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April 3, 2018

Mr. Chris Petykowski, P.E.
City of Madison
City-County Building, Room 115
210 Martin Luther King Jr. Boulevard
Madison, WI 53703

Re: Blair Street Corridor Study Report

Dear Chris,

Following is a PDF of the final revised Blair Street Corridor Study Report. Please distribute as necessary.

Please call with questions.

Sincerely,

STRAND ASSOCIATES, INC.®

Jeff Held, P.E., PTOE

Enclosure: Report

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Report for

City of Madison, Wisconsin

Blair Street Corridor Study Report

Prepared by:

STRAND ASSOCIATES, INC.®
910 West Wingra Drive
Madison, WI 53715
www.strand.com

April 2018

STRAND ASSOCIATES®

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EXECUTIVE SUMMARY

ES.01 INTRODUCTION

A. Background

The John Nolen Drive/Blair Street and Wilson Street/Williamson Street intersection is a cross roads for all transportation modes. It is one of the most highly used intersections for pedestrians, bicyclists, motor vehicles, and transit. It serves as both an entrance to the near east isthmus/Capitol area as well as the Williamson Street corridor. Key modal features associated with the intersection are listed following.

The importance of the intersection is augmented by the historic structures, such as Machinery Row and Hotel Ruby Marie, and parks such as Law Park and the Gateway Center pocket park. Figure ES.01-1 illustrates the modal importance of the intersection.

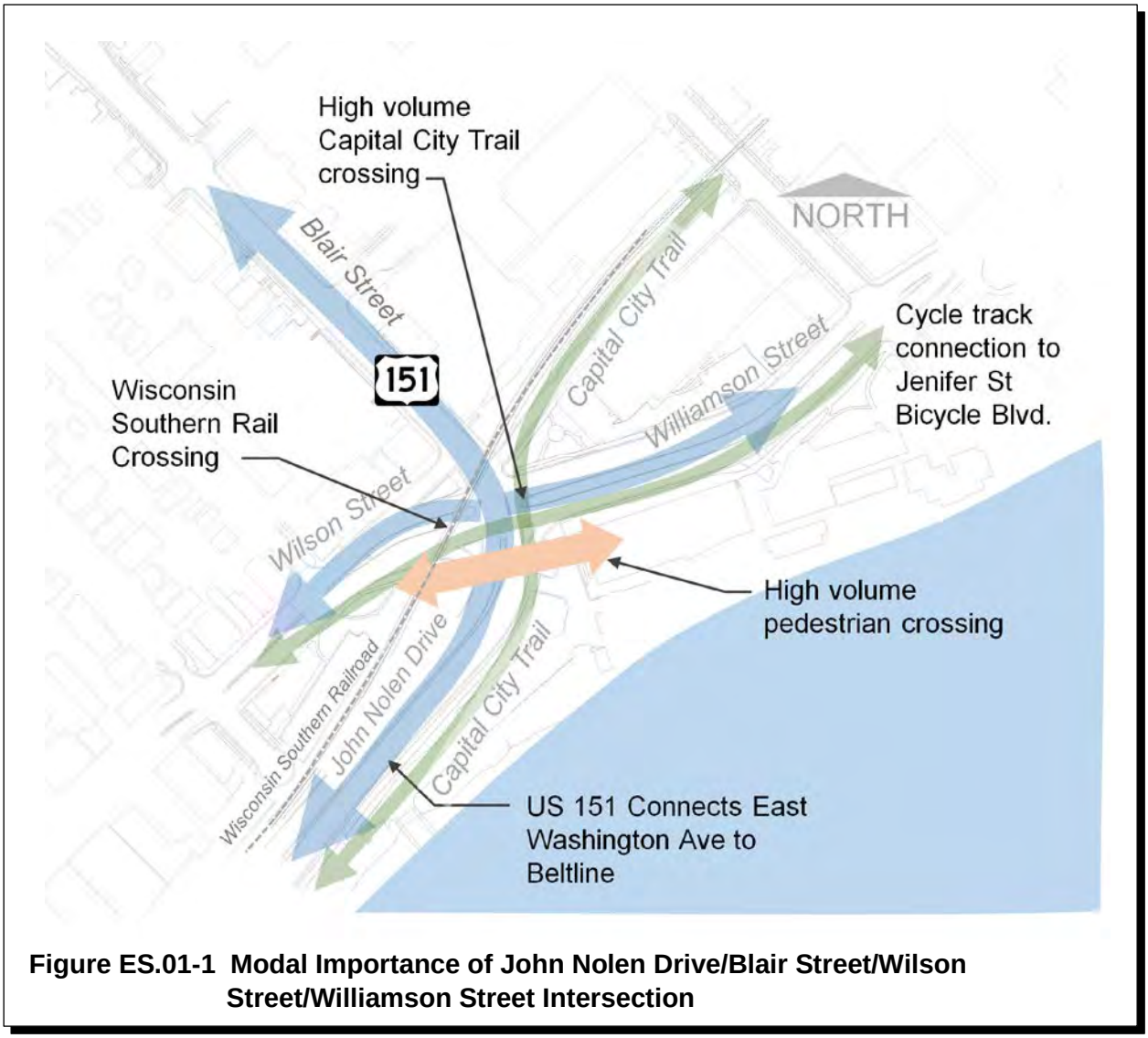


Figure ES.01-1 Modal Importance of John Nolen Drive/Blair Street/Wilson Street/Williamson Street Intersection

Because of the current pavement conditions, along with inadequate operations for all modes, the City of Madison (City) enlisted Strand Associates, Inc.® (Strand) to study the John Nolen Drive/Blair Street and Wilson Street/Williamson Street intersection. The study was to evaluate existing conditions for pedestrians, bicyclists, motorists, transit, and emergency services. The study was then to develop alternatives that improved mobility for all of these services. Eventually the study was to be used to help program improvements for the intersection to address the deteriorating pavement conditions.

Public and stakeholder interaction soon expanded the scope of the study to include John Nolen Drive at the North Shore Drive and Broom Street intersections. The study was also expanded to include a blocking exercise to determine viewshed effects of constructing a parking garage/elevated park structure over John Nolen Drive east of Monona Terrace. Figure ES.01-2 illustrates the limits of the study.

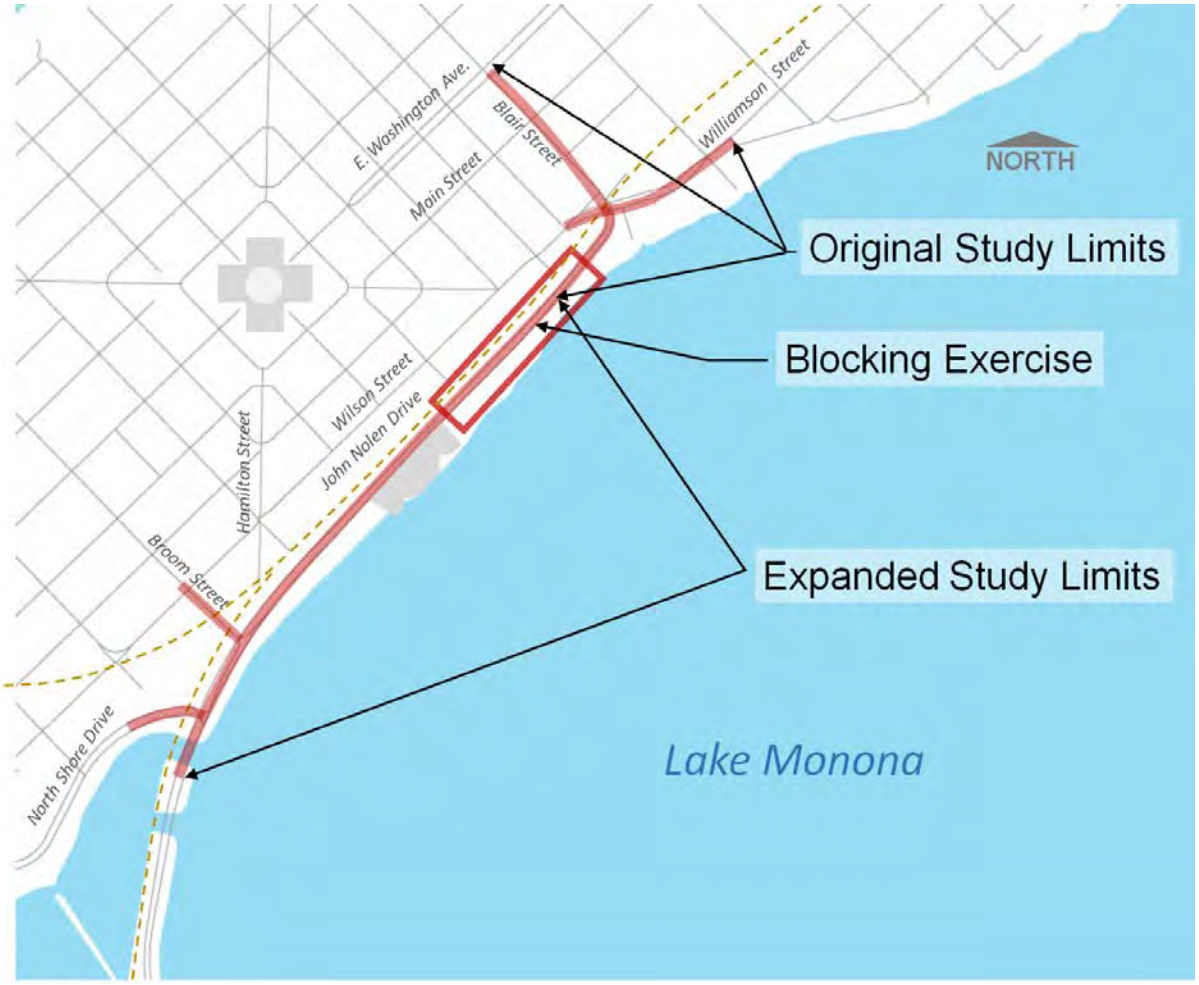


Figure ES.01-2 Study Limits

B. Study Purpose

The study's purpose is to develop a near-term solution for the John Nolen Drive/Blair Street and Wilson Street/Williamson Street intersection area that:

1. Can be reasonably funded with federal transportation monies within the next 5 to 10 years.

2. Improves operations, safety, and comfort for:

    a. Pedestrians
    b. Cyclists
    c. Motorists
    d. Transit

3. Addresses the poor pavement conditions.

4. Evaluates short and long-term options that improve pedestrian and bicycle access to the lakeshore from North Shore Drive to Blair Street.

5. Evaluates the viewshed effects of proposals that include a structure over John Nolen Drive east of Monona Terrace.

The Blair Street and John Nolen Drive corridor is designated as US 151, a connecting highway. Therefore, these legs of the intersection are under the jurisdiction of the Wisconsin Department of Transportation (WisDOT). WisDOT and Federal funding likely would be used (and required) for improvements to these legs of the intersection.

C. Study Schedule

The yearlong study was segmented into three phases. Phase 1 focused on identifying needs and developing alternatives. Phase 2 presented a range of alternatives and then used stakeholder feedback to refine the alternatives. Phase 3 presented both draft and final recommendations. Figure ES.01-3 graphically illustrates both the study phases and the study schedule.

Figure ES.01-3 Study Phases and Schedule

ES.02 RECOMMENDATIONS

A. John Nolen Drive/Blair Street and Wilson Street/Williamson Street Intersection

1. Interim Recommendations

Depending on the availability of funding, reconstruction/reconfiguration of this intersection is likely several years away. Yet, one of the key concerns of stakeholders is the conflicts between motor vehicles and pedestrians and bicyclists at the Machinery Row driveways in the southeast quadrant. The study team recommends that the City investigate the feasibility of installing vehicle detection combined with a warning beacon to alert bicyclists and pedestrians when a vehicle is present. The beacon could be mounted over a sign indicating "Blind Driveway", "Watch for Exiting Vehicles", or similar.

2. Near-Term Recommendations

Figure ES.02-1 illustrates the recommended configuration for the John Nolen Drive/Blair Street and Wilson Street//Williamson Street intersection. It is also included in Appendix F. The configuration is the product of considerable public comment and seeks to balance priorities of residents, businesses, and travelers of all modes. The reconstruction of this intersection is listed as a near-term recommendation pending its approval of Highway Safety Improvement Program grant funding. Key features of the intersection include:

a. Shifting intersection west.

b. Removing Wilson Street stub in front of Hotel Ruby Marie and the expand the greenspace.

c. Providing parallel parking and a buffered bike lane in front of Hotel Ruby Marie.

d. Installing a left turn lane on the Blair Street north approach.

e. Removing parking on the east Wilson Street stub serving the Gateway Shopping Center. In that space designate an at-grade cycle path. Maintaining existing sidewalk for pedestrians.

f. Providing green bike box and green route markings through the intersection for eastbound and westbound Williamson Street and Wilson Street cyclists. Providing ramp to cycle track in front of Machinery Row.

g. Providing green pavement marking for Capital City Trail on east Williamson Street approach. Providing separate ladder marking crossing for pedestrians adjacent to Capital City Trail marking.

h. Reconfiguring the John Nolen Drive to Williamson Street right-turn island to:

   (1) Provide more staging area for pedestrians and cyclists.

   (2) Reduce the speed of right turning vehicles with a tighter curb radius and raised pedestrian and bicycle crossing.

   (3) Add a narrow, raised lane separator between the northbound through land and the channelized right-turn lane in the gore area to reduce late lane changes.

i. Enlarging the staging area for pedestrians and cyclists crossing the John Nolen Drive to Williamson Street right turn movement.

j. Reducing Williamson Street median and reallocate space from median and narrower travel lanes to enlarge the space in front of Machinery Row. Separating pedestrians and cyclists through:

   (1) Widening the sidewalk in front of Machinery Row and realigning the existing cycle track

   (2) Adding on-street parking on eastbound Williamson Street.

k. Relocating the two Machinery Row driveways to the southwest and reduce into one driveway.

   (1) Providing a protected left turn into the parking lot. Access and egress options increase from the relocation.

   (2) Making provisions for future signalization if it becomes necessary.

l. Relocate Capital City Trail to travel through the city-owned parking lot to reduce the number of decision points from vehicles entering and exiting the parking lots. (Note: Parking lot configuration and Law Park design to be developed by Madison Parks).

m. Providing left turn lane for John Nolen Drive to Wilson and Blair Street to Williamson Street movements.

n. Maintaining bike box on west Wilson Street approach.

o. Adding a buffered bike lane approaching the intersection eastbound on Wilson Street.

p. Design elements provided to aid in the creation of a railroad Quiet Zone on the east Isthmus including Supplemental Safety Measures (SSM) and/or Alternative Safety Measures (ASM). These primarily consist of active warning devices including flashers and crossbucks and raised curb/separators that would prevent a conflicting motor vehicle from driving around the lowered crossbuck when a train is present. These treatments also led to a change in the westbound Williamson Street lane configuration that eliminates the shared through/left-turn lane and provides two left-turn lanes and one shared through/right-turn lane. There is a negligible change to motor vehicle operations. Appendix G contains a report authored by Mark Morrison, P.E. regarding his review of the preliminary intersection design.

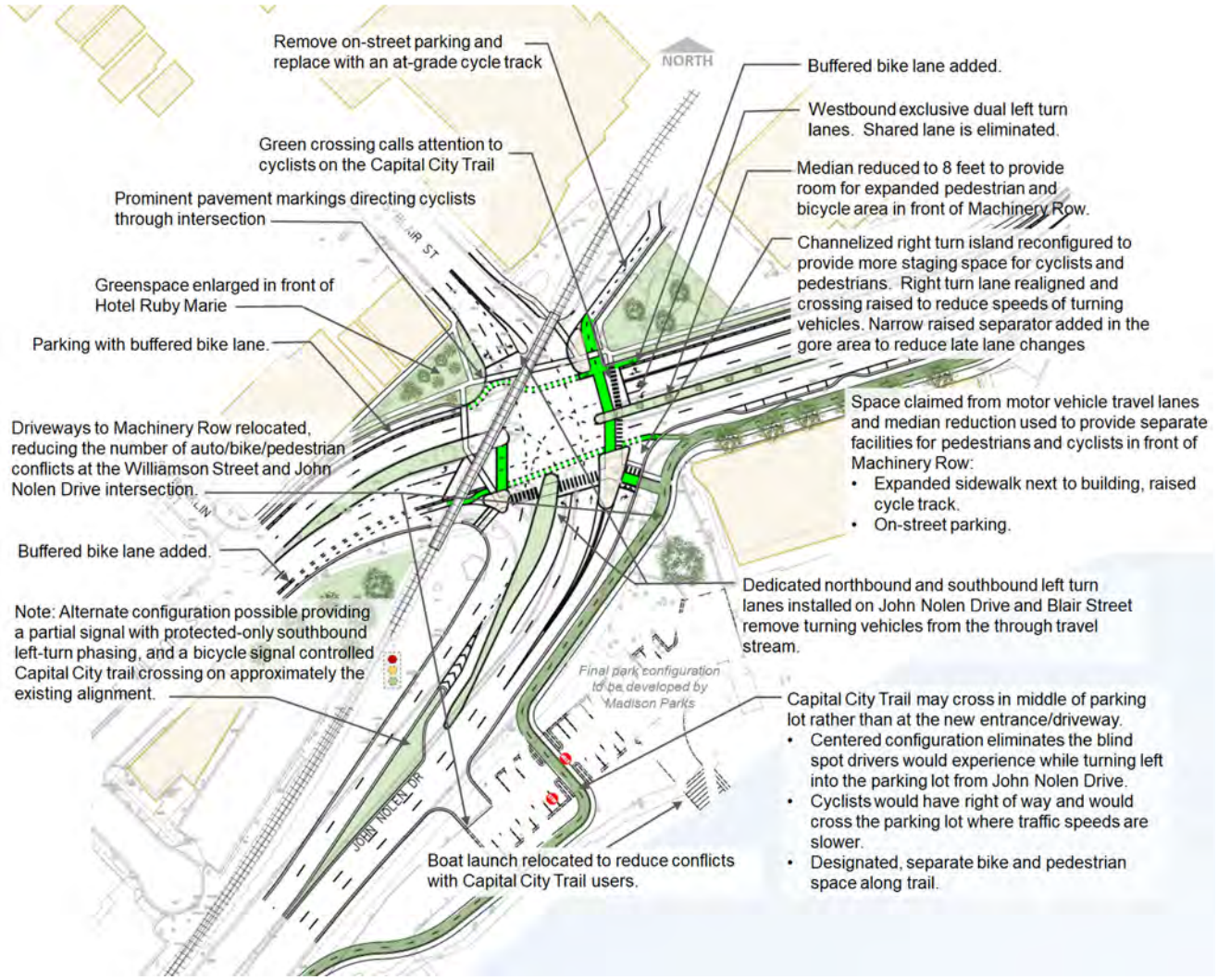


Figure ES.02-1 John Nolen Drive/Wilson/Blair/Williamson Street Intersection

Figure ES.02-2 shows the recommended cross section in front of Machinery Row.

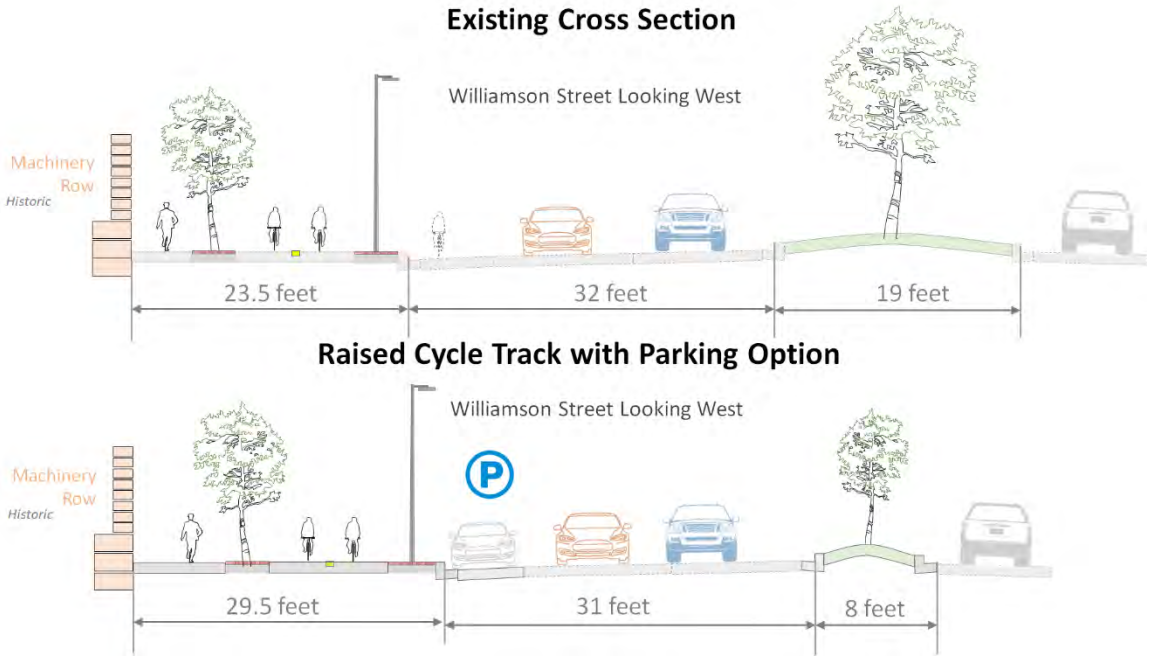


Figure ES.02-2 Recommended Cross Section in Front of Machinery Row

3. Long-Term Recommendations

If the John Nolen Drive/Blair Street and Wilson Street/Williamson Street intersection is to accommodate more motor vehicle traffic volumes, there are relatively few options. They include:

a. Providing a triple left-turn on the Williamson Street east approach. This would require expanding John Nolen Drive to three lanes in the southbound direction, and possible acquisition of right-of-way from the railroad. If this is a potential option for the future, the City may want to maintain the current width of the Williamson Street median.

b. Grade separate movements within the intersection. Section 4 describes some of the significant challenges associated with this in the tunnel option.

This study does not currently recommend either of these options. This intersection is "at capacity" for all travel modes and the dynamic mix enriches the corridors that connect to the intersection.

B. Williamson Street and Blount Street Intersection

The near and long-term recommendation at the Blount Street intersection is to provide a diagonal, signalized bicycle crossing connecting to the recommended cycletrack in front of Machinery Row

and a recommended cycletrack along Blount Street connecting to the Capital City Trail. Figure ES.02-3 shows the recommended configuration.

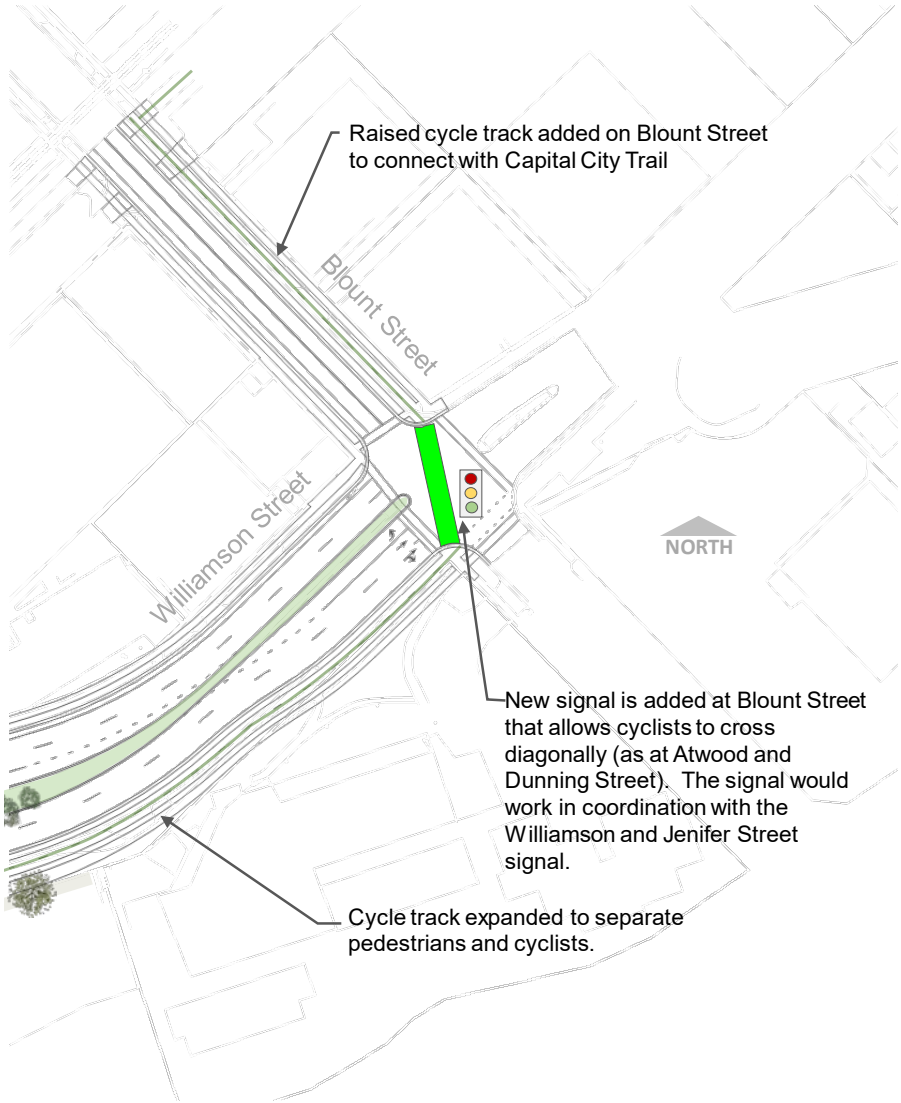


Figure ES.02-3 Williamson Street and Blount Street Intersection

C. Blair Street and Main Street Intersection

The study team recommends a traffic signal at Blair Street and Main Street as a means of providing a controlled bicycle and pedestrian crossing. From a motor vehicles operation standpoint, left turns from Blair Street to Main Street would likely need to be prohibited during peak periods, at a minimum. This is needed to avoid creating a condition similar to what currently exists at the John Nolen Drive/Blair Street and Wilson Street/Williamson Street intersection where left-turning vehicles on John Nolen Drive and Blair Street block one of the through lanes and lead to increased delays, queuing, and crashes.

D. East of Monona Terrace

There are several options being discussed for both Law Park and the air rights over John Nolen Drive. Some proposals include covering John Nolen Drive with a parking garage that has a roof-top park. Many also include constructing Frank Lloyd Wright's Boat House on Lake Monona.

1. Near-Term Recommendations

   a. Obtain an easement to allow a pedestrian and bike connection from Wilson Street to the edge of the railroad property to accommodate a future overpass of John Nolen Drive (completed).

   b. Work with the project team for the McGrath Redevelopment to construct footings that would accommodate a future overpass bridge that spans the rail line and John Nolen Drive to connect with the lake shore.

   c. Begin looking at funding options that could fund a pedestrian-bicycle overpass over the rail line and John Nolen Drive. Transportation Alternatives Program (or Set-Aside) might be one option.

2. Long-Term Options

The study recommends installing a pedestrian-bicycle overpass over the rail line and John Nolen Drive. Many have advocated for the bridge to be wide enough to accommodate landscaping, food carts, and/or activities. Madison Parks may soon be initiating a planning effort for Law Park. We recommend that this planning effort further refine the bridge's role and relationship to Law Park, and what amenities should be included.

As mentioned, there are proposals that include covering John Nolen Drive that could conflict with this bridge, depending on how far east the deck extends. The City can re-evaluate construction of the pedestrian-bicycle overpass in light of future priorities and proposals if and when bridge funding becomes available.

Figure 1.02-4 illustrates one option of a type of landscaped bridge that could be constructed. The actual bridge amenities should be determined in conjunction with Law Park planning.

Figure ES.02-4 Pedestrian Bridge to Law Park–One Possible Configuration

E. Broom Street Intersection

This intersection is particularly challenging. Full bike accommodations cannot be installed on Broom Street until it is reconstructed. And when it is reconstructed, building faces and topography constrain the amount of room for accommodations. The following paragraphs list the study's near and long-term recommendations.

1. Near-Term Solutions (2 to 5 years)

Near-term solutions (shown in Figure 1.02-5) for this intersection include:

a. Using a sharrow pavement marking to direct eastbound Broom Street cyclists to the left turn island. At the island, create a green colored box that directs cyclists where they should wait and cross, and alert drivers where cyclists will be crossing.

b. Creating a green bike box on the eastern left turn lane for northbound John Nolen Drive traffic to westbound Broom Street. This allows cyclists crossing John Nolen Drive from the Capital City Trail to westbound Broom Street the option

of positioning themselves in front of left-turning motor vehicle traffic and traveling through the intersection ahead of them during the protected left-turn signal phase.

c. Install a multi-use trail to connect Broom Street to Hamilton Street. This would provide a more direct route to the Capitol Square for cyclists, and allow them to travel on a roadway with less motor vehicle volume. Note that because this trail would travel on railroad right-of-way, coordination would be needed, which could delay implementation of the path.

