Normandale Lake District Plan

Draft

City of Bloomington

11/2/2017

Introduction

The Normandale Lake District is the City of Bloomington's western gateway. Mixing natural elements with commercial and residential uses, the area continues to evolve and develop. Previous plans recognized the area as an important commercial and employment center for the City and the Region. The Normandale Lake District Plan builds on previous plans to help guide the District's growth and identify development opportunities. Through careful planning the District has emerged as a distinctive destination that attracts a variety of users.

The 2008 Normandale Lake District Plan (NLDP) established a unified vision for the area and identified a funding mechanism to implement that vision. The plan has helped guide development and reinforced the District's identity and assets. It emphasized that transportation decisions consider enhancing connectivity for all user groups including pedestrians, bicyclists, and transit riders. It also highlighted the area's natural amenities like the Hyland-Bush-Anderson Lakes Regional Park Reserve including Normandale Lake Park, embracing them as community assets.

Since 2008, the market has changed, prompting reconsideration of the 2008 NLDP's original development assumptions. Whereas high quality office was the predominant land use assumed in the 2008 NLDP there has been recent construction and increasing interest in high density residential. This plan, the 2017 NLDP, will update the 2008 NLDP to reflect market changes and modify the list of recommended public improvements to implement the vision.

What is the Normandale Lake District Plan?

The NLDP was completed in 2008 and was incorporated in the City's *2008 Comprehensive Plan*. It was one of three identified development districts in the City as shown in Figure 1.

Figure 1: City of Bloomington Development Districts

The 2008 NLDP set a vision, goals, and an implementation plan for the District. The District boundary for the 2008 NLDP is shown in shown in Figure 2. The plan utilized market trends and traffic forecasts to identify policy and project recommendations related to land use, design, transportation, and utilities.

The forecasted increase in office resulted in a significant increase traffic in the District requiring major infrastructure improvements at the intersection of Normandale Boulevard and West 84th Street.

Figure 2: 2008 Normandale Lake District Planning Area

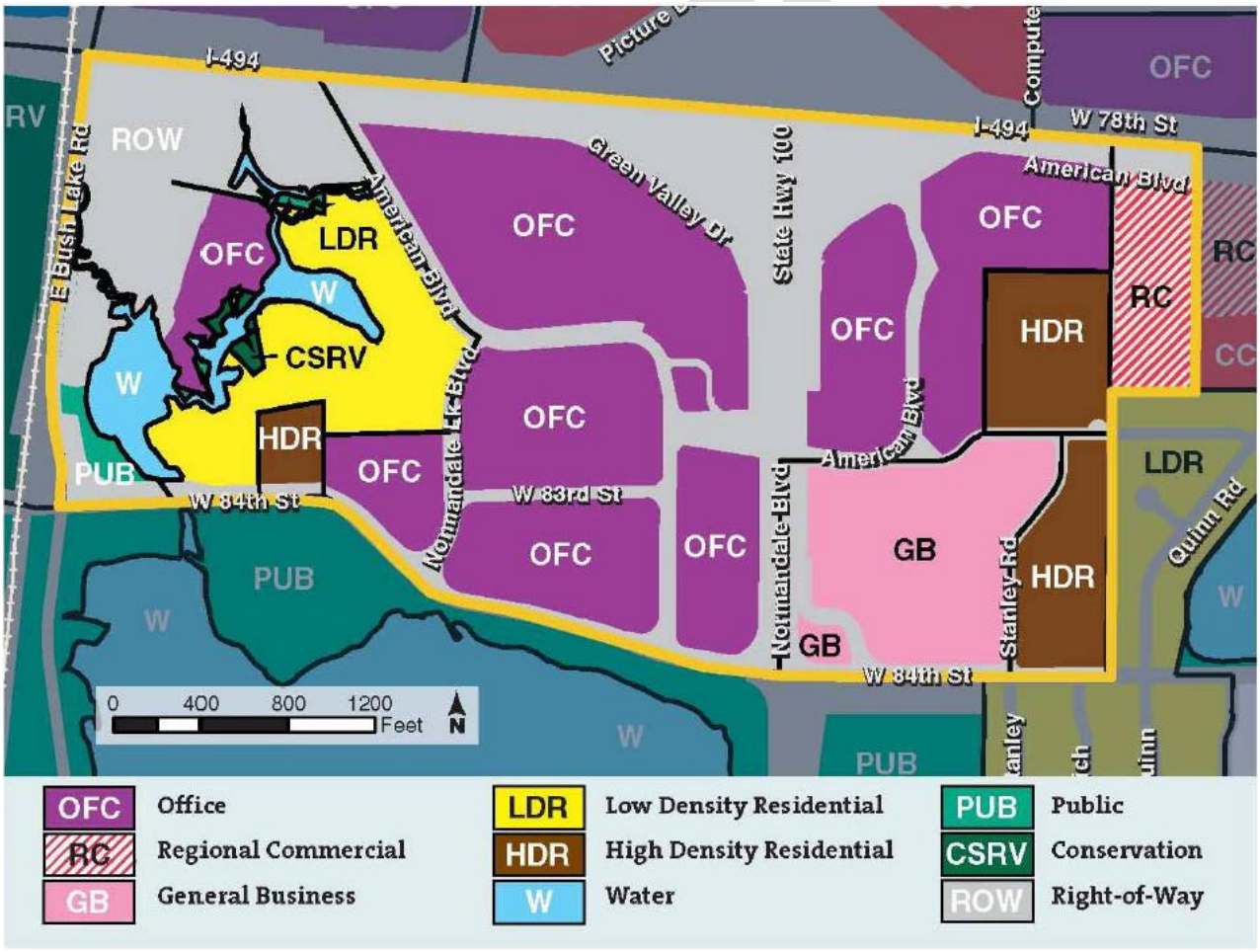
Why update the Normandale Lake District Plan?

There are three main drivers of the 2017 NLDP update process:

1. To evaluate the impact of land use changes on public infrastructure needs and priorities.

The 2008 NLDP envisioned that the majority of the District's undeveloped or underdeveloped land would be developed into office space, as shown in Figure 3. However, a significant decline in the office development market coupled with increased developer interest in residential have resulted in high density residential projects in locations previously envisioned for office towers. The 2017 NLDP evaluates the impacts the changing land use vision will have on District infrastructure needs and priorities.

Figure 3: 2008 Normandale Lake District Plan Proposed Land Use Guide Plan



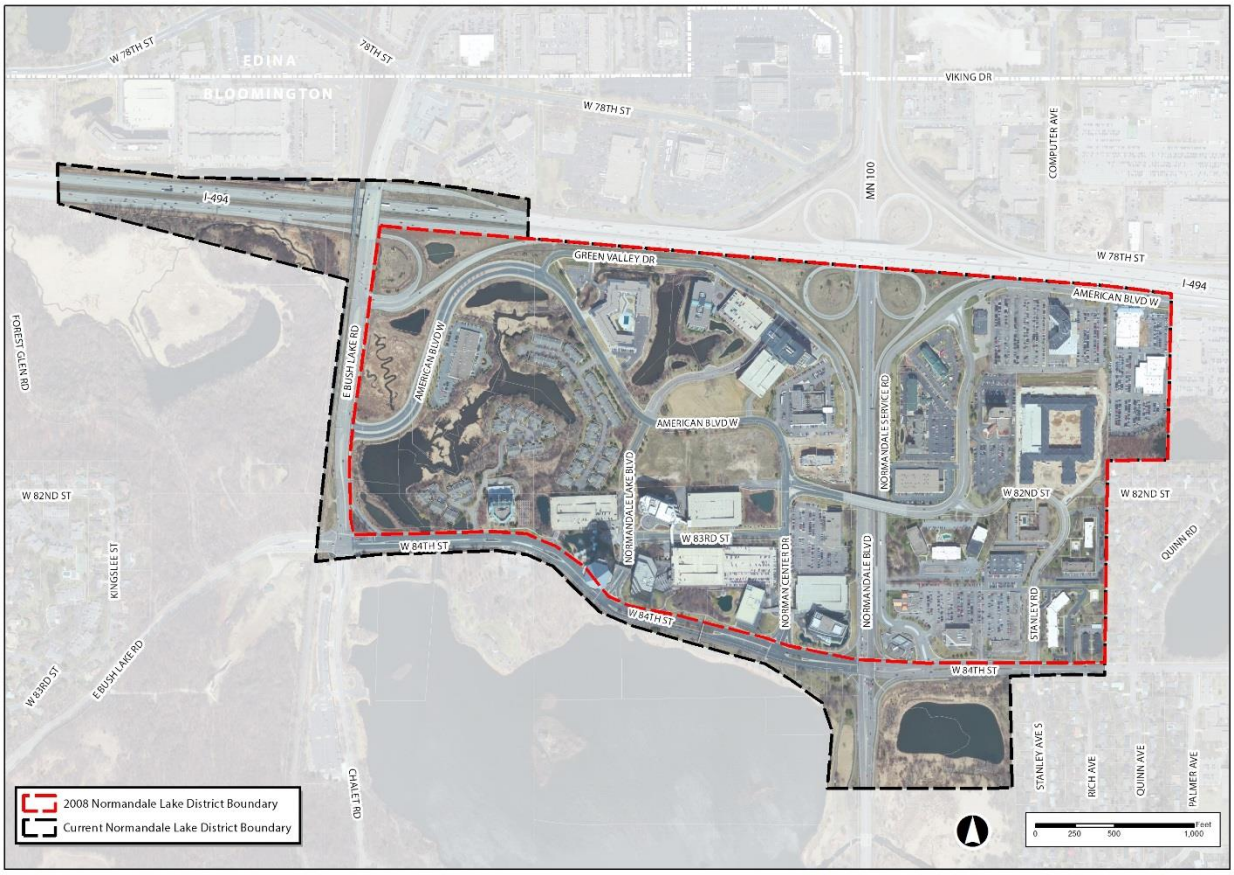
2. To reflect the impacts of the East Bush Lake Road/I-494 Ramp Project.

The interchange at East Bush Lake Road has been without a westbound I-494 on-ramp since it was constructed in 1960 shortly after the I-35W/I-494 interchange was completed. Adding a westbound access had been discussed for years, but unresolved design conflicts with the existing railroad bridge made this construction project not viable to include in the 2008 NLDP. Since then, Bloomington, working with other key stakeholders Edina, Hennepin County, and MNDOT, pursued many options to

achieve westbound access to I-494. These efforts resulted in design and funding of an innovative "inverted loop" design, as shown in Figure 4 that provides westbound access without disturbing the existing freight and commercial delivery railroad tracks just west of East Bush Lake Road. The addition of the westbound ramp will relieve traffic problems in the area and assist in smoother operation of the frequently congested interchange at TH 100/I-494. The project will have significant impacts on traffic patterns in the District; thereby impacting the needs of future District infrastructure. The 2017 NLDP update evaluates these impacts, which were identified in a traffic study prepared for the District in 2015. As part of the 2017 NLDP update, the District boundary was adjusted to officially incorporate the East Bush Lake Road/I-494 project site into the District, as shown in Figure 5.

Figure 4: East Bush Lake Road/I-494 Proposed Ramp Design Concept

Figure 5: Adjusted District Boundary



3. To update the District implementation Plan to reflect work completed since 2008.

Many of the projects from the 2008 NLDP implementation plan have been completed. This 2017 NLDP update will review the status of projects recommended in the 2008 NLDP. In addition to the 2015 traffic study, utility models were updated to evaluate infrastructure needs to accommodate the changing land uses. These infrastructure improvement projects will be incorporated into an updated Implementation Plan.

How to Use This Document

The 2017 NLDP update focuses on the public improvements needed to accommodate changes in land use patterns. It does not change or adjust the vision, goals and objectives set in the 2008 NLDP; however some of the specific projects described in the Implementation Plan have been changed or adjusted. To see the full discussion regarding the District's vision, goals and objectives please see page 4.1 of the 2008 NLDP.

The next chapter, *Progress Since 2008, Other Considerations, and Recommendations,* provides an overview of the projects recommended in the 2008 NLDP. Each project type has three sections. The first section summarizes the status of the projects. The second section briefly explains the impacts of the completed projects as well as other changes that have occurred since the 2008 NLDP. The third section discusses recommendations for the District in light of changes since the 2008 NLDP.

The final chapter of this report is the Implementation Plan. It takes the recommendations from the previous chapter and assigns a timeline priority and identifies responsible implementation parties. It also discusses the strategy to fund the projects. The projects are divided into short term and future project timeframes. Some will be implemented immediately while others may require additional study or may never be completed if unanticipated changes in the market occur. The NLDP should continue to be updated periodically to evaluate progress and market changes.

Path near Covington Apartment and Norman Point

An example of expanding upon the park-like character of the district.

SIDE BAR

The vision and goals for the District were set during the 2008 planning process. The 2017 NLDP Update was guided by this work. A summary of the vision and goals is provided below. To see a full discussion of the goals, vision, and objectives see page 4.1 of the 2008 NLDP (under separate cover).

Vision: The Big Idea

Continue to develop as a high quality, high density mixed use area in a manner that extends, reinforces and celebrates the natural environment.

Three primary goals to achieve this vision include:

a. Expand the park-like character.
b. Improve identity and connectivity.
c. Achieve a more visually cohesive built environment

Progress Since 2008, Other Considerations, and Recommendations

The 2008 Normandale Lake District Plan included a comprehensive implementation plan with short, mid, and long-term recommendations. These recommendations were broken down by the type of project including land use, urban design, movement and circulation, utilities, stormwater management, and projects outside the District. The full list of projects and status from the 2008 NLDP can be found in Appendix A.

Normandale Lake Office Park

The district integrates urban and natural elements to create a unique feel and destination.

Land Use and Development

Existing land use in the District continues to consist of a mix of office, hotels, freeway-oriented commercial, neighborhood-oriented retail, and multiple-family development. The District also continues to contain one of the largest concentration of Class A office space in the Twin Cities metropolitan region. Furthermore, new development projects have brought more residents and jobs to the area, as shown in Table 1.

Table 1: Employment and Residential Changes

	2008	2014
Residents	243	438
Workers	2,590	5,523

Source: U.S. Census Bureau. 2016. LODES Data. Longitudinal-Employer Household Dynamics Program. http://lehd.ces.census.gov/data/lodes/

Progress Since 2008

The 2008 NLDP recommended several land use changes and rezonings which encouraged a greater mix of uses. These changes in land use and zoning were designed to accommodate the changing market. The changes to zoning and land use and market changes are discussed in depth below.

Land Use Category Change and Rezonings

All of the land use category changes and rezonings recommended by the 2008 NLDP have been completed. These changes were completed to facilitate redevelopment of aging properties within the District as well as to align land use categories and zoning with existing uses. Also, most zoning changes were made to facilitate phasing out older commercial zoning districts and replacing them with updated commercial zoning districts. These changes did not significantly impact the uses of these properties. However, rezonings on a few parcels did allow significantly different uses. An example being 5800 West American Boulevard. This property was redesignated with a land use of High Density Residential from Office. It also was rezoned to RM-50 to accommodate multifamily residential development. A summary of land use category changes and zoning changes can be found on pages 5.8-5.9 and 5.12 of the 2008 NLDP (under separate cover). The current land use guide plan and zoning for the District are shown in Figure 6 and Figure 7.

Figure 6: Existing Normandale Lake District Land Use Guide Plan

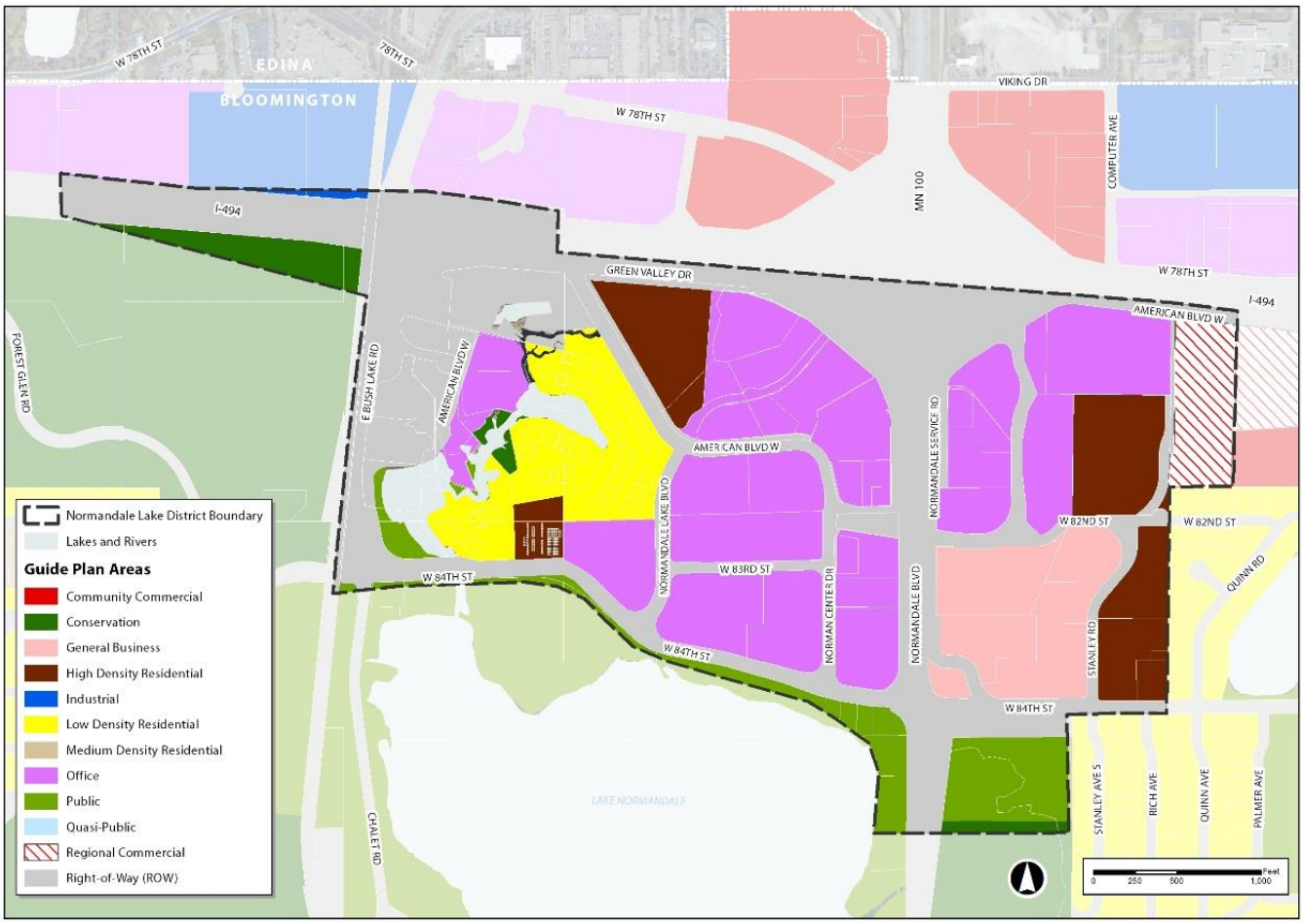
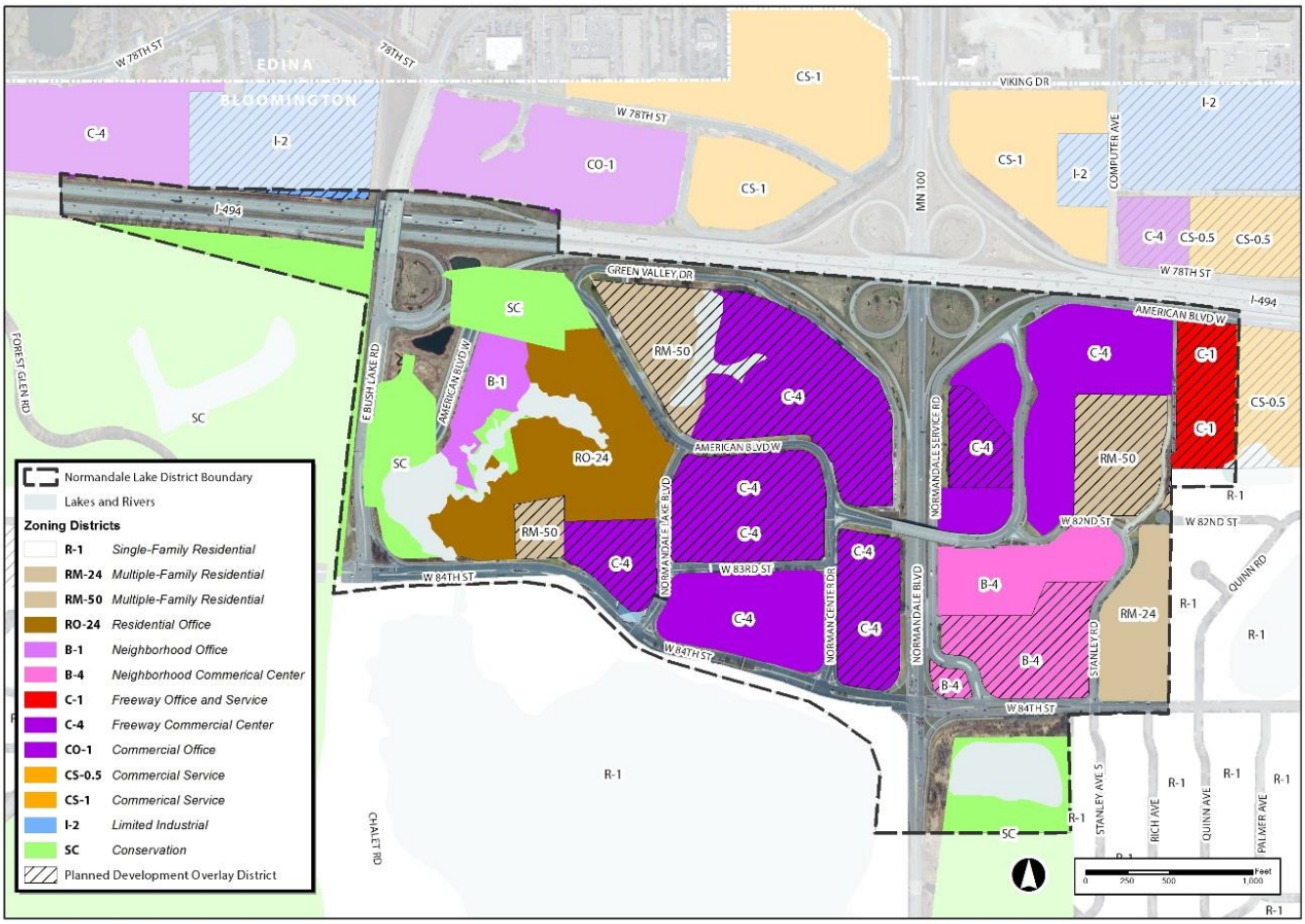


Figure 7: Existing Normandale Lake District Zoning



Development Projects Completed

Since the 2008 NLDP was adopted, several multi-family housing projects have been approved and/or constructed. Market demand for office significantly declined after 2008 while the market for multifamily residential has increased across the Twin Cities and beyond. As a result several parcels previously guided and zoned for office development have been reguided and rezoned to allow residential uses. These include:

- Covington Apartments at 5800 American Boulevard West was reguided High Density Residential (HDR) and rezoned to RM-50 to allow a 250 unit luxury apartment building (opened in 2014).
- ”Duke III” site formally known as the Preserve at 8101 Normandale Lake Boulevard, a 179 unit apartment building is under construction. The C-4 zoning district permits residential as long as part of the site is slated for commercial uses, so rezoning was not necessary. Existing office buildings in the “Duke” development provide the necessary commercial use.
- Two developable parcels remain in the District. These parcels, commonly referred to as the “Jostens site,” are currently zoned C-4 and have a land use guide plan designation for office. A preliminary development plan was approved for a hotel and an office on the two parcels. This information was considered in defining the two new development scenarios for the District discussed below.

Covington Apartments at 5800 American Boulevard West

A 250 unit apartment building that recently opened.

The Preserve Apartments at 8101 Normandale Lake Boulevard

A 179 unit apartment building that is under construction.

The Jostens Site

Other Considerations

Taking into consideration development that has occurred since 2008 and interest expressed by developers, two future (2040) development scenarios were created. The development scenarios were used to forecast future traffic in a 2015 traffic study for the District and also to model utility (sewer, water) needs. The two scenarios include: a 2040 Commercial Intensive scenario and a 2040 Mixed-Use Intensive scenario. These scenarios include the following assumptions, which are keyed to sites illustrated on Figure 8 and Figure 9:

2040 Commercial Scenario

1. Net increase of 250,000 Square Feet (SF) office (2009 approved PD)
2. Net increase of 257 hotel units (2009 approved PD)
3. Net increase of 332,000 SF office (approved PD)[1]
4. Net increase of 32 HDR dwelling units (d.u.) (assumed to intensify by 30%)
5. Net increase of 13 HDR d.u. (assumed to intensify by 30%)
6. Net increase of 78,000 SF of commercial for entire area

[1] Since this plan has started, site #3 (Duke III) has been developed as a 179 unit high density residential building.

Figure 8: Commercial Scenario

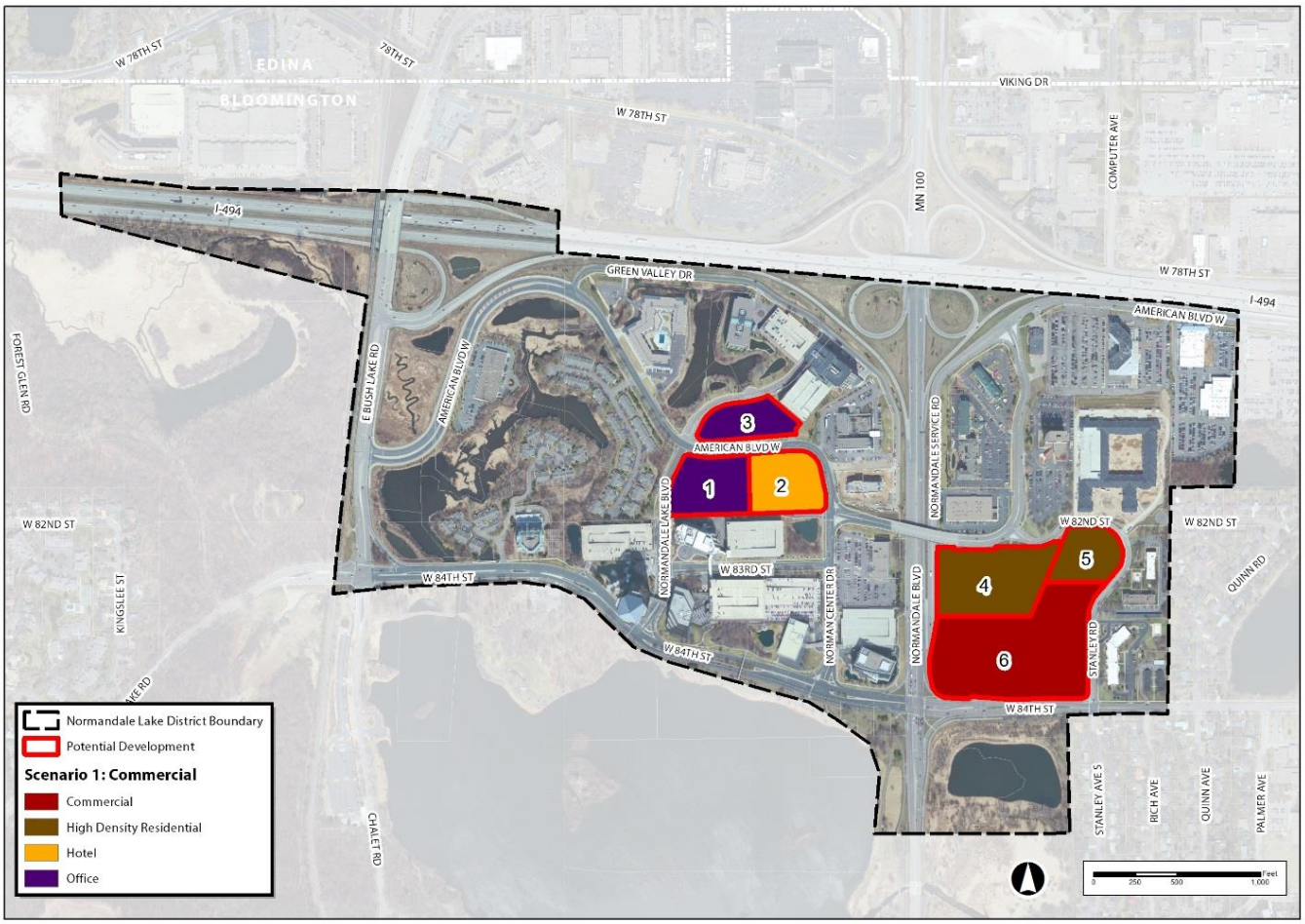


Table 2: Changes from 2008 Assumptions – Commercial Scenario

Use	Total Amounts	Percent Change from 2008 Assumptions
Residential	963 d.u.	+31%
Commercial	351,548 SF	-18%
Hotel	1,255 Hotel Rooms	+40%
Office	3,398,876 SF	-10%

2040 Mixed-Use Scenario

1. Net increase of 172 HDR d.u. (assumed 50 d.u. per acre)
2. Net increase of 257 hotel units (2009 approved PD)
3. Net increase of 200 HDR d.u.[2] (assumed per interest in parcel)
4. Net increase of 92 HDR d.u. (assumed 32 d.u. per acre similar to Covington/Luxembourg)
5. Net increase of 45 HDR d.u. (assumed 32 d.u. per acre similar to Covington/Luxembourg)
6. Net increase of 78,000 SF of commercial for entire area
7. Net increase of 409 HDR d.u. and net decrease of 265,658 SF of office (assumed 50 d.u. per acre)

[2] Since this plan has started, site #3 has been developed as a 179 unit high density residential building.

Figure 9: Mixed-Use Scenario

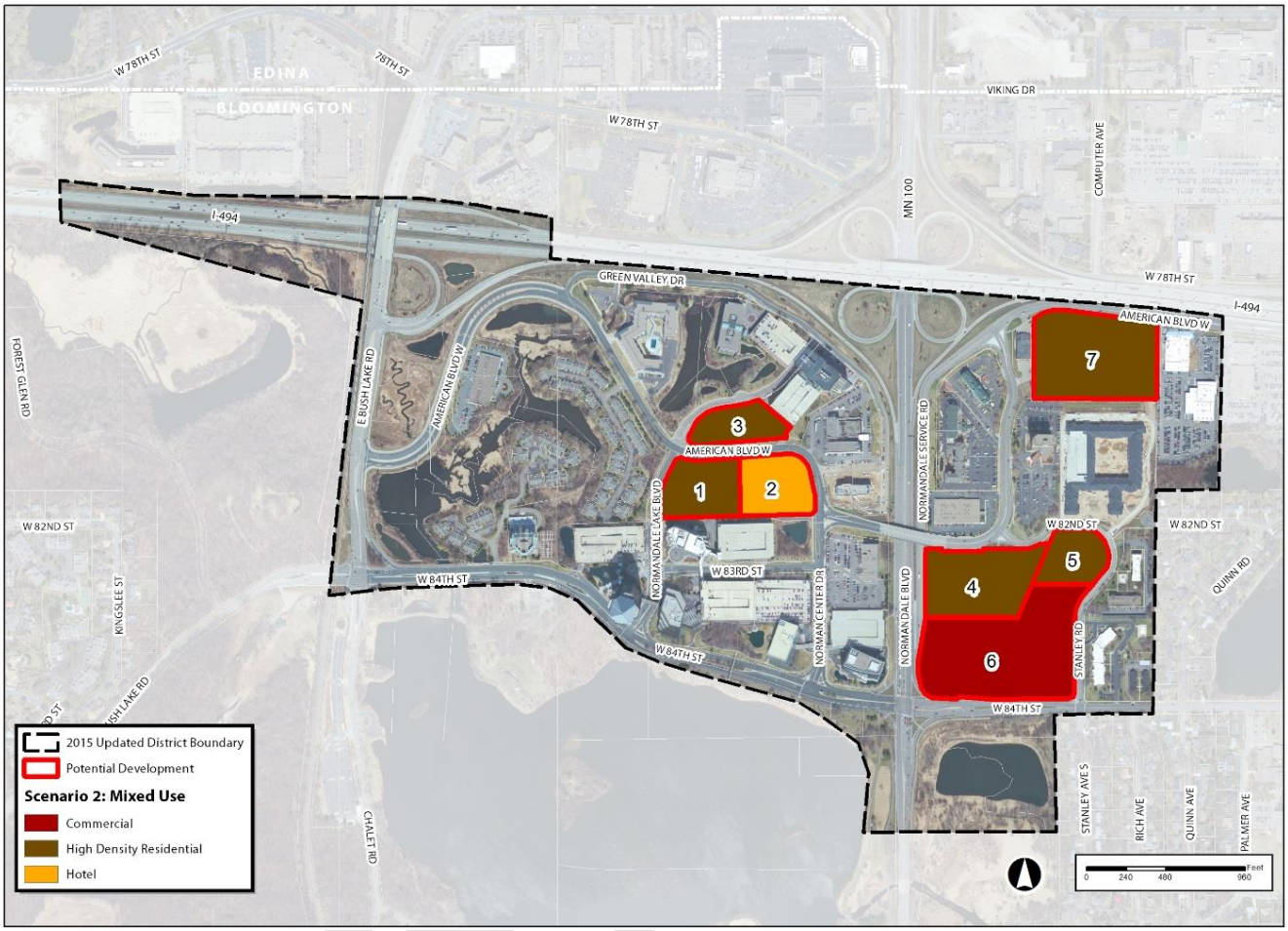


Table 3: Changes from 2008 Assumptions – Mixed Use Scenario

Use	Total Amounts	Percent Change from 2008 Assumptions
Residential	1,836 d.u.	+149%
Commercial	351,548 SF	-18%
Hotel	1,255 Hotel Rooms	+40%
Office	2,546,218 SF	-33%

These scenarios represent an array of development that may occur. Commercial and office uses tend to have greater impacts on traffic whereas high density residential tends to have a greater impact on sanitary sewer and water. The market for office and residential is in flux. Even as this plan was updated new development has occurred. Site number three (8101 Normandale Lake Boulevard) as described will have 179 units of residential. While this is different from the Commercial Intensive scenario it is in line with the Mixed Use Scenario. This plan uses the two scenarios or a combination of both to ensure that a range of development can be adequately served by city infrastructure.

