Lewiston City Council
AMENDED
WORK SESSION AGENDA
May 4, 2026 - 3:00 PM
Lewiston Bell Building – Second Floor Conference Room – 215 D Street
Lewiston, Idaho 83501

Seating will be available on a first-come, first-served basis. All others who wish to observe this meeting may watch and listen to the livestream on their own device(s) by visiting the City of Lewiston's website at cityoflewiston.org.

I. CALL TO ORDER

II. PLEDGE OF ALLEGIANCE

III. CITIZENS COMMENTS

This is an opportunity for individuals wishing to comment on agenda items or other matters they wish to bring to the Council's attention, excluding those scheduled for a public hearing. As there may not be another opportunity to comment once an agenda item is addressed, individuals are encouraged to speak at this time. Individuals are encouraged to discuss operational issues in advance with the Mayor. In consideration of others wishing to speak, commentary is limited to three (3) minutes.

IV. PRESENTATIONS

A. EMERGENCY MEDICAL SERVICES WEEK PROCLAMATION: Proclaiming the week of May 17–23, 2026 as Emergency Medical Services Week - Action Item (Mayor Johnson)

B. COMMUNITY DEVELOPMENT BLOCK GRANT 2026 ACTION PLAN PROJECT RECOMMENDATIONS: Project and funding recommendations for the Community Development Block Grant (CDBG) 2026 Action Plan - Action Item (Community Development Office Supervisor Dawn Ortiz)

V. DISCUSSION ITEMS

Please note that identifying an item as an "Action Item" does not require the City Council to vote on that item.

A. LEWISTON CIVIC THEATER SERVICES AGREEMENT ANNUAL ACCOUNTING: Presentation by Executive Director Nancy McIntosh regarding the activities financed to date with City funds in accordance with the Fiscal Year 2026 Services Agreement - Action Item

B. BOYS AND GIRLS CLUBS OF THE LEWIS CLARK VALLEY, INC. ANNUAL ACCOUNTING: Presentation by Executive Director Jon Evans regarding the activities financed to date with City funds in accordance with the Fiscal Year 2026 Services Agreement - Action Item

C. TRAFFIC ANALYSIS REPORT FOR BRYDEN AVENUE: Overview of maintenance and repair plans for Bryden Avenue, presented by Public Works Director Dustin Johnson - Action

Item

D. **ASSIGNED BUILDING FUND:** Discussion on the remaining balance and future plans of the assigned building fund, as requested by Council President Kleeburg at the March 23, 2026 City Council meeting - Action Item

E. **UTILITY RESERVES:** Discussion on utility reserves, as requested by Councilor Spickelmire at the April 27, 2026 City Council meeting - Action Item

VI. UNFINISHED AND NEW BUSINESS

A. **CITY COUNCILOR COMMENTS:** Comments shall not be related to an item currently before the City Council or an item that may come before the City Council in the foreseeable future, and shall be limited to comments, not discussion.

B. **CITY BOARDS AND COMMISSIONS LIAISON UPDATES**

C. **MAYOR COMMENTS**

D. **AGENDA TOPICS:** - Action Item

VII. ADJOURNMENT - Action Item

The City of Lewiston is committed to providing access and reasonable accommodation in its services, programs, and activities and encourages qualified persons with disabilities to participate. If you anticipate needing any type of accommodation or have questions about the physical access provided at this meeting, please contact Nikki Province, ADA Coordinator, at least forty-eight (48) hours in advance of the meeting at 208-746-3671 x 6211.

Proclamation

City of Lewiston, Idaho

WHEREAS, emergency medical services are a vital public service; and

WHEREAS, the members of emergency medical services teams are ready to provide lifesaving care to those in need 24 hours a day, seven days a week; and

WHEREAS, access to quality emergency care dramatically improves the survival and recovery of those who experience sudden illness or injury; and

WHEREAS, emergency medical services fill healthcare gaps by providing important, out-of-hospital care, including preventative medicine, follow-up care, and access to telemedicine; and

WHEREAS, the emergency medical services system consists of first responders, emergency medical technicians, paramedics, emergency medical dispatchers, firefighters, police officers, educators, administrators, pre-hospital nurses, emergency nurses, emergency physicians, trained members of the public, and other out of hospital medical care providers; and

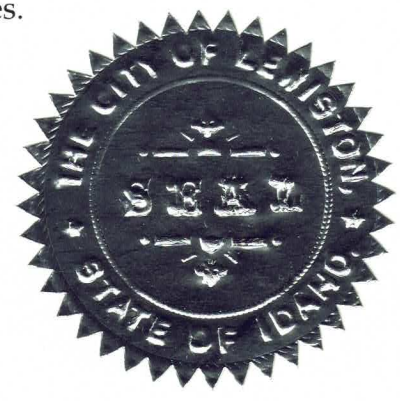
WHEREAS, the members of emergency medical services teams, whether career or volunteer, engage in thousands of hours of specialized training and continuing education to enhance their lifesaving skills; and

WHEREAS, it is appropriate to recognize the value and accomplishments of emergency medical services providers by designating the Emergency Medical Services (EMS) Week.

NOW THEREFORE, I, Dan Johnson, Mayor of the City of Lewiston, proclaim the week of May 17-23, 2026 as

"EMERGENCY MEDICAL SERVICES WEEK"

in the City of Lewiston, Idaho. The 52nd anniversary of Emergency Medical Services Week theme is EMS Week: Improving Outcomes, Together. I encourage the community to observe this week with activities in honor of the EMS profession and the essential service it provides.



IN WITNESS WHEREOF, I HAVE HEREUNTO SET MY HAND AND SEAL OF THE CITY OF LEWISTON, IDAHO, TO BE AFFIXED HERETO THIS 4TH DAY OF MAY 2026.

DANIEL G. JOHNSON, MAYOR
LEWISTON, IDAHO

CITY COUNCIL MEETING
AGENDA ITEM SUMMARY

ITEM TITLE	**AGENDA NO.** IV. B.
COMMUNITY DEVELOPMENT BLOCK GRANT 2026 ACTION PLAN PROJECT RECOMMENDATIONS	**AGENDA DATE:** May 4, 2026

ITEM SUMMARY (Background, Discussion, Key Points, Recommendations, etc.)

Each year the U.S. Department of Housing and Urban Development (HUD) provides funding to entitlement cities for housing and community development programs that benefit people of low or moderate income or eliminate blight. On February 3, 2026, the City of Lewiston received notice of funding for $258,298.00 for the 2026 Community Development Block Grant program year. On March 22, 2026, the notice of funding for the 2026 program year was published in English and Spanish in the Lewiston Tribune, social media and the City of Lewiston's website. Four applications were received (Lewiston School District, L-C Habitat for Humanity, Maven Rentals, and City of Lewiston Parks and Recreation Department). Adding the 2026 program funds to the rolled over 2025 program funds and estimated program income for program 2026, there is approximately $310,551.26 funds available in 2026 for programming.

The City is required to fund a Consolidated Plan effort every 5 years. The 2023-2027 Consolidated Plan will expire in 2027, so the City will need to set aside administrative funds in 2026 and 2027 to prepare this plan. Other administrative costs include training, hosting an annual Fair Housing Conference, grant software, lead-based paint inspections, and other miscellaneous costs. Additionally, the City annually sets aside funds for the Home Repair program, which provides financial assistance to eligible low and moderate income homeowners to repair and improve their homes. This program focuses on making essential repairs that address health, safety, and livability needs, and allows people to stay in place.

Applications recommended for the 2026 program year are as follows:

$40,000 for Administrative Costs, Fair Housing Conference and development of the 2028-2032 Consolidated Plan
$15,000 to Lewiston School District. This application addresses our 2023-2027 consolidated plan goal and priority need of Homeless Needs, which is considered a high-level need.
$60,000 to the Home Repair Program. This program will assist three to four applicants by doing small repairs/rehabilitations to their homes. This program allows applicants to remain in their home longer and allows for housing affordability by eliminating some of the costs to repair/rehabilitate their home.
$150,000 to the City of Lewiston Parks and Recreation Department. The public use structure known as Fenton Gym has water damage due to the roof needing to be repaired. These funds

will assist with the replacement of the roof and any repairs inside the building due to water damage. This application addresses our 2023-2027 consolidated plan goal and priority need of infrastructure and Public Facility Improvements, which is a High need. Repairing the roof and water damage will keep this gym open to the public.
$45,551.26 to the L-C Habitat for Humanity. This application addresses our 2023-2027 consolidated plan goal and priority need for infrastructure and Public Facility Improvements, along with the need for housing affordability and condition, which are both high needs.

There will be a 30-day public comment period for the 2026 Action Plan from May 9, 2026, to June 8, 2026. On June 8, 2026, a public hearing will be held by the City Council for the approval of the 2026 Action Plan.

BUDGET IMPACT (Identify any or all impacts this proposed action would have on the City budget and/or personnel resources)

The Community Development Block Grant funds are considered "pass-through" funding. These funds are represented in the City budget under the economic development funds, but do not have a budget impact.

ACTION PROPOSED

Consider staff recommendations of funding for the 2026 Action Plan. Direct staff to proceed with recommendations as presented or recommend changes.

Community Development Block Grant 2026 Program Year

Recommendations for the 2026 CDBG Program Year

CDBG – Applications Received

Lewiston School District seeks $15,000 to support families facing homelessness.

Maven Rentals/421 Burrell Ave is requesting $180,317 to replace private utility lines (electrical, water, and sewer), tree removal, restoring asphalt, and roof replacement to a nine-unit complex.

L-C Habitat for Humanity is seeking $64,500 to assist with infrastructure costs, such as curb, gutter, sidewalk, caping of utilities to parcels and construction of retaining wall.

City of Lewiston Park and Recreation Department is requesting $150,000 to repair/replace the Fenton Gym roof and water damage.

Recommendation for 2026 Program Year

$52,253.26 (2025 PY Roll over + Program Income estimate for 2026 PY)

$258,298 2026 PY funds

$310,551.26 Total for 2026 PY

$40,000 Administrative and Consolidated Plan

$15,000 Lewiston School District

$150,000 City of Lewiston Parks and Recreation

$60,000 Home Repair Program

$45,551.26 L-C Habitat for Humanity

$310,551.26

CDBG – Next Steps

An Action Plan identifying the selected applications and funding amount will be developed and a 30-day public comment period will run from
May 9, 2026, to June 8, 2026.

A Public Hearing and City Council approval of the Action Plan is scheduled for June 8, 2026.

The submission of the Action Plan to HUD is due on June 15, 2026.

The 2026 Program Year will commence on August 1, 2026.

QUESTIONS?

CITY COUNCIL MEETING
AGENDA ITEM SUMMARY

ITEM TITLE TRAFFIC ANALYSIS REPORT FOR BRYDEN AVENUE	**AGENDA NO.** V. C. **AGENDA DATE:** May 4, 2026

ITEM SUMMARY (Background, Discussion, Key Points, Recommendations, etc.)

Presentation by Public Works Director Johnson providing a high-level overview of maintenance and repair plans for Bryden Avenue.

BUDGET IMPACT (Identify any or all impacts this proposed action would have on the City budget and/or personnel resources)

Staff will provide a high-level overview regarding the status of projects on Bryden Avenue and the takeaways from the "Roundabout Traffic Analysis Report" for Phase 1 (4th Street to 7th Street) prepared by David Evans & Associates, Inc.

ACTION PROPOSED

None.

Memo

To: Mayor Johnson
Lewiston City Council

From: Dustin Johnson, PE, Public Works Director

Date: May 4, 2026

Subject: **Bryden Avenue**
Update and Discussion

Bryden Avenue has long been planned as a major street reconstruction project. The plans to improve Bryden Avenue date back to the completion of the Bryden Canyon project in the 1990's. In the early 2000's there were many public meetings and discussions as to what the segment of Bryden Avenue from the top of the canyon to Thain should look like. At that time the City of Lewiston broke the project into two phases: 4th Street to 7th Street, and 7th Street to Thain. These two segments on their own are very large projects for the City with regards to the overall transportation budget.

The City listed phase 1 (4th Street to 7th Street) in the Surface Transportation Plan (STP) program. The STP program is a federal allocation for surface transportation projects. The LC Valley Metropolitan Planning Organization (MPO) programs roughly $600,000 a year in STP funds. The City of Lewiston has traditionally relied on these funds for larger transportation projects. Unfortunately, with an annual allocation of $600,000, it typically takes years to build up enough funding to construct larger projects. An example of this is Snake River Avenue. The roundabout at Southway and Snake River Avenue was phase 1 of the project and was constructed in 2013. The second phase of the project (Southway to 11th Avenue) was programmed for design in 2014 and is currently under construction.

The design of phase 1 was started in 2022 and generally wrapped up in 2023 with completion of the final design, preliminary right-of-way (ROW) plans, and environmental documentation. The design incorporated a five lane section with sidewalks and full curb and gutter. Additional work to prepare the project for ROW purchase in 2030 includes preparation of final ROW plans, legal descriptions, and additional environmental documentation. This additional work has a negotiated scope and an agreement is currently being prepared by the State. Funding for the additional work in the amount of an estimated $250,000 will be by a combination of URA and STP. Upon the completion of the ROW package and environmental update, the project will be ready to move into the right of way acquisition phase of the project. However, since the project has been almost solely funded through the STP funds, there currently are not enough funds to start this process. Over the next few years, the funds should build up and ROW purchase should be started by 2030.

In 2025 a city councilor inquired if there could be cost savings by only constructing a three lane section. This would simplify the process and design because additional right of way would not be required. An amendment

was made to the design contract to re-evaluate the traffic functionality of the corridor to determine how effective a three lane section would be moving forward into the future.

Included with this memo is the Traffic Analysis Report prepared by David Evenas and Associates (DEA) for phase 1 of Bryden Avenue. The analysis utilized roundabouts as part of their analysis as they would provide the most efficient flow for analysing traffic in the corridor and would yield the most conservative results. The design being considered for this corridor does not include roundabouts.

The findings of the report are outlined on page 17 as part of the 'Conclusions and Recommendations'. The report states "Therefore, the three-lane cross-section with roundabouts along Bryden Avenue is not recommended based on the projected performance of the corridor as a whole system."

At this time phase 1 is estimated to be approximately $15 million for construction and right of way acquisition. The City has approximately $7.5 million in unallocated arterial reconstruction funds that could be used for this project. To date, the project has been funded solely through the STP process, with the local match coming from the Urban Renewal Area (URA). The project can continue down this route, but it will take a decade or longer to complete just phase I.

Fiscal Year	Revenue	Expense	Appropriation
2022	-$700,000		
2023	-$700,000		
2024	-$2,350,000		
2025	-$2,350,000	$1,000,000	Main Street Design (MJ024)
2026	-$2,350,000	$2,246,800	Main Street Grant Application/Design (MJ024) Bryden Canyon Overlay (TR076)
2027*	-$2,350,000		
Net Total:	**-$7,553,200**		

** 2027 Budget has not yet been approved*

The option of utilizing local funds from the arterial reconstruction fund accelerates this project to a more reasonable timeline. This option still requires the funds to be in hand whether they be STP funds or local arterial reconstruction funds.