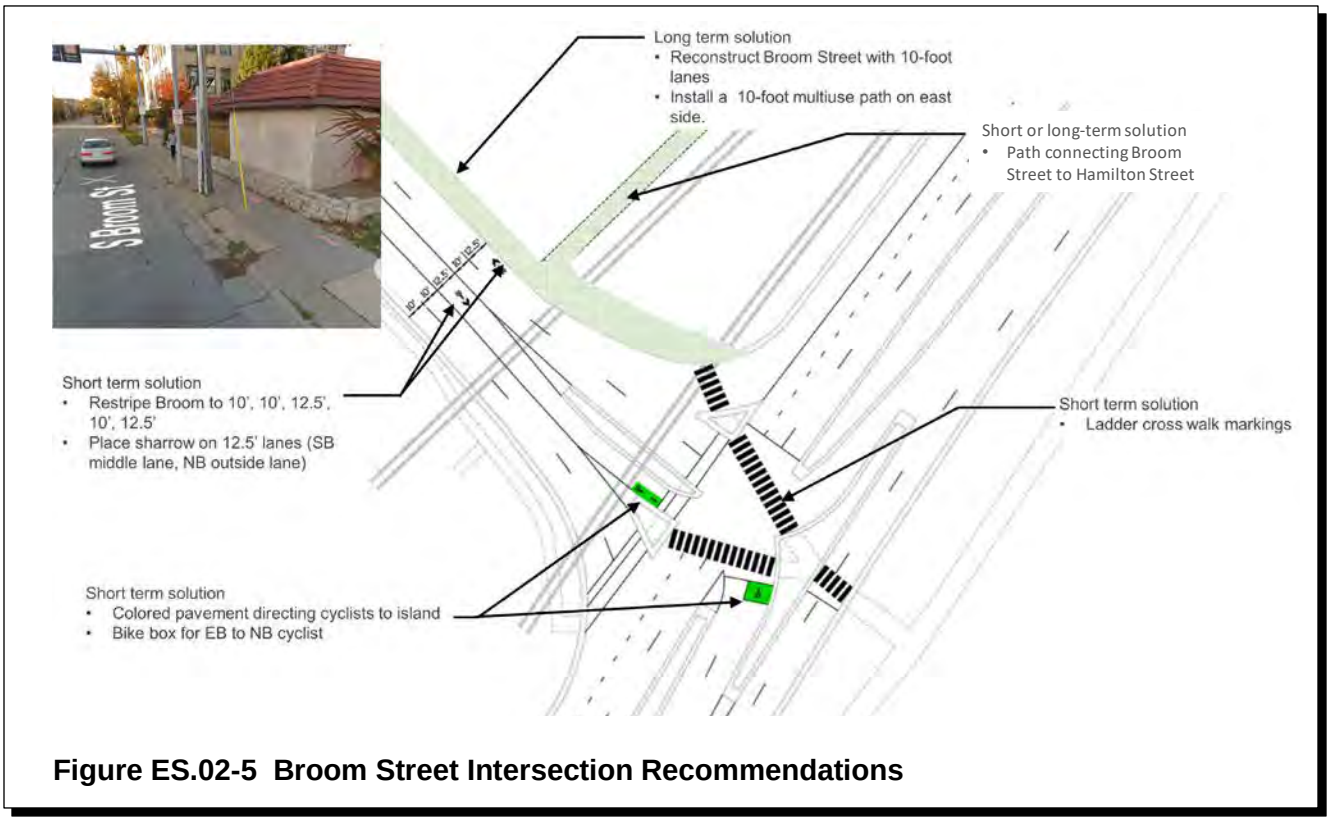


Figure ES.02-5 Broom Street Intersection Recommendations

2. Long Term Solutions (5 to 15 years)

Long term solutions for this intersection include:

a. Reconstructing Broom Street with narrower lanes (see Figure 1.02-5). With the additional space, install a raised cycle track (separated bicycle facility) on the east side of the street.

b. Connecting Broom Street with the pedestrian and bicycle underpass discussed under the North Shore Road improvements.

F. North Shore Drive Intersection

In recent years, the City has already made significant improvements to this intersection by enlarging the island on the north approach and providing green epoxy markings across John Nolen Drive. The following paragraphs describe additional measures that could be performed.

1. Near-Term Solutions (2 to 5 years)

The study recommends adding a no-right-turn blank out sign to the southbound channelized right turn lane. This will reinforce/alert drivers to the pedestrian and bicycle right-of-way during their walk signal phase.

The study team also recommends adding an off-path, paved staging area on the Capital City trail for pedestrians and cyclists. This will allow them to wait for a green signal to cross John Nolen Drive off the main path area.

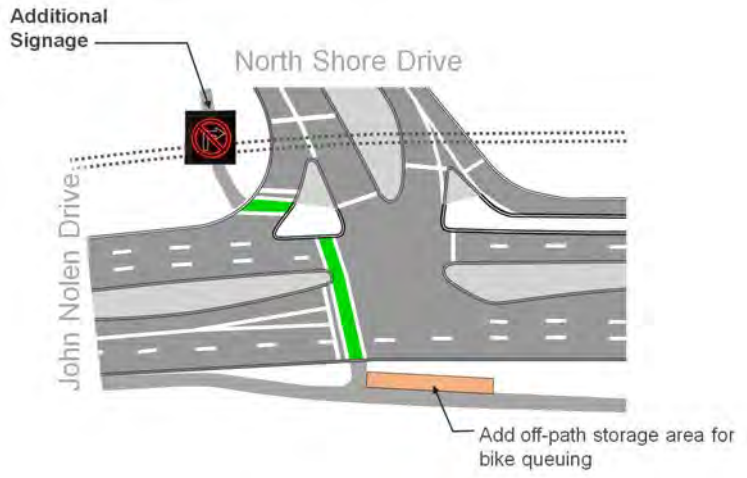


Figure ES.02-6 North Shore Drive–Near-Term Solutions

2. Long-Term Solutions (5 to 15 years)

Figure 1.02-7 illustrates one of the long-term recommendations. When the north approach of the intersection is reconstructed, the island channelizing the right turn could be enlarged to provide more room for cyclists and pedestrians waiting to cross either the right turn movement or John Nolen Drive. This modification would also reduce motor vehicle speeds.

Figure ES.02-7 North Shore Drive–Long-Term Solutions

A second long-term solution includes constructing a pedestrian and bike underpass between North Shore Drive and Broom Street. Features to consider in implementing this underpass include:

a. Raising the profile of John Nolen Drive between North Shore Drive and Broom Street. This will require reconstructing this portion of John Nolen Drive.

b. Even with this profile change on John Nolen Drive, a storm water lift station will be needed to drain the underpass of storm water that enters the underpass through the ramps.

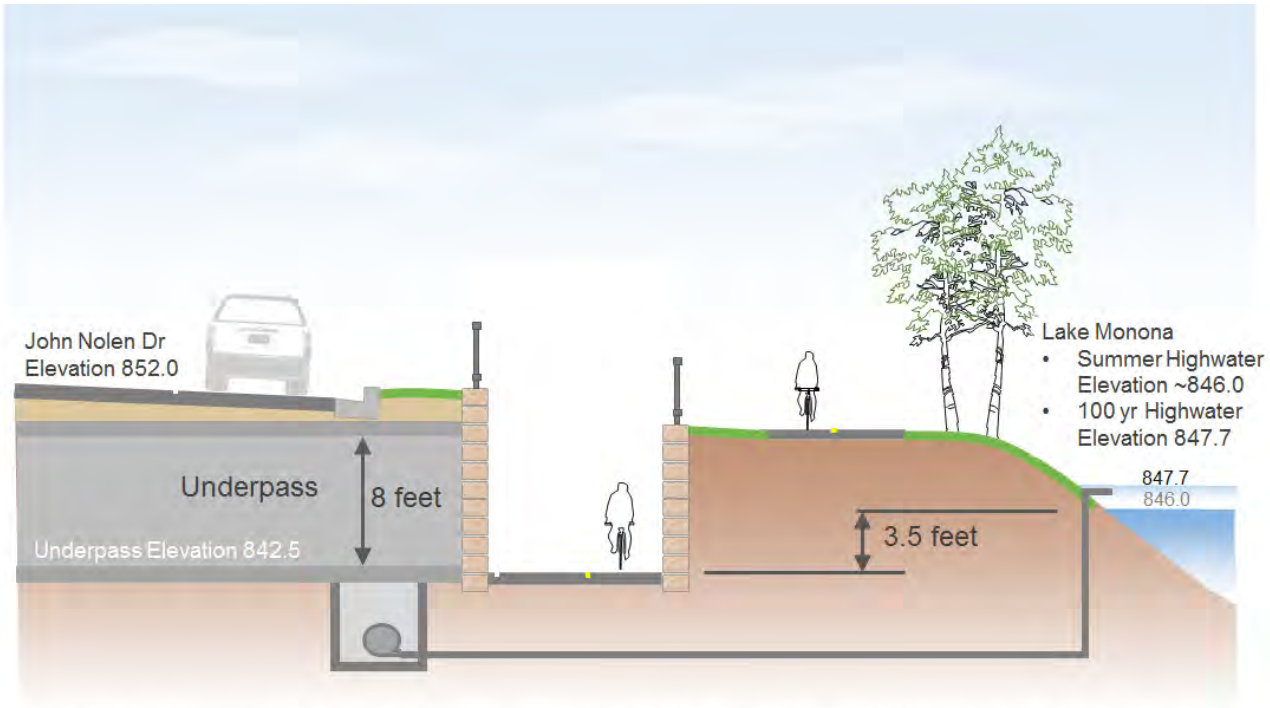
c. Reconstructing the westbound right turn lane onto North Shore Drive to reduce its functional width. This space will be needed for a ramp down to the pedestrian and bike underpass.

d. Constructing a multi-use path on the north side of North Shore Drive that connects to the pedestrian and bike underpass. This same path could continue to connect directly with Broom Street.

e. Relocating the Capital City Trail to the south to allow the trail room to travel around the ramps down to the pedestrian and bike underpass.

Figures ES.02-8 and ES.02-9 illustrates the connection network being proposed, and a cross section of the pedestrian bicycle underpass.

Figure ES.02-8 North Shore Drive–Long-Term Solutions



The underpass option places a pedestrian-bicycle tunnel underneath John Nolen Drive. This underpass would involve:

- Raising John Nolen Drive about 2 feet between North Shore Drive and Broom Street.
- Having the Capital City Trail run parallel to the ramp to the underpass.
- Constructing the underpass with a floor elevation of about 842.5.
- Because the underpass is beneath the normal lake level, the underpass would need to be watertight and would require a stormwater pump station.

Figure ES.02-9 North Shore Drive–Long-Term Solutions–Underpass Cross Section

SECTION 1
INTRODUCTION

1.01 BACKGROUND

The John Nolen Drive/Blair Street and Wilson Street/Williamson Street intersection is a cross roads for all transportation modes. It is one of the most highly used intersections for pedestrians, bicyclists, motor vehicles, and transit. It serves as both an entrance to the near east isthmus/Capitol area as well as the Williamson Street corridor. Key modal features associated with the intersection include:

1. **It is a high-volume pedestrian corridor that connects the Marquette neighborhood with the Capitol area**. This pedestrian routing serves home to work trips centered on the Capitol Square, and also trips oriented toward special events on the Capitol, such as the farmer's market, concerts on the Square, King Street concerts, Dane Dances, and others.

2. **It connects two of Madison's highest volume bike paths.** The Capitol City Trail crosses Williamson Street on the east leg, and it connects with the Machinery Row Cycle Track leading to the Jennifer Street bicycle boulevard. The intersection also connects the Capitol area with the Capital City Trail.

3. **It is a significant motor vehicle corridor,** essentially bridging the west with the east sides of the Capitol and carrying up to 37,000 vehicles per day. It is also a gateway to both Williamson Street and the Capitol area through Wilson Street.

4. **It is an important transit corridor.** Madison metro routes 3, 4,10, and 38 travel through several of the intersection approaches.

5. **It carries the Wisconsin Southern Railroad,** which when it travels through the intersection can cause considerable delay for all travel modes.

The importance of the intersection is augmented by the historic structures, such as Machinery Row and Hotel Ruby Marie, and parks such as Law Park and the Gateway Center pocket park. Figure 1.01-1 illustrates the modal importance of the intersection.

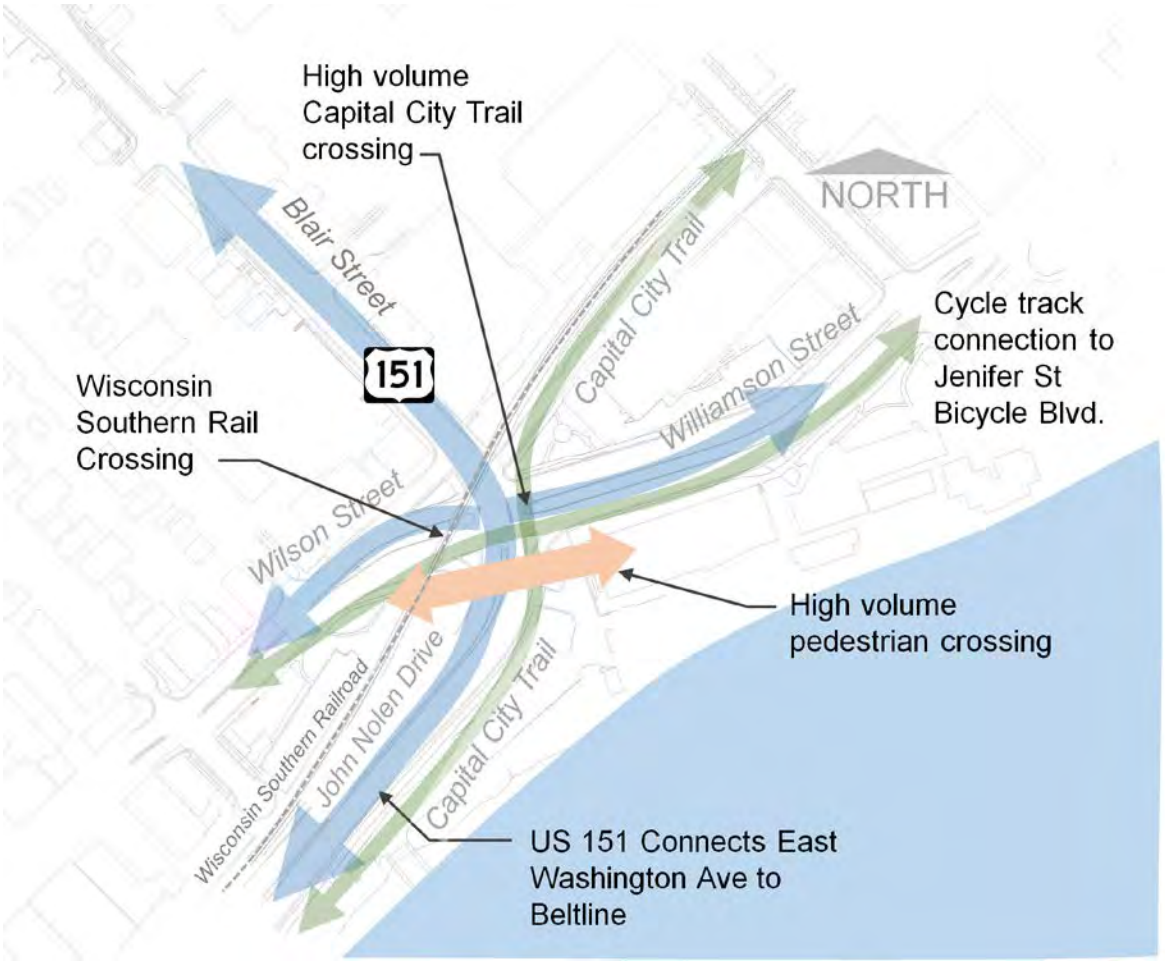


Figure 1.01-1 Modal Importance of John Nolen Drive/Blair Street/Wilson Street/Williamson Street Intersection

Because of the current pavement conditions, along with inadequate operations for all modes, the City of Madison (City) enlisted Strand Associates, Inc.® (Strand) to study the John Nolen Drive/Blair Street and Wilson Street/Williamson Street intersection. The study was to evaluate existing conditions for pedestrians, bicyclists, motorists, transit, and emergency services. The study was then to develop alternatives that improved mobility for all of these services. Eventually the study was to be used to help program improvements for the intersection to address the deteriorating pavement conditions.

Public and stakeholder interaction soon expanded the scope of the study to include John Nolen Drive at the North Shore Drive and Broom Street intersections. The study was also expanded to include a blocking exercise to determine viewshed effects of constructing a parking garage/elevated park structure over John Nolen Drive east of Monona Terrace. Figure 1.01-2 illustrates the limits of the study.

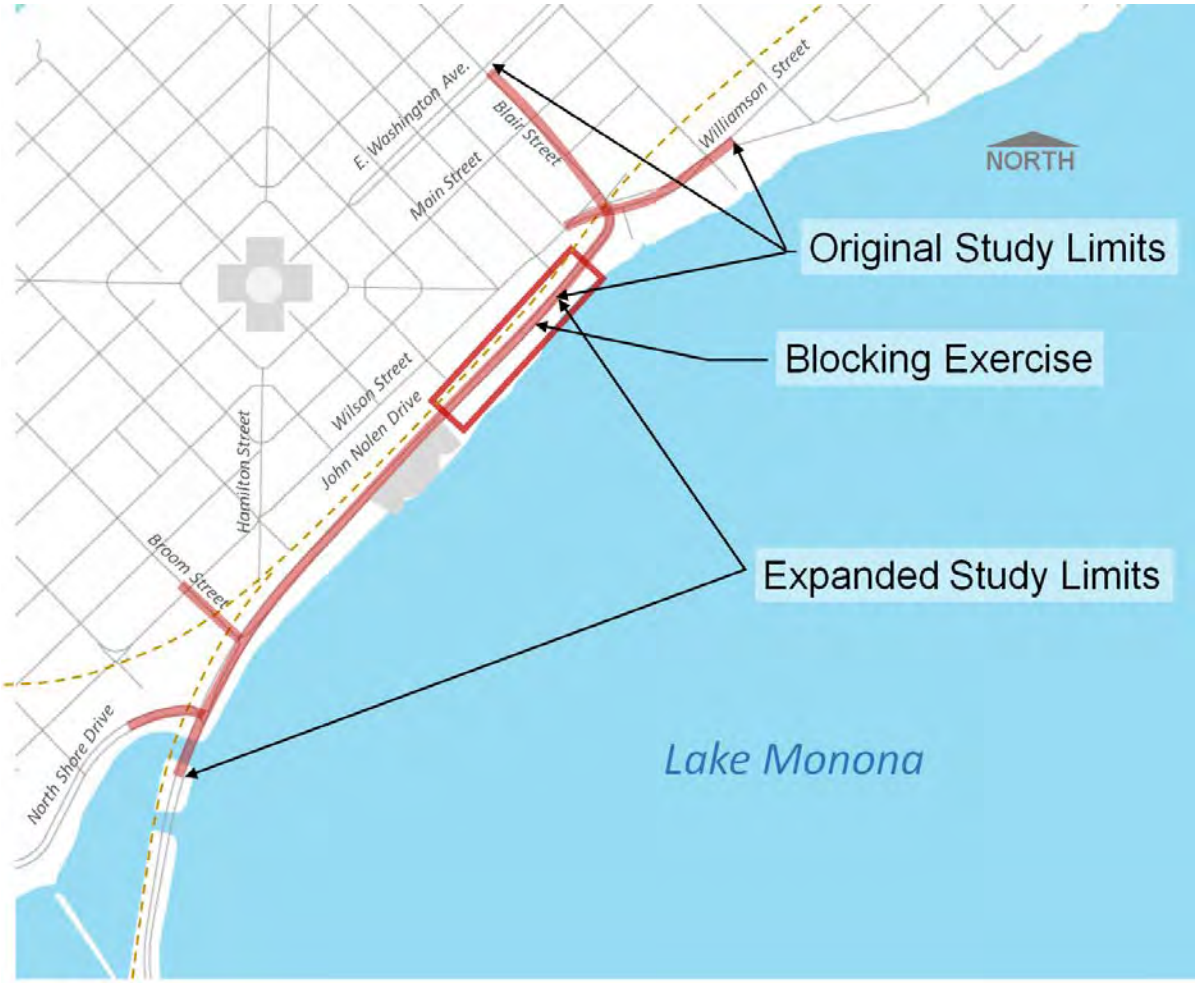


Figure 1.01-2 Study Limits

1.02 STUDY PURPOSE

The study's purpose is to develop a near-term solution for the John Nolen Drive/Blair Street and Wilson Street/Williamson Street intersection area that:

1. Can be reasonably funded with federal transportation monies within the next 5 to 10 years.

2. Improves operations, safety, and comfort for:
   a. Pedestrians
   b. Cyclists
   c. Motorists
   d. Transit

3. Addresses the poor pavement conditions.

4. Evaluates near- and long-term options that improve pedestrian and bicycle access to the lakeshore from North Shore Drive to Blair Street.

5. Evaluates the viewshed effects of proposals that include a structure over John Nolen Drive east of Monona Terrace.

The Blair Street and John Nolen Drive corridor is designated as US 151, a connecting highway. Therefore, these legs of the intersection are under the jurisdiction of the Wisconsin Department of Transportation (WisDOT). WisDOT and Federal funding likely would be used (and required) for improvements to these legs of the intersection.

1.03 STUDY SCHEDULE

The yearlong study was segmented into three phases. Phase 1 focused on identifying needs and developing alternatives. Phase 2 presented a range of alternatives and then used stakeholder feedback to refine the alternatives. Phase 3 presented both draft and final recommendations. Figure 1.03-1 graphically illustrates both the study phases and the study schedule.

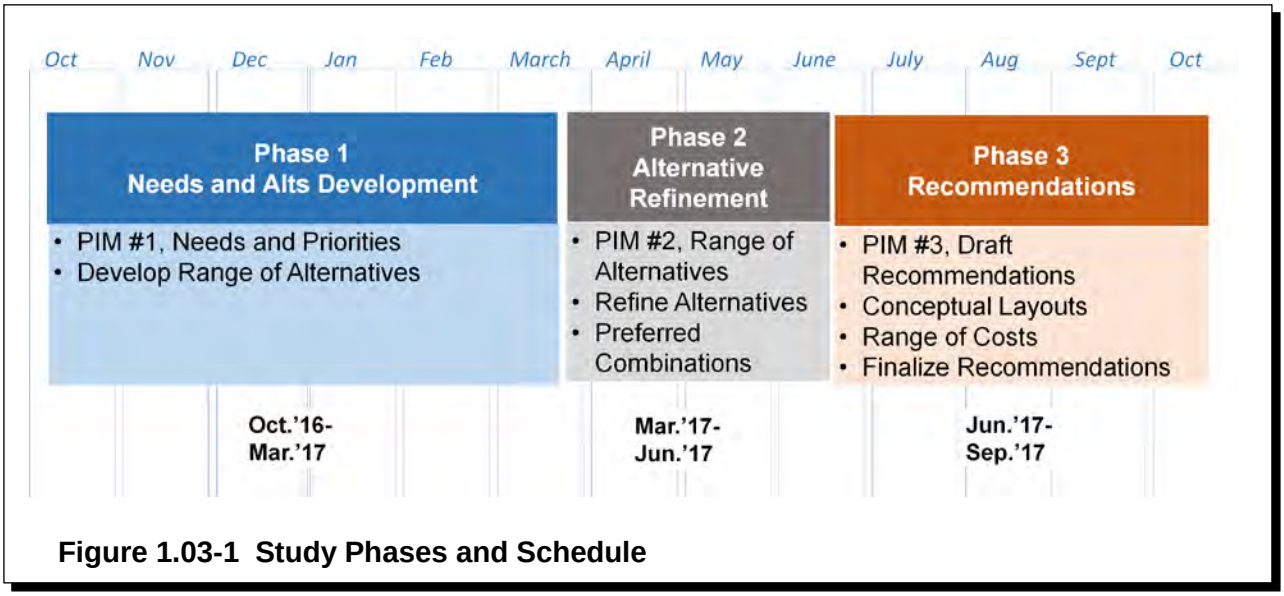


Figure 1.03-1 Study Phases and Schedule

1.04 OVERVIEW OF PREVIOUS STUDIES

There have been and are several studies of portions of the corridor that this study addresses. These include the South Capital Transit Oriented Development Study, as well as proposals/visions by Kenton Peters, Ken Saiki Design, and the Madison Design Professionals workgroup. The following paragraphs outline key features of their proposals.

A. South Capitol Transit Oriented Development Study

The City Planning Department enlisted the consultant team of Kimley Horne, Urban Assets, Potter Lawson, and Ken Saiki Design to develop a district planning study that provided design alternatives and recommendations for several components of the John Nolen Drive corridor. Some of the recommendations were endorsed by the South Capitol District Planning committee, while others were dismissed. The following briefly summarize the team's recommendations for areas that overlap with this study.

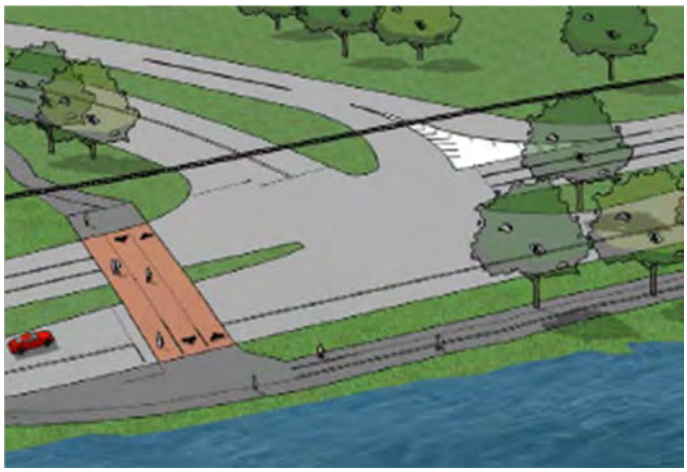


Figure 1.04-1 Example of a Super Crossing at North Shore Drive

1. North Shore and John Nolen Drive–Provide a "super crossing" that provides dedicated directional bike lanes and a shared pedestrian lane for crossing John Nolen Drive. They also recommend expanding bike and pedestrian queuing areas on both sides.

2. Broom Street and John Nolen Drive–Again, the study recommends providing a "super crossing" that provides dedicated directional bike lanes and a shared pedestrian lane for crossing John Nolen Drive. They also recommend providing a cycle track on the east side of Broom Street connecting to Wilson Street.

Figure 1.04-2 Example of a Super Crossing at Broom Street

3. John Nolen Drive/Blair Street and Wilson Street/Williamson Street–the study did not provide a unanimous recommendation for the intersection, but there were elements that the study advocated further evaluation of. These included:

    a. Provide a "super crossing" between Wilson Street and Williamson Street across the north Blair Street leg.

    b. Eliminate the small Wilson Street segment in front of Hotel Ruby Marie.

c. Remove and modify the back access to the Gateway Shopping Center.

d. Relocate the Machinery Row driveways.

e. Create left turn lanes to turn onto Wilson and Williamson Streets

4. Pedestrian connections–provide a grade separated plaza bridge pedestrian connection to Law Park on the east side of the Monona Terrace.

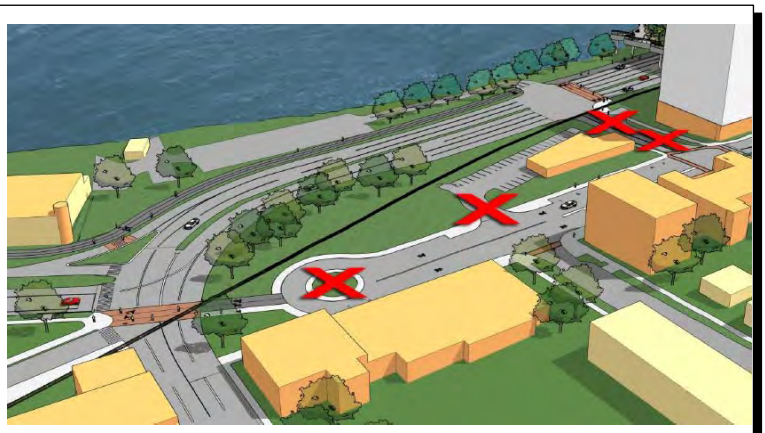


Figure 1.04-3 Partial Recommendations at Wilson/Williamson Intersection (x's convey concept portions not recommended)

B. Kenton Peters

Kenton Peters is a locally known architect, active for almost 50 years, who has designed several buildings in the Metropolitan area and downtown. He has been proposing covering John Nolen Drive with a park that steps down to the lake. The area above John Nolen Drive and under the park could be a parking garage and/or provide other uses. He suggested that leased parking and office space could pay the loan needed for building the raised park. The stepped park could lead to an enhanced waterfront that includes features such as the Frank Lloyd Wright Boathouse. Figure 1.04-5 illustrates the main concept advocated by Kenton Peters.

