in the area. The following sections detail the major opportunities and describe how they were incorporated into the transportation analysis.

Elaine-Culpepper-Trabert-Deering Corridor

Identified as a key opportunity both in the BeltLine Street Framework Plan and the Connect Atlanta transportation plan, the westward extension of Deering Road is an opportunity to connect Peachtree Road to Howell Mill Road and even as far west as Ellsworth Industrial Drive and Marietta Boulevard. There are engineering challenges to completing this connection, including the need for a grade-separated crossing of the CSX railroad near the Howells Yard wye. In addition, the introduction of vehicle traffic looking to use this new connection for east-west travel will impact existing streets such as Deering Road. Nonetheless, the connection is a notable opportunity to improve the currently-limited travel options not only in the BeltLine subarea but also within this part of northwest Atlanta.

Three-Lane Section for Howell Mill Road

Although Howell Mill Road includes two-lane sections at the southern end of Subarea 8 and immediately to the south of the CSX railroad bridge at the Waterworks, other sections of it (especially between 10th Street and Huff Road) feature imbalanced lane capacity—for example, two southbound lanes and one northbound lane between 10th Street and Trabert Avenue. The Subarea 8 plan presents an opportunity to convert this to a three-lane section with a two-way left turn lane to allow left turning vehicles a separate storage space and preserve the single through-travel lane for movement.

Huff/Howell Mill Intersection Capacity

The intersection of Huff and Howell Mill Roads currently experiences peak-hour traffic congestion; this has increased markedly in the last several years as new residential development to the west has relied on Huff Road as its primary access to and from Midtown Atlanta and other major regional destinations. Although it is expected that other network additions could partially alleviate the traffic burden that this intersection faces, its current design—with a wide apron of pavement on the northwest corner, presumably for truck movements, might allow an eastbound storage lane to be added for part of the intersection approach, adding capacity to the intersection.

Re-evaluating Traffic Signal Timing

Several Subarea 8 intersections feature signal timing patterns that may not be optimal for facilitating traffic flow, especially if traffic volumes increase into the future as a result of traffic growth throughout the region and as a direct consequence of new land development in the Subarea 8 study area. One notable example of this is the split phasing sequence at the intersection of 14th Street and Howell Mill Road, where northbound traffic volumes currently experience lengthy delay due to the provision of separate green-light intervals to both eastbound and westbound movements. This study explores opportunities to revise or optimize signal timing to make the most out of the existing infrastructure before committing to more costly improvements.

2.0 Existing Roadway Facilities

Subarea 8 is served mostly by arterial roadways that offer crossings of the subarea's multiple railroad lines and yards. Because of the relative continuity of Northside Drive and Howell Mill Road through the subarea, the major limitations in vehicle travel and mobility are in east-west movements.

Owing partly to the industrial- and railroad-based economic history of the area, Subarea 8 only features supporting networks of secondary streets in discrete areas, and many of these 'patches' of network are only connected to the rest of Atlanta's streets through major arterial and collector roads. As a result, the Subarea's thoroughfares, such as Huff Road, Chattahoochee Avenue, 10th, 14th and 17th Streets (in addition to the aforementioned Northside and Howell Mill) are vitally important to its roadway system.

2.1 Roadway Functional Classification

Urban Interstate
Interstate 75 forms the northeastern boundary of Subarea 8 for approximately 1.1 miles between the Howell Mill Road and Deering Road bridges. Though it does not pass directly through Subarea 8, it nonetheless retains a high degree of influence on travel patterns through the Subarea as both Northside Drive and Howell Mill Road feature interchange access to it.

Arterial Streets
The subarea's primary arterials are Northside Drive and Howell Mill Road, although it also includes sections of Marietta Boulevard and Marietta Street, both of which are also designated as arterials. Northside Drive is designated in GDOT's functional classification system as an Urban Principal Arterial and accounts for approximately 1.8 centerline miles of the Subarea 8 streets, while the remaining arterials are designated as Urban Minor Arterials and collectively account for approximately 2.9 miles of centerline.

Urban Collector Streets
The main GDOT-designated Urban Collector streets in the subarea are Huff Road, Ellsworth Industrial Drive, 17th Street, Deering Road and Chattahoochee Avenue, although the short portions of Defoor Avenue and 8th, 10th and 14th Streets that lie within the subarea also have this classification. Together these streets make up approximately 3.9 miles of the subarea's street centerline mileage.

Urban Local Access
This classification contains the majority of streets within the study area, approximately 17.3 roadway miles, and represents most neighborhood access and residential streets.

Although the functional classification system within the subarea includes a substantial amount of arterial roadways and collectors, it is important to emphasize the urban land use environment that these roads serve and to note that they are not purely consistent in character and function with the conventional classification system. Northside Drive and Howell Mill Road are the only roadways passing through the subarea that truly function as arterial roadways, or roads designed more for a mobility function than for a local access function. However, each of these roads carries a significant level of local traffic and accommodates relatively frequent cross-street and driveway access. Along some portions of these streets where development has focused on buildings against the right-of-way edge and where driveway access is not as frequent, on-street parking is provided. For this reason, a highway-oriented functional classification system has limitations and a more nuanced understanding of the street's multiple roles is important to keep in mind.

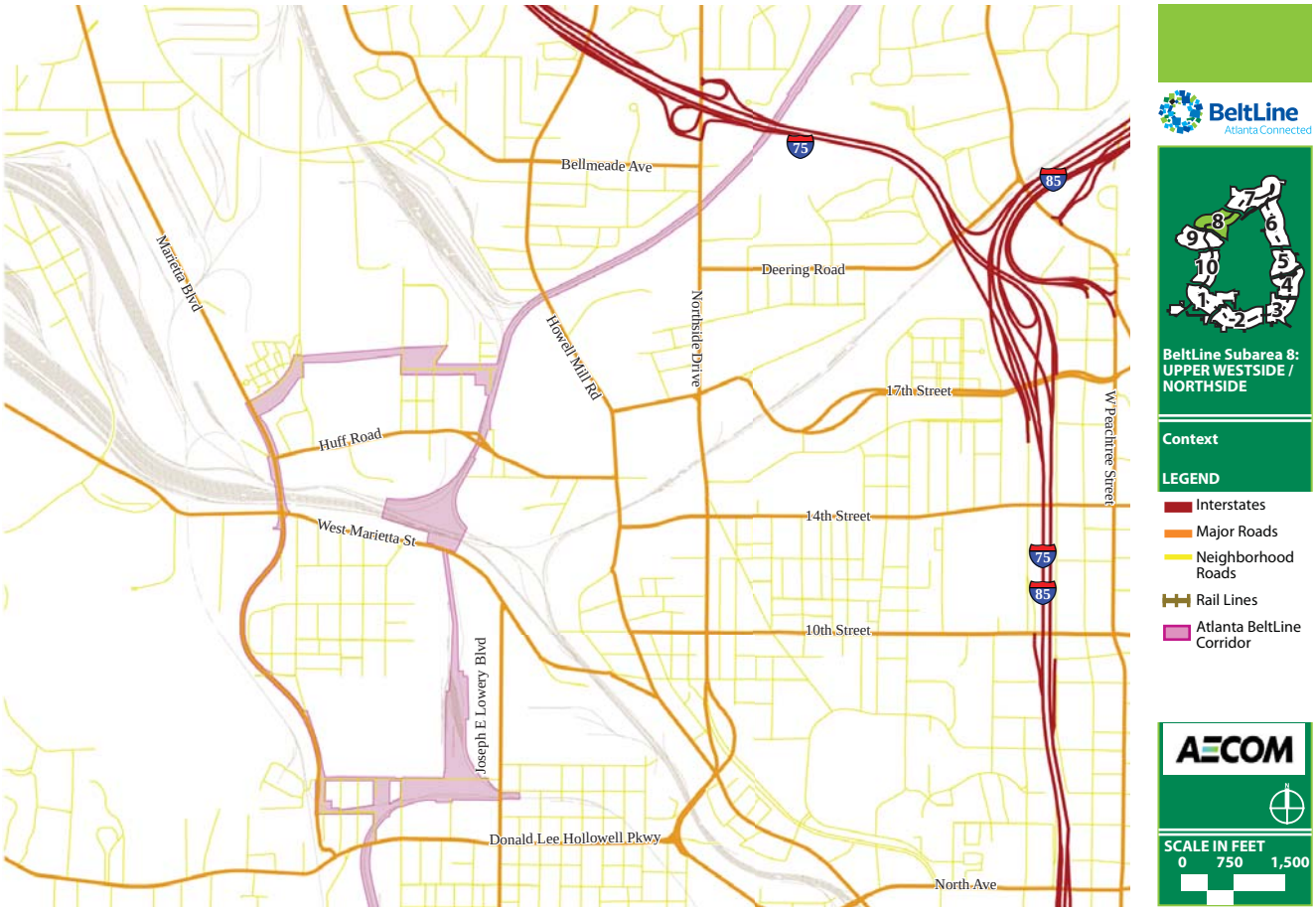


Figure 2.1: Functional Classification
Source: GDOT, Atlanta Regional Commission, City of Atlanta

Table 2.1: Functional Classification	
Classification	**Description**
Urban Interstate Principal Arterial	Uninterrupted, high-speed flow
Urban Freeways & Expressways	Uninterrupted, high-speed flow
Urban Principal Arterial	Serves the major activity centers of a metropolitan area; the highest traffic volume corridors and longest trips. The principal arterial will carry important intra-urban as well as inter-city bus routes.
Urban Minor Arterial	Provides service to trips of moderate length; distributes travel to smaller areas.
Urban Collector Street	Provide access and traffic circulation within residential neighborhoods, commercial, and industrial areas. The collector also collects traffic from local streets and channels it into the arterial street system.
Urban Local Road	Primarily provides access to residences, businesses, or other abutting properties. Traffic is local in nature and extent rather than regional, intrastate, or interstate.

Source: Georgia Department of Transportation, AASHTO

2.2 Existing Traffic Volumes

In order to establish a baseline for the traffic scenario analysis, traffic data collection was conducted throughout the study area.

For daily traffic volumes, the Georgia Department of Transportation's Statewide Traffic and Accident Reporting System (STARS) was used as a primary data source. Figure 2.2, the map of Existing Traffic Volumes (on the following page) illustrates the count locations with the most recent available volumes from STARS records.

To augment the STARS data, weekday intersection turning movement counts were taken during the morning (7 to 9 AM) and evening (4 to 6 PM) peak periods in February 2010. The four consecutive 15-minute interval volumes resulting in the highest traffic volume at each intersection were designated as the peak hour traffic volumes and used as the basis of intersection capacity analyses in sections 4, 5 and 6 of this report. Diagrams of these peak hour traffic counts for existing conditions are illustrated in the diagrams in Section 4.

Key Findings

In Subarea 8, traffic volumes are highest on Northside Drive, which provides an alternative connection from the Interstate highway system and Downtown, Midtown and Atlantic Station. Howell Mill Road also features access to I-75, but its relatively limited traffic capacity and its southern terminus at Marietta Street likely make it less desirable as a commuting street. According to the most recent GDOT counts available, Northside's average daily traffic (ADT) is 28,750 vehicles per day between I-75 and Deering Road and 24,120 between 10th and 14th Streets.

One important factor to note is that these volumes, when compared to comparable data from previous years, reflect a much slower rate of growth than those being forecast by the Atlanta region's travel demand model (discussed in the next section).

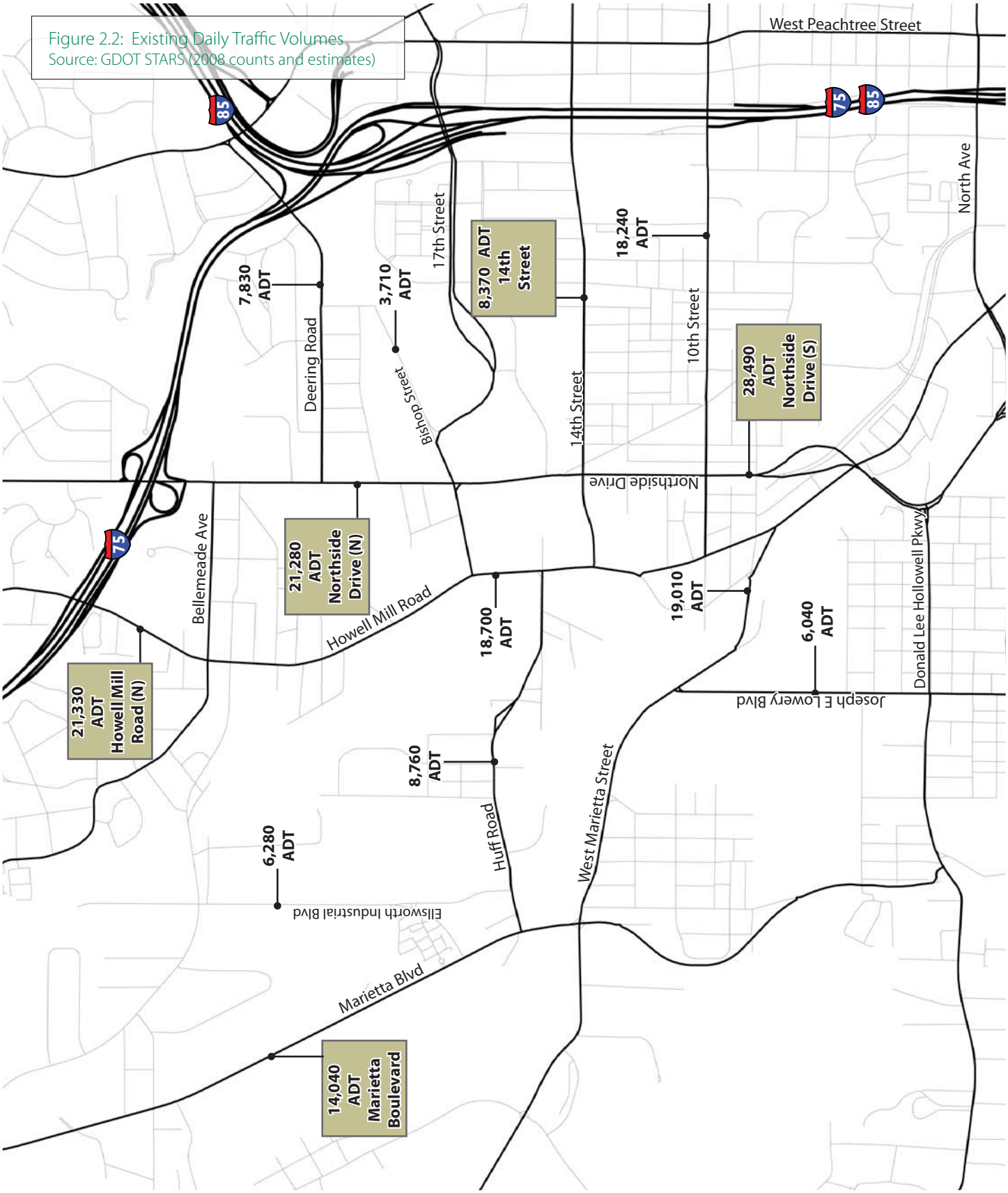


Figure 2.2: Existing Daily Traffic Volumes
Source: GDOT STARS (2008 counts and estimates)

Data Sources and Methodology for Analysis of Future Conditions

To examine the effects of traffic in future scenarios related to the Subarea 8 plan, the study team relied on future traffic projections to understand likely growth rates to apply to current traffic volumes. The study used the Atlanta Regional Commission's travel demand model forecasts to determine the relative growth in traffic for two separate periods: between 2005 and 2020 and between 2020 and 2030. The 2005-to-2020 growth rates were used as the background assumption for growth from the existing traffic volumes. Note that although existing volumes were counted in 2010, a 2010 database from the ARC model was not available to the study team and consequently 2005 was used for the base year. Table 2.2 below lists the volume assignments for each of these model years, and the calculated percentage change in volume.

The average percentage change in volume for the time period between 2005 and 2020 is 9.2 percent, or approximately 0.98 percent annual growth. However, the discrepancy between the model's growth rates and those borne out by actual traffic counts suggests that this rate may be high. Average daily traffic volumes on Northside declined an average of 1.14 percent per year between 17th Street and Deering Road, and they increased only an average of 0.57 percent per year between 10th and 14th Streets. For this reason, the study team used a moderate rate of 0.5 percent per year, reflecting the higher projections of traffic growth from the travel demand model but also the actual trends in traffic volumes in Subarea 8.

The average percentage change for the time period between 2020 and 2030 is lower, with a value of 3.7 percent over ten years, or roughly 0.41 percent annually. In this case, a higher, more conservative annual growth rate of 0.5 percent was applied to traffic volumes in 2020 to determine traffic in 2030, for a total growth of approximately 4.6 percent over the ten years.

It is worth reiterating that the volume assignments listed in Table 2.2 do not always correspond with actual traffic volumes. This is due to the way in which regional travel demand models operate: they distribute traffic onto a roadway network based on roadway capacity and adjacent population and employment concentration, but these do not always reflect real-world travel patterns. As a result, actual volumes (such as those shown in Figure 2.2) are not always consistent with volume assignments as reflected in the travel demand model. The travel demand model assignments are typically the only available projections of traffic in the future, and it is for this reason that they are used in this study to estimate traffic growth rates.

Table 2.2: Volume Assignments and Projections from ARC Travel Demand Model

	Volume Assignments from ARC Travel Demand Model			Percentage Change in Volume	
Street	**2005**	**2020**	**2030**	**% Change 2005 to 2020**	**% Change 2020 to 2030**
Howell Mill Rd (Huff to I-75)	12,387	13,802	14,571	11%	6%
Howell Mill Rd (14th to Huff)	16,002	17,080	16,670	7%	**-2%**
Howell Mill Rd (10th to 14th)	11,077	12,214	13,088	10%	7%
Howell Mill Rd (Marietta to 10th)	11,071	13,798	13,521	26%	**-3%**
Northside Dr (Deering to I-75)	32,153	34,446	36,750	7%	7%
Northside Dr (17th to Deering)	38,125	41,347	43,488	8%	5%
Northside Dr (10th to 14th)	46,636	50,212	50,984	8%	2%
Northside Dr (Tech Parkway to 10th)	54,868	61,403	64,167	12%	5%
Huff Rd (Ellsworth In. to Howell Mill)	11,353	11,419	11,309	1%	**-1%**
			Average Percent Change	9.2%	3.7%

3.0 Study Methodology

The traffic analysis for Subarea 8 used a methodology based on intersection and corridor facility performance standards as defined by the Transportation Research Board's Highway Capacity Manual 2000, a technical manual providing national guidance on traffic operations and facility capacity. It also used the Synchro traffic simulation software to gauge performance of intersections relative to one another in a simulated real-time traffic environment.

3.1 General Parameters and Input Assumptions for Traffic Analyses

In terms of input data for the analysis, morning and afternoon peak period intersection turning movement counts were taken in February 2010 and served as the basis for existing traffic conditions. The Subarea 8 traffic study accounted for future traffic based on a series of land use and development scenarios while making consistent use of a series of basic assumptions. The global parameters and assumptions used for the analysis and their explanations are as follows:

1. **Background growth, or regional traffic growth that is likely to occur regardless of new planned growth or development in Subarea 8.** This used average daily traffic assignments from the Atlanta Regional Commission travel demand forecasting model. It compared overall change in average daily traffic (ADT) throughout the subarea between 2005 (the model's base year at the time the Subarea 8 study began) and 2030 (the model's future horizon year). A 2020 model year was also used as an interim step, per the methodology that is standard to all other subarea master planning studies. All model roadway links inside the subarea were considered, with the sum total of 2005 ADT for all links being compared to the sum total of 2020 ADT for those same links. The difference between the two was divided by 2005 ADT to calculate an aggregate rate of growth, and this was decomposed into an annual rate to allow calculation of background growth for an interim year between 2005 and 2020. The same process was repeated for the period of 2020 to 2030, with a separate growth rate calculated to account for background growth between those two years.

2. **Likely levels of development in future years.** A real estate market study for the entire Atlanta BeltLine planning area was prepared that forecast likely levels of market absorption in the years 2020 and 2030. These market levels were expressed in terms of development in each subarea and were used as a basis for how much development would be added in the traffic analysis. For 2020 traffic, the market study was used as a basic development program for calculation of trip generation. For 2030 traffic, these figures were increased with an annual growth rate derived from the ARC travel demand model.

3. **Standard trip generation.** All calculations of new traffic expected from added future development were made according to guidance in the Institute of Traffic Engineers (ITE) Trip Generation Handbook, Eighth Edition. This includes regular peak-hour-based traffic generation rates per different land use categories as well as application of internal capture and pass-by trip reductions.

4. **Traffic analysis zones and trip distribution.** The study used a series of traffic analysis zones (TAZ) from the ARC travel demand model as the base geographic unit for aggregating traffic growth and distributing it onto the roadway network. These are shown in Figure 3.1.1. Within each of these zones, smaller development 'nodes' or districts were assumed to use certain intersections on the roadway network as a basis for where generated traffic would go. This was most applicable for the distribution of newly-generated traffic in the Subarea 8 plan, which was based on existing travel patterns as observed in the regional travel demand model and through existing intersection traffic counts.

5. **Transit reductions.** In all future development scenarios, including the baseline scenarios, the amount of vehicle traffic added by development that was likely to be captured by transit use or other non-vehicular modes was calculated according to a standard series of guidelines used in all subarea plans. The metrics used to measure propensity for transit use include walking distance to transit; the balance of residential, retail

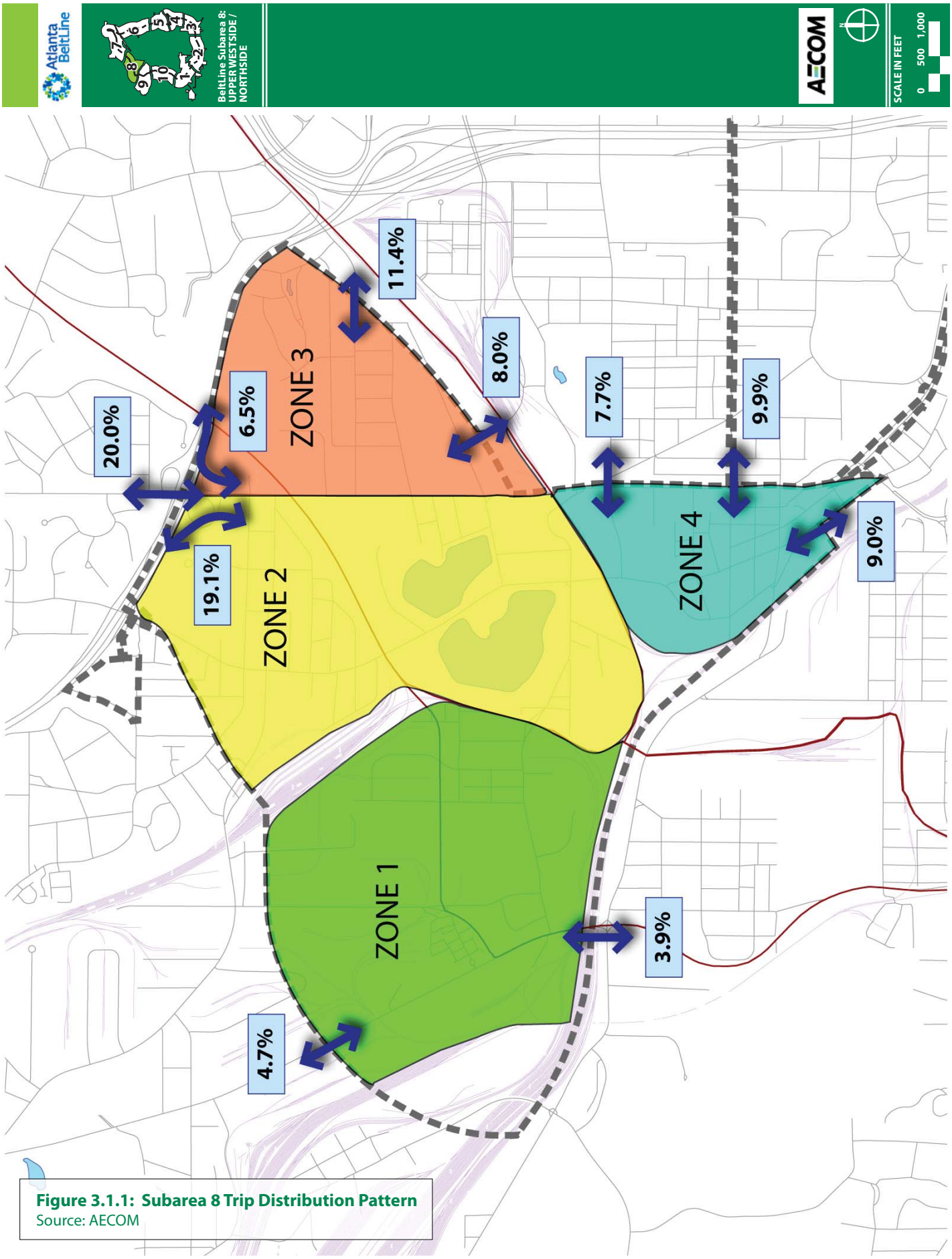


Figure 3.1.1: Subarea 8 Trip Distribution Pattern
Source: AECOM

and employment land uses; and neighborhood socioeconomic indicators that provide an understanding of likely transit dependency. Transit reduction potential was not determined for the existing conditions analysis, which relied simply on 2010 traffic counts.

6. **Signal Timing.** The 2010 Existing Traffic scenarios used current traffic counts and signal timing plans, but all future scenarios used Synchro to optimize signal cycle lengths and splits for the subarea network in order to minimize delay and improve overall efficiency of traffic operations.

3.2 Analysis Scenarios

Future traffic analysis scenarios are based on two major conditions related to the Subarea 8 plan: a baseline condition where Atlanta BeltLine transit infrastructure is not constructed, and a build condition where transit is constructed. In both of these scenarios, the Subarea Plan is assumed to follow a similar set of land use entitlements to the City of Atlanta's Comprehensive Development Plan (CDP) future land use map; for purposes of the traffic analysis, the BeltLine master plan is assumed to guide all growth and development. Land development program amounts forecast for the subarea in the 2005 BeltLine Redevelopment Plan were used as the basis for development program. The different land use-transportation scenarios can be summarized as follows:

1. **Existing Conditions.** Existing traffic counts and existing roadway design characteristics (such as number of lanes, lane assignments, intersection turn lane configuration and traffic signal timing) were used to determine level of service and discuss any notable traffic-related issues or challenges.
2. **2020 Baseline (Development according to the Subarea land use plan, but no transit).** Using existing traffic counts as a basis, traffic resulting from background growth (as expressed in the ARC travel demand model) was added to new development assumed under the subarea land use plan as projected by the RCLCO BeltLine Market Forecast 2008. This new traffic was expressed in terms of vehicle trips added and calculated using the ITE Trip Generation Handbook.
3. **2030 Baseline (Development according to the Subarea land use plan, but no transit).** This uses the 2020 traffic levels (from the 2020 Baseline Scenario) and assumes a growth rate derived from the ARC travel demand model to forecast likely 2030 traffic volumes.
4. **2020 Build.** Takes the 2020 Baseline Scenario assumptions and adds Atlanta BeltLine transit, thereby allowing new traffic resulting from development in the subarea to take a further reduction of trips through transit mode choice.
5. **2030 Build.** Takes the 2020 Build Scenario and assumes a growth rate derived from the ARC travel demand model to forecast likely 2030 traffic volumes.

For each of the scenarios, both weekday morning and afternoon peak hour intervals were studied.

Table: 3.1.2 Transit Percentage Reduction Methodology									
Subarea 8, Zone 1		Subarea 8, Zone 2		Subarea 8, Zone 3		Subarea 8, Zone 4			
No BeltLine (2020/2030)	BeltLine (2020/2030)	No BeltLine (2020/2030)	BeltLine (2020/2030)	No BeltLine (2020/2030)	BeltLine (2020/2030)	No BeltLine (2020/2030)	BeltLine (2020/2030)	Score	
									Walk Distance
0		0		0		0	0	0	3/4 to 1 mile
			5		5			5	1/2 mile
	10							10	1/4 mile
									Density (Mixed Use and Residential Only)
								1	Less than 5 units per acre
5	5					5	5	5	less than 10 units per acre
		8	8	8	8			8	less than 16 units per acre
								10	More than 16 units per acre
									Density (Employment per Acre)
0	0	0	0	0	0	0	0	0	10 to 250
								4	251 to 500
								6	501 to 1,400
								8	1,401 to 3,400
								10	3,401 to 6,900
									Land Use (Residential vs. Commercial)
2	2							2	Residence Only
								6	Commercial Only
		10	10	10	10	10	10	10	Mixed-Use
									Social Economics
		0						0	Area doesn't rely on transit
5				5		5	5	5	Area doesn't rely heavily on transit
	8		8		8			8	Area relies on transit
								10	Area relies heavily on transit
12	**25**	**18**	**31**	**23**	**31**	**20**	**20**	**Subtotal**	
15%	**28%**	**20%**	**30%**	**25%**	**30%**	**25%**	**25%**	**Score Equivalency to Trip/Transit Reduction Percentage**	

Score Equivalency to Trip/Transit Reduction Percentage	
30%	31 and above
28%	25-30
25%	20-24
20%	15-19
15%	10-14
10%	5-9
0%	1-4

4.0 Existing Conditions Traffic Analysis

The existing conditions analysis is based on intersection turning movement traffic counts taken in February 2010 and includes both morning and afternoon peak hours. Counts were taken at the following intersections:

1. Northside Drive/I-75 Northbound Access Ramps
2. Northside Drive/I-75 Southbound Access Ramps
3. Northside Drive/Bellemeade Drive
4. Northside Drive/Deering Road
5. Northside Drive/17th Street
6. Northside Drive/14th Street
7. Northside Drive/10th Street
8. Northside Drive/Marietta Street
9. Howell Mill Road/Bellemeade Drive
10. Howell Mill Road/Chattahoochee Avenue
11. Howell Mill Road/17th Street
12. Howell Mill Road/Huff Road
13. Howell Mill Road/14th Street
14. Howell Mill Road/10th Street
15. Howell Mill Road/8th Street
16. Howell Mill Road/Marietta Street
17. Marietta Boulevard/Huff Road
18. Peachtree Road/Deering Road

Existing roadway geometries and lane configurations for each of these intersections are shown in Figure 4.1.1. The existing traffic counts are shown in Figures 4.1.2 (for AM peak hour) and 4.1.3 (for PM peak hour). Using the HCM-based intersection level of service methodology along with Synchro's corridor-based analysis, the corridor levels of service were calculated for all intersections as well as the Howell Mill Road and Northside Drive corridors.

For purposes of this report, only HCM-based methodology is used for intersection reporting. Synchro's intersection performance reporting methodology, which factors the effects of downstream traffic congestion into its measurement of intersection performance, is used as a reference point in instances where HCM-based reporting methodology may not fully capture the effects of spillback congestion and queuing, closely spaced intersections, or other aspects of the physical environment that may affect intersection performance in the real world. Known cases of these types of conditions, such as the closely-spaced intersections of Howell Mill Road with Chattahoochee Avenue and Bellemeade Avenue, were given special consideration with Synchro's corridor-based traffic simulation capabilities to monitor the effects of these corridor characteristics.

4.1 Existing Traffic with Current Geometry

In terms of input data for the analysis, morning and afternoon peak period intersection turning movement counts were taken in February 2010 and served as the basis for current traffic analyses in this section. Current levels of service were also calculated using existing signal timing plans.

The subarea's current traffic operations are, by and large, not problematic from the perspective of traffic volumes and operations. However, several key intersections present challenges and continued to present challenges as additional traffic was applied to the network. These include the following:

- **Peachtree Road and Deering Road.** Although average delay is greater in the AM peak than in the PM peak, it is high in both peak periods and performs at a failing level of service in both. Although delay is significant on multiple movements, by far the highest level of movement-specific delay is from Peachtree to Deering Road.
- **Northside Drive and Marietta Street.** Synchro emulates the intersection performance effects of angle skew and curving approaches at intersections, both of which are featured at this intersection. In the future year scenarios discussed in Sections 5 and 6, the effects of this intersection design become more apparent, as it appears to contribute to overall reductions in level of service.
- **Howell Mill (Chattahoochee to I-75).** The Howell Mill intersections from Chattahoochee, north to I-75 represent an area of continued congestion due in part to continued commercial growth along this corridor and its access to I-75. The existing traffic analysis for the Bellemeade and Chattahoochee intersections with Howell Mill Road reflect this congestion with notable intersection delay. While these two intersections were widened recently notable delay continues and is partly an effect of their physical closeness. In addition, the limitations of the traffic modeling assumptions may mean that the actual experience of these intersections as a driver underestimate congestion. The constrained right-of-way and closeness of these intersections limits practical alternative solutions.

Table 4.1: Existing Level of Service (2010)

Intersection	*AM Peak LOS*	*AM Peak V/C Ratio*	*AM Peak Overall Delay*	*PM Peak LOS*	*PM Peak V/C Ratio*	*PM Peak Overall Delay*	*Problematic Movements*
Northside/I-75 NB Access	B	0.50	14 sec	B	0.58	15 sec	
Northside/I-75 SB Access	C	0.73	31 sec	B	0.85	19 sec	
Northside/Bellemeade	B	0.71	17 sec	C	0.90	23 sec	
Northside/Deering	B	0.72	17 sec	C	0.73	23 sec	
Northside/17th	D	0.75	38 sec	D	0.96	39 sec	
Northside/14th	D	0.74	40 sec	C	0.82	34 sec	
Northside/10th	B	0.49	19 sec	B	0.85	20 sec	
Northside/Marietta	D	0.80	40 sec	D	0.90	46 sec	
Howell Mill/Bellemeade	D	0.84	49 sec	D	0.93	47 sec	
Howell Mill/Chattahoochee	E	0.67	72 sec	C	0.70	24 sec	
Howell Mill/17th	A	0.63	10 sec	B	0.85	17 sec	
Howell Mill/Huff	D	0.84	41 sec	C	0.75	26 sec	
Howell Mill/14th	E	0.60	64 sec	C	0.72	28 sec	
Howell Mill/10th	B	0.32	12 sec	B	0.50	11 sec	
Howell Mill/8th	B	0.35	10 sec	B	0.36	13 sec	
Howell Mill/Marietta	A	0.27	9 sec	A	0.50	10 sec	
Marietta Blvd/Huff	B	0.43	10 sec	B	0.66	13 sec	
Peachtree/Deering	F	2.38	190 sec	F	0.83	82 sec	Delay caused largely by heavy NB left turn movement with inadequate green signal time

Figure 4.1.1
BeltLine Subarea 8
Existing Intersection Approach Lanes

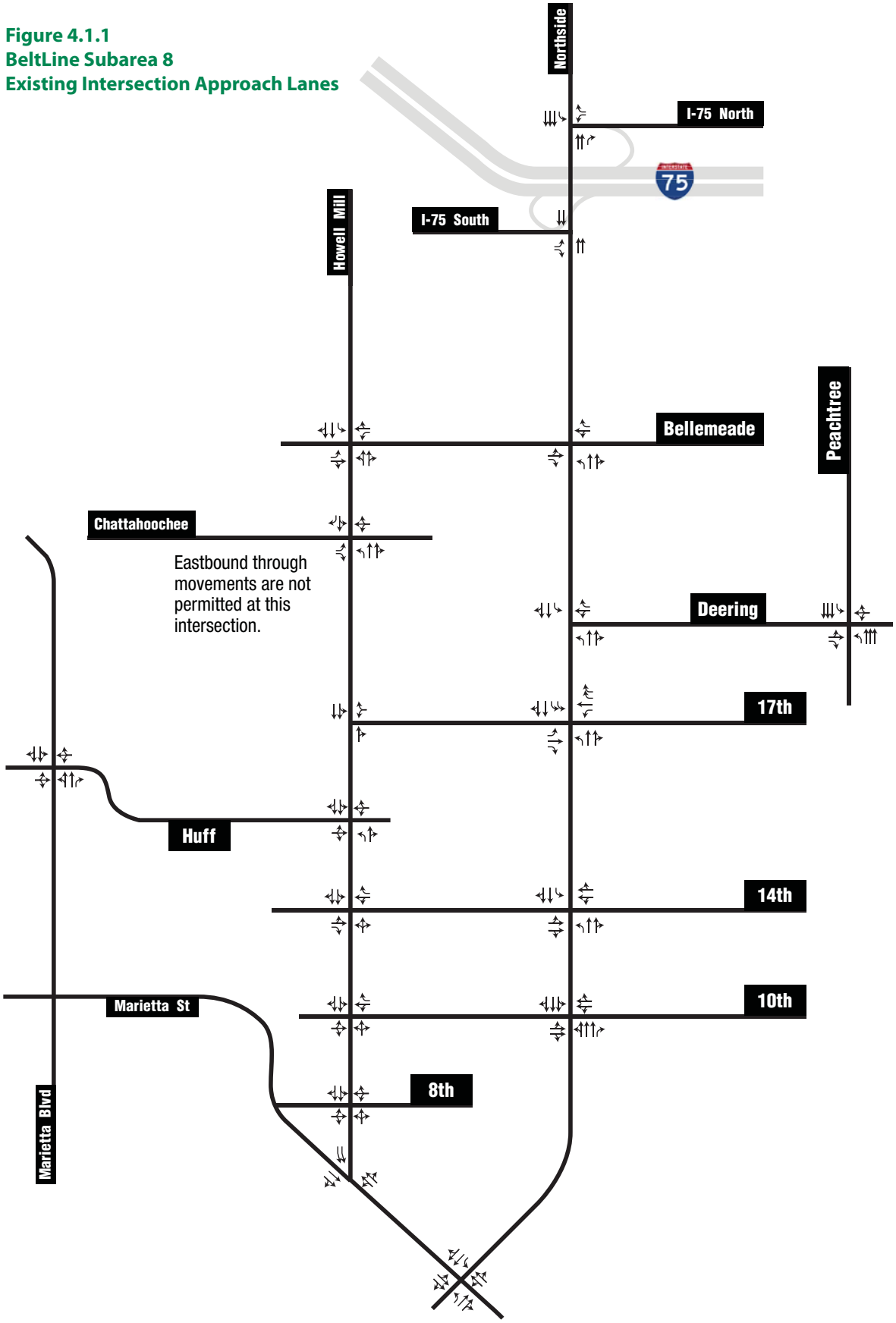


Figure 4.1.2
BeltLine Subarea 8
AM Peak Hour Existing Volumes

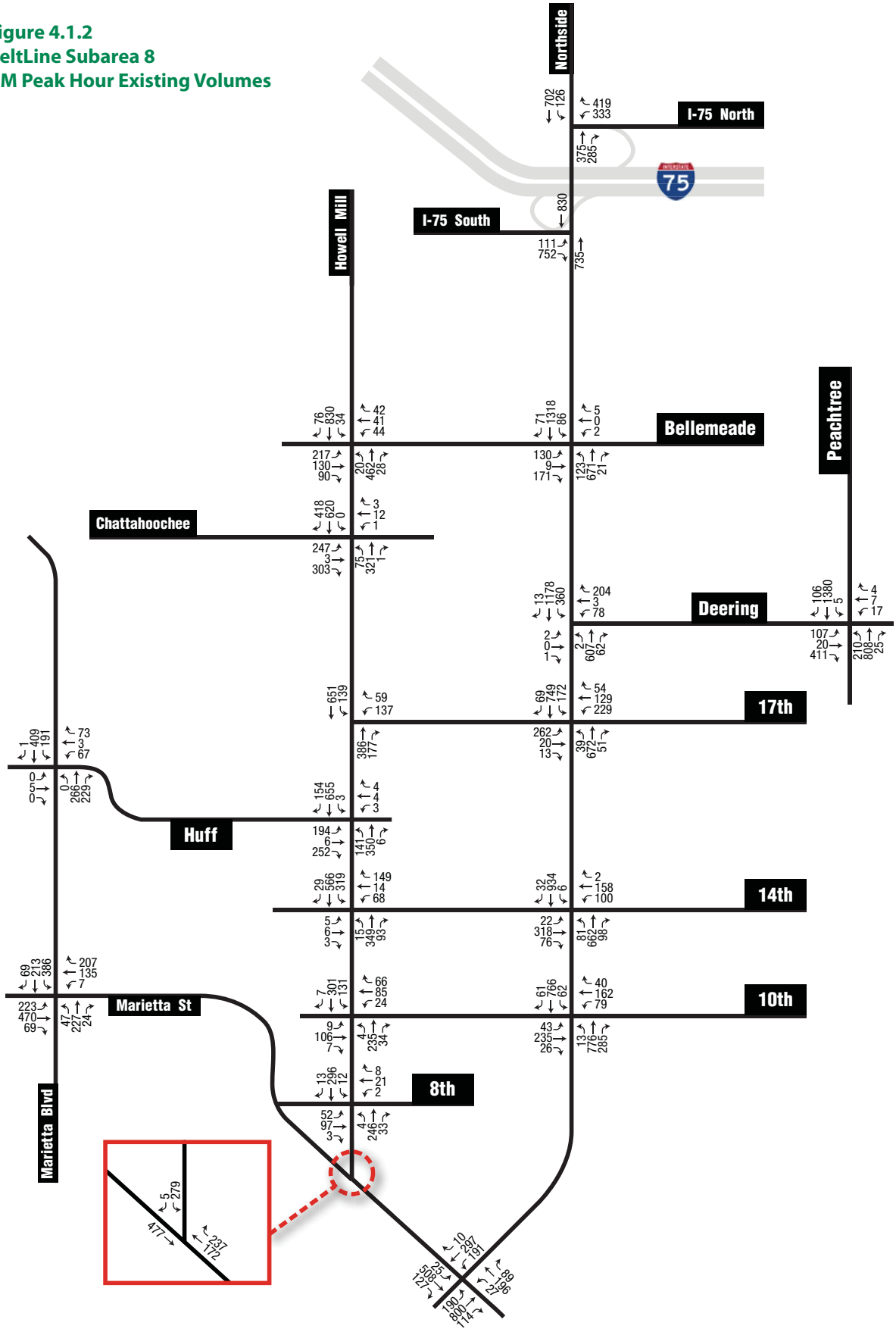


Figure 4.1.3
BeltLine Subarea 8
AM Peak Hour Existing Levels of Service

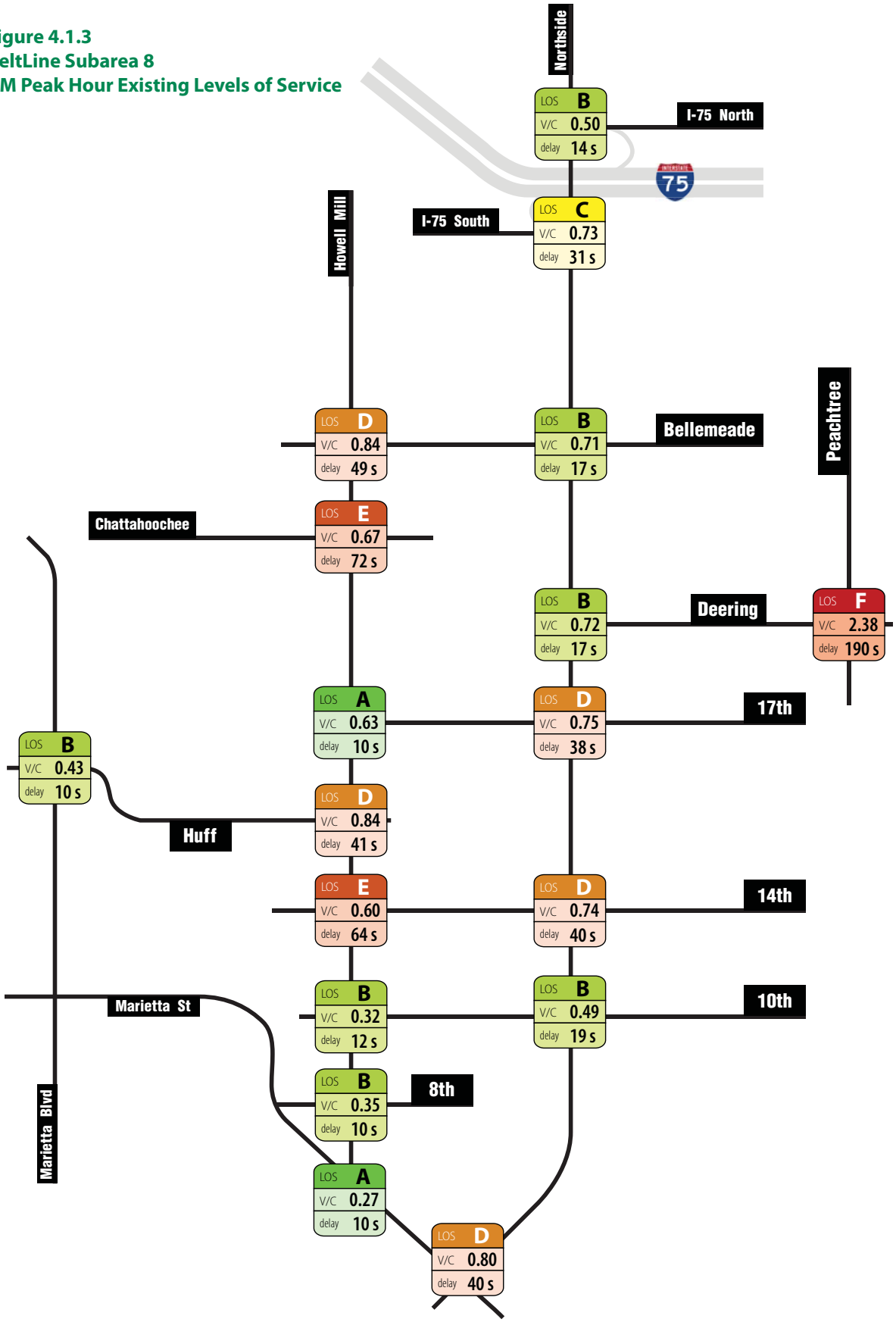


Figure 4.1.4
BeltLine Subarea 8
PM Peak Hour Existing Volumes

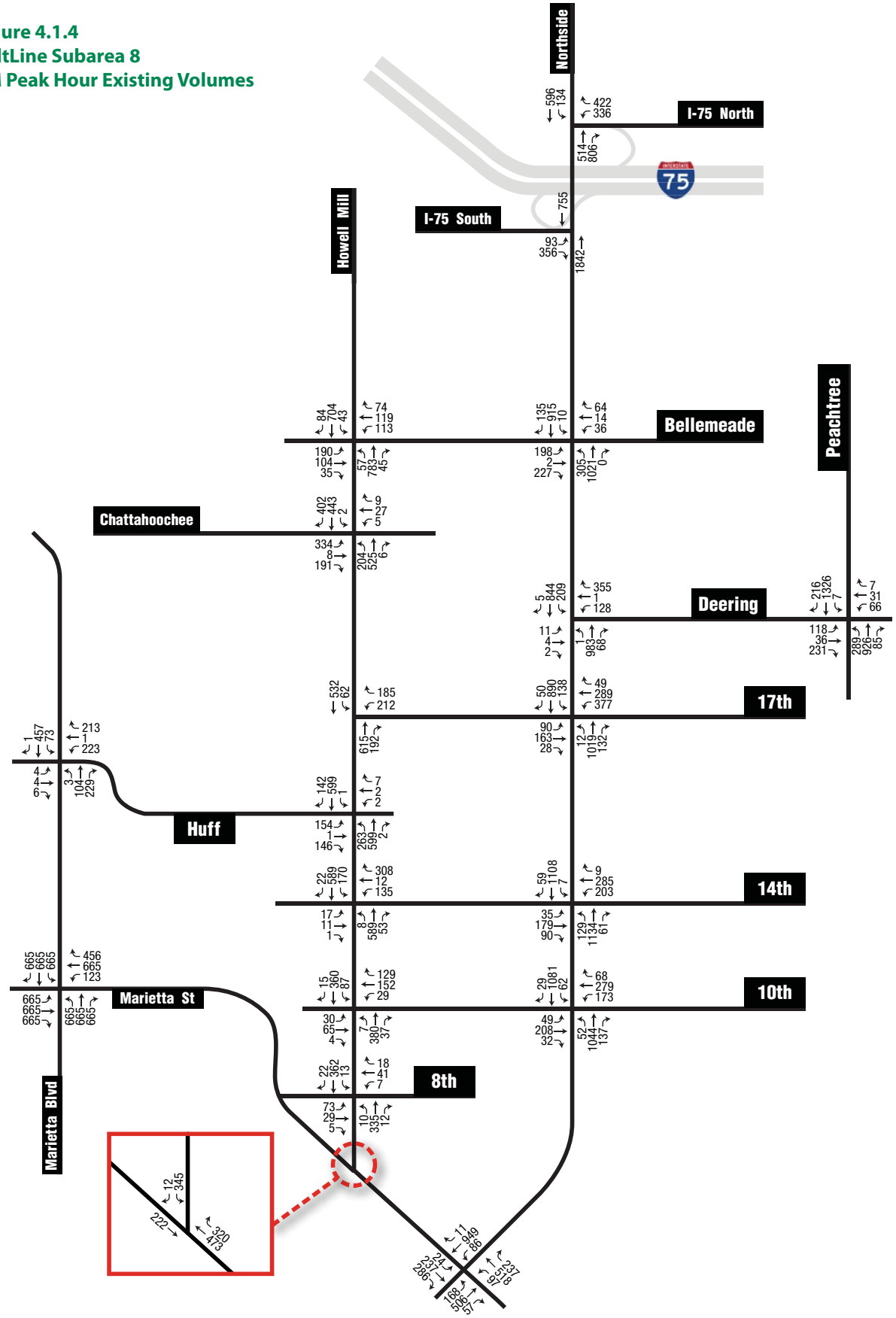
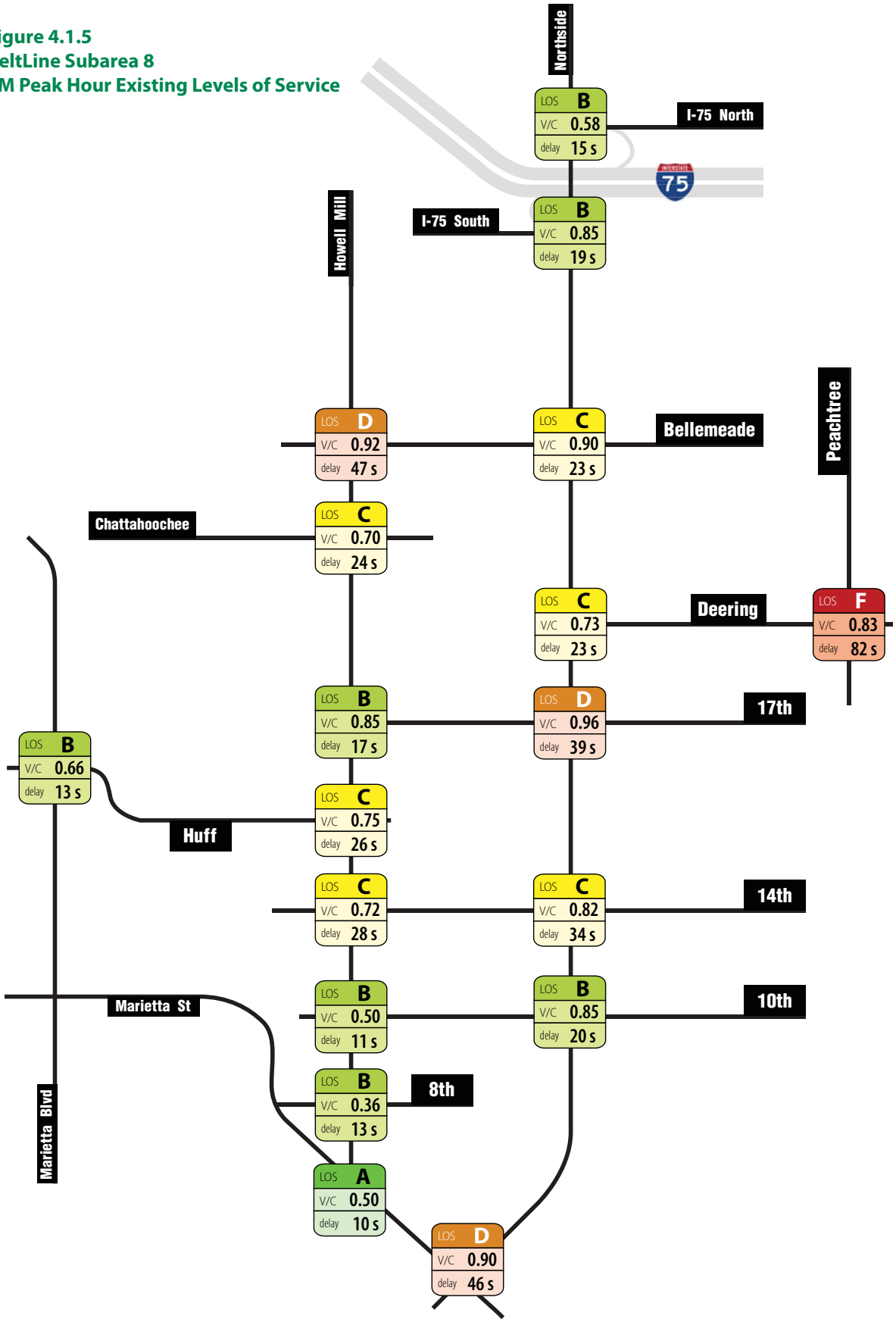


Figure 4.1.5
BeltLine Subarea 8
PM Peak Hour Existing Levels of Service



5.0 Traffic Analysis for Baseline Scenarios

5.1 2020 Baseline Scenario

This scenario considers the likely future land use in 2020 and the resulting traffic impacts if the Beltline transit infrastructure is not constructed. As discussed previously, this assumes that the Atlanta BeltLine Subarea 8 Master Plan and the City of Atlanta's current Comprehensive Development Plan (CDP) would have largely the same outcome in terms of entitlements for future development; for this reason and due to its more detailed site planning and consideration of development feasibility, the Subarea 8 development program was used to generate vehicle trip additions.

Trip generation calculations for this scenario, based on this assumed future development and following standard ITE methodology, are detailed in Tables 5.1.1 through 5.1.5 on the following pages. It is important to note that trip generation was calculated only for the amount of development program in each of the four zones that is a net addition over current development. The method of calculating this trip generation is discussed in additional detail later in this section (refer to the 'Trip Generation from Development' subheading).

In addition, the 2020 Baseline scenario accounts for a level of background traffic growth, or the added traffic likely to occur regardless of development activity specific to Subarea 8. The 0.5 percent annual growth rate used to add this amount of traffic is a conservative estimate derived from the ARC regional travel demand model and GDOT traffic counts throughout the subarea; this rate is discussed in additional detail in Section 2.2.

Planned Transportation Improvement Projects

At the beginning of the Subarea 8 planning process, the ARC Envision6 Transportation Plan was the active plan guiding an understanding of existing conditions. There are no improvements currently programmed to be completed in the subarea within the 2010-2020 period, nor are there projects in Envision6 assigned a priority that suggests they would be completed by this time. Concurrent with the planning process, however, was the completion and adoption of the Plan 2040 long range transportation plan. Because of this, it is assumed in traffic analysis models that the Northside Drive capacity addition project will be implemented by 2030.

2020 Baseline Scenario: What would 2020 be like if we had today's traffic patterns and mode split and only the redevelopment allowed by the existing land use plan?

FACTOR	HOW IT APPEARS IN THIS ANALYSIS
Year of Analysis	2020
Road Network	2020 RTP Network and New Development Streets (only new signalized intersections are considered in the road network)
Traffic Volumes	Existing Counts with 0.5 percent annual growth rate applied from 2010 to 2020 and Subarea 8 development-generated traffic added
Mode Split	Varies based on TAZ and location, but calculated according to BeltLine methodology
Trip Assignment	2010 Existing Pattern

What assumptions were made in traffic modeling to allow the results discussed in this section?

FACTOR	ASSUMPTION
Roadway Improvements	• 3-lane cross-section on Howell Mill between Trabert and Marietta • Added eastbound left turn and southbound right turn at Huff and Howell Mill • Added westbound right turn lane at 17th and Howell Mill • Separate westbound left, through and right lanes at Deering and Northside
Optimized Standard Cycle Length	**AM:** 110 seconds (half-cycles allowed) **PM:** 150 seconds on Northside; 120 seconds on Howell Mill

Added Local Street Network and Traffic Control

In anticipation of added growth and development even without the Subarea 8 land use plan, it is likely that local street network would be added along with new development. The enhancement of existing street network as a part of new development has become a general City of Atlanta policy under the Connect Atlanta Plan, and several specific locations within Subarea 8 have recommendations in Connect Atlanta for network connections to be made.

With this in mind, the baseline scenarios added street network to support the intensity and form of development envisioned in the CDP future land use recommendations. With regard to the Synchro models used to evaluate the impacts of added traffic, this included the extension of Trabert Avenue to Deering Road and a new signal on Northside Drive, north of Deering Road in the vicinity of the existing intersection of Northside Drive and Northside Circle, though it may take a different alignment from the present Northside Circle.

Trip Generation from Development

Although trip generation calculations were performed per standard ITE practice, modifications were made to the basic development program inputs to provide a more accurate estimate of Subarea 8 traffic impact. This involved three principal steps. First, the levels of 2020 market absorption forecast in the RCLCO Belt-Line Market Forecast 2008 were adjusted for the geographic boundaries of Subarea 8. The market study covered a larger geography than the Subarea 8 master plan study, and for this reason the development program was adjusted to account for 70 percent of retail, 80 percent of housing, and 90 percent of office demand. The adjustments to the different program components are detailed in Table 5.1.1 below.

The second step in calculating trip generation was to remove any program that would result in double-counting beyond current traffic. Not all proposed development in the subarea would be new development on currently vacant land. Multiple sites proposed for redevelopment currently feature existing development, and the vehicle trips generated through this program were presumed in this analysis to be reflected in the existing traffic volumes analyzed and discussed in Section 4 of this report. Instead of adding a full amount of traffic to represent each traffic zone's proposed future development program, only the traffic associated with the net addition in program was presumed and added to existing traffic volumes.

Table 5.1.1: 2020 Development Program

Land Use	2020 Market Demand (Subarea 8)	Study Area Capture	Study Area Program	Existing Development Replaced	Adjusted Program
Townhouse/Condo	4,122	80%	3,297	(459)	2,838
Retail	754,716	70%	528,301	(9,082)	519,219
Office	527,135	90%	474,421	(215,300)	259,121

The third step was to adjust the rates of internal capture of trips applied to each analysis zone's development program. ITE methodology includes a standard method of calculation that results in higher internal capture rates when a more complex mix of uses is featured on a given site, but traditionally has not sought to account for the built form of development— especially development designed to feature access to premium transit.

In recent years, ITE has partnered with researchers to perform surveys of transit-oriented developments in order to develop a more nuanced understanding of trip generation and internal capture. These surveys have suggested that transit-oriented development, both from the manner in which complementary uses are arranged (especially vertically within the same structures) and from the emphasis placed on pedestrian access and connectivity within developments, yields higher rates of internal capture, up to 60 percent in the Washington, DC region and nearly 50 percent in Portland, Oregon. In keeping with the standard structure of the ITE trip generation methodology, these reductions are exclusive of the transit share reduction of trips that is calculated separately.

For this reason, the Subarea 8 analysis used a 20 percent rate of internal capture, slightly higher than the results of the calculations of standard ITE methodology (which varied from 14 to 18 percent based on the analysis zone).

Analysis Results

Figures 5.1.1 through 5.1.7, illustrate the inputs and results of the Synchro-based analysis for this scenario. Figure 5.1 depicts the approach geometries assumed at each intersection. Figures 5.2 and 5.3 show the specific traffic volumes applied to each intersection for the AM and PM peak hours, respectively. Figures 5.1.4 through 5.1.7 show the total volumes and the HCM signalized intersection analysis results for the subarea network.

In general, added congestion and delay is far more pronounced in the PM peak hour than the AM peak, especially along the Northside Drive corridor. A major reason for this is the already-greater volumes using northbound Northside Drive in the PM peak, presumably to access I-75. However, the retail component of the proposed subarea development program, following general trends in retail hours of operation, tends to generate a greater amount of trips in the afternoon than in the morning, adding to the traffic using the subarea roadway network.

As Table 5.1.7 shows, the subarea's roadway network experiences its greatest congestion at intersections on Northside Drive in the PM peak hour. Many of these intersections are operating near capacity in existing conditions, and the addition of traffic from future development depends on key turning movements for traffic to reach other parts of Atlanta outside of Subarea 8.

Notable major factors contribute to this:

- **Northside Drive functions as a hybrid regional thoroughfare and connecting street network link for Subarea 8 traffic.** The road already carries heavy PM peak hour volumes, especially in the northbound direction. These volumes are higher than those in the 'mirror' movement of southbound volumes in the AM peak, presumably due to the differences in access to and from Interstate 75 in northbound and southbound directions. Generally speaking, access from the interstate for Atlanta CBD-bound morning commuters is more extensive than access to the interstate for northbound afternoon commuters leaving the Atlanta CBD.

- **Signal timing, while being optimized, was limited in order to not result in excessive wait times for pedestrian crossings.** In all Synchro-based analysis, network-wide signal optimization was not allowed to exceed 150-second cycle lengths. It is possible that use of longer cycles would have reduced delay and improved levels of service by allowing additional green time for Northside Drive traffic, but the Subarea 8 planning team maintained a position that this would impair walkability and reinforce motorists' perception of Northside Drive as a high-speed mobility street (as well as pedestrians' perspective of Northside Drive as a hostile walking environment with long waits for signal-protected crossings), both of which are counter to the intent of the subarea master plan.

- **Traffic distribution assumptions were based partially on current distributions of turning movements.** Key intersections were used as 'decision points' where motorists might turn or continue along a route; current traffic counts and the distribution of volume over the intersections' various turning movements were used as a guide for how to distribute added traffic. For example, if, of northbound traffic approaching an intersection, 10 percent currently turns left, 70 percent continues through, and 20 percent turns right, these same ratios would be the basis for distributing new northbound traffic generated from added development. In some cases, this caused an increase in volume suggesting a need for major changes to intersection design, such as a second westbound left turn lane at 17th Street and Northside Drive or a southbound right turn lane at Huff Road and Howell Mill Road; these increases in volume might not happen as increased congestion and delay on these movements prompt motorists to select other routes for travel.

Overall, the increase in delay, especially along Northside, points to the degree of change that the Atlanta BeltLine project and the development to be coordinated with it would bring to Subarea 8. As the predominantly industrial nature of the subarea's land use patterns evolves into a richer mix of active community uses, it is reasonable to expect that traffic will increase, especially along the currently limited options for mobility on the subarea's roadway network.

Table 5.1.2: Baseline 2020 Trip Generation - Total														
Land Use	ITE Code	Intensity		Daily Trip Ends	PM Peak-Hour Trip Ends					AM Peak-Hour Trip Ends				
					Total	In		Out		Total	In		Out	
						%	Trips	%	Trips		%	Trips	%	Trips
Townhouse/Condo	230	2,838	DU	11,816	934	67%	626	33%	308	1,249	17%	212	83%	1,036
Retail	820	519,219	GLA	19,811	1,918	49%	940	51%	978	519	61%	317	39%	202
Office	710	259,121	GFA	2,777	369	17%	63	83%	306	402	88%	354	12%	48
Total				**34,404**	**3,221**		**1,628**		**1,593**	**2,170**		**883**		**1,287**
Rates	***Daily***	***PM Peak***	***AM Peak***											
Internal Capture	20.00%	20.00%	20.00%	6,881	644		326		319	434		177		257
Modal Split	15.00%	15.00%	15.00%	4,129	387		195		191	260		106		154
Retail Pass-By		48.00%		597	597		292		304	162		99		63
Net External				22,798	1,594		815		779	1,314		502		812

Table 5.1.3: Baseline 2020 Trip Generation - Zone 1 *(Refer to Figure 3.1.1, page 10, for location and extent)*														
Land Use	ITE Code	Intensity		Daily Trip Ends	PM Peak-Hour Trip Ends					AM Peak-Hour Trip Ends				
					Total	In		Out		Total	In		Out	
						%	Trips	%	Trips		%	Trips	%	Trips
Townhouse/Condo	230	1,064	DU	5,033	418	67%	280	33%	138	468	17%	80	83%	389
Retail	820	88,115	GLA	6,255	584	49%	286	51%	298	88	61%	54	39%	34
Office	710	6,621	GFA	165	86	17%	15	83%	72	21	88%	19	12%	3
Total				**11,453**	**1,089**		**581**		**508**	**578**		**152**		**426**
Rates	***Daily***	***PM Peak***	***AM Peak***											
Internal Capture	20.00%	20.00%	20.00%	2,291	218		116		102	116		30		85
Modal Split	15.00%	15.00%	15.00%	1,374	131		70		61	69		18		51
Retail Pass-By		56.00%		214	214		105		109	32		20		13
Net External				7,573	526		290		236	360		84		277

Table 5.1.4: Baseline 2020 Trip Generation - Zone 2 *(Refer to Figure 3.1.1, page 10, for location and extent)*														
Land Use	ITE Code	Intensity		Daily Trip Ends	PM Peak-Hour Trip Ends					AM Peak-Hour Trip Ends				
					Total	In		Out		Total	In		Out	
						%	Trips	%	Trips		%	Trips	%	Trips
Townhouse/Condo	230	600	DU	3,057	261	67%	175	33%	86	264	17%	45	83%	219
Retail	820	87,414	GLA	6,222	581	49%	285	51%	296	87	61%	53	39%	34
Office	710	0	GFA	0	0	17%	0	83%	0	0	88%	0	12%	0
Total				**9,280**	**843**		**460**		**383**	**351**		**98**		**253**
Rates	***Daily***	***PM Peak***	***AM Peak***											
Internal Capture	20.00%	20.00%	20.00%	1,856	169		92		77	70		20		51
Modal Split	20.00%	20.00%	20.00%	1,485	135		74		61	56		16		41
Retail Pass-By		48.00%		169	169		83		86	25		15		10
Net External				5,770	370		212		159	200		47		152

Table 5.1.5: Baseline 2020 Trip Generation - Zone 3 *(Refer to Figure 3.1.1, page 10, for location and extent)*														
Land Use	ITE Code	Intensity		Daily Trip Ends	PM Peak-Hour Trip Ends					AM Peak-Hour Trip Ends				
					Total	In		Out		Total	In		Out	
						%	Trips	%	Trips		%	Trips	%	Trips
Townhouse/Condo	230	824	DU	4,029	339	67%	227	33%	112	363	17%	62	83%	301
Retail	820	293,690	GLA	13,679	1,309	49%	642	51%	668	294	61%	179	39%	115
Office	710	162,500	GFA	1,939	261	17%	44	83%	216	277	88%	243	12%	33
Total				**19,647**	**1,909**		**913**		**996**	**933**		**484**		**449**
Rates	***Daily***	***PM Peak***	***AM Peak***											
Internal Capture	20.00%	20.00%	20.00%	3,929	382		183		199	187		97		90
Modal Split	25.00%	25.00%	25.00%	3,929	382		183		199	187		97		90
Retail Pass-By		44.00%		315	315		155		161	71		43		28
Net External				11,473	830		393		437	489		247		242

Table 5.1.6: Baseline 2020 Trip Generation - Zone 4 *(Refer to Figure 3.1.1, page 10, for location and extent)*														
Land Use	ITE Code	Intensity		Daily Trip Ends	PM Peak-Hour Trip Ends					AM Peak-Hour Trip Ends				
					Total	In		Out		Total	In		Out	
						%	Trips	%	Trips		%	Trips	%	Trips
Townhouse/Condo	230	350	DU	1,913	168	67%	113	33%	55	154	17%	26	83%	128
Retail	820	50,000	GLA	4,328	400	49%	196	51%	204	50	61%	31	39%	20
Office	710	90,000	GFA	1,230	180	17%	31	83%	149	172	88%	152	12%	21
Total				**7,471**	**747**		**339**		**408**	**376**		**208**		**168**
Rates	***Daily***	***PM Peak***	***AM Peak***											
Internal Capture	20.00%	20.00%	20.00%	1,494	149		68		82	75		42		34
Modal Split	25.00%	25.00%	25.00%	1,494	149		68		82	75		42		34
Retail Pass-By		48.00%		106	106		52		54	13		8		5
Net External				4,377	343		152		191	213		117		96

Figure 5.1.1: 2020 Baseline Scenario Proposed Laneage with New Street Network from Added Development

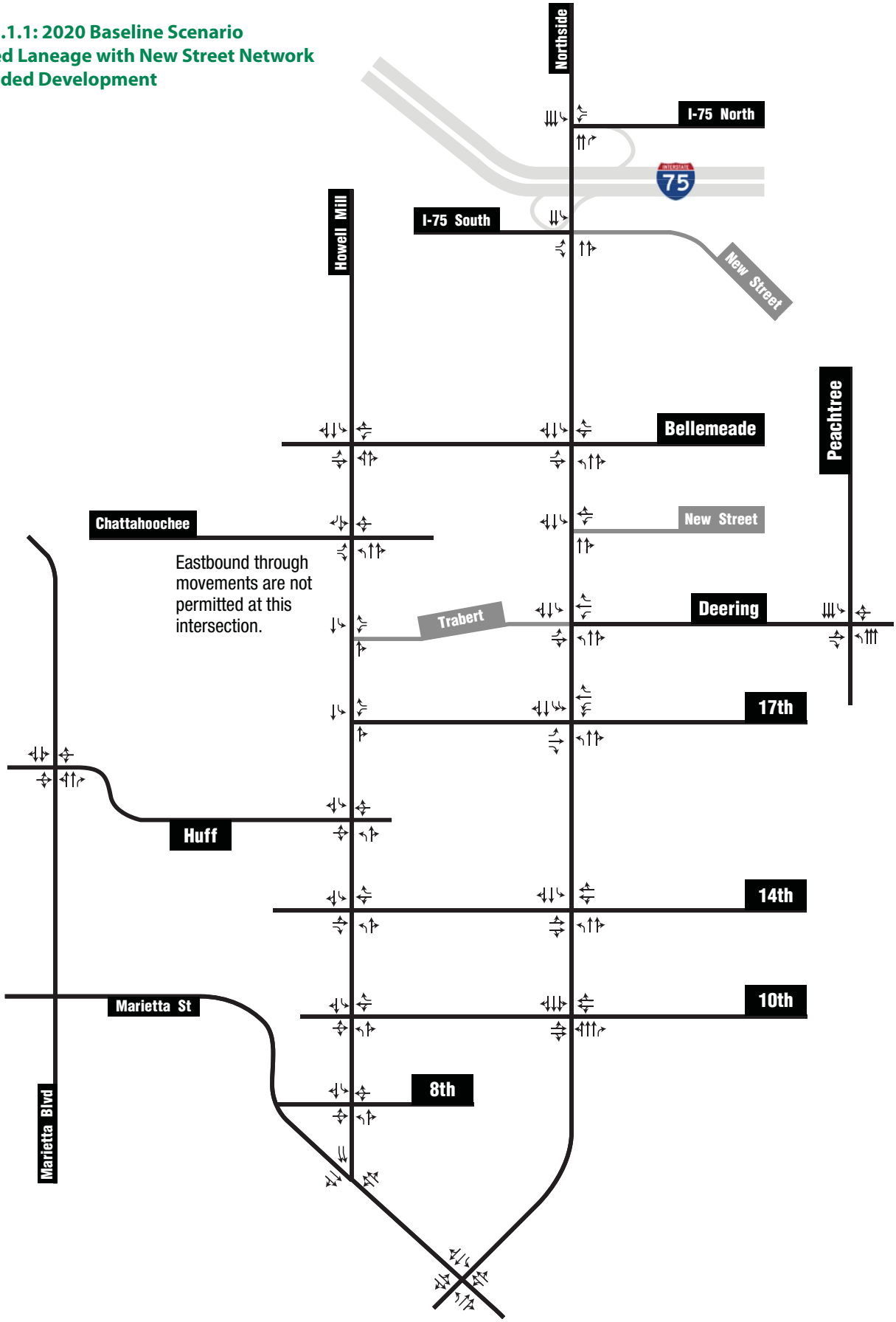


Figure 5.1.2
2020 Baseline Scenario
AM Peak Hour 2020 - Trip Generation
Applied to Subarea Intersections

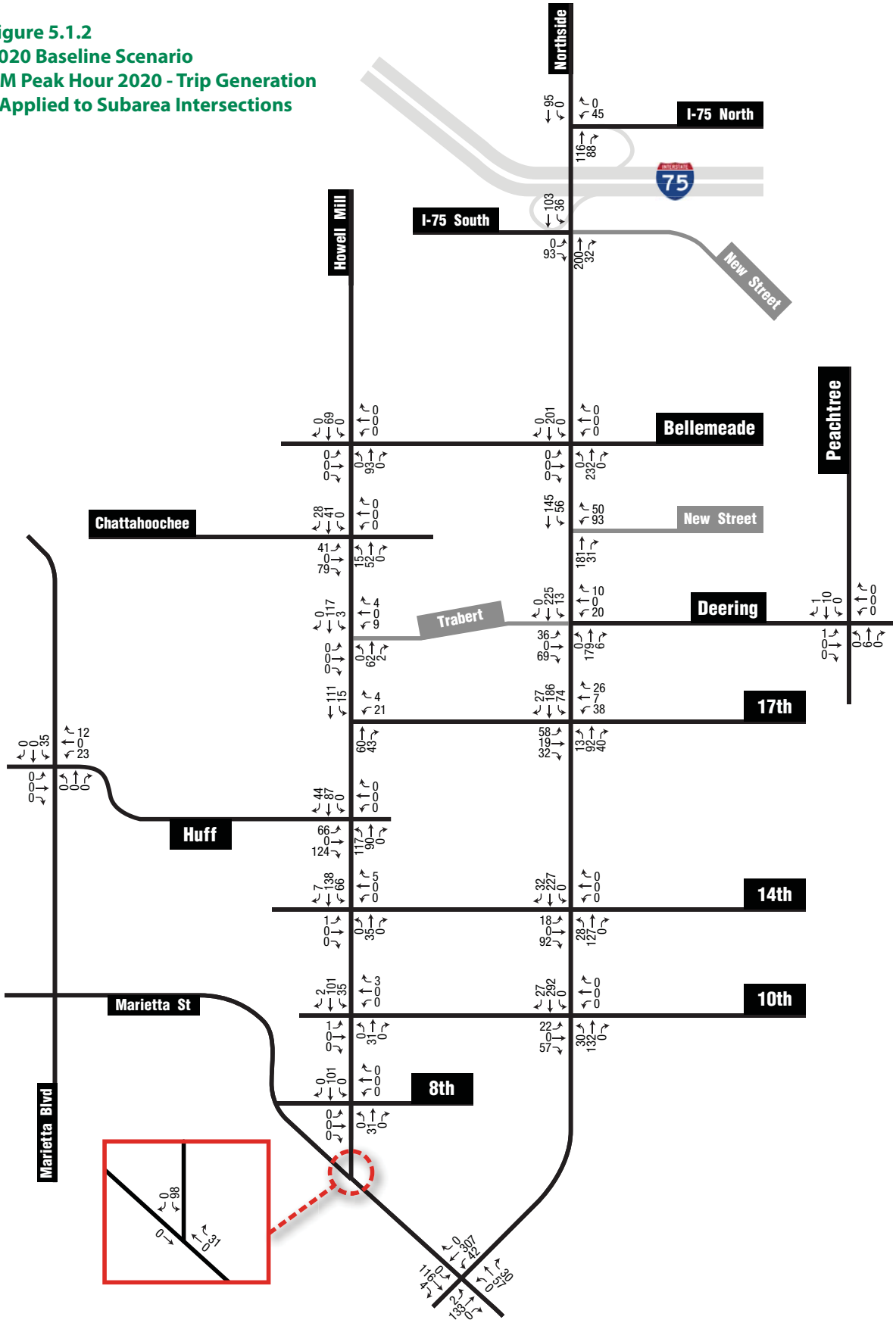


Figure 5.1.3
2020 Baseline Scenario
PM Peak Hour 2020 - Trip Generation
Applied to Subarea Intersections

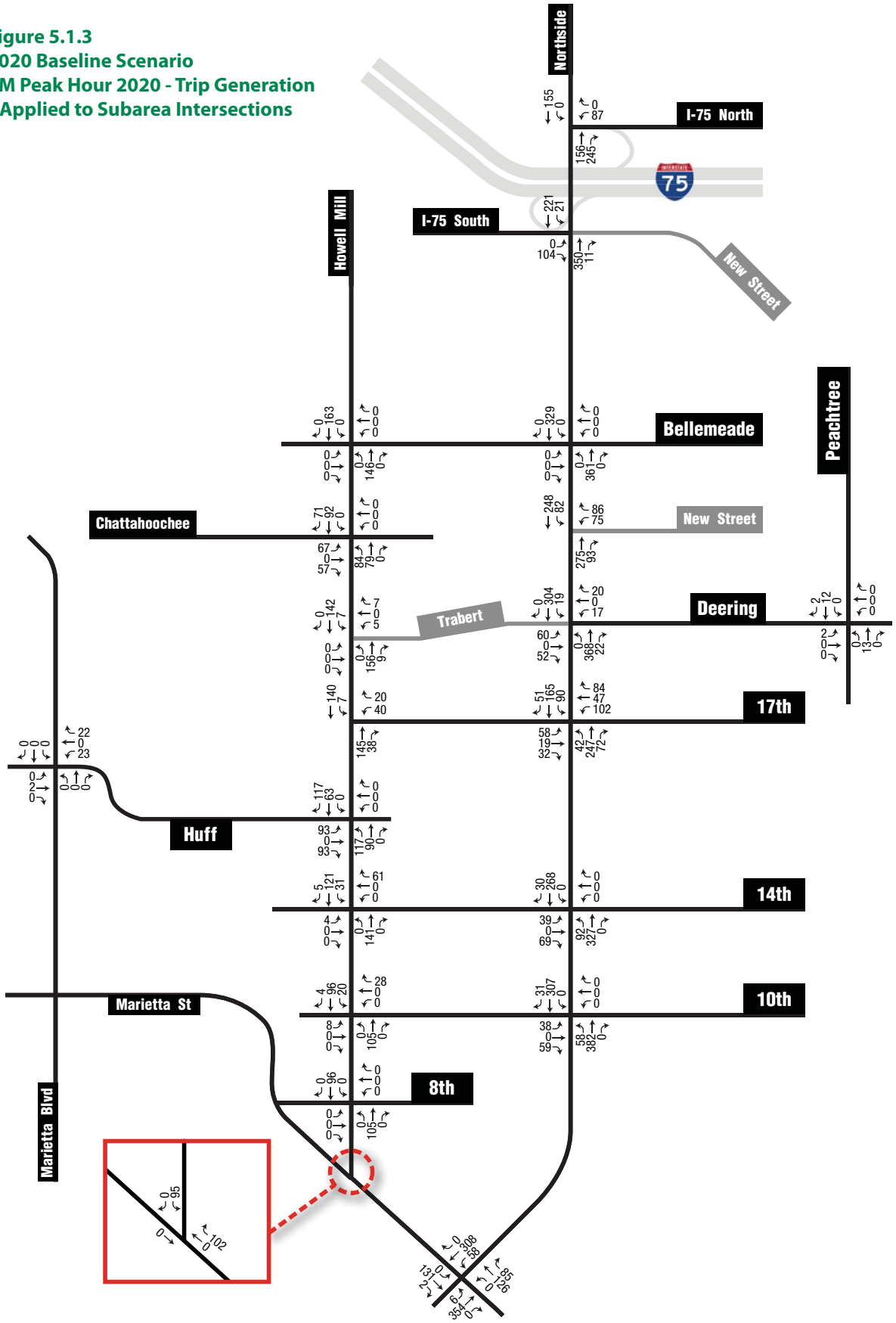


Figure 5.1.4
2020 Baseline Scenario
AM Peak Hour 2020 Volumes
without BeltLine Transit

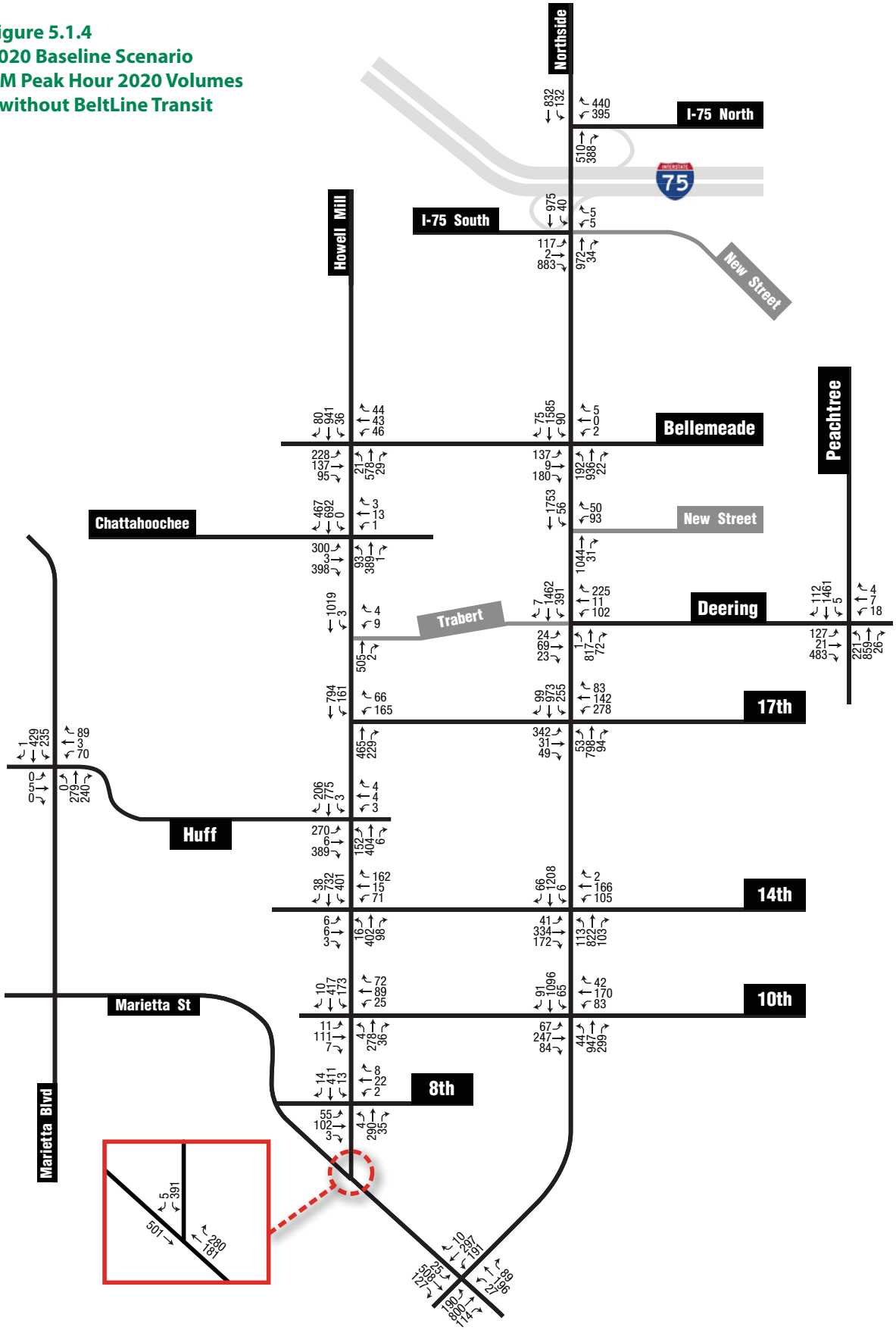


Figure 5.1.5
2020 Baseline Scenario
AM Peak Hour 2020 Levels of Service
without BeltLine Transit

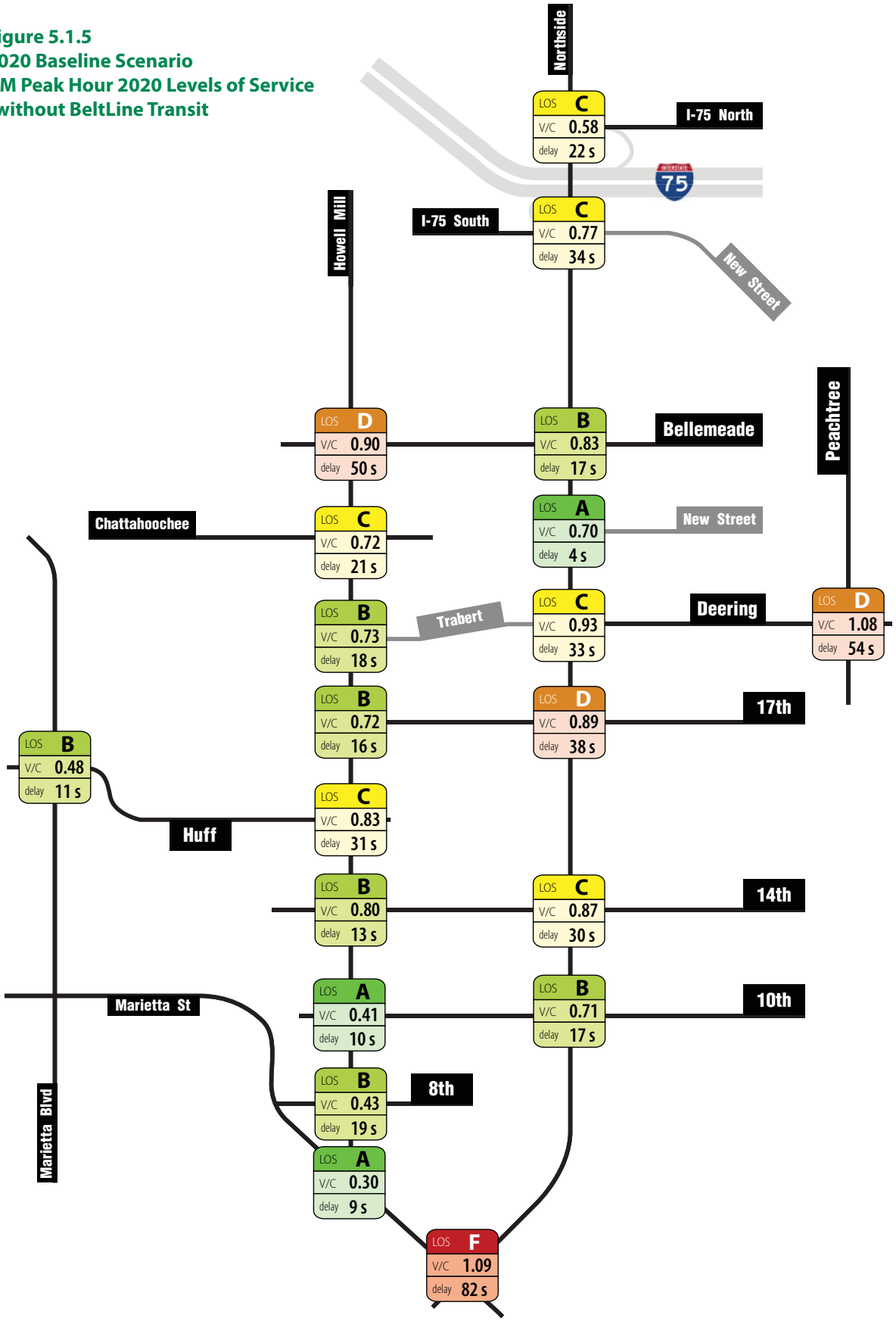


Figure 5.1.6
2020 Baseline Scenario
PM Peak Hour 2020 Volumes
without BeltLine Transit

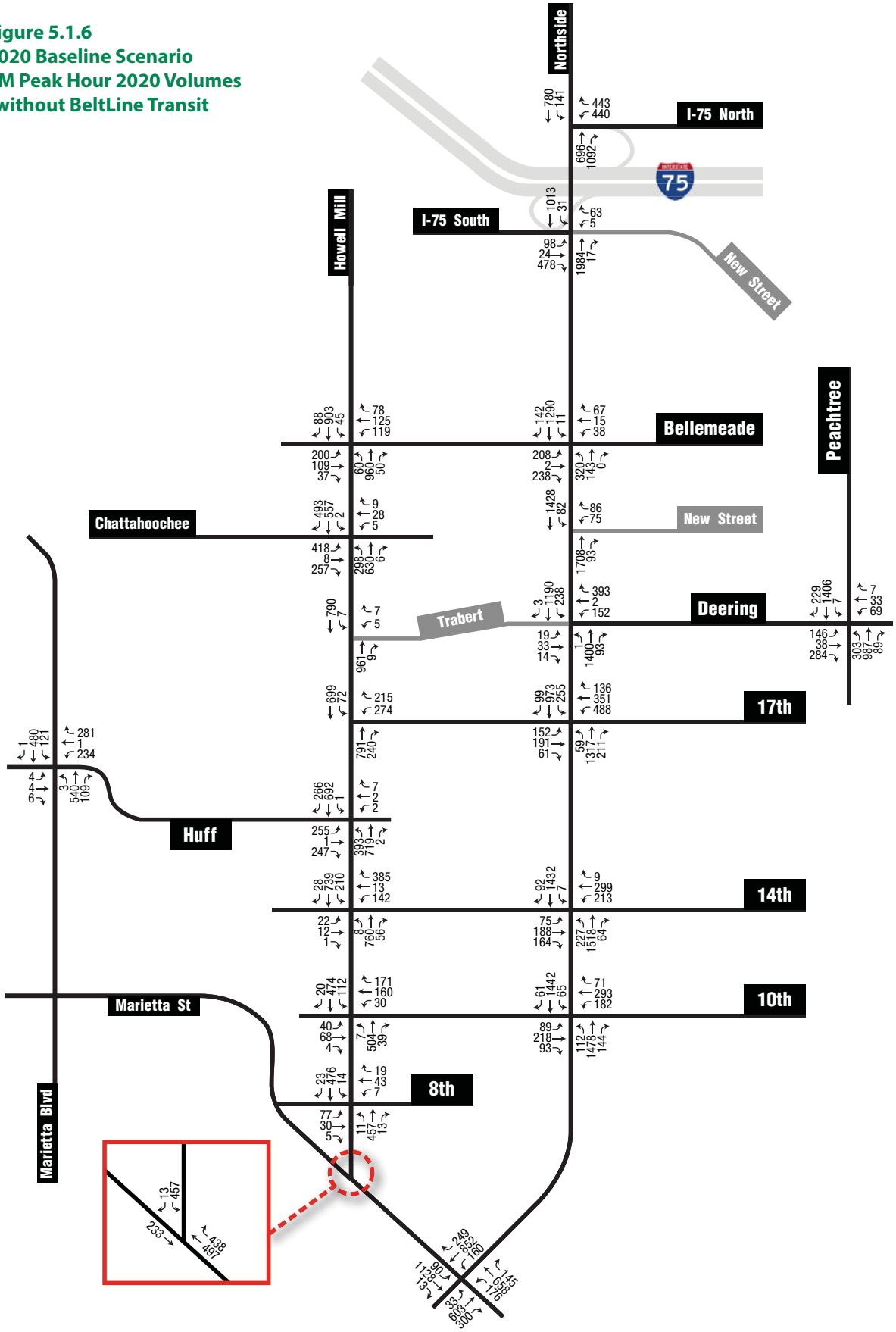


Figure 5.1.7
2020 Baseline Scenario
PM Peak Hour 2020 Levels of Service
without BeltLine Transit

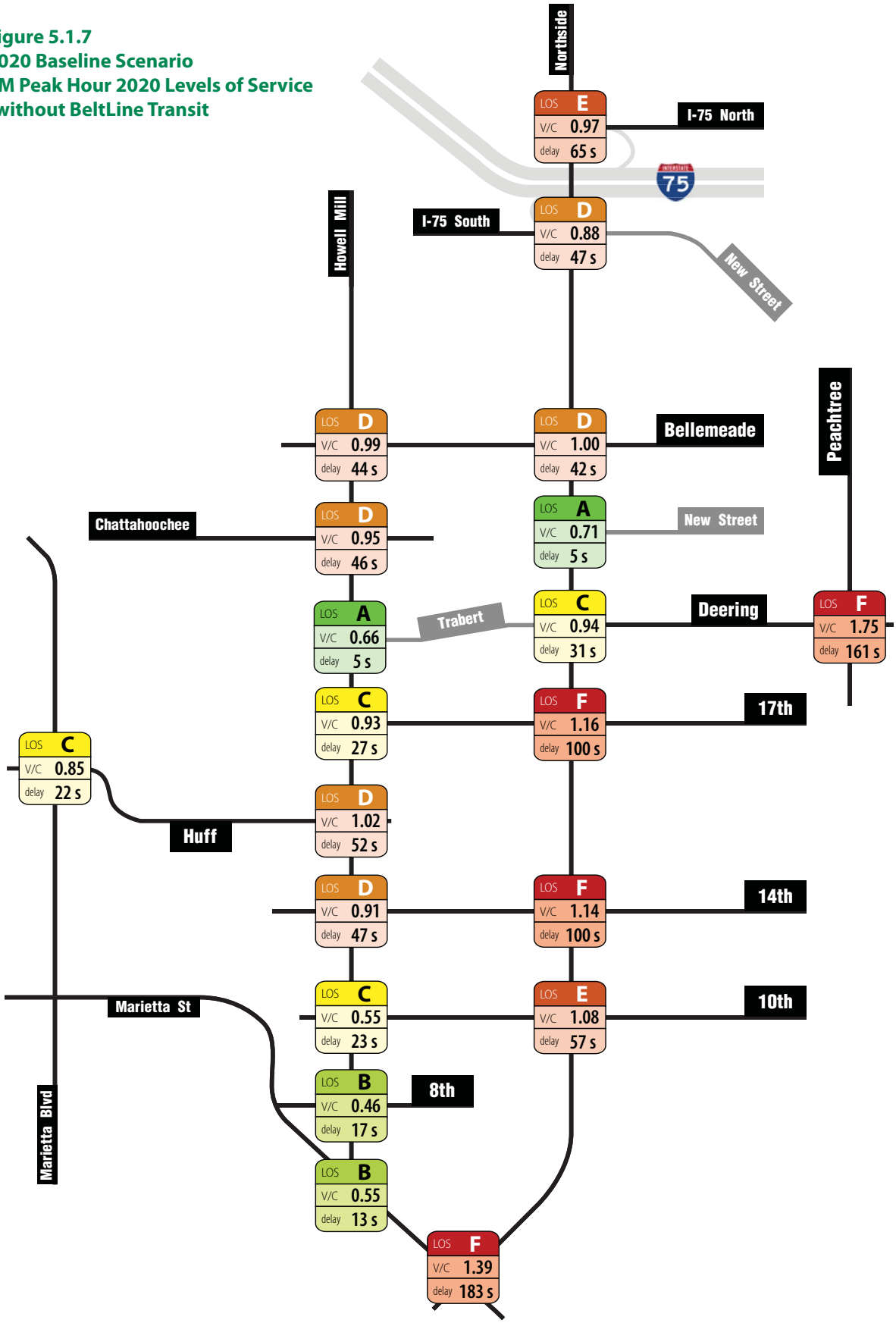


Table 5.1.7: 2020 Baseline (No BeltLine Transit) Level of Service							
Intersection	*AM Peak LOS*	*AM Peak V/C Ratio*	*AM Peak Overall Delay*	*PM Peak LOS*	*PM Peak V/C Ratio*	*PM Peak Overall Delay*	*Problematic Movements*
Northside/I-75 NB Access	C	0.58	22 sec	E	0.97	65 sec	Both WB left and NB volumes experience delays due to heavy volumes and signal timing balance.
Northside/I-75 SB Access	C	0.77	34 sec	D	0.88	47 sec	EB right movements are heavy and experience delay due to single lane on the access ramp
Northside/Bellemeade	B	0.83	17 sec	D	1.00	42 sec	NB left movements are heavy and approach capacity of a single lane; EB left movements experience delay due to inadequate signal timing
Northside/New Street	A	0.70	4 sec	A	0.71	5 sec	
Northside/Deering	C	0.93	33 sec	C	0.94	31 sec	
Northside/17th	D	0.89	38 sec	F	1.16	100 sec	All intersection approaches carry significant volumes and thus compete for limited signal time. In PM, both EB and WB left and through experience delay due to inadequate green time and heavy volumes; SBL also experiences heavy delay.

Table 5.1.7: 2020 Baseline (No BeltLine Transit) Level of Service							
Intersection	*AM Peak LOS*	*AM Peak V/C Ratio*	*AM Peak Overall Delay*	*PM Peak LOS*	*PM Peak V/C Ratio*	*PM Peak Overall Delay*	*Problematic Movements*
Northside/14th	C	0.87	30 sec	F	1.14	100 sec	In PM, all intersection approaches carry significant volumes and thus compete for limited signal time. EB and WB delay mostly because of lack of dedicated left turn storage on these approaches; NB left experiences delay due to need to prioritize heavy oncoming SB traffic volumes.
Northside/10th	B	0.71	17 sec	E	1.08	57 sec	EB and WB left and through experience delay due to inadequate green time and heavy volumes and lack of dedicated left turn storage; NBT also experiences some delay for the same reason (and greater PM NB left turn volumes than SB left turn volumes).
Northside/Marietta	F	1.08	82 sec	F	1.39	183 sec	NB movements on Marietta experience delay due to lack of dedicated left turn lane; NB Northside movements also experience delays from signal timing and right-turning friction from intersection angle.
Howell Mill/Bellemeade	D	0.90	50 sec	D	0.99	44 sec	EB left turns experience heavy delay in both peak periods.
Howell Mill/Chattahoochee	C	0.72	21 sec	D	0.95	46 sec	EB left turns experience heavy delay in both peak periods. Prohibition on through movements is a likely contributor to this delay.
Howell Mill/Deering Extension	B	0.73	18 sec	A	0.66	5 sec	
Howell Mill/17th	B	0.72	16 sec	C	0.93	27 sec	
Howell Mill/Huff	C	0.83	31 sec	D	1.02	52 sec	NB left experiences greatest delay from high volumes and inadequate green signal time.
Howell Mill/14th	B	0.71	18 sec	D	0.91	47 sec	WB left/through movements (which share a lane) experience delay due to inadequate green time; this is also something (though less) of a problem for WB right movements. Overlap green phase with SB left phase reduces this delay.
Howell Mill/10th	A	0.41	10 sec	C	0.55	23 sec	
Howell Mill/8th	B	0.43	19 sec	B	0.46	17 sec	
Howell Mill/Marietta	A	0.30	9 sec	B	0.55	13 sec	
Marietta Blvd/Huff	B	0.48	11 sec	C	0.85	23 sec	
Peachtree/Deering	D	1.08	54 sec	F	1.75	161 sec	Delay caused largely by heavy NB left turn movement with inadequate green signal time; EB approach also experiences heavy delay in PM.

5.2 2030 Baseline Scenario

This scenario is similar to the 2020 Baseline but uses an average growth rate derived from the Atlanta Regional Commission travel demand model to forecast increases in traffic between 2020 and 2030. As discussed in Section 2.2, although this growth rate is calculated on the basis of different data, the study also used 0.5 percent annual growth. All roadway assumptions for the 2020 Baseline scenario are incorporated into the 2030 Baseline scenario, along with additional changes to roadway geometry derived from long-range transportation plan projects. The most notable of these is the Northside Drive capacity project, discussed in more detail in the following paragraph.

Planned Transportation Improvement Projects

The ARC Envision6 long-range transportation plan and its successor, Plan 2040, both include a capacity-adding project on Northside Drive, widening the extent north of 14th Street from four to six vehicle travel lanes. For purposes of this study, the analysis assumed that this project would include auxiliary turn lanes at intersections as needed.

Added Local Street Network and Traffic Control

The 2030 baseline scenarios used the same added street network as in the 2020 baseline scenarios, which consisted primarily of an extension of Trabert Avenue from Northside Drive to Howell Mill Road and an addition of new signalized street access at Northside Circle and to the eastern leg of the existing intersection of Northside Drive and the southbound I-75 off-ramp.

2030 Baseline Scenario: What would 2030 be like if we had today's traffic patterns and mode split and only the redevelopment under the Subarea 8 land use plan?

FACTOR	HOW IT APPEARS IN THIS ANALYSIS
Year of Analysis	2030
Road Network	2030 RTP Network and New Development Streets
Traffic Volumes	2020 Analysis Volumes (0.5 percent Annual Background Growth to 2020 + Trip Generation from added development for 2020) increased with 0.5 percent Annual Background Growth from 2020 to 2030
Mode Split	Varies based on analysis zone and location, but calculated according to BeltLine methodology
Trip Assignment	2010 Existing Pattern, though additional traffic has been added to the extended Deering Road anticipating a shift in travel patterns based on its new offering of east-west connectivity

What assumptions were made in traffic modeling to allow the results discussed in this section?

FACTOR	ASSUMPTION
Roadway Improvements	All improvements from 2020 Baseline scenarios, with added travel lane per direction on Northside Drive north of 14th Street. No improvements were assumed south of 14th.
Optimized Cycle Length	**AM:** 90 seconds (half-cycles allowed) **PM:** 120 seconds (half-cycles allowed)

Analysis Results

As expected, the addition of the third travel lane per direction on Northside Drive substantially reduces congestion and delay as experienced at key Northside intersections, most notably in the PM peak hour. Northside continues to experience higher levels of delay on a corridor-wide basis than Howell Mill Road does, but the increase of intersection storage capacity brought about from the assumed widening allowed several intersections performing at failing levels of service in 2020 to be restored to acceptable levels of service by 2030, even considering the growth in traffic from 2020 to 2030.

Nonetheless, the analysis points to several specific movements that continue to experience delay at Northside Drive intersections, especially on cross-streets. This is most often due to the lack of dedicated left turn storage lanes, such as at 10th and 14th Streets. In the case of the intersection with Deering Road, signal timing priority is given to Northside Drive movements such that even minor additions of volume to the eastbound and westbound approaches greatly compound delay for these movements. Although the study assumed traffic volumes on Deering Road that were light relative to those on Northside Drive , this delay can be expected to increase as the connection of Trabert Avenue to Deering Road becomes a more desirable option and commuters increasingly use it.

In addition, the intersections of Howell Mill Road with Chattahoochee and Bellemeade Avenues begin to experience added congestion, largely due to the use of the Chattahoochee intersection by added traffic related to future development and the difficulty in coordinating signalization for all movements at this intersection and the Bellemeade/Howell Mill intersection just to its north.

As with other scenarios, a small number of intersections on the periphery of Subarea 8 experience congestion due to factors not directly associated with future development. Some, such as the intersection of Peachtree and Deering Roads, experience congestion today and, due to constraints of the built and natural environments, are largely limited to their current configuration. In other cases, such as the Marietta Street/ Northside Drive intersection, face inherent challenges due to particular factors of their geometric design and their location relative to other intersections.

To be sure, added traffic from future development does increase the traffic burden that these intersections must bear and does, in some cases, degrade their overall performance. However, these intersections experience problems in current conditions and their performance in future-year scenarios should be considered in light of how they function as major intersections for city-wide thoroughfares.