The option of utilizing a general obligation bond to fund this project would be the quickest timeline for completion of the project. The overall amount that would be required to be bonded would be reduced by utilizing STP, URA, and arterial reconstruction funds. The debt service for the bond would be serviced by the continued funding of the arterial reconstruction funds, so no new funds would need to be obligated from the

budget as it is currently structured. This is similar to how the Main Street Bond was proposed to be funded and would require approval from the Lewiston voters with a super-majority.

One final consideration is how the two phases have been broken up. Phase I (4th Street to 7th) has been designed and is currently programmed for right of way acquisition. If funding were found the project could complete right of way acquisition and then start construction immediately. Phase II (7th Street to Thain) has a concept, but no design work has been completed. . The pavement in both phases continues to degrade and must be addressed in the near future. At this time there is adequate funding between the URA and the Arterial Reconstruction funds to start the design of phase II.

Staff is looking to have a conversation with the City Council regarding the Bryden Avenue Corridor. At the May 4th work session staff will provide a brief history of the project, an overview of the attached report, and layout possible routes forward in funding and constructing Bryden Avenue.

Bryden Ave Reconstruction Stg 1, Lewiston

Project No. A020(024)

Key No. 20024

Roundabout Traffic Analysis Report

Prepared for the

City of Lewiston

Local Highway Technical Assistance Council

January 30, 2026

DEA Project No. CLEW0000-0002

DAVID EVANS AND ASSOCIATES INC.

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Executive Summary

This study evaluated future year 2051 traffic operations along Bryden Avenue between 4th Street and 7th Street within the City of Lewiston, Nez Perce County. This study is an expansion on the Bryden Avenue Corridor Study (June 2012) to evaluate traffic operations assuming the existing three-lane section and roundabouts at 4th Street, 5th Street, 6th Street, and 7th Street. This analysis is a follow-up to the June 2022 Bryden Ave Reconstruction Stg Traffic Analysis Report prepared by David Evans and Associates, Inc. (DEA) for a five-lane cross-section of Bryden Avenue. The purpose of this report is to accomplish these goals:

(1) Evaluate intersection Level of Service (LOS), delay, critical movement delays and capacity;
(2) Evaluate queue spillbacks on adjacent driveways and public streets;
(3) Evaluate the three-lane cross-section corridor considering the driveway and intersection density; and
(4) Determine the future failure year (before 2051) for the three-lane corridor cross-section with roundabout configuration.

Intersection Operations

- Single-lane roundabouts with shared left-through and dedicated right-turn lanes are not expected to achieve the City's level of service (LOS) D mobility target.
- Multi-lane (two-lane) roundabouts with dedicated left-turn lanes and shared through-right lanes are expected to achieve the City's LOS D mobility target but would require widening Bryden Avenue between 4th Street and 5th Street as mitigation.

Intersection Queuing

- The intersection analysis assumes independent operations of each roundabout and does not reflect the impacts of adjacent intersections on delay and queuing, which significantly impact travel time along Bryden Avenue.
- Along Bryden Avenue, significant queuing is projected in the eastbound direction at 5th Street during both the AM and PM peak hours, with backups to the 4th Street intersection during the PM peak hour.
- Significant queuing is projected in the westbound direction at 7th Street during both the AM and PM peak hours.

Corridor Operations

- It should be noted that the effects of the many driveways and intersections along the study corridor were not modeled. However, vehicles turning into and out of driveways and public streets along the corridor are expected to significantly reduce capacity for the corridor as drivers brake to turn into driveways or brake to allow vehicles into the traffic stream.
- Based on an evaluation of corridor performance using SimTraffic, vehicles on Bryden Avenue are projected to experience a travel time of approximately 662 seconds (11.0 minutes) in the peak westbound direction during the AM peak hour and approximately 2446 seconds (40.8 minutes) in the eastbound direction during the PM peak hour. This does not account for existing driveways between intersections.
- With a posted speed of 35 mph and a corridor length of approximately 4,000 feet, travel time should be closer to approximately 1.3 minutes in each direction at free-flow speed.
- The future year 2051 PM peak hour volume on Bryden Avenue is expected to exceed the planning-level capacity of 1,830 vehicles per hour for a three-lane cross-section to meet LOS D.

Failure Year

- Assuming a compounded annual growth rate of 1.29% per year, the 5th Street intersection with Bryden Avenue is projected to fail under future year 2033 conditions during the PM peak hour.

Recommendation

- The three-lane cross-section with roundabouts along Bryden Avenue is not recommended based on the projected performance of the corridor as a whole system.

Introduction

The objective of this study is to evaluate future year 2051 traffic operations along Bryden Avenue between 4th Street and 7th Street within the City of Lewiston, Nez Perce County. The City would like to expand on the Bryden Avenue Corridor Study (June 2012) to evaluate traffic operations assuming the existing three-lane section and roundabouts at 4th Street, 5th Street, 6th Street, and 7th Street. This analysis is a follow-up to the June 2022 Bryden Ave Reconstruction Stg Traffic Analysis Report prepared by David Evans and Associates, Inc. (DEA) for a five-lane cross-section of Bryden Avenue

The purpose of this report is to accomplish these goals:

(1) Evaluate intersection Level of Service (LOS), delay, critical movement delays and capacity;

(2) Evaluate queue spillbacks on adjacent driveways and public streets;

(3) Evaluate the three-lane cross-section corridor considering the driveway and intersection density; and

(4) Determine the future failure year (before 2051) for the three-lane corridor cross-section with roundabout configuration.

Figure 1 shows the project vicinity. The analyses will consider intersection configuration and traffic control at the project intersections identified in Table 1**.** These intersections can be seen in Figure 1**.**

Analysis Process

A one-lane roundabout configuration was evaluated as a starting basis for this analysis. However, along this three-lane corridor, a one-lane roundabout would require right-turn slip lanes to fully utilize the three-lane capacity of Bryden Avenue, thereby requiring significant right of way. Therefore, a second configuration fully utilizing three-lane capacity was evaluated. The existing lane configuration for side streets was assumed to remain. The following summarizes the lane configuration for the two roundabout scenarios evaluated for this analysis:

1. one-lane roundabouts with eastbound and westbound shared left/through lanes and right-turn lanes
2. two-lane roundabouts with eastbound and westbound left-turn lanes and shared through/right lanes.

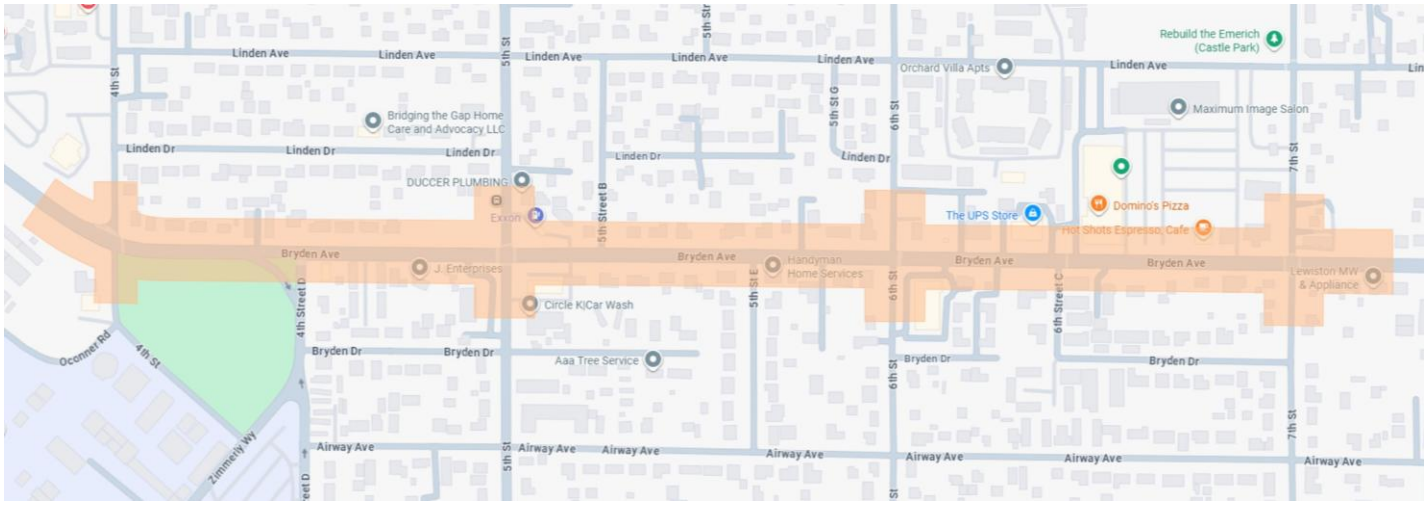

Figure 1. Project Vicinity

Table 1. Study Area Intersections

REPORT ID	INTERSECTION	SYNCHRO ID	EXISTING CONFIGURATION
1	*Bryden Ave at 4th St.*	*1*	**Two-Way Stop Control**
2	*Bryden at 5th St.*	*3*	**Signalized**
3	*Bryden at 6th St.*	*6*	**Two-Way Stop Control**
4	*Bryden at 7th St.*	*8*	**Signalized**

Turning Movement Volumes

Future year 2051 turning movement forecasts were obtained from the June 2022 Bryden Avenue Reconstruction Stg 1 Traffic Analysis. The future year 2051 forecasts were estimated by applying a compounding 1.29% annual growth rate to existing year 2022 AM and PM peak hour turning movement counts. Table 2 and Table 3 present the future year 2051 traffic volumes during the AM and PM peak hours, respectively.

Table 2. 2051 No Build Traffic Volumes – AM Peak Hour

ID	Intersection	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
1	Bryden Ave at 4th St.	106	733	70	64	1052	86	5	2	14	3	0	97
2	Bryden Ave at 5th St	84	571	20	8	910	261	166	162	5	165	66	119
3	Bryden Ave at 6th St	9	879	12	19	1024	26	9	0	32	13	1	32
4	Bryden Ave at 7th St	18	595	27	20	1036	35	98	43	24	38	24	34

Table 3. 2051 No Build Traffic Volumes – PM Peak Hour

ID	Intersection	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
1	Bryden Ave at 4th St.	88	1301	69	33	1049	22	55	3	39	13	2	191
2	Bryden Ave at 5th St	143	1007	114	35	821	211	127	157	24	372	263	171
3	Bryden Ave at 6th St	28	1176	42	46	963	36	12	3	28	12	15	19
4	Bryden Ave at 7th St	43	1145	29	38	943	46	108	67	50	75	56	26

Operational Analysis

An intersection operational analysis was performed using the Synchro (version 12) software. Analysis was based on approach geometry, intersection control, turning movements, peak hour factor, and heavy vehicle percentages.

Analysis was completed for forecast year 2051 assuming the current three-lane cross-section on Bryden Avenue. Two intersection configurations were assumed in this analysis: 1) single-lane roundabout with shared left-through and dedicated right-turn lanes; and 2) multi-lane roundabout with dedicated left-turn lanes and shared through-right lanes. Analysis was conducted for the AM and PM peak hour.

Three measures of effectiveness were considered in this analysis: Vehicular Delay (in seconds), Level of Service (LOS), and Volume-to-Capacity (V/C) ratio. An intersection-level analysis was conducted for the following locations:

1. Bryden Ave at 4th St
2. Bryden Ave at 5th St
3. Bryden Ave at 6th St
4. Bryden Ave at 7th St

Each of the intersections listed above was evaluated for operations during the AM and PM peak hours as this is typically the 'worst case' weekday traffic condition. The technical analysis focused on intersection operations. Intersections are typically what limit capacity of a roadway network. However, an evaluation of the mobility of the corridor as a whole is also important considering the high density of driveways serving a wide range of uses including residential and commercial. To evaluate the corridor as a whole, intersection queuing impacts were reviewed to determine impacts to adjacent driveways and public streets as was overall travel time during peak hours.

Assumptions/parameters for the operational analysis are defined below:

- For future year analyses, a peak hour factor (PHF of 0.95 was assumed under forecast year 2051 conditions.
- Heavy vehicle percentages were analyzed as 1% at the study area intersections within the local roadway network. It should be noted that less than 1% of total vehicles for any approach at all study intersections were heavy vehicles as shown in the existing turning movement counts conducted at the study intersections.
- Side street lane configurations were assumed to remain consistent with existing conditions, unless otherwise noted.

Level of Service Thresholds

Level of service is a quantifiable measure developed by the transportation profession to quantify driver perception for such elements as travel time, number of stops, total amount of stopped delay, and impediments caused by other vehicles afforded to drivers who utilize the roadway network. It has been defined by the Transportation Research Board (TRB) in the Highway Capacity Manual (HCM), which quantifies level of service into a range from "A" indicating little, if any, vehicle delay, to "F" indicating significant vehicle delay and congestion that may lead to system breakdown due to traffic volumes exceeding capacity. For roundabout-controlled intersections, LOS is calculated for the overall intersection operations using methodology from the HCM 7th Edition. Each LOS corresponds to a range of delay and worsens as delay increases. Figure 2 describes each LOS and range of delay for signalized and unsignalized (including roundabout-controlled) intersections.

The City of Lewiston prefers intersections, regardless of control type, to operate at LOS D or better during the peak periods. The 2020 Transportation Plan states that intersections with LOS worse than D (LOS E and F) are considered to have unacceptable levels of delay. Transportation improvements may be required to mitigate conditions created by development that cause level of service to drop below this desired LOS.