Land Use and Zoning Recommendations

No amendments to either land use or zoning are proposed with this update. The 2008 NLDP recommended zoning and land use changes that were put into place and can sufficiently accommodate the uses described in the two land use scenarios.

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The 2008 NLDP identified several parcels to be reclassified and rezoned. In some cases it was to rectify inconsistent land uses such as areas classified for office despite being used as conservation and water retention. In other cases land was rezoned and reclassified to accommodate future development demand. Outdated zoning districts were replaced with recently updated zoning districts to better accommodate redevelopment efforts in the District.

Urban Design

Progress Since 2008

Design guidelines for the Normandale Lake District were created and adopted in 2009 as recommended in the 2008 NLDP. These design standards were outlined on pages 5.22 – 5.29 of the 2008 NLDP. A full design plan was created for implementing streetscaping improvements. These improvements were designed to expand the park-like character of the District; one of the key plan goals. These guidelines also helped achieve the objectives to maintain and enhance the public realm, ensure visual and functional continuity, create a distinct district identity, and emphasize quality, comfort, and safety.

Plantings, transit stops, and wayfinding signage were designed and installed in accordance with the 2008 NLDP recommendations. Figure 10 illustrates where the improvements described in Table 4 were implemented. Most of the urban design and streetscaping elements recommended in the 2008 NLDP have been installed and have helped strengthen the identity of the District.

Figure 10: 2008 Normandale Lake District Plan Completed Urban Design Projects

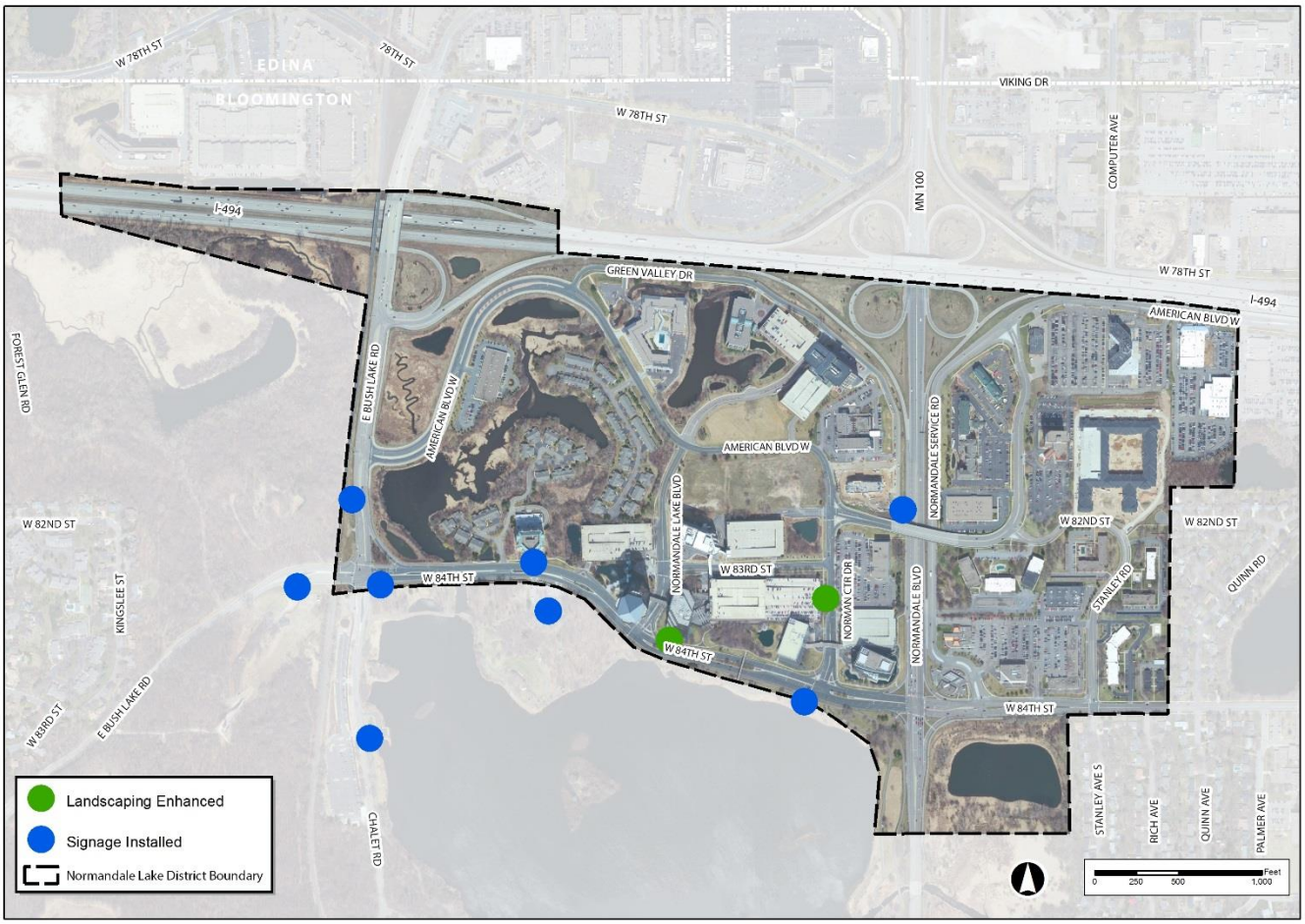


Table 4: 2008 Normandale Lake District Plan Streetscaping and Wayfinding Improvements

Streetscape Enhancements	
Design and construct short term urban design with 2008 planned projects	Completed in 2009
Wayfinding Signs	
Coordinate sign design with Three Rivers Park District, MnDOT, Hennepin County	Completed in 2009
Design wayfinding signs, District street signs, and prepare implementation program	Designed in 2009
Fabricate and install wayfinding signs	Completed in 2009

Other Considerations

The comprehensive nature of the streetscape enhancements and signage program have helped to develop the District's sense of place. The design standards have and will continue to enhance the streetscape as new developments and redevelopments come online. There are several new developments that should be incorporated into the wayfinding sign system. As street level projects are completed it will be important to build upon the branding efforts and expand the streetscaping elements.

Normandale Lake District Kiosk

The map kiosks need updating as new development has occurred.

Recommendations

Many of the projects were completed shortly after the 2008 NLDP was adopted. As a result some of the streetscape features are in need of updates and general maintenance. These updates are mostly short term projects that are easily completed and relatively inexpensive. Additionally, some streetscaping features will require design and construction and are considered future projects. These new elements will be identified as needed as development occurs in the District. These streetscape enhancements benefit all users and support the vision and goals for the District. Recommended upgrades include:

- Update wayfinding signage maps of the District. The aerial photo used for the signs needs to be updated with a current aerial photo and landmarks identified.
- Landscaping at West 84th Street and Normandale Boulevard is recommended. This area has recently been improved for pedestrians with a newly constructed sidewalk. Adding plantings will create a more pleasant environment for pedestrians and help enhance the District's entrance.
- Review remaining streetscaping projects to construct in conjunction with the District's design plan. This could include installing additional trees, lighting, repairing sidewalks, adding new pedestrian connections and installing additional planted medians.

Corner of West 84th Street and Normandale Boulevard

Landscaping can help create a more inviting atmosphere for pedestrians

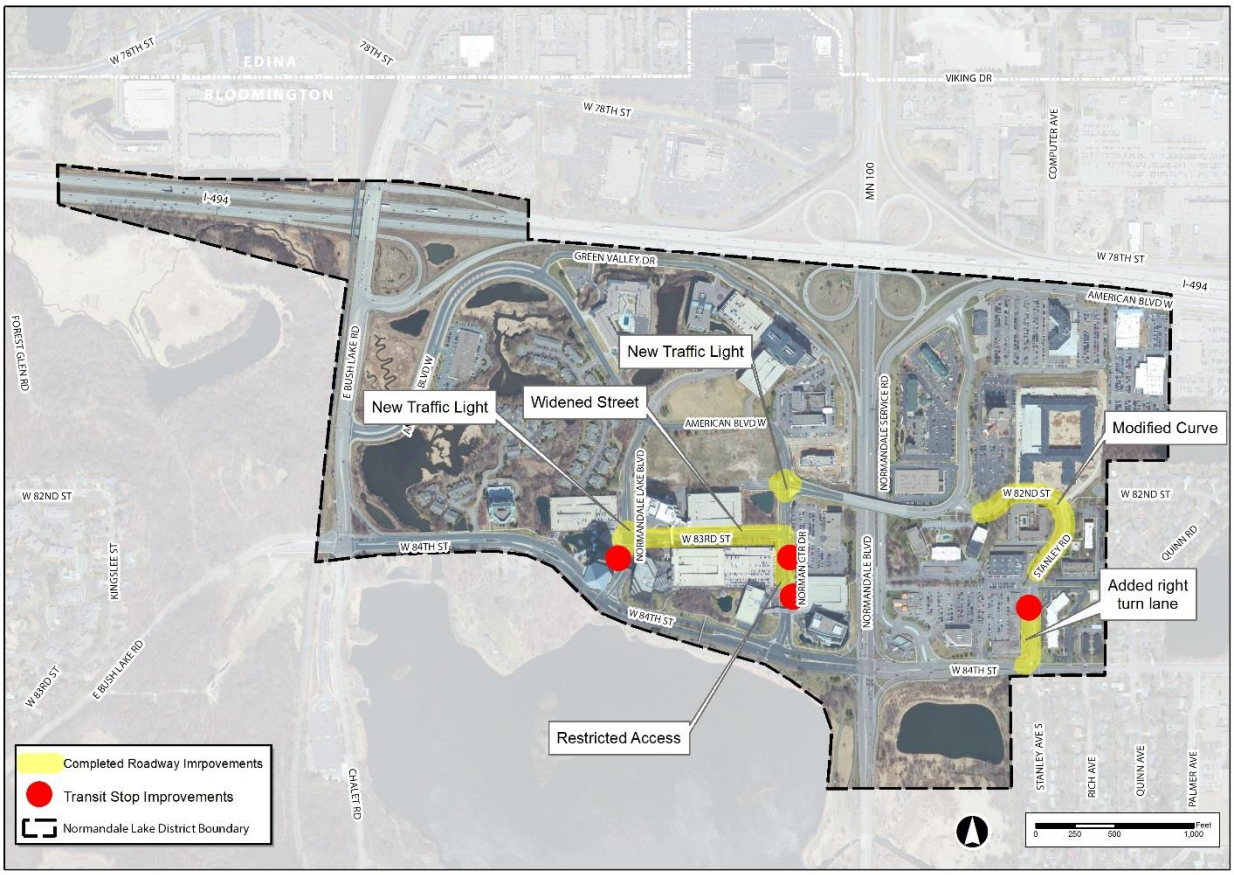
SIDE BAR

The 2008 NLDP highlighted the importance of streetscape elements in creating a sense of place. Various elements were designed to create a cohesive visual environment that enhances the park-like feel of the District and facilitates wayfinding.

Movement and Circulation Patterns

A major consideration of the 2008 NLDP was transportation, both internal to the District and to the Region. With land projected to be utilized for high density office uses the District was forecast to generate a high volume of peak-hour traffic. Recommendations from the 2008 NLDP centered on road and circulation improvements, transit improvements, and bicycle and pedestrian improvements, which can be found on pages 5.15-5.17 and 5.20-5.22 of that document. The location of completed projects is shown on Figure 11. The project status and impacts are explained by project type in the following section.

Figure 11: 2008 Normandale Lake District Plan Completed Transportation Projects



Roadway Improvements Progress

Most of the 2008 NLDP recommended road improvement projects were completed as originally proposed. A summary of the improvements completed is provided in Table 5. The 2008 NLDP identified the need for reconstruction of the West 84th Street and Normandale Boulevard intersection. The intensity of proposed land uses (particularly high density office) and the limited options to access the regional road system (e.g., I-494 and Hwy 100) resulted in a recommendation for a triple left turn lane at this intersection. This would bring the intersection from a projected unacceptable Level of Service (LOS) F to an acceptable LOS D. However, since then, another solution arose that would enhance access to I-494. An inverted loop providing westbound access to I-494 from East Bush Lake Road will shift trips

away from the West 84th Street and Normandale Boulevard intersection. This reduces congestion at the intersection sufficiently to alleviate the need for reconstruction and expansion.

Other improvements completed to improve traffic flow include: modifying and widening roadways, adding traffic signals, adding a right turn lane, and converting a road to one-way. These improvements improved internal vehicular movement throughout the District.

Norman Center Drive

Converted to One-Way to improve traffic operations

Table 5: 2008 NLDP Roadway Improvements

Road Improvements	
Widen W. 83rd St.	Completed 2009
Install access restriction on Norman Center Dr. between W. 83rd St. and W. 84th St.	Completed 2009
Install signal at American Blvd. and Norman Center Dr.	Completed 2009
Install signal at W. 83rd St. and Normandale Lake Blvd.	Completed 2009
Modify curve at W. 82nd St. and Stanley Rd.	Completed 2009
Add right turn lane (SB) and signal modification on Stanley Rd. and W. 84th St.	Completed 2009
Apply for grants for intersection	Attempted but unsuccessful
Reconstruct intersection of W. 84th St. and Normandale Blvd.	Deleted

Other Considerations

A traffic study was conducted in 2015 to study the traffic implications resulting from shifts in land use and construction of the East Bush Lake Road access to westbound I-494. The traffic study modeled the commercial scenario and mixed-use scenario outlined in the land use section of this plan for the years 2018 and 2040. Generally, the commercial scenario results in higher volumes of peak hour traffic while the mixed-use scenario has lower peak hour traffic. This is because residential uses in the mixed-use scenario tend to generate trips that go in the opposite direction during peak hours than employees working in the offices. The land use scenarios are expected to generate the following additional trips compared to existing conditions:

Table 6: Year 2040 Traffic Volumes

Scenario	A.M. Peak Hour	P.M. Peak Hour	Daily Trips
Commercial Scenario	930	1,402	11,624
Mixed-Use Scenario	564	966	11,827

Results of the year 2040 operations analysis indicate that all of the intersections studied are expected to operate at an acceptable overall LOS D or better during the A.M. and P.M. peak hours, with implementation of the recommended improvements under year 2018 conditions. This was similar in operation to the 2008 recommendations which did not include the westbound I-494 on-ramp at East Bush Lake Road. However, the 2015 traffic study identified an issue at West 84th Street and Normandale Service Road intersection. This intersection is expected to operate LOS F for both peak hours under both land use scenarios. The study identified a series of recommendations that will help improve overall operations in the District. The full study can be found in Appendix B.

Roadway Improvements Recommendation

Given shifts in land use and traffic patterns the list of roadway improvements and priorities needed to be updated. The construction of westbound on-ramp to I-494 at East Bush Lake Road will shift priority away from the West 84th Street and Normandale Boulevard intersection improvement. Additional treatments are also recommended to improve internal circulation for vehicles and pedestrians/bicyclists. The updated list of roadway improvements includes:

- Construct westbound ramp to I-494 at East Bush Lake Road. Funding has been secured to proceed with construction in 2017-2018. This project reduces 2040 projected congestion at West 84th Street and Normandale Boulevard, eliminating the need for improvements at that intersection.
- Add left turn restrictions signage during peak times at West 84th Street and Normandale Service Road. This intersection was shown to operate at a LOS F during peak hours which is not acceptable under normal conditions. To address this issue and help with circulation, consideration should be given for restricting left turns during peak periods of 7:00 A.M. to 9:00 A.M. and 4:00 P.M. to 6:00 P.M. Although it will not completely resolve the issue, it will reduce delays.
- Signal timing modifications are recommended on East Bush Lake Road, Norman Center Drive, American Boulevard, Normandale Lake Boulevard, and West 84th Street. These could potentially include a leading pedestrian signal that provides time for pedestrians to enter the intersection before vehicles.

- Extend the median on the north side of Normandale Lake Boulevard and American Boulevard intersection. The median located on Normandale Lake Boulevard ends before it reaches the intersection which can cause issues for turning vehicles. This could be completed by the property owner as development occurs.
- Adjust western curb line south of West 83rd Street along Norman Center Drive to improve compliance with one-way operations. Norman Center Drive was not originally designed to be a one way. It was converted to improve traffic operations at West 84th Street. This improvement would help complete the conversion and create addition green space to enhance the park-like character with potential use for events in the District.
- Install signal at American Boulevard and Normandale Lake Boulevard. This intersection is located adjacent to the District's two vacant development sites and near the entrance to the Normandale Lake Townhomes. As these sites are developed, additional traffic will be generated which may warrant a signalized intersection. To assist operation of a signalized intersection a right turn lane should be constructed. Signal construction and operation costs will need to be shared between the private developments to the north since the northern leg of the intersection is a private road.

Median at Normandale Lake Boulevard

The median should be extended closer to intersection and when development occurs the intersection may warrant a signal.

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Traffic congestion relief was the driving force for major improvements in the 2008 NLDP. Shifts in land uses and providing westbound access to I-494 from East Bush Lake Road have changed traffic patterns and thus, the District's roadway needs. An updated traffic study has shifted investment priority from major improvements at the intersection of Normandale Boulevard and West 84th Street to smaller improvements at other areas throughout the District.

Bicycle and Pedestrian Progress since 2008

The 2008 NLDP recommended trail and sidewalk improvements to facilitate pedestrian and bicycle connections throughout the District as described in Table 7 below. In coordination with streetscaping most trail and sidewalk projects were installed except along a few remaining parcels that do not have a trail or sidewalk connection.

A pedestrian bridge over Normandale Boulevard was required as part of the West 84th Street and Normandale Boulevard intersection improvements. To keep the intersection operating at optimal levels for traffic flow (i.e., LOS D or better), at-grade pedestrian crossings needed to be removed from the intersection. This included removing sidewalks along West 84th Street to discourage pedestrian movements and enhancing access through the Nine-Mile Creek underpass below Normandale Boulevard. The pedestrian bridge and underpass improvements were not completed because intersection improvements were not required, as discussed in the previous section. However, since 2008, improvements to the intersection, including sidewalks, were added to provide better pedestrian accommodation. The median at Normandale Service Road at West 84th Street was also extended to create a refuge island for pedestrians.

Table 7: 2008 Normandale Lake District Plan Pedestrian Bridge Improvements

Normandale Boulevard Pedestrian Bridge	
Design and construct pedestrian bridge	Not Required
Work with MnDOT to integrate east ramp approach into berm around Goldman Pond	Not Required
Work with Three Rivers Park District to integrate west ramp with park trails	Not Required
Trails	
Work with MnDOT to develop a plan for trails around Goldman Pond connecting to creek underpass tunnel	Not Completed
Improve sidewalk/trail on American Blvd. Bridge	Not Completed (Bridge was not Reconstructed)
Remove sidewalks on W. 84th St. at Normandale Blvd.	Delete

Other Considerations

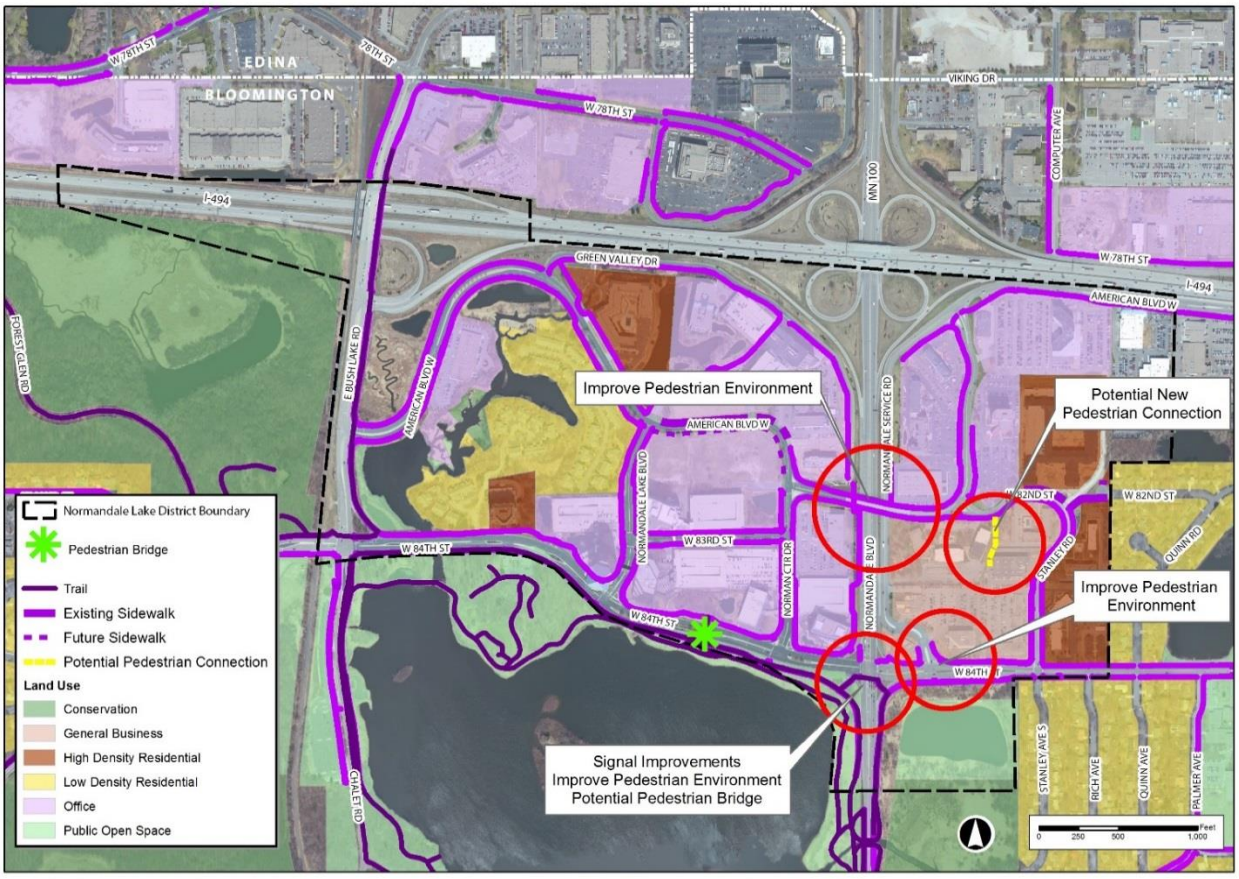
The installed trails and sidewalks created an extensive pedestrian network throughout the district. However, despite the improvements, wide roadways, wide turning radii, and fast vehicles continue to

impede pedestrian movements. These features deter pedestrian and bicycle access. Improvements can be designed to help enhance existing connections and create an inviting pedestrian experience. For example, sidewalks were installed in the islands at the corner of West 84th Street and Normandale Boulevard. However, despite being safer for pedestrians the crossing still connotes a space intended for vehicles not pedestrians. Minor improvements such as rapid flashing beacons or plantings in the island can soften the space and signal to vehicles that this spaces is intended for pedestrians.

As the District has grown in employment and residents it is important to encourage walking and biking to nearby destinations and discourage unnecessary vehicular trips that cause congestion. Both development scenarios project growth to continue which will likely result in more vehicle trips to and from and within the district. Vehicular congestion can be reduced through encouraging alternative transportation modes, especially for short trips that do not require a vehicle.

Redevelopment of the commercial areas will benefit from improved pedestrian and bicycle connections. Convenient pedestrian and bicycle access to office and residential uses benefit the commercial businesses. Similarly, residents and employees will benefit from improved access to commercial areas as well as the various parks and amenities in and adjacent to the District.

Figure 12: 2008 Normandale Lake District Plan Pedestrian Improvements



Pedestrian Bridge

Much of the need for the pedestrian bridge that was proposed in the 2008 plan was driven by the need for triple left turn lanes, but those are no longer necessary. However, the intersection still remains a barrier to pedestrians and bicyclists. These roadways are wide, carry a large number of vehicles, and can be difficult to safely navigate. Pedestrians and bicyclist would benefit from an improved crossing experience at this intersection and an elevated pedestrian crossing.

Important pedestrian destinations are Normandale Lake and the retail center on the east side of Normandale Boulevard. The office park, townhomes, condos, apartments, and hotels in the northwest quadrant of Normandale and 84th Street can utilize the existing pedestrian bridge over 84th Street, as well as the at-grade crossings of 84th Street to gain access to Normandale Lake Park. The northwest quadrant, however, does not have convenient and safe pedestrian access to the retail center east of Normandale Boulevard. The current crossings are the existing at-grade crossing of Normandale Boullevard/TH-100 and the existing American Boulevard bridge over TH-100. When redevelopment occurs on the east side of Normandale Boulevard, a pedestrian bridge or skyway connecting building or parking ramps north of 84th Street should be studied.

For access to Normandale Lake Park for those crossing on the south side of the intersection of 84th Street and Normandale Boulevard, there is an underpass south of the district at Normandale Boulevard along Nine Mile Creek. This underpass is in need of upgrades to enhance the user experience. The underpass is a quarter mile south of the intersection, which is not convenient for those traveling east and west on 84th Street. The sidewalks are frequently flooded and the pavement is beginning to deteriorate.

Underpass at Nine Mile Creek under Normandale Boulevard

The underpass is located a quarter mile south of West 84th Street and Normandale Boulevard. This picture highlights how high the water can get on a normal afternoon.

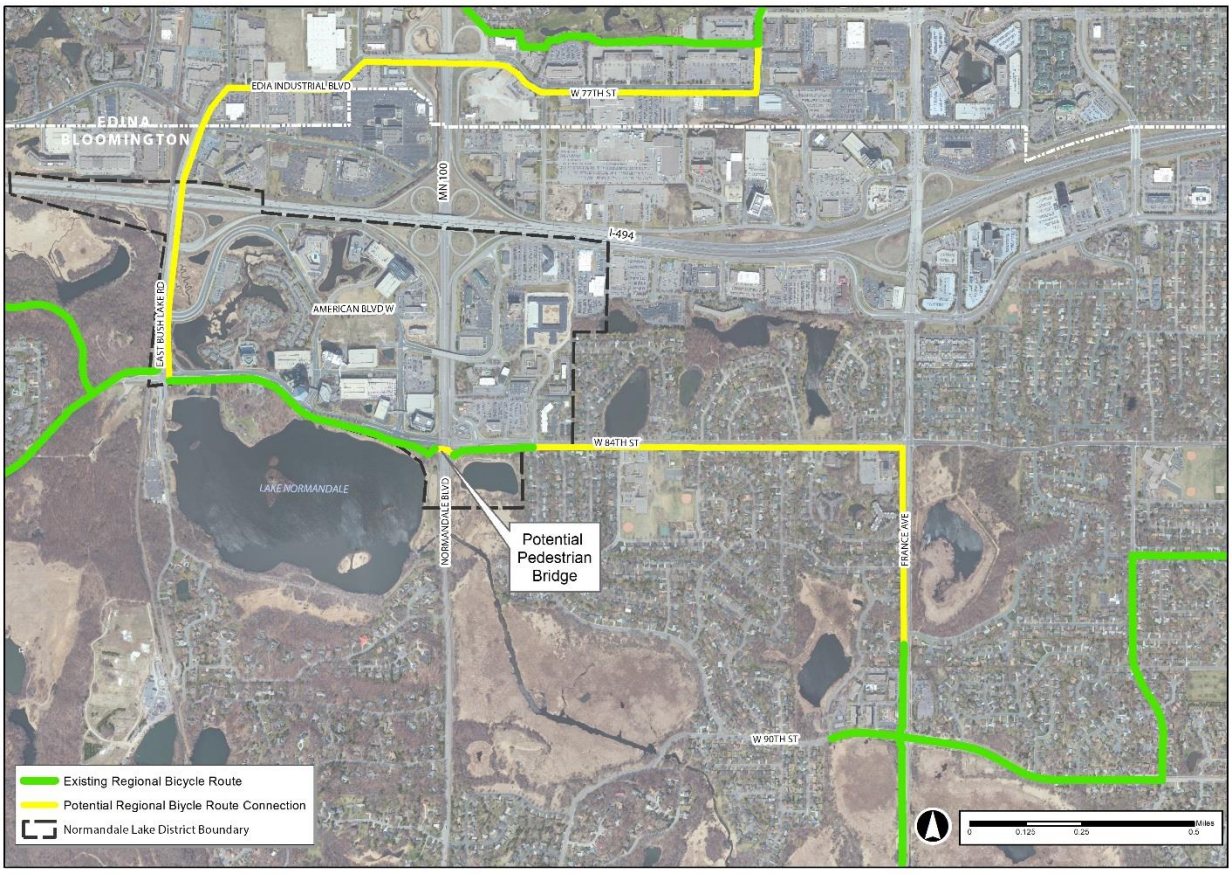
Underpass condition

The underpass is in need of upgrades. Water often creeps above the embankment and has started to deteriorate the pavement.

An east/west pedestrian bridge can provide a more direct connection over the intersection. However, because of the limited right of way the cost of the bridge is high. Additionally, to comply with the Americans with Disabilities Act (ADA), the bridge would either be a switchback style bridge or helix style on the approaches. The added approach lengths could create an inefficient route if it's perceived to take walkers longer than crossing at street level. Additional study will be needed to determine the appropriate placement and style of a pedestrian bridge.

A pedestrian bridge at this location has potential to create a regional bicycle network connection. If a bicycle connection can be made along East Bush Lake Road and Edina Industrial Boulevard to Nine Mile Creek Trail there is potential to connect to the multiuse trail along France Avenue. West 84th Street has been identified as a Tier 2 Alignment for the Metropolitan Council's Regional Bicycle Transportation Network. This potential to link regional trails makes the bridge attractive for grant opportunities which could assist in funding the bridge.

Figure 13: Potential Regional Bicycle Route Connection



American Boulevard

American Boulevard runs east and west providing the main connection throughout the district. Sidewalks are available however there is not a dedicated bikeway. Furthermore, the bridge over Normandale Boulevard, while functionally safe, is underutilized. The corridor has opportunity to be an east-west multimodal thoroughfare.

The City's Alternative Transportation Plan identifies American Boulevard as a potential bikeway. It recommends an off-street bicycle facility. While long-term efforts will continue to support the installation of an off-street bicycle facility in the short-term there is potential for on-street bike lanes. Today's traffic volumes suggest that there is potential to install bike lanes and reconfigure the roadway. A reconfigured roadway could improve safety for vehicles and pedestrians by reducing the number of conflict points and increase sightlines. A comprehensive multimodal study of American Boulevard should be considered before such a conversion as new developments are expected to come online increasing traffic volume. The study should identify a short term and long term recommended improvements to improve pedestrian and bicycle access while ensuring safe travel for vehicular traffic.

Additionally, it is important to promote pedestrian usage of the American Boulevard Bridge. This connection offers the same walking distance and time for the office buildings west of Normandale Boulevard to the commercial center to the east. Promoting this could sway those to take the safer route rather than crossing at West 84th Street. Wayfinding signage, public art, and railings can entice those on the west to use the existing overpass. Furthermore, there might be potential for an easement to allow pedestrians more direct access to the commercial center through the Normandale Lake Estates' common space. This route would provide a pedestrian shortcut benefiting the surrounding office, hotel, residential, and commercial uses.

Easement potential

A hotel occupant was observed cutting through the Normandale Estates' property to access the commercial center.

American Boulevard Bridge over Normandale Boulevard

Bridge looking west over Normandale Boulevard.

Bridge looking east over Normandale Boulevard

Recommendations

The most significant pedestrian/bicycle improvement recommended in the 2008 NLDP was the pedestrian bridge over Normandale Boulevard at West 84th Street (see Figure 12). However, it was not constructed and is no longer required. Sidewalk improvements were combined with streetscape enhancements to create a park-like feel in the District. However, better pedestrian and bicycle accommodations are needed to truly make the District walk/bike friendly. Opportunities exist to improve pedestrian safety and enhance the pedestrian experience. Additionally, pedestrian and bicycle circulation can be improved through construction of new sidewalks and trails and improvements to existing bridges. Studies should also be conducted to assist in determining additional pedestrian and bicycle connections both internally to the District and to the Region.

Safety and Improved Pedestrian Experience

- North side of West 84th Street and Normandale Boulevard pedestrian crossing improvements including:
    - Install new curb ramps and pedestrian actuated signals to meet ADA standards
    - Remove section of median that encroaches into crosswalk.

  These improvements will enhance safety for all users.
- Consider installing a rectangular rapid flash beacon (RRFB) to warn drivers of potential pedestrians crossing at southbound right turning movement off of Normandale Boulevard. This could help calm traffic which could provide a safer environment for pedestrians to cross.
- Evaluate the benefit of adding an island between the two northbound lanes at West 84th Street and Normandale Service Road. The street is wide for pedestrians to cross.
- Improve sidewalk and trail on American Boulevard Bridge over Normandale Boulevard. Consider adding public art or other enhancements to the bridge to create a gateway effect and enhance the pedestrian experience.
- Improve pedestrian crossing on the south side of West 84th Street and Normandale Boulevard to create a safer more pedestrian friendly environment.
- Install lighting at the existing pedestrian bridge over West 84th Street.

Improved Connection

- Fill gaps in the sidewalk network. A sidewalk should be installed along the south side of American Boulevard when the adjacent property ("Jostens's site") develops.
- Rehabilitate existing abutments on pedestrian bridge over West 84th Street. The bridge is in need of rehabilitation.
- East Bush Lake Road bicycle and pedestrian connection between Normandale Lake Park (Hyland-Bush-Anderson Lakes Regional Park Reserve) and Nine Mile Creek Regional Trail in Edina.
- Explore potential to create a sidewalk connection on the west side of Normandale Service Road from Hilton/Pacer Center area south toward West 84th Street.
- Implement Alternative Transportation Plan project recommendations and regional trails such as the American Boulevard off road trail.
- The pedestrian bridge over Normandale Boulevard at West 84th Street while no longer required, should be retained as a potential future, long-range project to facilitate a safer environment for pedestrians and bicycles.