Figure 5.2.1: 2030 Baseline Scenario
2030 Proposed Laneage

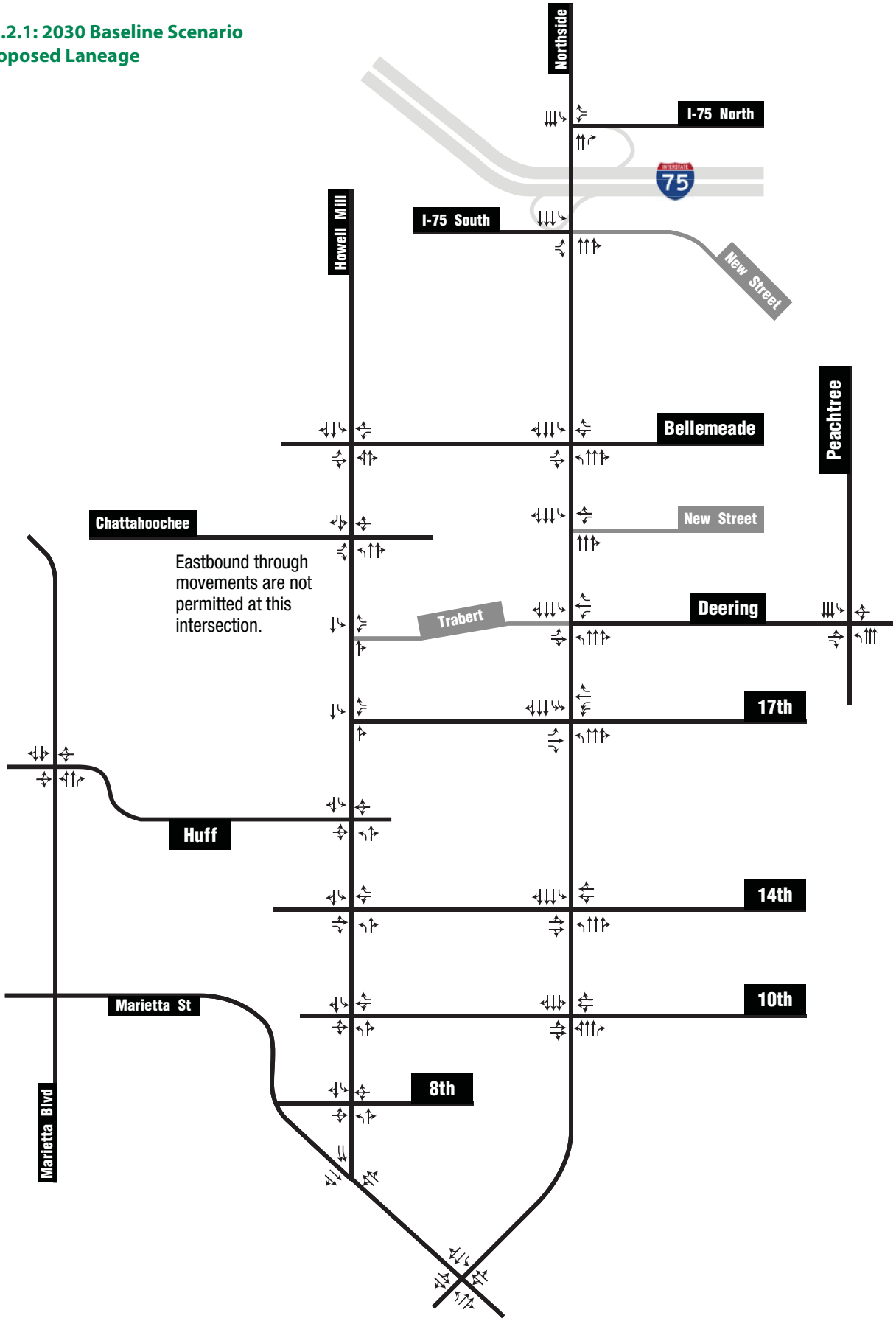


Figure 5.2.2
2030 Baseline Scenario
AM Peak Hour 2030 Volumes
without BeltLine Transit

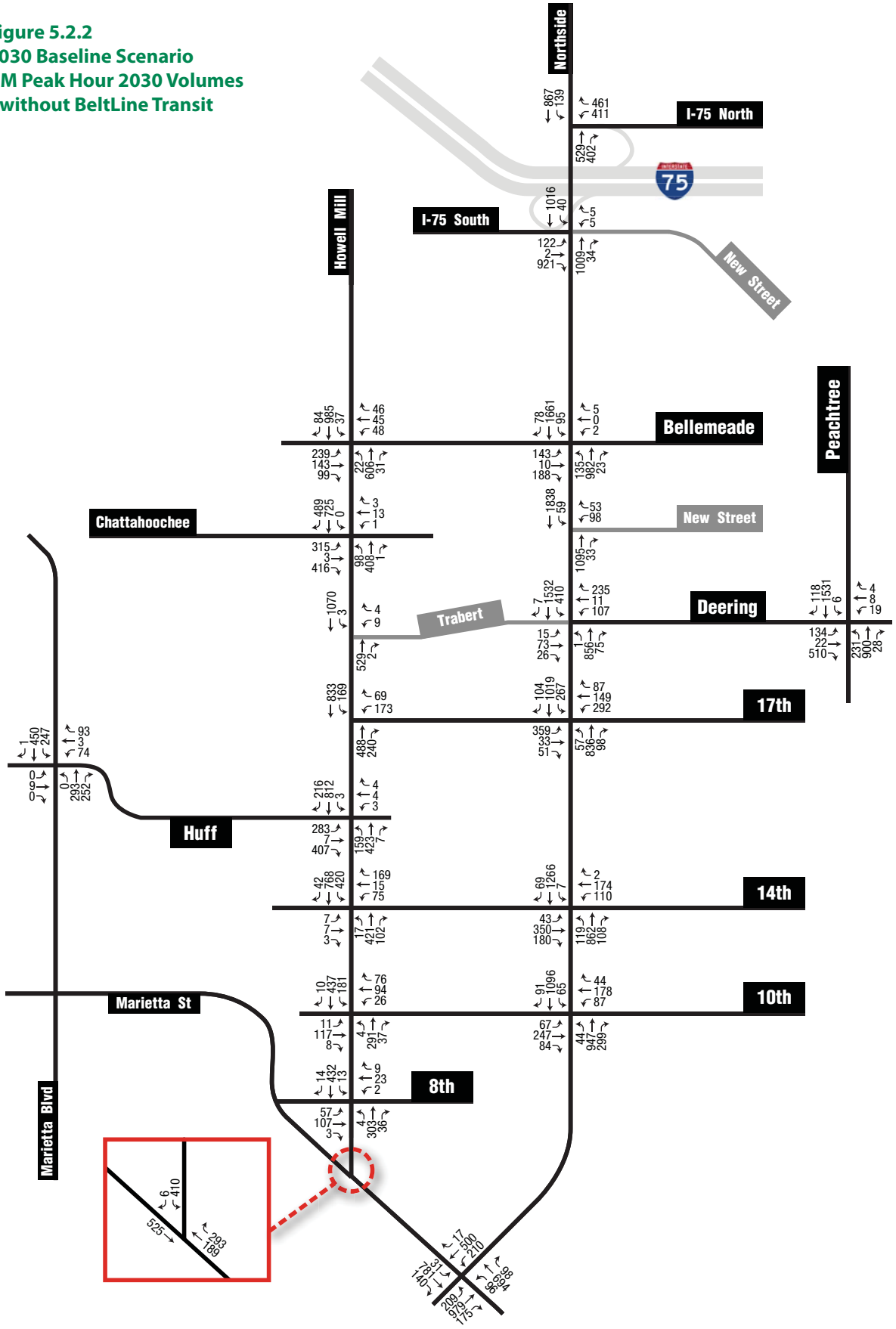


Figure 5.2.3
2030 Baseline Scenario
AM Peak Hour 2030 Levels of Service
without BeltLine Transit

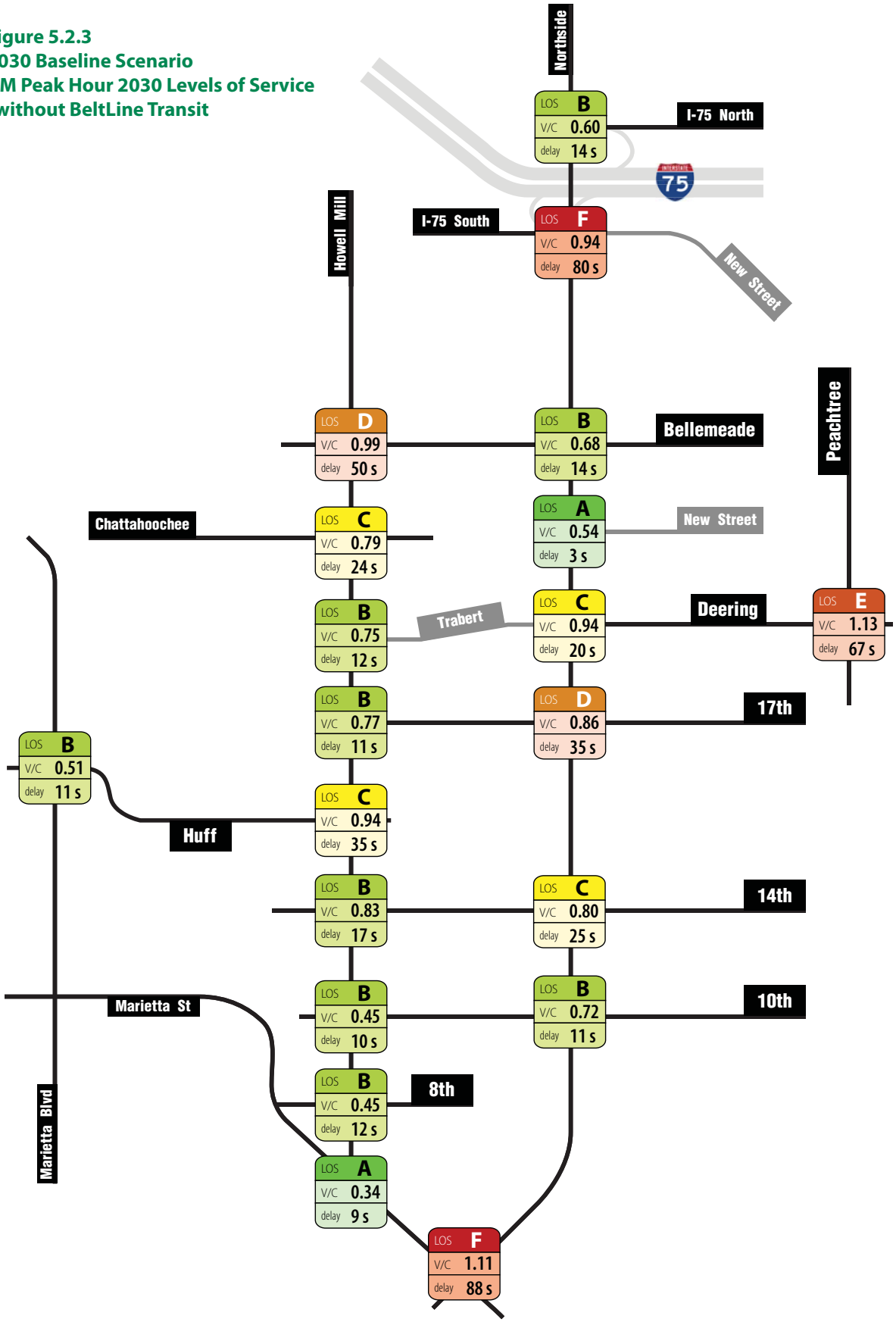


Figure 5.2.4
2030 Baseline Scenario
PM Peak Hour 2030 Volumes
without BeltLine Transit

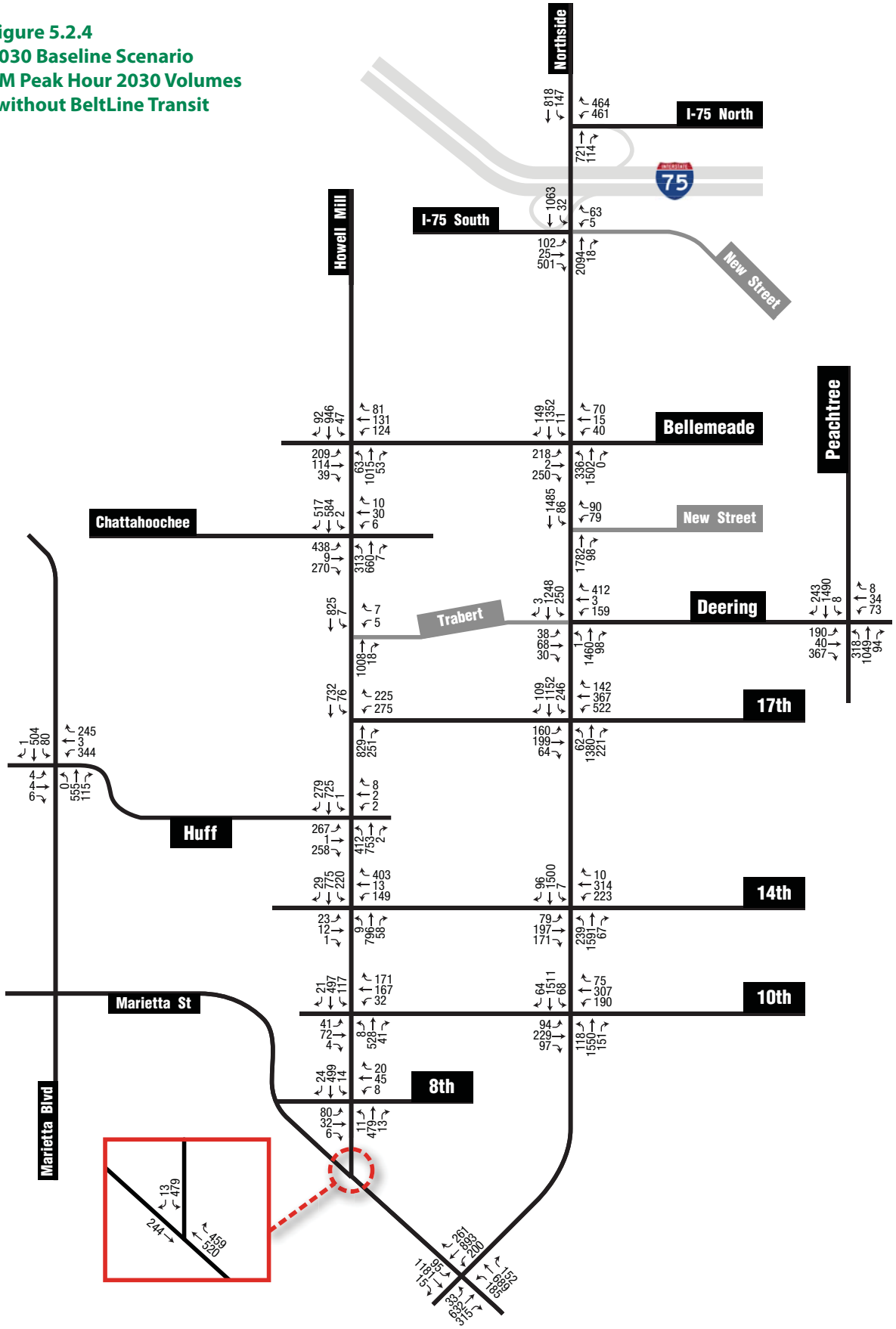


Figure 5.2.5
2030 Baseline Scenario
PM Peak Hour 2030 Levels of Service
without BeltLine Transit

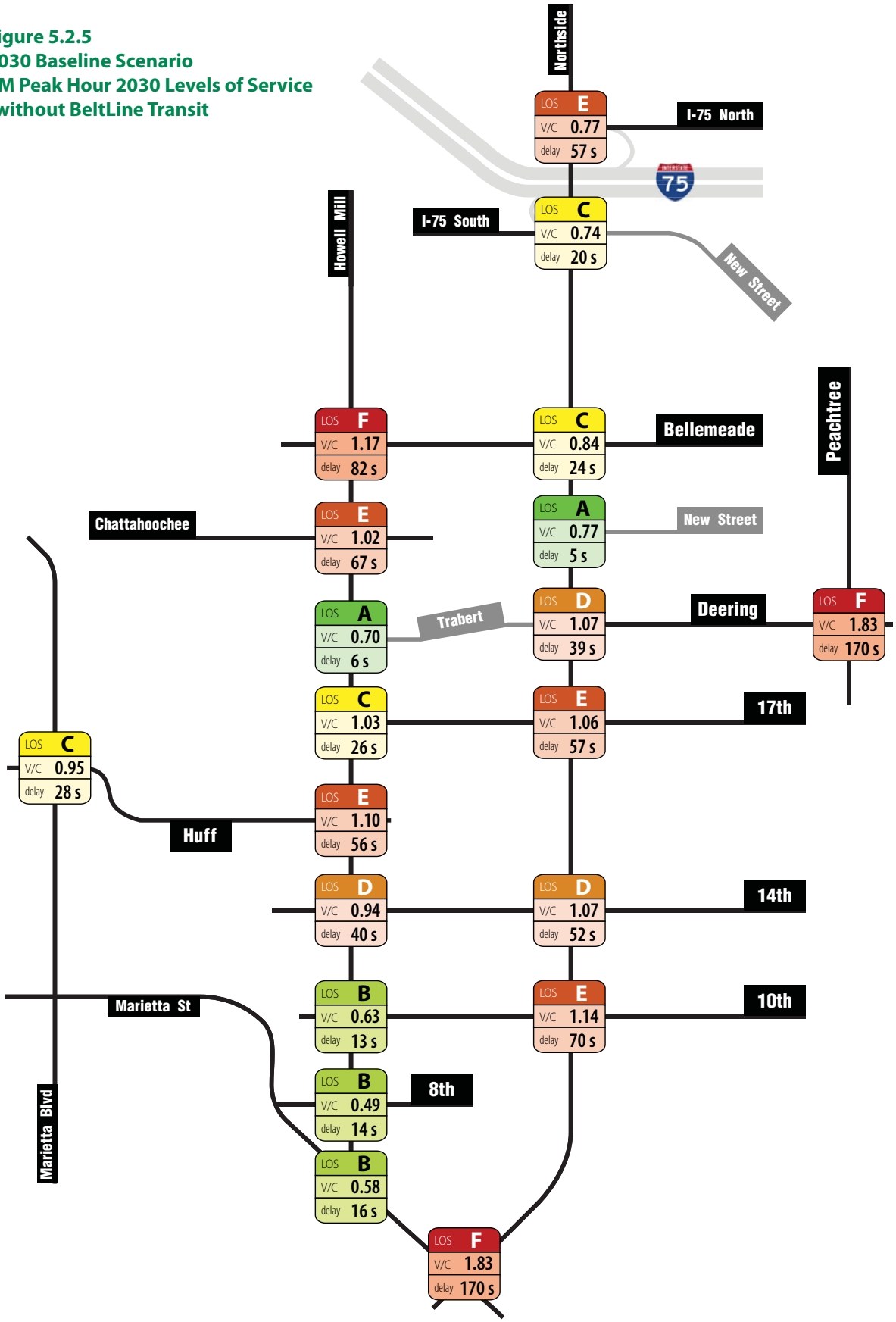


Table 5.2.1: 2030 Baseline (No BeltLine Transit) Level of Service							
Intersection	*AM Peak LOS*	*AM Peak V/C Ratio*	*AM Peak Overall Delay*	*PM Peak LOS*	*PM Peak V/C Ratio*	*PM Peak Overall Delay*	*Problematic Movements*
Northside/I-75 NB Access	B	0.60	14 sec	E	0.77	57 sec	Heavy NB right turns cause spillback and delay
Northside/I-75 SB Access	F	0.94	80 sec	C	0.74	20 sec	AM delay caused mostly by heavy EB right movement in single approach lane on interstate ramp. Northside Drive capacity project may include peripheral capacity improvements to side-street approaches such as this.
Northside/Bellemeade	B	0.68	14 sec	C	0.84	24 sec	
Northside/New Street	A	0.54	3 sec	A	0.71	5 sec	
Northside/Deering	B	0.94	20 sec	D	1.07	39 sec	Greatest delay experienced in WB left; small increments of added volume at this intersection produce disproportionately greater delay due to high priority in signal timing to move NB traffic.
Northside/17th	C	0.86	35 sec	E	1.06	57 sec	PM delay due to inadequate signal time for EB left and WB through movements, both of which must have exclusive phase intervals. SB left delay also high due to signal timing, although heavier opposing NB through has priority in timing assignment.

Table 5.2.1: 2030 Baseline (No BeltLine Transit) Level of Service							
Intersection	*AM Peak LOS*	*AM Peak V/C Ratio*	*AM Peak Overall Delay*	*PM Peak LOS*	*PM Peak V/C Ratio*	*PM Peak Overall Delay*	*Problematic Movements*
Northside/14th	C	0.80	25 sec	D	1.07	52 sec	WB movements begin to show added delay in PM due to lack of dedicated left turn lane.
Northside/10th	B	0.72	11 sec	E	1.14	70 sec	EB left and all WB movements experience high delay due to signal phasing not allowing protected turns, though roadway geometry on 10th St complicates their use. NB left movements are not assumed to have a dedicated storage lane.
Northside/Marietta	F	1.11	88 sec	F	1.39	183 sec	AM delay mostly on NB Northside approach.
Howell Mill/Bellemeade	D	0.99	50 sec	F	1.17	82 sec	EB left the greatest concentration of delay; NB movements also experience delay due to sharing of lanes.
Howell Mill/Chattahoochee	C	0.79	24 sec	E	1.02	67 sec	EB left volumes the major reason for overall delay in PM; they are heavy and exceed capacity of a single turn lane. This is a heavy volume in existing conditions and BeltLine traffic additions are not on their own a major contributor to forecast volumes (see Figure 5.1.3).
Howell Mill/Deering Extension	B	0.75	12 sec	A	0.70	6 sec	
Howell Mill/17th	B	0.77	11 sec	C	1.03	26 sec	
Howell Mill/Huff	C	0.94	35 sec	E	1.10	56 sec	EB left volumes in PM heavy; delay may be lessened by implementation of full three-lane section on Huff (which provides additional storage). NB left volumes are heavy and likely to experience long queues due to signal timing needs for moving SB traffic.
Howell Mill/14th	B	0.83	17 sec	D	0.94	40 sec	Longest delays are opposing SB left and NB through movements; split phasing of signal reduces time they can be given in cycle
Howell Mill/10th	B	0.45	10 sec	B	0.63	13 sec	
Howell Mill/8th	B	0.45	12 sec	B	0.49	14 sec	
Howell Mill/Marietta	A	0.34	9 sec	B	0.58	16 sec	
Marietta Blvd/Huff	B	0.51	11 sec	C	0.95	28 sec	
Peachtree/Deering	E	1.13	67 sec	F	1.83	170 sec	Delay caused largely by heavy NB left turn movement with inadequate green signal time; EB Deering movements also experience delay for signal timing reasons.

6.0 Traffic Analysis for Build (BeltLine) Scenarios

These scenarios use the Subarea 8 land use plan as the basis for trip generation and distribution. Scenarios that include the Atlanta BeltLine transit infrastructure also assume a generally higher transit mode share due to the immediate adjacency of premium transit within the subarea.

All Build scenarios for 2020 and 2030 use generally the same assumptions for roadway geometry as the baseline scenarios. In no cases did the analysis point to a greater need for roadway capacity or different configurations in the Build (BeltLine) scenarios than was apparent for their Base (no-BeltLine) counterparts. Refer to Figures 5.1.1 and 5.2.1 for a diagram illustrating the laneage assumptions used in the traffic models.

6.1 2020 Build (BeltLine) Scenario

This scenario is the same as 2020 Baseline, but it assumes that Atlanta BeltLine transit is constructed by 2020.

Planned Transportation Improvement Projects

The ARC Envision6 long-range transportation plan does not include any roadway improvement projects within Subarea 8 between 2010 and 2020.

In addition, several small-scale projects were built into Synchro models for the subarea, spurred mostly during the course of performing the analysis as a means of mitigating intersection-specific traffic impacts. These mitigation measures formed the basis for capital project recommendations; the assumptions for the model work are listed in the table to the right.

Trip Generation from Development

Input assumptions for trip generation for the Build scenarios were identical to those for the Baseline scenarios. The only substantial difference in trip generation was the assumption of different zone-specific mode shares.

2020 Build (BeltLine) Scenario: What would 2020 be like if we had BeltLine development through 2020 and BeltLine transit?

FACTOR	HOW IT APPEARS IN THIS ANALYSIS
Year of Analysis	2020
Road Network	2020 RTP Network and New Development Streets based on BeltLine construction (i.e. assuming a westward extension of Trabert/ Culpepper to Ellsworth Industrial or Marietta Boulevard)
Traffic Volumes	2020 BeltLine Build Analysis Volumes (0.5 percent Annual Background Growth from 2010 to 2020 + Trip Generation from added development for 2020).
Mode Split	Varies based on TAZ and location, but calculated according to BeltLine methodology and assumes premium transit. In general, mode splits were higher in BeltLine scenarios than in the baseline scenarios.
Trip Assignment	Existing patterns modified with distribution of new traffic based on new development, namely on the Culpepper/Trabert connection.

What assumptions were made in traffic modeling to allow the results discussed in this section?

FACTOR	ASSUMPTION
Roadway Improvements	All improvements from 2020 Baseline scenarios, with extended Culpepper/ Trabert west of Howell Mill
Optimized Cycle Length	**AM:** 120 seconds (half-cycles allowed) **PM:** 130 seconds (half-cycles allowed)

Analysis Results

Where the 2030 assumption of a widened Northside Drive had a notable effect on overall delay reduction along that corridor, the assumption of Atlanta BeltLine transit had a notable effect more on the Howell Mill Road corridor. This is due in no small part to the assumptions of traffic distribution onto the roadway network: a significant amount of development program in the subarea is located west of Howell Mill Road and, although the extension of Trabert Ave/ Culpepper Road west to Marietta Boulevard would provide another east-west option for this traffic, it is still likely to rely heavily on Howell Mill Road as a route option. One Howell Mill Road intersection bearing noteworthy burden in this scenario is the Howell Mill/ Chattahoochee intersection, where an already-heavy eastbound left turn volume is increased by new traffic using Howell Mill Road as a way to access Interstate 75. The assumption of higher transit mode share in trip generation due to the implementation of Atlanta BeltLine transit provides a particularly high level of offset to movements such as these and helps to mitigate congestion when compared to the Baseline scenario.

By contrast, much of the traffic using Northside Drive has been assigned to it based on current turning movements (and thus may begin to use alternative routes as intersection-specific congestion becomes more acute) or is assigned to it because of its location in the southern portion of Subarea 8, where Atlanta BeltLine transit offers less of a mobility option and due to its distance and the consequent change in mode split is more modest. As a result, its intersections do not see the same level of congestion and delay relief between the Baseline and the Build scenario in a given year. In other words, where the six-lane Northside in 2030 provides the greatest relief to its intersections, the addition of Atlanta BeltLine transit provides the greatest relief to Howell Mill Road.

As seen in Table 6.1.6 on this and the opposite page, certain intersections continue to experience congestion, although Howell Mill's intersections (especially Bellemeade and Chattahoochee) are generally performing at acceptable levels of service.

Table 6.1.1: BeltLine 2020 Trip Generation - Total														
Land Use	ITE Code	Intensity		Daily Trip Ends	PM Peak-Hour Trip Ends					AM Peak-Hour Trip Ends				
					Total	In		Out		Total	In		Out	
						%	Trips	%	Trips		%	Trips	%	Trips
Townhouse/Condo	230	2,838	DU	11,816	934	67%	626	33%	308	1,249	17%	212	83%	1,036
Retail	820	519,219	GLA	19,811	1,918	49%	940	51%	978	519	61%	317	39%	202
Office	710	259,121	GFA	2,777	369	17%	63	83%	306	402	88%	354	12%	48
Total				**34,404**	**3,221**		**1,628**		**1,593**	**2,170**		**883**		**1,287**
Rates	***Daily***	***PM Peak***	***AM Peak***											
Internal Capture	20.00%	20.00%	20.00%	6,881	644		326		319	434		177		257
Modal Split	28.50%	28.50%	28.50%	7,844	734		371		363	495		201		293
Retail Pass-By		48.00%		472	472		231		241	128		78		50
Net External				**19,207**	**1,370**		**700**		**670**	**1,113**		**427**		**686**

Table 6.1.2: BeltLine 2020 Trip Generation - Zone 1 *(Refer to Figure 3.1.1, page 10, for location and extent)*														
Land Use	ITE Code	Intensity		Daily Trip Ends	PM Peak-Hour Trip Ends					AM Peak-Hour Trip Ends				
					Total	In		Out		Total	In		Out	
						%	Trips	%	Trips		%	Trips	%	Trips
Townhouse/Condo	230	1,064	DU	5,033	418	67%	280	33%	138	468	17%	80	83%	389
Retail	820	88,115	GLA	6,255	584	49%	286	51%	298	88	61%	54	39%	34
Office	710	6,621	GFA	165	86	17%	15	83%	72	21	88%	19	12%	3
Total				**11,453**	**1,089**		**581**		**508**	**578**		**152**		**426**
Rates	***Daily***	***PM Peak***	***AM Peak***											
Internal Capture	20.00%	20.00%	20.00%	2,291	218		116		102	116		30		85
Modal Split	28.00%	28.00%	28.00%	2,565	244		130		114	129		34		95
Retail Pass-By		57%		172	172		84		88	26		16		10
Net External				**6,425**	**455**		**250**		**205**	**307**		**72**		**235**

Table 6.1.3: BeltLine 2020 Trip Generation - Zone 2 *(Refer to Figure 3.1.1, page 10, for location and extent)*

Land Use	ITE Code	Intensity		Daily Trip Ends	PM Peak-Hour Trip Ends					AM Peak-Hour Trip Ends				
					Total	In		Out		Total	In		Out	
						%	Trips	%	Trips		%	Trips	%	Trips
Townhouse/Condo	230	600	DU	3,057	261	67%	175	33%	86	264	17%	45	83%	219
Retail	820	87,414	GLA	6,222	581	49%	285	51%	296	87	61%	53	39%	34
Office	710	0	GFA	0	0	17%	0	83%	0	0	88%	0	12%	0
Total				**9,280**	**843**		**460**		**383**	**351**		**98**		**253**
Rates	***Daily***	***PM Peak***	***AM Peak***											
Internal Capture	20.00%	20.00%	20.00%	1,856	169		92		77	70		20		51
Modal Split	30.00%	30.00%	30.00%	2,227	202		110		92	84		24		61
Retail Pass-By		48.00%		141	141		69		72	21		13		8
Net External				**5,056**	**331**		**189**		**143**	**176**		**42**		**134**

Table 6.1.4: BeltLine 2020 Trip Generation - Zone 3 *(Refer to Figure 3.1.1, page 10, for location and extent)*

Land Use	ITE Code	Intensity		Daily Trip Ends	PM Peak-Hour Trip Ends					AM Peak-Hour Trip Ends				
					Total	In		Out		Total	In		Out	
						%	Trips	%	Trips		%	Trips	%	Trips
Townhouse/Condo	230	824	DU	4,029	339	67%	227	33%	112	363	17%	62	83%	301
Retail	820	293,690	GLA	13,679	1,309	49%	642	51%	668	294	61%	179	39%	115
Office	710	162,500	GFA	1,939	261	17%	44	83%	216	277	88%	243	12%	33
Total				**19,647**	**1,909**		**913**		**996**	**933**		**484**		**449**
Rates	***Daily***	***PM Peak***	***AM Peak***											
Internal Capture	20.00%	20.00%	20.00%	3,929	382		183		199	187		97		90
Modal Split	30.00%	30.00%	30.00%	4,715	458		219		239	224		116		108
Retail Pass-By		44.00%		285	285		140		145	64		39		25
Net External				**10,717**	**784**		**372**		**412**	**458**		**232**		**226**

Table 6.1.5: BeltLine 2020 Trip Generation - Zone 4 *(Refer to Figure 3.1.1, page 10, for location and extent)*

Land Use	ITE Code	Intensity		Daily Trip Ends	PM Peak-Hour Trip Ends					AM Peak-Hour Trip Ends				
					Total	In		Out		Total	In		Out	
						%	Trips	%	Trips		%	Trips	%	Trips
Townhouse/Condo	230	350	DU	1,913	168	67%	113	33%	55	154	17%	26	83%	128
Retail	820	50,000	GLA	4,328	400	49%	196	51%	204	50	61%	31	39%	20
Office	710	90,000	GFA	1,230	180	17%	31	83%	149	172	88%	152	12%	21
Total				**7,471**	**747**		**339**		**408**	**376**		**208**		**168**
Rates	***Daily***	***PM Peak***	***AM Peak***											
Internal Capture	20.00%	20.00%	20.00%	1,494	149		68		82	75		42		34
Modal Split	25.00%	25.00%	25.00%	1,494	149		68		82	75		42		34
Retail Pass-By		48.00%		106	106		52		54	13		8		5
Net External				**4,377**	**343**		**152**		**191**	**213**		**117**		**96**

Figure 6.1.1: 2020 Build (BeltLine) Scenario Proposed Laneage with New Street Network from Added Development

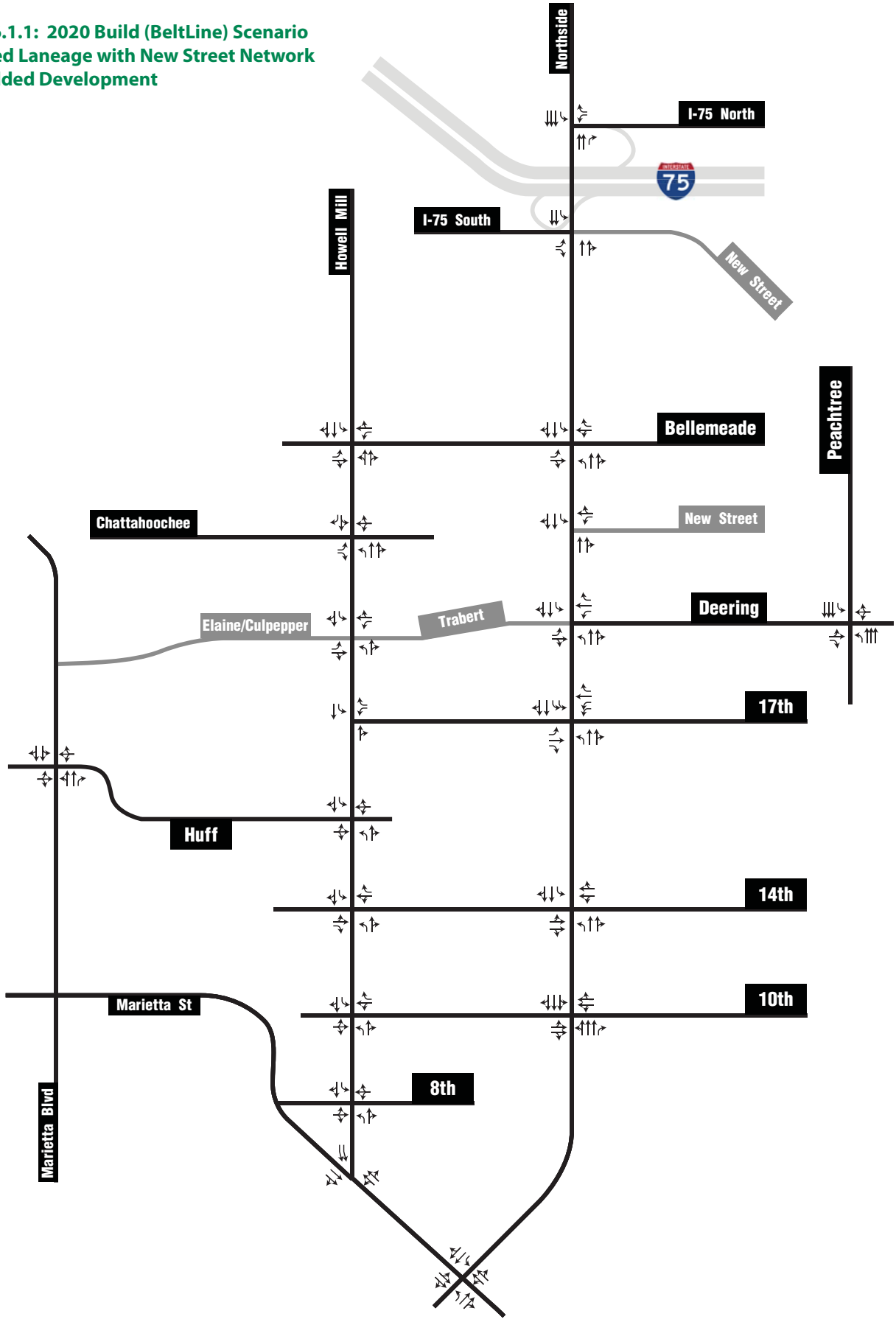


Figure 6.1.2
2020 Build (BeltLine) Scenario
AM Peak Hour 2020 - Trip Generation
Applied to Subarea Intersections

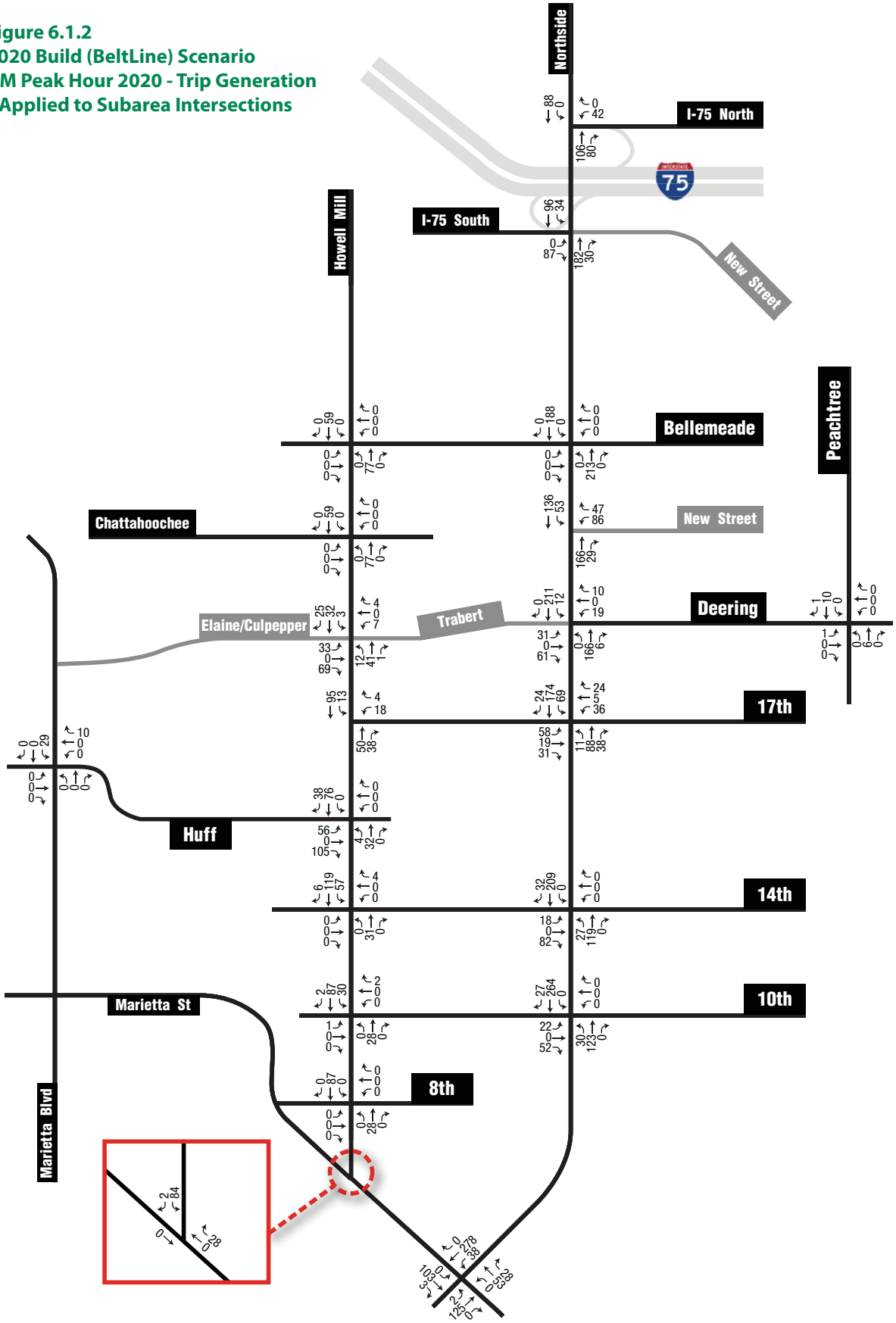


Figure 6.1.3
2020 Build (BeltLine) Scenario
PM Peak Hour 2020 - Trip Generation
Applied to Subarea Intersections

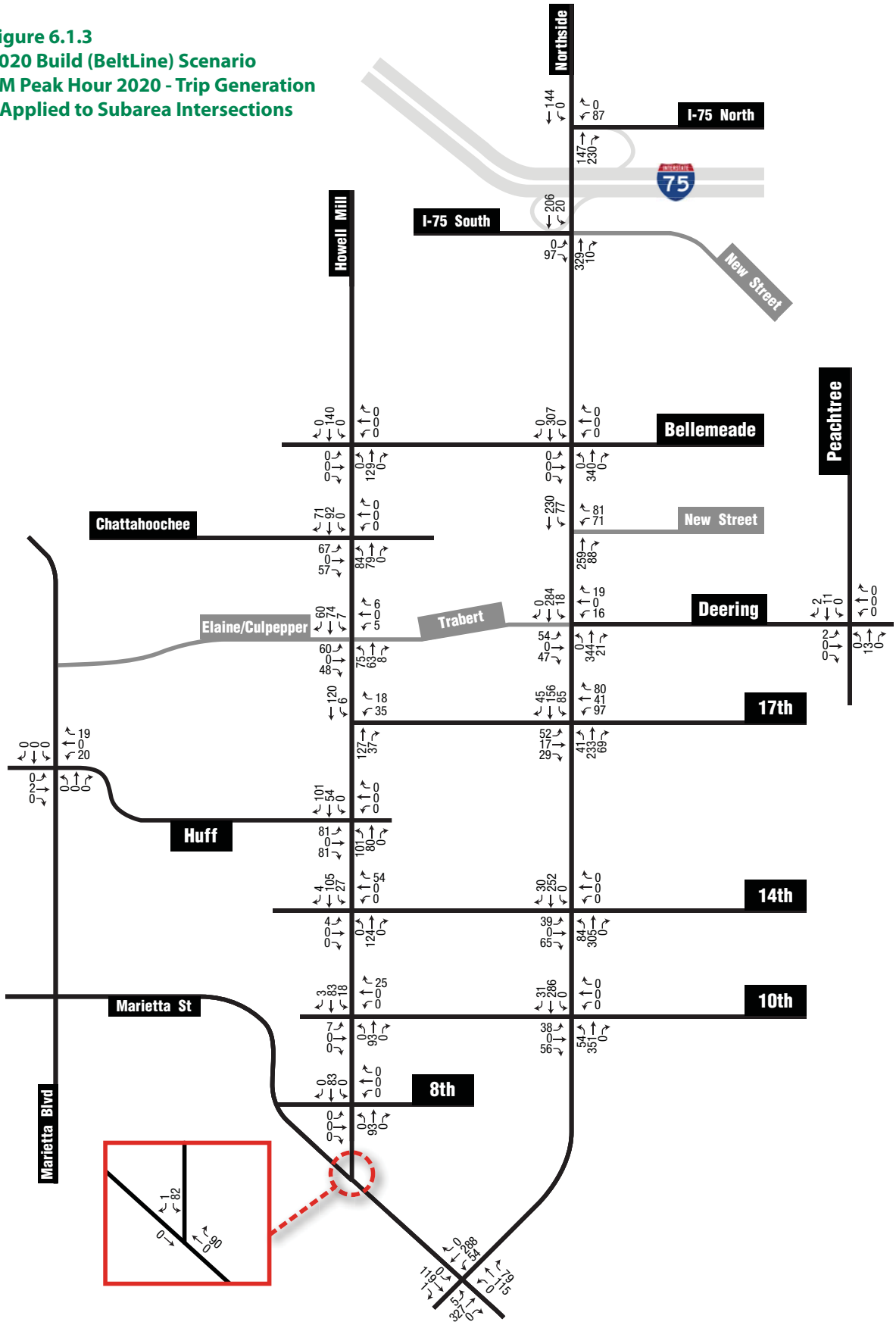


Figure 6.1.4
2020 Build (BeltLine) Scenario
AM Peak Hour 2020 Volumes
with BeltLine Transit

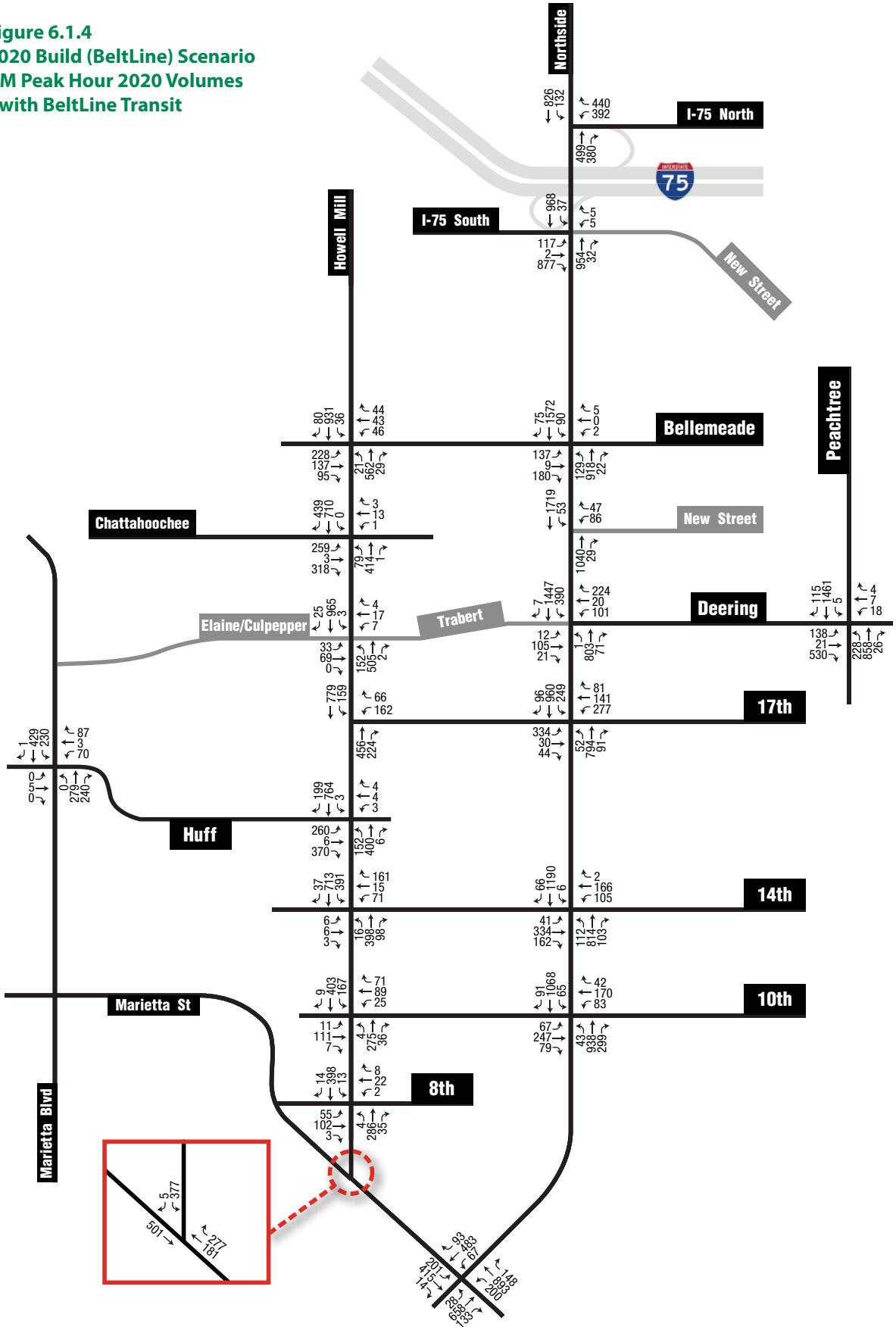


Figure 6.1.5
2020 Build (BeltLine) Scenario
AM Peak Hour 2020 Levels of Service
with BeltLine Transit

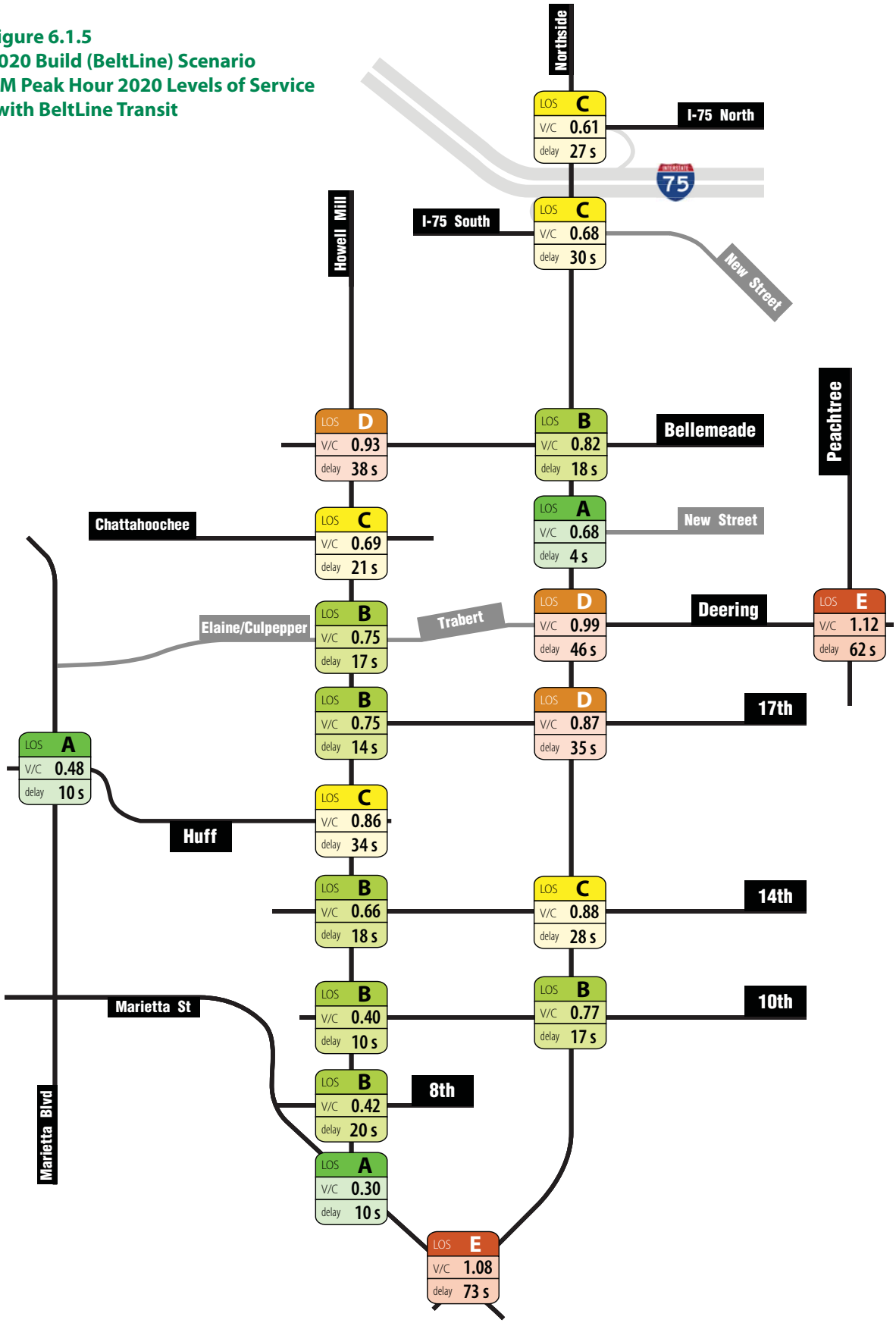


Figure 6.1.6
2020 Build (BeltLine) Scenario
PM Peak Hour 2020 Volumes
with BeltLine Transit

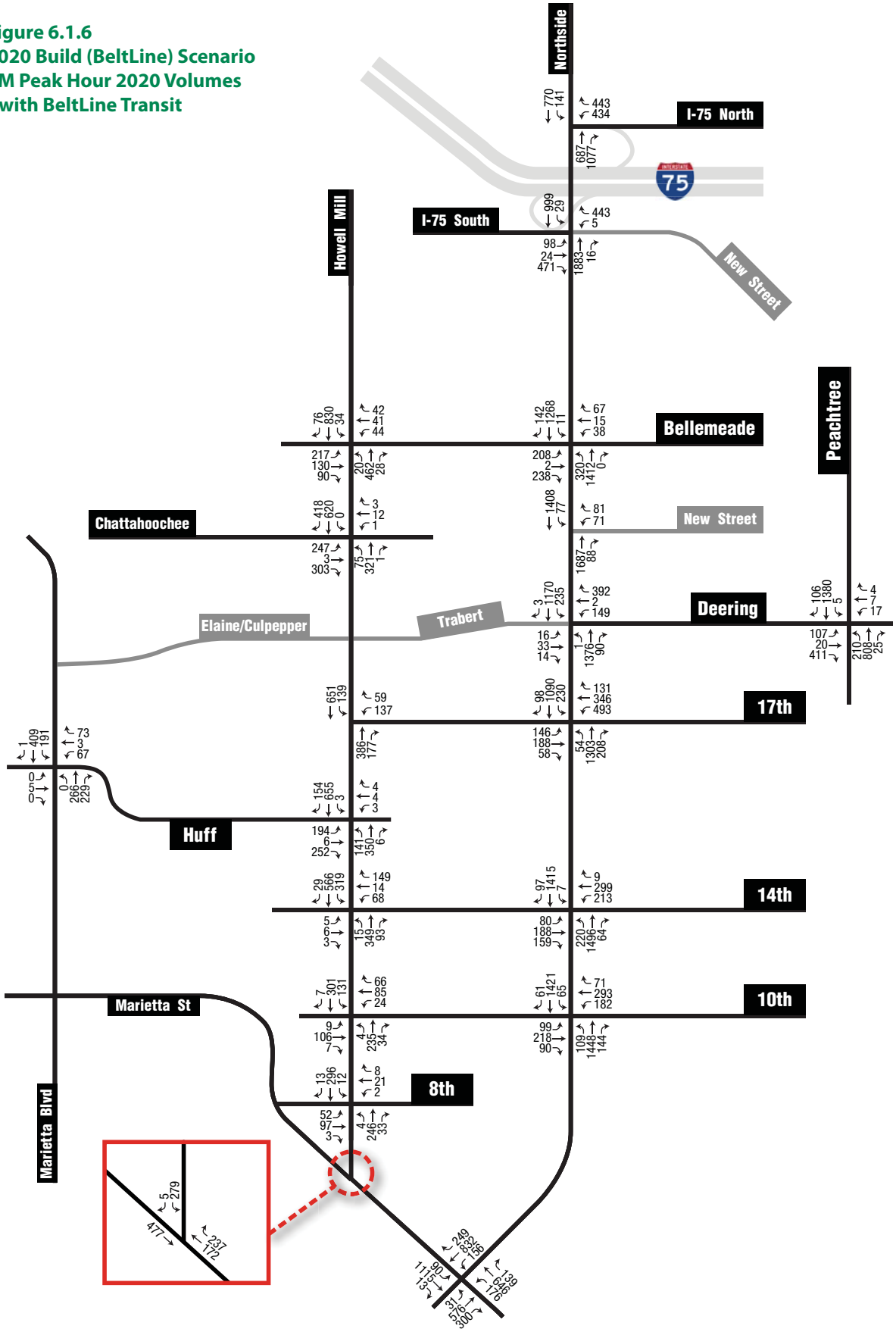


Figure 6.1.7
2020 Build (BeltLine) Scenario
PM Peak Hour 2020 Levels of Service
with BeltLine Transit

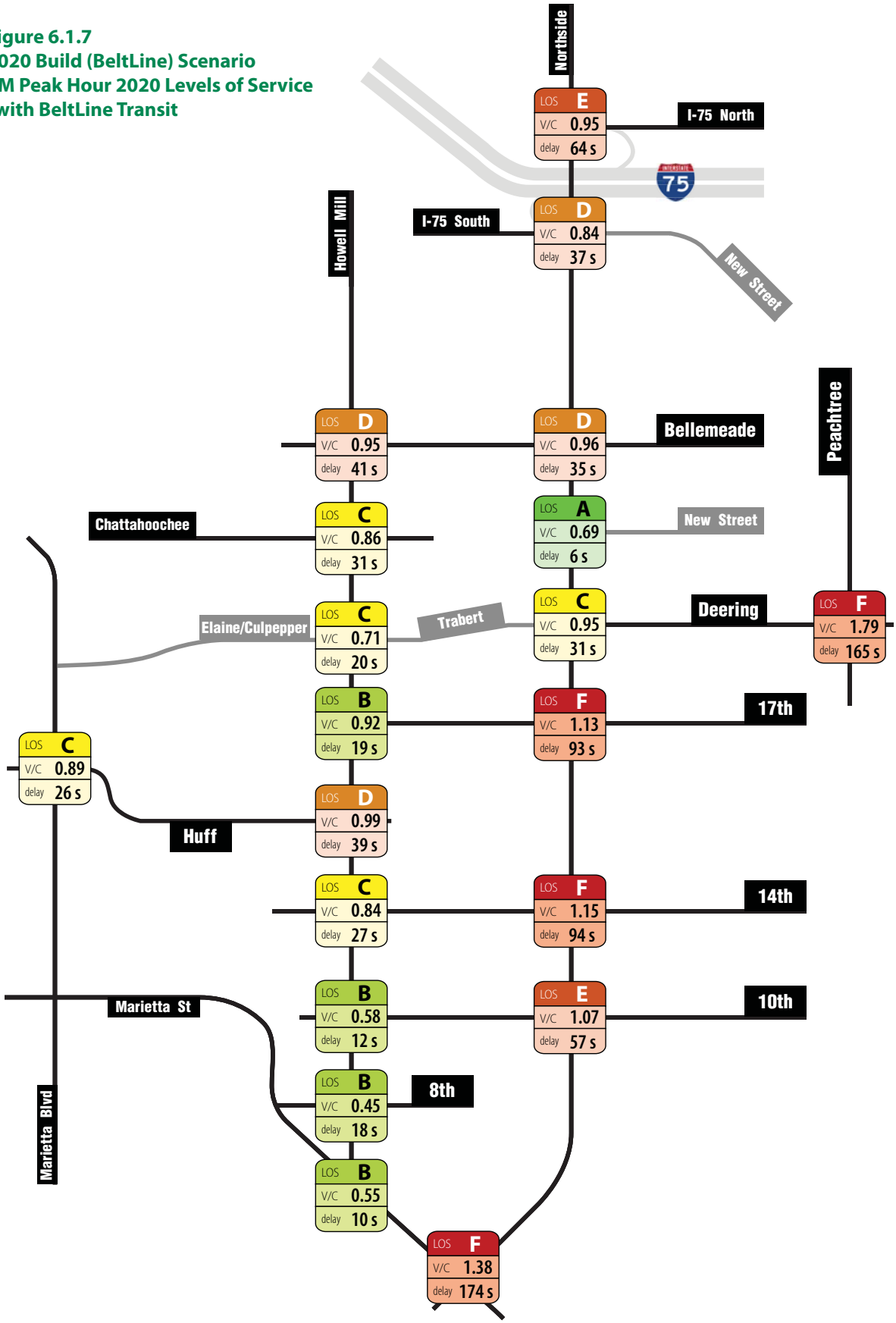


Table 6.1.6: 2020 Build (BeltLine Transit Added) Level of Service							
Intersection	*AM Peak LOS*	*AM Peak V/C Ratio*	*AM Peak Overall Delay*	*PM Peak LOS*	*PM Peak V/C Ratio*	*PM Peak Overall Delay*	*Problematic Movements and Other Notes*
Northside/I-75 NB Access	C	0.61	27 sec	E	0.95	64 sec	NB right turns experience delay in both peak periods due to lack of storage lane and the inability to allow permissive right turns for all movements; WB left turns also experience delay in PM.
Northside/I-75 SB Access	C	0.68	30 sec	D	0.84	37 sec	EB right turns due to lack of dedicated storage and inefficiency of permissive turning to relieve queues
Northside/Bellemeade	B	0.82	18 sec	D	0.96	35 sec	NB left movements are heavy and approach capacity of a single lane; EB left movements experience delay due to inadequate signal timing
Northside/New Street	A	0.69	4 sec	A	0.69	6 sec	
Northside/Deering	C	0.93	33 sec	C	0.95	31 sec	EB through volumes higher than in the no-build scenario due to the added westward extension of Deering; this adds a greater level of delay on this approach; WB left turns also experience delay in PM.
Northside/17th	C	0.87	35 sec	F	1.13	93 sec	All intersection approaches carry significant volumes and thus compete for limited signal time. In PM, both EB and WB left and through experience delay due to inadequate green time and heavy volumes; SBL also experiences heavy delay.
Northside/14th	C	0.88	28 sec	F	1.15	94 sec	In PM, all intersection approaches carry significant volumes and thus compete for limited signal time. EB and WB delay mostly because of lack of dedicated left turn storage on these approaches; NB left experiences delay due to need to prioritize heavy oncoming SB traffic volumes.
Northside/10th	B	0.77	17 sec	E	1.07	57 sec	EB and WB left and through experience delay due to inadequate green time and heavy volumes and lack of dedicated left turn storage; NBT also experiences some delay for the same reason (and greater PM NB left turn volumes than SB left turn volumes).

Table 6.1.6: 2020 Build (BeltLine Transit Added) Level of Service							
Intersection	*AM Peak LOS*	*AM Peak V/C Ratio*	*AM Peak Overall Delay*	*PM Peak LOS*	*PM Peak V/C Ratio*	*PM Peak Overall Delay*	*Problematic Movements and Other Notes*
Northside/Marietta	E	1.08	73 sec	F	1.38	174 sec	NB movements on Marietta experience delay due to lack of dedicated left turn lane; NB Northside movements also experience delays from signal timing and right-turning friction from intersection angle.
Howell Mill/Bellemeade	D	0.93	38 sec	D	0.95	41 sec	EB left turns experience heavy delay in both peak periods.
Howell Mill/Chattahoochee	C	0.69	21 sec	C	0.86	31 sec	Greatest delay shifted from EB to WB approach due to different signal timing optimization; reduction in EB lefts from increased transit share in Build scenarios helps this movement
Howell Mill/Deering Extension	B	0.75	17 sec	C	0.71	20 sec	No failing movements, though overall average delay increases due to western expansion in the Build scenarios and increased use of intersection (esp. WB approach)
Howell Mill/17th	B	0.75	14 sec	B	0.92	19 sec	
Howell Mill/Huff	C	0.86	34 sec	D	0.99	39 sec	NB left experiences greatest delay from high volumes and inadequate green signal time.
Howell Mill/14th	B	0.67	18 sec	C	0.84	27 sec	WB left/through movements (which share a lane) experience delay due to inadequate green time; this is also something (though less) of a problem for WB right movements. Overlap green phase with SB left phase reduces this delay.
Howell Mill/10th	B	0.40	10 sec	B	0.58	12 sec	
Howell Mill/8th	B	0.42	20 sec	B	0.45	18 sec	
Howell Mill/Marietta	A	0.30	10 sec	B	0.55	10 sec	
Marietta Blvd/Huff	A	0.48	10 sec	C	0.89	26 sec	
Peachtree/Deering	E	1.12	62 sec	F	1.79	165 sec	Delay caused largely by heavy NB left turn movement with inadequate green signal time; Deering approach also experiences delay due to added traffic from Subarea 8 development and no more green time given to it.

6.2 2030 Build Scenario

This scenario is the same as the 2020 Build scenario but uses an average growth rate derived from the ARC travel demand model to forecast increases in traffic between 2020 and 2030. As discussed in Section 2.2, this is a different growth rate than that used to assume background growth between 2010 and 2020, although it coincides with that rate and continues traffic growth at 0.5 percent per year.

Planned Transportation Improvement Projects

The ARC Envision6 long-range transportation plan includes the four-lane to six-lane widening of Northside Drive, discussed in more detail in Section 5.2.

Added Local Street Network and Traffic Control

The 2030 Build scenario used the same added street network as in the 2020 Build scenario. This network is founded on an assumption that most new streets directly intersecting with Northside Drive or Howell Mill Road would not be signalized.

2030 Build (BeltLine) Scenario: What would 2030 be like if we had significant BeltLine redevelopment and new roads, pedestrian connections and transit?

FACTOR	HOW IT APPEARS IN THIS ANALYSIS
Year of Analysis	2030
Road Network	2030 RTP Network and New Development Streets
Traffic Volumes	2020 BeltLine Build Analysis Volumes (0.5 percent Annual Background Growth to 2020 + Trip Generation from added development for 2020) increased with 0.5% Annual Background Growth from 2020 to 2030
Mode Split	Varies based on analysis zone and location, but calculated according to BeltLine methodology
Trip Assignment	Existing patterns modified with distribution of new traffic based on new development

What assumptions were made in traffic modeling to allow the results discussed in this section?

FACTOR	ASSUMPTION
Roadway Improvements	All improvements from 2020 Baseline scenarios, with extended Trabert Avenue west of Howell Mill and third travel lane added to northbound and southbound Northside Drive north of 14th Street)
Optimized Cycle Length	**AM:** 100 seconds (half-cycles allowed) **PM:** 110 seconds (half-cycles allowed)

Analysis Results

As discussed previously, 2030's widened Northside Drive has a notable effect on overall delay reduction along that corridor while the apparent benefits of Atlanta BeltLine Transit are more apparent on the Howell Mill Road corridor. This is due in no small part to the assumptions of traffic distribution onto the roadway network: a significant amount of development program in the subarea is located west of Howell Mill Road and, although the extension of Trabert/Culpepper west to Marietta Boulevard would provide another east-west option for this traffic, it is still likely to rely heavily on Howell Mill Road as a route option. One Howell Mill Road intersection bearing noteworthy burden from future traffic growth is the Howell Mill/Chattahoochee intersection, where an already-heavy eastbound left turn volume is increased by new traffic using Howell Mill Road as a way to access Interstate 75. The assumption of higher transit mode share in trip generation due to the presence of Atlanta BeltLine transit provides a particularly high level of offset to movements such as these and helps to mitigate congestion when compared to the Baseline scenario.

By contrast, much of the traffic using Northside Drive has been assigned to it based on current turning movements (and thus may begin to use alternative routes as intersection-specific congestion becomes more acute) or is assigned to it because of its location in the southern portion of Subarea 8, where transit offers less of a mobility option and the consequent change in mode split is more modest. As a result, its intersections do not see the same level of congestion and delay relief between the Baseline and the Build scenario in a given year. In other words, where the six-lane Northside Drive in 2030 provides the greatest relief to its intersections, the addition of Atlanta BeltLine transit provides the greatest relief to Howell Mill Road.

There are exceptions to this general rule, as shown in Table 6.2.1. Chief among them is the delay at the Howell Mill/Bellemeade intersection, which is due in part to increased volumes from background traffic growth but also to the difference in signal timing patterns, chosen by Synchro software for the entire network (or at least for an entire corridor) to reduce overall delay of traffic moving through Subarea 8.

Figure 6.2.1: 2030 Build (BeltLine) Scenario Proposed Laneage with New Street Network from Added Development

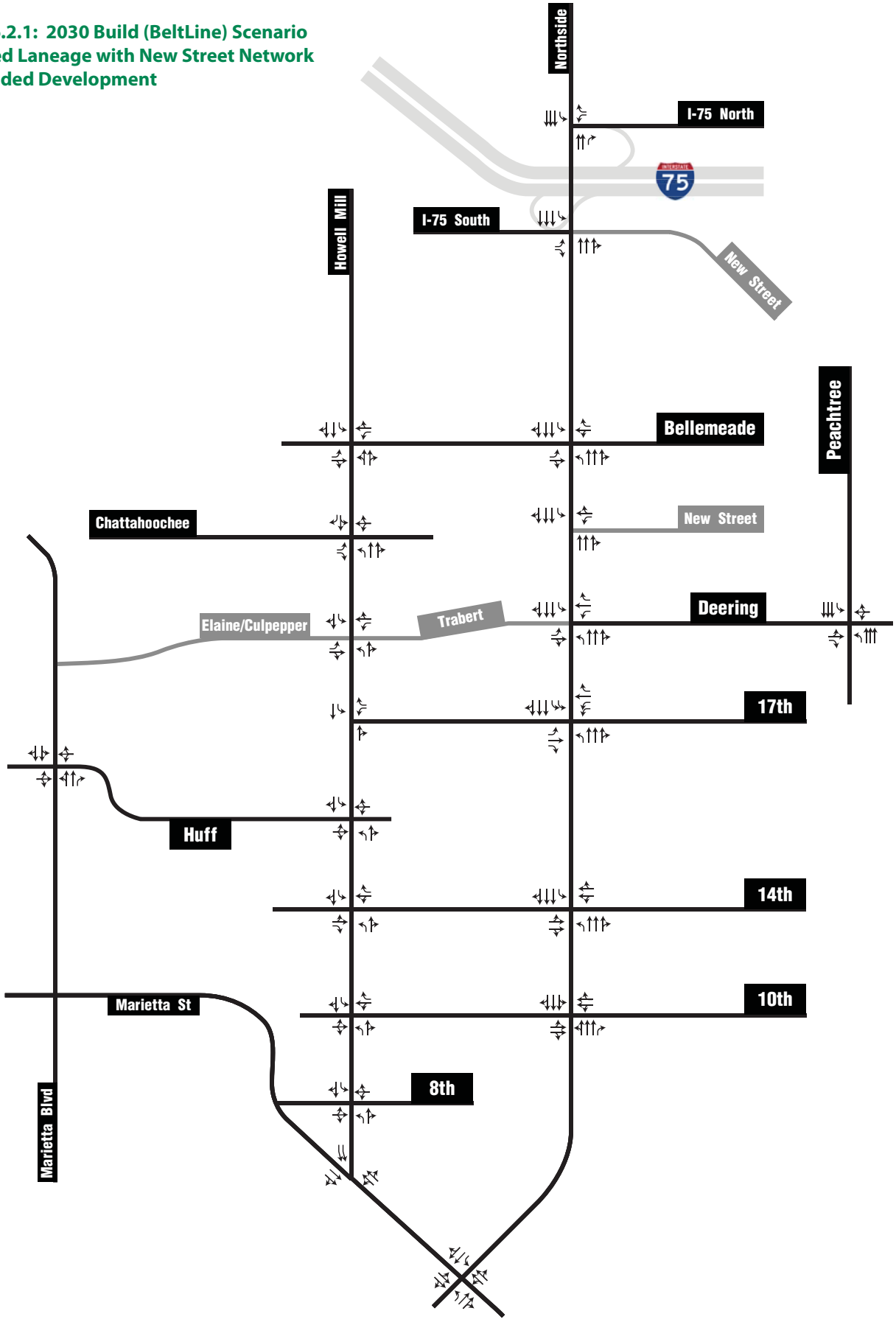


Figure 6.2.2
2030 Build (BeltLine) Scenario
AM Peak Hour 2030 Volumes
with BeltLine Transit

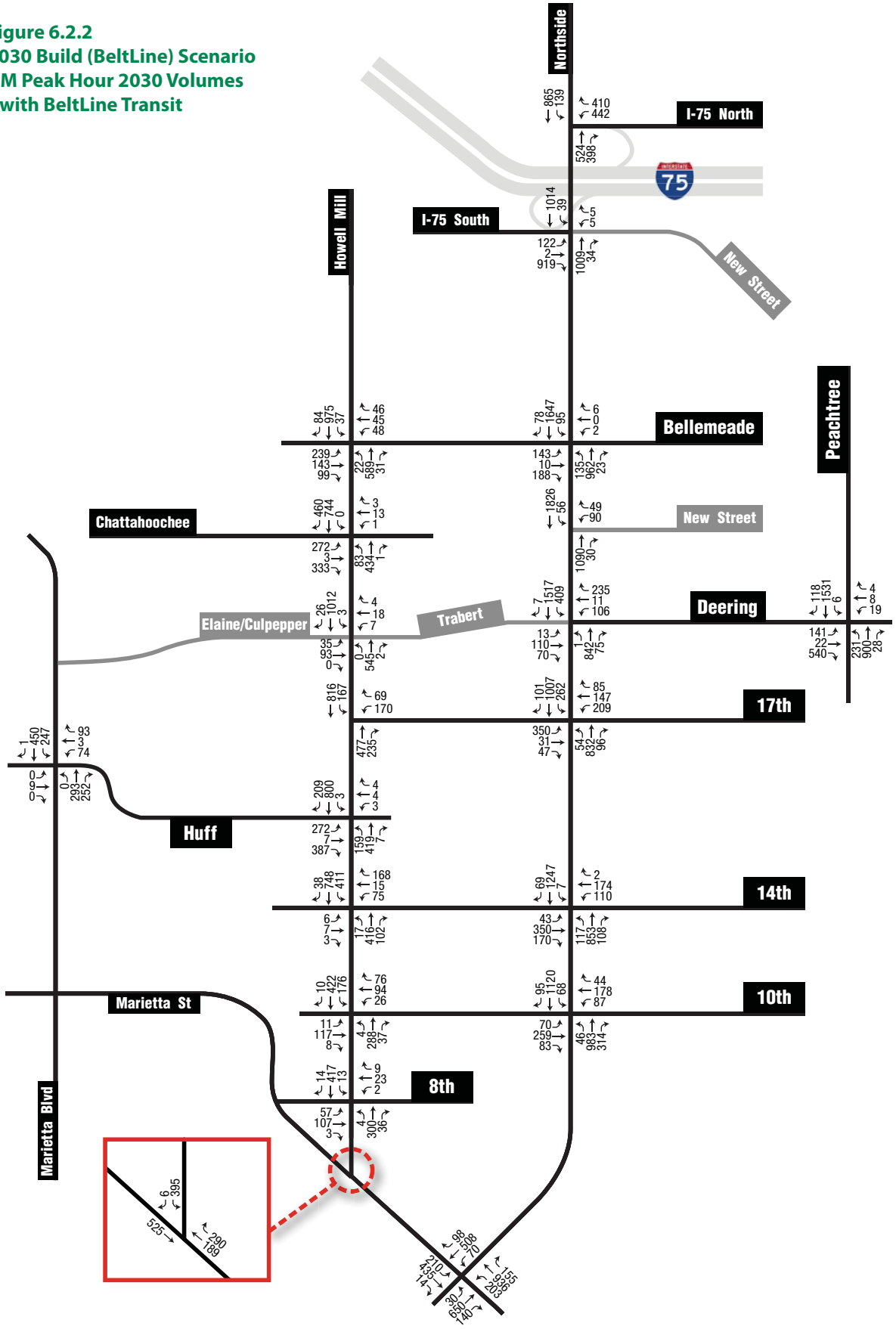


Figure 6.2.3
2030 Build (BeltLine) Scenario
AM Peak Hour 2030 Levels of Service
with BeltLine Transit

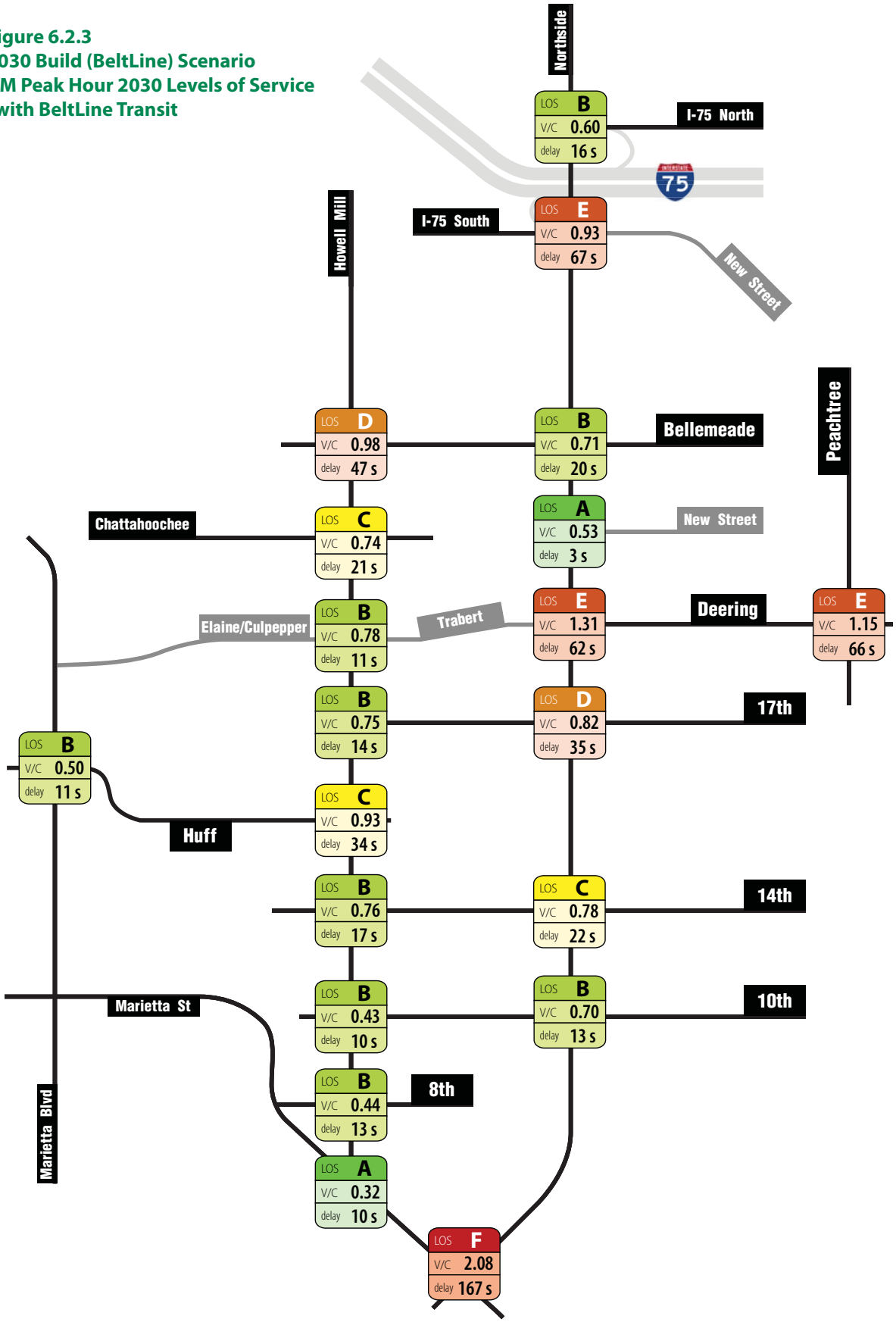


Figure 6.2.4
2030 Build (BeltLine) Scenario
PM Peak Hour 2030 Volumes
with BeltLine Transit

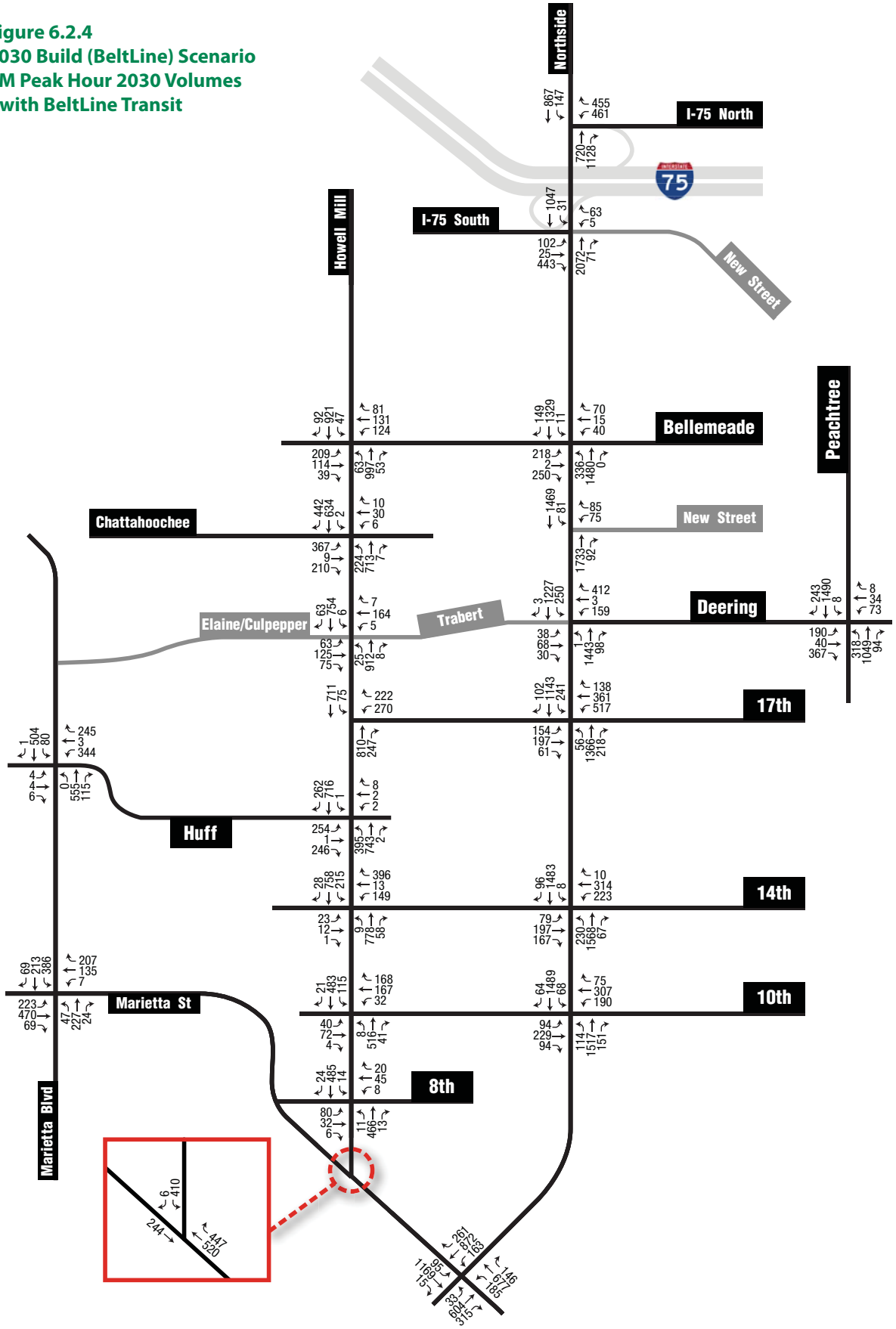


Figure 6.2.5
2030 Build (BeltLine) Scenario
PM Peak Hour 2030 Levels of Service
with BeltLine Transit

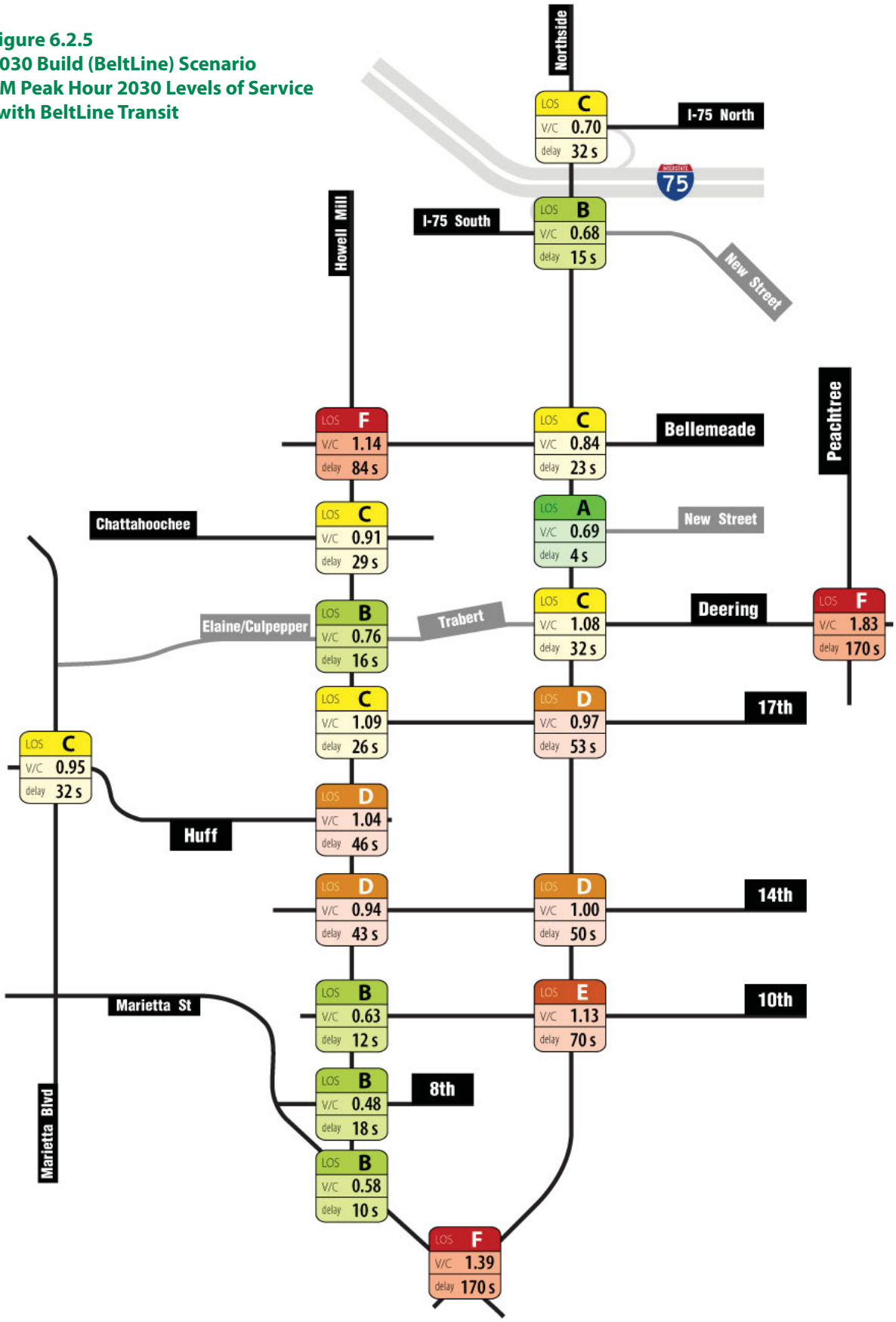


Table 6.2.1: 2030 Build (BeltLine Transit Added) Level of Service							
Intersection	*AM Peak LOS*	*AM Peak V/C Ratio*	*AM Peak Overall Delay*	*PM Peak LOS*	*PM Peak V/C Ratio*	*PM Peak Overall Delay*	*Problematic Movements and Other Notes*
Northside/I-75 NB Access	B	0.60	16 sec	C	0.70	32 sec	
Northside/I-75 SB Access	E	0.93	67 sec	B	0.68	15 sec	EB right turns exceed capacity of single lane in AM.
Northside/Bellemeade	B	0.71	20 sec	C	0.84	23 sec	Significant reduction in overall delay from capacity addition; no failing movements in AM or PM.
Northside/New Street	A	0.53	3 sec	A	0.69	4 sec	
Northside/Deering	E	1.31	62 sec	C	1.08	32 sec	Increased use of Deering through this intersection, including addition of more traffic EB approach due to westward extension to Marietta Blvd, increases overall delay. In AM, SB left volume is heavy and does not have adequate protected signal time against NB through traffic.
Northside/17th	C	0.82	35 sec	D	0.97	53 sec	Significant reduction in overall delay from capacity addition; no failing movements in AM. In PM, EB left, WB through and SB left continue to experience delay.
Northside/14th	C	0.78	22 sec	D	1.00	50 sec	EB and WB movements experience delay due to lack of left turn storage
Northside/10th	B	0.70	13 sec	E	1.13	70 sec	EB and WB movements experience delay due to lack of left turn storage
Northside/Marietta	F	2.08	167 sec	F	1.39	170 sec	Added delay due partly to shorter signal cycle, though also to heavy volumes and inadequate storage length on NB Marietta approach.

Table 6.2.1: 2030 Build (BeltLine Transit Added) Level of Service							
Intersection	*AM Peak LOS*	*AM Peak V/C Ratio*	*AM Peak Overall Delay*	*PM Peak LOS*	*PM Peak V/C Ratio*	*PM Peak Overall Delay*	*Problematic Movements and Other Notes*
Howell Mill/Bellemeade	D	0.98	47 sec	F	1.14	84 sec	EB left turns experience delay in both peak hours. NB through and right movements also experience delay; this is compounded by short spacing between Bellemeade and Chattahoochee intersections.
Howell Mill/ Chattahoochee	C	0.74	21 sec	C	0.91	29 sec	WB movements, due mostly to inadequate green time
Howell Mill/Deering Extension	B	0.78	11 sec	B	0.76	16 sec	
Howell Mill/17th	B	0.75	14 sec	C	1.09	26 sec	SB left movement experiences delay from inadequate signal time
Howell Mill/Huff	C	0.93	34 sec	D	1.04	46 sec	EB left; NB left relieved when compared to no-build scenarios due to transit reduction in traffic analysis zone 1 of this report
Howell Mill/14th	B	0.76	17 sec	D	0.94	43 sec	SB left movement
Howell Mill/10th	B	0.43	10 sec	B	0.63	12 sec	
Howell Mill/8th	B	0.44	13 sec	B	0.48	18 sec	
Howell Mill/Marietta	A	0.32	10 sec	B	0.58	10 sec	
Marietta Blvd/Huff	B	0.50	11 sec	C	0.95	32 sec	
Peachtree/Deering	E	1.15	66 sec	F	1.83	170 sec	Delay caused largely by heavy NB left turn movement with inadequate green signal time; Deering approach also experiences considerable delay

6.3 Comparison of Corridor Travel Times for All Scenarios

In addition to analysis based on intersection level of service, both Northside Drive and Howell Mill Road were analyzed to determine the overall delay experienced when traversing the entire corridors. Anecdotal accounts from community stakeholders suggest that the real phenomenon of delay is not always experienced at one intersection, but in terms of travel time. Tables 6.3.1 and 6.3.2 below list the results of this corridor level of service analysis, where travel times and speeds are reported corresponding to the previously presented analysis scenarios.

As future development in this analysis was assumed to add new streets to the street network, some intersections of new streets with Northside Drive were assumed to be signalized. Generally, travel time through a corridor slows when there are more signals.

The greatest change in travel time and corresponding corridor level of service, however, is along Northside Drive and comes from the addition of future background traffic growth and Subarea 8 development traffic. As is expected, travel times are longer and travel speeds lower when development and background growth are added under future scenarios. As background growth is based on regional estimates, it affects traffic entering the corridor under current travel patterns and is not generated by additional development.

Variations in the travel time and speeds represent the changes in development location, type, and intensity, but can also be a result of corridor optimization methods used to determine the area-wide signal timing plan. As stated previously, each corridor simulation model was constructed with a signal optimization being performed for the entire Subarea 8 network once all input traffic values were added.

Level of service on Northside Drive is improved with the addition of roadway capacity in the 2030 scenarios, where overall level of service on Howell Mill Road shows improvement when future transit is provided. Note that in all baseline and Build scenarios, Howell Mill Road itself is assumed to use a three-lane cross-section.

Table 6.3.1: Northside Drive Corridor Travel Times and Speeds

Scenario	AM Travel Time (Northbound)	AM Speed (Northbound)	PM Travel Time (Southbound)	PM Speed (Southbound)
Existing Conditions	5.8 min	17 mph	6.0 min	19 mph
2020 Baseline Scenario	5.8 min	17 mph	8.9 min	12 mph
2030 Baseline Scenario	6.2 min	16 mph	8.5 min	13 mph
2020 Build Scenario	5.9 min	16 mph	8.5 min	13 mph
2030 Build Scenario	6.1 min	16 mph	7.7 min	14 mph

Table 6.3.2: Howell Mill Road Corridor Travel Times and Speeds

Scenario	AM Travel Time (Northbound)	AM Speed (Northbound)	PM Travel Time (Southbound)	PM Speed (Southbound)
Existing Conditions	6.3 min	15 mph	5.7 min	15 mph
2020 Baseline Scenario	6.2 min	15 mph	6.2 min	14 mph
2030 Baseline Scenario	6.5 min	15 mph	7.1 min	13 mph
2020 Build Scenario	5.9 min	16 mph	6.1 min	15 mph
2030 Build Scenario	5.6 min	17 mph	7.5 min	12 mph

7.0 Conclusions and Recommendations

7.1 General Conclusions

Based on the analysis of traffic scenarios in the preceding sections, the addition of traffic from Subarea 8 development leads to considerably different travel patterns and roadway infrastructure performance into the future. The greatest factor of change is the addition of traffic to Northside Drive, which previously had functioned mainly as a mobility-oriented thoroughfare connecting Interstate 75 to central Atlanta employment and activity centers.

In considering these changes, the following general characteristics apply to the subarea and helped to establish a foundation for the nature and extent of improvements:

- Several intersections throughout the subarea, especially along Northside Drive, are currently operating near capacity. Even minor additions of traffic cause these intersections' levels of service to fall below acceptable levels, and further additions of traffic have a disproportionately greater level of traffic impact.
- Although HCM-based level of service analysis was used for subarea intersections, the effects of close signal spacing are also important to consider.
- Larger network enhancement opportunities are limited, due mostly to the subarea's rail network. The chief opportunity for additional rail crossing, the extension of Trabert/Culpepper west from Howell Mill to Ellsworth Industrial and Marietta Boulevard, is an important enhancement to overall roadway infrastructure.
- Howell Mill Road experiences some of its greatest operational constraints in places where dominant traffic volumes have only one moving lane to use for their direction, and this includes all turns and through volumes in that direction. Allowing a left turn storage lane frees up the through-moving lane to clear more traffic in a given time interval.

Overall, although there is an addition of traffic to the Subarea 8 roadway network, some parts of it appear better equipped to absorb it than others. Northside Drive experiences a more dramatic increase in traffic congestion and delay than Howell Mill Road does in the 2020 analysis year, but when the widening project assumed by 2030 is reflected in traffic models, this congestion decreases considerably-- with virtually none of the major movements of Northside Drive traffic experiencing overly lengthy delays.

On the other hand, although added traffic from future development does not generate the same degree of impact to the Howell Mill Road corridor, the assumption of future transit to increase transit's mode share and offset new vehicle trips is important in reducing congestion at key Howell Mill Road intersections, especially the intersections with Chattahoochee and Bellemeade Avenues.

7.2 Recommendations from Traffic Analysis

The following are recommendations for Subarea 8 based on traffic operations. Refer to Section 3.0 (Mobility) of the Plan Recommendations Report for a broader discussion of these recommendations.

Howell Mill/Huff Intersection Capacity

This intersection, already experiencing congestion in peak hours today, should be improved to add a dedicated eastbound left-turn storage lane. The current geometric design of the northwest corner of the intersection features a wide apron for receiving right-turning vehicles from Howell Mill Road; part of this space could be used to accommodate a turning lane today simply through restriping of lanes, although a more thorough and beneficial capacity-adding project would widen the intersection approach to add a turning lane at least 200 feet in length.

While all analysis scenarios show similar volumes making eastbound left and right turns, the advent of a dedicated left-turn storage lane allows right-turning vehicles to move ahead on a red light when gaps in southbound traffic on Howell Mill Road allow, thus processing a part of the eastbound approach traffic outside of dedicated phases and reducing overall delay.

The addition of traffic related to future development also points to a capacity deficiency for southbound vehicles at this intersection, however, especially in the PM peak hour. For this reason a southbound right turn lane was assumed. Although this is likely to be accommodated within existing right-of-way, it may do so at the expense of a safe and comfortable sidewalk along the west side of Howell Mill Road and as such should be carefully considered. Generally it is not the intent of the Subarea 8 master plan to promote vehicle capacity over walkability and access to the Atlanta BeltLine corridor.

HUFF/HOWELL MILL: WITH AND WITHOUT SOUTHBOUND RIGHT TURN LANE

PEAK HOUR	TURN LANE?	LOS	DELAY
2020 AM Baseline	No	F	82 seconds
	Yes	C	31 seconds
2020 PM Baseline	No	F	136 seconds
	Yes	D	52 seconds
2030 AM Baseline	No	F	98 seconds
	Yes	C	35 seconds
2030 PM Baseline	No	F	149 seconds
	Yes	E	56 seconds
2020 AM BeltLine	No	F	80 seconds
	Yes	C	34 seconds
2020 PM BeltLine	No	F	110 seconds
	Yes	D	39 seconds
2030 AM BeltLine	No	F	85 seconds
	Yes	C	34 seconds
2030 PM BeltLine	No	F	135 seconds
	Yes	D	46 seconds

Figure 7.2.1: Addition of Eastbound Left Turn Lane at Huff Road and Howell Mill Road
Source: AECOM

For reference purposes, the relative performance of the Huff/Howell Mill intersection is shown in the table to the right, with and without the southbound right turn lane. All reported performance levels assume that the recommendations to the eastbound approach are made.

3-Lane Section on Huff Road

The Huff Road corridor has already seen substantial redevelopment activity near its intersection with Ellsworth Industrial Road. This has added traffic volumes along the corridor and, significantly, has added demand for turns to access properties along the corridor. To support continued development, this corridor should be upgraded to a three-lane cross-section (one travel lane per direction and a two-way left turn lane). This is also a recommendation from the Connect Atlanta plan as well as other previous studies.

The cost of designing and constructing this project may complicate its execution and make it a longer-term endeavor. In the short term, however, capacity improvements to the Huff Road/Howell Mill Road intersection are likely to be more feasible.

Standard 3-Lane Section on Howell Mill (Trabert Avenue to Marietta Street)

Howell Mill Road currently features an asymmetrical cross-section for most of its extent through Subarea 8, with two southbound general purpose lanes, one northbound lane, and few cases of dedicated storage lanes for turns. This road diet project would introduce a standard three-lane section from Chattahoochee Avenue south to the road's end at Marietta Street. This allows improvements in safety resulting from northbound vehicles being able to see all oncoming traffic and the improvements in northbound capacity resulting from left turning vehicles being moved into a separate lane for awaiting gaps in southbound traffic for turn opportunities.

In addition, the standardization of this three lane section throughout the corridor allows the four-lane extent between the Huff Road and 14th Street intersections to be converted to three lanes, potentially freeing space for conversion to other cross-section elements (such as bike lanes, widened sidewalks alongside the historic White Provisions meatpacking structure, where sidewalks are currently uncomfortably narrow for a busy mixed-use district).

Figure 7.2.2: Added Westbound Right Turn Lane at 17th Street and Howell Mill Road
Source: AECOM

17th Street/Howell Mill Road Capacity Addition

17th Street is one of the critical east-west links in the Subarea 8 thoroughfare network, although it ends at Howell Mill Road and requires all traffic to make a left or right turn. As new development adds traffic to this link, the 17th Street approach to this intersection should add a right-turn storage lane to allow right turns to be separated from lefts, which would use the current single approach lane (refer to Figure 7.2.2 on the preceding page for an illustration of this concept). This not only shortens the queue lengths on 17th and lessens the risk of spillback queuing traffic at the Northside/17th intersection, but it also allows right turning vehicles to make turns on a red signal when gaps in northbound Howell Mill traffic allow, thus processing queues through all parts of the traffic signal cycle.

14th Street/Howell Mill Road Signalization Changes

This intersection currently features a split signal timing sequence due to the geometric offset between the eastern and western intersection approaches. While sound engineering judgment suggests that this kind of a timing configuration likely needs to remain for safety reasons, there is an opportunity to upgrade signal hardware to allow an overlap in green signal time between the heavy westbound right turn movement and the southbound left turn movement. This helps to alleviate congestion and reduce delay at this intersection.

This project, along with the implementation of the three-lane cross-section along the Howell Mill corridor, should allow the majority of the left turn lane length between 14th Street and Huff Road to be reserved for northbound left turns so that westbound right turns taking advantage of this overlapped signal timing have adequate storage space in the event of a red signal at Huff Road.

Access Management - Howell Mill Road & Northside Drive

Howell Mill Road

The Howell Mill Road corridor from Trabert Avenue to I-75 is commercial strip corridor that is incrementally redeveloping. Its current development pattern includes a range of small auto-oriented commercial sites with numerous and curb cuts. This unplanned pattern of vehicular access exacerbates traffic congestion, reduces overall safety and creates a pedestrian-hostile environment. An important traffic management solution for the corridor will be the reducing and elimination of curb cuts. This access management process will occur over time as properties redevelop and new site plans be designed to limit curb cuts to Howell Mill Road and interconnect to adjacent properties to share access.

Northside Drive

Northside Drive is an important regional corridor and long-term access management will be a valuable component of managing this corridor's traffic congestion over time. Recommendations of this Plan include a range of new parallel street connections, selected new signalized intersections, and street framework connections that create shared access to Northside Drive.

Northside/17th Westbound Approach

The westbound approach to this intersection currently features a single left turn lane and dual right turn lanes. This is likely due to traffic study forecasts for heavy demand for this movement (and its reflected southbound left-turn movement from Northside Drive) related to the development of Atlantic Station and expected travel patterns between it and Interstate 75 via Northside Drive. The analysis performed for the Subarea 8 master plan suggests that the single westbound left turn lane at this intersection may not be adequate to handle added Subarea 8 development, especially development in the southern half of the subarea near the Georgia Tech campus.

Potential Options

Potential options for this issue would reconfigure the intersection to add an additional left turn lane to reduce congestion and delay. Proposed here are two options for how this could be accomplished. Option A reconfigures the three eastbound lanes on 17th to utilize one for the southbound left movement onto Northside Drive. Heading east from Northside Drive the two eastbound lanes on 17th would transition back to the existing three travel lanes (with one dedicated for transit). Option B removes one of the northbound right turn lanes on 17th Street to allow for the additional southbound left turn movement onto Northside Drive. There are notable operational and lane continuity issues that would need to be evaluated with either of these options and further exploration should more broadly consider likely projections for future Atlantic Station development and anticipated travel patterns.

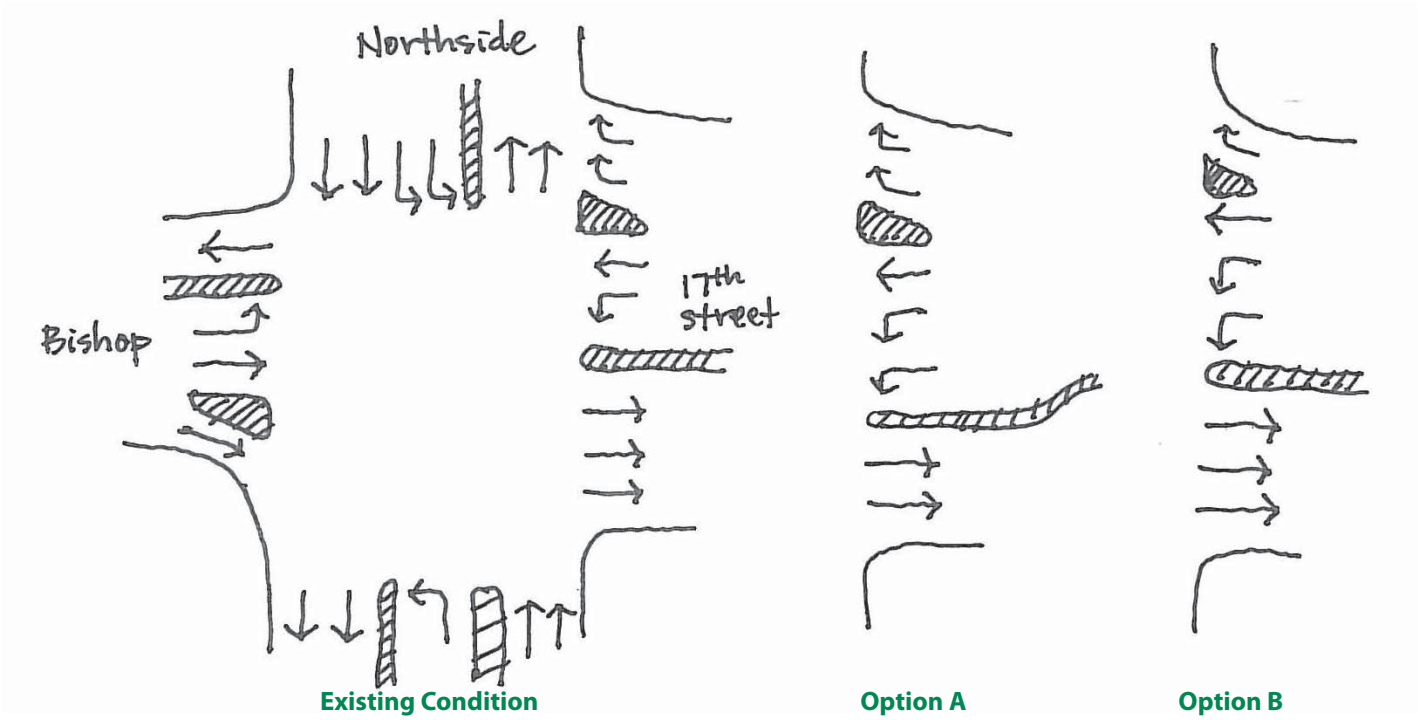


Figure 7.2.3: Potential Options Northside/17th Westbound Approach
Source: AECOM

7.3 Bicycle and Pedestrian Recommendations

The following are recommendations specific to bicycle and pedestrian safety and circulation. Although they may be related to other recommendations and may be tied into the operation of other modes of travel, their primary intent is to serve bicyclists and pedestrians.

General Enhancements to Sidewalk Connectivity

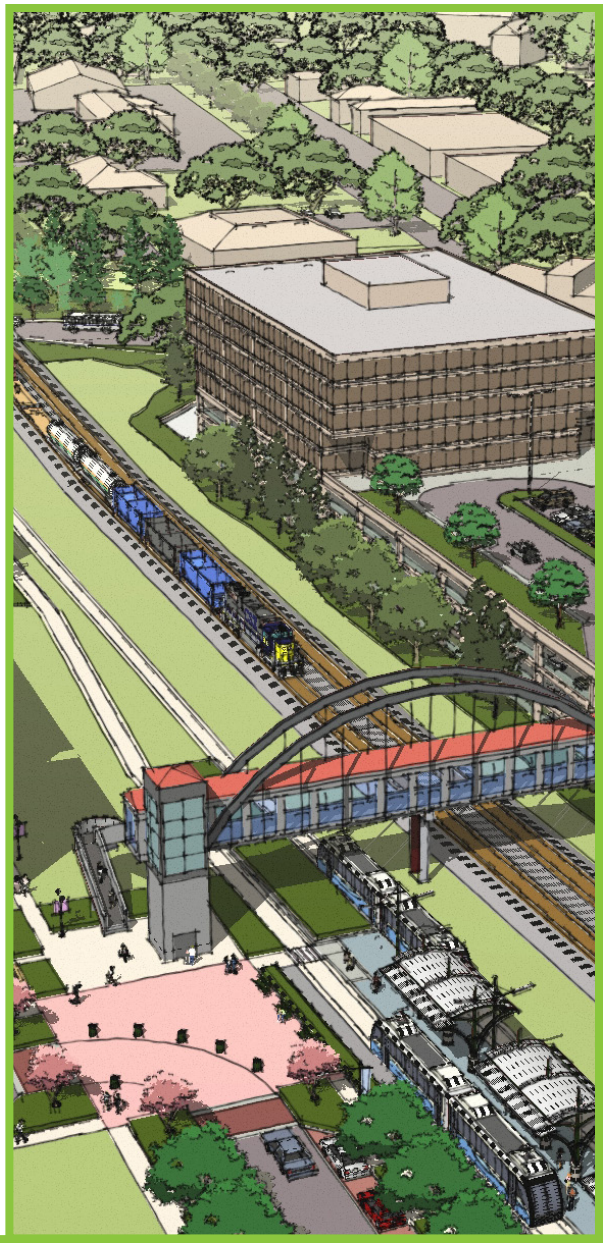
Both the Loring Heights and Berkeley Park neighborhoods, the areas of Subarea 8 with the most established single-family land use patterns, feature multiple streets with no sidewalks. As a general means of promoting walkability, accessibility and safety, these streets should have sidewalks added within public right-of-way where feasible.

Howell Mill Road Bicycle Corridor

The Connect Atlanta transportation plan defined the Marietta Street-Howell Mill Road corridor as one of its Core Bicycle Connections, meaning that it serves a long distance and provides direct connections to multiple parts of Atlanta. The City of Atlanta has designated this a bicycle route with signage and, north of Interstate 75, has striped wide travel lanes to delineate separate lanes for bicycles.

Although Connect Atlanta's street design guidance points to bicycle lanes as the preferred option for design of streets carrying designated bicycle routes, it also allows shared-use arrows ('sharrows') as a means of connecting gaps in bicycle lanes where the immediate fit of these lanes is not feasible, such as south of 14th Street.

In addition, the City of Atlanta was recently selected for funding from the Livable Center's Initiative for Cycle Atlanta. This program will identify methods to retrofit existing urban roadways with bicycle facilities in a context sensitive manner that protects the character and integrity of the community.