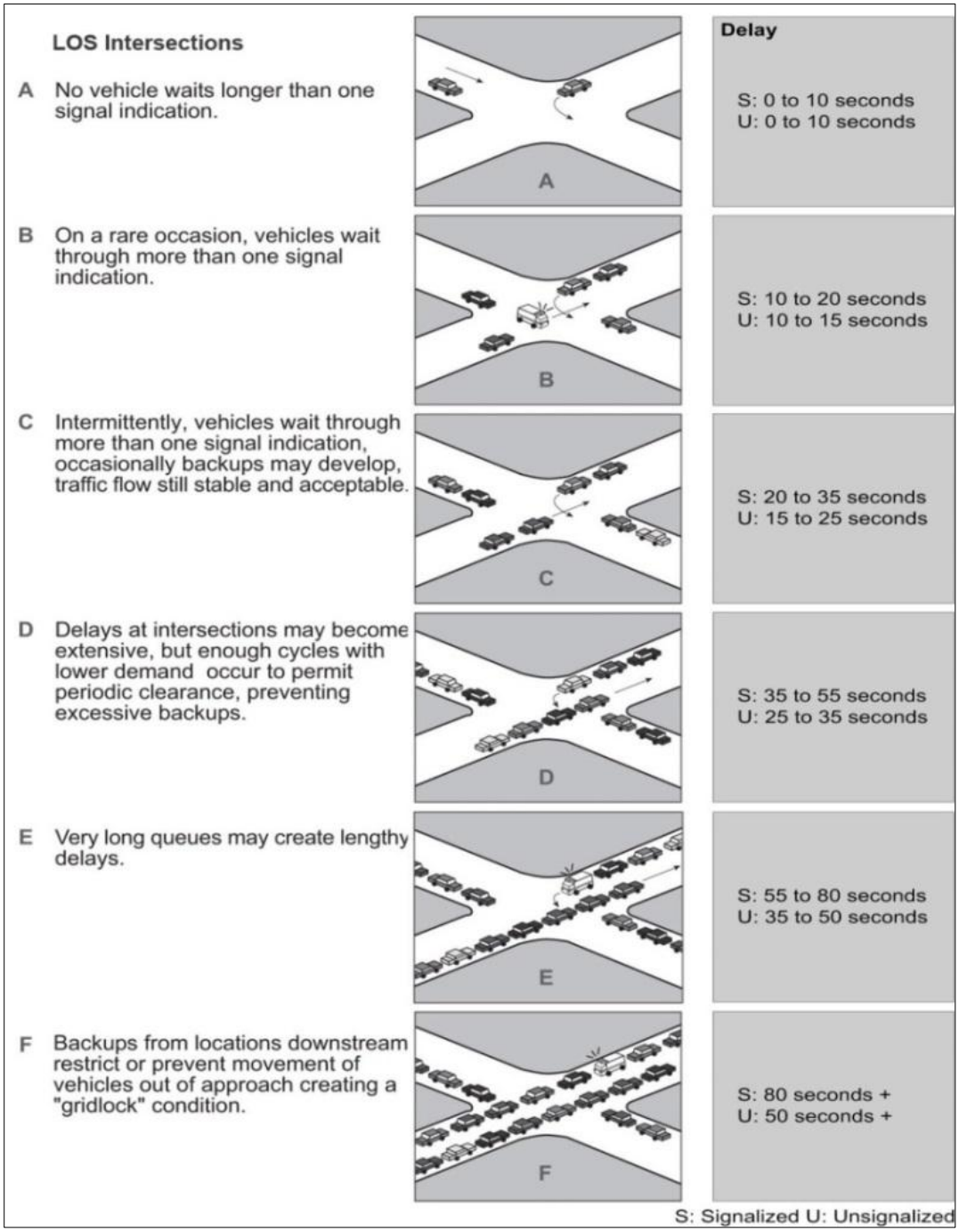

Figure 2. Level of Service Criteria

Future Year 2051 Conditions

Operations were assessed for forecast year 2051 Build Conditions. For this analysis, existing volumes were combined with a 1.29% annual growth rate (compounded) and applied for 29 years to estimate background growth for Year 2051. Year 2051 Traffic Volumes developed for this analysis scenario are shown in Table 2 and Table 3. The analysis assumes the existing three-lane section on Bryden Avenue with a two-way left turn lane (TWLTL). Northbound and southbound approaches from the side streets were assumed to remain consistent with existing conditions.

Forecast Year 2051 Single-Lane Roundabout Conditions Summary

Year 2051 single-lane roundabout conditions were evaluated using the projected year 2051 volumes as shown in Table 2 and Table 3. For this scenario, single-lane roundabouts with right-turn slip lanes are assumed at 4th, 5th, 6th, and 7th Streets as a way to maintain the three-lane cross-section capacity along Bryden Avenue and minimize the roundabout footprint to a single circulating lane. Intersection operations for the AM and PM peak hour are shown in Table 4. Synchro analysis worksheets are provided in **Appendix B**.

Table 4. Intersection Operations – 2051 Single-Lane Roundabouts along Bryden Avenue

INTERSECTION		Control Type	Int. LOS	Int. Delay (seconds)	Critical Movement		
					MVMT	Delay (s)	V/C
2051 AM Peak Hour Conditions							
1	Bryden Ave at 4th St.	Roundabout	C	24.6	WB LT	38.1	0.971
2	Bryden Ave at 5th St	Roundabout	**E**	**43.9**	WB LT	84.4	**1.107**
3	Bryden Ave at 6th St	Roundabout	B	13.8	WB LT	15.7	0.794
4	Bryden Ave at 7th St	Roundabout	C	19.6	WB LT	29.3	0.921
2051 PM Peak Hour Conditions							
1	Bryden Ave at 4th St.	Roundabout	**F**	**58.1**	EB LT	**83.7**	**1.128**
2	Bryden Ave at 5th St	Roundabout	**F**	**257.0**	SB LTR	**391.4**	**1.805**
3	Bryden Ave at 6th St	Roundabout	D	29.5	EB LT	44.3	1.003
4	Bryden Ave at 7th St	Roundabout	**E**	**48.8**	EB LT	**75.8**	**1.099**

WB – Westbound; EB – Eastbound; SB – Southbound; LT – Left/Through; LTR – Left/Through/Right

* Critical Movement LOS

As shown in Table 4, three out of the four study intersections are projected to operate at LOS D or better during the AM peak hour, while only one intersection is projected to operate at LOS D or better during the PM peak hour.

The intersection of Bryden and 5th Street is anticipated to operate at LOS E during the AM peak hour, with a projected average delay of 43.9 seconds. The critical westbound left/through movement is projected to have a delay of 84.4 seconds, and a v/c ratio of 1.107.

During the PM peak hour, the intersection of Bryden and 4th street is projected to operate at an LOS of F, with 58.1 seconds of delay. The critical movement is projected to be the eastbound left-through, with a delay of 83.7 seconds and a v/c of 1.128. The intersection of Bryden and 5th street is also projected to operate at an LOS F, with an average delay of 257 seconds. The critical approach is projected to be the southbound approach, with an average delay of 391.4 seconds and a v/c ratio of 1.805. The Intersection of Bryden and 7th is projected to operate at an LOS of E, with an average delay of 48.8 seconds. The critical movement for this intersection is projected to be the eastbound left, with an average delay of 75.8 seconds, and a v/c ratio of 1.099.

These results show single-lane roundabouts along the Bryden A0venue corridor are not projected to accommodate the future year 2051 demand with the current three-lane cross-section. Improvements beyond right-turn lane slip lanes, as assumed in this single-lane roundabout analysis, would be required for the 4th Street, 5th Street, and 7th Street intersections to meet the City's LOS D standard.

A review of multi-lane roundabout operations with the current three-lane cross-section along Bryden Avenue is discussed below.

Forecast Year 2051 Multi-Lane Roundabout Conditions Summary

Year 2051 Build conditions were evaluated using the projected year 2051 volumes as shown in Table 2 and Table 3. Intersection operations for the AM and PM peak hour are shown in Table 5. Synchro analysis worksheets are provided in **Appendix B**.

Table 5. Intersection Operations – 2051 Multi-Lane Roundabouts along Bryden Avenue

INTERSECTION		Control Type	Int. LOS	Int. Delay (seconds)	Critical Movement		
					MVMT	Delay (s)	V/C
Year 2051 AM Peak Hour Conditions							
1	Bryden Ave at 4th St.	Roundabout	C	20.8	WB TR	31.8	0.944
3	Bryden Ave at 5th St	Roundabout	**F**	**73.6**	WB TR	**147.5**	**1.274**
2	Bryden Ave at 6th St	Roundabout	B	13.5	WB TR	15.9	0.798
4	Bryden Ave at 7th St	Roundabout	C	19.5	WB TR	29.6	0.925
Year 2051 PM Peak Hour Conditions							
1	Bryden Ave at 4th St.	Roundabout	**E**	**42.3**	EB TR	**63.1**	**1.071**
3	Bryden Ave at 5th St	Roundabout	**F**	**123.7**	EB TR	**264.9**	**1.539**
2	Bryden Ave at 6th St	Roundabout	D	25.5	EB TR	36.6	0.973
4	Bryden Ave at 7th St	Roundabout	D	34.9	EB TR	50.9	**1.024**

WB – Westbound; EB – Eastbound; TR – Through/Right

* Critical Movement LOS

As shown in Table 5**,** one intersection is projected to fail during the AM peak hour, while two intersections are projected to fail during the PM peak hour, assuming multi-lane roundabout configurations.

During the AM peak hour, the intersection of 5th and Bryden is projected to operate at LOS F as a multi-lane roundabout, compared to an LOS of E assuming a single-lane roundabout. Note this intersection operates less efficiently with the multilane design due to a high westbound right-turn volume, which is better served by a dedicated right-turn slip lane. With the multi-lane design, the critical movement is projected to be the westbound through-right, with a delay of 147.5 seconds and a V/C of 1.274 as a multi-lane roundabout.

During the PM peak hour, the intersection of 4th and Bryden is projected to operate at an LOS of E with an average delay of 42.3 seconds. The intersection of 5th and Bryden is projected to operate at an LOS of F, with an average delay of 123.7 seconds. The eastbound through/right is projected to operate with a delay of 264.9 seconds and a V/C ratio of 1.539.

Overall, the multi-lane roundabout configuration is projected to result in improved operations during both the AM and PM peak hours in comparison to the single-lane roundabouts. However, improvements will still be required with the multi-lane roundabouts to achieve the City's LOS D standard.

Mitigated Year 2051 Multi-Lane Roundabout Conditions Summary

To achieve LOS D or better in future year 2051, the following mitigation is recommended with the multi-lane roundabouts:

- Bryden Avenue and 4th Street
  - Restripe to provide shared left/through and shared through/right on eastbound and westbound approaches
  - Restriping does not require widening of Bryden Avenue
- Bryden Avenue and 5th Street
  - Restripe to provide shared left/through and shared through/right on eastbound and westbound approaches
  - Add second westbound receiving lane on west leg of intersection

To improve capacity at the 4th Street and 5th Street roundabouts in the future, widening will be needed between 4th Street and 5th Street to accommodate two westbound lanes and between 5th Street and 5th Street E to accommodate two eastbound lanes.

Table 6. Intersection Operations – 2051 Multi-Lane Roundabouts with Mitigation

INTERSECTION		Control Type	Int. LOS	Int. Delay (seconds)	Critical Movement		
					MVMT	Delay (s)	V/C
Year 2051 AM Peak Hour Conditions							
1	Bryden Ave at 4th St.	Roundabout	A	7.7	SB LTR	9.9	0.200
2	Bryden Ave at 5th St	Roundabout	B	13.2	WB LT	14.6	0.680
4	Bryden Ave at 6th St	Roundabout	B	13.5	WB TR	15.9	0.798
3	Bryden Ave at 7th St	Roundabout	C	19.5	WB TR	29.6	0.925
Year 2051 PM Peak Hour Conditions							
1	Bryden Ave at 4th St.	Roundabout	A	9.5	SB LTR	14.6	0.431
2	Bryden Ave at 5th St	Roundabout	D	27.4	EB TR	39.0	0.920
4	Bryden Ave at 6th St	Roundabout	D	25.5	EB TR	36.6	0.973
3	Bryden Ave at 7th St	Roundabout	D	34.9	EB TR	50.9	1.024

SB – Southbound; WB – Westbound; EB – Eastbound; LTR – Left/Through/Right; LT – Left/Through; TR – Through/Right
* Critical Movement LOS

Mitigated Year 2051 Five-Lane Section with Signalization Conditions Summary

In the Previous study, a five-lane section with signalization at 5th Street and 7th Street and two-way stop control at 4th Street and 6th Street were analyzed. Under these conditions, the intersection of Bryden Avenue at 6th Street is anticipated to operate at LOS F during the AM and PM peak.

Table 7. Intersection Operations – 2051 Five-Lane Section with Signalization

INTERSECTION		Control Type	Int. LOS	Int. Delay (seconds)	Critical Movement		
					MVMT	Delay (s)	V/C
Year 2051 AM Peak Hour Conditions							
1	Bryden Ave at 4th St	TWSC	B	0.9	EB L	12.7	0.19
2	Bryden Ave at 5th St	Signal	C	25.9	NB L	42.8	0.74
4	Bryden Ave at 6th St	TWSC	**F**	**2.7**	SB LTR	**85.8**	**0.54**
3	Bryden Ave at 7th St	Signal	B	13.2	SB TR	25.4	0.43
Year 2051 PM Peak Hour Conditions							
1	Bryden Ave at 4th St	TWSC	B	0.6	WB L	13.3	0.07
2	Bryden Ave at 5th St	Signal	D	42.6	EB TTR	46.4	0.93
4	Bryden Ave at 6th St	TWSC	**F**	**9.3**	SB LTR	**256.6**	**0.99**
3	Bryden Ave at 7th St	Signal	B	15.4	NB TR	29.5	0.65

SB – Southbound; WB – Westbound; EB – Eastbound; LTR – Left/Through/Right; LT – Left/Through; TR – Through/Right

95th Percentile Queuing

Queue lengths were evaluated to understand the impacts to adjacent driveways and public streets with the three-lane section with mitigation. The 95th-percentile queues were reviewed for the roundabout-controlled study intersections using both Synchro and SimTraffic software. Queue results were rounded up to the nearest 25 feet; where queuing results yielded a queue of zero (0) vehicles or zero (0) feet, a minimum 25-foot queue storage need was assumed.

The 95th percentile queuing results for the Future Year 2051 Multi-Lane roundabouts scenario with mitigation are presented in Table 8. Two storage lengths are presented in the table to evaluate queuing impacts: 1) the available storage refers to the striped storage or the storage available to the nearest driveway, and 2) the effective storage refers to the storage available to the next public street intersection. **Bolded** values indicate queues that are projected to exceed the available storage. **Bolded and underlined** values indicate queues that are projected to exceed the effective storage. A single storage value indicates an available storage. Synchro queuing worksheets can be found in Appendix C.

Table 8. 95th Percentile Queuing – Future Year 2051 Mult-Lane with Mitigation

Intersection	Approach/ Movement	Available / Effective Storage (feet)	95th Percentile Queue (feet) (AM / PM)
Bryden / 4th	EB LT	>1500 *	125 / 1100
	EB TR	>1500 *	50 / 1125
	WB LT	150 / 570	75 / 50
	WB TR	570	25 / 25
	NB	190	25 / 200
	SB	260	75 / 175
Bryden / 5th	EB LT	80 / 615	**600** / **1250**
	EB TR	80 / 615	**575** / **1275**
	WB LT	265	100 / 75
	WB TR	265	125 / 100
	NB L	65	**100** / **75**
	NB TR	260	100 / 75
	SB L	280	100 / 175
	SB TR	280	100 / **1500**
Bryden / 6th	EB L	430	25 / 25
	EB TR	430	50 / 50
	WB L	125 / 500	25 / 25
	WB TR	125 / 500	25 / 25
	NB	80 / 295	50 / 50
	SB	90 / 295	50 / 50
Bryden / 7th	EB L	195 / 710	25 / 25
	EB TR	195 / 710	50 / 125
	WB L	95 / 1265	**250** / **300**
	WB TR	95 / 1265	**1150** / **1275**
	NB L	65 / 80	**75** / **100**
	NB TR	270	75 / 75
	SB L	65 / 80	50 / **75**
	SB TR	600	50 / 75

Bold values indicate queues exceeding available storage lengths.
Bold and underlined values indicate queues exceeding effective storage lengths.
*4th Street intersection is near the crest of a Bryden Canyon Grade. Sight distance may limit this storage.

The 95th percentile queuing results presented in Table 8 show PM peak hour queues on the northbound and southbound approaches of 5th Street are projected to exceed available storage. Along Bryden Avenue, significant queuing is projected in the eastbound direction at 5th Street during both the AM and PM peak hours. Significant queuing is projected in the westbound direction at 7th Street during both the AM and PM peak hours. The effects of this significant queueing are also pictured in Figure 3 through Figure 10.

While the roundabouts are projected to individually operate acceptably under future year 2051 conditions with the three-lane cross-section and widening between 4th Street and 5th Street, the corridor as a whole is projected to experience significant queuing and delays from 4th Street to 7th Street. In other words, the intersection analysis assumes operations of each roundabout operating as a standalone intersection and does not reflect the impacts of adjacent intersections on delay and queuing.