Figure 1.04-4 Plaza Style Pedestrian Connection to Law Park

C. Madison Design Professionals Workgroup

The Madison Design Professionals Workgroup have been studying the John Nolen Drive/Wilson Street/Williamson Street/Blair Street intersection for the past three years. They were awarded a grant from the Madison Community Foundation to envision various alternatives for the Monona waterfront. Some of their long-term visions also include covering John Nolen Drive with a park. Some of their near-term recommendations include reducing the size of the John Nolen Drive/Wilson Street/Williamson Street/Blair Street intersection. Figures 1.04-6 and 1.04-7 illustrate some of their concepts.

Figure 1.04-5 Kenton Peters Waterfront Proposal

WSJ Madison Design Professionals Workgroup and ZebraDog

Figure 1.04-6 Madison Design Professionals Long-Term Vision

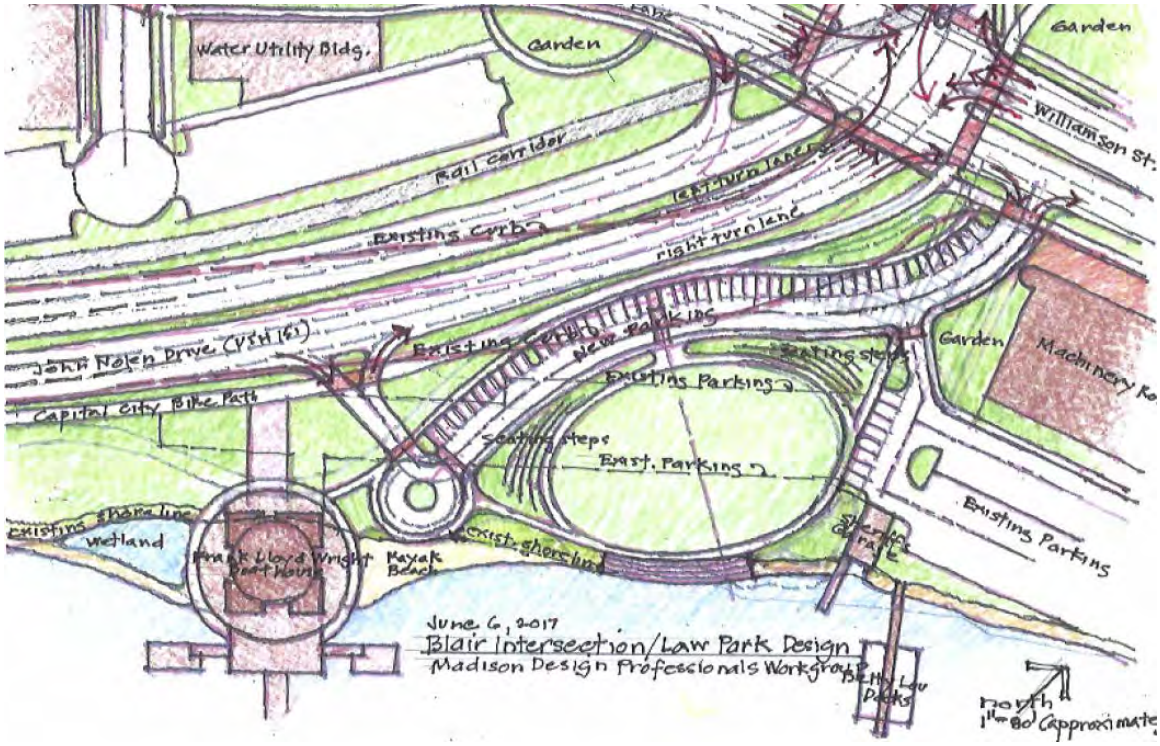


Figure 1.04-7 Madison Design Professionals Near-Term Vision

SECTION 2
BASE CONDITIONS AND PUBLIC INVOLVEMENT MEETING NO. 1

2.01 BASE CONDITIONS

Following is a summary of the current conditions along the study corridor.

A. General Transportation Context

The John Nolen Drive and Blair Street study corridor serves many functions. There is substantial pedestrian and bicycle activity along the corridor. The Capital City Trail lies along the south/east side of the corridor from its crossing at Williamson Street through the study boundary of North Shore Drive. Wilson Street is also a major pedestrian corridor connecting the Marquette neighborhood with the larger Capitol Square area.

Motor vehicles, including Metro Transit, use and cross the study corridor. The corridor is designated as US Highway 151, a corridor that is part of the National Highway System (NHS). NHS routes are those that are vital to the United States economy, national defense, and mobility. As such, according to the national Code of Federal Regulations (23 C.F.R. 625) NHS routes must "Adequately serve the existing and planned future traffic of the highway in a manner that is conducive to safety, durability, and economy of maintenance".

Daily motor vehicle traffic volumes have generally increased on the streets in the study area. The exception is along Williamson Street where traffic volumes have remained steady between 19,500 and 21,450 vehicles per day (vpd) from 1956 through 2013. Larger increases have occurred on North Shore Drive, Broom Street, John Nolen Drive, Blair Street, and East Washington Avenue. Figure 2.01-1 shows the daily traffic volumes in the study area.

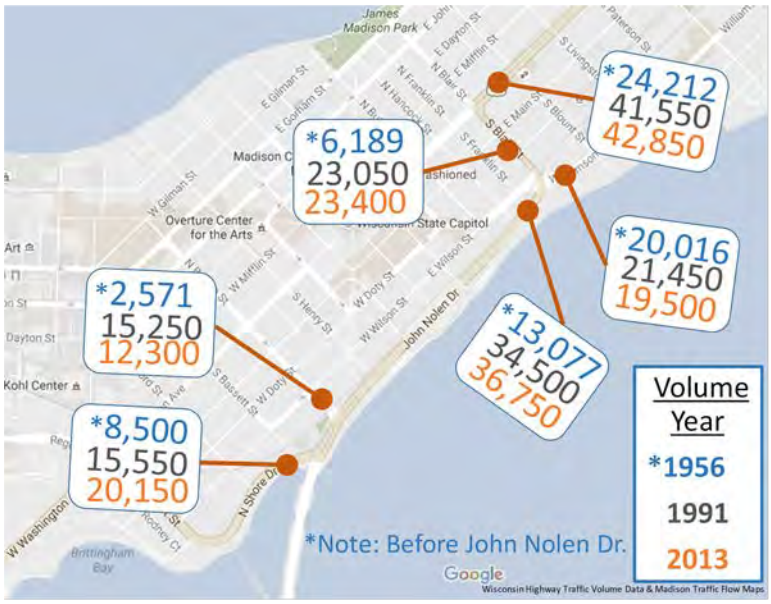


Figure 2.01-1 Daily Traffic Volumes in the Study Area

The Wisconsin and Southern Railroad (WSOR) maintains an active railroad corridor along the study corridor. The corridor crosses Monona Bay on the west side of and parallel to John Nolen Drive. It is joined by a second railroad corridor east of Broom Street. The WSOR railroad tracks continue along the west side of John Nolen Drive under Monona Terrace and cross the John Nolen Drive/Blair Street and Wilson Street/Williamson Street intersection from the southwest to the northeast. There is an average of six trains per day on this railroad corridor.

B. John Nolen Drive/Blair Street and Wilson Street/Williamson Street Intersection

1. Pedestrian Conditions

Pedestrian activity is abundant at this intersection. Marked crosswalks exist on all four legs of the intersection. The Capital City Trail crosses the eastern Williamson Street leg. Traffic counts taken in spring 2015 indicate pedestrian crossing volumes from 30 to 84 crossing occurrences (multiple pedestrians can cross in a single occurrence) in the AM and PM peak hours combined. Effectively, most or all of the crosswalks are used on each traffic signal cycle during the AM and PM peak hours. Pedestrian refuge islands are provided in the medians on the southern John Nolen Drive leg, the eastern Williamson Street leg, and the western Wilson Street leg. Refuge islands are also provided between the channelized right-turn lanes and the through lanes on the southern John Nolen Drive leg. Figure 2.01-2 shows the pedestrian accommodations at the intersection. There were zero reported pedestrian crashes at the intersection from 2011 through 2015.

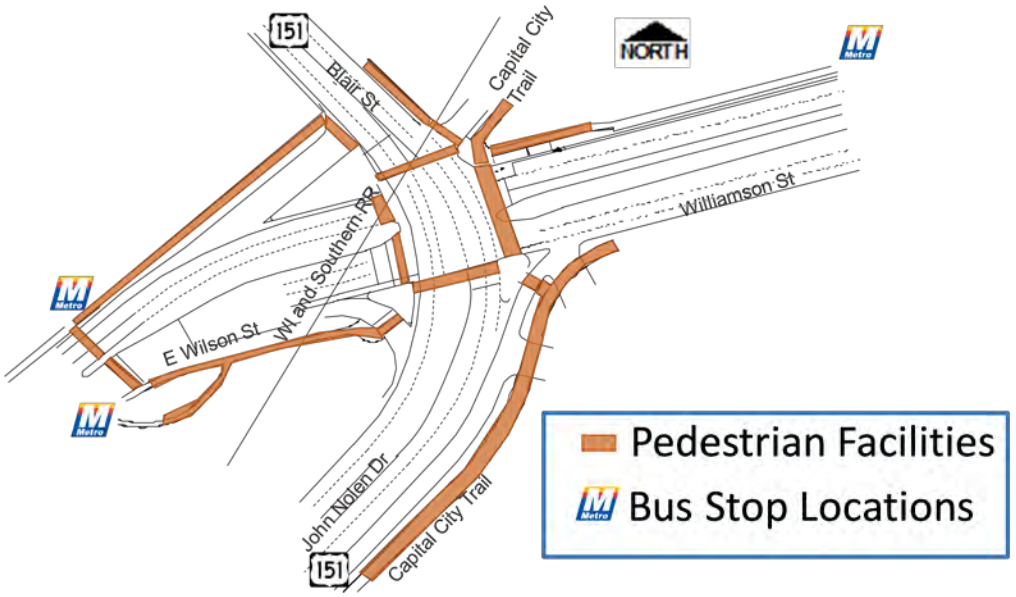


Figure 2.01-2 Pedestrian Accommodations at the John Nolen Drive/ Blair Street and Wilson Street/Williamson Street Intersection

2. Bicycle Conditions

This intersection sees high volumes of bicycle traffic, particularly on the eastern Williamson Street crossing of the Capital City Trail. Traffic counts taken in spring 2105 indicate bicycle crossing volumes exceeding 180 crossings in the AM and PM peak hours combined. The highest observed crossings were on the northern Blair Street leg and the eastern Williamson Street leg. The Capital City Trail joins a cycletrack in the southeast quadrant of the intersection that runs along the south side of Williamson Street in front of the Machinery Row building and Fauerbach Condominiums. There were nine reported bicycle crashes at the intersection from 2011 through 2015. Three

crashes occurred at one of the two driveways to the Machinery Row building located on the southeast corner of the intersection. Two crashes involved eastbound bicyclists traveling on Wilson Street. Two crashes occurred on the Capital City Trail crossing of the eastern Williamson Street leg. Two crashes involved westbound bicyclists traveling on Williamson Street.

3. Transit Conditions

Weekday Metro Transit Routes 10 and 38 travel on John Nolen Drive from Broom Street to the John Nolen Drive/Blair Street and Wilson Street/Williamson Street intersection where they continue service along Williamson Street and Jenifer Street. Weekday Routes 11 and 12 use Broom Street and travel south from there along John Nolen Drive. At the John Nolen Drive/Blair Street and Wilson Street/Williamson Street intersection Routes 3, 4, 10, and 38 cross John Nolen Drive/Blair Street while using Wilson Street and Williamson Street.

4. Motor Vehicle Conditions

Motor vehicle operations are typically evaluated based on the Level of Service (LOS) criteria as defined in the Highway Capacity Manual (HCM) from the Federal Highway Administration (FHWA). LOS values range from A through F with LOS A representing very low delay to drivers and LOS F representing conditions where the vehicular demand (arrivals at an intersection) exceeds the capacity of the intersection. LOS F conditions result in long delays and queuing at intersections.

Congestion and queuing occur during the current AM and PM peak hours at the John Nolen Drive/Blair Street and Wilson Street/Williamson Street intersection. The John Nolen Drive northbound through (NBT) and Blair Street southbound through (SBT) movements currently operate at LOS F. One of the key contributing factors to poor operations is the lack of left-turn lanes for the John Nolen Drive northbound left-turn (NBL) and Blair Street southbound left-turn (SBL) movements. Left-turning traffic on these legs often block the inside through travel lane, significantly impacting the motor vehicle capacity.

There were 92 reported motor vehicle crashes at the intersection from 2011 through 2015; 46 of the 92 (50 percent) were rear-end crashes. Of these, 59 percent occurred on northbound John Nolen Drive. Appendix A includes additional details regarding crashes at this intersection.

C. Monona Terrace to Law Park Area

1. Pedestrian and Bicycle Conditions

The Capital City Trail runs along the east side of John Nolen Drive. A pedestrian and bicycle elevator is available for public use at the Monona Terrace. Anecdotal comments from area stakeholders suggest the elevator is not well known. In general, local stakeholders often commented on the lack of pedestrian and bicycle connectivity between the Capital Square area and the Monona lakeshore. There were zero reported pedestrian and bicycle crashes in this area from 2011 through 2015.

2. Transit Conditions

Weekday Metro Transit Routes 10 and 38 travel on John Nolen Drive from Broom Street to the John Nolen Drive/Blair Street and Wilson Street/Williamson Street intersection where they continue service along Williamson Street and Jenifer Street.

3. Motor Vehicle Conditions

Motor vehicle operations along John Nolen Drive in this area are considered acceptable, including at the signalized intersection serving Monona Terrace. Northbound John Nolen Drive queuing from the John Nolen Drive/Blair Street and Wilson Street/Williamson Street intersection sometimes backs into this portion of the study corridor.

D. John Nolen Drive and North Shore Drive and Broom Street Area

1. Pedestrian Conditions

Pedestrian activity is abundant at both intersections in this area. At Broom Street, marked crosswalks exist crossing northbound John Nolen Drive with a median refuge provided between the NBT and NBL lanes. From there, crosswalks are provided to the northeast and northwest quadrants of the intersection. The Capital City Trail runs parallel to and east of John Nolen Drive at Broom Street. Traffic counts taken in spring 2015 indicate pedestrian crossing volumes from 40 to 62 crossing occurrences (multiple pedestrians can cross in a single occurrence) in the AM and PM peak hours combined. Effectively, the crosswalks are used on most traffic signal cycles during the AM and PM peak hours. Figure 2.01-3 shows the pedestrian accommodations at the Broom Street intersection. There were zero reported pedestrian crashes at the intersection from 2011 through 2015.

At North Shore Drive, marked crosswalks exist crossing northbound John Nolen Drive with a median refuge provided between the eastbound left-turn lanes (EBL) and the channelized eastbound right-turn lane (EBR). The Capital City Trail runs parallel to and east of John Nolen Drive at Broom Street. Traffic counts taken in Spring 2015 indicate pedestrian crossing volumes of up to 43 crossing occurrences (multiple pedestrians can cross in a single occurrence) in the AM and PM peak hours combined. Effectively, the crosswalks are used on most traffic signal cycles during the AM and PM peak hours. Figure 2.01-4 shows the pedestrian accommodations at the North Shore Drive intersection. There were zero reported pedestrian crashes at the intersection from 2011 through 2015.

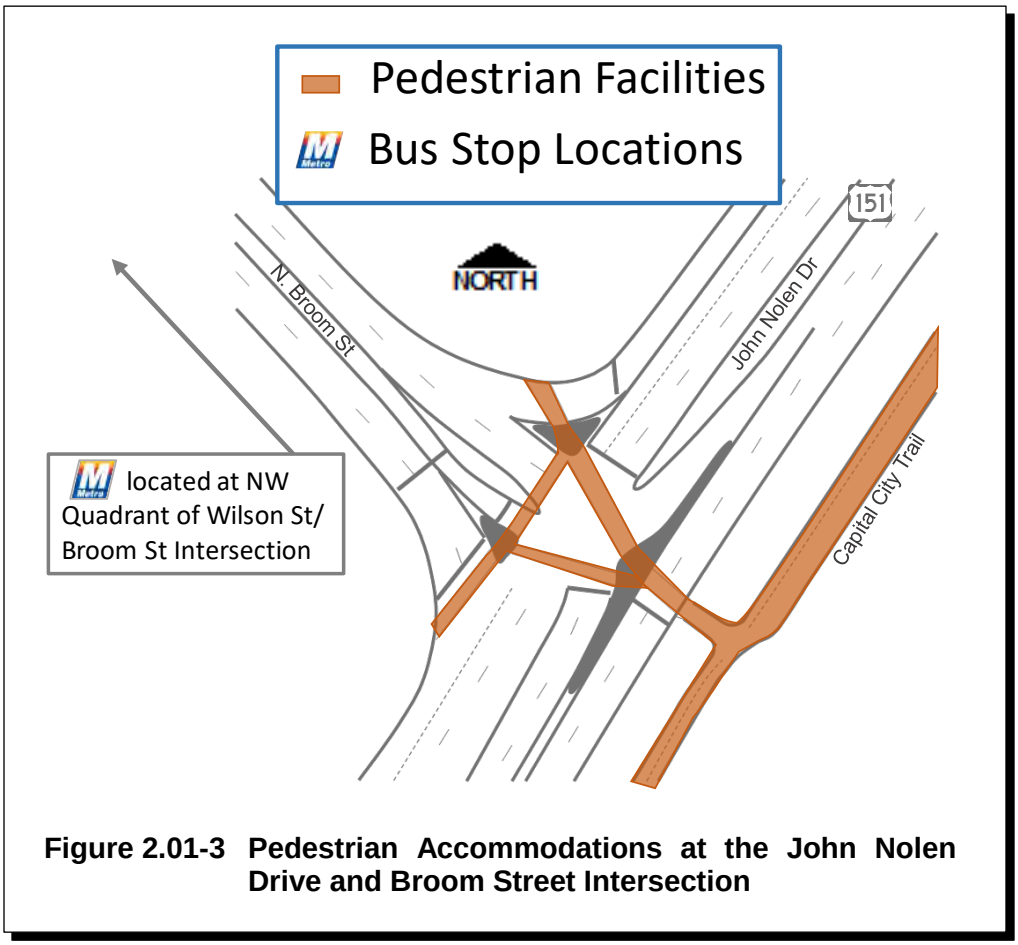


Figure 2.01-3 Pedestrian Accommodations at the John Nolen Drive and Broom Street Intersection

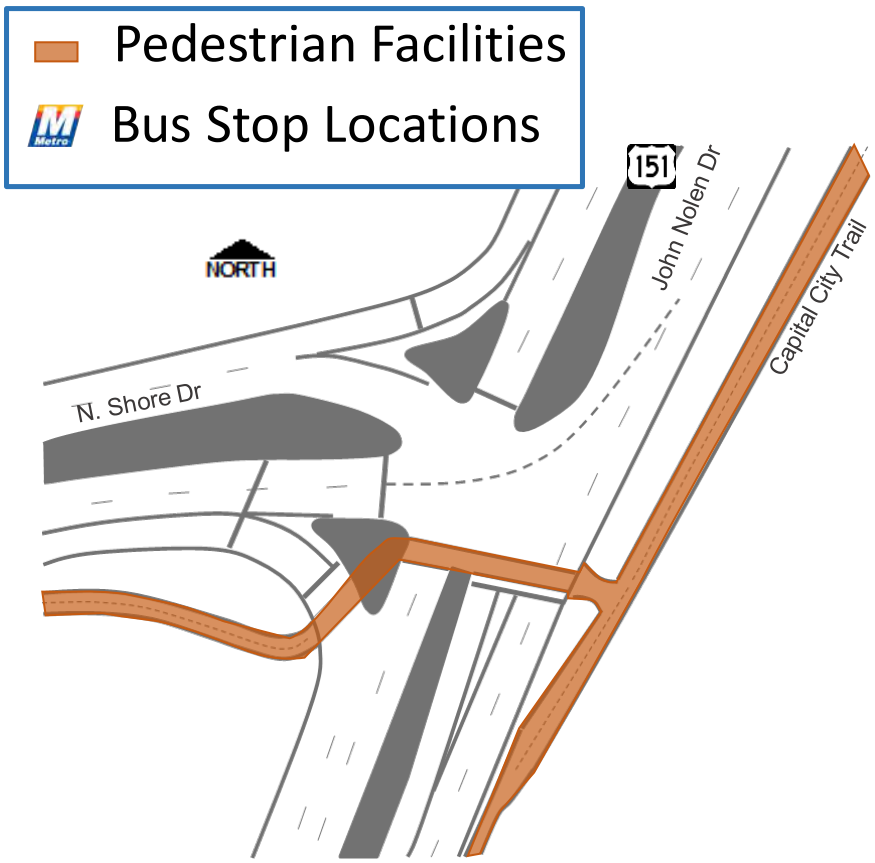


Figure 2.01-4 Pedestrian Accommodations at the John Nolen Drive and North Shore Drive Intersection

2. Bicycle Conditions

The Broom Street intersection sees moderate volumes of bicycle traffic crossing John Nolen Drive, with high volumes using the Capital City Trail on the east side of John Nolen Drive. Traffic counts taken in Spring 2015 indicate bicycle crossing volumes of up to 20 in the AM and PM peak hours combined. There were three reported bicycle crashes at the intersection from 2011 through 2015; one occurred at the crossing of the John Nolen Drive NBT lanes, one at the crossing of the John Nolen Drive SBT lanes, and one at the crossing of the Broom Street eastbound right-turn lanes (EBR).

The North Shore Drive intersection sees high volumes of bicycle traffic crossing John Nolen Drive, with high volumes also using the Capital City Trail on the east side of John Nolen Drive. Traffic counts taken in Spring 2015 indicate bicycle crossing volumes of nearly 100 in the AM and PM peak hours combined. There were six reported bicycle crashes at the intersection from 2011

through 2015; one occurred at the crossing of the John Nolen Drive NBL turn lane, while five occurred crossing the North Shore Drive channelized eastbound right-turn lane to southbound John Nolen Drive. Of the five, four occurred prior to the improvements made to the intersection in 2013 that eliminated one southbound John Nolen Drive travel lane to allow for a larger refuge island.

3. Transit Conditions

Weekday Metro Transit Routes 10 and 38 travel on John Nolen Drive from Broom Street to the John Nolen Drive/Blair Street and Wilson Street/Williamson Street intersection where they continue service along Williamson Street and Jenifer Street. Weekday Routes 11 and 12 use Broom Street and travel south from there along John Nolen Drive. At the John Nolen Drive/Blair Street and Wilson Street/Williamson Street intersection routes 3, 4, 10, and 38 cross John Nolen Drive/Blair Street while using Wilson Street and Williamson Street. There are no Metro routes that use North Shore Drive.

4. Motor Vehicle Conditions

Congestion and queuing occur during the current AM and PM peak hours at the John Nolen Drive and Broom Street intersection. The John Nolen Drive NBT movement currently operates at LOS F during the AM peak hour. Queues exceed 700 feet northbound during the AM peak hour (reaching North Shore Drive upstream) and southbound during the PM peak hour.

There were 52 reported motor vehicle crashes at the intersection from 2011 through 2015; 32 of the 52 (62 percent) were rear-end crashes. This typically indicates the congestion and queuing is contributing to the crashes. Appendix A includes additional details regarding crashes at this intersection.

Congestion and queuing also occur during the current AM and PM peak hours at the John Nolen Drive and North Shore Drive intersection. During the AM peak hour, the John Nolen Drive northbound left turn operates at LOS F with queues approaching 700 feet that spill out of the turn bay storage. During the PM peak hour, the eastbound North Shore Drive left turn operates at LOS F while southbound John Nolen Drive queuing approaches 900 feet (reaching Broom Street upstream).

There were 119 reported motor vehicle crashes at the intersection from 2011 through 2015. The intersection crash rate was 1.41 crashes per 100 million entering vehicles (MEV). In Wisconsin, intersections with crash rates exceeding 1.00 per MEV are typically considered worthy of investigation for safety improvements. Rear-end crashes contributed to 58 of the 119 (49 percent) crashes. This typically indicates the congestion and queuing is contributing to the crashes. Appendix A includes additional details regarding crashes at this intersection.

2.02 PUBLIC INVOLVEMENT MEETING NO. 1

The first Public Involvement Meeting (PIM No. 1) was held at the Monona Terrace Convention Center on November 30, 2016, from 7 to 9 PM; 43 people attended. The primary goals of the meeting were to share information about the existing transportation conditions and gather feedback regarding needs from local stakeholders.

A. Presentation and Display Materials

The slideshow presentation from PIM No. 1 are included in Appendix B. The presentation outline follows:

1. Study corridor and reasons for study.
    a. Upcoming projects
    b. Previous studies and longer-term opportunities
2. Background and current conditions
3. Study process and schedule
4. Questions and answers
5. Goals exercise

B. Summary of Goals Exercise

Large paper roll plots showing aerial photos of the study corridor were provided at the meeting along with sharpie markers and sticky notes. The study team asked participants to provide feedback on corridor features and concerns. A full summary of the notes is included in Appendix B. Following are the most common comments.

1. At the John Nolen Drive/Blair Street and Wilson Street/Williamson Street intersection the driveways serving the Machinery Row businesses in the southeast quadrant of the intersection causes problems with limited sight distances and conflicts between pedestrians, bicycles, and motor vehicles.
2. John Nolen Drive and Blair Street are barriers for pedestrians and bicycles. Additional and/or improved crossings are needed.
3. The Capital City Trail approach from the east to the John Nolen Drive/Blair Street and Wilson Street/Williamson Street intersection is confusing. Separate space for pedestrians and bicycles would be desirable.
4. The refuge islands at the John Nolen Drive/Blair Street and Wilson Street/Williamson Street intersection are not large enough for bicycles.

5. A better connection for pedestrians and bicycles between the Capitol Square and the Law Park/Lake Monona shoreline is needed.

6. The six-leg intersection at Wilson Street and Hamilton Street is confusing.

7. Long-term, “big picture” study is needed for the area.

C. Summary of Verbal and Written Comments

A full summary of the verbal and written comments is included in Appendix B. Following are the most common comments.

1. Needs:

   a. Pedestrians and bicyclists need better defined separate spaces on the south side of Williamson Street between John Nolen Drive/Blair Street and Jenifer Street.

   b. A better connection for pedestrians and bicycles between the Capitol Square and the Law Park/Lake Monona Shoreline is needed.

   c. Law Park is under used. Consider barriers and/or fences between the park and John Nolen Drive.

   d. The John Nolen Drive/Blair Street corridor works well for cars, but it needs to work well for residents too.

   e. Turns into the Essen Haus parking lot are as bad as at the main intersection, and redevelopment there is expected. Eliminate access to Blair Street and provide it via Wilson Street or Franklin Street.

2. Goals, ideas, and solutions:

   a. Better aesthetics along John Nolen Drive and traffic calming are needed to reduce speeding and red light running.

   b. Deemphasize Williamson Street as a through corridor by eliminating the channelized right-turn from John Nolen Drive to Williamson Street and implementing aesthetics and traffic calming to communicate that the first block of Williamson Street is a neighborhood.

   c. Maybe delays (LOS F), queuing, and congestion for cars is not a bad thing.

   d. Relocate the Capital City Trail crossing from the Williamson Street side of the intersection to Blount Street.

e. Cross the Capital City Trail under John Nolen Drive in the Broom Street and North Shore Drive area.

f. Implement a railroad quiet zone in this area.

g. Advance the Monona lake shore concepts that cover John Nolen Drive and place a park and open space on top.

h. Extend Hancock Street to John Nolen Drive and reroute Wilson Street traffic to the Hancock Street extension.

i. Close the Wilson Street approach to the main intersection and reuse the space for pedestrians and bicycles.

j. Make Wilson Street one-way or two-way for its entire length instead of switching back and forth.

SECTION 3
RANGE OF ALTERNATIVES AND PUBLIC MEETING NO. 2

3.01 RANGE OF ALTERNATIVES

The study team reviewed alternatives initially developed as part of the WisDOT's Madison Beltline Planning and Environment Linkages study (PEL) as a starting point. The team used Synchro and SimTraffic software to evaluate motor vehicle operations with forecasted 2050 AM and PM traffic volumes with the goal of reducing delays and queuing compared to a No Build condition. Based on the initial alternatives developed during the PEL the team created additional alternatives. Detailed motor vehicle operations results are included in Appendix C.

A. Blair Street/John Nolen Drive and Wilson Street/Williamson Street Intersection

1. Alternative 0: No Build

Congestion and queuing are estimated to be significant in 2050 under a No Build condition. Overall, the intersection operates at LOS F (342 seconds of delay) during the AM peak hour and LOS F (168 seconds of delay) during the PM peak hour. The John Nolen Drive NBT and Blair Street SBT movements operate at LOS F in the AM and PM peak hours with queues of 800 to nearly 1,300 feet. The WBL operates at LOS E during both peaks.