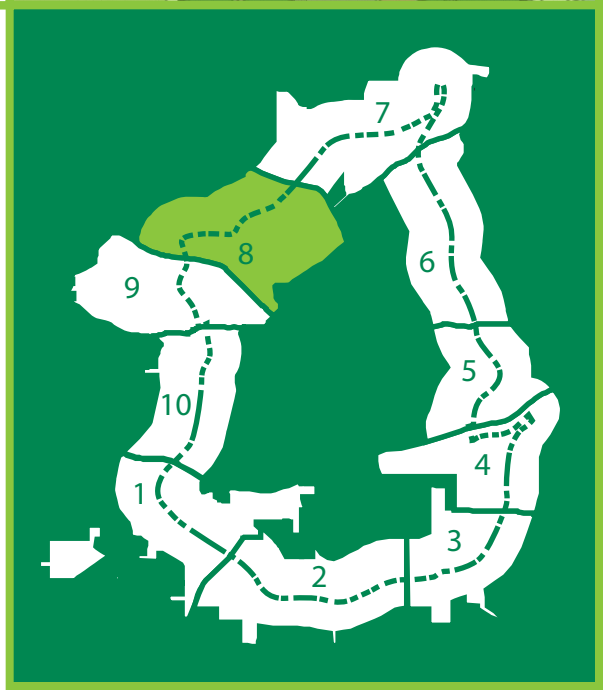


APPENDIX A

SYNCHRO REPORTS

Subarea 8 - Upper Westside/Northside

TRANSPORTATION ANALYSIS REPORT



SYNCHRO REPORTS

EXISTING CONDITIONS

AM Peak Hour

HCM Level of Service Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	262	20	13	229	129	54	39	672	51	172	749	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	12	10	10	11	10	10	10	10	10	10
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	0.88	1.00	0.95		0.97	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1636	1773	1615	1636	1722	2686	1178	3269		3204	3249	
Flt Permitted	0.95	1.00	1.00	0.74	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1636	1773	1615	1268	1722	2686	1178	3269		3204	3249	
Peak-hour factor, PHF	0.91	0.63	0.65	0.84	0.73	0.84	0.75	0.84	0.85	0.78	0.94	0.75
Adj. Flow (vph)	288	32	20	273	177	64	52	800	60	221	797	92
RTOR Reduction (vph)	0	0	15	0	0	50	0	7	0	0	11	0
Lane Group Flow (vph)	288	32	5	273	177	14	52	853	0	221	878	0
Confl. Peds. (#/hr)	1					1			3	3		
Heavy Vehicles (%)	3%	0%	0%	3%	3%	0%	43%	2%	0%	2%	2%	3%
Turn Type	Prot		Perm	pm+pt		Perm	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4	8		8						
Actuated Green, G (s)	15.0	19.0	19.0	28.0	16.0	16.0	4.0	23.0		6.0	25.0	
Effective Green, g (s)	16.0	20.0	20.0	30.0	17.0	17.0	5.0	24.0		7.0	26.0	
Actuated g/C Ratio	0.20	0.25	0.25	0.38	0.21	0.21	0.06	0.30		0.09	0.32	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	327	443	404	535	366	571	74	981		280	1056	
v/s Ratio Prot	c0.18	c0.02		0.08	0.10		0.04	0.26		c0.07	c0.27	
v/s Ratio Perm			0.00	c0.11		0.01						
v/c Ratio	0.88	0.07	0.01	0.51	0.48	0.02	0.70	0.87		0.79	0.83	
Uniform Delay, d1	31.1	22.9	22.6	18.8	27.6	24.9	36.8	26.5		35.8	25.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	27.0	0.3	0.1	3.5	4.5	0.1	43.4	10.4		19.9	7.6	
Delay (s)	58.1	23.2	22.6	22.2	32.2	25.0	80.2	36.9		55.7	32.6	
Level of Service	E	C	C	C	C	C	F	D		E	C	
Approach Delay (s)		52.7			26.0			39.4			37.2	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM Average Control Delay	37.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	67.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	22	318	76	100	158	2	81	662	98	6	934	32
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	9	12	12	9	12	10	10	10	10	10	10
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95			0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.97			1.00		1.00	0.98		1.00	0.99	
Flt Protected		1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3002			3070		1636	3164		1685	3269	
Flt Permitted		0.91			0.56		0.13	1.00		0.13	1.00	
Satd. Flow (perm)		2750			1744		222	3164		229	3269	
Peak-hour factor, PHF	0.69	0.83	0.73	0.70	0.84	0.50	0.70	0.83	0.70	0.75	0.89	0.53
Adj. Flow (vph)	32	383	104	143	188	4	116	798	140	8	1049	60
RTOR Reduction (vph)	0	24	0	0	1	0	0	16	0	0	5	0
Lane Group Flow (vph)	0	495	0	0	334	0	116	922	0	8	1104	0
Confl. Peds. (#/hr)	2		1	1		2	2		3	3		2
Heavy Vehicles (%)	3%	4%	6%	4%	3%	0%	3%	4%	3%	0%	2%	5%
Turn Type	Perm			pm+pt			pm+pt			pm+pt		
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		25.0			38.0		38.0	30.0		38.0	30.0	
Effective Green, g (s)		26.0			39.0		40.0	31.0		40.0	31.0	
Actuated g/C Ratio		0.29			0.43		0.44	0.34		0.44	0.34	
Clearance Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)		786			879		237	1078		245	1114	
v/s Ratio Prot					c0.04		c0.05	0.29		0.00	c0.34	
v/s Ratio Perm		c0.18			0.13		0.17			0.01		
v/c Ratio		0.63			0.38		0.49	0.86		0.03	0.99	
Uniform Delay, d1		28.3			17.7		19.2	27.9		16.3	29.9	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		3.8			1.2		7.1	8.7		0.2	25.0	
Delay (s)		32.1			19.0		26.2	36.6		16.6	54.8	
Level of Service		C			B		C	D		B	D	
Approach Delay (s)		32.1			19.0			35.5			54.6	
Approach LOS		C			B			D			D	

Intersection Summary			
HCM Average Control Delay	40.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	91.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	71.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	43	235	26	79	162	40	13	776	285	62	766	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	10	12	12	9	12	12	11	12	12	10	12
Total Lost time (s)	4.0	4.0			4.0			4.0	4.0		4.0	
Lane Util. Factor	1.00	1.00			0.95			0.91	1.00		0.91	
Frpb, ped/bikes	1.00	1.00			1.00			1.00	0.96		1.00	
Flpb, ped/bikes	1.00	1.00			1.00			1.00	1.00		1.00	
Frt	1.00	0.97			0.98			1.00	0.85		0.99	
Flt Protected	0.95	1.00			0.99			1.00	1.00		1.00	
Satd. Flow (prot)	1603	1696			3071			4957	1541		4678	
Flt Permitted	0.46	1.00			0.62			0.88	1.00		0.76	
Satd. Flow (perm)	775	1696			1944			4349	1541		3566	
Peak-hour factor, PHF	0.67	0.93	0.50	0.79	0.81	0.91	0.46	0.91	0.91	0.67	0.91	0.59
Adj. Flow (vph)	64	253	52	100	200	44	28	853	313	93	842	103
RTOR Reduction (vph)	0	7	0	0	11	0	0	0	148	0	12	0
Lane Group Flow (vph)	64	299	0	0	333	0	0	881	165	0	1026	0
Confl. Peds. (#/hr)	3		1	1		3	18		5	5		18
Heavy Vehicles (%)	1%	2%	0%	3%	2%	0%	0%	1%	1%	1%	1%	1%
Turn Type	Perm			Perm			Perm		Perm	pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	29.0	29.0			29.0			56.0	56.0		69.0	
Effective Green, g (s)	30.0	30.0			30.0			57.0	57.0		70.0	
Actuated g/C Ratio	0.28	0.28			0.28			0.53	0.53		0.65	
Clearance Time (s)	5.0	5.0			5.0			5.0	5.0		5.0	
Lane Grp Cap (vph)	215	471			540			2295	813		2404	
v/s Ratio Prot		c0.18									c0.04	
v/s Ratio Perm	0.08				0.17			0.20	0.11		c0.24	
v/c Ratio	0.30	0.63			0.62			0.38	0.20		0.43	
Uniform Delay, d1	30.7	34.2			34.0			15.1	13.5		9.2	
Progression Factor	1.00	1.00			1.00			1.00	1.00		1.00	
Incremental Delay, d2	3.5	6.4			5.2			0.5	0.6		0.6	
Delay (s)	34.2	40.6			39.2			15.6	14.1		9.8	
Level of Service	C	D			D			B	B		A	
Approach Delay (s)		39.5			39.2			15.2			9.8	
Approach LOS		D			D			B			A	

Intersection Summary			
HCM Average Control Delay	19.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	108.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	73.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	137	59	386	177	139	651
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	1.00		1.00			0.95
Frpb, ped/bikes	0.99		0.99			1.00
Flpb, ped/bikes	1.00		1.00			1.00
Frt	0.96		0.96			1.00
Flt Protected	0.97		1.00			0.99
Satd. Flow (prot)	1635		1702			3396
Flt Permitted	0.97		1.00			0.68
Satd. Flow (perm)	1635		1702			2323
Peak-hour factor, PHF	0.75	0.74	0.89	0.90	0.85	0.90
Adj. Flow (vph)	183	80	434	197	164	723
RTOR Reduction (vph)	24	0	26	0	0	0
Lane Group Flow (vph)	239	0	605	0	0	887
Confl. Peds. (#/hr)		1		1	1	
Heavy Vehicles (%)	4%	2%	3%	2%	1%	2%
Turn Type					Perm	
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	12.4		28.4			28.4
Effective Green, g (s)	13.4		29.4			29.4
Actuated g/C Ratio	0.26		0.58			0.58
Clearance Time (s)	5.0		5.0			5.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	431		985			1344
v/s Ratio Prot	c0.15		0.36			
v/s Ratio Perm						c0.38
v/c Ratio	0.56		0.61			0.66
Uniform Delay, d1	16.1		7.0			7.3
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	1.6		1.1			1.2
Delay (s)	17.7		8.1			8.5
Level of Service	B		A			A
Approach Delay (s)	17.7		8.1			8.5
Approach LOS	B		A			A

Intersection Summary			
HCM Average Control Delay	9.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	50.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	74.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	6	3	68	14	149	15	349	93	319	566	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	10	12	10	12	11	12	12	11	12
Total Lost time (s)		4.0	4.0		4.0	4.0		4.0			4.0	
Lane Util. Factor		1.00	1.00		1.00	1.00		1.00			0.95	
Frpb, ped/bikes		1.00	0.98		1.00	1.00		1.00			1.00	
Flpb, ped/bikes		1.00	1.00		1.00	1.00		1.00			1.00	
Frt		1.00	0.85		1.00	0.85		0.97			0.99	
Flt Protected		0.98	1.00		0.97	1.00		1.00			0.98	
Satd. Flow (prot)		1863	1585		1822	1492		1746			3377	
Flt Permitted		0.91	1.00		0.97	1.00		0.95			0.54	
Satd. Flow (perm)		1729	1585		1822	1492		1669			1840	
Peak-hour factor, PHF	0.63	0.50	0.75	0.81	0.40	0.81	0.94	0.82	0.75	0.90	0.91	0.73
Adj. Flow (vph)	8	12	4	84	35	184	16	426	124	354	622	40
RTOR Reduction (vph)	0	0	3	0	0	145	0	6	0	0	2	0
Lane Group Flow (vph)	0	20	1	0	119	39	0	560	0	0	1014	0
Confl. Peds. (#/hr)			2	2								
Heavy Vehicles (%)	0%	0%	0%	1%	0%	1%	0%	2%	2%	1%	1%	0%
Turn Type	Perm		Perm	Split		Prot	Perm			pm+pt		
Protected Phases		8		7	7	7		2		1	6	
Permitted Phases	8		8				2			6		
Actuated Green, G (s)		38.0	38.0		35.0	35.0		65.0			83.0	
Effective Green, g (s)		39.0	39.0		36.0	36.0		66.0			84.0	
Actuated g/C Ratio		0.23	0.23		0.21	0.21		0.39			0.49	
Clearance Time (s)		5.0	5.0		5.0	5.0		5.0			5.0	
Lane Grp Cap (vph)		394	361		384	314		644			1030	
v/s Ratio Prot					c0.07	0.03					c0.08	
v/s Ratio Perm		c0.01	0.00					0.34			c0.40	
v/c Ratio		0.05	0.00		0.31	0.12		0.87			1.07dl	
Uniform Delay, d1		51.5	51.0		57.0	54.7		48.5			42.9	
Progression Factor		1.00	1.00		1.00	1.00		1.00			1.00	
Incremental Delay, d2		0.2	0.0		2.1	0.8		14.8			24.6	
Delay (s)		51.8	51.0		59.1	55.5		63.4			67.5	
Level of Service		D	D		E	E		E			E	
Approach Delay (s)		51.7			56.9			63.4			67.5	
Approach LOS		D			E			E			E	

Intersection Summary			
HCM Average Control Delay	64.4	HCM Level of Service	E
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	171.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.0%	ICU Level of Service	D
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	9	106	7	24	85	66	4	235	34	131	301	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	14	12	12	9	9	12	11	12	12	12	12
Total Lost time (s)		4.0			4.0	4.0		4.0			4.0	
Lane Util. Factor		1.00			1.00	1.00		1.00			0.95	
Frt		0.99			1.00	0.85		0.98			1.00	
Flt Protected		0.99			0.99	1.00		1.00			0.98	
Satd. Flow (prot)		1905			1628	1439		1759			3471	
Flt Permitted		0.97			0.92	1.00		0.99			0.74	
Satd. Flow (perm)		1860			1519	1439		1739			2592	
Peak-hour factor, PHF	0.56	0.83	0.58	0.75	0.79	0.79	0.50	0.85	0.85	0.86	0.92	0.44
Adj. Flow (vph)	16	128	12	32	108	84	8	276	40	152	327	16
RTOR Reduction (vph)	0	5	0	0	0	49	0	8	0	0	4	0
Lane Group Flow (vph)	0	151	0	0	140	35	0	316	0	0	491	0
Heavy Vehicles (%)	6%	5%	0%	0%	5%	1%	0%	3%	0%	2%	2%	0%
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		24.0			24.0	24.0		26.0			26.0	
Effective Green, g (s)		25.0			25.0	25.0		27.0			27.0	
Actuated g/C Ratio		0.42			0.42	0.42		0.45			0.45	
Clearance Time (s)		5.0			5.0	5.0		5.0			5.0	
Lane Grp Cap (vph)		775			633	600		783			1166	
v/s Ratio Prot												
v/s Ratio Perm		0.08			c0.09	0.02		0.18			c0.19	
v/c Ratio		0.19			0.22	0.06		0.40			0.42	
Uniform Delay, d1		11.1			11.2	10.5		11.1			11.2	
Progression Factor		1.00			1.00	1.00		1.00			1.00	
Incremental Delay, d2		0.6			0.8	0.2		1.5			1.1	
Delay (s)		11.7			12.1	10.6		12.6			12.3	
Level of Service		B			B	B		B			B	
Approach Delay (s)		11.7			11.5			12.6			12.3	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	12.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	SBL	SBR	NWL	NWR
Lane Configurations						
Volume (vph)	0	477	279	5	172	237
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	10	9	12	10	9
Total Lost time (s)		4.0	4.0		4.0	4.0
Lane Util. Factor		0.88	0.97		1.00	1.00
Frt		0.85	1.00		1.00	0.85
Flt Protected		1.00	0.95		0.95	1.00
Satd. Flow (prot)		2627	3091		1636	1425
Flt Permitted		1.00	0.95		0.95	1.00
Satd. Flow (perm)		2627	3091		1636	1425
Peak-hour factor, PHF	0.55	0.84	0.92	0.63	0.86	0.93
Adj. Flow (vph)	0	568	303	8	200	255
RTOR Reduction (vph)	0	194	3	0	0	0
Lane Group Flow (vph)	0	374	308	0	200	255
Heavy Vehicles (%)	13%	1%	2%	0%	3%	2%
Turn Type		custom				pt+ov
Protected Phases			6		8	8 6
Permitted Phases		4				
Actuated Green, G (s)		45.0	21.0		45.0	76.0
Effective Green, g (s)		46.0	22.0		46.0	76.0
Actuated g/C Ratio		0.61	0.29		0.61	1.00
Clearance Time (s)		5.0	5.0		5.0	
Lane Grp Cap (vph)		1590	895		990	1425
v/s Ratio Prot			c0.10		0.12	0.18
v/s Ratio Perm		c0.14				
v/c Ratio		0.24	0.34		0.20	0.18
Uniform Delay, d1		6.9	21.3		6.7	0.0
Progression Factor		1.00	1.00		1.00	1.00
Incremental Delay, d2		0.3	1.1		0.5	0.3
Delay (s)		7.3	22.4		7.2	0.3
Level of Service		A	C		A	A
Approach Delay (s)	7.3		22.4		3.3	
Approach LOS	A		C		A	

Intersection Summary			
HCM Average Control Delay	9.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	76.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	24.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	NBL2	NBL	NBR	SEL	SER	SER2	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	27	196	89	25	508	127	190	800	114	191	297	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	12	10	10	12	11	11	12	11	11	12
Total Lost time (s)		4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		0.97		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.99		1.00	0.99		1.00	0.99		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00		0.99	1.00		1.00	1.00	
Frt		0.95		0.86	0.85		1.00	0.98		1.00	0.99	
Flt Protected		0.97		1.00	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3080		1493	1368		1667	3368		1728	3408	
Flt Permitted		0.80		0.94	1.00		0.54	1.00		0.10	1.00	
Satd. Flow (perm)		2542		1414	1368		948	3368		187	3408	
Peak-hour factor, PHF	0.75	0.93	0.74	0.78	0.90	0.81	0.90	0.94	0.79	0.94	0.91	0.36
Adj. Flow (vph)	36	211	120	32	564	157	211	851	144	203	326	28
RTOR Reduction (vph)	0	60	0	0	25	0	0	13	0	0	6	0
Lane Group Flow (vph)	0	307	0	376	352	0	211	982	0	203	348	0
Confl. Peds. (#/hr)	1		2	2		1	10		12	12		10
Heavy Vehicles (%)	4%	2%	1%	2%	2%	5%	4%	1%	0%	1%	1%	0%
Turn Type	pm+pt				custom		pm+pt			pm+pt		
Protected Phases	5	2					7	4		3	8	
Permitted Phases	2			6	6		4			8		
Actuated Green, G (s)		42.0		29.0	29.0		42.0	34.0		52.0	39.0	
Effective Green, g (s)		43.0		30.0	30.0		44.0	35.0		53.0	40.0	
Actuated g/C Ratio		0.41		0.29	0.29		0.42	0.34		0.51	0.38	
Clearance Time (s)		5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)		1098		408	395		463	1133		303	1311	
v/s Ratio Prot		c0.02					0.04	c0.29		c0.09	0.10	
v/s Ratio Perm		0.09		c0.27	0.26		0.15			0.25		
v/c Ratio		0.28		0.92	0.89		0.46	0.87		0.67	0.27	
Uniform Delay, d1		20.2		35.9	35.4		19.8	32.3		21.4	21.9	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.6		28.6	24.8		3.2	9.0		11.2	0.5	
Delay (s)		20.9		64.5	60.2		23.0	41.3		32.6	22.4	
Level of Service		C		E	E		C	D		C	C	
Approach Delay (s)		20.9		62.4				38.1			26.1	
Approach LOS		C		E				D			C	

Intersection Summary			
HCM Average Control Delay	39.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	104.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	77.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	217	130	90	44	41	42	20	462	28	34	830	76
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	10	12	12	12	12	10	10	12	10	10	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	0.95
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.94		1.00	0.94		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1605	1649		1804	1736		1636	1641		1652	1722	1533
Flt Permitted	0.44	1.00		0.23	1.00		0.19	1.00		0.38	1.00	1.00
Satd. Flow (perm)	735	1649		444	1736		324	1641		663	1722	1533
Peak-hour factor, PHF	0.89	0.83	0.80	0.79	0.64	0.88	0.56	0.92	0.78	0.71	0.95	0.86
Adj. Flow (vph)	244	157	112	56	64	48	36	502	36	48	874	88
RTOR Reduction (vph)	0	17	0	0	18	0	0	2	0	0	0	26
Lane Group Flow (vph)	244	252	0	56	94	0	36	536	0	48	874	62
Confl. Peds. (#/hr)	2		3	3		2	7		2	2		7
Heavy Vehicles (%)	1%	0%	0%	0%	2%	0%	3%	7%	5%	2%	3%	0%
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	29.0	19.0		23.2	16.1		95.4	92.3		95.4	92.3	92.3
Effective Green, g (s)	31.0	20.0		25.2	17.1		97.4	95.3		97.4	95.3	95.3
Actuated g/C Ratio	0.22	0.14		0.18	0.12		0.68	0.66		0.68	0.66	0.66
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	7.0		5.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	225	230		155	207		257	1090		478	1144	1018
v/s Ratio Prot	c0.08	c0.15		0.02	0.05		c0.00	0.33		0.00	c0.51	
v/s Ratio Perm	0.15			0.04			0.09			0.07		0.04
v/c Ratio	1.08	1.09		0.36	0.45		0.14	0.49		0.10	0.76	0.06
Uniform Delay, d1	54.9	61.8		50.9	58.8		14.0	12.0		8.6	16.4	8.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	84.3	87.0		1.4	1.6		0.3	1.6		0.1	4.9	0.1
Delay (s)	139.2	148.7		52.4	60.4		14.2	13.6		8.7	21.3	8.5
Level of Service	F	F		D	E		B	B		A	C	A
Approach Delay (s)		144.2			57.7			13.7			19.6	
Approach LOS		F			E			B			B	

Intersection Summary			
HCM Average Control Delay	49.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	143.5	Sum of lost time (s)	16.0
Intersection Capacity Utilization	71.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	130	9	171	2	0	5	123	671	21	86	1318	71
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	10	10	10	10	10	10
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.98		1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		0.99	1.00	1.00	1.00		1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected		0.96	1.00		0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1789	1542		1789	1397	1636	3281		1651	3292	
Flt Permitted		0.74	1.00		0.46	1.00	0.10	1.00		0.29	1.00	
Satd. Flow (perm)		1383	1542		871	1397	174	3281		506	3292	
Peak-hour factor, PHF	0.81	0.75	0.81	0.50	0.92	0.63	0.85	0.82	0.58	0.83	0.94	0.77
Adj. Flow (vph)	160	12	211	4	0	8	145	818	36	104	1402	92
RTOR Reduction (vph)	0	0	33	0	0	7	0	3	0	0	4	0
Lane Group Flow (vph)	0	172	178	0	4	1	145	851	0	104	1490	0
Confl. Peds. (#/hr)	1		7	7		1	7		3	3		7
Heavy Vehicles (%)	1%	5%	3%	0%	50%	14%	3%	2%	0%	2%	1%	5%
Turn Type	Perm		pm+ov	Perm		Perm	pm+pt			pm+pt		
Protected Phases		2	3		6		3	8		7	4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)		16.5	24.7		16.5	16.5	71.3	63.1		69.5	62.2	
Effective Green, g (s)		17.5	26.7		17.5	17.5	73.3	65.1		71.5	64.2	
Actuated g/C Ratio		0.17	0.26		0.17	0.17	0.71	0.63		0.69	0.62	
Clearance Time (s)		5.0	5.0		5.0	5.0	5.0	6.0		5.0	6.0	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		235	460		148	238	255	2076		444	2054	
v/s Ratio Prot			0.03				c0.05	0.26		0.02	c0.45	
v/s Ratio Perm		c0.12	0.08		0.00	0.00	0.35			0.14		
v/c Ratio		0.73	0.39		0.03	0.01	0.57	0.41		0.23	0.73	
Uniform Delay, d1		40.5	31.4		35.6	35.5	11.5	9.4		5.5	13.3	
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		11.1	0.5		0.1	0.0	2.9	0.6		0.3	2.3	
Delay (s)		51.6	31.9		35.7	35.5	14.4	10.0		5.7	15.6	
Level of Service		D	C		D	D	B	A		A	B	
Approach Delay (s)		40.8			35.5			10.6			14.9	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM Average Control Delay	16.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	102.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	247	3	303	1	12	3	75	321	1	0	620	418
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	9	12	12	10	12	11	9	12	12	10	10
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95			1.00	1.00
Frpb, ped/bikes	1.00	0.98			1.00		1.00	1.00			1.00	1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00			1.00	1.00
Frt	1.00	0.85			0.98		1.00	1.00			1.00	0.85
Flt Protected	0.95	1.00			0.99		0.95	1.00			1.00	1.00
Satd. Flow (prot)	1617	1430			1712		1745	2925			1689	1507
Flt Permitted	0.66	1.00			0.38		0.34	1.00			1.00	1.00
Satd. Flow (perm)	1116	1430			660		628	2925			1689	1507
Peak-hour factor, PHF	0.85	0.75	0.94	0.25	0.75	0.75	0.75	0.88	0.25	0.92	0.98	0.93
Adj. Flow (vph)	291	4	322	4	16	4	100	365	4	0	633	449
RTOR Reduction (vph)	0	261	0	0	4	0	0	0	0	0	0	121
Lane Group Flow (vph)	291	65	0	0	20	0	100	369	0	0	633	328
Confl. Peds. (#/hr)	4		3	3		4						
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	11%	0%	0%	5%	0%
Turn Type	pm+pt			Perm			pm+pt			Perm		Perm
Protected Phases	7	4			8		5	2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	14.2	14.2			5.1		91.2	91.2			83.2	83.2
Effective Green, g (s)	14.2	15.2			6.1		91.2	92.2			84.2	84.2
Actuated g/C Ratio	0.12	0.13			0.05		0.79	0.80			0.73	0.73
Clearance Time (s)	4.0	5.0			5.0		4.0	5.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	159	188			35		535	2337			1232	1100
v/s Ratio Prot	c0.08	0.05					0.01	c0.13			c0.37	
v/s Ratio Perm	c0.14				0.03		0.14					0.22
v/c Ratio	1.83	0.34			0.58		0.19	0.16			0.51	0.30
Uniform Delay, d1	51.1	45.6			53.4		4.1	2.7			6.7	5.4
Progression Factor	1.00	1.00			1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	397.1	1.1			21.0		0.2	0.1			1.5	0.7
Delay (s)	448.1	46.7			74.4		4.3	2.8			8.3	6.1
Level of Service	F	D			E		A	A			A	A
Approach Delay (s)		236.0			74.4			3.1			7.4	
Approach LOS		F			E			A			A	

Intersection Summary			
HCM Average Control Delay	71.6	HCM Level of Service	E
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	115.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	71.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	194	6	252	3	4	4	141	350	6	3	655	154
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	11	11	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0		4.0	4.0			4.0	
Lane Util. Factor		1.00			1.00		1.00	1.00			0.95	
Frpb, ped/bikes		0.99			0.99		1.00	1.00			1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00			1.00	
Frt		0.93			0.95		1.00	1.00			0.97	
Flt Protected		0.98			0.98		0.95	1.00			1.00	
Satd. Flow (prot)		1646			1712		1728	1813			3309	
Flt Permitted		0.84			0.87		0.14	1.00			0.95	
Satd. Flow (perm)		1422			1520		249	1813			3156	
Peak-hour factor, PHF	0.76	0.38	0.84	0.38	0.50	0.50	0.78	0.86	0.75	0.75	0.90	0.73
Adj. Flow (vph)	255	16	300	8	8	8	181	407	8	4	728	211
RTOR Reduction (vph)	0	39	0	0	5	0	0	1	0	0	26	0
Lane Group Flow (vph)	0	532	0	0	19	0	181	414	0	0	917	0
Confl. Peds. (#/hr)	1		3	3		1			1	1		
Heavy Vehicles (%)	5%	0%	3%	0%	0%	0%	1%	1%	0%	0%	1%	5%
Turn Type	Perm			Perm			pm+pt			Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		35.0			35.0		56.0	56.0			38.0	
Effective Green, g (s)		36.0			36.0		57.0	57.0			39.0	
Actuated g/C Ratio		0.36			0.36		0.56	0.56			0.39	
Clearance Time (s)		5.0			5.0		5.0	5.0			5.0	
Lane Grp Cap (vph)		507			542		346	1023			1219	
v/s Ratio Prot							c0.07	0.23				
v/s Ratio Perm		c0.37			0.01		0.22				c0.29	
v/c Ratio		1.05			0.03		0.52	0.40			0.75	
Uniform Delay, d1		32.5			21.2		14.8	12.4			26.8	
Progression Factor		1.00			1.00		1.00	1.00			1.00	
Incremental Delay, d2		53.4			0.1		5.6	1.2			4.3	
Delay (s)		85.9			21.3		20.4	13.6			31.1	
Level of Service		F			C		C	B			C	
Approach Delay (s)		85.9			21.3			15.7			31.1	
Approach LOS		F			C			B			C	

Intersection Summary			
HCM Average Control Delay	41.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	101.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	85.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	5	0	67	3	73	0	266	229	191	409	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0	4.0		4.0	
Lane Util. Factor		1.00			1.00			0.95	1.00		0.95	
Frt		1.00			0.94			1.00	0.85		1.00	
Flt Protected		1.00			0.98			1.00	1.00		0.99	
Satd. Flow (prot)		1429			1591			3312	1553		3392	
Flt Permitted		1.00			0.87			1.00	1.00		0.77	
Satd. Flow (perm)		1429			1417			3312	1553		2641	
Peak-hour factor, PHF	0.25	0.63	0.25	0.76	0.25	0.79	0.92	0.95	0.82	0.94	0.85	0.25
Adj. Flow (vph)	0	8	0	88	12	92	0	280	279	203	481	4
RTOR Reduction (vph)	0	0	0	0	57	0	0	0	155	0	1	0
Lane Group Flow (vph)	0	8	0	0	135	0	0	280	124	0	687	0
Heavy Vehicles (%)	0%	33%	0%	9%	43%	5%	0%	9%	4%	1%	6%	50%
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		16.0			16.0			19.0	19.0		19.0	
Effective Green, g (s)		17.0			17.0			20.0	20.0		20.0	
Actuated g/C Ratio		0.38			0.38			0.44	0.44		0.44	
Clearance Time (s)		5.0			5.0			5.0	5.0		5.0	
Lane Grp Cap (vph)		540			535			1472	690		1174	
v/s Ratio Prot		0.01						0.08				
v/s Ratio Perm					c0.10				0.08		c0.26	
v/c Ratio		0.01			0.25			0.19	0.18		0.59	
Uniform Delay, d1		8.8			9.6			7.6	7.5		9.4	
Progression Factor		1.00			1.00			1.00	1.00		1.00	
Incremental Delay, d2		0.1			1.1			0.3	0.6		2.1	
Delay (s)		8.8			10.8			7.9	8.1		11.5	
Level of Service		A			B			A	A		B	
Approach Delay (s)		8.8			10.8			8.0			11.5	
Approach LOS		A			B			A			B	

Intersection Summary			
HCM Average Control Delay	10.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	52	97	3	2	21	8	4	246	33	12	296	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	11	12	12	12	12	12	10	12
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			0.95	
Frpb, ped/bikes		1.00			0.99			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			0.97			0.98			0.99	
Flt Protected		0.98			1.00			1.00			1.00	
Satd. Flow (prot)		1780			1721			1826			3293	
Flt Permitted		0.90			0.98			0.99			0.94	
Satd. Flow (perm)		1622			1693			1808			3088	
Peak-hour factor, PHF	0.77	0.81	0.38	0.50	0.66	0.67	0.50	0.93	0.75	0.75	0.93	0.54
Adj. Flow (vph)	68	120	8	4	32	12	8	265	44	16	318	24
RTOR Reduction (vph)	0	3	0	0	7	0	0	13	0	0	12	0
Lane Group Flow (vph)	0	193	0	0	41	0	0	304	0	0	346	0
Confl. Peds. (#/hr)	4		5	5		4						
Heavy Vehicles (%)	0%	1%	0%	0%	0%	8%	0%	2%	2%	4%	1%	0%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		18.0			18.0			17.0			17.0	
Effective Green, g (s)		19.0			19.0			18.0			18.0	
Actuated g/C Ratio		0.42			0.42			0.40			0.40	
Clearance Time (s)		5.0			5.0			5.0			5.0	
Lane Grp Cap (vph)		685			715			723			1235	
v/s Ratio Prot												
v/s Ratio Perm		c0.12			0.02			c0.17			0.11	
v/c Ratio		0.28			0.06			0.42			0.28	
Uniform Delay, d1		8.5			7.7			9.7			9.1	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.0			0.2			1.8			0.6	
Delay (s)		9.5			7.9			11.5			9.7	
Level of Service		A			A			B			A	
Approach Delay (s)		9.5			7.9			11.5			9.7	
Approach LOS		A			A			B			A	

Intersection Summary			
HCM Average Control Delay	10.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	39.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBL2	SBL	SBR	NWL	NWR	NWR2	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	5	1380	106	210	808	25	107	20	411	17	7	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	10	12	12	10	10	10	12	11	12
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	
Lane Util. Factor	1.00	0.94		1.00	0.76			1.00	1.00		1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.96		0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.97	1.00		0.98	
Frt	1.00	0.99		1.00	0.85			1.00	0.85		0.97	
Flt Protected	0.95	0.96		0.95	1.00			0.96	1.00		0.98	
Satd. Flow (prot)	1745	4998		1685	3449			1655	1451		1681	
Flt Permitted	0.24	0.96		0.12	1.00			0.76	1.00		0.75	
Satd. Flow (perm)	445	4998		214	3449			1302	1451		1290	
Peak-hour factor, PHF	0.62	0.95	0.83	0.25	0.90	0.69	0.84	0.63	0.93	0.71	0.58	0.33
Adj. Flow (vph)	8	1453	128	840	898	36	127	32	442	24	12	12
RTOR Reduction (vph)	0	7	0	0	2	0	0	0	34	0	9	0
Lane Group Flow (vph)	8	1574	0	840	932	0	0	159	408	0	39	0
Confl. Peds. (#/hr)			5	5			17		20	20		17
Heavy Vehicles (%)	0%	1%	0%	0%	7%	1%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt				custom		Perm		pm+ov	Perm		
Protected Phases	1	6		5	2			4	5		8	
Permitted Phases	6			2			4		4	8		
Actuated Green, G (s)	85.0	84.2		101.2	95.4			19.9	31.9		19.9	
Effective Green, g (s)	87.0	87.2		102.2	98.4			20.9	33.9		20.9	
Actuated g/C Ratio	0.65	0.66		0.77	0.74			0.16	0.25		0.16	
Clearance Time (s)	5.0	7.0		5.0	7.0			5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	308	3274		308	2550			204	413		203	
v/s Ratio Prot	0.00	0.31		c0.27	0.27				c0.10			
v/s Ratio Perm	0.02			c1.83				0.12	0.18		0.03	
v/c Ratio	0.03	0.48		2.73	0.37			0.78	0.99		0.19	
Uniform Delay, d1	8.0	11.6		26.8	6.2			53.9	49.4		48.8	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.0	0.5		786.4	0.4			17.0	40.5		0.5	
Delay (s)	8.1	12.1		813.2	6.6			70.9	89.9		49.2	
Level of Service	A	B		F	A			E	F		D	
Approach Delay (s)		12.0		388.5				84.9			49.2	
Approach LOS		B		F				F			D	

Intersection Summary			
HCM Average Control Delay	189.9	HCM Level of Service	F
HCM Volume to Capacity ratio	2.38		
Actuated Cycle Length (s)	133.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	61.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	2	0	1	78	3	204	2	607	62	360	1178	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	14	14	14	14	14	14	10	10	10	10	10	10
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.93			1.00	0.85	1.00	0.98		1.00	1.00	
Flt Protected		0.98			0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1470			1937	1706	1346	3259		1685	3324	
Flt Permitted		0.91			0.74	1.00	0.20	1.00		0.27	1.00	
Satd. Flow (perm)		1367			1494	1706	278	3259		479	3324	
Peak-hour factor, PHF	0.50	0.25	0.25	0.56	0.25	0.93	0.25	0.88	0.78	0.88	0.87	0.65
Adj. Flow (vph)	4	0	4	139	12	219	8	690	79	409	1354	20
RTOR Reduction (vph)	0	3	0	0	0	0	0	8	0	0	1	0
Lane Group Flow (vph)	0	5	0	0	151	219	8	761	0	409	1373	0
Confl. Peds. (#/hr)	5					5	3					3
Heavy Vehicles (%)	0%	0%	50%	0%	0%	1%	25%	2%	0%	0%	1%	7%
Turn Type	Perm			Perm		pt+ov	Perm			pm+pt		
Protected Phases		4			8	8 1		2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		24.0			24.0	42.0	54.0	54.0		72.0	72.0	
Effective Green, g (s)		25.0			25.0	43.0	57.0	57.0		73.0	75.0	
Actuated g/C Ratio		0.23			0.23	0.40	0.53	0.53		0.68	0.69	
Clearance Time (s)		5.0			5.0		7.0	7.0		5.0	7.0	
Lane Grp Cap (vph)		316			346	679	147	1720		480	2308	
v/s Ratio Prot						0.13		0.23		c0.11	0.41	
v/s Ratio Perm		0.00			c0.10		0.03			c0.47		
v/c Ratio		0.02			0.44	0.32	0.05	0.44		0.85	0.59	
Uniform Delay, d1		32.0			35.5	22.4	12.4	15.7		10.3	8.6	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.1			4.0	1.3	0.7	0.8		17.2	1.1	
Delay (s)		32.1			39.4	23.7	13.1	16.5		27.5	9.7	
Level of Service		C			D	C	B	B		C	A	
Approach Delay (s)		32.1			30.1			16.5			13.8	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	16.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	108.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	62.0%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	333	419	375	285	126	702
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	13	13	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.91
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1680	1503	3252	1455	1626	4673
Flt Permitted	0.95	1.00	1.00	1.00	0.37	1.00
Satd. Flow (perm)	1680	1503	3252	1455	625	4673
Peak-hour factor, PHF	0.94	0.91	0.83	0.84	0.88	0.87
Adj. Flow (vph)	354	460	452	339	143	807
RTOR Reduction (vph)	0	224	0	228	0	0
Lane Group Flow (vph)	354	236	452	111	143	807
Turn Type		Perm		Perm	pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Actuated Green, G (s)	19.0	19.0	17.0	17.0	26.0	26.0
Effective Green, g (s)	20.0	20.0	18.0	18.0	27.0	27.0
Actuated g/C Ratio	0.36	0.36	0.33	0.33	0.49	0.49
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	611	547	1064	476	398	2294
v/s Ratio Prot	c0.21		c0.14		0.03	c0.17
v/s Ratio Perm		0.16		0.08	0.14	
v/c Ratio	0.58	0.43	0.42	0.23	0.36	0.35
Uniform Delay, d1	14.1	13.2	14.5	13.5	8.2	8.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.0	2.5	1.2	1.1	2.5	0.4
Delay (s)	18.1	15.7	15.7	14.6	10.7	9.0
Level of Service	B	B	B	B	B	A
Approach Delay (s)	16.7		15.2			9.3
Approach LOS	B		B			A

Intersection Summary			
HCM Average Control Delay	13.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	45.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	111	752	0	735	830	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	14	12	11	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		0.95	0.95	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1745	1723		3455	3610	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	1745	1723		3455	3610	
Peak-hour factor, PHF	0.84	0.94	0.92	0.89	0.99	0.92
Adj. Flow (vph)	132	800	0	826	838	0
RTOR Reduction (vph)	0	68	0	0	0	0
Lane Group Flow (vph)	132	732	0	826	838	0
Heavy Vehicles (%)	0%	0%	0%	1%	0%	0%
Turn Type		Perm				
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	37.0	37.0		44.0	44.0	
Effective Green, g (s)	38.0	38.0		45.0	45.0	
Actuated g/C Ratio	0.42	0.42		0.49	0.49	
Clearance Time (s)	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	729	719		1709	1785	
v/s Ratio Prot	0.08			c0.24	0.23	
v/s Ratio Perm		c0.43				
v/c Ratio	0.18	1.02		0.48	0.47	
Uniform Delay, d1	16.7	26.5		15.3	15.1	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	38.3		1.0	0.9	
Delay (s)	17.2	64.8		16.3	16.0	
Level of Service	B	E		B	B	
Approach Delay (s)	58.1			16.3	16.0	
Approach LOS	E			B	B	

Intersection Summary			
HCM Average Control Delay	31.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	91.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	76.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

SYNCHRO REPORTS

EXISTING CONDITIONS

PM Peak Hour

HCM Level of Service Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	90	163	28	377	289	49	12	1019	132	138	890	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	12	10	10	11	10	10	10	10	10	10
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	0.88	1.00	0.95		0.97	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1620	1756	1585	1650	1722	2748	1053	3269		3236	3293	
Flt Permitted	0.95	1.00	1.00	0.33	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1620	1756	1585	575	1722	2748	1053	3269		3236	3293	
Peak-hour factor, PHF	0.78	0.87	0.78	0.92	0.93	0.77	0.50	0.94	0.83	0.89	0.90	0.66
Adj. Flow (vph)	115	187	36	410	311	64	24	1084	159	155	989	76
RTOR Reduction (vph)	0	0	30	0	0	49	0	12	0	0	5	0
Lane Group Flow (vph)	115	187	6	410	311	15	24	1231	0	155	1060	0
Confl. Peds. (#/hr)			4	4					3	3		
Heavy Vehicles (%)	4%	1%	0%	2%	3%	0%	60%	1%	0%	1%	1%	4%
Turn Type	Prot		Perm	pm+pt		Perm	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4	8		8						
Actuated Green, G (s)	8.7	13.9	13.9	32.9	20.2	20.2	1.9	37.5		5.0	40.6	
Effective Green, g (s)	8.7	14.9	14.9	32.9	21.2	21.2	1.9	38.5		5.0	41.6	
Actuated g/C Ratio	0.10	0.17	0.17	0.37	0.24	0.24	0.02	0.43		0.06	0.47	
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0		4.0	5.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	158	293	264	392	408	652	22	1408		181	1532	
v/s Ratio Prot	0.07	0.11		c0.18	0.18		0.02	c0.38		c0.05	c0.32	
v/s Ratio Perm			0.00	c0.21		0.01						
v/c Ratio	0.73	0.64	0.02	1.05	0.76	0.02	1.09	0.87		0.86	0.69	
Uniform Delay, d1	39.2	34.7	31.2	25.4	31.8	26.2	43.8	23.2		41.8	18.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	15.4	4.5	0.0	58.0	8.2	0.0	221.9	7.8		30.6	2.6	
Delay (s)	54.6	39.3	31.2	83.4	40.0	26.2	265.7	31.1		72.4	21.4	
Level of Service	D	D	C	F	D	C	F	C		E	C	
Approach Delay (s)		43.6			61.5			35.5			27.9	
Approach LOS		D			E			D			C	

Intersection Summary			
HCM Average Control Delay	39.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	89.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	79.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	35	179	90	203	285	9	129	1134	61	7	1108	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	9	12	12	9	12	10	10	10	10	10	10
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95			0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.99			1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.95			1.00		1.00	0.99		1.00	0.99	
Flt Protected		0.99			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		2964			3063		1668	3300		1683	3303	
Flt Permitted		0.82			0.60		0.09	1.00		0.16	1.00	
Satd. Flow (perm)		2459			1877		156	3300		276	3303	
Peak-hour factor, PHF	0.80	0.90	0.73	0.83	0.89	0.56	0.85	0.96	0.76	0.44	0.90	0.78
Adj. Flow (vph)	44	199	123	245	320	16	152	1181	80	16	1231	76
RTOR Reduction (vph)	0	62	0	0	2	0	0	5	0	0	4	0
Lane Group Flow (vph)	0	304	0	0	579	0	152	1256	0	16	1303	0
Confl. Peds. (#/hr)	5		2	2		5	3		4	4		3
Heavy Vehicles (%)	3%	4%	1%	4%	3%	0%	1%	1%	1%	0%	1%	1%
Turn Type	Perm			pm+pt			pm+pt			Perm		
Protected Phases		4		3	8		5	2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		24.0			39.0		52.0	52.0		40.0	40.0	
Effective Green, g (s)		25.0			40.0		53.0	53.0		41.0	41.0	
Actuated g/C Ratio		0.25			0.40		0.52	0.52		0.41	0.41	
Clearance Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)		609			873		202	1732		112	1341	
v/s Ratio Prot					c0.07		0.06	c0.38			c0.39	
v/s Ratio Perm		0.12			c0.19		0.34			0.06		
v/c Ratio		0.50			0.66		0.75	0.73		0.14	0.97	
Uniform Delay, d1		32.6			25.0		20.8	18.4		18.9	29.4	
Progression Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		2.9			4.0		22.5	2.7		2.7	18.7	
Delay (s)		35.5			28.9		43.3	21.1		21.6	48.1	
Level of Service		D			C		D	C		C	D	
Approach Delay (s)		35.5			28.9			23.5			47.8	
Approach LOS		D			C			C			D	

Intersection Summary			
HCM Average Control Delay	34.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	101.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	49	208	32	173	279	68	52	1044	137	62	1081	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	10	12	12	9	12	12	11	12	12	10	12
Total Lost time (s)	4.0	4.0			4.0			4.0	4.0		4.0	
Lane Util. Factor	1.00	1.00			0.95			0.91	1.00		0.91	
Frpb, ped/bikes	1.00	1.00			1.00			1.00	0.97		1.00	
Flpb, ped/bikes	1.00	1.00			1.00			1.00	1.00		1.00	
Frt	1.00	0.98			0.98			1.00	0.85		1.00	
Flt Protected	0.95	1.00			0.98			1.00	1.00		1.00	
Satd. Flow (prot)	1620	1693			3075			4952	1565		4755	
Flt Permitted	0.32	1.00			0.66			0.78	1.00		0.79	
Satd. Flow (perm)	551	1693			2069			3854	1565		3750	
Peak-hour factor, PHF	0.65	0.75	0.80	0.82	0.91	0.81	0.73	0.90	0.84	0.82	0.92	0.73
Adj. Flow (vph)	75	277	40	211	307	84	71	1160	163	76	1175	40
RTOR Reduction (vph)	0	9	0	0	22	0	0	0	75	0	5	0
Lane Group Flow (vph)	75	308	0	0	580	0	0	1231	88	0	1286	0
Confl. Peds. (#/hr)	7		1	1		7	25		6	6		25
Heavy Vehicles (%)	0%	3%	0%	1%	2%	0%	0%	1%	0%	0%	1%	0%
Turn Type	Perm			Perm			pm+pt		Perm	Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	19.0	19.0			19.0			32.0	32.0		23.0	
Effective Green, g (s)	20.0	20.0			20.0			33.0	33.0		24.0	
Actuated g/C Ratio	0.33	0.33			0.33			0.54	0.54		0.39	
Clearance Time (s)	5.0	5.0			5.0			5.0	5.0		5.0	
Lane Grp Cap (vph)	181	555			678			2175	847		1475	
v/s Ratio Prot		0.18						c0.05				
v/s Ratio Perm	0.14				c0.28			0.26	0.06		c0.34	
v/c Ratio	0.41	0.56			0.86			0.57	0.10		0.87	
Uniform Delay, d1	15.9	16.8			19.2			9.3	6.8		17.1	
Progression Factor	1.00	1.00			1.00			1.00	1.00		1.00	
Incremental Delay, d2	6.9	4.0			13.1			1.1	0.2		7.3	
Delay (s)	22.8	20.8			32.3			10.3	7.1		24.4	
Level of Service	C	C			C			B	A		C	
Approach Delay (s)		21.2			32.3			10.0			24.4	
Approach LOS		C			C			A			C	

Intersection Summary			
HCM Average Control Delay	19.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	61.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	85.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	212	185	615	192	62	532
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	1.00		1.00			0.95
Frt	0.93		0.97			1.00
Flt Protected	0.97		1.00			0.99
Satd. Flow (prot)	1665		1758			3409
Flt Permitted	0.97		1.00			0.67
Satd. Flow (perm)	1665		1758			2297
Peak-hour factor, PHF	0.95	0.89	0.91	0.87	0.82	0.96
Adj. Flow (vph)	223	208	676	221	76	554
RTOR Reduction (vph)	56	0	20	0	0	0
Lane Group Flow (vph)	375	0	877	0	0	630
Heavy Vehicles (%)	1%	0%	1%	1%	0%	2%
Turn Type					Perm	
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	14.8		30.1			30.1
Effective Green, g (s)	15.8		31.1			31.1
Actuated g/C Ratio	0.29		0.57			0.57
Clearance Time (s)	5.0		5.0			5.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	479		996			1301
v/s Ratio Prot	c0.23		c0.50			
v/s Ratio Perm						0.27
v/c Ratio	0.78		0.88			0.48
Uniform Delay, d1	18.0		10.3			7.1
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	8.2		9.2			0.3
Delay (s)	26.2		19.5			7.4
Level of Service	C		B			A
Approach Delay (s)	26.2		19.5			7.4
Approach LOS	C		B			A

Intersection Summary			
HCM Average Control Delay	17.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	54.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	92.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	17	11	1	135	12	308	8	589	53	170	589	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	10	12	10	12	11	12	12	11	12
Total Lost time (s)		4.0	4.0		4.0	4.0		4.0			4.0	
Lane Util. Factor		1.00	1.00		1.00	1.00		1.00			0.95	
Frpb, ped/bikes		1.00	0.98		1.00	0.98		1.00			1.00	
Flpb, ped/bikes		1.00	1.00		1.00	1.00		1.00			1.00	
Frt		1.00	0.85		1.00	0.85		0.98			0.99	
Flt Protected		0.97	1.00		0.96	1.00		1.00			0.99	
Satd. Flow (prot)		1841	1590		1803	1470		1785			3400	
Flt Permitted		0.25	1.00		0.96	1.00		0.99			0.59	
Satd. Flow (perm)		481	1590		1803	1470		1760			2022	
Peak-hour factor, PHF	0.61	0.69	0.25	0.80	0.60	0.79	0.68	0.90	0.58	0.94	0.94	0.69
Adj. Flow (vph)	28	16	4	169	20	390	12	654	91	181	627	32
RTOR Reduction (vph)	0	0	3	0	0	314	0	5	0	0	3	0
Lane Group Flow (vph)	0	44	1	0	189	76	0	752	0	0	837	0
Confl. Peds. (#/hr)			2	2		2			1	1		
Heavy Vehicles (%)	0%	0%	0%	1%	0%	1%	0%	1%	1%	1%	1%	0%
Turn Type	Perm		Perm	Split		Perm	Perm			Perm		
Protected Phases		4		8	8			2			6	
Permitted Phases	4		4			8	2			6		
Actuated Green, G (s)		16.0	16.0		16.0	16.0		46.0			46.0	
Effective Green, g (s)		16.0	16.0		16.0	16.0		46.0			46.0	
Actuated g/C Ratio		0.18	0.18		0.18	0.18		0.51			0.51	
Clearance Time (s)		4.0	4.0		4.0	4.0		4.0			4.0	
Lane Grp Cap (vph)		86	283		321	261		900			1033	
v/s Ratio Prot					c0.10							
v/s Ratio Perm		c0.09	0.00			0.05		c0.43			0.41	
v/c Ratio		0.51	0.00		0.59	0.29		0.84			0.81	
Uniform Delay, d1		33.5	30.4		34.0	32.1		18.8			18.4	
Progression Factor		1.00	1.00		1.00	1.00		0.79			1.00	
Incremental Delay, d2		20.1	0.0		7.7	2.8		8.4			6.9	
Delay (s)		53.6	30.5		41.7	34.9		23.3			25.2	
Level of Service		D	C		D	C		C			C	
Approach Delay (s)		51.6			37.1			23.3			25.2	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM Average Control Delay	28.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	81.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	65	4	29	152	129	7	380	37	87	360	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	14	12	12	9	9	12	11	12	12	12	12
Total Lost time (s)		4.0			4.0	4.0		4.0			4.0	
Lane Util. Factor		1.00			1.00	1.00		1.00			0.95	
Frpb, ped/bikes		1.00			1.00	0.98		1.00			1.00	
Flpb, ped/bikes		1.00			1.00	1.00		1.00			1.00	
Frt		0.99			1.00	0.85		0.99			0.99	
Flt Protected		0.99			0.99	1.00		1.00			0.99	
Satd. Flow (prot)		1892			1652	1408		1792			3538	
Flt Permitted		0.89			0.91	1.00		0.98			0.80	
Satd. Flow (perm)		1711			1526	1408		1765			2858	
Peak-hour factor, PHF	0.83	0.71	0.50	0.60	0.93	0.87	0.58	0.88	0.77	0.87	0.87	0.54
Adj. Flow (vph)	36	92	8	48	163	148	12	432	48	100	414	28
RTOR Reduction (vph)	0	5	0	0	0	92	0	9	0	0	9	0
Lane Group Flow (vph)	0	131	0	0	211	56	0	483	0	0	533	0
Confl. Peds. (#/hr)	1		3	3		1	2		1	1		2
Heavy Vehicles (%)	0%	7%	0%	0%	3%	1%	0%	1%	0%	1%	0%	0%
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		16.0			16.0	16.0		19.0			19.0	
Effective Green, g (s)		17.0			17.0	17.0		20.0			20.0	
Actuated g/C Ratio		0.38			0.38	0.38		0.44			0.44	
Clearance Time (s)		5.0			5.0	5.0		5.0			5.0	
Lane Grp Cap (vph)		646			576	532		784			1270	
v/s Ratio Prot												
v/s Ratio Perm		0.08			c0.14	0.04		c0.27			0.19	
v/c Ratio		0.20			0.37	0.11		0.62			0.42	
Uniform Delay, d1		9.4			10.1	9.1		9.6			8.5	
Progression Factor		1.00			1.00	1.00		1.00			0.88	
Incremental Delay, d2		0.7			1.8	0.4		3.6			0.6	
Delay (s)		10.1			11.9	9.5		13.2			8.1	
Level of Service		B			B	A		B			A	
Approach Delay (s)		10.1			10.9			13.2			8.1	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM Average Control Delay	10.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	76.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBR	SBL	SBR	NWL	NWR
Lane Configurations						
Volume (vph)	0	222	345	12	473	320
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	10	9	12	10	9
Total Lost time (s)		4.0	4.0		4.0	4.0
Lane Util. Factor		0.88	0.97		1.00	1.00
Frpb, ped/bikes		1.00	1.00		1.00	1.00
Flpb, ped/bikes		1.00	1.00		1.00	1.00
Frt		0.85	0.99		1.00	0.85
Flt Protected		1.00	0.95		0.95	1.00
Satd. Flow (prot)		2601	3140		1668	1439
Flt Permitted		1.00	0.95		0.95	1.00
Satd. Flow (perm)		2601	3140		1668	1439
Peak-hour factor, PHF	0.90	0.79	0.89	0.60	0.88	0.96
Adj. Flow (vph)	0	281	388	20	538	333
RTOR Reduction (vph)	0	116	5	0	0	0
Lane Group Flow (vph)	0	165	403	0	538	333
Confl. Peds. (#/hr)				2		
Heavy Vehicles (%)	3%	2%	0%	0%	1%	1%
Turn Type		custom				pt+ov
Protected Phases			6		8	8 6
Permitted Phases		4				
Actuated Green, G (s)		46.0	24.0		46.0	80.0
Effective Green, g (s)		47.0	25.0		47.0	80.0
Actuated g/C Ratio		0.59	0.31		0.59	1.00
Clearance Time (s)		5.0	5.0		5.0	
Lane Grp Cap (vph)		1528	981		980	1439
v/s Ratio Prot			c0.13		c0.32	0.23
v/s Ratio Perm		0.06				
v/c Ratio		0.11	0.41		0.55	0.23
Uniform Delay, d1		7.3	21.7		10.0	0.0
Progression Factor		1.00	0.67		1.00	1.00
Incremental Delay, d2		0.1	1.2		2.2	0.4
Delay (s)		7.4	15.7		12.3	0.4
Level of Service		A	B		B	A
Approach Delay (s)	7.4		15.7		7.7	
Approach LOS	A		B		A	

Intersection Summary			
HCM Average Control Delay	9.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	NBL2	NBL	NBR	SEL	SER	SER2	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	97	518	237	24	237	286	168	506	57	86	949	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	12	10	10	12	11	11	12	11	11	12
Total Lost time (s)		4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		0.97		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.99		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt		0.96		0.87	0.85		1.00	0.98		1.00	1.00	
Flt Protected		0.96		0.99	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3132		1517	1398		1728	3393		1724	3446	
Flt Permitted		0.63		0.80	1.00		0.11	1.00		0.31	1.00	
Satd. Flow (perm)		2059		1216	1398		198	3393		565	3446	
Peak-hour factor, PHF	0.83	0.83	0.88	0.75	0.94	0.93	0.98	0.89	0.89	0.90	0.89	0.69
Adj. Flow (vph)	117	624	269	32	252	308	171	569	64	96	1066	16
RTOR Reduction (vph)	0	34	0	0	178	0	0	8	0	0	1	0
Lane Group Flow (vph)	0	976	0	259	155	0	171	625	0	96	1081	0
Confl. Peds. (#/hr)	1		2	2		1	10		12	12		10
Heavy Vehicles (%)	1%	1%	1%	0%	1%	1%	1%	1%	0%	1%	1%	0%
Turn Type	pm+pt				custom		pm+pt			pm+pt		
Protected Phases	5	2					7	4		3	8	
Permitted Phases	2			6	6		4			8		
Actuated Green, G (s)		45.0		32.0	32.0		53.0	45.0		53.0	45.0	
Effective Green, g (s)		46.0		33.0	33.0		55.0	46.0		55.0	46.0	
Actuated g/C Ratio		0.41		0.29	0.29		0.49	0.41		0.49	0.41	
Clearance Time (s)		5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)		924		355	408		218	1381		367	1403	
v/s Ratio Prot		c0.08					c0.06	0.18		0.02	0.31	
v/s Ratio Perm		c0.35		0.21	0.11		c0.32			0.11		
v/c Ratio		1.06		0.73	0.38		0.78	0.45		0.26	0.77	
Uniform Delay, d1		33.5		36.0	31.9		21.5	24.4		16.4	28.9	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		45.7		12.4	2.7		24.1	1.1		1.7	4.1	
Delay (s)		79.2		48.4	34.5		45.6	25.4		18.1	33.1	
Level of Service		E		D	C		D	C		B	C	
Approach Delay (s)		79.2		40.6				29.7			31.9	
Approach LOS		E		D				C			C	

Intersection Summary			
HCM Average Control Delay	46.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	113.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	87.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	190	104	35	113	119	74	57	783	48	43	704	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	10	12	12	12	12	10	10	12	10	10	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.98		1.00	0.99		1.00	1.00		1.00	1.00	0.93
Flpb, ped/bikes	1.00	1.00		0.97	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.95		1.00	0.94		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1607	1657		1750	1768		1685	1717		1685	1705	1506
Flt Permitted	0.37	1.00		0.65	1.00		0.13	1.00		0.06	1.00	1.00
Satd. Flow (perm)	621	1657		1199	1768		235	1717		114	1705	1506
Peak-hour factor, PHF	0.83	0.93	0.63	0.81	0.88	0.84	0.84	0.83	0.56	0.83	0.94	0.96
Adj. Flow (vph)	229	112	56	140	135	88	68	943	86	52	749	88
RTOR Reduction (vph)	0	15	0	0	20	0	0	3	0	0	0	39
Lane Group Flow (vph)	229	153	0	140	203	0	68	1026	0	52	749	49
Confl. Peds. (#/hr)	2		17	17		2	13		3	3		13
Heavy Vehicles (%)	1%	0%	0%	0%	0%	0%	0%	2%	0%	0%	4%	0%
Turn Type	pm+pt			Perm			Perm			Perm		Perm
Protected Phases	7	4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	40.0	40.0		27.0	27.0		70.0	70.0		61.0	61.0	61.0
Effective Green, g (s)	41.0	41.0		28.0	28.0		71.0	71.0		62.0	62.0	62.0
Actuated g/C Ratio	0.34	0.34		0.23	0.23		0.59	0.59		0.52	0.52	0.52
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	5.0
Lane Grp Cap (vph)	286	566		280	413		139	1016		59	881	778
v/s Ratio Prot	c0.06	0.09			0.11			c0.60			0.44	
v/s Ratio Perm	c0.21			0.12			0.29			0.45		0.03
v/c Ratio	0.80	0.27		0.50	0.49		0.49	1.01		0.88	0.85	0.06
Uniform Delay, d1	35.0	28.6		39.9	39.8		14.1	24.5		25.7	25.0	14.5
Progression Factor	1.00	1.00		1.00	1.00		1.14	1.21		1.00	1.00	1.00
Incremental Delay, d2	20.6	1.2		6.3	4.1		10.5	29.0		86.5	10.1	0.2
Delay (s)	55.5	29.8		46.2	44.0		26.6	58.6		112.2	35.1	14.6
Level of Service	E	C		D	D		C	E		F	D	B
Approach Delay (s)		44.7			44.8			56.6			37.6	
Approach LOS		D			D			E			D	

Intersection Summary			
HCM Average Control Delay	47.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	198	2	227	36	14	64	305	1021	0	10	915	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	10	10	10	10	10	10
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	1.00		1.00	0.98	
Flt Protected		0.95	1.00		0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1811	1599		1826	1615	1668	3336		1685	3269	
Flt Permitted		0.67	1.00		0.50	1.00	0.14	1.00		0.25	1.00	
Satd. Flow (perm)		1276	1599		941	1615	246	3336		445	3269	
Peak-hour factor, PHF	0.85	0.50	0.86	0.60	0.70	0.70	0.89	0.90	0.92	0.50	0.91	0.91
Adj. Flow (vph)	233	4	264	60	20	91	343	1134	0	20	1005	148
RTOR Reduction (vph)	0	0	49	0	0	71	0	0	0	0	11	0
Lane Group Flow (vph)	0	237	215	0	80	20	343	1134	0	20	1142	0
Confl. Peds. (#/hr)			4	4			2					2
Heavy Vehicles (%)	0%	0%	1%	0%	0%	0%	1%	1%	0%	0%	1%	0%
Turn Type	Perm		pt+ov	Perm		Perm	pm+pt			Perm		
Protected Phases		4	4 5		8		5	2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		20.0	40.0		20.0	20.0	71.0	71.0		53.0	53.0	
Effective Green, g (s)		23.0	43.0		23.0	23.0	72.0	72.0		54.0	54.0	
Actuated g/C Ratio		0.22	0.42		0.22	0.22	0.70	0.70		0.52	0.52	
Clearance Time (s)		7.0			7.0	7.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)		285	668		210	361	365	2332		233	1714	
v/s Ratio Prot			0.13				c0.13	0.34			0.35	
v/s Ratio Perm		c0.19			0.09	0.01	c0.53			0.04		
v/c Ratio		0.83	0.32		0.38	0.06	0.94	0.49		0.09	0.67	
Uniform Delay, d1		38.2	20.2		34.0	31.5	22.0	7.1		12.2	17.9	
Progression Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		23.7	1.3		5.2	0.3	34.1	0.7		0.7	2.1	
Delay (s)		61.9	21.5		39.1	31.8	56.1	7.8		12.9	20.0	
Level of Service		E	C		D	C	E	A		B	B	
Approach Delay (s)		40.6			35.2			19.0			19.9	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM Average Control Delay	23.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	103.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	74.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	334	8	191	5	27	9	204	525	6	2	443	402
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	9	12	12	10	12	11	9	12	12	10	10
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95			1.00	1.00
Frpb, ped/bikes	1.00	0.97			1.00		1.00	1.00			1.00	0.97
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00			1.00	1.00
Frt	1.00	0.86			0.98		1.00	1.00			1.00	0.85
Flt Protected	0.95	1.00			0.99		0.95	1.00			1.00	1.00
Satd. Flow (prot)	1576	1414			1717		1728	3206			1721	1410
Flt Permitted	0.62	1.00			0.96		0.34	1.00			1.00	1.00
Satd. Flow (perm)	1031	1414			1662		619	3206			1715	1410
Peak-hour factor, PHF	0.89	0.50	0.88	0.63	0.52	0.75	0.86	0.91	0.50	0.50	0.95	0.90
Adj. Flow (vph)	375	16	217	8	52	12	237	577	12	4	466	447
RTOR Reduction (vph)	0	143	0	0	6	0	0	1	0	0	0	216
Lane Group Flow (vph)	375	90	0	0	66	0	237	588	0	0	470	231
Confl. Peds. (#/hr)	1		9	9		1	2		2	2		2
Heavy Vehicles (%)	3%	0%	1%	0%	0%	0%	1%	1%	0%	0%	3%	4%
Turn Type	pm+pt			Perm			pm+pt			Perm		Perm
Protected Phases	7	4			8		5	2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	40.0	40.0			27.0		70.0	70.0			61.0	61.0
Effective Green, g (s)	41.0	41.0			28.0		71.0	71.0			62.0	62.0
Actuated g/C Ratio	0.34	0.34			0.23		0.59	0.59			0.52	0.52
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0			5.0	5.0
Lane Grp Cap (vph)	393	483			388		412	1897			886	729
v/s Ratio Prot	c0.07	0.06					c0.02	0.18				
v/s Ratio Perm	c0.25				0.04		c0.32				0.27	0.16
v/c Ratio	0.95	0.19			0.17		0.58	0.31			0.53	0.32
Uniform Delay, d1	39.5	27.8			36.7		18.3	12.2			19.3	16.8
Progression Factor	1.00	1.00			1.00		1.00	1.00			0.52	0.25
Incremental Delay, d2	35.2	0.9			0.9		5.7	0.4			1.4	0.7
Delay (s)	74.7	28.6			37.7		24.0	12.7			11.4	4.8
Level of Service	E	C			D		C	B			B	A
Approach Delay (s)		57.1			37.7			15.9			8.2	
Approach LOS		E			D			B			A	

Intersection Summary			
HCM Average Control Delay	24.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	154	1	146	2	2	7	263	599	2	1	599	142
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	11	11	11	11	11	11	11	11
Total Lost time (s)		4.0			4.0		4.0	4.0			4.0	
Lane Util. Factor		1.00			1.00		1.00	1.00			0.95	
Frpb, ped/bikes		0.99			0.98		1.00	1.00			1.00	
Flpb, ped/bikes		0.99			1.00		1.00	1.00			1.00	
Frt		0.93			0.92		1.00	1.00			0.97	
Flt Protected		0.98			0.99		0.95	1.00			1.00	
Satd. Flow (prot)		1642			1638		1711	1817			3311	
Flt Permitted		0.84			0.94		0.19	1.00			0.95	
Satd. Flow (perm)		1415			1553		344	1817			3154	
Peak-hour factor, PHF	0.90	0.25	0.75	0.50	0.50	0.58	0.83	0.90	0.50	0.25	0.92	0.81
Adj. Flow (vph)	171	4	195	4	4	12	317	666	4	4	651	175
RTOR Reduction (vph)	0	40	0	0	8	0	0	0	0	0	24	0
Lane Group Flow (vph)	0	330	0	0	12	0	317	670	0	0	806	0
Confl. Peds. (#/hr)	4		4	4		4			2	2		
Heavy Vehicles (%)	5%	0%	2%	0%	0%	0%	2%	1%	0%	0%	1%	6%
Turn Type	Perm			Perm			pm+pt			Perm		
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		32.0			32.0		57.0	57.0			39.0	
Effective Green, g (s)		34.0			34.0		58.0	59.0			41.0	
Actuated g/C Ratio		0.34			0.34		0.57	0.58			0.41	
Clearance Time (s)		6.0			6.0		5.0	6.0			6.0	
Lane Grp Cap (vph)		476			523		387	1061			1280	
v/s Ratio Prot							c0.11	0.37				
v/s Ratio Perm		c0.23			0.01		c0.36				0.26	
v/c Ratio		0.69			0.02		0.82	0.63			0.63	
Uniform Delay, d1		29.0			22.4		15.0	13.8			23.9	
Progression Factor		1.00			1.00		1.00	1.00			1.00	
Incremental Delay, d2		8.1			0.1		17.4	2.9			2.4	
Delay (s)		37.1			22.5		32.4	16.7			26.3	
Level of Service		D			C		C	B			C	
Approach Delay (s)		37.1			22.5			21.7			26.3	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM Average Control Delay	26.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	101.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	87.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

30: Huff Road/Kennesaw Drive & Marietta Boulevard

PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	4	4	6	223	1	213	3	514	104	73	457	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0	4.0		4.0	
Lane Util. Factor		1.00			1.00			0.95	1.00		0.95	
Frpb, ped/bikes		1.00			0.99			1.00	1.00		1.00	
Flpb, ped/bikes		1.00			1.00			1.00	1.00		1.00	
Frt		0.97			0.94			1.00	0.85		1.00	
Flt Protected		0.98			0.97			1.00	1.00		0.99	
Satd. Flow (prot)		1647			1657			3423	1524		3343	
Flt Permitted		0.84			0.82			0.94	1.00		0.81	
Satd. Flow (perm)		1406			1387			3236	1524		2737	
Peak-hour factor, PHF	0.33	0.33	0.75	0.85	0.25	0.95	0.38	0.92	0.87	0.83	0.84	0.25
Adj. Flow (vph)	12	12	8	262	4	224	8	559	120	88	544	4
RTOR Reduction (vph)	0	5	0	0	72	0	0	0	71	0	1	0
Lane Group Flow (vph)	0	27	0	0	418	0	0	567	49	0	635	0
Confl. Peds. (#/hr)	1					1						
Heavy Vehicles (%)	0%	25%	0%	5%	75%	2%	33%	5%	6%	6%	7%	50%
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		16.0			16.0			16.0	16.0		16.0	
Effective Green, g (s)		17.0			17.0			17.0	17.0		17.0	
Actuated g/C Ratio		0.40			0.40			0.40	0.40		0.40	
Clearance Time (s)		5.0			5.0			5.0	5.0		5.0	
Lane Grp Cap (vph)		569			561			1310	617		1108	
v/s Ratio Prot												
v/s Ratio Perm		0.02			c0.30			0.18	0.03		c0.23	
v/c Ratio		0.05			0.75			0.43	0.08		0.57	
Uniform Delay, d1		7.6			10.7			9.0	7.7		9.7	
Progression Factor		1.00			1.00			1.00	1.00		1.00	
Incremental Delay, d2		0.2			8.7			1.0	0.2		2.2	
Delay (s)		7.7			19.4			10.1	7.9		11.8	
Level of Service		A			B			B	A		B	
Approach Delay (s)		7.7			19.4			9.7			11.8	
Approach LOS		A			B			A			B	

Intersection Summary			
HCM Average Control Delay	13.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	42.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	71.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	73	29	5	7	41	18	10	335	12	13	362	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	11	12	12	12	12	12	10	12
Total Lost time (s)		4.0			4.0			4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			0.95	
Frpb, ped/bikes		1.00			0.99			1.00			1.00	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			0.97			1.00			0.99	
Flt Protected		0.97			0.99			1.00			1.00	
Satd. Flow (prot)		1757			1749			1866			3329	
Flt Permitted		0.80			0.96			0.96			0.93	
Satd. Flow (perm)		1442			1701			1795			3103	
Peak-hour factor, PHF	0.91	0.81	0.63	0.58	0.85	0.90	0.36	0.86	0.75	0.65	0.93	0.79
Adj. Flow (vph)	80	36	8	12	48	20	28	390	16	20	389	28
RTOR Reduction (vph)	0	3	0	0	13	0	0	2	0	0	6	0
Lane Group Flow (vph)	0	121	0	0	68	0	0	432	0	0	431	0
Confl. Peds. (#/hr)	2		4	4		2			2	2		
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	0%	0%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		30.0			30.0			42.0			42.0	
Effective Green, g (s)		30.0			30.0			42.0			42.0	
Actuated g/C Ratio		0.38			0.38			0.52			0.52	
Clearance Time (s)		4.0			4.0			4.0			4.0	
Lane Grp Cap (vph)		541			638			942			1629	
v/s Ratio Prot												
v/s Ratio Perm		c0.08			0.04			c0.24			0.14	
v/c Ratio		0.22			0.11			0.46			0.26	
Uniform Delay, d1		17.1			16.3			11.9			10.5	
Progression Factor		1.00			1.00			1.00			1.00	
Incremental Delay, d2		1.0			0.3			1.6			0.4	
Delay (s)		18.0			16.6			13.5			10.9	
Level of Service		B			B			B			B	
Approach Delay (s)		18.0			16.6			13.5			10.9	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	13.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBL2	SBL	SBR	NWL	NWR	NWR2	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	7	1326	216	289	926	85	118	36	231	66	31	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	10	12	12	10	10	10	12	11	12
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	
Lane Util. Factor	1.00	0.94		1.00	0.76			1.00	1.00		1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.97			1.00	0.92		1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99	1.00		0.98	
Frt	1.00	0.98		1.00	0.85			1.00	0.85		0.99	
Flt Protected	0.95	0.96		0.95	1.00			0.96	1.00		0.97	
Satd. Flow (prot)	1745	4941		1685	3539			1684	1393		1709	
Flt Permitted	0.15	0.96		0.95	1.00			0.70	1.00		0.45	
Satd. Flow (perm)	280	4941		1685	3539			1223	1393		802	
Peak-hour factor, PHF	0.44	0.88	0.79	0.77	0.91	0.76	0.76	0.75	0.89	0.75	0.86	0.58
Adj. Flow (vph)	16	1507	273	375	1018	112	155	48	260	88	36	12
RTOR Reduction (vph)	0	25	0	0	9	0	0	0	140	0	3	0
Lane Group Flow (vph)	16	1755	0	375	1121	0	0	203	120	0	133	0
Confl. Peds. (#/hr)	3		6	6		3	14		31	31		14
Heavy Vehicles (%)	0%	1%	1%	0%	1%	0%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt				custom		Perm		Perm	Perm		
Protected Phases	1	6		5				4			8	
Permitted Phases	6				2		4		4	8		
Actuated Green, G (s)	76.0	66.0		10.0	66.0			20.0	20.0		20.0	
Effective Green, g (s)	78.0	67.0		11.0	67.0			22.0	22.0		22.0	
Actuated g/C Ratio	0.70	0.60		0.10	0.60			0.20	0.20		0.20	
Clearance Time (s)	5.0	5.0		5.0	5.0			6.0	6.0		6.0	
Lane Grp Cap (vph)	339	2956		165	2117			240	274		158	
v/s Ratio Prot	0.00	c0.36		c0.22								
v/s Ratio Perm	0.03				0.32			c0.17	0.09		0.17	
v/c Ratio	0.05	0.59		2.27	0.53			0.85	0.44		0.84	
Uniform Delay, d1	6.0	14.0		50.5	13.2			43.4	39.6		43.3	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.3	0.9		591.6	1.0			29.0	5.0		38.9	
Delay (s)	6.3	14.9		642.1	14.2			72.4	44.6		82.2	
Level of Service	A	B		F	B			E	D		F	
Approach Delay (s)		14.8		170.6				56.8			82.2	
Approach LOS		B		F				E			F	

Intersection Summary			
HCM Average Control Delay	82.3	HCM Level of Service	F
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	112.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	11	4	2	128	1	355	1	983	68	209	844	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	14	14	14	14	14	14	10	10	10	10	10	10
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		0.99			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.98			1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected		0.97			0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1904			1928	1706	1680	3300		1685	3329	
Flt Permitted		0.81			0.71	1.00	0.30	1.00		0.14	1.00	
Satd. Flow (perm)		1591			1438	1706	538	3300		242	3329	
Peak-hour factor, PHF	0.55	1.00	0.50	0.84	0.25	0.84	0.25	0.94	0.77	0.89	0.91	0.41
Adj. Flow (vph)	20	4	4	152	4	423	4	1046	88	235	927	12
RTOR Reduction (vph)	0	3	0	0	0	0	0	5	0	0	1	0
Lane Group Flow (vph)	0	25	0	0	156	423	4	1129	0	235	938	0
Confl. Peds. (#/hr)	5		1	1		5	3					3
Heavy Vehicles (%)	0%	0%	0%	0%	0%	1%	0%	1%	0%	0%	1%	0%
Turn Type	Perm			Perm		pt+ov	Perm			pm+pt		
Protected Phases		4			8	8 1		2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		33.0			33.0	49.0	58.0	58.0		73.0	73.0	
Effective Green, g (s)		35.0			35.0	51.0	61.0	61.0		74.0	76.0	
Actuated g/C Ratio		0.29			0.29	0.43	0.51	0.51		0.62	0.64	
Clearance Time (s)		6.0			6.0		7.0	7.0		5.0	7.0	
Lane Grp Cap (vph)		468			423	731	276	1692		284	2126	
v/s Ratio Prot						c0.25		0.34		c0.08	0.28	
v/s Ratio Perm		0.02			0.11		0.01			c0.44		
v/c Ratio		0.05			0.37	0.58	0.01	0.67		0.83	0.44	
Uniform Delay, d1		30.1			33.3	25.8	14.2	21.5		17.3	10.8	
Progression Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.2			2.5	3.3	0.1	2.1		23.4	0.7	
Delay (s)		30.3			35.7	29.2	14.3	23.6		40.6	11.5	
Level of Service		C			D	C	B	C		D	B	
Approach Delay (s)		30.3			30.9			23.5			17.3	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM Average Control Delay	22.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	119.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	75.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	336	422	514	806	134	596
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	13	13	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.91
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1865	1669	3574	1599	1805	5136
Flt Permitted	0.95	1.00	1.00	1.00	0.30	1.00
Satd. Flow (perm)	1865	1669	3574	1599	572	5136
Peak-hour factor, PHF	0.93	0.93	0.83	0.90	0.84	0.91
Adj. Flow (vph)	361	454	619	896	160	655
RTOR Reduction (vph)	0	204	0	534	0	0
Lane Group Flow (vph)	361	250	619	362	160	655
Heavy Vehicles (%)	0%	0%	1%	1%	0%	1%
Turn Type		Perm		Perm	pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Actuated Green, G (s)	16.0	16.0	22.0	22.0	31.0	31.0
Effective Green, g (s)	17.0	17.0	23.0	23.0	32.0	32.0
Actuated g/C Ratio	0.30	0.30	0.40	0.40	0.56	0.56
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	556	498	1442	645	429	2883
v/s Ratio Prot	c0.19		0.17		c0.03	0.13
v/s Ratio Perm		0.15		c0.23	0.18	
v/c Ratio	0.65	0.50	0.43	0.56	0.37	0.23
Uniform Delay, d1	17.4	16.5	12.3	13.1	6.6	6.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.8	3.6	0.9	3.5	2.5	0.2
Delay (s)	23.2	20.1	13.2	16.6	9.1	6.5
Level of Service	C	C	B	B	A	A
Approach Delay (s)	21.5		15.2			7.0
Approach LOS	C		B			A

Intersection Summary			
HCM Average Control Delay	14.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	57.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	93	356	0	1842	755	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	14	12	11	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		0.95	0.95	
Frt	1.00	0.85		1.00	1.00	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	1728	1706		3490	3574	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	1728	1706		3490	3574	
Peak-hour factor, PHF	0.73	0.83	0.92	0.91	0.92	0.92
Adj. Flow (vph)	127	429	0	2024	821	0
RTOR Reduction (vph)	0	140	0	0	0	0
Lane Group Flow (vph)	127	289	0	2024	821	0
Heavy Vehicles (%)	1%	1%	1%	0%	1%	0%
Turn Type		Perm				
Protected Phases	4			2	6	
Permitted Phases		4				
Actuated Green, G (s)	16.0	16.0		39.0	39.0	
Effective Green, g (s)	17.0	17.0		40.0	40.0	
Actuated g/C Ratio	0.26	0.26		0.62	0.62	
Clearance Time (s)	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	452	446		2148	2199	
v/s Ratio Prot	0.07			c0.58	0.23	
v/s Ratio Perm		c0.17				
v/c Ratio	0.28	0.65		0.94	0.37	
Uniform Delay, d1	19.1	21.3		11.4	6.2	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.5	7.1		9.9	0.5	
Delay (s)	20.7	28.4		21.3	6.7	
Level of Service	C	C		C	A	
Approach Delay (s)	26.7			21.3	6.7	
Approach LOS	C			C	A	

Intersection Summary			
HCM Average Control Delay	18.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	62.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

SYNCHRO REPORTS

BASELINE SCENARIO

2020 AM Peak Hour
HCM Level of Service Analysis

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	395	440	510	388	132	832
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	13	13	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.91
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1680	1503	3252	1455	1626	4673
Flt Permitted	0.95	1.00	1.00	1.00	0.34	1.00
Satd. Flow (perm)	1680	1503	3252	1455	584	4673
Peak-hour factor, PHF	0.94	0.91	0.83	0.84	0.88	0.87
Adj. Flow (vph)	420	484	614	462	150	956
RTOR Reduction (vph)	0	179	0	311	0	0
Lane Group Flow (vph)	420	305	614	151	150	956
Turn Type		Perm		Perm	pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Actuated Green, G (s)	19.0	19.0	17.0	17.0	26.0	26.0
Effective Green, g (s)	20.0	20.0	18.0	18.0	27.0	27.0
Actuated g/C Ratio	0.36	0.36	0.33	0.33	0.49	0.49
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	611	547	1064	476	381	2294
v/s Ratio Prot	c0.25		c0.19		0.04	c0.20
v/s Ratio Perm		0.20		0.10	0.16	
v/c Ratio	0.69	0.56	0.58	0.32	0.39	0.42
Uniform Delay, d1	14.8	14.0	15.3	13.9	11.8	9.0
Progression Factor	1.00	1.00	0.92	4.36	1.00	1.00
Incremental Delay, d2	6.2	4.1	1.4	1.1	3.0	0.6
Delay (s)	21.1	18.0	15.5	61.6	14.9	9.5
Level of Service	C	B	B	E	B	A
Approach Delay (s)	19.4		35.3			10.2
Approach LOS	B		D			B

Intersection Summary			
HCM Average Control Delay	21.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	53.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	117	2	883	5	0	5	0	972	34	40	975	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	14	12	12	12	12	11	12	12	12	12
Total Lost time (s)		5.0	4.0	4.0		4.0		4.0	5.0		4.0	
Lane Util. Factor		0.95	0.95	1.00		1.00		0.95	1.00		0.95	
Frt		0.89	0.85	1.00		0.85		1.00	0.85		1.00	
Flt Protected		0.99	1.00	0.95		1.00		1.00	1.00		1.00	
Satd. Flow (prot)		1583	1637	1626		1455		3455	1455		3586	
Flt Permitted		0.99	1.00	0.45		1.00		1.00	1.00		0.74	
Satd. Flow (perm)		1583	1637	768		1455		3455	1455		2650	
Peak-hour factor, PHF	0.84	0.92	0.94	0.92	0.92	0.92	0.92	0.89	0.92	0.92	0.99	0.92
Adj. Flow (vph)	139	2	939	5	0	5	0	1092	37	43	985	0
RTOR Reduction (vph)	0	94	209	0	0	4	0	0	22	0	0	0
Lane Group Flow (vph)	0	451	326	5	0	1	0	1092	15	0	1028	0
Heavy Vehicles (%)	0%	11%	0%	11%	11%	11%	0%	1%	11%	11%	0%	0%
Turn Type	Split		Perm	custom		custom			Perm	Perm		
Protected Phases	4	4						2			6	
Permitted Phases			4	8		8			2	6		
Actuated Green, G (s)		34.0	34.0	16.0		16.0		46.0	46.0		46.0	
Effective Green, g (s)		34.0	35.0	16.0		16.0		47.0	46.0		47.0	
Actuated g/C Ratio		0.31	0.32	0.15		0.15		0.43	0.42		0.43	
Clearance Time (s)		5.0	5.0	4.0		4.0		5.0	5.0		5.0	
Lane Grp Cap (vph)		489	521	112		212		1476	608		1132	
v/s Ratio Prot		c0.28						0.32				
v/s Ratio Perm			0.20	c0.01		0.00			0.01		c0.39	
v/c Ratio		0.92	0.63	0.04		0.00		0.74	0.03		0.91	
Uniform Delay, d1		36.7	31.9	40.4		40.2		26.4	18.8		29.5	
Progression Factor		1.00	1.00	1.00		1.00		0.54	0.31		0.83	
Incremental Delay, d2		25.3	5.6	0.7		0.0		2.8	0.1		10.9	
Delay (s)		62.1	37.5	41.2		40.2		16.9	5.9		35.3	
Level of Service		E	D	D		D		B	A		D	
Approach Delay (s)		49.9			40.7			16.5			35.3	
Approach LOS		D			D			B			D	

Intersection Summary			
HCM Average Control Delay	33.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	95.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	137	9	180	2	0	5	129	936	22	90	1585	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	10	10	10	10	10	10
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.98		1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		0.99	1.00	1.00	1.00		1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	1.00		1.00	0.99	
Flt Protected		0.96	1.00		0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1789	1541		1788	1397	1636	3286		1652	3297	
Flt Permitted		0.74	1.00		0.47	1.00	0.06	1.00		0.17	1.00	
Satd. Flow (perm)		1381	1541		890	1397	103	3286		299	3297	
Peak-hour factor, PHF	0.81	0.75	0.81	0.50	0.92	0.63	0.85	0.82	0.58	0.83	0.94	0.77
Adj. Flow (vph)	169	12	222	4	0	8	152	1141	38	108	1686	97
RTOR Reduction (vph)	0	0	15	0	0	6	0	2	0	0	4	0
Lane Group Flow (vph)	0	181	207	0	4	2	152	1177	0	108	1779	0
Confl. Peds. (#/hr)	1		7	7		1	7		3	3		7
Heavy Vehicles (%)	1%	5%	3%	0%	50%	14%	3%	2%	0%	2%	1%	5%
Turn Type	Perm		pm+ov	Perm		Perm	pm+pt			pm+pt		
Protected Phases		2	3		6		3	8		7	4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)		21.0	31.0		21.0	21.0	76.0	66.0		70.0	63.0	
Effective Green, g (s)		22.0	33.0		22.0	22.0	78.0	68.0		72.0	65.0	
Actuated g/C Ratio		0.20	0.30		0.20	0.20	0.71	0.62		0.65	0.59	
Clearance Time (s)		5.0	5.0		5.0	5.0	5.0	6.0		5.0	6.0	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		276	518		178	279	226	2031		294	1948	
v/s Ratio Prot			0.04				c0.07	0.36		0.03	c0.54	
v/s Ratio Perm		c0.13	0.09		0.00	0.00	0.41			0.21		
v/c Ratio		0.66	0.40		0.02	0.01	0.67	0.58		0.37	0.91	
Uniform Delay, d1		40.5	30.6		35.4	35.2	36.1	12.5		19.3	20.0	
Progression Factor		0.98	0.96		1.00	1.00	0.68	0.34		0.82	0.75	
Incremental Delay, d2		10.9	0.5		0.2	0.0	7.2	1.1		0.4	4.2	
Delay (s)		50.7	29.8		35.6	35.3	31.9	5.4		16.2	19.2	
Level of Service		D	C		D	D	C	A		B	B	
Approach Delay (s)		39.2			35.4			8.4			19.1	
Approach LOS		D			D			A			B	

Intersection Summary			
HCM Average Control Delay	17.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	82.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	24	69	23	102	11	225	1	817	72	391	1462	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	14	14	14	14	14	14	10	10	10	10	10	10
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1907	1734		1925	2027	1706	1348	3264		1685	3331	
Flt Permitted	0.73	1.00		0.31	1.00	1.00	0.11	1.00		0.10	1.00	
Satd. Flow (perm)	1462	1734		619	2027	1706	153	3264		173	3331	
Peak-hour factor, PHF	0.50	0.25	0.25	0.56	0.25	0.93	0.25	0.88	0.78	0.88	0.87	0.65
Adj. Flow (vph)	48	276	92	182	44	242	4	928	92	444	1680	11
RTOR Reduction (vph)	0	11	0	0	0	0	0	7	0	0	0	0
Lane Group Flow (vph)	48	357	0	182	44	242	4	1013	0	444	1691	0
Confl. Peds. (#/hr)	5					5	3					3
Heavy Vehicles (%)	0%	0%	50%	0%	0%	1%	25%	2%	0%	0%	1%	7%
Turn Type	Perm			Perm		pt+ov	Perm			pm+pt		
Protected Phases		4			8	8 1		2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	34.0	34.0		34.0	34.0	64.0	34.0	34.0		66.0	64.0	
Effective Green, g (s)	35.0	35.0		35.0	35.0	65.0	37.0	37.0		67.0	67.0	
Actuated g/C Ratio	0.32	0.32		0.32	0.32	0.59	0.34	0.34		0.61	0.61	
Clearance Time (s)	5.0	5.0		5.0	5.0		7.0	7.0		5.0	7.0	
Lane Grp Cap (vph)	465	552		197	645	1008	51	1098		463	2029	
v/s Ratio Prot		0.21			0.02	0.14		0.31		c0.23	0.51	
v/s Ratio Perm	0.03			c0.29			0.03			c0.36		
v/c Ratio	0.10	0.65		0.92	0.07	0.24	0.08	0.92		0.96	0.83	
Uniform Delay, d1	26.4	32.2		36.2	26.1	10.7	24.9	35.1		34.3	17.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	0.96	0.96		0.92	0.94	
Incremental Delay, d2	0.4	5.8		46.8	0.2	0.6	1.3	7.1		26.6	3.0	
Delay (s)	26.9	38.0		83.1	26.3	11.3	25.1	40.7		58.1	19.0	
Level of Service	C	D		F	C	B	C	D		E	B	
Approach Delay (s)		36.7			40.6			40.6			27.1	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM Average Control Delay	33.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	69.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	342	31	49	278	142	83	53	798	94	255	973	99
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	12	10	10	11	10	10	10	10	10	10
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.95		0.97	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1636	1773	1615	3173	1722	1539	1178	3252		3204	3244	
Flt Permitted	0.95	1.00	1.00	0.73	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1636	1773	1615	2422	1722	1539	1178	3252		3204	3244	
Peak-hour factor, PHF	0.91	0.63	0.65	0.84	0.73	0.84	0.75	0.84	0.85	0.78	0.94	0.75
Adj. Flow (vph)	376	49	75	331	195	99	71	950	111	327	1035	132
RTOR Reduction (vph)	0	0	61	0	0	84	0	8	0	0	9	0
Lane Group Flow (vph)	376	49	14	331	195	15	71	1053	0	327	1158	0
Confl. Peds. (#/hr)	1					1			3	3		
Heavy Vehicles (%)	3%	0%	0%	3%	3%	0%	43%	2%	0%	2%	2%	3%
Turn Type	Prot		Perm	pm+pt		Perm	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4	8		8						
Actuated Green, G (s)	25.0	20.0	20.0	37.0	16.0	16.0	6.0	38.0		11.0	43.0	
Effective Green, g (s)	26.0	21.0	21.0	39.0	17.0	17.0	7.0	39.0		12.0	44.0	
Actuated g/C Ratio	0.24	0.19	0.19	0.35	0.15	0.15	0.06	0.35		0.11	0.40	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	387	338	308	1009	266	238	75	1153		350	1298	
v/s Ratio Prot	c0.23	c0.03		0.07	c0.11		0.06	c0.32		0.10	c0.36	
v/s Ratio Perm			0.01	0.05		0.01						
v/c Ratio	0.97	0.14	0.05	0.33	0.73	0.06	0.95	0.91		0.93	0.89	
Uniform Delay, d1	41.6	37.0	36.3	25.6	44.3	39.7	51.3	33.9		48.6	30.8	
Progression Factor	1.08	1.05	1.48	1.00	1.00	1.00	1.04	0.38		0.76	0.63	
Incremental Delay, d2	35.9	0.8	0.2	0.9	16.4	0.5	75.9	9.7		22.0	5.4	
Delay (s)	80.8	39.6	54.0	26.5	60.7	40.2	129.3	22.7		58.9	24.7	
Level of Service	F	D	D	C	E	D	F	C		E	C	
Approach Delay (s)		72.7			39.3			29.4			32.2	
Approach LOS		E			D			C			C	

Intersection Summary			
HCM Average Control Delay	37.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	79.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	41	334	172	105	166	2	113	822	103	6	1208	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	9	12	12	9	12	10	10	10	10	10	10
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95			0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.95			1.00		1.00	0.98		1.00	0.99	
Flt Protected		1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		2922			3071		1636	3173		1685	3249	
Flt Permitted		0.86			0.54		0.08	1.00		0.11	1.00	
Satd. Flow (perm)		2513			1709		143	3173		195	3249	
Peak-hour factor, PHF	0.69	0.83	0.73	0.70	0.84	0.50	0.70	0.83	0.70	0.75	0.89	0.53
Adj. Flow (vph)	59	402	236	150	198	4	161	990	147	8	1357	125
RTOR Reduction (vph)	0	59	0	0	1	0	0	11	0	0	6	0
Lane Group Flow (vph)	0	638	0	0	351	0	161	1126	0	8	1476	0
Confl. Peds. (#/hr)	2		1	1		2	2		3	3		2
Heavy Vehicles (%)	3%	4%	6%	4%	3%	0%	3%	4%	3%	0%	2%	5%
Turn Type	Perm			pm+pt			pm+pt			pm+pt		
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		27.0			36.0		55.0	55.0		52.0	52.0	
Effective Green, g (s)		28.0			37.0		56.0	56.0		53.0	53.0	
Actuated g/C Ratio		0.25			0.34		0.51	0.51		0.48	0.48	
Clearance Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)		640			637		181	1615		162	1565	
v/s Ratio Prot					c0.03		0.06	c0.35		0.00	c0.45	
v/s Ratio Perm		c0.25			0.16		0.39			0.02		
v/c Ratio		1.00			0.95dl		0.89	0.70		0.05	0.94	
Uniform Delay, d1		41.0			29.7		41.0	20.5		18.2	27.1	
Progression Factor		0.57			1.00		0.79	0.85		0.33	0.42	
Incremental Delay, d2		30.3			3.4		36.6	2.0		0.4	9.6	
Delay (s)		53.7			33.2		69.1	19.6		6.4	21.1	
Level of Service		D			C		E	B		A	C	
Approach Delay (s)		53.7			33.2			25.7			21.0	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM Average Control Delay	29.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	84.4%	ICU Level of Service	E
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	67	247	84	83	170	42	44	947	299	65	1096	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	10	12	12	9	12	12	11	12	12	10	12
Total Lost time (s)	4.0	4.0			4.0			4.0	4.0		4.0	
Lane Util. Factor	1.00	1.00			0.95			0.91	1.00		0.91	
Frpb, ped/bikes	1.00	0.99			1.00			1.00	0.96		0.99	
Flpb, ped/bikes	1.00	1.00			1.00			1.00	1.00		1.00	
Frt	1.00	0.94			0.98			1.00	0.85		0.98	
Flt Protected	0.95	1.00			0.99			1.00	1.00		1.00	
Satd. Flow (prot)	1603	1641			3071			4948	1540		4677	
Flt Permitted	0.48	1.00			0.59			0.67	1.00		0.73	
Satd. Flow (perm)	809	1641			1845			3353	1540		3414	
Peak-hour factor, PHF	0.67	0.93	0.50	0.79	0.81	0.91	0.46	0.91	0.91	0.67	0.91	0.59
Adj. Flow (vph)	100	266	168	105	210	46	96	1041	329	97	1204	154
RTOR Reduction (vph)	0	20	0	0	10	0	0	0	170	0	13	0
Lane Group Flow (vph)	100	414	0	0	351	0	0	1137	159	0	1442	0
Confl. Peds. (#/hr)	3		1	1		3	18		5	5		18
Heavy Vehicles (%)	1%	2%	0%	3%	2%	0%	0%	1%	1%	1%	1%	1%
Turn Type	Perm			Perm			Perm		Perm	pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	39.0	39.0			39.0			52.0	52.0		61.0	
Effective Green, g (s)	40.0	40.0			40.0			53.0	53.0		62.0	
Actuated g/C Ratio	0.36	0.36			0.36			0.48	0.48		0.56	
Clearance Time (s)	5.0	5.0			5.0			5.0	5.0		5.0	
Lane Grp Cap (vph)	294	597			671			1616	742		1982	
v/s Ratio Prot		c0.25									c0.03	
v/s Ratio Perm	0.12				0.19			0.34	0.10		c0.38	
v/c Ratio	0.34	0.69			0.52			0.91dl	0.21		0.73	
Uniform Delay, d1	25.4	29.8			27.5			22.3	16.5		17.8	
Progression Factor	0.85	0.85			1.00			0.69	0.08		0.64	
Incremental Delay, d2	3.1	6.4			2.9			1.2	0.3		0.9	
Delay (s)	24.6	31.7			30.4			16.7	1.7		12.2	
Level of Service	C	C			C			B	A		B	
Approach Delay (s)		30.4			30.4			13.3			12.2	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	16.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	88.6%	ICU Level of Service	E
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	201	428	14	200	897	150	28	666	133	71	513	93
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	12	10	10	12	11	11	12	11	11	12
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95			0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		1.00			0.98		1.00	0.97		1.00	0.95	
Flt Protected		0.98			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3233			3189		1678	3339		1728	3269	
Flt Permitted		0.51			0.61		0.17	1.00		0.17	1.00	
Satd. Flow (perm)		1669			1953		294	3339		303	3269	
Peak-hour factor, PHF	0.78	0.90	0.81	0.75	0.93	0.74	0.90	0.94	0.79	0.94	0.91	0.36
Adj. Flow (vph)	258	476	17	267	965	203	31	709	168	76	564	258
RTOR Reduction (vph)	0	1	0	0	12	0	0	19	0	0	48	0
Lane Group Flow (vph)	0	750	0	0	1423	0	31	858	0	76	774	0
Confl. Peds. (#/hr)	2		1	1		2	10		12	12		10
Heavy Vehicles (%)	2%	2%	5%	4%	2%	1%	4%	1%	0%	1%	1%	0%
Turn Type	custom			pm+pt			pm+pt			pm+pt		
Protected Phases				5	2		7	4		3	8	
Permitted Phases	6	6		2			4			8		
Actuated Green, G (s)		59.0			68.0		27.0	23.0		27.0	23.0	
Effective Green, g (s)		60.0			69.0		29.0	24.0		29.0	24.0	
Actuated g/C Ratio		0.55			0.63		0.26	0.22		0.26	0.22	
Clearance Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)		910			1281		140	729		145	713	
v/s Ratio Prot					c0.05		0.01	c0.26		c0.02	0.24	
v/s Ratio Perm		0.45			c0.65		0.05			0.11		
v/c Ratio		2.02dl			1.11		0.22	1.18		0.52	1.08	
Uniform Delay, d1		20.6			20.5		32.2	43.0		33.1	43.0	
Progression Factor		0.66			1.00		1.00	1.00		0.65	0.70	
Incremental Delay, d2		8.0			61.4		3.6	93.7		9.0	53.9	
Delay (s)		21.6			81.9		35.9	136.7		30.7	84.2	
Level of Service		C			F		D	F		C	F	
Approach Delay (s)		21.6			81.9			133.3			79.7	
Approach LOS		C			F			F			E	

Intersection Summary			
HCM Average Control Delay	81.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	93.7%	ICU Level of Service	F
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	228	137	95	46	43	44	21	578	29	36	941	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	10	12	12	12	12	10	10	12	10	10	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.94		1.00	0.94		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1606	1649		1801	1738		1636	1644		1652	1722	1545
Flt Permitted	0.35	1.00		0.59	1.00		0.07	1.00		0.25	1.00	1.00
Satd. Flow (perm)	598	1649		1110	1738		113	1644		431	1722	1545
Peak-hour factor, PHF	0.89	0.83	0.80	0.79	0.64	0.88	0.56	0.92	0.78	0.71	0.95	0.86
Adj. Flow (vph)	256	165	119	58	67	50	38	628	37	51	991	93
RTOR Reduction (vph)	0	24	0	0	25	0	0	2	0	0	0	32
Lane Group Flow (vph)	256	260	0	58	92	0	38	663	0	51	991	61
Confl. Peds. (#/hr)	2		3	3		2	7		2	2		7
Heavy Vehicles (%)	1%	0%	0%	0%	2%	0%	3%	7%	5%	2%	3%	0%
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	21.3	21.3		14.8	14.8		62.2	59.8		64.2	60.8	60.8
Effective Green, g (s)	22.3	22.3		15.8	15.8		64.2	62.8		66.2	63.8	63.8
Actuated g/C Ratio	0.20	0.20		0.14	0.14		0.58	0.57		0.60	0.58	0.58
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	7.0		5.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	222	334		188	250		113	939		308	999	896
v/s Ratio Prot	c0.12	0.16		0.01	c0.05		c0.01	0.40		0.01	c0.58	
v/s Ratio Perm	c0.12			0.03			0.19			0.09		0.04
v/c Ratio	1.15	0.78		0.31	0.37		0.34	0.71		0.17	0.99	0.07
Uniform Delay, d1	42.2	41.5		42.6	42.6		22.5	17.0		12.0	22.8	10.1
Progression Factor	1.00	1.00		0.48	0.50		1.09	1.33		1.00	1.00	1.00
Incremental Delay, d2	107.9	10.9		0.6	0.6		1.5	3.9		0.3	26.6	0.1
Delay (s)	150.1	52.4		20.9	22.0		26.1	26.6		12.2	49.5	10.2
Level of Service	F	D		C	C		C	C		B	D	B
Approach Delay (s)		98.7			21.6			26.5			44.6	
Approach LOS		F			C			C			D	

Intersection Summary			
HCM Average Control Delay	49.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	9	0	4	0	505	2	3	1019	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor				1.00	1.00			1.00		1.00	1.00	
Frt				1.00	0.85			1.00		1.00	1.00	
Flt Protected				0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)				1626	1455			1711		1626	1712	
Flt Permitted				0.76	1.00			1.00		0.40	1.00	
Satd. Flow (perm)				1296	1455			1711		692	1712	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	10	0	4	0	549	2	3	1108	0
RTOR Reduction (vph)	0	0	0	0	3	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	10	1	0	0	551	0	3	1108	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)				16.0	16.0			56.0		56.0	56.0	
Effective Green, g (s)				16.0	16.0			56.0		56.0	56.0	
Actuated g/C Ratio				0.20	0.20			0.70		0.70	0.70	
Clearance Time (s)				4.0	4.0			4.0		4.0	4.0	
Lane Grp Cap (vph)				259	291			1198		484	1198	
v/s Ratio Prot					0.00			0.32			c0.65	
v/s Ratio Perm				c0.01						0.00		
v/c Ratio				0.04	0.00			0.46		0.01	0.92	
Uniform Delay, d1				25.8	25.6			5.3		3.6	10.2	
Progression Factor				1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2				0.3	0.0			1.3		0.0	13.3	
Delay (s)				26.1	25.6			6.6		3.6	23.5	
Level of Service				C	C			A		A	C	
Approach Delay (s)		0.0			26.0			6.6			23.4	
Approach LOS		A			C			A			C	

Intersection Summary			
HCM Average Control Delay	17.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	63.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	6	6	3	71	15	162	16	402	98	401	732	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	10	12	10	12	11	12	12	11	12
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00	0.97		1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	0.97		1.00	0.99	
Flt Protected		0.98	1.00		0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1858	1572		1823	1492	1805	1744		1787	1803	
Flt Permitted		0.39	1.00		0.97	1.00	0.16	1.00		0.21	1.00	
Satd. Flow (perm)		737	1572		1823	1492	308	1744		389	1803	
Peak-hour factor, PHF	0.63	0.50	0.75	0.81	0.40	0.81	0.94	0.82	0.75	0.90	0.91	0.73
Adj. Flow (vph)	10	12	4	88	38	200	17	490	131	446	804	52
RTOR Reduction (vph)	0	0	4	0	0	175	0	7	0	0	2	0
Lane Group Flow (vph)	0	22	0	0	126	25	17	614	0	446	854	0
Confl. Peds. (#/hr)			2	2								
Heavy Vehicles (%)	0%	0%	0%	1%	0%	1%	0%	2%	2%	1%	1%	0%
Turn Type	Perm		Perm	Split		Prot	Perm			pm+pt		
Protected Phases		8		7	7	7		2		1	6	
Permitted Phases	8		8				2			6		
Actuated Green, G (s)		6.5	6.5		12.9	12.9	48.6	48.6		75.6	75.6	
Effective Green, g (s)		7.5	7.5		13.9	13.9	49.6	49.6		76.6	76.6	
Actuated g/C Ratio		0.07	0.07		0.13	0.13	0.45	0.45		0.70	0.70	
Clearance Time (s)		5.0	5.0		5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		50	107		230	189	139	786		563	1256	
v/s Ratio Prot					c0.07	0.02		0.35		c0.17	0.47	
v/s Ratio Perm		c0.03	0.00				0.06			c0.39		
v/c Ratio		0.44	0.00		0.55	0.13	0.12	0.78		0.79	0.68	
Uniform Delay, d1		49.2	47.8		45.1	42.7	17.6	25.6		26.8	9.6	
Progression Factor		1.00	1.00		0.81	0.51	0.78	0.75		0.63	0.41	
Incremental Delay, d2		6.1	0.0		1.7	0.2	1.8	7.5		3.8	1.5	
Delay (s)		55.3	47.8		38.2	22.1	15.4	26.6		20.6	5.4	
Level of Service		E	D		D	C	B	C		C	A	
Approach Delay (s)		54.1			28.3			26.3			10.7	
Approach LOS		D			C			C			B	

Intersection Summary			
HCM Average Control Delay	18.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	11	111	7	25	89	72	4	278	36	173	417	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	14	12	12	9	9	12	11	12	12	12	12
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.99			1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected		0.99			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1904			1628	1439	1805	1759		1770	1851	
Flt Permitted		0.96			0.91	1.00	0.40	1.00		0.49	1.00	
Satd. Flow (perm)		1838			1504	1439	761	1759		915	1851	
Peak-hour factor, PHF	0.56	0.83	0.58	0.75	0.79	0.79	0.50	0.85	0.85	0.86	0.92	0.44
Adj. Flow (vph)	20	134	12	33	113	91	8	327	42	201	453	23
RTOR Reduction (vph)	0	5	0	0	0	61	0	9	0	0	3	0
Lane Group Flow (vph)	0	161	0	0	146	30	8	360	0	201	473	0
Heavy Vehicles (%)	6%	5%	0%	0%	5%	1%	0%	3%	0%	2%	2%	0%
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		17.0			17.0	17.0	28.0	28.0		28.0	28.0	
Effective Green, g (s)		18.0			18.0	18.0	29.0	29.0		29.0	29.0	
Actuated g/C Ratio		0.33			0.33	0.33	0.53	0.53		0.53	0.53	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)		602			492	471	401	927		482	976	
v/s Ratio Prot								0.20			c0.26	
v/s Ratio Perm		0.09			c0.10	0.02	0.01			0.22		
v/c Ratio		0.27			0.30	0.06	0.02	0.39		0.42	0.48	
Uniform Delay, d1		13.6			13.8	12.7	6.2	7.7		7.9	8.3	
Progression Factor		1.00			0.87	0.98	0.47	0.54		1.10	1.08	
Incremental Delay, d2		1.1			1.2	0.2	0.1	1.2		2.0	1.3	
Delay (s)		14.7			13.2	12.7	3.0	5.4		10.7	10.3	
Level of Service		B			B	B	A	A		B	B	
Approach Delay (s)		14.7			13.0			5.3			10.4	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM Average Control Delay	10.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	SBL	SBR	NWL	NWR
Lane Configurations						
Volume (vph)	0	501	391	5	181	280
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	10	9	12	10	9
Total Lost time (s)		4.0	4.0		4.0	4.0
Lane Util. Factor		0.88	0.97		1.00	1.00
Frt		0.85	1.00		1.00	0.85
Flt Protected		1.00	0.95		0.95	1.00
Satd. Flow (prot)		2627	3093		1636	1425
Flt Permitted		1.00	0.95		0.95	1.00
Satd. Flow (perm)		2627	3093		1636	1425
Peak-hour factor, PHF	0.55	0.84	0.92	0.63	0.86	0.93
Adj. Flow (vph)	0	596	425	8	210	301
RTOR Reduction (vph)	0	228	1	0	0	0
Lane Group Flow (vph)	0	368	432	0	210	301
Heavy Vehicles (%)	13%	1%	2%	0%	3%	2%
Turn Type		custom				pt+ov
Protected Phases			6		8	8 6
Permitted Phases		4				
Actuated Green, G (s)		57.0	43.0		57.0	110.0
Effective Green, g (s)		58.0	44.0		58.0	110.0
Actuated g/C Ratio		0.53	0.40		0.53	1.00
Clearance Time (s)		5.0	5.0		5.0	
Lane Grp Cap (vph)		1385	1237		863	1425
v/s Ratio Prot			c0.14		0.13	0.21
v/s Ratio Perm		c0.14				
v/c Ratio		0.27	0.35		0.24	0.21
Uniform Delay, d1		14.3	23.0		14.1	0.0
Progression Factor		1.00	0.31		0.70	1.00
Incremental Delay, d2		0.5	0.7		0.1	0.0
Delay (s)		14.8	7.8		9.9	0.0
Level of Service		B	A		A	A
Approach Delay (s)	14.8		7.8		4.1	
Approach LOS	B		A		A	

Intersection Summary			
HCM Average Control Delay	9.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	28.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	165	66	465	229	161	794
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	1.00		1.00		1.00	1.00
Frpb, ped/bikes	0.99		0.99		1.00	1.00
Flpb, ped/bikes	1.00		1.00		1.00	1.00
Frt	0.96		0.96		1.00	1.00
Flt Protected	0.97		1.00		0.95	1.00
Satd. Flow (prot)	1637		1697		1728	1801
Flt Permitted	0.97		1.00		0.27	1.00
Satd. Flow (perm)	1637		1697		495	1801
Peak-hour factor, PHF	0.75	0.74	0.89	0.90	0.85	0.90
Adj. Flow (vph)	220	89	522	254	189	882
RTOR Reduction (vph)	14	0	15	0	0	0
Lane Group Flow (vph)	295	0	761	0	189	882
Confl. Peds. (#/hr)		1		1	1	
Heavy Vehicles (%)	4%	2%	3%	2%	1%	2%
Turn Type					Perm	
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	23.6		76.4		76.4	76.4
Effective Green, g (s)	24.6		77.4		77.4	77.4
Actuated g/C Ratio	0.22		0.70		0.70	0.70
Clearance Time (s)	5.0		5.0		5.0	5.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	366		1194		348	1267
v/s Ratio Prot	c0.18		0.45			c0.49
v/s Ratio Perm					0.38	
v/c Ratio	0.81		0.64		0.54	0.70
Uniform Delay, d1	40.4		8.8		7.8	9.5
Progression Factor	0.97		0.78		1.00	1.00
Incremental Delay, d2	6.9		2.2		6.0	3.2
Delay (s)	46.0		9.0		13.8	12.6
Level of Service	D		A		B	B
Approach Delay (s)	46.0		9.0			12.9
Approach LOS	D		A			B

Intersection Summary			
HCM Average Control Delay	16.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	70.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	300	3	398	1	13	3	93	389	1	0	692	467
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	9	12	12	10	12	11	9	12	12	10	10
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95			1.00	1.00
Frpb, ped/bikes	1.00	0.97			1.00		1.00	1.00			1.00	1.00
Flpb, ped/bikes	0.99	1.00			1.00		1.00	1.00			1.00	1.00
Frt	1.00	0.85			0.98		1.00	1.00			1.00	0.85
Flt Protected	0.95	1.00			0.99		0.95	1.00			1.00	1.00
Satd. Flow (prot)	1615	1412			1715		1745	2926			1689	1507
Flt Permitted	0.74	1.00			0.33		0.23	1.00			1.00	1.00
Satd. Flow (perm)	1260	1412			573		431	2926			1689	1507
Peak-hour factor, PHF	0.85	0.75	0.94	0.25	0.75	0.75	0.75	0.88	0.25	0.92	0.98	0.93
Adj. Flow (vph)	353	4	423	4	17	4	124	442	4	0	706	502
RTOR Reduction (vph)	0	162	0	0	4	0	0	0	0	0	0	219
Lane Group Flow (vph)	353	265	0	0	21	0	124	446	0	0	706	283
Confl. Peds. (#/hr)	4		3	3		4						
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	11%	0%	0%	5%	0%
Turn Type	pm+pt			Perm			pm+pt			Perm		Perm
Protected Phases	7	4			8		5	2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	32.0	31.0			6.0		70.0	69.0			61.0	61.0
Effective Green, g (s)	32.0	32.0			7.0		70.0	70.0			62.0	62.0
Actuated g/C Ratio	0.29	0.29			0.06		0.64	0.64			0.56	0.56
Clearance Time (s)	4.0	5.0			5.0		4.0	5.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	434	411			36		322	1862			952	849
v/s Ratio Prot	c0.16	0.19					c0.01	0.15			c0.42	
v/s Ratio Perm	c0.08				0.04		0.23					0.19
v/c Ratio	0.81	0.64			0.59		0.39	0.24			0.74	0.33
Uniform Delay, d1	34.8	34.0			50.1		24.6	8.6			18.0	12.9
Progression Factor	1.00	1.00			1.00		1.00	1.00			0.65	0.60
Incremental Delay, d2	11.1	3.4			23.3		0.8	0.3			2.5	0.5
Delay (s)	45.9	37.5			73.4		25.3	8.9			14.3	8.2
Level of Service	D	D			E		C	A			B	A
Approach Delay (s)		41.3			73.4			12.5			11.8	
Approach LOS		D			E			B			B	

Intersection Summary			
HCM Average Control Delay	21.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	82.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	270	6	389	3	4	4	152	404	6	3	775	206
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	11	11	11	11	11	11	11	11
Total Lost time (s)	3.0	4.0			4.0		4.0	4.0		4.0	4.0	5.0
Lane Util. Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.97			0.99		1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.86			0.96		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1715	1533			1710		1728	1814		1743	1818	1487
Flt Permitted	0.74	1.00			0.75		0.10	1.00		0.40	1.00	1.00
Satd. Flow (perm)	1336	1533			1295		184	1814		737	1818	1487
Peak-hour factor, PHF	0.76	0.38	0.84	0.38	0.50	0.50	0.78	0.86	0.75	0.75	0.90	0.73
Adj. Flow (vph)	355	16	463	8	8	8	195	470	8	4	861	282
RTOR Reduction (vph)	0	165	0	0	7	0	0	1	0	0	0	75
Lane Group Flow (vph)	355	314	0	0	17	0	195	477	0	4	861	207
Confl. Peds. (#/hr)	1		3	3		1			1	1		
Heavy Vehicles (%)	5%	0%	3%	0%	0%	0%	1%	1%	0%	0%	1%	5%
Turn Type	pm+pt			Perm			pm+pt			Perm		Perm
Protected Phases	7	4			8		5	2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	31.0	31.0			16.0		69.0	69.0		57.0	57.0	57.0
Effective Green, g (s)	32.0	32.0			17.0		70.0	70.0		58.0	58.0	57.0
Actuated g/C Ratio	0.29	0.29			0.15		0.64	0.64		0.53	0.53	0.52
Clearance Time (s)	4.0	5.0			5.0		5.0	5.0		5.0	5.0	5.0
Lane Grp Cap (vph)	430	446			200		229	1154		389	959	771
v/s Ratio Prot	c0.09	0.21					c0.06	0.26			c0.47	
v/s Ratio Perm	c0.15				0.01		0.48			0.01		0.14
v/c Ratio	0.83	0.71			0.09		0.85	0.41		0.01	0.90	0.27
Uniform Delay, d1	36.2	34.8			39.8		40.0	9.9		12.4	23.3	14.8
Progression Factor	1.00	1.00			1.00		0.65	0.27		0.93	0.93	0.89
Incremental Delay, d2	16.4	9.0			0.8		24.2	0.8		0.0	10.0	0.6
Delay (s)	52.6	43.8			40.7		50.2	3.5		11.5	31.6	13.9
Level of Service	D	D			D		D	A		B	C	B
Approach Delay (s)		47.6			40.7			17.0			27.2	
Approach LOS		D			D			B			C	

Intersection Summary			
HCM Average Control Delay	31.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	83.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	5	0	70	3	89	0	279	240	235	429	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0	4.0		4.0	
Lane Util. Factor		1.00			1.00			0.95	1.00		0.95	
Frt		1.00			0.93			1.00	0.85		1.00	
Flt Protected		1.00			0.98			1.00	1.00		0.98	
Satd. Flow (prot)		1429			1590			3312	1553		3393	
Flt Permitted		1.00			0.88			1.00	1.00		0.75	
Satd. Flow (perm)		1429			1425			3312	1553		2585	
Peak-hour factor, PHF	0.25	0.63	0.25	0.76	0.25	0.79	0.92	0.95	0.82	0.94	0.85	0.25
Adj. Flow (vph)	0	8	0	92	12	113	0	294	293	250	505	4
RTOR Reduction (vph)	0	0	0	0	70	0	0	0	163	0	1	0
Lane Group Flow (vph)	0	8	0	0	147	0	0	294	130	0	758	0
Heavy Vehicles (%)	0%	33%	0%	9%	43%	5%	0%	9%	4%	1%	6%	50%
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		16.0			16.0			19.0	19.0		19.0	
Effective Green, g (s)		17.0			17.0			20.0	20.0		20.0	
Actuated g/C Ratio		0.38			0.38			0.44	0.44		0.44	
Clearance Time (s)		5.0			5.0			5.0	5.0		5.0	
Lane Grp Cap (vph)		540			538			1472	690		1149	
v/s Ratio Prot		0.01						0.09				
v/s Ratio Perm					c0.10				0.08		c0.29	
v/c Ratio		0.01			0.27			0.20	0.19		0.66	
Uniform Delay, d1		8.8			9.7			7.6	7.6		9.8	
Progression Factor		1.00			1.00			1.00	1.00		1.00	
Incremental Delay, d2		0.1			1.2			0.3	0.6		3.0	
Delay (s)		8.8			11.0			7.9	8.2		12.8	
Level of Service		A			B			A	A		B	
Approach Delay (s)		8.8			11.0			8.1			12.8	
Approach LOS		A			B			A			B	

Intersection Summary			
HCM Average Control Delay	10.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.6%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	55	102	3	2	22	8	4	290	35	13	411	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	11	12	12	12	12	12	10	12
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00			0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.99			0.97		1.00	0.98		1.00	0.99	
Flt Protected		0.98			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1776			1720		1805	1826		1736	1742	
Flt Permitted		0.88			0.98		0.40	1.00		0.49	1.00	
Satd. Flow (perm)		1595			1695		769	1826		888	1742	
Peak-hour factor, PHF	0.77	0.81	0.38	0.50	0.66	0.67	0.50	0.93	0.75	0.75	0.93	0.54
Adj. Flow (vph)	71	126	8	4	33	12	8	312	47	17	442	26
RTOR Reduction (vph)	0	1	0	0	8	0	0	5	0	0	2	0
Lane Group Flow (vph)	0	204	0	0	41	0	8	354	0	17	466	0
Confl. Peds. (#/hr)	4		5	5		4						
Heavy Vehicles (%)	0%	1%	0%	0%	0%	8%	0%	2%	2%	4%	1%	0%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		36.0			36.0		64.0	64.0		64.0	64.0	
Effective Green, g (s)		37.0			37.0		65.0	65.0		65.0	65.0	
Actuated g/C Ratio		0.34			0.34		0.59	0.59		0.59	0.59	
Clearance Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)		537			570		454	1079		525	1029	
v/s Ratio Prot								0.19			c0.27	
v/s Ratio Perm		c0.13			0.02		0.01			0.02		
v/c Ratio		0.38			0.07		0.02	0.33		0.03	0.45	
Uniform Delay, d1		27.8			24.8		9.3	11.4		9.4	12.6	
Progression Factor		1.00			1.00		1.14	1.21		1.01	1.19	
Incremental Delay, d2		2.0			0.2		0.1	0.8		0.1	1.3	
Delay (s)		29.8			25.1		10.7	14.7		9.6	16.3	
Level of Service		C			C		B	B		A	B	
Approach Delay (s)		29.8			25.1			14.6			16.0	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	18.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	44.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	5	1461	112	221	859	26	127	21	483	18	7	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	10	12	12	10	10	10	12	11	12
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	
Lane Util. Factor	1.00	0.91		1.00	0.91			1.00	1.00		1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.99		0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.97	1.00		0.99	
Frt	1.00	0.99		1.00	0.99			1.00	0.85		0.97	
Flt Protected	0.95	1.00		0.95	1.00			0.96	1.00		0.98	
Satd. Flow (prot)	1745	5068		1685	4830			1652	1487		1685	
Flt Permitted	0.28	1.00		0.08	1.00			0.75	1.00		0.51	
Satd. Flow (perm)	508	5068		148	4830			1288	1487		890	
Peak-hour factor, PHF	0.62	0.95	0.83	0.25	0.90	0.69	0.84	0.63	0.93	0.71	0.58	0.33
Adj. Flow (vph)	8	1538	135	884	954	38	151	33	519	25	12	12
RTOR Reduction (vph)	0	8	0	0	3	0	0	0	0	0	9	0
Lane Group Flow (vph)	8	1665	0	884	989	0	0	184	519	0	40	0
Confl. Peds. (#/hr)			5	5			17		20	20		17
Heavy Vehicles (%)	0%	1%	0%	0%	7%	1%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt			pm+pt			Perm		pm+ov	Perm		
Protected Phases	1	6		5	2			4	5		8	
Permitted Phases	6			2			4		4	8		
Actuated Green, G (s)	43.8	43.0		106.0	100.2			16.0	74.0		16.0	
Effective Green, g (s)	45.8	46.0		107.0	103.2			17.0	76.0		17.0	
Actuated g/C Ratio	0.34	0.34		0.80	0.77			0.13	0.57		0.13	
Clearance Time (s)	5.0	7.0		5.0	7.0			5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	190	1740		795	3720			163	888		113	
v/s Ratio Prot	0.00	0.33		c0.49	0.20				0.26			
v/s Ratio Perm	0.01			c0.40				c0.14	0.09		0.05	
v/c Ratio	0.04	0.96		1.11	0.27			1.13	0.58		0.36	
Uniform Delay, d1	29.5	43.0		33.6	4.5			58.5	18.8		53.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.1	13.5		67.2	0.2			109.3	1.0		1.9	
Delay (s)	29.6	56.6		100.8	4.6			167.8	19.8		55.4	
Level of Service	C	E		F	A			F	B		E	
Approach Delay (s)		56.4			50.0			58.5			55.4	
Approach LOS		E			D			E			E	