Based on an evaluation of corridor performance using SimTraffic, vehicles on Bryden Avenue are projected to experience a travel time of approximately 662 seconds (11.0 minutes) in the peak westbound direction during the AM peak hour and approximately 2446 seconds (40.8 minutes) in the eastbound direction during the PM peak hour. With a posted speed of 35 mph and a corridor length of approximately 4,000 feet, travel time should be closer to approximately 1.3 minutes in each direction at free-flow speed.

In the eastbound direction a significant bottleneck is expected between 4th Street and 5th Street due to the high volume of through vehicles (1301 vehicles), with queues at 5th Street backing up to the 4th Street roundabout. Signalization at the 5th Street intersection may be necessary instead of a roundabout as queues during the PM peak hour at the 5th Street roundabout are projected to spill back to the 4th Street roundabout even with the improvements noted above.

The HCM7 methodology states that to achieve a LOS D/E threshold along a corridor, daily traffic should not exceed 18,300 vehicles per day (bidirectional) for a two-lane section with a center turn lane, such as Bryden Avenue. Typically, the PM peak hour experiences about 10% of the daily traffic. Therefore, the PM peak hour capacity for Bryden Avenue to operate at LOS D/E as a corridor is 1,830 vehicles (bidirectional) per hour. In future year 2051, the projected bidirectional PM peak hour volume is expected to exceed 2,000 vehicles. Therefore, a three-lane cross-section will not provide adequate capacity to achieve the LOS D/E target during the PM peak hour.

From a safety perspective, the long eastbound queue at the 4th Street roundabout can also be problematic due to the presence of a vertical crest approximately 550 feet west of 4th Street. The increase in eastbound queues at this location combined with the limited sight distance resulting from the vertical crest can increase the likelihood of rear-end crashes at this location due to the limited visibility.

Similarly, standing queues along the corridor contributing to congestion can increase driver frustration at driveways and other public intersections due to the limited gaps in traffic along the Bryden Avenue traffic stream, which can result in drivers taking short gaps which impacts traffic safety. It should be noted that the effects of the many driveways and intersections along the study corridor were not modeled. However, vehicles turning into and out of driveways and public streets along the corridor are expected to significantly reduce capacity for the corridor as drivers brake to turn into driveways or brake to allow vehicles into the traffic stream.

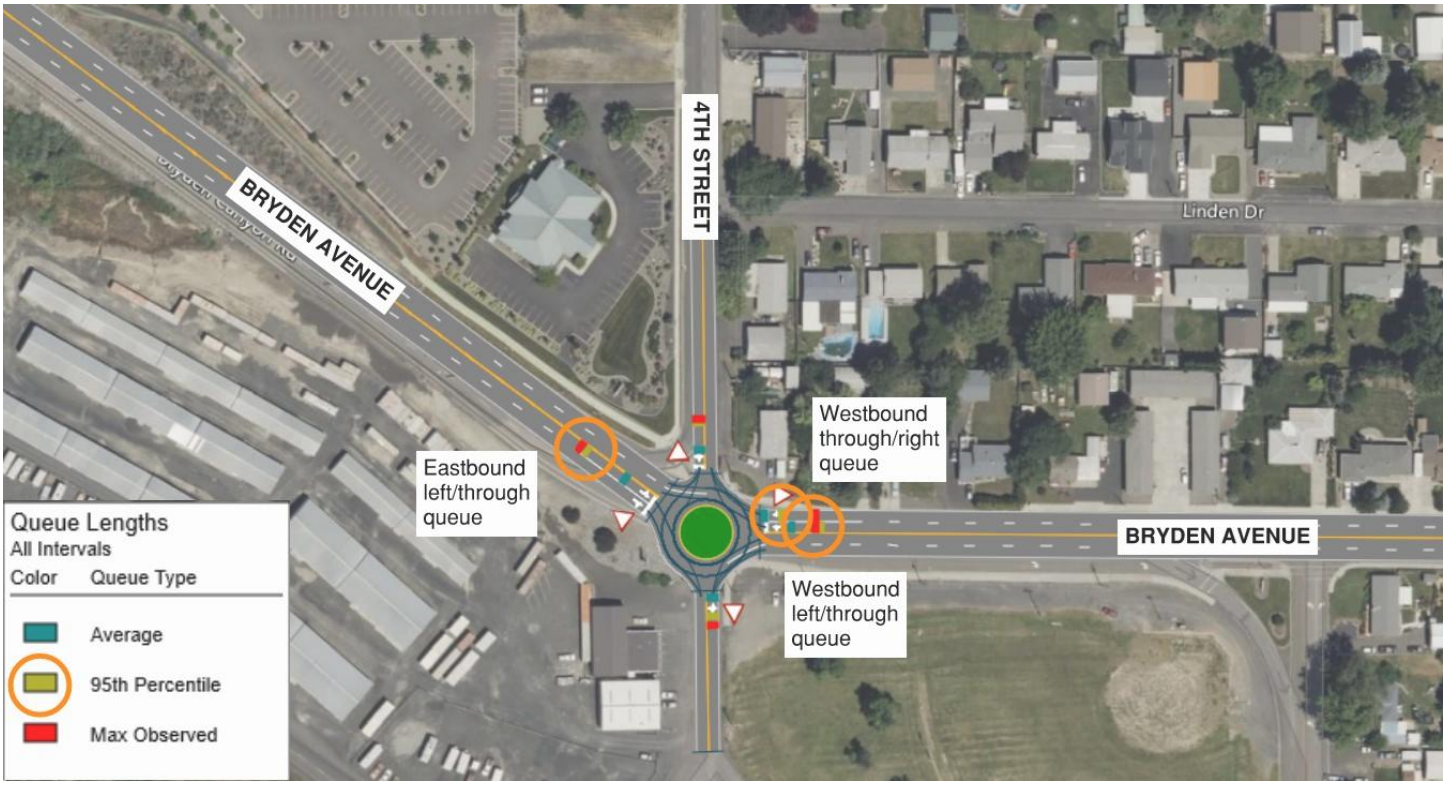

Figure 3. AM Peak Hour Queues at 4th Street

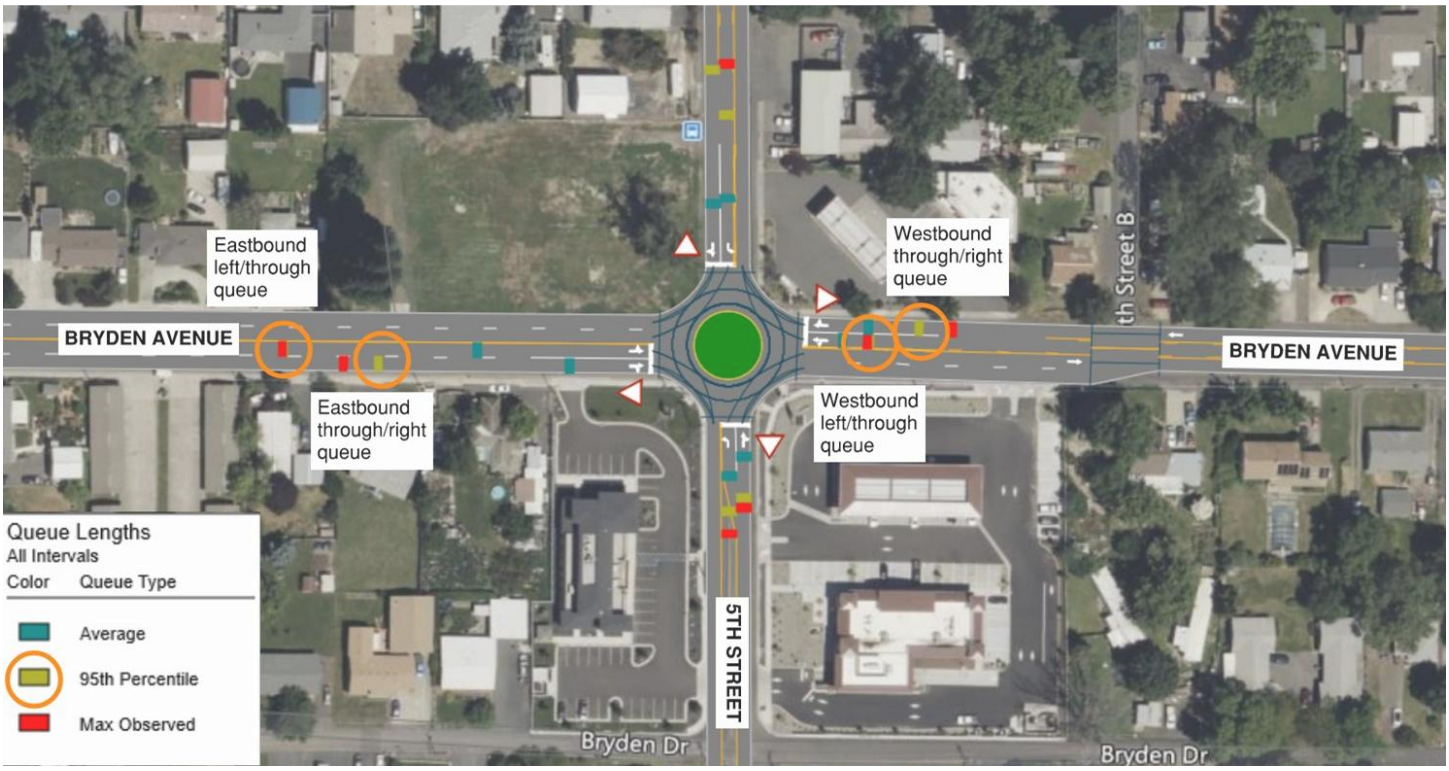

Figure 4. AM Peak Hour Queues at 5th Street

Figure 5. AM Peak Hour Queues at 6th Street

Figure 6. AM Peak Hour Queues at 7th Street

Figure 7. PM Peak Hour Queues at 4th Street

Figure 8. PM Peak Hour Queues at 5th Street

Figure 9. PM Peak Hour Queues at 6th Street

Figure 10. PM Peak Hour Queues at 7th Street

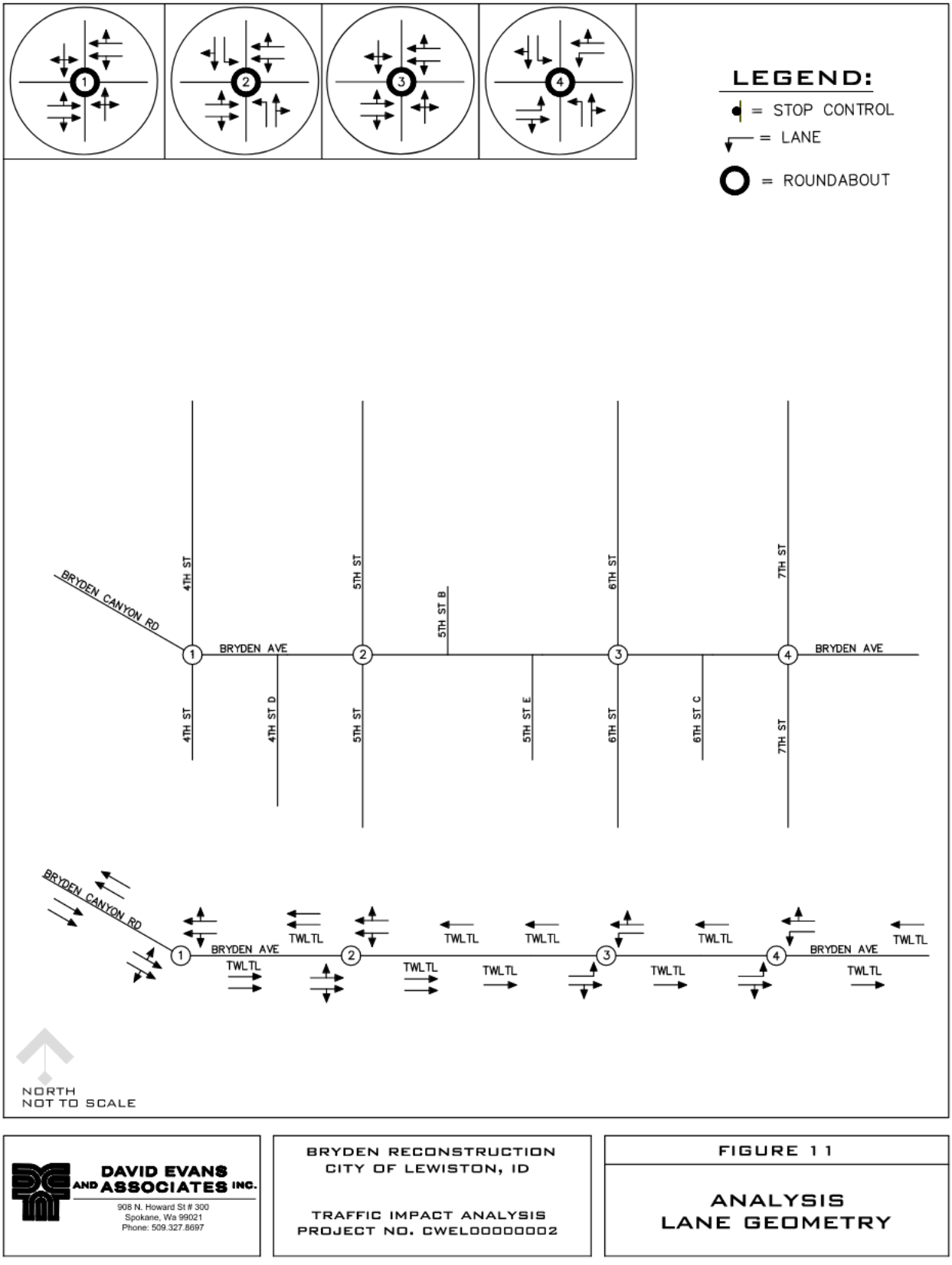

Figure 11. 2051 Analysis Lane Geometry and Traffic Control

Sensitivity Analysis

A sensitivity analysis was conducted to determine the future failure year (before 2051) for the three-lane cross-section roundabout configurations without the recommended mitigation. Assuming a compounded annual growth rate of 1.29% per year, the 5th Street intersection with Bryden Avenue is projected to fail under future year 2033 conditions during the PM peak hour.

While this intersection is projected to operate at LOS E under future year 2033 conditions, the 4th Street roundabout is projected to operate at LOS C and the 6th and 7th Street roundabouts are projected to operate at LOS B as multilane roundabouts without additional widening along Bryden Avenue during the PM peak hour.

Conclusion and Recommendations

An operational analysis of four (4) intersections along Bryden Avenue between 4th Street and 7th Street was completed under the direction City of Lewiston. The analysis reviewed projected operations under future year 2051 with the existing three-lane cross-section of Bryden Avenue and roundabouts at 4th, 5th, 6th, and 7th Street.

Two analysis scenarios were reviewed: 1) single-lane roundabouts with dedicated right-turn slip lanes; and 2) multi-lane roundabouts with shared left/through and shared through/right lanes on the westbound and eastbound approaches. The existing minor street lane configurations were assumed with both scenarios.

Single-lane roundabouts along the Bryden Avenue corridor are not projected to accommodate the future year 2051 demand with the current three-lane cross-section. Improvements beyond right-turn lane slip lanes, as assumed in the single-lane roundabout analysis, would be required for the 4th Street, 5th Street, and 7th Street intersections to meet the City's LOS D standard.