Additional Study

- Perform baseline pedestrian and bicycle counts in the District.
- Continue to participate in Three Rivers Park District feasibility study for an East Bush Lake Road bicycle and pedestrian connection to evaluate the feasibility of a trail connection between Normandale Lake Park (Hyland-Bush-Anderson Lakes Regional Park Reserve) and Nine Mile Creek Regional Trail in Edina.
- Discuss interim pedestrian connection from West 82nd Street to Life Time Fitness with private property owners. This could significantly reduce walking distance between the east and west halves of the District and encourage more pedestrian activity.
- Work with Hennepin County to study pedestrian crossing and other potential streetscape improvements to enhance the pedestrian realm at West 84th Street and Normandale Boulevard.

SIDE BAR

Incremental improvements made in conjunction with new road and development projects have resulted in a comprehensive sidewalk and trail network. The 2008 NLDP focused on creating a needed pedestrian and bicycle connection over Normandale at West 84th Street as part of the proposed intersection improvements. Since the intersection improvements are no longer deemed necessary, the need for a pedestrian bridge is greatly reduced. Focus can be shifted towards enhancing the sidewalk and trail network and addressing existing barriers such as improving crosswalks.

Transit Progress

The 2008 NLDP focused on creating a more transit friendly environment through enhanced bus stops and improved service. Working with Metro Transit, routes have been modified to improve access and increase efficiency. The 589 Route provides express service from the District to downtown Minneapolis. Additional east/west service is provided by the 542 and 540 routes. All three routes generally operate every 15-30 minutes.

To improve the user experience two enhanced bus stops were constructed in areas that experience high ridership. The bus stop enhancements included a shelter and decorative concrete pad that matches the streetscape design. Additionally, two stops have been outfitted with a decorative concrete pad. Almost every stop directly connects to a sidewalk. This helps users navigate to and from the stops. A summary of project status is provided in Table 8 with locations shown in Figure 14.

Pictures of Transit Improvements

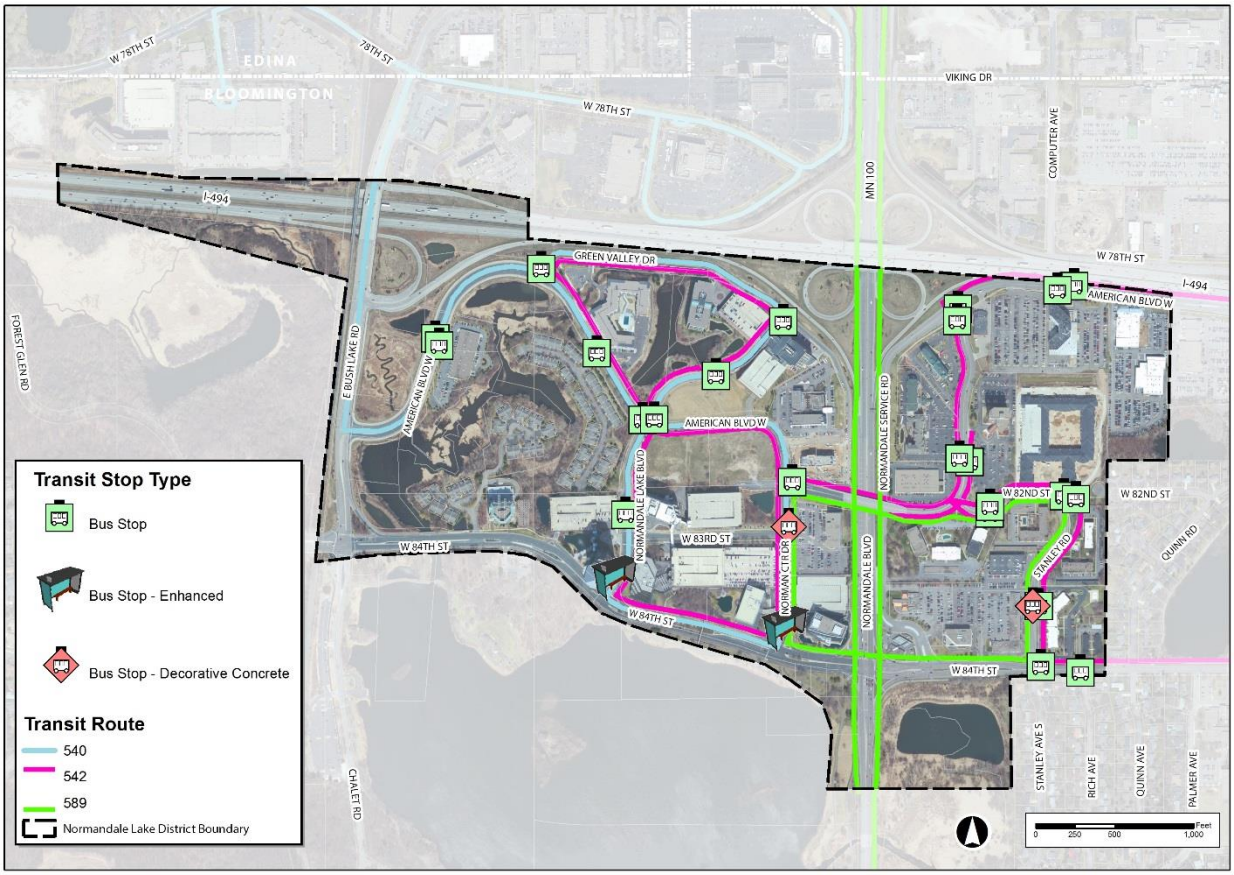
Decorative concrete pad.

Enhanced bus stop with shelter.

Table 8: Status of 2008 Normandale Lake District Plan Transit Enhancement Projects

Transit Enhancements	
Work with Metro Transit to modify routes serving the District to improve access and efficiency.	Completed
Expand AM and PM reverse commute trips between downtown Minneapolis and Normandale Lake Office Park.	Completed
Enhance design of existing bus stops. Coordinate with streetscape enhancements.	Designed and partially installed in 2009
Design and construct an enhanced transit stop to serve the east side of the District.	Designed
Work with Metro Transit to improve east-west transit service along American Blvd.	Completed

Figure 14: Transit Enhancements



Other Considerations

The District has experienced growth in residential units and is projected to continue to attract a mix of uses as it redevelops. This increased mix of uses will change transit needs. Current and future residents will demand transit service that connects them to work centers in other areas of Bloomington and the Region. Likewise, with a significant concentration of office space, the District will remain a regional employment center with workers desiring convenient transit access. The number of commuters using specific transit stops will fluctuate as new development occurs. The current locations of transit stops provide excellent access to transit. No part of the District is further than a quarter mile walking distance to a transit stop. Ridership demand is an important factor in determining what, if any, additional transit stop enhancements are recommended. Given that transit service is well distributed throughout the District the quality of transit will be an important factor to encourage transit ridership. This includes the frequency of trips as well as the quality of transit facilities (i.e. shelters, concrete pads, heaters).

Proposed transitways outside the District may have implications on transit service to the District. The construction and completion of the Orange Line Bus Rapid Transit and Southwest Light Rail may have stations that could be easily accessible to the District through coordinated transit service. Coordination with Metro Transit and Southwest Transit will be important as these projects move forward.

Recommendations

Transit needs will continue to evolve as development and redevelopment occurs. The City should continue to work with Metro Transit to improve access and promote transit ridership. Transit ridership directly contributes to a reduction in commuter congestion. To support transit, the City will continue to explore, with Metro Transit, the feasibility of Arterial Bus Rapid Transit along American Boulevard. The City should also continue its collaboration with the I-494 Corridor Commission. The Commission advocates for congestion relief of I-494 through improved transit access to important destinations along the corridor. Other improvements such as route adjustments and enhanced bus stops should be addressed as needed as the District continues to develop.

SIDE BAR

Transit plays an important role in enhancing access to the District and helping to reduce peak hour congestion. Changes to service and modifications to routes impact ridership. The City should continue to work with Metro Transit to ensure the District residents and employees are well served.

Utilities

Progress Since 2008

Sanitary sewer and water are services provided by the City of Bloomington and were reviewed as part of the 2008 NLDP. The plan found that while available water service would accommodate the anticipated growth there would likely be issues related to sanitary sewer, particularly on the east side of the District. The City has worked with the Metropolitan Council Environmental Services (MCES) to identify potential improvements to the system, which are described in Table 9. The 2008 NLDP did not find any issues or recommend projects pertaining to the water system infrastructure. The utilities section can be found on page 5.17-5.18 of the 2008 NLPD.

Table 9: 2008 Normandale Lake District Plan Utility Improvements

Utility Improvements – Sanitary Sewer	
Work with MCES and Edina to address capacity constraints in 3-BN-499 interceptor	Temporary fix done in 2009
MCES interceptor improvements	TBD by Met Council
Improvements to water and sanitary systems	None Needed

Other Considerations

Primary land use can impact the needs for different utilities. Residential uses create higher demand for sanitary sewer and water service than office uses especially during the evening. The mixed-use and commercial development scenarios were used to model sanitary and water system needs. The models show similar needs between the two scenarios for sanitary and water improvements. Redevelopment in the eastern section of the District will have the greatest impacts on the existing water and sanitary sewer systems. The results of the utility system models are explained below. Stormwater management will be addressed in the next section of this document.

Water

Water service needed to accommodate future development was modeled for the mixed use and commercial land use scenarios and found to be substantially adequate under both scenarios for commercial and domestic water use. Both scenarios, however, result in fire flow deficiencies in this area primarily because the recently opened Luxembourg Apartments uses most of the domestic capacity of the 6 inch supply lines on West 82nd Street and Stanley Road. The deficiency is more pronounced beyond the eastern boundary of the District, but is less critical because affected properties are mostly single family as compared to multifamily and commercial.

Locations with water capacity for fire protection deficiencies are illustrated on Figure 15. These are the deficiencies anticipated if all projected (2040) development occurs and no additional system improvements are made.

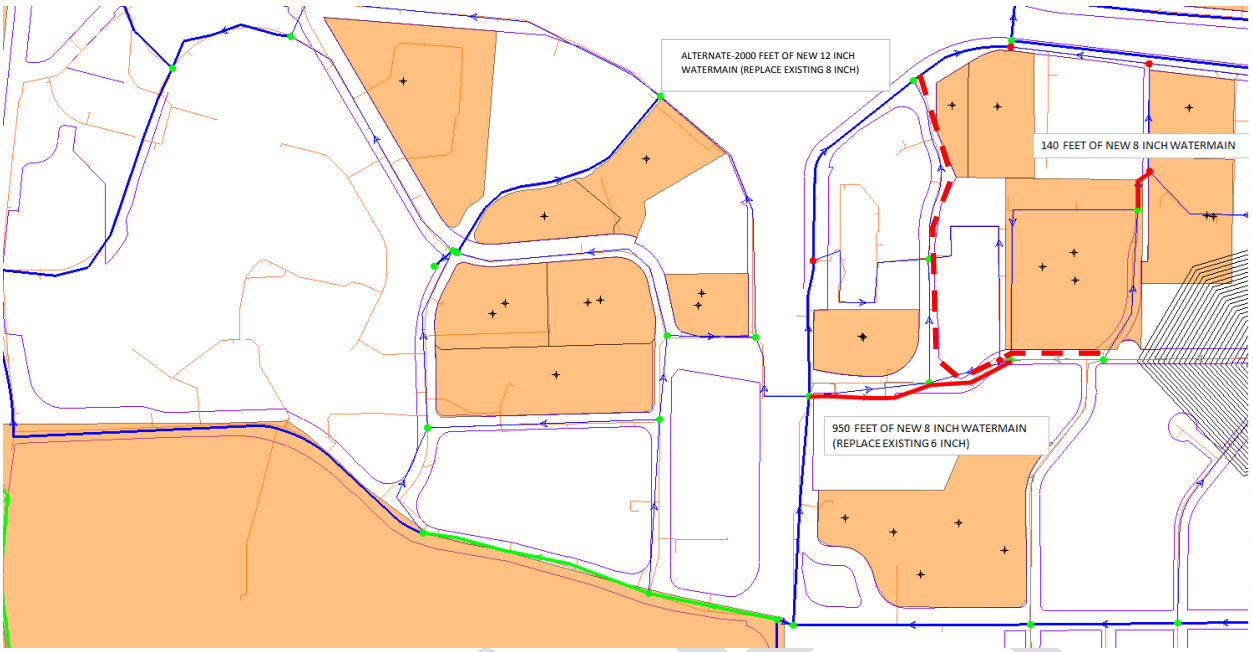
Figure 15: Year 2040 Water Capacity without Improvements

Recommendations

A minor but critical water main improvement is the completion of the link from the northwest corner of the recently completed Luxembourg development to the water main in the Stanley Road extension that connects to the 8 inch main on American Boulevard as shown in Figure 16.

New additional demand originating from development in the area bounded by Normandale, West 82nd Street, West 84th Street, and Stanley Road could be supported by a new internal private loop originating from either Normandale Boulevard or West 84th Street and connecting to West 82nd Street at the Luxembourg development or by increasing the main size on either West 82nd Street or on Stanley Road. The most efficient supply option to relieve the deficiencies would be to increase the size of the main in West 82nd Street from Normandale Boulevard to the southwest corner of the Luxembourg site. No additional development demands should be placed on the 6 inch main on West 82nd Street without upgrading it to the minimum size of 8 inches needed for higher density or commercial areas. If the water main improvements on West 82nd Street and north of Luxembourg are installed, the fire flow for the District is fully compliant as shown in the model results in Figure 16.

Figure 16: Year 2040 Water Capacity with Improvements



Whether the future development proceeds in accordance with the commercial scenario or mixed-use scenario, some localized water main improvements are recommended. The following infrastructure improvement projects have been identified to support both land use scenarios:

- Install 140 feet of new 8 inch water main north of Luxembourg and 950 feet of 8 inch water main replacement in West 82nd Street. This will alleviate water service issues in the eastern part of the District.
- An alternative to the 950 feet of water main replacement would be installing 2000 feet of 12 inch water main replacement concurrently with the sewer and force main work planned by the Metropolitan Council on American Blvd W. and W. 82nd St.
- Install a private loop system if it can be coordinated with potential redevelopment south of West 82nd Street.
- Continue to collaborate with the Metropolitan Council Environmental Services to improve the area's lift station and complete interceptor improvements.
- Add a 160 foot water main connection near Luxembourg Apartments.
- Upgrade the Chalet Lift Station Pumps (future project).

Sanitary Sewer

Sanitary sewer needs were also modeled under the mixed-use and commercial scenarios and both scenarios resulted in similar outcomes regarding future sanitary sewer demand. In both scenarios, the same pipe segments exceed the flow thresholds, however the mixed-use scenario was slightly worse; exceeding the commercial scenario by less than 10 percent.

Modeling indicated that several existing pipes will have peak flow levels that exceed the City's maximum threshold. The models indicated surcharging may occur.

Since the peak flow levels modeled exceed the City's threshold, the Utilities staff will continue to monitor and evaluate the actual flow during peak periods. Staff will use that information to evaluate new development and determine their impacts as they come on line. Development that contributes to excessive sewer system flow levels may need to participate in necessary system replacement costs. A potential solution is to upsize several pipes. The specific improvements are discussed below.

Recommendations

Projects in the short term and mid-term have been identified to address potential sanitary sewer needs. Modeling has identified some system deficiency when development reaches full build out in 2040. To address those issues the following infrastructure improvement projects have been identified:

- Increase sanitary sewer to 21 inches under West 84th Street between East Bush Lake Road and Normandale Lake Condos.
- Increase portions of the sanitary sewer to 15 inches under West 84th Street between Norman Center Drive and Stanley Road.

Stormwater Management

Progress Since 2008

Stormwater can impact the quality of water in lakes, streams, and rivers and in heavy rain events cause flooding of roads and even structures. The City of Bloomington addresses stormwater management through its Local Surface Water Management Plan (LSWMP). Many of the recommendations in the 2008 NLDP were to continue enforcing the City's existing stormwater management strategies and update the LSWMP. Specific stormwater improvement projects were identified in the 2008 NLDP on pages 5.18-5.19 and 6.2. Completion of these projects is on-going and is typically coordinated with road improvements or construction projects. There has not been any additional need for significant storm sewer infrastructure improvements in the District. More recent development in the area currently meets the City's LSWMP goals; while future redevelopment will be required to implement stormwater management as part of the redevelopment project. The City's LSWMP is in the process of being updated to accurately reflect the City's goals for water resource management and provide direction towards achieving those goals through policies and standards such as the incorporation of low impact design (LID) techniques.

The Normandale Lake water quality improvement project is currently under way. The City and Nine Mile Creek Watershed District are working with the Army Corps of Engineers to develop and implement lake management concepts aimed at improving the ecological function and water quality within the lake. Normandale Lake is a manmade lake created to provide flood control and protect human life and structures. The watershed area that drains to Normandale Lake is over 21,000 acres and 27% is within Bloomington. Other areas include portions of Hopkins, Edina, Eden Prairie, and Minnetonka. Due to the large urban watershed, the lake is subject to significant inputs of stormwater runoff and upstream nutrient loading. The City currently treats the vegetation on Normandale Lake with aquatic herbicides under a permit from the Minnesota Department of Natural Resources and the Corps of Engineers. During the permitting process to create Normandale Lake, a condition was placed on the lake prohibiting vegetation control on the west half of the lake. Thus, only the east half of the lake can currently be managed for aquatic vegetation. Additional restrictions limit what can be treated on the east side of the lake to 15% of the 112 acre surface area. Closely tied to water quality and overall ecosystem health is an aquatic plant population diversity. Any potential future management techniques will be centered on developing a plan for controlling invasive plant species and reintroducing and re-establishing a more diverse and expansive native plant community within the lake with the goal of improving and protecting water quality.

Table 10: 2008 Normandale Lake District Plan Stormwater Management Improvements

Stormwater Management	
Water quality and storm sewer infrastructure improvements as needed to meet City's Comprehensive Surface Water Management Plan (CSWMP) goals, NPDES MS4 permit requirements or TMDL implementation plan requirements	No particular projects to note
Normandale Lake Water Quality improvement project	2018-2019
Update City's LSWMP to accurately reflect the City's goals and policies for water resource management	2016-2018

Other Considerations

Policies provide an effective tool for stormwater management and are typically realized during site design. The 2008 plan identified several policy improvements that the City is currently working on. These include best management practices for LID techniques, evaluation of stormwater as part of the project application review, and requiring stormwater management plans in coordination with project approval. Since the development of the NLDP, both development assumptions and stormwater management requirements have changed. In 2015, Section IV of the LSWMP was amended to include additional requirements for post construction stormwater runoff management including: promoting green infrastructure techniques, additional volume control requirements, infiltration area restrictions, and long-term maintenance. Regardless of land use, development sites are required to be designed to appropriately accommodate anticipated stormwater quantity and also address water quality.

Recommendations

Stormwater management is required as part of each site design regardless of land use. Policy has helped guide the standard design principles that are required for site level stormwater management. No major upgrades to stormwater infrastructure have been identified to accommodate forecast development in the District. Recommendations to better manage stormwater include:

- Continue to improve and update the City's Local Surface Water Management Plan to include promoting green infrastructure techniques, additional volume control requirements, infiltration area restrictions, and long-term maintenance.
- Collaborate with the Nine Mile Creek Watershed District on water quality improvement efforts for Normandale Lake.

Normandale Lake

Normandale Lake is a shallow lake with abundant aquatic plant growth, including Curlyleaf Pondweed, which is an aquatic invasive species.

Projects outside of the District

Progress Since 2008

Several projects were identified as part of the 2008 NLDP that were outside of the study area boundary. These projects helped to alleviate traffic issues, create a sense of place when entering the District, and supported efforts to create a welcoming environment around the District's boundaries. Nearly every project recommended in the 2008 NLDP has been completed or is under construction (see Table 11). One exception is the westbound I-494 Entrance ramp off East Bush Lake Road, which was not included in the 2008 NLDP as funding was deemed very speculative at the time. That project has now been fully funded and will start construction in 2018. As noted previously, the ability to implement this project is one of the key drivers of this update as it has significant impacts on traffic flow and congestion, and alleviates the need for major reconstruction of the intersection of West 84th Street and Normandale Boulevard.

Table 11: 2008 Normandale Lake District Plan Other Improvements Outside the District

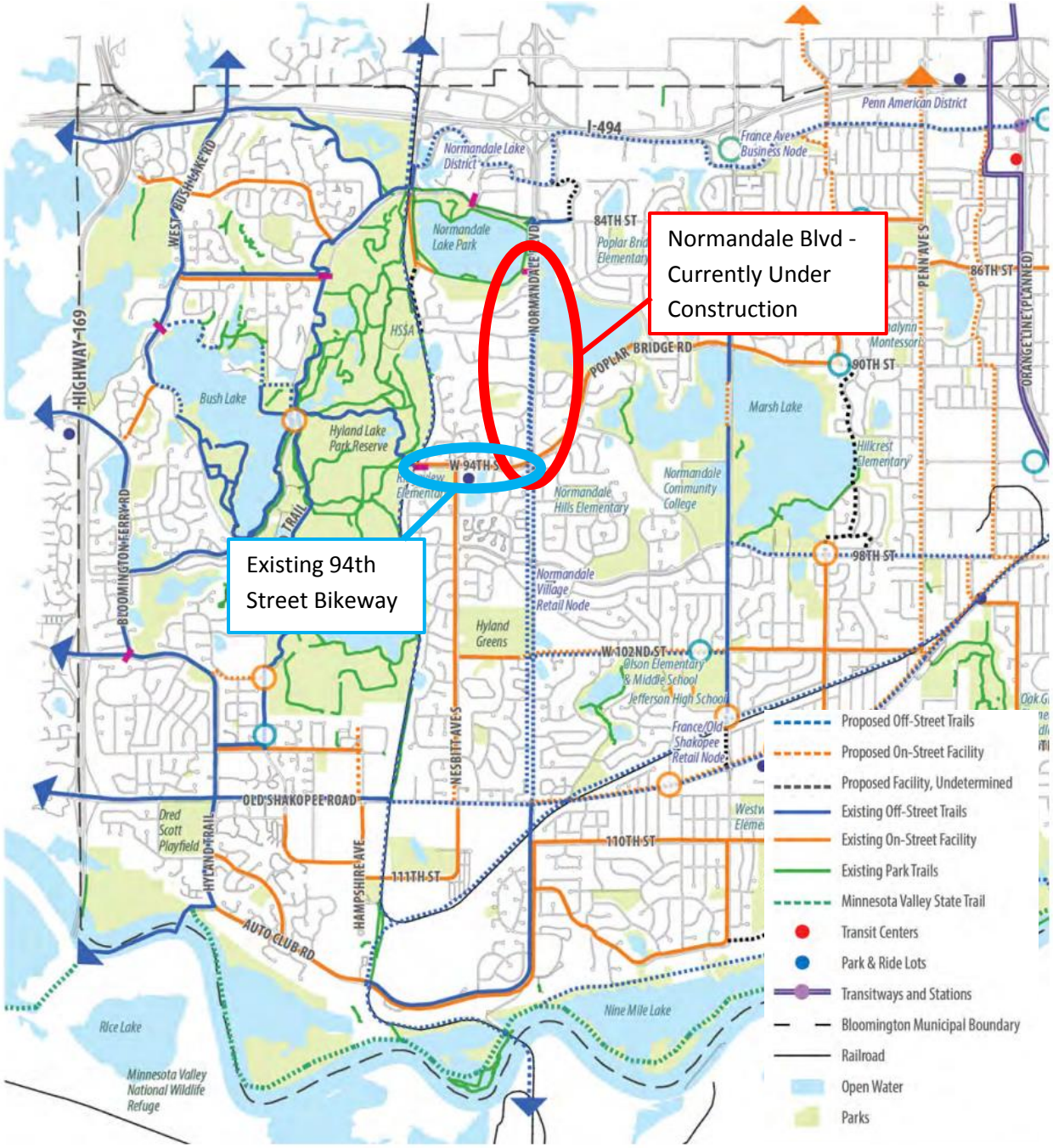
Outside the District Improvements	
Construct median in Normandale Blvd. between Nine Mile Creek and 94th Street to create protect turn lanes	Under Construction
Identify traffic management measures for residential area south of W. 84th St., east of Stanley Rd.	Completed
Install traffic calming measures in neighborhood south of W. 84th St., east of Stanley Rd.	Completed
Construct access ramp to WB I-494 at E. Bush Lake Rd.	2018
Remove house on Sharrett property (north side of Normandale Lake)	Completed
Miscellaneous path improvements and maintenance in Normandale Lake Park	Completed
Design and install kiosks and identification signs in Normandale Lake Park	Completed

Normandale Lake District Sign

This sign incorporates the district brand while directing to amenities outside the district.

Additionally, an off road multiuse trail has been included as part of the construction along Normandale Boulevard south of the District. This trail will connect the District's trail network to the West 94th Street Bikeway. The west 94th Street Bikeway provides an east-west connection into Hyland-Bush-Anderson Lakes Regional Park Reserve to the west connecting to the Normandale Boulevard Trail. It is a major east-west bikeway. The Normandale Boulevard Trail is included in the City's Alternative Transportation Plan (ATP) and will eventually connect with the completed trail segment south of W. Old Shakopee Road that turns west along Auto Club Road and provides access to the Minnesota River Valley. It is identified as a Community Corridor which provides intra-city connections to local destinations in the city as well as access to regional trails. Local destinations may include recreational, institutional, and commercial uses, as well as transit facilities, all of which are found in the District.

Figure 17: Alternative Transportation Plan Proposed Projects



Additional Considerations

The District boundary was expanded for this update to incorporate the I-494/East Bush Lake Road interchange. However, there are still areas outside the District that are impacted by development in the District. Most notably is East Bush Lake Road north of I-494. The additional I-494 entrance ramp will generate traffic and impact the adjacent road network.

Similarly projects outside the District may impact the District. An example being the newly constructed Nine-Mile Creek Regional Trail. This trail runs east and west just north of the District in Edina. The close

proximity to the District and Hyland-Bush-Anderson Lakes Regional Park Reserve could potential increase bicycle and pedestrian traffic. East Bush Lake Road provides the nearest connection over I-494 to connect to the Nine Mile Creek Trail. Signs that this will become an informal route.

Recommendations

Projects outside the District can influence the District and similarly projects inside the District have influence outside the District. Projects that influence the area include the Nine-Mile Creek Regional Trail, American Boulevard Corridor Study, and East Bush Lake Road On-Ramp.

The Nine-Mile Creek Trail Regional Trail will connect the Minnesota Valley Refuge to Hopkins through Bloomington, Richfield, Minnetonka, and Edina. Segments have been completed in Edina just north of the District. East Bush Lake Road has potential to become a popular bike route connecting to the trail. Pedestrian and bicycle movements should be monitored. Additional safety considerations might become necessary if there is a significant increase in pedestrian and bicycle travel.

There is potential to make a formal connection from the Nine-Mile Creek Regional Trail to the District and Bloomington's trails. This will provide regional bicycle access to the District from neighboring communities to the north. A feasibility study for connection between Hyland-Bush-Anderson Lakes Regional Park Reserve is recommended.

Bicyclist on East Bush Lake Road

These bicyclists were observed riding on East Bush Lake Road trail west of Chalet Road along East Bush Lake Road over I-494 presumable to connect to the recently opened Nine Mile Creek Trail.

An American Boulevard Corridor Study is proposed to understand how best to utilize the existing corridor. American Boulevard acts as a reliever to I-494 and connects to the Penn American District and South Loop District. Preliminary traffic analysis shows potential to incorporate a multimodal approach to the corridor. Additional study is proposed to evaluate the corridor's potential.

The improved access to I-494 at East Bush Lake Road will ease traffic congestion at Normandale Boulevard and West 84th Street but will also increase traffic at East Bush Lake Road and 78th Street. As part of the construction of the on-ramp or shortly thereafter improvements should be made to the East Bush Lake Road and 78th Street. This will need to be coordinated with the City of Edina because the intersection is located on the border between the two cities.

SIDE BAR

Projects outside the District affect how people get to the District and know when they have arrived. Working with partners such as Three Rivers Park District, MnDOT, and the City of Edina is crucial to ensure a well-connected District that services both Bloomington and their respective interests.

Implementation Plan

Summary of Plan Recommendations

The recommendations described in the previous chapter are summarized in Table 12: Proposed Public Improvements in the District. The anticipated time frame and responsible agency or partner for the implementation of each is task is identified.

Table 12: Proposed Public Improvements in the District

Action/Task	Responsible Party	City Cost	Status
Engineering Studies			
American Blvd. multi-modal corridor study: Analyze ways to balance walking, biking, and transit needs with vehicle traffic	Bloomington	$120,000	Future Project
Roadway Improvements			
Construct access ramp to westbound I-494 at E. Bush Lake Rd.	MnDOT, Hennepin County, Bloomington	$750,000	2017-2018
Add left turn restriction signage during peak times at W. 84th St. /Normandale Service Road	Bloomington	Minimal City Cost	Short-term
Signal timing modifications • Study on E. Bush Lake Rd. between 78th St. and W. 84th St. • Norman Center Dr. and American Blvd. • Normandale Lake Blvd. and W. 84th St. • Explore leading pedestrian signals where applicable	Bloomington/ Hennepin County	$12,000	Short-term
Extend median south on Normandale Lake Blvd. towards American Blvd. Also move stop signs closer to American Blvd.	Private Developer	No City Cost	Future Project
Adjust western curb line south of W. 83rd St. along Norman Center Dr. to improve compliance with one-way operations	Bloomington	TBD	Future Project
American Blvd. and Normandale Lake Blvd. • Install a signal • Construct a northbound right turn lane	Bloomington	$315,000	Future Project

Action/Task	Responsible Party	City Cost	Status
Bicycle and Pedestrian Projects			
Fill in sidewalk gaps	Private developer	No City Cost	As development occurs
North side of W. 84th St. and Normandale Blvd. pedestrian crossing improvements • Install new ramps and pedestrian actuated signals to meet ADA standards • Remove median nose	Bloomington	$50,000	Short-term
South side of W. 84th St. and Normandale Blvd. pedestrian crossing improvements	Bloomington	$50,000	Short-term
Rehabilitate existing abutments on pedestrian bridge over W. 84th St. and install lighting	Bloomington	$500,000	Short-term
Perform baseline pedestrian and bicycle counts	Bloomington	Part of City Budget	Short-term
E. Bush Lake Rd. bicycle and pedestrian connection feasibility study. Participate in Three Rivers Park District Study for a 1.5 mile connection between Hyland Park and Nine Mile Creek Regional Trail in Edina*	Bloomington	$10,000	Short-term
E. Bush Lake Rd. bicycle and pedestrian connection between Hyland Park and Nine Mile Creek Regional Trail. Funds would be used as a match for Federal and/or other regional grant funding**	Bloomington	$500,000	Short-term
Explore a rectangular rapid flash beacon (RRFB) to help pedestrians cross southbound right turning movement off of Normandale Blvd.	Bloomington, Hennepin County	$50,000	Short-term
Explore adding an island between the two northbound lanes at W. 84th St. and Normandale Service Rd.	Bloomington	TBD	Future Project
Discuss interim pedestrian connection from W. 82nd St. to Life Time Fitness with private property owners.	N/A	No Cost	Short-term
Explore sidewalk connection on the west side of Normandale Service Rd. from Hilton/Pacer Center area to make another pedestrian connection to Poor Richards, etc.	Bloomington	TBD	Future Project
Work with Hennepin County to study pedestrian crossing and other potential streetscape improvements to enhance the pedestrian realm at W. 84th St. and Normandale Blvd.	Bloomington, Hennepin County	$35,000	Future Project
Improve sidewalk/trail on American Blvd. bridge over Normandale Blvd. Explore adding public art, etc. to the bridge to create a gateway effect	Bloomington	TBD	Future Project
Alternative Transportation Plan project recommendations and regional trails	Bloomington and regional partners	TBD	Future Project
Pedestrian bridge over Normandale Blvd. at W. 84th St.	Bloomington	TBD	Future Project

* Project contingent on funding partnership with Hennepin County, Three Rivers Regional Park District, and City of Edina.

**Project contingent on funding partnerships with Hennepin County, Three Rivers Regional Park District, and City of Edina as well as Federal and/or other regional grant dollars.

Action/Task	Responsible Party	City Cost	Status
Streetscape Enhancements			
Update aerial photos on all map signage	Bloomington	$10,000	Short-term
Improved landscaping at W. 84th St. and Normandale Blvd.	Bloomington	$8,000	Short-term
Design and construct mid-term urban design (trees, lighting, sidewalks, planted medians, enhanced bus stops)	Bloomington	TBD	Future Project
Transit Enhancements			
American Blvd. arterial BRT	Metro Transit	TBD	Long-term
Utility Improvements			
Metropolitan Council Environmental Services Lift station	Metropolitan Council	No City Cost	Short-Term
Metropolitan Council Environmental Services interceptor improvements	Metropolitan Council	No City Cost	Short-term
Increase water main from 6" to 8" under W. 82nd St. between bridge and Luxembourg apartments	Bloomington	$600,000	Short-term
Add 160' water main connection near Luxembourg apartments	Bloomington	$85,000	Future Project
Increase sanitary sewer from 16" to 21" under W. 84th St. between E. Bush Lake Rd. and Normandale condos	Bloomington	$1,400,000	Future Project
Increase sanitary sewer from 10" to 15" and 12" to 15" under W. 84th St. between Norman Center Dr. and Stanley Rd.	Bloomington	$1,800,000	Future Project
Chalet lift station pumps	Bloomington	TBD	Future Project
Stormwater Management			
Normandale Lake Water Quality improvement project	Nine Mile Creek Watershed District	No City Cost	Short-term
Update City's Comprehensive Surface Water Management Plan to include Low Impact Design (LID) techniques and criteria	Bloomington	Citywide Plan	Short-term

Phasing Plan

The implementation of the plan recommendations is expected to occur over three phases. The short term and future projects relate to the readiness of the project. The readiness of the project may be influenced by funding needs, the design needs, and the readiness of related projects.