Intersection Summary			
HCM Average Control Delay	53.9	HCM Level of Service	D
HCM Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	134.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	80.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	93	50	1044	31	56	1753
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frt	1.00	0.85	1.00		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1626	1455	3238		1626	3252
Flt Permitted	0.95	1.00	1.00		0.22	1.00
Satd. Flow (perm)	1626	1455	3238		374	3252
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	101	54	1135	34	61	1905
RTOR Reduction (vph)	0	46	2	0	0	0
Lane Group Flow (vph)	101	8	1167	0	61	1905
Turn Type		Perm			Perm	
Protected Phases	8		2			6
Permitted Phases		8			6	
Actuated Green, G (s)	16.0	16.0	86.0		86.0	86.0
Effective Green, g (s)	16.0	16.0	86.0		86.0	86.0
Actuated g/C Ratio	0.15	0.15	0.78		0.78	0.78
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Lane Grp Cap (vph)	237	212	2532		292	2542
v/s Ratio Prot	c0.06		0.36			c0.59
v/s Ratio Perm		0.01			0.16	
v/c Ratio	0.43	0.04	0.46		0.21	0.75
Uniform Delay, d1	42.8	40.4	4.1		3.1	6.3
Progression Factor	1.00	1.00	0.17		0.37	0.27
Incremental Delay, d2	5.5	0.3	0.4		0.8	1.1
Delay (s)	48.3	40.7	1.1		2.0	2.8
Level of Service	D	D	A		A	A
Approach Delay (s)	45.7		1.1			2.8
Approach LOS	D		A			A

Intersection Summary			
HCM Average Control Delay	4.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

SYNCHRO REPORTS

BASELINE SCENARIO

2020 PM Peak Hour
HCM Level of Service Analysis

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	440	443	696	1092	141	780
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	13	13	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.91
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1680	1503	3252	1455	1626	4673
Flt Permitted	0.95	1.00	1.00	1.00	0.28	1.00
Satd. Flow (perm)	1680	1503	3252	1455	486	4673
Peak-hour factor, PHF	0.94	0.91	0.83	0.84	0.88	0.87
Adj. Flow (vph)	468	487	839	1300	160	897
RTOR Reduction (vph)	0	160	0	399	0	0
Lane Group Flow (vph)	468	327	839	901	160	897
Turn Type		Perm		Perm	pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Actuated Green, G (s)	40.0	40.0	91.0	91.0	100.0	100.0
Effective Green, g (s)	41.0	41.0	92.0	92.0	101.0	101.0
Actuated g/C Ratio	0.27	0.27	0.61	0.61	0.67	0.67
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	459	411	1995	892	365	3146
v/s Ratio Prot	c0.28		0.26		c0.01	0.19
v/s Ratio Perm		0.22		c0.62	0.28	
v/c Ratio	1.02	0.80	0.42	1.01	0.44	0.29
Uniform Delay, d1	54.5	50.6	15.1	29.0	18.8	9.9
Progression Factor	1.00	1.00	1.04	3.67	1.00	1.00
Incremental Delay, d2	47.1	14.7	0.3	21.3	3.8	0.2
Delay (s)	101.6	65.3	15.9	127.7	22.6	10.1
Level of Service	F	E	B	F	C	B
Approach Delay (s)	83.1		83.8			12.0
Approach LOS	F		F			B

Intersection Summary			
HCM Average Control Delay	65.4	HCM Level of Service	E
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	82.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	98	24	478	5	0	63	0	1984	17	31	1013	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	14	12	12	12	12	11	12	12	12	12
Total Lost time (s)		5.0	4.0	4.0		4.0		4.0	5.0		4.0	
Lane Util. Factor		1.00	1.00	1.00		1.00		0.95	1.00		0.95	
Frt		1.00	0.85	1.00		0.85		1.00	0.85		1.00	
Flt Protected		0.96	1.00	0.95		1.00		1.00	1.00		1.00	
Satd. Flow (prot)		1790	1723	1626		1455		3455	1455		3591	
Flt Permitted		0.96	1.00	0.67		1.00		1.00	1.00		0.63	
Satd. Flow (perm)		1790	1723	1140		1455		3455	1455		2250	
Peak-hour factor, PHF	0.84	0.92	0.94	0.92	0.92	0.92	0.92	0.89	0.92	0.92	0.99	0.92
Adj. Flow (vph)	117	26	509	5	0	68	0	2229	18	34	1023	0
RTOR Reduction (vph)	0	0	235	0	0	55	0	0	4	0	0	0
Lane Group Flow (vph)	0	143	274	5	0	13	0	2229	14	0	1057	0
Heavy Vehicles (%)	0%	11%	0%	11%	11%	11%	0%	1%	11%	11%	0%	0%
Turn Type	Split		Perm	custom		custom			Perm	Perm		
Protected Phases	4	4						2			6	
Permitted Phases			4	8		8			2	6		
Actuated Green, G (s)		19.0	19.0	16.0		16.0		101.0	101.0		101.0	
Effective Green, g (s)		19.0	20.0	16.0		16.0		102.0	101.0		102.0	
Actuated g/C Ratio		0.13	0.13	0.11		0.11		0.68	0.67		0.68	
Clearance Time (s)		5.0	5.0	4.0		4.0		5.0	5.0		5.0	
Lane Grp Cap (vph)		227	230	122		155		2349	980		1530	
v/s Ratio Prot		0.08						c0.65				
v/s Ratio Perm			c0.16	0.00		c0.01			0.01		0.47	
v/c Ratio		0.63	1.19	0.04		0.08		0.95	0.01		0.69	
Uniform Delay, d1		62.2	65.0	60.1		60.4		21.6	8.1		14.5	
Progression Factor		1.00	1.00	1.00		1.00		0.77	0.49		1.45	
Incremental Delay, d2		12.6	121.0	0.6		1.0		7.4	0.0		2.2	
Delay (s)		74.7	186.0	60.7		61.4		24.2	4.0		23.2	
Level of Service		E	F	E		E		C	A		C	
Approach Delay (s)		161.6			61.4			24.0			23.2	
Approach LOS		F			E			C			C	

Intersection Summary			
HCM Average Control Delay	46.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	208	2	238	38	15	67	320	1433	0	11	1290	142
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	10	10	10	10	10	10
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		5.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.97		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.87		1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1783	1522		1805	1374		1636	3303		1650	3249	
Flt Permitted	0.60	1.00		0.28	1.00		0.05	1.00		0.12	1.00	
Satd. Flow (perm)	1122	1522		534	1374		91	3303		205	3249	
Peak-hour factor, PHF	0.81	0.75	0.81	0.50	0.92	0.63	0.85	0.82	0.58	0.83	0.94	0.77
Adj. Flow (vph)	257	3	294	76	16	106	376	1748	0	13	1372	184
RTOR Reduction (vph)	0	223	0	0	30	0	0	0	0	0	7	0
Lane Group Flow (vph)	257	74	0	76	92	0	376	1748	0	13	1549	0
Confl. Peds. (#/hr)	1		7	7		1	7		3	3		7
Heavy Vehicles (%)	1%	5%	3%	0%	50%	14%	3%	2%	0%	2%	1%	5%
Turn Type	Perm			Perm			pm+pt			Perm		
Protected Phases		2			6		3	8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	35.0	35.0		35.0	35.0		104.0	104.0		71.0	71.0	
Effective Green, g (s)	36.0	36.0		36.0	36.0		105.0	106.0		72.0	73.0	
Actuated g/C Ratio	0.24	0.24		0.24	0.24		0.70	0.71		0.48	0.49	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	269	365		128	330		362	2334		98	1581	
v/s Ratio Prot		0.05			0.07		c0.20	0.53			0.48	
v/s Ratio Perm	c0.23			0.14			c0.53			0.06		
v/c Ratio	0.96	0.20		0.59	0.28		1.04	0.75		0.13	0.98	
Uniform Delay, d1	56.2	45.5		50.5	46.4		52.2	13.7		21.7	37.8	
Progression Factor	0.79	0.47		1.00	1.00		1.03	1.24		0.74	0.87	
Incremental Delay, d2	43.8	1.2		18.7	2.1		51.5	1.7		1.6	12.9	
Delay (s)	88.2	22.5		69.2	48.5		105.1	18.7		17.6	45.9	
Level of Service	F	C		E	D		F	B		B	D	
Approach Delay (s)		53.0			56.5			34.0			45.7	
Approach LOS		D			E			C			D	

Intersection Summary			
HCM Average Control Delay	41.5	HCM Level of Service	D
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	96.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	19	33	14	152	2	393	1	1400	93	238	1190	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	14	14	14	14	14	14	10	10	10	10	10	10
Total Lost time (s)	3.0	4.0		3.0	4.0	4.0	1.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1906	1685		1925	2027	1680	1348	3273		1685	3333	
Flt Permitted	0.75	1.00		0.20	1.00	1.00	0.11	1.00		0.05	1.00	
Satd. Flow (perm)	1509	1685		407	2027	1680	156	3273		89	3333	
Peak-hour factor, PHF	0.50	0.25	0.25	0.56	0.25	0.93	0.25	0.88	0.78	0.88	0.87	0.65
Adj. Flow (vph)	38	132	56	271	8	423	4	1591	119	270	1368	5
RTOR Reduction (vph)	0	11	0	0	0	0	0	3	0	0	0	0
Lane Group Flow (vph)	38	177	0	271	8	423	4	1707	0	270	1373	0
Confl. Peds. (#/hr)	5					5	3					3
Heavy Vehicles (%)	0%	0%	50%	0%	0%	1%	25%	2%	0%	0%	1%	7%
Turn Type	pm+pt			pm+pt		pm+ov	pm+pt			pm+pt		
Protected Phases	7	4		3	8	1	5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	21.0	17.0		39.0	31.0	52.0	77.0	73.0		101.0	91.0	
Effective Green, g (s)	23.0	18.0		40.0	32.0	54.0	83.0	76.0		102.0	94.0	
Actuated g/C Ratio	0.15	0.12		0.27	0.21	0.36	0.55	0.51		0.68	0.63	
Clearance Time (s)	4.0	5.0		4.0	5.0	5.0	4.0	7.0		5.0	7.0	
Lane Grp Cap (vph)	245	202		301	432	605	142	1658		295	2089	
v/s Ratio Prot	0.01	0.11		c0.11	0.00	0.10	0.00	c0.52		c0.13	0.41	
v/s Ratio Perm	0.02			c0.13		0.15	0.01			0.49		
v/c Ratio	0.16	0.88		0.90	0.02	0.70	0.03	1.03		0.92	0.66	
Uniform Delay, d1	54.9	64.9		47.8	46.6	41.1	34.2	37.0		57.0	17.8	
Progression Factor	1.01	1.01		1.00	1.00	1.00	0.15	0.20		0.68	0.30	
Incremental Delay, d2	1.3	38.0		31.7	0.1	6.6	0.0	16.0		30.6	1.4	
Delay (s)	56.7	103.3		79.5	46.7	47.6	5.2	23.3		69.1	6.7	
Level of Service	E	F		E	D	D	A	C		E	A	
Approach Delay (s)		95.4			59.9			23.2			16.9	
Approach LOS		F			E			C			B	

Intersection Summary			
HCM Average Control Delay	30.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	79.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	152	191	61	488	351	136	59	1317	211	235	1099	103
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	12	10	10	11	10	10	10	10	10	10
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.95		0.97	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1636	1773	1615	3173	1722	1538	1178	3235		3204	3248	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1636	1773	1615	3173	1722	1538	1178	3235		3204	3248	
Peak-hour factor, PHF	0.91	0.63	0.65	0.84	0.73	0.84	0.75	0.84	0.85	0.78	0.94	0.75
Adj. Flow (vph)	167	303	94	581	481	162	79	1568	248	301	1169	137
RTOR Reduction (vph)	0	0	78	0	0	89	0	8	0	0	6	0
Lane Group Flow (vph)	167	303	16	581	481	73	79	1808	0	301	1300	0
Confl. Peds. (#/hr)	1					1			3	3		
Heavy Vehicles (%)	3%	0%	0%	3%	3%	0%	43%	2%	0%	2%	2%	3%
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8						
Actuated Green, G (s)	12.0	25.0	25.0	22.0	35.0	35.0	12.0	72.0		11.0	71.0	
Effective Green, g (s)	13.0	26.0	26.0	23.0	36.0	36.0	13.0	73.0		12.0	72.0	
Actuated g/C Ratio	0.09	0.17	0.17	0.15	0.24	0.24	0.09	0.49		0.08	0.48	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	142	307	280	487	413	369	102	1574		256	1559	
v/s Ratio Prot	c0.10	0.17		0.18	c0.28		0.07	c0.56		c0.09	0.40	
v/s Ratio Perm			0.01			0.05						
v/c Ratio	1.18	0.99	0.06	1.19	1.16	0.20	0.77	1.15		1.18	0.83	
Uniform Delay, d1	68.5	61.8	51.8	63.5	57.0	45.5	67.1	38.5		69.0	33.8	
Progression Factor	0.90	0.89	0.91	1.00	1.00	1.00	1.04	0.57		1.13	1.27	
Incremental Delay, d2	124.7	44.1	0.3	105.6	97.5	1.2	5.2	67.6		104.1	3.9	
Delay (s)	186.3	99.3	47.4	169.1	154.5	46.7	75.1	89.6		182.2	46.7	
Level of Service	F	F	D	F	F	D	E	F		F	D	
Approach Delay (s)		116.4			147.2			89.0			72.1	
Approach LOS		F			F			F			E	

Intersection Summary			
HCM Average Control Delay	100.2	HCM Level of Service	F
HCM Volume to Capacity ratio	1.16		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	90.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	75	188	164	213	299	9	227	1518	64	7	1432	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	9	12	12	9	12	10	10	10	10	10	10
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95			0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.99			1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.94			1.00		1.00	0.99		1.00	0.99	
Flt Protected		0.99			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		2874			3061		1636	3215		1685	3240	
Flt Permitted		0.54			0.53		0.06	1.00		0.06	1.00	
Satd. Flow (perm)		1567			1670		108	3215		111	3240	
Peak-hour factor, PHF	0.69	0.83	0.73	0.70	0.84	0.50	0.70	0.83	0.70	0.75	0.89	0.53
Adj. Flow (vph)	109	227	225	304	356	18	324	1829	91	9	1609	174
RTOR Reduction (vph)	0	77	0	0	1	0	0	2	0	0	5	0
Lane Group Flow (vph)	0	484	0	0	677	0	324	1918	0	9	1778	0
Confl. Peds. (#/hr)	2		1	1		2	2		3	3		2
Heavy Vehicles (%)	3%	4%	6%	4%	3%	0%	3%	4%	3%	0%	2%	5%
Turn Type	Perm			pm+pt			pm+pt			pm+pt		
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		38.0			47.0		84.0	84.0		68.0	68.0	
Effective Green, g (s)		39.0			48.0		85.0	85.0		69.0	69.0	
Actuated g/C Ratio		0.26			0.32		0.57	0.57		0.46	0.46	
Clearance Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)		407			581		275	1822		104	1490	
v/s Ratio Prot					c0.04		c0.16	0.60		0.00	c0.55	
v/s Ratio Perm		0.31			c0.33		0.50			0.04		
v/c Ratio		1.19			1.73dl		1.18	1.05		0.09	1.19	
Uniform Delay, d1		55.5			51.0		61.0	32.5		34.0	40.5	
Progression Factor		1.00			1.00		0.83	0.71		0.30	0.44	
Incremental Delay, d2		107.2			91.8		96.2	30.5		0.6	89.6	
Delay (s)		162.7			142.8		147.1	53.5		11.0	107.2	
Level of Service		F			F		F	D		B	F	
Approach Delay (s)		162.7			142.8			67.0			106.8	
Approach LOS		F			F			E			F	

Intersection Summary			
HCM Average Control Delay	100.4	HCM Level of Service	F
HCM Volume to Capacity ratio	1.14		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	96.5%	ICU Level of Service	F
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	89	218	93	182	293	71	112	1478	144	65	1442	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	10	12	12	9	12	12	11	12	12	10	12
Total Lost time (s)	4.0	4.0			4.0			4.0	4.0		4.0	
Lane Util. Factor	1.00	1.00			0.95			0.91	1.00		0.91	
Frpb, ped/bikes	1.00	0.99			1.00			1.00	0.96		1.00	
Flpb, ped/bikes	1.00	1.00			1.00			1.00	1.00		1.00	
Frt	1.00	0.93			0.98			1.00	0.85		0.99	
Flt Protected	0.95	1.00			0.98			0.99	1.00		1.00	
Satd. Flow (prot)	1608	1627			3066			4939	1530		4722	
Flt Permitted	0.24	1.00			0.55			0.63	1.00		0.65	
Satd. Flow (perm)	407	1627			1709			3149	1530		3060	
Peak-hour factor, PHF	0.67	0.93	0.50	0.79	0.81	0.91	0.46	0.91	0.91	0.67	0.91	0.59
Adj. Flow (vph)	133	234	186	230	362	78	243	1624	158	97	1585	103
RTOR Reduction (vph)	0	19	0	0	7	0	0	0	61	0	4	0
Lane Group Flow (vph)	133	401	0	0	663	0	0	1867	97	0	1781	0
Confl. Peds. (#/hr)	3		1	1		3	18		5	5		18
Heavy Vehicles (%)	1%	2%	0%	3%	2%	0%	0%	1%	1%	1%	1%	1%
Turn Type	Perm			Perm			Perm		Perm	pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	50.0	50.0			50.0			81.0	81.0		90.0	
Effective Green, g (s)	51.0	51.0			51.0			82.0	82.0		91.0	
Actuated g/C Ratio	0.34	0.34			0.34			0.55	0.55		0.61	
Clearance Time (s)	5.0	5.0			5.0			5.0	5.0		5.0	
Lane Grp Cap (vph)	138	553			581			1721	836		1912	
v/s Ratio Prot		0.25									c0.03	
v/s Ratio Perm	0.33				c0.39			c0.59	0.06		0.53	
v/c Ratio	0.96	0.72			1.55dl			3.16dl	0.12		0.93	
Uniform Delay, d1	48.6	43.4			49.5			34.0	16.5		26.7	
Progression Factor	0.97	0.97			1.00			0.94	0.40		0.26	
Incremental Delay, d2	67.1	8.0			83.0			47.3	0.2		1.1	
Delay (s)	114.1	49.9			132.5			79.3	6.8		8.0	
Level of Service	F	D			F			E	A		A	
Approach Delay (s)		65.4			132.5			73.6			8.0	
Approach LOS		E			F			E			A	

Intersection Summary			
HCM Average Control Delay	57.3	HCM Level of Service	E
HCM Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	107.6%	ICU Level of Service	G
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	90	1128	13	176	658	145	33	603	300	160	852	249
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	12	10	10	12	11	11	12	11	11	12
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95			0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			1.00		1.00	0.98		1.00	0.98	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		1.00			0.97		1.00	0.94		1.00	0.94	
Flt Protected		1.00			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3282			3168		1678	3219		1728	3194	
Flt Permitted		0.60			0.49		0.11	1.00		0.95	1.00	
Satd. Flow (perm)		1984			1581		196	3219		1728	3194	
Peak-hour factor, PHF	0.78	0.90	0.81	0.75	0.93	0.74	0.90	0.94	0.79	0.94	0.91	0.36
Adj. Flow (vph)	115	1253	16	235	708	196	37	641	380	170	936	692
RTOR Reduction (vph)	0	1	0	0	12	0	0	58	0	0	89	0
Lane Group Flow (vph)	0	1383	0	0	1127	0	37	963	0	170	1539	0
Confl. Peds. (#/hr)	2		1	1		2	10		12	12		10
Heavy Vehicles (%)	2%	2%	5%	4%	2%	1%	4%	1%	0%	1%	1%	0%
Turn Type	custom			pm+pt			pm+pt			Prot		
Protected Phases				5	2		7	4		3	8	
Permitted Phases	6	6		2			4					
Actuated Green, G (s)		73.0			82.0		40.0	40.0		13.0	49.0	
Effective Green, g (s)		74.0			83.0		41.0	41.0		14.0	50.0	
Actuated g/C Ratio		0.49			0.55		0.27	0.27		0.09	0.33	
Clearance Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)		979			928		103	880		161	1065	
v/s Ratio Prot					c0.04		0.01	c0.30		0.10	c0.48	
v/s Ratio Perm		c0.70			0.63		0.09					
v/c Ratio		1.41			1.90dl		0.36	1.09		1.06	1.45	
Uniform Delay, d1		38.0			33.5		67.7	54.5		68.0	50.0	
Progression Factor		0.62			1.00		1.00	1.00		0.97	0.69	
Incremental Delay, d2		191.9			106.6		9.5	59.3		57.3	202.3	
Delay (s)		215.6			140.1		77.2	113.8		123.6	237.0	
Level of Service		F			F		E	F		F	F	
Approach Delay (s)		215.6			140.1			112.6			226.3	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM Average Control Delay	182.9	HCM Level of Service	F
HCM Volume to Capacity ratio	1.39		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	111.0%	ICU Level of Service	H
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	200	109	37	119	125	78	60	960	50	45	903	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	10	12	12	12	12	10	10	12	10	10	12
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.99		1.00	0.99			1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.95			0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)	1608	1695		1802	1776			3117		1652	3216	
Flt Permitted	0.19	1.00		0.36	1.00			0.67		0.15	1.00	
Satd. Flow (perm)	329	1695		686	1776			2092		261	3216	
Peak-hour factor, PHF	0.89	0.83	0.80	0.79	0.64	0.88	0.56	0.92	0.78	0.71	0.95	0.86
Adj. Flow (vph)	225	131	46	151	195	89	107	1043	64	63	951	102
RTOR Reduction (vph)	0	9	0	0	11	0	0	3	0	0	5	0
Lane Group Flow (vph)	225	168	0	151	273	0	0	1211	0	63	1048	0
Confl. Peds. (#/hr)	2		3	3		2	7		2	2		7
Heavy Vehicles (%)	1%	0%	0%	0%	2%	0%	3%	7%	5%	2%	3%	0%
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	34.6	19.6		39.4	22.0			87.8		96.0	96.0	
Effective Green, g (s)	36.6	20.6		41.4	23.0			90.8		97.0	99.0	
Actuated g/C Ratio	0.24	0.14		0.28	0.15			0.61		0.65	0.66	
Clearance Time (s)	5.0	5.0		5.0	5.0			7.0		5.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	217	233		326	272			1266		208	2123	
v/s Ratio Prot	c0.11	0.10		c0.06	c0.15					0.01	c0.33	
v/s Ratio Perm	0.14			0.07				c0.58		0.19		
v/c Ratio	1.04	0.72		0.46	1.00			0.96		0.30	0.49	
Uniform Delay, d1	63.6	62.0		52.3	63.5			27.8		13.9	12.9	
Progression Factor	1.00	1.00		0.77	0.77			1.17		1.00	1.00	
Incremental Delay, d2	71.1	10.5		0.2	26.8			12.7		0.8	0.8	
Delay (s)	134.6	72.5		40.8	75.6			45.0		14.8	13.7	
Level of Service	F	E		D	E			D		B	B	
Approach Delay (s)		107.3			63.5			45.0			13.7	
Approach LOS		F			E			D			B	

Intersection Summary			
HCM Average Control Delay	44.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	93.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	5	0	7	0	961	9	7	790	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor				1.00	1.00			1.00		1.00	1.00	
Frt				1.00	0.85			1.00		1.00	1.00	
Flt Protected				0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)				1626	1455			1709		1626	1712	
Flt Permitted				0.76	1.00			1.00		0.22	1.00	
Satd. Flow (perm)				1296	1455			1709		373	1712	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	5	0	8	0	1045	10	8	859	0
RTOR Reduction (vph)	0	0	0	0	7	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	5	1	0	0	1055	0	8	859	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)				16.0	16.0			126.0		126.0	126.0	
Effective Green, g (s)				16.0	16.0			126.0		126.0	126.0	
Actuated g/C Ratio				0.11	0.11			0.84		0.84	0.84	
Clearance Time (s)				4.0	4.0			4.0		4.0	4.0	
Lane Grp Cap (vph)				138	155			1436		313	1438	
v/s Ratio Prot					0.00			c0.62			0.50	
v/s Ratio Perm				c0.00						0.02		
v/c Ratio				0.04	0.01			0.73		0.03	0.60	
Uniform Delay, d1				60.1	59.9			5.0		2.0	3.9	
Progression Factor				0.91	1.00			0.53		0.61	0.84	
Incremental Delay, d2				0.5	0.1			1.7		0.1	1.4	
Delay (s)				55.0	60.0			4.4		1.3	4.6	
Level of Service				E	E			A		A	A	
Approach Delay (s)		0.0			58.0			4.4			4.6	
Approach LOS		A			E			A			A	

Intersection Summary			
HCM Average Control Delay	4.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	61.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	22	12	1	142	13	385	8	760	56	210	739	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	10	12	10	12	11	12	12	11	12
Total Lost time (s)		4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00	1.00	0.95	0.95	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00	0.97	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected		0.97	1.00	0.95	0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1845	1569	1585	1733	1492	1805	1780		1787	1807	
Flt Permitted		0.97	1.00	0.95	0.97	1.00	0.35	1.00		0.05	1.00	
Satd. Flow (perm)		1845	1569	1585	1733	1492	659	1780		88	1807	
Peak-hour factor, PHF	0.63	0.50	0.75	0.81	0.40	0.81	0.94	0.82	0.75	0.90	0.91	0.73
Adj. Flow (vph)	35	24	1	175	32	475	9	927	75	233	812	38
RTOR Reduction (vph)	0	0	1	0	0	176	0	2	0	0	1	0
Lane Group Flow (vph)	0	59	0	103	104	299	9	1000	0	233	849	0
Confl. Peds. (#/hr)			2	2								
Heavy Vehicles (%)	0%	0%	0%	1%	0%	1%	0%	2%	2%	1%	1%	0%
Turn Type	Split		Perm	Split		pm+ov	Perm			pm+pt		
Protected Phases	8	8		4	4	1		2		1	6	
Permitted Phases			8			4	2			6		
Actuated Green, G (s)		8.6	8.6	8.0	8.0	30.3	81.1	81.1		108.4	108.4	
Effective Green, g (s)		9.6	9.6	9.0	9.0	32.3	82.1	82.1		109.4	109.4	
Actuated g/C Ratio		0.07	0.07	0.06	0.06	0.23	0.59	0.59		0.78	0.78	
Clearance Time (s)		5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		127	108	102	111	344	386	1044		352	1412	
v/s Ratio Prot		c0.03		c0.07	0.06	c0.14		c0.56		0.11	0.47	
v/s Ratio Perm			0.00			0.06	0.01			0.41		
v/c Ratio		0.46	0.00	1.01	0.94	0.87	0.02	0.96		0.66	0.60	
Uniform Delay, d1		62.7	60.7	65.5	65.2	51.8	12.1	27.3		43.8	6.3	
Progression Factor		1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2		2.7	0.0	91.8	65.0	20.1	0.1	19.4		4.6	1.9	
Delay (s)		65.4	60.7	157.3	130.2	71.9	12.3	46.7		48.4	8.2	
Level of Service		E	E	F	F	E	B	D		D	A	
Approach Delay (s)		65.3			93.7			46.4			16.9	
Approach LOS		E			F			D			B	

Intersection Summary			
HCM Average Control Delay	46.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	81.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	68	4	30	160	171	7	504	39	112	474	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	14	12	12	9	9	12	11	12	12	12	12
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.99			1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected		0.98			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1873			1628	1439	1805	1768		1770	1843	
Flt Permitted		0.64			0.93	1.00	0.36	1.00		0.31	1.00	
Satd. Flow (perm)		1221			1524	1439	680	1768		576	1843	
Peak-hour factor, PHF	0.56	0.83	0.58	0.75	0.79	0.79	0.50	0.85	0.85	0.86	0.92	0.44
Adj. Flow (vph)	71	82	7	40	203	216	14	593	46	130	515	45
RTOR Reduction (vph)	0	1	0	0	0	150	0	2	0	0	2	0
Lane Group Flow (vph)	0	159	0	0	243	66	14	637	0	130	558	0
Heavy Vehicles (%)	6%	5%	0%	0%	5%	1%	0%	3%	0%	2%	2%	0%
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		45.0			45.0	45.0	95.0	95.0		95.0	95.0	
Effective Green, g (s)		46.0			46.0	46.0	96.0	96.0		96.0	96.0	
Actuated g/C Ratio		0.31			0.31	0.31	0.64	0.64		0.64	0.64	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)		374			467	441	435	1132		369	1180	
v/s Ratio Prot								c0.36			0.30	
v/s Ratio Perm		0.13			c0.16	0.05	0.02			0.23		
v/c Ratio		0.42			0.52	0.15	0.03	0.56		0.35	0.47	
Uniform Delay, d1		41.4			42.9	37.8	9.9	15.2		12.5	13.9	
Progression Factor		1.00			0.97	1.11	0.79	0.70		1.00	1.00	
Incremental Delay, d2		3.5			0.4	0.1	0.1	1.9		2.6	1.4	
Delay (s)		44.9			41.9	42.0	8.0	12.5		15.2	15.3	
Level of Service		D			D	D	A	B		B	B	
Approach Delay (s)		44.9			41.9			12.4			15.3	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM Average Control Delay	23.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	64.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	SBL	SBR	NWL	NWR
Lane Configurations						
Volume (vph)	0	233	457	13	497	438
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	10	9	12	10	9
Total Lost time (s)		4.0	4.0		4.0	4.0
Lane Util. Factor		0.88	0.97		1.00	1.00
Frt		0.85	0.99		1.00	0.85
Flt Protected		1.00	0.95		0.95	1.00
Satd. Flow (prot)		2627	3087		1636	1425
Flt Permitted		1.00	0.95		0.95	1.00
Satd. Flow (perm)		2627	3087		1636	1425
Peak-hour factor, PHF	0.55	0.84	0.92	0.63	0.86	0.93
Adj. Flow (vph)	0	277	497	21	578	471
RTOR Reduction (vph)	0	87	2	0	0	0
Lane Group Flow (vph)	0	190	516	0	578	471
Heavy Vehicles (%)	13%	1%	2%	0%	3%	2%
Turn Type		custom				pt+ov
Protected Phases			6		8	8 6
Permitted Phases		4				
Actuated Green, G (s)		94.0	46.0		94.0	150.0
Effective Green, g (s)		95.0	47.0		95.0	150.0
Actuated g/C Ratio		0.63	0.31		0.63	1.00
Clearance Time (s)		5.0	5.0		5.0	
Lane Grp Cap (vph)		1664	967		1036	1425
v/s Ratio Prot			c0.17		c0.35	0.33
v/s Ratio Perm		0.07				
v/c Ratio		0.11	0.53		0.56	0.33
Uniform Delay, d1		10.9	42.5		15.6	0.0
Progression Factor		1.00	0.65		0.68	1.00
Incremental Delay, d2		0.1	1.9		0.2	0.1
Delay (s)		11.0	29.6		10.8	0.1
Level of Service		B	C		B	A
Approach Delay (s)	11.0		29.6		6.0	
Approach LOS	B		C		A	

Intersection Summary			
HCM Average Control Delay	13.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	47.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	274	215	791	240	72	699
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11
Total Lost time (s)	4.0	5.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	0.98	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.97		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1678	1493	1722		1728	1801
Flt Permitted	0.95	1.00	1.00		0.09	1.00
Satd. Flow (perm)	1678	1493	1722		161	1801
Peak-hour factor, PHF	0.75	0.74	0.89	0.90	0.85	0.90
Adj. Flow (vph)	365	291	889	267	85	777
RTOR Reduction (vph)	0	169	7	0	0	0
Lane Group Flow (vph)	365	122	1149	0	85	777
Confl. Peds. (#/hr)		1		1	1	
Heavy Vehicles (%)	4%	2%	3%	2%	1%	2%
Turn Type		Perm			Perm	
Protected Phases	8		2			6
Permitted Phases		8			6	
Actuated Green, G (s)	32.9	32.9	107.1		107.1	107.1
Effective Green, g (s)	33.9	32.9	108.1		108.1	108.1
Actuated g/C Ratio	0.23	0.22	0.72		0.72	0.72
Clearance Time (s)	5.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	379	327	1241		116	1298
v/s Ratio Prot	c0.22		c0.67			0.43
v/s Ratio Perm		0.08			0.53	
v/c Ratio	0.96	0.37	0.93		0.73	0.60
Uniform Delay, d1	57.4	49.8	17.6		12.4	10.3
Progression Factor	0.68	0.79	1.00		0.78	0.37
Incremental Delay, d2	7.3	0.1	13.0		27.9	1.7
Delay (s)	46.4	39.6	30.6		37.6	5.4
Level of Service	D	D	C		D	A
Approach Delay (s)	43.4		30.6			8.6
Approach LOS	D		C			A

Intersection Summary			
HCM Average Control Delay	26.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	418	8	257	5	28	9	298	630	6	2	557	493
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	9	12	12	10	12	11	9	12	12	10	10
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95			1.00	1.00
Frpb, ped/bikes	1.00	0.97			1.00		1.00	1.00			1.00	1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00			1.00	1.00
Frt	1.00	0.86			0.98		1.00	1.00			1.00	0.85
Flt Protected	0.95	1.00			0.99		0.95	1.00			1.00	1.00
Satd. Flow (prot)	1620	1416			1695		1745	2922			1689	1507
Flt Permitted	0.46	1.00			0.82		0.17	1.00			1.00	1.00
Satd. Flow (perm)	777	1416			1403		309	2922			1686	1507
Peak-hour factor, PHF	0.85	0.75	0.94	0.25	0.75	0.75	0.75	0.88	0.25	0.92	0.98	0.93
Adj. Flow (vph)	492	11	273	20	37	12	397	716	24	2	568	530
RTOR Reduction (vph)	0	181	0	0	6	0	0	2	0	0	0	248
Lane Group Flow (vph)	492	103	0	0	63	0	397	738	0	0	570	282
Confl. Peds. (#/hr)	4		3	3		4						
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	11%	0%	0%	5%	0%
Turn Type	pm+pt			Perm			pm+pt			Perm		Perm
Protected Phases	7	4			8		5	2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	49.3	49.3			10.3		90.7	90.7			61.1	61.1
Effective Green, g (s)	49.3	50.3			11.3		90.7	91.7			62.1	62.1
Actuated g/C Ratio	0.33	0.34			0.08		0.60	0.61			0.41	0.41
Clearance Time (s)	4.0	5.0			5.0		4.0	5.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	452	475			106		432	1786			698	624
v/s Ratio Prot	c0.25	0.07					c0.16	0.25				
v/s Ratio Perm	c0.10				0.05		c0.40				0.34	0.19
v/c Ratio	1.09	0.22			0.60		0.92	0.41			0.82	0.45
Uniform Delay, d1	48.1	35.7			67.2		32.7	15.2			38.9	31.7
Progression Factor	1.00	1.00			1.00		1.64	1.05			0.82	0.21
Incremental Delay, d2	68.4	0.2			8.8		19.3	0.5			9.1	2.1
Delay (s)	116.4	35.9			75.9		72.9	16.4			40.9	8.7
Level of Service	F	D			E		E	B			D	A
Approach Delay (s)		87.0			75.9			36.1			25.4	
Approach LOS		F			E			D			C	

Intersection Summary			
HCM Average Control Delay	46.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	86.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	255	1	247	2	2	7	393	719	2	1	692	266
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	11	11	11	11	11	11	11	11
Total Lost time (s)	3.0	4.0			4.0		4.0	4.0		4.0	4.0	5.0
Lane Util. Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.97			0.99		1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85			0.92		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00			0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1715	1523			1641		1728	1817		1745	1818	1487
Flt Permitted	0.74	1.00			0.92		0.07	1.00		0.16	1.00	1.00
Satd. Flow (perm)	1330	1523			1520		132	1817		286	1818	1487
Peak-hour factor, PHF	0.76	0.38	0.84	0.38	0.50	0.50	0.78	0.86	0.75	0.75	0.90	0.73
Adj. Flow (vph)	336	3	294	5	4	14	504	836	3	1	769	364
RTOR Reduction (vph)	0	223	0	0	12	0	0	0	0	0	0	156
Lane Group Flow (vph)	336	74	0	0	11	0	504	839	0	1	769	208
Confl. Peds. (#/hr)	1		3	3		1			1	1		
Heavy Vehicles (%)	5%	0%	3%	0%	0%	0%	1%	1%	0%	0%	1%	5%
Turn Type	pm+pt			Perm			pm+pt			Perm		Perm
Protected Phases	7	4			8		5	2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	28.0	28.0			16.0		82.0	82.0		50.0	50.0	50.0
Effective Green, g (s)	29.0	29.0			17.0		83.0	83.0		51.0	51.0	50.0
Actuated g/C Ratio	0.24	0.24			0.14		0.69	0.69		0.42	0.42	0.42
Clearance Time (s)	4.0	5.0			5.0		5.0	5.0		5.0	5.0	5.0
Lane Grp Cap (vph)	350	368			215		464	1257		122	773	620
v/s Ratio Prot	c0.07	0.05					c0.25	0.46			0.42	
v/s Ratio Perm	c0.16				0.01		c0.50			0.00		0.14
v/c Ratio	0.96	0.20			0.05		1.09	0.67		0.01	0.99	0.33
Uniform Delay, d1	45.0	36.3			44.5		41.3	10.6		19.9	34.4	23.7
Progression Factor	0.92	0.81			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	38.7	1.2			0.5		67.1	2.8		0.1	31.1	1.5
Delay (s)	80.0	30.6			45.0		108.4	13.4		20.0	65.5	25.2
Level of Service	F	C			D		F	B		C	E	C
Approach Delay (s)		56.8			45.0			49.1			52.5	
Approach LOS		E			D			D			D	

Intersection Summary			
HCM Average Control Delay	51.9	HCM Level of Service	D
HCM Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	89.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	4	4	6	234	1	281	3	540	109	121	480	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0	4.0		4.0	
Lane Util. Factor		1.00			1.00			0.95	1.00		0.95	
Frt		0.93			0.93			1.00	0.85		1.00	
Flt Protected		0.98			0.98			1.00	1.00		0.99	
Satd. Flow (prot)		1664			1610			3312	1553		3393	
Flt Permitted		0.83			0.83			0.95	1.00		0.69	
Satd. Flow (perm)		1400			1367			3153	1553		2360	
Peak-hour factor, PHF	0.25	0.63	0.25	0.76	0.25	0.79	0.92	0.95	0.82	0.94	0.85	0.25
Adj. Flow (vph)	16	6	24	308	4	356	3	568	133	129	565	4
RTOR Reduction (vph)	0	12	0	0	62	0	0	0	86	0	1	0
Lane Group Flow (vph)	0	34	0	0	606	0	0	571	47	0	697	0
Heavy Vehicles (%)	0%	33%	0%	9%	43%	5%	0%	9%	4%	1%	6%	50%
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		30.0			30.0			20.0	20.0		20.0	
Effective Green, g (s)		31.0			31.0			21.0	21.0		21.0	
Actuated g/C Ratio		0.52			0.52			0.35	0.35		0.35	
Clearance Time (s)		5.0			5.0			5.0	5.0		5.0	
Lane Grp Cap (vph)		723			706			1104	544		826	
v/s Ratio Prot												
v/s Ratio Perm		0.02			c0.44			0.18	0.03		c0.30	
v/c Ratio		0.05			0.86			0.52	0.09		0.84	
Uniform Delay, d1		7.2			12.6			15.5	13.1		18.0	
Progression Factor		1.00			1.07			1.00	1.00		1.00	
Incremental Delay, d2		0.1			7.5			1.7	0.3		10.3	
Delay (s)		7.3			21.0			17.2	13.4		28.3	
Level of Service		A			C			B	B		C	
Approach Delay (s)		7.3			21.0			16.5			28.3	
Approach LOS		A			C			B			C	

Intersection Summary			
HCM Average Control Delay	21.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	78.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	77	30	5	7	43	19	11	457	13	14	476	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	11	12	12	12	12	12	10	12
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00			0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		0.99			1.00		1.00	1.00		1.00	1.00	
Frt		0.99			0.96		1.00	0.99		1.00	0.99	
Flt Protected		0.97			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1733			1705		1805	1853		1736	1737	
Flt Permitted		0.72			0.96		0.36	1.00		0.39	1.00	
Satd. Flow (perm)		1287			1645		692	1853		720	1737	
Peak-hour factor, PHF	0.77	0.81	0.38	0.50	0.66	0.67	0.50	0.93	0.75	0.75	0.93	0.54
Adj. Flow (vph)	100	37	13	14	65	28	22	491	17	19	512	43
RTOR Reduction (vph)	0	2	0	0	8	0	0	1	0	0	2	0
Lane Group Flow (vph)	0	148	0	0	99	0	22	507	0	19	553	0
Confl. Peds. (#/hr)	4		5	5		4						
Heavy Vehicles (%)	0%	1%	0%	0%	0%	8%	0%	2%	2%	4%	1%	0%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		44.0			44.0		96.0	96.0		96.0	96.0	
Effective Green, g (s)		45.0			45.0		97.0	97.0		97.0	97.0	
Actuated g/C Ratio		0.30			0.30		0.65	0.65		0.65	0.65	
Clearance Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)		386			494		447	1198		466	1123	
v/s Ratio Prot								0.27			c0.32	
v/s Ratio Perm		c0.11			0.06		0.03			0.03		
v/c Ratio		0.38			0.20		0.05	0.42		0.04	0.49	
Uniform Delay, d1		41.5			39.1		9.7	12.9		9.6	13.7	
Progression Factor		1.00			1.00		1.14	1.19		0.36	0.31	
Incremental Delay, d2		2.9			0.9		0.2	1.1		0.1	1.4	
Delay (s)		44.4			40.0		11.2	16.4		3.6	5.7	
Level of Service		D			D		B	B		A	A	
Approach Delay (s)		44.4			40.0			16.2			5.6	
Approach LOS		D			D			B			A	

Intersection Summary			
HCM Average Control Delay	16.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	7	1406	229	303	987	89	146	38	284	69	33	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	10	12	12	10	10	10	12	11	12
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	
Lane Util. Factor	1.00	0.91		1.00	0.91			1.00	1.00		1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.98		1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99	1.00		0.99	
Frt	1.00	0.98		1.00	0.98			1.00	0.85		0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.96	1.00		0.97	
Satd. Flow (prot)	1745	5008		1685	4799			1691	1481		1734	
Flt Permitted	0.22	1.00		0.15	1.00			0.67	1.00		0.51	
Satd. Flow (perm)	398	5008		263	4799			1182	1481		912	
Peak-hour factor, PHF	0.62	0.95	0.83	0.25	0.90	0.69	0.84	0.63	0.93	0.71	0.58	0.33
Adj. Flow (vph)	11	1480	276	1212	1097	129	174	60	305	97	57	21
RTOR Reduction (vph)	0	36	0	0	18	0	0	0	1	0	7	0
Lane Group Flow (vph)	11	1720	0	1212	1208	0	0	234	304	0	168	0
Confl. Peds. (#/hr)			5	5			17		20	20		17
Heavy Vehicles (%)	0%	1%	0%	0%	7%	1%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt			pm+pt			Perm		pm+ov	Perm		
Protected Phases	1	6		5	2			4	5		8	
Permitted Phases	6			2			4		4	8		
Actuated Green, G (s)	22.8	22.0		46.0	40.2			15.2	34.2		15.2	
Effective Green, g (s)	24.8	25.0		47.0	43.2			16.2	36.2		16.2	
Actuated g/C Ratio	0.34	0.34		0.64	0.59			0.22	0.49		0.22	
Clearance Time (s)	5.0	7.0		5.0	7.0			5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	168	1710		557	2832			262	813		202	
v/s Ratio Prot	0.00	0.34		c0.59	0.25				0.10			
v/s Ratio Perm	0.02			c0.80				c0.20	0.10		0.18	
v/c Ratio	0.07	1.01		2.18	0.43			0.89	0.37		0.83	
Uniform Delay, d1	16.1	24.1		20.0	8.2			27.7	11.5		27.2	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.2	23.2		535.1	0.5			29.4	0.3		24.3	
Delay (s)	16.3	47.3		555.0	8.7			57.0	11.8		51.5	
Level of Service	B	D		F	A			E	B		D	
Approach Delay (s)		47.1			280.3			31.4			51.5	
Approach LOS		D			F			C			D	

Intersection Summary			
HCM Average Control Delay	161.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.75		
Actuated Cycle Length (s)	73.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	72.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	75	86	1708	93	82	1428
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1626	1455	3227		1626	3252
Flt Permitted	0.95	1.00	1.00		0.08	1.00
Satd. Flow (perm)	1626	1455	3227		144	3252
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	82	93	1857	101	89	1552
RTOR Reduction (vph)	0	51	3	0	0	0
Lane Group Flow (vph)	82	42	1955	0	89	1552
Turn Type		Perm			Perm	
Protected Phases	8		2			6
Permitted Phases		8			6	
Actuated Green, G (s)	16.0	16.0	126.0		126.0	126.0
Effective Green, g (s)	16.0	16.0	126.0		126.0	126.0
Actuated g/C Ratio	0.11	0.11	0.84		0.84	0.84
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Lane Grp Cap (vph)	173	155	2711		121	2732
v/s Ratio Prot	c0.05		0.61			0.48
v/s Ratio Perm		0.03			c0.62	
v/c Ratio	0.47	0.27	0.72		0.74	0.57
Uniform Delay, d1	63.0	61.6	4.9		5.0	3.7
Progression Factor	1.00	1.00	0.29		1.53	0.24
Incremental Delay, d2	9.0	4.3	0.6		16.2	0.4
Delay (s)	72.1	65.9	2.0		23.9	1.3
Level of Service	E	E	A		C	A
Approach Delay (s)	68.8		2.0			2.5
Approach LOS	E		A			A

Intersection Summary			
HCM Average Control Delay	5.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

SYNCHRO REPORTS

BASELINE SCENARIO

2030 AM Peak Hour
HCM Level of Service Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	359	33	51	292	149	87	57	836	98	267	1019	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	12	10	10	11	10	10	10	10	10	10
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.91		0.97	0.91	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1636	1773	1615	3173	1722	1540	1178	4674		3204	4660	
Flt Permitted	0.95	1.00	1.00	0.72	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1636	1773	1615	2415	1722	1540	1178	4674		3204	4660	
Peak-hour factor, PHF	0.91	0.63	0.65	0.84	0.73	0.84	0.75	0.84	0.85	0.78	0.94	0.75
Adj. Flow (vph)	395	52	78	348	204	104	76	995	115	342	1084	139
RTOR Reduction (vph)	0	0	59	0	0	84	0	16	0	0	18	0
Lane Group Flow (vph)	395	52	19	348	204	20	76	1094	0	342	1205	0
Confl. Peds. (#/hr)	1					1			3	3		
Heavy Vehicles (%)	3%	0%	0%	3%	3%	0%	43%	2%	0%	2%	2%	3%
Turn Type	Prot		Perm	pm+pt		Perm	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4	8		8						
Actuated Green, G (s)	23.0	21.0	21.0	34.0	16.0	16.0	6.0	22.0		9.0	25.0	
Effective Green, g (s)	24.0	22.0	22.0	36.0	17.0	17.0	7.0	23.0		10.0	26.0	
Actuated g/C Ratio	0.27	0.24	0.24	0.40	0.19	0.19	0.08	0.26		0.11	0.29	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	436	433	395	1126	325	291	92	1194		356	1346	
v/s Ratio Prot	c0.24	0.03		0.07	c0.12		0.06	0.23		c0.11	c0.26	
v/s Ratio Perm			0.01	0.06		0.01						
v/c Ratio	0.91	0.12	0.05	0.31	0.63	0.07	0.83	0.92		0.96	0.90	
Uniform Delay, d1	31.9	26.5	26.0	18.9	33.6	30.0	40.9	32.6		39.8	30.7	
Progression Factor	0.82	1.11	1.56	1.00	1.00	1.00	0.93	0.55		0.89	0.66	
Incremental Delay, d2	21.2	0.5	0.2	0.7	8.9	0.4	46.8	10.4		32.2	7.3	
Delay (s)	47.5	29.7	40.8	19.6	42.5	30.4	84.9	28.5		67.7	27.6	
Level of Service	D	C	D	B	D	C	F	C		E	C	
Approach Delay (s)		44.8			28.4			32.1			36.4	
Approach LOS		D			C			C			D	

Intersection Summary			
HCM Average Control Delay	34.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	72.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	43	350	180	110	174	2	119	862	108	7	1266	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	9	12	12	9	12	10	10	10	10	10	10
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95			0.95		1.00	0.91		1.00	0.91	
Frpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.95			1.00		1.00	0.98		1.00	0.99	
Flt Protected		1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		2922			3071		1636	4561		1685	4669	
Flt Permitted		0.88			0.55		0.14	1.00		0.14	1.00	
Satd. Flow (perm)		2580			1722		246	4561		253	4669	
Peak-hour factor, PHF	0.69	0.83	0.73	0.70	0.84	0.50	0.70	0.83	0.70	0.75	0.89	0.53
Adj. Flow (vph)	62	422	247	157	207	4	170	1039	154	9	1422	130
RTOR Reduction (vph)	0	71	0	0	1	0	0	22	0	0	12	0
Lane Group Flow (vph)	0	660	0	0	367	0	170	1171	0	9	1540	0
Confl. Peds. (#/hr)	2		1	1		2	2		3	3		2
Heavy Vehicles (%)	3%	4%	6%	4%	3%	0%	3%	4%	3%	0%	2%	5%
Turn Type	Perm			pm+pt			pm+pt			pm+pt		
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		26.0			35.0		36.0	36.0		32.0	32.0	
Effective Green, g (s)		27.0			36.0		37.0	37.0		33.0	33.0	
Actuated g/C Ratio		0.30			0.40		0.41	0.41		0.37	0.37	
Clearance Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)		774			764		240	1875		172	1712	
v/s Ratio Prot					c0.03		0.07	c0.26		0.00	c0.33	
v/s Ratio Perm		c0.26			0.17		0.22			0.02		
v/c Ratio		0.85			0.86dl		0.71	0.62		0.05	0.90	
Uniform Delay, d1		29.6			20.1		31.0	21.0		19.8	26.9	
Progression Factor		0.66			1.00		1.27	1.44		0.48	0.44	
Incremental Delay, d2		8.0			2.2		12.4	1.2		0.4	5.8	
Delay (s)		27.6			22.2		51.8	31.4		10.0	17.6	
Level of Service		C			C		D	C		A	B	
Approach Delay (s)		27.6			22.2			33.9			17.6	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM Average Control Delay	25.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.0%	ICU Level of Service	D
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	70	259	88	87	178	44	46	992	314	68	1149	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	10	12	12	9	12	12	11	12	12	10	12
Total Lost time (s)	4.0	4.0			4.0			4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00			0.95			0.91	1.00	1.00	0.91	
Frpb, ped/bikes	1.00	0.99			1.00			1.00	0.97	1.00	1.00	
Flpb, ped/bikes	1.00	1.00			1.00			1.00	1.00	1.00	1.00	
Frt	1.00	0.94			0.98			1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00			0.99			1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1604	1641			3072			4947	1545	1787	4690	
Flt Permitted	0.47	1.00			0.59			0.68	1.00	0.17	1.00	
Satd. Flow (perm)	801	1641			1827			3403	1545	313	4690	
Peak-hour factor, PHF	0.67	0.93	0.50	0.79	0.81	0.91	0.46	0.91	0.91	0.67	0.91	0.59
Adj. Flow (vph)	104	278	176	110	220	48	100	1090	345	101	1263	161
RTOR Reduction (vph)	0	25	0	0	13	0	0	0	188	0	18	0
Lane Group Flow (vph)	104	429	0	0	365	0	0	1190	157	101	1406	0
Confl. Peds. (#/hr)	3		1	1		3	18		5	5		18
Heavy Vehicles (%)	1%	2%	0%	3%	2%	0%	0%	1%	1%	1%	1%	1%
Turn Type	Perm			Perm			Perm		Perm	pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	31.0	31.0			31.0			40.0	40.0	49.0	49.0	
Effective Green, g (s)	32.0	32.0			32.0			41.0	41.0	50.0	50.0	
Actuated g/C Ratio	0.36	0.36			0.36			0.46	0.46	0.56	0.56	
Clearance Time (s)	5.0	5.0			5.0			5.0	5.0	5.0	5.0	
Lane Grp Cap (vph)	285	583			650			1550	704	256	2606	
v/s Ratio Prot		c0.26								0.02	c0.30	
v/s Ratio Perm	0.13				0.20			c0.35	0.10	0.20		
v/c Ratio	0.36	0.74			0.56			0.97dl	0.22	0.39	0.54	
Uniform Delay, d1	21.5	25.3			23.4			20.5	14.8	19.5	12.7	
Progression Factor	0.96	0.94			1.00			0.33	0.00	0.42	0.38	
Incremental Delay, d2	3.5	7.8			3.5			1.3	0.3	2.2	0.4	
Delay (s)	24.1	31.5			26.8			8.0	0.3	10.3	5.2	
Level of Service	C	C			C			A	A	B	A	
Approach Delay (s)		30.1			26.8			6.3			5.5	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM Average Control Delay	11.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	90.2%	ICU Level of Service	E
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	173	69	488	240	169	833
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	1.00		1.00		1.00	1.00
Frpb, ped/bikes	0.99		0.99		1.00	1.00
Flpb, ped/bikes	1.00		1.00		1.00	1.00
Frt	0.96		0.96		1.00	1.00
Flt Protected	0.97		1.00		0.95	1.00
Satd. Flow (prot)	1637		1697		1728	1801
Flt Permitted	0.97		1.00		0.24	1.00
Satd. Flow (perm)	1637		1697		442	1801
Peak-hour factor, PHF	0.75	0.74	0.89	0.90	0.85	0.90
Adj. Flow (vph)	231	93	548	267	199	926
RTOR Reduction (vph)	16	0	18	0	0	0
Lane Group Flow (vph)	308	0	797	0	199	926
Confl. Peds. (#/hr)		1		1	1	
Heavy Vehicles (%)	4%	2%	3%	2%	1%	2%
Turn Type					Perm	
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	19.7		60.3		60.3	60.3
Effective Green, g (s)	20.7		61.3		61.3	61.3
Actuated g/C Ratio	0.23		0.68		0.68	0.68
Clearance Time (s)	5.0		5.0		5.0	5.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	377		1156		301	1227
v/s Ratio Prot	c0.19		0.47			c0.51
v/s Ratio Perm					0.45	
v/c Ratio	0.82		0.69		0.66	0.75
Uniform Delay, d1	32.8		8.6		8.3	9.4
Progression Factor	0.65		0.95		0.40	0.45
Incremental Delay, d2	8.5		2.5		4.3	1.7
Delay (s)	30.0		10.7		7.6	5.9
Level of Service	C		B		A	A
Approach Delay (s)	30.0		10.7			6.2
Approach LOS	C		B			A

Intersection Summary			
HCM Average Control Delay	11.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	73.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	9	0	4	0	529	2	3	1070	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor				1.00	1.00			1.00		1.00	1.00	
Frt				1.00	0.85			1.00		1.00	1.00	
Flt Protected				0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)				1626	1455			1711		1626	1712	
Flt Permitted				0.76	1.00			1.00		0.40	1.00	
Satd. Flow (perm)				1296	1455			1711		681	1712	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	10	0	4	0	575	2	3	1163	0
RTOR Reduction (vph)	0	0	0	0	3	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	10	1	0	0	577	0	3	1163	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)				16.0	16.0			66.0		66.0	66.0	
Effective Green, g (s)				16.0	16.0			66.0		66.0	66.0	
Actuated g/C Ratio				0.18	0.18			0.73		0.73	0.73	
Clearance Time (s)				4.0	4.0			4.0		4.0	4.0	
Lane Grp Cap (vph)				230	259			1255		499	1255	
v/s Ratio Prot					0.00			0.34			c0.68	
v/s Ratio Perm				c0.01						0.00		
v/c Ratio				0.04	0.00			0.46		0.01	0.93	
Uniform Delay, d1				30.7	30.4			4.8		3.2	10.0	
Progression Factor				1.50	1.00			0.52		0.75	0.68	
Incremental Delay, d2				0.3	0.0			0.8		0.0	9.0	
Delay (s)				46.3	30.5			3.4		2.4	15.7	
Level of Service				D	C			A		A	B	
Approach Delay (s)		0.0			41.8			3.4			15.7	
Approach LOS		A			D			A			B	

Intersection Summary			
HCM Average Control Delay	11.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	66.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	7	7	3	75	15	169	17	421	102	420	768	42
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	10	12	10	12	11	12	12	11	12
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00	0.97		1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	0.97		1.00	0.99	
Flt Protected		0.98	1.00		0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1859	1574		1822	1492	1805	1744		1787	1802	
Flt Permitted		0.80	1.00		0.97	1.00	0.14	1.00		0.23	1.00	
Satd. Flow (perm)		1513	1574		1822	1492	269	1744		427	1802	
Peak-hour factor, PHF	0.63	0.50	0.75	0.81	0.40	0.81	0.94	0.82	0.75	0.90	0.91	0.73
Adj. Flow (vph)	11	14	4	93	38	209	18	513	136	467	844	58
RTOR Reduction (vph)	0	0	4	0	0	180	0	8	0	0	2	0
Lane Group Flow (vph)	0	25	0	0	131	29	18	641	0	467	900	0
Confl. Peds. (#/hr)			2	2								
Heavy Vehicles (%)	0%	0%	0%	1%	0%	1%	0%	2%	2%	1%	1%	0%
Turn Type	Perm		Perm	Split		Prot	Perm			pm+pt		
Protected Phases		8		7	7	7		2		1	6	
Permitted Phases	8		8				2			6		
Actuated Green, G (s)		3.3	3.3		11.7	11.7	43.0	43.0		60.0	60.0	
Effective Green, g (s)		4.3	4.3		12.7	12.7	44.0	44.0		61.0	61.0	
Actuated g/C Ratio		0.05	0.05		0.14	0.14	0.49	0.49		0.68	0.68	
Clearance Time (s)		5.0	5.0		5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		72	75		257	211	132	853		486	1221	
v/s Ratio Prot					c0.07	0.02		0.37		c0.14	0.50	
v/s Ratio Perm		c0.02	0.00				0.07			c0.51		
v/c Ratio		0.35	0.00		0.51	0.14	0.14	0.75		0.96	0.74	
Uniform Delay, d1		41.5	40.8		35.8	33.9	12.6	18.6		24.1	9.3	
Progression Factor		1.00	1.00		0.67	0.55	0.85	0.84		0.57	0.39	
Incremental Delay, d2		2.9	0.0		1.2	0.2	2.1	5.9		16.3	1.5	
Delay (s)		44.4	40.8		25.1	18.8	12.8	21.5		30.1	5.2	
Level of Service		D	D		C	B	B	C		C	A	
Approach Delay (s)		43.9			21.2			21.2			13.7	
Approach LOS		D			C			C			B	

Intersection Summary			
HCM Average Control Delay	17.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	11	117	8	26	94	76	4	291	37	181	437	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	14	12	12	9	9	12	11	12	12	12	12
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.99			1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected		0.99			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1904			1628	1439	1805	1759		1770	1852	
Flt Permitted		0.96			0.91	1.00	0.35	1.00		0.46	1.00	
Satd. Flow (perm)		1841			1503	1439	660	1759		853	1852	
Peak-hour factor, PHF	0.56	0.83	0.58	0.75	0.79	0.79	0.50	0.85	0.85	0.86	0.92	0.44
Adj. Flow (vph)	20	141	14	35	119	96	8	342	44	210	475	23
RTOR Reduction (vph)	0	7	0	0	0	60	0	11	0	0	4	0
Lane Group Flow (vph)	0	168	0	0	154	36	8	375	0	210	494	0
Heavy Vehicles (%)	6%	5%	0%	0%	5%	1%	0%	3%	0%	2%	2%	0%
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		16.0			16.0	16.0	19.0	19.0		19.0	19.0	
Effective Green, g (s)		17.0			17.0	17.0	20.0	20.0		20.0	20.0	
Actuated g/C Ratio		0.38			0.38	0.38	0.44	0.44		0.44	0.44	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)		695			568	544	293	782		379	823	
v/s Ratio Prot								0.21			c0.27	
v/s Ratio Perm		0.09			c0.10	0.03	0.01			0.25		
v/c Ratio		0.24			0.27	0.07	0.03	0.48		0.55	0.60	
Uniform Delay, d1		9.6			9.7	8.9	7.0	8.8		9.2	9.5	
Progression Factor		1.00			0.89	1.04	0.78	0.66		1.01	0.96	
Incremental Delay, d2		0.8			0.9	0.2	0.2	2.0		4.3	2.4	
Delay (s)		10.4			9.6	9.5	5.7	7.8		13.5	11.5	
Level of Service		B			A	A	A	A		B	B	
Approach Delay (s)		10.4			9.6			7.8			12.1	
Approach LOS		B			A			A			B	

Intersection Summary			
HCM Average Control Delay	10.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	SBL	SBR	NWL	NWR
Lane Configurations						
Volume (vph)	0	525	410	6	189	293
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	10	9	12	10	9
Total Lost time (s)		4.0	4.0		4.0	4.0
Lane Util. Factor		0.88	0.97		1.00	1.00
Frt		0.85	1.00		1.00	0.85
Flt Protected		1.00	0.95		0.95	1.00
Satd. Flow (prot)		2627	3092		1636	1425
Flt Permitted		1.00	0.95		0.95	1.00
Satd. Flow (perm)		2627	3092		1636	1425
Peak-hour factor, PHF	0.55	0.84	0.92	0.63	0.86	0.93
Adj. Flow (vph)	0	625	446	10	220	315
RTOR Reduction (vph)	0	205	2	0	0	0
Lane Group Flow (vph)	0	420	454	0	220	315
Heavy Vehicles (%)	13%	1%	2%	0%	3%	2%
Turn Type		custom				pt+ov
Protected Phases			6		8	8 6
Permitted Phases		4				
Actuated Green, G (s)		46.0	34.0		46.0	90.0
Effective Green, g (s)		47.0	35.0		47.0	90.0
Actuated g/C Ratio		0.52	0.39		0.52	1.00
Clearance Time (s)		5.0	5.0		5.0	
Lane Grp Cap (vph)		1372	1202		854	1425
v/s Ratio Prot			c0.15		0.13	0.22
v/s Ratio Perm		c0.16				
v/c Ratio		0.31	0.38		0.26	0.22
Uniform Delay, d1		12.2	19.7		11.9	0.0
Progression Factor		1.00	0.38		0.94	1.00
Incremental Delay, d2		0.6	0.8		0.2	0.1
Delay (s)		12.8	8.3		11.4	0.1
Level of Service		B	A		B	A
Approach Delay (s)	12.8		8.3		4.7	
Approach LOS	B		A		A	

Intersection Summary			
HCM Average Control Delay	8.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	29.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL2	EBL	EBR	NBL2	NBL	NBR	SEL	SER	SER2	SWL	SWR	SWR2
Lane Configurations												
Volume (vph)	209	979	175	96	694	98	31	781	140	210	500	17
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	10	10	12	10	10	12	11	11	12
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.97			0.97		1.00	0.95		1.00	0.88	
Frpb, ped/bikes	1.00	0.99			1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97			0.98		0.86	0.85		1.00	0.85	
Flt Protected	0.95	0.96			0.96		1.00	1.00		0.95	1.00	
Satd. Flow (prot)	1677	3274			3154		1494	1374		1728	2723	
Flt Permitted	0.16	0.96			0.53		0.86	1.00		0.18	1.00	
Satd. Flow (perm)	283	3274			1744		1290	1374		331	2723	
Peak-hour factor, PHF	0.90	0.94	0.79	0.75	0.93	0.74	0.78	0.90	0.81	0.94	0.91	0.36
Adj. Flow (vph)	232	1041	222	128	746	132	40	868	173	223	549	47
RTOR Reduction (vph)	0	21	0	0	14	0	0	16	0	0	7	0
Lane Group Flow (vph)	232	1242	0	0	993	0	457	608	0	223	589	0
Confl. Peds. (#/hr)	10		12	1		2	2		1	12		10
Heavy Vehicles (%)	4%	1%	0%	4%	2%	1%	2%	2%	5%	1%	1%	0%
Turn Type	pm+pt			pm+pt				custom			custom	
Protected Phases	7	4		5	2					3	8	
Permitted Phases	4			2			6	6		8		
Actuated Green, G (s)	36.0	27.0			44.0		35.0	35.0		25.0	21.0	
Effective Green, g (s)	37.0	28.0			45.0		36.0	36.0		27.0	22.0	
Actuated g/C Ratio	0.41	0.31			0.50		0.40	0.40		0.30	0.24	
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	287	1019			950		516	550		177	666	
v/s Ratio Prot	0.10	c0.38			c0.06					c0.07	0.22	
v/s Ratio Perm	0.23				c0.46		0.35	0.44		0.31		
v/c Ratio	0.81	1.22			1.04		0.89	1.11		1.26	0.88	
Uniform Delay, d1	20.1	31.0			22.5		25.1	27.0		30.8	32.8	
Progression Factor	1.00	1.00			1.00		0.79	0.80		0.73	0.77	
Incremental Delay, d2	21.2	107.6			41.6		18.6	69.7		149.0	13.6	
Delay (s)	41.4	138.6			64.1		38.6	91.4		171.7	38.8	
Level of Service	D	F			E		D	F		F	D	
Approach Delay (s)		123.5			64.1		69.1			75.0		
Approach LOS		F			E		E			E		

Intersection Summary			
HCM Average Control Delay	87.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.11		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	106.7%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	239	143	99	48	45	46	22	606	31	37	985	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	10	12	12	12	12	10	10	12	10	10	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.94		1.00	0.94		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1606	1650		1799	1739		1636	1643		1652	1722	1552
Flt Permitted	0.43	1.00		0.58	1.00		0.08	1.00		0.22	1.00	1.00
Satd. Flow (perm)	725	1650		1097	1739		145	1643		377	1722	1552
Peak-hour factor, PHF	0.89	0.83	0.80	0.79	0.64	0.88	0.56	0.92	0.78	0.71	0.95	0.86
Adj. Flow (vph)	269	172	124	61	70	52	39	659	40	52	1037	98
RTOR Reduction (vph)	0	30	0	0	32	0	0	2	0	0	0	38
Lane Group Flow (vph)	269	266	0	61	90	0	39	697	0	52	1037	60
Confl. Peds. (#/hr)	2		3	3		2	7		2	2		7
Heavy Vehicles (%)	1%	0%	0%	0%	2%	0%	3%	7%	5%	2%	3%	0%
Turn Type	pm+pt			Perm			pm+pt			pm+pt		Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	24.1	24.1		10.5	10.5		48.9	46.5		48.9	46.5	46.5
Effective Green, g (s)	25.1	25.1		11.5	11.5		50.9	49.5		50.9	49.5	49.5
Actuated g/C Ratio	0.28	0.28		0.13	0.13		0.57	0.55		0.57	0.55	0.55
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	7.0		5.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	296	460		140	222		138	904		261	947	854
v/s Ratio Prot	c0.10	0.16			0.05		c0.01	0.42		0.01	c0.60	
v/s Ratio Perm	c0.16			0.06			0.15			0.11		0.04
v/c Ratio	0.91	0.58		0.44	0.40		0.28	0.77		0.20	1.10	0.07
Uniform Delay, d1	29.9	27.9		36.3	36.1		38.8	15.8		22.2	20.2	9.5
Progression Factor	1.00	1.00		0.60	0.66		1.52	1.37		1.00	1.00	1.00
Incremental Delay, d2	29.6	1.8		1.7	0.9		1.0	5.5		0.4	58.7	0.2
Delay (s)	59.5	29.7		23.6	24.8		60.0	27.2		22.6	79.0	9.6
Level of Service	E	C		C	C		E	C		C	E	A
Approach Delay (s)		43.9			24.4			29.0			70.8	
Approach LOS		D			C			C			E	

Intersection Summary			
HCM Average Control Delay	50.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	143	10	188	2	0	6	135	982	23	95	1661	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	10	10	10	10	10	10
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes		1.00	0.99		1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		0.99	1.00	1.00	1.00		1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	1.00		1.00	0.99	
Flt Protected		0.96	1.00		0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1790	1546		1791	1397	1636	4722		1652	4738	
Flt Permitted		0.74	1.00		0.51	1.00	0.11	1.00		0.13	1.00	
Satd. Flow (perm)		1383	1546		965	1397	196	4722		222	4738	
Peak-hour factor, PHF	0.81	0.75	0.81	0.50	0.92	0.63	0.85	0.82	0.58	0.83	0.94	0.77
Adj. Flow (vph)	177	13	232	4	0	10	159	1198	40	114	1767	101
RTOR Reduction (vph)	0	0	4	0	0	8	0	4	0	0	7	0
Lane Group Flow (vph)	0	190	228	0	4	2	159	1234	0	114	1861	0
Confl. Peds. (#/hr)	1		7	7		1	7		3	3		7
Heavy Vehicles (%)	1%	5%	3%	0%	50%	14%	3%	2%	0%	2%	1%	5%
Turn Type	Perm		pm+ov	Perm		Perm	pm+pt			pm+pt		
Protected Phases		2	3		6		3	8		7	4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)		20.0	33.0		20.0	20.0	48.1	47.1		41.0	41.0	
Effective Green, g (s)		21.0	35.0		21.0	21.0	49.1	49.1		42.0	43.0	
Actuated g/C Ratio		0.23	0.39		0.23	0.23	0.55	0.55		0.47	0.48	
Clearance Time (s)		5.0	5.0		5.0	5.0	5.0	6.0		5.0	6.0	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		323	670		225	326	331	2576		229	2264	
v/s Ratio Prot			0.05				0.07	c0.26		0.04	c0.39	
v/s Ratio Perm		c0.14	0.09		0.00	0.00	0.19			0.19		
v/c Ratio		0.59	0.34		0.02	0.01	0.48	0.48		0.50	0.82	
Uniform Delay, d1		30.7	19.4		26.6	26.5	23.5	12.6		15.3	20.2	
Progression Factor		0.84	0.76		1.00	1.00	0.63	0.67		1.26	0.66	
Incremental Delay, d2		7.4	0.3		0.1	0.0	1.1	0.6		0.2	0.3	
Delay (s)		33.2	15.0		26.7	26.5	15.9	9.0		19.5	13.6	
Level of Service		C	B		C	C	B	A		B	B	
Approach Delay (s)		23.2			26.6			9.8			13.9	
Approach LOS		C			C			A			B	

Intersection Summary			
HCM Average Control Delay	13.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	70.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	315	3	416	1	13	3	98	408	1	0	725	489
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	9	12	12	10	12	11	9	12	12	10	10
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95			1.00	1.00
Frpb, ped/bikes	1.00	0.97			1.00		1.00	1.00			1.00	1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00			1.00	1.00
Frt	1.00	0.85			0.98		1.00	1.00			1.00	0.85
Flt Protected	0.95	1.00			0.99		0.95	1.00			1.00	1.00
Satd. Flow (prot)	1619	1415			1715		1745	2926			1689	1507
Flt Permitted	0.66	1.00			0.85		0.17	1.00			1.00	1.00
Satd. Flow (perm)	1116	1415			1465		305	2926			1689	1507
Peak-hour factor, PHF	0.85	0.75	0.94	0.25	0.75	0.75	0.75	0.88	0.25	0.92	0.98	0.93
Adj. Flow (vph)	371	4	443	4	17	4	131	464	4	0	740	526
RTOR Reduction (vph)	0	119	0	0	4	0	0	0	0	0	0	265
Lane Group Flow (vph)	371	328	0	0	21	0	131	468	0	0	740	261
Confl. Peds. (#/hr)	4		3	3		4						
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	11%	0%	0%	5%	0%
Turn Type	pm+pt			Perm			pm+pt			Perm		Perm
Protected Phases	7	4			8		5	2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	28.3	28.3			5.2		52.7	51.7			43.7	43.7
Effective Green, g (s)	28.3	29.3			6.2		52.7	52.7			44.7	44.7
Actuated g/C Ratio	0.31	0.33			0.07		0.59	0.59			0.50	0.50
Clearance Time (s)	4.0	5.0			5.0		4.0	5.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	458	461			101		243	1713			839	748
v/s Ratio Prot	c0.17	0.23					c0.02	0.16			c0.44	
v/s Ratio Perm	c0.08				0.01		0.29					0.17
v/c Ratio	0.81	0.71			0.21		0.54	0.27			0.88	0.35
Uniform Delay, d1	27.5	26.6			39.6		28.8	9.2			20.3	13.8
Progression Factor	1.00	1.00			1.00		1.26	1.40			0.80	1.06
Incremental Delay, d2	10.4	5.1			1.0		2.1	0.4			5.2	0.5
Delay (s)	37.9	31.8			40.6		38.4	13.2			21.4	15.1
Level of Service	D	C			D		D	B			C	B
Approach Delay (s)		34.6			40.6			18.7			18.8	
Approach LOS		C			D			B			B	

Intersection Summary			
HCM Average Control Delay	23.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	85.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	283	7	407	3	4	4	159	423	7	3	812	216
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	11	11	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	5.0
Lane Util. Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.97			0.99		1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.86			0.96		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1714	1536			1712		1728	1813		1743	1818	1487
Flt Permitted	0.74	1.00			0.65		0.08	1.00		0.39	1.00	1.00
Satd. Flow (perm)	1338	1536			1128		145	1813		713	1818	1487
Peak-hour factor, PHF	0.76	0.38	0.84	0.38	0.50	0.50	0.78	0.86	0.75	0.75	0.90	0.73
Adj. Flow (vph)	372	18	485	8	8	8	204	492	9	4	902	296
RTOR Reduction (vph)	0	160	0	0	6	0	0	1	0	0	0	145
Lane Group Flow (vph)	372	343	0	0	18	0	204	500	0	4	902	152
Confl. Peds. (#/hr)	1		3	3		1			1	1		
Heavy Vehicles (%)	5%	0%	3%	0%	0%	0%	1%	1%	0%	0%	1%	5%
Turn Type	Perm			Perm			pm+pt			Perm		Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	24.0	24.0			24.0		56.0	56.0		45.0	45.0	45.0
Effective Green, g (s)	25.0	25.0			25.0		57.0	57.0		46.0	46.0	45.0
Actuated g/C Ratio	0.28	0.28			0.28		0.63	0.63		0.51	0.51	0.50
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0		5.0	5.0	5.0
Lane Grp Cap (vph)	372	427			313		215	1148		364	929	744
v/s Ratio Prot		0.22					c0.07	0.28			0.50	
v/s Ratio Perm	c0.28				0.02		c0.53			0.01		0.10
v/c Ratio	1.00	0.80			0.06		0.95	0.44		0.01	0.97	0.20
Uniform Delay, d1	32.5	30.2			23.9		35.5	8.4		10.8	21.4	12.5
Progression Factor	0.89	0.80			1.00		0.60	0.32		0.65	0.85	0.49
Incremental Delay, d2	45.7	14.3			0.4		42.4	0.9		0.0	18.2	0.4
Delay (s)	74.7	38.5			24.2		63.7	3.6		7.1	36.4	6.5
Level of Service	E	D			C		E	A		A	D	A
Approach Delay (s)		53.9			24.2			21.0			29.0	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM Average Control Delay	34.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	87.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	9	0	74	3	93	0	293	252	247	450	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0	4.0		4.0	
Lane Util. Factor		1.00			1.00			0.95	1.00		0.95	
Frt		1.00			0.93			1.00	0.85		1.00	
Flt Protected		1.00			0.98			1.00	1.00		0.98	
Satd. Flow (prot)		1429			1591			3312	1553		3394	
Flt Permitted		1.00			0.87			1.00	1.00		0.74	
Satd. Flow (perm)		1429			1418			3312	1553		2569	
Peak-hour factor, PHF	0.25	0.63	0.25	0.76	0.25	0.79	0.92	0.95	0.82	0.94	0.85	0.25
Adj. Flow (vph)	0	14	0	97	12	118	0	308	307	263	529	4
RTOR Reduction (vph)	0	0	0	0	73	0	0	0	171	0	1	0
Lane Group Flow (vph)	0	14	0	0	154	0	0	308	136	0	795	0
Heavy Vehicles (%)	0%	33%	0%	9%	43%	5%	0%	9%	4%	1%	6%	50%
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		16.0			16.0			19.0	19.0		19.0	
Effective Green, g (s)		17.0			17.0			20.0	20.0		20.0	
Actuated g/C Ratio		0.38			0.38			0.44	0.44		0.44	
Clearance Time (s)		5.0			5.0			5.0	5.0		5.0	
Lane Grp Cap (vph)		540			536			1472	690		1142	
v/s Ratio Prot		0.01						0.09				
v/s Ratio Perm					c0.11				0.09		c0.31	
v/c Ratio		0.03			0.29			0.21	0.20		0.70	
Uniform Delay, d1		8.8			9.8			7.7	7.6		10.1	
Progression Factor		1.00			0.57			1.00	1.00		1.00	
Incremental Delay, d2		0.1			1.1			0.3	0.6		3.5	
Delay (s)		8.9			6.6			8.0	8.3		13.6	
Level of Service		A			A			A	A		B	
Approach Delay (s)		8.9			6.6			8.1			13.6	
Approach LOS		A			A			A			B	

Intersection Summary			
HCM Average Control Delay	10.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	57	107	3	2	23	9	4	303	36	13	432	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	11	12	12	12	12	12	10	12
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00			0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.99			0.97		1.00	0.98		1.00	0.99	
Flt Protected		0.98			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1778			1719		1805	1827		1736	1743	
Flt Permitted		0.88			0.98		0.39	1.00		0.48	1.00	
Satd. Flow (perm)		1596			1694		748	1827		879	1743	
Peak-hour factor, PHF	0.77	0.81	0.38	0.50	0.66	0.67	0.50	0.93	0.75	0.75	0.93	0.54
Adj. Flow (vph)	74	132	8	4	35	13	8	326	48	17	465	26
RTOR Reduction (vph)	0	1	0	0	9	0	0	6	0	0	2	0
Lane Group Flow (vph)	0	213	0	0	43	0	8	368	0	17	489	0
Confl. Peds. (#/hr)	4		5	5		4						
Heavy Vehicles (%)	0%	1%	0%	0%	0%	8%	0%	2%	2%	4%	1%	0%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		28.0			28.0		52.0	52.0		52.0	52.0	
Effective Green, g (s)		29.0			29.0		53.0	53.0		53.0	53.0	
Actuated g/C Ratio		0.32			0.32		0.59	0.59		0.59	0.59	
Clearance Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)		514			546		440	1076		518	1026	
v/s Ratio Prot								0.20			c0.28	
v/s Ratio Perm		c0.13			0.03		0.01			0.02		
v/c Ratio		0.41			0.08		0.02	0.34		0.03	0.48	
Uniform Delay, d1		23.9			21.2		7.7	9.5		7.8	10.6	
Progression Factor		1.00			1.00		0.52	0.54		0.74	0.75	
Incremental Delay, d2		2.4			0.3		0.1	0.9		0.1	1.3	
Delay (s)		26.3			21.5		4.1	6.0		5.9	9.2	
Level of Service		C			C		A	A		A	A	
Approach Delay (s)		26.3			21.5			5.9			9.1	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM Average Control Delay	11.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.9%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBL2	SBL	SBR	NWL	NWR	NWR2	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	6	1531	118	231	900	28	134	22	510	19	8	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	10	12	12	10	10	10	12	11	12
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	
Lane Util. Factor	1.00	0.94		1.00	0.76			1.00	1.00		1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.99		0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.97	1.00		0.99	
Frt	1.00	0.99		1.00	0.85			1.00	0.85		0.97	
Flt Protected	0.95	0.96		0.95	1.00			0.96	1.00		0.98	
Satd. Flow (prot)	1745	4998		1685	3449			1653	1486		1692	
Flt Permitted	0.21	0.96		0.09	1.00			0.74	1.00		0.50	
Satd. Flow (perm)	389	4998		151	3449			1273	1486		870	
Peak-hour factor, PHF	0.62	0.95	0.83	0.25	0.90	0.69	0.84	0.63	0.93	0.71	0.58	0.33
Adj. Flow (vph)	10	1612	142	924	1000	41	160	35	548	27	14	12
RTOR Reduction (vph)	0	8	0	0	2	0	0	0	0	0	8	0
Lane Group Flow (vph)	10	1746	0	924	1039	0	0	195	548	0	45	0
Confl. Peds. (#/hr)			5	5			17		20	20		17
Heavy Vehicles (%)	0%	1%	0%	0%	7%	1%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt				custom		Perm		pm+ov	Perm		
Protected Phases	1	6		5	2			4	5		8	
Permitted Phases	6			2			4		4	8		
Actuated Green, G (s)	42.8	42.0		105.0	99.2			17.0	75.0		17.0	
Effective Green, g (s)	44.8	45.0		106.0	102.2			18.0	77.0		18.0	
Actuated g/C Ratio	0.33	0.34		0.79	0.76			0.13	0.57		0.13	
Clearance Time (s)	5.0	7.0		5.0	7.0			5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	148	1678		795	2631			171	898		117	
v/s Ratio Prot	0.00	0.35		c0.51	0.30				0.27			
v/s Ratio Perm	0.02			c0.41				c0.15	0.10		0.05	
v/c Ratio	0.07	1.04		1.16	0.39			1.14	0.61		0.39	
Uniform Delay, d1	30.5	44.5		33.5	5.4			58.0	18.7		53.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.2	33.3		86.7	0.4			111.6	1.2		2.1	
Delay (s)	30.7	77.8		120.2	5.8			169.6	19.8		55.1	
Level of Service	C	E		F	A			F	B		E	
Approach Delay (s)		77.6		59.6				59.1			55.1	
Approach LOS		E		E				E			E	

Intersection Summary			
HCM Average Control Delay	66.5	HCM Level of Service	E
HCM Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	134.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	66.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	73	26	107	11	235	1	856	75	410	1532	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	14	14	14	14	14	14	10	10	10	10	10	10
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.87		1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1917	1721		1925	1723		1348	4691		1685	4786	
Flt Permitted	0.43	1.00		0.30	1.00		0.18	1.00		0.95	1.00	
Satd. Flow (perm)	862	1721		610	1723		258	4691		1685	4786	
Peak-hour factor, PHF	0.50	0.25	0.25	0.56	0.25	0.93	0.25	0.88	0.78	0.88	0.87	0.65
Adj. Flow (vph)	30	292	104	191	44	253	4	973	96	466	1761	11
RTOR Reduction (vph)	0	11	0	0	0	0	0	13	0	0	1	0
Lane Group Flow (vph)	30	385	0	191	297	0	4	1056	0	466	1771	0
Confl. Peds. (#/hr)	5					5	3					3
Heavy Vehicles (%)	0%	0%	50%	0%	0%	1%	25%	2%	0%	0%	1%	7%
Turn Type	Perm			Perm			Perm			Prot		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2					
Actuated Green, G (s)	29.0	29.0		29.0	29.0		19.0	19.0		25.0	49.0	
Effective Green, g (s)	30.0	30.0		30.0	30.0		22.0	22.0		26.0	52.0	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.24	0.24		0.29	0.58	
Clearance Time (s)	5.0	5.0		5.0	5.0		7.0	7.0		5.0	7.0	
Lane Grp Cap (vph)	287	574		203	574		63	1147		487	2765	
v/s Ratio Prot		0.22			0.17			c0.23		c0.28	0.37	
v/s Ratio Perm	0.03			c0.31			0.02					
v/c Ratio	0.10	0.67		0.94	0.52		0.06	0.92		0.96	0.64	
Uniform Delay, d1	20.7	25.8		29.1	24.2		26.1	33.2		31.4	12.7	
Progression Factor	1.00	1.00		1.00	1.00		0.31	0.32		0.56	0.26	
Incremental Delay, d2	0.7	6.1		49.4	3.3		0.9	7.1		28.0	1.0	
Delay (s)	21.5	31.9		78.5	27.5		8.9	17.8		45.8	4.3	
Level of Service	C	C		E	C		A	B		D	A	
Approach Delay (s)		31.1			47.5			17.8			12.9	
Approach LOS		C			D			B			B	

Intersection Summary			
HCM Average Control Delay	20.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	411	461	529	402	139	867
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	13	13	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	0.88	1.00	0.91
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1680	1503	3252	2561	1626	4673
Flt Permitted	0.95	1.00	1.00	1.00	0.24	1.00
Satd. Flow (perm)	1680	1503	3252	2561	405	4673
Peak-hour factor, PHF	0.94	0.91	0.83	0.84	0.88	0.87
Adj. Flow (vph)	437	507	637	479	158	997
RTOR Reduction (vph)	0	199	0	325	0	0
Lane Group Flow (vph)	437	308	637	154	158	997
Turn Type		Perm		Perm	pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Actuated Green, G (s)	37.0	37.0	28.0	28.0	43.0	43.0
Effective Green, g (s)	38.0	38.0	29.0	29.0	44.0	44.0
Actuated g/C Ratio	0.42	0.42	0.32	0.32	0.49	0.49
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	709	635	1048	825	347	2285
v/s Ratio Prot	c0.26		c0.20		0.06	c0.21
v/s Ratio Perm		0.20		0.06	0.17	
v/c Ratio	0.62	0.48	0.61	0.19	0.46	0.44
Uniform Delay, d1	20.3	18.9	25.7	22.0	14.4	14.9
Progression Factor	1.00	1.00	0.26	0.04	1.00	1.00
Incremental Delay, d2	4.0	2.6	2.1	0.4	4.3	0.6
Delay (s)	24.3	21.5	8.7	1.3	18.7	15.6
Level of Service	C	C	A	A	B	B
Approach Delay (s)	22.8		5.5			16.0
Approach LOS	C		A			B

Intersection Summary			
HCM Average Control Delay	14.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	55.1%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	122	2	921	5	0	5	0	1009	34	40	1016	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	14	12	12	12	12	11	12	12	12	12
Total Lost time (s)		5.0	4.0	4.0		4.0		4.0	5.0		4.0	
Lane Util. Factor		1.00	1.00	1.00		1.00		0.91	1.00		0.95	
Frt		1.00	0.85	1.00		0.85		1.00	0.85		1.00	
Flt Protected		0.95	1.00	0.95		1.00		1.00	1.00		1.00	
Satd. Flow (prot)		1808	1723	1626		1455		4964	1455		3587	
Flt Permitted		0.95	1.00	0.66		1.00		1.00	1.00		0.77	
Satd. Flow (perm)		1808	1723	1136		1455		4964	1455		2785	
Peak-hour factor, PHF	0.84	0.92	0.94	0.92	0.92	0.92	0.92	0.89	0.92	0.92	0.99	0.92
Adj. Flow (vph)	145	2	980	5	0	5	0	1134	37	43	1026	0
RTOR Reduction (vph)	0	0	248	0	0	4	0	0	25	0	0	0
Lane Group Flow (vph)	0	147	732	5	0	1	0	1134	12	0	1069	0
Heavy Vehicles (%)	0%	11%	0%	11%	11%	11%	0%	1%	11%	11%	0%	0%
Turn Type	Split		Perm	custom		custom			Perm	Perm		
Protected Phases	4	4						2			6	
Permitted Phases			4	8		8			2	6		
Actuated Green, G (s)		30.0	30.0	16.0		16.0		30.0	30.0		30.0	
Effective Green, g (s)		30.0	31.0	16.0		16.0		31.0	30.0		31.0	
Actuated g/C Ratio		0.33	0.34	0.18		0.18		0.34	0.33		0.34	
Clearance Time (s)		5.0	5.0	4.0		4.0		5.0	5.0		5.0	
Lane Grp Cap (vph)		603	593	202		259		1710	485		959	
v/s Ratio Prot		0.08						0.23				
v/s Ratio Perm			c0.42	c0.00		0.00			0.01		c0.38	
v/c Ratio		0.24	1.23	0.02		0.00		0.66	0.03		1.11	
Uniform Delay, d1		21.8	29.5	30.6		30.4		25.1	20.2		29.5	
Progression Factor		1.00	1.00	1.00		1.00		0.98	1.32		0.66	
Incremental Delay, d2		1.0	119.3	0.2		0.0		1.8	0.1		64.5	
Delay (s)		22.7	148.8	30.8		30.5		26.4	26.6		84.1	
Level of Service		C	F	C		C		C	C		F	
Approach Delay (s)		132.3			30.6			26.4			84.1	
Approach LOS		F			C			C			F	

Intersection Summary			
HCM Average Control Delay	80.0	HCM Level of Service	F
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	99.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	98	53	1095	33	59	1838
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	0.91		1.00	0.91
Frt	1.00	0.85	1.00		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1626	1455	4652		1626	4673
Flt Permitted	0.95	1.00	1.00		0.20	1.00
Satd. Flow (perm)	1626	1455	4652		341	4673
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	107	58	1190	36	64	1998
RTOR Reduction (vph)	0	46	4	0	0	0
Lane Group Flow (vph)	107	12	1222	0	64	1998
Turn Type		Perm			Perm	
Protected Phases	8		2			6
Permitted Phases		8			6	
Actuated Green, G (s)	19.0	19.0	63.0		63.0	63.0
Effective Green, g (s)	19.0	19.0	63.0		63.0	63.0
Actuated g/C Ratio	0.21	0.21	0.70		0.70	0.70
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Lane Grp Cap (vph)	343	307	3256		239	3271
v/s Ratio Prot	c0.07		0.26			c0.43
v/s Ratio Perm		0.01			0.19	
v/c Ratio	0.31	0.04	0.38		0.27	0.61
Uniform Delay, d1	30.0	28.2	5.5		5.0	7.1
Progression Factor	1.00	1.00	0.19		0.27	0.20
Incremental Delay, d2	2.4	0.2	0.2		1.8	0.6
Delay (s)	32.3	28.5	1.2		3.1	2.0
Level of Service	C	C	A		A	A
Approach Delay (s)	31.0		1.2			2.0
Approach LOS	C		A			A

Intersection Summary			
HCM Average Control Delay	3.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	47.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

SYNCHRO REPORTS

BASELINE SCENARIO

2030 PM Peak Hour
HCM Level of Service Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	160	199	64	522	367	142	62	1380	221	246	1152	109
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	12	10	10	11	10	10	10	10	10	10
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.91		0.97	0.91	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1636	1773	1615	3173	1722	1539	1178	4650		3204	4666	
Flt Permitted	0.95	1.00	1.00	0.27	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1636	1773	1615	897	1722	1539	1178	4650		3204	4666	
Peak-hour factor, PHF	0.91	0.63	0.65	0.84	0.73	0.84	0.75	0.84	0.85	0.78	0.94	0.75
Adj. Flow (vph)	176	316	98	621	503	169	83	1643	260	315	1226	145
RTOR Reduction (vph)	0	0	73	0	0	111	0	18	0	0	12	0
Lane Group Flow (vph)	176	316	25	621	503	58	83	1885	0	315	1359	0
Confl. Peds. (#/hr)	1					1			3	3		
Heavy Vehicles (%)	3%	0%	0%	3%	3%	0%	43%	2%	0%	2%	2%	3%
Turn Type	Prot		Perm	pm+pt		Perm	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4	8		8						
Actuated Green, G (s)	12.0	30.0	30.0	48.0	33.0	33.0	11.0	44.0		11.0	44.0	
Effective Green, g (s)	13.0	31.0	31.0	50.0	34.0	34.0	12.0	45.0		12.0	45.0	
Actuated g/C Ratio	0.11	0.26	0.26	0.42	0.28	0.28	0.10	0.38		0.10	0.38	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	177	458	417	677	488	436	118	1744		320	1750	
v/s Ratio Prot	0.11	0.18		c0.12	c0.29		0.07	c0.41		c0.10	0.29	
v/s Ratio Perm			0.02	0.26		0.04						
v/c Ratio	0.99	0.69	0.06	0.92	1.03	0.13	0.70	1.08		0.98	0.78	
Uniform Delay, d1	53.5	40.2	33.5	28.3	43.0	32.0	52.3	37.5		53.9	33.1	
Progression Factor	1.19	0.98	1.18	1.00	1.00	1.00	1.14	0.55		1.14	0.79	
Incremental Delay, d2	58.9	6.6	0.2	19.4	48.9	0.6	15.3	42.0		40.5	2.7	
Delay (s)	122.5	45.9	39.8	47.7	91.9	32.7	75.0	62.6		102.2	28.9	
Level of Service	F	D	D	D	F	C	E	E		F	C	
Approach Delay (s)		67.7			62.9			63.1			42.6	
Approach LOS		E			E			E			D	

Intersection Summary			
HCM Average Control Delay	57.3	HCM Level of Service	E
HCM Volume to Capacity ratio	1.06		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	80.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	79	197	171	223	314	10	239	1591	67	7	1500	96
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	9	12	12	9	12	10	10	10	10	10	10
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95			0.95		1.00	0.91		1.00	0.91	
Frpb, ped/bikes		0.99			1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.94			1.00		1.00	0.99		1.00	0.99	
Flt Protected		0.99			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		2874			3060		1636	4620		1685	4656	
Flt Permitted		0.62			0.53		0.10	1.00		0.10	1.00	
Satd. Flow (perm)		1808			1658		168	4620		173	4656	
Peak-hour factor, PHF	0.69	0.83	0.73	0.70	0.84	0.50	0.70	0.83	0.70	0.75	0.89	0.53
Adj. Flow (vph)	114	237	234	319	374	20	341	1917	96	9	1685	181
RTOR Reduction (vph)	0	95	0	0	2	0	0	5	0	0	11	0
Lane Group Flow (vph)	0	490	0	0	711	0	341	2009	0	9	1855	0
Confl. Peds. (#/hr)	2		1	1		2	2		3	3		2
Heavy Vehicles (%)	3%	4%	6%	4%	3%	0%	3%	4%	3%	0%	2%	5%
Turn Type	Perm			pm+pt			pm+pt			pm+pt		
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		33.0			42.0		59.0	59.0		45.0	45.0	
Effective Green, g (s)		34.0			43.0		60.0	60.0		46.0	46.0	
Actuated g/C Ratio		0.28			0.36		0.50	0.50		0.38	0.38	
Clearance Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)		512			653		316	2310		129	1785	
v/s Ratio Prot					c0.05		c0.17	0.43		0.00	c0.40	
v/s Ratio Perm		0.27			c0.35		c0.37			0.02		
v/c Ratio		0.96			1.71dl		1.08	0.87		0.07	1.04	
Uniform Delay, d1		42.3			38.5		45.1	26.5		28.7	37.0	
Progression Factor		0.62			1.00		0.97	0.99		0.53	0.64	
Incremental Delay, d2		26.8			61.9		51.8	1.5		0.6	27.6	
Delay (s)		53.2			100.4		95.8	27.8		15.7	51.1	
Level of Service		D			F		F	C		B	D	
Approach Delay (s)		53.2			100.4			37.6			51.0	
Approach LOS		D			F			D			D	

Intersection Summary			
HCM Average Control Delay	51.9	HCM Level of Service	D
HCM Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	86.5%	ICU Level of Service	E
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	94	229	97	190	307	75	118	1550	151	68	1511	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	10	12	12	9	12	12	11	12	12	10	12
Total Lost time (s)	4.0	4.0			4.0			4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00			0.95			0.91	1.00	1.00	0.91	
Frpb, ped/bikes	1.00	0.99			1.00			1.00	0.96	1.00	1.00	
Flpb, ped/bikes	1.00	1.00			1.00			1.00	1.00	1.00	1.00	
Frt	1.00	0.93			0.98			1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00			0.98			0.99	1.00	0.95	1.00	
Satd. Flow (prot)	1608	1627			3067			4939	1538	1787	4734	
Flt Permitted	0.22	1.00			0.54			0.64	1.00	0.06	1.00	
Satd. Flow (perm)	380	1627			1684			3176	1538	112	4734	
Peak-hour factor, PHF	0.67	0.93	0.50	0.79	0.81	0.91	0.46	0.91	0.91	0.67	0.91	0.59
Adj. Flow (vph)	140	246	194	241	379	82	257	1703	166	101	1660	108
RTOR Reduction (vph)	0	15	0	0	9	0	0	0	76	0	6	0
Lane Group Flow (vph)	140	425	0	0	693	0	0	1960	90	101	1762	0
Confl. Peds. (#/hr)	3		1	1		3	18		5	5		18
Heavy Vehicles (%)	1%	2%	0%	3%	2%	0%	0%	1%	1%	1%	1%	1%
Turn Type	Perm			Perm			Perm		Perm	pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	39.0	39.0			39.0			62.0	62.0	71.0	71.0	
Effective Green, g (s)	40.0	40.0			40.0			63.0	63.0	72.0	72.0	
Actuated g/C Ratio	0.33	0.33			0.33			0.52	0.52	0.60	0.60	
Clearance Time (s)	5.0	5.0			5.0			5.0	5.0	5.0	5.0	
Lane Grp Cap (vph)	127	542			561			1667	807	137	2840	
v/s Ratio Prot		0.26								0.03	c0.37	
v/s Ratio Perm	0.37				c0.41			c0.62	0.06	0.41		
v/c Ratio	1.10	0.78			1.77dl			3.47dl	0.11	0.74	0.62	
Uniform Delay, d1	40.0	36.1			40.0			28.5	14.4	39.8	15.3	
Progression Factor	0.95	0.96			1.00			0.81	0.43	0.34	0.12	
Incremental Delay, d2	109.4	10.7			120.9			85.1	0.2	3.2	0.1	
Delay (s)	147.6	45.2			160.9			108.1	6.4	16.6	1.9	
Level of Service	F	D			F			F	A	B	A	
Approach Delay (s)		69.9			160.9			100.2			2.7	
Approach LOS		E			F			F			A	

Intersection Summary			
HCM Average Control Delay	70.4	HCM Level of Service	E
HCM Volume to Capacity ratio	1.14		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	110.8%	ICU Level of Service	H
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	275	225	829	251	76	732
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11
Total Lost time (s)	4.0	5.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	0.98	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.97		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1678	1494	1722		1728	1801
Flt Permitted	0.95	1.00	1.00		0.07	1.00
Satd. Flow (perm)	1678	1494	1722		120	1801
Peak-hour factor, PHF	0.75	0.74	0.89	0.90	0.85	0.90
Adj. Flow (vph)	367	304	931	279	89	813
RTOR Reduction (vph)	0	162	9	0	0	0
Lane Group Flow (vph)	367	142	1201	0	89	813
Confl. Peds. (#/hr)		1		1	1	
Heavy Vehicles (%)	4%	2%	3%	2%	1%	2%
Turn Type		Perm			Perm	
Protected Phases	8		2			6
Permitted Phases		8			6	
Actuated Green, G (s)	24.0	24.0	86.0		86.0	86.0
Effective Green, g (s)	25.0	24.0	87.0		87.0	87.0
Actuated g/C Ratio	0.21	0.20	0.72		0.72	0.72
Clearance Time (s)	5.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	350	299	1248		87	1306
v/s Ratio Prot	c0.22		0.70			0.45
v/s Ratio Perm		0.09			c0.74	
v/c Ratio	1.05	0.47	0.96		1.02	0.62
Uniform Delay, d1	47.5	42.4	15.0		16.5	8.3
Progression Factor	0.62	0.38	0.74		0.73	0.32
Incremental Delay, d2	41.5	0.4	12.2		90.1	1.7
Delay (s)	71.1	16.5	23.3		102.1	4.3
Level of Service	E	B	C		F	A
Approach Delay (s)	46.3		23.3			14.0
Approach LOS	D		C			B

Intersection Summary			
HCM Average Control Delay	25.8	HCM Level of Service	C
HCM Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	85.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	5	0	7	0	1008	18	7	825	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor				1.00	1.00			1.00		1.00	1.00	
Frt				1.00	0.85			1.00		1.00	1.00	
Flt Protected				0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)				1626	1455			1707		1626	1712	
Flt Permitted				0.76	1.00			1.00		0.17	1.00	
Satd. Flow (perm)				1296	1455			1707		293	1712	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	0	5	0	8	0	1096	20	8	897	0
RTOR Reduction (vph)	0	0	0	0	7	0	0	1	0	0	0	0
Lane Group Flow (vph)	0	0	0	5	1	0	0	1115	0	8	897	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)				16.0	16.0			96.0		96.0	96.0	
Effective Green, g (s)				16.0	16.0			96.0		96.0	96.0	
Actuated g/C Ratio				0.13	0.13			0.80		0.80	0.80	
Clearance Time (s)				4.0	4.0			4.0		4.0	4.0	
Lane Grp Cap (vph)				173	194			1366		234	1370	
v/s Ratio Prot					0.00			c0.65			0.52	
v/s Ratio Perm				c0.00						0.03		
v/c Ratio				0.03	0.01			0.82		0.03	0.65	
Uniform Delay, d1				45.2	45.1			6.9		2.5	5.0	
Progression Factor				0.78	1.00			0.69		0.40	0.62	
Incremental Delay, d2				0.3	0.1			2.5		0.2	1.8	
Delay (s)				35.4	45.2			7.3		1.2	4.9	
Level of Service				D	D			A		A	A	
Approach Delay (s)		0.0			41.4			7.3			4.8	
Approach LOS		A			D			A			A	

Intersection Summary			
HCM Average Control Delay	6.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	64.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	23	12	1	149	13	403	9	796	58	220	775	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	10	12	10	12	11	12	12	11	12
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00	0.97		1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected		0.97	1.00		0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1844	1571		1807	1492	1805	1781		1787	1807	
Flt Permitted		0.97	1.00		0.96	1.00	0.17	1.00		0.06	1.00	
Satd. Flow (perm)		1844	1571		1807	1492	323	1781		106	1807	
Peak-hour factor, PHF	0.63	0.50	0.75	0.81	0.40	0.81	0.94	0.82	0.75	0.90	0.91	0.73
Adj. Flow (vph)	37	24	1	184	32	498	10	971	77	244	852	40
RTOR Reduction (vph)	0	0	1	0	0	178	0	2	0	0	1	0
Lane Group Flow (vph)	0	61	0	0	216	320	10	1046	0	244	891	0
Confl. Peds. (#/hr)			2	2								
Heavy Vehicles (%)	0%	0%	0%	1%	0%	1%	0%	2%	2%	1%	1%	0%
Turn Type	Split		Perm	Split		pm+ov	Perm			pm+pt		
Protected Phases	8	8		4	4	1		2		1	6	
Permitted Phases			8			4	2			6		
Actuated Green, G (s)		8.1	8.1		15.6	25.6	66.3	66.3		81.3	81.3	
Effective Green, g (s)		9.1	9.1		16.6	27.6	67.3	67.3		82.3	82.3	
Actuated g/C Ratio		0.08	0.08		0.14	0.23	0.56	0.56		0.69	0.69	
Clearance Time (s)		5.0	5.0		5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		140	119		250	393	181	999		227	1239	
v/s Ratio Prot		c0.03			0.12	c0.07		0.59		c0.10	0.49	
v/s Ratio Perm			0.00			0.14	0.03			c0.64		
v/c Ratio		0.44	0.00		0.86	0.81	0.06	1.05		1.07	0.72	
Uniform Delay, d1		53.0	51.2		50.6	43.8	11.9	26.4		51.2	11.7	
Progression Factor		1.00	1.00		0.89	0.75	0.84	0.74		0.58	0.25	
Incremental Delay, d2		2.2	0.0		3.0	1.2	0.5	39.9		61.7	1.7	
Delay (s)		55.2	51.2		48.2	34.3	10.6	59.4		91.6	4.6	
Level of Service		E	D		D	C	B	E		F	A	
Approach Delay (s)		55.1			38.5			58.9			23.3	
Approach LOS		E			D			E			C	

Intersection Summary			
HCM Average Control Delay	40.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	84.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	41	72	4	32	167	171	8	528	41	117	497	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	14	12	12	9	9	12	11	12	12	12	12
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.99			1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected		0.98			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1874			1628	1439	1805	1768		1770	1843	
Flt Permitted		0.76			0.93	1.00	0.33	1.00		0.27	1.00	
Satd. Flow (perm)		1450			1521	1439	628	1768		509	1843	
Peak-hour factor, PHF	0.56	0.83	0.58	0.75	0.79	0.79	0.50	0.85	0.85	0.86	0.92	0.44
Adj. Flow (vph)	73	87	7	43	211	216	16	621	48	136	540	48
RTOR Reduction (vph)	0	3	0	0	0	151	0	5	0	0	5	0
Lane Group Flow (vph)	0	164	0	0	254	65	16	664	0	136	583	0
Heavy Vehicles (%)	6%	5%	0%	0%	5%	1%	0%	3%	0%	2%	2%	0%
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		17.0			17.0	17.0	33.0	33.0		33.0	33.0	
Effective Green, g (s)		18.0			18.0	18.0	34.0	34.0		34.0	34.0	
Actuated g/C Ratio		0.30			0.30	0.30	0.57	0.57		0.57	0.57	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)		435			456	432	356	1002		288	1044	
v/s Ratio Prot								c0.38			0.32	
v/s Ratio Perm		0.11			c0.17	0.05	0.03			0.27		
v/c Ratio		0.38			0.56	0.15	0.04	0.66		0.47	0.56	
Uniform Delay, d1		16.6			17.6	15.4	5.8	9.0		7.7	8.2	
Progression Factor		1.00			0.91	0.94	1.07	1.02		1.07	1.13	
Incremental Delay, d2		2.5			0.4	0.1	0.2	3.2		3.6	1.4	
Delay (s)		19.1			16.6	14.5	6.4	12.5		11.9	10.8	
Level of Service		B			B	B	A	B		B	B	
Approach Delay (s)		19.1			15.6			12.3			11.0	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	13.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	66.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	SBL	SBR	NWL	NWR
Lane Configurations						
Volume (vph)	0	244	479	13	520	459
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	10	9	12	10	9
Total Lost time (s)		4.0	4.0		4.0	4.0
Lane Util. Factor		0.88	0.97		1.00	1.00
Frt		0.85	0.99		1.00	0.85
Flt Protected		1.00	0.95		0.95	1.00
Satd. Flow (prot)		2627	3088		1636	1425
Flt Permitted		1.00	0.95		0.95	1.00
Satd. Flow (perm)		2627	3088		1636	1425
Peak-hour factor, PHF	0.55	0.84	0.92	0.63	0.86	0.93
Adj. Flow (vph)	0	290	521	21	605	494
RTOR Reduction (vph)	0	77	3	0	0	0
Lane Group Flow (vph)	0	213	539	0	605	494
Heavy Vehicles (%)	13%	1%	2%	0%	3%	2%
Turn Type		custom				pt+ov
Protected Phases			6		8	8 6
Permitted Phases		4				
Actuated Green, G (s)		74.0	36.0		74.0	120.0
Effective Green, g (s)		75.0	37.0		75.0	120.0
Actuated g/C Ratio		0.62	0.31		0.62	1.00
Clearance Time (s)		5.0	5.0		5.0	
Lane Grp Cap (vph)		1642	952		1023	1425
v/s Ratio Prot			c0.17		c0.37	0.35
v/s Ratio Perm		0.08				
v/c Ratio		0.13	0.57		0.59	0.35
Uniform Delay, d1		9.2	34.8		13.4	0.0
Progression Factor		1.00	1.14		0.61	1.00
Incremental Delay, d2		0.2	2.1		0.2	0.1
Delay (s)		9.3	41.6		8.4	0.1
Level of Service		A	D		A	A
Approach Delay (s)	9.3		41.6		4.6	
Approach LOS	A		D		A	

Intersection Summary			
HCM Average Control Delay	15.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL2	EBL	EBR	NBL2	NBL	NBR	SEL	SER	SER2	SWL	SWR	SWR2
Lane Configurations												
Volume (vph)	33	632	315	185	689	152	95	1181	15	200	893	261
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	10	10	12	10	10	12	11	11	12
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.94			0.97		1.00	0.95		1.00	0.76	
Frpb, ped/bikes	1.00	0.98			1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.94			0.97		0.89	0.85		1.00	0.85	
Flt Protected	0.95	0.97			0.96		0.99	1.00		0.95	1.00	
Satd. Flow (prot)	1678	4599			3139		1525	1383		1728	3539	
Flt Permitted	0.17	0.97			0.52		0.44	1.00		0.17	1.00	
Satd. Flow (perm)	307	4599			1711		682	1383		316	3539	
Peak-hour factor, PHF	0.90	0.94	0.79	0.75	0.93	0.74	0.78	0.90	0.81	0.94	0.91	0.36
Adj. Flow (vph)	37	672	399	247	741	205	122	1312	19	213	981	725
RTOR Reduction (vph)	0	82	0	0	15	0	0	1	0	0	111	0
Lane Group Flow (vph)	37	989	0	0	1178	0	476	976	0	213	1595	0
Confl. Peds. (#/hr)	10		12	1		2	2		1	12		10
Heavy Vehicles (%)	4%	1%	0%	4%	2%	1%	2%	2%	5%	1%	1%	0%
Turn Type	pm+pt			pm+pt				custom			custom	
Protected Phases	7	4		5	2					3	8	
Permitted Phases	4			2			6	6		8		
Actuated Green, G (s)	27.0	27.0			66.0		57.0	57.0		35.0	35.0	
Effective Green, g (s)	28.0	28.0			67.0		58.0	58.0		36.0	36.0	
Actuated g/C Ratio	0.23	0.23			0.56		0.48	0.48		0.30	0.30	
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	129	1073			1015		330	668		248	1062	
v/s Ratio Prot	0.01	c0.22			c0.05					0.09	c0.45	
v/s Ratio Perm	0.06				0.60		0.70	c0.71		0.16		
v/c Ratio	0.29	0.92			1.76dl		1.44	1.46		0.86	1.50	
Uniform Delay, d1	52.4	44.9			26.5		31.0	31.0		35.2	42.0	
Progression Factor	1.00	1.00			1.00		0.62	0.63		0.74	0.64	
Incremental Delay, d2	5.5	14.1			83.4		215.3	215.9		22.6	229.2	
Delay (s)	58.0	59.0			109.9		234.6	235.4		48.8	256.1	
Level of Service	E	E			F		F	F		D	F	
Approach Delay (s)		59.0			109.9		235.1			233.1		
Approach LOS		E			F		F			F		

Intersection Summary			
HCM Average Control Delay	173.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.41		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	105.4%	ICU Level of Service	G
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	209	114	39	124	131	81	63	1015	53	47	946	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	10	12	12	12	12	10	10	12	10	10	12
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.99			1.00		1.00	1.00	0.95
Flpb, ped/bikes	1.00	1.00		0.99	1.00			1.00		1.00	1.00	1.00
Frt	1.00	0.96		1.00	0.95			0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			1.00		0.95	1.00	1.00
Satd. Flow (prot)	1608	1695		1796	1778			3121		1652	1722	1541
Flt Permitted	0.19	1.00		0.64	1.00			0.57		0.15	1.00	1.00
Satd. Flow (perm)	322	1695		1210	1778			1797		265	1722	1541
Peak-hour factor, PHF	0.89	0.83	0.80	0.79	0.64	0.88	0.56	0.92	0.78	0.71	0.95	0.86
Adj. Flow (vph)	235	137	49	157	205	92	112	1103	68	66	996	107
RTOR Reduction (vph)	0	11	0	0	14	0	0	3	0	0	0	28
Lane Group Flow (vph)	235	175	0	157	283	0	0	1280	0	66	996	79
Confl. Peds. (#/hr)	2		3	3		2	7		2	2		7
Heavy Vehicles (%)	1%	0%	0%	0%	2%	0%	3%	7%	5%	2%	3%	0%
Turn Type	pm+pt			Perm			pm+pt			pm+pt		Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	28.0	28.0		16.0	16.0			71.8		82.0	80.0	80.0
Effective Green, g (s)	29.0	29.0		17.0	17.0			74.8		83.0	83.0	83.0
Actuated g/C Ratio	0.24	0.24		0.14	0.14			0.62		0.69	0.69	0.69
Clearance Time (s)	5.0	5.0		5.0	5.0			7.0		5.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	164	410		171	252			1120		232	1191	1066
v/s Ratio Prot	c0.10	0.10			0.16					0.01	c0.58	
v/s Ratio Perm	c0.25			0.13				c0.71		0.19		0.05
v/c Ratio	1.43	0.43		0.92	1.12			1.14		0.28	0.84	0.07
Uniform Delay, d1	43.0	38.5		50.8	51.5			22.6		18.3	13.5	6.0
Progression Factor	1.00	1.00		0.51	0.49			1.73		1.00	1.00	1.00
Incremental Delay, d2	226.1	0.7		26.7	77.1			70.1		0.7	7.0	0.1
Delay (s)	269.1	39.2		52.8	102.6			109.2		19.0	20.6	6.1
Level of Service	F	D		D	F			F		B	C	A
Approach Delay (s)		167.5			85.4			109.2			19.2	
Approach LOS		F			F			F			B	