The multi-lane roundabout configuration is projected to result in improved operations during both the AM and PM peak hours in comparison to the single-lane roundabouts. However, improvements will still be required with the multi-lane roundabouts to achieve the City's LOS D standard. The recommended mitigation includes the following:

- Bryden Avenue and 4th Street
  - Restripe to provide shared left/through and shared through/right on eastbound and westbound approaches
  - Restriping does not require widening of Bryden Avenue
- Bryden Avenue and 5th Street
  - Restripe to provide shared left/through and shared through/right on eastbound and westbound approaches
  - Add second westbound receiving lane on west leg of intersection

Without the recommended mitigation noted above, the 5th Street multilane roundabout is projected to fail under future year 2033 conditions during the PM peak hour at an LOS E. Signalization at the 5th Street intersection may be necessary instead of a roundabout as queues during the PM peak hour at the 5th Street roundabout are projected to spill back to the 4th Street roundabout even with the improvements noted above.

While the remaining roundabouts are projected to operate at LOS C or better during the same year without widening of Bryden Avenue, queues along Bryden Avenue are expected to be significant during peak hours, with travel times along the corridor estimated at 662 seconds (11.0 minutes) in the peak westbound direction during the AM peak hour and approximately 2446 seconds (40.8 minutes) in the eastbound direction during the PM peak hour. With a posted speed of 35 mph and a corridor length of approximately 4,000 feet, travel time should be closer to approximately 1.3 minutes in each direction at free-flow speed. Therefore, the three-lane cross-section with roundabouts along Bryden Avenue is not recommended based on the projected performance of the corridor as a whole system.

Appendices

- Appendix A – Future Year 2051 Operational Analysis Output Sheets (Synchro)
    - Single-Lane Roundabouts
    - Multi-Lane Roundabouts
- Appendix B – Mitigated Year 2051 Operational Analysis Output Sheets (Synchro)
    - Multi-Lane Roundabouts
- Appendix C - Year 2051 PM Roundabout Queuing Worksheets (SimTraffic)
    - Multi-Lane Roundabouts with Mitigation
- Appendix D - Year 2033 PM Operational Analysis Output Sheets (Synchro)
    - Multi-Lane Roundabouts
- Appendix E - Year 2032 PM Operational Analysis Output Sheets (Synchro)
    - Multi-Lane Roundabouts

Appendix A - Future Year 2051 Operational Analysis

Intersection	
Intersection Delay, s/veh	24.6
Intersection LOS	C

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	958	1265	22	105
Demand Flow Rate, veh/h	968	1278	22	106
Vehicles Circulating, veh/h	71	120	896	1191
Vehicles Exiting, veh/h	1226	798	68	115
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	11.8	35.6	7.0	13.2
Approach LOS	B	E	A	B

Lane	Left	Bypass	Left	Bypass	Left	Left
Designated Moves	LT	R	LT	R	LTR	LTR
Assumed Moves	LT		LT		LTR	LTR
RT Channelized		Yield		Yield		
Lane Util	1.000		1.000		1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976	4.976	4.976
A (Intercept)	1380	1380	1380	1380	1380	1380
B (Slope)	1.02e-3	1.02e-3	1.02e-3	1.02e-3	1.02e-3	1.02e-3
Entry Flow, veh/h	893	75	1186	92	22	106
Cap Entry Lane, veh/h	1283	1287	1221	1227	553	410
Entry HV Adj Factor	0.990	0.990	0.990	0.990	0.999	0.991
Flow Entry, veh/h	884	74	1174	91	22	105
Cap Entry, veh/h	1271	1275	1208	1215	553	406
V/C Ratio	0.696	0.058	0.971	0.075	0.040	0.259
Control Delay, s/veh	12.5	3.3	38.1	3.6	7.0	13.2
LOS	B	A	E	A	A	B
95th %tile Queue, veh	6	0	19	0	0	1

Intersection	
Intersection Delay, s/veh	43.9
Intersection LOS	E

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	710	1241	351	368
Demand Flow Rate, veh/h	717	1254	355	372
Vehicles Circulating, veh/h	254	439	872	1153
Vehicles Exiting, veh/h	1271	788	78	262
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	12.6	67.1	19.7	49.0
Approach LOS	B	F	C	E

Lane	Left	Bypass	Left	Bypass	Left	Left
Designated Moves	LT	R	LT	R	LTR	LTR
Assumed Moves	LT		LT		LTR	LTR
RT Channelized		Yield		Yield		
Lane Util	1.000		1.000		1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976	4.976	4.976
A (Intercept)	1380	1380	1380	1380	1380	1380
B (Slope)	1.02e-3	1.02e-3	1.02e-3	1.02e-3	1.02e-3	1.02e-3
Entry Flow, veh/h	696	21	976	278	355	372
Cap Entry Lane, veh/h	1065	1274	882	1056	567	426
Entry HV Adj Factor	0.990	0.990	0.990	0.990	0.990	0.990
Flow Entry, veh/h	689	21	966	275	351	368
Cap Entry, veh/h	1054	1262	873	1046	561	422
V/C Ratio	0.654	0.017	1.107	0.263	0.626	0.874
Control Delay, s/veh	12.9	3.0	84.4	6.0	19.7	49.0
LOS	B	A	F	A	C	E
95th %tile Queue, veh	5	0	26	1	4	9

Intersection	
Intersection Delay, s/veh	13.8
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	1	2	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	947	1125	43	49
Demand Flow Rate, veh/h	956	1136	43	49
Vehicles Circulating, veh/h	35	18	957	1118
Vehicles Exiting, veh/h	1132	982	21	36
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	12.5	15.4	8.0	9.7
Approach LOS	B	C	A	A

Lane	Left	Bypass	Left	Right	Left	Left
Designated Moves	LT	R	LT	R	LTR	LTR
Assumed Moves	LT		LT	R	LTR	LTR
RT Channelized		Yield				
Lane Util	1.000		0.976	0.024	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.535	2.535	2.609	2.609
Critical Headway, s	4.976	4.976	4.544	4.544	4.976	4.976
A (Intercept)	1380	1380	1420	1420	1380	1380
B (Slope)	1.02e-3	1.02e-3	9.101e-4	9.101e-4	1.02e-3	1.02e-3
Entry Flow, veh/h	943	13	1109	27	43	49
Cap Entry Lane, veh/h	1331	1351	1397	1397	520	441
Entry HV Adj Factor	0.990	0.990	0.990	1.000	1.000	1.000
Flow Entry, veh/h	934	13	1098	27	43	49
Cap Entry, veh/h	1318	1337	1383	1397	520	441
V/C Ratio	0.708	0.010	0.794	0.019	0.083	0.111
Control Delay, s/veh	12.6	2.8	15.7	2.7	8.0	9.7
LOS	B	A	C	A	A	A
95th %tile Queue, veh	6	0	9	0	0	0

Intersection	
Intersection Delay, s/veh	19.6
Intersection LOS	C

Approach	EB	WB	NB	SB
Entry Lanes	1	2	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	673	1149	173	101
Demand Flow Rate, veh/h	679	1160	174	101
Vehicles Circulating, veh/h	86	168	691	1227
Vehicles Exiting, veh/h	1242	697	46	101
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	8.2	28.4	8.4	13.5
Approach LOS	A	D	A	B

Lane	Left	Bypass	Left	Right	Left	Left
Designated Moves	LT	R	LT	R	LTR	LTR
Assumed Moves	LT		LT	R	LTR	LTR
RT Channelized		Yield				
Lane Util	1.000		0.968	0.032	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.535	2.535	2.609	2.609
Critical Headway, s	4.976	4.976	4.544	4.544	4.976	4.976
A (Intercept)	1380	1380	1420	1420	1380	1380
B (Slope)	1.02e-3	1.02e-3	9.101e-4	9.101e-4	1.02e-3	1.02e-3
Entry Flow, veh/h	651	28	1123	37	174	101
Cap Entry Lane, veh/h	1264	1317	1219	1219	682	395
Entry HV Adj Factor	0.990	0.990	0.990	1.000	0.992	0.998
Flow Entry, veh/h	645	28	1112	37	173	101
Cap Entry, veh/h	1252	1304	1207	1219	676	394
V/C Ratio	0.515	0.021	0.921	0.030	0.255	0.256
Control Delay, s/veh	8.5	2.9	29.3	3.2	8.4	13.5
LOS	A	A	D	A	A	B
95th %tile Queue, veh	3	0	15	0	1	1

Intersection	
Intersection Delay, s/veh	58.1
Intersection LOS	F

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	1535	1162	102	217
Demand Flow Rate, veh/h	1551	1173	103	219
Vehicles Circulating, veh/h	51	156	1491	1209
Vehicles Exiting, veh/h	1377	1438	37	97
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	79.9	39.3	19.9	22.1
Approach LOS	F	E	C	C

Lane	Left	Bypass	Left	Bypass	Left	Left
Designated Moves	LT	R	LT	R	LTR	LTR
Assumed Moves	LT		LT		LTR	LTR
RT Channelized		Yield		Yield		
Lane Util	1.000		1.000		1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976	4.976	4.976
A (Intercept)	1380	1380	1380	1380	1380	1380
B (Slope)	1.02e-3	1.02e-3	1.02e-3	1.02e-3	1.02e-3	1.02e-3
Entry Flow, veh/h	1477	74	1150	23	103	219
Cap Entry Lane, veh/h	1310	1329	1177	1250	302	402
Entry HV Adj Factor	0.990	0.990	0.990	0.990	0.990	0.991
Flow Entry, veh/h	1462	73	1139	23	102	217
Cap Entry, veh/h	1297	1316	1166	1237	299	398
V/C Ratio	1.128	0.055	0.977	0.019	0.342	0.545
Control Delay, s/veh	83.7	3.2	40.0	3.1	19.9	22.1
LOS	F	A	E	A	C	C
95th %tile Queue, veh	36	0	19	0	1	3

Intersection	
Intersection Delay, s/veh	257.0
Intersection LOS	F

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	1331	1123	324	849
Demand Flow Rate, veh/h	1345	1134	327	858
Vehicles Circulating, veh/h	713	455	1620	1045
Vehicles Exiting, veh/h	1190	1492	317	320
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	362.6	54.1	174.3	391.4
Approach LOS	F	F	F	F

Lane	Left	Bypass	Left	Bypass	Left	Left
Designated Moves	LT	R	LT	R	LTR	LTR
Assumed Moves	LT		LT		LTR	LTR
RT Channelized		Yield		Yield		
Lane Util	1.000		1.000		1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976	4.976	4.976
A (Intercept)	1380	1380	1380	1380	1380	1380
B (Slope)	1.02e-3	1.02e-3	1.02e-3	1.02e-3	1.02e-3	1.02e-3
Entry Flow, veh/h	1224	121	910	224	327	858
Cap Entry Lane, veh/h	667	999	868	996	264	475
Entry HV Adj Factor	0.990	0.990	0.991	0.990	0.992	0.990
Flow Entry, veh/h	1211	120	901	222	324	849
Cap Entry, veh/h	660	989	859	986	262	470
V/C Ratio	1.836	0.121	1.049	0.225	1.237	1.805
Control Delay, s/veh	398.1	4.7	66.0	5.8	174.3	391.4
LOS	F	A	F	A	F	F
95th %tile Queue, veh	75	0	21	1	16	53

Intersection	
Intersection Delay, s/veh	29.5
Intersection LOS	D

Approach	EB	WB	NB	SB
Entry Lanes	1	2	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	1311	1100	45	49
Demand Flow Rate, veh/h	1323	1110	45	49
Vehicles Circulating, veh/h	77	45	1292	1085
Vehicles Exiting, veh/h	1057	1292	64	70
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	42.9	15.1	11.7	9.4
Approach LOS	E	C	B	A

Lane	Left	Bypass	Left	Right	Left	Left
Designated Moves	LT	R	LT	R	LTR	LTR
Assumed Moves	LT		LT	R	LTR	LTR
RT Channelized		Yield				
Lane Util	1.000		0.966	0.034	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.535	2.535	2.609	2.609
Critical Headway, s	4.976	4.976	4.544	4.544	4.976	4.976
A (Intercept)	1380	1380	1420	1420	1380	1380
B (Slope)	1.02e-3	1.02e-3	9.101e-4	9.101e-4	1.02e-3	1.02e-3
Entry Flow, veh/h	1279	44	1072	38	45	49
Cap Entry Lane, veh/h	1276	1293	1363	1363	369	456
Entry HV Adj Factor	0.990	0.990	0.991	1.000	0.999	0.997
Flow Entry, veh/h	1267	44	1062	38	45	49
Cap Entry, veh/h	1263	1280	1350	1363	369	455
V/C Ratio	1.003	0.034	0.786	0.028	0.122	0.107
Control Delay, s/veh	44.3	3.1	15.6	2.9	11.7	9.4
LOS	F	A	C	A	B	A
95th %tile Queue, veh	22	0	9	0	0	0

Intersection	
Intersection Delay, s/veh	48.8
Intersection LOS	E

Approach	EB	WB	NB	SB
Entry Lanes	1	2	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	1281	1081	238	165
Demand Flow Rate, veh/h	1293	1091	241	167
Vehicles Circulating, veh/h	180	232	1342	1158
Vehicles Exiting, veh/h	1145	1351	100	165
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	74.0	27.3	33.7	16.0
Approach LOS	F	D	D	C

Lane	Left	Bypass	Left	Right	Left	Left
Designated Moves	LT	R	LT	R	LTR	LTR
Assumed Moves	LT		LT	R	LTR	LTR
RT Channelized		Yield				
Lane Util	1.000		0.956	0.044	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.535	2.535	2.609	2.609
Critical Headway, s	4.976	4.976	4.544	4.544	4.976	4.976
A (Intercept)	1380	1380	1420	1420	1380	1380
B (Slope)	1.02e-3	1.02e-3	9.101e-4	9.101e-4	1.02e-3	1.02e-3
Entry Flow, veh/h	1262	31	1043	48	241	167
Cap Entry Lane, veh/h	1148	1246	1150	1150	351	424
Entry HV Adj Factor	0.990	0.990	0.990	1.000	0.989	0.990
Flow Entry, veh/h	1250	31	1033	48	238	165
Cap Entry, veh/h	1137	1234	1139	1150	347	420
V/C Ratio	1.099	0.025	0.907	0.042	0.686	0.394
Control Delay, s/veh	75.8	3.1	28.4	3.5	33.7	16.0
LOS	F	A	D	A	D	C
95th %tile Queue, veh	30	0	14	0	5	2

Intersection	
Intersection Delay, s/veh	20.8
Intersection LOS	C

Approach	EB	WB	NB	SB
Entry Lanes	2	2	1	1
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	958	1265	22	105
Demand Flow Rate, veh/h	968	1278	22	106
Vehicles Circulating, veh/h	71	120	896	1191
Vehicles Exiting, veh/h	1226	798	143	207
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	9.8	30.3	5.8	9.9
Approach LOS	A	D	A	A