Short-Term (2018 – 2020)

Short-term projects are anticipated to be completed in the first three years after the plan update is adopted. They are either fairly easy to implement, relatively inexpensive, or have already been studied, planned, and designed. These projects include pedestrian upgrades, traffic control signage, map signage updates, and water main replacement. Additionally, studies have been identified to assist with the planning of future projects.

Future Projects (2021+)

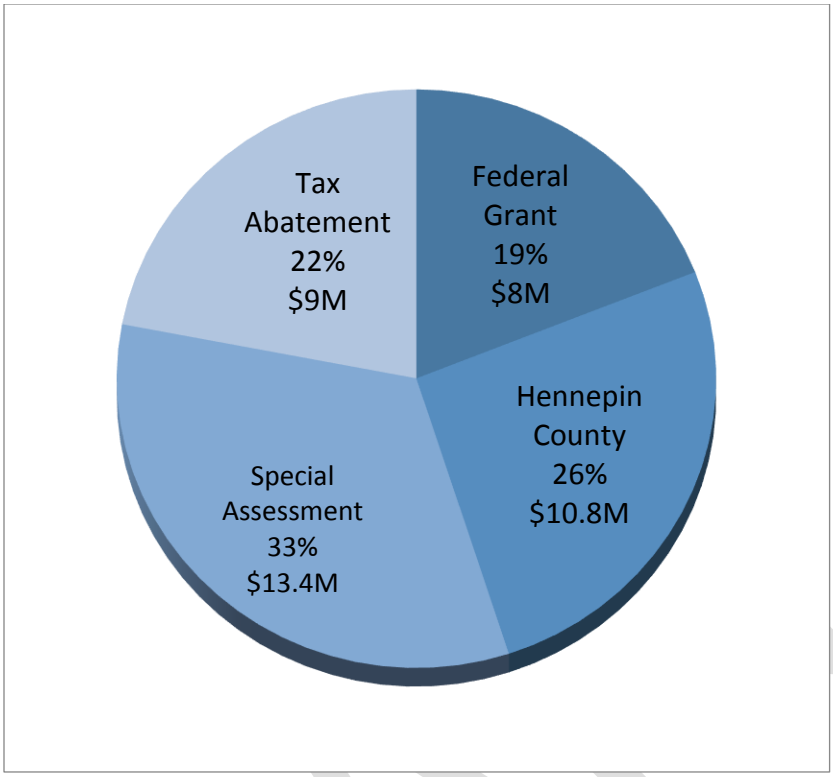
Future projects are anticipated to be completed four or more years after the plan update is adopted. They may require additional study, design, and partner coordination. Resources for these improvements are not always included in the proposed financing strategy but will be identified in relation to future road improvement projects.

Funding Scenario

2008 Funding

The funding strategy developed for the 2008 NLDP improvements included a combination of Special Assessments, Tax Abatement, Hennepin County funds, and Federal grants for a total financial package of $41.2M (see Figure 18). Springsted, Inc., the City's financial consultant for the 2008 NLDP, prepared a comprehensive cash flow funding model for the proposed public improvements. For the short term improvements, consisting of local road improvements, urban design enhancements, and district signage, the only funding tool used was Special Assessments. For the 2008 NLDP mid-term improvements, consisting of the widened intersection at West 84th Street and Normandale Boulevard and the pedestrian bridge over Normandale Boulevard, the funding strategy was to use a combination of Special Assessments, Hennepin County Funds, Tax Abatement, and Federal grants. The mid-term projects relied on the City obtaining an $8M Federal grant. Although the City applied for Federal grants twice for the West 84th Street and Normandale intersection improvement, both times were unsuccessful. Without the Federal grant, the mid-term improvements could not be adequately funded and were placed on hold.

Figure 18: 2008 Funding Strategy



Updates to Funding Scenario

The City began to explore the possibility of a westbound on-ramp to I-494 at East Bush Lake Road and in 2015, the City applied for two grants to fund the on-ramp project and was successful in obtaining funds from both the State-level Transportation and Economic Development (TED) grant and Federal Moving Ahead for Progress in the 21st Century (MAP-21) grant. Those two grants coupled with Hennepin County funds are estimated to nearly fully fund the westbound on-ramp to I-494 at East Bush Lake Road project.

After updating the other proposed improvements in the Normandale Lake District, the estimated total cost (including the on-ramp project) is approximately $36.9M (see Figure 19) City Finance Staff updated the financial models originally created by Springsted, Inc. and determined that no additional Special Assessments are needed to fund the future projects. All of the future improvements are anticipated to be able to be funded completely with Tax Abatement funds.

Figure 19: 2017 Funding Strategy

Federal Grant

In 2014, the City applied for and was awarded the MAP-21 Federal grant in the amount of $7.28M for the westbound on-ramp to I-494 at East Bush Lake Road.

State Grant

In 2015, the City applied for and was awarded the TED grant in the amount of $5M for the westbound on-ramp to I-494 at East Bush Lake Road.

Hennepin County

East Bush Lake Road is a County Road. The City requested that Hennepin County pay a portion of the design and construction of the westbound on-ramp to I-494 at East Bush Lake Road. Hennepin County has committed to funding up to $700k for the project.

Commercial Property Owners

The office owners and developers in the northwest quadrant of West 84th Street and Normandale Boulevard entered into special assessment agreements with the City based on the 2008 plan improvements and funding scenario. In 2009, the short-term public improvements were completed and 100% of those costs were assessed to the commercial property owners who had signed agreements. The second phase of the special assessment agreement was for the mid-term improvements to be partially funded with special assessments. With the update to the NLDP, the 2008 mid-term improvements are no longer viable and the westbound on-ramp to I-494 at East Bush Lake Road will serve as traffic mitigation for the District. The updated public improvement costs were analyzed and it was determined that the City will be able to terminate those special assessment agreements, since this source of funding is no longer needed to fund upcoming improvement projects in the District. In total, approximately $6.4M was collected from Special Assessments to pay for the 2009 public improvements.

City of Bloomington

The City has committed to use its property tax abatement authority for new development occurring in the District. Several parcels that are estimated to redevelop in the future were selected for inclusion in the tax abatement revenue collection. The first tax abatement resolution for the District was adopted by the City Council in 2007. Since then, there have been updates in 2008, 2010, and 2017, where updates have been made to the resolution. With each tax abatement resolution update, the Bloomington School District and Hennepin County are invited to participate and in all cases, they both have declined. Under State law, the City may collect tax abatement for 20 years on each parcel included in the tax abatement district. It is anticipated that $12M of property tax abatement funding will be spent on upcoming District improvements. Staff modeled the tax abatement district and it is estimated that up to $18.6M will be available in tax abatement revenue through the year 2027. Should the District not require any additional public improvements, the City Council may elect to terminate the tax abatement district at any time. However, once terminated, the tax abatement will be exhausted as a funding mechanism in the District in the future.

Figure 20: Tax Abatement Areas

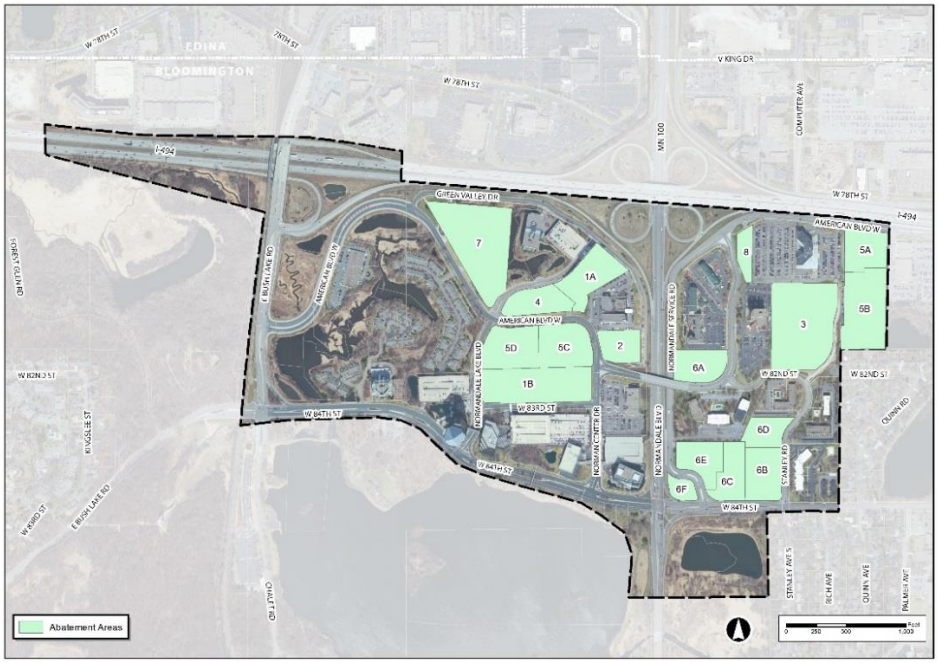


Table 13: Projected Budget

Project Element	Total Construction Cost (at year of Construction)	Federal Grant (MAP-21)	State Grant (TED)	Hennepin County	Commercial Property Assessment	Tax Abatement
2009 Projects	$6.4M				$6.4M	
On-Ramp	$13.3M	$7.3M	$5.0M	$0.7M		$0.4M
Future local improvements	$11.7M					$11.7M
TOTAL	$31.4M	$7.3M	$5.0M	$0.7M	$6.4M	$12.1M
% Share	100%	23%	16%	2%	20%	39%

Appendix A:

2008 Normandale Lake District Plan Project Progress

Normandale Lake District Plan

Section 6 Implementation Plan

Action/Task	Status
Road Improvements	
Widen W. 83rd St.	Completed in 2009
Install access restriction on Norman Center Dr. between W. 83rd St. and W. 84th St.	Completed in 2009
Install signal at American Blvd. and Norman Center Dr.	Completed in 2009
Install signal at W. 83rd St. and Normandale Lake Blvd.	Completed in 2009
Modify curve at W. 82nd St. and Stanley Rd.	Completed in 2009
Add right turn lane (SB) and signal modification on Stanley Rd. and W. 84th St.	Completed in 2009
Apply for grants for intersection	Failed to receive grant
Reconstruct intersection of W. 84th St. and Normandale Blvd.	Improvement no longer needed
Pedestrian Bridge	
Design and construct pedestrian bridge	Not Required
Work with MnDOT to integrate east ramp approach into berm around Goldman Pond	Not Required
Work with Three Rivers Park District to integrate west ramp with park trails	Not Required
Utility Improvements	
Work with MCES and Edina to address capacity constraints in 3-BN-499 interceptor	Temporary fix done in 2009
MCES interceptor improvements	TBD by Met Council
Improvements to water and sanitary systems	None Completed
Stormwater Management	
Water quality and storm sewer infrastructure improvements as needed to meet City's Comprehensive Surface Water Management Plan (CSWMP) goals, NPDES MS4 permit requirements or TMDL implementation plan requirements.	No projects identified
Normandale Lake Water Quality improvement project (by Nine Mile Creek Watershed District)	Fall 2018-Winter 2019
Update City's CSWMP to include Low Impact Design (LID) techniques and criteria.	2016 - 2017
Trails	
Work with MnDOT to develop trails around Goldman Pond connecting to creek underpass tunnel.	Delete
Improve sidewalk/trail on American Blvd. bridge	Not Completed
Remove sidewalks on W. 84th St. and Normandale Blvd.	Delete
Streetscape Enhancements	
Design and construct short term urban design with 2008 planned projects.	Completed in 2009

Design and construct mid-term urban design (trees, lighting, sidewalks, planted medians)	Green streets in map below are complete, all others remain.
Wayfinding Signs	
Coordinate sign design with TRPD, MnDOT, Hennepin County	Completed in 2009
Design wayfinding signs, District street signs, and prepare implementation program	Designed in 2009
Fabricate and install wayfinding signs	Partially installed in 2009
Transit Enhancements	
Work with Metro Transit to modify routes serving the District to improve access and efficiency.	Completed
Expand AM and PM reverse commute trips between downtown Minneapolis and Normandale Lake Office Park.	Completed
Enhance design of existing bus stops. Coordinate with streetscape enhancements.	Designed and partially installed in 2009
Design and Construct an enhanced transit stop to serve the east side of the District	Designed
Work with Metro Transit to improve east-west transit service along American Blvd.	Completed
Land Use and Zoning	
Amend Comprehensive Guide Plan	Completed
Amend zoning	Completed
Develop and adopt District urban design guidelines	Completed
Redevelopment	
Work with property owner to address redevelopment issues (lot consolidation)	On Going
Outside the District Improvements	
Construct median in Normandale Blvd. between Nine Mile Creek and 94th Street	Under Construction
Identify traffic management measures for Poplar Bridge neighborhood	Completed
Install traffic calming measures in Poplar Bridge Neighborhood	Completed
Construct access ramp to WB I-494 at E. Bush Lake Rd.	2018
Remove house on Sharrett property (north side of Normandale Lake)	Completed
Miscellaneous path improvements and maintenance in Normandale Lake Park	Completed
Design and install kiosks and identification signs in Normandale Lake Park	Completed

Appendix B:

2015 Normandale Lake District Traffic Study

SRF Consulting Group, Inc. | Engineers Planners Designers

Memorandum

SRF No. 0158818

To: Kirk Roberts, PE
City of Bloomington

From: Josh Maus, Senior Associate, PE, PTOE
Emily Gross, Engineer, EIT

Date: December 18, 2015

Subject: Normandale Lake District Traffic Study Update

Introduction

As requested, SRF has completed an update to the *Normandale Lake District Plan Traffic Operations Technical Report*, dated November 2007. The study area is generally bounded by I-494 to the north, East Bush Lake Road to the west, 84th Street to the south, and Stanley Road to the east in the City of Bloomington (see Figure 1: Project Location). The purpose of the update is to reflect development that has occurred since the original study was completed and potential changes to future land use within the District. The following information provides the assumptions, analysis, and study recommendations offered for consideration.

Existing Conditions

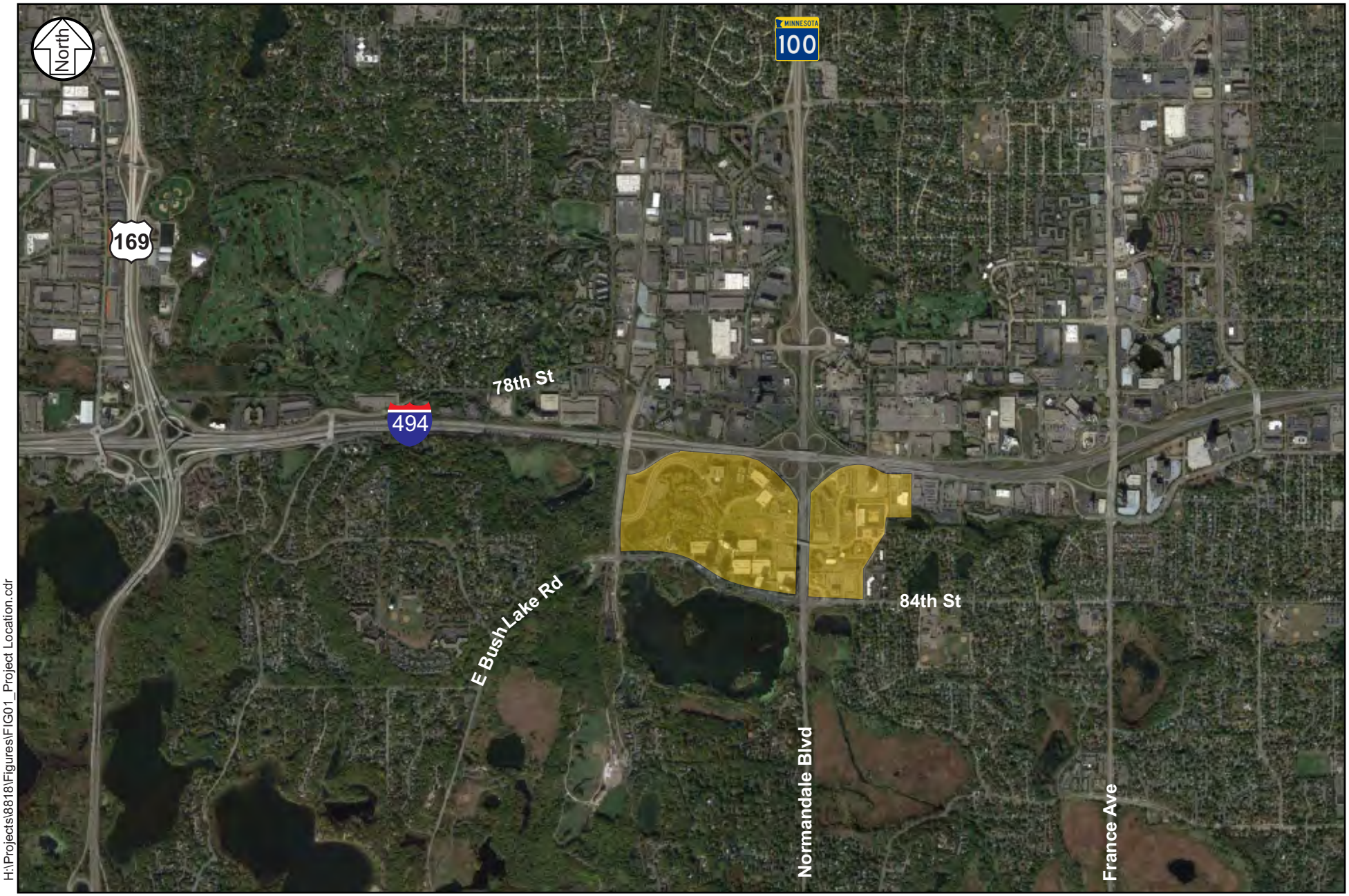
The existing conditions were reviewed to establish a baseline to compare future development impacts. The evaluation of existing conditions includes peak hour intersection counts, field observations, and an intersection capacity analysis.

Data Collection

Intersection turning movement counts were collected by SRF during the weekday a.m. and p.m. peak periods in April 2015 at the following locations:

- 84th Street/Norman Center Drive
- 84th Street/Normandale Boulevard
- 84th Street/Normandale Service Road
- 84th Street/Stanley Road
- American Boulevard/Norman Center Drive
- American Boulevard/82nd Street
- American Boulevard/Normandale Service Road

Current (less than two years old) turning movement count data was utilized for the remaining seven key intersections from the *I-494/East Bush Lake Road Preliminary Design Project*. Intersection turning movement counts were collected by SRF during the weekday a.m. and p.m. peak periods in August 2013 at the following locations:



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Project Location

Normandale Lake District Traffic Study Update
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Figure 1

- East Bush Lake Road/78th Street
- East Bush Lake Road/Westbound I-494 Ramp
- East Bush Lake Road/Eastbound I-494 Ramps
- East Bush Lake Road/American Boulevard
- East Bush Lake Road/84th Street
- 84th Street/Normandale Lake Boulevard
- American Boulevard/Normandale Lake Boulevard

Minnesota Department of Transportation (MnDOT) detector data at the I-494/East Bush Lake Road and the I-494/TH 100 interchanges was obtained for weekday a.m. and p.m. peak periods to compare the traffic volumes in August 2013 with April 2015 traffic volumes. Results of this comparison indicate that the traffic volumes collected in April 2015 are consistent with the August 2013 traffic volumes. Therefore the August 2013 traffic volumes were not modified for existing conditions.

Two site visits were conducted during the a.m. and p.m. peak periods to observe traffic patterns and identify current operational issues. These site visits were also used to identify roadway characteristics (i.e. roadway geometry, traffic controls, and posted speed limits) within the study area:

- **East Bush Lake Road** within the study area is a four-lane divided roadway with turn lanes and a posted speed limit of 40 miles per hour (mph).
- **Normandale Lake Boulevard** is a two-lane undivided roadway near American Boulevard that expands to a four-lane divided roadway from 83rd Street to 84th Street and has a 30 mph speed limit.
- **Norman Center Drive** is generally a four-lane roadway with turn lanes and a 35 mph speed limit. Norman Center Drive transitions from two-way traffic to one-way northbound traffic midway between 84th Street and 83rd Street (no southbound traffic is permitted to enter Norman Center Drive at 83rd Street). North of 83rd Street, Norman Center Drive is two-way traffic again.
- **Normandale Boulevard** expands from a four-lane divided roadway south of 84th Street to seven-lane divided roadway (three northbound and four southbound lanes) with turn lanes north of 84th Street and has a 45 mph speed limit.
- **Normandale Service Road** is a four lane undivided roadway with a 35 mph speed limit.
- **Stanley Road/82nd Street** is a two-lane undivided roadway with turn lanes at select intersections and a 30 mph speed limit.
- **78th Street** is a four-lane undivided roadway with a 35 mph speed limit.
- **American Boulevard** is a four-lane divided roadway with turn lanes west of Green Valley Drive and is a four-lane undivided roadway east of Green Valley Drive. American Boulevard has a 35 mph speed limit west of Norman Center Drive, 30 mph between Norman Center Drive and Normandale Service Road, and 40 mph east of Normandale Service Road.
- **84th Street** is generally a six-lane divided roadway with turn lanes, but transitions to a four-lane west of Normandale Lake Boulevard and east of Stanley Road. 84th Street has a 40 mph speed limit west of East Bush Lake Road, 35 mph between East Bush Lake Road and Stanley Road, and 30 mph east of Stanley Road.

All of the study intersections are signalized except the 84th Street/Normandale Service Road, American Boulevard/Normandale Lake Boulevard, American Boulevard/82nd Street, and American Boulevard/Normandale Service Road intersections which are unsignalized with side-street stop control. Existing geometrics, traffic control, and peak hour traffic volumes are shown in Figure 2.

Intersection Capacity Analysis

An existing intersection capacity analysis was completed to establish a baseline condition to which future traffic operations could be compared. The study intersections were analyzed using a combination of Synchro/SimTraffic software (V8.0) and the Highway Capacity Manual (HCM).

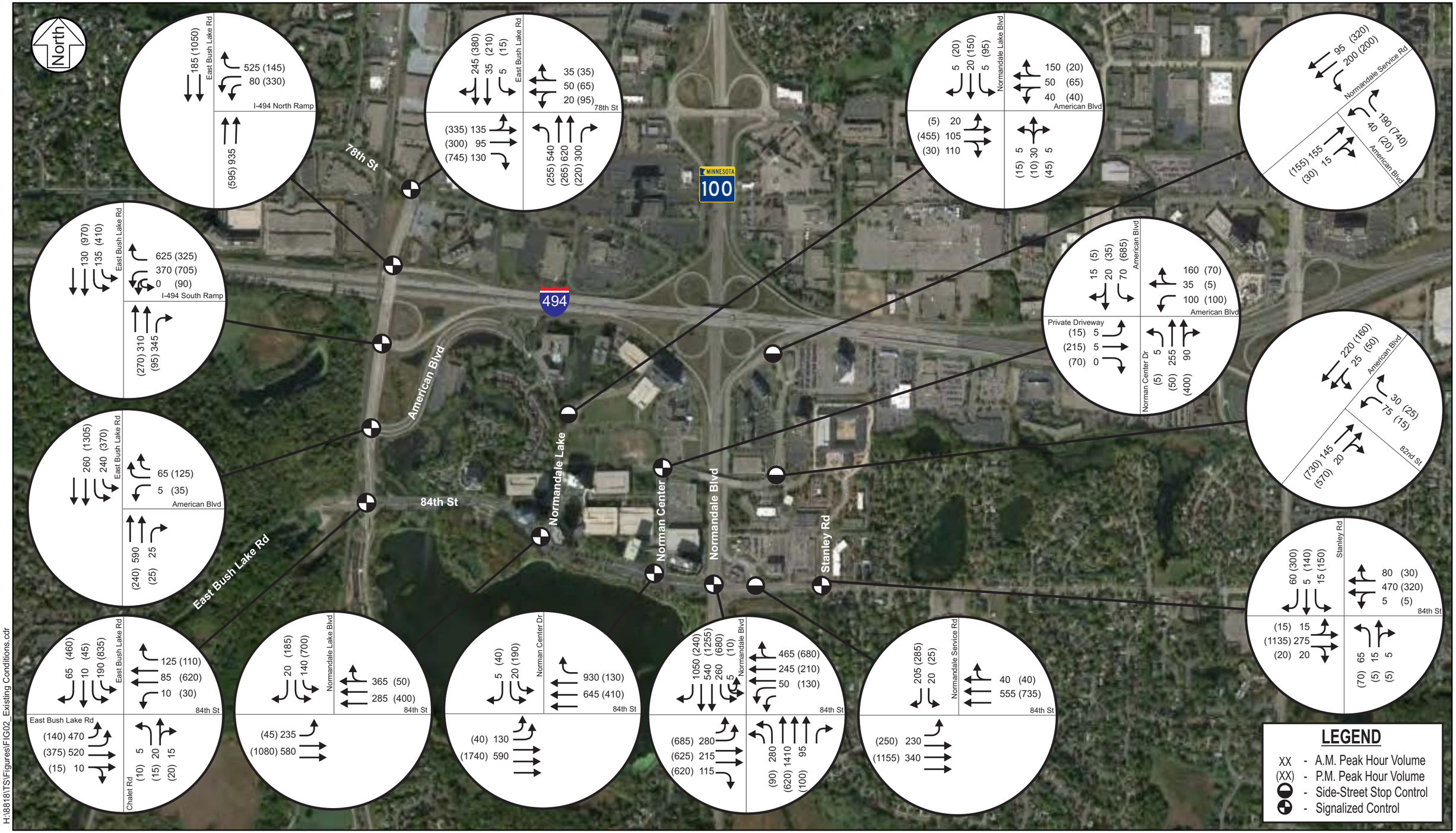
Capacity analysis results identify a Level of Service (LOS) which indicates how well an intersection is operating. Intersections are ranked from LOS A through LOS F. The LOS results are based on average delay per vehicle, which correspond to the delay threshold values shown in Table 1. LOS A indicates the best traffic operation, while LOS F indicates an intersection where demand exceeds capacity. Overall intersection LOS A through LOS D is generally considered acceptable in the Twin Cities Metropolitan Area.

Table 1: Level of Service Criteria for Signalized and Unsignalized Intersections

LOS Designation	Signalized Intersection Average Delay/Vehicle (seconds)	Unsignalized Intersection Average Delay/Vehicle (seconds)
A	≤ 10	≤ 10
B	> 10 - 20	> 10 - 15
C	> 20 - 35	> 15 - 25
D	> 35 - 55	> 25 - 35
E	> 55 - 80	> 35 - 50
F	> 80	> 50

For side-street stop controlled intersections, special emphasis is given to providing an estimate for the level of service of the side-street approach. Traffic operations at an unsignalized intersection with side-street stop control can be described in two ways. First, consideration is given to the overall intersection level of service. This takes into account the total number of vehicles entering the intersection and the capability of the intersection to support these volumes. Second, it is important to consider the delay on the minor approach. Since the mainline does not have to stop, the majority of delay is attributed to the side-street approaches. It is typical of intersections with higher mainline traffic volumes to experience high levels of delay (i.e. poor levels of service) on the side-street approaches, but an acceptable overall intersection level of service during peak hour conditions.

Results of the existing capacity analysis shown in Table 2 indicate that all study intersections currently operate at an acceptable overall LOS D or better during the a.m. and p.m. peak hours, with the existing traffic control, geometric layout, and signal timing.



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Existing Conditions

Normandale Lake District Traffic Study Update
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Figure 2

Table 2: Existing Conditions Peak Hour Capacity Analysis

Intersection	A.M. Peak		P.M. Peak	
	LOS	Delay (sec.)	LOS	Delay (sec.)
East Bush Lake Road/78th Street	C	25	C	25
East Bush Lake Road/Westbound I-494 Ramp	B	19	B	14
East Bush Lake Road/Eastbound I-494 Ramps	B	13	C	20
East Bush Lake Road/American Boulevard	B	13	B	16
East Bush Lake Road/84th Street	B	14	C	32
84th Street/Normandale Lake Boulevard	B	10	B	14
84th Street/Norman Center Drive	A	7	A	9
84th Street/Normandale Boulevard	C	33	D	43
84th Street/Normandale Service Road (1)	C/E	45	A/D	32
84th Street/Stanley Road	A	7	B	12
American Boulevard/Normandale Lake Boulevard (1)	A/A	8	A/B	13
American Boulevard/Norman Center Drive	A	7	B	15
American Boulevard/82nd Street (1)	A/A	6	A/A	7
American Boulevard/Normandale Service Road (1)	A/A	4	A/A	7

(1) Indicates an unsignalized intersection with side-street stop control, where the overall LOS is shown followed by the worst approach LOS.

Although all of the intersections operated at acceptable overall levels of service during the a.m. and p.m. peak hours, the following operational issues were observed during field observations as well as in the simulation model:

East Bush Lake Road/78th Street

- During the a.m. peak hour northbound left-turn queues extend approximately 530 feet, which is beyond the available turn lane storage. These queues cause inefficient traffic operations for northbound through and westbound right-turn movements at the East Bush Lake Road/ Westbound I-494 Ramp intersection.
- During the p.m. peak hour eastbound queues extend approximately 360 feet, blocking access to the eastbound right-turn lane. Based on one day of field observations, these queues extended more than 700 feet and cycle failure was observed. The intersection currently operates with eastbound/westbound split phasing.
- The City should consider modify the signal timing or restriping this intersection to improve traffic operations. However, since the intersection currently operates at an overall acceptable level of service, no modifications are recommended under existing conditions.

East Bush Lake Road/Eastbound I-494 Ramps

- During the p.m. peak hour when eastbound I-494 is experiencing heavy congestion, motorists were observed to exit at East Bush Lake Road and either make a westbound U-turn to return to I-494 or make a westbound left-turn to either a southbound left-turn at American Boulevard or 84th Street depending on the motorist's final destination. While this "cut-through" travel pattern occurs on a regular basis, the magnitude of motorists making these movements is dependent on the level of congestion of eastbound I-494.

- Since the intersection currently operates at an acceptable level of service, no modification is recommended under existing conditions.

East Bush Lake Road/84th Street

- During the p.m. peak hour southbound left-turn queues extend approximately 540 feet, which is beyond the available storage.
  - Since the eastern southbound through lanes traps into a southbound left-turn lane at this intersection, these queues do not significantly impact other movements (i.e. southbound through or right-turns). Therefore, no modification is recommended under existing conditions.

84th Street/Normandale Boulevard

- During the a.m. peak hour, poor lane utilization was observed on the westbound through and northbound left-turn movements due to the high percentage of vehicles destined to make a westbound right-turn at the 84th Street/Norman Center Drive intersection.
- During the p.m. peak hour, eastbound queues along 84th Street extend through the Norman Center Drive intersection and some days will extend past the Normandale Lake Boulevard intersection. However, on those days the queues are generally "rolling" rather than stopped.
- No modifications to signal timing or geometrics are recommended under existing conditions.

84th Street/Normandale Service Road

- During the a.m. peak hour, the westbound approach of the 84th Street/Normandale Boulevard intersection queues through the Normandale Service Road intersection approximately 10 percent of the peak hour, resulting in poor operations for the Normandale Service Road southbound approach.
- During the a.m. and p.m. peak hour eastbound left-turn queues extend beyond available storage (approximately 150 and 170 feet), respectively. These stopped vehicles extend into the eastbound through lanes which increases the potential for rear-end crashes along 84th Street.
- The City should consider restricting all left-turns during peak periods at this intersection. However, since the intersection operates at an overall acceptable level of service, no modifications are recommended under existing conditions, but the City should continue to monitor.

American Boulevard/Normandale Lake Boulevard

- There is an existing sight distance issue for southbound approach vehicles at the location of the stop signs. The location of the Norman Pointe monument signs and landscaping make it difficult for motorists to see vehicles traveling along American Boulevard. However, when vehicles pull forward past the stop signs, which motorist were observed to do, the sight distance does meet the minimum AASHTO sight distance requirements.
  - Recommendations to improve sight distance are recommended later in the study.

American Boulevard/Norman Center Drive

- During the p.m. peak hour southbound left-turn queues extend approximately 350 feet, blocking access to two driveways along American Boulevard.
  - This is considered to be a relatively minor issue under existing conditions. However, the City should continue to monitor this area and consider restricting access to right-in/right-out or three-quarter if safety/operational issues warrant modification.