Intersection Summary			
HCM Average Control Delay	81.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.17		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	110.8%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	218	2	250	40	15	70	336	1502	0	11	1352	149
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	10	10	10	10	10	10
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes		1.00	0.99		1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		0.99	1.00	1.00	1.00		1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	1.00		1.00	0.98	
Flt Protected		0.95	1.00		0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1788	1546		1674	1397	1636	4746		1652	4670	
Flt Permitted		0.64	1.00		0.45	1.00	0.08	1.00		0.09	1.00	
Satd. Flow (perm)		1201	1546		793	1397	141	4746		158	4670	
Peak-hour factor, PHF	0.81	0.75	0.81	0.50	0.92	0.63	0.85	0.82	0.58	0.83	0.94	0.77
Adj. Flow (vph)	269	3	309	80	16	111	395	1832	0	13	1438	194
RTOR Reduction (vph)	0	0	2	0	0	58	0	0	0	0	14	0
Lane Group Flow (vph)	0	272	307	0	96	53	395	1832	0	13	1618	0
Confl. Peds. (#/hr)	1		7	7		1	7		3	3		7
Heavy Vehicles (%)	1%	5%	3%	0%	50%	14%	3%	2%	0%	2%	1%	5%
Turn Type	Perm		pm+ov	Perm		Perm	pm+pt			pm+pt		
Protected Phases		2	3		6		3	8		7	4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)		31.5	61.0		31.5	31.5	78.5	70.9		44.6	43.0	
Effective Green, g (s)		32.5	63.0		32.5	32.5	79.5	72.9		46.6	45.0	
Actuated g/C Ratio		0.27	0.52		0.27	0.27	0.66	0.61		0.39	0.38	
Clearance Time (s)		5.0	5.0		5.0	5.0	5.0	6.0		5.0	6.0	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		325	863		215	378	473	2883		94	1751	
v/s Ratio Prot			0.09				c0.21	0.39		0.00	c0.35	
v/s Ratio Perm		c0.23	0.11		0.12	0.04	0.34			0.05		
v/c Ratio		0.84	0.36		0.45	0.14	0.84	0.64		0.14	0.92	
Uniform Delay, d1		41.3	16.6		36.3	33.2	34.5	15.1		41.1	35.9	
Progression Factor		1.04	1.02		1.00	1.00	0.54	0.30		0.82	0.79	
Incremental Delay, d2		21.5	0.2		6.6	0.8	10.9	1.0		0.5	7.0	
Delay (s)		64.4	17.3		42.9	33.9	29.5	5.6		33.9	35.5	
Level of Service		E	B		D	C	C	A		C	D	
Approach Delay (s)		39.3			38.1			9.8			35.5	
Approach LOS		D			D			A			D	

Intersection Summary			
HCM Average Control Delay	23.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	438	9	270	6	30	10	313	660	7	2	584	517
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	9	12	12	10	12	11	9	12	12	10	10
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95			1.00	1.00
Frpb, ped/bikes	1.00	0.97			1.00		1.00	1.00			1.00	1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00			1.00	1.00
Frt	1.00	0.86			0.98		1.00	0.99			1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00			1.00	1.00
Satd. Flow (prot)	1620	1420			1696		1745	2922			1689	1507
Flt Permitted	0.49	1.00			0.80		0.16	1.00			1.00	1.00
Satd. Flow (perm)	842	1420			1377		295	2922			1686	1507
Peak-hour factor, PHF	0.85	0.75	0.94	0.25	0.75	0.75	0.75	0.88	0.25	0.92	0.98	0.93
Adj. Flow (vph)	515	12	287	24	40	13	417	750	28	2	596	556
RTOR Reduction (vph)	0	208	0	0	6	0	0	2	0	0	0	307
Lane Group Flow (vph)	515	91	0	0	71	0	417	776	0	0	598	249
Confl. Peds. (#/hr)	4		3	3		4						
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	11%	0%	0%	5%	0%
Turn Type	pm+pt			Perm			pm+pt			Perm		Perm
Protected Phases	7	4			8		5	2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	32.0	32.0			10.0		78.0	78.0			50.1	50.1
Effective Green, g (s)	32.0	33.0			11.0		78.0	79.0			51.1	51.1
Actuated g/C Ratio	0.27	0.28			0.09		0.65	0.66			0.43	0.43
Clearance Time (s)	4.0	5.0			5.0		4.0	5.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	341	391			126		481	1924			718	642
v/s Ratio Prot	c0.23	0.06					c0.17	0.27				
v/s Ratio Perm	c0.18				0.05		c0.39				0.35	0.17
v/c Ratio	1.51	0.23			0.56		0.87	0.40			0.83	0.39
Uniform Delay, d1	42.9	33.7			52.2		26.3	9.5			30.7	23.7
Progression Factor	1.00	1.00			1.00		1.17	1.47			0.78	0.51
Incremental Delay, d2	244.3	0.3			5.6		10.4	0.4			6.1	0.9
Delay (s)	287.2	34.0			57.8		41.0	14.4			29.9	13.0
Level of Service	F	C			E		D	B			C	B
Approach Delay (s)		194.2			57.8			23.7			21.7	
Approach LOS		F			E			C			C	

Intersection Summary			
HCM Average Control Delay	66.6	HCM Level of Service	E
HCM Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	90.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	267	1	258	2	2	8	412	753	2	1	725	279
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	11	11	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	5.0
Lane Util. Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.97			0.98		1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85			0.91		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00			0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1713	1523			1635		1728	1817		1745	1818	1487
Flt Permitted	0.74	1.00			0.94		0.07	1.00		0.13	1.00	1.00
Satd. Flow (perm)	1336	1523			1549		132	1817		239	1818	1487
Peak-hour factor, PHF	0.76	0.38	0.84	0.38	0.50	0.50	0.78	0.86	0.75	0.75	0.90	0.73
Adj. Flow (vph)	351	3	307	5	4	16	528	876	3	1	806	382
RTOR Reduction (vph)	0	233	0	0	12	0	0	0	0	0	0	156
Lane Group Flow (vph)	351	77	0	0	13	0	528	879	0	1	806	226
Confl. Peds. (#/hr)	1		3	3		1			1	1		
Heavy Vehicles (%)	5%	0%	3%	0%	0%	0%	1%	1%	0%	0%	1%	5%
Turn Type	Perm			Perm			pm+pt			Perm		Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	28.0	28.0			28.0		82.0	82.0		50.0	50.0	50.0
Effective Green, g (s)	29.0	29.0			29.0		83.0	83.0		51.0	51.0	50.0
Actuated g/C Ratio	0.24	0.24			0.24		0.69	0.69		0.42	0.42	0.42
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	323	368			374		464	1257		102	773	620
v/s Ratio Prot		0.05					c0.27	0.48			0.44	
v/s Ratio Perm	c0.26				0.01		c0.52			0.00		0.15
v/c Ratio	1.09	0.21			0.03		1.14	0.70		0.01	1.04	0.36
Uniform Delay, d1	45.5	36.3			34.8		42.7	11.0		19.9	34.5	24.1
Progression Factor	0.95	0.81			1.00		0.87	0.58		0.77	0.94	1.28
Incremental Delay, d2	75.1	0.3			0.0		70.4	1.0		0.1	37.8	1.1
Delay (s)	118.4	29.6			34.8		107.6	7.4		15.5	70.3	31.9
Level of Service	F	C			C		F	A		B	E	C
Approach Delay (s)		76.8			34.8			45.0			57.9	
Approach LOS		E			C			D			E	

Intersection Summary			
HCM Average Control Delay	56.0	HCM Level of Service	E
HCM Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	92.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	4	4	6	344	3	245	0	555	115	80	504	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0	4.0		4.0	
Lane Util. Factor		1.00			1.00			0.95	1.00		0.95	
Frt		0.93			0.95			1.00	0.85		1.00	
Flt Protected		0.98			0.97			1.00	1.00		0.99	
Satd. Flow (prot)		1664			1618			3312	1553		3393	
Flt Permitted		0.81			0.79			1.00	1.00		0.76	
Satd. Flow (perm)		1377			1322			3312	1553		2579	
Peak-hour factor, PHF	0.25	0.63	0.25	0.76	0.25	0.79	0.92	0.95	0.82	0.94	0.85	0.25
Adj. Flow (vph)	16	6	24	453	12	310	0	584	140	85	593	4
RTOR Reduction (vph)	0	11	0	0	40	0	0	0	96	0	1	0
Lane Group Flow (vph)	0	35	0	0	735	0	0	584	44	0	681	0
Heavy Vehicles (%)	0%	33%	0%	9%	43%	5%	0%	9%	4%	1%	6%	50%
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		32.0			32.0			18.0	18.0		18.0	
Effective Green, g (s)		33.0			33.0			19.0	19.0		19.0	
Actuated g/C Ratio		0.55			0.55			0.32	0.32		0.32	
Clearance Time (s)		5.0			5.0			5.0	5.0		5.0	
Lane Grp Cap (vph)		757			727			1049	492		817	
v/s Ratio Prot								0.18				
v/s Ratio Perm		0.03			c0.56				0.03		c0.26	
v/c Ratio		0.05			1.01			0.56	0.09		0.83	
Uniform Delay, d1		6.2			13.5			17.0	14.4		19.0	
Progression Factor		1.00			0.90			1.00	1.00		1.00	
Incremental Delay, d2		0.1			25.8			2.1	0.4		9.8	
Delay (s)		6.4			37.9			19.1	14.8		28.8	
Level of Service		A			D			B	B		C	
Approach Delay (s)		6.4			37.9			18.3			28.8	
Approach LOS		A			D			B			C	

Intersection Summary			
HCM Average Control Delay	28.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	82.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	80	32	6	8	45	20	11	479	13	14	499	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	11	12	12	12	12	12	10	12
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00			0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		0.99			1.00		1.00	1.00		1.00	1.00	
Frt		0.99			0.96		1.00	1.00		1.00	0.99	
Flt Protected		0.97			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1734			1705		1805	1854		1736	1737	
Flt Permitted		0.73			0.95		0.35	1.00		0.38	1.00	
Satd. Flow (perm)		1306			1638		665	1854		696	1737	
Peak-hour factor, PHF	0.77	0.81	0.38	0.50	0.66	0.67	0.50	0.93	0.75	0.75	0.93	0.54
Adj. Flow (vph)	104	40	16	16	68	30	22	515	17	19	537	44
RTOR Reduction (vph)	0	4	0	0	11	0	0	1	0	0	3	0
Lane Group Flow (vph)	0	156	0	0	103	0	22	531	0	19	578	0
Confl. Peds. (#/hr)	4		5	5		4						
Heavy Vehicles (%)	0%	1%	0%	0%	0%	8%	0%	2%	2%	4%	1%	0%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		34.0			34.0		76.0	76.0		76.0	76.0	
Effective Green, g (s)		35.0			35.0		77.0	77.0		77.0	77.0	
Actuated g/C Ratio		0.29			0.29		0.64	0.64		0.64	0.64	
Clearance Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)		381			478		427	1190		447	1115	
v/s Ratio Prot								0.29			c0.33	
v/s Ratio Perm		c0.12			0.06		0.03			0.03		
v/c Ratio		0.41			0.22		0.05	0.45		0.04	0.52	
Uniform Delay, d1		34.2			32.1		8.0	10.8		7.9	11.5	
Progression Factor		1.00			1.00		0.92	0.89		0.58	0.50	
Incremental Delay, d2		3.3			1.0		0.2	1.2		0.2	1.5	
Delay (s)		37.5			33.2		7.5	10.8		4.8	7.3	
Level of Service		D			C		A	B		A	A	
Approach Delay (s)		37.5			33.2			10.7			7.2	
Approach LOS		D			C			B			A	

Intersection Summary			
HCM Average Control Delay	14.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	47.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	8	1490	243	318	1049	94	190	40	367	73	34	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	10	12	12	10	10	10	12	11	12
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	
Lane Util. Factor	1.00	0.91		1.00	0.91			1.00	1.00		1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00			1.00	0.98		1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99	1.00		0.99	
Frt	1.00	0.98		1.00	0.98			1.00	0.85		0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.96	1.00		0.97	
Satd. Flow (prot)	1745	4996		1685	4800			1686	1482		1733	
Flt Permitted	0.20	1.00		0.13	1.00			0.65	1.00		0.33	
Satd. Flow (perm)	367	4996		236	4800			1132	1482		581	
Peak-hour factor, PHF	0.62	0.95	0.83	0.25	0.90	0.69	0.84	0.63	0.93	0.71	0.58	0.33
Adj. Flow (vph)	13	1568	293	1272	1166	136	226	63	395	103	59	24
RTOR Reduction (vph)	0	32	0	0	15	0	0	0	0	0	6	0
Lane Group Flow (vph)	13	1829	0	1272	1287	0	0	289	395	0	180	0
Confl. Peds. (#/hr)			5	5			17		20	20		17
Heavy Vehicles (%)	0%	1%	0%	0%	7%	1%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt			pm+pt			Perm		pm+ov	Perm		
Protected Phases	1	6		5	2			4	5		8	
Permitted Phases	6			2			4		4	8		
Actuated Green, G (s)	25.8	25.0		56.0	50.2			16.0	42.0		16.0	
Effective Green, g (s)	27.8	28.0		57.0	53.2			17.0	44.0		17.0	
Actuated g/C Ratio	0.33	0.33		0.68	0.63			0.20	0.52		0.20	
Clearance Time (s)	5.0	7.0		5.0	7.0			5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	151	1665		626	3040			229	847		118	
v/s Ratio Prot	0.00	0.37		c0.65	0.27				0.15			
v/s Ratio Perm	0.03			c0.72				0.26	0.12		c0.31	
v/c Ratio	0.09	1.10		2.03	0.42			1.26	0.47		1.52	
Uniform Delay, d1	19.5	28.0		22.8	7.7			33.5	12.6		33.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.2	54.2		470.0	0.4			148.1	0.4		273.2	
Delay (s)	19.7	82.2		492.7	8.1			181.6	13.0		306.7	
Level of Service	B	F		F	A			F	B		F	
Approach Delay (s)		81.8			247.6			84.2			306.7	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM Average Control Delay	170.2	HCM Level of Service	F
HCM Volume to Capacity ratio	1.83		
Actuated Cycle Length (s)	84.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	78.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	38	68	30	159	3	412	1	1460	98	250	1248	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	14	14	14	14	14	14	10	10	10	10	10	10
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1904	1677		1925	2027	1666	1348	4703		1685	4789	
Flt Permitted	0.75	1.00		0.34	1.00	1.00	0.10	1.00		0.95	1.00	
Satd. Flow (perm)	1503	1677		687	2027	1666	141	4703		1685	4789	
Peak-hour factor, PHF	0.50	0.25	0.25	0.56	0.25	0.93	0.25	0.88	0.78	0.88	0.87	0.65
Adj. Flow (vph)	76	272	120	284	12	443	4	1659	126	284	1434	5
RTOR Reduction (vph)	0	13	0	0	0	0	0	7	0	0	0	0
Lane Group Flow (vph)	76	379	0	284	12	443	4	1778	0	284	1439	0
Confl. Peds. (#/hr)	5					5	3					3
Heavy Vehicles (%)	0%	0%	50%	0%	0%	1%	25%	2%	0%	0%	1%	7%
Turn Type	Perm			Perm		Perm	Perm			Prot		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2					
Actuated Green, G (s)	45.0	45.0		45.0	45.0	45.0	40.0	40.0		18.0	63.0	
Effective Green, g (s)	46.0	46.0		46.0	46.0	46.0	43.0	43.0		19.0	66.0	
Actuated g/C Ratio	0.38	0.38		0.38	0.38	0.38	0.36	0.36		0.16	0.55	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	7.0	7.0		5.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	576	643		263	777	639	51	1685		267	2634	
v/s Ratio Prot		0.23			0.01			c0.38		c0.17	0.30	
v/s Ratio Perm	0.05			c0.41		0.27	0.03					
v/c Ratio	0.13	0.59		1.08	0.02	0.69	0.08	1.06		1.06	0.55	
Uniform Delay, d1	24.0	29.5		37.0	23.0	31.1	25.4	38.5		50.5	17.4	
Progression Factor	1.01	1.01		1.00	1.00	1.00	0.29	0.46		0.64	0.52	
Incremental Delay, d2	0.1	1.4		78.4	0.0	3.3	0.3	26.5		71.0	0.8	
Delay (s)	24.3	31.0		115.4	23.0	34.3	7.7	44.4		103.5	9.7	
Level of Service	C	C		F	C	C	A	D		F	A	
Approach Delay (s)		29.9			65.3			44.3			25.2	
Approach LOS		C			E			D			C	

Intersection Summary			
HCM Average Control Delay	39.2	HCM Level of Service	D
HCM Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	461	464	721	1144	147	818
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	13	13	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	0.88	1.00	0.91
Frpb, ped/bikes	1.00	1.00	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1680	1503	3252	2505	1626	4673
Flt Permitted	0.95	1.00	1.00	1.00	0.16	1.00
Satd. Flow (perm)	1680	1503	3252	2505	271	4673
Peak-hour factor, PHF	0.94	0.91	0.83	0.84	0.88	0.87
Adj. Flow (vph)	490	510	869	1362	167	940
RTOR Reduction (vph)	0	139	0	874	0	0
Lane Group Flow (vph)	490	371	869	488	167	940
Confl. Peds. (#/hr)				1		
Turn Type		Perm		Perm	pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Actuated Green, G (s)	19.9	19.9	20.5	20.5	30.1	30.1
Effective Green, g (s)	20.9	20.9	21.5	21.5	31.1	31.1
Actuated g/C Ratio	0.35	0.35	0.36	0.36	0.52	0.52
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	585	524	1165	898	267	2422
v/s Ratio Prot	c0.29		c0.27		c0.06	0.20
v/s Ratio Perm		0.25		0.19	0.27	
v/c Ratio	0.84	0.71	0.75	0.54	0.63	0.39
Uniform Delay, d1	18.0	16.9	16.9	15.3	9.8	8.7
Progression Factor	1.00	1.00	0.85	9.25	1.00	1.00
Incremental Delay, d2	10.1	4.3	3.1	1.7	4.5	0.5
Delay (s)	28.1	21.2	17.5	143.5	14.3	9.2
Level of Service	C	C	B	F	B	A
Approach Delay (s)	24.6		94.4			10.0
Approach LOS	C		F			A

Intersection Summary			
HCM Average Control Delay	56.8	HCM Level of Service	E
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	102	25	501	5	0	63	0	2094	18	32	1063	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	14	12	12	12	12	11	12	12	12	12
Total Lost time (s)		5.0	4.0	4.0		4.0		4.0	5.0		4.0	
Lane Util. Factor		1.00	1.00	1.00		1.00		0.91	1.00		0.95	
Frt		1.00	0.85	1.00		0.85		1.00	0.85		1.00	
Flt Protected		0.96	1.00	0.95		1.00		1.00	1.00		1.00	
Satd. Flow (prot)		1789	1723	1626		1455		4964	1455		3592	
Flt Permitted		0.96	1.00	0.68		1.00		1.00	1.00		0.71	
Satd. Flow (perm)		1789	1723	1160		1455		4964	1455		2562	
Peak-hour factor, PHF	0.84	0.92	0.94	0.92	0.92	0.92	0.92	0.89	0.92	0.92	0.99	0.92
Adj. Flow (vph)	121	27	533	5	0	68	0	2353	20	35	1074	0
RTOR Reduction (vph)	0	0	214	0	0	65	0	0	6	0	0	0
Lane Group Flow (vph)	0	148	319	5	0	3	0	2353	14	0	1109	0
Heavy Vehicles (%)	0%	11%	0%	11%	11%	11%	0%	1%	11%	11%	0%	0%
Turn Type	Split		Perm	custom		custom			Perm	Perm		
Protected Phases	4	4						2			6	
Permitted Phases			4	8		8			2	6		
Actuated Green, G (s)		23.9	23.9	5.9		5.9		76.2	76.2		76.2	
Effective Green, g (s)		23.9	24.9	5.9		5.9		77.2	76.2		77.2	
Actuated g/C Ratio		0.20	0.21	0.05		0.05		0.64	0.64		0.64	
Clearance Time (s)		5.0	5.0	4.0		4.0		5.0	5.0		5.0	
Vehicle Extension (s)		3.0	3.0	3.0		3.0		3.0	3.0		3.0	
Lane Grp Cap (vph)		356	358	57		72		3194	924		1648	
v/s Ratio Prot		0.08						c0.47				
v/s Ratio Perm			c0.19	c0.00		0.00			0.01		0.43	
v/c Ratio		0.42	0.89	0.09		0.05		0.74	0.02		0.67	
Uniform Delay, d1		42.0	46.2	54.5		54.4		14.5	8.1		13.5	
Progression Factor		1.00	1.00	1.00		1.00		0.50	0.39		1.10	
Incremental Delay, d2		0.8	23.1	0.7		0.3		1.3	0.0		1.9	
Delay (s)		42.7	69.3	55.1		54.6		8.6	3.2		16.7	
Level of Service		D	E	E		D		A	A		B	
Approach Delay (s)		63.5			54.7			8.5			16.7	
Approach LOS		E			D			A			B	

Intersection Summary			
HCM Average Control Delay	20.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	79	90	1782	98	86	1485
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	0.91		1.00	0.91
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1626	1455	4636		1626	4673
Flt Permitted	0.95	1.00	1.00		0.08	1.00
Satd. Flow (perm)	1626	1455	4636		139	4673
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	86	98	1937	107	93	1614
RTOR Reduction (vph)	0	38	4	0	0	0
Lane Group Flow (vph)	86	60	2040	0	93	1614
Turn Type		Perm			Perm	
Protected Phases	8		2			6
Permitted Phases		8			6	
Actuated Green, G (s)	11.6	11.6	100.4		100.4	100.4
Effective Green, g (s)	11.6	11.6	100.4		100.4	100.4
Actuated g/C Ratio	0.10	0.10	0.84		0.84	0.84
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	157	141	3879		116	3910
v/s Ratio Prot	c0.05		0.44			0.35
v/s Ratio Perm		0.04			c0.67	
v/c Ratio	0.55	0.43	0.53		0.80	0.41
Uniform Delay, d1	51.7	51.1	2.9		4.9	2.4
Progression Factor	1.00	1.00	0.58		1.68	0.25
Incremental Delay, d2	3.9	2.1	0.2		27.0	0.2
Delay (s)	55.6	53.1	1.8		35.2	0.8
Level of Service	E	D	A		D	A
Approach Delay (s)	54.3		1.8			2.7
Approach LOS	D		A			A

Intersection Summary			
HCM Average Control Delay	4.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

SYNCHRO REPORTS

BELTLINE SCENARIO

2020 AM Peak Hour
HCM Level of Service Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	334	30	44	277	141	81	52	794	91	249	960	96
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	12	10	10	11	10	10	10	10	10	10
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.95		0.97	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1636	1773	1615	3173	1722	1538	1178	3253		3204	3245	
Flt Permitted	0.95	1.00	1.00	0.73	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1636	1773	1615	2424	1722	1538	1178	3253		3204	3245	
Peak-hour factor, PHF	0.91	0.63	0.65	0.84	0.73	0.84	0.75	0.84	0.85	0.78	0.94	0.75
Adj. Flow (vph)	367	48	68	330	193	96	69	945	107	319	1021	128
RTOR Reduction (vph)	0	0	56	0	0	83	0	7	0	0	8	0
Lane Group Flow (vph)	367	48	12	330	193	13	69	1045	0	319	1141	0
Confl. Peds. (#/hr)	1					1			3	3		
Heavy Vehicles (%)	3%	0%	0%	3%	3%	0%	43%	2%	0%	2%	2%	3%
Turn Type	Prot		Perm	pm+pt		Perm	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4	8		8						
Actuated Green, G (s)	30.0	21.0	21.0	39.0	15.0	15.0	8.0	42.0		13.0	47.0	
Effective Green, g (s)	31.0	22.0	22.0	41.0	16.0	16.0	9.0	43.0		14.0	48.0	
Actuated g/C Ratio	0.26	0.18	0.18	0.34	0.13	0.13	0.08	0.36		0.12	0.40	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	423	325	296	984	230	205	88	1166		374	1298	
v/s Ratio Prot	c0.22	0.03		0.07	c0.11		0.06	c0.32		0.10	c0.35	
v/s Ratio Perm			0.01	0.04		0.01						
v/c Ratio	0.87	0.15	0.04	0.34	0.84	0.06	0.78	0.90		0.85	0.88	
Uniform Delay, d1	42.5	41.1	40.3	29.0	50.7	45.4	54.5	36.4		52.0	33.3	
Progression Factor	0.89	1.05	1.49	1.00	1.00	1.00	0.94	0.41		0.72	0.57	
Incremental Delay, d2	17.2	0.8	0.2	0.9	29.1	0.6	39.5	8.5		10.6	4.2	
Delay (s)	55.2	44.1	60.5	29.9	79.9	46.0	90.5	23.2		47.9	23.0	
Level of Service	E	D	E	C	E	D	F	C		D	C	
Approach Delay (s)		54.9			48.0			27.3			28.4	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM Average Control Delay	34.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	41	334	162	105	166	2	112	814	103	6	1190	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	9	12	12	9	12	10	10	10	10	10	10
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95			0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.95			1.00		1.00	0.98		1.00	0.99	
Flt Protected		1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		2928			3071		1636	3172		1685	3248	
Flt Permitted		0.88			0.54		0.08	1.00		0.11	1.00	
Satd. Flow (perm)		2574			1687		135	3172		193	3248	
Peak-hour factor, PHF	0.69	0.83	0.73	0.70	0.84	0.50	0.70	0.83	0.70	0.75	0.89	0.53
Adj. Flow (vph)	59	402	222	150	198	4	160	981	147	8	1337	125
RTOR Reduction (vph)	0	49	0	0	1	0	0	10	0	0	6	0
Lane Group Flow (vph)	0	634	0	0	351	0	160	1118	0	8	1456	0
Confl. Peds. (#/hr)	2		1	1		2	2		3	3		2
Heavy Vehicles (%)	3%	4%	6%	4%	3%	0%	3%	4%	3%	0%	2%	5%
Turn Type	Perm			pm+pt			pm+pt			pm+pt		
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		32.0			41.0		60.0	60.0		55.0	55.0	
Effective Green, g (s)		33.0			42.0		61.0	61.0		56.0	56.0	
Actuated g/C Ratio		0.28			0.35		0.51	0.51		0.47	0.47	
Clearance Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)		708			648		194	1612		152	1516	
v/s Ratio Prot					c0.02		0.07	c0.35		0.00	c0.45	
v/s Ratio Perm		c0.25			0.17		0.35			0.02		
v/c Ratio		0.90			1.01dl		0.82	0.69		0.05	0.96	
Uniform Delay, d1		41.9			31.3		45.1	22.4		20.7	30.9	
Progression Factor		0.60			1.00		0.67	0.60		0.36	0.55	
Incremental Delay, d2		13.9			3.2		24.5	1.8		0.5	12.1	
Delay (s)		39.1			34.5		54.8	15.2		8.0	29.3	
Level of Service		D			C		D	B		A	C	
Approach Delay (s)		39.1			34.5			20.1			29.2	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM Average Control Delay	28.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	81.9%	ICU Level of Service	D
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	67	247	79	83	170	42	43	938	299	65	1068	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	10	12	12	9	12	12	11	12	12	10	12
Total Lost time (s)	4.0	4.0			4.0			4.0	4.0		4.0	
Lane Util. Factor	1.00	1.00			0.95			0.91	1.00		0.91	
Frpb, ped/bikes	1.00	1.00			1.00			1.00	0.97		1.00	
Flpb, ped/bikes	1.00	1.00			1.00			1.00	1.00		1.00	
Frt	1.00	0.94			0.98			1.00	0.85		0.98	
Flt Protected	0.95	1.00			0.99			1.00	1.00		1.00	
Satd. Flow (prot)	1605	1645			3072			4947	1550		4682	
Flt Permitted	0.51	1.00			0.62			0.73	1.00		0.76	
Satd. Flow (perm)	866	1645			1919			3629	1550		3561	
Peak-hour factor, PHF	0.67	0.93	0.50	0.79	0.81	0.91	0.46	0.91	0.91	0.67	0.91	0.59
Adj. Flow (vph)	100	266	158	105	210	46	93	1031	329	97	1174	154
RTOR Reduction (vph)	0	36	0	0	19	0	0	0	197	0	25	0
Lane Group Flow (vph)	100	388	0	0	342	0	0	1124	132	0	1400	0
Confl. Peds. (#/hr)	3		1	1		3	18		5	5		18
Heavy Vehicles (%)	1%	2%	0%	3%	2%	0%	0%	1%	1%	1%	1%	1%
Turn Type	Perm			Perm			Perm		Perm	pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	18.0	18.0			18.0			23.0	23.0		32.0	
Effective Green, g (s)	19.0	19.0			19.0			24.0	24.0		33.0	
Actuated g/C Ratio	0.32	0.32			0.32			0.40	0.40		0.55	
Clearance Time (s)	5.0	5.0			5.0			5.0	5.0		5.0	
Lane Grp Cap (vph)	274	521			608			1452	620		2052	
v/s Ratio Prot		c0.24									c0.06	
v/s Ratio Perm	0.12				0.18			c0.31	0.08		0.32	
v/c Ratio	0.36	0.75			0.56			0.77	0.21		0.68	
Uniform Delay, d1	15.8	18.3			17.0			15.6	11.8		9.7	
Progression Factor	0.92	0.92			1.00			0.83	0.81		1.65	
Incremental Delay, d2	3.7	9.2			3.7			2.2	0.4		0.7	
Delay (s)	18.2	26.0			20.8			15.2	9.9		16.8	
Level of Service	B	C			C			B	A		B	
Approach Delay (s)		24.5			20.8			14.0			16.8	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	17.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	85.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	162	66	456	224	159	779
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	1.00		1.00		1.00	1.00
Frpb, ped/bikes	0.99		0.99		1.00	1.00
Flpb, ped/bikes	1.00		1.00		1.00	1.00
Frt	0.96		0.96		1.00	1.00
Flt Protected	0.97		1.00		0.95	1.00
Satd. Flow (prot)	1637		1697		1727	1801
Flt Permitted	0.97		1.00		0.25	1.00
Satd. Flow (perm)	1637		1697		459	1801
Peak-hour factor, PHF	0.75	0.74	0.89	0.90	0.85	0.90
Adj. Flow (vph)	216	89	512	249	187	866
RTOR Reduction (vph)	26	0	27	0	0	0
Lane Group Flow (vph)	279	0	734	0	187	866
Confl. Peds. (#/hr)		1		1	1	
Heavy Vehicles (%)	4%	2%	3%	2%	1%	2%
Turn Type					Perm	
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	13.4		36.6		36.6	36.6
Effective Green, g (s)	14.4		37.6		37.6	37.6
Actuated g/C Ratio	0.24		0.63		0.63	0.63
Clearance Time (s)	5.0		5.0		5.0	5.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	393		1063		288	1129
v/s Ratio Prot	c0.17		0.43			c0.48
v/s Ratio Perm					0.41	
v/c Ratio	0.71		0.69		0.65	0.77
Uniform Delay, d1	20.9		7.4		7.0	8.1
Progression Factor	0.82		1.00		1.00	1.00
Incremental Delay, d2	3.1		3.0		10.8	5.0
Delay (s)	20.2		10.3		17.9	13.1
Level of Service	C		B		B	B
Approach Delay (s)	20.2		10.3			13.9
Approach LOS	C		B			B

Intersection Summary			
HCM Average Control Delay	13.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	69.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	33	69	0	7	17	4	0	519	1	3	965	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.97			1.00		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)	1626	1712		1626	1665			1711		1626	1705	
Flt Permitted	0.74	1.00		0.71	1.00			1.00		0.40	1.00	
Satd. Flow (perm)	1272	1712		1212	1665			1711		678	1705	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	36	75	0	8	18	4	0	564	1	3	1049	27
RTOR Reduction (vph)	0	0	0	0	3	0	0	0	0	0	1	0
Lane Group Flow (vph)	36	75	0	8	19	0	0	565	0	3	1075	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	16.0	16.0		16.0	16.0			56.0		56.0	56.0	
Effective Green, g (s)	16.0	16.0		16.0	16.0			56.0		56.0	56.0	
Actuated g/C Ratio	0.20	0.20		0.20	0.20			0.70		0.70	0.70	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Lane Grp Cap (vph)	254	342		242	333			1198		475	1194	
v/s Ratio Prot		c0.04			0.01			0.33			c0.63	
v/s Ratio Perm	0.03			0.01						0.00		
v/c Ratio	0.14	0.22		0.03	0.06			0.47		0.01	0.90	
Uniform Delay, d1	26.3	26.8		25.8	25.9			5.4		3.6	9.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	1.2	1.5		0.3	0.3			1.3		0.0	10.9	
Delay (s)	27.5	28.2		26.0	26.2			6.7		3.6	20.7	
Level of Service	C	C		C	C			A		A	C	
Approach Delay (s)		28.0			26.2			6.7			20.6	
Approach LOS		C			C			A			C	

Intersection Summary			
HCM Average Control Delay	16.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	67.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	6	6	3	71	15	161	16	398	98	391	713	37
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	10	12	10	12	11	12	12	11	12
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00	0.97		1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	0.97		1.00	0.99	
Flt Protected		0.98	1.00		0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1858	1569		1823	1492	1805	1743		1787	1803	
Flt Permitted		0.79	1.00		0.97	1.00	0.21	1.00		0.24	1.00	
Satd. Flow (perm)		1508	1569		1823	1492	397	1743		443	1803	
Peak-hour factor, PHF	0.63	0.50	0.75	0.81	0.40	0.81	0.94	0.82	0.75	0.90	0.91	0.73
Adj. Flow (vph)	10	12	4	88	38	199	17	485	131	434	784	51
RTOR Reduction (vph)	0	0	4	0	0	176	0	7	0	0	1	0
Lane Group Flow (vph)	0	22	0	0	126	23	17	609	0	434	834	0
Confl. Peds. (#/hr)			2	2								
Heavy Vehicles (%)	0%	0%	0%	1%	0%	1%	0%	2%	2%	1%	1%	0%
Turn Type	Perm		Perm	Split		Prot	Perm			pm+pt		
Protected Phases		8		7	7	7		2		1	6	
Permitted Phases	8		8				2			6		
Actuated Green, G (s)		4.9	4.9		13.0	13.0	57.1	57.1		87.1	87.1	
Effective Green, g (s)		5.9	5.9		14.0	14.0	58.1	58.1		88.1	88.1	
Actuated g/C Ratio		0.05	0.05		0.12	0.12	0.48	0.48		0.73	0.73	
Clearance Time (s)		5.0	5.0		5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		74	77		213	174	192	844		616	1324	
v/s Ratio Prot					c0.07	0.02		0.35		c0.15	0.46	
v/s Ratio Perm		c0.01	0.00				0.04			c0.36		
v/c Ratio		0.30	0.00		0.59	0.13	0.09	0.72		0.70	0.63	
Uniform Delay, d1		55.0	54.3		50.3	47.6	16.7	24.5		24.9	7.9	
Progression Factor		1.00	1.00		0.69	0.55	0.81	0.78		0.69	0.54	
Incremental Delay, d2		2.2	0.0		2.8	0.2	0.9	5.2		2.0	1.2	
Delay (s)		57.3	54.3		37.5	26.2	14.3	24.3		19.1	5.5	
Level of Service		E	D		D	C	B	C		B	A	
Approach Delay (s)		56.8			30.6			24.0			10.1	
Approach LOS		E			C			C			B	

Intersection Summary			
HCM Average Control Delay	17.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	11	111	7	25	89	71	4	275	36	167	403	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	14	12	12	9	9	12	11	12	12	12	12
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.99			1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected		0.99			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1904			1628	1439	1805	1758		1770	1852	
Flt Permitted		0.96			0.91	1.00	0.41	1.00		0.49	1.00	
Satd. Flow (perm)		1840			1506	1439	784	1758		912	1852	
Peak-hour factor, PHF	0.56	0.83	0.58	0.75	0.79	0.79	0.50	0.85	0.85	0.86	0.92	0.44
Adj. Flow (vph)	20	134	12	33	113	90	8	324	42	194	438	20
RTOR Reduction (vph)	0	5	0	0	0	60	0	8	0	0	3	0
Lane Group Flow (vph)	0	161	0	0	146	30	8	358	0	194	455	0
Heavy Vehicles (%)	6%	5%	0%	0%	5%	1%	0%	3%	0%	2%	2%	0%
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		19.0			19.0	19.0	31.0	31.0		31.0	31.0	
Effective Green, g (s)		20.0			20.0	20.0	32.0	32.0		32.0	32.0	
Actuated g/C Ratio		0.33			0.33	0.33	0.53	0.53		0.53	0.53	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)		613			502	480	418	938		486	988	
v/s Ratio Prot								0.20			c0.25	
v/s Ratio Perm		0.09			c0.10	0.02	0.01			0.21		
v/c Ratio		0.26			0.29	0.06	0.02	0.38		0.40	0.46	
Uniform Delay, d1		14.6			14.8	13.6	6.6	8.2		8.3	8.7	
Progression Factor		1.00			0.75	0.69	0.54	0.67		1.05	1.04	
Incremental Delay, d2		1.0			1.1	0.2	0.1	1.1		2.0	1.2	
Delay (s)		15.7			12.2	9.6	3.6	6.6		10.7	10.2	
Level of Service		B			B	A	A	A		B	B	
Approach Delay (s)		15.7			11.2			6.5			10.4	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM Average Control Delay	10.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	SBL	SBR	NWL	NWR
Lane Configurations						
Volume (vph)	0	501	377	5	181	277
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	10	9	12	10	9
Total Lost time (s)		4.0	4.0		4.0	4.0
Lane Util. Factor		0.88	0.97		1.00	1.00
Frt		0.85	1.00		1.00	0.85
Flt Protected		1.00	0.95		0.95	1.00
Satd. Flow (prot)		2627	3093		1636	1425
Flt Permitted		1.00	0.95		0.95	1.00
Satd. Flow (perm)		2627	3093		1636	1425
Peak-hour factor, PHF	0.55	0.84	0.92	0.63	0.86	0.93
Adj. Flow (vph)	0	596	410	8	210	298
RTOR Reduction (vph)	0	226	1	0	0	0
Lane Group Flow (vph)	0	370	417	0	210	298
Heavy Vehicles (%)	13%	1%	2%	0%	3%	2%
Turn Type		custom				pt+ov
Protected Phases			6		8	8 6
Permitted Phases		4				
Actuated Green, G (s)		64.0	46.0		64.0	120.0
Effective Green, g (s)		65.0	47.0		65.0	120.0
Actuated g/C Ratio		0.54	0.39		0.54	1.00
Clearance Time (s)		5.0	5.0		5.0	
Lane Grp Cap (vph)		1423	1211		886	1425
v/s Ratio Prot			c0.13		0.13	0.21
v/s Ratio Perm		c0.14				
v/c Ratio		0.26	0.34		0.24	0.21
Uniform Delay, d1		14.7	25.7		14.5	0.0
Progression Factor		1.00	0.31		0.75	1.00
Incremental Delay, d2		0.4	0.7		0.1	0.0
Delay (s)		15.1	8.8		10.9	0.0
Level of Service		B	A		B	A
Approach Delay (s)	15.1		8.8		4.5	
Approach LOS	B		A		A	

Intersection Summary			
HCM Average Control Delay	9.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	27.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	201	415	14	200	893	148	28	658	133	67	483	93
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	12	10	10	12	11	11	12	11	11	12
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95			0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		1.00			0.98		1.00	0.97		1.00	0.95	
Flt Protected		0.98			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3232			3189		1678	3334		1728	3256	
Flt Permitted		0.50			0.61		0.18	1.00		0.18	1.00	
Satd. Flow (perm)		1656			1970		321	3334		331	3256	
Peak-hour factor, PHF	0.78	0.90	0.81	0.75	0.93	0.74	0.90	0.94	0.79	0.94	0.91	0.36
Adj. Flow (vph)	258	461	17	267	960	200	31	700	168	71	531	258
RTOR Reduction (vph)	0	1	0	0	11	0	0	18	0	0	50	0
Lane Group Flow (vph)	0	735	0	0	1416	0	31	850	0	71	739	0
Confl. Peds. (#/hr)	2		1	1		2	10		12	459		10
Heavy Vehicles (%)	2%	2%	5%	4%	2%	1%	4%	1%	0%	1%	1%	0%
Turn Type	custom			pm+pt			pm+pt			pm+pt		
Protected Phases				5	2		7	4		3	8	
Permitted Phases	6	6		2			4			8		
Actuated Green, G (s)		66.0			75.0		26.0	26.0		26.0	26.0	
Effective Green, g (s)		67.0			76.0		27.0	27.0		27.0	27.0	
Actuated g/C Ratio		0.56			0.63		0.22	0.22		0.22	0.22	
Clearance Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)		925			1298		129	750		133	733	
v/s Ratio Prot					c0.05		0.01	c0.26		0.02	c0.23	
v/s Ratio Perm		0.44			c0.65		0.04			0.10		
v/c Ratio		1.94dl			1.09		0.24	1.13		0.53	1.01	
Uniform Delay, d1		21.0			22.0		38.1	46.5		53.2	46.5	
Progression Factor		0.61			1.00		1.00	1.00		0.86	0.77	
Incremental Delay, d2		6.7			53.6		4.4	76.2		10.6	30.3	
Delay (s)		19.5			75.6		42.4	122.7		56.1	66.1	
Level of Service		B			E		D	F		E	E	
Approach Delay (s)		19.5			75.6			119.9			65.3	
Approach LOS		B			E			F			E	

Intersection Summary			
HCM Average Control Delay	73.0	HCM Level of Service	E
HCM Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	92.7%	ICU Level of Service	F
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	228	137	95	46	43	44	21	562	29	36	931	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	10	12	12	12	12	10	10	12	10	10	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	0.95
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.94		1.00	0.94		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1605	1648		1803	1737		1636	1643		1652	1722	1535
Flt Permitted	0.42	1.00		0.30	1.00		0.06	1.00		0.33	1.00	1.00
Satd. Flow (perm)	717	1648		564	1737		103	1643		567	1722	1535
Peak-hour factor, PHF	0.89	0.83	0.80	0.79	0.64	0.88	0.56	0.92	0.78	0.71	0.95	0.86
Adj. Flow (vph)	256	165	119	58	67	50	38	611	37	51	980	93
RTOR Reduction (vph)	0	21	0	0	23	0	0	2	0	0	0	30
Lane Group Flow (vph)	256	263	0	58	94	0	38	646	0	51	980	63
Confl. Peds. (#/hr)	2		3	3		2	7		2	2		7
Heavy Vehicles (%)	1%	0%	0%	0%	2%	0%	3%	7%	5%	2%	3%	0%
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	29.3	21.1		17.5	14.3		69.5	69.5		73.3	71.3	71.3
Effective Green, g (s)	30.3	22.1		19.5	15.3		70.5	72.5		74.3	74.3	74.3
Actuated g/C Ratio	0.25	0.18		0.16	0.13		0.59	0.60		0.62	0.62	0.62
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	7.0		5.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	262	304		135	221		104	993		398	1066	950
v/s Ratio Prot	c0.09	0.16		0.02	0.05		0.01	c0.39		0.01	c0.57	
v/s Ratio Perm	c0.16			0.05			0.21			0.07		0.04
v/c Ratio	0.98	0.86		0.43	0.43		0.37	0.65		0.13	0.92	0.07
Uniform Delay, d1	43.0	47.5		43.7	48.3		23.8	15.5		16.7	20.2	9.1
Progression Factor	1.00	1.00		0.42	0.51		0.84	0.99		1.00	1.00	1.00
Incremental Delay, d2	48.7	21.6		1.3	0.8		1.9	2.9		0.1	13.9	0.1
Delay (s)	91.8	69.1		19.6	25.3		21.9	18.2		16.8	34.1	9.2
Level of Service	F	E		B	C		C	B		B	C	A
Approach Delay (s)		79.9			23.4			18.5			31.3	
Approach LOS		E			C			B			C	

Intersection Summary			
HCM Average Control Delay	37.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	137	9	180	2	0	5	129	918	22	90	1572	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	10	10	10	10	10	10
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00	0.98		1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		0.99	1.00	1.00	1.00		1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	1.00		1.00	0.99	
Flt Protected		0.96	1.00		0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1788	1536		1786	1396	1636	3286		1652	3296	
Flt Permitted		0.74	1.00		0.47	1.00	0.05	1.00		0.18	1.00	
Satd. Flow (perm)		1381	1536		891	1396	93	3286		310	3296	
Peak-hour factor, PHF	0.81	0.75	0.81	0.50	0.92	0.63	0.85	0.82	0.58	0.83	0.94	0.77
Adj. Flow (vph)	169	12	222	4	0	8	152	1120	38	108	1672	97
RTOR Reduction (vph)	0	0	16	0	0	6	0	2	0	0	4	0
Lane Group Flow (vph)	0	181	206	0	4	2	152	1156	0	108	1765	0
Confl. Peds. (#/hr)	1		7	7		1	7		3	3		7
Heavy Vehicles (%)	1%	5%	3%	0%	50%	14%	3%	2%	0%	2%	1%	5%
Turn Type	Perm		pm+ov	Perm		Perm	pm+pt			pm+pt		
Protected Phases		2	3		6		3	8		7	4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)		24.1	35.0		24.1	24.1	83.9	73.0		75.9	69.0	
Effective Green, g (s)		25.1	37.0		25.1	25.1	85.9	75.0		77.9	71.0	
Actuated g/C Ratio		0.21	0.31		0.21	0.21	0.72	0.62		0.65	0.59	
Clearance Time (s)		5.0	5.0		5.0	5.0	5.0	6.0		5.0	6.0	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		289	525		186	292	220	2054		290	1950	
v/s Ratio Prot			0.04				c0.07	0.35		0.02	c0.54	
v/s Ratio Perm		c0.13	0.10		0.00	0.00	0.43			0.22		
v/c Ratio		0.63	0.39		0.02	0.01	0.69	0.56		0.37	0.91	
Uniform Delay, d1		43.2	32.7		37.7	37.6	39.0	13.0		20.9	21.5	
Progression Factor		0.91	0.84		1.00	1.00	0.66	0.23		0.81	0.74	
Incremental Delay, d2		9.1	0.4		0.2	0.0	8.4	1.0		0.6	5.4	
Delay (s)		48.4	27.9		37.9	37.6	34.1	4.0		17.5	21.4	
Level of Service		D	C		D	D	C	A		B	C	
Approach Delay (s)		37.1			37.7			7.5			21.1	
Approach LOS		D			D			A			C	

Intersection Summary			
HCM Average Control Delay	18.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	259	3	318	1	13	3	79	414	1	0	710	439
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	9	12	12	10	12	11	9	12	12	10	10
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95			1.00	1.00
Frpb, ped/bikes	1.00	0.97			1.00		1.00	1.00			1.00	1.00
Flpb, ped/bikes	0.99	1.00			1.00		1.00	1.00			1.00	1.00
Frt	1.00	0.85			0.98		1.00	1.00			1.00	0.85
Flt Protected	0.95	1.00			0.99		0.95	1.00			1.00	1.00
Satd. Flow (prot)	1616	1410			1713		1745	2926			1689	1507
Flt Permitted	0.65	1.00			0.87		0.27	1.00			1.00	1.00
Satd. Flow (perm)	1100	1410			1496		488	2926			1689	1507
Peak-hour factor, PHF	0.85	0.75	0.94	0.25	0.75	0.75	0.75	0.88	0.25	0.92	0.98	0.93
Adj. Flow (vph)	305	4	338	4	17	4	105	470	4	0	724	472
RTOR Reduction (vph)	0	180	0	0	4	0	0	0	0	0	0	173
Lane Group Flow (vph)	305	162	0	0	21	0	105	474	0	0	724	299
Confl. Peds. (#/hr)	4		3	3		4						
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	11%	0%	0%	5%	0%
Turn Type	pm+pt			Perm			pm+pt			Perm		Perm
Protected Phases	7	4			8		5	2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	26.9	26.9			4.9		84.1	83.1			75.1	75.1
Effective Green, g (s)	26.9	27.9			5.9		84.1	84.1			76.1	76.1
Actuated g/C Ratio	0.22	0.23			0.05		0.70	0.70			0.63	0.63
Clearance Time (s)	4.0	5.0			5.0		4.0	5.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	324	328			74		384	2051			1071	956
v/s Ratio Prot	c0.14	0.12					0.01	c0.16			c0.43	
v/s Ratio Perm	c0.07				0.01		0.18					0.20
v/c Ratio	0.94	0.50			0.29		0.27	0.23			0.68	0.31
Uniform Delay, d1	45.2	39.9			55.0		18.4	6.4			14.1	10.0
Progression Factor	1.00	1.00			1.00		1.00	1.00			0.39	0.06
Incremental Delay, d2	34.8	1.2			2.1		0.4	0.3			1.8	0.5
Delay (s)	80.0	41.1			57.2		18.8	6.7			7.3	1.0
Level of Service	E	D			E		B	A			A	A
Approach Delay (s)		59.4			57.2			8.9			4.8	
Approach LOS		E			E			A			A	

Intersection Summary			
HCM Average Control Delay	20.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	79.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	260	6	370	3	4	4	152	400	6	3	764	199
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	11	11	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	5.0
Lane Util. Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.97			0.99		1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.86			0.96		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1712	1530			1711		1728	1813		1741	1818	1487
Flt Permitted	0.74	1.00			0.76		0.09	1.00		0.49	1.00	1.00
Satd. Flow (perm)	1336	1530			1324		167	1813		902	1818	1487
Peak-hour factor, PHF	0.76	0.38	0.84	0.38	0.50	0.50	0.78	0.86	0.75	0.75	0.90	0.73
Adj. Flow (vph)	342	16	440	8	8	8	195	465	8	4	849	273
RTOR Reduction (vph)	0	171	0	0	6	0	0	0	0	0	0	87
Lane Group Flow (vph)	342	285	0	0	18	0	195	473	0	4	849	186
Confl. Peds. (#/hr)	1		3	3		1			1	1		
Heavy Vehicles (%)	5%	0%	3%	0%	0%	0%	1%	1%	0%	0%	1%	5%
Turn Type	Perm			Perm			pm+pt			Perm		Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	34.0	34.0			34.0		76.0	76.0		63.0	63.0	63.0
Effective Green, g (s)	35.0	35.0			35.0		77.0	77.0		64.0	64.0	63.0
Actuated g/C Ratio	0.29	0.29			0.29		0.64	0.64		0.53	0.53	0.52
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0		5.0	5.0	5.0
Lane Grp Cap (vph)	390	446			386		224	1163		481	970	781
v/s Ratio Prot		0.19					c0.07	0.26			0.47	
v/s Ratio Perm	c0.26				0.01		c0.49			0.00		0.13
v/c Ratio	0.88	0.64			0.05		0.87	0.41		0.01	0.88	0.24
Uniform Delay, d1	40.5	37.0			30.5		27.6	10.4		13.1	24.5	15.5
Progression Factor	1.00	1.00			1.00		1.85	0.27		0.79	0.95	0.93
Incremental Delay, d2	23.2	6.8			0.2		27.9	0.8		0.0	7.8	0.5
Delay (s)	63.6	43.8			30.8		78.8	3.6		10.4	31.0	14.8
Level of Service	E	D			C		E	A		B	C	B
Approach Delay (s)		52.3			30.8			25.5			27.0	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM Average Control Delay	34.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	82.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	5	0	70	3	87	0	279	240	230	429	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0	4.0		4.0	
Lane Util. Factor		1.00			1.00			0.95	1.00		0.95	
Frt		1.00			0.93			1.00	0.85		1.00	
Flt Protected		1.00			0.98			1.00	1.00		0.98	
Satd. Flow (prot)		1429			1590			3312	1553		3393	
Flt Permitted		1.00			0.87			1.00	1.00		0.75	
Satd. Flow (perm)		1429			1420			3312	1553		2587	
Peak-hour factor, PHF	0.25	0.63	0.25	0.76	0.25	0.79	0.92	0.95	0.82	0.94	0.85	0.25
Adj. Flow (vph)	0	8	0	92	12	110	0	294	293	245	505	4
RTOR Reduction (vph)	0	0	0	0	71	0	0	0	156	0	1	0
Lane Group Flow (vph)	0	8	0	0	143	0	0	294	137	0	753	0
Heavy Vehicles (%)	0%	33%	0%	9%	43%	5%	0%	9%	4%	1%	6%	50%
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		15.0			15.0			20.0	20.0		20.0	
Effective Green, g (s)		16.0			16.0			21.0	21.0		21.0	
Actuated g/C Ratio		0.36			0.36			0.47	0.47		0.47	
Clearance Time (s)		5.0			5.0			5.0	5.0		5.0	
Lane Grp Cap (vph)		508			505			1546	725		1207	
v/s Ratio Prot		0.01						0.09				
v/s Ratio Perm					c0.10				0.09		c0.29	
v/c Ratio		0.02			0.28			0.19	0.19		0.62	
Uniform Delay, d1		9.4			10.4			7.0	7.0		9.0	
Progression Factor		1.00			1.00			1.00	1.00		1.00	
Incremental Delay, d2		0.1			1.4			0.3	0.6		2.4	
Delay (s)		9.5			11.8			7.3	7.6		11.5	
Level of Service		A			B			A	A		B	
Approach Delay (s)		9.5			11.8			7.4			11.5	
Approach LOS		A			B			A			B	

Intersection Summary			
HCM Average Control Delay	10.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	55	102	3	2	22	8	4	286	35	13	398	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	11	12	12	12	12	12	10	12
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00			0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		0.99			1.00		1.00	1.00		1.00	1.00	
Frt		0.99			0.97		1.00	0.98		1.00	0.99	
Flt Protected		0.98			1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1774			1718		1805	1826		1736	1742	
Flt Permitted		0.88			0.98		0.41	1.00		0.49	1.00	
Satd. Flow (perm)		1592			1694		784	1826		889	1742	
Peak-hour factor, PHF	0.77	0.81	0.38	0.50	0.66	0.67	0.50	0.93	0.75	0.75	0.93	0.54
Adj. Flow (vph)	71	126	8	4	33	12	8	308	47	17	428	26
RTOR Reduction (vph)	0	1	0	0	8	0	0	4	0	0	2	0
Lane Group Flow (vph)	0	204	0	0	41	0	8	351	0	17	452	0
Confl. Peds. (#/hr)	4		5	5		4						
Heavy Vehicles (%)	0%	1%	0%	0%	0%	8%	0%	2%	2%	4%	1%	0%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		40.0			40.0		70.0	70.0		70.0	70.0	
Effective Green, g (s)		41.0			41.0		71.0	71.0		71.0	71.0	
Actuated g/C Ratio		0.34			0.34		0.59	0.59		0.59	0.59	
Clearance Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)		544			579		464	1080		526	1031	
v/s Ratio Prot								0.19			c0.26	
v/s Ratio Perm		c0.13			0.02		0.01			0.02		
v/c Ratio		0.37			0.07		0.02	0.32		0.03	0.44	
Uniform Delay, d1		29.8			26.7		10.1	12.4		10.2	13.5	
Progression Factor		1.00			1.00		1.13	1.13		1.03	1.25	
Incremental Delay, d2		2.0			0.2		0.1	0.8		0.1	1.2	
Delay (s)		31.8			26.9		11.5	14.8		10.6	18.1	
Level of Service		C			C		B	B		B	B	
Approach Delay (s)		31.8			26.9			14.7			17.8	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	19.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	43.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBL2	SBL	SBR	NWL	NWR	NWR2	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	5	1461	115	228	858	26	138	21	530	18	7	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	10	12	12	10	10	10	12	11	12
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	
Lane Util. Factor	1.00	0.94		1.00	0.76			1.00	1.00		1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.98		0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.97	1.00		0.99	
Frt	1.00	0.99		1.00	0.85			1.00	0.85		0.97	
Flt Protected	0.95	0.96		0.95	1.00			0.96	1.00		0.98	
Satd. Flow (prot)	1745	4995		1685	3449			1644	1482		1682	
Flt Permitted	0.23	0.96		0.09	1.00			0.75	1.00		0.55	
Satd. Flow (perm)	415	4995		151	3449			1278	1482		950	
Peak-hour factor, PHF	0.62	0.95	0.83	0.25	0.90	0.69	0.84	0.63	0.93	0.71	0.58	0.33
Adj. Flow (vph)	8	1538	139	912	953	38	164	33	570	25	12	12
RTOR Reduction (vph)	0	8	0	0	2	0	0	0	0	0	9	0
Lane Group Flow (vph)	8	1669	0	912	989	0	0	197	570	0	40	0
Confl. Peds. (#/hr)			5	5			17		20	20		17
Heavy Vehicles (%)	0%	1%	0%	0%	7%	1%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt				custom		Perm		pm+ov	Perm		
Protected Phases	1	6		5	2			4	5		8	
Permitted Phases	6			2			4		4	8		
Actuated Green, G (s)	42.8	42.0		104.0	98.2			18.0	75.0		18.0	
Effective Green, g (s)	44.8	45.0		105.0	101.2			19.0	77.0		19.0	
Actuated g/C Ratio	0.33	0.34		0.78	0.76			0.14	0.57		0.14	
Clearance Time (s)	5.0	7.0		5.0	7.0			5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	157	1677		782	2605			181	896		135	
v/s Ratio Prot	0.00	0.33		c0.50	0.29				0.28			
v/s Ratio Perm	0.02			c0.41				c0.15	0.11		0.04	
v/c Ratio	0.05	1.00		1.17	0.38			1.09	0.64		0.29	
Uniform Delay, d1	30.3	44.4		33.9	5.6			57.5	19.1		51.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.1	20.9		88.5	0.4			92.5	1.5		1.2	
Delay (s)	30.4	65.3		122.4	6.0			150.0	20.6		52.7	
Level of Service	C	E		F	A			F	C		D	
Approach Delay (s)		65.1		61.8				53.8			52.7	
Approach LOS		E		E				D			D	

Intersection Summary			
HCM Average Control Delay	61.6	HCM Level of Service	E
HCM Volume to Capacity ratio	1.12		
Actuated Cycle Length (s)	134.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	64.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	12	105	21	101	20	224	1	803	71	390	1447	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	14	14	14	14	14	14	10	10	10	10	10	10
Total Lost time (s)	3.0	4.0		3.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1925	1824		1925	2027	1706	1348	3264		1685	3331	
Flt Permitted	0.70	1.00		0.11	1.00	1.00	0.11	1.00		0.10	1.00	
Satd. Flow (perm)	1429	1824		232	2027	1706	149	3264		169	3331	
Peak-hour factor, PHF	0.50	0.25	0.25	0.56	0.25	0.93	0.25	0.88	0.78	0.88	0.87	0.65
Adj. Flow (vph)	24	420	84	180	80	241	4	912	91	443	1663	11
RTOR Reduction (vph)	0	6	0	0	0	0	0	6	0	0	0	0
Lane Group Flow (vph)	24	498	0	180	80	241	4	997	0	443	1674	0
Confl. Peds. (#/hr)						5	3					3
Heavy Vehicles (%)	0%	0%	50%	0%	0%	1%	25%	2%	0%	0%	1%	7%
Turn Type	pm+pt			pm+pt		pt+ov	Perm			pm+pt		
Protected Phases	7	4		3	8	8 1		2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	35.0	31.0		41.0	34.0	60.0	35.0	35.0		68.0	66.0	
Effective Green, g (s)	37.0	32.0		43.0	35.0	62.0	38.0	38.0		69.0	69.0	
Actuated g/C Ratio	0.31	0.27		0.36	0.29	0.52	0.32	0.32		0.57	0.57	
Clearance Time (s)	4.0	5.0		4.0	5.0		7.0	7.0		5.0	7.0	
Lane Grp Cap (vph)	461	486		196	591	881	47	1034		438	1915	
v/s Ratio Prot	0.00	c0.27		c0.06	0.04	0.14		0.31		c0.23	0.50	
v/s Ratio Perm	0.01			0.27			0.03			c0.35		
v/c Ratio	0.05	1.02		0.92	0.14	0.27	0.09	0.96		1.01	0.87	
Uniform Delay, d1	29.1	44.0		31.6	31.3	16.3	28.8	40.3		40.1	21.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.93		0.90	0.88	
Incremental Delay, d2	0.2	47.3		45.9	0.5	0.8	1.8	12.9		40.0	4.5	
Delay (s)	29.3	91.3		77.6	31.8	17.1	30.4	50.3		76.1	23.8	
Level of Service	C	F		E	C	B	C	D		E	C	
Approach Delay (s)		88.5			41.2			50.3			34.7	
Approach LOS		F			D			D			C	

Intersection Summary			
HCM Average Control Delay	46.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	11.0
Intersection Capacity Utilization	74.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	392	440	499	380	132	826
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	13	13	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.91
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1680	1503	3252	1455	1626	4673
Flt Permitted	0.95	1.00	1.00	1.00	0.26	1.00
Satd. Flow (perm)	1680	1503	3252	1455	451	4673
Peak-hour factor, PHF	0.94	0.91	0.83	0.84	0.88	0.87
Adj. Flow (vph)	417	484	601	452	150	949
RTOR Reduction (vph)	0	189	0	309	0	0
Lane Group Flow (vph)	417	295	601	143	150	949
Turn Type		Perm		Perm	pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Actuated Green, G (s)	22.0	22.0	18.0	18.0	28.0	28.0
Effective Green, g (s)	23.0	23.0	19.0	19.0	29.0	29.0
Actuated g/C Ratio	0.38	0.38	0.32	0.32	0.48	0.48
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	644	576	1030	461	335	2259
v/s Ratio Prot	c0.25		c0.18		0.04	c0.20
v/s Ratio Perm		0.20		0.10	0.17	
v/c Ratio	0.65	0.51	0.58	0.31	0.45	0.42
Uniform Delay, d1	15.2	14.2	17.2	15.5	9.6	10.0
Progression Factor	1.00	1.00	0.81	6.09	1.00	1.00
Incremental Delay, d2	5.0	3.2	1.5	1.1	4.3	0.6
Delay (s)	20.2	17.4	15.4	95.6	13.9	10.6
Level of Service	C	B	B	F	B	B
Approach Delay (s)	18.7		49.8			11.1
Approach LOS	B		D			B

Intersection Summary			
HCM Average Control Delay	26.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	52.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	117	2	877	5	0	5	0	954	32	37	968	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	14	12	12	12	12	11	12	12	12	12
Total Lost time (s)		5.0	4.0	4.0		4.0		4.0	5.0	5.0	4.0	
Lane Util. Factor		0.95	0.95	1.00		1.00		0.95	1.00	1.00	0.95	
Frt		0.89	0.85	1.00		0.85		1.00	0.85	1.00	1.00	
Flt Protected		0.99	1.00	0.95		1.00		1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1584	1637	1626		1455		3455	1455	1626	3610	
Flt Permitted		0.99	1.00	0.45		1.00		1.00	1.00	0.10	1.00	
Satd. Flow (perm)		1584	1637	770		1455		3455	1455	176	3610	
Peak-hour factor, PHF	0.84	0.92	0.94	0.92	0.92	0.92	0.92	0.89	0.92	0.92	0.99	0.92
Adj. Flow (vph)	139	2	933	5	0	5	0	1072	35	40	978	0
RTOR Reduction (vph)	0	85	187	0	0	4	0	0	21	0	0	0
Lane Group Flow (vph)	0	457	345	5	0	1	0	1072	14	40	978	0
Heavy Vehicles (%)	0%	11%	0%	11%	11%	11%	0%	1%	11%	11%	0%	0%
Turn Type	Split		Perm	custom		custom			Perm	Perm		
Protected Phases	4	4						2			6	
Permitted Phases			4	8		8			2	6		
Actuated Green, G (s)		43.0	43.0	16.0		16.0		47.0	47.0	47.0	47.0	
Effective Green, g (s)		43.0	44.0	16.0		16.0		48.0	47.0	47.0	48.0	
Actuated g/C Ratio		0.36	0.37	0.13		0.13		0.40	0.39	0.39	0.40	
Clearance Time (s)		5.0	5.0	4.0		4.0		5.0	5.0	5.0	5.0	
Lane Grp Cap (vph)		568	600	103		194		1382	570	69	1444	
v/s Ratio Prot		c0.29						c0.31			0.27	
v/s Ratio Perm			0.21	c0.01		0.00			0.01	0.23		
v/c Ratio		0.80	0.58	0.05		0.00		0.78	0.03	0.58	0.68	
Uniform Delay, d1		34.7	30.5	45.4		45.1		31.3	22.4	28.7	29.6	
Progression Factor		1.00	1.00	1.00		1.00		0.54	0.42	0.82	0.84	
Incremental Delay, d2		11.5	4.0	0.9		0.0		3.6	0.1	27.8	2.3	
Delay (s)		46.2	34.5	46.3		45.1		20.6	9.5	51.4	27.2	
Level of Service		D	C	D		D		C	A	D	C	
Approach Delay (s)		40.4			45.7			20.2			28.2	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM Average Control Delay	29.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	13.0
Intersection Capacity Utilization	76.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	86	47	1040	29	53	1719
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frt	1.00	0.85	1.00		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1626	1455	3239		1626	3252
Flt Permitted	0.95	1.00	1.00		0.22	1.00
Satd. Flow (perm)	1626	1455	3239		378	3252
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	93	51	1130	32	58	1868
RTOR Reduction (vph)	0	44	2	0	0	0
Lane Group Flow (vph)	93	7	1160	0	58	1868
Turn Type		Perm			Perm	
Protected Phases	8		2			6
Permitted Phases		8			6	
Actuated Green, G (s)	17.0	17.0	95.0		95.0	95.0
Effective Green, g (s)	17.0	17.0	95.0		95.0	95.0
Actuated g/C Ratio	0.14	0.14	0.79		0.79	0.79
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Lane Grp Cap (vph)	230	206	2564		299	2575
v/s Ratio Prot	c0.06		0.36			c0.57
v/s Ratio Perm		0.00			0.15	
v/c Ratio	0.40	0.04	0.45		0.19	0.73
Uniform Delay, d1	46.9	44.4	4.1		3.1	6.1
Progression Factor	1.00	1.00	0.29		0.40	0.26
Incremental Delay, d2	5.2	0.3	0.3		0.7	0.9
Delay (s)	52.1	44.7	1.5		2.0	2.5
Level of Service	D	D	A		A	A
Approach Delay (s)	49.5		1.5			2.5
Approach LOS	D		A			A

Intersection Summary			
HCM Average Control Delay	4.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

SYNCHRO REPORTS

BELTLINE SCENARIO

2020 PM Peak Hour
HCM Level of Service Analysis

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	434	443	687	1077	141	770
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	13	13	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	1.00	1.00	0.91
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1680	1503	3252	1455	1626	4673
Flt Permitted	0.95	1.00	1.00	1.00	0.29	1.00
Satd. Flow (perm)	1680	1503	3252	1455	489	4673
Peak-hour factor, PHF	0.94	0.91	0.83	0.84	0.88	0.87
Adj. Flow (vph)	462	487	828	1282	160	885
RTOR Reduction (vph)	0	159	0	417	0	0
Lane Group Flow (vph)	462	328	828	865	160	885
Turn Type		Perm		Perm	pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Actuated Green, G (s)	35.0	35.0	76.0	76.0	85.0	85.0
Effective Green, g (s)	36.0	36.0	77.0	77.0	86.0	86.0
Actuated g/C Ratio	0.28	0.28	0.59	0.59	0.66	0.66
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	465	416	1926	862	367	3091
v/s Ratio Prot	c0.27		0.25		c0.02	0.19
v/s Ratio Perm		0.22		c0.59	0.27	
v/c Ratio	0.99	0.79	0.43	1.00	0.44	0.29
Uniform Delay, d1	46.9	43.5	14.5	26.5	17.2	9.2
Progression Factor	1.00	1.00	1.07	4.25	1.00	1.00
Incremental Delay, d2	40.2	14.0	0.3	19.9	3.7	0.2
Delay (s)	87.1	57.5	15.9	132.5	20.9	9.4
Level of Service	F	E	B	F	C	A
Approach Delay (s)	71.9		86.7			11.2
Approach LOS	E		F			B

Intersection Summary			
HCM Average Control Delay	64.1	HCM Level of Service	E
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	98	24	471	5	0	60	0	1883	16	29	999	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	14	12	12	12	12	11	12	12	12	12
Total Lost time (s)		5.0	4.0	4.0		4.0		4.0	5.0		4.0	
Lane Util. Factor		1.00	1.00	1.00		1.00		0.95	1.00		0.95	
Frt		1.00	0.85	1.00		0.85		1.00	0.85		1.00	
Flt Protected		0.96	1.00	0.95		1.00		1.00	1.00		1.00	
Satd. Flow (prot)		1790	1723	1626		1455		3455	1455		3592	
Flt Permitted		0.96	1.00	0.67		1.00		1.00	1.00		0.65	
Satd. Flow (perm)		1790	1723	1140		1455		3455	1455		2349	
Peak-hour factor, PHF	0.84	0.92	0.94	0.92	0.92	0.92	0.92	0.89	0.92	0.92	0.99	0.92
Adj. Flow (vph)	117	26	501	5	0	65	0	2116	17	32	1009	0
RTOR Reduction (vph)	0	0	245	0	0	57	0	0	5	0	0	0
Lane Group Flow (vph)	0	143	256	5	0	8	0	2116	12	0	1041	0
Heavy Vehicles (%)	0%	11%	0%	11%	11%	11%	0%	1%	11%	11%	0%	0%
Turn Type	Split		Perm	custom		custom			Perm	Perm		
Protected Phases	4	4						2			6	
Permitted Phases			4	8		8			2	6		
Actuated Green, G (s)		17.0	17.0	16.0		16.0		83.0	83.0		83.0	
Effective Green, g (s)		17.0	18.0	16.0		16.0		84.0	83.0		84.0	
Actuated g/C Ratio		0.13	0.14	0.12		0.12		0.65	0.64		0.65	
Clearance Time (s)		5.0	5.0	4.0		4.0		5.0	5.0		5.0	
Lane Grp Cap (vph)		234	239	140		179		2232	929		1518	
v/s Ratio Prot		0.08						c0.61				
v/s Ratio Perm			c0.15	0.00		c0.01			0.01		0.44	
v/c Ratio		0.61	1.07	0.04		0.04		0.95	0.01		0.69	
Uniform Delay, d1		53.4	56.0	50.2		50.3		21.0	8.6		14.6	
Progression Factor		1.00	1.00	1.00		1.00		0.58	0.55		1.29	
Incremental Delay, d2		11.4	78.8	0.5		0.5		7.4	0.0		2.2	
Delay (s)		64.7	134.8	50.7		50.7		19.6	4.7		21.0	
Level of Service		E	F	D		D		B	A		C	
Approach Delay (s)		119.2			50.7			19.5			21.0	
Approach LOS		F			D			B			C	

Intersection Summary			
HCM Average Control Delay	36.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	208	2	238	38	15	67	320	1412	0	11	1268	142
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	10	10	10	10	10	10
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		5.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	0.97		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.87		1.00	1.00		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1784	1526		1795	1374		1636	3303		1652	3249	
Flt Permitted	0.61	1.00		0.29	1.00		0.06	1.00		0.07	1.00	
Satd. Flow (perm)	1143	1526		544	1374		106	3303		116	3249	
Peak-hour factor, PHF	0.81	0.75	0.81	0.50	0.92	0.63	0.85	0.82	0.58	0.83	0.94	0.77
Adj. Flow (vph)	257	3	294	76	16	106	376	1722	0	13	1349	184
RTOR Reduction (vph)	0	224	0	0	30	0	0	0	0	0	8	0
Lane Group Flow (vph)	257	73	0	76	92	0	376	1722	0	13	1525	0
Confl. Peds. (#/hr)	1		7	7		1	7		3	3		7
Heavy Vehicles (%)	1%	5%	3%	0%	50%	14%	3%	2%	0%	2%	1%	5%
Turn Type	Perm			Perm			pm+pt			Perm		
Protected Phases		2			6		3	8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	30.0	30.0		30.0	30.0		90.0	89.0		59.0	59.0	
Effective Green, g (s)	31.0	31.0		31.0	31.0		91.0	91.0		60.0	61.0	
Actuated g/C Ratio	0.24	0.24		0.24	0.24		0.70	0.70		0.46	0.47	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	273	364		130	328		380	2312		54	1525	
v/s Ratio Prot		0.05			0.07		c0.20	0.52			0.47	
v/s Ratio Perm	c0.22			0.14			c0.49			0.11		
v/c Ratio	0.94	0.20		0.58	0.28		0.99	0.74		0.24	1.00	
Uniform Delay, d1	48.6	39.6		43.8	40.4		44.9	12.2		21.2	34.5	
Progression Factor	0.99	1.63		1.00	1.00		0.79	0.42		0.71	0.67	
Incremental Delay, d2	40.7	1.2		17.8	2.1		36.8	1.7		6.2	17.8	
Delay (s)	88.9	65.6		61.6	42.5		72.5	6.8		21.3	41.0	
Level of Service	F	E		E	D		E	A		C	D	
Approach Delay (s)		76.4			49.9			18.6			40.8	
Approach LOS		E			D			B			D	

Intersection Summary			
HCM Average Control Delay	35.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	95.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	16	33	14	149	2	392	1	1376	90	235	1170	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11	10	10	10	10	10	10
Total Lost time (s)	3.0	4.0		3.0	4.0	4.0	1.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.96		1.00	1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1729	1527		1745	1837	1524	1348	3274		1685	3333	
Flt Permitted	0.75	1.00		0.25	1.00	1.00	0.10	1.00		0.07	1.00	
Satd. Flow (perm)	1370	1527		459	1837	1524	137	3274		116	3333	
Peak-hour factor, PHF	0.50	0.25	0.25	0.56	0.25	0.93	0.25	0.88	0.78	0.88	0.87	0.65
Adj. Flow (vph)	32	132	56	266	8	422	4	1564	115	267	1345	5
RTOR Reduction (vph)	0	12	0	0	0	0	0	4	0	0	0	0
Lane Group Flow (vph)	32	176	0	266	8	422	4	1675	0	267	1350	0
Confl. Peds. (#/hr)	5					5	3					3
Heavy Vehicles (%)	0%	0%	50%	0%	0%	1%	25%	2%	0%	0%	1%	7%
Turn Type	pm+pt			pm+pt		pm+ov	pm+pt			pm+pt		
Protected Phases	7	4		3	8	1	5	2		1	6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)	20.0	16.0		34.0	26.0	43.0	62.0	62.0		78.0	76.0	
Effective Green, g (s)	22.0	17.0		35.0	27.0	45.0	65.0	65.0		79.0	79.0	
Actuated g/C Ratio	0.17	0.13		0.27	0.21	0.35	0.50	0.50		0.61	0.61	
Clearance Time (s)	4.0	5.0		4.0	5.0	5.0	4.0	7.0		5.0	7.0	
Lane Grp Cap (vph)	246	200		272	382	528	134	1637		288	2025	
v/s Ratio Prot	0.01	0.12		c0.11	0.00	0.11	0.00	c0.51		c0.13	0.41	
v/s Ratio Perm	0.02			c0.15		0.17	0.01			0.43		
v/c Ratio	0.13	0.88		0.98	0.02	0.80	0.03	1.02		0.93	0.67	
Uniform Delay, d1	45.7	55.5		43.2	41.0	38.4	19.9	32.5		49.1	16.8	
Progression Factor	0.98	0.98		1.00	1.00	1.00	0.28	0.24		0.62	0.45	
Incremental Delay, d2	1.1	38.4		49.2	0.1	12.0	0.0	13.8		33.0	1.5	
Delay (s)	45.7	92.6		92.4	41.1	50.4	5.6	21.6		63.5	9.1	
Level of Service	D	F		F	D	D	A	C		E	A	
Approach Delay (s)		85.8			66.3			21.6			18.1	
Approach LOS		F			E			C			B	

Intersection Summary			
HCM Average Control Delay	31.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	79.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	146	188	58	493	346	131	54	1303	208	230	1090	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	12	10	10	11	10	10	10	10	10	10
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.95		0.97	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1636	1773	1615	3173	1722	1539	1178	3236		3204	3250	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1636	1773	1615	3173	1722	1539	1178	3236		3204	3250	
Peak-hour factor, PHF	0.91	0.63	0.65	0.84	0.73	0.84	0.75	0.84	0.85	0.78	0.94	0.75
Adj. Flow (vph)	160	298	89	587	474	156	72	1551	245	295	1160	131
RTOR Reduction (vph)	0	0	75	0	0	101	0	10	0	0	6	0
Lane Group Flow (vph)	160	298	14	587	474	55	72	1786	0	295	1285	0
Confl. Peds. (#/hr)	1					1			3	3		
Heavy Vehicles (%)	3%	0%	0%	3%	3%	0%	43%	2%	0%	2%	2%	3%
Turn Type	Prot		Perm	Prot		Perm	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8						
Actuated Green, G (s)	9.0	19.0	19.0	20.0	30.0	30.0	11.0	63.0		8.0	60.0	
Effective Green, g (s)	10.0	20.0	20.0	21.0	31.0	31.0	12.0	64.0		9.0	61.0	
Actuated g/C Ratio	0.08	0.15	0.15	0.16	0.24	0.24	0.09	0.49		0.07	0.47	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	126	273	248	513	411	367	109	1593		222	1525	
v/s Ratio Prot	0.10	0.17		c0.18	c0.28		0.06	c0.55		c0.09	0.40	
v/s Ratio Perm			0.01			0.04						
v/c Ratio	1.27	1.09	0.06	1.14	1.15	0.15	0.66	1.12		1.33	0.84	
Uniform Delay, d1	60.0	55.0	46.9	54.5	49.5	39.1	57.0	33.0		60.5	30.3	
Progression Factor	0.86	0.92	1.00	1.00	1.00	1.00	0.85	0.73		0.99	0.84	
Incremental Delay, d2	163.8	77.0	0.4	85.9	93.3	0.9	2.8	55.5		167.5	4.0	
Delay (s)	215.7	127.5	47.4	140.4	142.8	40.0	51.3	79.6		227.2	29.6	
Level of Service	F	F	D	F	F	D	D	E		F	C	
Approach Delay (s)		140.3			128.5			78.5			66.4	
Approach LOS		F			F			E			E	

Intersection Summary			
HCM Average Control Delay	93.0	HCM Level of Service	F
HCM Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	88.9%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	80	188	159	213	299	9	220	1496	64	7	1415	97
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	9	12	12	9	12	10	10	10	10	10	10
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95			0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		0.99			1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.94			1.00		1.00	0.99		1.00	0.98	
Flt Protected		0.99			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		2879			3061		1636	3215		1685	3237	
Flt Permitted		0.60			0.54		0.06	1.00		0.07	1.00	
Satd. Flow (perm)		1755			1688		106	3215		116	3237	
Peak-hour factor, PHF	0.69	0.83	0.73	0.70	0.84	0.50	0.70	0.83	0.70	0.75	0.89	0.53
Adj. Flow (vph)	116	227	218	304	356	18	314	1802	91	9	1590	183
RTOR Reduction (vph)	0	78	0	0	1	0	0	3	0	0	7	0
Lane Group Flow (vph)	0	483	0	0	677	0	314	1890	0	9	1766	0
Confl. Peds. (#/hr)	2		1	1		2	2		3	3		2
Heavy Vehicles (%)	3%	4%	6%	4%	3%	0%	3%	4%	3%	0%	2%	5%
Turn Type	Perm			pm+pt			pm+pt			pm+pt		
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		30.0			39.0		81.0	72.0		64.0	60.0	
Effective Green, g (s)		31.0			40.0		82.0	73.0		66.0	61.0	
Actuated g/C Ratio		0.24			0.31		0.63	0.56		0.51	0.47	
Clearance Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)		419			572		267	1805		119	1519	
v/s Ratio Prot					c0.05		c0.15	0.59		0.00	0.55	
v/s Ratio Perm		0.28			c0.32		c0.59			0.04		
v/c Ratio		1.15			2.04dl		1.18	1.05		0.08	1.16	
Uniform Delay, d1		49.5			45.0		53.1	28.5		56.6	34.5	
Progression Factor		0.67			1.00		0.78	0.83		0.72	0.81	
Incremental Delay, d2		90.5			99.2		94.7	28.1		0.5	76.4	
Delay (s)		123.6			144.2		136.3	51.7		41.0	104.3	
Level of Service		F			F		F	D		D	F	
Approach Delay (s)		123.6			144.2			63.7			104.0	
Approach LOS		F			F			E			F	

Intersection Summary			
HCM Average Control Delay	94.3	HCM Level of Service	F
HCM Volume to Capacity ratio	1.15		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	95.8%	ICU Level of Service	F
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	99	218	90	182	293	71	109	1448	144	65	1421	61
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	10	12	12	9	12	12	11	12	12	10	12
Total Lost time (s)	4.0	4.0			4.0			4.0	4.0		4.0	
Lane Util. Factor	1.00	1.00			0.95			0.91	1.00		0.91	
Frpb, ped/bikes	1.00	0.99			1.00			1.00	0.96		1.00	
Flpb, ped/bikes	1.00	1.00			1.00			1.00	1.00		1.00	
Frt	1.00	0.93			0.98			1.00	0.85		0.99	
Flt Protected	0.95	1.00			0.98			0.99	1.00		1.00	
Satd. Flow (prot)	1608	1629			3067			4939	1535		4723	
Flt Permitted	0.25	1.00			0.56			0.64	1.00		0.66	
Satd. Flow (perm)	423	1629			1747			3167	1535		3103	
Peak-hour factor, PHF	0.67	0.93	0.50	0.79	0.81	0.91	0.46	0.91	0.91	0.67	0.91	0.59
Adj. Flow (vph)	148	234	180	230	362	78	237	1591	158	97	1562	103
RTOR Reduction (vph)	0	20	0	0	8	0	0	0	72	0	5	0
Lane Group Flow (vph)	148	394	0	0	662	0	0	1828	86	0	1757	0
Confl. Peds. (#/hr)	3		1	1		3	18		5	5		18
Heavy Vehicles (%)	1%	2%	0%	3%	2%	0%	0%	1%	1%	1%	1%	1%
Turn Type	Perm			Perm			Perm		Perm	pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	44.0	44.0			44.0			67.0	67.0		76.0	
Effective Green, g (s)	45.0	45.0			45.0			68.0	68.0		77.0	
Actuated g/C Ratio	0.35	0.35			0.35			0.52	0.52		0.59	
Clearance Time (s)	5.0	5.0			5.0			5.0	5.0		5.0	
Lane Grp Cap (vph)	146	564			605			1657	803		1900	
v/s Ratio Prot		0.24									c0.04	
v/s Ratio Perm	0.35				c0.38			c0.58	0.06		0.51	
v/c Ratio	1.01	0.70			1.40dl			3.25dl	0.11		0.92	
Uniform Delay, d1	42.5	36.7			42.5			31.0	15.7		23.9	
Progression Factor	1.00	1.00			1.00			0.88	0.42		0.56	
Incremental Delay, d2	77.8	7.0			65.0			54.9	0.2		1.0	
Delay (s)	120.4	43.7			107.5			82.3	6.9		14.4	
Level of Service	F	D			F			F	A		B	
Approach Delay (s)		63.9			107.5			76.3			14.4	
Approach LOS		E			F			E			B	

Intersection Summary			
HCM Average Control Delay	57.2	HCM Level of Service	E
HCM Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	106.4%	ICU Level of Service	G
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	90	1115	13	176	646	139	31	576	300	156	832	249
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	12	10	10	12	11	11	12	11	11	12
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95			0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes		1.00			1.00		1.00	0.98		1.00	0.98	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		1.00			0.97		1.00	0.94		1.00	0.94	
Flt Protected		1.00			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		3282			3170		1678	3218		1728	3195	
Flt Permitted		0.62			0.50		0.13	1.00		0.95	1.00	
Satd. Flow (perm)		2047			1602		235	3218		1728	3195	
Peak-hour factor, PHF	0.78	0.90	0.81	0.75	0.93	0.74	0.90	0.94	0.79	0.94	0.91	0.36
Adj. Flow (vph)	115	1239	16	235	695	188	34	613	380	166	914	692
RTOR Reduction (vph)	0	1	0	0	13	0	0	72	0	0	106	0
Lane Group Flow (vph)	0	1369	0	0	1105	0	34	921	0	166	1500	0
Confl. Peds. (#/hr)	2		1	1		2	10		12	12		10
Heavy Vehicles (%)	2%	2%	5%	4%	2%	1%	4%	1%	0%	1%	1%	0%
Turn Type	custom			pm+pt			pm+pt			Prot		
Protected Phases				5	2		7	4		3	8	
Permitted Phases	6	6		2			4					
Actuated Green, G (s)		61.0			70.0		34.0	34.0		11.0	41.0	
Effective Green, g (s)		62.0			71.0		35.0	35.0		12.0	42.0	
Actuated g/C Ratio		0.48			0.55		0.27	0.27		0.09	0.32	
Clearance Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)		976			935		119	866		160	1032	
v/s Ratio Prot					c0.05		0.01	c0.29		0.10	c0.47	
v/s Ratio Perm		c0.67			0.60		0.07					
v/c Ratio		1.40			1.82dl		0.29	1.06		1.04	1.45	
Uniform Delay, d1		34.0			29.5		57.4	47.5		59.0	44.0	
Progression Factor		0.63			1.00		1.00	1.00		0.96	0.69	
Incremental Delay, d2		187.5			92.8		5.9	49.1		53.3	206.3	
Delay (s)		208.8			122.3		63.4	96.6		110.0	236.5	
Level of Service		F			F		E	F		F	F	
Approach Delay (s)		208.8			122.3			95.5			224.6	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM Average Control Delay	173.8	HCM Level of Service	F
HCM Volume to Capacity ratio	1.38		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	109.2%	ICU Level of Service	H
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	200	109	37	119	125	78	60	951	50	45	879	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	10	12	12	12	12	10	10	12	10	10	12
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	0.99			1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Frt	1.00	0.96		1.00	0.95			0.99		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)	1608	1696		1800	1777			3119		1652	3216	
Flt Permitted	0.17	1.00		0.56	1.00			0.65		0.16	1.00	
Satd. Flow (perm)	282	1696		1066	1777			2051		273	3216	
Peak-hour factor, PHF	0.89	0.83	0.80	0.79	0.64	0.88	0.56	0.92	0.78	0.71	0.95	0.86
Adj. Flow (vph)	225	131	46	151	195	89	107	1034	64	63	925	102
RTOR Reduction (vph)	0	10	0	0	13	0	0	3	0	0	5	0
Lane Group Flow (vph)	225	167	0	151	271	0	0	1202	0	63	1022	0
Confl. Peds. (#/hr)	2		3	3		2	7		2	2		7
Heavy Vehicles (%)	1%	0%	0%	0%	2%	0%	3%	7%	5%	2%	3%	0%
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	37.7	23.9		27.9	19.0			72.0		82.2	80.2	
Effective Green, g (s)	38.8	24.9		29.9	20.0			75.0		83.2	83.2	
Actuated g/C Ratio	0.30	0.19		0.23	0.15			0.58		0.64	0.64	
Clearance Time (s)	5.0	5.0		5.0	5.0			7.0		5.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	235	325		301	273			1183		219	2058	
v/s Ratio Prot	c0.11	0.10		0.04	0.15					0.01	c0.32	
v/s Ratio Perm	c0.18			0.08				c0.59		0.17		
v/c Ratio	0.96	0.51		0.50	0.99			1.02		0.29	0.50	
Uniform Delay, d1	39.0	47.1		42.1	54.9			27.5		24.1	12.3	
Progression Factor	1.00	1.00		0.37	0.45			1.06		1.00	1.00	
Incremental Delay, d2	46.4	1.4		0.4	27.0			27.6		0.7	0.9	
Delay (s)	85.4	48.5		15.9	51.6			56.9		24.8	13.2	
Level of Service	F	D		B	D			E		C	B	
Approach Delay (s)		69.1			39.2			56.9			13.9	
Approach LOS		E			D			E			B	

Intersection Summary			
HCM Average Control Delay	41.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	92.8%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	60	43	5	8	67	10	75	889	10	9	735	72
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1626	1687		1626	1678		1626	1709		1626	1689	
Flt Permitted	0.70	1.00		0.72	1.00		0.18	1.00		0.12	1.00	
Satd. Flow (perm)	1202	1687		1238	1678		313	1709		212	1689	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	47	5	9	73	11	82	966	11	10	799	78
RTOR Reduction (vph)	0	4	0	0	8	0	0	1	0	0	6	0
Lane Group Flow (vph)	65	48	0	9	76	0	82	976	0	10	871	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	16.0	16.0		16.0	16.0		41.0	41.0		41.0	41.0	
Effective Green, g (s)	16.0	16.0		16.0	16.0		41.0	41.0		41.0	41.0	
Actuated g/C Ratio	0.25	0.25		0.25	0.25		0.63	0.63		0.63	0.63	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	296	415		305	413		197	1078		134	1065	
v/s Ratio Prot		0.03			0.05			c0.57			0.52	
v/s Ratio Perm	c0.05			0.01			0.26			0.05		
v/c Ratio	0.22	0.12		0.03	0.18		0.42	0.91		0.07	0.82	
Uniform Delay, d1	19.5	19.0		18.6	19.3		6.0	10.3		4.6	9.2	
Progression Factor	1.00	1.00		1.05	1.04		1.05	1.23		0.79	1.80	
Incremental Delay, d2	1.7	0.6		0.2	1.0		3.4	7.3		0.8	5.6	
Delay (s)	21.2	19.6		19.8	21.1		9.7	19.9		4.5	22.1	
Level of Service	C	B		B	C		A	B		A	C	
Approach Delay (s)		20.5			21.0			19.1			21.9	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM Average Control Delay	20.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	70.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	21	12	1	142	13	377	8	743	56	206	723	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	10	12	10	12	11	12	12	11	12
Total Lost time (s)		4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00	1.00	0.95	0.95	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00	0.97	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt		1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected		0.97	1.00	0.95	0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1847	1570	1585	1733	1492	1805	1780		1787	1807	
Flt Permitted		0.97	1.00	0.95	0.97	1.00	0.23	1.00		0.08	1.00	
Satd. Flow (perm)		1847	1570	1585	1733	1492	440	1780		149	1807	
Peak-hour factor, PHF	0.63	0.50	0.75	0.81	0.40	0.81	0.94	0.82	0.75	0.90	0.91	0.73
Adj. Flow (vph)	33	24	1	175	32	465	9	906	75	229	795	37
RTOR Reduction (vph)	0	0	1	0	0	187	0	2	0	0	1	0
Lane Group Flow (vph)	0	57	0	103	104	278	9	979	0	229	831	0
Confl. Peds. (#/hr)			2	2								
Heavy Vehicles (%)	0%	0%	0%	1%	0%	1%	0%	2%	2%	1%	1%	0%
Turn Type	Split		Perm	Split		pm+ov	Perm			pm+pt		
Protected Phases	8	8		4	4	1		2		1	6	
Permitted Phases			8			4	2			6		
Actuated Green, G (s)		8.2	8.2	13.1	13.1	26.1	75.7	75.7		93.7	93.7	
Effective Green, g (s)		9.2	9.2	14.1	14.1	28.1	76.7	76.7		94.7	94.7	
Actuated g/C Ratio		0.07	0.07	0.11	0.11	0.22	0.59	0.59		0.73	0.73	
Clearance Time (s)		5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		131	111	172	188	368	260	1050		285	1316	
v/s Ratio Prot		c0.03		0.07	0.06	c0.08		c0.55		0.09	0.46	
v/s Ratio Perm			0.00			0.10	0.02			0.50		
v/c Ratio		0.44	0.00	0.60	0.55	0.75	0.03	0.93		0.80	0.63	
Uniform Delay, d1		57.9	56.1	55.3	55.0	47.7	11.2	24.3		44.8	8.9	
Progression Factor		1.00	1.00	0.86	0.86	0.67	0.83	0.87		0.49	0.28	
Incremental Delay, d2		2.3	0.0	0.5	0.3	0.8	0.2	14.5		9.3	1.4	
Delay (s)		60.2	56.1	48.1	47.8	32.9	9.5	35.6		31.1	3.9	
Level of Service		E	E	D	D	C	A	D		C	A	
Approach Delay (s)		60.1			37.6			35.3			9.7	
Approach LOS		E			D			D			A	

Intersection Summary			
HCM Average Control Delay	26.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	39	68	4	30	160	160	7	492	39	109	461	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	14	12	12	9	9	12	11	12	12	12	12
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.99			1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected		0.98			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1873			1628	1439	1805	1767		1770	1844	
Flt Permitted		0.78			0.93	1.00	0.36	1.00		0.30	1.00	
Satd. Flow (perm)		1500			1529	1439	684	1767		562	1844	
Peak-hour factor, PHF	0.56	0.83	0.58	0.75	0.79	0.79	0.50	0.85	0.85	0.86	0.92	0.44
Adj. Flow (vph)	70	82	7	40	203	203	14	579	46	127	501	43
RTOR Reduction (vph)	0	3	0	0	0	141	0	4	0	0	5	0
Lane Group Flow (vph)	0	156	0	0	243	62	14	621	0	127	539	0
Heavy Vehicles (%)	6%	5%	0%	0%	5%	1%	0%	3%	0%	2%	2%	0%
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		19.0			19.0	19.0	36.0	36.0		36.0	36.0	
Effective Green, g (s)		20.0			20.0	20.0	37.0	37.0		37.0	37.0	
Actuated g/C Ratio		0.31			0.31	0.31	0.57	0.57		0.57	0.57	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)		462			470	443	389	1006		320	1050	
v/s Ratio Prot								c0.35			0.29	
v/s Ratio Perm		0.10			c0.16	0.04	0.02			0.23		
v/c Ratio		0.34			0.52	0.14	0.04	0.62		0.40	0.51	
Uniform Delay, d1		17.4			18.5	16.3	6.2	9.3		7.8	8.5	
Progression Factor		1.00			0.86	0.81	0.56	0.78		1.10	1.04	
Incremental Delay, d2		2.0			0.4	0.1	0.2	2.7		2.9	1.4	
Delay (s)		19.4			16.4	13.2	3.6	9.9		11.5	10.3	
Level of Service		B			B	B	A	A		B	B	
Approach Delay (s)		19.4			15.0			9.8			10.6	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM Average Control Delay	12.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	63.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	SBL	SBR	NWL	NWR
Lane Configurations						
Volume (vph)	0	233	444	13	497	426
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	10	9	12	10	9
Total Lost time (s)		4.0	4.0		4.0	4.0
Lane Util. Factor		0.88	0.97		1.00	1.00
Frt		0.85	0.99		1.00	0.85
Flt Protected		1.00	0.95		0.95	1.00
Satd. Flow (prot)		2627	3087		1636	1425
Flt Permitted		1.00	0.95		0.95	1.00
Satd. Flow (perm)		2627	3087		1636	1425
Peak-hour factor, PHF	0.55	0.84	0.92	0.63	0.86	0.93
Adj. Flow (vph)	0	277	483	21	578	458
RTOR Reduction (vph)	0	96	3	0	0	0
Lane Group Flow (vph)	0	181	501	0	578	458
Heavy Vehicles (%)	13%	1%	2%	0%	3%	2%
Turn Type		custom				pt+ov
Protected Phases			6		8	8 6
Permitted Phases		4				
Actuated Green, G (s)		80.0	40.0		80.0	130.0
Effective Green, g (s)		81.0	41.0		81.0	130.0
Actuated g/C Ratio		0.62	0.32		0.62	1.00
Clearance Time (s)		5.0	5.0		5.0	
Lane Grp Cap (vph)		1637	974		1019	1425
v/s Ratio Prot			c0.16		c0.35	0.32
v/s Ratio Perm		0.07				
v/c Ratio		0.11	0.51		0.57	0.32
Uniform Delay, d1		9.9	36.4		14.3	0.0
Progression Factor		1.00	0.38		0.95	1.00
Incremental Delay, d2		0.1	1.7		0.2	0.1
Delay (s)		10.1	15.4		13.8	0.1
Level of Service		B	B		B	A
Approach Delay (s)	10.1		15.4		7.7	
Approach LOS	B		B		A	

Intersection Summary			
HCM Average Control Delay	10.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	47.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	266	212	773	236	71	679
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11
Total Lost time (s)	4.0	5.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00		0.95	0.95
Frpb, ped/bikes	1.00	0.98	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.97		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1678	1494	1722		1641	1710
Flt Permitted	0.95	1.00	1.00		0.09	0.96
Satd. Flow (perm)	1678	1494	1722		160	1642
Peak-hour factor, PHF	0.75	0.74	0.89	0.90	0.85	0.90
Adj. Flow (vph)	355	286	869	262	84	754
RTOR Reduction (vph)	0	170	8	0	0	0
Lane Group Flow (vph)	355	116	1123	0	76	762
Confl. Peds. (#/hr)		1		1	1	
Heavy Vehicles (%)	4%	2%	3%	2%	1%	2%
Turn Type		Perm			Perm	
Protected Phases	8		2			6
Permitted Phases		8			6	
Actuated Green, G (s)	28.9	28.9	91.1		91.1	91.1
Effective Green, g (s)	29.9	28.9	92.1		92.1	92.1
Actuated g/C Ratio	0.23	0.22	0.71		0.71	0.71
Clearance Time (s)	5.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	386	332	1220		113	1163
v/s Ratio Prot	c0.21		c0.65			
v/s Ratio Perm		0.08			0.48	0.46
v/c Ratio	0.92	0.35	0.92		0.67	0.66
Uniform Delay, d1	48.9	42.6	15.9		10.6	10.3
Progression Factor	0.54	0.26	0.65		1.24	1.07
Incremental Delay, d2	3.7	0.1	9.3		17.5	1.7
Delay (s)	30.1	11.2	19.6		30.6	12.8
Level of Service	C	B	B		C	B
Approach Delay (s)	21.7		19.6			14.4
Approach LOS	C		B			B

Intersection Summary			
HCM Average Control Delay	18.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	76.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	351	8	201	5	28	9	214	680	6	2	605	422
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	9	12	12	10	12	11	9	12	12	10	10
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95			1.00	1.00
Frpb, ped/bikes	1.00	0.97			1.00		1.00	1.00			1.00	1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00			1.00	1.00
Frt	1.00	0.86			0.98		1.00	1.00			1.00	0.85
Flt Protected	0.95	1.00			0.99		0.95	1.00			1.00	1.00
Satd. Flow (prot)	1617	1421			1697		1745	2923			1689	1507
Flt Permitted	0.65	1.00			0.35		0.20	1.00			1.00	1.00
Satd. Flow (perm)	1100	1421			599		368	2923			1686	1507
Peak-hour factor, PHF	0.85	0.75	0.94	0.25	0.75	0.75	0.75	0.88	0.25	0.92	0.98	0.93
Adj. Flow (vph)	413	11	214	20	37	12	285	773	24	2	617	454
RTOR Reduction (vph)	0	141	0	0	6	0	0	2	0	0	0	217
Lane Group Flow (vph)	413	84	0	0	63	0	285	795	0	0	619	237
Confl. Peds. (#/hr)	4		3	3		4						
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	11%	0%	0%	5%	0%
Turn Type	pm+pt			Perm			pm+pt			Perm		Perm
Protected Phases	7	4			8		5	2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	44.4	43.4			10.6		76.6	76.6			61.9	61.9
Effective Green, g (s)	44.4	44.4			11.6		76.6	77.6			62.9	62.9
Actuated g/C Ratio	0.34	0.34			0.09		0.59	0.60			0.48	0.48
Clearance Time (s)	4.0	5.0			5.0		4.0	5.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	490	485			53		330	1745			816	729
v/s Ratio Prot	c0.19	0.06					c0.07	0.27				
v/s Ratio Perm	0.10				c0.10		c0.44				0.37	0.16
v/c Ratio	0.84	0.17			1.18		0.86	0.46			0.76	0.32
Uniform Delay, d1	40.0	30.0			59.2		20.6	14.5			27.4	20.5
Progression Factor	1.00	1.00			1.00		1.11	1.03			0.81	0.33
Incremental Delay, d2	12.5	0.2			181.3		12.0	0.5			5.8	1.0
Delay (s)	52.5	30.1			240.5		34.9	15.4			27.8	7.9
Level of Service	D	C			F		C	B			C	A
Approach Delay (s)		44.6			240.5			20.6			19.4	
Approach LOS		D			F			C			B	

Intersection Summary			
HCM Average Control Delay	30.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	87.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	243	1	235	2	2	7	378	709	2	1	683	251
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	11	11	11	11	11	11	11	11
Total Lost time (s)	3.0	4.0			4.0		4.0	4.0		4.0	4.0	5.0
Lane Util. Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.97			0.99		1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85			0.92		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00			0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1715	1522			1640		1728	1817		1745	1818	1487
Flt Permitted	0.74	1.00			0.92		0.09	1.00		0.18	1.00	1.00
Satd. Flow (perm)	1330	1522			1521		166	1817		339	1818	1487
Peak-hour factor, PHF	0.76	0.38	0.84	0.38	0.50	0.50	0.78	0.86	0.75	0.75	0.90	0.73
Adj. Flow (vph)	320	3	280	5	4	14	485	824	3	1	759	344
RTOR Reduction (vph)	0	215	0	0	12	0	0	0	0	0	0	138
Lane Group Flow (vph)	320	68	0	0	11	0	485	827	0	1	759	206
Confl. Peds. (#/hr)	1		3	3		1			1	1		
Heavy Vehicles (%)	5%	0%	3%	0%	0%	0%	1%	1%	0%	0%	1%	5%
Turn Type	pm+pt			Perm			pm+pt			Perm		Perm
Protected Phases	7	4			8		5	2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	29.0	29.0			16.0		91.0	91.0		58.0	58.0	58.0
Effective Green, g (s)	30.0	30.0			17.0		92.0	92.0		59.0	59.0	58.0
Actuated g/C Ratio	0.23	0.23			0.13		0.71	0.71		0.45	0.45	0.45
Clearance Time (s)	4.0	5.0			5.0		5.0	5.0		5.0	5.0	5.0
Lane Grp Cap (vph)	337	351			199		466	1286		154	825	663
v/s Ratio Prot	c0.07	0.04					c0.23	0.46			0.42	
v/s Ratio Perm	c0.15				0.01		c0.50			0.00		0.14
v/c Ratio	0.95	0.19			0.05		1.04	0.64		0.01	0.92	0.31
Uniform Delay, d1	49.3	40.3			49.5		42.1	10.2		19.4	33.3	23.1
Progression Factor	1.00	1.00			1.00		0.95	0.65		0.68	0.74	0.66
Incremental Delay, d2	37.8	1.2			0.5		39.1	1.1		0.1	12.4	0.8
Delay (s)	87.1	41.5			50.0		79.2	7.7		13.3	37.1	16.0
Level of Service	F	D			D		E	A		B	D	B
Approach Delay (s)		65.7			50.0			34.2			30.5	
Approach LOS		E			D			C			C	

Intersection Summary			
HCM Average Control Delay	39.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	7.0
Intersection Capacity Utilization	87.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	4	4	6	234	1	327	3	540	109	125	480	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0	4.0		4.0	
Lane Util. Factor		1.00			1.00			0.95	1.00		0.95	
Frt		0.93			0.92			1.00	0.85		1.00	
Flt Protected		0.98			0.98			1.00	1.00		0.99	
Satd. Flow (prot)		1664			1606			3312	1553		3393	
Flt Permitted		0.82			0.84			0.95	1.00		0.69	
Satd. Flow (perm)		1381			1380			3154	1553		2372	
Peak-hour factor, PHF	0.25	0.63	0.25	0.76	0.25	0.79	0.92	0.95	0.82	0.94	0.85	0.25
Adj. Flow (vph)	16	6	24	308	4	414	3	568	133	133	565	4
RTOR Reduction (vph)	0	12	0	0	71	0	0	0	84	0	1	0
Lane Group Flow (vph)	0	34	0	0	655	0	0	571	49	0	701	0
Heavy Vehicles (%)	0%	33%	0%	9%	43%	5%	0%	9%	4%	1%	6%	50%
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		29.0			29.0			21.0	21.0		21.0	
Effective Green, g (s)		30.0			30.0			22.0	22.0		22.0	
Actuated g/C Ratio		0.50			0.50			0.37	0.37		0.37	
Clearance Time (s)		5.0			5.0			5.0	5.0		5.0	
Lane Grp Cap (vph)		691			690			1156	569		870	
v/s Ratio Prot												
v/s Ratio Perm		0.02			c0.47			0.18	0.03		c0.30	
v/c Ratio		0.05			0.95			0.49	0.09		0.81	
Uniform Delay, d1		7.7			14.3			14.7	12.4		17.1	
Progression Factor		1.00			1.00			1.00	1.00		1.00	
Incremental Delay, d2		0.1			23.9			1.5	0.3		7.9	
Delay (s)		7.8			38.1			16.2	12.7		25.0	
Level of Service		A			D			B	B		C	
Approach Delay (s)		7.8			38.1			15.5			25.0	
Approach LOS		A			D			B			C	

Intersection Summary			
HCM Average Control Delay	26.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	77	30	5	7	43	19	11	444	13	14	464	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	11	12	12	12	12	12	10	12
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00			0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		0.99			1.00		1.00	1.00		1.00	1.00	
Frt		0.99			0.96		1.00	0.99		1.00	0.99	
Flt Protected		0.97			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1735			1706		1805	1853		1736	1736	
Flt Permitted		0.73			0.96		0.38	1.00		0.41	1.00	
Satd. Flow (perm)		1301			1647		719	1853		747	1736	
Peak-hour factor, PHF	0.77	0.81	0.38	0.50	0.66	0.67	0.50	0.93	0.75	0.75	0.93	0.54
Adj. Flow (vph)	100	37	13	14	65	28	22	477	17	19	499	43
RTOR Reduction (vph)	0	3	0	0	10	0	0	1	0	0	2	0
Lane Group Flow (vph)	0	147	0	0	97	0	22	493	0	19	540	0
Confl. Peds. (#/hr)	4		5	5		4						
Heavy Vehicles (%)	0%	1%	0%	0%	0%	8%	0%	2%	2%	4%	1%	0%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		36.0			36.0		84.0	84.0		84.0	84.0	
Effective Green, g (s)		37.0			37.0		85.0	85.0		85.0	85.0	
Actuated g/C Ratio		0.28			0.28		0.65	0.65		0.65	0.65	
Clearance Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)		370			469		470	1212		488	1135	
v/s Ratio Prot								0.27			c0.31	
v/s Ratio Perm		c0.11			0.06		0.03			0.03		
v/c Ratio		0.40			0.21		0.05	0.41		0.04	0.48	
Uniform Delay, d1		37.5			35.3		8.0	10.6		8.0	11.3	
Progression Factor		1.00			1.00		0.89	0.94		1.10	1.19	
Incremental Delay, d2		3.2			1.0		0.2	1.0		0.1	1.3	
Delay (s)		40.7			36.3		7.4	10.9		8.9	14.7	
Level of Service		D			D		A	B		A	B	
Approach Delay (s)		40.7			36.3			10.8			14.5	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM Average Control Delay	17.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.8%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	7	1408	229	303	990	89	180	38	350	69	33	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	10	12	12	10	10	10	12	11	12
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	
Lane Util. Factor	1.00	0.91		1.00	0.91			1.00	1.00		1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.98		1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99	1.00		0.99	
Frt	1.00	0.98		1.00	0.98			1.00	0.85		0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.96	1.00		0.97	
Satd. Flow (prot)	1745	5008		1685	4800			1687	1480		1736	
Flt Permitted	0.22	1.00		0.15	1.00			0.66	1.00		0.45	
Satd. Flow (perm)	397	5008		263	4800			1163	1480		799	
Peak-hour factor, PHF	0.62	0.95	0.83	0.25	0.90	0.69	0.84	0.63	0.93	0.71	0.58	0.33
Adj. Flow (vph)	11	1482	276	1212	1100	129	214	60	376	97	57	21
RTOR Reduction (vph)	0	36	0	0	18	0	0	0	1	0	7	0
Lane Group Flow (vph)	11	1722	0	1212	1211	0	0	274	376	0	168	0
Confl. Peds. (#/hr)			5	5			17		20	20		17
Heavy Vehicles (%)	0%	1%	0%	0%	7%	1%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt			pm+pt			Perm		pm+ov	Perm		
Protected Phases	1	6		5	2			4	5		8	
Permitted Phases	6			2			4		4	8		
Actuated Green, G (s)	22.8	22.0		46.0	40.2			16.0	35.0		16.0	
Effective Green, g (s)	24.8	25.0		47.0	43.2			17.0	37.0		17.0	
Actuated g/C Ratio	0.34	0.34		0.64	0.58			0.23	0.50		0.23	
Clearance Time (s)	5.0	7.0		5.0	7.0			5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	166	1692		551	2802			267	820		184	
v/s Ratio Prot	0.00	0.34		c0.59	0.25				0.12			
v/s Ratio Perm	0.02			c0.80				c0.24	0.13		0.21	
v/c Ratio	0.07	1.02		2.20	0.43			1.03	0.46		0.91	
Uniform Delay, d1	16.5	24.5		20.2	8.6			28.5	12.0		27.8	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.2	26.4		545.8	0.5			62.0	0.4		42.3	
Delay (s)	16.6	50.9		566.0	9.1			90.5	12.4		70.1	
Level of Service	B	D		F	A			F	B		E	
Approach Delay (s)		50.6			285.6			45.3			70.1	
Approach LOS		D			F			D			E	

Intersection Summary			
HCM Average Control Delay	164.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.79		
Actuated Cycle Length (s)	74.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	75.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	71	81	1687	88	77	1408
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1626	1455	3228		1626	3252
Flt Permitted	0.95	1.00	1.00		0.08	1.00
Satd. Flow (perm)	1626	1455	3228		142	3252
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	77	88	1834	96	84	1530
RTOR Reduction (vph)	0	47	3	0	0	0
Lane Group Flow (vph)	77	41	1927	0	84	1530
Turn Type		Perm			Perm	
Protected Phases	8		2			6
Permitted Phases		8			6	
Actuated Green, G (s)	16.0	16.0	106.0		106.0	106.0
Effective Green, g (s)	16.0	16.0	106.0		106.0	106.0
Actuated g/C Ratio	0.12	0.12	0.82		0.82	0.82
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Lane Grp Cap (vph)	200	179	2632		116	2652
v/s Ratio Prot	c0.05		c0.60			0.47
v/s Ratio Perm		0.03			0.59	
v/c Ratio	0.38	0.23	0.73		0.72	0.58
Uniform Delay, d1	52.5	51.4	5.5		5.4	4.2
Progression Factor	1.00	1.00	0.45		1.77	0.69
Incremental Delay, d2	5.5	2.9	0.6		15.2	0.4
Delay (s)	58.0	54.4	3.0		24.8	3.3
Level of Service	E	D	A		C	A
Approach Delay (s)	56.1		3.0			4.4
Approach LOS	E		A			A

Intersection Summary			
HCM Average Control Delay	6.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	67.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