Lane	Left	Right	Left	Right	Left	Left
Designated Moves	L	TR	L	TR	LTR	LTR
Assumed Moves	L	TR	L	TR	LTR	LTR
RT Channelized						
Lane Util	0.117	0.883	0.053	0.947	1.000	1.000
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.328	4.328
A (Intercept)	1350	1420	1350	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	8.501e-4	8.501e-4
Entry Flow, veh/h	113	855	68	1210	22	106
Cap Entry Lane, veh/h	1264	1337	1209	1282	663	516
Entry HV Adj Factor	0.991	0.990	0.985	0.990	0.999	0.991
Flow Entry, veh/h	112	846	67	1198	22	105
Cap Entry, veh/h	1253	1323	1191	1270	662	511
V/C Ratio	0.089	0.640	0.056	0.944	0.033	0.205
Control Delay, s/veh	3.6	10.6	3.5	31.8	5.8	9.9
LOS	A	B	A	D	A	A
95th %tile Queue, veh	0	5	0	17	0	1

Intersection	
Intersection Delay, s/veh	73.6
Intersection LOS	F

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	710	1241	351	368
Demand Flow Rate, veh/h	717	1254	355	372
Vehicles Circulating, veh/h	254	439	872	1153
Vehicles Exiting, veh/h	1271	788	99	540
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	9.0	146.6	9.3	13.4
Approach LOS	A	F	A	B

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	L	TR	L	TR	L	TR	L	TR
Assumed Moves	L	TR	L	TR	L	TR	L	TR
RT Channelized								
Lane Util	0.124	0.876	0.006	0.994	0.499	0.501	0.473	0.527
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4
Entry Flow, veh/h	89	628	8	1246	177	178	176	196
Cap Entry Lane, veh/h	1069	1144	901	978	605	677	467	533
Entry HV Adj Factor	0.989	0.990	1.000	0.990	0.989	0.990	0.989	0.991
Flow Entry, veh/h	88	622	8	1233	175	176	174	194
Cap Entry, veh/h	1057	1133	901	968	598	670	462	528
V/C Ratio	0.083	0.549	0.009	1.274	0.292	0.263	0.377	0.368
Control Delay, s/veh	4.1	9.7	4.1	147.5	9.9	8.6	14.3	12.6
LOS	A	A	A	F	A	A	B	B
95th %tile Queue, veh	0	3	0	44	1	1	2	2

Intersection	
Intersection Delay, s/veh	13.5
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	2	2	1	1
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	947	1125	43	49
Demand Flow Rate, veh/h	956	1136	43	49
Vehicles Circulating, veh/h	35	18	957	1118
Vehicles Exiting, veh/h	1132	982	34	36
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	11.6	15.7	6.5	7.6
Approach LOS	B	C	A	A

Lane	Left	Right	Left	Right	Left	Left
Designated Moves	L	TR	L	TR	LTR	LTR
Assumed Moves	L	TR	L	TR	LTR	LTR
RT Channelized						
Lane Util	0.009	0.991	0.018	0.982	1.000	1.000
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.328	4.328
A (Intercept)	1350	1420	1350	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	8.501e-4	8.501e-4
Entry Flow, veh/h	9	947	20	1116	43	49
Cap Entry Lane, veh/h	1307	1378	1328	1399	629	549
Entry HV Adj Factor	1.000	0.990	1.000	0.990	1.000	1.000
Flow Entry, veh/h	9	938	20	1105	43	49
Cap Entry, veh/h	1307	1365	1328	1385	629	549
V/C Ratio	0.007	0.687	0.015	0.798	0.068	0.089
Control Delay, s/veh	2.8	11.6	2.8	15.9	6.5	7.6
LOS	A	B	A	C	A	A
95th %tile Queue, veh	0	6	0	9	0	0

Intersection	
Intersection Delay, s/veh	19.5
Intersection LOS	C

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	673	1149	173	101
Demand Flow Rate, veh/h	679	1160	174	101
Vehicles Circulating, veh/h	86	168	691	1227
Vehicles Exiting, veh/h	1242	697	74	101
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	7.8	29.2	6.2	9.1
Approach LOS	A	D	A	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	L	TR	L	TR	L	TR	L	TR
Assumed Moves	L	TR	L	TR	L	TR	L	TR
RT Channelized								
Lane Util	0.028	0.972	0.018	0.982	0.598	0.402	0.396	0.604
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4
Entry Flow, veh/h	19	660	21	1139	104	70	40	61
Cap Entry Lane, veh/h	1247	1320	1157	1231	715	789	437	500
Entry HV Adj Factor	1.000	0.991	1.000	0.990	0.990	0.994	1.000	0.996
Flow Entry, veh/h	19	654	21	1128	103	70	40	61
Cap Entry, veh/h	1247	1307	1157	1219	708	784	437	498
V/C Ratio	0.015	0.500	0.018	0.925	0.145	0.089	0.092	0.122
Control Delay, s/veh	3.0	8.0	3.3	29.6	6.7	5.5	9.5	8.8
LOS	A	A	A	D	A	A	A	A
95th %tile Queue, veh	0	3	0	16	1	0	0	0

Intersection	
Intersection Delay, s/veh	42.3
Intersection LOS	E

Approach	EB	WB	NB	SB
Entry Lanes	2	2	1	1
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	1535	1162	102	217
Demand Flow Rate, veh/h	1551	1173	103	219
Vehicles Circulating, veh/h	51	156	1491	1209
Vehicles Exiting, veh/h	1377	1438	111	120
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	59.5	27.2	13.5	14.6
Approach LOS	F	D	B	B

Lane	Left	Right	Left	Right	Left	Left
Designated Moves	L	TR	L	TR	LTR	LTR
Assumed Moves	L	TR	L	TR	LTR	LTR
RT Channelized						
Lane Util	0.061	0.939	0.030	0.970	1.000	1.000
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.328	4.328
A (Intercept)	1350	1420	1350	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	8.501e-4	8.501e-4
Entry Flow, veh/h	94	1457	35	1138	103	219
Cap Entry Lane, veh/h	1288	1360	1169	1244	400	508
Entry HV Adj Factor	0.989	0.990	1.000	0.990	0.990	0.991
Flow Entry, veh/h	93	1442	35	1127	102	217
Cap Entry, veh/h	1274	1346	1169	1232	396	503
V/C Ratio	0.073	1.071	0.030	0.915	0.258	0.431
Control Delay, s/veh	3.4	63.1	3.3	28.0	13.5	14.6
LOS	A	F	A	D	B	B
95th %tile Queue, veh	0	30	0	15	1	2

Intersection	
Intersection Delay, s/veh	123.7
Intersection LOS	F

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	1331	1123	324	849
Demand Flow Rate, veh/h	1345	1134	327	858
Vehicles Circulating, veh/h	713	455	1620	1045
Vehicles Exiting, veh/h	1190	1492	438	544
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	235.7	90.4	23.7	30.0
Approach LOS	F	F	C	D

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	L	TR	L	TR	L	TR	L	TR
Assumed Moves	L	TR	L	TR	L	TR	L	TR
RT Channelized								
Lane Util	0.114	0.886	0.033	0.967	0.413	0.587	0.462	0.538
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4
Entry Flow, veh/h	153	1192	37	1097	135	192	396	462
Cap Entry Lane, veh/h	701	775	888	965	304	358	516	584
Entry HV Adj Factor	0.987	0.990	1.000	0.990	0.993	0.991	0.990	0.990
Flow Entry, veh/h	151	1180	37	1086	134	190	392	457
Cap Entry, veh/h	691	767	888	955	302	355	511	578
V/C Ratio	0.218	1.539	0.042	1.137	0.444	0.536	0.767	0.791
Control Delay, s/veh	7.7	264.9	4.4	93.4	23.3	23.9	30.4	29.7
LOS	A	F	A	F	C	C	D	D
95th %tile Queue, veh	1	59	0	30	2	3	7	8

Intersection	
Intersection Delay, s/veh	25.5
Intersection LOS	D

Approach	EB	WB	NB	SB
Entry Lanes	2	2	1	1
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	1311	1100	45	49
Demand Flow Rate, veh/h	1323	1110	45	49
Vehicles Circulating, veh/h	77	45	1292	1085
Vehicles Exiting, veh/h	1057	1292	108	70
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	35.9	14.6	8.9	7.4
Approach LOS	E	B	A	A

Lane	Left	Right	Left	Right	Left	Left
Designated Moves	L	TR	L	TR	LTR	LTR
Assumed Moves	L	TR	L	TR	LTR	LTR
RT Channelized						
Lane Util	0.022	0.978	0.043	0.957	1.000	1.000
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.328	4.328
A (Intercept)	1350	1420	1350	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	8.501e-4	8.501e-4
Entry Flow, veh/h	29	1294	48	1062	45	49
Cap Entry Lane, veh/h	1258	1330	1295	1367	473	565
Entry HV Adj Factor	1.000	0.990	1.000	0.990	0.999	0.997
Flow Entry, veh/h	29	1282	48	1052	45	49
Cap Entry, veh/h	1258	1317	1295	1354	473	563
V/C Ratio	0.023	0.973	0.037	0.777	0.095	0.087
Control Delay, s/veh	3.0	36.6	3.1	15.1	8.9	7.4
LOS	A	E	A	C	A	A
95th %tile Queue, veh	0	20	0	9	0	0

Intersection	
Intersection Delay, s/veh	34.9
Intersection LOS	D

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	1281	1081	238	165
Demand Flow Rate, veh/h	1293	1091	241	167
Vehicles Circulating, veh/h	180	232	1342	1158
Vehicles Exiting, veh/h	1145	1351	131	165
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	49.2	26.5	13.4	9.6
Approach LOS	E	D	B	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	L	TR	L	TR	L	TR	L	TR
Assumed Moves	L	TR	L	TR	L	TR	L	TR
RT Channelized								
Lane Util	0.035	0.965	0.037	0.963	0.477	0.523	0.479	0.521
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4
Entry Flow, veh/h	45	1248	40	1051	115	126	80	87
Cap Entry Lane, veh/h	1144	1219	1090	1166	393	454	465	531
Entry HV Adj Factor	1.000	0.990	1.000	0.991	0.991	0.986	0.988	0.993
Flow Entry, veh/h	45	1236	40	1041	114	124	79	86
Cap Entry, veh/h	1144	1207	1090	1155	389	448	459	527
V/C Ratio	0.039	1.024	0.037	0.901	0.293	0.278	0.172	0.164
Control Delay, s/veh	3.5	50.9	3.6	27.4	14.5	12.5	10.3	9.0
LOS	A	F	A	D	B	B	B	A
95th %tile Queue, veh	0	23	0	14	1	1	1	1

Appendix B – Mitigated Year 2051 Operational Analysis

Intersection	
Intersection Delay, s/veh	7.7
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	2	2	1	1
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	958	1265	22	105
Demand Flow Rate, veh/h	968	1278	22	106
Vehicles Circulating, veh/h	71	120	896	1191
Vehicles Exiting, veh/h	1226	798	143	207
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	6.3	8.5	5.8	9.9
Approach LOS	A	A	A	A

Lane	Left	Right	Left	Right	Left	Left
Designated Moves	LT	TR	LT	TR	LTR	LTR
Assumed Moves	LT	TR	LT	TR	LTR	LTR
RT Channelized						
Lane Util	0.470	0.530	0.470	0.530	1.000	1.000
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.328	4.328
A (Intercept)	1350	1420	1350	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	8.501e-4	8.501e-4
Entry Flow, veh/h	455	513	601	677	22	106
Cap Entry Lane, veh/h	1264	1337	1209	1282	663	516
Entry HV Adj Factor	0.990	0.990	0.989	0.990	0.999	0.991
Flow Entry, veh/h	450	508	595	670	22	105
Cap Entry, veh/h	1252	1324	1196	1270	662	511
V/C Ratio	0.360	0.384	0.497	0.528	0.033	0.205
Control Delay, s/veh	6.3	6.3	8.4	8.6	5.8	9.9
LOS	A	A	A	A	A	A
95th %tile Queue, veh	2	2	3	3	0	1

Intersection	
Intersection Delay, s/veh	13.2
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	710	1241	351	368
Demand Flow Rate, veh/h	717	1254	355	372
Vehicles Circulating, veh/h	254	439	872	1153
Vehicles Exiting, veh/h	1271	788	99	540
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	12.5	14.6	9.3	13.4
Approach LOS	B	B	A	B

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	R	LT	TR	L	TR	L	TR
Assumed Moves	LT	R	LT	TR	L	TR	L	TR
RT Channelized								
Lane Util	0.971	0.029	0.470	0.530	0.499	0.501	0.473	0.527
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4
Entry Flow, veh/h	696	21	589	665	177	178	176	196
Cap Entry Lane, veh/h	1069	1144	901	978	605	677	467	533
Entry HV Adj Factor	0.990	1.000	0.991	0.989	0.989	0.990	0.989	0.991
Flow Entry, veh/h	689	21	583	658	175	176	174	194
Cap Entry, veh/h	1058	1144	893	967	598	670	462	528
V/C Ratio	0.651	0.018	0.653	0.680	0.292	0.263	0.377	0.368
Control Delay, s/veh	12.8	3.3	14.6	14.6	9.9	8.6	14.3	12.6
LOS	B	A	B	B	A	A	B	B
95th %tile Queue, veh	5	0	5	6	1	1	2	2

Intersection	
Intersection Delay, s/veh	13.5
Intersection LOS	B

Approach	EB	WB	NB	SB
Entry Lanes	2	2	1	1
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	947	1125	43	49
Demand Flow Rate, veh/h	956	1136	43	49
Vehicles Circulating, veh/h	35	18	957	1118
Vehicles Exiting, veh/h	1132	982	34	36
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	11.6	15.7	6.5	7.6
Approach LOS	B	C	A	A

Lane	Left	Right	Left	Right	Left	Left
Designated Moves	L	TR	L	TR	LTR	LTR
Assumed Moves	L	TR	L	TR	LTR	LTR
RT Channelized						
Lane Util	0.009	0.991	0.018	0.982	1.000	1.000
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.328	4.328
A (Intercept)	1350	1420	1350	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	8.501e-4	8.501e-4
Entry Flow, veh/h	9	947	20	1116	43	49
Cap Entry Lane, veh/h	1307	1378	1328	1399	629	549
Entry HV Adj Factor	1.000	0.990	1.000	0.990	1.000	1.000
Flow Entry, veh/h	9	938	20	1105	43	49
Cap Entry, veh/h	1307	1365	1328	1385	629	549
V/C Ratio	0.007	0.687	0.015	0.798	0.068	0.089
Control Delay, s/veh	2.8	11.6	2.8	15.9	6.5	7.6
LOS	A	B	A	C	A	A
95th %tile Queue, veh	0	6	0	9	0	0

Intersection	
Intersection Delay, s/veh	19.5
Intersection LOS	C

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	673	1149	173	101
Demand Flow Rate, veh/h	679	1160	174	101
Vehicles Circulating, veh/h	86	168	691	1227
Vehicles Exiting, veh/h	1242	697	74	101
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	7.8	29.2	6.2	9.1
Approach LOS	A	D	A	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	L	TR	L	TR	L	TR	L	TR
Assumed Moves	L	TR	L	TR	L	TR	L	TR
RT Channelized								
Lane Util	0.028	0.972	0.018	0.982	0.598	0.402	0.396	0.604
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4
Entry Flow, veh/h	19	660	21	1139	104	70	40	61
Cap Entry Lane, veh/h	1247	1320	1157	1231	715	789	437	500
Entry HV Adj Factor	1.000	0.991	1.000	0.990	0.990	0.994	1.000	0.996
Flow Entry, veh/h	19	654	21	1128	103	70	40	61
Cap Entry, veh/h	1247	1307	1157	1219	708	784	437	498
V/C Ratio	0.015	0.500	0.018	0.925	0.145	0.089	0.092	0.122
Control Delay, s/veh	3.0	8.0	3.3	29.6	6.7	5.5	9.5	8.8
LOS	A	A	A	D	A	A	A	A
95th %tile Queue, veh	0	3	0	16	1	0	0	0