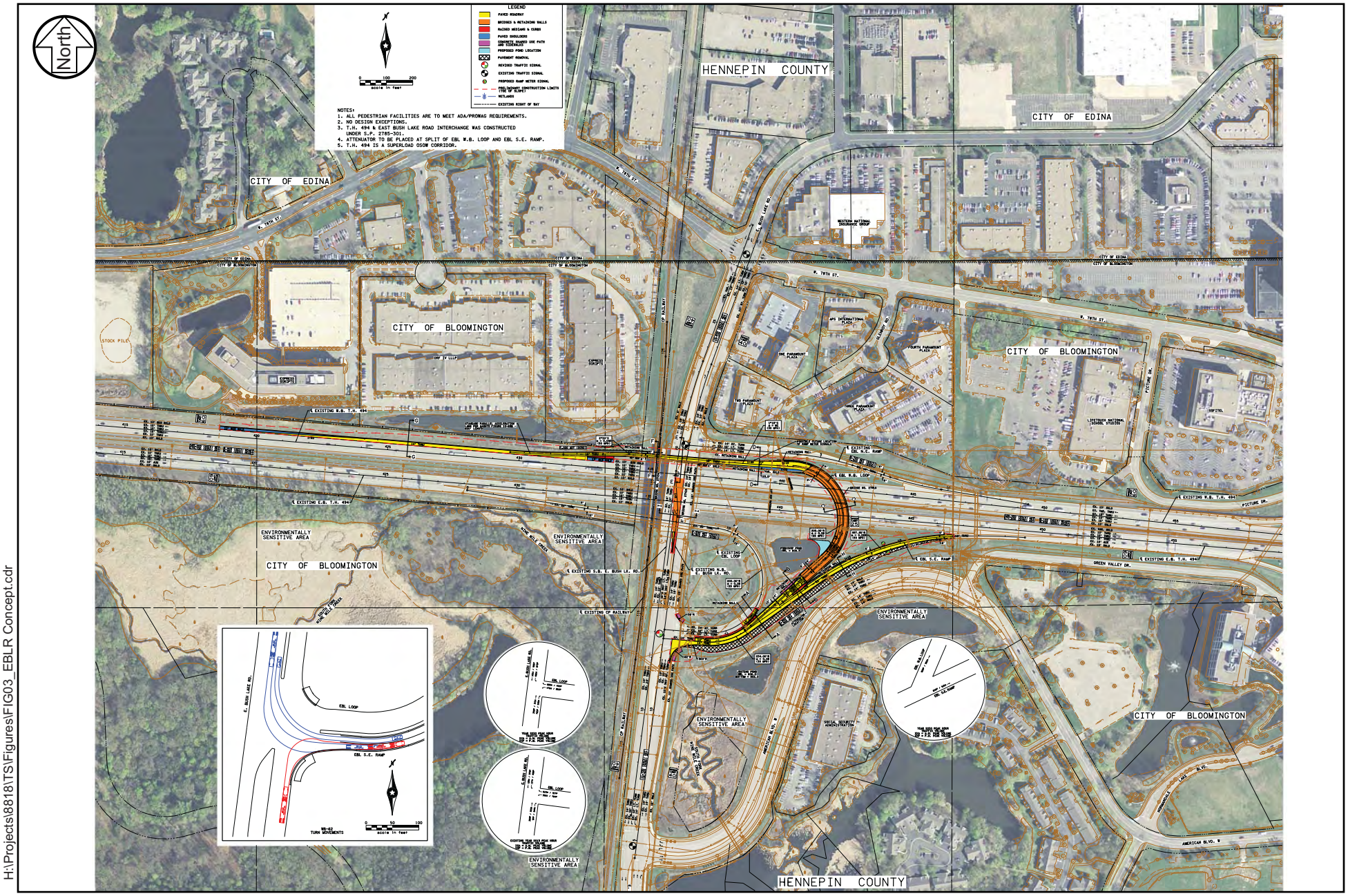
I-494/East Bush Lake Road Westbound On-Ramp

The I-494/East Bush Lake Road Westbound On-Ramp concept shown in Figure 3 is expected to be constructed by year 2018. This proposed ramp will result in more direct access for regional trips destined for westbound I-494 from Bloomington's Normandale Lakes District and southern Edina. This is an assumed regional improvement by year 2018 conditions and travel pattern shifts for motorists rerouting to use the I-494/East Bush Lake Road Westbound On-Ramp were based on the *I-494/East Bush Lake Road Preliminary Design Project*.

In addition to providing access to westbound I-494, the project plans to extend the southbound left-turn lanes and provide a signal overlap phase for the northbound right-turn movement. With the signal overlap phase, it is assumed that no westbound U-turn movement would be permitted since it would be in direct conflict with the northbound right-turn movement or at a minimum should be signed no U-turns during the p.m. peak period. Motorists currently making westbound U-turns during the p.m. peak hour were assumed to stay on I-494 and no longer would be using the East Bush Lake Road as a cut-through route.

Year 2018 Traffic Forecasts

This section focuses on the development of year 2018 traffic forecast, which represent conditions soon after the opening of the I-494/East Bush Lake Road Westbound On-Ramp. Additional analysis was completed under year 2018 conditions for a proposed residential development located in the northeast quadrant of the American Boulevard/Normandale Lake Boulevard intersections as part of the *Norman Point Development Traffic Study*, dated August 4, 2015 (see appendix). However, since the development had not been approved at the time of this study, trips associated with the development area were not included in year 2018 analysis. However, results from the Norman Point development traffic study indicate that the residential development has a minimal impact to traffic operations. It should be noted that future development was assumed at this location under year 2040 conditions. This section describes the methodology/assumptions used to develop the year 2018 traffic forecasts.



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SRF Consulting Group, Inc.

I-494/East Bush Lake Road Westbound On-Ramp Layout

Normandale Lake District Traffic Study Update

City of Bloomington

Figure 3

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August 2015

Existing Normandale Lake District Trips

The existing intersection turning movement counts were reviewed to understand the routes and travel patterns vehicles are currently using to enter and exit the Normandale Lake District. It is important to understand the existing routes to account for the travel pattern shifts that will occur with the construction of the I-494/East Bush Lake Road Westbound On-Ramp and to accurately distribute trips generated by future development in the Normandale Lake District.Existing Normandale Lake District trips were generated for the study area based on land use and occupancy data provided by the City and the *Institute of Transportation Engineer (ITE) Trip Generation Manual, 9th Edition*. It should be noted that using the average ITE trip generation rate for the office land uses to generate existing trips in the Normandale Lake District yielded trips approximately 40 percent higher than the traffic volumes collected during the intersection turning movement counts. This review indicates that office land uses in the area bounded by 84th Street to the south, Normandale Boulevard to the east, I-494 to the north, and East Bush Lake Road to the west, generate trips more consistently with the ITE fitted curve rather than the average rate. The fitted curve is generally recommended to generate trips for land use developments with large square footages to better account for the multi-tenant offices with varying office hours. The fitted curve also accounts for the likelihood that large office complexes will have higher modal and multi-use reductions internally.

The existing Normandale Lake District trips based on ITE and the intersection traffic volume counts were compared to estimate the existing modal/multi-use reduction. Based on this review, a 15 percent reduction is estimated for the current land uses. This reduction is consistent data provided from the travel demand model (accounts for both modal and multi-use reduction in the study area) and the methodology described in the *ITE Trip Generation Manual, 9th Edition* and *NCHRP Report 684* to estimate multi-use reduction for areas with multiple land use types. The 15 percent reduction accounts for trips using nearby transit options, walking/biking, or motorists utilizing more than one land uses within the Normandale Lake District.

Results of the trip generation analysis for the existing Normandale Lake District shown in Table 3 indicate that the entire Normandale Lake District generate 3,362 a.m. peak hour, 4,202 p.m. peak hour, and 32,636 daily trips (accounting for the 15-percent multi-modal use reduction).

Table 3: Existing Normandale Lake District ITE Trip Generation Estimates

Land Use (ITE Code)	Size	A.M. Peak Hour		P.M. Peak Hour		Daily Trips
		In	Out	In	Out	
504A						
Residential (220)	250 DU	26	102	101	54	1,663
Office (710) [1]	552.541 KSF	487	66	108	528	3,336
	504A Subtotal	513	168	209	582	4,998
504B						
Hotel (310)	258 Rooms	81	56	79	76	2,108
	504B Subtotal	81	56	79	76	2,108
504C						
Office (710) [1]	1955.599 KSF	1,724	235	383	1,868	11,806
	504C Subtotal	1,724	235	383	1,868	11,806
504D						
Residential (220)	107 DU	8	39	37	18	622
Office (710) [1]	36.827 KSF	32	4	7	35	222
	504D Subtotal	40	44	44	54	844
	SUBTOTAL TAZ 504	**2,357**	**503**	**715**	**2,579**	**19,757**
502A						
Commercial (820) [2]	176.938 KSF	86	53	257	279	6,171
	502A Subtotal	86	53	257	279	6,171
502B						
Residential (220)	279 DU	28	114	112	61	1,855
	502B Subtotal	28	114	112	61	1,855
502C						
Hotel (310)	388 Rooms	121	84	119	114	3,170
Office (710)	38.078 KSF	52	7	10	47	420
	502C Subtotal	174	91	128	161	3,590
502D						
Hotel (310)	252 Rooms	79	55	77	74	2,059
Office (710) [3]	265.658 KSF	215	29	40	194	1,729
Commercial (820)	13.279 KSF	8	5	24	26	567
Car Dealership (841)	82.285 KSF	119	40	87	130	2,667
	502D Subtotal	421	129	227	423	7,022
	SUBTOTAL TAZ 502	**709**	**387**	**725**	**924**	**18,639**
	TOTAL TAZ 502/504	**3,066**	**890**	**1,440**	**3,503**	**38,396**
	15% Modal/Multi-Use Reduction	*-460*	*-133*	*-216*	*-525*	*-5,759*
	TOTAL TAZ 502/504	**2,606**	**756**	**1,224**	**2,978**	**32,636**

1) ITE fitted curve for the office land uses used to generate office trips for TAZ 504

2) 82 percent of the retail area is occupied (reduction to trips applied accordingly)

3) 59 percent of office space is occupied (reduction to trips applied accordingly)

Background Traffic

To estimate year 2018 background growth, growth rates were applied to the existing non-Normandale Lake District traffic volume set. These growth rates were based on historical traffic volume trends, information provided from the Year 2030 Metro Council Travel Demand Model with updated 2040 SE data, and the *I-494/East Bush Lake Road Preliminary Design Project* forecast memo. It should be noted that much of the growth expected in the area is directly due to the expected/proposed land use changes in the Normandale Lake District and not necessarily related to growth outside of the study area. A growth rate of one-quarter percent per year was applied to all movements entering the study area, except for the northbound and southbound through movements at the Normandale Boulevard/ 84th Street intersection, where a three-quarter percent per year growth rate.

Development Currently Under Construction

Year 2018 conditions also include trips that will be generated by the Hampton Inn and Luxembourg Apartments, which are currently under construction and expected to open within the next six months. The Hampton Inn is located in the northeast quadrant of the American Boulevard/Norman Center Drive intersection and the Luxembourg Apartments are generally located north of 82nd Street/Stanley Road and east of American Boulevard. Trip generation estimates for the a.m. and p.m. peak hour and on a daily basis were calculated for the hotel and apartment land uses based on the *ITE Trip Generation Manual, 9th Edition*. Consistent with findings from existing conditions, a 15 percent modal/multi-use reduction was applied to the developments. Results of the trip generation estimate shown in Table 4 indicate that the apartment and hotel land uses will generate a total of approximately 167 a.m. peak hour, 200 p.m. peak hour, and 2,288 daily trips.

Table 4: Trip Generation Estimates – Developments Currently Under Construction

Land Use Type *(ITE Code)*	Size	P.M. Peak Hour Trips		Saturday Peak Hour Trips		Daily Trips
		In	Out	In	Out	
Hotel (310) [1]	100 rooms	31	22	31	29	817
Apartment (210)	282 DU	29	115	114	61	1,875
Subtotal		60	137	145	91	2,692
Modal/Multi-Use Reduction (15%)		(9)	(21)	(22)	(14)	(404)
Total		51	116	123	77	2,288

Directional Distribution

The Normandale Lake District directional distribution shown in Figure 4 was developed using information provided from the existing and year 2030 Metro Council Travel Demand Models with updated 2040 SE data. It should be noted that motorists in the study area have route choice to reach their destination. To route the existing Normandale Lake District and development trips currently under construction, trips were individually routed based on access location, current travel patterns, and an understanding of where vehicles are currently making cut-through routes.

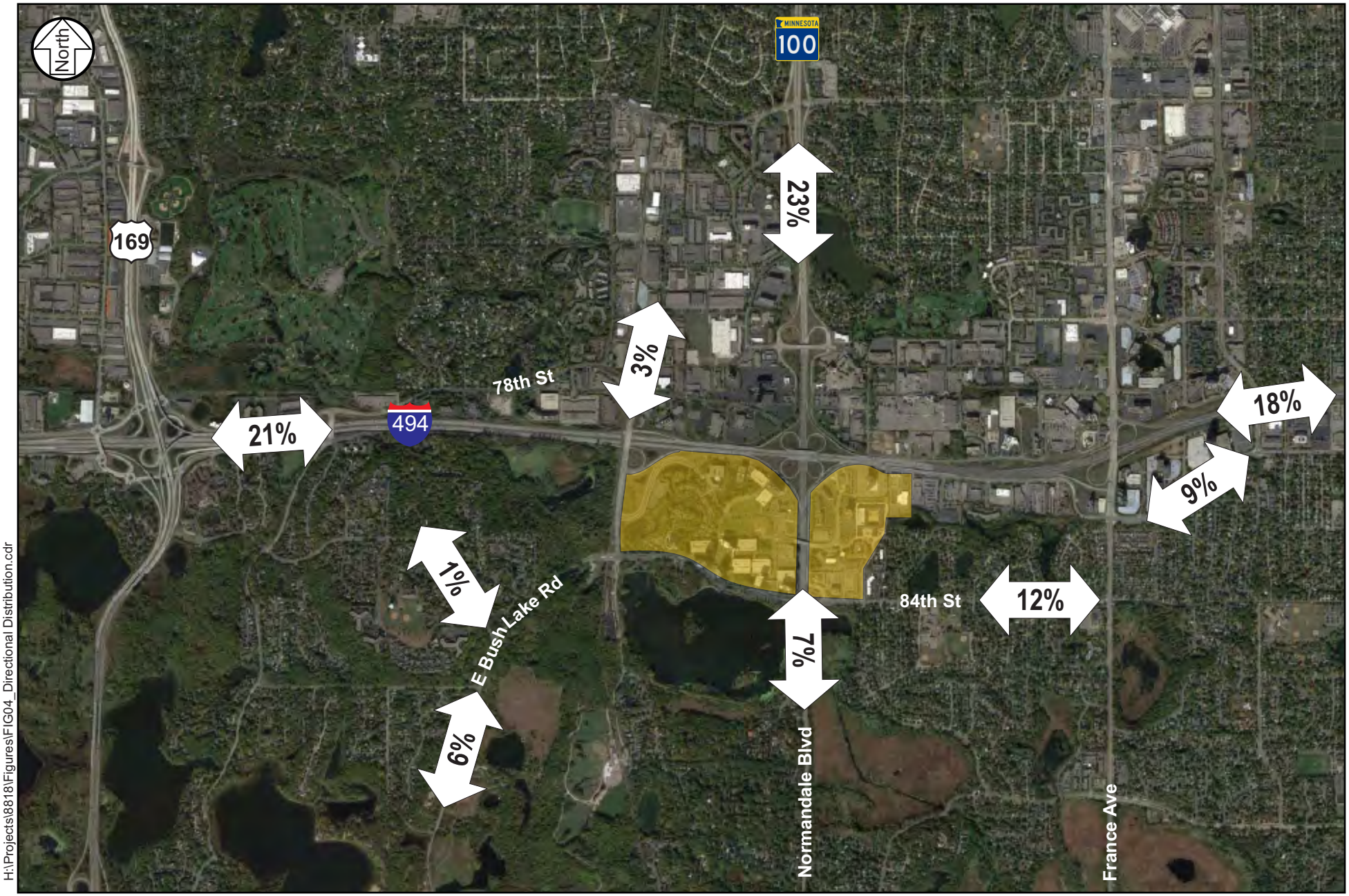
The directional distribution was compared to assumptions made for the original *Normandale Lake District Plan Traffic Operations Technical Report*, dated November 2007. In general, the directional distribution for the updated and 2007 traffic studies are similar. However, notable differences include that the 2007 study did not assume the improvements to the I-494/TH 169 interchange or the construction of the new I-494/East Bush Lake Road Westbound On-Ramp, where the updated study does account for these transportation improvements. Assuming the completed/programmed improvements, the updated directional distribution estimates that more vehicles will access I-494 between TH 169 and East Bush Lake Road and fewer vehicles will use East Bush Lake Road to the north of I-494 and Highwood Drive (which no longer provides access to TH 169).

I-494/East Bush Lake Road Westbound On-Ramp

As previously mentioned, year 2018 conditions assume that the I-494/East Bush Lake Road Westbound On-Ramp is complete and open to traffic. Trips generated by the developments located in the Normandale Lake District Area were individually rerouted based on access location, directional distribution, and ITE trip generation to account for the travel pattern shifts with construction of the new on-ramp. Travel pattern and traffic volume magnitude shift for non-Normandale Lake District Area trips were based on the information provided in the *I-494/East Bush Lake Road Preliminary Design Project* forecast memo.

Approximately 325 a.m. peak hour and 465 p.m. peak hour non-Normandale Lake District trips are expected to reroute to the I-494/East Bush Lake Road Westbound On-Ramp once the ramp opens. The majority of this shift is from trips destined to/from the west, north, and east of the East Bush Lake Road/78th Street intersection. A portion of vehicles currently using East Bush Lake Road to access US Highway 169 to the south are also expected to reroute to the I-494/East Bush Lake Road Westbound On-Ramp.

Approximately 105 a.m. peak hour and 400 p.m. peak hour Normandale Lake District trips (including existing land uses and the two developments that are currently under construction) are expected to reroute to the I-494/East Bush Lake Road Westbound On-Ramp under year 2018 conditions. These trips will divert away from making an eastbound left-turn or westbound right-turn at the 84th Street/Normandale Boulevard intersection and away from making a northbound left-turn at East Bush Lake Road/78th Street intersection.



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Directional Distribution

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Figure 4

Year 2018 traffic forecasts, which take into account background growth, travel pattern shifts due to the new I-494/East Bush Lake Road Westbound On-Ramp, and trips generated by the Hampton Inn and Luxemburg Apartments (currently under construction) are shown in Figure 5.

Year 2018 Conditions

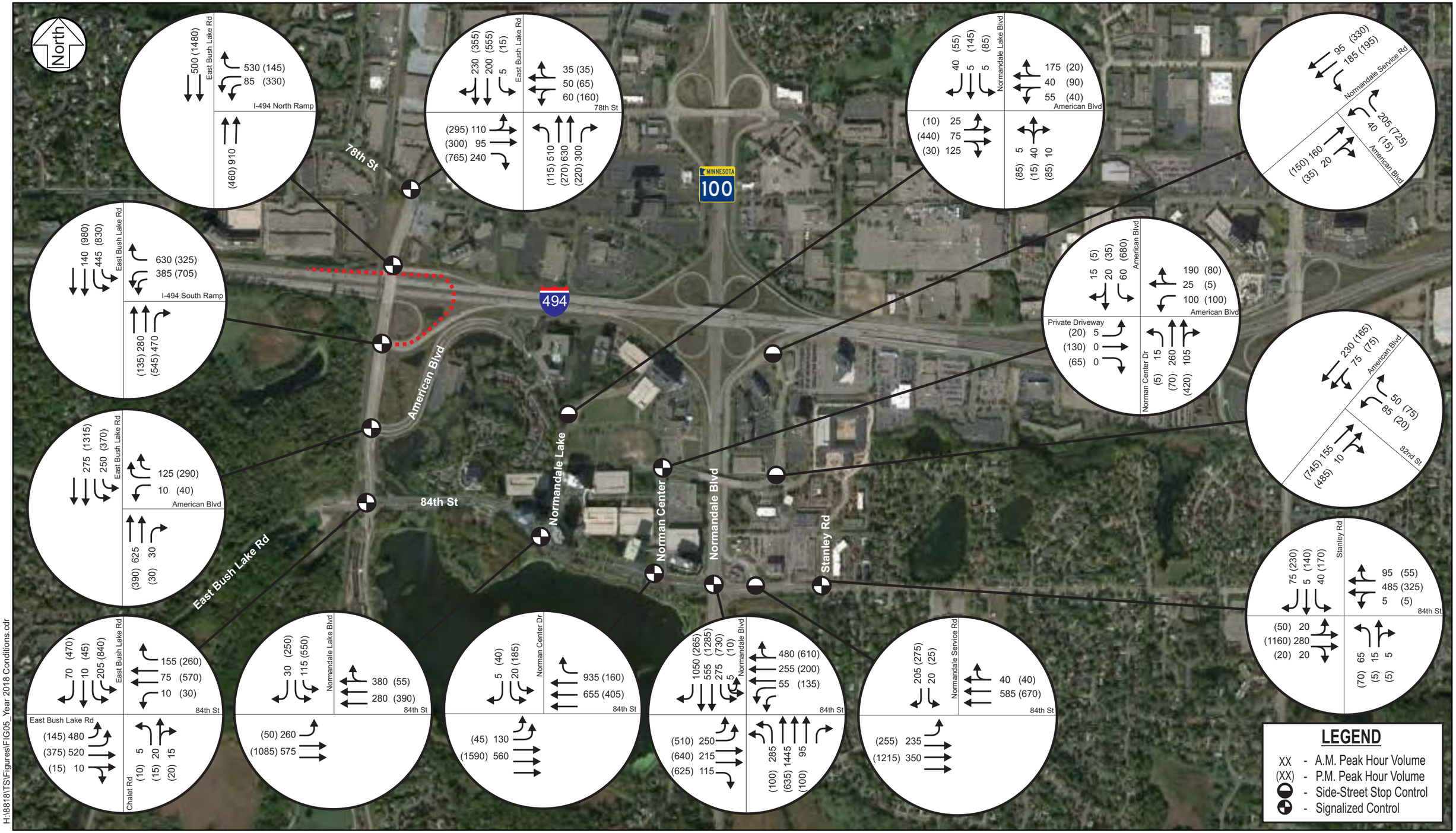
Intersection Capacity Analysis

To determine if the existing roadway network can accommodate year 2018 traffic forecasts, a detailed traffic capacity analysis was completed. The year 2018 conditions were reviewed to establish a baseline to compare future impacts associated with the Normandale Lake District. Study intersections were analyzed using Synchro/SimTraffic. Results of the year 2018 operations analysis shown in Table 5 indicate that the study intersections are expected to operate at an acceptable overall LOS D or better during the a.m. and p.m. peak hours, with the existing traffic control, geometric layout, and signal timing, except the East Bush Lake Road/78th Street intersection which is expected to operate at LOS E during the p.m. peak hour.

Table 5: Year 2018 Conditions Peak Hour Capacity Analysis

Intersection	A.M. Peak		P.M. Peak	
	LOS	Delay (sec.)	LOS	Delay (sec.)
East Bush Lake Road/78th Street	C	25	E	59
East Bush Lake Road/Westbound I-494 Ramp	B	17	C	25
East Bush Lake Road/Eastbound I-494 Ramps	B	15	D	41
East Bush Lake Road/American Boulevard	B	14	B	17
East Bush Lake Road/84th Street	B	14	C	30
84th Street/Normandale Lake Boulevard	B	10	B	14
84th Street/Norman Center Drive	A	7	A	8
84th Street/Normandale Boulevard	C	30	D	37
84th Street/Normandale Service Road (1)	B/D	34	A/C	19
84th Street/Stanley Road	A	7	B	12
American Boulevard/Normandale Lake Boulevard (1)	A/A	8	A/B	12
American Boulevard/Norman Center Drive	A	6	B	13
American Boulevard/82nd Street (1)	A/A	7	A/A	9
American Boulevard/Normandale Service Road (1)	A/A	3	A/A	6

(1) Indicates an unsignalized intersection with side-street stop control, where the overall LOS is shown followed by the worst approach LOS.



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Year 2018 Conditions

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Figure 5

To provide acceptable operations at the East Bush Lake Road/78th Street intersection, the modifications listed below are recommended (see Figure 6). It should be noted that at this intersection there is limited right-of-way to expand the roadway width due to existing building location and grade changes. Therefore, the existing roadway width was maintained.

- Restripe the eastbound approach to provide a left-turn, single through, and right-turn lane.
- Restripe the westbound approach to provide a left-turn and shared through/right-turn lane.
- Restripe the southbound approach to provide a southbound left-turn, single through, and trap the right-turn lane.
- Remove the split phasing along the eastbound and westbound approaches and provide protected/permitted left-turn phasing.

Figure 6: Recommended Geometric Modifications to the East Bush Lake Road/78th Street Intersection

To improve traffic operations along East Bush Lake Road during the p.m. peak, signal timing cycles and splits should be optimized at the study intersections from 78th Street to 84th Street. Current cycle lengths along East Bush Lake Road during the p.m. peak hour are 90 seconds, a 150 second cycle length was assumed for analysis purposes.

With the modifications identified, results of the year 2018 operations analysis shown in Table 6 indicate that the study intersections are expected to operate at an acceptable overall LOS D or better during the p.m. peak hour. In addition, the City should monitor the 84th Street/Normandale Service Road intersection and consider installing "No Left Turn" signs during the a.m. and p.m. peak periods for the southbound and eastbound approaches. As mentioned under existing conditions, eastbound left-turn queues extend beyond the available storage, causing safety and operational issues for mainline traffic on 84th Street.

Table 6: Year 2018 Conditions Peak Hour Capacity Analysis – Recommended Improvements

Intersection	P.M. Peak	
	LOS	Delay (sec.)
East Bush Lake Road/78th Street	C	25
East Bush Lake Road/Westbound I-494 Ramp	C	23
East Bush Lake Road/Eastbound I-494 Ramps	C	27
East Bush Lake Road/American Boulevard	B	17
East Bush Lake Road/84th Street	C	25
84th Street/Normandale Lake Boulevard	B	14
84th Street/Norman Center Drive	A	7
84th Street/Normandale Boulevard	D	37
84th Street/Normandale Service Road (1)	A/C	23
84th Street/Stanley Road	B	13
American Boulevard/Normandale Lake Boulevard (1)	A/B	14
American Boulevard/Norman Center Drive	B	14
American Boulevard/82nd Street (1)	A/A	7
American Boulevard/Normandale Service Road (1)	A/A	6

(1) Indicates an unsignalized intersection with side-street stop control, where the overall LOS is shown followed by the worst approach LOS.

Year 2040 Traffic Forecasts

This section describes the methodology/assumptions used to develop the year 2040 traffic forecasts.

Background Traffic

To develop year 2040 background growth to the study area, existing non-Normandale Lake District traffic volumes were grown at the same rate as assumed to develop year 2018 traffic forecasts (i.e. a growth rate of one-quarter percent per year was applied to all movements entering the study area, except for the northbound and southbound through movements at the Normandale Boulevard/84th Street intersection, where a three-quarter percent per year growth rate).

I-494/East Bush Lake Road Westbound On-Ramp

Consistent with the methodology used to develop year 2018 traffic forecast, the travel pattern and traffic volume magnitude shift for non-Normandale Lake District Area trips were based on the information provided in the *I-494/East Bush Lake Road Preliminary Design Project* forecast memo.

Year 2040 Land Use Plans

To account for traffic impacts associated with future development in the Normandale Lake District Area, two land use scenarios were considered for year 2040: commercial and mixed-use. Trip generation estimates shown in Table 7 include both the existing and future development trips (i.e. cumulative) to better understand travel pattern shifts under year 2040 conditions. Further, as discussed when evaluating the existing Normandale Lake District Area any trips associated with office land use growth in TAZ 504 were generated using the cumulative fitted curve for the total office square footage in the subarea.

It should be noted that the mixed-use land use scenario assumes that the existing office development in TAZ 502D is redeveloped as residential. The method described above accounts for the removal of the existing land use and the addition of the proposed land use trips. Consistent with existing conditions, a 15 percent modal/multi-use reduction was applied to all future trips for both land use scenarios.

Results of the year 2040 trip generation analysis shown in Table 7 and Figure 7 indicate the land use scenarios are estimated to generate the following additional trips compared to existing conditions:

- **Commercial Scenario**: 930 a.m. peak hour, 1,402 p.m. peak hour, and 11,624 daily trips
- **Mixed-Use Scenario**: 564 a.m. peak hour, 966 p.m. peak hour, and 11,827 daily trips

Year 2040 trips generated from the Normandale Lake District for both the commercial and mixed-used land use scenarios were distributed throughout the transportation network based on the directional distribution shown in Figure 4. These trips represent both the existing and future land uses to account for existing trips shifting from their current route to the I-494/East Bush Lake Road Westbound On-Ramp. Therefore, some movements are expected to decrease in traffic volume compared to existing conditions.

Year 2040 traffic forecasts, which take into account background growth, travel pattern shifts due to the new I-494/East Bush Lake Road Westbound On-Ramp, and trips generated by the anticipated land use plans for the Normandale Lake District are shown in Figure 8 and 9 for the commercial and mixed-use scenarios, respectively.

Table 7: Year 2040 Trip Generation Estimates

EXISTING							2040 COMMERCIAL							2040 MIXED-USE						
Land Use (ITE Code)	Size	A.M. Peak Hour		P.M. Peak Hour		Daily	Land Use (ITE Code)	Size	A.M. Peak Hour		P.M. Peak Hour		Daily	Land Use (ITE Code)	Size	A.M. Peak Hour		P.M. Peak Hour		Daily
		In	Out	In	Out	Trips			In	Out	In	Out	Trips			In	Out	In	Out	Trips
504A							**504A**							**504A**						
Residential (220)	250 DU	26	102	101	54	1,663	Residential (220)	250 DU	26	102	101	54	1,663	Residential (220) [5]	450 DU	46	184	181	98	2,993
Office (710) [1]	552.541 KSF	487	66	108	528	3,336	Office (710) [1]	884.541 KSF	748	102	172	841	5,081	Office (710) [1]	552.541 KSF	487	66	108	528	3,336
504A Subtotal		**513**	**168**	**209**	**582**	**4,998**	**504A Subtotal**		**773**	**204**	**273**	**895**	**6,743**	**504A Subtotal**		**533**	**250**	**289**	**625**	**6,328**
							Delta (Compared to Existing)		*261*	*36*	*64*	*313*	*1,745*	Delta (Compared to Existing)		*20*	*82*	*81*	*43*	*1,330*
504B							**504B**							**504B**						
Hotel (310)	258 Rooms	81	56	79	76	2,108	Hotel (310)	358 Rooms	112	78	110	105	2,925	Hotel (310)	358 Rooms	112	78	110	105	2,925
504B Subtotal		**81**	**56**	**79**	**76**	**2,108**	**504B Subtotal**		**112**	**78**	**110**	**105**	**2,925**	**504B Subtotal**		**112**	**78**	**110**	**105**	**2,925**
							Delta (Compared to Existing)		*31*	*22*	*31*	*29*	*817*	Delta (Compared to Existing)		*31*	*22*	*31*	*29*	*817*
504C							**504C**							**504C**						
Residential (220)	--	--	--	--	--	--	Residential (220)	--	--	--	--	--	--	Residential (220)	172 DU	18	70	69	37	1,144
Hotel (310)	--	--	--	--	--	--	Hotel (310)	257 Rooms	80	56	79	76	2,100	Hotel (310)	257 Rooms	80	56	79	76	2,100
Office (710) [1]	1955.599 KSF	1,724	235	383	1,868	11,806	Office (710) [1]	2210.599 KSF	1,869	255	430	2,101	12,697	Office (710) [1]	1955.599 KSF	1,724	235	383	1,868	11,806
504C Subtotal		**1,724**	**235**	**383**	**1,868**	**11,806**	**504C Subtotal**		**1,950**	**311**	**509**	**2,176**	**14,797**	**504C Subtotal**		**1,822**	**361**	**531**	**1,981**	**15,050**
							Delta (Compared to Existing)		*226*	*76*	*126*	*309*	*2,991*	Delta (Compared to Existing)		*98*	*126*	*148*	*113*	*3,243*
504D							**504D**							**504D**						
Residential (220)	107 DU	8	39	37	18	622	Residential (220)	107 DU	8	39	37	18	622	Residential (220)	107 DU	8	39	37	18	622
Office (710) [1]	36.827 KSF	32	4	7	35	222	Office (710) [1]	36.827 KSF	32	4	7	35	222	Office (710) [1]	36.827 KSF	32	4	7	35	222
504D Subtotal		**40**	**44**	**44**	**54**	**844**	**504D Subtotal**		**40**	**44**	**44**	**54**	**844**	**504D Subtotal**		**40**	**44**	**44**	**54**	**844**
							Delta (Compared to Existing)		*0*	*0*	*0*	*0*	*0*	Delta (Compared to Existing)		*0*	*0*	*0*	*0*	*0*
SUBTOTAL TAZ 504		**2,357**	**503**	**715**	**2,579**	**19,757**	**TOTAL TAZ 504**		**2,876**	**636**	**936**	**3,230**	**25,309**	**TOTAL TAZ 504**		**2,507**	**732**	**974**	**2,765**	**25,147**
							Delta (Compared to Existing)		*518*	*133*	*221*	*651*	*5,553*	Delta (Compared to Existing)		*150*	*229*	*259*	*186*	*5,390*
502A							**502A**							**502A**						
Commercial (820) [2]	176.938 KSF	86	53	257	279	6,171	Commercial (820)	255.684 KSF	152	93	455	493	10,918	Commercial (820)	255.684 KSF	152	93	455	493	10,918
502A Subtotal		**86**	**53**	**257**	**279**	**6,171**	**502A Subtotal**		**152**	**93**	**455**	**493**	**10,918**	**502A Subtotal**		**152**	**93**	**455**	**493**	**10,918**
							Delta (Compared to Existing)		*66*	*41*	*198*	*214*	*4,746*	Delta (Compared to Existing)		*66*	*41*	*198*	*214*	*4,746*
502B							**502B**							**502B**						
Residential (220)	279 DU	28	114	112	61	1,855	Residential (220)	324 DU	33	132	131	70	2,155	Residential (220)	416 DU	42	170	168	90	2,766
502B Subtotal		**28**	**114**	**112**	**61**	**1,855**	**502B Subtotal**		**33**	**132**	**131**	**70**	**2,155**	**502B Subtotal**		**42**	**170**	**168**	**90**	**2,766**
							Delta (Compared to Existing)		*5*	*18*	*18*	*10*	*299*	Delta (Compared to Existing)		*14*	*56*	*55*	*30*	*911*
502C							**502C**							**502C**						
Hotel (310)	388 Rooms	121	84	119	114	3,170	Hotel (310)	388 Rooms	121	84	119	114	3,170	Hotel (310)	388 Rooms	121	84	119	114	3,170
Office (710)	38.078 KSF	52	7	10	47	420	Office (710)	38.078 KSF	52	7	10	47	420	Office (710)	38.078 KSF	52	7	10	47	420
502C Subtotal		**174**	**91**	**128**	**161**	**3,590**	**502C Subtotal**		**174**	**91**	**128**	**161**	**3,590**	**502C Subtotal**		**174**	**91**	**128**	**161**	**3,590**
							Delta (Compared to Existing)		*0*	*0*	*0*	*0*	*0*	Delta (Compared to Existing)		*0*	*0*	*0*	*0*	*0*
502D							**502D**							**502D**						
Residential (220) [3]	-	-	-	-	-	-	Residential (220)	282 DU	29	115	114	61	1,875	Residential (220)	691 DU	70	282	278	150	4,595
Hotel (310)	252 Rooms	79	55	77	74	2,059	Hotel (310)	252 Rooms	79	55	77	74	2,059	Hotel (310)	252 Rooms	79	55	77	74	2,059
Office (710) [4]	265.658 KSF	215	29	40	194	1,729	Office (710)	265.658 KSF	365	50	67	329	2,930	Office (710)	--	--	--	--	--	--
Commercial (820)	13.279 KSF	8	5	24	26	567	Commercial (820)	13.279 KSF	8	5	24	26	567	Commercial (820)	13.279 KSF	8	5	24	26	567
Car Dealership (841)	82.285 KSF	119	40	87	130	2,667	Car Dealership (841)	82.285 KSF	119	40	87	130	2,667	Car Dealership (841)	82.285 KSF	119	40	87	130	2,667
502D Subtotal		**421**	**129**	**227**	**423**	**7,022**	**502D Subtotal**		**599**	**264**	**368**	**619**	**10,099**	**502D Subtotal**		**276**	**381**	**466**	**379**	**9,888**
							Delta (Compared to Existing)		*178*	*135*	*141*	*196*	*3,077*	Delta (Compared to Existing)		*-145*	*253*	*239*	*-44*	*2,866*
SUBTOTAL TAZ 502		**709**	**387**	**725**	**924**	**18,639**	**TOTAL TAZ 502**		**958**	**581**	**1,083**	**1,344**	**26,761**	**TOTAL TAZ 502**		**644**	**736**	**1,217**	**1,124**	**27,163**
							Delta (Compared to Existing)		*249*	*194*	*357*	*420*	*8,122*	Delta (Compared to Existing)		*-65*	*349*	*492*	*200*	*8,524*
SUBTOTAL TAZ 502/504		**3,066**	**890**	**1,440**	**3,503**	**38,396**	**SUBTOTAL TAZ 502/504**		**3,833**	**1,217**	**2,018**	**4,574**	**52,070**	**SUBTOTAL TAZ 502/504**		**3,151**	**1,468**	**2,191**	**3,889**	**52,310**
15% Modal/Multi-Use Reduction		**-460**	**-133**	**-216**	**-525**	**-5,759**	**15% Modal/Multi-Use Reduction**		**-575**	**-183**	**-303**	**-686**	**-7,811**	**15% Modal/Multi-Use Reduction**		**-473**	**-220**	**-329**	**-583**	**-7,846**
TOTAL TAZ 502/504		**2,606**	**756**	**1,224**	**2,978**	**32,636**	**TOTAL TAZ 502/504**		**3,258**	**1,034**	**1,716**	**3,888**	**44,260**	**TOTAL TAZ 502/504**		**2,679**	**1,248**	**1,862**	**3,306**	**44,463**
							Delta (Compared to Existing)		***652***	***278***	***492***	***910***	***11,624***	**Delta (Compared to Existing)**		***72***	***492***	***638***	***328***	***11,827***