2. Alternative 1: Add NBL and SBL

Adding a NBL turn bay and SBL turn bay on John Nolen Drive/Blair Street results in overall intersection operations at LOS D (55 seconds of delay) during the AM peak hour and LOS D (37 seconds of delay) during the PM peak hour. During the AM peak hour, the WBL, NBL, and SBT/R movements operate at LOS E and southbound queuing is nearly 950 feet. During the PM peak hour, The WBL operates at LOS F. Figure 3.01-1 shows the No Build condition and Alternative 1.

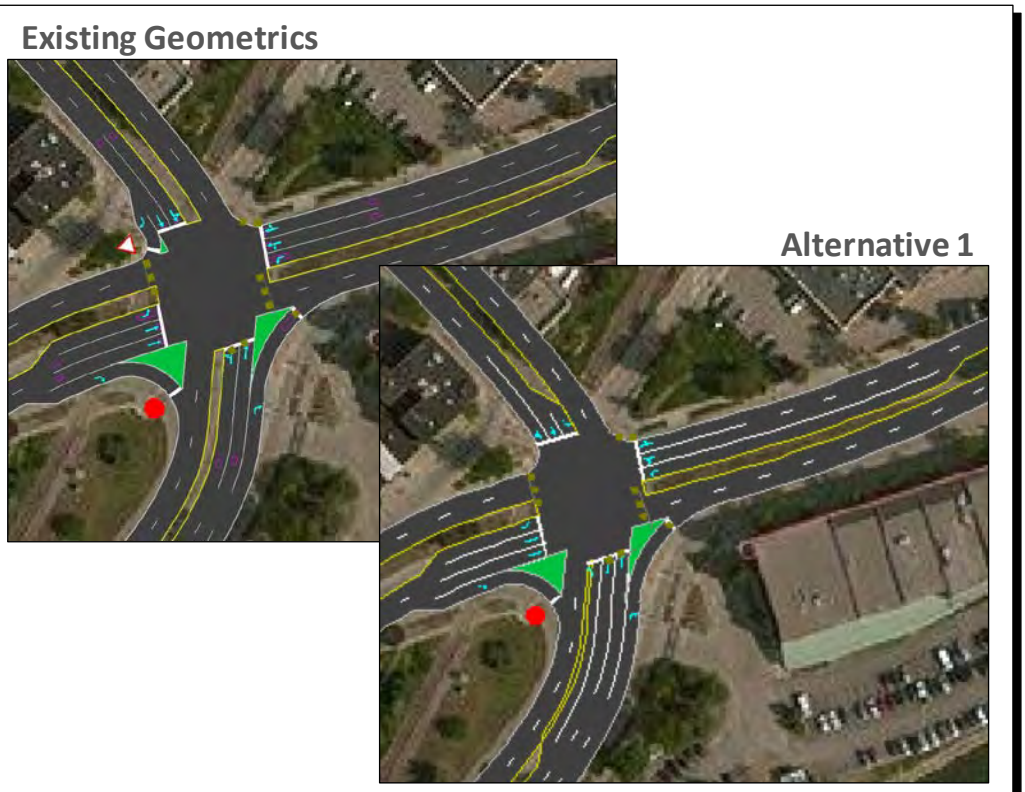


Figure 3.01-1 Alternative 1

3. Alternative 2: Add NBL, SBL, Single EBT, WBT

Reducing the eastbound and westbound through lanes allows the westbound shared through/left-turn lane on Williamson Street to be converted to an exclusive left-turn lane, which allows for modified signal phasing. It also reduces the intersection footprint overall. With this configuration the intersection operates overall at LOS E (75 seconds of delay) during the AM peak hour and LOS E (64 seconds of delay) during the PM peak-hour. There are six movements that operate at LOS E and one at LOS F in the AM peak hour. There are three movements that operate at LOS E and one at LOS F in the PM peak hour. Figure 3.01-2 shows the No Build condition and Alternative 2.

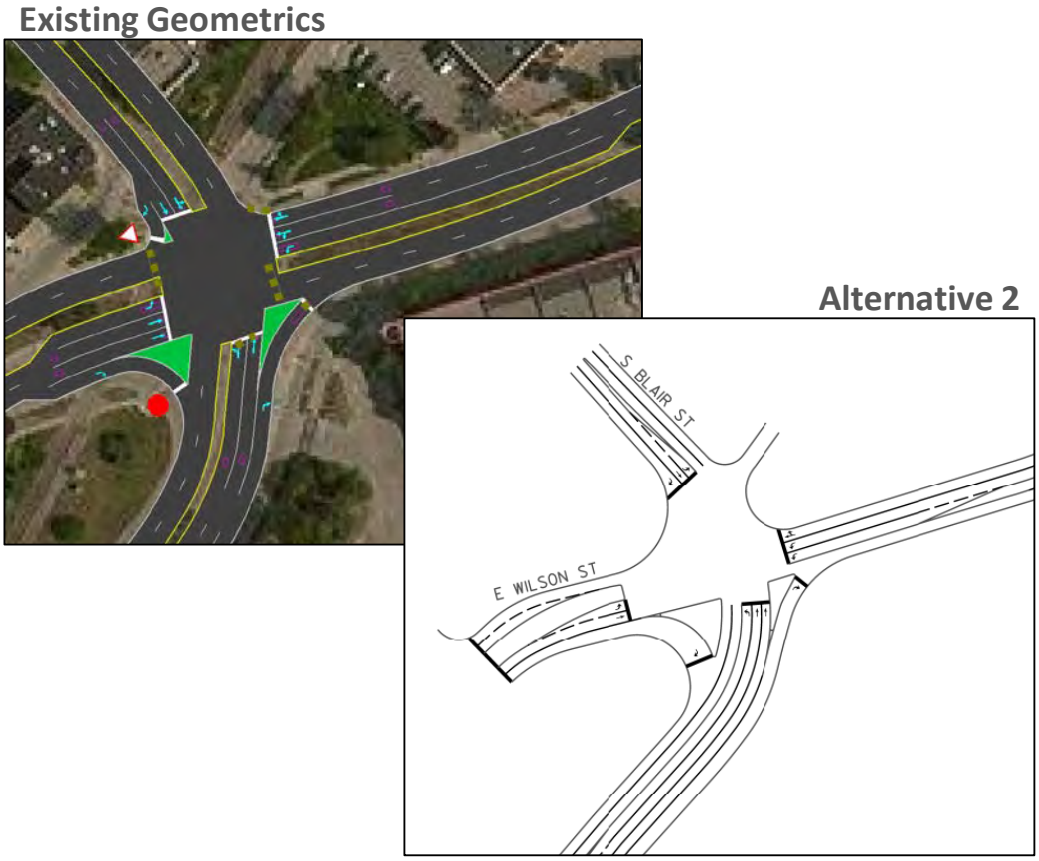


Figure 3.01-2 Alternative 2

4. Alternative 3: Add NBL, SBL, Single EBT, Eliminate Shared WBL/T

Reducing the eastbound through lanes reduces the intersection footprint. Eliminating the shared WBT/L allows for modified signal phasing options. With this configuration the intersection operates overall at LOS D (54 seconds of delay) during the AM peak hour and LOS E (60 seconds of delay) during the PM peak-hour. There are four movements that operate at LOS E and two at LOS F in the AM peak hour. There are three movements that operate at LOS E and one at LOS F in the PM peak-hour. Figure 3.01-3 shows the No Build condition and Alternative 3.

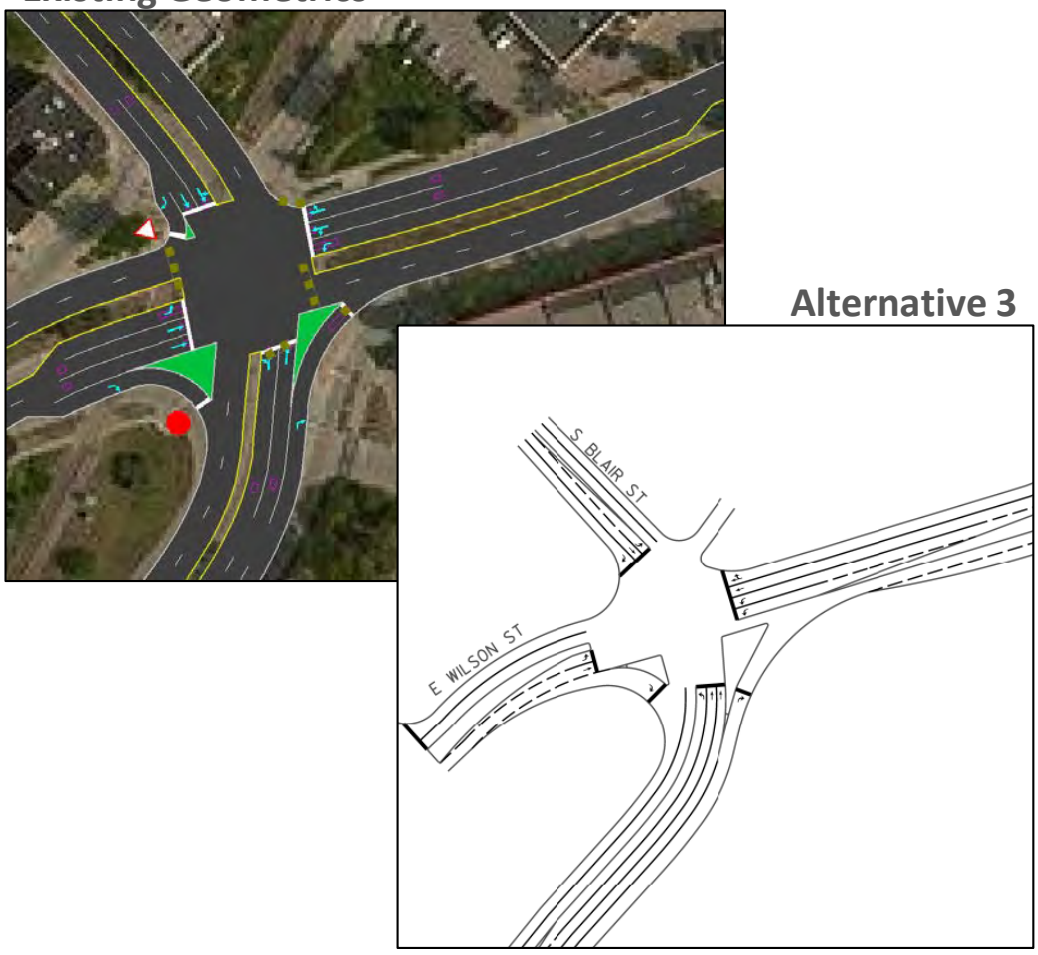


Figure 3.01-3 Alternative 3

5. Alternative 4: One-Way Circulator using Hancock Street

Alternative 4 uses one-way streets to provide motor vehicle access and mobility. Westbound Williamson Street traffic destined for southbound John Nolen Drive continues west on Wilson Street before turning south on the new Hancock Street connection to John Nolen Drive. Southbound Blair Street traffic turns right on to westbound Wilson Street and turns south on the new Hancock Street connection. Eastbound Wilson Street traffic destined for eastbound Williamson Street turns right on to the new Hancock Street connection followed by left on to John Nolen Drive. Figure 3.01-4 shows the No Build condition and Alternative 4.

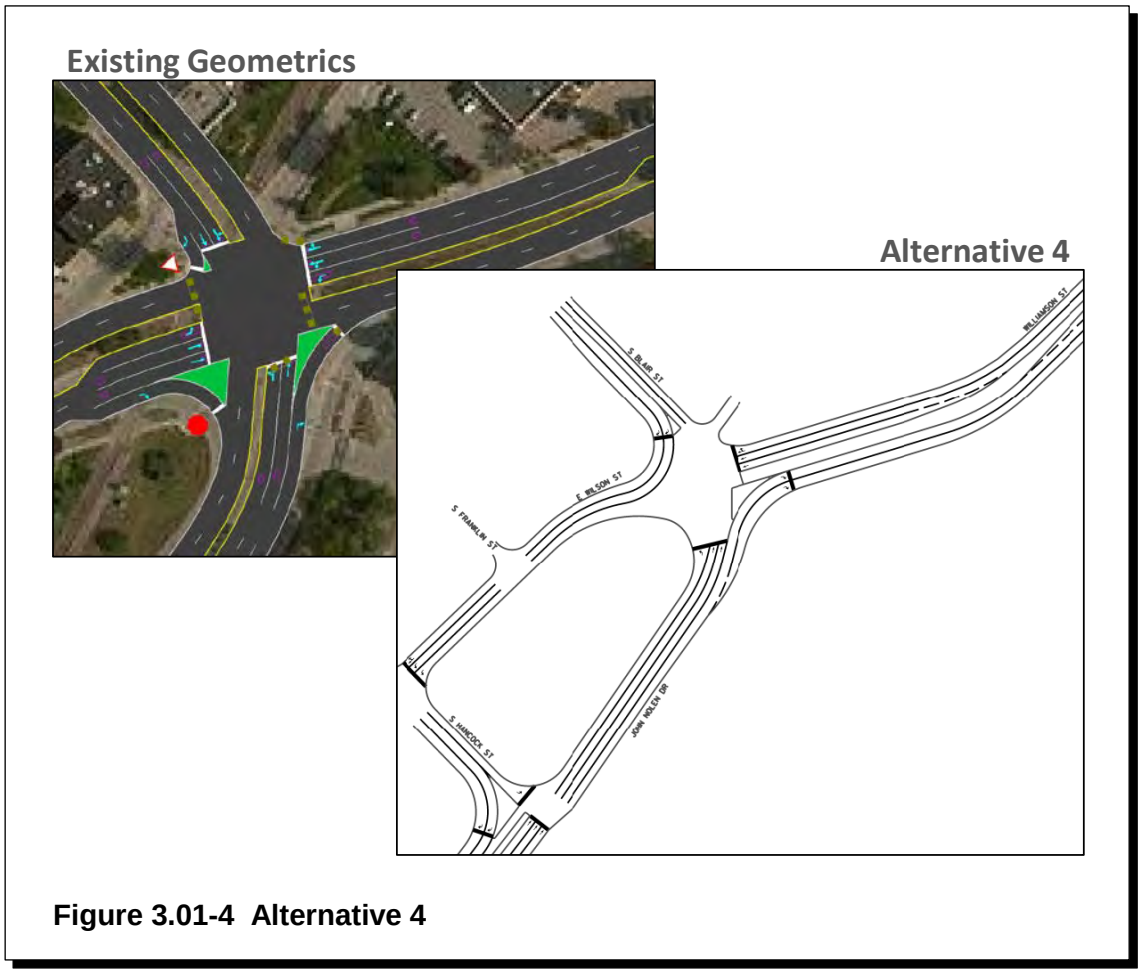


Figure 3.01-4 Alternative 4

With this configuration the John Nolen Drive/Blair Street and Wilson Street/Williamson Street intersection operates overall at LOS E (59 seconds of delay) during the AM peak hour and LOS B (15 seconds of delay) during the PM peak hour. During the AM peak hour, the WBT/R, NBL, and SBR movements operate at LOS F.

The other two signals operate overall at LOS C or better. There are two movements that operate at LOS E during the AM peak hour.

6. Alternative 4a: One-Way Circulator with Two-Way Hancock Street

Alternative 4a operates similarly to Alternative 4, with the exception being that the Hancock Street connection between Wilson Street and John Nolen Drive operates as a two-way street. Northbound John Nolen Drive traffic destined for westbound Wilson Street turns left on to northbound Hancock Street followed by a left-turn on to Wilson Street. Figure 3.01-5 shows the No Build condition and Alternative 4a.

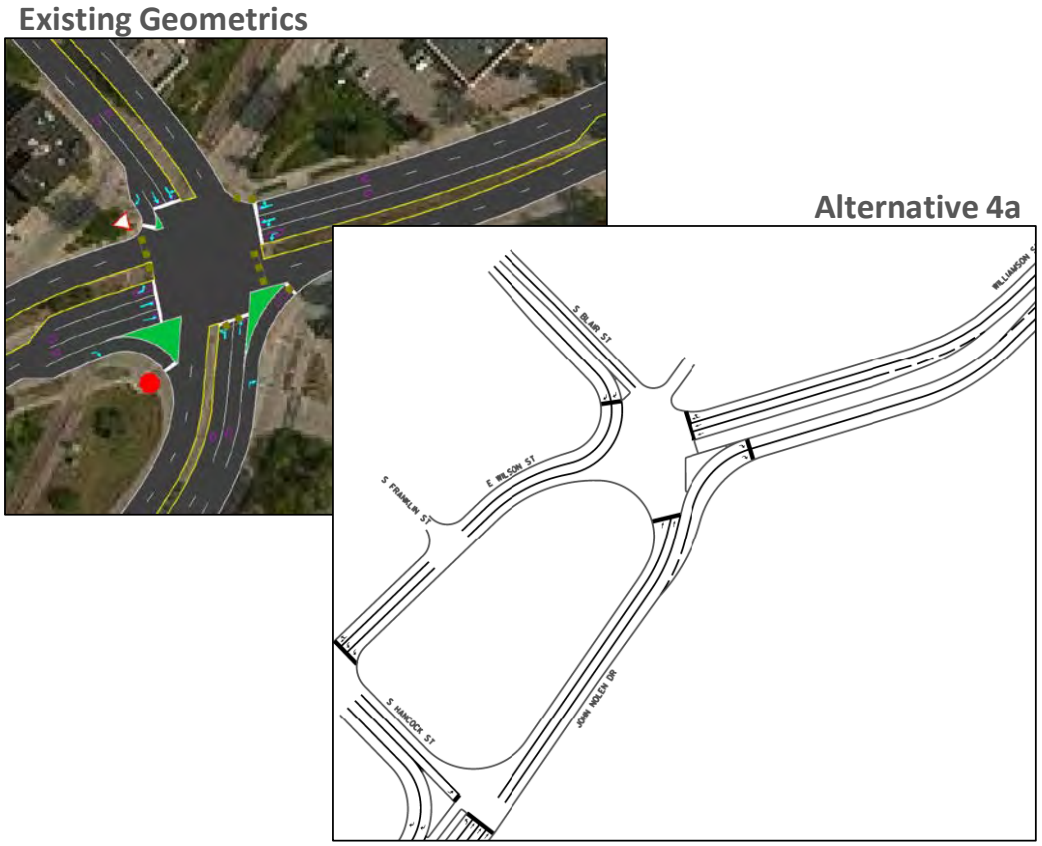


Figure 3.01-5 Alternative 4a

With this configuration the John Nolen Drive/Blair Street and Wilson Street/ Williamson Street intersection operates overall at LOS C (30 seconds of delay) during the AM peak hour and LOS B (12 seconds of delay) during the PM peak hour. All movements operate at LOS D or better during both peaks.

The other two signals operate overall at LOS C or better. The left-turn from southbound/eastbound Hancock Street to northbound John Nolen Drive operates at LOS F during the PM peak hour.

7. Alternative 5: Two-way Operation with Two-Way Hancock Street

Alternative 5 also includes a two-way Hancock Street connection. Wilson Street between Hancock Street and John Nolen Drive/Blair Street allows two-way operation, so southbound Hancock Street only serves eastbound Wilson Street traffic destined for southbound John Nolen Drive. Northbound John Nolen Drive traffic destined for westbound Wilson Street uses the Hancock Street connection as well. Figure 3.01-6 shows the No Build condition and Alternative 5.

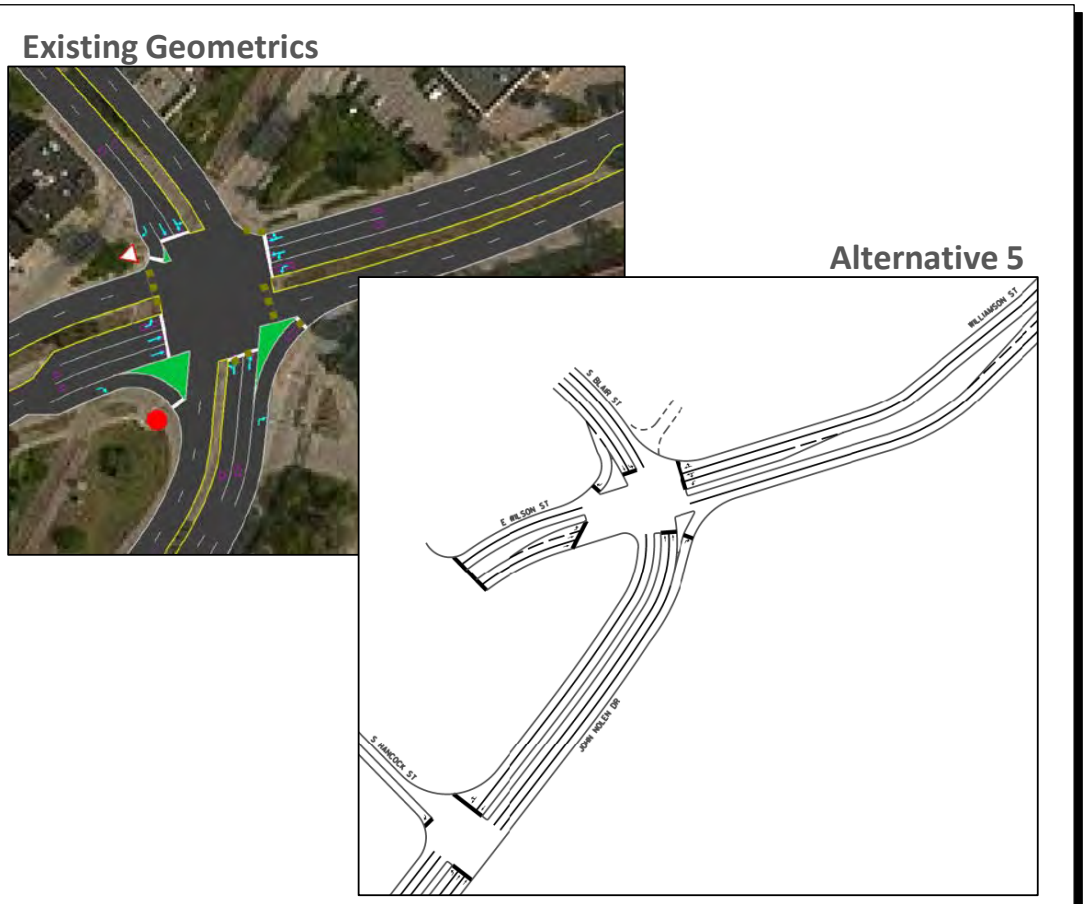


Figure 3.01-6 Alternative 5

With this configuration the John Nolen Drive/Blair Street and Wilson Street/Williamson Street intersection operates overall at LOS F (132 seconds of delay) during the AM peak hour and LOS D (51 seconds of delay) during the PM peak hour. There are several movements that operate at LOS E or LOS F during the AM and/or PM peak hours.

The other two signals operate overall at LOS C or better. All movements operate at LOS D or better during both peaks.

8. Alternative 6: Two-Way Operation with Two-Way Hancock Street and Relocated Williamson Street WBL

Alternative 6 is similar to Alternative 5 except that it prohibits the WBL from Williamson Street directly on to southbound John Nolen Drive. Southbound Hancock Street serves eastbound Wilson Street traffic and westbound Williamson Street traffic destined for southbound John Nolen Drive. Northbound John Nolen Drive traffic destined for westbound Wilson Street uses the Hancock Street connection, as well. Figure 3.01-7 shows the No Build condition and Alternative 6.

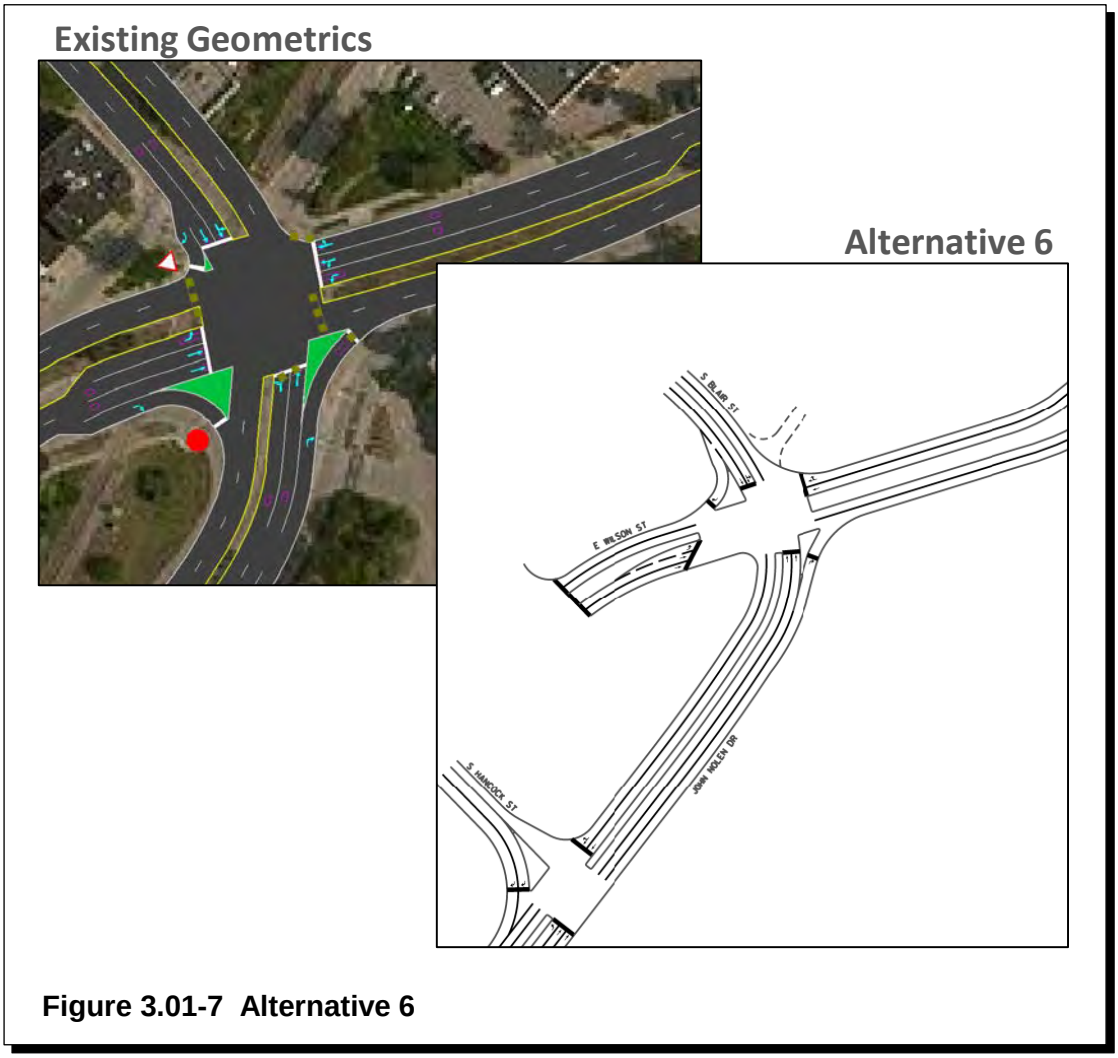


Figure 3.01-7 Alternative 6

With this configuration the John Nolen Drive/Blair Street and Wilson Street/Williamson Street intersection operates overall at LOS F (180 seconds of delay) during the AM peak hour and LOS D (48 seconds of delay) during the PM peak hour. There are several movements that operate at LOS E or LOS F during the AM and/or PM peak hours.

The other two signals operate overall at LOS C or better. The right turn from the Hancock Street extension to southbound John Nolen Drive operates at LOS F during the AM peak hour.

9. Alternative 6a: Two-Way Operation with Two-Way Hancock Street, Relocated Williamson Street WBL, and Three NBT Lanes on John Nolen Drive

Alternative 6a is similar to Alternative 6 except that it provides three through lanes on northbound John Nolen Drive at the Hancock Street connection. The team did not model 2050 operations in detail because operations are similar to Alternative 6. Figure 3.01-8 shows Alternative 6 compared to Alternative 6a.