Intersection	
Intersection Delay, s/veh	9.5
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	2	2	1	1
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	1535	1162	102	217
Demand Flow Rate, veh/h	1551	1173	103	219
Vehicles Circulating, veh/h	51	156	1491	1209
Vehicles Exiting, veh/h	1377	1438	111	120
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	9.5	8.3	13.5	14.6
Approach LOS	A	A	B	B

Lane	Left	Right	Left	Right	Left	Left
Designated Moves	LT	TR	LT	TR	LTR	LTR
Assumed Moves	LT	TR	LT	TR	LTR	LTR
RT Channelized						
Lane Util	0.470	0.530	0.470	0.530	1.000	1.000
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.328	4.328
A (Intercept)	1350	1420	1350	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	8.501e-4	8.501e-4
Entry Flow, veh/h	729	822	551	622	103	219
Cap Entry Lane, veh/h	1288	1360	1169	1244	400	508
Entry HV Adj Factor	0.990	0.990	0.991	0.990	0.990	0.991
Flow Entry, veh/h	722	814	546	616	102	217
Cap Entry, veh/h	1275	1346	1159	1231	396	503
V/C Ratio	0.566	0.604	0.471	0.500	0.258	0.431
Control Delay, s/veh	9.3	9.7	8.2	8.3	13.5	14.6
LOS	A	A	A	A	B	B
95th %tile Queue, veh	4	4	3	3	1	2

Intersection	
Intersection Delay, s/veh	27.4
Intersection LOS	D

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	1331	1123	324	849
Demand Flow Rate, veh/h	1345	1134	327	858
Vehicles Circulating, veh/h	713	455	1620	1045
Vehicles Exiting, veh/h	1190	1492	438	544
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	38.8	13.0	23.7	30.0
Approach LOS	E	B	C	D

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	LT	TR	LT	TR	L	TR	L	TR
Assumed Moves	LT	TR	LT	TR	L	TR	L	TR
RT Channelized								
Lane Util	0.470	0.530	0.470	0.530	0.413	0.587	0.462	0.538
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4
Entry Flow, veh/h	632	713	533	601	135	192	396	462
Cap Entry Lane, veh/h	701	775	888	965	304	358	516	584
Entry HV Adj Factor	0.990	0.990	0.991	0.991	0.993	0.991	0.990	0.990
Flow Entry, veh/h	626	706	528	595	134	190	392	457
Cap Entry, veh/h	694	767	880	956	302	355	511	578
V/C Ratio	0.902	0.920	0.600	0.623	0.444	0.536	0.767	0.791
Control Delay, s/veh	38.6	39.0	13.0	12.9	23.3	23.9	30.4	29.7
LOS	E	E	B	B	C	C	D	D
95th %tile Queue, veh	12	13	4	5	2	3	7	8

Intersection	
Intersection Delay, s/veh	25.5
Intersection LOS	D

Approach	EB	WB	NB	SB
Entry Lanes	2	2	1	1
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	1311	1100	45	49
Demand Flow Rate, veh/h	1323	1110	45	49
Vehicles Circulating, veh/h	77	45	1292	1085
Vehicles Exiting, veh/h	1057	1292	108	70
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	35.9	14.6	8.9	7.4
Approach LOS	E	B	A	A

Lane	Left	Right	Left	Right	Left	Left
Designated Moves	L	TR	L	TR	LTR	LTR
Assumed Moves	L	TR	L	TR	LTR	LTR
RT Channelized						
Lane Util	0.022	0.978	0.043	0.957	1.000	1.000
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.328	4.328
A (Intercept)	1350	1420	1350	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	8.501e-4	8.501e-4
Entry Flow, veh/h	29	1294	48	1062	45	49
Cap Entry Lane, veh/h	1258	1330	1295	1367	473	565
Entry HV Adj Factor	1.000	0.990	1.000	0.990	0.999	0.997
Flow Entry, veh/h	29	1282	48	1052	45	49
Cap Entry, veh/h	1258	1317	1295	1354	473	563
V/C Ratio	0.023	0.973	0.037	0.777	0.095	0.087
Control Delay, s/veh	3.0	36.6	3.1	15.1	8.9	7.4
LOS	A	E	A	C	A	A
95th %tile Queue, veh	0	20	0	9	0	0

Intersection	
Intersection Delay, s/veh	34.9
Intersection LOS	D

Approach	EB	WB	NB	SB
Entry Lanes	2	2	2	2
Conflicting Circle Lanes	2	2	2	2
Adj Approach Flow, veh/h	1281	1081	238	165
Demand Flow Rate, veh/h	1293	1091	241	167
Vehicles Circulating, veh/h	180	232	1342	1158
Vehicles Exiting, veh/h	1145	1351	131	165
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	49.2	26.5	13.4	9.6
Approach LOS	E	D	B	A

Lane	Left	Right	Left	Right	Left	Right	Left	Right
Designated Moves	L	TR	L	TR	L	TR	L	TR
Assumed Moves	L	TR	L	TR	L	TR	L	TR
RT Channelized								
Lane Util	0.035	0.965	0.037	0.963	0.477	0.523	0.479	0.521
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645	4.328
A (Intercept)	1350	1420	1350	1420	1350	1420	1350	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4
Entry Flow, veh/h	45	1248	40	1051	115	126	80	87
Cap Entry Lane, veh/h	1144	1219	1090	1166	393	454	465	531
Entry HV Adj Factor	1.000	0.990	1.000	0.991	0.991	0.986	0.988	0.993
Flow Entry, veh/h	45	1236	40	1041	114	124	79	86
Cap Entry, veh/h	1144	1207	1090	1155	389	448	459	527
V/C Ratio	0.039	1.024	0.037	0.901	0.293	0.278	0.172	0.164
Control Delay, s/veh	3.5	50.9	3.6	27.4	14.5	12.5	10.3	9.0
LOS	A	F	A	D	B	B	B	A
95th %tile Queue, veh	0	23	0	14	1	1	1	1

Appendix C – Year 2051 PM Roundabout Queuing

Intersection: 1: 4th St. & Bryden Ave.

Movement	EB	EB	WB	WB	NB	SB
Directions Served	LT	TR	LT	TR	LTR	LTR
Maximum Queue (ft)	289	273	69	51	47	54
Average Queue (ft)	96	30	25	3	7	27
95th Queue (ft)	204	147	57	24	29	51
Link Distance (ft)	892	892		535	162	298
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			100			
Storage Blk Time (%)				0		
Queuing Penalty (veh)				0		

Intersection: 3: 5th St & Bryden Ave

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	LT	R	LT	TR	L	TR	L	TR
Maximum Queue (ft)	200	588	163	193	88	140	123	93
Average Queue (ft)	135	186	57	77	48	15	57	40
95th Queue (ft)	246	578	119	149	80	84	102	73
Link Distance (ft)		587		236		641		1208
Upstream Blk Time (%)		1						
Queuing Penalty (veh)		5						
Storage Bay Dist (ft)	100		110		40		100	
Storage Blk Time (%)	50		1	5	12	0	1	0
Queuing Penalty (veh)	10		7	22	20	0	3	0

Intersection: 6: 6th Street & Bryden Ave

Movement	EB	WB	NB	SB
Directions Served	TR	TR	LTR	LTR
Maximum Queue (ft)	54	172	53	60
Average Queue (ft)	5	12	20	21
95th Queue (ft)	30	78	48	52
Link Distance (ft)	376	458	241	231
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)		0		
Queuing Penalty (veh)		0		

Intersection: 8: 7th st & Bryden Ave

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (ft)	10	70	200	1041	79	56	52	93
Average Queue (ft)	0	13	87	1005	36	17	22	25
95th Queue (ft)	6	45	250	1115	67	48	51	61
Link Distance (ft)		687		993		964		1016
Upstream Blk Time (%)				88				
Queuing Penalty (veh)				0				
Storage Bay Dist (ft)	200		100		60		65	
Storage Blk Time (%)				91	1	0	0	2
Queuing Penalty (veh)				18	1	0	0	1

Zone Summary

Zone wide Queuing Penalty: 88

Intersection: 1: 4th St. & Bryden Ave.

Movement	EB	EB	WB	WB	NB	SB
Directions Served	LT	TR	LT	TR	LTR	LTR
Maximum Queue (ft)	944	932	63	38	178	122
Average Queue (ft)	814	795	24	2	62	45
95th Queue (ft)	1115	1114	58	15	141	83
Link Distance (ft)	892	892	534	534	162	298
Upstream Blk Time (%)	62	56			6	
Queuing Penalty (veh)	0	0			0	
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 3: 5th St & Bryden Ave

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	LT	TR	LT	TR	L	TR	L	TR
Maximum Queue (ft)	200	598	108	137	95	675	170	1238
Average Queue (ft)	184	496	43	49	81	511	168	999
95th Queue (ft)	247	787	86	101	114	899	188	1537
Link Distance (ft)		587		241		641		1208
Upstream Blk Time (%)		7				65		53
Queuing Penalty (veh)		84				0		0
Storage Bay Dist (ft)	100		110		40		100	
Storage Blk Time (%)	81	82	0	1	80	55	92	32
Queuing Penalty (veh)	496	524	1	6	143	69	400	119

Intersection: 6: 6th Street & Bryden Ave

Movement	EB	EB	WB	WB	NB	SB
Directions Served	L	TR	L	TR	LTR	LTR
Maximum Queue (ft)	239	377	21	36	118	59
Average Queue (ft)	115	354	1	2	36	21
95th Queue (ft)	312	436	12	18	85	48
Link Distance (ft)		376		458	241	231
Upstream Blk Time (%)		2				
Queuing Penalty (veh)		23				
Storage Bay Dist (ft)	140		200			
Storage Blk Time (%)		95				
Queuing Penalty (veh)		27				

Intersection: 8: 7th st & Bryden Ave

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (ft)	300	689	200	1048	98	151	81	106
Average Queue (ft)	166	661	131	939	45	38	35	32
95th Queue (ft)	410	779	286	1204	75	79	61	70
Link Distance (ft)		687		993		964		1016
Upstream Blk Time (%)		2		73				
Queuing Penalty (veh)		30		0				
Storage Bay Dist (ft)	200		100		60		65	
Storage Blk Time (%)		98		98	3	3	1	1
Queuing Penalty (veh)		42		37	3	4	1	1

Zone Summary

Zone wide Queuing Penalty: 2009

Appendix D – Year 2033 PM Operational Analysis

Intersection	
Intersection Delay, s/veh	15.0
Intersection LOS	C

Approach	EB	WB	NB
Entry Lanes	2	2	1
Conflicting Circle Lanes	2	2	2
Adj Approach Flow, veh/h	1219	923	82
Demand Flow Rate, veh/h	1232	932	82
Vehicles Circulating, veh/h	40	124	1184
Vehicles Exiting, veh/h	1094	1142	88
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	18.0	12.7	9.0
Approach LOS	C	B	A

Lane	Left	Right	Left	Right	Left	Left
Designated Moves	L	TR	L	TR	LTR	LTR
Assumed Moves	L	TR	L	TR	LTR	LTR
RT Channelized						
Lane Util	0.061	0.939	0.029	0.971	1.000	1.000
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.328	4.328
A (Intercept)	1350	1420	1350	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	8.501e-4	8.501e-4
Entry Flow, veh/h	75	1157	27	905	82	175
Cap Entry Lane, veh/h	1301	1373	1204	1278	519	628
Entry HV Adj Factor	0.987	0.990	1.000	0.990	1.000	0.988
Flow Entry, veh/h	74	1145	27	896	82	173
Cap Entry, veh/h	1284	1359	1204	1266	519	621
V/C Ratio	0.058	0.843	0.022	0.708	0.158	0.278
Control Delay, s/veh	3.3	19.0	3.2	13.0	9.0	9.4
LOS	A	C	A	B	A	A
95th %tile Queue, veh	0	11	0	6	1	1

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Approach	SB
Entry Lanes	1
Conflicting Circle Lanes	2
Adj Approach Flow, veh/h	173
Demand Flow Rate, veh/h	175
Vehicles Circulating, veh/h	959
Vehicles Exiting, veh/h	97
Ped Vol Crossing Leg, #/h	0
Ped Cap Adj	1.000
Approach Delay, s/veh	9.4
Approach LOS	A

Lane	
Designated Moves	
Assumed Moves	
RT Channelized	
Lane Util	
Follow-Up Headway, s	
Critical Headway, s	
A (Intercept)	
B (Slope)	
Entry Flow, veh/h	
Cap Entry Lane, veh/h	
Entry HV Adj Factor	
Flow Entry, veh/h	
Cap Entry, veh/h	
V/C Ratio	
Control Delay, s/veh	
LOS	
95th %tile Queue, veh	

Intersection								
Intersection Delay, s/veh	36.6							
Intersection LOS	E							

Approach	EB		WB		NB		
Entry Lanes	2		2		2		
Conflicting Circle Lanes	2		2		2		
Adj Approach Flow, veh/h	1056		892		257		
Demand Flow Rate, veh/h	1066		901		259		
Vehicles Circulating, veh/h	576		359		1294		
Vehicles Exiting, veh/h	945		1194		348		
Ped Vol Crossing Leg, #/h	0		0		0		
Ped Cap Adj	1.000		1.000		1.000		
Approach Delay, s/veh	69.9		21.6		13.0		
Approach LOS	F		C		B		

Lane	Left	Right	Left	Right	Left	Right	Left
Designated Moves	L	TR	L	TR	L	TR	L
Assumed Moves	L	TR	L	TR	L	TR	L
RT Channelized							
Lane Util	0.113	0.887	0.032	0.968	0.413	0.587	0.470
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645
A (Intercept)	1350	1420	1350	1420	1350	1420	1350
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4
Entry Flow, veh/h	120	946	29	872	107	152	325
Cap Entry Lane, veh/h	795	870	970	1047	411	473	630
Entry HV Adj Factor	0.992	0.990	1.000	0.990	0.991	0.991	0.991
Flow Entry, veh/h	119	937	29	863	106	151	322
Cap Entry, veh/h	788	862	970	1036	407	469	624
V/C Ratio	0.151	1.087	0.030	0.833	0.261	0.322	0.516
Control Delay, s/veh	6.1	78.0	4.0	22.2	13.2	12.9	14.3
LOS	A	F	A	C	B	B	B
95th %tile Queue, veh	1	24	0	10	1	1	3

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Approach	SB
Entry Lanes	2
Conflicting Circle Lanes	2
Adj Approach Flow, veh/h	686
Demand Flow Rate, veh/h	692
Vehicles Circulating, veh/h	829
Vehicles Exiting, veh/h	431
Ped Vol Crossing Leg, #/h	0
Ped Cap Adj	1.000
Approach Delay, s/veh	13.8
Approach LOS	B