1) ITE fitted curve for the office land uses used to generate office trips for TAZ 504
2) 82 percent of the retail area is occupied (reduction to trips applied accordingly)
3) Residential development was not open during counts (i.e. was not generating trips)
4) 59 percent of office space is occupied (reduction to trips applied accordingly)
5) Includes planned residential development proposal (5650 American Boulevard, 177 DU)

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PM Peak Hour ITE Trip Comparison

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Figure 7

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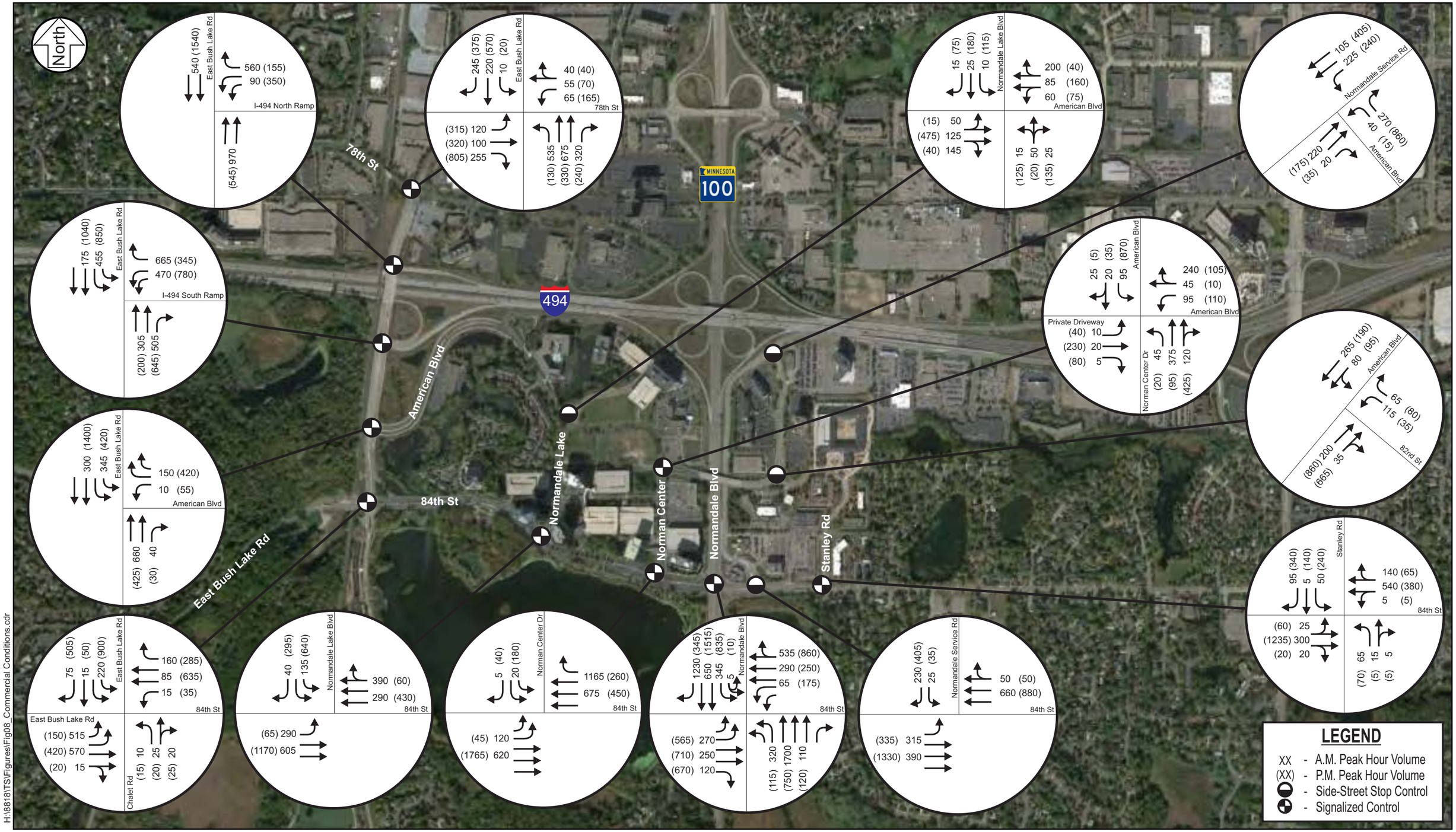

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Year 2040 Commercial Land Use Conditions

Normandale Lake District Traffic Study Update
City of Bloomington

Figure 8

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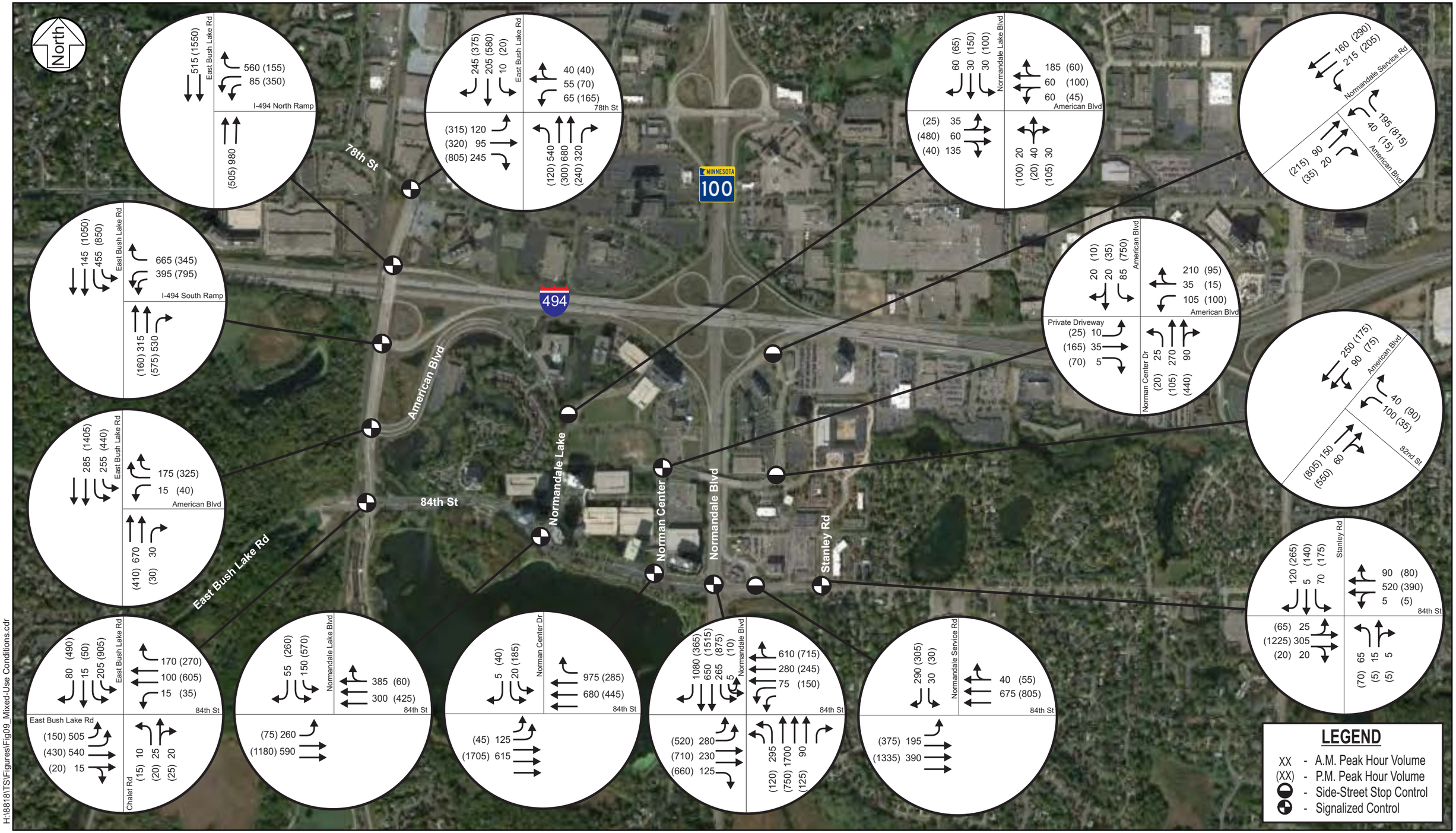

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Year 2040 Mixed-Use Land Use Conditions

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Figure 9

Year 2040 Conditions

Intersection Capacity Analysis

To determine if the existing roadway network and the improvements recommended under year 2018 conditions can accommodate year 2040 traffic forecasts, a detailed traffic capacity analysis was completed. The year 2040 conditions for both the commercial and mixed-use land use scenarios were evaluated to understand the long-term traffic impacts associated with the Normandale Lake District Area to the study intersections. Once again the study intersections were analyzed using Synchro/SimTraffic. Results of the year 2040 operations analysis shown in Table 8 indicate that all of the study intersections are expected to operate at an acceptable overall LOS D or better during the a.m. and p.m. peak hours, with the existing roadway network and recommended improvements under year 2018 conditions, except at the 84th Street/Normandale Service Road intersection which is expected to operate LOS F for both peak hours and land use scenarios. To improve traffic operations at the 84th Street/Normandale Service Road intersection, the following is recommended:

- Install turn restriction signs at the 84th Street/Normandale Service Road intersection for all left-turn movements (eastbound and southbound). These signs should read "No Left Turns from 7:00 am to 9:00 am and 4:00 pm to 6:00 pm".
    - During the peak periods, left-turning vehicles are expected to divert to either the access 300 feet east along 84th Street or Stanley Road. Note that due to the close intersection spacing between Normandale Service Road and Normandale Boulevard, southbound right-turn vehicles at the 84th Street/Normandale Service Road intersection will continue to experience significant delay during peak periods even with left-turns restricted. Without additional modifications to the access, vehicles are likely to divert to an alternative route.
- The City has had some discussions with closing or disconnecting access on Normandale Service Road north of the Holiday gas station access. Additional analysis should be completed to determine the feasibility of relocating this roadway section.

Although the remaining study intersections are expected to operate at an overall acceptable level of service, the following improvements are offered for consideration for both land use scenarios:

- Optimize signal timing splits along East Bush Lake Road between 78th Street and 84th Street and along 84th Street between East Bush Lake Road and Stanley Road.
- Construct a northbound right-turn lane at American Boulevard/Norman Center Drive.
- Increase the cycle length at the American Boulevard/82nd Street intersection to accommodate the increased traffic volume under year 2040 conditions.
    - With signal timing improvements, southbound queues will continue to extend approximately 550 feet blocking access to the adjacent driveways. The City is considering installing a raised median along American Boulevard between Normandale Lake Blvd and Norman Center Drive, which is discussed in the next section.

Table 8: Year 2040 Conditions Peak Hour Capacity Analysis

Intersection	Year 2040 – Commercial				Year 2040 – Mixed-Use			
	A.M. Peak		P.M. Peak		A.M. Peak		P.M. Peak	
	LOS	Delay (sec.)	LOS	Delay (sec.)	LOS	Delay (sec.)	LOS	Delay (sec.)
East Bush Lake Road/78th Street	B	16	D	44	B	16	D	44
East Bush Lake Road/Westbound I-494 Ramp	C	21	C	25	C	20	C	25
East Bush Lake Road/Eastbound I-494 Ramps	B	18	C	31	B	16	C	30
East Bush Lake Road/American Boulevard	B	16	B	19	B	14	B	19
East Bush Lake Road/84th Street	B	15	C	29	B	15	C	27
84th Street/Normandale Lake Boulevard	B	11	C	20	B	11	B	16
84th Street/Norman Center Drive	A	7	B	18	A	7	C	22
84th Street/Normandale Boulevard	D	52	D	50	C	33	D	53
84th Street/Normandale Service Road (1)	F/F	> 3 min.	F/F	> 3 min.	E/F	> 3 min.	C/F	106
84th Street/Stanley Road	B	10	B	13	A	7	B	12
American Boulevard/Normandale Lake Boulevard (1)	A/A	9	B/D	31	A/A	7	B/D	25
American Boulevard/Norman Center Drive	A	7	C	30	A	6	C	20
American Boulevard/82nd Street (1)	A/A	8	B/B	13	A/A	7	A/A	10
American Boulevard/Normandale Service Road (1)	A/A	4	A/A	8	A/A	3	A/A	8

(1) Indicates an unsignalized intersection with side-street stop control, where the overall LOS is shown followed by the worst approach LOS.

Other Considerations

American Boulevard Layout

The City is considering installing a raised median along American Boulevard between Normandale Lake Boulevard and Norman Center Drive. A preliminary layout is shown in Figure 10. The proposed layout would modify four-existing driveways that are current full-access to right-in/right-out. The access modification would reroute vehicles that would be making left-turns in and out of the driveways to the American Boulevard/Normandale Lake Boulevard intersection.

As previously mentioned, during the p.m. peak hour under year 2040 conditions for both the commercial and mixed-use land use scenarios, southbound queues at the American Boulevard/ 82nd Street intersection extend approximately 550 feet, which would block access three of the driveways. These southbound queues would limit the sight distance of vehicles making a left-turn movement into or out of the blocked driveways and may also increase the likelihood of risky driver behavior.

American Boulevard/Norman Center Drive

As mentioned in the *Norman Point Development Traffic Study*, dated August 4, 2015, which is included in the appendix, the existing monument signs and landscaping located north of American Boulevard on the east and west side of Normandale Lake Boulevard create sight distance issues for motorists making southbound movements at the stop sign locations. However, when motorists pull forward past the stop signs the sight distance does appear to meet AASHTO minimums. To improve current conditions consider the following: extend the median further south closer to American Boulevard, relocate the stop signs closer to American Boulevard, add stop bars to the north approach and/or relocate/remove the monument signs.

A sensitivity test was conducted under year 2040 conditions to understand the traffic impacts to the American Boulevard/Norman Center Drive intersection if/when the raised along American Boulevard between Normandale Lake Boulevard and Norman Center Drive is constructed. As previously mentioned, the raised median would divert additional traffic to the American Boulevard/ Norman Center Drive intersection. Results of the sensitivity analysis indicate that the intersection is expected to operate acceptably during the a.m. and p.m. peak hours under year 2040 conditions with the mixed-use land use scenario. However, with the commercial land use scenario, during the p.m. peak hour the intersection is expected to operate at LOS F with no modifications to the current traffic control (i.e. side-street stop control).

North

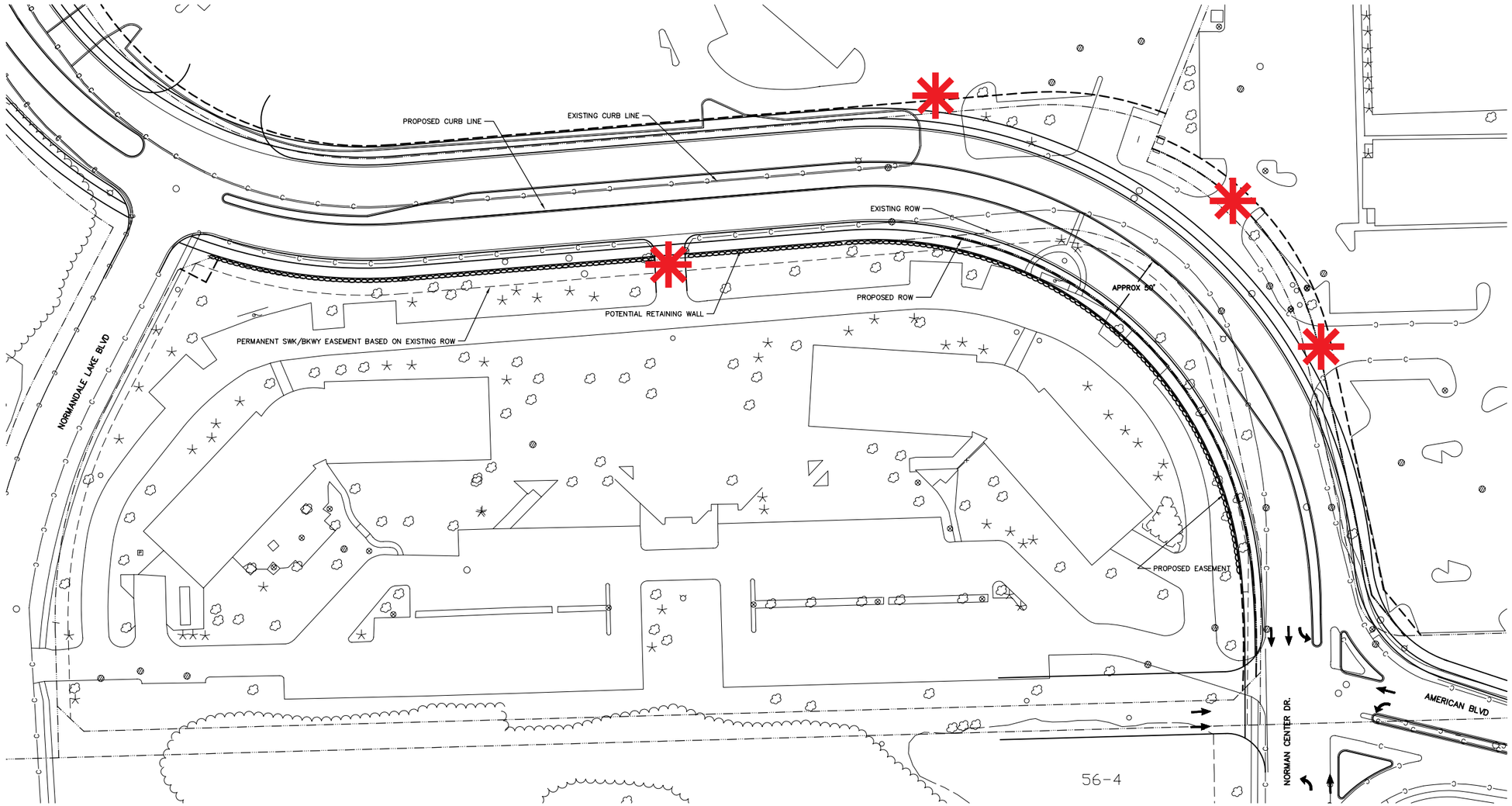
AMERICAN BLVD

FROM NORMAN CENTER DRIVE
TO NORMANDALE LAKE BLVD

N

0 40 80

SCALE IN FEET



Represents a driveway modified to right-in/right-out access

PRELIMINARY 30 MPH DESIGN
AMERICAN BLVD
FROM NORMANDALE LAKE BLVE TO NORMAN CENTER DRIVE

CITY OF BLOOMINGTON MINNESOTA
1700 W 98TH ST.
BLOOMINGTON, MINNESOTA 55431
PHONE (952) 563-8700

ENGINEERING DIVISION
PUBLIC WORKS DEPARTMENT
200X-XXX STREET IMPROVEMENT PROJECT

REVISIONS

DATE	DESCRIPTION	BY
	PRELIMINARY PLAN	

I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

JULIE M. LONG — LIC. # 25847 — DATE X/XX/OX

DRAWN: XXX
CHECKED: XXX
APPROVED: XXX

SHEET:
X OF X

Drawing name: H:\PROJECTS\2007\GreenValleyDr\cadfiles\GVD\dwg\prelim am blvd 30mph-062708.dwg -- Printed: Jun 27, 2008 - 2:29pm

H:\8818\TS\Figures\Fig10_American Boulevard Layout.cdr

SRF Consulting Group, Inc.

0158818
August 2015

Preliminary Layout for American Boulevard

Normandale Lake District Traffic Study Update
City of Bloomington

Figure 10

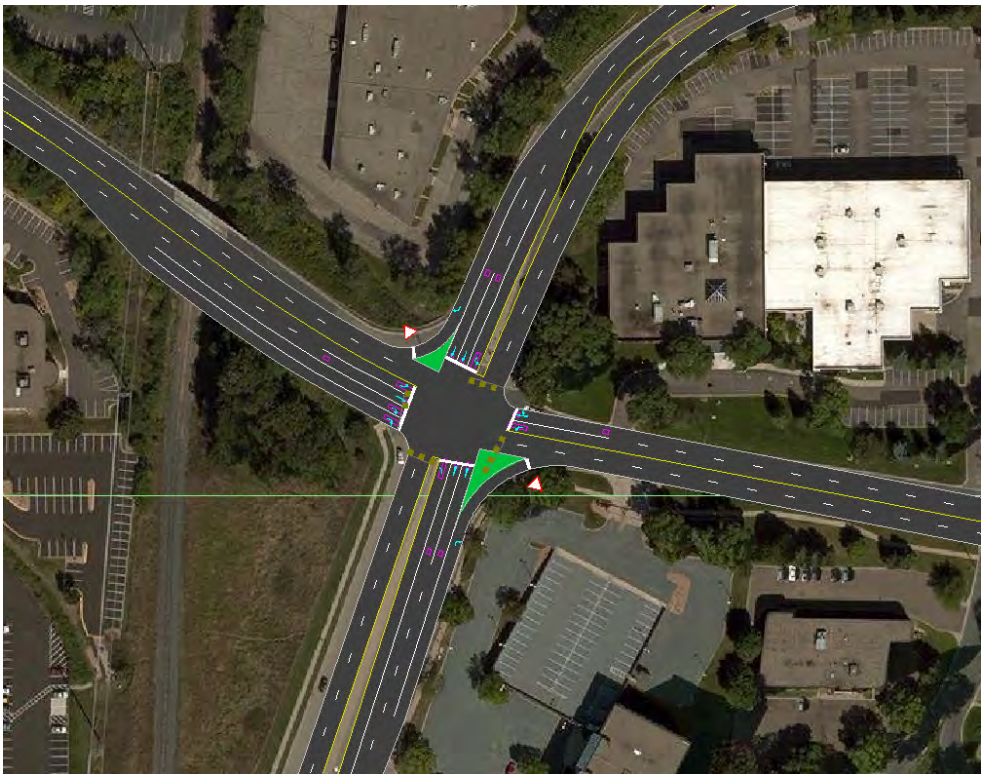
Therefore, if American Boulevard is reconstructed in order to provide acceptable operations during the p.m. peak hour under year 2040 commercial land use conditions, consider installing a traffic signal or a roundabout. A cursory review of the peak hour volumes indicates that year 2040 p.m. peak hour volumes will meet the peak hour warrant (Warrant 3B).

East Bush Lake Road/78th Street

As previously discussed, striping modifications to the East Bush Lake Road/78th Street intersection were recommended to accommodate year 2018 traffic volumes. However, these improvements are considered an interim solution until right-of-way can be acquired and the 78th Street Bridge is replaced. To provide acceptable and safe operations in the long-term, consider the following improvements (shown in Figure 11):

- Reconstruct the eastbound approach to provide a left-turn, a single through, and dual right-turn lanes and remove the right-turn lane channelization.
- Restripe the westbound approach to provide a left-turn and a shared through/right-turn lane.
- Reconstruct the southbound approach to provide a left-turn lane, two though lanes, and a right-turn lane.
- Remove the split phasing along the eastbound and westbound approaches and provide protected/permitted left-turn phasing.

Figure 11: Long-Term Geometric Modifications to the East Bush Lake Road/78th Street Intersection



Pedestrian/Bicyclist Accommodations

Existing pedestrian and bicyclist accommodations were reviewed for the Normandale Lake District. Based on discussions with City staff, there is a demand for on-road or off-road bike lanes on East Bush Lake to provide connectivity between the Normandale Lake District and Edina to the north. Long-term the bike lanes should continue north of 78th Street (into Edina) to provide better connectivity. The southern end of the bike lane on East Bush Lake Road would connect into the existing trails along East Bush Lake Road providing access to the south and to the trails within the adjacent parks. In addition, long-term the City plans to evaluate the potential to provide bike lanes and/or multi-use paths along 78th Street and American Boulevard.

Wayfinding

Installation of overhead and/or electronic wayfinding signage was considered for the Normandale Lake District Area. Considerations was given to determine if the signing would improve traffic flow through better guidance. However, since the majority of motorists on the internal roadway system are generated by residential and/or office developments in the District, motorists are expected to be familiar with the transportation network and the available alternatives routes. Further, with existing traffic mapping technology, such as Google, motorists are able to easily/quickly identify the fastest route based on current traffic conditions and often times before exiting from their parking space. Therefore, overhead and electronic wayfinding signage is not recommended for this area.

Normandale Lake/84th Street

To better understand the origins of eastbound vehicles on 84th Street, the traffic volumes generated from the Normandale Lake District were compared to the traffic volumes generated from outside the study area network. Existing and year 2040 peak hour volumes were used to estimate the percent of vehicles entering the eastbound approach of the Normandale Lake/84th Street intersection from the Normandale Lake District. This review focused on the p.m. peak hour and specifically the eastbound through and right-turn movements. Based on existing and year 2040 volumes, it is estimated that approximately 25 to 30 percent of vehicles making an eastbound through and right-turn movement are from the Normandale Lake District. The remaining 70 to 75 percent are vehicles with origins outside of the Normandale Lake District (e.g. I-494 cut-through traffic, East Bush Lake Road north of I-494, East Bush Lake Road south of 84th Street, etc.).

A portion of the 70 to 75 percent of eastbound through/right-turn vehicles at the Normandale Lake/ 84th Street intersection would be classified as I-494 "cut-through" traffic. Under existing conditions, when eastbound I-494 is experiencing heavy congestion, motorists exit at East Bush Lake Road and either make a westbound U-turn to return to I-494 or make a westbound left-turn to either a southbound left-turn at American Boulevard or 84th Street depending on the motorist's final destination. While this "cut-through" travel pattern occurs on a regular basis, the magnitude of motorists making these movements is dependent on the level of congestion of eastbound I-494.

American Boulevard – Roadway Diet Review

Peak hour and daily traffic volumes under existing and year 2040 conditions were reviewed to determine potential locations along American Boulevard where a "roadway diet" could be considered. For purposes of this review, American Boulevard was evaluated to determine the potential to reduce a through lane to provide space for a bike lane or multi-use trail.

In April 2015, daily (24-hour) counts were conducted along American Boulevard at two locations: between Normandale Lake Boulevard and Norman Center Drive and between Norman Center Drive and 82nd Street. The hourly volume profiles for both the eastbound and westbound directions in Figure 12 and Figure 13 indicate that American Boulevard experiences a significant increase in traffic during the p.m. peak period in the eastbound direction. On the segment of American Boulevard Normandale Lake Boulevard and Norman Center Drive, 39 percent of the daily volume occurred between the hours of 3:00 p.m. and 6:00 p.m.; and for the segment between Norman Center Drive and 82nd Street, 47 percent of the daily volume occurred between the hours of 3:00 p.m. and 6:00 p.m.

Figure 12: American Boulevard Volume Profile

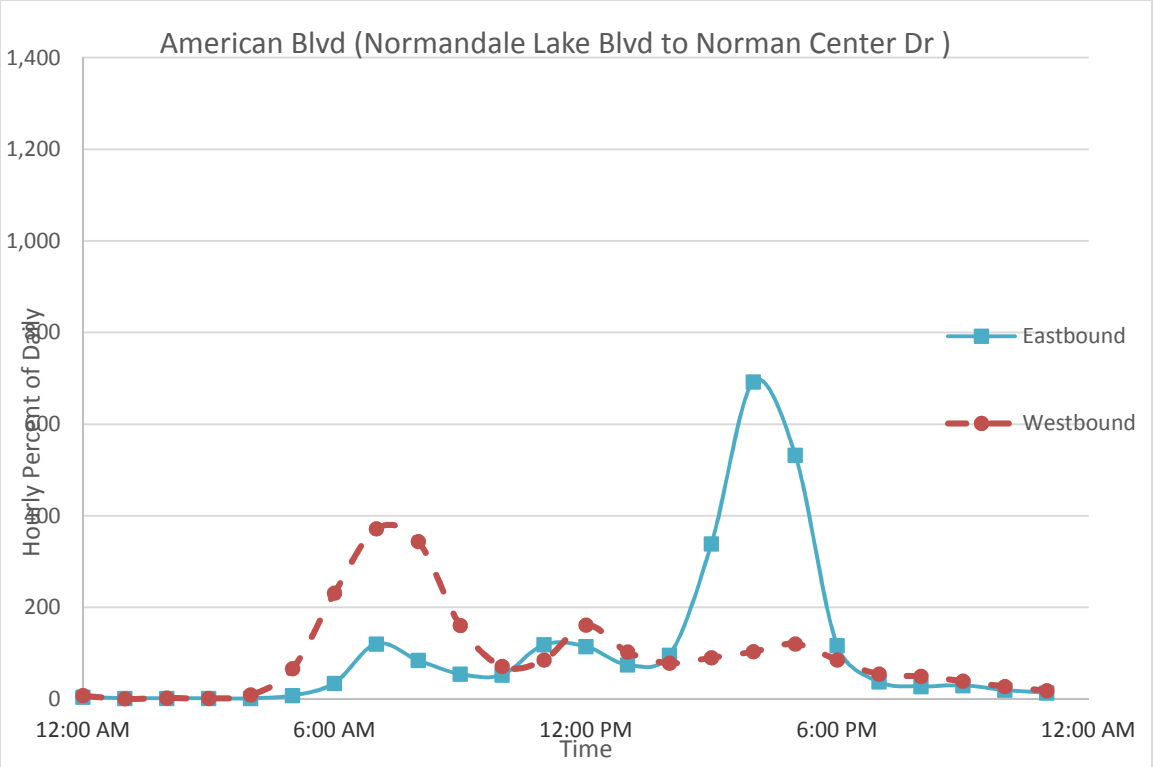
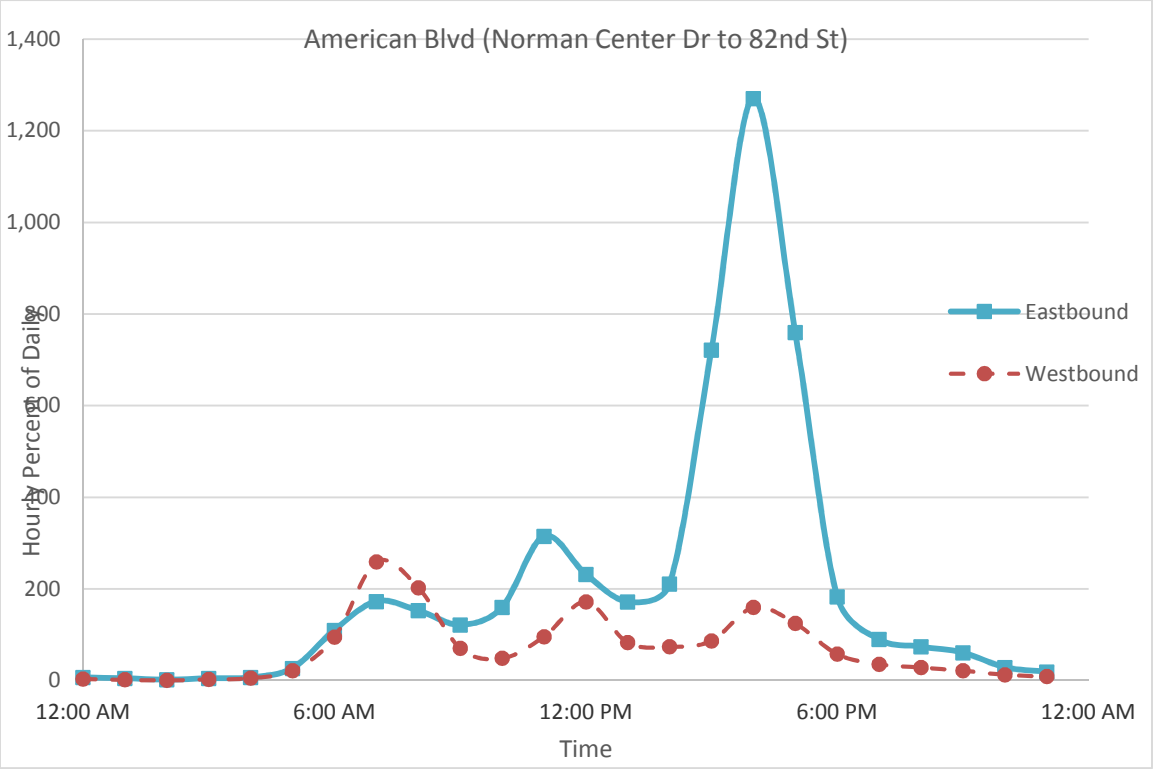


Figure 13: American Boulevard Volume Profile



A planning level review of the a.m. and p.m. peak hour volumes was completed to identify segments on American Boulevard where a roadway diet could be considered. Based on a review of peak hour and directional volumes, the segment of American Boulevard between East Bush Lake Road and the Normandale Boulevard Service Road could potentially be reduced to one westbound through lane and two eastbound through lanes (currently a four-lane undivided). However, additional traffic operational analysis should be conducted to confirm that acceptable traffic operations would be maintained along the corridor and at key intersections.