SYNCHRO REPORTS

BELTLINE SCENARIO

2030 AM Peak Hour
HCM Level of Service Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	350	31	47	209	147	85	54	832	96	262	1007	101
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	12	10	10	11	10	10	10	10	10	10
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.91		0.97	0.91	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1636	1773	1615	3173	1722	1540	1178	4674		3204	4661	
Flt Permitted	0.95	1.00	1.00	0.73	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1636	1773	1615	2422	1722	1540	1178	4674		3204	4661	
Peak-hour factor, PHF	0.91	0.63	0.65	0.84	0.73	0.84	0.75	0.84	0.85	0.78	0.94	0.75
Adj. Flow (vph)	385	49	72	249	201	101	72	990	113	336	1071	135
RTOR Reduction (vph)	0	0	50	0	0	84	0	14	0	0	16	0
Lane Group Flow (vph)	385	49	22	249	201	17	72	1089	0	336	1190	0
Confl. Peds. (#/hr)	1					1			3	3		
Heavy Vehicles (%)	3%	0%	0%	3%	3%	0%	43%	2%	0%	2%	2%	3%
Turn Type	Prot		Perm	pm+pt		Perm	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4	8		8						
Actuated Green, G (s)	28.0	30.0	30.0	30.0	16.0	16.0	8.0	24.0		12.0	28.0	
Effective Green, g (s)	29.0	31.0	31.0	32.0	17.0	17.0	9.0	25.0		13.0	29.0	
Actuated g/C Ratio	0.29	0.31	0.31	0.32	0.17	0.17	0.09	0.25		0.13	0.29	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	474	550	501	888	293	262	106	1169		417	1352	
v/s Ratio Prot	c0.24	0.03		0.04	c0.12		0.06	0.23		c0.10	c0.26	
v/s Ratio Perm			0.01	0.05		0.01						
v/c Ratio	0.81	0.09	0.04	0.28	0.69	0.07	0.68	0.93		0.81	0.88	
Uniform Delay, d1	33.0	24.5	24.1	25.8	39.0	34.8	44.1	36.7		42.3	33.8	
Progression Factor	0.83	1.27	2.13	1.00	1.00	1.00	0.86	0.55		0.79	0.78	
Incremental Delay, d2	11.8	0.3	0.1	0.8	12.3	0.5	25.6	12.5		7.1	3.9	
Delay (s)	39.2	31.4	51.4	26.6	51.3	35.3	63.5	32.7		40.6	30.3	
Level of Service	D	C	D	C	D	D	E	C		D	C	
Approach Delay (s)		40.2			37.2			34.6			32.6	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM Average Control Delay	34.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	71.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	43	350	170	110	174	2	117	853	108	7	1247	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	9	12	12	9	12	10	10	10	10	10	10
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95			0.95		1.00	0.91		1.00	0.91	
Frpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.95			1.00		1.00	0.98		1.00	0.99	
Flt Protected		1.00			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		2929			3071		1636	4559		1685	4668	
Flt Permitted		0.88			0.54		0.12	1.00		0.12	1.00	
Satd. Flow (perm)		2576			1700		203	4559		209	4668	
Peak-hour factor, PHF	0.69	0.83	0.73	0.70	0.84	0.50	0.70	0.83	0.70	0.75	0.89	0.53
Adj. Flow (vph)	62	422	233	157	207	4	167	1028	154	9	1401	130
RTOR Reduction (vph)	0	58	0	0	1	0	0	20	0	0	11	0
Lane Group Flow (vph)	0	659	0	0	367	0	167	1162	0	9	1520	0
Confl. Peds. (#/hr)	2		1	1		2	2		3	3		2
Heavy Vehicles (%)	3%	4%	6%	4%	3%	0%	3%	4%	3%	0%	2%	5%
Turn Type	Perm			pm+pt			pm+pt			pm+pt		
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		29.0			38.0		43.0	43.0		38.0	38.0	
Effective Green, g (s)		30.0			39.0		44.0	44.0		39.0	39.0	
Actuated g/C Ratio		0.30			0.39		0.44	0.44		0.39	0.39	
Clearance Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)		773			732		233	2006		155	1821	
v/s Ratio Prot					c0.03		c0.07	0.25		0.00	c0.33	
v/s Ratio Perm		c0.26			0.17		0.24			0.02		
v/c Ratio		0.85			0.90dl		0.72	0.58		0.06	0.83	
Uniform Delay, d1		32.9			23.1		33.2	21.0		20.3	27.6	
Progression Factor		0.49			1.00		1.02	1.16		0.28	0.42	
Incremental Delay, d2		8.5			2.5		13.3	0.9		0.5	3.5	
Delay (s)		24.6			25.6		47.1	25.4		6.2	15.0	
Level of Service		C			C		D	C		A	B	
Approach Delay (s)		24.6			25.6			28.1			14.9	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM Average Control Delay	22.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	75.2%	ICU Level of Service	D
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	70	259	83	87	178	44	46	983	314	68	1120	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	10	12	12	9	12	12	11	12	12	10	12
Total Lost time (s)	4.0	4.0			4.0			4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00			0.95			0.91	1.00	1.00	0.91	
Frpb, ped/bikes	1.00	0.99			1.00			1.00	0.96	1.00	0.99	
Flpb, ped/bikes	1.00	1.00			1.00			1.00	1.00	1.00	1.00	
Frt	1.00	0.94			0.98			1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00			0.99			1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1604	1645			3072			4946	1543	1787	4686	
Flt Permitted	0.47	1.00			0.59			0.68	1.00	0.17	1.00	
Satd. Flow (perm)	798	1645			1851			3379	1543	316	4686	
Peak-hour factor, PHF	0.67	0.93	0.50	0.79	0.81	0.91	0.46	0.91	0.91	0.67	0.91	0.59
Adj. Flow (vph)	104	278	166	110	220	48	100	1080	345	101	1231	161
RTOR Reduction (vph)	0	21	0	0	11	0	0	0	186	0	17	0
Lane Group Flow (vph)	104	423	0	0	367	0	0	1180	159	101	1375	0
Confl. Peds. (#/hr)	3		1	1		3	18		5	5		18
Heavy Vehicles (%)	1%	2%	0%	3%	2%	0%	0%	1%	1%	1%	1%	1%
Turn Type	Perm			Perm			Perm		Perm	pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	36.0	36.0			36.0			45.0	45.0	54.0	54.0	
Effective Green, g (s)	37.0	37.0			37.0			46.0	46.0	55.0	55.0	
Actuated g/C Ratio	0.37	0.37			0.37			0.46	0.46	0.55	0.55	
Clearance Time (s)	5.0	5.0			5.0			5.0	5.0	5.0	5.0	
Lane Grp Cap (vph)	295	609			685			1554	710	247	2577	
v/s Ratio Prot		c0.26								0.02	c0.29	
v/s Ratio Perm	0.13				0.20			c0.35	0.10	0.20		
v/c Ratio	0.35	0.69			0.54			0.93dl	0.22	0.41	0.53	
Uniform Delay, d1	22.8	26.7			24.7			22.4	16.3	22.1	14.3	
Progression Factor	0.94	0.94			1.00			0.49	0.08	0.50	0.50	
Incremental Delay, d2	3.2	6.2			3.0			0.3	0.1	2.8	0.4	
Delay (s)	24.6	31.3			27.7			11.3	1.3	13.8	7.6	
Level of Service	C	C			C			B	A	B	A	
Approach Delay (s)		30.0			27.7			9.0			8.0	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM Average Control Delay	13.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	89.2%	ICU Level of Service	E
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	170	69	477	235	167	816
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	1.00		1.00		1.00	1.00
Frpb, ped/bikes	0.99		0.99		1.00	1.00
Flpb, ped/bikes	1.00		1.00		1.00	1.00
Frt	0.96		0.96		1.00	1.00
Flt Protected	0.97		1.00		0.95	1.00
Satd. Flow (prot)	1637		1697		1728	1801
Flt Permitted	0.97		1.00		0.25	1.00
Satd. Flow (perm)	1637		1697		461	1801
Peak-hour factor, PHF	0.75	0.74	0.89	0.90	0.85	0.90
Adj. Flow (vph)	227	93	536	261	196	907
RTOR Reduction (vph)	15	0	17	0	0	0
Lane Group Flow (vph)	305	0	780	0	196	907
Confl. Peds. (#/hr)		1		1	1	
Heavy Vehicles (%)	4%	2%	3%	2%	1%	2%
Turn Type					Perm	
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	22.3		67.7		67.7	67.7
Effective Green, g (s)	23.3		68.7		68.7	68.7
Actuated g/C Ratio	0.23		0.69		0.69	0.69
Clearance Time (s)	5.0		5.0		5.0	5.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	381		1166		317	1237
v/s Ratio Prot	c0.19		0.46			c0.50
v/s Ratio Perm					0.42	
v/c Ratio	0.80		0.67		0.62	0.73
Uniform Delay, d1	36.1		9.1		8.5	9.9
Progression Factor	0.96		1.05		0.46	0.50
Incremental Delay, d2	7.4		2.3		4.3	1.9
Delay (s)	42.0		11.8		8.2	6.8
Level of Service	D		B		A	A
Approach Delay (s)	42.0		11.8			7.0
Approach LOS	D		B			A

Intersection Summary			
HCM Average Control Delay	13.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	72.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	35	93	0	7	18	4	0	545	1	3	1012	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Frt	1.00	1.00		1.00	0.98			1.00		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00			1.00		0.95	1.00	
Satd. Flow (prot)	1626	1712		1626	1669			1711		1626	1705	
Flt Permitted	0.74	1.00		0.65	1.00			1.00		0.40	1.00	
Satd. Flow (perm)	1269	1712		1110	1669			1711		677	1705	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	38	101	0	8	20	4	0	592	1	3	1100	28
RTOR Reduction (vph)	0	0	0	0	3	0	0	0	0	0	1	0
Lane Group Flow (vph)	38	101	0	8	21	0	0	593	0	3	1127	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	16.0	16.0		16.0	16.0			76.0		76.0	76.0	
Effective Green, g (s)	16.0	16.0		16.0	16.0			76.0		76.0	76.0	
Actuated g/C Ratio	0.16	0.16		0.16	0.16			0.76		0.76	0.76	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Lane Grp Cap (vph)	203	274		178	267			1300		515	1296	
v/s Ratio Prot		c0.06			0.01			0.35			c0.66	
v/s Ratio Perm	0.03			0.01						0.00		
v/c Ratio	0.19	0.37		0.04	0.08			0.46		0.01	0.87	
Uniform Delay, d1	36.4	37.5		35.5	35.7			4.4		2.9	8.5	
Progression Factor	1.00	1.00		0.67	0.63			0.80		0.49	0.48	
Incremental Delay, d2	2.0	3.8		0.4	0.5			0.8		0.0	6.2	
Delay (s)	38.4	41.3		24.3	23.1			4.4		1.4	10.3	
Level of Service	D	D		C	C			A		A	B	
Approach Delay (s)		40.5			23.4			4.4			10.3	
Approach LOS		D			C			A			B	

Intersection Summary			
HCM Average Control Delay	10.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	70.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	6	7	3	75	15	168	17	416	102	411	748	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	10	12	10	12	11	12	12	11	12
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00	0.97		1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	0.97		1.00	0.99	
Flt Protected		0.98	1.00		0.97	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1861	1573		1822	1492	1805	1744		1787	1803	
Flt Permitted		0.81	1.00		0.97	1.00	0.16	1.00		0.21	1.00	
Satd. Flow (perm)		1530	1573		1822	1492	300	1744		398	1803	
Peak-hour factor, PHF	0.63	0.50	0.75	0.81	0.40	0.81	0.94	0.82	0.75	0.90	0.91	0.73
Adj. Flow (vph)	10	14	4	93	38	207	18	507	136	457	822	52
RTOR Reduction (vph)	0	0	4	0	0	180	0	7	0	0	2	0
Lane Group Flow (vph)	0	24	0	0	131	27	18	636	0	457	872	0
Confl. Peds. (#/hr)			2	2								
Heavy Vehicles (%)	0%	0%	0%	1%	0%	1%	0%	2%	2%	1%	1%	0%
Turn Type	Perm		Perm	Split		Prot	Perm			pm+pt		
Protected Phases		8		7	7	7		2		1	6	
Permitted Phases	8		8				2			6		
Actuated Green, G (s)		4.7	4.7		12.2	12.2	46.1	46.1		68.1	68.1	
Effective Green, g (s)		5.7	5.7		13.2	13.2	47.1	47.1		69.1	69.1	
Actuated g/C Ratio		0.06	0.06		0.13	0.13	0.47	0.47		0.69	0.69	
Clearance Time (s)		5.0	5.0		5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		87	90		241	197	141	821		525	1246	
v/s Ratio Prot					c0.07	0.02		0.36		c0.16	0.48	
v/s Ratio Perm		c0.02	0.00				0.06			c0.44		
v/c Ratio		0.28	0.00		0.54	0.14	0.13	0.77		0.87	0.70	
Uniform Delay, d1		45.2	44.5		40.6	38.4	14.9	22.0		25.6	9.2	
Progression Factor		1.00	1.00		0.71	0.45	0.81	0.78		0.63	0.39	
Incremental Delay, d2		1.7	0.0		1.9	0.2	1.8	6.9		7.3	1.5	
Delay (s)		46.9	44.5		30.5	17.3	13.9	24.0		23.5	5.1	
Level of Service		D	D		C	B	B	C		C	A	
Approach Delay (s)		46.6			22.5			23.7			11.4	
Approach LOS		D			C			C			B	

Intersection Summary			
HCM Average Control Delay	16.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	11	117	8	26	94	75	4	288	37	176	422	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	14	12	12	9	9	12	11	12	12	12	12
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.99			1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected		0.99			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1904			1628	1439	1805	1758		1770	1851	
Flt Permitted		0.96			0.91	1.00	0.39	1.00		0.48	1.00	
Satd. Flow (perm)		1839			1499	1439	737	1758		886	1851	
Peak-hour factor, PHF	0.56	0.83	0.58	0.75	0.79	0.79	0.50	0.85	0.85	0.86	0.92	0.44
Adj. Flow (vph)	20	141	14	35	119	95	8	339	44	205	459	23
RTOR Reduction (vph)	0	6	0	0	0	63	0	10	0	0	4	0
Lane Group Flow (vph)	0	169	0	0	154	32	8	374	0	205	479	0
Heavy Vehicles (%)	6%	5%	0%	0%	5%	1%	0%	3%	0%	2%	2%	0%
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		16.0			16.0	16.0	24.0	24.0		24.0	24.0	
Effective Green, g (s)		17.0			17.0	17.0	25.0	25.0		25.0	25.0	
Actuated g/C Ratio		0.34			0.34	0.34	0.50	0.50		0.50	0.50	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)		625			510	489	369	879		443	926	
v/s Ratio Prot								0.21			c0.26	
v/s Ratio Perm		0.09			c0.10	0.02	0.01			0.23		
v/c Ratio		0.27			0.30	0.07	0.02	0.42		0.46	0.52	
Uniform Delay, d1		12.0			12.1	11.1	6.3	7.9		8.1	8.4	
Progression Factor		1.00			0.96	1.34	0.59	0.79		0.91	0.90	
Incremental Delay, d2		1.1			1.2	0.2	0.1	1.4		2.6	1.6	
Delay (s)		13.1			12.9	15.1	3.9	7.7		10.0	9.2	
Level of Service		B			B	B	A	A		B	A	
Approach Delay (s)		13.1			13.7			7.6			9.4	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	10.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	SBL	SBR	NWL	NWR
Lane Configurations						
Volume (vph)	0	525	395	6	189	290
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	10	9	12	10	9
Total Lost time (s)		4.0	4.0		4.0	4.0
Lane Util. Factor		0.88	0.97		1.00	1.00
Frt		0.85	1.00		1.00	0.85
Flt Protected		1.00	0.95		0.95	1.00
Satd. Flow (prot)		2627	3092		1636	1425
Flt Permitted		1.00	0.95		0.95	1.00
Satd. Flow (perm)		2627	3092		1636	1425
Peak-hour factor, PHF	0.55	0.84	0.92	0.63	0.86	0.93
Adj. Flow (vph)	0	625	429	10	220	312
RTOR Reduction (vph)	0	215	2	0	0	0
Lane Group Flow (vph)	0	410	437	0	220	312
Heavy Vehicles (%)	13%	1%	2%	0%	3%	2%
Turn Type		custom				pt+ov
Protected Phases			6		8	8 6
Permitted Phases		4				
Actuated Green, G (s)		52.0	38.0		52.0	100.0
Effective Green, g (s)		53.0	39.0		53.0	100.0
Actuated g/C Ratio		0.53	0.39		0.53	1.00
Clearance Time (s)		5.0	5.0		5.0	
Lane Grp Cap (vph)		1392	1206		867	1425
v/s Ratio Prot			c0.14		0.13	0.22
v/s Ratio Perm		c0.16				
v/c Ratio		0.29	0.36		0.25	0.22
Uniform Delay, d1		13.1	21.7		12.8	0.0
Progression Factor		1.00	0.43		0.85	1.00
Incremental Delay, d2		0.5	0.8		0.1	0.0
Delay (s)		13.6	10.1		10.9	0.0
Level of Service		B	B		B	A
Approach Delay (s)	13.6		10.1		4.5	
Approach LOS	B		B		A	

Intersection Summary			
HCM Average Control Delay	9.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	28.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL2	EBL	EBR	NBL2	NBL	NBR	SEL	SER	SER2	SWL	SWR	SWR2
Lane Configurations												
Volume (vph)	30	650	140	203	936	155	210	435	14	70	508	98
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	10	10	12	10	10	12	11	11	12
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.97			0.97		1.00	0.95		1.00	0.88	
Frpb, ped/bikes	1.00	0.99			1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97			0.98		0.98	0.85		1.00	0.85	
Flt Protected	0.95	0.96			0.96		0.96	1.00		0.95	1.00	
Satd. Flow (prot)	1678	3258			3147		1630	1383		1728	2729	
Flt Permitted	0.20	0.96			0.65		0.14	1.00		0.20	1.00	
Satd. Flow (perm)	353	3258			2143		231	1383		364	2729	
Peak-hour factor, PHF	0.90	0.94	0.79	0.75	0.93	0.74	0.78	0.90	0.81	0.94	0.91	0.36
Adj. Flow (vph)	33	691	177	271	1006	209	269	483	17	74	558	272
RTOR Reduction (vph)	0	24	0	0	14	0	0	1	0	0	49	0
Lane Group Flow (vph)	33	844	0	0	1472	0	317	451	0	74	781	0
Confl. Peds. (#/hr)	10		12	1		2	2		1	12		10
Heavy Vehicles (%)	4%	1%	0%	4%	2%	1%	2%	2%	5%	1%	1%	0%
Turn Type	pm+pt			pm+pt				custom			custom	
Protected Phases	7	4		5	2					3	8	
Permitted Phases	4			2			6	6		8		
Actuated Green, G (s)	23.0	19.0			62.0		53.0	53.0		23.0	19.0	
Effective Green, g (s)	25.0	20.0			63.0		54.0	54.0		25.0	20.0	
Actuated g/C Ratio	0.25	0.20			0.63		0.54	0.54		0.25	0.20	
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	155	652			1400		125	747		159	546	
v/s Ratio Prot	0.01	0.26			c0.05					c0.02	c0.29	
v/s Ratio Perm	0.04				0.61		c1.37	0.33		0.09		
v/c Ratio	0.21	1.29			1.05		2.54	0.60		0.47	1.43	
Uniform Delay, d1	42.2	40.0			18.5		23.0	15.7		43.2	40.0	
Progression Factor	1.00	1.00			1.00		0.82	0.68		0.77	0.65	
Incremental Delay, d2	3.1	143.7			38.9		712.9	3.4		8.0	202.6	
Delay (s)	45.3	183.7			57.4		731.8	14.1		41.3	228.5	
Level of Service	D	F			E		F	B		D	F	
Approach Delay (s)		178.6			57.4		310.0			213.1		
Approach LOS		F			E		F			F		

Intersection Summary			
HCM Average Control Delay	166.8	HCM Level of Service	F
HCM Volume to Capacity ratio	2.08		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	108.0%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	239	143	99	48	45	46	22	589	31	37	975	84
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	10	12	12	12	12	10	10	12	10	10	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.94		1.00	0.94		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1606	1650		1798	1739		1636	1643		1652	1722	1548
Flt Permitted	0.41	1.00		0.57	1.00		0.10	1.00		0.22	1.00	1.00
Satd. Flow (perm)	685	1650		1080	1739		171	1643		385	1722	1548
Peak-hour factor, PHF	0.89	0.83	0.80	0.79	0.64	0.88	0.56	0.92	0.78	0.71	0.95	0.86
Adj. Flow (vph)	269	172	124	61	70	52	39	640	40	52	1026	98
RTOR Reduction (vph)	0	28	0	0	28	0	0	2	0	0	0	32
Lane Group Flow (vph)	269	268	0	61	94	0	39	678	0	52	1026	66
Confl. Peds. (#/hr)	2		3	3		2	7		2	2		7
Heavy Vehicles (%)	1%	0%	0%	0%	2%	0%	3%	7%	5%	2%	3%	0%
Turn Type	pm+pt			Perm			pm+pt			pm+pt		Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	21.9	21.9		10.9	10.9		58.5	56.5		58.7	58.7	58.7
Effective Green, g (s)	22.9	22.9		11.9	11.9		59.5	59.5		59.7	61.7	61.7
Actuated g/C Ratio	0.23	0.23		0.12	0.12		0.60	0.60		0.60	0.62	0.62
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	7.0		5.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	221	378		129	207		152	978		301	1062	955
v/s Ratio Prot	c0.09	0.16			0.05		0.01	c0.41		0.01	c0.60	
v/s Ratio Perm	c0.19			0.06			0.14			0.09		0.04
v/c Ratio	1.22	0.71		0.47	0.45		0.26	0.69		0.17	0.97	0.07
Uniform Delay, d1	37.8	35.5		41.1	41.0		32.7	14.0		11.6	18.2	7.7
Progression Factor	1.00	1.00		0.94	1.00		1.33	1.43		1.00	1.00	1.00
Incremental Delay, d2	131.6	6.0		2.2	1.2		0.8	3.5		0.3	20.6	0.1
Delay (s)	169.4	41.5		40.7	42.1		44.2	23.4		11.9	38.7	7.8
Level of Service	F	D		D	D		D	C		B	D	A
Approach Delay (s)		102.4			41.6			24.5			35.0	
Approach LOS		F			D			C			C	

Intersection Summary			
HCM Average Control Delay	47.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	80.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	143	10	188	2	0	6	135	962	23	95	1647	78
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	10	10	10	10	10	10
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes		1.00	0.98		1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		0.99	1.00	1.00	1.00		1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	1.00		1.00	0.99	
Flt Protected		0.96	1.00		0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1789	1541		1789	1397	1636	4721		1651	4737	
Flt Permitted		0.74	1.00		0.52	1.00	0.08	1.00		0.18	1.00	
Satd. Flow (perm)		1382	1541		983	1397	131	4721		318	4737	
Peak-hour factor, PHF	0.81	0.75	0.81	0.50	0.92	0.63	0.85	0.82	0.58	0.83	0.94	0.77
Adj. Flow (vph)	177	13	232	4	0	10	159	1173	40	114	1752	101
RTOR Reduction (vph)	0	0	4	0	0	7	0	4	0	0	6	0
Lane Group Flow (vph)	0	190	228	0	4	3	159	1209	0	114	1847	0
Confl. Peds. (#/hr)	1		7	7		1	7		3	3		7
Heavy Vehicles (%)	1%	5%	3%	0%	50%	14%	3%	2%	0%	2%	1%	5%
Turn Type	Perm		pm+ov	Perm		Perm	pm+pt			pm+pt		
Protected Phases		2	3		6		3	8		7	4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)		25.0	35.4		25.0	25.0	61.9	51.5		56.1	48.6	
Effective Green, g (s)		26.0	37.4		26.0	26.0	63.9	53.5		58.1	50.6	
Actuated g/C Ratio		0.26	0.37		0.26	0.26	0.64	0.54		0.58	0.51	
Clearance Time (s)		5.0	5.0		5.0	5.0	5.0	6.0		5.0	6.0	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		359	638		256	363	255	2526		298	2397	
v/s Ratio Prot			0.04				c0.07	0.26		0.03	c0.39	
v/s Ratio Perm		c0.14	0.11		0.00	0.00	0.33			0.19		
v/c Ratio		0.53	0.36		0.02	0.01	0.62	0.48		0.38	0.77	
Uniform Delay, d1		31.7	22.6		27.5	27.4	19.6	14.5		9.9	20.0	
Progression Factor		0.99	0.77		1.00	1.00	0.93	1.82		0.75	0.69	
Incremental Delay, d2		5.3	0.3		0.1	0.0	4.5	0.6		0.1	0.2	
Delay (s)		36.6	17.8		27.6	27.5	22.7	27.1		7.5	14.1	
Level of Service		D	B		C	C	C	C		A	B	
Approach Delay (s)		26.3			27.5			26.6			13.7	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM Average Control Delay	19.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	70.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	272	3	333	1	13	3	83	434	1	0	744	460
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	9	12	12	10	12	11	9	12	12	10	10
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95			1.00	1.00
Frpb, ped/bikes	1.00	0.97			1.00		1.00	1.00			1.00	1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00			1.00	1.00
Frt	1.00	0.85			0.98		1.00	1.00			1.00	0.85
Flt Protected	0.95	1.00			0.99		0.95	1.00			1.00	1.00
Satd. Flow (prot)	1618	1414			1714		1745	2926			1689	1507
Flt Permitted	0.64	1.00			0.86		0.22	1.00			1.00	1.00
Satd. Flow (perm)	1094	1414			1491		407	2926			1689	1507
Peak-hour factor, PHF	0.85	0.75	0.94	0.25	0.75	0.75	0.75	0.88	0.25	0.92	0.98	0.93
Adj. Flow (vph)	320	4	354	4	17	4	111	493	4	0	759	495
RTOR Reduction (vph)	0	141	0	0	4	0	0	0	0	0	0	200
Lane Group Flow (vph)	320	217	0	0	21	0	111	497	0	0	759	295
Confl. Peds. (#/hr)	4		3	3		4						
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	11%	0%	0%	5%	0%
Turn Type	pm+pt			Perm			pm+pt			Perm		Perm
Protected Phases	7	4			8		5	2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	24.1	24.1			4.0		66.9	65.9			57.9	57.9
Effective Green, g (s)	24.1	25.1			5.0		66.9	66.9			58.9	58.9
Actuated g/C Ratio	0.24	0.25			0.05		0.67	0.67			0.59	0.59
Clearance Time (s)	4.0	5.0			5.0		4.0	5.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	348	355			75		326	1957			995	888
v/s Ratio Prot	c0.15	0.15					0.01	c0.17			c0.45	
v/s Ratio Perm	c0.07				0.01		0.21					0.20
v/c Ratio	0.92	0.61			0.28		0.34	0.25			0.76	0.33
Uniform Delay, d1	36.5	33.1			45.8		20.8	6.6			15.3	10.5
Progression Factor	1.00	1.00			1.00		1.19	1.28			0.61	0.39
Incremental Delay, d2	28.4	3.1			2.1		0.6	0.3			2.9	0.5
Delay (s)	64.8	36.2			47.8		25.3	8.8			12.3	4.7
Level of Service	E	D			D		C	A			B	A
Approach Delay (s)		49.7			47.8			11.8			9.3	
Approach LOS		D			D			B			A	

Intersection Summary			
HCM Average Control Delay	20.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	82.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	272	7	387	3	4	4	159	419	7	3	800	209
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	11	11	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	5.0
Lane Util. Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.97			0.99		1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.86			0.96		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1714	1536			1712		1728	1813		1743	1818	1487
Flt Permitted	0.74	1.00			0.70		0.09	1.00		0.39	1.00	1.00
Satd. Flow (perm)	1338	1536			1212		161	1813		722	1818	1487
Peak-hour factor, PHF	0.76	0.38	0.84	0.38	0.50	0.50	0.78	0.86	0.75	0.75	0.90	0.73
Adj. Flow (vph)	358	18	461	8	8	8	204	487	9	4	889	286
RTOR Reduction (vph)	0	158	0	0	6	0	0	1	0	0	0	104
Lane Group Flow (vph)	358	321	0	0	18	0	204	495	0	4	889	182
Confl. Peds. (#/hr)	1		3	3		1			1	1		
Heavy Vehicles (%)	5%	0%	3%	0%	0%	0%	1%	1%	0%	0%	1%	5%
Turn Type	Perm			Perm			pm+pt			Perm		Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	27.0	27.0			27.0		63.0	63.0		52.0	52.0	52.0
Effective Green, g (s)	28.0	28.0			28.0		64.0	64.0		53.0	53.0	52.0
Actuated g/C Ratio	0.28	0.28			0.28		0.64	0.64		0.53	0.53	0.52
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0		5.0	5.0	5.0
Lane Grp Cap (vph)	375	430			339		213	1160		383	964	773
v/s Ratio Prot		0.21					c0.07	0.27			0.49	
v/s Ratio Perm	c0.27				0.02		c0.55			0.01		0.12
v/c Ratio	0.95	0.75			0.05		0.96	0.43		0.01	0.92	0.24
Uniform Delay, d1	35.4	32.8			26.3		37.8	8.9		11.1	21.6	13.1
Progression Factor	1.00	1.00			1.00		0.58	0.28		0.68	0.86	0.61
Incremental Delay, d2	36.3	11.3			0.3		43.4	0.9		0.0	11.6	0.5
Delay (s)	71.7	44.0			26.6		65.2	3.4		7.6	30.3	8.5
Level of Service	E	D			C		E	A		A	C	A
Approach Delay (s)		55.9			26.6			21.4			24.9	
Approach LOS		E			C			C			C	

Intersection Summary			
HCM Average Control Delay	33.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	85.6%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	6	0	74	3	91	0	293	252	241	450	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0	4.0		4.0	
Lane Util. Factor		1.00			1.00			0.95	1.00		0.95	
Frt		1.00			0.93			1.00	0.85		1.00	
Flt Protected		1.00			0.98			1.00	1.00		0.98	
Satd. Flow (prot)		1429			1591			3312	1553		3394	
Flt Permitted		1.00			0.87			1.00	1.00		0.75	
Satd. Flow (perm)		1429			1419			3312	1553		2575	
Peak-hour factor, PHF	0.25	0.63	0.25	0.76	0.25	0.79	0.92	0.95	0.82	0.94	0.85	0.25
Adj. Flow (vph)	0	10	0	97	12	115	0	308	307	256	529	4
RTOR Reduction (vph)	0	0	0	0	72	0	0	0	171	0	1	0
Lane Group Flow (vph)	0	10	0	0	152	0	0	308	136	0	788	0
Heavy Vehicles (%)	0%	33%	0%	9%	43%	5%	0%	9%	4%	1%	6%	50%
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		16.0			16.0			19.0	19.0		19.0	
Effective Green, g (s)		17.0			17.0			20.0	20.0		20.0	
Actuated g/C Ratio		0.38			0.38			0.44	0.44		0.44	
Clearance Time (s)		5.0			5.0			5.0	5.0		5.0	
Lane Grp Cap (vph)		540			536			1472	690		1144	
v/s Ratio Prot		0.01						0.09				
v/s Ratio Perm					c0.11				0.09		c0.31	
v/c Ratio		0.02			0.28			0.21	0.20		0.69	
Uniform Delay, d1		8.8			9.8			7.7	7.6		10.0	
Progression Factor		1.00			1.00			1.00	1.00		1.00	
Incremental Delay, d2		0.1			1.3			0.3	0.6		3.4	
Delay (s)		8.8			11.1			8.0	8.3		13.4	
Level of Service		A			B			A	A		B	
Approach Delay (s)		8.8			11.1			8.1			13.4	
Approach LOS		A			B			A			B	

Intersection Summary			
HCM Average Control Delay	11.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	57	107	3	2	23	9	4	300	36	13	417	14
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	11	12	12	12	12	12	10	12
Total Lost time (s)		4.0			4.0			4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00			1.00		1.00	1.00	
Frpb, ped/bikes		1.00			0.99			1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00			1.00		1.00	1.00	
Frt		0.99			0.97			0.98		1.00	0.99	
Flt Protected		0.98			1.00			1.00		0.95	1.00	
Satd. Flow (prot)		1777			1719			1830		1736	1742	
Flt Permitted		0.88			0.98			0.99		0.51	1.00	
Satd. Flow (perm)		1593			1694			1815		925	1742	
Peak-hour factor, PHF	0.77	0.81	0.38	0.50	0.66	0.67	0.50	0.93	0.75	0.75	0.93	0.54
Adj. Flow (vph)	74	132	8	4	35	13	8	323	48	17	448	26
RTOR Reduction (vph)	0	1	0	0	9	0	0	5	0	0	2	0
Lane Group Flow (vph)	0	213	0	0	43	0	0	374	0	17	472	0
Confl. Peds. (#/hr)	4		5	5		4						
Heavy Vehicles (%)	0%	1%	0%	0%	0%	8%	0%	2%	2%	4%	1%	0%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		31.0			31.0			59.0		59.0	59.0	
Effective Green, g (s)		32.0			32.0			60.0		60.0	60.0	
Actuated g/C Ratio		0.32			0.32			0.60		0.60	0.60	
Clearance Time (s)		5.0			5.0			5.0		5.0	5.0	
Lane Grp Cap (vph)		510			542			1089		555	1045	
v/s Ratio Prot											c0.27	
v/s Ratio Perm		c0.13			0.03			0.21		0.02		
v/c Ratio		0.42			0.08			0.34		0.03	0.45	
Uniform Delay, d1		26.7			23.7			10.1		8.1	11.0	
Progression Factor		1.00			1.00			0.79		0.53	0.67	
Incremental Delay, d2		2.5			0.3			0.9		0.1	1.2	
Delay (s)		29.2			24.0			8.8		4.4	8.6	
Level of Service		C			C			A		A	A	
Approach Delay (s)		29.2			24.0			8.8			8.5	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM Average Control Delay	13.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SBL2	SBL	SBR	NWL	NWR	NWR2	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	6	1531	118	231	900	28	141	22	540	19	8	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	10	12	12	10	10	10	12	11	12
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	
Lane Util. Factor	1.00	0.94		1.00	0.76			1.00	1.00		1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00			1.00	0.99		0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.97	1.00		0.99	
Frt	1.00	0.99		1.00	0.85			1.00	0.85		0.97	
Flt Protected	0.95	0.96		0.95	1.00			0.96	1.00		0.98	
Satd. Flow (prot)	1745	4998		1685	3449			1652	1485		1693	
Flt Permitted	0.21	0.96		0.08	1.00			0.74	1.00		0.47	
Satd. Flow (perm)	389	4998		148	3449			1269	1485		821	
Peak-hour factor, PHF	0.62	0.95	0.83	0.25	0.90	0.69	0.84	0.63	0.93	0.71	0.58	0.33
Adj. Flow (vph)	10	1612	142	924	1000	41	168	35	581	27	14	12
RTOR Reduction (vph)	0	8	0	0	2	0	0	0	0	0	8	0
Lane Group Flow (vph)	10	1746	0	924	1039	0	0	203	581	0	45	0
Confl. Peds. (#/hr)			5	5			17		20	20		17
Heavy Vehicles (%)	0%	1%	0%	0%	7%	1%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt				custom		Perm		pm+ov	Perm		
Protected Phases	1	6		5	2			4	5		8	
Permitted Phases	6			2			4		4	8		
Actuated Green, G (s)	43.8	43.0		105.0	99.2			17.0	74.0		17.0	
Effective Green, g (s)	45.8	46.0		106.0	102.2			18.0	76.0		18.0	
Actuated g/C Ratio	0.34	0.34		0.79	0.76			0.13	0.57		0.13	
Clearance Time (s)	5.0	7.0		5.0	7.0			5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	151	1716		782	2631			170	887		110	
v/s Ratio Prot	0.00	0.35		c0.51	0.30				0.28			
v/s Ratio Perm	0.02			c0.42				c0.16	0.11		0.06	
v/c Ratio	0.07	1.02		1.18	0.39			1.19	0.65		0.41	
Uniform Delay, d1	29.8	44.0		34.0	5.4			58.0	20.0		53.1	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.2	26.2		94.6	0.4			130.8	1.7		2.5	
Delay (s)	30.0	70.2		128.6	5.8			188.8	21.7		55.6	
Level of Service	C	E		F	A			F	C		E	
Approach Delay (s)		70.0		63.6				65.0			55.6	
Approach LOS		E		E				E			E	

Intersection Summary			
HCM Average Control Delay	66.2	HCM Level of Service	E
HCM Volume to Capacity ratio	1.15		
Actuated Cycle Length (s)	134.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	67.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	13	110	70	106	11	235	1	842	75	409	1517	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	14	14	14	14	14	14	10	10	10	10	10	10
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.94		1.00	0.87		1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1916	1598		1925	1721		1348	4690		1685	4786	
Flt Permitted	0.50	1.00		0.14	1.00		0.19	1.00		0.95	1.00	
Satd. Flow (perm)	1014	1598		287	1721		270	4690		1685	4786	
Peak-hour factor, PHF	0.50	0.25	0.25	0.56	0.25	0.93	0.25	0.88	0.78	0.88	0.87	0.65
Adj. Flow (vph)	26	440	280	189	44	253	4	957	96	465	1744	11
RTOR Reduction (vph)	0	2	0	0	0	0	0	12	0	0	1	0
Lane Group Flow (vph)	26	718	0	189	297	0	4	1041	0	465	1754	0
Confl. Peds. (#/hr)	5					5	3					3
Heavy Vehicles (%)	0%	0%	50%	0%	0%	1%	25%	2%	0%	0%	1%	7%
Turn Type	Perm			Perm			Perm			Prot		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2					
Actuated Green, G (s)	47.0	47.0		47.0	47.0		18.0	18.0		18.0	41.0	
Effective Green, g (s)	48.0	48.0		48.0	48.0		21.0	21.0		19.0	44.0	
Actuated g/C Ratio	0.48	0.48		0.48	0.48		0.21	0.21		0.19	0.44	
Clearance Time (s)	5.0	5.0		5.0	5.0		7.0	7.0		5.0	7.0	
Lane Grp Cap (vph)	487	767		138	826		57	985		320	2106	
v/s Ratio Prot		0.45			0.17			c0.22		c0.28	0.37	
v/s Ratio Perm	0.03			c0.66			0.01					
v/c Ratio	0.05	0.94		1.37	0.36		0.07	1.06		1.45	0.83	
Uniform Delay, d1	13.9	24.5		26.0	16.3		31.7	39.5		40.5	24.8	
Progression Factor	0.86	0.94		1.00	1.00		0.43	0.48		0.66	0.45	
Incremental Delay, d2	0.2	20.2		205.4	1.2		1.2	37.1		218.2	3.5	
Delay (s)	12.1	43.3		231.4	17.6		14.7	56.1		245.1	14.7	
Level of Service	B	D		F	B		B	E		F	B	
Approach Delay (s)		42.2			100.7			55.9			62.9	
Approach LOS		D			F			E			E	

Intersection Summary			
HCM Average Control Delay	61.9	HCM Level of Service	E
HCM Volume to Capacity ratio	1.31		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	442	410	524	398	139	865
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	13	13	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	0.88	1.00	0.91
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1680	1503	3252	2561	1626	4673
Flt Permitted	0.95	1.00	1.00	1.00	0.24	1.00
Satd. Flow (perm)	1680	1503	3252	2561	404	4673
Peak-hour factor, PHF	0.94	0.91	0.83	0.84	0.88	0.87
Adj. Flow (vph)	470	451	631	474	158	994
RTOR Reduction (vph)	0	179	0	322	0	0
Lane Group Flow (vph)	470	272	631	152	158	994
Turn Type		Perm		Perm	pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Actuated Green, G (s)	44.0	44.0	31.0	31.0	46.0	46.0
Effective Green, g (s)	45.0	45.0	32.0	32.0	47.0	47.0
Actuated g/C Ratio	0.45	0.45	0.32	0.32	0.47	0.47
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	756	676	1041	820	324	2196
v/s Ratio Prot	c0.28		c0.19		0.05	c0.21
v/s Ratio Perm		0.18		0.06	0.18	
v/c Ratio	0.62	0.40	0.61	0.18	0.49	0.45
Uniform Delay, d1	21.0	18.5	28.7	24.6	17.1	17.8
Progression Factor	1.00	1.00	0.26	0.04	1.00	1.00
Incremental Delay, d2	3.8	1.8	2.2	0.4	5.2	0.7
Delay (s)	24.8	20.2	9.6	1.4	22.3	18.5
Level of Service	C	C	A	A	C	B
Approach Delay (s)	22.6		6.1			19.0
Approach LOS	C		A			B

Intersection Summary			
HCM Average Control Delay	15.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.7%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	122	2	919	5	0	5	0	1000	34	39	1014	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	14	12	12	12	12	11	12	12	12	12
Total Lost time (s)		5.0	4.0	4.0		4.0		4.0	5.0		4.0	
Lane Util. Factor		1.00	1.00	1.00		1.00		0.91	1.00		0.95	
Frt		1.00	0.85	1.00		0.85		1.00	0.85		1.00	
Flt Protected		0.95	1.00	0.95		1.00		1.00	1.00		1.00	
Satd. Flow (prot)		1808	1723	1626		1455		4964	1455		3587	
Flt Permitted		0.95	1.00	0.66		1.00		1.00	1.00		0.78	
Satd. Flow (perm)		1808	1723	1136		1455		4964	1455		2819	
Peak-hour factor, PHF	0.84	0.92	0.94	0.92	0.92	0.92	0.92	0.89	0.92	0.92	0.99	0.92
Adj. Flow (vph)	145	2	978	5	0	5	0	1124	37	42	1024	0
RTOR Reduction (vph)	0	0	221	0	0	4	0	0	24	0	0	0
Lane Group Flow (vph)	0	147	757	5	0	1	0	1124	13	0	1066	0
Heavy Vehicles (%)	0%	11%	0%	11%	11%	11%	0%	1%	11%	11%	0%	0%
Turn Type	Split		Perm	custom		custom			Perm	Perm		
Protected Phases	4	4						2			6	
Permitted Phases			4	8		8			2	6		
Actuated Green, G (s)		35.0	35.0	16.0		16.0		35.0	35.0		35.0	
Effective Green, g (s)		35.0	36.0	16.0		16.0		36.0	35.0		36.0	
Actuated g/C Ratio		0.35	0.36	0.16		0.16		0.36	0.35		0.36	
Clearance Time (s)		5.0	5.0	4.0		4.0		5.0	5.0		5.0	
Lane Grp Cap (vph)		633	620	182		233		1787	509		1015	
v/s Ratio Prot		0.08						0.23				
v/s Ratio Perm			c0.44	c0.00		0.00			0.01		c0.38	
v/c Ratio		0.23	1.22	0.03		0.00		0.63	0.03		1.05	
Uniform Delay, d1		23.0	32.0	35.4		35.3		26.5	21.3		32.0	
Progression Factor		1.00	1.00	1.00		1.00		0.41	0.05		0.64	
Incremental Delay, d2		0.9	113.6	0.3		0.0		1.5	0.1		40.6	
Delay (s)		23.9	145.6	35.7		35.3		12.5	1.2		61.0	
Level of Service		C	F	D		D		B	A		E	
Approach Delay (s)		129.7			35.5			12.1			61.0	
Approach LOS		F			D			B			E	

Intersection Summary			
HCM Average Control Delay	67.0	HCM Level of Service	E
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	99.4%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	90	49	1090	30	56	1826
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	0.91		1.00	0.91
Frt	1.00	0.85	1.00		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1626	1455	4654		1626	4673
Flt Permitted	0.95	1.00	1.00		0.20	1.00
Satd. Flow (perm)	1626	1455	4654		347	4673
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	98	53	1185	33	61	1985
RTOR Reduction (vph)	0	42	3	0	0	0
Lane Group Flow (vph)	98	11	1215	0	61	1985
Turn Type		Perm			Perm	
Protected Phases	8		2			6
Permitted Phases		8			6	
Actuated Green, G (s)	20.0	20.0	72.0		72.0	72.0
Effective Green, g (s)	20.0	20.0	72.0		72.0	72.0
Actuated g/C Ratio	0.20	0.20	0.72		0.72	0.72
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Lane Grp Cap (vph)	325	291	3351		250	3365
v/s Ratio Prot	c0.06		0.26			c0.42
v/s Ratio Perm		0.01			0.18	
v/c Ratio	0.30	0.04	0.36		0.24	0.59
Uniform Delay, d1	34.1	32.2	5.3		4.8	6.8
Progression Factor	1.00	1.00	0.24		0.29	0.23
Incremental Delay, d2	2.4	0.2	0.1		1.6	0.5
Delay (s)	36.4	32.5	1.4		3.0	2.1
Level of Service	D	C	A		A	A
Approach Delay (s)	35.0		1.4			2.1
Approach LOS	D		A			A

Intersection Summary			
HCM Average Control Delay	3.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

SYNCHRO REPORTS

BELTLINE SCENARIO

2030 PM Peak Hour
HCM Level of Service Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	154	197	61	517	361	138	56	1366	218	241	1143	102
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	10	12	10	10	11	10	10	10	10	10	10
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.91		0.97	0.91	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1636	1773	1615	3173	1722	1539	1178	4650		3204	4670	
Flt Permitted	0.95	1.00	1.00	0.23	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1636	1773	1615	782	1722	1539	1178	4650		3204	4670	
Peak-hour factor, PHF	0.91	0.63	0.65	0.84	0.73	0.84	0.75	0.84	0.85	0.78	0.94	0.75
Adj. Flow (vph)	169	313	94	615	495	164	75	1626	256	309	1216	136
RTOR Reduction (vph)	0	0	72	0	0	118	0	19	0	0	12	0
Lane Group Flow (vph)	169	313	22	615	495	46	75	1863	0	309	1340	0
Confl. Peds. (#/hr)	1					1			3	3		
Heavy Vehicles (%)	3%	0%	0%	3%	3%	0%	43%	2%	0%	2%	2%	3%
Turn Type	Prot		Perm	pm+pt		Perm	Prot			Prot		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4	8		8						
Actuated Green, G (s)	10.0	25.0	25.0	45.0	30.0	30.0	11.0	40.0		10.0	39.0	
Effective Green, g (s)	11.0	26.0	26.0	46.0	31.0	31.0	12.0	41.0		11.0	40.0	
Actuated g/C Ratio	0.10	0.24	0.24	0.42	0.28	0.28	0.11	0.37		0.10	0.36	
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	164	419	382	675	485	434	129	1733		320	1698	
v/s Ratio Prot	0.10	0.18		c0.13	c0.29		0.06	c0.40		c0.10	0.29	
v/s Ratio Perm			0.01	0.25		0.03						
v/c Ratio	1.03	0.75	0.06	0.91	1.02	0.11	0.58	1.07		0.97	0.79	
Uniform Delay, d1	49.5	39.0	32.5	25.2	39.5	29.2	46.6	34.5		49.3	31.2	
Progression Factor	1.08	1.08	1.51	1.00	1.00	1.00	1.30	0.36		1.00	0.93	
Incremental Delay, d2	70.4	9.2	0.2	18.6	46.2	0.5	8.4	39.4		36.4	3.0	
Delay (s)	124.1	51.4	49.5	43.8	85.7	29.7	69.1	51.9		85.9	31.9	
Level of Service	F	D	D	D	F	C	E	D		F	C	
Approach Delay (s)		72.4			58.3			52.6			42.0	
Approach LOS		E			E			D			D	

Intersection Summary			
HCM Average Control Delay	52.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	79.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	79	197	167	223	314	10	230	1568	67	8	1483	96
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	9	12	12	9	12	10	10	10	10	10	10
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95			0.95		1.00	0.91		1.00	0.91	
Frpb, ped/bikes		0.99			1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00		1.00	1.00		1.00	1.00	
Frt		0.94			1.00		1.00	0.99		1.00	0.99	
Flt Protected		0.99			0.98		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		2877			3060		1636	4619		1685	4656	
Flt Permitted		0.55			0.54		0.11	1.00		0.11	1.00	
Satd. Flow (perm)		1608			1702		186	4619		192	4656	
Peak-hour factor, PHF	0.69	0.83	0.73	0.70	0.84	0.50	0.70	0.83	0.70	0.75	0.89	0.53
Adj. Flow (vph)	114	237	229	319	374	20	329	1889	96	11	1666	181
RTOR Reduction (vph)	0	99	0	0	2	0	0	5	0	0	12	0
Lane Group Flow (vph)	0	481	0	0	711	0	329	1980	0	11	1835	0
Confl. Peds. (#/hr)	2		1	1		2	2		3	3		2
Heavy Vehicles (%)	3%	4%	6%	4%	3%	0%	3%	4%	3%	0%	2%	5%
Turn Type	Perm			pm+pt			pm+pt			pm+pt		
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		29.0			38.0		53.0	53.0		41.0	41.0	
Effective Green, g (s)		30.0			39.0		54.0	54.0		42.0	42.0	
Actuated g/C Ratio		0.27			0.35		0.49	0.49		0.38	0.38	
Clearance Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)		439			665		315	2268		141	1778	
v/s Ratio Prot					c0.05		c0.16	0.43		0.00	c0.39	
v/s Ratio Perm		0.30			c0.33		0.35			0.03		
v/c Ratio		1.10			1.50dl		1.04	0.87		0.08	1.03	
Uniform Delay, d1		40.0			35.5		41.0	24.9		26.1	34.0	
Progression Factor		0.64			1.00		0.90	0.86		0.47	0.60	
Incremental Delay, d2		67.2			54.9		41.1	1.7		0.6	25.2	
Delay (s)		92.7			90.4		77.9	23.3		12.8	45.7	
Level of Service		F			F		E	C		B	D	
Approach Delay (s)		92.7			90.4			31.0			45.5	
Approach LOS		F			F			C			D	

Intersection Summary			
HCM Average Control Delay	50.2	HCM Level of Service	D
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	85.7%	ICU Level of Service	E
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	94	229	94	190	307	75	114	1517	151	68	1489	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	10	12	12	9	12	12	11	12	12	10	12
Total Lost time (s)	4.0	4.0			4.0			4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00			0.95			0.91	1.00	1.00	0.91	
Frpb, ped/bikes	1.00	0.99			1.00			1.00	0.96	1.00	1.00	
Flpb, ped/bikes	1.00	1.00			1.00			1.00	1.00	1.00	1.00	
Frt	1.00	0.94			0.98			1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00			0.98			0.99	1.00	0.95	1.00	
Satd. Flow (prot)	1606	1630			3067			4939	1540	1787	4735	
Flt Permitted	0.22	1.00			0.54			0.64	1.00	0.07	1.00	
Satd. Flow (perm)	377	1630			1695			3184	1540	123	4735	
Peak-hour factor, PHF	0.67	0.93	0.50	0.79	0.81	0.91	0.46	0.91	0.91	0.67	0.91	0.59
Adj. Flow (vph)	140	246	188	241	379	82	248	1667	166	101	1636	108
RTOR Reduction (vph)	0	17	0	0	9	0	0	0	80	0	7	0
Lane Group Flow (vph)	140	417	0	0	693	0	0	1915	86	101	1737	0
Confl. Peds. (#/hr)	3		1	1		3	18		5	5		18
Heavy Vehicles (%)	1%	2%	0%	3%	2%	0%	0%	1%	1%	1%	1%	1%
Turn Type	Perm			Perm			Perm		Perm	pm+pt		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	35.0	35.0			35.0			56.0	56.0	65.0	65.0	
Effective Green, g (s)	36.0	36.0			36.0			57.0	57.0	66.0	66.0	
Actuated g/C Ratio	0.33	0.33			0.33			0.52	0.52	0.60	0.60	
Clearance Time (s)	5.0	5.0			5.0			5.0	5.0	5.0	5.0	
Lane Grp Cap (vph)	123	533			555			1650	798	149	2841	
v/s Ratio Prot		0.26								0.03	c0.37	
v/s Ratio Perm	0.37				c0.41			c0.60	0.06	0.37		
v/c Ratio	1.14	0.78			1.77dl			3.22dl	0.11	0.68	0.61	
Uniform Delay, d1	37.0	33.5			37.0			26.5	13.5	35.6	13.9	
Progression Factor	0.94	0.94			1.00			0.77	0.41	0.60	0.58	
Incremental Delay, d2	122.5	10.8			126.0			78.8	0.2	2.3	0.1	
Delay (s)	157.4	42.2			163.0			99.2	5.8	23.8	8.2	
Level of Service	F	D			F			F	A	C	A	
Approach Delay (s)		70.3			163.0			91.8			9.0	
Approach LOS		E			F			F			A	

Intersection Summary			
HCM Average Control Delay	69.7	HCM Level of Service	E
HCM Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	109.5%	ICU Level of Service	H
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	270	222	810	247	75	711
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	11	11	11	11	11	11
Total Lost time (s)	4.0	5.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frpb, ped/bikes	1.00	0.98	0.99		1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00
Frt	1.00	0.85	0.97		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1678	1495	1722		1728	1801
Flt Permitted	0.95	1.00	1.00		0.06	1.00
Satd. Flow (perm)	1678	1495	1722		111	1801
Peak-hour factor, PHF	0.75	0.74	0.89	0.90	0.85	0.90
Adj. Flow (vph)	360	300	910	274	88	790
RTOR Reduction (vph)	0	163	10	0	0	0
Lane Group Flow (vph)	360	137	1174	0	88	790
Confl. Peds. (#/hr)		1		1	1	
Heavy Vehicles (%)	4%	2%	3%	2%	1%	2%
Turn Type		Perm			Perm	
Protected Phases	8		2			6
Permitted Phases		8			6	
Actuated Green, G (s)	23.6	23.6	76.4		76.4	76.4
Effective Green, g (s)	24.6	23.6	77.4		77.4	77.4
Actuated g/C Ratio	0.22	0.21	0.70		0.70	0.70
Clearance Time (s)	5.0	5.0	5.0		5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	375	321	1212		78	1267
v/s Ratio Prot	c0.21		0.68			0.44
v/s Ratio Perm		0.09			c0.79	
v/c Ratio	0.96	0.43	0.97		1.13	0.62
Uniform Delay, d1	42.2	37.3	15.2		16.3	8.6
Progression Factor	0.65	0.63	0.75		0.89	0.43
Incremental Delay, d2	19.0	0.3	13.8		123.8	1.6
Delay (s)	46.5	23.7	25.2		138.3	5.4
Level of Service	D	C	C		F	A
Approach Delay (s)	36.1		25.2			18.7
Approach LOS	D		C			B

Intersection Summary			
HCM Average Control Delay	25.7	HCM Level of Service	C
HCM Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	84.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	63	125	75	5	164	7	25	912	8	6	754	63
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.94		1.00	0.99		1.00	1.00		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1626	1615		1626	1701		1626	1709		1626	1692	
Flt Permitted	0.45	1.00		0.38	1.00		0.23	1.00		0.18	1.00	
Satd. Flow (perm)	769	1615		646	1701		401	1709		310	1692	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	68	136	82	5	178	8	27	991	9	7	820	68
RTOR Reduction (vph)	0	19	0	0	2	0	0	0	0	0	3	0
Lane Group Flow (vph)	68	199	0	5	184	0	27	1000	0	7	885	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	21.0	21.0		21.0	21.0		81.0	81.0		81.0	81.0	
Effective Green, g (s)	21.0	21.0		21.0	21.0		81.0	81.0		81.0	81.0	
Actuated g/C Ratio	0.19	0.19		0.19	0.19		0.74	0.74		0.74	0.74	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	147	308		123	325		295	1258		228	1246	
v/s Ratio Prot		c0.12			0.11			c0.58			0.52	
v/s Ratio Perm	0.09			0.01			0.07			0.02		
v/c Ratio	0.46	0.64		0.04	0.57		0.09	0.79		0.03	0.71	
Uniform Delay, d1	39.5	41.1		36.3	40.4		4.1	9.2		3.9	8.0	
Progression Factor	1.00	1.00		1.00	0.99		0.67	0.81		0.22	0.45	
Incremental Delay, d2	10.1	10.0		0.6	7.0		0.3	2.5		0.2	2.3	
Delay (s)	49.6	51.0		36.9	47.1		3.0	10.0		1.0	5.9	
Level of Service	D	D		D	D		A	A		A	A	
Approach Delay (s)		50.7			46.9			9.8			5.8	
Approach LOS		D			D			A			A	

Intersection Summary			
HCM Average Control Delay	16.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	73.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	23	12	1	149	13	396	9	778	58	215	758	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	10	12	10	12	11	12	12	11	12
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00	0.97		1.00	1.00	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected		0.97	1.00		0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1844	1572		1807	1492	1805	1780		1787	1807	
Flt Permitted		0.97	1.00		0.96	1.00	0.16	1.00		0.06	1.00	
Satd. Flow (perm)		1844	1572		1807	1492	312	1780		118	1807	
Peak-hour factor, PHF	0.63	0.50	0.75	0.81	0.40	0.81	0.94	0.82	0.75	0.90	0.91	0.73
Adj. Flow (vph)	37	24	1	184	32	489	10	949	77	239	833	38
RTOR Reduction (vph)	0	0	1	0	0	192	0	2	0	0	1	0
Lane Group Flow (vph)	0	61	0	0	216	297	10	1024	0	239	870	0
Confl. Peds. (#/hr)			2	2								
Heavy Vehicles (%)	0%	0%	0%	1%	0%	1%	0%	2%	2%	1%	1%	0%
Turn Type	Split		Perm	Split		pm+ov	Perm			pm+pt		
Protected Phases	8	8		4	4	1		2		1	6	
Permitted Phases			8			4	2			6		
Actuated Green, G (s)		7.9	7.9		15.3	23.3	58.8	58.8		71.8	71.8	
Effective Green, g (s)		8.9	8.9		16.3	25.3	59.8	59.8		72.8	72.8	
Actuated g/C Ratio		0.08	0.08		0.15	0.23	0.54	0.54		0.66	0.66	
Clearance Time (s)		5.0	5.0		5.0	5.0	5.0	5.0		5.0	5.0	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		149	127		268	397	170	968		215	1196	
v/s Ratio Prot		c0.03			0.12	c0.06		0.57		c0.09	0.48	
v/s Ratio Perm			0.00			0.14	0.03			c0.65		
v/c Ratio		0.41	0.00		0.81	0.75	0.06	1.06		1.11	0.73	
Uniform Delay, d1		48.1	46.5		45.3	39.4	11.8	25.1		47.3	12.1	
Progression Factor		1.00	1.00		0.91	0.85	0.98	0.84		0.51	0.29	
Incremental Delay, d2		1.8	0.0		1.7	0.7	0.6	43.8		74.9	1.7	
Delay (s)		49.9	46.5		43.0	34.3	12.2	64.8		98.9	5.2	
Level of Service		D	D		D	C	B	E		F	A	
Approach Delay (s)		49.8			36.9			64.3			25.4	
Approach LOS		D			D			E			C	

Intersection Summary			
HCM Average Control Delay	42.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	83.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	72	4	32	167	168	8	516	41	115	483	21
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	14	12	12	9	9	12	11	12	12	12	12
Total Lost time (s)		4.0			4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.99			1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected		0.98			0.99	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1875			1628	1439	1805	1767		1770	1842	
Flt Permitted		0.78			0.93	1.00	0.33	1.00		0.27	1.00	
Satd. Flow (perm)		1498			1522	1439	635	1767		509	1842	
Peak-hour factor, PHF	0.56	0.83	0.58	0.75	0.79	0.79	0.50	0.85	0.85	0.86	0.92	0.44
Adj. Flow (vph)	71	87	7	43	211	213	16	607	48	134	525	48
RTOR Reduction (vph)	0	3	0	0	0	147	0	5	0	0	6	0
Lane Group Flow (vph)	0	162	0	0	254	66	16	650	0	134	567	0
Heavy Vehicles (%)	6%	5%	0%	0%	5%	1%	0%	3%	0%	2%	2%	0%
Turn Type	Perm			Perm		Perm	Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		
Actuated Green, G (s)		16.0			16.0	16.0	29.0	29.0		29.0	29.0	
Effective Green, g (s)		17.0			17.0	17.0	30.0	30.0		30.0	30.0	
Actuated g/C Ratio		0.31			0.31	0.31	0.55	0.55		0.55	0.55	
Clearance Time (s)		5.0			5.0	5.0	5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)		463			470	445	346	964		278	1005	
v/s Ratio Prot								c0.37			0.31	
v/s Ratio Perm		0.11			c0.17	0.05	0.03			0.26		
v/c Ratio		0.35			0.54	0.15	0.05	0.67		0.48	0.56	
Uniform Delay, d1		14.7			15.8	13.8	5.8	9.0		7.7	8.2	
Progression Factor		1.00			0.98	1.22	0.61	0.56		1.06	1.03	
Incremental Delay, d2		2.1			0.4	0.1	0.2	3.5		4.0	1.5	
Delay (s)		16.8			15.8	16.8	3.8	8.6		12.1	10.0	
Level of Service		B			B	B	A	A		B	B	
Approach Delay (s)		16.8			16.3			8.4			10.4	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM Average Control Delay	11.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	66.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	SBL	SBR	NWL	NWR
Lane Configurations						
Volume (vph)	0	244	466	13	520	447
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	12	10	9	12	10	9
Total Lost time (s)		4.0	4.0		4.0	4.0
Lane Util. Factor		0.88	0.97		1.00	1.00
Frt		0.85	0.99		1.00	0.85
Flt Protected		1.00	0.95		0.95	1.00
Satd. Flow (prot)		2627	3087		1636	1425
Flt Permitted		1.00	0.95		0.95	1.00
Satd. Flow (perm)		2627	3087		1636	1425
Peak-hour factor, PHF	0.55	0.84	0.92	0.63	0.86	0.93
Adj. Flow (vph)	0	290	507	21	605	481
RTOR Reduction (vph)	0	84	3	0	0	0
Lane Group Flow (vph)	0	206	525	0	605	481
Heavy Vehicles (%)	13%	1%	2%	0%	3%	2%
Turn Type		custom				pt+ov
Protected Phases			6		8	8 6
Permitted Phases		4				
Actuated Green, G (s)		67.0	33.0		67.0	110.0
Effective Green, g (s)		68.0	34.0		68.0	110.0
Actuated g/C Ratio		0.62	0.31		0.62	1.00
Clearance Time (s)		5.0	5.0		5.0	
Lane Grp Cap (vph)		1624	954		1011	1425
v/s Ratio Prot			c0.17		c0.37	0.34
v/s Ratio Perm		0.08				
v/c Ratio		0.13	0.55		0.60	0.34
Uniform Delay, d1		8.7	31.6		12.7	0.0
Progression Factor		1.00	0.61		0.70	1.00
Incremental Delay, d2		0.2	2.0		0.2	0.1
Delay (s)		8.9	21.2		9.1	0.1
Level of Service		A	C		A	A
Approach Delay (s)	8.9		21.2		5.1	
Approach LOS	A		C		A	

Intersection Summary			
HCM Average Control Delay	10.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL2	EBL	EBR	NBL2	NBL	NBR	SEL	SER	SER2	SWL	SWR	SWR2
Lane Configurations												
Volume (vph)	33	604	315	185	677	146	95	1169	15	163	872	261
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	11	12	10	10	12	10	10	12	11	11	12
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.94			0.97		1.00	0.95		1.00	0.76	
Frpb, ped/bikes	1.00	0.98			1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.94			0.97		0.89	0.85		1.00	0.85	
Flt Protected	0.95	0.97			0.96		0.99	1.00		0.95	1.00	
Satd. Flow (prot)	1678	4598			3140		1523	1383		1728	3539	
Flt Permitted	0.18	0.97			0.53		0.47	1.00		0.18	1.00	
Satd. Flow (perm)	321	4598			1721		732	1383		331	3539	
Peak-hour factor, PHF	0.90	0.94	0.79	0.75	0.93	0.74	0.78	0.90	0.81	0.94	0.91	0.36
Adj. Flow (vph)	37	643	399	247	728	197	122	1299	19	173	958	725
RTOR Reduction (vph)	0	87	0	0	16	0	0	1	0	0	124	0
Lane Group Flow (vph)	37	955	0	0	1156	0	499	940	0	173	1559	0
Confl. Peds. (#/hr)	10		12	1		2	2		1	12		10
Heavy Vehicles (%)	4%	1%	0%	4%	2%	1%	2%	2%	5%	1%	1%	0%
Turn Type	pm+pt			pm+pt				custom			custom	
Protected Phases	7	4		5	2					3	8	
Permitted Phases	4			2			6	6		8		
Actuated Green, G (s)	26.0	26.0			60.0		51.0	51.0		31.0	31.0	
Effective Green, g (s)	27.0	27.0			61.0		52.0	52.0		32.0	32.0	
Actuated g/C Ratio	0.25	0.25			0.55		0.47	0.47		0.29	0.29	
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)	140	1129			1019		346	654		223	1030	
v/s Ratio Prot	0.01	c0.21			c0.05					0.07	c0.44	
v/s Ratio Perm	0.05				0.58		c0.68	0.68		0.16		
v/c Ratio	0.26	0.85			1.64dl		1.44	1.44		0.78	1.51	
Uniform Delay, d1	47.4	39.5			24.5		29.0	29.0		32.4	39.0	
Progression Factor	1.00	1.00			1.00		0.65	0.66		0.71	0.68	
Incremental Delay, d2	4.6	7.9			72.9		214.5	205.6		16.7	234.6	
Delay (s)	51.9	47.4			97.4		233.5	224.8		39.7	261.2	
Level of Service	D	D			F		F	F		D	F	
Approach Delay (s)		47.5			97.4		227.8			240.6		
Approach LOS		D			F		F			F		

Intersection Summary			
HCM Average Control Delay	169.5	HCM Level of Service	F
HCM Volume to Capacity ratio	1.39		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	104.1%	ICU Level of Service	G
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	209	114	39	124	131	81	63	997	53	47	921	92
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	10	12	12	12	12	10	10	12	10	10	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00		1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.96		1.00	0.95		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1608	1695		1796	1772		1636	1643		1652	1722	1545
Flt Permitted	0.19	1.00		0.64	1.00		0.06	1.00		0.07	1.00	1.00
Satd. Flow (perm)	322	1695		1211	1772		111	1643		114	1722	1545
Peak-hour factor, PHF	0.89	0.83	0.80	0.79	0.64	0.88	0.56	0.92	0.78	0.71	0.95	0.86
Adj. Flow (vph)	235	137	49	157	205	92	112	1084	68	66	969	107
RTOR Reduction (vph)	0	12	0	0	14	0	0	2	0	0	0	40
Lane Group Flow (vph)	235	174	0	157	283	0	112	1150	0	66	969	67
Confl. Peds. (#/hr)	2		3	3		2	7		2	2		7
Heavy Vehicles (%)	1%	0%	0%	0%	2%	0%	3%	7%	5%	2%	3%	0%
Turn Type	pm+pt			Perm			pm+pt			pm+pt		Perm
Protected Phases	7	4			8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	29.0	29.0		16.0	16.0		64.8	60.8		63.2	60.0	60.0
Effective Green, g (s)	30.0	30.0		17.0	17.0		66.8	63.8		65.2	63.0	63.0
Actuated g/C Ratio	0.27	0.27		0.15	0.15		0.61	0.58		0.59	0.57	0.57
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	7.0		5.0	7.0	7.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	193	462		187	274		137	953		126	986	885
v/s Ratio Prot	c0.10	0.10			0.16		c0.04	c0.70		0.02	0.56	
v/s Ratio Perm	c0.23			0.13			0.46			0.29		0.04
v/c Ratio	1.22	0.38		0.84	1.03		0.82	1.21		0.52	0.98	0.08
Uniform Delay, d1	37.0	32.4		45.2	46.5		23.7	23.1		24.9	23.0	10.5
Progression Factor	1.00	1.00		0.50	0.48		1.41	1.21		1.00	1.00	1.00
Incremental Delay, d2	135.6	0.5		14.4	45.6		24.6	100.9		3.9	24.8	0.2
Delay (s)	172.6	32.9		36.9	68.1		58.1	128.9		28.7	47.8	10.7
Level of Service	F	C		D	E		E	F		C	D	B
Approach Delay (s)		110.9			57.4			122.6			43.2	
Approach LOS		F			E			F			D	

Intersection Summary			
HCM Average Control Delay	84.4	HCM Level of Service	F
HCM Volume to Capacity ratio	1.14		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	89.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	218	2	250	40	15	70	336	1480	0	11	1329	149
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	10	10	10	10	10	10
Total Lost time (s)		4.0	4.0		4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00	1.00		1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes		1.00	0.99		1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00	1.00		0.99	1.00	1.00	1.00		1.00	1.00	
Frt		1.00	0.85		1.00	0.85	1.00	1.00		1.00	0.98	
Flt Protected		0.95	1.00		0.96	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1789	1547		1674	1397	1636	4746		1652	4669	
Flt Permitted		0.65	1.00		0.47	1.00	0.09	1.00		0.10	1.00	
Satd. Flow (perm)		1215	1547		815	1397	157	4746		178	4669	
Peak-hour factor, PHF	0.81	0.75	0.81	0.50	0.92	0.63	0.85	0.82	0.58	0.83	0.94	0.77
Adj. Flow (vph)	269	3	309	80	16	111	395	1805	0	13	1414	194
RTOR Reduction (vph)	0	0	2	0	0	64	0	0	0	0	16	0
Lane Group Flow (vph)	0	272	307	0	96	47	395	1805	0	13	1592	0
Confl. Peds. (#/hr)	1		7	7		1	7		3	3		7
Heavy Vehicles (%)	1%	5%	3%	0%	50%	14%	3%	2%	0%	2%	1%	5%
Turn Type	Perm		pm+ov	Perm		Perm	pm+pt			pm+pt		
Protected Phases		2	3		6		3	8		7	4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)		28.8	56.0		28.8	28.8	71.2	63.6		39.6	38.0	
Effective Green, g (s)		29.8	58.0		29.8	29.8	72.2	65.6		41.6	40.0	
Actuated g/C Ratio		0.27	0.53		0.27	0.27	0.66	0.60		0.38	0.36	
Clearance Time (s)		5.0	5.0		5.0	5.0	5.0	6.0		5.0	6.0	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		329	872		221	378	482	2830		102	1698	
v/s Ratio Prot			0.09				c0.21	0.38		0.00	c0.34	
v/s Ratio Perm		c0.22	0.11		0.12	0.03	0.33			0.05		
v/c Ratio		0.83	0.35		0.43	0.12	0.82	0.64		0.13	0.94	
Uniform Delay, d1		37.7	15.1		33.1	30.3	31.3	14.5		38.2	33.8	
Progression Factor		1.03	1.01		1.00	1.00	0.43	0.42		0.80	0.77	
Incremental Delay, d2		20.2	0.2		6.1	0.7	9.6	1.0		0.4	9.3	
Delay (s)		59.2	15.4		39.2	30.9	23.0	7.1		31.1	35.4	
Level of Service		E	B		D	C	C	A		C	D	
Approach Delay (s)		35.9			34.8			9.9			35.4	
Approach LOS		D			C			A			D	

Intersection Summary			
HCM Average Control Delay	23.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	76.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	367	9	210	6	30	10	224	713	7	2	634	442
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	9	9	12	12	10	12	11	9	12	12	10	10
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0			4.0	4.0
Lane Util. Factor	1.00	1.00			1.00		1.00	0.95			1.00	1.00
Frpb, ped/bikes	1.00	0.97			1.00		1.00	1.00			1.00	1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00			1.00	1.00
Frt	1.00	0.86			0.98		1.00	0.99			1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00			1.00	1.00
Satd. Flow (prot)	1618	1425			1697		1745	2922			1689	1507
Flt Permitted	0.66	1.00			0.40		0.13	1.00			1.00	1.00
Satd. Flow (perm)	1125	1425			683		242	2922			1686	1507
Peak-hour factor, PHF	0.85	0.75	0.94	0.25	0.75	0.75	0.75	0.88	0.25	0.92	0.98	0.93
Adj. Flow (vph)	432	12	223	24	40	13	299	810	28	2	647	475
RTOR Reduction (vph)	0	147	0	0	7	0	0	2	0	0	0	268
Lane Group Flow (vph)	432	88	0	0	70	0	299	836	0	0	649	207
Confl. Peds. (#/hr)	4		3	3		4						
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	11%	0%	0%	5%	0%
Turn Type	pm+pt			Perm			pm+pt			Perm		Perm
Protected Phases	7	4			8		5	2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	37.6	36.6			10.1		63.4	63.4			47.0	47.0
Effective Green, g (s)	37.6	37.6			11.1		63.4	64.4			48.0	48.0
Actuated g/C Ratio	0.34	0.34			0.10		0.58	0.59			0.44	0.44
Clearance Time (s)	4.0	5.0			5.0		4.0	5.0			5.0	5.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	485	487			69		309	1711			736	658
v/s Ratio Prot	c0.18	0.06					c0.11	0.29				
v/s Ratio Perm	0.12				c0.10		c0.45				0.38	0.14
v/c Ratio	0.89	0.18			1.01		0.97	0.49			0.88	0.32
Uniform Delay, d1	34.5	25.4			49.4		25.8	13.2			28.4	20.3
Progression Factor	1.00	1.00			1.00		0.86	0.99			0.65	0.33
Incremental Delay, d2	18.2	0.2			111.6		33.5	0.7			5.7	0.4
Delay (s)	52.7	25.6			161.1		55.6	13.7			24.2	7.1
Level of Service	D	C			F		E	B			C	A
Approach Delay (s)		43.1			161.1			24.7			17.0	
Approach LOS		D			F			C			B	

Intersection Summary			
HCM Average Control Delay	29.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	90.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	254	1	246	2	2	8	395	743	2	1	716	262
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	11	11	11	11	11	11	11	11	11
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	5.0
Lane Util. Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.97			0.99		1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.85			0.91		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00			0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1713	1524			1635		1728	1817		1745	1818	1487
Flt Permitted	0.74	1.00			0.94		0.08	1.00		0.14	1.00	1.00
Satd. Flow (perm)	1336	1524			1549		145	1817		251	1818	1487
Peak-hour factor, PHF	0.76	0.38	0.84	0.38	0.50	0.50	0.78	0.86	0.75	0.75	0.90	0.73
Adj. Flow (vph)	334	3	293	5	4	16	506	864	3	1	796	359
RTOR Reduction (vph)	0	224	0	0	12	0	0	0	0	0	0	163
Lane Group Flow (vph)	334	72	0	0	13	0	506	867	0	1	796	197
Confl. Peds. (#/hr)	1		3	3		1			1	1		
Heavy Vehicles (%)	5%	0%	3%	0%	0%	0%	1%	1%	0%	0%	1%	5%
Turn Type	Perm			Perm			pm+pt			Perm		Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	25.0	25.0			25.0		75.0	75.0		45.0	45.0	45.0
Effective Green, g (s)	26.0	26.0			26.0		76.0	76.0		46.0	46.0	45.0
Actuated g/C Ratio	0.24	0.24			0.24		0.69	0.69		0.42	0.42	0.41
Clearance Time (s)	5.0	5.0			5.0		5.0	5.0		5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	316	360			366		474	1255		105	760	608
v/s Ratio Prot		0.05					c0.25	0.48			0.44	
v/s Ratio Perm	c0.25				0.01		c0.48			0.00		0.13
v/c Ratio	1.06	0.20			0.03		1.07	0.69		0.01	1.05	0.32
Uniform Delay, d1	42.0	33.7			32.3		38.7	10.1		18.7	32.0	22.1
Progression Factor	1.00	1.00			1.00		0.83	0.53		0.72	0.72	0.69
Incremental Delay, d2	66.4	0.3			0.0		43.6	1.0		0.1	40.2	1.0
Delay (s)	108.4	33.9			32.4		75.7	6.3		13.6	63.3	16.2
Level of Service	F	C			C		E	A		B	E	B
Approach Delay (s)		73.4			32.4			31.9			48.6	
Approach LOS		E			C			C			D	

Intersection Summary			
HCM Average Control Delay	46.2	HCM Level of Service	D
HCM Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	90.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	4	4	6	344	3	245	0	555	115	80	504	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0			4.0	4.0		4.0	
Lane Util. Factor		1.00			1.00			0.95	1.00		0.95	
Frt		0.93			0.95			1.00	0.85		1.00	
Flt Protected		0.98			0.97			1.00	1.00		0.99	
Satd. Flow (prot)		1664			1618			3312	1553		3393	
Flt Permitted		0.81			0.79			1.00	1.00		0.76	
Satd. Flow (perm)		1377			1322			3312	1553		2579	
Peak-hour factor, PHF	0.25	0.63	0.25	0.76	0.25	0.79	0.92	0.95	0.82	0.94	0.85	0.25
Adj. Flow (vph)	16	6	24	453	12	310	0	584	140	85	593	4
RTOR Reduction (vph)	0	11	0	0	40	0	0	0	96	0	1	0
Lane Group Flow (vph)	0	35	0	0	735	0	0	584	44	0	681	0
Heavy Vehicles (%)	0%	33%	0%	9%	43%	5%	0%	9%	4%	1%	6%	50%
Turn Type	Perm			Perm			Perm		Perm	Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		32.0			32.0			18.0	18.0		18.0	
Effective Green, g (s)		33.0			33.0			19.0	19.0		19.0	
Actuated g/C Ratio		0.55			0.55			0.32	0.32		0.32	
Clearance Time (s)		5.0			5.0			5.0	5.0		5.0	
Lane Grp Cap (vph)		757			727			1049	492		817	
v/s Ratio Prot								0.18				
v/s Ratio Perm		0.03			c0.56				0.03		c0.26	
v/c Ratio		0.05			1.01			0.56	0.09		0.83	
Uniform Delay, d1		6.2			13.5			17.0	14.4		19.0	
Progression Factor		1.00			1.00			1.00	1.00		1.00	
Incremental Delay, d2		0.1			36.1			2.1	0.4		9.8	
Delay (s)		6.4			49.6			19.1	14.8		28.8	
Level of Service		A			D			B	B		C	
Approach Delay (s)		6.4			49.6			18.3			28.8	
Approach LOS		A			D			B			C	

Intersection Summary			
HCM Average Control Delay	32.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	82.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	80	32	6	8	45	20	11	466	13	14	485	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	11	12	12	11	12	12	12	12	12	10	12
Total Lost time (s)		4.0			4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes		1.00			0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		0.99			1.00		1.00	1.00		1.00	1.00	
Frt		0.99			0.96		1.00	1.00		1.00	0.99	
Flt Protected		0.97			0.99		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1735			1706		1805	1854		1736	1737	
Flt Permitted		0.75			0.95		0.35	1.00		0.39	1.00	
Satd. Flow (perm)		1335			1640		674	1854		706	1737	
Peak-hour factor, PHF	0.77	0.81	0.38	0.50	0.66	0.67	0.50	0.93	0.75	0.75	0.93	0.54
Adj. Flow (vph)	104	40	16	16	68	30	22	501	17	19	522	44
RTOR Reduction (vph)	0	4	0	0	12	0	0	1	0	0	3	0
Lane Group Flow (vph)	0	157	0	0	102	0	22	517	0	19	563	0
Confl. Peds. (#/hr)	4		5	5		4						
Heavy Vehicles (%)	0%	1%	0%	0%	0%	8%	0%	2%	2%	4%	1%	0%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)		32.0			32.0		68.0	68.0		68.0	68.0	
Effective Green, g (s)		33.0			33.0		69.0	69.0		69.0	69.0	
Actuated g/C Ratio		0.30			0.30		0.63	0.63		0.63	0.63	
Clearance Time (s)		5.0			5.0		5.0	5.0		5.0	5.0	
Lane Grp Cap (vph)		401			492		423	1163		443	1090	
v/s Ratio Prot								0.28			c0.32	
v/s Ratio Perm		c0.12			0.06		0.03			0.03		
v/c Ratio		0.39			0.21		0.05	0.44		0.04	0.52	
Uniform Delay, d1		30.5			28.7		7.9	10.6		7.9	11.3	
Progression Factor		1.00			1.00		0.88	0.87		1.31	1.58	
Incremental Delay, d2		2.8			1.0		0.2	1.2		0.2	1.5	
Delay (s)		33.4			29.7		7.2	10.4		10.5	19.4	
Level of Service		C			C		A	B		B	B	
Approach Delay (s)		33.4			29.7			10.3			19.1	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	18.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	47.0%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	8	1490	243	318	1049	94	190	40	367	73	34	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	12	10	12	12	10	10	10	12	11	12
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0		4.0	
Lane Util. Factor	1.00	0.91		1.00	0.91			1.00	1.00		1.00	
Frpb, ped/bikes	1.00	0.99		1.00	1.00			1.00	0.98		1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			0.99	1.00		0.99	
Frt	1.00	0.98		1.00	0.98			1.00	0.85		0.98	
Flt Protected	0.95	1.00		0.95	1.00			0.96	1.00		0.97	
Satd. Flow (prot)	1745	4996		1685	4800			1686	1482		1733	
Flt Permitted	0.20	1.00		0.13	1.00			0.65	1.00		0.33	
Satd. Flow (perm)	367	4996		236	4800			1132	1482		581	
Peak-hour factor, PHF	0.62	0.95	0.83	0.25	0.90	0.69	0.84	0.63	0.93	0.71	0.58	0.33
Adj. Flow (vph)	13	1568	293	1272	1166	136	226	63	395	103	59	24
RTOR Reduction (vph)	0	32	0	0	15	0	0	0	0	0	6	0
Lane Group Flow (vph)	13	1829	0	1272	1287	0	0	289	395	0	180	0
Confl. Peds. (#/hr)			5	5			17		20	20		17
Heavy Vehicles (%)	0%	1%	0%	0%	7%	1%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt			pm+pt			Perm		pm+ov	Perm		
Protected Phases	1	6		5	2			4	5		8	
Permitted Phases	6			2			4		4	8		
Actuated Green, G (s)	25.8	25.0		56.0	50.2			16.0	42.0		16.0	
Effective Green, g (s)	27.8	28.0		57.0	53.2			17.0	44.0		17.0	
Actuated g/C Ratio	0.33	0.33		0.68	0.63			0.20	0.52		0.20	
Clearance Time (s)	5.0	7.0		5.0	7.0			5.0	5.0		5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		3.0	
Lane Grp Cap (vph)	151	1665		626	3040			229	847		118	
v/s Ratio Prot	0.00	0.37		c0.65	0.27				0.15			
v/s Ratio Perm	0.03			c0.72				0.26	0.12		c0.31	
v/c Ratio	0.09	1.10		2.03	0.42			1.26	0.47		1.52	
Uniform Delay, d1	19.5	28.0		22.8	7.7			33.5	12.6		33.5	
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2	0.2	54.2		470.0	0.4			148.1	0.4		273.2	
Delay (s)	19.7	82.2		492.7	8.1			181.6	13.0		306.7	
Level of Service	B	F		F	A			F	B		F	
Approach Delay (s)		81.8			247.6			84.2			306.7	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM Average Control Delay	170.2	HCM Level of Service	F
HCM Volume to Capacity ratio	1.83		
Actuated Cycle Length (s)	84.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	78.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	38	68	30	159	3	412	1	1443	98	250	1227	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	14	14	14	14	14	14	10	10	10	10	10	10
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.98	1.00	1.00		1.00	1.00	
Flpb, ped/bikes	0.99	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	1.00	0.85	1.00	0.99		1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1906	1677		1925	2027	1668	1347	4702		1685	4789	
Flt Permitted	0.75	1.00		0.33	1.00	1.00	0.11	1.00		0.95	1.00	
Satd. Flow (perm)	1504	1677		676	2027	1668	152	4702		1685	4789	
Peak-hour factor, PHF	0.50	0.25	0.25	0.56	0.25	0.93	0.25	0.88	0.78	0.88	0.87	0.65
Adj. Flow (vph)	76	272	120	284	12	443	4	1640	126	284	1410	5
RTOR Reduction (vph)	0	14	0	0	0	0	0	8	0	0	0	0
Lane Group Flow (vph)	76	378	0	284	12	443	4	1758	0	284	1415	0
Confl. Peds. (#/hr)	5					5	3					3
Heavy Vehicles (%)	0%	0%	50%	0%	0%	1%	25%	2%	0%	0%	1%	7%
Turn Type	Perm			Perm		Perm	Perm			Prot		
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8		8	2					
Actuated Green, G (s)	40.0	40.0		40.0	40.0	40.0	37.0	37.0		16.0	58.0	
Effective Green, g (s)	41.0	41.0		41.0	41.0	41.0	40.0	40.0		17.0	61.0	
Actuated g/C Ratio	0.37	0.37		0.37	0.37	0.37	0.36	0.36		0.15	0.55	
Clearance Time (s)	5.0	5.0		5.0	5.0	5.0	7.0	7.0		5.0	7.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	561	625		252	756	622	55	1710		260	2656	
v/s Ratio Prot		0.23			0.01			c0.37		c0.17	0.30	
v/s Ratio Perm	0.05			c0.42		0.27	0.03					
v/c Ratio	0.14	0.60		1.13	0.02	0.71	0.07	1.03		1.09	0.53	
Uniform Delay, d1	22.8	27.9		34.5	21.8	29.5	22.9	35.0		46.5	15.5	
Progression Factor	0.77	0.71		1.00	1.00	1.00	0.32	0.32		0.61	0.45	
Incremental Delay, d2	0.1	1.6		95.2	0.0	3.9	0.2	15.5		80.8	0.7	
Delay (s)	17.7	21.4		129.7	21.8	33.3	7.6	26.6		109.3	7.7	
Level of Service	B	C		F	C	C	A	C		F	A	
Approach Delay (s)		20.8			70.2			26.6			24.7	
Approach LOS		C			E			C			C	

Intersection Summary			
HCM Average Control Delay	32.2	HCM Level of Service	C
HCM Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	461	455	720	1128	147	818
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width	13	13	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	0.95	0.88	1.00	0.91
Frpb, ped/bikes	1.00	1.00	1.00	0.98	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	0.85	1.00	1.00
Flt Protected	0.95	1.00	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1680	1503	3252	2501	1626	4673
Flt Permitted	0.95	1.00	1.00	1.00	0.24	1.00
Satd. Flow (perm)	1680	1503	3252	2501	406	4673
Peak-hour factor, PHF	0.94	0.91	0.83	0.84	0.88	0.87
Adj. Flow (vph)	490	500	867	1343	167	940
RTOR Reduction (vph)	0	368	0	623	0	0
Lane Group Flow (vph)	490	132	867	720	167	940
Confl. Peds. (#/hr)				1		
Turn Type		Perm		Perm	pm+pt	
Protected Phases	8		2		1	6
Permitted Phases		8		2	6	
Actuated Green, G (s)	27.0	27.0	58.0	58.0	73.0	73.0
Effective Green, g (s)	28.0	28.0	59.0	59.0	74.0	74.0
Actuated g/C Ratio	0.25	0.25	0.54	0.54	0.67	0.67
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	428	383	1744	1341	395	3144
v/s Ratio Prot	c0.29		0.27		c0.04	0.20
v/s Ratio Perm		0.09		c0.29	0.24	
v/c Ratio	1.14	0.35	0.50	0.54	0.42	0.30
Uniform Delay, d1	41.0	33.5	16.1	16.6	8.5	7.4
Progression Factor	1.00	1.00	0.62	1.58	1.00	1.00
Incremental Delay, d2	89.4	0.5	0.7	1.1	0.7	0.2
Delay (s)	130.4	34.1	10.7	27.3	9.2	7.6
Level of Service	F	C	B	C	A	A
Approach Delay (s)	81.8		20.8			7.9
Approach LOS	F		C			A

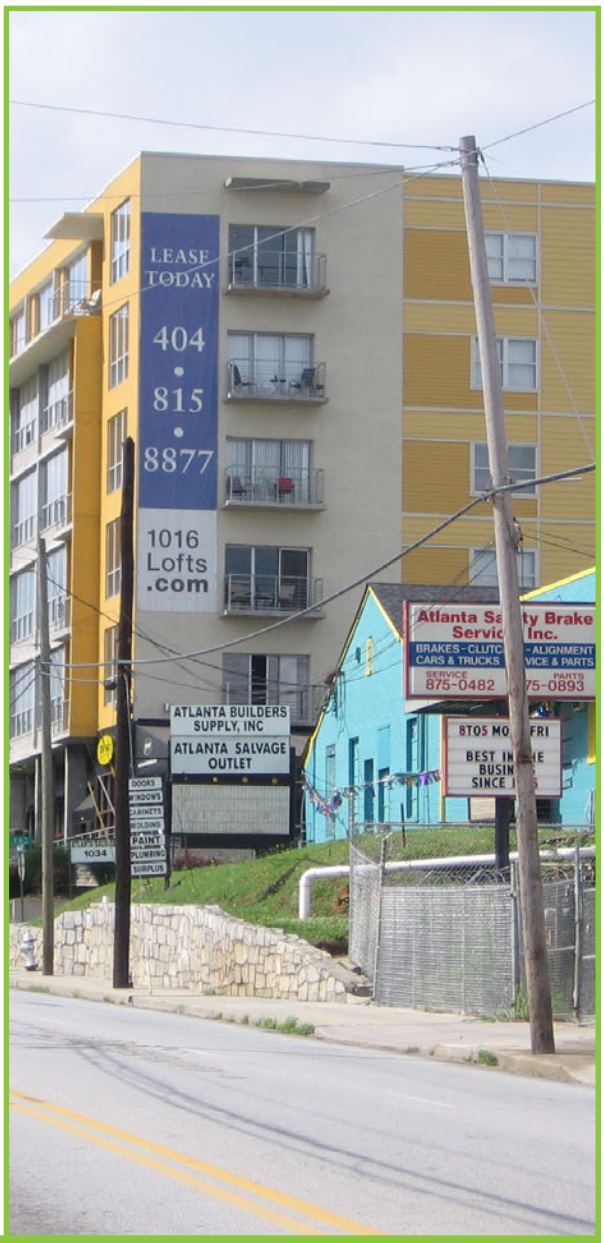
Intersection Summary			
HCM Average Control Delay	31.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	102	25	443	5	0	63	0	2072	17	31	1047	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	12	14	12	12	12	12	11	12	12	12	12
Total Lost time (s)		5.0	4.0	4.0		4.0		4.0	5.0		4.0	
Lane Util. Factor		1.00	1.00	1.00		1.00		0.91	1.00		0.95	
Frt		1.00	0.85	1.00		0.85		1.00	0.85		1.00	
Flt Protected		0.96	1.00	0.95		1.00		1.00	1.00		1.00	
Satd. Flow (prot)		1789	1723	1626		1455		4964	1455		3592	
Flt Permitted		0.96	1.00	0.69		1.00		1.00	1.00		0.74	
Satd. Flow (perm)		1789	1723	1180		1455		4964	1455		2676	
Peak-hour factor, PHF	0.84	0.92	0.94	0.92	0.92	0.92	0.92	0.89	0.92	0.92	0.99	0.92
Adj. Flow (vph)	121	27	471	5	0	68	0	2328	18	34	1058	0
RTOR Reduction (vph)	0	0	238	0	0	64	0	0	5	0	0	0
Lane Group Flow (vph)	0	148	233	5	0	4	0	2328	13	0	1092	0
Heavy Vehicles (%)	0%	11%	0%	11%	11%	11%	0%	1%	11%	11%	0%	0%
Turn Type	Split		Perm	custom		custom			Perm	Perm		
Protected Phases	4	4						2			6	
Permitted Phases			4	8		8			2	6		
Actuated Green, G (s)		18.0	18.0	5.8		5.8		72.2	72.2		72.2	
Effective Green, g (s)		18.0	19.0	5.8		5.8		73.2	72.2		73.2	
Actuated g/C Ratio		0.16	0.17	0.05		0.05		0.67	0.66		0.67	
Clearance Time (s)		5.0	5.0	4.0		4.0		5.0	5.0		5.0	
Vehicle Extension (s)		3.0	3.0	3.0		3.0		3.0	3.0		3.0	
Lane Grp Cap (vph)		293	298	62		77		3303	955		1781	
v/s Ratio Prot		0.08						c0.47				
v/s Ratio Perm			c0.14	c0.00		0.00			0.01		0.41	
v/c Ratio		0.51	0.78	0.08		0.05		0.70	0.01		0.61	
Uniform Delay, d1		41.9	43.5	49.6		49.5		11.6	6.6		10.4	
Progression Factor		1.00	1.00	1.00		1.00		0.48	0.21		0.92	
Incremental Delay, d2		1.4	12.5	0.6		0.3		1.0	0.0		1.3	
Delay (s)		43.3	56.0	50.1		49.7		6.6	1.4		10.9	
Level of Service		D	E	D		D		A	A		B	
Approach Delay (s)		53.0			49.8			6.6			10.9	
Approach LOS		D			D			A			B	

Intersection Summary			
HCM Average Control Delay	15.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	75	85	1733	92	81	1469
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	1.00	1.00	0.91		1.00	0.91
Frt	1.00	0.85	0.99		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1626	1455	4638		1626	4673
Flt Permitted	0.95	1.00	1.00		0.09	1.00
Satd. Flow (perm)	1626	1455	4638		149	4673
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	82	92	1884	100	88	1597
RTOR Reduction (vph)	0	39	4	0	0	0
Lane Group Flow (vph)	82	53	1980	0	88	1597
Turn Type		Perm			Perm	
Protected Phases	8		2			6
Permitted Phases		8			6	
Actuated Green, G (s)	10.9	10.9	91.1		91.1	91.1
Effective Green, g (s)	10.9	10.9	91.1		91.1	91.1
Actuated g/C Ratio	0.10	0.10	0.83		0.83	0.83
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	161	144	3841		123	3870
v/s Ratio Prot	c0.05		0.43			0.34
v/s Ratio Perm		0.04			c0.59	
v/c Ratio	0.51	0.37	0.52		0.72	0.41
Uniform Delay, d1	47.0	46.3	2.8		4.0	2.5
Progression Factor	1.00	1.00	0.55		1.47	0.29
Incremental Delay, d2	2.5	1.6	0.2		17.7	0.2
Delay (s)	49.5	47.9	1.7		23.6	0.9
Level of Service	D	D	A		C	A
Approach Delay (s)	48.7		1.7			2.1
Approach LOS	D		A			A

Intersection Summary			
HCM Average Control Delay	4.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.2%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



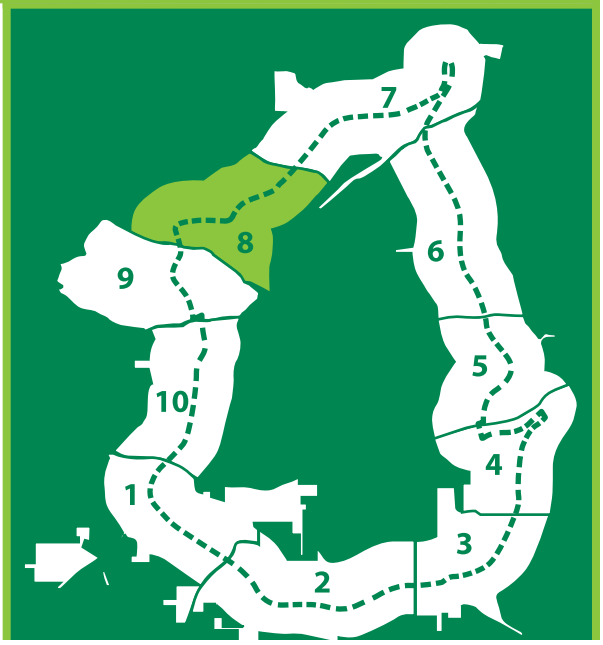
Atlanta BeltLine Master Plan

SUBAREA 8

UPPER WESTSIDE-NORTHSIDE

INVENTORY & ASSESSMENT REPORT

Prepared for
Atlanta BeltLine, Inc.
by AECOM



Adopted by The Atlanta City Council
March 19, 2012

Legislation Number: 12-O-0151/12-O-0150/CDP-12-001

Atlanta BeltLine

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ACKNOWLEDGEMENTS

The Honorable Mayor **Kasim Reed**

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BeltLine Partnership Appointee

Cathy Woolard
Community Representative to the ABI Board

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Moniqua Williams, Atlantic Station

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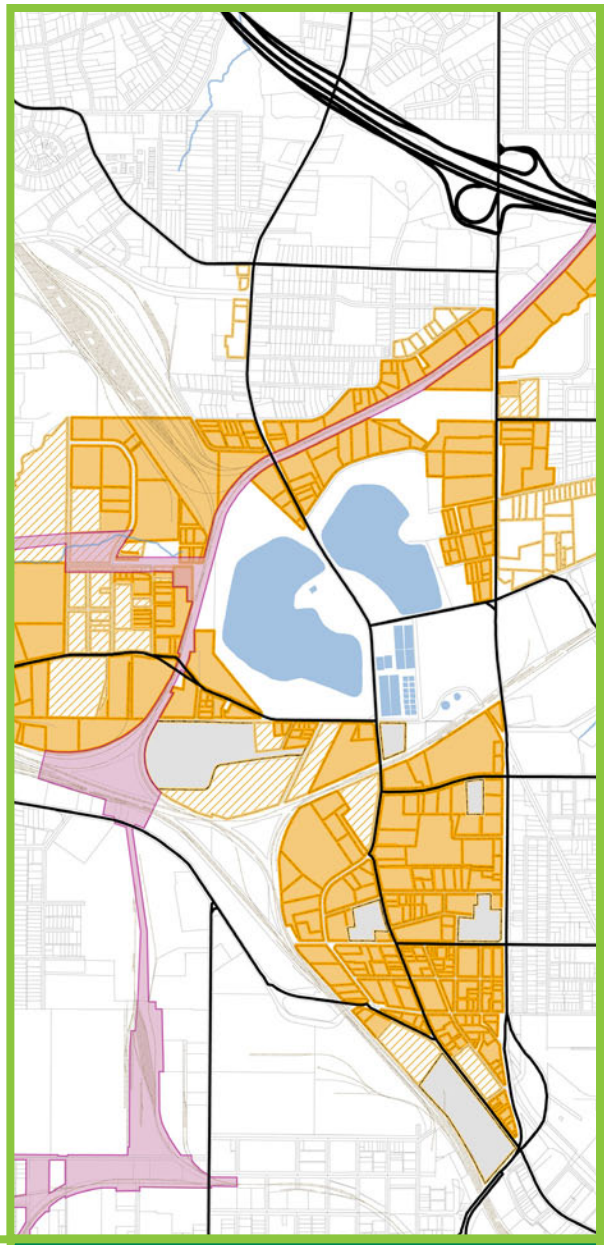


INVENTORY & ASSESSMENT REPORT

Executive Summary

Introduction

The Study Area

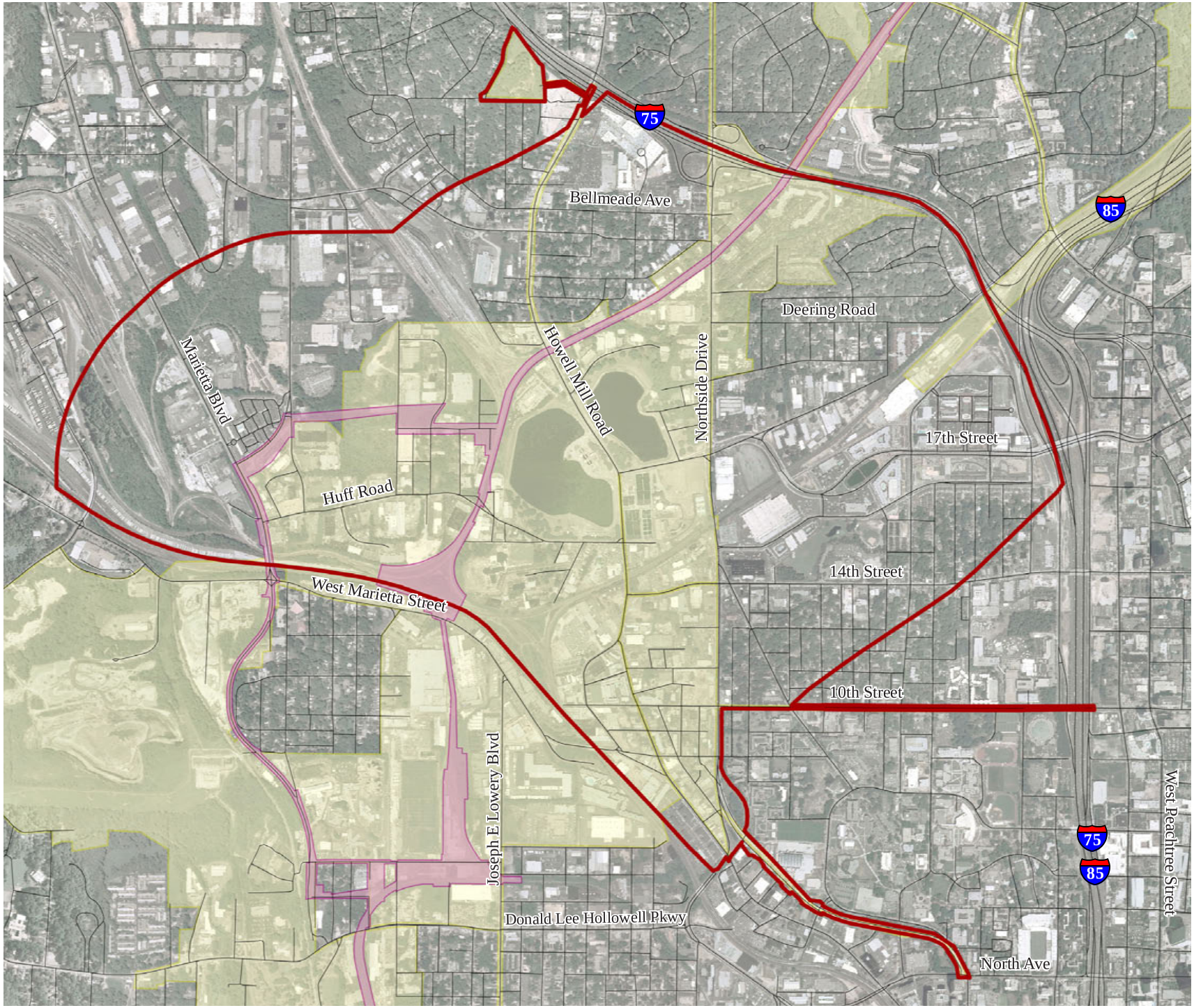
The BeltLine Subarea 8 extends from I-75 to the north, I-75/85, portions of Home Park, and Georgia Tech to the east, Marietta Street to the south, and Marietta Boulevard, to the west. This study focuses on the area contained within BeltLine Tax Allocation District (TAD) which includes key corridors, parks and open spaces, the BeltLine corridor, and potential redevelopment areas.

The Inventory and Assessment Report is organized into three categories:

1.0 Land Use & Design – identifies existing and future land use patterns, related land use studies, potential redevelopment opportunities, and neighborhood and historic resources.

2.0 Mobility – identifies multi-modal opportunities including potential trail alternatives, existing rail infrastructure, transit routes, sidewalk and bicycle network, and vehicular connectivity.

3.0 Parks & Open Space – identifies existing parks, natural features, creeks and floodplain, and topography.



BeltLine
Atlanta Connected

BeltLine Subarea 8: UPPER WESTSIDE / NORTHSIDE

THE STUDY AREA

LEGEND

- TAD Boundary
- BeltLine Corridor
- Study Area Boundary

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SCALE IN FEET

0 500 1,000

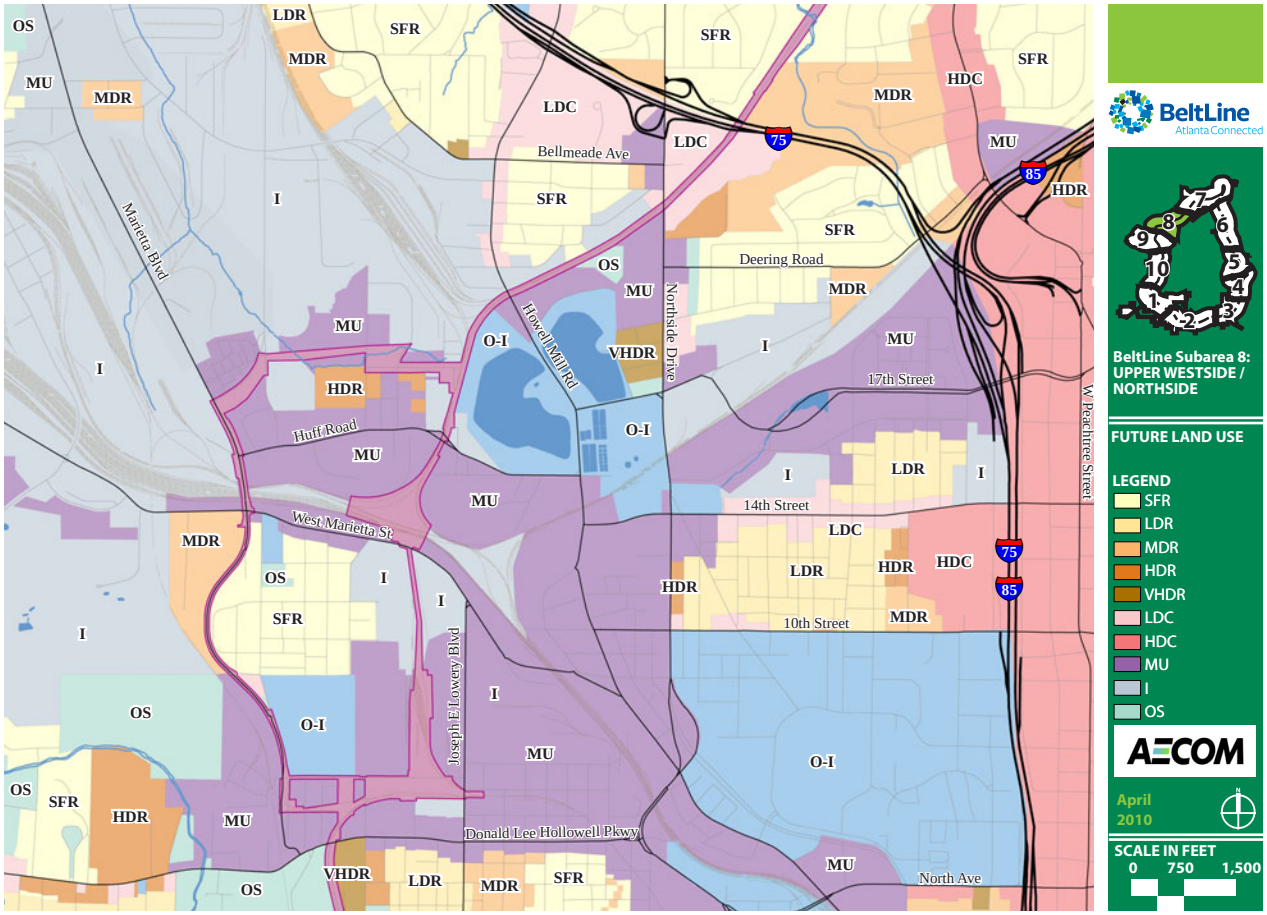
Land Use & Urban Design

Subarea 8 has historically been an industrial area with related single-family neighborhoods developed around it. This area is now transitioning into a range of mixed-use neighborhoods with new multi-family and commercial development. Key issues include:

- Shaping redevelopment potential. There are large areas surrounding the Water Works site from Marietta Boulevard to Northside Drive that have the potential to redevelop. These lands are primarily industrial sites that recently have been converting to residential, office and mixed-use development.

- Defining the intensity and character of land use change. The City has already identified much of the existing industrial land as mixed use in the adopted Future Land Use Plan. While this establishes the policy for land use change, incremental rezoning on a site-by-site basis will ultimately shape the form and intensity of development. The Subarea Plan should be used to guide these rezoning and define the intended intensity and character of redevelopment.

- Establishing areas of industrial protection. The City's Industrial Preservation Policy identifies areas of industrial protection, areas for redevelopment, and areas needing further analysis. There are key areas in the Subarea that require further analysis and evaluation. The Subarea Plan should clarify the extent of mixed-use redevelopment on industrial lands and establish which industrial areas should be protected.