Lane	Right
Designated Moves	TR
Assumed Moves	TR
RT Channelized	
Lane Util	0.530
Follow-Up Headway, s	2.535
Critical Headway, s	4.328
A (Intercept)	1420
B (Slope)	8.501e-4
Entry Flow, veh/h	367
Cap Entry Lane, veh/h	702
Entry HV Adj Factor	0.991
Flow Entry, veh/h	364
Cap Entry, veh/h	696
V/C Ratio	0.523
Control Delay, s/veh	13.3
LOS	B
95th %tile Queue, veh	3

Intersection	
Intersection Delay, s/veh	11.9
Intersection LOS	B

Approach	EB	WB	NB
Entry Lanes	2	2	1
Conflicting Circle Lanes	2	2	2
Adj Approach Flow, veh/h	1041	873	35
Demand Flow Rate, veh/h	1051	881	35
Vehicles Circulating, veh/h	60	35	1025
Vehicles Exiting, veh/h	837	1025	86
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	14.3	9.5	6.7
Approach LOS	B	A	A

Lane	Left	Right	Left	Right	Left	Left
Designated Moves	L	TR	L	TR	LTR	LTR
Assumed Moves	L	TR	L	TR	LTR	LTR
RT Channelized						
Lane Util	0.022	0.978	0.043	0.957	1.000	1.000
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.328	4.328
A (Intercept)	1350	1420	1350	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	8.501e-4	8.501e-4
Entry Flow, veh/h	23	1028	38	843	35	38
Cap Entry Lane, veh/h	1277	1349	1307	1378	594	684
Entry HV Adj Factor	1.000	0.990	1.000	0.990	0.999	0.997
Flow Entry, veh/h	23	1018	38	835	35	38
Cap Entry, veh/h	1277	1337	1307	1365	594	682
V/C Ratio	0.018	0.762	0.029	0.612	0.059	0.056
Control Delay, s/veh	3.0	14.5	3.0	9.8	6.7	5.9
LOS	A	B	A	A	A	A
95th %tile Queue, veh	0	8	0	4	0	0

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Approach	SB
Entry Lanes	1
Conflicting Circle Lanes	2
Adj Approach Flow, veh/h	38
Demand Flow Rate, veh/h	38
Vehicles Circulating, veh/h	859
Vehicles Exiting, veh/h	57
Ped Vol Crossing Leg, #/h	0
Ped Cap Adj	1.000
Approach Delay, s/veh	5.9
Approach LOS	A

Lane	
Designated Moves	
Assumed Moves	
RT Channelized	
Lane Util	
Follow-Up Headway, s	
Critical Headway, s	
A (Intercept)	
B (Slope)	
Entry Flow, veh/h	
Cap Entry Lane, veh/h	
Entry HV Adj Factor	
Flow Entry, veh/h	
Cap Entry, veh/h	
V/C Ratio	
Control Delay, s/veh	
LOS	
95th %tile Queue, veh	

Intersection							
Intersection Delay, s/veh	13.5						
Intersection LOS	B						

Approach	EB	WB	NB
Entry Lanes	2	2	2
Conflicting Circle Lanes	2	2	2
Adj Approach Flow, veh/h	1017	857	187
Demand Flow Rate, veh/h	1027	865	189
Vehicles Circulating, veh/h	142	183	1066
Vehicles Exiting, veh/h	906	1072	103
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	16.1	12.3	9.0
Approach LOS	C	B	A

Lane	Left	Right	Left	Right	Left	Right	Left
Designated Moves	L	TR	L	TR	L	TR	L
Assumed Moves	L	TR	L	TR	L	TR	L
RT Channelized							
Lane Util	0.035	0.965	0.037	0.963	0.476	0.524	0.481
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645
A (Intercept)	1350	1420	1350	1420	1350	1420	1350
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4
Entry Flow, veh/h	36	991	32	833	90	99	63
Cap Entry Lane, veh/h	1185	1259	1141	1216	506	574	581
Entry HV Adj Factor	1.000	0.990	1.000	0.991	0.989	0.994	0.984
Flow Entry, veh/h	36	981	32	825	89	98	62
Cap Entry, veh/h	1185	1246	1141	1204	501	571	571
V/C Ratio	0.030	0.787	0.028	0.685	0.178	0.173	0.108
Control Delay, s/veh	3.3	16.5	3.4	12.7	9.6	8.5	7.6
LOS	A	C	A	B	A	A	A
95th %tile Queue, veh	0	9	0	6	1	1	0

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Approach	SB
Entry Lanes	2
Conflicting Circle Lanes	2
Adj Approach Flow, veh/h	130
Demand Flow Rate, veh/h	131
Vehicles Circulating, veh/h	917
Vehicles Exiting, veh/h	131
Ped Vol Crossing Leg, #/h	0
Ped Cap Adj	1.000
Approach Delay, s/veh	7.2
Approach LOS	A

Lane	Right
Designated Moves	TR
Assumed Moves	TR
RT Channelized	
Lane Util	0.519
Follow-Up Headway, s	2.535
Critical Headway, s	4.328
A (Intercept)	1420
B (Slope)	8.501e-4
Entry Flow, veh/h	68
Cap Entry Lane, veh/h	651
Entry HV Adj Factor	0.993
Flow Entry, veh/h	68
Cap Entry, veh/h	647
V/C Ratio	0.104
Control Delay, s/veh	6.7
LOS	A
95th %tile Queue, veh	0

Appendix E – Year 2032 PM Operational Analysis

Intersection	
Intersection Delay, s/veh	14.5
Intersection LOS	B

Approach	EB	WB	NB
Entry Lanes	2	2	1
Conflicting Circle Lanes	2	2	2
Adj Approach Flow, veh/h	1204	911	81
Demand Flow Rate, veh/h	1217	920	81
Vehicles Circulating, veh/h	40	122	1170
Vehicles Exiting, veh/h	1079	1129	87
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	17.4	12.3	8.9
Approach LOS	C	B	A

Lane	Left	Right	Left	Right	Left	Left
Designated Moves	L	TR	L	TR	LTR	LTR
Assumed Moves	L	TR	L	TR	LTR	LTR
RT Channelized						
Lane Util	0.061	0.939	0.029	0.971	1.000	1.000
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.328	4.328
A (Intercept)	1350	1420	1350	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	8.501e-4	8.501e-4
Entry Flow, veh/h	74	1143	27	893	81	173
Cap Entry Lane, veh/h	1301	1373	1207	1280	525	635
Entry HV Adj Factor	0.986	0.990	1.000	0.990	1.000	0.988
Flow Entry, veh/h	73	1131	27	884	81	171
Cap Entry, veh/h	1283	1359	1207	1268	525	628
V/C Ratio	0.057	0.833	0.022	0.698	0.154	0.272
Control Delay, s/veh	3.3	18.3	3.2	12.6	8.9	9.2
LOS	A	C	A	B	A	A
95th %tile Queue, veh	0	11	0	6	1	1

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Approach	SB
Entry Lanes	1
Conflicting Circle Lanes	2
Adj Approach Flow, veh/h	171
Demand Flow Rate, veh/h	173
Vehicles Circulating, veh/h	946
Vehicles Exiting, veh/h	96
Ped Vol Crossing Leg, #/h	0
Ped Cap Adj	1.000
Approach Delay, s/veh	9.2
Approach LOS	A

Lane	
Designated Moves	
Assumed Moves	
RT Channelized	
Lane Util	
Follow-Up Headway, s	
Critical Headway, s	
A (Intercept)	
B (Slope)	
Entry Flow, veh/h	
Cap Entry Lane, veh/h	
Entry HV Adj Factor	
Flow Entry, veh/h	
Cap Entry, veh/h	
V/C Ratio	
Control Delay, s/veh	
LOS	
95th %tile Queue, veh	

Intersection	
Intersection Delay, s/veh	34.1
Intersection LOS	D

Approach	EB	WB	NB
Entry Lanes	2	2	2
Conflicting Circle Lanes	2	2	2
Adj Approach Flow, veh/h	1044	882	253
Demand Flow Rate, veh/h	1054	891	255
Vehicles Circulating, veh/h	569	354	1279
Vehicles Exiting, veh/h	934	1180	344
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	64.3	20.5	12.7
Approach LOS	F	C	B

Lane	Left	Right	Left	Right	Left	Right	Left
Designated Moves	L	TR	L	TR	L	TR	L
Assumed Moves	L	TR	L	TR	L	TR	L
RT Channelized							
Lane Util	0.113	0.887	0.033	0.967	0.416	0.584	0.470
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645
A (Intercept)	1350	1420	1350	1420	1350	1420	1350
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4
Entry Flow, veh/h	119	935	29	862	106	149	321
Cap Entry Lane, veh/h	800	875	975	1051	416	479	635
Entry HV Adj Factor	0.992	0.990	1.000	0.990	0.991	0.991	0.991
Flow Entry, veh/h	118	926	29	853	105	148	318
Cap Entry, veh/h	793	867	975	1040	412	475	629
V/C Ratio	0.149	1.068	0.030	0.820	0.255	0.311	0.506
Control Delay, s/veh	6.1	71.7	4.0	21.1	13.0	12.5	14.0
LOS	A	F	A	C	B	B	B
95th %tile Queue, veh	1	23	0	10	1	1	3

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Approach	SB
Entry Lanes	2
Conflicting Circle Lanes	2
Adj Approach Flow, veh/h	677
Demand Flow Rate, veh/h	683
Vehicles Circulating, veh/h	820
Vehicles Exiting, veh/h	425
Ped Vol Crossing Leg, #/h	0
Ped Cap Adj	1.000
Approach Delay, s/veh	13.4
Approach LOS	B

Lane	Right
Designated Moves	TR
Assumed Moves	TR
RT Channelized	
Lane Util	0.530
Follow-Up Headway, s	2.535
Critical Headway, s	4.328
A (Intercept)	1420
B (Slope)	8.501e-4
Entry Flow, veh/h	362
Cap Entry Lane, veh/h	707
Entry HV Adj Factor	0.991
Flow Entry, veh/h	359
Cap Entry, veh/h	701
V/C Ratio	0.512
Control Delay, s/veh	13.0
LOS	B
95th %tile Queue, veh	3

Intersection	
Intersection Delay, s/veh	11.6
Intersection LOS	B

Approach	EB	WB	NB
Entry Lanes	2	2	1
Conflicting Circle Lanes	2	2	2
Adj Approach Flow, veh/h	1029	863	35
Demand Flow Rate, veh/h	1039	871	35
Vehicles Circulating, veh/h	60	35	1013
Vehicles Exiting, veh/h	827	1013	86
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	13.9	9.3	6.7
Approach LOS	B	A	A

Lane	Left	Right	Left	Right	Left	Left
Designated Moves	L	TR	L	TR	LTR	LTR
Assumed Moves	L	TR	L	TR	LTR	LTR
RT Channelized						
Lane Util	0.022	0.978	0.044	0.956	1.000	1.000
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.535	2.535
Critical Headway, s	4.645	4.328	4.645	4.328	4.328	4.328
A (Intercept)	1350	1420	1350	1420	1420	1420
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	8.501e-4	8.501e-4
Entry Flow, veh/h	23	1016	38	833	35	38
Cap Entry Lane, veh/h	1277	1349	1307	1378	600	690
Entry HV Adj Factor	1.000	0.990	1.000	0.990	0.999	0.997
Flow Entry, veh/h	23	1006	38	825	35	38
Cap Entry, veh/h	1277	1337	1307	1365	600	688
V/C Ratio	0.018	0.753	0.029	0.604	0.058	0.055
Control Delay, s/veh	3.0	14.1	3.0	9.6	6.7	5.8
LOS	A	B	A	A	A	A
95th %tile Queue, veh	0	8	0	4	0	0

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Approach	SB
Entry Lanes	1
Conflicting Circle Lanes	2
Adj Approach Flow, veh/h	38
Demand Flow Rate, veh/h	38
Vehicles Circulating, veh/h	849
Vehicles Exiting, veh/h	57
Ped Vol Crossing Leg, #/h	0
Ped Cap Adj	1.000
Approach Delay, s/veh	5.8
Approach LOS	A

Lane	
Designated Moves	
Assumed Moves	
RT Channelized	
Lane Util	
Follow-Up Headway, s	
Critical Headway, s	
A (Intercept)	
B (Slope)	
Entry Flow, veh/h	
Cap Entry Lane, veh/h	
Entry HV Adj Factor	
Flow Entry, veh/h	
Cap Entry, veh/h	
V/C Ratio	
Control Delay, s/veh	
LOS	
95th %tile Queue, veh	

Intersection	
Intersection Delay, s/veh	13.0
Intersection LOS	B

Approach	EB	WB	NB
Entry Lanes	2	2	2
Conflicting Circle Lanes	2	2	2
Adj Approach Flow, veh/h	1004	847	184
Demand Flow Rate, veh/h	1013	855	186
Vehicles Circulating, veh/h	140	181	1051
Vehicles Exiting, veh/h	895	1056	102
Ped Vol Crossing Leg, #/h	0	0	0
Ped Cap Adj	1.000	1.000	1.000
Approach Delay, s/veh	15.4	12.0	8.8
Approach LOS	C	B	A

Lane	Left	Right	Left	Right	Left	Right	Left
Designated Moves	L	TR	L	TR	L	TR	L
Assumed Moves	L	TR	L	TR	L	TR	L
RT Channelized							
Lane Util	0.036	0.964	0.037	0.963	0.478	0.522	0.481
Follow-Up Headway, s	2.667	2.535	2.667	2.535	2.667	2.535	2.667
Critical Headway, s	4.645	4.328	4.645	4.328	4.645	4.328	4.645
A (Intercept)	1350	1420	1350	1420	1350	1420	1350
B (Slope)	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4	8.501e-4	9.199e-4
Entry Flow, veh/h	36	977	32	823	89	97	62
Cap Entry Lane, veh/h	1187	1261	1143	1218	513	581	587
Entry HV Adj Factor	1.000	0.990	1.000	0.991	0.989	0.994	0.984
Flow Entry, veh/h	36	968	32	815	88	96	61
Cap Entry, veh/h	1187	1249	1143	1206	508	578	577
V/C Ratio	0.030	0.775	0.028	0.676	0.173	0.167	0.106
Control Delay, s/veh	3.3	15.9	3.4	12.3	9.4	8.3	7.5
LOS	A	C	A	B	A	A	A
95th %tile Queue, veh	0	8	0	6	1	1	0

Intersection	
Intersection Delay, s/veh	
Intersection LOS	

Approach	SB
Entry Lanes	2
Conflicting Circle Lanes	2
Adj Approach Flow, veh/h	128
Demand Flow Rate, veh/h	129
Vehicles Circulating, veh/h	906
Vehicles Exiting, veh/h	130
Ped Vol Crossing Leg, #/h	0
Ped Cap Adj	1.000
Approach Delay, s/veh	7.1
Approach LOS	A

Lane	Right
Designated Moves	TR
Assumed Moves	TR
RT Channelized	
Lane Util	0.519
Follow-Up Headway, s	2.535
Critical Headway, s	4.328
A (Intercept)	1420
B (Slope)	8.501e-4
Entry Flow, veh/h	67
Cap Entry Lane, veh/h	657
Entry HV Adj Factor	0.993
Flow Entry, veh/h	67
Cap Entry, veh/h	653
V/C Ratio	0.102
Control Delay, s/veh	6.6
LOS	A
95th %tile Queue, veh	0