Planning Level Cost Estimates

The City identified seven (7) improvements to develop planning level cost estimates for and are summarized in Table 10. These are planning level construction costs and do not include engineering/design services. Also, note that for four of the improvement options listed below, detailed cost information is provided in the Appendix.

Table 10: Planning Level Cost Estimates

Improvement Option	Assumptions	Estimated Planning Level Construction Costs
1. On-Road East Bush Lake Road pedestrian/bike connection (between 78th Street and 84th Street) – No roadway widening	Two-way cycle track on the west side of East Bush Lake Road; vertical delineators to separate vehicular and bicyclist traffic; no roadway widening assumed (existing land widths and medians modified to accommodate bike lanes) – Detail cost information provided in Appendix	$1,000,000
2. On-Road East Bush Lake Road pedestrian/bike connection (between 78th Street and 84th Street) – Roadway widening	Two-way cycle track on the west side of East Bush Lake Road; roadway widening on west side assumed; bridge width was not modified; costs do not include railroad agreements nor right-of-way acquisitions – Detail cost information provided in Appendix	$1,190,000
3. American Blvd/Normandale Lake Blvd traffic control change (signal or roundabout)		Signal - $250,000 Roundabout – $1,230,000
4. Signal timing modifications at East Bush Lake Road between 78th Street and 84th Street (five signalized intersections); American Blvd / 82nd Street, and Normandale Lake/84th Street	Includes data, collection, development of timing plans, and documentation	$3,000 per intersection
5. Repair/replace existing pedestrian bridge over 84th Street abutments (bridge located between Normandale Lake Blvd and Norman Center Drive)	Costs include removal of two existing walls, replacement with modular block walls, bridge shoring or temporary removal, trail repair, and soft costs/contingency of 20% each Note: no soils information reviewed, assumed bridge supported on piles, big block walls assumed non-reinforced; both walls assumed similar in size	$215,000
6. East Bush Lake Road /78th Street intersection – Short-Term/ Restriping	Detail cost information provided in Appendix	$460,000
7. East Bush Lake Road /78th Street intersection – Long-Term/ Roadway Widening	Assume that short-term improvements have been constructed and use as baseline for long-term improvements – Detail cost information provided in Appendix	$2,935,000

Conclusions and Recommendations

Based on the analysis the following conclusions and recommendations are offered for your consideration:

- Results of the existing capacity analysis indicate that all study intersections currently operate at an acceptable overall LOS D or better during the a.m. and p.m. peak hours, with the existing traffic control, geometric layout, and signal timing.
  - While overall the study intersection operate at acceptable levels of service, existing traffic issues were observed to occur at multiple intersections including: East Bush Lake Road/Eastbound I-494 Ramps, East Bush Lake Road/84th Street, 84th Street/Normandale Boulevard, 84th Street/Normandale Service Road, American Boulevard/Normandale Lake Boulevard, and American Boulevard/Norman Center Drive. However, to better understand traffic impacts to the study area under future conditions no modifications to signal timing and/or geometrics are recommended under existing conditions.
- Results of the year 2018 conditions indicate that geometric modifications will be needed at the East Bush Lake Road/78th Street intersection and signal timing modifications will be needed at the study intersections along East Bush Lake Road. These improvements are required to accommodate the travel pattern shifts due to the new I-494/East Bush Lake Road Westbound On-Ramp.
- Two land use scenarios were evaluated for the Normandale Lake District Area: commercial and mixed-use. The land use scenarios are expected to generate the following additional trips compared to existing conditions:
  - Commercial Scenario: 930 a.m. peak hour, 1,402 p.m. peak hour, and 11,624 daily trips
  - Mixed-Use Scenario: 564 a.m. peak hour, 966 p.m. peak hour, and 11,827 daily trips
- Results of the year 2040 operations analysis indicate that all of the study intersections are expected to operate at an acceptable overall LOS D or better during the a.m. and p.m. peak hours, with the recommended improvements under year 2018 conditions, except at the 84th Street/Normandale Service Road intersection which is expected to operate LOS F for both peak hours and land use scenarios.
  - To improve traffic operations at the 84th Street/Normandale Service Road intersection, it is recommended to install turn restriction signs at the 84th Street/Normandale Service Road intersection for all left-turn movements (eastbound and southbound). These signs should read "No Left Turns from 7:00 am to 9:00 am and 4:00 pm to 6:00 pm".
- The following additional improvements are recommended to improve traffic operations under year 2040 conditions:
  - Optimize signal timing splits along East Bush Lake Road between 78th Street and 84th Street and along 84th Street between East Bush Lake Road and Stanley Road.
  - Construct a northbound right-turn lane at American Boulevard/Norman Center Drive.

  - Increase the cycle length at the American Boulevard/82nd Street intersection to accommodate the increased traffic volume under year 2040 conditions.

- A raised median along American Boulevard between Normandale Lake Boulevard and Norman Center Drive was also reviewed to determine the traffic impacts to the study area. Installing a raised median would restrict access at the four existing driveways between Normandale Lake Boulevard and Norman Center Drive to right-in/right-out access. Vehicles wanting to make left-turns into or out of the driveways would likely divert to the American Boulevard/Normandale Lake Boulevard intersection.
  - A sensitivity test was conducted under year 2040 conditions to understand the traffic impacts to the American Boulevard/Norman Center Drive intersection if/when the raised along American Boulevard between Normandale Lake Boulevard and Norman Center Drive is constructed. Results indicate that with the commercial land use scenario, during the p.m. peak hour the intersection is expected to operate at LOS F with no modifications to the current traffic control (i.e. side-street stop control).
    - To provide acceptable levels of service under this scenario a traffic signal or roundabout should be considered at this location.
- The striping modifications recommended under year 2018 conditions at the East Bush Lake Road/78th Street intersection are an interim solution. When funds/right-of-way becomes available, consider the long-term following improvements.
  - Reconstruct the eastbound approach to provide a left-turn, a single through, and dual right-turn lanes and remove the right-turn lane channelization.
  - Restripe the westbound approach to provide a left-turn and a shared through/right-turn lane.
  - Reconstruct the southbound approach to provide a left-turn lane, two though lanes, and a right-turn lane.
  - Remove the split phasing along the eastbound and westbound approaches and provide protected/permitted left-turn phasing.

Appendix A
Norman Pointe Development
Traffic Study

SRF Consulting Group, Inc. | Engineers Planners Designers

Memorandum

SRF No. 0158818

To: Kirk Roberts, PE
City of Bloomington

From: Joshua Maus, PE, PTOE
Emily Gross, EIT

Date: August 4, 2015

Subject: Norman Pointe Development Traffic Study

Introduction

As requested, SRF has completed a traffic study for the proposed Norman Pointe residential development in the City of Bloomington (see Figure 1: Project Location). The proposed development is located in the northeast quadrant of the American Boulevard/Normandale Lake Boulevard intersection. This traffic study is supplementary to the ongoing *Normandale Lake District Traffic Study Update*. The main objectives of this study are to evaluate the traffic impacts to the adjacent roadway network and recommend any necessary improvements to accommodate the proposed development. The following information provides the assumptions, analysis, and study recommendations offered for consideration.

Existing Conditions

The existing conditions were reviewed to establish a baseline to compare and determine any future impacts associated with the proposed development. The evaluation of existing conditions includes peak hour intersection counts, field observations, and an intersection capacity analysis.

Data Collection

As part of the ongoing *Normandale Lake District Traffic Study Update,* intersection turning movement counts were collected by SRF during the weekday a.m. and p.m. peak periods in August 2013 and April 2015 at the following locations:

- East Bush Lake Road/78th Street
- East Bush Lake Road/Westbound I-494 Ramp
- East Bush Lake Road/Eastbound I-494 Ramps
- East Bush Lake Road/American Boulevard
- East Bush Lake Road/84th Street
- 84th Street/Normandale Lake Boulevard
- 84th Street/Norman Center Drive
- 84th Street/Normandale Boulevard
- 84th Street/Normandale Service Road
- 84th Street/Stanley Road
- American Boulevard/Normandale Lake Boulevard
- American Boulevard/Norman Center Drive
- American Boulevard/82nd Street
- American Boulevard/Normandale Service Road

Two site visits were conducted during the a.m. and p.m. peak periods to observe traffic patterns and identify current operational issues. These site visits were also used to identify roadway characteristics (i.e. roadway geometry, traffic controls, and posted speed limits) within the study area. Existing geometrics, traffic control, and peak hour traffic volumes are shown in Figure 2.

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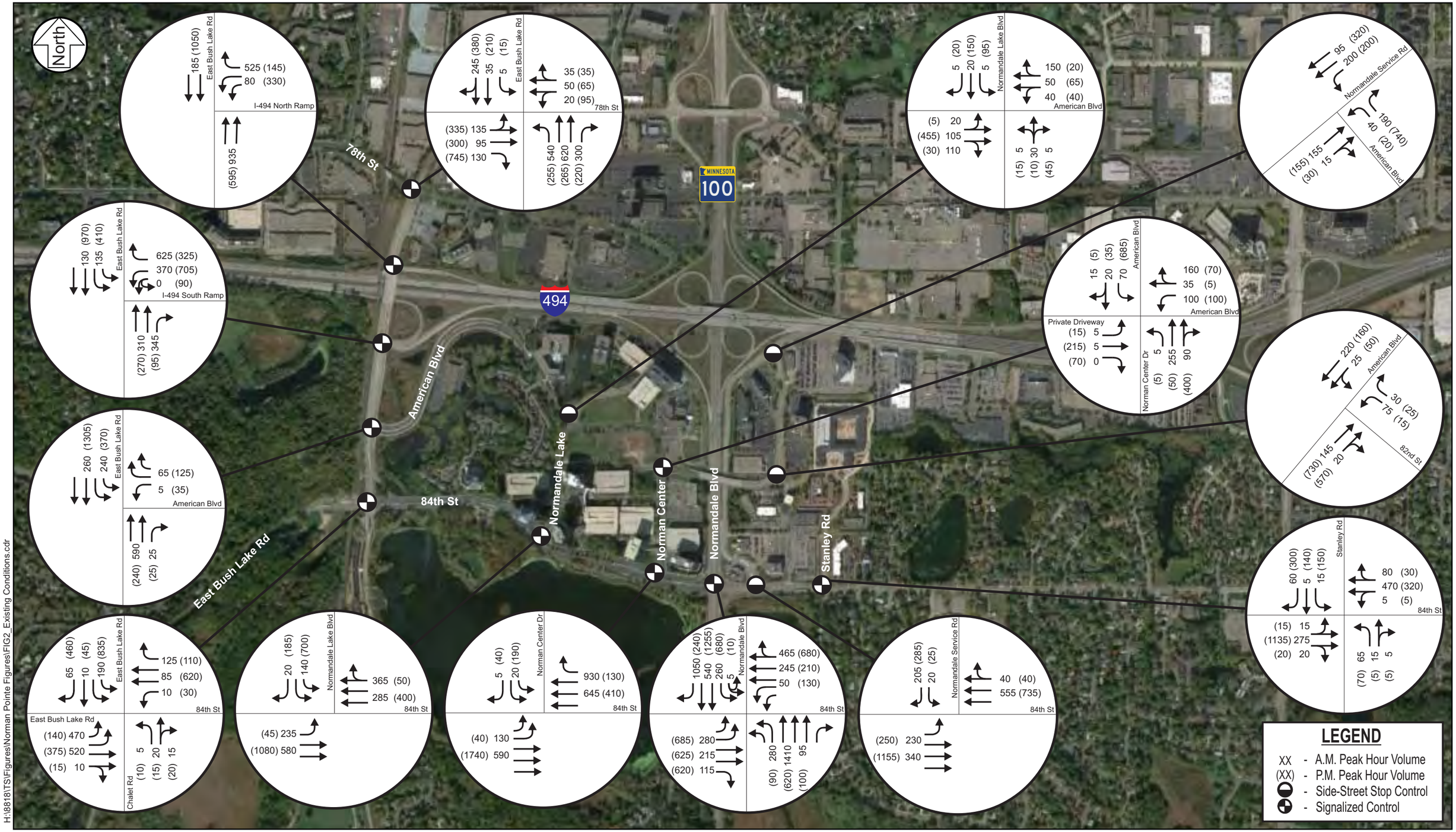
SRF Consulting Group, Inc.

Project Location

Norman Pointe Development Traffic Study
City of Bloomington

158818
July 2015

Figure 1



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SRF Consulting Group, Inc.

Existing Conditions

Norman Pointe Development Traffic Study

City of Bloomington

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July 2015

Figure 2

Intersection Capacity Analysis

An existing intersection capacity analysis was completed to establish a baseline condition to which future traffic operations could be compared. The study intersections were analyzed using a combination of Synchro/SimTraffic software (V8.0) and the *Highway Capacity Manual* (HCM).

Capacity analysis results identify a Level of Service (LOS) which indicates how well an intersection is operating. Intersections are ranked from LOS A through LOS F. The LOS results are based on average delay per vehicle, which correspond to the delay threshold values shown in Table 1. LOS A indicates the best traffic operation, while LOS F indicates an intersection where demand exceeds capacity. Overall intersection LOS A through LOS D is generally considered acceptable in the Twin Cities Metropolitan Area.

Table 1: Level of Service Criteria for Signalized and Unsignalized Intersections

LOS Designation	Signalized Intersection Average Delay/Vehicle (seconds)	Unsignalized Intersection Average Delay/Vehicle (seconds)
A	≤ 10	≤ 10
B	> 10 - 20	> 10 - 15
C	> 20 - 35	> 15 - 25
D	> 35 - 55	> 25 - 35
E	> 55 - 80	> 35 - 50
F	> 80	> 50

For side-street stop controlled intersections, special emphasis is given to providing an estimate for the level of service of the side-street approach. Traffic operations at an unsignalized intersection with side-street stop control can be described in two ways. First, consideration is given to the overall intersection level of service. This takes into account the total number of vehicles entering the intersection and the capability of the intersection to support these volumes. Second, it is important to consider the delay on the minor approach. Since the mainline does not have to stop, the majority of delay is attributed to the side-street approaches. It is typical of intersections with higher mainline traffic volumes to experience high levels of delay (i.e. poor levels of service) on the side-street approaches, but an acceptable overall intersection level of service during peak hour conditions.

Results of the existing capacity analysis shown in Table 2 indicate that all study intersections currently operate at an acceptable overall LOS D or better during the a.m. and p.m. peak hours, with the existing traffic control, geometric layout, and signal timing.

Table 2: Existing Conditions Peak Hour Capacity Analysis

Intersection	A.M. Peak		P.M. Peak	
	LOS	Delay (sec.)	LOS	Delay (sec.)
East Bush Lake Road/78th Street	C	25	C	25
East Bush Lake Road/Westbound I-494 Ramp	B	19	B	14
East Bush Lake Road/Eastbound I-494 Ramps	B	13	C	20
East Bush Lake Road/American Boulevard	B	13	B	16
East Bush Lake Road/84th Street	B	14	C	32
84th Street/Normandale Lake Boulevard	B	10	B	14
84th Street/Norman Center Drive	A	7	A	9
84th Street/Normandale Boulevard	C	33	D	43
84th Street/Normandale Service Road (1)	C/E	45	A/D	32
84th Street/Stanley Road	A	7	B	12
American Boulevard/Normandale Lake Boulevard (1)	A/A	8	A/B	13
American Boulevard/Norman Center Drive	A	7	B	15
American Boulevard/82nd Street (1)	A/A	6	A/A	7
American Boulevard/Normandale Service Road (1)	A/A	4	A/A	7

(1) Indicates an unsignalized intersection with side-street stop control, where the overall LOS is shown followed by the worst approach LOS.

Although all of the intersections operated at acceptable overall levels of service during the a.m. and p.m. peak hours, the following operational issues were observed during field observations as well as in the simulation model:

- East Bush Lake Road/78th Street
  - During the a.m. peak hour northbound left-turn queues extend approximately 530 feet, which is beyond the available turn lane storage. These queues cause inefficient traffic operations for northbound through and westbound right-turn movements at the East Bush Lake Road/Westbound I-494 Ramp intersection.
  - During the p.m. peak hour eastbound queues extend approximately 360 feet, blocking access to the eastbound right-turn lane. Based on one day of field observations, these queues extended more than 700 feet and cycle failure was observed. The intersection currently operates with eastbound/westbound split phasing.
- East Bush Lake Road/Eastbound I-494 Ramps
  - During the p.m. peak hour when eastbound I-494 is experiencing heavy congestion, motorists were observed to exit at East Bush Lake Road and either make a westbound U-turn to return to I-494 or make a westbound left-turn to either a southbound left-turn at American Boulevard or 84th Street depending on the motorist's final destination. While this "cut-through" travel pattern occurs on a regular basis, the magnitude of motorists making these movements is dependent on the level of congestion of eastbound I-494.

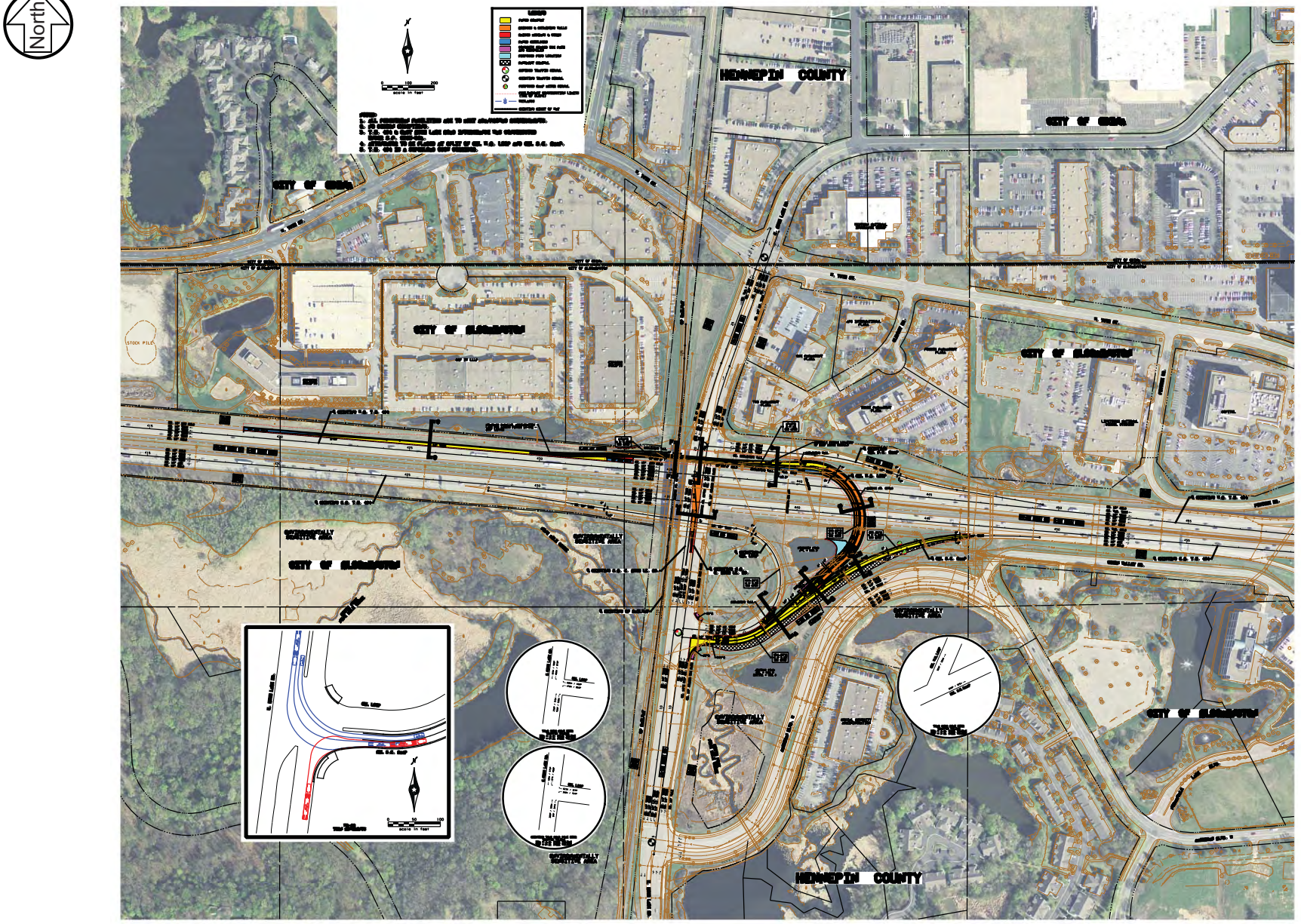
- East Bush Lake Road/84th Street
  - During the p.m. peak hour southbound left-turn queues extend approximately 540 feet, which is beyond the available storage.

- 84th Street/Normandale Boulevard
  - During the a.m. peak hour, poor lane utilization was observed on the westbound through and northbound left-turn movements due to the high percentage of vehicles destined to make a westbound right-turn at the 84th Street/Norman Center Drive intersection.
  - During the p.m. peak hour, eastbound queues along 84th Street extend through the Norman Center Drive intersection and some days will extend past the Normandale Lake Boulevard intersection. However, on those days the queues are generally "rolling" rather than stopped.
- 84th Street/Normandale Service Road
  - During the a.m. peak hour, the westbound approach of the 84th Street/ Normandale Boulevard intersection queues through the Normandale Service Road intersection approximately 10 percent of the peak hour, resulting in poor operations for the Normandale Service Road southbound approach.
  - During the a.m. and p.m. peak hour eastbound left-turn queues extend beyond available storage (approximately 150 and 170 feet), respectively. These stopped vehicles would extend into the eastbound through lanes which would increase the potential for rear-end crashes along 84th Street.
- American Boulevard/Normandale Lake Boulevard
  - There is an existing sight distance issue for southbound approach vehicles at the location of the stop signs. The location of the Norman Pointe monument signs and landscaping make it difficult for motorists to see vehicles traveling along American Boulevard. However, when vehicles pull forward past the stop signs, which motorist were observed to do, the sight distance does meet the minimum AASHTO sight distance requirements.

- American Boulevard/Norman Center Drive
  - During the p.m. peak hour southbound left-turn queues extend approximately 350 feet, blocking access to two driveways along American Boulevard.

I-494/East Bush Lake Road Westbound On-Ramp

The I-494/East Bush Lake Road Westbound On-Ramp concept shown in Figure 3 is expected to be constructed by year 2018. This proposed ramp will result in more direct access for regional trips destined for westbound I-494 from Bloomington's Normandale Lakes District and southern Edina. This is an assumed regional improvement under year 2018 conditions and travel pattern shifts for motorists rerouting to use the I-494/East Bush Lake Road Westbound On-Ramp were based on the *I-494/East Bush Lake Road Preliminary Design Project*.



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158818
July 2015

I-494/East Bush Lake Road Westbound On-Ramp Layout

Norman Pointe Development Traffic Study
City of Bloomington

Figure 3

In addition to providing access to westbound I-494, the project plans to extend the southbound left-turn lanes and provide a signal overlap phase for the northbound right-turn movement. With the signal overlap phase, it is assumed that no westbound U-turn movement would be permitted since it would be in direct conflict with the northbound right-turn movement. Motorists currently making westbound U-turns were assumed to stay on I-494 and no longer would be using the East Bush Lake Road as a cut-through route.

Year 2018 No Build Traffic Forecasts

Traffic forecasts were developed for year 2018 (one-year after the opening) conditions for both with and without the construction of the proposed Norman Pointe residential development (i.e. year 2018 no build and build conditions, respectively). This section describes the methodology/assumptions used to develop year 2018 no build traffic forecasts. Year 2018 build forecasts will be discussed in the upcoming sections of this document.

Background Traffic

To develop year 2018 background growth to the study area, growth rates were applied to the existing non-Normandale Lake District traffic volume set. These growth rates were based on historical traffic volume trends, information provided from the Year 2030 Metro Council Travel Demand Model with updated 2040 SE data, and the *I-494/East Bush Lake Road Preliminary Design Project* forecast memo. It should be noted that much of the growth expected in the area is directly due to the expected/proposed land use changes in the Normandale Lake District and not necessarily related to growth outside of the study area. A growth rate of one-quarter percent per year was applied to all movements entering the study area, except for the northbound and southbound through movements at the Normandale Boulevard/84th Street intersection, where a three-quarter percent per year growth rate.

Development Currently Under Construction

In addition to the general background increases, year 2018 no build conditions include trips that will be generated by the Hampton Inn and Luxembourg Apartments, which are currently under construction and expected to open in the next six months. The Hampton Inn is located in the northeast quadrant of the American Boulevard/Norman Center Drive intersection and the Luxembourg Apartments are generally located north of 82nd Street/Stanley Road and east of American Boulevard. Trip generation estimates for the a.m. and p.m. peak hour and on a daily basis were calculated for the hotel and apartment land uses based on the *ITE Trip Generation Manual, 9th Edition.* A 15 percent modal/multi-use reduction was applied to the developments. This value was calculated using current traffic counts and trip generation estimate for the existing development. Results of the trip generation estimate shown in Table 3 indicate that the apartment and hotel land uses will generate a total of approximately 167 a.m. peak hour, 200 p.m. peak hour, and 2,288 daily trips.

Table 3: Trip Generation Estimates – Developments Currently Under Construction

Land Use Type *(ITE Code)*	Size	A.M. Peak Hour Trips		P.M. Peak Hour Trips		Daily Trips
		In	Out	In	Out	
Hotel (310)	100 rooms	31	22	31	29	817
Apartment (210)	282 DU	29	115	114	61	1,875
Subtotal		60	137	145	91	2,692
Modal/Multi-Use Reduction (15%)		(9)	(21)	(22)	(14)	(404)
Total		51	116	123	77	2,288

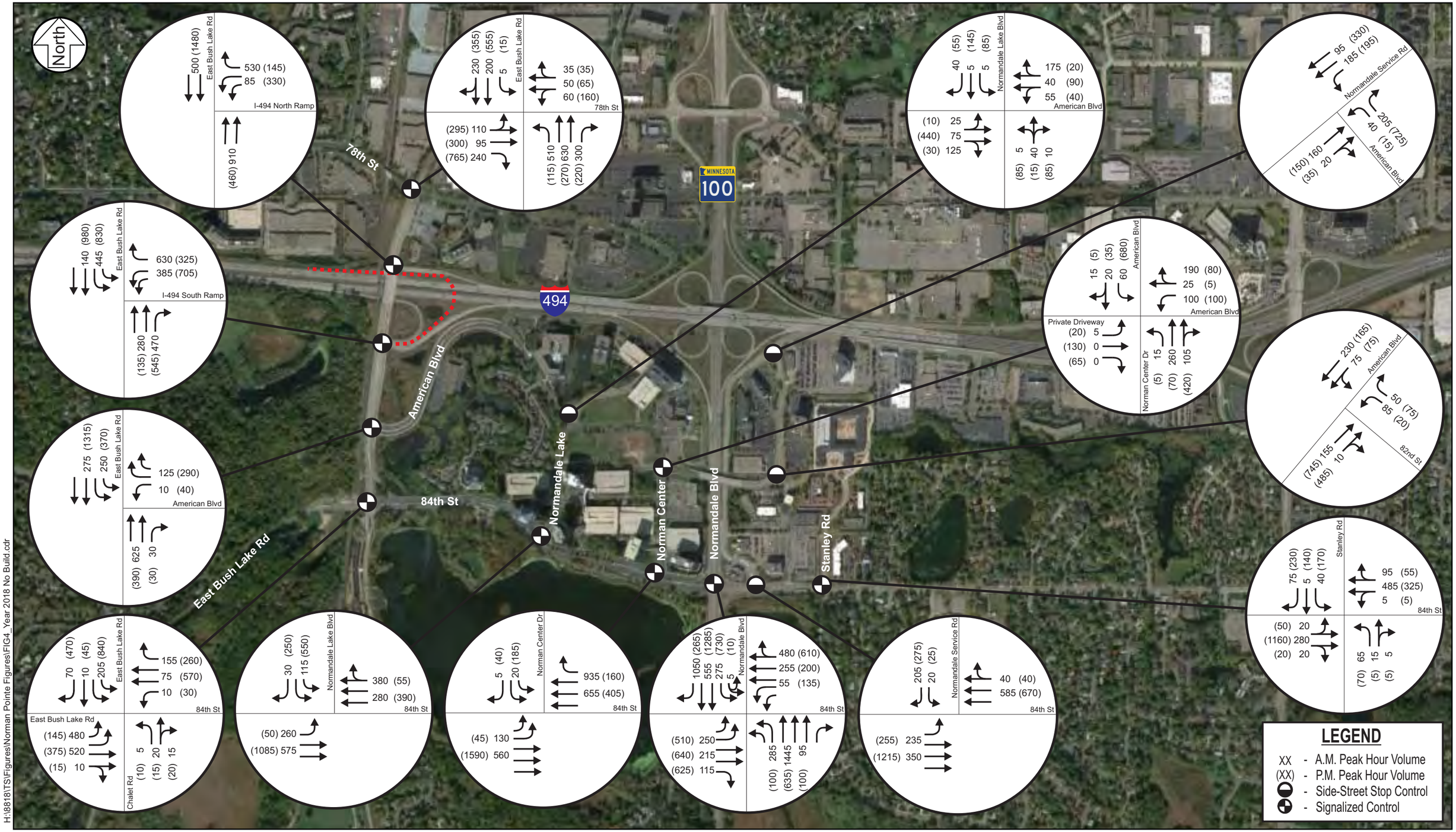
I-494/East Bush Lake Road Westbound On-Ramp

As previously mentioned, year 2018 no build conditions assume that the I-494 East Bush Lake Road Westbound On-Ramp is complete and open to traffic. It should be noted that trips generated in the Normandale Lake District Area were individually rerouted based on the development access location, directional distribution, and ITE trip generation to account for the travel pattern shifts to the new on-ramp. However, the travel pattern and traffic volume magnitude shift for non-Normandale Lake District Area trips were based on the information provided in the *I-494/East Bush Lake Road Preliminary Design Project* forecast memo and are consistent with assumptions from the ongoing *Normandale Lake District Traffic Study Update*.

Approximately 325 a.m. peak hour and 465 p.m. peak hour non-Normandale Lake District trips are expected to reroute to the I-494 East Bush Lake Road Westbound On-Ramp under year 2018 conditions. The majority of this shift is from trips destined to/from the west, north, and east of the East Bush Lake Road/78th Street intersection. A portion of vehicles that are currently using East Bush Lake Road to access US Highway 169 to the south are also expected to reroute to the I-494 East Bush Lake Road Westbound On-Ramp.

Approximately 105 a.m. peak hour and 400 p.m. peak hour Normandale Lake District trips (including existing land uses and the two developments that are currently under construction) are expected to reroute to the I-494 East Bush Lake Road Westbound On-Ramp under year 2018 conditions. These trips will divert away from making an eastbound left-turn or westbound right-turn at the 84th Street/Normandale Boulevard intersection and northbound left-turn at East Bush Lake Road/78th Street.

Year 2018 no build traffic forecasts, which take into account background growth, trips generated by the Hampton Inn and Luxemburg Apartments (currently under construction), and travel pattern shifts due to the new I-494 East Bush Lake Road Westbound On-Ramp, are shown in Figure 4.



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158818
July 2015

Year 2018 No Build Conditions

Norman Pointe Development Traffic Study
City of Bloomington

Figure 4

Year 2018 No Build Conditions

Intersection Capacity Analysis

To determine if the existing roadway network can accommodate year 2018 no build traffic forecasts, a detailed traffic capacity analysis was completed. The year 2018 no build conditions were reviewed to establish a baseline to compare and determine any future impacts associated with the proposed development. Study intersections were analyzed using Synchro/SimTraffic and HCM. Results of the year 2018 no build operations analysis shown in Table 4 indicates that the study intersections are expected to operate at an acceptable overall LOS D or better during the a.m. and p.m. peak hours, with the existing traffic control, geometric layout, and signal timing, except the East Bush Lake Road/ 78th Street intersection which is expected to operate at LOS E during the p.m. peak hour.

Table 4: Year 2018 No Build Conditions Peak Hour Capacity Analysis

Intersection	A.M. Peak		P.M. Peak	
	LOS	Delay (sec.)	LOS	Delay (sec.)
East Bush Lake Road/78th Street	C	25	E	59
East Bush Lake Road/Westbound I-494 Ramp	B	17	C	25
East Bush Lake Road/Eastbound I-494 Ramps	B	15	D	41
East Bush Lake Road/American Boulevard	B	14	B	17
East Bush Lake Road/84th Street	B	14	C	30
84th Street/Normandale Lake Boulevard	B	10	B	14
84th Street/Norman Center Drive	A	7	A	8
84th Street/Normandale Boulevard	C	30	D	37
84th Street/Normandale Service Road (1)	B/D	34	A/C	19
84th Street/Stanley Road	A	7	B	12
American Boulevard/Normandale Lake Boulevard (1)	A/A	8	A/B	12
American Boulevard/Norman Center Drive	A	6	B	13
American Boulevard/82nd Street (1)	A/A	7	A/A	9
American Boulevard/Normandale Service Road (1)	A/A	3	A/A	6

(1) Indicates an unsignalized intersection with side-street stop control, where the overall LOS is shown followed by the worst approach LOS.