BeltLine
Atlanta Connected
BeltLine Subarea 8:
UPPER WESTSIDE / NORTHSIDE
FUTURE LAND USE
LEGEND
SFR
LDR
MDR
HDR
VHDR
LDC
HDC
MU
I
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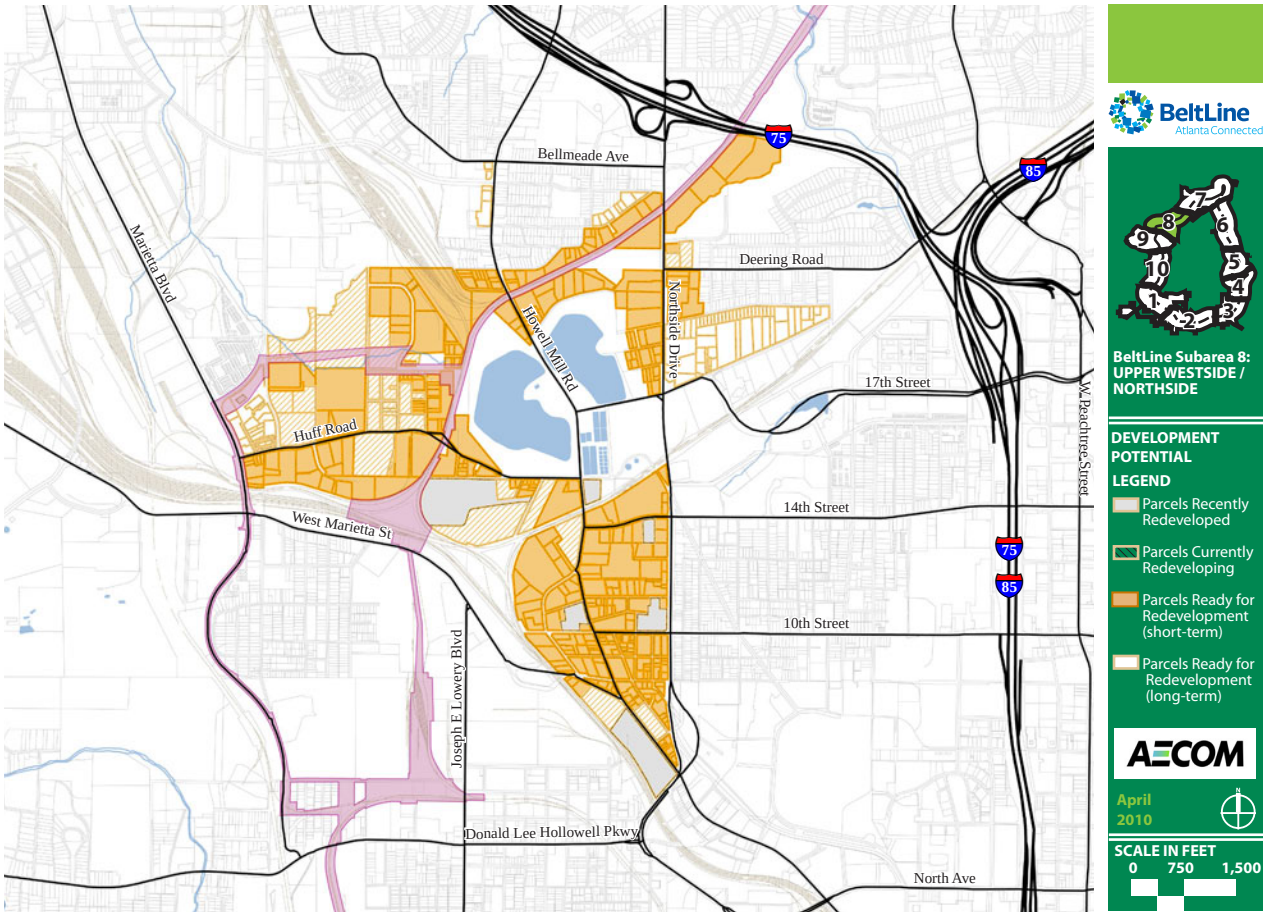
SCALE IN FEET
0 750 1,500
Bellmeade Ave
Deering Road
17th Street
14th Street
10th Street
West Marietta St
Huff Road
Donald Lee Hollowell Pkwy
North Ave
Marietta Blvd
Howell Mill Rd
Northside Drive
Joseph E Lowery Blvd
W Peachtree Street
75
85


BeltLine
Atlanta Connected
BeltLine Subarea 8:
UPPER WESTSIDE / NORTHSIDE
DEVELOPMENT POTENTIAL
LEGEND
Parcels Recently Redeveloped
Parcels Currently Redeveloping
Parcels Ready for Redevelopment (short-term)
Parcels Ready for Redevelopment (long-term)
AECOM
April 2010
SCALE IN FEET
0 750 1,500
Bellmeade Ave
Deering Road
17th Street
14th Street
10th Street
West Marietta St
Huff Road
Donald Lee Hollowell Pkwy
North Ave
Marietta Blvd
Howell Mill Rd
Northside Drive
Joseph E Lowery Blvd
W Peachtree Street
75
85

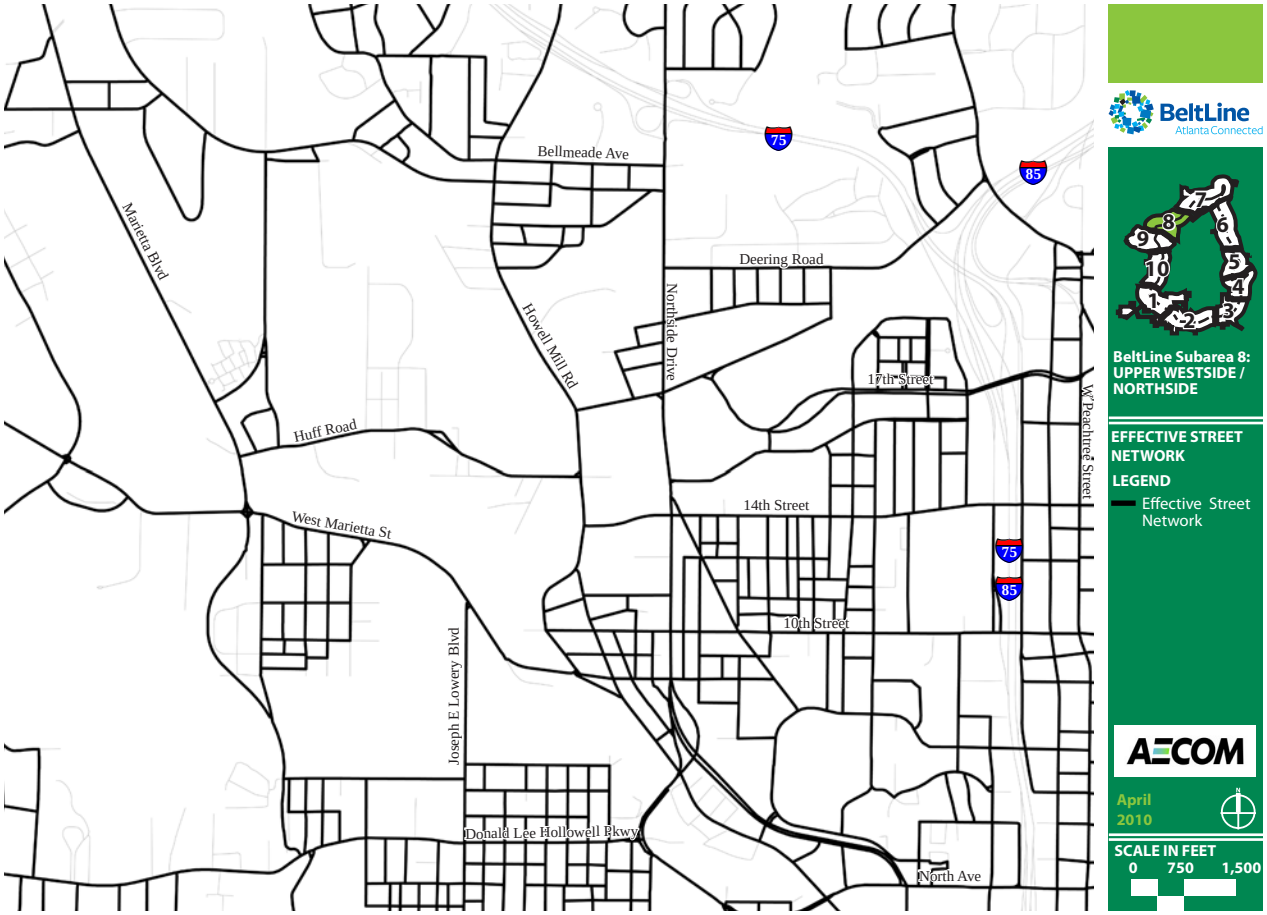
Mobility

The industrial land use pattern has produced a relatively sparse street and transportation network. This is a result of the network of rail corridors and yards that served this uses, existing topography, and large-scale industrial parcels (most notably the Atlanta Water Works site). Building new connections and mobility options (such as BeltLine Transit), and enhancing existing transportation infrastructure will be critical in supporting continued redevelopment. Key issues include:

- Build new connectivity. Major east-west gaps in connectivity exist between Marietta Boulevard, Howell Mill and Northside Drive. Where feasible, new east-west street connections should be accommodated through redevelopment.

- Enhance existing infrastructure. Existing street corridors such as Northside Drive, Howell Mill and Huff Road lack adequate pedestrian amenities or sidewalks. As new mixed-use redevelopment continues to transform the area adding new residents and visitors, these existing corridors will need to be enhanced to accommodate their expanding multi-modal role.

- Maximize transit accessibility. The areas around the future transit stations will need enhanced local connectivity. Many of these areas are constrained by existing rail corridors and industrial uses. Through redevelopment, a finer grain network of streets, trails and pedestrian access points will need to be planned in order to maximize the "reach" and accessibility of the future transit system.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Deering Road
Howell Mill Rd
Northside Drive
17th Street
W Peachtree Street
Huff Road
14th Street
West Marietta St
10th Street
Joseph E Lowery Blvd
Donald Lee Hollowell Pkwy
North Ave
75
85
BeltLine
Atlanta Connected
BeltLine Subarea 8: UPPER WESTSIDE / NORTHSIDE
EFFECTIVE STREET NETWORK
LEGEND
Effective Street Network
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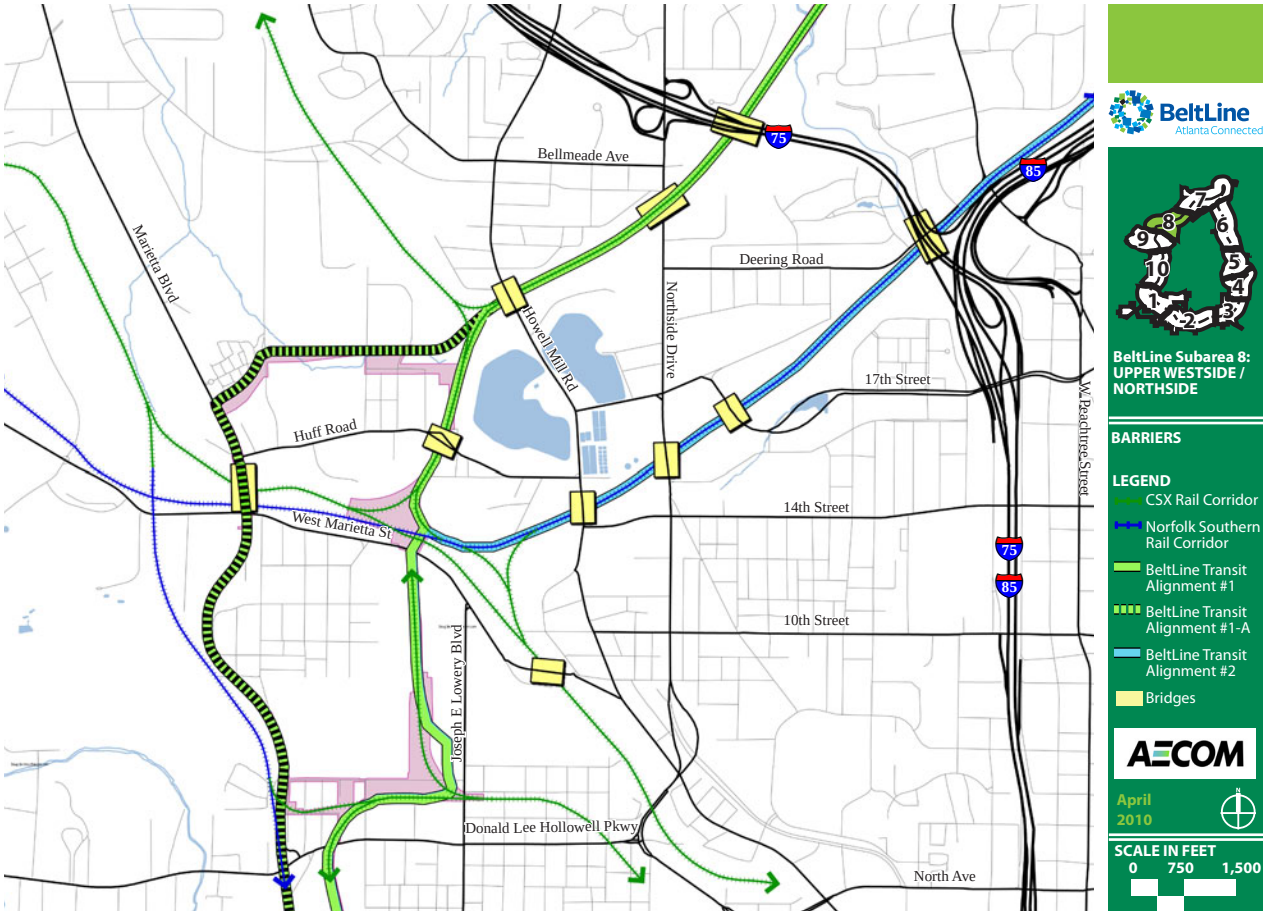
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Huff Road
14th Street
West Marietta St
10th Street
Joseph E Lowery Blvd
Donald Lee Hollowell Pkwy
North Ave
75
85
BeltLine
Atlanta Connected
BeltLine Subarea 8: UPPER WESTSIDE / NORTHSIDE
BARRIERS
LEGEND
CSX Rail Corridor
Norfolk Southern Rail Corridor
BeltLine Transit Alignment #1
BeltLine Transit Alignment #1-A
BeltLine Transit Alignment #2
Bridges
AECOM
April 2010
SCALE IN FEET
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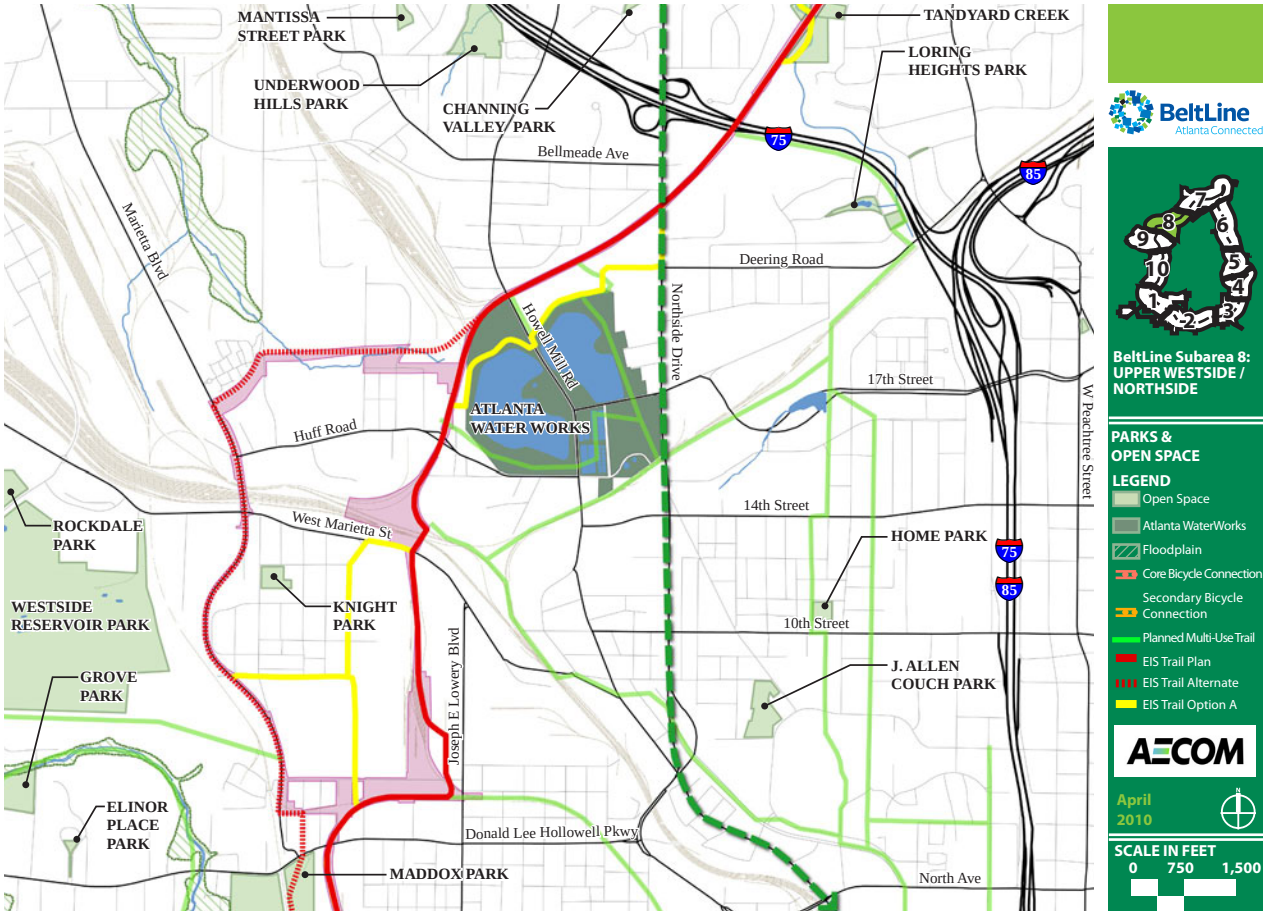
Parks & Open Space

This historically industrial area lacks an established or connected parks and open system. The future BeltLine Trail will link this area to a city-wide set of resources. However, new parks and the joint use of existing resources (such as the Water Works site) will be needed to support redevelopment and a growing residential population.
Key issues include:

- Establish public access to the Atlanta Water Works site. The open space surrounding the reservoirs has historically been open to the public for passive recreational use. In recent years, for security reasons, public access to the Water Works site has been restricted. Establishing a plan for the joint use of portions of the Water Works for publically accessible trails and passive recreational use is a critical goal of the Subarea Plan.

- Maximize access to the BeltLine Trail. Given the industrial nature of the area and potential trail alignments that utilize or are adjacent to rail corridors, a key goal of the Subarea Plan should be to organize redevelopment to maximize access and exposure through new streets, urban form, and secondary trail connections.

- Identify new park opportunities. The scale of redevelopment in the Subarea affords the opportunity to identify and target new parks and open spaces. The existing topography suggests potential sites that could take advantage of unique views at high points such as Northside Drive and 17th Street, or in low areas along creek systems such as north of Huff Road.


MANTISSA STREET PARK
UNDERWOOD HILLS PARK
CHANNING VALLEY PARK
TANDYARD CREEK
LORING HEIGHTS PARK
Bellmeade Ave
Marietta Blvd
Deering Road
Howell Mill Rd
Northside Drive
17th Street
ATLANTA WATER WORKS
Huff Road
W Peachtree Street
14th Street
West Marietta St
ROCKDALE PARK
HOME PARK
KNIGHT PARK
WESTSIDE RESERVOIR PARK
10th Street
Joseph E Lowery Blvd
J. ALLEN COUCH PARK
GROVE PARK
ELINOR PLACE PARK
Donald Lee Hollowell Pkwy
MADDOX PARK
North Ave
75
85
BeltLine
Atlanta Connected
BeltLine Subarea 8: UPPER WESTSIDE / NORTHSIDE
PARKS & OPEN SPACE
LEGEND
Open Space
Atlanta WaterWorks
Floodplain
Core Bicycle Connection
Secondary Bicycle Connection
Planned Multi-Use Trail
EIS Trail Plan
EIS Trail Alternate
EIS Trail Option A
AECOM
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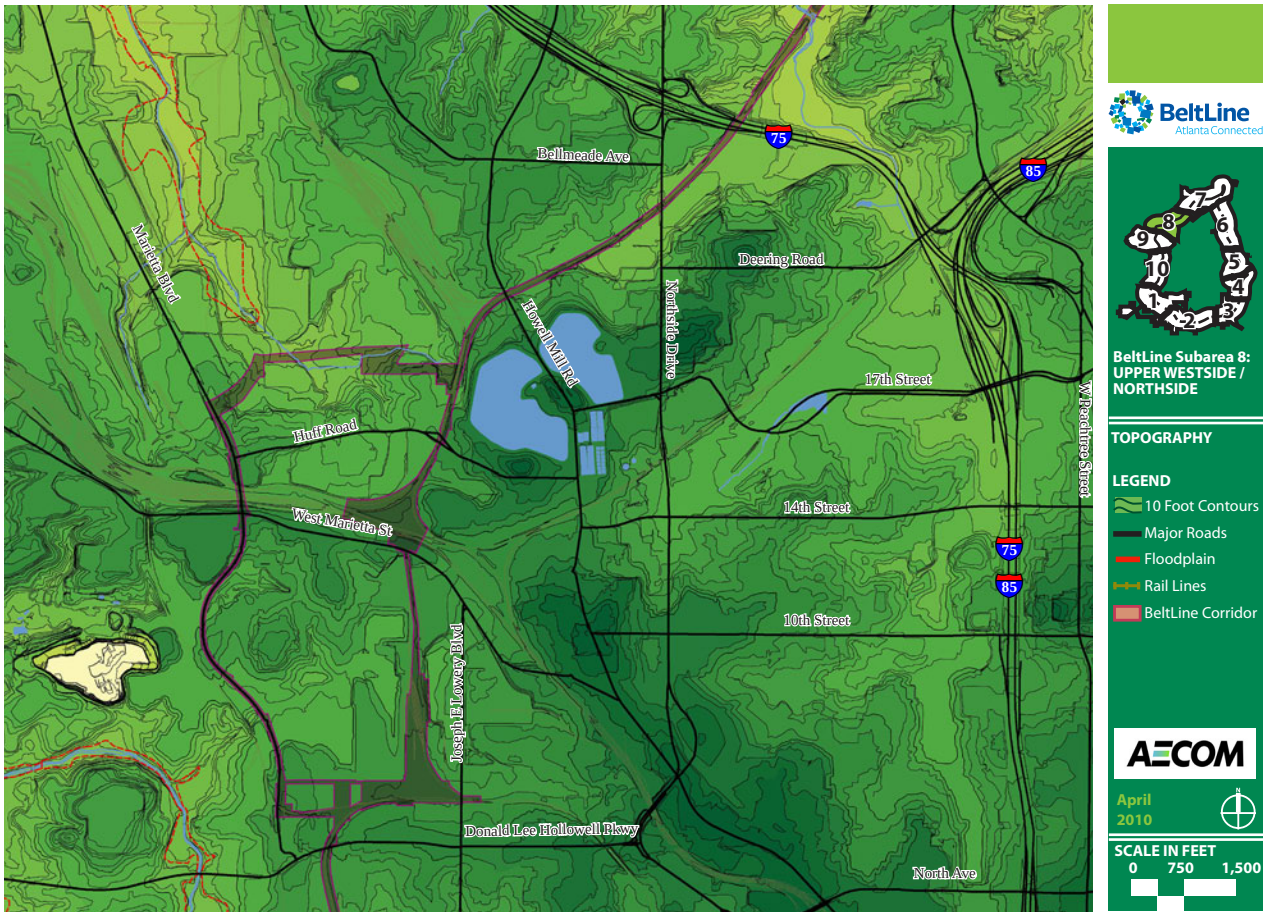
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W Peachtree Street
14th Street
West Marietta St
10th Street
Joseph E Lowery Blvd
Donald Lee Hollowell Pkwy
North Ave
75
85
BeltLine
Atlanta Connected
BeltLine Subarea 8: UPPER WESTSIDE / NORTHSIDE
TOPOGRAPHY
LEGEND
10 Foot Contours
Major Roads
Floodplain
Rail Lines
BeltLine Corridor
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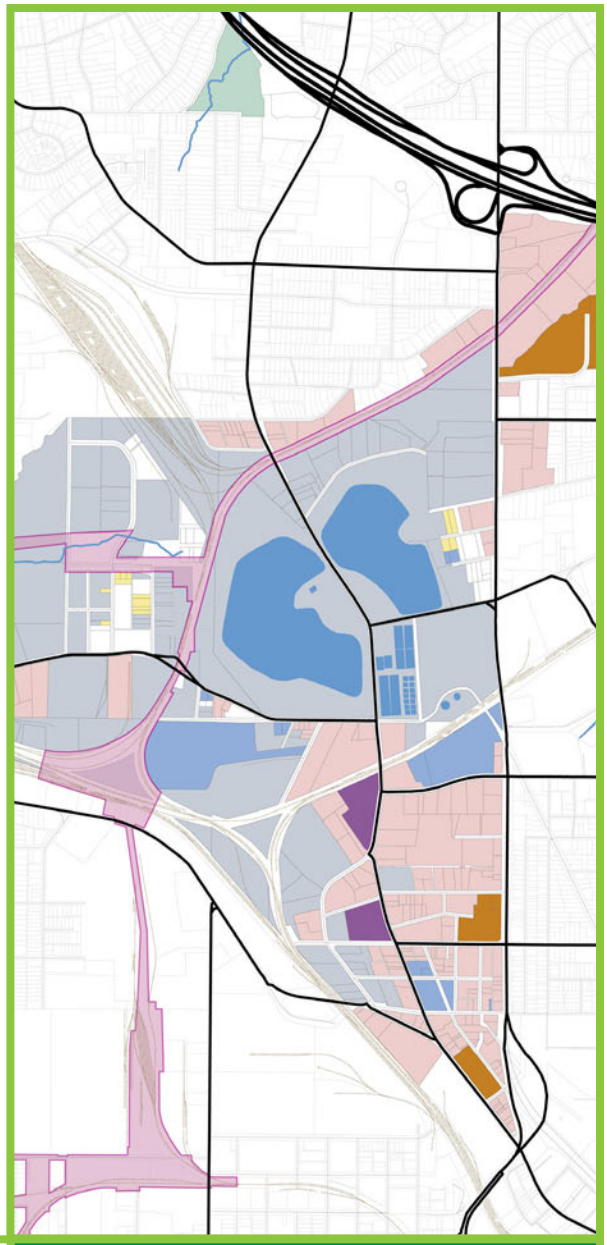


INVENTORY & ASSESSMENT REPORT

1.0
Land Use & Design

1.1 Existing Land Use Survey

The existing land use within the TAD district was surveyed utilizing standardized categories of land use via a "windshield survey" on a parcel-by-parcel basis. The categories are consistent with Atlanta's BeltLine land use and include:

Open Space: This category pertains to any piece of property that is intentionally being used for any open space uses.

Low Density Residential: This category pertains to situations in which multiple housing units are contained within a single lot, but at a low density (i.e., approximately less than 12 units per acre).

Medium Density Residential: This category pertains to situations in which multiple housing units are contained within a single lot, but at a medium density (i.e., approximately 12-36 units per acre).

High Density Residential: This category pertains to situations in which multiple housing units are contained within a single lot, but at a high density (i.e., approximately 36-72 units per acre).

Low Density Commercial: This category pertains to parcels that contain a commercial business – typically a business that sells goods and/or services (that is not manufacturing or industrial) at a low density (i.e., approximately 3 stories or less).

High Density Commercial: This category pertains to parcels that contain a commercial business - typically a business that sells goods and/or services (that is not manufacturing or industrial) at a high density (i.e., approximately 4 stories or more).

Industrial: This category pertains to parcels that contain a manufacturing, production or processing use. In general, this would include anything that requires the use of heavy machinery and typically involves loading and unloading of heavy trucks.

Office/Institutional: This category pertains to parcels that are used exclusively for civic use, or service-provider institutional uses. Institutional uses generally include any civic or service-related facility even if not publicly owned or operated.

Mixed-Use 5-9 Levels: This category pertains to parcels that contain a mix of residential and non-residential uses, as long as the residential uses are approximately 20% or more of the development and the building height is between 5-9 levels.

Mixed-Use 10+ Levels: This category pertains to parcels that contain a mix of residential and non-residential uses, as long as the residential uses are approximately 20% or more of the development and the building height is above 10 levels.

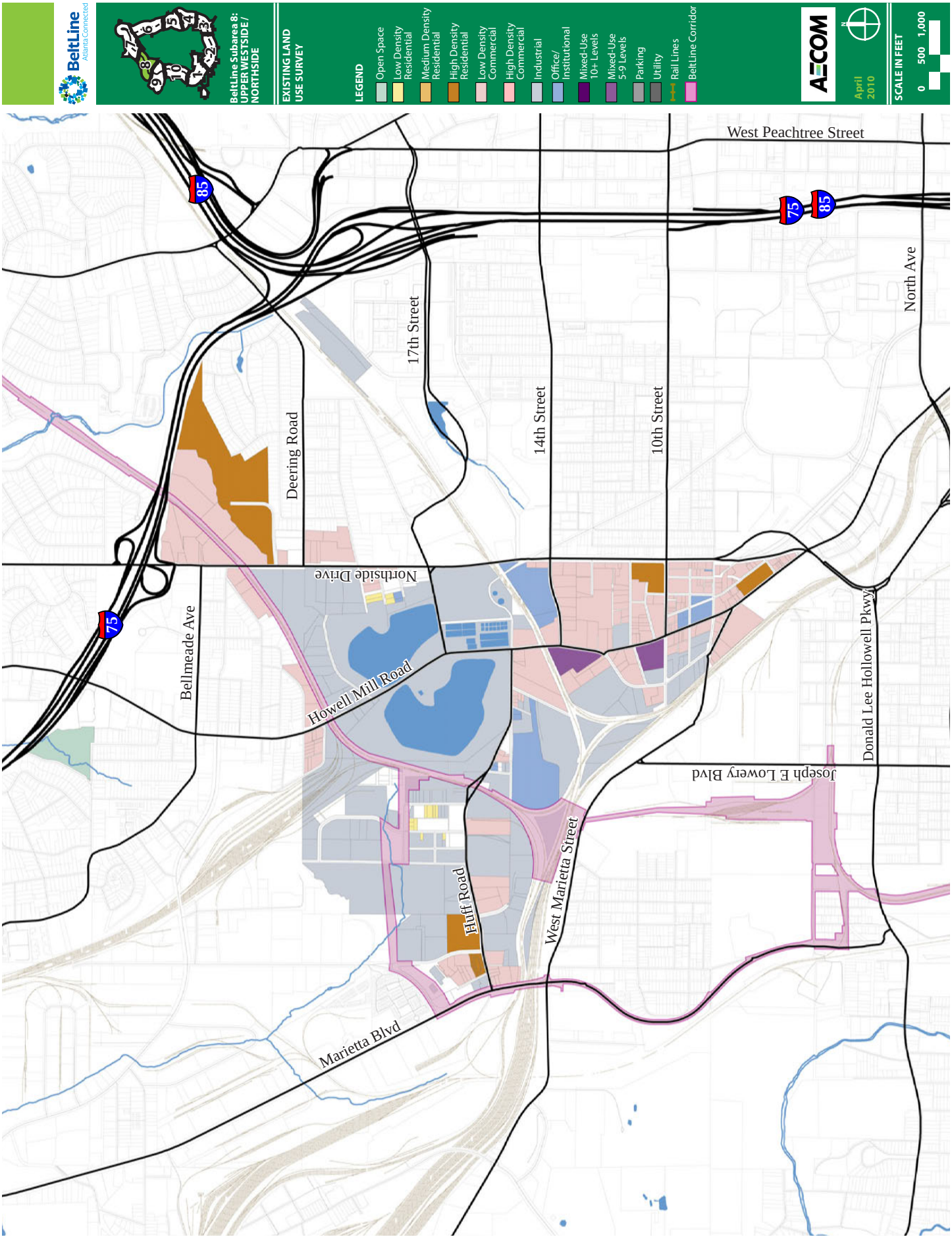
Parking: This category is confined to parcels that are solely used for parking.

Vacant Land: This category pertains to parcels that do not contain a primary structure.

Summary:

- A significant portion of the land within the TAD is industrial which is concentrated to the west of Northside Drive along Howell Mill Road, Huff Road, and West Marietta Street.
- Commercial development is focused along Northside Drive between 10th Street and 14th Street, adjacent to the Georgia Tech campus.
- Former industrial land along Howell Mill Road on the south side of the site has recently been converted to commercial and mixed-use development. This is a continuing trend.
- There is a lack of parks and open space within the study area and TAD. The Atlanta Water Works contains passive open space but is designated industrial because of its utility and restricted access.

Land Use	Acres	Percentage
Industrial	367.9	57.7%
Commercial	152.4	23.9%
Residential	47.1	7.4%
Office/Institutional	28.6	4.5%
Vacant	24.3	3.8%
Open Space	9.4	1.5%
Mixed-Use	7.5	1.2%
Total	**637.2**	**100%**


BeltLine
Atlanta Connected
BeltLine Subarea 8:
UPPER WESTSIDE / NORTHSIDE
EXISTING LAND USE SURVEY
LEGEND
Open Space
Low Density Residential
Medium Density Residential
High Density Residential
Low Density Commercial
High Density Commercial
Industrial
Office/ Institutional
Mixed-Use 10+ Levels
Mixed-Use 5-9 Levels
Parking
Utility
Rail Lines
BeltLine Corridor
AECOM
April 2010
SCALE IN FEET
0 500 1,000
West Peachtree Street
North Ave
17th Street
14th Street
10th Street
Deering Road
Northside Drive
Bellmeade Ave
Howell Mill Road
Donald Lee Hollowell Pkwy
Joseph E Lowery Blvd
West Marietta Street
Huff Road
Marietta Blvd
75
85

1.2 Future Land Use

The Comprehensive Development Plan (CDP) has established future land use classifications for all land in the City. The CDP's Future Land Use Map reflects long-term land use goals and is not always consistent with the existing land use or current zoning. Any parcel rezoning must be consistent with the Future Land Use Plan.

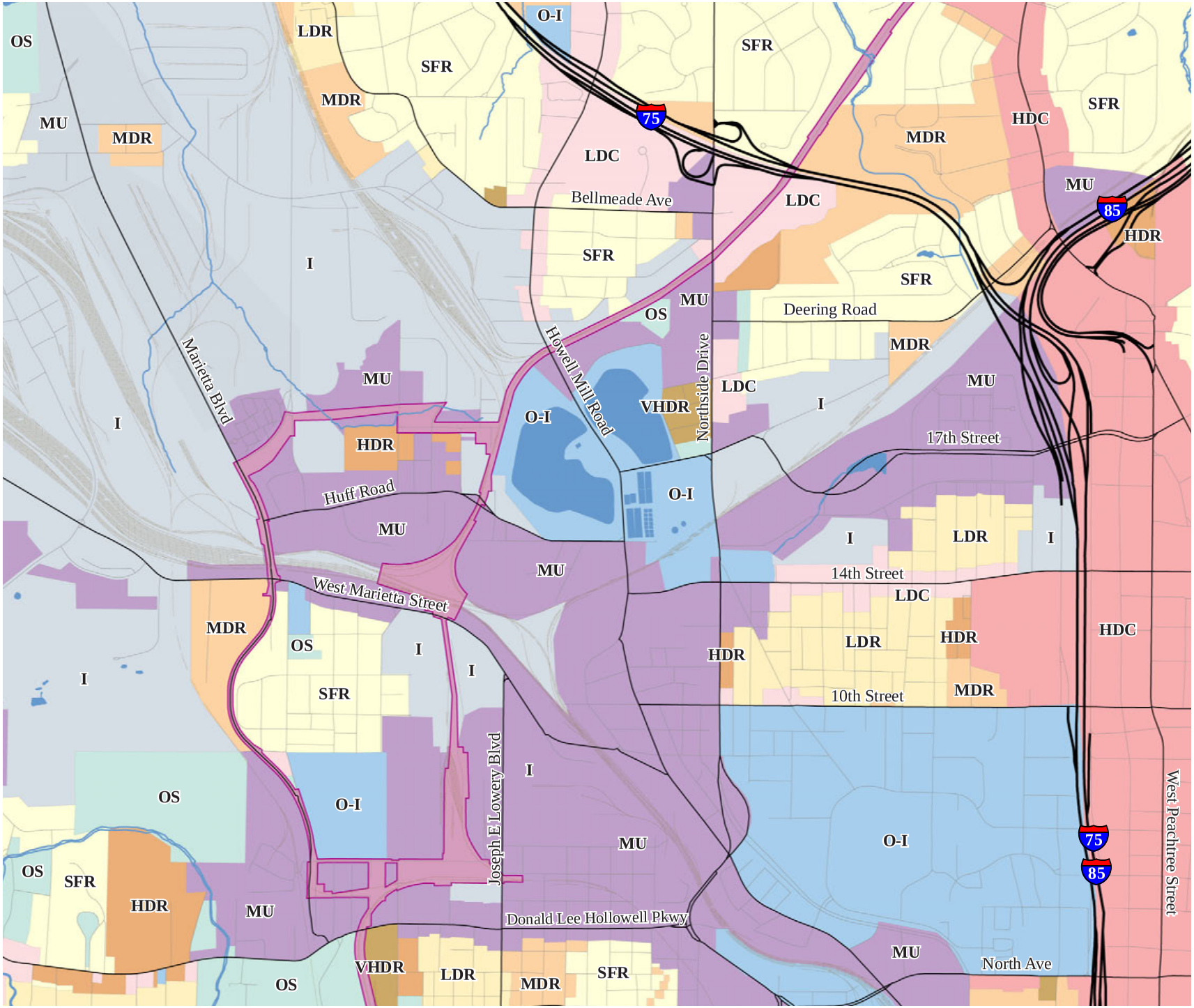
Summary

- The Marietta Boulevard and Marietta Street corridor has the highest concentration of mixed-use in the study area.
- The Atlanta Water Works area is designated for Office-Institutional and surrounded by mixed-use and higher density residential uses.
- No significant areas within the study area have been designated for parks or open space use.

Land Use Designation	Compatible Zoning Districts	Allowed Units per Acre	F.A.R. Limits
Open Space	Varies	-	-
Single-Family Residential	R-1 to R-4, PD-H	N/A	N/A
Low-Density Residential	R-1 to R-4, RG-1 & RG-2, MR-1 & MR-2, PD-H	0-8 0-16 0-32	0.0 - 0.348
Medium-Density Residential	R-1 to R-5, RG-1 to RG-2, MR-1 & MR-2, RG-3, MR-3, PD-H	0-16 0-29 0-64	0.0 - 0.696
High-Density Residential	R-1 to R-5, RG-1 to RG-4, MR-1 to MR-4, PD-H	N/A	0.0 - 1.49
Very High-Density Residential	R-1 to R-5, RG-1 to RG-6, MR-1 to MR-6, PD-H	N/A	0.0 - 6.40
Low-Density Commercial	R-1 to R-5, RG-1 to RG-3, R-LC, MR-1 to MR-4, O-I, LW, NC, C-1 & C-2, MRC-1 & MRC-2, PD-H, PD-OC	N/A	Established by Zoning District Regulations
High-Density Commercial	R-1 to R-5, RG-1 to RG-6, R-LC, MR-1 to MR-6, O-I, LW, NC, C-1 to C-5, MRC-1 & MRC-3, PD-H, PD-MU, PD-OC	N/A	Established by Zoning District Regulations
Industrial	LW, I-1, I-2, PD-BP	N/A	Established by Zoning District Regulations
Office/Institutional	R-1 to R-5, RG-1 to RG-6, MR-1 to MR-6, O-1, PD-BP	N/A	Established by Zoning District Regulations
Office/Institutional/ Residential	R-1 to R-5, RG-1 to RG-6, MR-1 to MR-6, O-I	N/A	Established by Zoning District Regulations
Mixed-Use (min. 20% residential required)	All districts except for I-1, I-2 & PD-BP	N/A	Established by Zoning District Regulations

Except for I and PD districts, all land use designations are incremental. A higher density designation may include lesser density designation.

Source: 2011 Comprehensive Development Plan (CDP), City of Atlanta Bureau of Planning,
http://www.atlantaga.gov/client_resources/government/planning/cdp/community_assessment/2011cdp_ca_landuse.pdf



BeltLine
Atlanta Connected

BeltLine Subarea 8: UPPER WESTSIDE / NORTHSIDE

FUTURE LAND USE

LEGEND

- SFR- Single-Family Residential
- LDR- Low Density Residential
- MDR- Medium Density Res.
- HDR- High Density Residential
- VHDR- Very High Density Res.
- LDC- Low Density Commercial
- HDC- High Density Comm.
- MU- Mixed-Use
- I - Industrial
- O-I - Office / Institutional
- OS - Open Space
- Rail Lines
- BeltLine Corridor

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April 2010

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SCALE IN FEET

0 500 1,000

1.3 Current Zoning

Zoning Categories Basic Description:

(C-2) Commercial Service: Intent: Provide a broad range of sales, service and repair activities while encouraging residential use either as a principal use or in mixed use development. There is an unlimited height requirement except when adjacent to residential uses.

(C-3) Commercial-Residential: Intent: Provide a moderate to high-intensity uses of a broad range in areas of major intersections or of areas of regional significance. The maximum height allowed is 225 feet.

(RG) Residential General: Intent: Provide for a range of residential densities that are compatible with the comprehensive plan. RG2 FAR: .174-.348, RG4 FAR: .746-1.49, RG5 FAR: 1.6-3.2.

(LW) Live-Work: Intent: Encourage the rehabilitation or development of underutilized industrial areas while enhancing the environmental and recreational amenities. The floor area ratio ranges from .5 for non-residential uses to .696 for residential uses to a combined F.A.R. of 1.196. There is a 52 foot height maximum and a requirement for a minimum of 15 foot sidewalks.

(I-1) Light Industrial: Intent: Provide locations for wholesaling, warehousing, storage, light manufacturing, processing, repair services, and sales lots in addition to other retail and service establishments, as well as permitting the conversion of industrial buildings to multi-family dwellings.

(OI) Office-Institutional: Intent: Provide office, institutional, residential or mixed-use development without general commercial development.

(MRC) Mixed Residential and Commercial: Intent: Provide for a range of residential and commercial densities that serve a single neighborhood or a group of adjacent neighborhoods and provide commercial uses. The F.A.R. should range from .696 to 3.2 for residential, 1.0 to 4.0 for non residential and 1.696 to 7.20 for mixed use. There is a 225 foot height maximum, an open space requirement of 10%-20%, and a requirement for a minimum of 15 foot sidewalks.

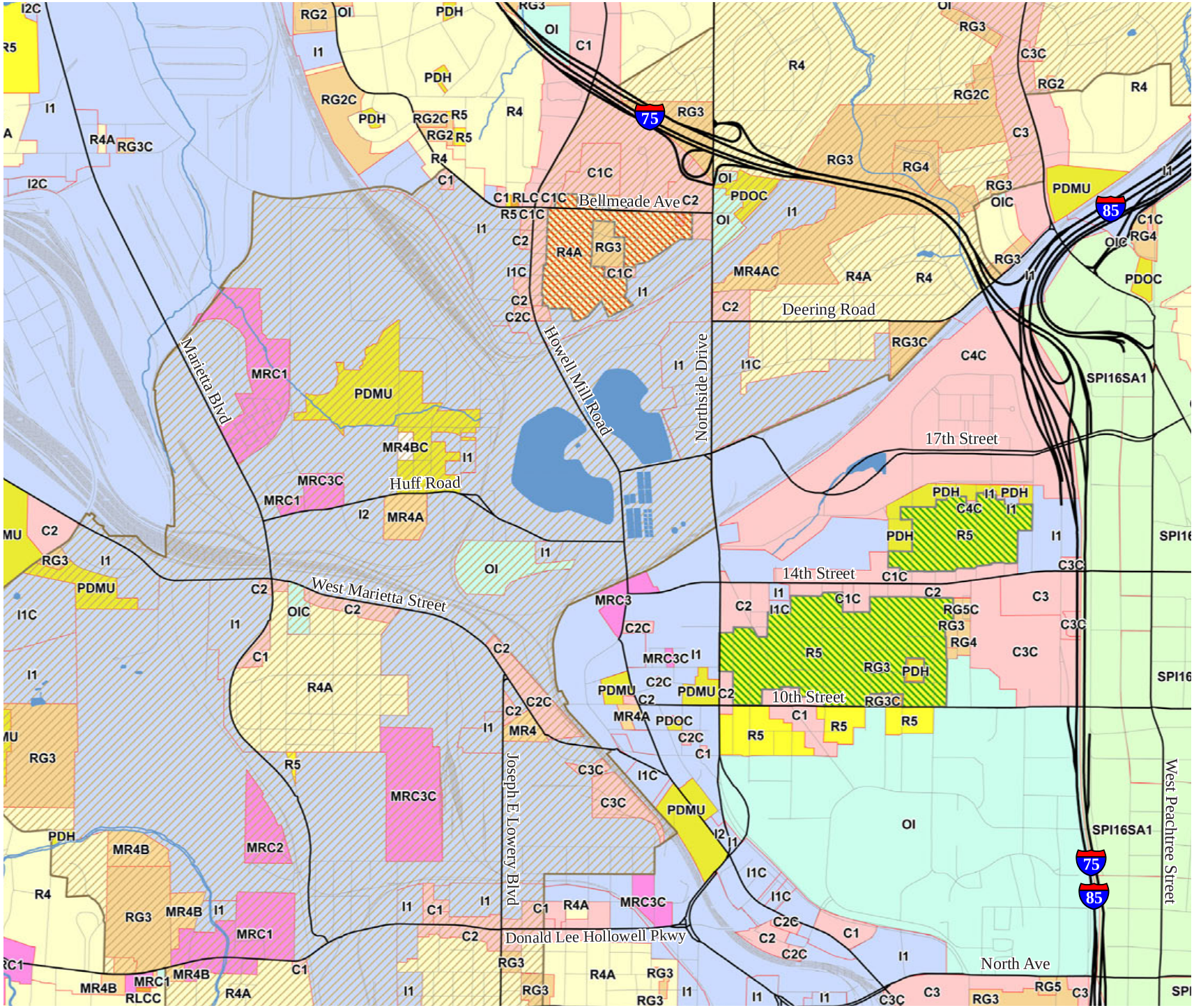
(SPI-8) Home Park Overlay District: Intent: Preserve and protect the Home Park neighborhood from overcrowding of streets with excessive vehicles parked resulting from the rental of housing units.

(SPI-14) Berkeley Park Overlay District: Intent: Preserve and protect the Berkeley Park neighborhood from overcrowding with all of its accompanying negative impacts, such as excessive noise and traffic, due to the rental of housing units to large groups of unrelated individuals.

BeltLine Overlay District: Intent: Establish a zoning district overlay that establishes a set of criteria regulating certain characteristics that anticipates, manages, and encourage quality development opportunities.

Summary:

- The majority of the TAD is zoned Industrial with disconnected areas of Mixed-Use.
- Sections of Home Park and Berkeley Park fall within overlay districts that limit density specifically of residential development.
- The highest intensity uses are located in Atlantic Station north of Home Park.
- There is a mix of Industrial and lower density Commercial at the adjacent to Georgia Tech at the south end of the Northside Drive-Howell Mill Road corridor.



BeltLine
Atlanta Connected

BeltLine Subarea 8: UPPER WESTSIDE / NORTHSIDE

ZONING

LEGEND

- Berkeley Park Overlay District
- Home Park Overlay District
- BeltLine Overlay District
- Rail Lines

AECOM

April 2010

SCALE IN FEET

0 500 1,000

1.4 Population & Employment

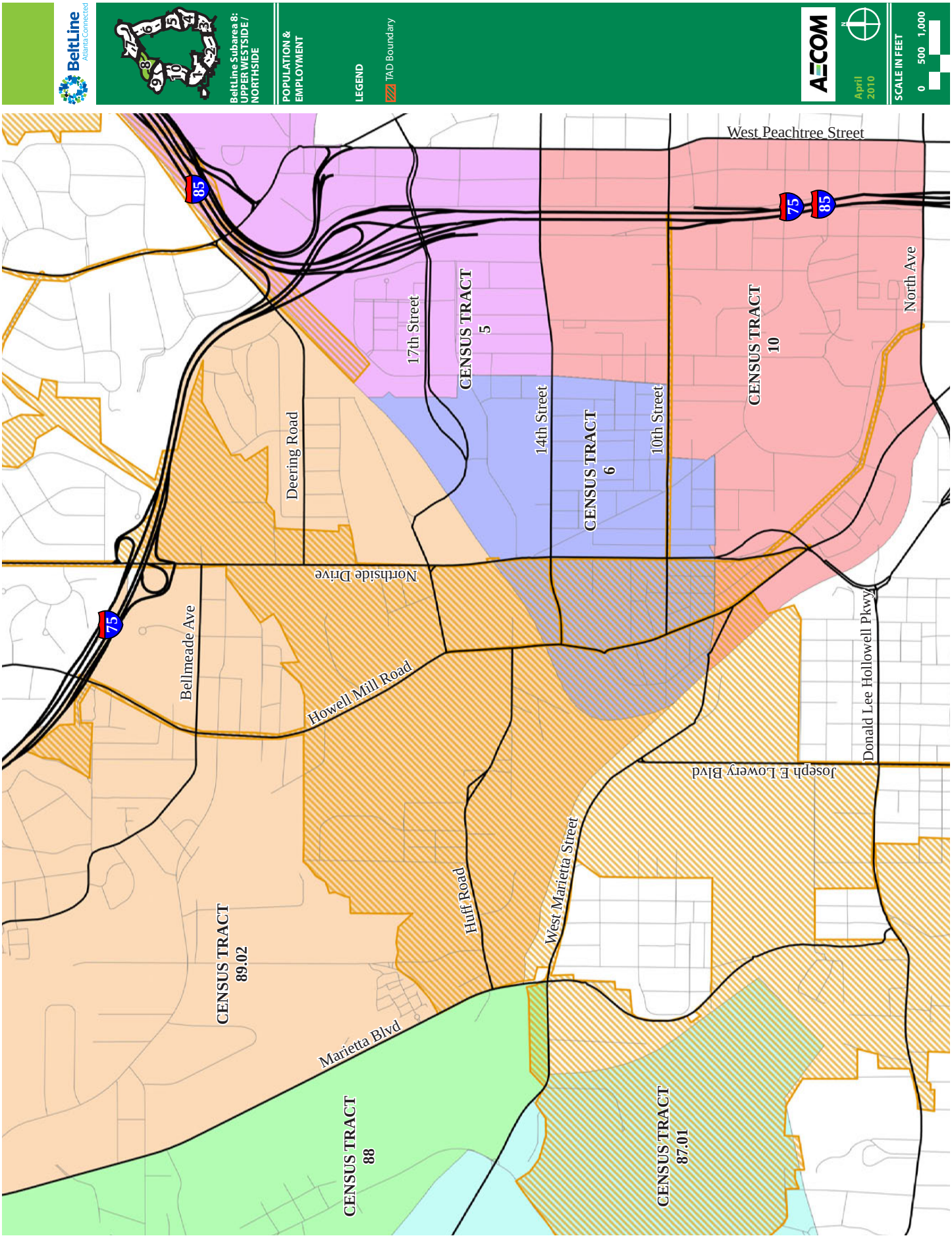
There are six census tracts that are contained in the study area boundary.

Summary

- Tracts 87.01 and 88 are only partially contained in the study area boundary.
- Tracts 5 and 10, which include Atlantic Station, Home Park, and Georgia Tech are projected to have the largest population increases.
- Tracts 10 and 89.02 have the largest number of employees. Tract 10 includes Georgia Tech and is projected to experience the greatest employment growth through 2030. However, Tract 89.02 is projected to have a significant decline in employment.
- Tracts 5 and 6, which combined contain all of Atlantic Station, is projected to post substanial gains in both population and employment.

Population and Employment					
		Population		Employment	
Tract #	**Description of Area**	**2000 Census**	**2030***	**2000***	**2030***
05.00	Atlantic Station/Home Park (East)	3,705	8,910	6,223	8,909
06.00	Atlantic Station/Home Park (West)	2,707	5,811	3,095	6,439
10.00	Georgia Institute of Technology	9,233	14,978	13,520	21,072
87.01	Rockdale	326	2,164	482	690
88.00	Tilford	2,972	6,066	6,011	5,777
89.02	Berkeley Park, Blandtown/Loring Heights	4,859	5,016	13,570	10,911
	Total	**23,802**	**42,945**	**42,901**	**53,798**

*Based on the Atlanta Regional Commission's projections.


BeltLine
Atlanta Connected
BeltLine Subarea 8:
UPPER WESTSIDE /
NORTHSIDE
POPULATION &
EMPLOYMENT
LEGEND
TAD Boundary
AECOM
April
2010
SCALE IN FEET
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West Peachtree Street
North Ave
Donald Lee Hollowell Pkwy
Joseph E Lowery Blvd
Northside Drive
Howell Mill Road
Marietta Blvd
West Marietta Street
Huff Road
Bellmeade Ave
Deering Road
17th Street
14th Street
10th Street
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CENSUS TRACT
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CENSUS TRACT
10
CENSUS TRACT
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CENSUS TRACT
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75
85

1.5 Related Plans & Studies

There are a number of related studies and plans in and adjacent to the study area that have recommended future land use changes, opportunities for redevelopment, new street connections, and transit recommendations. The table below lists all related plans and studies in the study area that have been reviewd. The following provides an overview of some of these key plans and studies.

Summary

BeltLine Environmental Impact Statement (EIS)

- Will establish alignments and right-of-way for all BeltLine multi-use trail corridors & transit and conceptual locations for all stations.

Connect Atlanta Plan

- Atlanta's first comprehensive transportation plan that incorporates recommended transportation improvements from all previous small area plans and neighborhoods studies.

BeltLine Redevelopment Plan

- Guides subarea planning activities including land use refinements and transportation and park improvements.

Northside Drive Corridor Study

- Evaluates existing transportation infrastructure and develops alternative land use and transportation improvements for the Northside Drive corridor.

Upper Westside LCI

- Assesses area needs and issues in developing a community vision for housing, economic development, transportation, land use, and development.

Georgia Tech Campus Master Plan

- Establishes plan for future development of the campus including new areas of interest beyond the core campus.

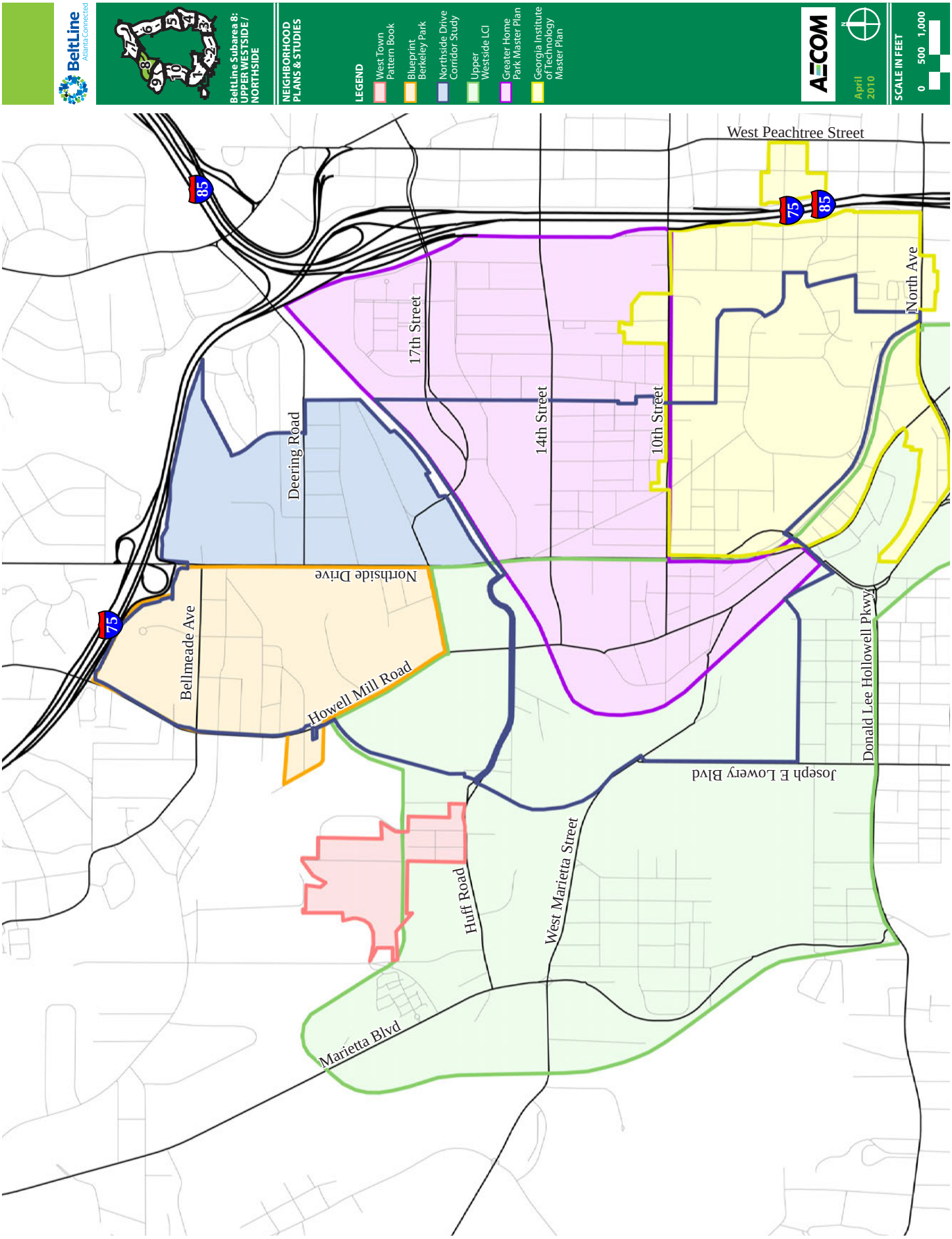
Berkeley Park Blueprints Study

- Addresses critical planning issues from transportation improvements to architectural design concerns.

Greater Home Park Master Plan

- Integrates development of three disparate areas - Home Park, Atlantic Station, and adjacent Northside Drive corridor - into unified neighborhood.

Related Plans & Studies			
Plan/Study Title	**Status**	**Date**	**Adopting Agency**
City-wide Plans/Studies			
BeltLine Environmental Imact Statement (EIS)	Draft	Ongoing	n/a
Atlanta's Project Greenspace	Adopted	2009 - December	City of Atlanta
Industrial Preservation Policy for the BeltLine Planning Area	Draft	2009 - September	n/a
Connect Atlanta Plan	Adopted	2008 - December	City of Atlanta
Atlanta Strategic Action Plan	Adoped	2007 - April	City of Atlanta
BeltLine Brownfield Survey	Study Only	2007 - Summer	n/a
BeltLine Redevelopment Plan	Adopted	2005 - November	City of Atlanta
Neighborhood Plans/Studies			
West Town Pattern Book	Draft	2007 - July	Brock Development
Northside Drive Corridor Study	Adopted	2005 - July	City of Atlanta
Upper Westside LCI	Adopted	2005 - January	City of Atlanta
Georgia Institute of Technology Campus Master Plan Update	Adopted	2004 - November	Georgia Institute of Technology
Berkeley Park Blueprints Study	Study Only	2004 - Fall	n/a
Greater Home Park Master Plan	Adopted	2002 - August	Home Park Neighborhood


BeltLine
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BeltLine Subarea 8:
UPPER WESTSIDE /
NORTHSIDE
NEIGHBORHOOD
PLANS & STUDIES
LEGEND
West Town Pattern Book
Blueprint Berkeley Park
Northside Drive Corridor Study
Upper Westside LCI
Greater Home Park Master Plan
Georgia Institute of Technology Master Plan
AECOM
April 2010
SCALE IN FEET
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West Peachtree Street
17th Street
14th Street
10th Street
Deering Road
Northside Drive
Bellmeade Ave
Howell Mill Road
Joseph E Lowery Blvd
Donald Lee Hollowell Pkwy
North Ave
Huff Road
West Marietta Street
Marietta Blvd
75
85

1.6 Industrial Preservation Policy

The Industrial Preservation Policy has just recently begun development and is in early draft stages. It addresses all currently classified Industrial land within the BeltLine TAD. The primary objective is to balance redevelopment of land adjacent to BeltLine transit with long term demand for industrial land within the city.

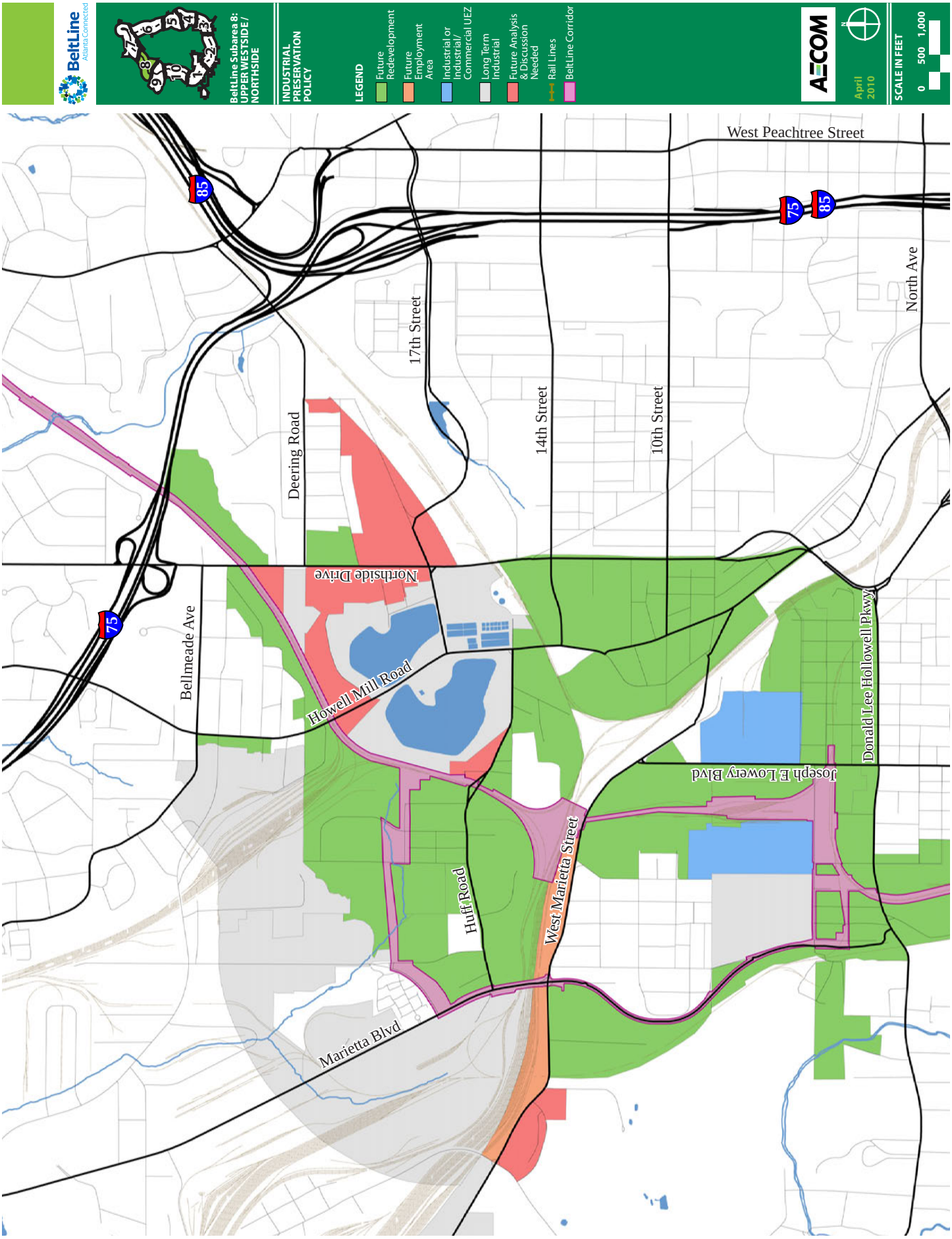
Summary

- Most of the study area has been designated for Future Redevelopment which is consistent with the Future Land Use Plan's vision for mixed-use.

- The majority of land designated for Long-Term Industrial use is located on the north side of the study area between Howell Mill Road and Marietta Boulevard.

- The Atlanta Water Works and resevoir has also been designated for Long-Term Industrial use.

- Land surrounding the resevoir and north along Bishop Street has been designated as areas needing further analysis and discussion. The final alignment of the BeltLine transit to be established in the final EIS will inform the future industrial scope of these areas.


BeltLine
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BeltLine Subarea 8:
UPPER WESTSIDE / NORTHSIDE
INDUSTRIAL PRESERVATION POLICY
LEGEND
Future Redevelopment
Future Employment Area
Industrial or Industrial/ Commercial UEZ
Long Term Industrial
Future Analysis & Discussion Needed
Rail Lines
BeltLine Corridor
AECOM
April 2010
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Joseph E Lowery Blvd
Northside Drive
Howell Mill Road
Bellmeade Ave
Marietta Blvd
Huff Road
West Marietta Street
Deering Road
17th Street
14th Street
10th Street
75
85

1.7 Related Studies: Land Use Change

The following summarizes the key land use change recommendations from the previous plans and studies.

Summary

BeltLine Redevelopment Plan

- Proposes mixed-use and open space development north of the resevoir at the intersection of the CSX rail corridor and Howell Mill Road
- Designates Underwood Hills Park along Harper Street as open space.
- Proposes open space to the west of the resevoir along Huff Road.

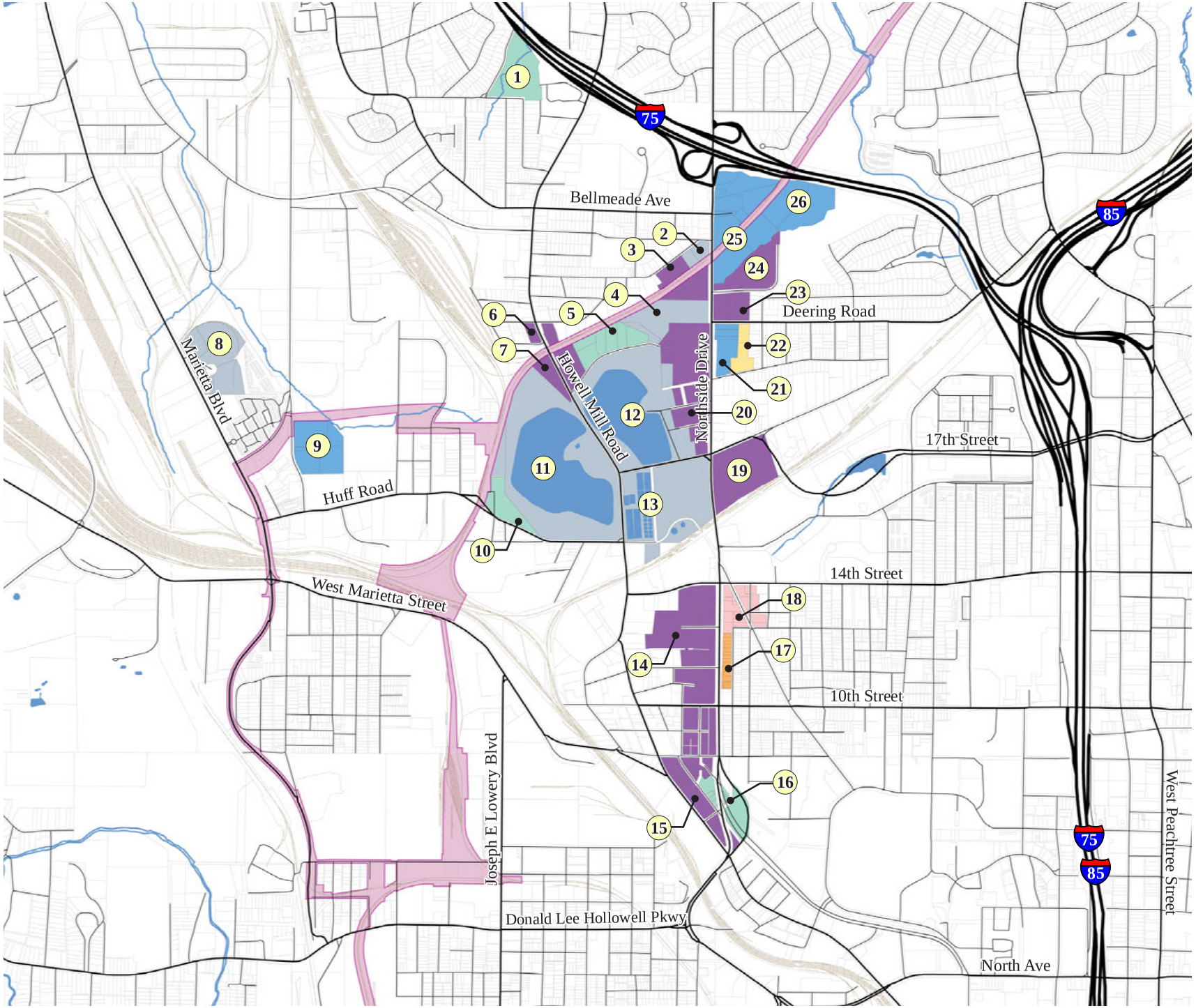
Northside Drive Corridor Study

- Specifies density for mixed-use development along Northside Drive.
- Northside Drive adjacent to I-75 is designated as Office-Institutional.

Industrial Preservation Policy

- Proposes changing the designation of the site occupied by the resevoir from Office-Institutional to Industrial.
- Retains existing industrial use of the site north of M West along Marietta Boulevard.

	Adopted Future Land Use	Proposed Future Land Use	Study
1	Single Family Residential	Open Space	BeltLine Redevelopment Plan
2	Low Density Commercial	Industrial	BeltLine Redevelopment Plan
3	Industrial	Mixed-Use (5-9 Stories)	BeltLine Redevelopment Plan
4	Mixed-Use	Industrial	Industrial Preservation Policy
5	Mixed-Use	Open Space	BeltLine Redevelopment Plan
6	Industrial	Mixed-Use (5-9 Stories)	BeltLine Redevelopment Plan
7	Mixed-Use	Mixed-Use (5-9 Stories)	BeltLine Redevelopment Plan
8	Mixed-Use	Industrial	Industrial Preservation Policy
9	Industrial	Office-Institutional	BeltLine Redevelopment Plan
10	Industrial	Open Space	BeltLine Redevelopment Plan
11	Office-Institutional	Industrial	Industrial Preservation Policy
12	Office-Institutional	Industrial	Industrial Preservation Policy
13	Office-Institutional	Industrial	Industrial Preservation Policy
14	Mixed-Use	Mixed-Use (5-9 Stories)	Northside Drive Corridor Study
15	Mixed-Use	Mixed-Use (5-9 Stories)	Northside Drive Corridor Study
16	Mixed-Use	Open Space	Northside Drive Corridor Study
17	Low Density Residential	Medium Density Residential	Northside Drive Corridor Study
18	Low Density Commercial	Low Density Commercial	Northside Drive Corridor Study
19	Industrial	Mixed-Use (5-9 Stories)	Northside Drive Corridor Study
20	Medium Density Residential	Mixed-Use (5-9 Stories)	BeltLine Redevelopment Plan
21	Mixed-Use	Office-Institutional	Northside Drive Corridor Study
22	Open Space	Low Density Residential	BeltLine Redevelopment Plan
23	Mixed-Use	Mixed-Use (5-9 Stories)	Northside Drive Corridor Study
24	High Density Residential	Mixed-Use (5-9 Stories)	BeltLine Redevelopment Plan
25	Low Density Commercial	Office-Institutional	Northside Drive Corridor Study
26	Low Density Commercial	Office-Institutional	BeltLine Redevelopment Plan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Howell Mill Road
Northside Drive
Marietta Blvd
Huff Road
West Marietta Street
17th Street
14th Street
10th Street
Joseph E Lowery Blvd
Donald Lee Hollowell Pkwy
North Ave
West Peachtree Street
75
85
BeltLine
Atlanta Connected
BeltLine Subarea 8:
UPPER WESTSIDE / NORTHSIDE
RELATED STUDIES:
LAND USE CHANGE
LEGEND
SFR- Single-Family Residential
LDR- Low Density Residential
MDR- Medium Density Res.
HDR- High Density Residential
VHDR- Very High Density Res.
LDC- Low Density Commercial
HDC- High Density Comm.
MU- Mixed-Use
I - Industrial
O-I - Office / Institutional
OS - Open Space
Rail Lines
BeltLine Corridor
AECOM
April 2010
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1.8 Related Studies: Transportation

The following summarizes the key transportation recommendations from the previous plans and studies.

Summary

Connect Atlanta Plan

- Extension of Deering Road across Northside Drive, adjacent to the Atlanta Water Works site, through the proposed West Town development, and connecting to Marietta Boulevard.
- Installation of traffic calming measures along Deering Road.
- New street framework along Ellsworth Industrial Boulevard that connects with new streets proposed by the West Town development north of Huff Road.
- New street framework connecting along Joseph E Lowery Boulevard.
- Proposed intersection realignment at intersection of 14th Street and Northside Drive.
- Narrow Howell Mill Road to three lanes (two travel lanes and center turn lane with on-street bicycle lanes).
- Widen Huff Road to add left turn lane from BeltLine intersection to Marietta Boulevard.
- Proposes transit connections to Northwest Atlanta and Cobb County along Marietta Street.

West Town Pattern Book

- New street framework and connections along Fairmont Avenue and English Street.

Northside Drive Corridor Study

- New sidewalks on both sides of Northside Drive south of Bellmeade Street.
- Widen Northside Drive to six lanes and a median/turn lane south of I-75.
- Potential for future transit in outside lanes.
- New street connections at Ethel Street and 8th Street.

Upper Westside LCI

- New street connections with Huff Road and Jefferson Street.
- Northside Drive intersection improvements at 10th Street and 14th Street.
- Howell Mill Road intersection improvements at 17th Street and Brady Avenue.
- Proposes potential transit opportunities throughout the study area.

Georgia Tech Campus Master Plan Update

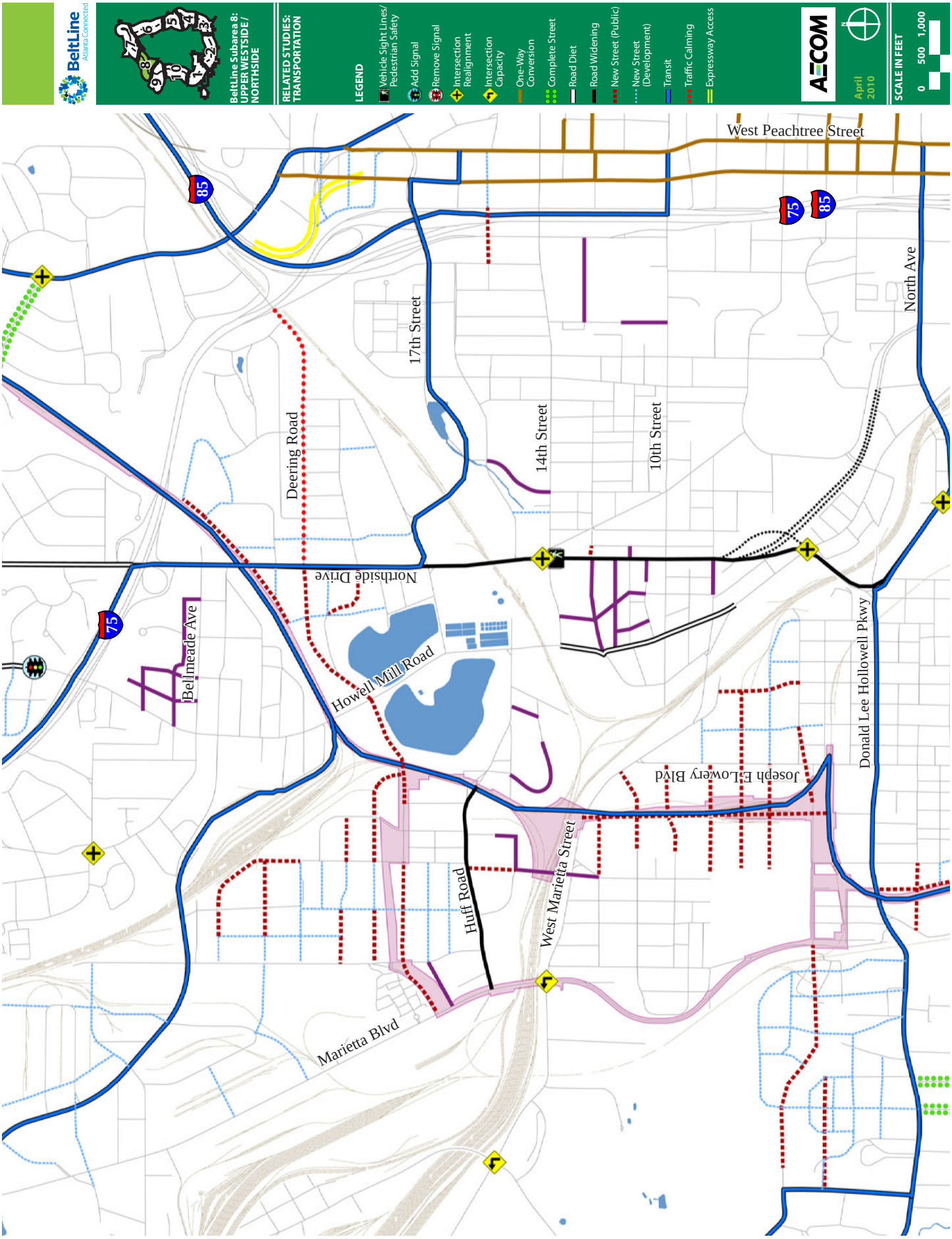
- Removal of Tech Parkway from State Street to Northside Drive.

Berkeley Park Blueprints Study

- New street framework and connections along Bellmeade Avenue.
- New sidewalks and bike lanes along Holmes Street.
- Streetscape improvements and new bike lanes along Bellmeade Avenue.
- Bellmeade Avenue intersection improvements at Northside Drive and Howell Mill Road.
- New street framework adjacent to the Atlanta Water Works site along Northside Drive.

Greater Home Park Master plan

- New street framework and connections between Howell Mill Road and Northside Drive south of 14th Street.
- New street connection between 14th Street and 16th Street.
- Proposes connection from Mecaslin Street to Atlantic Station.
- Proposes traffic calming measures on residential streets connecting 14th Street and 16th Street.


BeltLine
Atlanta Connected
BeltLine Subarea 8:
UPPER WESTSIDE /
NORTHSIDE
RELATED STUDIES:
TRANSPORTATION
LEGEND
Vehicle Sight Lines/ Pedestrian Safety
Add Signal
Remove Signal
Intersection Realignment
Intersection Capacity
One-Way Conversion
Complete Street
Road Diet
Road Widening
New Street (Public)
New Street (Development)
Transit
Traffic Calming
Expressway Access
AECOM
April 2010
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West Peachtree Street
North Ave
17th Street
14th Street
10th Street
Deering Road
Northside Drive
Howell Mill Road
Bellmeade Ave
Donald Lee Hollowell Pkwy
Joseph E. Lowery Blvd
West Marietta Street
Huff Road
Marietta Blvd
85
75

1.9 Potential Redevelopment

This snapshot of the potential redevelopment opportunities in the study area is based on stakeholder interviews, field observations and land use analysis of existing parcels within the TAD. They have been grouped into the following categories:

Parcels Currently Redeveloping: projects that are under construction or approved.

Parcels Ready for Redevelopment (Short-term): parcels that are likely to redevelop in the next 2-5 years based on location and under utilization.

Parcels Ready for Redevelopment (Long-term): parcels that are in position to redevelop in the next 5 years and beyond based on location and under utilization.

Summary

- In the Peachtree/Piedmont Hospital area, there is significant potential for redevelopment in the short-term including several large parcels such as the Colonial Homes property and the Brookwood Square shopping center.

- The Lindbergh Station Area is undergoing significant redevelopment currently.

- The Armour Drive/Monroe Drive area has some potential for redevelopment in the short-term with some redevelopment underway.

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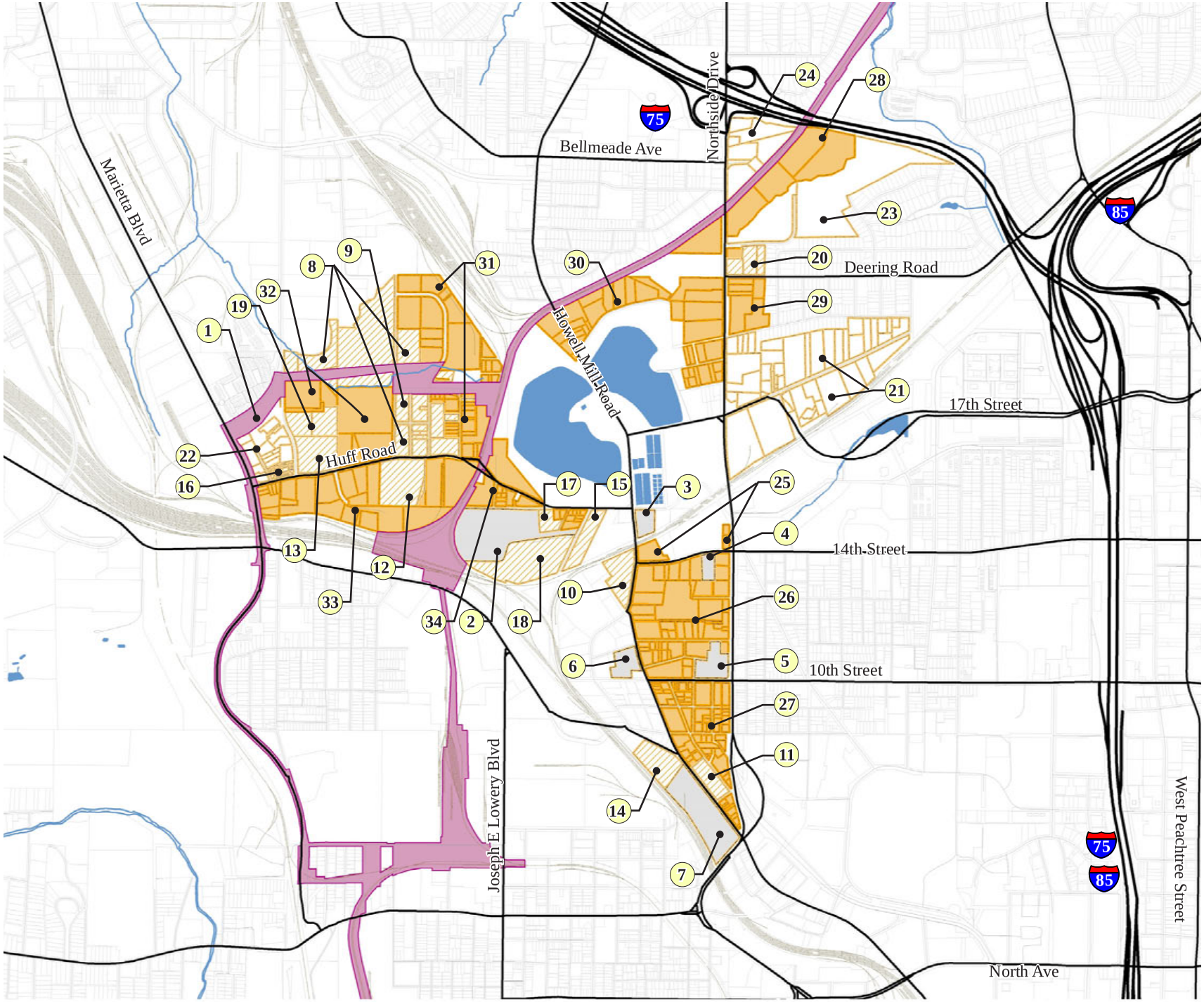
	Area	EXLU	FLU	Zoning	Acres
1	Glassworks (Ellsworth Industrial)	I	MU	I2	0.23
2	The Howard School (Foster Street)	OI	MU	O2	15.07
3	Market at the Works	LC	MU	I2	1.81
4	Progressive Lighting (14th Street)	LC	MU	I1	1.33
5	Tivoli Ten Side (10th Street)	HR	MU	PDMU	3.42
6	Alta West Apartments (Howell Mill)	MU9	MU	PDMU	2.6
7	M Street (Northside Drive)	I	MU	PDMU	10.71
8	West Town	I/V/LR	MU	PDMU	43.01
9	Culpepper Street	I	HDR	MR4BC	1.44
10	White Provision (Howell Mill)	MU9	MU	MRC3	4.27
11	Alliance (Northside Drive)	HR	MU	PDMU	2.58
12	Alexan MetroWest (Huff Road)	I	MU	MR4A	8.07
13	Apex West Midtown (Huff Road)	HR	MU	MRC3C	5.64
14	Brickworks (Marietta Street)	LC	MU	I1C	4.76
15	Gables Westside (Huff Road)	LC	MU	I2	3.43
16	Huff Heights (Huff Road)	HR	MU	MRCI	1.36
17	John P Whittaker School (Huff Road)	I	MU	I1	1.57
18	Murray Mill	I	MU	I2	11.51
19	The Heights Ellsworth (Ellsworth Boulevard)	I	I	I2	5.04
20	Westwood Property (Deering Road)	V	MU	C2	3.61
21	Bishop Street	I	I/MU/LDC	I1/I2	57.74
22	Ellsworth Industrial and Marietta Boulevard	LC/I/V	MU	I2	7.69
23	Highland Ridge Apartments (Northside Drive)	HR	VHDR/MDR	MR4AC	31.04
24	Office Park (Northside Drive)	LC	LDC	PDOC/OI	12.2
25	North of 14th Street, between Howell Mill and Northside Drive	LC	MU	MRC3/I1	2.36
26	Between Northside Drive and Howell Mill; 14th St. and 10th St.	HC/LC/I	MU	I1/C2C/MRC3C/C2	34.95
27	Between Northside Drive and Howell Mill and south of 10th St.	LC/OI/V	MU	I1/C2C/PDOC/CI	17.05
28	Northside Drive north of Deering Road	LC/I	LDC/MU	I1	23.35
29	Northside Drive	I/LC/LR/OI	LDC/MU/VHDR	C2/I1C/I1	23.74
30	Howell Mill Road north of Atlanta Waterworks	I	MU	I1	14.35
31	North of Huff Road and east of Fairmont Avenue	I/LR/V	I/MU/HDR	I1	31.02
32	North of Huff Road and west of Fairmont Avenue	I	I/MU	I1	22.06
33	South of Huff Road	I/LC	MU	I2	32.05
34	Huff Road at Atlanta Waterworks	OI/LC/I/V	MU	I1	10.82
				TOTAL	**451.88**



BeltLine
Atlanta Connected

BeltLine Subarea 8:
UPPER WESTSIDE / NORTHSIDE

POTENTIAL REDEVELOPMENT

LEGEND

- Parcels Recently Redeveloped
- Parcels Currently Redeveloping
- Parcels Ready for Redevelopment (short-term)
- Parcels Ready for Redevelopment (long-term)
- Rail Lines
- BeltLine Corridor

AECOM

April 2010

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1.10 Neighborhoods & Historic Resources

The study area includes established and historic neighborhoods that were built between the late 1800's and 1950's. These neighborhoods have left behind historic resources which include buildings and structures.

Summary

Designated Areas on the National Register of Historic Places: These cultural resources were deemed by the National Register as worthy of preservation on the local and state level.

- **Berkeley Park Historic District:** This district developed over several periods from 1900 through 1974; its significance is based on it's major architectural, planning, and transportation elements.
- **Howell Station Historic District:** Also known as Knight Park, this area developed from the late 1800's through the 1950's; its significance is due to its architecture, development and community planning.
- **Howell Interlocking Historic District:** Also known as Howell Junction, this district contains a great number of historical buildings that are centered around what is now known as White Provisions; its significance is due to its planning, landscape architecture, and architecture.

Candidate for Historic District Designation (not yet recognized by National Register): These districts have a local level of significance and were included in the Atlanta Urban Design Commission's *BeltLine Historic Resources Survey* as potential candidates for Historic Distric designation. To be considered a candidate a property must be largely unaltered and greater than 50 years old (built prior to 1955).

- **Atlanta Water Works:** Developed in the 1800's as a critical piece of urban infrastructure, its continued operation and expansion over the past century has witnessed the construction of several buildings representing multiple periods of architectural styles; its significance is based on major architectural, landscape, and planning elements.
- **Home Park Neighborhood (partial):** The survey and scope for this district is still pending. Its significance may be due to its community planning and architecture.
- **Loring Heights Neighborhood:** An example of post World War II housing in Atlanta, the neighborhood originally provided workforce housing to workers at the nearby Atlantic Steel plant; its significance is due to its community planning.

Historic Resources: These resources are identified by the Atlanta Urban Design Commission and include historic structures, objects, and buildings. While no historic objects are located in the study area, the following structures and buildings have been identified:

Historic Structures: Defined as: "a functional construction made for purposes other than creating shelter, such as a bridge."

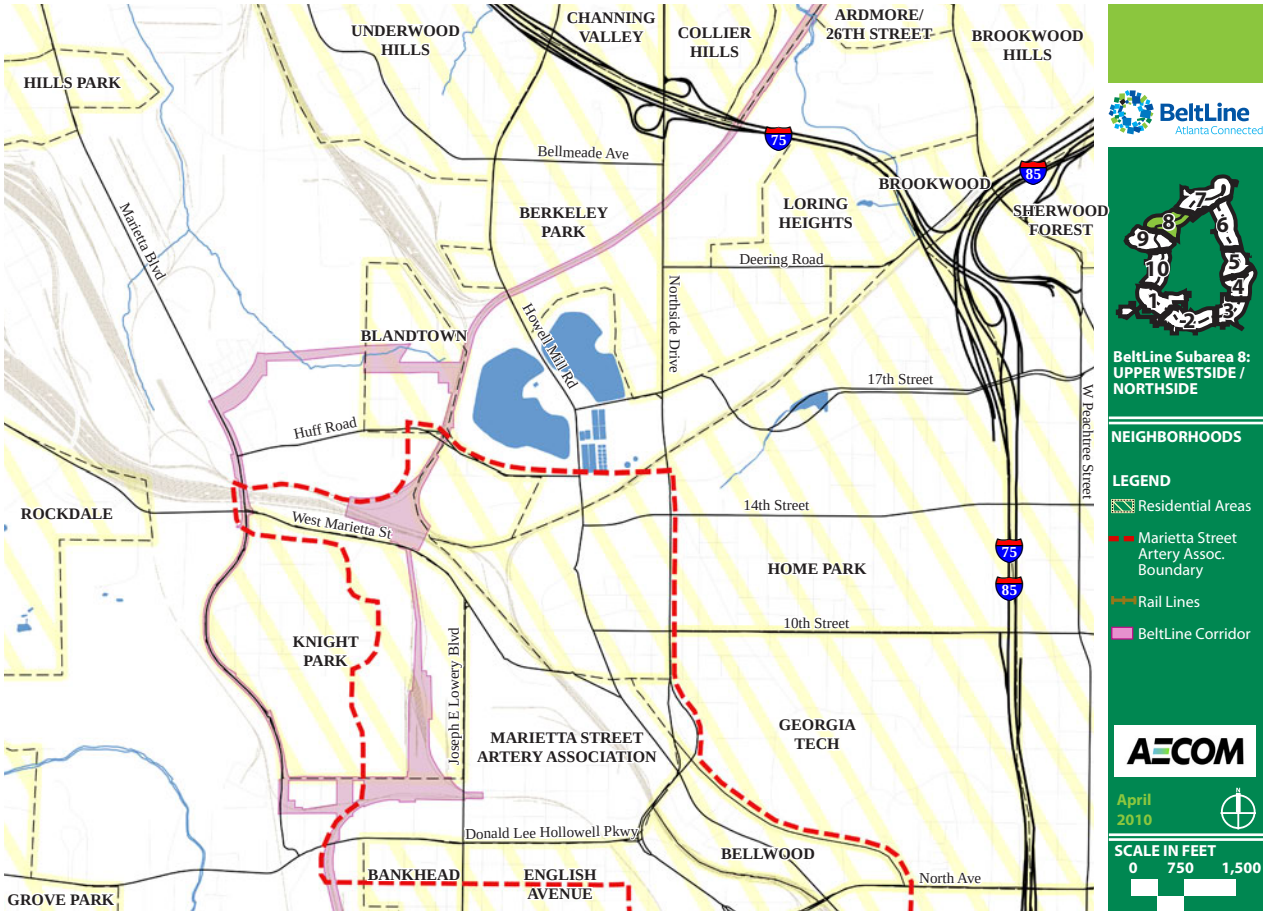
1. 1956 - Large overpass for railroad yards; concrete with metal railings.
2. 1950 - Concrete bridge with metal railings.
3. 1950 - Concrete railroad overpass with arched concrete piers and steel trestle.
4. 1930 - Gas Light Service building; concrete pediment and decorative blocks; arched front.

Historic Buildings: Defined as: "a resource created principally to shelter any form of human activity, such as a house." There are 55 historic buildings within the study area. Included in this are the following:

- **White Provision Company -** This building is significant for its industrial history and Art Deco architectural elements. It continues to be an important anchor in Atlanta's Westside redevelopment.
- **Van Winkle Gin and Machine Works (Murray Mill):** This collection of industrial buildings are significant because they are an example of 19th and 20th century industrial architecture and engineering.

Sources:

National Register of Historic Places:
www.nationalregisterofhistoricplaces.com
National Park Service (Atlanta):
www.nps.gov/history/nr/travel/atlanta/sitelist.htm
Atlanta Urban Design Commission:
www.atlantaga.gov/government/urbandesign.aspx


UNDERWOOD HILLS
CHANNING VALLEY
COLLIER HILLS
ARDMORE/ 26TH STREET
BROOKWOOD HILLS
HILLS PARK
Bellmeade Ave
BROOKWOOD
LORING HEIGHTS
SHERWOOD FOREST
BERKELEY PARK
Marietta Blvd
Deering Road
Northside Drive
BLANDTOWN
Howell Mill Rd
17th Street
W Peachtree Street
Huff Road
ROCKDALE
West Marietta St
14th Street
HOME PARK
10th Street
KNIGHT PARK
Joseph E Lowery Blvd
MARIETTA STREET ARTERY ASSOCIATION
GEORGIA TECH
Donald Lee Hollowell Pkwy
BELLWOOD
BANKHEAD
ENGLISH AVENUE
North Ave
GROVE PARK
BeltLine
Atlanta Connected
BeltLine Subarea 8: UPPER WESTSIDE / NORTHSIDE
NEIGHBORHOODS
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Residential Areas
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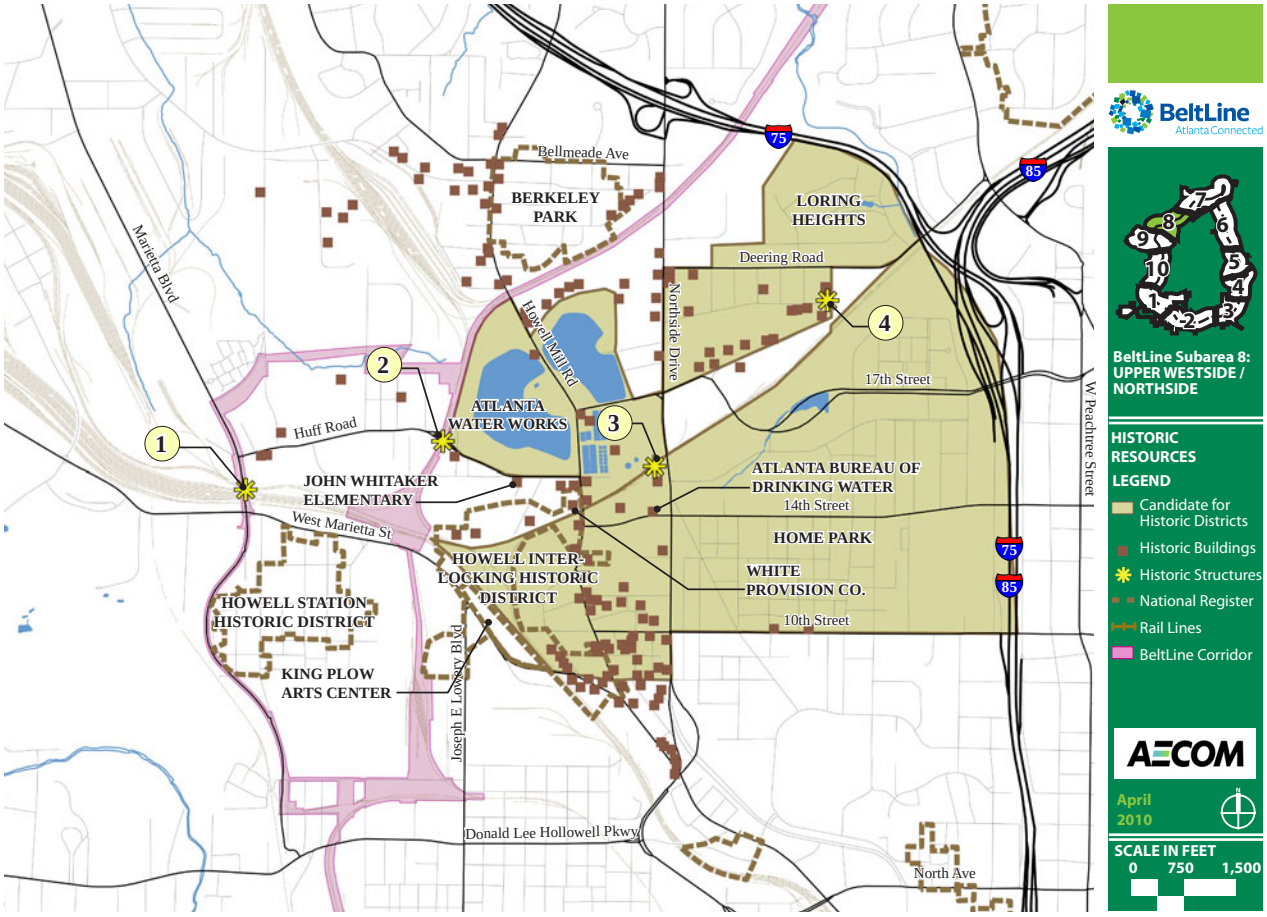
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Huff Road
JOHN WHITAKER ELEMENTARY
ATLANTA BUREAU OF DRINKING WATER
14th Street
West Marietta St
HOME PARK
HOWELL INTER-LOCKING HISTORIC DISTRICT
WHITE PROVISION CO.
HOWELL STATION HISTORIC DISTRICT
10th Street
KING PLOW ARTS CENTER
Joseph E Lowery Blvd
Donald Lee Hollowell Pkwy
North Ave
BeltLine
Atlanta Connected
BeltLine Subarea 8: UPPER WESTSIDE / NORTHSIDE
HISTORIC RESOURCES
LEGEND
Candidate for Historic Districts
Historic Buildings
Historic Structures
National Register
Rail Lines
BeltLine Corridor
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April 2010
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1.11 The Urban Design Character

The urban design character varies from 1920's single-family bungalows to recently renovated warehouse and industrial buildings that have brought new intensity to the Howell Mill and Huff Road corridors. Theses design characteristics have been broken down into districts. The following a summary of these districts:

Berkeley Park (residential) - Established in the 1920's this district is characterized by its stock of single-family bungalows. The district is generally bounded by Bellmeade Avenue, Atlanta Waterworks, Howell Mill Road and Northside Drive.

Loring Heights (residential) - Established in the 1940's this district is characterized by its stock of single-family bungalows and garden apartments. The district is generally bounded by I-75, Northside Drive and Bishop Street.

Bishop Street (light industrial) – This district, which lies between Loring Heights and the Norfolk Southern rail corridor, consists mainly of single-story light industrial, warehouse and flex-office space.

Atlanta Waterworks (industrial) – This district was established in the late 1800's and has since expanded to meet Atlanta's growing water needs. The buildings architecture is representative of the Late Victorian style. The district is centered on the intersection of Howell Mill Road and 17th Street.

Huff Road Corridor (warehousing/commercial/ multi-family) – This district is characterized by the concentration of home furnishing warehouses. The corridor has recently expanded to include multi-family housing and retail. The district is bounded by Howell Mill Road and Marietta Boulevard.

Westside (mixed-use) – This district is centered on the White Provisions Company building that originally served as a meat packing plant. Today, the building and area includes a mix of restaurants, apartments and condos, and retail. The district is a bookend to the Huff Road Corridor and is bounded by Huff Road, West Marietta Street, and Northside Drive.

Brickworks (mixed-use) – This district has recently transformed from industrial/warehousing are to a mixed-use development that includes apartments, retail, restaurants, and live/work opportunities. The area is bounded by 8th Street, Northside Drive, and West Marietta Street.

BeltLine Atlanta Connected

BeltLine Subarea 8: UPPER WESTSIDE / NORTHSIDE

URBAN DESIGN CHARACTER

LEGEND

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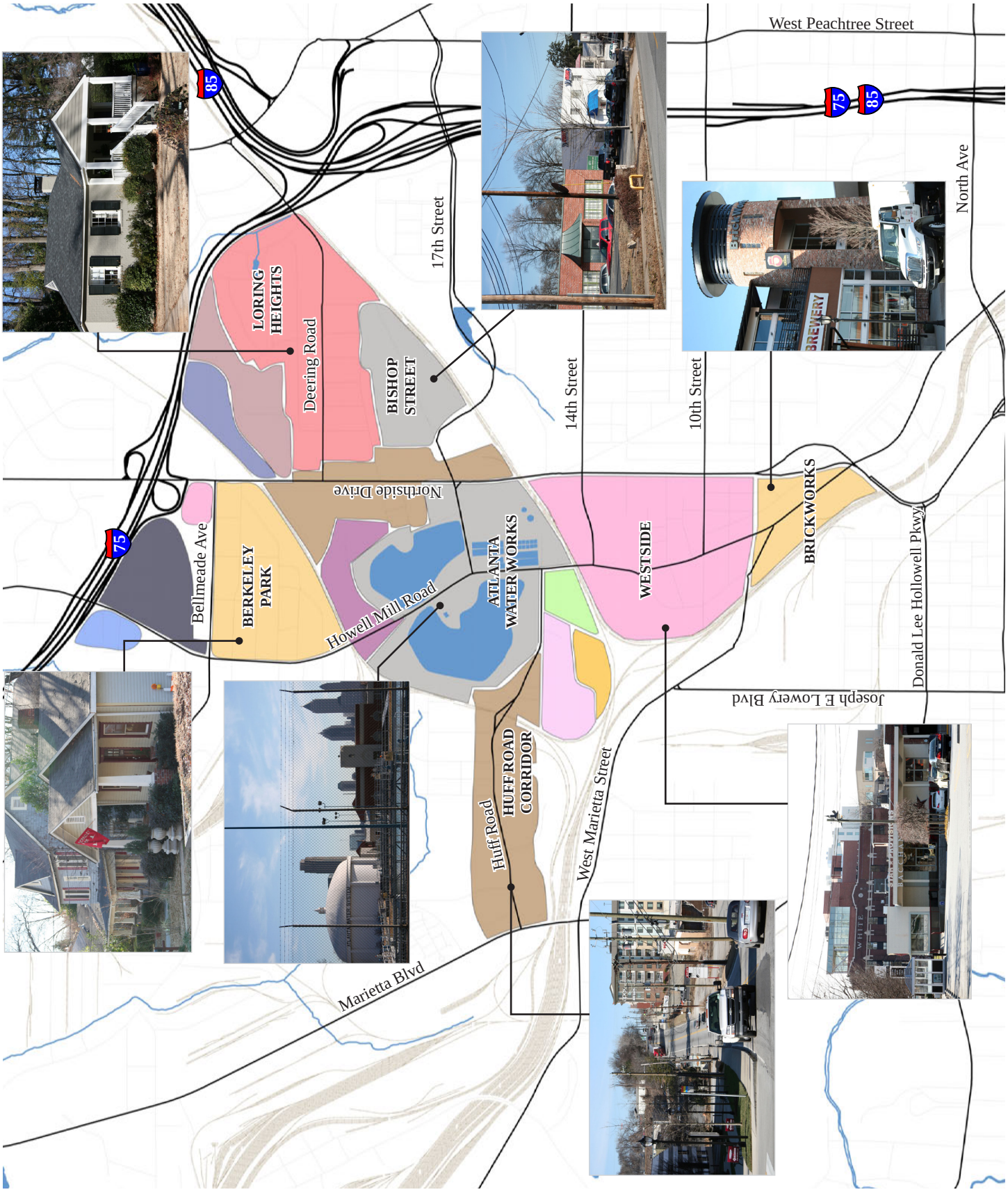
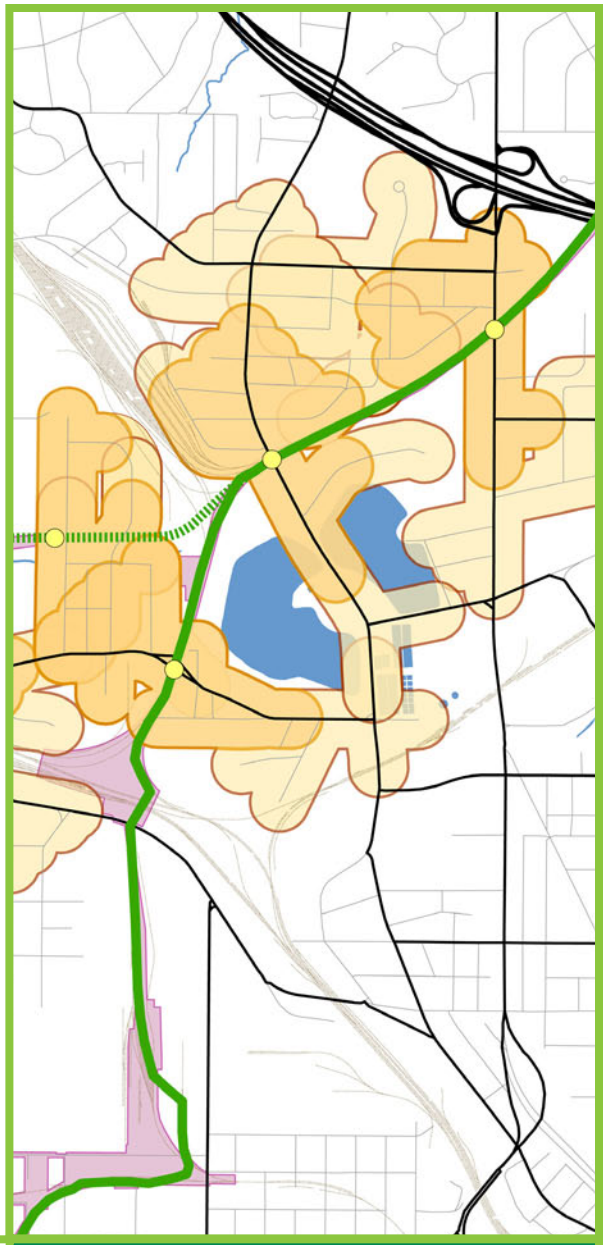
April 2010

SCALE IN FEET

0 500 1,000





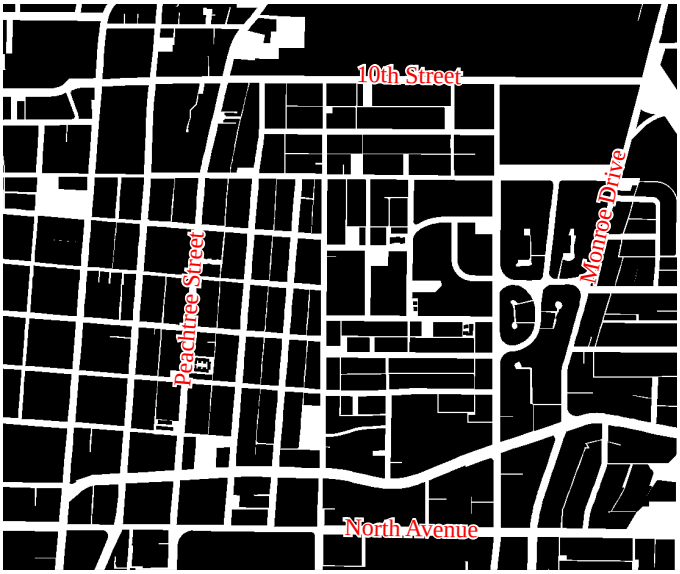
INVENTORY & ASSESSMENT REPORT

2.0 Mobility

2.1 Existing Network & Connectivity

Summary

- Based on simple connectivity ratios (number of road links divided by intersections) the study area performs below more urban areas in Atlanta, such as Midtown.
- Selected areas such as the Home Park / Atlantic Station neighborhoods perform slightly better than the subarea overall.
- The figure ground diagrams for each area confirm visually the difference in block size, street connectivity, and density of street connections.



Midtown

Summary

Area	Analysis 1*	Analysis 2**
BeltLine Subarea 8	1.30	0.94
Midtown	1.60	1.00
Home Park & Atlantic Station	1.45	0.99

Home Park & Atlantic Station

*"The number of roadway links divided by the number of roadway nodes (Ewing, 1996).... a score of 1.4 is the minimum required for a walkable community." (VTPI, 2007)

**"The ratio of intersections divided by intersections and dead-ends, expressed on scale from zero to 1.0 (USEPA, 2002). An index over .75 is desirable." (VTPI, 2007)

Sources:

Reid, Ewing (1996), *Best Development Practices; Doing the Right Thing and Making Money at the Same Time*, Planners Press (www.planning.org), 1996.

USEPA (2002), *Smart Growth Index (SGI) Model*, U.S. Environmental Protection Agency (www.epa.gove/smartgrowth/topics/sgipilot.htm), 2002.

Victoria Transport Policy Institute (2007), *Roadway Connectivity; Creating More Connected Roadway and Pathway Networks*, (www.vtpi.org/tdm.com)

Scale in Feet
0 400 800

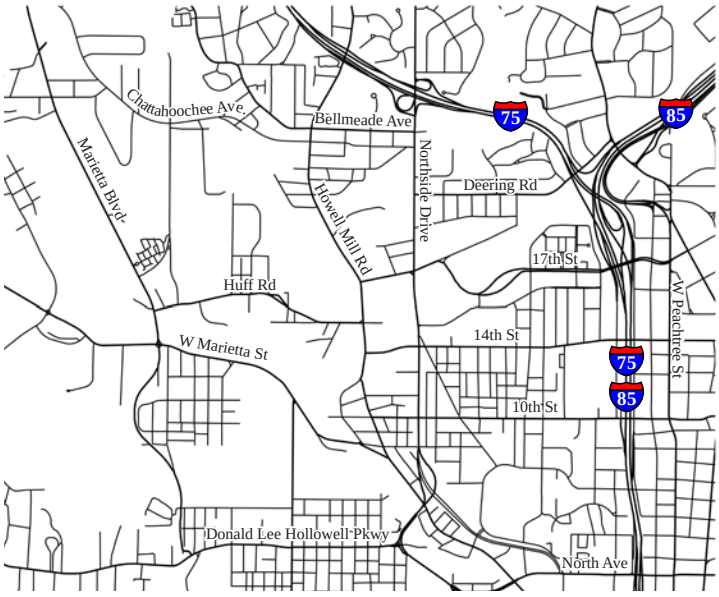
2.2 Effective Network

- There are 38 miles of road network within the Study Area boundary.
- Of those 38 miles only 28 miles, or 43%, connect to more than one street to form a connected network.
- These "effective network" streets are the streets that provide real connectivity in the area, providing the multiple travel routes that move residents and regional trips.
- The area where lack of "effective network" becomes most apparent is in the transitioning industrial areas near Huff Road between Marietta Boulevard and Howell Mill Road.

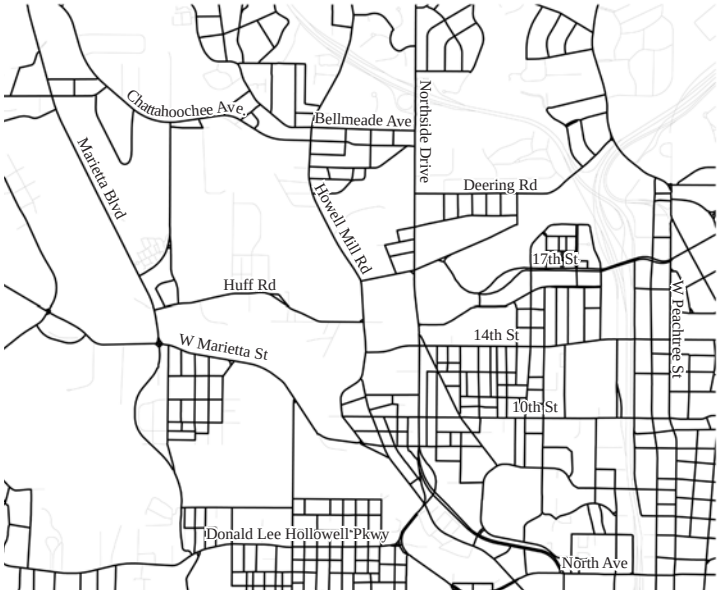
2.3 East-West & North-South Connections

Summary

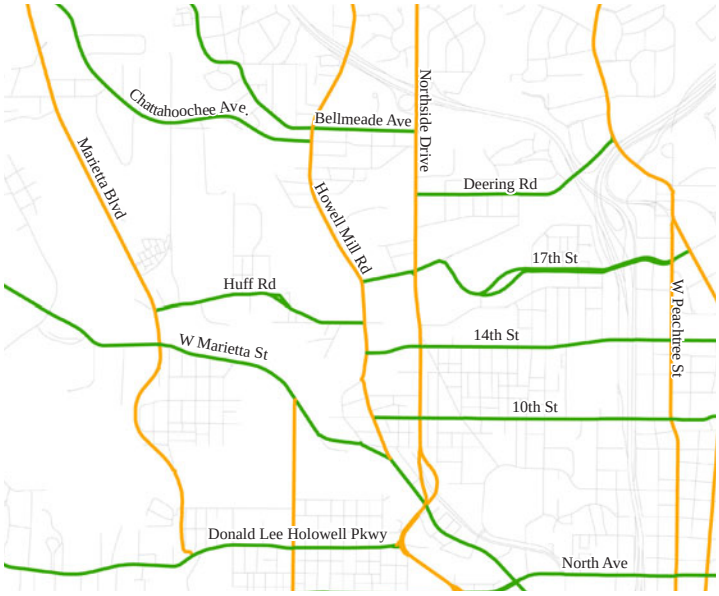
- Connectivity in the study area relies heavily on the north-south connections of Howell Mill Road, Northside Drive, and east-west connections of14th Street and 10th Street.
- East-west connections in the central study area are discontinuous at Howell Mill or Northside, where many streets branch either to the west or east of these roadways, but not through both which requires more turns thus complicating intersection performance.
- The trend to convert former industrial land into mixed use or high-density residential could add significant traffic to Huff Road between Marietta and Howell Mill.
- Northside Drive experiences high traffic from the east due to its access to I-75. Howell Mill Road also provides access to I-75, but this access is complicated by the high traffic volumes around the Howell Mill Square Shopping Center.
- The existing rail lines serve as the main barrier to increased connectivity, particularly in the historically industrial area near Huff Road. Interstate 75 on the northern edge of the subarea also affects potential connectivity improvements.



Existing Network



Effective Network



North-South & East-West Network

North-South Connections
East-West Connections

Scale in Feet
0 2,000

2.4 Historic & Projected Traffic Counts

Current traffic counts were analyzed within the study area. The major corridors of Northside Drive, Howell Mill Road, Marietta Boulevard, and 14th Street were further studied for historic and projected traffic counts between the years 2003 and 2030.

Summary

- Northside Drive north of 14th Street has seen a decline in overall traffic in the past seven years, while Northside Drive south of 14th Street has seen an overall increase in traffic over the same time period due to new mixed use developments.

- Northside Drive south of 14th Street is projected to have the highest growth in traffic with an increase of 125% by 2030.

- Future projections show relatively constant traffic volumes on Howell Mill Road, while traffic volumes on Northside Drive and Marietta Boulevard are projected to grow substantially.

- Historically, traffic on Marietta Boulevard has maintained constant volumes, but future projections show 109% growth by 2030.

- Traffic on 14th Street decreased in 2008 likely due to the bridge replacement project over Interstate 75/85. This new high-capacity bridge is reflected in the high projections for traffic growth on 14th Street for both 2020 and 2030.

Northside Drive (N)	
Year	**Volume**
2003	31,254
2004	25,482
2005	27,310
2006	29,460
2007	22,170
2008	21,280
2020	41,347
2030	43,488

Northside Drive (S)	
Year	**Volume**
2003	23,217
2004	20,775
2005	22,600
2006	25,930
2007	27,040
2008	28,490
2020	61,403
2030	64,167

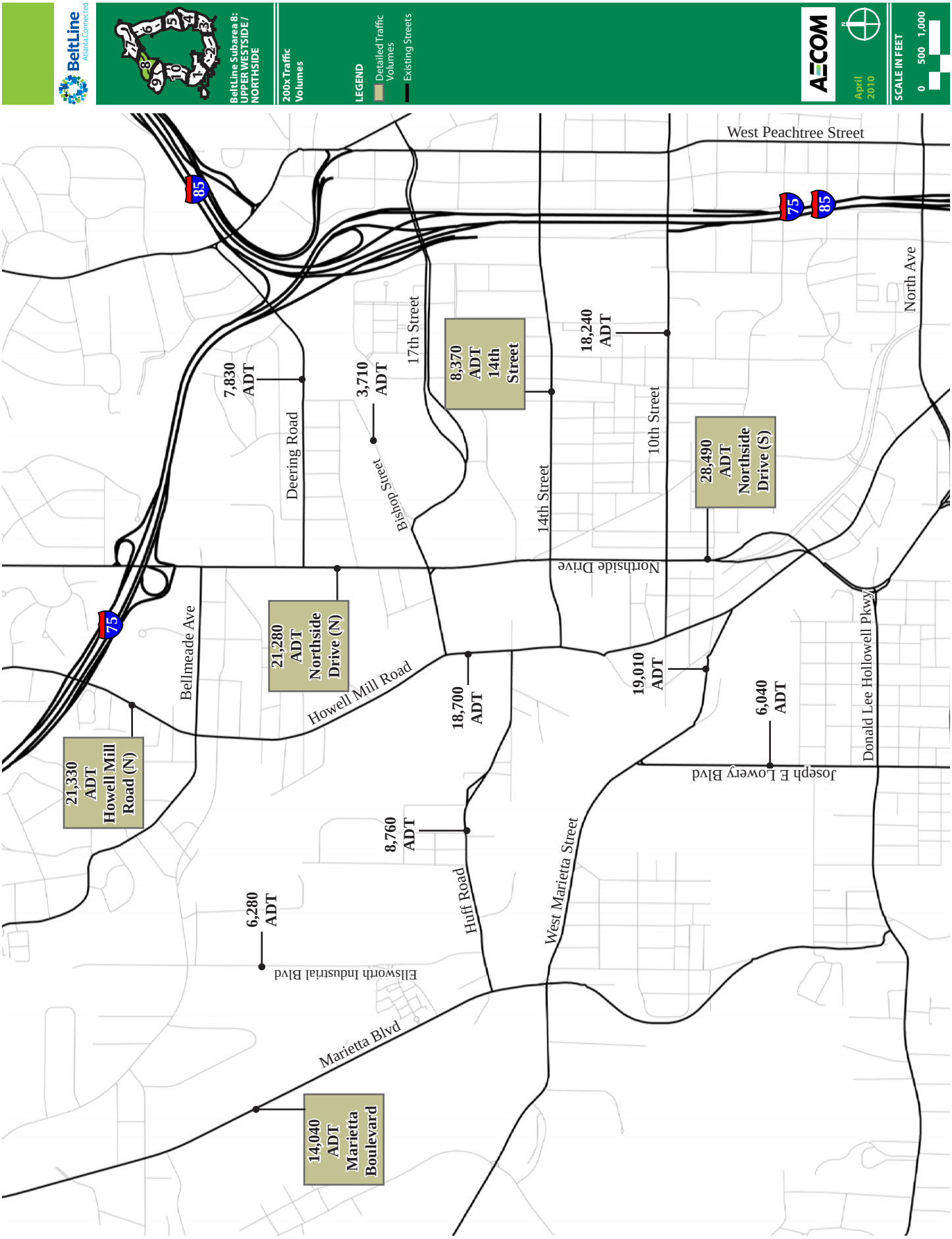
Howell Mill Road (N)	
Year	**Volume**
2003	25,813
2004	26,274
2005	26,530
2006	24,510
2007	22,520
2008	18,910
2020	19,514
2030	22,098

Marietta Boulevard	
Year	**Volume**
2003	14,543
2004	13,984
2005	14,560
2006	14,600
2007	14,980
2008	14,040
2020	26,854
2030	29,397

14th Street	
Year	**Volume**
2003	14,060
2004	11,680
2005	12,080
2006	12,510
2007	12,240
2008	8,370
2020	25,519
2030	25,990

Projected Volume from ARC TDM

Source: Georgia Department of Transportation, The Atlanta Regional Commission's TDM


BeltLine
Atlanta Connected
BeltLine Subarea 8:
UPPER WESTSIDE /
NORTHSIDE
200x Traffic
Volumes
LEGEND
Detailed Traffic
Volumes
Existing Streets
AECOM
April
2010
SCALE IN FEET
0 500 1,000
West Peachtree Street
North Ave
Donald Lee Hollowell Pkwy
Joseph E Lowery Blvd
Northside Drive
10th Street
14th Street
17th Street
Bishop Street
Deering Road
Bellmeade Ave
Howell Mill Road
Huff Road
West Marietta Street
Ellsworth Industrial Blvd
Marietta Blvd
85
75
7,830
ADT
3,710
ADT
8,370
ADT
14th
Street
18,240
ADT
28,490
ADT
Northside
Drive (S)
21,280
ADT
Northside
Drive (N)
21,330
ADT
Howell Mill
Road (N)
18,700
ADT
19,010
ADT
6,040
ADT
8,760
ADT
6,280
ADT
14,040
ADT
Marietta
Boulevard

2.5 Intersection Level of Service

Current turning movement counts for both morning and afternoon peak periods were collected at 17 intersections within the study area. These counts were used to construct a simulation model of existing traffic conditions at these intersections. Signal timing plans for the signalized intersections were not available; as a result, the simulations assumed an optimized network for signal timing and used these timings in calculating levels of service for each intersection. The diagrams below present a summary of significant findings, highlighting intersections with notably low levels of service.

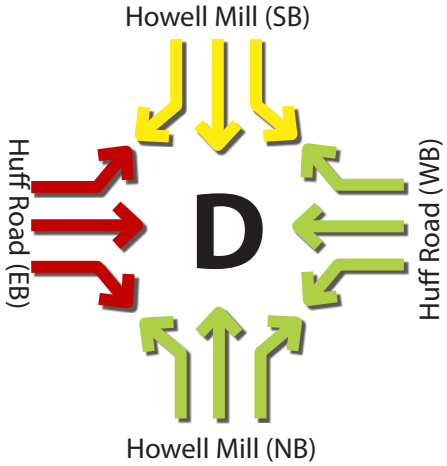
Summary

The following diagrams depict both approach-specific and overall levels of service for each intersection as calculated by Synchro. The color-coding of each movement's arrow is based on the color scale below and refers to the particular level of service (expressed in terms of average vehicle delay) for that specific movement. The circle in the middle of each intersection diagram is an aggregated level of service for the entire intersection.

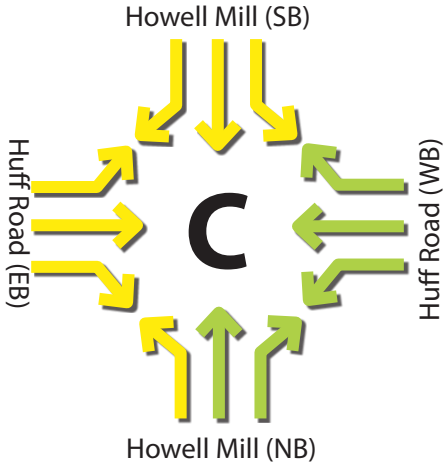
Huff Road & Howell Mill Road

Due to the greater traffic volumes on Howell Mill Road, northbound and southbound movements are given priority in signal timing. This causes delay on eastbound movements in the morning peak period, due presumably to traffic from new residential development to the west along Huff Road. The greater length of signal green time given to Howell Mill allows the traffic returning to these destinations in the afternoon to be processed without a corresponding amount of delay.

AM



PM

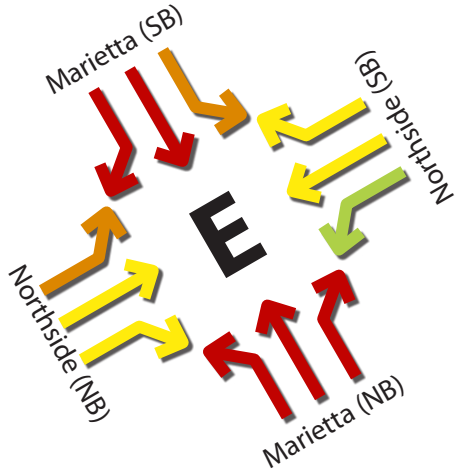


Marietta Street & Northside Drive

The Marietta approaches of this street are limited by the lack of dedicated left turn lanes and sufficient protected left turn phasing. Northside Drive is given greater signal timing at this signal, particularly during the PM peak.

AM

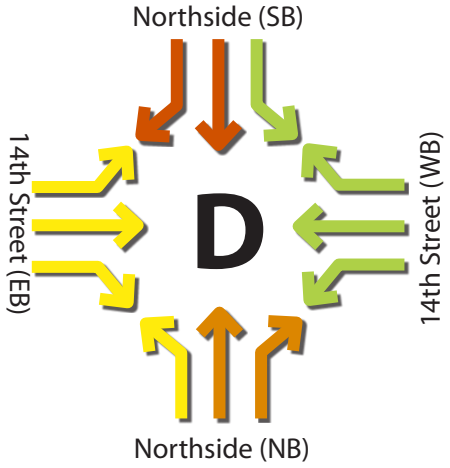
PM



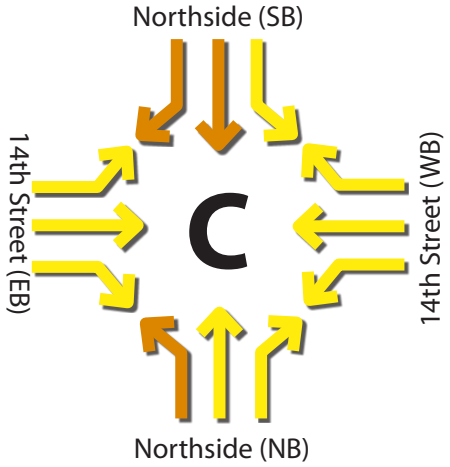
14th Street & Northside Drive

This intersection does not currently experience failing levels of service, although the close spacing of the Hemphill Avenue/Northside Drive intersection may lead to queuing through the 14th Street intersection. The greatest delays are experienced in the southbound direction in the morning peak period.

AM



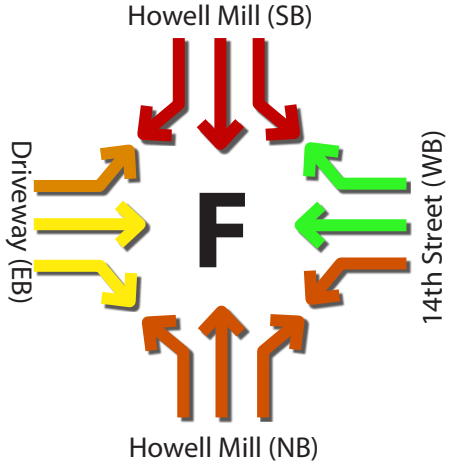
PM



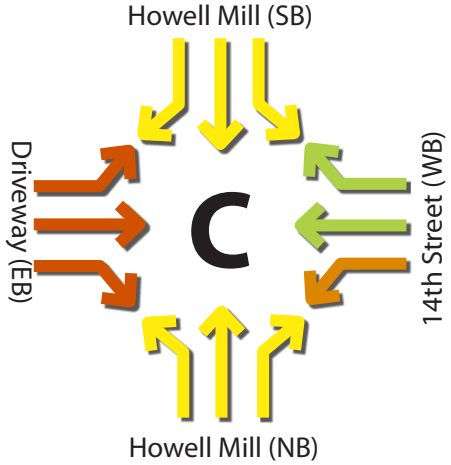
14th Street & Howell Mill Road

14th Street appears to be favored at this intersection; northbound and southbound approaches experience delay in the morning peak hour due to split phasing to allow protected southbound left turns.

AM



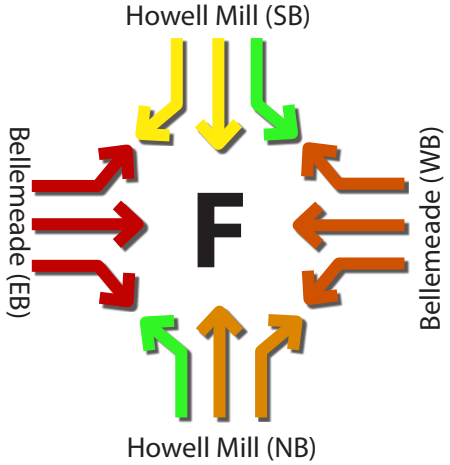
PM



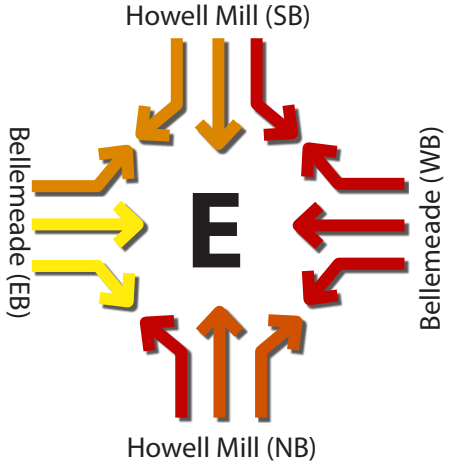
Bellemeade Avenue & Howell Mill Road

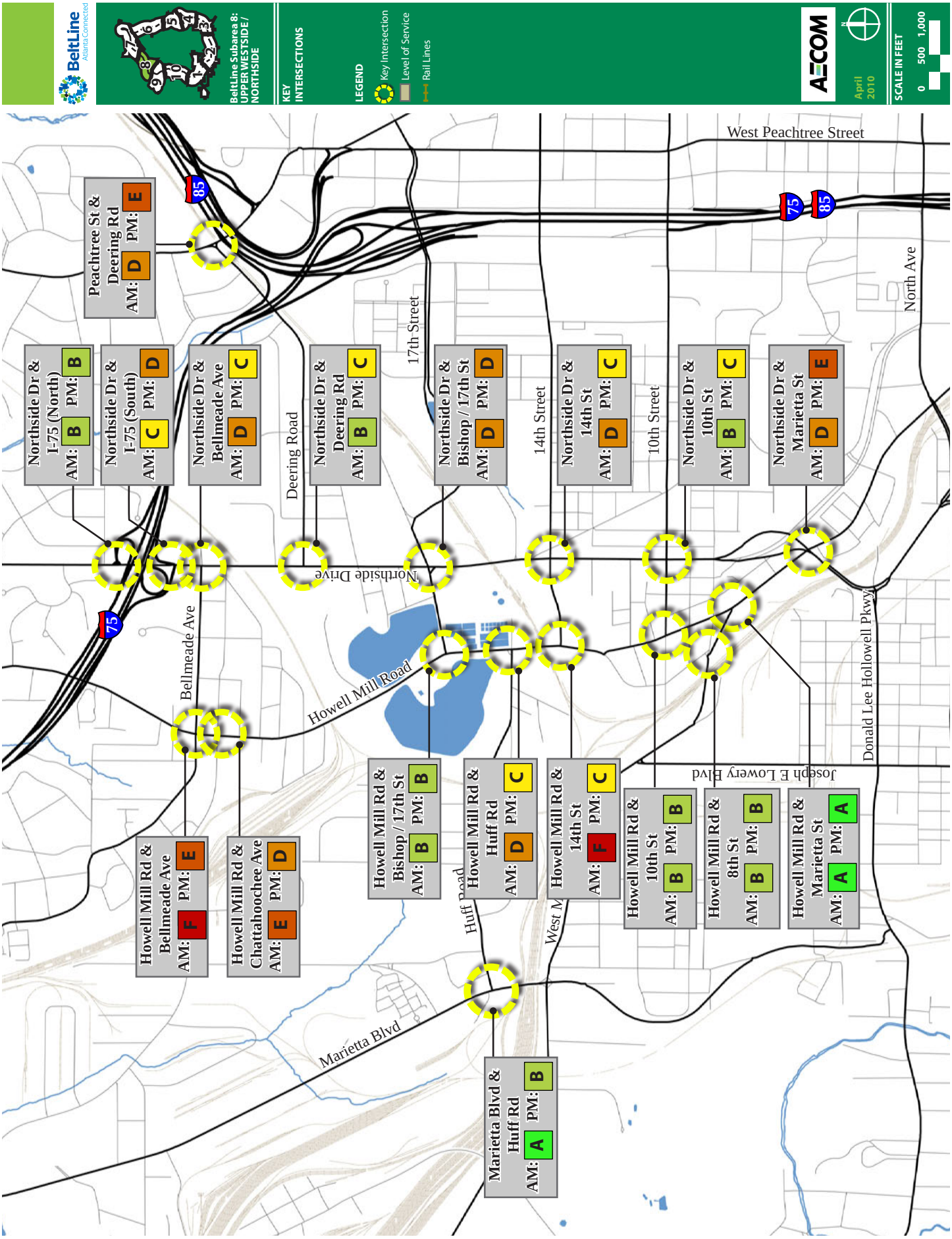
This intersection is compromised by its close proximity to the Chattahoochee/Howell Mill signal to the south. In an effort to manage queuing spillback through the intersections, north-south movements have been favored in signal timing, creating additional delay for east-west movements. North and south left turn movements also experience delay in the afternoon peak, due presumable to greater turning demand to access Bellemeade than in the morning peak.

AM



PM




BeltLine
Atlanta Connected
BeltLine Subarea 8:
UPPER WESTSIDE /
NORTHSIDE
KEY
INTERSECTIONS
LEGEND
Key Intersection
Level of Service
Rail Lines
AECOM
April
2010
SCALE IN FEET
0 500 1,000
Peachtree St & Deering Rd AM: D PM: E
Northside Dr & I-75 (North) AM: B PM: B
Northside Dr & I-75 (South) AM: C PM: D
Northside Dr & Bellmeade Ave AM: D PM: C
Northside Dr & Deering Rd AM: B PM: C
Northside Dr & Bishop / 17th St AM: D PM: D
Northside Dr & 14th St AM: D PM: C
Northside Dr & 10th St AM: B PM: C
Northside Dr & Marietta St AM: D PM: E
Howell Mill Rd & Bellmeade Ave AM: F PM: E
Howell Mill Rd & Chattahoochee Ave AM: E PM: D
Howell Mill Rd & Bishop / 17th St AM: B PM: B
Howell Mill Rd & Huff Rd AM: D PM: C
Howell Mill Rd & 14th St AM: F PM: C
Howell Mill Rd & 10th St AM: B PM: B
Howell Mill Rd & 8th St AM: B PM: B
Howell Mill Rd & Marietta St AM: A PM: A
Marietta Blvd & Huff Rd AM: A PM: B
West Peachtree Street
17th Street
14th Street
10th Street
North Ave
Northside Drive
Deering Road
Bellmeade Ave
Howell Mill Road
Huff Road
West M
Joseph E Lowery Blvd
Donald Lee Hollowell Pkwy
Marietta Blvd
75
85

2.6 Interstate Access & Street Hierarchy

The area's connectivity is also influenced by access to Interstates 75/85. Key observations of the study area include:

Summary

- I-75/85 serves as a physical boundary for the subarea and influences connectivity to the north and the east. Access to the interstate is influenced by the connection of I-75 and I-85 in the northeast section of the subarea.

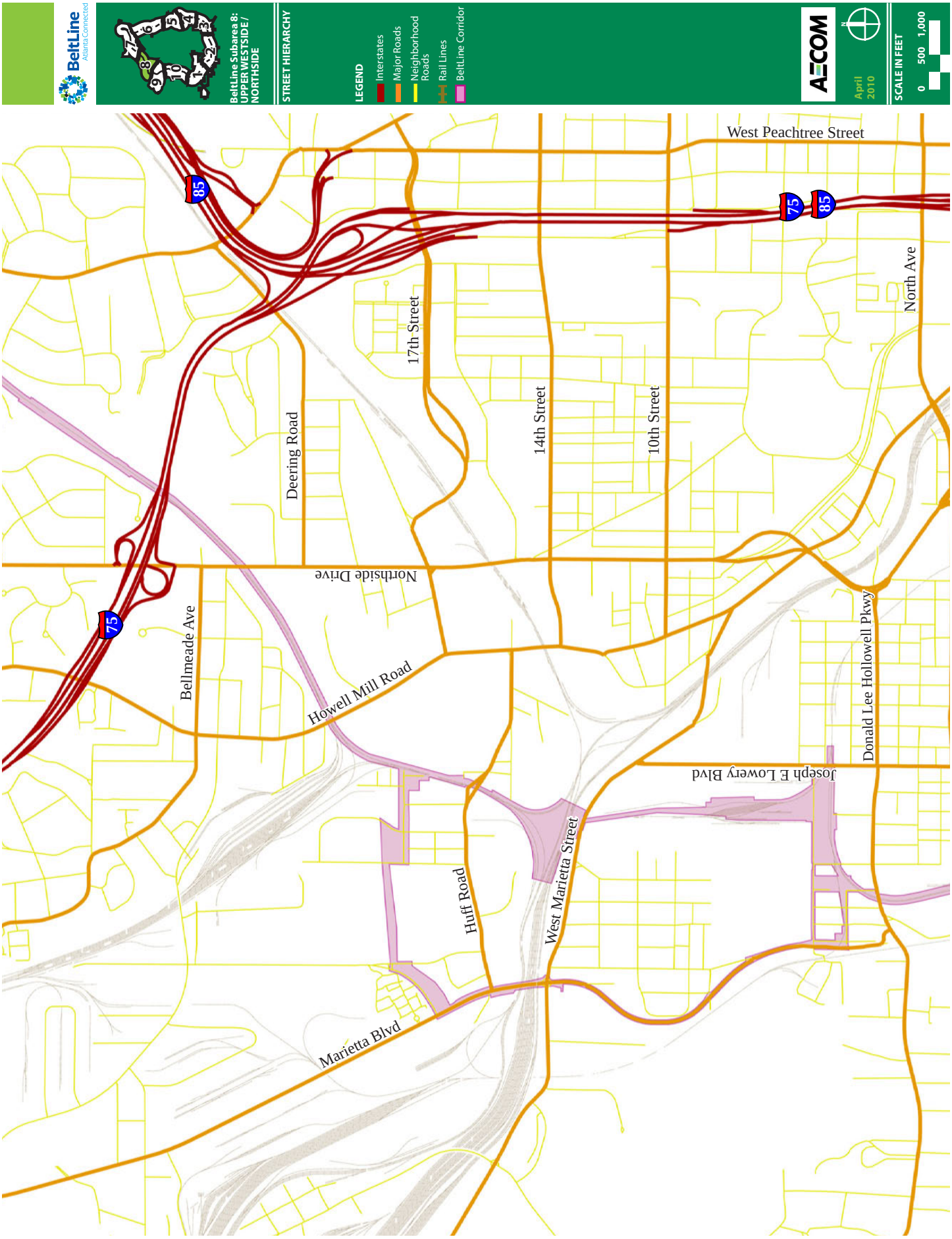
- Deering Road is the only roadway within the study area that crosses I-75 or I-85 without providing an interstate access or egress point. Deering also connects to Peacthree Street unlike Howell Mill Road and Northside Drive which are parallel.

- Northside Drive and Howell Mill Road provide access to both directions of Interstate 75.

- No routes in the study area provide direct access to northbound Interstate 85.

- To the east, only 14th Street provides access to Interstate 75 northbound, and only 10th Street provides southbound access.

- Traffic from Interstates 75 and 85 can access the study area via exits at Howell Mill Road, Northside Drive, 17th Street, and Techwood Drive.


BeltLine
Atlanta Connected
BeltLine Subarea 8:
UPPER WESTSIDE /
NORTHSIDE
STREET HIERARCHY
LEGEND
Interstates
Major Roads
Neighborhood Roads
Rail Lines
BeltLine Corridor
AECOM
April 2010
SCALE IN FEET
0 500 1,000
West Peachtree Street
North Ave
17th Street
14th Street
10th Street
Deering Road
Northside Drive
Bellmeade Ave
Howell Mill Road
Donald Lee Hollowell Pkwy
Joseph E Lowery Blvd
Huff Road
West Marietta Street
Marietta Blvd
85
75

2.7 Existing Crash Data

The crash data were analyzed along the two major corridors within the study area: Howell Mill Road and Northside Drive. The crash data were provided by the Georgia Department of Transportation for the year of 2006.

Northside Dr. at Marietta St. 81 Accidents	
Type	Percent
Pedestrian	4.2%
Angle	54.2%
Head-on	0%
Rear-end	20.8%
Sideswipe Opposite Direction	16.7%
Sideswipe Same Direction	0%
Other	8.3%

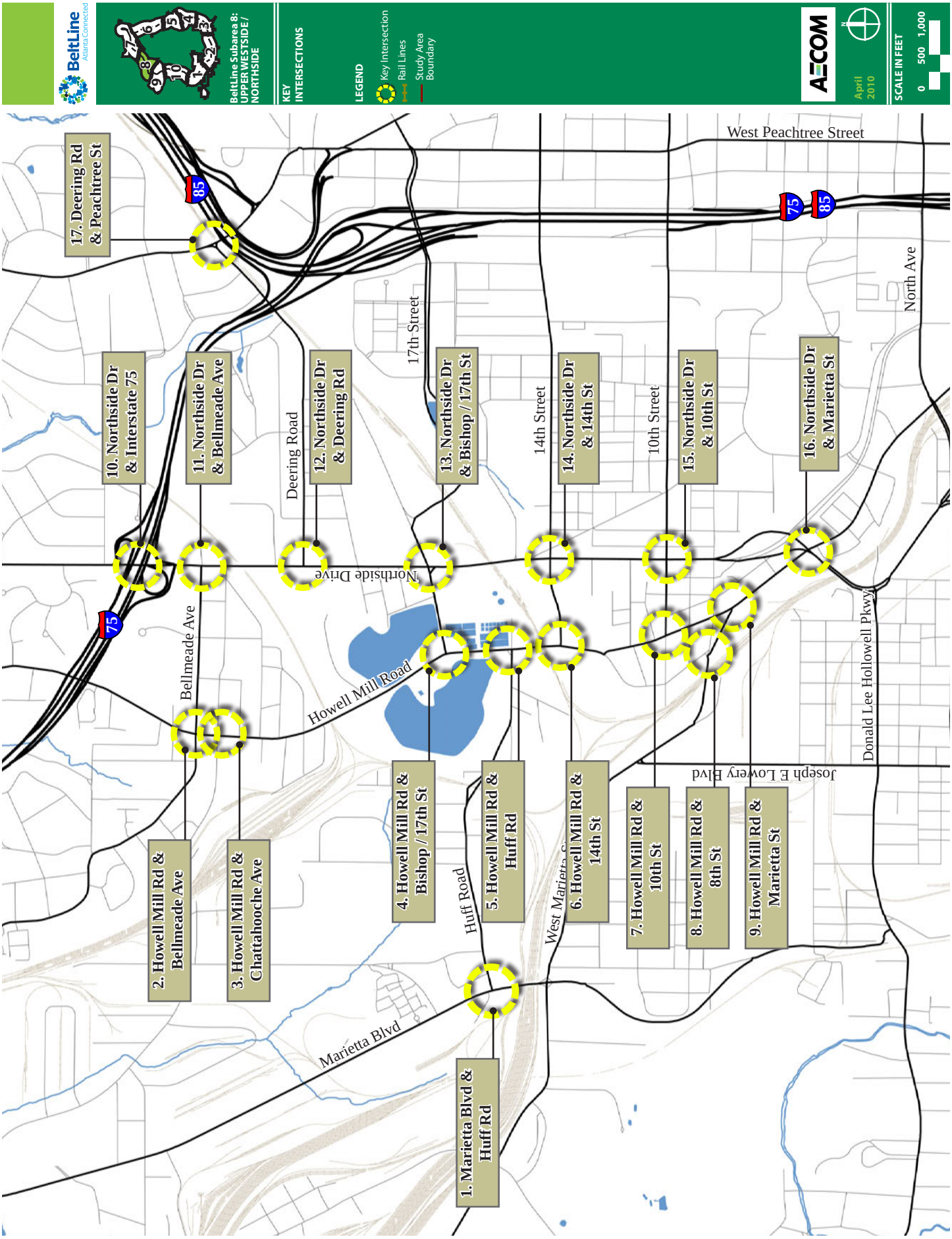
Northside Dr. at 10th St. 47 Accidents	
Type	Percent
Pedestrian	0%
Angle	61.5%
Head-on	7.7%
Rear-end	23.1%
Sideswipe Opposite Direction	0%
Sideswipe Same Direction	7.7%
Other	0%

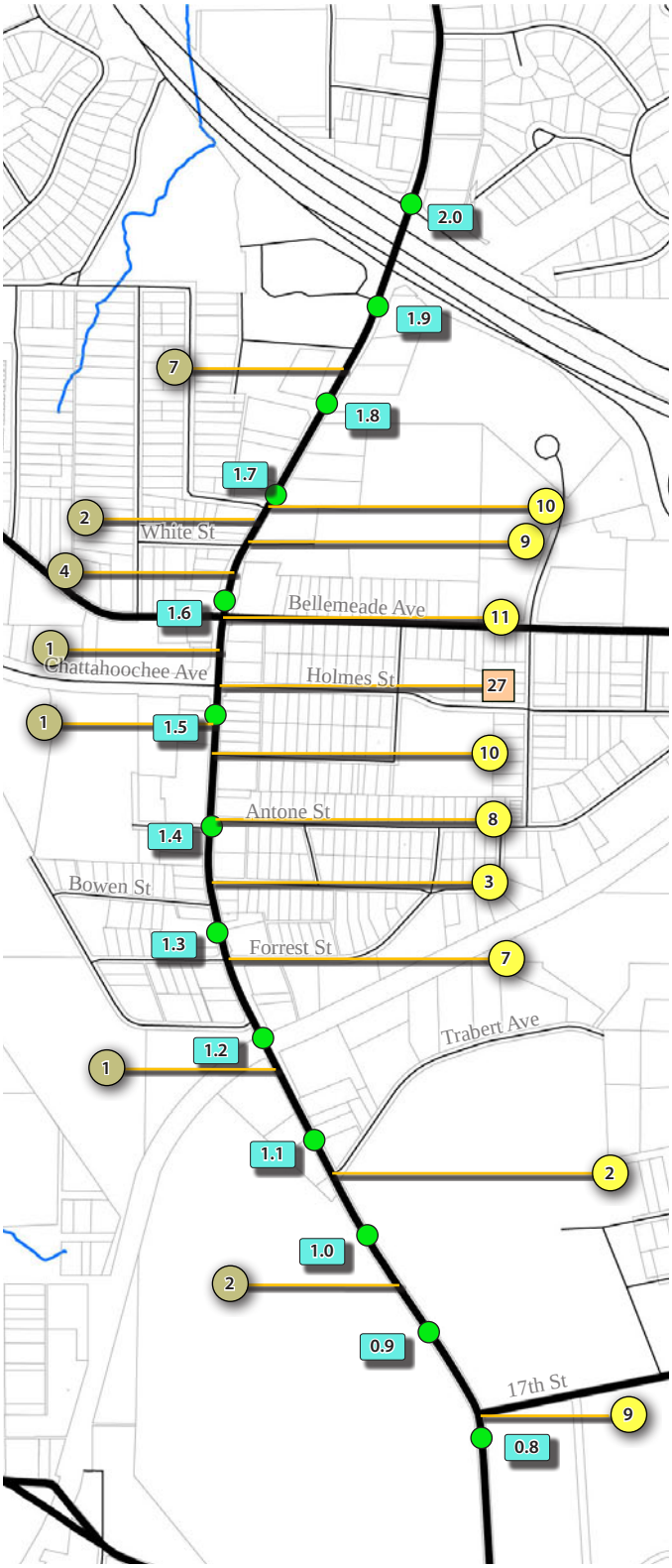
Northside Dr. at 14th St./Hemphill Ave. 90 Accidents	
Type	Percent
Pedestrian	0%
Angle	48.3%
Head-on	0%
Rear-end	20.7%
Sideswipe Opposite Direction	6.9%
Sideswipe Same Direction	17.2%
Other	6.9%

Northside Dr. at Interstate 75 39 Accidents	
Type	Percent
Pedestrian	0%
Angle	27.3%
Head-on	0%
Rear-end	36.4%
Sideswipe Opposite Direction	0%
Sideswipe Same Direction	9.1%
Other	27.3%

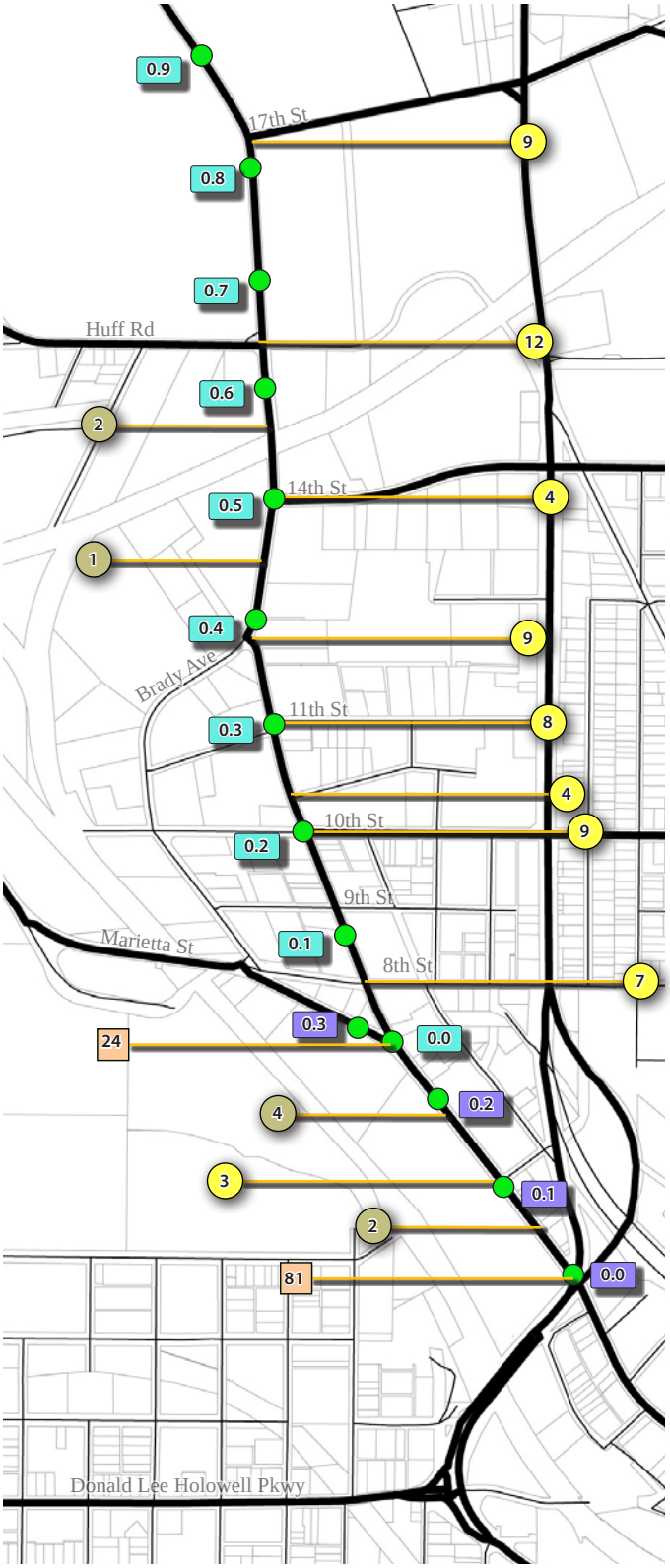
Howell Mill Rd. at Chattahoochee Ave. 27 Accidents	
Type	Percent
Pedestrian	0%
Angle	56.3%
Head-on	0%
Rear-end	18.8%
Sideswipe Opposite Direction	0%
Sideswipe Same Direction	18.8%
Other	6.3%

Howell Mill Rd. at Marietta St. 24 Accidents	
Type	Percent
Pedestrian	0%
Angle	45.5%
Head-on	9.1%
Rear-end	9.1%
Sideswipe Opposite Direction	0%
Sideswipe Same Direction	27.3%
Other	9.1%


BeltLine
Atlanta Connected
BeltLine Subarea 8:
UPPER WESTSIDE /
NORTHSIDE
KEY
INTERSECTIONS
LEGEND
Key Intersection
Rail Lines
Study Area
Boundary
AECOM
April
2010
SCALE IN FEET
0 500 1,000
17. Deering Rd & Peachtree St
10. Northside Dr & Interstate 75
11. Northside Dr & Bellmeade Ave
12. Northside Dr & Deering Rd
13. Northside Dr & Bishop / 17th St
14. Northside Dr & 14th St
15. Northside Dr & 10th St
16. Northside Dr & Marietta St
2. Howell Mill Rd & Bellmeade Ave
3. Howell Mill Rd & Chattahoochee Ave
4. Howell Mill Rd & Bishop / 17th St
5. Howell Mill Rd & Huff Rd
6. Howell Mill Rd & 14th St
7. Howell Mill Rd & 10th St
8. Howell Mill Rd & 8th St
9. Howell Mill Rd & Marietta St
1. Marietta Blvd & Huff Rd
West Peachtree Street
17th Street
14th Street
10th Street
North Ave
Deering Road
Northside Drive
Bellmeade Ave
Howell Mill Road
Huff Road
West Marietta St
Joseph E Lowery Blvd
Donald Lee Hollowell Pkwy
Marietta Blvd
85
75



Howell Mill Road(north) Crash Data



Howell Mill Road / Marietta Street (south) Crash Data

Source: Georgia Department of Transportation

BeltLine Atlanta Connected

BeltLine Subarea 8: UPPER WESTSIDE / NORTHSIDE

April 2010

LEGEND

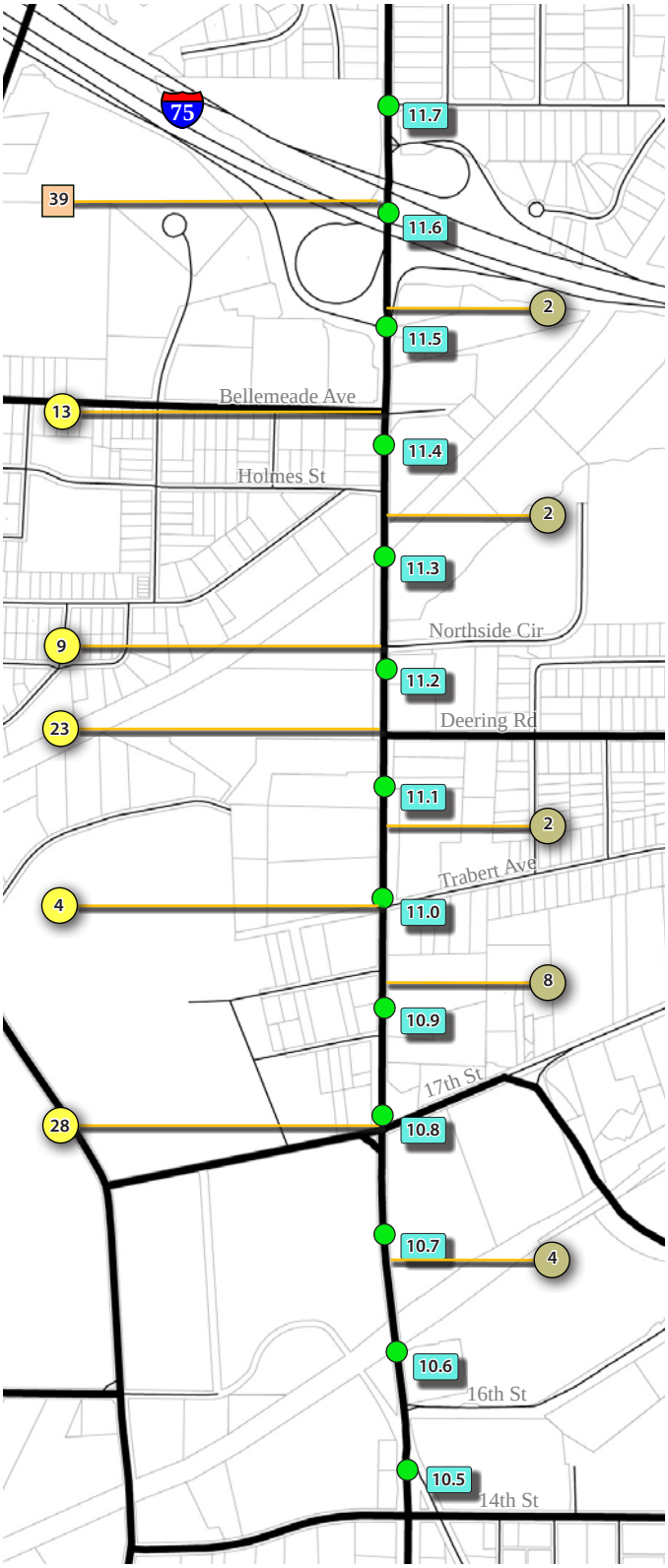
- Mile Posts (/10th Mile)
- Segment 1 Mile Posts
- Segment 2 Mile Posts
- Intersection Crashes
- Mid-block Crashes
- "Hotspot" Locations

AECOM

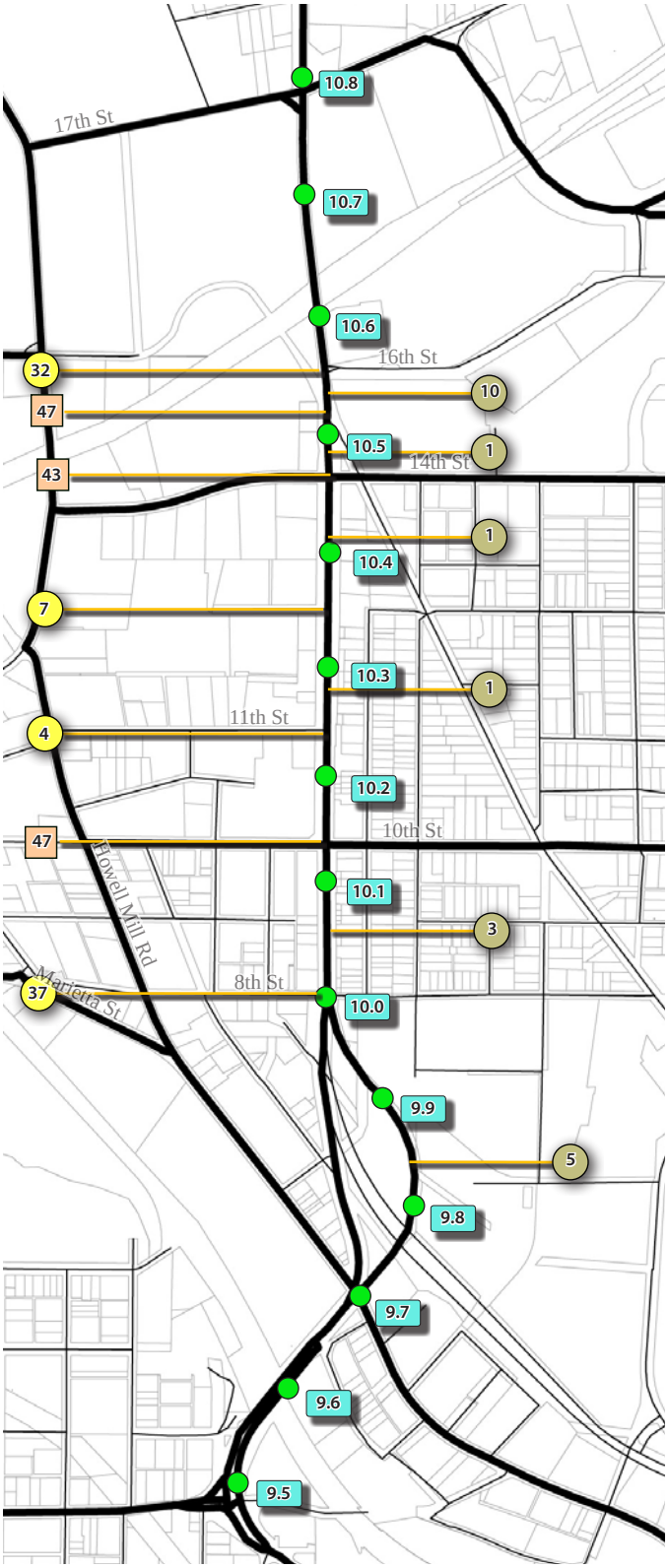
N

SCALE IN FEET

0 500 1,000



Northside Drive (north) Crash Data



Northside Drive (south) Crash Data

Source: Georgia Department of Transportation

BeltLine Atlanta Connected

BeltLine Subarea 8: UPPER WESTSIDE / NORTHSIDE

April 2010

LEGEND

- Mile Posts (/10th Mile)
- Segment 1 Mile Posts
- "Hotspot" Locations
- Intersection Crashes
- Mid-block Crashes

AECOM

N

SCALE IN FEET

0 500 1,000

2.8 Sidewalk Network

Summary

- Northside Drive has broken sidewalks from Trabert Avenue to north of Interstate 75. Sidewalks present in the Blandtown Neighborhood around Huff Road correspond to recent infill development.

- The majority of streets within Home Park and Atlantic Station neighborhoods have complete sidewalks.

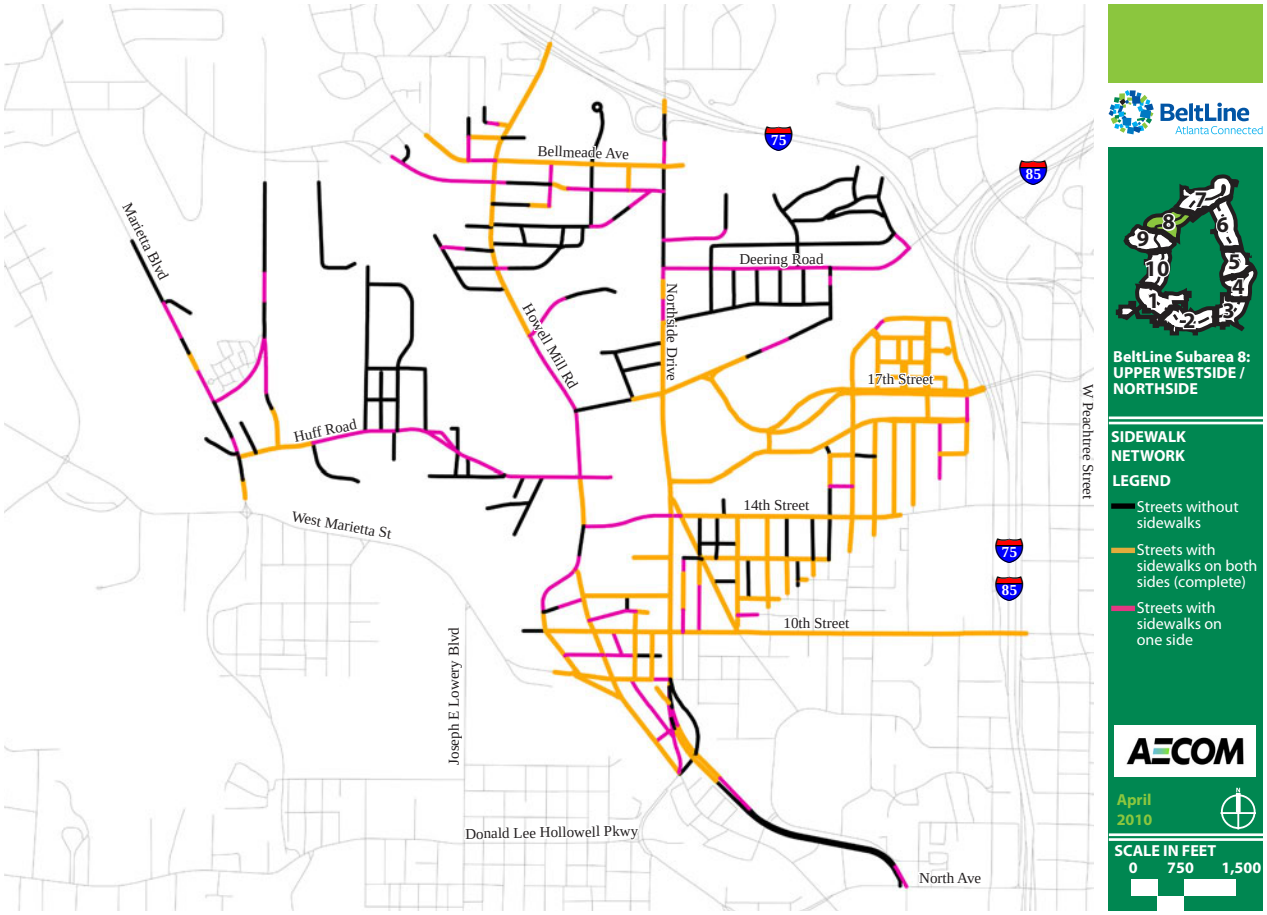
- The neighborhoods of Loring Heights and Berkeley Park lack sidewalks on most streets, with a few streets containing sidewalks on only one side.

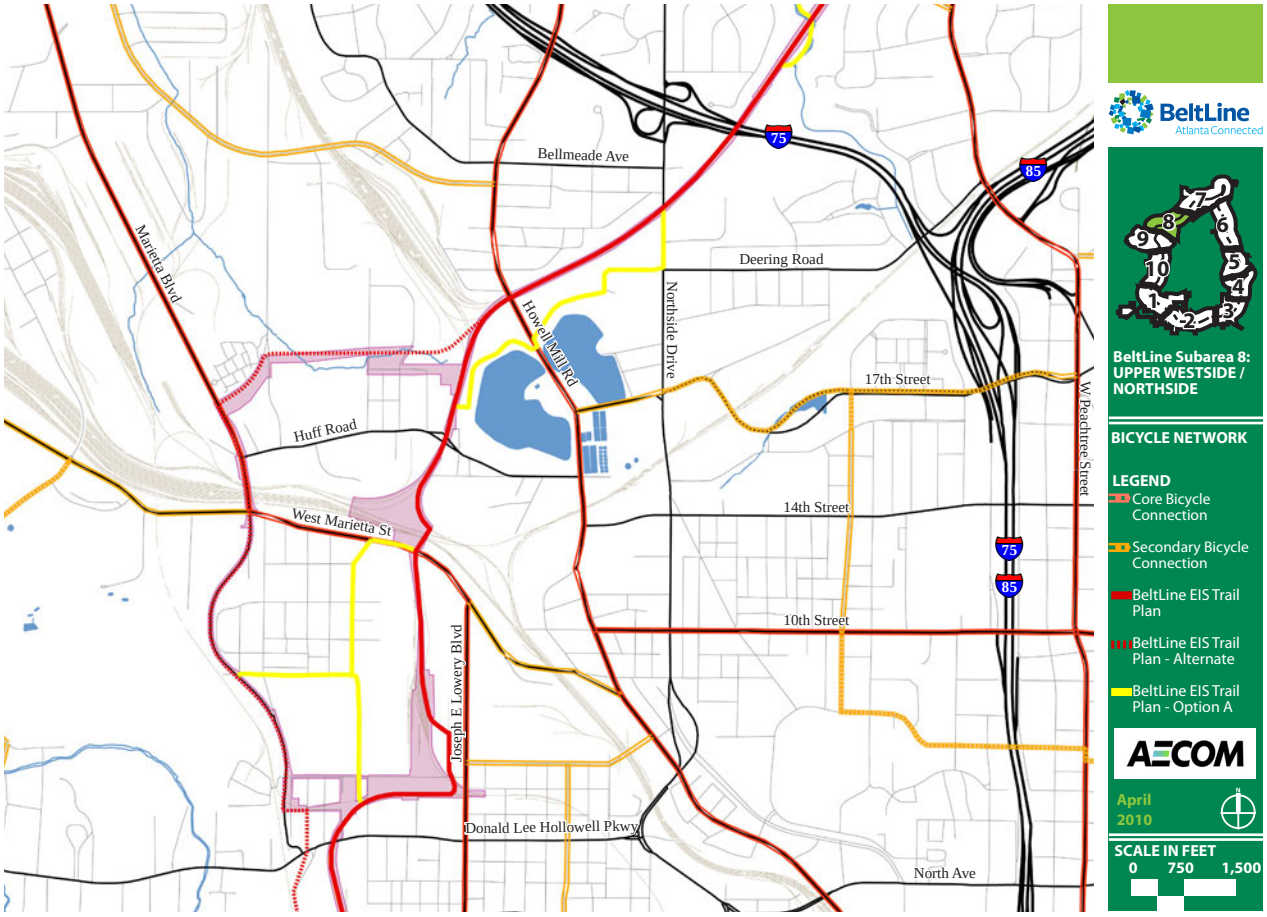
2.9 Bicycle Network

Summary

- Currently, there are no streets with bicycle lanes in the study area, but some signed bicycle routes do exist. There are current plans underway for additional core and secondary bicycle routes throughout the study area.

- The 2009 proposed BeltLine Trail Plan intersects the City's proposed bicycle routes at Howell Mill Road and Marietta Street.


Bellmeade Ave
Marietta Blvd
Deering Road
Northside Drive
Howell Mill Rd
17th Street
W Peachtree Street
Huff Road
14th Street
West Marietta St
10th Street
Joseph E Lowery Blvd
Donald Lee Hollowell Pkwy
North Ave
75
85
BeltLine
Atlanta Connected
BeltLine Subarea 8: UPPER WESTSIDE / NORTHSIDE
SIDEWALK NETWORK
LEGEND
Streets without sidewalks
Streets with sidewalks on both sides (complete)
Streets with sidewalks on one side
AECOM
April 2010
SCALE IN FEET
0 750 1,500


Bellmeade Ave
Marietta Blvd
Deering Road
Northside Drive
Howell Mill Rd
17th Street
W Peachtree Street
Huff Road
14th Street
West Marietta St
10th Street
Joseph E Lowery Blvd
Donald Lee Hollowell Pkwy
North Ave
75
85
BeltLine
Atlanta Connected
BeltLine Subarea 8: UPPER WESTSIDE / NORTHSIDE
BICYCLE NETWORK
LEGEND
Core Bicycle Connection
Secondary Bicycle Connection
BeltLine EIS Trail Plan
BeltLine EIS Trail Plan - Alternate
BeltLine EIS Trail Plan - Option A
AECOM
April 2010
SCALE IN FEET
0 750 1,500

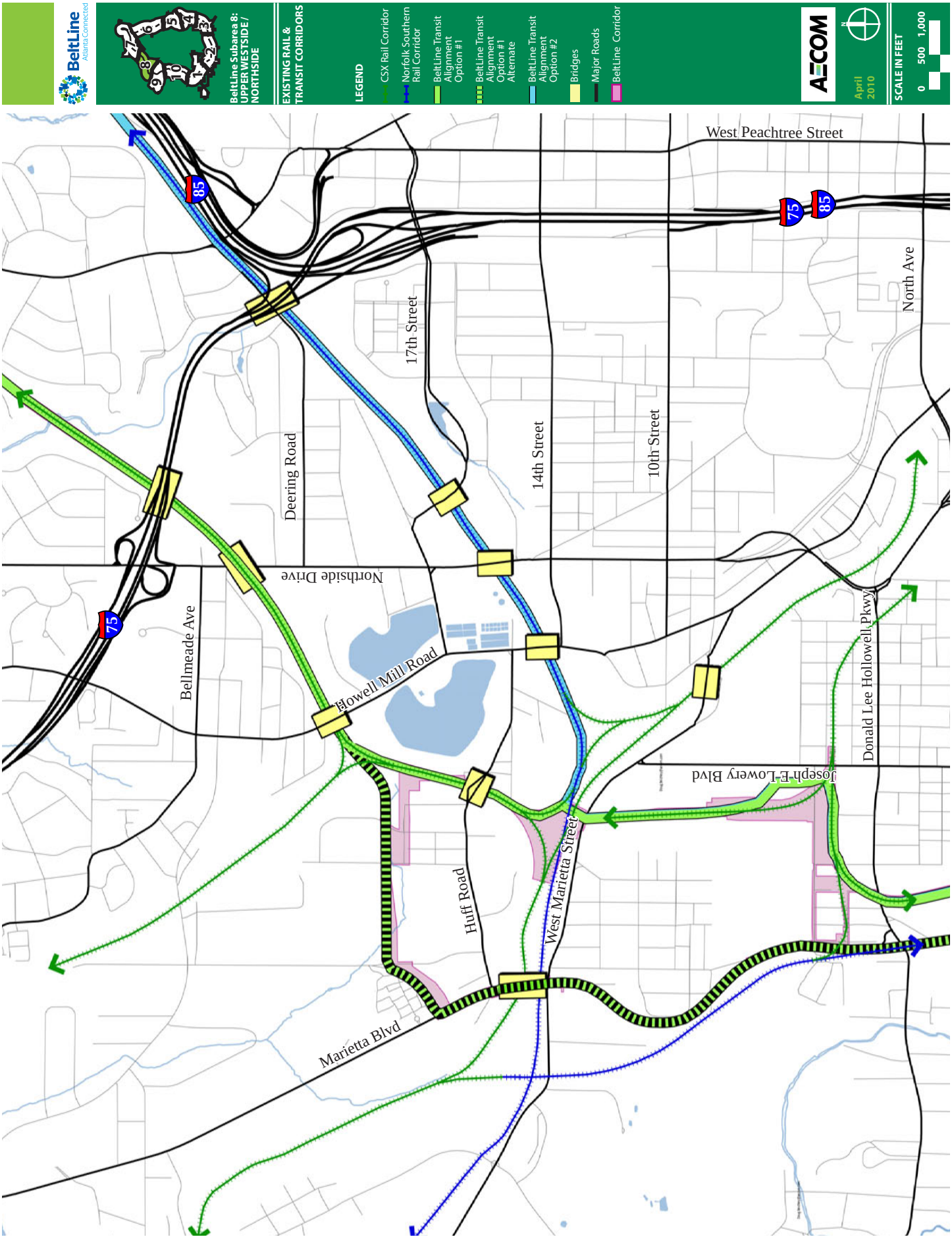
2.10 Existing Rail & Transit Corridors

The study area includes active freight and transit rail corridors and an intermodal freight terminal, which limit connectivity for new transit, streets and trails.

Summary

- Three alignment options (#1A, #1B, and #2) utilize varying routes to navigate through the CSX and Norfolk Southern corridors.

- Both Alignments 1A and 1B utilize the existing southwest-northeast CSX corridor. Alignment 1B leaves the CSX corridor near the Blandtown Neighborhood, and joins with a Norfolk Southern Corridor near the southwest portion of the study area. Alignment 2 follows the southwest-northeast Norfolk Southern corridor before linking to the CSX corridor from Alignment 1A.


BeltLine
Atlanta Connected
BeltLine Subarea 8:
UPPER WESTSIDE /
NORTHSIDE
EXISTING RAIL &
TRANSIT CORRIDORS
LEGEND
CSX Rail Corridor
Norfolk Southern
Rail Corridor
BeltLine Transit
Alignment
Option #1
BeltLine Transit
Alignment
Option #1
Alternate
BeltLine Transit
Alignment
Option #2
Bridges
Major Roads
BeltLine Corridor
AECOM
April
2010
SCALE IN FEET
0 500 1,000
West Peachtree Street
North Ave
17th Street
14th Street
10th Street
Deering Road
Northside Drive
Bellmeade Ave
Howell Mill Road
Donald Lee Hollowell Pkwy
Joseph E. Lowery Blvd
West Marietta Street
Huff Road
Marietta Blvd
85
75

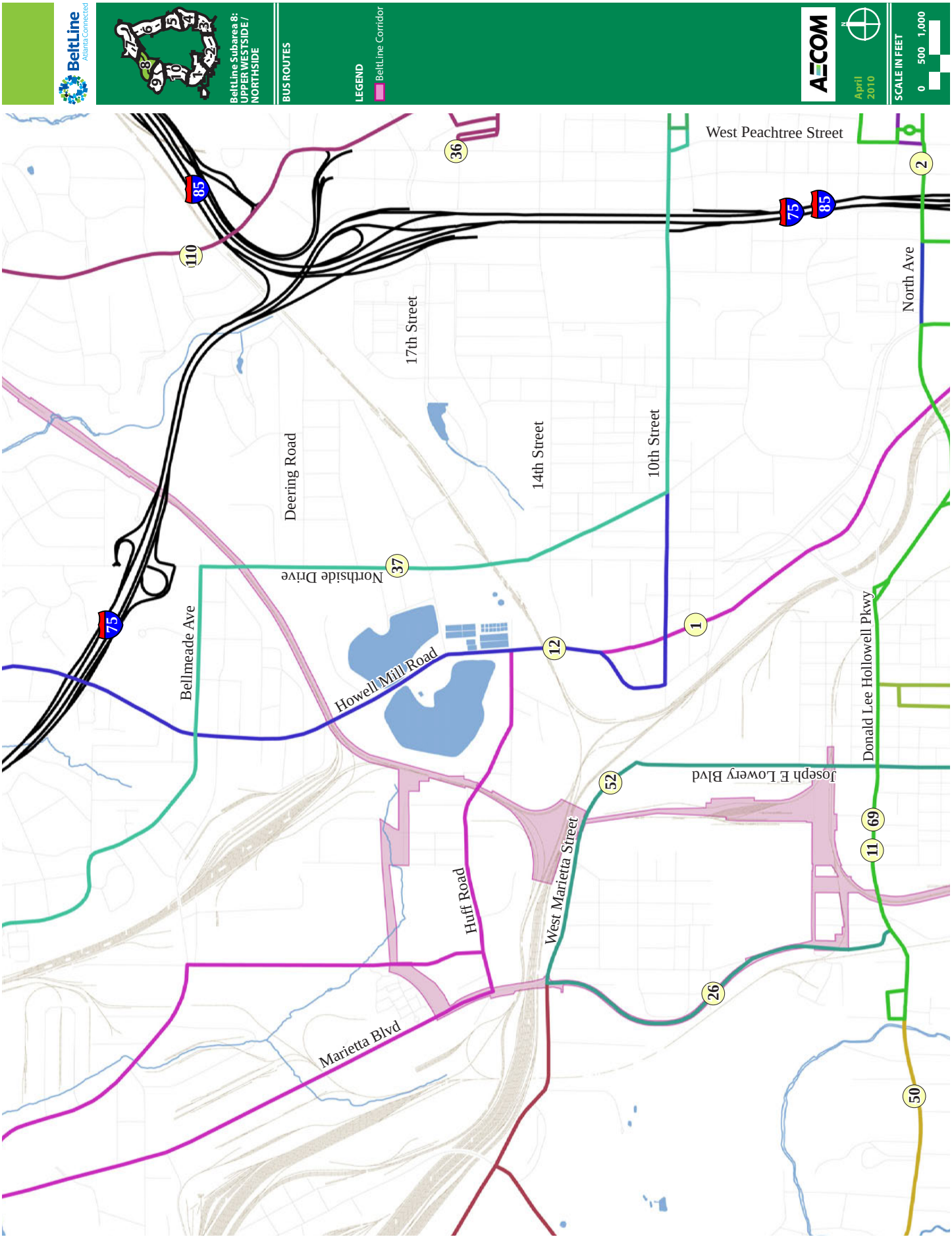
2.11 Bus Routes

Summary
Several routes serve the study area, including:

- **Route 1 Centennial Olympic Park/Coronet Way** - This line links Downtown Atlanta to Fernleaf Neighborhood with service along Marietta Street / Marietta Boulevard in the western part of this subarea.

- **Route 12 Howell Mill / Cumberland -** This bus line provides service along 10th Street and Howell Mill Road from Midtown to the Cumberland Mall, with service to Georgia Tech, Howell Mill Square, West Paces Medical Center, and West Paces Ferry Shopping.

- **Routes 37 Defoors Ferry Road/Atlantic Station-** This bus line provides service from the Midtown Station to Atlantic Station, the Loring Heights and Underwood Hills neighborhoods and the Marietta Boulevard/Bolton Road area.


BeltLine
Atlanta Connected
BeltLine Subarea 8:
UPPER WESTSIDE /
NORTHSIDE
BUS ROUTES
LEGEND
BeltLine Corridor
AECOM
April
2010
SCALE IN FEET
0 500 1,000
West Peachtree Street
North Ave
17th Street
14th Street
10th Street
Deering Road
Northside Drive
Bellmeade Ave
Howell Mill Road
Donald Lee Hollowell Pkwy
Joseph E Lowery Blvd
West Marietta Street
Huff Road
Marietta Blvd
85
75
36
110
2
37
12
1
52
69
11
26
50

2.12 Physical Constraints

The study area includes a number of physical constraints that challenge the creation of network connections but also add to the overall open space.

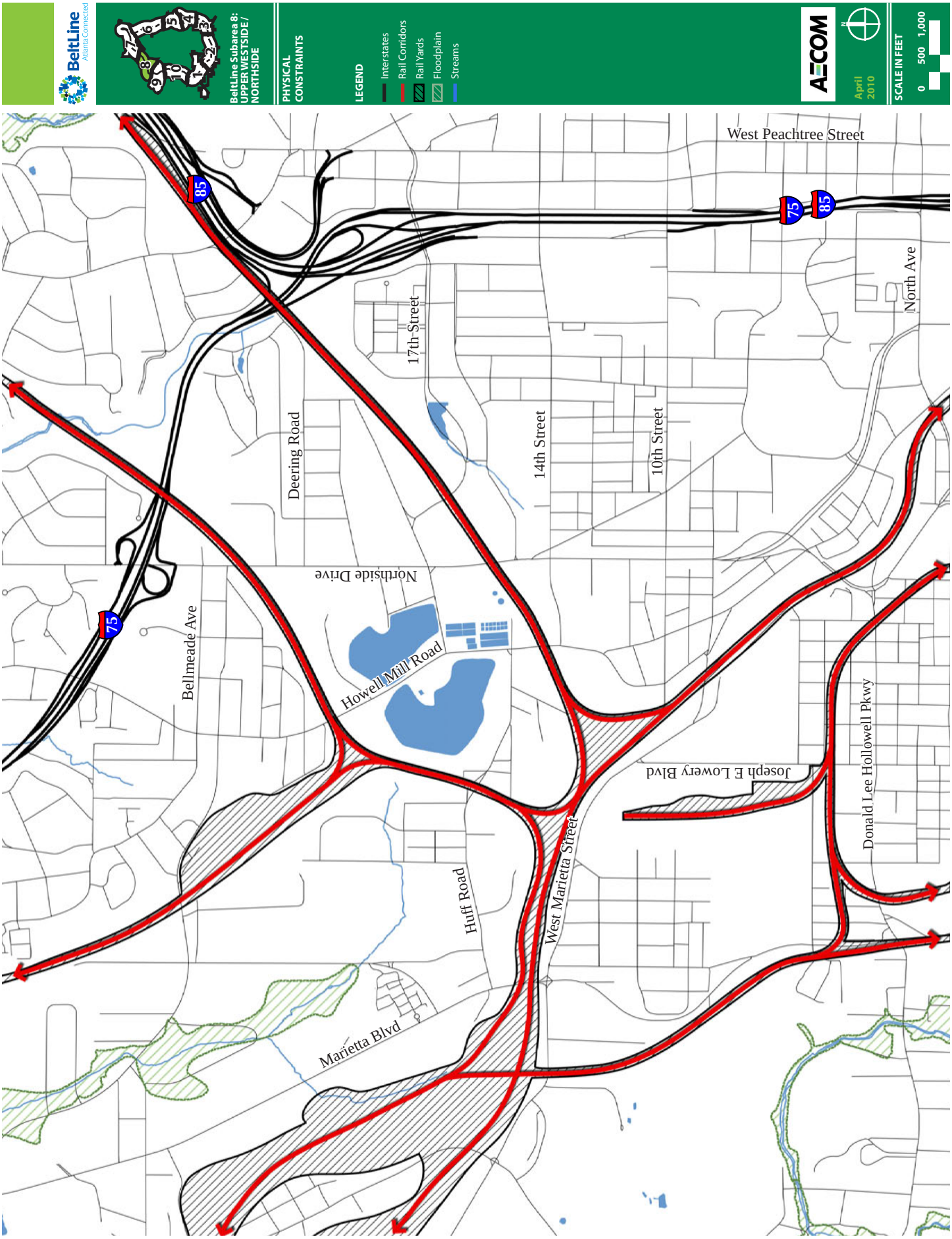
Summary

- Several rail corridors run through the study area, and at the same time the study area lacks connectivity because of the limited at-grade or grade-separated crossings over these railroads.

- The Atlanta City Water Works Resevoirs affect street connectivity in the central study area and, as a result, are surrounded by relatively high-volume streets.

- The heavy industrial land uses have created extensive rail spur networks in the central part of the study area. In some cases, these rail spurs occupying several acres of non-linear space, thereby limiting the connectivity in the area.

- The existing street network has evolved from the limitations of the rail corridors. For instance, Marietta Street parallels the rail corridor, and several other streets approach and/or parallel the railways without providing cross-access.


BeltLine
Atlanta Connected
BeltLine Subarea 8:
UPPER WESTSIDE /
NORTHSIDE
PHYSICAL
CONSTRAINTS
LEGEND
Interstates
Rail Corridors
Rail Yards
Floodplain
Streams
AECOM
April
2010
SCALE IN FEET
0 500 1,000
West Peachtree Street
85
75
85
North Ave
17th Street
Deering Road
14th Street
10th Street
Northside Drive
75
Bellmeade Ave
Howell Mill Road
Joseph E Lowery Blvd
Donald Lee Hollowell Pkwy
West Marietta Street
Huff Road
Marietta Blvd

2.13 Transit Accessibility

Pedestrian accessibility to future BeltLine Transit Stations will be important for the success of transit in the area. This diagram illustrates the actual 5 and 10-minute walking distances around the proposed stations.

Summary

Alignment #1 Accessibility:

- Most of the service area coverage in this alignment are associated with the stations at Northside and Howell Mill. This alignment has the smallest service area for both 5 and 10 minute walk times.

Alignment #1 Alternative Accessibility:

- This alignment provides the most pedestrian accessibility, with four stations in the study area, and the largest 5-minute and 10-minute service areas.

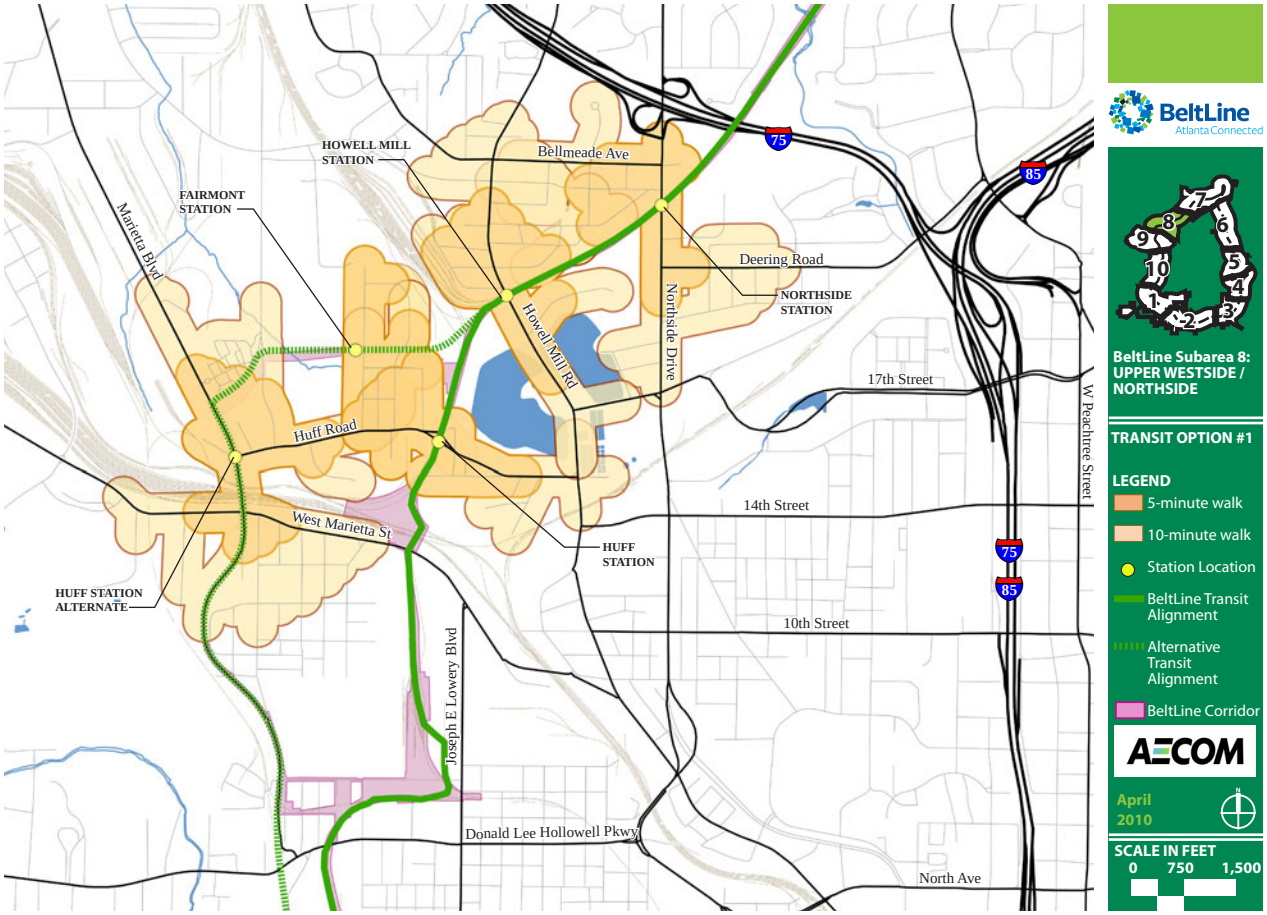
Alignment #2 Accessibility:

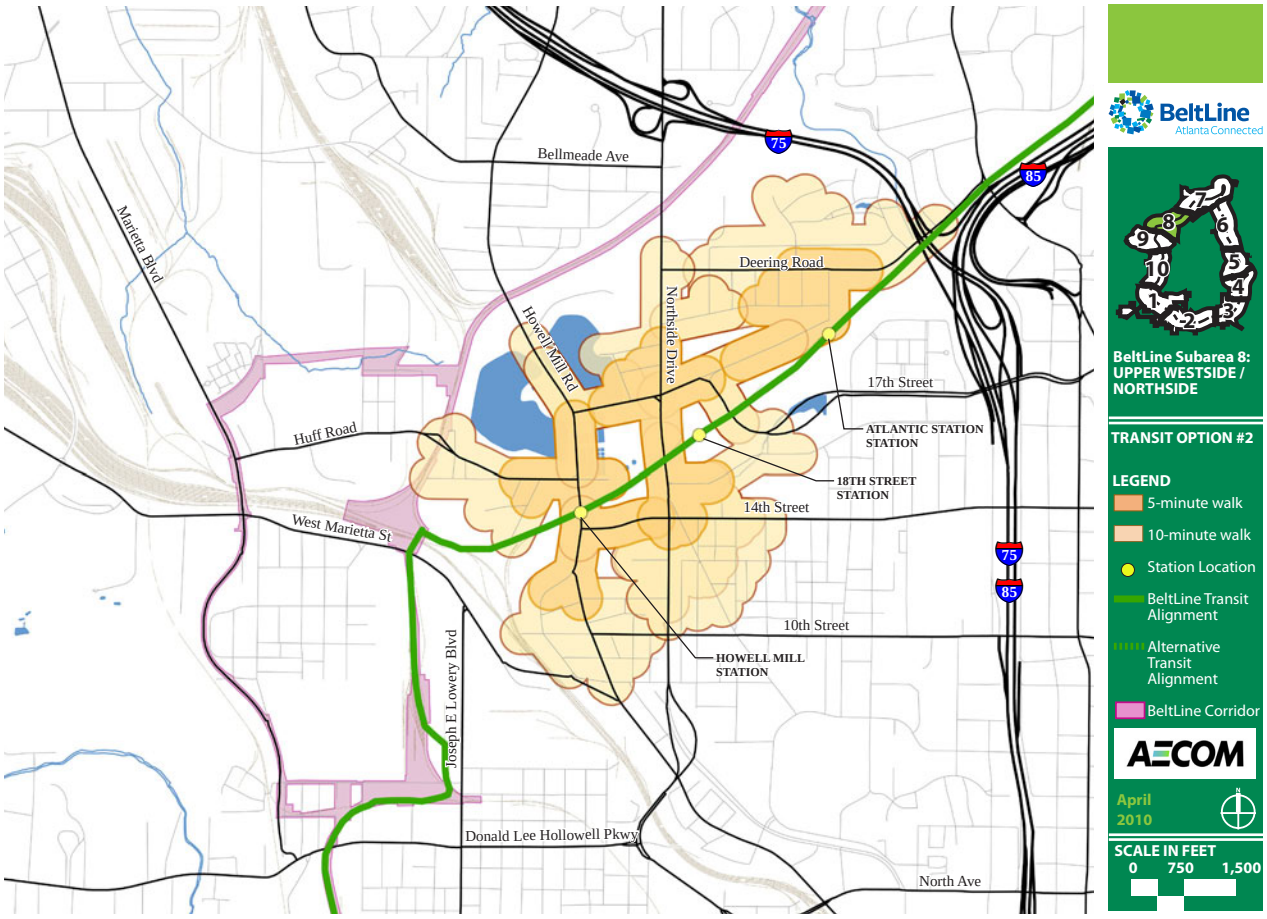
- Alignment #2 provides pedestrian accessibility within a 10-minute walk because of the existing connectivity in the Home Park Neighborhood. However, accessibility within 5 minutes of the stations is considerably lower.

BeltLine Alignment Service Areas For Subarea 8

Alignment	Station	5-minute Walking Service Area (Acres)*	10-minute Walking Service Area (Acres)*	Percent Coverage of Ideal 5-minute Service Area***	Percent Coverage of Ideal 10-minute Service Area***
1**	1 - Northside	74	211	60%	42%
	1 - Howell Mill	84	208	67%	41%
1A	1A - Huff	78	155	62%	31%
	Total Alignment 1A	**236**	**574**	**63%**	**38%**
1B	1B - Fairmont	68	99	54%	20%
	1B - Huff	95	266	76%	53%
	Total Alignment 1B	**163**	**365**	**65%**	**36%**
2	2 - Atlantic Station	60	188	48%	37%
	2 - 18th Street	78	292	62%	58%
	2 - Howell Mill	81	295	65%	59%
	Total Alignment 2	**219**	**775**	**58%**	**51%**

**Assumes adequate sidewalks and safe pedestrian conditions*
*** Stations for Alignment 1 apply to both Option A and Option B*
**** Ideal Coverage for 5-Minute Walk is 125 Acres; 10-Minute Walk to 502 Acres*


BeltLine
Atlanta Connected
HOWELL MILL STATION
FAIRMONT STATION
Bellmeade Ave
Marietta Blvd
Deering Road
NORTHSIDE STATION
Northside Drive
Howell Mill Rd
17th Street
W Peachtree Street
Huff Road
14th Street
West Marietta St
HUFF STATION
HUFF STATION ALTERNATE
10th Street
Joseph E Lowery Blvd
Donald Lee Hollowell Pkwy
North Ave
75
85
BeltLine Subarea 8: UPPER WESTSIDE / NORTHSIDE
TRANSIT OPTION #1
LEGEND
5-minute walk
10-minute walk
Station Location
BeltLine Transit Alignment
Alternative Transit Alignment
BeltLine Corridor
AECOM
April 2010
SCALE IN FEET
0 750 1,500

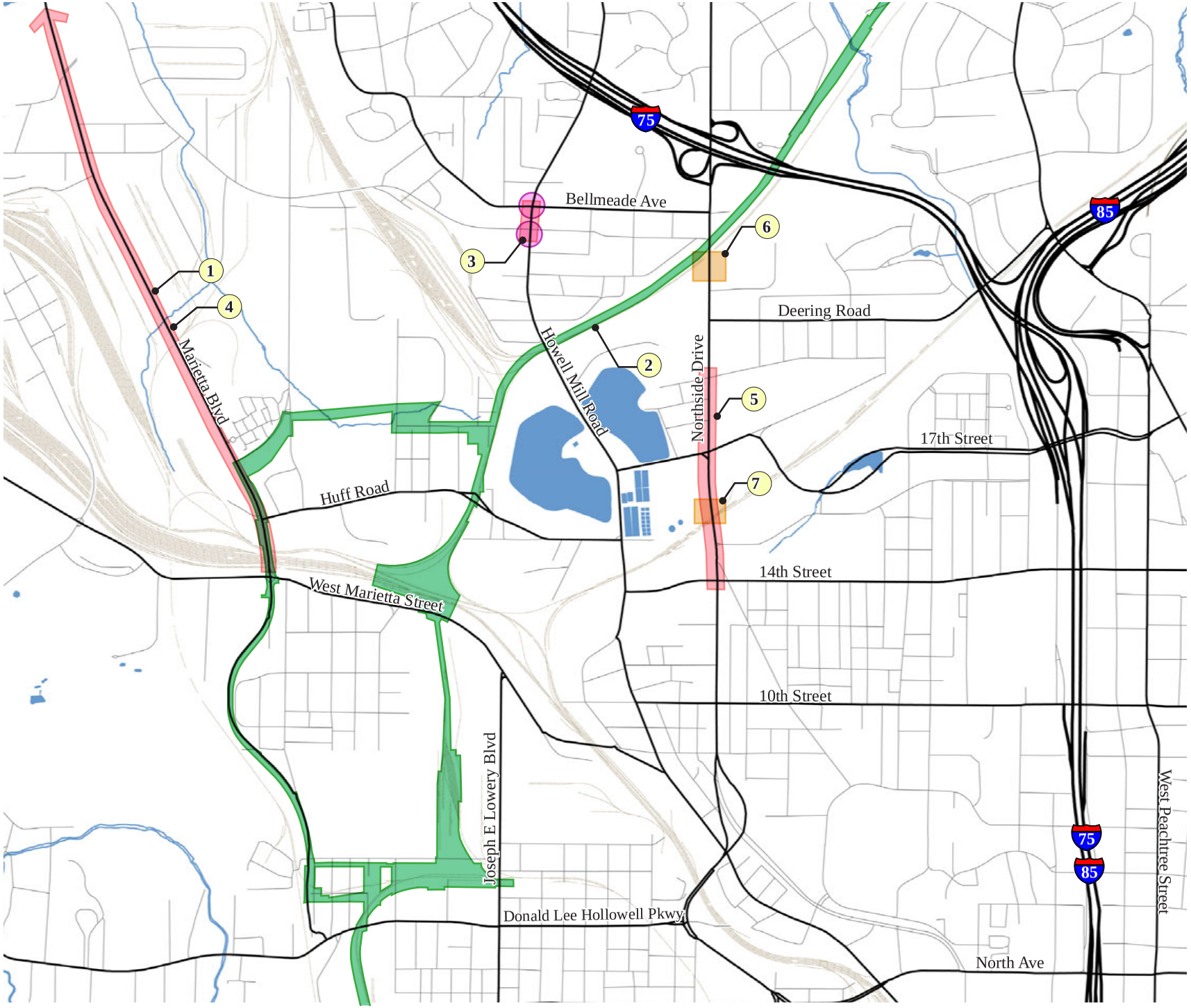

BeltLine
Atlanta Connected
Bellmeade Ave
Marietta Blvd
Deering Road
Northside Drive
Howell Mill Rd
17th Street
ATLANTIC STATION STATION
Huff Road
18TH STREET STATION
14th Street
West Marietta St
10th Street
HOWELL MILL STATION
Joseph E Lowery Blvd
Donald Lee Hollowell Pkwy
North Ave
75
85
BeltLine Subarea 8: UPPER WESTSIDE / NORTHSIDE
TRANSIT OPTION #2
LEGEND
5-minute walk
10-minute walk
Station Location
BeltLine Transit Alignment
Alternative Transit Alignment
BeltLine Corridor
AECOM
April 2010
SCALE IN FEET
0 750 1,500

2.14 Programmed Projects

The planned projects listed below for this study area were taken from the City of Atlanta's Capital Improvements Program (2010-2014) and The Atlanta Regional Commission's 2008-2013 Transportation Improvement Program (TIP) and the Regional Transportation Plan (RTP).

	Project Name	Description	Open Year	Status	Source	TIP/CIP Number	Cost	Funding Source
1	**Marietta Boulevard Bicycling and Pedestrian Improvements**	Bicycle/Pedestrian facilities on Marietta Boulevard from Marietta Street to the Atlanta City Limits	2011	Programmed	TIP	AT-AR-BP303	$1,590,000	Federal, Local
2	**BeltLine Transit Service in NW Quadrant**	BeltLine Transit from Bankhead to Lindbergh	2030	Long-range	TIP (2008-2013)	AR-45ID	$266,000,000	Local
3	**Howell Mill Road Intersection Improvements***	Widening narrow lanes and adding turn lanes on Howell Mill Road from Chattahoochee Avenue to Bellemeade Avenue	n/a	n/a	CIP	DPW-05-0237	$3,150,000	Local
4	**Marietta Boulevard Streetscapes**	Sidewalks and pedestrian improvements along Marietta Boulevard from West Marietta Street to City limit/ River	2011	n/a	CIP	DPW-05-0310	$1,600,000	Local
5	**Northside Drive - US 41/SR 3-B**	Pavement improvements on Northside Drive from 14th Street to Trabert Avenue	n/a	n/a	CIP	DPW-05-0379	$5,000,000	Federal, Local
6	**Northside Drive - US 41/SR 3-Bridge**	Construction of a railroad overpass at the CSX Railroad and Northside Drive (US41/ SR 3)		Evaluation/ Design Development	CIP	DPW-05-0383	$8,050,000	Federal, Local
7	**Northside Drive Bridge**	Improvements to the Northside Drive bridge over Norfolk Southern Railroad	2008/2015	n/a	CIP	DPW-05-0383	$2,674,000	Federal, Local

* *Recently completed*



BeltLine
Atlanta Connected

BeltLine Subarea 8:
UPPER WESTSIDE / NORTHSIDE

PROGRAMMED PROJECTS

LEGEND

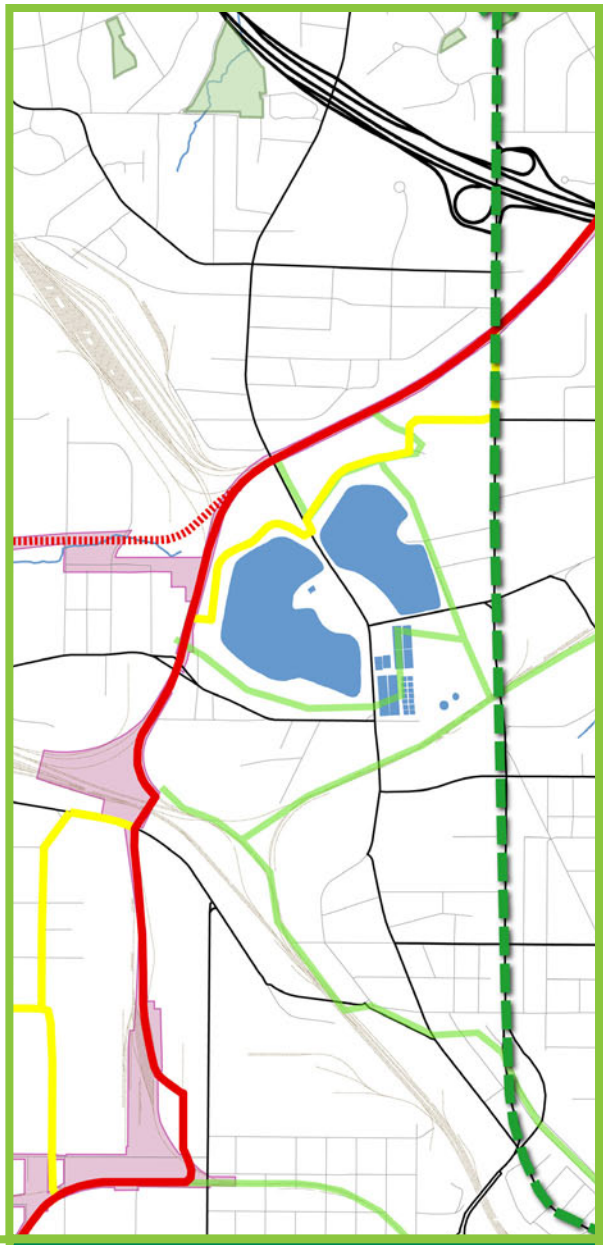
- Streescape Improvements
- Intersection Improvements
- BeltLine
- Bridge Improvements
- High-Speed Transit
- Peachtree Streetcar
- Railroads

AECOM

April 2010

SCALE IN FEET

0 500 1,000



INVENTORY & ASSESSMENT REPORT

3.0 Parks & Greenspace

3.1 Parks & Open Space

This subarea is historically an industrial area with related single-family neighborhoods developed around it. This area is now transitioning from industrial into a range of mixed-use neighborhoods with new multi-family and commercial development. Because of this, the area lacks an established or connected parks and open system. The majority of existing parks and open spaces are within existing neighborhoods. Existing parks within the subarea include:

Loring Heights Park – Is located along the eastern edge of the neighborhood and includes a duck pond and picnics area. Recently, a new park was added to the neighborhood and features a large open play field and fenced-in dog area.

Underwood Hills Park – This 10 acre park is surrounded by single-family bungalows and includes tennis courts, a playground, basketball courts and play field.

Atlanta Water Works – The open space surrounding the reservoirs has historically been open to the public for passive recreational use. In recent years, for security reasons, public access to the Water Works site has been restricted. The BeltLine Redevelopment Plan envisions the potential to reutilize portions of the Water Works for publicly accessible trails and passive recreational use.

Existing parks adjacent to the subarea include:

Tanyard Creek Park – Runs along Tanyard Creek through the Ardmore and Collier Hills neighborhoods and was an important site in the Civil War's Battle of Peachtree Creek.

Home Park – This Park is located one block north of 10th Street between Tumlin Street and State Street. The Park is adjacent to the R. Kirk Landon Learning Center and includes a basketball court and a large play field.

J. Allen Couch Park – This City owned park is located on the west campus of Georgia Institute of Technology at the intersection of Hemphill Avenue and Ferst Street. The large field is used for a variety of Georgia Tech intramural athletics.

Westside Reservoir Park – Future regional park master planned as part of the BeltLine parks and open space system that will include passive and active recreational uses in addition to a City water reservoir.

Knight Park – This neighborhood park is located on Church Street, one block south of West Marietta Street.

Channing Valley Park – This small neighborhood park is located in single-family neighborhood between Howell Mill Road and Northside Drive.

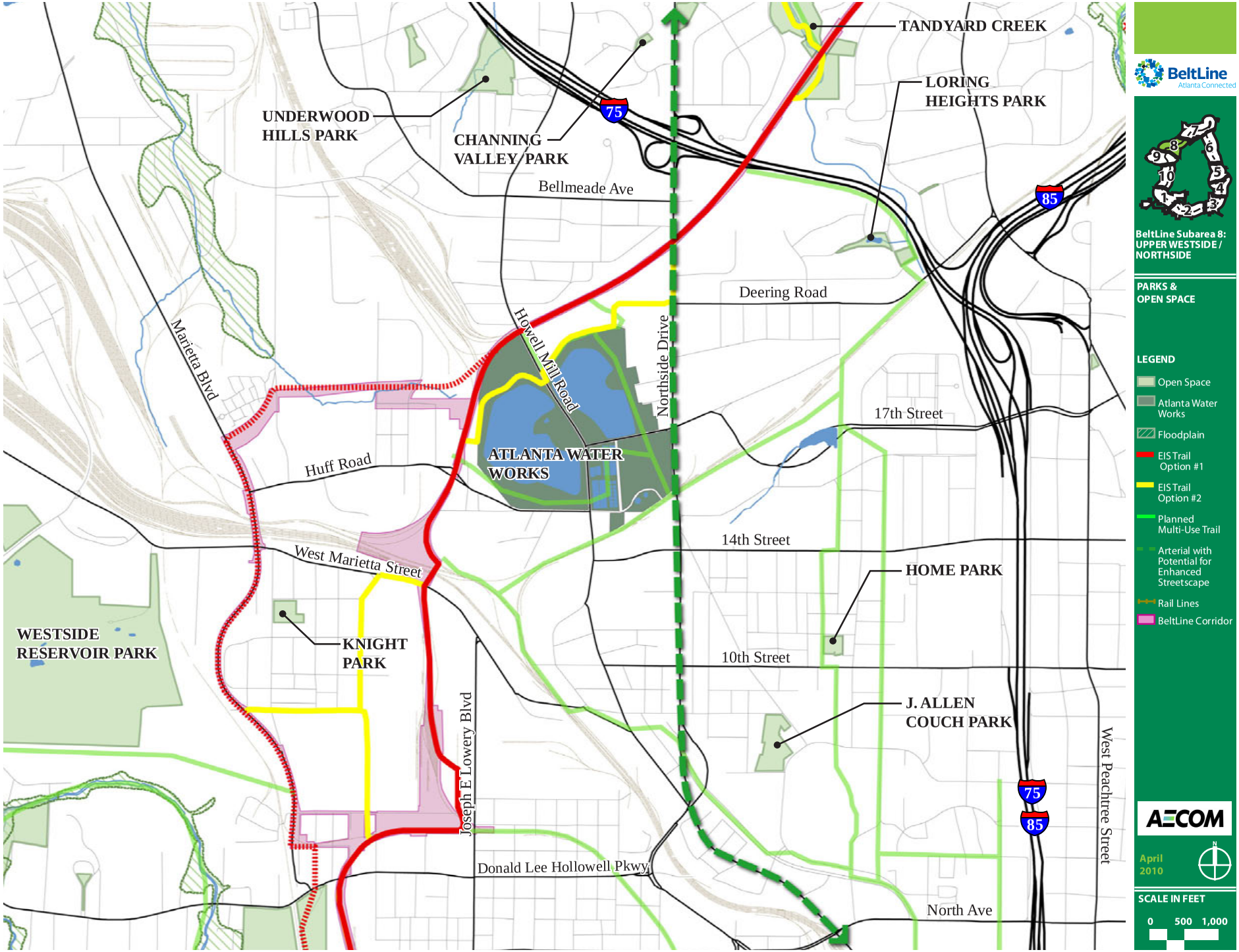
Underwood Hills Park – This 10 acre park is surrounded by single-family bungalows and includes tennis courts, a playground, basketball courts and play field.

Total Parkland per 1,000 Residents, FY 2009			
City	Population	Total Park Acres	Acres per 1,000 Residents
BeltLine Subarea 8	23,802*	12	.5
Atlanta, Georgia	537,958	3,867	7.2
Denver, Colorado	598,707	5,900	9.9
Portland, Oregon	557,706	13,512	24.2
Raleigh, North Carolina	392,552	12,403	31.6

**The Trust for Public Land, www.tpl.org/ccpe*

The adjacent chart compares existing park lands within Subarea 8, exclusive of Atlanta Water Works, against cities of comparable size that are national recognized for the amount of parkland per 1,000 residents.

*Based on 2000 Census Data described in section 1.4 Population & Employment.


TANDYARD CREEK
LORING HEIGHTS PARK
UNDERWOOD HILLS PARK
CHANNING VALLEY PARK
Bellmeade Ave
75
85
Deering Road
Howell Mill Road
Northside Drive
Marietta Blvd
17th Street
ATLANTA WATER WORKS
Huff Road
14th Street
West Marietta Street
HOME PARK
WESTSIDE RESERVOIR PARK
KNIGHT PARK
10th Street
J. ALLEN COUCH PARK
Joseph E Lowery Blvd
West Peachtree Street
Donald Lee Hollowell Pkwy
North Ave
BeltLine
Atlanta Connected
BeltLine Subarea 8: UPPER WESTSIDE / NORTHSIDE
PARKS & OPEN SPACE
LEGEND
Open Space
Atlanta Water Works
Floodplain
EIS Trail Option #1
EIS Trail Option #2
Planned Multi-Use Trail
Arterial with Potential for Enhanced Streetscape
Rail Lines
BeltLine Corridor
AECOM
April 2010
N
SCALE IN FEET
0 500 1,000

3.2 Tree Canopy

The Study Area has a good amount of tree coverage despite the large infrastructure operations of the Atlanta Waterworks and numerous rail corridors.

Summary

- A majority of the tree coverage is located in the existing neighborhoods of Loring Heights and Berkeley Park.

- Undeveloped land provides significant tree coverage in West Midtown, between Marietta Street and Atlanta Waterworks.

- Former warehousing and light industrial uses along Howell Mill Road, south of Huff Road, have a sparse tree canopy.

BeltLine
Atlanta Connected

BeltLine Subarea 8: UPPER WESTSIDE / NORTHSIDE

TREE CANOPY

LEGEND

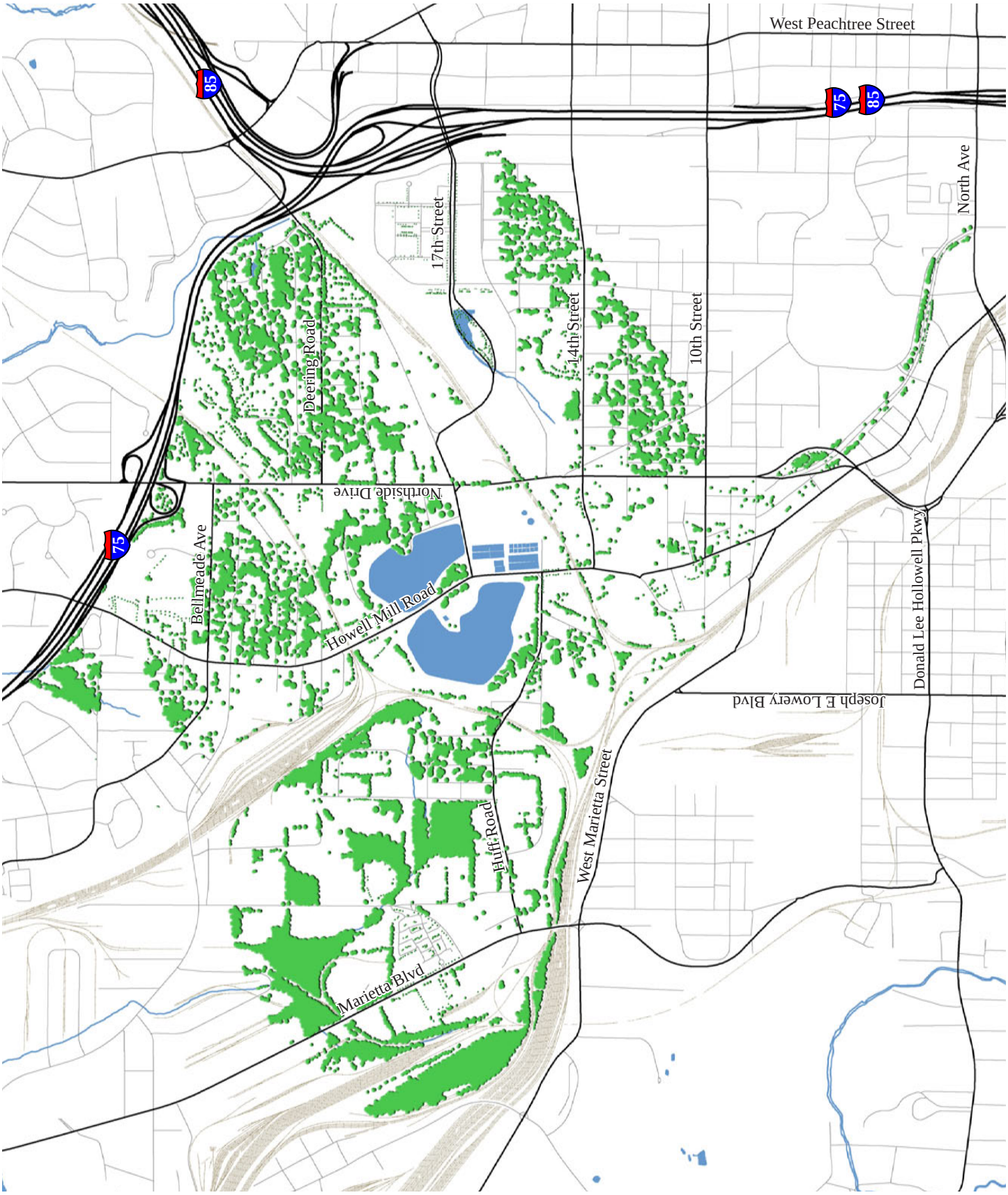
- Existing Tree Canopy
- Major Roads

AECOM

April 2010

SCALE IN FEET

0 500 1,000



3.3 Topography & Creek Systems

The topography has shaped the development pattern and rail corridors of the area.

Summary

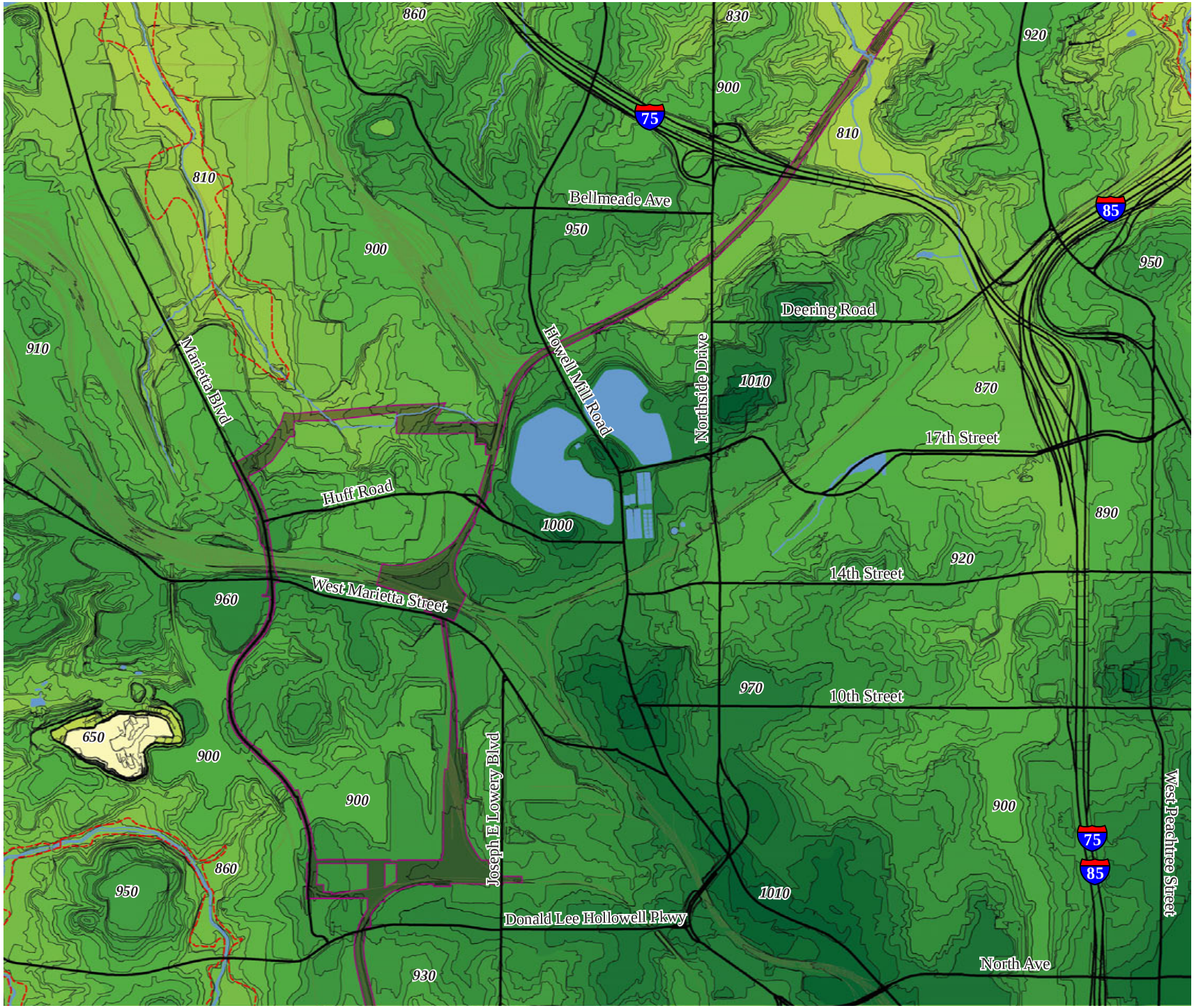
- The Loring Heights and Berkeley Park neighborhoods have steep topography within their boundaries and are separated by low-lying areas, limiting greater street connectivity.

- Two high-points in the area are along Northside Drive south of Deering Road and within the boundary of Atlanta Waterworks. These high points offer dramatic and scenic views of the city's skyline from Buckhead to Downtown.

- The rail corridors take advantage of the relatively flat topography associated with the valleys.

- A large floodplain east of Marietta Street provides significant tree canopy within the study area.

- Overall topography within the area presents challenges to a more robust street network and overall pedestrian mobility.



BeltLine
Atlanta Connected

BeltLine Subarea 8: UPPER WESTSIDE / NORTHSIDE

TOPOGRAPHY

LEGEND

- 10 Foot Contours
- Major Roads
- Floodplain
- Rail Lines
- BeltLine Corridor

AECOM

April 2010

N

SCALE IN FEET

0 500 1,000

3.4 Proposed Trail Alignments

The BeltLine EIS is currently evaluating the impact of the transit and trail alignment for the full 22-mile corridor. In Subarea 8 there are several trail alignment alternatives that are being considered. The ultimate trail alignment and location may likely utilize a combination of these alternatives. These alternatives include:

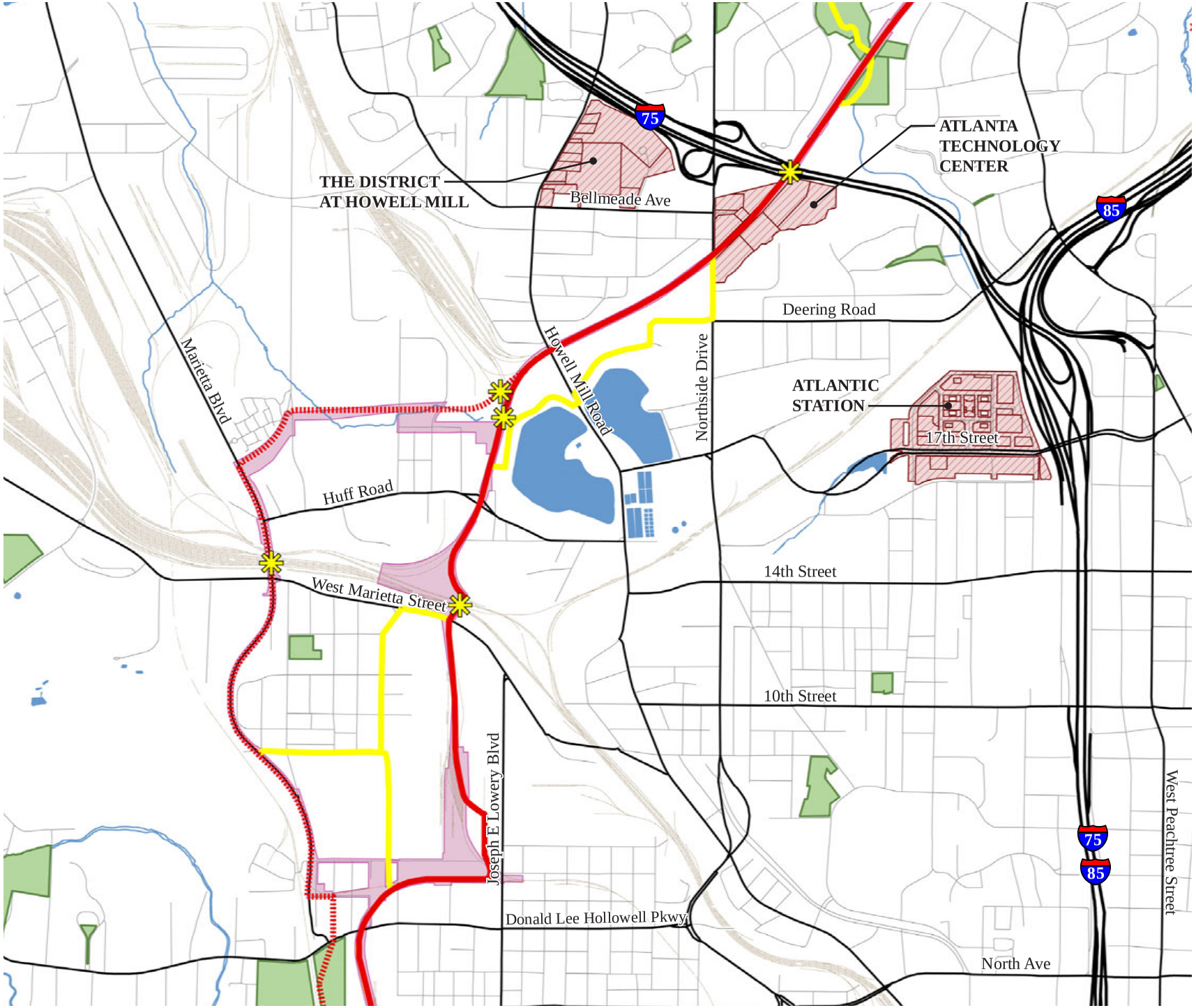
Option 1:

- The CSX corridor - running alongside the transit alignment within or adjacent to the CSX rail corridor and connecting north to the completed portion of BeltLine Trail along Tanyard Creek.

- Segment Alternative: Marietta Blvd. corridor – running along Marietta Blvd. along with transit north to the CSX corridor near Howell Mill Road.

Option 2:

- Utilizes portions of the Marietta Blvd. and CSX corridors with alternative segments that include various street connections that connect between the Marietta Blvd. and CSX corridors.


THE DISTRICT AT HOWELL MILL
Bellmeade Ave
ATLANTA TECHNOLOGY CENTER
Deering Road
Northside Drive
Howell Mill Road
Marietta Blvd
ATLANTIC STATION
17th Street
Huff Road
West Marietta Street
14th Street
10th Street
Joseph E Lowery Blvd
Donald Lee Hollowell Pkwy
North Ave
West Peachtree Street
75
85
BeltLine
Atlanta Connected
BeltLine Subarea 8: UPPER WESTSIDE / NORTHSIDE
PROPOSED TRAIL ALIGNMENTS
LEGEND
EIS Alignment Option #1
EIS Alignment Option #2
Bridges
Parks & Open Space
Employment Centers
Rail Lines
BeltLine Corridor
AECOM
April 2010
SCALE IN FEET
0 500 1,000