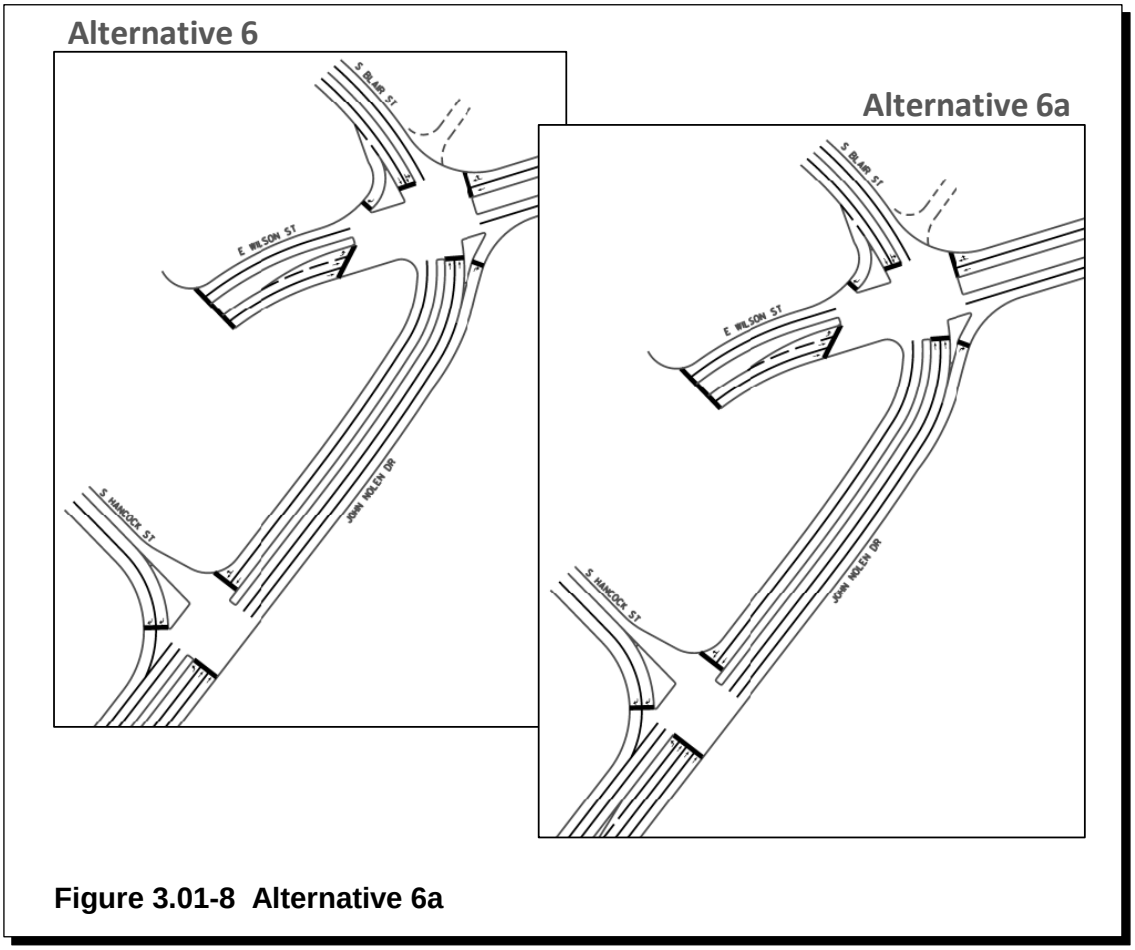


Figure 3.01-8 Alternative 6a

10. Alternative 7: Compact Circulator

Alternative 7 is similar to Alternative 4 by providing one-way counterclockwise circulation, but using a new extension of Franklin Street rather than the Hancock Street location. This provides a more compact system that functions similarly to a signalized roundabout. The team did not model 2050 operations in detail because operations are similar to Alternative 4. Figure 3.01-9 shows Alternative 4 and Alternative 7.

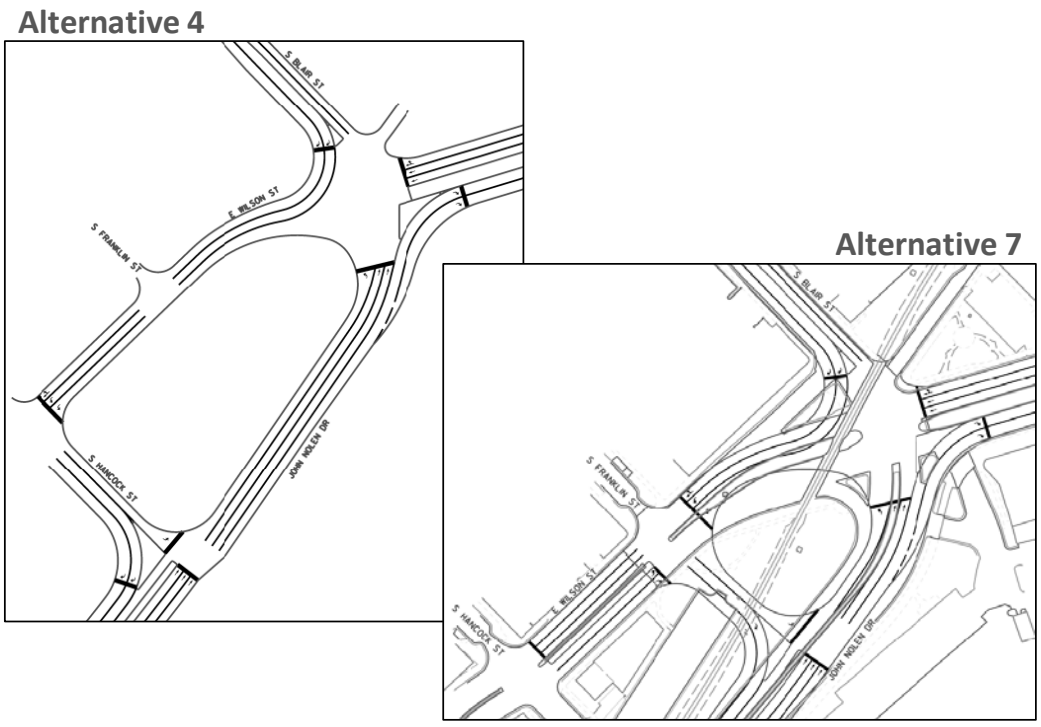


Figure 3.01-9 Alternative 7

11. Alternative 8: Add NBL, SBL, and Triple WBL

Alternative 8 is similar to Alternative 1 while adding a third westbound left-turn lane from Williamson Street to southbound John Nolen Drive. Adding a NBL turn bay on John Nolen Drive, a SBL turn bay on Blair Street, and a third WBL on Williamson Street results in overall intersection operations at LOS E (60 seconds of delay) during the AM peak hour and LOS C (28 seconds of delay) during the PM peak hour. All movements operate at LOS D or better during the PM peak hour. During the AM peak hour, the WBL, WBT/R, NBL, and EBT movements operate at LOS E and southbound queuing is nearly 950 feet. Figure 3.01-10 shows the No Build condition and Alternative 8.

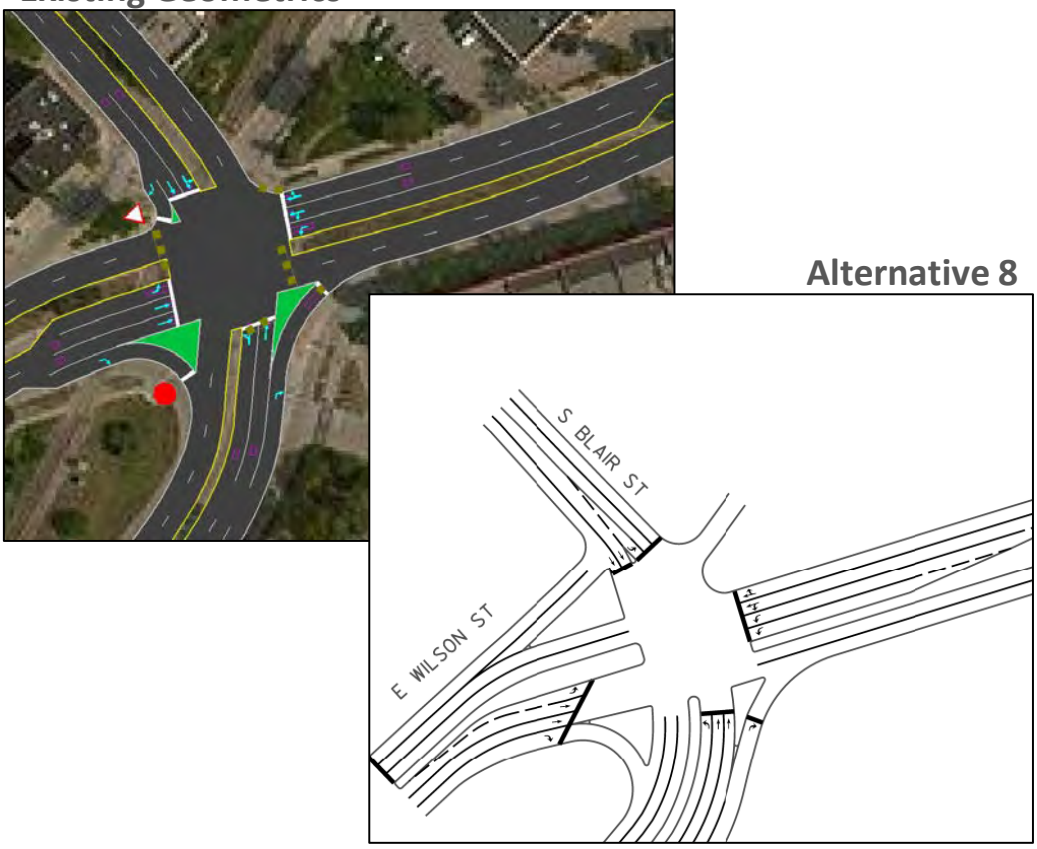


Figure 3.01-10 Alternative 8

12. Alternative 9: One-Way Blair Street and Blount Street Couplet

This alternative routes all northbound John Nolen Drive traffic destined for northbound Blair Street and/or East Washington Avenue on to eastbound Williamson Street and northbound Blount Street which operates one-way northbound. Blair Street operates one-way southbound so that Blair Street and Blount Street operate as a one-way pair (or couplet). This alternative was developed shortly before PIM No. 2 and 2050 operations were not modeled in detail. Instead, the team chose to bring it to the public for input before deciding if additional investigation was warranted. Figure 3.01-11 shows Alternative 9.

Figure 3.01-11 Alternative 9

13. Williamson Street and Blount Street Cycle Track

This alternative aims to improve conditions for pedestrians and bicyclists in the Law Park and Machinery Row area. Several features are included. The existing driveways to Machinery Row and Law Park are eliminated. The access is relocated to the south on John Nolen Drive providing a right-in, right-out, left-in motor vehicle configuration. The Capital City Trail is routed through a reconfigured parking area adjacent to the new access. This is done to move the trail away from John Nolen Drive to eliminate the conflict that would occur between motor vehicles turning into

and out of the relocated access point and the existing trail location running directly adjacent to John Nolen Drive.

Separate space for pedestrians and bicycles are proposed throughout the area. The space along the south side of Williamson Street between John Nolen Drive and Blount Street is reorganized to provide wider, separated space for pedestrians and bicycles. A new signal is provided at Blount Street that will work in conjunction with the existing bus signal at Jenifer Street. A diagonal crossing for pedestrians and bicycles is proposed at the new Blount Street signal. A cycle track is provided along Blount Street up to the existing Capital City Trail crossing. This alternative provides an alternate option for Capital City Trail users, allowing them to avoid crossing Williamson Street at the John Nolen Drive/Blount Street and Wilson Street/Williamson Street intersection. Figure 3.01-12 shows this alternative.

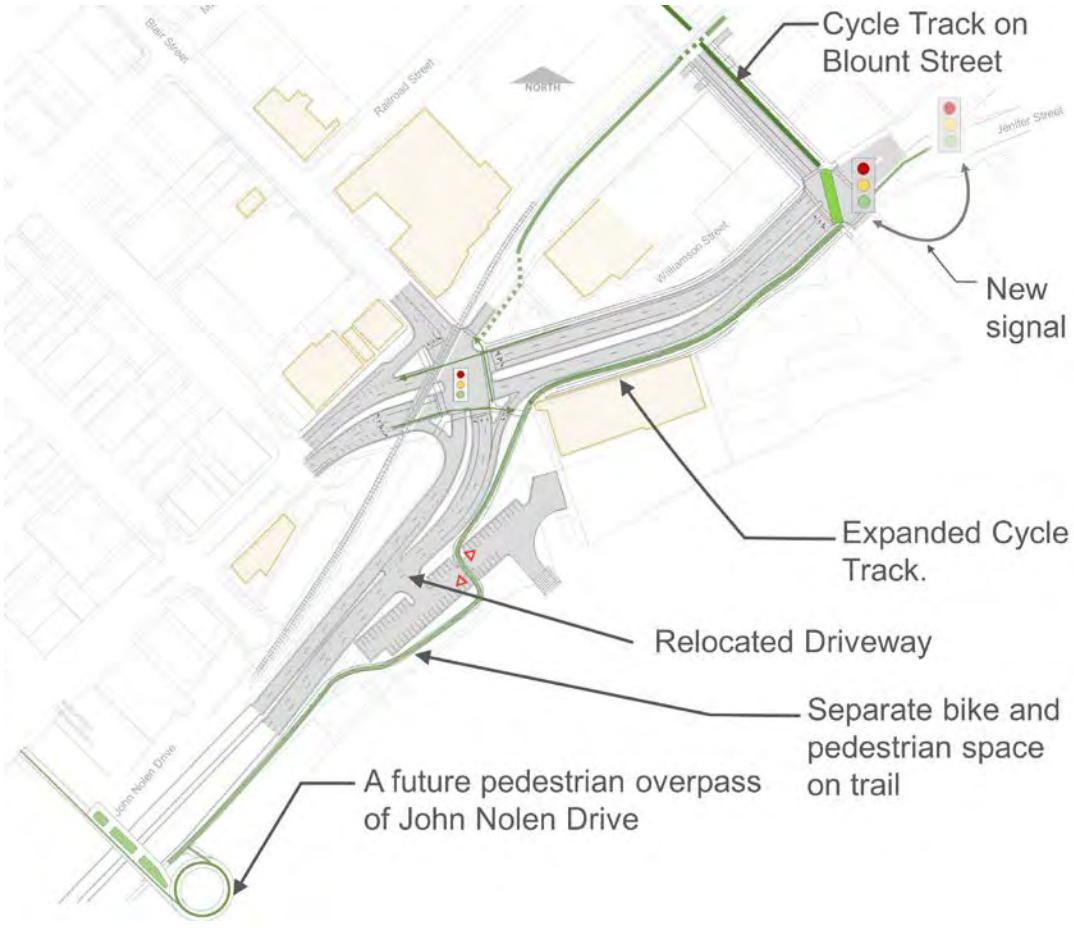


Figure 3.01-12 Williamson Street and Blount Street Cycletrack

14. Traffic Signal at Blair Street and Main Street

At PIM No. 1 the team received comments regarding the difficulty for pedestrians and bicycles crossing Blair Street at Main Street. The team investigated a traffic signal at Blair Street and Main Street as a means of providing a controlled bicycle and pedestrian crossing. From a motor vehicles operation standpoint, left-turns from Blair Street to Main Street would likely need to be prohibited, during peak periods at a minimum. This is needed to avoid creating a condition similar to what currently exists at the John Nolen Drive/Blair Street and Wilson Street/Williamson Street intersection where left-turning vehicles on John Nolen Drive and Blair Street block one of the through lanes and lead to increased delays, queuing, and crashes.

15. John Nolen Drive/Blair Street tunnel

Some have advocated for a tunnel to accommodate motor vehicle traffic through the intersection. A tunnel would reduce motor vehicle volumes, making the intersection more pedestrian and motor vehicle friendly. Figure 3.01-13 illustrates the concept of the tunnel.

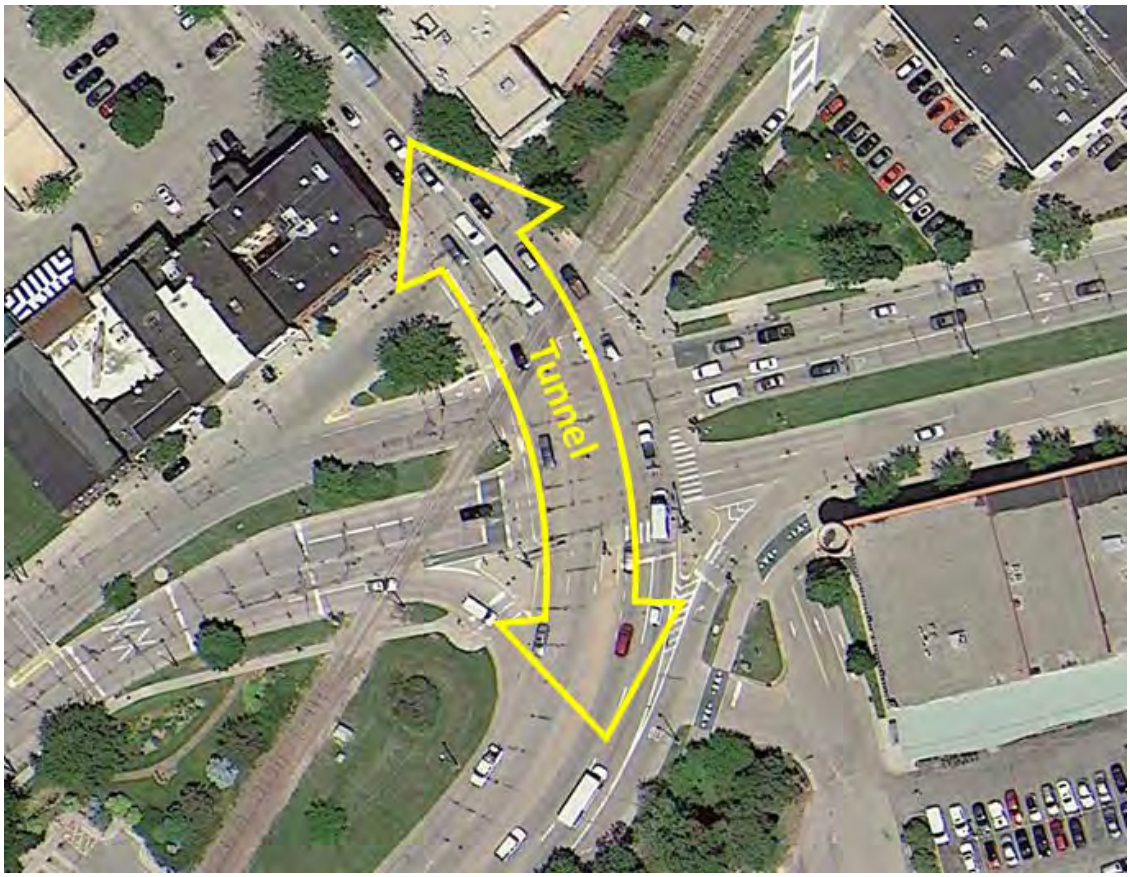


Figure 3.01-13 John Nolen Drive/Blair Street Tunnel Concept

The study team evaluated two concepts of a tunnel. There are several constraints associated with the construction of a tunnel, some of which include:

1. The distance between the Hotel Ruby Marie and the Madison Gas & Electric building, when including required offsets from walls and median barriers, do not allow for four travel lanes (two in each direction) in the tunnel.

2. Ramp grades are generally limited to 6 percent in states with snow cover. This limits how quickly John Nolen Drive/Blair Street can get below existing grade, and consequently limits the ability to provide cross street connections to Blair Street.

3. The railroad crosses the west approach of the intersection. Railroad grade changes are generally limited to 2 percent or less. As a railroad grade changes, it eliminates the ability of cross streets to travel across the rail line. Changing the railroad grade in the isthmus area likely would eliminate the ability of streets that currently cross the rail line to continue crossing the rail line.

4. The John Nolen Drive/Blair Street and Wilson Street/Williamson Street intersection is only 6 to 8 feet above the mean water level of Lake Monona. Any tunnel option will require pumps to drain pavement water that drains into the tunnel. Because of the size of the intersection, and the importance of keeping it open even during power outages, these options will require a substantial pump station and associated infrastructure.

5. There are numerous utilities that travel through this intersection that service the Capital area. Some utilities, such as fiber optic lines, are not dependent on grades. Other utilities, such as water, sewer, and storm sewer need to either maintain a specific grade for flow, or keep a minimum cover to keep from freezing.

Figure 3.01-14 illustrates the geometric constraints of the tunnel. Figure 3.01-15 illustrates the operational constraints associated with a tunnel. Figure 3.01-16 shows utilities that cross the intersection that would require relocation with a tunnel option. Figure 3.01-17 shows elevation constraints associated with the tunnel.

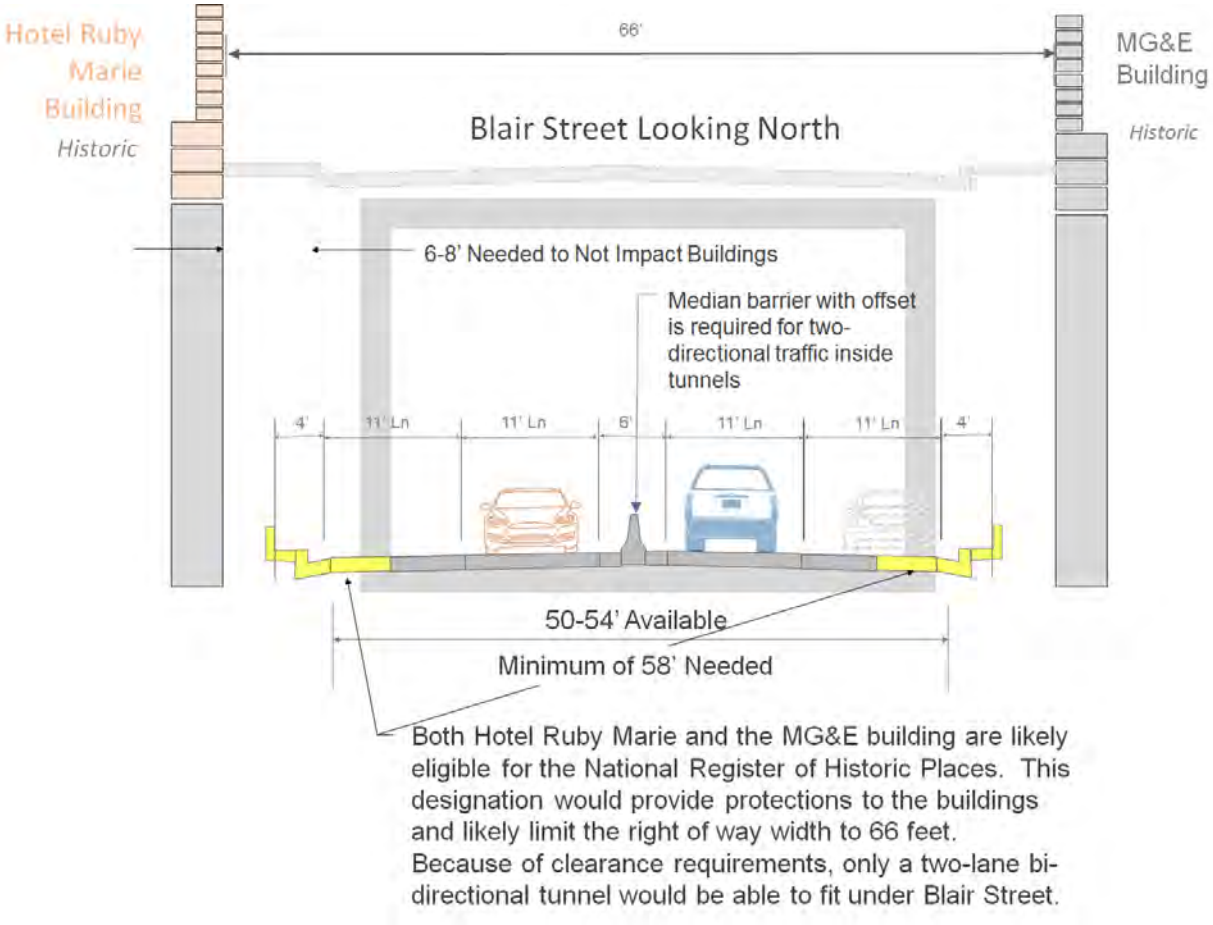
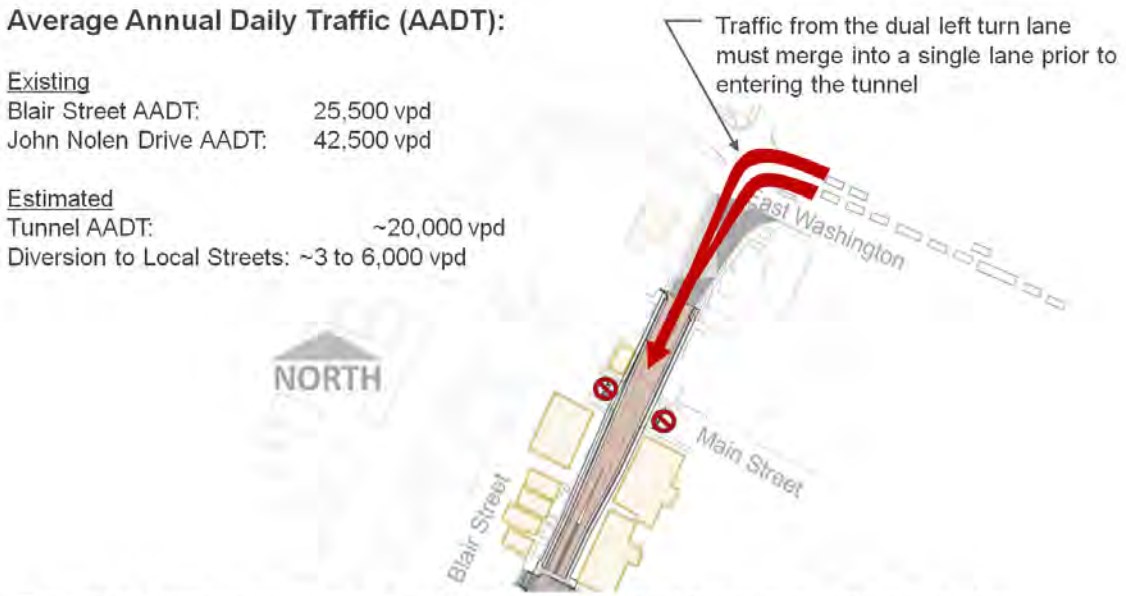
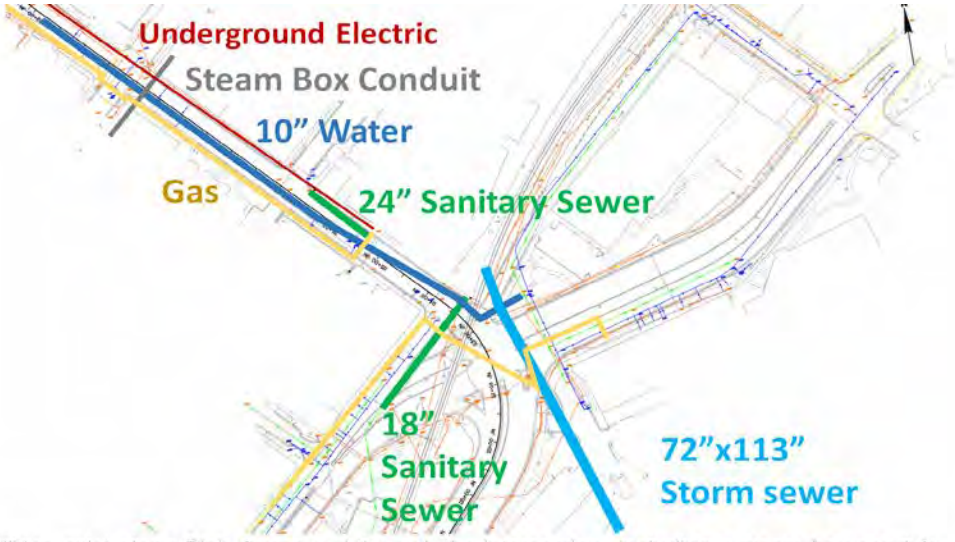


Figure 3.01-14 Tunnel Concept Constraints



The dual left-turn movement from East Washington Ave. must merge to a single lane prior to entering the tunnel. Based on the estimated turning volume, this substandard merge length will result in unbalanced lane usage on East Washington Avenue. Modeling indicates that this left turn queue would will backup through the Blount Street and Livingston Street intersections, and possibly farther.

Figure 4.01-15 Tunnel Concept Operational Constraints



Utilities exist along Blair Street and through the intersection, including a steam box conduit associated with the Capitol power plant. Some utilities, such as underground electrical lines and water lines are difficult yet possible to relocate. Other utilities, such as storm sewer and sanitary sewers, rely on a constant grade to allow them to drain by gravity. These utilities are not easily relocated or lowered without installing pump stations. Of particular concern at this location is the 72 inch by 113 inch storm sewer draining to Lake Monona.

Figure 3.01-16 Tunnel Concept Utility Relocations

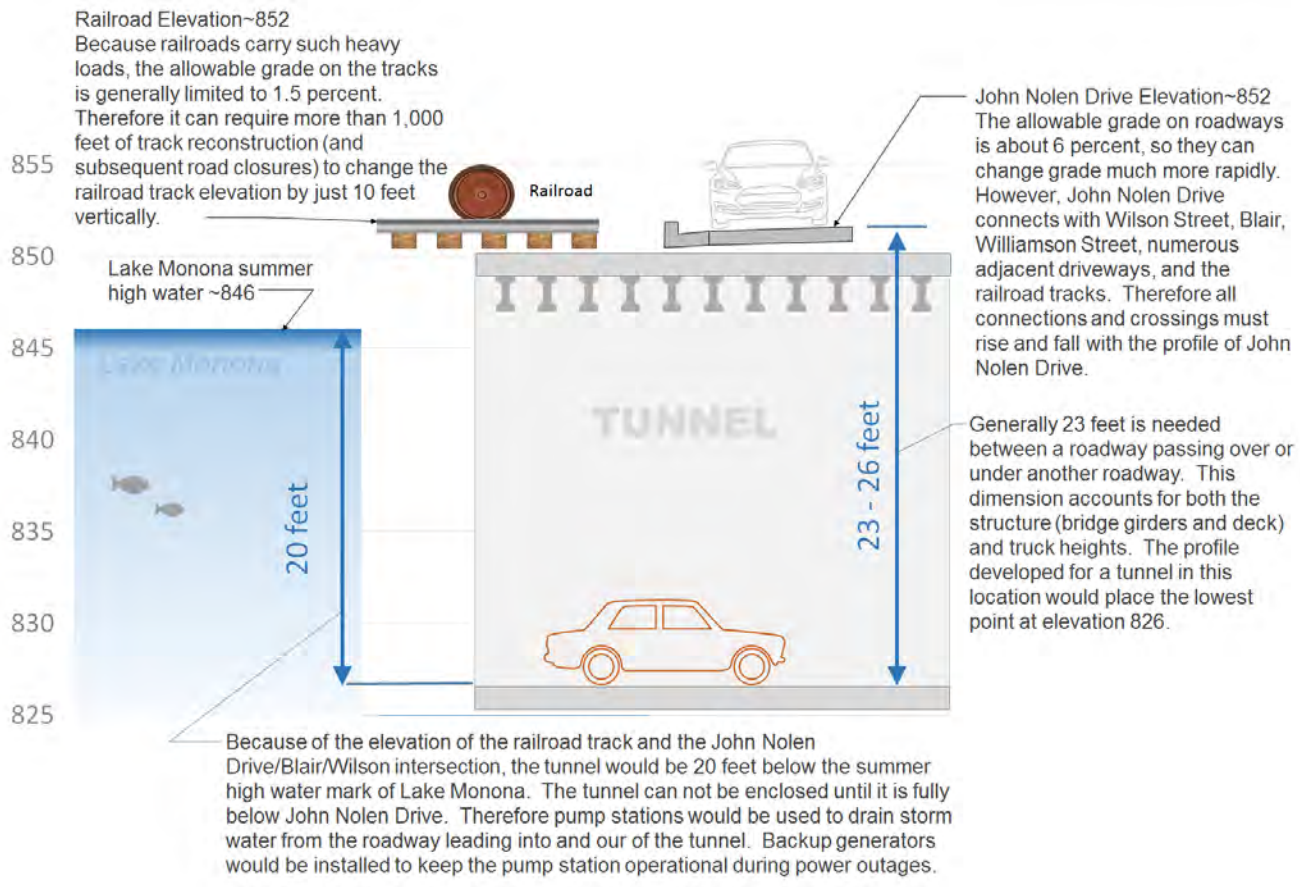


Figure 3.01-17 Tunnel Concept Elevation Constraints

Tunnel Option 1 maintains local surface access to Railroad Street, Main Street, and East Washington Avenue by providing frontage roads adjacent to the tunnel. It is shown as a schematic illustration Figure 3.01-18.

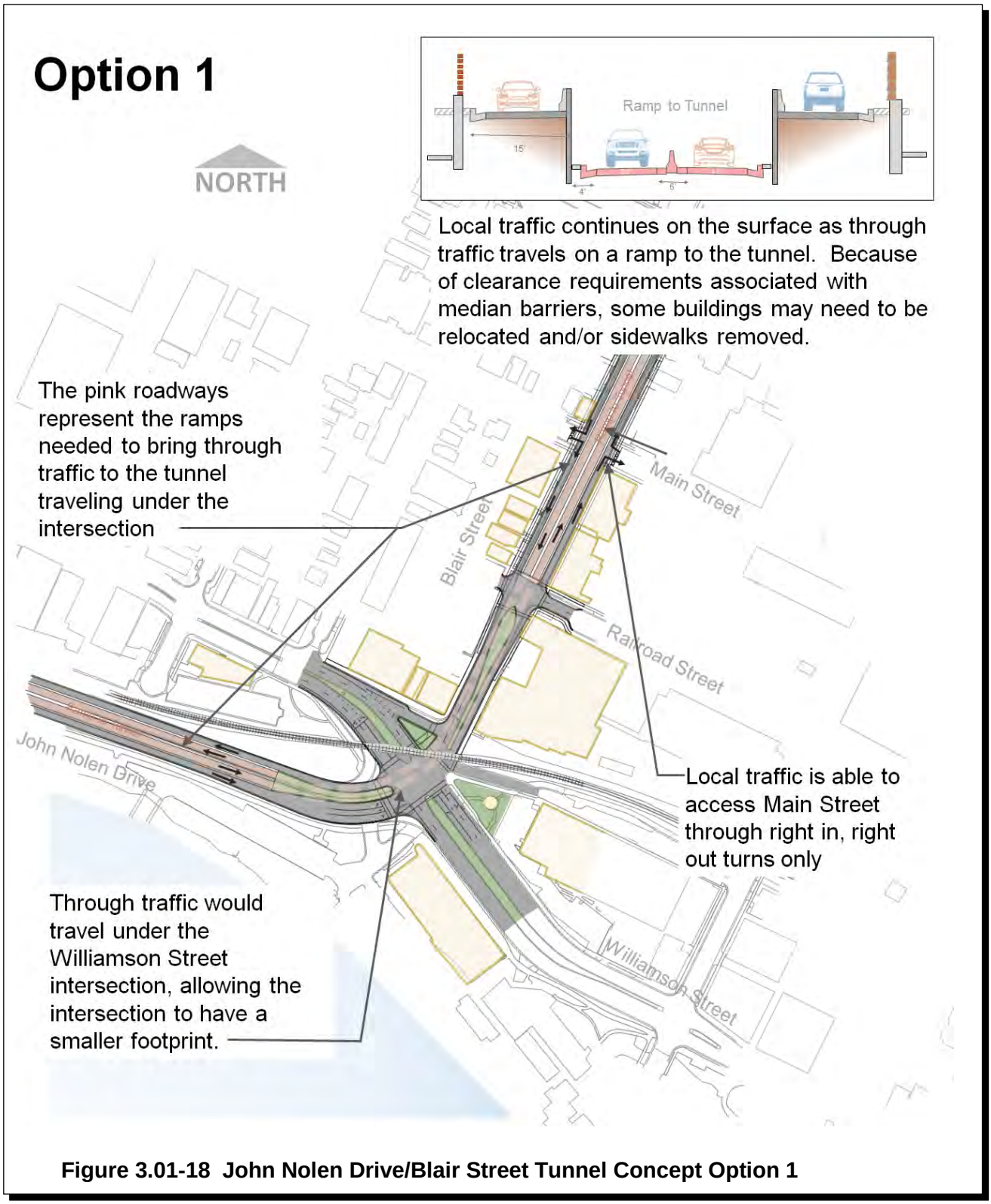


Figure 3.01-18 John Nolen Drive/Blair Street Tunnel Concept Option 1

Tunnel Option 2 maintains local surface access to Railroad Street. Access to Main Street is closed. The connection to and from East Washington Avenue flows directly into the tunnel. Figure 3.01-19 illustrates this concept.

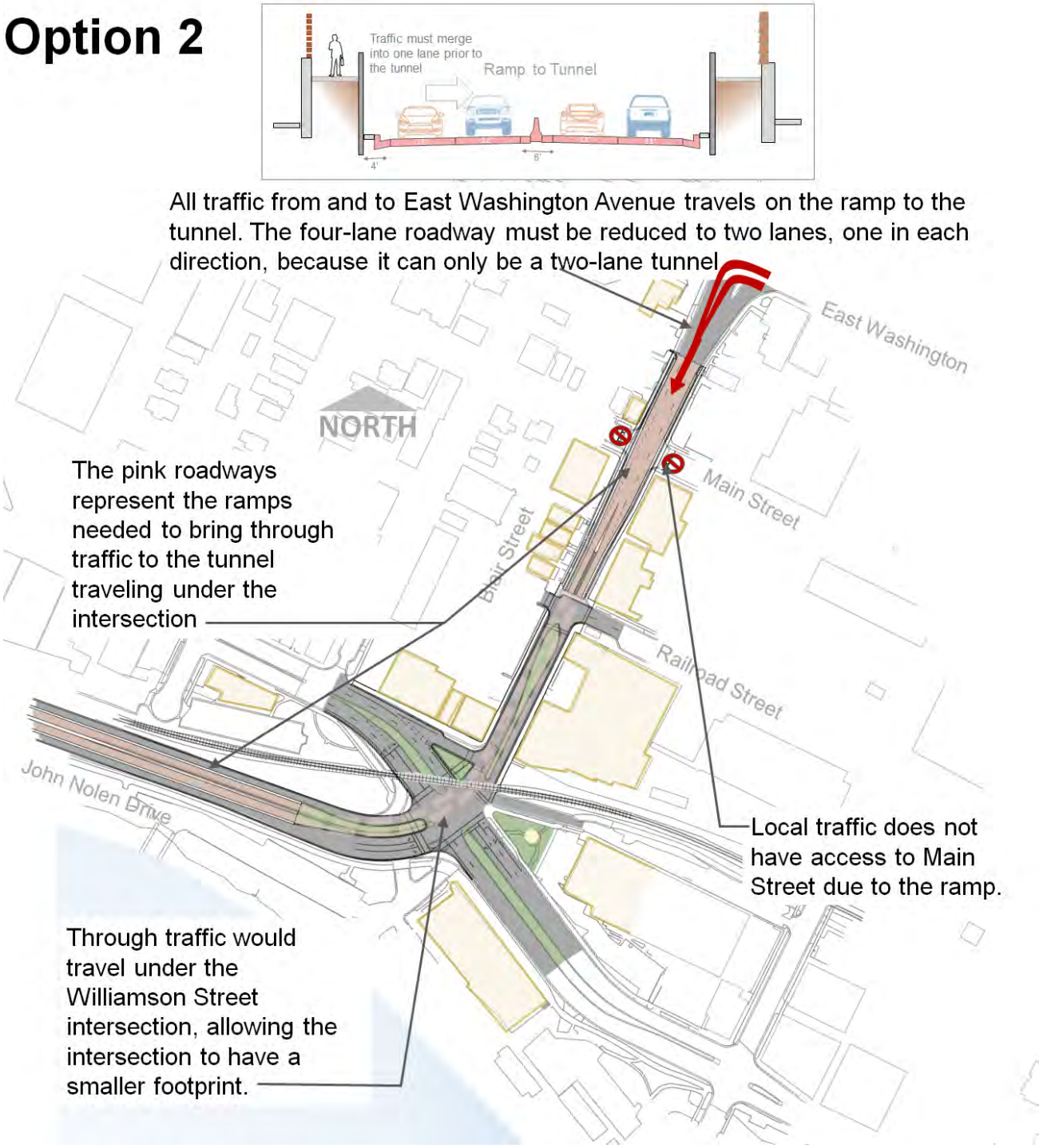


Figure 3.01-19 John Nolen Drive/Blair Street Tunnel Concept Option 2

While constructing both tunnel options is possible, and they could provide some benefits to the area, the costs and impacts associated with either are substantial.

16. Summary of Motor Vehicle Operations for Initial Alternatives

Table 3.01-1 summarizes the motor vehicle operations for the initial range of alternatives at the John Nolen Drive/Blair Street and Wilson Street/Williamson Street intersection.

B. Monona Terrace to Law Park Area

1. Pedestrian Overpass at the McGrath Building

The study team investigated a pedestrian overpass of John Nolen Drive with the goal of improving the connectivity of the Capital Square and King Street area with the Monona lakeshore. This was a key need expressed by local stakeholders. In fall 2016 the property at 149 East Wilson Street was being redeveloped (McGrath Redevelopment). The team examined a connection between the McGrath Redevelopment site and 137 East Wilson Street (Marina Building) to the south/west. Figure 3.01-20 shows some of the renderings developed for the pedestrian/bicycle overpass of John Nolen Drive.

2. Monona Terrace Deck Extension

Multiple proposals for a long-term vision east of Monona Terrace for the Monona lakeshore and Law Park area include an elevated park over John Nolen Drive. Some of these proposals include a parking garage located above John Nolen Drive, and below the elevated park. The study team investigated how these decks over John Nolen Drive east of Monona Terrace would impact the existing and planned buildings on the north/west side of John Nolen Drive, such as the Marina Building and the McGrath Redevelopment. Figure 3.01-21 shows some of the renderings prepared by the study team. Additional views were presented at PIM No. 2 and are included in Appendix D.

Table 3.01-1 2050 AM and PM Peak Hour Motor Vehicle Operations Summary for the John Nolen Drive/Blair Street and Wilson Street/Williamson Street

Alternative	Overall LOS	LOS E Movements	LOS F Movements
Alt 0: No Build	F *F*	WBL *WBL*	NBL, NBT, SBL, SBT *NBL, NBT, SBL, SBT*
Alt 1: Add NBL, SBL	D *D*	WBL, NBL, SBT, SBR --	-- *WBL*
Alt 2: Add NBL, SBL, single EBT, WBT	E *E*	EBL, EBT, EBR, WBL, NBL, NBT *WBL, NBT, SBT, SBR*	WBT, WBR, SBT, SBR *EBT*
Alt 3: Add NBL, SBL, single EBT, eliminate WBL/T	D *E*	EBL, EBR, WBL, WBT, WBR *EBL, WBL, NBT*	EBT, NBL *EBT*
Alt 4: One-way Circulator, One-way Hancock	E *B*	-- --	WBT, WBR, NBL, SBR --
Alt 4a: One-way Circulator, Two-way Hancock	C *B*	-- --	-- --
Alt 5: Two-way Operation, Two-way Hancock	F *D*	EBL, EBT *EBT*	WBL, WBT, WBR, SBL, SBT *WBL, SBL, SBT*
Alt 6: Two-way Operation, Two-way Hancock, Relocate WBL	F *D*	EBL, EBT --	EBL, EBT, EBR, SBL, SBT *EBT, WBL, WBT, WBR*
[1]Alt 6a: Two-way Operation, Two-way Hancock, Relocate WBL, 3 NBT	F *D*	EBL, EBT --	EBL, EBT, EBR, SBL, SBT *EBT, WBL, WBT, WBR*
[2]Alt 7: One-way Circulator, One-way Franklin	E *B*	-- --	WBT, WBR, NBL, SBR --
Alt 8: Add NBL, SBL, WBL	E *C*	WBL, WBT, WBR, SBT, SBR --	-- --
[3]Alt 9: One-way Blair and Blount Couplet			

Notes:
AM Peak Hour
PM Peak Hour
NBL, NBT, NBR = Northbound John Nolen Drive Left, Through, Right
SBL, SBT, SBR = Southbound Blair Street Left, Through, Right
EBL, EBT, EBR = Eastbound Wilson Street Left, Through, Right
WBL, WBT, WBR = Westbound Williamson Street Left, Through, Right
[1]Alt 6a 2050 operations not modeled, Alt 6 operations shown in the table.
[2]Alt 7 2050 operations not modeled, Alt 4 operations shown in the table.
[3]Alt 9 2050 operations not modeled. The team chose to ask for stakeholder input at PIM No. 2 prior to additional analysis.

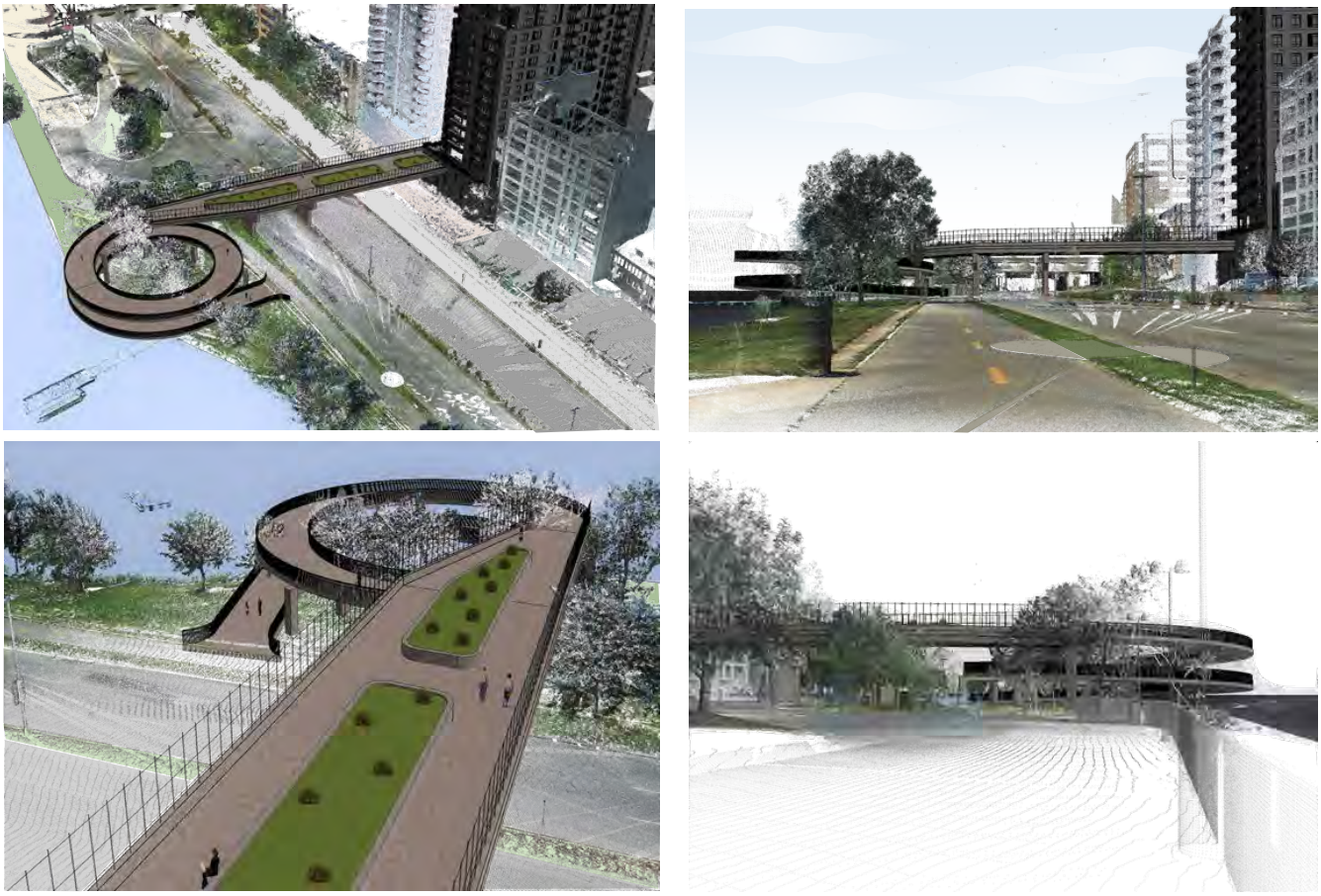


Figure 3.01-20 Pedestrian/Bicycle Overpass of John Nolen Drive

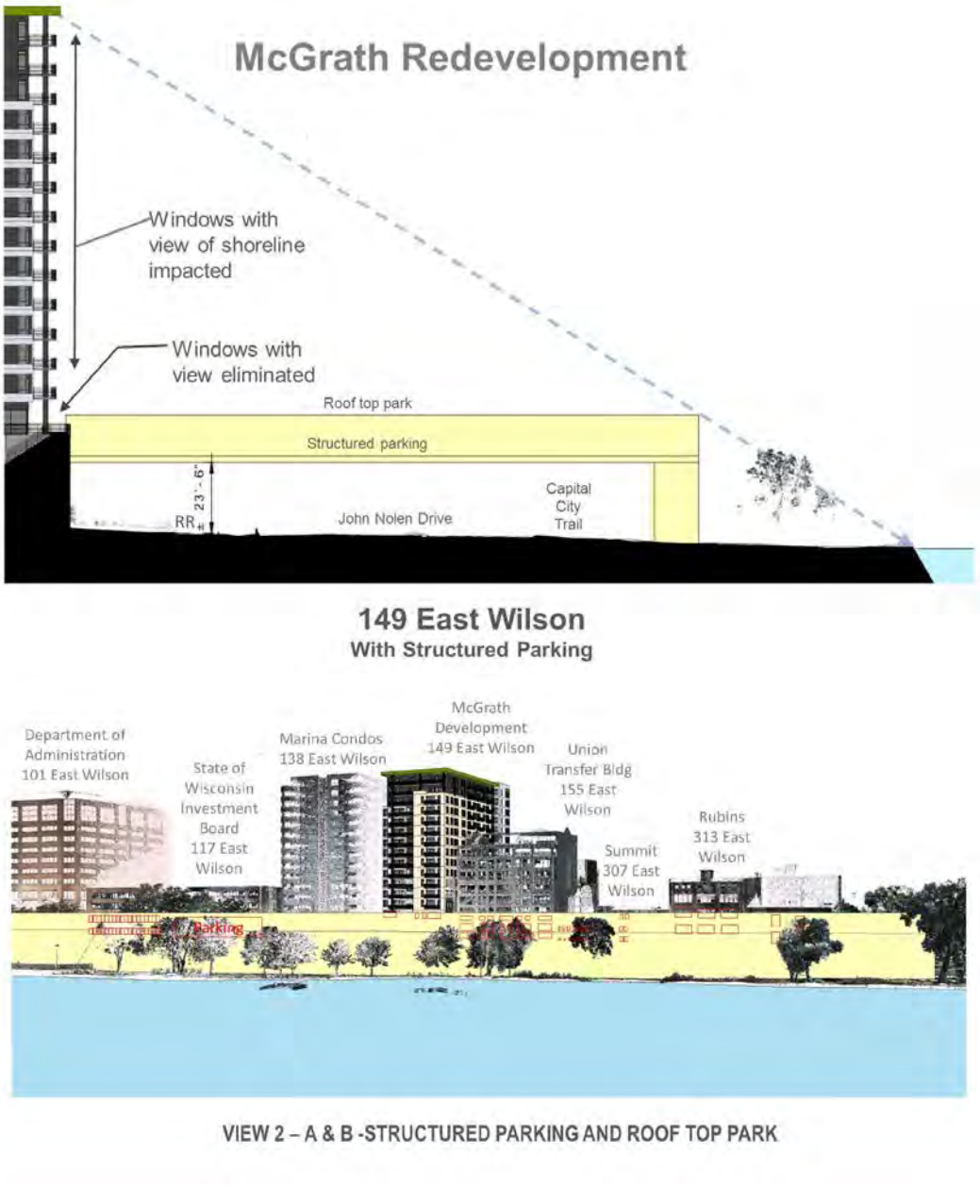


Figure 3.01-21 Renderings of a Raised Deck Over John Nolen Drive East of Monona Terrace

C. John Nolen Drive at North Shore Drive and Broom Street

1. Blankout Signage for No Right Turn on Red at North Shore Drive

The study team developed near-term improvements for the bicycle and pedestrian crossing of John Nolen Drive at North Shore Drive. These include additional blankout signage reinforcing the right-turn-on-red prohibition that currently exists for the eastbound North Shore Drive right-turn to southbound John Nolen Drive. Also proposed is the addition of a staging area adjacent to the Capital City Trail on the east side of John Nolen Drive for pedestrians and bicycles waiting to cross John Nolen Drive.

2. Single Stage Path Crossing at North Shore Drive

The South Capital Transit Oriented Development Study as well as stakeholder feedback suggested investigation of a single traffic signal phase pedestrian and bicycle crossing of John Nolen Drive at North Shore Drive. The study team modeled this condition using the existing crosswalk configuration and 2015 traffic volumes. This requires a much longer signal phase that stops northbound and southbound John Nolen Drive traffic than under the current, two-stage crossing configuration. During the AM peak hour, the northbound John Nolen Drive left turning motor vehicle traffic would experience severe average delays exceeding 150 seconds accompanied by northbound queues reaching 800 to 1,200 feet in length or more. During the PM peak-hour the southbound John Nolen Drive through motor vehicle traffic would experience severe average delays of 180 seconds accompanied by southbound queues reaching 1,300 feet in length or more.

Another alternative would be to reduce the crossing length, so a shorter signal phase would be required. Because of the existing roadway geometry, this would require a costly reconfiguration of the beam guard that exits in the median of John Nolen Drive and the connection to the Capital City Trail on the east side of John Nolen Drive would not have any throat length/staging space for crossing pedestrians and bicyclists. This would create frequent conflicts between path users traveling through along John Nolen Drive and those wishing to cross.

Based on these results the study team chose not to bring this alternative forward as an option at PIM No. 2.

3. Single Stage Crossing at Broom Street

The South Capital Transit Oriented Development Study, as well as stakeholder feedback, suggested investigation of a single traffic signal phase pedestrian and bicycle crossing of John Nolen Drive at Broom Street. The study team modeled this condition using the existing crosswalk configuration and 2015 traffic volumes. This requires a much longer signal phase that stops northbound and southbound John Nolen Drive traffic than under the current, two-stage crossing configuration. During the AM peak hour, the northbound John Nolen Drive left turning motor vehicle traffic would experience significant average delays exceeding 100 seconds accompanied by northbound queues reaching 600 to 900 feet in length or more, blocking the North Shore Drive intersection upstream. During the PM peak hour, the eastbound left-turning

Broom Street traffic would experience severe average delays of more than 130 seconds accompanied by queues reaching 490 feet or longer, blocking the Wilson Street intersection upstream. The northbound John Nolen Drive through motor vehicle traffic would experience significant average delays of more than 80 seconds accompanied by northbound queues reaching 1,200 feet in length or more, blocking the North Shore Drive intersection upstream.

Based on these results the study team chose not to bring this alternative forward as an option at PIM No. 2.

4. Path from Broom Street to Hamilton Street along the WSOR Railroad Tracks

One of the pedestrian and particularly bicycle connectivity issues in this area is between the Capital City Trail west of the Monona Terrace and the Capital Square area. The study team investigated a connection along the railroad tracks on the west side of Jon Nolen Drive between Broom Street and Hamilton Street to improve this connectivity. An existing worn trail in the grass along the railroad tracks indicates this connection is desired by pedestrians.

While coordination with the railroad to allow such a connection will be a challenge, it does appear there is sufficient room to provide a shared use path parallel to the tracks.

5. Bicycle and Pedestrian Underpass of John Nolen Drive

Local advocates have proposed a system of John Nolen Drive pedestrian and bicycle underpasses as an alternative for crossing John Nolen Drive at-grade. The study team reviewed the feasibility of an underpass between North Shore Drive and Broom Street.

4.02 PUBLIC INVOLVEMENT MEETING NO. 2

A. Study Team Pre-Screening

Considering that nine alternatives were developed for the John Nolen Drive/Blair Street and Wilson Street/Williamson Street intersection, prior to PIM No. 2 the study team reviewed the alternatives to narrow the pool to a smaller amount that warranted a higher level of development. Each of the refined alternatives includes the Williamson Street and Blount Street cycle track and signalized diagonal bicycle and pedestrian crossing at the intersection of Blount Street and Williamson Street.

1. Alternative 1: Add NBL and SBL

Alternative 1 represents a “do minimum” option with relatively modest physical impacts while addressing the key motor vehicle safety issue of a lack of northbound and southbound left-turn bays. For this reason, the study team elected to develop Alternative 1 further prior to PIM No. 2. Figure 3.02-1 shows the more highly developed Alternative 1.

Figure 3.02-1 Alternative 1

2. Alternative 7: Compact Circulator

Alternative 7 showed promise as an innovative solution that reconfigures the motor vehicle operations, potentially allowing for a smaller footprint at the John Nolen Drive/Blair Street and Wilson Street/Williamson Street intersection. Figure 3.02-2 shows the more highly developed Alternative 7.

Figure 3.02-2 Alternative 7

3. Alternative 8: Add NBL, SBL, and Triple WBL

Alternative 8 provides a modestly larger footprint than Alternative 1 because the triple westbound left turn from Williamson Street requires three receiving lanes on southbound John Nolen Drive. Alternative 8 also addresses the key motor vehicle safety issue of a lack of northbound and southbound left-turn bays. For this reason, the study team elected to develop Alternative 8 further prior to PIM No. 2. Figure 3.02-3 shows the more highly developed Alternative 8.

Figure 3.02-3 Alternative 8

4. Alternative 9: One-Way Blair Street and Blount Street Couplet

Initial testing of motor vehicle operations suggested that Alternative 9 showed promise for improving conditions at the John Nolen Drive/Blount Street and Wilson Street/Williamson Street intersection. While this alternative routes additional traffic to Williamson Street between Blair Street and Blount Street and to Blount Street between Williamson Street and East Washington Avenue, it also reduces traffic on Blair Street from East Washington Avenue to Wilson Street/Williamson Street. For these reasons, the study team elected to develop Alternative 9 further prior to PIM No. 2. Figure 3.02-4 shows the more highly developed Alternative 9.

Figure 3.02-4 Alternative 9

B. Presentation and Display Materials

The second public meeting was held at the Monona Terrace Convention Center on April 17, 2017, from 7 to 9 P.M.; 52 people signed in. The primary goals of the meeting were to discuss the range of alternatives and gather feedback about the alternatives from local stakeholders.

The slideshow presentation and exhibit materials from PIM No. 2 are included in Appendix D. The presentation outline follows:

1. Study corridor and reasons for study.
    a. Upcoming projects
    b. Previous studies and longer-term opportunities
2. John Nolen Drive/Blair Street and Wilson Street/Williamson Street intersection area
3. East of Monona Terrace area
4. John Nolen Drive and North Shore Drive and Broom Street area
5. Next steps
6. Questions and answers

The exhibits displayed included the following:

1. Overview of Ideas (summary of multiple longer-term visions for the Monona Lakeshore).
2. John Nolen Drive/Blair Street and Wilson Street/Williamson Street Intersection area
    a. John Nolen Drive/Blair Street and Wilson Street/Williamson Street Intersection Expressed Needs
    b. John Nolen/Blair/Williamson/Wilson Tunnel Alternative (3 boards). Not recommended for further study.
    c. Bike Routing showing the cycle track along Williamson Street and Blount Street. Recommended for further study.
    d. Alternatives considered
    e. Alternative 1 NB and SB Left Turn Lanes. Recommended for further study.
    f. Alternative 7 Circulator. Not recommended for further study.
    g. Alternative 8 Westbound Triple Left. Not recommended for further study.
    h. Alternative 9 One-way Couplet (2 boards). Recommended for further study.
    i. Traffic Signal at Main Street and Blair Street. Recommended for further study.

3. East of Monona Terrace area

    a. Pedestrian Bicycle Connection to Law Park. Recommended for further study.

    b. Discussion of Concepts East of Monona Terrace (4 boards).

4. North Shore Drive and Broom Street area

    a. North Shore Drive/North Broom Street Expressed Needs

    b. North Shore and Broom Street Characteristics

    c. North Shore and Broom Street–Bicycle Underpass. Recommended for further study.

C. Summary of PIM No. 2 Verbal and Written Comments

A full summary of the verbal and written comments is included in Appendix D. Following are the most common comments.

1. Reduce the speeds of or eliminate the John Nolen Drive northbound channelized right-turn lane.

2. Move the intersection west and reduce the median width on Williamson Street to gain space for pedestrians and bicycles and create a more “Main Street” feel.

3. Support for Alternative 1, including relocating the Machinery Row driveways and reorganizing/expanding the bicycle and pedestrian space along the south side of Williamson Street. Request to add further enhancements for east-west bike travel on Williamson Street and Wilson Street.

4. Support for the bicycle and pedestrian overpass of John Nolen Drive east of Monona Terrace.

5. The team should develop a near-term improvement for the John Nolen Drive pedestrian and bicycle crossing at Broom Street.

6. Support and Opposition for Alternative 9.

4.01 JOHN NOLEN DRIVE/BLAIR STREET AND WILSON STREET/WILLIAMSON STREET ALTERNATIVES SCREENING

The study team reviewed the four alternatives that were highlighted as showing the most promise at PIM No. 2. These included Alternatives 1, 7, 8, and 9. First, the team developed refined Synchro traffic models. 2015 traffic volumes were used to provide an understanding of operational conditions shortly after construction for each alternative. Detailed modeling results are included in Appendix C. Table 4.01-1 summarizes the 2015 operations modeling.

Alternative	Peak Hour	Overall LOS (sec)	LOS E Movements	LOS F Movements	Queues >500 feet
Alt 1: Add NBL, SBL	AM	D (44)	WBL, WBT	--	WBL, NBT, SBT
	PM	C (31)	WBL	--	NBR
Alt 7: Circulator	AM	C (24)	--	--	--
	PM	C (20)	--	--	NBT, NBR
Alt 8: Add NBL, SBL, WBL	AM	D (36)	--	--	NBT, SBT
	PM	C (28)	--	--	NBT, NBR
Alt 9: One-way Couplet	AM	D (36)	WBT, NBL, SBT	--	SBT
	PM	E (61)	EBT, WBL, NBR, SBL	--	NBR

Table 4.01-1 2015 Operations Modeling Summary

Based on the operations modeling results, the team agreed to study Alternative 1 and Alternative 9 further. Alternative 7 was dismissed because of challenges in accommodating bicycles, and its complexity and cost versus the other alternatives. Alternative 8 was eliminated due to offering only modestly better traffic operations while requiring a higher level of impacts and costs compared to Alternative 1.

Carrying Alternatives 1 and 9 forward, the team evaluated them against the needs identified in the area, as well as in terms of how each mode of travel was impacted and the anticipated construction costs.

4.02 JOHN NOLEN DRIVE/BLAIR STREET AND WILSON STREET/WILLIAMSON STREET ALTERNATIVES EVALUATION

Figure 4.02-1 shows the team's evaluation of Alternative 1 and Alternative 9 against the most frequently expressed needs. Green text indicates a relative improvement over existing conditions. Yellow text indicates mixed or unknown results. Red text indicates poorer conditions compared to existing conditions.

Figure 4.02-2 shows the team's evaluation of Alternative 1 and Alternative 9 in terms of each travel mode, stakeholder comments, cost, and additional considerations.

Figure 4.02-1 Alternatives 1 and 9 Versus the Expressed Needs

Expressed Concern/Evaluation Factor	Alt 1 – Add NBL, SBL	Alt 9 – One-Way Couplet
John Nolen Drive is a barrier for pedestrian/bicycle access to the lake.	• Ped/bike access to lake is enhanced when combined with proposed ped/bike overpass	• Reduced when combined with proposed overpass
Reduce Speeds of Northbound Right-Turns	• Smaller radii on northbound right-turn channelization should reduce right turn travel speeds.	• Providing a dual right turn lane for the northbound to eastbound movement requires larger radii and consequently may increase speeds.
Discourage Use of Williamson Street for Longer Trips	• Use of Williamson Street for longer trips is likely to remain unchanged from current conditions	• Directing all northbound traffic down Williamson Street until Blount Street may conflict with these goals.
Reduce Conflicts at Machinery Row Driveways	• Relocated parking lot access and realigned bike path reduces the number of conflicts at the intersection.	• Relocated parking lot access and realigned bike path reduces the number of conflicts at the intersection.
Provide Off-Path Staging Area for North-South bikes/peds crossing Williamson Street	• Additional staging area provided with the modified northbound right-turn channelization	• Modest staging area may be possible with dual channelized northbound through/right-turn.
Better Delineate Bicycle versus Pedestrian Space along south side of Williamson Street between Blair Street and Jennifer Street	• Reallocation of space along the Machinery Row cycle track provide better delineation, and more room, for pedestrians and bicycles.	• Reallocation of space along the Machinery Row cycle track provide better delineation, and more room, for pedestrians and bicycles.
Relocate Capital City Trail Crossing of Williamson Street from Blair Street to Blount Street	• Achieved with signalized diagonal crossing and cycle track connection along Blount Street. Existing Capital City Trail crossing at Blair Street intersection remains.	• Achieved with signalized diagonal crossing and cycletrack connection along Blount Street. • Existing Capital City Trail crossing at Blair Street is eliminated.
Improve Pedestrian and Bicycle Access Across Blair Street	• Blair Street is easier to cross for pedestrians and bikes if Main Street signal is implemented.	• Blair Street is easier to cross for pedestrians and bikes because Blair Street carries about 50 percent less traffic. One-way operation on Blair Street also provides larger gaps in traffic.

Figure 4.02-2 Alternatives 1 and 9 Versus the Expressed Needs

Evaluation Factor	Alt 1 – Add NBL, SBL	Alt 9 – One-Way Couplet

Accommodations for Pedestrians and Bicycles	• Enhanced accommodations for pedestrians and bicycles through:
	  • Reallocation of space along Machinery Road cycle track
	  • Relocating parking lot driveway to minimize ped/bike/auto conflicts at intersection.
	  • Better delineation of connection of Wilson Street to Capital City Trail for bicycles and pedestrians.
		• One-way Blair Street may allow for more space to be dedicated to terrace, pedestrian, and/or bicycle accommodations.
		• Enhanced accommodations along John Nolen Drive and Williamson Street
		• Increased traffic volumes along Williamson Street between Blair Street and Blount Street.

Transit	• No significant impacts.	• Lower traffic volumes eastbound along East Washington Avenue between Blair Street and Blount Street which carries 9 weekday routes and has a bus stop at the southeast corner at Blount Street. • Higher traffic volumes along eastbound Williamson Street between Blair Street and Blount Street which carries 4 weekday routes. • No significant impacts to current routing.
Motor Vehicles	• Modest improvement to delays and queuing compared to a Do Nothing scenario.	• Lower delay and queuing during the AM peak hour than Alt 1 • Higher delay and queuing during the PM peak hour than Alt 1
Stakeholder and Alder Comments	• Generally positive	• Generally negative
Cost	• $3.7 Million	• $6.0 Million
Additional Considerations	• Reduced crashes with the addition of left-turn bays.	• Reduced crashes with the addition of left-turn bays. • Spreads traffic burden among two streets instead of one. • Perception of encouraging John Nolen Drive northbound/ eastbound traffic to use Williamson Street instead of East Washington Avenue.
Result	**Recommended**	Dismissed

4.03 ALTERNATIVE 1 ADDITIONAL REFINEMENTS

Based on study team and stakeholder input, Alternative 1 was refined further prior to PIM No. 3. The team received several iterations of intersection concepts from the Madison Design Professionals workgroup. Some of the concepts were able to be implemented while others could not be supported by the study team. The key features proposed included:

1. Moving the intersection west. The study team revised the design to move the intersection as far west as possible while accommodating truck turning paths and the addition of northbound and southbound left-turn lanes.

2. Expanding the space in front of Machinery Row. The revised design includes a staging area in front of Machinery Row for pedestrians and bicycles waiting to cross Williamson Street or John Nolen Drive.

3. Providing expanded stormwater treatment features. The revised design maintains the 18-foot-wide median along Williamson Street to provide options for stormwater treatment during final design.

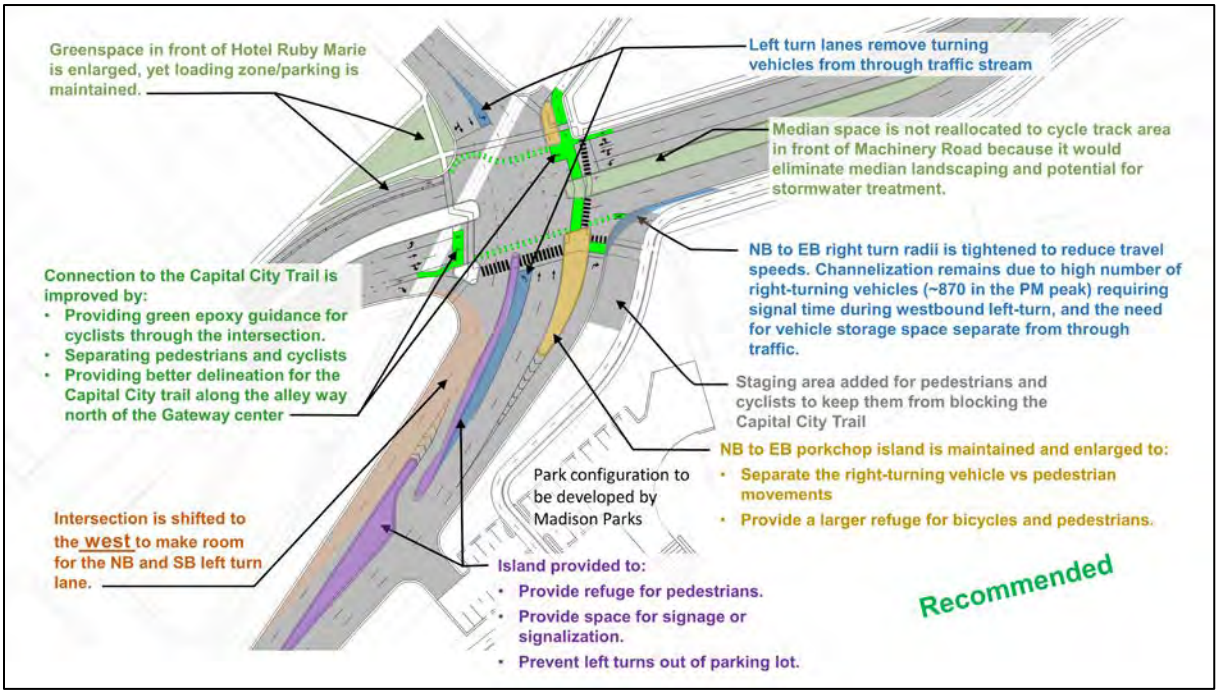
4. Providing right-in, right-out motor vehicle access to Machinery Row/Law Park. The revised design provides a relocated right-in, right-out, left-in access farther south on John Nolen Drive, improving conditions compared to the exiting configuration.

5. Removing the Wilson Street entrance to the Gateway Mall in the northeast quadrant. The study team does not support this removal because of potential impacts to internal circulation and truck deliveries to the Gateway Mall parcel.

6. Removing the Wilson Street stub in front of Hotel Ruby Marie. The revised design removes this portion of Wilson Street.

7. Removing the John Nolen Drive channelized northbound right turn to eastbound Williamson Street. The study team does not support eliminating the channelized right turn. It allows for positive control of the conflict between the high volume of bicycles and pedestrians crossing Williamson Street and John Nolen Drive and the right turning motor vehicle traffic. The total number of potential conflicts during peak periods between these movements is likely one of the highest in the City.

Figure 4.03-1 shows an exhibit that was displayed at PIM #3 that summarizes the revised Alternative 1 design.



Note: This exhibit was presented at PIM No. 3, additional refinements have been made, See Section 5 Recommendations.

Figure 4.03-1 Alternative 1 Refinements Based on Stakeholder Input

4.04 BROOM STREET NEAR-TERM IMPROVEMENTS

One of the comments the study team received at PIM No. 2 was a disappointment in the lack of improvements at the John Nolen Drive and Broom Street intersection, other than the pedestrian and bicycle underpass and possible path connection between Broom Street and Hamilton Street parallel to the railroad tracks west of John Nolen Drive. The study team refined the alternatives at Broom Street to respond to these comments.

Figure 4.04-1 shows the refinements presented at PIM No. 3. New near-term options included reconfigured lane widths along Broom Street and bike boxes for the northbound John Nolen Drive to westbound Broom Street and eastbound Broom Street to the Capital City Trail crossings. A new long-term option was also introduced consisting of the reconstruction of Broom Street to provide narrower motor vehicle lanes to allow for a 10-foot path along the north side of Broom Street between John Nolen Drive and Wilson Street.

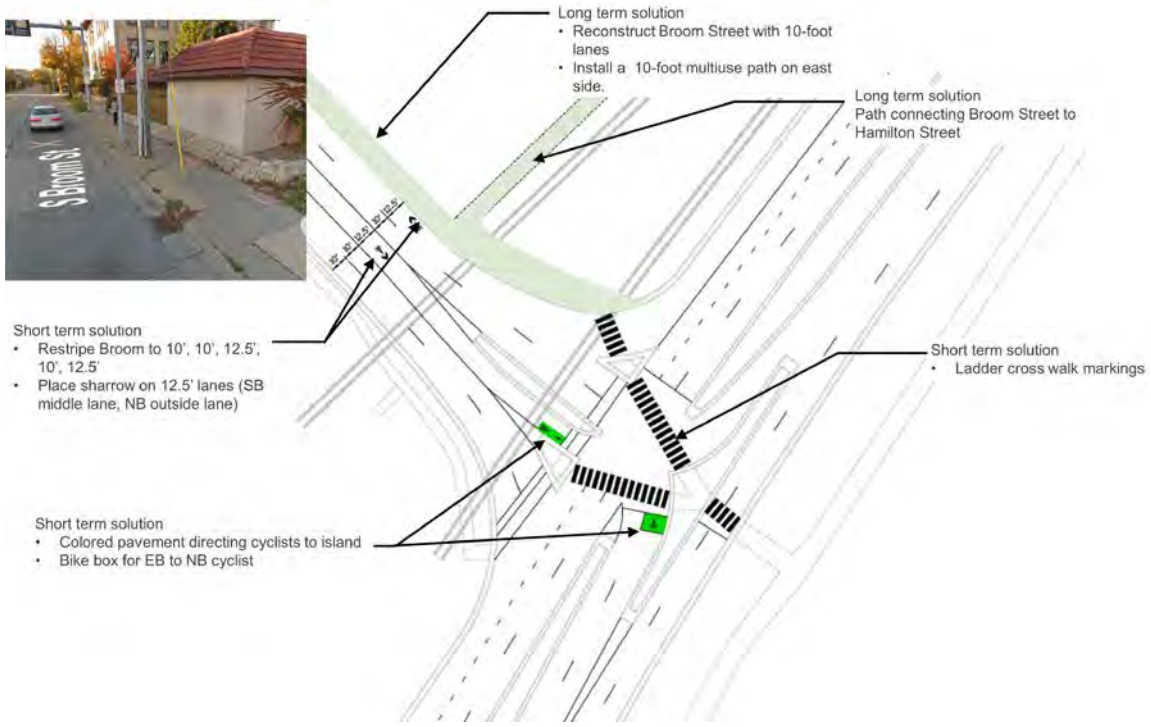


Figure 4.04-1 Broom Street Refined Improvements

4.05 PUBLIC INVOLVEMENT MEETING NO. 3

The third public meeting was held at the Monona Terrace Convention Center on August 9, 2017, from 7 to 9 P.M.; 45 people signed in. The primary goals of the meeting were to discuss the refined alternatives and draft recommendations and gather feedback from local stakeholders.

A. Presentation and display materials

The slideshow presentation and exhibit materials from PIM No. 3 are included in Appendix E. The presentation outline follows:

1. Study corridor and reasons for study
   a. Upcoming projects
   b. Previous studies and longer-term opportunities
2. John Nolen Drive/Blair Street and Wilson Street/Williamson Street intersection area
3. John Nolen Drive and North Shore Drive and Broom Street area
4. Overview of PIM No. 3 exhibits
5. Study schedule
6. Questions and answers

The exhibits displayed included the following:

1. Study Purpose

2. Overview of Ideas (summary of multiple longer-term visions for the Monona lakeshore)

3. John Nolen Drive/Blair Street and Wilson Street/Williamson Street Intersection area

    a. John Nolen Drive/Blair Street and Wilson Street/Williamson Street Intersection Expressed Needs

    b. John Nolen/Blair/Williamson/Wilson Tunnel Alternative (3 boards). Dismissed.

    c. Bike Routing showing the cycle track along Williamson Street and Blount Street. Recommended.

    d. Alt 1 NB and SB Left Turn Lanes. Recommended.

    e. Why is the Channelized Right Turn Remaining? Why is the Driveway Entrance Being Relocated?

    f. Alt 1 Revisions Responding to Public Comments

    g. Alt 7 One-way Couplet. Dismissed.

    h. Alt 9 One-way Couplet. Dismissed.

    i. Alt 1 and Alt 9 Comparison–Expressed Needs

    j. Alt 1 and Alt 9 Comparison–Additional Measures

    k. Traffic Signal at Main Street and Blair Street. Recommended.

4. East of Monona Terrace area

    a. Pedestrian Bicycle Connection to Law Park. Recommended.

    b. Discussion of Concepts East of Monona Terrace (four boards). Further Study by Others.

5. North Shore Drive and Broom Street area

    a. North Shore Drive/North Broom Street Expressed Needs

    b. Broom Street Near and Long-Term Recommendations

c. North Shore Drive Near and Long-Term Recommendations

d. Right Turn Channelization

e. North Shore and Broom Street–Bicycle Underpass. Recommended (long term).

B. Summary of PIM No. 3 Verbal and Written Comments

A full summary of the verbal and written comments is included in Appendix E. Following are the most common comments.

1. Eliminate the John Nolen Drive channelized right-turn lane. (five comments)

   The study team does not recommend eliminating the channelized right turn because it allows for controlled interaction between the high volume of right-turning traffic and the high volume of bicycles and pedestrians crossing the east and south legs of the intersection.

2. Can pedestrians be detected instead of requiring them to push a button? (four comments)

   Optical detection is still relatively expensive and not perfectly reliable. It's likely push buttons would still be provided. The design will seek to locate the buttons or add buttons in a way that reduces or eliminates conflicts between pedestrians and bicyclists.

3. Could a raised pedestrian/bicycle crossing (table) be installed at the John Nolen Drive channelized northbound right turn on to Williamson Street? (four comments)

   Perhaps, the team will consider it.

4. Williamson Street from John Nolen Drive/Blair Street to Jenifer Street should look more like a "Main Street" and less like a continuation of US 151. (three comments)

5. Support for the proposed improvements to the John Nolen Drive/Blair Street and Wilson Street/Williamson Street intersection. (three comments)

6. Can the John Nolen Drive right turn on to Williamson Street be shortened to a turn bay instead of a full lane? This may reduce occurrences of traffic choosing to bypass the through movement queue and diverting to Williamson Street. This diverted traffic then takes a left on a side street to access East Washington Avenue instead of staying on Blair Street. (two comments)

   The team reviewed forecasted motor vehicle queue lengths to evaluate this idea and does not recommend removing the third John Nolen Drive travel lane. It should be noted that the addition of left-turn bays will improve operations and reduce through movement queuing, which should reduce traffic diversion onto Williamson Street.

7. Is there any way the project could be advanced (sooner than 2020 or 2021)? The driveways for Machinery Row are dangerous. Could there be interim measures, such as stop signs on the path at the driveways?

   It is possible the City could make some improvements sooner to the portions outside the core of the intersection. The team discussed interim treatments for the Machinery Row driveways and developed a recommendation for one.

4.06 ALTERNATIVE 1 REFINEMENTS

Following PIM No. 3, the study team made refinements to Alternative 1. The median on Williamson Street was reduced from the existing 18 feet to 8 feet to provide additional space in front of Machinery Row. The final configuration of the pedestrian and bicycle space along Williamson Street between John Nolen Drive and Jenifer Street will be decided during final design. Additional refinements include reducing the size of the refuge island created by the John Nolen Drive channelized northbound right turn lane to eastbound Williamson Street to provide additional open space, and routing the relocated Capital City Trail closer to John Nolen Drive to provide additional space for Law Park. The final configuration of the Capital City Trail, Law Park and Machinery Row parking, and boat launch will be determined during final design. Figure 4.06-1 shows the final Alternative 1 developed as part of this study. This layout was taken before City boards, commissions, and committees for review with their comments considered when developing the recommendations.

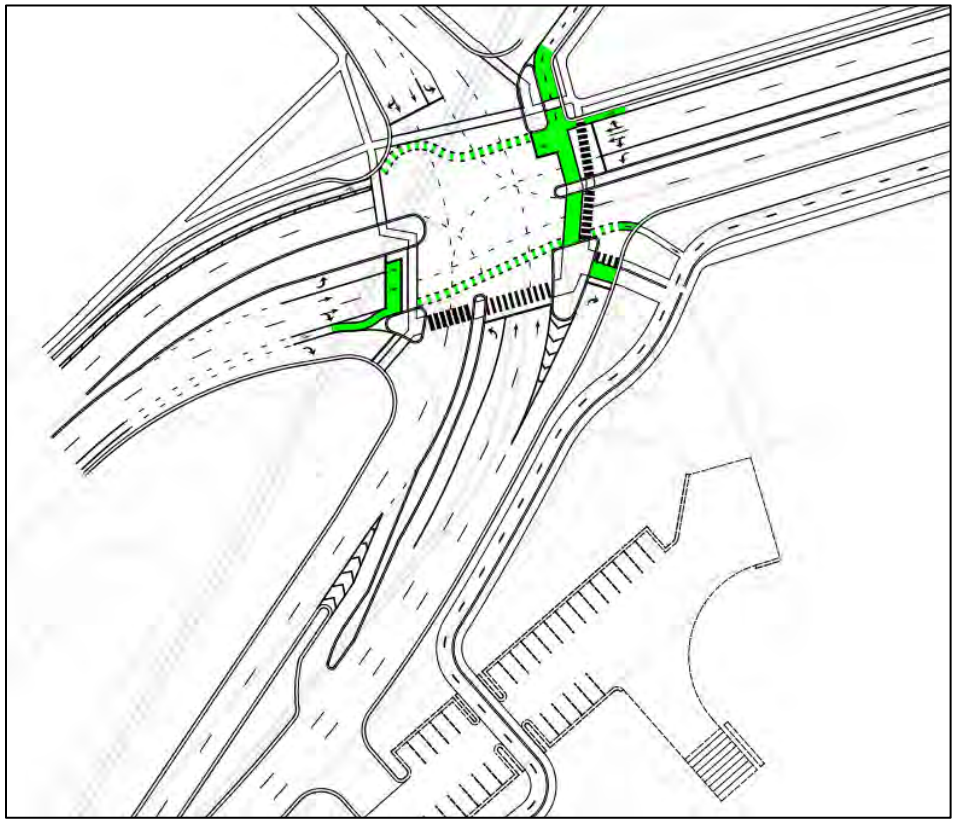


Figure 4.06-1 Alternative 1 Refinements

SECTION 5
RECOMMENDATIONS AND NEXT STEPS

5.01 JOHN NOLEN DRIVE/BLAIR STREET AND WILSON STREET/WILLIAMSON STREET INTERSECTION AREA

A. John Nolen Drive/Blair Street and Wilson Street/Williamson Street Intersection

1. Interim Recommendations

Depending on the availability of funding, reconstruction/reconfiguration of this intersection is likely several years away. Yet, one of the key concerns of stakeholders is the conflicts between motor vehicles and pedestrians and bicyclists at the Machinery Row driveways in the southeast quadrant. The study team recommends that the City investigate the feasibility of installing vehicle detection combined with a warning beacon to alert bicyclists and pedestrians when a vehicle is present. The beacon could be mounted over a sign indicating “Blind Driveway”, or “Watch for Exiting Vehicles”, or similar.

2. Near-Term Recommendations

Figure 5.01-1 illustrates the recommended configuration for the John Nolen Drive/Blair Street and Wilson Street//Williamson Street intersection. It is also included in Appendix F. The configuration is the product of considerable public comment and seeks to balance priorities of residents, businesses, and travelers of all modes. The reconstruction of this intersection is listed as a near-term recommendation pending its approval of Highway Safety Improvement Program grant funding. Key features of the intersection include:

a. Shifting intersection west.

b. Removing Wilson Street stub in front of Hotel Ruby Marie and the expand the greenspace.

c. Providing parallel parking and a buffered bike lane in front of Hotel Ruby Marie.

d. Installing a left turn lane on the Blair Street north approach.

e. Removing parking on the east Wilson Street stub serving the Gateway Shopping Center. In that space designate an at-grade cycle path. Maintaining existing sidewalk for pedestrians.

f. Providing green bike box and green route markings through the intersection for eastbound and westbound Williamson Street and Wilson Street cyclists. Providing ramp to cycle track in front of Machinery Row.

g. Providing green pavement marking for Capital City Trail on east Williamson Street approach. Providing separate ladder marking crossing for pedestrians adjacent to Capital City Trail marking.

h. Reconfiguring the John Nolen Drive to Williamson Street right-turn island to:

(1) Provide more staging area for pedestrians and cyclists.

(2) Reduce the speed of right turning vehicles with a tighter curb radius and raised pedestrian and bicycle crossing.

(3) Add a narrow, raised lane separator between the northbound through land and the channelized right-turn lane in the gore area to reduce late lane changes.

i. Enlarging the staging area for pedestrians and cyclists crossing the John Nolen Drive to Williamson Street right turn movement.

j. Reducing Williamson Street median and reallocate space from median and narrower travel lanes to enlarge the space in front of Machinery Row. Separating pedestrians and cyclists through:

(1) Widening the sidewalk in front of Machinery Row and realigning the existing cycle track

(2) Adding on-street parking on eastbound Williamson Street.

k. Relocating the two Machinery Row driveways to the southwest and reduce into one driveway.

(1) Providing a protected left turn into the parking lot. Access and egress options increase from the relocation.

(2) Making provisions for future signalization if it becomes necessary.

l. Relocate Capital City Trail to travel through the city-owned parking lot to reduce the number of decision points from vehicles entering and exiting the parking lots. (Note: Parking lot configuration and Law Park design to be developed by Madison Parks).

m. Providing left turn lane for John Nolen Drive to Wilson and Blair Street to Williamson Street movements.

n. Maintaining bike box on west Wilson Street approach.

o. Adding a buffered bike lane approaching the intersection eastbound on Wilson Street.

p. Design elements provided to aid in the creation of a railroad Quiet Zone on the east Isthmus including Supplemental Safety Measures (SSM) and/or

Alternative Safety Measures (ASM). These primarily consist of active warning devices including flashers and crossbucks and raised curb/separators that would prevent a conflicting motor vehicle from driving around the lowered crossbuck when a train is present. These treatments also led to a change in the westbound Williamson Street lane configuration that eliminates the shared through/left-turn lane and provides two left-turn lanes and one shared through/right-turn lane. There is a negligible change to motor vehicle operations. Appendix G contains a report authored by Mark Morrison, P.E. regarding his review of the preliminary intersection design.

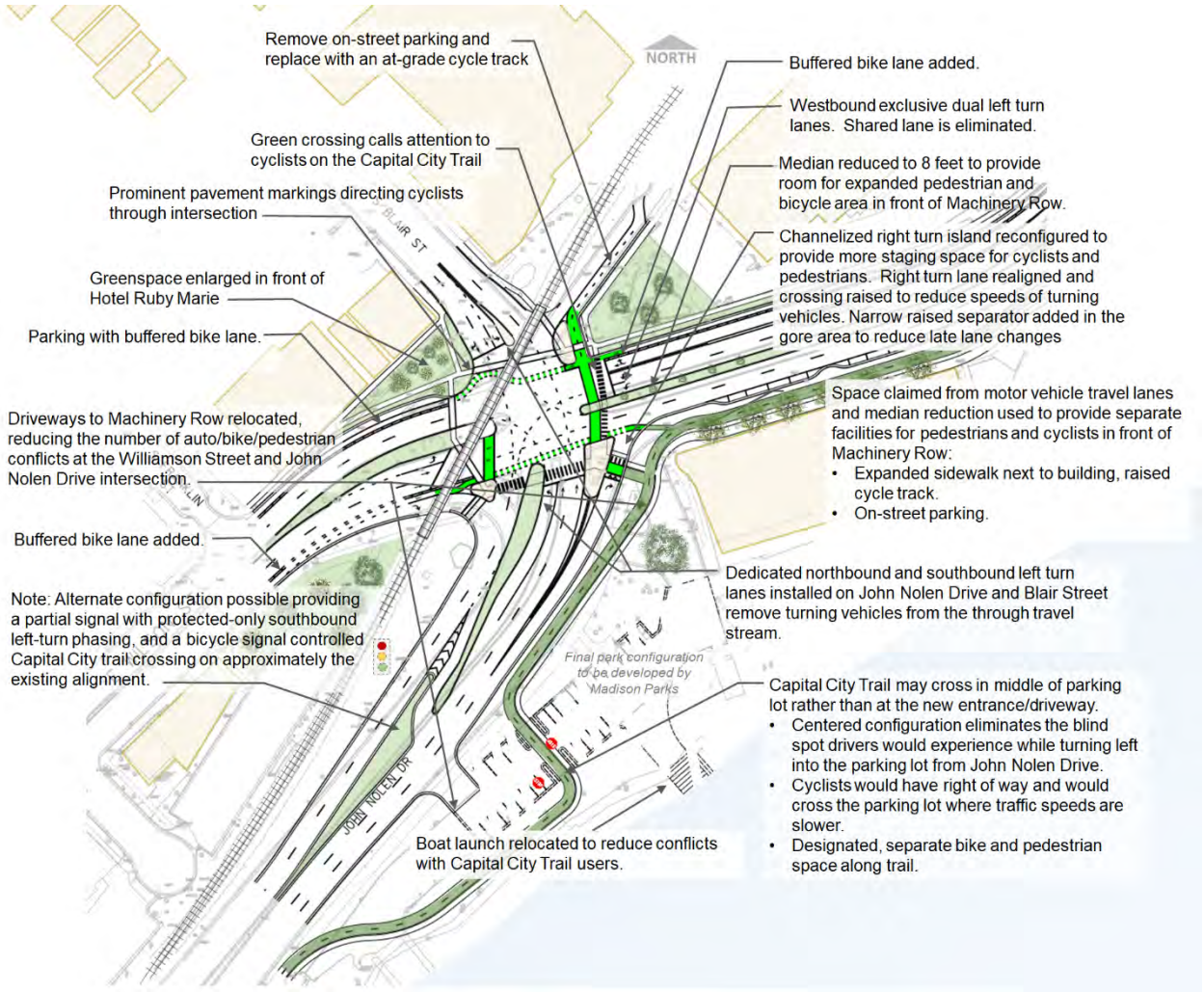


Figure 5.01-1 John Nolen Drive/Wilson/Blair/Williamson Street Intersection

Figure 5.01-2 shows the recommended cross section in front of Machinery Row.

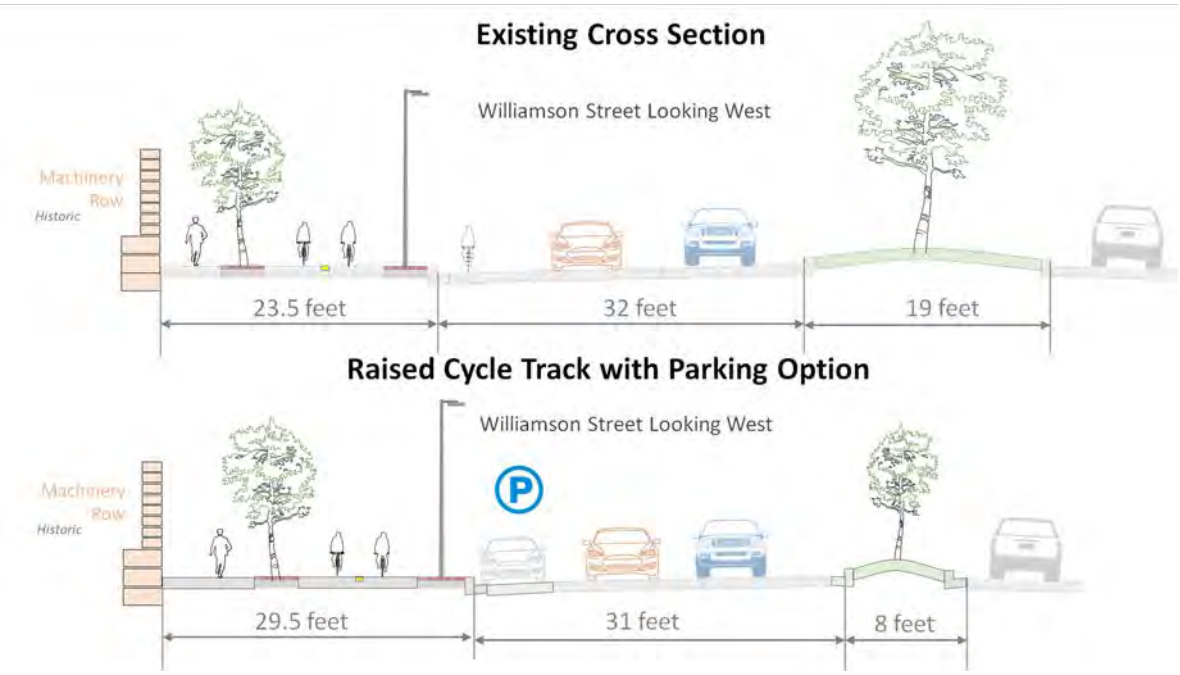


Figure 5.01-2 Recommended Cross Section in Front of Machinery Row

2. Long-Term Recommendations

If the John Nolen Drive/Blair Street and Wilson Street/Williamson Street intersection is to accommodate more motor vehicle traffic volumes, there are relatively few options. They include:

a. Providing a triple left-turn on the Williamson Street east approach. This would require expanding John Nolen Drive to three lanes in the southbound direction, and possible acquisition of right-of-way from the railroad. If this is a potential option for the future, the City may want to maintain the current width of the Williamson Street median.

b. Grade separate movements within the intersection. Section 3 describes some of the significant challenges associated with this in the tunnel option.

This study does not currently recommend either of these options. This intersection is "at capacity" for all travel modes and the dynamic mix enriches the corridors that connect to the intersection.

B. Williamson Street and Blount Street Intersection

The near and long-term recommendation at the Blount Street intersection is to provide a diagonal, signalized bicycle crossing connecting to the recommended cycletrack in front of Machinery Row and a recommended cycletrack along Blount Street connecting to the Capital City Trail. Figure 5.01-3 shows the recommended configuration.

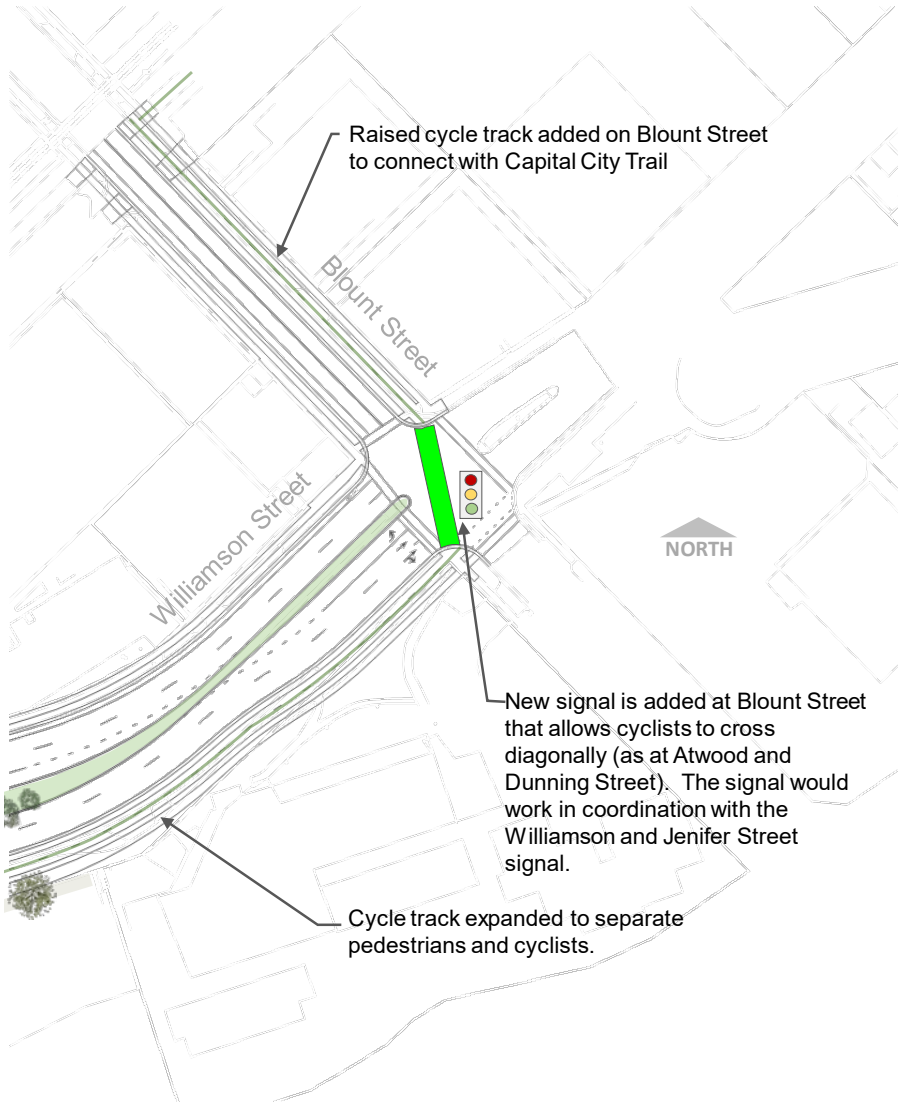


Figure 5.01-3 Williamson Street and Blount Street Intersection

C. Blair Street and Main Street Intersection

The study team recommends a traffic signal at Blair Street and Main Street as a means of providing a controlled bicycle and pedestrian crossing. From a motor vehicles operation standpoint, left turns from Blair Street to Main Street would likely need to be prohibited during peak periods at a minimum. This is needed to avoid creating a condition similar to what currently exists at the John Nolen Drive/Blair Street and Wilson Street/Williamson Street intersection where left-turning vehicles on John Nolen Drive and Blair Street block one of the through lanes and lead to increased delays, queuing, and crashes.

5.02 EAST OF MONONA TERRACE

There are several options being discussed for both Law Park and the air rights over John Nolen Drive. Some proposals include covering John Nolen Drive with a parking garage that has a roof-top park. Many also include constructing Frank Lloyd Wright's Boat House on Lake Monona.

A. Near-Term Recommendations

1. Obtain an easement to allow a pedestrian and bike connection from Wilson Street to the edge of the railroad property to accommodate a future overpass of John Nolen Drive (completed).

2. Work with the project team for the McGrath Redevelopment to construct footings that would accommodate a future overpass bridge that spans the rail line and John Nolen Drive to connect with the lakeshore.

3. Begin looking a funding options that could fund a pedestrian bicycle overpass over the rail line and John Nolen Drive. Transportation Alternatives Program (or Set-Aside) might be one option.

B. Long-Term Options

The study recommends installing a pedestrian bicycle overpass over the rail line and John Nolen Drive. Many have advocated for the bridge to be wide enough to accommodate landscaping, food carts, and/or activities. Madison Parks may soon be initiating a planning effort for Law Park. We recommend that this planning effort further refine the bridge's role and relationship to Law Park, and what amenities should be included.

As mentioned, there are proposals that include covering John Nolen Drive could conflict with this bridge, depending on how far east the deck extends. The City can re-evaluate construction of the pedestrian-bicycle overpass in light of future priorities and proposals if and when bridge funding becomes available.

Figure 5.02-1 illustrates one option of a type of landscaped bridge that could be constructed. The actual bridge amenities should be determined in conjunction with Law Park Planning.

Figure 5.02-1 Pedestrian Bridge to Law Park–One Possible Configuration

5.03 BROOM STREET INTERSECTION

This intersection is particularly challenging. Full bike accommodations cannot be installed on Broom Street until it is reconstructed. And when it is reconstructed, building faces and topography constrain the amount of room for accommodations. The following paragraphs list the study's near and long-term recommendations.

A. Near-Term Solutions (2 to 5 years)

Near-term solutions (shown in Figure 5.03-1) for this intersection include:

1. Using a sharrow pavement marking to direct eastbound Broom Street cyclists to the left turn island. At the island create a green colored box that directs cyclists where they should wait and cross, and alerts drivers where cyclists will be crossing.

2. Creating a green bike box on the eastern left turn lane for northbound John Nolen Drive traffic to westbound Broom Street. This allows cyclists crossing John Nolen Drive from the Capital City Trail to westbound Broom Street the option of positioning themselves in front

of left-turning motor vehicle traffic, and allows cyclists to travel through the intersection ahead of the left-turning motor vehicles during the protected left-turn signal phase.

3. Installing a multi-use trail to connect Broom Street to Hamilton Street. This would provide a more direct route to the Capitol Square for cyclists, and allow them to travel on a roadway with less motor vehicle volume. Note that because this trail would travel on railroad right-of-way, coordination would be needed, which could delay implementation of the path.

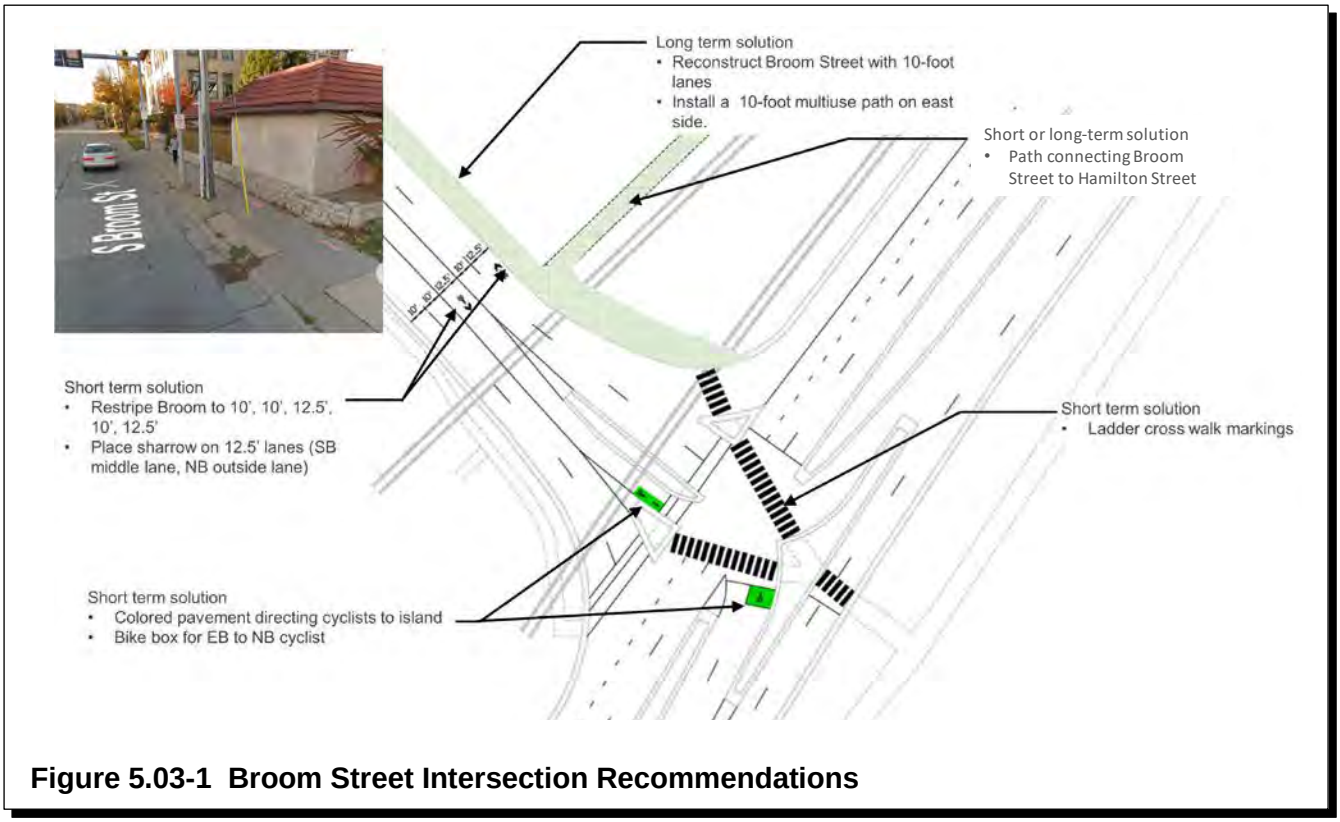


Figure 5.03-1 Broom Street Intersection Recommendations

B Long Term Solutions (5 to 15 years)

Long term solutions for this intersection include:

1. Reconstruct Broom Street with narrower lanes (see Figure 5.03-1). With the additional space, install a raised cycle track (separated bicycle facility) on the east side of the street.

2. Connecting Broom Street with the pedestrian and bicycle underpass discussed under the North Shore Road improvements.

5.04 NORTH SHORE DRIVE INTERSECTION

In recent years, the City has already made significant improvements to this intersection by enlarging the island on the north approach and providing green epoxy markings across John Nolen Drive. The following paragraphs describe additional measures that could be performed.

A. Near-Term Solutions (2 to 5 years)

The study recommends adding a no-right-turn blank out sign to the southbound channelized right turn lane. This will reinforce/alert drivers to the pedestrian and bicycle right-of-way during their walk signal phase.

The study team also recommends adding an off-path, paved, staging area on the Capital City trail for pedestrians and cyclists. This will allow them to wait for a green signal to cross John Nolen Drive off the main path area.

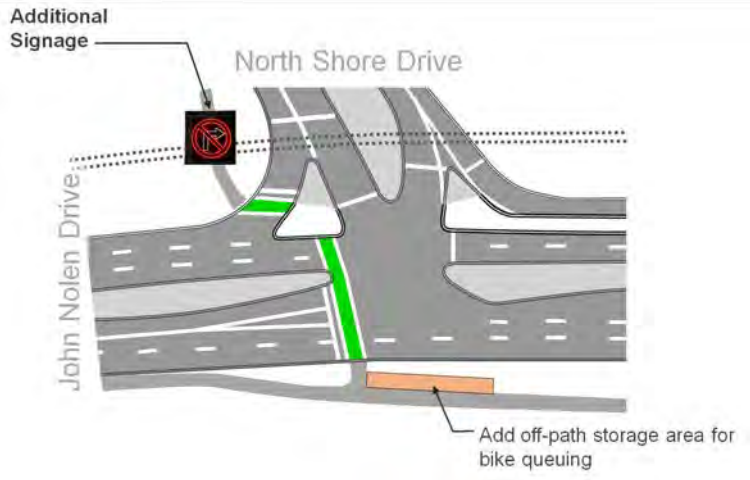


Figure 5.04-1 North Shore Drive–Near-Term Solutions

B. Long-Term Solutions (5 to 15 Years)

Figure 5.04-2 illustrates one of the long-term recommendations. When the north approach of the intersection is reconstructed, the island channelizing the right turn could be enlarged to provide more room for cyclists and pedestrians waiting to cross either the right turn movement or John Nolen Drive. This modification would also reduce motor vehicle speeds.

A second-long term solution includes constructing a pedestrian and bike underpass between North Shore Drive and Broom Street. Features to consider in implementing this underpass include:

Figure 5.04-2 North Shore Drive–Long-Term Solutions

1. Raising the profile of John Nolen Drive between North Shore Drive and Broom Street. This will require reconstructing this portion of John Nolen Drive.

2. Even with this profile change on John Nolen Drive, a storm water lift station will be needed to drain the underpass of storm water that enters the underpass through the ramps.

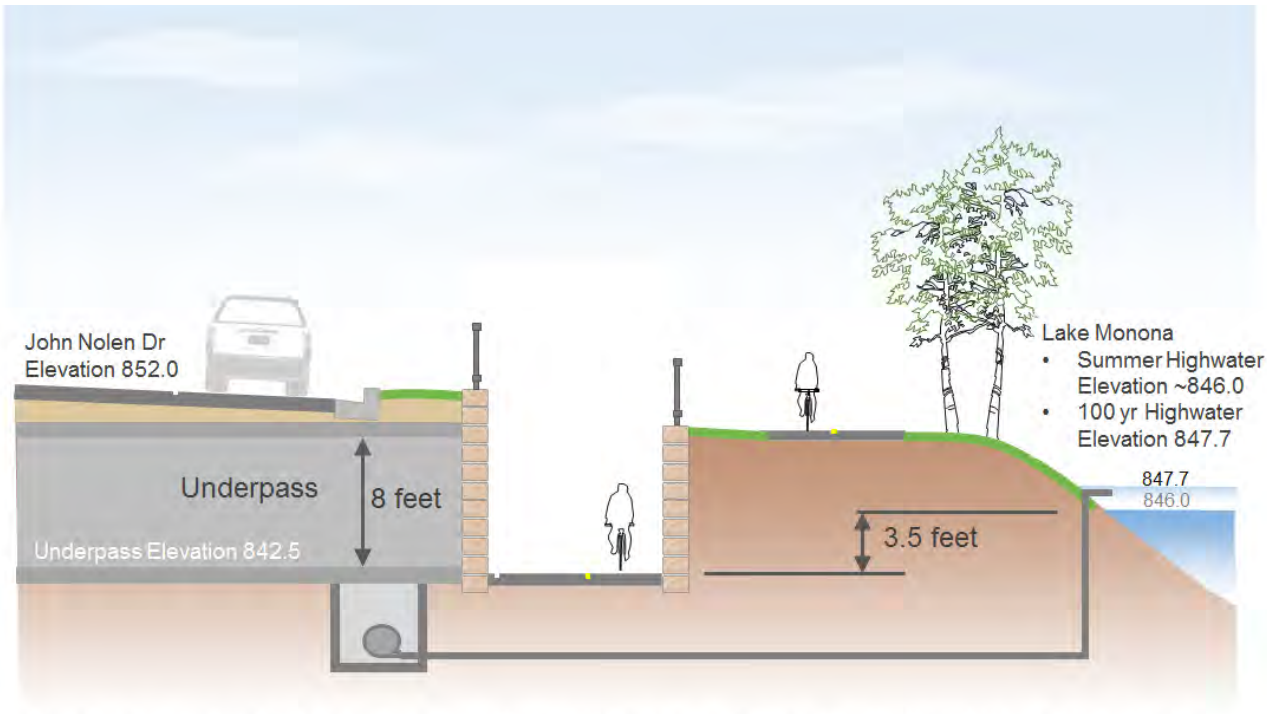
3. Reconstructing the westbound right turn lane onto North Shore Drive to reduce its functional width. This space will be needed for a ramp down to the pedestrian and bike underpass.

4. Constructing a multi-use path on the north side of North Shore Drive that connects to the pedestrian and bike underpass. This same path could continue to connect directly with Broom Street.

5. Relocating the Capital City Trail to the south to allow the trail room to travel around the ramps down to the pedestrian and bike underpass.

Figures 5.04-3 and 5.04-4 illustrates the connection network being proposed, and a cross section of the pedestrian bicycle underpass.

Figure 5.04-3 North Shore Drive–Long-Term Solutions



The underpass option places a pedestrian-bicycle tunnel underneath John Nolen Drive. This underpass would involve:

- Raising John Nolen Drive about 2 feet between North Shore Drive and Broom Street.
- Having the Capital City Trail run parallel to the ramp to the underpass.
- Constructing the underpass with a floor elevation of about 842.5.
- Because the underpass is beneath the normal lake level, the underpass would need to be watertight and would require a stormwater pump station.

Figure 5.04-4 North Shore Drive–Long-Term Solutions–Underpass Cross Section

5.05 COMMENTS FROM REVIEWING BODIES

A. Pedestrian, Bicycle, and Motor Vehicle Committee, August 22, 2017

City staff presented the draft study recommendations to the City of Madison Pedestrian, Bicycle, and Motor Vehicle Committee on August 22, 2017. The following summarizes the comments received applicable to the John Nolen Drive/Blair Street and Wilson Street/Williamson Street intersection.

1. Consider a single eastbound motor vehicle lane on Wilson Street.

   The study team evaluated two alternatives that reduced eastbound Wilson Street to a single through lane (Alternative 2 and Alternative 3). Both were dismissed due to multiple LOS F movements in the initial 2050 operations modeling.

2. Soften the cycletrack corner radii.

The study team agrees with this comment and recommends it be implemented during final design.

3. On westbound Wilson Street in front of Hotel Ruby Marie consider swapping the position of the on-street parking and the buffered bicycle lane.

This area is expected to be serve as a part-time loading zone, which would create conflicts between deliveries and the on-street bicycle accommodation. The study team does not recommend this be implemented during final design.

4. Consider swapping the position of the crosswalk on the west Wilson Street leg and the bicycle box (place the bike box in front of the crosswalk).

The study team implemented this change in subsequent revisions to the intersection layout.

5. Provide an enhanced connection between the Hotel Ruby Marie and Essen House area and the Capital City Trail considering the expected redevelopment of those properties.

This comment refers to making it easier for eastbound bicyclists leaving the northwest quadrant of the intersection wishing to travel eastbound on the Capital City Trail. The study team recommends this be investigated during final design.

6. Reduce the Williamson Street median to provide additional space in front of Machinery Row.

The study team recommends this be implemented during final design.

7. Straighten the Capital City Trail crossing on the east Williamson Street leg.

The configuration of this crossing is a result of accommodating truck turns through the intersection while providing separate space for bicycles and pedestrians making the Capital City Trail crossing and moving the intersection west to provide more space in front of Machinery Row. The study team does not recommend this be implemented during final design.

8. Soften the proposed Capital City Trail crossing of the relocated Law Park/Machinery Row parking area.

The study team prefers the 90-degree reverse curves to slow bicycle travel through the crossing, provide the shortest crossing possible, and provide optimal sight lines for both motorists and bicyclists. The ultimate layout will be developed during the City of Madison Parks Department's Law Park planning process.

9. Maintain the motor vehicle eastbound u-turn movement at Blount Street and Williamson Street.

The geometry of the eastbound approach is not proposed to be modified. Vehicles that can currently make a u-turn at this intersection will continue to be able to do so after the project is completed.

10. Modify the North Shore Drive path crossing to be create a single stage crossing for pedestrians and bicyclists.

The study team investigated this change and recommends maintaining the current geometry and signal timings that provide for a two-stage crossing. Reasons for this include:

a. The study team modeled this condition using the existing crosswalk configuration and 2015 traffic volumes. This requires a much longer signal phase that stops northbound and southbound John Nolen Drive traffic than under the current, two-stage crossing configuration. During the AM peak hour, the northbound John Nolen Drive left turning motor vehicle traffic would experience severe average delays exceeding 150 seconds accompanied by northbound queues reaching 800 to 1,200 feet in length or more. During the PM peak-hour the southbound John Nolen Drive through motor vehicle traffic would experience severe average delays of 180 seconds accompanied by southbound queues reaching 1,300 feet in length or more.

b. An alternative to the existing configuration would be to reduce the crossing length, so a shorter signal phase would be required. Because of the existing roadway geometry, this would require a costly reconfiguration of the beam guard that exits in the median of John Nolen Drive and the connection to the Capital City Trail on the east side of John Nolen Drive would not have any throat length/staging space for crossing pedestrians and bicyclists. This would create frequent conflicts between path users traveling through along John Nolen Drive and those wishing to cross.