To provide acceptable operations at the East Bush Lake Road/78th Street intersection, the modifications listed below are recommended (see Figure 5). It should be noted that at this intersection there is limited right-of-way to expand the roadway width due to existing building location and grade changes. Therefore, the existing roadway width was maintained.

- Restripe the eastbound approach to provide a left-turn, single through, and right-turn lane.
- Restripe the westbound approach to provide a left-turn and shared through/right-turn lane.
- Restripe the southbound approach to provide a southbound left-turn, single through, and trap the right-turn lane.
- Remove the split phasing along the eastbound and westbound approaches and provide protected/permitted left-turn phasing.

Figure 5: Recommended Geometric Modifications to the East Bush Lake Road/78th Street Intersection

To improve traffic operations along East Bush Lake Road during the p.m. peak hour under year 2018 conditions, signal timing cycles and splits should be optimized at the study intersections from 78th Street to 84th Street. Current cycle lengths along East Bush Lake Road during the p.m. peak hour are 90 seconds, a 150 second cycle length was assumed for analysis purposes.

With the modifications identified above to the p.m. peak hour, results of the year 2018 no build operations analysis shown in Table 5 indicates that the study intersections are expected to operate at an acceptable overall LOS D or better. In addition to the modifications listed above, the City should monitor the 84th Street/Normandale Service Road intersection and consider installing "No Left Turn" signs during the a.m. and p.m. peak periods. As mentioned under existing conditions, eastbound left-turn queues extend beyond the available storage, causing safety and operational issues for mainline traffic on 84th Street

Table 5: Year 2018 No Build Conditions Peak Hour Capacity Analysis – Recommended Improvements

Intersection	P.M. Peak	
	LOS	Delay (sec.)
East Bush Lake Road/78th Street	C	25
East Bush Lake Road/Westbound I-494 Ramp	C	23
East Bush Lake Road/Eastbound I-494 Ramps	C	27
East Bush Lake Road/American Boulevard	B	17
East Bush Lake Road/84th Street	C	25
84th Street/Normandale Lake Boulevard	B	14
84th Street/Norman Center Drive	A	7
84th Street/Normandale Boulevard	D	37
84th Street/Normandale Service Road (1)	A/C	23
84th Street/Stanley Road	B	13
American Boulevard/Normandale Lake Boulevard (1)	A/B	14
American Boulevard/Norman Center Drive	B	14
American Boulevard/82nd Street (1)	A/A	7
American Boulevard/Normandale Service Road (1)	A/A	6

(1) Indicates an unsignalized intersection with side-street stop control, where the overall LOS is shown followed by the worst approach LOS.

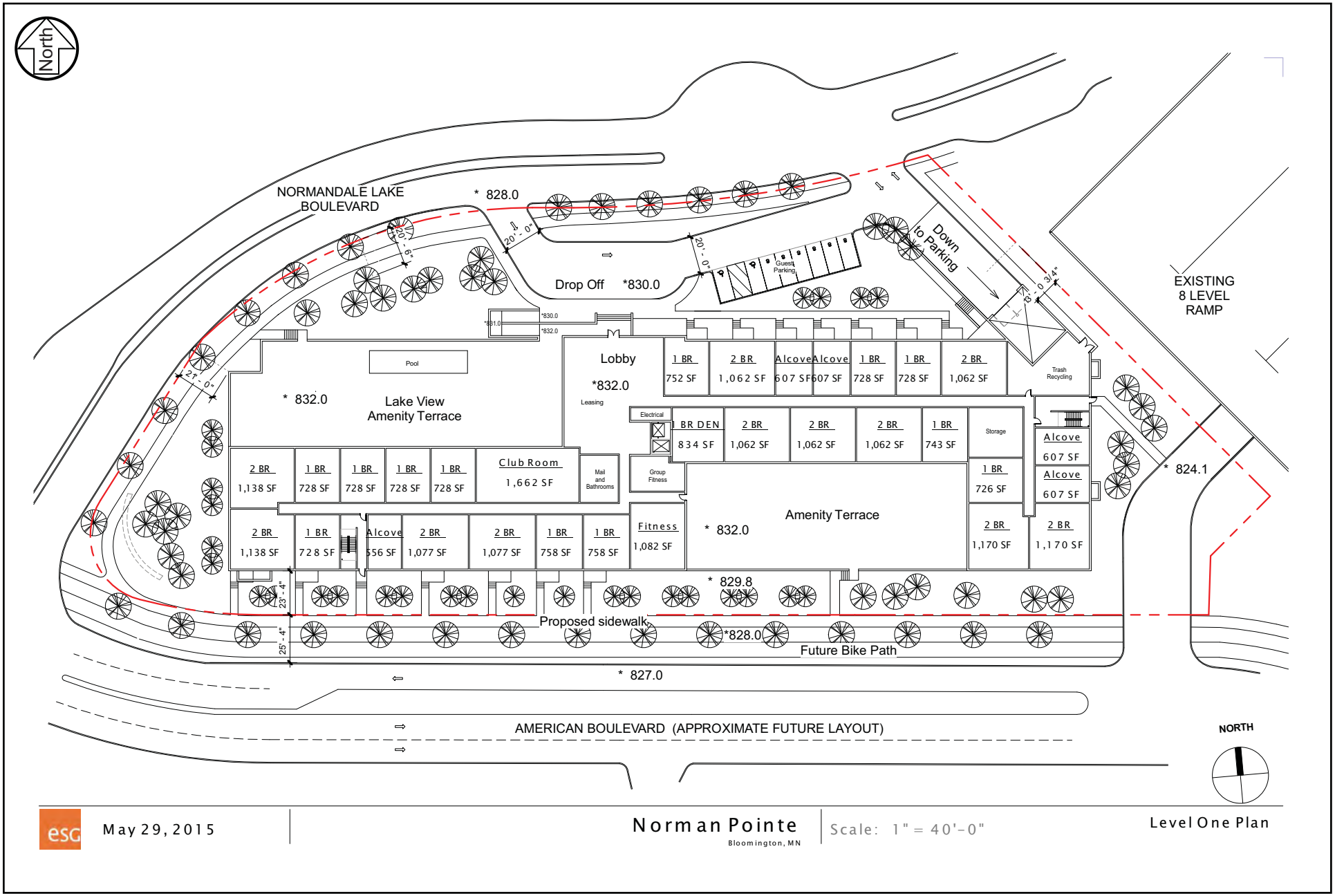
Proposed Development

The proposed Norman Pointe residential development is located in the northeast quadrant of American Boulevard/Normandale Lake Boulevard intersection and is expected to open in year 2017. This site is currently vacant. The proposed development consists of 177-unit apartment complex (see Figure 6). Access to the proposed development is proposed at two locations along Normandale Lake Boulevard. The westernmost driveway is right-in only and leads to a drop-off area and guest parking. The easternmost driveway is a full access and leads down to the underground parking facility.

To account for traffic impacts associated with the proposed development, trip generation estimates for the a.m. and p.m. peak hours and on a daily basis were developed using the *ITE Trip Generation Manual, 9th Edition*. A modal/multi-use trip reduction of 15 percent was applied to the proposed development trips, which is consistent with existing trips in the Normandale Lake District. Results of the trip generation estimates shown in Table 6 indicate that the proposed residential development will generate 76 a.m. peak hour, 92 p.m. peak hour, and 1,000 daily trips.

Table 6: Trip Generation Estimates – Proposed Development

Land Use Type *(ITE Code)*	Size	A.M. Peak Hour Trips		P.M. Peak Hour Trips		Daily Trips
		In	Out	In	Out	
Apartment (210)	177 DU	18	72	71	38	1,177
Modal/Multi-Use Reduction (15%)		(3)	(11)	(11)	(6)	(177)
Total		15	61	60	32	1,000



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Site Plan

Norman Pointe Development Traffic Study
City of Bloomington

Figure 6

The arriving/departing vehicles of the proposed development were distributed throughout the study area based on the directional distribution shown in Figure 7. The directional distribution was developed based on the regional travel demand model, existing area travel patterns, and is consistent with previous studies conducted in the Normandale Lake District. Norman Pointe site generated trips are shown in Figure 8. Resultant year 2018 build traffic forecasts, which take into account background growth, trips generated by the Hampton Inn and Luxemburg Apartments (currently under construction), travel pattern shifts due to the new I-494 East Bush Lake Road Westbound On-Ramp, and the proposed Norman Pointe residential development are shown in Figure 9.

Year 2018 Build Conditions

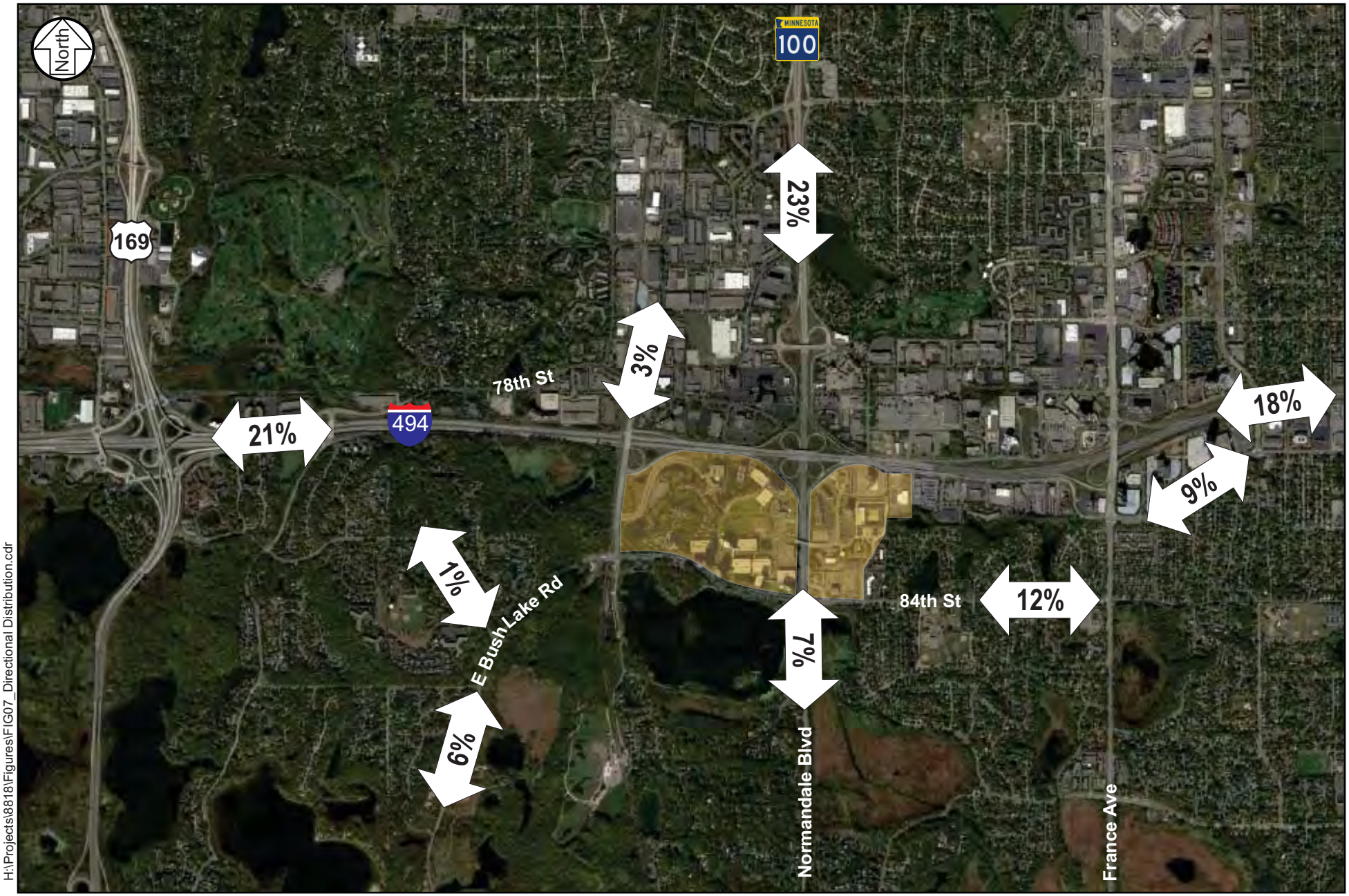
Intersection Capacity Analysis

To determine if the 2018 no build roadway network can accommodate year 2018 build traffic forecasts a detailed traffic capacity analysis was completed. It should be noted that the intersection modifications to East Bush Lake Road/78th Street and the signal timing adjustments to East Bush Lake Road at the study intersections from 78th Street to 84th Street identified under year 2018 no build conditions, were assumed under year 2018 build conditions. Study intersections were analyzed using Synchro/SimTraffic and HCM. Results of the year 2018 build operations analysis shown in Table 7 indicate that the study intersections are expected to operate at an acceptable overall LOS D or better during the a.m. and p.m. peak hours, with the recommended no build roadway network.

Table 7: Year 2018 Build Conditions Peak Hour Capacity Analysis

Intersection	A.M. Peak		P.M. Peak	
	LOS	Delay (sec.)	LOS	Delay (sec.)
East Bush Lake Road/78th Street	B	15	C	26
East Bush Lake Road/Westbound I-494 Ramp	B	18	C	22
East Bush Lake Road/Eastbound I-494 Ramps	B	16	C	28
East Bush Lake Road/American Boulevard	B	14	B	17
East Bush Lake Road/84th Street	B	14	C	25
84th Street/Normandale Lake Boulevard	B	10	B	13
84th Street/Norman Center Drive	A	7	A	7
84th Street/Normandale Boulevard	C	31	D	37
84th Street/Normandale Service Road (1)	C/**E**	**45**	A/C	19
84th Street/Stanley Road	A	7	B	12
American Boulevard/Normandale Lake Boulevard (1)	A/A	8	A/C	15
American Boulevard/Norman Center Drive	A	6	B	15
American Boulevard/82nd Street (1)	A/A	7	A/A	8
American Boulevard/Normandale Service Road (1)	A/A	3	A/A	6

(1) Indicates an unsignalized intersection with side-street stop control, where the overall LOS is shown followed by the worst approach LOS.



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Directional Distribution

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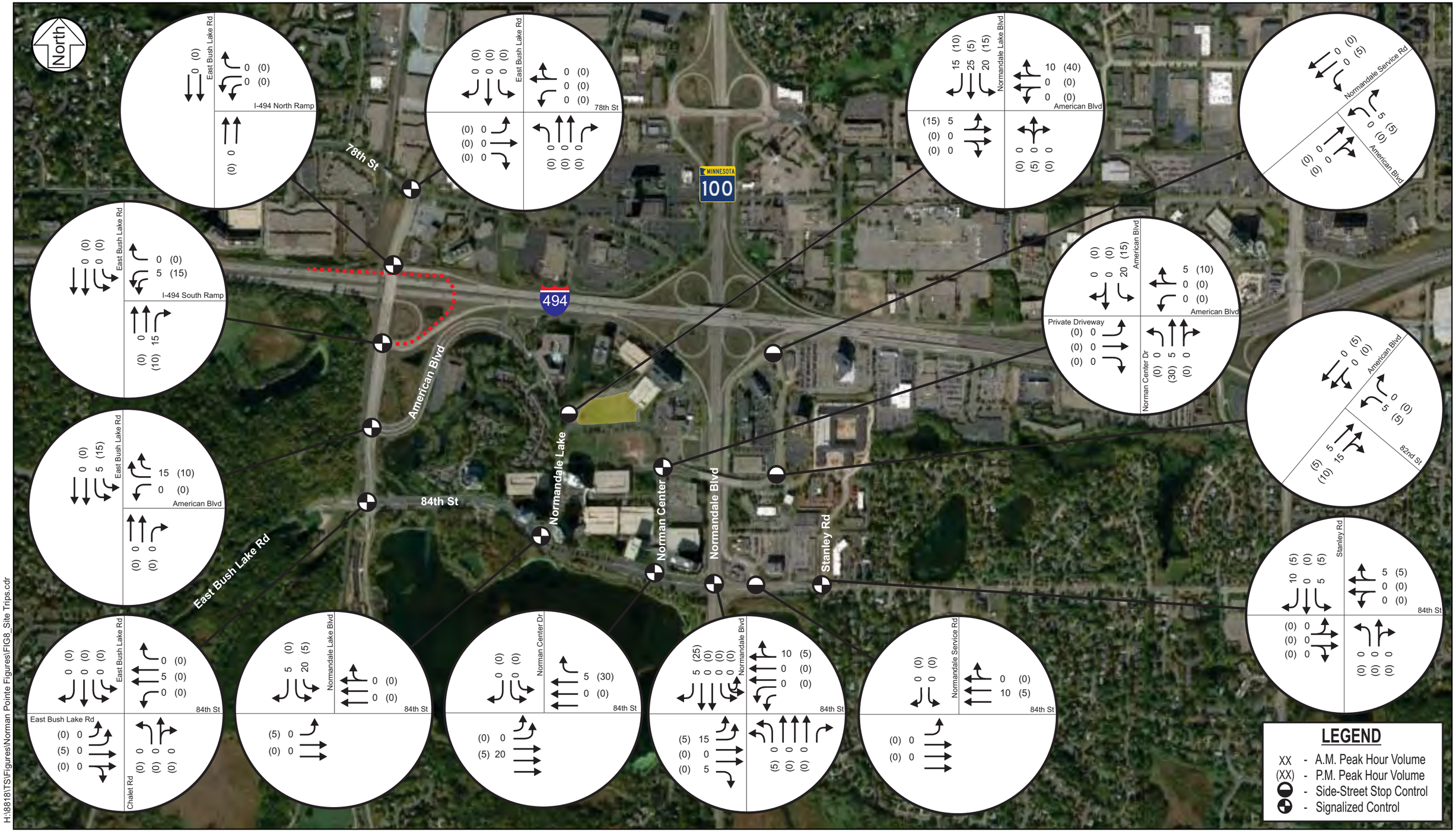
City of Bloomington

Figure 7



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Norman Pointe Site Trips

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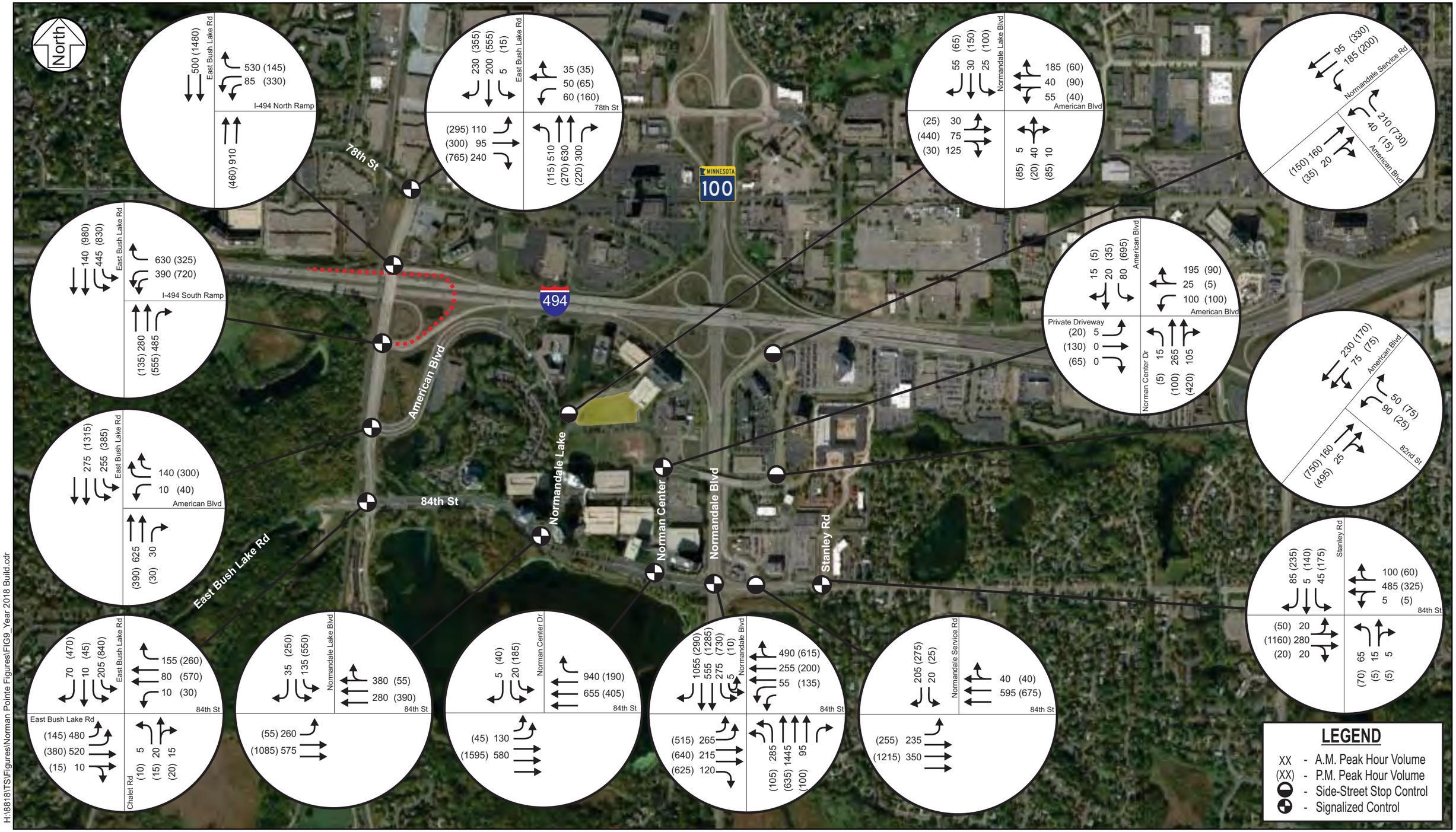
City of Bloomington

Figure 8



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Year 2018 Build Conditions

Norman Pointe Development Traffic Study
City of Bloomington

Figure 9

Based on the analysis results, the proposed development has a minimal effect on traffic operations in the study area. It should be noted that the American Boulevard/Normandale Lake Boulevard intersection is expected to operate acceptably under year 2018 build conditions. A cursory of the peak hour traffic volumes indicates that this intersection will not meet signal warrants under year 2018 build conditions. No traffic control or geometric improvements are needed.

As mentioned under the year 2018 no build conditions, the City should also consider installing "No Left Turn" signs during the a.m. and p.m. peak periods at the 84th Street/Normandale Service Road intersection.

Site Plan Review

A review of the proposed development site plan (dated May 29, 2015) was completed to identify any issues and recommend potential improvements. The following summarizes the findings of the site plan review:

- Consider constructing angle parking for the guest parking spaces located in the drop-off area to reduce confusion and likelihood of motorists driving the wrong way on the one-way drive aisle (guest parking shown as 90-degree parking on the proposed site plan).
- Install "No Left-Turn" and "Do Not Enter" signs to discourage vehicles exiting the underground parking facility to enter the wrong way in the drop-off area.
- As previously mentioned, the existing monument signs and landscaping located north of American Boulevard on the east and west side of Normandale Lake Boulevard create sight distance issues for motorists making southbound movements at the stop sign locations. However, when motorists pull forward past the stop signs the sight distance does appear to meet AASHTO minimums. To improve current conditions consider the following: extend the median further south closer to American Boulevard, relocate the stop signs closer to American Boulevard, add stop bars to the north approach and/or relocate/remove the monument signs.

Conclusions and Recommendations

Based on the analysis the following conclusions and recommendations are offered for your consideration:

- Results of the existing capacity analysis indicate that all study intersections currently operate at an acceptable overall LOS D or better during the a.m. and p.m. peak hours, with the existing traffic control, geometric layout, and signal timing.
    - While overall the study intersection operate at acceptable levels of service, existing traffic issues were observed to occur at multiple locations.
- Results of the year 2018 no build conditions indicate that geometric modifications will be needed at the East Bush Lake Road/78th Street intersection and signal timing modifications will be needed at the study intersections along East Bush Lake Road. These improvements are required to accommodate the travel pattern shifts due to the new I-494 East Bush Lake Road Westbound On-Ramp.

- Results of the year 2018 build operations analysis indicate that the study intersections are expected to operate at an acceptable overall LOS D or better during the a.m. and p.m. peak hours, with the recommended no build roadway network.
- The following site plan improvements should be considered:
  - Consider constructing angle parking for the guest parking spaces located in the drop-off area to reduce confusion and likelihood of motorists driving the wrong way on the one-way drive aisle (guest parking shown as 90-degree parking on the proposed site plan).
  - Install "No Left-Turn" and "Do Not Enter" signs to discourage vehicles exiting the underground parking facility to enter the wrong way in the drop-off area.
  - The existing monument signs and landscaping located north of American Boulevard on the east and west side of Normandale Lake Boulevard create sight distance issues for motorists making southbound movements at the stop sign locations. However, when motorists pull forward past the stop signs the sight distance does appear to meet AASHTO minimums. To improve current conditions consider the following: extend the median further south closer to American Boulevard, relocate the stop signs closer to American Boulevard, add stop bars to the north approach and/or relocate/remove the monument signs.

Appendix B
Concept Cost Estimates

SRF Consulting Group, Inc. — Engineers Planners Designers

PROJECT
Concept Cost Estimate (based upon 2015 bid price information)
Prepared By: SRF Consulting Group, Inc., December 2015

ITEM	DESCRIPTION		UNIT	UNIT PRICE	Option1 On Road Cycle Track EBL Road (W Side) Use Median Width EST. QUANTITY	Option1 EST. AMOUNT	Option2 On Road Cycle Track EBL Road (W Side) Widen to West EST. QUANTITY	Option2 EST. AMOUNT	Option 6 Lane Reconfiguration to 78th Ave / EBLR Intersection EST. QUANTITY	Option 6 EST. AMOUNT	Option 7 Lane Reconfiguration 78th Ave / EBLR Intersection (Assumes Option 6 is in Place EST. QUANTITY	Option 7 EST. AMOUNT
PAVING AND GRADING COSTS												
GrP 1a	Excavation - common & subgrade		cu. yd.	$7.00	3,000	$21,000	3,000	$21,000	114	$799	1,300	$9,100
GrP 1b	Sawing Bituminous Pavement		lin. ft.	$1.50	5,950	$8,925	2,000	$3,000	330	$495	1,500	$2,250
GrP 1c	Remove Curb and Gutter		lin. ft.	$3.00	5,950	$17,850	2,000	$6,000	150	$450	1,500	$4,500
GrP 2a	Clearing & Grubbing		acre	$5000.00							0.55	$2,750
GrP 2c	Granular Borrow - Structural (CV)		cu. yd.	$20.00			1,500	$30,000			2,000	$40,000
GrP 2d	Granular Subgrade (CV)		cu. yd.	$16.00	1,100	$17,600	1,100	$17,600	15	$240	500	$8,000
GrP 3a	Bituminous Pavement	(1)	sq. yd.	$41.00	3,400	$139,400	3,325	$136,325	45	$1,845	1,500	$61,500
GrP 4a	Concrete Walk / Trail / Median	(2)	sq. yd.	$46.00	1,350	$62,100	200	$9,200	300	$13,800	95	$4,370
GrP 4b	Bituminous Walk / Trail	(2)	sq. yd.	$23.00	360	$8,280						
GrP 4c	ADA Pedestrian Curb Ramp		each	$1500.00	1	$1,500			7	$10,500	7	$10,500
GrP 5	Concrete Curb and Gutter		lin. ft.	$16.00	5,950	$95,200	2,000	$32,000	380	$6,080	1,300	$20,800
GrP 7	Cycle Track Delineators		Each	$30.00	180	$5,400	120	$3,600				
GrP 8a	Removals - Pavement		sq. yd.	$7.50	5,800	$43,500			280	$2,100		
GrP 8b	Removals - Guardrail		lin. ft.	$3							700	$2,100
GrP 8c	Removals - Drainage		lin. ft.	$20	300	$6,000	150	$3,000	30	$600	150	$3,000
	SUBTOTAL PAVING AND GRADING COSTS:					**$426,755**		**$261,725**		**$36,909**		**$168,870**
DRAINAGE, UTILITIES AND EROSION CONTROL												
Dr 3	Water Quality Ponds		Ls	$20,000			1	$20,000			1	$20,000
Dr 5	Drainage - urban (range 10-30%)		10%			$43,000	1	$26,000	1	$4,000	1	$34,000
Dr 7	Turf Establishment & Erosion Control		lump sum			$4,000		$10,000		$369		$8,000
Dr 8	Landscaping		lump sum					$7,000				
	SUBTOTAL DRAINAGE, UTILITIES AND EROSION CONTROL					**$47,000**		**$63,000**		**$4,369**		**$62,000**
BRIDGE COSTS												
Br 1	Bridge - Widening	(7)	lump sum	$1,000,000							1	$1,000,000
	SUBTOTAL BRIDGE COSTS:											**$1,000,000**
RETAINING WALLS & OTHER MINOR STRUCTURAL COSTS												
RW 22	Large Block Gravity Wall		sq. ft.	$45			5,100	$229,500			8,400	$378,000
RW 26	Temporary Steel Sheet Pile		sq. ft.	$20			5,100	$102,000				
	SUBTOTAL RETAINING WALLS & OTHER MINOR STRUCTURAL COSTS:							**$331,500**				**$378,000**
NOISE ABATEMENT COSTS												
	SUBTOTAL NOISE ABATEMENT COSTS:											
SIGNAL AND LIGHTING COSTS												
SGL 2	Signals (temporary)		each	$80,000					1	$80,000	1	$80,000
SGL 3	Modify Signal System		each	$35,000	3.00	$105,000						
SGL 4	Modify Signal System		each	$30,000			3.00	$90,000				
SGL 5	Modify Signal System		each	$150,000					1.00	$150,000	1.00	$150,000
	SUBTOTAL SIGNAL AND LIGHTING COSTS:					**$105,000**		**$90,000**		**$230,000**		**$230,000**
SIGNING & STRIPING COSTS												
SGN 1	Signing (C&D)		sq ft	$45	180.0	$8,100	60.0	$2,700	100.0	$4,500	150.0	$6,750
SGN 2	Striping		Lin Ft	$3	19400.0	$58,200	6100.0	$18,300	2000.0	$6,000	4800.0	$14,400
SGN 3	Pavement Markings		each	$500					10.0	$5,000	10.0	$5,000
SGN 4	Crosswalks		sq ft	$10					860.0	$8,600	900.0	$9,000
SGN 5	Guardrail		lin ft	$25							700.0	$17,500
	SUBTOTAL SIGNING & STRIPING COSTS:					**$66,300**		**$21,000**		**$24,100**		**$52,650**
	SUBTOTAL CONSTRUCTION COSTS:					**$645,055**		**$767,225**		**$295,378**		**$1,891,520**

SRF Consulting Group, Inc. — Engineers Planners Designers

PROJECT
Concept Cost Estimate (based upon 2015 bid price information)
Prepared By: SRF Consulting Group, Inc., December 2015

	ITEM DESCRIPTION		UNIT	UNIT PRICE	Option1 On Road Cycle Track EBL Road (W Side) Use Median Width EST. QUANTITY	Option1 On Road Cycle Track EBL Road (W Side) Use Median Width EST. AMOUNT	Option2 On Road Cycle Track EBL Road (W Side) Widen to West EST. QUANTITY	Option2 On Road Cycle Track EBL Road (W Side) Widen to West EST. AMOUNT	Option 6 Lane Reconfiguration to 78th Ave / EBLR Intersection EST. QUANTITY	Option 6 Lane Reconfiguration to 78th Ave / EBLR Intersection EST. AMOUNT	Option 7 Lane Reconfiguration 78th Ave / EBLR Intersection (Assumes Option 6 is in Place EST. QUANTITY	Option 7 Lane Reconfiguration 78th Ave / EBLR Intersection (Assumes Option 6 is in Place EST. AMOUNT
MISCELLANEOUS COSTS												
M 1	Mobilization		5%			$32,000		$38,000		$15,000		$95,000
M 2	Non Quantified Minor Items (10% to 30%)		15%			$97,000		$115,000		$44,000		$284,000
M 7	Temporary Pavement & Drainage		1%			$6,000		$8,000		$3,000		$19,000
M 8	Traffic Control		3%			$19,000		$23,000		$9,000		$57,000
	SUBTOTAL MISCELLANEOUS COSTS:					**$154,000**		**$184,000**		**$71,000**		**$455,000**
ESTIMATED TOTAL CONSTRUCTION COSTS without Contingency:						**$799,055**		**$951,225**		**$366,378**		**$2,346,520**
1	Contingency or "risk" (10% to 30%)		25%			$200,000		$238,000		$92,000		$587,000
ESTIMATED TOTAL CONSTRUCTION COSTS PLUS CONTINGENCY:						**$999,055**		**$1,189,225**		**$458,378**		**$2,933,520**
	OTHER PROJECT COSTS:											
	RAILROAD AGREEMENTS		Lump Sum	$1								
	UTIITY AGREEMENTS		Lump Sum	$1								
	TURN BACK AGREEMENTS		Lump Sum	$1								
	PROJECT MITIGATION		Lump Sum	$1								
	R/W ACQUISITIONS		Lump Sum	$1								
	Other		Lump Sum									
	DESIGN ENG. & CONSTRUCTION ADMIN.		Lump Sum									
	SUBTOTAL OTHER PROJECT COSTS											
	TOTAL PROJECT COST (based upon 2015 bid price information)					**$999,055**		**$1,189,225**		**$458,378**		**$2,933,520**
	INFLATION COST (CURRENT YR. TO YR. OF OPEN		Years	3%								
	TOTAL PROJECT COST (OPENING YEAR DOLLARS)					**$999,055**		**$1,189,225**		**$458,378**		**$2,933,520**

NOTE: (1) Includes aggregate base class 5 and PASB or OGAB, as appropriate.
(2) Includes aggregate base class 5.
(7) Assumes a bridge widening is possible depending on grades of RR and overhead utilities
Utility Agreements based upon:
R/W Acquisitions based upon: